TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart E (Section 15.407)**
Report No.:	RFBDZB-WTW-P22100578
FCC ID:	TK4WLE3000HX
Product:	Network Security Appliance
Brand:	CHECK POINT™
Model No.:	V91W, V91WC
Received Date:	2022/10/21
Test Date:	2023/5/3
Issued Date:	2023/6/26
Applicant:	Compex Systems Pte Ltd
Address:	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
FCC Registration / Designation Number:	198487 / TW2021

Approved by: Jeremy . Lin , **Date:** 2023/6/26

Jeremy Lin / Project Engineer

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Prepared by : Jessica Cheng / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBDZB-WTW-P22100578	Original release.	2023/6/26

1 Certificate

Product:	Network Security Appliance
Brand:	CHECK POINT™
Test Model:	V91W, V91WC
Sample Status:	Engineering sample
Applicant:	Compex Systems Pte Ltd
Test Date:	2023/5/3
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407)
Measurement procedure:	ANSI C63.10-2013 KDB 789033 D02 General UNII Test Procedure New Rules v02r01 KDB 662911 D01 Multiple Transmitter Output v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	RF Output Power	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is R-SMA not a standard connector.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Network Security Appliance
Brand	CHECK POINT™
Test Model	V91W, V91WC
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from Adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	Up to 4803.9 Mbps
Operating Frequency	5.18 GHz ~ 5.25 GHz 5.25 GHz ~ 5.32 GHz 5.5 GHz ~ 5.72 GHz 5.745 GHz ~ 5.825 GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):25 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):12 802.11ac (VHT80), 802.11ax (HE80):6 802.11ac (VHT160), 802.11ax (HE160):2
Output Power	5.18 GHz ~ 5.25 GHz : 76.498 mW (18.84 dBm) 5.25 GHz ~ 5.32 GHz : 76.907 mW (18.86 dBm) 5.5 GHz ~ 5.72 GHz : 152.16 mW (21.82 dBm) 5.745 GHz ~ 5.825 GHz : 493.109 mW (26.93 dBm)
EUT Category	Master device

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with original test report is adding a platform: Network Security Appliance (Brand: Check Point / Model: V91W, V91WC) and the platform contain FCC ID (WWAN : N7NEM91 , WIFI : TK4WLE3000HX) , therefore Output Power and DFS tests were performed for this addendum.
2. This report was tested Output Power only, and DFS testing was covered in another report: RFBDZB-WTW-P22100578-1.
3. The WLAN 5GHz & WWAN can transmit simultaneously.
4. The emission of the simultaneous operation has been evaluated and no non-compliance was found.
5. Due to different firmware versions, the power setting value is different from the original module report. After confirmation and measurement, the powe value is lower than the original power value.

6. The EUT is a Network Security Appliance, which has several models with the differences as below:

Regulated model	V91W	V91WC
Family	V1	V1
Flavor	Wifi6	Wifi6, 5G
Motherboard	B558	B558
	v1.05	v1.05
DRAM	4GB	4GB
eMMC	16GB	16GB
Wifi	WLE3000HX	
Wifi spec	802.11ax, 2.4GHz, 5GHz	
Wifi FCC	TK4WLE3000HX	
Wifi IC	7849A-WLE3000HX	
Cellular	NA	EM9191
Cellular spec	NA	3G, 4G LTE, 5G
Cellular FCC	NA	N7NEM91
Cellular IC	NA	2417C-EM91
GPS	NA	NA
DSL	NA	NA
Power Adapter	1. FSP060-DHAN3 2. EA10731J-120	

The model: V91WC was for final test and presented in the test report.

7. The EUT consumes power from the switching power adapters, as the following:

AC Adapter 1		
Brand	Model	Specification
FSP	FSP060-DHAN3	AC Input : 100-240Vac, 50-60Hz, 1.8A DC Output : 12Vdc, 5A, 60.0W Non-shielded DC cable 1.2m (with one core)
AC Adapter 2		
Brand	Model	Specification
EDAC	EA10731J-120	AC Input : 100-240V, 50-60Hz,2.0A DC Output : 12.0V, 5.0A, 60.0W Non-shielded AC 3 Pin cable 1.8m Non-shielded DC cable 1.2m (with one core)

The adapter 2 was for final test and presented in the test report.

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Gain (dBi)	Antenna Type	Connector Type
4.29	Omni	R-SMA

*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

5 GHz Band		
Modulation Mode	**TX & RX Configuration**	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ac (VHT160)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX
802.11ax (HE160)	4TX	4RX
Note: Beamforming mode not supported.		

3.3 Channel List

For 5180 ~ 5320MHz:

8 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	52	5260 MHz
40	5200 MHz	56	5280 MHz
44	5220 MHz	60	5300 MHz
48	5240 MHz	64	5320 MHz

4 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	54	5270 MHz
46	5230 MHz	62	5310 MHz

2 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz

1 straddle channel is provided for 802.11ac (VHT160), 802.11ax (HE160):

Channel	Frequency
50	5250 MHz

For 5500 ~ 5720 MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	138	5690 MHz
122	5610 MHz		

1 straddle channel is provided for 802.11ac (VHT160), 802.11ax (HE160):

Channel	Frequency
114	5570 MHz

For 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	802.11a	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	6Mb/s
	802.11ac (VHT20)	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0
	802.11ac (VHT40)	CDD	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0
	802.11ac (VHT80)	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0
	802.11ac (VHT160)	CDD	50, 114	BPSK	MCS0
	802.11ax (HE20)	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0
	802.11ax (HE40)	CDD	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0
	802.11ax (HE80)	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0
	802.11ax (HE160)	CDD	50, 114	BPSK	MCS0

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MIMO Powermeasurement Test set (4X4) KEYSIGHT	U2021XA	U2021XA_001	2022/6/13	2023/6/12
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1339443	2022/5/29	2023/5/28
Spectrum Analyzer KEYSIGHT	N9030A	MY54490260	2022/7/14	2023/7/13
Spectrum Analyzer R&S	FSV40	101042	2022/9/5	2023/9/4
Temperature & Humidity Chamber TERCHY	MHU-225AU	920409	2022/6/27	2023/6/26
Voltage Meter FLUKE	179	89610322	2022/10/3	2023/10/2

Notes:

1. The test was performed in LK - Oven
2. Tested Date: 2023/5/3

5 Limits of Test Items

5.1 RF Output Power

Operation Band	EUT Category	Limit
U-NII-1	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
	Fixed point-to-point Access Point	1 Watt (30 dBm)
	Indoor Access Point	1 Watt (30 dBm)
	Mobile and Portable client device	250mW (24 dBm)

Operation Band	Limit
U-NII-2A	250 mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	250 mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

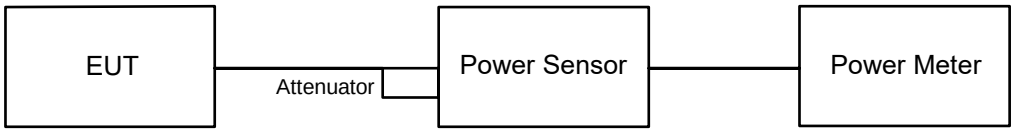
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

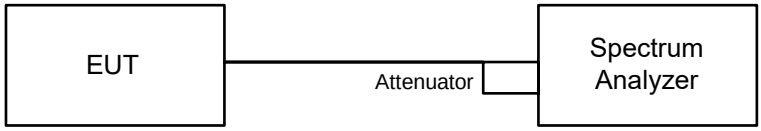
6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup



For channel straddling:



6.1.2 Test Procedure

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to average. Duty factor is not added to measured value.

For channel straddling:

Method SA-2A

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
d. Manually set sweep time ≥ 10 × (number of points in sweep) × (total on/off period of the transmitted signal).
e. Perform a single sweep.
f. Record the max value and add 10 log (1/duty cycle).

Note: When measuring straddle channel power, use compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument's band power measurement function, with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 76% RH	Tested By:	Waydi Tuan

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	9.50	9.68	10.00	10.17	38.601	15.87	30	Pass
40	5200	9.74	10.34	10.20	10.16	41.08	16.14	30	Pass
48	5240	9.28	9.71	8.35	9.56	33.702	15.28	30	Pass
52	5260	9.07	9.61	9.65	9.49	35.331	15.48	24	Pass
60	5300	9.14	9.64	9.40	9.52	35.071	15.45	24	Pass
64	5320	9.06	9.69	9.28	9.43	34.607	15.39	24	Pass
100	5500	9.25	9.47	9.66	9.47	35.363	15.49	24	Pass
116	5580	9.39	9.42	9.44	9.44	35.02	15.44	24	Pass
140	5700	9.48	9.69	10.26	9.81	38.372	15.84	24	Pass
*144 (U-NII-2C)	5720	7.87	7.88	8.90	7.83	26.951	14.31	22.86	Pass
*144 (U-NII-3)	5720	2.67	2.66	3.68	2.60	8.106	9.09	30	Pass
149	5745	20.24	20.44	20.90	20.11	441.936	26.45	30	Pass
157	5785	19.98	20.16	20.61	20.22	423.57	26.27	30	Pass
165	5825	20.28	20.65	20.31	20.53	443.183	26.47	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	9.18	9.56	9.62	9.73	35.875	15.55	30	Pass
40	5200	9.09	9.30	9.46	9.75	34.892	15.43	30	Pass
48	5240	9.11	9.00	9.45	9.48	33.772	15.29	30	Pass
52	5260	9.26	9.60	9.50	9.43	35.236	15.47	24	Pass
60	5300	8.96	9.58	9.09	9.42	33.808	15.29	24	Pass
64	5320	9.05	9.41	9.30	9.39	33.966	15.31	24	Pass
100	5500	9.03	9.12	9.78	9.32	34.221	15.34	24	Pass
116	5580	9.44	9.22	9.65	9.47	35.223	15.47	24	Pass
140	5700	9.22	9.57	10.21	9.59	37.008	15.68	24	Pass
*144 (U-NII-2C)	5720	7.75	8.20	8.54	8.23	29.493	14.70	22.98	Pass
*144 (U-NII-3)	5720	2.90	3.36	3.73	3.45	9.723	9.88	30	Pass
149	5745	20.28	20.46	21.10	20.39	456.053	26.59	30	Pass
157	5785	19.98	20.43	20.83	19.99	430.778	26.34	30	Pass
165	5825	20.43	20.63	20.23	20.41	441.358	26.45	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	10.87	10.86	11.13	11.14	50.381	17.02	30	Pass
46	5230	12.42	12.47	12.52	12.77	71.907	18.57	30	Pass
54	5270	12.07	12.36	12.24	12.87	69.439	18.42	24	Pass
62	5310	12.23	12.30	12.11	12.31	66.97	18.26	24	Pass
102	5510	12.09	12.24	12.26	12.74	68.55	18.36	24	Pass
110	5550	12.32	12.26	11.97	12.62	67.908	18.32	24	Pass
134	5670	11.95	12.01	12.39	12.35	66.07	18.20	24	Pass
*142 (U-NII-2C)	5710	10.72	10.74	10.71	10.72	57.709	17.61	24	Pass
*142 (U-NII-3)	5710	-0.37	-0.42	-0.39	-0.38	4.4668	6.50	30	Pass
151	5755	20.56	21.09	21.41	20.51	493.109	26.93	30	Pass
159	5795	20.60	20.57	21.28	20.80	483.343	26.84	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	9.92	9.81	10.26	10.02	40.053	16.03	30	Pass
58	5290	9.40	9.01	9.45	9.71	34.836	15.42	24	Pass
106	5530	13.14	12.76	12.90	12.53	76.891	18.86	24	Pass
122	5610	14.82	15.53	14.86	15.19	129.723	21.13	24	Pass
*138 (U-NII-2C)	5690	14.88	14.84	15.38	14.19	134.838	21.30	24	Pass
*138 (U-NII-3)	5690	0.05	0.10	0.61	-0.60	4.4837	6.52	30	Pass
155	5775	18.31	18.54	19.32	18.59	296.997	24.73	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT160)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
*50 (U-NII-1)	5250	6.03	6.09	5.57	6.03	17.773	12.50	30	Pass
*50 (U-NII-2A)	5250	5.96	5.95	5.95	5.99	17.887	12.53	24	Pass
114	5570	11.90	12.54	12.60	12.20	68.228	18.34	24	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	9.53	10.07	10.35	10.75	41.861	16.22	30	Pass
40	5200	10.10	10.38	10.22	10.48	42.836	16.32	30	Pass
48	5240	9.50	10.21	9.88	10.07	39.298	15.94	30	Pass
52	5260	9.83	9.72	9.92	10.06	38.948	15.90	24	Pass
60	5300	9.77	9.73	9.63	9.75	37.505	15.74	24	Pass
64	5320	9.59	9.71	9.76	9.86	37.598	15.75	24	Pass
100	5500	9.30	9.86	10.01	10.13	38.521	15.86	24	Pass
116	5580	9.47	9.82	9.92	9.61	37.404	15.73	24	Pass
140	5700	9.66	10.15	10.55	9.88	40.676	16.09	24	Pass
*144 (U-NII-2C)	5720	7.22	7.67	8.14	7.67	25.301	14.03	22.99	Pass
*144 (U-NII-3)	5720	2.95	3.39	3.86	3.37	9.438	9.75	30	Pass
149	5745	20.44	20.63	21.51	20.47	479.282	26.81	30	Pass
157	5785	20.13	20.41	20.90	19.83	432.127	26.36	30	Pass
165	5825	20.69	20.98	20.62	20.75	476.729	26.78	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the directional gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	10.38	10.68	10.64	10.87	46.415	16.67	30	Pass
46	5230	12.78	12.66	12.71	13.10	76.498	18.84	30	Pass
54	5270	12.85	12.55	12.73	13.20	76.907	18.86	24	Pass
62	5310	10.67	10.82	10.95	10.89	48.466	16.85	24	Pass
102	5510	12.56	12.33	12.62	12.98	73.272	18.65	24	Pass
110	5550	12.40	12.42	12.93	13.02	74.515	18.72	24	Pass
134	5670	12.09	12.14	12.51	12.49	68.115	18.33	24	Pass
*142 (U-NII-2C)	5710	12.06	12.53	13.08	12.55	76.881	18.86	24	Pass
*142 (U-NII-3)	5710	1.67	2.12	2.65	2.18	7.01	8.46	30	Pass
151	5755	20.04	20.26	21.47	20.66	463.789	26.66	30	Pass
159	5795	20.24	20.53	21.32	20.80	474.407	26.76	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	10.70	11.15	11.20	10.92	50.323	17.02	30	Pass
58	5290	9.78	10.49	10.32	10.42	42.48	16.28	24	Pass
106	5530	12.88	13.06	12.95	13.03	79.454	19.00	24	Pass
122	5610	15.16	15.36	15.18	15.41	134.88	21.30	24	Pass
*138 (U-NII-2C)	5690	15.31	15.34	15.77	15.30	152.16	21.82	24	Pass
*138 (U-NII-3)	5690	1.37	1.46	1.90	1.36	6.19	7.92	30	Pass
155	5775	16.70	17.20	17.42	17.12	205.985	23.14	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

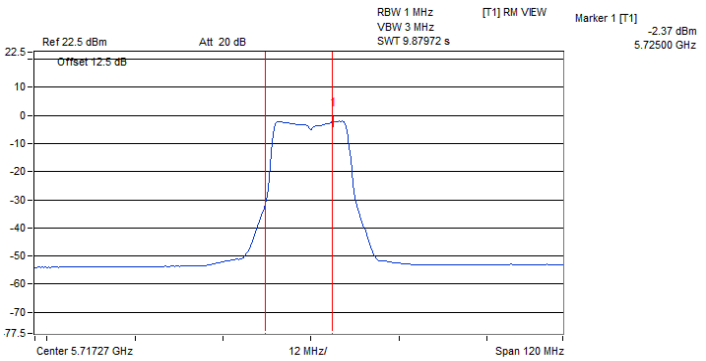
802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
*50 (U-NII-1)	5250	5.52	5.48	5.52	5.50	15.344	11.86	30	Pass
*50 (U-NII-2A)	5250	5.49	5.47	5.49	5.47	15.256	11.83	24	Pass
114	5570	13.40	14.56	14.50	13.29	99.968	20.00	24	Pass

Notes:

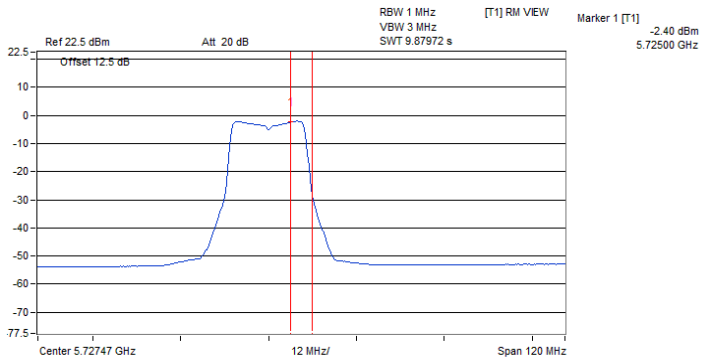
1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 4.29 dBi < 6 dBi, so the output power limit shall not be reduced.

Spectrum Plot for channel straddling



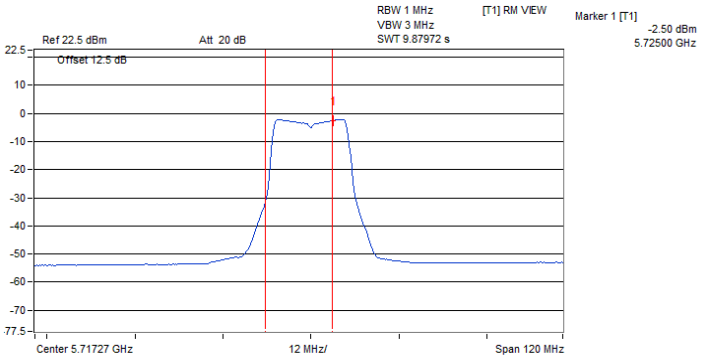
TX Channel Bandwidth 15.45 MHz Power 7.87 dBm

802.11a / Chain 0 : CH 144 (U-NII-2C)



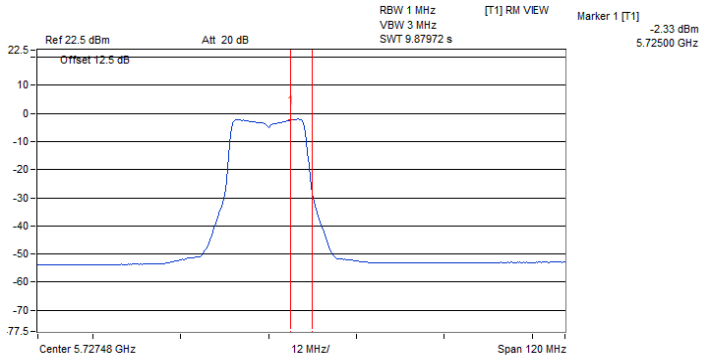
TX Channel Bandwidth 4.95 MHz Power 2.67 dBm

802.11a / Chain 0 : CH 144 (U-NII-3)



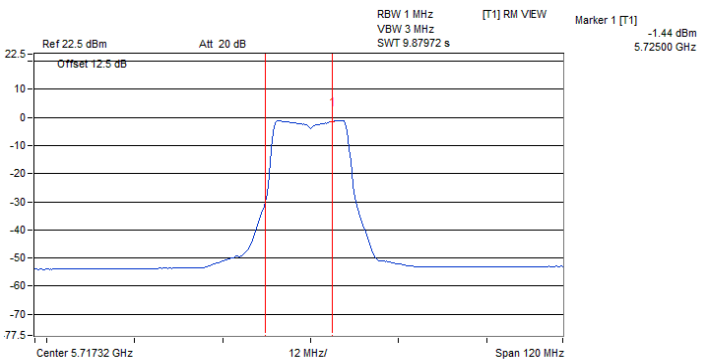
TX Channel Bandwidth 15.46 MHz Power 7.88 dBm

802.11a / Chain 1 : CH 144 (U-NII-2C)



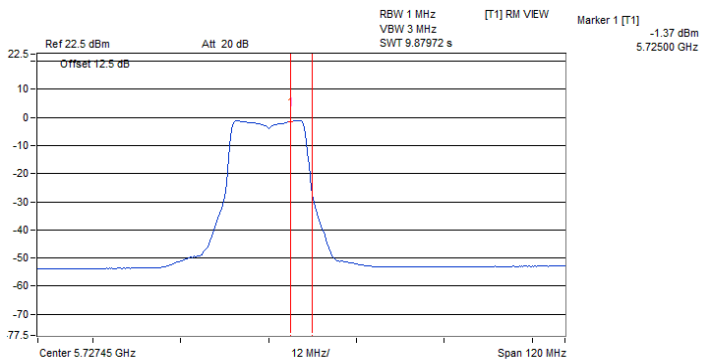
TX Channel Bandwidth 4.96 MHz Power 2.66 dBm

802.11a / Chain 1 : CH 144 (U-NII-3)



TX Channel Bandwidth 15.36 MHz Power 8.9 dBm

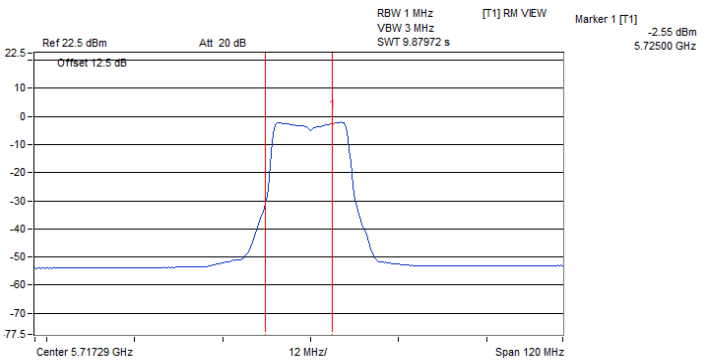
802.11a / Chain 2 : CH 144 (U-NII-2C)



TX Channel Bandwidth 4.91 MHz Power 3.68 dBm

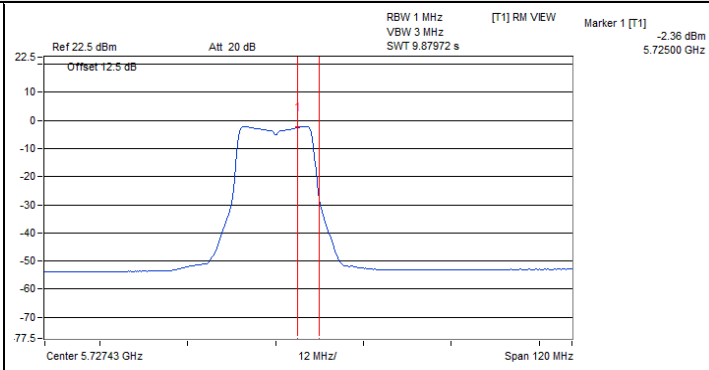
802.11a / Chain 2 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



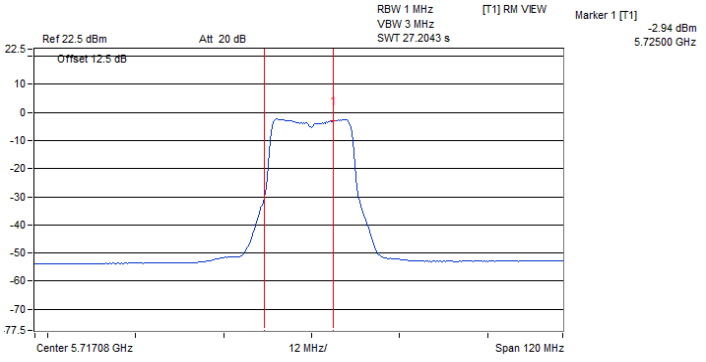
TX Channel Bandwidth 15.41 MHz Power 7.83 dBm

802.11a / Chain 3 : CH 144 (U-NII-2C)



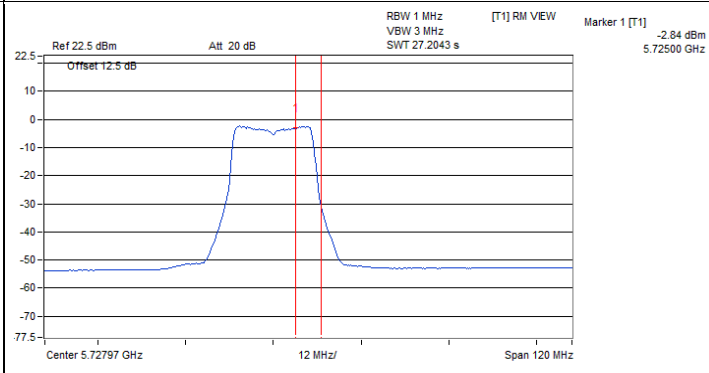
TX Channel Bandwidth 4.86 MHz Power 2.6 dBm

802.11a / Chain 3 : CH 144 (U-NII-3)



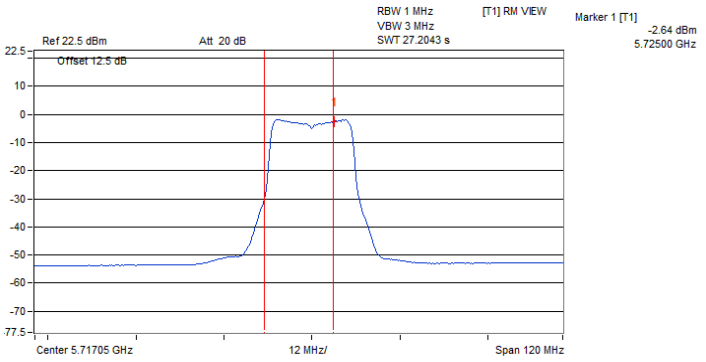
TX Channel Bandwidth 15.83 MHz Power 7.75 dBm

802.11ac (VHT20) / Chain 0 : CH 144 (U-NII-2C)



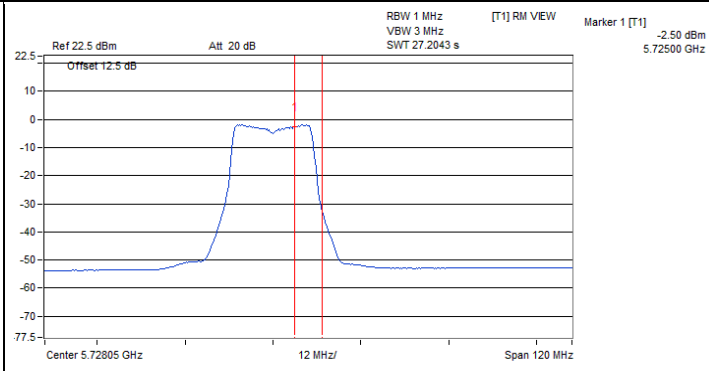
TX Channel Bandwidth 5.94 MHz Power 2.9 dBm

802.11ac (VHT20) / Chain 0 : CH 144 (U-NII-3)



TX Channel Bandwidth 15.9 MHz Power 8.2 dBm

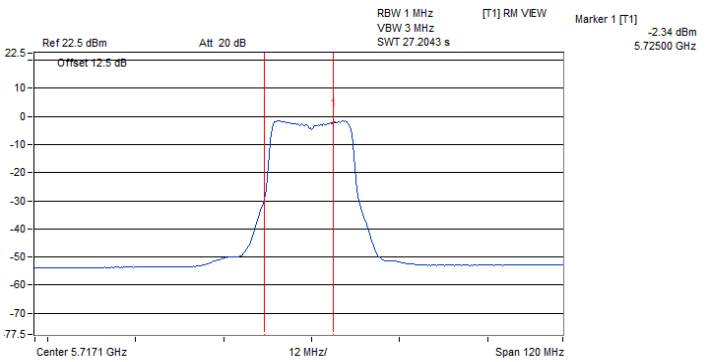
802.11ac (VHT20) / Chain 1 : CH 144 (U-NII-2C)



TX Channel Bandwidth 6.1 MHz Power 3.36 dBm

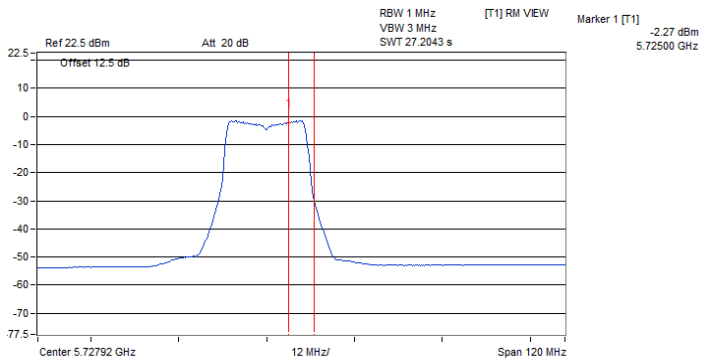
802.11ac (VHT20) / Chain 1 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



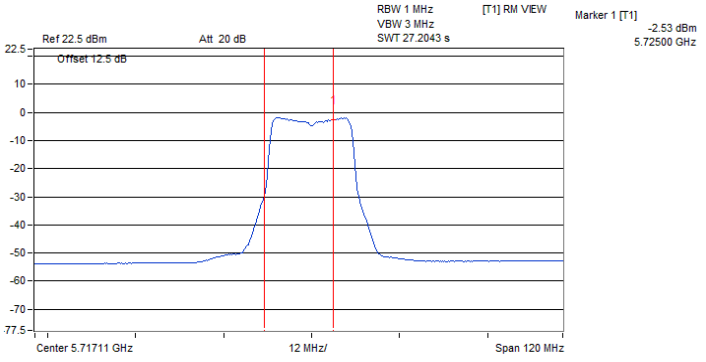
TX Channel Bandwidth 15.79 MHz Power 8.54 dBm

802.11ac (VHT20) / Chain 2 : CH 144 (U-NII-2C)



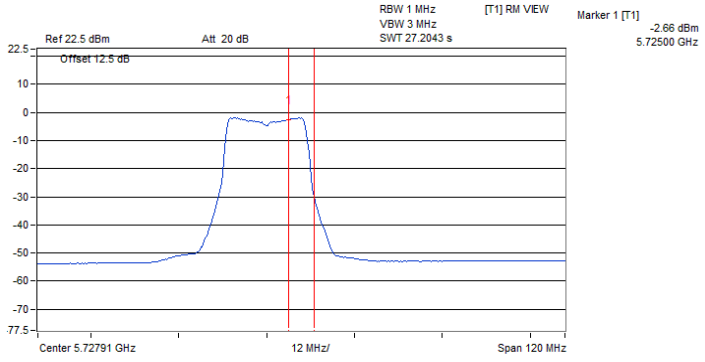
TX Channel Bandwidth 5.84 MHz Power 3.73 dBm

802.11ac (VHT20) / Chain 2 : CH 144 (U-NII-3)



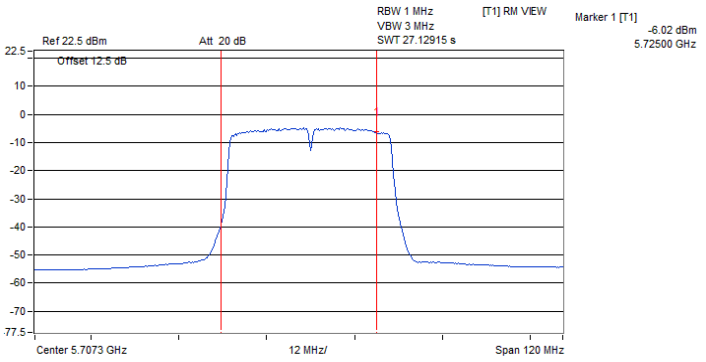
TX Channel Bandwidth 15.78 MHz Power 8.23 dBm

802.11ac (VHT20) / Chain 3 : CH 144 (U-NII-2C)



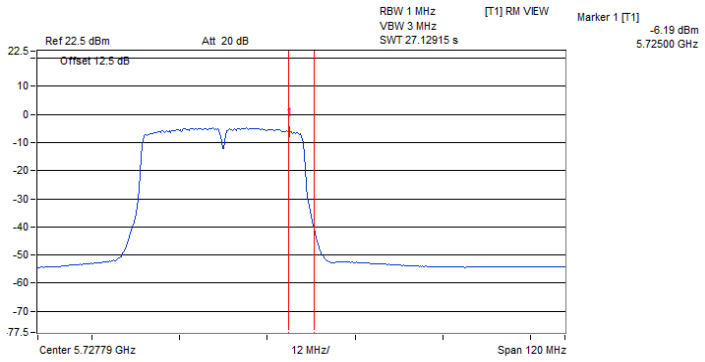
TX Channel Bandwidth 5.82 MHz Power 3.45 dBm

802.11ac (VHT20) / Chain 3 : CH 144 (U-NII-3)



TX Channel Bandwidth 35.4 MHz Power 10.72 dBm

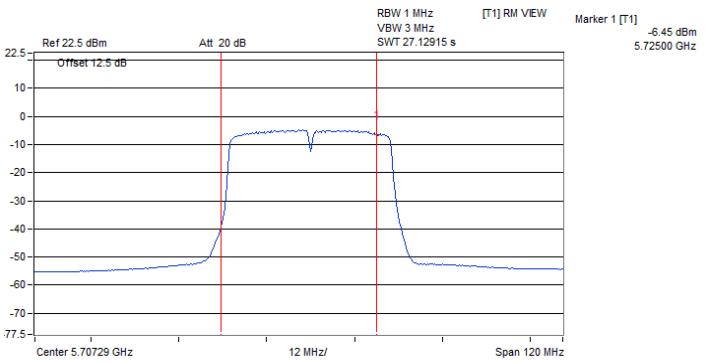
802.11ac (VHT40) / Chain 0 : CH 142 (U-NII-2C)



TX Channel Bandwidth 5.58 MHz Power -0.37 dBm

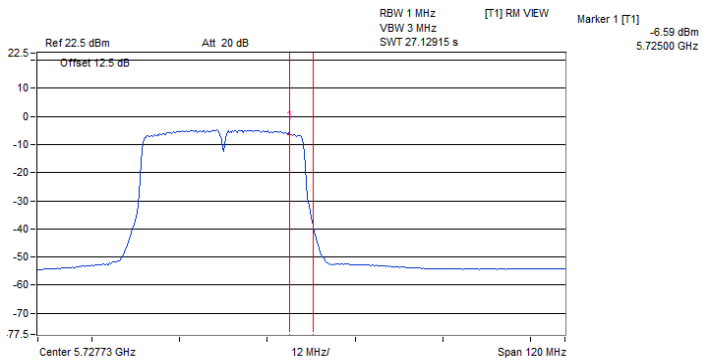
802.11ac (VHT40) / Chain 0 : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



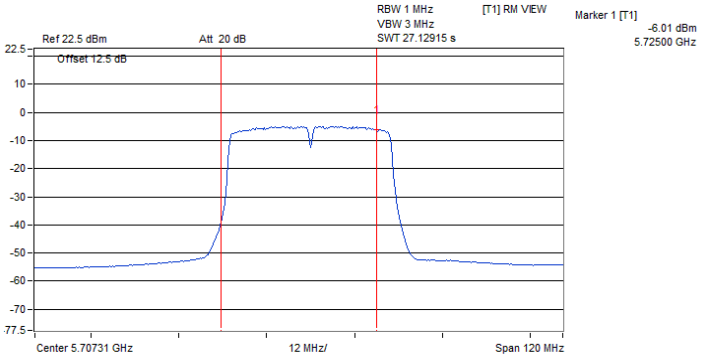
TX Channel Bandwidth 35.42 MHz Power 10.74 dBm

802.11ac (VHT40) / Chain 1 : CH 142 (U-NII-2C)



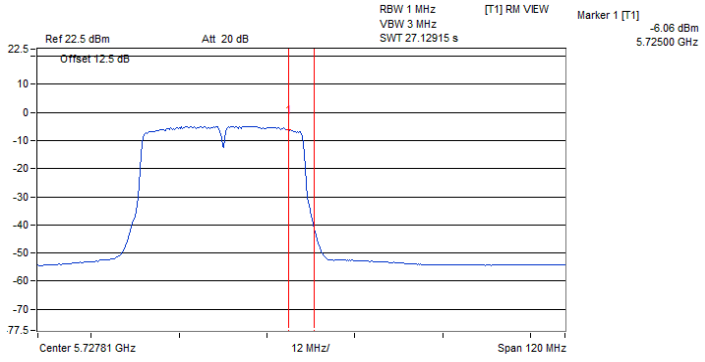
TX Channel Bandwidth 5.47 MHz Power -0.42 dBm

802.11ac (VHT40) / Chain 1 : CH 142 (U-NII-3)



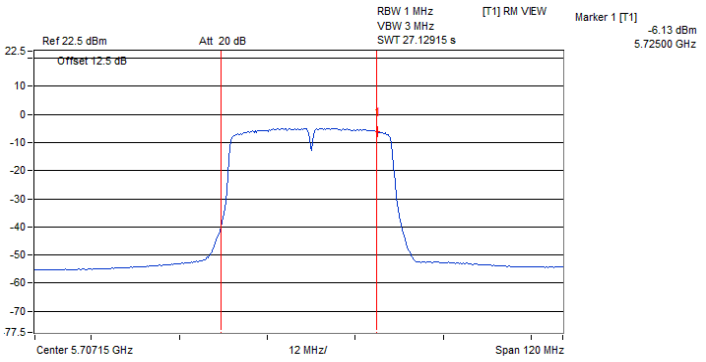
TX Channel Bandwidth 35.38 MHz Power 10.71 dBm

802.11ac (VHT40) / Chain 2 : CH 142 (U-NII-2C)



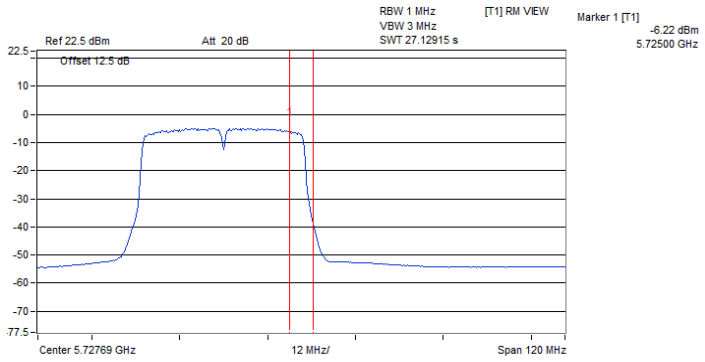
TX Channel Bandwidth 5.62 MHz Power -0.39 dBm

802.11ac (VHT40) / Chain 2 : CH 142 (U-NII-3)



TX Channel Bandwidth 35.69 MHz Power 10.72 dBm

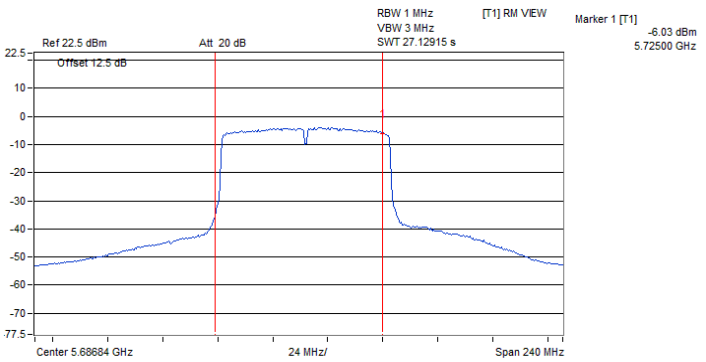
802.11ac (VHT40) / Chain 3 : CH 142 (U-NII-2C)



TX Channel Bandwidth 5.39 MHz Power -0.38 dBm

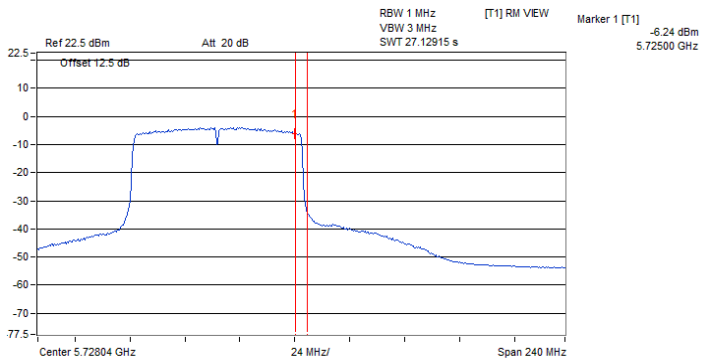
802.11ac (VHT40) / Chain 3 : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



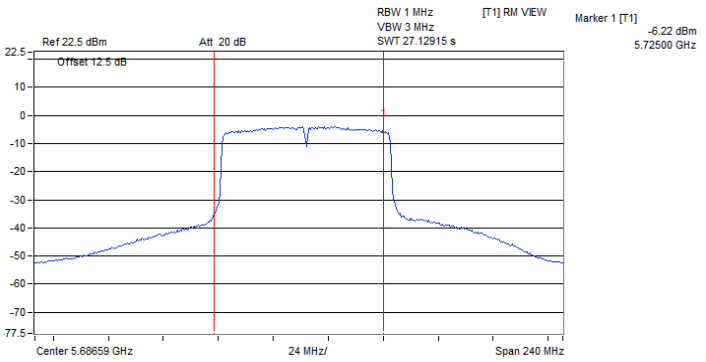
TX Channel Bandwidth 76.31 MHz Power 14.88 dBm

802.11ac (VHT80) / Chain 0 : CH 138 (U-NII-2C)



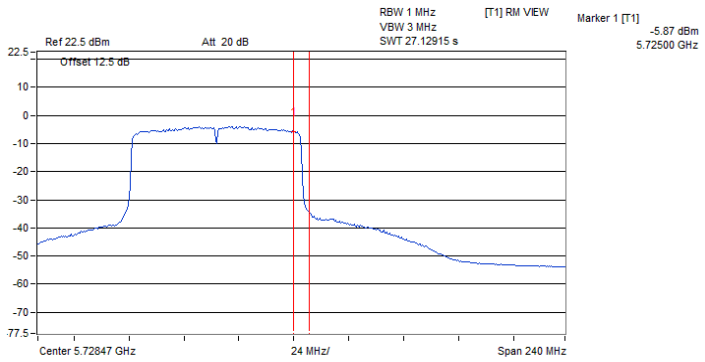
TX Channel Bandwidth 6.08 MHz Power 0.05 dBm

802.11ac (VHT80) / Chain 0 : CH 138 (U-NII-3)



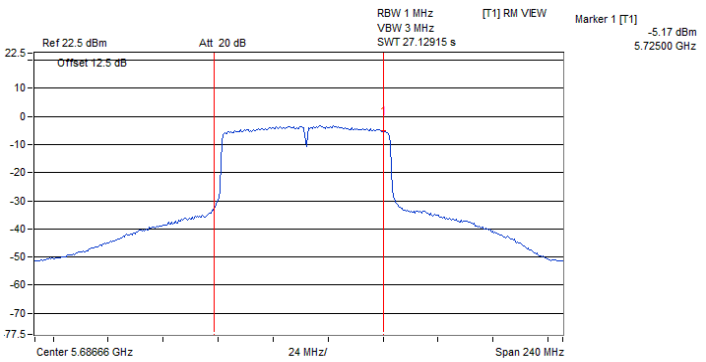
TX Channel Bandwidth 76.81 MHz Power 14.84 dBm

802.11ac (VHT80) / Chain 1 : CH 138 (U-NII-2C)



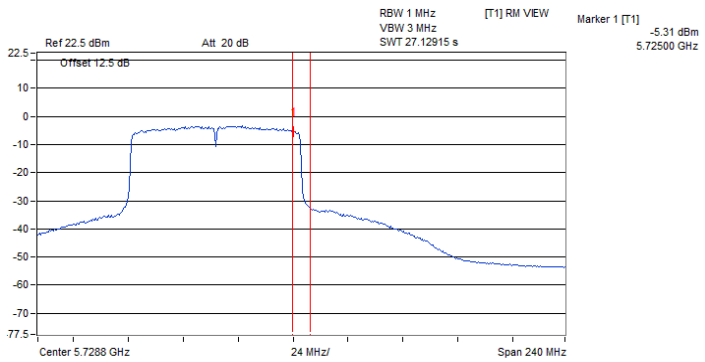
TX Channel Bandwidth 6.95 MHz Power 0.1 dBm

802.11ac (VHT80) / Chain 1 : CH 138 (U-NII-3)



TX Channel Bandwidth 76.67 MHz Power 15.38 dBm

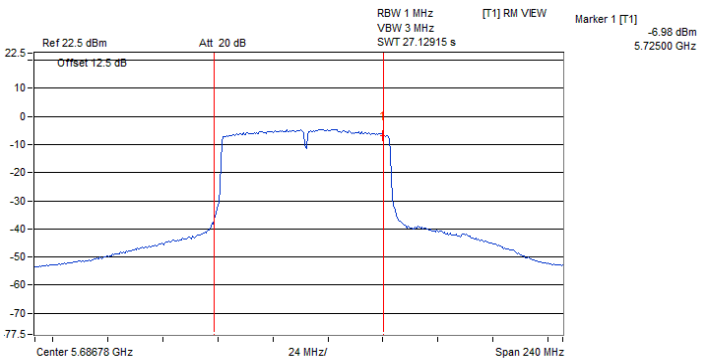
802.11ac (VHT80) / Chain 2 : CH 138 (U-NII-2C)



TX Channel Bandwidth 7.6 MHz Power 0.61 dBm

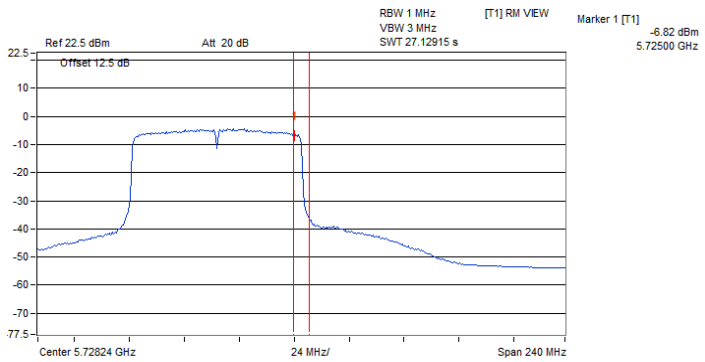
802.11ac (VHT80) / Chain 2 : CH 138 (U-NII-3)

Spectrum Plot for channel straddling



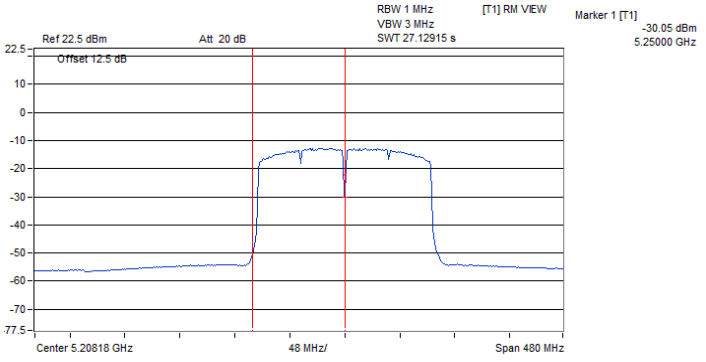
TX Channel Bandwidth 76.43 MHz Power 14.19 dBm

802.11ac (VHT80) / Chain 3 : CH 138 (U-NII-2C)



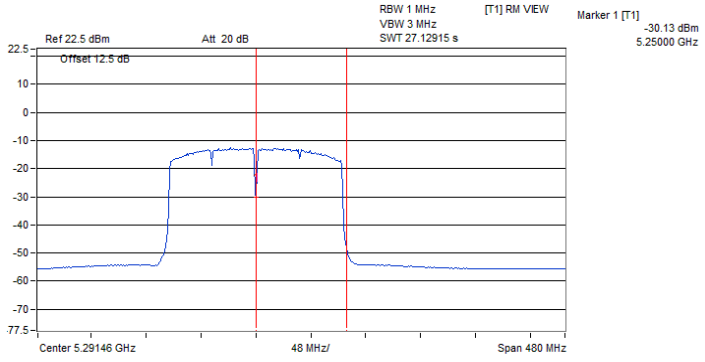
TX Channel Bandwidth 6.48 MHz Power -0.6 dBm

802.11ac (VHT80) / Chain 3 : CH 138 (U-NII-3)



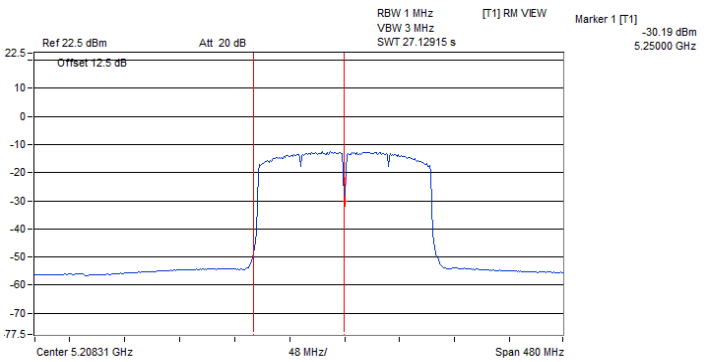
TX Channel Bandwidth 83.63 MHz Power 6.03 dBm

802.11ac (VHT160) / Chain 0 : CH 50 (U-NII-1)



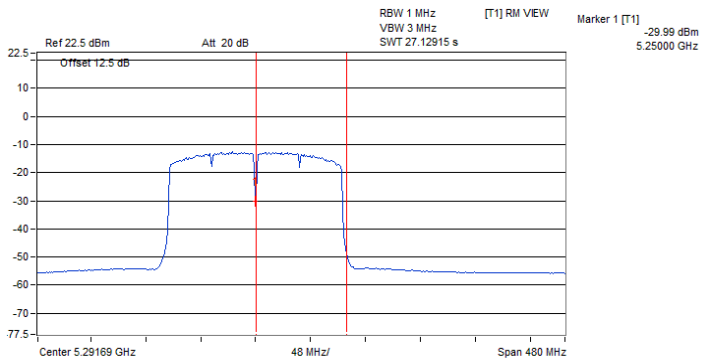
TX Channel Bandwidth 82.93 MHz Power 5.96 dBm

802.11ac (VHT160) / Chain 0 : CH 50 (U-NII-2A)



TX Channel Bandwidth 83.37 MHz Power 6.09 dBm

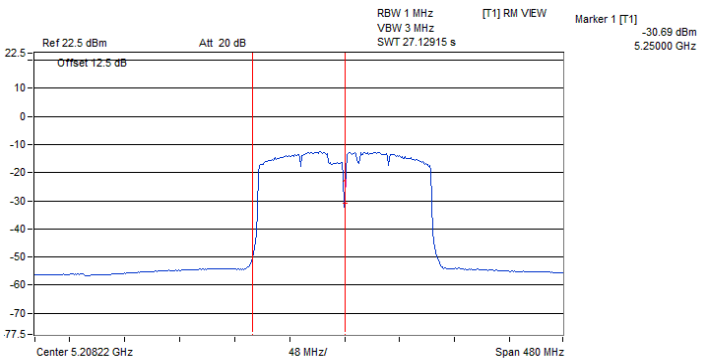
802.11ac (VHT160) / Chain 1 : CH 50 (U-NII-1)



TX Channel Bandwidth 83.39 MHz Power 5.95 dBm

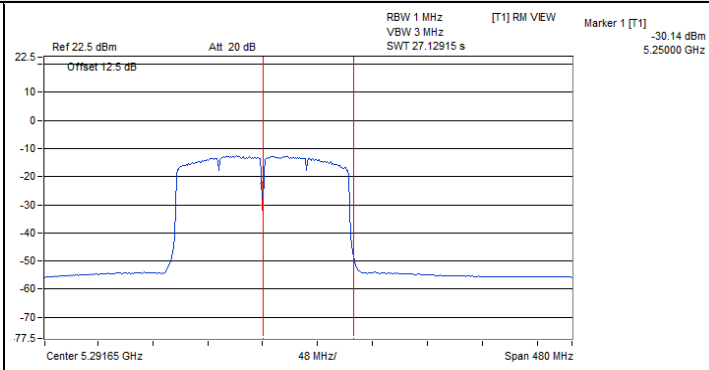
802.11ac (VHT160) / Chain 1 : CH 50 (U-NII-2A)

Spectrum Plot for channel straddling



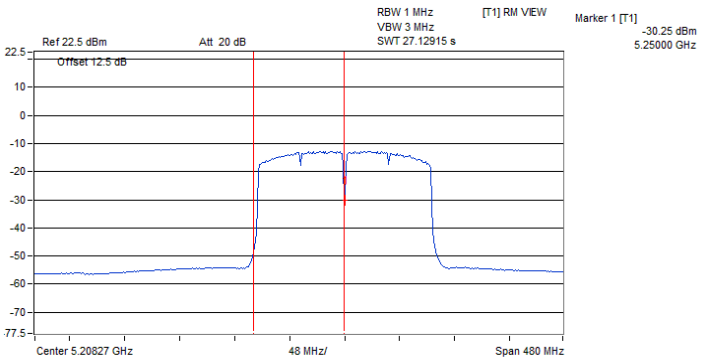
TX Channel Bandwidth 83.56 MHz Power 5.57 dBm

802.11ac (VHT160) / Chain 2 : CH 50 (U-NII-1)



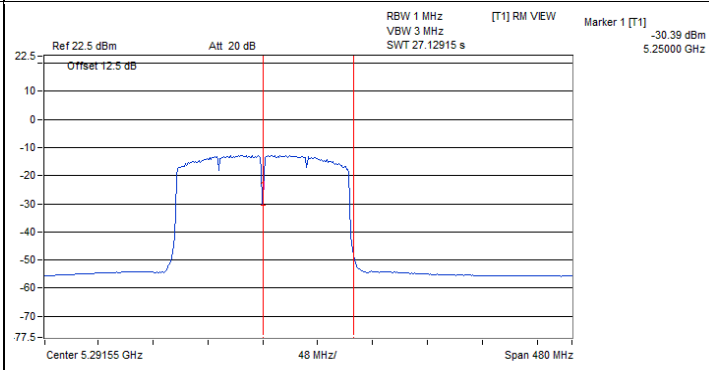
TX Channel Bandwidth 83.31 MHz Power 5.95 dBm

802.11ac (VHT160) / Chain 2 : CH 50 (U-NII-2A)



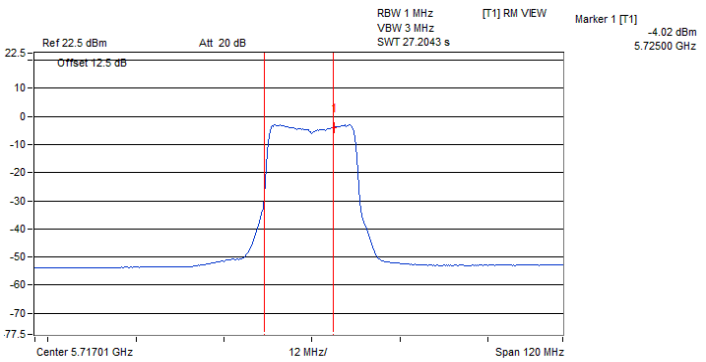
TX Channel Bandwidth 83.46 MHz Power 6.03 dBm

802.11ac (VHT160) / Chain 3 : CH 50 (U-NII-1)



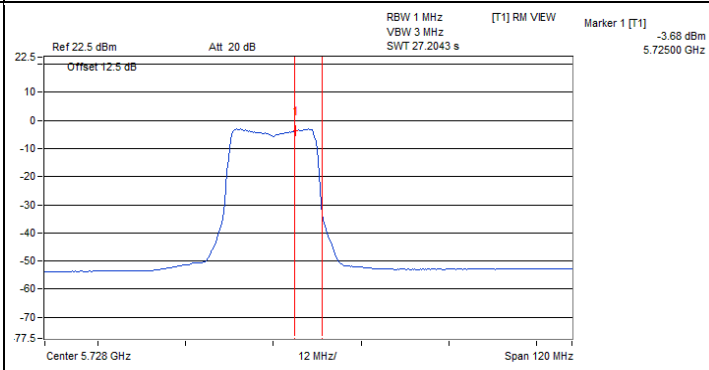
TX Channel Bandwidth 83.11 MHz Power 5.99 dBm

802.11ac (VHT160) / Chain 3 : CH 50 (U-NII-2A)



TX Channel Bandwidth 15.98 MHz Power 7.22 dBm

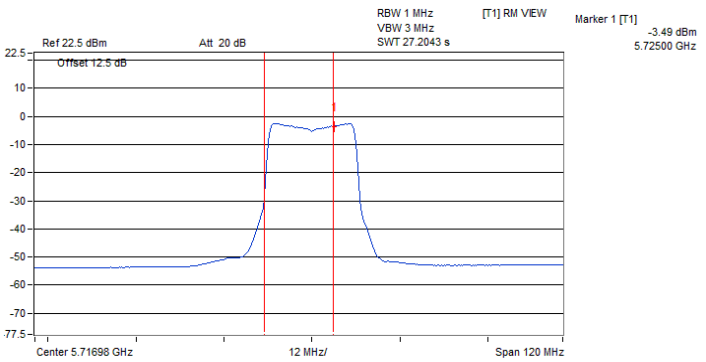
802.11ax (HE20) / Chain 0 : CH 144 (U-NII-2C)



TX Channel Bandwidth 6.01 MHz Power 2.95 dBm

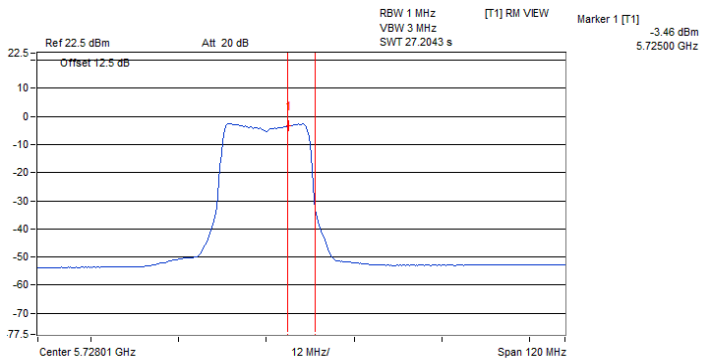
802.11ax (HE20) / Chain 0 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



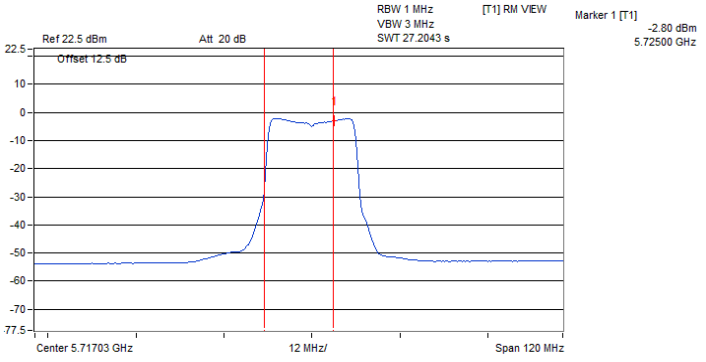
TX Channel Bandwidth 16.04 MHz Power 7.67 dBm

802.11ax (HE20) / Chain 1 : CH 144 (U-NII-2C)



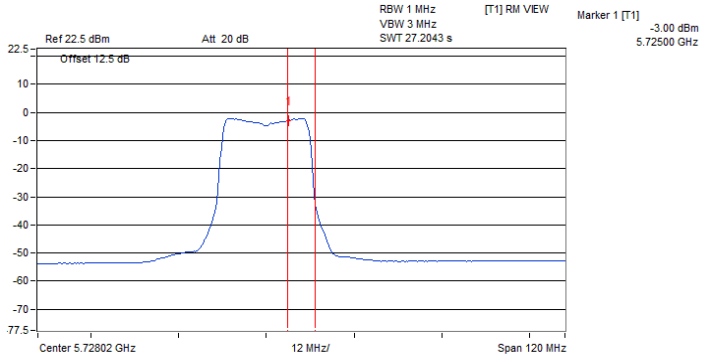
TX Channel Bandwidth 6.03 MHz Power 3.39 dBm

802.11ax (HE20) / Chain 1 : CH 144 (U-NII-3)



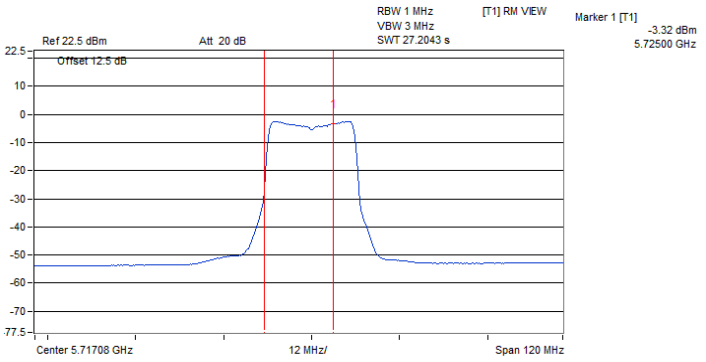
TX Channel Bandwidth 15.94 MHz Power 8.14 dBm

802.11ax (HE20) / Chain 2 : CH 144 (U-NII-2C)



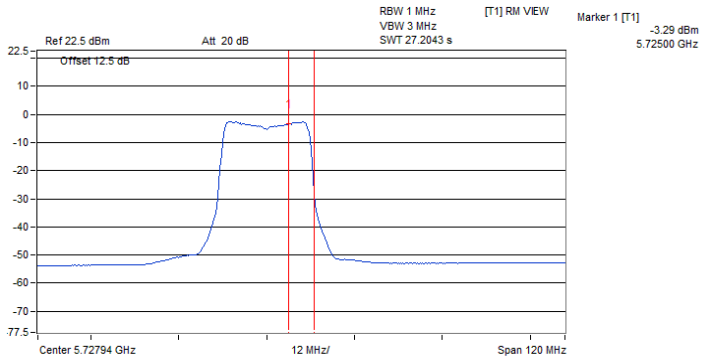
TX Channel Bandwidth 6.04 MHz Power 3.86 dBm

802.11ax (HE20) / Chain 2 : CH 144 (U-NII-3)



TX Channel Bandwidth 15.84 MHz Power 7.67 dBm

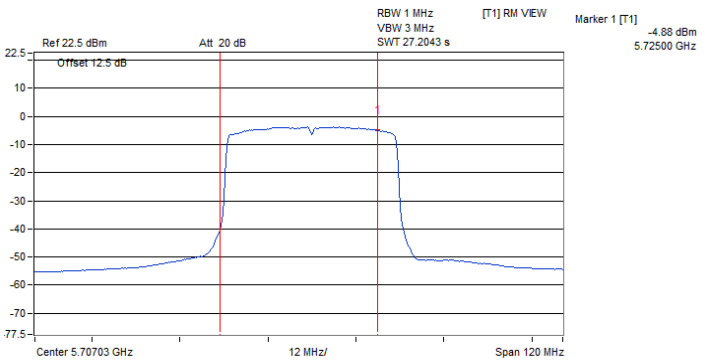
802.11ax (HE20) / Chain 3 : CH 144 (U-NII-2C)



TX Channel Bandwidth 5.89 MHz Power 3.37 dBm

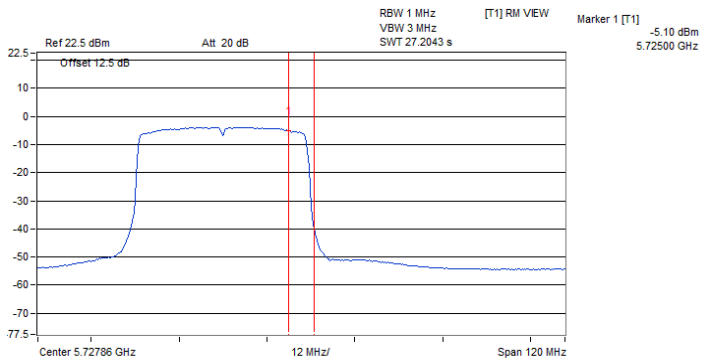
802.11ax (HE20) / Chain 3 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



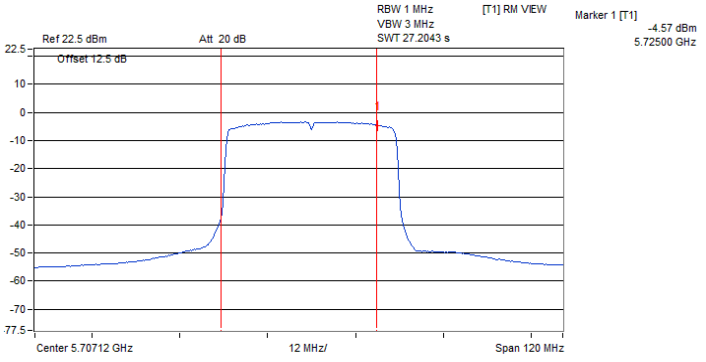
TX Channel Bandwidth 35.93 MHz Power 12.06 dBm

802.11ax (HE40) / Chain 0 : CH 142 (U-NII-2C)



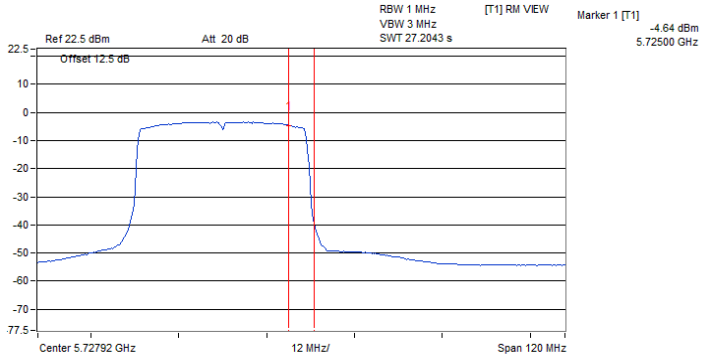
TX Channel Bandwidth 5.73 MHz Power 1.67 dBm

802.11ax (HE40) / Chain 0 : CH 142 (U-NII-3)



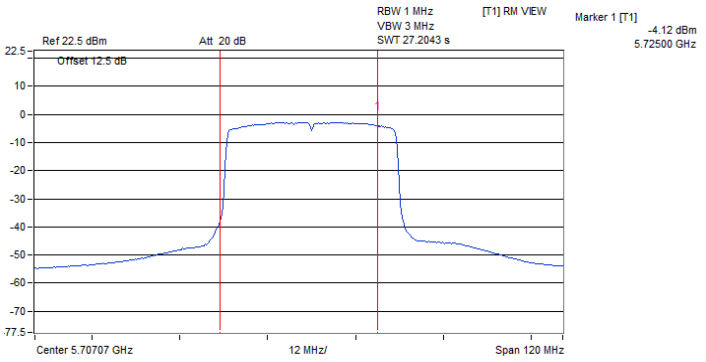
TX Channel Bandwidth 35.75 MHz Power 12.53 dBm

802.11ax (HE40) / Chain 1 : CH 142 (U-NII-2C)



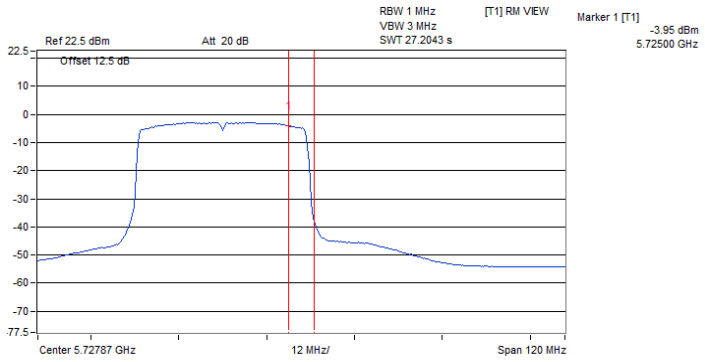
TX Channel Bandwidth 5.84 MHz Power 2.12 dBm

802.11ax (HE40) / Chain 1 : CH 142 (U-NII-3)



TX Channel Bandwidth 35.86 MHz Power 13.08 dBm

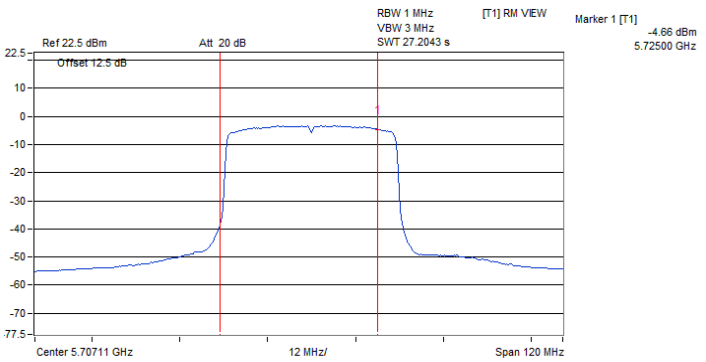
802.11ax (HE40) / Chain 2 : CH 142 (U-NII-2C)



TX Channel Bandwidth 5.75 MHz Power 2.65 dBm

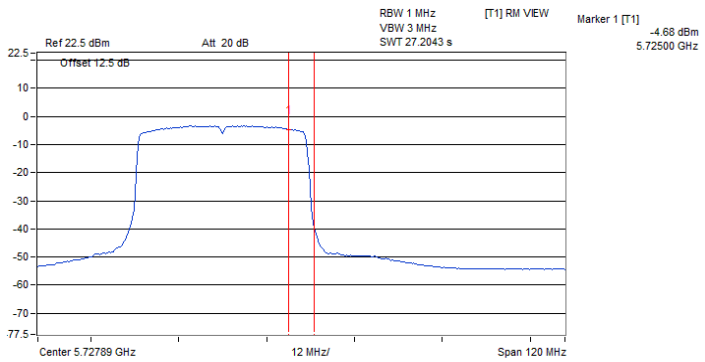
802.11ax (HE40) / Chain 2 : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



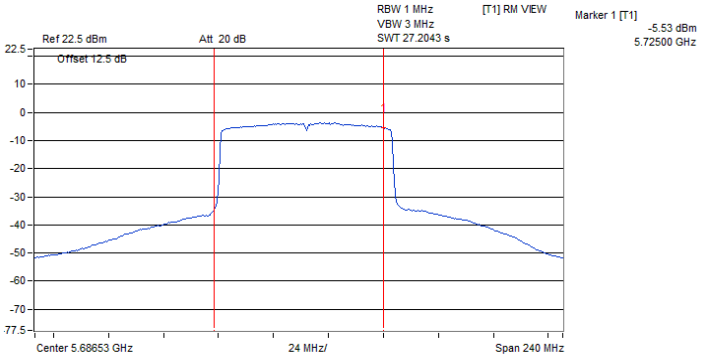
TX Channel Bandwidth 35.77 MHz Power 12.55 dBm

802.11ax (HE40) / Chain 3 : CH 142 (U-NII-2C)



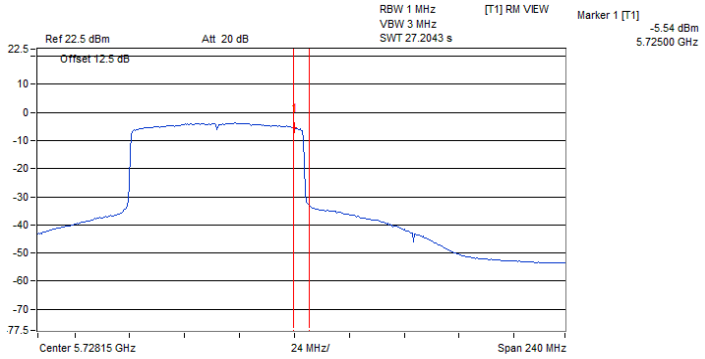
TX Channel Bandwidth 5.79 MHz Power 2.18 dBm

802.11ax (HE40) / Chain 3 : CH 142 (U-NII-3)



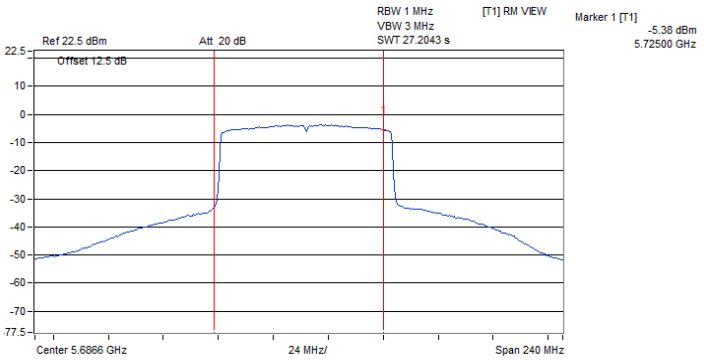
TX Channel Bandwidth 76.94 MHz Power 15.31 dBm

802.11ax (HE80) / Chain 0 : CH 138 (U-NII-2C)



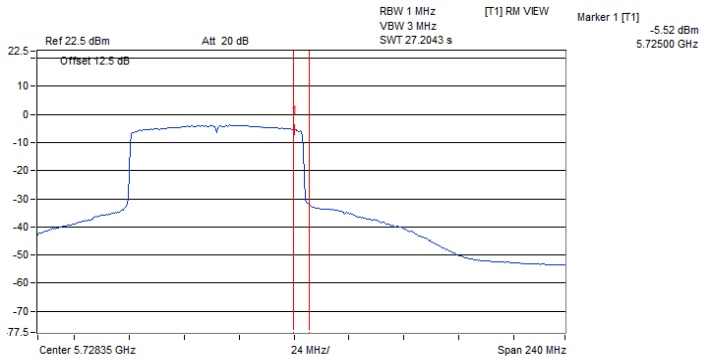
TX Channel Bandwidth 6.31 MHz Power 1.37 dBm

802.11ax (HE80) / Chain 0 : CH 138 (U-NII-3)



TX Channel Bandwidth 76.8 MHz Power 15.34 dBm

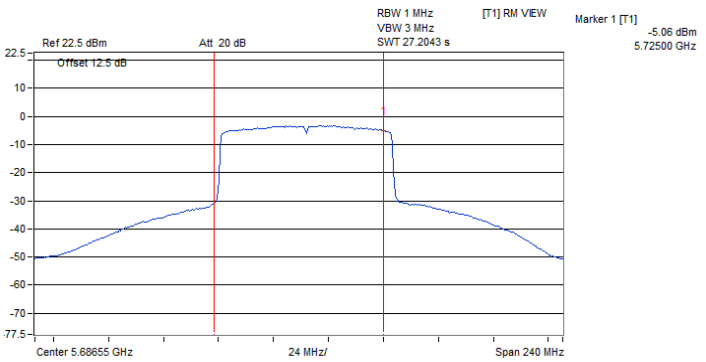
802.11ax (HE80) / Chain 1 : CH 138 (U-NII-2C)



TX Channel Bandwidth 6.71 MHz Power 1.46 dBm

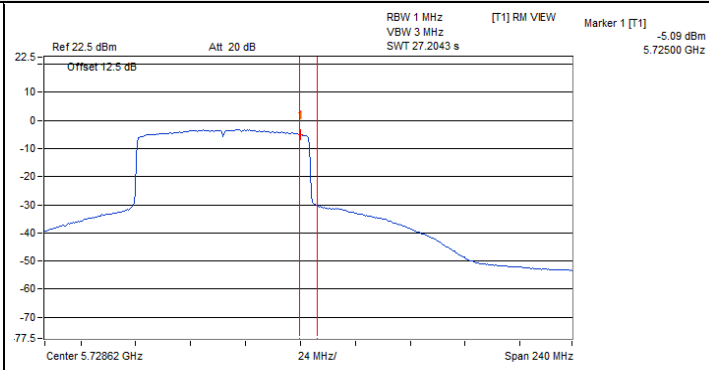
802.11ax (HE80) / Chain 1 : CH 138 (U-NII-3)

Spectrum Plot for channel straddling



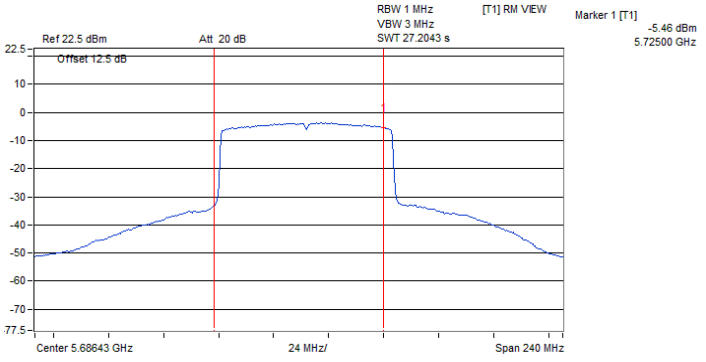
TX Channel Bandwidth 76.89 MHz Power 15.77 dBm

802.11ax (HE80) / Chain 2 : CH 138 (U-NII-2C)



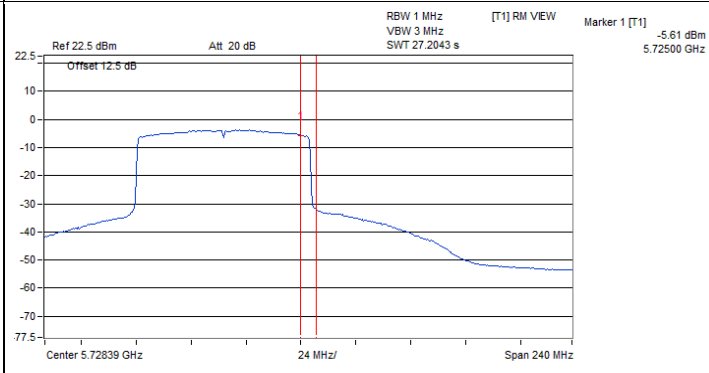
TX Channel Bandwidth 7.24 MHz Power 1.9 dBm

802.11ax (HE80) / Chain 2 : CH 138 (U-NII-3)



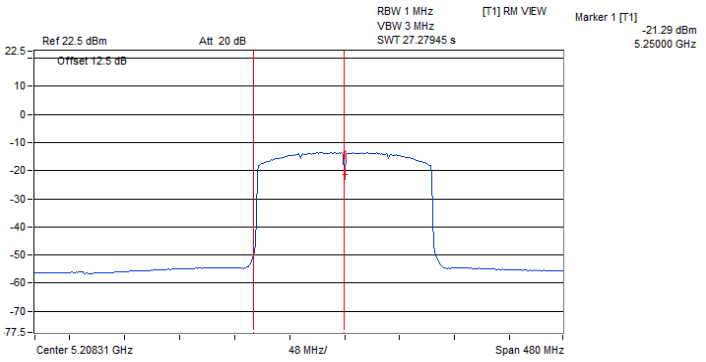
TX Channel Bandwidth 77.13 MHz Power 15.3 dBm

802.11ax (HE80) / Chain 3 : CH 138 (U-NII-2C)



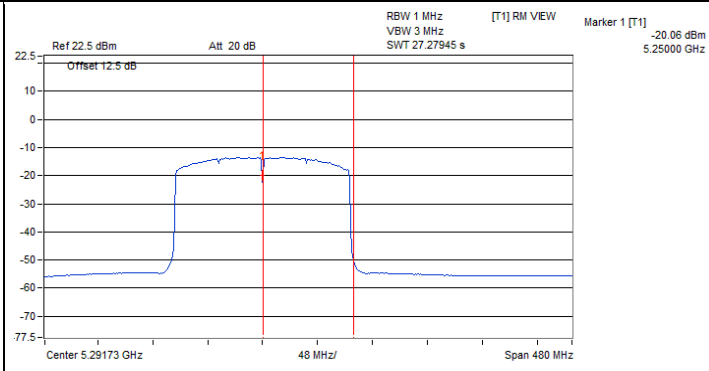
TX Channel Bandwidth 6.79 MHz Power 1.36 dBm

802.11ax (HE80) / Chain 3 : CH 138 (U-NII-3)



TX Channel Bandwidth 83.38 MHz Power 5.52 dBm

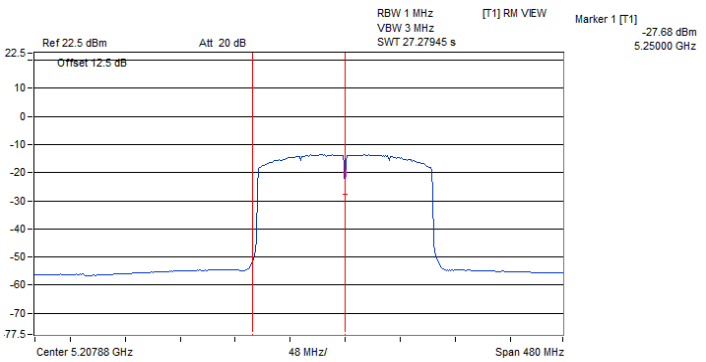
802.11ax (HE160) / Chain 0 : CH 50 (U-NII-1)



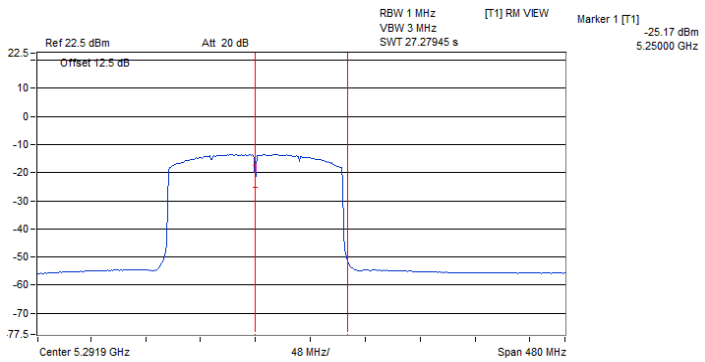
TX Channel Bandwidth 83.47 MHz Power 5.49 dBm

802.11ax (HE160) / Chain 0 : CH 50 (U-NII-2A)

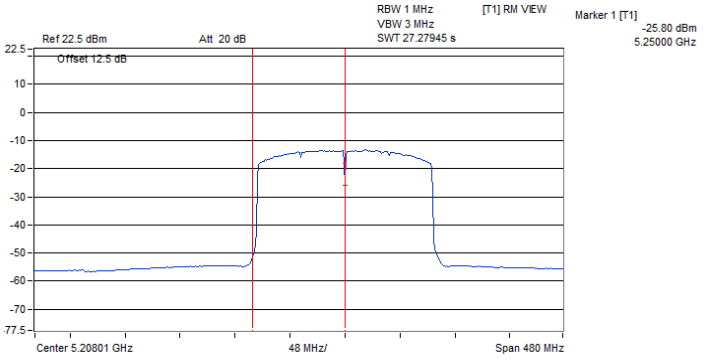
Spectrum Plot for channel straddling



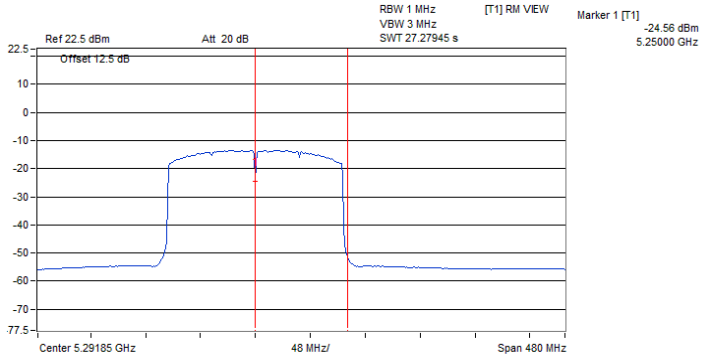
802.11ax (HE160) / Chain 1 : CH 50 (U-NII-1)



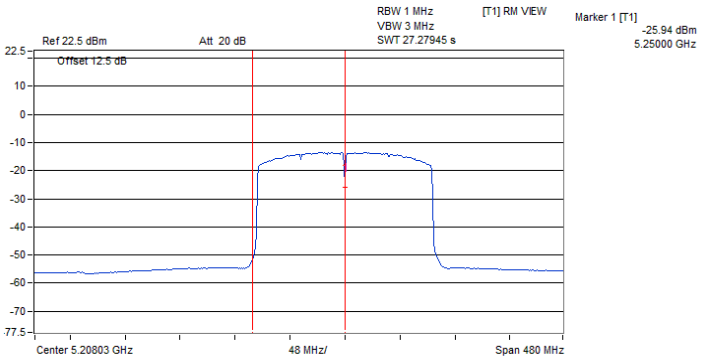
802.11ax (HE160) / Chain 1 : CH 50 (U-NII-2A)



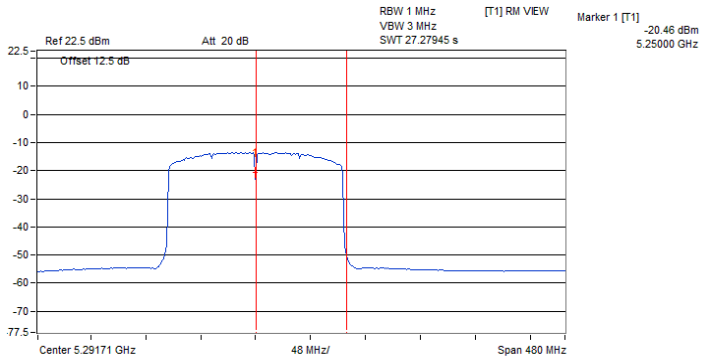
802.11ax (HE160) / Chain 2 : CH 50 (U-NII-1)



802.11ax (HE160) / Chain 2 : CH 50 (U-NII-2A)



802.11ax (HE160) / Chain 3 : CH 50 (U-NII-1)



802.11ax (HE160) / Chain 3 : CH 50 (U-NII-2A)

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26051924

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Tel: 886-3-6668565
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Email: service.adt@bureauveritas.com
Web Site: http://ee.bureauveritas.com.tw

The address and road map of all our labs can be found in our web site also.

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