



RF TEST REPORT

Applicant	Alcatel-Lucent Shanghai Bell Co.,Ltd.
FCC ID	2ADZRXS250WXAB
Product	XGSPON ONU
Brand	NOKIA
Model	XS-250WX-A/XS-240W-A
Report No.	R1801B0002-R1
Issue Date	April 18, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15E (2018)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Xianqing Li

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

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Summary of measurement results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Average conducted output power	15.407(a)	PASS
2	Occupied bandwidth	15.407(e)	PASS
3	Frequency stability	15.407(g)	PASS
4	Maximum power spectral density	15.407(a)	PASS
5	Unwanted Emissions	15.407(b)	PASS
6	Conducted Emissions	15.207	PASS
Date of Testing: December 20, 2016 ~ February 4, 2017 and September 18, 2017~ January 4, 2018 and January 24, 2018~ April 10, 2018.			



1. Test Laboratory

1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

1.2. Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Xu Kai
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

2. General Description of Equipment under Test

Client Information

Applicant	Alcatel-Lucent Shanghai Bell CO. Ltd.
Applicant address	388-389#,Ningqiao Road,Pudong Jinqiao, Shanghai, P.R. China
Manufacturer	Alcatel-Lucent Shanghai Bell CO. Ltd.
Manufacturer address	388-389#,Ningqiao Road,Pudong Jinqiao, Shanghai, P.R. China

General information

EUT Description	
Model	XS-250WX-A/XS-240W-A
SN:	/
Hardware Version	3FE 48307 AA /3FE 48631 AA
Software Version	3FE47059
Power Supply	AC adapter
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1: 3.0 dBi Antenna 2: 3.0 dBi Antenna 3: 3.0 dBi Antenna 4: 3.0 dBi
additional beamforming gain	6 dB
Test Mode(s)	U-NII-1(5150MHz-5250MHz) U-NII-2A(5250MHz-5350MHz) U-NII-2C(5470MHz-5725MHz with 5600MHz -5650MHz) U-NII-3(5725MHz-5850MHz)
Modulation Type	802.11a/n (HT20/HT40) : OFDM 802.11ac (HT20.HT40/HT80): OFDM
Max. Conducted Power	28.17 dBm
Operating Frequency Range(s)	U-NII-1: 5150-5250MHz U-NII-2A:5250-5350MHz U-NII-2C:5470-5725MHz (with 5600MHz -5650MHz) U-NII-3: 5725-5850MHz
Operating voltage range:	90 V to 264 V
State AC voltage:	120V



EUT Accessory	
Adapter	Manufacturer: DELTA electronics, INC. Model: ADP-66CR BC
Note: The information of the EUT is declared by the manufacturer.	

XS-250WX-A	XS-240W-A
With 10GE port	Without 10GE port
Note: Customer declaration, two models is the same except 10GE port. During the test, both of two models are evaluated, XS-250WX-A selected as the worst condition, but only the worst case is recorded in this report.	

	Model	ONU Part number	Kit Part number
US ONU	XS-250WX-A	3FE 48307 AA	-
US Kit	XS-250WX-A	3FE 48307 AA	3FE 48439 AA
US ONU	XS-240W-A	3FE 48631 AA	-
US Kit	XS-240W-A	3FE 48631 AA	3FE 48626 AA

XS-250WX-A/XS-240W-A (R1801B0002-R1) is a variant model of XS-250WX-A/XS-240W-A (RBA1709-0095RF03R2).

Tested band refer to the following table.

The detailed product change description please refers to the ANNEX B.

Band	Original (RBA1709-0095RF03R2)	Variant (R1801B0002-R1)
U-NII-1	Pass	Refer to the Original
U-NII-2A	Not support	Pass
U-NII-2C	Not support	Pass
U-NII-3	Pass	Refer to the Original



3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC CFR47 Part 15E (2018) Unlicensed National Information Infrastructure Devices

ANSI C63.10 (2013)

KDB 789033 D02 General UNII Test Procedures New Rules v01r04

KDB 662911 D01 Multiple Transmitter Output v02r01

4. Test Configuration

Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Band	Data Rate				
	Antenna 1	Antenna 2	Antenna 3	Antenna 4	Antenna type
802.11a	6 Mbps	6 Mbps	6 Mbps	6 Mbps	SISO
802.11n HT20	MCS24	MCS24	MCS24	MCS24	MIMO
802.11n HT40	MCS24	MCS24	MCS24	MCS24	
802.11ac HT20	MCS0NSS4	MCS0NSS4	MCS0NSS4	MCS0NSS4	
802.11ac HT40	MCS0NSS4	MCS0NSS4	MCS0NSS4	MCS0NSS4	
802.11ac HT80	MCS0NSS4	MCS0NSS4	MCS0NSS4	MCS0NSS4	

The worst case Antenna mode for each of the following tests for Wi-Fi:

Test Cases	Antenna 1	Antenna 2	Antenna 3	Antenna 4	MIMO
Average conducted output power	802.11a	802.11a	802.11a	802.11a	802.11n HT20/40 802.11ac HT20/40/80
Occupied bandwidth	--	--	--	--	802.11n HT20/40 802.11ac HT20/40/80
Frequency stability	--	--	--	802.11a	--
Power Spectral Density	802.11a	802.11a	802.11a	802.11a	802.11n HT20/40 802.11ac HT20/40/80
Unwanted Emissions	--	802.11a	--	--	802.11n HT20/40 802.11ac HT20/40/80
Conducted Emissions	--	802.11a	--	--	802.11n HT20/40 802.11ac HT20/40/80
Note: "O": test all bands					

**Wireless Technology and Frequency Range**

Wireless Technology		Bandwidth	Channel	Frequency
Wi-Fi	U-NII-1	20 MHz	36	5180MHz
			40	5200MHz
			44	5220MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-2A	20 MHz	52	5260MHz
			56	5280MHz
			60	5300MHz
			64	5320MHz
		40 MHz	54	5270MHz
			62	5310MHz
		80 MHz	58	5290MHz
	U-NII-2C	20 MHz	100	5500MHz
			104	5520MHz
			108	5540MHz
			112	5560MHz
			116	5580MHz
			120	5600MHz
			124	5620MHz
			128	5640MHz
			132	5660MHz
			136	5680MHz
			140	5700MHz
		40 MHz	102	5510MHz
			110	5550MHz
			118	5590MHz
			126	5630MHz
			134	5670MHz
			142	5710MHz
		80 MHz	106	5530MHz
			122	5610MHz
			138	5690MHz
	U-NII-3	20 MHz	149	5745MHz
			157	5785MHz
			165	5825MHz
		40 MHz	151	5755MHz



			159	5795MHz
		80 MHz	155	5775MHz
Does this device support TPC Function? ☐ Yes ☒ No				
Does this device support TDWR Band? ☒ Yes ☐ No				

5. Test Case Results

5.1. Occupied Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

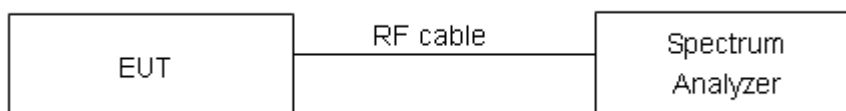
For U-NII-1, set RBW $\approx 1\%$ OCB kHz, VBW $\geq 3 \times$ RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

For U-NII-3, Set RBW = 100 kHz, VBW $\geq 3 \times$ RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

Use the 99 % power bandwidth function of the instrument

Test Setup



Limits

Rule FCC Part §15.407(e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 936$ Hz.

Test Results:
SISO Antenna 4 U-NII-1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	17.344	30.00	PASS
	5200	17.208	29.79	PASS
	5240	17.263	29.26	PASS

SISO Antenna 4 U-NII-2A

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5260	16.855	22.58	PASS
	5300	16.881	23.20	PASS
	5320	16.992	25.58	PASS

SISO Antenna 4 U-NII-2C

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5500	16.666	21.01	PASS
	5580	16.671	21.02	PASS
	5700	16.739	25.32	PASS

SISO Antenna 4 U-NII-3

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit(kHz)	Conclusion
802.11a	5745	16.570	16.40	500	PASS
	5785	16.554	16.41	500	PASS
	5825	16.551	16.37	500	PASS



SISO Antenna 4

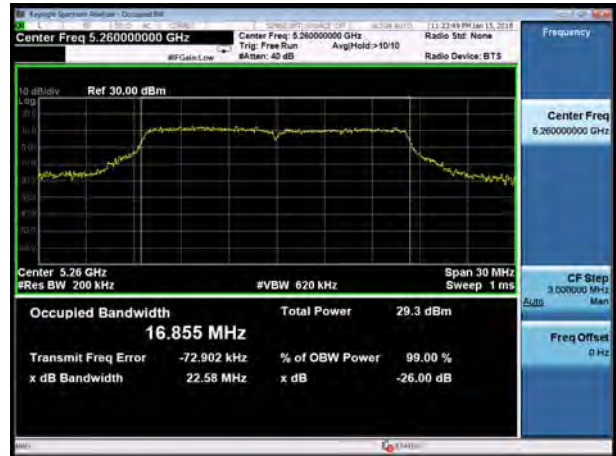
U-NII-1, 802.11a

Carrier frequency (MHz): 5180



U-NII-2A, 802.11a

Carrier frequency (MHz): 5260



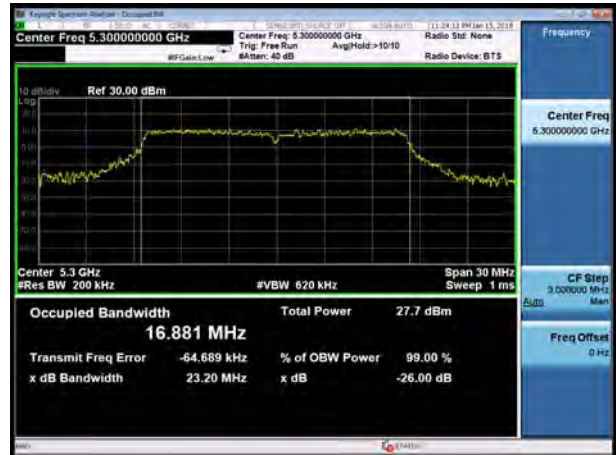
U-NII-1, 802.11a

Carrier frequency (MHz): 5200



U-NII-2A, 802.11a

Carrier frequency (MHz): 5300



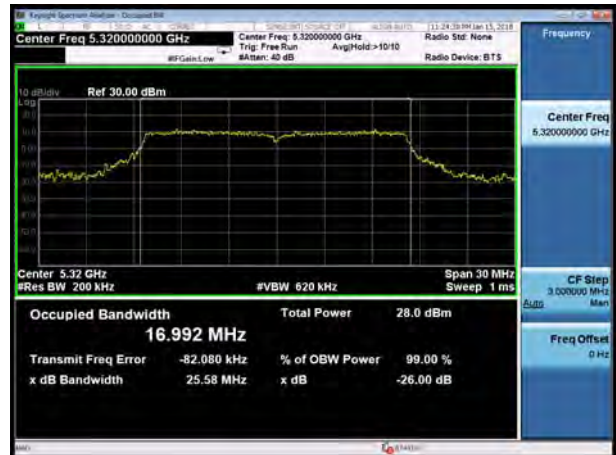
U-NII-1, 802.11a

Carrier frequency (MHz): 5240

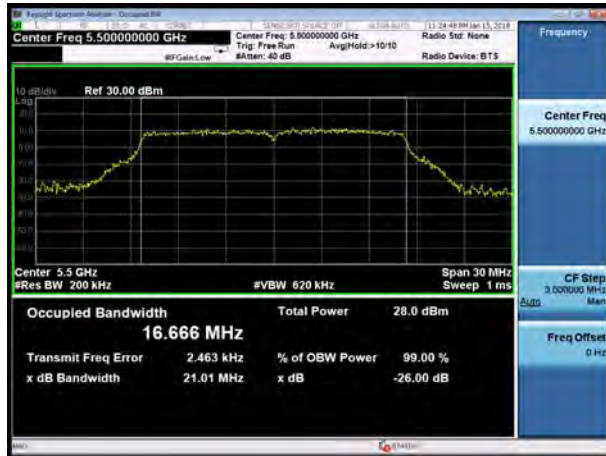


U-NII-2A, 802.11a

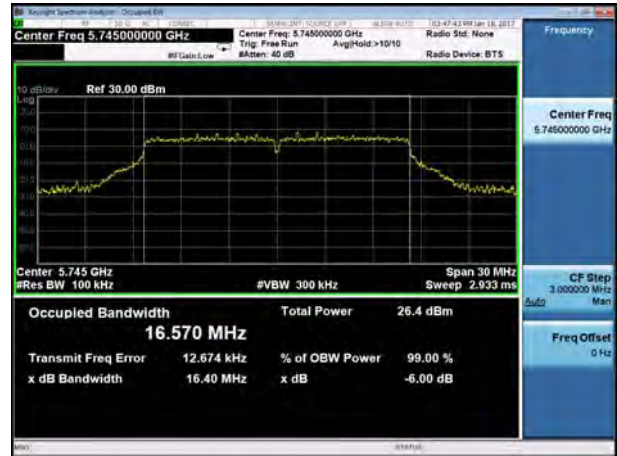
Carrier frequency (MHz): 5320



U-NII-2C, 802.11a
Carrier frequency (MHz): 5500



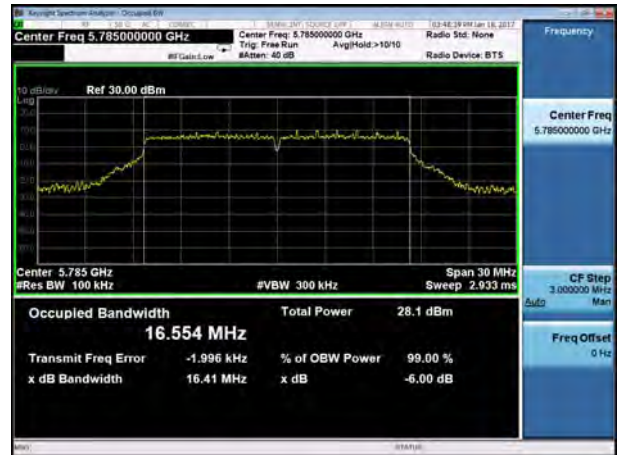
U-NII-3, 802.11a
Carrier frequency (MHz): 5745



U-NII-2C, 802.11a
Carrier frequency (MHz): 5580



U-NII-3, 802.11a
Carrier frequency (MHz): 5785



U-NII-2C, 802.11a
Carrier frequency (MHz): 5700



U-NII-3, 802.11a
Carrier frequency (MHz): 5825



**MIMO Antenna 4 U-NII-1**

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Limit(kHz)	Conclusion
802.11n HT20	5180	17.862	21.54	500	PASS
	5200	17.830	21.19	500	PASS
	5240	17.837	21.58	500	PASS
802.11n HT40	5190	36.188	39.33	500	PASS
	5230	36.197	39.13	500	PASS
802.11ac HT20	5180	17.837	21.21	500	PASS
	5200	17.839	21.68	500	PASS
	5240	17.864	21.34	500	PASS
802.11ac HT40	5190	36.177	39.07	500	PASS
	5230	36.183	39.20	500	PASS
802.11ac HT80	5210	75.028	78.78	500	PASS

MIMO Antenna 4 U-NII-3

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit(kHz)	Conclusion
802.11n HT20	5745	17.913	17.902	500	PASS
	5785	17.911	17.882	500	PASS
	5825	17.898	17.890	500	PASS
802.11n HT40	5755	36.304	36.319	500	PASS
	5795	36.278	36.260	500	PASS
802.11ac HT20	5745	17.946	17.939	500	PASS
	5785	17.886	17.921	500	PASS
	5825	17.915	17.857	500	PASS
802.11ac HT40	5755	36.309	36.305	500	PASS
	5795	36.298	36.301	500	PASS
802.11ac HT80	5775	75.765	75.730	500	PASS

MIMO Antenna 4 U-NII-2A (Without Beamforming)

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11n HT20	5260	17.821	21.19	PASS
	5300	17.837	21.50	PASS
	5320	17.826	21.05	PASS
802.11n HT40	5270	36.210	39.20	PASS
	5310	36.309	39.23	PASS
802.11ac HT20	5260	17.741	21.19	PASS
	5300	17.840	21.26	PASS
	5320	17.856	20.74	PASS
802.11ac HT40	5270	36.274	39.49	PASS
	5310	36.258	39.38	PASS
802.11ac HT80	5290	75.652	80.00	PASS

MIMO Antenna 4 U-NII-2A (With Beamforming)

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11n HT20	5260	16.635	20.87	PASS
	5300	16.703	20.82	PASS
	5320	16.662	20.84	PASS
802.11n HT40	5270	36.250	39.26	PASS
	5310	36.293	39.91	PASS
802.11ac HT20	5260	16.555	20.53	PASS
	5300	16.573	20.49	PASS
	5320	16.571	20.67	PASS
802.11ac HT40	5270	36.261	30.39	PASS
	5310	36.670	39.96	PASS
802.11ac HT80	5290	75.644	81.49	PASS

**MIMO Antenna 4 U-NII-2C (Without Beamforming)**

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11n HT20	5500	16.594	20.92	PASS
	5580	17.477	20.83	PASS
	5700	16.572	20.56	PASS
802.11n HT40	5510	36.285	39.44	PASS
	5550	36.291	39.60	PASS
	5670	36.373	39.40	PASS
802.11ac HT20	5500	16.700	20.86	PASS
	5580	16.541	20.76	PASS
	5700	16.559	20.53	PASS
802.11ac HT40	5510	36.231	39.50	PASS
	5550	36.245	39.49	PASS
	5670	36.305	39.75	PASS
802.11ac HT80	5530	75.601	80.79	PASS

MIMO Antenna 4 U-NII-2C (With Beamforming)

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11n HT20	5500	16.502	20.84	PASS
	5580	16.583	20.87	PASS
	5700	16.553	20.69	PASS
802.11n HT40	5510	36.266	39.59	PASS
	5550	36.256	39.35	PASS
	5670	36.267	39.59	PASS
802.11ac HT20	5500	16.507	20.62	PASS
	5580	16.498	20.47	PASS
	5700	16.486	19.67	PASS
802.11ac HT40	5510	36.303	39.25	PASS
	5550	36.256	39.72	PASS
	5670	36.279	39.93	PASS
802.11ac HT80	5530	75.680	80.81	PASS



MIMO Antenna 4 U-NII-1

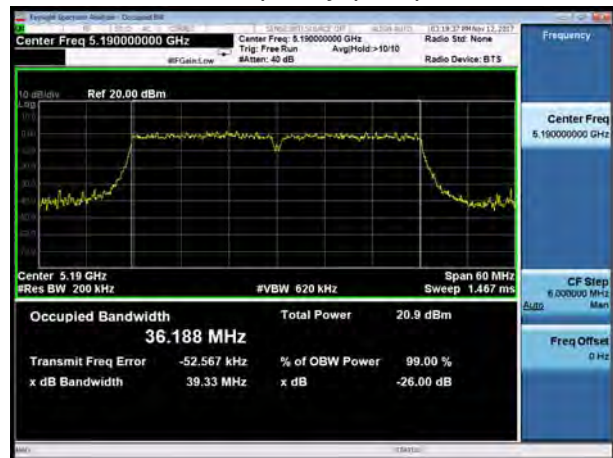
U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5180



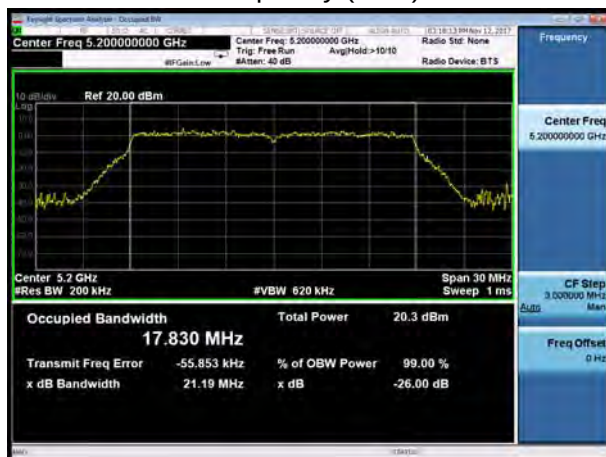
U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5190



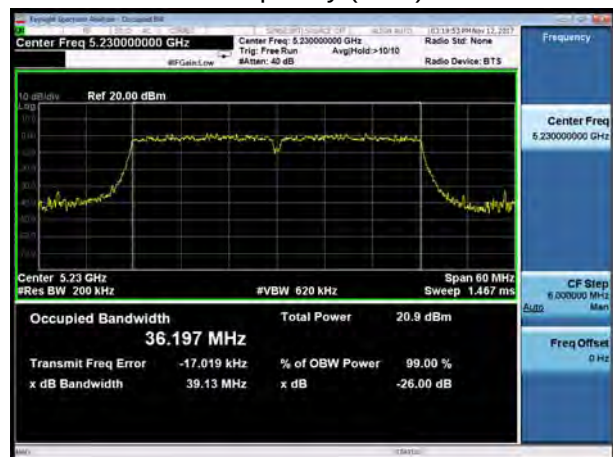
U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5200



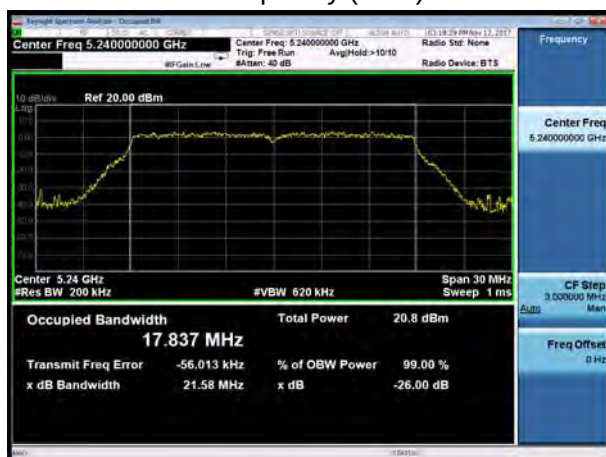
U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5230



U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5240



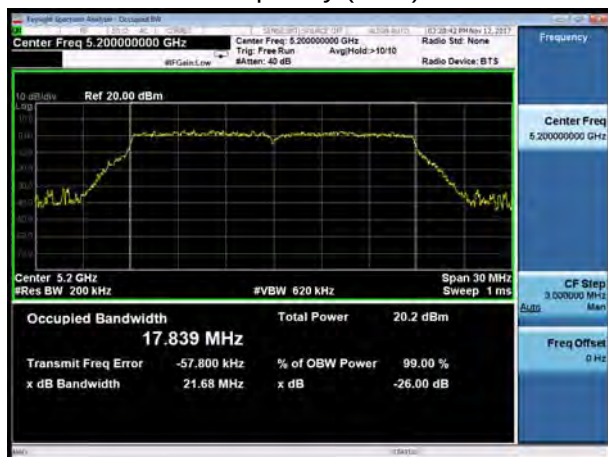
U-NII-1, 802.11ac HT20
Carrier frequency (MHz): 5180



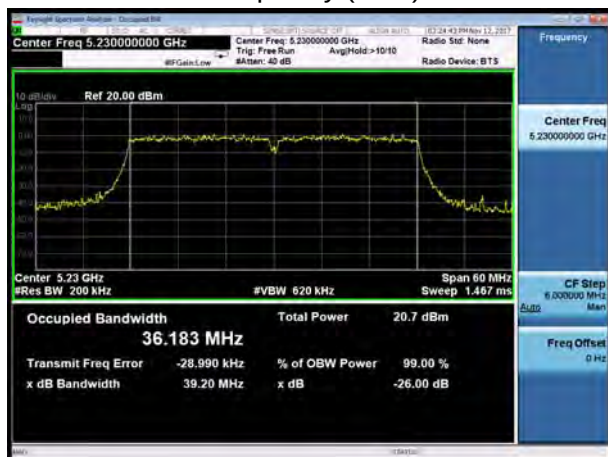
U-NII-1, 802.11ac HT40
Carrier frequency (MHz): 5190



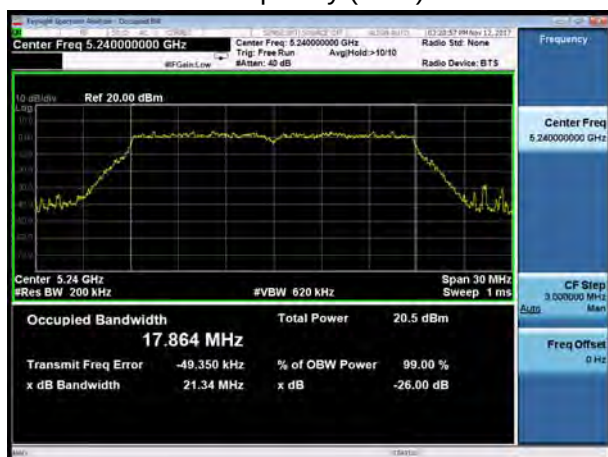
U-NII-1, 802.11ac HT20
Carrier frequency (MHz): 5200



U-NII-1, 802.11ac HT40
Carrier frequency (MHz): 5230



U-NII-1, 802.11ac HT20
Carrier frequency (MHz): 5240



U-NII-1, 802.11ac HT80
Carrier frequency (MHz): 5210



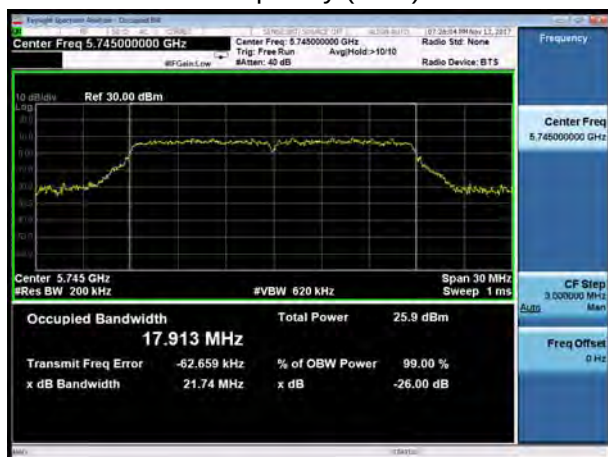


MIMO Antenna 4 U-NII-3

99% bandwidth

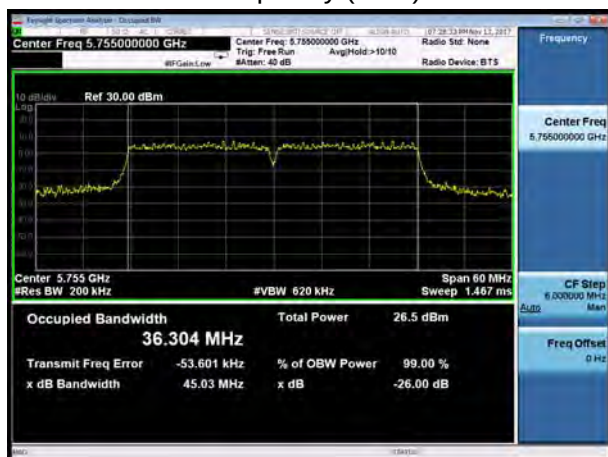
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



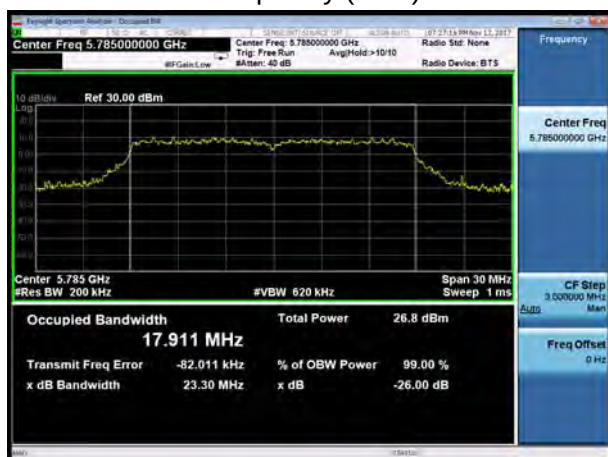
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



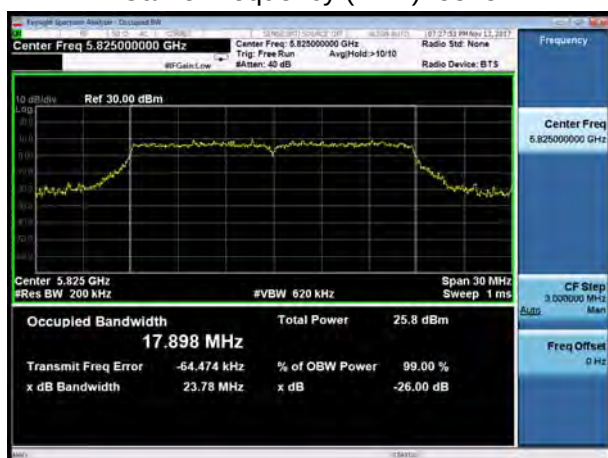
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825

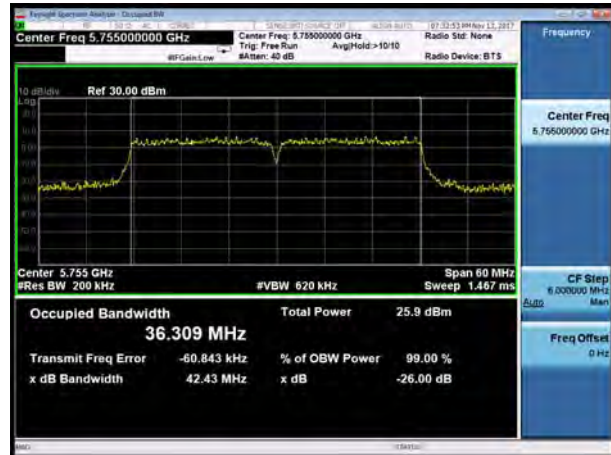




U-NII-3, 802.11ac HT20
Carrier frequency (MHz): 5745



U-NII-3, 802.11ac HT40
Carrier frequency (MHz): 5755



U-NII-3, 802.11ac HT20
Carrier frequency (MHz): 5785



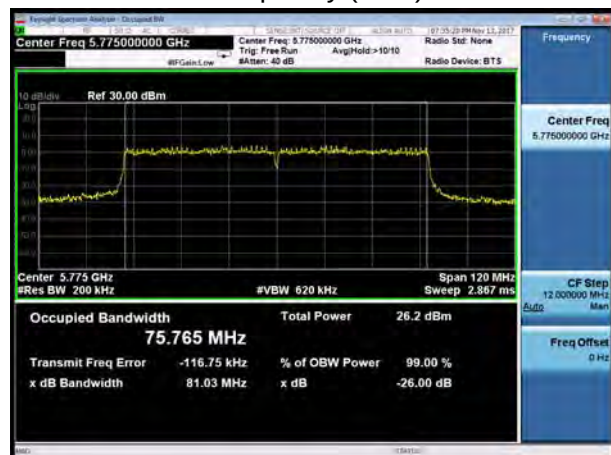
U-NII-3, 802.11ac HT40
Carrier frequency (MHz): 5795



U-NII-3, 802.11ac HT20
Carrier frequency (MHz): 5825



U-NII-3, 802.11ac HT80
Carrier frequency (MHz): 5775

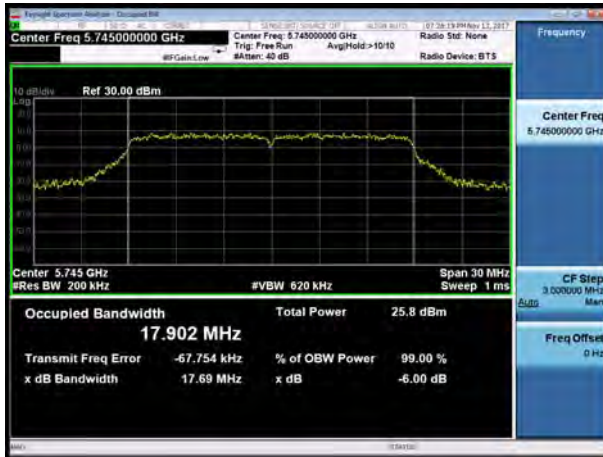




Minimum 6 dB bandwidth

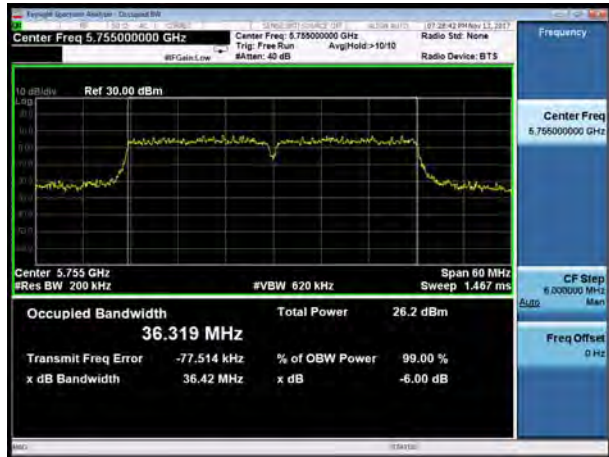
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



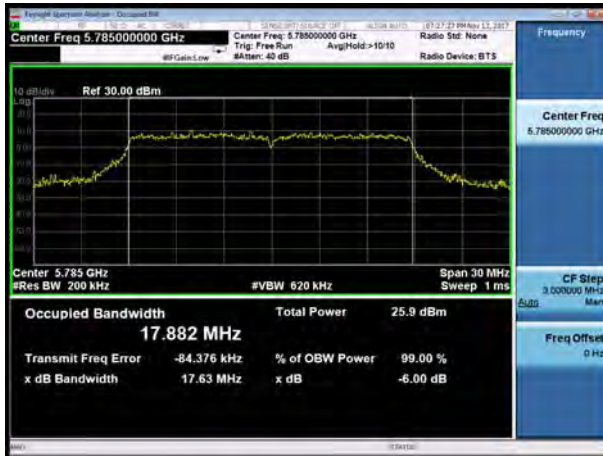
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755



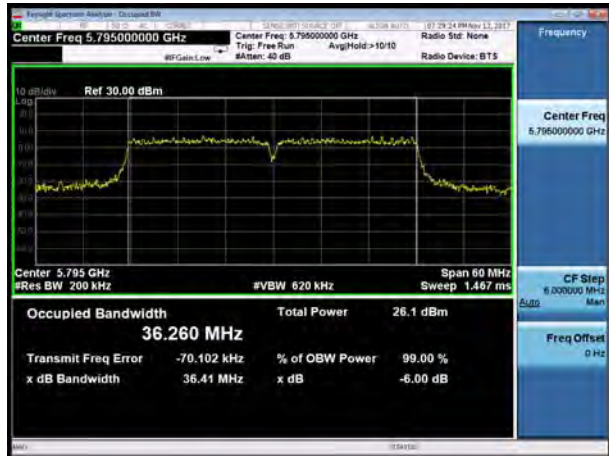
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795

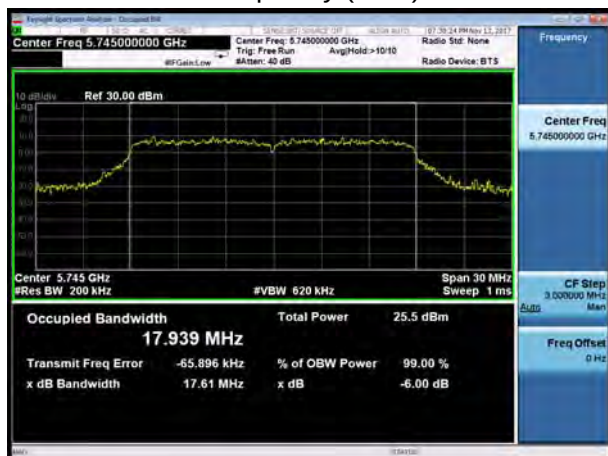


U-NII-3, 802.11n HT20

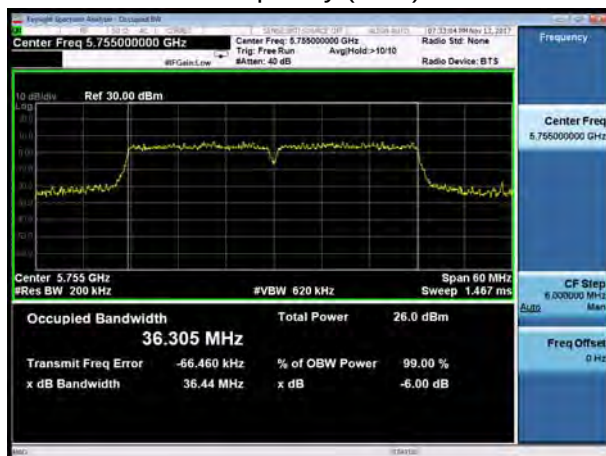
Carrier frequency (MHz): 5825



U-NII-3, 802.11ac HT20
Carrier frequency (MHz): 5745



U-NII-3, 802.11ac HT40
Carrier frequency (MHz): 5755



U-NII-3, 802.11ac HT20
Carrier frequency (MHz): 5785



U-NII-3, 802.11ac HT40
Carrier frequency (MHz): 5795



U-NII-3, 802.11ac HT20
Carrier frequency (MHz): 5825



U-NII-3, 802.11ac HT80
Carrier frequency (MHz): 5775



MIMO Antenna 4 U-NII-2A (Without Beamforming)

U-NII-2A, 802.11n HT20

Carrier frequency (MHz): 5260



U-NII-2A, 802.11n HT40

Carrier frequency (MHz): 5270



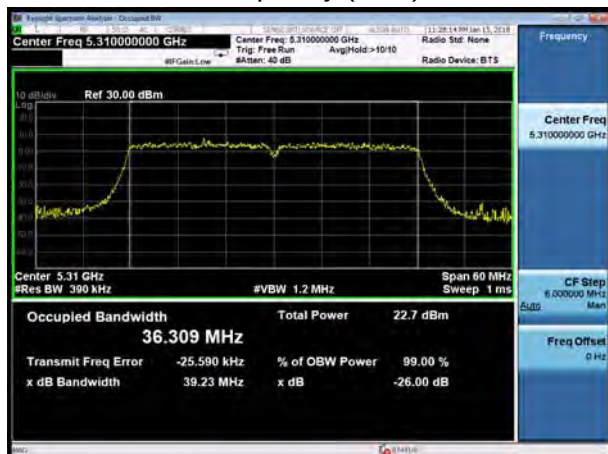
U-NII-2A, 802.11n HT20

Carrier frequency (MHz): 5300



U-NII-2A, 802.11n HT40

Carrier frequency (MHz): 5310

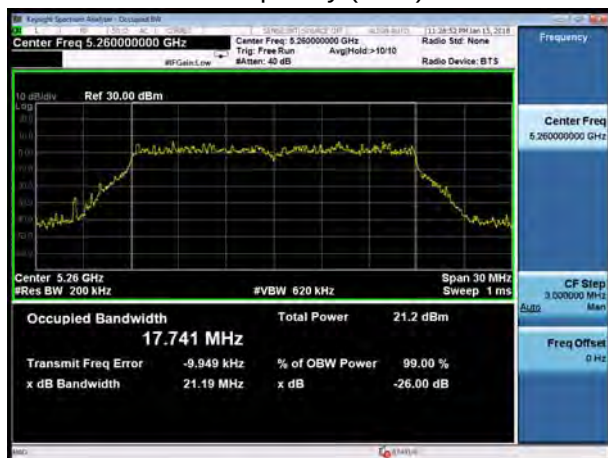


U-NII-2A, 802.11n HT20

Carrier frequency (MHz): 5320



U-NII-2A, 802.11ac HT20
Carrier frequency (MHz):5260



U-NII-2A, 802.11ac HT40
Carrier frequency (MHz): 5270



U-NII-2A, 802.11ac HT20
Carrier frequency (MHz): 5300



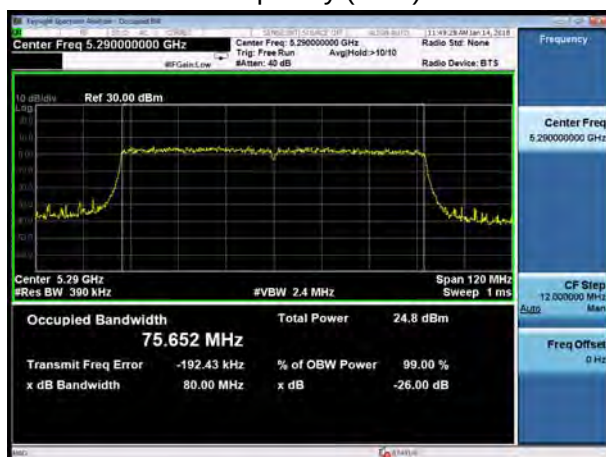
U-NII-2A, 802.11ac HT40
Carrier frequency (MHz): 5310



U-NII-2A, 802.11ac HT20
Carrier frequency (MHz):5320

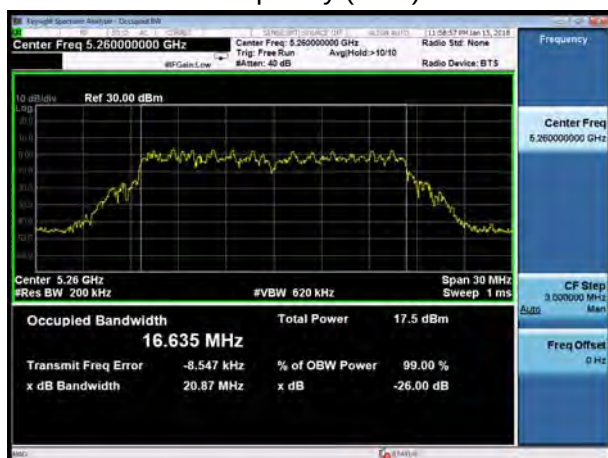


U-NII-2A, 802.11ac HT80
Carrier frequency (MHz): 5290



**MIMO Antenna 4 U-NII-2A (With Beamforming)**

U-NII-2A, 802.11n HT20
Carrier frequency (MHz): 5260



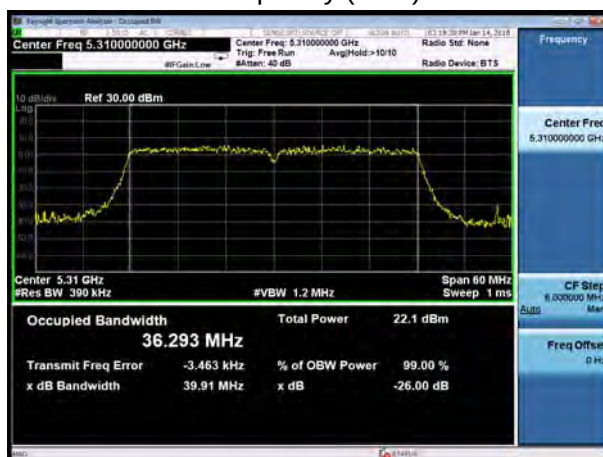
U-NII-2A, 802.11n HT40
Carrier frequency (MHz): 5270



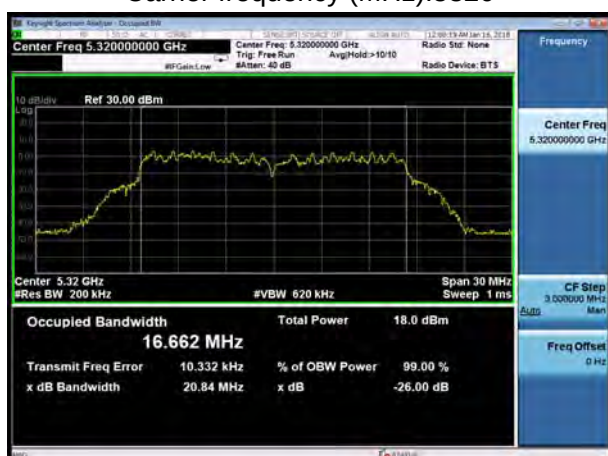
U-NII-2A, 802.11n HT20
Carrier frequency (MHz): 5300



U-NII-2A, 802.11n HT40
Carrier frequency (MHz): 5310



U-NII-2A, 802.11n HT20
Carrier frequency (MHz): 5320



U-NII-2A, 802.11ac HT20
Carrier frequency (MHz):5260



U-NII-2A, 802.11ac HT40
Carrier frequency (MHz): 5270



U-NII-2A, 802.11ac HT20
Carrier frequency (MHz): 5300



U-NII-2A, 802.11ac HT40
Carrier frequency (MHz): 5310



U-NII-2A, 802.11ac HT20
Carrier frequency (MHz):5320

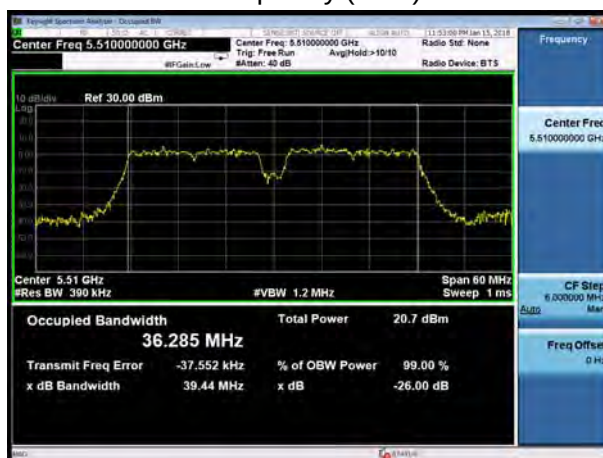
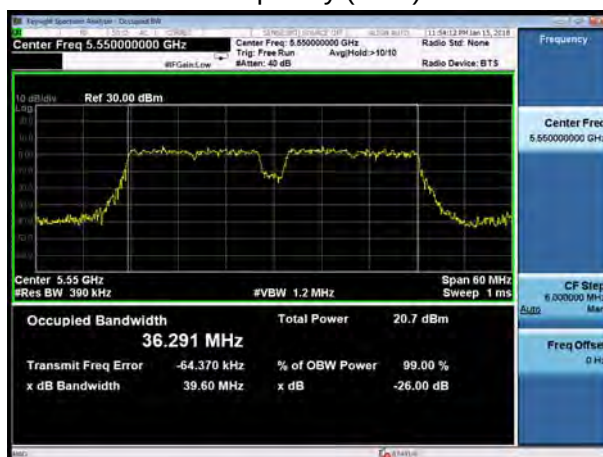


U-NII-2A, 802.11ac HT80
Carrier frequency (MHz): 5290

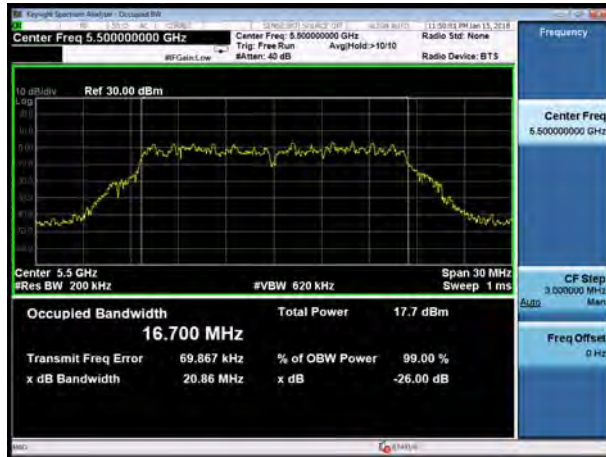




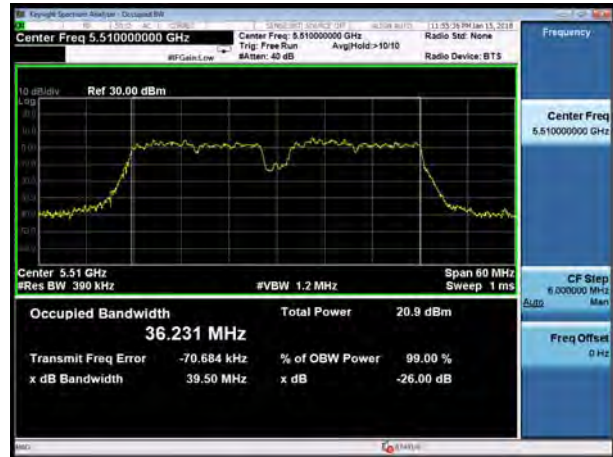
MIMO Antenna 4 U-NII-2C (Without Beamforming)

U-NII-2C, 802.11n HT20
Carrier frequency (MHz): 5500U-NII-2C, 802.11n HT40
Carrier frequency (MHz): 5510U-NII-2C, 802.11n HT20
Carrier frequency (MHz): 5580U-NII-2C, 802.11n HT40
Carrier frequency (MHz): 5550U-NII-2C, 802.11n HT20
Carrier frequency (MHz): 5700U-NII-2C, 802.11n HT40
Carrier frequency (MHz): 5670

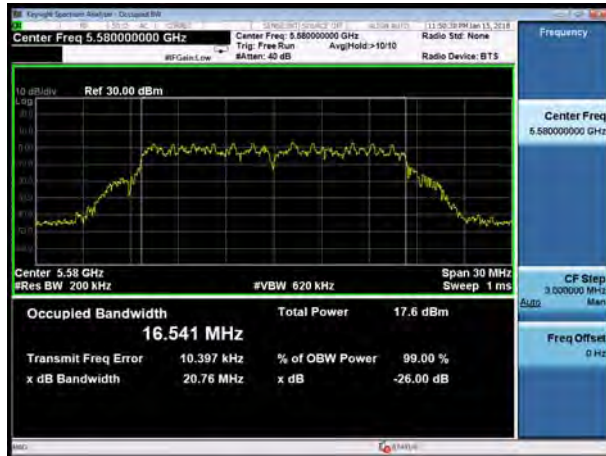
U-NII-2C, 802.11ac HT20
Carrier frequency (MHz): 5500



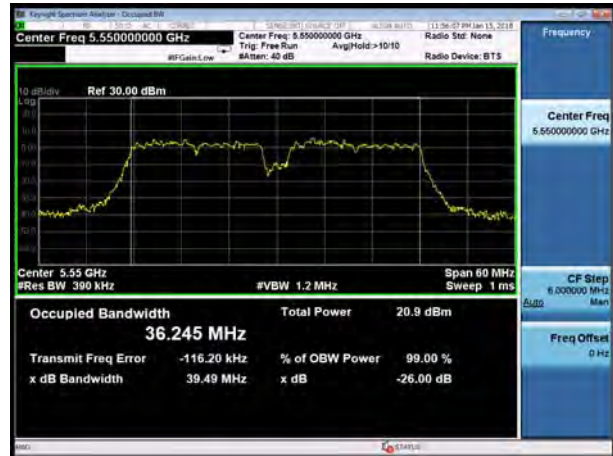
U-NII-2C, 802.11ac HT40
Carrier frequency (MHz): 5510



U-NII-2C, 802.11ac HT20
Carrier frequency (MHz): 5580



U-NII-2C, 802.11ac HT40
Carrier frequency (MHz): 5550



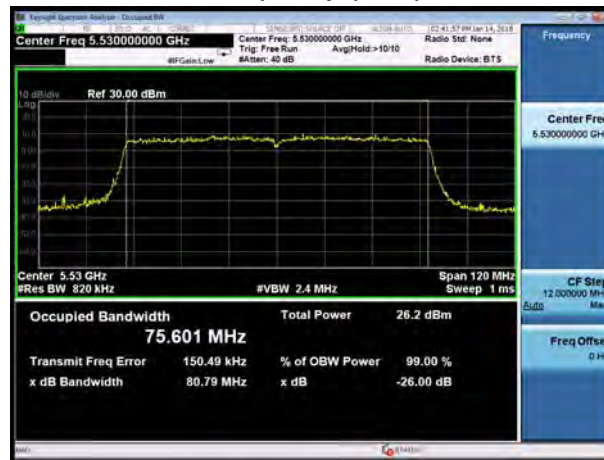
U-NII-2C, 802.11ac HT20
Carrier frequency (MHz): 5700



U-NII-2C, 802.11ac HT40
Carrier frequency (MHz): 5670



U-NII-2C, 802.11ac HT80
Carrier frequency (MHz): 5530



MIMO Antenna 4 U-NII-2C (With Beamforming)

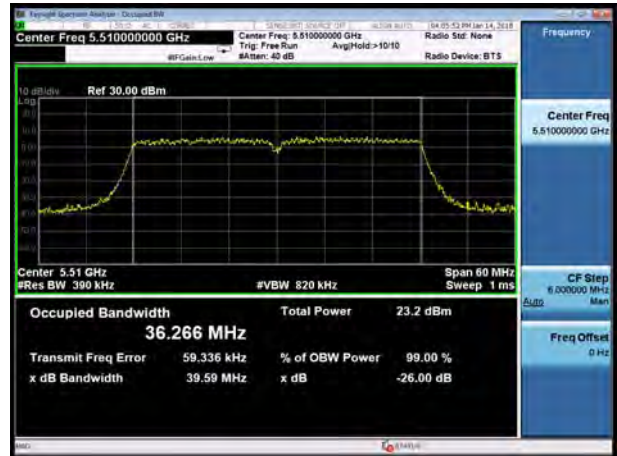
U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5500



U-NII-2C, 802.11n HT40

Carrier frequency (MHz): 5510



U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5580



U-NII-2C, 802.11n HT40

Carrier frequency (MHz): 5550



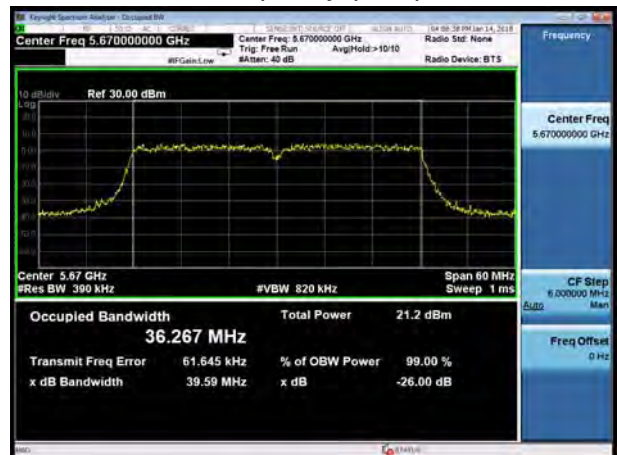
U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5700



U-NII-2C, 802.11n HT40

Carrier frequency (MHz): 5670



U-NII-2C, 802.11ac HT20
Carrier frequency (MHz): 5500



U-NII-2C, 802.11ac HT40
Carrier frequency (MHz): 5510



U-NII-2C, 802.11ac HT20
Carrier frequency (MHz): 5580



U-NII-2C, 802.11ac HT40
Carrier frequency (MHz): 5550



U-NII-2C, 802.11ac HT20
Carrier frequency (MHz): 5700



U-NII-2C, 802.11ac HT40
Carrier frequency (MHz): 5670



U-NII-2C, 802.11ac HT80
Carrier frequency (MHz): 5530



5.2. Average Power Output –Conducted

Ambient condition

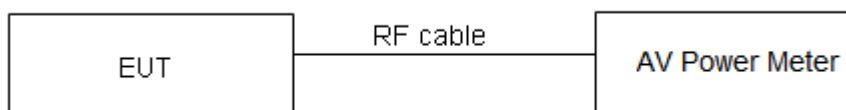
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to AV Power Meter through an external attenuator and a known loss cable. The EUT is max power transmission with proper modulation. We use Maximum average Conducted Output Power Level Method in KDB789033 for this test

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Test Setup



Limits

Rule FCC Part 15.407(a)(1)(2)(3)

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.44$ dB.



Test Results

Without beamforming

Network Standards		Channel/Frequency (MHz)	B=26 dB bandwidth (MHz)	Limit 11 dBm + 10 log B (dBm)	Final Limit(dBm)
U-NII-2A	802.11a	52/5260	22.58	24.54	24
		60/5300	23.20	24.65	24
		64/5320	25.58	25.08	24
	802.11n HT20	52/5260	21.19	24.26	24
		60/5300	21.50	24.32	24
		64/5320	21.05	24.23	24
	802.11n HT40	54/5270	39.20	26.93	24
		62/5310	39.23	26.94	24
	802.11ac HT20	52/5260	21.19	24.26	24
		60/5300	21.26	24.28	24
		64/5320	20.74	24.17	24
	802.11ac HT40	54/5270	39.49	26.96	24
		62/5310	39.38	26.95	24
	802.11ac HT80	58/5290	80.00	30.03	24
U-NII-2C	802.11a	100/5500	21.01	24.22	24
		116/5580	21.02	24.23	24
		140/5700	25.32	25.03	24
	802.11n HT20	100/5500	20.92	24.21	24
		116/5580	20.83	24.19	24
		140/5700	20.56	24.13	24
	802.11n HT40	102/5510	39.44	26.96	24
		110/5550	39.60	26.98	24
		134/5670	39.40	26.95	24
	802.11ac HT20	100/5500	20.86	24.19	24
		116/5580	20.76	24.17	24
		140/5700	20.53	24.12	24
	802.11ac HT40	102/5510	39.50	26.97	24
		110/5550	39.49	26.96	24
		134/5670	39.75	26.99	24
	802.11ac HT80	106/5530	80.79	30.07	24
Note: 250mW=24dBm					

**With beamforming**

Network Standards		Channel/Frequency (MHz)	B=26 dB bandwidth (MHz)	Limit 11 dBm + 10 log B (dBm)	Final Limit(dBm)
U-NII-2A	802.11n HT20	52/5260	20.87	24.20	24.00
		60/5300	20.82	24.18	24.00
		64/5320	20.84	24.19	24.00
	802.11n HT40	54/5270	39.26	26.94	24.00
		62/5310	39.91	27.01	24.00
	802.11ac HT20	52/5260	20.53	24.12	24.00
		60/5300	20.49	24.12	24.00
		64/5320	20.67	24.15	24.00
	802.11ac HT40	54/5270	30.37	25.82	24.00
		62/5310	39.96	27.02	24.00
	802.11ac HT80	58/5290	81.49	30.11	24.00
U-NII-2C	802.11n HT20	100/5500	20.84	24.19	24.00
		116/5580	20.87	24.20	24.00
		140/5700	20.69	24.16	24.00
	802.11n HT40	102/5510	39.59	26.98	24.00
		110/5550	39.35	26.95	24.00
		134/5670	39.59	26.98	24.00
	802.11ac HT20	100/5500	20.62	24.14	24.00
		116/5580	20.47	24.11	24.00
		140/5700	19.67	23.94	23.94
	802.11ac HT40	102/5510	39.25	26.94	24.00
		110/5550	39.72	26.99	24.00
		134/5670	39.93	27.01	24.00
	802.11ac HT80	106/5530	80.81	30.07	24.00

Note: 250mW=24dBm

Band	T _{on} (ms)	T _(on+off) (ms)	Duty cycle	Duty cycle correction Factor(dB)
802.11a	2.06	2.17	0.95	0.23
802.11n HT20	1.92	2.02	0.95	0.22
802.11n HT40	1.93	1.96	0.98	0.07
802.11ac HT20	0.94	1.04	0.90	0.44
802.11ac HT40	0.95	0.98	0.97	0.13
802.11ac HT80	2.07	2.18	0.95	0.22
Note: when Duty cycle>0.98, Duty cycle correction Factor not required.				

SISO Antenna 1 U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	22.12	30	PASS
	40/5200	23.08	30	PASS
	48/5240	22.08	30	PASS

SISO Antenna 2 U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	23.19	30	PASS
	40/5200	23.96	30	PASS
	48/5240	22.74	30	PASS

SISO Antenna 3 U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	22.51	30	PASS
	40/5200	23.24	30	PASS
	48/5240	22.36	30	PASS

SISO Antenna 4 U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	23.91	30	PASS
	40/5200	24.81	30	PASS
	48/5240	23.92	30	PASS

**SISO Antenna 1 U-NII-2A**

Network Standards	Channel/ Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	52/5260	22.02	22.25	24.00	PASS
	60/5300	21.86	22.09	24.00	PASS
	64/5320	21.62	21.85	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

SISO Antenna 2 U-NII-2A

Network Standards	Channel/ Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	52/5260	22.41	22.64	24.00	PASS
	60/5300	21.24	21.47	24.00	PASS
	64/5320	20.74	20.97	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

SISO Antenna 3 U-NII-2A

Network Standards	Channel/ Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	52/5260	22.44	22.67	24.00	PASS
	60/5300	21.63	21.86	24.00	PASS
	64/5320	20.89	21.12	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

SISO Antenna 4 U-NII-2A

Network Standards	Channel/ Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	52/5260	22.90	23.13	24.00	PASS
	60/5300	21.84	22.07	24.00	PASS
	64/5320	21.65	21.88	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

**SISO Antenna 1 U-NII-2C**

Network Standards	Channel/Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	100/5500	22.18	22.41	24.00	PASS
	116/5580	21.28	21.51	24.00	PASS
	140/5700	22.13	22.36	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

SISO Antenna 2 U-NII-2C

Network Standards	Channel/Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	100/5500	21.66	21.89	24.00	PASS
	116/5580	21.64	21.87	24.00	PASS
	140/5700	23.30	23.53	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

SISO Antenna 3 U-NII-2C

Network Standards	Channel/Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	100/5500	21.54	21.77	24.00	PASS
	116/5580	21.01	21.24	24.00	PASS
	140/5700	22.97	23.20	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

SISO Antenna 4 U-NII-2C

Network Standards	Channel/Frequency (MHz)	Read Value (dBm)	Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	100/5500	22.18	22.41	24.00	PASS
	116/5580	21.89	22.12	24.00	PASS
	140/5700	22.92	23.15	24.00	PASS
Note: Output Power=Read Value+Duty cycle correction factor					

**SISO Antenna 1 U-NII-3**

Network Standards	Channel/Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	22.76	30	PASS
	157/5785	23.22	30	PASS
	165/5825	22.90	30	PASS

SISO Antenna 2 U-NII-3

Network Standards	Channel/Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	23.20	30	PASS
	157/5785	23.41	30	PASS
	165/5825	23.14	30	PASS

SISO Antenna 3 U-NII-3

Network Standards	Channel/Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	25.18	30	PASS
	157/5785	26.02	30	PASS
	165/5825	25.53	30	PASS

SISO Antenna 4 U-NII-3

Network Standards	Channel/Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	22.31	30	PASS
	157/5785	22.77	30	PASS
	165/5825	22.40	30	PASS

**MIMO without beamforming****U-NII-1**

Network Standards		Channel/ Frequency (MHz)	Average Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-1	36/5180	20.36	21.59	21.18	22.44	27.48	30	PASS
		40/5200	21.40	22.26	21.78	23.00	28.17	30	PASS
		48/5240	20.74	21.83	21.27	22.37	27.62	30	PASS
802.11n HT40	U-NII-1	38/5190	17.41	18.25	17.73	18.79	24.10	30	PASS
		46/5230	17.51	18.55	17.98	19.06	24.33	30	PASS
802.11ac HT20	U-NII-1	36/5180	20.73	21.63	21.22	22.37	27.55	30	PASS
		40/5200	21.31	22.03	21.85	22.82	28.06	30	PASS
		48/5240	21.01	21.78	21.13	22.56	27.69	30	PASS
802.11ac HT40	U-NII-1	38/5190	17.45	18.31	17.82	18.75	24.13	30	PASS
		46/5230	17.49	18.61	18.07	19.00	24.35	30	PASS
802.11ac HT80	U-NII-1	42/5210	17.51	18.25	17.91	19.09	24.25	30	PASS

Note: According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain, Directional gain = GANT + Array Gain,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less, for 20-MHz channel widths with NANT ≥ 5.

So directional gain = GANT + Array Gain = 3 dBi < 6dBi. So the power limit is 30dBm.



U-NII-2A

Network Standards		Channel/ Frequency (MHz)	Average Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-2A	52/5260	11.97	15.88	11.83	13.53	19.65	24	PASS
		60/5300	12.58	11.72	11.60	13.35	18.39	24	PASS
		64/5320	12.91	11.65	11.77	13.22	18.46	24	PASS
802.11n HT40	U-NII-2A	54/5270	14.63	15.26	15.15	15.74	21.23	24	PASS
		62/5310	15.30	14.84	14.88	15.53	21.17	24	PASS
802.11ac HT20	U-NII-2A	52/5260	12.16	12.28	12.36	13.93	18.76	24	PASS
		60/5300	13.04	12.05	12.11	13.74	18.81	24	PASS
		64/5320	13.29	12.19	11.98	13.63	18.85	24	PASS
802.11ac HT40	U-NII-2A	54/5270	15.13	15.44	15.36	16.11	21.54	24	PASS
		62/5310	15.88	15.04	14.92	15.83	21.46	24	PASS
802.11ac HT80	U-NII-2A	58/5290	17.58	17.53	17.29	17.52	23.51	24	PASS

Note: According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = GANT + Array Gain,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = GANT + Array Gain = 3 dBi < 6dBi. So the power limit is 24dBm.



U-NII-2C

Network Standards		Channel/ Frequency (MHz)	Average Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-2C	100/5500	12.97	13.18	12.67	13.47	19.10	24	PASS
		116/5580	12.27	13.02	12.15	13.47	18.78	24	PASS
		140/5700	11.77	13.25	13.12	12.68	18.76	24	PASS
802.11n HT40	U-NII-2C	102/5510	15.45	15.62	15.22	16.00	21.60	24	PASS
		110/5550	15.17	15.63	15.14	16.07	21.54	24	PASS
		134/5670	15.34	15.36	14.86	15.48	21.29	24	PASS
802.11ac HT20	U-NII-2C	100/5500	13.36	13.79	13.24	13.99	19.62	24	PASS
		116/5580	12.67	13.49	12.72	13.85	19.23	24	PASS
		140/5700	12.20	13.18	13.51	12.88	18.99	24	PASS
802.11ac HT40	U-NII-2C	102/5510	15.79	16.04	15.66	16.45	22.01	24	PASS
		110/5550	15.66	15.99	15.76	16.58	22.03	24	PASS
		134/5670	15.68	15.68	15.27	15.93	21.66	24	PASS
802.11ac HT80	U-NII-2C	106/5530	17.54	17.55	17.34	18.51	23.79	24	PASS

Note: According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = GANT + Array Gain,
For power measurements on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $NANT \geq 5$.
So directional gain = GANT + Array Gain = 3 dBi < 6dBi. So the power limit is 24dBm.



U-NII-3

Network Standards		Channel/ Frequency (MHz)	Average Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-3	149/5745	20.38	20.81	22.62	19.62	27.02	30	PASS
		157/5785	21.21	21.43	23.48	20.34	27.80	30	PASS
		165/5825	20.49	20.76	22.83	19.90	27.17	30	PASS
802.11n HT40	U-NII-3	151/5755	20.88	21.07	23.29	20.25	27.56	30	PASS
		159/5795	20.79	20.92	23.07	20.22	27.42	30	PASS
802.11ac HT20	U-NII-3	149/5745	20.24	20.76	22.7	19.68	27.02	30	PASS
		157/5785	20.81	21.38	23.31	20.46	27.66	30	PASS
		165/5825	20.62	20.63	23.05	19.81	27.23	30	PASS
802.11ac HT40	U-NII-3	151/5755	20.94	21.05	23.23	20.31	27.55	30	PASS
		159/5795	20.83	20.89	23.14	20.33	27.46	30	PASS
802.11ac HT80	U-NII-3	155/5775	19.35	19.87	22.26	19.05	26.35	30	PASS

Note: According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = GANT + Array Gain,

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

So directional gain = GANT + Array Gain = 3 dBi < 6dBi. So the power limit is 30dBm.

**MIMO with beamforming**

Network Standards		Channel/ Frequency (MHz)	Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	Total		
802.11n HT20	U-NII-1	36/5180	20.23	20.34	20.45	20.29	26.35	26.98	PASS
		40/5200	20.22	20.33	20.45	20.56	26.41	26.98	PASS
		48/5240	20.36	20.29	20.35	20.48	26.39	26.98	PASS
802.11n HT40	U-NII-1	38/5190	20.54	20.49	20.57	20.63	26.58	26.98	PASS
		46/5230	20.38	20.49	20.47	20.61	26.51	26.98	PASS
802.11ac HT20	U-NII-1	36/5180	20.19	20.11	20.07	20.26	26.18	26.98	PASS
		40/5200	20.26	20.36	20.13	20.28	26.28	26.98	PASS
		48/5240	20.04	20.21	20.09	20.25	26.17	26.98	PASS
802.11ac HT40	U-NII-1	38/5190	20.32	20.26	20.26	20.46	26.35	26.98	PASS
		46/5230	20.31	20.44	20.34	20.38	26.39	26.98	PASS
802.11ac HT80	U-NII-1	42/5210	20.30	20.39	20.32	20.48	26.40	26.98	PASS

Note: 1. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log (4/1) =9.02 dBi>6dBi.
So the limt= 30+(6dBi- 9.02)= 26.98 dBm.

Network Standards		Channel/ Frequency (MHz)	Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	Total		
802.11n HT20	U-NII-2A	52/5260	12.33	11.81	11.69	13.71	18.48	20.98	PASS
		60/5300	12.08	11.54	11.44	13.32	18.18	20.98	PASS
		64/5320	12.15	11.65	11.72	13.24	18.26	20.98	PASS
802.11n HT40	U-NII-2A	54/5270	14.23	14.52	14.34	15.07	20.57	20.98	PASS
		62/5310	14.35	14.51	14.38	15.05	20.60	20.98	PASS
802.11ac HT20	U-NII-2A	52/5260	12.75	12.32	12.42	14.15	18.99	20.98	PASS
		60/5300	12.48	11.97	11.84	14.19	18.75	20.98	PASS
		64/5320	12.52	12.20	12.03	13.98	18.77	20.98	PASS
802.11ac HT40	U-NII-2A	54/5270	14.51	14.50	14.51	15.47	20.78	20.98	PASS
		62/5310	14.80	14.32	14.88	15.43	20.89	20.98	PASS
802.11ac HT80	U-NII-2A	58/5290	14.53	14.60	14.62	15.37	20.82	20.98	PASS
Note: 1. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log（4/1）=9.02 dBi>6dBi. So the limt= 24+(6dBi- 9.02)=20.98 dBm.									



Network Standards		Channel/ Frequency (MHz)	Average Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-2C	100/5500	12.35	13.21	12.45	13.51	18.93	20.98	PASS
		116/5580	12.26	13.04	11.91	13.25	18.67	20.98	PASS
		140/5700	12.58	13.35	13.10	12.41	18.90	20.98	PASS
802.11n HT40	U-NII-2C	102/5510	14.43	14.42	14.41	15.54	20.75	20.98	PASS
		110/5550	14.46	14.54	14.56	15.40	20.78	20.98	PASS
		134/5670	14.31	14.52	14.39	14.80	20.53	20.98	PASS
802.11ac HT20	U-NII-2C	100/5500	13.02	13.66	13.23	13.98	19.51	20.98	PASS
		116/5580	12.77	13.43	12.66	13.94	19.25	20.98	PASS
		140/5700	12.89	13.39	13.30	12.98	19.16	20.92	PASS
802.11ac HT40	U-NII-2C	102/5510	14.54	14.58	14.46	15.56	20.83	20.98	PASS
		110/5550	14.31	14.60	14.63	15.38	20.76	20.98	PASS
		134/5670	14.37	14.49	14.50	14.79	20.56	20.98	PASS
802.11ac HT80	U-NII-2C	106/5530	14.50	14.74	14.78	15.62	20.96	20.98	PASS

Note: 1. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log（4/1）=9.02 dBi>6dBi.
So the limt= 24+(6dBi- 9.02)=20.98, 23.94+(6dBi- 9.02)=20.92dBm.

Network Standards		Channel/ Frequency (MHz)	Output Power (dBm)					Limit (dBm)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	Total		
802.11n HT20	U-NII-3	149/5745	20.26	20.37	19.99	20.07	26.20	26.98	PASS
		157/5785	20.13	20.25	20.27	20.20	26.23	26.98	PASS
		165/5825	20.22	20.35	20.27	20.04	26.24	26.98	PASS
802.11n HT40	U-NII-3	151/5755	20.54	20.73	20.45	20.75	26.64	26.98	PASS
		159/5795	20.31	20.50	20.02	20.41	26.33	26.98	PASS
802.11ac HT20	U-NII-3	149/5745	20.20	19.96	19.89	20.17	26.08	26.98	PASS
		157/5785	19.77	20.01	19.94	20.08	25.97	26.98	PASS
		165/5825	20.03	19.81	19.70	19.88	25.88	26.98	PASS
802.11ac HT40	U-NII-3	151/5755	20.24	20.13	20.29	20.00	26.19	26.98	PASS
		159/5795	20.03	20.14	20.20	19.77	26.06	26.98	PASS
802.11ac HT80	U-NII-3	155/5775	20.25	20.40	20.21	20.39	26.34	26.98	PASS

Note: 1. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log（4/1）=9.02 dBi>6dBi.
So the limt= 30+(6dBi- 9.02)= 26.98 dBm.

5.3. Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. Frequency stability with respect to ambient temperature

a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.

b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.

c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

g) Measure the frequency at each of frequencies specified in 5.6.

h) Switch OFF the EUT but do not switch OFF the oscillator heater.

i) Lower the chamber temperature by not more than 10 C, and allow the temperature inside the chamber to stabilize.

j) Repeat step f) through step i) down to the lowest specified temperature.

2. Frequency stability when varying supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 °C to +25

°C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.

a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.



- b) Tune the EUT to one of the number of frequencies required in 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- c) Measure the frequency at each of the frequencies specified in 5.6.
- d) Repeat the above procedure at 85% and 115% of the nominal supply voltage.

Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 936\text{Hz}$

**Test Results**

Voltage (V)	Temperature (°C)	U-NII-1 Test Results			
		5200MHz			
		1min	2min	5min	10min
120	-20	5199.957	5199.957	5199.952	5199.951
120	-10	5199.952	5199.952	5199.958	5199.955
120	0	5199.957	5199.957	5199.951	5199.954
120	10	5199.959	5199.959	5199.951	5199.951
120	20	5199.954	5199.954	5199.960	5199.951
120	30	5199.955	5199.955	5199.958	5199.958
120	40	5199.958	5199.958	5199.958	5199.958
120	50	5199.956	5199.956	5199.958	5199.958
90	20	5199.952	5199.952	5199.960	5199.955
264	20	5199.951	5199.951	5199.959	5199.952
MHz		0.049	0.050	0.049	0.049
PPM		0.001	0.001	0.001	0.001

Voltage (V)	Temperature (°C)	U-NII-2A Test Results			
		5300MHz			
		1min	2min	5min	10min
120	-20	5299.997	5299.99	5299.982	5299.974
120	-10	5299.992	5299.982	5299.977	5299.97
120	0	5299.986	5299.974	5299.976	5299.962
120	10	5299.982	5299.967	5299.967	5299.954
120	20	5299.976	5299.963	5299.964	5299.944
120	30	5299.968	5299.957	5299.959	5299.935
120	40	5299.962	5299.953	5299.952	5299.927
120	50	5299.958	5299.949	5299.947	5299.925
90	20	5299.95	5299.949	5299.938	5299.924
264	20	5299.942	5299.945	5299.931	5299.922
MHz		-0.05781	-0.05465	-0.06908	-0.07828
PPM		-10.908	-10.3111	-13.0342	-14.7698



Voltage (V)	Temperature (°C)	U-NII-2C Test Results			
		5580MHz			
		1min	2min	5min	10min
120	-20	5580.006	5580.003	5580.001	5580
120	-10	5580	5579.997	5579.997	5580
120	0	5579.995	5579.991	5579.993	5579.991
120	10	5579.985	5579.981	5579.991	5579.991
120	20	5579.98	5579.977	5579.985	5579.987
120	30	5579.973	5579.967	5579.975	5579.984
120	40	5579.965	5579.958	5579.973	5579.983
120	50	5579.961	5579.958	5579.964	5579.982
90	20	5579.96	5579.954	5579.964	5579.978
264	20	5579.954	5579.948	5579.954	5579.975
MHz		-0.04576	-0.05173	-0.04609	-0.02518
PPM		-8.19995	-9.2702	-8.26068	-4.51301

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
120	-20	5784.954	5784.955	5784.952	5784.954
120	-10	5784.957	5784.953	5784.953	5784.951
120	0	5784.952	5784.954	5784.954	5784.959
120	10	5784.955	5784.956	5784.958	5784.952
120	20	5784.951	5784.954	5784.953	5784.950
120	30	5784.954	5784.957	5784.959	5784.957
120	40	5784.955	5784.958	5784.956	5784.956
120	50	5784.952	5784.958	5784.950	5784.958
90	20	5784.959	5784.957	5784.959	5784.954
264	20	5784.952	5784.960	5784.958	5784.958
MHz		0.049	0.047	0.050	0.050
PPM		0.00095	0.00090	0.00096	0.00096

5.4. Power Spectral Density

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

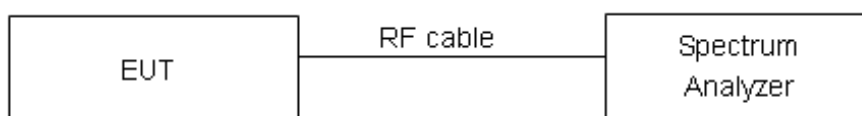
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 510kHz, VBW =1.5MHz for the band 5.725-5.85 GHz

Set RBW = 1 MHz, VBW =3MHz for the band 5.150-5.250 GHz

The conducted PSD is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Test setup



Limits

Rule FCC Part 15.407(a)(1)/ Part 15.407(a)(2) / Part 15.407(a)(3)

For an indoor 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. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Frequency Bands/MHz	Limits
5150-5250	17dBm/MHz
5.25-5.35 GHz and 5.47-5.725 GHz	11dBm/MHz
5725-5850	30dBm/500kHz



Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.75\text{dB}$.

Test Results:

Band	T _{on} (ms)	T _(on+off) (ms)	Duty cycle	Duty cycle correction Factor(dB)
802.11a	2.06	2.17	0.95	0.23
802.11n HT20	1.92	2.02	0.95	0.22
802.11n HT40	1.93	1.96	0.98	0.07
802.11ac HT20	0.94	1.04	0.90	0.44
802.11ac HT40	0.95	0.98	0.97	0.13
802.11ac HT80	2.07	2.18	0.95	0.22
Note: when Duty cycle>0.98, Duty cycle correction Factor not required.				

SISO Antenna 1 U-NII-1

Network Standards	Channel Number	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	9.507	17	PASS
	40	9.408	17	PASS
	48	9.399	17	PASS

SISO Antenna 2 U-NII-1

Network Standards	Channel Number	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	10.193	17	PASS
	40	10.334	17	PASS
	48	9.522	17	PASS

SISO Antenna 3 U-NII-1

Network Standards	Channel Number	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	9.594	17	PASS
	40	9.480	17	PASS
	48	9.338	17	PASS

SISO Antenna 4 U-NII-1

Network Standards	Channel Number	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	10.830	17	PASS
	40	10.534	17	PASS
	48	10.166	17	PASS

**SISO Antenna 1 U-NII-2A**

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	52	10.593	10.819	11	PASS
	60	10.644	10.870	11	PASS
	64	10.473	10.699	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

SISO Antenna 2 U-NII-2A

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	52	10.604	10.830	11	PASS
	60	10.754	10.980	11	PASS
	64	10.402	10.628	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

SISO Antenna 3 U-NII-2A

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	52	10.588	10.814	11	PASS
	60	10.486	10.712	11	PASS
	64	10.288	10.514	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

SISO Antenna 4 U-NII-2A

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	52	10.748	10.974	11	PASS
	60	10.444	10.670	11	PASS
	64	10.539	10.765	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

**SISO Antenna 1 U-NII-2C**

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	100	10.757	10.983	11	PASS
	116	10.296	10.522	11	PASS
	140	10.657	10.883	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

SISO Antenna 2 U-NII-2C

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	100	10.507	10.733	11	PASS
	116	10.483	10.709	11	PASS
	140	10.757	10.983	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

SISO Antenna 3 U-NII-2C

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	100	10.597	10.823	11	PASS
	116	10.371	10.597	11	PASS
	140	10.632	10.858	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

SISO Antenna 4 U-NII-2C

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	100	10.738	10.964	11	PASS
	116	10.156	10.382	11	PASS
	140	10.748	10.974	11	PASS
Note: Power Spectral Density =Read Value+Duty cycle correction factor					

**SISO Antenna 1 U-NII-3**

Network Standards	Channel Number	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	5.753	30	PASS
	157	5.949	30	PASS
	165	6.237	30	PASS

SISO Antenna 2 U-NII-3

Network Standards	Channel Number	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	6.454	30	PASS
	157	7.001	30	PASS
	165	7.909	30	PASS

SISO Antenna 3 U-NII-3

Network Standards	Channel Number	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	7.045	30	PASS
	157	7.508	30	PASS
	165	8.017	30	PASS

SISO Antenna 4 U-NII-3

Network Standards	Channel Number	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	5.276	30	PASS
	157	5.351	30	PASS
	165	5.994	30	PASS

**MIMO without beamforming****U-NII-1**

Network Standards		Channel/ Frequency (MHz)	Power Spectral Density (dBm /MHz)					Limit (dBm / MHz)	Conclusion
			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-1	36/5180	7.573	7.976	7.532	7.581	13.690	13.98	PASS
		40/5200	7.414	8.167	7.513	7.778	13.748	13.98	PASS
		48/5240	7.507	7.709	7.249	8.329	13.738	13.98	PASS
802.11n HT40	U-NII-1	38/5190	1.918	2.809	1.731	2.075	8.174	13.98	PASS
		46/5230	1.519	1.591	0.977	2.053	7.572	13.98	PASS
802.11ac HT20	U-NII-1	36/5180	7.509	8.228	7.405	8.364	13.918	13.98	PASS
		40/5200	7.962	7.948	7.750	8.157	13.977	13.98	PASS
		48/5240	7.352	8.125	7.230	8.093	13.740	13.98	PASS
802.11ac HT40	U-NII-1	38/5190	1.494	2.605	1.702	2.180	8.037	13.98	PASS
		46/5230	1.029	1.951	0.853	2.299	7.596	13.98	PASS
802.11ac HT80	U-NII-1	42/5210	-0.556	0.089	-0.646	0.589	5.919	13.98	PASS

Note: According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB, so directional gain=GANT+Array Gain=3+10log (4/1) =9.02>6dBi. So the limit=17+(6- 9.02)=13.98 dBm.



U-NII-2A

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density (dBm /MHz)									Limit (dBm / MHz)	Conclusion
MIMO Antenna		ANT1		ANT2		ANT3		ANT4		MIMO		
		Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)			
802.11n HT20	52/5260	0.48	0.70	0.41	0.63	0.40	0.62	1.86	2.08	7.08	7.98	PASS
	60/5300	0.38	0.60	0.42	0.64	0.50	0.72	1.73	1.95	7.03	7.98	PASS
	64/5320	0.56	0.78	0.66	0.88	0.11	0.33	1.59	1.81	7.00	7.98	PASS
802.11n HT40	54/5270	0.72	0.79	0.76	0.83	0.65	0.72	1.50	1.57	7.01	7.98	PASS
	62/5310	0.69	0.76	0.74	0.81	0.63	0.71	0.81	0.88	6.81	7.98	PASS
802.11ac HT20	52/5260	0.85	1.29	0.52	0.96	0.44	0.87	2.05	2.49	7.47	7.98	PASS
	60/5300	0.69	1.13	0.95	1.38	0.30	0.74	2.05	2.48	7.50	7.98	PASS
	64/5320	0.76	1.20	0.62	1.06	0.61	1.05	1.38	1.82	7.31	7.98	PASS
802.11ac HT40	54/5270	0.77	0.89	0.76	0.88	1.02	1.14	1.08	1.21	7.05	7.98	PASS
	62/5310	0.55	0.67	0.72	0.84	0.60	0.73	0.84	0.96	6.82	7.98	PASS
802.11ac HT80	58/5290	-0.97	-0.75	-0.28	-0.05	0.16	0.38	0.02	0.25	6.00	7.98	PASS

Note: 1. Note: Power Spectral Density =Read Value+Duty cycle correction factor

2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB, so directional gain=GANT+Array Gain=3+10log (4/1) =9.02>6dBi. So the limit=11+(6- 9.02)=7.98 dBm.



U-NII-2C

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density (dBm /MHz)									Limit (dBm / MHz)	Conclusion
MIMO Antenna		ANT1		ANT2		ANT3		ANT4		MIMO		
		Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)			
802.11n HT20	100/5500	0.53	0.75	0.70	0.92	1.18	1.40	1.56	1.78	7.25	7.98	PASS
	116/5580	0.84	1.06	0.73	0.95	0.92	1.14	1.48	1.70	7.24	7.98	PASS
	140/5700	0.88	1.10	1.25	1.47	1.27	1.49	1.22	1.44	7.40	7.98	PASS
802.11n HT40	102/5510	0.57	0.64	0.88	0.96	0.61	0.68	1.52	1.59	7.00	7.98	PASS
	110/5550	0.50	0.57	0.85	0.92	0.84	0.91	1.69	1.76	7.08	7.98	PASS
	134/5670	0.80	0.88	0.85	0.92	0.40	0.47	0.93	1.00	6.84	7.98	PASS
802.11ac HT20	100/5500	0.96	1.40	1.15	1.59	0.98	1.41	1.68	2.11	7.66	7.98	PASS
	116/5580	0.85	1.28	0.99	1.42	0.60	1.04	1.75	2.19	7.52	7.98	PASS
	140/5700	0.79	1.23	1.50	1.93	1.41	1.84	1.13	1.57	7.67	7.98	PASS
802.11ac HT40	102/5510	0.81	0.93	1.40	1.53	1.36	1.48	1.93	2.05	7.54	7.98	PASS
	110/5550	0.88	1.00	1.30	1.42	1.18	1.30	1.99	2.11	7.50	7.98	PASS
	134/5670	0.82	0.95	1.28	1.41	0.77	0.89	1.53	1.66	7.26	7.98	PASS
802.11ac HT80	106/5530	0.23	0.45	0.65	0.87	0.49	0.72	1.15	1.37	6.89	7.98	PASS

Note: 1. Note: Power Spectral Density =Read Value+Duty cycle correction factor

2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB, so directional gain=GANT+Array Gain=3+10log (4/1) =9.02>6dBi. So the limit=11+(6- 9.02)=7.98 dBm.



U-NII-3

Network Standards		Channel/ Frequency (MHz)	Power Spectral Density (dBm /MHz)					Limit (dBm / MHz)	Conclusion
			ANT1	ANT2	ANT3	ANT4	MIMO		
802.11n HT20	U-NII-3	149/5745	3.049	4.235	4.263	2.840	9.667	26.98	PASS
		157/5785	3.385	4.144	5.094	2.898	9.981	26.98	PASS
		165/5825	4.284	4.679	5.497	3.355	10.542	26.98	PASS
802.11n HT40	U-NII-3	151/5755	-0.601	1.266	1.242	-0.215	6.524	26.98	PASS
		159/5795	1.182	1.469	2.107	-0.064	7.263	26.98	PASS
802.11ac HT20	U-NII-3	149/5745	3.133	4.233	4.566	2.478	9.703	26.98	PASS
		157/5785	3.815	4.442	4.691	2.786	10.014	26.98	PASS
		165/5825	3.902	4.823	5.660	3.079	10.494	26.98	PASS
802.11ac HT40	U-NII-3	151/5755	-0.176	1.379	1.164	-0.164	6.632	26.98	PASS
		159/5795	0.876	0.860	2.007	-0.130	6.990	26.98	PASS
802.11ac HT80	U-NII-3	155/5775	-3.930	-2.968	-2.464	-5.093	2.519	26.98	PASS

Note: According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain,
 Directional gain = GANT + Array Gain, For PSD measurements on all devices, Array Gain = $10\log(N_{ant}/N_{ss})$ dB,
 so directional gain = GANT + Array Gain = $3 + 10\log(4/1) = 9.02 > 6$ dBi. So the limit = $30 + (6 - 9.02) = 26.98$ dBm.

MIMO with beamforming

U-NII-1

Network Standards		Channel/ Frequency (MHz)	Power Spectral Density (dBm / MHz)					Limit (dBm / MHz)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	Total		
802.11n HT20	U-NII-1	36/5180	5.54	6.19	6.82	6.83	12.40	13.98	PASS
		40/5200	5.42	5.82	6.60	6.23	12.06	13.98	PASS
		48/5240	6.20	6.62	7.02	6.98	12.74	13.98	PASS
802.11n HT40	U-NII-1	38/5190	3.41	2.75	3.95	4.03	9.58	13.98	PASS
		46/5230	3.30	3.75	3.66	3.43	9.56	13.98	PASS
802.11ac HT20	U-NII-1	36/5180	5.64	6.15	5.98	6.47	12.09	13.98	PASS
		40/5200	5.94	5.98	5.94	5.75	11.92	13.98	PASS
		48/5240	5.99	6.51	6.25	6.49	12.33	13.98	PASS
802.11ac HT40	U-NII-1	38/5190	3.50	3.03	3.60	2.93	9.29	13.98	PASS
		46/5230	3.33	3.09	3.36	3.16	9.25	13.98	PASS
802.11ac HT80	U-NII-1	42/5210	0.86	1.48	2.22	1.44	7.55	13.98	PASS

Note:Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log（4/1）=9.02 dBi>6dBi. So the limit=17+(6- 9.02)=13.98 dBm.



U-NII-2A

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density (dBm /MHz)									Limit (dBm / MHz)	Conclusion
MIMO Antenna		ANT1		ANT2		ANT3		ANT4		MIMO		
		Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)			
802.11n HT20	52/5260	0.48	0.70	0.41	0.63	0.40	0.62	1.86	2.08	7.08	7.98	PASS
	60/5300	0.38	0.60	0.42	0.64	0.50	0.72	1.73	1.95	7.03	7.98	PASS
	64/5320	0.56	0.78	0.66	0.88	0.11	0.33	1.59	1.81	7.00	7.98	PASS
802.11n HT40	54/5270	0.23	0.30	-0.22	-0.14	0.01	0.08	0.83	0.90	6.32	7.98	PASS
	62/5310	0.37	0.44	-0.20	-0.13	0.60	0.68	0.89	0.96	6.52	7.98	PASS
802.11ac HT20	52/5260	0.85	1.29	0.52	0.96	0.44	0.87	2.05	2.49	7.47	7.98	PASS
	60/5300	0.69	1.13	0.95	1.38	0.30	0.74	2.05	2.48	7.50	7.98	PASS
	64/5320	0.76	1.20	0.62	1.06	0.61	1.05	1.38	1.82	7.31	7.98	PASS
802.11ac HT40	54/5270	0.66	0.78	0.38	0.50	0.69	0.81	0.92	1.05	6.81	7.98	PASS
	62/5310	0.55	0.67	0.72	0.84	0.60	0.73	0.84	0.96	6.82	7.98	PASS
802.11ac HT80	58/5290	-2.87	-2.64	-2.86	-2.63	-1.93	-1.70	-1.82	-1.60	3.90	7.98	PASS

Note: 1. Note: Power Spectral Density =Read Value+Duty cycle correction factor

2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB, so directional gain=GANT+Array Gain=3+10log (4/1) =9.02>6dBi. So the limit=11+(6- 9.02)=7.98 dBm.



U-NII-2C

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density (dBm /MHz)									Limit (dBm / MHz)	Conclusion
MIMO Antenna		ANT1		ANT2		ANT3		ANT4		MIMO		
		Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)	Read Value (dBm /MHz)	PSD (dBm /MHz)			
802.11n HT20	100/5500	0.53	0.75	0.70	0.47	1.18	1.40	1.56	1.78	7.15	7.98	PASS
	116/5580	0.84	1.06	0.73	-0.03	0.92	1.14	1.48	1.70	7.03	7.98	PASS
	140/5700	0.88	1.10	1.25	-2.39	1.27	1.49	1.22	1.44	6.69	7.98	PASS
802.11n HT40	102/5510	0.19	0.26	0.25	0.17	0.52	0.59	1.84	1.91	6.81	7.98	PASS
	110/5550	-0.29	-0.22	-0.25	0.19	0.54	0.61	1.63	1.71	6.65	7.98	PASS
	134/5670	-2.45	-2.38	-2.61	-0.11	-0.46	-0.39	-1.38	-1.31	5.06	7.98	PASS
802.11ac HT20	100/5500	0.96	1.40	1.15	1.59	0.98	1.41	1.68	2.11	7.66	7.98	PASS
	116/5580	0.85	1.28	0.99	1.42	0.60	1.04	1.75	2.19	7.52	7.98	PASS
	140/5700	0.79	1.23	1.50	1.93	1.41	1.84	1.13	1.57	7.67	7.98	PASS
802.11ac HT40	102/5510	0.48	0.60	0.09	0.22	0.40	0.52	1.84	1.96	6.90	7.98	PASS
	110/5550	0.48	0.60	0.12	0.34	0.49	0.61	1.82	1.94	6.94	7.98	PASS
	134/5670	-0.64	-0.52	-0.18	-0.18	-2.85	-2.73	0.25	0.38	5.40	7.98	PASS
802.11ac HT80	106/5530	-3.09	-2.87	-2.16	-1.93	-2.31	-2.08	-1.80	-1.57	3.93	7.98	PASS

Note: 1. Note: Power Spectral Density =Read Value+Duty cycle correction factor

2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices, Array Gain=10log(Nant/Nss)dB, so directional gain=GANT+Array Gain=3+10log (4/1) =9.02>6dBi. So the limit=11+(6- 9.02)=7.98 dBm.



U-NII-3

Network Standards		Channel/ Frequency (MHz)	Power Spectral Density(dBm / MHz)					Limit (dBm / MHz)	Conclusion
MIMO Antenna			ANT1	ANT2	ANT3	ANT4	Total		
802.11n HT20	U-NII-3	149/5745	4.96	6.54	5.15	5.56	11.62	26.98	PASS
		157/5785	5.54	5.83	5.85	5.62	11.73	26.98	PASS
		165/5825	5.66	5.91	5.74	5.59	11.75	26.98	PASS
802.11n HT40	U-NII-3	151/5755	2.78	3.36	2.79	2.94	8.99	26.98	PASS
		159/5795	2.53	3.16	2.90	2.97	8.92	26.98	PASS
802.11ac HT20	U-NvII-3	149/5745	5.42	5.99	5.53	6.19	11.81	26.98	PASS
		157/5785	5.44	6.12	5.38	5.97	11.76	26.98	PASS
		165/5825	5.55	6.14	5.88	5.99	11.92	26.98	PASS
802.11ac HT40	U-NII-3	151/5755	2.54	3.17	3.71	2.99	9.14	26.98	PASS
		159/5795	1.90	3.32	3.42	2.81	8.92	26.98	PASS
802.11ac HT80	U-NII-3	155/5775	0.05	-0.53	-0.50	-0.18	5.74	26.98	PASS

Note: Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i), If all antennas have the same gain, directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS}) = 3 + 10 \log(4/1) = 9.02 \text{ dBi} > 6 \text{ dBi}$. So the limit = $30 + (6 - 9.02) = 26.98 \text{ dBm}$.



SISO Antenna 1

U-NII-1, 802.11a, Channel No.: 36



U-NII-2A, 802.11a, Channel No.: 54



U-NII-1, 802.11a, Channel No.: 40



U-NII-2A, 802.11a, Channel No.: 60



U-NII-1, 802.11a, Channel No.: 48



U-NII-2A, 802.11a, Channel No.: 64

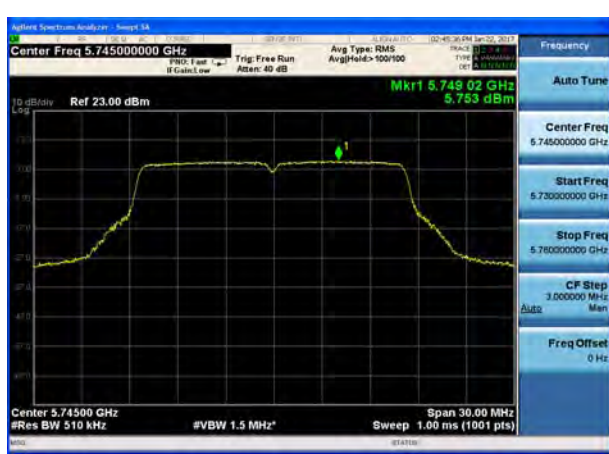




U-NII-2C, 802.11a, Channel No.: 100



U-NII-3, 802.11a, Channel No.: 149



U-NII-2C, 802.11a, Channel No.: 116



U-NII-3, 802.11a, Channel No.: 157



U-NII-2C, 802.11a, Channel No.: 140



U-NII-3, 802.11a, Channel No.: 165





SISO Antenna 2

U-NII-1, 802.11a, Channel No.: 36



U-NII-2A, 802.11a, Channel No.: 54



U-NII-1, 802.11a, Channel No.: 40



U-NII-2A, 802.11a, Channel No.: 60



U-NII-1, 802.11a, Channel No.: 48

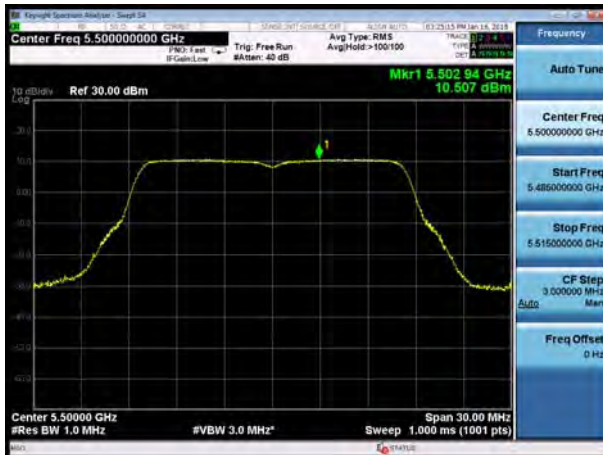


U-NII-2A, 802.11a, Channel No.: 64





U-NII-2C, 802.11a, Channel No.: 100



U-NII-3, 802.11a, Channel No.: 149



U-NII-2C, 802.11a, Channel No.: 116



U-NII-3, 802.11a, Channel No.: 157



U-NII-2C, 802.11a, Channel No.: 140



U-NII-3, 802.11a, Channel No.: 165





SISO Antenna 3

U-NII-1, 802.11a, Channel No.: 36



U-NII-2A, 802.11a, Channel No.: 54



U-NII-1, 802.11a, Channel No.: 40



U-NII-2A, 802.11a, Channel No.: 60



U-NII-1, 802.11a, Channel No.: 48



U-NII-2A, 802.11a, Channel No.: 64

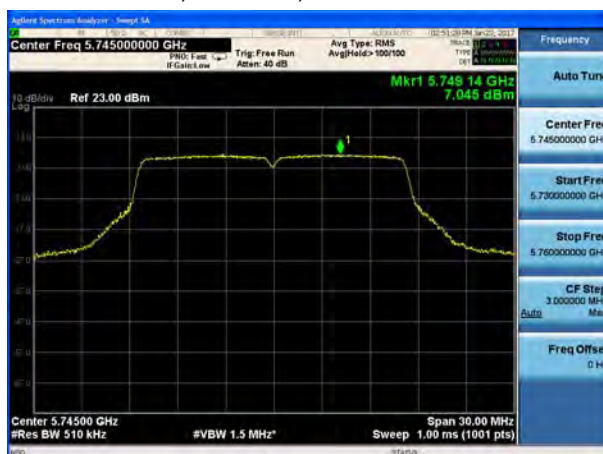




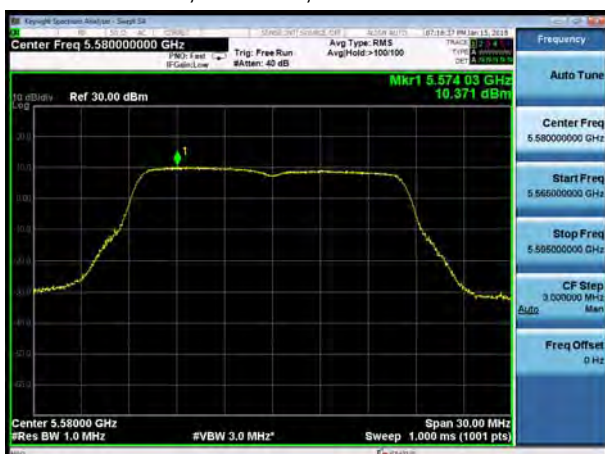
U-NII-2C, 802.11a, Channel No.: 100



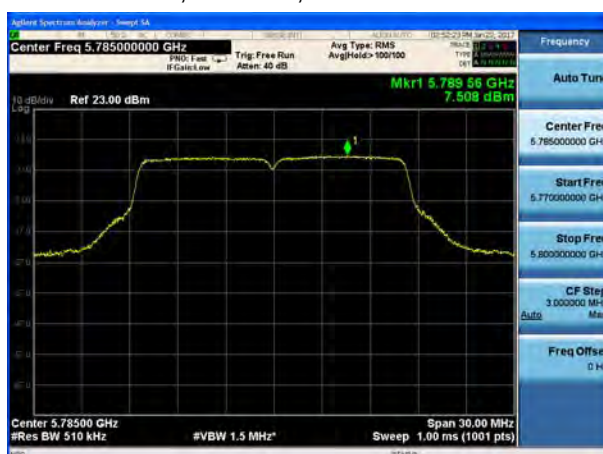
U-NII-3, 802.11a, Channel No.: 149



U-NII-2C, 802.11a, Channel No.: 116



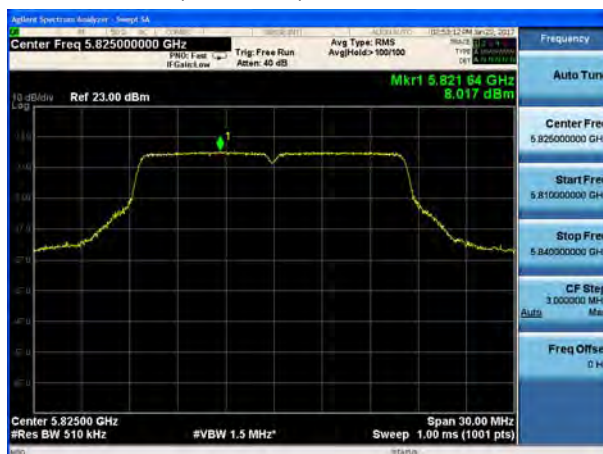
U-NII-3, 802.11a, Channel No.: 157



U-NII-2C, 802.11a, Channel No.: 140



U-NII-3, 802.11a, Channel No.: 165





SISO Antenna 4

U-NII-1, 802.11a, Channel No.: 36



U-NII-2A, 802.11a, Channel No.: 54



U-NII-1, 802.11a, Channel No.: 40



U-NII-2A, 802.11a, Channel No.: 60



U-NII-1, 802.11a, Channel No.: 48



U-NII-2A, 802.11a, Channel No.: 64





U-NII-2C, 802.11a, Channel No.: 100



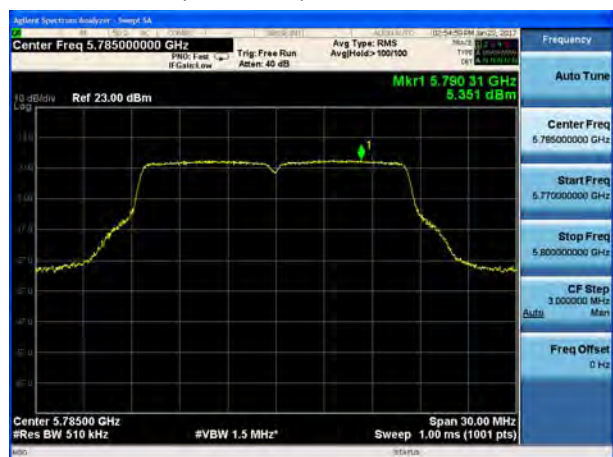
U-NII-3, 802.11a, Channel No.: 149



U-NII-2C, 802.11a, Channel No.: 116



U-NII-3, 802.11a, Channel No.: 157



U-NII-2C, 802.11a, Channel No.: 140



U-NII-3, 802.11a, Channel No.: 165

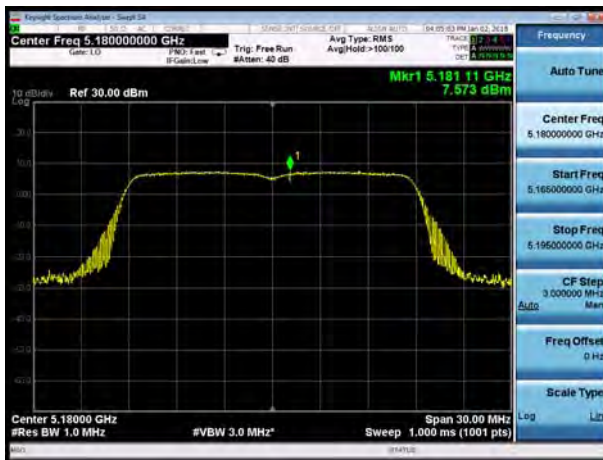




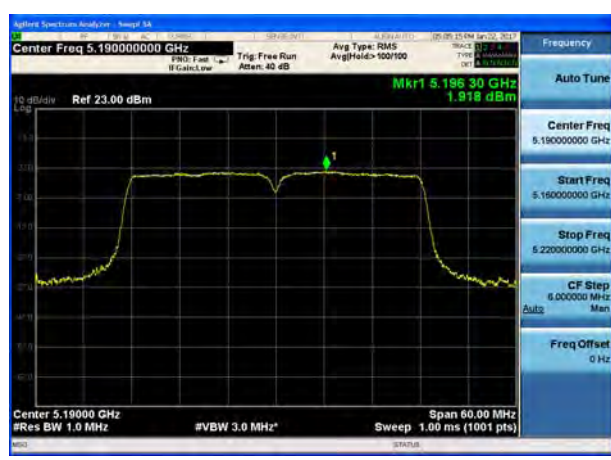
MIMO without beamforming

MIMO Antenna 1

U-NII-1, 802.11n HT20, Channel No.: 36



U-NII-1, 802.11n HT40, Channel No.: 38



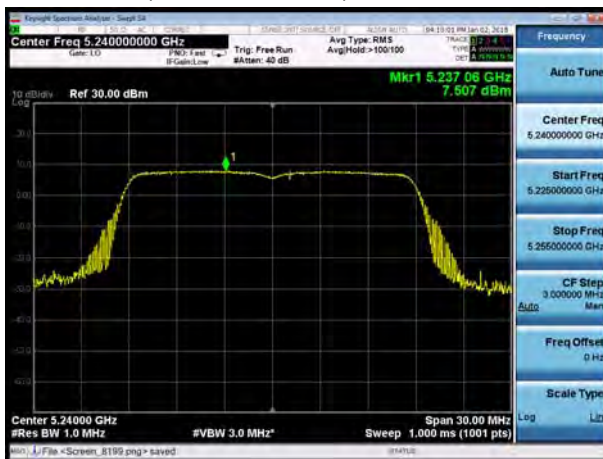
U-NII-1, 802.11n HT20, Channel No.: 40



U-NII-1, 802.11n HT40, Channel No.: 46

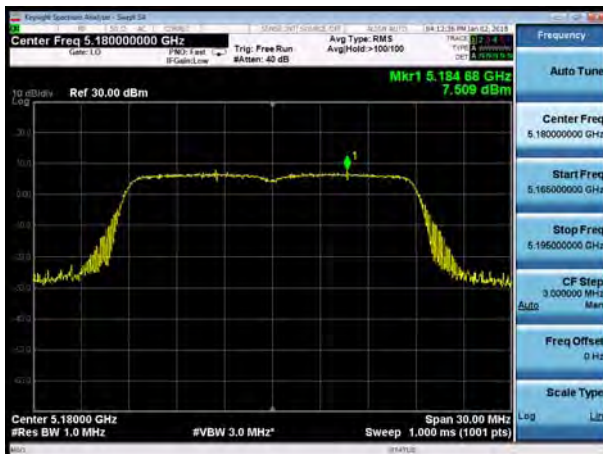


U-NII-1, 802.11n HT20, Channel No.: 48

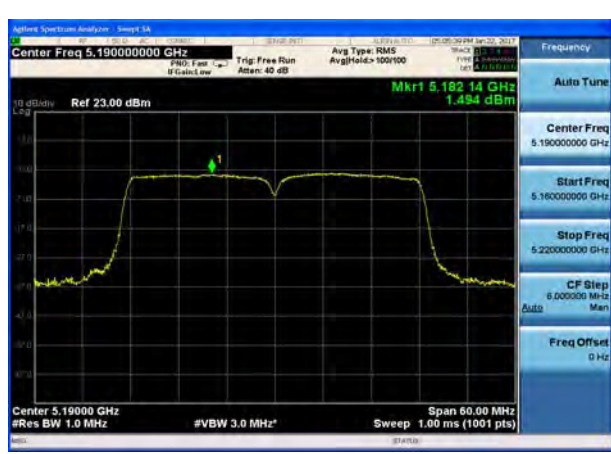




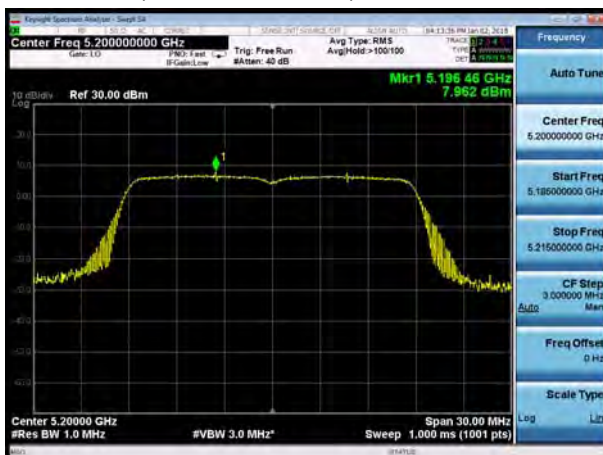
U-NII-1, 802.11ac HT20, Channel No.: 36



U-NII-1, 802.11ac HT40, Channel No.: 38



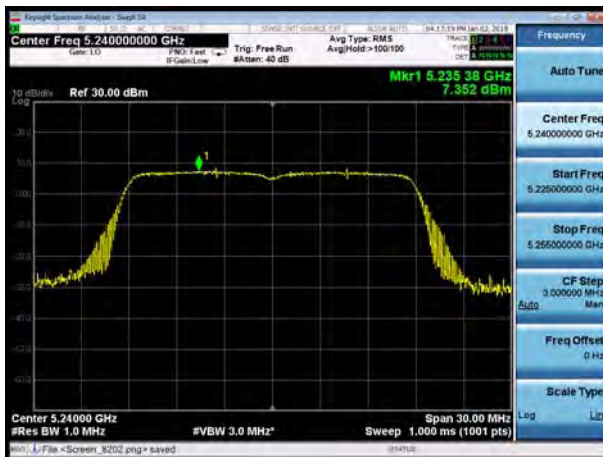
U-NII-1, 802.11ac HT20, Channel No.: 40



U-NII-1 802.11ac HT40, Channel No.:46



U-NII-1, 802.11ac HT20, Channel No.: 48



U-NII-1, 802.11ac HT80, Channel No.: 42





U-NII-2A, 802.11n HT20, Channel No.: 52



U-NII-2A, 802.11n HT40, Channel No.: 54



U-NII-2A, 802.11n HT20, Channel No.: 60



U-NII-2A, 802.11n HT40, Channel No.: 62



U-NII-2A, 802.11n HT20, Channel No.: 64





U-NII-2A, 802.11ac HT20, Channel No.: 52



U-NII-2A, 802.11ac HT40, Channel No.: 54



U-NII-2A, 802.11ac HT20, Channel No.: 60



U-NII-2A, 802.11ac HT40, Channel No.: 62



U-NII-2A, 802.11ac HT20, Channel No.: 64



U-NII-2A, 802.11ac HT80, Channel No.: 58





U-NII-2C, 802.11n HT20, Channel No.: 100



U-NII-2C, 802.11n HT40, Channel No.: 102



U-NII-2C, 802.11n HT20, Channel No.: 116



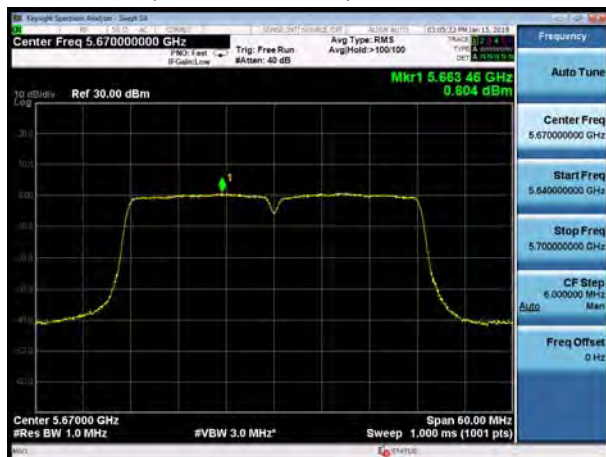
U-NII-2C, 802.11n HT40, Channel No.: 110



U-NII-2C, 802.11n HT20, Channel No.: 140



U-NII-2C, 802.11n HT40, Channel No.: 134





U-NII-2C, 802.11ac HT20, Channel No.: 100



U-NII-2C, 802.11ac HT40, Channel No.: 102



U-NII-2C, 802.11ac HT20, Channel No.: 116



U-NII-2C, 802.11ac HT40, Channel No.: 110



U-NII-2C, 802.11ac HT20, Channel No.: 140



U-NII-2C, 802.11ac HT40, Channel No.: 134

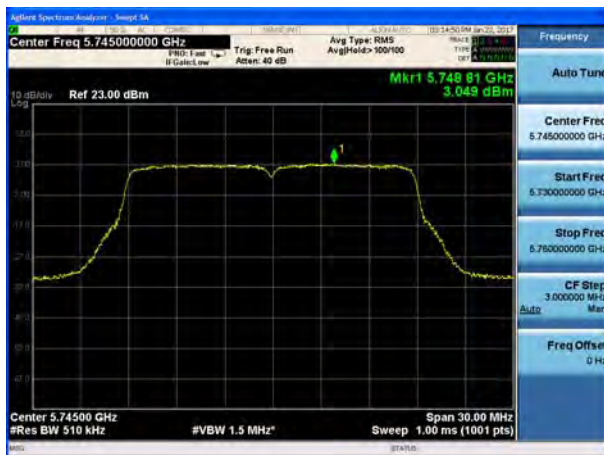


U-NII-2C, 802.11ac HT80, Channel No.: 106





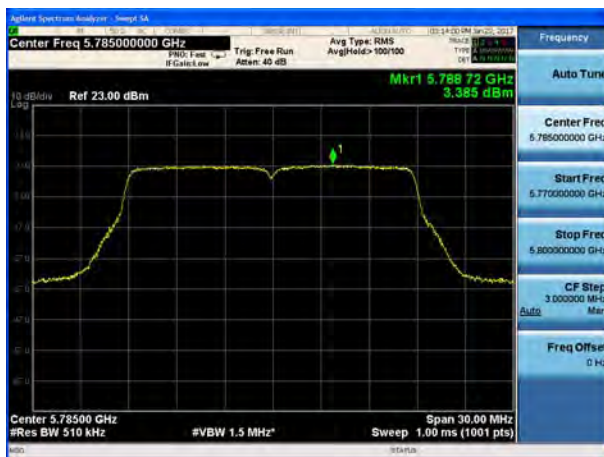
U-NII-3, 802.11n HT20, Channel No.: 149



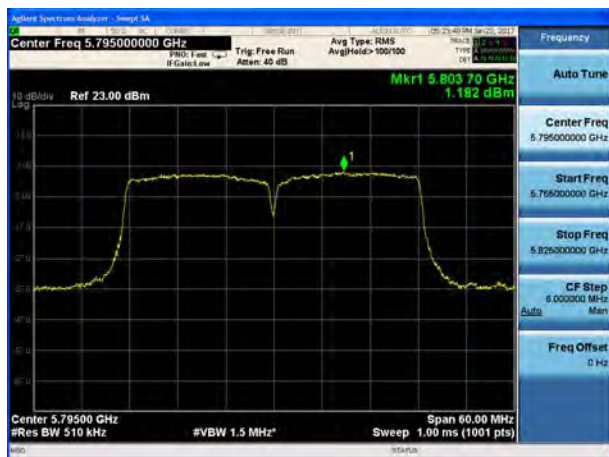
U-NII-3, 802.11n HT40, Channel No.: 151



U-NII-3, 802.11n HT20, Channel No.: 157



U-NII-3, 802.11n HT40, Channel No.: 159

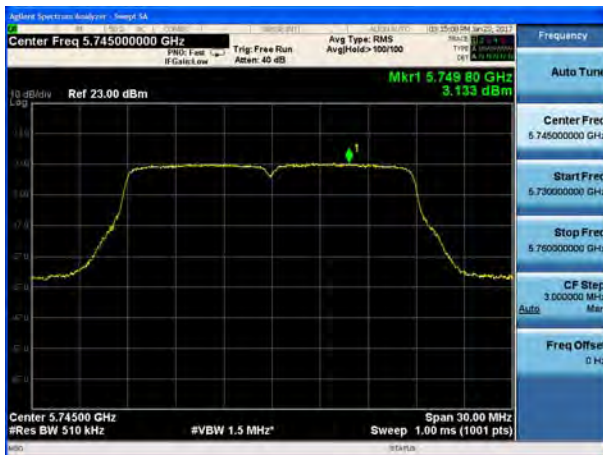


U-NII-3, 802.11n HT20, Channel No.: 165





U-NII-3, 802.11ac HT20, Channel No.: 149



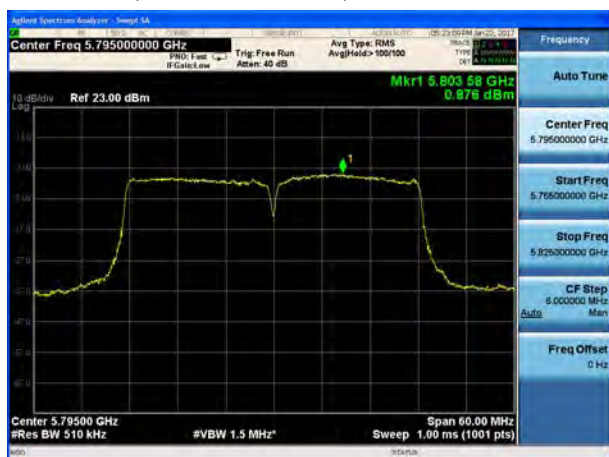
U-NII-3, 802.11ac HT40, Channel No.: 151



U-NII-3, 802.11ac HT20, Channel No.: 157



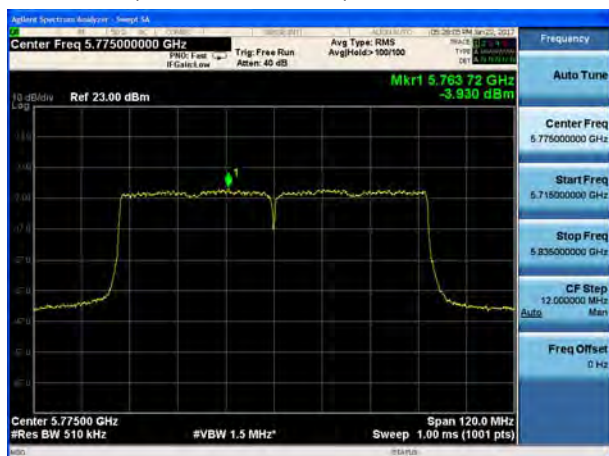
U-NII-3, 802.11ac HT40, Channel No.: 159



U-NII-3, 802.11ac HT20, Channel No.: 165



U-NII-3, 802.11ac HT80, Channel No.: 155





MIMO Antenna 2

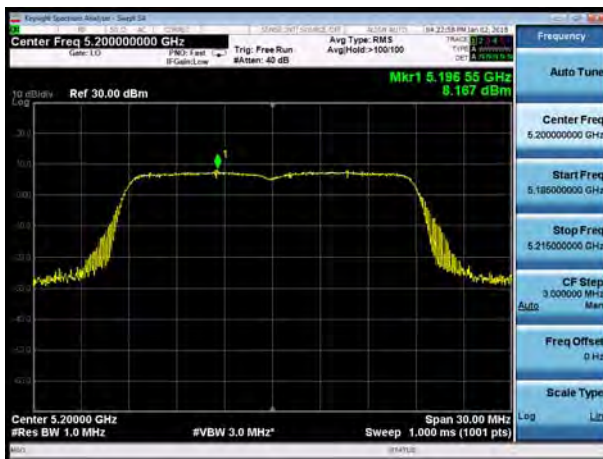
U-NII-1, 802.11n HT20, Channel No.: 36



U-NII-1, 802.11n HT40, Channel No.: 38



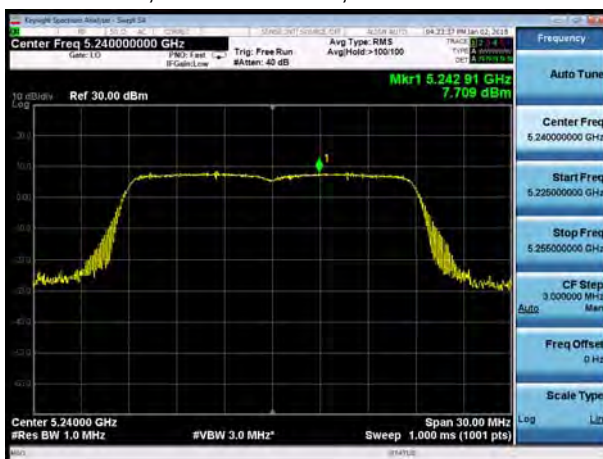
U-NII-1, 802.11n HT20, Channel No.: 40



U-NII-1, 802.11n HT40, Channel No.: 46

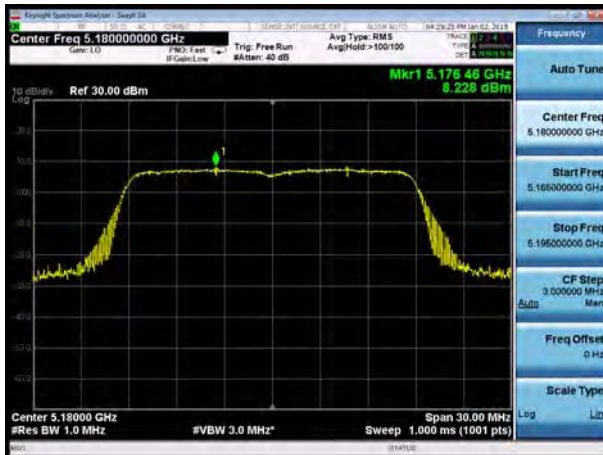


U-NII-1, 802.11n HT20, Channel No.: 48

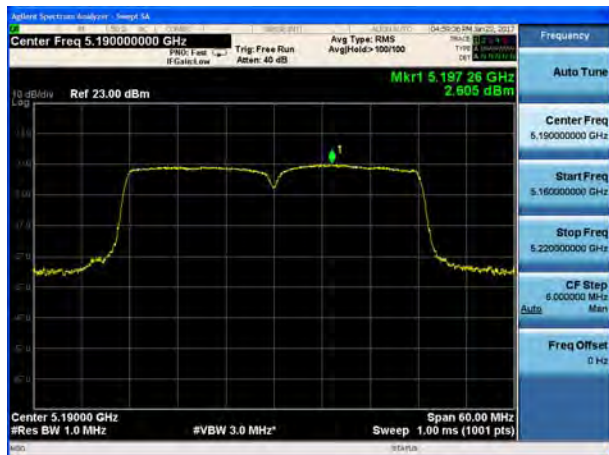




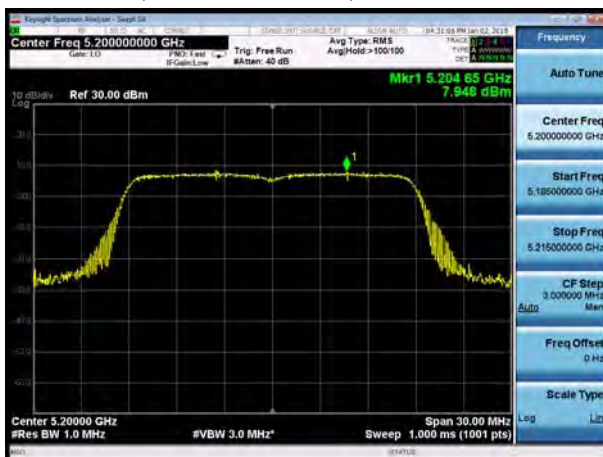
U-NII-1, 802.11ac HT20, Channel No.: 36



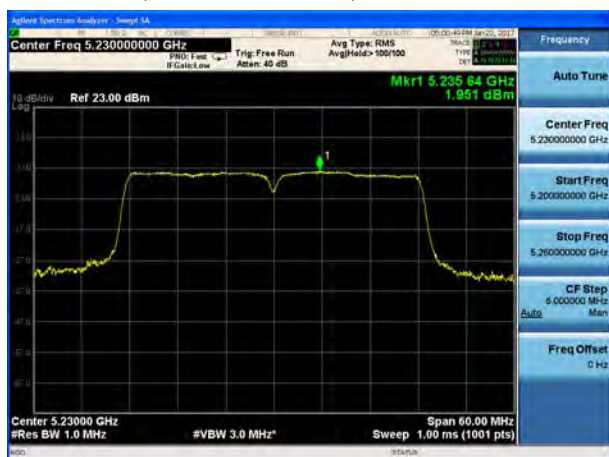
U-NII-1, 802.11ac HT40, Channel No.: 38



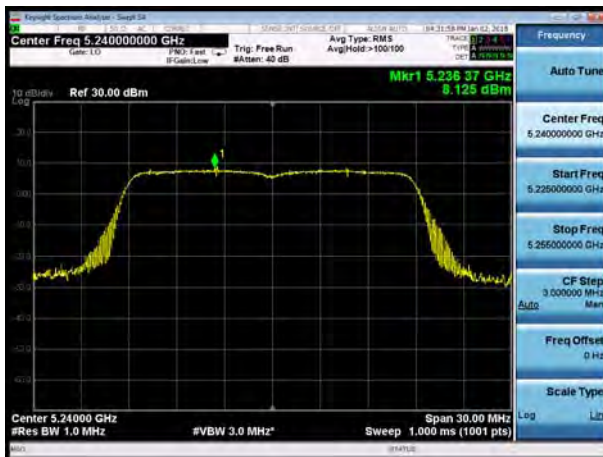
U-NII-1, 802.11ac HT20, Channel No.: 40



U-NII-1, 802.11ac HT40, Channel No.: 46



U-NII-1, 802.11ac HT20, Channel No.: 48



U-NII-1, 802.11ac HT80, Channel No.: 42





U-NII-2A, 802.11n HT20, Channel No.: 52



U-NII-2A, 802.11n HT40, Channel No.: 54



U-NII-2A, 802.11n HT20, Channel No.: 60



U-NII-2A, 802.11n HT40, Channel No.: 62



U-NII-2A, 802.11n HT20, Channel No.: 64

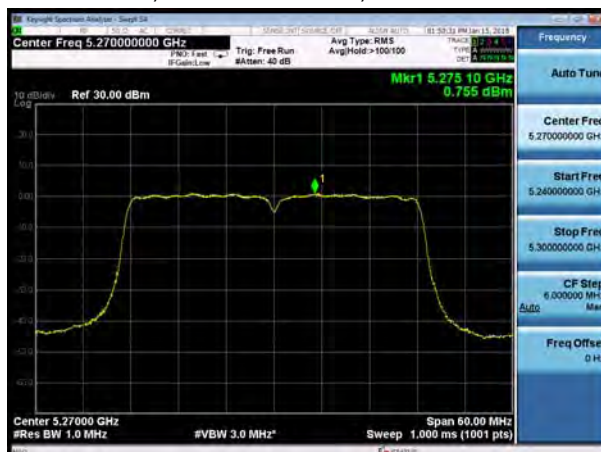




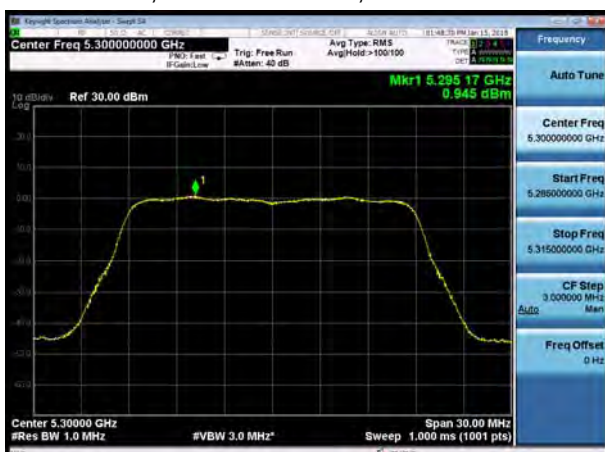
U-NII-2A, 802.11ac HT20, Channel No.: 52



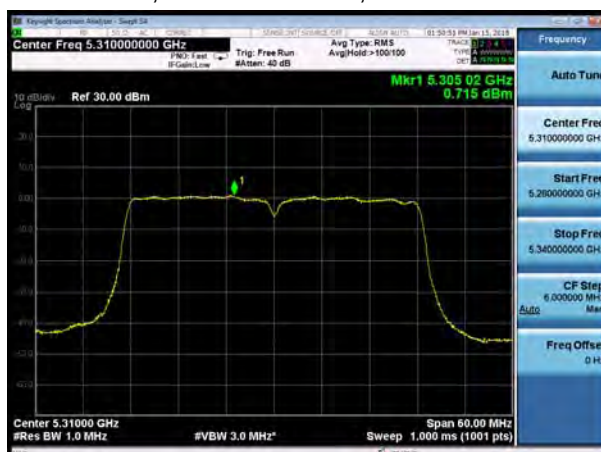
U-NII-2A, 802.11ac HT40, Channel No.: 54



U-NII-2A, 802.11ac HT20, Channel No.: 60



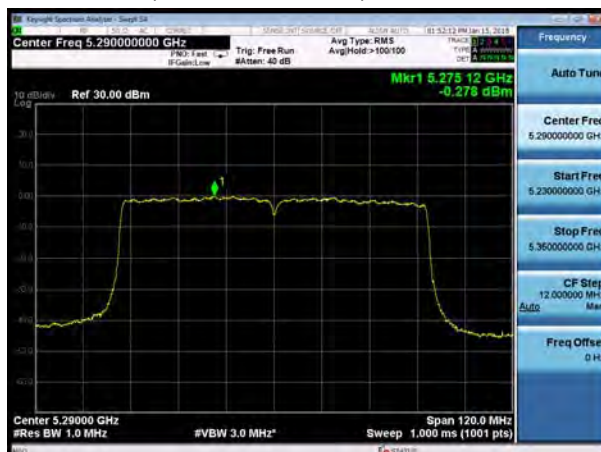
U-NII-2A, 802.11ac HT40, Channel No.: 62



U-NII-2A, 802.11ac HT20, Channel No.: 64



U-NII-2A, 802.11ac HT80, Channel No.: 58





U-NII-2C, 802.11n HT20, Channel No.: 100



U-NII-2C, 802.11n HT40, Channel No.: 102



U-NII-2C, 802.11n HT20, Channel No.: 116



U-NII-2C, 802.11n HT40, Channel No.: 110



U-NII-2C, 802.11n HT20, Channel No.: 140



U-NII-2C, 802.11n HT40, Channel No.: 134





U-NII-2C, 802.11ac HT20, Channel No.: 100



U-NII-2C, 802.11ac HT40, Channel No.: 102



U-NII-2C, 802.11ac HT20, Channel No.: 116



U-NII-2C, 802.11ac HT40, Channel No.: 110



U-NII-2C, 802.11ac HT20, Channel No.: 140



U-NII-2C, 802.11ac HT40, Channel No.: 134



U-NII-2C, 802.11ac HT80, Channel No.: 106

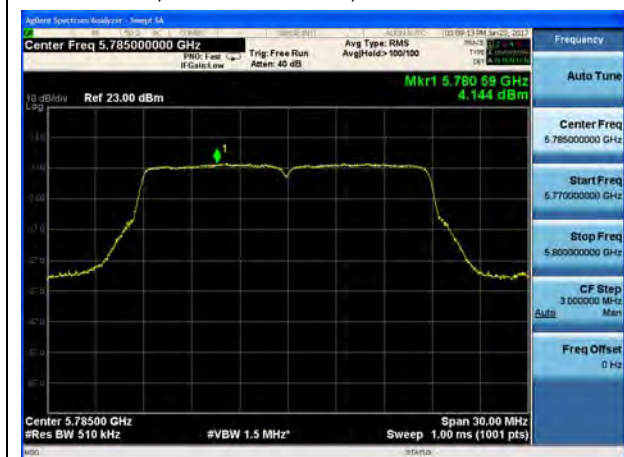




U-NII-3, 802.11n HT20, Channel No.: 149



U-NII-3, 802.11n HT20, Channel No.: 157



U-NII-3, 802.11n HT20, Channel No.: 165

U-NII-3, 802.11n HT40, Channel No.: 151



U-NII-3, 802.11n HT40, Channel No.: 159







U-NII-3, 802.11ac HT20, Channel No.: 149



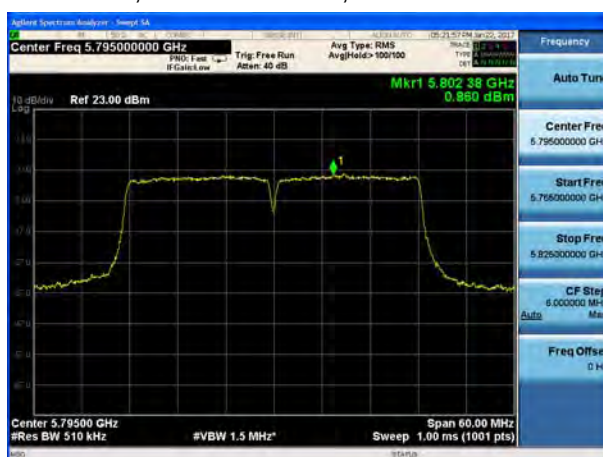
U-NII-3, 802.11ac HT40, Channel No.: 151



U-NII-3, 802.11ac HT20, Channel No.: 157



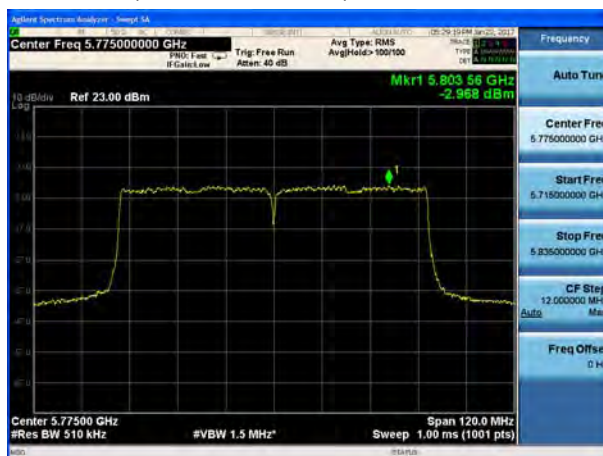
U-NII-3, 802.11ac HT40, Channel No.: 159



U-NII-3, 802.11ac HT20, Channel No.: 165



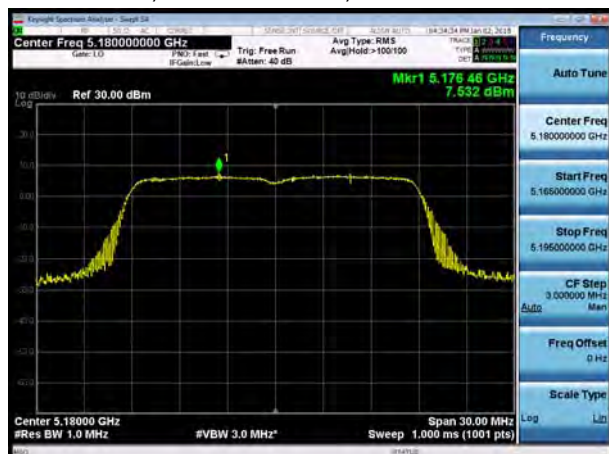
U-NII-3, 802.11ac HT80, Channel No.: 155





MIMO Antenna 3

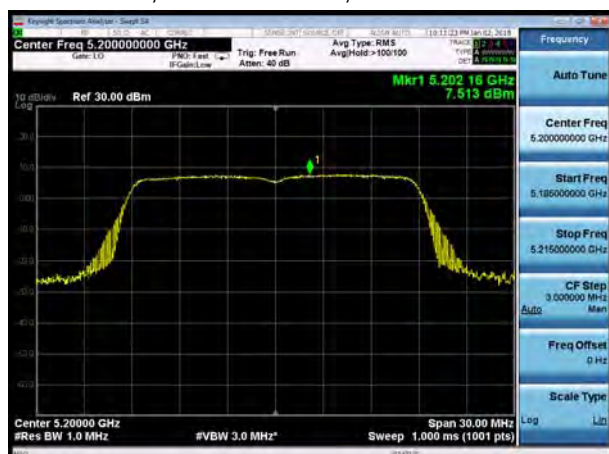
U-NII-1, 802.11n HT20, Channel No.: 36



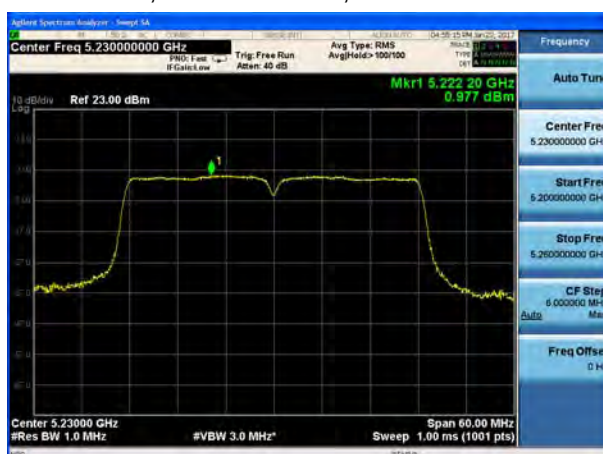
U-NII-1, 802.11n HT40, Channel No.: 38



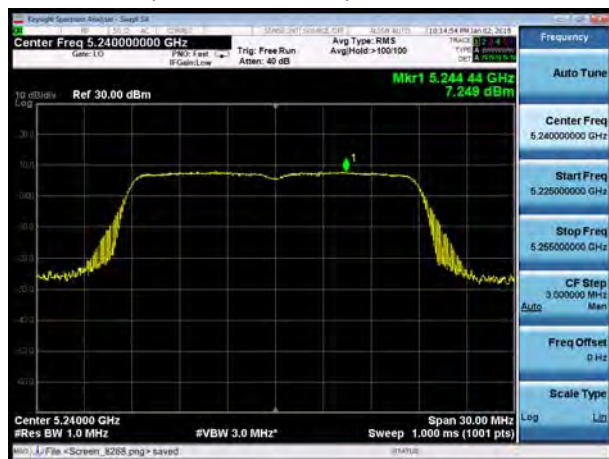
U-NII-1, 802.11n HT20, Channel No.: 40



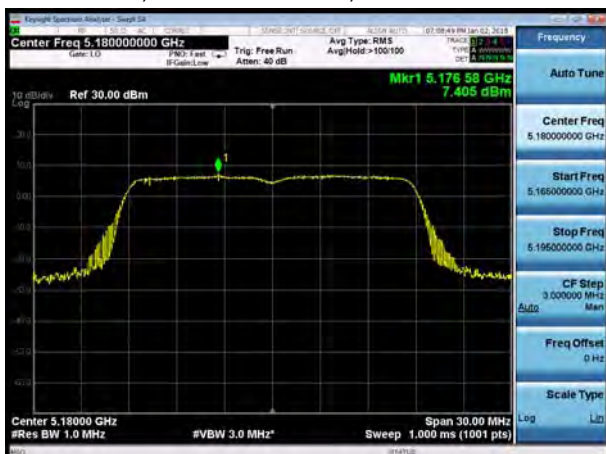
U-NII-1, 802.11n HT40, Channel No.: 46



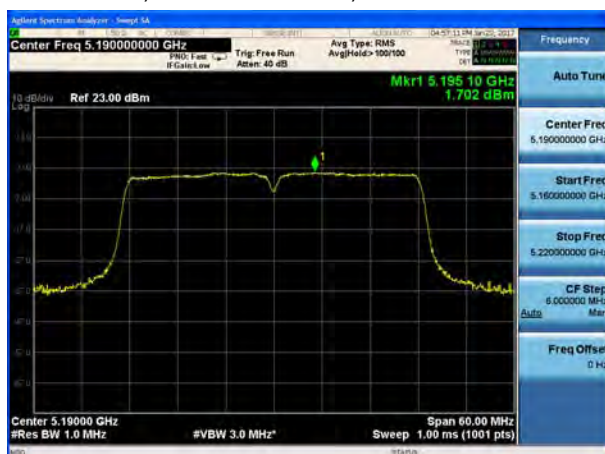
U-NII-1, 802.11n HT20, Channel No.: 48



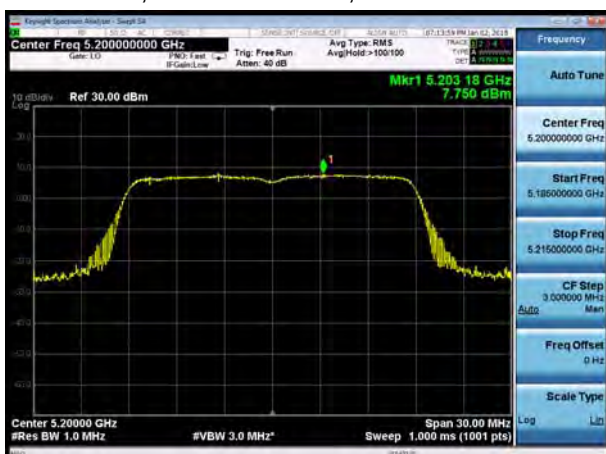
U-NII-1, 802.11ac HT20, Channel No.: 36



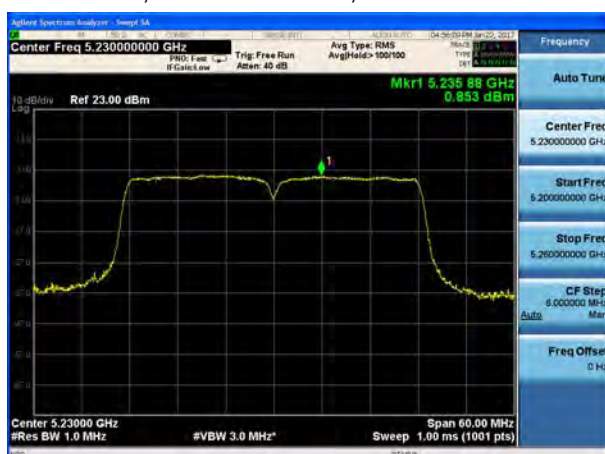
U-NII-1, 802.11ac HT40, Channel No.: 38



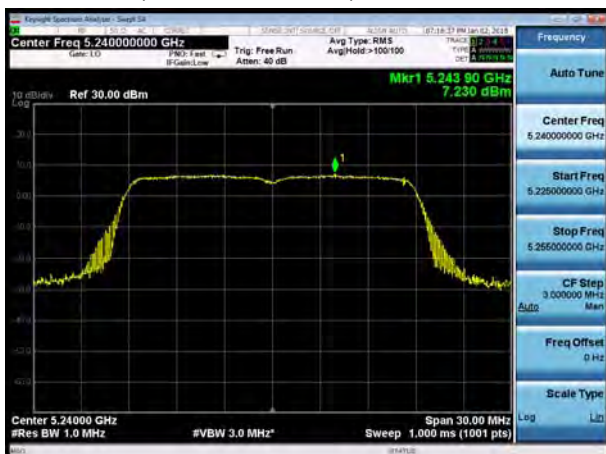
U-NII-1, 802.11ac HT20, Channel No.: 40



U-NII-1, 802.11ac HT40, Channel No.: 46



U-NII-1, 802.11ac HT20, Channel No.: 48



U-NII-1, 802.11ac HT80, Channel No.: 42

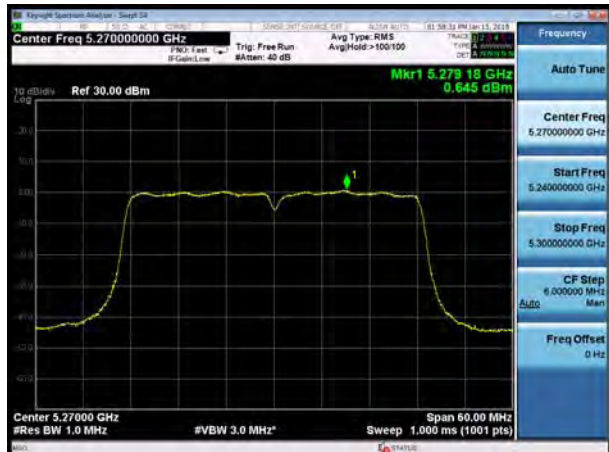




U-NII-2A, 802.11n HT20, Channel No.: 52



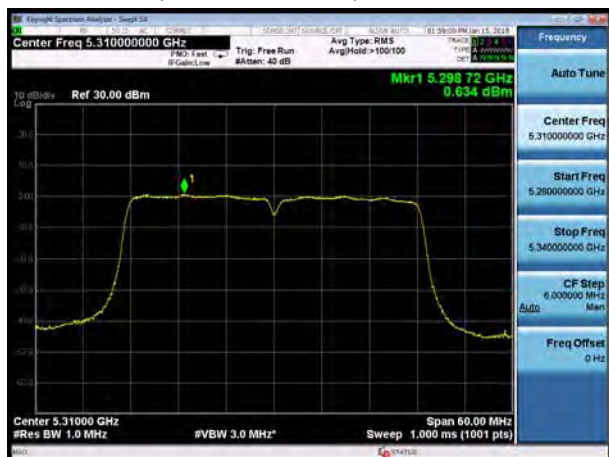
U-NII-2A, 802.11n HT40, Channel No.: 54



U-NII-2A, 802.11n HT20, Channel No.: 60



U-NII-2A, 802.11n HT40, Channel No.: 62



U-NII-2A, 802.11n HT20, Channel No.: 64

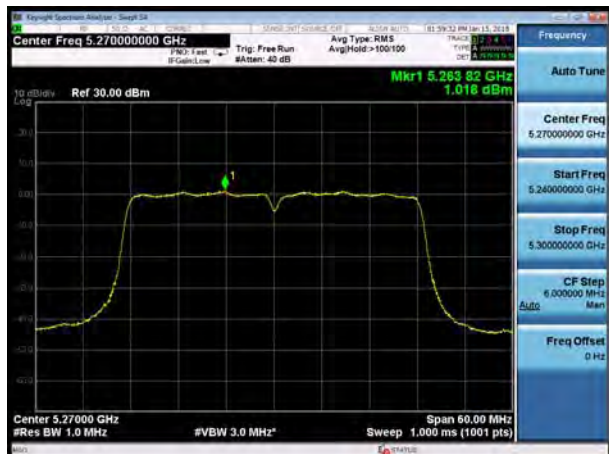




U-NII-2A, 802.11ac HT20, Channel No.: 52



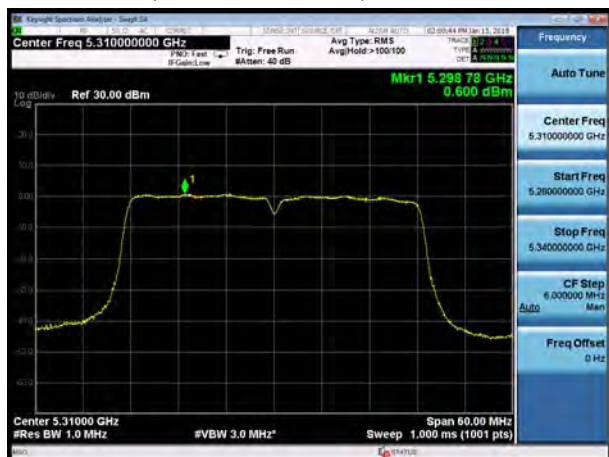
U-NII-2A, 802.11ac HT40, Channel No.: 54



U-NII-2A, 802.11ac HT20, Channel No.: 60



U-NII-2A, 802.11ac HT40, Channel No.: 62



U-NII-2A, 802.11ac HT20, Channel No.: 64



U-NII-2A, 802.11ac HT80, Channel No.: 58





U-NII-2C, 802.11n HT20, Channel No.: 100



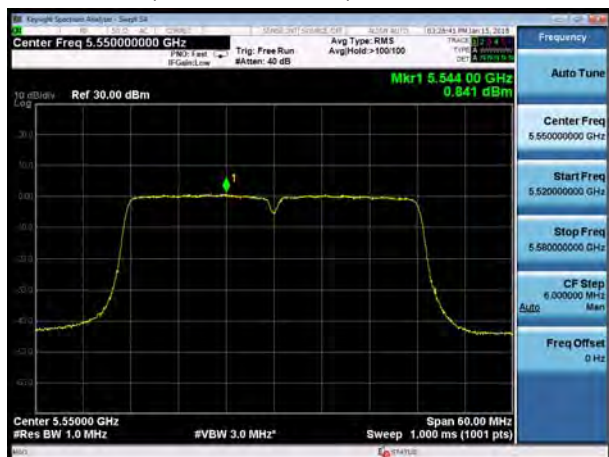
U-NII-2C, 802.11n HT40, Channel No.: 102



U-NII-2C, 802.11n HT20, Channel No.: 116



U-NII-2C, 802.11n HT40, Channel No.: 110



U-NII-2C, 802.11n HT20, Channel No.: 140



U-NII-2C, 802.11n HT40, Channel No.: 134





U-NII-2C, 802.11ac HT20, Channel No.: 100



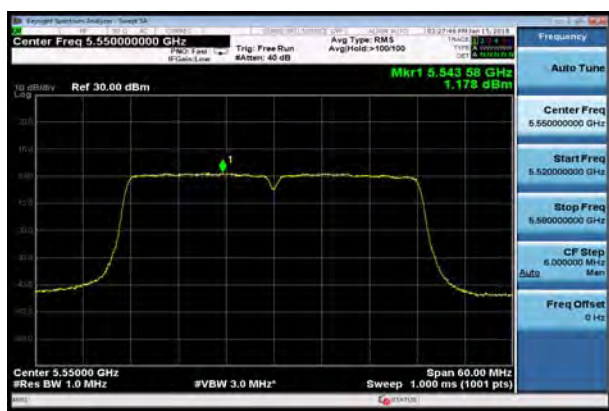
U-NII-2C, 802.11ac HT40, Channel No.: 102



U-NII-2C, 802.11ac HT20, Channel No.: 116



U-NII-2C, 802.11ac HT40, Channel No.: 110



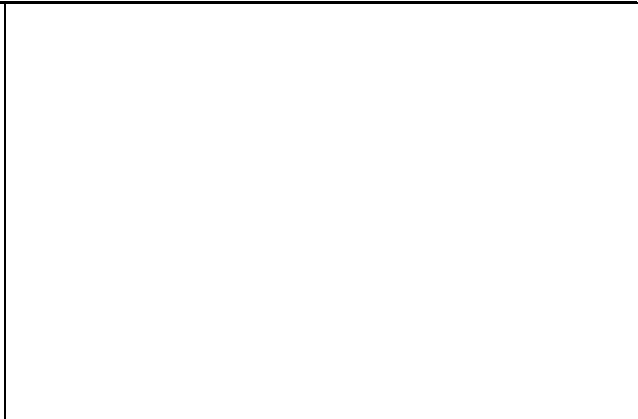
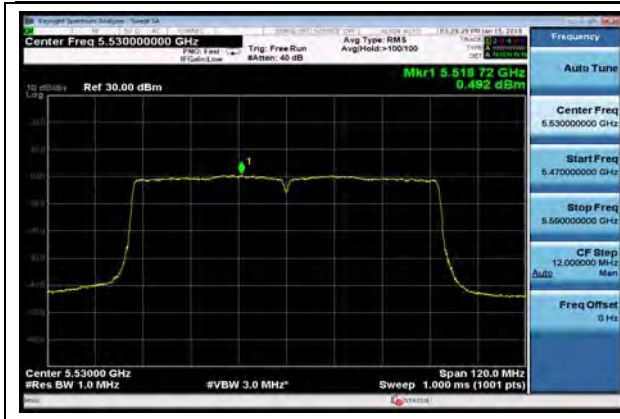
U-NII-2C, 802.11ac HT20, Channel No.: 140



U-NII-2C, 802.11ac HT40, Channel No.: 134



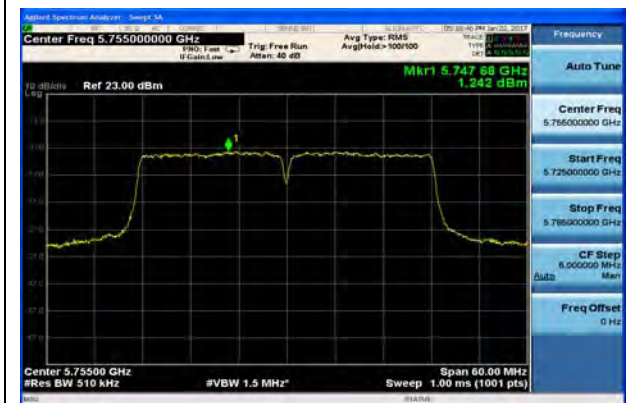
U-NII-2C, 802.11ac HT80, Channel No.: 106



U-NII-3, 802.11n HT20, Channel No.: 149



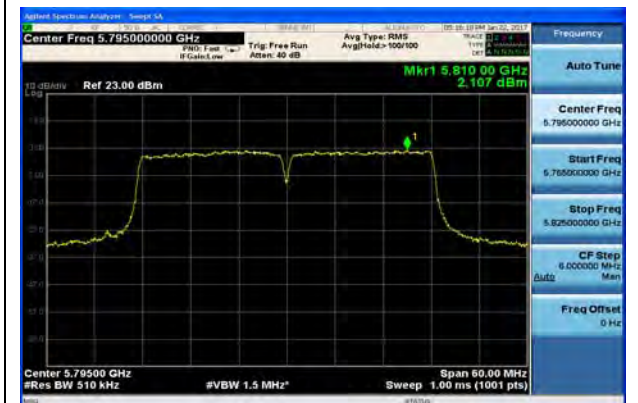
U-NII-3, 802.11n HT40, Channel No.: 151



U-NII-3, 802.11n HT20, Channel No.: 157



U-NII-3, 802.11n HT40, Channel No.: 159



U-NII-3, 802.11n HT20, Channel No.: 165

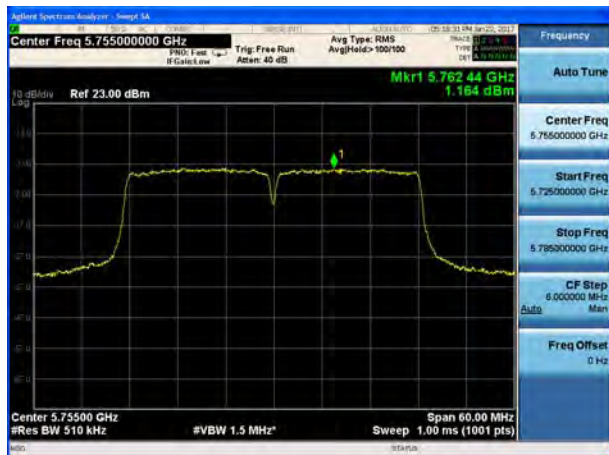




U-NII-3, 802.11ac HT20, Channel No.: 149



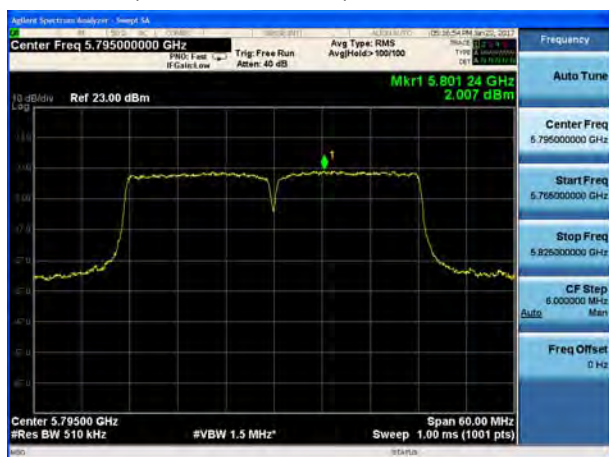
U-NII-3, 802.11ac HT40, Channel No.: 151



U-NII-3, 802.11ac HT20, Channel No.: 157



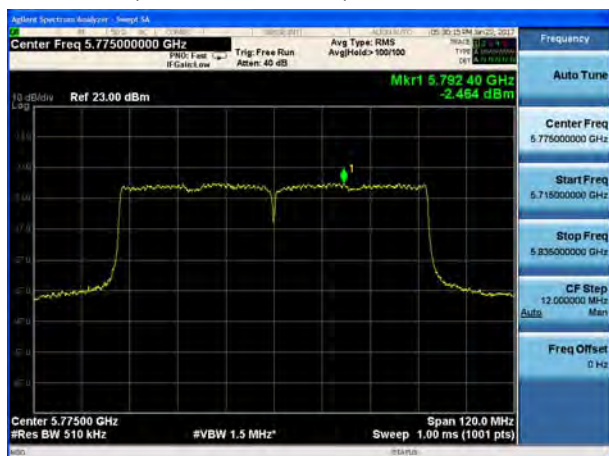
U-NII-3, 802.11ac HT40, Channel No.: 159



U-NII-3, 802.11ac HT20, Channel No.: 165



U-NII-3, 802.11ac HT80, Channel No.: 155



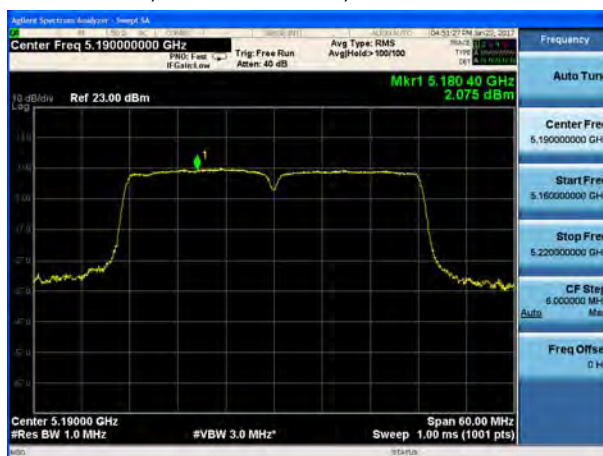


MIMO Antenna 4

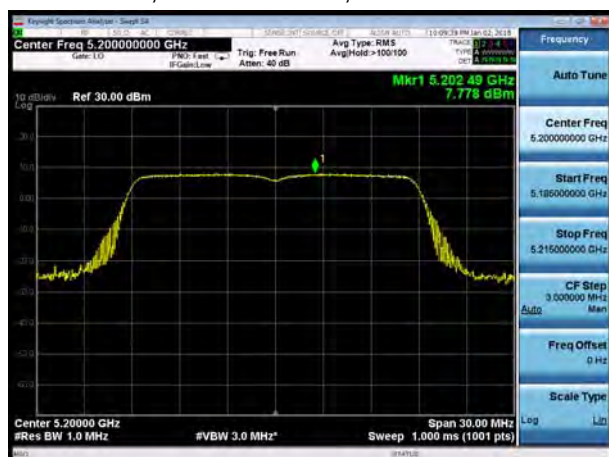
U-NII-1, 802.11n HT20, Channel No.: 36



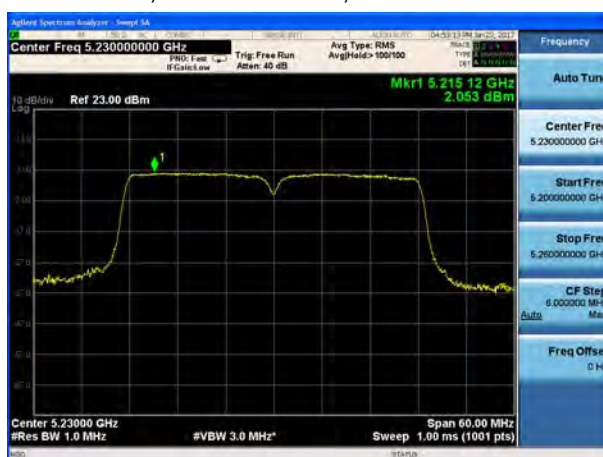
U-NII-1, 802.11n HT40, Channel No.: 38



U-NII-1, 802.11n HT20, Channel No.: 40



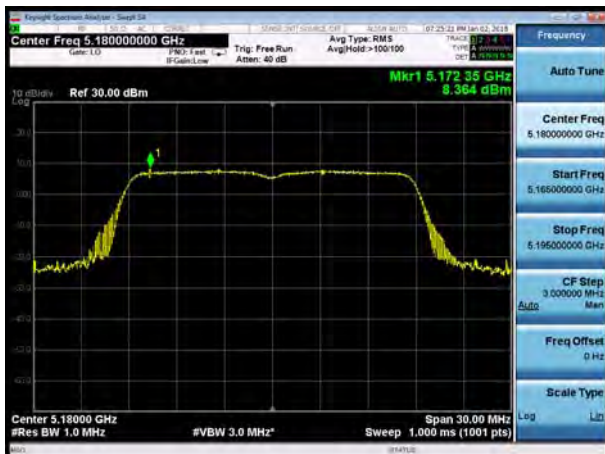
U-NII-1, 802.11n HT40, Channel No.: 46



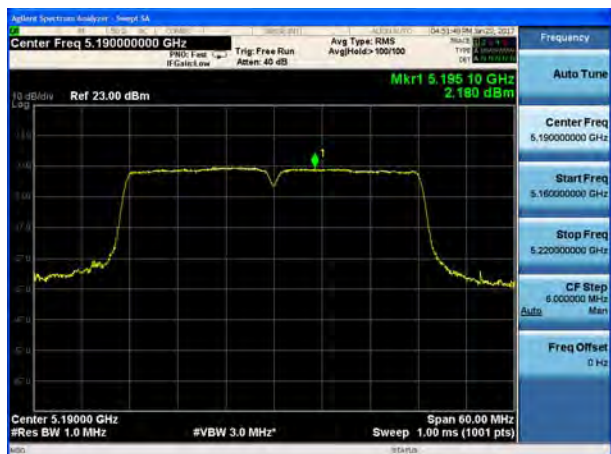
U-NII-1, 802.11n HT20, Channel No.: 48



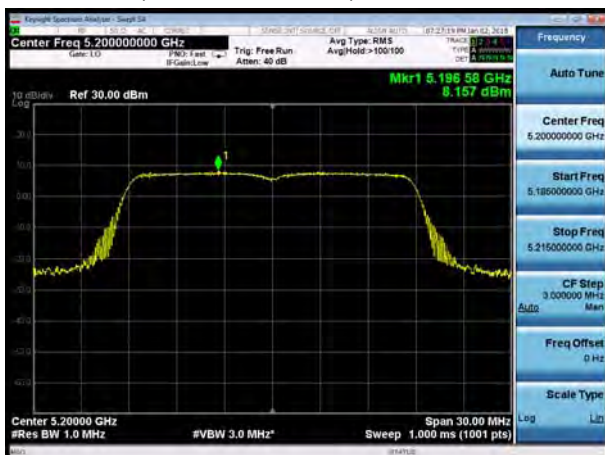
U-NII-1, 802.11ac HT20, Channel No.: 36



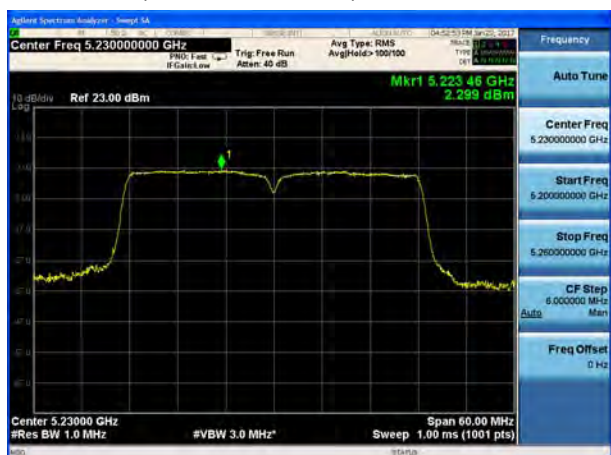
U-NII-1, 802.11ac HT40, Channel No.: 38



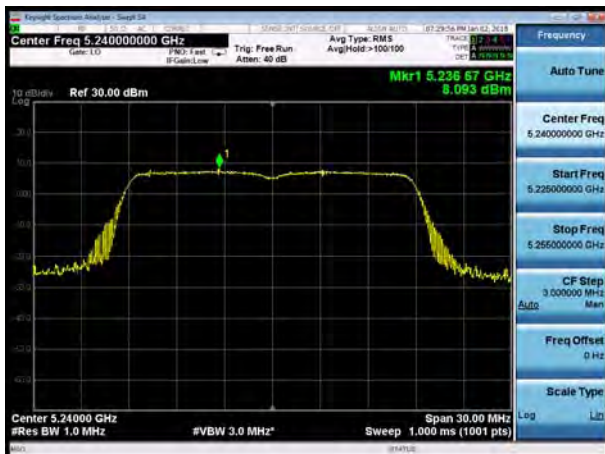
U-NII-1, 802.11ac HT20, Channel No.: 40



U-NII-1, 802.11ac HT40, Channel No.: 46



U-NII-1, 802.11ac HT20, Channel No.: 48



U-NII-1, 802.11ac HT80, Channel No.: 42





U-NII-2A, 802.11n HT20, Channel No.: 52



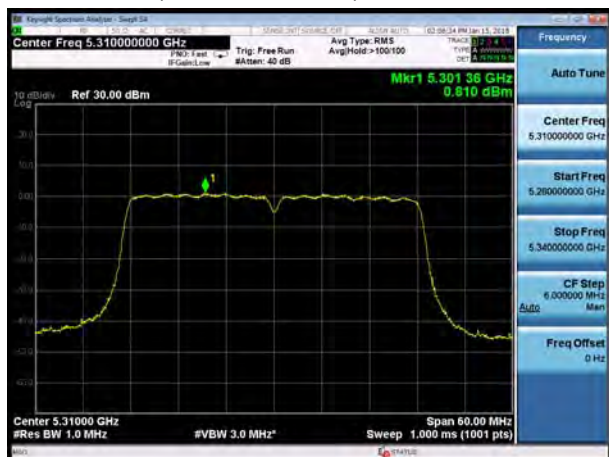
U-NII-2A, 802.11n HT40, Channel No.: 54



U-NII-2A, 802.11n HT20, Channel No.: 60



U-NII-2A, 802.11n HT40, Channel No.: 62



U-NII-2A, 802.11n HT20, Channel No.: 64

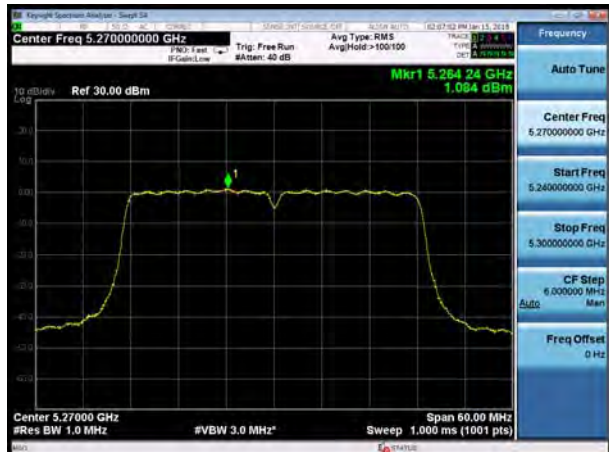




U-NII-2A, 802.11ac HT20, Channel No.: 52



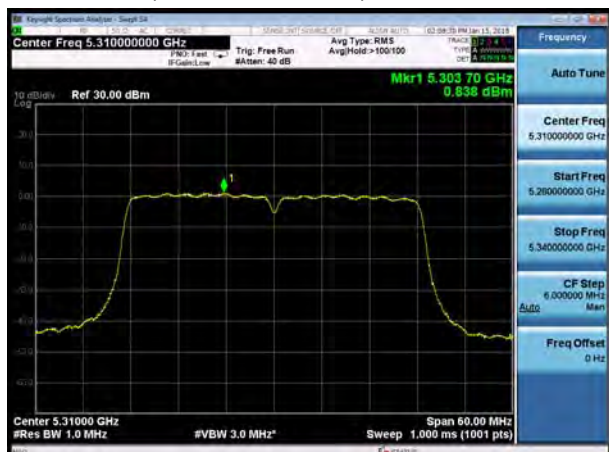
U-NII-2A, 802.11ac HT40, Channel No.: 54



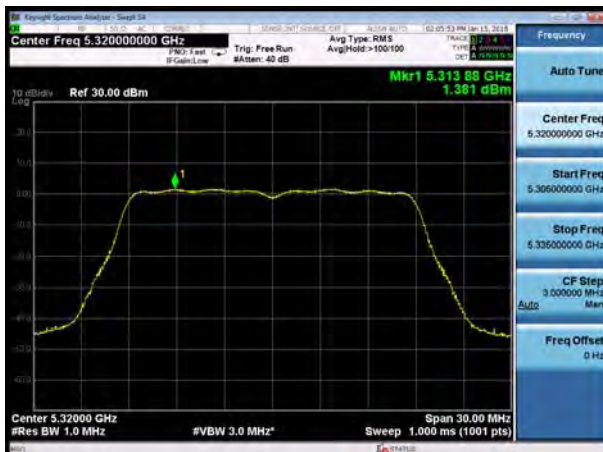
U-NII-2A, 802.11ac HT20, Channel No.: 60



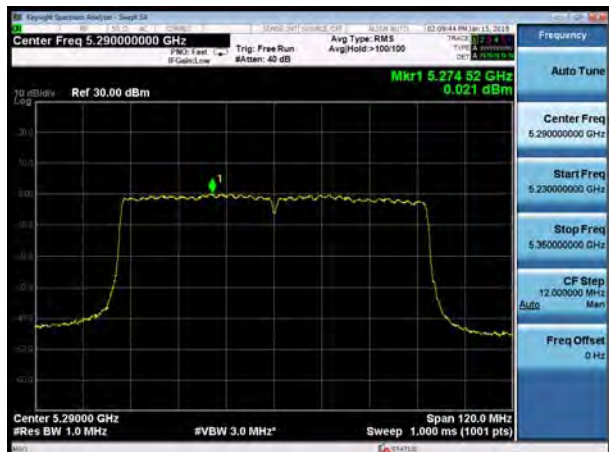
U-NII-2A, 802.11ac HT40, Channel No.: 62



U-NII-2A, 802.11ac HT20, Channel No.: 64



U-NII-2A, 802.11ac HT80, Channel No.: 58

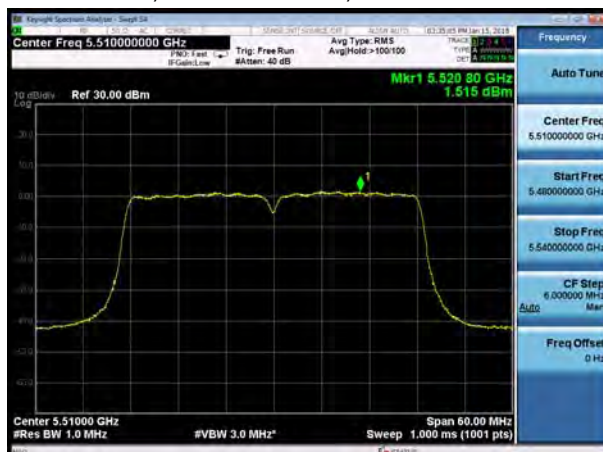




U-NII-2C, 802.11n HT20, Channel No.: 100



U-NII-2C, 802.11n HT40, Channel No.: 102



U-NII-2C, 802.11n HT20, Channel No.: 116



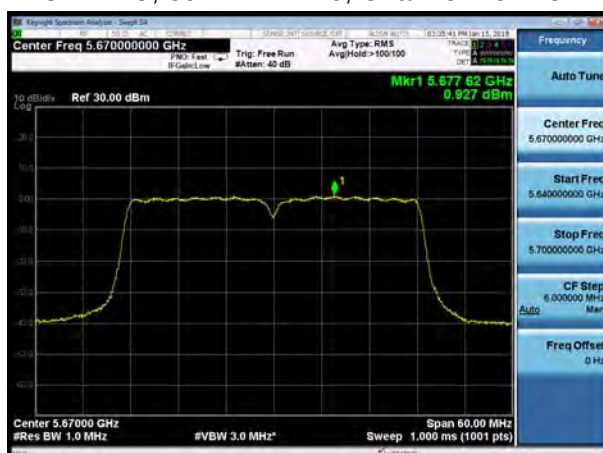
U-NII-2C, 802.11n HT40, Channel No.: 110



U-NII-2C, 802.11n HT20, Channel No.: 140



U-NII-2C, 802.11n HT40, Channel No.: 134





U-NII-2C, 802.11ac HT20, Channel No.: 100



U-NII-2C, 802.11ac HT40, Channel No.: 102



U-NII-2C, 802.11ac HT20, Channel No.: 116



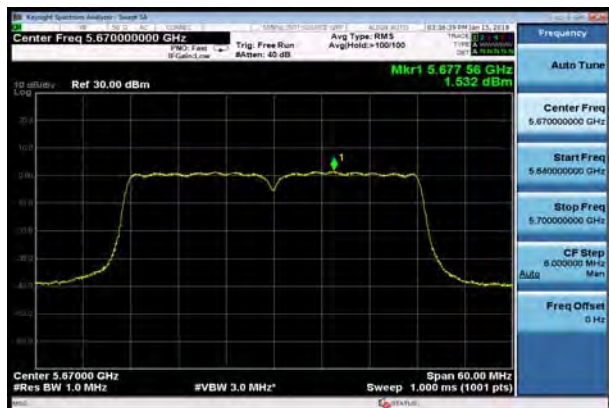
U-NII-2C, 802.11ac HT40, Channel No.: 110



U-NII-2C, 802.11ac HT20, Channel No.: 140

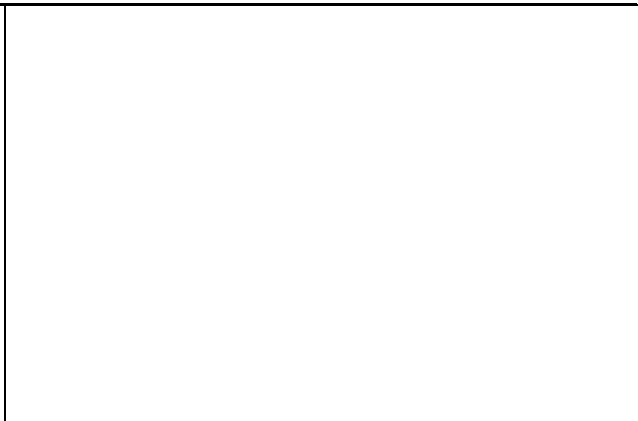


U-NII-2C, 802.11ac HT40, Channel No.: 134

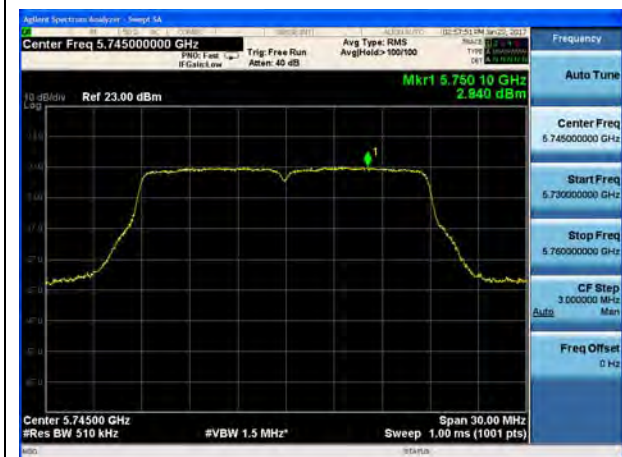


U-NII-2C, 802.11ac HT80, Channel No.: 106





U-NII-3, 802.11n HT20, Channel No.: 149

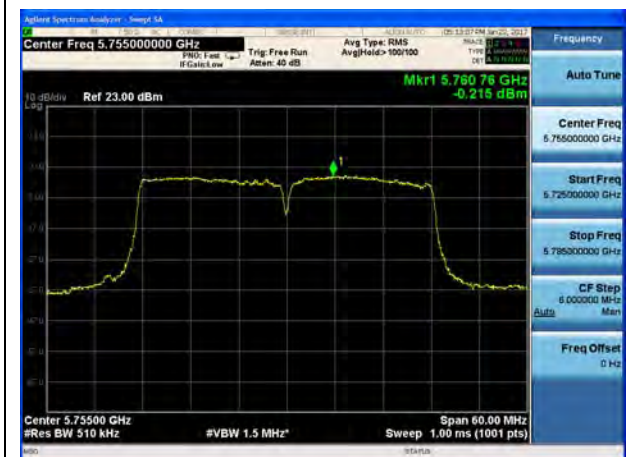


U-NII-3, 802.11n HT20, Channel No.: 157

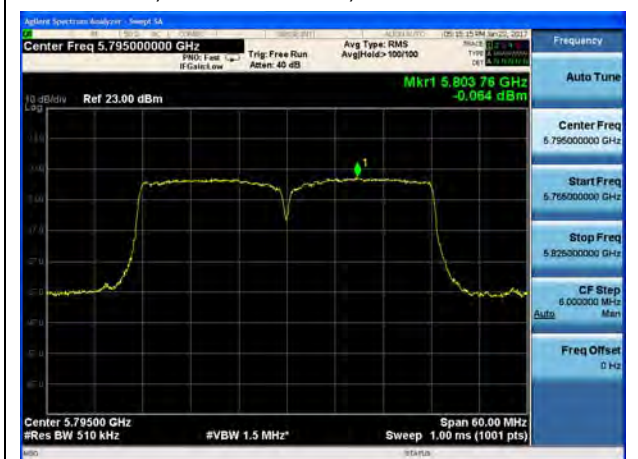


U-NII-3, 802.11n HT20, Channel No.: 165

U-NII-3, 802.11n HT40, Channel No.: 151



U-NII-3, 802.11n HT40, Channel No.: 159



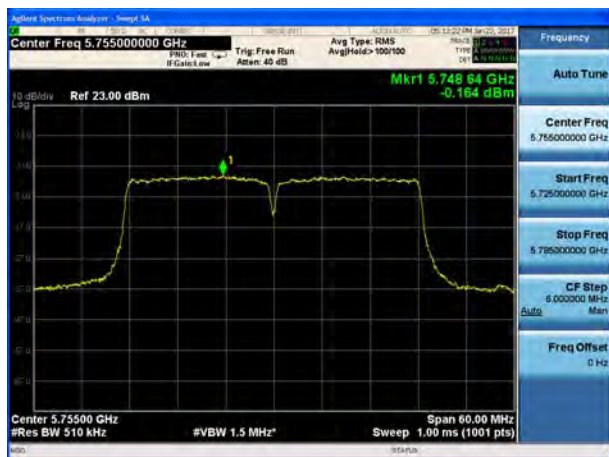




U-NII-3, 802.11ac HT20, Channel No.: 149



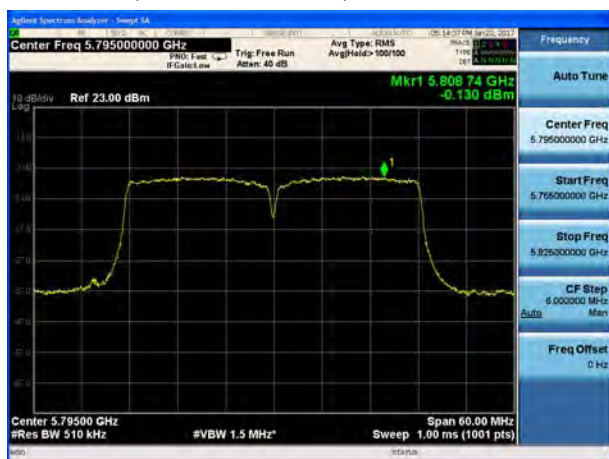
U-NII-3, 802.11ac HT40, Channel No.: 151



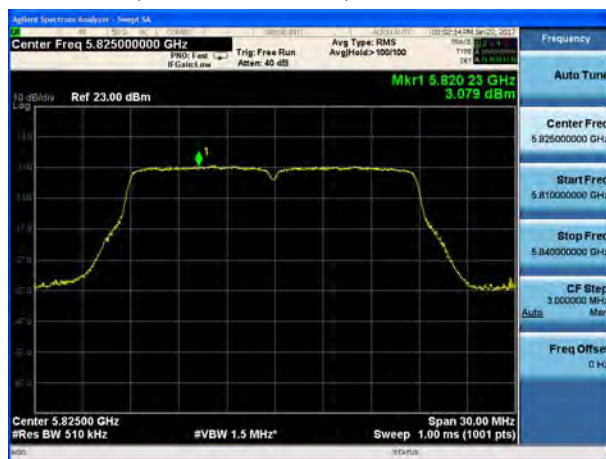
U-NII-3, 802.11ac HT20, Channel No.: 157



U-NII-3, 802.11ac HT40, Channel No.: 159



U-NII-3, 802.11ac HT20, Channel No.: 165



U-NII-3, 802.11ac HT80, Channel No.: 155

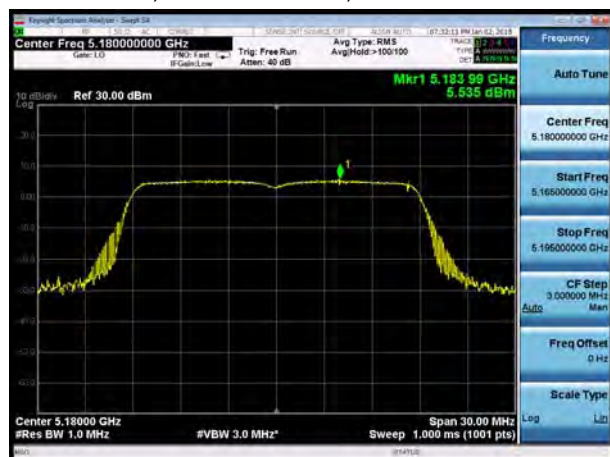




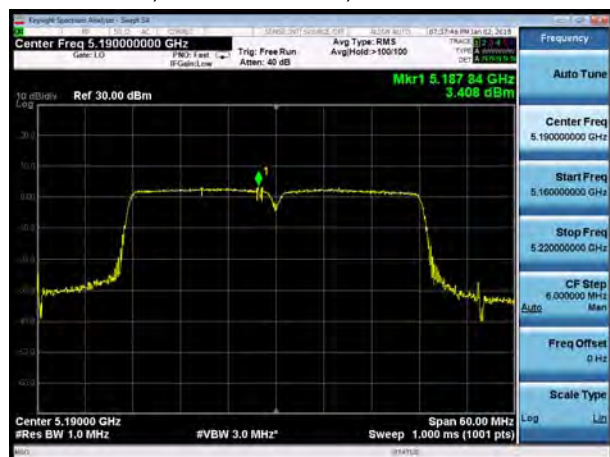
MIMO with beamforming

MIMO Antenna 1

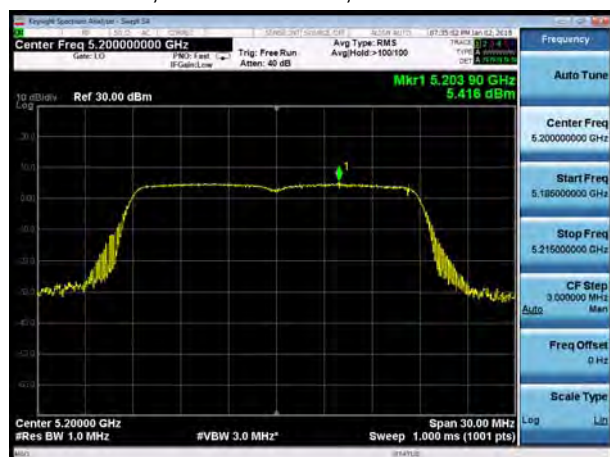
U-NII-1, 802.11n HT20, Channel No.: 36



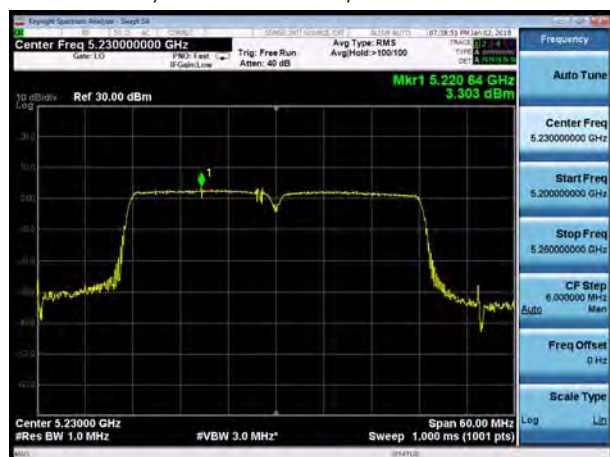
U-NII-1, 802.11n HT40, Channel No.: 38



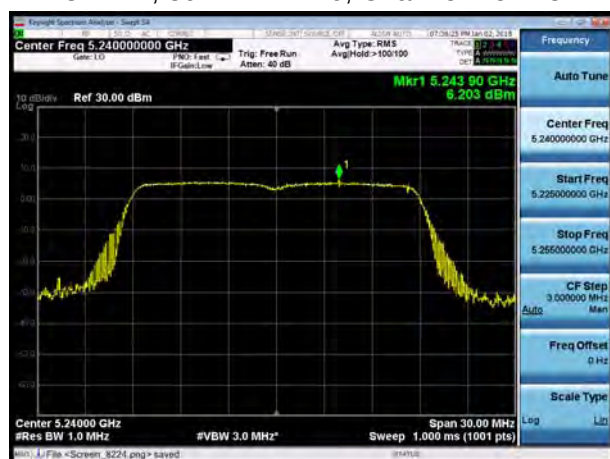
U-NII-1, 802.11n HT20, Channel No.: 40



U-NII-1, 802.11n HT40, Channel No.: 46

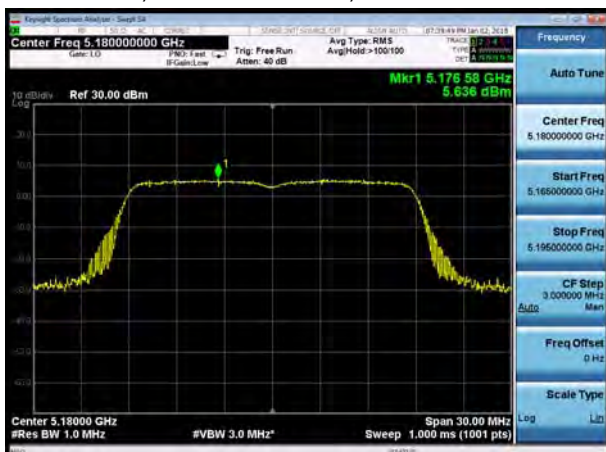


U-NII-1, 802.11n HT20, Channel No.: 48

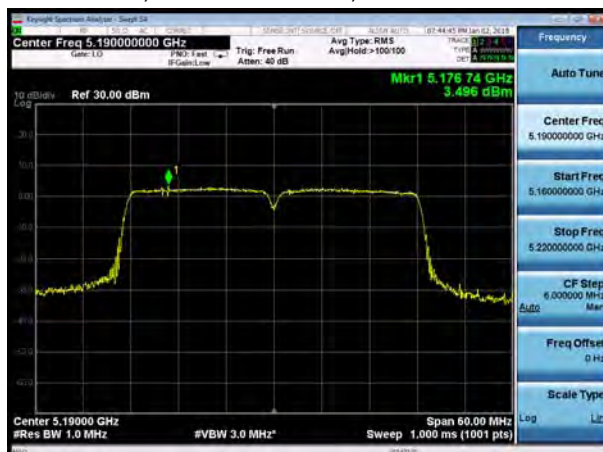




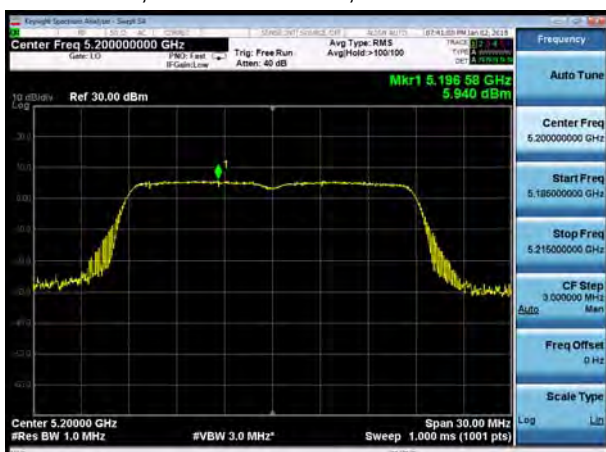
U-NII-1, 802.11ac HT20, Channel No.: 36



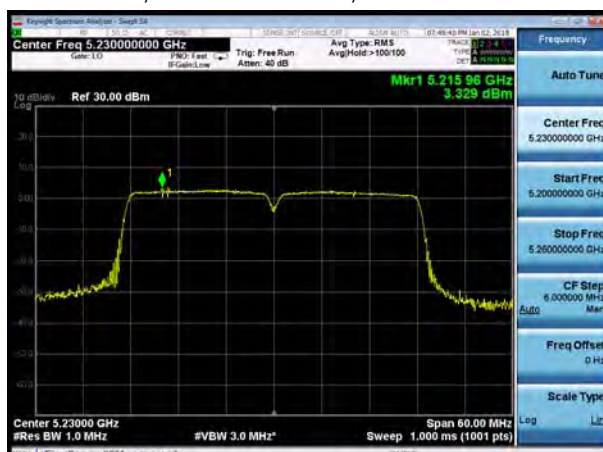
U-NII-1, 802.11ac HT40, Channel No.: 38



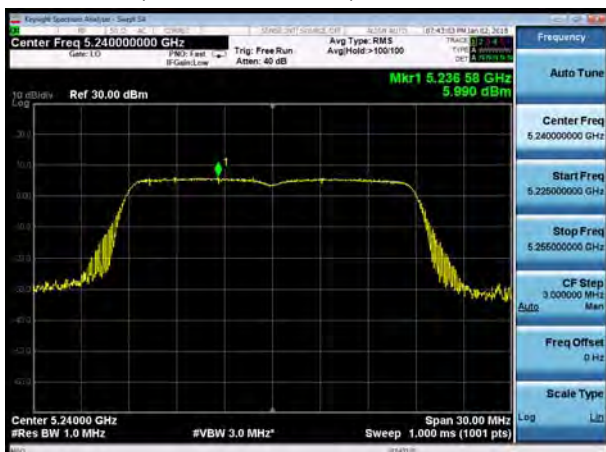
U-NII-1, 802.11ac HT20, Channel No.: 40



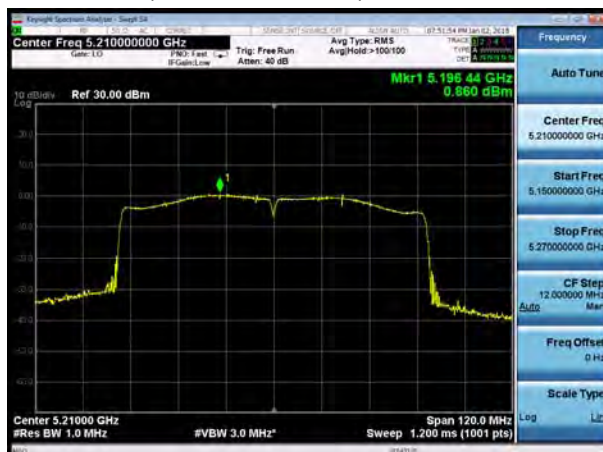
U-NII-1, 802.11ac HT40, Channel No.: 46



U-NII-1, 802.11ac HT20, Channel No.: 48



U-NII-1, 802.11ac HT80, Channel No.: 42

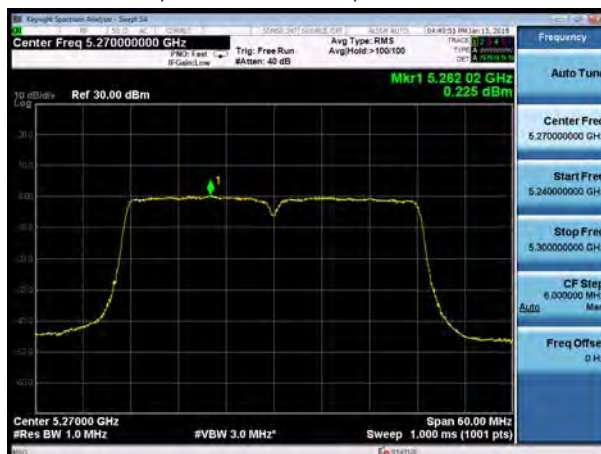




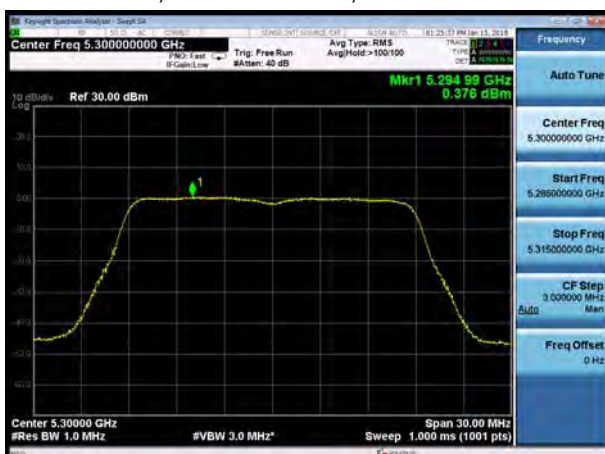
U-NII-2A, 802.11n HT20, Channel No.: 52



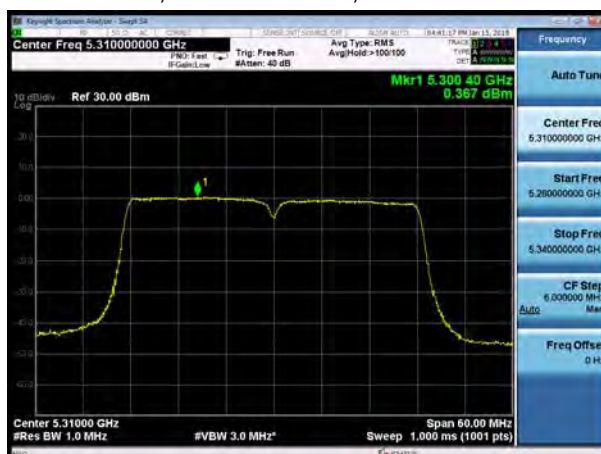
U-NII-2A, 802.11n HT40, Channel No.: 54



U-NII-2A, 802.11n HT20, Channel No.: 60



U-NII-2A, 802.11n HT40, Channel No.: 62



U-NII-2A, 802.11n HT20, Channel No.: 64

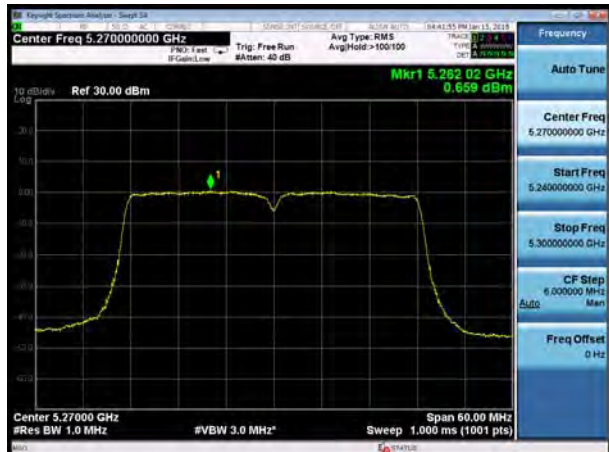




U-NII-2A, 802.11ac HT20, Channel No.: 52



U-NII-2A, 802.11ac HT40, Channel No.: 54



U-NII-2A, 802.11ac HT20, Channel No.: 60



U-NII-2A, 802.11ac HT40, Channel No.: 62



U-NII-2A, 802.11ac HT20, Channel No.: 64



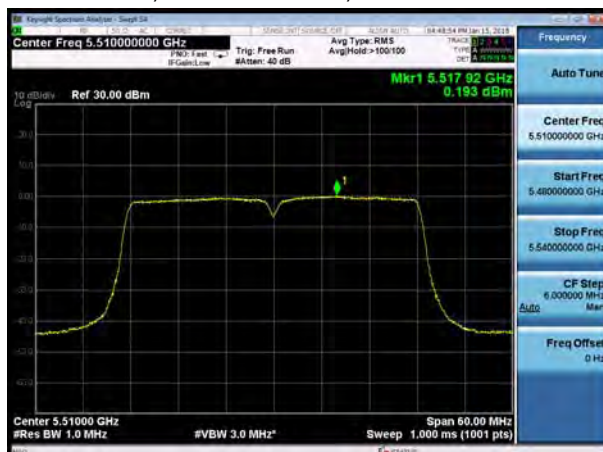
U-NII-2A, 802.11ac HT80, Channel No.: 58



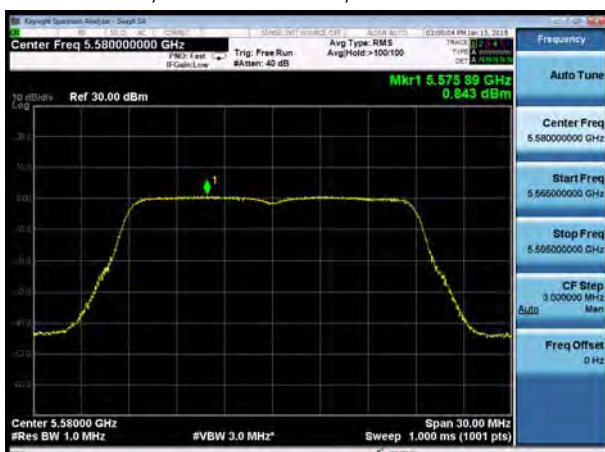
U-NII-2C, 802.11n HT20, Channel No.: 100



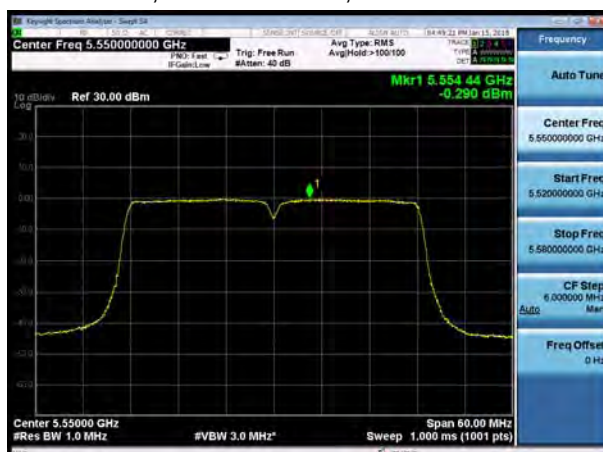
U-NII-2C, 802.11n HT40, Channel No.: 102



U-NII-2C, 802.11n HT20, Channel No.: 116



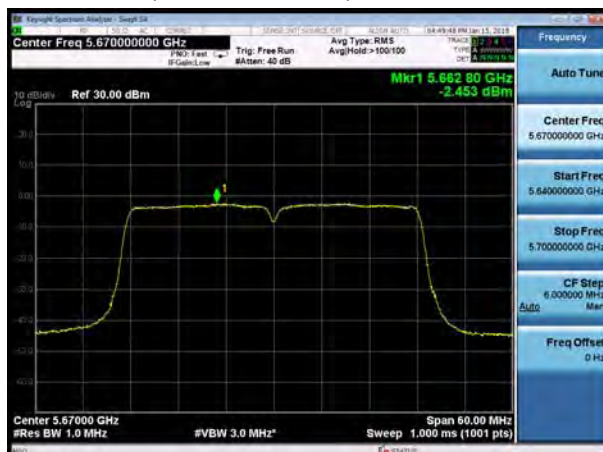
U-NII-2C, 802.11n HT40, Channel No.: 110



U-NII-2C, 802.11n HT20, Channel No.: 140



U-NII-2C, 802.11n HT40, Channel No.: 134

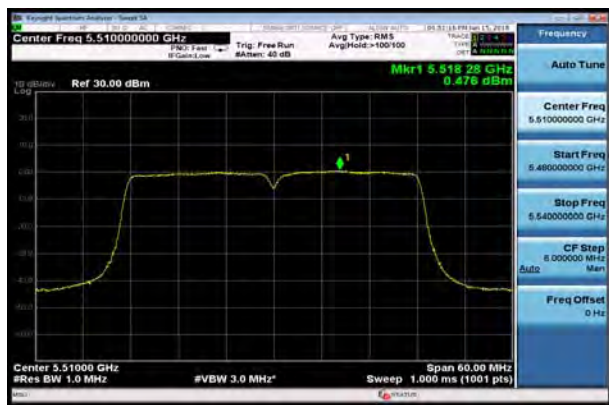




U-NII-2C, 802.11ac HT20, Channel No.: 100



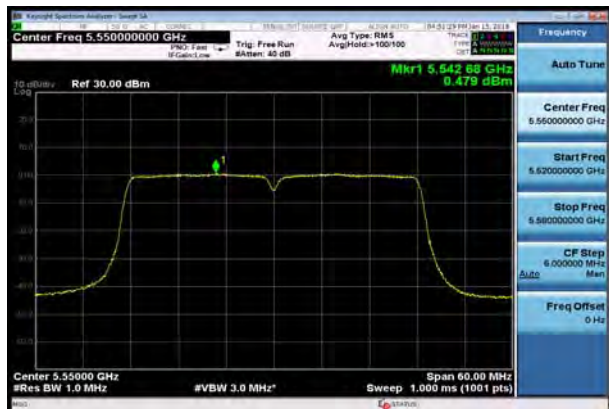
U-NII-2C, 802.11ac HT40, Channel No.: 102



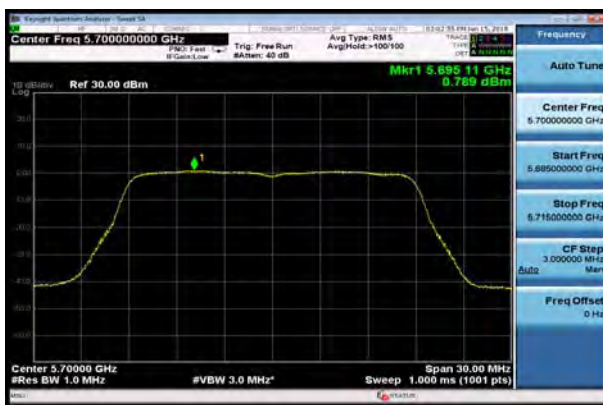
U-NII-2C, 802.11ac HT20, Channel No.: 116



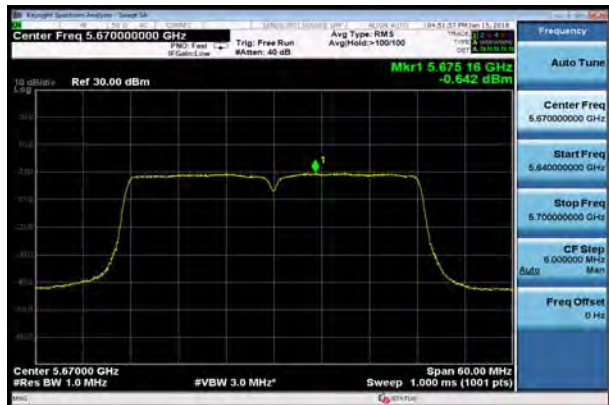
U-NII-2C, 802.11ac HT40, Channel No.: 110



U-NII-2C, 802.11ac HT20, Channel No.: 140



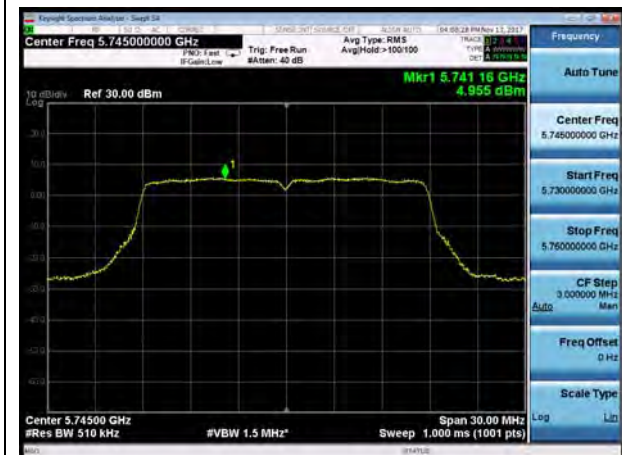
U-NII-2C, 802.11ac HT40, Channel No.: 134



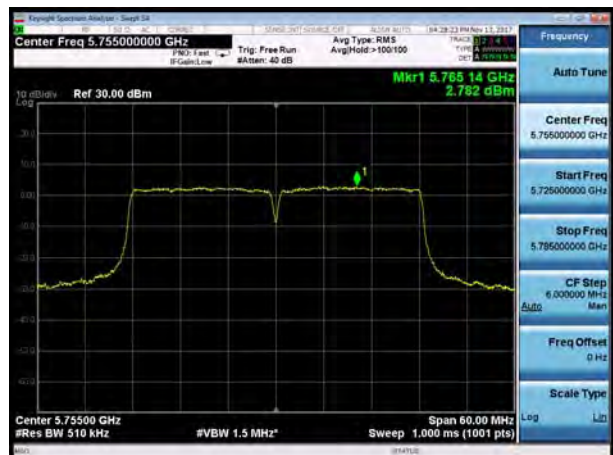
U-NII-2C, 802.11ac HT80, Channel No.: 106



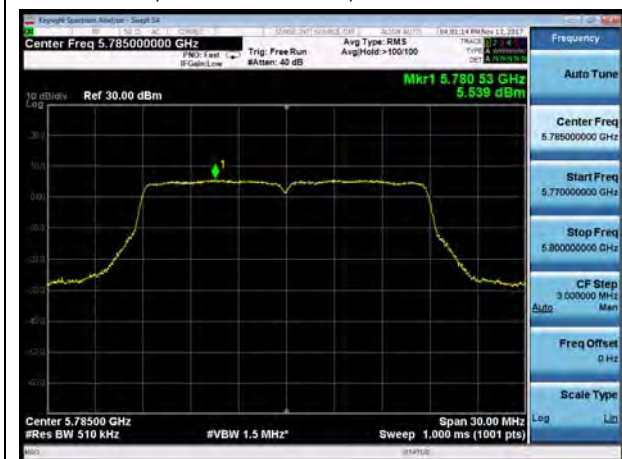
U-NII-3, 802.11n HT20, Channel No.: 149



U-NII-3, 802.11n HT40, Channel No.: 151



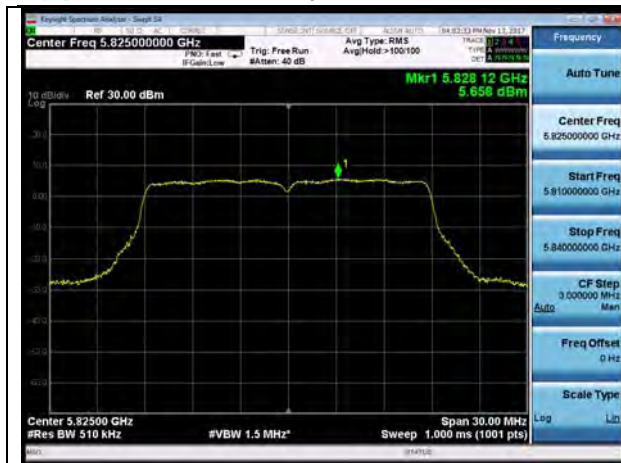
U-NII-3, 802.11n HT20, Channel No.: 157



U-NII-3, 802.11n HT40, Channel No.: 159

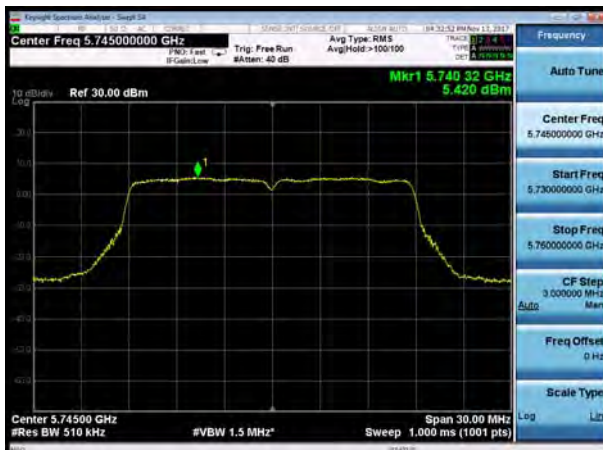


U-NII-3, 802.11n HT20, Channel No.: 165





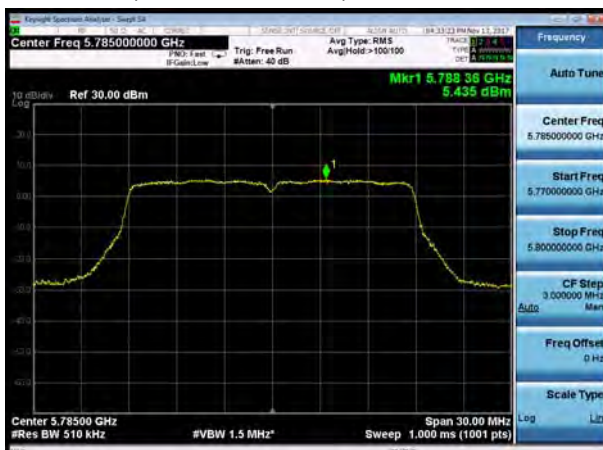
U-NII-3, 802.11ac HT20, Channel No.: 149



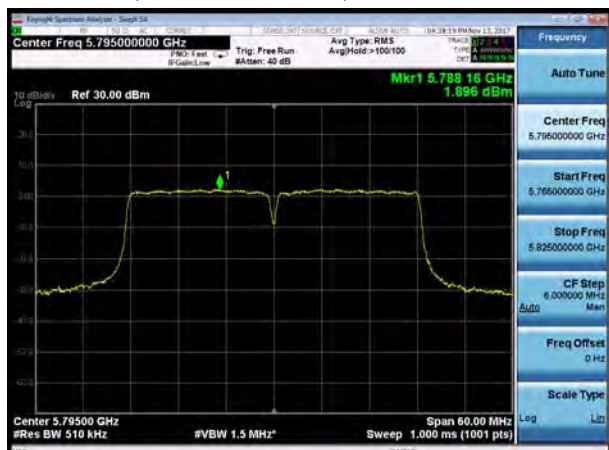
U-NII-3, 802.11ac HT40, Channel No.: 151



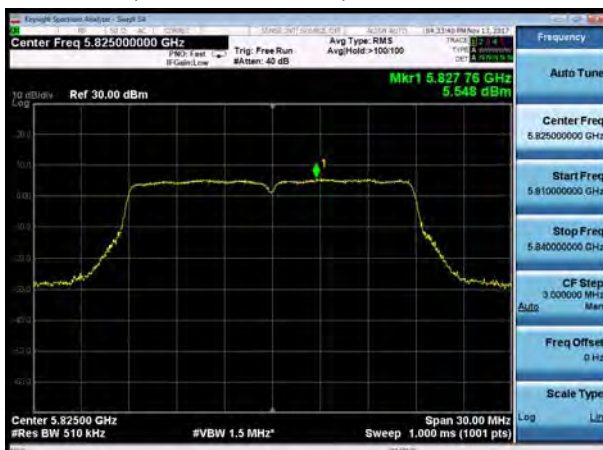
U-NII-3, 802.11ac HT20, Channel No.: 157



U-NII-3, 802.11ac HT40, Channel No.: 159



U-NII-3, 802.11ac HT20, Channel No.: 165



U-NII-3, 802.11ac HT80, Channel No.: 155

