RF TEST REPORT

Applicant	Nokia ShangHai Bell Co., Ltd
FCC ID	2ADZRG240WG
Product	7368 ISAM ONT
Brand	NOKIA
Marketing	G-240W-G
Model	G-240W-G
Report No.	R1807B0070-R2V1
Issue Date	October 19, 2018

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

Performed by: Peng Tao | *Approved by: Kai Xu*

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Summary of measurement results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Average conducted output power	15.407(a)	PASS
2	Occupied bandwidth	15.407(e)	PASS
3	Frequency stability	15.407(g)	PASS
4	Maximum power spectral density	15.407(a)	PASS
5	Unwanted Emissions	15.407(b)	PASS
6	Conducted Emissions	15.207	PASS
Date of Testing: July 9, 2018~ September 4, 2018			

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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

CNAS (accreditation number: L2264)

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

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

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

IC (recognition number is 8510A)

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

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

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

A2LA (Certificate Number: 3857.01)

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

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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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Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

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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-240W-G
IMEI	/
Hardware Version	PEM2
Software Version	Null
Power Supply	AC adapter
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1: 3.0 dBi Antenna 2: 3.0 dBi Antenna 3: 3.0 dBi
Test Mode(s)	U-NII-1(5150MHz-5250MHz) U-NII-3(5725MHz-5850MHz)
Modulation Type	802.11a/n (HT20/HT40) : OFDM 802.11ac (VHT20/VHT40/VHT80): OFDM
Max. Conducted Power	26.96dBm
Operating Frequency Range(s)	U-NII-1: 5150-5250MHz U-NII-3: 5725-5850MHz
Operating temperature range:	-5 ° C to 45° C
Operating voltage range:	10 V to 14 V
State AC voltage:	12V
EUT Accessory	
Adapter 1	Manufacturer: MOSO POWER SUPPLY TECHNOLOGY CO.,LTD Model: MSA-C3000CS12.0-40W-US
Adapter 2	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL CO.,LTD Model: RD1203000-C55-20MG
Adapter 3	Manufacturer: MOSO POWER SUPPLY TECHNOLOGY CO.,LTD Model: MSA-C3000CS12.0-40W-DE

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Adapter 4	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL CO.,LTD Model: RD1203000-C55-20OG
Adapter 5	Manufacturer: LUCENT TRANS ELECTRONICS CO., LTD Model: 1L43-US1230
Adapter 6	Manufacturer: Shenzhen Mass Power Electronic Limited Model: NBS40C120300M2
Adapter 7	Manufacturer: ShenZhen SOY Technology Co., Ltd. Model: SOY-1200300
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 1) will be recorded in this report.	

Information of Configuration:

No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1.1	G-240W-G	3FE47555BB	PEM2	PEM
1.2	G-240W-G	3FE47555AB	PEM2	PEM
1.3	G-240W-G	3FE47555AE	PEM2	PEM
2.1	Power adapter	RD1203000-C55-20MG	A/0	PEM
2.2	Power adapter	MSA-C3000CS12.0-40W-US	A/0	PEM
2.3	Power adapter	1L43-US1230	A/0	PEM
2.4	Power adapter	MSA-C3000CS12.0-40W-DE	A/0	PEM
2.5	Power adapter	RD1203000-C55-20OG	A/0	PEM
2.6	Power adapter	NBS40C120300M2	A/0	PEM
2.7	Power adapter	SOY-1200300	A/0	PEM

Kit Code	EMA	Part Description	Power Adaptor
3FE47536DA	3FE 47555 BB	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,AR Plug, 2PIN	NBS40C120300M2/ SOY-1200300
3FE47536BA	3FE 47555 AB	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,EU Plug Type C, 2PIN	RD1203000-C55-20OG/ MSA-C3000CS12.0-40W-DE
3FE47536BB	3FE 47555 BB	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,EU Plug Type C, 2PIN	RD1203000-C55-20OG/ MSA-C3000CS12.0-40W-DE
3FE47536AE	3FE 47555 AE	2POTS,4GE,WIFI 802.11ac 3x3/802.11n 2x2, Emcore BOSA,US Plug, 2PIN	RD1203000-C55-20MG/ MSAC3000CS12.0-40W-US/ 1L43-US1230

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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

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4. Test Configuration

Test Mode

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

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

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

Worst-case data rates are shown as following table.

Band	Data Rate			
	Antenna 1	**Antenna 2**	**Antenna 3**	**MIMO**
802.11a	6 Mbps	6 Mbps	6 Mbps	--
802.11n HT20	--	--	--	MCS0
802.11n HT40	--	--	--	MCS0
802.11ac VHT20	--	--	--	MCS0
802.11ac VHT40	--	--	--	MCS0
802.11ac VHT80	--	--	--	MCS0

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

Test Cases	Antenna 1	Antenna 2	Antenna 3	MIMO
Average conducted output power	802.11a	802.11a	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Occupied bandwidth	--	--	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Frequency stability	--	--	802.11a	--
Power Spectral Density	802.11a	802.11a	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Unwanted Emissions	--	--	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Conducted Emissions	--	--	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Note：“O”: test all bands				

According to RF Output power results in chapter 5.1, MIMO Antenna 1 was selected as the worst antenna for 802.11n HT20/40, 802.11ac VHT20/40/80. SISO Antenna 3 was selected as the worst SISO antenna for 802.11a.

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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-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				

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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.

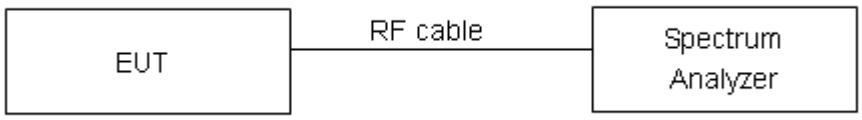
For U-NII-1/U-NII-2A/U-NII-2C, set RBW ≈1% OCB kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the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

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Test Results:

SISO Antenna 3

U-NII-1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	16.701	20.64	PASS
	5200	17.115	29.07	PASS
	5240	16.785	27.67	PASS

U-NII-3

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5745	16.821	16.34	500	PASS
	5785	16.835	16.36	500	PASS
	5825	16.834	16.35	500	PASS

MIMO Antenna 1

U-NII-1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11n HT20	5180	17.747	21.84	PASS
	5200	17.836	28.84	PASS
	5240	17.852	28.93	PASS
802.11n HT40	5190	36.259	39.15	PASS
	5230	36.325	54.08	PASS
802.11ac VHT20	5180	17.828	28.81	PASS
	5200	17.843	28.48	PASS
	5240	17.811	27.92	PASS
802.11ac VHT40	5190	36.393	58.69	PASS
	5230	36.360	57.08	PASS
802.11ac VHT80	5210	75.671	81.49	PASS

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U-NII-3

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11n HT20	5745	17.854	17.60	500	PASS
	5785	17.867	17.57	500	PASS
	5825	17.787	17.57	500	PASS
802.11n HT40	5755	36.339	36.10	500	PASS
	5795	36.400	36.31	500	PASS
802.11ac VHT20	5745	17.821	17.60	500	PASS
	5785	17.814	17.56	500	PASS
	5825	17.783	17.57	500	PASS
802.11ac VHT40	5755	36.391	36.09	500	PASS
	5795	36.428	36.34	500	PASS
802.11ac VHT80	5775	75.748	75.31	500	PASS

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SISO Antenna 3

U-NII-1, 802.11a

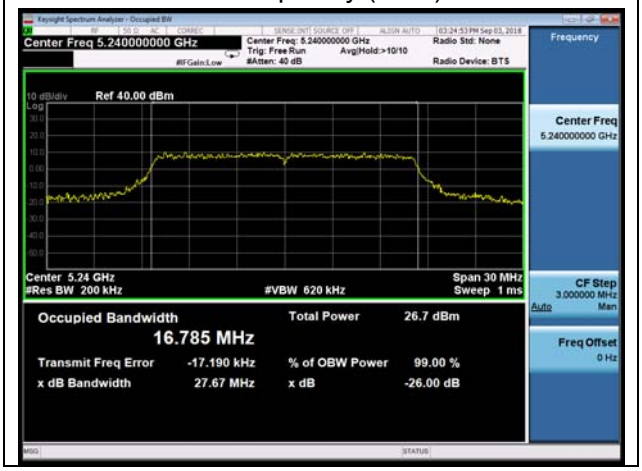
Carrier frequency (MHz): 5180

U-NII-1, 802.11a

Carrier frequency (MHz): 5200

U-NII-1, 802.11a

Carrier frequency (MHz):5240



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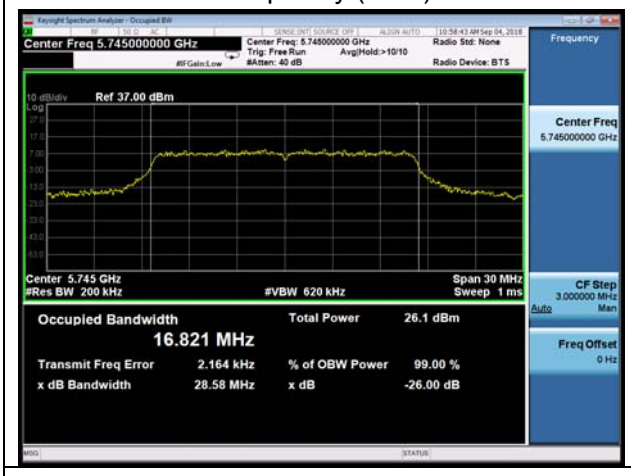
99% bandwidth	Minimum 6 dB bandwidth
U-NII-3, 802.11a Carrier frequency (MHz): 5745  	U-NII-3, 802.11a Carrier frequency (MHz): 5745
U-NII-3, 802.11a Carrier frequency (MHz): 5785 	U-NII-3, 802.11a Carrier frequency (MHz): 5785
U-NII-3, 802.11a Carrier frequency (MHz): 5825 	U-NII-3, 802.11a Carrier frequency (MHz): 5825

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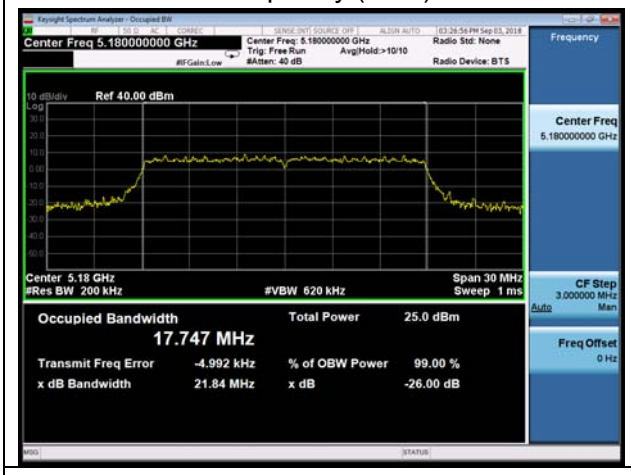
MIMO Antenna 1

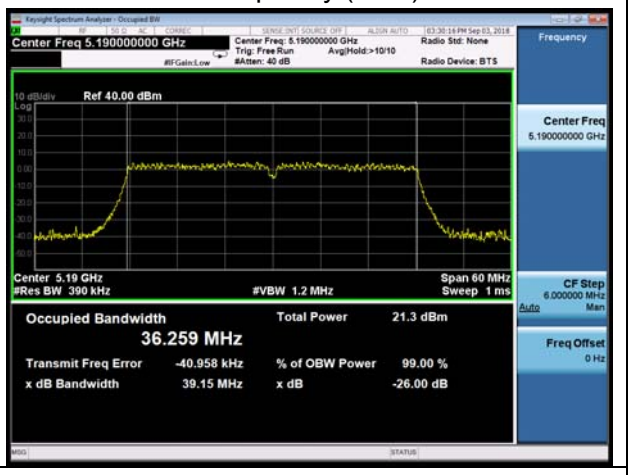
U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5180



U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5190

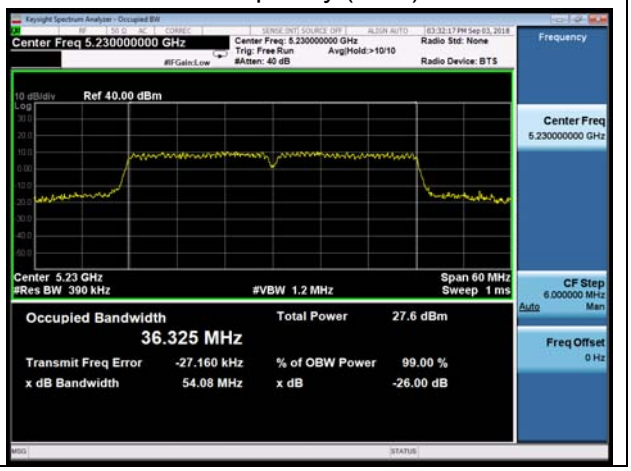


U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5200

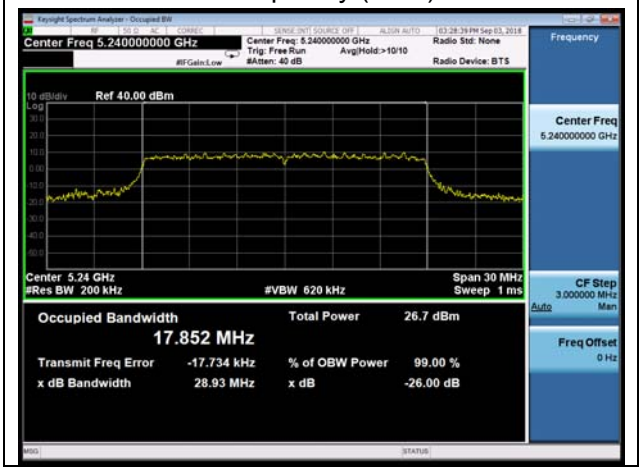
U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5230



U-NII-1, 802.11n HT20

Carrier frequency (MHz):5240



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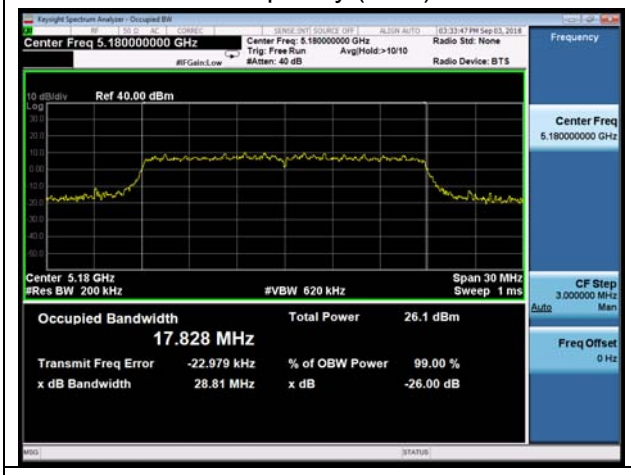
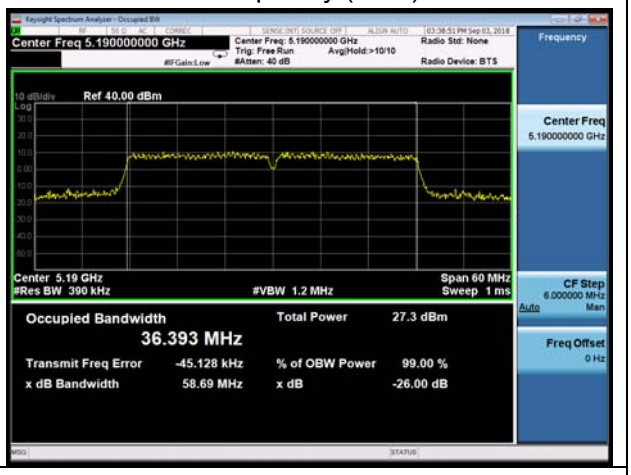
U-NII-1, 802.11ac VHT20

Carrier frequency (MHz): 5180



U-NII-1, 802.11ac VHT40

Carrier frequency (MHz): 5190



U-NII-1, 802.11ac VHT20

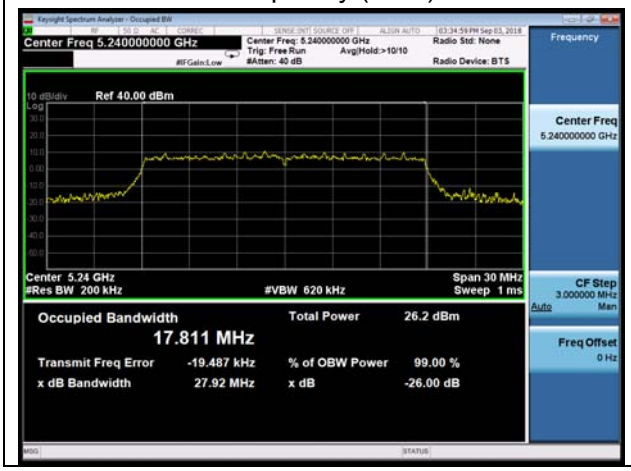
Carrier frequency (MHz): 5200

U-NII-1, 802.11ac VHT40

Carrier frequency (MHz): 5230

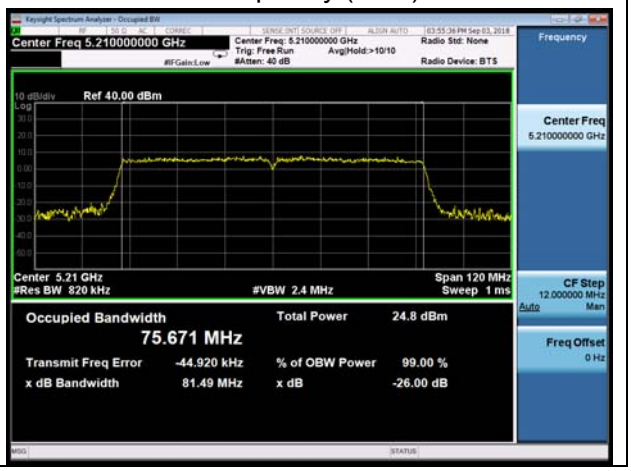
U-NII-1, 802.11ac VHT20

Carrier frequency (MHz):5240



U-NII-1, 802.11ac VHT80

Carrier frequency (MHz): 5210



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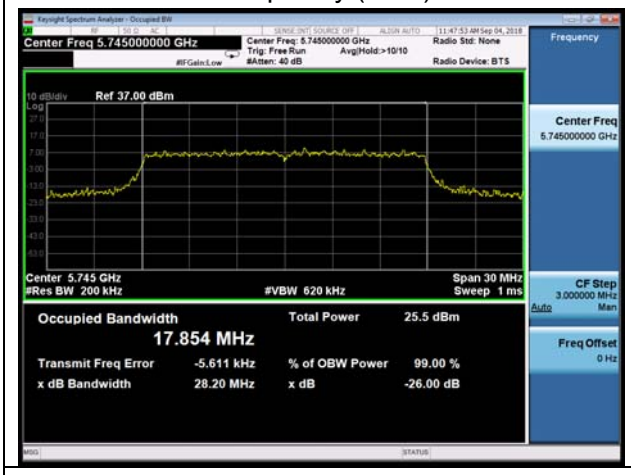
99% bandwidth

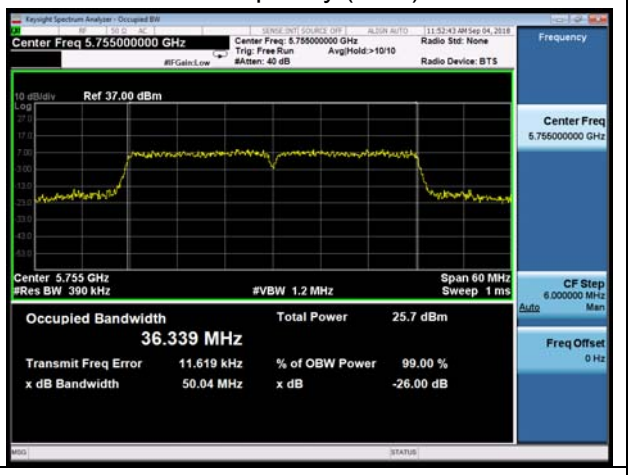
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



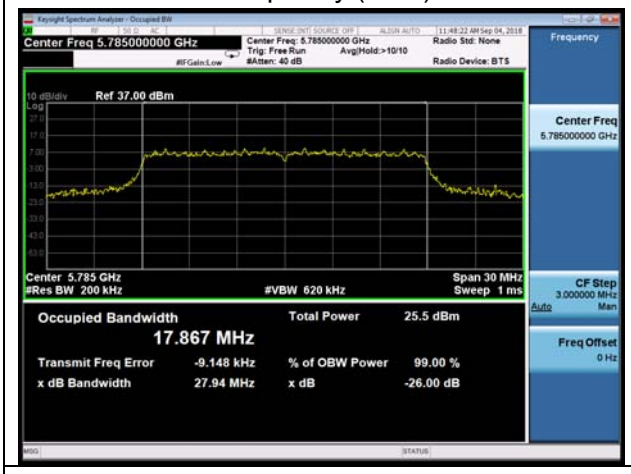
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785

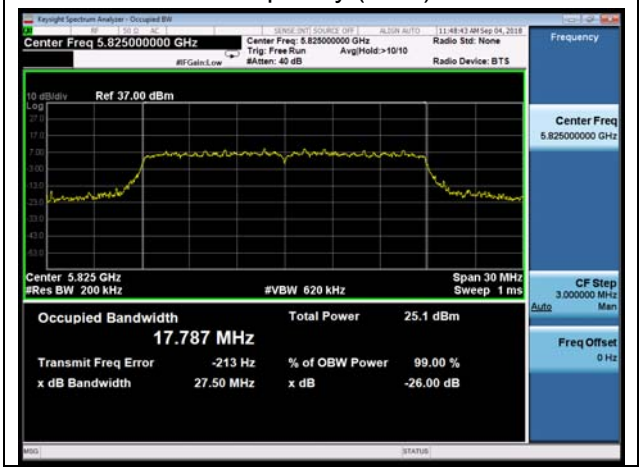


U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825



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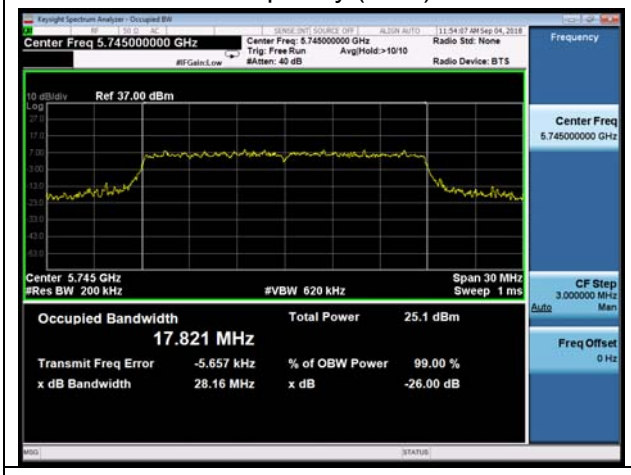
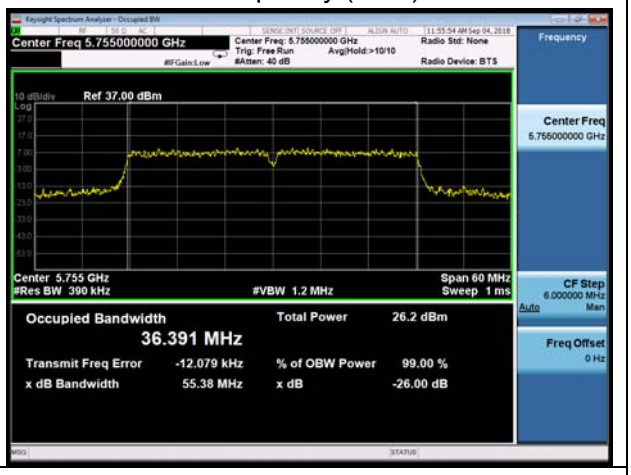
U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5745



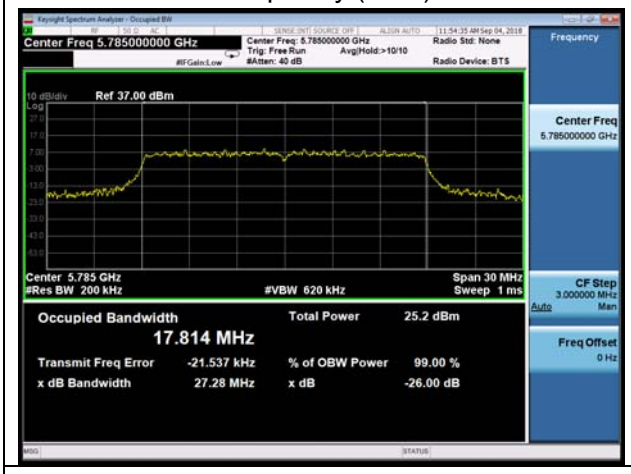
U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5785

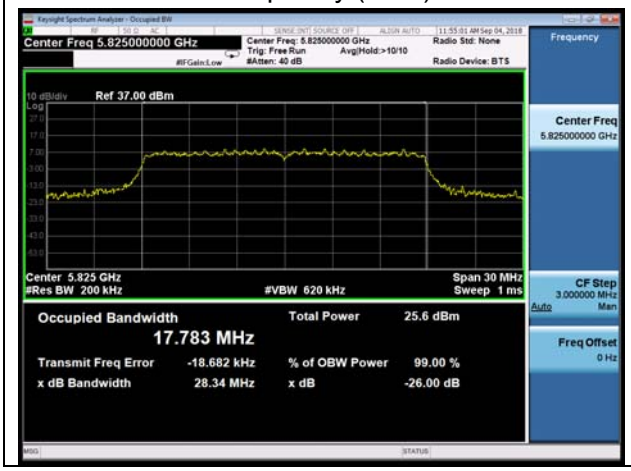


U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5795

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5825



U-NII-3, 802.11ac VHT80

Carrier frequency (MHz): 5775

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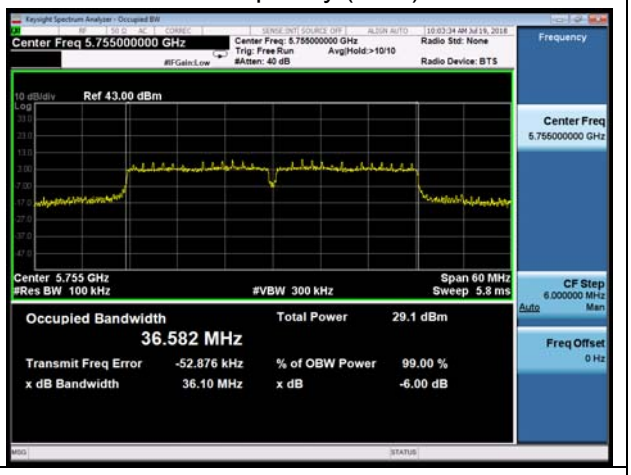
Minimum 6 dB bandwidth

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745

U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755

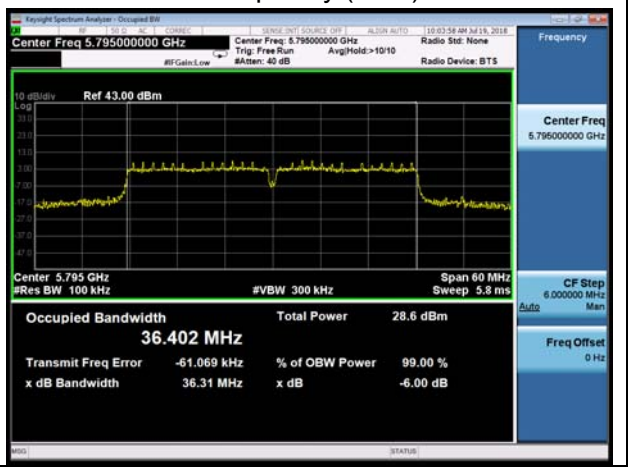


U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785

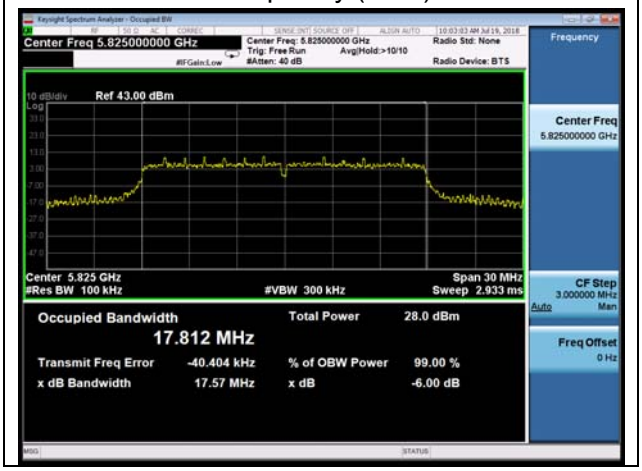
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825



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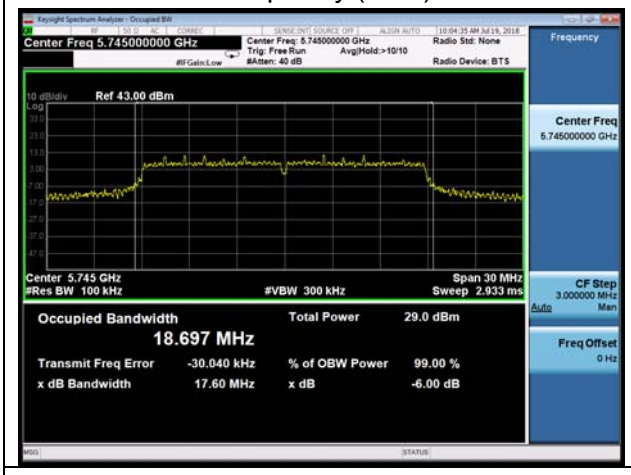
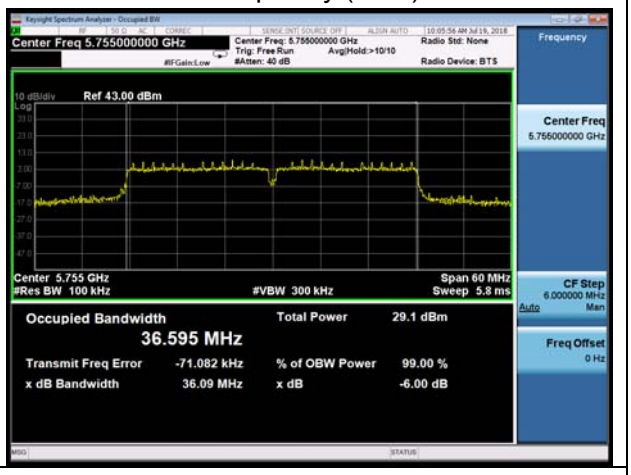
U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5785

U-NII-3, 802.11ac VHT40

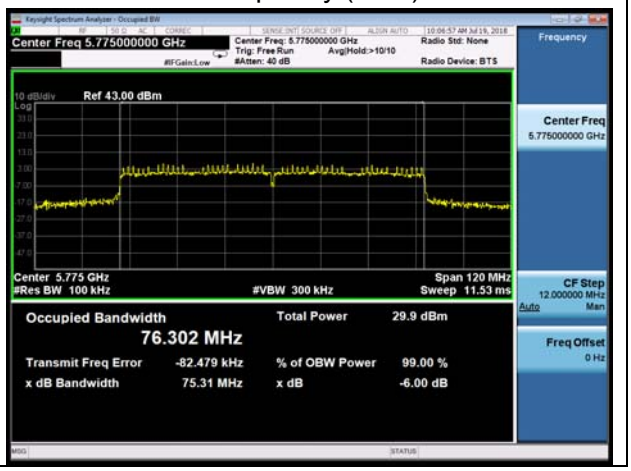
Carrier frequency (MHz): 5795

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5825

U-NII-3, 802.11ac VHT80

Carrier frequency (MHz): 5775



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5.2. Average Power Output –Conducted

Ambient condition

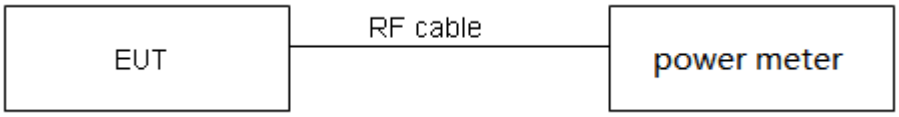
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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

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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.

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Test Results

Band	T_{on} (ms)	$T_{(on+off)}$ (ms)	Duty cycle	Duty cycle correction Factor(dB)
802.11a	2.06	2.17	0.95	0.21
802.11n HT20	1.92	2.02	0.95	0.21
802.11n HT40	0.94	1.04	0.90	0.44
802.11ac VHT20	1.93	1.95	0.99	NA
802.11ac VHT40	0.95	0.98	0.97	0.14
802.11ac VHT80	0.46	0.49	0.94	0.26
Note: when Duty cycle>0.98, Duty cycle correction Factor not required.				

SISO Antenna 1

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	18.16	18.37	30	PASS
	40/5200	21.69	21.90	30	PASS
	48/5240	21.75	21.96	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-3

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	21.85	22.06	30	PASS
	157/5785	21.91	22.12	30	PASS
	165/5825	21.76	21.97	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

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SISO Antenna 2

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	18.64	18.85	30	PASS
	40/5200	21.83	22.04	30	PASS
	48/5240	21.89	22.10	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-3

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	21.92	22.13	30	PASS
	157/5785	21.72	21.93	30	PASS
	165/5825	21.69	21.90	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

SISO Antenna 3

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	18.59	18.80	30	PASS
	40/5200	22.15	22.36	30	PASS
	48/5240	21.88	22.09	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-3

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	21.75	21.96	30	PASS
	157/5785	21.53	21.74	30	PASS
	165/5825	22.05	22.26	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

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MIMO (Without Beamforming)

U-NII-1

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		MIMO Antenna3		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)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	36/5180	17.93	18.14	17.24	17.45	17.56	17.77	22.57	30.00	PASS
	44/5220	22.14	22.35	21.95	22.16	21.72	21.93	26.92	30.00	PASS
	48/5240	21.95	22.16	21.44	21.65	21.22	21.43	26.53	30.00	PASS
802.11n HT40	38/5190	13.27	13.71	13.43	13.87	13.21	13.65	18.51	30.00	PASS
	46/5230	21.88	22.32	21.65	22.09	21.24	21.68	26.81	30.00	PASS
802.11ac VHT20	36/5180	22.22	22.22	22.34	22.34	22.00	22.00	26.96	30.00	PASS
	44/5220	21.96	21.96	22.45	22.45	21.68	21.68	26.81	30.00	PASS
	48/5240	21.88	21.88	21.65	21.65	21.14	21.14	26.34	30.00	PASS
802.11ac VHT40	38/5190	21.79	21.93	21.64	21.78	21.21	21.35	26.47	30.00	PASS
	46/5230	22.06	22.20	21.94	22.08	21.35	21.49	26.71	30.00	PASS
802.11ac VHT80	42/5210	16.30	16.56	16.25	16.51	16.17	16.43	21.27	30.00	PASS

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

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})}+10^{(\text{Power antenna3 in dBm/10})})$.

2. The manufacturer declared the transmitter output signals is CDD mode And N_{ss}=1. 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.

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U-NII-3

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		MIMO Antenna3		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)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	149/5745	21.86	22.07	21.44	21.65	21.55	21.76	26.60	30.00	PASS
	157/5785	21.66	21.87	21.08	21.29	21.34	21.55	26.35	30.00	PASS
	165/5825	22.11	22.32	21.48	21.69	21.54	21.75	26.70	30.00	PASS
802.11n HT40	151/5755	21.14	21.58	21.08	21.52	21.03	21.47	26.29	30.00	PASS
	159/5795	21.93	22.37	21.12	21.56	21.35	21.79	26.69	30.00	PASS
802.11ac VHT20	149/5745	22.06	22.06	21.64	21.64	21.76	21.76	26.59	30.00	PASS
	157/5785	21.94	21.94	21.25	21.25	21.52	21.52	26.35	30.00	PASS
	165/5825	22.04	22.04	21.53	21.53	21.67	21.67	26.52	30.00	PASS
802.11ac VHT40	151/5755	21.74	21.88	21.28	21.42	21.52	21.66	26.43	30.00	PASS
	159/5795	22.28	22.42	21.39	21.53	21.66	21.80	26.71	30.00	PASS
802.11ac VHT80	155/5775	17.88	18.14	17.30	17.56	17.45	17.71	22.58	30.00	PASS

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

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})}+10^{(\text{Power antenna3 in dBm/10})})$.

2. The manufacturer declared the transmitter output signals is CDD mode And N_{ss}=1. 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.

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MIMO (With Beamforming)

U-NII-1

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		MIMO Antenna3		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)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	36/5180	18.27	18.48	18.18	18.39	17.65	17.86	23.02	28.23	PASS
	44/5220	22.08	22.29	21.85	22.06	21.57	21.78	26.82	28.23	PASS
	48/5240	21.88	22.09	21.35	21.56	21.16	21.37	26.46	28.23	PASS
802.11n HT40	38/5190	13.19	13.63	13.23	13.67	12.86	13.30	18.30	28.23	PASS
	46/5230	21.76	22.20	21.54	21.98	21.13	21.57	26.69	28.23	PASS
802.11ac VHT20	36/5180	22.16	22.16	22.16	22.16	21.94	21.94	26.86	28.23	PASS
	44/5220	21.81	21.81	22.37	22.37	21.58	21.58	26.70	28.23	PASS
	48/5240	21.69	21.69	21.45	21.45	21.06	21.06	26.18	28.23	PASS
802.11ac VHT40	38/5190	21.66	21.80	21.42	21.56	21.14	21.28	26.33	28.23	PASS
	46/5230	22.00	22.14	21.77	21.91	21.20	21.34	26.58	28.23	PASS
802.11ac VHT80	42/5210	16.43	16.69	16.51	16.77	16.13	16.39	21.39	28.23	PASS

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

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})}+10^{(\text{Power antenna3 in dBm/10})})$.

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（3/1）=7.77dBi ＞6dBi. So the limt is 30+(6-7.77)=28.23dBm.

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U-NII-3

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		MIMO Antenna3		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)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	149/5745	21.77	21.98	21.36	21.57	21.42	21.63	26.50	28.23	PASS
	157/5785	21.52	21.73	20.95	21.16	21.17	21.38	26.20	28.23	PASS
	165/5825	22.00	22.21	21.28	21.49	21.26	21.47	26.51	28.23	PASS
802.11n HT40	151/5755	20.86	21.30	20.62	21.06	20.44	20.88	25.85	28.23	PASS
	159/5795	21.83	22.27	21.06	21.50	21.17	21.61	26.58	28.23	PASS
802.11ac VHT20	149/5745	21.86	21.86	21.46	21.46	21.61	21.61	26.42	28.23	PASS
	157/5785	21.75	21.75	21.18	21.18	21.42	21.42	26.23	28.23	PASS
	165/5825	21.91	21.91	21.27	21.27	21.58	21.58	26.37	28.23	PASS
802.11ac VHT40	151/5755	21.55	21.69	21.16	21.30	21.49	21.63	26.32	28.23	PASS
	159/5795	22.03	22.17	21.12	21.26	21.54	21.68	26.49	28.23	PASS
802.11ac VHT80	155/5775	17.24	17.50	17.52	17.78	16.95	17.21	22.27	28.23	PASS

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

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})}+10^{(\text{Power antenna3 in dBm/10})})$.

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（3/1）=7.77dBi ＞6dBi. So the limt is 30+(6-7.77)=28.23dBm.

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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.

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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

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Test Results

SISO Antenna 3

Voltage (V)	Temperature (°C)	U-NII-1 Test Results			
		5200MHz			
		1min	2min	5min	10min
12	-5	5200.004444	5199.996832	5199.991329	5199.983242
12	5	5200.009921	5199.989077	5199.987082	5199.980477
12	10	5200.001798	5199.984453	5199.977927	5199.979888
12	15	5200.000781	5199.980861	5199.977370	5199.973995
12	20	5199.998438	5199.974425	5199.969145	5199.964929
12	30	5199.992876	5199.968964	5199.960743	5199.963164
12	35	5199.991166	5199.966652	5199.954648	5199.956508
12	45	5199.986186	5199.957348	5199.953417	5199.953638
10	20	5199.980728	5199.956523	5199.945002	5199.950652
14	20	5199.976635	5199.951488	5199.935720	5199.944764
MHz		-0.023365	-0.048512	-0.064280	-0.055236
PPM		-4.493276	-9.329223	-12.361553	-10.622358

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
12	-5	5784.997051	5784.994406	5784.985524	5784.978516
12	5	5784.987774	5784.992532	5784.978465	5784.974502
12	10	5784.985987	5784.982672	5784.971450	5784.968908
12	15	5784.978531	5784.976342	5784.966748	5784.960700
12	20	5784.968920	5784.973977	5784.961986	5784.953142
12	30	5784.962469	5784.964436	5784.955896	5784.943781
12	35	5784.956000	5784.963225	5784.946490	5784.937266
12	45	5784.948100	5784.957555	5784.939203	5784.930581
10	20	5784.944436	5784.952973	5784.929709	5784.924059
14	20	5784.939729	5784.944128	5784.921148	5784.916005
MHz		-0.060271	-0.055872	-0.078852	-0.083995
PPM		-10.418439	-9.658060	-13.630343	-14.519441

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5.4. Power Spectral Density

Ambient condition

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

Method of Measurement

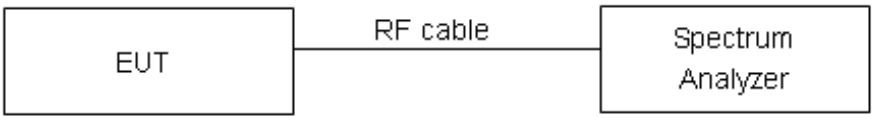
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

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	17dBm/MHz
5.25-5.35 GHz and 5.47-5.725 GHz	11dBm/MHz
5725-5850	30dBm/500kHz

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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.

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Test Results:

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

SISO Antenna 1

U-NII-1

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	6.25	6.46	17	PASS
	40	10.80	11.02	17	PASS
	48	10.18	10.39	17	PASS

U-NII-3

Network Standards	Channel Number	Read Value (dBm/500kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	7.69	7.90	30	PASS
	157	7.41	7.63	30	PASS
	165	7.13	7.34	30	PASS

SISO Antenna 2

U-NII-1

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	7.32	7.53	17	PASS
	40	10.14	10.36	17	PASS
	48	9.83	10.04	17	PASS

U-NII-3

Network Standards	Channel Number	Read Value (dBm/500kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	7.67	7.88	30	PASS
	157	7.05	7.27	30	PASS
	165	6.35	6.56	30	PASS

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SISO Antenna 3

U-NII-1

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	7.42	7.64	17	PASS
	40	10.01	10.22	17	PASS
	48	9.55	9.76	17	PASS

U-NII-3

Network Standards	Channel Number	Read Value (dBm/500kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	7.43	7.64	30	PASS
	157	7.21	7.42	30	PASS
	165	7.67	7.89	30	PASS

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MIMO without Beamforming

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density							Limit (dBm /MHz)	Conclusion
		Antenna 1		Antenna 2		Antenna 3		Total Power (dBm /MHz)		
		Read Value (dBm/ MHz)	PSD (dBm /MHz)	Read Value (dBm/ MHz)	PSD (dBm /MHz)	Read Value (dBm/ MHz)	PSD (dBm /MHz)			
802.11n HT20	36/5180	6.56	6.77	6.98	7.19	5.83	6.04	11.46	15.23	PASS
	40/5200	10.18	10.39	9.80	10.01	9.47	9.68	14.81	15.23	PASS
	48/5240	9.36	9.57	9.45	9.66	8.80	9.01	14.19	15.23	PASS
802.11n HT40	38/5190	-1.73	-1.29	-0.75	-0.31	-2.33	-1.89	3.66	15.23	PASS
	46/5230	4.85	5.29	5.38	5.82	5.10	5.54	10.33	15.23	PASS
802.11ac VHT20	36/5180	9.32	9.32	9.34	9.34	8.79	8.79	13.93	15.23	PASS
	40/5200	8.99	8.99	9.08	9.08	8.63	8.63	13.68	15.23	PASS
	48/5240	9.50	9.50	9.62	9.62	9.03	9.03	14.16	15.23	PASS
802.11ac VHT40	38/5190	4.99	5.14	5.28	5.42	4.78	4.92	9.94	15.23	PASS
	46/5230	6.19	6.33	6.20	6.35	5.87	6.01	11.00	15.23	PASS
802.11ac VHT80	42/5210	-1.20	-0.94	-1.37	-1.11	-1.67	-1.41	3.62	15.23	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=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})}+10^{(\text{PSD antenna3 in dBm/10})})$

3. Nss=1. 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（3/1)=7.77>6 dBi. So the PSD limt is 17-(directional gain-6 dBi) =17-(7.77-6)=15.23 dBm.

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U-NII-3

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density							Limit (dBm/ 500kHz)	Conclusion
		Antenna 1		Antenna 2		Antenna 3		Total Power (dBm/ 500kHz)		
		Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)			
802.11n HT20	149/5745	7.16	7.37	6.95	7.16	6.54	6.75	11.87	28.23	PASS
	157/5785	6.72	6.93	6.14	6.35	6.34	6.55	11.39	28.23	PASS
	165/5825	6.67	6.88	6.01	6.22	5.97	6.18	11.21	28.23	PASS
802.11n HT40	151/5755	3.36	3.80	3.69	4.12	3.33	3.77	8.67	28.23	PASS
	159/5795	3.74	4.18	2.53	2.97	2.97	3.41	8.32	28.23	PASS
802.11ac VHT20	149/5745	7.07	7.07	6.86	6.86	6.95	6.95	11.73	28.23	PASS
	157/5785	6.68	6.68	5.95	5.95	6.17	6.17	11.05	28.23	PASS
	165/5825	6.59	6.59	5.97	5.97	7.19	7.19	11.38	28.23	PASS
802.11ac VHT40	151/5755	3.83	3.97	3.39	3.53	3.86	4.00	8.61	28.23	PASS
	159/5795	3.87	4.01	3.20	3.34	3.66	3.80	8.50	28.23	PASS
802.11ac VHT80	155/5775	-3.61	-3.35	-2.46	-2.20	-3.80	-3.54	1.78	28.23	PASS

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

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})}+10^{(\text{Power antenna3 in dBm/10})})$.

2. Nss=1. 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（3/1)=7.77>6 dBi. So the PSD limt is 30-(directional gain-6 dBi) =30-(7.77-6) =28.23dBm.

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MIMO with Beamforming

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density							Limit (dBm /MHz)	Conclusion
		Antenna 1		Antenna 2		Antenna 3		Total Power (dBm /MHz)		
		Read Value (dBm/ MHz)	PSD (dBm /MHz)	Read Value (dBm/ MHz)	PSD (dBm /MHz)	Read Value (dBm/ MHz)	PSD (dBm /MHz)			
802.11n HT20	36/5180	6.82	7.03	6.45	6.66	5.97	6.18	11.41	15.23	PASS
	40/5200	8.68	8.90	8.66	8.87	8.59	8.80	13.63	15.23	PASS
	48/5240	9.37	9.58	9.59	9.80	9.12	9.33	14.34	15.23	PASS
802.11n HT40	38/5190	-1.34	-0.91	-0.83	-0.40	-2.06	-1.63	3.82	15.23	PASS
	46/5230	5.93	6.36	6.06	6.49	5.37	5.81	11.00	15.23	PASS
802.11ac VHT20	36/5180	9.29	9.29	9.47	9.47	8.82	8.82	13.97	15.23	PASS
	40/5200	8.76	8.76	9.21	9.21	9.24	9.24	13.85	15.23	PASS
	48/5240	9.62	9.62	9.61	9.61	9.13	9.13	14.23	15.23	PASS
802.11ac VHT40	38/5190	4.96	5.10	5.52	5.67	5.01	5.15	10.09	15.23	PASS
	46/5230	5.82	5.97	6.64	6.78	5.61	5.75	10.96	15.23	PASS
802.11ac VHT80	42/5210	-0.95	-0.69	-1.31	-1.05	-2.23	-1.97	3.57	15.23	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=$10\log(10^{(\text{PSD antenna1 in dBm/10})}+10^{(\text{PSD antenna2 in dBm/10})}+10^{(\text{PSD antenna3 in dBm/10})})$

3. Nss=1. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e）(i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log（3/1)=7.77>6 dBi. So the PSD limt is 17-(directional gain-6 dBi) =17-(7.77-6)=15.23 dBm.

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U-NII-3

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density							Limit (dBm/ 500kHz)	Conclusion
		Antenna 1		Antenna 2		Antenna 3		Total Power (dBm/ 500kHz)		
		Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)			
802.11n HT20	149/5745	6.46	6.67	6.76	6.97	6.68	6.89	11.61	28.23	PASS
	157/5785	6.59	6.80	6.28	6.49	6.26	6.47	11.36	28.23	PASS
	165/5825	6.82	7.03	6.02	6.23	6.17	6.38	11.33	28.23	PASS
802.11n HT40	151/5755	3.78	4.22	3.23	3.66	3.19	3.62	8.61	28.23	PASS
	159/5795	4.00	4.44	3.16	3.60	3.59	4.03	8.81	28.23	PASS
802.11ac VHT20	149/5745	7.87	7.87	7.12	7.12	7.16	7.16	12.17	28.23	PASS
	157/5785	7.01	7.01	6.53	6.53	7.12	7.12	11.66	28.23	PASS
	165/5825	7.19	7.19	6.26	6.26	6.48	6.48	11.43	28.23	PASS
802.11ac VHT40	151/5755	4.34	4.49	3.74	3.88	4.49	4.64	9.12	28.23	PASS
	159/5795	4.21	4.36	3.59	3.73	3.61	3.76	8.73	28.23	PASS
802.11ac VHT80	155/5775	-3.63	-3.37	-2.62	-2.36	-4.50	-4.24	1.52	28.23	PASS

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

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm/10})}+10^{(\text{Power antenna2 in dBm/10})}+10^{(\text{Power antenna3 in dBm/10})})$.

2. Nss=1. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e）(i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=3+10log（3/1)=7.77>6 dBi. So the PSD limt is 30-(directional gain-6 dBi) =30-(7.77-6) =28.23dBm.

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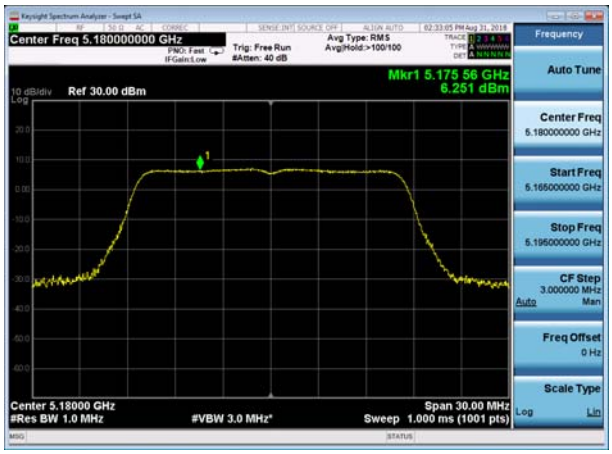
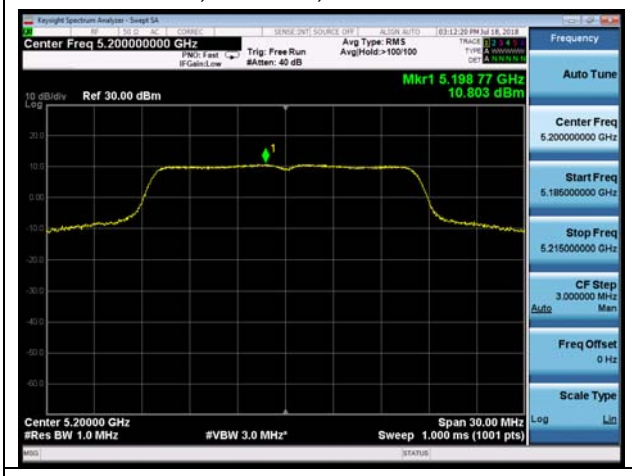
SISO Antenna 1

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



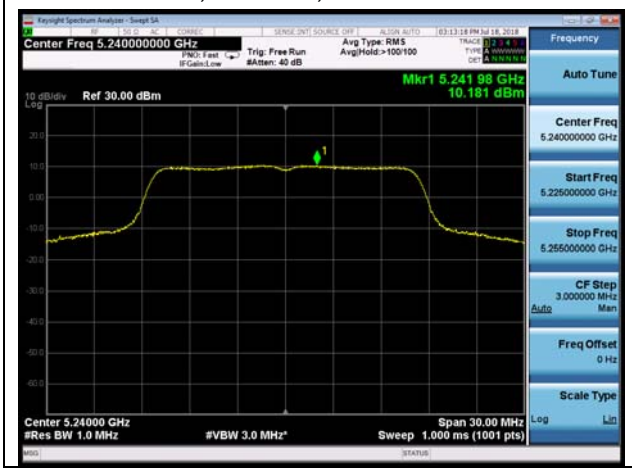
U-NII-3, 802.11a, Channel No.: 149

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



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

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



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

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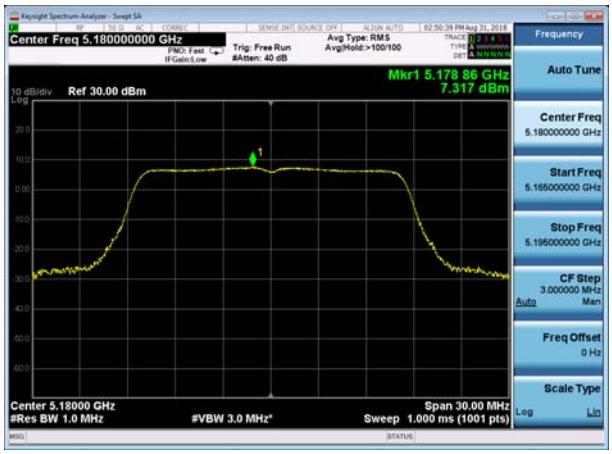
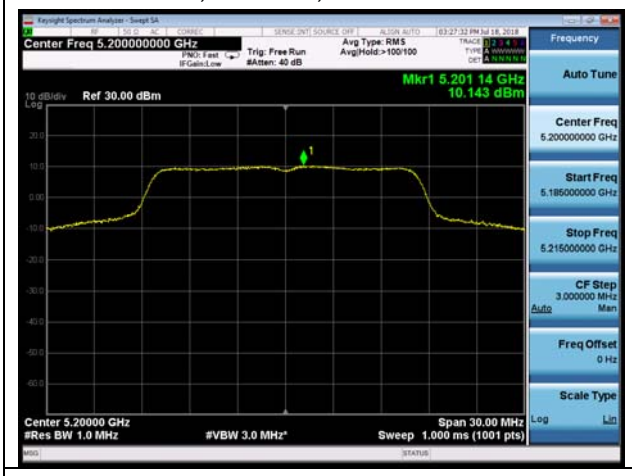
SISO Antenna 2

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

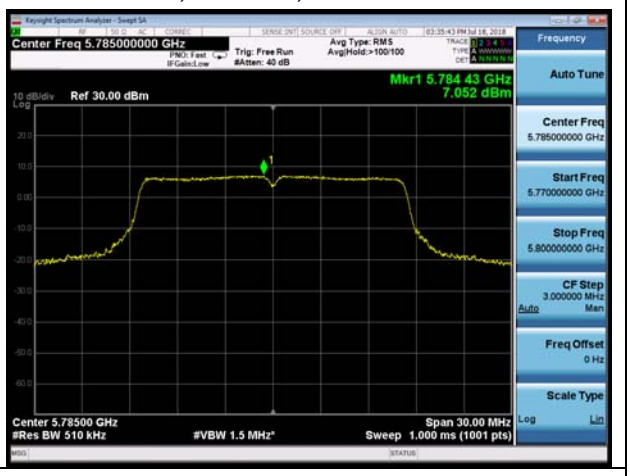


U-NII-3, 802.11a, Channel No.: 149

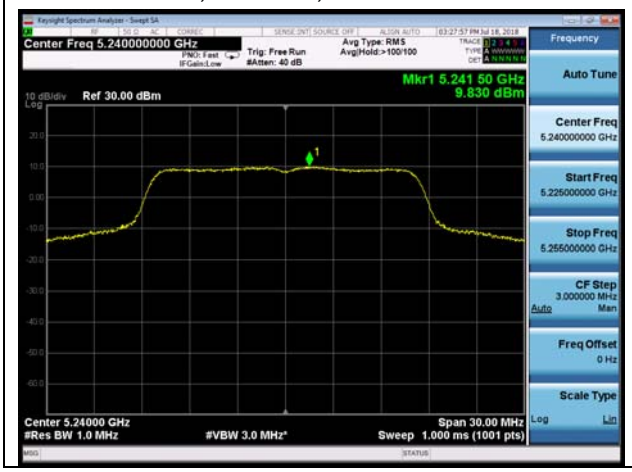
U-NII-1, 802.11a, Channel No.: 40



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



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



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

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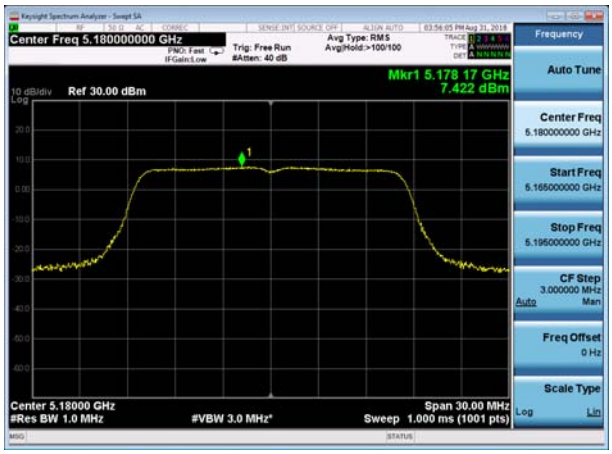
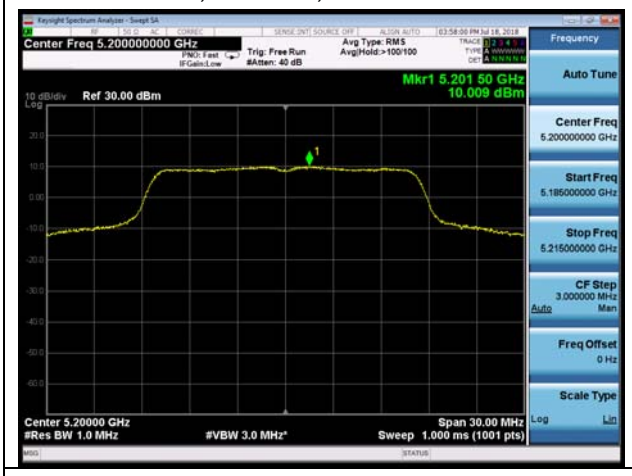
SISO Antenna 3

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



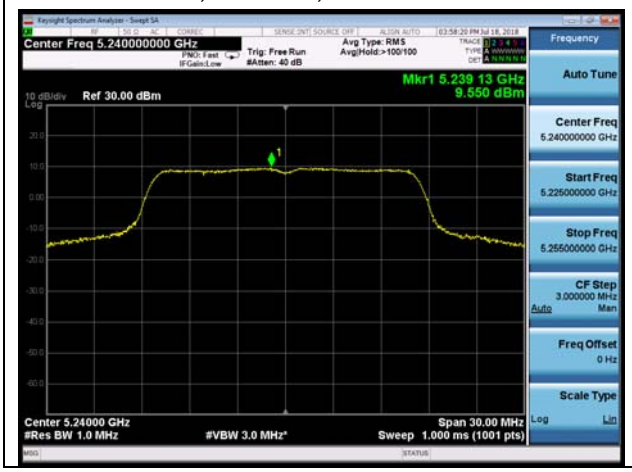
U-NII-3, 802.11a, Channel No.: 149

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



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

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



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

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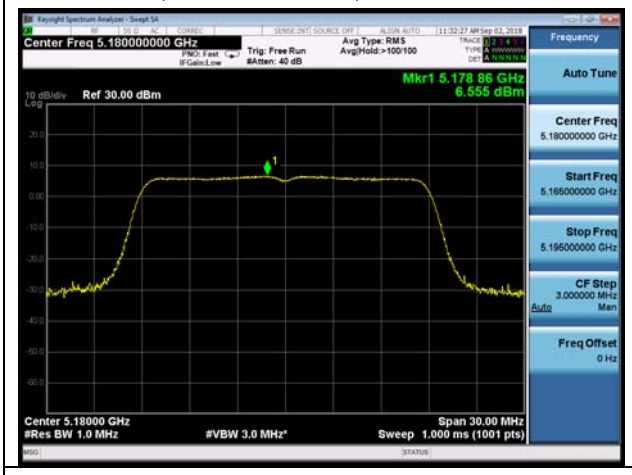
MIMO without Beamforming

Antenna 1

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

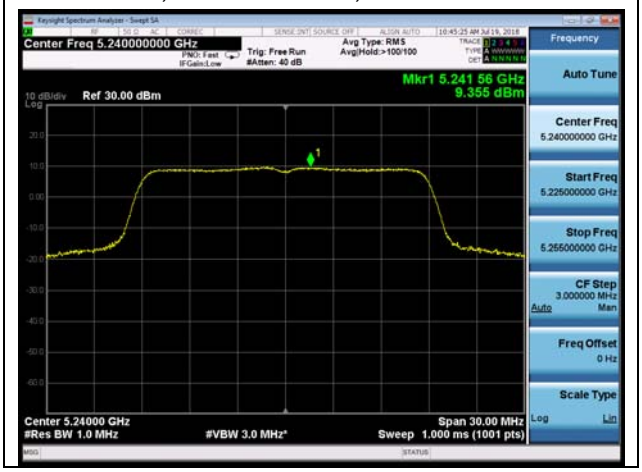


U-NII-1, 802.11n HT40, Channel No.: 38

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

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

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



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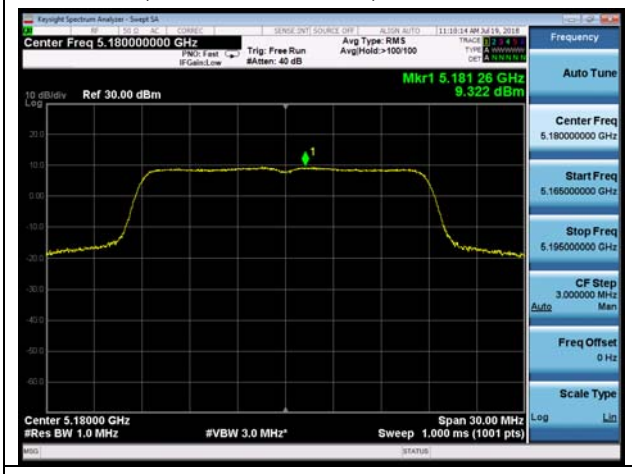
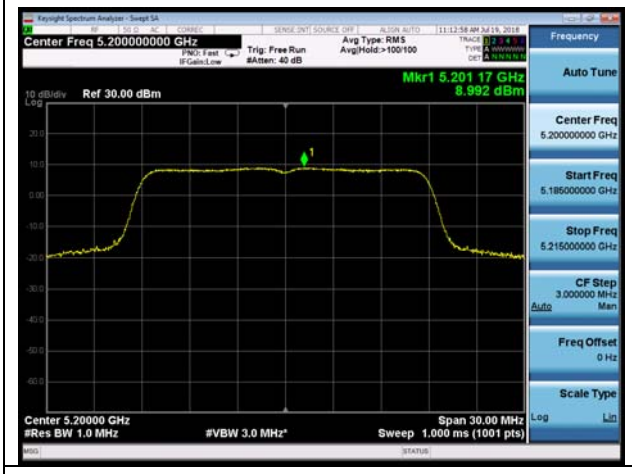
U-NII-1, 802.11ac VHT20, Channel No.: 36



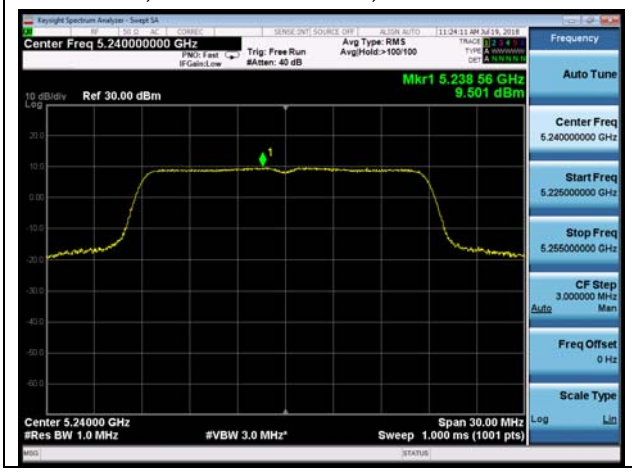
U-NII-1, 802.11ac VHT40, Channel No.: 38

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



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

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



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

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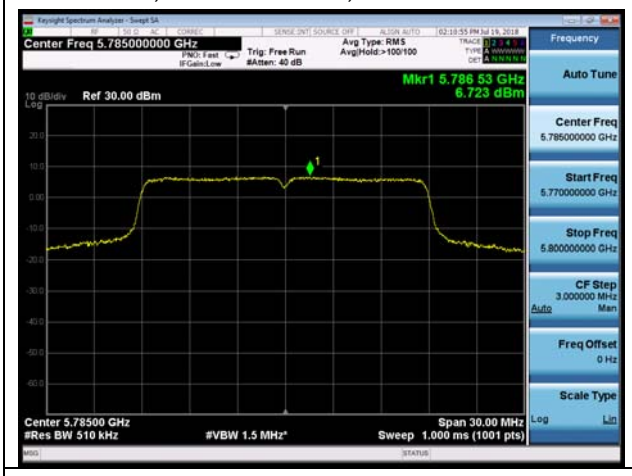
U-NII-3, 802.11n HT20, Channel No.: 149

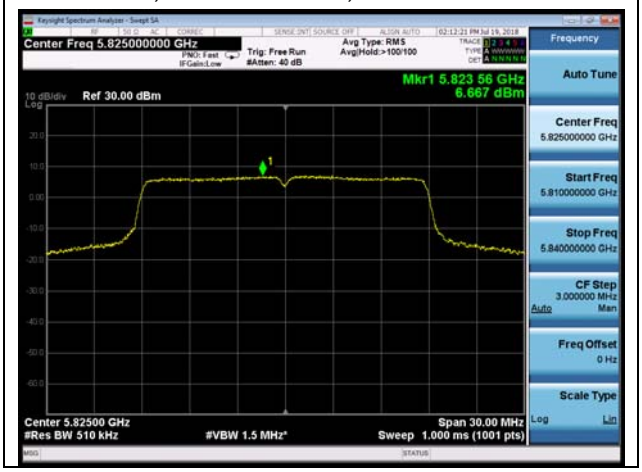
U-NII-3, 802.11n HT40, Channel No.: 151

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



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

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



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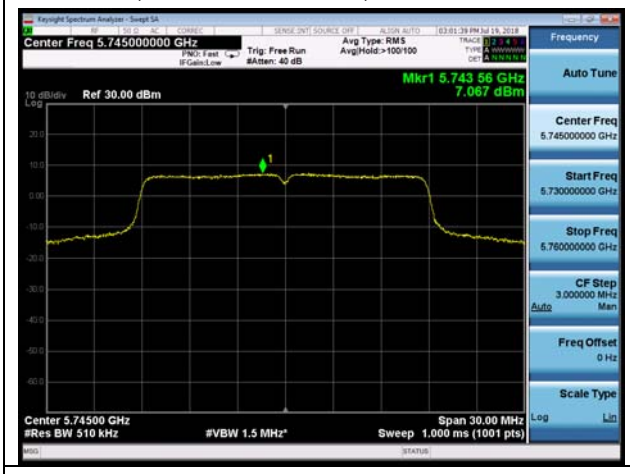
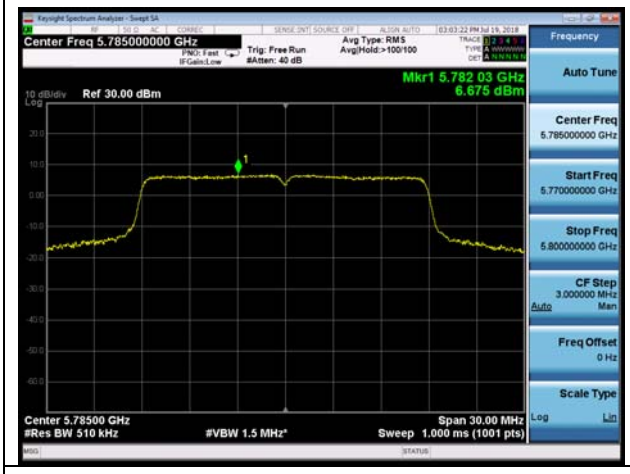
U-NII-3, 802.11ac VHT20, Channel No.: 149



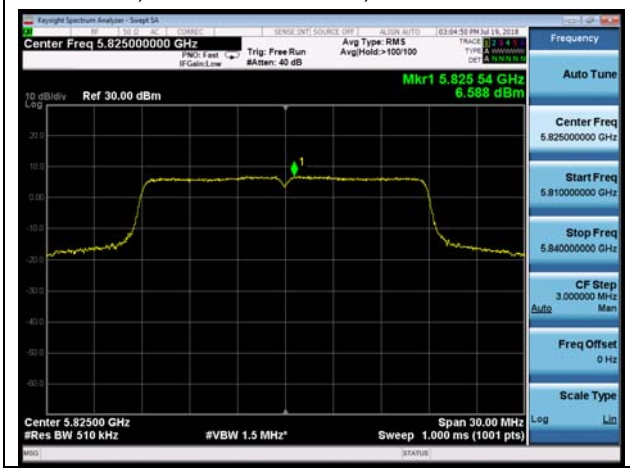
U-NII-3, 802.11ac VHT40, Channel No.: 151

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



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

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



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

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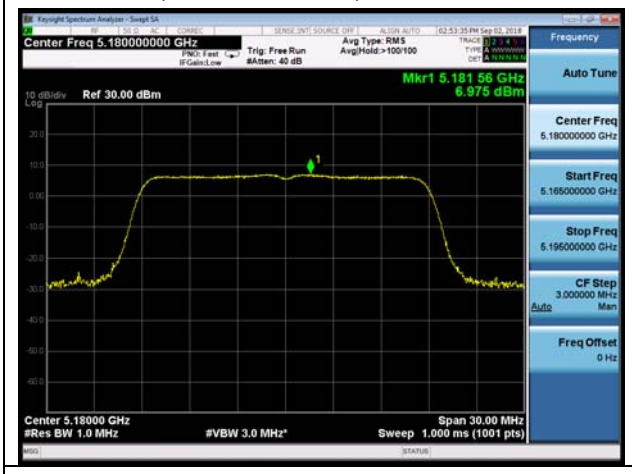
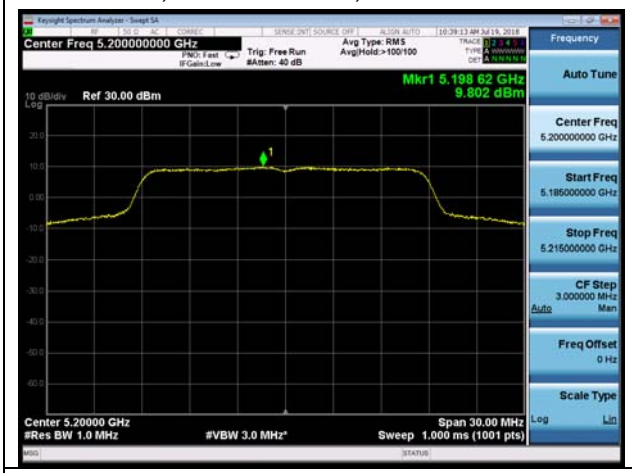
Antenna 2

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



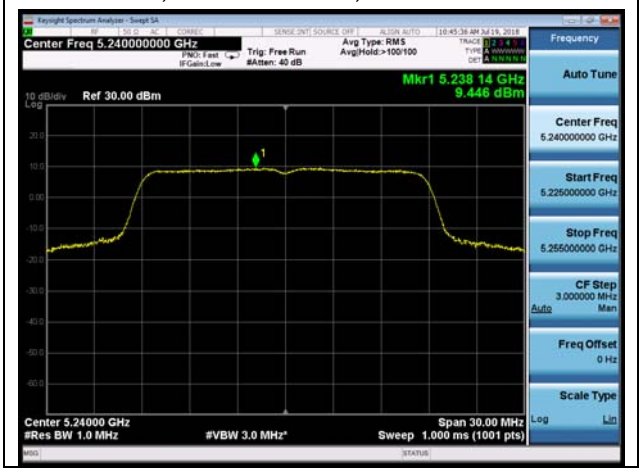
U-NII-1, 802.11n HT40, Channel No.: 38

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



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

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



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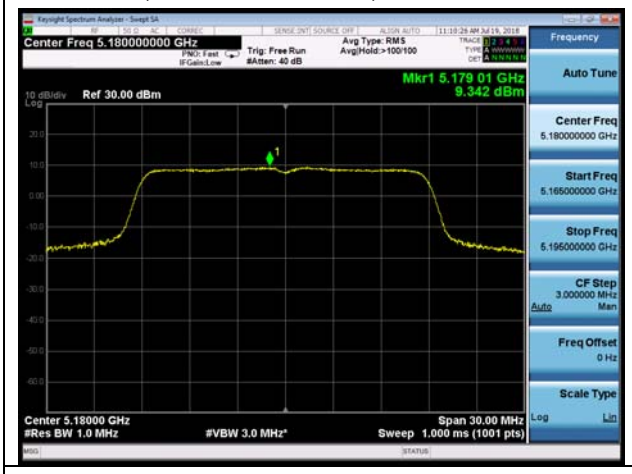
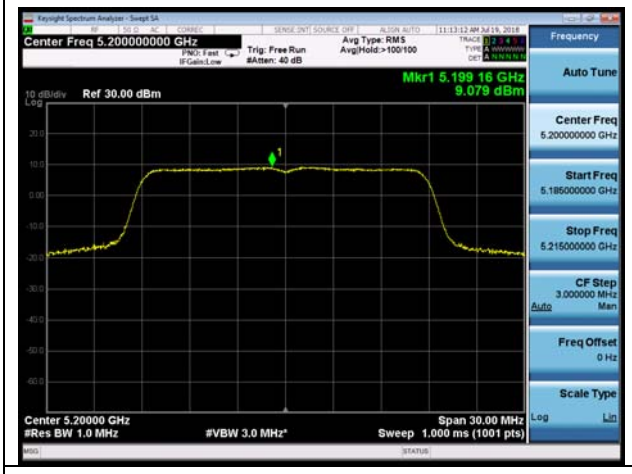
U-NII-1, 802.11ac VHT20, Channel No.: 36



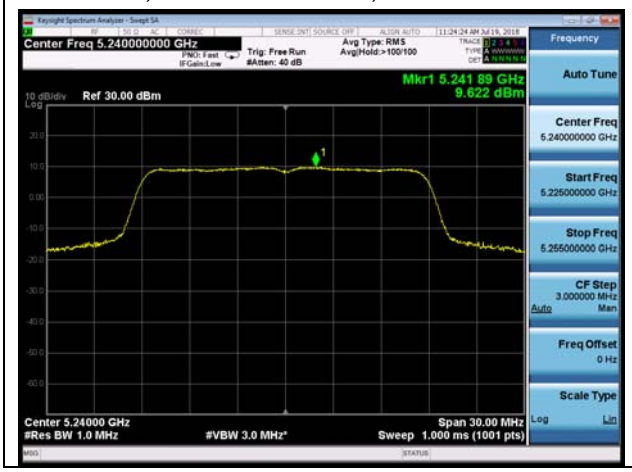
U-NII-1, 802.11ac VHT40, Channel No.: 38

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



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

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



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

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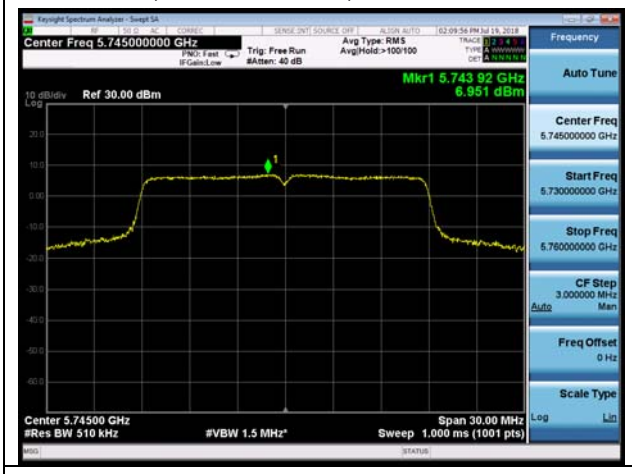
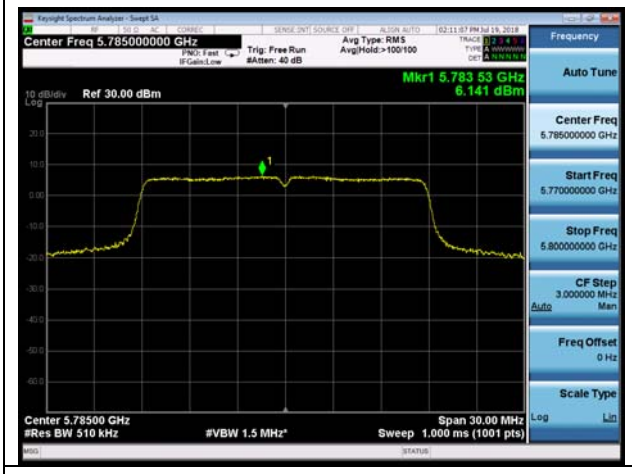
U-NII-3, 802.11n HT20, Channel No.: 149



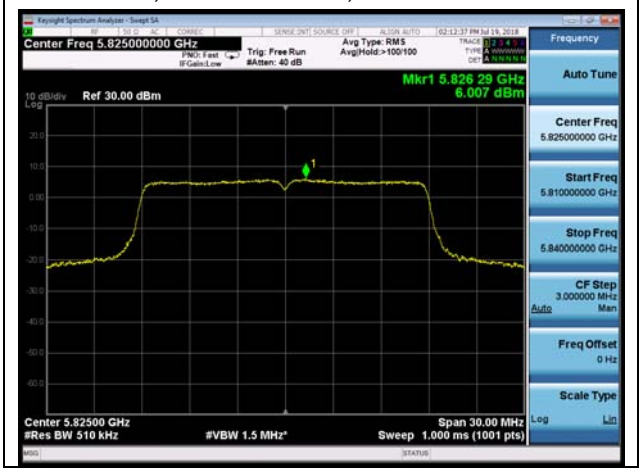
U-NII-3, 802.11n HT40, Channel No.: 151

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



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

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



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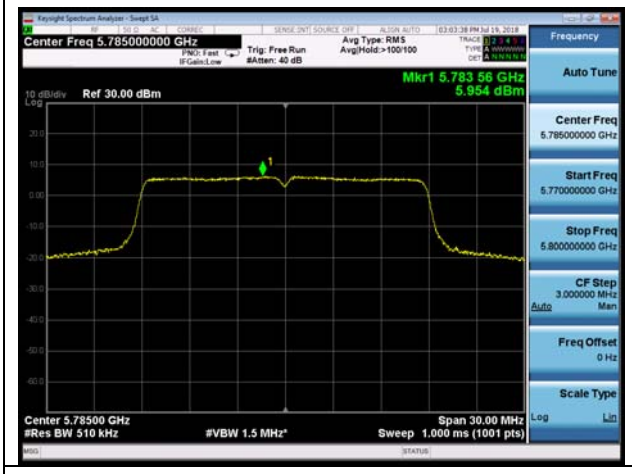
U-NII-3, 802.11ac VHT20, Channel No.: 149

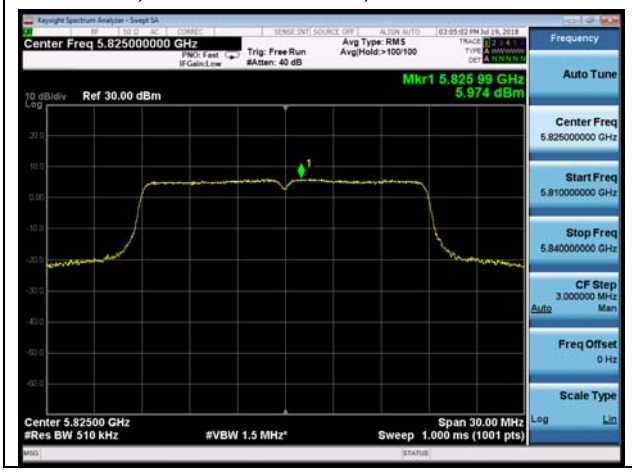
U-NII-3, 802.11ac VHT40, Channel No.: 151

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



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

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



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

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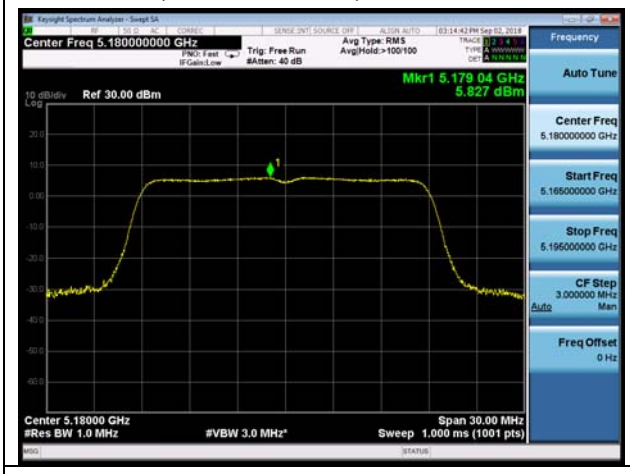
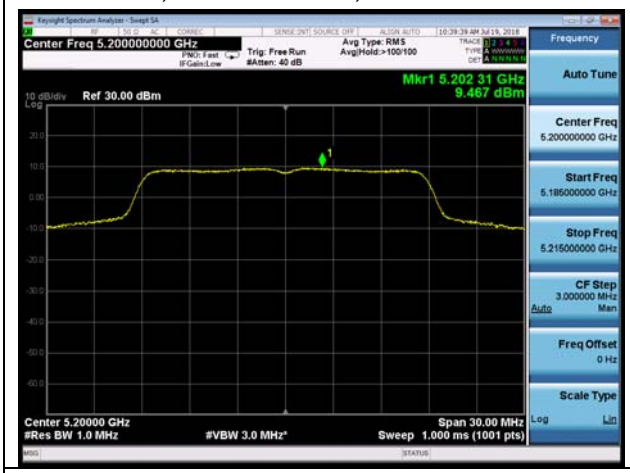
Antenna 3

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



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

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



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

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

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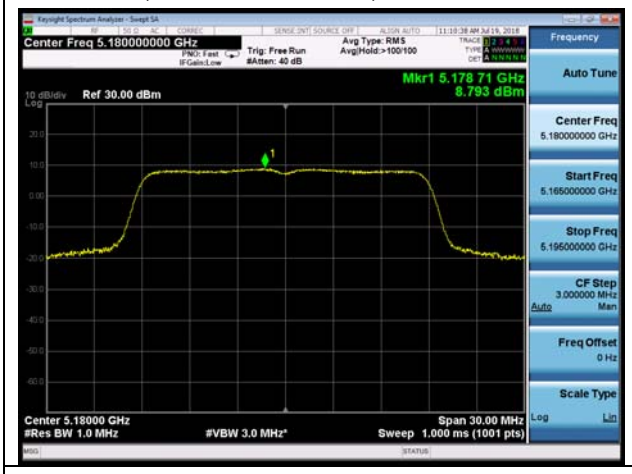
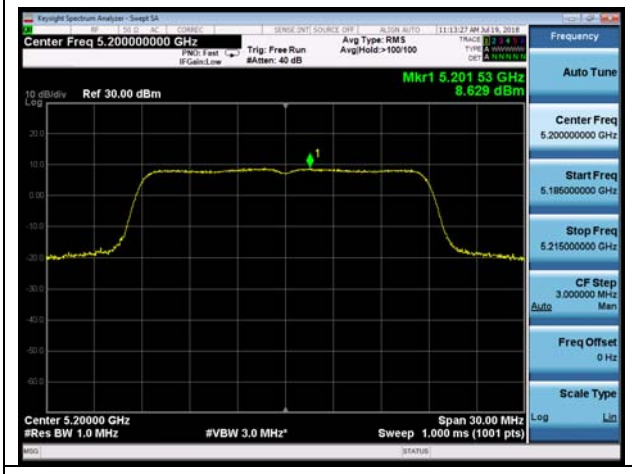
U-NII-1, 802.11ac VHT20, Channel No.: 36



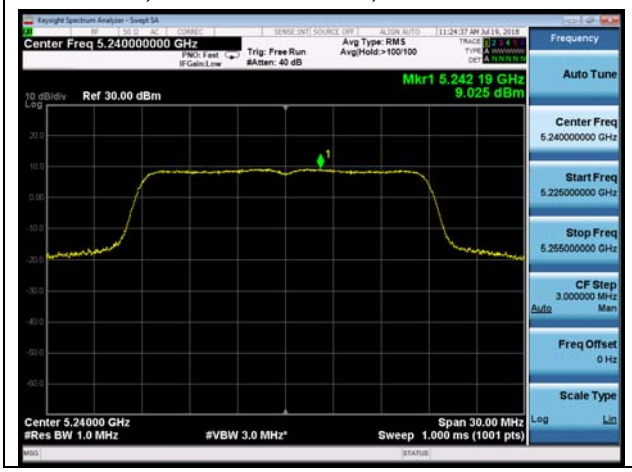
U-NII-1, 802.11ac VHT40, Channel No.: 38

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



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

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



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

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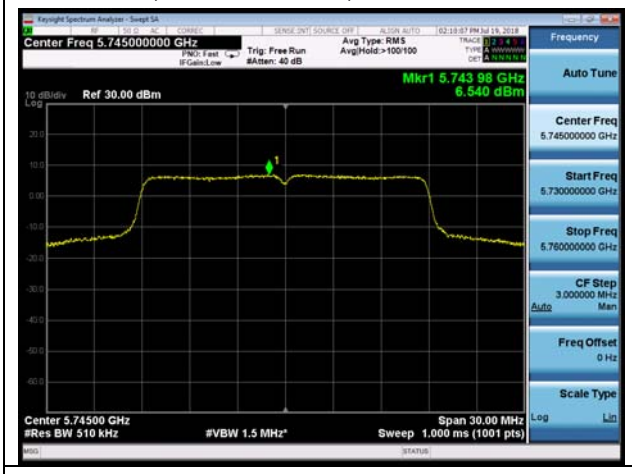
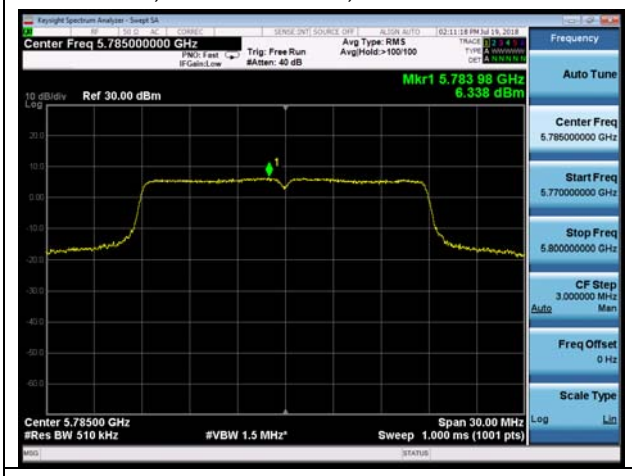
U-NII-3, 802.11n HT20, Channel No.: 149



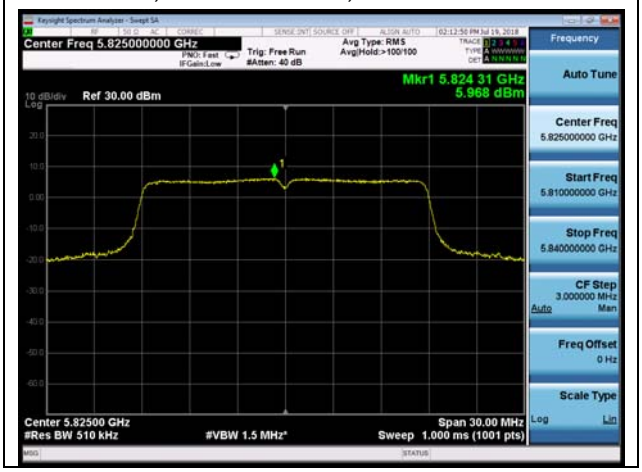
U-NII-3, 802.11n HT40, Channel No.: 151

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



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

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



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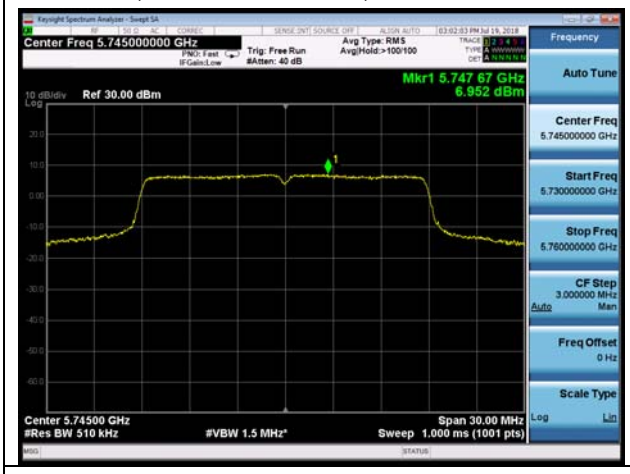
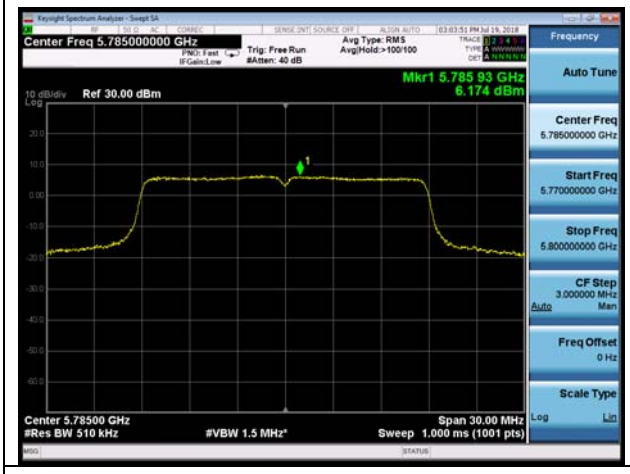
U-NII-3, 802.11ac VHT20, Channel No.: 149



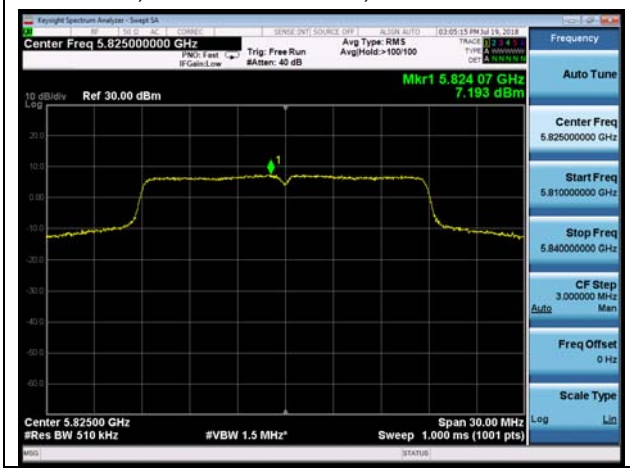
U-NII-3, 802.11ac VHT40, Channel No.: 151

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



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

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



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

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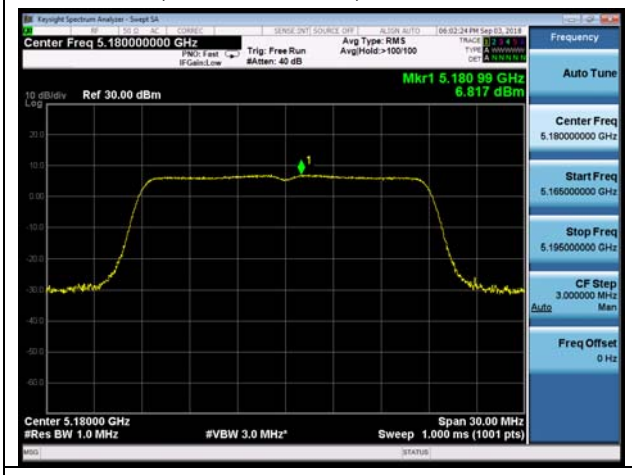
MIMO with Beamforming

Antenna 1

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

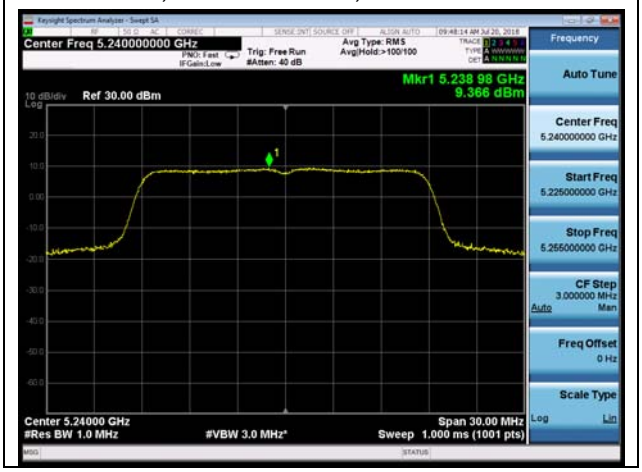


U-NII-1, 802.11n HT40, Channel No.: 38

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

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

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



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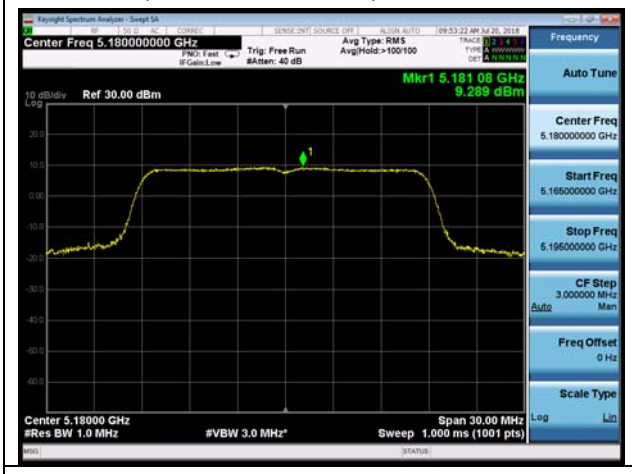
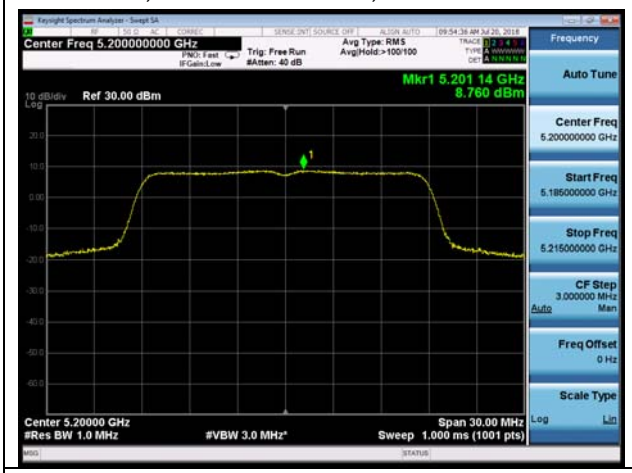
U-NII-1, 802.11ac VHT20, Channel No.: 36



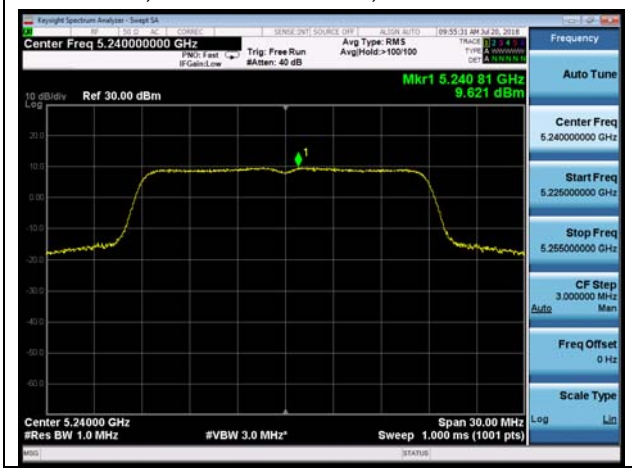
U-NII-1, 802.11ac VHT40, Channel No.: 38

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



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

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



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

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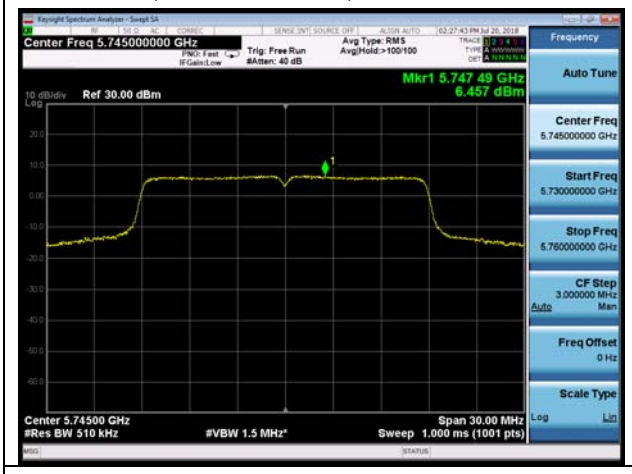
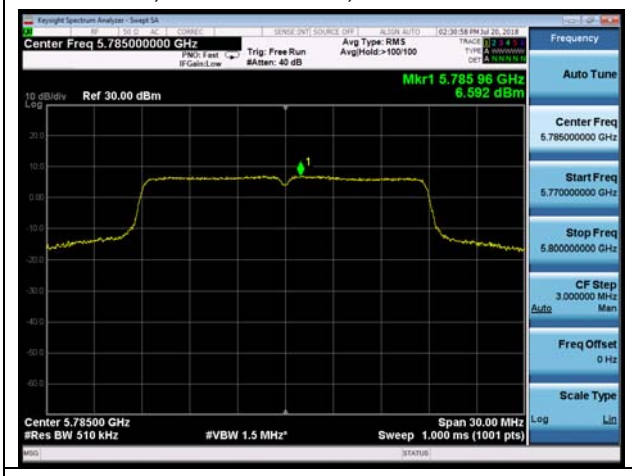
U-NII-3, 802.11n HT20, Channel No.: 149



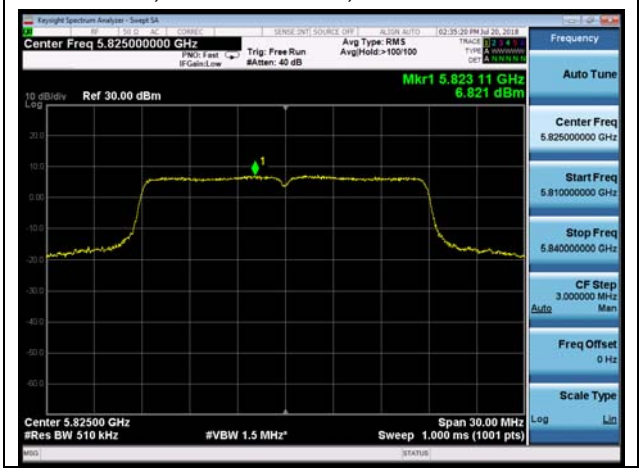
U-NII-3, 802.11n HT40, Channel No.: 151

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



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

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



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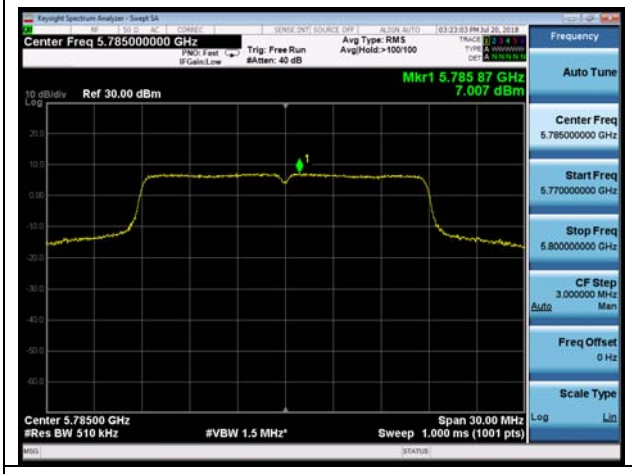
U-NII-3, 802.11ac VHT20, Channel No.: 149

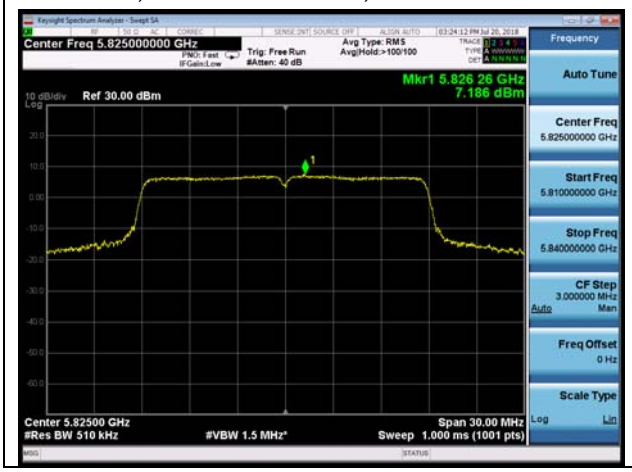
U-NII-3, 802.11ac VHT40, Channel No.: 151

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



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

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



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

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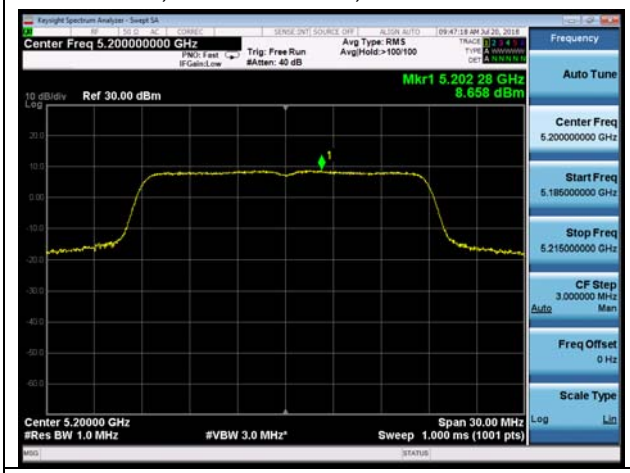
Antenna 2

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

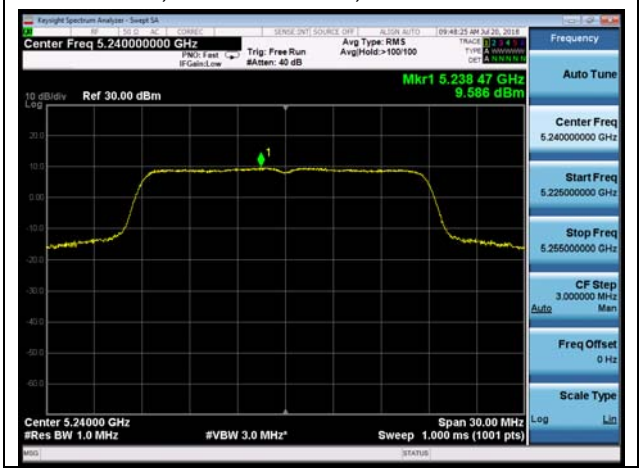
U-NII-1, 802.11n HT40, Channel No.: 38

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



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

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



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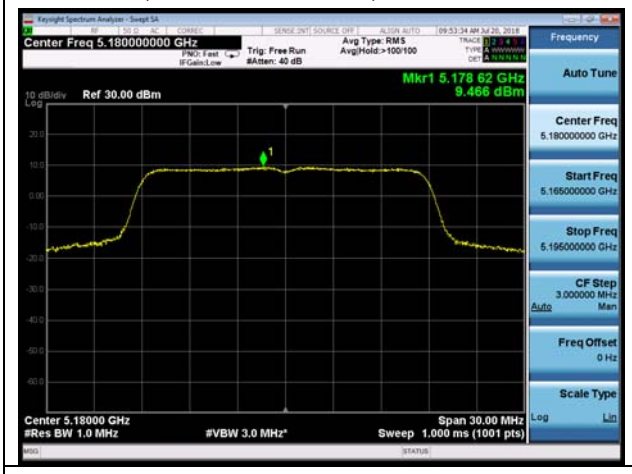
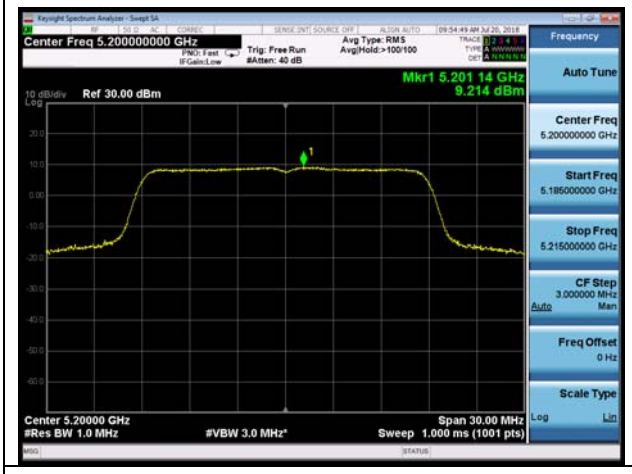
U-NII-1, 802.11ac VHT20, Channel No.: 36



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

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



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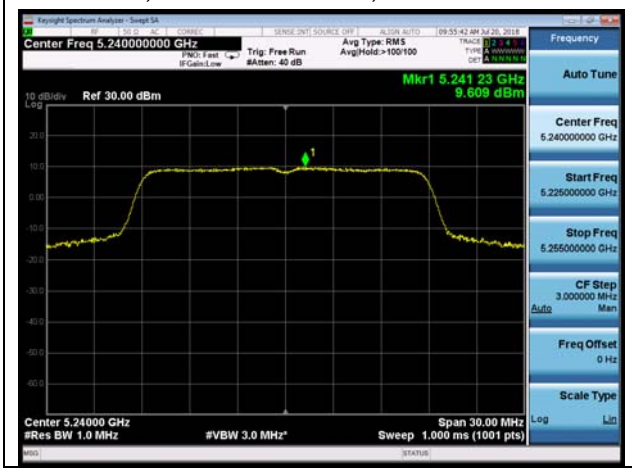
U-NII-1, 802.11ac VHT20, Channel No.: 48



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

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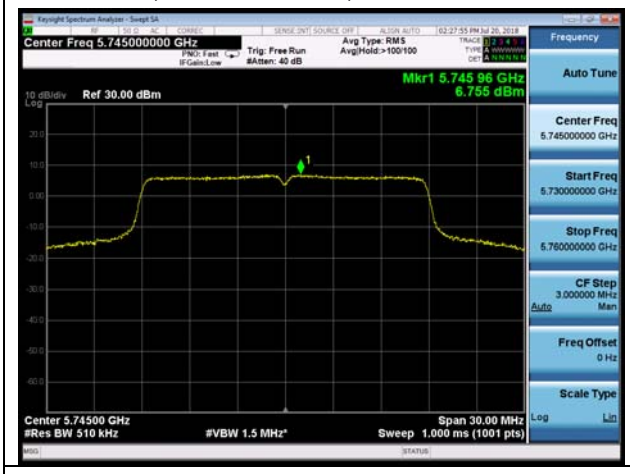
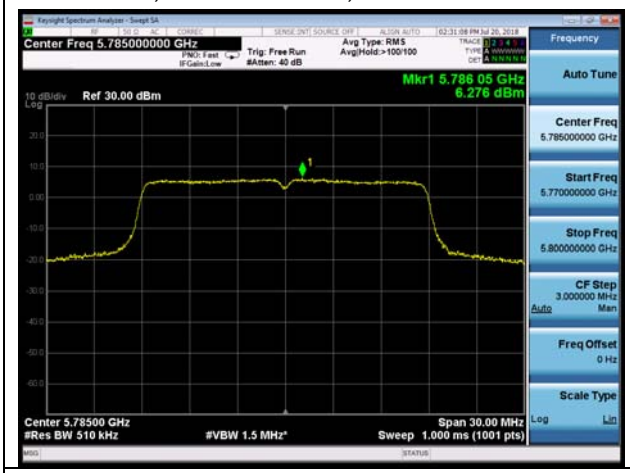
U-NII-3, 802.11n HT20, Channel No.: 149



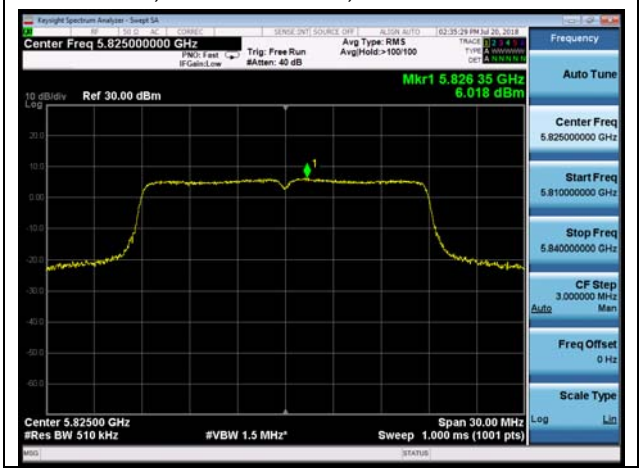
U-NII-3, 802.11n HT40, Channel No.: 151

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



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

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



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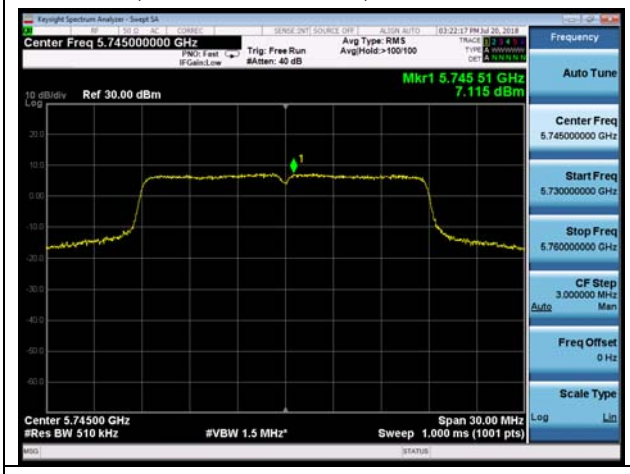
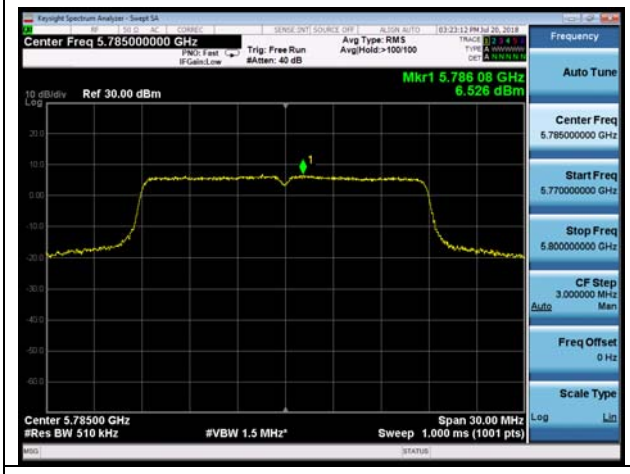
U-NII-3, 802.11ac VHT20, Channel No.: 149



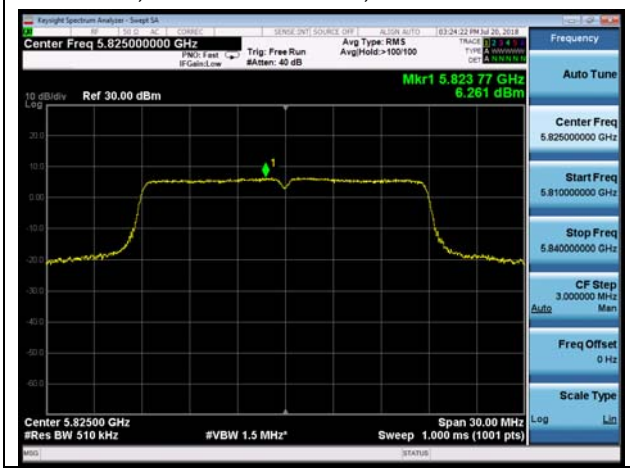
U-NII-3, 802.11ac VHT40, Channel No.: 151

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



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

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



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

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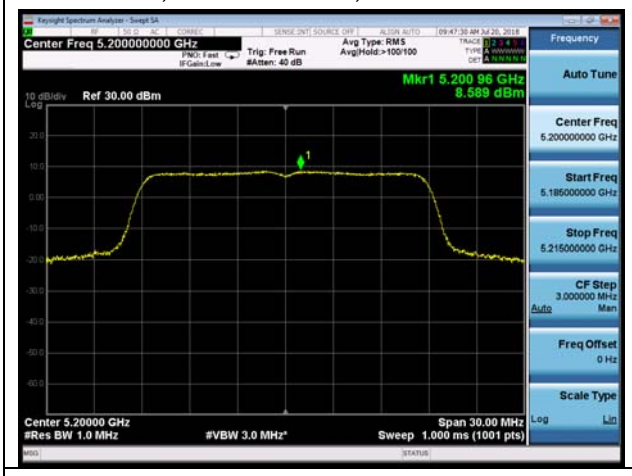
Antenna 3

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

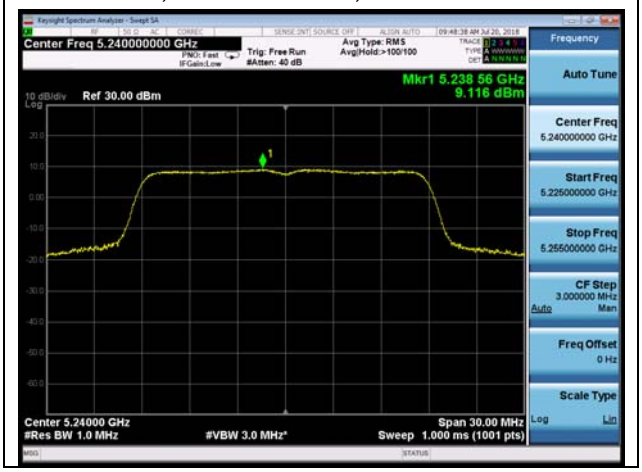
U-NII-1, 802.11n HT40, Channel No.: 38

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



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

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



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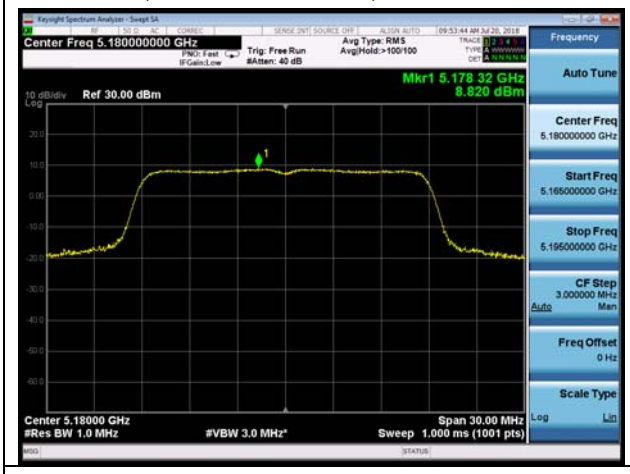
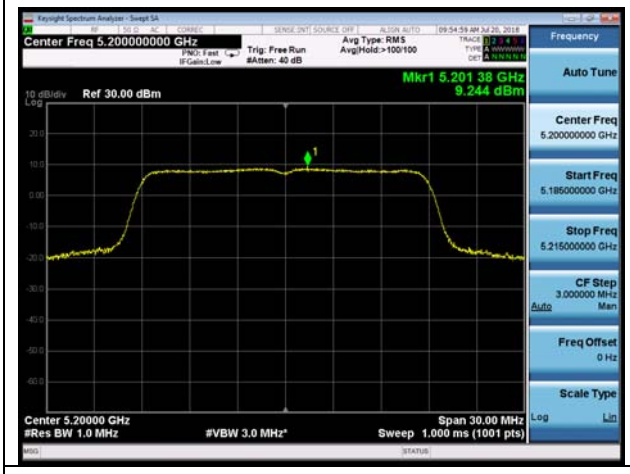
U-NII-1, 802.11ac VHT20, Channel No.: 36



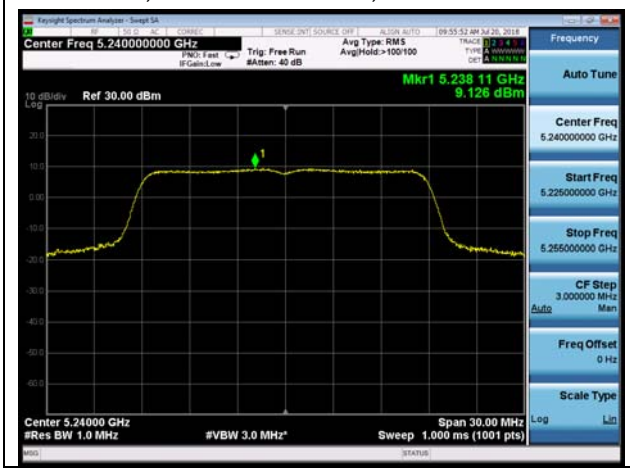
U-NII-1, 802.11ac VHT40, Channel No.: 38

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



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

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



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

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