

Produkte
Products

Prüfbericht - Nr.: 19660146 004		Seite 1 von 58	
<i>Test Report No.:</i>		<i>Page 1 of 58</i>	
Auftraggeber: <i>Client:</i>	Redpine Signals Inc. 2107 N.First Street, Suite 680 San Jose, CA 95131-2019 U.S.A		
Gegenstand der Prüfung: <i>Test item:</i>	802.11 abgn WiFi/BT/Zigbee MODULE		
Bezeichnung: <i>Identification:</i>	RS9113DB	Serien-Nr.: <i>Serial No.</i>	Engineering Sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	1803095560	Eingangsdatum: <i>Date of receipt:</i>	31.08.2015
Prüfort: <i>Testing location:</i>	Refer Page 4 of 58 for test facilities		
Prüfgrundlage: <i>Test specification:</i>	FCC Part 15, Subpart E ANSI C63.10-2013		
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The tests item passed the test specification(s).</i>		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland (India) Pvt. Ltd. 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India FCC Registration No.: 176555		
geprüft / tested by:		kontrolliert / reviewed by:	
26.05.2017	Shrikanth S Naik Sr. Engineer	07.06.2017	Saibaba Siddapur Assistant Manager
<i>Datum</i> <i>Date</i>	<i>Name/Stellung</i> <i>Name/Position</i>	<i>Datum</i> <i>Date</i>	<i>Name/Stellung</i> <i>Name/Position</i>
	<i>Unterschrift</i> <i>Signature</i>		<i>Unterschrift</i> <i>Signature</i>
Sonstiges / Other Aspects: FCC ID: XF6-RS9113DB ; Class 2 Permissive Change			
Abkürzungen:	P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	Abbreviations:	P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

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Test Result Summary

Clause	Test Item	Result
15.407 (a)	Emission Bandwidth	Pass
15.407 (a)	Maximum Conducted Output Power	Pass
15.407 (a)	Power Spectral Density	Pass
15.209/15.205/15.407	Radiated Spurious Emissions and Restricted bands of operation	Pass
15.403 (h) (2)	Dynamic Frequency Selection	Pass

Note: Conducted measurements are done according to the procedure given in KDB No. 789033 D02 General U-NII Test Procedures New Rules v01r04

The Module is originally certified for FCC with FCC ID: **XF6-RS9113DB**, with respect to the changes made to originally certified module Class 2 permissive change has been applied. Changes made to the originally certified module are listed in the below table.

Application Purpose	Antenna	Wi-Fi (5GHz)
Class II Permissive Change	Redpine Antenna	Band 5.25 – 5.35 GHz & band 5.47 – 5.725GHz are added with 20MHz channel bandwidth and DFS slave mode without radar detection capability.
	Molex Antenna	
	Fractus Antenna	

Also, to address the test results for the above changes, the original test report 19660146 001 is been updated to 19660146 004.

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List of Test and Measurement Instruments

Equipment	Manufacturer	Model	S/N	Calibration Due Date	Used for Test Items
EMI Test Receiver	Rohde &Schwarz	ESU 40	100288	29.10.2017	Radiated Spurious Emissions
Broadband Antenna	Frankonia	ALX-4000	ALX-4000-814	09.01.2018	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	16.03.2018	
Emission Horn Antenna	ETS Lindgren	116706	00107323	02.11.2017	
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	22.12.2017	
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	13.02.2018	Antenna - Port Conducted Tests
Signal Analyzer	Rohde & Schwarz	FSV7	101644	01.12.2017	
Vector Signal Generator	Rohde & Schwarz	SMBV100	260789	03.12.2017	
Open Switch & Control Unit	Rohde & Schwarz	OSP120 Incl. B157	OSP120-101323 & B157-100894	16.06.2017	

Testing Facilities

TUV Rheinland (India) Private Limited
 No. 108, West Wing
 Electronic city Phase I
 Bangalore – 560100

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General Product Information

Product Function and Intended Use

The RS9113 module integrates a multi-threaded MAC processor with integrated analog peripherals and support for digital peripherals, baseband digital signal processor, analog front-end, crystal oscillator, calibration OTP memory, Dual band RF transceiver, Dual-band high-power amplifiers, baluns, diplexers, diversity switch and Quad-SPI Flash thus providing a fully-integrated solution for embedded wireless applications. The RS9113 based chips and modules leverage and improve upon Redpine's proven low power innovations from Lite-FTM products (RS9110) and provide WLAN 802.11n, BT4.0 and ZigBee convergence solution for integration into mobile and M2M communication devices. It can connect to a host processor through SDIO, USB, SPI or UART interfaces.

Ratings and System Details

Operating Frequency	5150 - 5350 MHz, 5470 – 5725 MHz, 5725 – 5850 MHz	
No. of channel	Refer Table 1 in page 7.	
Channel Spacing	20 MHz	
Transmitted Power	802.11a_5.25GHz to 5.725GHz	9.25dBm
	802.11n_5.25GHz to 5.725GHz	9.28dBm
Modulation	802.11a	OFDM with BPSK,QPSK, 16-QAM, 64-QAM
	802.11n	BPSK,QPSK,16-QAM,64-QAM
Data Rate	802.11n: MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps	
Antenna Type	Refer Table 2 in page 7.	
Supply Voltage	3.1-3.6 V DC	
Environmental	-40°C to +85°C	

Test Conditions:

Supply Voltage: 5V DC from USB

Environmental conditions:

Temperature: +23.3 ° C

RH: 62%

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Test Set-up and Operation Mode

Principle of Configuration Selection

Transmission was enabled with 100% duty cycle duty on low, mid and high channel.

Test Operation and Test Software

Test software was used to enable the transmission with 100% duty cycle, changing channels (low/mid/high) and data rates on the EUT for the tests in this report.

Special Accessories and Auxiliary Equipment

- None

Countermeasures to achieve EMC Compliance

- None

Test Modes – Data Rates and Modulations

For Radiated spurious emissions, the tests were performed for all data rates and only worst case results are reported in this report.

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Table of Carrier frequencies

Frequency Band	Channel No.	Channel Bandwidth (MHz)	Frequency (MHz)
UNII 1 (5150 – 5250 MHz)	36	20	5180
	40	20	5200
	44	20	5220
	48	20	5240
	38	40	5190
	46	40	5230
UNII 2A (5250 – 5350MHz)	52	20	5260
	56	20	5280
	60	20	5300
	64	20	5320
UNII 2C (5470 – 5725MHz)	100	20	5500
	104	20	5520
	108	20	5540
	112	20	5560
	116	20	5580
	120	20	5600
	124	20	5620
	128	20	5640
	132	20	5660
	136	20	5680
UNII 3 (5725 – 5850MHz)	140	20	5700
	149	20	5745
	143	20	5765
	157	20	5785
	161	20	5805
	165	20	5825
	151	40	5755
	159	40	5795

Table 1

Note: UNII 2A & UNII 2C bands are restricted to 20MHz channels only.

List of Antenna Used:

Make	Model/Part #	Antenna Gain at 2.4GHz (dBi)	Antenna Gain at 5 GHz (dBi)	Type of Antenna
Redpine	-	0.99	4.42	Trace
Molex	PS-47950-001	3	4.6	External
Fractus	FR05-S1-NO-1-004	1.8	4.9	Chip

Table 2

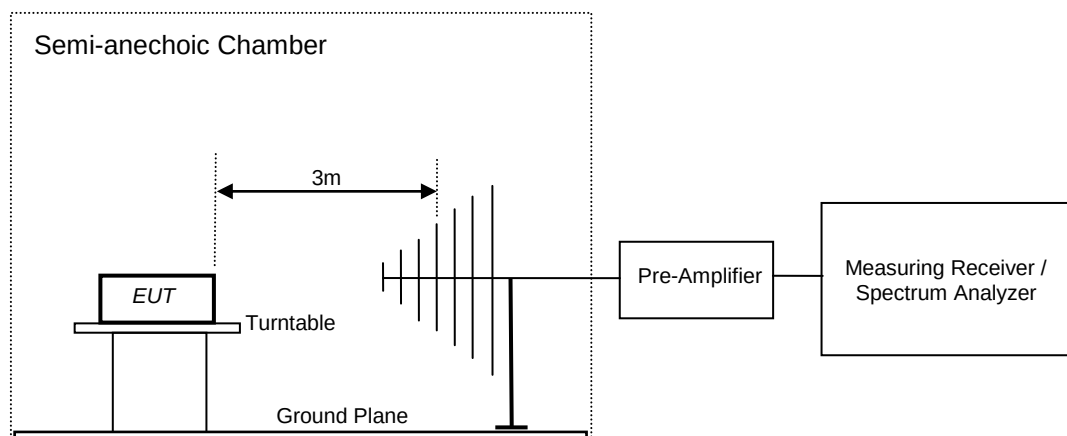
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Test Methodology

Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 meters far from the measuring antenna for below 1GHz. The equipment under test (EUT) was placed at the middle of the 1.5m high turntable, and the EUT is 3 meters far from the measuring antenna for above 1GHz. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.



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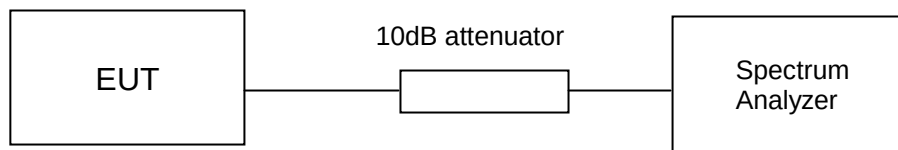
Test Results

**Emission Bandwidth
Result**

**Section 15.407 (a)
Pass**

Test Specification FCC Part 15 Section 15.407(a)
Measurement Bandwidth (RBW) 300 kHz

Test Method:

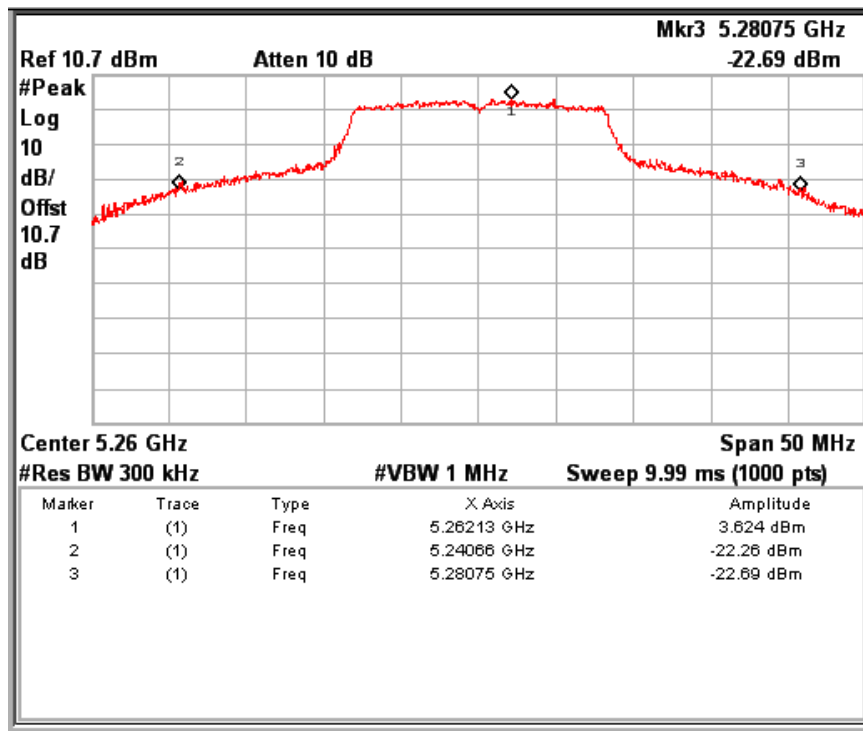


Test Result:

Modulation: 802.11a

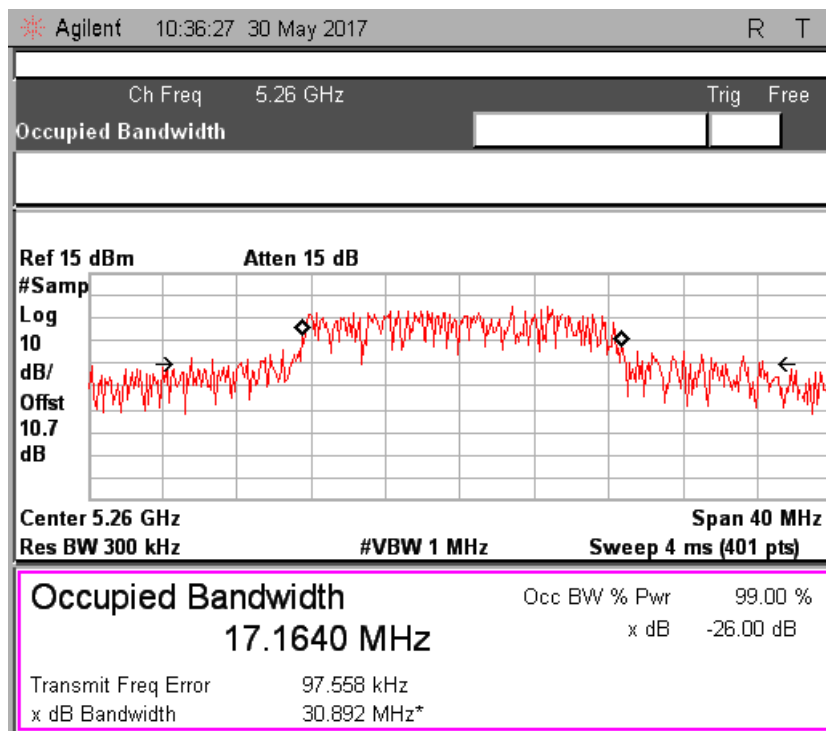
Data Rate (Mbps)	Channel. No	Frequency (MHz)	EBW (MHz)	OBW (MHz)
6	52	5260	40.09	17.16
	64	5320	38.63	16.89
	100	5500	38.63	16.83
	140	5700	37.58	16.71
54	52	5260	38.48	18.58
	64	5320	36.13	16.45
	100	5500	38.08	16.68
	140	5700	37.13	16.69

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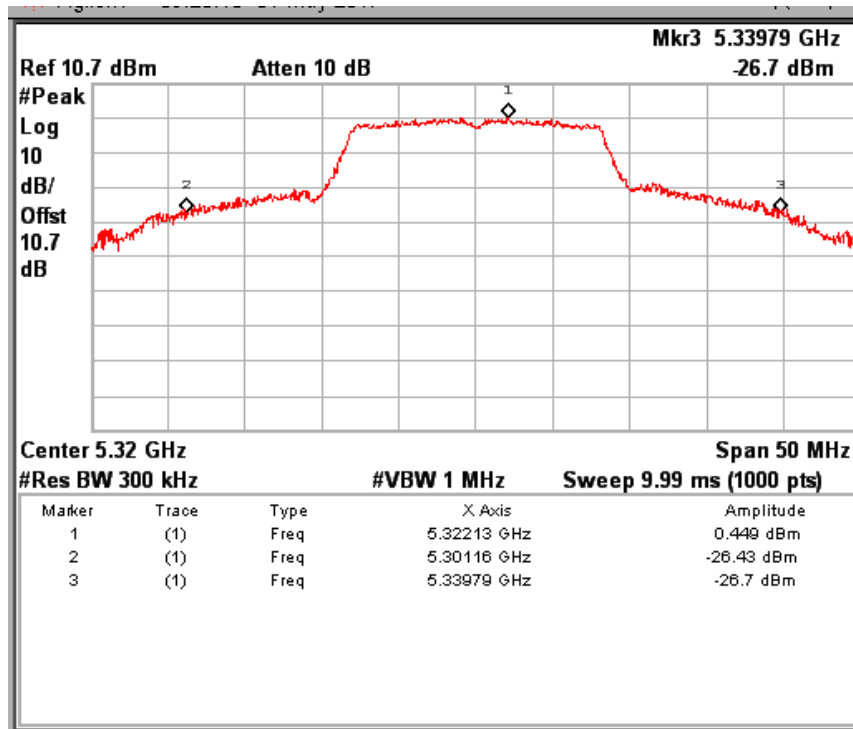
Data Rate: 6Mbps

Channel Frequency: 5260MHz



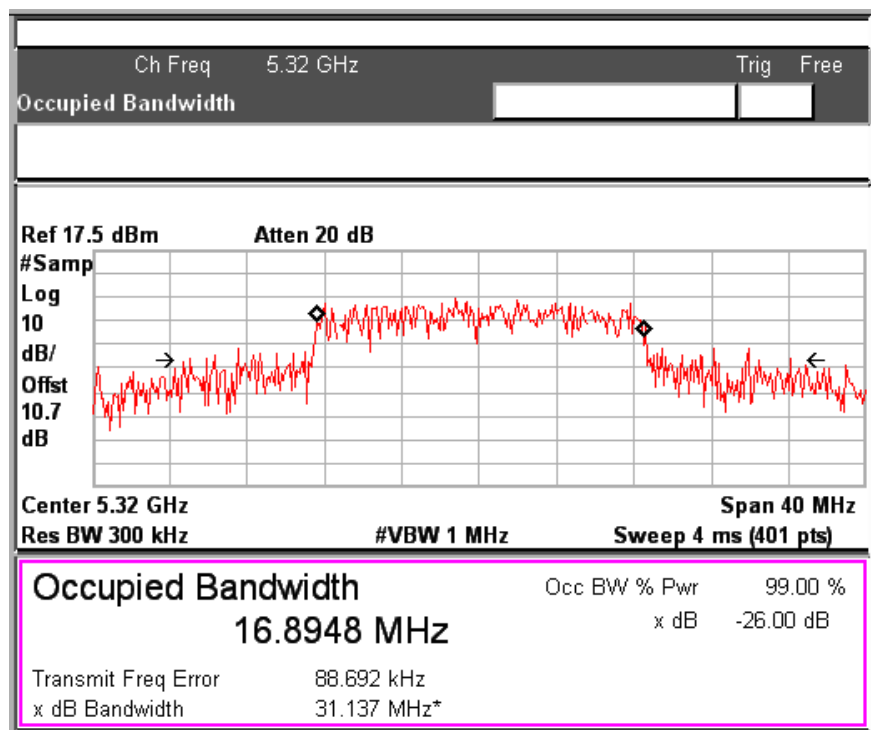
Data Rate: 6Mbps

Channel Frequency: 5260MHz



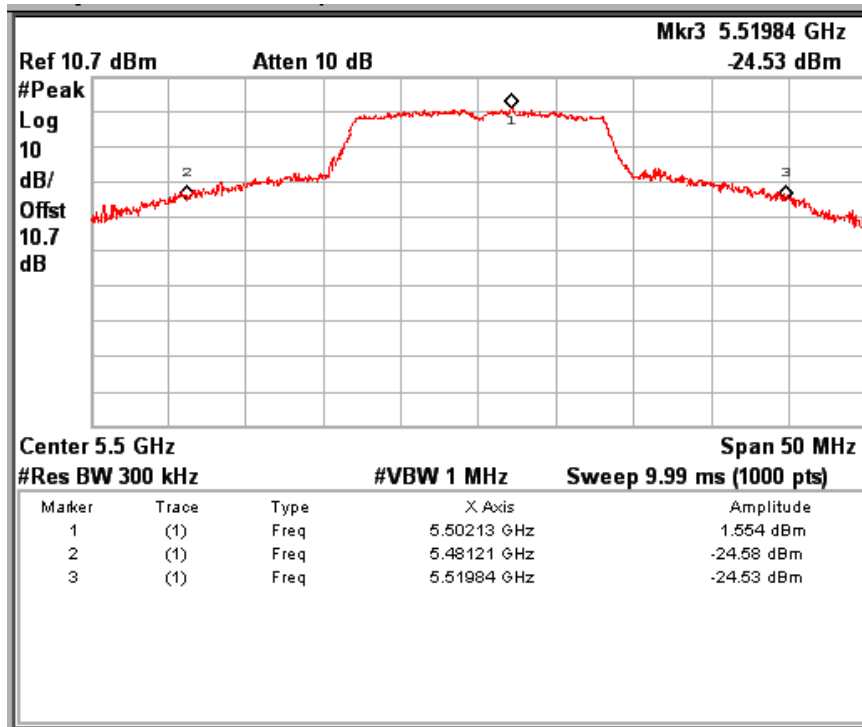
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Channel Frequency: 5320MHz



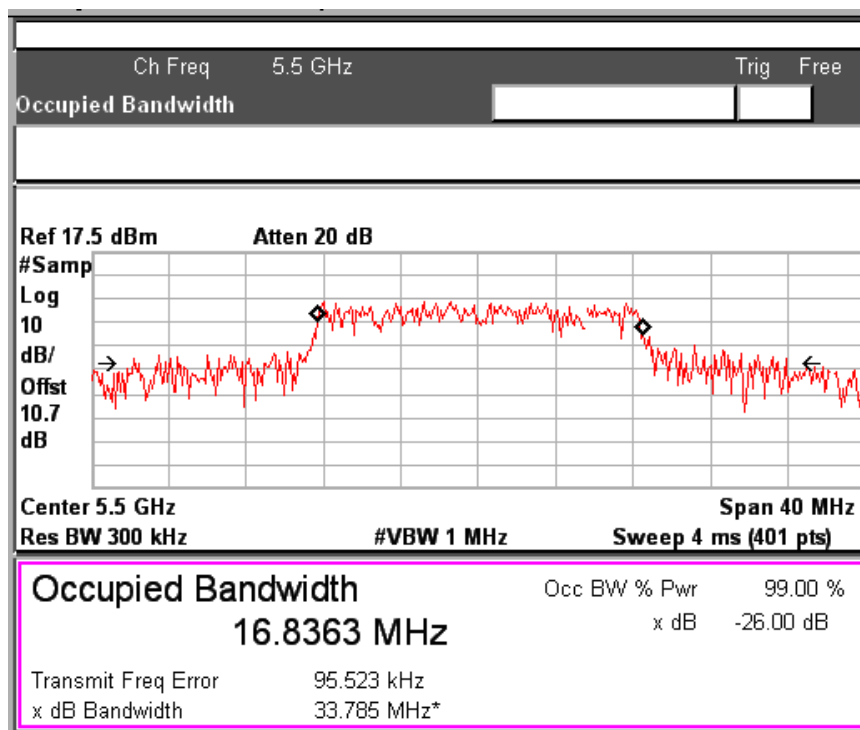
Data Rate: 6Mbps

Channel Frequency: 5320MHz



Data Rate: 6Mbps

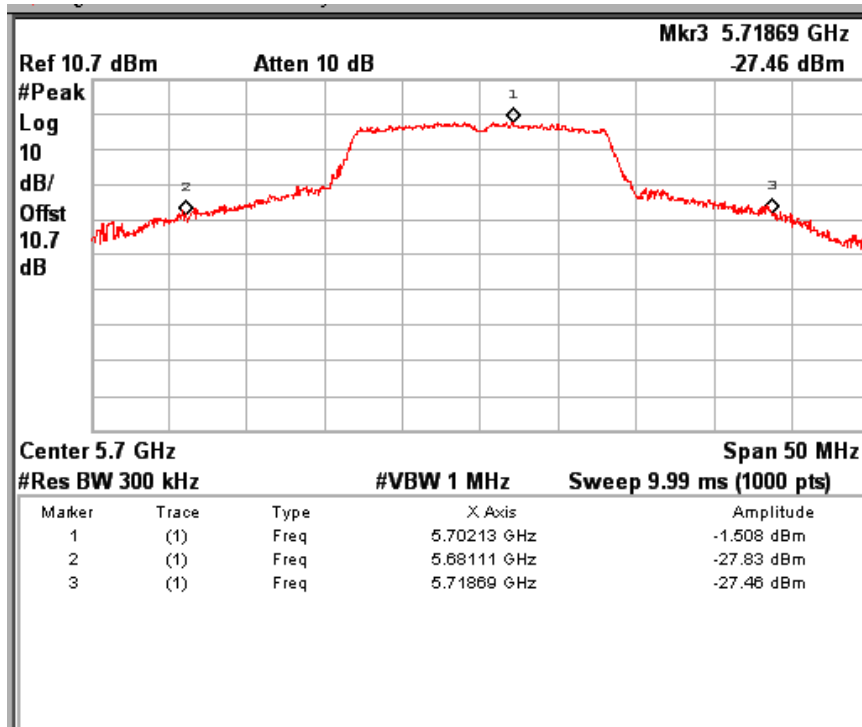
Channel Frequency: 5500MHz



Data Rate: 6Mbps

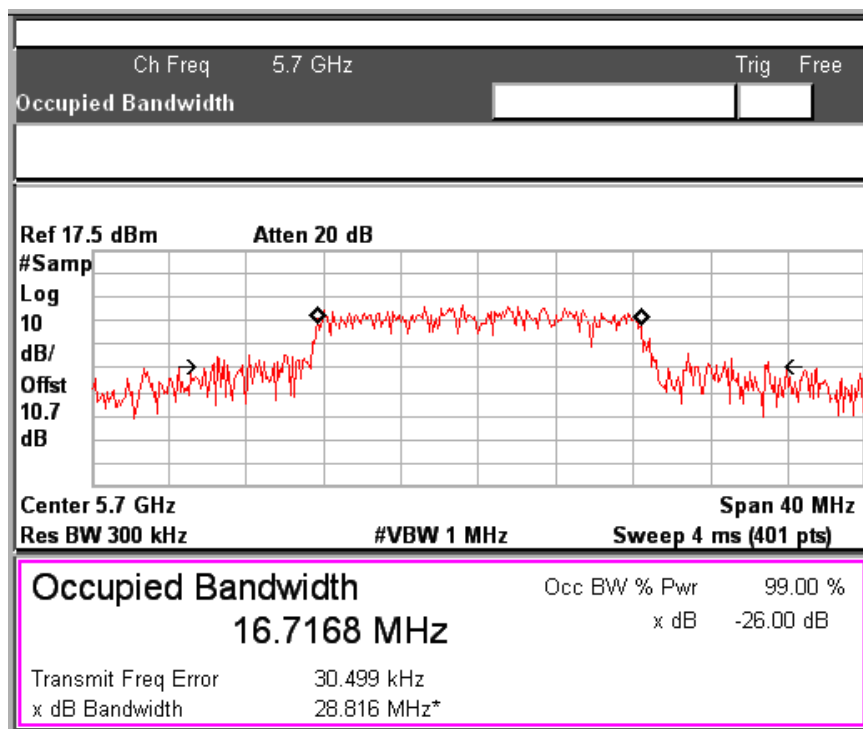
Channel Frequency: 5500MHz

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Data Rate: 6Mbps

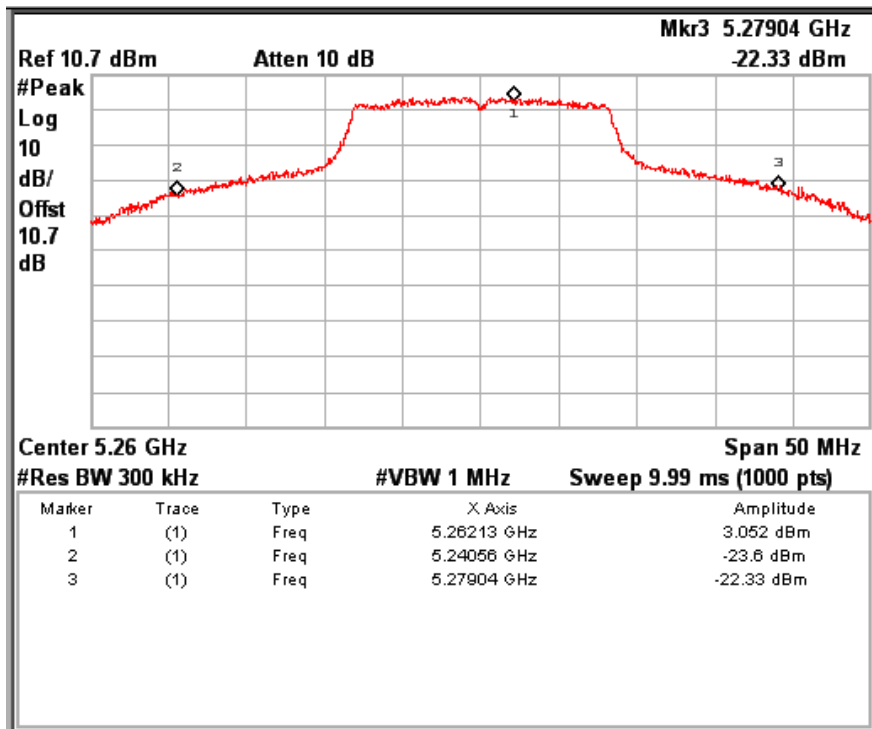
Channel Frequency: 5700MHz



Data Rate: 6Mbps

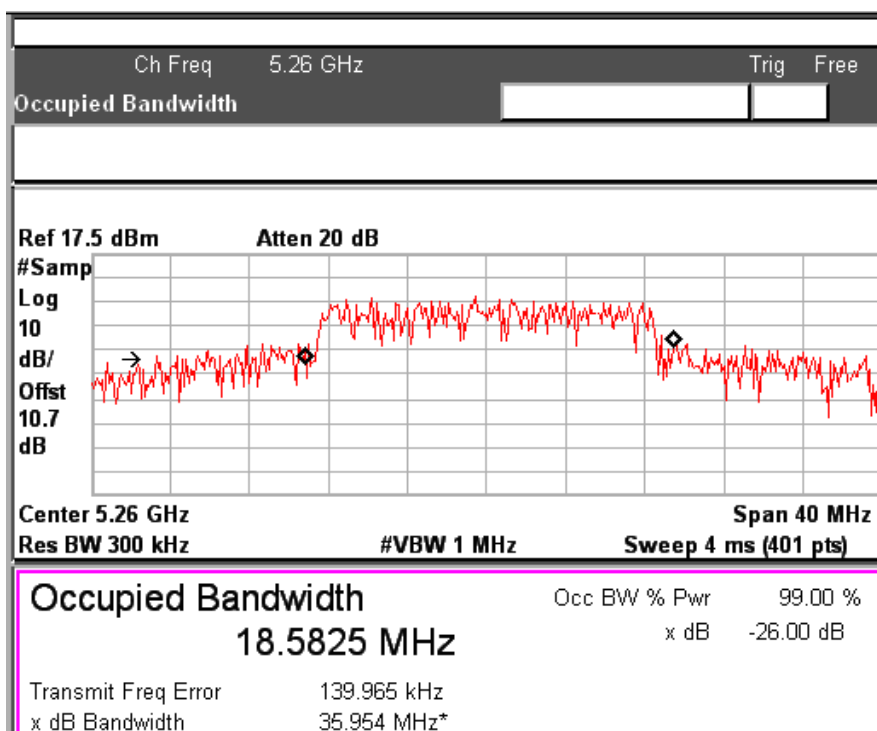
Channel Frequency: 5700MHz

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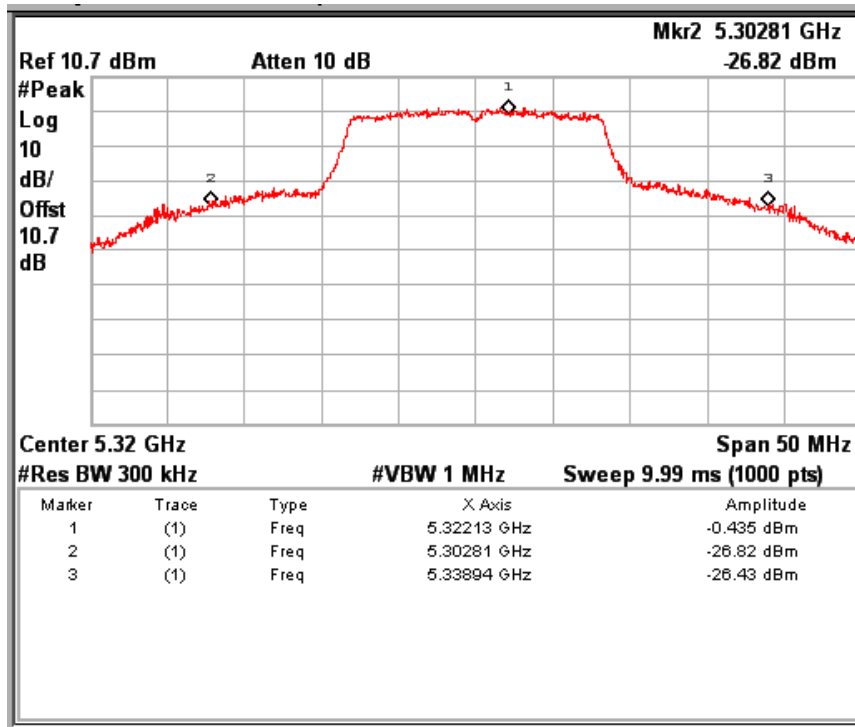
Data Rate: 54Mbps

Channel Frequency: 5260MHz



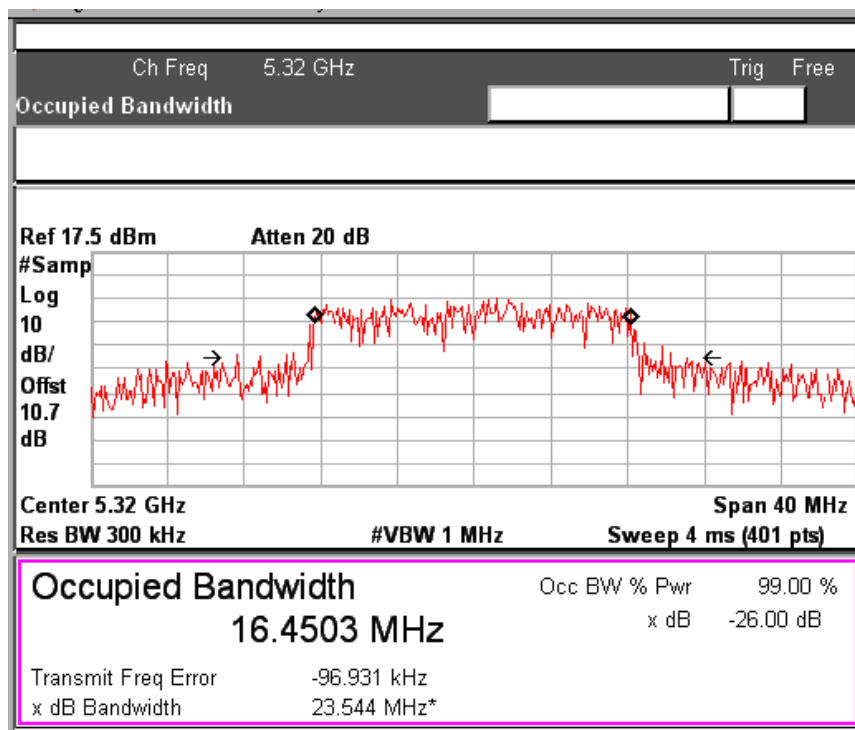
Data Rate: 54Mbps

Channel Frequency: 5260MHz



Data Rate: 54Mbps

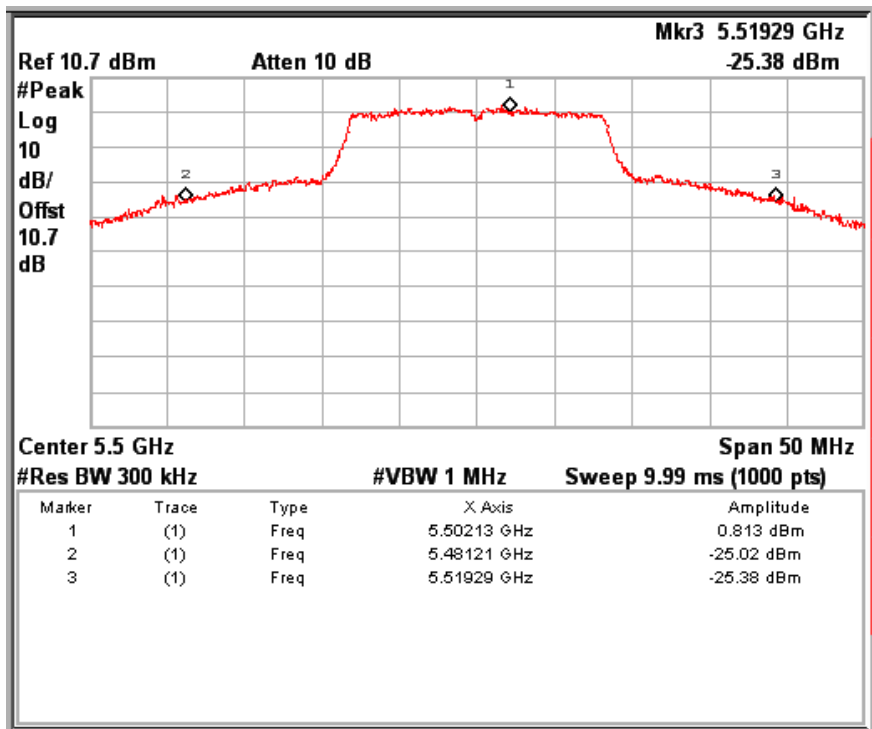
Channel Frequency: 5320MHz



Data Rate: 54Mbps

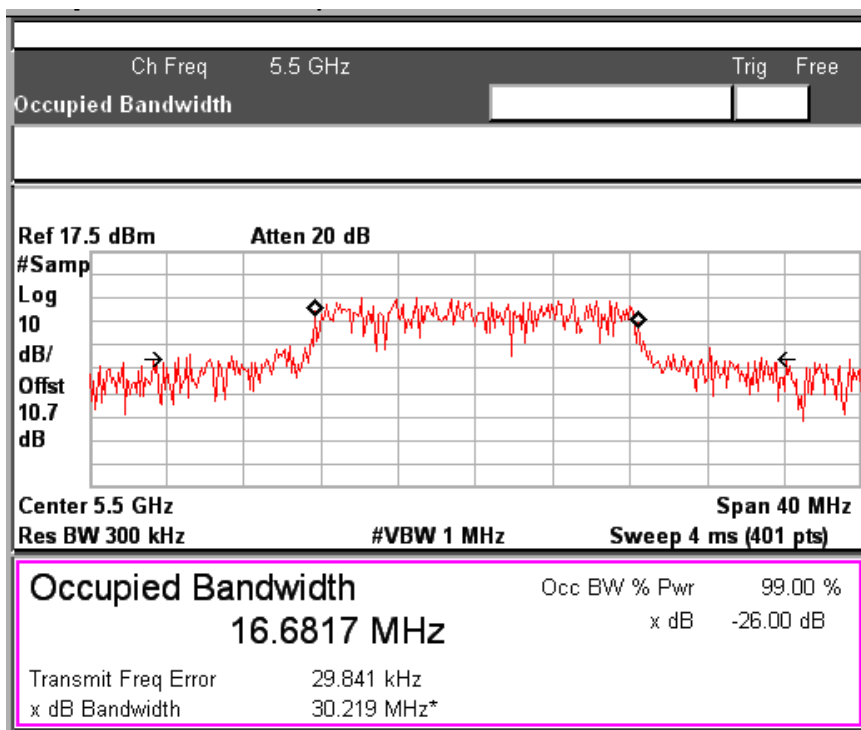
Channel Frequency: 5320MHz

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Data Rate: 54Mbps

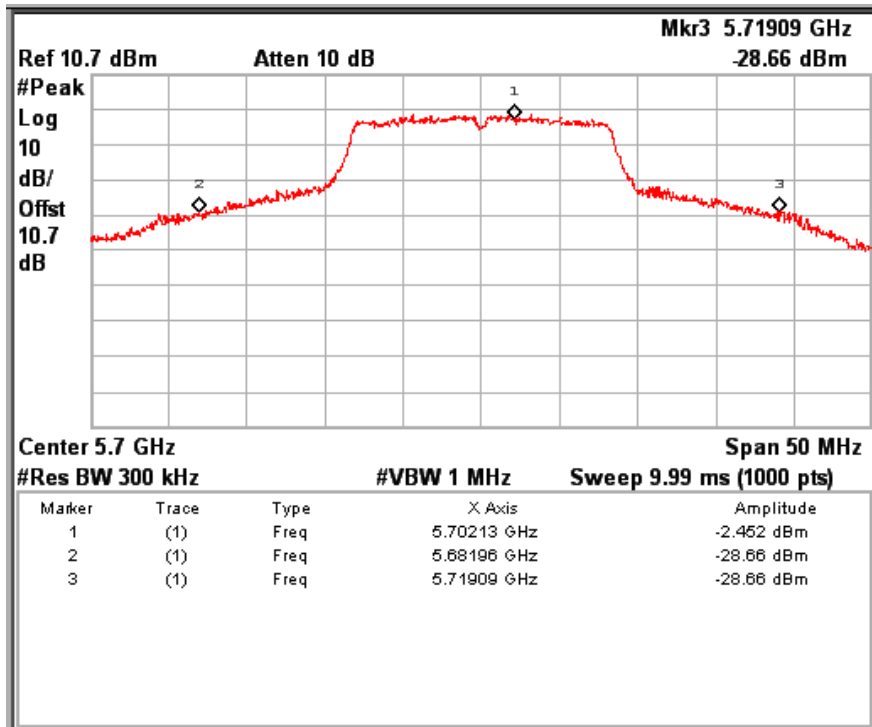
Channel Frequency: 5500MHz



Data Rate: 54Mbps

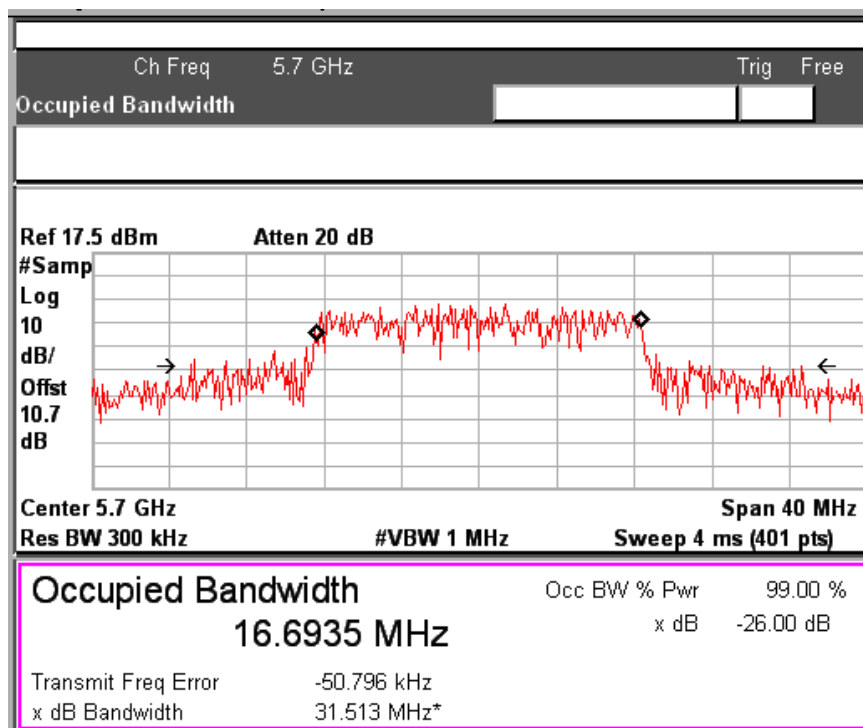
Channel Frequency: 5500MHz

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Data Rate: 54Mbps

Channel Frequency: 5700MHz



Data Rate: 54Mbps

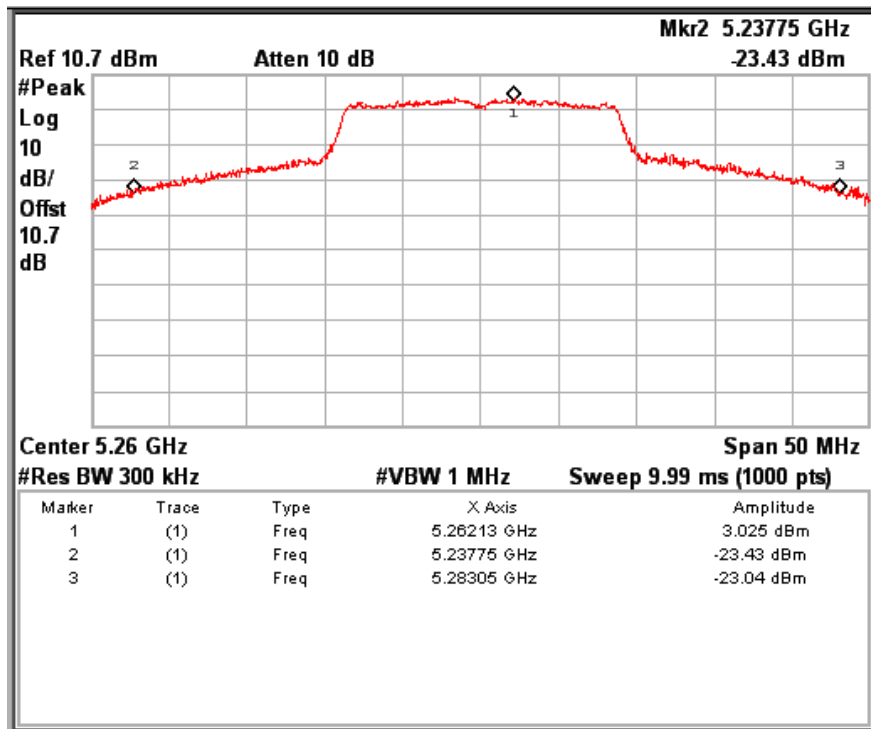
Channel Frequency: 5700MHz

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Modulation: 802.11n

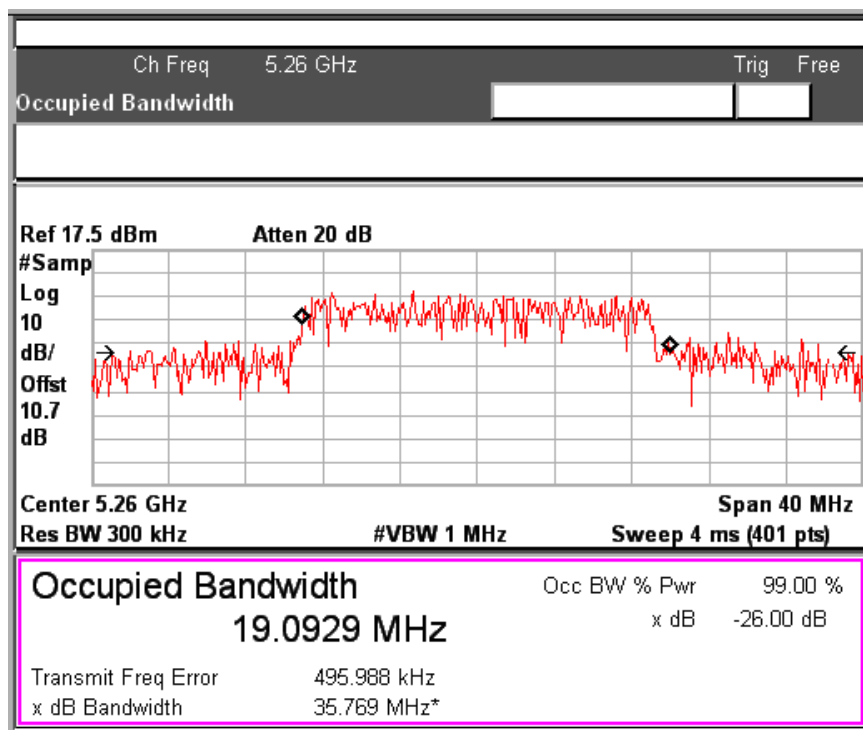
Data Rate	Channel. No	Frequency (MHz)	EBW (MHz)	OBW (MHz)
MCS0	52	5260	45.30	19.09
	64	5320	41.30	17.76
	100	5500	42.90	18.48
	140	5700	38.64	17.75
MCS7	52	5260	38.98	19.00
	64	5320	38.78	17.83
	100	5500	39.84	17.95
	140	5700	34.53	17.87

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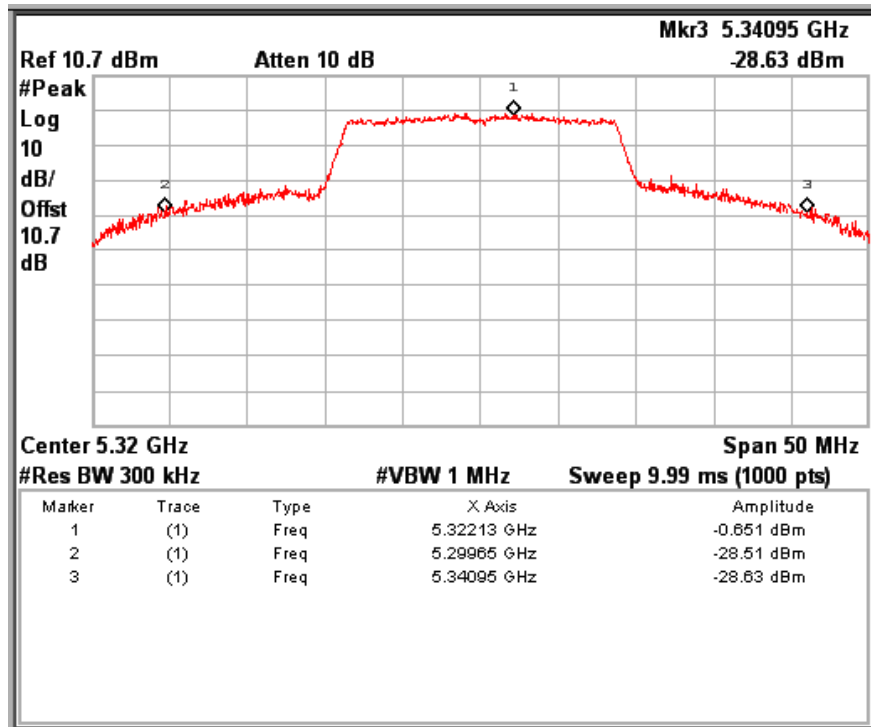
Data Rate: MCS0

Channel Frequency: 5260MHz



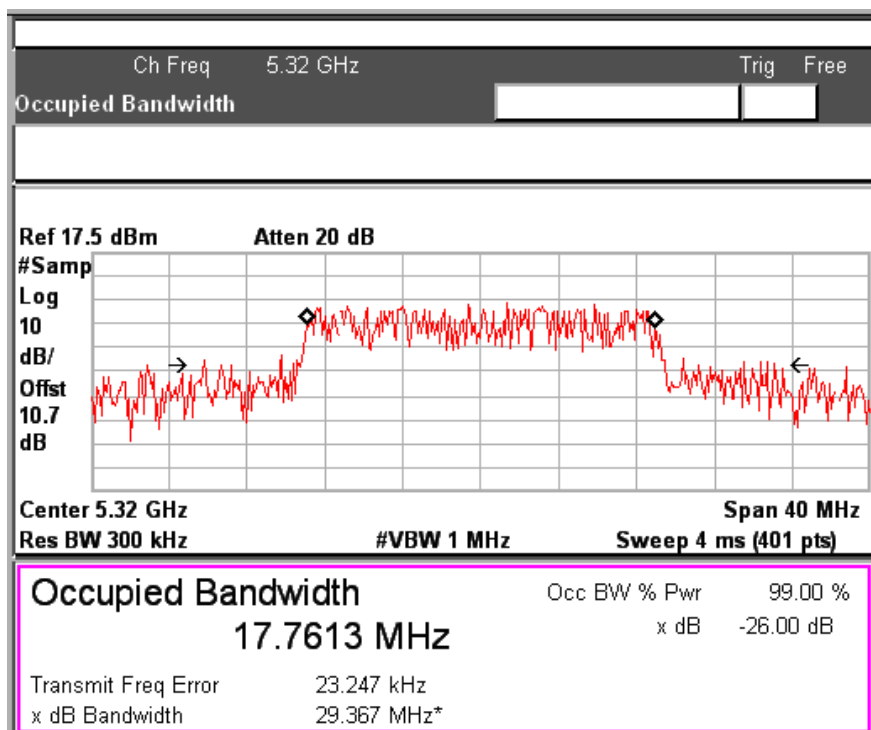
Data Rate: MCS0

Channel Frequency: 5260MHz



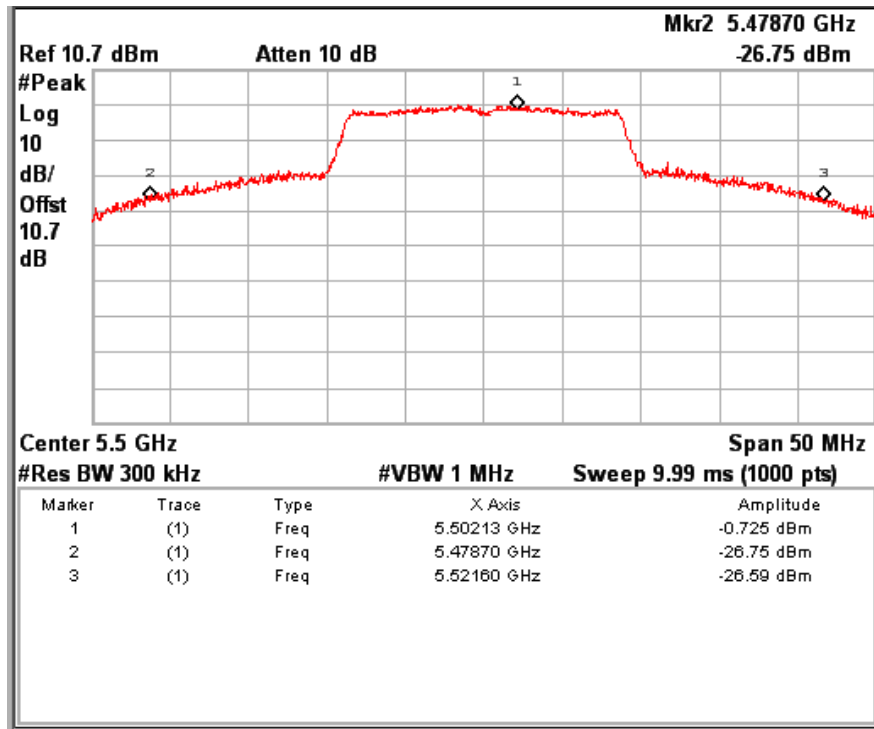
Data Rate: MCS0

Channel Frequency: 5320MHz



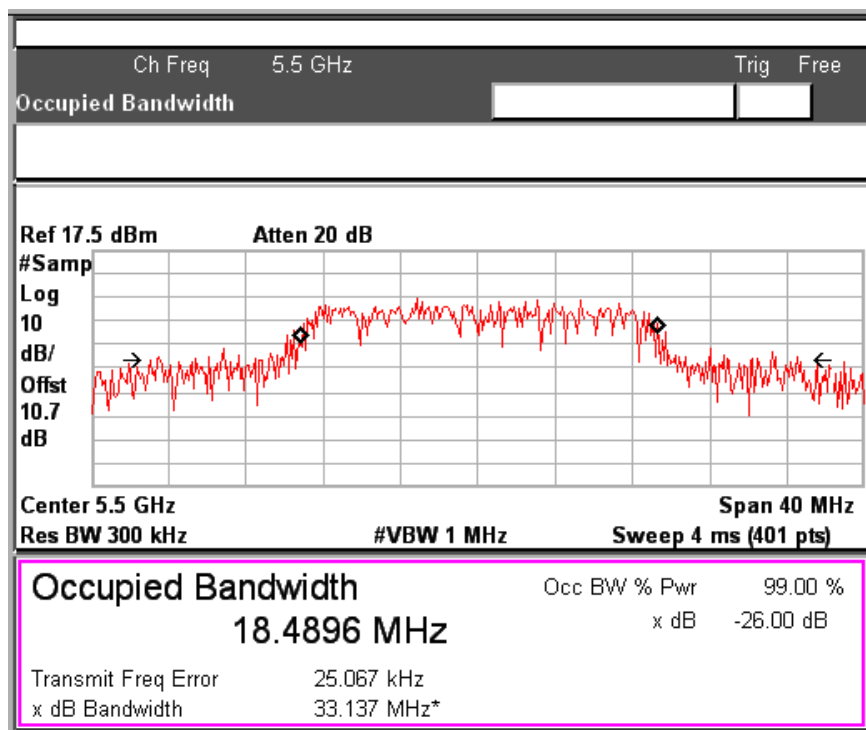
Data Rate: MCS0

Channel Frequency: 5320MHz



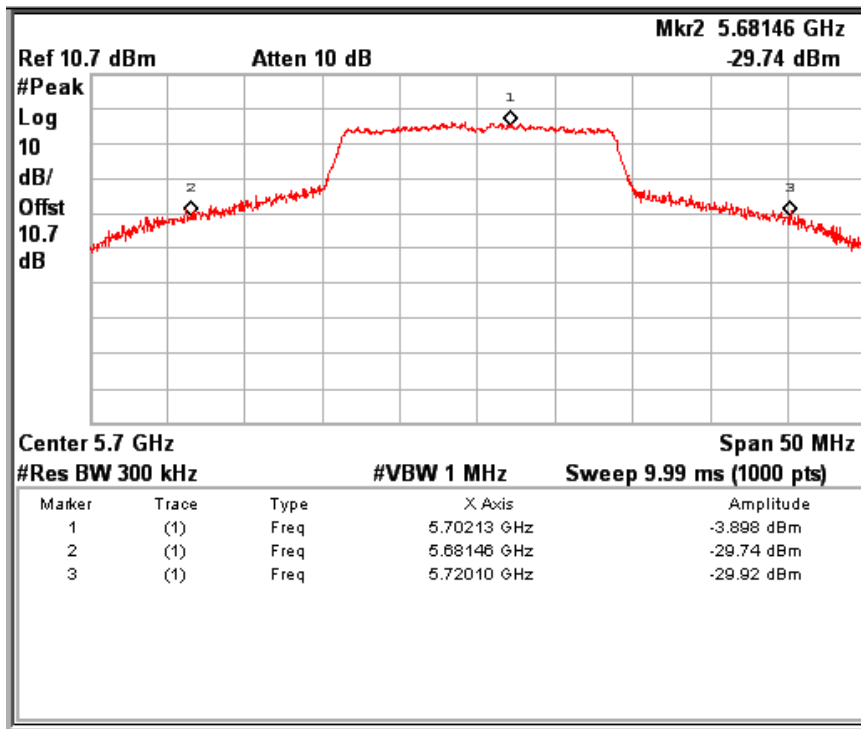
Data Rate: MCS0

Channel Frequency: 5500MHz



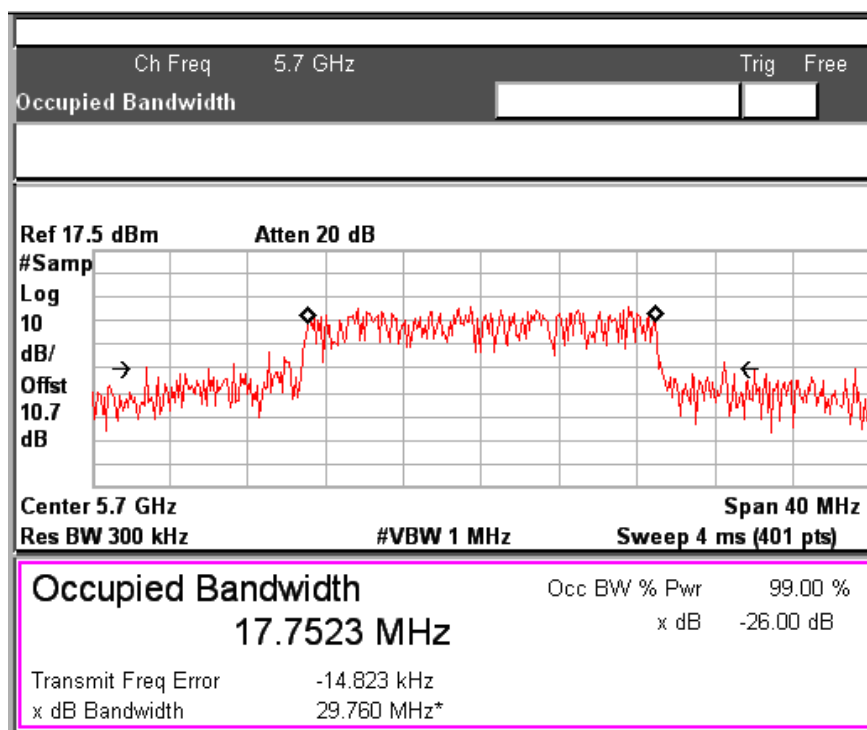
Data Rate: MCS0

Channel Frequency: 5500MHz



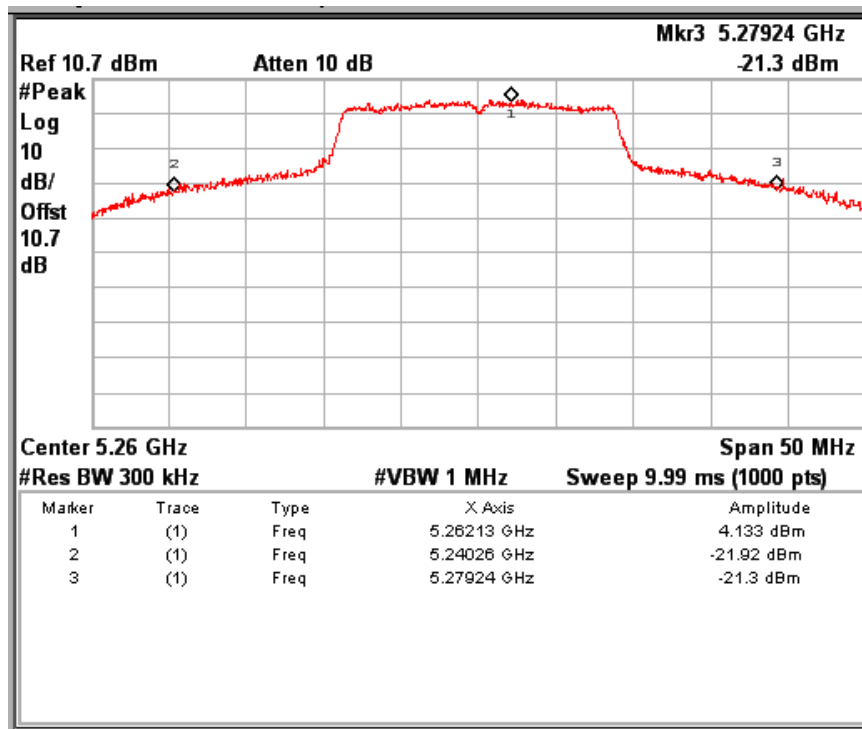
Data Rate: MCS0

Channel Frequency: 5700MHz



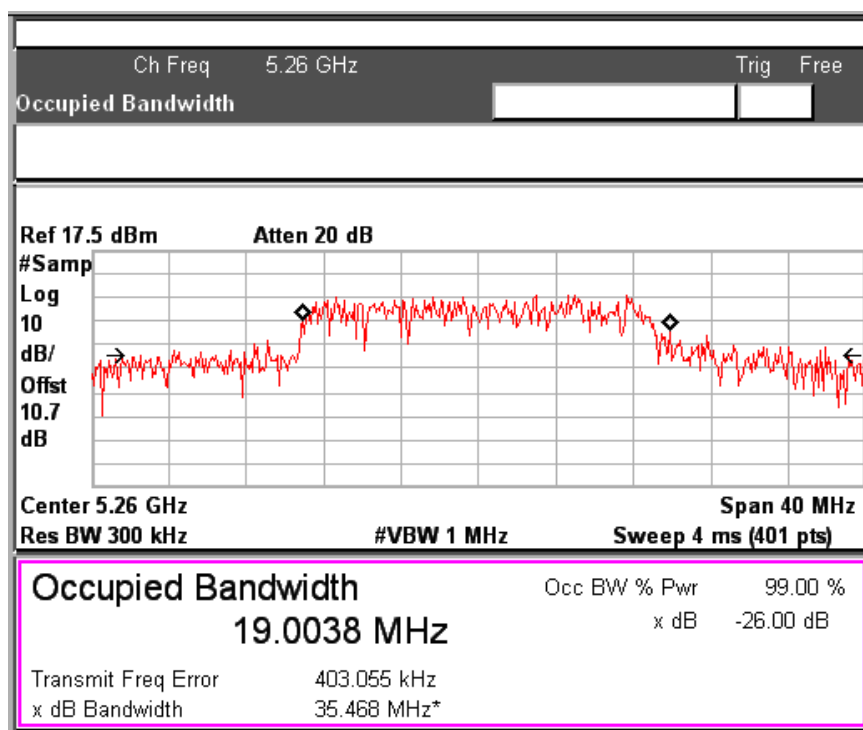
Data Rate: MCS0

Channel Frequency: 5700MHz



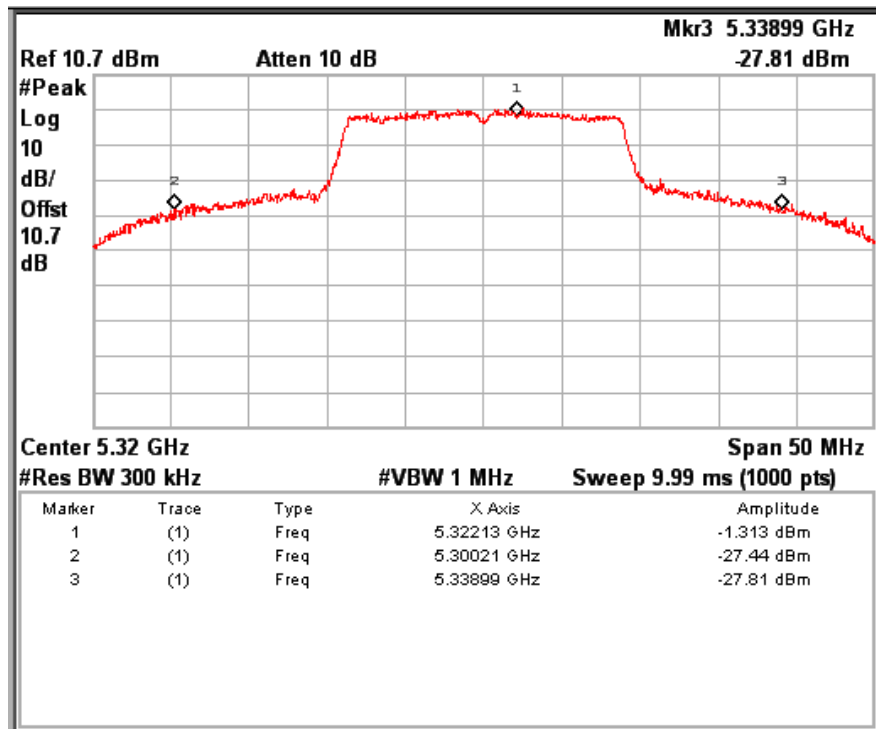
Data Rate: MCS7

Channel Frequency: 5260MHz



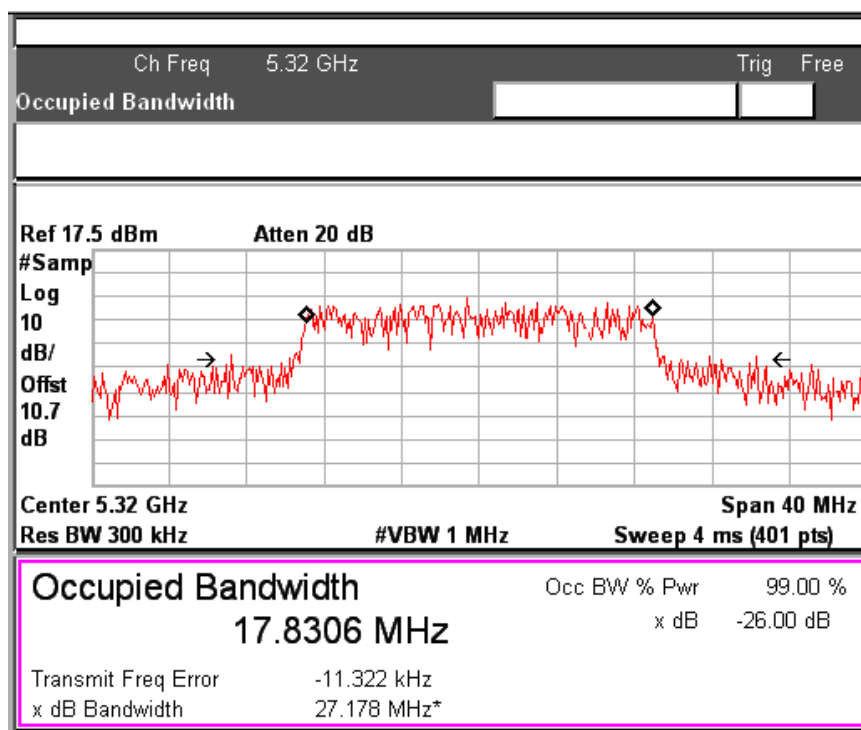
Data Rate: MCS7

Channel Frequency: 5260MHz



Data Rate: MCS7

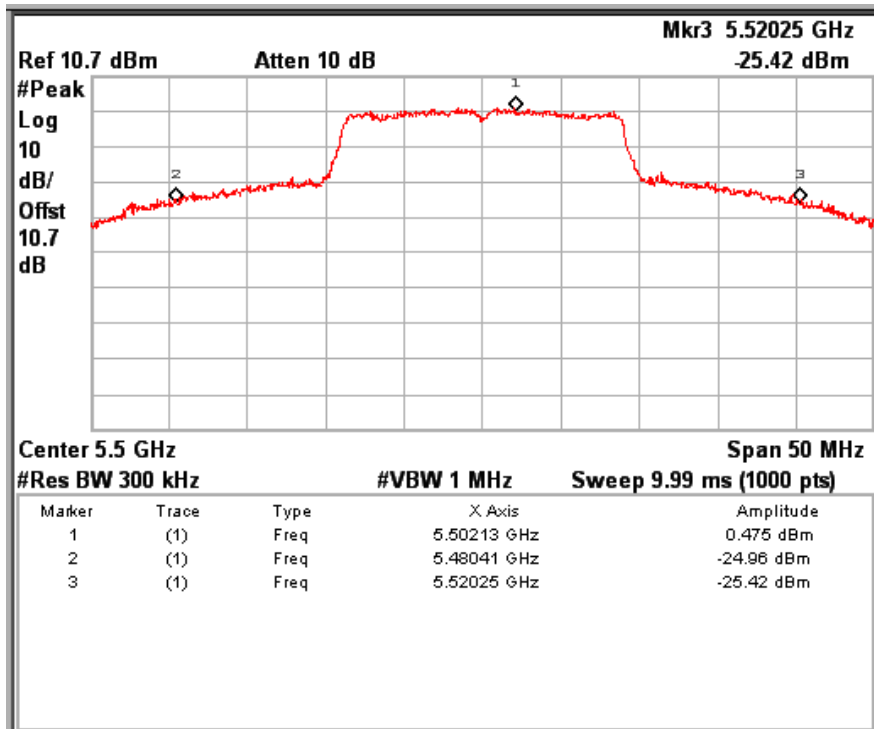
Channel Frequency: 5320MHz



Data Rate: MCS7

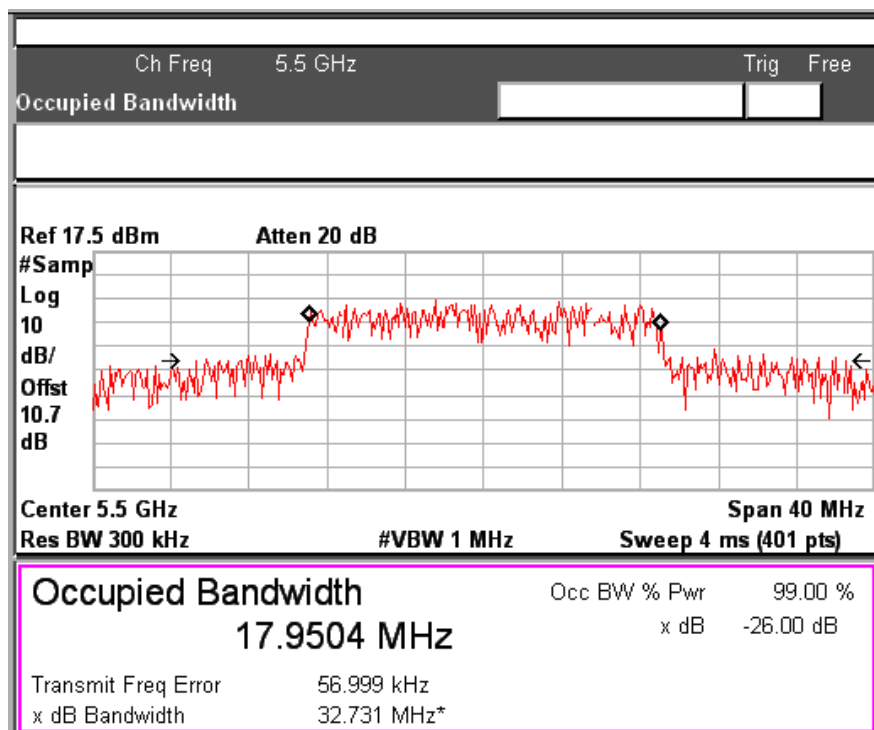
Channel Frequency: 5320MHz

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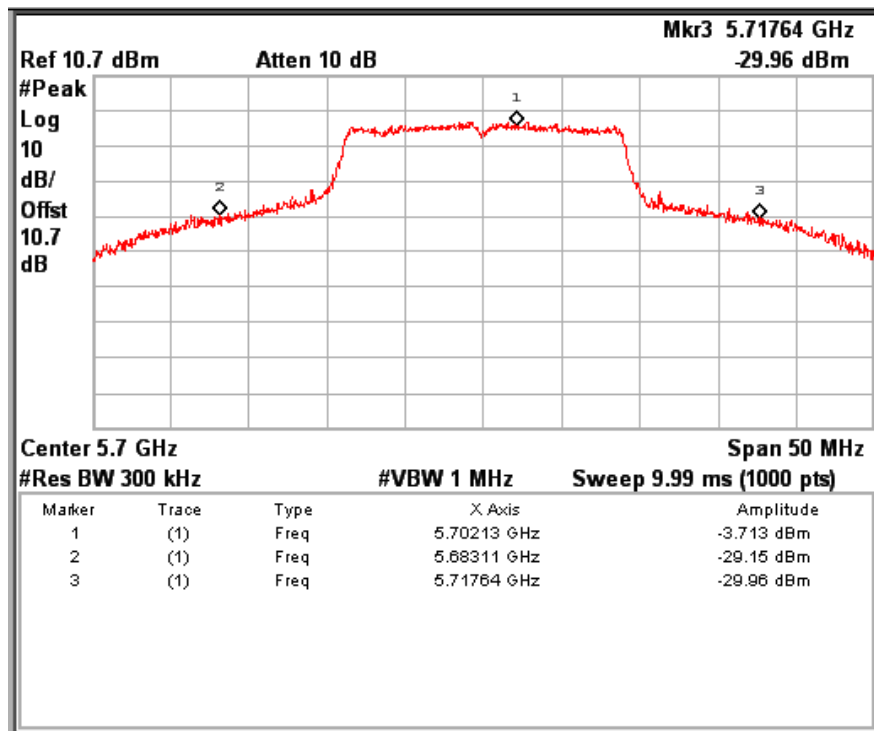
Data Rate: MCS7

Channel Frequency: 5500MHz



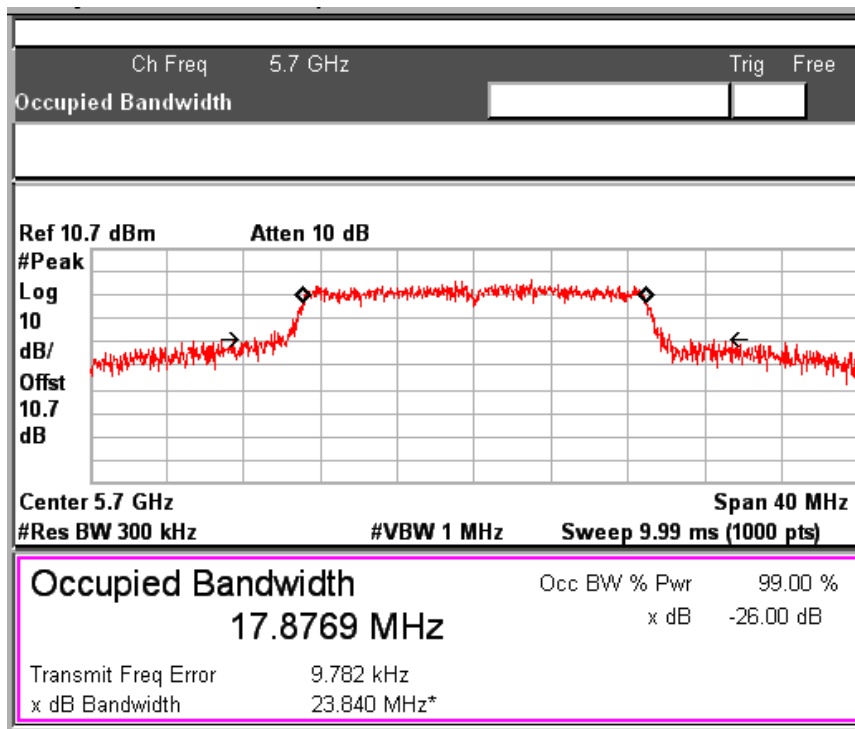
Data Rate: MCS7

Channel Frequency: 5500MHz



Data Rate: MCS7

Channel Frequency: 5700MHz



Data Rate: MCS7

Channel Frequency: 5700MHz

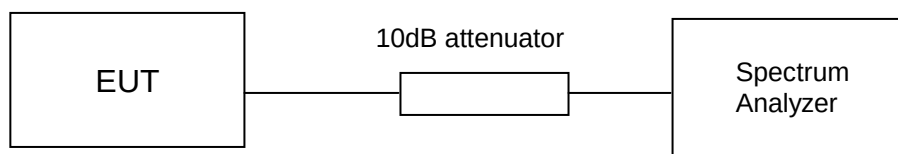
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**Maximum conducted output power
Result**

**Section 15.407(a)
Pass**

Test Specification	FCC Part 15 Subpart E
Measurement Bandwidth (RBW)	1 MHz
Requirement	For the band 5250 - 5350 MHz, 5470 – 5725 MHz, 5725 – 5850 MHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11dBm + 10log B, where B is the 26- dB emission bandwidth in MHz

Test Method:

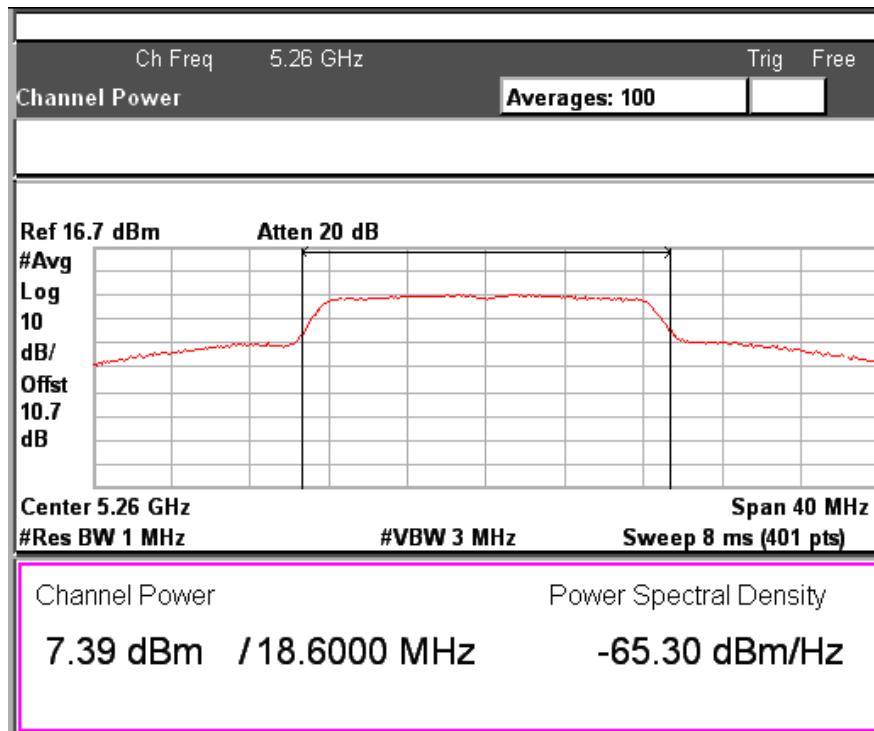


Test Result:

Note: Attenuation of 10dB and cable loss of 0.7dB is included in the test results.

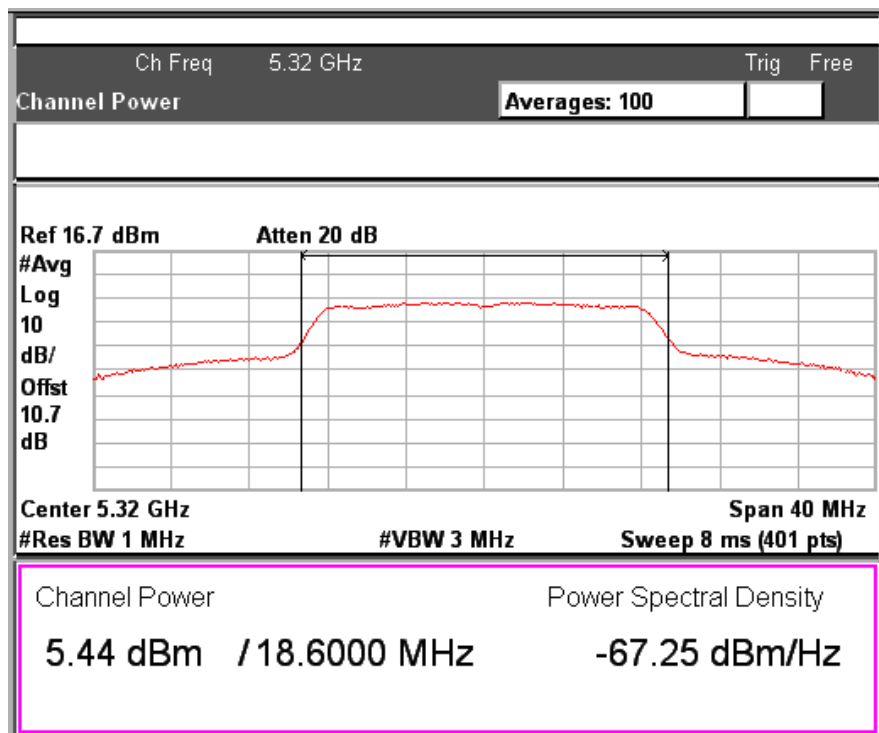
Modulation: 802.11a

Data Rate (Mbps)	Channel No.	Frequency (MHz)	Output power (dBm)	Limit (dBm)	Margin (dB)
6	52	5260	7.39	23.97	-16.58
	64	5320	5.44	23.97	-18.53
	100	5500	3.64	23.97	-20.33
	140	5700	9.25	23.97	-14.72
54	52	5260	7.38	23.97	-16.59
	64	5320	5.52	23.97	-18.45
	100	5500	3.91	23.97	-20.06
	140	5700	9.22	23.97	-14.75



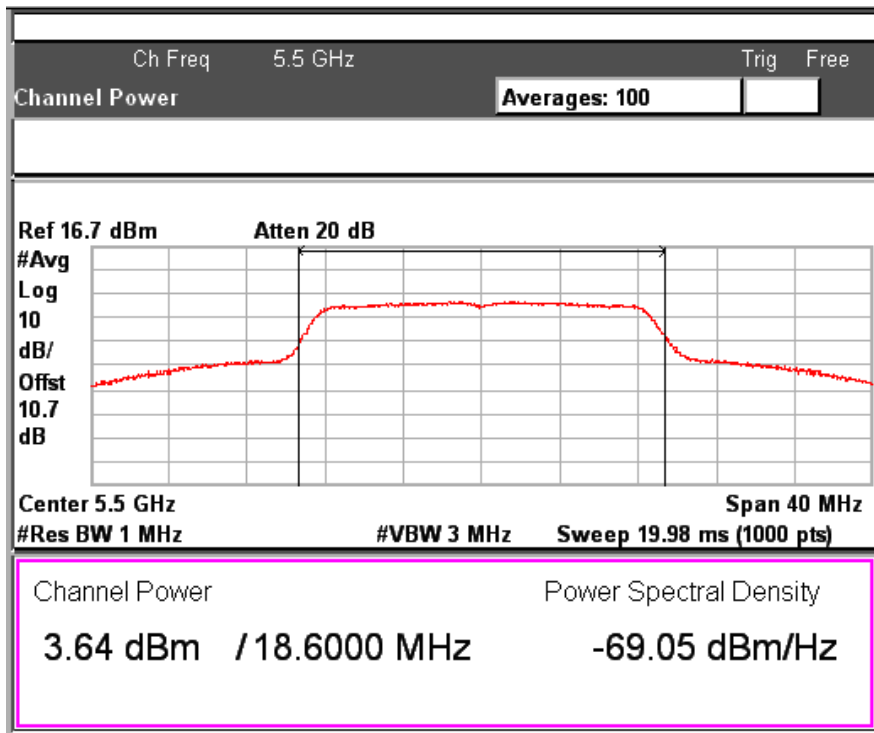
Data Rate: 6Mbps

Channel Frequency: 5260MHz



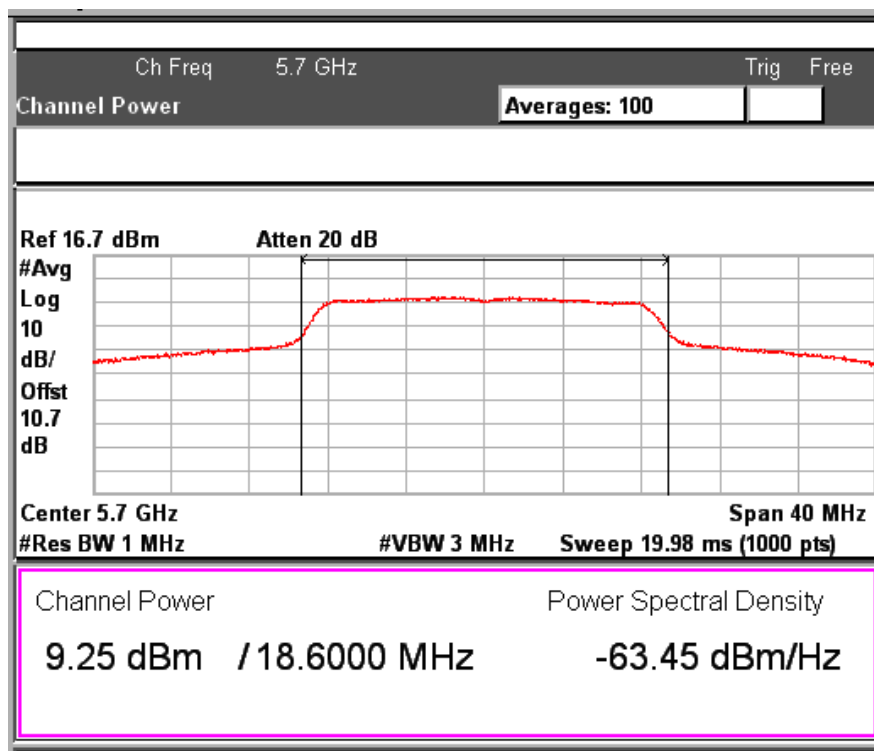
Data Rate: 6Mbps

Channel Frequency: 5320MHz



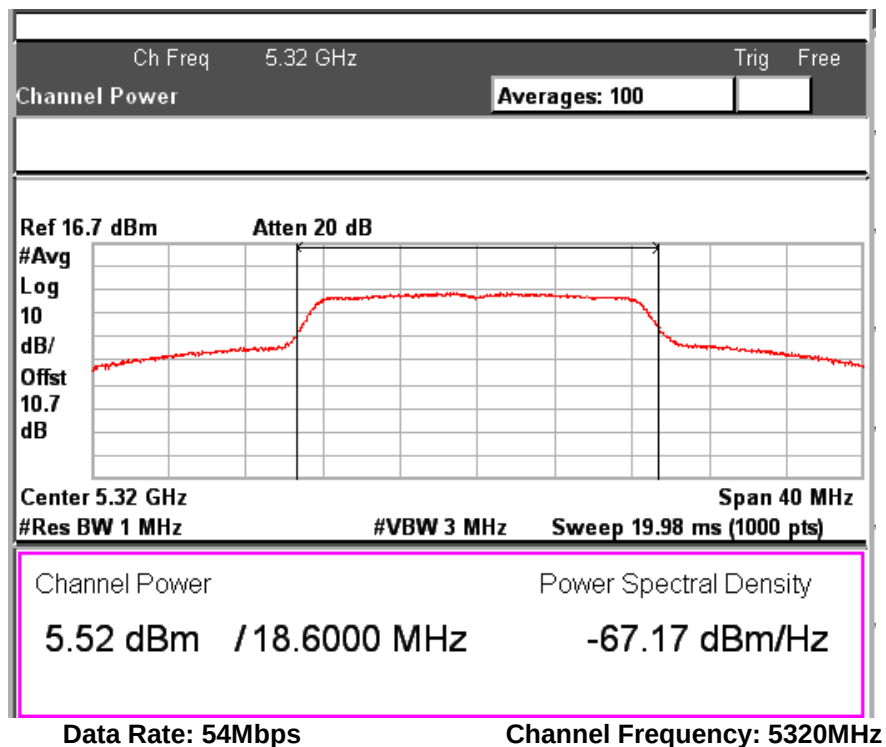
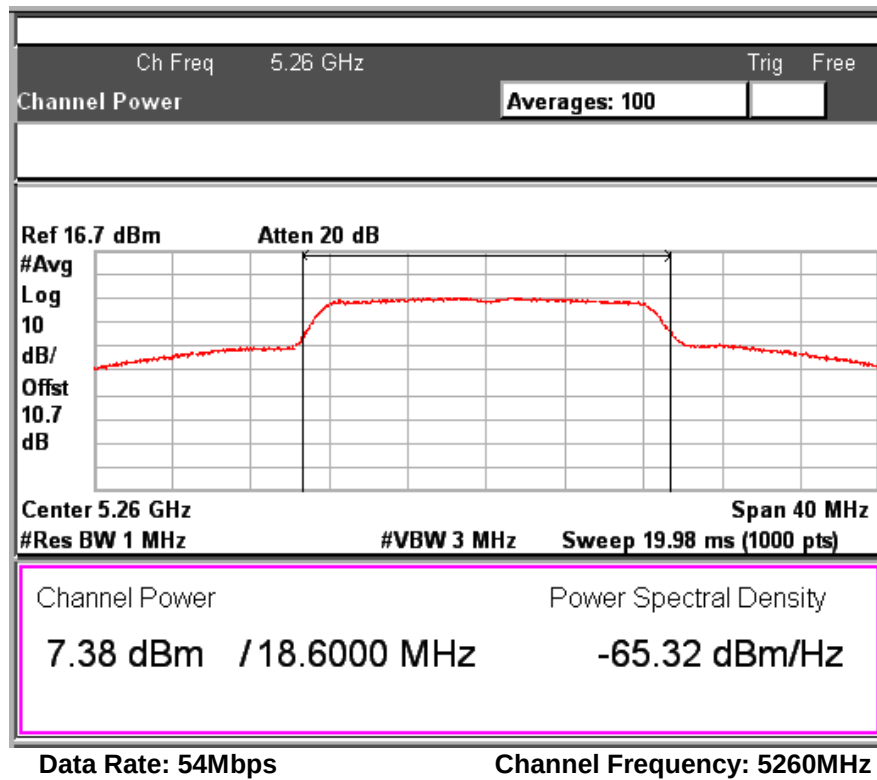
Data Rate: 6Mbps

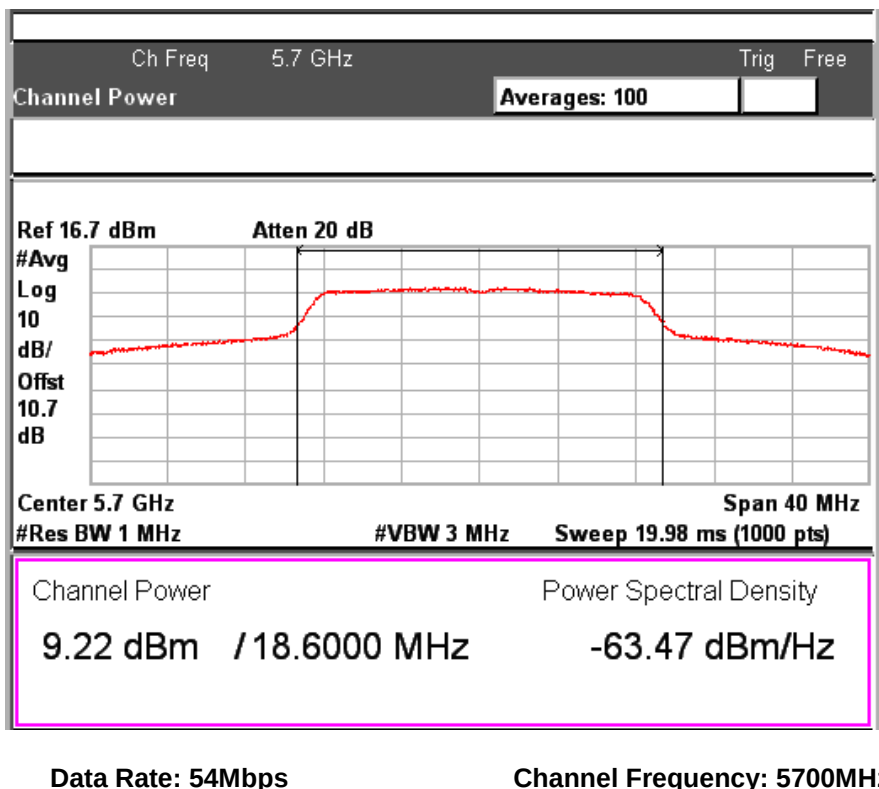
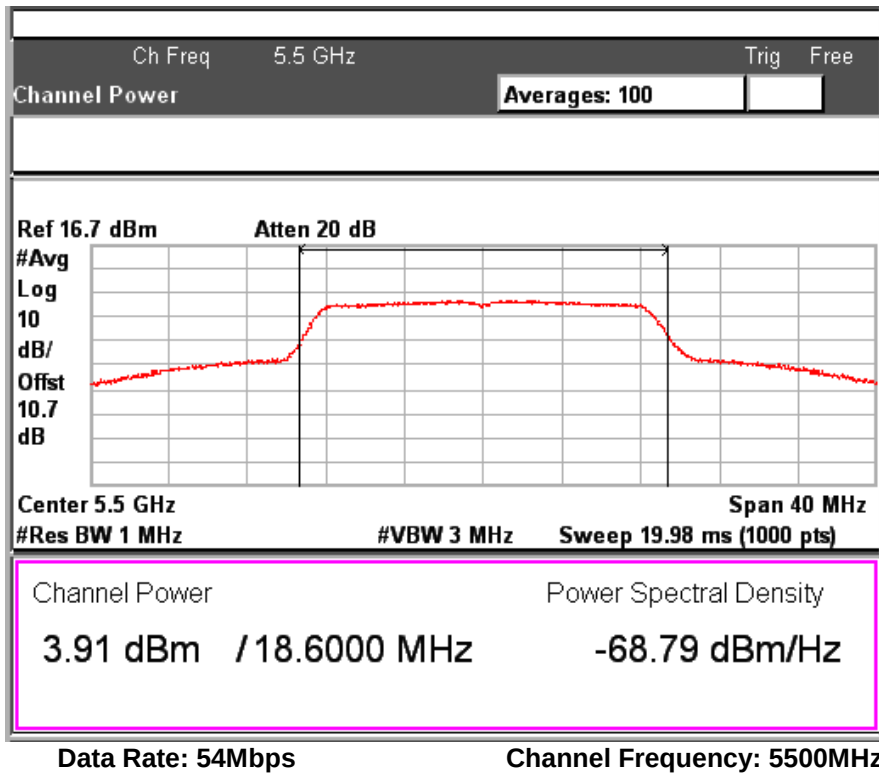
Channel Frequency: 5500MHz



Data Rate: 6Mbps

Channel Frequency: 5700MHz

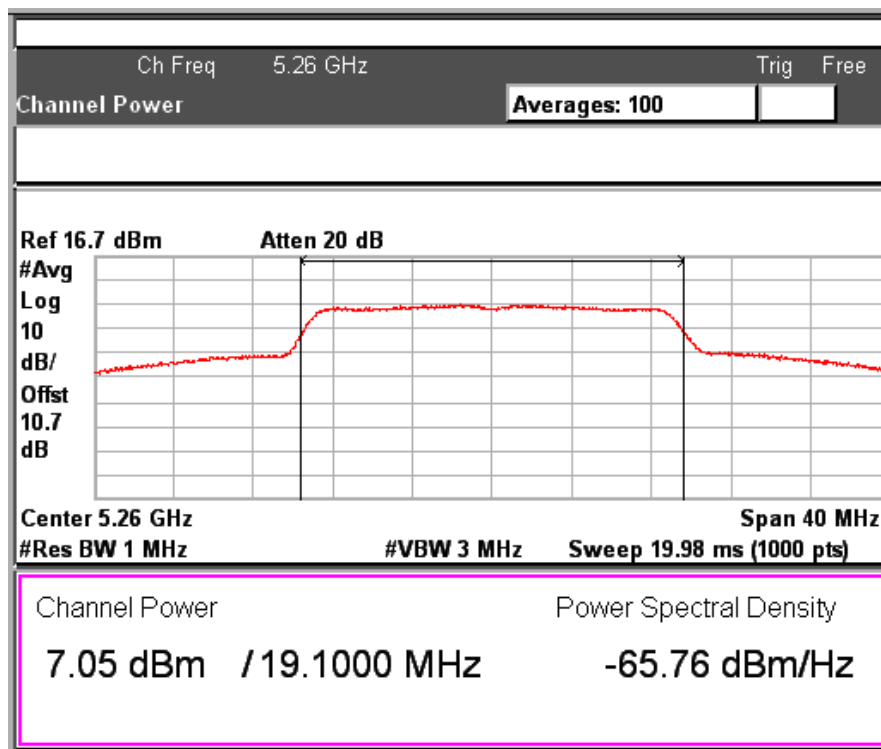




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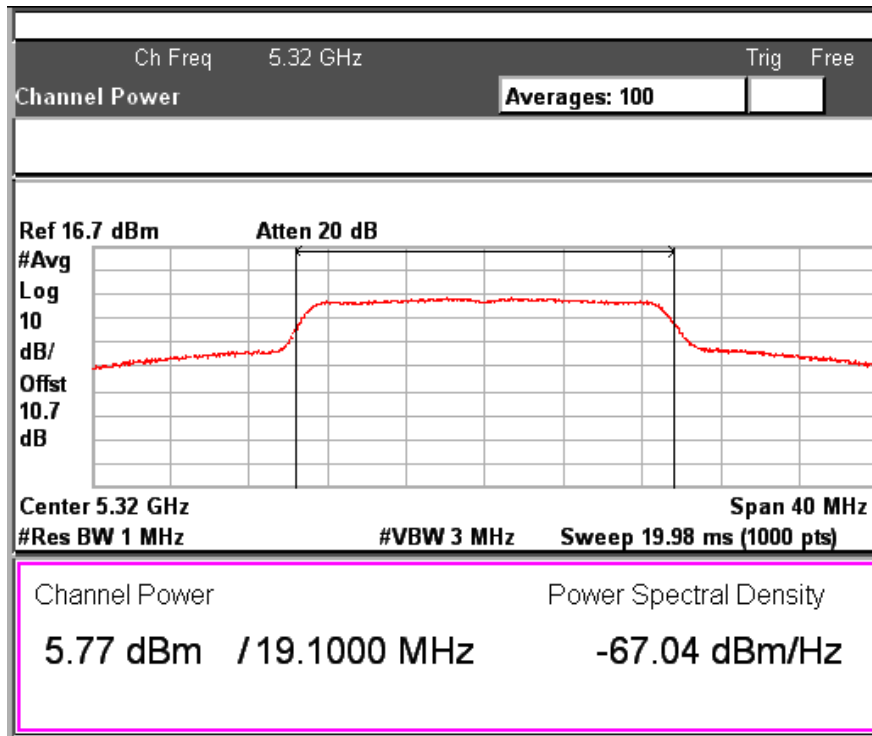
Modulation: 802.11n

Data Rate	Channel No.	Frequency (MHz)	Output power (dBm)	Limit (dBm)	Margin (dB)
MCS0	52	5260	7.05	23.97	-16.92
	64	5320	5.77	23.97	-18.2
	100	5500	1.04	23.97	-22.93
	140	5700	9.28	23.97	-14.69
MCS7	52	5260	6.80	23.97	-17.17
	64	5320	5.77	23.97	-18.2
	100	5500	1.36	23.97	-22.61
	140	5700	9.24	23.97	-14.73



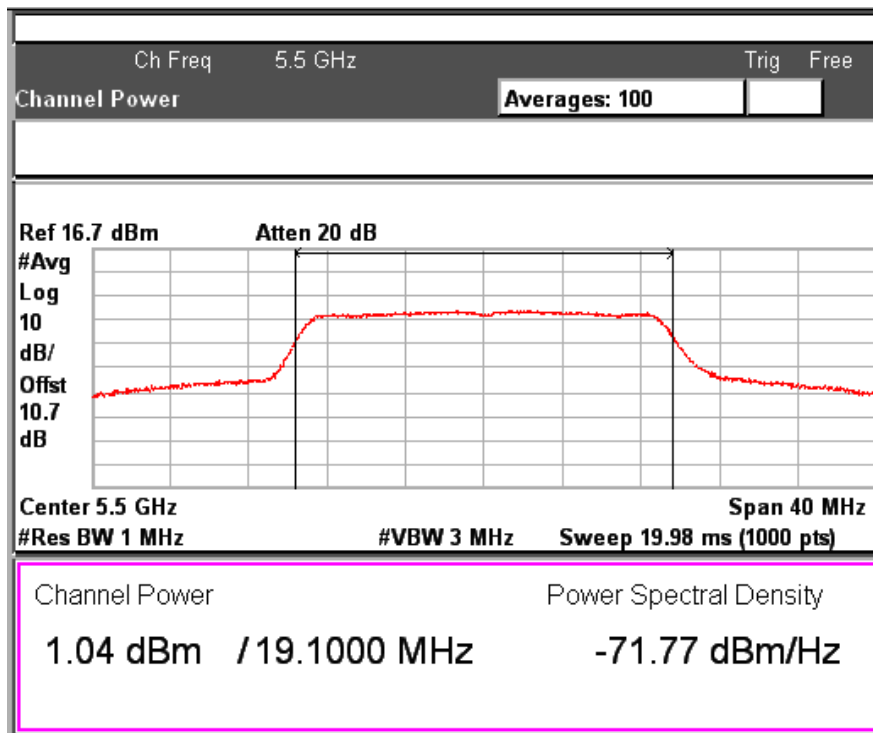
Data Rate: MCS0

Channel Frequency: 5260MHz



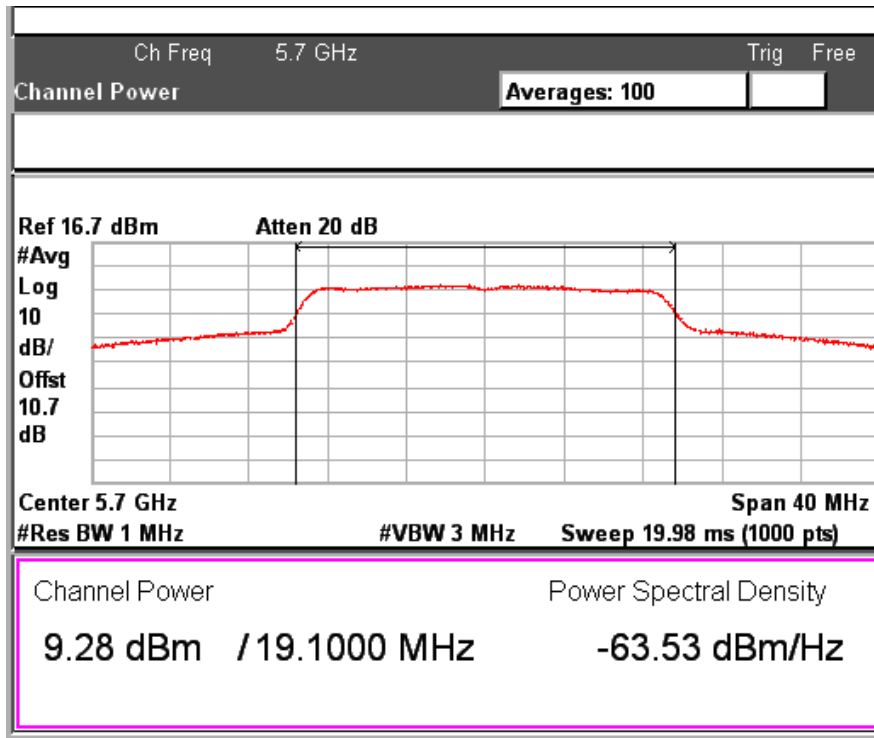
Data Rate: MCS0

Channel Frequency: 5320MHz



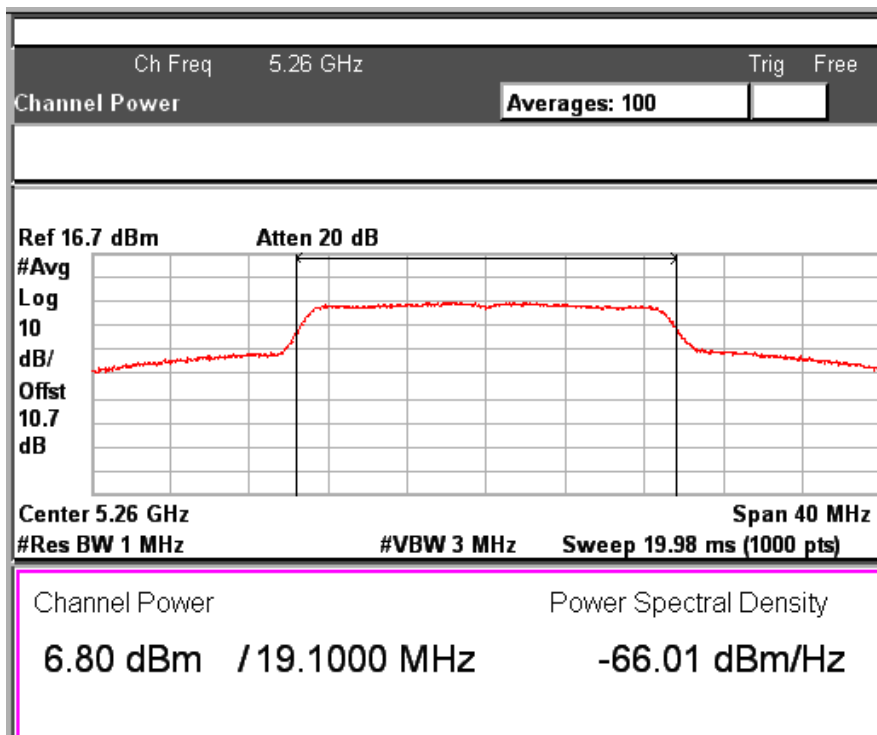
Data Rate: MCS0

Channel Frequency: 5500MHz



Data Rate: MCS0

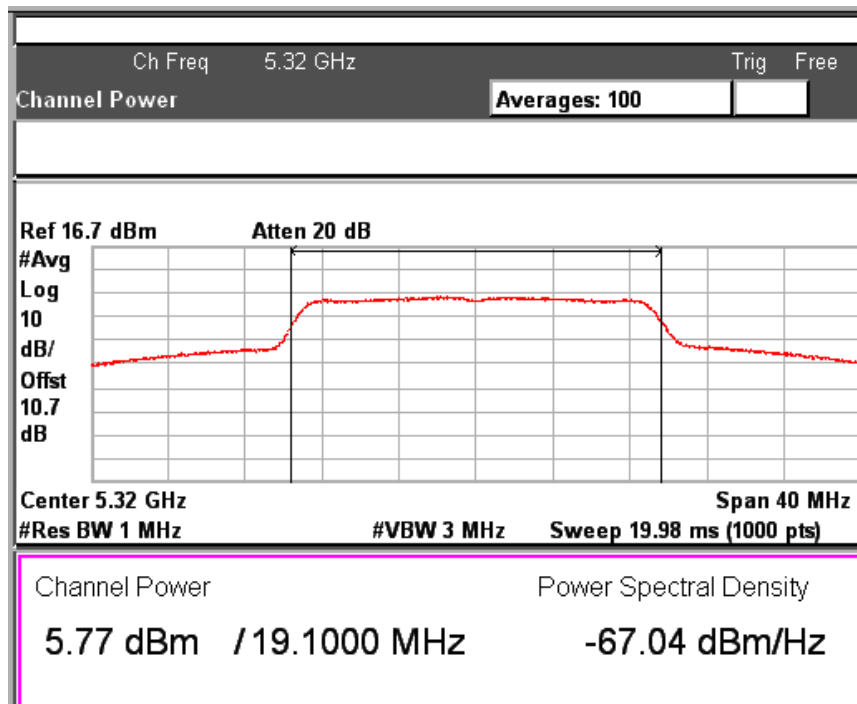
Channel Frequency: 5700MHz



Data Rate: MCS7

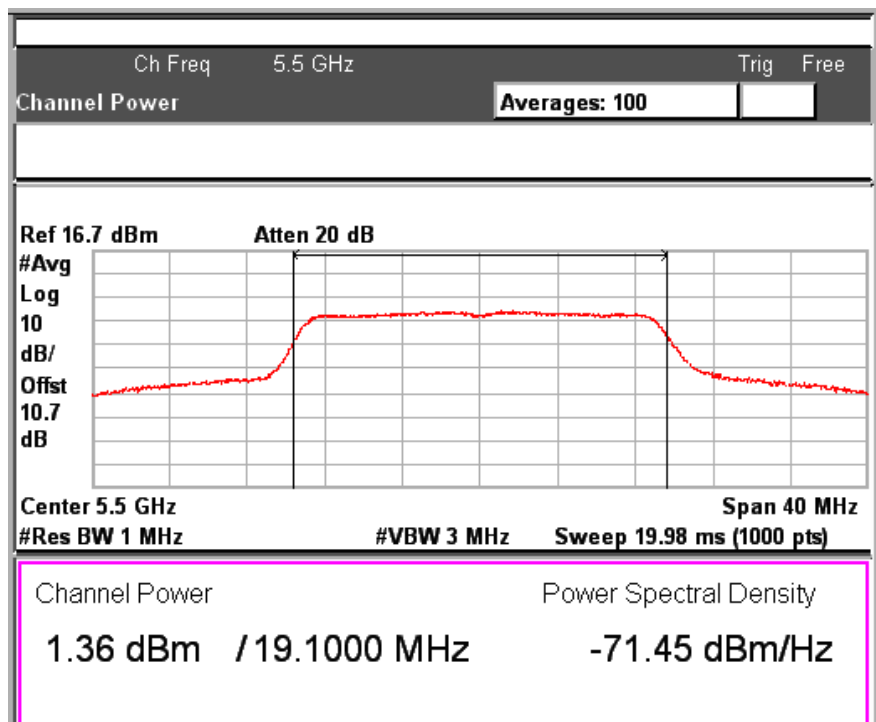
Channel Frequency: 5260MHz

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Data Rate: MCS7

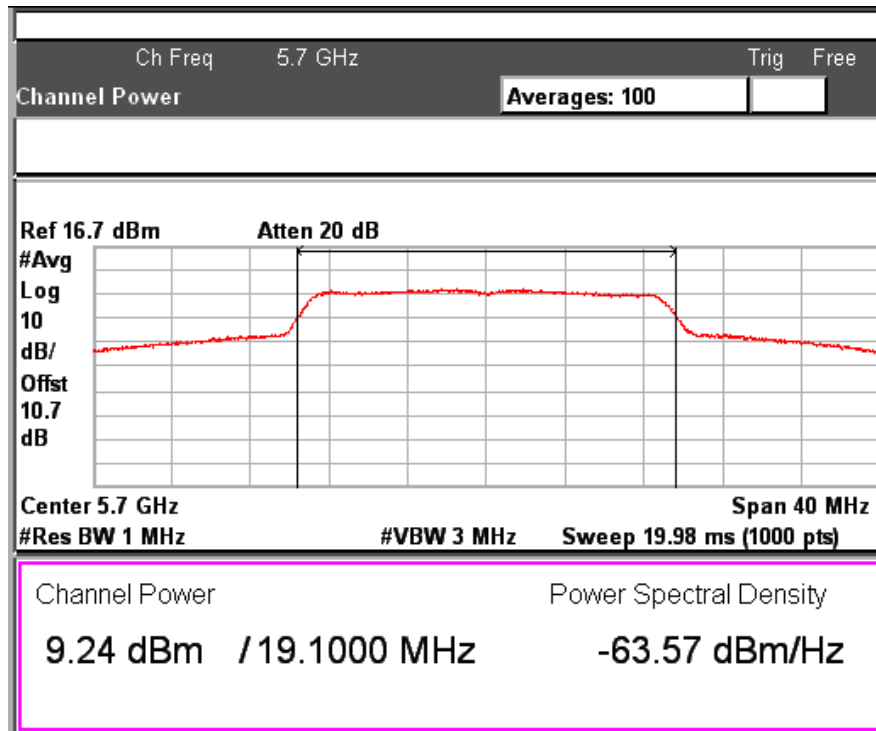
Channel Frequency: 5320MHz



Data Rate: MCS7

Channel Frequency: 5500MHz

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Data Rate: MCS7

Channel Frequency: 5700MHz

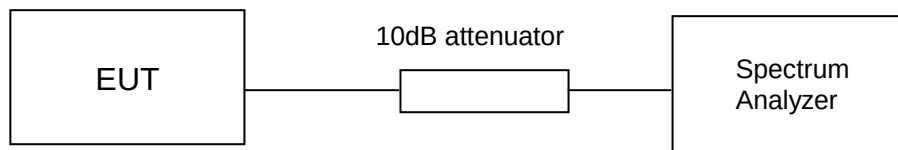
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**Peak power spectral density
Result**

**Section 15.407 (a)
Pass**

Test Specification FCC Part 15 Section 15.407 (a)
Requirement Maximum power spectral density shall not exceed 11 dBm in any 1-MHz band

Test Method:



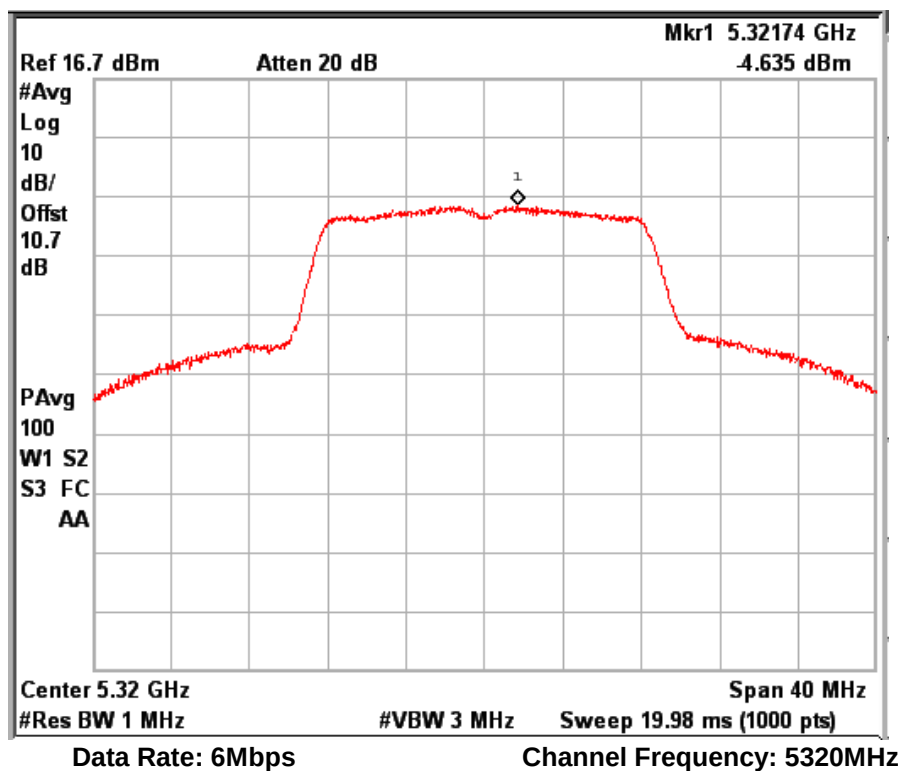
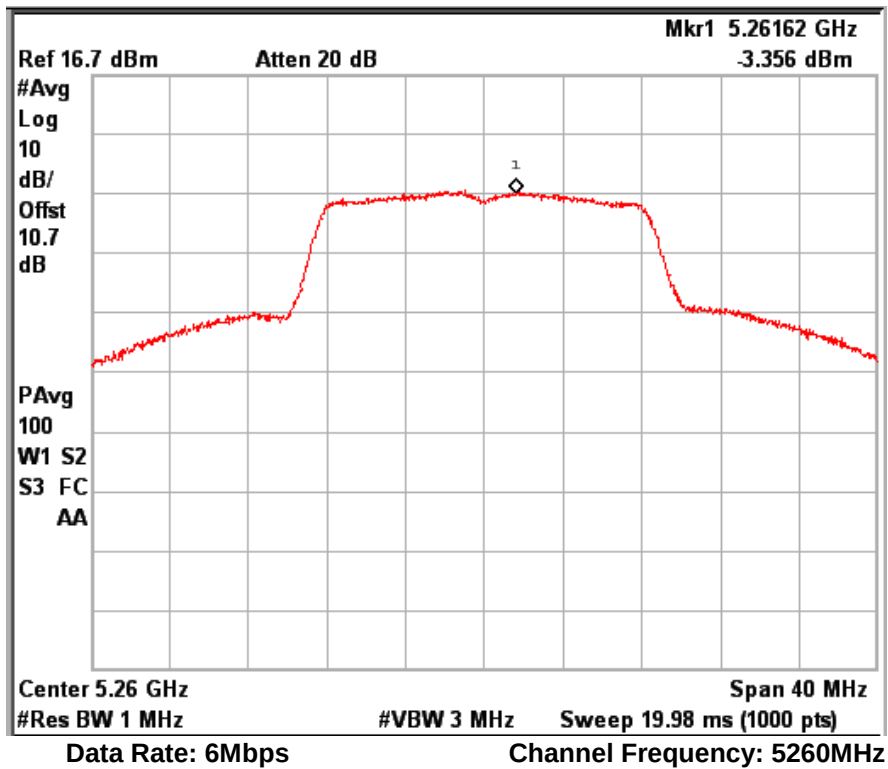
Test Result:

Note: Attenuation of 10dB and cable loss of 0.7dB is included in the test results.

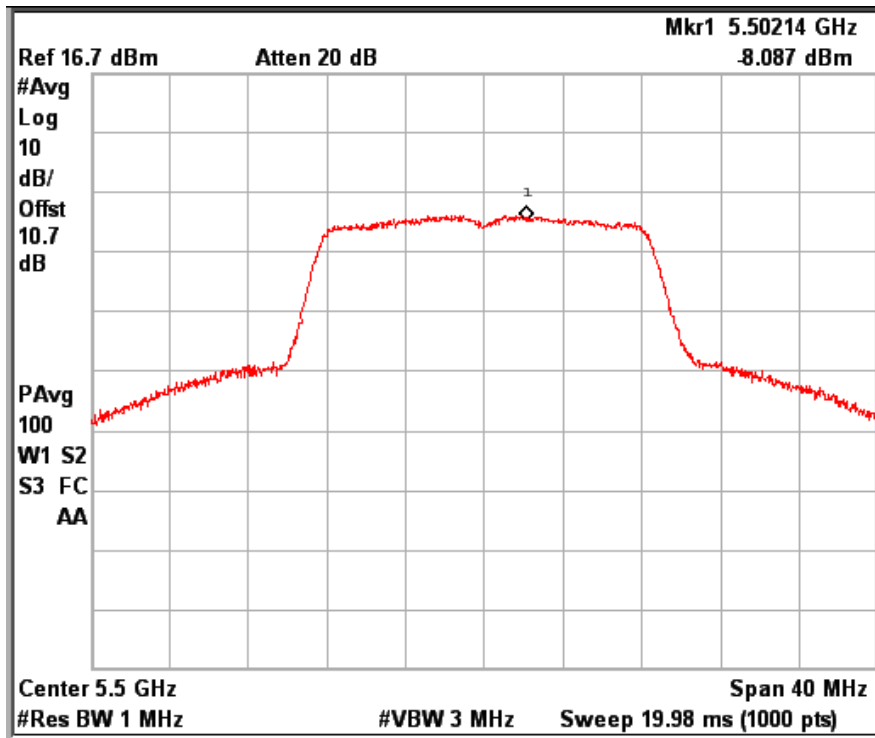
Modulation: 802.11a

Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
6	52	5260	-3.356	11.00	-14.356
	64	5320	-4.635	11.00	-15.635
	100	5500	-8.087	11.00	-19.087
	140	5700	-1.362	11.00	-12.362
54	52	5260	-3.248	11.00	-14.248
	64	5320	-5.409	11.00	-16.409
	100	5500	-7.959	11.00	-18.959
	140	5700	-1.241	11.00	-12.241

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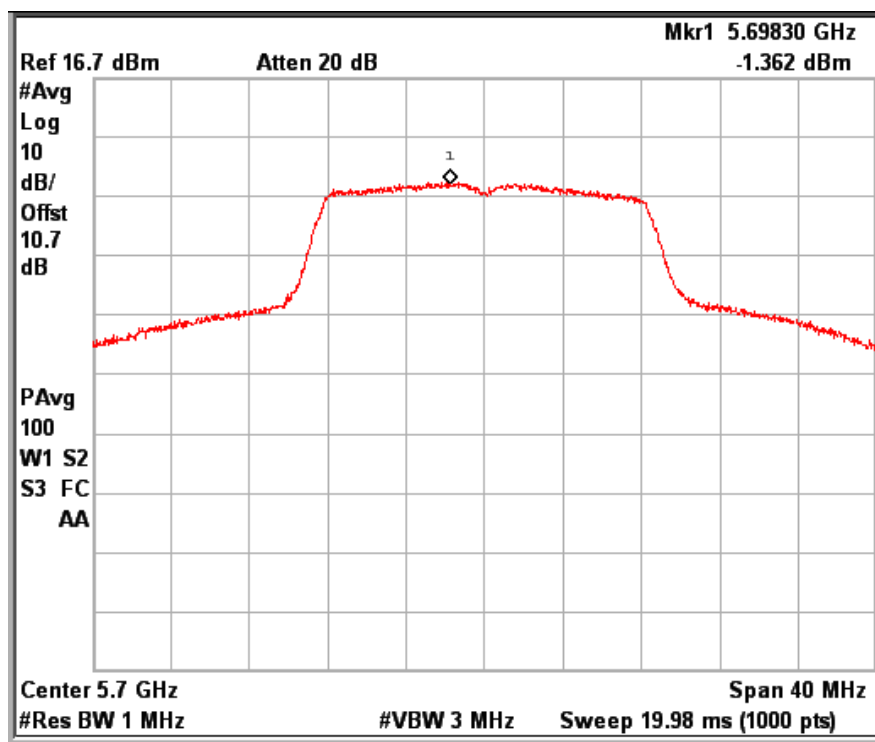


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Data Rate: 6Mbps

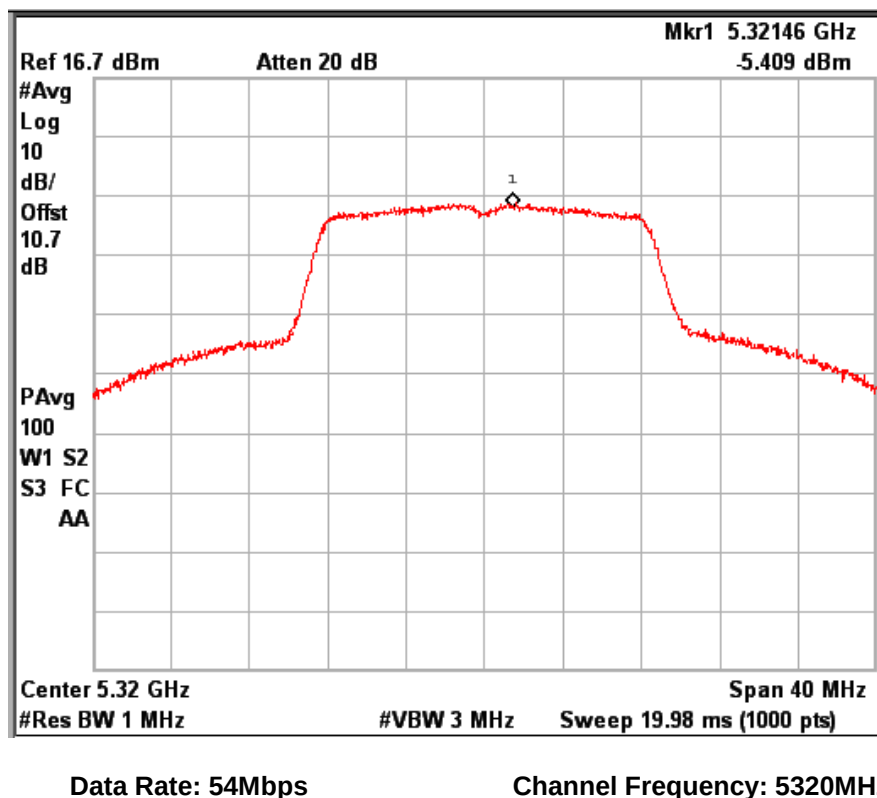
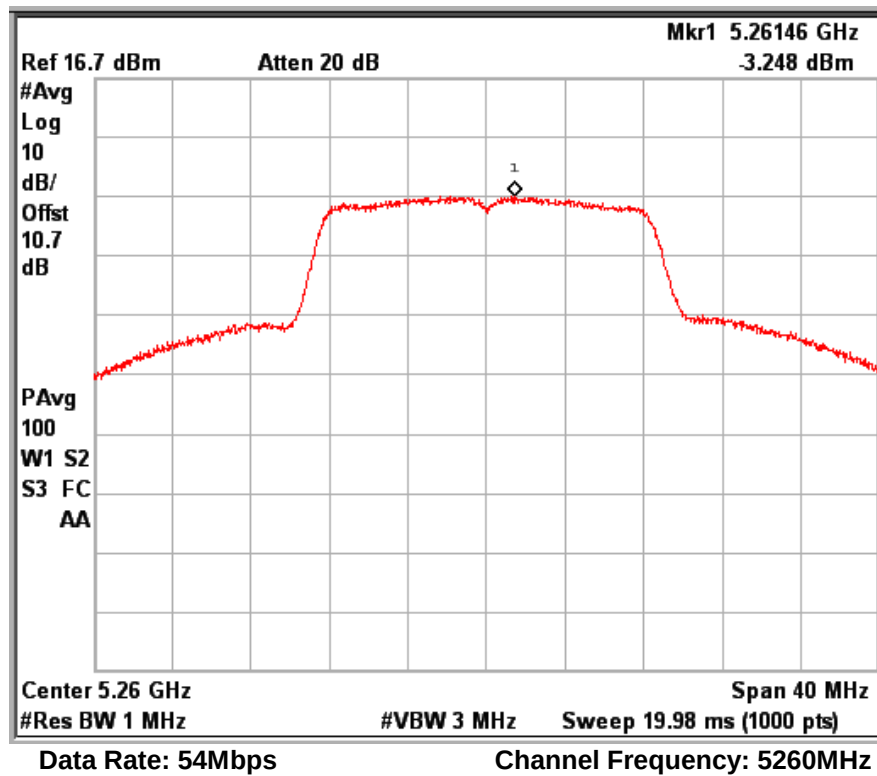
Channel Frequency: 5500MHz



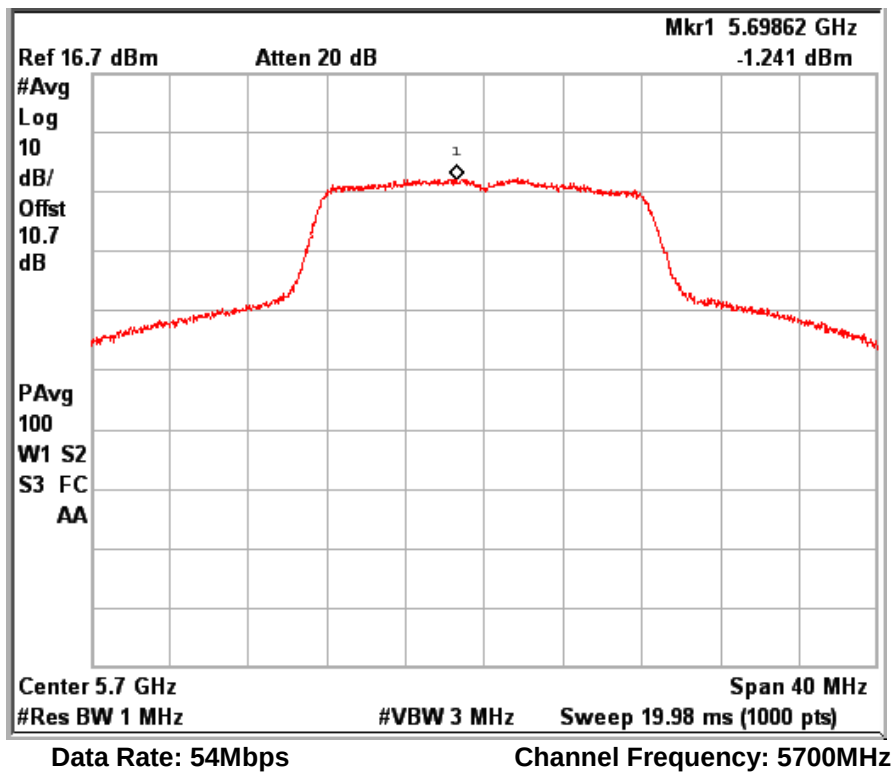
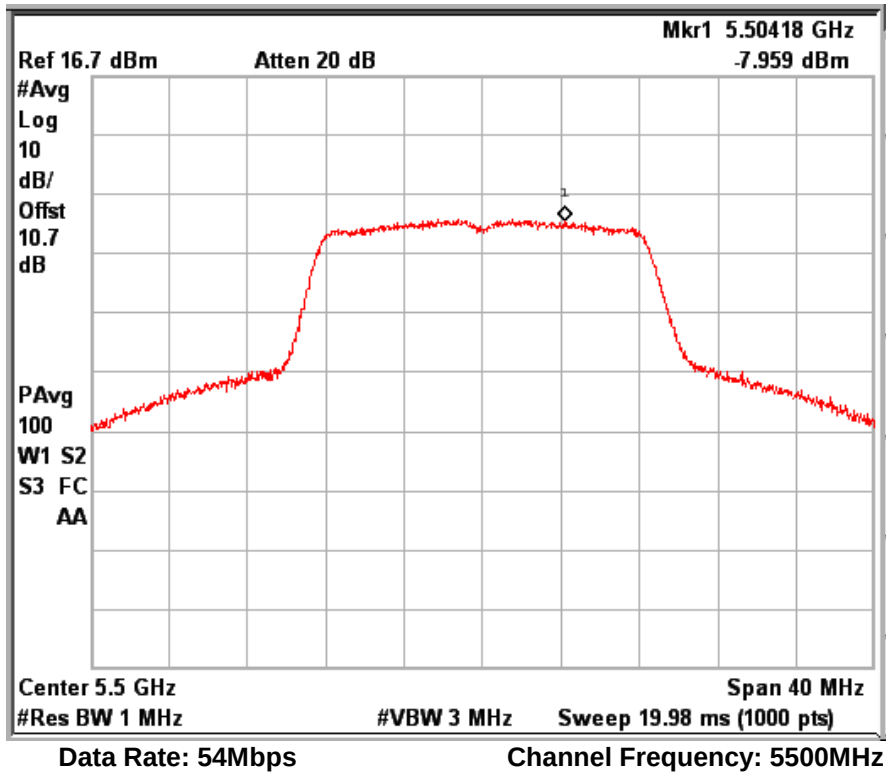
Data Rate: 6Mbps

Channel Frequency: 5700MHz

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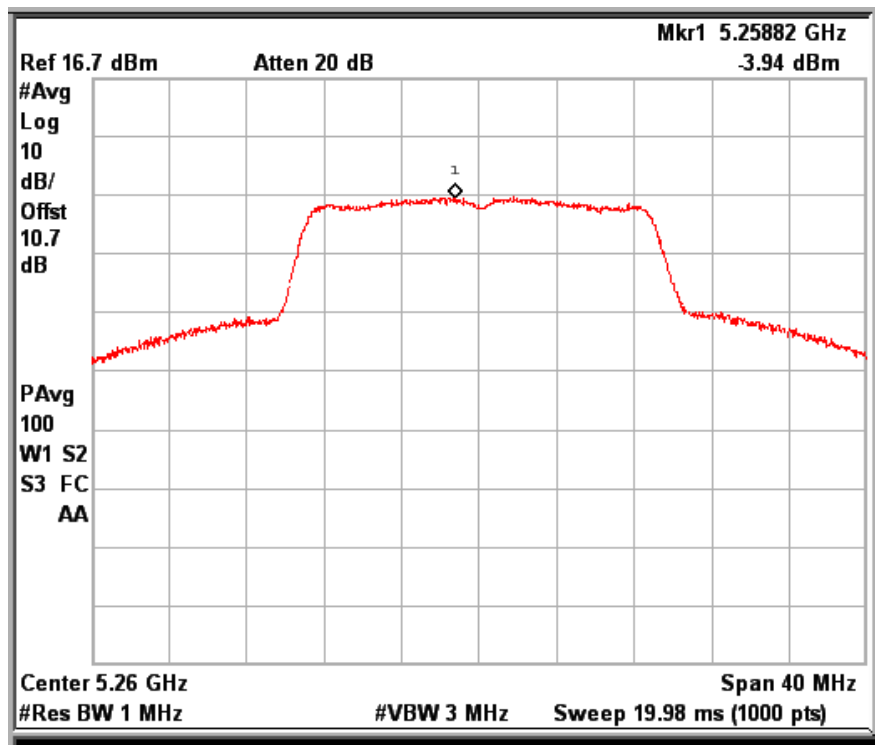


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Modulation: 802.11n

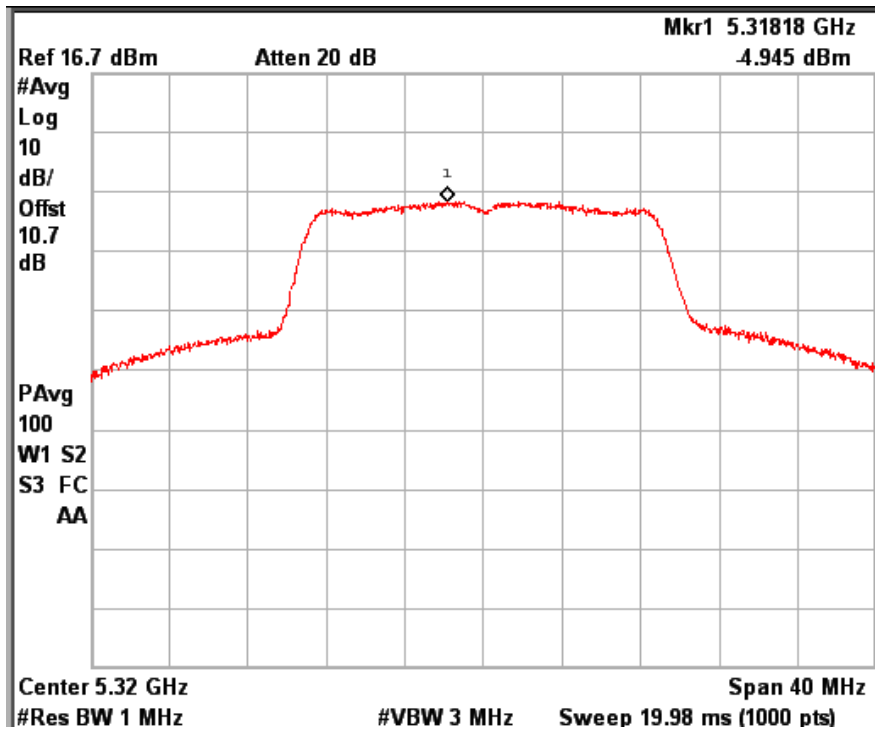
Data Rate	Channel No.	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
MCS0	52	5260	-3.94	11.00	-14.94
	64	5320	-4.945	11.00	-15.945
	100	5500	-9.263	11.00	-20.263
	140	5700	-1.283	11.00	-12.283
MCS7	52	5260	-3.524	11.00	-14.524
	64	5320	-4.712	11.00	-15.712
	100	5500	-9.528	11.00	-20.528
	140	5700	-1.144	11.00	-12.144



Data Rate: MCS0

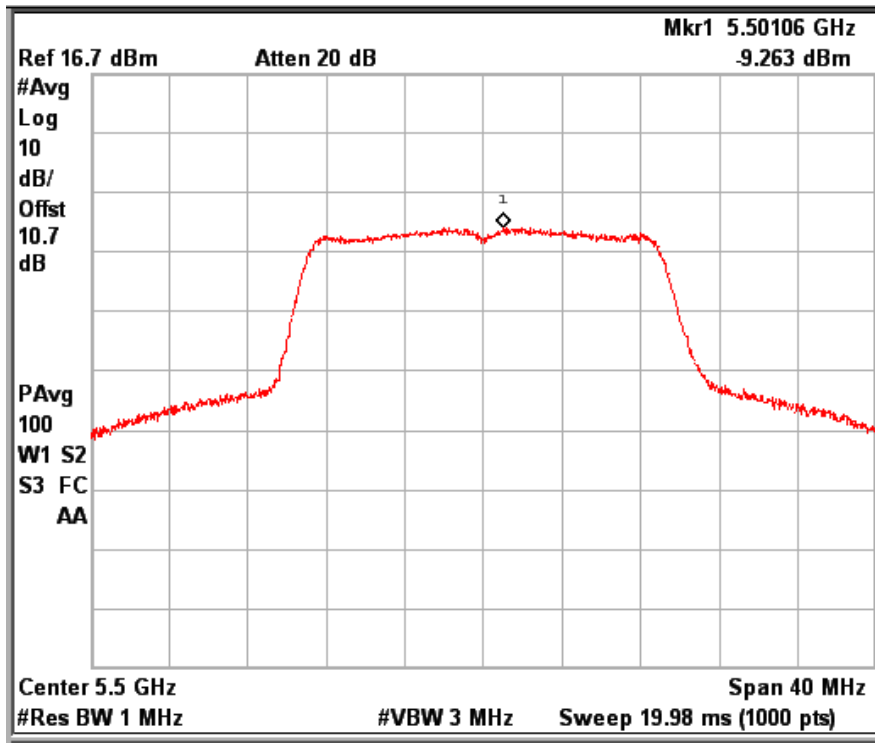
Channel Frequency: 5260MHz

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Data Rate: MCS0

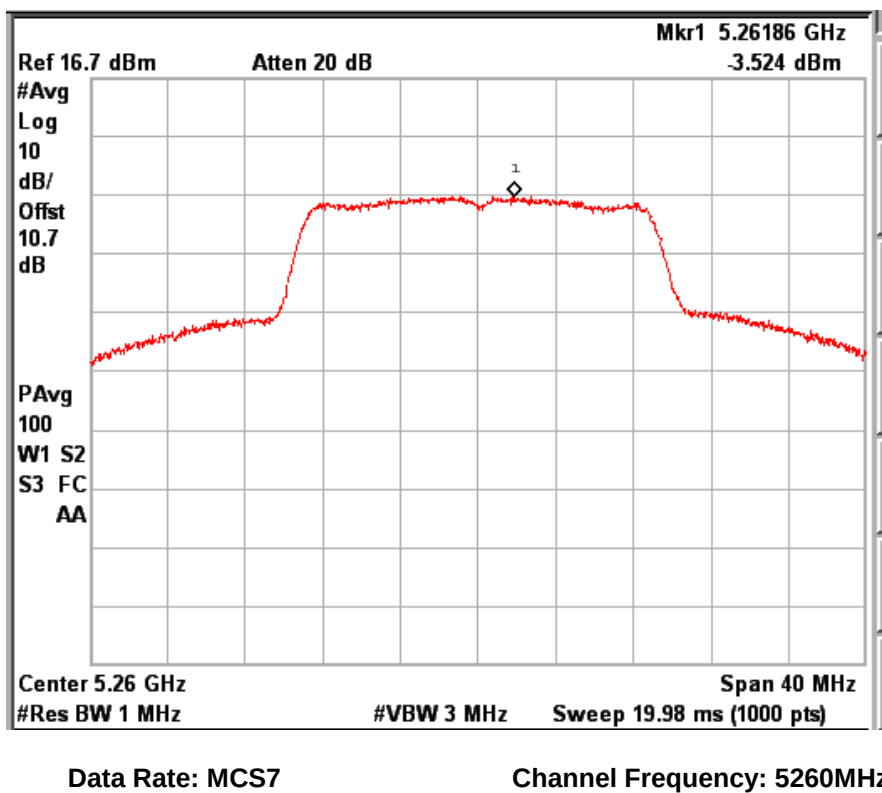
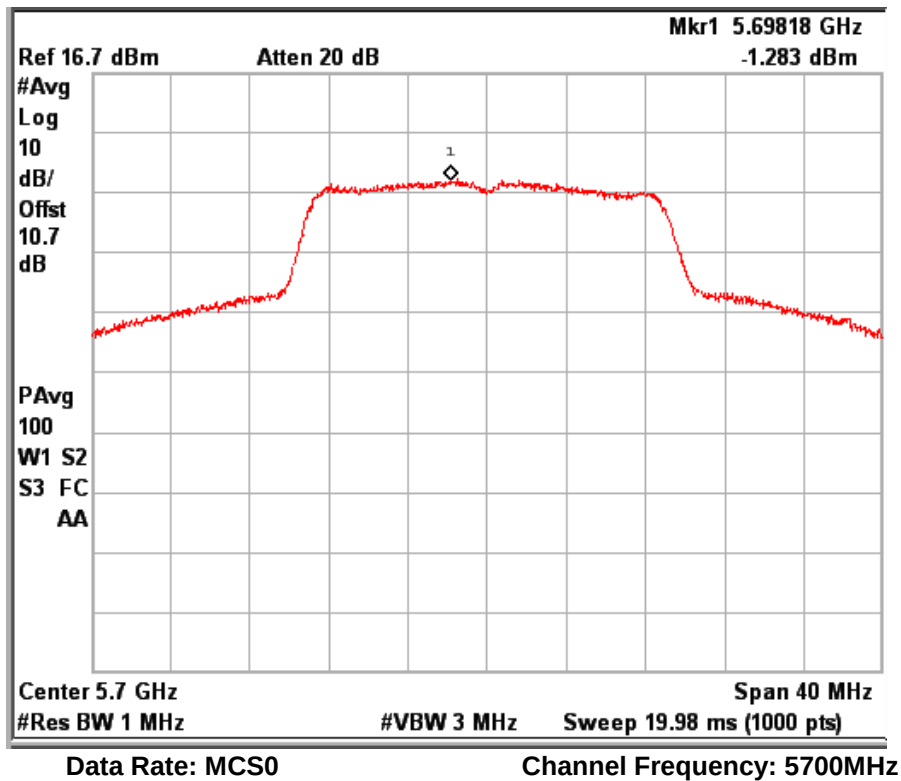
Channel Frequency: 5320MHz



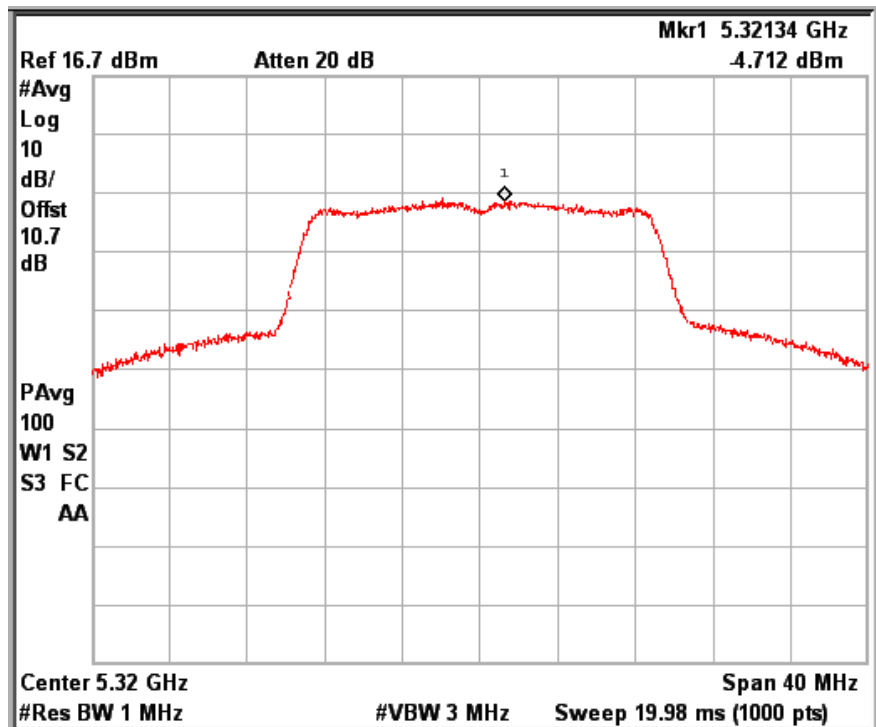
Data Rate: MCS0

Channel Frequency: 5500MHz

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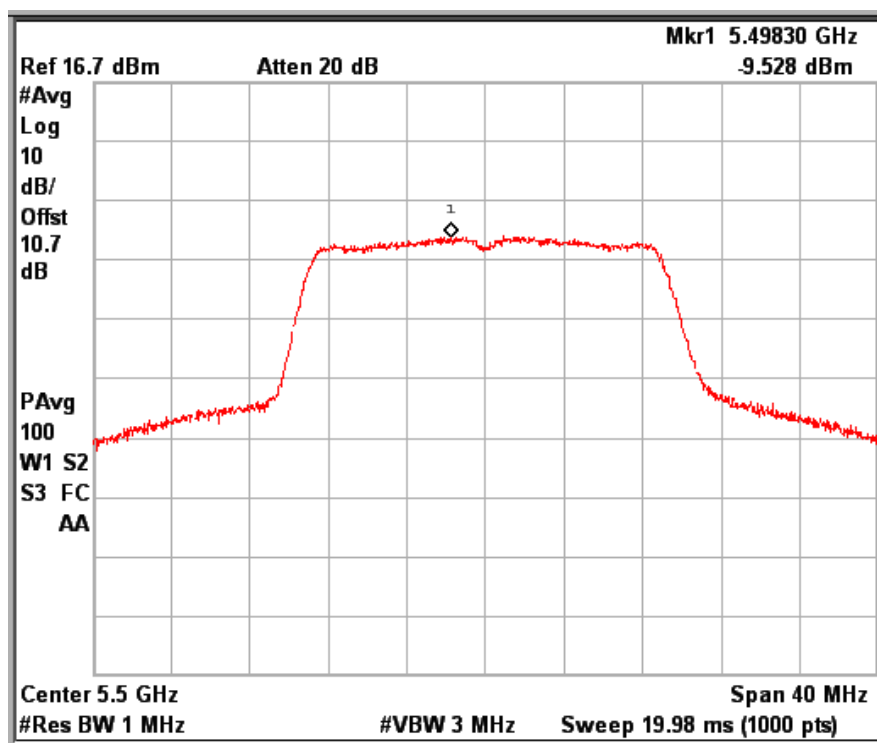


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Data Rate: MCS7

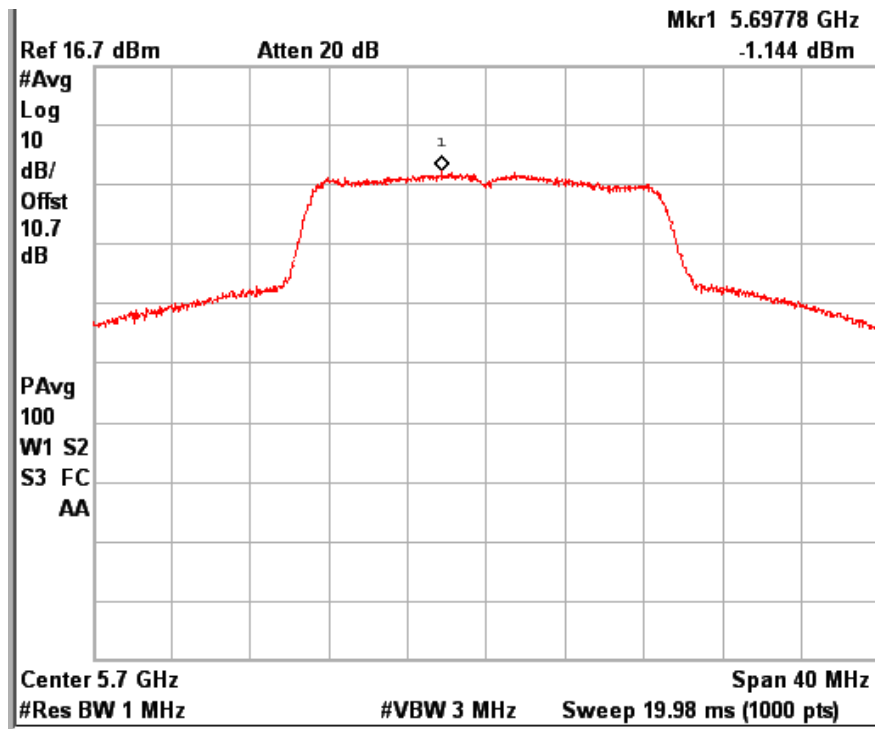
Channel Frequency: 5320MHz



Data Rate: MCS7

Channel Frequency: 5500MHz

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Data Rate: MCS7

Channel Frequency: 5700MHz

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**Radiated Spurious Emissions,
Restricted Bands of Operation and
Unwanted Emission
Result**

**Section 15.209 /15.205/15.407 (b) (6)
Pass**

Test Specification	FCC Part 15 Section 15.209
Test Method	ANSI C63.10-2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3m
Detection	QP for frequency below 1GHz, Peak/Average for frequency above 1GHz
Requirement	Should Comply with the limits stated in the below table.

Limit for Radiated Emission of Section 15.209:

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * the limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds To 88,50 – 53.80, 53.80 – 43.00 and 49.5dB $\mu\text{V/m}$ at 3m range by extrapolation calculation and The measurement of loop antenna

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

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Test results:

For frequencies Range 9 kHz - 1 GHz

No spurious emissions were found in this frequency range.

For Frequencies above 1 GHz

Note: Harmonic emissions were attenuated below 20dB below the limit, hence not reported.

802.11a: Channel Bandwidth - 20MHz; Data rate - 54 Mbps; Antenna - Fractus						
Frequency Bands	Channel No./ Frequency	Frequency (MHz)	Polarization	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5250-5350 (UNII - 2A)	52 (5260MHz)	5260 (Pk)	Vertical	107.13	*	-
		5260 (Av)		96.89	*	-
		5260 (Pk)	Horizontal	102.43	*	-
		5260 (Av)		91.21	*	-
	64 (5320MHz)	5320 (Pk)	Vertical	105.64	*	-
		5320 (Av)		95.34	*	-
		5350 (Pk)		68.45	74	-5.55
		5350 (Av)		49.21	54	-4.79
		5320 (Pk)	Horizontal	103.44	*	-
		5320 (Av)		94.12	*	-
		5350 (Pk)		66.78	74	-7.22
		5350 (Av)		46.64	54	-7.36
5470-5725 (UNII - 2C)	100 (5500MHz)	5460 (Pk)	Vertical	56.57	74	
		5460 (Av)		42.07	54	
		5470 (Pk)		65.76	68.23	-2.47
		5500 (Pk)		103.25	*	-
		5500 (Av)		92.84	*	-
		5460 (Pk)	Horizontal	53.44	74	
		5460 (Av)		39.33	54	
		5470 (Pk)		63.25	68.23	-4.98
		5500 (Pk)		100.27	*	-
		5500 (Av)		90.39	*	-
	120 (5600MHz)	5600 (Pk)	Vertical	106.53	*	-
		5600 (Av)		95.67	*	-
		5600 (Pk)	Horizontal	100.34	*	-
		5600 (Av)		90.21	*	-
	140 (5700MHz)	5700 (Pk)	Vertical	106.45	*	-
		5700 (Av)		95.54	*	-
		5700 (Pk)	Horizontal	100.34	*	-
		5700 (Av)		90.21	*	-

* - -> Fundamental Frequency

P-->Peak detector

AV-->Average Detector

802.11n: Channel Bandwidth - 20MHz; Data rate - MCS7; Antenna - Fractus						
Frequency Bands	Channel No./ Frequency	Frequency (MHz)	Polarization	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5250-5350 (UNII - 2A)	52 (5260MHz)	5260 (Pk)	Vertical	106.54	*	-
		5260 (Av)		96.32	*	-
		5260 (Pk)	Horizontal	101.93	*	-
		5260 (Av)		89.45	*	-
	64 (5320MHz)	5320 (Pk)	Vertical	105.32	*	-
		5320 (Av)		95.81	*	-
		5350 (Pk)		69.07	74	-4.93
		5350 (Av)		49.49	54	-4.51
		5320 (Pk)	Horizontal	103.17	*	-
		5320 (Av)		93.12	*	-
		5350 (Pk)		67.1	74	-6.9
		5350 (Av)		47.09	54	-6.91
5470-5725 (UNII - 2C)	100 (5500MHz)	5460 (Pk)	Vertical	49.80	74	
		5460 (Av)		39.13	54	
		5470 (Pk)		59.35	68.23	-8.88
		5500 (Pk)		101.85	*	-
		5500 (Av)		92.25	*	-
		5460 (Pk)	Horizontal	45.63	74	
		5460 (Av)		36.36	54	
		5470 (Pk)		56.26	68.23	-11.97
		5500 (Pk)		98.9	*	-
		5500 (Av)		89.04	*	-
	120 (5600MHz)	5600 (Pk)	Vertical	105.64	*	-
		5600 (Av)		94.78	*	-
		5600 (Pk)	Horizontal	99.67	*	-
		5600 (Av)		89.21	*	-
	140 (5700MHz)	5700 (Pk)	Vertical	105.88	*	-
		5700 (Av)		94.64	*	-
		5700 (Pk)	Horizontal	99.86	*	-
		5700 (Av)		89.48	*	-

* - -> Fundamental Frequency
P-->Peak detector
AV-->Average Detector

802.11a: Channel Bandwidth - 20MHz; Data rate - 54 Mbps; Antenna - Molex						
Freq Bands	Ch No./ Frequency	Frequency (MHz)	Polarization	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5250-5350 (UNII - 2A)	52 (5260MHz)	5260 (Pk)	Vertical	100.24	*	-
		5260 (Av)		90.12	*	-
		5260 (Pk)	Horizontal	108.97	*	-
		5260 (Av)		98.34	*	-
	64 (5320MHz)	5320 (Pk)	Vertical	99.59	*	-
		5320 (Av)		88.54	*	-
		5350 (Pk)		59.77	74	-14.23
		5350 (Av)		40.91	54	-13.09
		5320 (Pk)	Horizontal	107.02	*	-
		5320 (Av)		97.12	*	-
		5350 (Pk)		66.19	74	-7.81
		5350 (Av)		45.92	54	-8.08
5470-5725 (UNII - 2C)	100 (5500MHz)	5460 (Pk)	Vertical	48.11	74	
		5460 (Av)		36.17	54	
		5470 (Pk)		59.34	68.23	-8.89
		5500 (Pk)		96.98	*	-
		5500 (Av)		86.94	*	-
		5460 (Pk)	Horizontal	55.01	74	
		5460 (Av)		40.28	54	
		5470 (Pk)		65.76	68.23	-2.47
		5500 (Pk)		106.38	*	-
		5500 (Av)		96.05	*	-
	120 (5600MHz)	5600 (Pk)	Vertical	103.12	*	-
		5600 (Av)		93.44	*	-
		5600 (Pk)	Horizontal	107.34	*	-
		5600 (Av)		97.13	*	-
	140 (5700MHz)	5700 (Pk)	Vertical	103.23	*	-
		5700 (Av)		93.36	*	-
		5700 (Pk)	Horizontal	107.52	*	-
		5700 (Av)		97.24	*	-

* - -> Fundamental Frequency
P-->Peak detector
AV-->Average Detector

802.11n: Channel Bandwidth - 20MHz; Data rate - MCS7; Antenna - Molex						
Freq Bands	Ch No./ Frequency	Frequency (MHz)	Polarization	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5250-5350 (UNII - 2A)	52 (5260MHz)	5260 (Pk)	Vertical	100.14	*	-
		5260 (Av)		90.04	*	-
		5260 (Pk)	Horizontal	108.78	*	-
		5260 (Av)		97.34	*	-
	64 (5320MHz)	5320 (Pk)	Vertical	99.17	*	-
		5320 (Av)		89	*	-
		5350 (Pk)		62.44	74	-11.56
		5350 (Av)		44.06	54	-9.94
		5320 (Pk)	Horizontal	107.01	*	-
		5320 (Av)		96.72	*	-
		5350 (Pk)		69	74	-5
		5350 (Av)		49.5	54	-4.5
5470-5725 (UNII - 2C)	100 (5500MHz)	5460 (Pk)	Vertical	44.05	74	
		5460 (Av)		33.98	54	
		5470 (Pk)		52.9	68.23	-15.33
		5500 (Pk)		97.52	*	-
		5500 (Av)		86.94	*	-
		5460 (Pk)	Horizontal	48.38	74	
		5460 (Av)		38.84	54	
		5470 (Pk)		58.34	68.23	-9.89
		5500 (Pk)		103.65	*	-
		5500 (Av)		93.91	*	-
	120 (5600MHz)	5600 (Pk)	Vertical	101.34	*	-
		5600 (Av)		92.08	*	-
		5600 (Pk)	Horizontal	107.32	*	-
		5600 (Av)		97.86	*	-
	140 (5700MHz)	5700 (Pk)	Vertical	101.76	*	-
		5700 (Av)		91.67	*	-
		5700 (Pk)	Horizontal	107.21	*	-
		5700 (Av)		97.45	*	-

* - -> Fundamental Frequency

P-->Peak detector

AV-->Average Detector

802.11a: Channel Bandwidth - 20MHz; Data rate - 54 Mbps; Antenna - Redpine						
Freq Bands	Ch No./ Frequency	Frequency (MHz)	Polarization	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5250-5350 (UNII - 2A)	52 (5260MHz)	5260 (Pk)	Vertical	101.56	*	-
		5260 (Av)		90.67	*	-
		5260 (Pk)	Horizontal	108.92	*	-
		5260 (Av)		98.32	*	-
	64 (5320MHz)	5320 (Pk)	Vertical	100.2	*	-
		5320 (Av)		90.45	*	-
		5350 (Pk)		60.32	74	-13.68
		5350 (Av)		42.47	54	-11.53
		5320 (Pk)	Horizontal	107.34	*	-
		5320 (Av)		97.42	*	-
		5350 (Pk)		69.21	74	-4.79
		5350 (Av)		49.45	54	-4.55
5470-5725 (UNII - 2C)	100 (5500MHz)	5460 (Pk)	Vertical	46.78	74	
		5460 (Av)		34.78	54	
		5470 (Pk)		56.19	68.23	-12.04
		5500 (Pk)		100.32	*	-
		5500 (Av)		89.32	*	-
		5460 (Pk)	Horizontal	50.19	74	
		5460 (Av)		38.62	54	
		5470 (Pk)		62.14	68.23	-6.09
		5500 (Pk)		106.32	*	-
		5500 (Av)		95.86	*	-
	120 (5600MHz)	5600 (Pk)	Vertical	100.98	*	-
		5600 (Av)		90.21	*	-
		5600 (Pk)	Horizontal	108.32	*	-
		5600 (Av)		98.03	*	-
	140 (5700MHz)	5700 (Pk)	Vertical	101.92	*	-
		5700 (Av)		91.56	*	-
		5700 (Pk)	Horizontal	107.89	*	-
		5700 (Av)		97.74	*	-

* - -> Fundamental Frequency

P-->Peak detector

AV-->Average Detector

802.11n: Channel Bandwidth - 20MHz; Data rate - MCS7; Antenna - Redpine						
Freq Bands	Ch No./ Frequency	Frequency (MHz)	Polarization	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5250-5350 (UNII - 2A)	52 (5260MHz)	5260 (Pk)	Vertical	101.11	*	-
		5260 (Av)		90.45	*	-
		5260 (Pk)	Horizontal	108.31	*	-
		5260 (Av)		97.88	*	-
	64 (5320MHz)	5320 (Pk)	Vertical	100.07	*	-
		5320 (Av)		90.51	*	-
		5350 (Pk)		61.47	74	-12.53
		5350 (Av)		43.83	54	-10.17
		5320 (Pk)	Horizontal	107.27	*	-
		5320 (Av)		97.15	*	-
		5350 (Pk)		73.05	74	-0.95
		5350 (Av)		52.93	54	-1.07
5470-5725 (UNII - 2C)	100 (5500MHz)	5460 (Pk)	Vertical	45.12	74	
		5460 (Av)		33.74	54	
		5470 (Pk)		53.19	68.23	-15.04
		5500 (Pk)		99.17	*	-
		5500 (Av)		88.21	*	-
		5460 (Pk)	Horizontal	49.74	74	
		5460 (Av)		41.78	54	
		5470 (Pk)		60.74	68.23	-7.49
		5500 (Pk)		105.89	*	-
		5500 (Av)		95.58	*	-
	120 (5600MHz)	5600 (Pk)	Vertical	100.45	*	-
		5600 (Av)		89.56	*	-
		5600 (Pk)	Horizontal	107.94	*	-
		5600 (Av)		97.68	*	-
	140 (5700MHz)	5700 (Pk)	Vertical	101.32	*	-
		5700 (Av)		91.23	*	-
		5700 (Pk)	Horizontal	107.45	*	-
		5700 (Av)		97.32	*	-

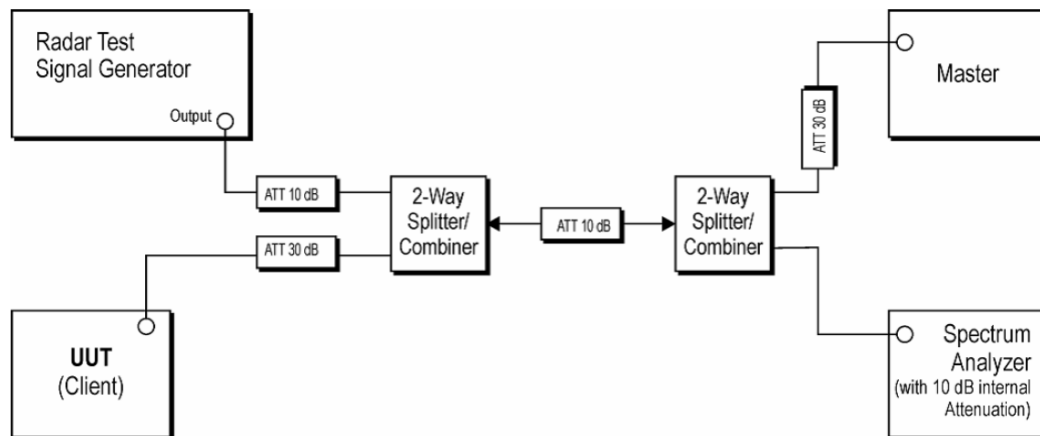
* - -> Fundamental Frequency

P-->Peak detector

AV-->Average Detector

Dynamic Frequency Selection (DFS)
Result
Section 15.403 (h) (2)
Pass

Below set-up is a set-up whereby the UUT is an RLAN device operating in slave mode without Radar Interference Detection function. This set-up also contains an RLAN device operating in master mode. The Radar test signals are injected into the master device. The UUT (slave device) is associated with the master device.

Test Setup


Note: FCC Certified Access Point is used for testing with FCC ID: LDK102056

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required

Note : The Radio module supports only client without radar detection feature.

Channel Move Time and the Channel Closing Transmission Time test is performed with Radar Type 0

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Channel Shutdown and Non-Occupancy period:

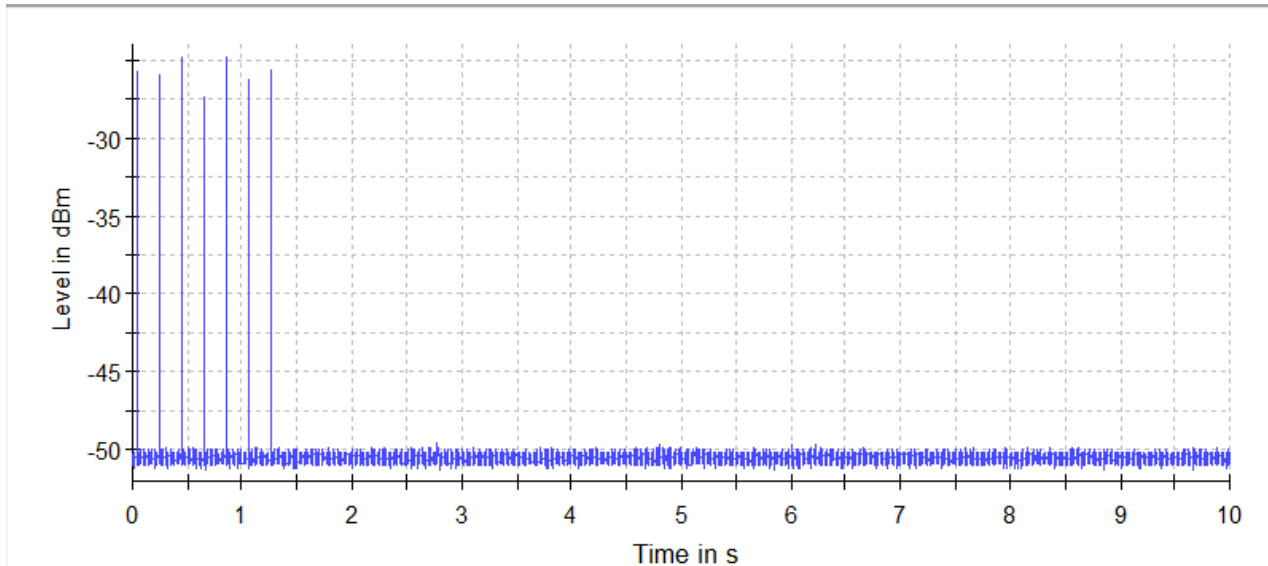
Channel Bandwidth: 20 MHz

Operating Frequency (MHz)	Test	Measured Value	Limit
5260	Channel move Time	0	10 sec
	Channel Closing Transmission Time	0	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period
	Non Occupancy Time	1860.062sec	Min 30 minutes
5500	Channel move Time	0	10 sec
	Channel Closing Transmission Time	0	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period
	Non Occupancy Time	1860.062 sec	Min 30 minutes

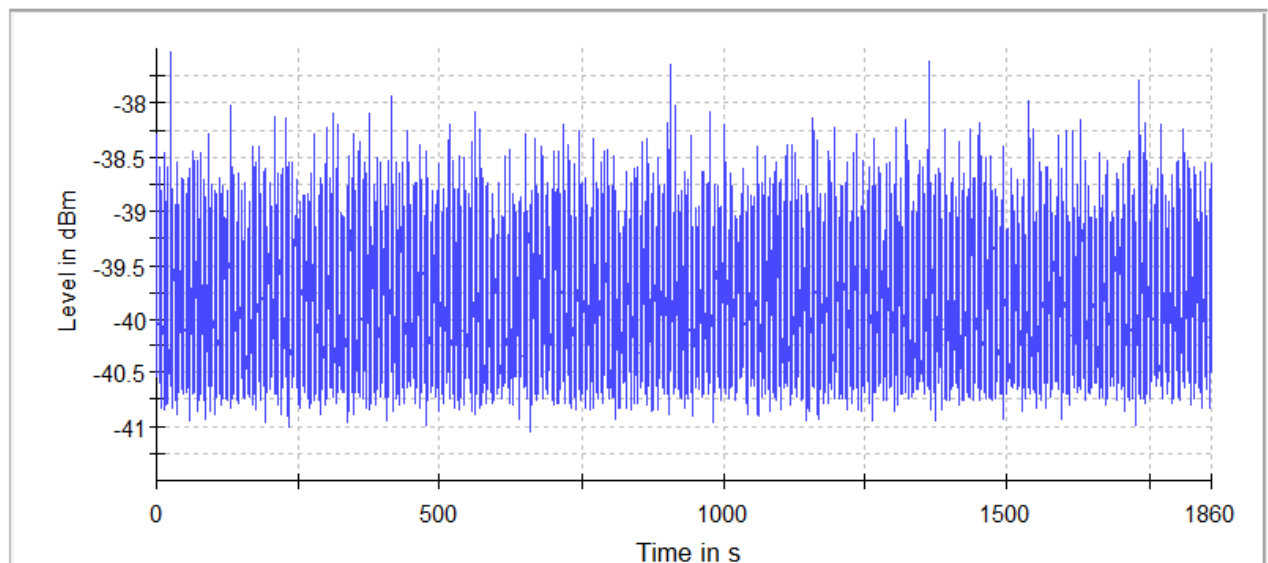
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Channel Frequency 5260 MHz

Channel Shutdown



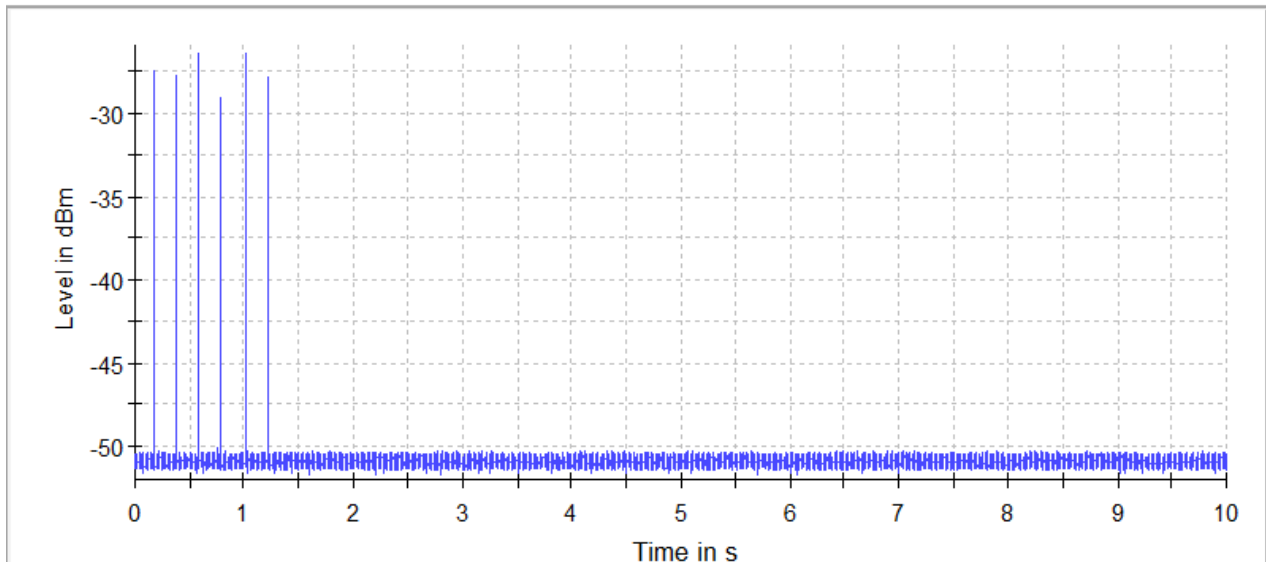
Non Occupancy Period



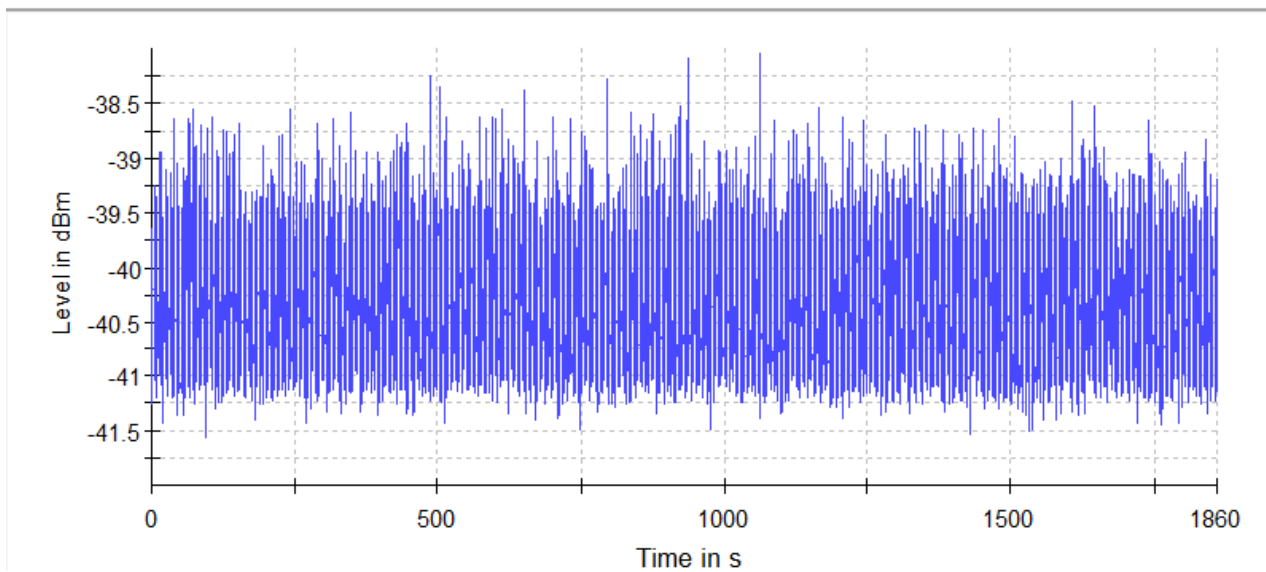
www.tuv.com

Channel Frequency 5500 MHz

Channel Shutdown



Non Occupancy Period



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Power level Settings used during testing:

20MHz Channel

20MHz Channel: Power setting used for Molex antenna. Attenuation to the Antenna Gain used is '0'								
Band	Channel Frequency (MHz)	Channel No.	Data Rate					
			MCS0	6Mbps	MCS4	24Mbps	MCS7	54Mbps
UNII 2A	5260	52	12	13	12	13	12	13
	5300	60	12	13	12	13	12	13
	5320	64	10	10	10	10	10	10
UNII 2C	5500	100	5	7	5	7	5	7
	5600	120	11	12	11	12	11	12
	5700	140	11	12	11	12	11	12

20MHz Channel: Power setting used for Fractus antenna. Attenuation to the Antenna Gain used is '0'								
Band	Channel Frequency (MHz)	Channel No.	Data Rate					
			MCS0	6Mbps	MCS4	24Mbps	MCS7	54Mbps
UNII 2A	5260	52	12	13	12	13	12	13
	5300	60	12	13	12	13	12	13
	5320	64	10	10	10	10	10	10
UNII 2C	5500	100	5	7	5	7	5	7
	5600	120	11	12	11	12	11	12
	5700	140	11	12	11	12	11	12

20MHz Channel: Power setting used for Redpine antenna. Attenuation to the Antenna Gain used is '0'								
Band	Channel Frequency (MHz)	Channel No.	Data Rate					
			MCS0	6Mbps	MCS4	24Mbps	MCS7	54Mbps
UNII 2A	5260	52	12	13	12	13	12	13
	5300	60	12	13	12	13	12	13
	5320	64	10	10	10	10	10	10
UNII 2C	5500	100	5	7	5	7	5	7
	5600	120	11	12	11	12	11	12
	5700	140	11	12	11	12	11	12