

RF TEST REPORT



Report No.: FCC_SL17072501-RUC-022_W53W56

Supersede Report No.:

Applicant	:	Ruckus Wireless, Inc.
Product Name	:	E510 Access Point
Model No.	:	E510
Test Standard	:	47 CFR 15.407
Test Method	:	ANSI C63.4: 2014 789033 D02 General UNII Test Procedures New Rules v01
FCC ID	:	S9GE510
IC ID	:	5912A-E510
Dates of test	:	10/24/2017-10/31/2017
Issue Date	:	11/07/2017
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	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
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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.



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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

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_SL17072501-RUC-022_W53W56	None	Original	11/07/2017

2 Executive Summary

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

Company: Ruckus Wireless, Inc.
Product: E510 Access Point
Model: E510

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	:	Ruckus Wireless, Inc.
Applicant Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A
Manufacturer Name	:	Ruckus Wireless, Inc.
Manufacturer Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A

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	E510 Access Point
Model No.	E510
Trade Name	Ruckus
Serial No.	361706000066
Host Model No.	N/A
Input Power	48VDC (PoE)
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Date of EUT received	10/20/2017
Equipment Class/ Category	DTS, UNII
Port/Connectors	PoE, Ethernet

6.2 Radio Description

Radio Type	802.11a	802.11n-20M	802.11n-40M	802.11ac-80M
Operating Frequency	5260-5320MHz 5500-5720MHz	5260-5320MHz 5500-5720MHz	5270-5310MHz 5510-5710MHz	5290MHz, 5530MHz 5610MHz, 5690MHz
Modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	20MHz	20MHz	40MHz	80MHz
Number of Channels	16	16	6	4
Antenna Type	External PCB Antenna			
Antenna Gain (Peak)	5GHz: 3.5 dBi			
Antenna Connector Type	U.FL			
Note	2.4GHz and 5GHz Radio transmit simultaneously			

EUT Power level setting

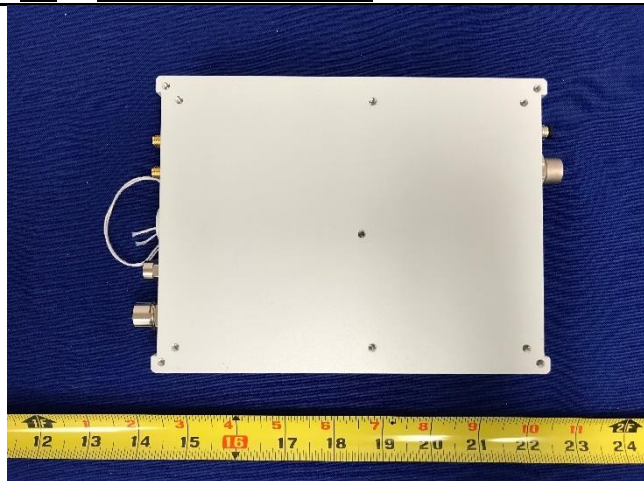
Mode	Frequency	Power Setting
802.11-a	5260	42
802.11-a	5280	42
802.11-a	5320	42
802.11-n-20	5260	42
802.11-n-20	5280	42
802.11-n-20	5320	42
802.11-n-40	5270	43
802.11-n-40	5310	40
802.11-ac-80	5290	40
802.11-a	5500	40
802.11-a	5580	40
802.11-a	5700	40
802.11-n-20	5500	40
802.11-n-20	5580	40
802.11-n-20	5700	40
802.11-n-40	5510	42
802.11-n-40	5590	42
802.11-n-40	5670	40
802.11-ac-80	5530	40
802.11-ac-80	5610	40

CROSS Band channels power setting

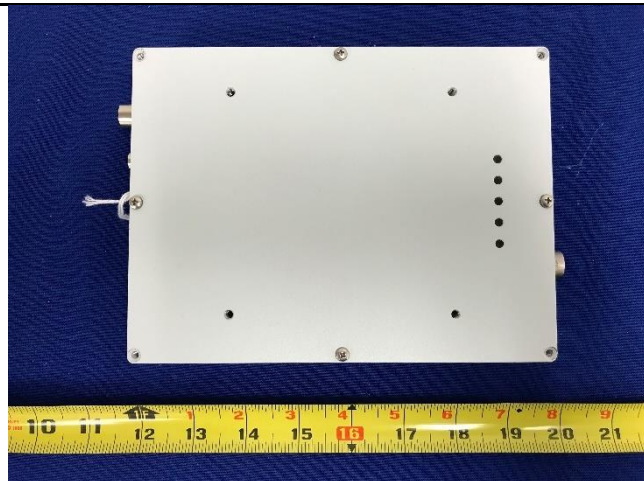
Mode	Frequency	Power Setting
802.11-a	5720	40
802.11-n-20	5720	40
802.11-n-40	5710	40
802.11-ac-80	5690	40

Note: All data rate has been verified and worst case was used for all test items.

6.3 EUT Photos - External



Top View



Bottom View



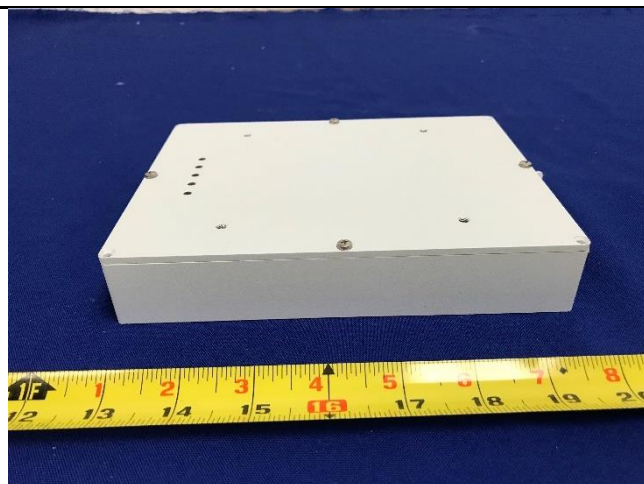
Front View



Rear View

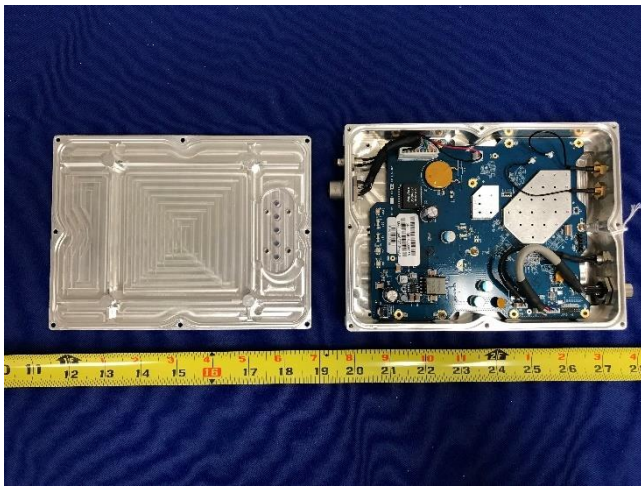


Right Side View

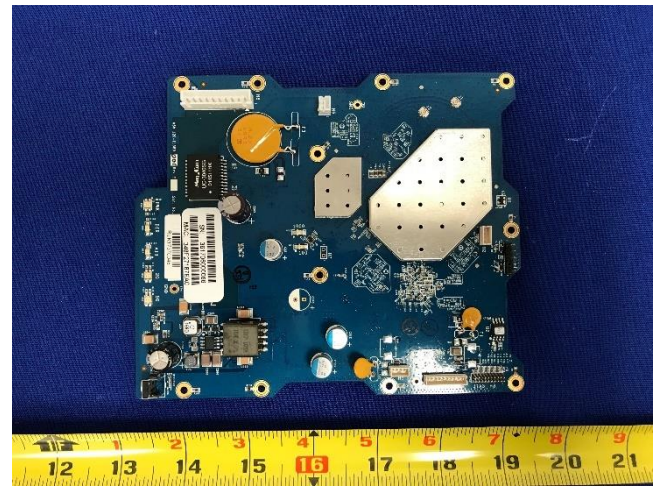


Left Side View

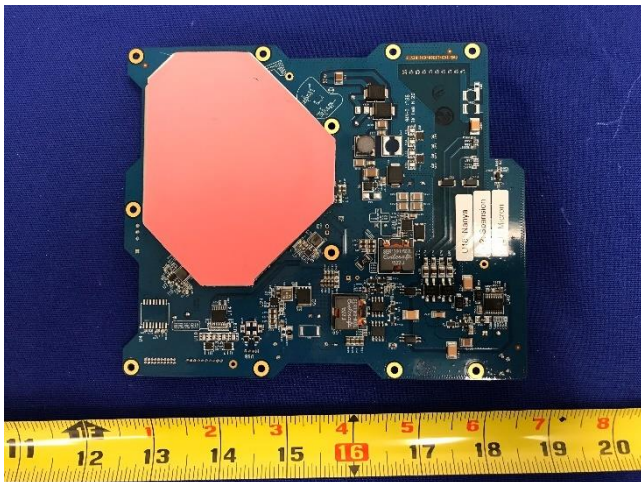
6.4 EUT Photos - Internal



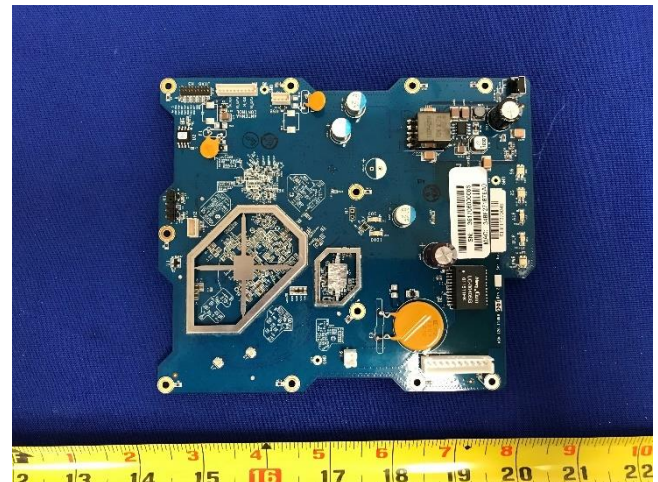
EUT Case off View



Modem Board Top View with shielding



Modem Board Bottom View with shielding



Modem Board Top View without shielding



Modem Board Bottom View without shielding

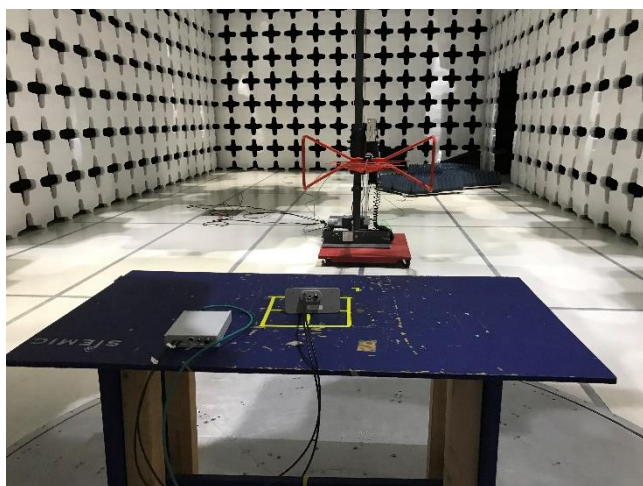


Antenna Top View

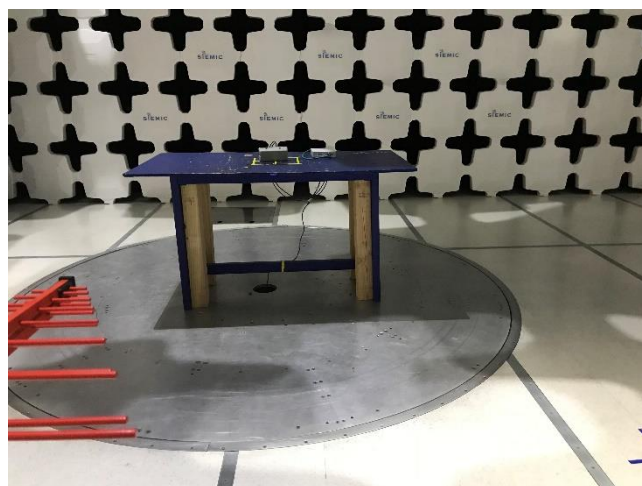


Antenna Bottom View

6.5 Test Setup Photos



Radiated Emissions (<1GHz) – Front View



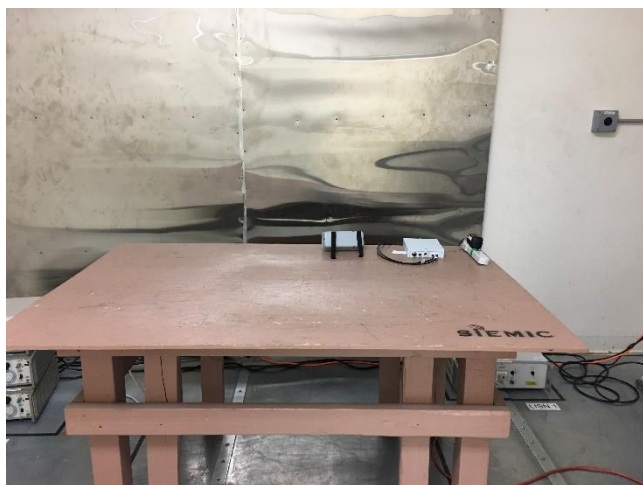
Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View



Conducted Emissions – Front View



Conducted Emissions – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	VOSTRO 1520	26543939185	Dell	-

7.2 Cabling Description

Item	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
1	EUT	RJ45	Power Over Ethernet Injector	RJ45	>3m	N/A	-
2	Laptop	RJ45	Power Over Ethernet Injector	RJ45	>3m	N/A	

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Command prompt	Set the EUT to transmit continuously in diferent test mode

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 v01	☒ 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 v01	☒ Pass ☐ N/A
Maximum conducted Output Power	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☒ 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 v01	☒ Pass ☐ N/A
Power Spectral Density	FCC	15.407 (a) (2)	789033 D02 General UNII Test Procedures New Rules v01	☒ 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	- All measurement uncertainties are not taken into consideration for all presented test result. - 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.
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9 Measurement Uncertainty

9.1 Conducted Emissions

The test is to measure the conducted emissions to the mains port of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the LISN
- Uncertainty of cables
- Uncertainty due to the mismatches
- Etc, see the below table for details

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
LISN Insertion Loss	0.40	Normal	2	1	0.20
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 LISN - Receiver	0.25	U-Shape	1.414	1	0.1768033
LISN Impedance	2.5	Triangular	2.449	1	1.0208248
Combined Standard Uncertainty					1.928133
Expanded Uncertainty (K=2)					3.856266

The total derived measurement uncertainty is +/- 3.86 dB.

9.2 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.

9.3 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.

9.4 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

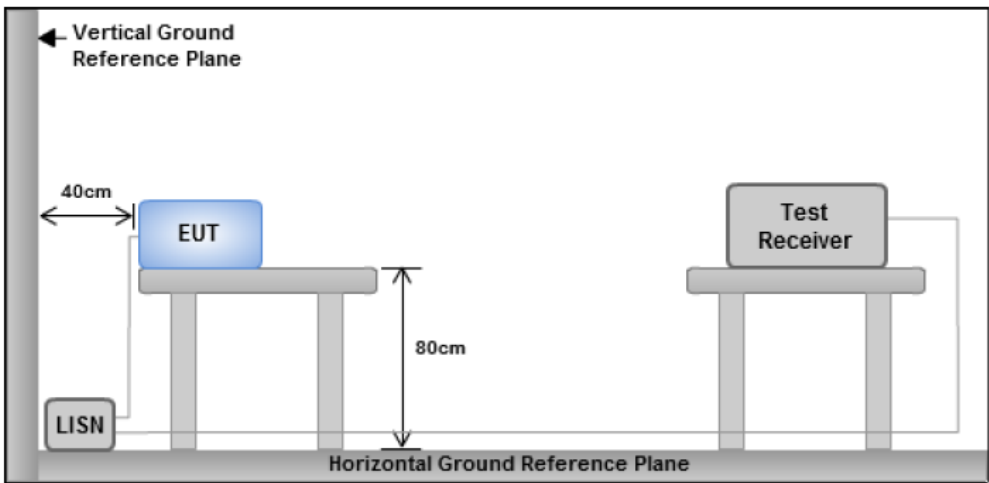
The total derived measurement uncertainty is +/- 0.95 dB.

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
15.207(a)	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 μ H/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 in two modes of operations: (1) P.O.E Mode; (2) Power Supply Mode	
Result		☒ Pass ☐ Fail	

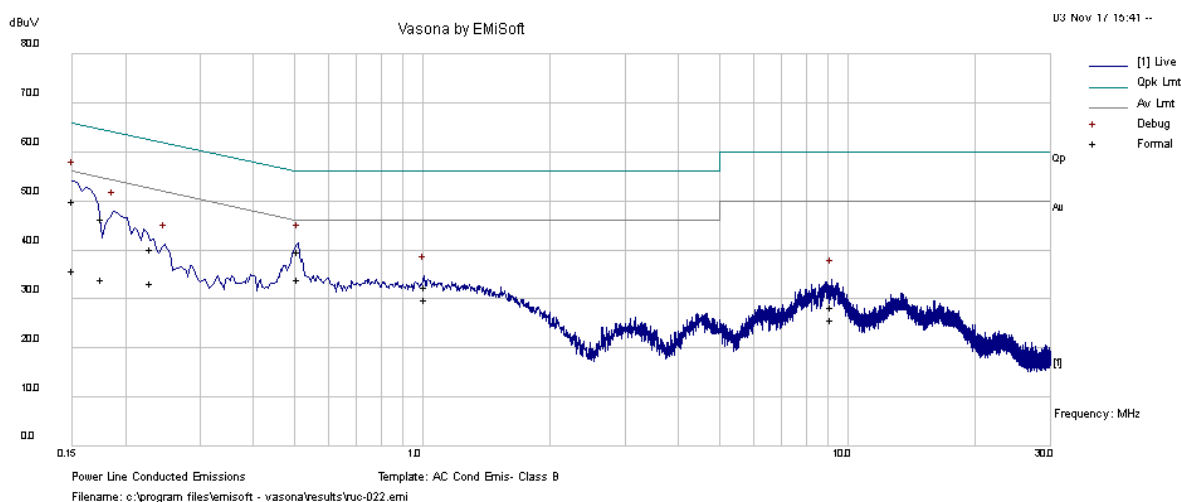
Test Data ☒ Yes ☐ N/A

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:	120Vac, 60Hz			
Tested by:	Gary Chou			
Test Date:	11/03/2017			
Remarks	Power Supply, Live			

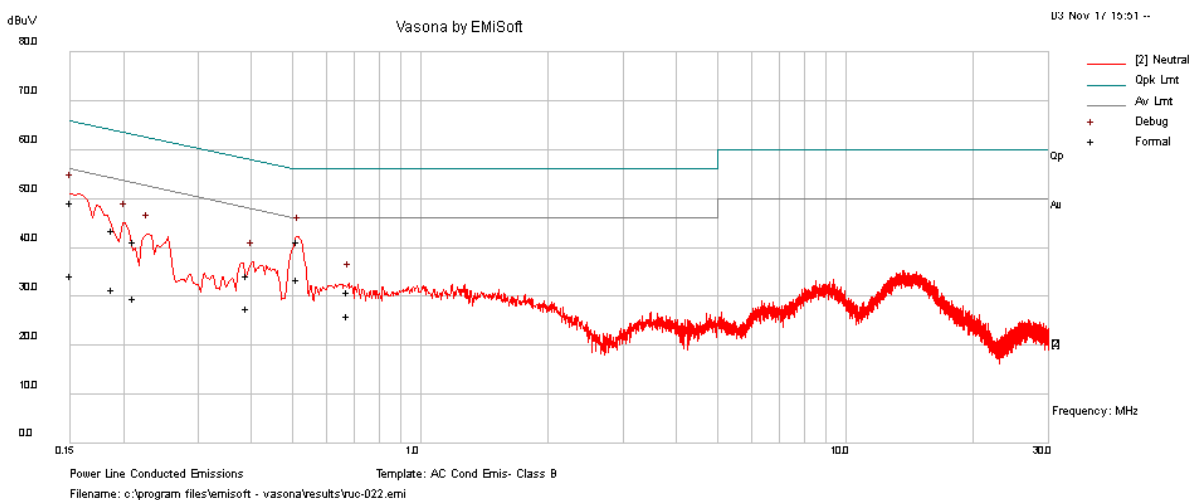


Line Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.15	38.84	9.33	1.74	49.91	Quasi Peak	Live	66	-16.09	Pass
0.51	29.73	9.33	0.63	39.68	Quasi Peak	Live	56	-16.32	Pass
0.18	35.59	9.33	1.44	46.36	Quasi Peak	Live	64.65	-18.29	Pass
0.23	29.86	9.32	1.1	40.28	Quasi Peak	Live	62.47	-22.19	Pass
1.02	22.64	9.33	0.53	32.5	Quasi Peak	Live	56	-23.50	Pass
9.19	18.05	9.86	0.51	28.42	Quasi Peak	Live	60	-31.58	Pass
0.15	24.84	9.33	1.74	35.9	Average	Live	56	-20.10	Pass
0.51	23.93	9.33	0.63	33.88	Average	Live	46	-12.12	Pass
0.18	23.17	9.33	1.44	33.94	Average	Live	54.65	-20.71	Pass
0.23	22.76	9.32	1.1	33.18	Average	Live	52.47	-19.29	Pass
1.02	19.96	9.33	0.53	29.82	Average	Live	46	-16.18	Pass
9.19	15.38	9.86	0.51	25.74	Average	Live	50	-24.26	Pass

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	Gary Chou			
Test Date:	11/03/2017			
Remarks	Power Supply, Neutral			

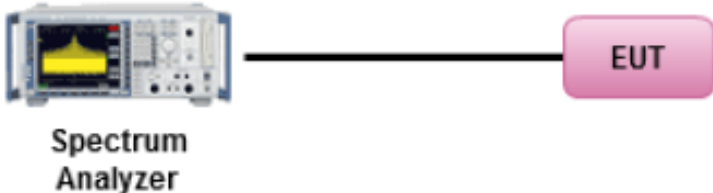


Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.51	31.29	9.33	0.62	41.24	Quasi Peak	Neutral	56	-14.76	Pass
0.15	38.11	9.33	1.74	49.18	Quasi Peak	Neutral	66	-16.82	Pass
0.19	32.95	9.32	1.34	43.62	Quasi Peak	Neutral	64.12	-20.51	Pass
0.21	30.64	9.32	1.18	41.15	Quasi Peak	Neutral	63.12	-21.97	Pass
0.39	24.27	9.33	0.71	34.31	Quasi Peak	Neutral	58.04	-23.74	Pass
0.67	20.97	9.33	0.57	30.86	Quasi Peak	Neutral	56	-25.14	Pass
0.51	23.6	9.33	0.62	33.55	Average	Neutral	46	-12.45	Pass
0.15	23.19	9.33	1.74	34.26	Average	Neutral	56	-21.74	Pass
0.19	20.85	9.32	1.34	31.51	Average	Neutral	54.12	-22.61	Pass
0.21	19.01	9.32	1.18	29.52	Average	Neutral	53.12	-23.61	Pass
0.39	17.64	9.33	0.71	27.68	Average	Neutral	48.04	-20.37	Pass
0.67	16.02	9.33	0.57	25.92	Average	Neutral	46	-20.08	Pass

10.2 6dB & 26 dB Bandwidth

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	-	26 dB Emission BW: Report only for reference.	☒
		6 dB Emission BW: Report only for reference(Cross Band)	☒
	a) (2)	26 dB Emission BW: Report only for power limit calculation.	☐
Test Setup	 Spectrum Analyzer		
Test Procedure	789033 D02 General UNII Test Procedures New Rules v01 <u>26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)</u> - 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 - Allow the trace to stabilize. - Capture the plot. - Repeat above steps for different test channel and other modulation type. <u>6dB Emission bandwidth measurement procedure</u> - Use the spectrum analyzer built-in measurement function to determine the 26dB BW. - o Set RBW = 100kHz - o Set VBW > 3RBW - o Detector = Peak - o Trace mode = max hold - Allow the trace to stabilize. - Capture the plot. - Repeat above steps for different test channel and other modulation type.		
Test Date	10/24/2017	Environmental condition	Temperature 23°C Relative Humidity 42% Atmospheric Pressure 1021mbar
Remark	N/A		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test was done by Chen Ge at RF test site.

26dB Bandwidth measurement result for 5.3GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)
26dB BW	802.11a	5260	Low	16.405
	802.11a	5280	Mid	16.410
	802.11a	5320	High	16.429
	802.11n-20	5260	Low	17.619
	802.11n-20	5280	Mid	17.598
	802.11n-20	5320	High	17.637
	802.11n-40	5270	Low	35.997
	802.11n-40	5310	High	36.030
	802.11ac-80	5290	Mid	75.737

26dB Bandwidth measurement result for 5.5GHz

Type	Test mode	Freq (MHz)	CH	Result (MHz)
26dB BW	802.11a	5500	Low	16.422
	802.11a	5580	Mid	16.448
	802.11a	5700	High	16.464
	802.11n-20	5500	Low	17.614
	802.11n-20	5580	Mid	17.646
	802.11n-20	5700	High	17.650
	802.11n-40	5510	Low	36.049
	802.11n-40	5590	Mid	36.036
	802.11n-40	5670	High	35.965
	802.11ac-80	5530	Low	75.650
	802.11ac-80	5610	High	75.704

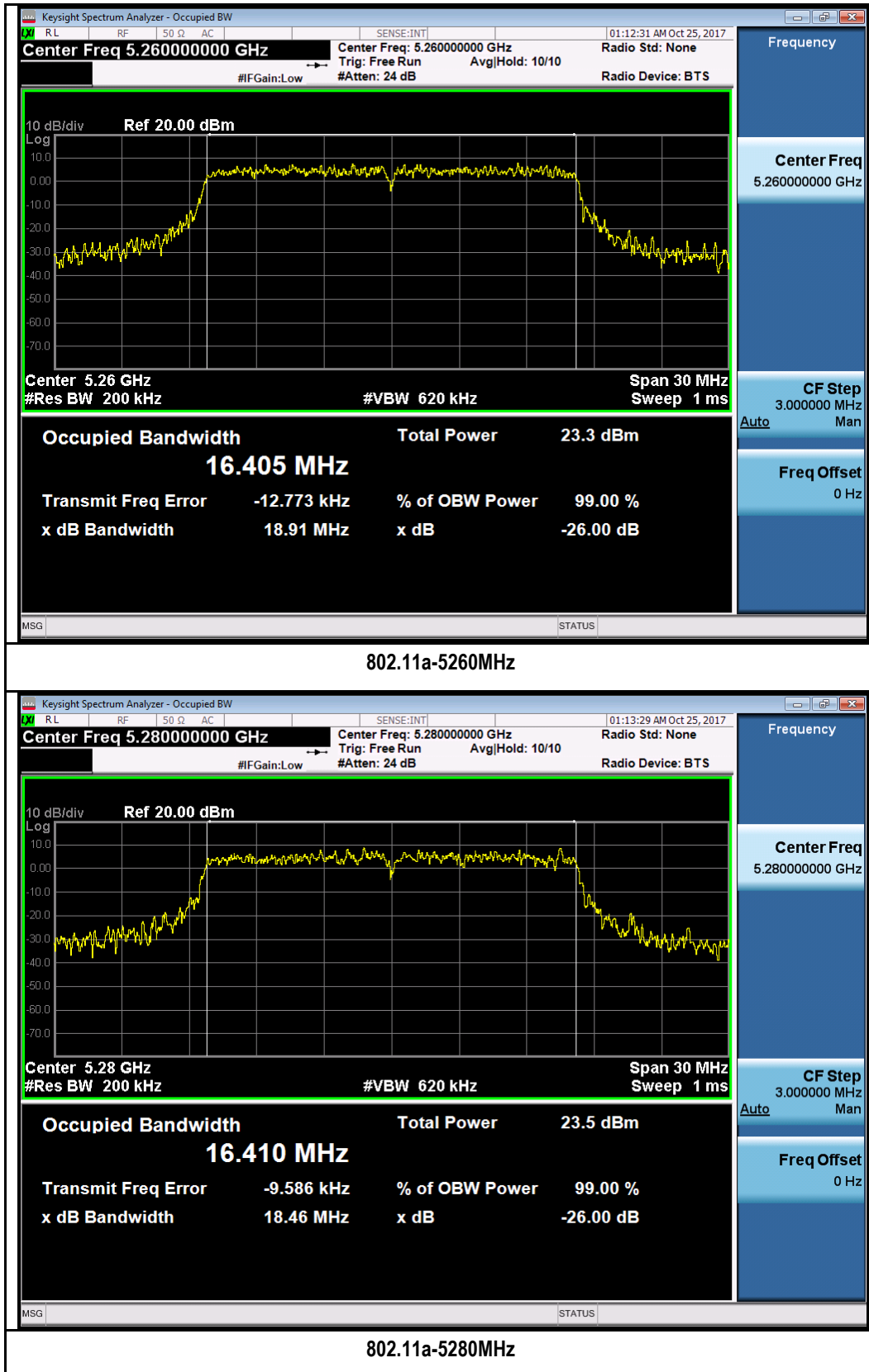
26dB Bandwidth measurement result for cross channels

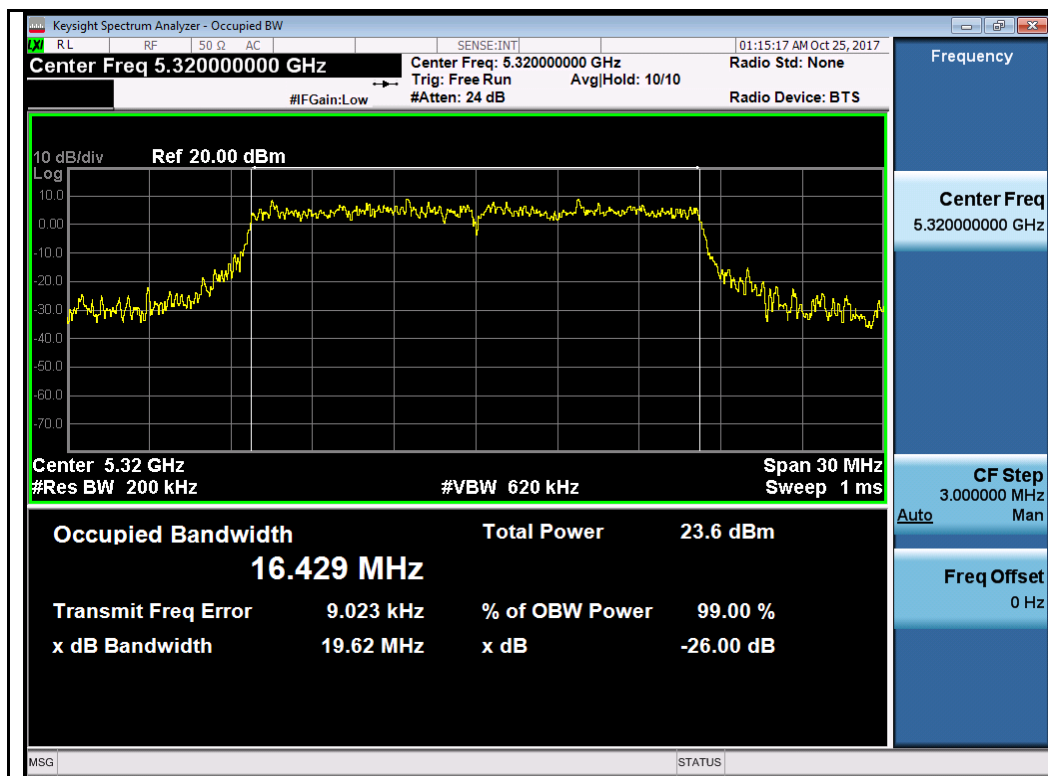
Type	Test mode	Freq (MHz)	CH	Result (MHz)
26dB BW	802.11a	5720	CROSS	19.66
	802.11n-20	5720	CROSS	20.25
	802.11n-40	5710	CROSS	38.70
	802.11ac-80	5690	CROSS	81.27

6 Bandwidth measurement result for cross channels

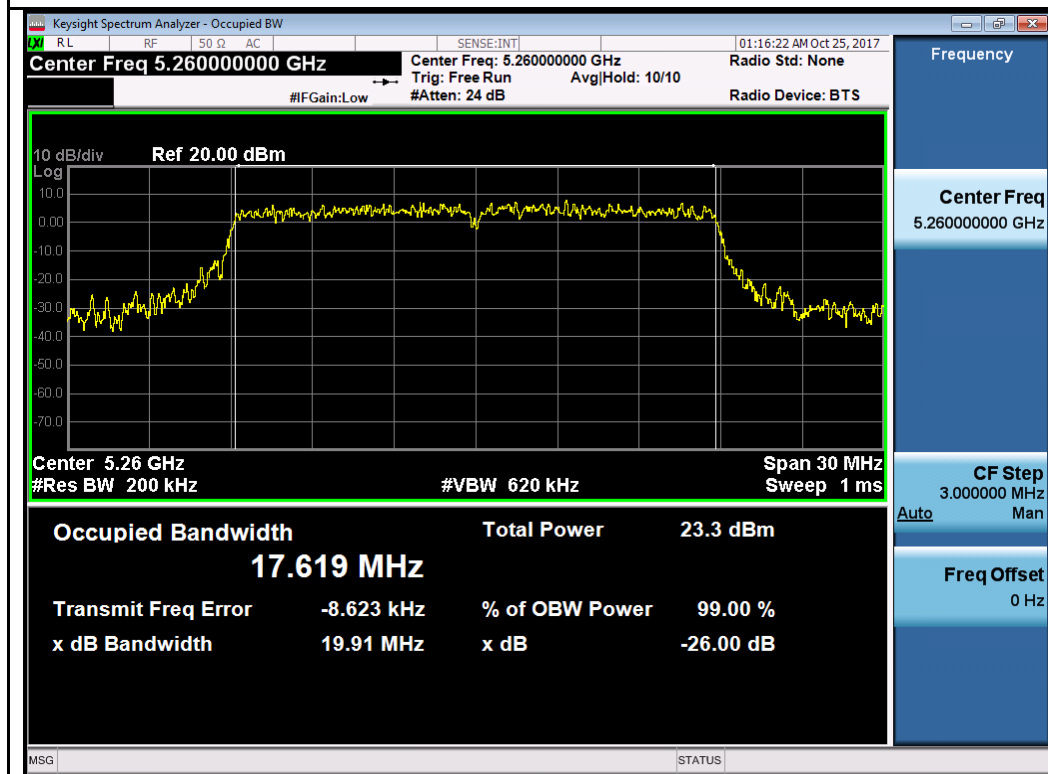
Type	Test mode	Freq (MHz)	CH	Result (MHz)
26dB BW	802.11a	5720	CROSS	16.34
	802.11n-20	5720	CROSS	17.66
	802.11n-40	5710	CROSS	35.96
	802.11ac-80	5690	CROSS	76.04

26dB Bandwidth Test Plots
W53:

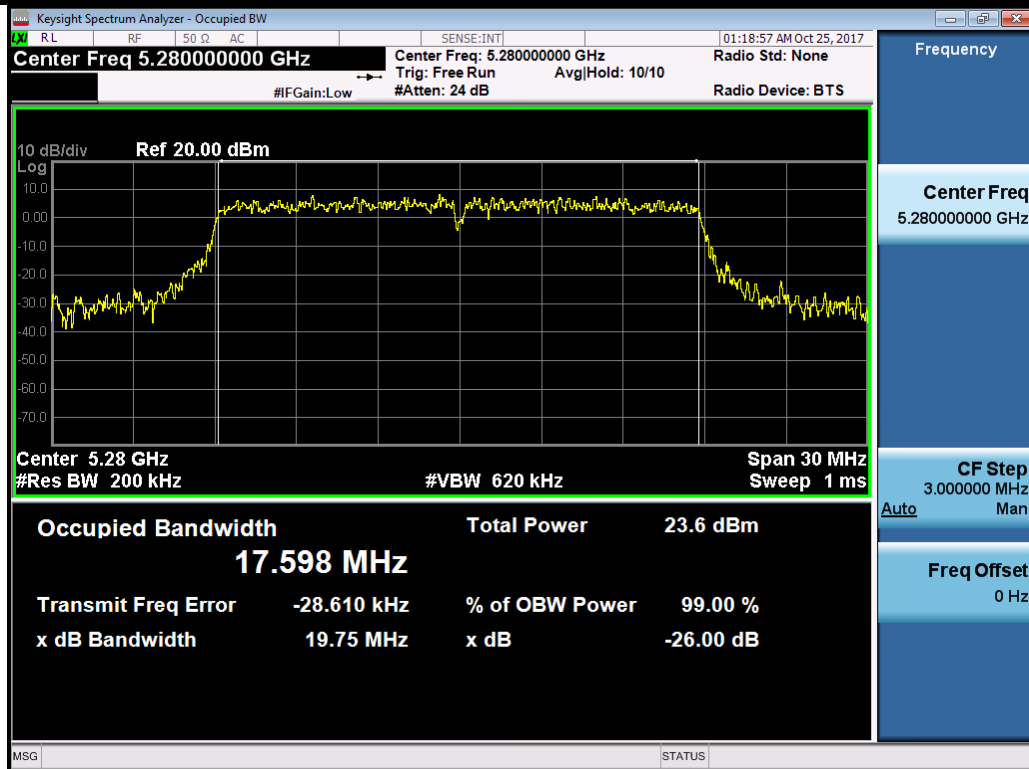




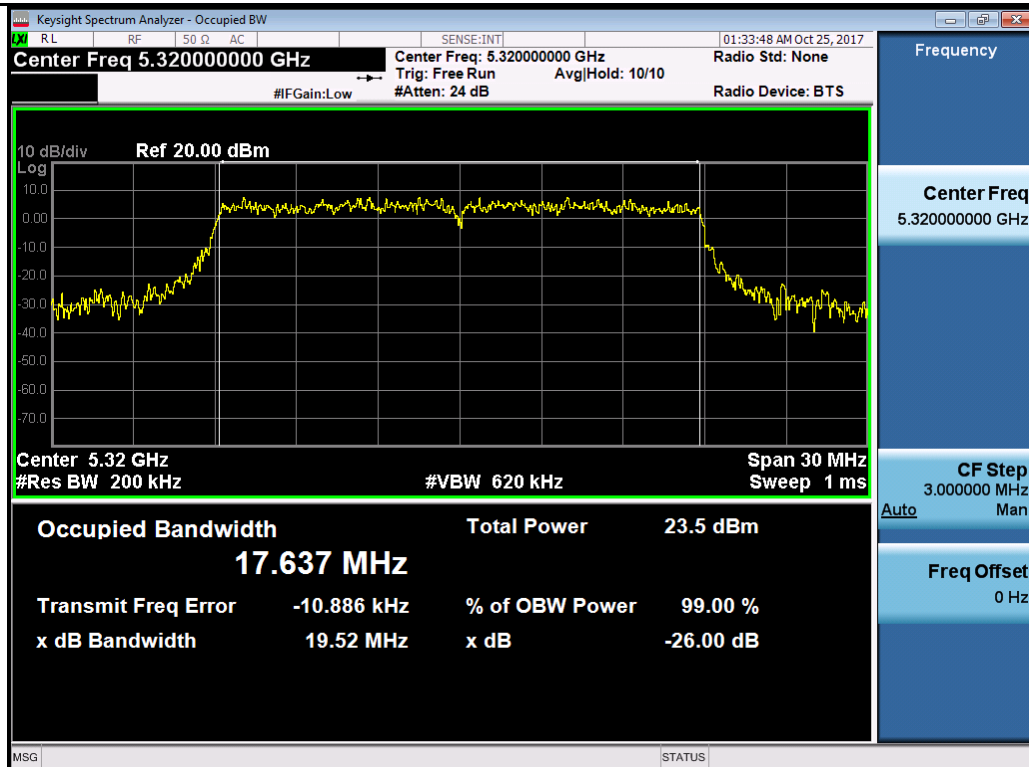
802.11a-5320MHz



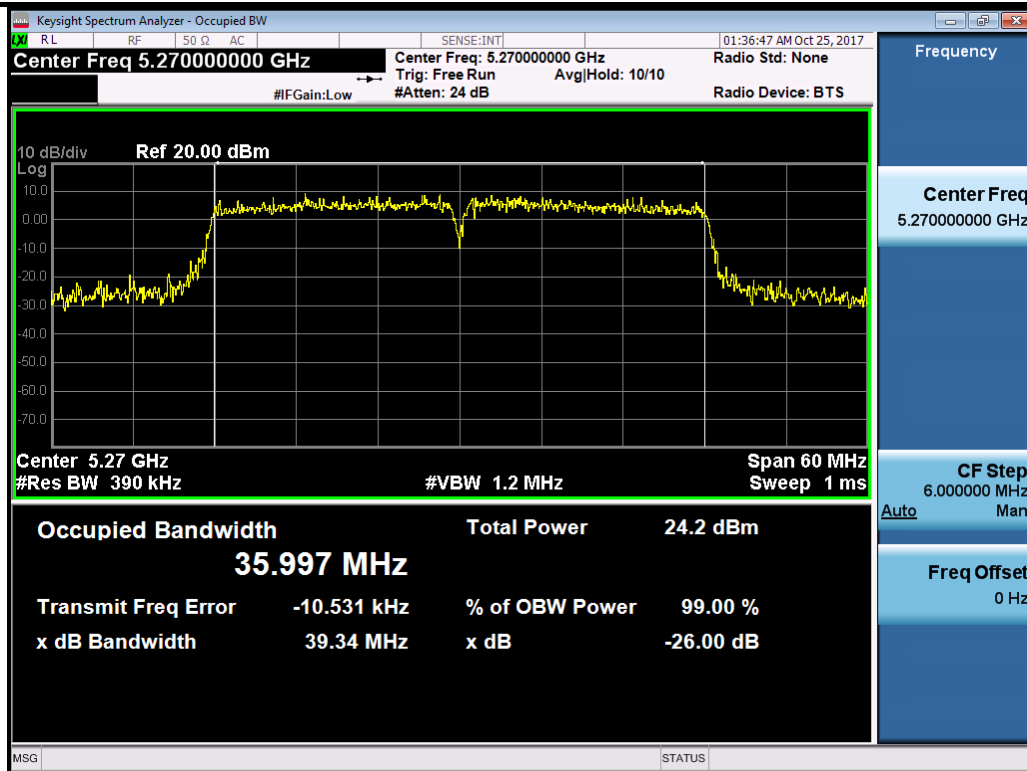
802.11n-HT20-5260MHz



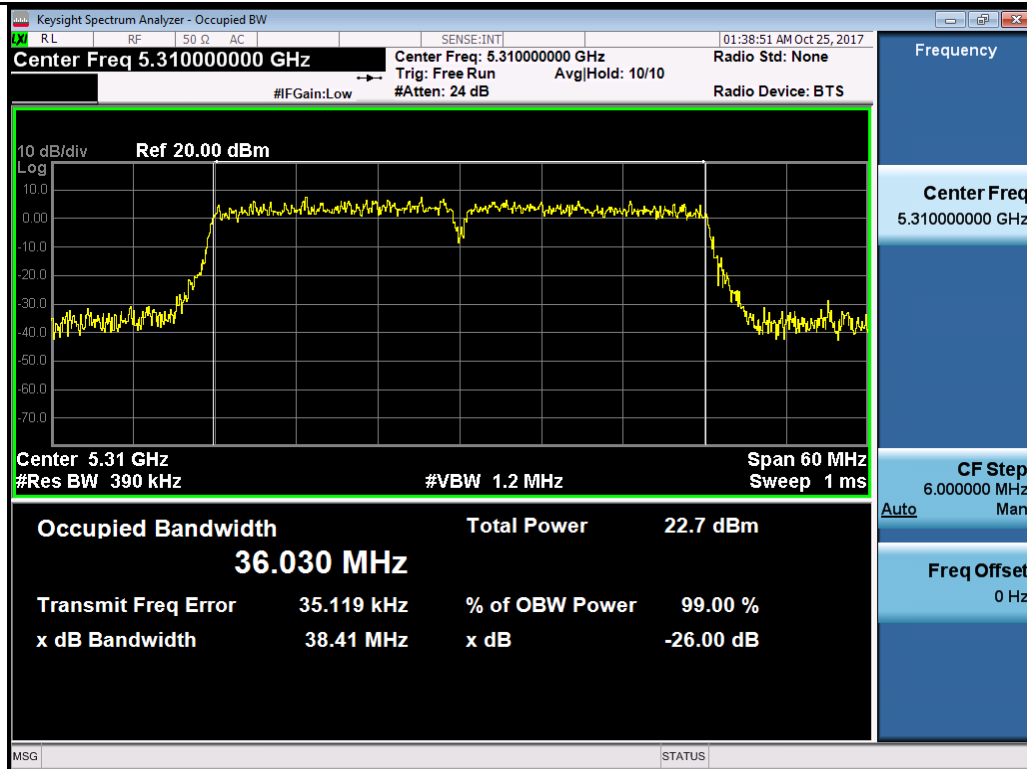
802.11n-HT20-5280MHz



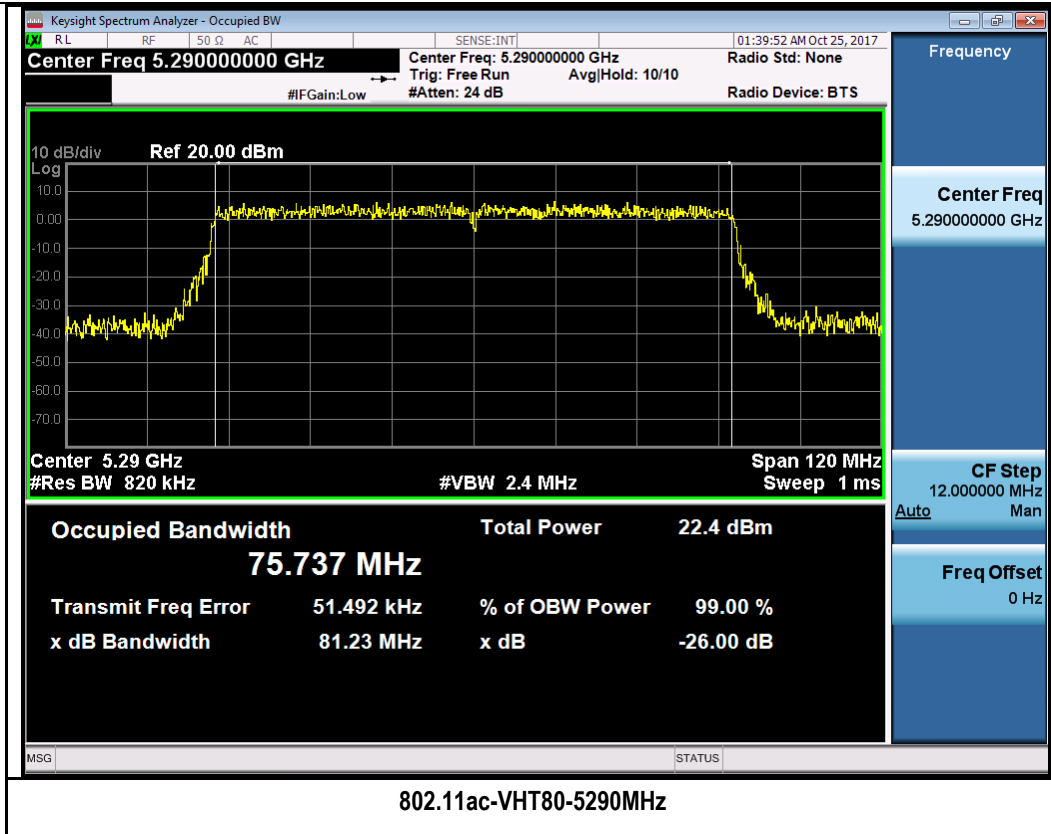
802.11n-HT20-5320MHz



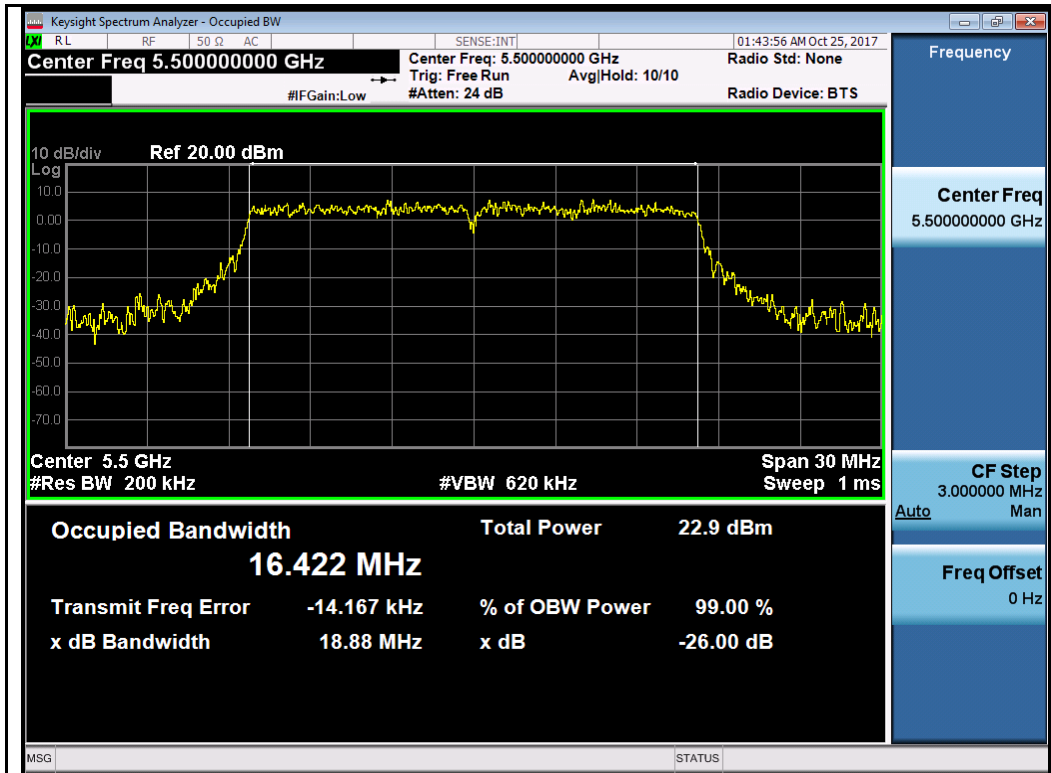
802.11n-HT40-5270MHz



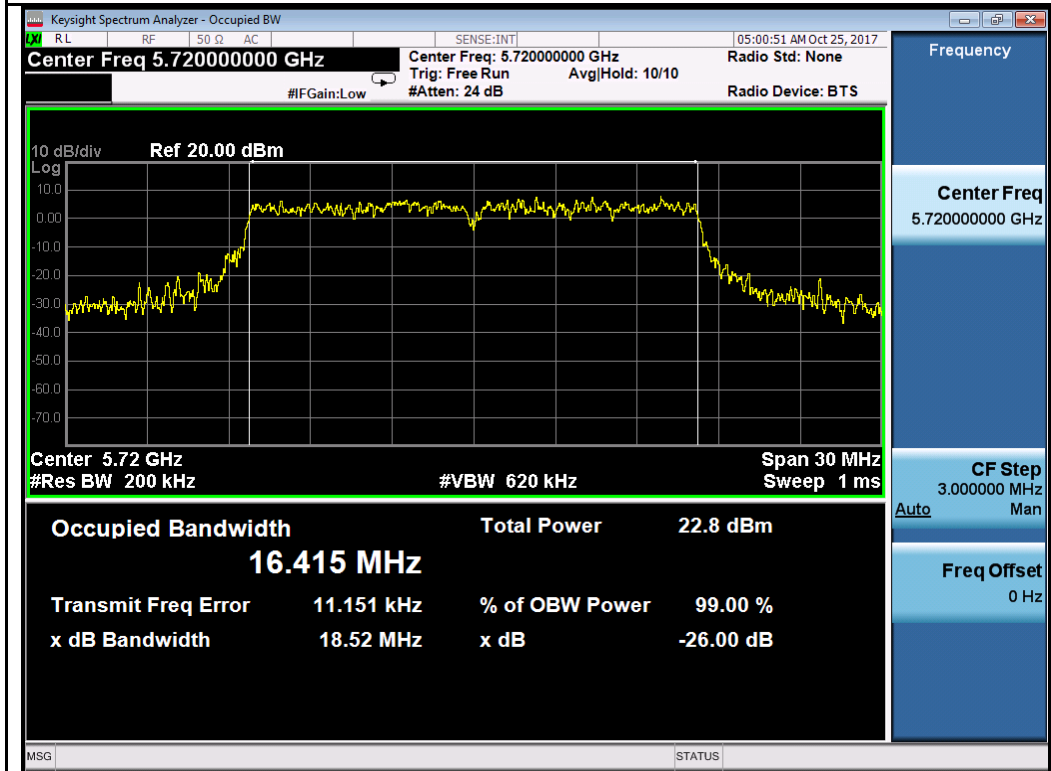
802.11n-HT40-5310MHz



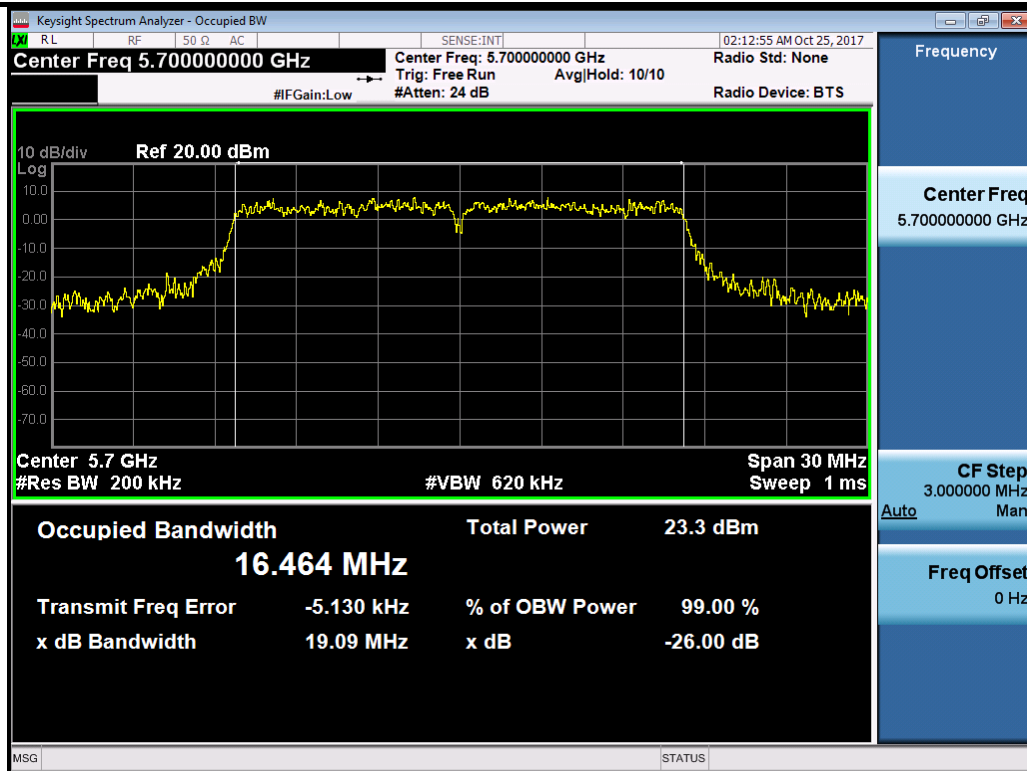
W56:



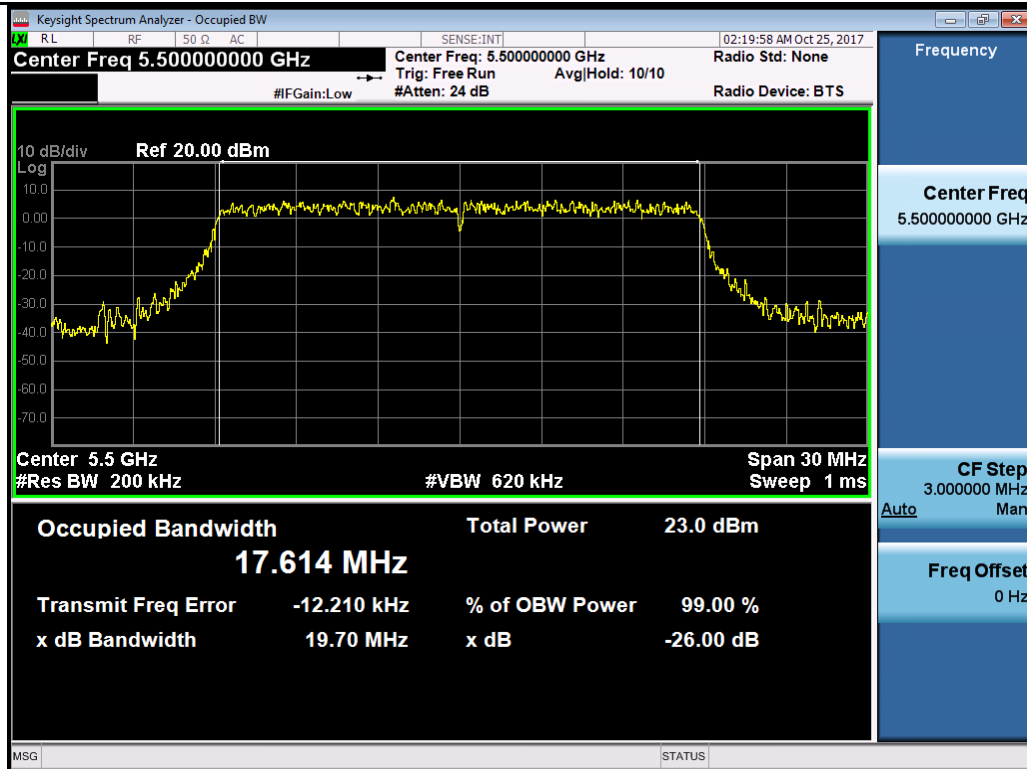
802.11a-5500MHz



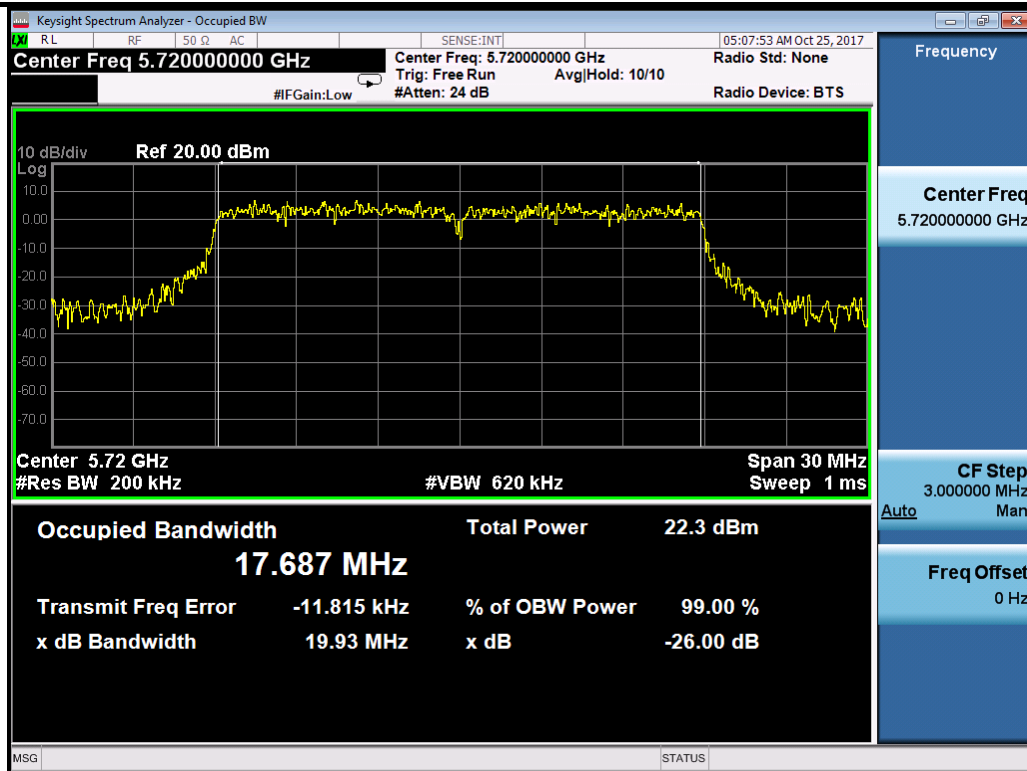
802.11a-5580MHz



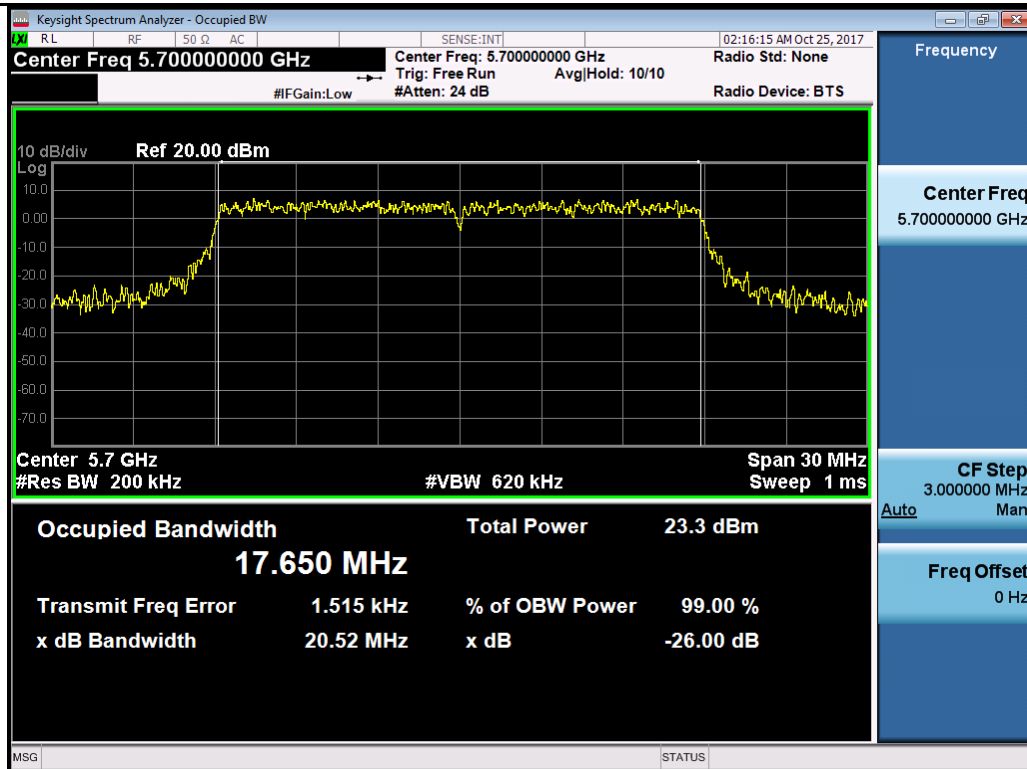
802.11a-5700MHz



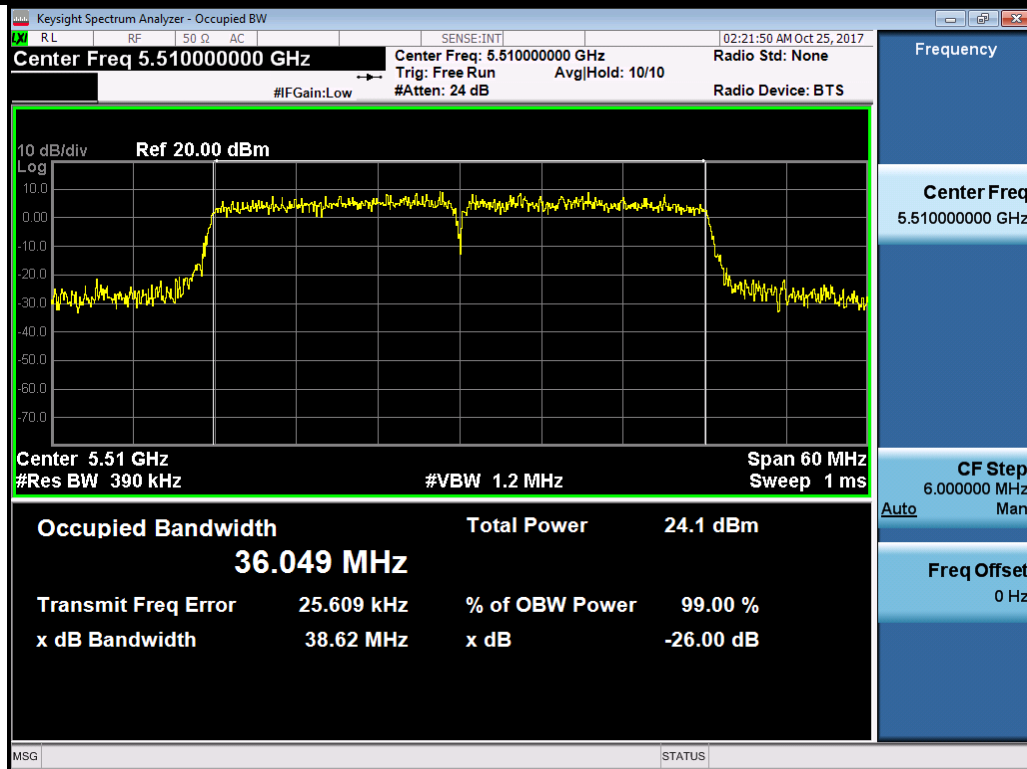
802.11n-HT20-5500MHz



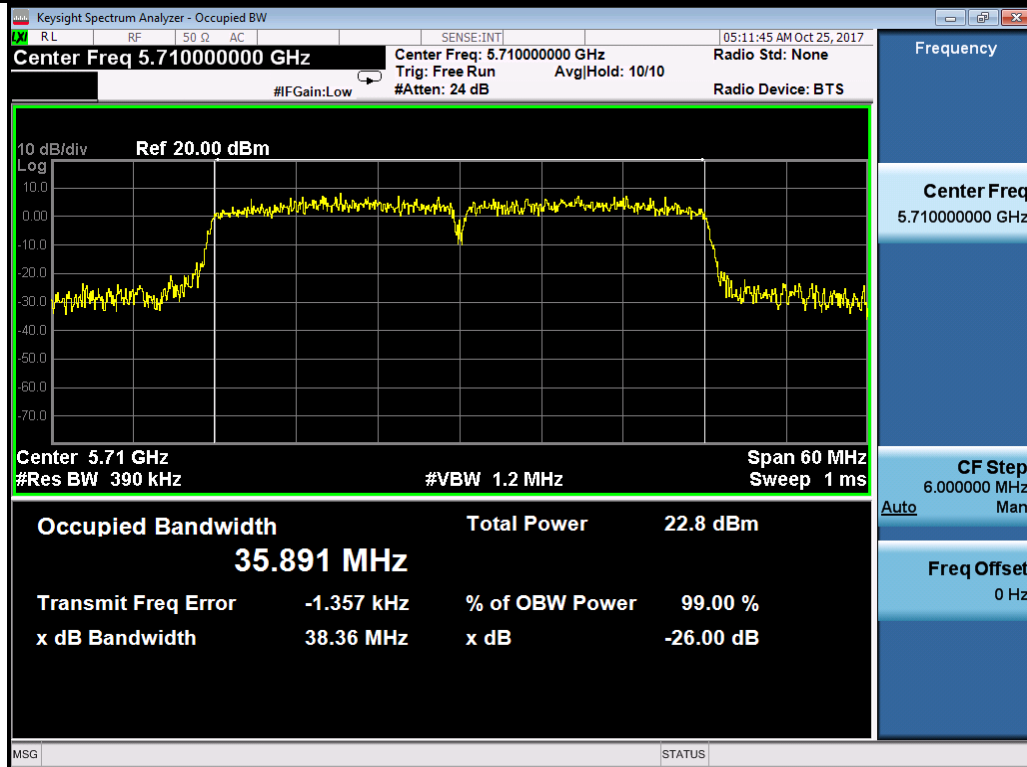
802.11n-HT20-5580MHz



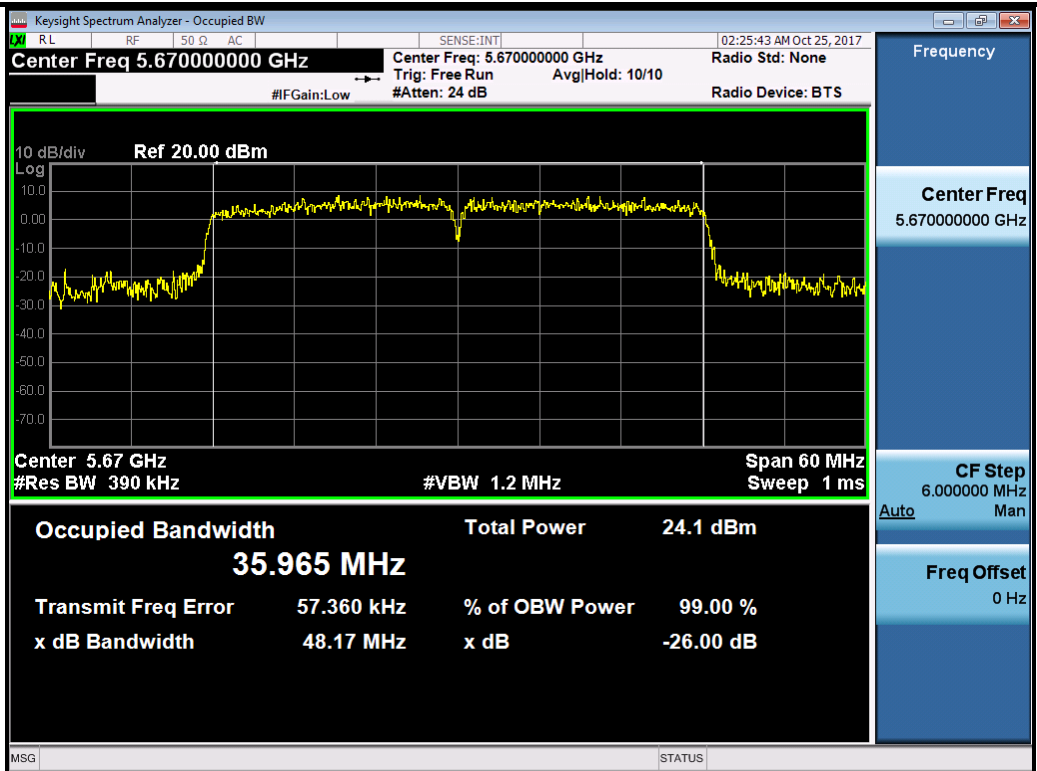
802.11n-HT20-5700MHz



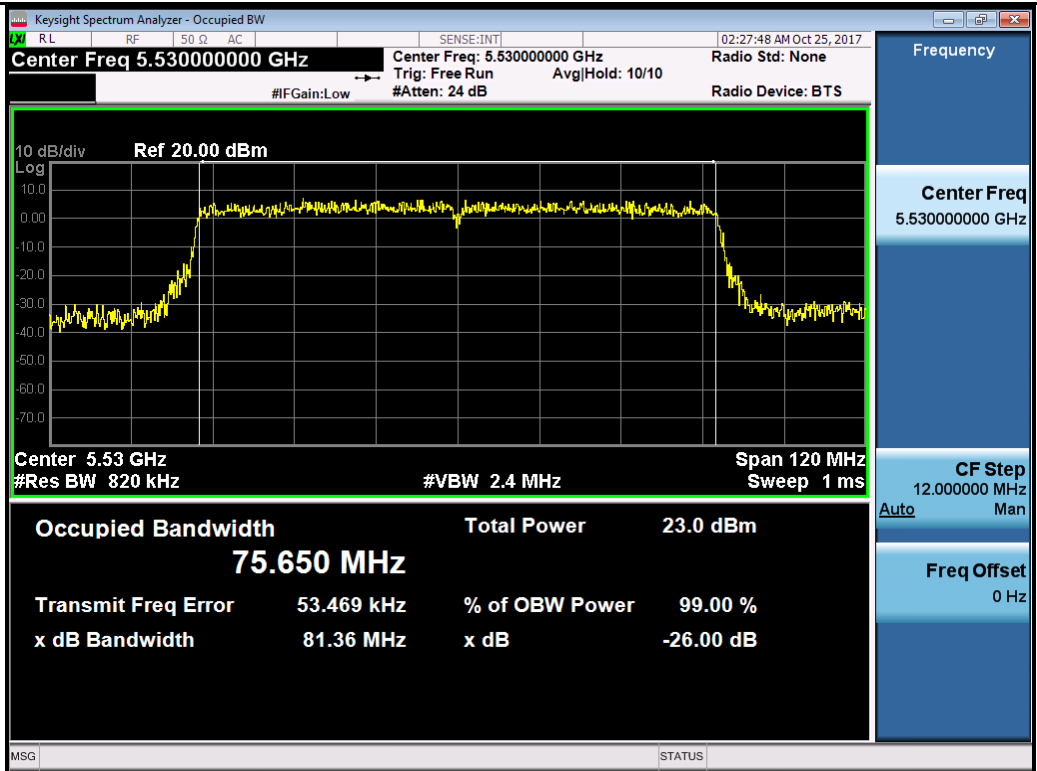
802.11n-HT40-5510MHz



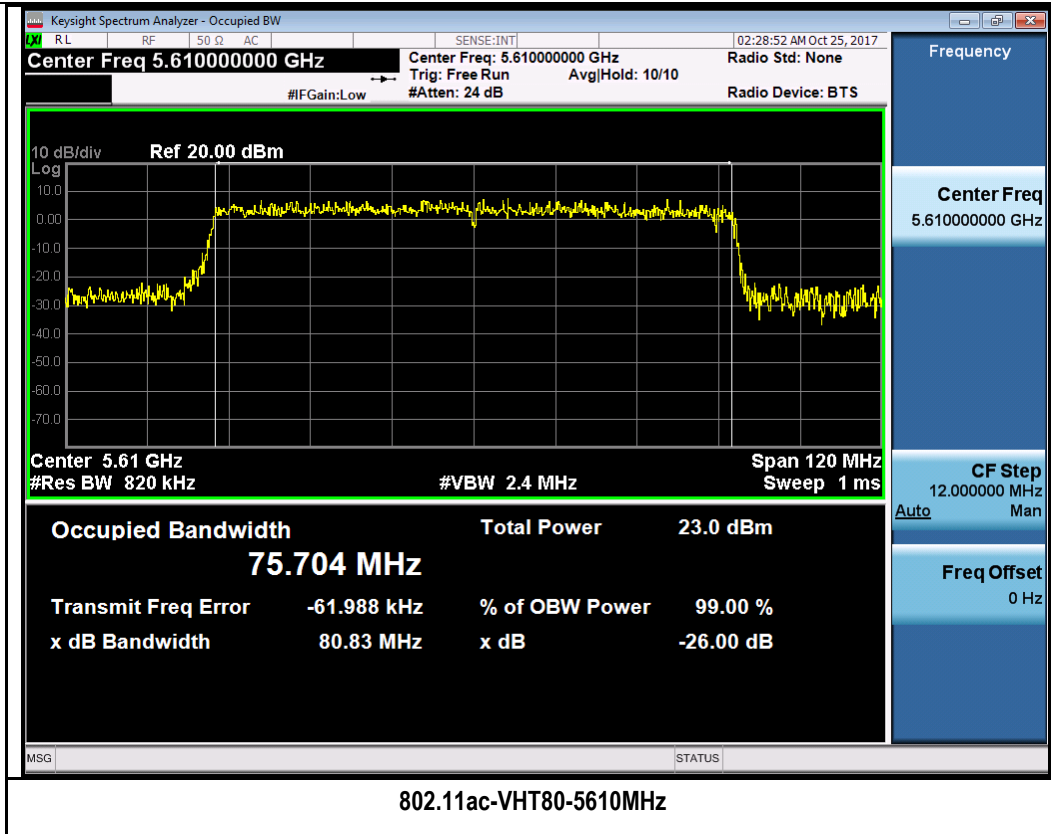
802.11n-HT40-5550MHz



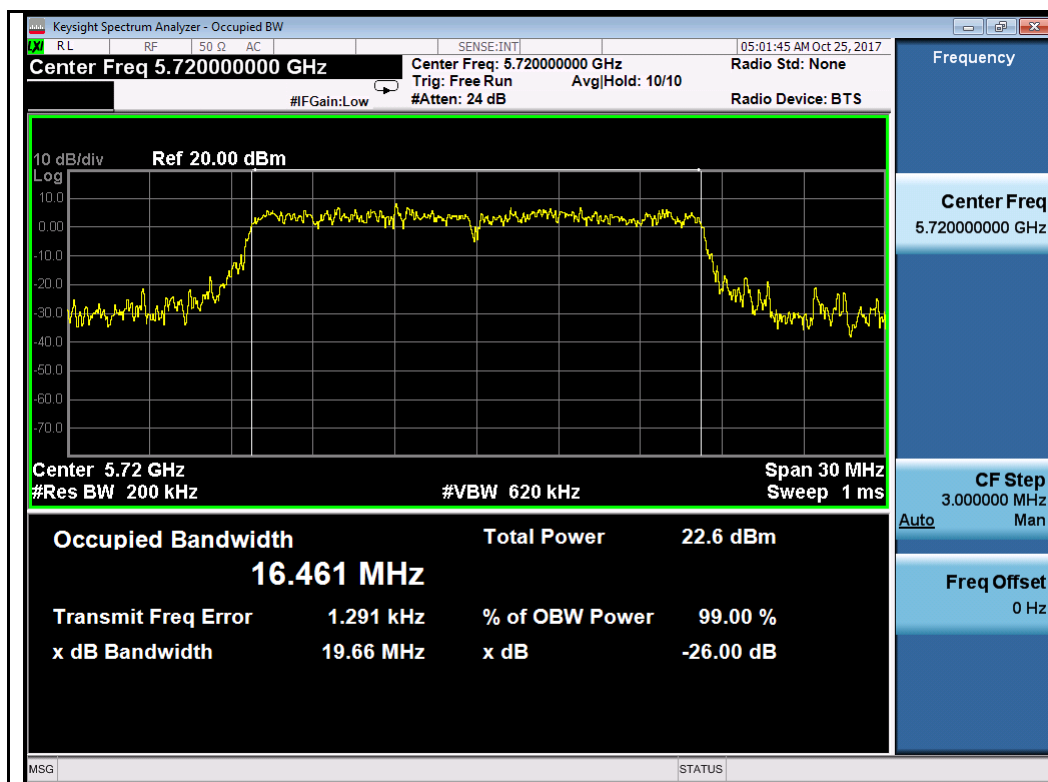
802.11n-HT40-5670MHz



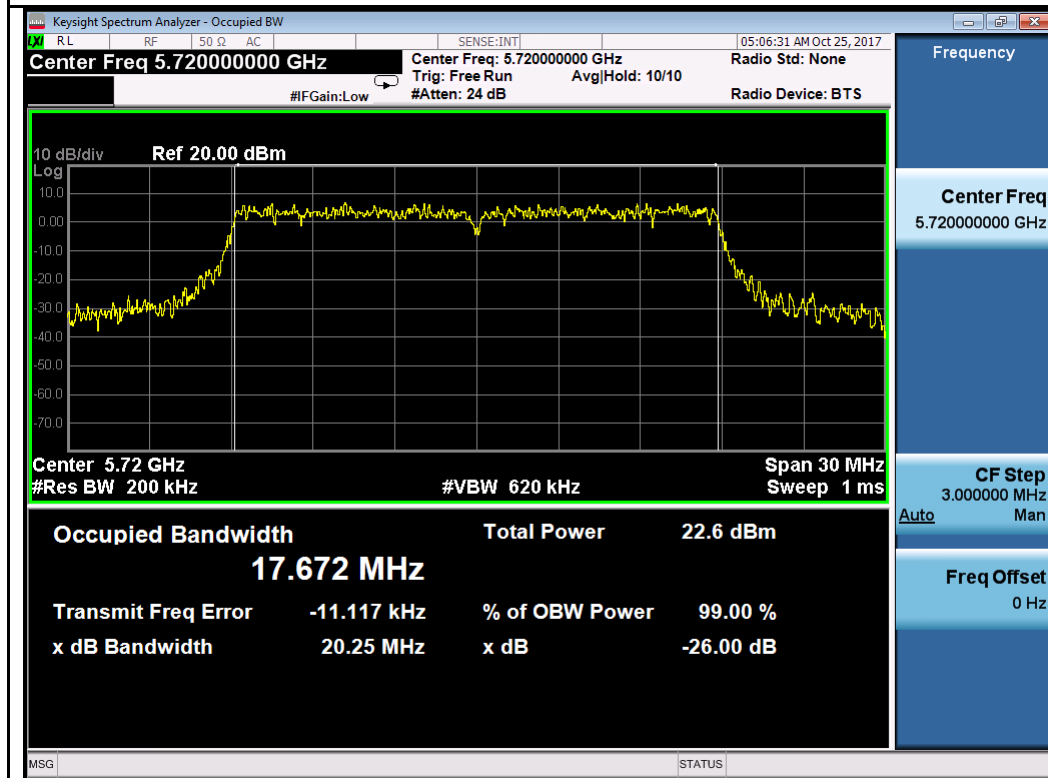
802.11ac-VHT80-5530MHz



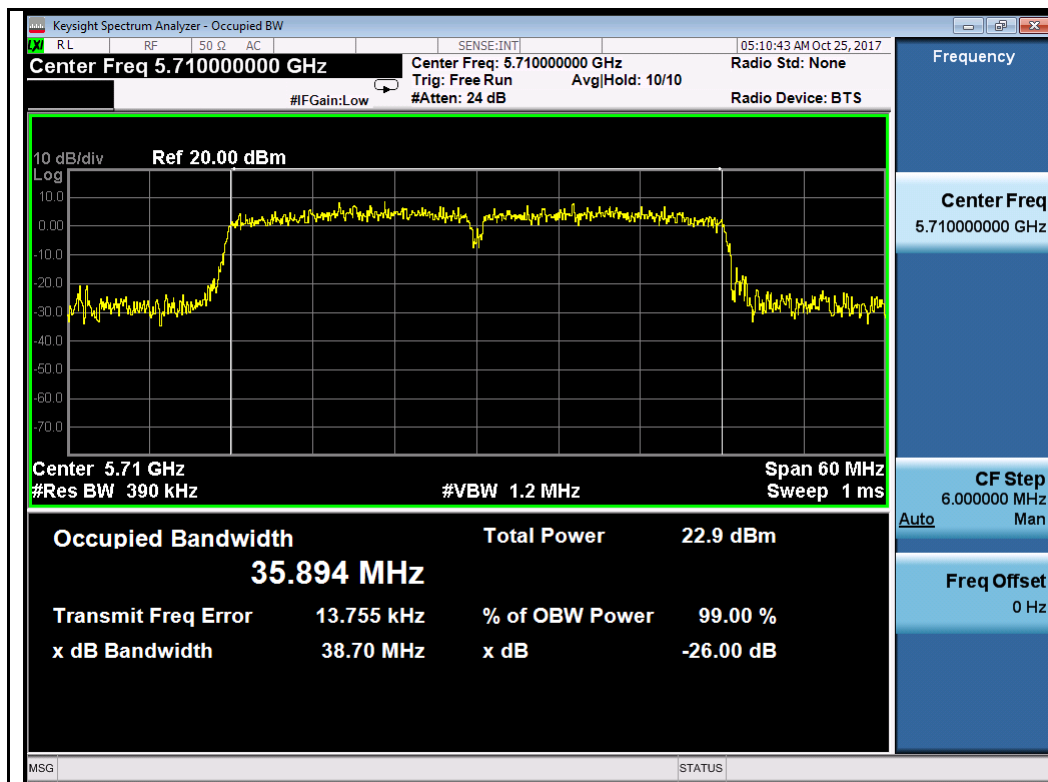
26dB BW Cross Band:



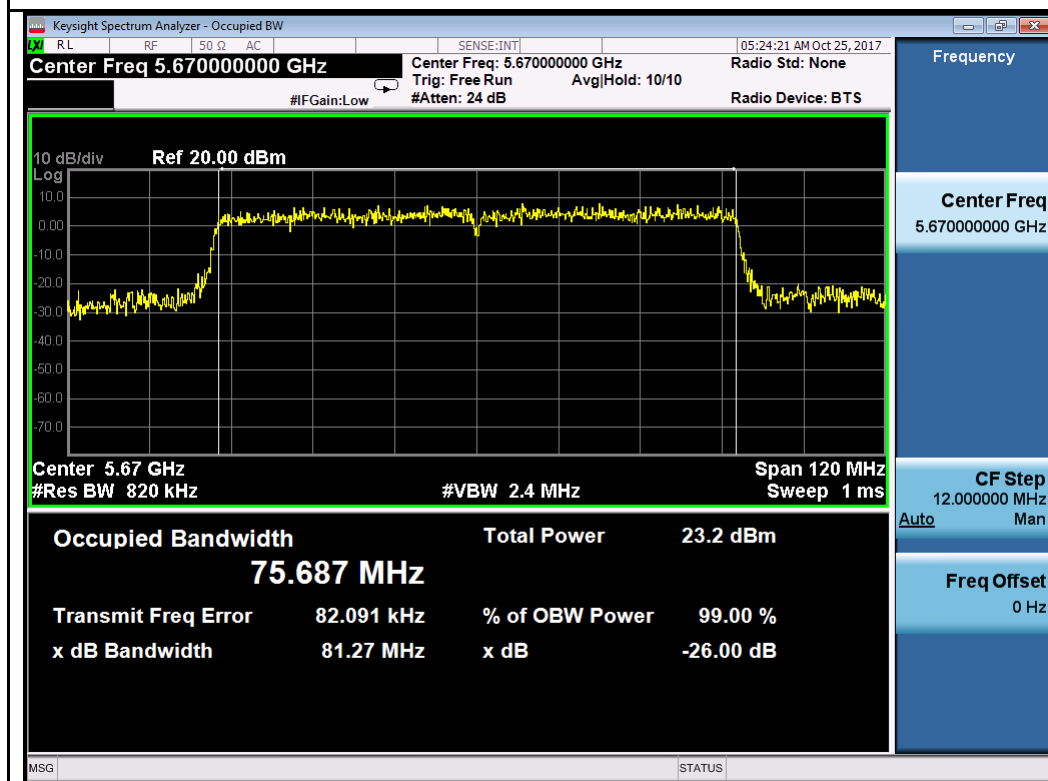
802.11a-5720MHz



802.11n-HT20 5720MHz

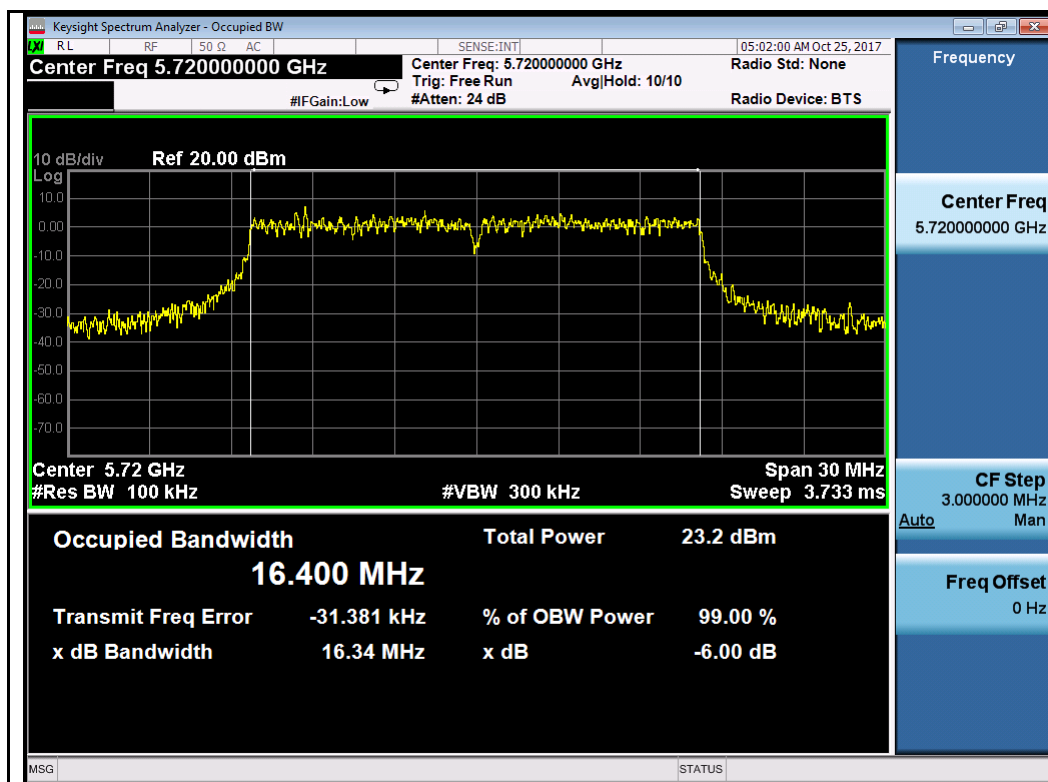


802.11n-HT40 5710MHz

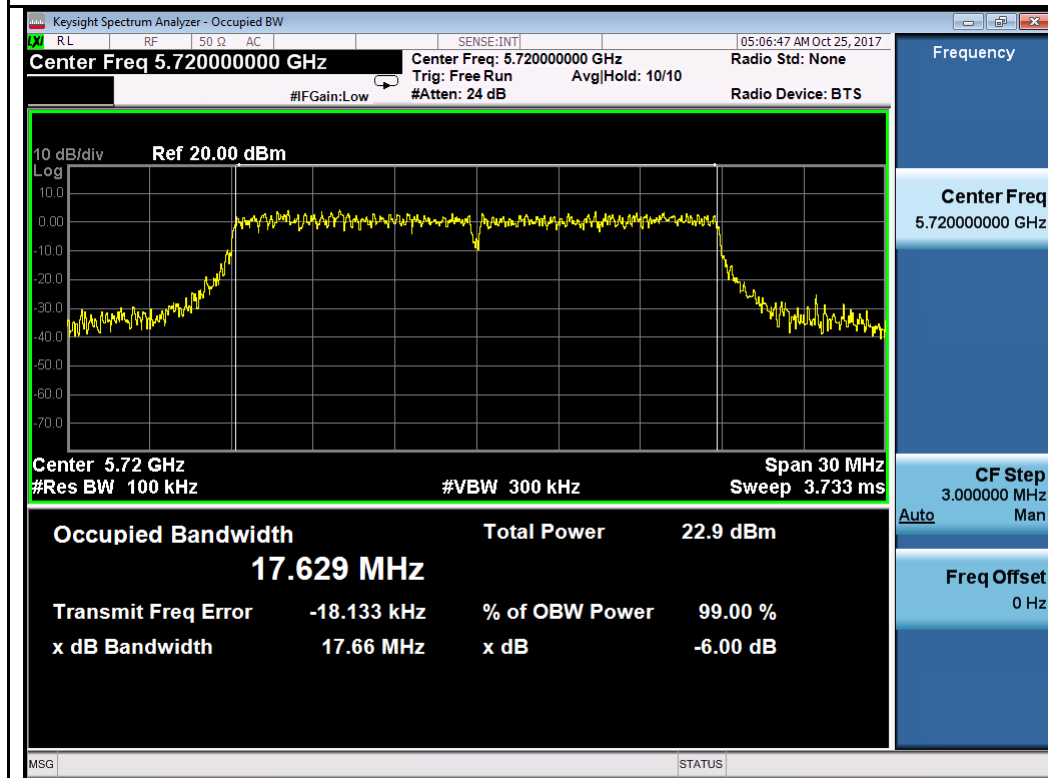


802.11ac-VHT80-5690MHz

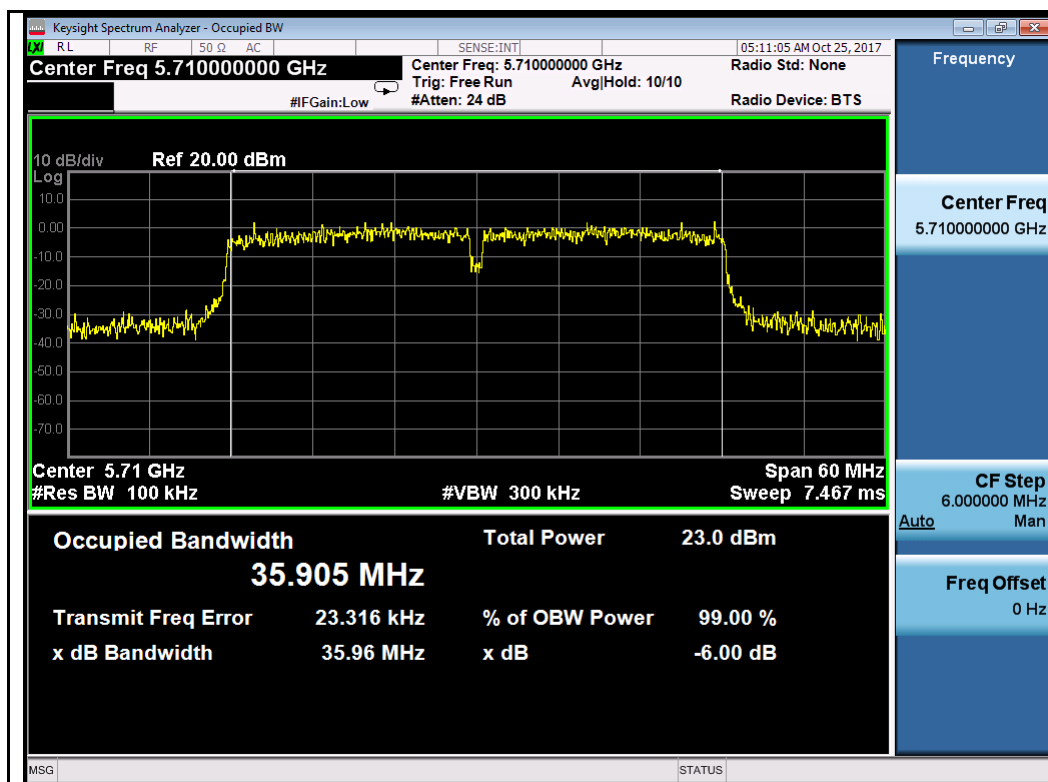
6dB BW Cross Band:



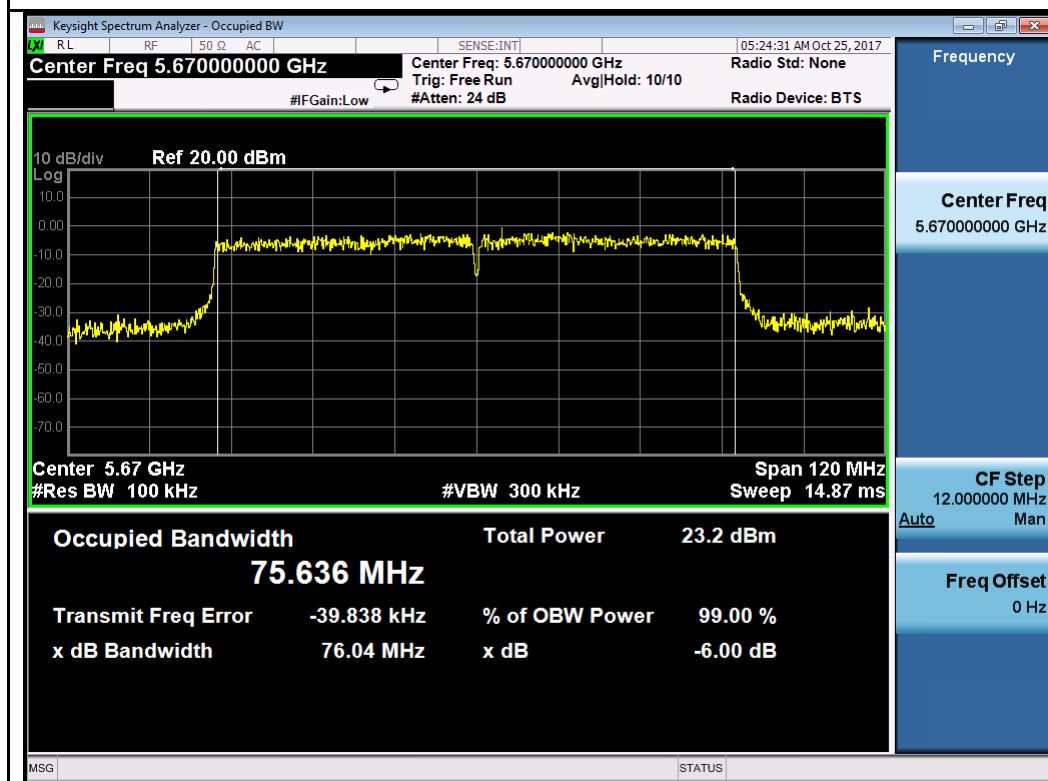
802.11a-5720MHz



802.11n-HT20 5720MHz



802.11n-HT40 5710MHz

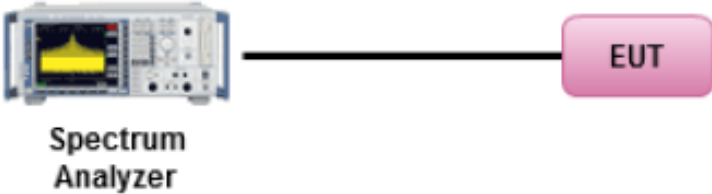


802.11ac-VHT80-5690MHz

10.3 Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.407	a)(2)	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.	☒
	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	 Spectrum Analyzer ————— EUT		
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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): - 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 - Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.) - Sweep time = auto. - Detector = power averaging (rms), if available. Otherwise, use sample detector mode. - 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 $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run." - Trace average at least 100 traces in power averaging (rms) mode. - 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.		
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Test Date	10/24/2017	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark	N/A		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by **Chen Ge** at RF test site.

Output Power measurement result for 5.3GHz

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain0	Chain1	Combined Power		
Output Power	802.11a	5260	Low	20.008	19.612	22.825	24	Pass
	802.11a	5280	Mid	19.719	19.647	22.694	24	Pass
	802.11a	5320	High	20.253	19.872	23.077	24	Pass
	802.11n-20M	5260	Low	20.155	20.078	23.127	24	Pass
	802.11n-20M	5280	Mid	20.083	19.572	22.845	24	Pass
	802.11n-20M	5320	High	19.995	19.900	22.958	24	Pass
	802.11n-40M	5270	Low	20.535	20.867	23.714	24	Pass
	802.11n-40M	5310	Mid	18.808	18.620	21.725	24	Pass
	802.11ac-80M	5290	High	19.241	18.852	22.061	24	Pass

Output Power measurement result for 5.5GHz

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain0	Chain1	Combined Power		
Output Power	802.11a	5500	Low	19.357	19.194	22.286	24	Pass
	802.11a	5580	Mid	20.043	19.711	22.890	24	Pass
	802.11a	5700	High	19.368	19.713	22.554	24	Pass
	802.11n-20M	5500	Low	19.198	19.538	22.382	24	Pass
	802.11n-20M	5580	Mid	20.108	19.708	22.923	24	Pass
	802.11n-20M	5700	High	19.752	19.831	22.802	24	Pass
	802.11n-40M	5510	Low	20.603	20.233	23.432	24	Pass
	802.11n-40M	5550	Mid	20.594	21.278	23.960	24	Pass
	802.11n-40M	5670	High	20.345	20.077	23.223	24	Pass
	802.11ac-80M	5530	Low	19.893	19.871	22.892	24	Pass
	802.11ac-80M	5610	High	19.318	20.271	22.831	24	Pass

Note: Two chains are cross-polarized, additional gain is $10 \log_{10}(\text{NANT})=0\text{dB}$, max directional gain of the EUT is 3.5dBi. No limit adjustment is needed. All the mode transmission is MIMO.

Output Power measurement result for CROSS channels (in band 5470-5725MHz)

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain0	Chain1	Combined Power		
	802.11a	5720	CROSS	19.58	19.47	22.54	24	Pass
	802.11n-20M	5720	CROSS	19.34	19.29	22.33	24	Pass
	802.11n-40M	5710	CROSS	19.74	19.76	22.76	24	Pass
	802.11ac-80M	5690	CROSS	20.14	20.42	23.29	24	Pass

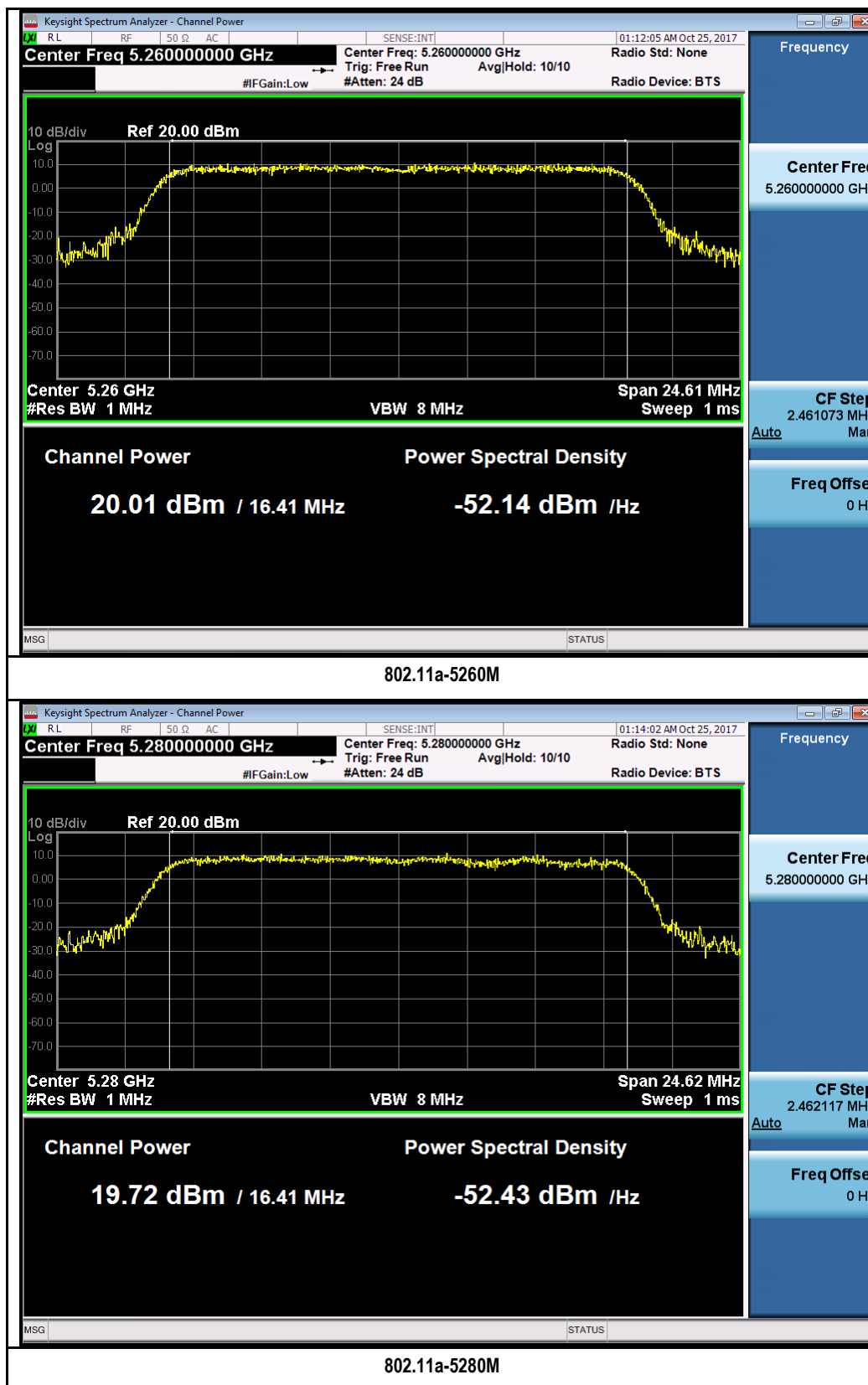
Output Power measurement result for CROSS channels (in band 5725-5850MHz)

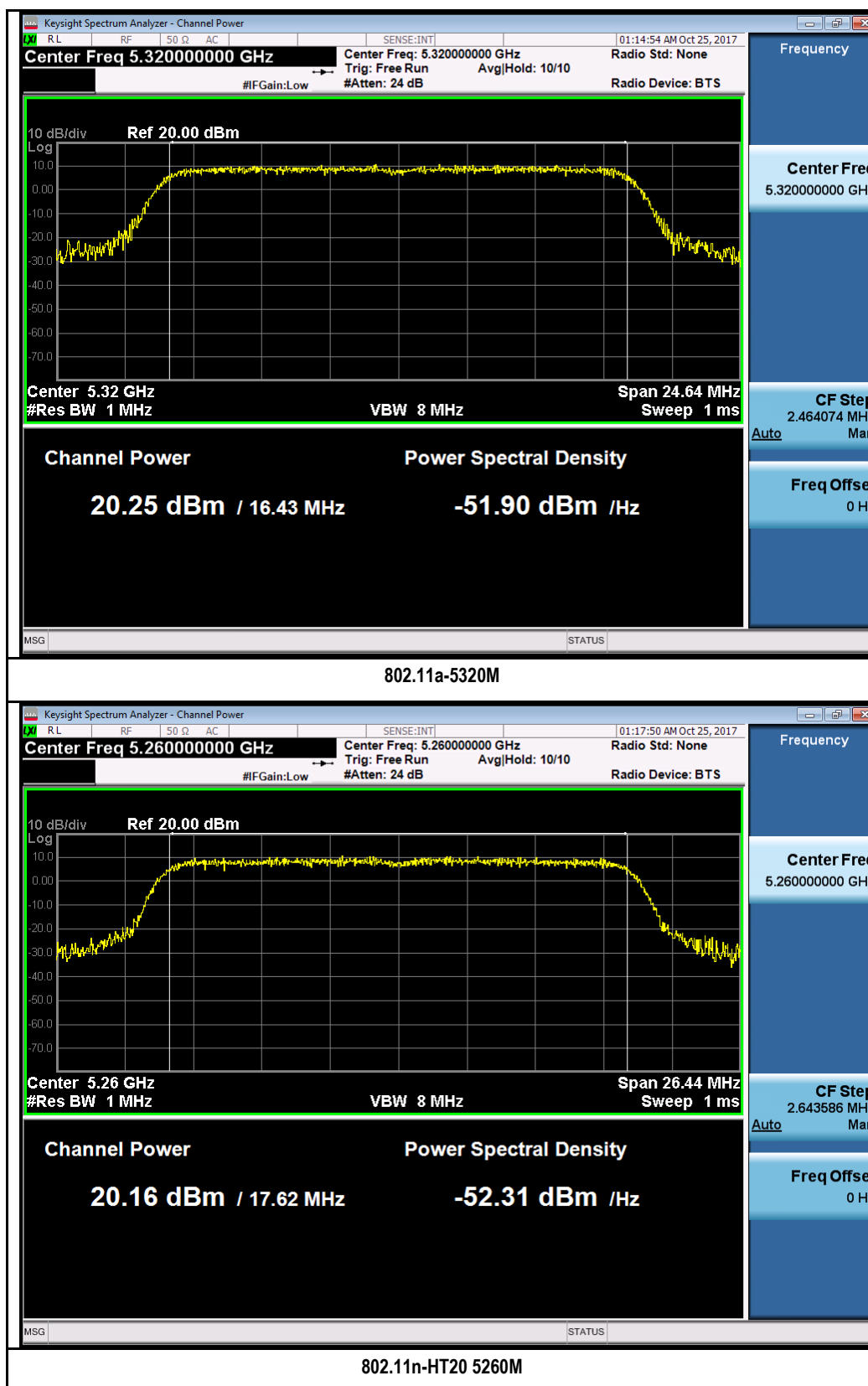
Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain0	Chain1	Combined Power		
Output Power	802.11a	5720	CROSS	19.58	19.47	22.54	30	Pass
	802.11n-20M	5720	CROSS	19.34	19.29	22.33	30	Pass
	802.11n-40M	5710	CROSS	19.74	19.76	22.76	30	Pass
	802.11ac-80M	5690	CROSS	20.14	20.42	23.29	30	Pass

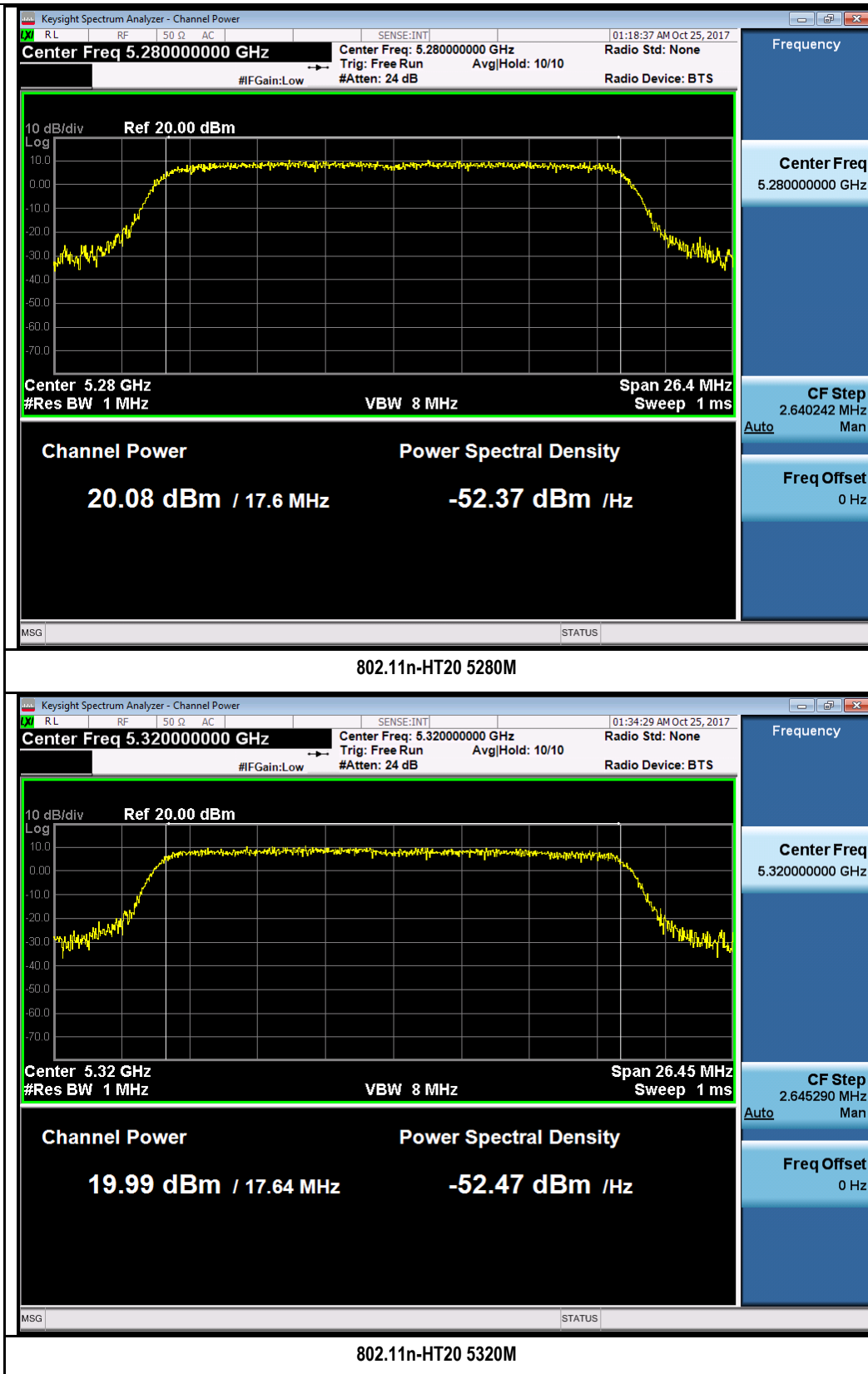
Note: Two chains are cross-polarized, additional gain is $10 \log_{10}(NANT)=0\text{dB}$, max directional gain of the EUT is 3.5dBi. No limit adjustment is needed. All the mode transmission is MIMO

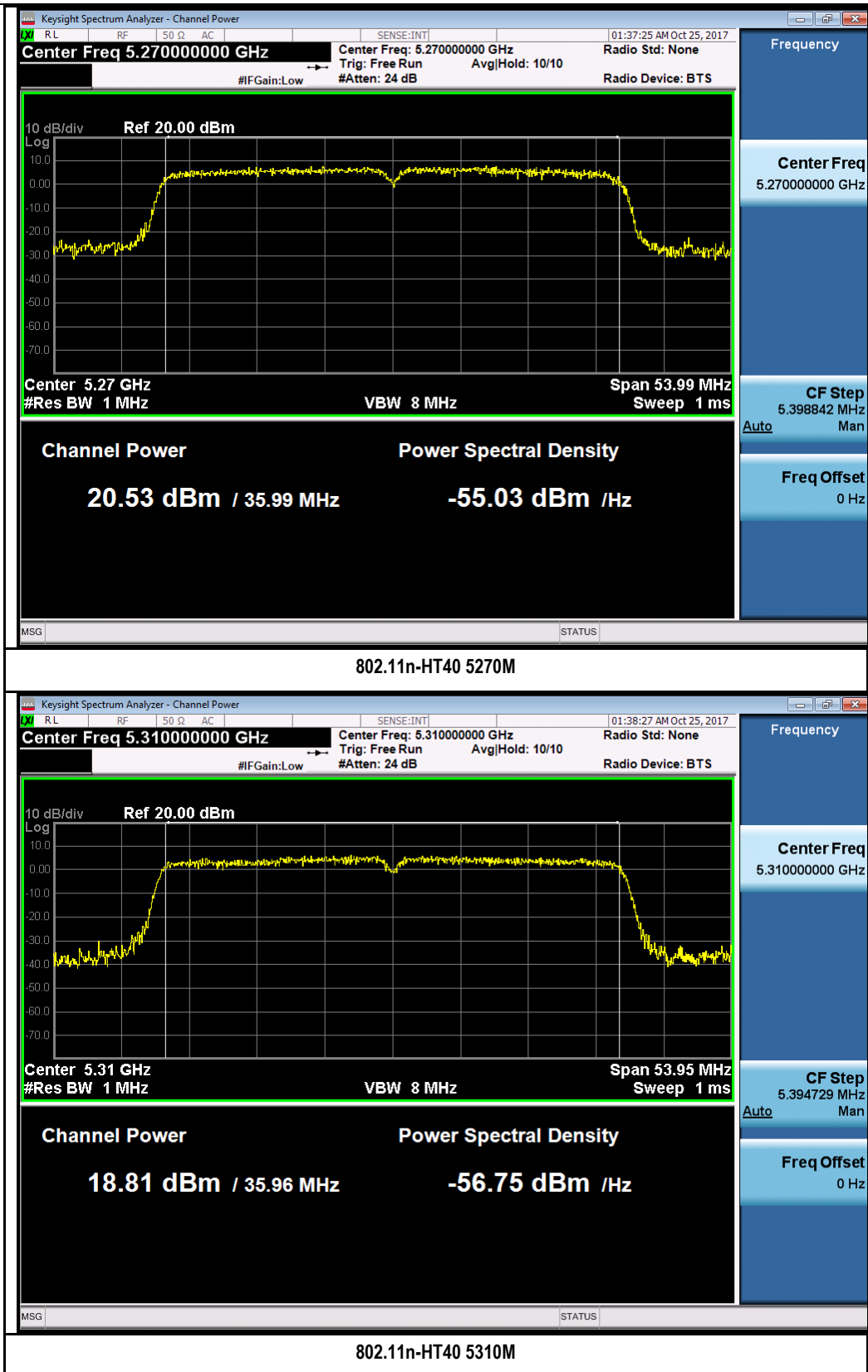
Test Plot for W53:

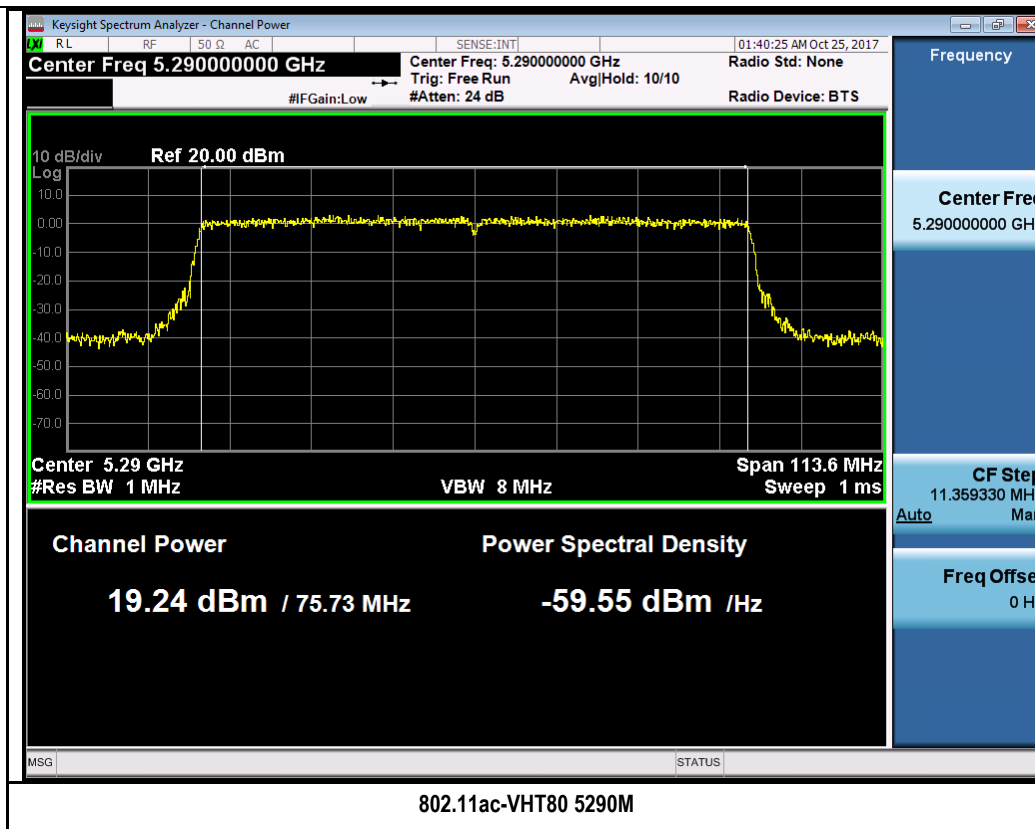
Chain 0:



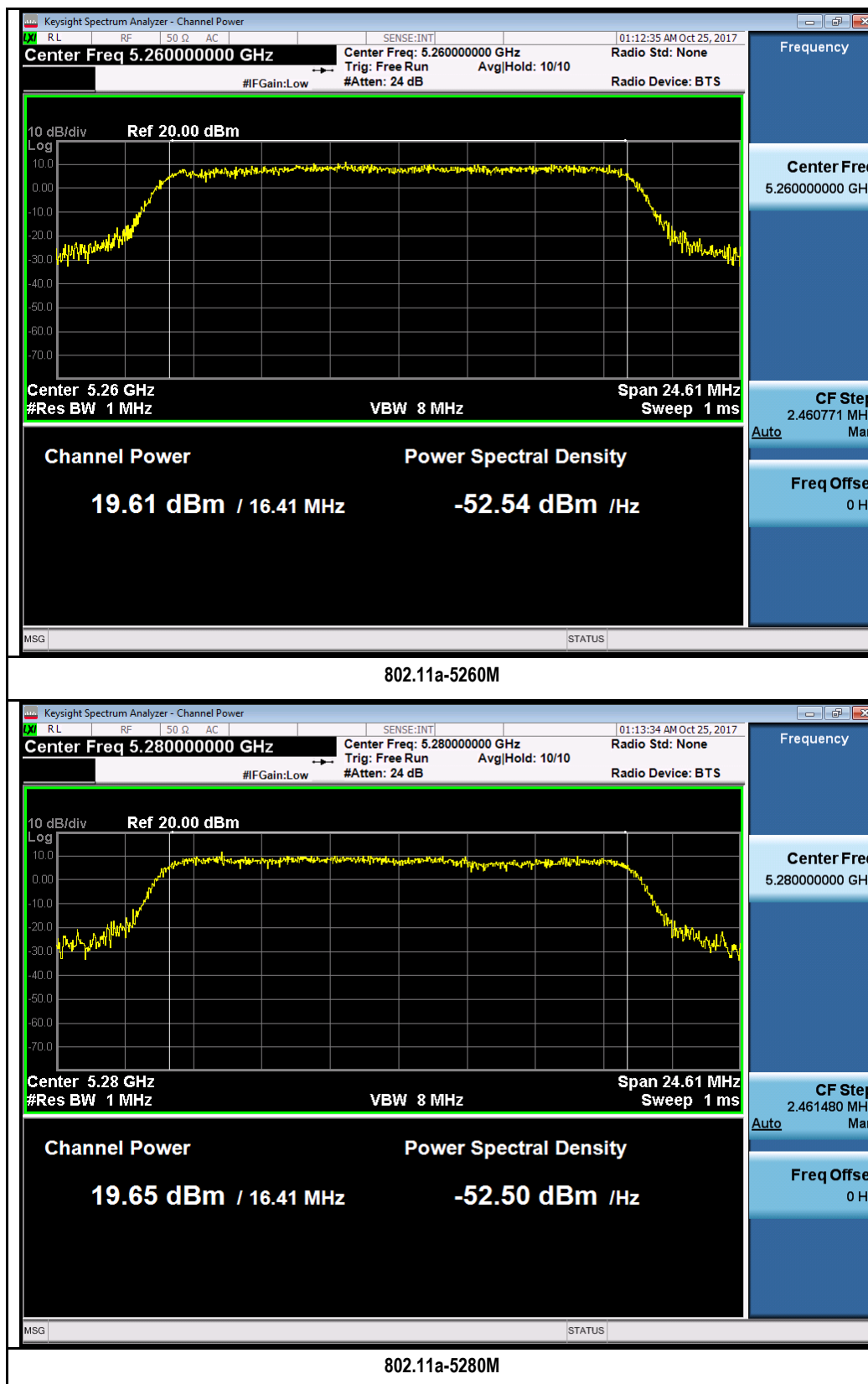




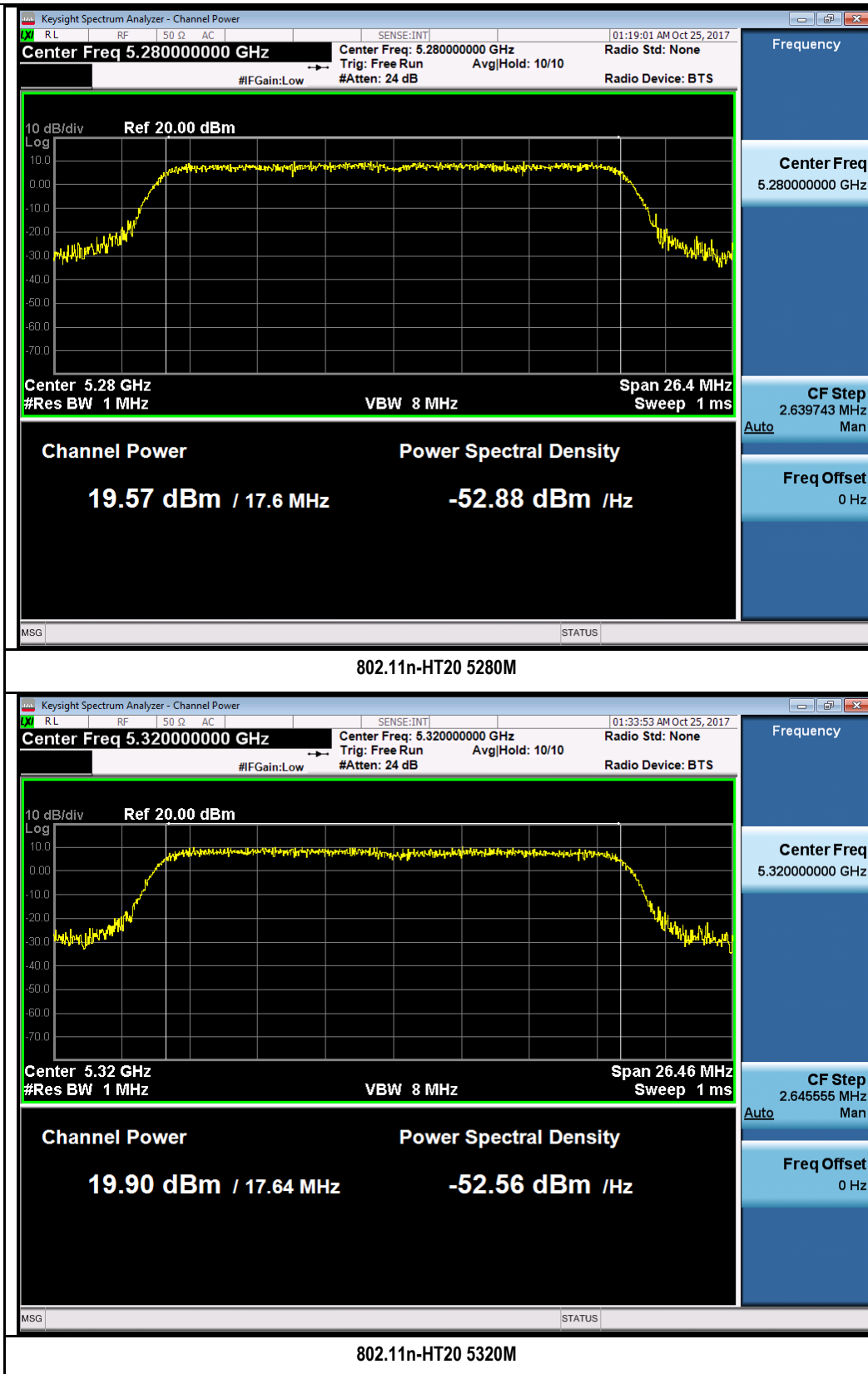




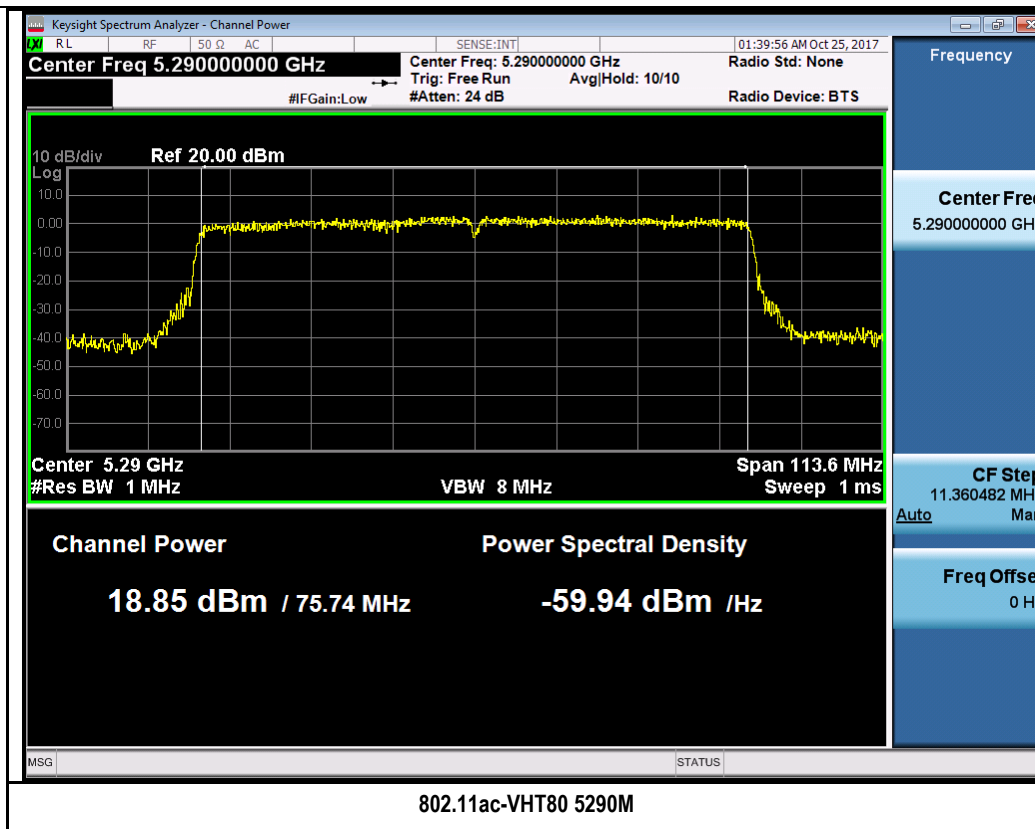
Chain 1:





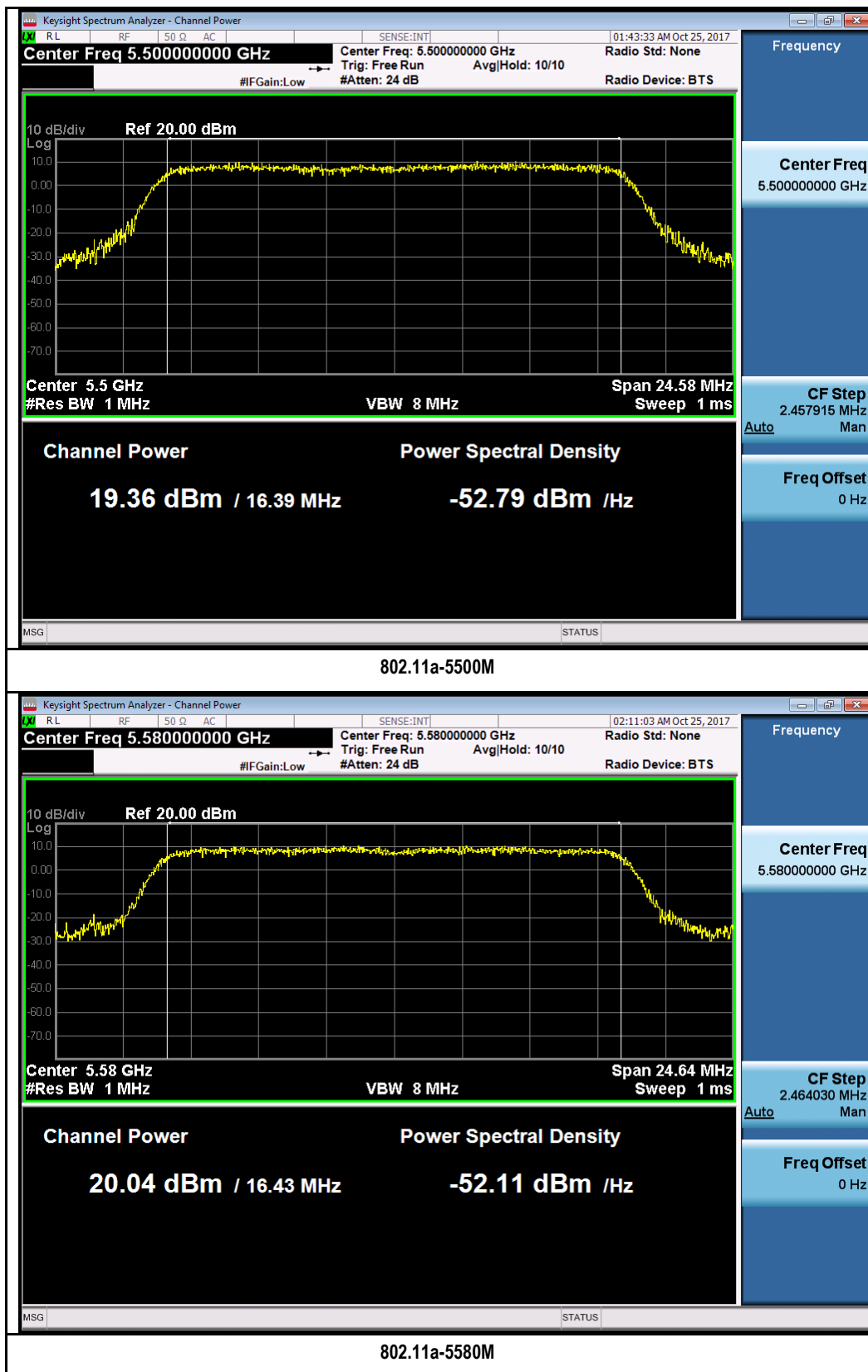


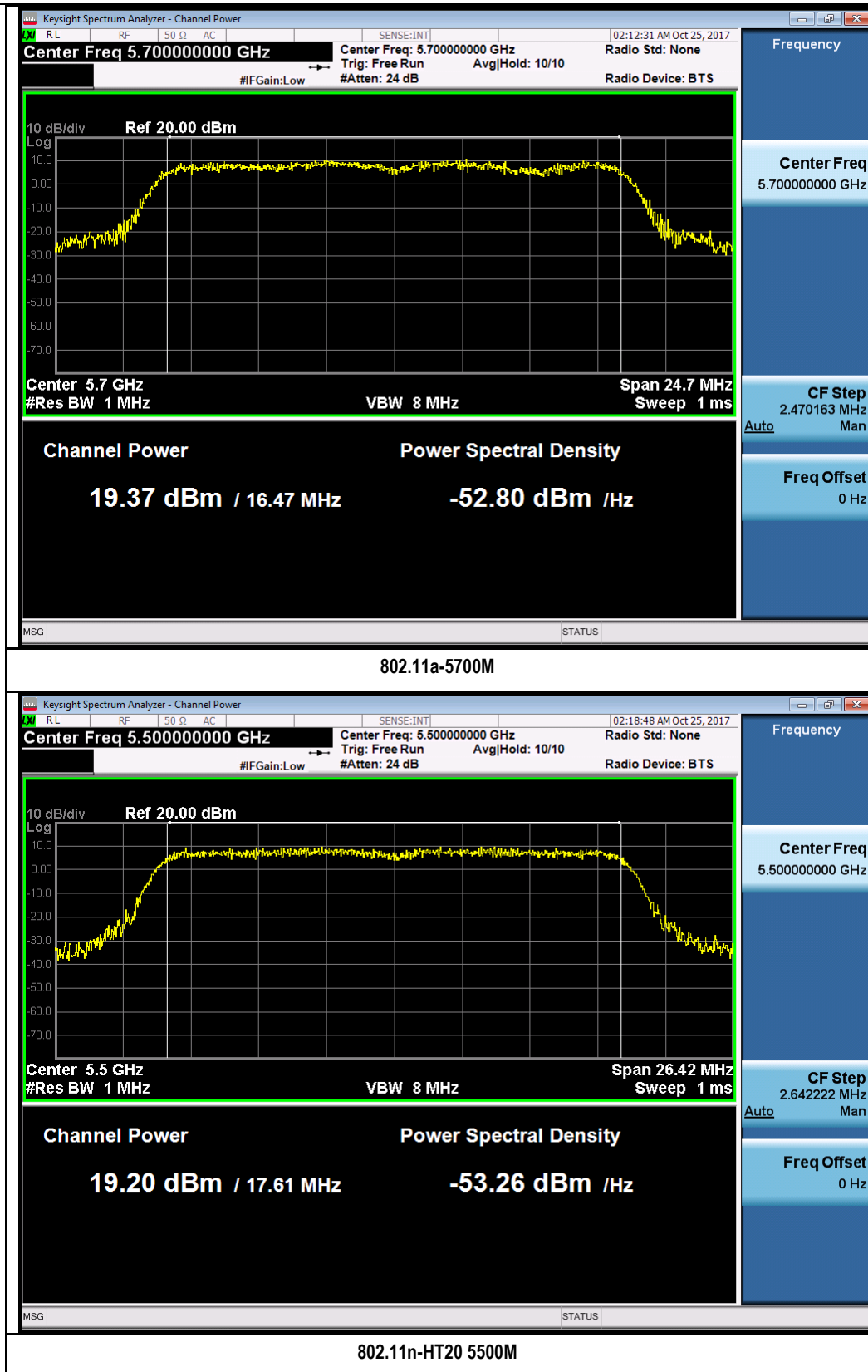


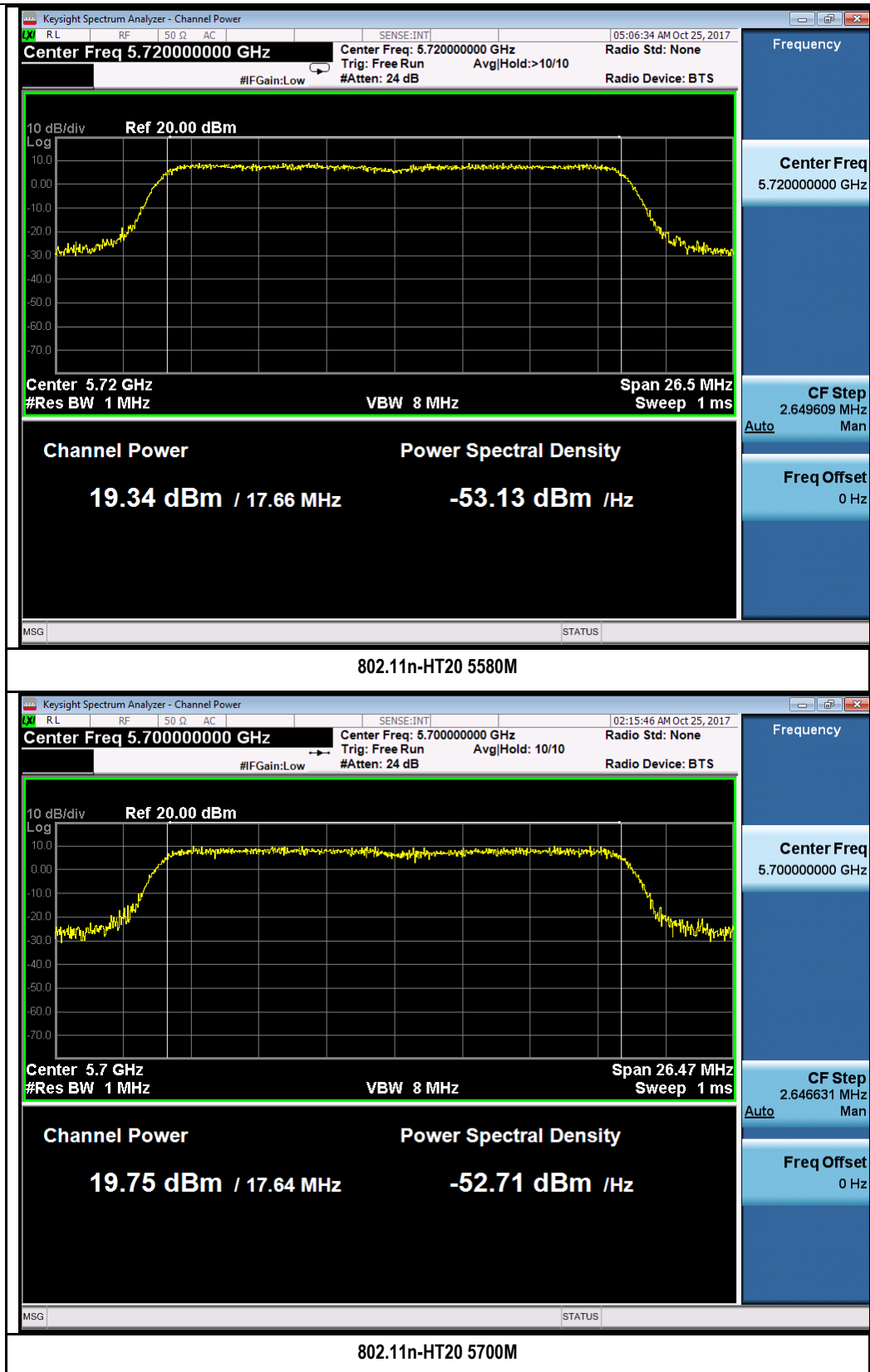


Test Plot for W56:

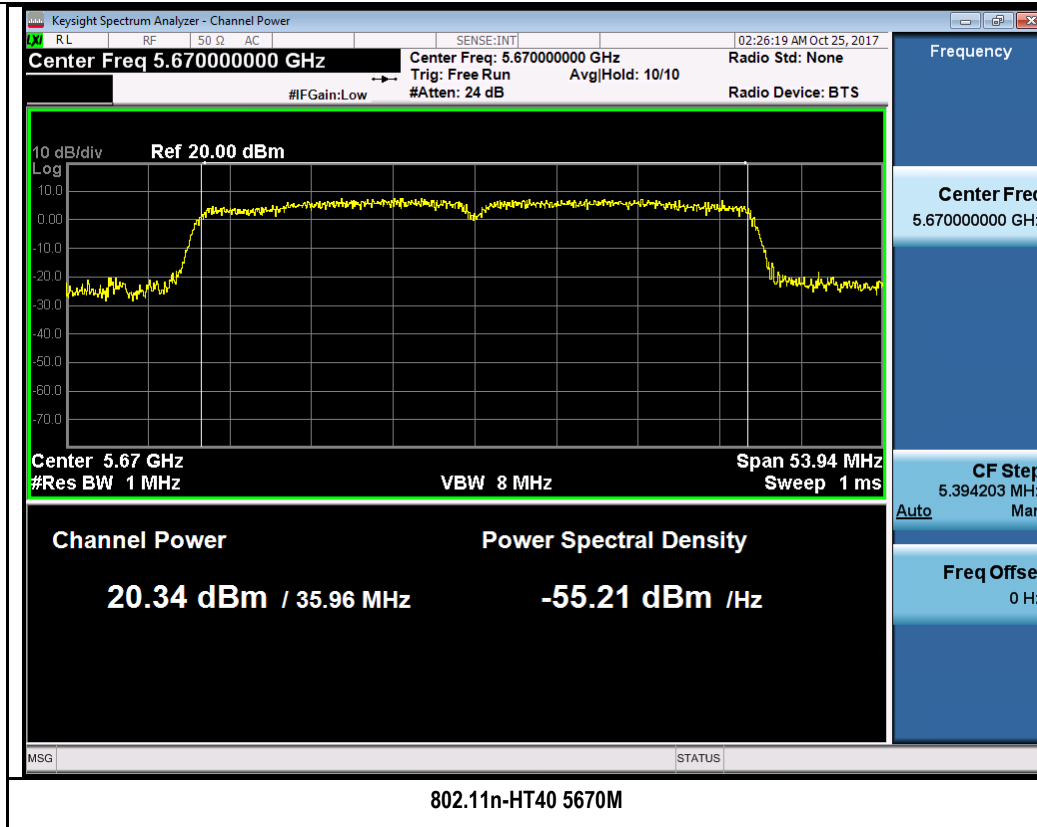
Chain 0:

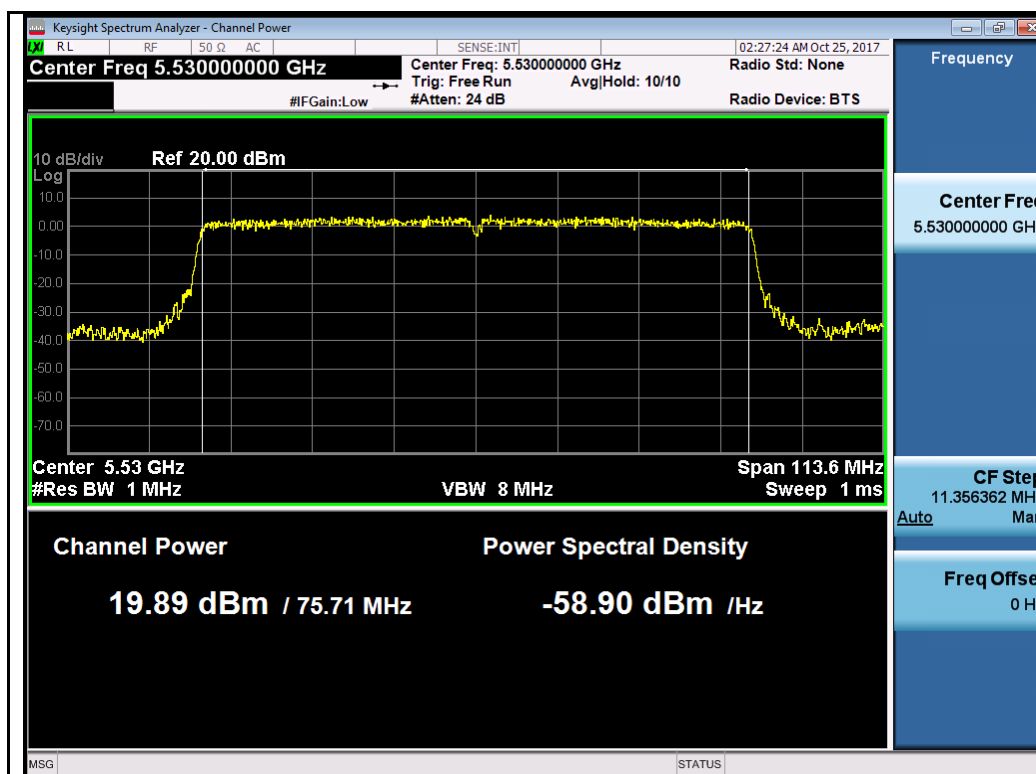




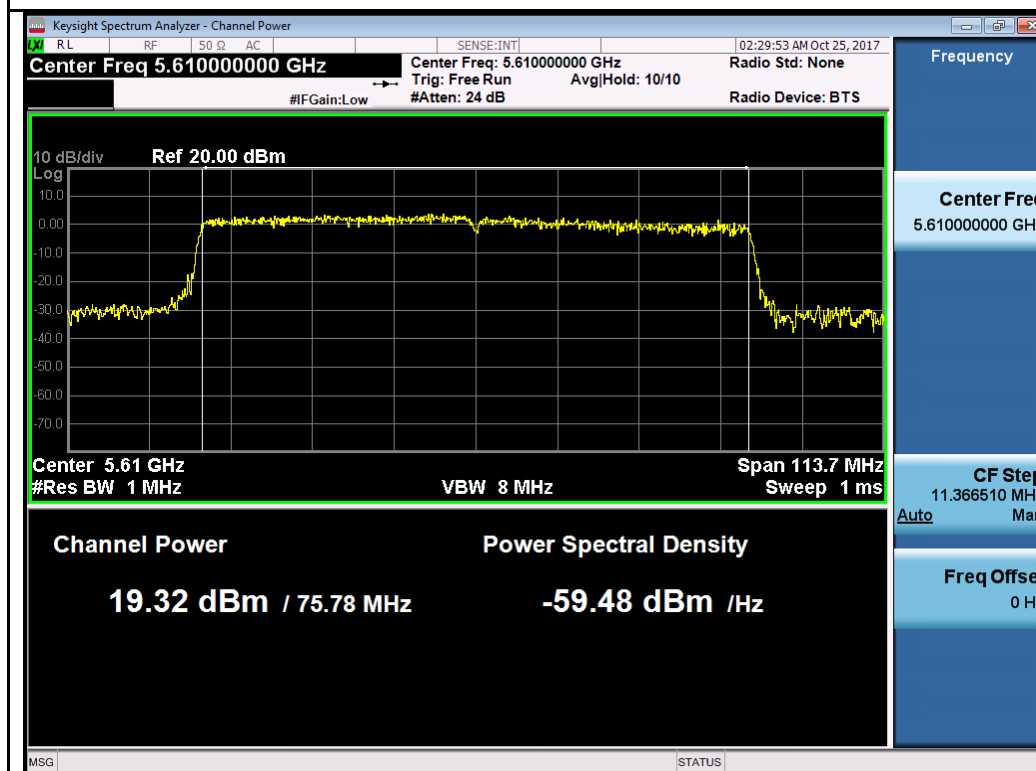








802.11ac-VHT80 5530M



802.11ac-VHT80 5610M

Chain 1:

