

TEST REPORT

Product Name: Floodlight Cam Pro F3
FCC ID: 2AYZ8WP05001132
Trademark: Winees
Model Number: WP05001132
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Sample Received Date: Oct. 16, 2023
Sample tested Date: Oct. 16, 2023 to Nov. 08, 2023
Issue Date: Nov. 08, 2023
Report No.: CTB231108049RFX
Test Standards: 47 CFR Part 15 Subpart E
Test Results: PASS
Remark: This is WIFI-5GHz band radio test report.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB231108049RFX	Nov. 08, 2023	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
AC Power Line Conducted Emission	47 CFR Part 15 Subpart E Section 15.407 (b)(6)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart E Section 15.205/15.407(b)	KDB789033	PASS
Band edge	47 CFR Part 15 Subpart E Section 15.205/15.407(b)	KDB789033	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart E Section 15.407 (a)	KDB789033	PASS
Emission Bandwidth & Occupied Bandwidth	47 CFR Part 15 Subpart E Section 15.407 (a)(e)	KDB789033	PASS
Power Spectral Density	47 CFR Part 15 Subpart E Section 15.407 (a)	KDB789033	PASS
Frequency stability	47 CFR Part 15 Subpart E Section 15.407 (g)	KDB789033	PASS
Operation in the absence of information to the transmit	47 CFR Part 15 Subpart E Section 15.407 (b)	47 CFR Part 15 Subpart E	PASS
Antenna Requirement	47 CFR Part 15 Subpart E Section 15.203	/	PASS

Remark:
Test according to ANSI C63.10-2013.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Adjacent channel power	U=±1.3dB
Conducted Adjacent channel power	U=±1.38dB
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(9KHz-30MHz)	U=±4.8dB
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
3m chamber Radiated spurious emission(18GHz-40GHz)	U=±3.4dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59°C
Supply voltages	U=±3%
Time	U=±5%
Conducted emission(150K-30MHz)	3.2dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	WP05001132
Model Description:	N/A
Wi-Fi Specification:	IEEE 802.11a/n/ac
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	IEEE 802.11a/n/ac(20M): 5150MHz ~5250MHz/ 4 channel IEEE 802.11n/ac(40M): 5150MHz ~5250MHz/ 2 channel IEEE 802.11ac(80M): 5150MHz ~5250MHz/ 1 channel IEEE 802.11a/n/ac(20M): 5250MHz ~5350 MHz/ 4 channel IEEE802.11n/ac(40M): 5250MHz ~5350 MHz/ 2 channel IEEE802.11ac(80M): 5250MHz ~5350 MHz/ 1 channel IEEE 802.11a/n/ac(20M): 5470MHz ~5725 MHz/ 11 channel IEEE802.11n/ac(40M): 5470MHz ~5725 MHz/ 5 channel IEEE802.11ac(80M): 5470MHz ~5725 MHz/ 3 channel IEEE 802.11a/n/ac(20M): 5725MHz ~5850MHz/ 5 channel IEEE 802.11n/ac(40M): 5725MHz ~5850MHz/ 2 channel IEEE 802.11ac(80M): 5725MHz ~5850MHz/ 1 channel
Max. RF output power:	WiFi (5G): 16.058dBm
Type of Modulation:	WiFi (5G): OFDM
Antenna installation:	WiFi (5G): FPC antenna
Antenna Gain:	WiFi (5.2G): ANT1: 2.97dBi, ANT2: 2.71dBi WiFi (5.3G): ANT1: 3.3dBi, ANT2: 3.07dBi WiFi (5.6G): ANT1: 3.47dBi, ANT2: 3.15dBi WiFi (5.8G): ANT1: 2.31dBi, ANT2: 3.18dBi
Ratings:	AC 110-240V, 50/60Hz

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

For 802.11a/n/ac(20M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz
For 802.11a/n/ac(20M) Operation in the 5250MHz ~5350 MHz band			
Channel	Frequency	Channel	Frequency
52	5260MHz	60	5300MHz
56	5280MHz	64	5320MHz
For 802.11a/n/ac(20M) Operation in the 5470MHz ~5725 MHz band			
Channel	Frequency	Channel	Frequency
100	5500MHz	124	5620 MHz
104	5520MHz	128	5640 MHz
108	5540MHz	132	5660 MHz
112	5560MHz	136	5680MHz
116	5580MHz	140	5700MHz
120	5600 MHz		
For 802.11a/n/ac(20M) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz	NA	NA

For 802.11n/ac(40M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz
For 802.11n/ac(40M) Operation in the 5250MHz ~5350 MHz band			
Channel	Frequency	Channel	Frequency
54	5270MHz	62	5310MHz
For 802.11n/ac(40M) Operation in the 5470MHz ~5725 MHz band			
Channel	Frequency	Channel	Frequency
102	5510MHz	126	5630MHz
110	5550MHz	134	5670MHz
118	5590MHz		
For 802.11n/ac(40M) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

For 802.11ac(80M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
42	5210MHz	NA	NA
For 802.11ac(80M) Operation in the 5250MHz ~5350 MHz band			
Channel	Frequency	Channel	Frequency
58	5290MHz	NA	NA
For 802.11ac(80M) Operation in the 5470MHz ~5725 MHz band			
Channel	Frequency	Channel	Frequency
106	5530MHz	138	5690MHz
122	5610 MHz		
For 802.11ac(80M) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	Channel	Frequency
155	5775MHz	NA	NA

NOTE: Dutycycle>98%.

Test mode	rate
802.11a	54M
802.11n	500M
802.11/ac	500M

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11a/n/ac(20M)	5150MHz ~5250 MHz	Channel 36	Channel 40	Channel 48
		5180MHz	5200MHz	5240MHz
Channel 38		N/A	Channel 46	
5190MHz		N/A	5230MHz	
802.11ac(80M)		N/A	Channel 42	N/A
N/A		5210MHz	N/A	
802.11a/n/ac(20M)	5250MHz ~5350 MHz	Channel 52	Channel 56	Channel 64
		5260MHz	5280MHz	5320MHz
Channel 54		N/A	Channel 62	
5270MHz		N/A	5310MHz	
802.11ac(80M)		N/A	Channel 58	N/A
N/A		5290MHz	N/A	
802.11a/n/ac(20M)	5470MHz ~5725 MHz	Channel 100	Channel 116	Channel 140
		5500MHz	5580MHz	5700MHz
Channel 102		N/A	Channel 134	
5510MHz		N/A	5670MHz	
802.11ac(80M)		N/A	Channel 106	N/A
N/A		5530MHz	N/A	
802.11a/n/ac(20M)	5725MHz ~5850 MHz	Channel 149	Channel 157	Channel 165
		5745MHz	5785MHz	5825MHz
Channel 151		N/A	Channel 159	
5755MHz		N/A	5795MHz	
802.11ac(80M)		N/A	Channel 155	N/A
N/A		5775MHz	N/A	

4.6 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(AC):NV	120V
Normal Temperature(°C):NT	23
Low Temperature(°C):LT	0
High Temperature(°C):HT	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinh Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

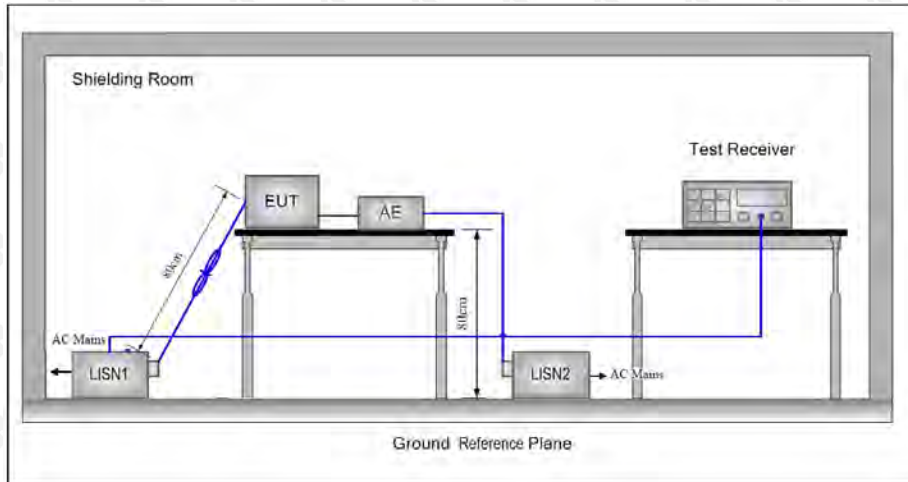
5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2024.07.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2024.07.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2024.07.05
4	Communication test set	R&S	CMW500	108058	2024.07.05
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2024.07.05
6	Signal Generator	Agilent	N5181A	MY50140365	2024.07.05
7	Vector signal generator	Agilent	N5182A	MY47420195	2024.07.05
8	Communication test set	Agilent	E5515C	MY50102567	2024.07.06
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2024.07.05
10	5 GHz Filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2024.07.06
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	2024.07.06
12	BT&WI-FI Automatic test software	Microwave	MTS8000	Ver. 2.0.0.0	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2024.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2024.07.05
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/
16	966 chamber	C.R.T.	966	/	2024.08.11
17	Receiver	R&S	ESPI	100362	2024.07.05
18	Amplifier	HP	8447E	2945A02747	2024.07.05
19	Amplifier	Agilent	8449B	3008A01838	2024.07.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2024.07.08

21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	2024.07.08
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	2024.07.08
24	loop antenna	ZHINAN	ZN30900A	GTS534	/
25	40G Horn antenna	A/H/System	SAS-574	588	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2024.07.05

6. AC POWER LINE CONDUCTED EMISSION

6.1 Block Diagram Of Test Setup



6.2 Limit

Table 4 – AC power-line conducted emissions limits		
Frequency (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 ^{Note 1}	56 to 46 ^{Note 1}
0.5 - 5	56	46
5 - 30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

* Decreasing linearly with the logarithm of the frequency

6.3 Test procedure

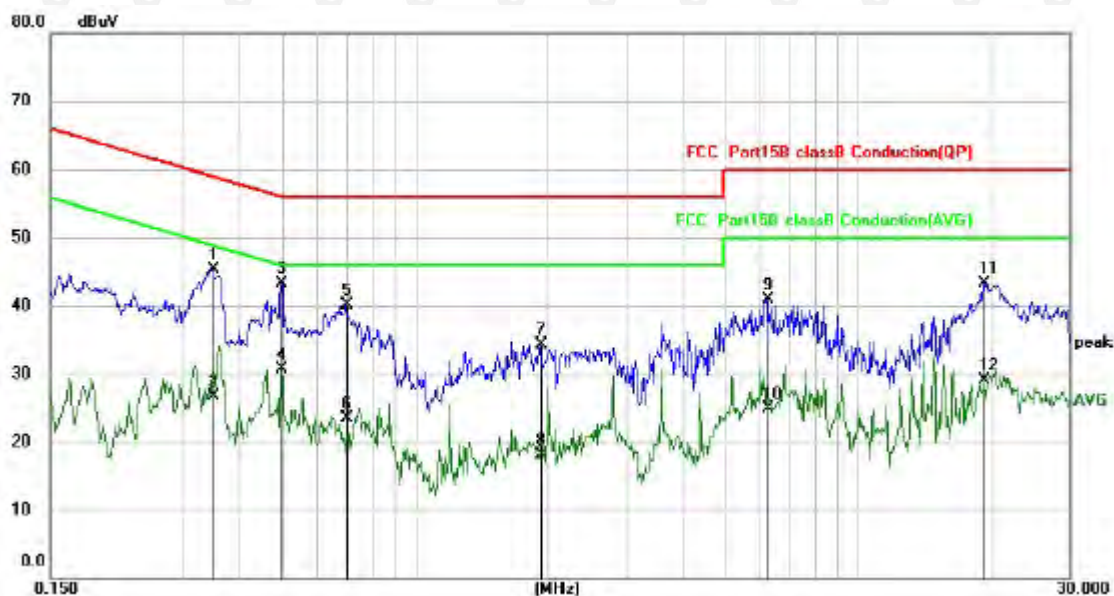
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50 Ω /50 μ H + 5 Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane.

This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

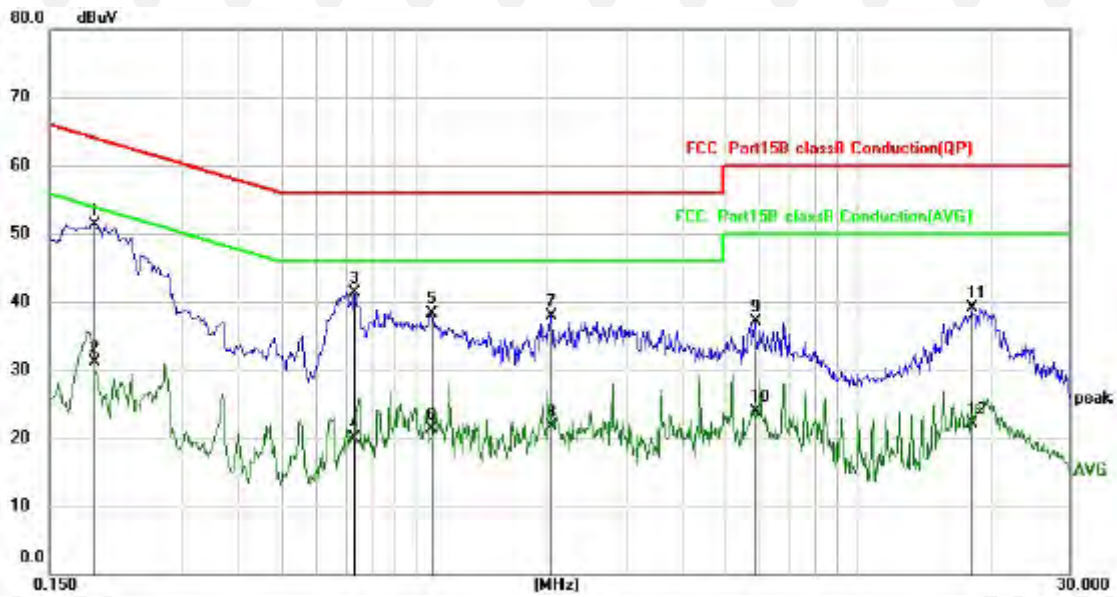
6.4 Test Result

L:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1		0.3500	35.35	9.97	45.32	58.96	-13.64	QP
2		0.3500	16.81	9.97	26.78	48.96	-22.18	AVG
3	*	0.4979	33.25	9.99	43.24	56.03	-12.79	QP
4		0.4979	20.70	9.99	30.69	46.03	-15.34	AVG
5		0.6979	30.14	10.02	40.16	56.00	-15.84	QP
6		0.6979	13.48	10.02	23.50	46.00	-22.50	AVG
7		1.9219	24.17	10.08	34.25	56.00	-21.75	QP
8		1.9219	7.95	10.08	18.03	46.00	-27.97	AVG
9		6.2259	30.44	10.47	40.91	60.00	-19.09	QP
10		6.2259	14.35	10.47	24.82	50.00	-25.18	AVG
11		19.1459	32.46	10.80	43.26	60.00	-16.74	QP
12		19.1459	18.25	10.80	29.05	50.00	-20.95	AVG

N:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV	dBuV	dB	
1	*	0.1900	41.36	9.95	51.31	64.04	-12.73	QP
2		0.1900	21.10	9.95	31.05	54.04	-22.99	AVG
3		0.7300	31.34	10.02	41.36	56.00	-14.64	QP
4		0.7300	9.86	10.02	19.88	46.00	-26.12	AVG
5		1.0900	28.22	10.02	38.24	56.00	-17.76	QP
6		1.0900	11.27	10.02	21.29	46.00	-24.71	AVG
7		2.0379	27.89	10.09	37.98	56.00	-18.02	QP
8		2.0379	11.60	10.09	21.69	46.00	-24.31	AVG
9		5.8658	26.75	10.44	37.19	60.00	-22.81	QP
10		5.8658	13.47	10.44	23.91	50.00	-26.09	AVG
11		18.1100	28.32	10.79	39.11	60.00	-20.89	QP
12		18.1100	11.35	10.79	22.14	50.00	-27.86	AVG

Remark:

- Factor = Cable loss + LISN factor, Margin = Limit – Level
- All modes were tested at AC 120V and 240V, only the worst result of AC 120V 60Hz was reported.
- All the test modes completed for test. Only the worst result of was reported.

7. RADIATED SPURIOUS EMISSIONS

7.1 Block Diagram Of Test Setup

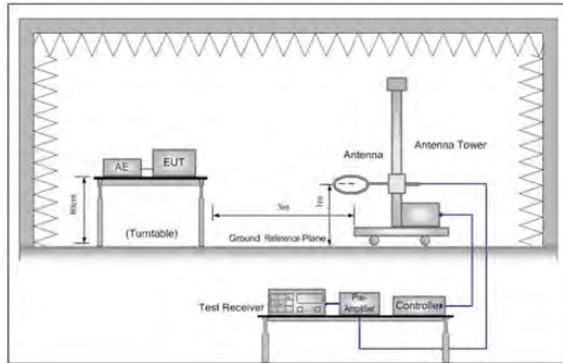


Figure 1. Below 30MHz

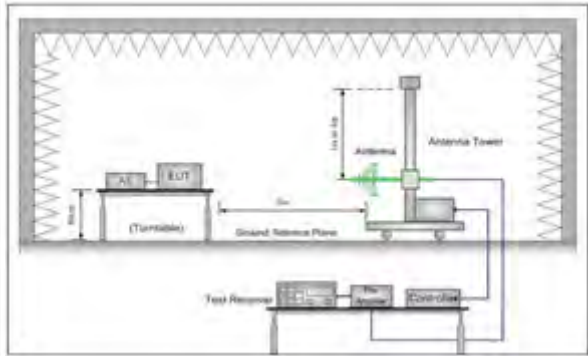


Figure 2. 30MHz to 1GHz

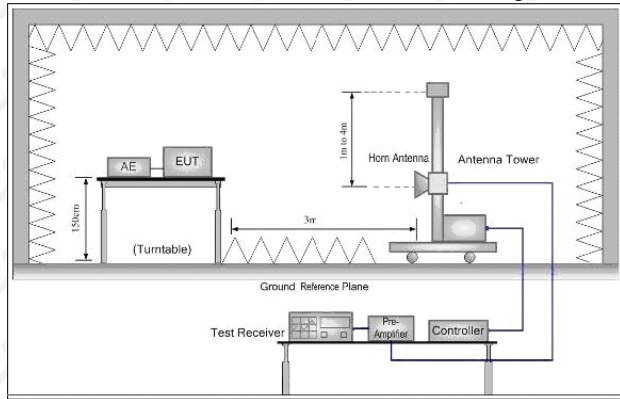


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

Frequency	Field strength (dB μ V/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	$20\log 2400/F$ (kHz) + 80	Quasi-peak	3
0.490MHz-1.705MHz	$20\log 24000/F$ (kHz) + 40	Quasi-peak	3
1.705MHz-30MHz	$20\log 30$ + 40	Quasi-peak	3
30MHz-88MHz	40.0	Quasi-peak	3
88MHz-216MHz	43.5	Quasi-peak	3
216MHz-960MHz	46.0	Quasi-peak	3
960MHz-1GHz	54.0	Quasi-peak	3
Above 1GHz	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

If radiated measurements are performed, field strength is then converted to EIRP as follows:

(i) $EIRP = (E \cdot d)^2 / 30$

where:

- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

(ii) Working in dB units, the above equation is equivalent to:

$$EIRP[dBm] = E[dB\mu V/m] + 20 \log(d[meters]) - 104.77$$

(iii) Or, if d is 3 meters:

$$EIRP[dBm] = E[dB\mu V/m] - 95.2$$

7.3 Test procedure

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

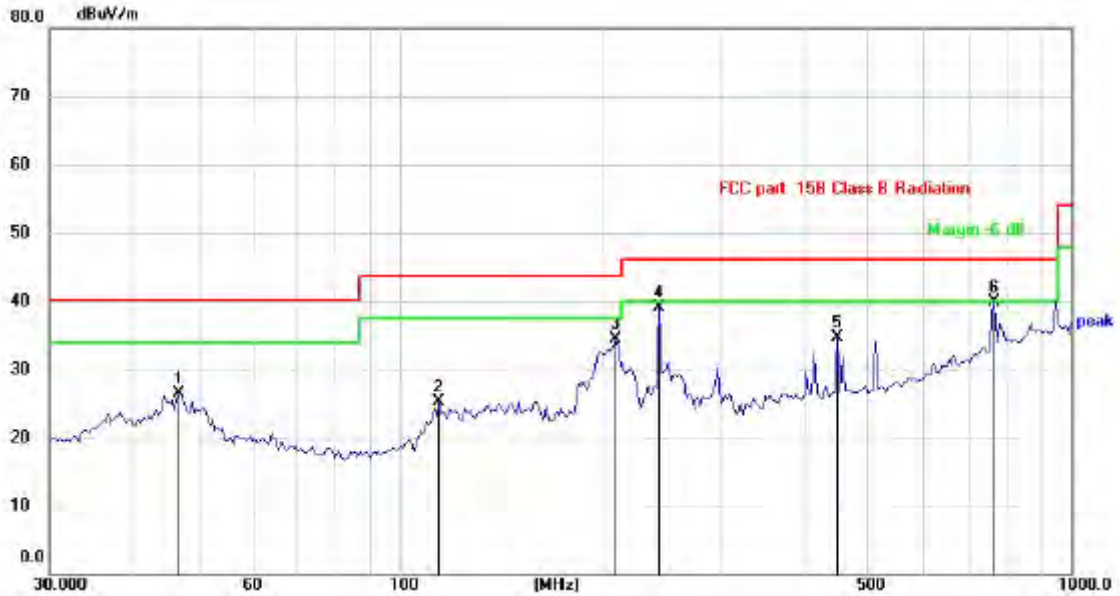
- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
- j. Repeat above procedures until all frequencies measured was complete.

Receiver set:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

7.4 Test Result

30MHz-1GHz Test Results:
 Modulation : 802.11a (the worst data)
 Test Channel : 5780MHz
 Antenna polarity: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		46.9123	32.50	-6.06	26.44	40.00	-13.56	QP
2		114.7155	31.58	-6.20	25.38	43.50	-18.12	QP
3		210.0481	41.83	-7.36	34.47	43.50	-9.03	QP
4		243.8042	46.17	-6.97	39.20	46.00	-6.80	QP
5		450.3446	35.82	-1.05	34.77	46.00	-11.23	QP
6	*	768.7481	34.07	5.84	39.91	46.00	-6.09	QP

Antenna polarity: V



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1	*	47.7422	42.19	-6.22	35.97	40.00	-4.03	QP
2		149.2238	35.33	-3.26	32.07	43.50	-11.43	QP
3		243.8042	44.20	-6.97	37.23	46.00	-8.77	QP
4		298.2681	36.44	-4.81	31.63	46.00	-14.37	QP
5		513.6331	34.88	0.39	35.27	46.00	-10.73	QP
6		782.3453	30.98	6.09	37.07	46.00	-8.93	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

- The margin of 9K-30MH measurement exceeds 20dB, so the test chart is not included. Test Mode: 802.11a20 (the worst)

Radiated Spurious Emission (Above 1GHz):

Modulation : 802.11(a) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5180MHz									
10360	41.38	16.39	57.77	74	-16.23	PK	1.05	83	H
10360	26.76	16.39	43.15	54	-10.85	AV	1.52	157	H
10360	40.17	16.39	56.56	74	-17.44	PK	1.34	224	V
10360	25.13	16.39	41.52	54	-12.48	AV	1.49	102	V
Channel:5240MHz									
10480	41.38	16.11	57.49	74	-16.51	PK	1.52	138	H
10480	25.21	16.11	41.32	54	-12.68	AV	1.53	360	H
10480	41.80	16.11	57.91	74	-16.09	PK	1.77	142	V
10480	26.75	16.11	42.86	54	-11.14	AV	1.17	182	V
Channel:5260MHz									
10520	41.38	16.39	57.77	74	-16.23	PK	1.05	83	H
10520	26.76	16.39	43.15	54	-10.85	AV	1.52	157	H
10520	40.17	16.39	56.56	74	-17.44	PK	1.34	224	V
10520	25.13	16.39	41.52	54	-12.48	AV	1.49	102	V
Channel:5320MHz									
10640	40.78	16.39	57.17	74	-16.83	PK	1.42	50	H
10640	27.68	16.39	44.07	54	-9.93	AV	1.52	357	H
10640	40.97	16.39	57.36	74	-16.64	PK	1.07	322	V
10640	25.57	16.39	41.96	54	-12.04	AV	1.19	184	V
Channel:5500MHz									
11000	40.97	16.39	57.36	74	-16.64	PK	1.35	156	H
11000	26.29	16.39	42.68	54	-11.32	AV	1.09	212	H
11000	39.60	16.39	55.99	74	-18.01	PK	1.33	291	V
11000	25.51	16.39	41.90	54	-12.10	AV	1.49	161	V
Channel:5700MHz									
11400	41.29	16.39	57.68	74	-16.32	PK	1.14	283	H
11400	25.38	16.39	41.77	54	-12.23	AV	1.09	305	H
11400	40.38	16.39	56.77	74	-17.23	PK	1.44	34	V
11400	27.40	16.39	43.79	54	-10.21	AV	1.44	326	V

Channel:5745MHz									
11490	40.01	17.46	57.47	74	-16.53	PK	1.37	195	H
11490	27.37	17.46	44.83	54	-9.17	AV	1.18	197	H
11490	40.12	17.46	57.58	74	-16.42	PK	1.45	334	V
11490	25.13	17.46	42.59	54	-11.41	AV	1.27	116	V
Channel:5825MHz									
11650	41.26	17.57	58.83	74	-15.17	PK	1.46	165	H
11650	27.33	17.57	44.90	54	-9.10	AV	1.66	235	H
11650	39.58	17.57	57.15	74	-16.85	PK	1.27	330	V
11650	25.93	17.57	43.50	54	-10.50	AV	1.49	147	V

Modulation : 802.11(n40) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5190MHz									
10380	40.38	16.34	56.72	74	-17.28	PK	1.79	42	H
10380	26.45	16.34	42.79	54	-11.21	AV	1.40	6	H
10380	41.43	16.34	57.77	74	-16.23	PK	1.01	290	V
10380	25.87	16.34	42.21	54	-11.79	AV	1.37	346	V
Channel:5230MHz									
10460	41.89	16.15	58.04	74	-15.96	PK	1.18	247	H
10460	25.55	16.15	41.70	54	-12.30	AV	1.56	73	H
10460	41.41	16.15	57.56	74	-16.44	PK	1.80	316	V
10460	26.64	16.15	42.79	54	-11.21	AV	1.03	259	V

Channel:5270MHz									
10540	41.21	16.34	57.55	74	-16.45	PK	1.25	34	H
10540	26.62	16.34	42.96	54	-11.04	AV	1.42	44	H
10540	40.73	16.34	57.07	74	-16.93	PK	1.75	181	V
10540	27.26	16.34	43.60	54	-10.40	AV	1.01	333	V
Channel:5310MHz									
10620	39.74	16.34	56.08	74	-17.92	PK	1.20	259	H
10620	26.03	16.34	42.37	54	-11.63	AV	1.06	358	H
10620	41.91	16.34	58.25	74	-15.75	PK	1.81	359	V
10620	27.88	16.34	44.22	54	-9.78	AV	1.01	251	V

Channel:5510MHz									
11020	39.93	16.34	56.27	74	-17.73	PK	1.26	290	H
11020	27.39	16.34	43.73	54	-10.27	AV	1.24	6	H
11020	40.65	16.34	56.99	74	-17.01	PK	1.43	284	V
11020	25.81	16.34	42.15	54	-11.85	AV	1.17	179	V
Channel:5670MHz									
11340	40.19	16.34	56.53	74	-17.47	PK	1.10	155	H
11340	26.97	16.34	43.31	54	-10.69	AV	1.83	31	H
11340	40.58	16.34	56.92	74	-17.08	PK	1.66	323	V
11340	25.53	16.34	41.87	54	-12.13	AV	1.41	315	V

Channel:5755MHz									
11510	40.05	17.49	57.54	74	-16.46	PK	1.17	255	H
11510	25.30	17.49	42.79	54	-11.21	AV	1.54	301	H
11510	41.15	17.49	58.64	74	-15.36	PK	1.48	154	V
11510	25.94	17.49	43.43	54	-10.57	AV	1.33	6	V
Channel:5795MHz									
11590	41.61	17.52	59.13	74	-17.90	PK	1.05	43	H
11590	26.42	17.52	43.94	54	-14.87	AV	1.27	301	H
11590	40.62	17.52	58.14	74	-15.86	PK	1.55	148	V
11590	27.09	17.52	44.61	54	-9.39	AV	1.41	170	V

Modulation : 802.11(VH80) (the worst data)

Freq (MHz)	Rd_level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	detector	Height	Degree	Antenna polarization
Channel:5210MHz									
10420	39.97	16.25	56.22	74	-17.78	PK	1.88	18	H
10420	25.92	16.25	42.17	54	-11.83	AV	1.31	161	H
10420	40.22	16.25	56.47	74	-17.53	PK	1.03	164	V
10420	26.11	16.25	42.36	54	-11.64	AV	1.35	331	V
Channel:5290MHz									
10580	39.05	16.25	55.30	74	-18.70	PK	1.25	258	H
10580	27.82	16.25	44.07	54	-9.93	AV	1.23	142	H
10580	41.79	16.25	58.04	74	-15.96	PK	1.34	161	V

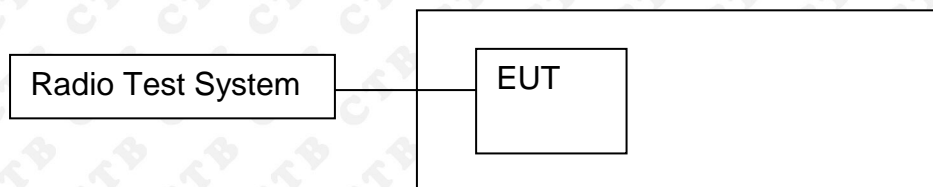
10580	27.66	16.25	43.91	54	-10.09	AV	1.77	348	V
Channel:5530MHz									
11060	39.62	17.50	57.12	74	-16.88	PK	1.46	187	H
11060	25.63	17.50	43.13	54	-10.87	AV	1.60	283	H
11060	39.63	17.50	57.13	74	-16.87	PK	1.26	291	V
11060	27.60	17.50	45.10	54	-8.90	AV	1.73	113	V
Channel:5775MHz									
11550	41.53	17.50	59.03	74	-14.97	PK	1.55	123	H
11550	26.75	17.50	44.25	54	-9.75	AV	1.41	300	H
11550	39.06	17.50	56.56	74	-17.44	PK	1.25	241	V
11550	25.69	17.50	43.19	54	-10.81	AV	1.34	136	V

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits
2. The EUT was tested in the low, high channel and the worst case position data was reported.
3. Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. BAND EDGE

8.1 Block Diagram Of Test Setup



8.2 Limit

(1) 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.

(2) 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.

(3) 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.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

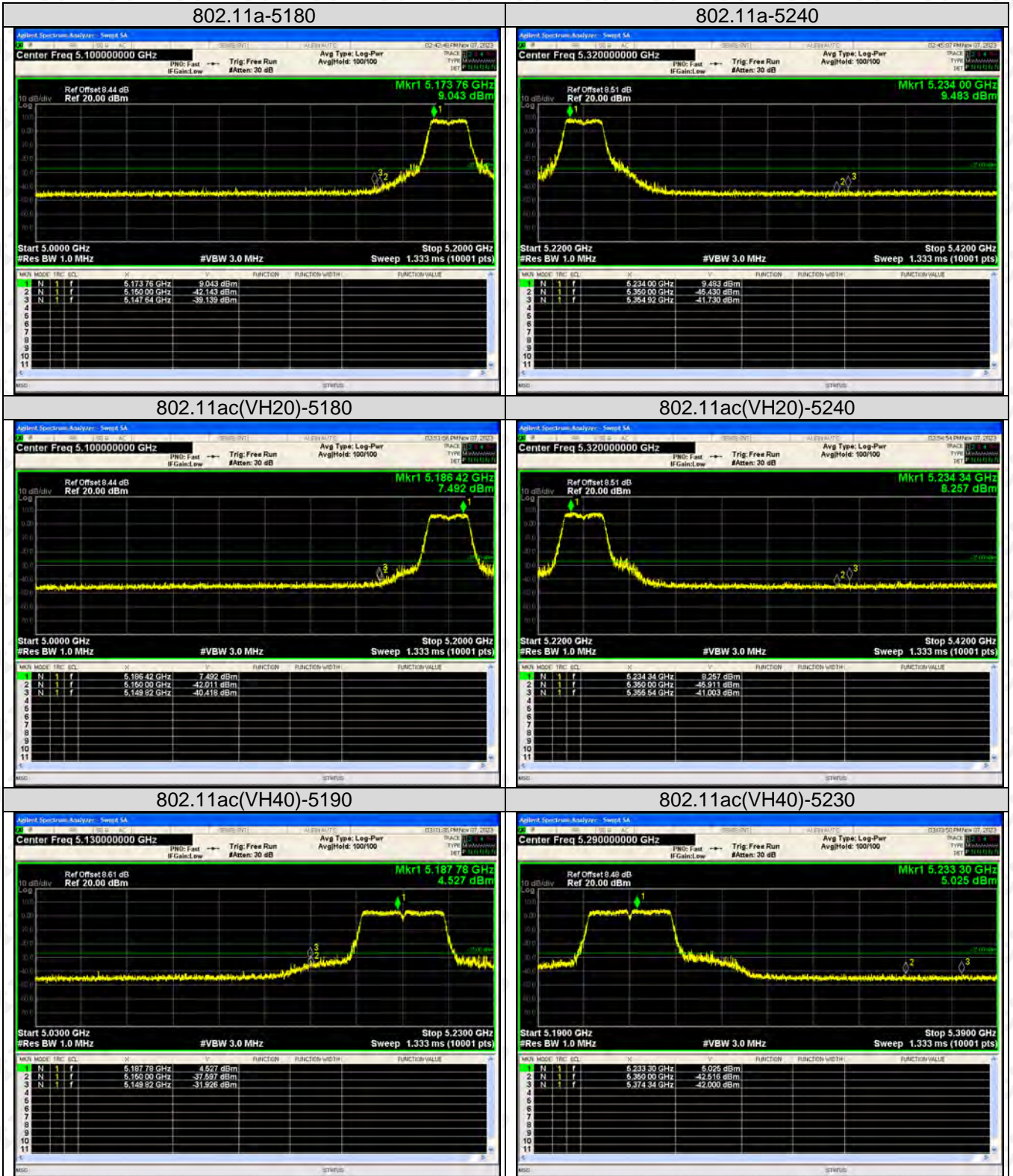
(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

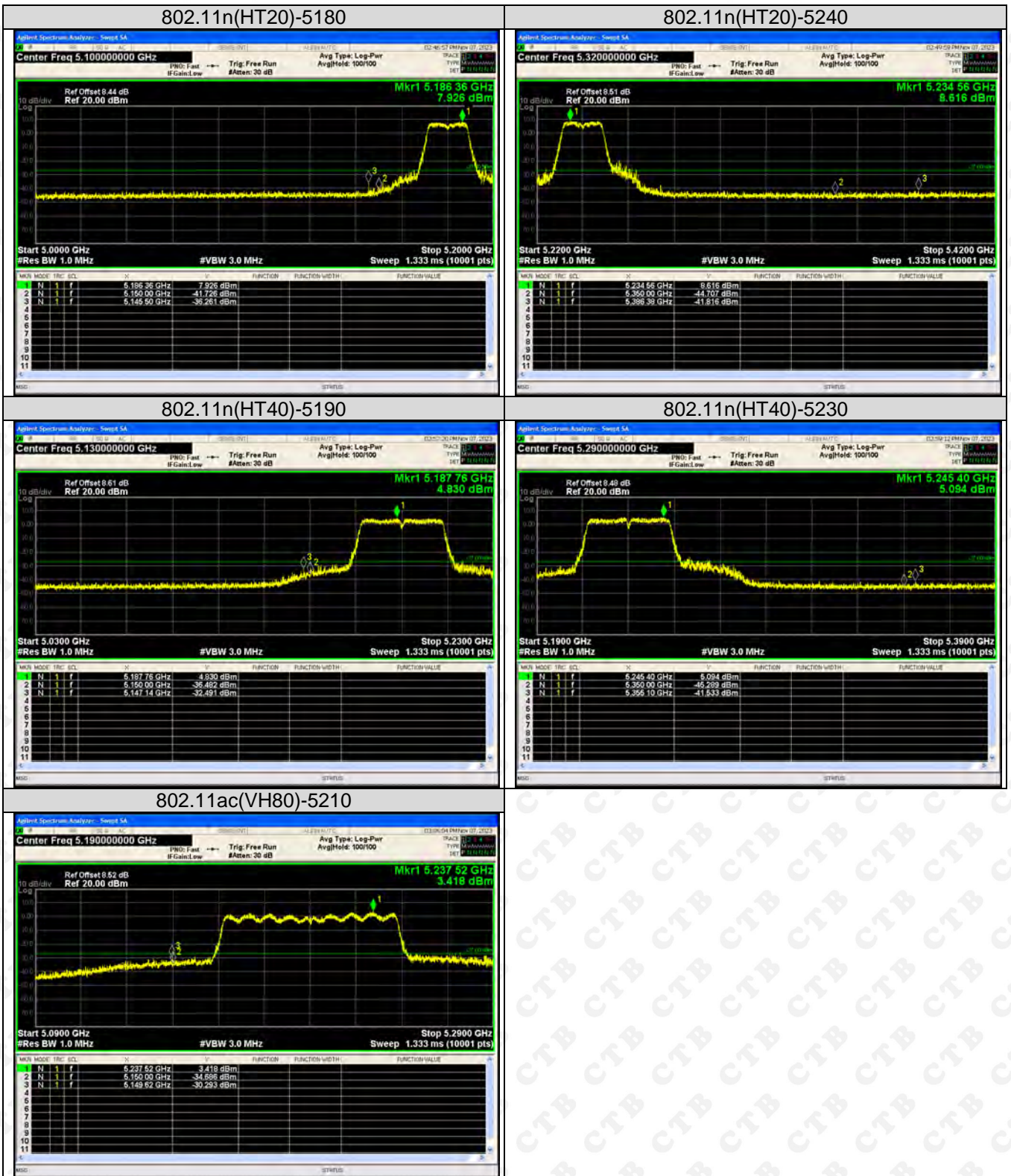
8.3 Test procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

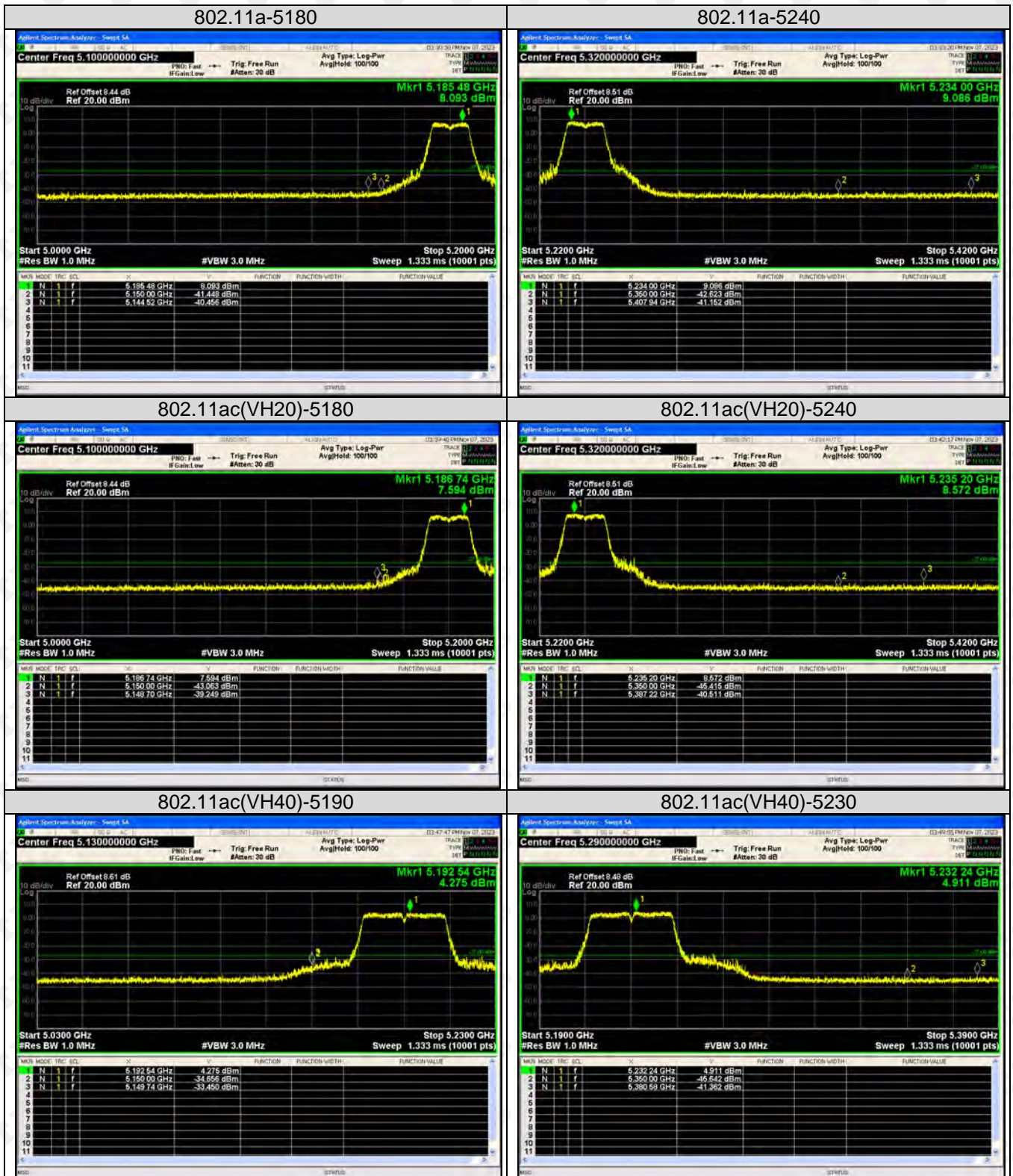
8.4 Test Result

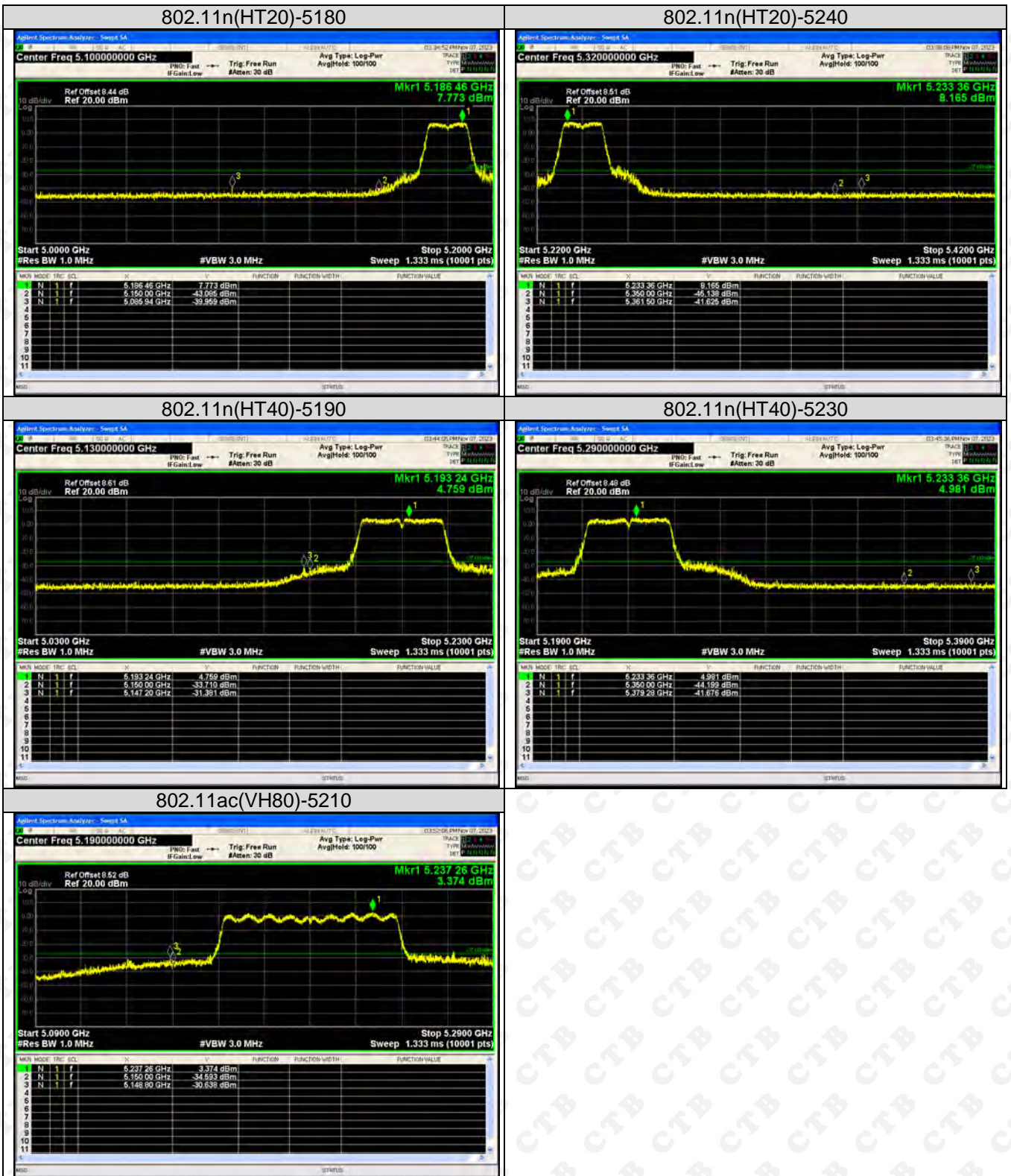
Test Graph
 5150-5250MHz:
 ANT 1



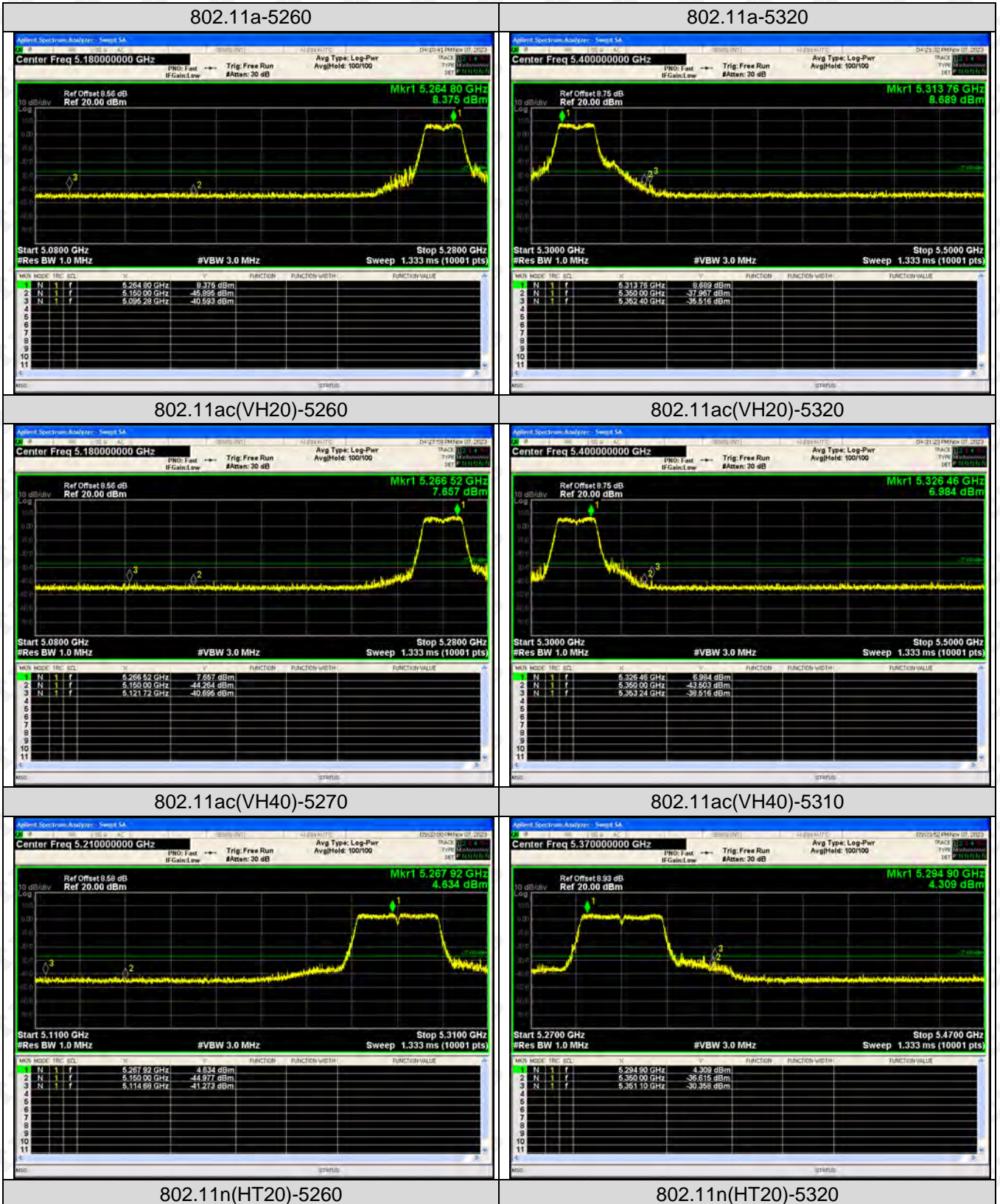


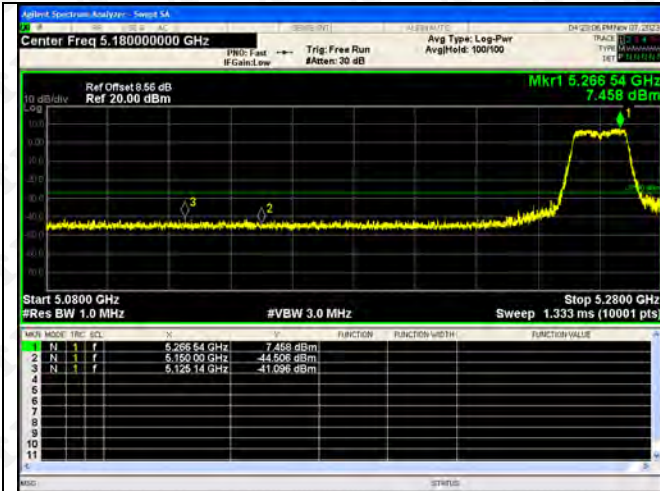
ANT 2





5250-5350MHz:
ANT1

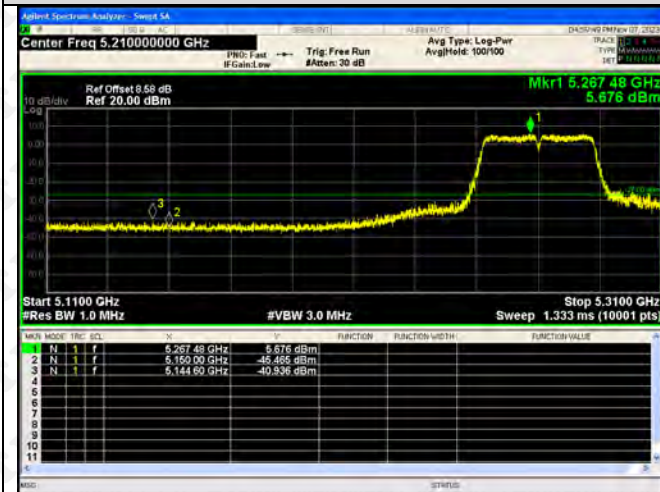




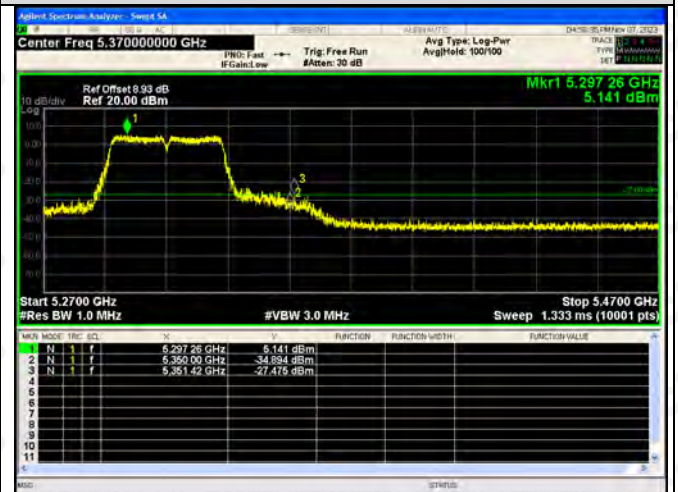
802.11n(HT40)-5270



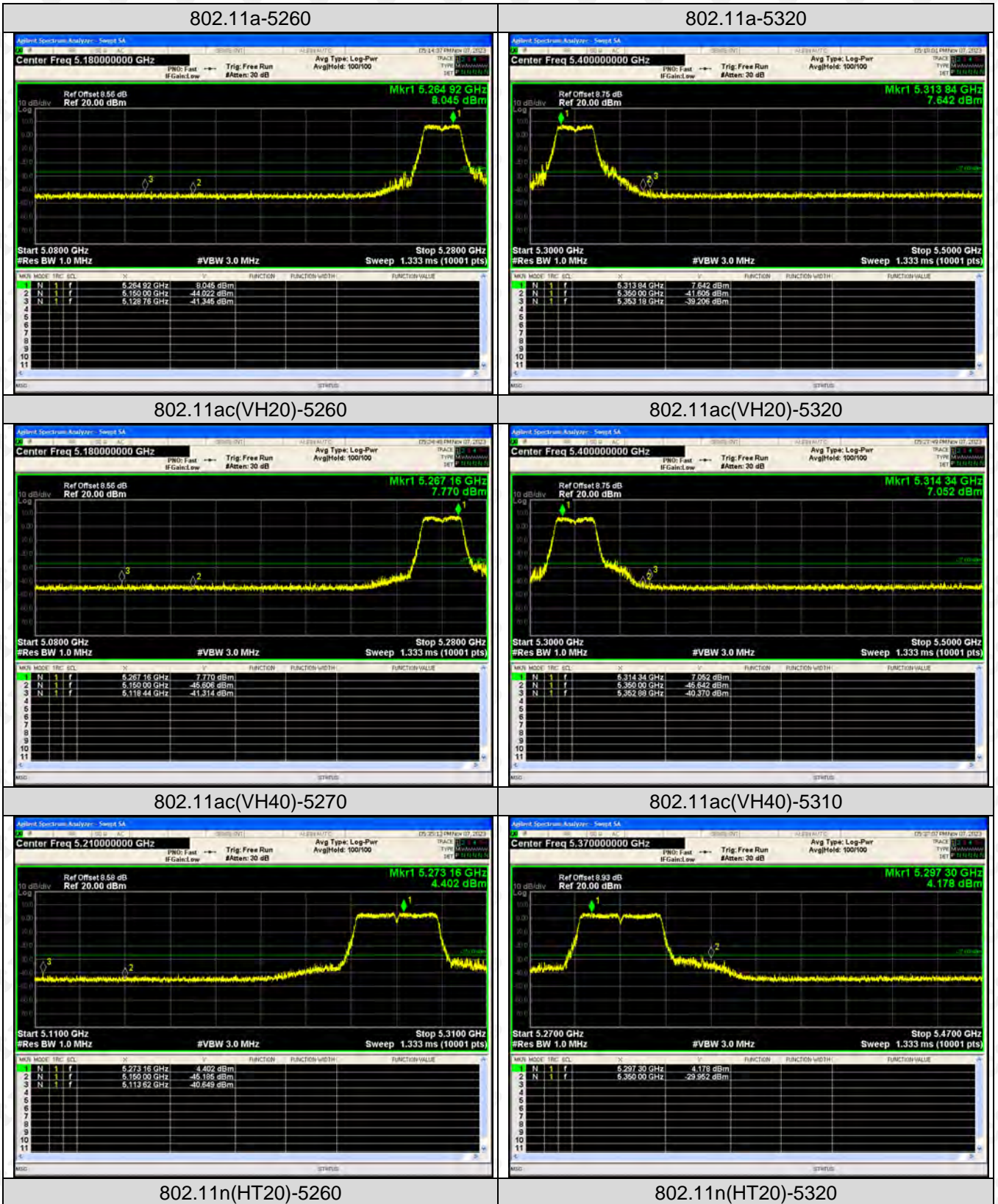
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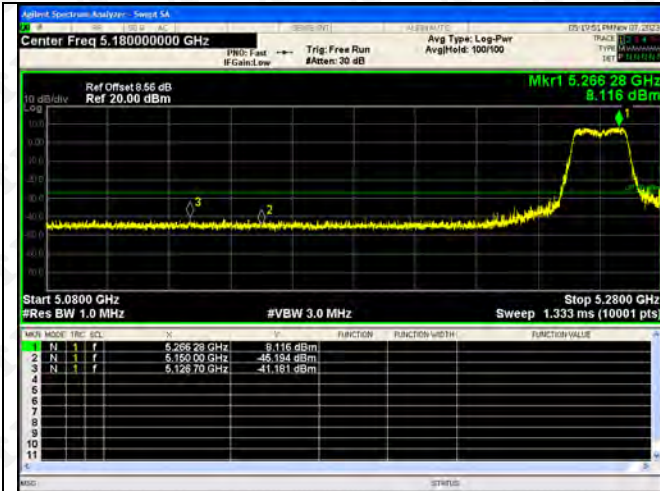


802.11ac(VH80)-5290

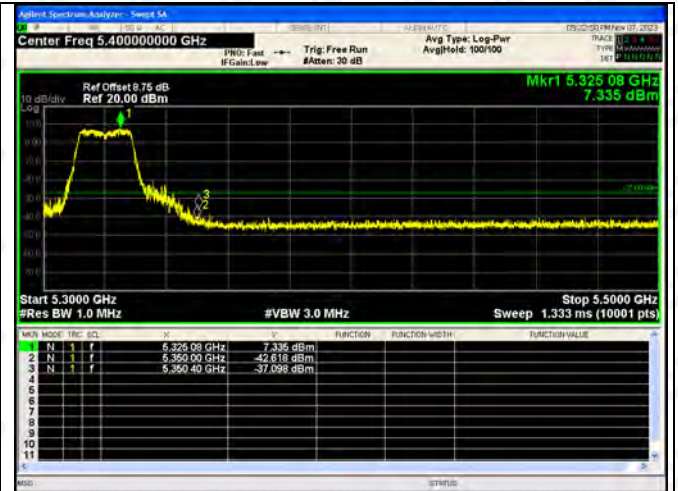


ANT2

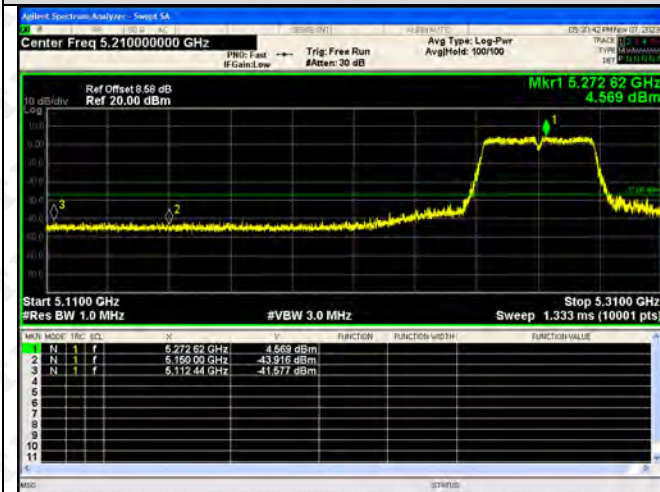




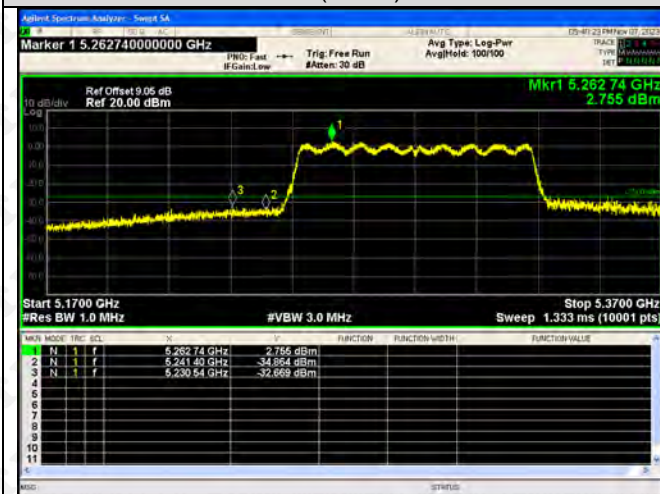
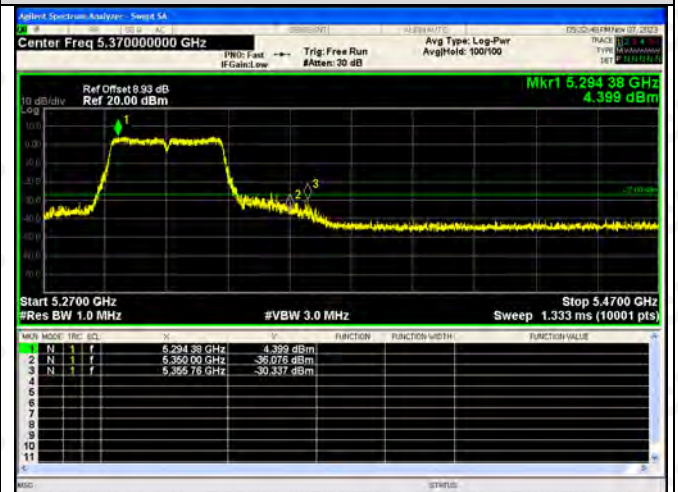
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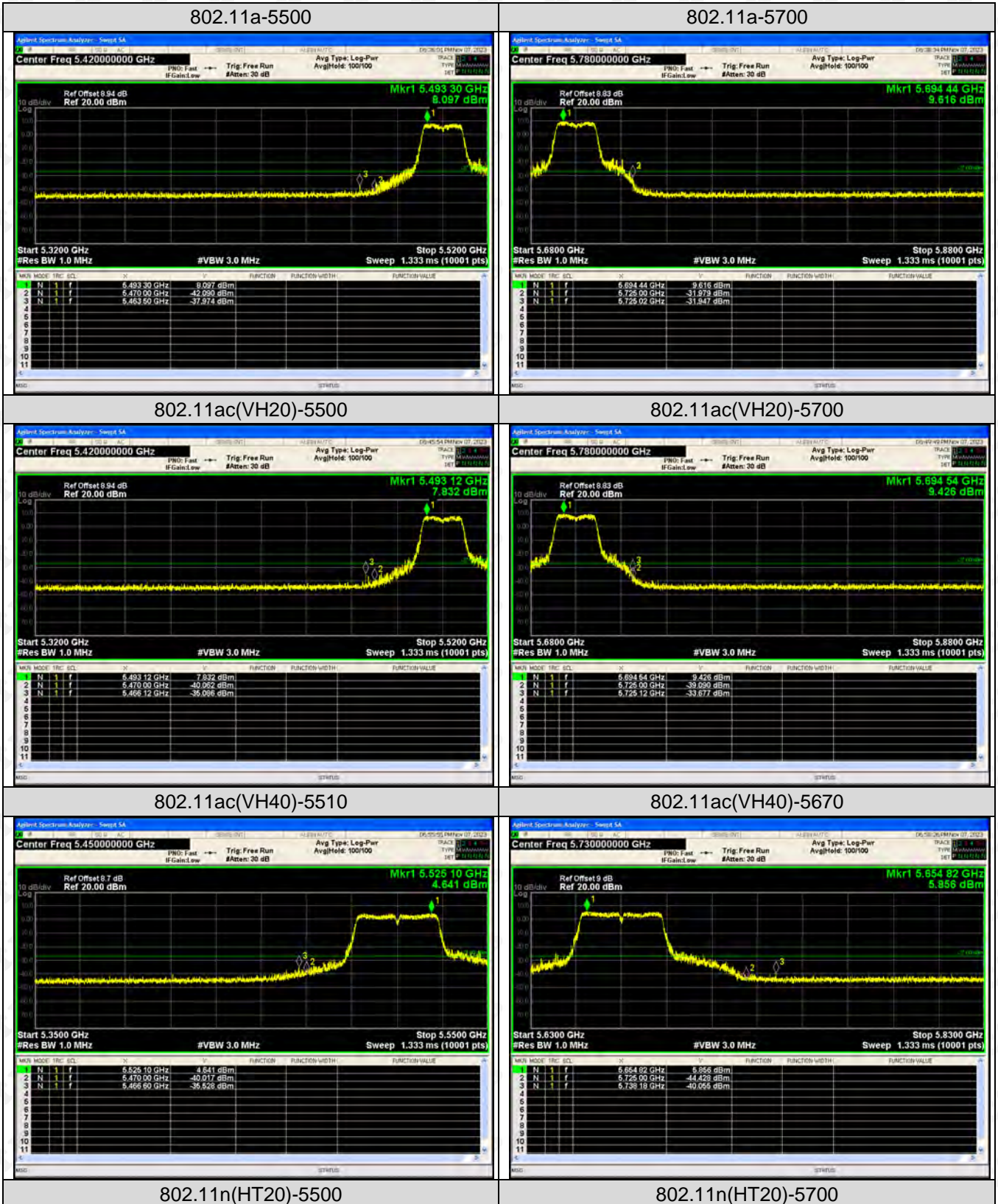
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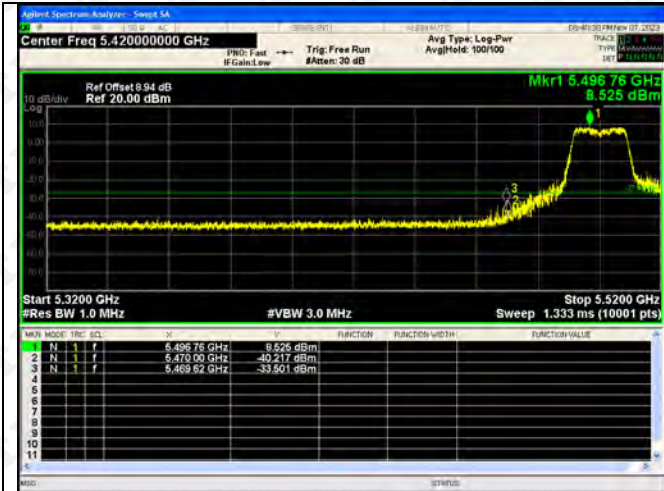


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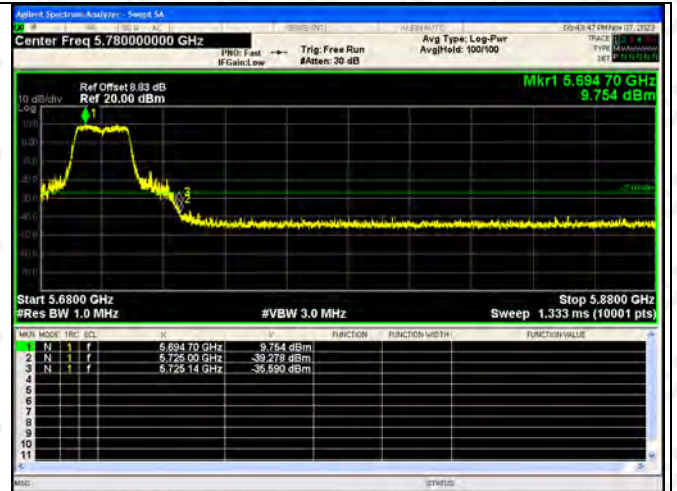


5470-5725MHz:
ANT1

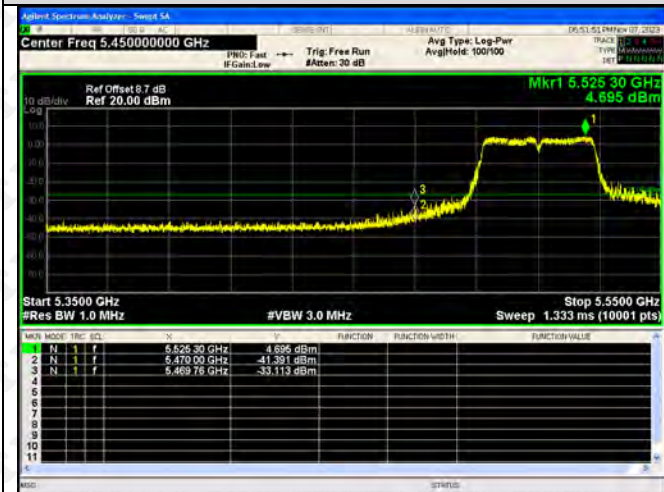




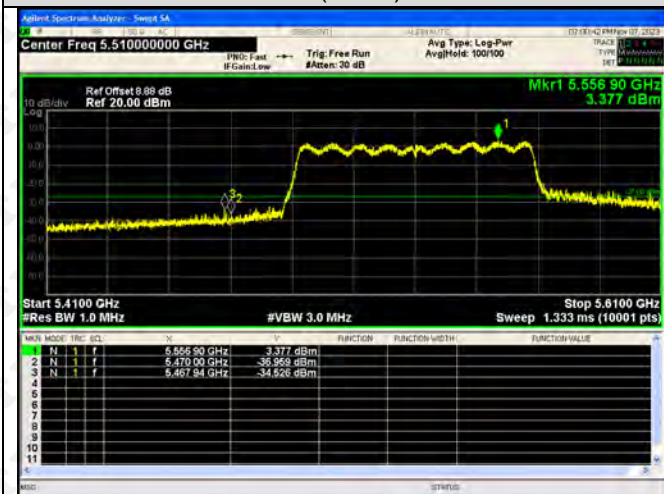
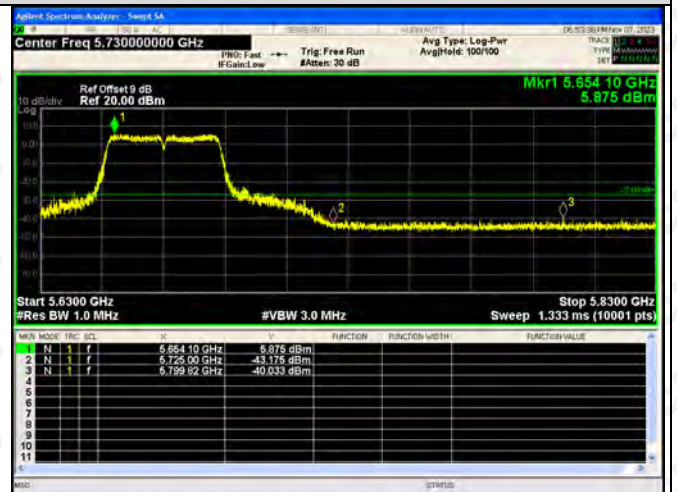
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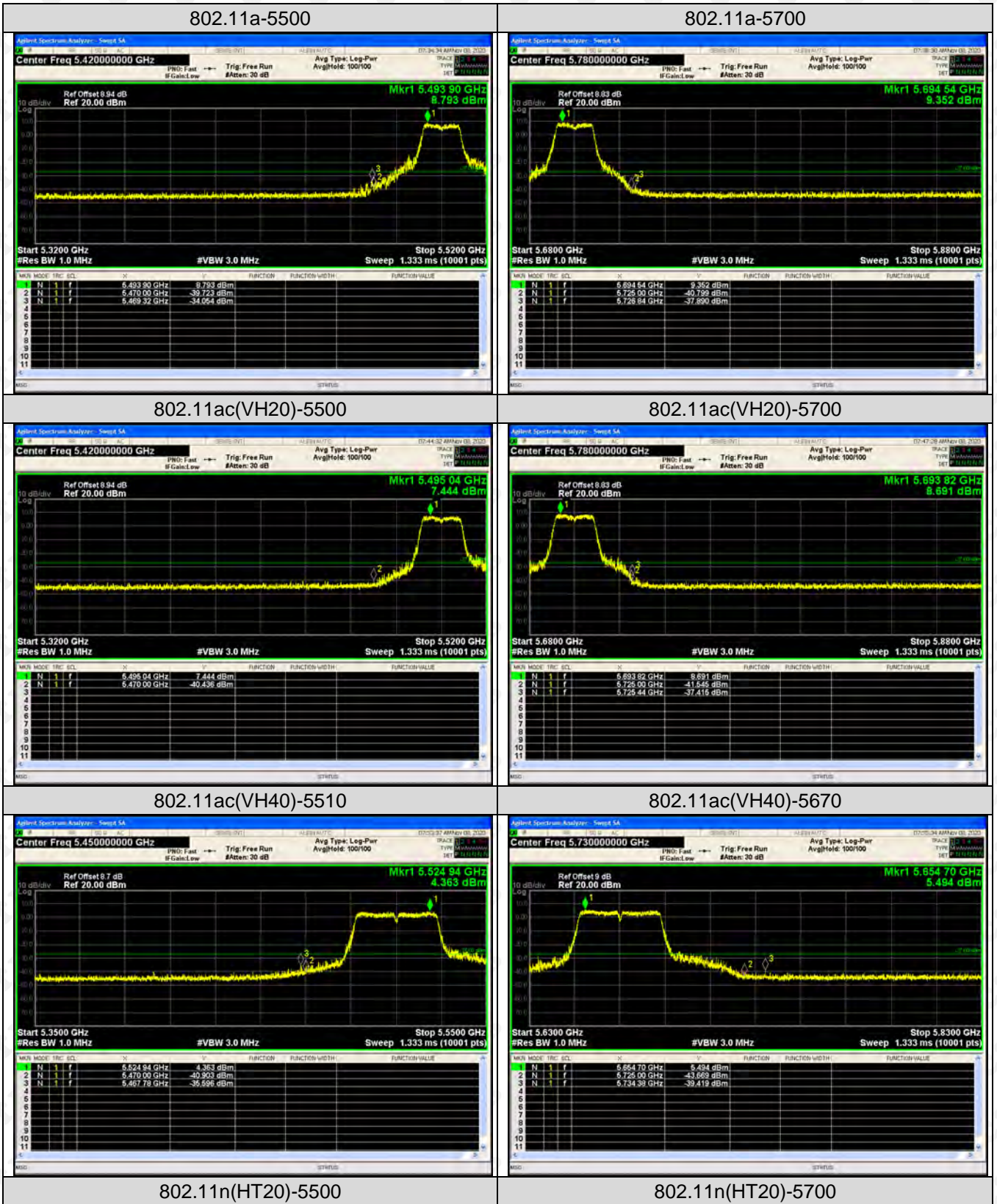
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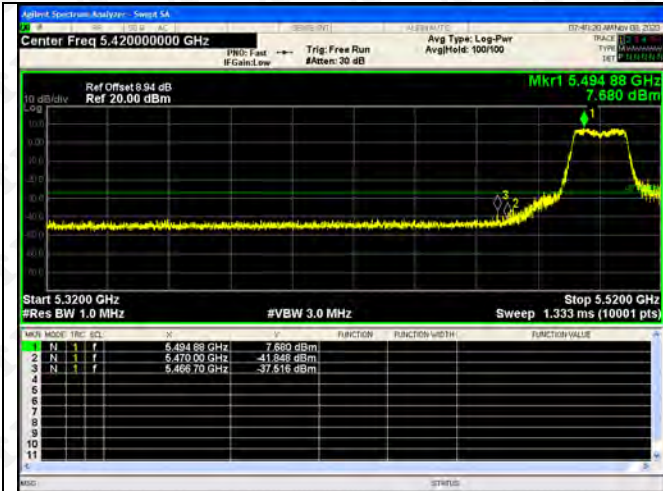


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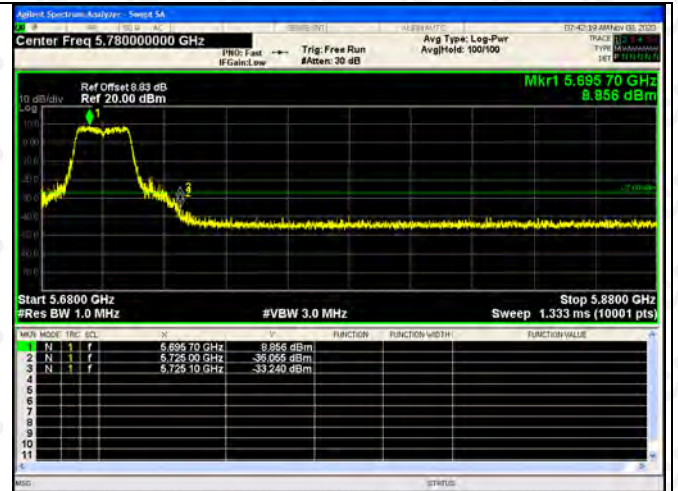


ANT2

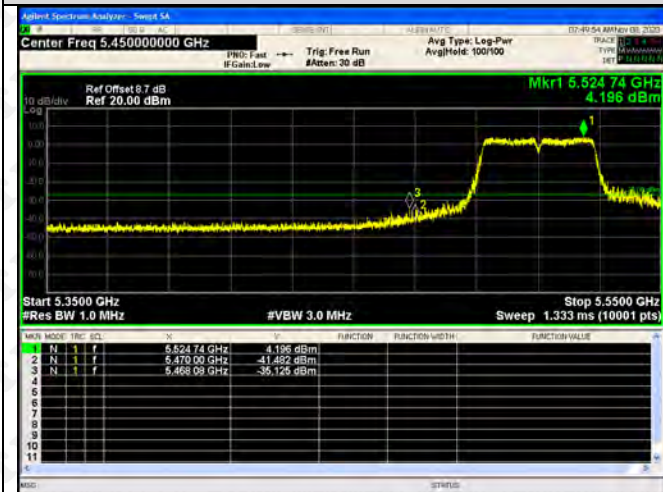




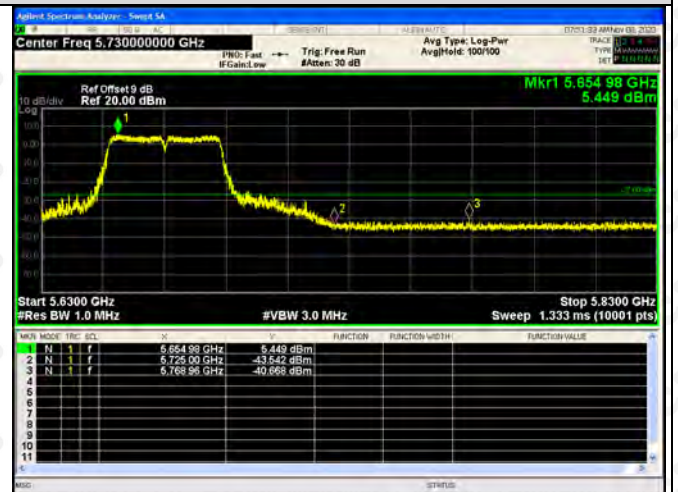
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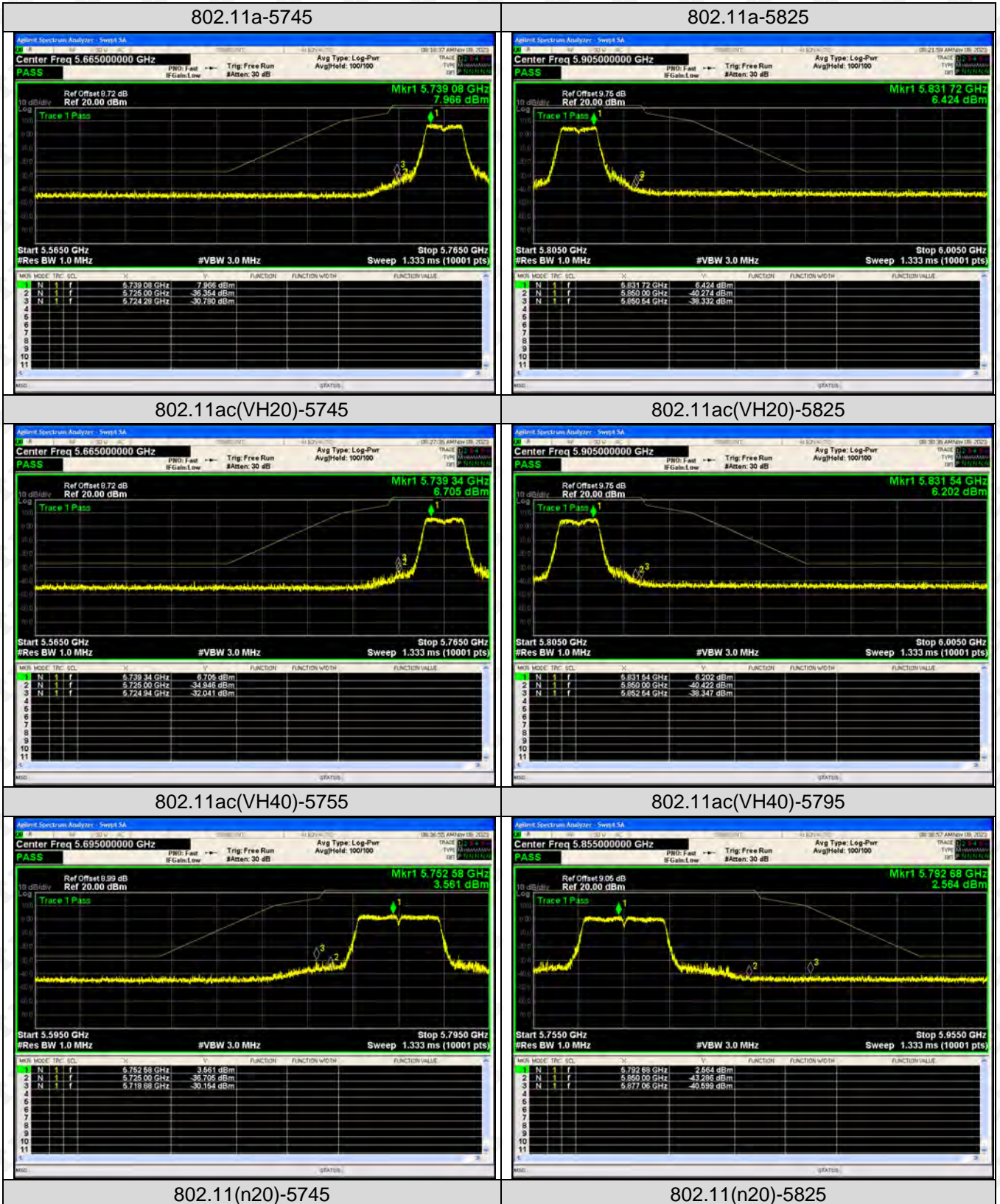
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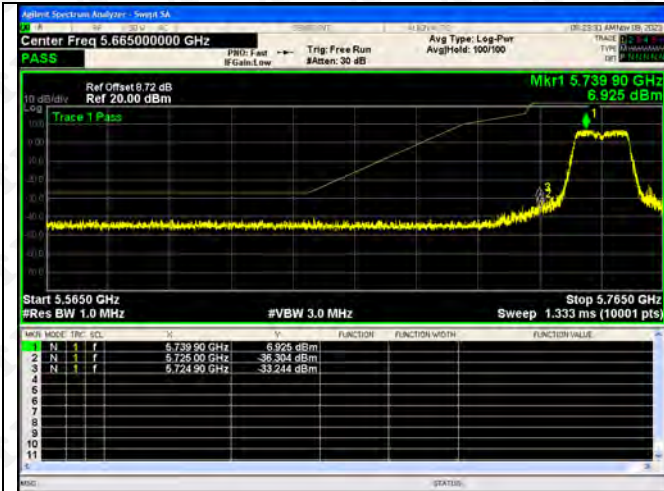


802.11ac(VH80)-5530



5725-5850MHz
ANT1

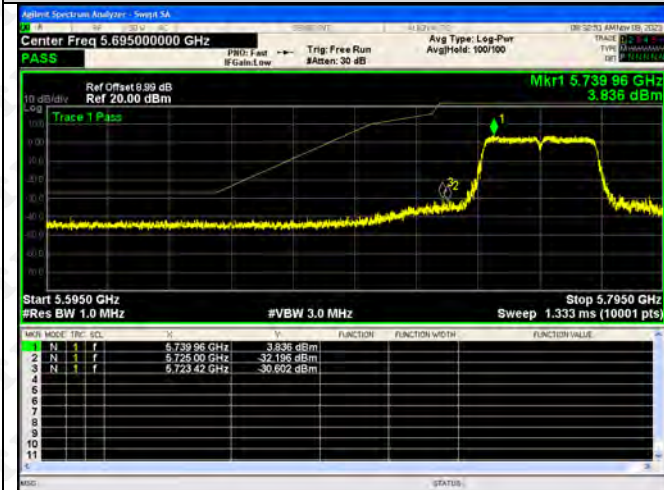




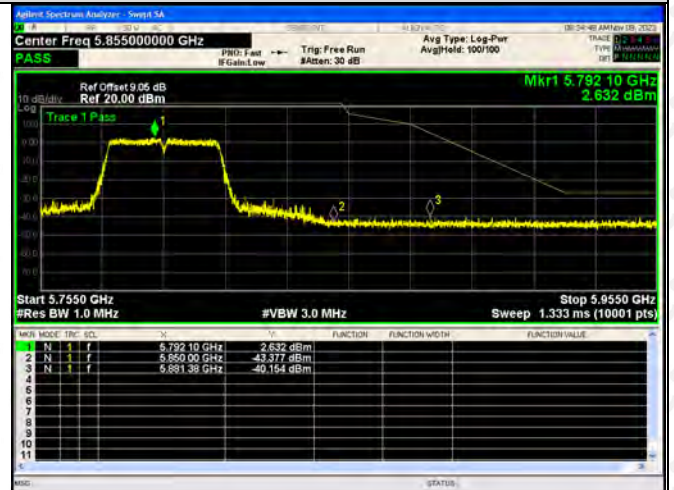
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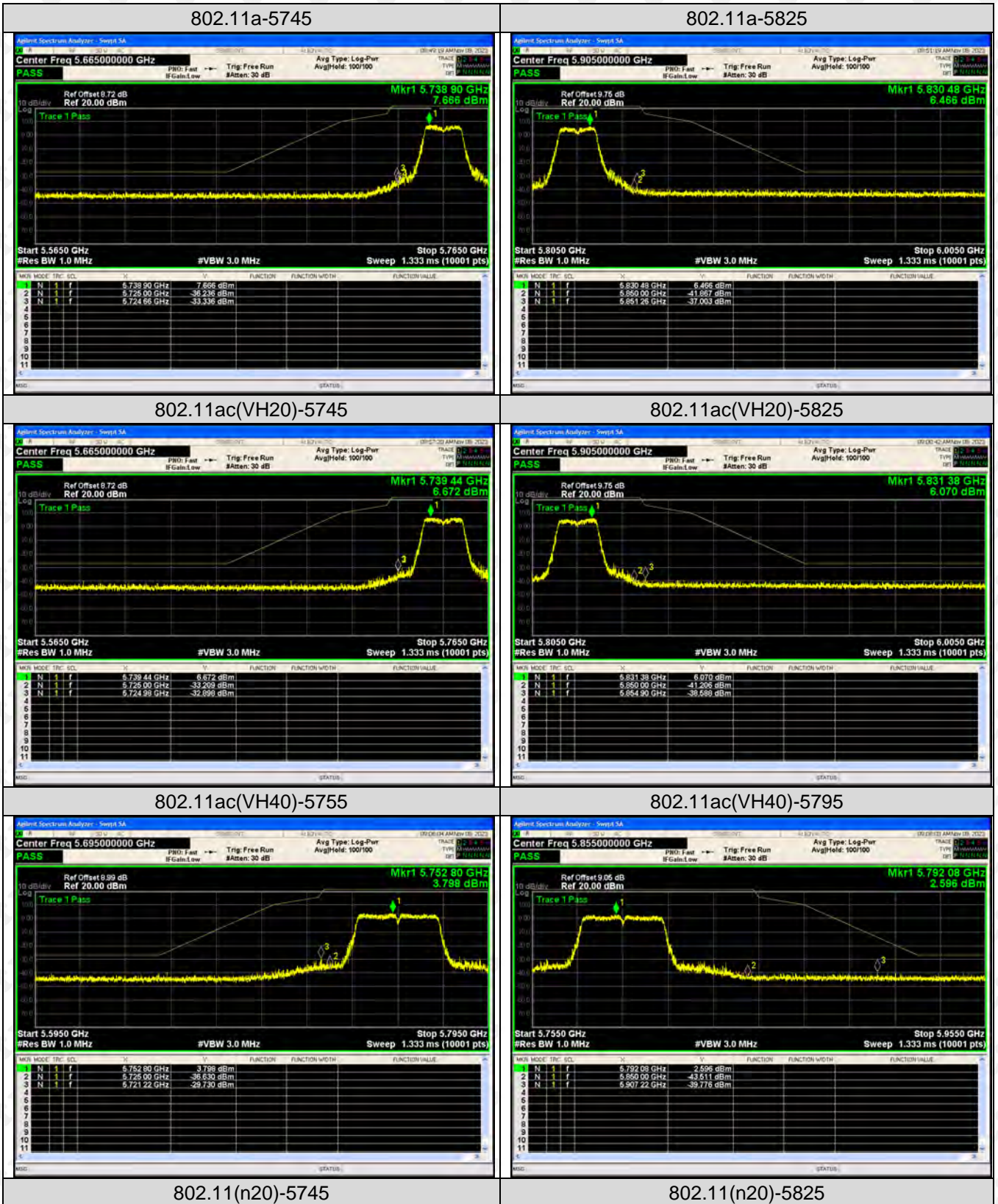
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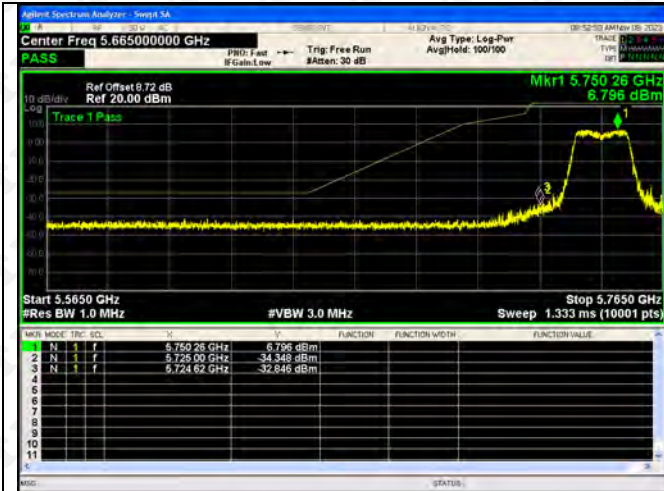


802.11ac(VH80)-5775



ANT2

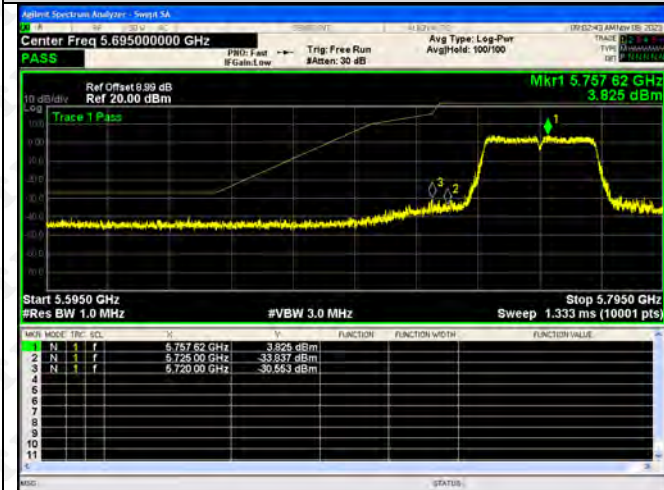




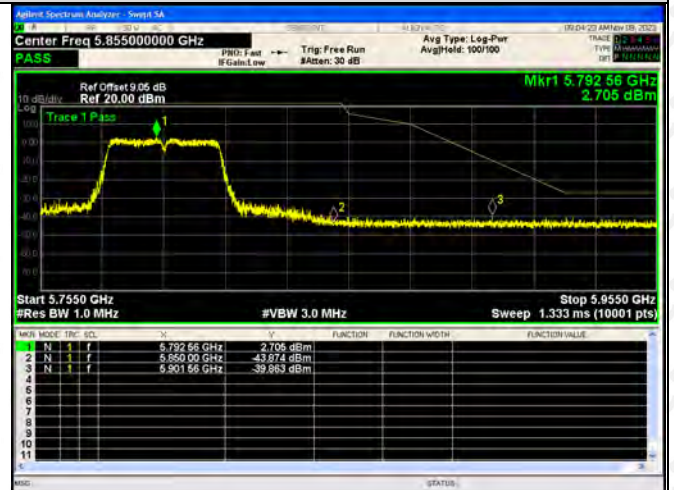
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802.11(n40)-5795

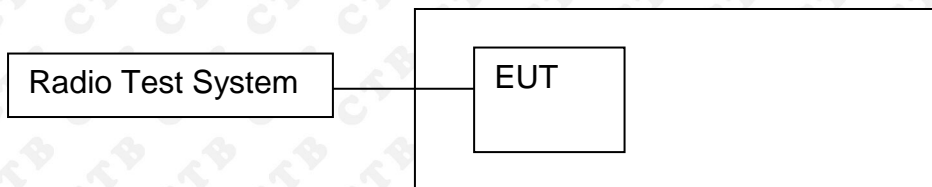


802.11ac(VH80)-5775



9. CONDUCTED OUTPUT POWER

9.1 Block Diagram Of Test Setup



9.2 Limit

(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 mobile and portable 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 $11 \text{ dBm} + 10 \log B$, 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.

(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

(5) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution

bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

(h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).

(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

9.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW \geq 3 MHz.

(iv) Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle $< 98\%$, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."

(viii) Trace average at least 100 traces in power averaging (rms) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

9.4 Test Result

5150-5250MHz:

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5180	12.896	12.016	/	30
	5200	12.453	11.625	/	30
	5240	12.979	12.423	/	30
802.11ac20	5180	11.168	11.105	14.147	30
	5200	11.16	11.519	14.354	30
	5240	11.97	12.336	15.167	30
802.11ac40	5190	11.291	11.152	14.232	30
	5230	11.828	11.676	14.763	30
802.11ac80	5210	11.483	11.509	14.506	30
802.11n(HT20)	5180	11.601	11.485	14.554	30
	5200	11.937	10.903	14.461	30
	5240	12.378	11.677	15.052	30
802.11n(HT40)	5190	11.603	11.79	14.708	30
	5230	11.862	11.788	14.835	30

5250-5350MHz:

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5260	11.971	11.472	/	23.98
	5280	11.887	12.023	/	23.98
	5320	12.734	11.513	/	23.98
802.11ac20	5260	11.245	11.432	14.350	23.98
	5280	11.442	11.906	14.690	23.98
	5320	10.529	11.112	13.841	23.98
802.11ac40	5270	11.673	11.526	14.610	23.98
	5310	11.368	11.267	14.328	23.98
802.11ac80	5290	11.149	11.477	14.326	23.98
802.11n(HT20)	5260	11.165	11.858	14.536	23.98
	5280	11.394	12.009	14.723	23.98
	5320	11.077	11.489	14.298	23.98
802.11n(HT40)	5270	11.455	11.731	14.605	23.98
	5310	12.681	11.413	15.103	23.98

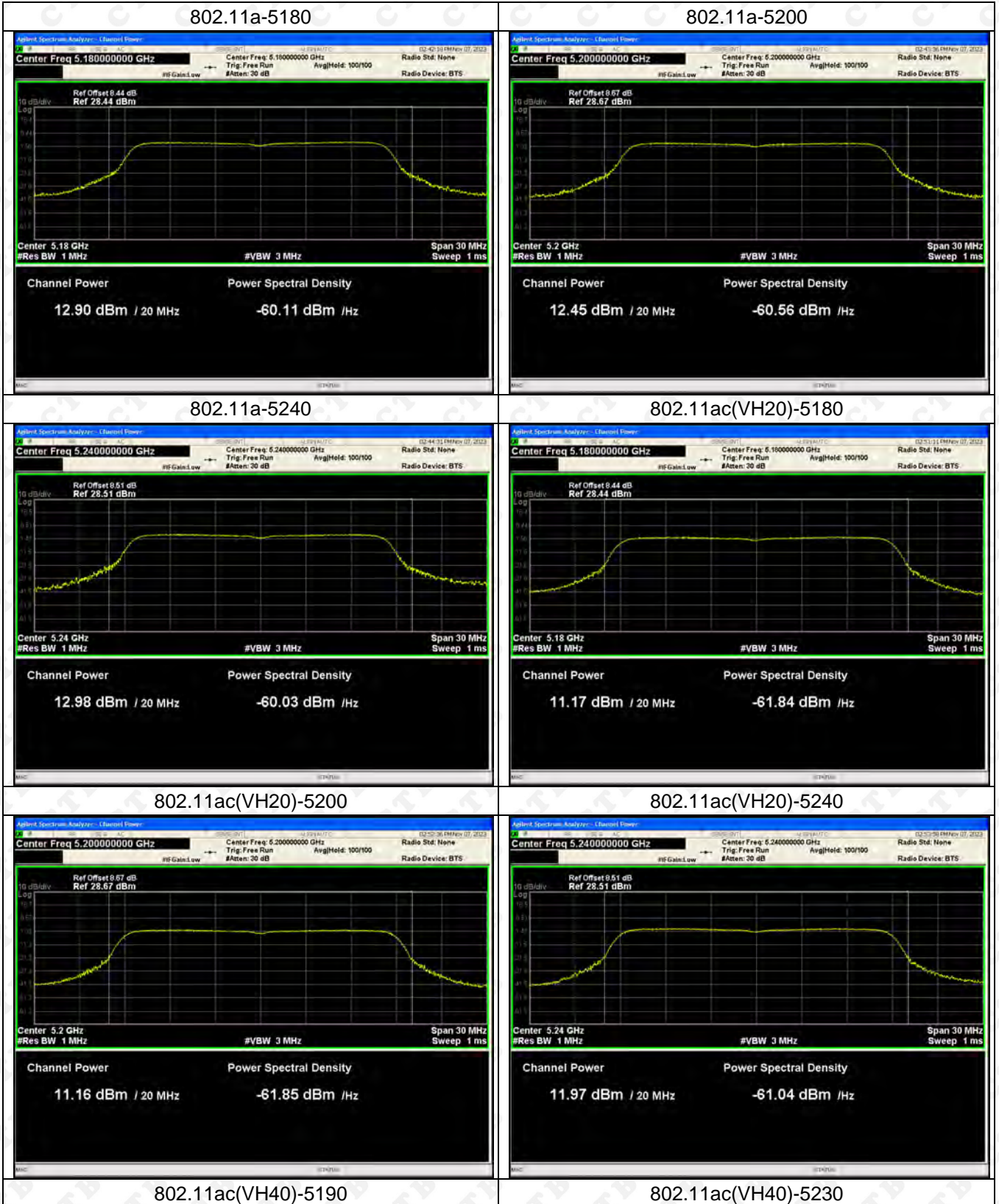
5470-5725MHz:

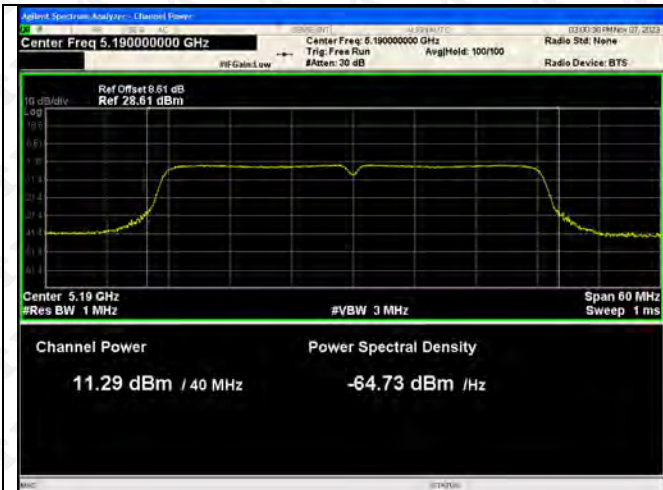
Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5500	11.49	11	/	23.98
	5580	12.917	13.119	/	23.98
	5700	12.756	12.646	/	23.98
802.11ac20	5500	11.527	11.028	14.295	23.98
	5580	12.978	12.535	15.772	23.98
	5700	13.43	12.339	15.929	23.98
802.11ac40	5510	11.182	10.911	14.059	23.98
	5670	12.503	12.249	15.388	23.98
802.11ac80	5530	11.585	11.352	14.480	23.98
802.11n(HT20)	5500	12.145	11.256	14.734	23.98
	5580	13.391	12.612	16.029	23.98
	5700	13.402	12.662	16.058	23.98
802.11n(HT40)	5510	11.292	10.984	14.151	23.98
	5670	12.574	12.188	15.396	23.98

5725-5850MHz:

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5745	11.342	11.59	/	30
	5785	10.776	10.558	/	30
	5825	9.901	9.866	/	30
802.11ac20	5745	10.139	10.264	13.212	30
	5785	9.86	9.813	12.847	30
	5825	9.32	9.255	12.298	30
802.11ac40	5755	10.323	10.419	13.382	30
	5795	9.153	9.277	12.226	30
802.11ac80	5775	10.592	10.754	13.684	30
802.11n(HT20)	5745	10.582	10.363	13.484	30
	5785	10.097	10.068	13.093	30
	5825	9.509	9.544	12.537	30
802.11n(HT40)	5755	10.538	10.558	13.558	30
	5795	9.3	9.345	12.333	30

Test Graph:
5150-5250MHz-Power
ANT1





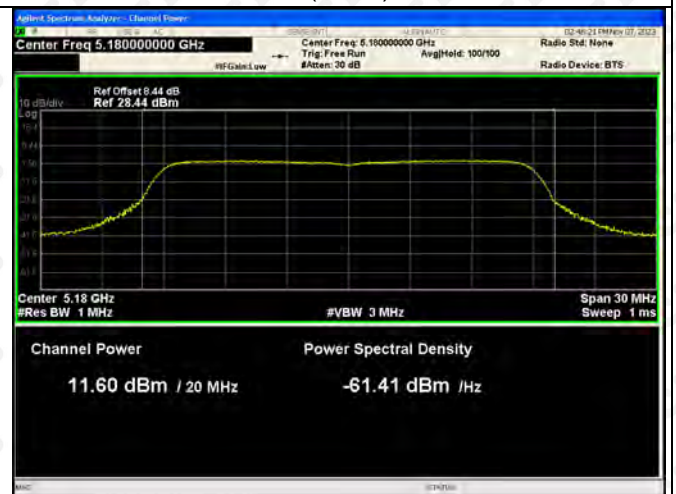
802.11ac(VH80)-5210



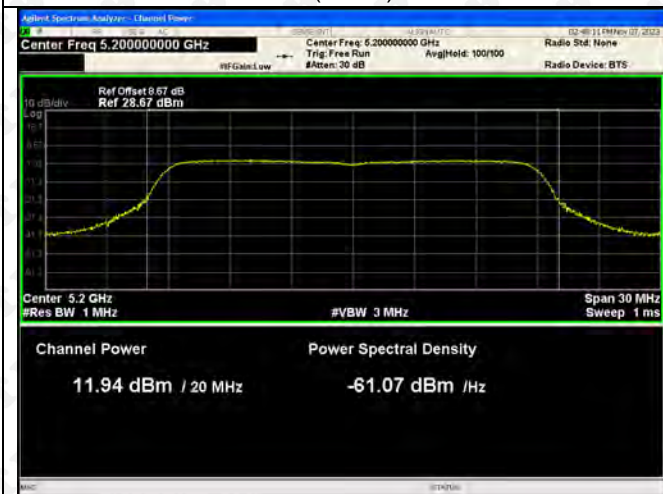
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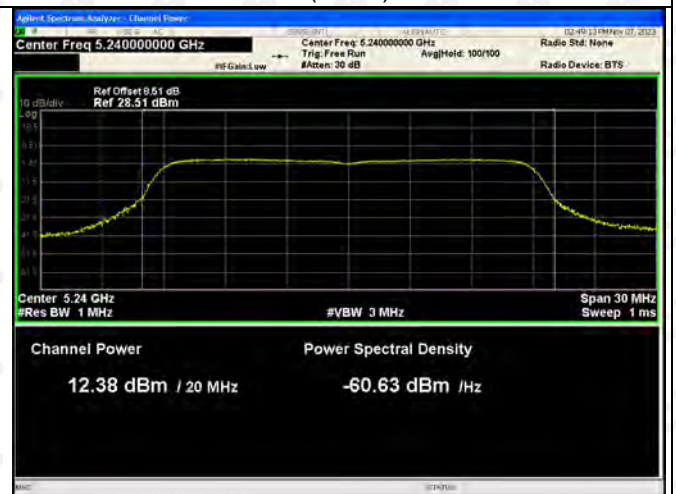
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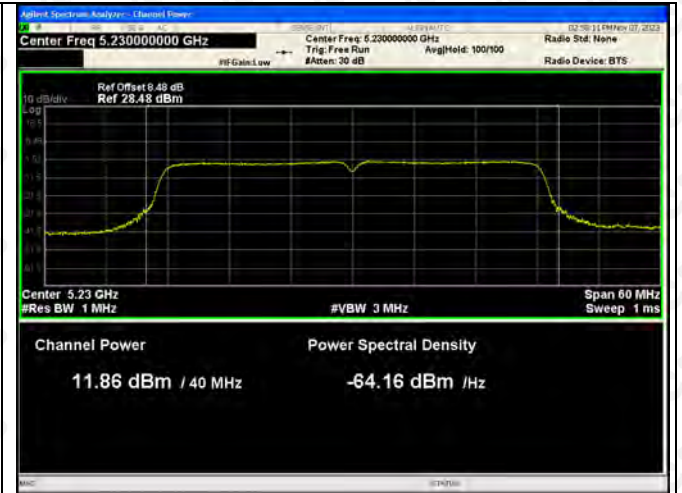
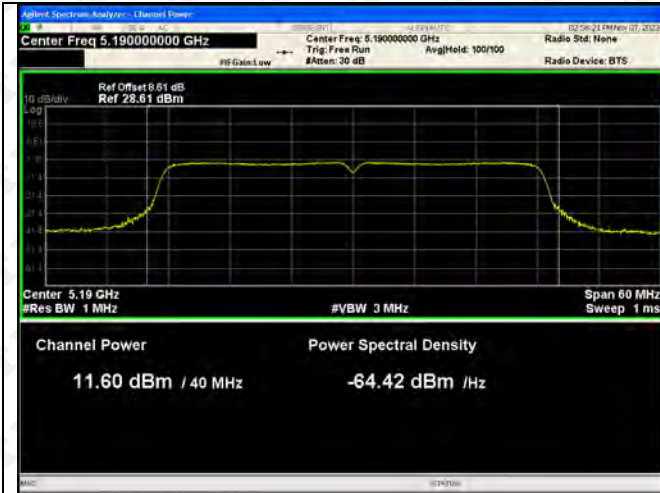
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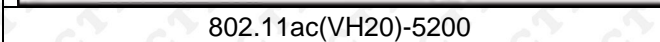
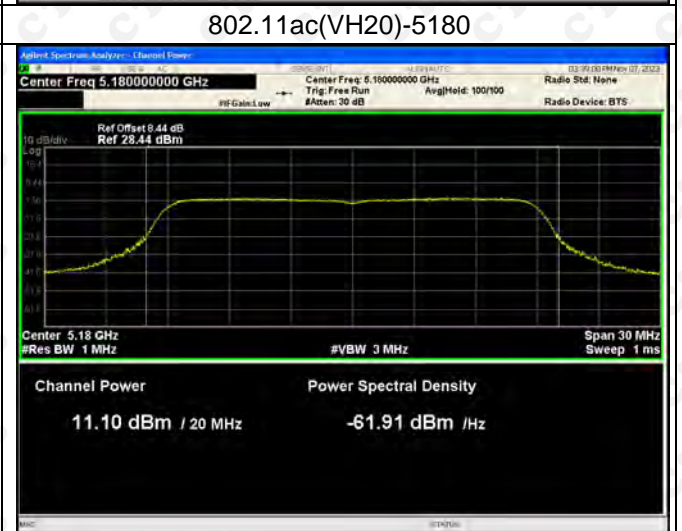
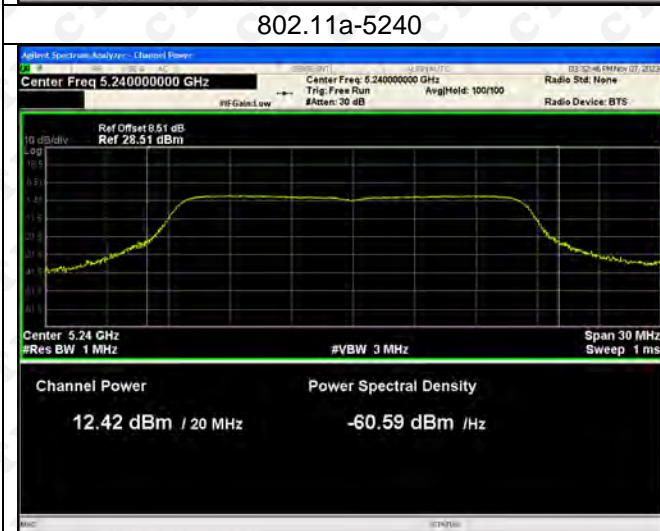
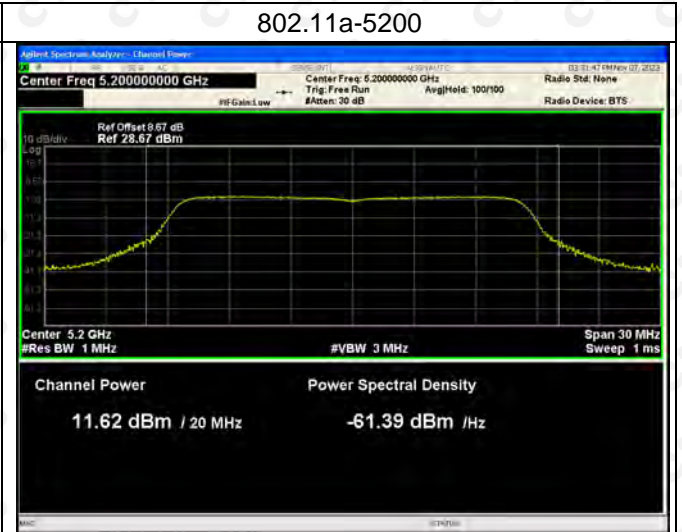
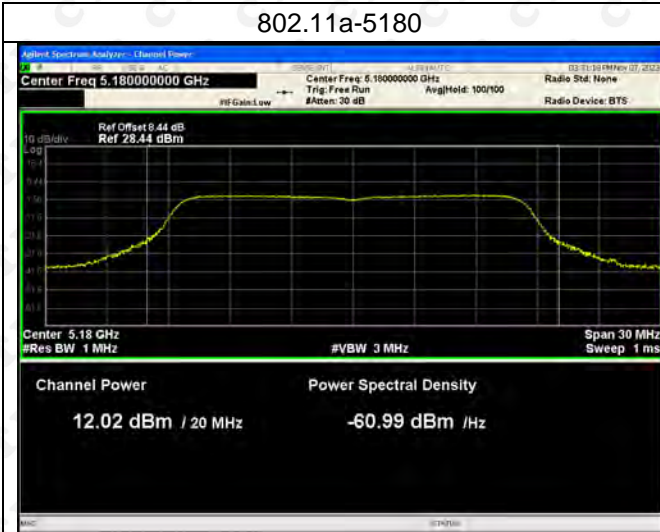
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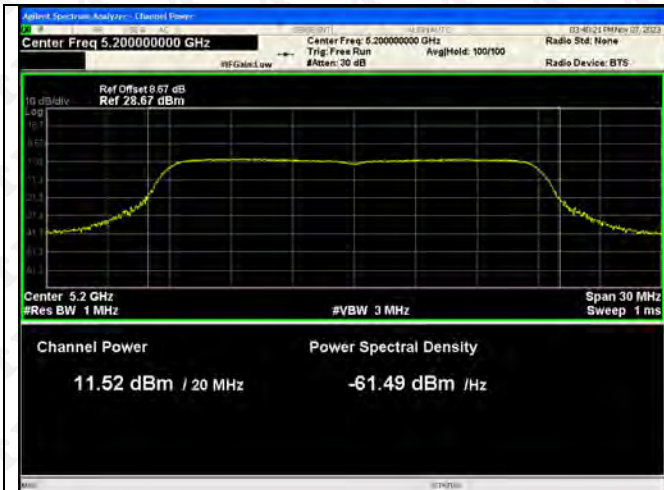


802.11n(HT40)-5230



ANT2





802.11ac(VH40)-5190



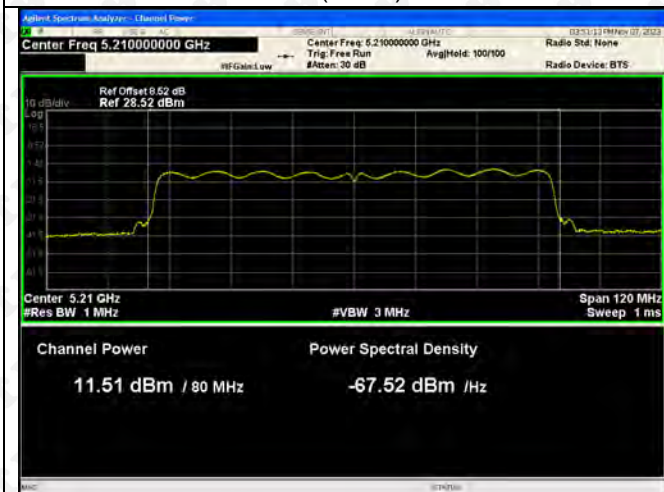
802.11ac(VH40)-5230



802.11ac(VH80)-5210



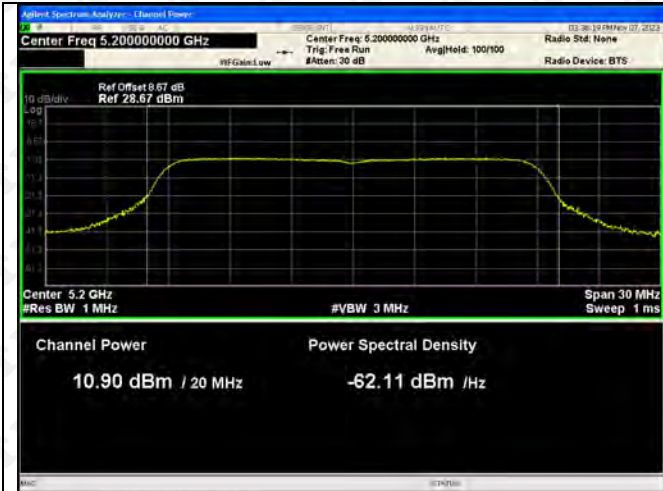
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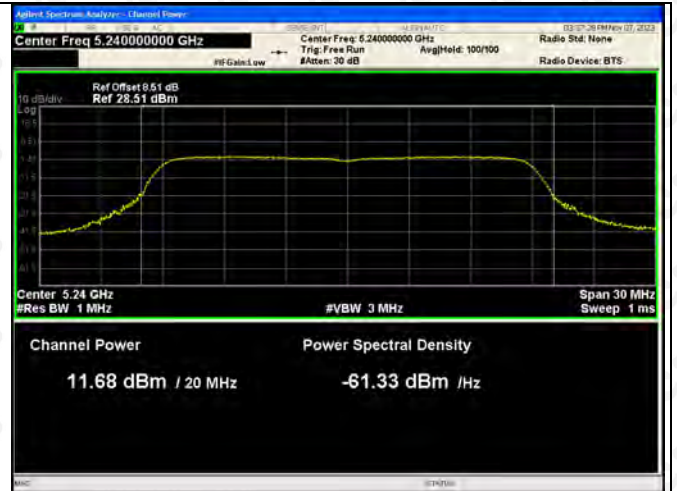
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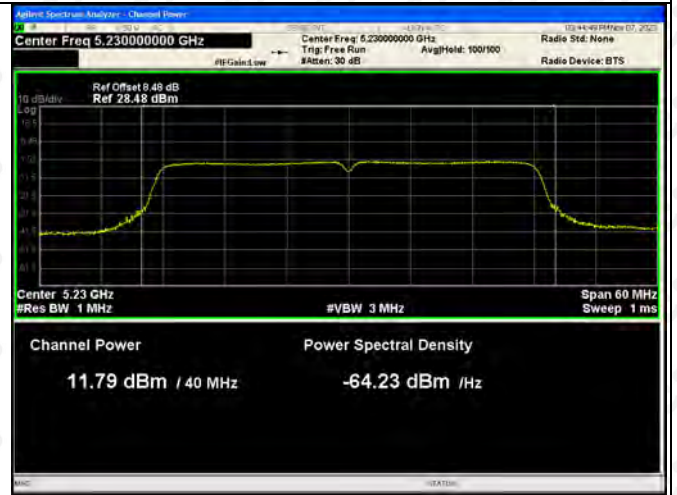
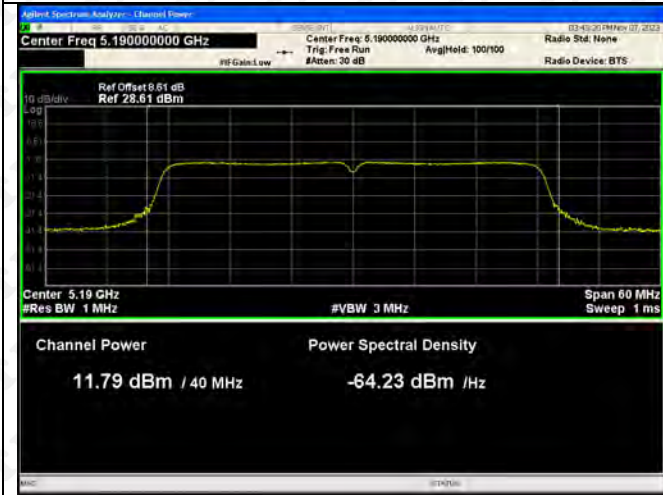
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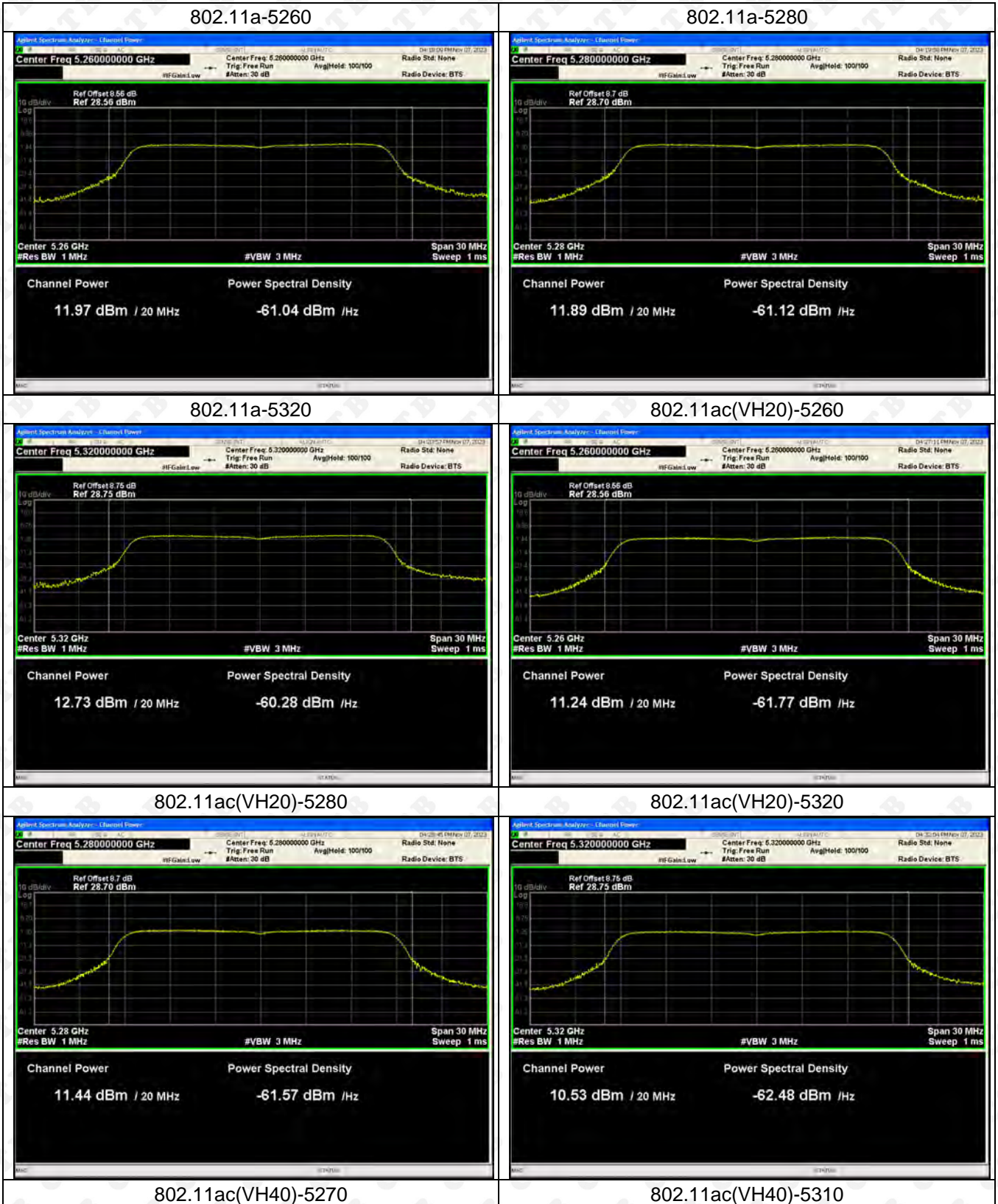
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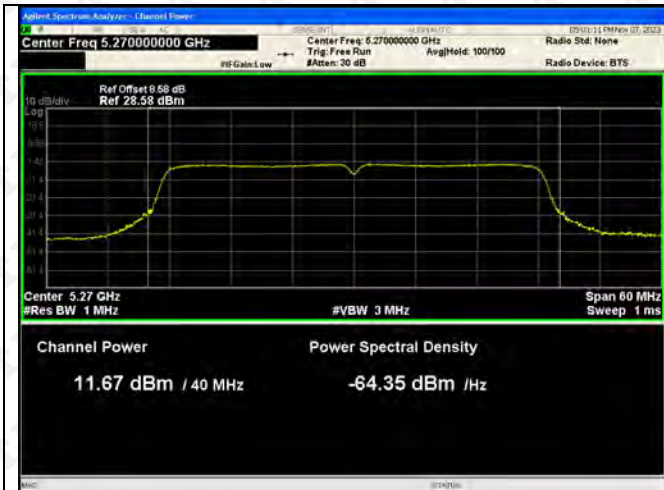


802.11n(HT40)-5230



5250-5350MHz-Power
ANT1

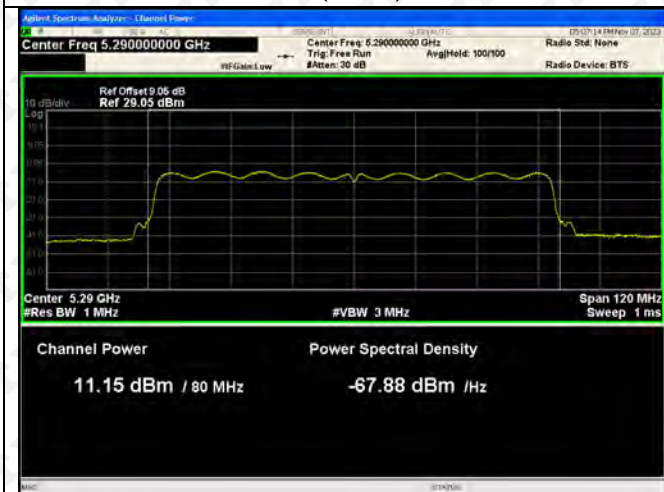




802.11ac(VH80)-5290



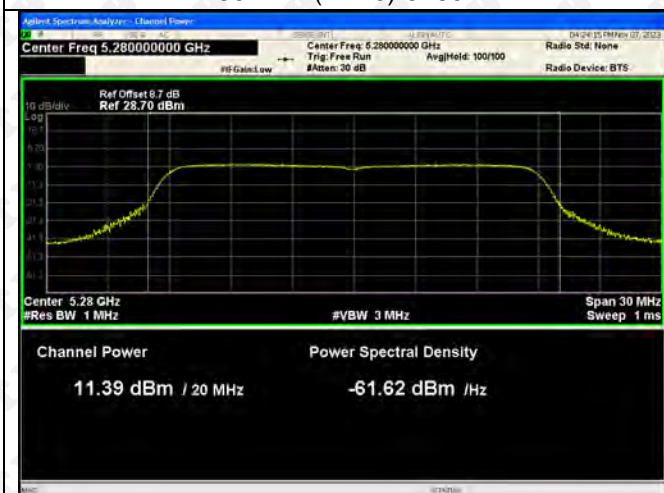
802.11n(HT20)-5260



802.11n(HT20)-5280



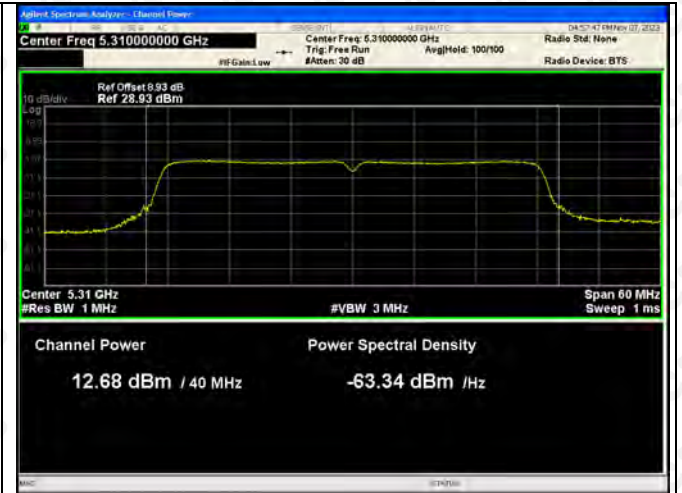
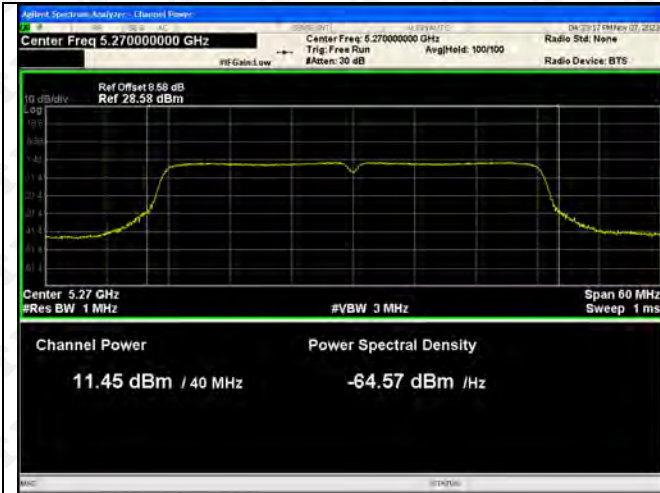
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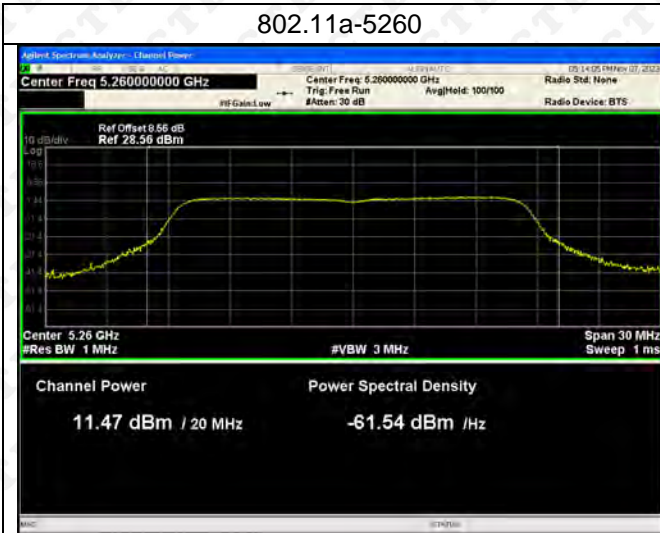
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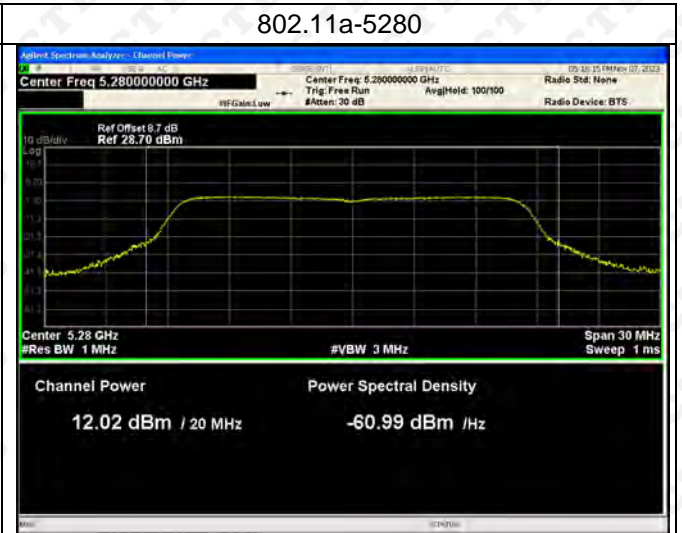
802.11n(HT40)-5310



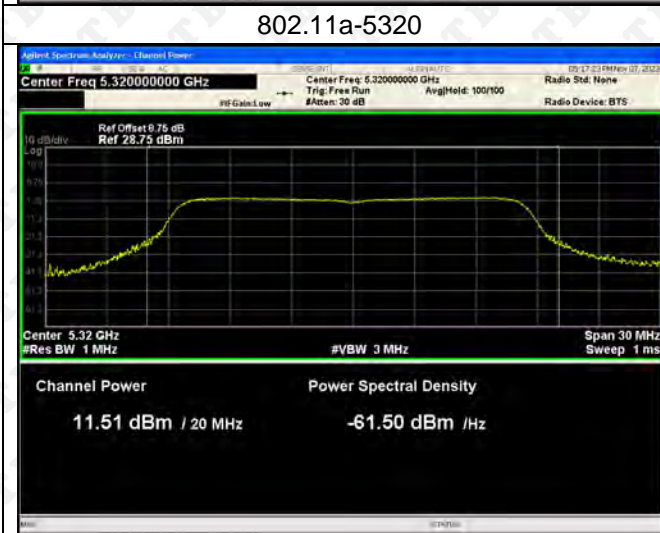
ANT2



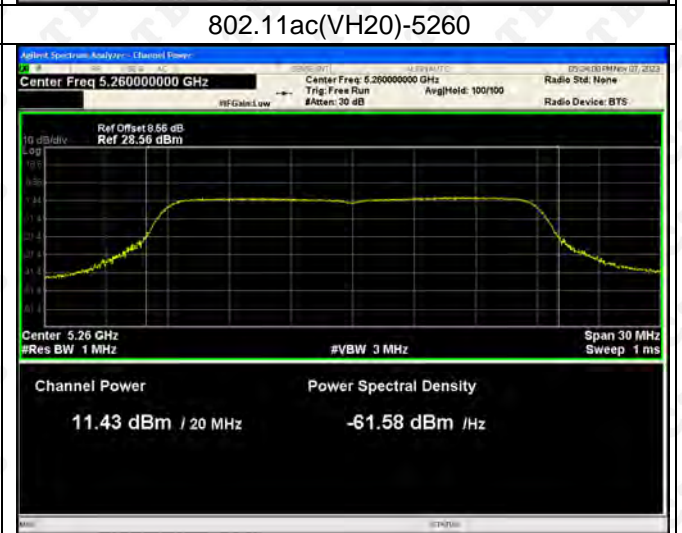
802.11a-5260



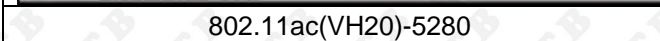
802.11a-5280



802.11a-5320



802.11ac(VH20)-5260



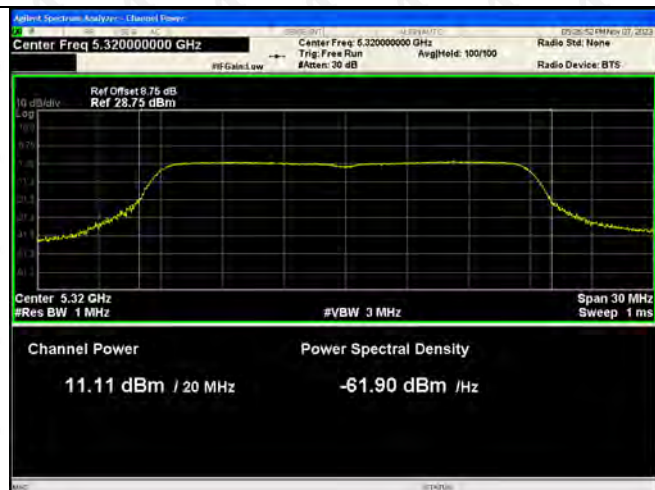
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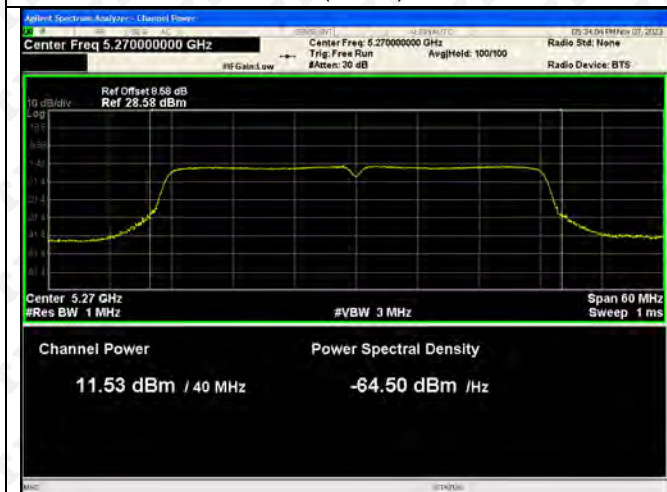
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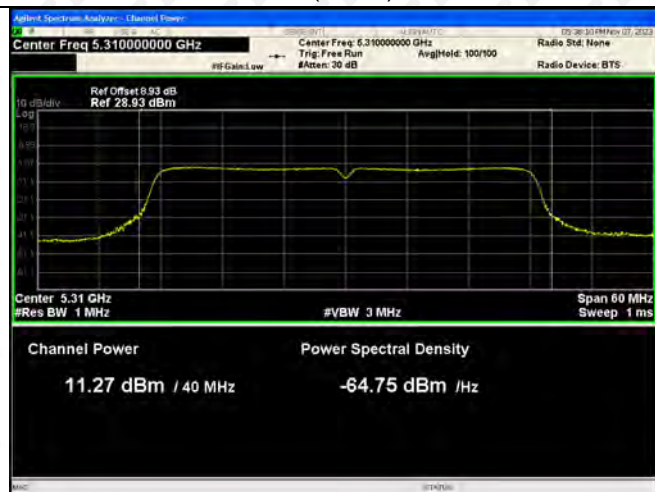
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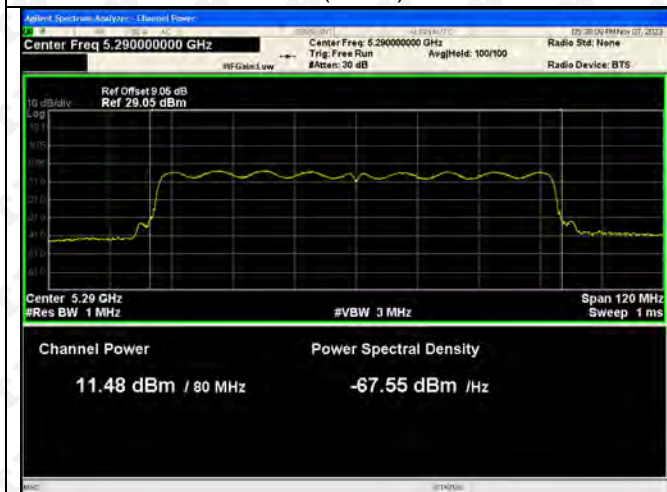
802.11ac(VH40)-5310



802.11ac(VH80)-5290



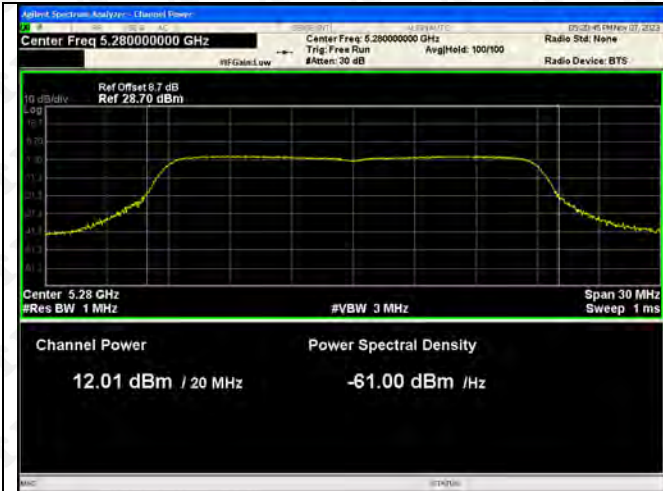
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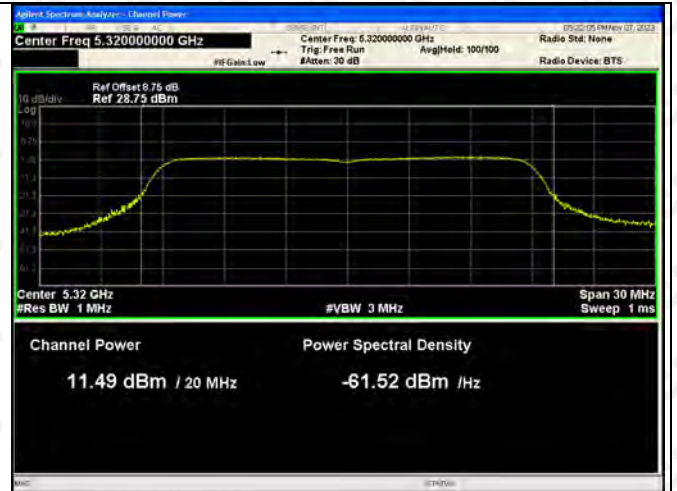
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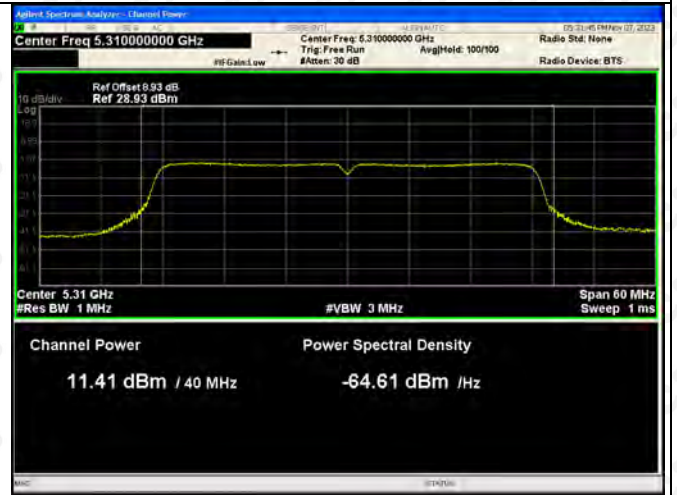
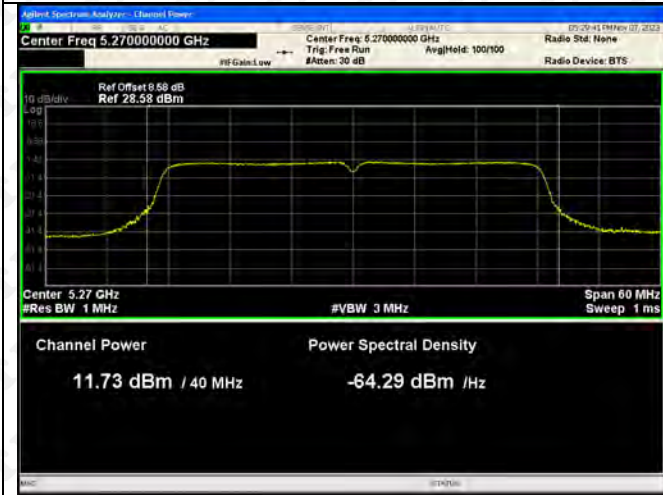
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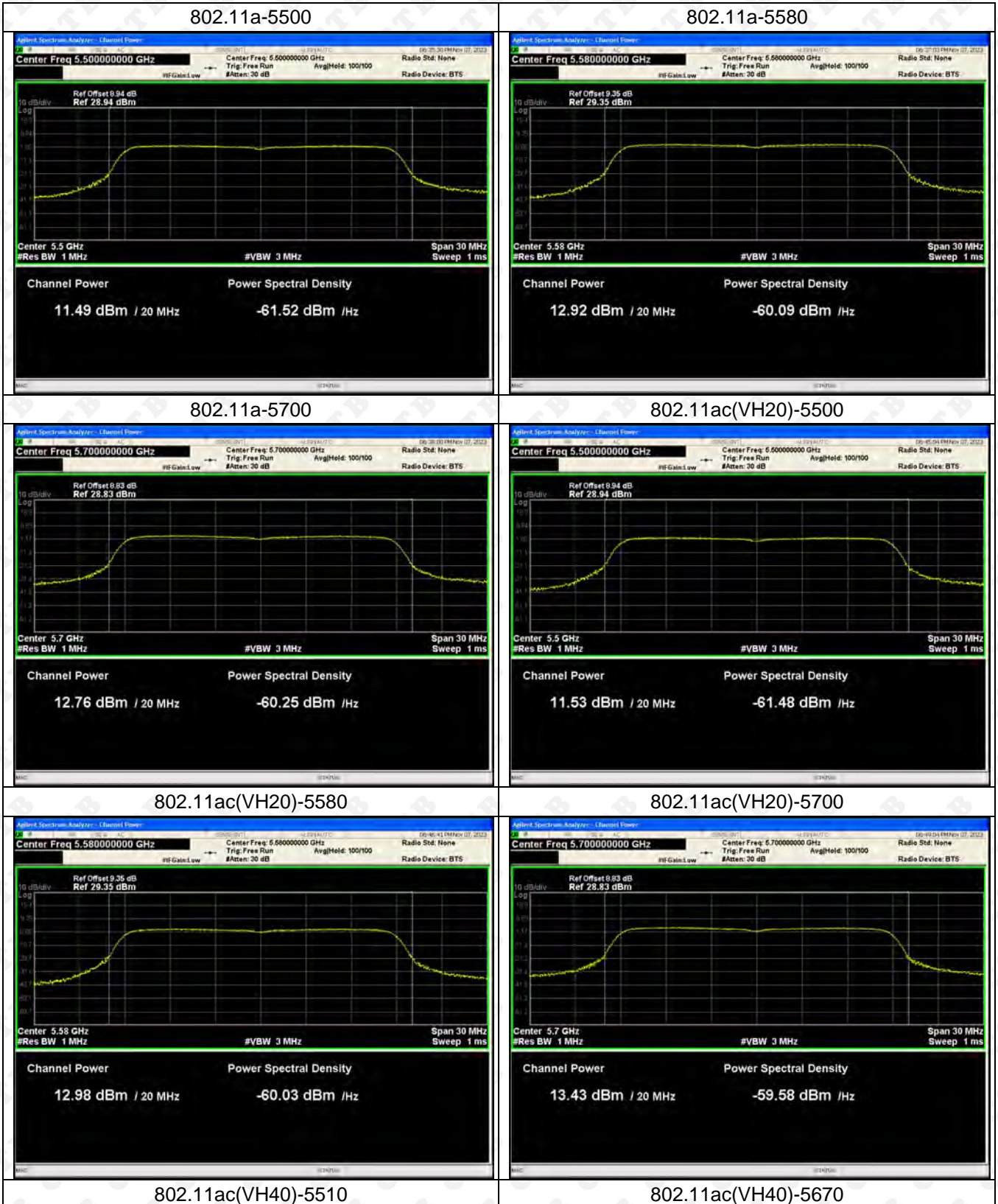
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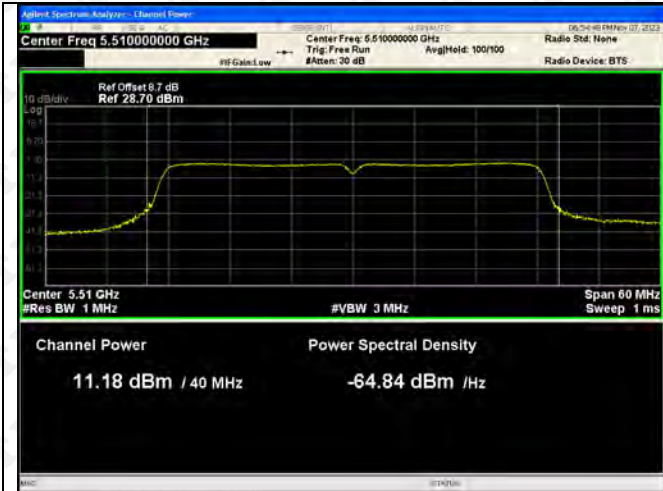


802.11n(HT40)-5310

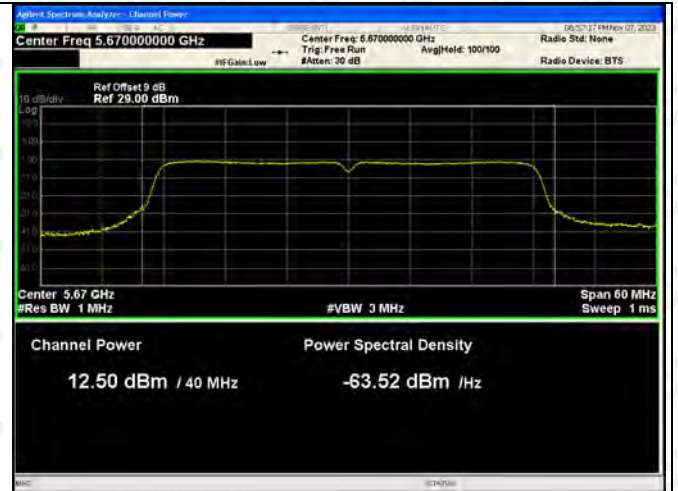


5470-5725MHz-Power
ANT1

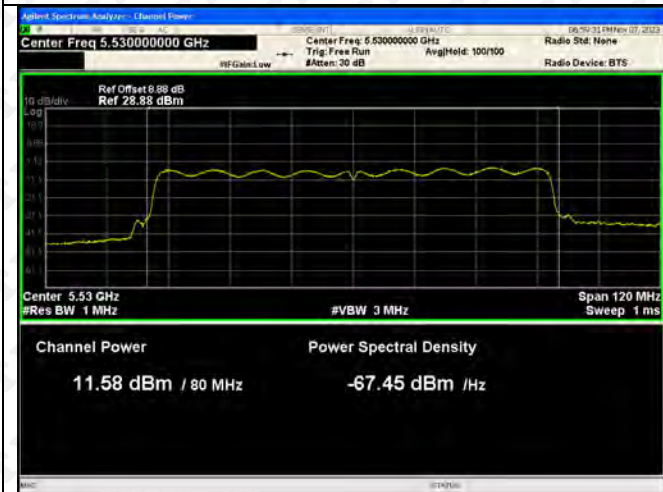




802.11ac(VH80)-5530



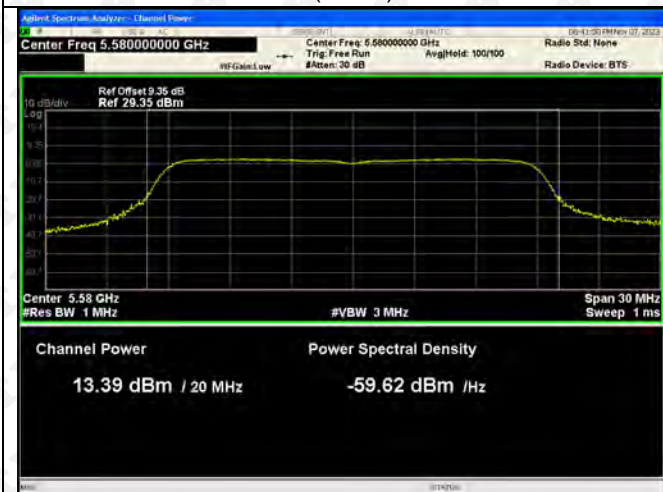
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802.11n(HT20)-5580



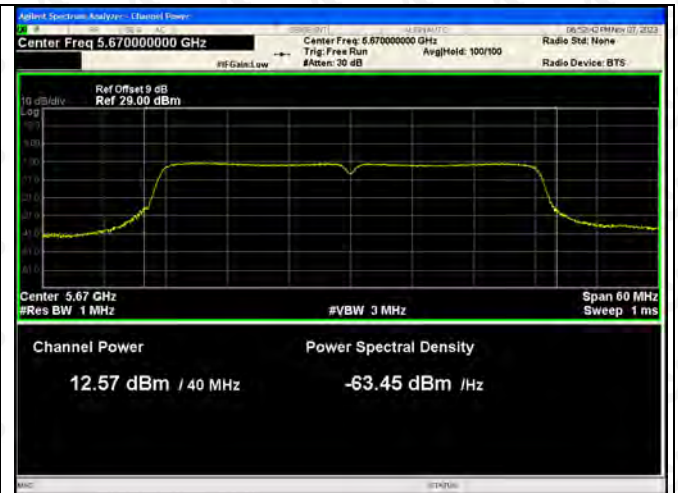
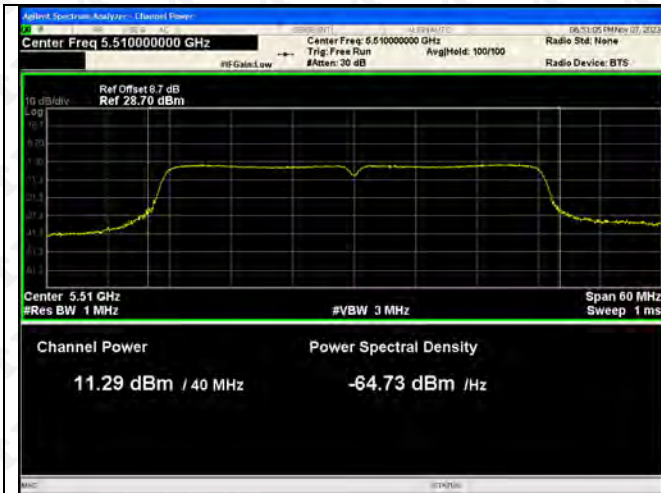
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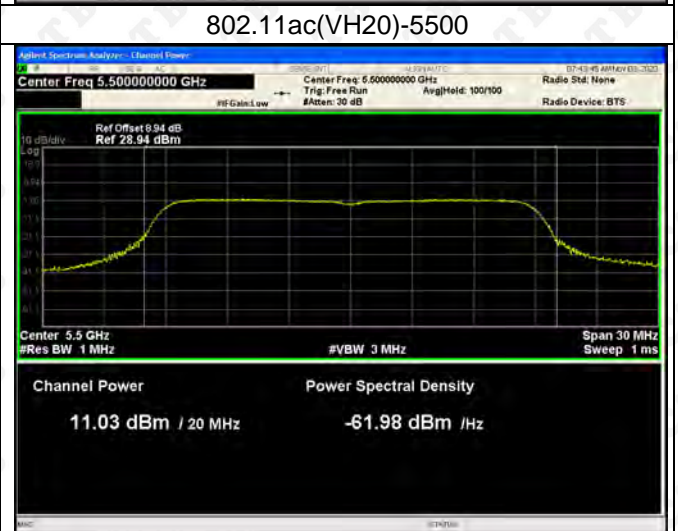
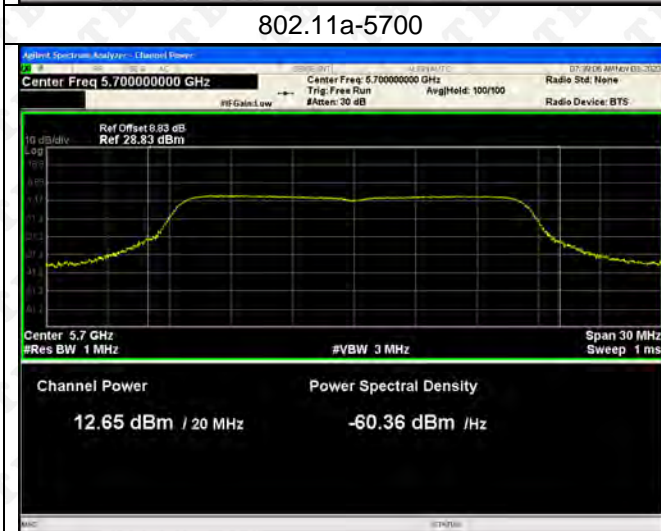
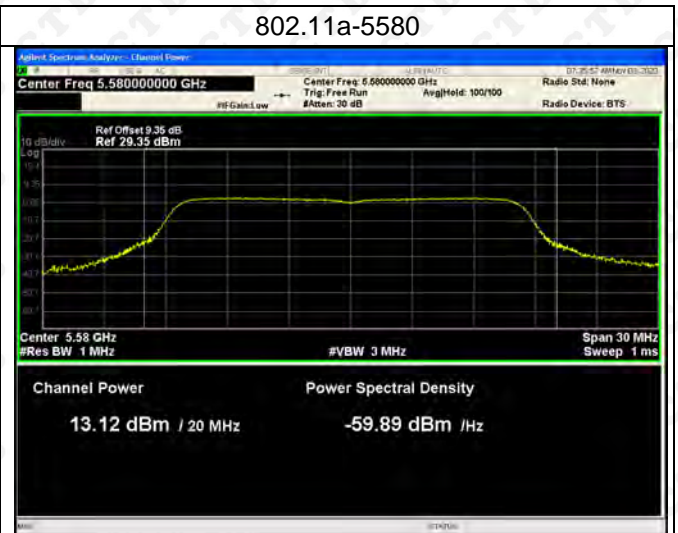
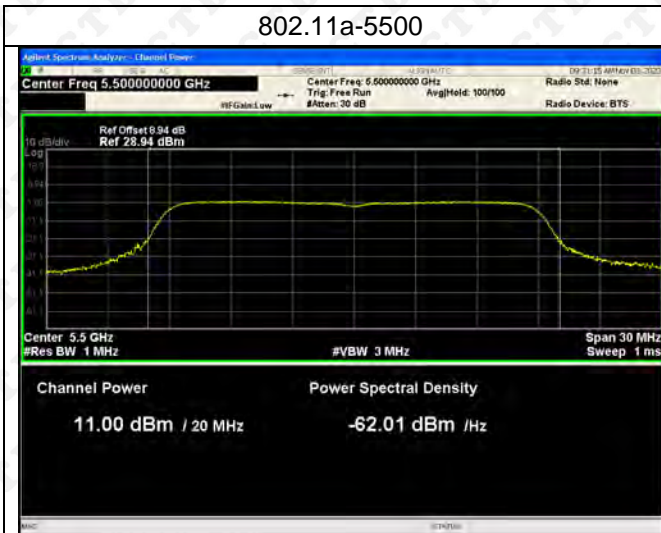
802.11n(HT40)-5510



802.11n(HT40)-5670



ANT2



802.11ac(VH20)-5580

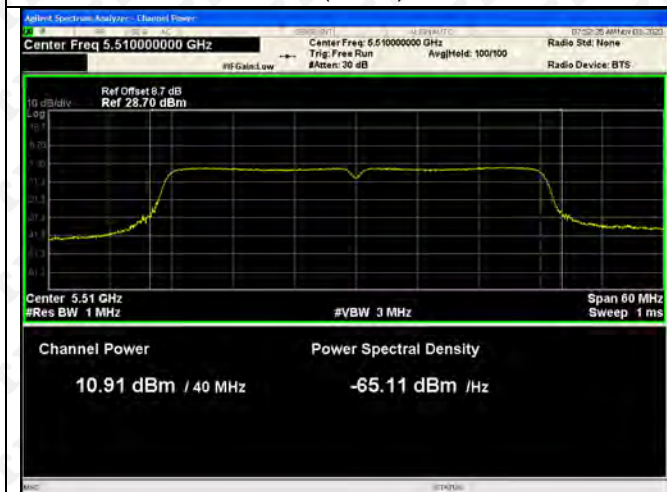
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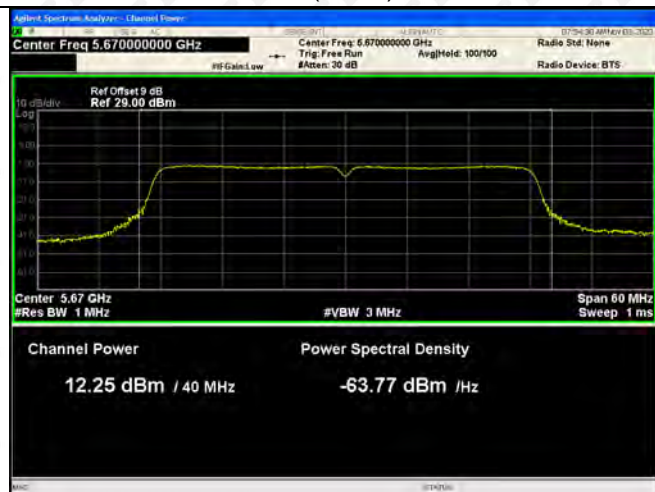
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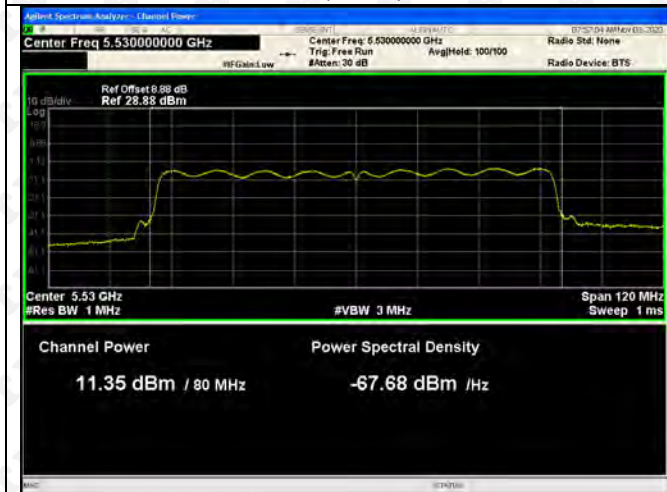
802.11ac(VH40)-5670



802.11ac(VH80)-5530



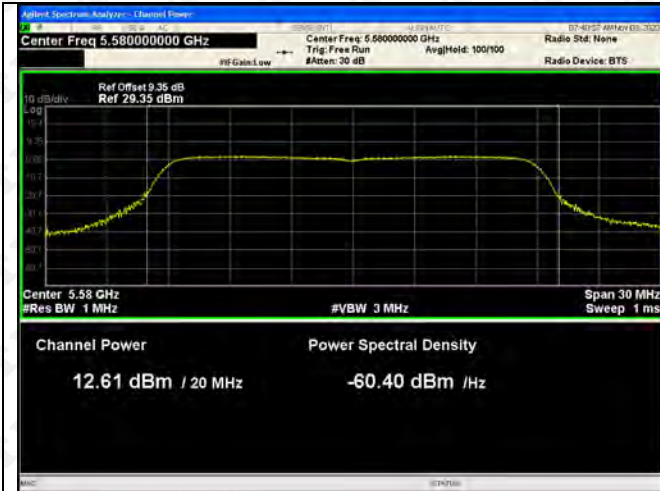
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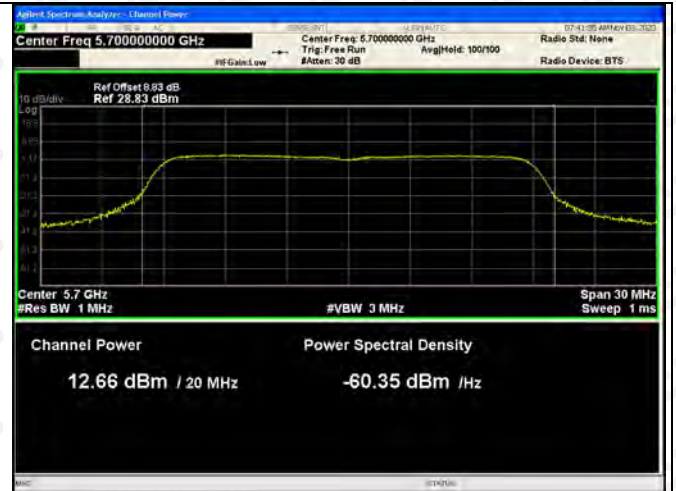
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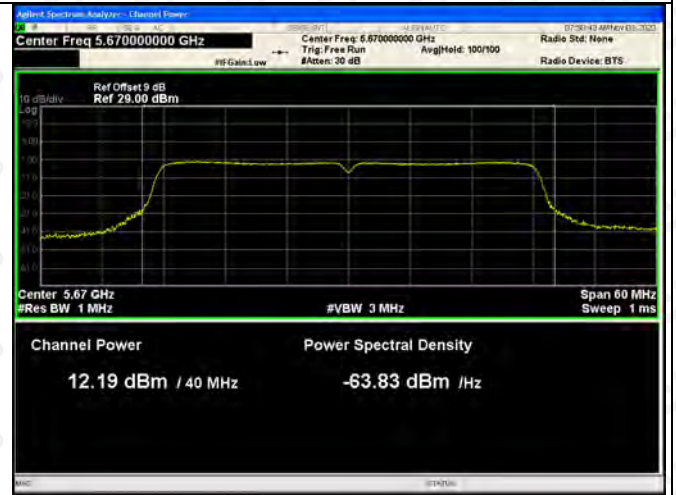
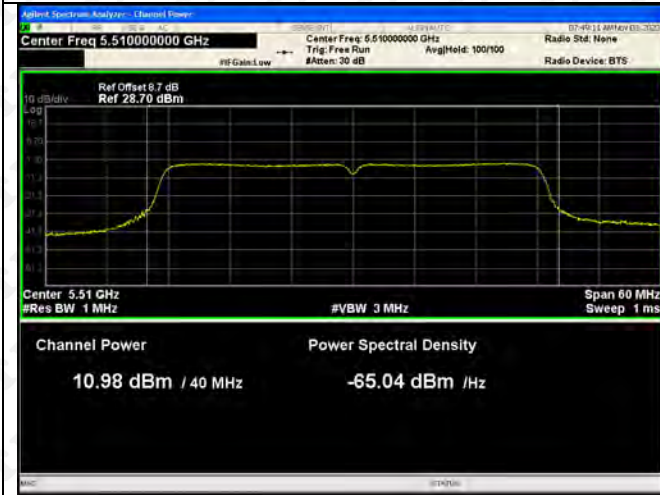
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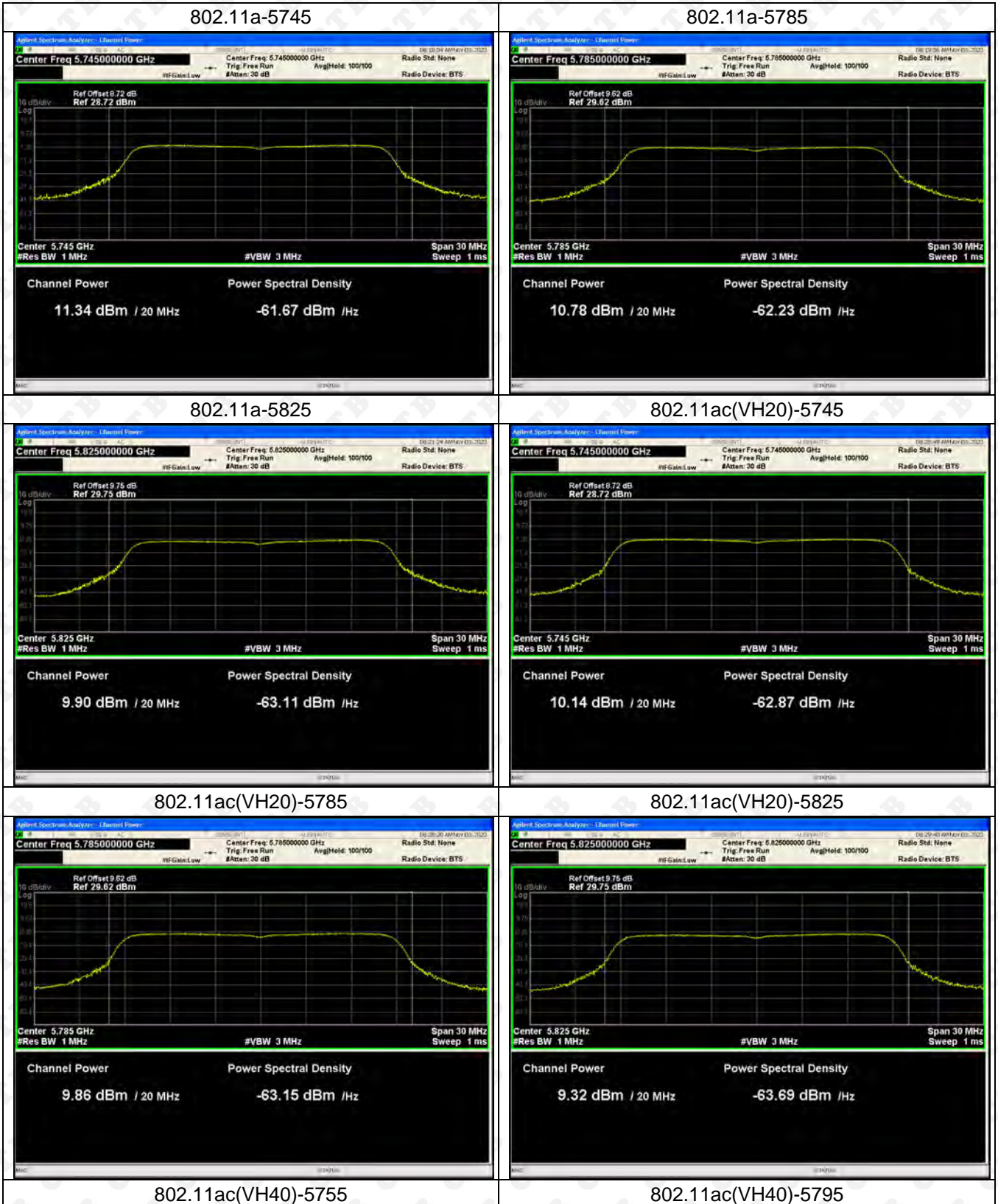
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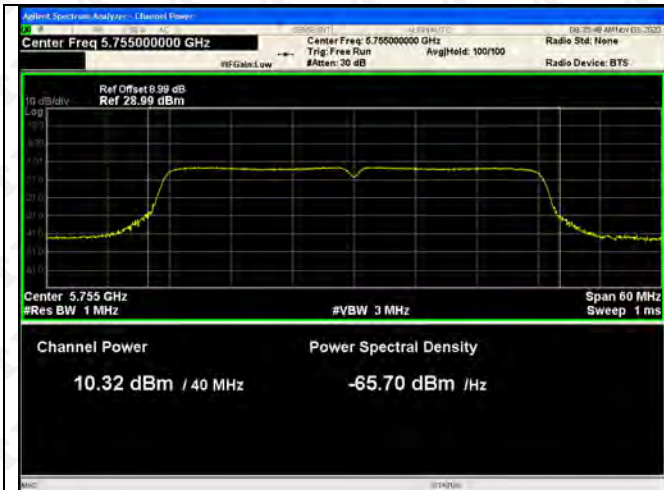


802.11n(HT40)-5670



5725-5850MHz:-Power
ANT1





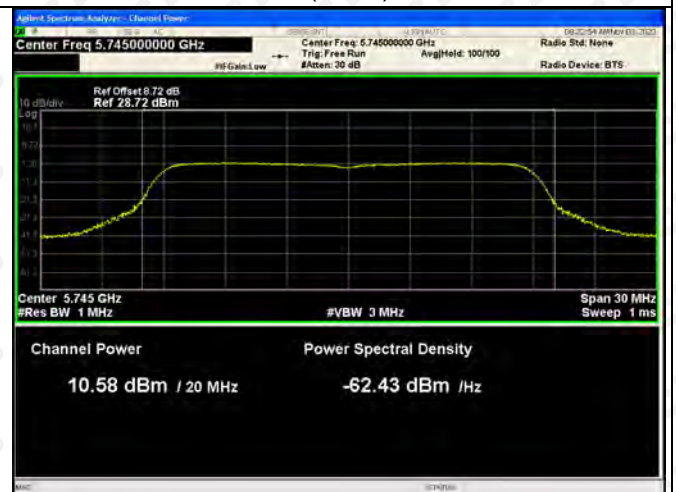
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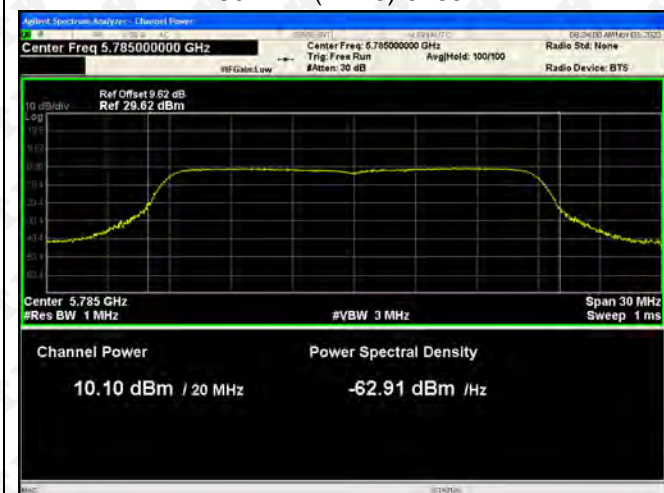
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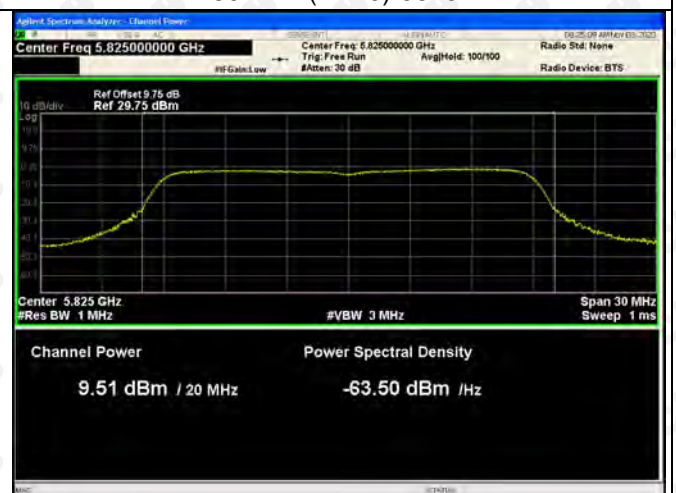
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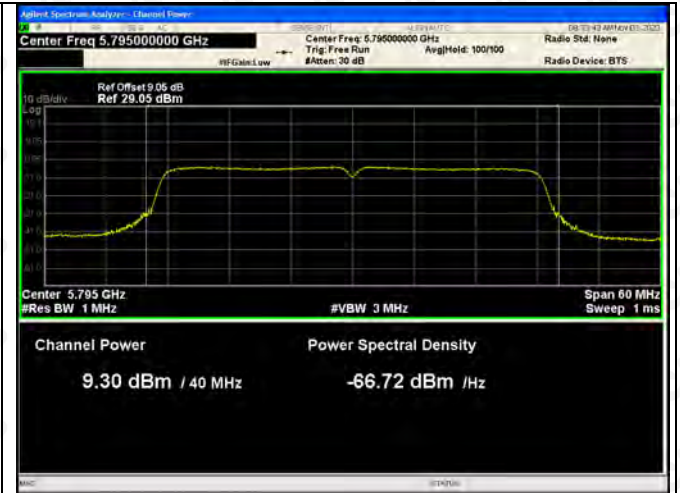
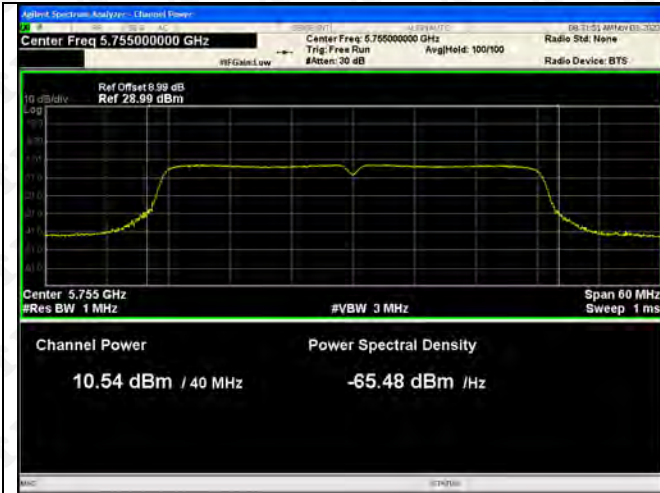
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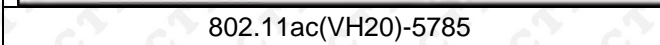
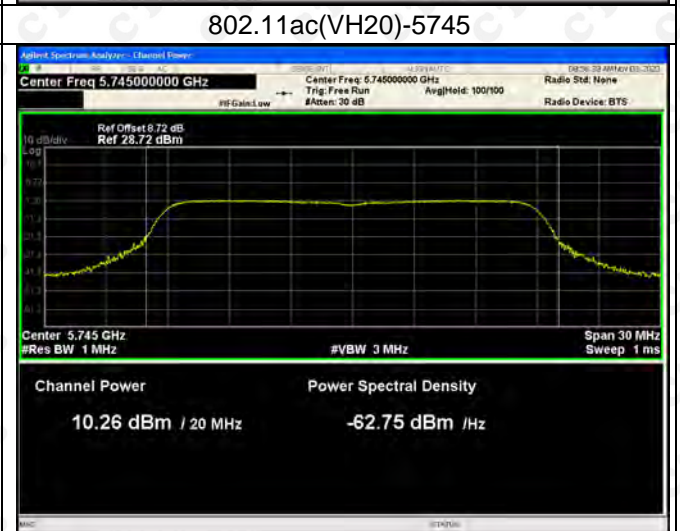
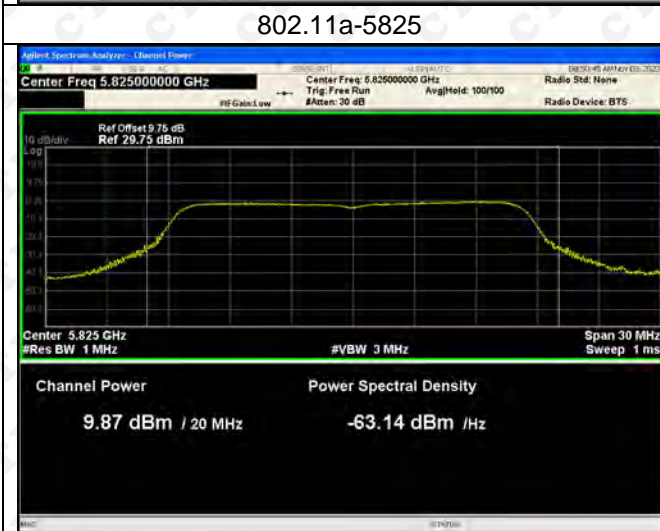
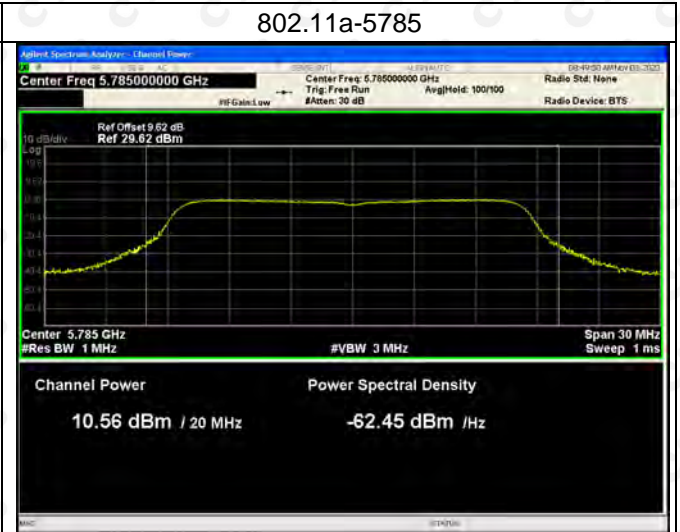
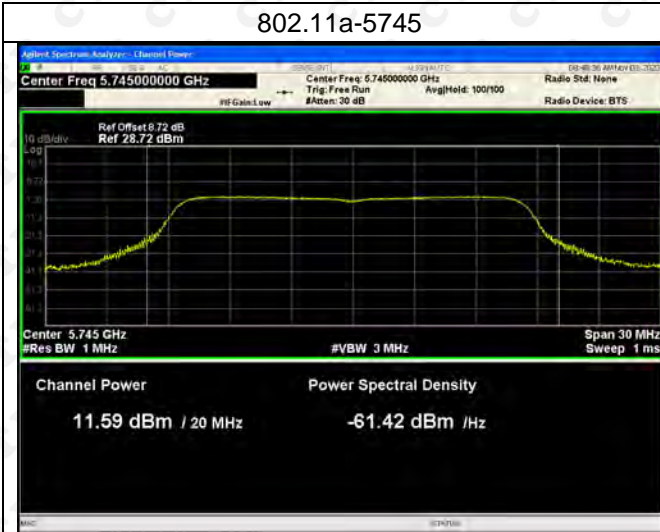
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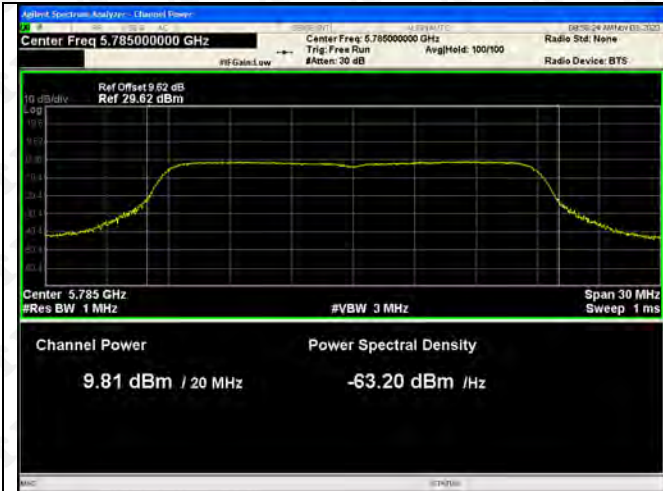


802.11n(HT40)-5825

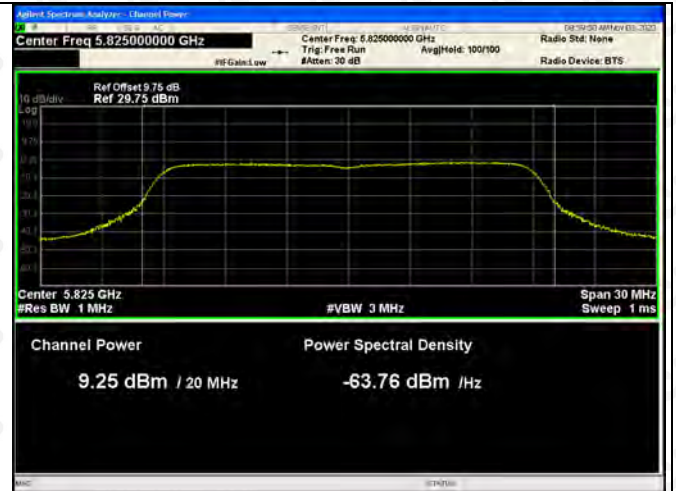


ANT2





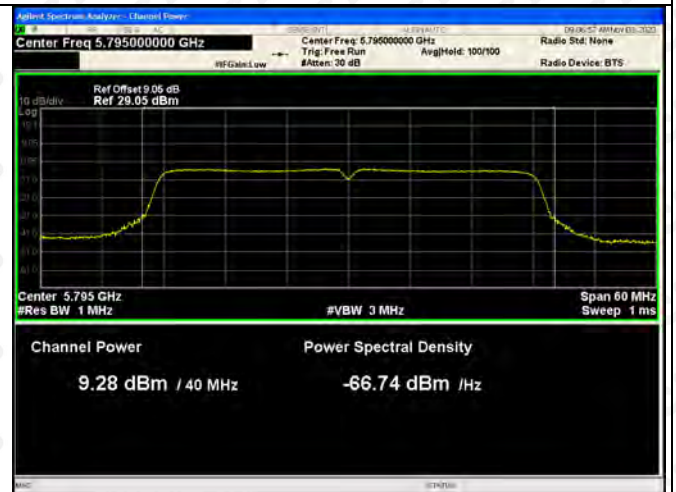
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802.11ac(VH40)-5795



802.11ac(VH80)-5775



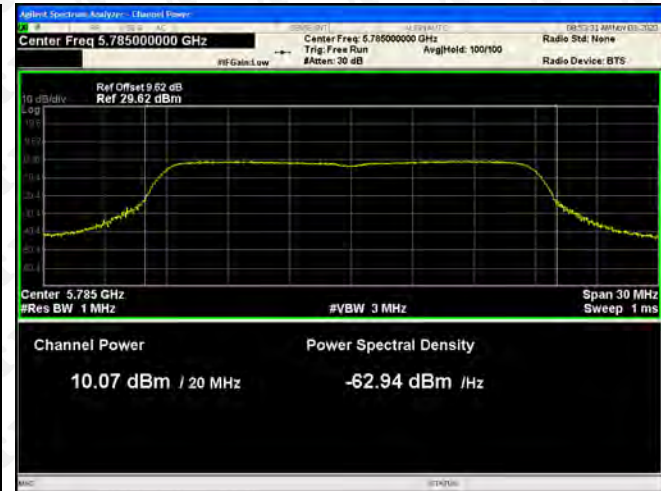
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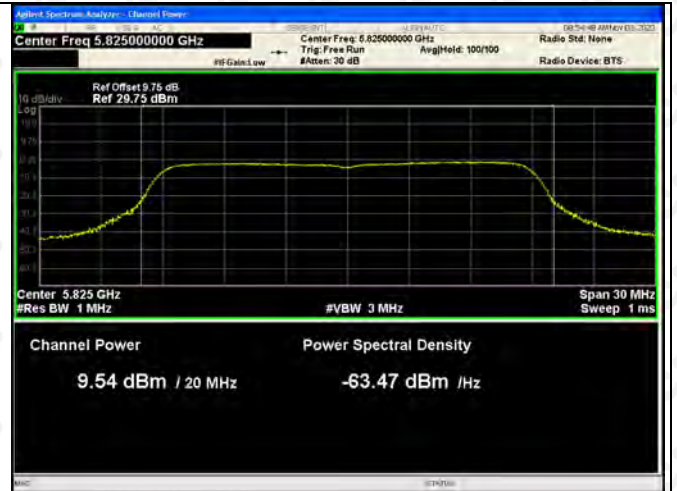
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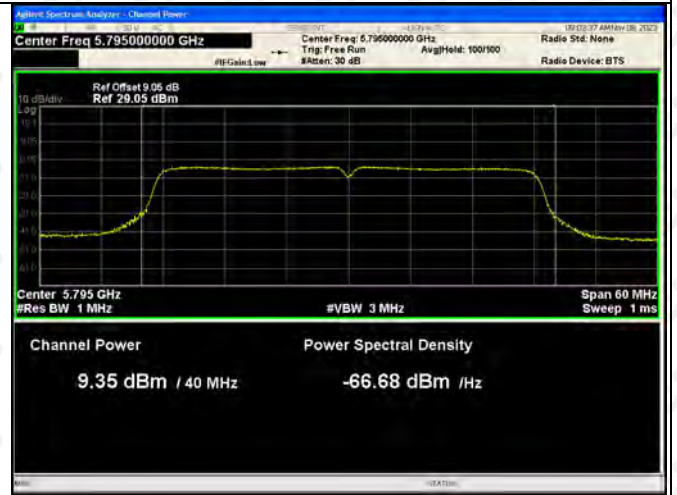
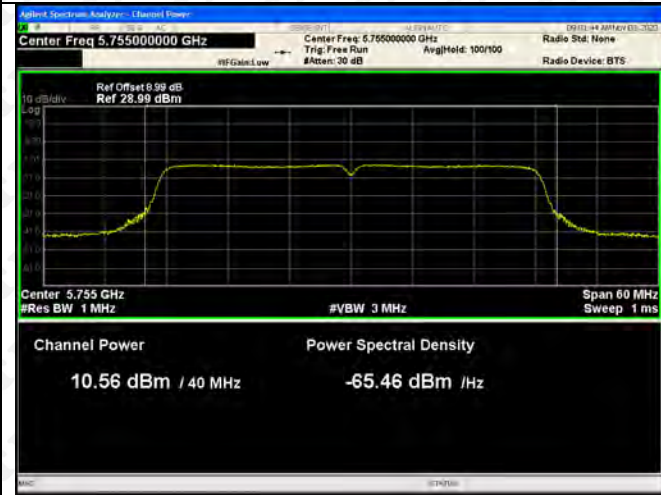
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802.11n(HT40)-5795

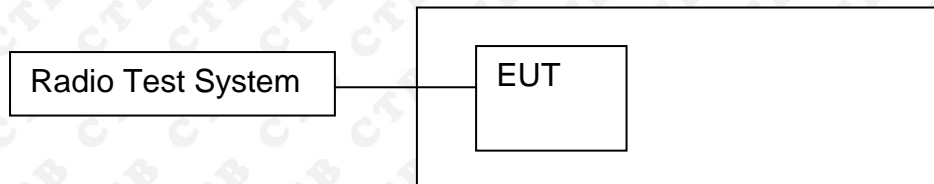


802.11n(HT40)-5825



10. EMISSION BANDWIDTH & OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limits

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable 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 $11 \text{ dBm} + 10 \log B$, 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. 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.

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

10.3 Test Procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725–5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725–5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 * \text{RBW}$.
- c) Detector = Peak.

- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) 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 in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

D. 99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the 789033 D02 General UNII Test Procedures New Rules v02r01 Page 4 spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).

The following procedure shall be used for measuring (99%) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1% to 5% of the OBW
4. Set VBW $\geq 3 * RBW$
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99% power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

10.4 Test Results

5150-5250MHz:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)&ANT1	26dB Bandwidth (MHz)&ANT2
802.11a	5180	21.155	20.992
	5200	21.167	21.186
	5240	21.189	21.178
802.11ac20	5180	21.687	21.714
	5200	21.806	21.619
	5240	21.658	21.799
802.11ac40	5190	41.616	41.494
	5230	41.645	41.55
802.11ac80	5210	80.554	80.646
802.11n(HT20)	5180	21.743	21.736
	5200	21.583	21.721
	5240	21.567	21.758
802.11n(HT40)	5190	41.532	41.842
	5230	41.256	40.958

5250-5350 MHz:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)&ANT1	26dB Bandwidth (MHz)&ANT2
802.11a	5260	21.043	21.245
	5280	21.012	21.172
	5320	24.158	21.317
802.11ac20	5260	21.58	22.004
	5280	21.73	21.619
	5320	21.788	21.891
802.11ac40	5270	41.276	41.485
	5310	41.452	41.733
802.11ac80	5290	80.08	81.707
802.11n(HT20)	5260	21.51	21.708
	5280	21.489	21.889
	5320	21.623	21.987
802.11n(HT40)	5270	41.332	41.638
	5310	41.358	41.939

5470-5725MHz:

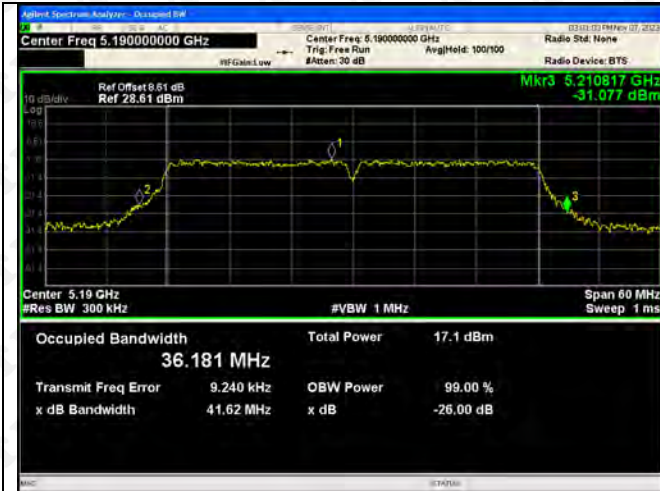
Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)&ANT1	26dB Bandwidth (MHz)&ANT2
802.11a	5500	21.791	29.276
	5580	21.829	21.315
	5700	21.59	21.248
802.11ac20	5500	21.692	21.865
	5580	21.583	21.816
	5700	21.877	21.614
802.11ac40	5510	41.608	41.235
	5670	41.499	40.93
802.11ac80	5530	80.976	82.268
802.11n(HT20)	5500	21.778	21.966
	5580	21.776	21.608
	5700	22.055	21.739
802.11n(HT40)	5510	42.826	41.508
	5670	41.564	41.245

5725-5850MHz:

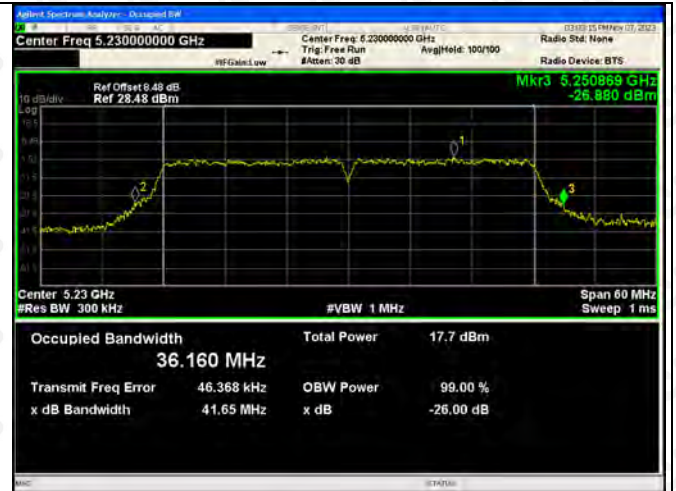
Test mode	Test Channel (MHz)	6dB Bandwidth (MHz)&ANT1	6dB Bandwidth (MHz)&ANT2
802.11a	5745	16.54	16.549
	5785	16.58	16.56
	5825	16.503	16.52
802.11ac20	5745	17.715	17.782
	5785	17.781	17.768
	5825	17.759	17.735
802.11ac40	5755	36.48	36.493
	5795	36.52	36.456
802.11ac80	5775	76.167	76.236
802.11n(HT20)	5745	17.683	17.799
	5785	17.76	17.752
	5825	17.773	17.761
802.11n(HT40)	5755	36.497	36.513
	5795	36.47	36.478

Test Graph:
5150-5250MHz-Power
ANT1





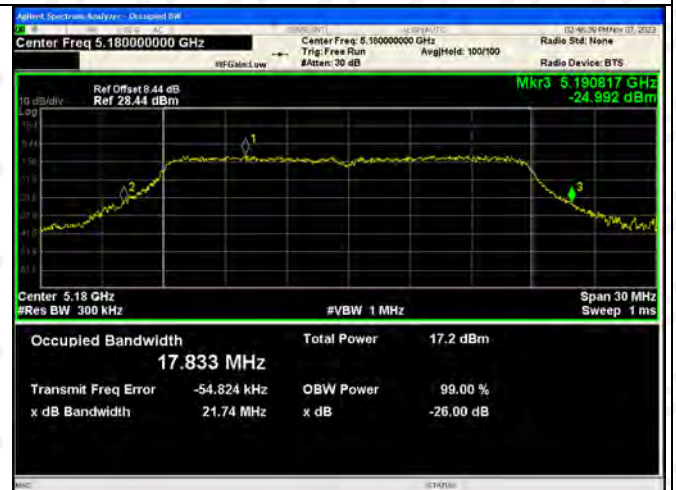
802.11ac(VH80)-5210



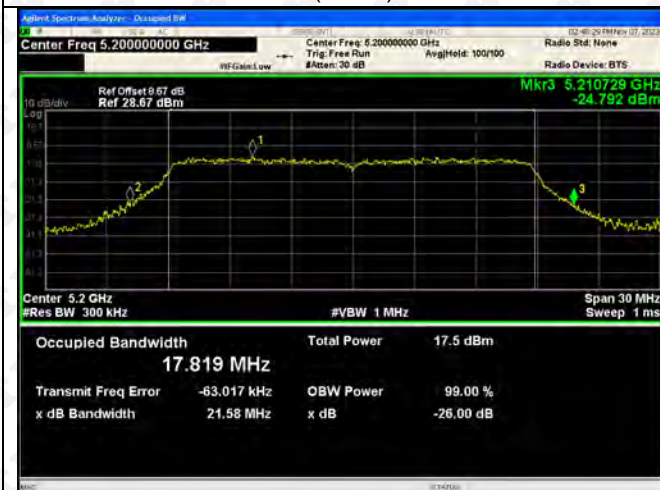
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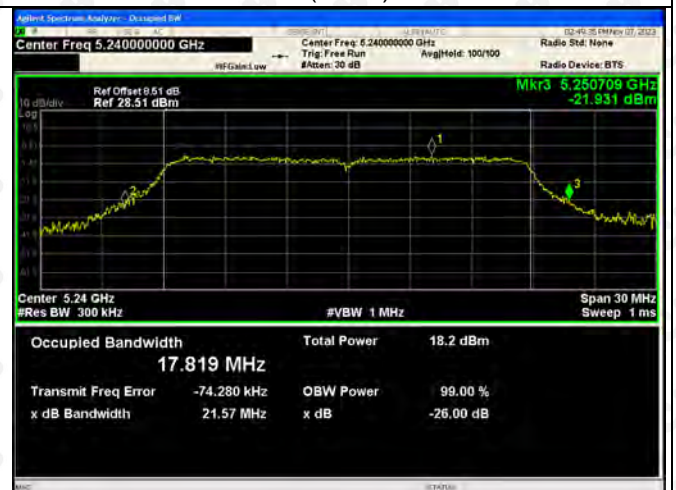
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802.11n(HT20)-5240



802.11n(HT40)-5190



802.11n(HT40)-5230