RF TEST REPORT

Applicant	Nokia ShangHai Bell Co., Ltd.
FCC ID	2ADZRG1425GB
Product	Nokia ONT
Brand	NOKIA
Model	G-1425G-B
Report No.	R2111A0997-R2V1
Issue Date	June 6, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15E (2021)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Prepared by: Peng Tao

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

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

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

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

TABLE OF CONTENT

Version	Revision description	Issue Date
Rev.0	Initial issue of report.	April 27, 2022
Rev.1	Update information.	June 6, 2022
Note: This revised report (Report No. R2111A0997-R2V1) supersedes and replaces the previously issued report (Report No. R2111A0997-R2). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of measurement results

Number	Test Case	Clause in FCC rules	Verdict
1	Average 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: January 20, 2022 ~ April 15, 2022 Date of Sample Received: December 11, 2021			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

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.

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

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

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	Nokia ShangHai Bell Co., Ltd.
Applicant address	No. 388, Ningqiao Rd. Pilot Free Trade Zone, Shanghai, China
Manufacturer 1	TAICANG T&W ELECTRONICS CO., LTD
Manufacturer address 1	89# Jiang Nan RD, Lu Du TownTaicang, Jiangsu, China
Manufacturer 2	Shenzhen Twowing Technologies CO., LTD
Manufacturer address 2	Nangang industrial building, No.3 Industrial Zone, Tangtou village, Shiyan Town, Bao'an District,Shenzhen City,Guangdong Province, China

2.2. General information

EUT Description			
Model	G-1425G-B		
Lab internal SN	R2111A0997/S01		
Hardware Version	PEM1		
Software Version	3FE49568HJJI31		
Power Supply	AC Adapter		
Antenna Type	External Antenna		
Directional Gain	Antenna	Frequency(MHz)	Gain (dBi)
	MIMO (For Power)	5150~5250	4.60
		5250~5350	4.60
		5470~5725	5.00
		5725~5850	4.70
	MIMO (For PSD)	5150~5250	5.40
		5250~5350	5.40
		5470~5725	5.60
		5725~5850	5.60
	Beamforming (For Power)	5150~5250	4.60
		5250~5350	4.60
		5470~5725	5.00
		5725~5850	4.70
	Beamforming (For PSD)	5150~5250	5.30
		5250~5350	5.30
		5470~5725	5.50
		5725~5850	5.40
Operating Frequency Range(s)	U-NII-1: 5150MHz-5250MHz U-NII-2A:5250MHz -5350MHz U-NII-2C:5470MHz-5725MHz		

	U-NII-3: 5725MHz -5850MHz
Modulation Type	802.11a/n (HT20/HT40) : OFDM 802.11ac (VHT20/VHT40/VHT80): OFDM
Max. Conducted Power	26.78dBm
Testing temperature range:	-20 ° C to 50° C
Operating temperature range:	-5 ° C to 45° C
Operating voltage range:	10 V to 14V
State DC voltage:	12V
EUT Accessory	
Adapter 1	Manufacturer: Dongguan Shilong Fuhua Electronics Co.,Ltd Model: UES24WU-120200SPA
Adapter 2	Manufacturer: MOSO Power Supply Technology Co.,Ltd Model: MSA-C1500CS12.0-18J-US
Adapter 3	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL Co.,Ltd Model: RD1201500-C55-153YG
Adapter 4	Manufacturer: Dongguan Shilong Fuhua Electronics Co.,Ltd Model: UES18LB-120150SPA
Adapter 5	Manufacturer: Dongguan Shilong Fuhua Electronics Co.,Ltd Model: UES18LU-120150SPA
Adapter 6	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL Co.,Ltd Model: RD1201500-C55-153MG
Adapter 7	Manufacturer: ShenZhen SOY Technology Co.,Ltd Model: SOY-1200300-3014-II
Adapter 8	Manufacturer: ShenZhen Mass Power Electronic Limited Model: NBS40C120300M2
Adapter 9	Manufacturer: Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL Co.,Ltd Model: RD1201500-C55-198MG
Adapter 10	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL Co.,Ltd Model: RD1201500-C55-198OG
Adapter 11	Manufacturer: SHENZHEN RUIDE ELECTRONICAL INDUSTRIAL Co.,Ltd Model: RD1201500-C55-198YG
Adapter 12	Manufacturer: ShenZhen SOY Technology Co.,Ltd Model: SOY-1200150AR
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.	

Configure		Configure 1	Configure 2
Item		G-1425G-B	G-1425G-B 2nd
DDR	MPN	NT5CC256M16ER-EK	K4B4G1646E-BYMA
	Vendor	Nanya	Samsung
Flash	MPN	MT29F2G01ABAGDWB-IT:G	TC58CVG1S3HRAIJ
	Vendor	Micron	Kioxia
PCB	Vendor	JIANGMEN BENLIDA PRINTED CIRCUIT CO.,LTD	Mei Zhou Dingtai Circait Board Co,.Ltd
schematic		The same	
The difference between the two configures is only the DDR, Flash and PCB. Configure 2 verifies power only. The power of configure 2 are varied due to measurement uncertainty, and sample tolerance of the acceptance range and the report only records data for configuration 1.			

The detailed product change description please refers to the Difference Declaration Letter.

Information of Configuration:

ONT Mnemonic	Kit Code	EMA Code	Part Description
G-1425G-B	3FE49881XXXX (X can be A-Z or blank)	3FE49937XXXX (X can be A-Z or blank)	GPON ONT,1xPOTS,4xGE UNI, WIFI 5, 2x2 11n + 2x2 11ac

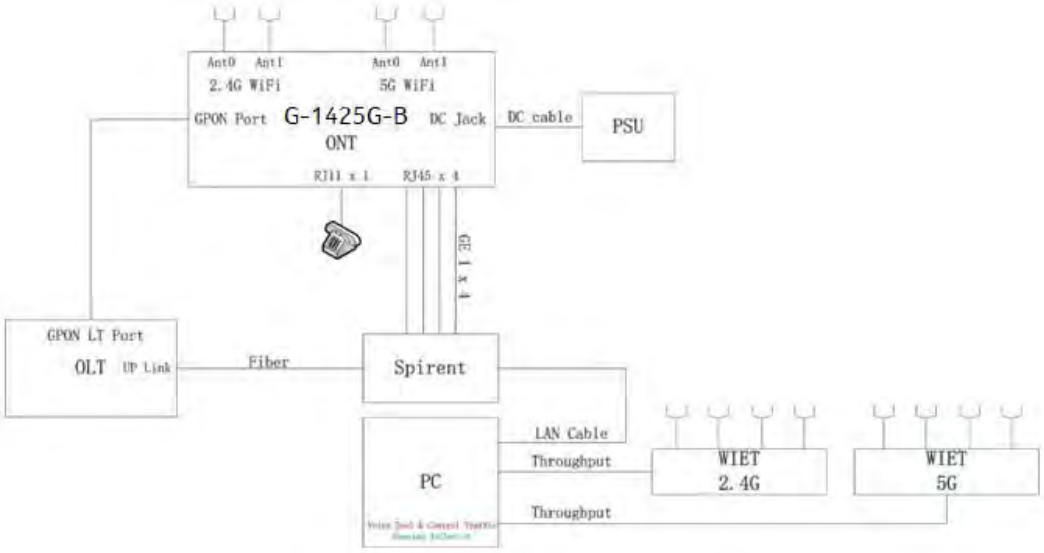
No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1.1	EMA-G-1425G-B	3FE49937XXXX (X can be A-Z or blank)	PEM2	-
2.1	Power adapter	MSA-C1500CS12.0-18J-US	/	PEM
2.2	Power adapter	UES24WU-120200SPA	/	PEM
2.3	Power adapter	UES18LU-120150SPA	/	PEM
2.4	Power adapter	RD1201500-C55-153MG	/	PEM
2.5	Power adapter	RD1201500-C55-153YG	/	PEM
2.6	Power adapter	UES18LB-120150SPA	/	PEM
2.7	Power adapter	SOY-1200300-3014-II	/	PEM
2.8	Power adapter	NBS40C120300M2	/	PEM
2.9	Power adapter	RD1201500-C55-198MG	/	PEM
2.10	Power adapter	RD1201500-C55-198OG	/	PEM
2.11	Power adapter	RD1201500-C55-198YG	/	PEM
2.12	Power adapter	SOY-1200150AR	/	PEM

Auxiliary equipment details

No.	Name	Brand name	Model	NSB code	Valid Until
1	Test Center	Spirent	DE48E0	DC2228	2012.12.20
2	PC	Lenovo	T61	7661MC4L3KW965	No Cal. Required
3	OLT	Nokia	N.A	--	No Cal. Required
4	Phone	N.A	N.A	-	No Cal. Required

Information of Ports

No.	Port name	Number	Shielded or unshielded	Cable type (optic, twisted pair, etc.)	Max. Cable length
1	LAN1	/	Unshielded	CAT5E	/
2	LAN2	/	Unshielded	CAT5E	/
3	LAN3	/	Unshielded	CAT5E	/
4	LAN4	/	Unshielded	CAT5E	/
5	TEL1	/	Unshielded	twisted pair	/



3. Applied Standards

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

Test standards:

FCC CFR47 Part 15E (2021) Unlicensed National Information Infrastructure Devices

ANSI C63.10 (2013)

Reference standard:

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.

Mode	Data Rate	
	MIMO	Beamforming
802.11a	6 Mbps	6 Mbps
802.11n HT20	MCS8	MCS8
802.11n HT40	MCS8	MCS8
802.11ac VHT20	MCS0	MCS0
802.11ac VHT40	MCS0	MCS0
802.11ac VHT80	MCS0	MCS0

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

Test Cases	MIMO	Beamforming
Average conducted output power	O	O
Occupied bandwidth	O	--
Frequency stability	O	--
Power Spectral Density	O	O
Unwanted Emissions	O	--
Conducted Emissions	O	--
Note: “O”: test all bands		

Wireless Technology and Frequency Range

Wireless Technology		Bandwidth	Channel	Frequency
Wi-Fi	U-NII-1	20 MHz	36	5180MHz
			40	5200MHz
			44	5220MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-2A	20 MHz	52	5260MHz
			56	5280MHz
			60	5300MHz
			64	5320MHz
		40 MHz	54	5270MHz
			62	5310MHz
		80 MHz	58	5290MHz
	U-NII-2C	20 MHz	100	5500MHz
			104	5520MHz
			108	5540MHz
			112	5560MHz
			120	5600MHz
			124	5620MHz
			128	5640MHz
			132	5660MHz
			136	5680MHz
			140	5700MHz
		40 MHz	102	5510MHz
			110	5550MHz
			118	5590MHz
			126	5630MHz
			134	5670MHz
		80 MHz	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.

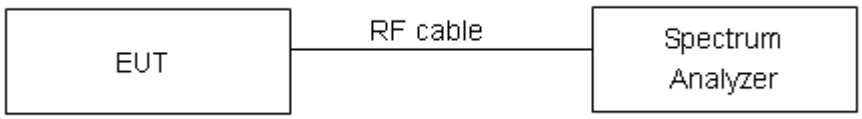
For U-NII-1/U-NII-2A/U-NII-2C, set RBW ≈1% OCB kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the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

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	36/5180	16.58	20.16	PASS
	40/5200	16.57	20.04	PASS
	48/5240	16.59	19.80	PASS
802.11n HT20	36/5180	17.73	22.95	PASS
	40/5200	17.74	22.88	PASS
	48/5240	23.07	30.00	PASS
802.11n HT40	38/5190	35.91	39.86	PASS
	46/5230	36.30	59.97	PASS
802.11ac VHT20	36/5180	17.69	23.93	PASS
	40/5200	17.70	21.18	PASS
	48/5240	23.15	30.00	PASS
802.11ac VHT40	38/5190	35.93	39.71	PASS
	46/5230	36.33	58.43	PASS
802.11ac VHT80	42/5210	75.28	79.42	PASS

U-NII-2A

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	52/5260	16.69	23.06	PASS
	60/5300	17.06	30.00	PASS
	64/5320	16.53	19.59	PASS
802.11n HT20	52/5260	17.80	24.86	PASS
	60/5300	17.79	27.18	PASS
	64/5320	17.80	25.05	PASS
802.11n HT40	54/5270	36.82	60.00	PASS
	62/5310	35.88	39.78	PASS
802.11ac VHT20	52/5260	17.71	25.28	PASS
	60/5300	17.80	27.35	PASS
	64/5320	17.74	27.20	PASS
802.11ac VHT40	54/5270	36.83	59.81	PASS
	62/5310	35.96	39.82	PASS
802.11ac VHT80	58/5290	75.26	79.63	PASS

U-NII-2C

Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	100/5500	16.66	24.32	PASS
	120/5600	16.59	19.78	PASS
	140/5700	16.55	19.59	PASS
	144/5720	16.60	19.81	PASS
802.11n HT20	100/5500	17.75	26.32	PASS
	120/5600	17.77	26.23	PASS
	140/5700	17.72	20.80	PASS
	144/5720	17.81	27.99	PASS
802.11n HT40	102/5510	35.93	40.09	PASS
	118/5590	36.60	60.00	PASS
	134/5670	36.17	58.29	PASS
	142/5710	36.81	60.00	PASS
802.11ac VHT20	100/5500	17.70	25.32	PASS
	120/5600	17.74	24.26	PASS
	140/5700	17.64	20.37	PASS
	144/5720	17.83	27.57	PASS
802.11ac VHT40	102/5510	36.00	39.88	PASS
	118/5590	36.68	59.94	PASS
	134/5670	36.25	56.08	PASS
	142/5710	36.99	60.00	PASS
802.11ac VHT80	122/5610	77.01	120.00	PASS
	138/5690	79.24	120.00	PASS

U-NII-3

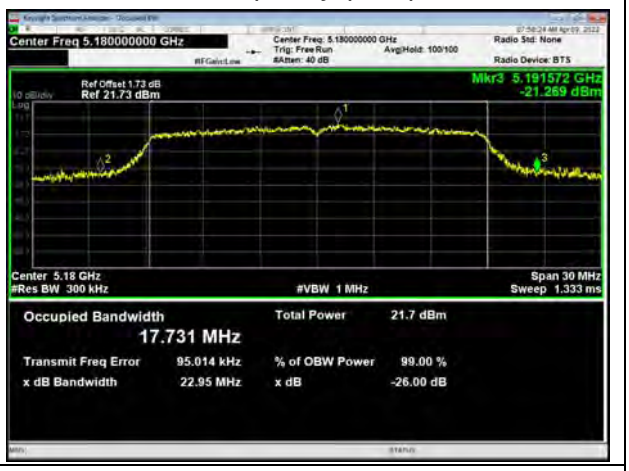
Mode	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5745	17.21	15.05	500	PASS
	5785	19.20	15.09	500	PASS
	5825	24.00	15.09	500	PASS
802.11n HT20	5745	19.37	13.74	500	PASS
	5785	26.23	16.50	500	PASS
	5825	26.20	17.23	500	PASS
802.11n HT40	5755	38.26	33.83	500	PASS
	5795	41.06	35.01	500	PASS
802.11ac VHT20	5745	19.28	15.78	500	PASS
	5785	26.55	16.17	500	PASS
	5825	26.08	16.18	500	PASS
802.11ac VHT40	5755	37.98	34.99	500	PASS
	5795	39.76	35.06	500	PASS
802.11ac VHT80	5775	75.74	75.11	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

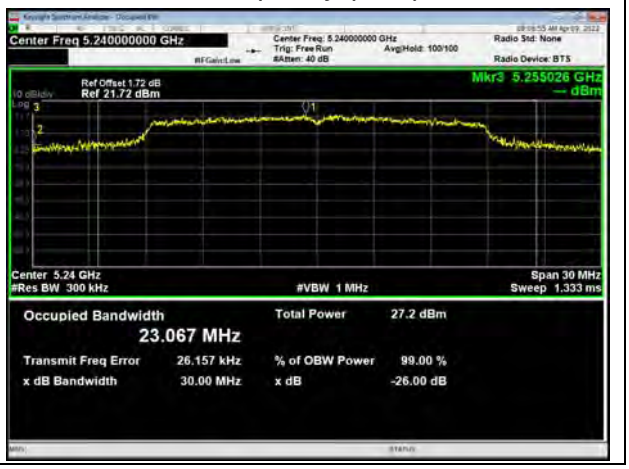
Carrier frequency (MHz): 5200

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

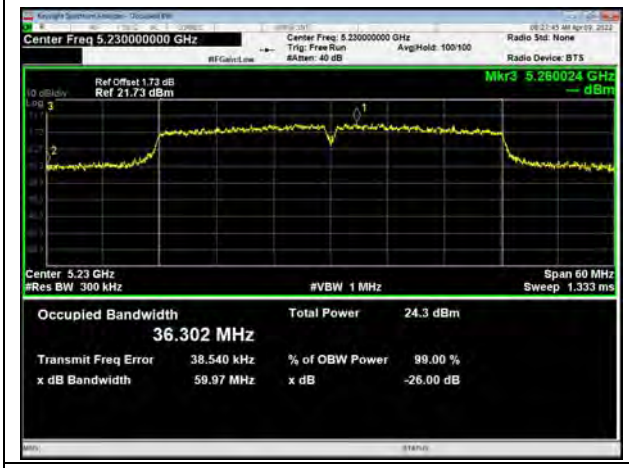
Carrier frequency (MHz): 5190

U-NII-1, 802.11ac VHT20

Carrier frequency (MHz): 5180

U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5230



U-NII-1, 802.11ac VHT20

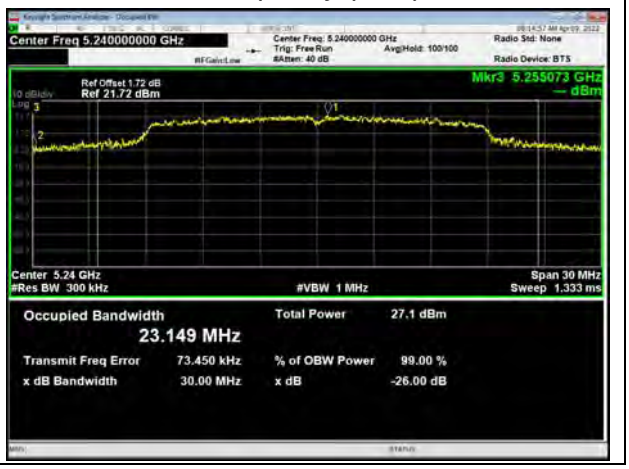
Carrier frequency (MHz): 5200

U-NII-1, 802.11ac VHT40

Carrier frequency (MHz): 5190

U-NII-1, 802.11ac VHT20

Carrier frequency (MHz):5240

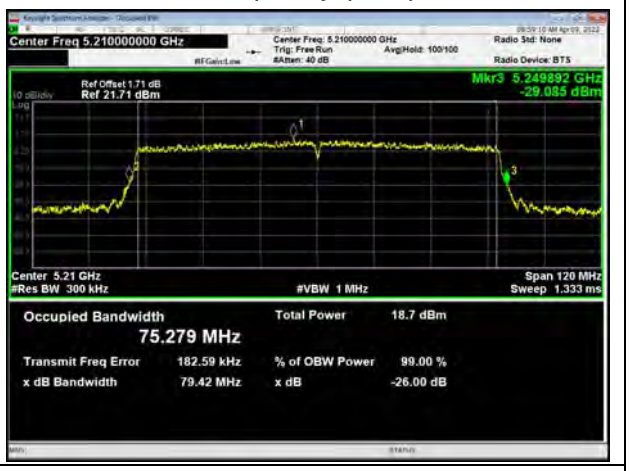


U-NII-1, 802.11ac VHT40

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

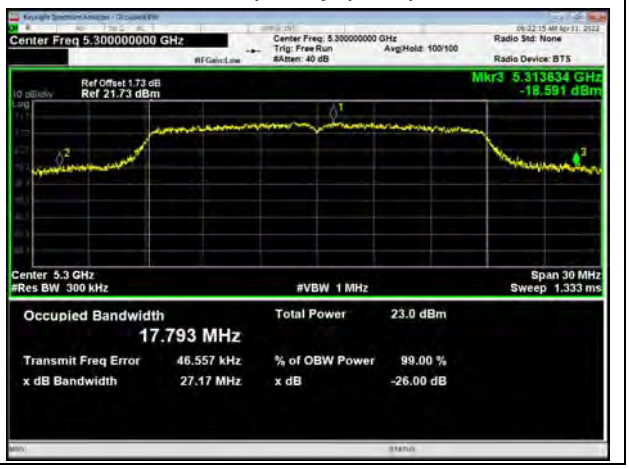
Carrier frequency (MHz): 5260

U-NII-2A, 802.11a

Carrier frequency (MHz): 5300

U-NII-2A, 802.11n HT20

Carrier frequency (MHz): 5300

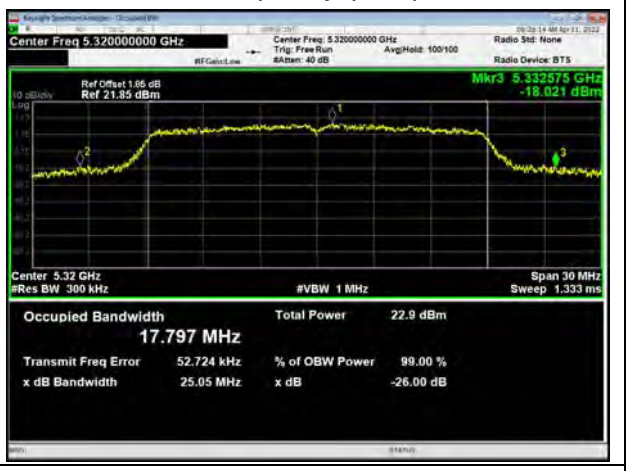


U-NII-2A, 802.11a

Carrier frequency (MHz):5320

U-NII-2A, 802.11n HT20

Carrier frequency (MHz):5320

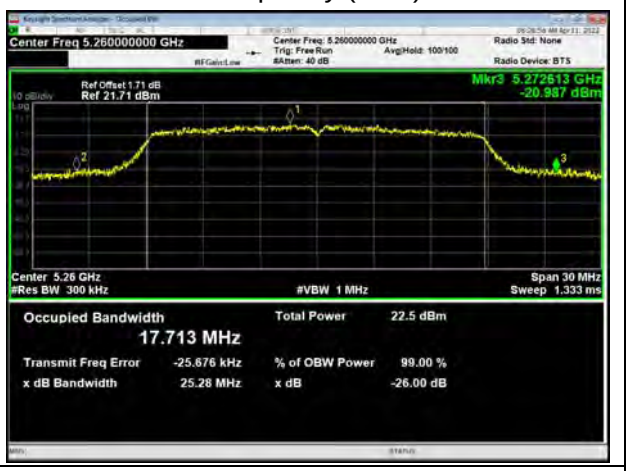


U-NII-2A, 802.11n HT40

Carrier frequency (MHz): 5270

U-NII-2A, 802.11ac VHT20

Carrier frequency (MHz):5260

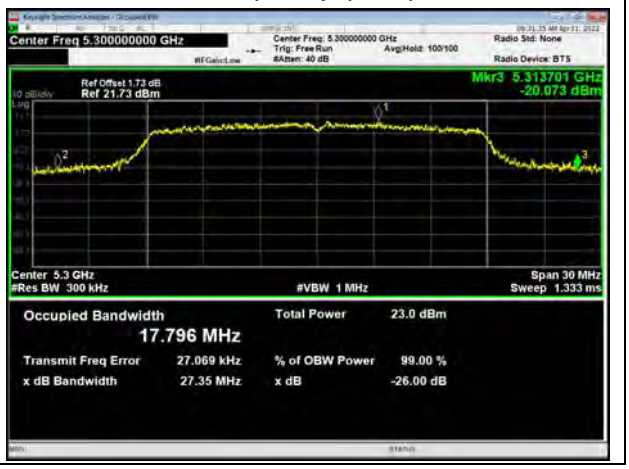


U-NII-2A, 802.11n HT40

Carrier frequency (MHz): 5310

U-NII-2A, 802.11ac VHT20

Carrier frequency (MHz): 5300

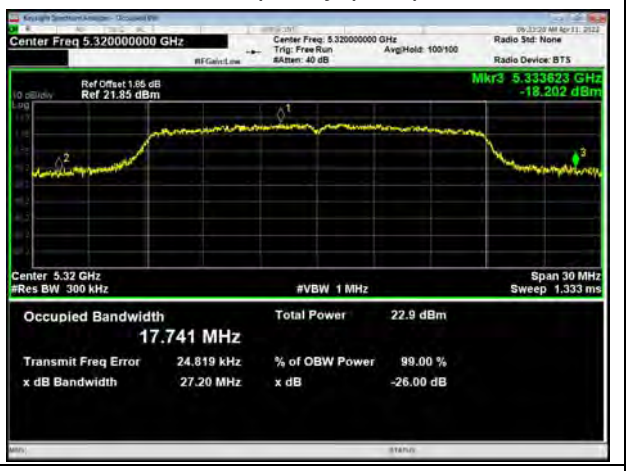


U-NII-2A, 802.11ac VHT40

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

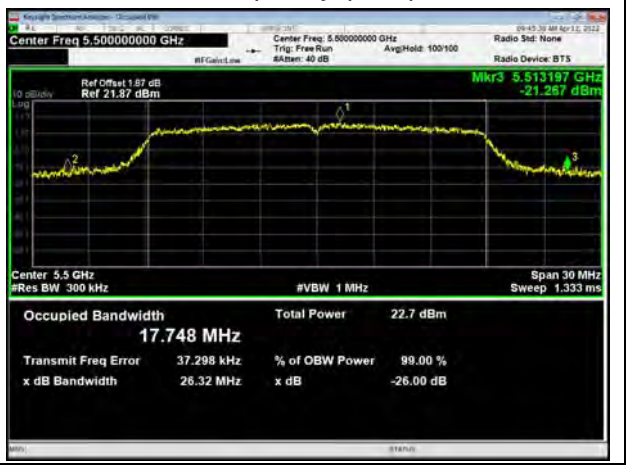
Carrier frequency (MHz): 5290

U-NII-2C, 802.11a

Carrier frequency (MHz): 5500

U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5500

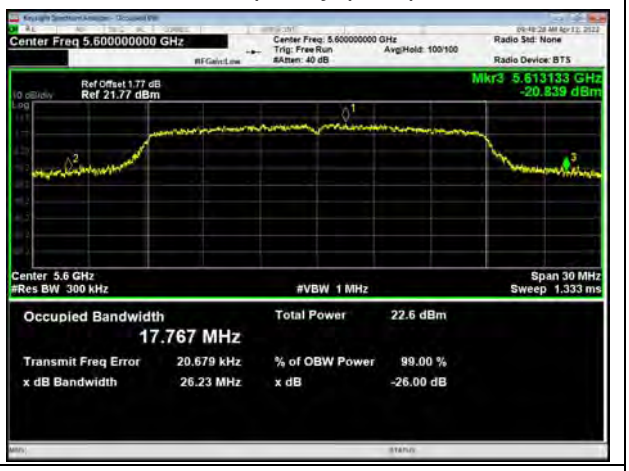


U-NII-2C, 802.11a

Carrier frequency (MHz): 5600

U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5600



U-NII-2C, 802.11a

Carrier frequency (MHz): 5700

U-NII-2C, 802.11n HT20

Carrier frequency (MHz): 5700

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): 5510

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

U-NII-2C, 802.11n HT40
Carrier frequency (MHz): 5590

U-NII-2C, 802.11ac VHT20
Carrier frequency (MHz): 5600

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

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

U-NII-2C, 802.11n HT40
Carrier frequency (MHz): 5710

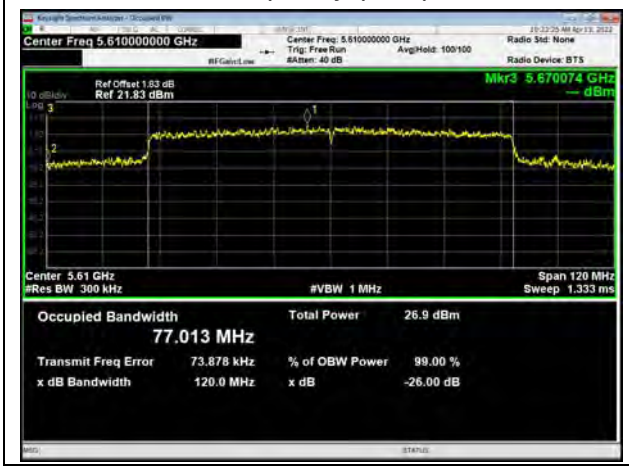
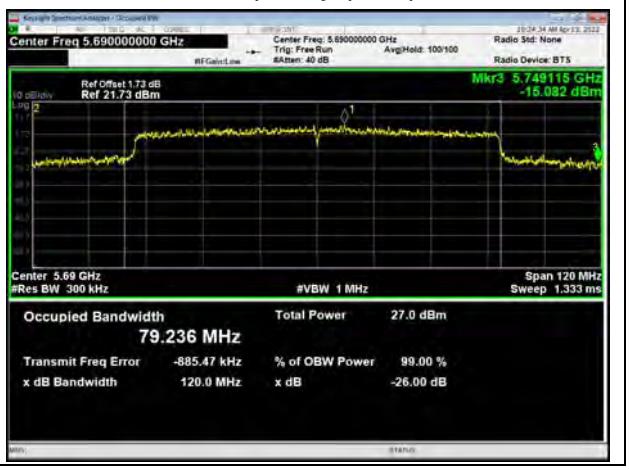
U-NII-2C, 802.11ac VHT20
Carrier frequency (MHz): 5720

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

U-NII-2C, 802.11ac VHT40
Carrier frequency (MHz): 5590

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

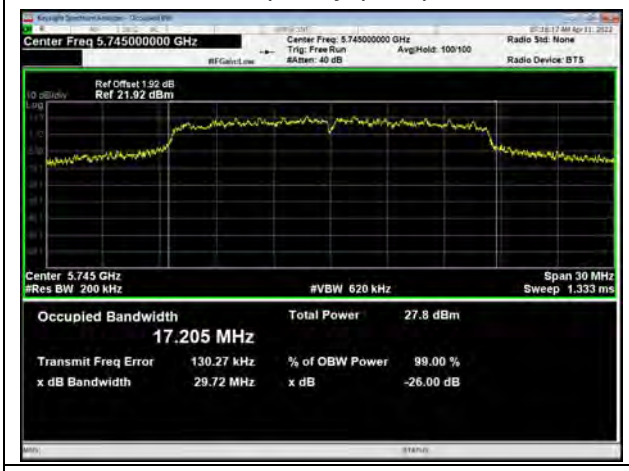
U-NII-2C, 802.11ac VHT40
Carrier frequency (MHz): 5710

U-NII-2C, 802.11ac VHT80 Carrier frequency (MHz): 5610	U-NII-2C, 802.11ac VHT80 Carrier frequency (MHz): 5690
	

99% bandwidth

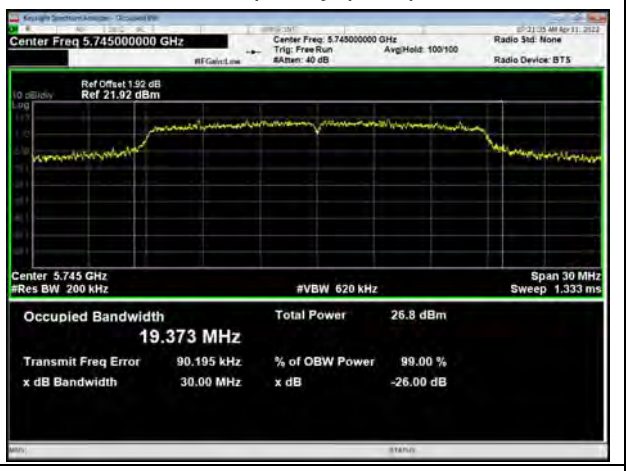
U-NII-3, 802.11a

Carrier frequency (MHz): 5745



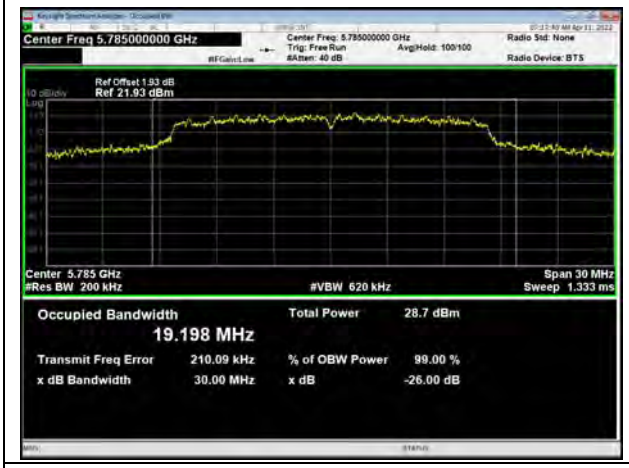
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



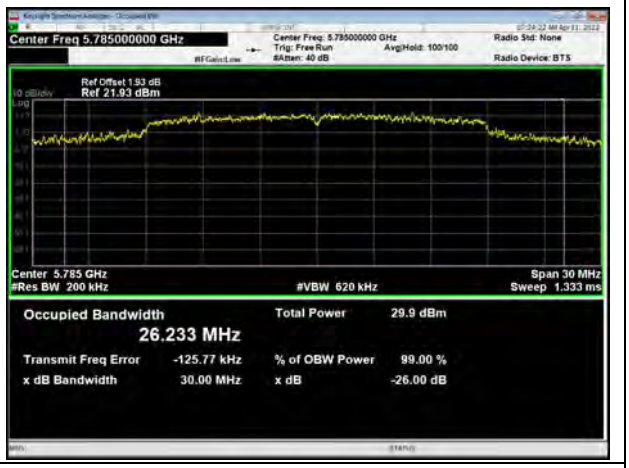
U-NII-3, 802.11a

Carrier frequency (MHz): 5785



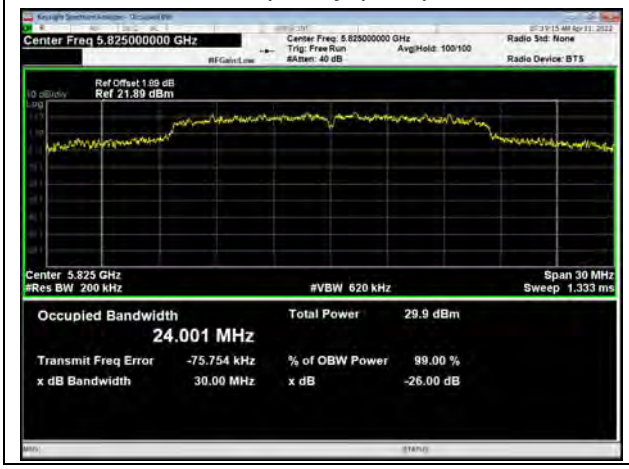
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



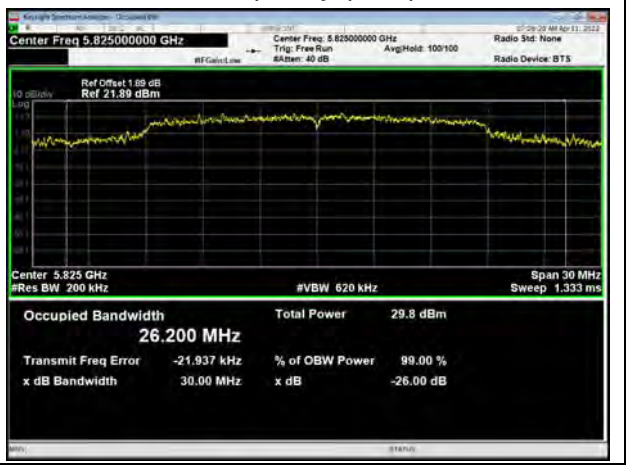
U-NII-3, 802.11a

Carrier frequency (MHz): 5825



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825

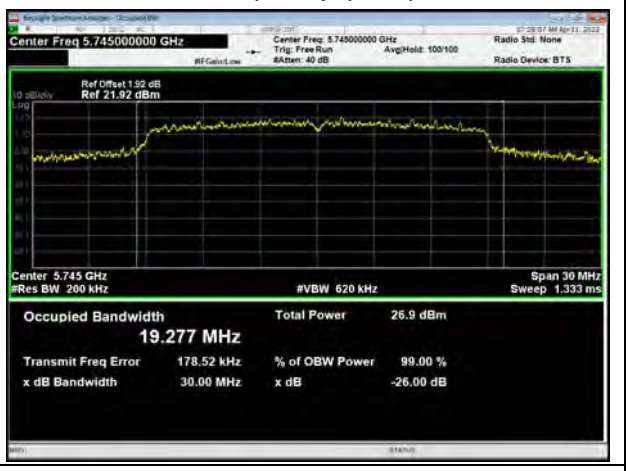


U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5745

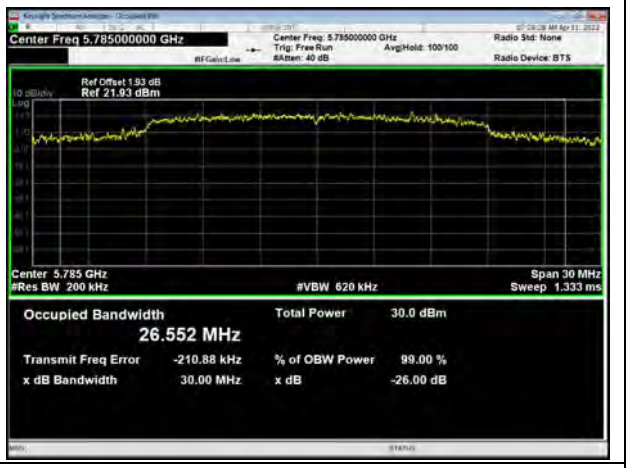


U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5785

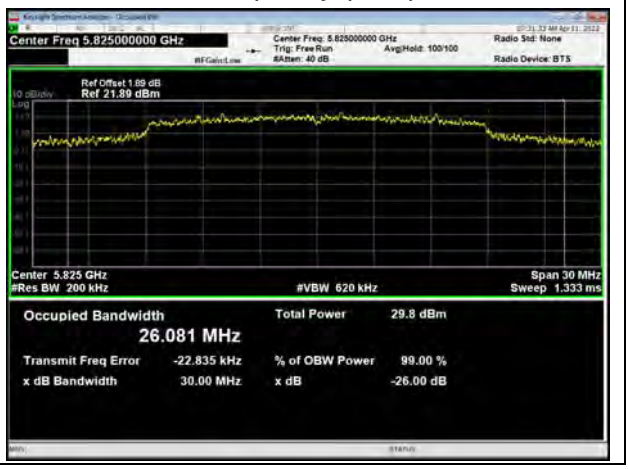


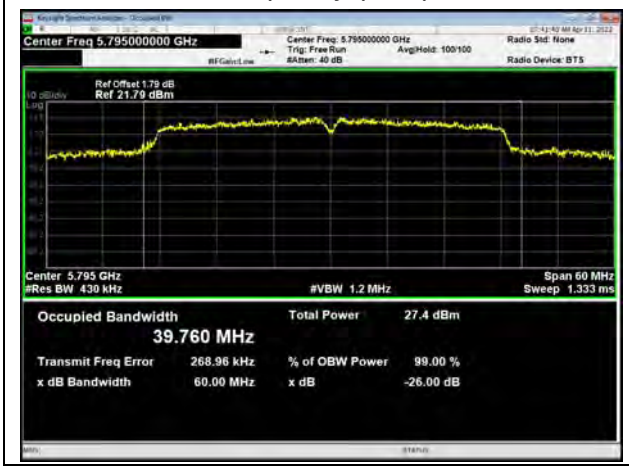
U-NII-3, 802.11ac VHT40

Carrier frequency (MHz): 5755

U-NII-3, 802.11ac VHT20

Carrier frequency (MHz): 5825

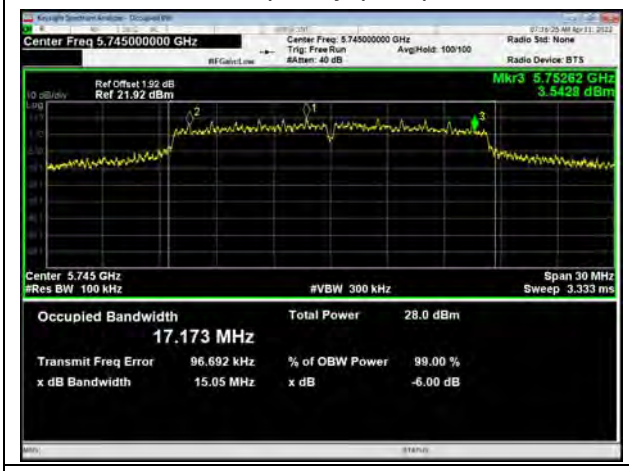


U-NII-3, 802.11ac VHT40 Carrier frequency (MHz): 5795	U-NII-3, 802.11ac VHT80 Carrier frequency (MHz): 5775
	

Minimum 6 dB bandwidth

U-NII-3, 802.11a

Carrier frequency (MHz): 5745

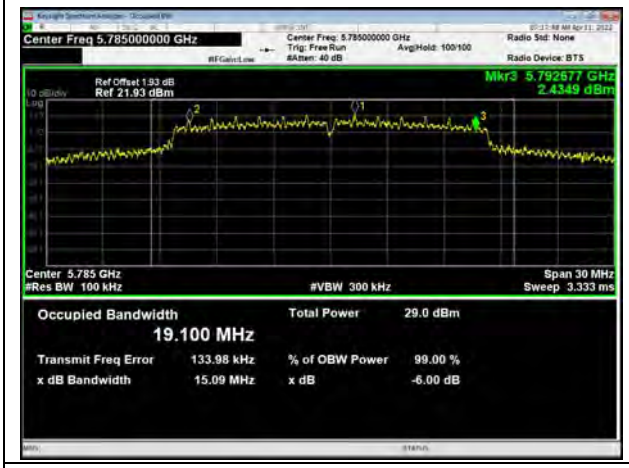


U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745

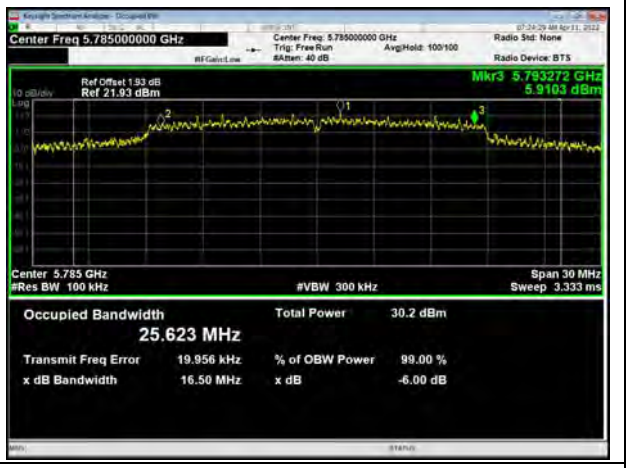
U-NII-3, 802.11a

Carrier frequency (MHz): 5785



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



U-NII-3, 802.11a

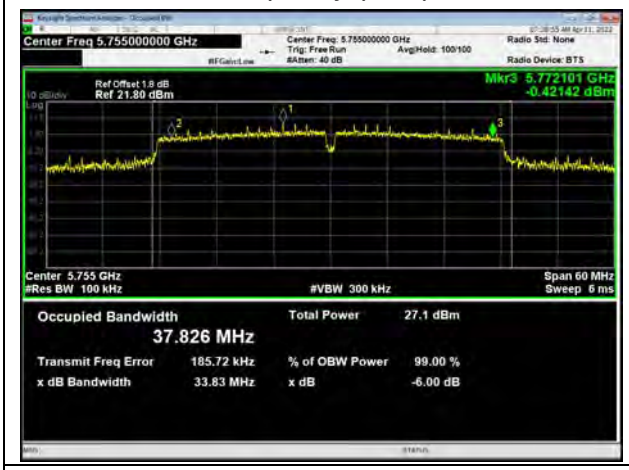
Carrier frequency (MHz): 5825

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

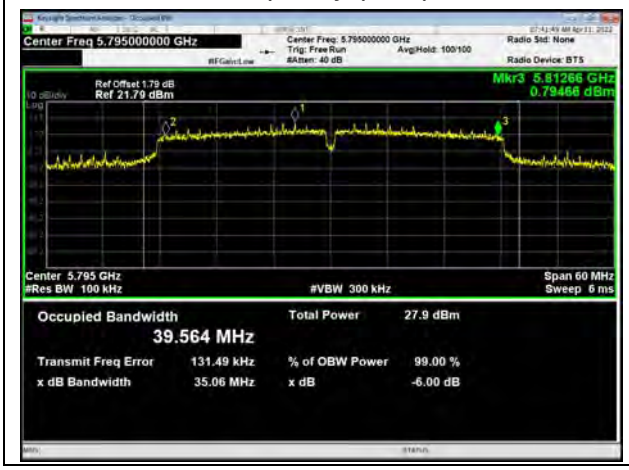
Carrier frequency (MHz): 5785

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

Ambient condition

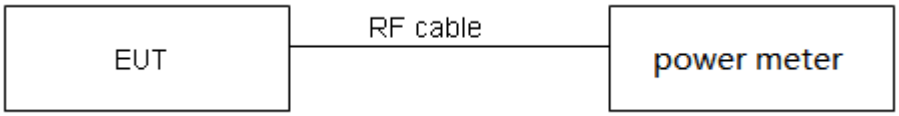
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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

Mode	T_{on} (ms)	$T_{(on+off)}$ (ms)	Duty cycle	Duty cycle correction Factor(dB)
802.11a	0.19	0.23	0.83	0.83
802.11n HT20	1.30	1.34	0.97	0.13
802.11n HT40	0.64	0.68	0.94	0.26
802.11ac VHT20	1.19	1.24	0.96	0.18
802.11ac VHT40	0.59	0.64	0.92	0.35
802.11ac VHT80	0.30	0.34	0.88	0.54
Note: when Duty cycle≥0.98, Duty cycle correction Factor not required.				

Test Mode		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	23.06	24.63>24	24.00
		60/5300	30.00	25.77>24	24.00
		64/5320	19.59	23.92<24	23.92
	802.11n HT20	52/5260	24.86	24.95>24	24.00
		60/5300	27.18	25.34>24	24.00
		64/5320	25.05	24.99>24	24.00
	802.11n HT40	54/5270	60.00	28.78>24	24.00
		62/5310	39.78	27.00>24	24.00
	802.11ac VHT20	52/5260	25.28	25.03>24	24.00
		60/5300	27.35	25.37>24	24.00
		64/5320	27.20	25.35>24	24.00
	802.11ac VHT40	54/5270	59.81	28.77>24	24.00
		62/5310	39.82	27.00>24	24.00
	802.11ac VHT80	58/5290	79.63	30.01>24	24.00
U-NII-2C	802.11a	100/5500	24.32	24.86>24	24.00
		120/5600	19.78	23.96<24	23.96
		140/5700	19.59	23.92<24	23.92
		144/5720	19.81	23.97<24	23.97
	802.11n HT20	100/5500	26.32	25.20>24	24.00
		120/5600	26.23	25.19>24	24.00
		140/5700	20.80	24.18>24	24.00
		144/5720	27.99	25.47>24	24.00
	802.11n HT40	102/5510	40.09	27.03>24	24.00
		118/5590	60.00	28.78>24	24.00
		134/5670	58.29	28.66>24	24.00
		142/5710	60.00	28.78>24	24.00
	802.11ac	100/5500	25.32	25.03>24	24.00

	VHT20	120/5600	24.26	24.85>24	24.00
		140/5700	20.37	24.09>24	24.00
		144/5720	27.57	25.40>24	24.00
	802.11ac VHT40	102/5510	39.88	27.01>24	24.00
		118/5590	59.94	28.78>24	24.00
		134/5670	56.08	28.49>24	24.00
		142/5710	60.00	28.78>24	24.00
	802.11ac VHT80	122/5610	120.00	31.79>24	24.00
		138/5690	120.00	31.79>24	24.00
Note: 250mW=24dBm					

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

MIMO

U-NII-1

Test Mode	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	13.79	14.62	15.33	16.16	18.47	30.00	PASS
	44/5220	13.87	14.70	15.43	16.26	18.56	30.00	PASS
	48/5240	14.43	15.26	15.96	16.79	19.10	30.00	PASS
802.11n HT20	36/5180	15.90	16.03	17.74	17.87	20.06	30.00	PASS
	44/5220	16.35	16.48	18.03	18.16	20.41	30.00	PASS
	48/5240	21.28	21.41	22.73	22.87	25.21	30.00	PASS
802.11n HT40	38/5190	14.13	14.39	15.85	16.11	18.35	30.00	PASS
	46/5230	18.51	18.77	19.90	20.16	22.53	30.00	PASS
802.11ac VHT20	36/5180	16.02	16.19	17.55	17.72	20.04	30.00	PASS
	44/5220	16.49	16.67	18.04	18.22	20.52	30.00	PASS
	48/5240	21.27	21.45	22.64	22.82	25.20	30.00	PASS
802.11ac VHT40	38/5190	14.06	14.41	15.76	16.11	18.35	30.00	PASS
	46/5230	18.41	18.76	19.83	20.18	22.54	30.00	PASS
802.11ac VHT80	42/5210	12.31	12.85	13.20	13.75	16.33	30.00	PASS

Note: 1. Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain =4.60dBi<6dBi. So the power limit is 30dBm.

U-NII-2A

Test Mode	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	16.81	17.64	17.44	18.27	20.98	24.00	PASS
	60/5300	15.99	16.82	15.31	16.14	19.50	24.00	PASS
	64/5320	15.91	16.74	15.21	16.04	19.42	23.92	PASS
802.11n HT20	52/5260	16.73	16.86	17.47	17.60	20.26	24.00	PASS
	60/5300	17.22	17.35	17.12	17.25	20.31	24.00	PASS
	64/5320	17.08	17.21	16.87	17.00	20.12	24.00	PASS
802.11n HT40	54/5270	19.57	19.84	20.36	20.62	23.26	24.00	PASS
	62/5310	15.69	15.95	15.28	15.54	18.76	24.00	PASS
802.11ac VHT20	52/5260	16.72	16.90	17.40	17.58	20.26	24.00	PASS
	60/5300	17.28	17.46	17.01	17.19	20.34	24.00	PASS
	64/5320	17.10	17.28	16.70	16.88	20.09	24.00	PASS
802.11ac VHT40	54/5270	19.49	19.84	20.28	20.64	23.27	24.00	PASS
	62/5310	15.59	15.94	15.15	15.51	18.74	24.00	PASS
802.11ac VHT80	58/5290	11.74	12.29	12.29	12.84	15.58	24.00	PASS

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

U-NII-2C

Test Mode	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	15.07	15.90	14.78	15.61	18.77	24.00	PASS
	120/5600	15.50	16.33	16.41	17.24	19.82	23.96	PASS
	140/5700	15.08	15.91	14.27	15.10	18.54	23.92	PASS
	144/5720	16.06	16.89	15.16	15.99	19.47	23.97	PASS
802.11n HT20	100/5500	16.90	17.03	17.18	17.31	20.18	24.00	PASS
	120/5600	16.74	16.87	17.41	17.54	20.23	24.00	PASS
	140/5700	15.47	15.60	14.96	15.09	18.36	24.00	PASS
	144/5720	17.64	17.77	17.15	17.28	20.54	24.00	PASS
802.11n HT40	102/5510	15.89	16.15	15.70	15.96	19.07	24.00	PASS
	118/5590	19.81	20.07	17.89	18.15	22.23	24.00	PASS
	134/5670	17.69	17.95	17.48	17.74	20.86	24.00	PASS
	142/5710	20.34	20.61	19.70	19.96	23.31	24.00	PASS
802.11ac VHT20	100/5500	16.928	17.11	17.17	17.35	20.24	24.00	PASS
	120/5600	16.822	17.00	17.38	17.55	20.30	24.00	PASS
	140/5700	15.565	15.74	14.89	15.07	18.43	24.00	PASS
	144/5720	17.421	17.60	16.80	16.98	20.31	24.00	PASS
802.11ac VHT40	102/5510	15.954	16.31	15.63	15.98	19.16	24.00	PASS
	118/5590	19.785	20.14	20.26	20.61	23.39	24.00	PASS
	134/5670	17.732	18.09	17.55	17.91	21.01	24.00	PASS
	142/5710	20.423	20.78	19.71	20.07	23.45	24.00	PASS
802.11ac VHT80	122/5610	20.168	20.71	20.48	21.02	23.88	24.00	PASS
	138/5690	20.344	20.89	20.18	20.72	23.82	24.00	PASS

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

U-NII-3

Test Mode	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	20.77	21.60	20.90	21.73	24.68	30.00	PASS
	157/5785	21.66	22.49	21.40	22.23	25.37	30.00	PASS
	165/5825	22.57	23.40	22.27	23.09	26.26	30.00	PASS
802.11n HT20	149/5745	20.81	20.94	20.66	20.79	23.88	30.00	PASS
	157/5785	23.47	23.60	23.79	23.93	26.78	30.00	PASS
	165/5825	23.23	23.36	23.41	23.54	26.46	30.00	PASS
802.11n HT40	151/5755	20.56	20.82	20.25	20.51	23.68	30.00	PASS
	159/5795	21.11	21.37	20.86	21.13	24.26	30.00	PASS
802.11ac VHT20	149/5745	20.82	21.00	20.55	20.72	23.87	30.00	PASS
	157/5785	23.51	23.69	23.44	23.61	26.66	30.00	PASS
	165/5825	23.33	23.51	23.48	23.65	26.59	30.00	PASS
802.11ac VHT40	151/5755	20.45	20.81	20.32	20.67	23.75	30.00	PASS
	159/5795	21.07	21.42	20.83	21.18	24.31	30.00	PASS
802.11ac VHT80	155/5775	17.88	18.42	17.55	18.10	21.27	30.00	PASS

Note: 1. Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain =4.70dBi<6dBi. So the power limit is 30dBm.

Beamforming

U-NII-1

Test Mode	Channel/ Frequency (MHz)	Beamforming Antenna 1		Beamforming 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	13.95	14.78	14.57	15.40	18.11	30.00	PASS
	44/5220	13.84	14.67	14.60	15.43	18.08	30.00	PASS
	48/5240	14.53	15.36	15.23	16.06	18.73	30.00	PASS
802.11n HT20	36/5180	16.13	16.26	16.97	17.10	19.71	30.00	PASS
	44/5220	16.55	16.68	17.28	17.41	20.07	30.00	PASS
	48/5240	21.11	21.24	21.89	22.02	24.66	30.00	PASS
802.11n HT40	38/5190	14.05	14.31	14.95	15.21	17.80	30.00	PASS
	46/5230	18.41	18.67	19.12	19.38	22.05	30.00	PASS
802.11ac VHT20	36/5180	15.89	16.07	16.62	16.80	19.46	30.00	PASS
	44/5220	16.45	16.63	17.26	17.44	20.06	30.00	PASS
	48/5240	21.06	21.24	21.73	21.91	24.60	30.00	PASS
802.11ac VHT40	38/5190	14.01	14.36	14.99	15.34	17.89	30.00	PASS
	46/5230	18.31	18.66	19.05	19.40	22.06	30.00	PASS
802.11ac VHT80	42/5210	11.67	12.21	12.44	12.98	15.63	30.00	PASS

Note: 1. Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain =4.60dBi<6dBi. So the power limit is 30dBm.

U-NII-2A

Test Mode	Channel/ Frequency (MHz)	Beamforming Antenna 1		Beamforming 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	16.20	17.03	17.69	18.52	20.85	24.00	PASS
	60/5300	14.96	15.79	15.03	15.86	18.84	24.00	PASS
	64/5320	15.37	16.20	15.14	15.97	19.10	23.92	PASS
802.11n HT20	52/5260	15.97	16.10	16.98	17.11	19.65	24.00	PASS
	60/5300	16.63	16.76	16.66	16.79	19.79	24.00	PASS
	64/5320	16.39	16.52	16.21	16.34	19.44	24.00	PASS
802.11n HT40	54/5270	18.91	19.17	19.71	19.97	22.60	24.00	PASS
	62/5310	15.16	15.42	14.82	15.08	18.27	24.00	PASS
802.11ac VHT20	52/5260	16.39	16.57	17.10	17.28	19.95	24.00	PASS
	60/5300	16.91	17.09	16.73	16.91	20.01	24.00	PASS
	64/5320	16.60	16.78	16.33	16.51	19.66	24.00	PASS
802.11ac VHT40	54/5270	19.11	19.46	19.95	20.30	22.91	24.00	PASS
	62/5310	15.15	15.50	14.84	15.19	18.36	24.00	PASS
802.11ac VHT80	58/5290	11.43	11.97	12.02	12.56	15.29	24.00	PASS

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

U-NII-2C

Test Mode	Channel/ Frequency (MHz)	Beamforming Antenna 1		Beamforming 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	14.29	15.12	14.10	14.93	18.04	24.00	PASS
	120/5600	14.85	15.68	15.65	16.48	19.11	23.96	PASS
	140/5700	14.32	15.15	13.56	14.39	17.80	23.92	PASS
	144/5720	15.50	16.33	15.08	15.91	19.14	23.97	PASS
802.11n HT20	100/5500	15.14	15.27	16.53	16.66	19.03	24.00	PASS
	120/5600	15.96	16.09	16.74	16.87	19.51	24.00	PASS
	140/5700	14.67	14.80	14.26	14.39	17.61	24.00	PASS
	144/5720	16.99	17.12	16.63	16.76	19.96	24.00	PASS
802.11n HT40	102/5510	15.00	15.26	15.07	15.33	18.31	24.00	PASS
	118/5590	19.07	19.33	19.64	19.90	22.64	24.00	PASS
	134/5670	17.05	17.31	16.99	17.25	20.29	24.00	PASS
	142/5710	19.74	20.00	19.09	19.35	22.70	24.00	PASS
802.11ac VHT20	100/5500	16.25	16.43	16.44	16.62	19.54	24.00	PASS
	120/5600	16.17	16.35	16.86	17.04	19.72	24.00	PASS
	140/5700	14.81	14.99	14.25	14.43	17.73	24.00	PASS
	144/5720	17.07	17.25	16.60	16.78	20.03	24.00	PASS
802.11ac VHT40	102/5510	14.90	15.25	14.97	15.32	18.30	24.00	PASS
	118/5590	19.06	19.41	19.45	19.80	22.62	24.00	PASS
	134/5670	16.96	17.31	16.94	17.29	20.31	24.00	PASS
	142/5710	19.59	19.94	19.04	19.39	22.69	24.00	PASS
802.11ac VHT80	122/5610	19.47	20.01	19.86	20.40	23.22	24.00	PASS
	138/5690	19.77	20.31	19.61	20.15	23.24	24.00	PASS

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

U-NII-3

Test Mode	Channel/ Frequency (MHz)	Beamforming Antenna 1		Beamforming 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	20.85	21.68	20.59	21.42	24.56	30.00	PASS
	157/5785	21.28	22.11	21.37	22.20	25.17	30.00	PASS
	165/5825	22.25	23.08	22.01	22.84	25.97	30.00	PASS
802.11n HT20	149/5745	20.64	20.77	20.63	20.76	23.78	30.00	PASS
	157/5785	23.35	23.48	23.56	23.69	26.60	30.00	PASS
	165/5825	22.92	23.05	23.47	23.60	26.35	30.00	PASS
802.11n HT40	151/5755	20.25	20.51	20.32	20.58	23.56	30.00	PASS
	159/5795	20.73	20.99	20.79	21.05	24.03	30.00	PASS
802.11ac VHT20	149/5745	20.65	20.83	20.45	20.63	23.74	30.00	PASS
	157/5785	23.31	23.49	23.47	23.65	26.58	30.00	PASS
	165/5825	22.91	23.09	23.41	23.59	26.36	30.00	PASS
802.11ac VHT40	151/5755	20.21	20.56	20.21	20.56	23.57	30.00	PASS
	159/5795	20.75	21.10	20.73	21.08	24.10	30.00	PASS
802.11ac VHT80	155/5775	17.40	17.94	17.51	18.05	21.01	30.00	PASS

Note: 1. Average Power with duty factor = Average Power Measured +Duty cycle correction factor

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

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

3. The manufacturer declared that the directional gain 4.70dBi<6dBi. So the power limit 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
12.00	-5	5199.991753	5199.986021	5199.983938	5199.975510
12.00	0	5199.981941	5199.985893	5199.982911	5199.971030
12.00	10	5199.977055	5199.981307	5199.973181	5199.963257
12.00	20	5199.974382	5199.980107	5199.969516	5199.957242
12.00	25	5199.973621	5199.973761	5199.968246	5199.955061
12.00	30	5199.963646	5199.964056	5199.967791	5199.951996
12.00	40	5199.956489	5199.960562	5199.963465	5199.946781
12.00	45	5199.953940	5199.953218	5199.962206	5199.946656
10.00	25	5199.949901	5199.946050	5199.956713	5199.940852
14.00	25	5199.947536	5199.944623	5199.955144	5199.934398
Max. ΔMHz		-0.052464	-0.055377	-0.044856	-0.065602
PPM		-10.089213	-10.649419	-8.626094	-12.615840

Voltage (V)	Temperature (°C)	U-NII-2A Test Results			
		5300MHz			
		1min	2min	5min	10min
12.00	-5	5300.001779	5299.995094	5299.988126	5299.982009
12.00	0	5299.997867	5299.985870	5299.988115	5299.978933
12.00	10	5299.989951	5299.985760	5299.978700	5299.975143
12.00	20	5299.988136	5299.983541	5299.969637	5299.974232
12.00	25	5299.987815	5299.975674	5299.969091	5299.971746
12.00	30	5299.980658	5299.967875	5299.962293	5299.966004
12.00	40	5299.973383	5299.964111	5299.959974	5299.959243
12.00	45	5299.970859	5299.954489	5299.952253	5299.956858
10.00	25	5299.969860	5299.953642	5299.943200	5299.953186
14.00	25	5299.963593	5299.947929	5299.935582	5299.946981
Max. ΔMHz		-0.036407	-0.052071	-0.064418	-0.053019
PPM		-6.869206	-9.824645	-12.154347	-10.003647

Voltage (V)	Temperature (°C)	U-NII-2C Test Results			
		5580MHz			
		1min	2min	5min	10min
12.00	-5	5580.001930	5579.996089	5579.994521	5579.986344
12.00	0	5579.997176	5579.989477	5579.994091	5579.984712
12.00	10	5579.993866	5579.985941	5579.990336	5579.977340
12.00	20	5579.991627	5579.978503	5579.987662	5579.971993
12.00	25	5579.990628	5579.968843	5579.981873	5579.966773
12.00	30	5579.981885	5579.960627	5579.975061	5579.966746
12.00	40	5579.975169	5579.955611	5579.973143	5579.959800
12.00	45	5579.968648	5579.949495	5579.963899	5579.957918
10.00	25	5579.961404	5579.940359	5579.963029	5579.957421
14.00	25	5579.960274	5579.930843	5579.956420	5579.952062
Max. ΔMHz		-0.039726	-0.069157	-0.043580	-0.047938
PPM		-7.119395	-12.393786	-7.810021	-8.591030

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
12.00	-5	5785.006153	5784.996660	5784.987933	5784.978544
12.00	0	5785.005159	5784.991919	5784.979450	5784.976736
12.00	10	5785.003750	5784.988031	5784.979181	5784.968726
12.00	20	5784.996031	5784.987692	5784.970540	5784.961234
12.00	25	5784.994383	5784.984688	5784.965760	5784.952446
12.00	30	5784.984875	5784.976968	5784.958862	5784.949580
12.00	40	5784.979340	5784.974903	5784.949364	5784.940478
12.00	45	5784.974916	5784.973963	5784.945716	5784.932718
10.00	25	5784.972839	5784.970290	5784.942971	5784.926689
14.00	25	5784.964637	5784.965493	5784.937496	5784.925849
Max. ΔMHz		-0.035363	-0.034507	-0.062504	-0.074151
PPM		-6.112861	-5.964830	-10.804519	-12.817829

5.4. Power Spectral Density

Ambient condition

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

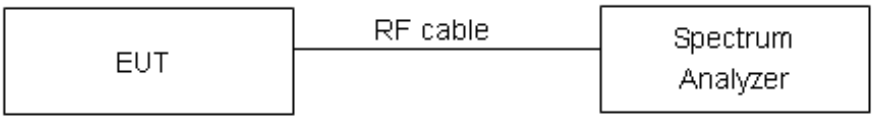
Method of Measurement

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

Set RBW = 1MHz, VBW =3MHz for the band 5.150-5.250GHz, 5.250-5.350GHz, 5.470-5.725GHz.
Set RBW = 470kHz, VBW =1.5MHz for the band 5.725-5.850GHz

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

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum 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 500kHz 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	17/11dBm/MHz
5.25-5.35 GHz and 5.47-5.725 GHz	11dBm/MHz
5725-5850	30dBm/500kHz

Measurement Uncertainty

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

Test Results:

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

MIMO

U-NII-1

Mode	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	4.33	5.16	5.78	6.61	8.96	17.00	PASS
	40/5200	4.68	5.51	5.97	6.80	9.21	17.00	PASS
	48/5240	5.03	5.86	6.59	7.42	9.72	17.00	PASS
802.11n HT20	36/5180	6.25	6.38	8.03	8.16	10.37	17.00	PASS
	40/5200	6.61	6.74	8.19	8.32	10.61	17.00	PASS
	48/5240	11.32	11.45	12.99	13.12	15.38	17.00	PASS
802.11n HT40	38/5190	1.35	1.61	3.16	3.42	5.62	17.00	PASS
	46/5230	5.89	6.15	6.96	7.22	9.73	17.00	PASS
802.11ac VHT20	36/5180	6.5	6.68	7.71	7.89	10.34	17.00	PASS
	40/5200	6.76	6.94	8.47	8.65	10.89	17.00	PASS
	48/5240	11.33	11.51	12.72	12.90	15.27	17.00	PASS
802.11ac VHT40	38/5190	1.46	1.81	3.24	3.59	5.80	17.00	PASS
	46/5230	5.8	6.15	7.02	7.37	9.82	17.00	PASS
802.11ac VHT80	42/5210	-3.49	-2.95	-3.05	-2.51	0.29	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 that the directional gain = 5.40dBi<6dBi. So the PSD limit is 17dBm.

U-NII-2A

Mode	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	52/5260	6.20	7.03	6.88	7.71	10.39	11.00	PASS
	60/5300	6.57	7.40	5.74	6.57	10.01	11.00	PASS
	64/5320	6.77	7.60	5.66	6.49	10.09	11.00	PASS
802.11n HT20	52/5260	7.07	7.20	7.68	7.81	10.53	11.00	PASS
	60/5300	7.54	7.67	7.44	7.57	10.63	11.00	PASS
	64/5320	7.22	7.35	7.07	7.20	10.29	11.00	PASS
802.11n HT40	54/5270	7.11	7.37	7.55	7.81	10.61	11.00	PASS
	62/5310	2.97	3.23	2.64	2.90	6.08	11.00	PASS
802.11ac VHT20	52/5260	6.95	7.13	7.59	7.77	10.47	11.00	PASS
	60/5300	7.69	7.87	7.56	7.74	10.81	11.00	PASS
	64/5320	7.50	7.68	7.22	7.40	10.55	11.00	PASS
802.11ac VHT40	54/5270	6.81	7.16	7.63	7.98	10.60	11.00	PASS
	62/5310	2.98	3.33	2.53	2.88	6.12	11.00	PASS
802.11ac VHT80	58/5290	-4.01	-3.47	-3.66	-3.12	-0.28	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 that the directional gain = 5.40dBi<6dBi. So the PSD limit is 11dBm.

U-NII-2C

Mode	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	100/5500	5.57	6.40	5.40	6.23	9.33	11.00	PASS
	120/5600	6.19	7.02	7.09	7.92	10.50	11.00	PASS
	140/5700	5.66	6.49	5.23	6.06	9.29	11.00	PASS
	144/5720	7.13	7.96	6.19	7.02	10.53	11.00	PASS
802.11n HT20	100/5500	7.43	7.56	7.45	7.58	10.58	11.00	PASS
	120/5600	7.08	7.21	7.78	7.91	10.59	11.00	PASS
	140/5700	5.64	5.77	5.26	5.39	8.60	11.00	PASS
	144/5720	7.72	7.85	7.52	7.65	10.76	11.00	PASS
802.11n HT40	102/5510	3.15	3.41	3.38	3.64	6.54	11.00	PASS
	118/5590	7.11	7.37	7.66	7.92	10.67	11.00	PASS
	134/5670	4.92	5.18	4.61	4.87	8.04	11.00	PASS
	142/5710	7.27	7.53	6.95	7.21	10.39	11.00	PASS
802.11ac VHT20	100/5500	7.01	7.19	7.54	7.72	10.47	11.00	PASS
	120/5600	7.00	7.18	7.53	7.71	10.46	11.00	PASS
	140/5700	5.89	6.07	5.55	5.73	8.91	11.00	PASS
	144/5720	7.65	7.83	7.16	7.34	10.60	11.00	PASS
802.11ac VHT40	102/5510	3.33	3.68	3.40	3.75	6.73	11.00	PASS
	118/5590	7.03	7.38	7.44	7.79	10.60	11.00	PASS
	134/5670	4.97	5.32	4.74	5.09	8.22	11.00	PASS
	142/5710	7.67	8.02	6.77	7.12	10.61	11.00	PASS
802.11ac VHT80	122/5610	4.33	4.87	4.82	5.36	8.14	11.00	PASS
	138/5690	4.40	4.94	4.39	4.93	7.95	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 that the directional gain = 5.60dBi<6dBi. So the PSD limit is 11dBm.

U-NII-3

Mode	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm/ 500kHz)	Conclusion
		Antenna 1				Total Power (dBm/ 500kHz)		
		Read Value (dBm/ 470kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 470kHz)	PSD (dBm/ 500kHz)			
802.11a	149/5745	8.52	9.62	8.43	9.53	12.59	30.00	PASS
	157/5785	9.08	10.18	8.88	9.98	13.09	30.00	PASS
	165/5825	10.03	11.13	10.22	11.32	14.24	30.00	PASS
802.11n HT20	149/5745	8.28	8.68	8.22	8.62	11.66	30.00	PASS
	157/5785	10.87	11.27	10.87	11.27	14.28	30.00	PASS
	165/5825	10.51	10.91	10.76	11.16	14.05	30.00	PASS
802.11n HT40	151/5755	4.77	5.30	4.67	5.20	8.26	30.00	PASS
	159/5795	5.50	6.03	5.44	5.97	9.01	30.00	PASS
802.11ac VHT20	149/5745	8.00	8.45	7.90	8.35	11.41	30.00	PASS
	157/5785	10.69	11.14	10.84	11.29	14.22	30.00	PASS
	165/5825	10.59	11.04	10.80	11.25	14.16	30.00	PASS
802.11ac VHT40	151/5755	4.72	5.34	4.75	5.37	8.37	30.00	PASS
	159/5795	5.18	5.80	4.84	5.46	8.65	30.00	PASS
802.11ac VHT80	155/5775	-0.80	0.01	-0.94	-0.13	2.95	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 that the directional gain = 5.60dBi<6dBi. So the PSD limit is 30dBm.

Beamforming

U-NII-1

Mode	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	4.45	5.28	5.06	5.89	8.61	17.00	PASS
	40/5200	4.59	5.42	5.16	5.99	8.72	17.00	PASS
	48/5240	4.99	5.82	5.77	6.60	9.24	17.00	PASS
802.11n HT20	36/5180	6.68	6.81	7.28	7.41	10.13	17.00	PASS
	40/5200	6.89	7.02	7.66	7.79	10.43	17.00	PASS
	48/5240	11.51	11.64	12.17	12.30	14.99	17.00	PASS
802.11n HT40	38/5190	1.63	1.89	2.44	2.70	5.33	17.00	PASS
	46/5230	5.73	5.99	6.33	6.59	9.31	17.00	PASS
802.11ac VHT20	36/5180	6.4	6.58	6.94	7.12	9.87	17.00	PASS
	40/5200	6.77	6.95	7.77	7.95	10.49	17.00	PASS
	48/5240	11.02	11.20	11.74	11.92	14.58	17.00	PASS
802.11ac VHT40	38/5190	1.41	1.76	2.32	2.67	5.25	17.00	PASS
	46/5230	5.83	6.18	6.34	6.69	9.46	17.00	PASS
802.11ac VHT80	42/5210	-3.54	-3.00	-3.27	-2.73	0.15	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 that the directional gain = 5.30dBi<6dBi. So the PSD limit is 17dBm.

U-NII-2A

Mode	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	52/5260	5.98	6.81	6.51	7.34	10.09	11.00	PASS
	60/5300	5.37	6.20	5.5	6.33	9.28	11.00	PASS
	64/5320	6.15	6.98	6.07	6.90	9.95	11.00	PASS
802.11n HT20	52/5260	6.44	6.57	7.12	7.25	9.94	11.00	PASS
	60/5300	6.84	6.97	6.8	6.93	9.96	11.00	PASS
	64/5320	6.8	6.93	6.54	6.67	9.81	11.00	PASS
802.11n HT40	54/5270	6.18	6.44	7.29	7.55	10.04	11.00	PASS
	62/5310	2.58	2.84	2.29	2.55	5.71	11.00	PASS
802.11ac VHT20	52/5260	6.8	6.98	7.34	7.52	10.27	11.00	PASS
	60/5300	7.25	7.43	7.04	7.22	10.34	11.00	PASS
	64/5320	6.73	6.91	6.41	6.59	9.76	11.00	PASS
802.11ac VHT40	54/5270	6.5	6.85	7.38	7.73	10.33	11.00	PASS
	62/5310	2.5	2.85	2.23	2.58	5.73	11.00	PASS
802.11ac VHT80	58/5290	-4.6	-4.06	-3.8	-3.26	-0.63	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 that the directional gain = 5.30dBi<6dBi. So the PSD limit is 11dBm.

U-NII-2C

Mode	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	100/5500	5.29	6.12	5.49	6.32	9.23	11.00	PASS
	120/5600	5.46	6.29	6.19	7.02	9.68	11.00	PASS
	140/5700	4.85	5.68	4.21	5.04	8.38	11.00	PASS
	144/5720	6.07	6.90	5.66	6.49	9.71	11.00	PASS
802.11n HT20	100/5500	6.34	6.47	7.14	7.27	9.90	11.00	PASS
	120/5600	6.35	6.48	7.08	7.21	9.87	11.00	PASS
	140/5700	5.08	5.21	4.81	4.94	8.09	11.00	PASS
	144/5720	7.08	7.21	6.89	7.02	10.13	11.00	PASS
802.11n HT40	102/5510	2.44	2.70	2.54	2.80	5.76	11.00	PASS
	118/5590	6.1	6.36	6.68	6.94	9.67	11.00	PASS
	134/5670	4.00	4.26	4.42	4.68	7.49	11.00	PASS
	142/5710	6.99	7.25	6.20	6.46	9.89	11.00	PASS
802.11ac VHT20	100/5500	6.66	6.84	6.78	6.96	9.91	11.00	PASS
	120/5600	6.73	6.91	7.00	7.18	10.06	11.00	PASS
	140/5700	4.99	5.17	4.60	4.78	7.99	11.00	PASS
	144/5720	7.38	7.56	6.70	6.88	10.24	11.00	PASS
802.11ac VHT40	102/5510	2.40	2.75	2.17	2.52	5.65	11.00	PASS
	118/5590	6.38	6.73	6.92	7.27	10.02	11.00	PASS
	134/5670	4.11	4.46	4.10	4.45	7.47	11.00	PASS
	142/5710	7.25	7.60	6.14	6.49	10.09	11.00	PASS
802.11ac VHT80	122/5610	3.79	4.33	3.66	4.20	7.28	11.00	PASS
	138/5690	3.96	4.50	4.20	4.74	7.64	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 that the directional gain = 5.50dBi<6dBi. So the PSD limit is 11dBm.

U-NII-3

Mode	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm/ 500kHz)	Conclusion
		Antenna 1		Antenna 2		Total Power (dBm/ 500kHz)		
		Read Value (dBm/ 470kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 470kHz)	PSD (dBm/ 500kHz)			
802.11a	149/5745	8.91	9.74	8.75	9.58	12.67	30.00	PASS
	157/5785	8.63	9.46	9.53	10.36	12.94	30.00	PASS
	165/5825	10.05	10.88	9.34	10.17	13.55	30.00	PASS
802.11n HT20	149/5745	8.22	8.35	8.11	8.24	11.31	30.00	PASS
	157/5785	10.74	10.87	10.88	11.01	13.95	30.00	PASS
	165/5825	10.39	10.52	10.83	10.96	13.76	30.00	PASS
802.11n HT40	151/5755	4.88	5.14	4.93	5.19	8.18	30.00	PASS
	159/5795	4.96	5.22	4.84	5.10	8.17	30.00	PASS
802.11ac VHT20	149/5745	8.07	8.25	8.19	8.37	11.32	30.00	PASS
	157/5785	10.42	10.60	11	11.18	13.91	30.00	PASS
	165/5825	10.26	10.44	10.73	10.91	13.69	30.00	PASS
802.11ac VHT40	151/5755	4.77	5.12	4.39	4.74	7.95	30.00	PASS
	159/5795	4.87	5.22	4.92	5.27	8.26	30.00	PASS
802.11ac VHT80	155/5775	-1.03	-0.49	-1.38	-0.84	2.35	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 that the directional gain = 5.40dBi<6dBi. So the PSD limit is 17dBm.

MIMO

Antenna 1

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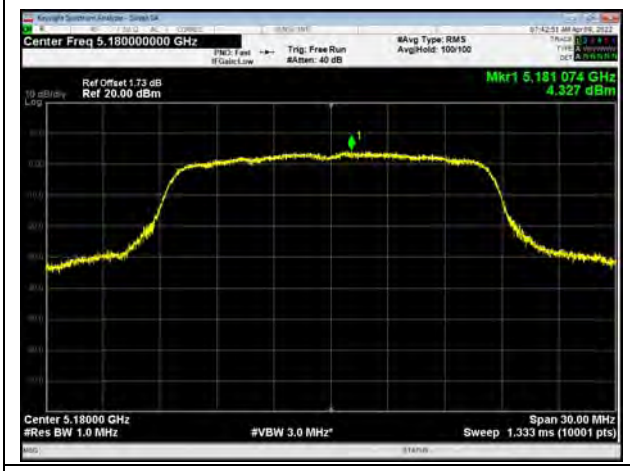	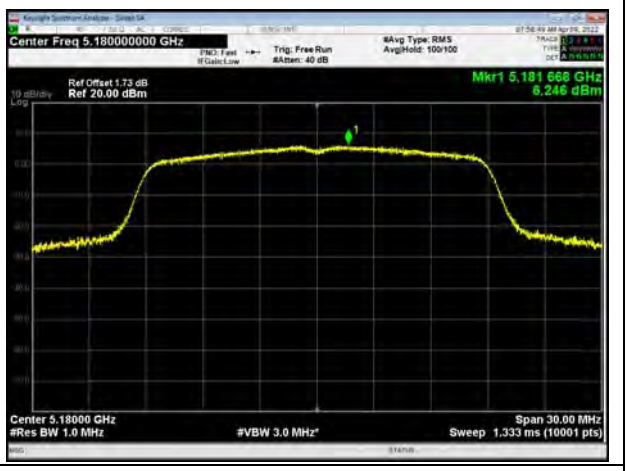
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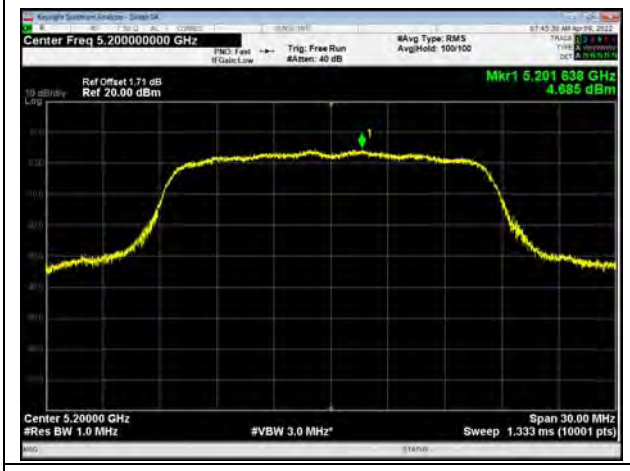	
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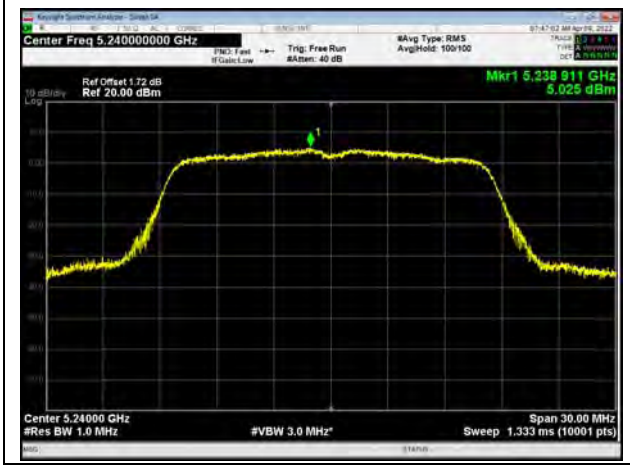
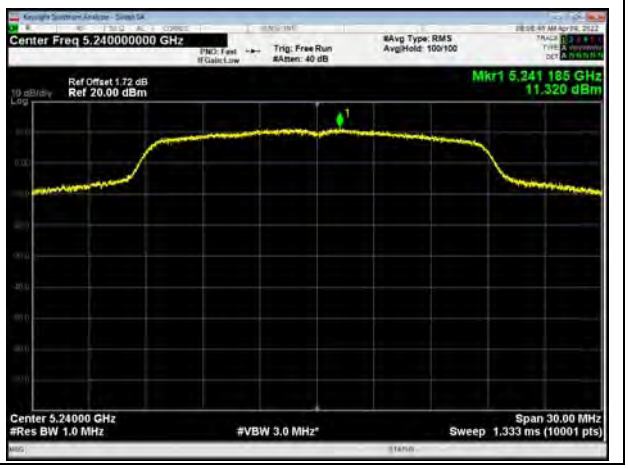
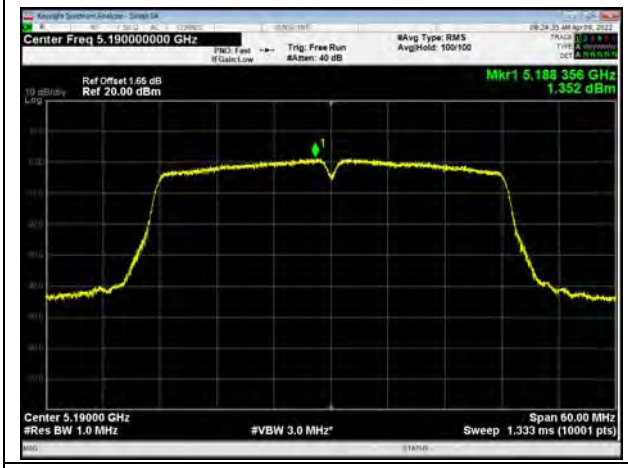
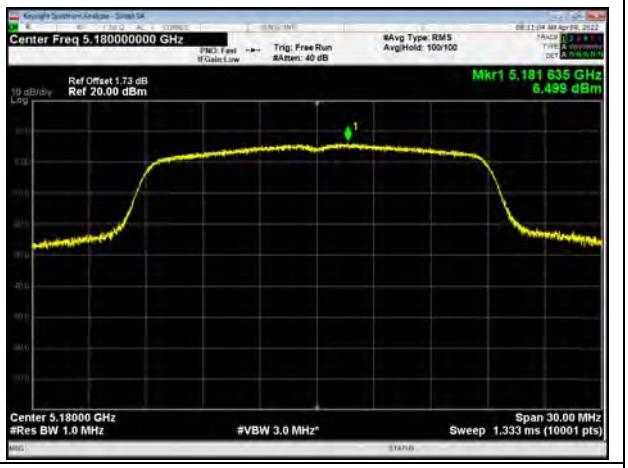
	

U-NII-1, 802.11n HT40, Channel No.: 38



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



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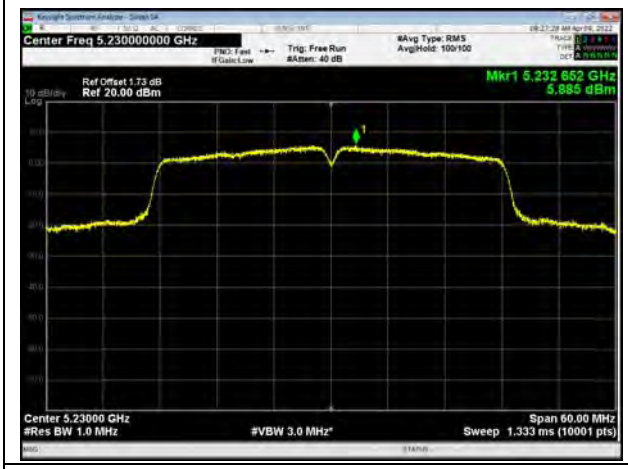

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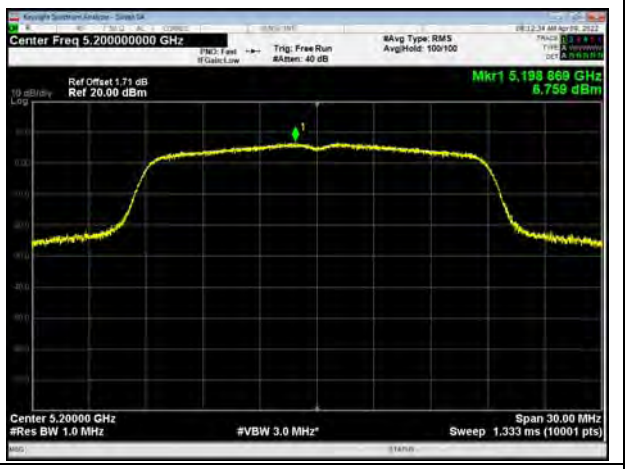

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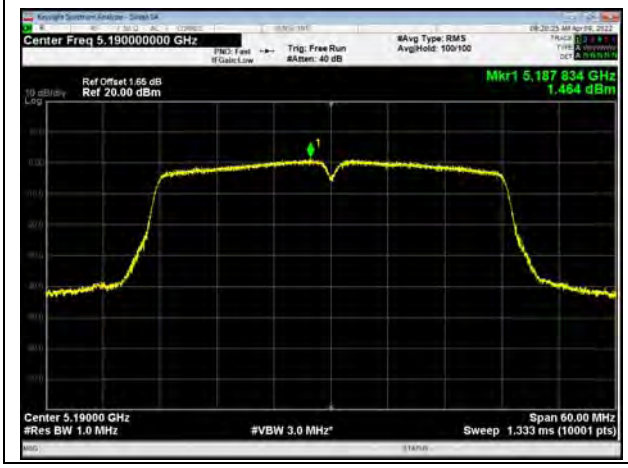
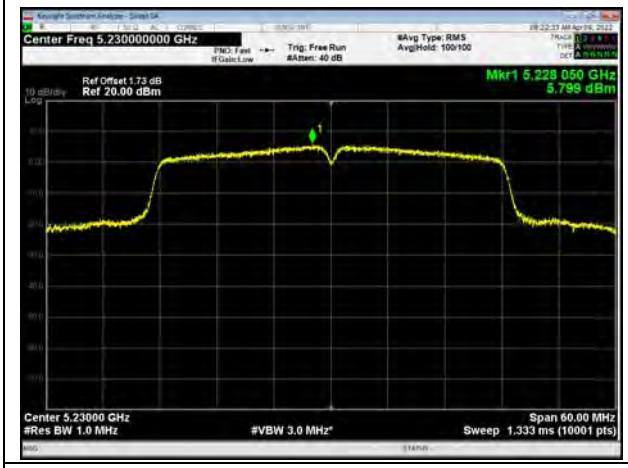
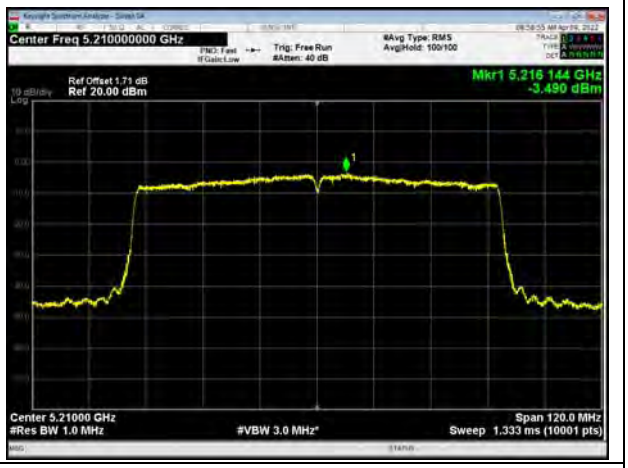


U-NII-1, 802.11ac VHT20, Channel No.: 48

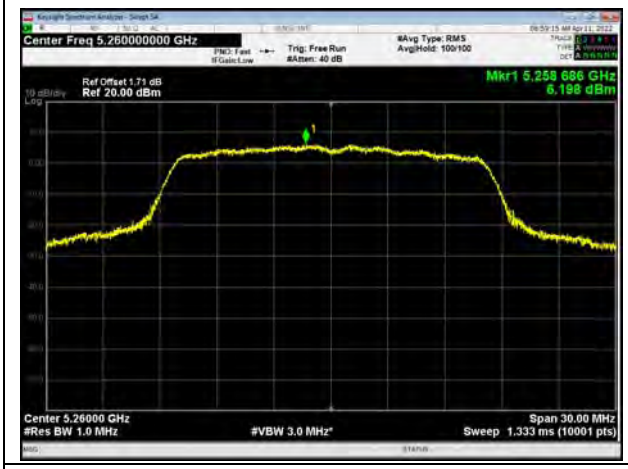
U-NII-1, 802.11ac VHT40, Channel No.: 46



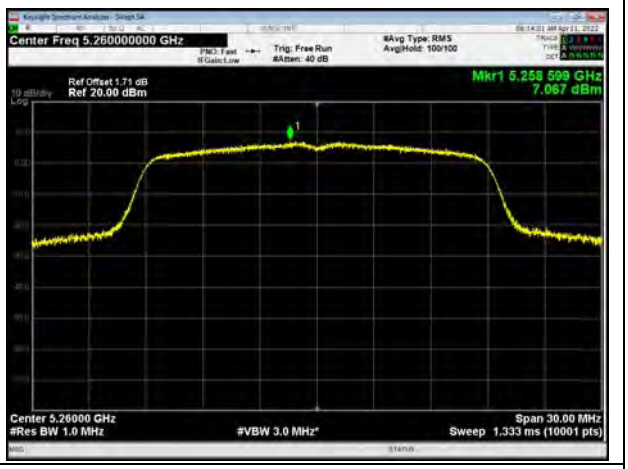
U-NII-1, 802.11ac VHT80, Channel No.: 42



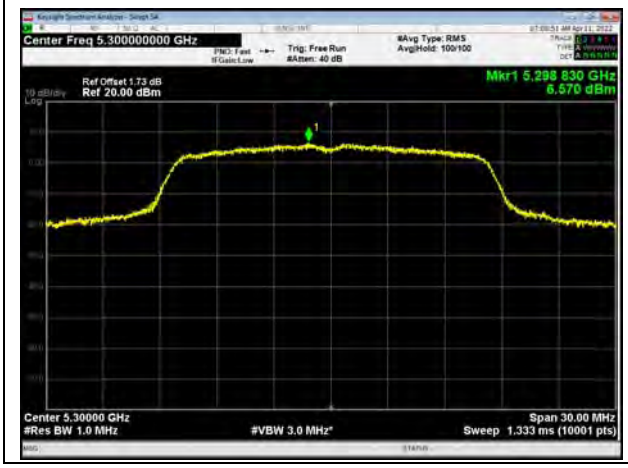
U-NII-2A, 802.11a, Channel No.: 52



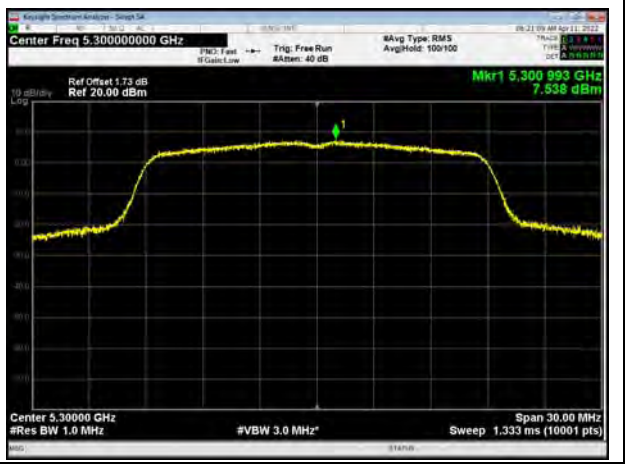
U-NII-2A, 802.11n HT20, Channel No.: 52



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

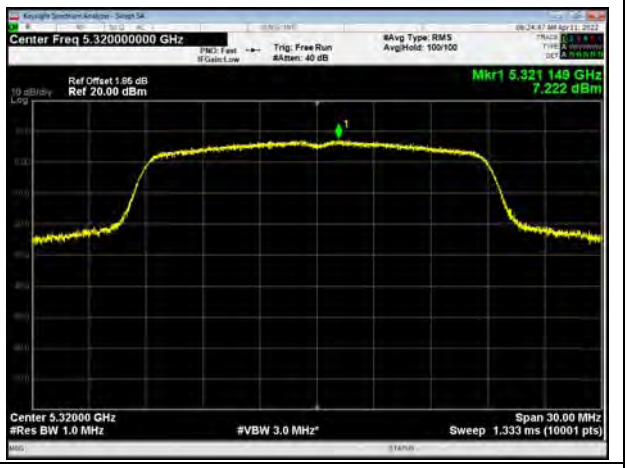


U-NII-2A, 802.11n HT20, Channel No.: 60

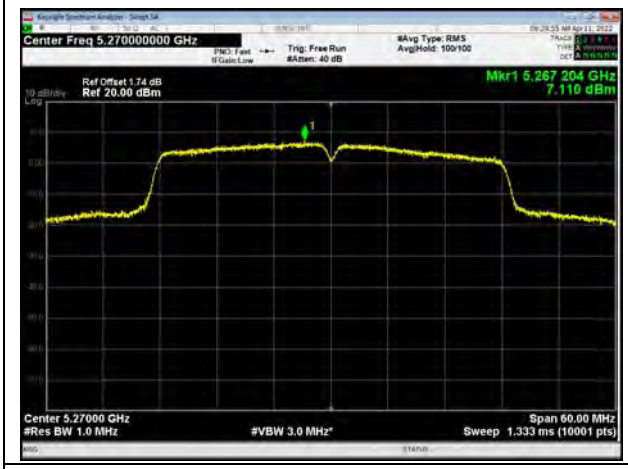


U-NII-2A, 802.11a, Channel No.: 64

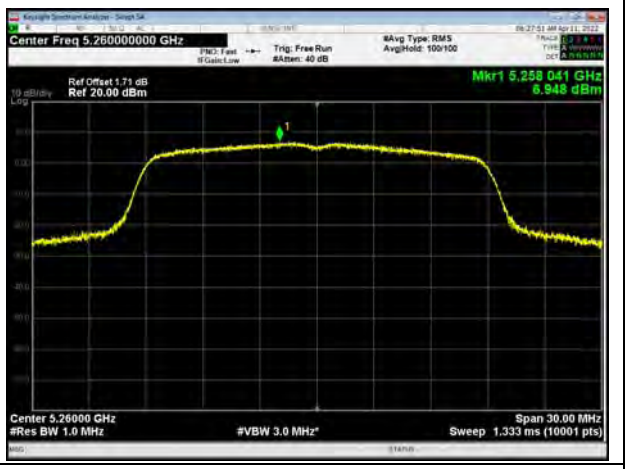
U-NII-2A, 802.11n HT20, Channel No.: 64



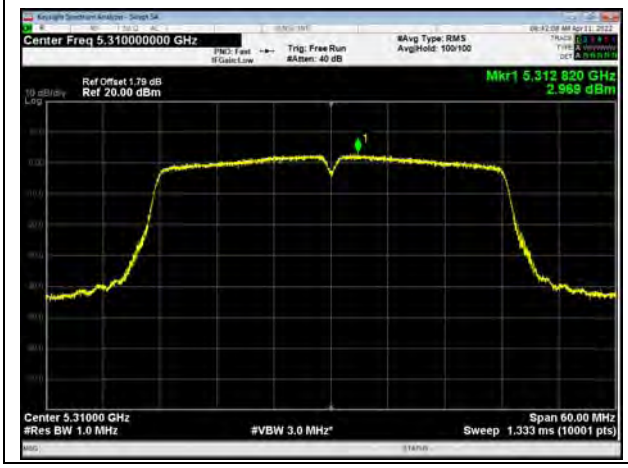
U-NII-2A, 802.11n HT40, Channel No.: 54



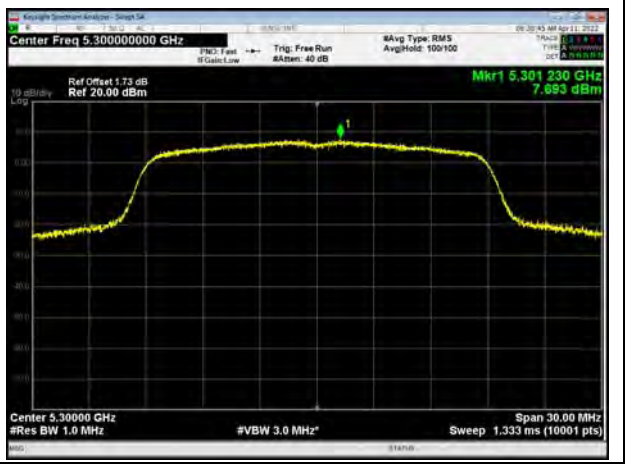
U-NII-2A, 802.11ac VHT20, Channel No.:52



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

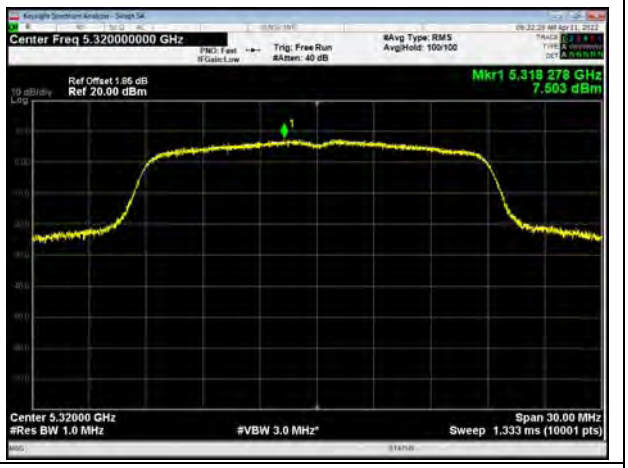


U-NII-2A, 802.11ac VHT20, Channel No.: 60



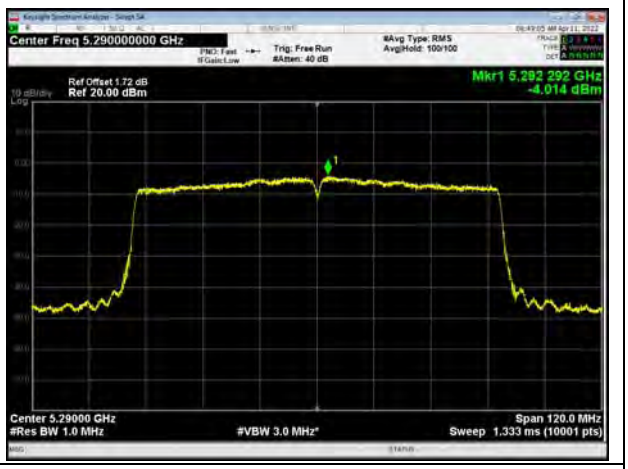
U-NII-2A, 802.11ac VHT40, Channel No.: 54

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

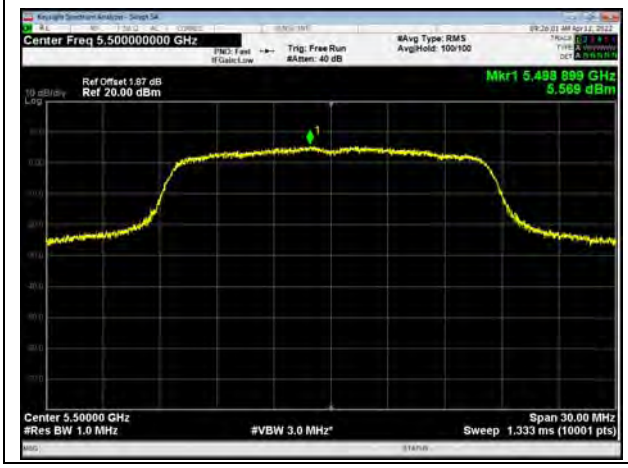


U-NII-2A, 802.11ac VHT40, Channel No.: 62

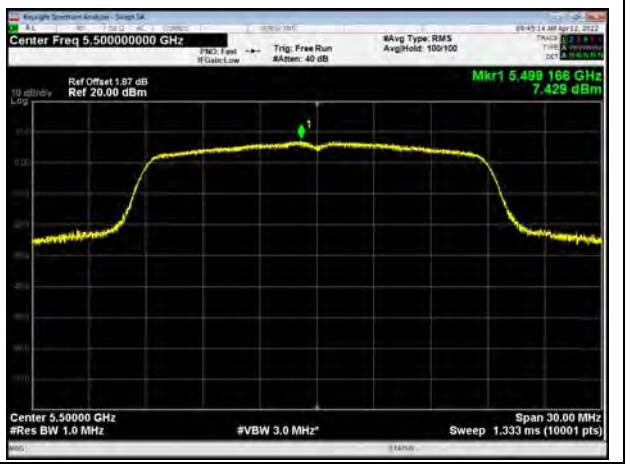
U-NII-2A, 802.11ac VHT80, Channel No.: 58



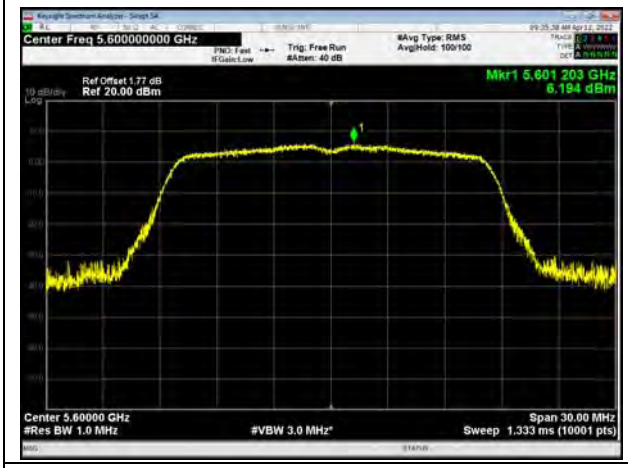
U-NII-2C, 802.11a, Channel No.: 100



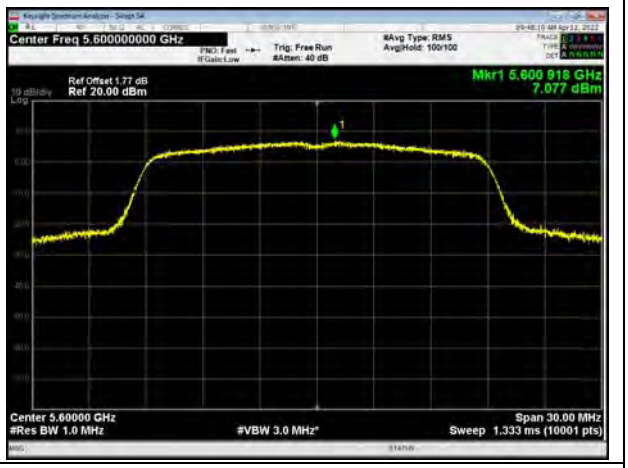
U-NII-2C, 802.11n HT20, Channel No.: 100



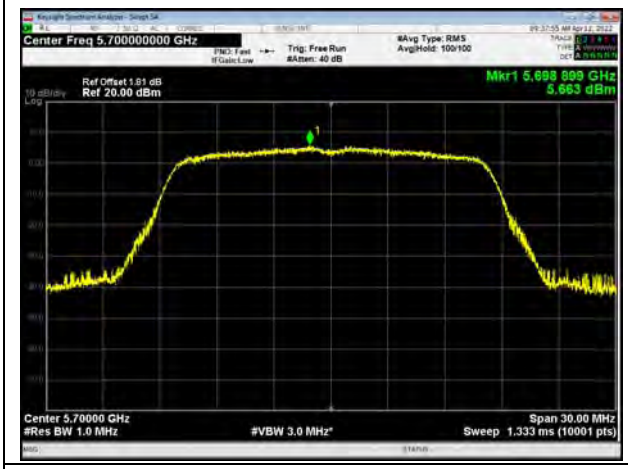
U-NII-2C, 802.11a, Channel No.: 120



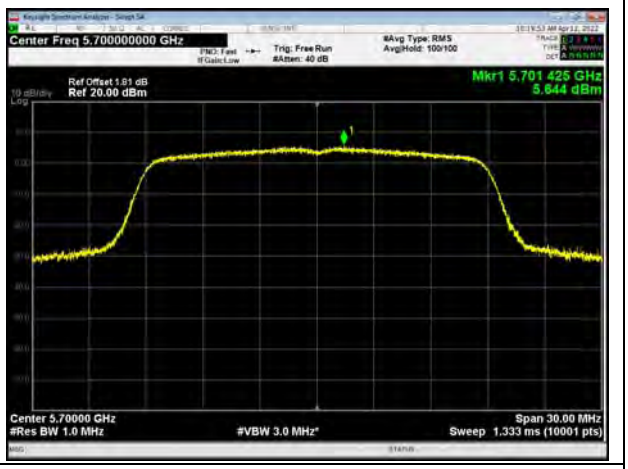
U-NII-2C, 802.11n HT20, Channel No.: 120



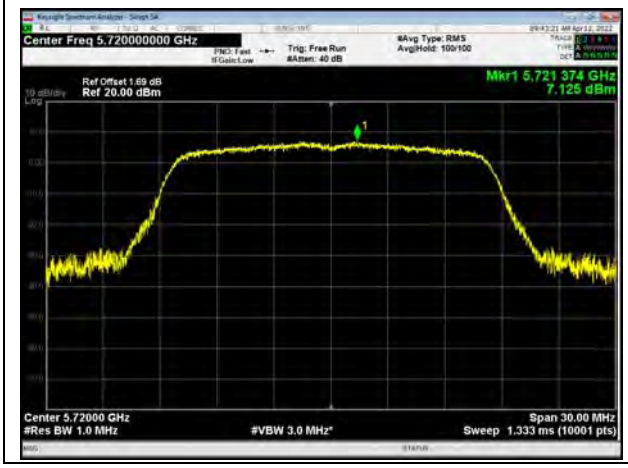
U-NII-2C, 802.11a, Channel No.: 140



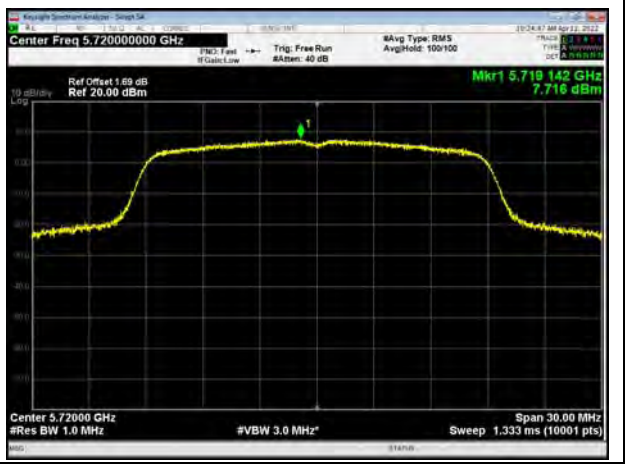
U-NII-2C, 802.11n HT20, Channel No.: 140



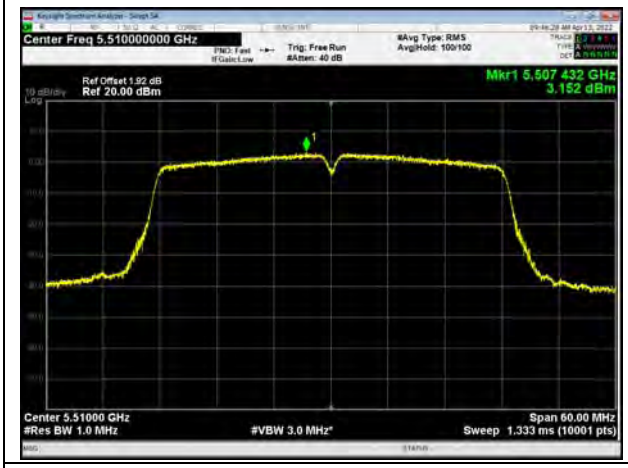
U-NII-2C, 802.11a, Channel No.: 144



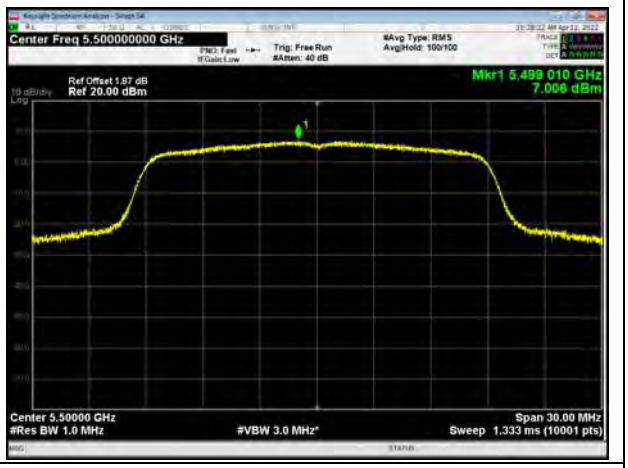
U-NII-2C, 802.11n HT20, Channel No.: 144



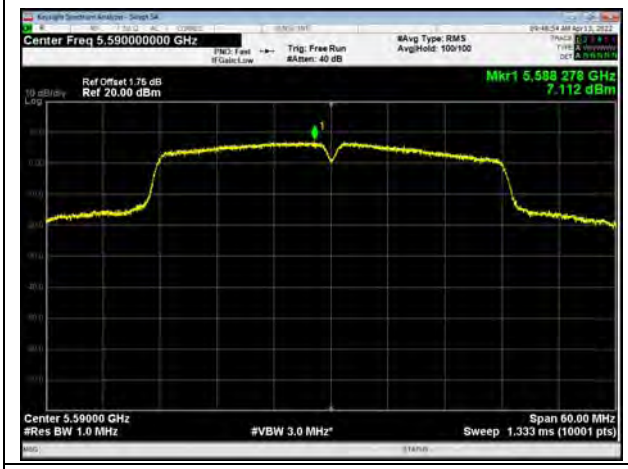
U-NII-2C, 802.11n HT40, Channel No.: 102



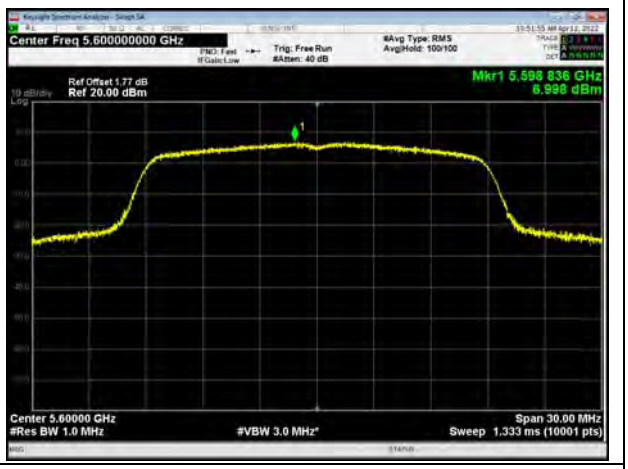
U-NII-2C, 802.11ac VHT20, Channel No.: 100



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

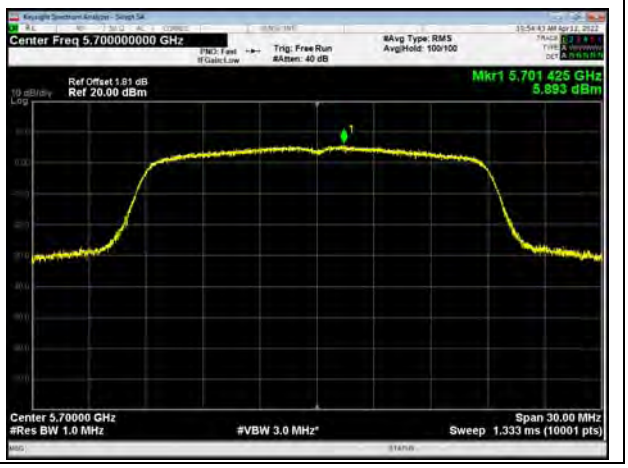


U-NII-2C, 802.11ac VHT20, Channel No.: 120

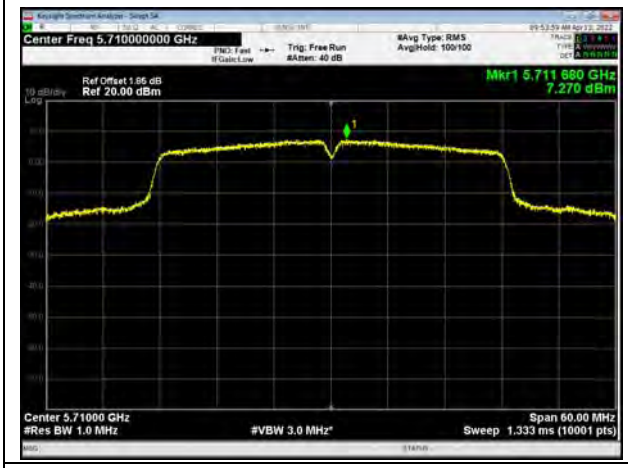


U-NII-2C, 802.11n HT40, Channel No.: 134

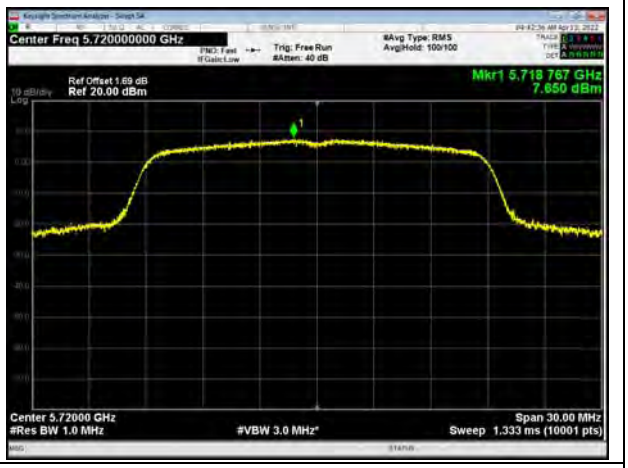
U-NII-2C, 802.11ac VHT20, Channel No.: 140



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

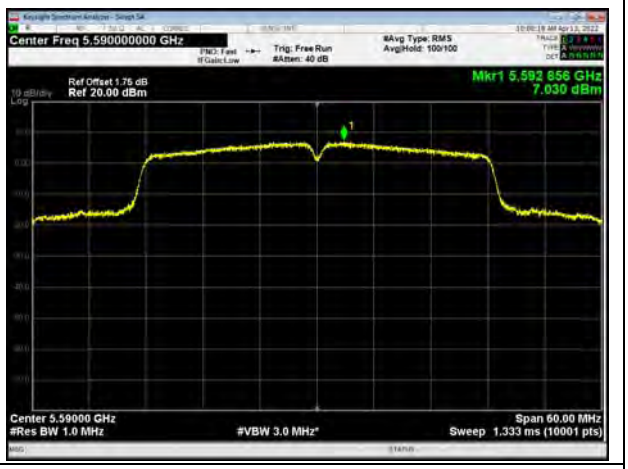


U-NII-2C, 802.11ac VHT20, Channel No.: 144

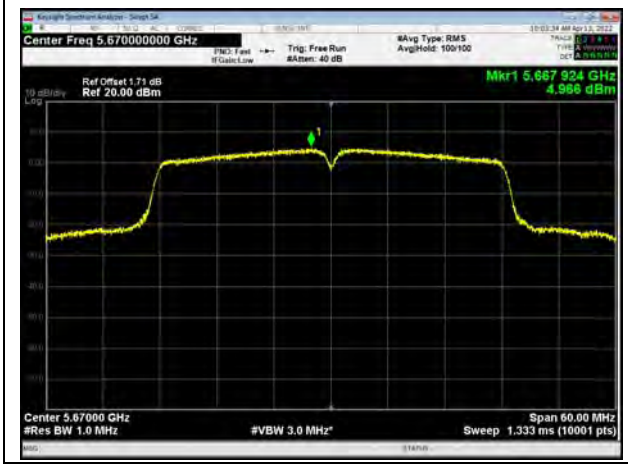


U-NII-2C, 802.11ac VHT40, Channel No.: 102

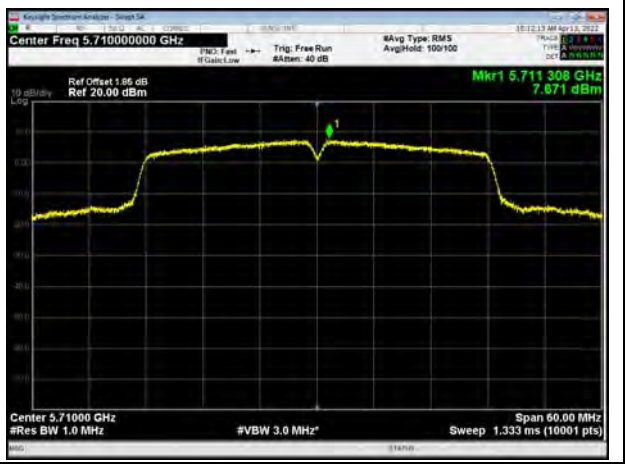
U-NII-2C, 802.11ac VHT40, Channel No.: 118



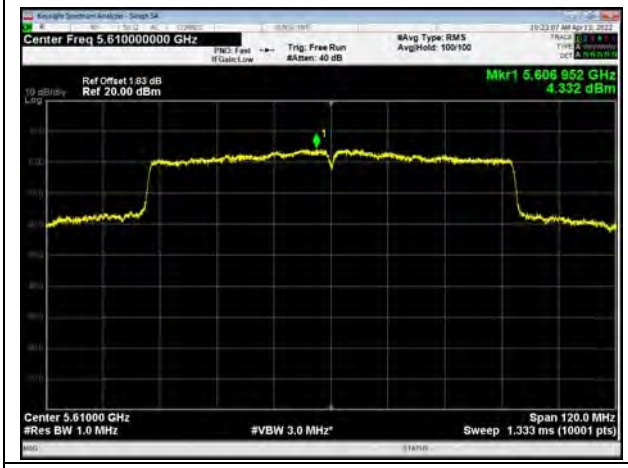
U-NII-2C, 802.11ac VHT40, Channel No.: 134



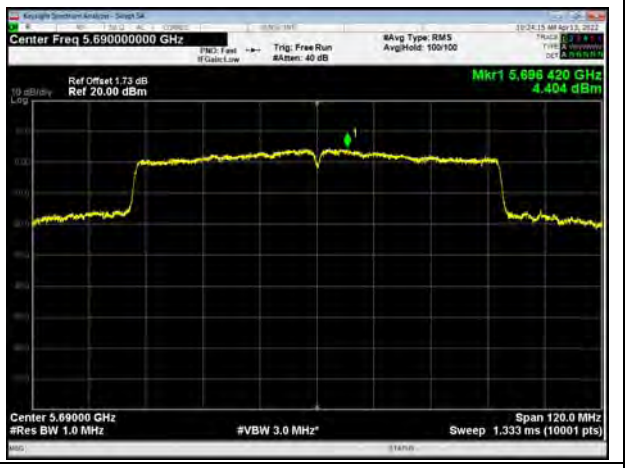
U-NII-2C, 802.11ac VHT40, Channel No.: 142



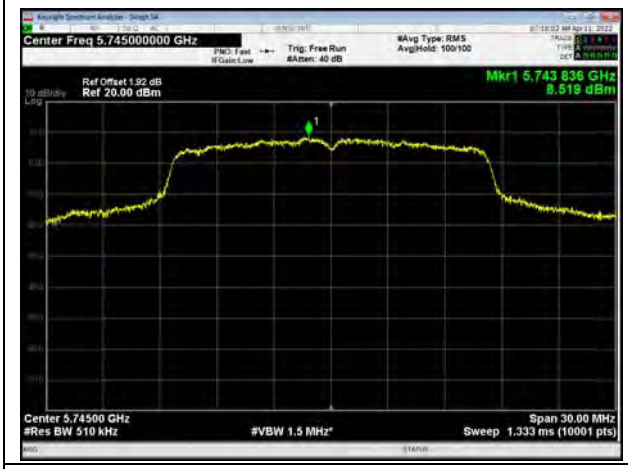
U-NII-2C, 802.11ac VHT80, Channel No.: 122



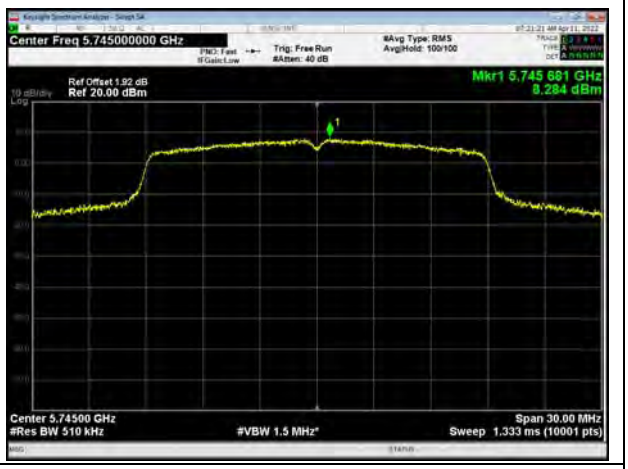
U-NII-2C, 802.11ac VHT80, Channel No.: 138



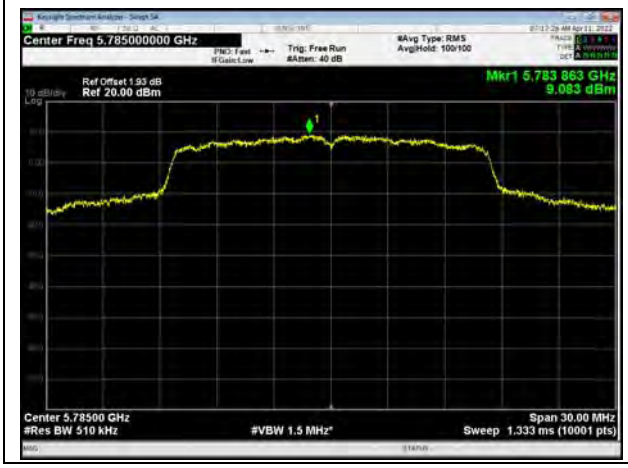
U-NII-3, 802.11a, Channel No.: 149



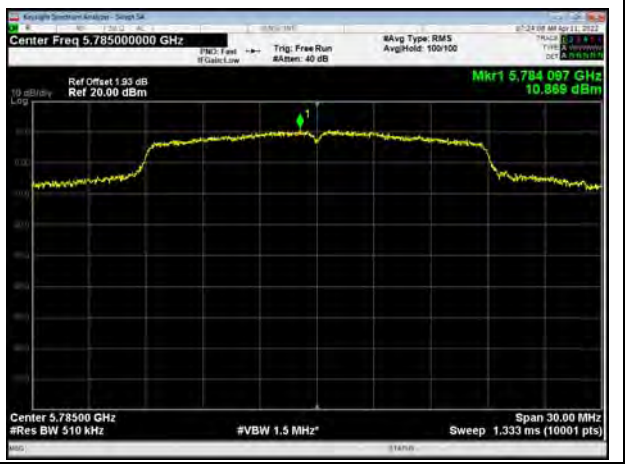
U-NII-3, 802.11n HT20, Channel No.: 149



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

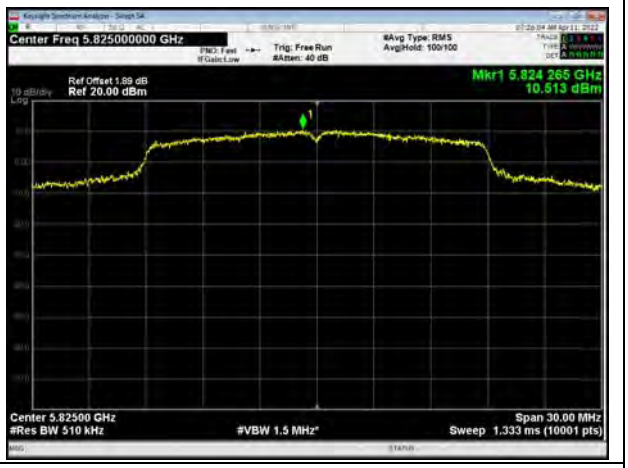


U-NII-3, 802.11n HT20, Channel No.: 157

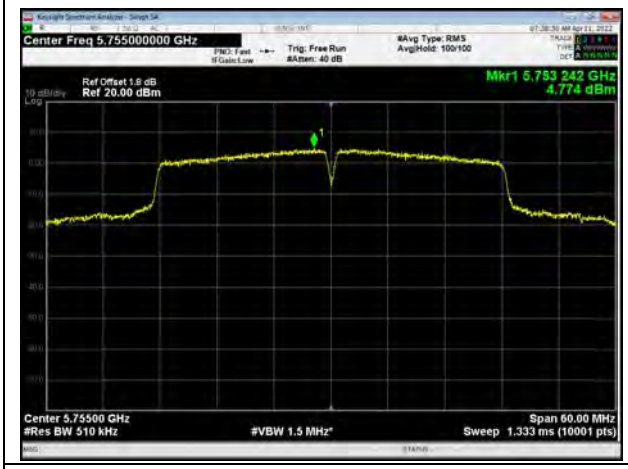


U-NII-3, 802.11a, Channel No.: 165

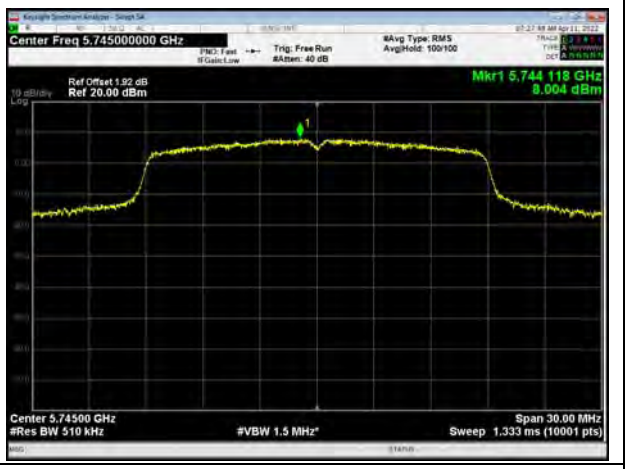
U-NII-3, 802.11n HT20, Channel No.: 165



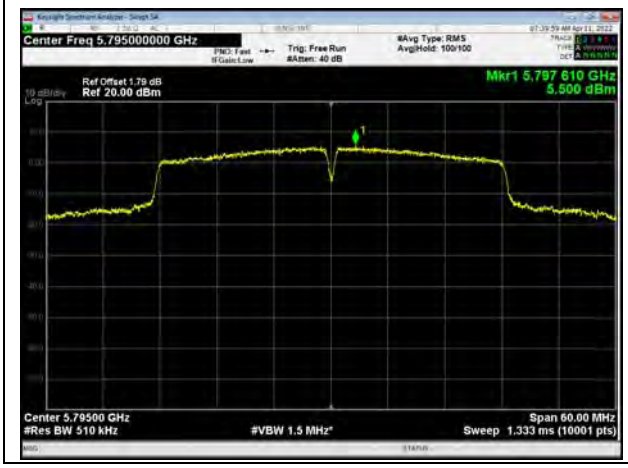
U-NII-3, 802.11n HT40, Channel No.: 151



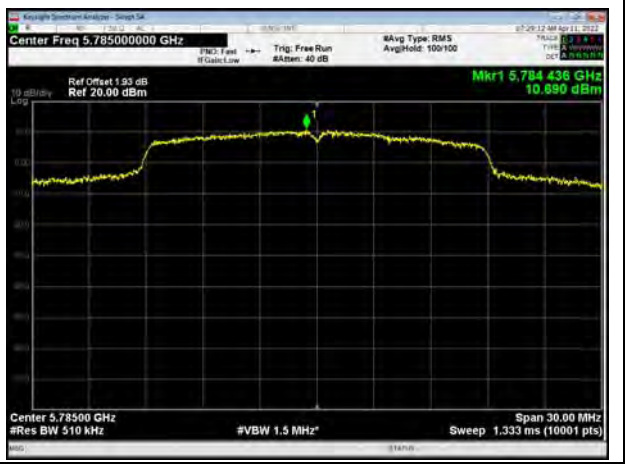
U-NII-3, 802.11ac VHT20, Channel No.: 149



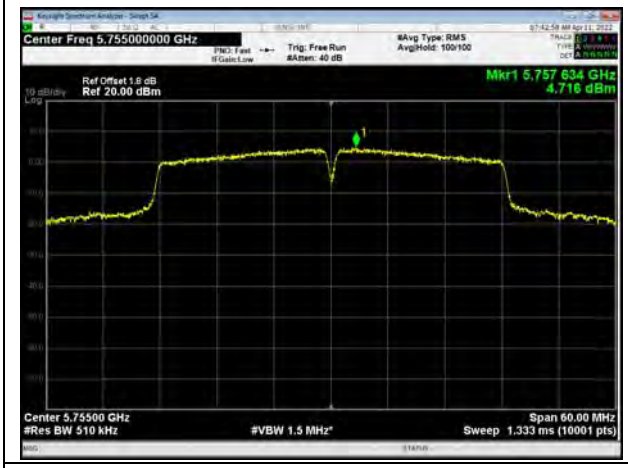
U-NII-3, 802.11n HT40, Channel No.: 159



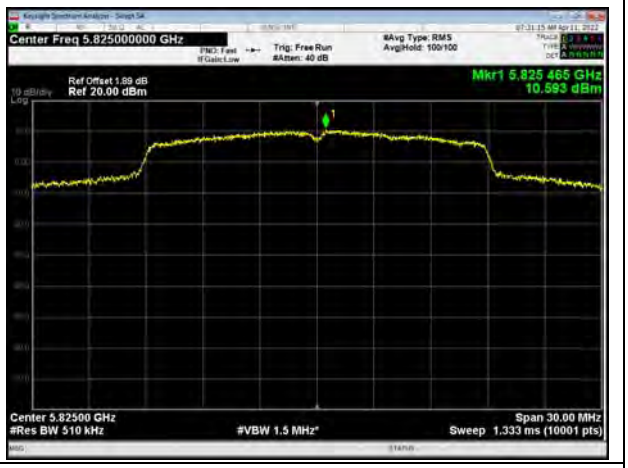
U-NII-3, 802.11ac VHT20, Channel No.: 157



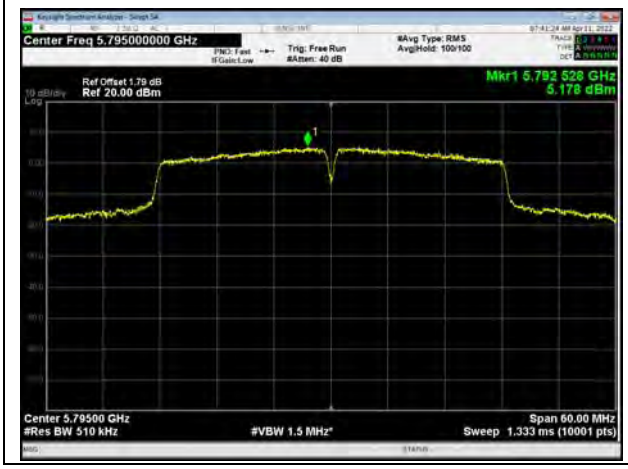
U-NII-3, 802.11ac VHT40, Channel No.: 151



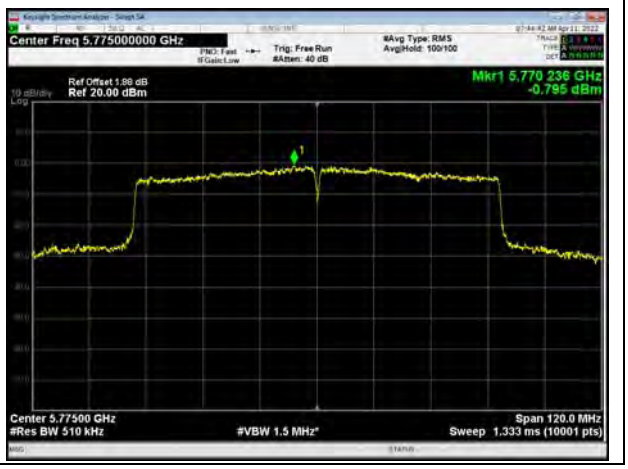
U-NII-3, 802.11ac VHT20, Channel No.: 165



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



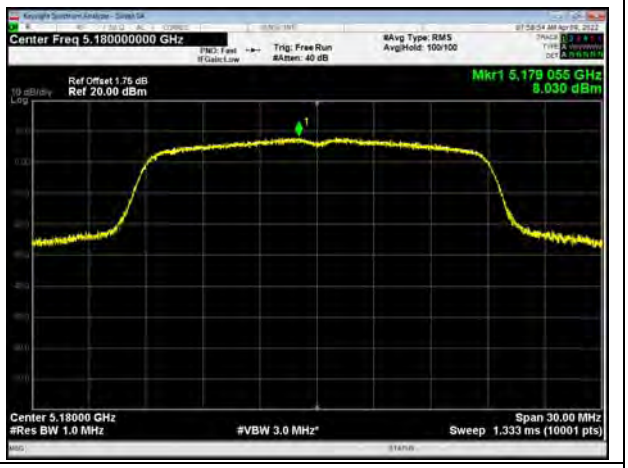
U-NII-3, 802.11ac VHT80, Channel No.: 155



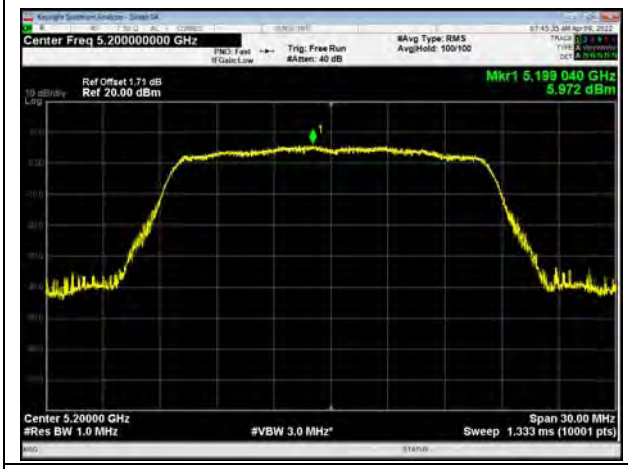
Antenna 2

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

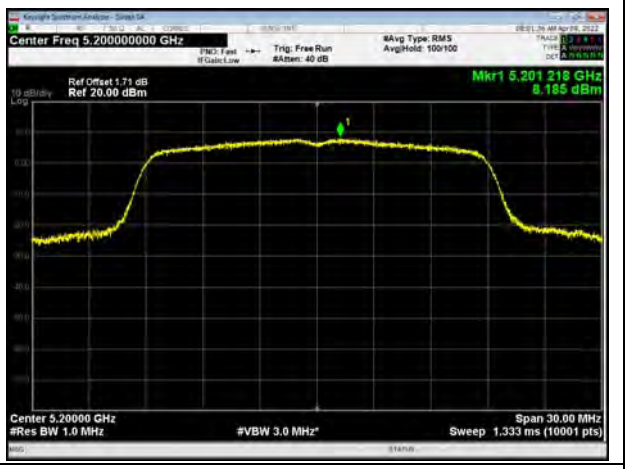
U-NII-1, 802.11n HT20, Channel No.: 36



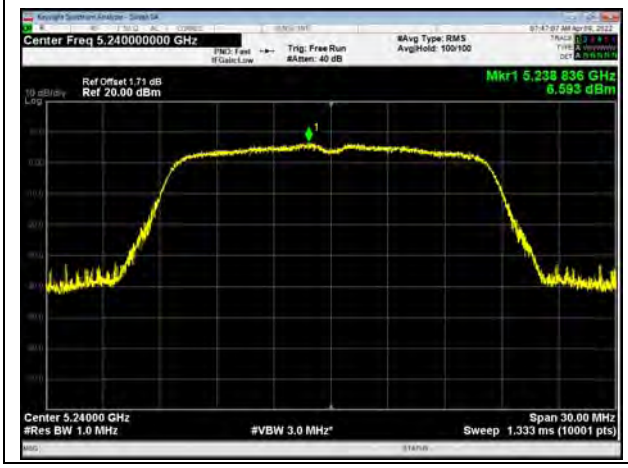
U-NII-1, 802.11a, Channel No.: 40



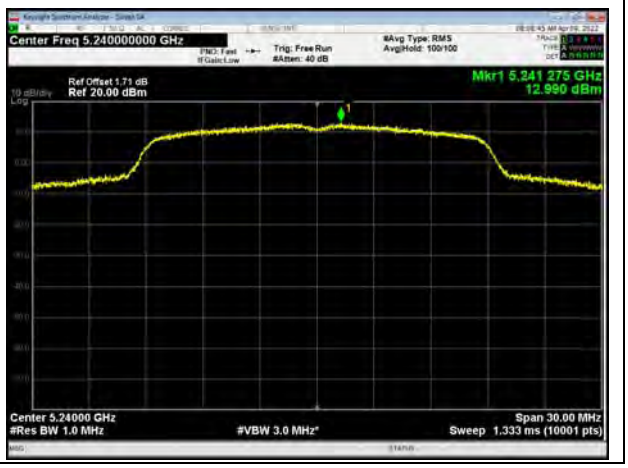
U-NII-1, 802.11n HT20, Channel No.: 40



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

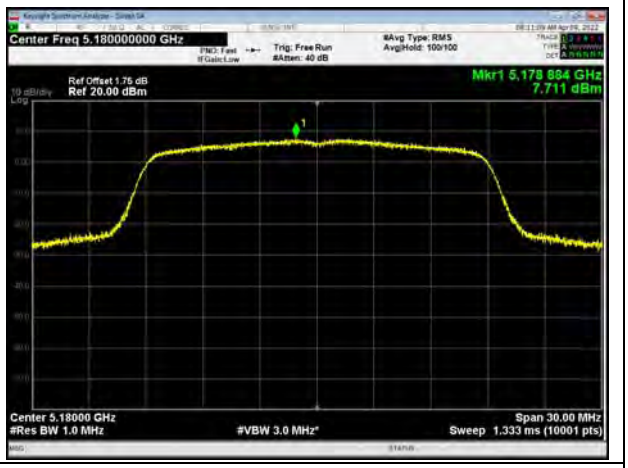


U-NII-1, 802.11n HT20, Channel No.: 48

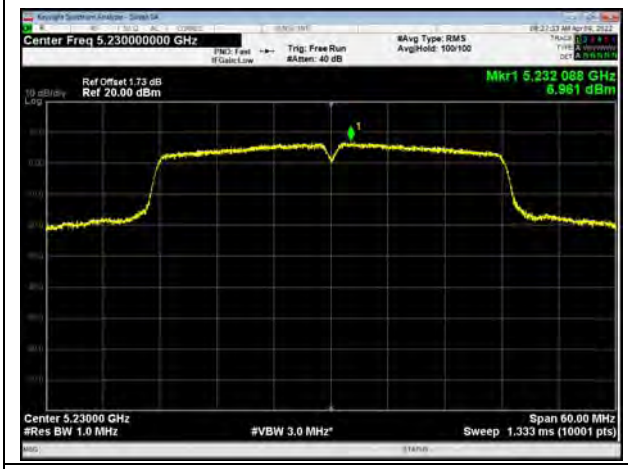


U-NII-1, 802.11n HT40, Channel No.: 38

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

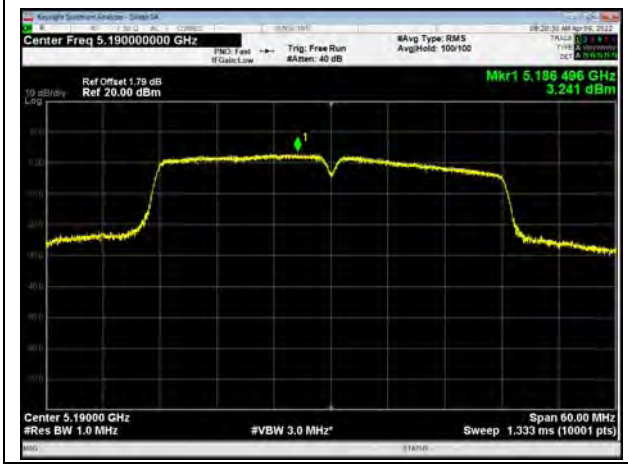


U-NII-1, 802.11n HT40, Channel No.: 46

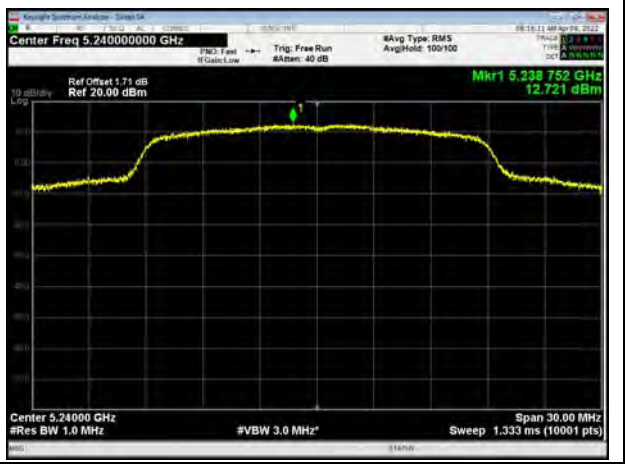


U-NII-1, 802.11ac VHT20, Channel No.: 40

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

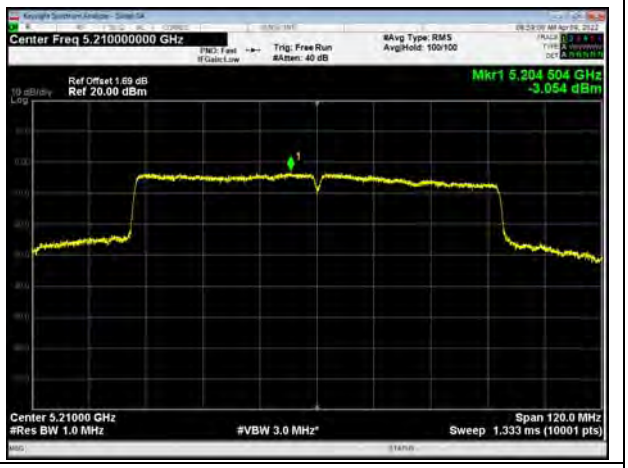


U-NII-1, 802.11ac VHT20, Channel No.: 48

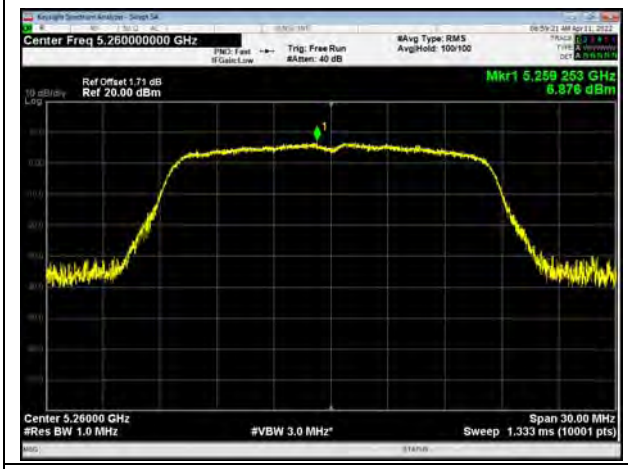


U-NII-1, 802.11ac VHT40, Channel No.: 46

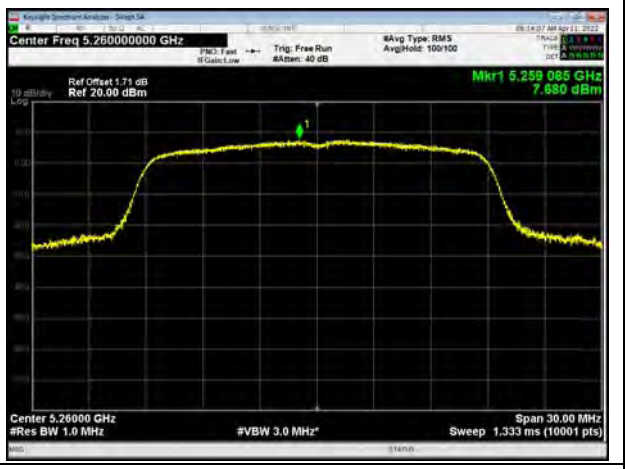
U-NII-1, 802.11ac VHT80, Channel No.: 42



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

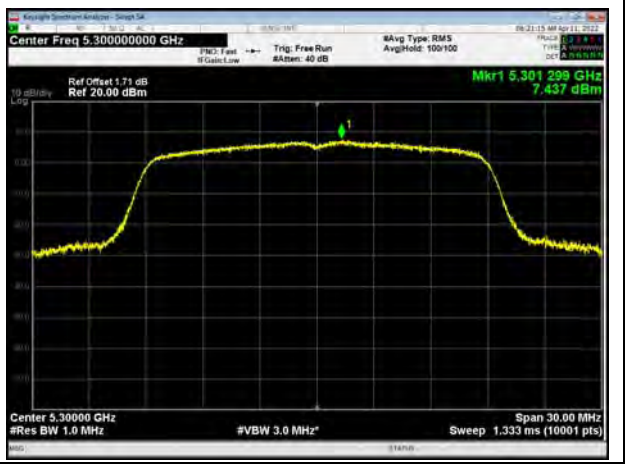


U-NII-2A, 802.11n HT20, Channel No.: 52

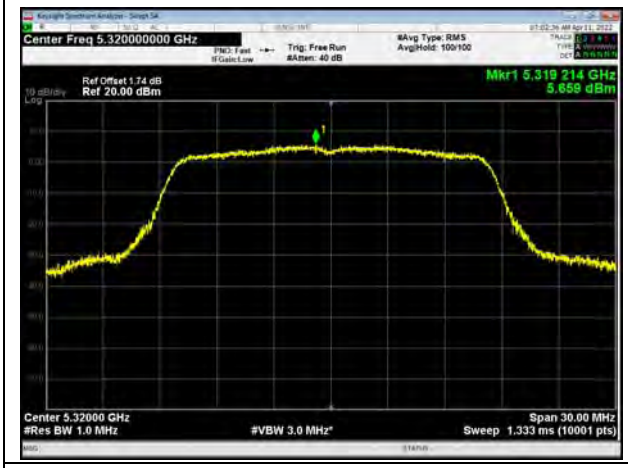


U-NII-2A, 802.11a, Channel No.: 60

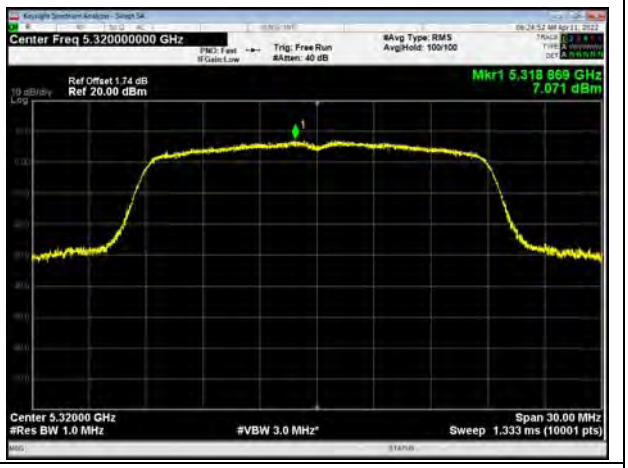
U-NII-2A, 802.11n HT20, Channel No.: 60



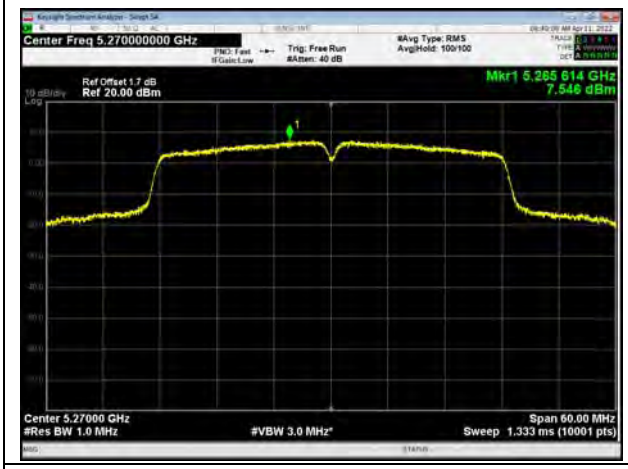
U-NII-2A, 802.11a, Channel No.: 64



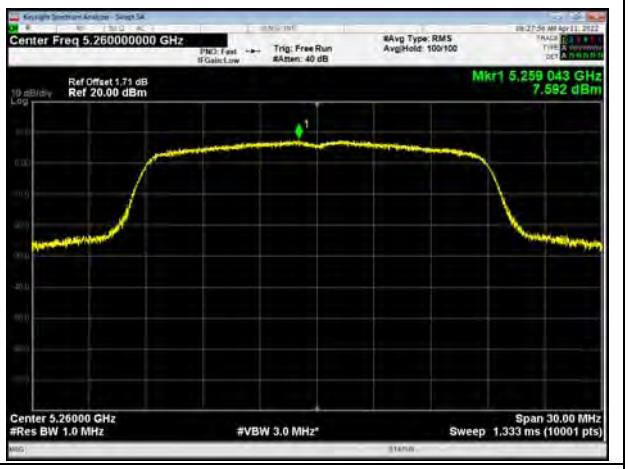
U-NII-2A, 802.11n HT20, Channel No.: 64



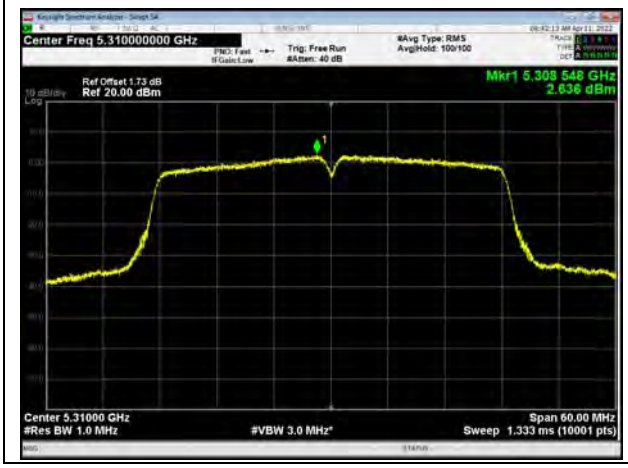
U-NII-2A, 802.11n HT40, Channel No.: 54



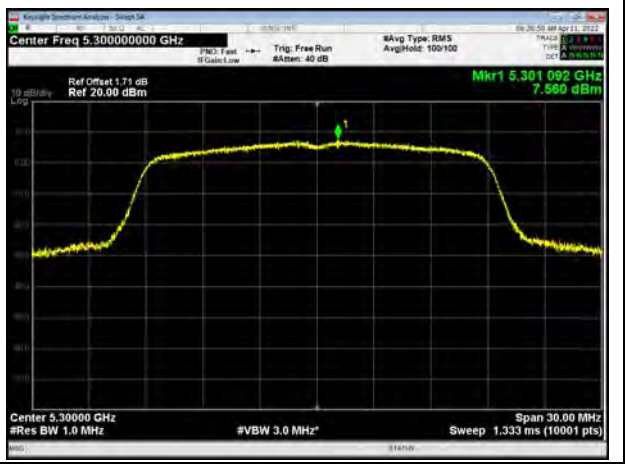
U-NII-2A, 802.11ac VHT20, Channel No.:52



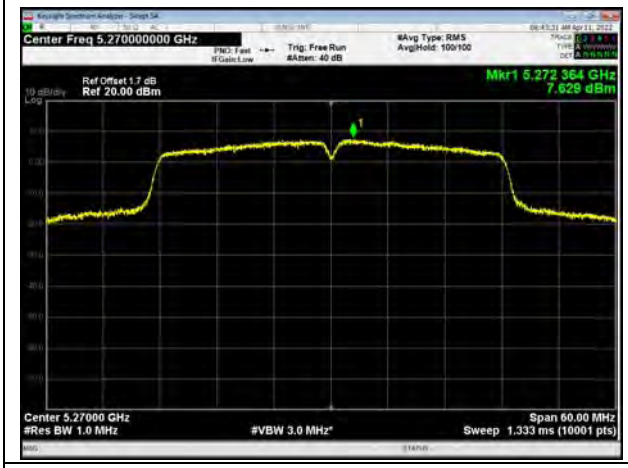
U-NII-2A, 802.11n HT40, Channel No.: 62



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

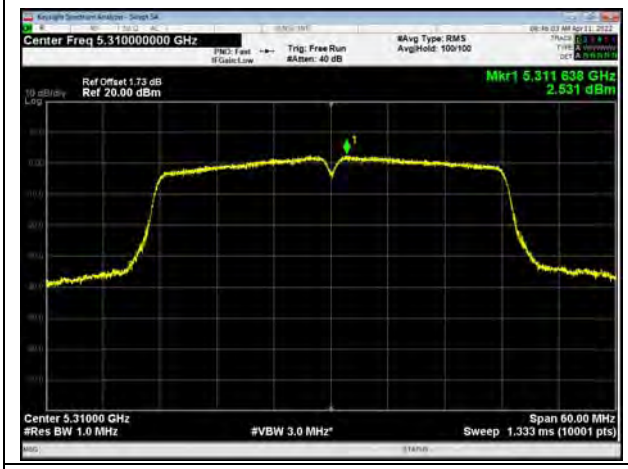


U-NII-2A, 802.11ac VHT40, Channel No.: 54

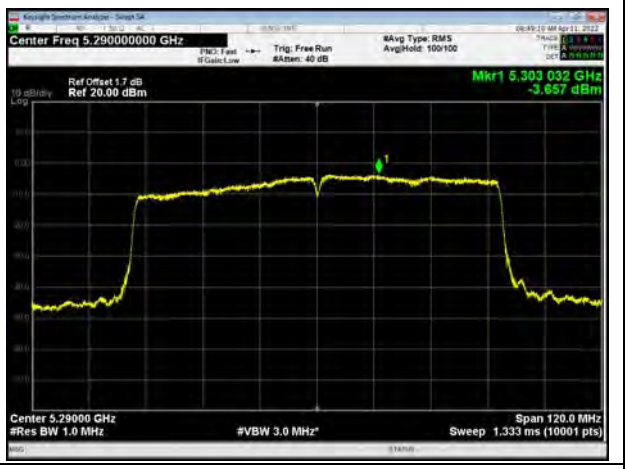


U-NII-2A, 802.11ac VHT20, Channel No.: 64

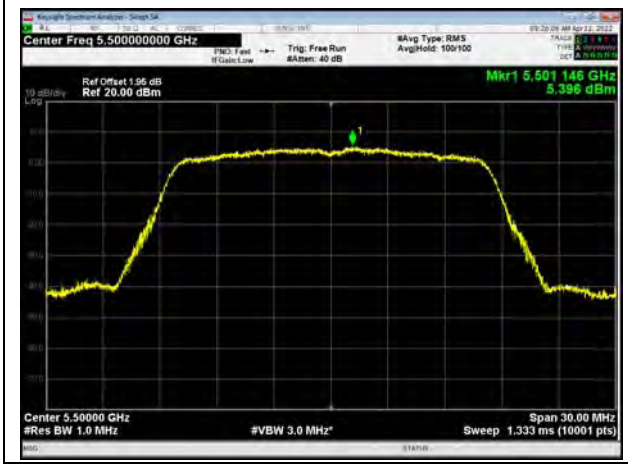
U-NII-2A, 802.11ac VHT40, Channel No.: 62



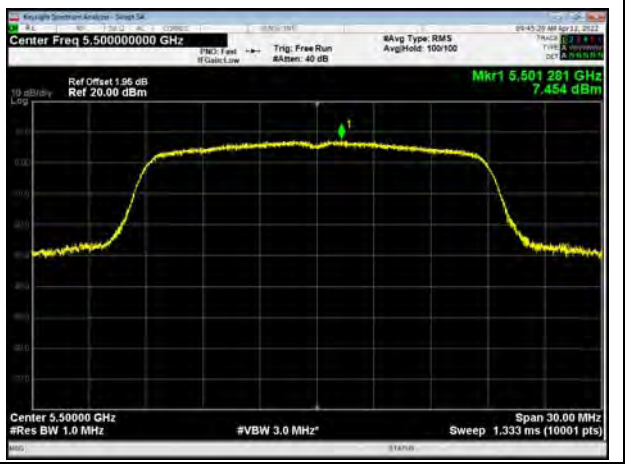
U-NII-2A, 802.11ac VHT80, Channel No.: 58



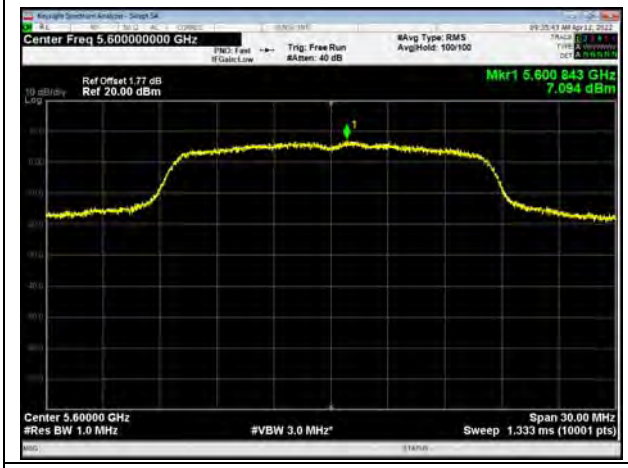
U-NII-2C, 802.11a, Channel No.: 100



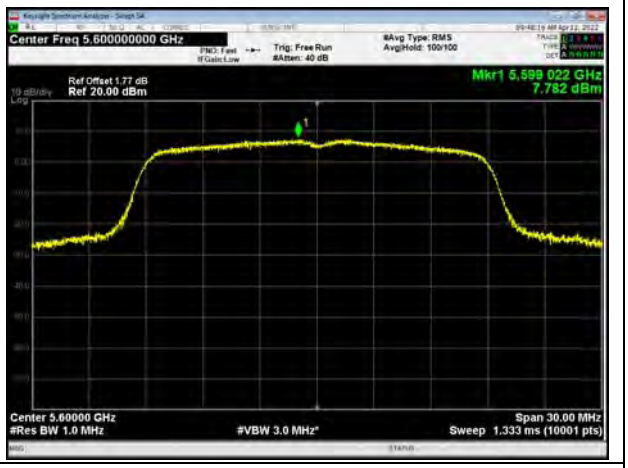
U-NII-2C, 802.11n HT20, Channel No.: 100



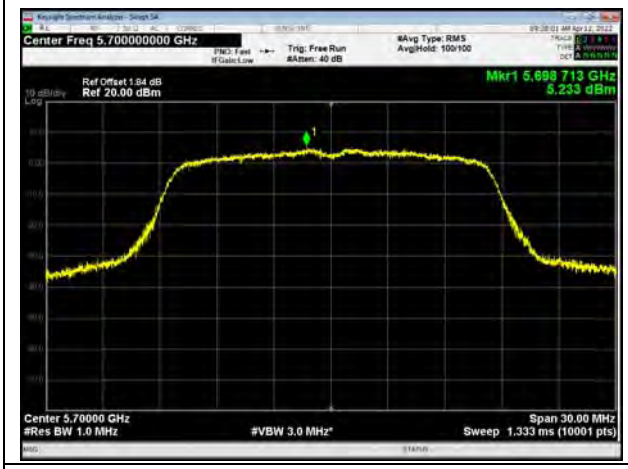
U-NII-2C, 802.11a, Channel No.: 120



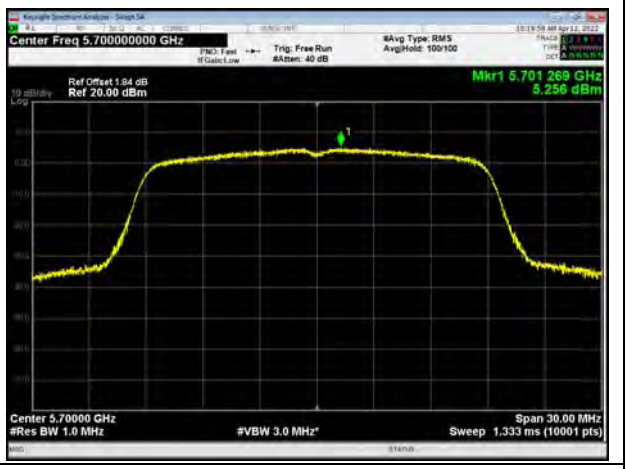
U-NII-2C, 802.11n HT20, Channel No.: 120



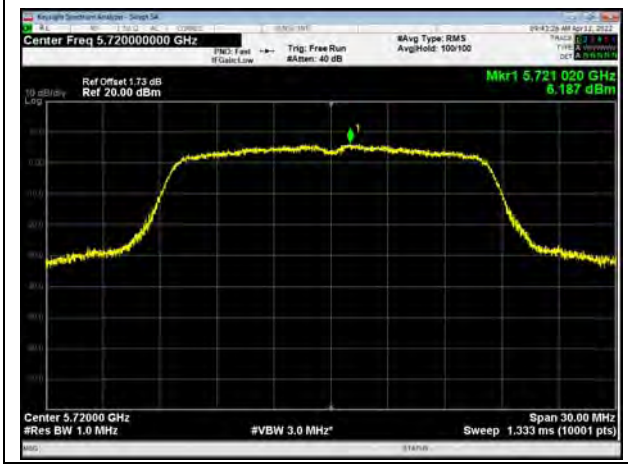
U-NII-2C, 802.11a, Channel No.: 140



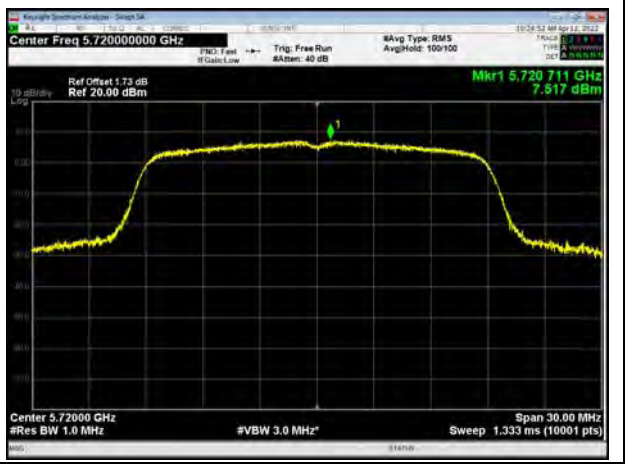
U-NII-2C, 802.11n HT20, Channel No.: 140



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



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

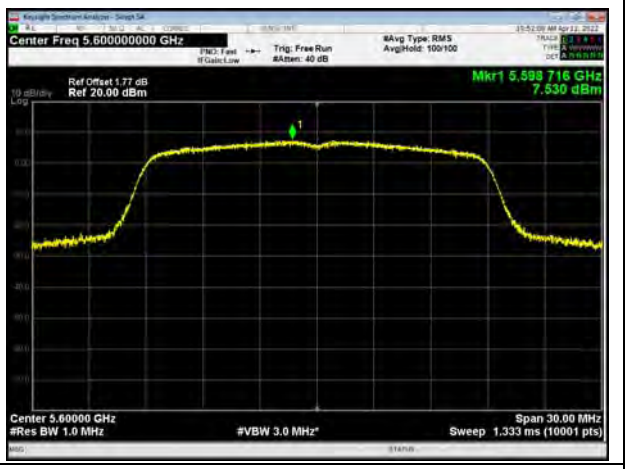


U-NII-2C, 802.11n HT40, Channel No.: 102

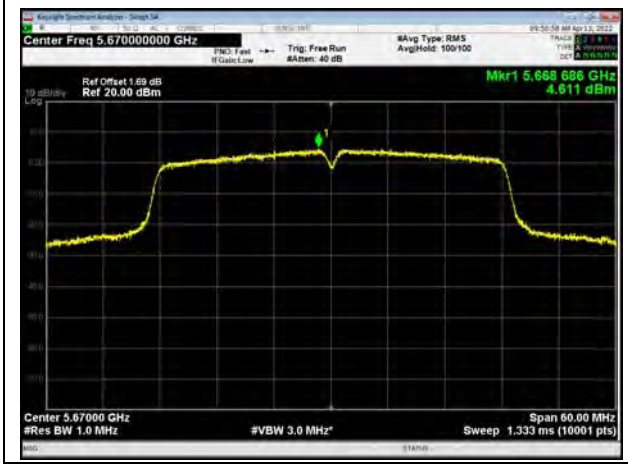
U-NII-2C, 802.11ac VHT20, Channel No.: 100

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

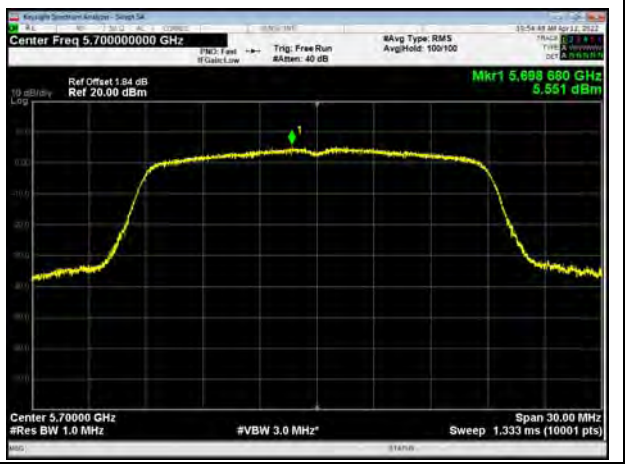
U-NII-2C, 802.11ac VHT20, Channel No.: 120



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



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



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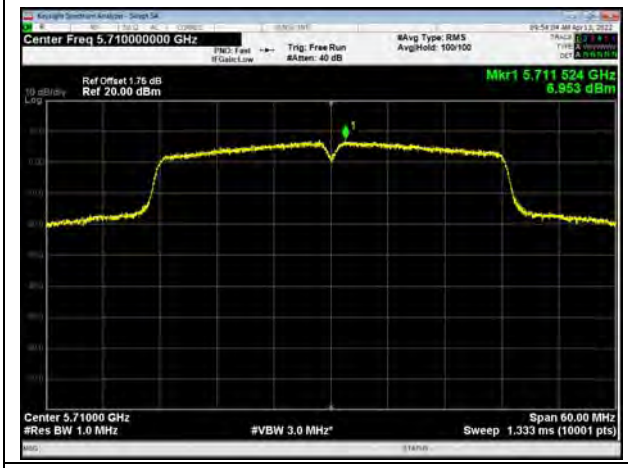
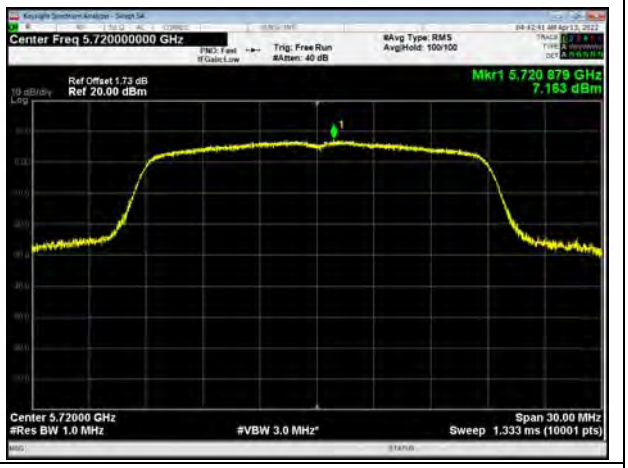
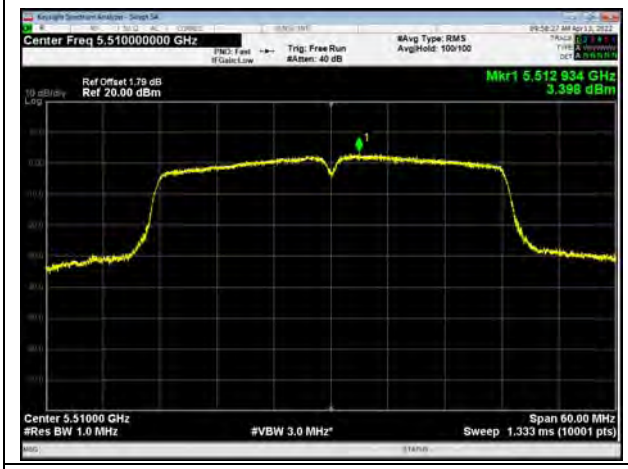


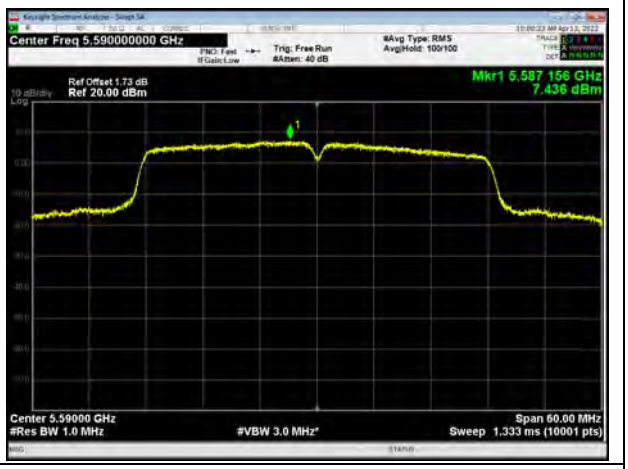
U-NII-2C, 802.11ac VHT20, Channel No.: 144



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

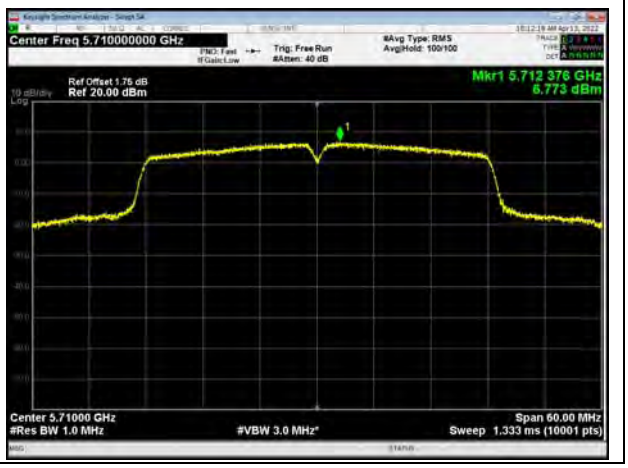


U-NII-2C, 802.11ac VHT40, Channel No.: 118

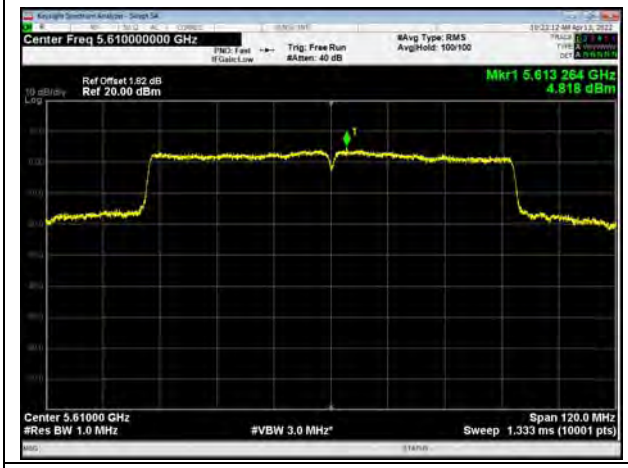


U-NII-2C, 802.11ac VHT40, Channel No.: 134

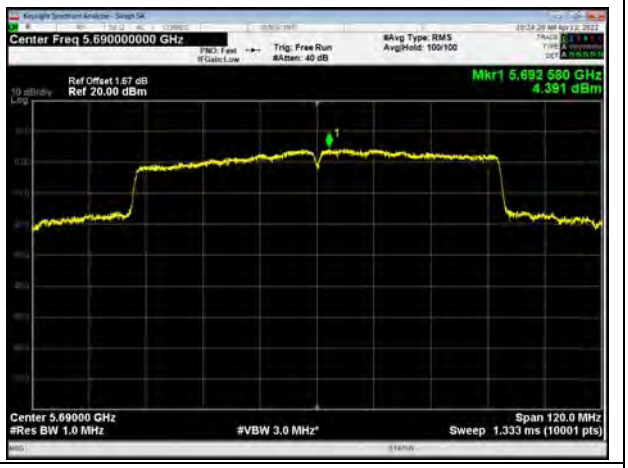
U-NII-2C, 802.11ac VHT40, Channel No.: 142



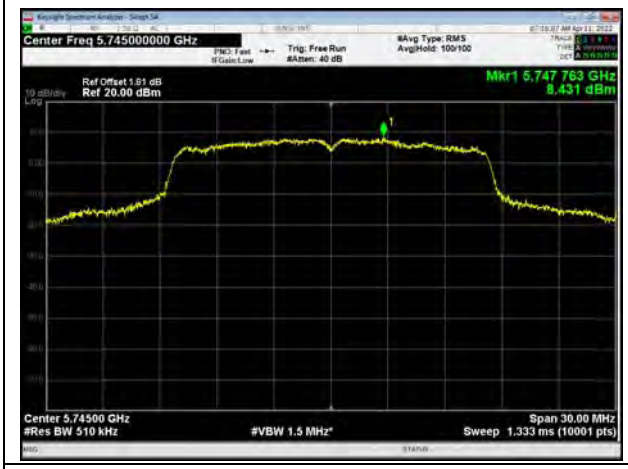
U-NII-2C, 802.11ac VHT80, Channel No.: 122



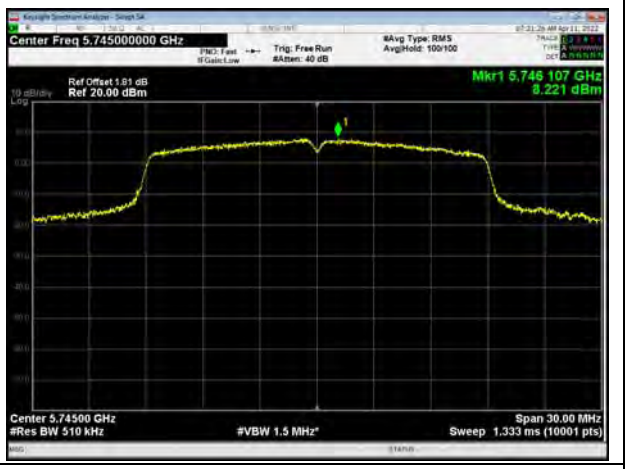
U-NII-2C, 802.11ac VHT80, Channel No.: 138



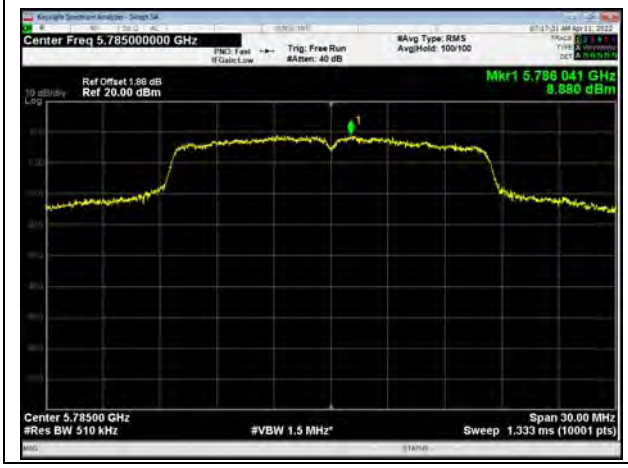
U-NII-3, 802.11a, Channel No.: 149



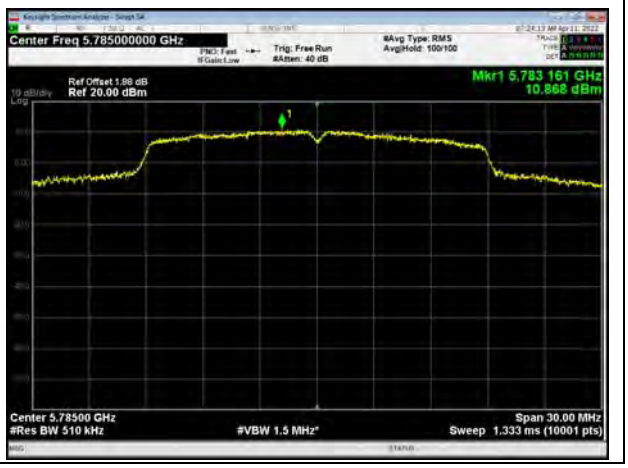
U-NII-3, 802.11n HT20, Channel No.: 149



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

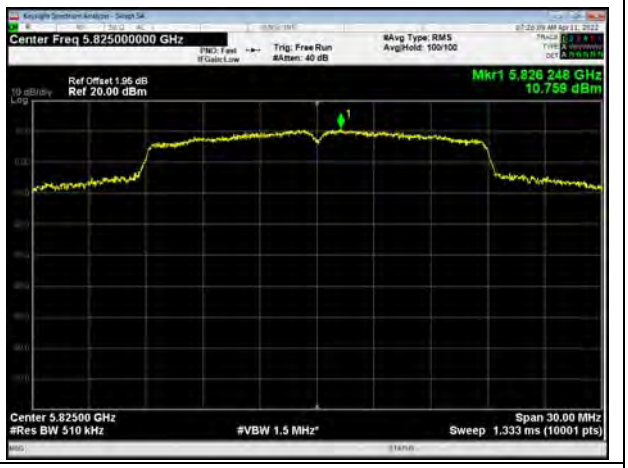


U-NII-3, 802.11n HT20, Channel No.: 157

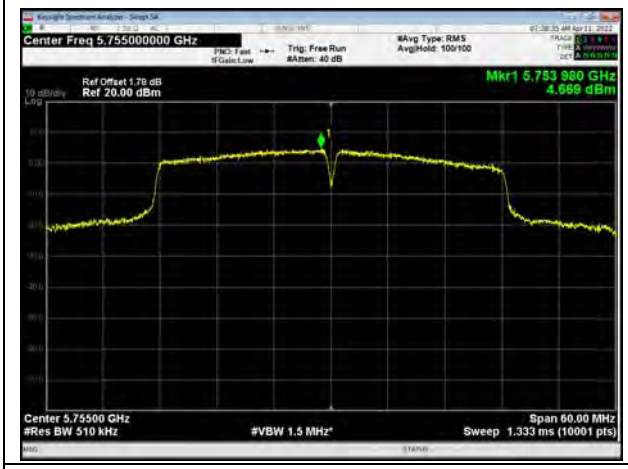


U-NII-3, 802.11a, Channel No.: 165

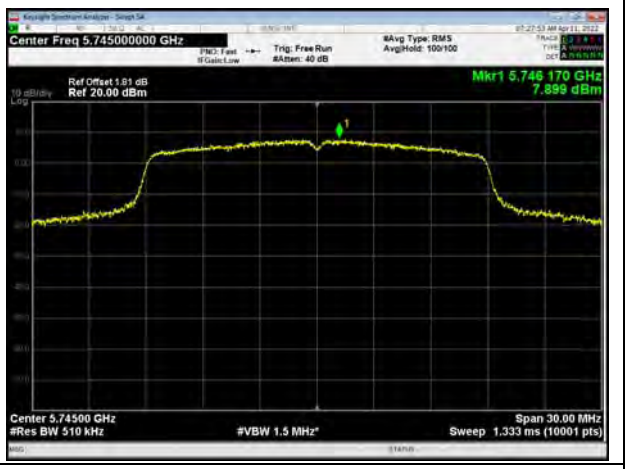
U-NII-3, 802.11n HT20, Channel No.: 165



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



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



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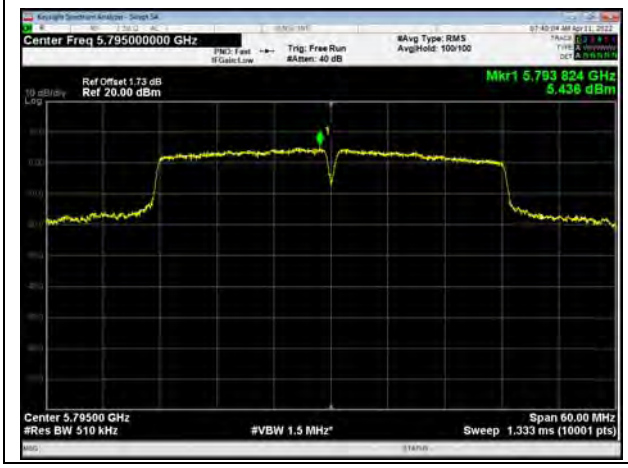
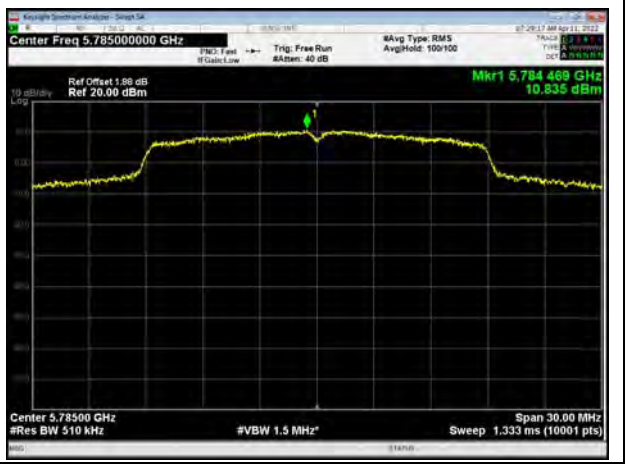
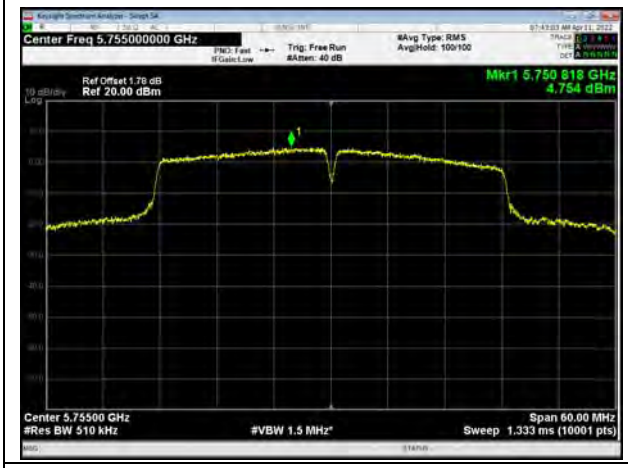


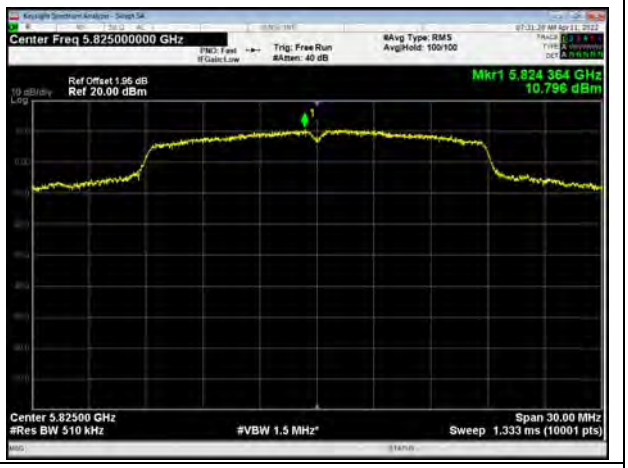
U-NII-3, 802.11ac VHT20, Channel No.: 157



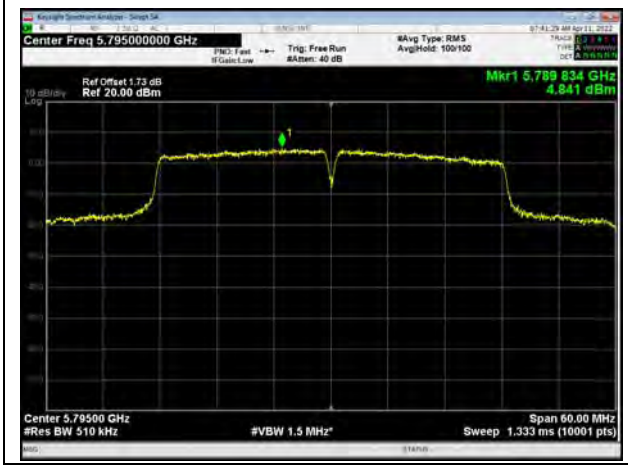
U-NII-3, 802.11ac VHT40, Channel No.: 151



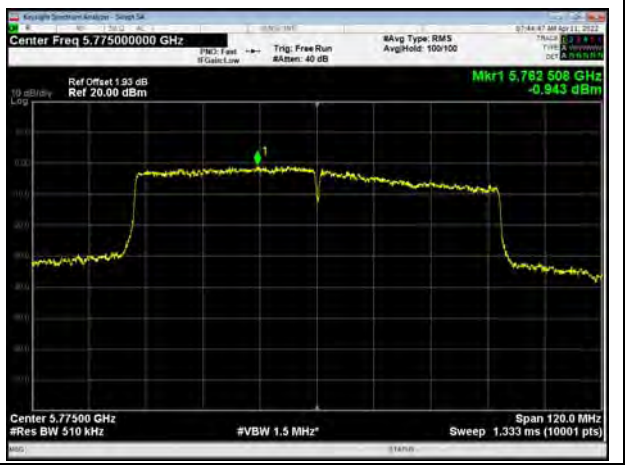
U-NII-3, 802.11ac VHT20, Channel No.: 165



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



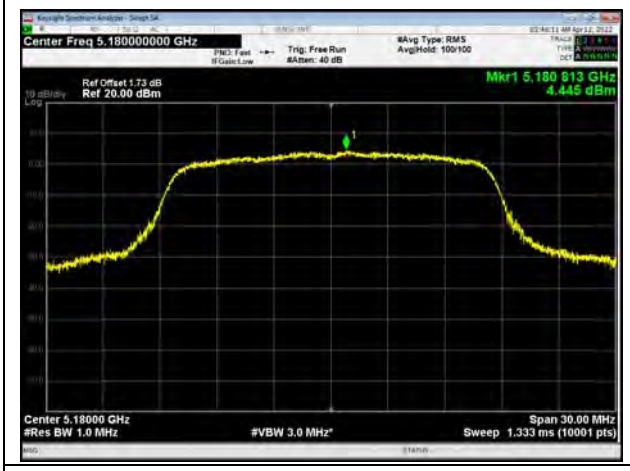
U-NII-3, 802.11ac VHT80, Channel No.: 155



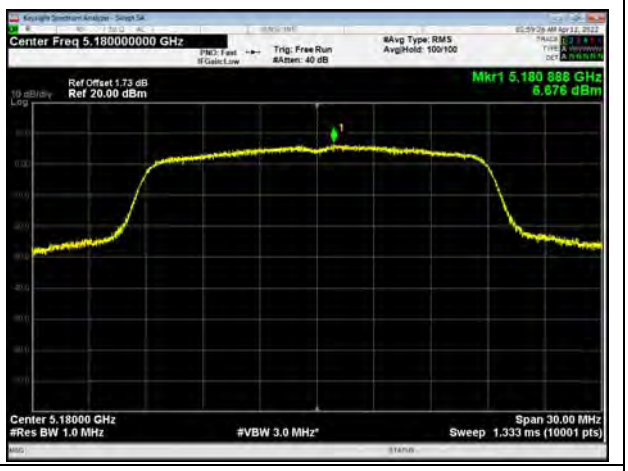
Beamforming

Antenna 1

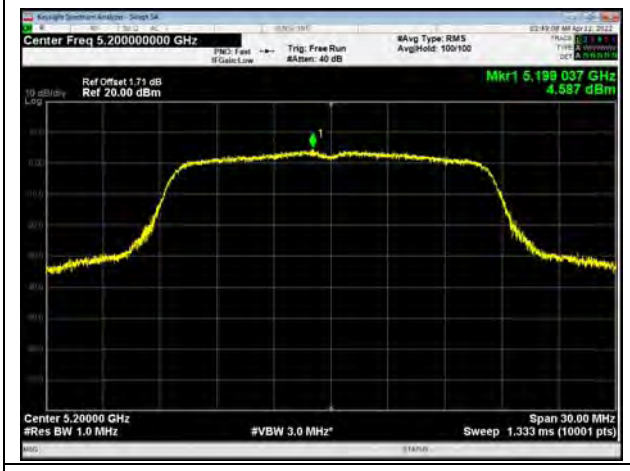
U-NII-1, 802.11a, Channel No.: 36



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

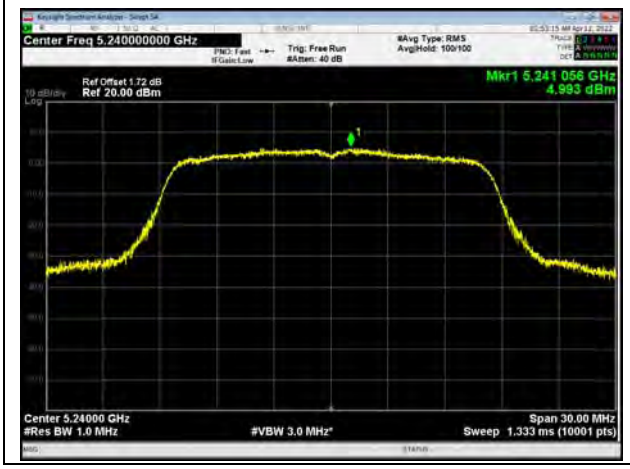


U-NII-1, 802.11a, Channel No.: 40

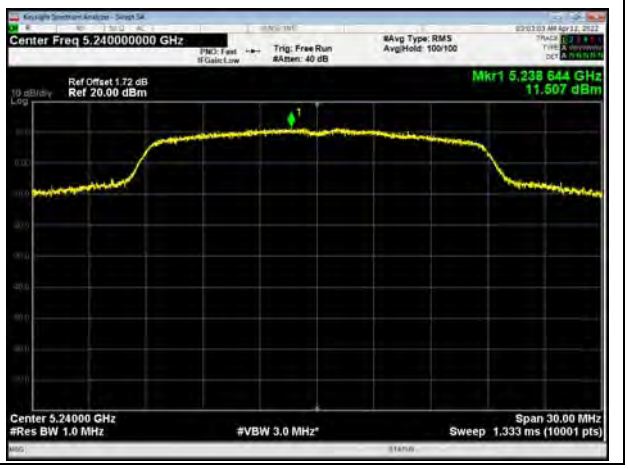


U-NII-1, 802.11n HT20, Channel No.: 40

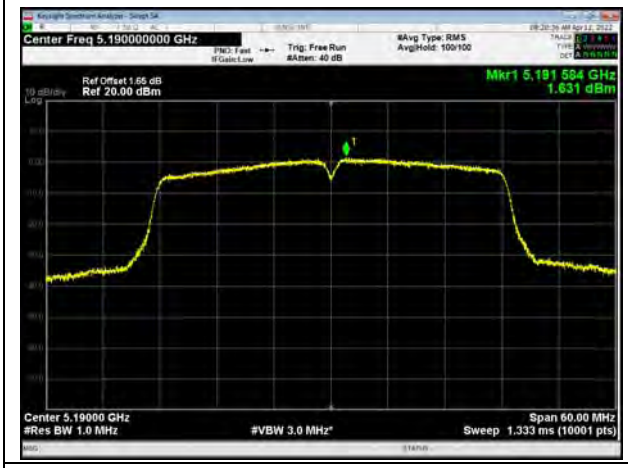
U-NII-1, 802.11a, Channel No.: 48



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



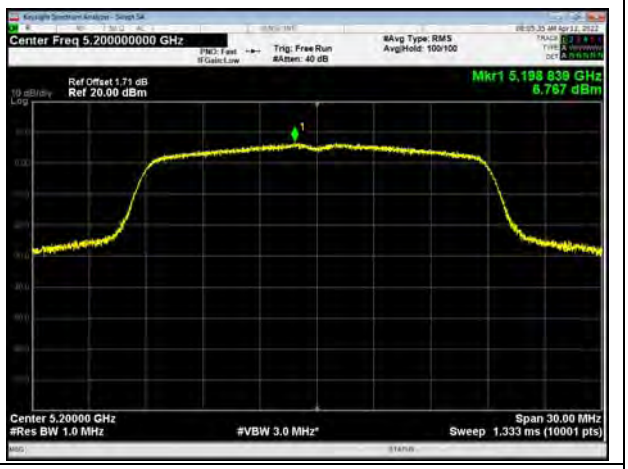
U-NII-1, 802.11n HT40, Channel No.: 38



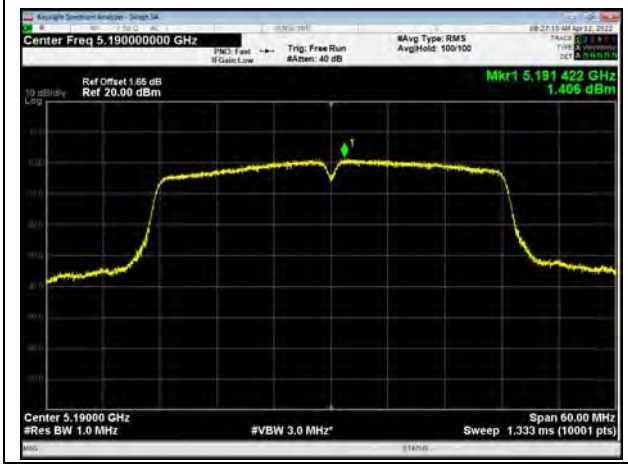
U-NII-1, 802.11ac VHT20, Channel No.: 36

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

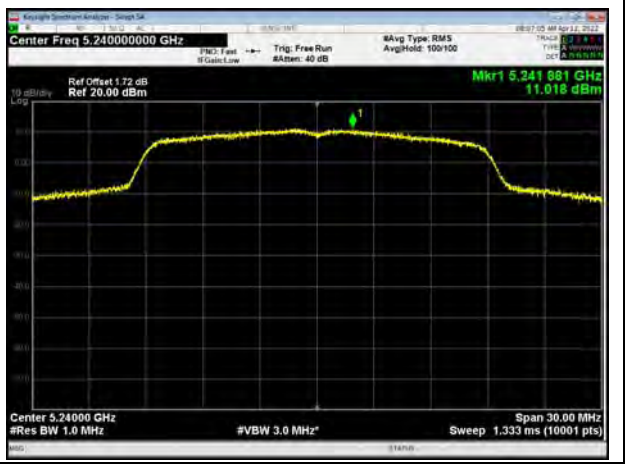
U-NII-1, 802.11ac VHT20, Channel No.: 40



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

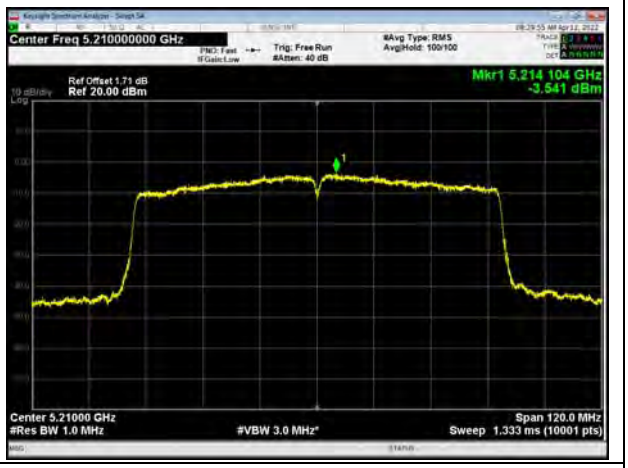


U-NII-1, 802.11ac VHT20, Channel No.: 48

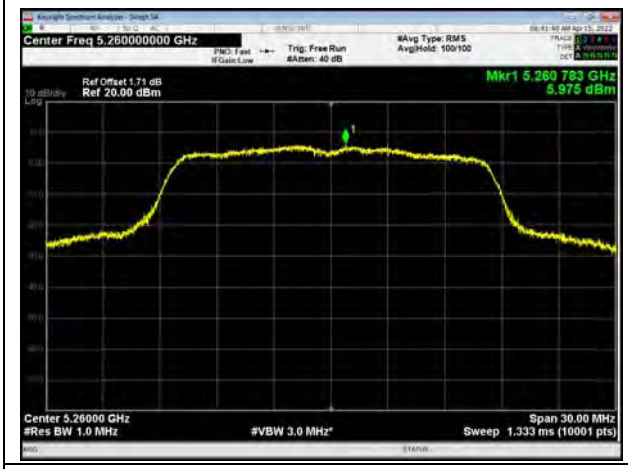


U-NII-1, 802.11ac VHT40, Channel No.: 46

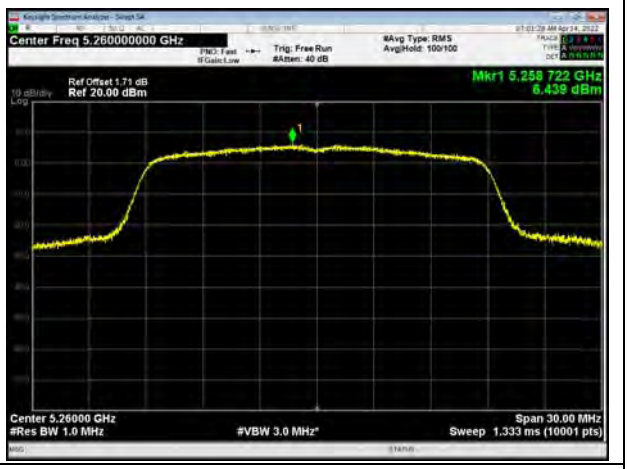
U-NII-1, 802.11ac VHT80, Channel No.: 42



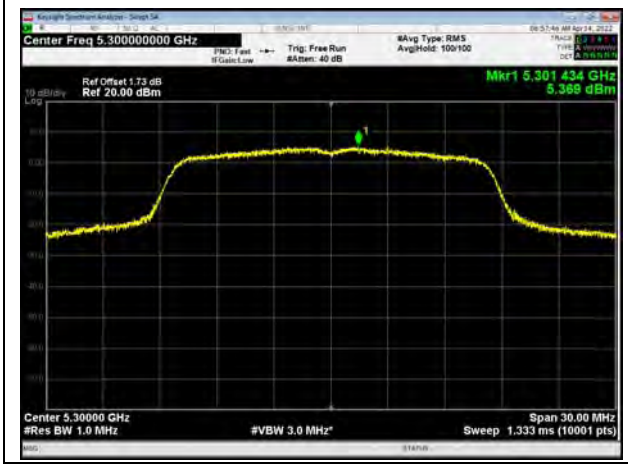
U-NII-2A, 802.11a, Channel No.: 52



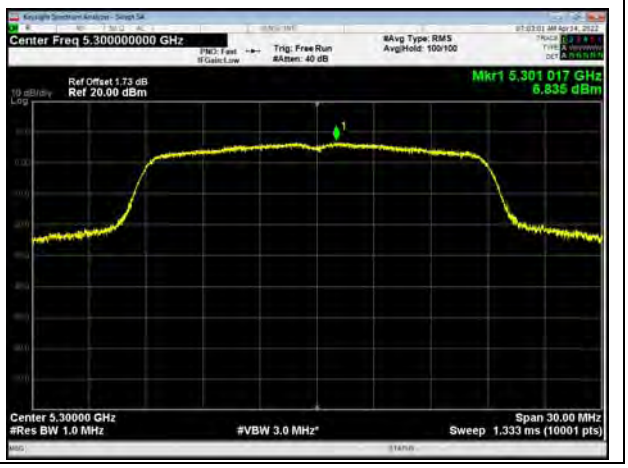
U-NII-2A, 802.11n HT20, Channel No.: 52



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



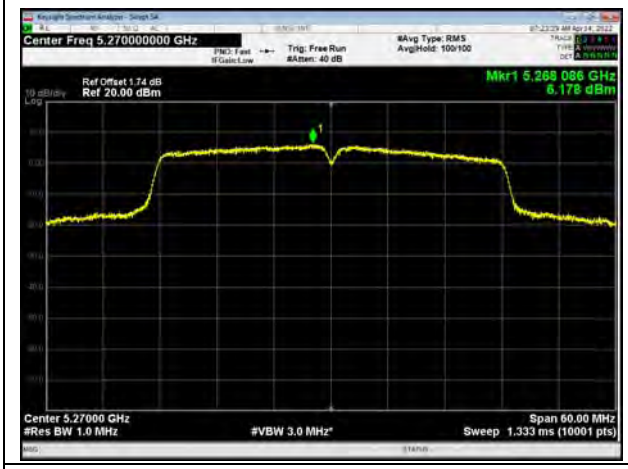
U-NII-2A, 802.11n HT20, Channel No.: 60



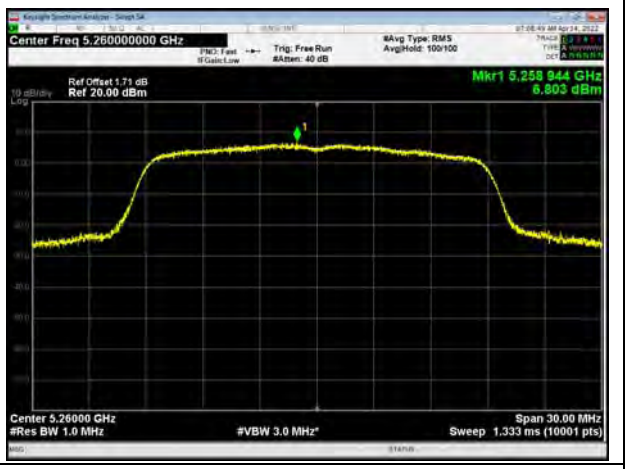
U-NII-2A, 802.11a, Channel No.: 64

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

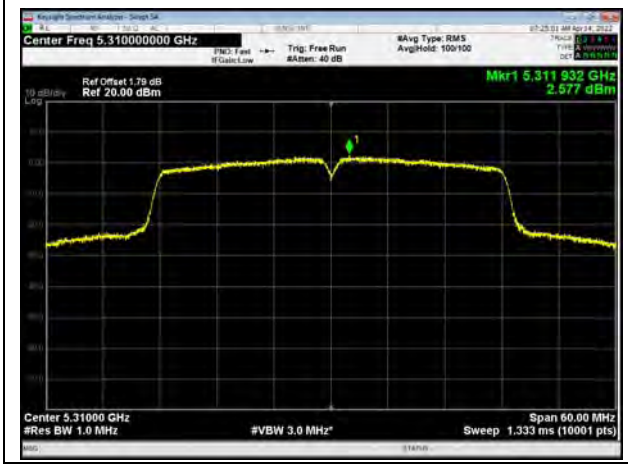
U-NII-2A, 802.11n HT40, Channel No.: 54



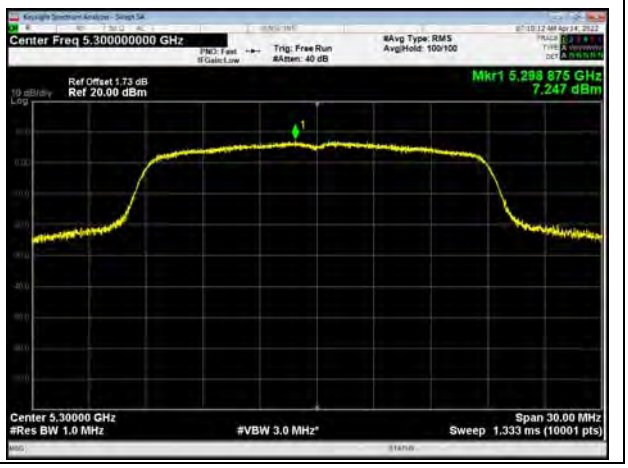
U-NII-2A, 802.11ac VHT20, Channel No.:52



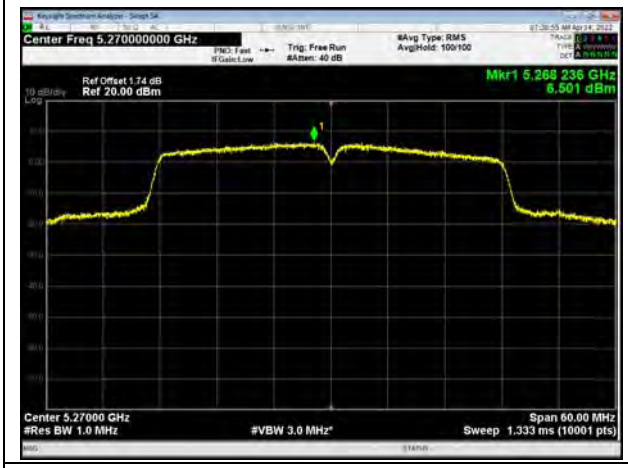
U-NII-2A, 802.11n HT40, Channel No.: 62



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

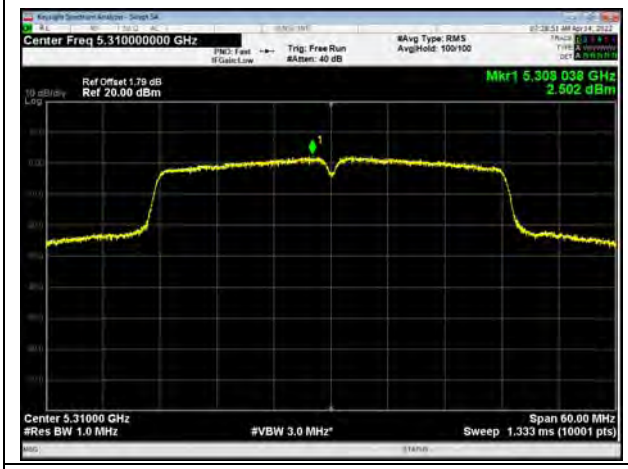


U-NII-2A, 802.11ac VHT40, Channel No.: 54

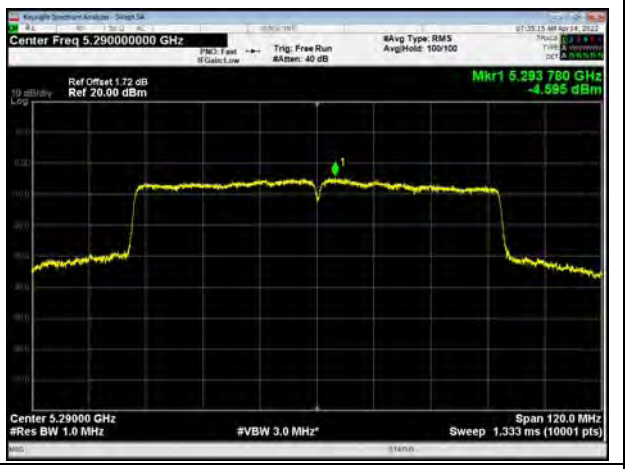


U-NII-2A, 802.11ac VHT20, Channel No.: 64

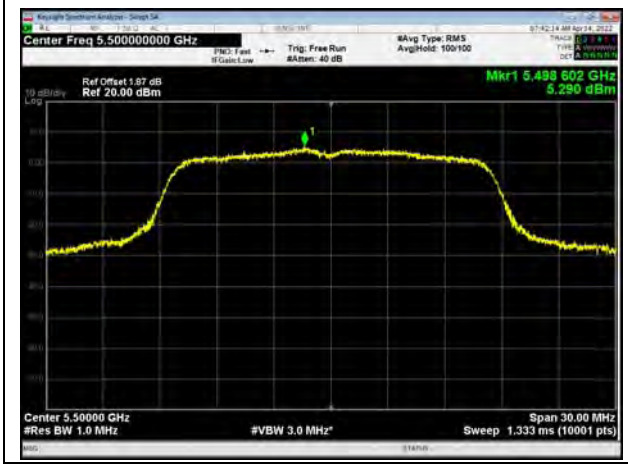
U-NII-2A, 802.11ac VHT40, Channel No.: 62



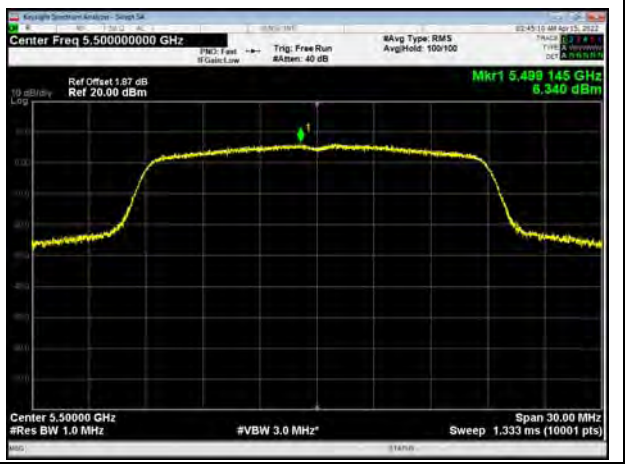
U-NII-2A, 802.11ac VHT80, Channel No.: 58



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



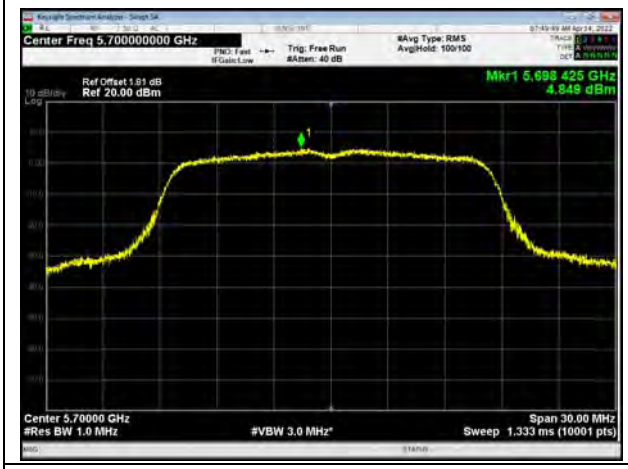
U-NII-2C, 802.11n HT20, Channel No.: 100



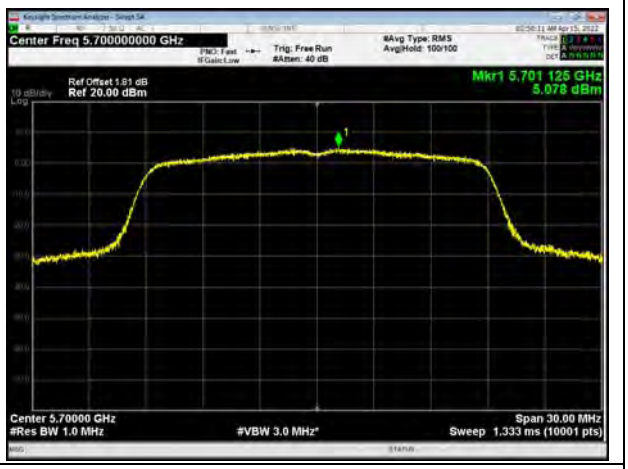
U-NII-2C, 802.11a, Channel No.: 120

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

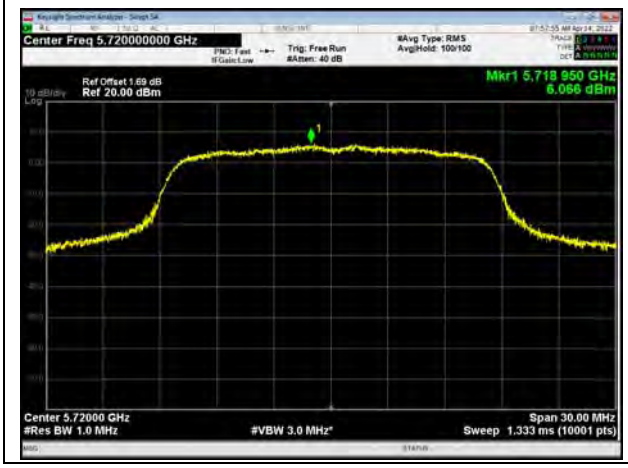
U-NII-2C, 802.11a, Channel No.: 140



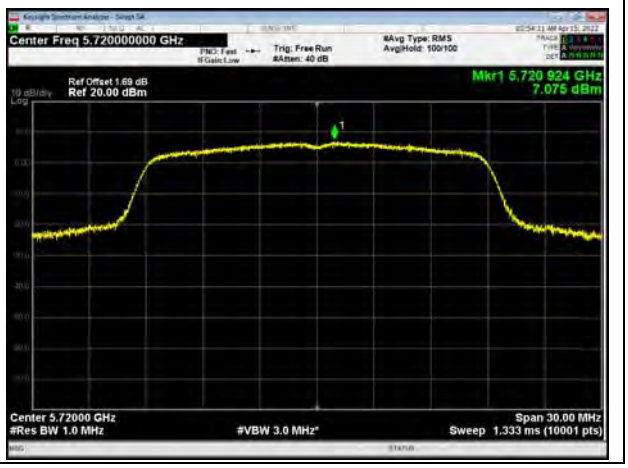
U-NII-2C, 802.11n HT20, Channel No.: 140



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

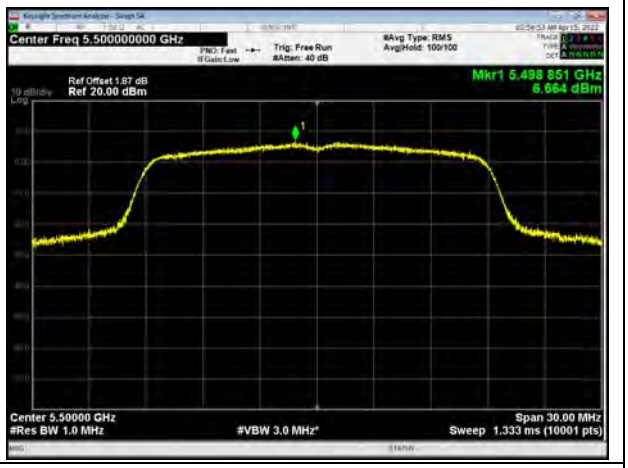


U-NII-2C, 802.11n HT20, Channel No.: 144

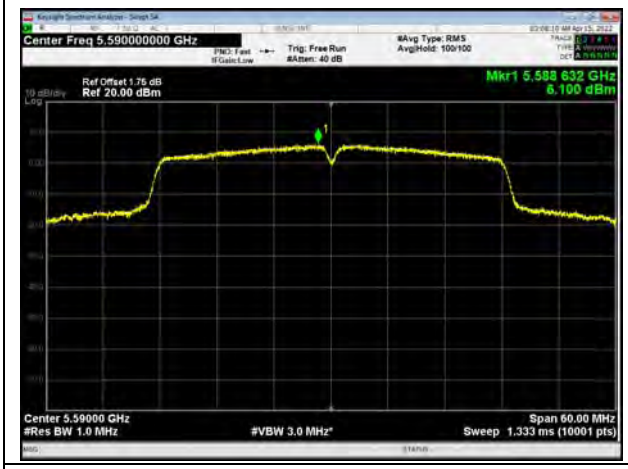


U-NII-2C, 802.11n HT40, Channel No.: 102

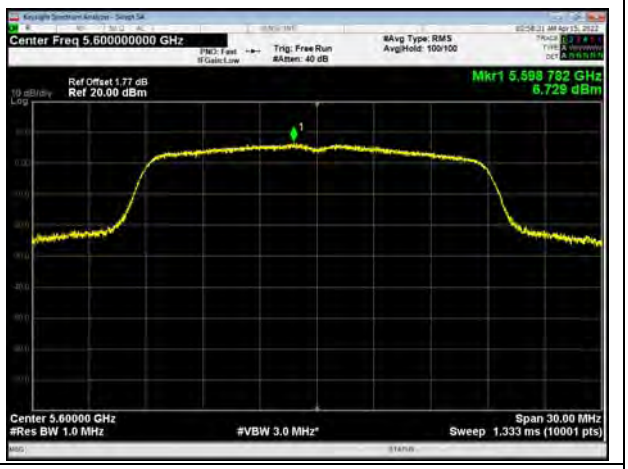
U-NII-2C, 802.11ac VHT20, Channel No.: 100



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

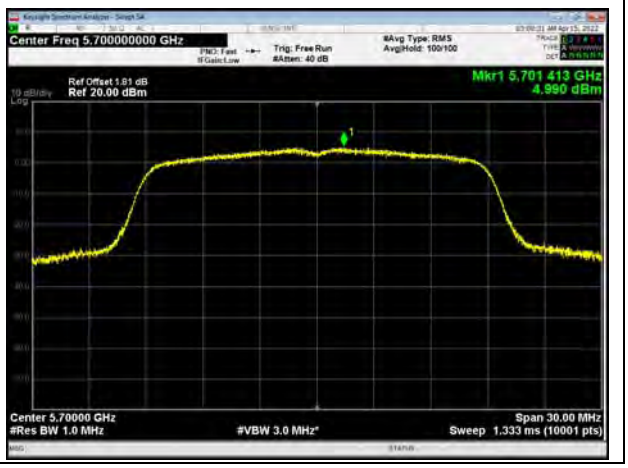


U-NII-2C, 802.11ac VHT20, Channel No.: 120



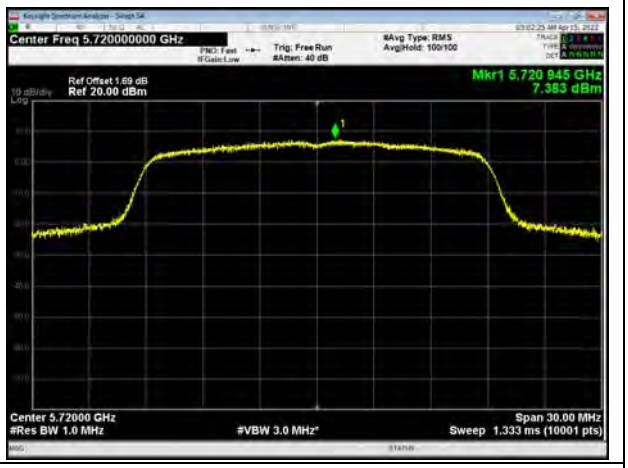
U-NII-2C, 802.11n HT40, Channel No.: 134

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



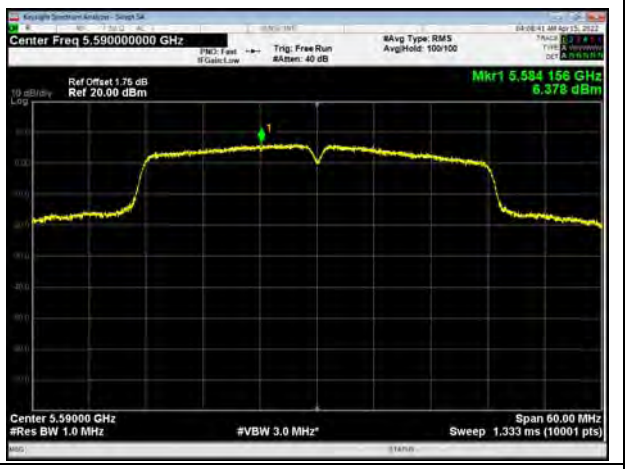
U-NII-2C, 802.11n HT40, Channel No.: 142

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

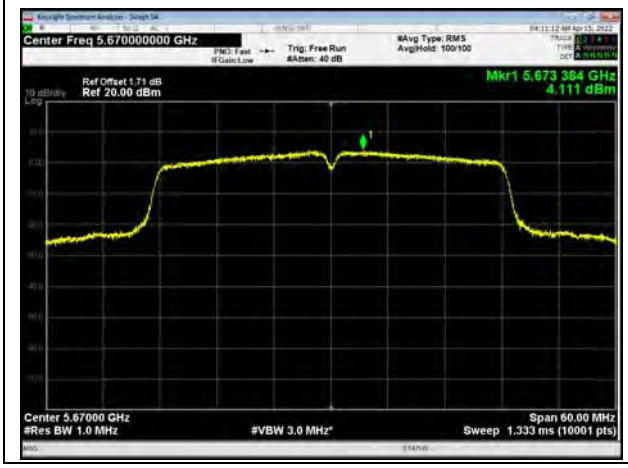


U-NII-2C, 802.11ac VHT40, Channel No.: 102

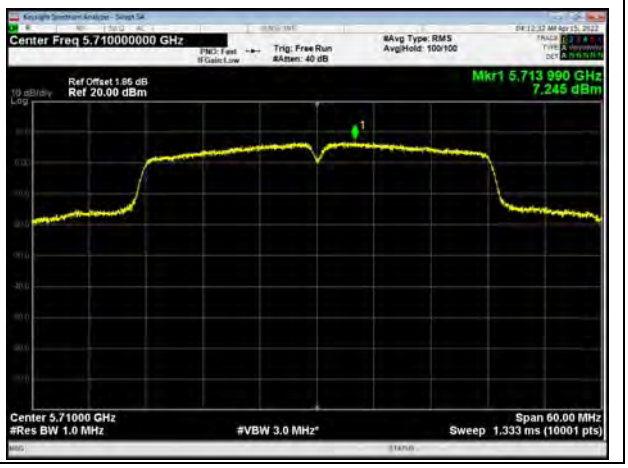
U-NII-2C, 802.11ac VHT40, Channel No.: 118



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

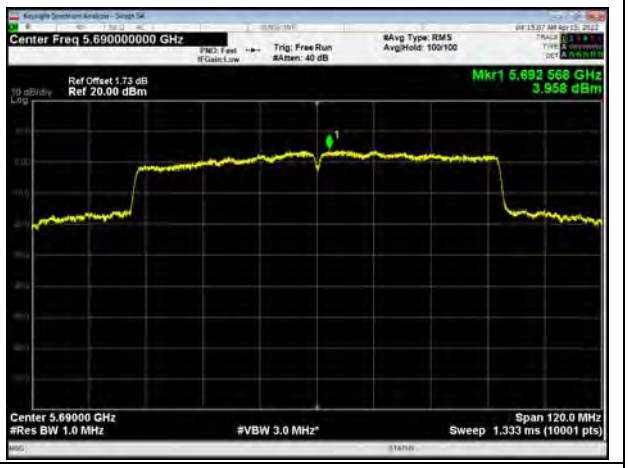


U-NII-2C, 802.11ac VHT40, Channel No.: 142

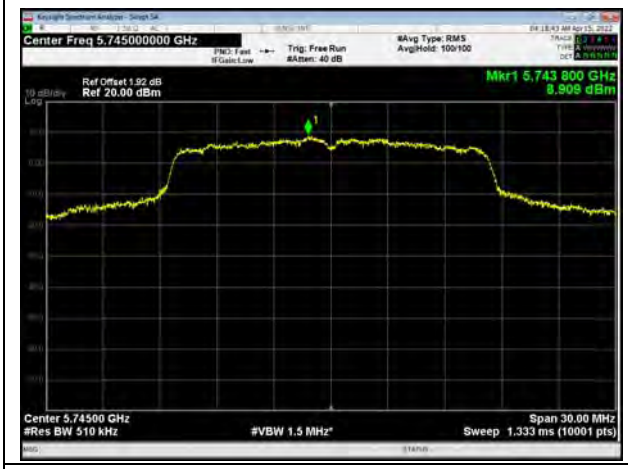


U-NII-2C, 802.11ac VHT80, Channel No.: 122

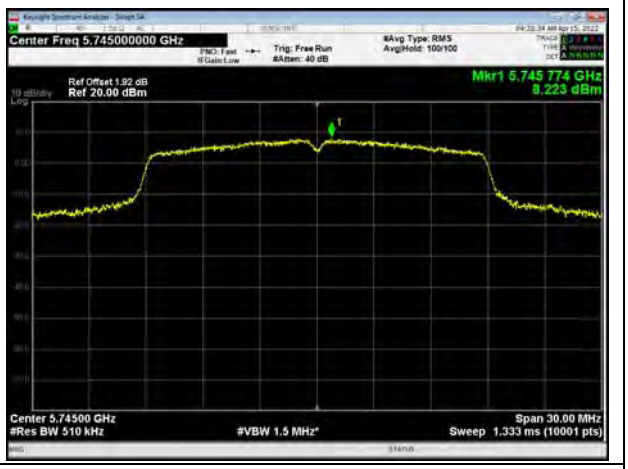
U-NII-2C, 802.11ac VHT80, Channel No.: 138



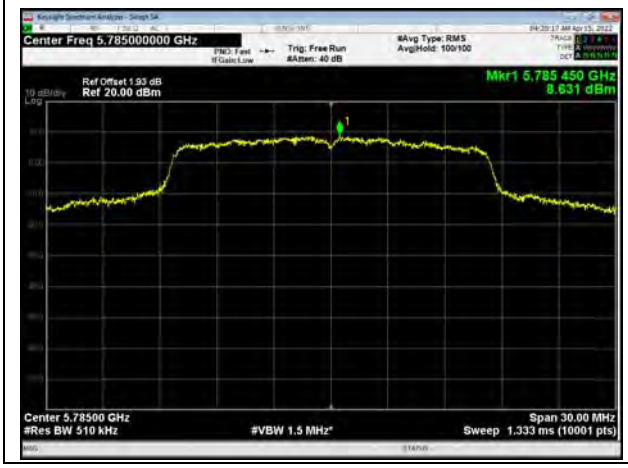
U-NII-3, 802.11a, Channel No.: 149



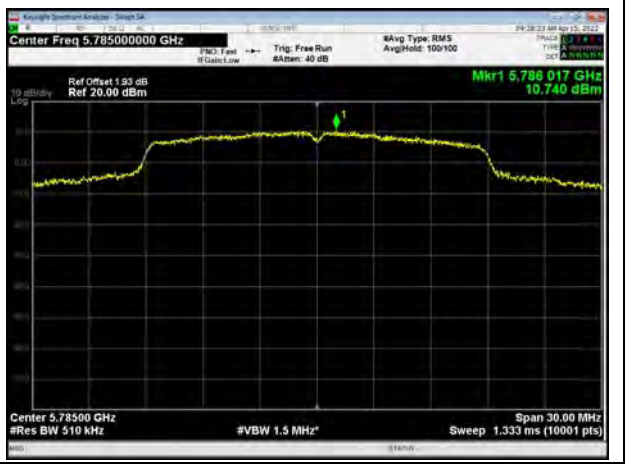
U-NII-3, 802.11n HT20, Channel No.: 149



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



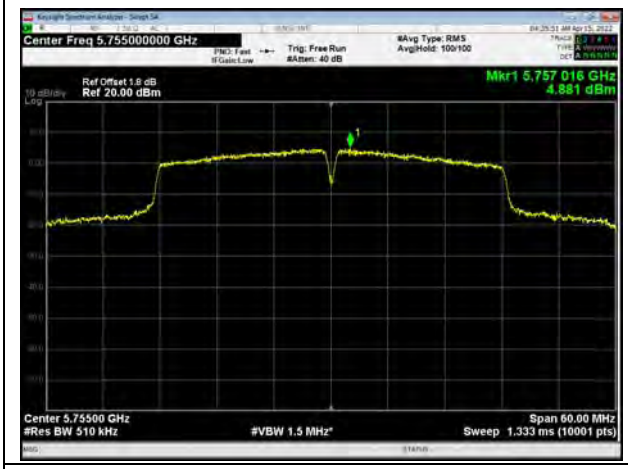
U-NII-3, 802.11n HT20, Channel No.: 157



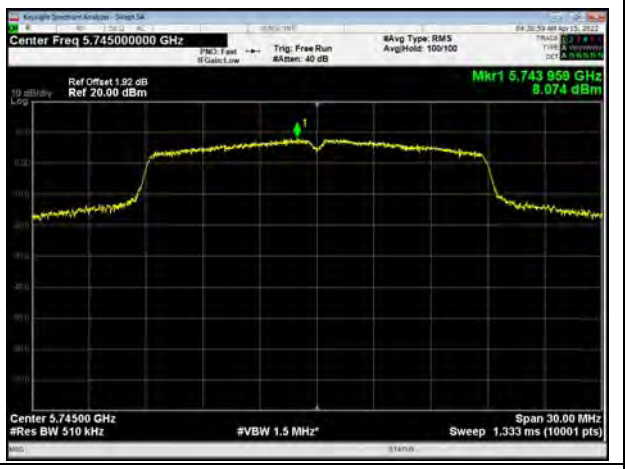
U-NII-3, 802.11a, Channel No.: 165

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



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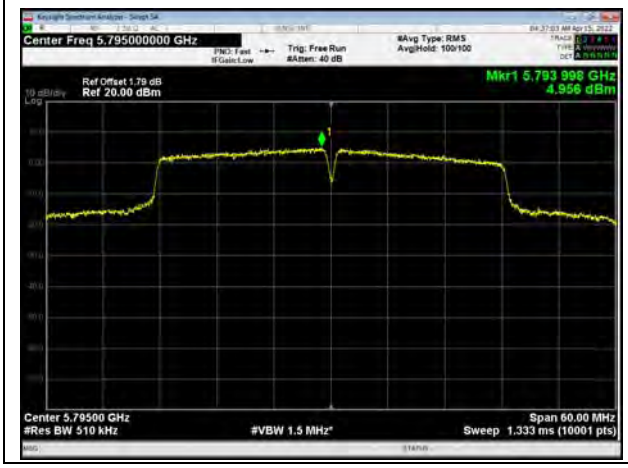
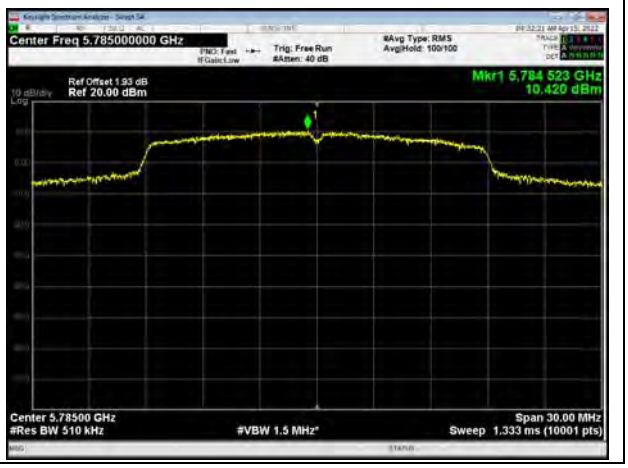


U-NII-3, 802.11ac VHT20, Channel No.: 157



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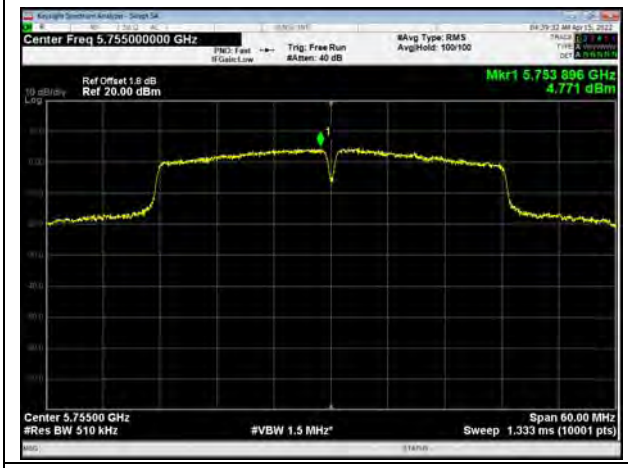
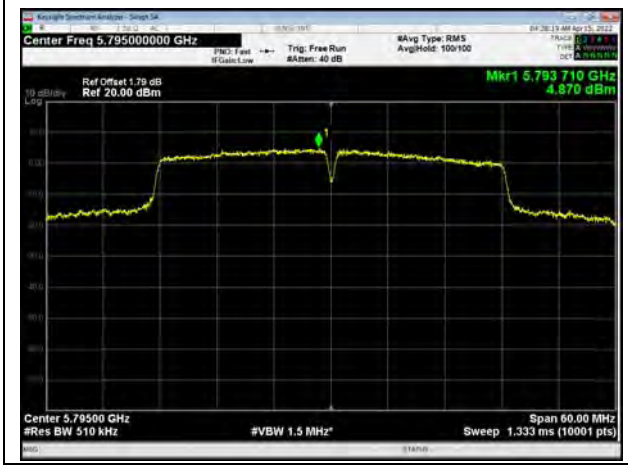
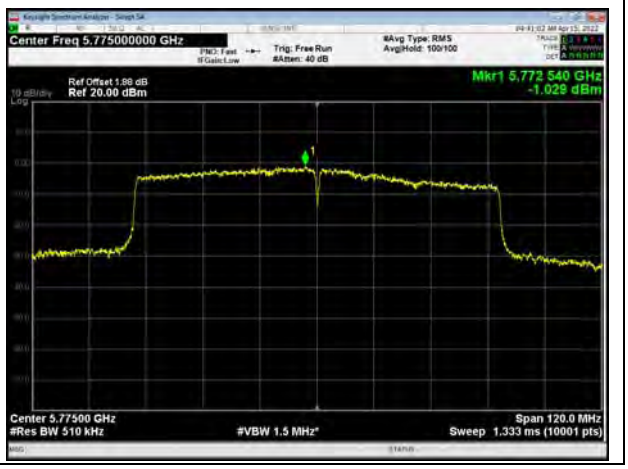


U-NII-3, 802.11ac VHT20, Channel No.: 165

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

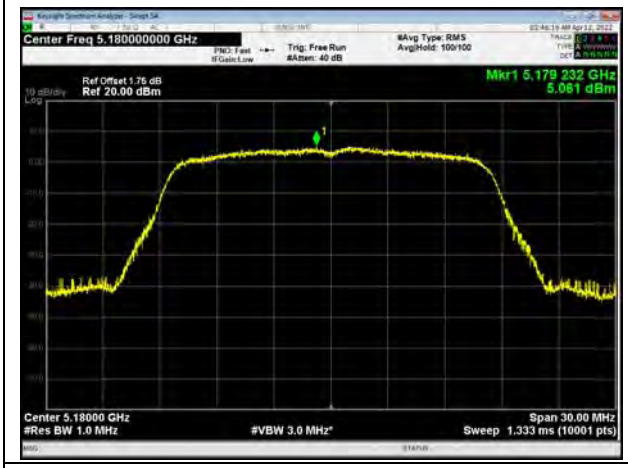


U-NII-3, 802.11ac VHT80, Channel No.: 155

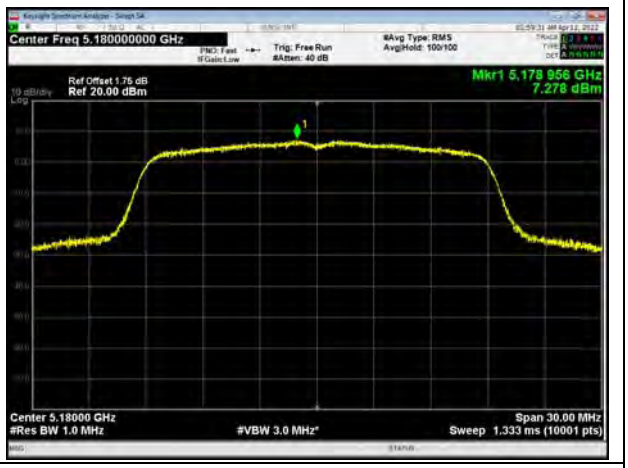


Antenna 2

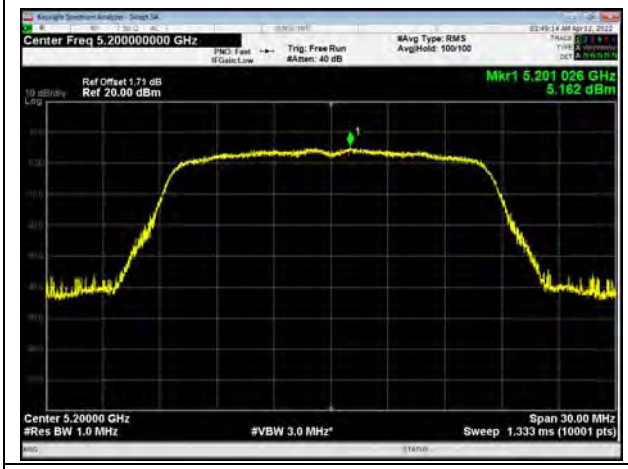
U-NII-1, 802.11a, Channel No.: 36



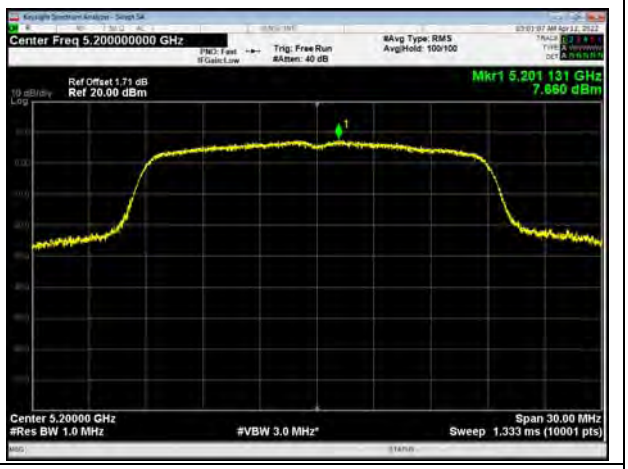
U-NII-1, 802.11n HT20, Channel No.: 36



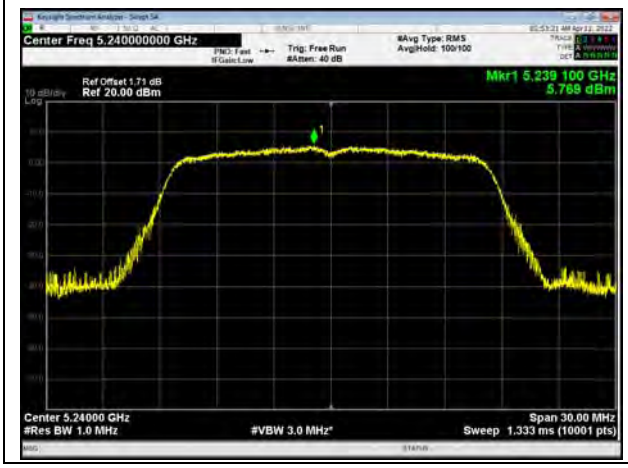
U-NII-1, 802.11a, Channel No.: 40



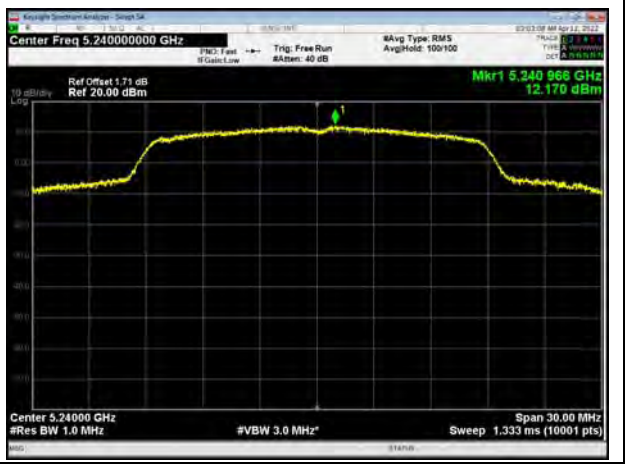
U-NII-1, 802.11n HT20, Channel No.: 40



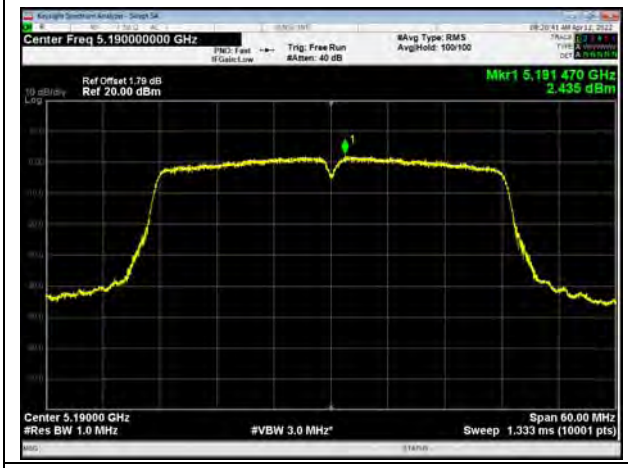
U-NII-1, 802.11a, Channel No.: 48



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

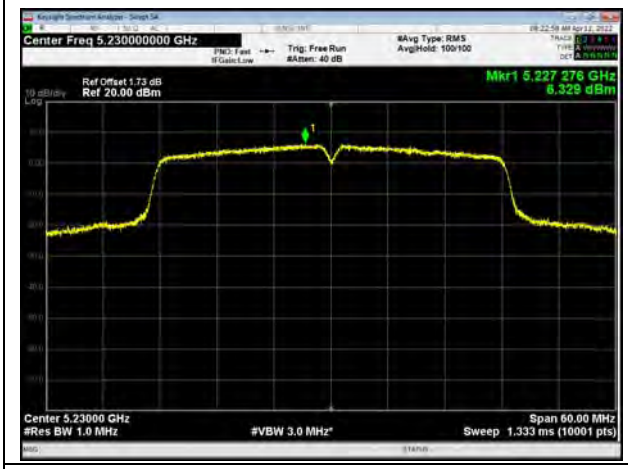


U-NII-1, 802.11n HT40, Channel No.: 38



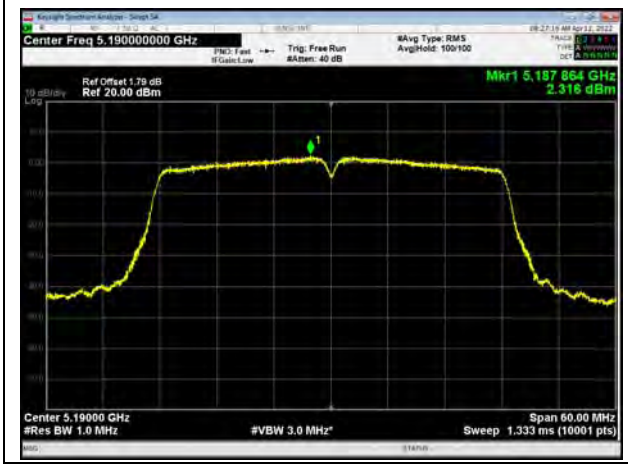
U-NII-1, 802.11ac VHT20, Channel No.: 36

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



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

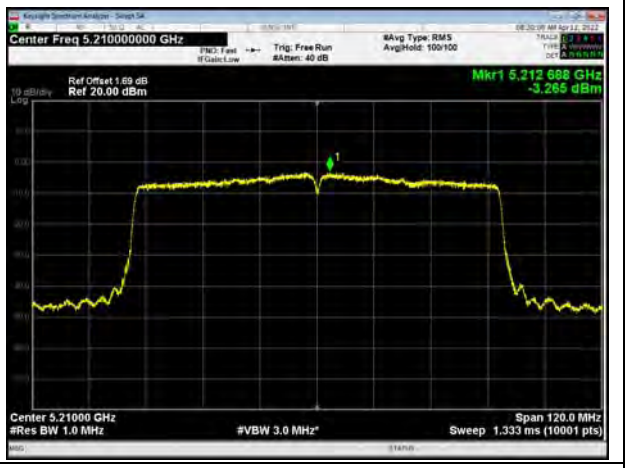
U-NII-1, 802.11ac VHT40, Channel No.: 38



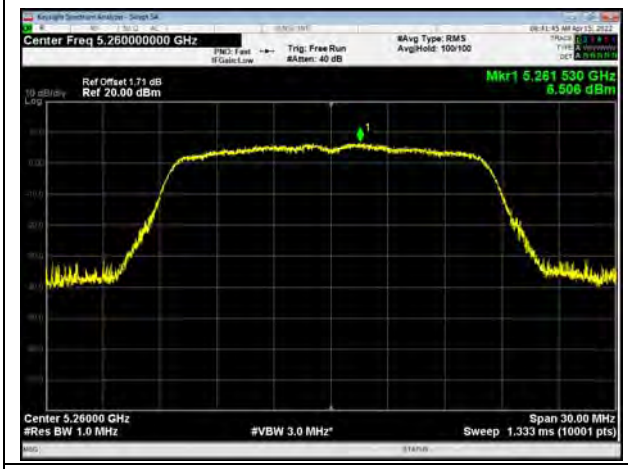
U-NII-1, 802.11ac VHT20, Channel No.: 48

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

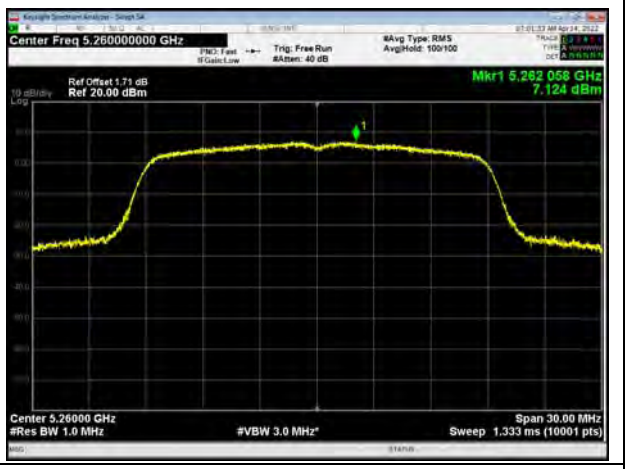
U-NII-1, 802.11ac VHT80, Channel No.: 42



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



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



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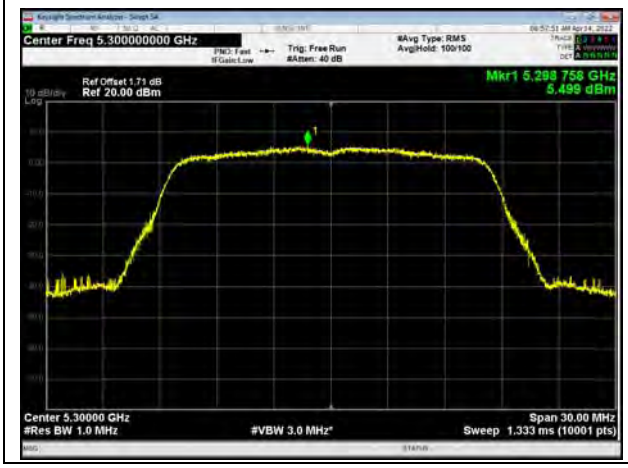

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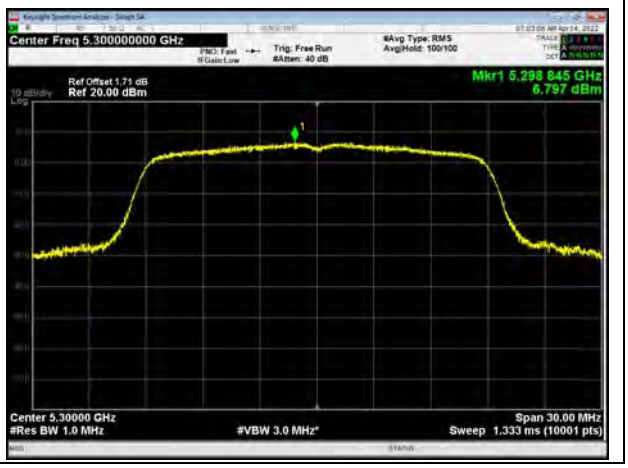

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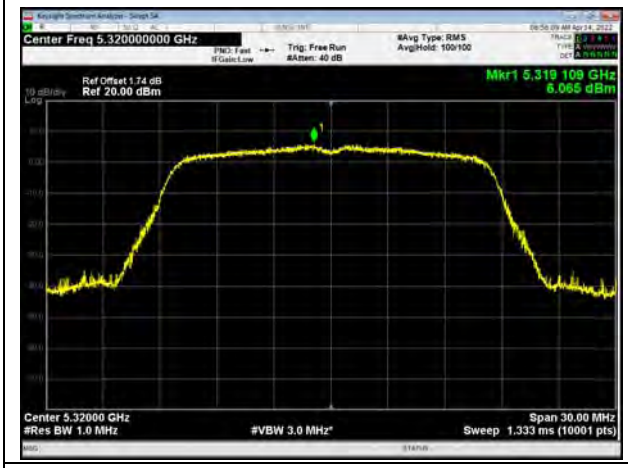

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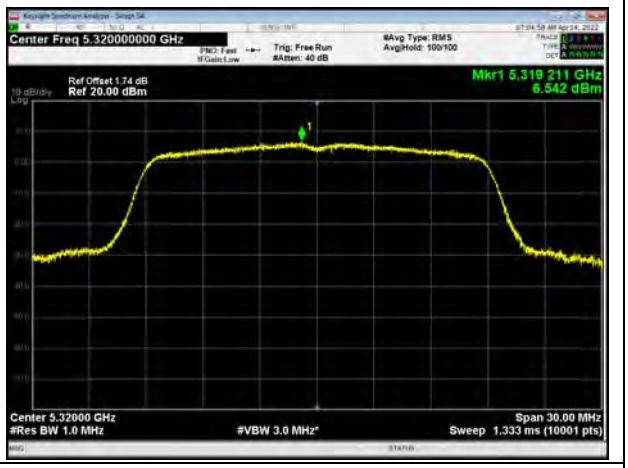

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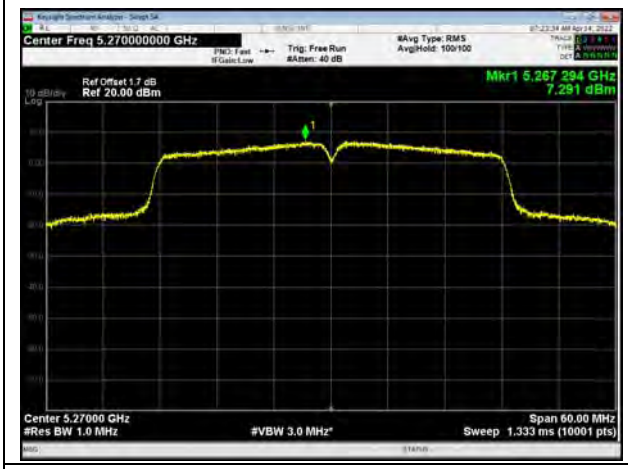
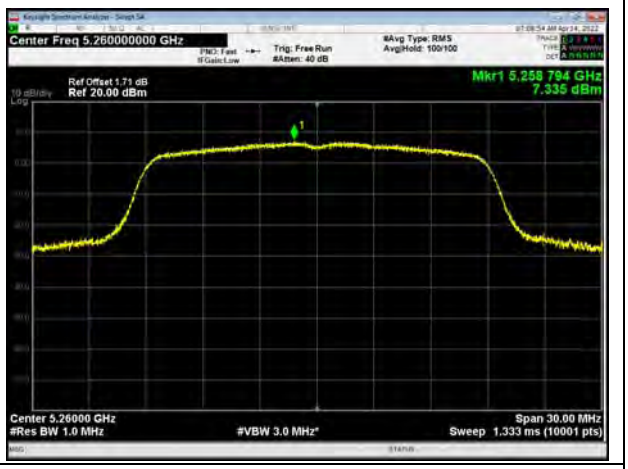


U-NII-2A, 802.11ac VHT20, Channel No.:52



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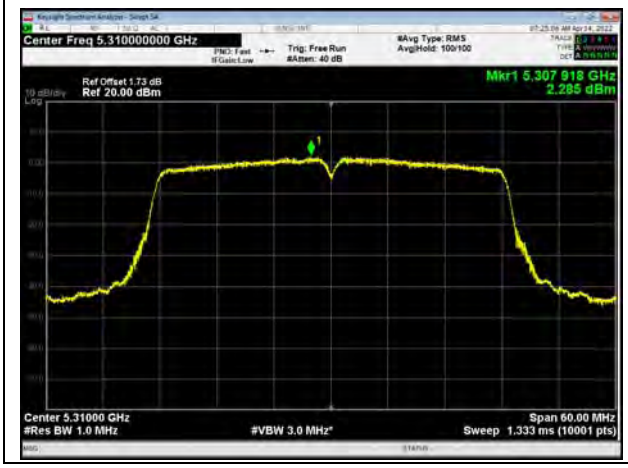

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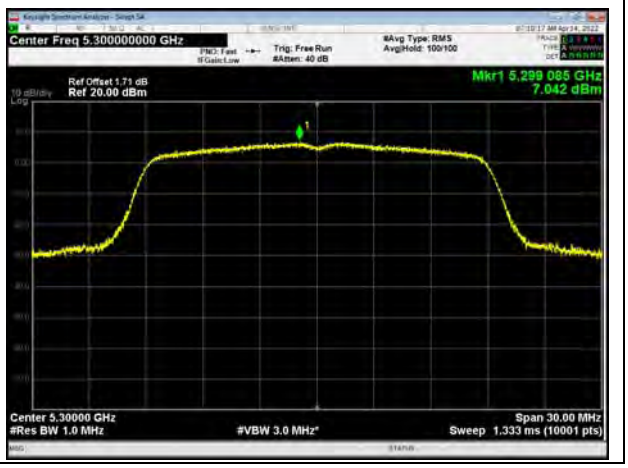
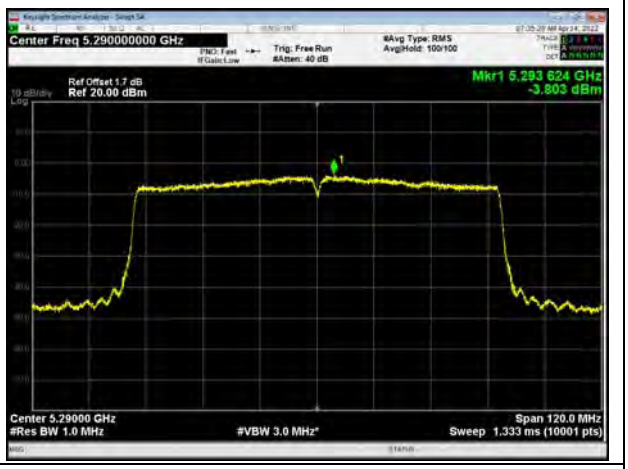


U-NII-2A, 802.11ac VHT40, Channel No.: 54

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



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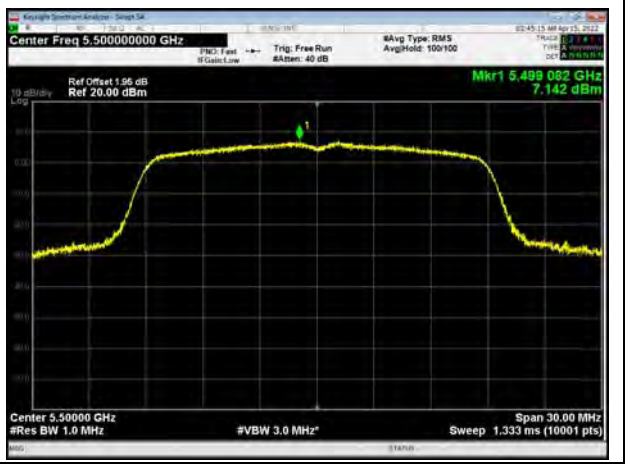
U-NII-2C, 802.11n HT20, Channel No.: 100



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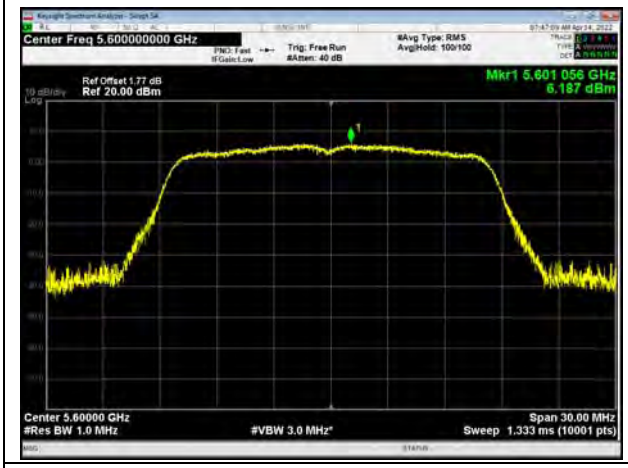

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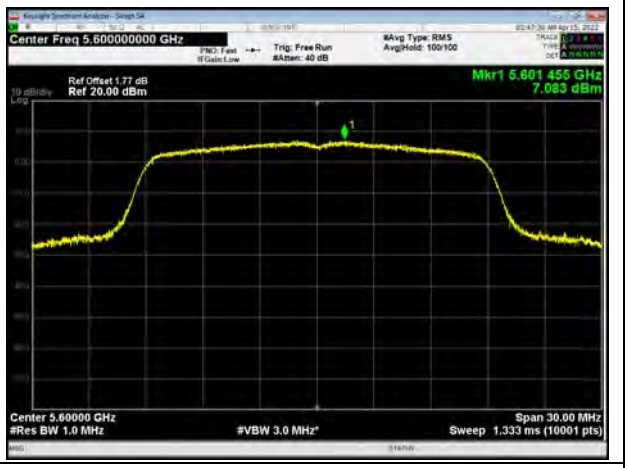

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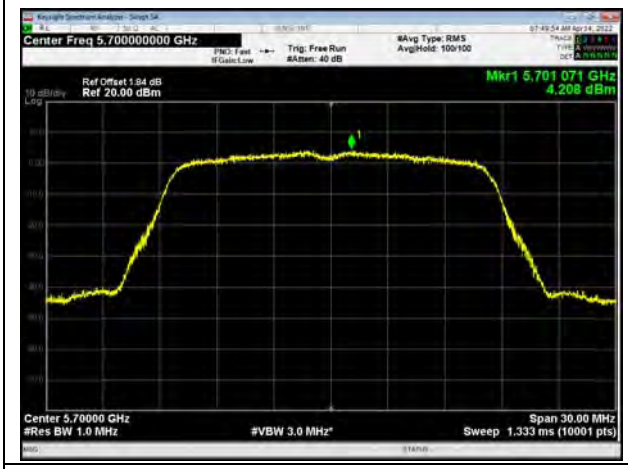

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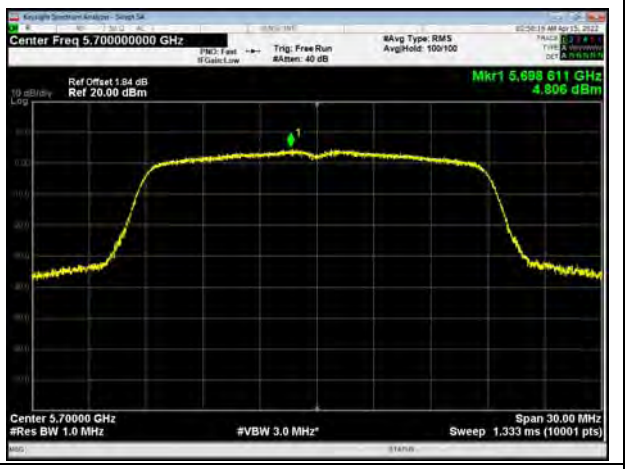

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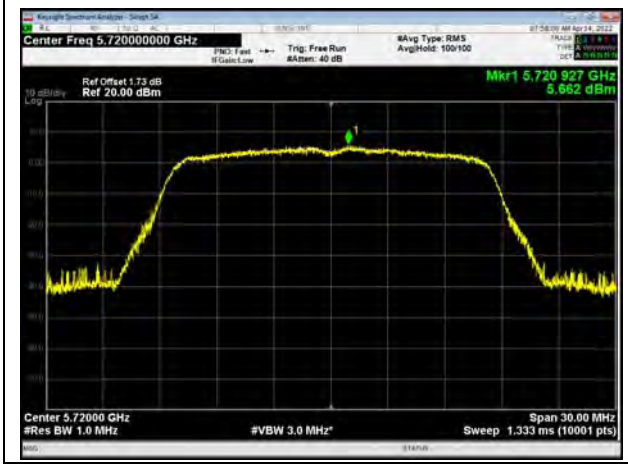

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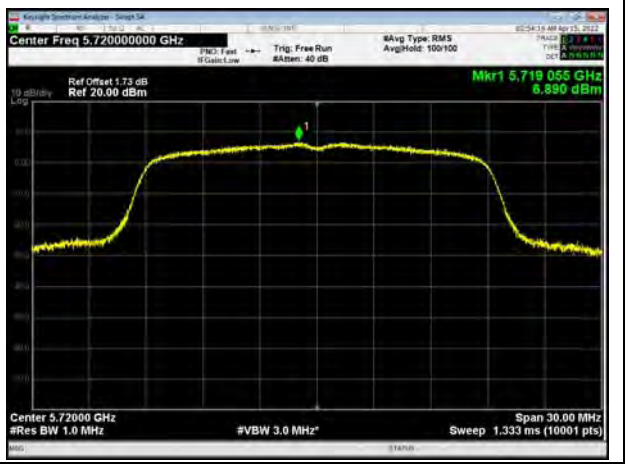
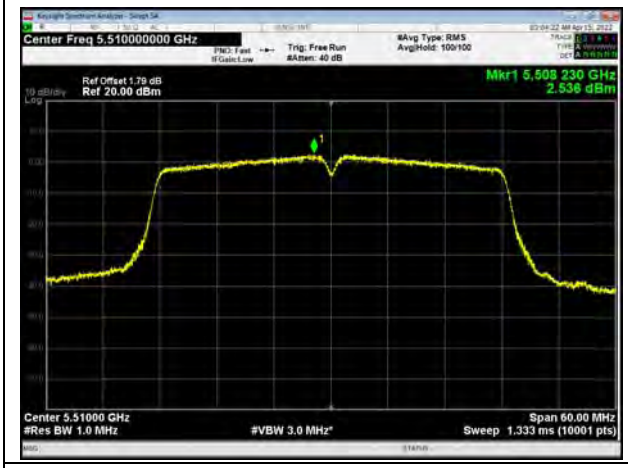
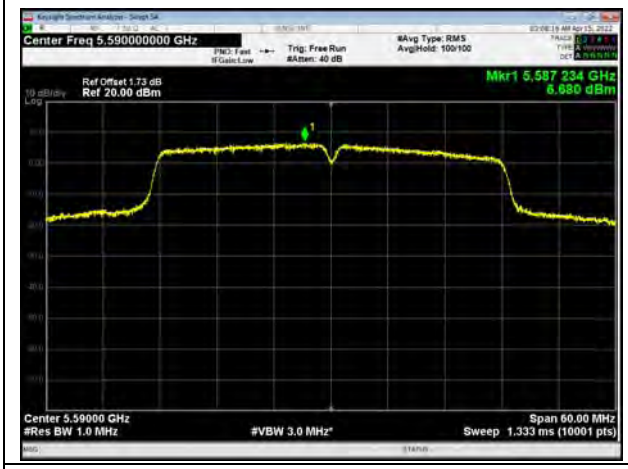


U-NII-2C, 802.11n HT40, Channel No.: 102



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

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



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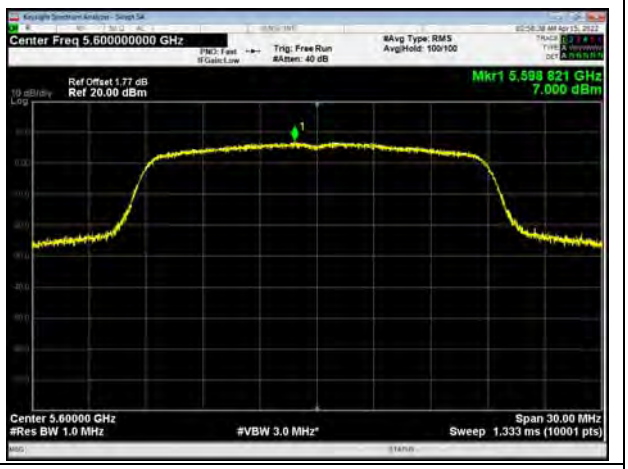

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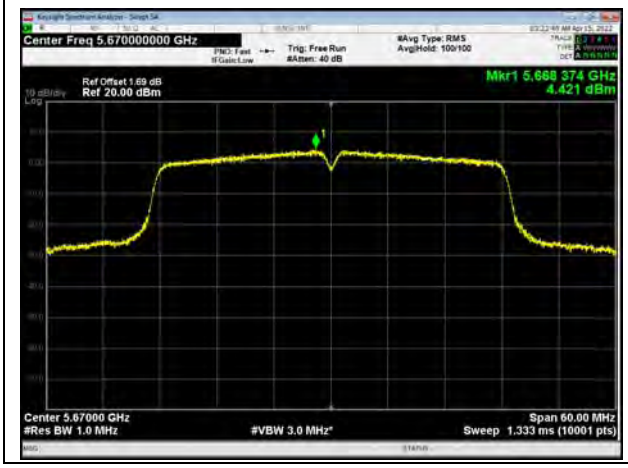

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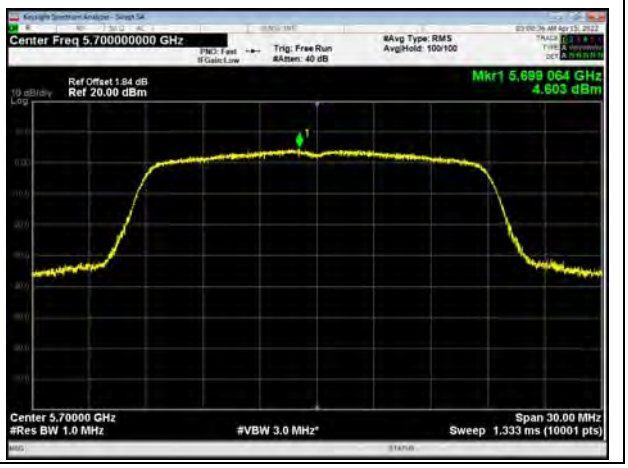

U-NII-2C, 802.11n HT40, Channel No.: 142

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

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

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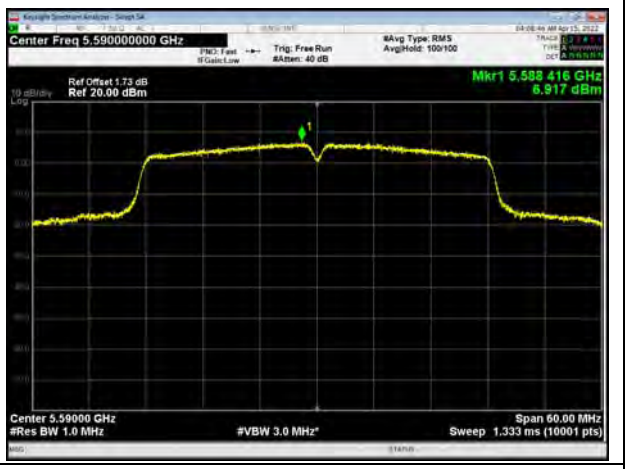

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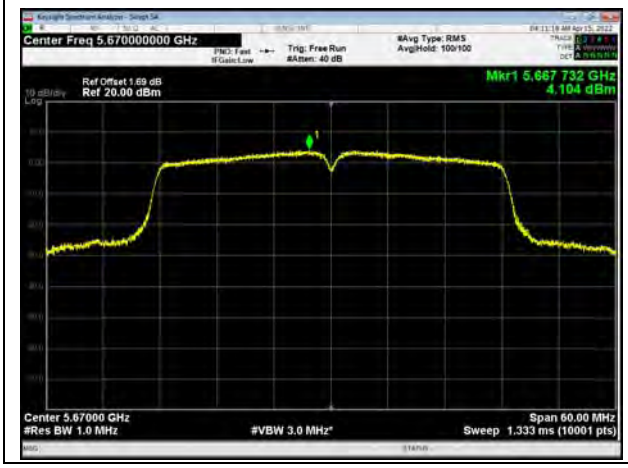

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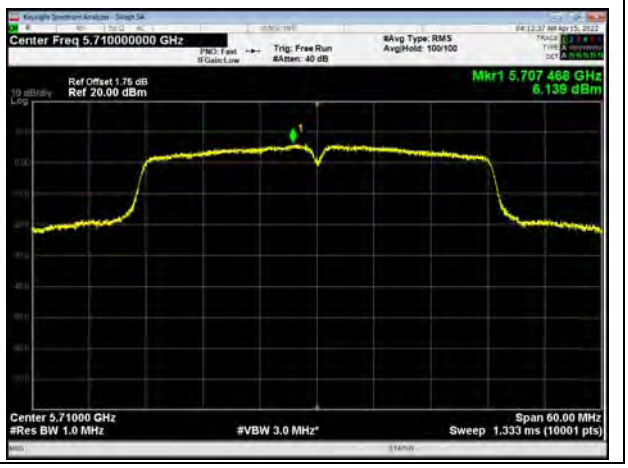

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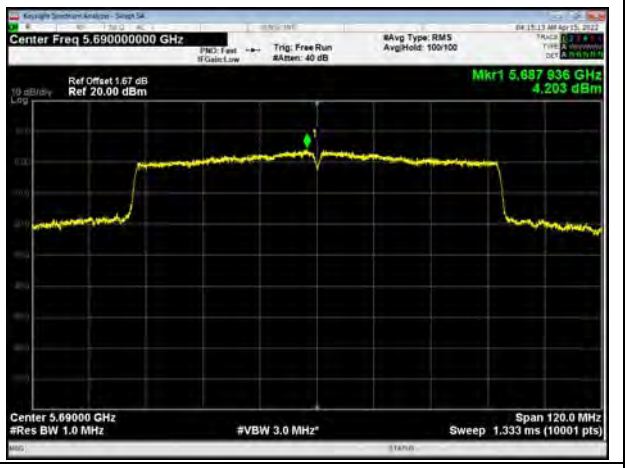
U-NII-2C, 802.11ac VHT80, Channel No.: 138



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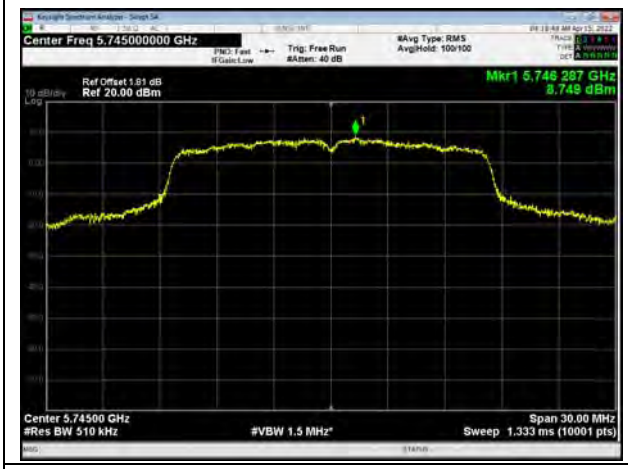

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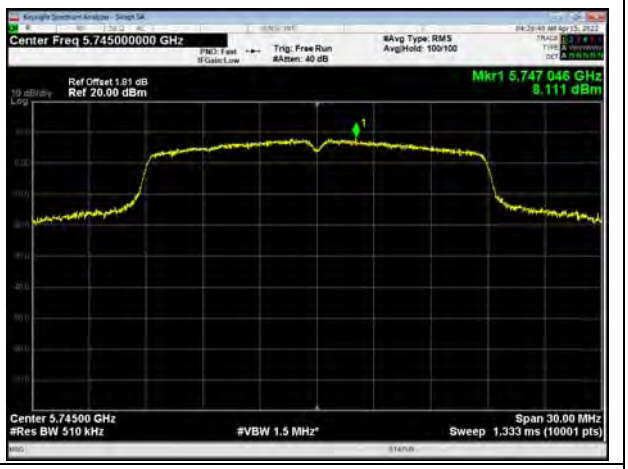

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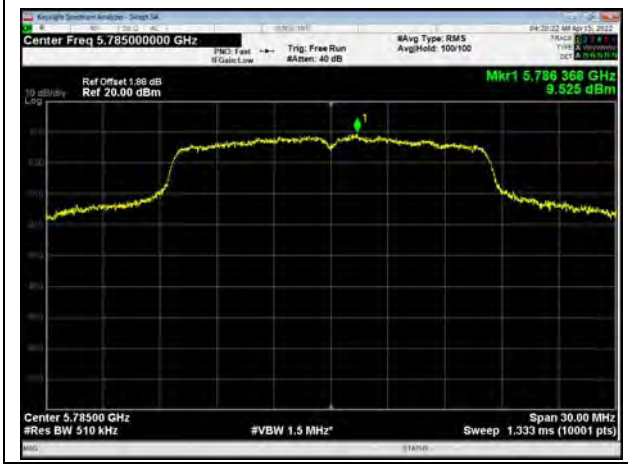

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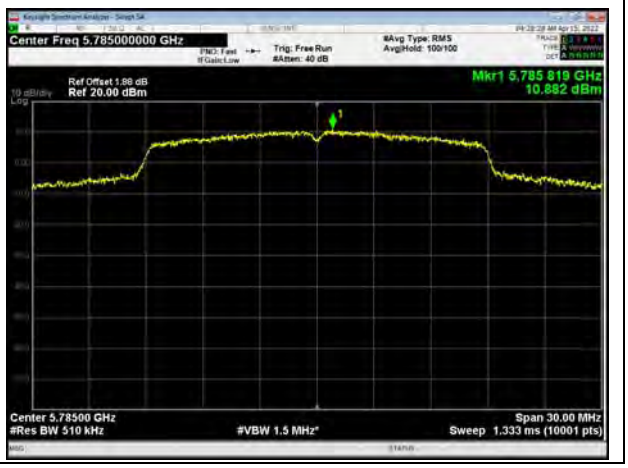

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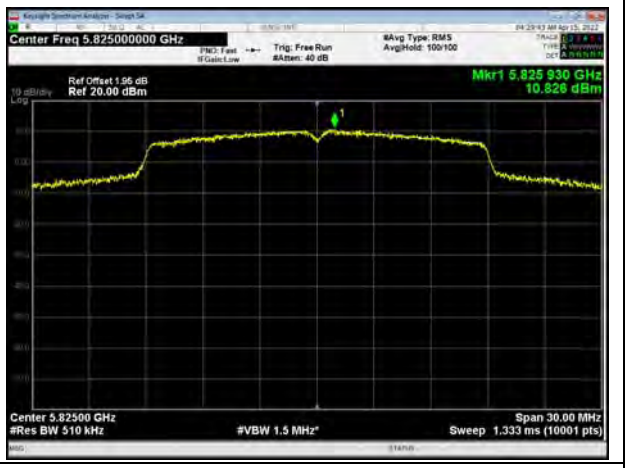
U-NII-3, 802.11n HT20, Channel No.: 165



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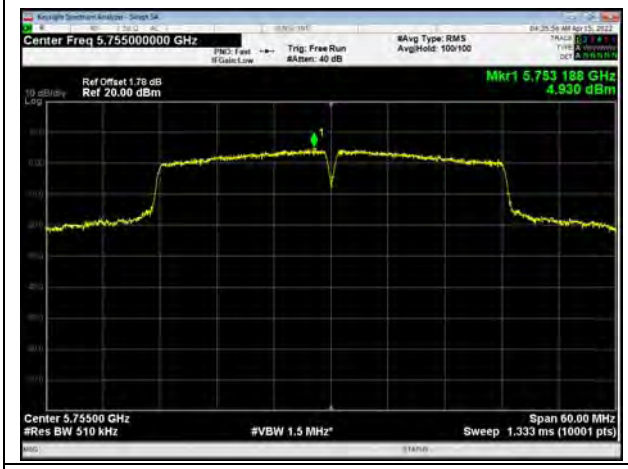

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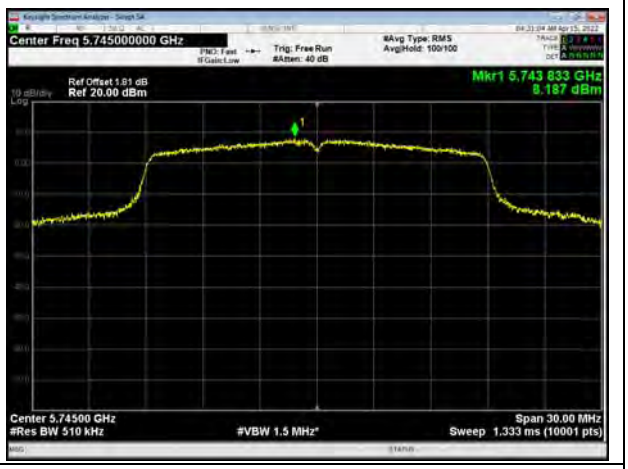

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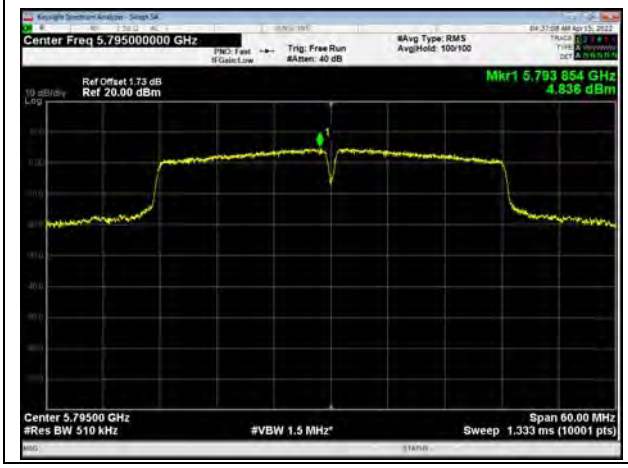

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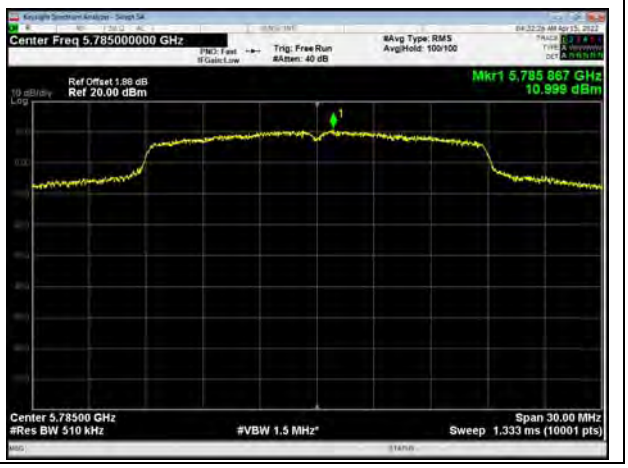

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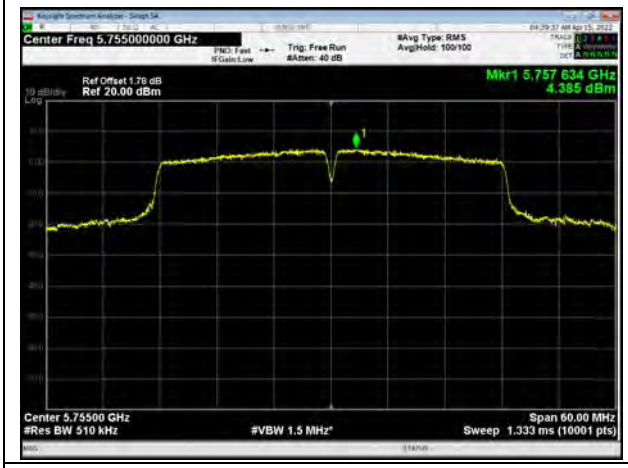

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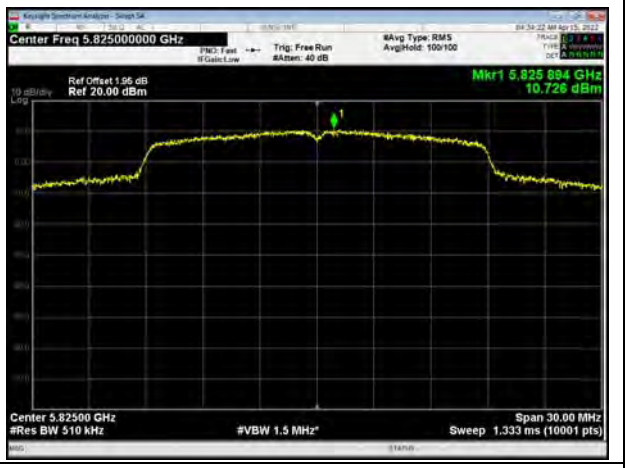

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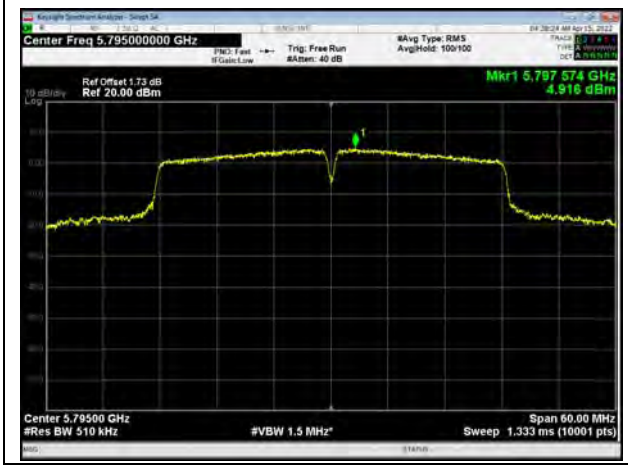

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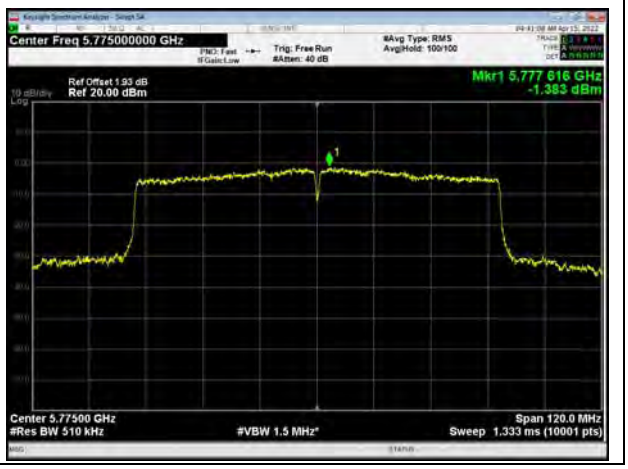


5.5. Unwanted Emission

Ambient condition

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

Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.
Sweep the whole frequency band range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.
Set the spectrum analyzer in the following:
9kHz~150 kHz
RBW=200Hz, VBW=1kHz/ Sweep=AUTO
150 kHz~30MHz
RBW=9KHz, VBW=30KHz,/ Sweep=AUTO
Below 1GHz
RBW=100kHz / VBW=300kHz / Sweep=AUTO
a) Peak emission levels are measured by setting the instrument as follows:
Above 1GHz
PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO
b) Average emission levels are measured by setting the instrument as follows:
Above 1GHz
AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO
c) Detector: The measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific

emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

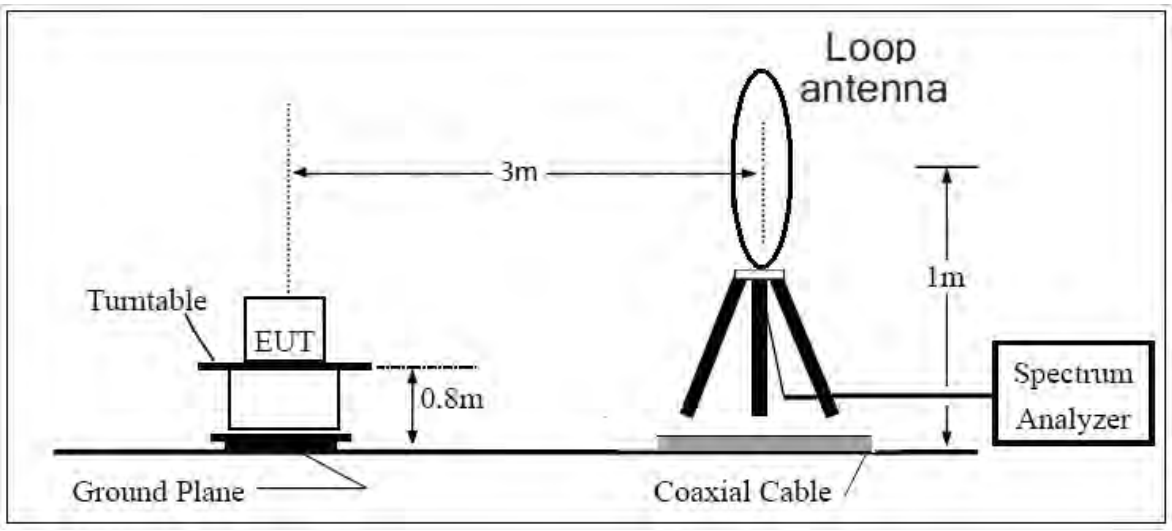
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Reduce the video bandwidth until no significant variations in the displayed signal are observed in subsequent traces, provided the video bandwidth is no less than 1 Hz. For regulatory requirements that specify averaging only over the transmit duration (e.g., digital transmission system [DTS] and Unlicensed National Information Infrastructure [U-NII]), the video bandwidth shall be greater than [1 / (minimum transmitter on time)] and no less than 1 Hz.

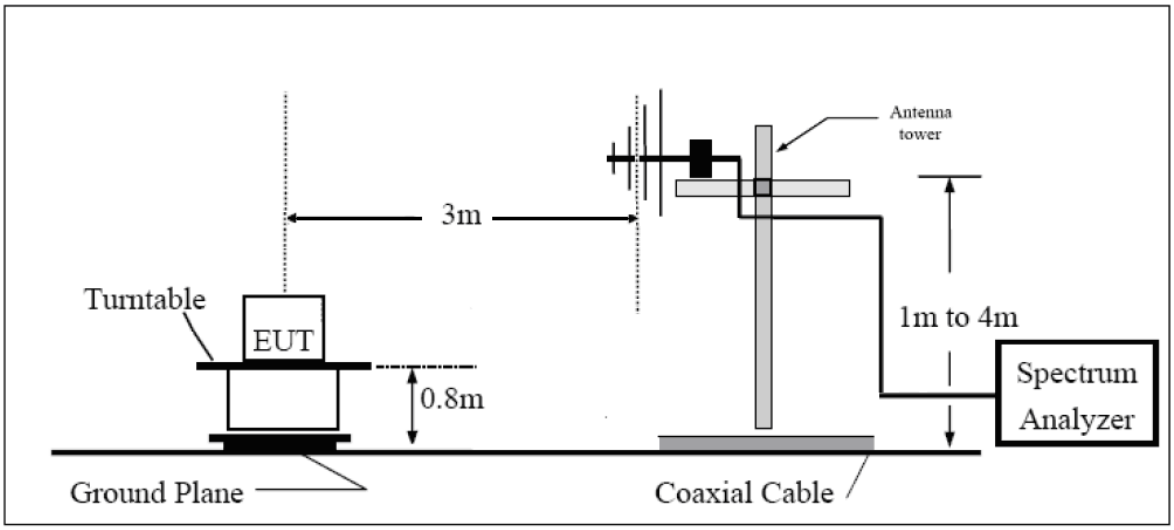
The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the loop antenna is vertical, others antenna are vertical and horizontal.

The test is in transmitting mode.

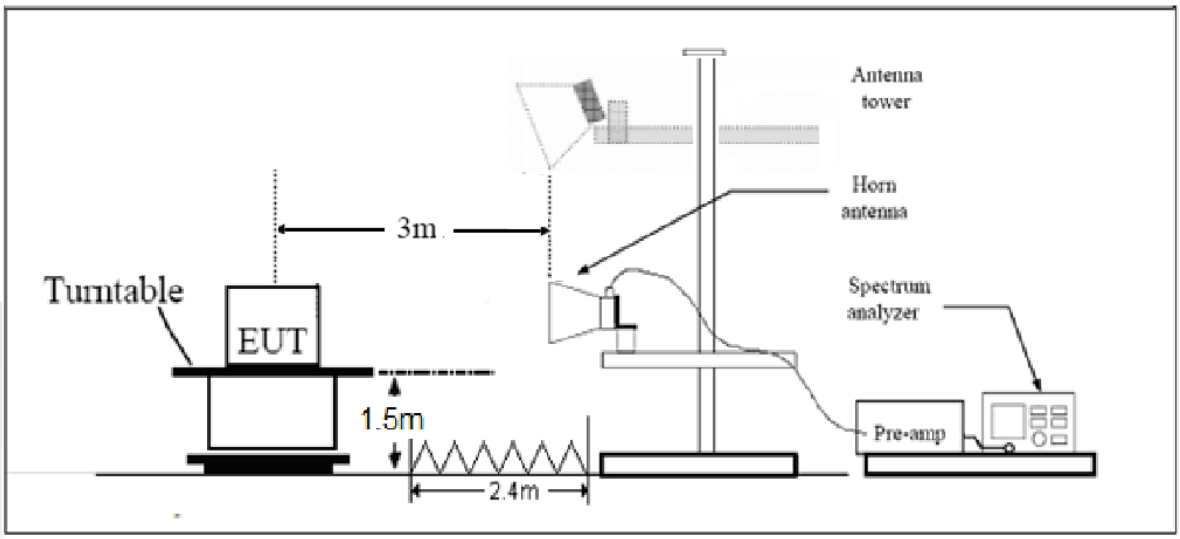
9KHz~~~30MHz



30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits

(1) For transmitters operating in the 5725-5850 MHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz(68.2dBμV/m).

(3) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz(68.2dBμV/m).

(4) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz(68.2dBμV/m).

Note: the following formula is used to convert the EIRP to field strength

§1、E[dBμV/m] = EIRP[dBm] - 20 log(d[meters]) + 104.77, where E = field strength and

d = distance at which field strength limit is specified in the rules;

§2、E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters

(5) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table.

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.17 dB
200MHz-1GHz	4.84 dB
1-18GHz	4.35 dB
18-26.5GHz	5.90 dB
26.5GHz~40GHz	5.92 dB

Test Results:

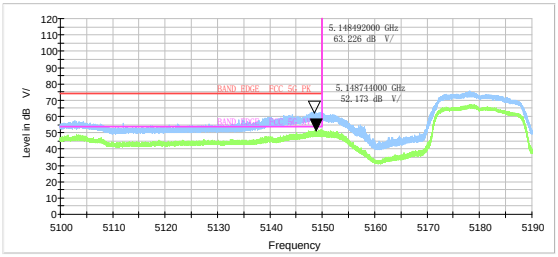
The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for V20MHz/V40MHz, therefore investigated worst case to representative mode in test report.

A font (Level in dB V/)in the test plot =(level in dB μ V/m)

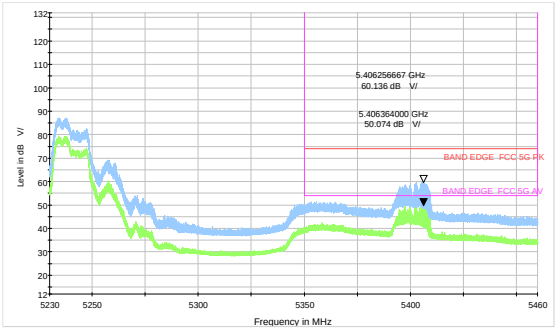
The signal beyond the limit is carrier.

U-NII-1

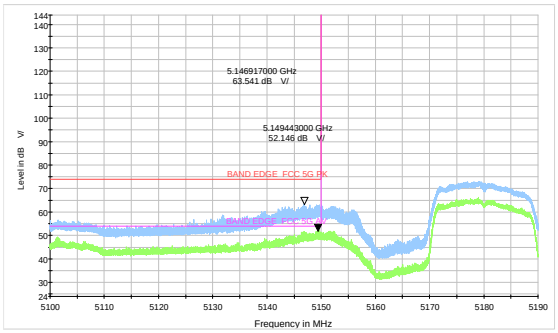
802.11a-Channel 36: Peak+ Average



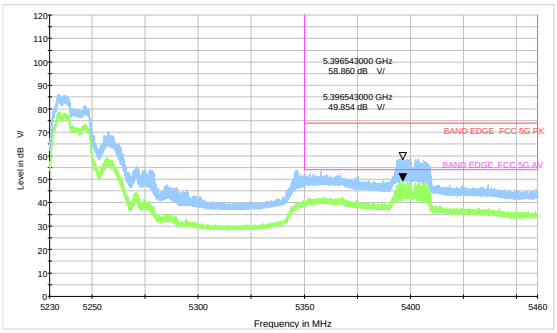
802.11a-Channel 48: Peak+ Average



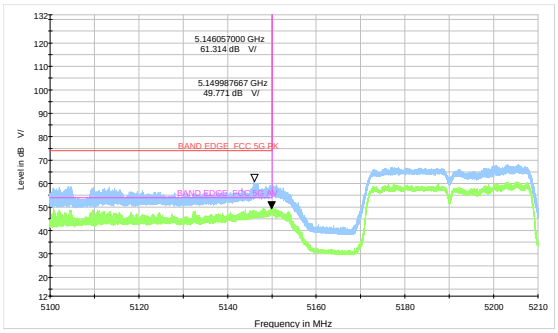
802.11n HT20-Channel 36: Peak+ Average



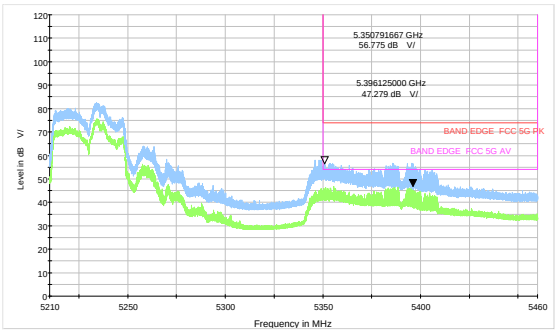
802.11n HT20-Channel 48: Peak+ Average



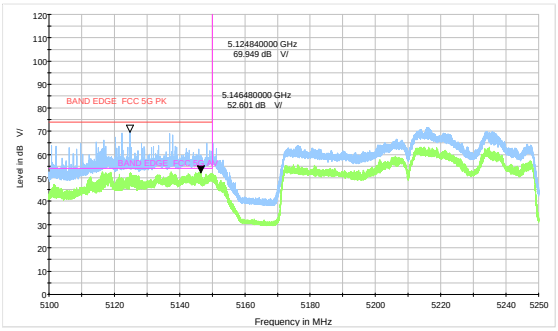
802.11n HT40-Channel 38: Peak+ Average



802.11n HT40-Channel 46: Peak+ Average

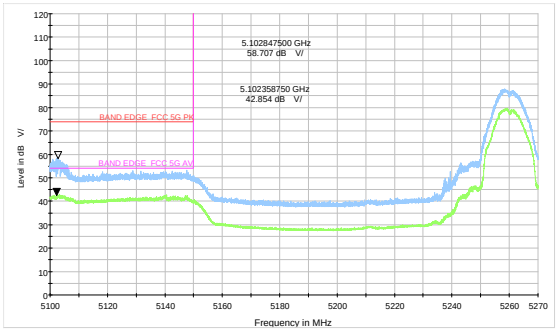


802.11ac VHT80 –Channel 42: Peak+ Average

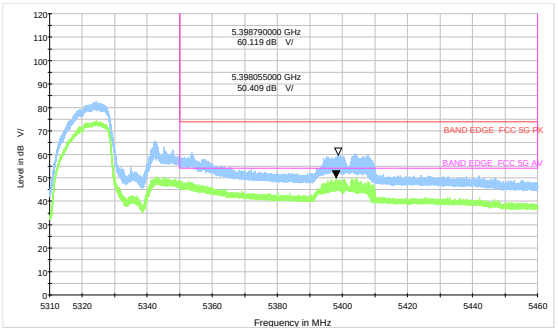


U-NII-2A

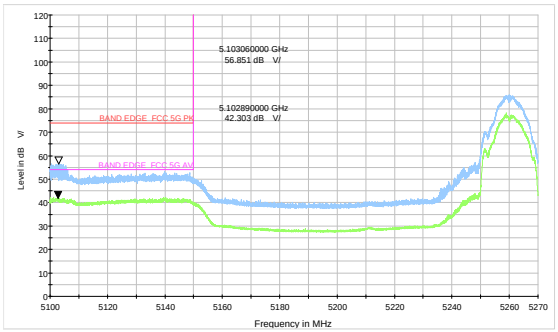
802.11a-Channel 52: Peak+ Average



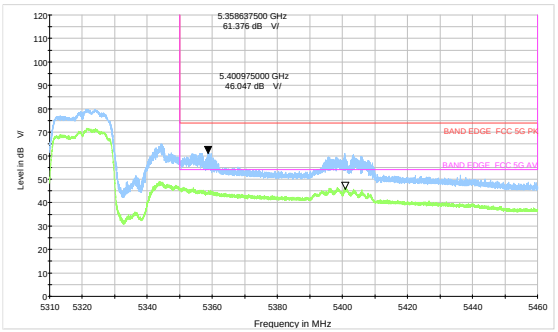
802.11a-Channel 64: Peak+ Average



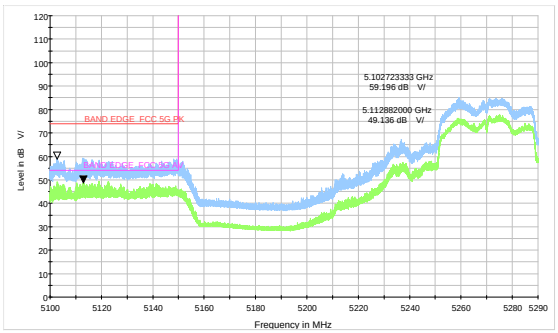
802.11n HT20-Channel 52: Peak+ Average



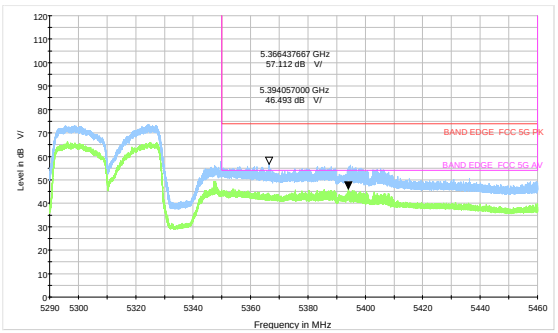
802.11n HT20-Channel 64: Peak+ Average



802.11n HT40-Channel 54: Peak+ Average



802.11n HT40-Channel 62: Peak+ Average



802.11ac VHT80 –Channel 58: Peak+ Average