

4. 6 dB Bandwidth

4.1. Test Setup



4.2. Limit

According to §15.407(e), within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

4.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section C.2 of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = 100 kHz.
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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.

Remark;

In case of band crossing channels 138, 142 and 144, the measurement is complied with section III.A of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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4.4. Test Result

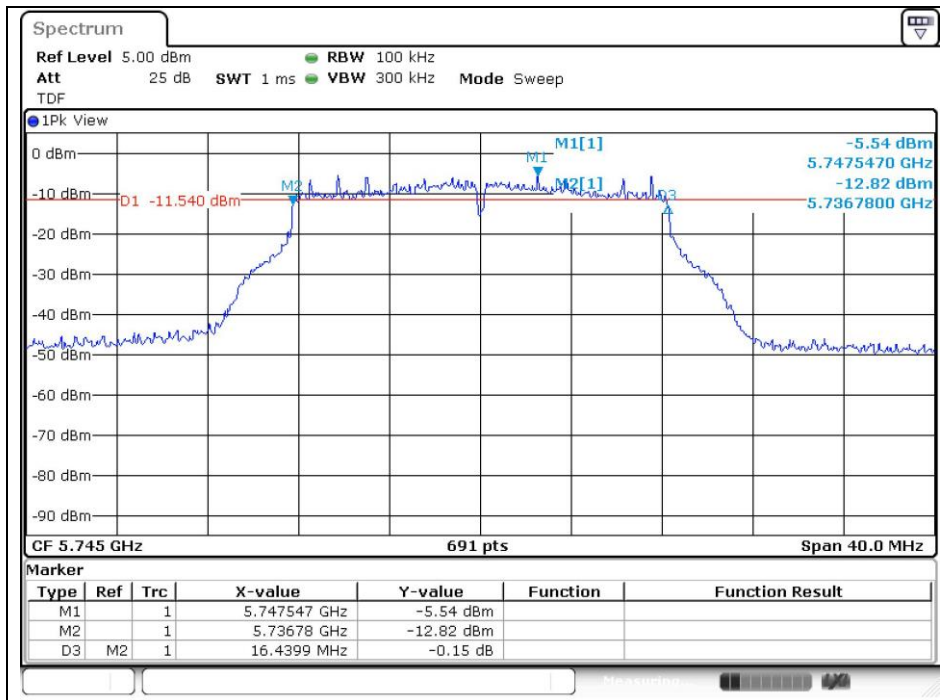
Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

Band	Mode	Frequency (MHz)	Ch.	Data Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Bandwidth (kHz)
U-NII 3	11a	5 745	149	6	16.440	500
		5 785	157		16.440	
		5 825	165		16.440	
	11ac_VHT20	5 745	149	MCS0	17.656	
		5 785	157		17.656	
		5 825	165		17.656	
	11ac_VHT40	5 755	151	MCS4	36.585	
		5 795	159		36.585	
	11ac_VHT80	5 775	155	MCS0	75.716	
U-NII 3 (Band-crossing channels)	11a	5 720	144	6	3.220	
	11ac_VHT20	5 720	144	MCS0	3.857	
	11ac_VHT40	5 710	142	MCS4	3.290	
	11ac_VHT80	5 690	138	MCS0	3.060	

- Test plots

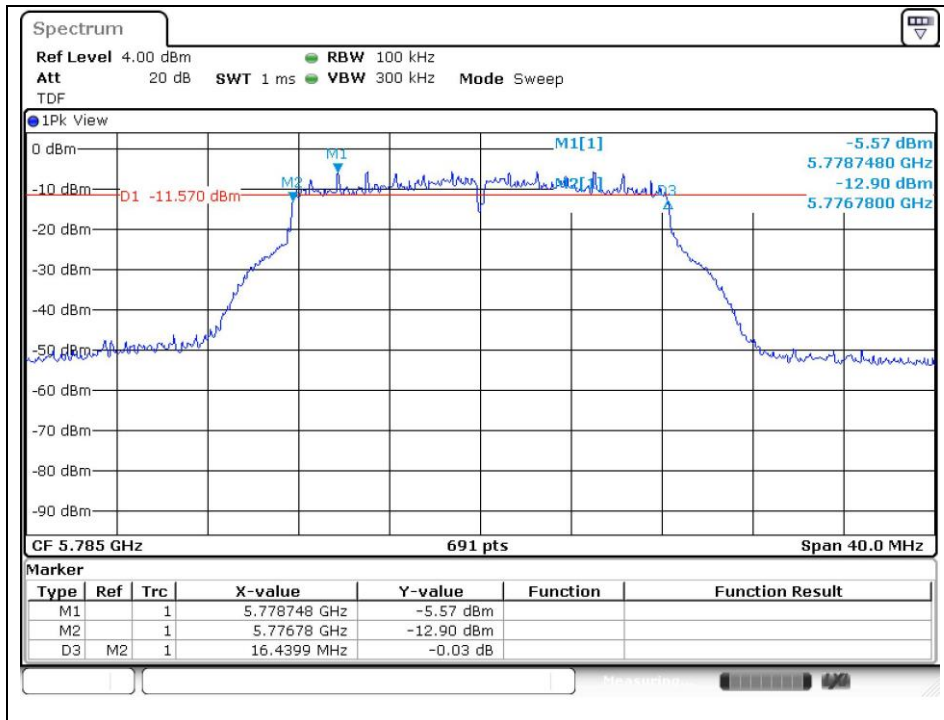
802.11a (Band 3)

Low Channel (5 745 MHz)

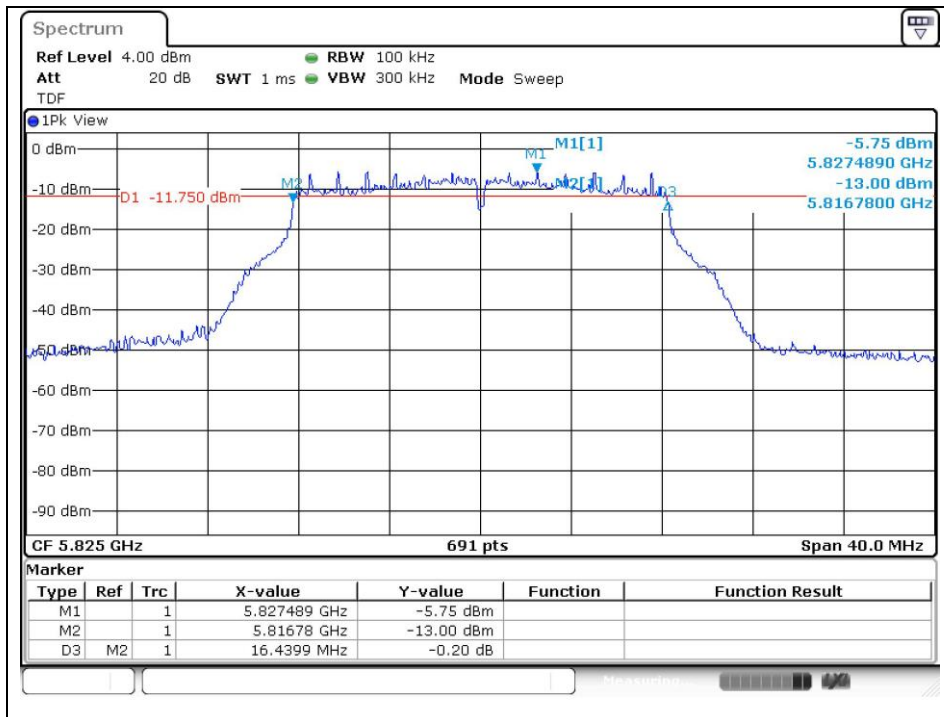


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Middle Channel (5 785 MHz)



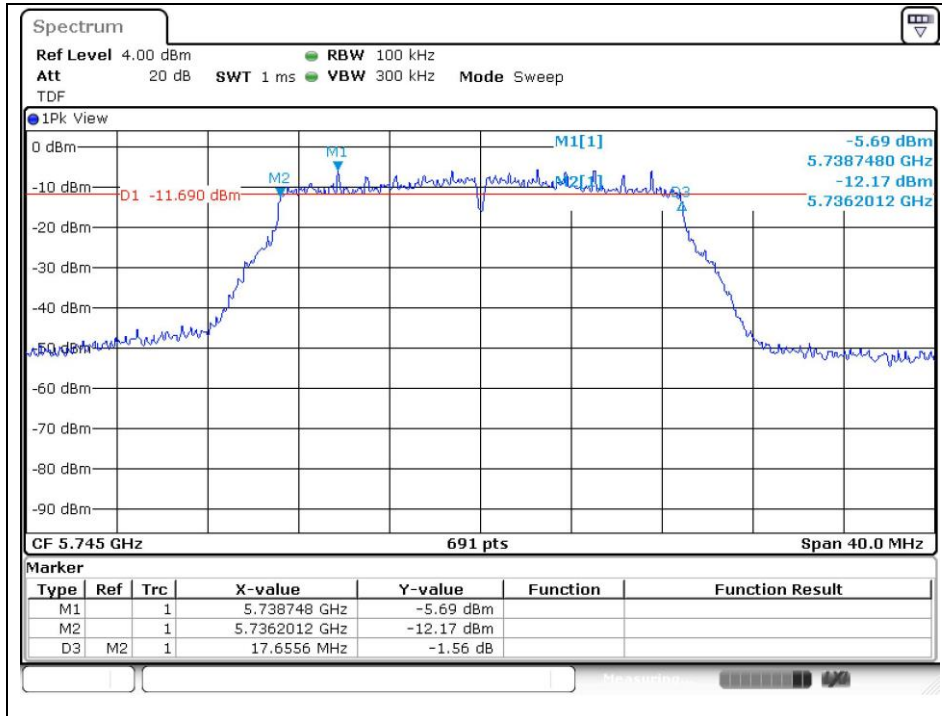
High Channel (5 825 MHz)



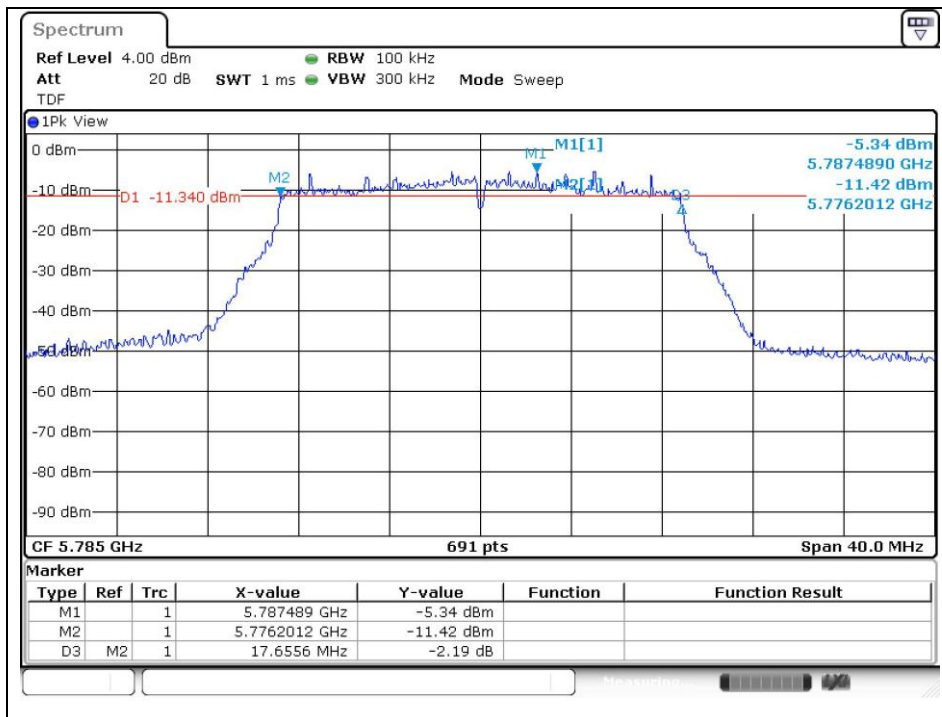
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802.11ac_VHT20 (Band 3)

Low Channel (5 745 MHz)

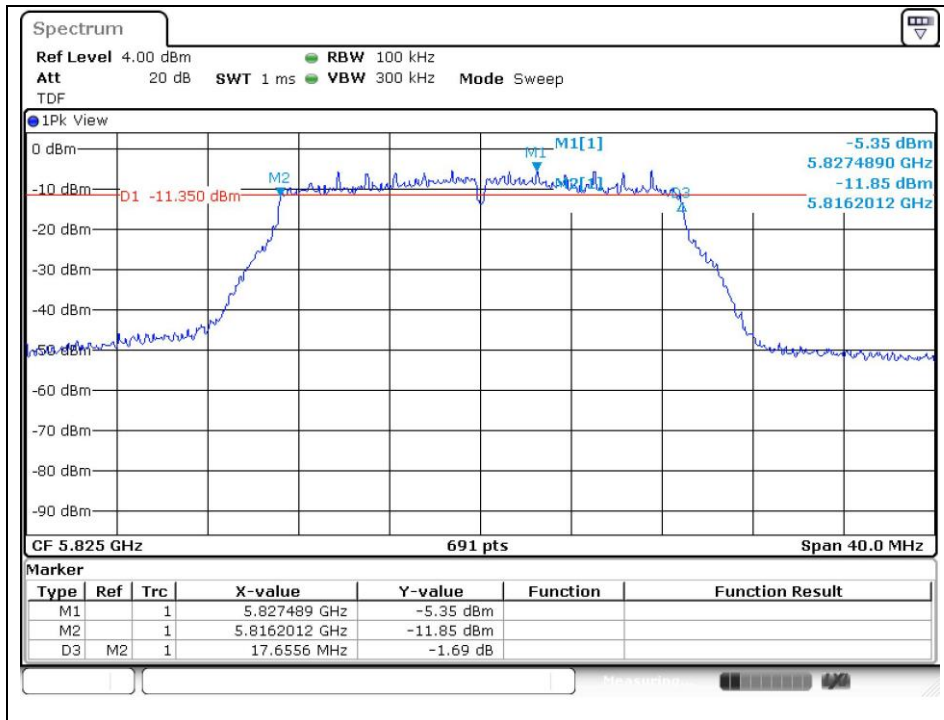


Middle Channel (5 785 MHz)



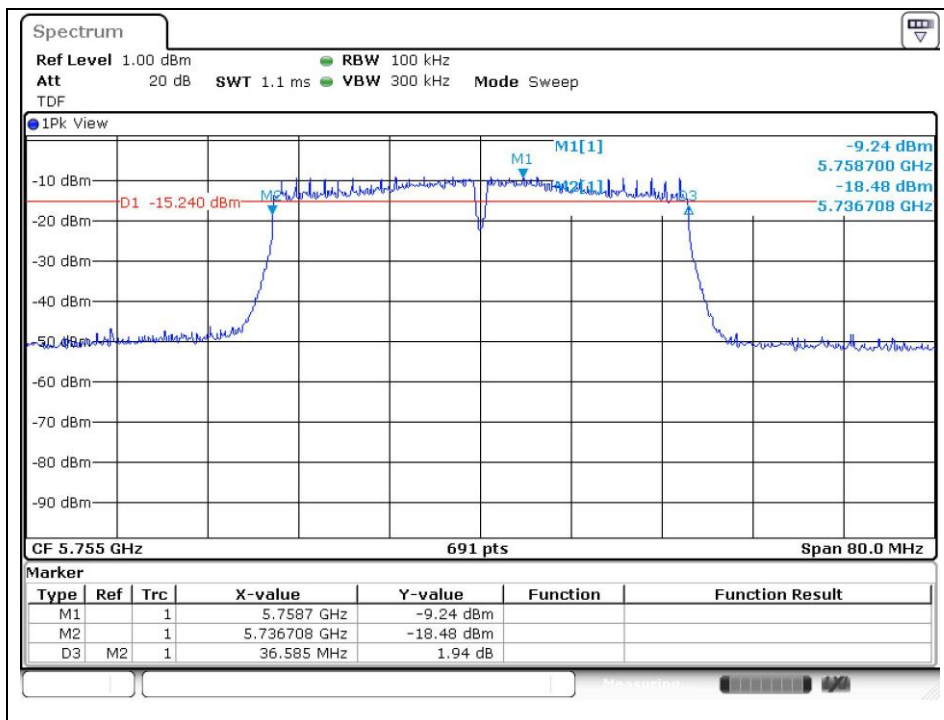
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High Channel (5 825 MHz)



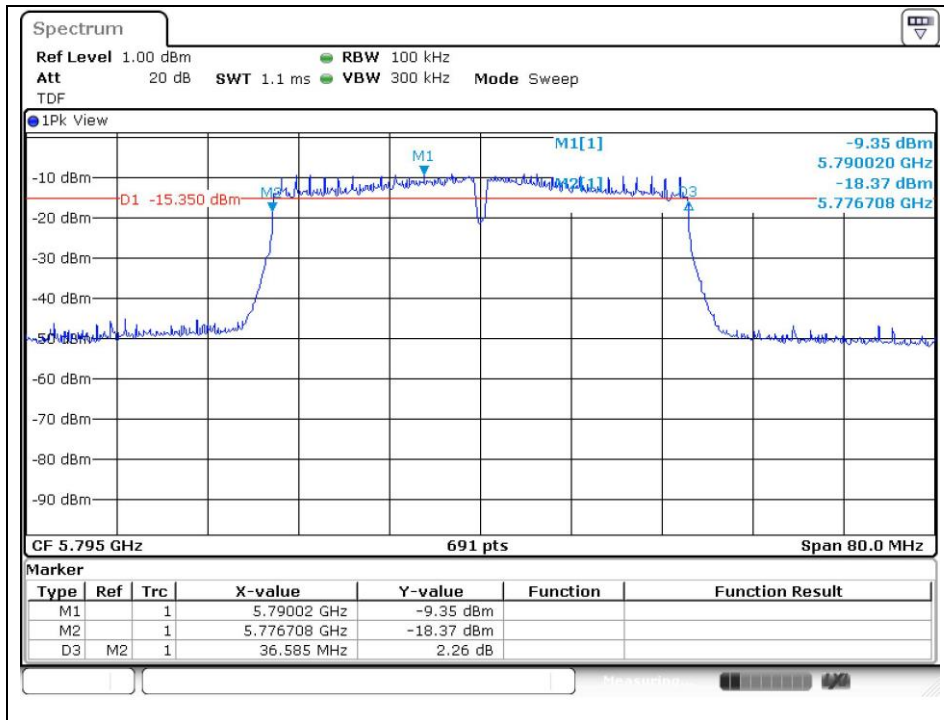
802.11ac_VHT40 (Band 3)

Low Channel (5 755 MHz)



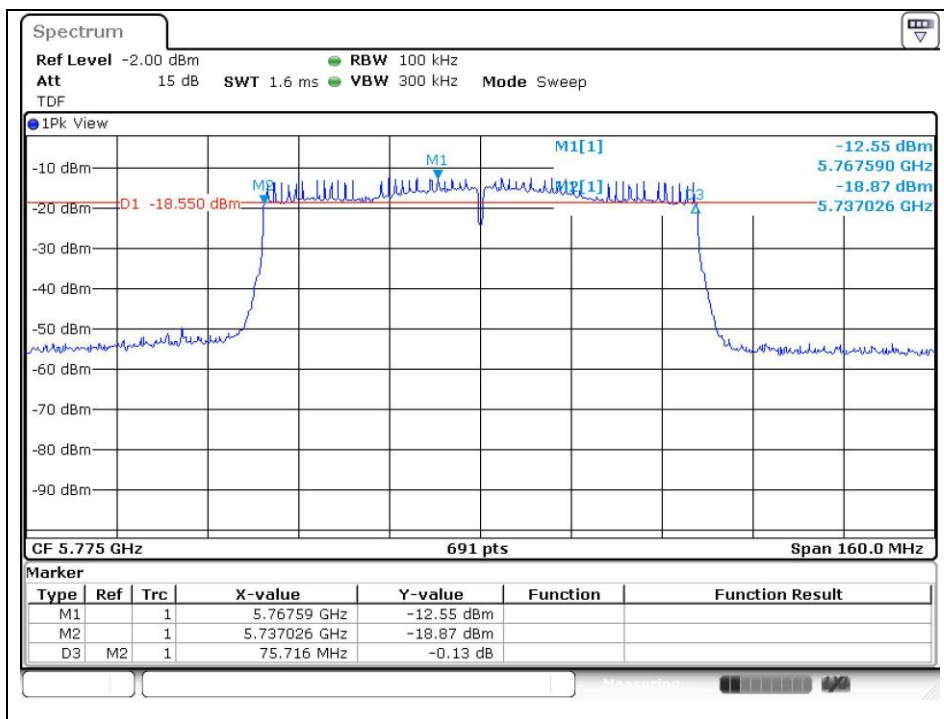
The results of this test report are effective only to the items tested. The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

High Channel (5 795 MHz)



802.11ac_VHT80 (Band 3)

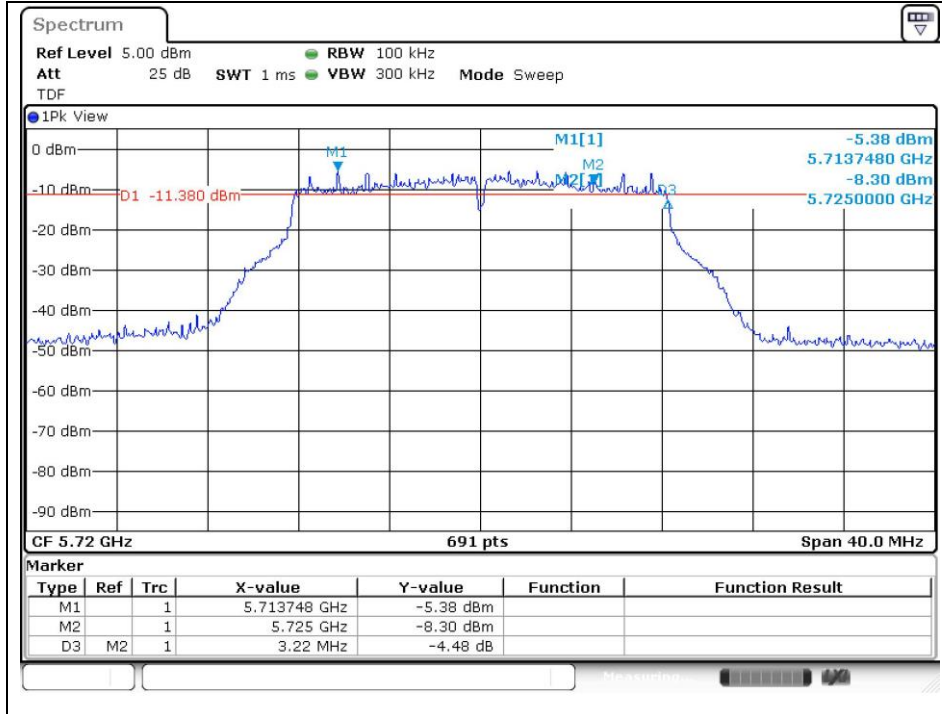
Middle Channel (5 775 MHz)



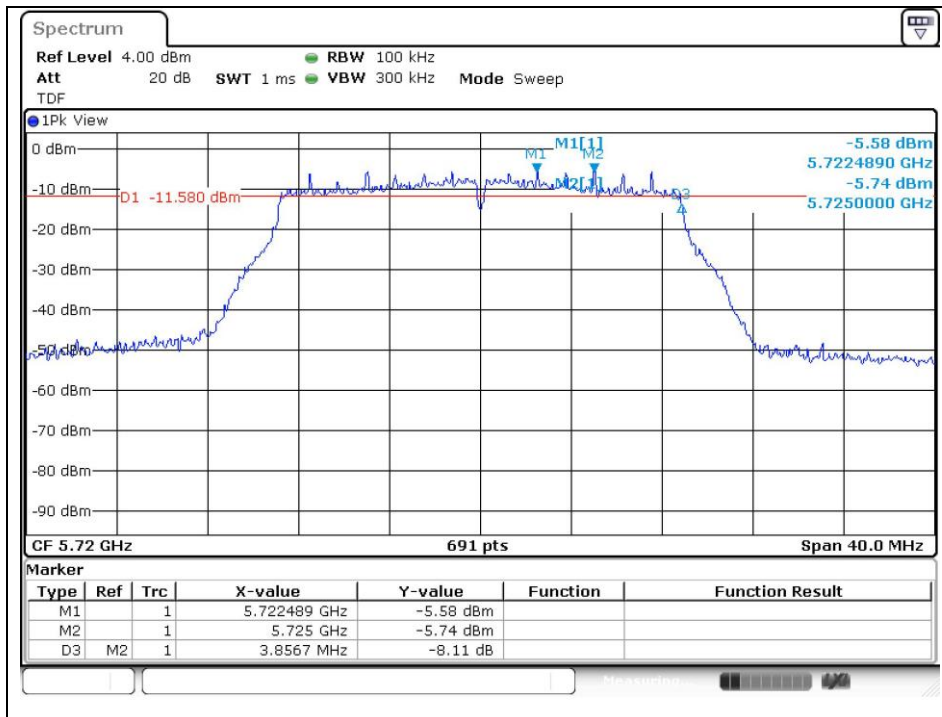
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Band-crossing channels

802.11a (5 720 MHz)

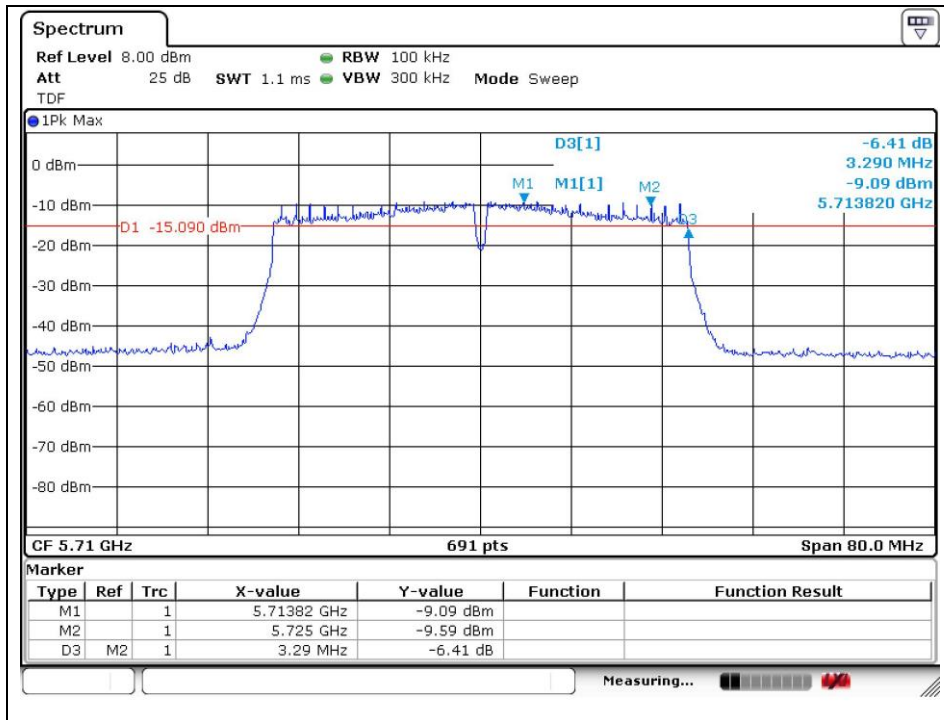


802.11ac_VHT20 (5 720 MHz)

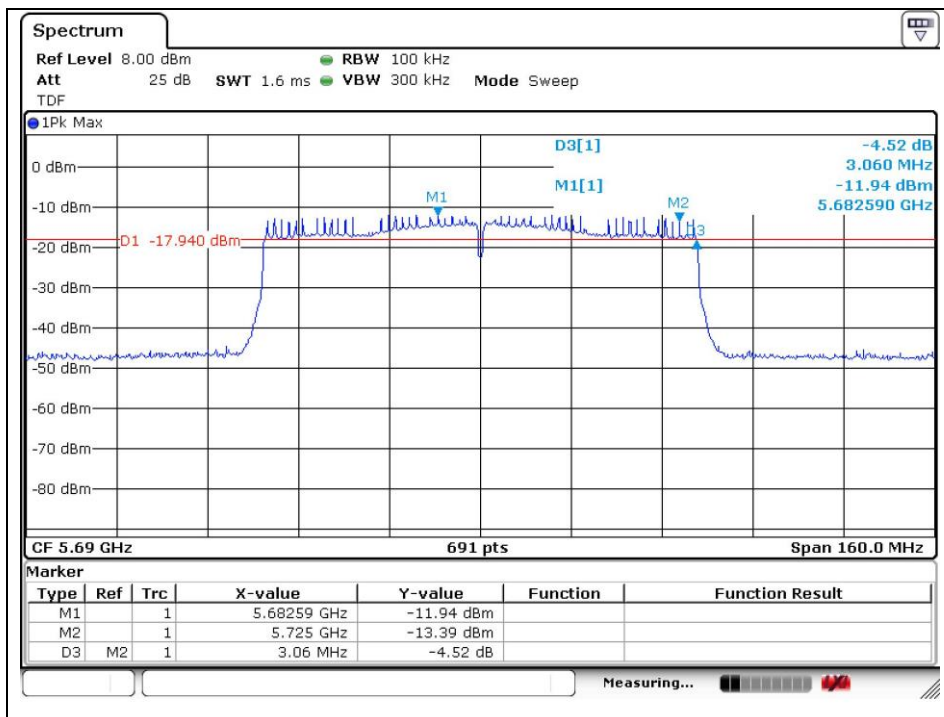


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802.11ac_VHT40 (5 710 MHz)



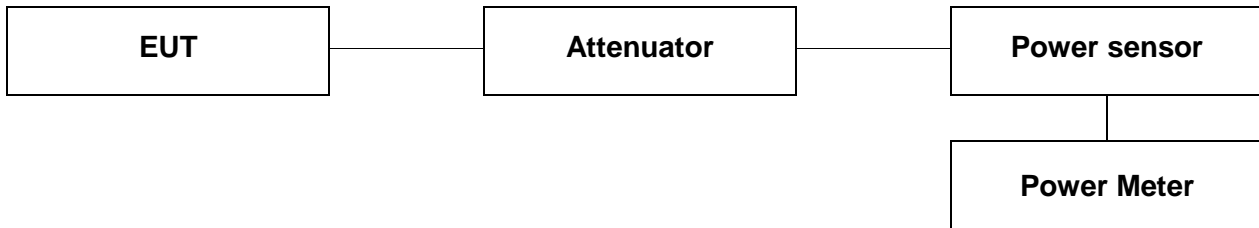
802.11ac_VHT80 (5 690 MHz)



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5. Maximum Conducted Output Power

5.1. Test Setup



5.2. Limit

According to 15.407(a)(1)(iv)

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dB i. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i.

According to 15.407(a)(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 dB m + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i.

According to 15.407(a)(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 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i 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.

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5.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section E.3.a of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:
 - The EUT is configured to transmit continuously or to transmit with a consistent duty cycle.
 - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
 - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
3. If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in section II.B.
4. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
5. Adjust the measurement in dB m by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25 %).
6. In case of band crossing channels 138, 142 and 144, the measurement is complied with section III.A of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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5.4. Test Result

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

Test mode: 11a

Band	Frequency (MHz)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
U-NII 1	5 180	6	7.11	0.24	7.35
	5 220		7.34		7.58
	5 240		7.17		7.41
U-NII 2A	5 260		7.58		7.82
	5 300		7.29		7.53
	5 320		6.85		7.09
U-NII 2C	5 500		6.97		7.21
	5 580		6.87		7.11
	5 720		6.97		7.21
U-NII 3	5 745		6.63		6.87
	5 785		7.12		7.36
	5 825		7.02		7.26

Band	Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98	/		-0.61	23.98
	5 220					
	5 240					
U-NII 2A	5 260	23.98	21.071	24.24	-0.18	23.98
	5 300		21.071	24.24		
	5 320		21.303	24.28		
U-NII 2C	5 500	23.98	21.071	24.24	-0.77	23.98
	5 580		21.013	24.22		
	5 720		21.129	24.25		
U-NII 3	5 745	30	/		-0.18	30
	5 785					
	5 825					

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)

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Test mode: 11ac_VHT20

Band	Frequency (MHz)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
U-NII 1	5 180	MCS0	5.49	0.22	5.71
	5 220		5.42		5.64
	5 240		5.42		5.64
U-NII 2A	5 260		5.81		6.03
	5 300		5.52		5.74
	5 320		4.84		5.06
U-NII 2C	5 500		5.37		5.59
	5 580		6.22		6.44
	5 720		6.53		6.75
U-NII 3	5 745		6.24		6.46
	5 785		6.21		6.43
	5 825		5.83		6.05

Band	Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98			-0.61	23.98
	5 220					
	5 240					
U-NII 2A	5 260	23.98	21.534	24.33	-0.18	23.98
	5 300		21.592	24.34		
	5 320		21.476	24.32		
U-NII 2C	5 500	23.98	21.476	24.32	-0.77	23.98
	5 580		21.303	24.28		
	5 720		21.476	24.32		
U-NII 3	5 745	30			-0.18	30
	5 785					
	5 825					

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)

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Test mode: 11ac_VHT40

Band	Frequency (MHz)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
U-NII 1	5 190	MCS4	1.39	1.83	3.22
	5 230		1.01		2.84
U-NII 2A	5 270		3.98		5.81
	5 310		3.72		5.55
U-NII 2C	5 510		3.88		5.71
	5 550		4.07		5.90
	5 710		4.01		5.84
U-NII 3	5 755		3.91		5.74
	5 795		4.02		5.85

Band	Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 190	23.98			-0.61	23.98
	5 230					
U-NII 2A	5 270	23.98	39.711	26.99	-0.18	23.98
	5 310		39.711	26.99		
U-NII 2C	5 510	23.98	39.826	27.00	-0.77	23.98
	5 550		39.711	26.99		
	5 710		39.826	27.00		
U-NII 3	5 755	30			-0.18	30
	5 795					

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)

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Test mode: 11ac_VHT80

Band	Frequency (MHz)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
U-NII 1	5 210	MCS0	3.15	0.86	4.01
U-NII 2A	5 290		5.20		6.06
U-NII 2C	5 530		4.85		5.71
	5 690		4.94		5.80
U-NII 3	5 755		4.34		5.20

Band	FCC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
U-NII 1	5 210	23.98			-0.61	23.98
U-NII 2A	5 290	23.98	82.431	30.16	-0.18	23.98
U-NII 2C	5 530	23.98	82.200	30.15	-0.77	23.98
	5 690	23.98	82.200	30.15		23.98
U-NII 3	5 775	30			-0.18	30

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)

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- Band-crossing channels

Mode	Band	Frequency (MHz)	Data Rate (Mbps)	Average Power (dB m)	Duty Cycle Correction Factor (dB)	Average Power Result (dB m)
11a	U-NII 2C	5 720	6	5.20	0.24	5.44
	U-NII 3			-1.85		-1.61
11ac_VHT20	U-NII 2C	5 720	MCS0	5.39	0.22	5.61
	U-NII 3			-1.32		-1.10
11ac_VHT40	U-NII 2C	5 710	MCS4	2.83	1.83	4.66
	U-NII 3			-8.68		-6.85
11ac_VHT80	U-NII 2C	5 690	MCS0	4.15	0.86	5.01
	U-NII 3			-10.85		-9.99

Mode	Band	Limit					
		Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna Gain (dB i)	Limit (dB m)
11a	U-NII 2C	5 720	23.98	15.593	22.93	-0.77	22.93
	U-NII 3						-0.18
11ac_VHT20	U-NII 2C	5 720	23.98	15.593	22.93	-0.77	22.93
	U-NII 3						-0.18
11ac_VHT40	U-NII 2C	5 710	23.98	34.797	26.42	-0.77	23.98
	U-NII 3						-0.18
11ac_VHT80	U-NII 2C	5 690	23.98	75.980	29.81	-0.77	23.98
	U-NII 3						-0.18

Remark;

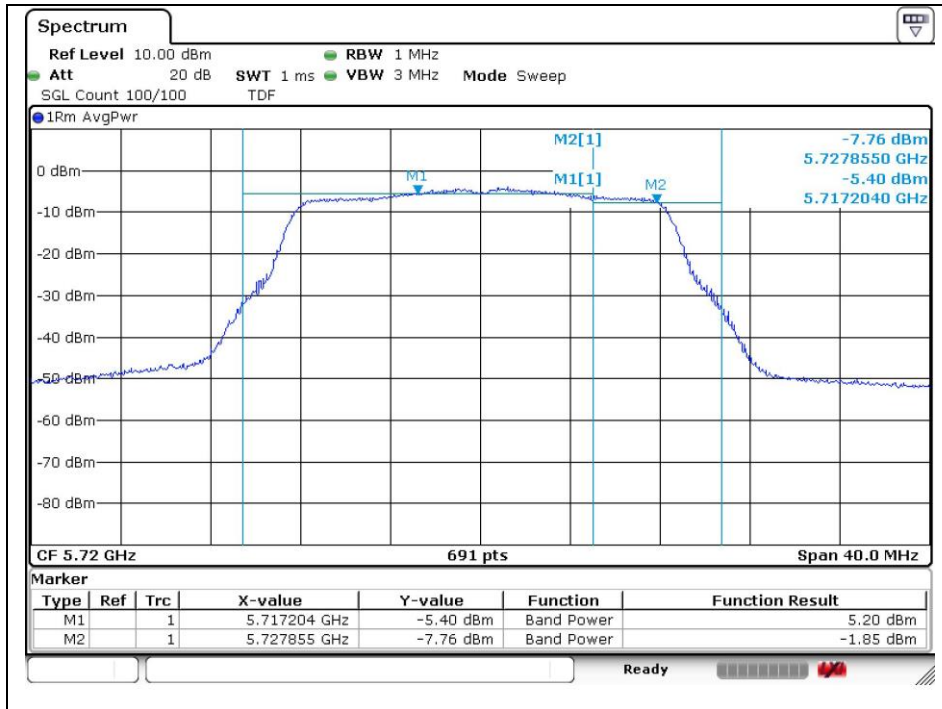
1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)

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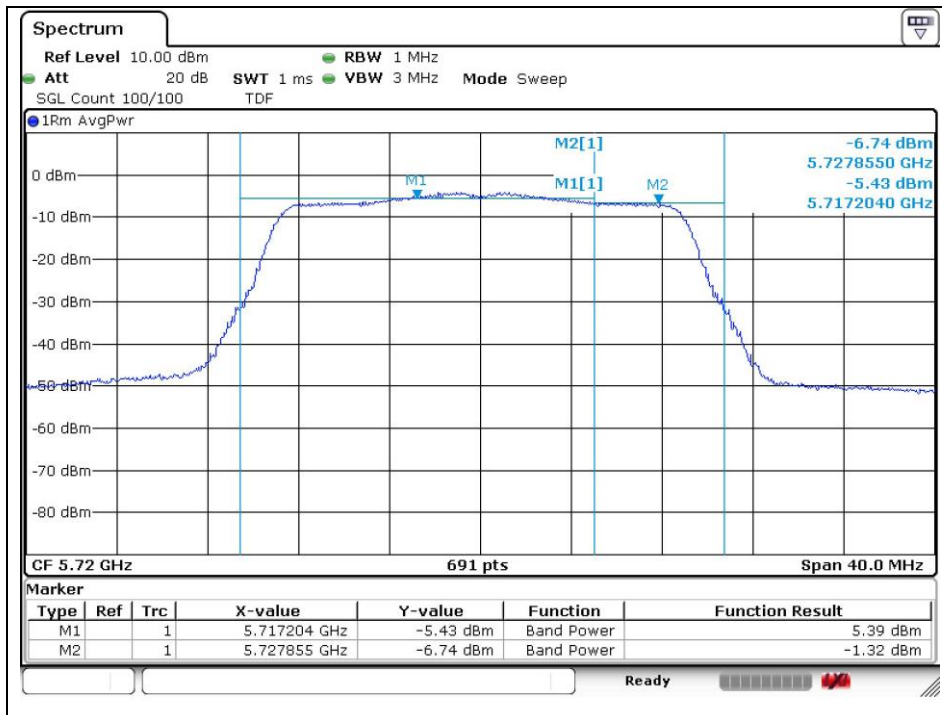
- Test plots

Band-crossing channels

802.11a (5 720 MHz)

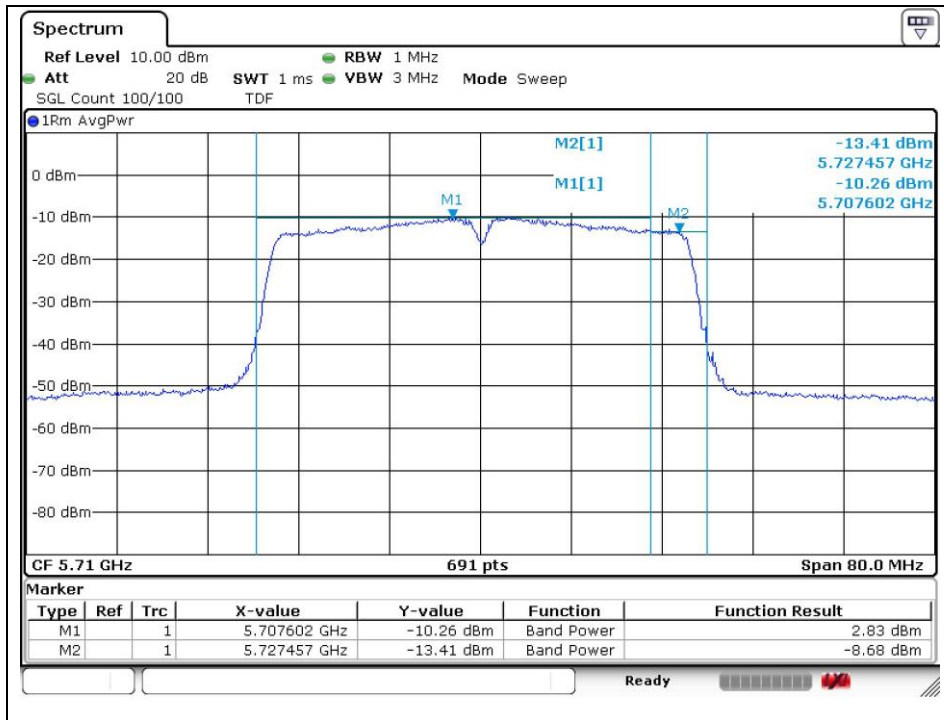


802.11ac_VHT20 (5 720 MHz)

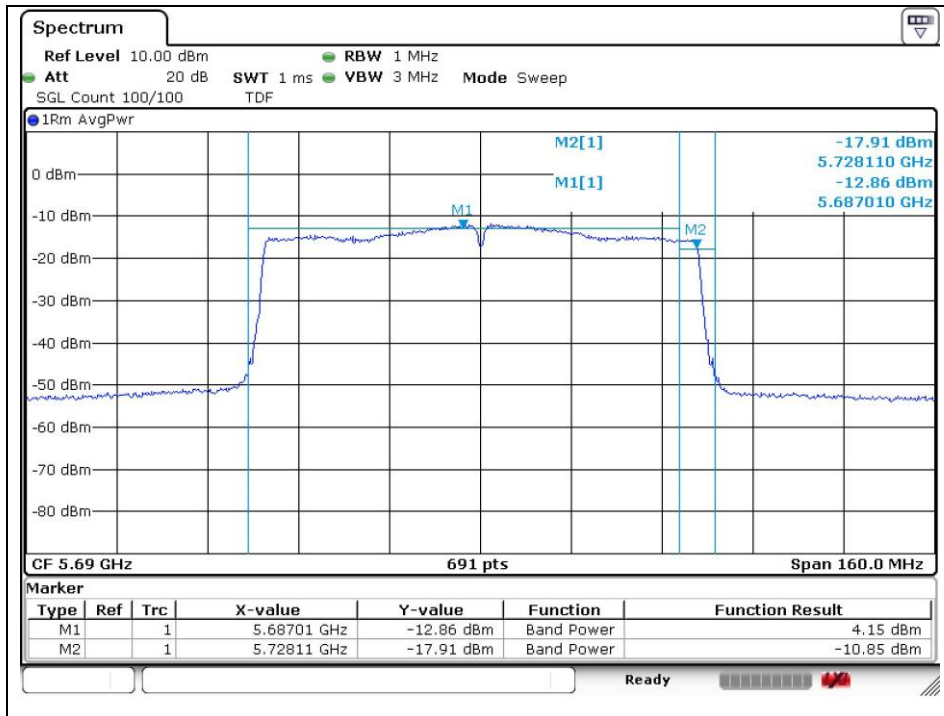


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802.11ac_VHT40 (5 710 MHz)



802.11ac_VHT80 (5 690 MHz)



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