RF TEST REPORT

Applicant	Nokia Shanghai Bell Co., Ltd
FCC ID	2ADZRG140WH
Product	7368 ISAM ONT G-140W-H
Brand	Nokia
Model	G-140W-H
Report No.	R1905B0058-R2V2
Issue Date	August 29, 2019

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.

Peng Tao

Performed by: Peng Tao

Kai Xu

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

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Summary of measurement results

Number	Test Case	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	Power spectral density	15.407(a)	PASS
5	Unwanted Emissions	15.407(b)	PASS
6	Conducted Emissions	15.207	PASS
Date of Testing: June 3, 2019~ June 26, 2019			

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.

1.2. Test facility

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
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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	Nokia Shanghai Bell Co., Ltd.
Applicant address	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China
Manufacturer	Nokia Shanghai Bell Co., Ltd.
Manufacturer address	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China

General information

EUT Description	
Model	G-140W-H
IMEI	/
Hardware Version	3FE 48055 AAAA
Software Version	3FE48077FGBB12
Power Supply	AC adapter
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1: 3.0 dBi Antenna 2: 3.0 dBi
additional beamforming gain	NA
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 (VHT20/VHT40/VHT80): OFDM
Max. Conducted Power	27.02dBm
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 temperature range:	-5 ° C to 45° C
Operating voltage range:	11.4 V to 12.6 V
State DC voltage:	12V
EUT Accessory	
Adapter 1	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd. Model: UES24WU-120200SPA

Adapter 2	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd. Model: UE24WU-120200SPA
Adapter 3	Manufacturer: SOY Model: SOY-1200200AR
Adapter 4	Manufacturer: RUIDE(SHENZHEN) ELECTRONIC INDUSTRIAL CO., LTD. Model: RD1202000-C55-154MG
Adapter 5	Manufacturer: RUIDE(SHENZHEN) ELECTRONIC INDUSTRIAL CO., LTD. Model: RD1202000-C55-154MG
Adapter 6	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd. Model: UE190412GWAD5RI/UE24WV-120200SPA
Adapter 7	Manufacturer: RUIDE(SHENZHEN) ELECTRONIC INDUSTRIAL CO., LTD. Model: BR120200-EC5C-HH00/RD1202000-C55-154OG
Note: The information of the EUT is declared by the manufacturer. 2. There is more than one Adapter, each one should be applied throughout the compliance test respectively, and however, only the worst case (Adapter 5) will be recorded in this report.	

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 v02r01

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**
802.11a	6 Mbps	6 Mbps
802.11n HT20	MCS0	MCS0
802.11n HT40	MCS0	MCS0
802.11ac VHT20	MCS0	MCS0
802.11ac VHT40	MCS0	MCS0
802.11ac VHT80	MCS0	MCS0
The device supports non-beamforming and beamforming function in 802.11n/ac, after pre-testing, beamforming mode has the worst emission value, so the worst case was recorded.		

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

Test Cases	Antenna 1	Antenna 2	MIMO
Average conducted output power	O	O	O
Occupied bandwidth	802.11a	--	802.11n HT20/40 802.11ac VHT20/40/80
Frequency stability	802.11a	--	--
Power Spectral Density	O	O	O
Unwanted Emissions	802.11a	--	802.11n HT20/40 802.11ac VHT20/40/80
Conducted Emissions	O	--	--
Note：“O”: test all bands			

According to RF Output power results in chapter 5.1, MIMO was selected as the worst antenna for 802.11n HT20/40, 802.11ac VHT20/40/80. SISO Antenna 1 was selected as the worst SISO antenna for 802.11a.

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
			144	5720MHz
		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
			153	5765MHz
			157	5785MHz

			161	5805MHz
			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.

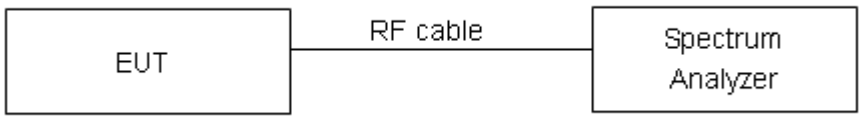
For U-NII-1/U-NII-2A/U-NII-2C, set RBW ≈1% OCB kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

For U-NII-3, Set RBW = 100 kHz, VBW ≥ 3 × 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:

U-NII-1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	16.656	19.86	PASS
	5200	17.395	29.67	PASS
	5240	16.620	20.00	PASS
802.11n HT20	5180	17.744	20.07	PASS
	5200	17.884	29.40	PASS
	5240	17.701	20.45	PASS
802.11n HT40	5190	36.272	39.86	PASS
	5230	36.270	39.90	PASS
802.11ac VHT20	5180	17.987	29.72	PASS
	5200	18.005	29.83	PASS
	5240	18.042	29.76	PASS
802.11ac VHT40	5190	36.573	59.79	PASS
	5230	36.569	59.35	PASS
802.11ac VHT80	5210	75.630	81.79	PASS

U-NII-2A

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5260	16.636	20.13	PASS
	5300	16.635	19.93	PASS
	5320	16.626	19.90	PASS
802.11n HT20	5260	17.768	20.34	PASS
	5300	17.715	20.31	PASS
	5320	17.757	20.33	PASS
802.11n HT40	5270	36.253	39.51	PASS
	5310	36.252	39.44	PASS
802.11ac VHT20	5260	17.757	20.18	PASS
	5300	17.748	20.23	PASS
	5320	17.734	20.20	PASS
802.11ac VHT40	5270	36.318	39.66	PASS
	5310	36.283	39.73	PASS
802.11ac VHT80	5290	75.657	81.74	PASS

U-NII-2C

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5500	16.648	19.91	PASS
	5580	16.698	19.90	PASS
	5700	16.647	19.99	PASS
802.11n HT20	5500	17.723	20.37	PASS
	5580	17.748	20.23	PASS
	5700	17.731	20.24	PASS
802.11n HT40	5510	36.308	39.44	PASS
	5550	36.252	39.51	PASS
	5670	36.301	39.68	PASS
802.11ac VHT20	5500	17.730	20.29	PASS
	5580	17.743	20.22	PASS
	5700	17.734	20.25	PASS
802.11ac VHT40	5510	36.311	39.71	PASS
	5550	36.237	39.72	PASS
	5670	36.256	39.56	PASS
802.11ac VHT80	5530	75.639	81.89	PASS

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5720	13.372	15.03	PASS
802.11n HT20	5720	13.909	15.17	PASS
802.11n HT40	5710	33.029	34.92	PASS
802.11ac VHT20	5720	13.880	15.21	PASS
802.11ac VHT40	5710	33.009	34.82	PASS
802.11ac VHT80	5690	72.495	75.73	PASS

U-NII-3

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Conclusion
802.11a	5720	4.0777	3.201	PASS
802.11n HT20	5720	4.2827	3.796	PASS
802.11n HT40	5710	4.2383	3.200	PASS
802.11ac VHT20	5720	4.2601	3.829	PASS
802.11ac VHT40	5710	4.3513	3.201	PASS
802.11ac VHT80	5690	21.458	3.139	PASS

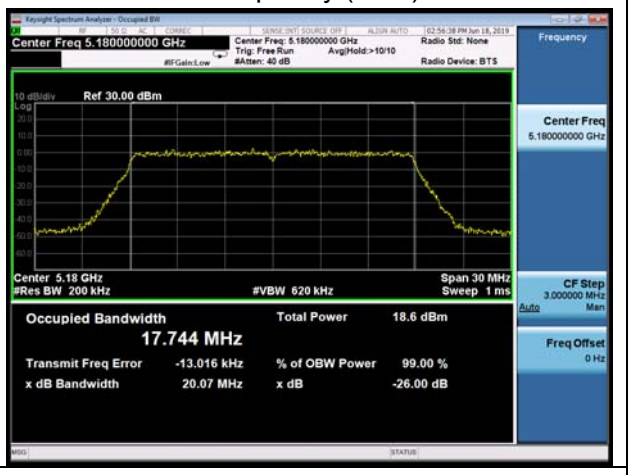
Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5745	16.911	16.39	500	PASS
	5785	16.826	16.36	500	PASS
	5825	16.769	16.35	500	PASS
802.11n HT20	5745	17.888	17.74	500	PASS
	5785	17.870	17.54	500	PASS
	5825	17.905	17.56	500	PASS
802.11n HT40	5755	36.466	36.00	500	PASS
	5795	36.379	35.94	500	PASS
802.11ac VHT20	5745	17.867	17.56	500	PASS
	5785	17.888	17.59	500	PASS
	5825	17.864	17.15	500	PASS
802.11ac VHT40	5755	36.488	36.37	500	PASS
	5795	36.369	36.33	500	PASS
802.11ac VHT80	5775	76.023	75.42	500	PASS

U-NII-1, 802.11a

Carrier frequency (MHz): 5180

U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5180



U-NII-1, 802.11a

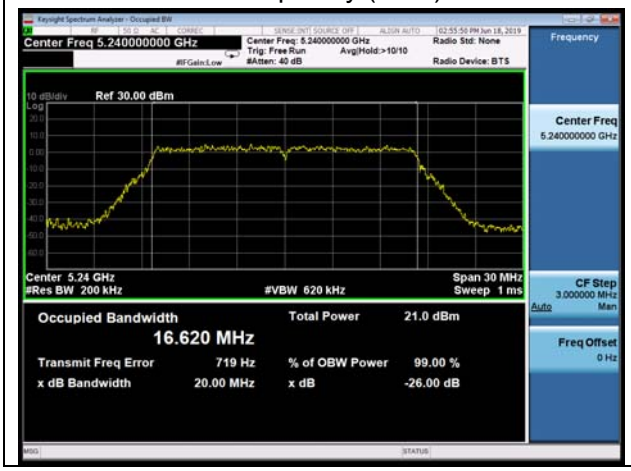
Carrier frequency (MHz): 5200

U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5200

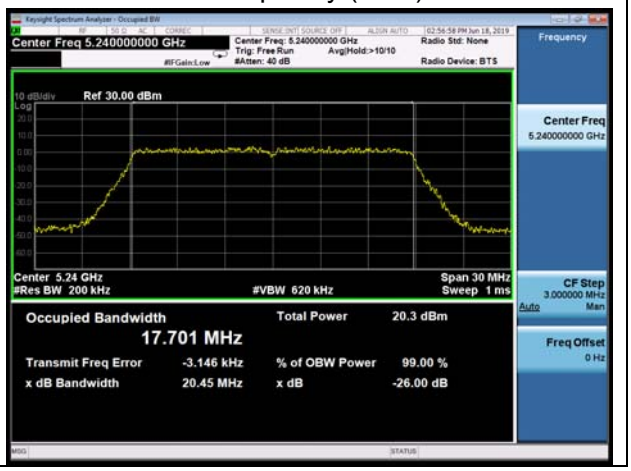
U-NII-1, 802.11a

Carrier frequency (MHz):5240



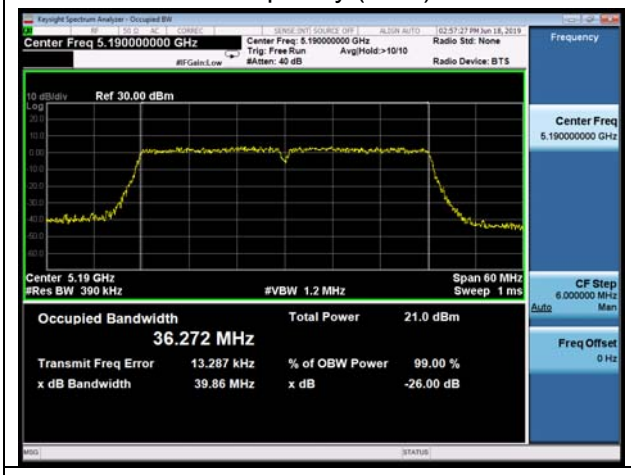
U-NII-1, 802.11n HT20

Carrier frequency (MHz):5240



U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5190



U-NII-1, 802.11ac VHT20

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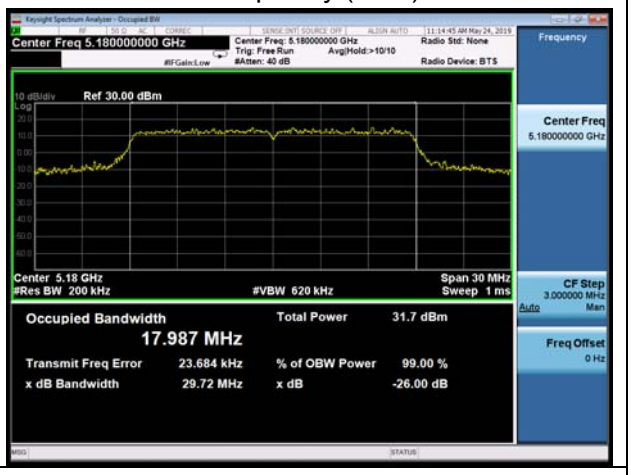
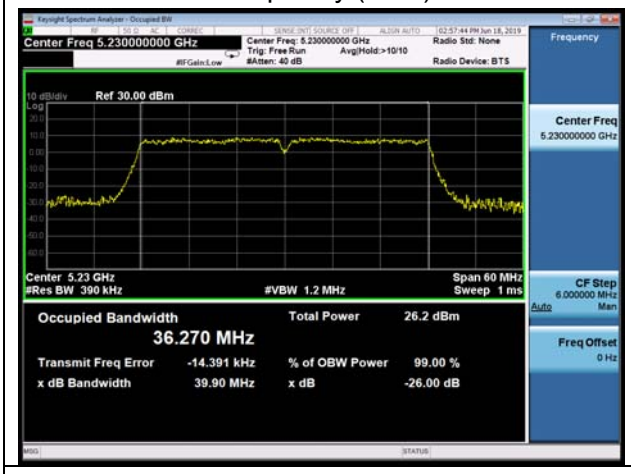


U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5230



U-NII-1, 802.11ac VHT20

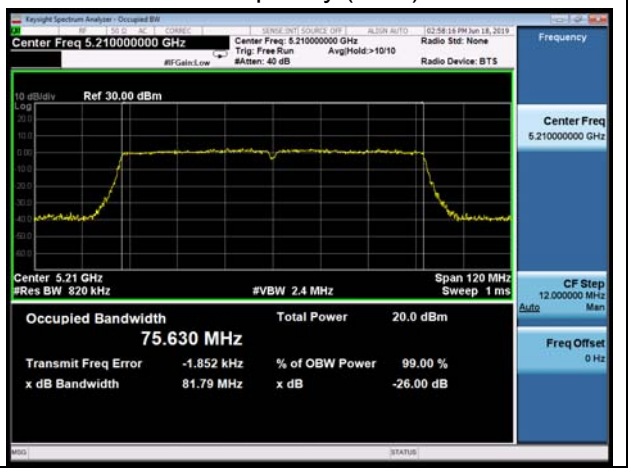
Carrier frequency (MHz): 5200

U-NII-1, 802.11ac VHT40

Carrier frequency (MHz): 5190

U-NII-1, 802.11ac VHT20

Carrier frequency (MHz):5240

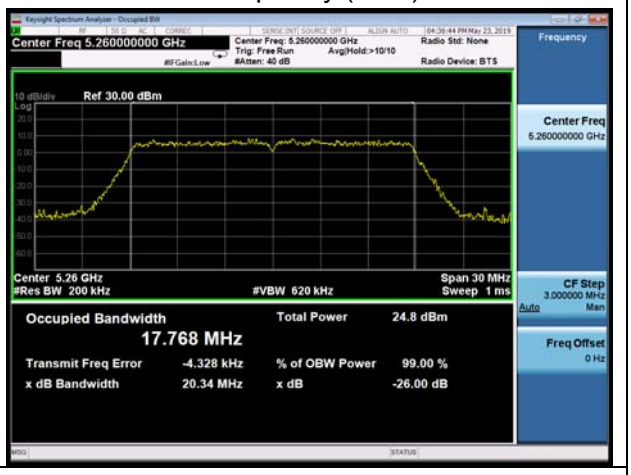
U-NII-1, 802.11ac VHT40 Carrier frequency (MHz): 5230	U-NII-1, 802.11ac VHT80 Carrier frequency (MHz): 5210
	

U-NII-2A, 802.11a

Carrier frequency (MHz): 5260

U-NII-2A, 802.11n HT20

Carrier frequency (MHz): 5260

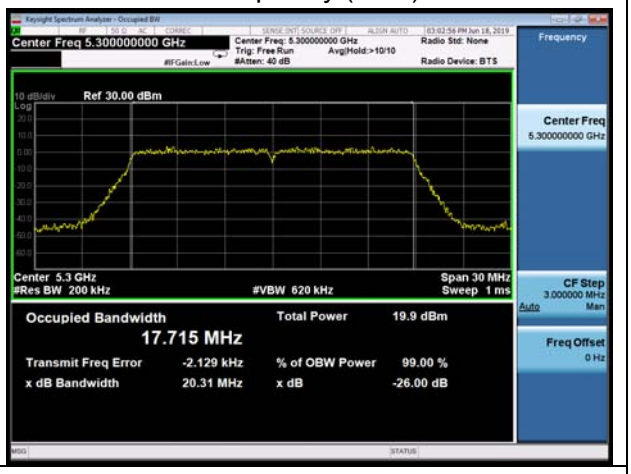


U-NII-2A, 802.11a

Carrier frequency (MHz): 5300

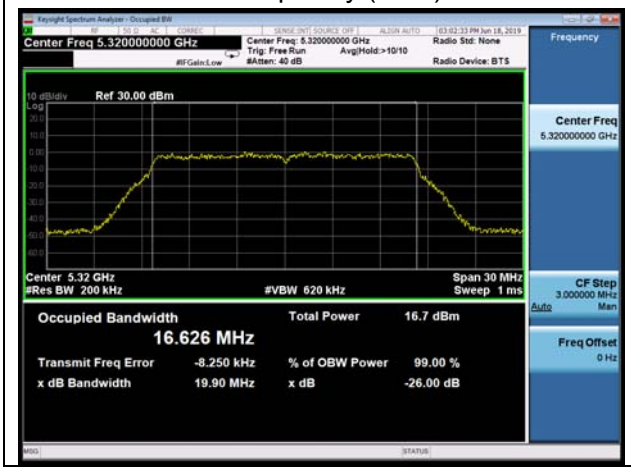
U-NII-2A, 802.11n HT20

Carrier frequency (MHz): 5300



U-NII-2A, 802.11a

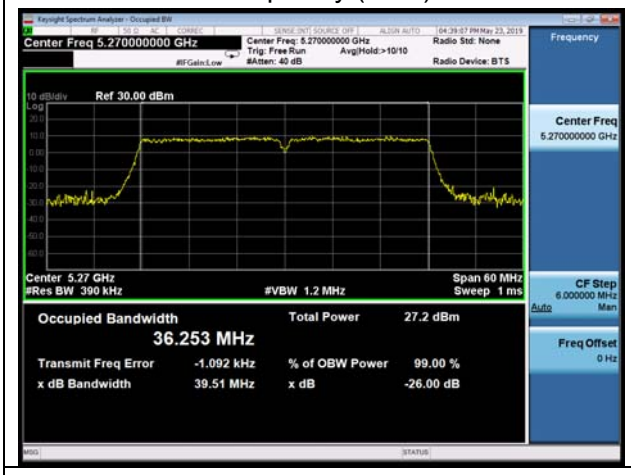
Carrier frequency (MHz):5320



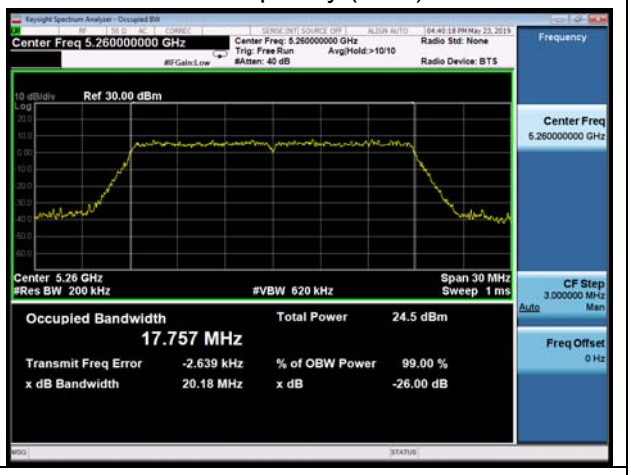
U-NII-2A, 802.11n HT20

Carrier frequency (MHz):5320

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



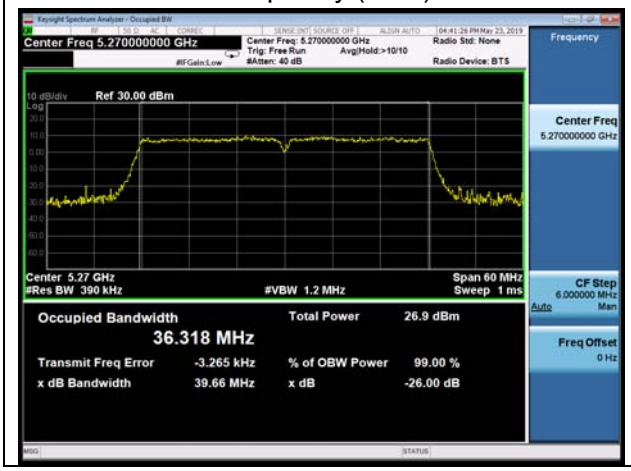
U-NII-2A, 802.11ac VHT20
Carrier frequency (MHz):5260



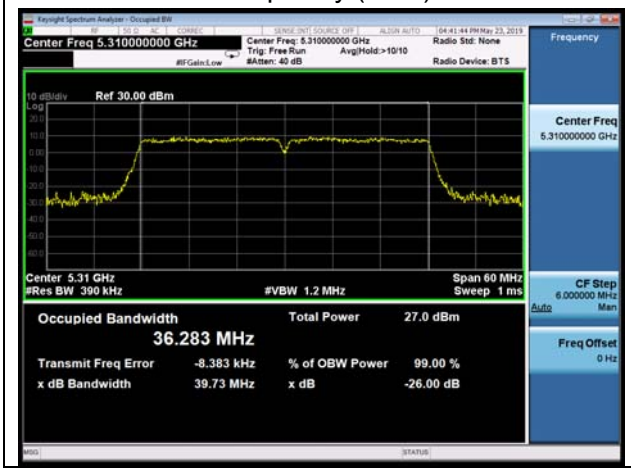
U-NII-2A, 802.11n HT40
Carrier frequency (MHz): 5310

U-NII-2A, 802.11ac VHT20
Carrier frequency (MHz): 5300

U-NII-2A, 802.11ac VHT40
Carrier frequency (MHz): 5270



U-NII-2A, 802.11ac VHT20
Carrier frequency (MHz):5320

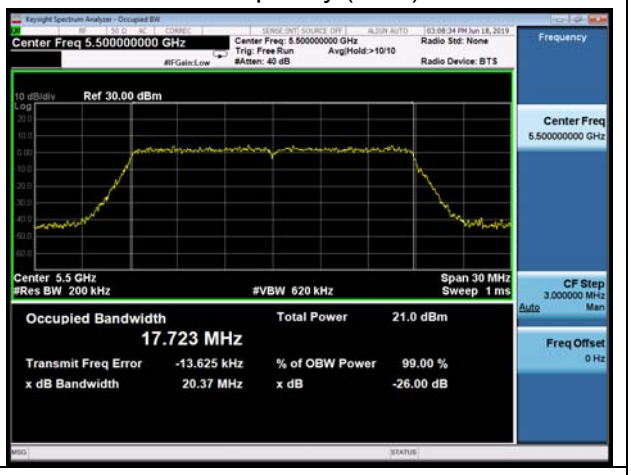
U-NII-2A, 802.11ac VHT40 Carrier frequency (MHz): 5310	U-NII-2A, 802.11ac VHT80 Carrier frequency (MHz): 5290
	

U-NII-2C, 802.11a

Carrier frequency (MHz): 5500

U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5500



U-NII-2C, 802.11a

Carrier frequency (MHz): 5580

U-NII-2C, 802.11n HT20

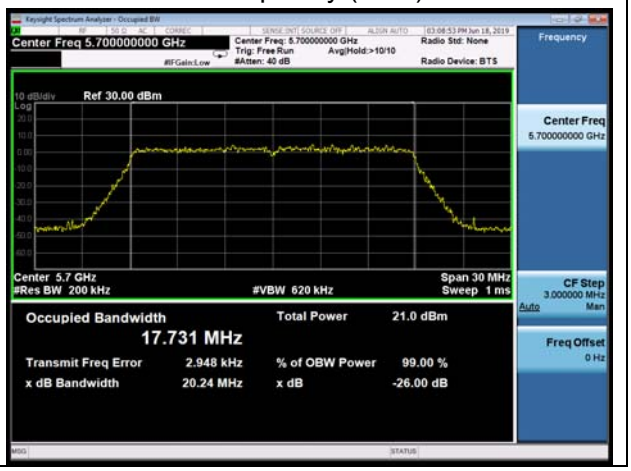
Carrier frequency (MHz): 5580

U-NII-2C, 802.11a

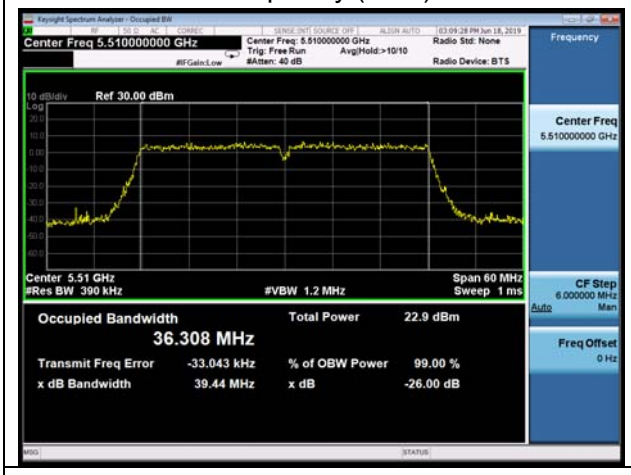
Carrier frequency (MHz):5700

U-NII-2C, 802.11n HT20

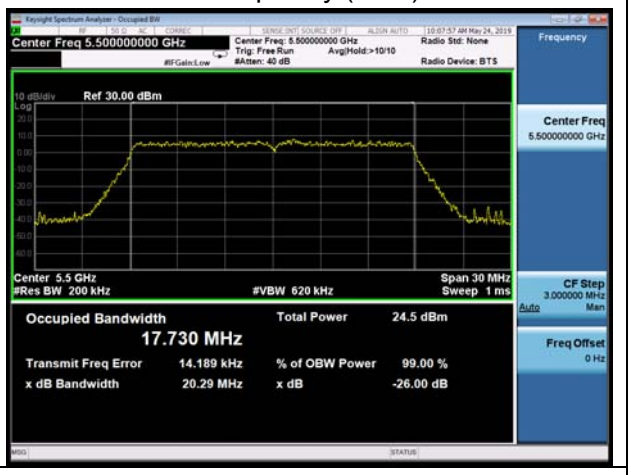
Carrier frequency (MHz):5700



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



U-NII-2C, 802.11ac VHT20
Carrier frequency (MHz): 5500



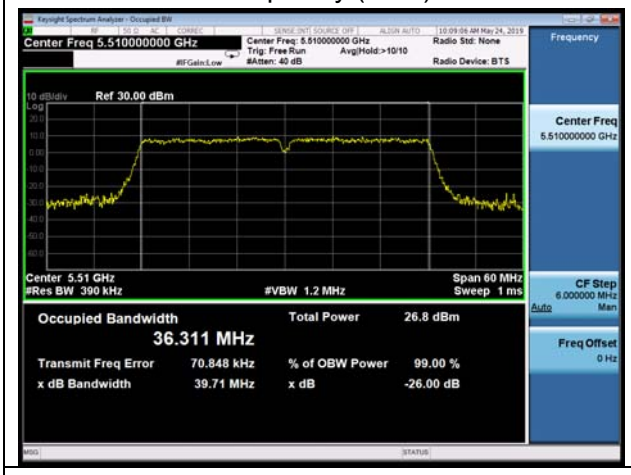
U-NII-2C, 802.11n HT40
Carrier frequency (MHz): 5550

U-NII-2C, 802.11ac VHT20
Carrier frequency (MHz): 5580

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

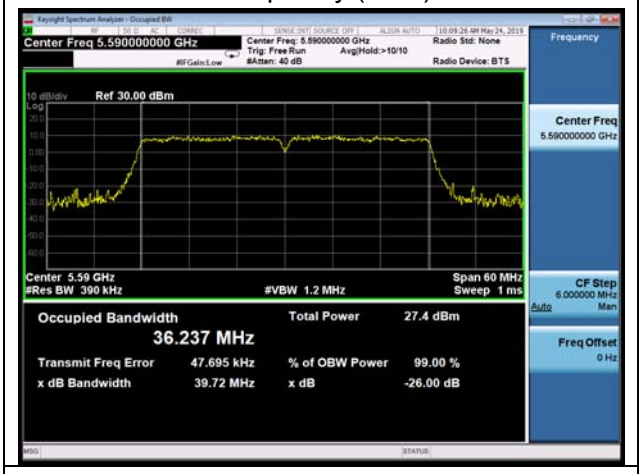
U-NII-2C, 802.11ac VHT20
Carrier frequency (MHz):5700

U-NII-2C, 802.11ac VHT40
Carrier frequency (MHz): 5510

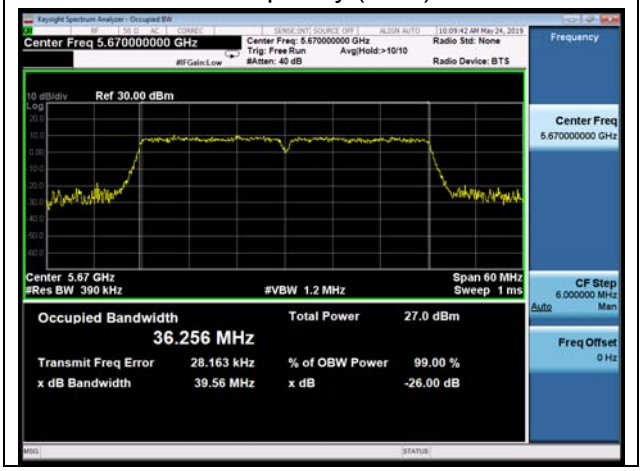


U-NII-2C, 802.11ac VHT80
Carrier frequency (MHz): 5530

U-NII-2C, 802.11ac VHT40
Carrier frequency (MHz): 5550

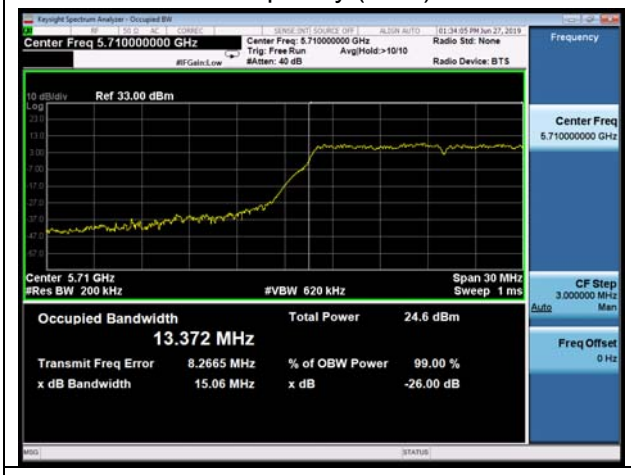


U-NII-2C, 802.11ac VHT40
Carrier frequency (MHz): 5670



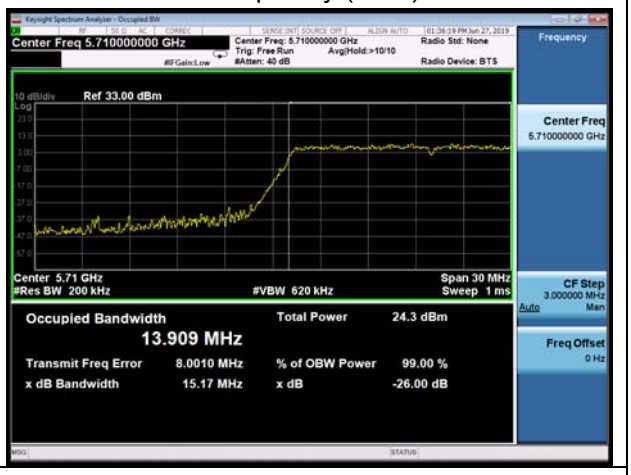
U-NII-2C, 802.11a

Carrier frequency (MHz): 5720



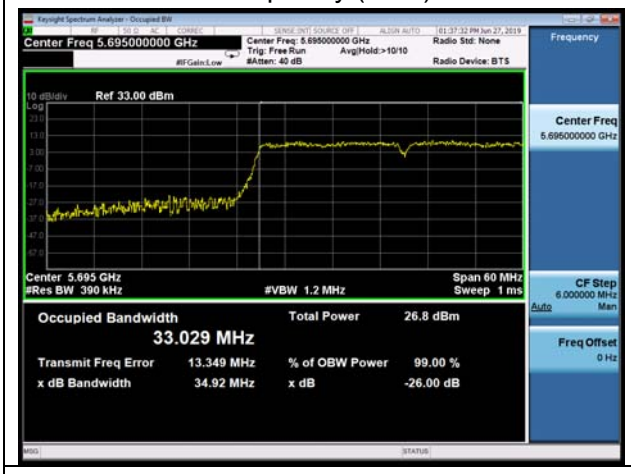
U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5720



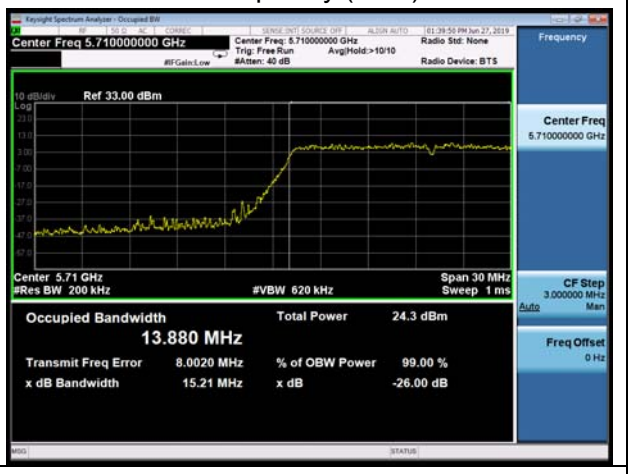
U-NII-2C, 802.11n HT40

Carrier frequency (MHz): 5710



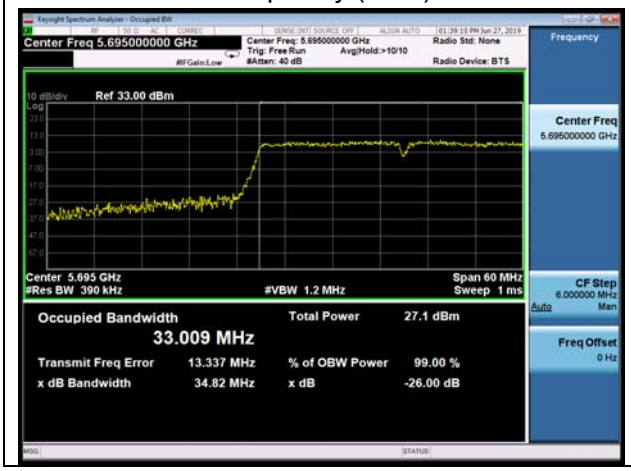
U-NII-2C, 802.11ac VHT20

Carrier frequency (MHz): 5720



U-NII-2C, 802.11ac VHT40

Carrier frequency (MHz): 5710



U-NII-2C, 802.11ac VHT40

Carrier frequency (MHz): 5690

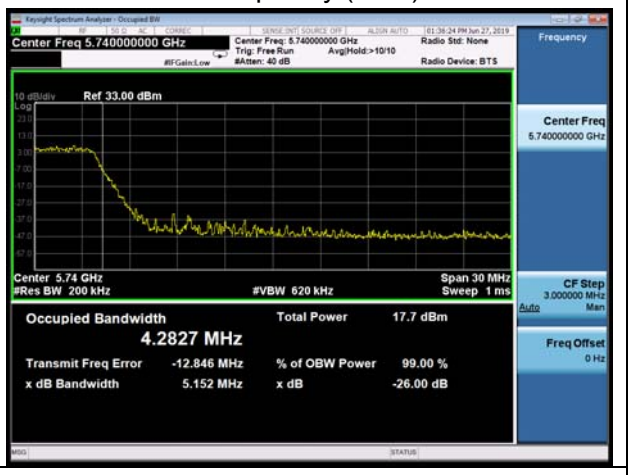
99% bandwidth

U-NII-3, 802.11a

Carrier frequency (MHz): 5720

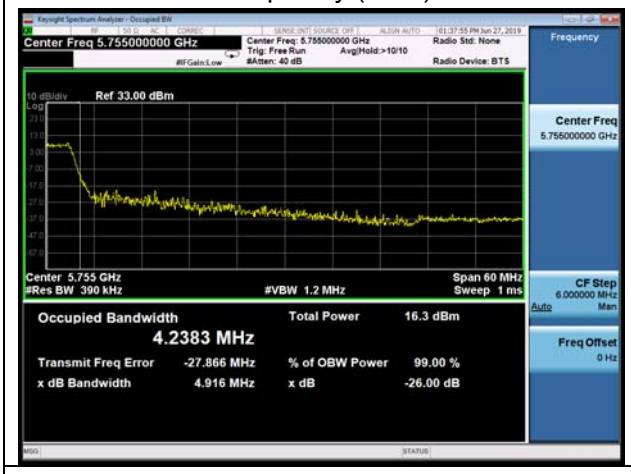
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5720



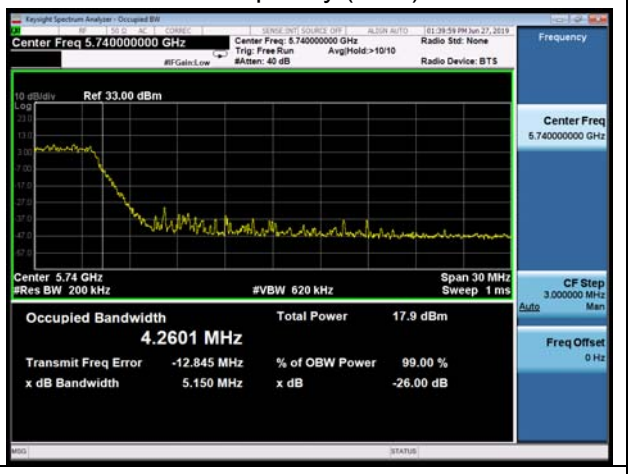
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5710



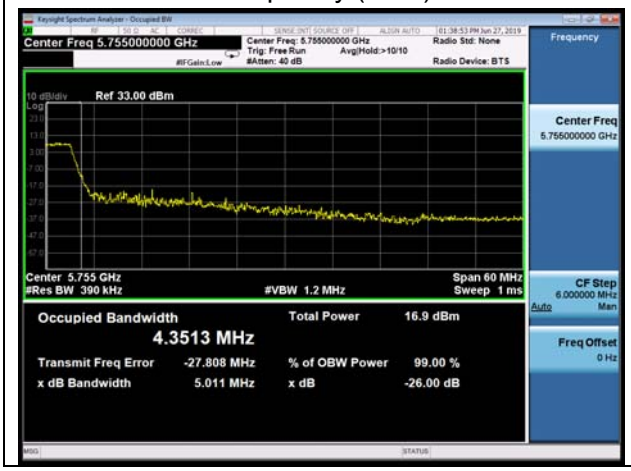
U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5720



U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5710



U-NII-3, 802.11ac VHT40

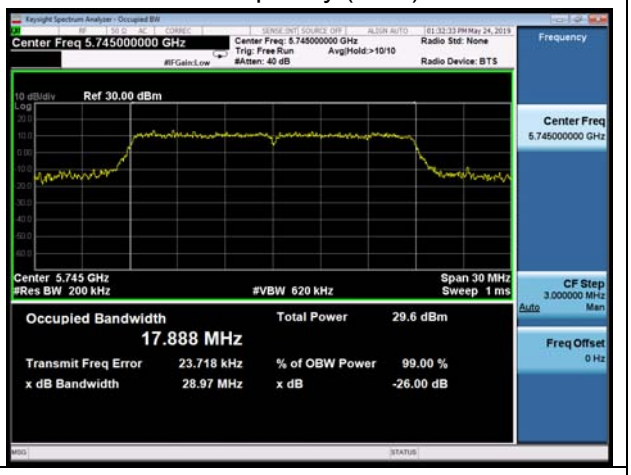
Carrier frequency (MHz): 5690

U-NII-3, 802.11a

Carrier frequency (MHz): 5745

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11a

Carrier frequency (MHz): 5785

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785

U-NII-3, 802.11a

Carrier frequency (MHz): 5825

U-NII-3, 802.11n HT20

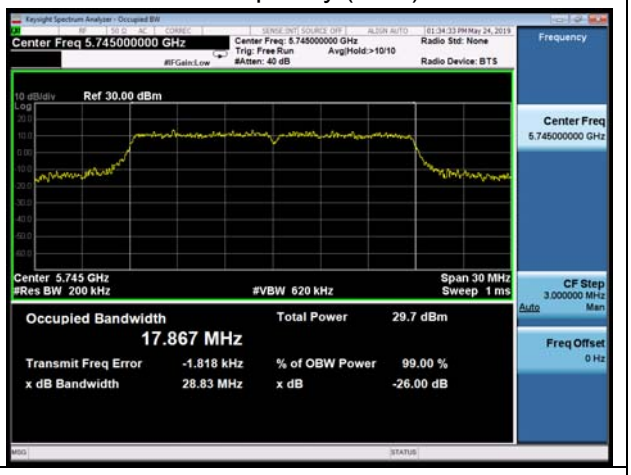
Carrier frequency (MHz): 5825

U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795

U-NII-3, 802.11ac VHT20

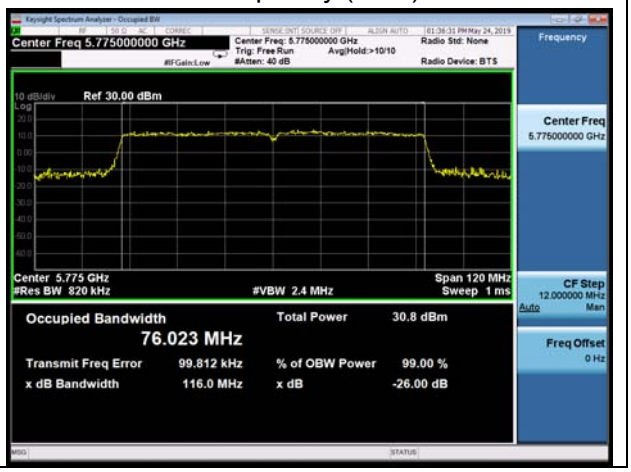
Carrier frequency (MHz): 5785

U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5755

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5825

U-NII-3, 802.11ac VHT40 Carrier frequency (MHz): 5795	U-NII-3, 802.11ac VHT80 Carrier frequency (MHz): 5775
	

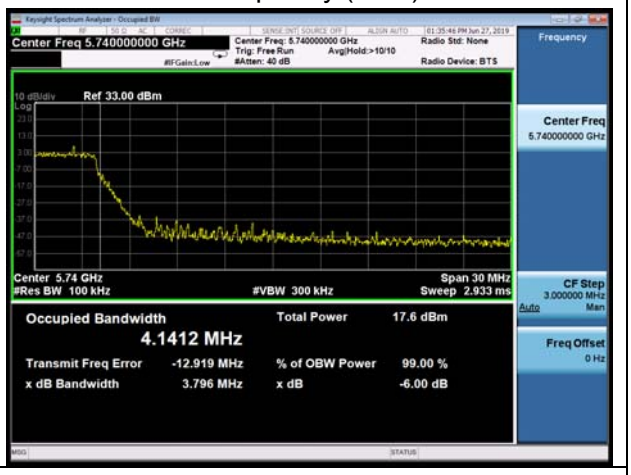
Minimum 6 dB bandwidth

U-NII-3, 802.11a

Carrier frequency (MHz): 5720

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5720



U-NII-3, 802.11n HT40

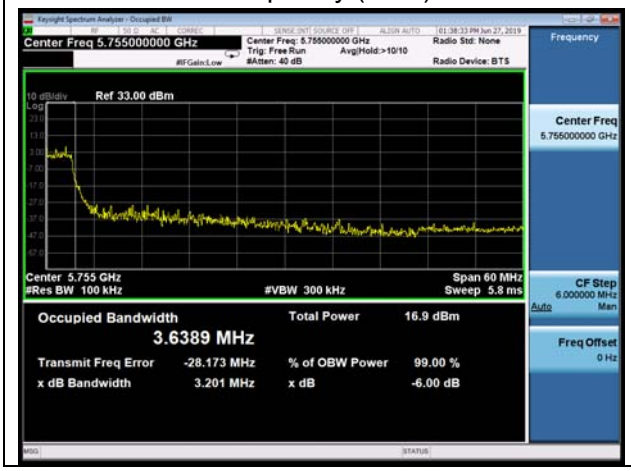
Carrier frequency (MHz): 5710

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5720

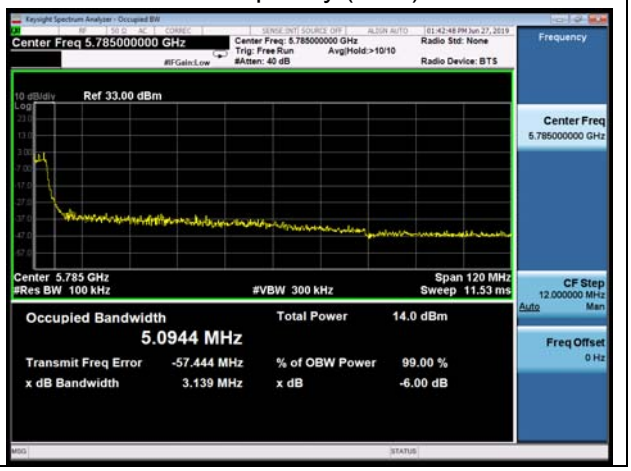
U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5710



U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5690

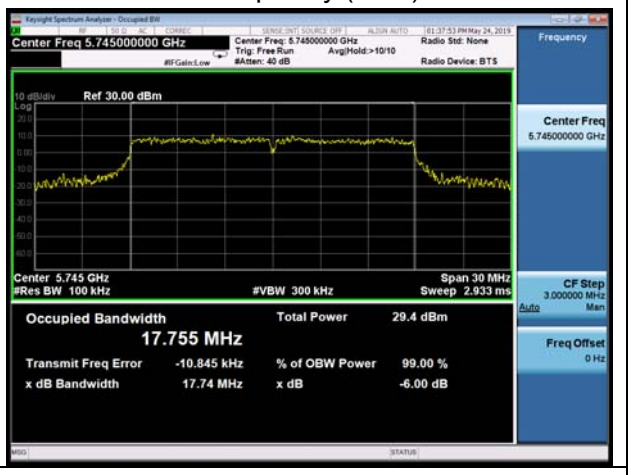


U-NII-3, 802.11a

Carrier frequency (MHz): 5745

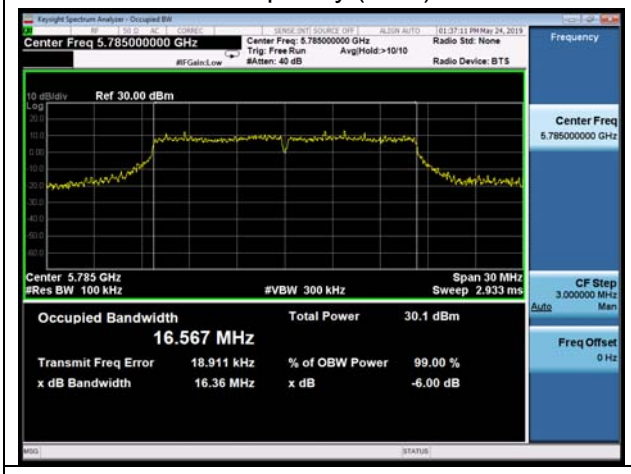
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



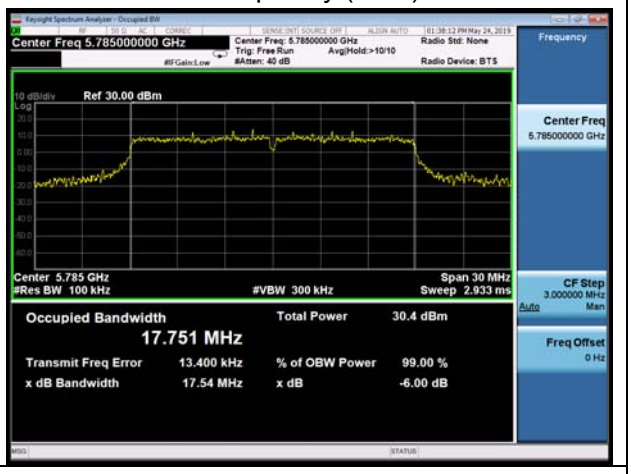
U-NII-3, 802.11a

Carrier frequency (MHz): 5785



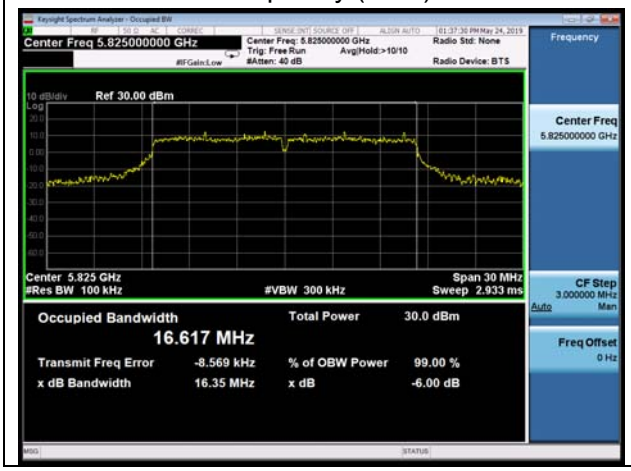
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



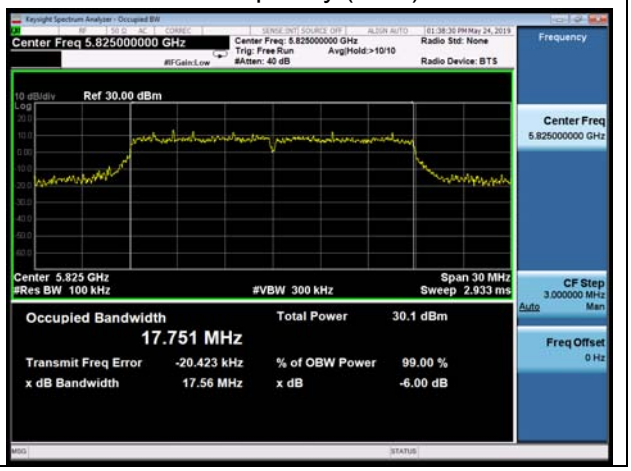
U-NII-3, 802.11a

Carrier frequency (MHz): 5825



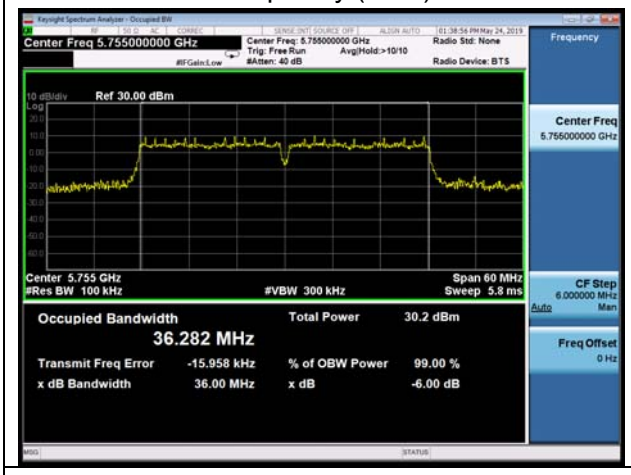
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825



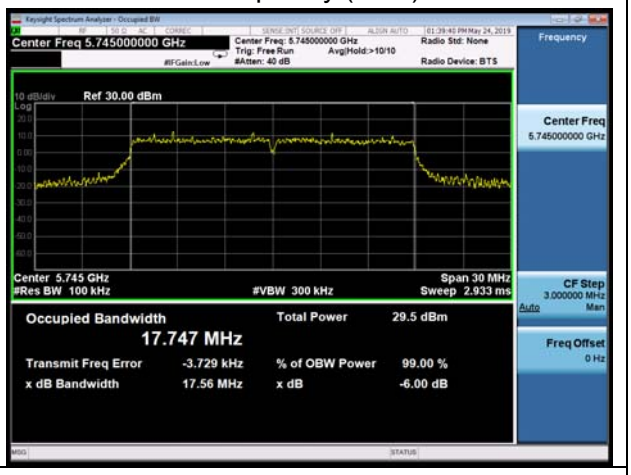
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755



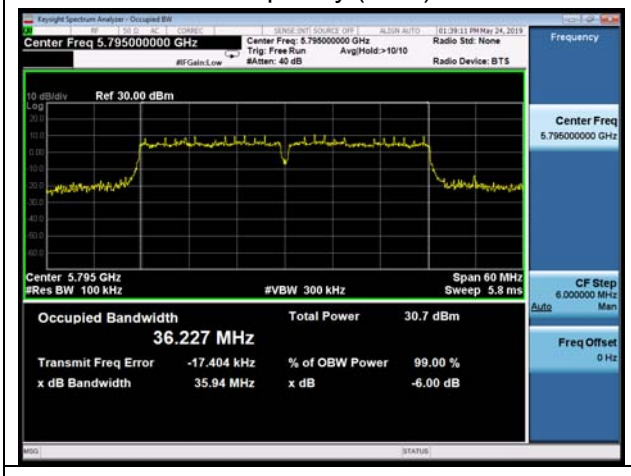
U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795

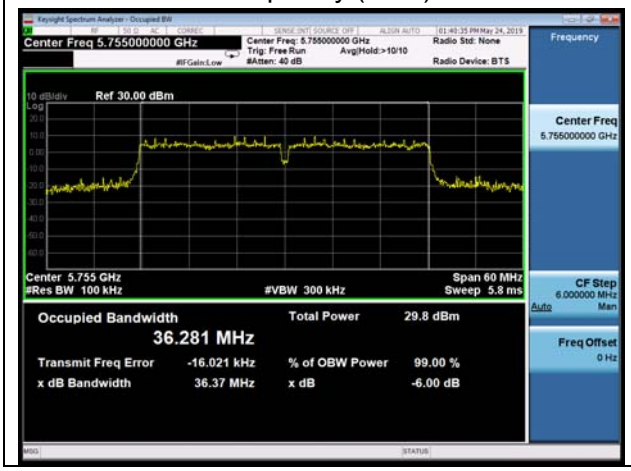


U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5785

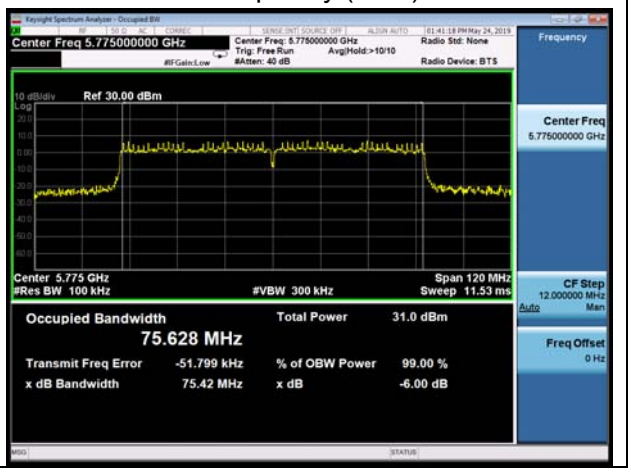
U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5825

U-NII-3, 802.11ac VHT40 Carrier frequency (MHz): 5795	U-NII-3, 802.11ac VHT80 Carrier frequency (MHz): 5775
	

5.2. Average Power Output –Conducted

Ambient condition

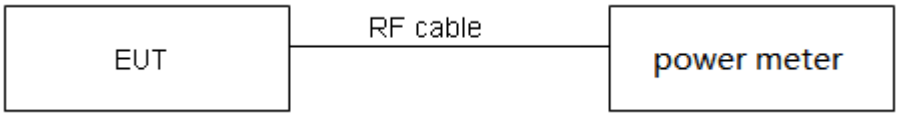
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the average 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)
(1) For the band 5.15-5.25 GHz.
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, 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.
(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23

dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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.

(3)For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. 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

The Max EIRP≥ 500mW and able to lower EIRP below 20.97dB.

Band	T_{on} (ms)	$T_{(on+off)}$ (ms)	Duty cycle	Duty cycle correction Factor(dB)
802.11a	2.06	2.18	0.95	0.23
802.11n HT20	1.92	2.02	0.95	0.23
802.11n HT40	0.94	1.04	0.90	0.46
802.11ac VHT20	1.93	1.95	0.99	NA
802.11ac VHT40	0.95	0.98	0.97	0.13
802.11ac VHT80	0.46	0.49	0.94	0.26
Note: when Duty cycle>0.98, Duty cycle correction Factor not required.				

MIMO Antenna 1&2 Power Index(Without Beamforming)												
Packet Type	**CH36**	**CH40**	**CH48**	**CH52**	**CH60**	**CH64**	**CH100**	**CH120**	**CH140**	**CH149**	**CH157**	**CH165**
802.11a	60	95	60	74	74	40	45	74	74	95	95	95
802.11n HT20	50	95	55	74	55	74	60	74	60	95	95	95
802.11ac VHT20	95	95	95	74	74	74	74	74	74	95	95	95
Packet Type	**CH38**	**CH46**	**CH54**	**CH62**	**CH102**	**CH118**	**CH134**	**CH151**	**CH159**	/	/	/
802.11n HT40	60	80	83	60	70	82	70	95	95	/	/	/
802.11ac VHT40	95	95	83	83	83	82	83	95	95	/	/	/
Packet Type	**CH42**	**CH58**	**CH122**	**CH155**	/	/	/	/	/	/	/	/
802.11ac VHT80	50	70	82	95	/	/	/	/	/	/	/	/

MIMO Antenna 1&2 Power Index(Without Beamforming)	
Packet Type	**CH144**
802.11a	74
802.11n HT20	74
802.11ac VHT20	74
Packet Type	**CH142**
802.11n HT40	82
802.11ac VHT40	82
Packet Type	**CH138**
802.11ac VHT80	82

MIMO Antenna 1&2 Power Index(With Beamforming)												
Packet Type	**CH36**	**CH40**	**CH48**	**CH52**	**CH60**	**CH64**	**CH100**	**CH120**	**CH140**	**CH149**	**CH157**	**CH165**
802.11n HT20	50	95	55	74	55	74	60	74	60	95	95	95
802.11ac VHT20	95	95	95	74	74	74	74	74	74	95	95	95
Packet Type	**CH38**	**CH46**	**CH54**	**CH62**	**CH102**	**CH118**	**CH134**	**CH151**	**CH159**	/	/	/
802.11n HT40	60	80	83	60	70	82	70	95	95	/	/	/
802.11ac VHT40	95	95	83	83	83	82	83	95	95	/	/	/
Packet Type	**CH42**	**CH58**	**CH122**	**CH155**	/	/	/	/	/	/	/	/
802.11ac VHT80	50	70	82	95	/	/	/	/	/	/	/	/

MIMO Antenna 1&2 Power Index(With Beamforming)	
Packet Type	**CH144**
802.11n HT20	74
802.11ac VHT20	74
Packet Type	**CH142**
802.11n HT40	82
802.11ac VHT40	82
Packet Type	**CH138**
802.11ac VHT80	82

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	20.13	24.04>24	24.00
		60/5300	19.93	24.00>24	24.00
		64/5320	19.90	23.99<24	23.99
	802.11n HT20	52/5260	20.34	24.08>24	24.00
		60/5300	20.31	24.08>24	24.00
		64/5320	20.33	24.08>24	24.00
	802.11n HT40	54/5270	39.51	26.97>24	24.00
		62/5310	39.44	26.96>24	24.00
	802.11ac VHT20	52/5260	20.18	24.05>24	24.00
		60/5300	20.23	24.06>24	24.00
		64/5320	20.20	24.05>24	24.00
	802.11ac VHT40	54/5270	39.66	26.98>24	24.00
		62/5310	39.73	26.99>24	24.00
	802.11ac VHT80	58/5290	81.74	30.12>24	24.00
U-NII-2C	802.11a	100/5500	19.91	23.99<24	23.99
		120/5600	19.90	23.99<24	23.99
		140/5700	19.99	24.01>24	24.00
	802.11n HT20	100/5500	20.37	24.09>24	24.00
		120/5600	20.23	24.06>24	24.00
		140/5700	20.24	24.06>24	24.00
	802.11n HT40	102/5510	39.44	26.96>24	24.00
		118/5590	39.51	26.97>24	24.00
		134/5670	39.68	26.99>24	24.00
	802.11ac VHT20	100/5500	20.29	24.07>24	24.00
		120/5600	20.22	24.06>24	24.00
		140/5700	20.25	24.06>24	24.00
	802.11ac VHT40	102/5510	39.71	26.99>24	24.00
		118/5590	39.72	26.99>24	24.00
		134/5670	39.56	26.97>24	24.00
	802.11ac VHT80	122/5610	81.89	30.13>24	24.00
Note: 250mW=24dBm					

Network Standards		Channel/ Frequency (MHz)	BAND 2C B=26 dB bandwidth (MHz)	BAND 3 B=26 dB bandwidth	Total B=26 dB bandwidth	Limit 11 dBm + 10 log B (dBm)	Final Limit(dBm)
U-NII-2C	802.11a	144/5720	15.06	5.09	20.15	24.04>24	24.00
	802.11n HT20	144/5720	15.17	5.15	20.32	24.08>24	24.00
	802.11n HT40	142/5710	34.92	4.92	39.84	27.00>24	24.00
	802.11ac VHT20	144/5720	15.21	5.15	20.36	24.09>24	24.00
	802.11ac VHT40	142/5710	34.82	5.01	39.83	27.00>24	24.00
	802.11ac VHT80	138/5690	75.73	6.53	82.26	30.15>24	24.00
Note: 250mW=24dBm							

Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor

MIMO (Without Beamforming)

U-NII-1

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11a	36/5180	15.44	15.67	15.13	15.36	18.53	30.00	PASS
	40/5200	23.58	23.81	23.26	23.49	26.66	30.00	PASS
	48/5240	15.54	15.77	15.11	15.34	18.57	30.00	PASS
802.11n HT20	36/5180	12.83	13.06	12.36	12.59	15.84	30.00	PASS
	40/5200	23.81	24.04	23.58	23.81	26.94	30.00	PASS
	48/5240	13.93	14.16	13.53	13.76	16.97	30.00	PASS
802.11n HT40	38/5190	15.52	15.98	15.27	15.73	18.86	30.00	PASS
	46/5230	20.52	20.98	20.13	20.59	23.80	30.00	PASS
802.11ac VHT20	36/5180	23.84	23.84	23.55	23.55	26.71	30.00	PASS
	40/5200	23.87	23.87	23.69	23.69	26.79	30.00	PASS
	48/5240	23.78	23.78	23.43	23.43	26.62	30.00	PASS
802.11ac VHT40	38/5190	23.66	23.79	23.12	23.25	26.53	30.00	PASS
	46/5230	23.79	23.92	23.24	23.37	26.66	30.00	PASS
802.11ac VHT80	42/5210	12.75	13.01	12.36	12.62	15.83	30.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. The manufacturer declared the transmitter output signals is CDD mode And $N_{ss}=2$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + 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 = G_{ANT} + Array Gain $=3+0=3$ dBi<6dBi. So the power limt is 30dBm.

U-NII-2A

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11a	52/5260	18.56	18.79	18.63	18.86	21.83	24.00	PASS
	60/5300	18.82	19.05	18.58	18.81	21.94	24.00	PASS
	64/5320	10.47	10.70	10.21	10.44	13.58	23.99	PASS
802.11n HT20	52/5260	18.82	19.05	18.64	18.87	21.97	24.00	PASS
	60/5300	13.99	14.22	13.36	13.59	16.93	24.00	PASS
	64/5320	18.59	18.82	18.37	18.60	21.72	24.00	PASS
802.11n HT40	54/5270	20.44	20.90	20.16	20.62	23.77	24.00	PASS
	62/5310	15.55	16.01	15.13	15.59	18.81	24.00	PASS
802.11ac VHT20	52/5260	18.75	18.75	18.36	18.36	21.57	24.00	PASS
	60/5300	18.88	18.88	18.62	18.62	21.76	24.00	PASS
	64/5320	18.92	18.92	18.55	18.55	21.75	24.00	PASS
802.11ac VHT40	54/5270	20.66	20.79	20.38	20.51	23.66	24.00	PASS
	62/5310	20.71	20.84	20.37	20.50	23.68	24.00	PASS
802.11ac VHT80	58/5290	18.03	18.29	17.62	17.88	21.10	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. The manufacturer declared the transmitter output signals is CDD mode And $N_{ss}=2$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + 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 = G_{ANT} + Array Gain $=3+0=3$ dBi<6dBi. So the power limt is Min(24,11 dBm + 10 log B) dBm.

U-NII-2C

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11a	100/5500	11.68	11.91	11.16	11.39	14.67	23.99	PASS
	120/5600	19.22	19.45	18.89	19.12	22.30	23.99	PASS
	140/5700	19.01	19.24	18.74	18.97	22.12	24.00	PASS
802.11n HT20	100/5500	15.58	15.81	15.12	15.35	18.60	24.00	PASS
	120/5600	19.32	19.55	18.96	19.19	22.38	24.00	PASS
	140/5700	15.72	15.95	15.36	15.59	18.78	24.00	PASS
802.11n HT40	102/5510	17.88	18.34	17.45	17.91	21.14	24.00	PASS
	118/5590	20.69	21.15	20.23	20.69	23.93	24.00	PASS
	134/5670	17.78	18.24	17.56	18.02	21.14	24.00	PASS
802.11ac VHT20	100/5500	18.95	18.95	18.75	18.75	21.86	24.00	PASS
	120/5600	19.36	19.36	19.11	19.11	22.25	24.00	PASS
	140/5700	19.28	19.28	18.99	18.99	22.15	24.00	PASS
802.11ac VHT40	102/5510	20.73	20.86	20.46	20.59	23.73	24.00	PASS
	118/5590	20.84	20.97	20.58	20.71	23.85	24.00	PASS
	134/5670	20.88	21.01	20.47	20.60	23.82	24.00	PASS
802.11ac VHT80	122/5610	20.81	21.07	20.60	20.86	23.97	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. The manufacturer declared the transmitter output signals is CDD mode And $N_{ss}=2$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain,

For power measurements on IEEE 802.11 devices,

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

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 $N_{ANT} \ge 5$.

So directional gain = G_{ANT} + Array Gain =3+0=3 dBi<6dBi. So the power limt is Min(24,11 dBm + 10 log B) dBm.

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11a	144/5720	19.22	19.45	19.03	19.26	22.37	24.00	PASS
802.11n HT20	144/5720	19.34	19.57	18.99	19.22	22.41	24.00	PASS
802.11n HT40	142/5710	20.58	21.04	20.12	20.58	23.82	24.00	PASS
802.11ac VHT20	144/5720	19.25	19.25	19.11	19.11	22.19	24.00	PASS
802.11ac VHT40	142/5710	20.67	20.80	20.03	20.16	23.50	24.00	PASS
802.11ac VHT80	138/5690	20.75	21.01	20.54	20.80	23.91	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. The manufacturer declared the transmitter output signals is CDD mode And $N_{ss}=2$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + 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 = G_{ANT} + Array Gain $=3+0=3$ dBi<6dBi. So the power limt is Min(24,11 dBm + 10 log B) dBm.

U-NII-3

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11a	149/5745	23.55	23.78	23.67	23.90	26.85	30.00	PASS
	157/5785	23.68	23.91	23.78	24.01	26.97	30.00	PASS
	165/5825	23.58	23.81	23.72	23.95	26.89	30.00	PASS
802.11n HT20	149/5745	23.68	23.91	23.75	23.98	26.95	30.00	PASS
	157/5785	23.72	23.95	23.84	24.07	27.02	30.00	PASS
	165/5825	23.45	23.68	23.81	24.04	26.87	30.00	PASS
802.11n HT40	151/5755	23.33	23.79	23.46	23.92	26.86	30.00	PASS
	159/5795	23.40	23.86	23.58	24.04	26.96	30.00	PASS
802.11ac VHT20	149/5745	23.88	23.88	23.92	23.92	26.91	30.00	PASS
	157/5785	23.79	23.79	23.89	23.89	26.85	30.00	PASS
	165/5825	23.67	23.67	23.74	23.74	26.72	30.00	PASS
802.11ac VHT40	151/5755	23.66	23.79	23.73	23.86	26.83	30.00	PASS
	159/5795	23.54	23.67	23.82	23.95	26.82	30.00	PASS
802.11ac VHT80	155/5775	23.43	23.69	23.56	23.82	26.76	30.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. The manufacturer declared the transmitter output signals is CDD mode And $N_{ss}=2$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + 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 = G_{ANT} + Array Gain $=3+0=3$ dBi<6dBi. So the power limt is 30dBm.

MIMO (With Beamforming)

U-NII-1

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	36/5180	12.77	13.00	12.31	12.54	15.79	30.00	PASS
	40/5200	23.77	24.00	23.47	23.70	26.86	30.00	PASS
	48/5240	13.93	14.16	13.44	13.67	16.93	30.00	PASS
802.11n HT40	38/5190	15.44	15.90	15.13	15.59	18.76	30.00	PASS
	46/5230	20.44	20.90	20.06	20.52	23.72	30.00	PASS
802.11ac VHT20	36/5180	23.82	23.82	23.51	23.51	26.68	30.00	PASS
	40/5200	23.81	23.81	23.64	23.64	26.74	30.00	PASS
	48/5240	23.74	23.74	23.42	23.42	26.59	30.00	PASS
802.11ac VHT40	38/5190	23.62	23.75	23.11	23.24	26.51	30.00	PASS
	46/5230	23.69	23.82	23.22	23.35	26.60	30.00	PASS
802.11ac VHT80	42/5210	12.67	12.93	12.28	12.54	15.75	30.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power =$10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. 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（2/Nss）=3 dBi<6dBi. So the power limt is 30dBm.

U-NII-2A

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	52/5260	18.73	18.96	18.61	18.84	21.91	24.00	PASS
	60/5300	13.79	14.02	13.23	13.46	16.76	24.00	PASS
	64/5320	18.53	18.76	18.35	18.58	21.68	24.00	PASS
802.11n HT40	54/5270	20.42	20.88	20.12	20.58	23.74	24.00	PASS
	62/5310	15.46	15.92	15.07	15.53	18.74	24.00	PASS
802.11ac VHT20	52/5260	18.74	18.74	18.31	18.31	21.54	24.00	PASS
	60/5300	18.87	18.87	18.57	18.57	21.73	24.00	PASS
	64/5320	18.89	18.89	18.52	18.52	21.72	24.00	PASS
802.11ac VHT40	54/5270	20.61	20.74	20.35	20.48	23.62	24.00	PASS
	62/5310	20.66	20.79	20.33	20.46	23.63	24.00	PASS
802.11ac VHT80	58/5290	17.97	18.23	17.53	17.79	21.02	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. 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（2/Nss）=3 dBi<6dBi. So the power limt is Min(24,11 dBm + 10 log B) dBm.

U-NII-2C

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	100/5500	15.42	15.65	15.11	15.34	18.51	24.00	PASS
	120/5600	19.31	19.54	18.93	19.16	22.36	24.00	PASS
	140/5700	15.62	15.85	15.26	15.49	18.68	24.00	PASS
802.11n HT40	102/5510	17.67	18.13	17.32	17.78	20.97	24.00	PASS
	118/5590	20.66	21.12	20.23	20.69	23.92	24.00	PASS
	134/5670	17.65	18.11	17.46	17.92	21.02	24.00	PASS
802.11ac VHT20	100/5500	18.93	18.93	18.74	18.74	21.85	24.00	PASS
	120/5600	19.32	19.32	19.09	19.09	22.22	24.00	PASS
	140/5700	19.27	19.27	18.96	18.96	22.13	24.00	PASS
802.11ac VHT40	102/5510	20.66	20.79	20.44	20.57	23.69	24.00	PASS
	118/5590	20.82	20.95	20.53	20.66	23.81	24.00	PASS
	134/5670	20.84	20.97	20.45	20.58	23.79	24.00	PASS
802.11ac VHT80	122/5610	20.78	21.04	20.57	20.83	23.94	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. 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（2/Nss）=3 dBi<6dBi. So the power limt is Min(24,11 dBm + 10 log B) dBm.

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	144/5720	19.31	19.54	18.91	19.14	22.35	24.00	PASS
802.11n HT40	142/5710	20.52	20.98	20.11	20.57	23.79	24.00	PASS
802.11ac VHT20	144/5720	19.19	19.19	19.04	19.04	22.13	24.00	PASS
802.11ac VHT40	142/5710	20.54	20.67	20.01	20.14	23.42	24.00	PASS
802.11ac VHT80	138/5690	20.66	20.92	20.45	20.71	23.82	24.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power =$10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})})$.
2. 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（2/Nss）=3 dBi<6dBi. So the power limt is Min(24,11 dBm + 10 log B) dBm.

U-NII-3

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	149/5745	23.65	23.88	23.68	23.91	26.90	30.00	PASS
	157/5785	23.71	23.94	23.73	23.96	26.96	30.00	PASS
	165/5825	23.43	23.66	23.78	24.01	26.85	30.00	PASS
802.11n HT40	151/5755	23.30	23.76	23.42	23.88	26.83	30.00	PASS
	159/5795	23.33	23.79	23.51	23.97	26.89	30.00	PASS
802.11ac VHT20	149/5745	23.82	23.82	23.90	23.90	26.87	30.00	PASS
	157/5785	23.77	23.77	23.84	23.84	26.82	30.00	PASS
	165/5825	23.64	23.64	23.71	23.71	26.69	30.00	PASS
802.11ac VHT40	151/5755	23.62	23.75	23.67	23.80	26.78	30.00	PASS
	159/5795	23.46	23.59	23.77	23.90	26.75	30.00	PASS
802.11ac VHT80	155/5775	23.37	23.63	23.53	23.79	26.72	30.00	PASS

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$.

2. 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（2/Nss）=3 dBi<6dBi. So the power limt is 30dBm.

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 that 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= 936Hz

Test Results

Voltage (V)	Temperature (°C)	U-NII-1 Test Results			
		5200MHz			
		1min	2min	5min	10min
12	-5	5199.996938	5199.993461	5199.991706	5199.984814
12	0	5200.000776	5199.986959	5199.989154	5199.981011
12	5	5199.999098	5199.986762	5199.988978	5199.975901
12	10	5199.991730	5199.983722	5199.979332	5199.973732
12	20	5199.991073	5199.980365	5199.971300	5199.968443
12	30	5199.988626	5199.976566	5199.964280	5199.961828
12	40	5199.983774	5199.969675	5199.963192	5199.958734
12	45	5199.974454	5199.969224	5199.958337	5199.956476
11.4	20	5199.968941	5199.965445	5199.949631	5199.954466
12.6	20	5199.965298	5199.963455	5199.943643	5199.951686
MHz		-0.034702	-0.036545	-0.056357	-0.048314
PPM		-6.673379	-7.027938	-10.837850	-9.291225

Voltage (V)	Temperature (°C)	U-NII-2A Test Results			
		5300MHz			
		1min	2min	5min	10min
12	-5	5299.998301	5299.994184	5299.987642	5299.978477
12	0	5299.995694	5299.993908	5299.986839	5299.974712
12	5	5299.989544	5299.984543	5299.979264	5299.967450
12	10	5299.984128	5299.975550	5299.970357	5299.967129
12	20	5299.975885	5299.965695	5299.965529	5299.960886
12	30	5299.966563	5299.963841	5299.957446	5299.959584
12	40	5299.962249	5299.954966	5299.947821	5299.955880
12	45	5299.956613	5299.945955	5299.946371	5299.946082
11.4	20	5299.947931	5299.938020	5299.937914	5299.945570
12.6	20	5299.940088	5299.934130	5299.932384	5299.937052
MHz		-0.059912	-0.065870	-0.067616	-0.062948
PPM		-11.304120	-12.428388	-12.757771	-11.876983

Voltage (V)	Temperature (°C)	U-NII-2C Test Results			
		5580MHz			
		1min	2min	5min	10min
12	-5	5579.998473	5579.988894	5579.985269	5579.980320
12	0	5579.994713	5579.985473	5579.977791	5579.973332
12	5	5579.984985	5579.979594	5579.977129	5579.966536
12	10	5579.980481	5579.974086	5579.972621	5579.961811
12	20	5579.973423	5579.970325	5579.963131	5579.957195
12	30	5579.971412	5579.962170	5579.956288	5579.951605
12	40	5579.966249	5579.961473	5579.949213	5579.943100
12	45	5579.965395	5579.956504	5579.943208	5579.938066
11.4	20	5579.958793	5579.951083	5579.935354	5579.932209
12.6	20	5579.951622	5579.945273	5579.926556	5579.930463
MHz		-0.048378	-0.054727	-0.073444	-0.069537
PPM		-8.669908	-9.807789	-13.161968	-12.461764

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
12	-5	5784.994583	5784.990770	5784.981564	5784.972254
12	0	5784.988906	5784.985018	5784.981062	5784.964408
12	5	5784.984059	5784.980235	5784.972796	5784.964097
12	10	5784.974439	5784.970336	5784.963358	5784.962883
12	20	5784.974161	5784.961295	5784.953409	5784.953460
12	30	5784.966689	5784.959716	5784.951248	5784.951166
12	40	5784.964951	5784.954096	5784.949139	5784.951090
12	45	5784.957939	5784.949722	5784.944392	5784.945374
11.4	20	5784.955433	5784.941072	5784.936784	5784.935482
12.6	20	5784.949817	5784.935836	5784.931498	5784.929331
MHz		-0.050183	-0.064164	-0.068502	-0.070669
PPM		-8.674743	-11.091485	-11.841382	-12.215880

5.4. Power Spectral Density

Ambient condition

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

Method of Measurement

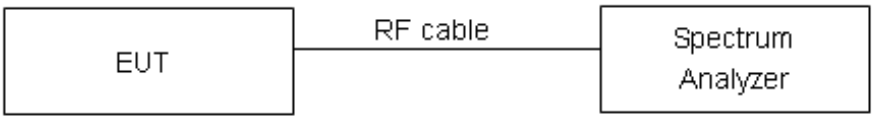
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 500 kHz, 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 transmittingantennas 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	17MHz
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= 0.75dB.

Test Results:

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

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Network Standards	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		Antenna 1		Antenna 2		Total Power (dBm /MHz)		
		Read Value (dBm/MHz)	PSD (dBm /MHz)	Read Value (dBm/MHz)	PSD (dBm /MHz)			
802.11a	36/5180	3.61	3.84	3.49	3.72	6.79	17.00	PASS
	40/5200	11.98	12.21	12.36	12.58	15.41	17.00	PASS
	48/5240	4.12	4.35	4.16	4.39	7.38	17.00	PASS
802.11n HT20	36/5180	1.14	1.37	1.13	1.36	4.37	17.00	PASS
	40/5200	11.83	12.06	12.05	12.28	15.18	17.00	PASS
	48/5240	2.47	2.69	2.09	2.32	5.52	17.00	PASS
802.11n HT40	38/5190	0.03	0.49	0.35	0.81	3.66	17.00	PASS
	46/5230	4.44	4.90	4.67	5.13	8.02	17.00	PASS
802.11ac VHT20	36/5180	12.06	12.06	11.80	11.80	14.94	17.00	PASS
	40/5200	11.99	11.99	11.42	11.42	14.73	17.00	PASS
	48/5240	12.25	12.25	12.47	12.47	15.37	17.00	PASS
802.11ac VHT40	38/5190	8.40	8.52	8.55	8.68	11.61	17.00	PASS
	46/5230	8.64	8.77	8.69	8.81	11.80	17.00	PASS
802.11ac VHT80	42/5210	-5.20	-4.95	-4.89	-4.63	-1.78	17.00	PASS

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

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=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（2/2)=3<6 dBi. So the PSD limt is 17dBm.

U-NII-2A

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11a	52/5260	7.52	7.75	7.33	7.56	10.67	11.00	PASS
	60/5300	7.86	8.09	7.40	7.63	10.88	11.00	PASS
	64/5320	-0.50	-0.27	-0.82	-0.59	2.59	11.00	PASS
802.11n HT20	52/5260	7.21	7.44	7.25	7.48	10.47	11.00	PASS
	60/5300	2.82	3.05	2.02	2.25	5.68	11.00	PASS
	64/5320	7.71	7.94	7.15	7.38	10.68	11.00	PASS
802.11n HT40	54/5270	6.33	6.78	5.56	6.02	9.43	11.00	PASS
	62/5310	0.39	0.85	0.62	1.08	3.98	11.00	PASS
802.11ac VHT20	52/5260	7.36	7.36	7.33	7.33	10.35	11.00	PASS
	60/5300	7.29	7.29	7.19	7.19	10.25	11.00	PASS
	64/5320	7.66	7.66	7.66	7.66	10.67	11.00	PASS
802.11ac VHT40	54/5270	6.28	6.40	5.96	6.09	9.26	11.00	PASS
	62/5310	6.21	6.33	5.88	6.00	9.18	11.00	PASS
802.11ac VHT80	58/5290	0.27	0.53	0.01	0.27	3.41	11.00	PASS

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

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=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（2/2)=3<6 dBi. So the PSD limt is 11dBm.

U-NII-2C

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11a	100/5500	-0.12	0.11	0.35	0.58	3.36	11.00	PASS
	120/5600	7.89	8.12	7.53	7.76	10.95	11.00	PASS
	140/5700	7.97	8.20	7.46	7.69	10.96	11.00	PASS
802.11n HT20	100/5500	3.31	3.54	3.51	3.74	6.65	11.00	PASS
	120/5600	7.66	7.89	7.57	7.80	10.86	11.00	PASS
	140/5700	3.69	3.92	3.80	4.02	6.98	11.00	PASS
802.11n HT40	102/5510	2.75	3.20	2.36	2.82	6.03	11.00	PASS
	118/5590	6.64	7.10	6.77	7.23	10.17	11.00	PASS
	134/5670	2.74	3.19	2.34	2.79	6.01	11.00	PASS
802.11ac VHT20	100/5500	7.29	7.29	7.43	7.43	10.37	11.00	PASS
	120/5600	7.61	7.61	7.74	7.74	10.68	11.00	PASS
	140/5700	7.68	7.68	7.62	7.62	10.66	11.00	PASS
802.11ac VHT40	102/5510	6.37	6.49	6.27	6.40	9.46	11.00	PASS
	118/5590	6.95	7.07	6.73	6.85	9.97	11.00	PASS
	134/5670	6.41	6.53	6.41	6.54	9.54	11.00	PASS
802.11ac VHT80	122/5610	3.39	3.64	3.20	3.46	6.56	11.00	PASS

Note: 1. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

2. The manufacturer declared the transmitter output signals is CDD mode and N_{ss}=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain, For power spectral density (PSD) measurements on all devices, Array Gain = $10\log(N_{ANT}/N_{SS})$ dB=0.

So directional gain = G_{ANT} + Array Gain =3+0=3 dBi<6dBi. So the power limt is 11dBm

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11a	144/5720	7.70	7.92	7.75	7.98	10.96	11.00	PASS
802.11n HT20	144/5720	7.07	7.30	7.22	7.45	10.39	11.00	PASS
802.11n HT40	142/5710	6.40	6.85	6.61	7.06	9.97	11.00	PASS
802.11ac VHT20	144/5720	7.02	7.02	7.22	7.22	10.13	11.00	PASS
802.11ac VHT40	142/5710	6.49	6.62	6.36	6.48	9.56	11.00	PASS
802.11ac VHT80	138/5690	3.08	3.34	2.87	3.12	6.24	11.00	PASS

Note: 1. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

2. The manufacturer declared the transmitter output signals is CDD mode and N_{ss}=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain, For power spectral density (PSD) measurements on all devices, Array Gain = 10 $\log(N_{ANT}/N_{SS})$ dB=0.

So directional gain = G_{ANT} + Array Gain =3+0=3dBi<6dBi. So the power limt is 11dBm

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Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11a	144/5720	3.42	3.65	3.76	3.99	6.83	30.00	PASS
802.11n HT20	144/5720	3.81	4.04	3.62	3.85	6.96	30.00	PASS
802.11n HT40	142/5710	2.64	3.09	2.31	2.76	5.94	30.00	PASS
802.11ac VHT20	144/5720	3.25	3.25	3.19	3.19	6.23	30.00	PASS
802.11ac VHT40	142/5710	2.45	2.57	2.31	2.44	5.52	30.00	PASS
802.11ac VHT80	138/5690	-0.95	-0.69	-1.20	-0.94	2.20	30.00	PASS

Note: 1. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

2. The manufacturer declared the transmitter output signals is CDD mode and N_{ss}=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain, For power spectral density (PSD) measurements on all devices, Array Gain = 10 log(N_{ANT}/N_{SS}) dB=0.

So directional gain = G_{ANT} + Array Gain =3+0=3dBi<6dBi. So the power limt is 30dBm

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11a	149/5745	10.17	10.40	9.78	10.01	13.22	30.00	PASS
	157/5785	10.16	10.39	10.59	10.82	13.62	30.00	PASS
	165/5825	9.59	9.82	10.07	10.29	13.07	30.00	PASS
802.11n HT20	149/5745	9.47	9.70	9.68	9.91	12.82	30.00	PASS
	157/5785	9.84	10.07	10.38	10.61	13.36	30.00	PASS
	165/5825	8.95	9.18	8.90	9.13	12.16	30.00	PASS
802.11n HT40	151/5755	6.01	6.46	5.99	6.45	9.47	30.00	PASS
	159/5795	6.82	7.28	6.81	7.27	10.28	30.00	PASS
802.11ac VHT20	149/5745	9.18	9.18	9.78	9.78	12.50	30.00	PASS
	157/5785	10.14	10.14	10.42	10.42	13.29	30.00	PASS
	165/5825	9.62	9.62	9.78	9.78	12.71	30.00	PASS

802.11ac VHT40	151/5755	6.29	6.42	6.99	7.11	9.79	30.00	PASS
	159/5795	6.82	6.94	7.54	7.67	10.33	30.00	PASS
802.11ac VHT80	155/5775	3.09	3.35	3.49	3.74	6.56	30.00	PASS

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

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=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（2/2)=3<6 dBi. So the PSD limt is 30dBm.

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Network Standards	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		Antenna 1		Antenna 2		Total Power (dBm /MHz)		
		Read Value (dBm/MHz)	PSD (dBm /MHz)	Read Value (dBm/MHz)	PSD (dBm /MHz)			
802.11n HT20	36/5180	1.15	1.38	1.23	1.46	4.43	17.00	PASS
	40/5200	11.67	11.90	11.70	11.93	14.92	17.00	PASS
	48/5240	2.50	2.73	2.71	2.94	5.84	17.00	PASS
802.11n HT40	38/5190	0.12	0.58	0.37	0.83	3.71	17.00	PASS
	46/5230	5.11	5.56	4.77	5.23	8.41	17.00	PASS
802.11ac VHT20	36/5180	11.83	11.83	12.42	12.42	15.15	17.00	PASS
	40/5200	12.10	12.10	11.78	11.78	14.95	17.00	PASS
	48/5240	11.94	11.94	12.31	12.31	15.14	17.00	PASS
802.11ac VHT40	38/5190	8.73	8.86	9.16	9.29	12.09	17.00	PASS
	46/5230	8.62	8.74	8.81	8.94	11.85	17.00	PASS
802.11ac VHT80	42/5210	-4.79	-4.53	-4.61	-4.35	-1.43	17.00	PASS

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

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=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（2/2)=3<6 dBi. So the PSD limt is 17dBm.

U-NII-2A

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11n HT20	52/5260	6.75	6.98	7.02	7.25	10.13	11.00	PASS
	60/5300	2.46	2.69	2.90	3.13	5.92	11.00	PASS
	64/5320	7.50	7.73	7.77	8.00	10.88	11.00	PASS
802.11n HT40	54/5270	5.86	6.32	5.96	6.42	9.38	11.00	PASS
	62/5310	0.63	1.09	0.21	0.66	3.89	11.00	PASS
802.11ac VHT20	52/5260	7.49	7.49	7.47	7.47	10.49	11.00	PASS
	60/5300	7.54	7.54	6.95	6.95	10.27	11.00	PASS
	64/5320	7.47	7.47	7.53	7.53	10.51	11.00	PASS
802.11ac VHT40	54/5270	6.08	6.21	6.23	6.36	9.29	11.00	PASS
	62/5310	6.43	6.55	6.12	6.25	9.41	11.00	PASS
802.11ac VHT80	58/5290	-0.07	0.19	-0.45	-0.19	3.01	11.00	PASS

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

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=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（2/2)=3<6 dBi. So the PSD limt is 11dBm.

U-NII-2C

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11n HT20	100/5500	3.50	3.73	3.07	3.30	6.53	11.00	PASS
	120/5600	7.49	7.72	7.28	7.51	10.63	11.00	PASS
	140/5700	3.77	4.00	3.45	3.68	6.85	11.00	PASS
802.11n HT40	102/5510	2.73	3.19	2.97	3.42	6.32	11.00	PASS
	118/5590	6.69	7.15	6.82	7.27	10.22	11.00	PASS
	134/5670	2.60	3.05	2.30	2.76	5.92	11.00	PASS
802.11ac VHT20	100/5500	7.41	7.41	7.19	7.19	10.31	11.00	PASS
	120/5600	7.69	7.69	7.37	7.37	10.54	11.00	PASS
	140/5700	7.44	7.44	7.83	7.83	10.65	11.00	PASS
802.11ac VHT40	102/5510	5.93	6.06	5.69	5.81	8.95	11.00	PASS
	118/5590	6.55	6.68	5.55	5.67	9.22	11.00	PASS
	134/5670	6.57	6.70	6.42	6.54	9.63	11.00	PASS
802.11ac VHT80	122/5610	4.22	4.47	3.84	4.10	7.30	11.00	PASS

Note: 1. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

2. The manufacturer declared the transmitter output signals is CDD mode and N_{ss}=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain, For power spectral density (PSD) measurements on all devices, Array Gain = $10\log(N_{ANT}/N_{SS})$ dB=0.

So directional gain = G_{ANT} + Array Gain =3+0=3dBi<6dBi. So the power limt is 11dBm

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11n HT20	144/5720	7.52	7.75	6.97	7.20	10.49	11.00	PASS
802.11n HT40	142/5710	6.79	7.25	6.15	6.61	9.95	11.00	PASS
802.11ac VHT20	144/5720	6.94	6.94	7.37	7.37	10.17	11.00	PASS
802.11ac VHT40	142/5710	6.18	6.31	6.97	7.10	9.73	11.00	PASS
802.11ac VHT80	138/5690	2.93	3.18	3.22	3.47	6.34	11.00	PASS

Note: 1. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

2. The manufacturer declared the transmitter output signals is CDD mode and N_{ss}=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain, For power spectral density (PSD) measurements on all devices, Array Gain = 10 log(N_{ANT}/N_{SS}) dB=0.

So directional gain = G_{ANT} + Array Gain =3+0=3 dBi<6dBi. So the power limt is 11dBm

U-NII-3

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11n HT20	144/5720	3.88	4.11	3.73	3.96	7.05	30.00	PASS
802.11n HT40	142/5710	2.53	2.99	2.45	2.91	5.96	30.00	PASS
802.11ac VHT20	144/5720	3.07	3.07	3.43	3.43	6.26	30.00	PASS
802.11ac VHT40	142/5710	2.07	2.20	2.39	2.52	5.37	30.00	PASS
802.11ac VHT80	138/5690	-1.30	-1.04	-1.05	-0.80	2.09	30.00	PASS

Note: 1. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

2. The manufacturer declared the transmitter output signals is CDD mode and N_{ss}=2. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = G_{ANT} + Array Gain, For power spectral density (PSD) measurements on all devices, Array Gain = 10 log(N_{ANT}/N_{SS}) dB=0.

So directional gain = G_{ANT} + Array Gain =3+0=3dBi<6dBi. So the power limt is 30dBm

Network Standards	Channel /Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		ANT1		ANT2		Total PSD (dBm/MHz)		
		Read Value (dBm/ MHz)	PSD (dBm/ MHz)	Read Value (dBm/ MHz)	PSD (dBm/ MHz)			
802.11n HT20	149/5745	9.00	9.23	10.10	10.33	12.82	30.00	PASS
	157/5785	9.99	10.22	9.01	9.24	12.77	30.00	PASS
	165/5825	9.50	9.73	9.20	9.43	12.59	30.00	PASS
802.11n HT40	151/5755	5.93	6.39	6.14	6.60	9.51	30.00	PASS
	159/5795	6.79	7.25	5.84	6.30	9.81	30.00	PASS
802.11ac VHT20	149/5745	9.06	9.06	9.16	9.16	12.12	30.00	PASS
	157/5785	10.20	10.20	8.71	8.71	12.53	30.00	PASS
	165/5825	9.87	9.87	9.54	9.54	12.72	30.00	PASS
802.11ac VHT40	151/5755	5.89	6.02	6.13	6.25	9.15	30.00	PASS
	159/5795	7.04	7.17	6.07	6.19	9.72	30.00	PASS
802.11ac VHT80	155/5775	3.44	3.70	3.55	3.81	6.77	30.00	PASS

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

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=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（2/2)=3<6 dBi. So the PSD limt is 30dBm.

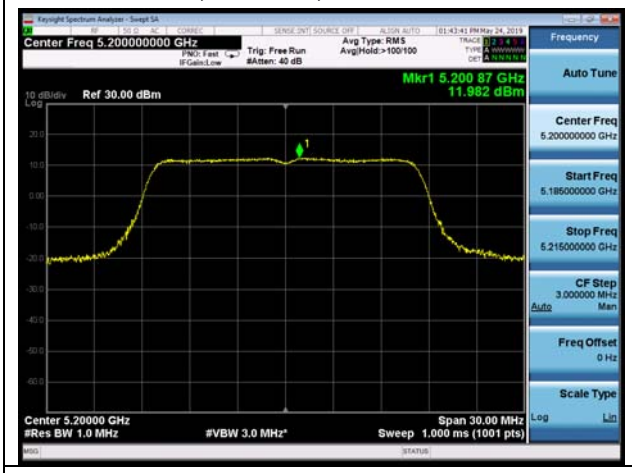
MIMO without Beamforming

MIMO Antenna 1

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

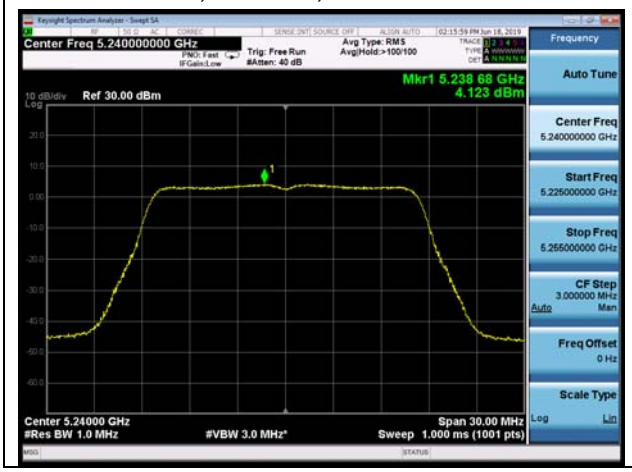
U-NII-1, 802.11n HT20, Channel No.: 36

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



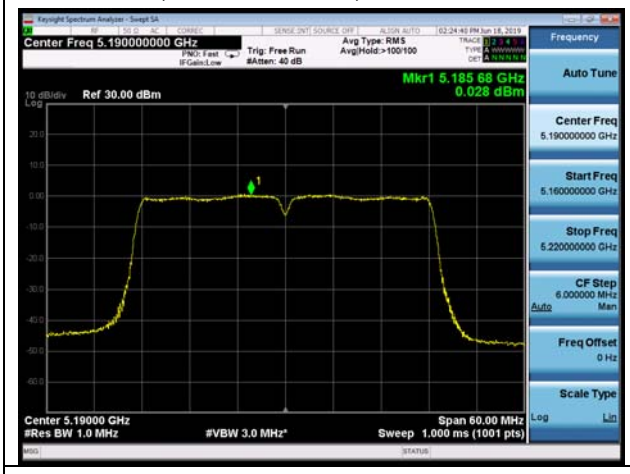
U-NII-1, 802.11n HT20, Channel No.: 40

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



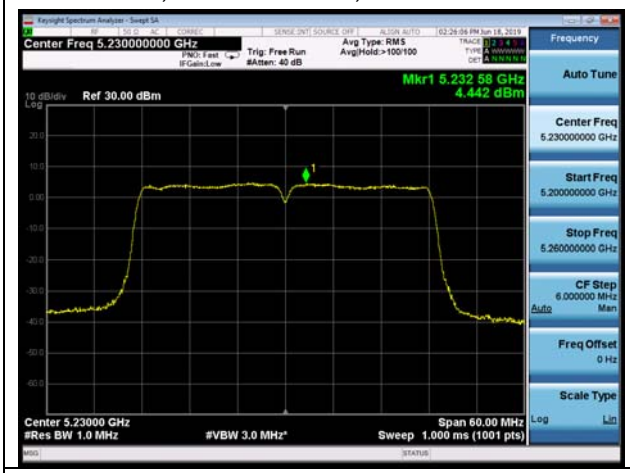
U-NII-1, 802.11n HT20, Channel No.: 48

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



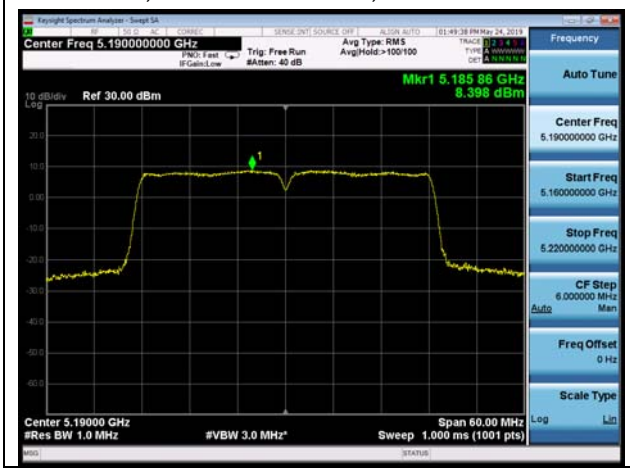
U-NII-1, 802.11ac VHT20, Channel No.: 36

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



U-NII-1, 802.11ac VHT20, Channel No.: 40

U-NII-1, 802.11ac VHT40, Channel No.: 38



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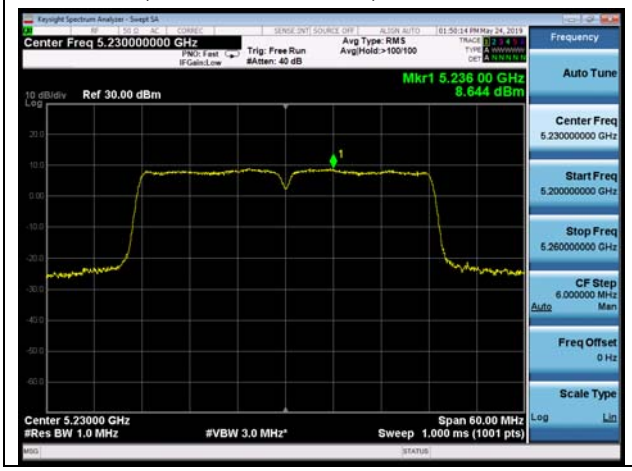
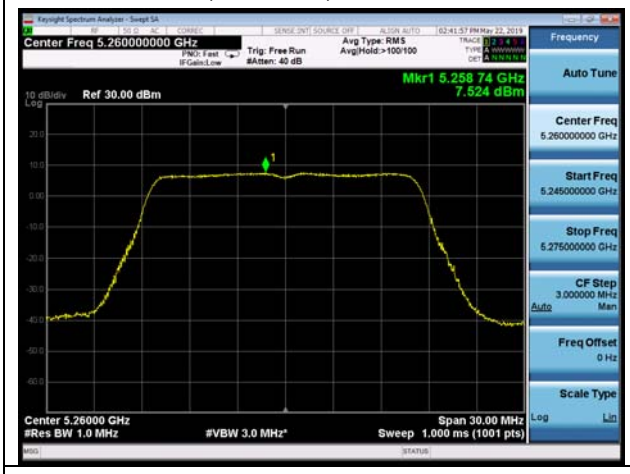
U-NII-1, 802.11ac VHT40, Channel No.: 46



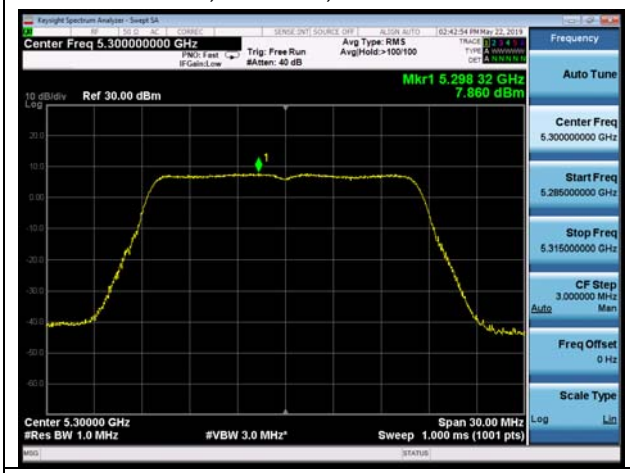
U-NII-1, 802.11ac VHT80, Channel No.: 42

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



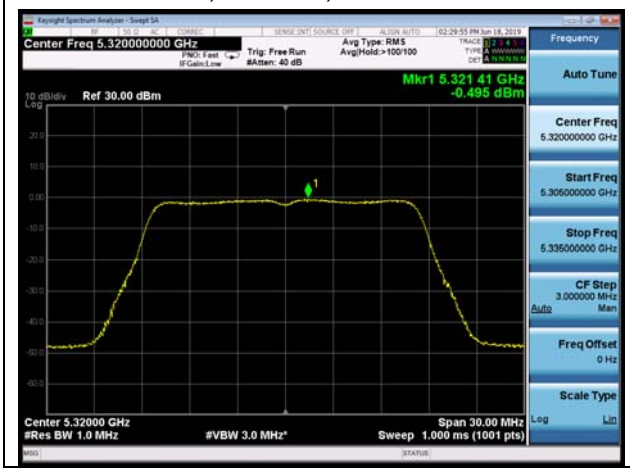
U-NII-2A, 802.11n HT20, Channel No.: 52

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



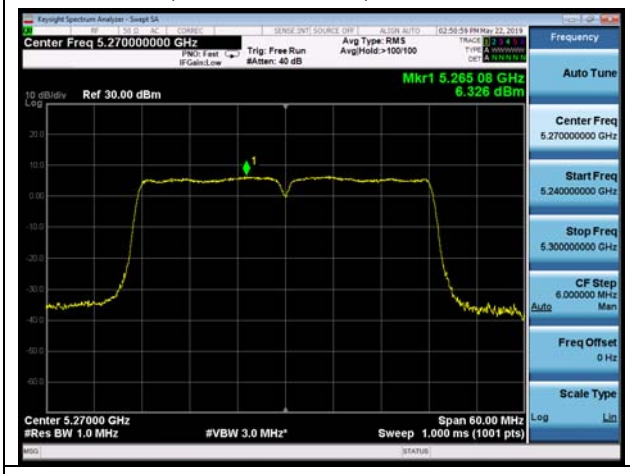
U-NII-2A, 802.11n HT20, Channel No.: 60

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



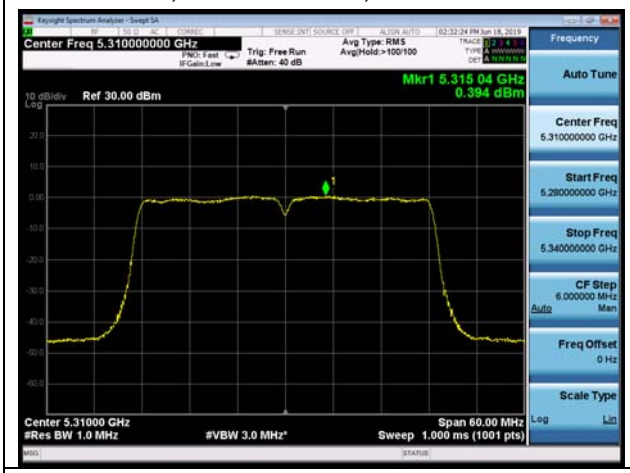
U-NII-2A, 802.11n HT20, Channel No.: 64

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



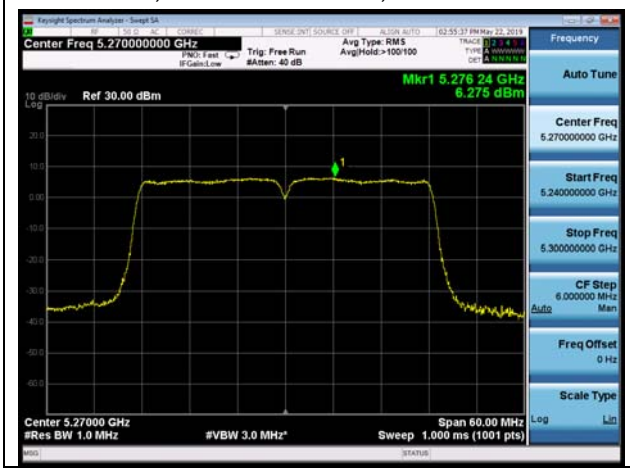
U-NII-2A, 802.11ac VHT20, Channel No.:52

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



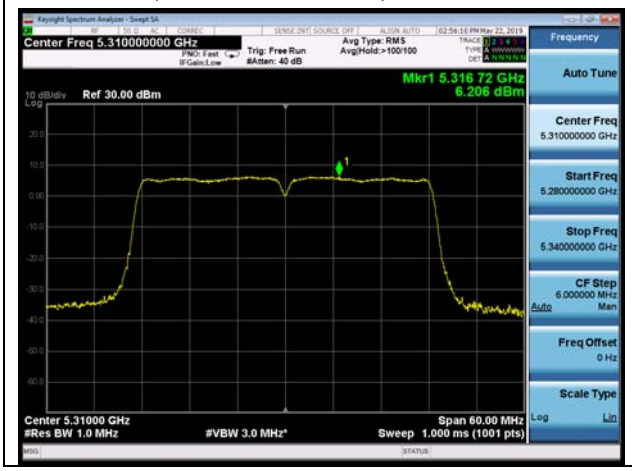
U-NII-2A, 802.11ac VHT20, Channel No.: 60

U-NII-2A, 802.11ac VHT40, Channel No.: 54



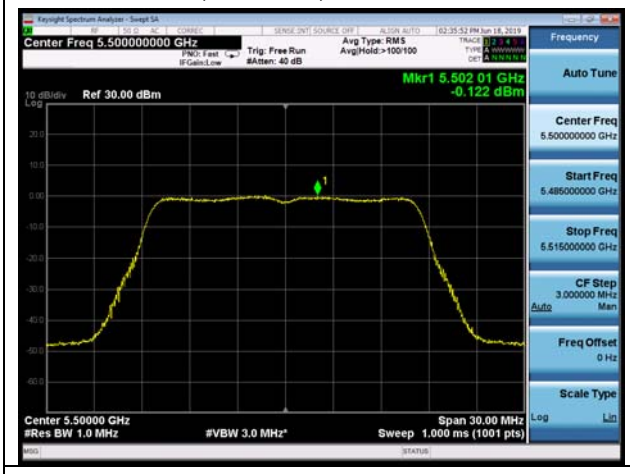
U-NII-2A, 802.11ac VHT20, Channel No.: 64

U-NII-2A, 802.11ac VHT40, Channel No.: 62



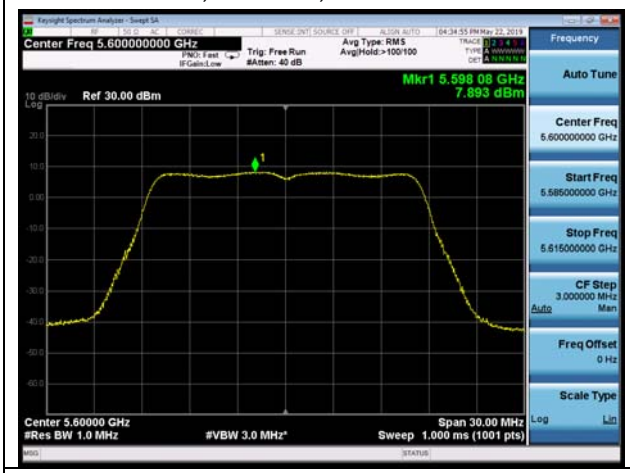
U-NII-2A, 802.11ac VHT80, Channel No.: 58

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



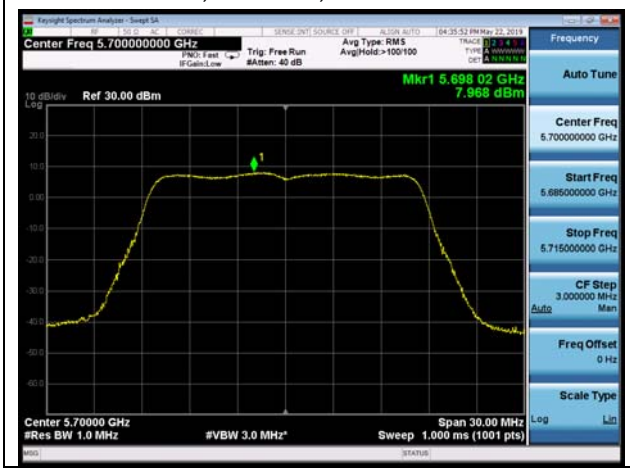
U-NII-2C, 802.11n HT20, Channel No.: 100

U-NII-2C, 802.11a, Channel No.: 120



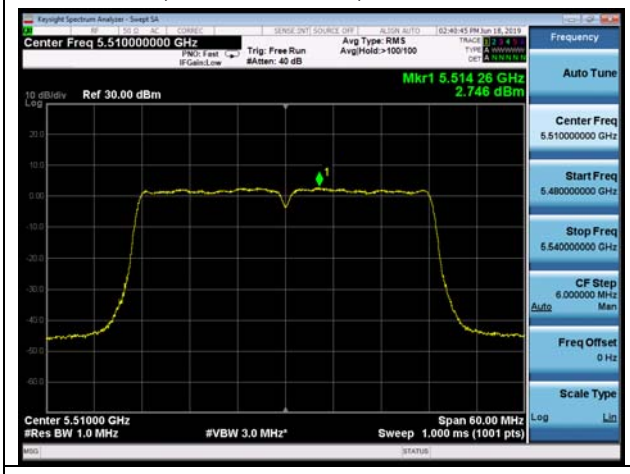
U-NII-2C, 802.11n HT20, Channel No.: 120

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



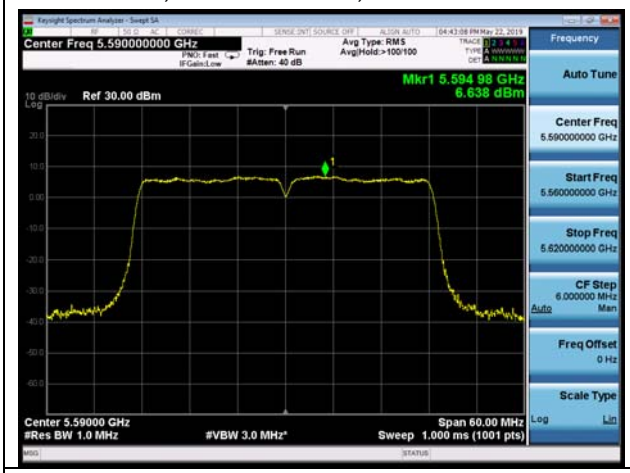
U-NII-2C, 802.11n HT20, Channel No.: 140

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



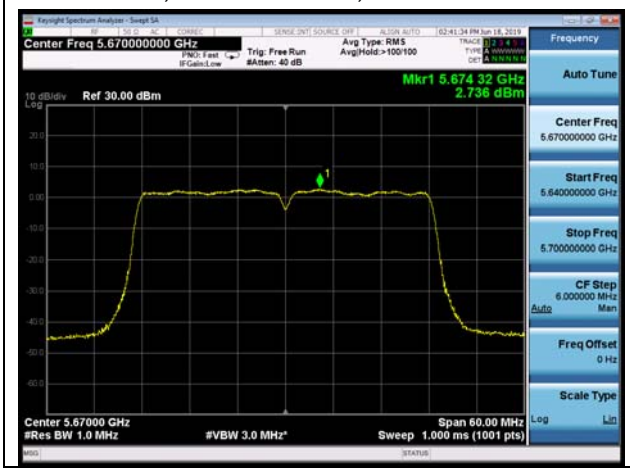
U-NII-2C, 802.11ac VHT20, Channel No.: 100

U-NII-2C, 802.11n HT40, Channel No.: 118



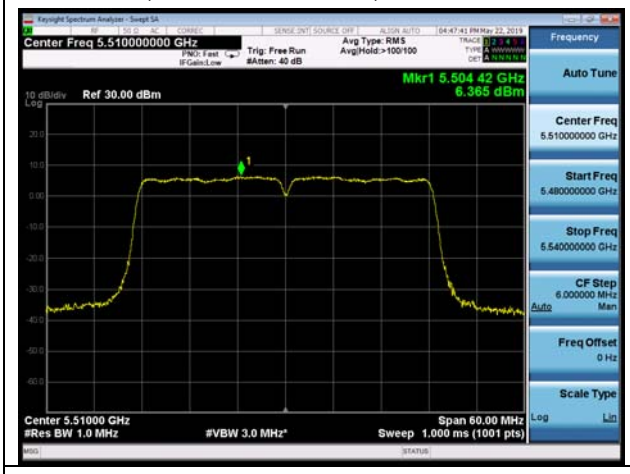
U-NII-2C, 802.11ac VHT20, Channel No.: 120

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



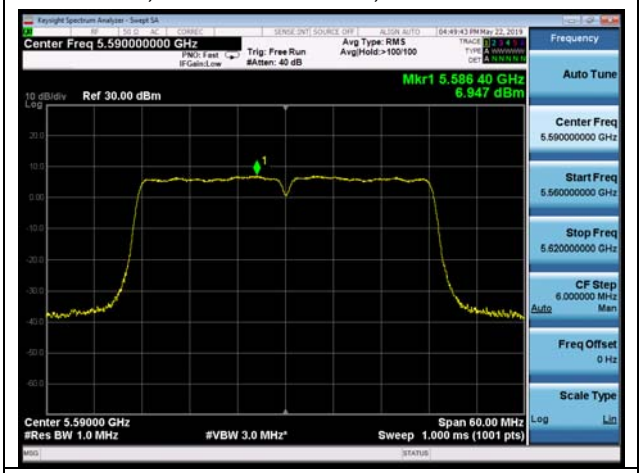
U-NII-2C, 802.11ac VHT20, Channel No.: 140

U-NII-2C, 802.11ac VHT40, Channel No.: 102

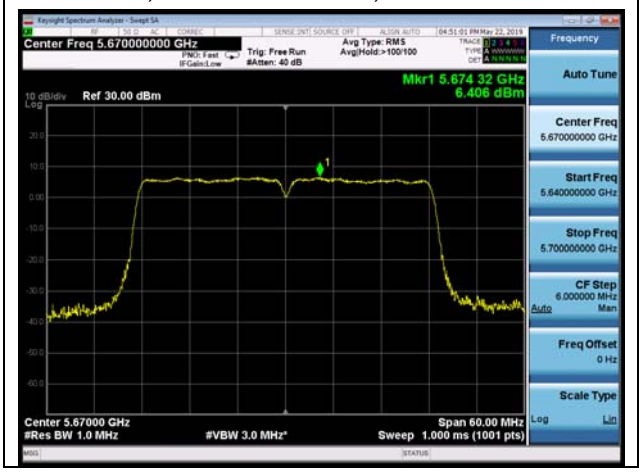


U-NII-2C, 802.11ac VHT80, Channel No.: 122

U-NII-2C, 802.11ac VHT40, Channel No.: 118



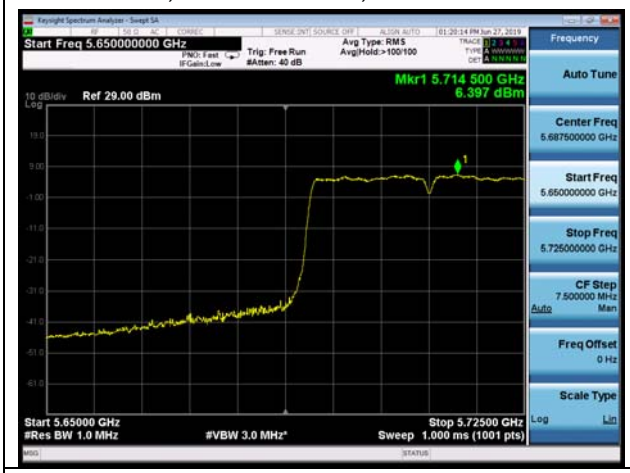
U-NII-2C, 802.11ac VHT40, Channel No.: 134



U-NII-2C, 802.11a, Channel No.: 144

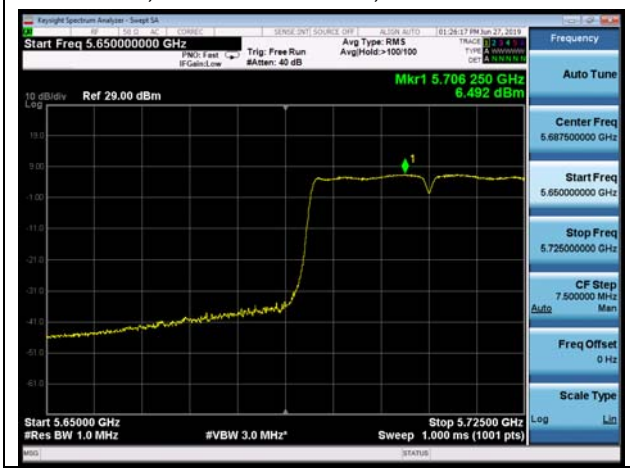
U-NII-2C, 802.11n HT20, Channel No.: 144

U-NII-2C, 802.11n HT40, Channel No.:142



U-NII-2C, 802.11ac VHT20, Channel No.: 144

U-NII-2C, 802.11ac VHT40, Channel No.: 142

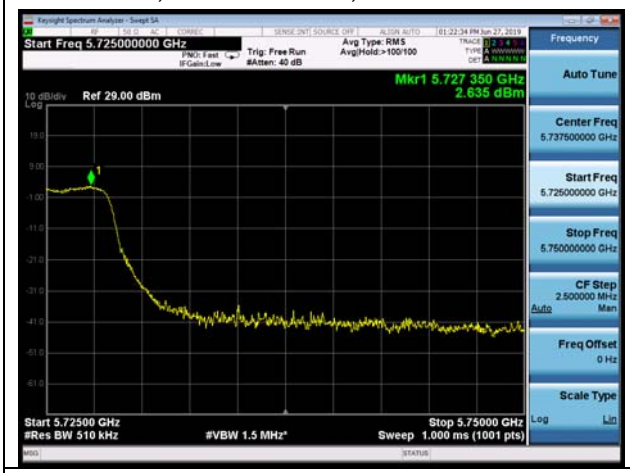


U-NII-2C, 802.11ac VHT80, Channel No.: 138

U-NII-3, 802.11a, Channel No.: 144

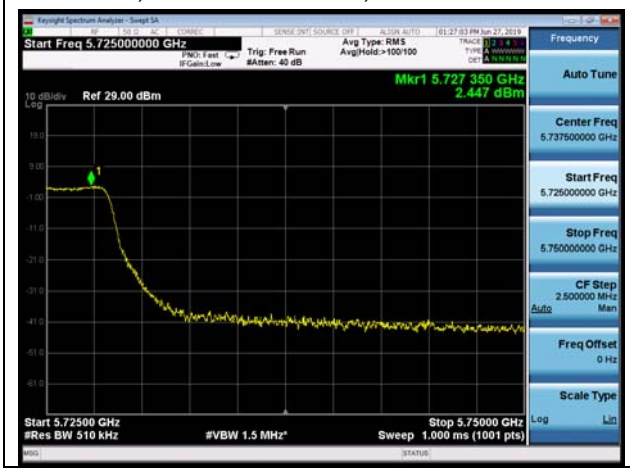
U-NII-3, 802.11n HT20, Channel No.: 144

U-NII-3, 802.11n HT40, Channel No.:142

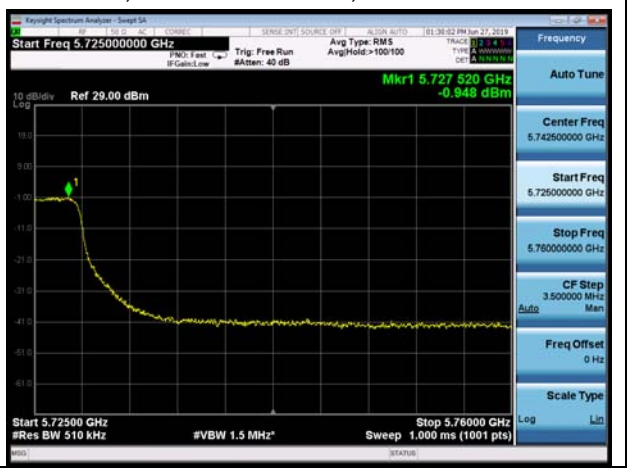


U-NII-3, 802.11ac VHT20, Channel No.: 144

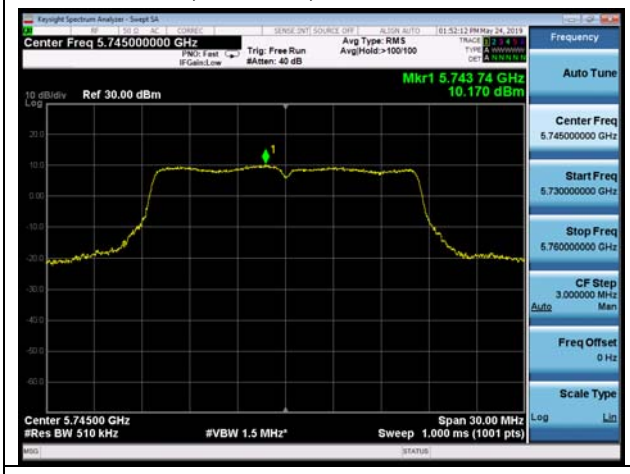
U-NII-3, 802.11ac VHT40, Channel No.: 142



U-NII-3, 802.11ac VHT80, Channel No.: 138

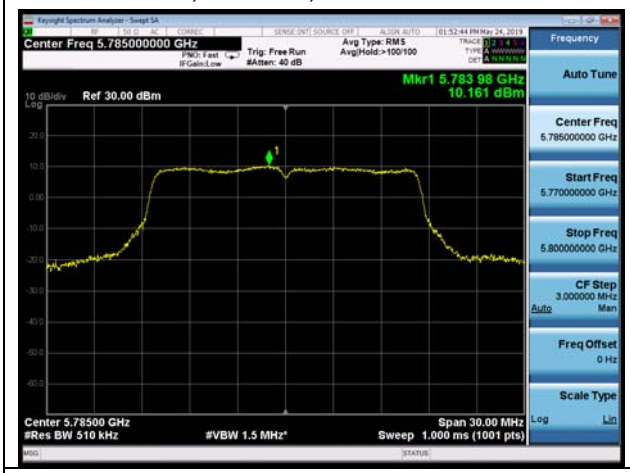


U-NII-3, 802.11a, Channel No.: 149



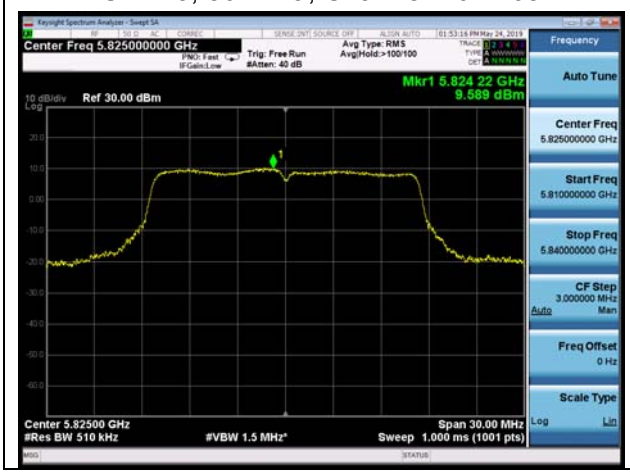
U-NII-3, 802.11n HT20, Channel No.: 149

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



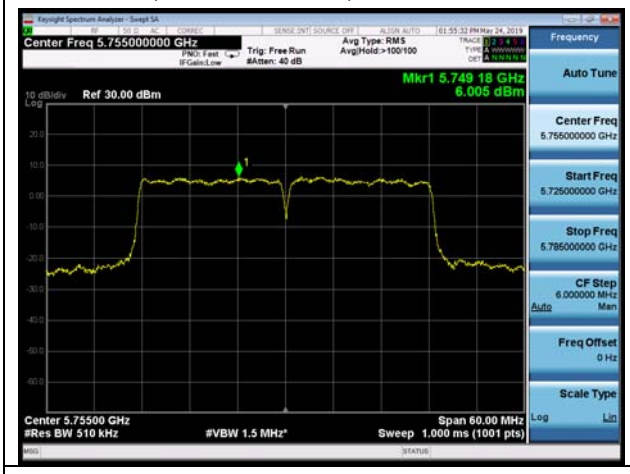
U-NII-3, 802.11n HT20, Channel No.: 157

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



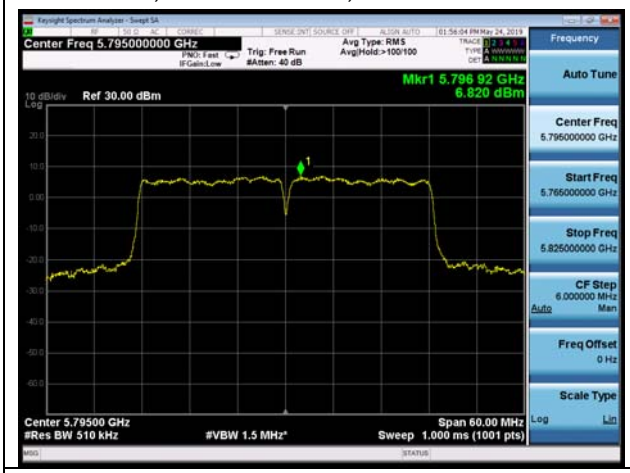
U-NII-3, 802.11n HT20, Channel No.: 165

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



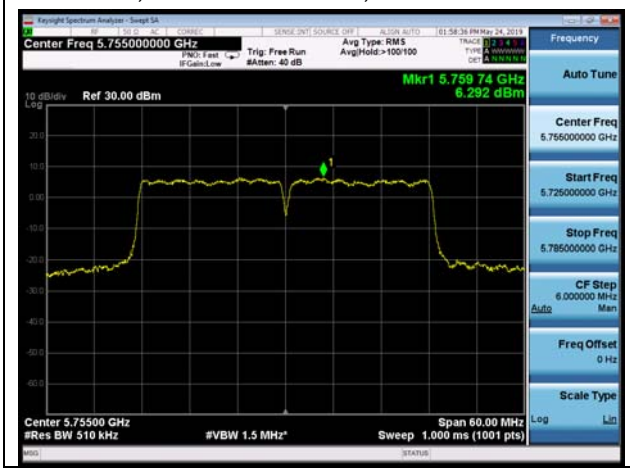
U-NII-3, 802.11ac VHT20, Channel No.: 149

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



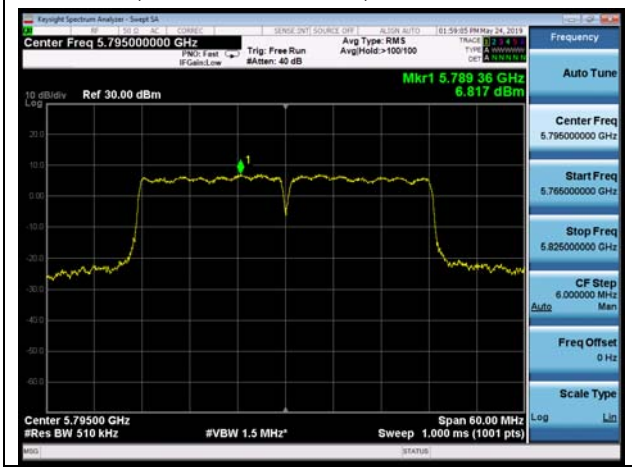
U-NII-3, 802.11ac VHT20, Channel No.: 157

U-NII-3, 802.11ac VHT40, Channel No.: 151



U-NII-3, 802.11ac VHT20, Channel No.: 165

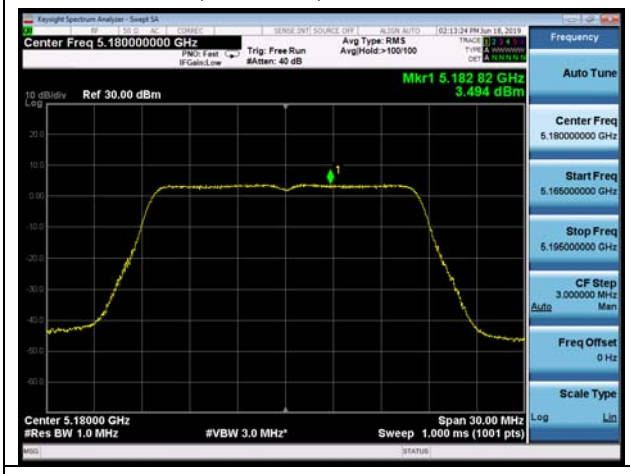
U-NII-3, 802.11ac VHT40, Channel No.: 159



U-NII-3, 802.11ac VHT80, Channel No.: 155

MIMO Antenna 2

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

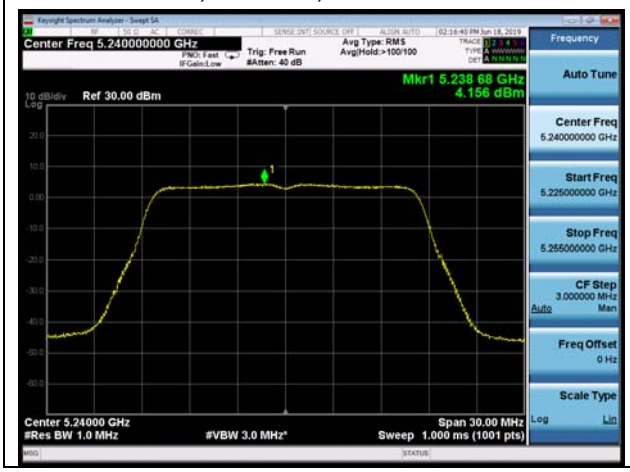


U-NII-1, 802.11n HT20, Channel No.: 36

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

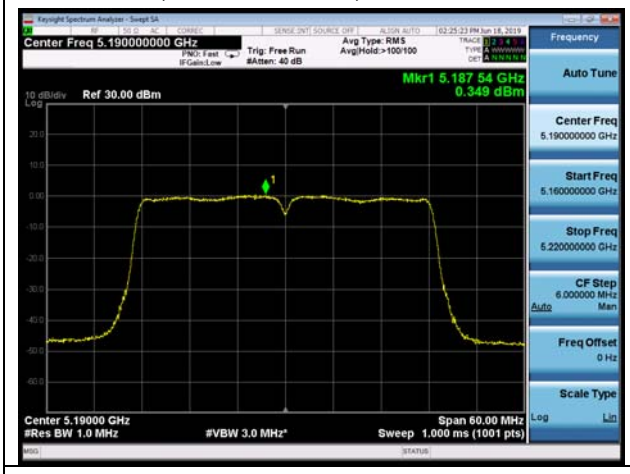
U-NII-1, 802.11n HT20, Channel No.: 40

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



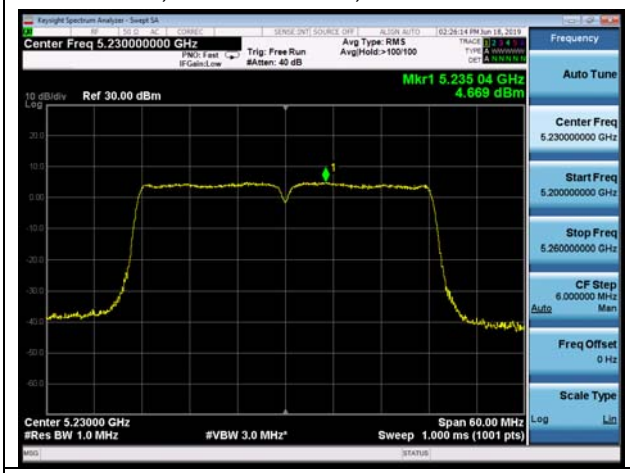
U-NII-1, 802.11n HT20, Channel No.: 48

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



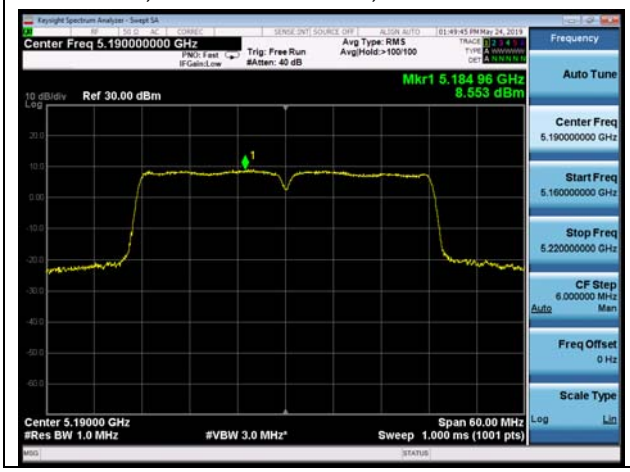
U-NII-1, 802.11ac VHT20, Channel No.: 36

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



U-NII-1, 802.11ac VHT20, Channel No.: 40

U-NII-1, 802.11ac VHT40, Channel No.: 38



U-NII-1, 802.11ac VHT20, Channel No.: 48