1. TEST RESULTS

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1.1. Maximum Conducted Output Power

Conducted Test Conditions for Maximum Conducted Output Power							
Standard:	FCC CFR 47:15.407	CC CFR 47:15.407 Ambient Temp. (°C): 24.0 - 27.5					
Test Heading:	Maximum Conducted Output Power	Rel. Humidity (%):	32 - 45				
Standard Section(s):	15.407 (a)(1), (2), (3)	Pressure (mBars):	999 - 1001				
Reference Document(s):	See Normative References						

Test Procedure for Maximum Conducted Output Power Measurement

Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document. Supporting Information

Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})]

G = Antenna Gain

Y = Beamforming Gain

x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power

Operating Frequency Band 5150-5250 MHz

15.407 (a)(1)

(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.

Operating Frequency Band 5250-5350 and 5470 - 5725 MHz

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 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.

Operating Frequency Band 5725 – 5850 MHz

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 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.

NOTE: All recorded power settings incorporate any reduction in output power brought about as a result of radiated spurious emissions and radiated band-edge testing.



Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measu	Test Measurement Results										
Test Frequency	Measured Conducted Output Power (dBm)			Calculated Total	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power			
Frequency		Por	rt(s)		Power	Bandwidth			Setting		
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting		
5180.0	16.22	13.62			18.12	Not Applicable	30.00	-11.88	15.00		
5200.0	18.34	18.18			21.27	Not Applicable	30.00	-8.73	18.00		
5240.0	18.23	18.21			21.23	Not Applicable	30.00	-8.77	18.00		

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results									
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum 26	Limit	Margin	EUT Power
Frequency		Por	t(s)		Total Power	dB Bandwidth			
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting
5210.0	13.43	12.81			16.14	Not Applicable	28.10	-11.96	12.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER				
Measurement Uncertainty:	1.33 dB				



Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results										
Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5180.0	15.37	12.70			17.25	Not Applicable	28.10	-10.85	14.00	
5200.0	18.40	16.45			20.54	Not Applicable	28.10	-7.56	18.00	
5240.0	18.34	16.55			20.55	Not Applicable	28.10	-7.55	18.00	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER				
Measurement Uncertainty:	1.33 dB				



Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results									
Test Frequency	Measure		Output Pow	er (dBm)	Calculated Total	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
Trequency		Poi	rt(s)		Power	Danuwiutii			
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	betting
5190.0	12.38	12.70			15.55	Not Applicable	28.10	-12.55	11.00
5230.0	16.16	16.40			19.29	Not Applicable	28.10	-8.81	18.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER				
Measurement Uncertainty:	1.33 dB				



Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measur	Test Measurement Results									
Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power	
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5260.0	16.22	18.22			20.34	30.862	24.00	-3.66	18.00	
5300.0	16.11	18.19	-		20.28	24.609	24.00	-3.72	18.00	
5320.0	14.93	11.59			16.58	19.960	24.00	-7.42	13.00	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	?2.81 dB					



Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measu	Test Measurement Results									
Test	Measured Conducted Output Power (dBm)			Calculated	Minimum					
Frequency		Por	t(s)		Total 26 dB Limit Power Bandwidth		Margin	EUT Power		
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5290.0	11.41	9.94			13.75	82.405	22.10	-8.35	9.00	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:						



Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Mea	Test Measurement Results									
Test Frequency	Measu	Measured Conducted Output Power (dBm)			Calculated	Minimum 26 dB	Linait			
	;у	Po	rt(s)		Total Power	Bandwidth	Limit	Limit Margin		
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5260.0	16.26	18.19			20.34	30.301	22.10	-1.76	18.00	
5300.0	16.08	18.15			20.25	29.659	22.10	-1.85	18.00	
5320.0	16.30	18.12			20.31	20.120	22.10	-1.79	18.00	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	?2.81 dB					



Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results									
Test Frequency	Measured Conducted Output Power (dBm)			Calculated	Minimum				
		Рог	t(s)		Total Power	Bandwidth		EUT Power	
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dB	Setting
5270.0	16.62	18.58			20.72	72.946	22.10	-1.38	18.00
5310.0	13.22	9.83			14.86	41.363	22.10	-7.24	11.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measu	Test Measurement Results									
Test	Test Measured Conducted Output Power (dBm)		Calculated	Minimum	Limit					
Frequency		Por	t(s)		Power	Total 26 dB Power Bandwidth		Margin	EUT Power	
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5500.0	14.70	11.44	-		16.38	19.880	23.98	-7.60	14.00	
5580.0	16.91	18.25	-		20.64	36.072	24.00	-3.36	18.00	
5720.0	17.23	18.25			20.78	35.912	24.00	-3.22	18.00	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measu	Test Measurement Results								
Test			Calculated Minimum		Limit				
Frequency		Por	t(s)		Power	otal 26 dB ower Bandwidth		Margin	EUT Power
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dB	Setting
5530.0	10.04	10.17			13.12	82.405	22.10	-8.98	9.00
5610.0	17.96	18.39	-		21.19	196.794	22.10	-0.91	18.00
5690.0	14.03	14.34			17.20	235.511	22.10	-4.90	14.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Meas	Test Measurement Results								
Test	Test Measured Conducted Output Power (dBm)		Calculated						
Frequence	у	Po	rt(s)		Total 26 dB Power Bandwidth		Limit	Margin	EUT Power
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting
5500.0	12.57	12.93			15.76	20.120	22.10	-6.34	12.00
5580.0	16.97	18.42			20.77	41.162	22.10	-1.33	18.00
5720.0	17.25	18.36			20.85	40.762	22.10	-1.25	18.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measu	Test Measurement Results								
Test	Test Measured Conducted Output Power (dBm)		Calculated	Minimum	Lineld				
Frequency		Рог	t(s)		Total Power			Margin	EUT Power
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting
5510.0	11.61	11.79	-	-	14.71	40.561	22.10	-7.39	11.00
5550.0	16.83	18.26		-	20.61	85.531	22.10	-1.49	18.00
5710.0	16.19	17.25			19.76	86.533	22.10	-2.34	17.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measu	Test Measurement Results									
Test	Measured Conducted Output Power (dBm)			Calculated Total	Minimum 26 dB	Limit	Margin			
Frequency		Por	rt(s)		Power Bandwidth		Linin	wargin	EUT Power	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5745.0	18.05	18.63			21.36	Not Applicable	30.00	-8.64	18.00	
5785.0	17.79	18.18			21.00	Not Applicable	30.00	-9.00	18.00	
5825.0	16.47	18.07			20.35	Not Applicable	30.00	-9.65	18.00	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Variant:	802.11ac-80	Duty Cycle (%):	98.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measu	Test Measurement Results									
Test	Measured Conducted Output Power (dBm)			Calculated	Minimum 26 dB	1.1				
Frequency		Por	t(s)		Total Power	Bandwidth	Limit	Margin	EUT Power	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting	
5775.0	18.07	18.27			21.18	Not Applicable	28.10	-6.92	18.00	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER				
Measurement Uncertainty:	1.33 dB				



Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test	Test Measurement Results									
				Test Frequency	Calculated Total	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power	
	quonoy		POI	(s)		Power	Danamaan			Setting
N	MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	ootting
57	745.0	17.21	18.34			20.82	Not Applicable	28.10	-7.28	18.00
57	785.0	16.80	18.29			20.62	Not Applicable	28.10	-7.48	18.00
58	825.0	16.58	18.21			20.48	Not Applicable	28.10	-7.62	18.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER				
Measurement Uncertainty:	1.33 dB				



Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results									
Test	Measured Conducted Output Power (dBm)			Calculated	Minimum 26 dB	Linelt			
Frequency		Por	Port(s) Total Power			Bandwidth	Limit	Margin	EUT Power
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dB	Setting
5755.0	16.90	18.12			20.56	Not Applicable	28.10	-7.54	18.00
5795.0	16.67	18.13			20.47	Not Applicable	28.10	-7.63	18.00

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER				
Measurement Uncertainty:	1.33 dB				



1.2. 26 dB & 99% Bandwidth

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Conducted Test Conditions for 26 dB and 99% Bandwidth									
Standard:	FCC CFR 47:15.407	Ambient Temp. (°C):	24.0 - 27.5						
Test Heading: 26 dB and 99 % Bandwidth		Rel. Humidity (%):	32 - 45						
Standard Section(s):	Standard Section(s): 15.407 (a)		999 - 1001						
Reference Document(s):	See Normative References								

Test Procedure for 26 dB and 99% Bandwidth Measurement

The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.

Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test	Measured 26 dB Bandwidth (MHz)		26 dB Bondwidth (MU-)					
Frequency		Port(s)				26 dB Bandwidth (MHz)		
MHz	а	b	С	d	Highest	Lowest		
5180.0	<u>19.719</u>	<u>19.719</u>			19.719	19.719		
5200.0	<u>28.778</u>	<u>25.251</u>			28.778	25.251		
5240.0	<u>32.144</u>	<u>29.739</u>			32.144	29.739		

Test Frequency	M	easured 99% E Por	Bandwidth (MF t(s)	łz)	99% Bandv	vidth (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5180.0	<u>16.673</u>	<u>16.673</u>			16.673	16.673	
5200.0	<u>16.914</u>	<u>16.914</u>	-		16.914	16.914	
5240.0	<u>16.994</u>	<u>16.834</u>			16.994	16.834	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	2.81 dB					



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

ment Results							
Ме	asured 26 dB	Bandwidth (M	Hz)	26 dB Band			
	Por	t(s)			26 dB Bandwidth (MHZ)		
а	b	С	d	Highest	Lowest		
<u>83.687</u>	<u>82.405</u>			83.687	82.405		
M	easured 99% E	Bandwidth (MF	lz)	00% Dand			
	Por	t(s)		99% Bandy	width (WHZ)		
а	b	С	d	Highest	Lowest		
<u>76.633</u>	<u>76.313</u>			76.633	76.313		
	a <u>83.687</u> M	Measured 26 dB Por a b 83.687 82.405 Measured 99% E Por a b	Measured 26 dB Bandwidth (M Port(s) a b c 83.687 82.405 Measured 99% Bandwidth (MH Port(s) a b c	Measured 26 dB Bandwidth (MHz) Port(s) a b c d 83.687 82.405 Measured 99% Bandwidth (MHz) Port(s) Port(s) a b c d	Measured 26 dB Bandwidth (MHz) 26 dB Bandwidth (MHz) Port(s) 26 dB Bandwidth (MHz) a b c d B3.687 82.405 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) 99% Bandwidth (MHz) a b c d	Measured 26 dB Bandwidth (MHz) 26 dB Bandwidth (MHz) Port(s) 26 dB Bandwidth (MHz) a b c d Highest Lowest 83.687 82.405 83.687 82.405 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) a b c d Highest Lowest	Measured 26 dB Bandwidth (MHz) 26 dB Bandwidth (MHz) Port(s) 26 dB Bandwidth (MHz) a b c d Highest Lowest 83.687 82.405 83.687 82.405 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) 99% Bandwidth (MHz) 99% Bandwidth (MHz) Image: Control of the second

Traceability to Industry Recognized Test Methodologies

	Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
	Measurement Uncertainty:	2.81 dB



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test	Me	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)		
Frequency	ency Port(s)	20 0B Banu						
MHz	а	b	С	d	Highest	Lowest		
5180.0	<u>20.120</u>	<u>20.120</u>			20.120	20.120		
5200.0	<u>37.194</u>	<u>21.403</u>			37.194	21.403		
5240.0	<u>21.563</u>	<u>21.563</u>			21.563	21.563		

M	easured 99% E	ed 99% Bandwidth (MHz)					
Port(s)				35 % Danuwiuth (WHZ)			
а	b	С	d	Highest	Lowest		
<u>17.715</u>	<u>17.715</u>			17.715	17.715		
<u>18.036</u>	<u>17.715</u>			18.036	17.715		
<u>17.796</u>	<u>17.796</u>			17.796	17.796		
	a <u>17.715</u> <u>18.036</u>	Por a b <u>17.715</u> <u>17.715</u> <u>18.036</u> <u>17.715</u>	Port(s) a b c <u>17.715</u> <u>17.715</u> <u>18.036</u> <u>17.715</u>	a b c d 17.715 17.715 18.036 17.715	Port(s) 99% Bandw a b c d Highest 17.715 17.715 17.715 18.036 17.715 18.036	Port(s) 99% Bandwidth (MHz) a b c d Highest Lowest 17.715 17.715 17.715 17.715 18.036 17.715 18.036 17.715	Port(s) 99% Bandwidth (MHz) a b c d Highest Lowest 17.715 17.715 17.715 17.715 18.036 17.715 18.036 17.715

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results								
Test	Me	easured 26 dB	Bandwidth (M	Hz)	26 dB Band			
Frequency		Por	t(s)		26 dB Bandwidth (MHz)			
MHz	а	b	С	d	Highest	Lowest		
5190.0	<u>41.202</u>	<u>40.561</u>			41.202	40.561		
5230.0	<u>85.050</u>	<u>55.311</u>			85.050	55.311		
Test	М	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)		
Frequency		Por	t(s)		55% Ballu			

Frequency		Por	t(s)		99% Bandy	viatri (ivinz)	
MHz	а	b	С	d	Highest	Lowest	
5190.0	<u>36.393</u>	<u>36.232</u>			36.393	36.232	
5230.0	<u>38.717</u>	<u>36.393</u>			38.717	36.393	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test	Ме	asured 26 dB	Bandwidth (M	Hz)	26 dB Bondwidth (MU-)		
Frequency	juency Port(s)			26 dB Bandwidth (MHz)			
MHz	а	b	С	d	Highest	Lowest	
5260.0	<u>41.202</u>	<u>30.862</u>			41.202	30.862	
5300.0	<u>38.557</u>	<u>24.609</u>			38.557	24.609	
5320.0	20.361	<u>19.960</u>			20.361	19.960	

Test Frequency	M	easured 99% E Por	Bandwidth (MF t(s)	łz)	99% Bandv	vidth (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5260.0	<u>17.796</u>	<u>16.754</u>			17.796	16.754	
5300.0	<u>17.555</u>	<u>16.834</u>			17.555	16.834	
5320.0	<u>16.673</u>	<u>16.673</u>			16.673	16.673	

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	?2.81 dB



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results							
Ме	asured 26 dB	Bandwidth (M	Hz)	26 dB Band	26 dB Bandwidth (MHz)		
	Por	t(s)		26 06 Bano			
а	b	С	d	Highest	Lowest		
<u>82.405</u>	<u>112.224</u>			112.224	82.405		
					•		
M	easured 99% E	Bandwidth (MF	lz)	00% Dand			
	Por	t(s)		99% Bandy	wiath (WHZ)		
а	b	С	d	Highest	Lowest		
<u>76.633</u>	<u>76.313</u>			76.633	76.313		
	Me <u>82.405</u> Ma	Measured 26 dB Por a b 82.405 112.224 Measured 99% E Por a b	Measured 26 dB Bandwidth (M Port(s) a b c 82.405 112.224 Measured 99% Bandwidth (MH Port(s) a b c	Measured 26 dB Bandwidth (MHz) Port(s) a b c d 82.405 112.224 Measured 99% Bandwidth (MHz) Port(s) Port(s) a b c d	Measured 26 dB Bandwidth (MHz) 26 dB Bandwidth (MHz) Port(s) 26 dB Bandwidth (MHz) a b c d 82.405 112.224 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) 99% Bandwidth (MHz) a b c d	Measured 26 dB Bandwidth (MHz) 26 dB Bandwidth (MHz) Port(s) a b c d Highest Lowest 82.405 112.224 112.224 82.405 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) a b c d Highest Lowest	Measured 26 dB Bandwidth (MHz) 26 dB Bandwidth (MHz) Port(s) 26 dB Bandwidth (MHz) a b c d Highest Lowest 82.405 112.224 112.224 82.405 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) a b c d Highest Lowest

Traceability to Industry Recognized Test Methodologies

	Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
	Measurement Uncertainty:	2.81 dB



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measure	Test Measurement Results									
Test	Me	asured 26 dB	Bandwidth (M	Hz)						
Frequency	Port(s)			26 dB Bandwidth (MHz)						
MHz	а	b	С	d	Highest	Lowest				
5260.0	<u>41.443</u>	<u>30.301</u>			41.443	30.301				
5300.0	<u>29.659</u>	<u>29.659</u>			29.659	29.659				
5320.0	<u>20.120</u>	<u>20.200</u>			20.200	20.120				
					•					

Test	M	easured 99% E	Bandwidth (MF	lz)	99% Bandv	vidth (MHz)	
Frequency	Port(s)						
MHz	а	b	c	d	Highest	Lowest	
5260.0	<u>17.916</u>	<u>16.834</u>			17.916	16.834	
5300.0	<u>16.834</u>	<u>16.834</u>	-		16.834	16.834	
5320.0	<u>17.715</u>	<u>17.715</u>			17.715	17.715	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	?2.81 dB				



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test	Me	asured 26 dB	Bandwidth (M	Hz)	26 dB Band			
Frequency	Port(s)				26 06 Bano	26 dB Bandwidth (MHz)		
MHz	а	b	С	d	Highest	Lowest		
5270.0	<u>75.992</u>	<u>72.946</u>			75.992	72.946		
5310.0	<u>41.363</u>	<u>43.447</u>			43.447	41.363		
Test	М	easured 99% E	Bandwidth (MF	lz)	00% Bandy	width (MHz)		
Frequency	Port(s)			99% Bandy				

Frequency		Por	t(s)		99% Banuv		
MHz	а	b	С	d	Highest	Lowest	
5270.0	<u>37.675</u>	<u>36.874</u>			37.675	36.874	
5310.0	<u>36.393</u>	<u>36.232</u>			36.393	36.232	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	2.81 dB					



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measure	Test Measurement Results									
Test	t Measured 26 dB Bandwidth (MHz)									
Frequency	Port(s)				26 dB Bandwidth (MHz)					
MHz	а	b	С	d	Highest	Lowest				
5500.0	<u>19.880</u>	<u>20.040</u>			20.040	19.880				
5580.0	<u>38.156</u>	<u>36.072</u>			38.156	36.072				
5720.0	<u>38.036</u>	<u>35.912</u>			38.036	35.912				

Test Frequency	M	easured 99% E Por	,	łz)	99% Bandv	vidth (MHz)	
MHz	а	b	с	d	Highest	Lowest	
5500.0	<u>16.673</u>	<u>16.673</u>			16.673	16.673	
5580.0	<u>19.118</u>	<u>17.315</u>			19.118	17.315	
5720.0	<u>20.321</u>	<u>17.395</u>			20.321	17.395	

Traceability to Industry Recognized Test Methodologies						
Work Instruction: WI-03 MEASURING RF SPECTRUM MASK						
Measurement Uncertainty:	2.81 dB					



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measure	Test Measurement Results									
Test	Ме	asured 26 dB	Bandwidth (M	Hz)	26 dB Bandwidth (MHz)					
Frequency		Por	t(s)							
MHz	а	b	с	d	Highest	Lowest				
5530.0	<u>82.405</u>	<u>82.405</u>			82.405	82.405				
5610.0	<u>196.794</u>	<u>199.599</u>			199.599	196.794				
5690.0	<u>151.343</u>	<u>166.253</u>			166.253	151.343				
								1		

Test	M	easured 99% E	Bandwidth (MF	łz)	99% Bandwidth (MHz)		
Frequency	Port(s)				35% Danuwiutii (WITZ)		
MHz	а	b	С	d	Highest	Lowest	
5530.0	<u>76.313</u>	<u>76.313</u>			76.313	76.313	
5610.0	<u>99.399</u>	<u>92.986</u>			99.399	92.986	
5690.0	<u>77.435</u>	<u>76.954</u>			77.435	76.954	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	2.81 dB					



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test	Me	asured 26 dB	Bandwidth (M	Hz)	- 26 dB Bandwidth (MHz)		
Frequency		Por	t(s)				
MHz	а	b	С	d	Highest	Lowest	
5500.0	<u>20.120</u>	<u>20.361</u>			20.361	20.120	
5580.0	<u>41.804</u>	<u>41.162</u>			41.804	41.162	
5720.0	<u>42.926</u>	<u>40.762</u>			42.926	40.762	

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				99% Bandv	vidth (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5500.0	<u>17.635</u>	<u>17.715</u>			17.715	17.635	
5580.0	<u>23.327</u>	<u>19.118</u>	-		23.327	19.118	
5720.0	<u>23.086</u>	<u>19.238</u>			23.086	19.238	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	2.81 dB					



Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test	Ме	asured 26 dB	Bandwidth (M	26 dB Band	26 dB Bandwidth (MU-)			
Frequency		Ροι	rt(s)		26 dB Bandwidth (MHz)			
MHz	а	b	с	d	Highest	Lowest		
5510.0	<u>42.164</u>	<u>40.561</u>			42.164	40.561		
5550.0	<u>93.407</u>	<u>85.531</u>			93.407	85.531		
5710.0	<u>89.659</u>	86.533			89.659	86.533		

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				99% Bandv	vidth (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5510.0	<u>36.553</u>	<u>36.393</u>			36.553	36.393	
5550.0	<u>50.261</u>	<u>38.076</u>	-		50.261	38.076	
5710.0	<u>51.363</u>	<u>38.677</u>			51.363	38.677	

Traceability to Industry Recognized Test Methodologies						
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK					
Measurement Uncertainty:	2.81 dB					



1.3. 6 dB & 99% Bandwidth

MiC@MLabs.

Conducted Test Conditions for 6 dB and 99% Bandwidth							
Standard:	FCC CFR 47:15.407	CC CFR 47:15.407 Ambient Temp. (°C): 24.0 - 27.5					
Test Heading:	6 dB and 99 % Bandwidth	Rel. Humidity (%):	32 - 45				
Standard Section(s):	15.407 (a)	Pressure (mBars):	999 - 1001				
Reference Document(s):	See Normative References						

Test Procedure for 6 dB and 99% Bandwidth Measurement

The bandwidth at 6 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to 100 kHz. Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.



Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test	Me	easured 6 dB E	Bandwidth (MF	łz)	C dB Bandwidth (MUs)			
Frequency		Por	t(s)	6 dB Bandwidth (MHz)				
MHz	а	b	С	d	Highest	Lowest		
5745.0	<u>16.353</u>	<u>16.353</u>			16.353	16.353		
5785.0	<u>16.353</u>	<u>16.353</u>			16.353	16.353		
5825.0	<u>16.353</u>	<u>16.353</u>			16.353	16.353		

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				99% Bandv	vidth (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5745.0	<u>17.315</u>	<u>16.513</u>			17.315	16.513	
5785.0	<u>17.315</u>	<u>16.834</u>	-		17.315	16.834	
5825.0	<u>17.154</u>	<u>16.834</u>			17.154	16.834	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	98.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

ment Results							
Me	easured 6 dB I	Bandwidth (MF					
	Por	t(s)		6 OB Banov			
а	b	С	d	Highest	Lowest		
<u>75.752</u>	<u>75.752</u>			75.752	75.752		
M	easured 99% E	Bandwidth (MF	lz)				
	Por	t(s)		99% Bandwidth (MHz)			
а	b	С	d	Highest	Lowest		
<u>90.180</u>	<u>77.355</u>			90.180	77.355		
	м а 75.752 Ма	Measured 6 dB I Por a b 75.752 75.752 Measured 99% E Por a b	Measured 6 dB Bandwidth (MH Port(s) a b c 75.752 75.752 Measured 99% Bandwidth (MH Port(s) a b c	Measured 6 dB Bandwidth (MHz) Port(s) a b c d 75.752 75.752 Measured 99% Bandwidth (MHz) Port(s) a b c a b c d	Measured 6 dB Bandwidth (MHz) 6 dB Bandwidth (MHz) Port(s) a b c d Highest 75.752 75.752 75.752 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) 99% Bandwidth (MHz) a b c d	Measured 6 dB Bandwidth (MHz) 6 dB Bandwidth (MHz) Port(s) a b c d Highest Lowest 75.752 75.752 75.752 75.752 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) a b c d Highest Lowest A lowest	Measured 6 dB Bandwidth (MHz) 6 dB Bandwidth (MHz) Port(s) a b c d Highest Lowest 75.752 75.752 75.752 75.752 Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz) Port(s) a b c d Highest Lowest A lowest

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB



Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results								
Test	Me	easured 6 dB E	Bandwidth (MF	łz)	6 dB Bandwidth (MHz)			
Frequency		Por	t(s)		6 UB Ballu			
MHz	а	b	С	d	Highest	Lowest		
5745.0	<u>17.555</u>	<u>17.555</u>			17.555	17.555		
5785.0	<u>17.635</u>	<u>17.635</u>			17.635	17.635		
5825.0	<u>17.555</u>	<u>17.555</u>			17.555	17.555		

Test	M	easured 99% E	sured 99% Bandwidth (MHz)		width (MHz)		
Frequency	Port(s)				99% Bandwidth (MHz)		
MHz	а	b	с	d	Highest	Lowest	
5745.0	<u>19.078</u>	<u>18.036</u>			19.078	18.036	
5785.0	<u>18.517</u>	<u>17.956</u>			18.517	17.956	
5825.0	<u>18.357</u>	<u>18.036</u>			18.357	18.036	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				



5755.0

5795.0

37.355

36.393

Title: Hewlett Packard Enterprise, Aruba User Experience Insight To: FCC Part 15 Subpart C 15.407 (NII) Serial #: HPEN141-U6 Rev A (Wi-Fi)

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test	Measured 6 dB Bandwidth (MHz)				6 dB Bandwidth (MHz)		
Frequency	Port(s)						
MHz	а	b	С	d	Highest	Lowest	
5755.0	<u>35.591</u>	<u>35.431</u>			35.591	35.431	
5795.0	<u>35.752</u>	<u>35.752</u>			35.752	35.752	
				•			1
Test	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)		
Frequency	Port(s)						
MHz	а	b	с	d	Highest	Lowest	

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				

37.355

36.393

36.713

36.393

Note: click the links in the above matrix to view the graphical image (plot).

36.713

36.393

1.4. Power Spectral Density

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Conducted Test Conditions for Power Spectral Density						
Standard:	CC CFR 47:15.407 Ambient Temp. (°C): 24.0 - 27.5					
Test Heading:	Power Spectral Density	Rel. Humidity (%):	32 - 45			
Standard Section(s):	15.407 (a)	5.407 (a) Pressure (mBars): 999 - 10				
Reference Document(s):	See Normative References					

Test Procedure for Power Spectral Density

The in-band power spectral density was measured using the test technique specified in KDB 789033. A 1 MHz measurement bandwidth was implemented for the analyzer sweep. Once the sweep is complete the analyzer trace data is downloaded and used for post processing purposes.

Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured separately. The Peak Power Spectral Density is the highest level found across the emission bandwidth. With multiple antenna port measurements the numerical analyzer data from each port is summed (å) and a link to this additional graphic is provided.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with multiple transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were post processed and the resulting numerical and graphical data presented.

NOTE: It may be observed that spectrum in some plots break the limit line however this in itself does NOT constitute a failure. In all cases a spectrum summation plot is provided in order to prove compliance. A failure occurs only after the summation of all spectrum plots have been summed and are found to be greater than the limit line.

Supporting Information

Calculated Power = A + 10 log (1/x) dBm A = Total Power Spectral Density $[10*Log10 (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})]$ x = Duty Cycle

Limits Power Spectral Density

Operating Frequency Band 5150-5250 MHz

15.407 (a)(1)

(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.

Operating Frequency Band 5250-5350 and 5470 - 5725 MHz

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 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.

Operating Frequency Band 5725 – 5850 MHz

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 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.



Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test	Ν	leasured Power	Spectral Densit	y	Summation Peak Marker +		
Frequency	Port(s) (dBm/MHz)			DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5180.0	<u>2.242</u>	<u>-1.566</u>			<u>3.795</u>	17.0	-13.2
5200.0	<u>4.152</u>	<u>4.047</u>			<u>7.179</u>	17.0	-9.8
5240.0	<u>4.110</u>	<u>4.037</u>			<u>7.159</u>	17.0	-9.9

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurem	ent Results						
Measured Power Spectral Density				Summation Peak Marker +			
Frequency	Port(s) (dBm/MHz)				DCCF (+0.56 dB)	Limit	Margin
MHz	а	a b c d			dBm/MHz	dBm/MHz	dB
5210.0	<u>-7.631</u>	<u>-8.115</u>			<u>-4.381</u>	15.1	-19.5

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Measured Power Spectral Density					Summation		
Test Frequency	Port(s) (dBm/MHz)			Peak Marker + DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5180.0	<u>1.074</u>	<u>-1.652</u>			<u>3.008</u>	15.1	-12.1
5200.0	<u>4.000</u>	<u>2.080</u>			<u>6.196</u>	15.1	-8.9
5240.0	<u>4.005</u>	<u>2.212</u>			<u>6.275</u>	15.1	-8.8

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Teet	Measured Power Spectral Density Summa						
Test Frequency	Port(s) (dBm/MHz)			Peak Marker + DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5190.0	<u>-4.890</u>	<u>-4.522</u>			<u>-1.619</u>	15.1	-16.7
5230.0	<u>-0.886</u>	<u>-0.853</u>			<u>2.217</u>	15.1	-12.9

Traceability to Industry Recognized Test Methodologies

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	Work Instruction: WI-03 MEASURING RF SPECTRUM MASK	
Mea	asurement Uncertainty: 2.81 dB	

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test	N	leasured Power	Spectral Densit	y	Summation Peak Marker +		
Test Frequency	Port(s) (dBm/MHz)				DCCF (+0.09 dB)	Limit	Margin
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5260.0	<u>1.768</u>	<u>3.929</u>			<u>6.069</u>	11.0	-4.9
5300.0	<u>1.679</u>	<u>3.903</u>			<u>6.012</u>	11.0	-5.0
5320.0	<u>0.709</u>	<u>-2.624</u>			<u>2.394</u>	11.0	-8.6

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	?2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results									
Measured Power Spectral Density					Summation Peak Marker +				
Frequency	Port(s) (dBm/MHz)			DCCF (+0.56 dB)	Limit	Margin			
MHz	а	a b c d				dBm/MHz	dB		
5290.0	<u>-10.181</u>	<u>-11.284</u>		<u>-7.275</u>	9.1	-16.4			

Traceability to Industry Recognized Test Methodologies					
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK				
Measurement Uncertainty:	2.81 dB				

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Test Frequency Port(s) (dBm/MHz)					Limit	Margin
inequency					DCCF (+0.09 dB)		
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5260.0	<u>1.875</u>	<u>3.812</u>			<u>6.018</u>	9.1	-3.1
5300.0	<u>1.744</u>	<u>3.890</u>		-	<u>6.002</u>	9.1	-3.1
5320.0	<u>-0.320</u>	<u>-4.724</u>			<u>1.096</u>	9.1	-8.0

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test	N	leasured Power	Spectral Densit	Summation Peak Marker +			
Test Frequency	Port(s) (dBm/MHz)			DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5270.0	<u>0.114</u>	<u>2.023</u>			<u>4.222</u>	9.1	-4.9
5310.0	<u>-4.252</u>	<u>-7.772</u>			<u>-2.632</u>	9.1	-11.7

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test	Ν	Measured Power Spectral Density			Summation Peak Marker +		
Frequency				DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5500.0	<u>0.395</u>	<u>-3.211</u>			<u>2.053</u>	11.0	-9.0
5580.0	<u>2.716</u>	<u>3.826</u>			<u>6.363</u>	11.0	-4.6
5720.0	<u>2.985</u>	<u>3.580</u>			<u>6.350</u>	11.0	-4.7

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	88.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test	N	Measured Power Spectral Density			Summation		
Test Frequency	Port(s) (dBm/MHz)			Peak Marker + DCCF (+0.56 dB)	Limit	Margin	
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5530.0	<u>-12.007</u>	<u>-11.498</u>			<u>-8.358</u>	9.1	-17.5
5610.0	<u>-3.371</u>	<u>-2.744</u>			<u>0.387</u>	9.1	-8.7
5690.0	<u>-3.542</u>	<u>-3.018</u>			<u>0.166</u>	9.1	-8.9

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test	N	Measured Power Spectral Density			Summation Peak Marker +		
Frequency	Port(s) (dBm/MHz)			DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5500.0	<u>-1.916</u>	<u>-1.870</u>			<u>1.200</u>	9.1	-7.9
5580.0	<u>2.798</u>	<u>3.883</u>			<u>6.441</u>	9.1	-2.7
5720.0	<u>2.807</u>	<u>3.605</u>			<u>6.251</u>	9.1	-2.9

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test	Measured Power Spectral Density			Summation Peak Marker +			
Frequency				DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5510.0	<u>-6.294</u>	<u>-6.593</u>			<u>-3.416</u>	9.1	-12.5
5550.0	<u>0.125</u>	<u>1.076</u>			<u>3.725</u>	9.1	-5.4
5710.0	<u>0.482</u>	<u>0.705</u>			<u>3.621</u>	9.1	-5.5

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	98.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	Not Applicable
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test	Measured Power Spectral Density						
Frequency	cy Port(s) (dBm/500 KHz)			Peak Marker + DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/500 KHz	dBm/500 KHz	dB
5745.0	<u>0.743</u>	<u>-6.955</u>			<u>1.488</u>	30.0	-28.5
5785.0	<u>0.404</u>	<u>0.811</u>			<u>3.711</u>	30.0	-26.3
5825.0	<u>-0.953</u>	<u>0.538</u>			<u>2.931</u>	30.0	-27.1

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	98.0
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results							
Measured Power Spectral Density					Summation Peak Marker +		
Frequency	Port(s) (dBm/500 KHz)			DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/500 KHz	dBm/500 KHz	dB
5775.0	<u>-7.018</u>	<u>-5.451</u>			<u>0.075</u>	28.1	-28.0

Traceability to Industry Recognized Test Methodologies				
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK			
Measurement Uncertainty:	2.81 dB			

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	98.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

Test Frequency				Summation Peak Marker + DCCF (+0.09	Limit	Margin	
MHz	а	b	С	d	dB) dBm/500 KHz	dBm/500 KHz	dB
5745.0	<u>-0.538</u>	<u>0.776</u>			<u>3.267</u>	28.1	-24.8
5785.0	<u>-0.897</u>	<u>0.600</u>			<u>2.965</u>	28.1	-25.1
5825.0	<u>-1.137</u>	<u>0.412</u>			<u>2.732</u>	28.1	-25.4

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor



Equipment Configuration for Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	98.0
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	4.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	3.00
TPC:	Not Applicable	Tested By:	GMH
Engineering Test Notes:	Mac Address 204C0380E4BE		

Test Measurement Results

T = = 4	N	leasured Power	Spectral Densit	Summation			
Test Frequency	Port(s) (dBm/500 KHz)			Peak Marker + DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/500 KHz	dBm/500 KHz	dB
5755.0	<u>-3.331</u>	<u>-1.869</u>			<u>0.486</u>	28.1	-27.6
5795.0	<u>-3.940</u>	<u>-2.196</u>			<u>0.037</u>	28.1	-28.1

Traceability to Industry Recognized Test Methodologies

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Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

1.5. Frequency Stability

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Test Procedure

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore, all RF signals should have better than ±20ppm stability.

This stability accounts for room temperature tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

 \pm 20ppm at 5.250 GHz translates to a maximum frequency shift of \pm 105 KHz. As the channel band-edge is at least 1 MHz from either of the band edges, \pm 105 KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

Specification

Limits

§15.407 (g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

1.6. Dynamic Frequency Selection (DFS)

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Test Conditions for Dynamic Frequency Selection (DFS)					
Standard:	FCC 15.407	Ambient Temp. (°C):	20.0 - 24.5		
Test Heading:	Dynamic Frequency Selection (DFS)	Rel. Humidity (%):	32 - 45		
Standard Section(s):	KDB 905462	Pressure (mBars):	999 - 1001		
EUT Type:	Slave w/ Radar Detection	Frequency Bands:	5,250 – 5,350 MHz 5,470 – 5,725 MHz		
Test Environment:	Radiated	Antenna Gain used for Testing:	0 dBi		
Detection Threshold:		a Test Radar Level: n/a (Threshold + Gain)			
Number of Antenna Chains:	2	Duty Cycle Target: ≥ 30.00%			
802.11a Transmit Power:	+15 dBm	Minimum Data Rate:	6 Mbit/s		
802.11ac-80 Transmit Power:	+15 dBm	Minimum Data Rate:	MCS0		
Uniform Loading:	For the above frequency band(s) the manufacturer declared that the device provides an aggregate uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.				
Communication Method:	The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is used during this video stream.				
Engineer Notes:					
Reference Document(s):	See Normative References				

Client Devices

a) A Client Device will not transmit before having received appropriate control signals from a Master Device.

b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.

c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.

d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client nonoccupancy period test. For devices that shutdown (rather than moving channels), no beacons should appear.

1.6.1. DFS Detection Thresholds

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The table below provides the DFS Detection Thresholds for Master Devices as well as Client Devices incorporating In-Service Monitoring.

DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (see Notes 1, 2 and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP > 200 milliwatt and power density &It10 dBm/MHz	-62 dBm
EIRP > 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

NOTE 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna

NOTE 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

NOTE 3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

1.6.2. <u>Response Requirements</u>

The following table provides the response requirements for Master and Client Devices incorporating DFS.

DFS Response Requirement Values

Parameter	Value
Non-Occupancy Period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds, see NOTE 1
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period, see NOTES 1 and 2
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth, see NOTE 3

NOTE 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

NOTE 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

NOTE 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

1.6.3. Radar Test Waveforms

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This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

1.6.3.1. Short Radar Pulses

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µS)	PRI (µS)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials	
0	1	1428	18	See Note 1	See Note 1	
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a Test B: 15 unique PRI values randomly selected in the range 518- 3066 μ S, with a minimum increment of 1 μ S, excluding PRI values selected in Test A	$\operatorname{Roundup} \left\{ \begin{pmatrix} \frac{1}{360} \end{pmatrix}, \\ \begin{pmatrix} \frac{19 \cdot 10^6}{\operatorname{PRI}_{\mu \operatorname{sec}}} \end{pmatrix} \right\}$	60%	30	
2	1-5	150-230	23-29	60%	30	
3	6-10	200-500	16-18	60%	30	
4	11-20	200-500	12-16	60%	30	
Aggrega	Aggregate (Radar Types 1-4)80%120					

Note 1: Short Radar Pulse Type 0 should be used for the Detection Bandwidth test, Channel Move Time and Channel Closing Time tests

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous in Tests A or B.

1.6.3.2. Long Radar Pulse Test

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Long Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

1. The transmission period for the Long Pulse Radar test signal is 12 seconds.

2. There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst Count.

3. Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.

4. The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.

5. Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Bursts may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.

6. If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.

7. The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

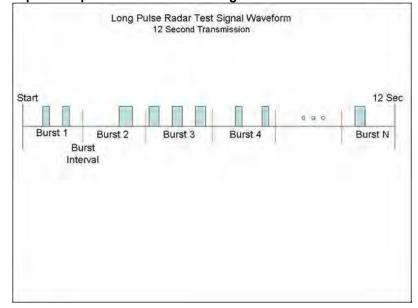
A representative example of a Long Pulse radar test waveform:

1. The total test signal length is 12 seconds.

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- 2. 8 Bursts are randomly generated for the Burst_Count
- 3. Burst 1 has 2 randomly generated pulses.
- 4. The pulse width (for both pulses) is randomly selected to be 75 microseconds.
- 5. The PRI is randomly selected to be at 1213 microseconds.
- 6. Bursts 2 through 8 are generated using steps 3 5.

7. Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).



Graphical representation of the Long Pulse Radar Test Waveform.



1.6.3.3. Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

1.6.4. Radar Waveform Calibration

The following equipment setup was used to calibrate the Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.

The signal generator amplitude was set so that the power level measured at the spectrum analyzer was equal to the DFS detection threshold +1dB (Ref Section 9.2).

1.6.5. Channel Close / Transmission Time

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The steps below define the procedure to determine the above-mentioned parameters when a radar burst with a level of up to 10 dB above the DFS Detection threshold is injected on the Operating Channel of the EUT.

Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time results to the limits defined in the DFS Response requirement values table.

Channel Closing Transmission Time - Measurement

The reference radar signature was introduced to the EUT, from which a 11 second transmission record was captured, as well as 1000ms of pre-trigger data. The Reference radar type was triggered to play at the exact time allowing the end of the pulse to occur at time t=0.

The system was setup to capture data for all transmission events above a given threshold level as determined and adjusted by the test engineer. The system time stamps all captured events with respect to T0 (zero time indicating the start of the measurement sequence) starting at the end of the radar pulse indicated by the purple vertical marker line in the Plot (on the next page).

The system captured data over a 12 second period at 10 points per microsecond. The data is analyzed by counting all "bursts" that occur above the threshold limit and aggregating the time each burst is on. The data is then compressed for presentation in one 12 second segment showing all of the activity recorded over the period.

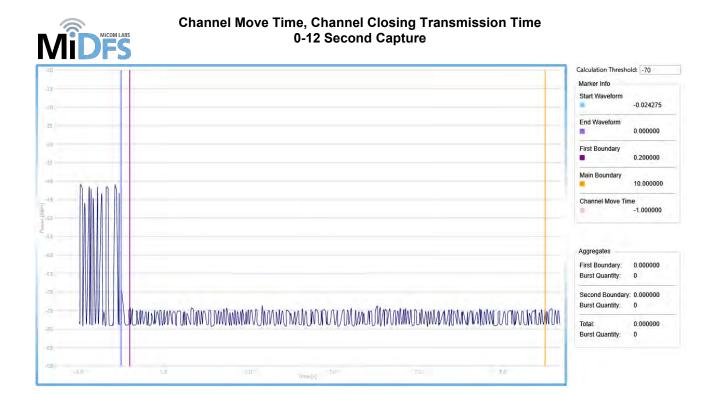


802.11ac-80 Channel 5530 MHz; Observed Frequency 5500 MHz

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The system measures and aggregates the pulses occurring after the end of the radar pulse to determine the following parameters: -

Test Heading	Time (Secs)	Limit (Secs)	Status
Channel Closing Transmission Time	0.000000	0.260	Complies
Channel Move Time	0.000000	10.0	Complies



1.6.6. Non-Occupancy Period

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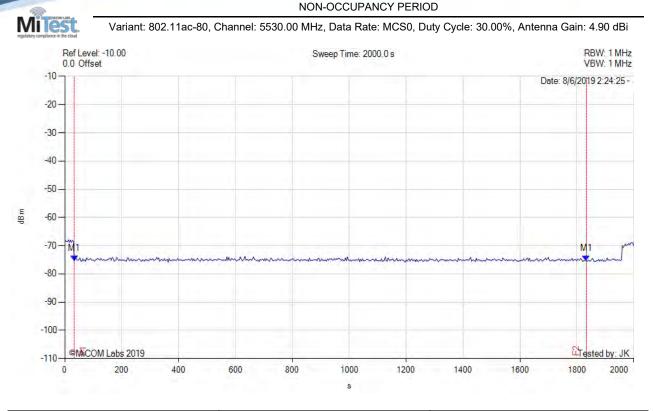
The EUT is monitored for more than 30 minutes following the channel close/move time to verify no transmissions resume on this Channel.

The device when triggered by the radar signature vacates the channel for a minimum period of 30 minutes per the standard. During this period the device can (assuming compliance to full DFS regulations) move to another frequency channel. It could also remain on the same channel and if this is the case the transmitter must remain muted for a period of 30 minutes.

If the transmitter has moved to another channel it cannot return and transmit on the original channel for an elapsed period of 30 minutes.

In the measured plots the period between the vertical frequency lines F1 and F2 = 30 minutes and therefore no EUT transmissions should occur between these two markers.





Analyzer Setup	Marker:Time:Amplitude	Test Results
Detector = POS	M1 : 33.333 s : -75.330 dBm	Observed Frequency: 5500.00 MHz
Sweep Count = View	M1 : 1833.333 s : -75.500 dBm	F2 – F1 = 1833.333 s – 33.333 s = 1800 s
RF Atten (dB) = 0		
Trace Mode = 0		

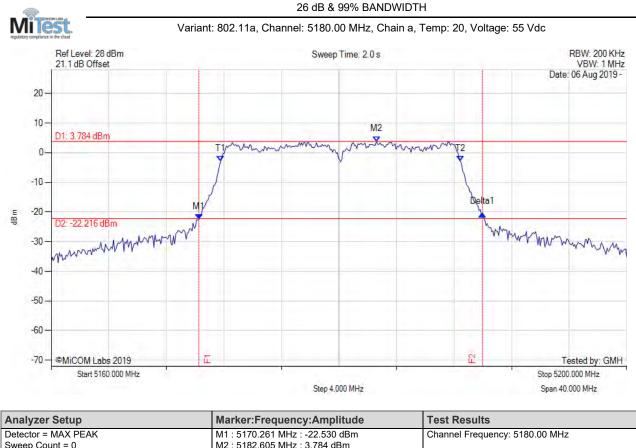


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A. APPENDIX - GRAPHICAL IMAGES

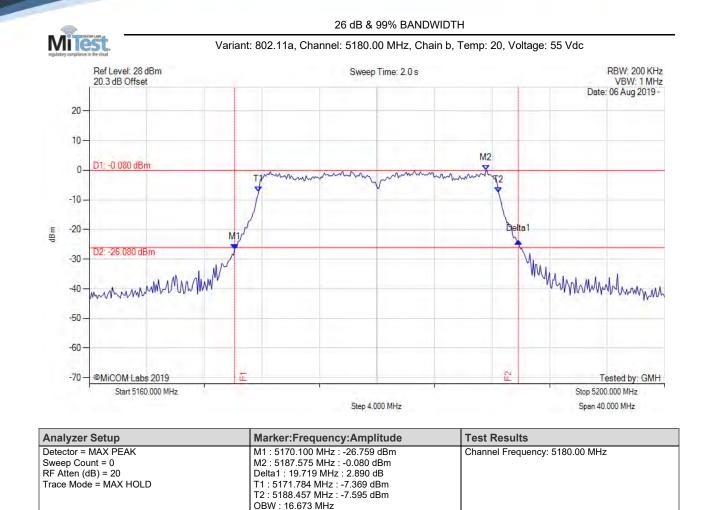
A.1. 26 dB & 99% Bandwidth

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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5170.261 MHz : -22.530 dBm	Channel Frequency: 5180.00 MHz
Sweep Count = 0	M2 : 5182.605 MHz : 3.784 dBm	
RF Atten (dB) = 20	Delta1 : 19.719 MHz : 1.928 dB	
Trace Mode = MAX HOLD	T1 : 5171.784 MHz : -2.911 dBm	
	T2 : 5188.457 MHz : -2.945 dBm	
	OBW : 16.673 MHz	

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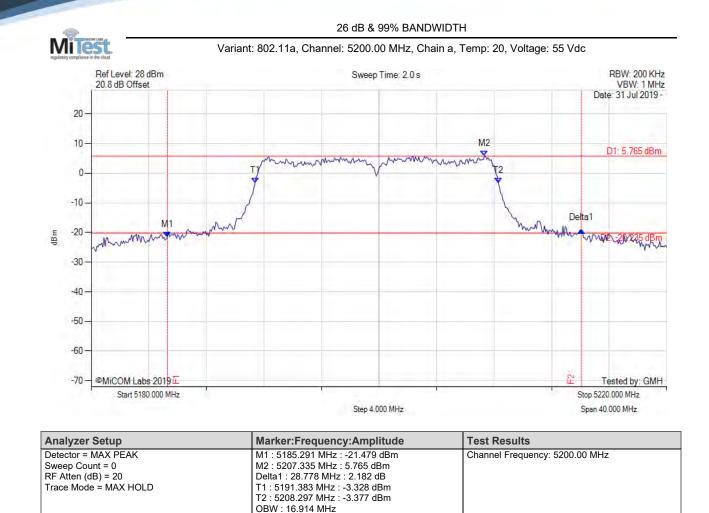


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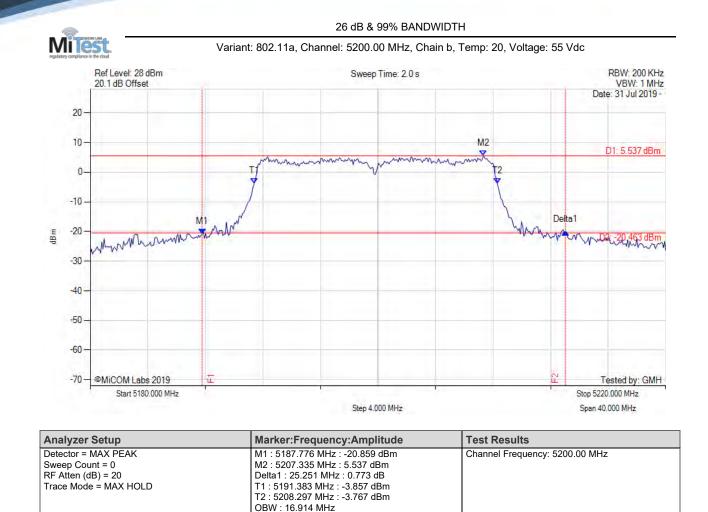
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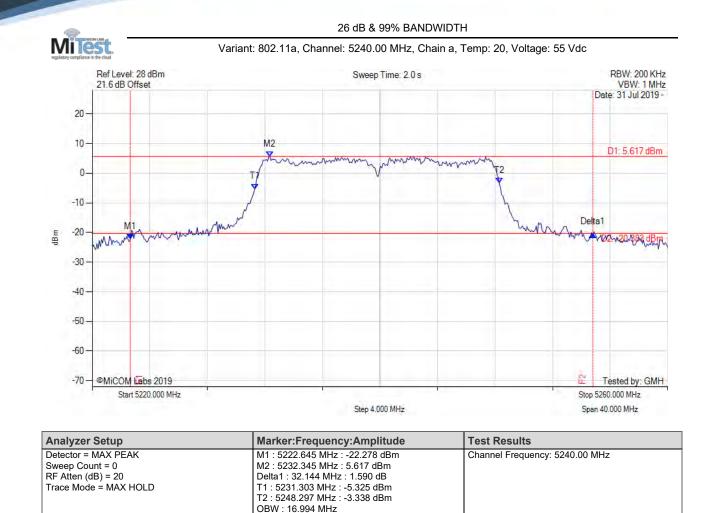
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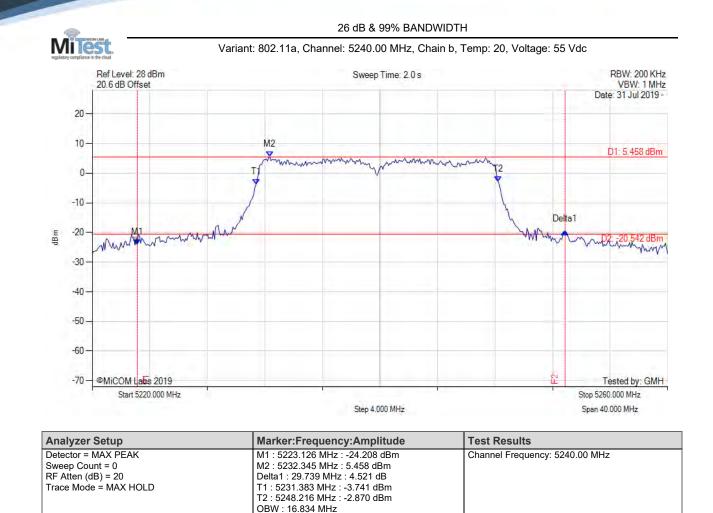
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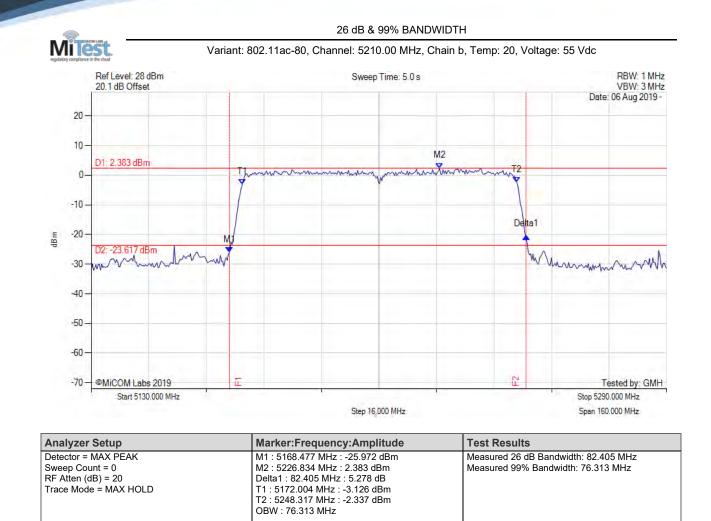


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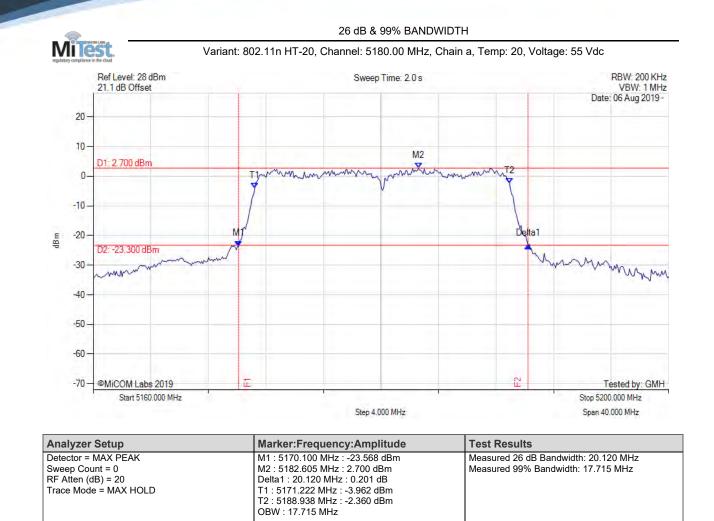
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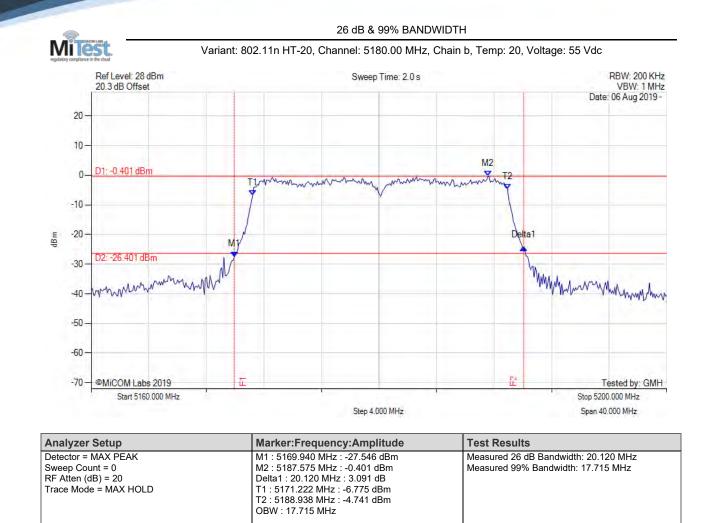
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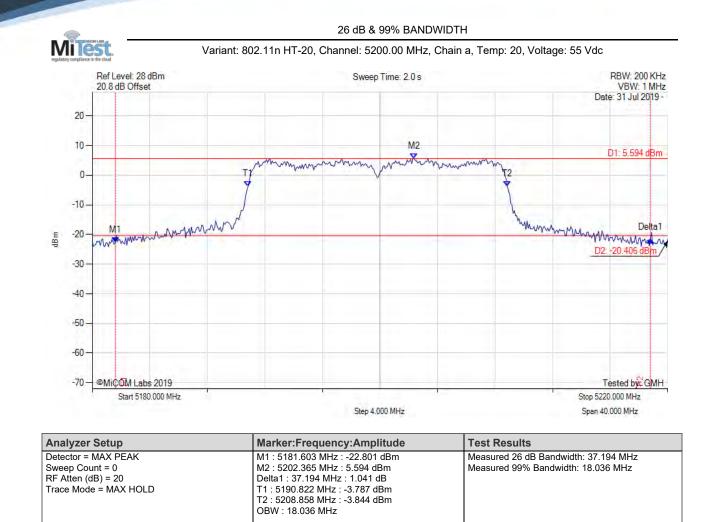
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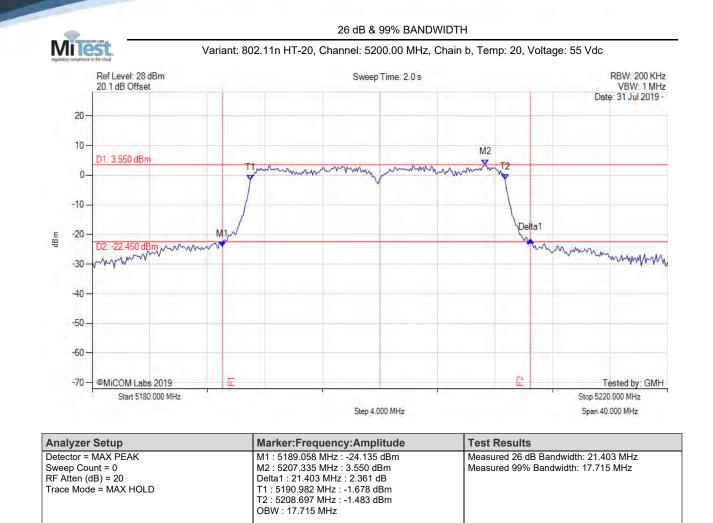
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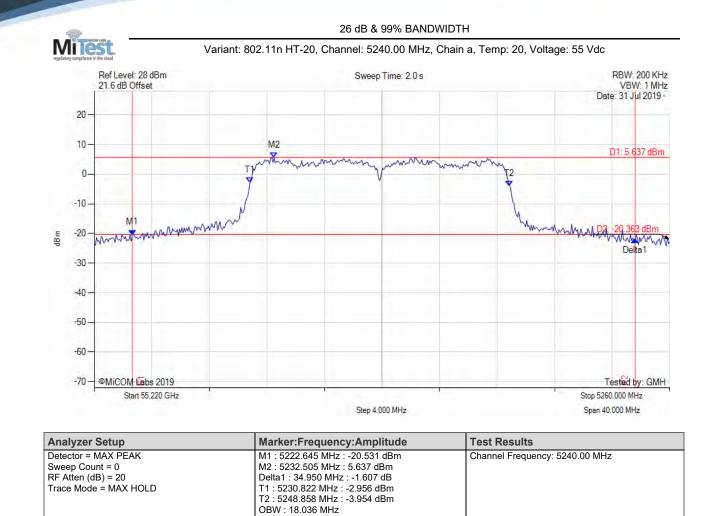
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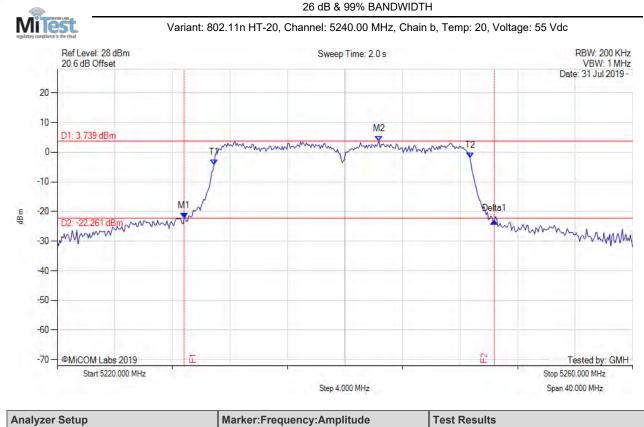
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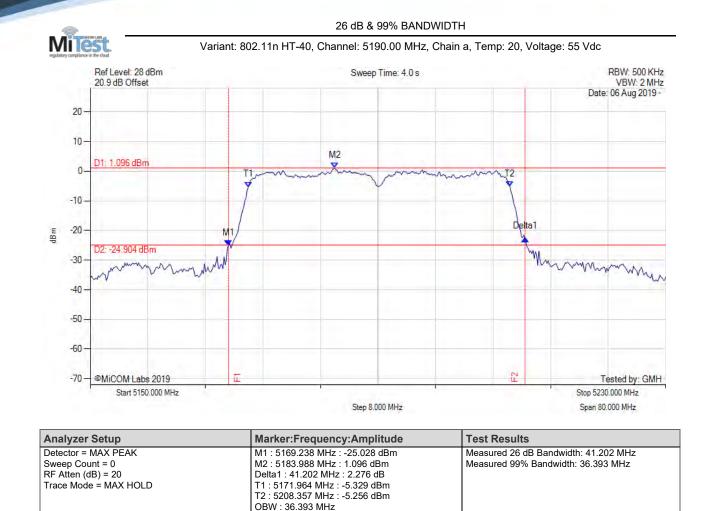


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK		Measured 26 dB Bandwidth: 21.563 MHz
Sweep Count = 0	ERROR!!! MULTIPLE TEST RESULTS MATCHES	Measured 99% Bandwidth: 17.796 MHz
RF Atten (dB) = 20		ERROR!!! MULTIPLE TEST RESULTS
Trace Mode = MAX HOLD		MATCHES

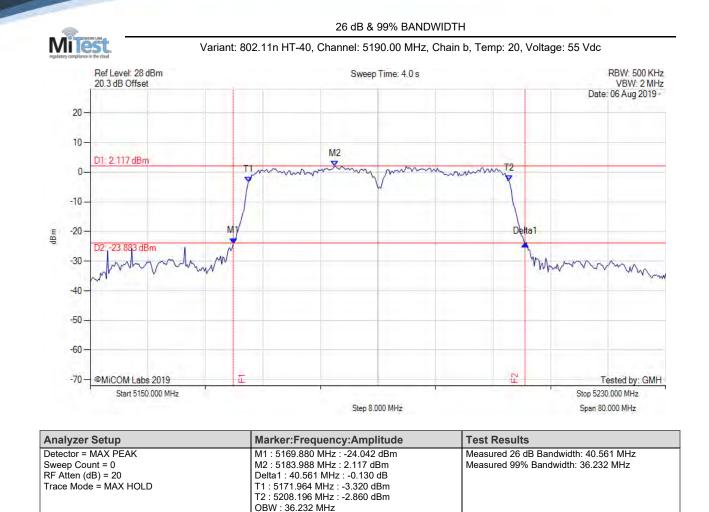
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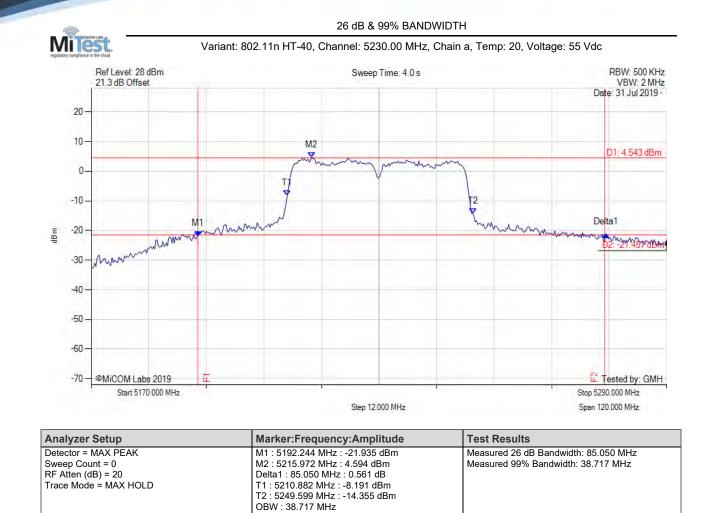


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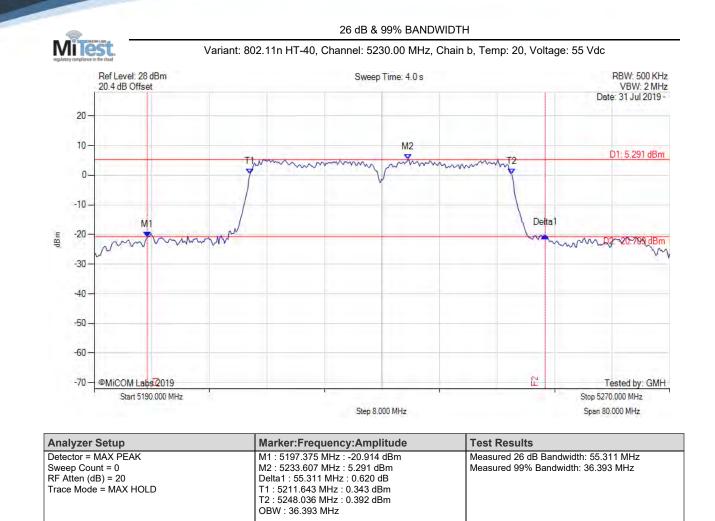
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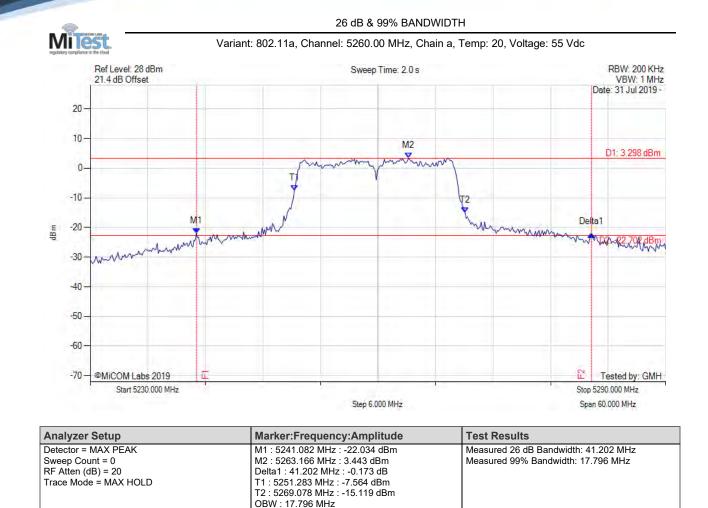
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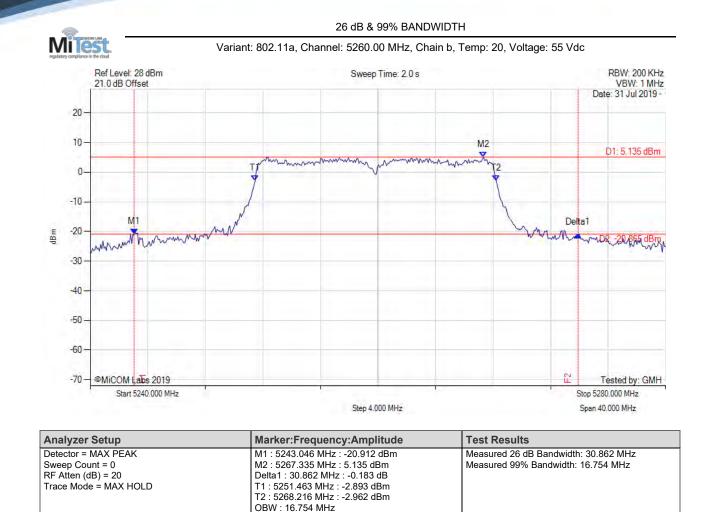
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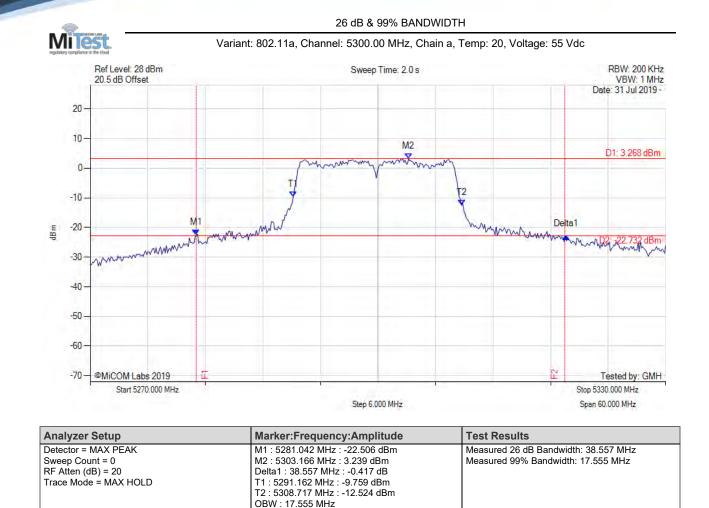
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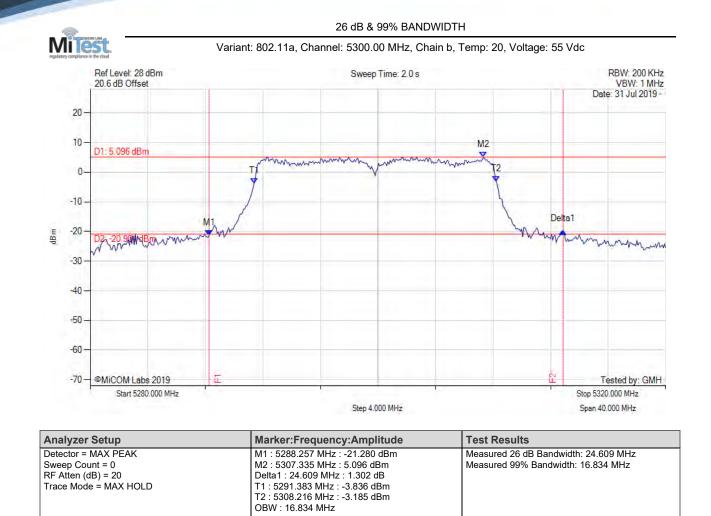


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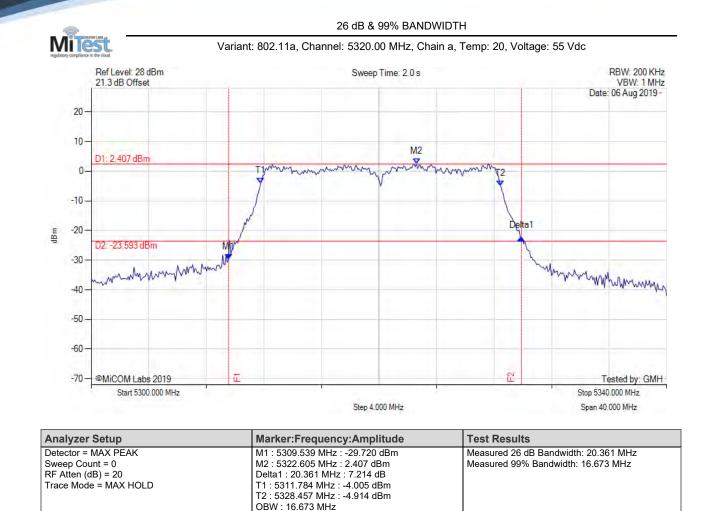


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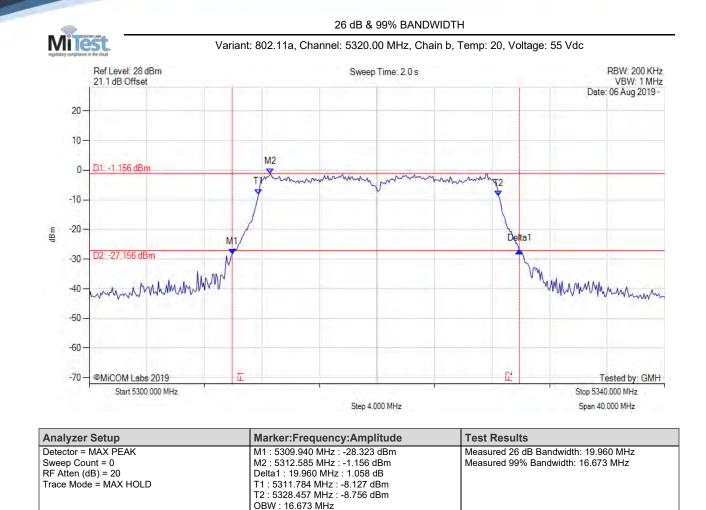
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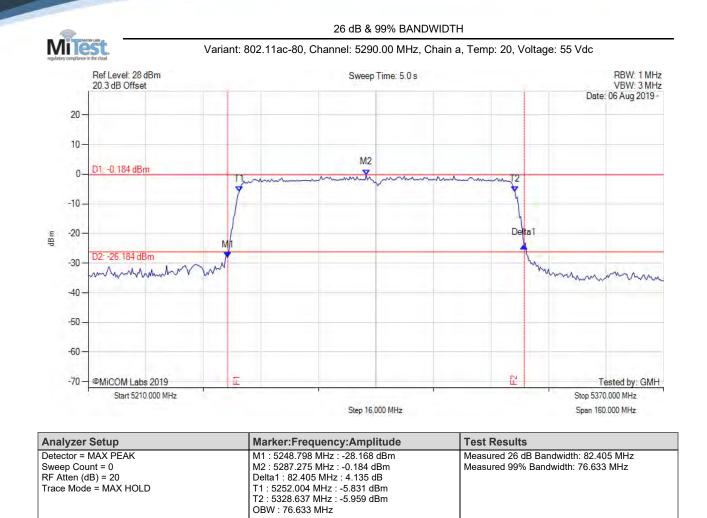
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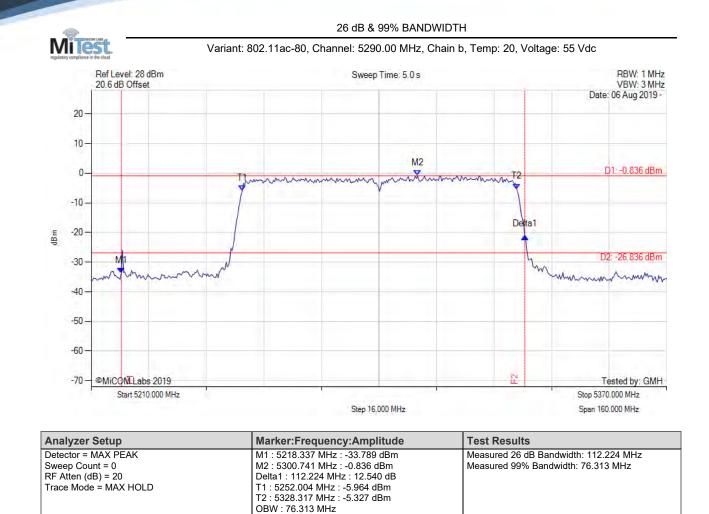
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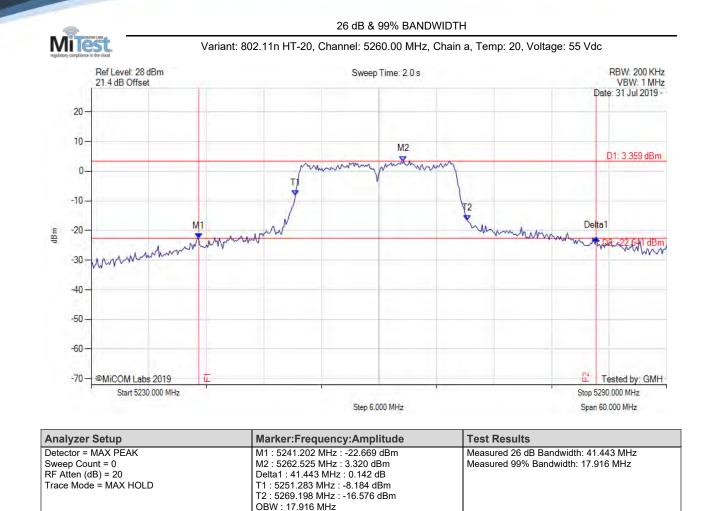
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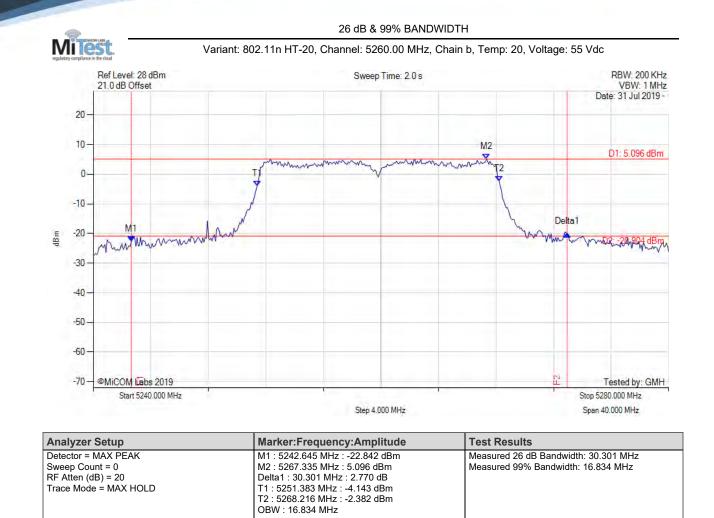
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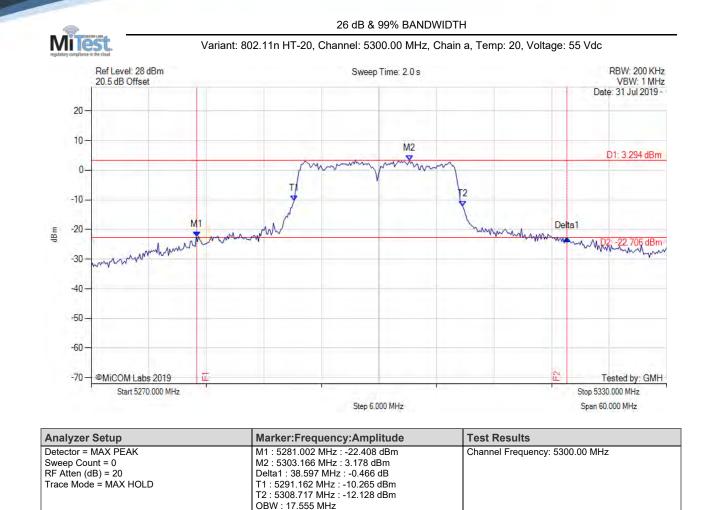
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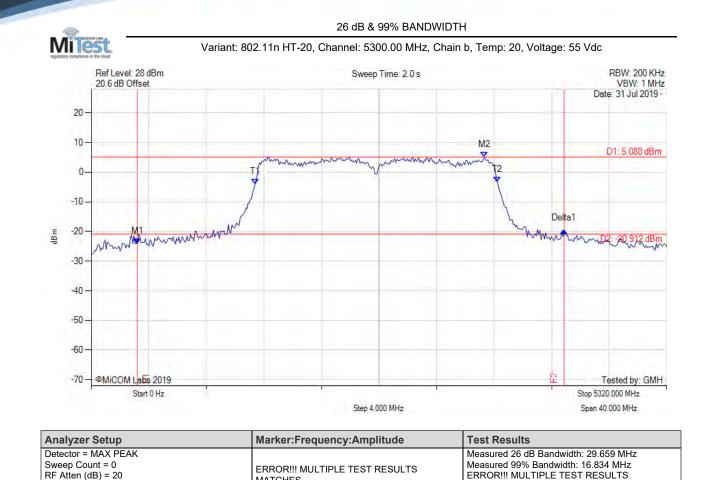


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MATCHES ...

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MATCHES.



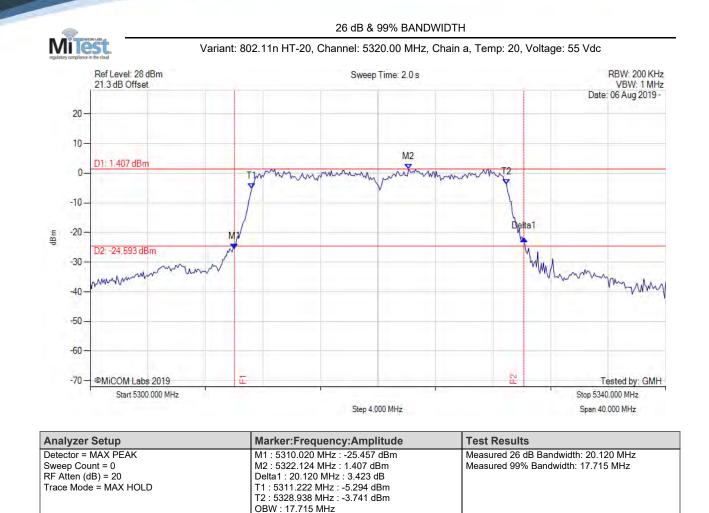
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Trace Mode = MAX HOLD

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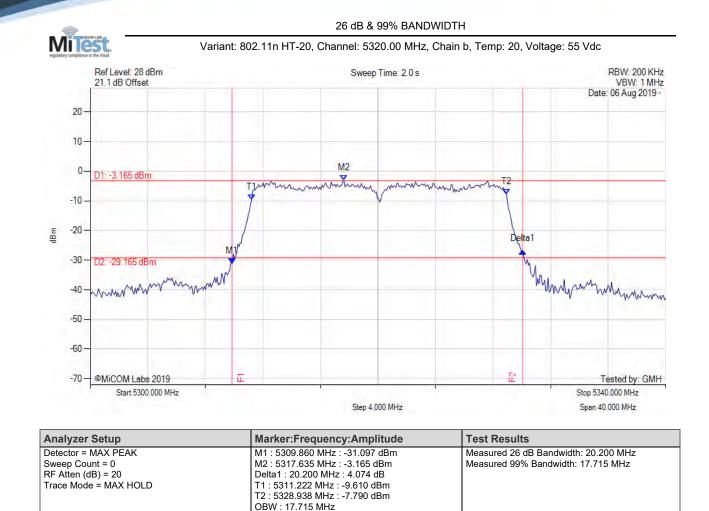
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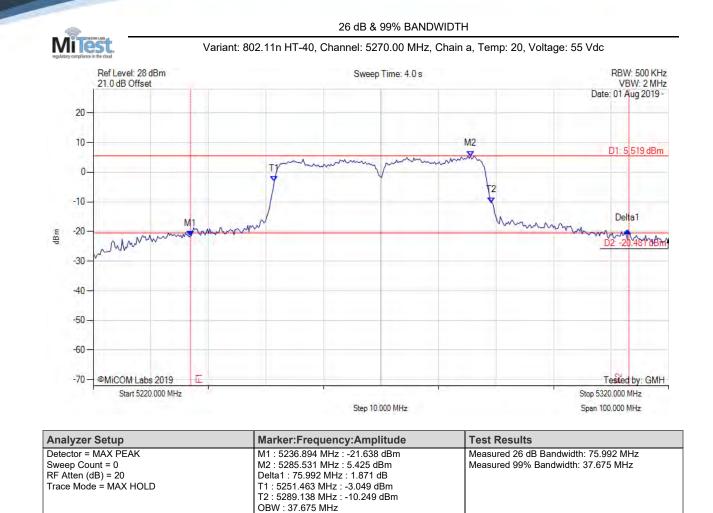
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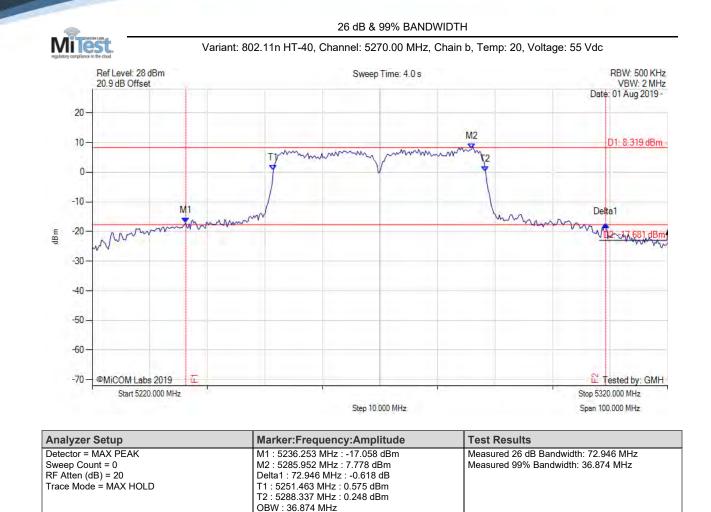
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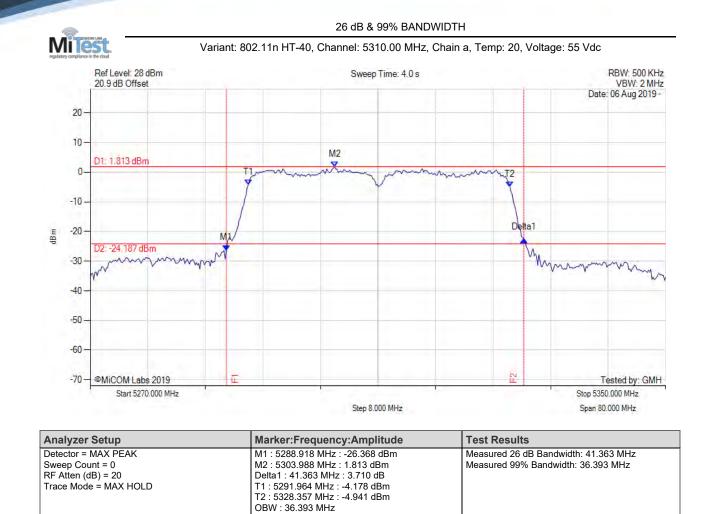


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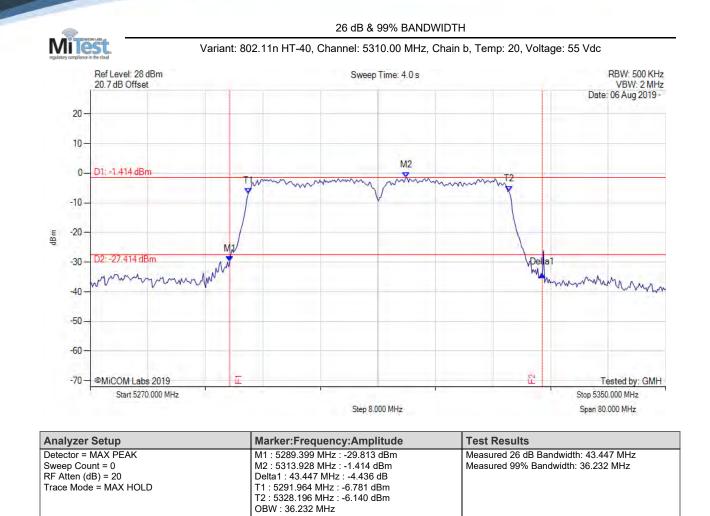


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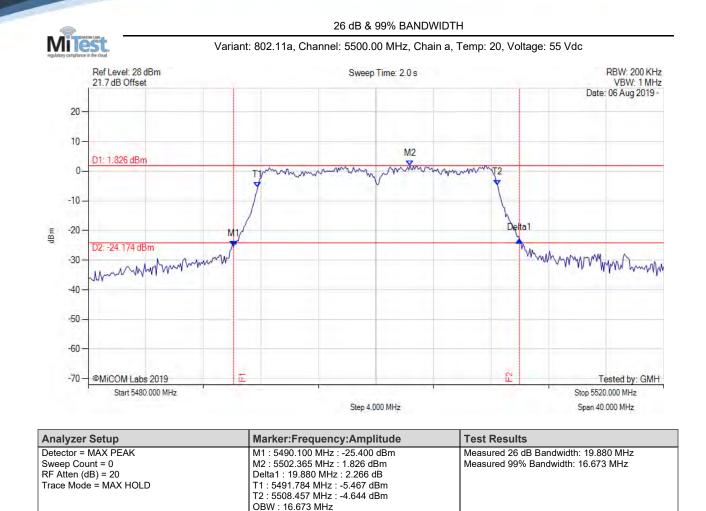
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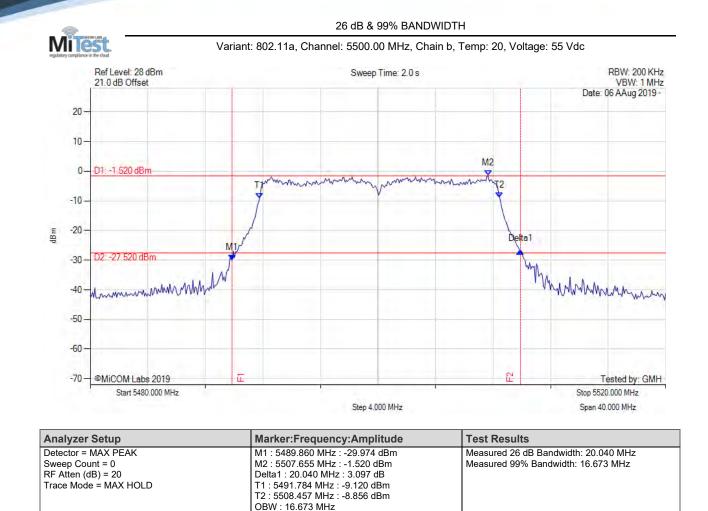
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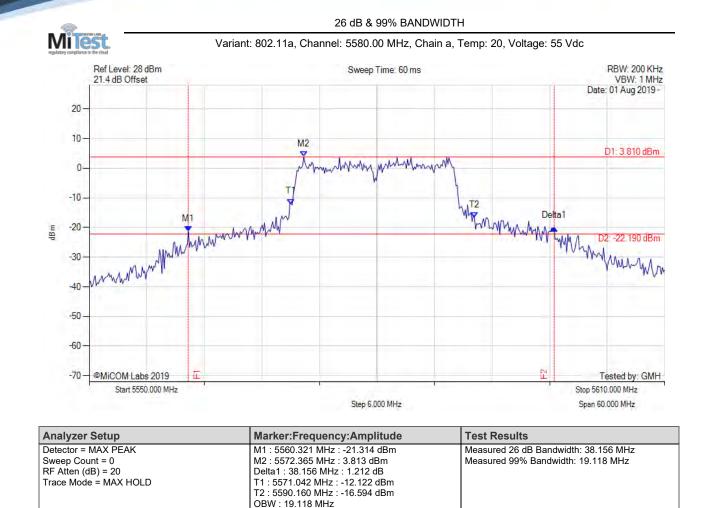
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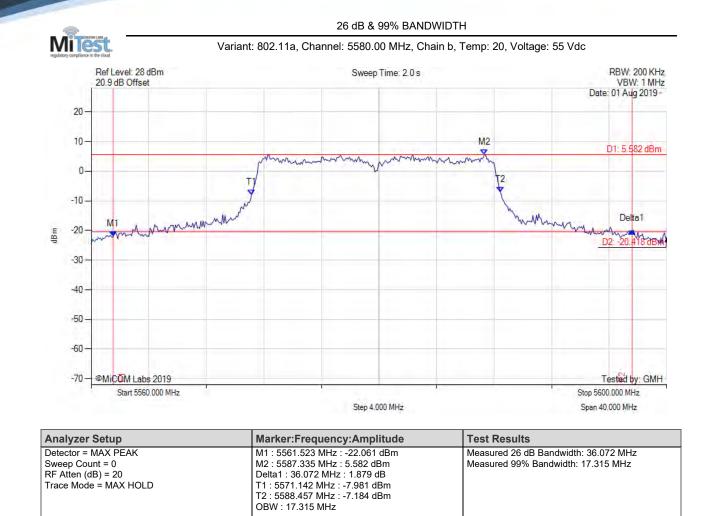
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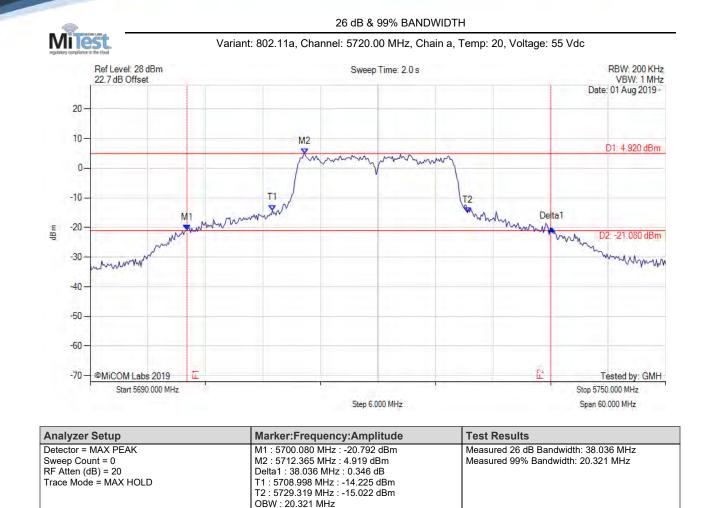
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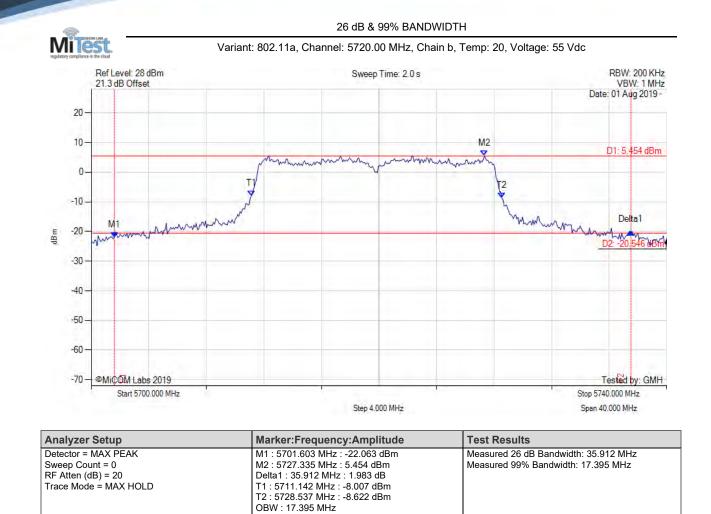
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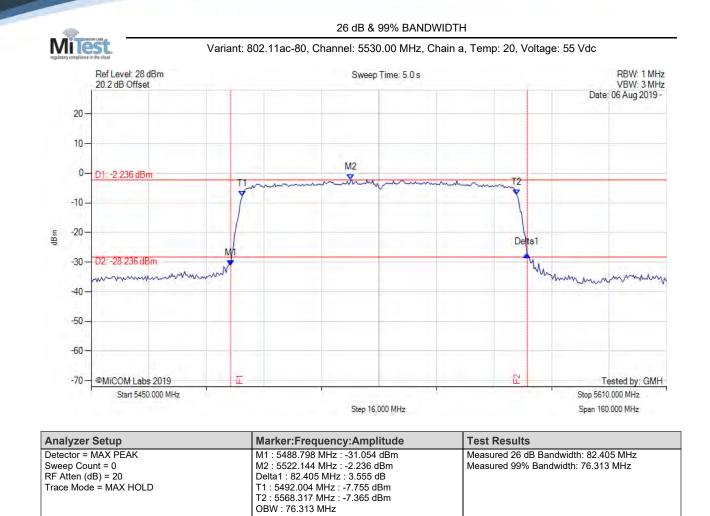
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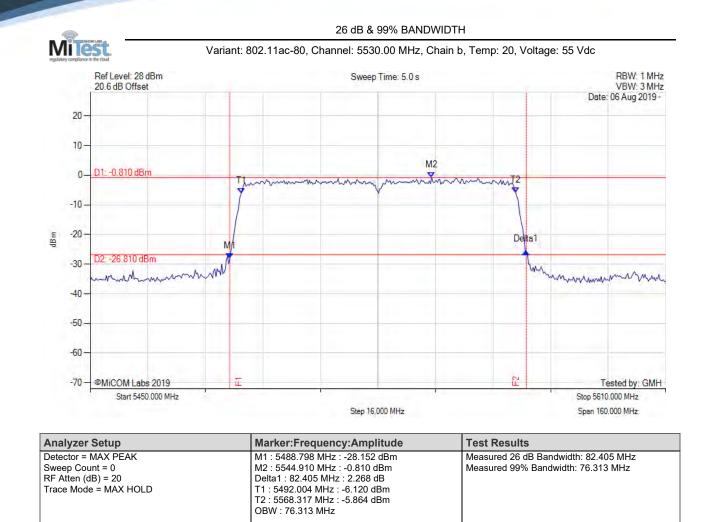


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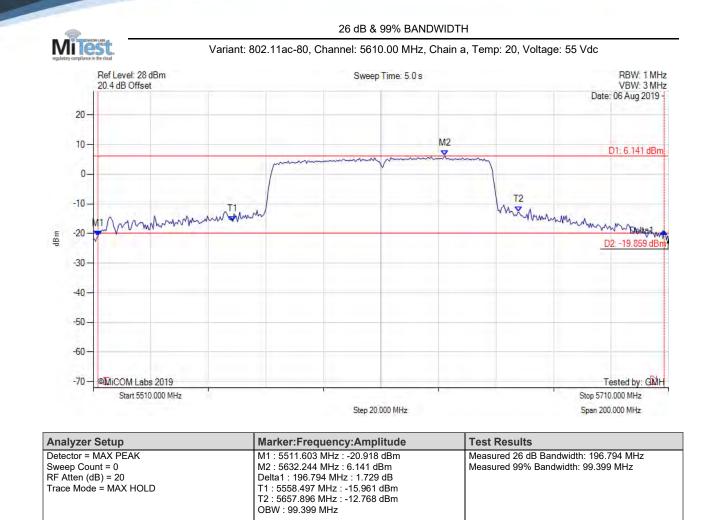


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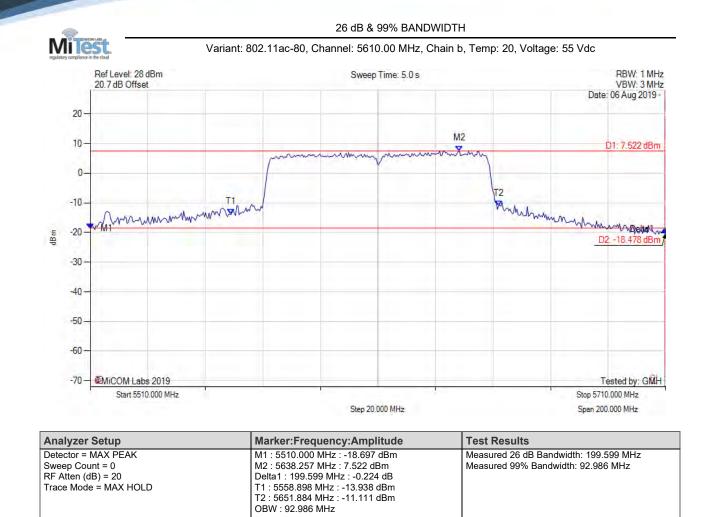
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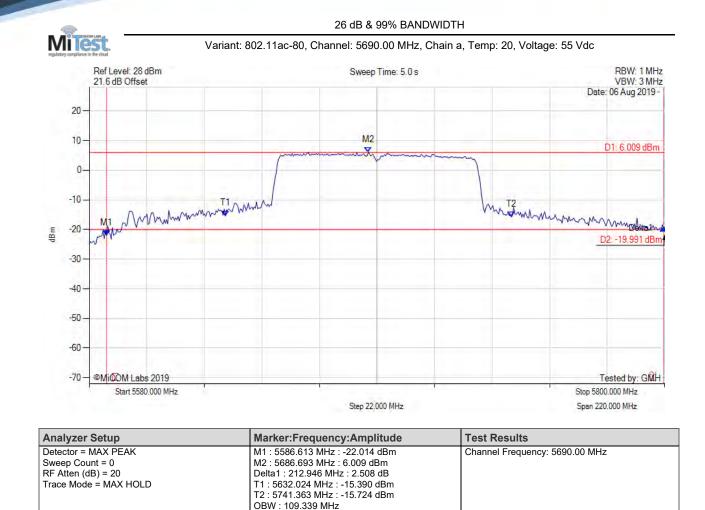
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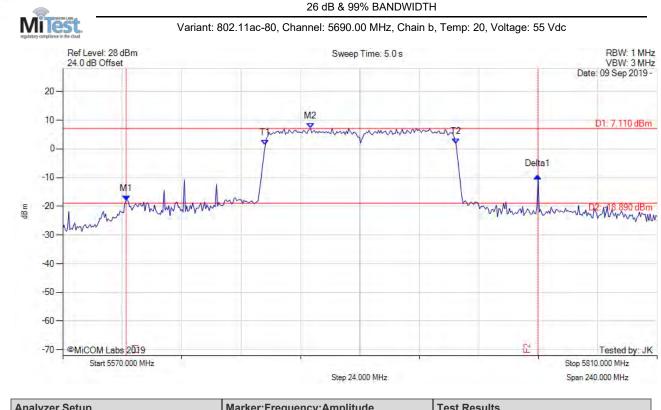
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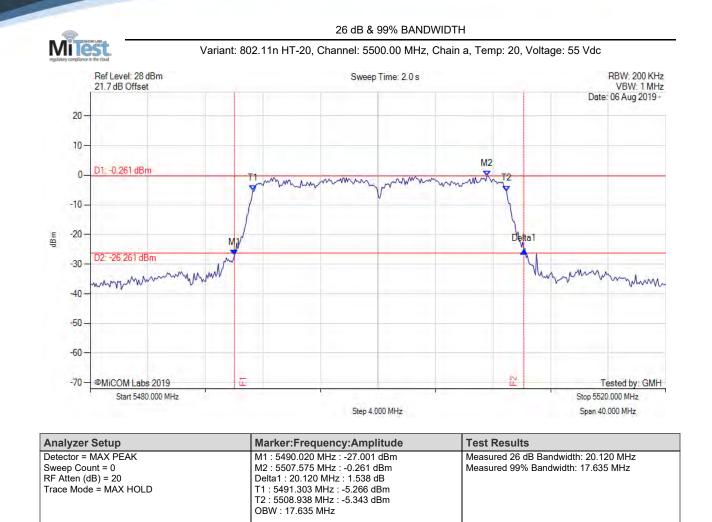
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5595.571 MHz : -17.969 dBm	Measured 26 dB Bandwidth: 166.253 MHz
Sweep Count = 0	M2 : 5670.040 MHz : 7.111 dBm	Measured 99% Bandwidth: 76.954 MHz
RF Atten (dB) = 20	Delta1 : 166.253 MHz : 8.530 dB	
Trace Mode = MAX HOLD	T1 : 5651.764 MHz : 1.281 dBm	
	T2 : 5728.717 MHz : 1.755 dBm	
	OBW : 76.954 MHz	

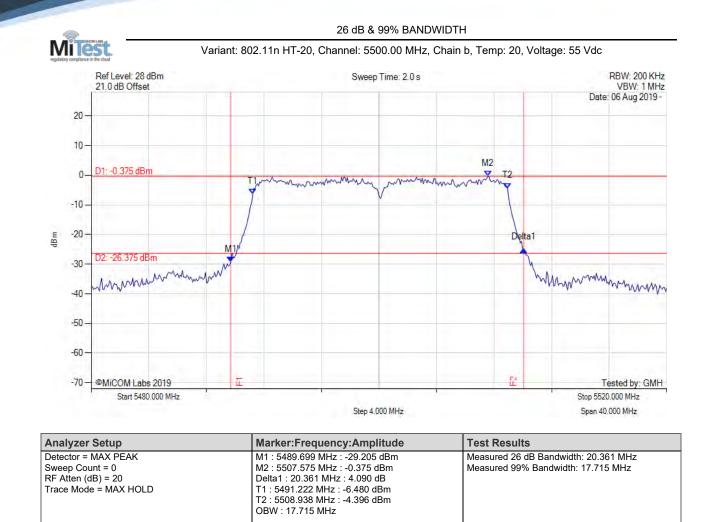
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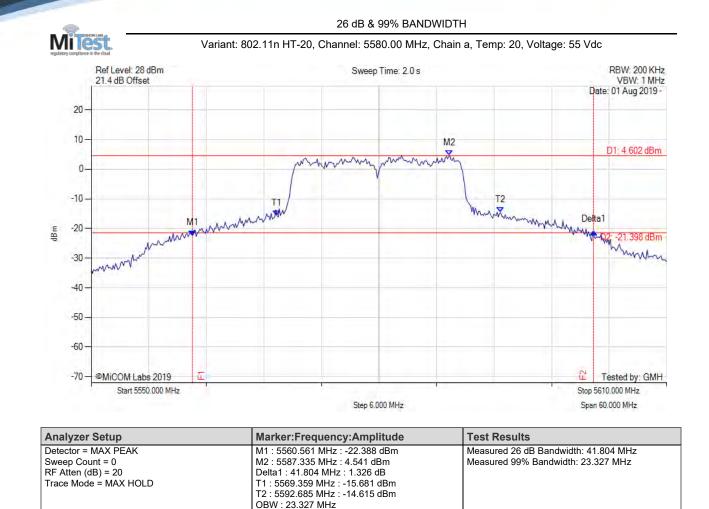
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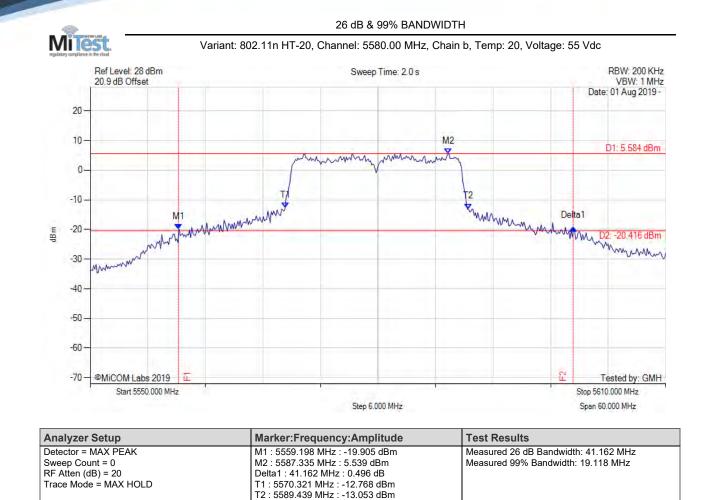
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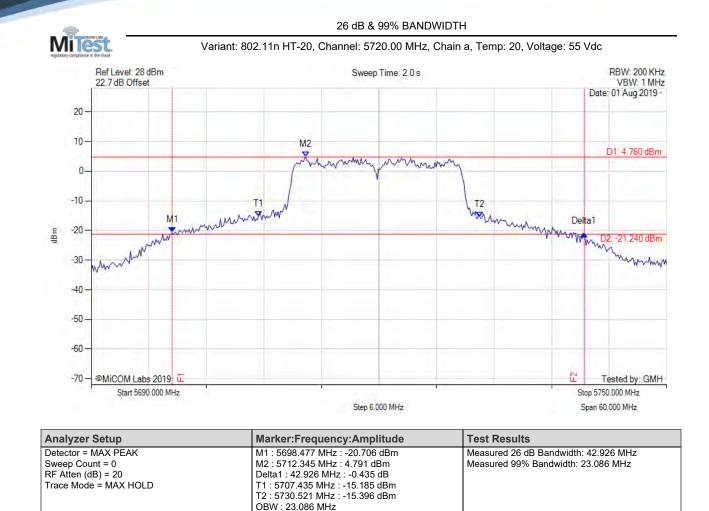
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OBW : 19.118 MHz

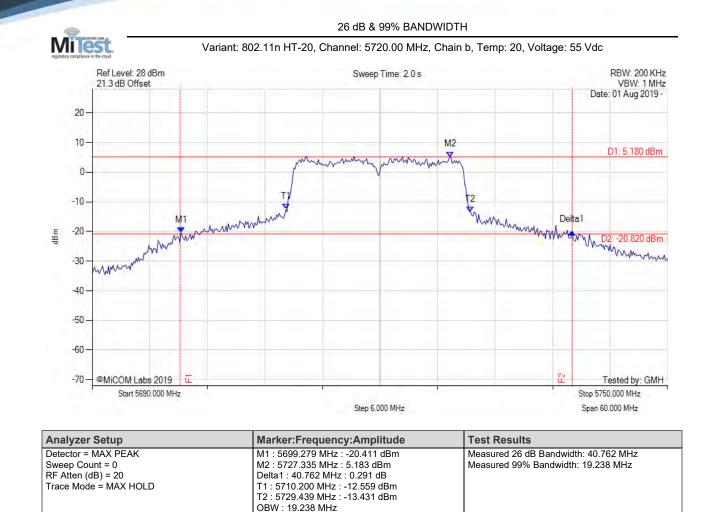
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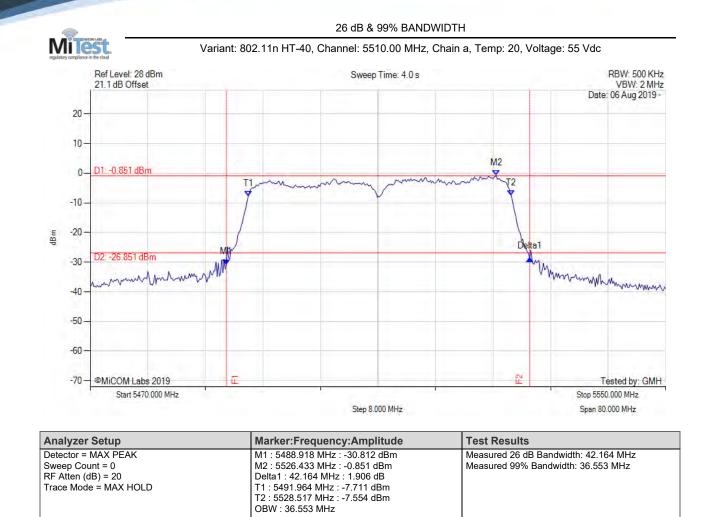
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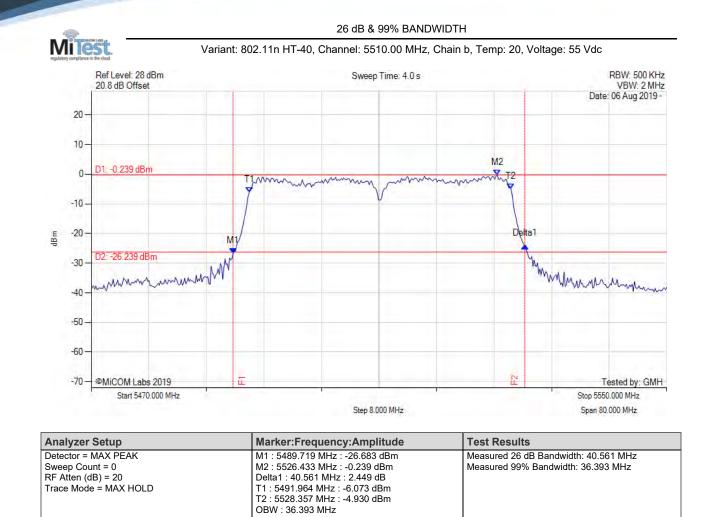


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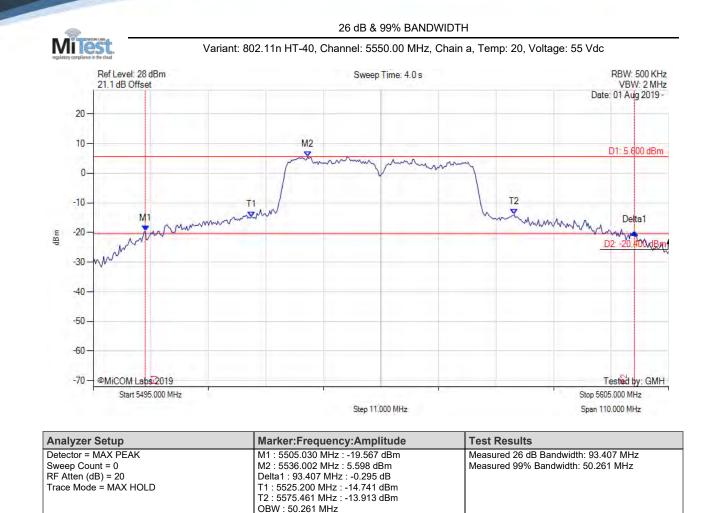
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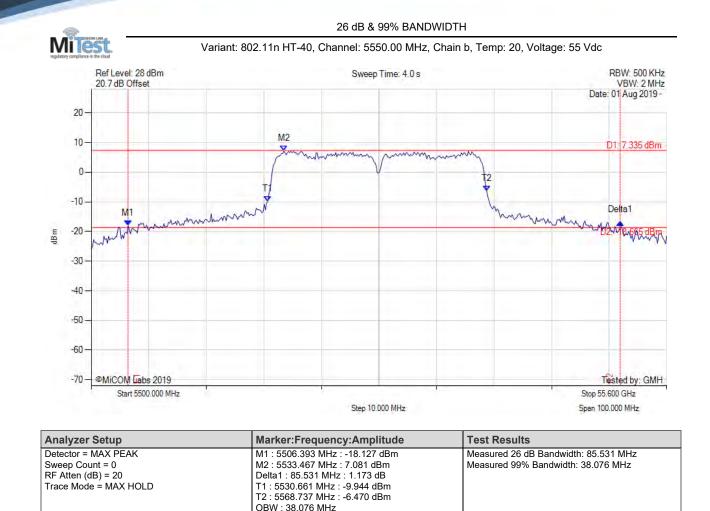
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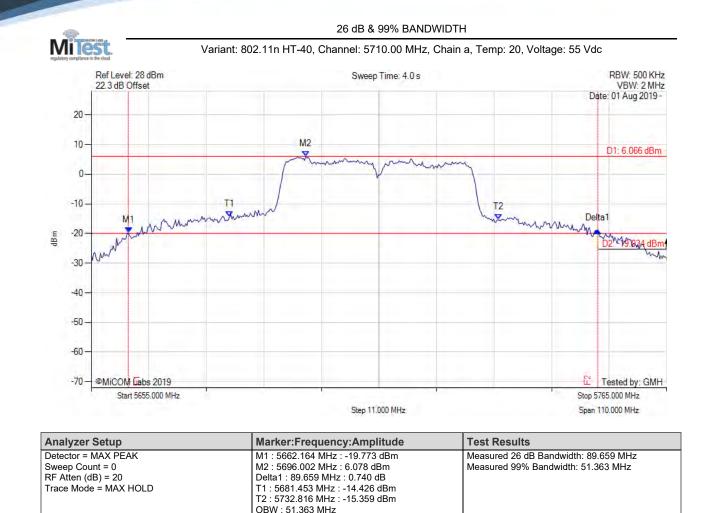
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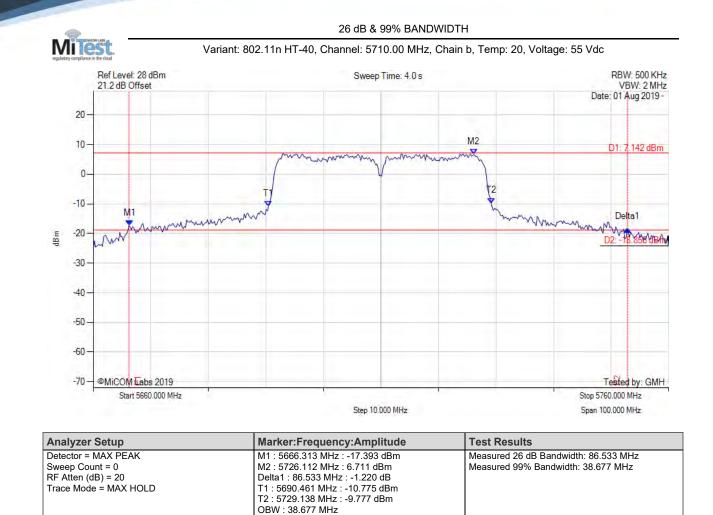
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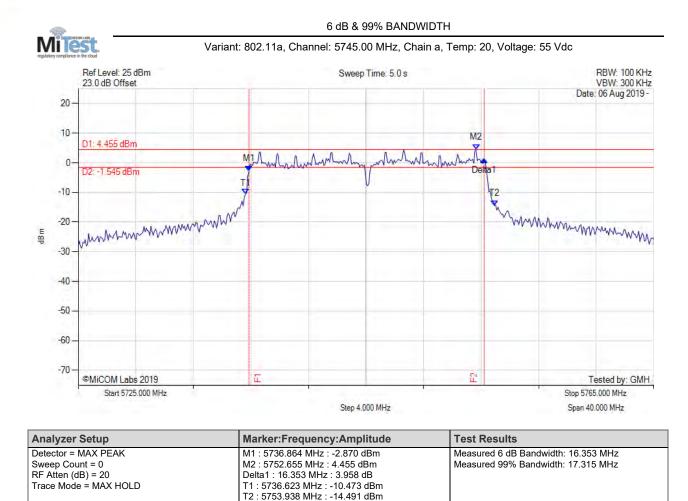
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A.2. 6 dB & 99% Bandwidth

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OBW : 17.315 MHz

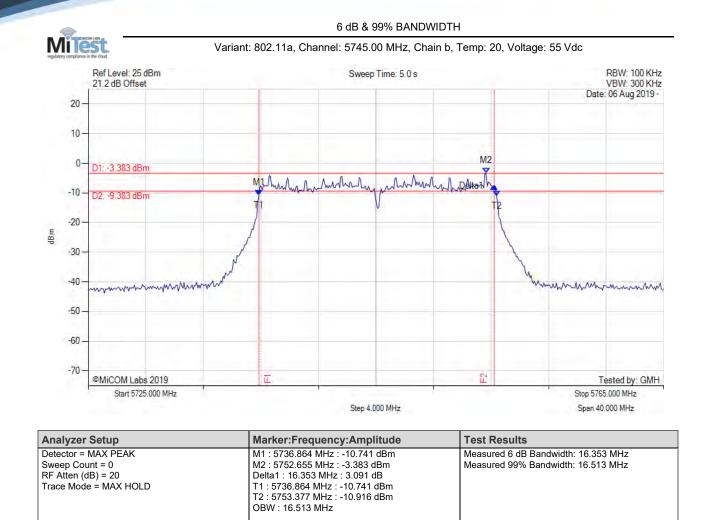
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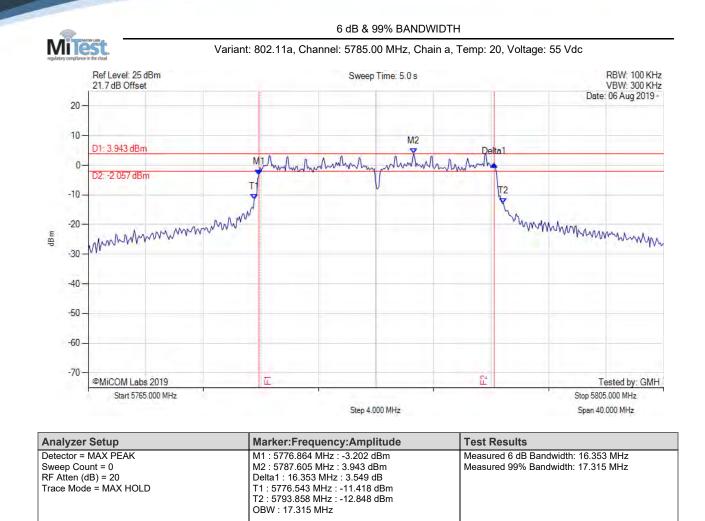
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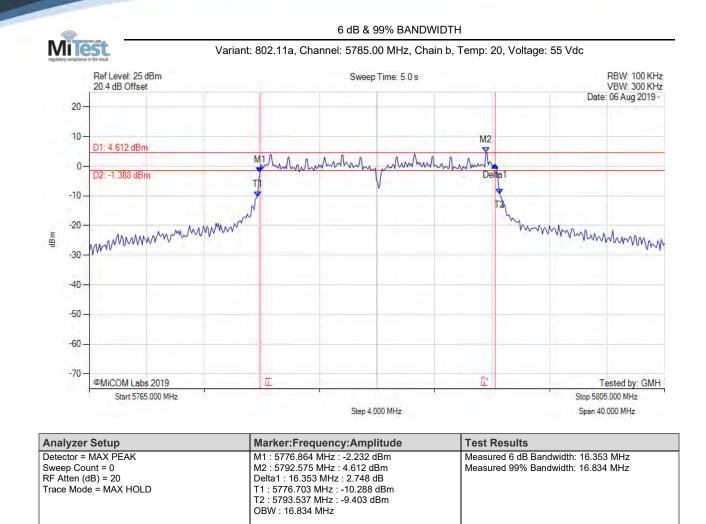
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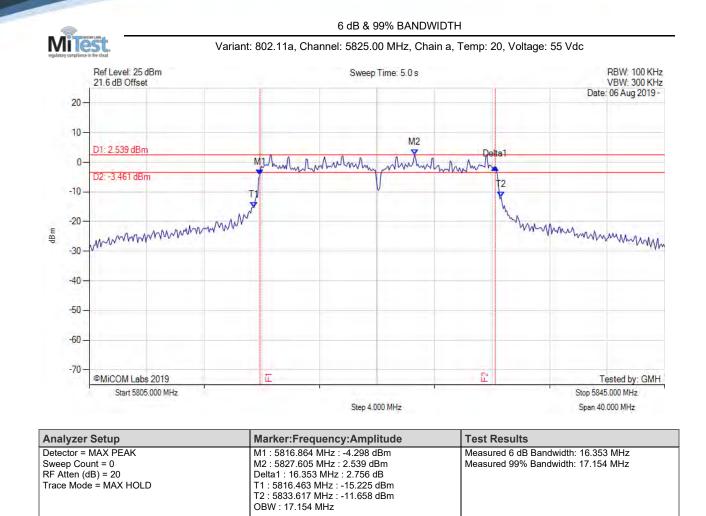
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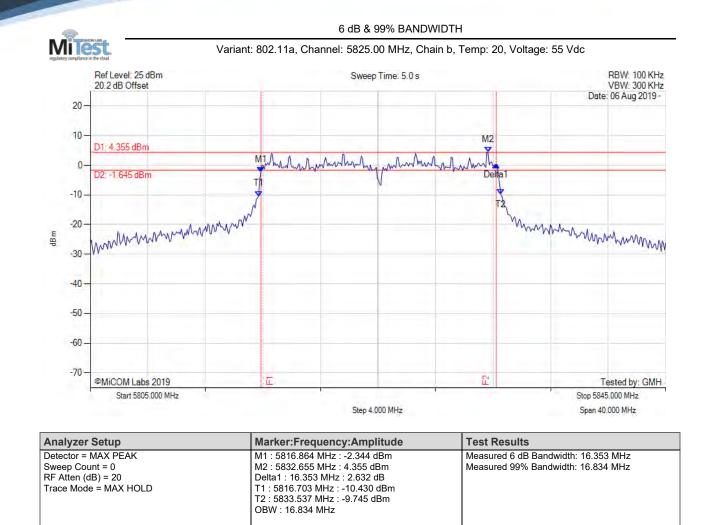
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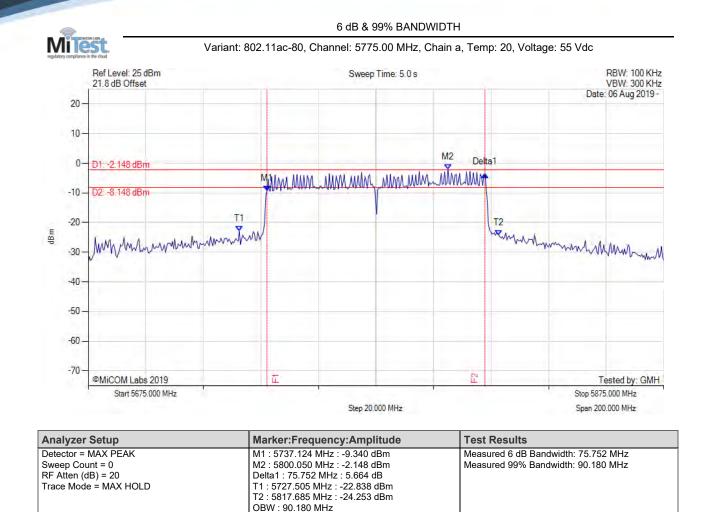
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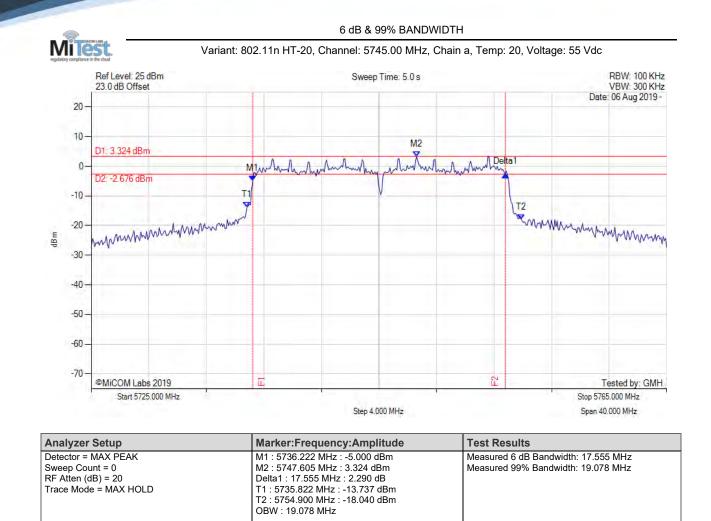
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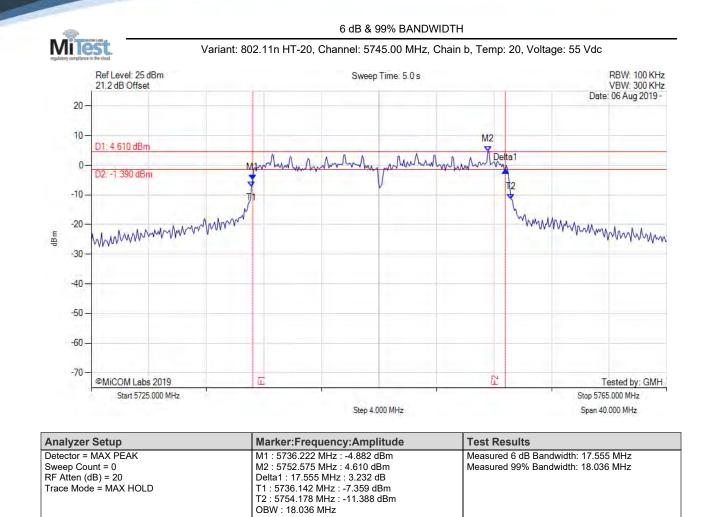
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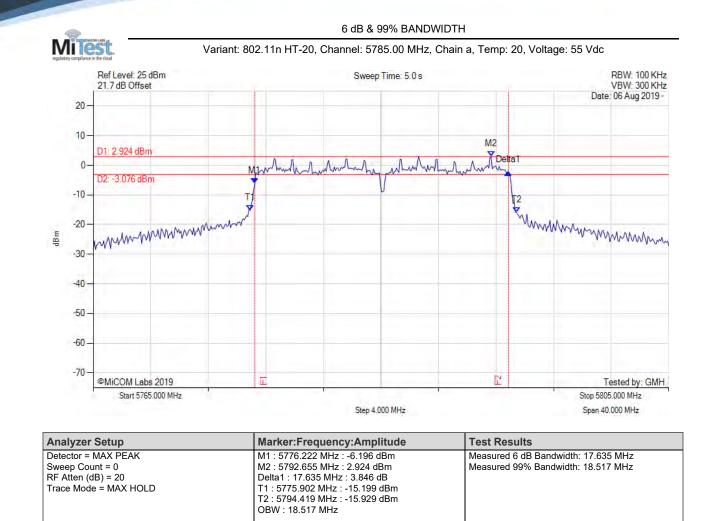
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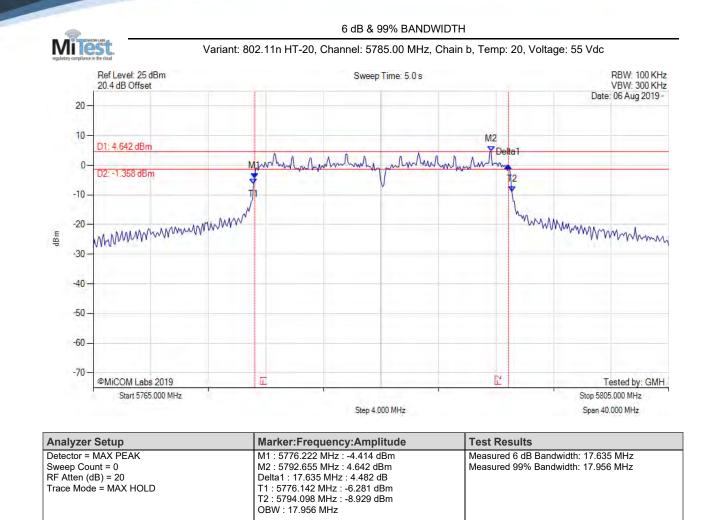
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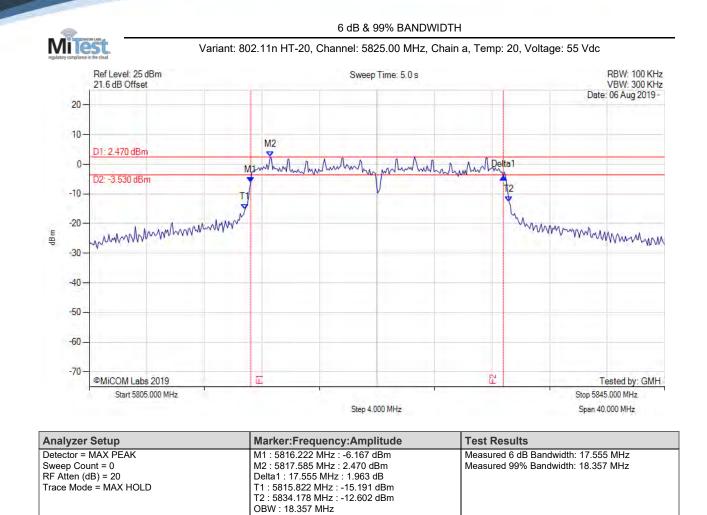
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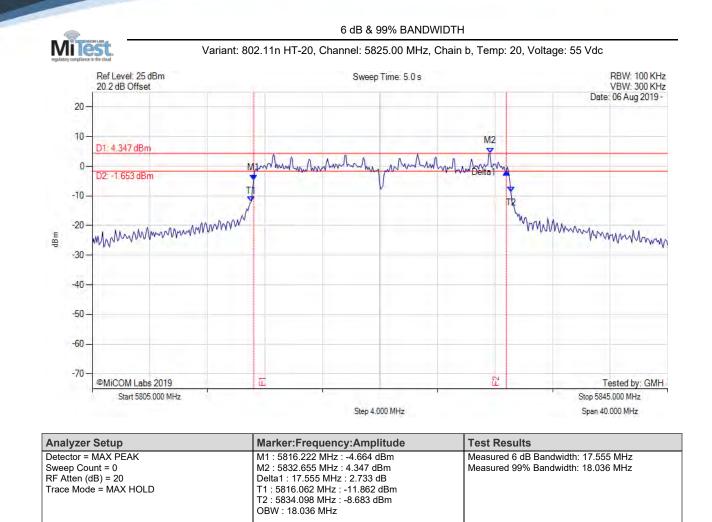
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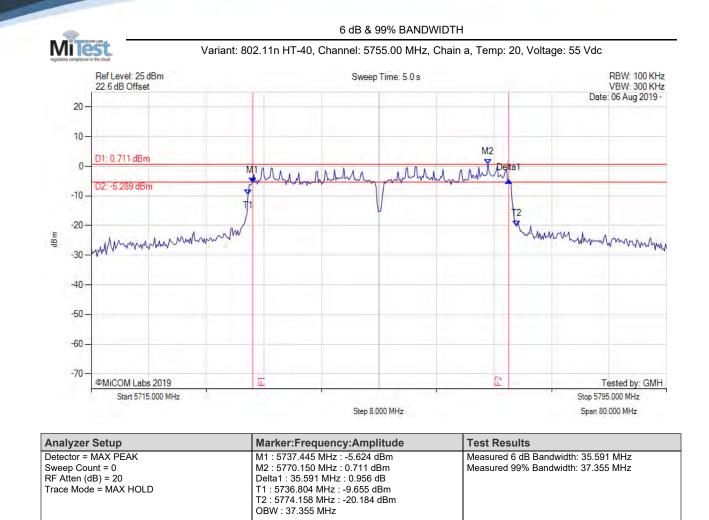
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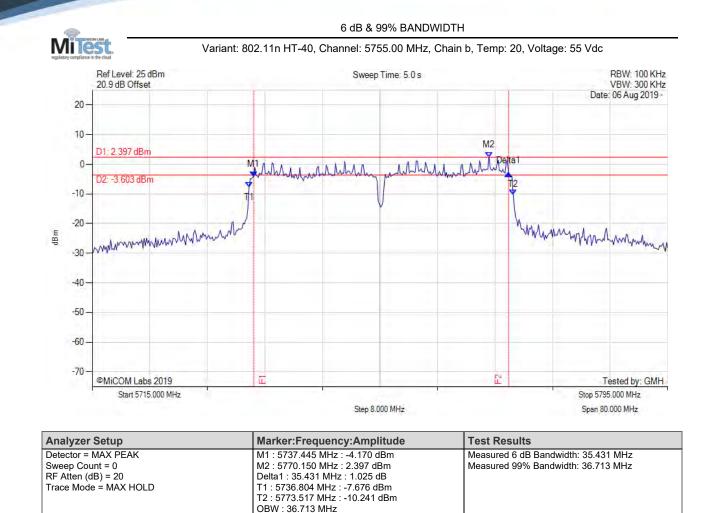
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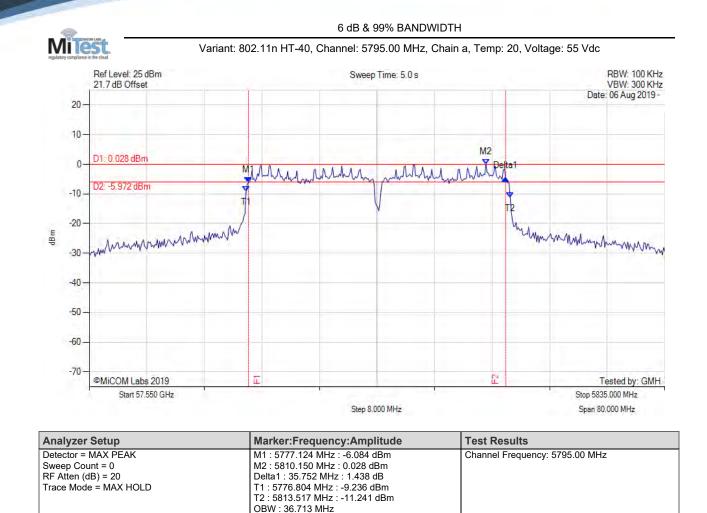
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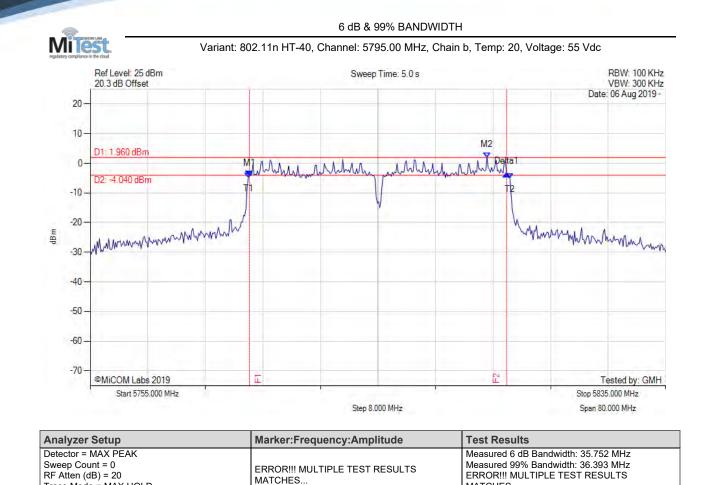
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MATCHES.



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Trace Mode = MAX HOLD

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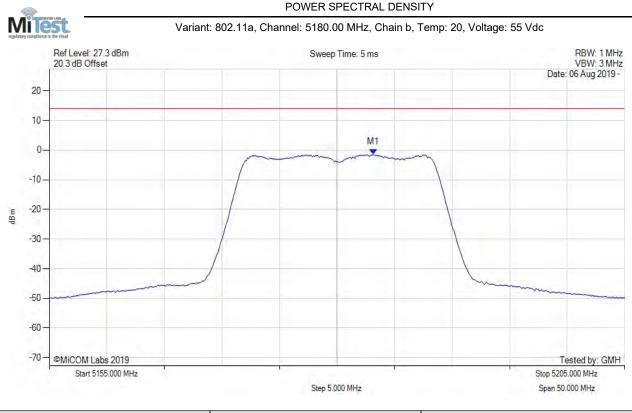
A.3. Power Spectral Density

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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5182.956 MHz : 2.242 dBm	Limit: ≤ 13.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

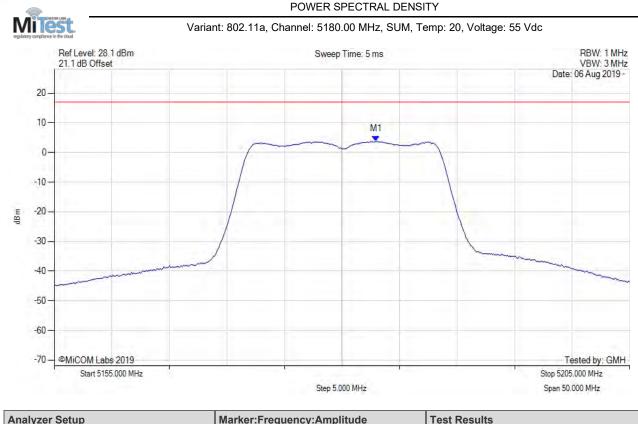




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5183.156 MHz : -1.566 dBm	Limit: ≤ 13.990 dBm

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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5183.000 MHz : 3.707 dBm	Limit: ≤ 17.0 dBm
Sweep Count = 100	M1 + DCCF : 5183.000 MHz : 3.795 dBm	Margin: -13.2 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		

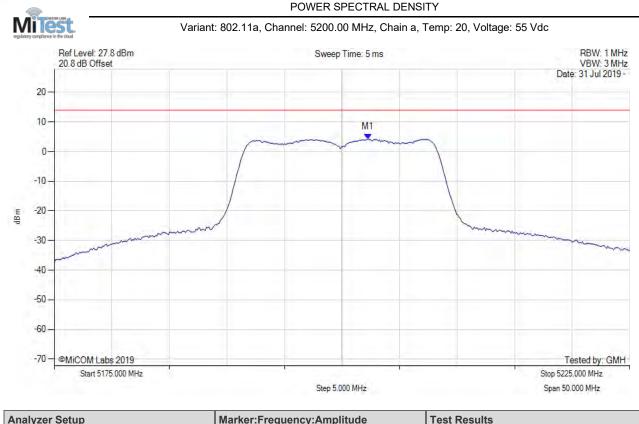
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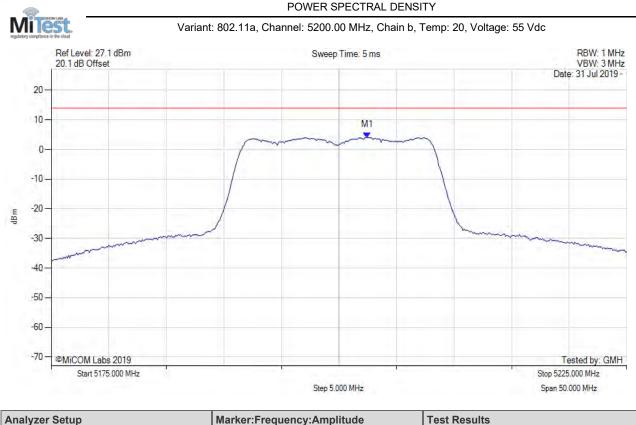
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5202.255 MHz : 4.152 dBm	Limit: ≤ 13.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

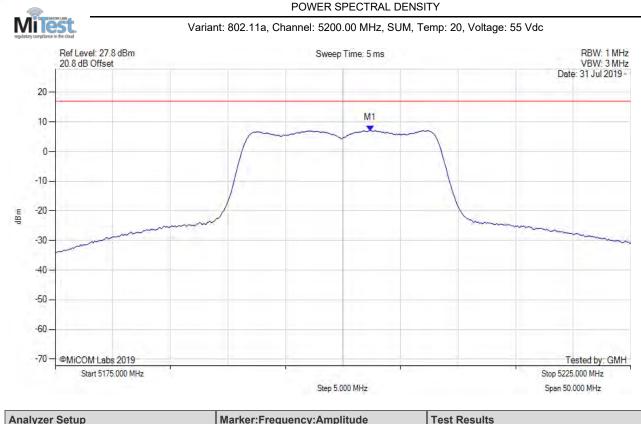




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5202.455 MHz : 4.047 dBm	Channel Frequency: 5200.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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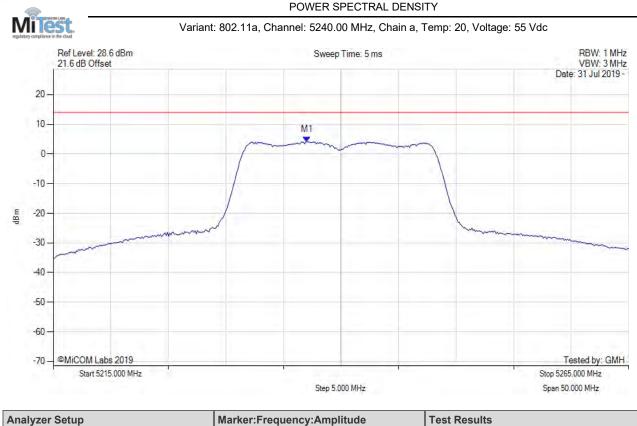
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	Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Γ	Detector = RMS	M1 : 5202.400 MHz : 7.091 dBm	Limit: ≤ 17.0 dBm
	Sweep Count = 100	M1 + DCCF : 5202.400 MHz : 7.179 dBm	Margin: -9.8 dB
	RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
	Trace Mode = VIEW		

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Analyzer Setup	Marker:Frequency:Amplitude	lest Results
Detector = RMS	M1 : 5237.044 MHz : 4.110 dBm	Limit: ≤ 13.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



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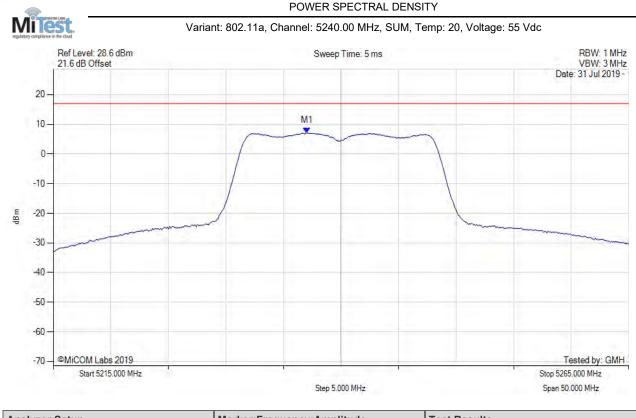
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5237.144 MHz : 4.037 dBm	Limit: ≤ 13.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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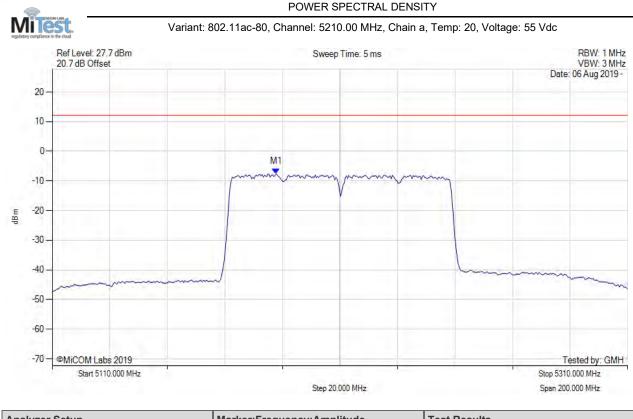
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5237.000 MHz : 7.071 dBm	Limit: ≤ 17.0 dBm
Sweep Count = 100	M1 + DCCF : 5237.000 MHz : 7.159 dBm	Margin: -9.9 dB
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Trace Mode = VIEW		

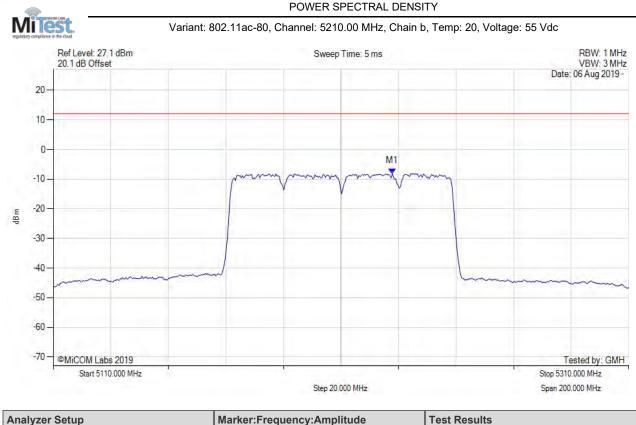


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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5187.756 MHz : -7.631 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

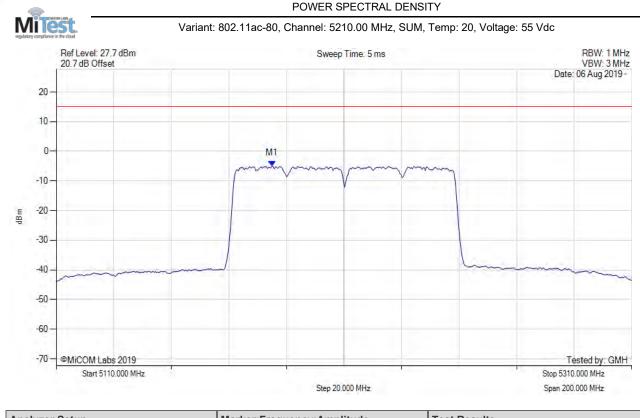




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5227.836 MHz : -8.115 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

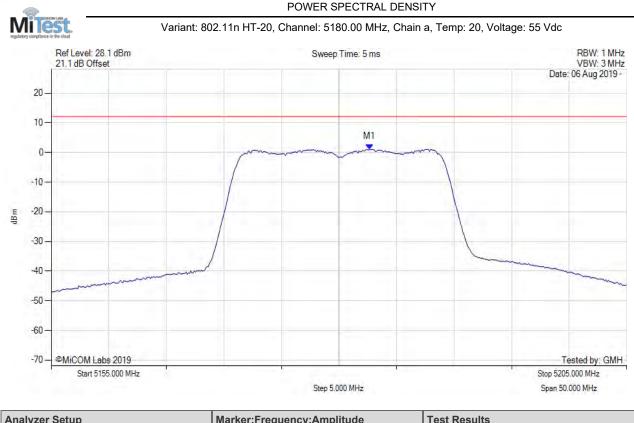


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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5184.900 MHz : -4.936 dBm	Limit: ≤ 15.1 dBm
Sweep Count = 100	M1 + DCCF : 5184.900 MHz : -4.381 dBm	Margin: -19.5 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.56 dB	-
Trace Mode = VIEW		





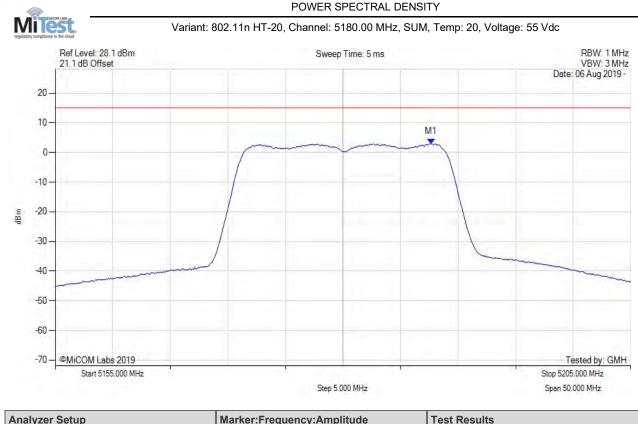
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5182.655 MHz : 1.074 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





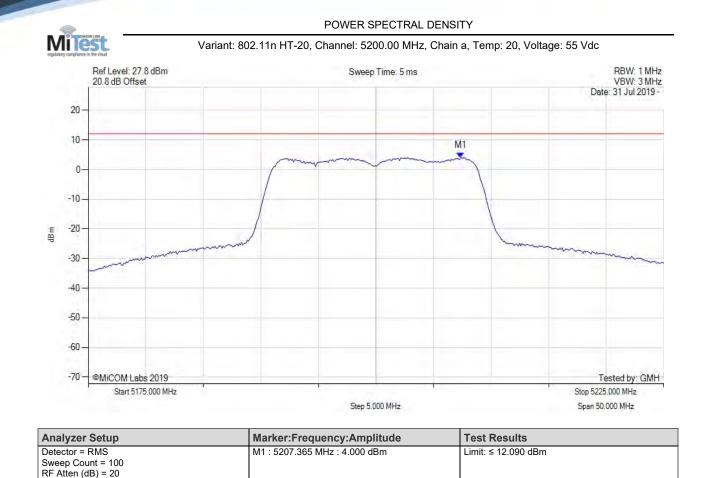
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5187.665 MHz : -1.652 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5187.700 MHz : 2.920 dBm	Limit: ≤ 15.1 dBm
Sweep Count = 100	M1 + DCCF : 5187.700 MHz : 3.008 dBm	Margin: -12.1 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		





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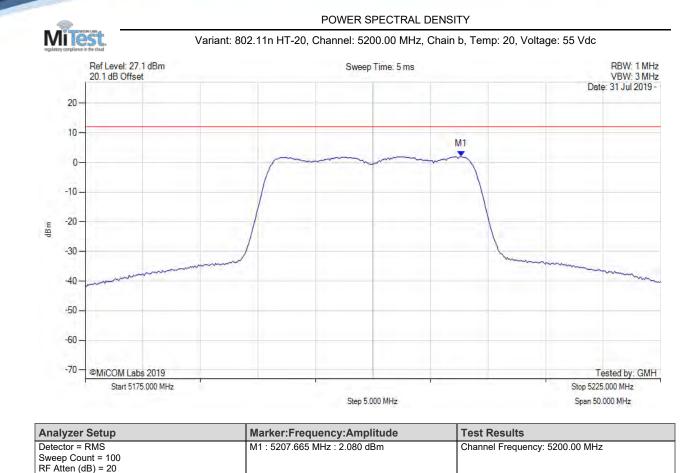
Trace Mode = VIEW

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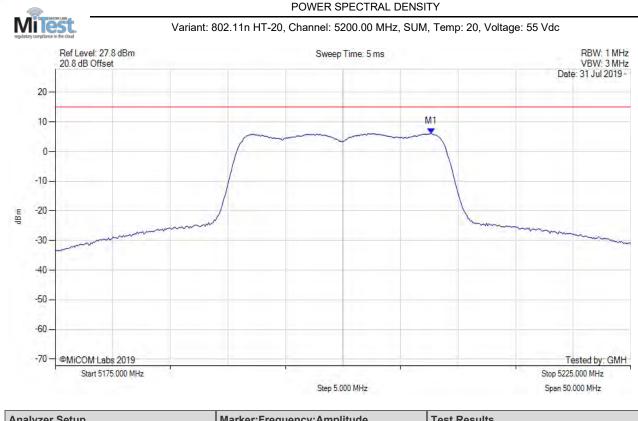


back to matrix

Trace Mode = VIEW

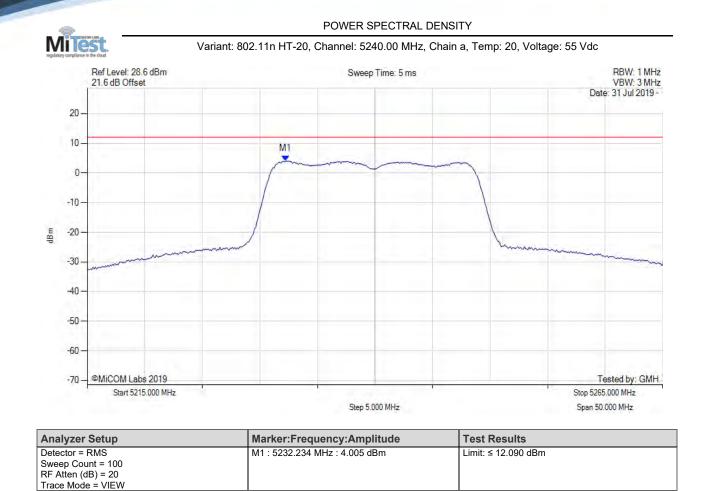


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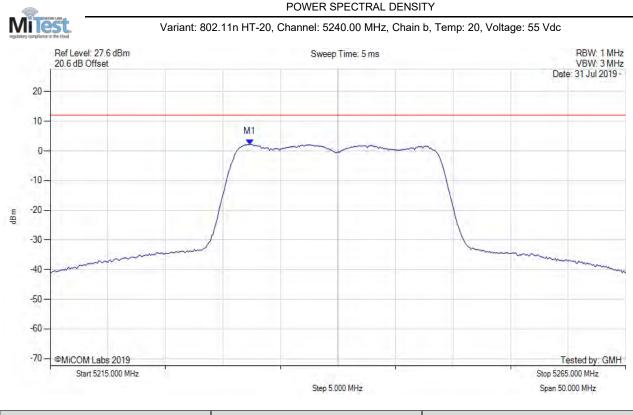


Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5207.700 MHz : 6.108 dBm	Limit: ≤ 15.1 dBm	
Sweep Count = 100	M1 + DCCF : 5207.700 MHz : 6.196 dBm	Margin: -8.9 dB	
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB		
Trace Mode = VIEW			



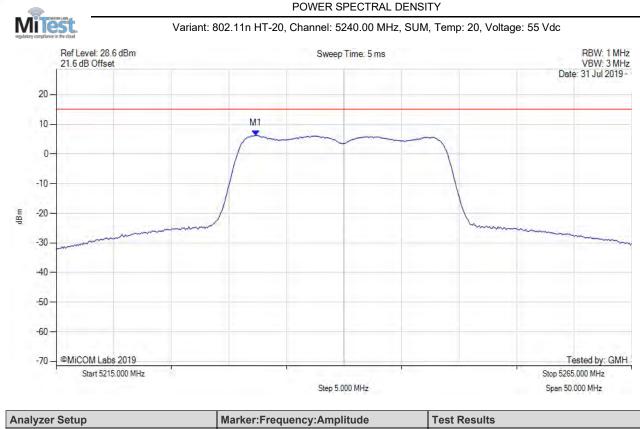






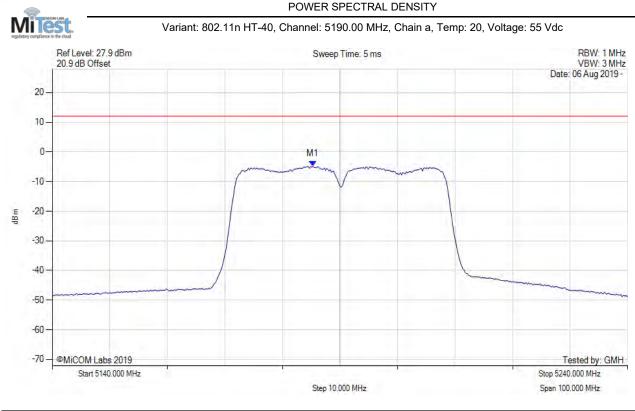
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5232.335 MHz : 2.212 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





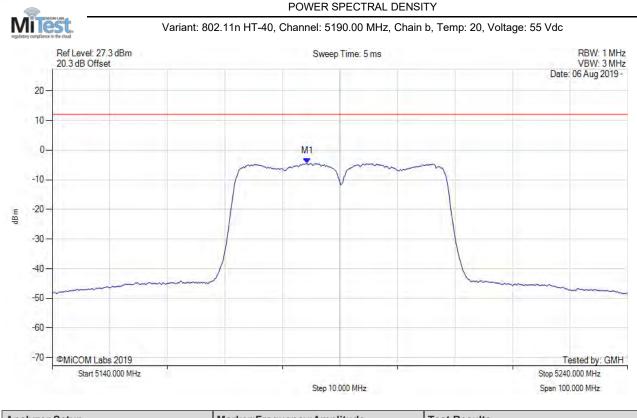
Detector = RMS	M1 : 5232.300 MHz : 6.187 dBm	Limit: ≤ 15.1 dBm
Sweep Count = 100	M1 + DCCF : 5232.300 MHz : 6.275 dBm	Margin: -8.8 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5185.291 MHz : -4.890 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5184.289 MHz : -4.522 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

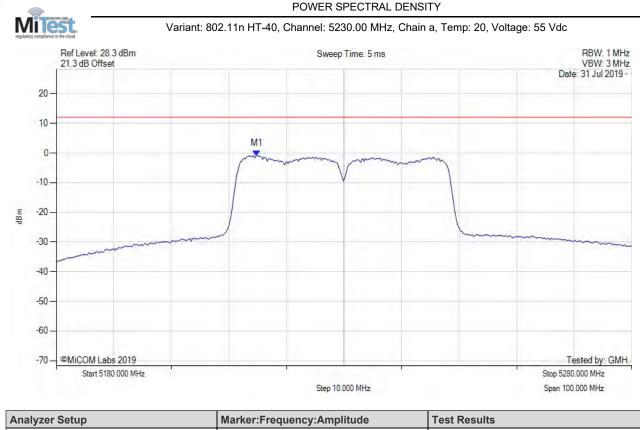


POWER SPECTRAL DENSITY Mi Variant: 802.11n HT-40, Channel: 5190.00 MHz, SUM, Temp: 20, Voltage: 55 Vdc Ref Level: 27.9 dBm Sweep Time: 5 ms RBW: 1 MHz VBW: 3 MHz 20.9 dB Offset Date: 06 Aug 2019 -20 10-M1 0--10--20dBm -30 --40 --50 -60 -70 -@MiCOM Labs 2019 Tested by: GMH Start 5140.000 MHz Stop 5240.000 MHz Step 10.000 MHz Span 100.000 MHz

Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5184.300 MHz : -1.707 dBm	Limit: ≤ 15.1 dBm
Sweep Count = 100	M1 + DCCF : 5184.300 MHz : -1.619 dBm	Margin: -16.7 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		



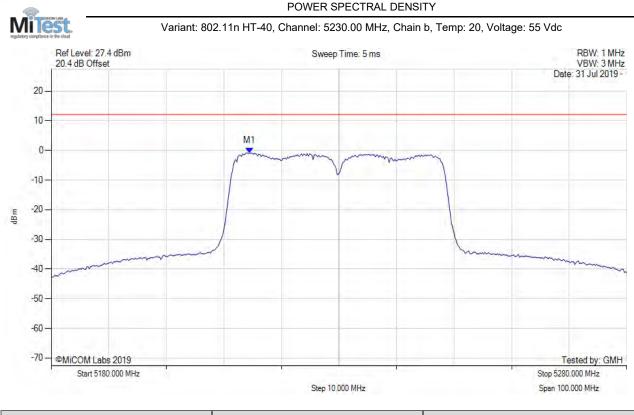
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Analyzer Setup	warker.Frequency.Ampiltude	Test Results
Detector = RMS	M1 : 5214.870 MHz : -0.886 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

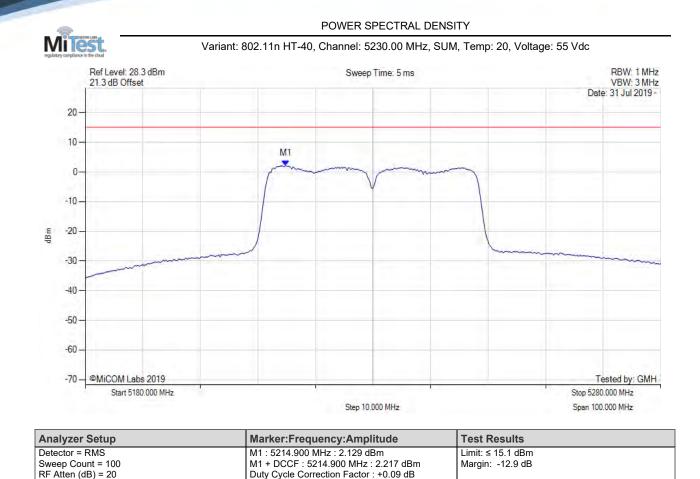


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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5214.469 MHz : -0.853 dBm	Limit: ≤ 12.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





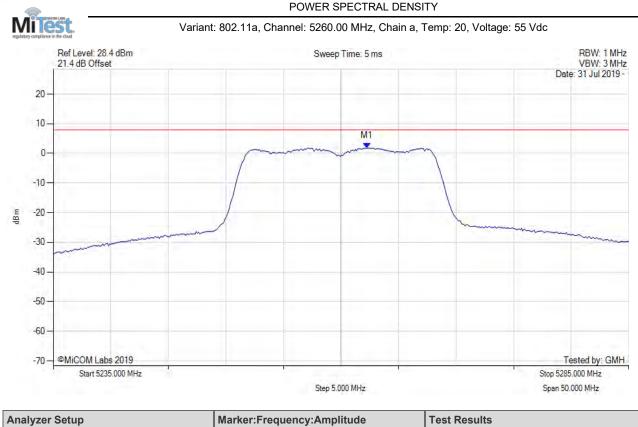
back to matrix

Trace Mode = VIEW



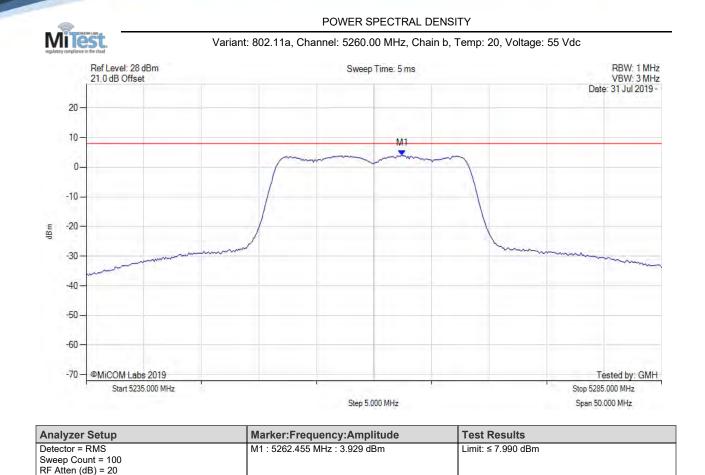
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Analyzer Setup	Marker.Frequency.Ampiltude	Test Results
Detector = RMS	M1 : 5262.255 MHz : 1.768 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



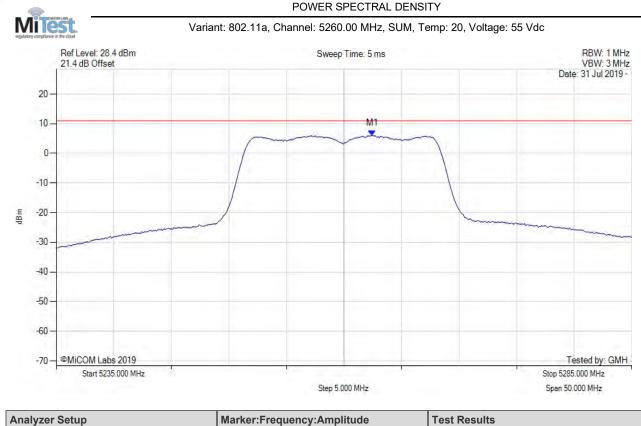


back to matrix

Trace Mode = VIEW

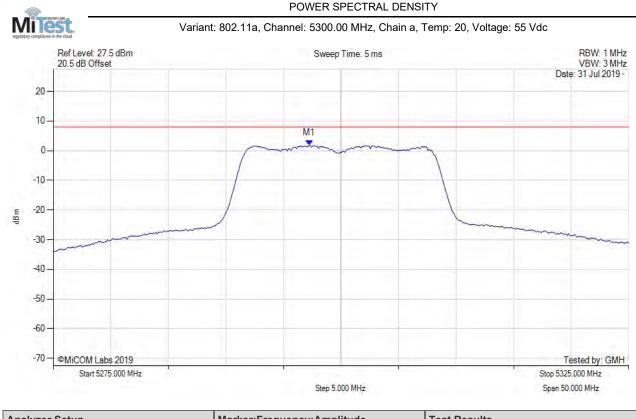
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5262.500 MHz : 5.981 dBm	Limit: ≤ 11.0 dBm	
Sweep Count = 100	M1 + DCCF : 5262.500 MHz : 6.069 dBm	Margin: -4.9 dB	
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB		
Trace Mode = VIEW			



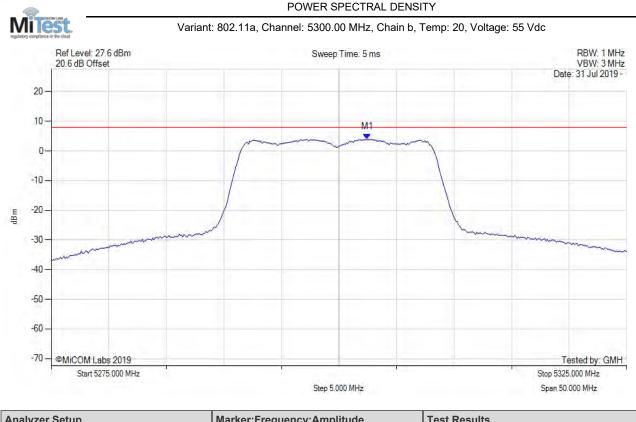


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5297.244 MHz : 1.679 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW		



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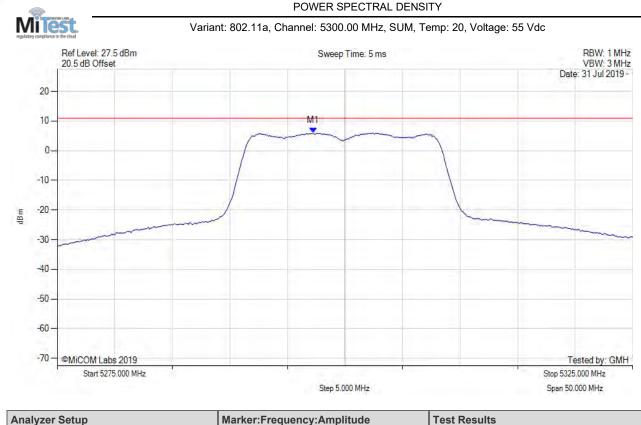
Title:Hewlett Packard Enterprise, Aruba User Experience InsightTo:FCC Part 15 Subpart C 15.407 (NII)al #:HPEN141-U6 Rev A (Wi-Fi)



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5302.455 MHz : 3.903 dBm	Channel Frequency: 5300.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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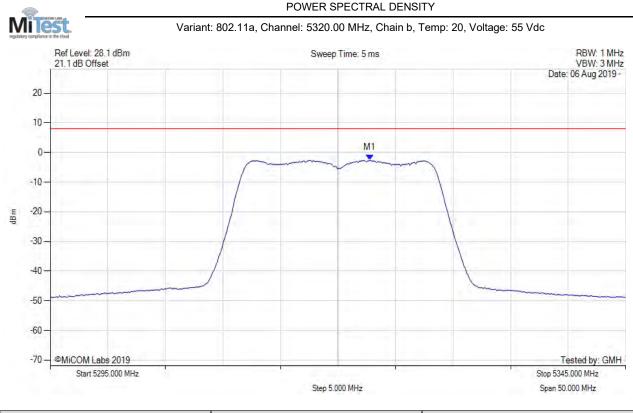
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5297.200 MHz : 5.924 dBm	Limit: ≤ 11.0 dBm
Sweep Count = 100	M1 + DCCF : 5297.200 MHz : 6.012 dBm	Margin: -5.0 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5323.056 MHz : 0.709 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

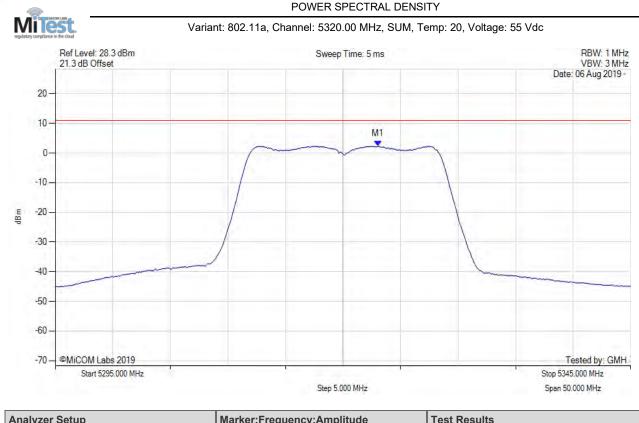




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5322.756 MHz : -2.624 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5323.100 MHz : 2.306 dBm	Limit: ≤ 11.0 dBm
Sweep Count = 100	M1 + DCCF : 5323.100 MHz : 2.394 dBm	Margin: -8.6 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		

back to matrix

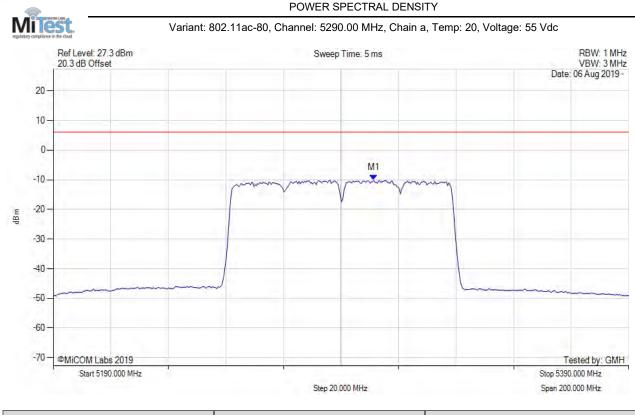
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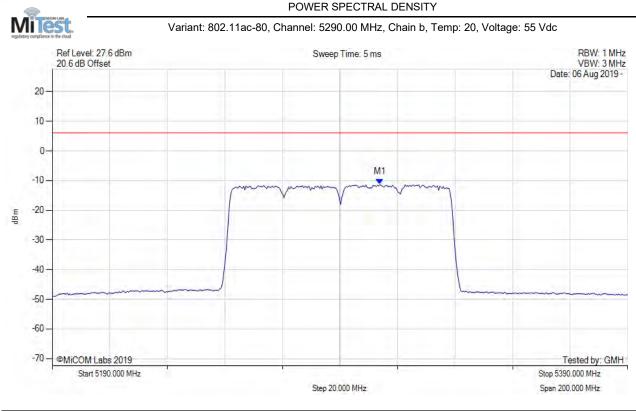


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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5301.423 MHz : -10.181 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



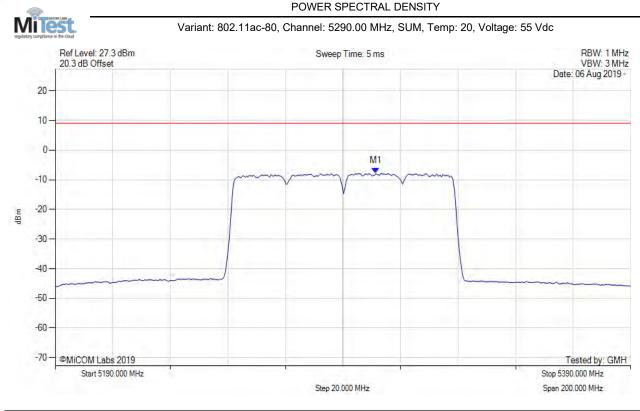


Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5303.828 MHz : -11.284 dBm	Limit: ≤ 6.090 dBm	
Sweep Count = 100			
RF Atten (dB) = 20			
Trace Mode = VIEW			



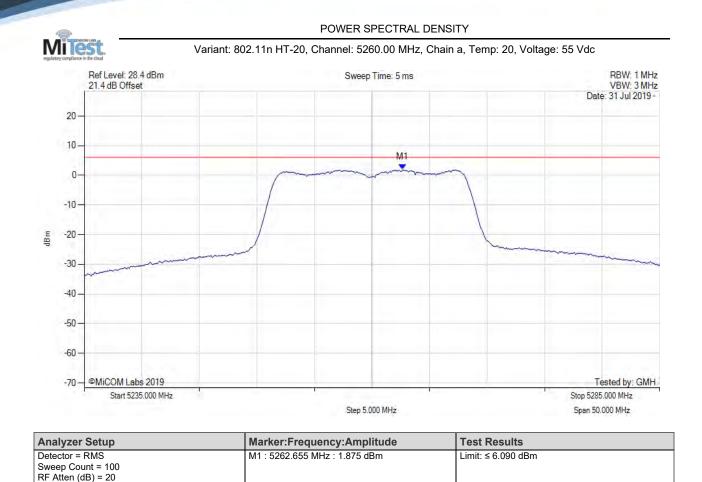
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5301.400 MHz : -7.830 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5301.400 MHz : -7.275 dBm	Margin: -16.4 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.56 dB	-
Trace Mode = VIEW		

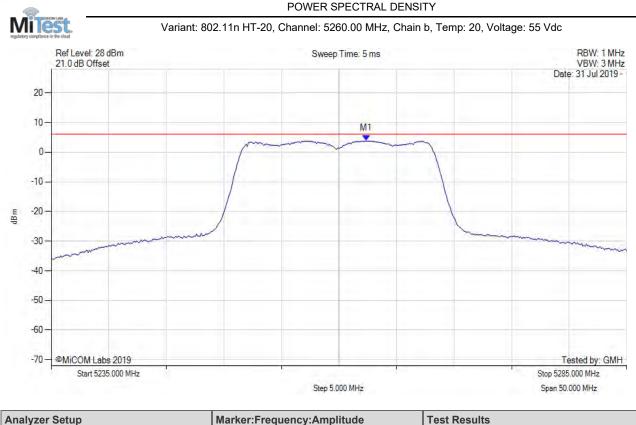




back to matrix

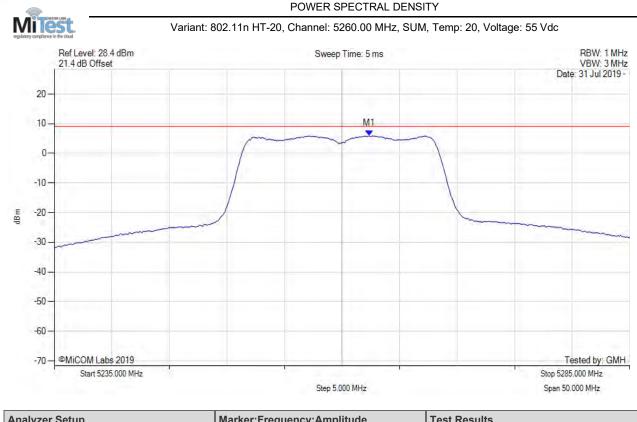
Trace Mode = VIEW





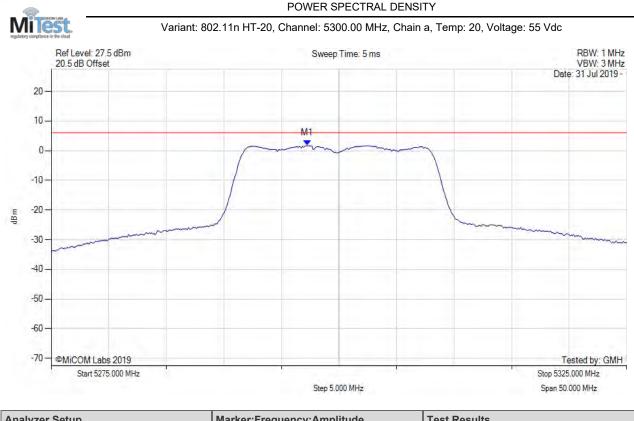
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5262.355 MHz : 3.812 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





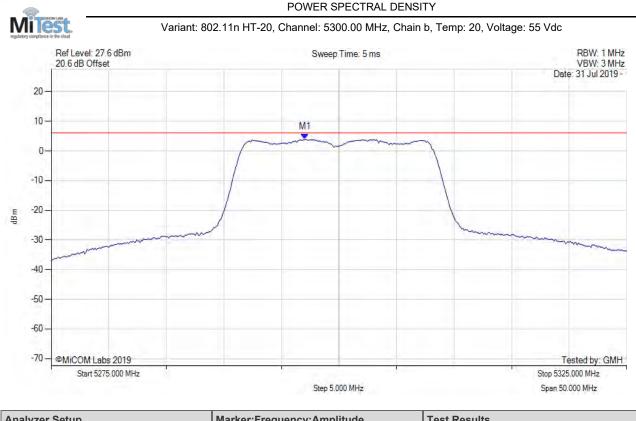
Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5262.400 MHz : 5.930 dBm	Limit: ≤ 9.1 dBm	
Sweep Count = 100	M1 + DCCF : 5262.400 MHz : 6.018 dBm	Margin: -3.1 dB	
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-	
Trace Mode = VIEW			





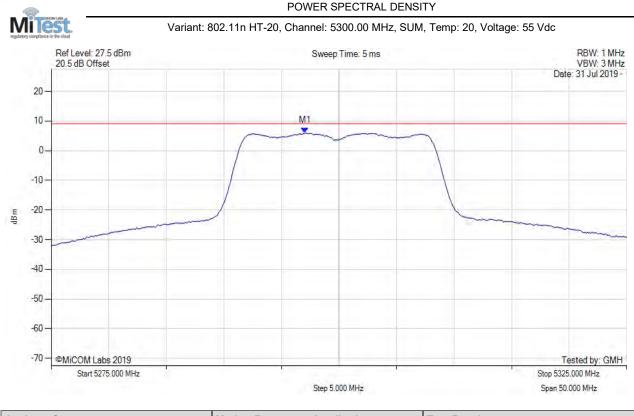
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5297.244 MHz : 1.744 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





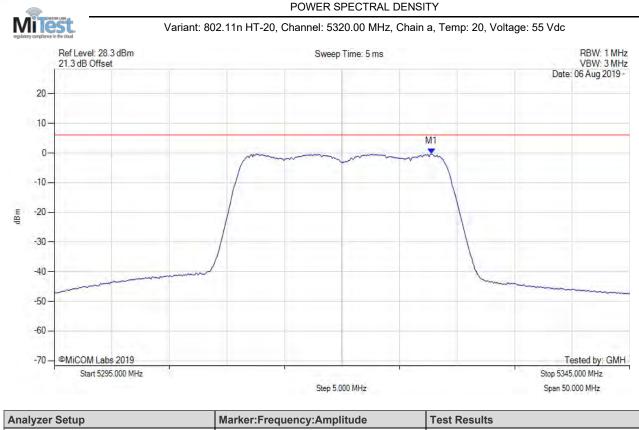
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5297.044 MHz : 3.890 dBm	Channel Frequency: 5300.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





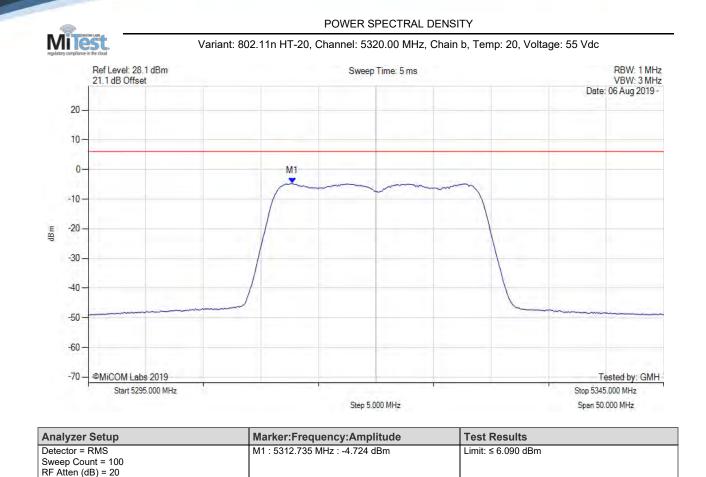
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5297.000 MHz : 5.914 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5297.000 MHz : 6.002 dBm	Margin: -3.1 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		





Analyzer Setup	warker.Frequency.Ampiltude	Test Results
Detector = RMS	M1 : 5327.766 MHz : -0.320 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

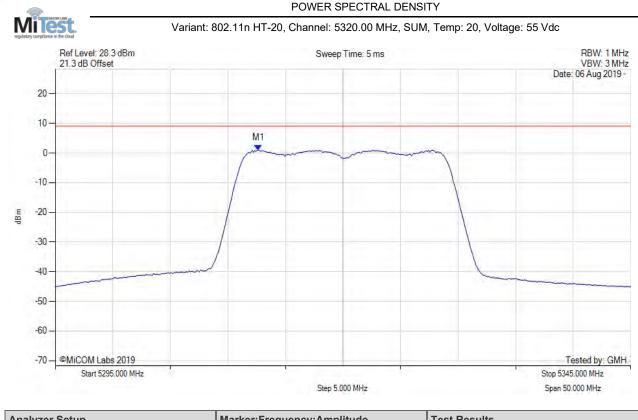




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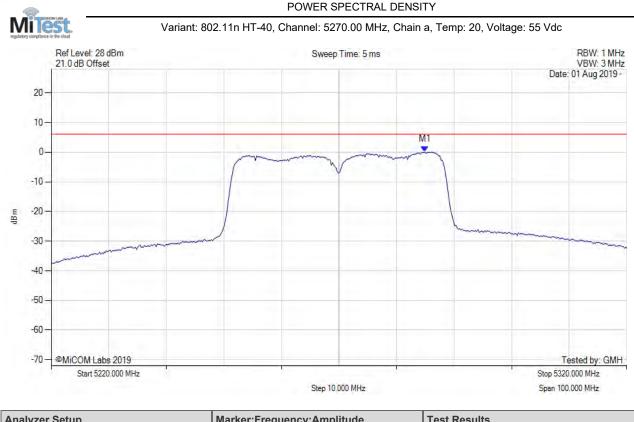
Trace Mode = VIEW





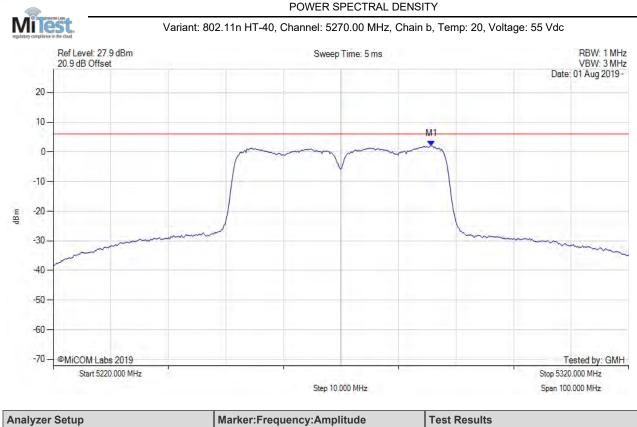
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5312.600 MHz : 1.008 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5312.600 MHz : 1.096 dBm	Margin: -8.0 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		





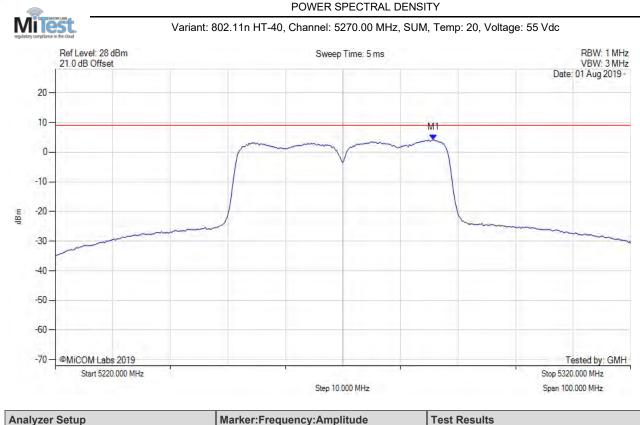
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5284.930 MHz : 0.114 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5285.731 MHz : 2.023 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

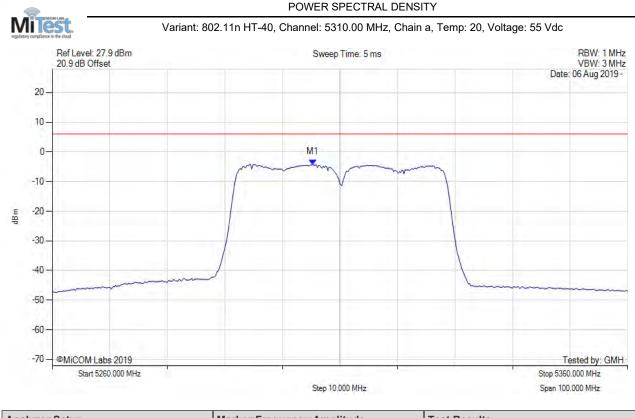




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5285.700 MHz : 4.134 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5285.700 MHz : 4.222 dBm	Margin: -4.9 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		

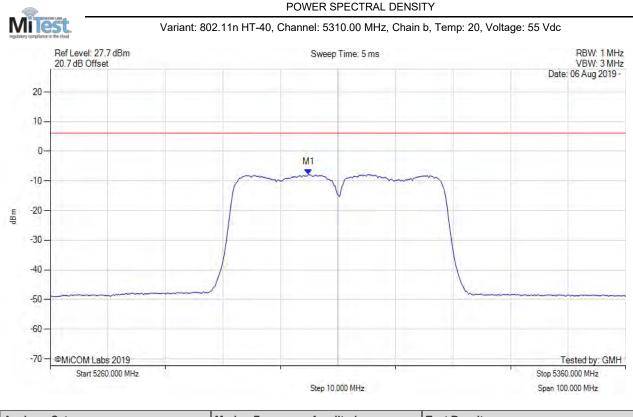


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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5305.291 MHz : -4.252 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5304.890 MHz : -7.772 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5305.300 MHz : -2.720 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5305.300 MHz : -2.632 dBm	Margin: -11.7 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		

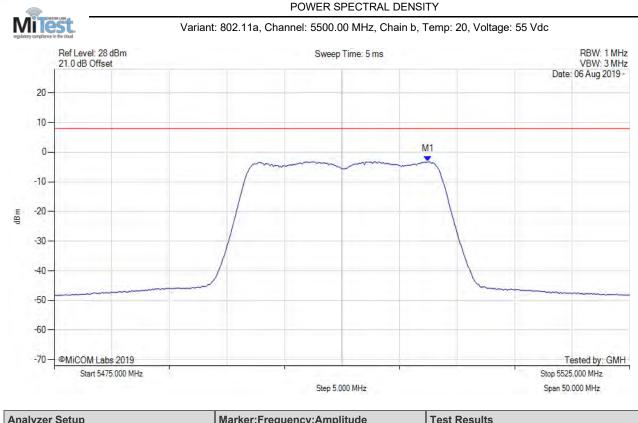




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5502.756 MHz : 0.395 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



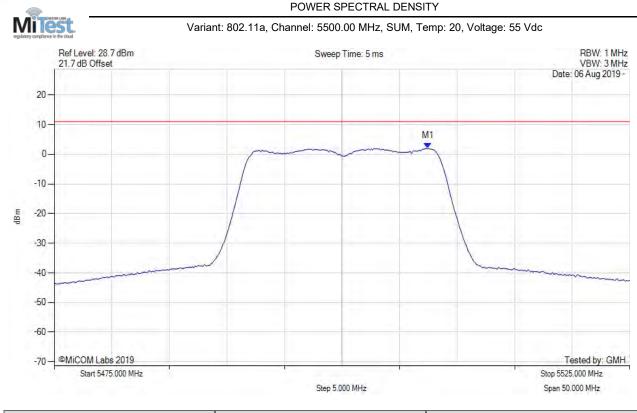
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5507.465 MHz : -3.211 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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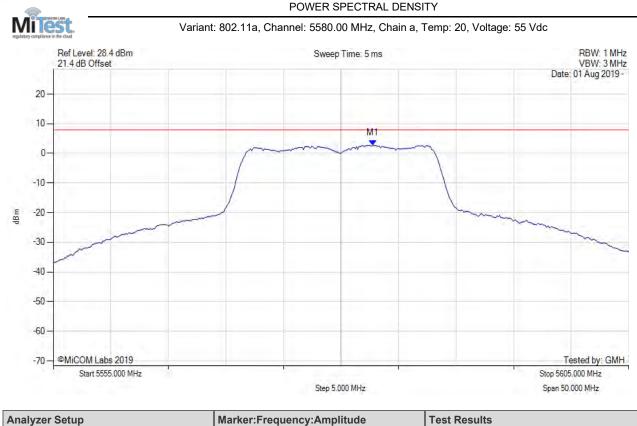
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5507.500 MHz : 1.965 dBm	Limit: ≤ 11.0 dBm	
Sweep Count = 100	M1 + DCCF : 5507.500 MHz : 2.053 dBm	Margin: -9.0 dB	
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB		
Trace Mode = VIEW			

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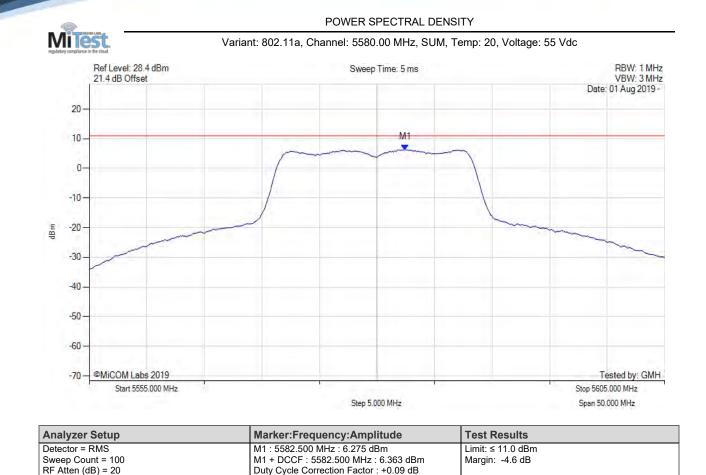
Analyzer Setup	warker.Frequency.Ampiltude	Test Results
Detector = RMS	M1 : 5582.756 MHz : 2.716 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



POWER SPECTRAL DENSITY Mi Variant: 802.11a, Channel: 5580.00 MHz, Chain b, Temp: 20, Voltage: 55 Vdc Ref Level: 27.9 dBm Sweep Time: 5 ms RBW: 1 MHz 20.9 dB Offset VBW: 3 MHz Date: 01 Aug 2019 -20 10 M1 0--10--20 dBm -30 -40--50 -60 -70 -@MiCOM Labs 2019 Tested by: GMH Start 5555.000 MHz Stop 5605.000 MHz Step 5.000 MHz Span 50.000 MHz

Analyzer Setup	Marker:Frequency:Amplitude	lest Results
Detector = RMS	M1 : 5582.655 MHz : 3.826 dBm	Channel Frequency: 5580.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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Trace Mode = VIEW

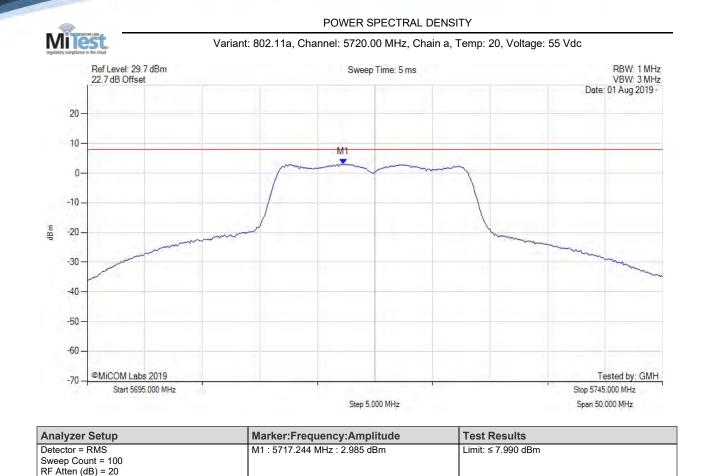
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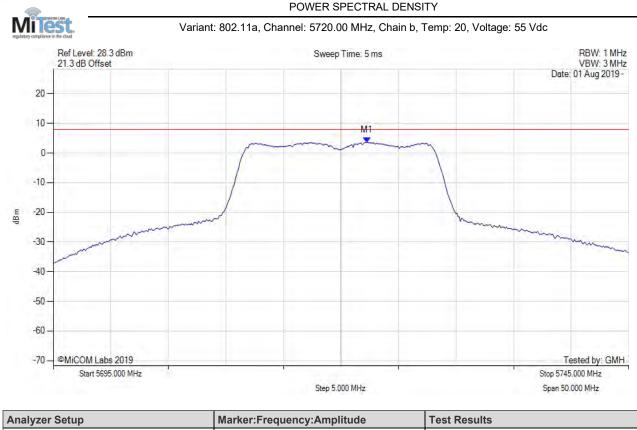
back to matrix

Trace Mode = VIEW



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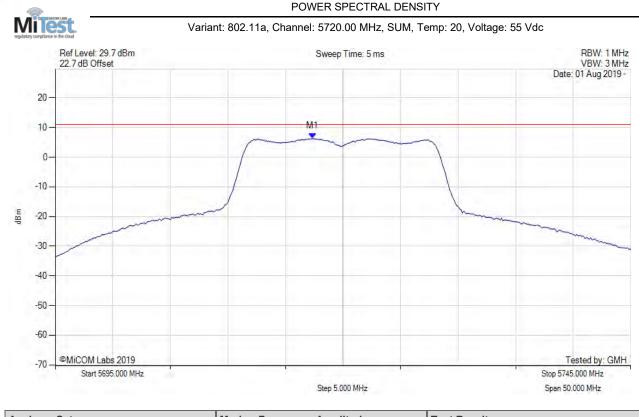
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Analyzer Setup	warker.Frequency.Ampiltude	Test Results
Detector = RMS	M1 : 5722.255 MHz : 3.580 dBm	Limit: ≤ 7.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5717.300 MHz : 6.262 dBm	Limit: ≤ 11.0 dBm
Sweep Count = 100	M1 + DCCF : 5717.300 MHz : 6.350 dBm	Margin: -4.7 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		

back to matrix

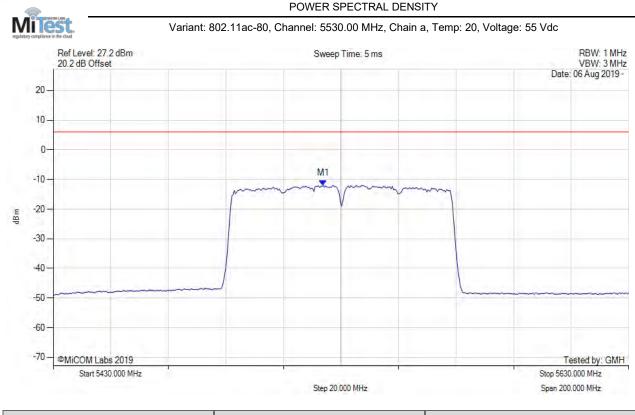
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5523.788 MHz : -12.007 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

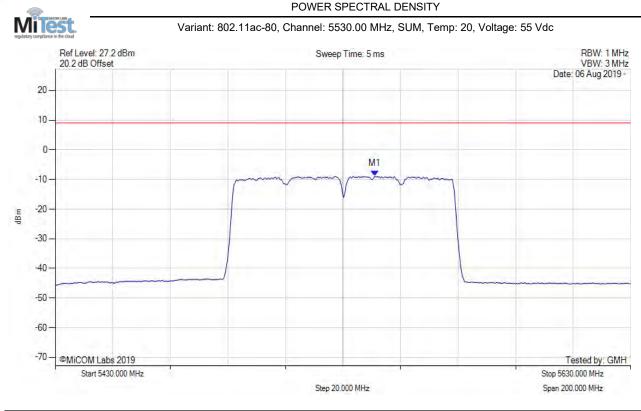


POWER SPECTRAL DENSITY Mi Variant: 802.11ac-80, Channel: 5530.00 MHz, Chain b, Temp: 20, Voltage: 55 Vdc RBW: 1 MHz VBW: 3 MHz Ref Level: 27.6 dBm Sweep Time: 5 ms 20.6 dB Offset Date: 06 Aug 2019 -20 10 0-M1 -10 -20 dBm -30 --40--50 -60 -70 -@MiCOM Labs 2019 Tested by: GMH Start 5430.000 MHz Stop 5630.000 MHz Step 20.000 MHz Span 200.000 MHz

Marker:Frequency:Amplitude	Test Results
M1 : 5554.649 MHz : -11.498 dBm	Limit: ≤ 6.090 dBm



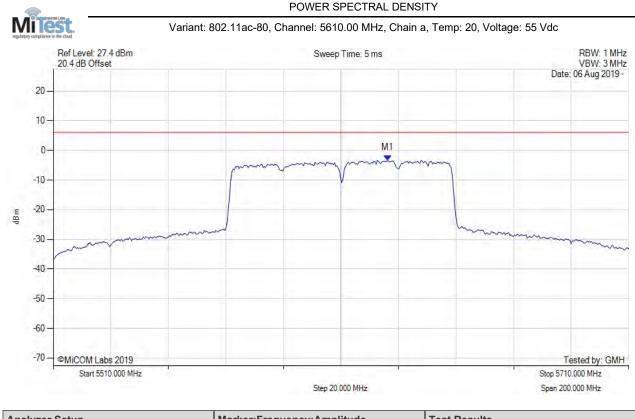
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5541.000 MHz : -8.913 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5541.000 MHz : -8.358 dBm	Margin: -17.5 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.56 dB	-
Trace Mode = VIEW		

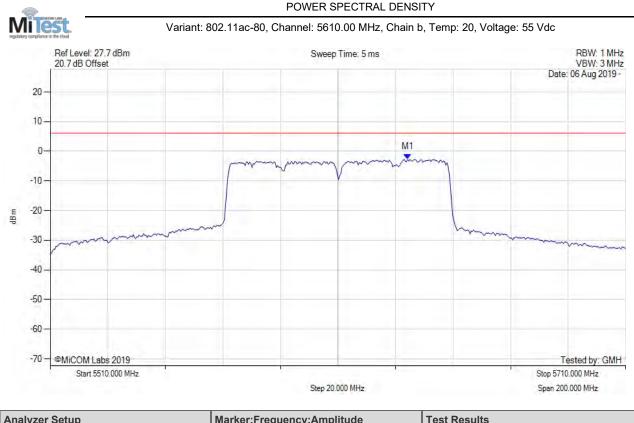


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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5626.232 MHz : -3.371 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

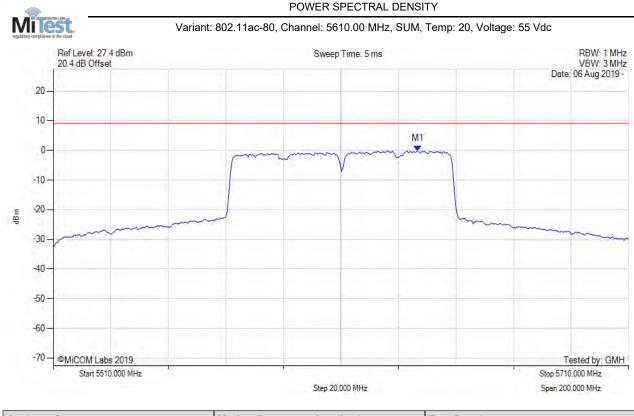




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5634.248 MHz : -2.744 dBm	Channel Frequency: 5610.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

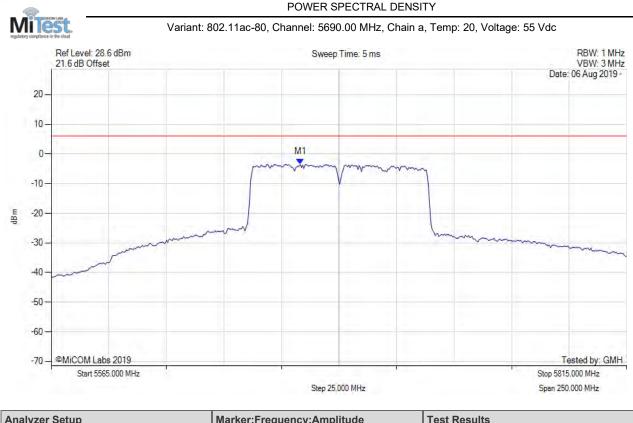


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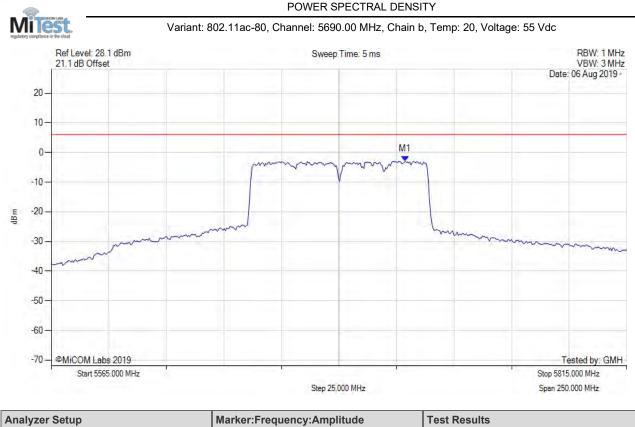
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5636.700 MHz : -0.168 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5636.700 MHz : 0.387 dBm	Margin: -8.7 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.56 dB	-
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5673.216 MHz : -3.542 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5718.808 MHz : -3.018 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



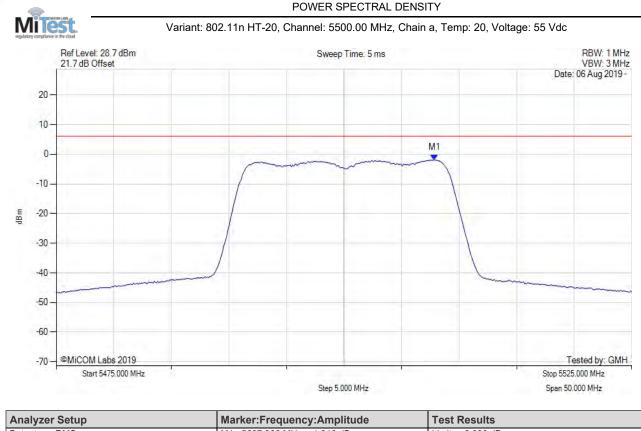
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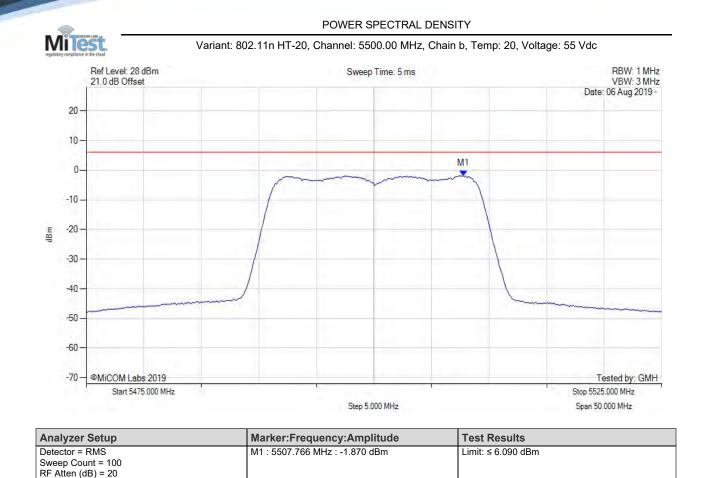
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5676.200 MHz : -0.389 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5676.200 MHz : 0.166 dBm	Margin: -8.9 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.56 dB	-
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5507.866 MHz : -1.916 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

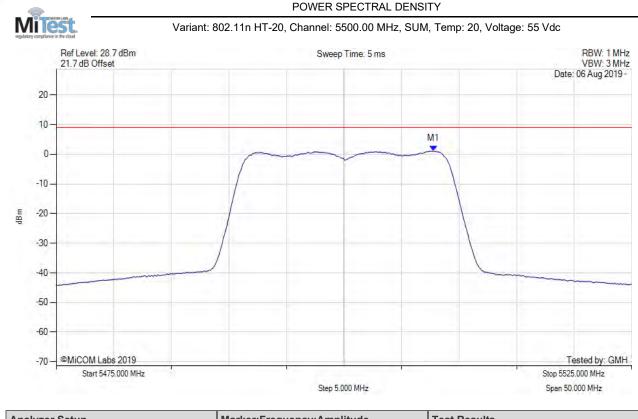




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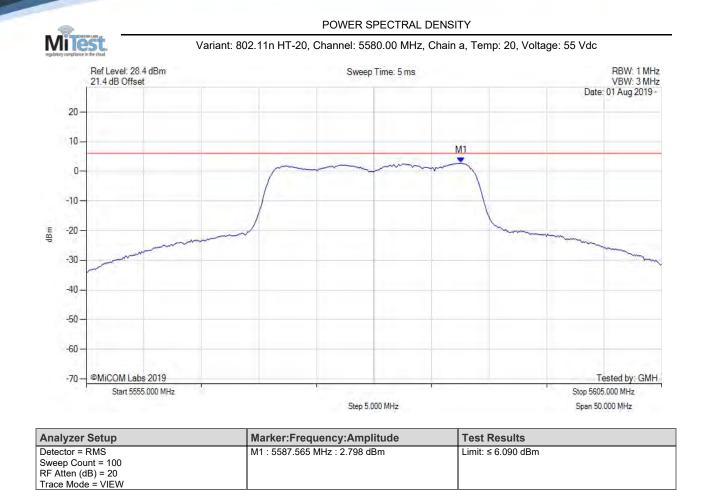


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5507.800 MHz : 1.112 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5507.800 MHz : 1.200 dBm	Margin: -7.9 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		



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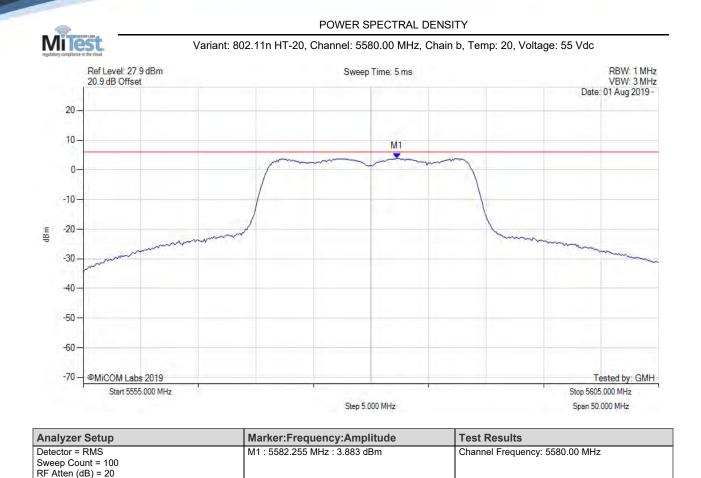
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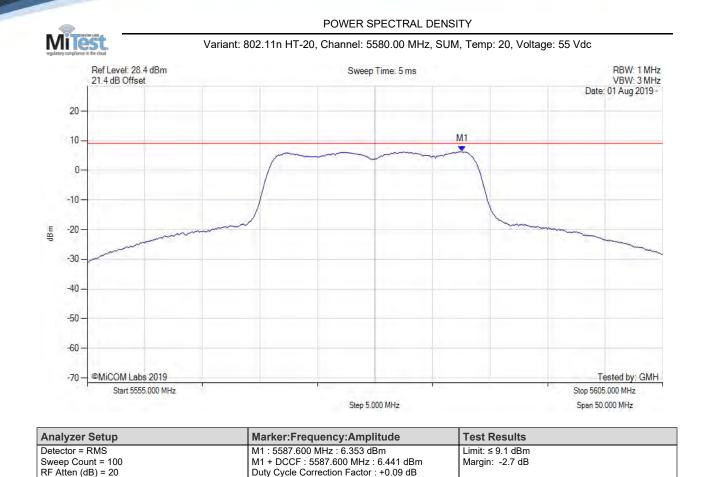
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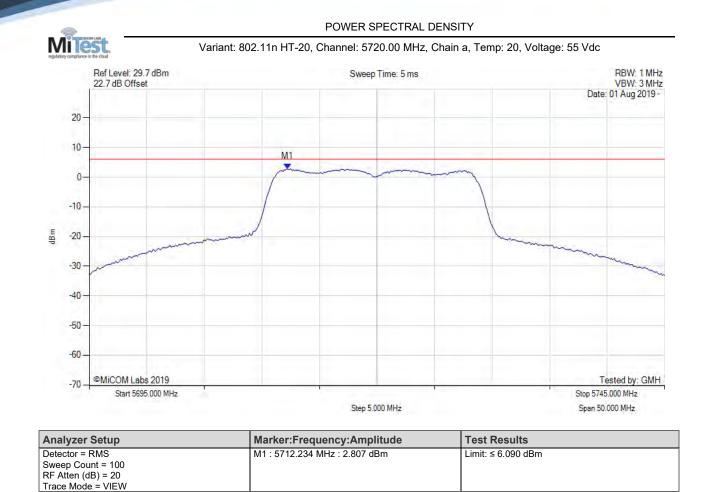
back to matrix



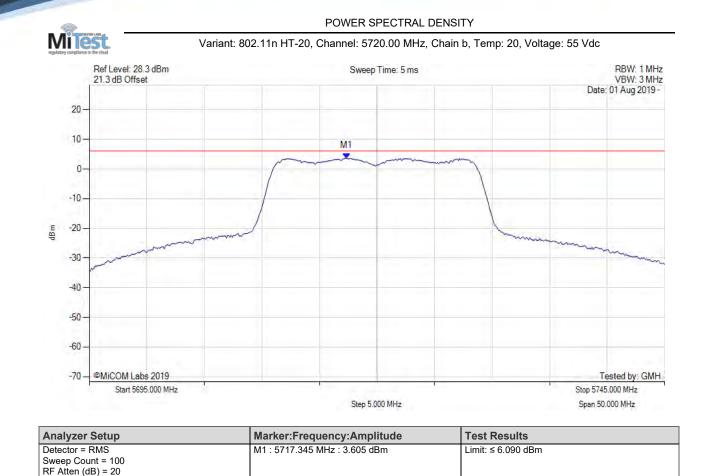


back to matrix



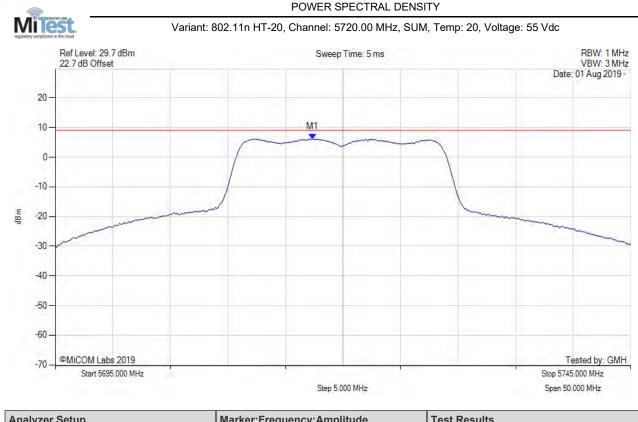






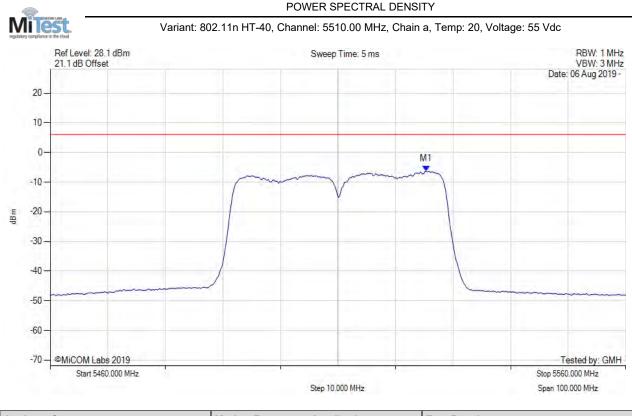
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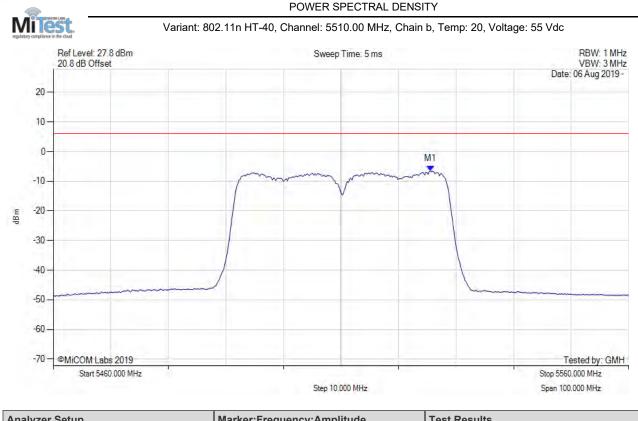
Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5717.300 MHz : 6.163 dBm	Limit: ≤ 9.1 dBm	
Sweep Count = 100	M1 + DCCF : 5717.300 MHz : 6.251 dBm	Margin: -2.9 dB	
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB		
Trace Mode = VIEW			





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5525.331 MHz : -6.294 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

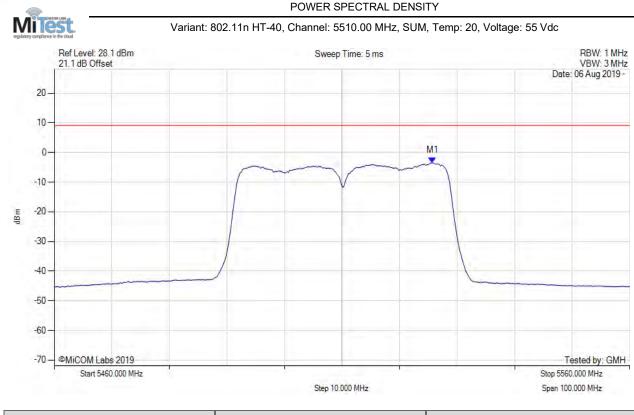




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5525.531 MHz : -6.593 dBm	Limit: ≤ 6.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

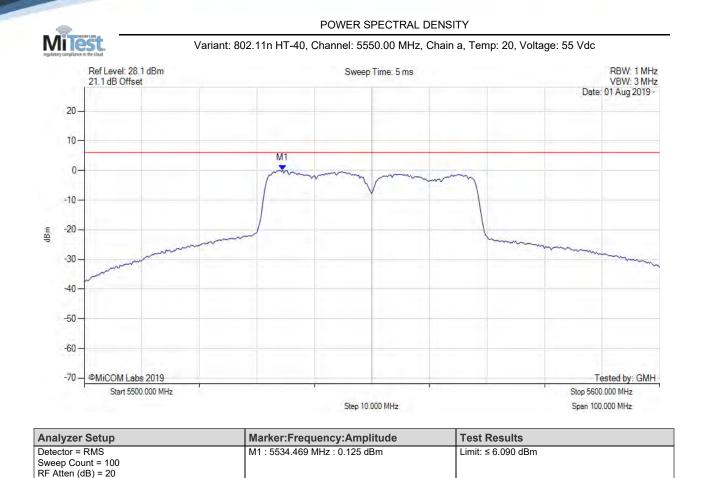


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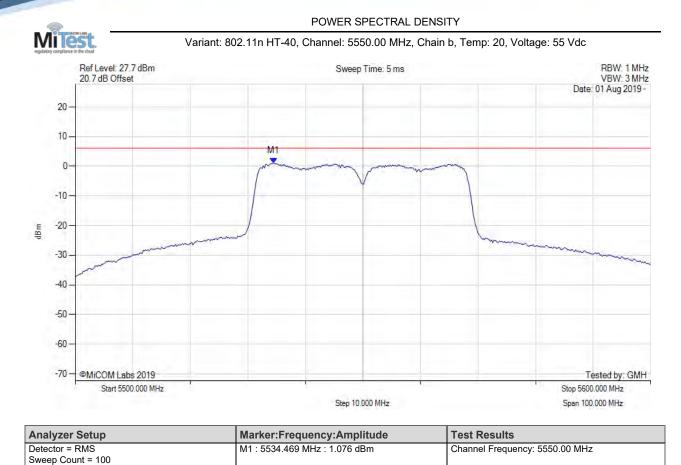
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5525.700 MHz : -3.504 dBm	Limit: ≤ 9.1 dBm
Sweep Count = 100	M1 + DCCF : 5525.700 MHz : -3.416 dBm	Margin: -12.5 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		





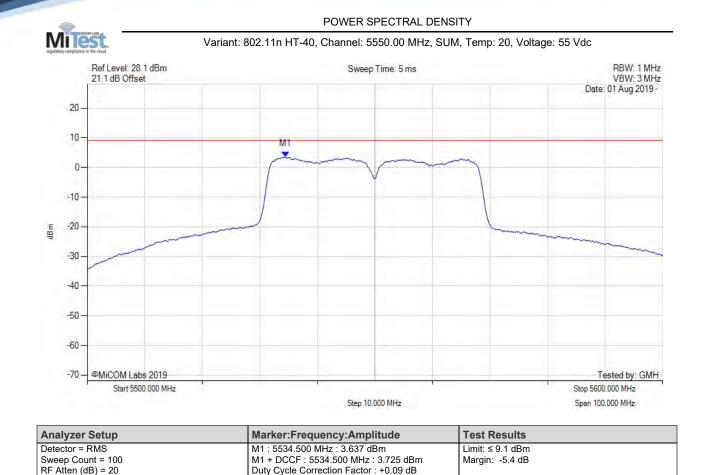
back to matrix





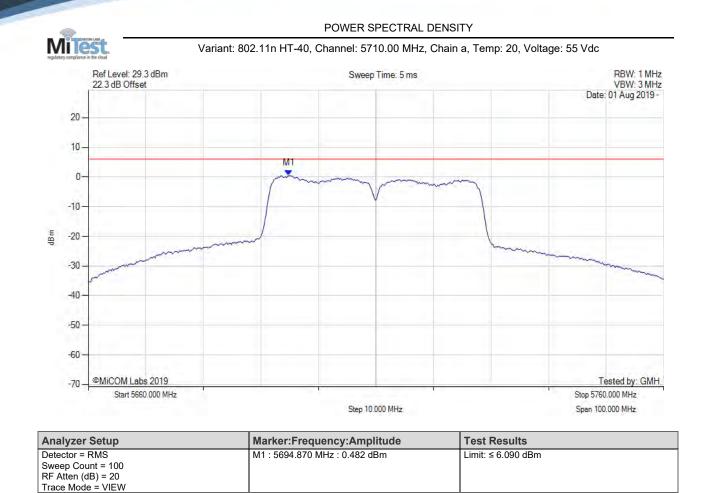
RF Atten (dB) = 20 Trace Mode = VIEW





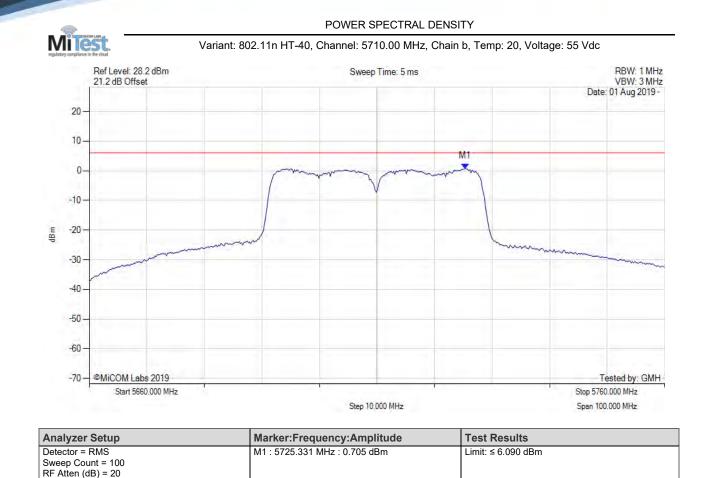
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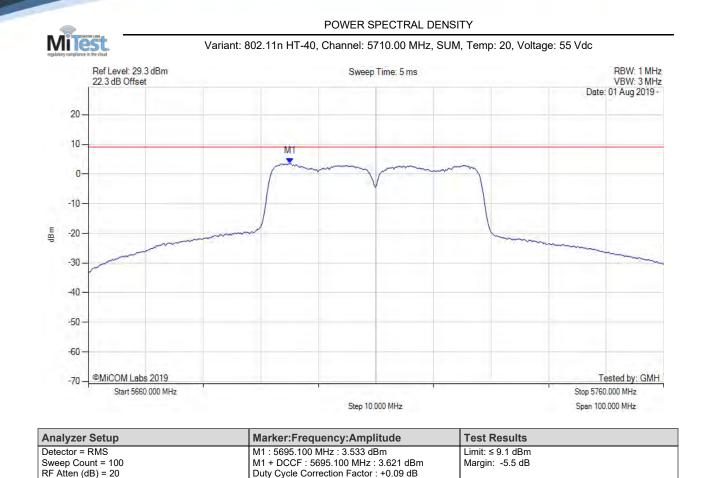
Trace Mode = VIEW

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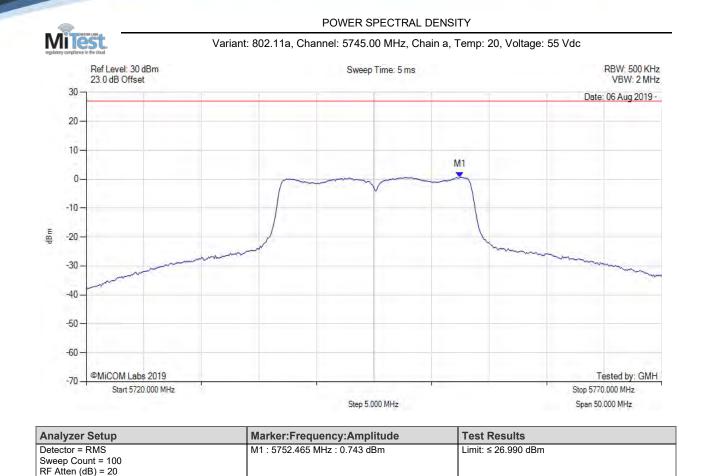




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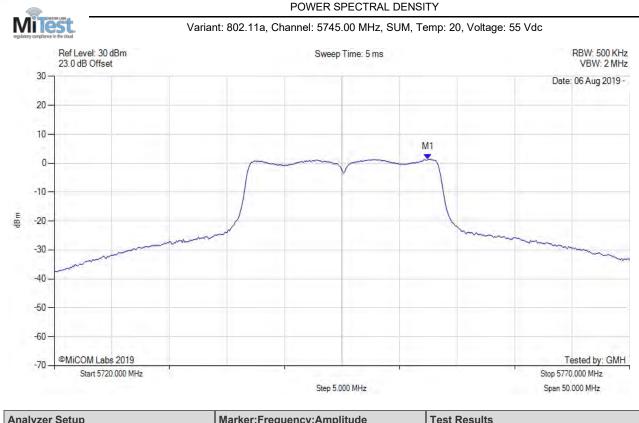
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POWER SPECTRAL DENSITY Mĭ Variant: 802.11a, Channel: 5745.00 MHz, Chain b, Temp: 20, Voltage: 55 Vdc Ref Level: 28.2 dBm Sweep Time: 5 ms RBW: 500 KHz 21.2 dB Offset VBW: 2 MHz Date: 06 Aug 2019 -20 10-0-M1 -10 -20 dBm -30--40--50 -60 -70 -©MiCOM Labs 2019 Tested by: GMH Start 5720.000 MHz Stop 5770.000 MHz Step 5.000 MHz Span 50.000 MHz

Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5752.866 MHz : -6.955 dBm	Limit: ≤ 26.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

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Analyzer Setup	Marker:Frequency:Amplitude	Test Results	
Detector = RMS	M1 : 5752.500 MHz : 1.400 dBm	Limit: ≤ 30.0 dBm	
Sweep Count = 100	M1 + DCCF : 5752.500 MHz : 1.488 dBm	Margin: -28.5 dB	
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB		
Trace Mode = VIEW			

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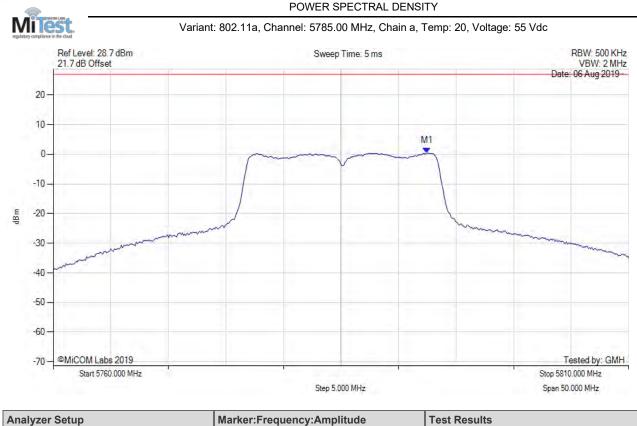
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5792.465 MHz : 0.404 dBm	Limit: ≤ 26.990 dBm
Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW		



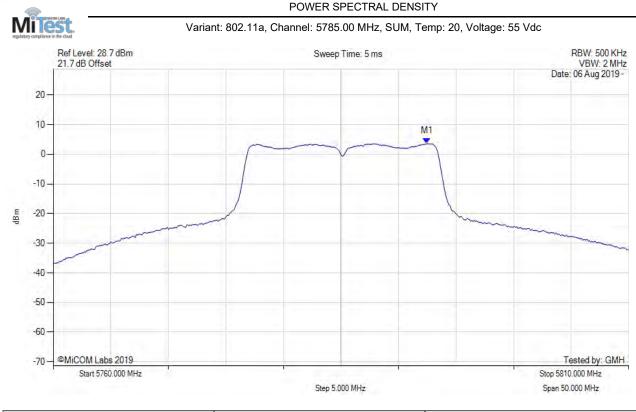
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POWER SPECTRAL DENSITY Mi Variant: 802.11a, Channel: 5785.00 MHz, Chain b, Temp: 20, Voltage: 55 Vdc Ref Level: 27.4 dBm Sweep Time: 5 ms RBW: 500 KHz 20.4 dB Offset VBW: 2 MHz Date: 06 Aug 2019 -20 10 Mi 0--10 -20 dBm -30 --40 -50 -60 -70 -©MiCOM Labs 2019 Tested by: GMH Start 5760.000 MHz Stop 5810.000 MHz Step 5.000 MHz Span 50.000 MHz

Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5792.465 MHz : 0.811 dBm	Channel Frequency: 5785.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

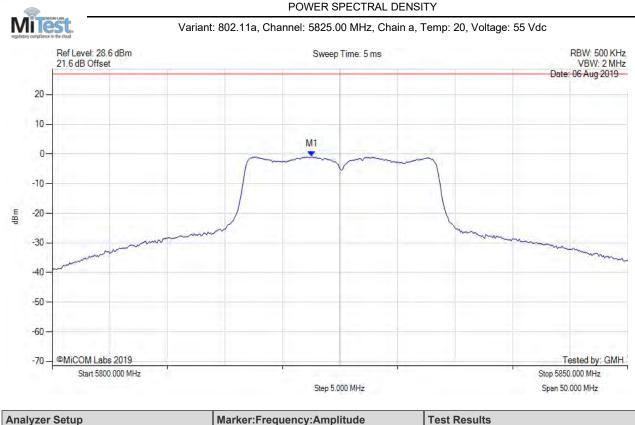
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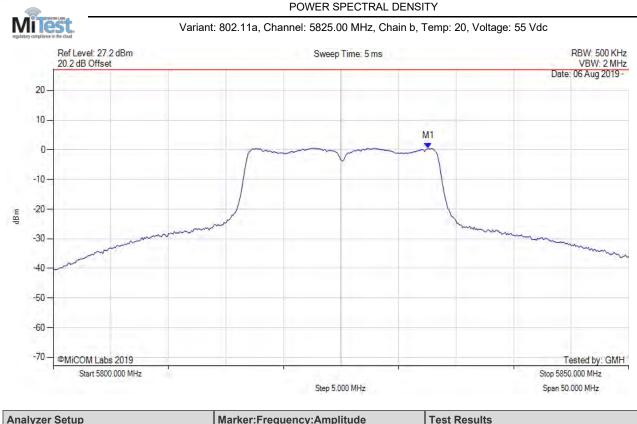
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5792.500 MHz : 3.623 dBm	Limit: ≤ 30.0 dBm
Sweep Count = 100	M1 + DCCF : 5792.500 MHz : 3.711 dBm	Margin: -26.3 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5822.545 MHz : -0.953 dBm	Limit: ≤ 26.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

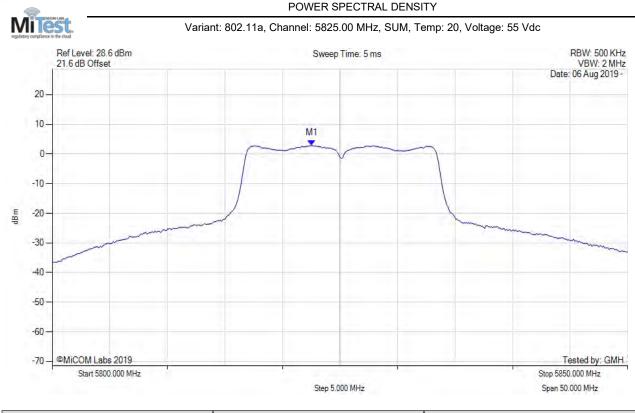




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5832.565 MHz : 0.538 dBm	Limit: ≤ 26.990 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

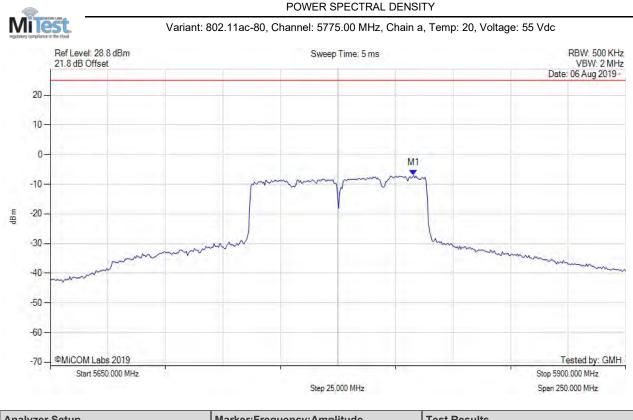
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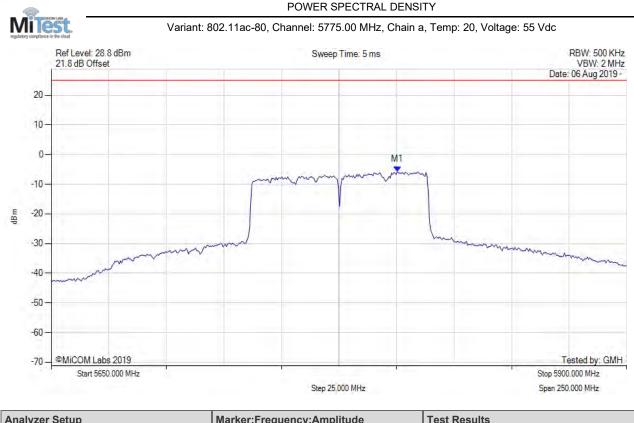
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5822.500 MHz : 2.843 dBm	Limit: ≤ 30.0 dBm
Sweep Count = 100	M1 + DCCF : 5822.500 MHz : 2.931 dBm	Margin: -27.1 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5807.816 MHz : -7.018 dBm	Limit: ≤ 25.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





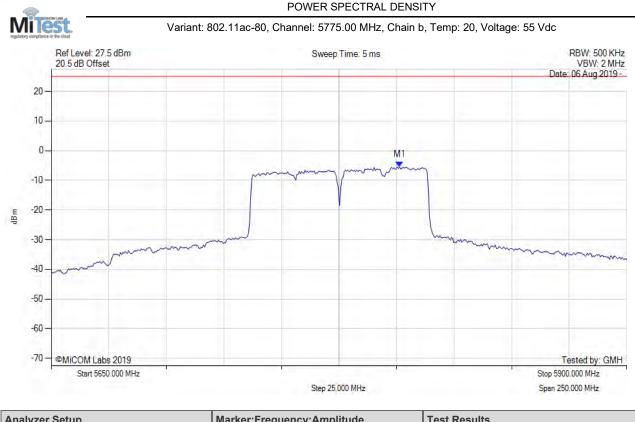
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5800.301 MHz : -5.749 dBm	Channel Frequency: 5775.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



POWER SPECTRAL DENSITY Mit Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: 20, Voltage: 55 Vdc Ref Level: 27.5 dBm Sweep Time: 5 ms RBW: 500 KHz VBW: 2 MHz 20.5 dB Offset Date: 06 Aug 2019 -20 10 0-M1 -10 -20 dBm -30--40 -50 -60 -70-©MiCOM Labs 2019 Tested by: GMH Start 5650.000 MHz Stop 5900.000 MHz Step 25.000 MHz Span 250.000 MHz

Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5801.804 MHz : -5.451 dBm	Limit: ≤ 25.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5801.303 MHz : -5.423 dBm	Channel Frequency: 5775.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

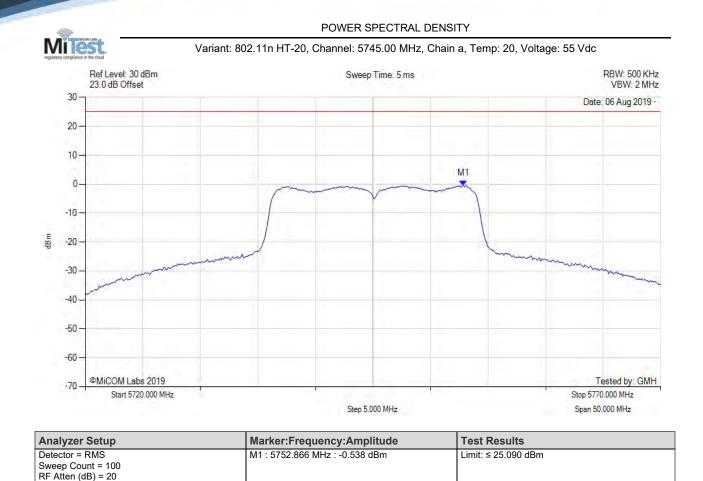


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POWER SPECTRAL DENSITY Mi Variant: 802.11ac-80, Channel: 5775.00 MHz, SUM, Temp: 20, Voltage: 55 Vdc Ref Level: 28.8 dBm Sweep Time: 5 ms RBW: 500 KHz 21.8 dB Offset VBW: 2 MHz Date: 06 Aug 2019 -20 10 M1 0--10--20dBm -30--40 -50 -60 ©MiCOM Labs 2019 Tested by: GMH -70 -Start 5650.000 MHz Stop 5900.000 MHz Step 25.000 MHz Span 250.000 MHz

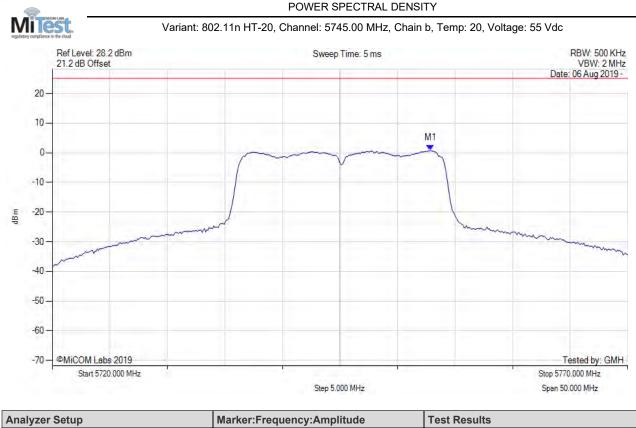
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5800.300 MHz : -0.013 dBm	Limit: ≤ 28.1 dBm
Sweep Count = 100	M1 + DCCF : 5800.300 MHz : 0.075 dBm	Margin: -28.0 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		





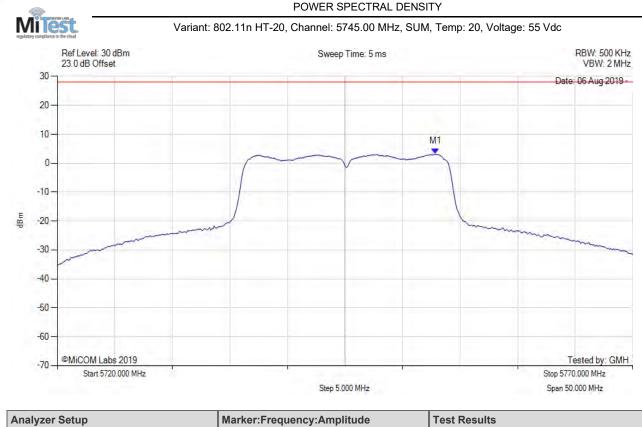
back to matrix





Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5752.866 MHz : 0.776 dBm	Limit: ≤ 25.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

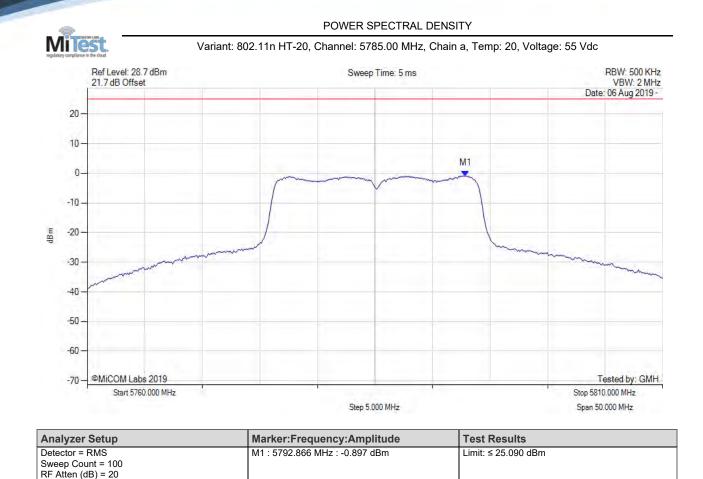




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5752.900 MHz : 3.179 dBm	Limit: ≤ 28.1 dBm
Sweep Count = 100	M1 + DCCF : 5752.900 MHz : 3.267 dBm	Margin: -24.8 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		



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Trace Mode = VIEW
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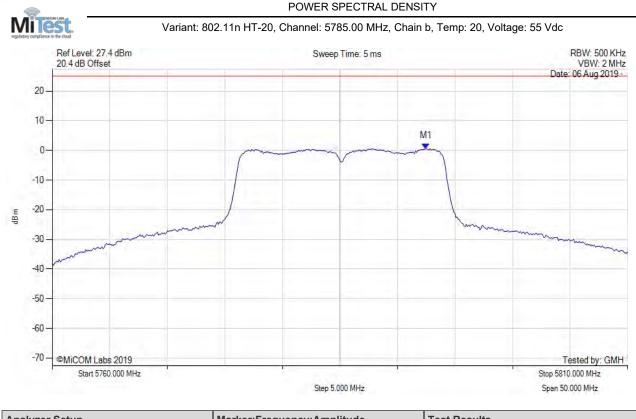
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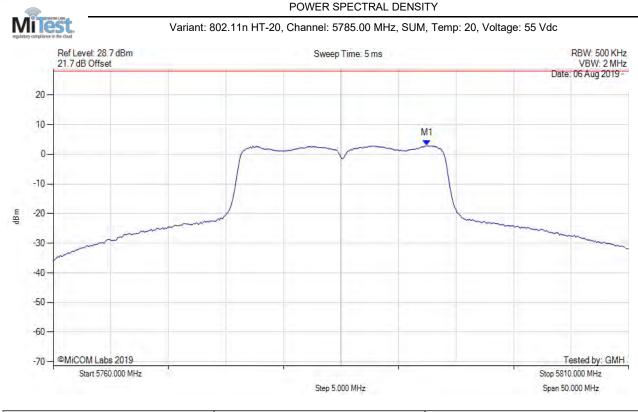
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5792.465 MHz : 0.600 dBm	Channel Frequency: 5785.00 MHz
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



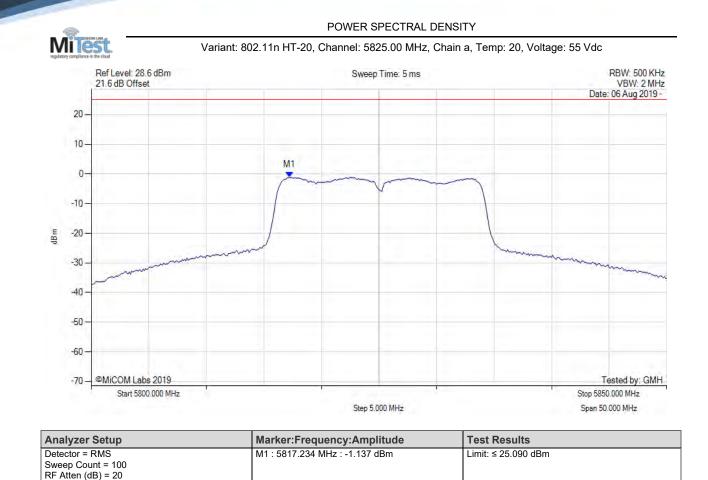
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5792.500 MHz : 2.877 dBm	Limit: ≤ 28.1 dBm
Sweep Count = 100	M1 + DCCF : 5792.500 MHz : 2.965 dBm	Margin: -25.1 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		

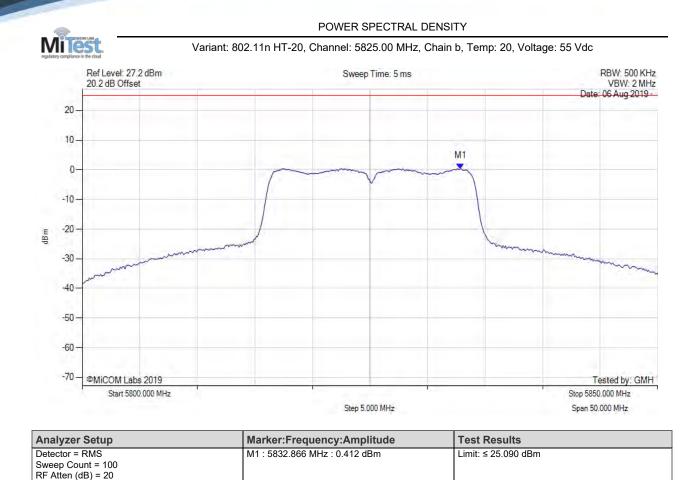


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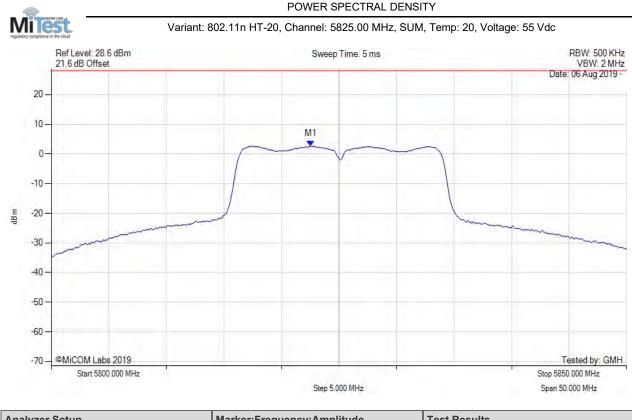




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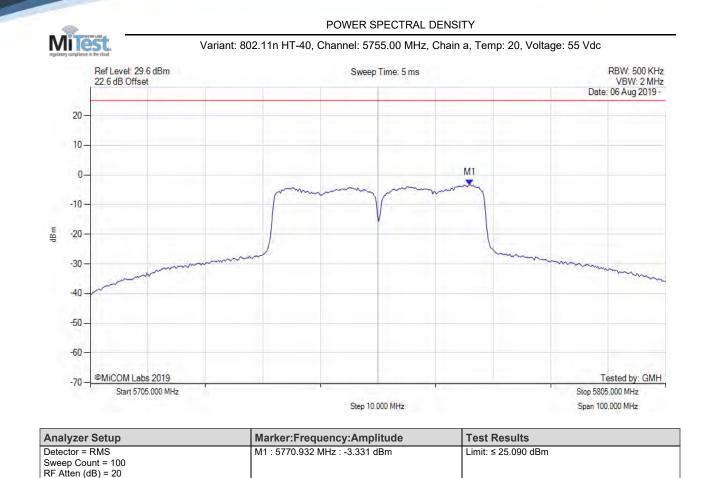
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5822.500 MHz : 2.644 dBm	Limit: ≤ 28.1 dBm
Sweep Count = 100	M1 + DCCF : 5822.500 MHz : 2.732 dBm	Margin: -25.4 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		



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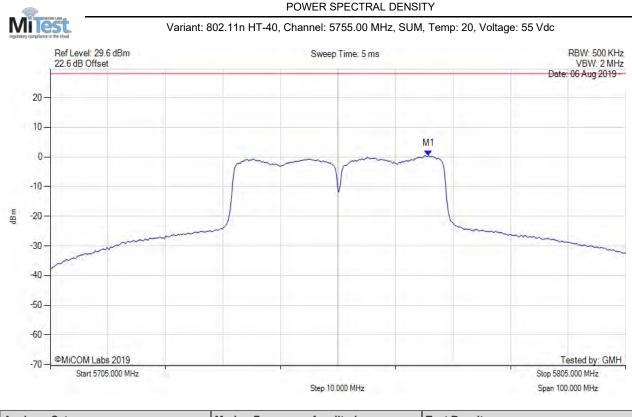


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POWER SPECTRAL DENSITY Mite Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain b, Temp: 20, Voltage: 55 Vdc Ref Level: 27.9 dBm Sweep Time: 5 ms RBW: 500 KHz VBW: 2 MHz 20.9 dB Offset Date: 06 Aug 2019 -20 10-M1 0--10--20 dBm -30 -40 -50 -60 -70 -@MiCOM Labs 2019 Tested by: GMH Start 5705.000 MHz Stop 5805.000 MHz Step 10.000 MHz Span 100.000 MHz

Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5770.130 MHz : -1.869 dBm	Limit: ≤ 25.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		

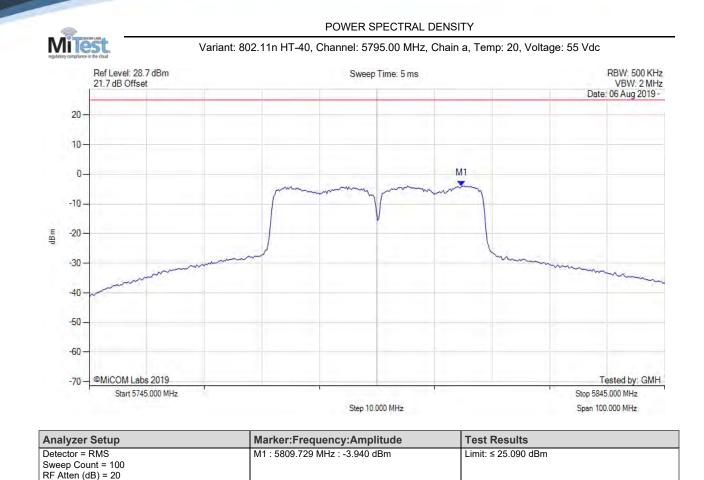




Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5770.700 MHz : 0.398 dBm	Limit: ≤ 28.1 dBm
Sweep Count = 100	M1 + DCCF : 5770.700 MHz : 0.486 dBm	Margin: -27.6 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	
Trace Mode = VIEW		



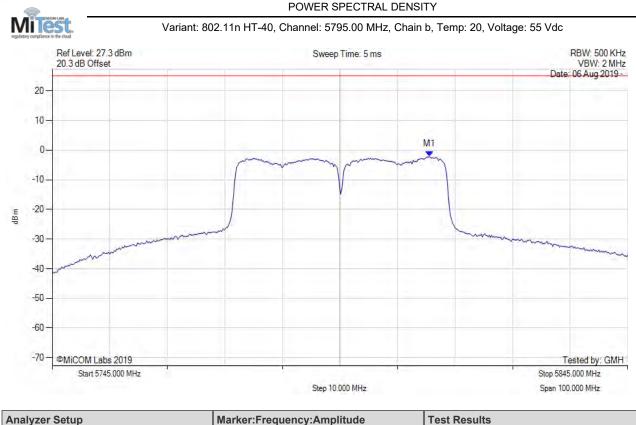
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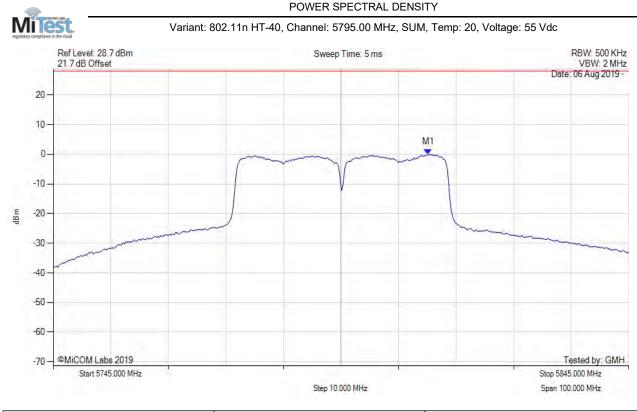
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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5810.531 MHz : -2.196 dBm	Limit: ≤ 25.090 dBm
Sweep Count = 100		
RF Atten (dB) = 20		
Trace Mode = VIEW		



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Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS	M1 : 5810.100 MHz : -0.051 dBm	Limit: ≤ 28.1 dBm
Sweep Count = 100	M1 + DCCF : 5810.100 MHz : 0.037 dBm	Margin: -28.1 dB
RF Atten (dB) = 20	Duty Cycle Correction Factor : +0.09 dB	-
Trace Mode = VIEW		





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