Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**19660254 001**	**Seite 1 von 99** *Page 1 of 99*
Auftraggeber: *Client:*	**Redpine Signals Inc** **2107 N.First Street, Suite 680,** **San Jose, CA 95131-2019** **United States**	
Gegenstand der Prüfung: *Test item:*	**Host Module**	
Bezeichnung: *Identification:*	**MS32018**	**Serien-Nr.:** *Serial No.* **Engineering Sample**
Wareneingangs-Nr.: *Receipt No.:*	**1803166512**	**Eingangsdatum:** *Date of receipt:* **19.09.2016**
Prüfort: *Testing location:*	**Refer Page 4 of 99 for test facilities**	
Prüfgrundlage: *Test specification:*	**FCC Part 15: Subpart C Section 15.247** **ANSI C63.10-2013**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**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:*		
28.10.2016	Girish Kumar Engineer	Girish	31.10.2016	Vinay N Asst. Manager	Vinay.N
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges /*Other Aspects:* **FCC ID : XF6-MS32018**

Abkürzungen:				*Abbreviations:*			
P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*	
F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*	
N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*	
N/T	=	*nicht getestet*		*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.

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.

Test Result Summary

Clause	Test Item	Result
FCC 15.247(b) (3)	Maximum Average Conducted Output Power	Pass
FCC 15.247(a) (2)	6dB Bandwidth	Pass
FCC 15.247(e)	Maximum Power Spectral Density	Pass
FCC 15.247(d)	Band-edge compliance	Pass
FCC 15.209 / FCC 15.205	Spurious Radiated Emissions and Restricted Bands of Operation	Pass

Note: Conducted measurements are done according to the procedure given in KDB No. **558074 D01 DTS Meas Guidance v03r05**

Content

List of Test and Measurement Instruments 4

General Product Information 5

Product Function and Intended Use 5
Ratings and System Details 5

Test Set-up and Operation Mode 6

Principle of Configuration Selection 6
Test Operation and Test Software 6
Test Modes – Data Rates and Modulations 6

Test Methodology 7

Radiated Emission Test 7

Test Results 8

Maximum Average Conducted Output Power — Section 15.247(b) (3) 8
Maximum Power Spectral Density — Section 15.247(e) 22
6 dB Bandwidth — Section 15.247(a) (2) 36
Band-edge Compliance — Section 15.247(d) 63
Spurious Radiated Emissions and 87
Restricted Bands of Operation — Section 15.209 and 15.205 87
Conducted Emission Test on A.C. Power Line — Section 15.207 95

Appendix 1: Test Setup Photo

Appendix 2: EUT External Photo

Appendix 3: EUT Internal Photo

Appendix 4: FCC Label and Label Location

Appendix 5: Block Diagram

Appendix 6: Specification of EUT

Appendix 7: Schematic Diagrams

Appendix 8: Bill of Material

Appendix 9: User Manual

Appendix 10: Maximum Permissible Exposure Calculation

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List of Test and Measurement Instruments

TUV Rheinland (India) Pvt. Ltd. , Bangalore

Equipment	Manufacturer	Model	S/N	Calibration Due Date
EMI Test Receiver	Rohde &Schwarz	ESU 40	100288	23.11.2017
Broadband Antenna	Frankonia	ALX-4000	ALX-4000-806	10.06.2017
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	14.03.2017
Double-Ridged Waveguide Horn Antenna	ETS Lindgren	116706	00107323	02.11.2016
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	22.12.2016
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	23.04.2017
LISN	Rohde & Schwarz	ENV4200	100163	03.02.2017
EMI Receiver	Rohde & Schwarz	ESR7	101133	17.11.2016

Testing Facilities:

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

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 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 Range	2400MHz – 2483.50MHz	
No. of channel	11	
Channel Spacing	5MHz	
Transmitted Power	802.11b	17.41dBm
	802.11g	17.74dBm
	802.11n	17.85dBm
Data Rate	802.11b: 1,2, 5.5,11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6.5, 14.4, 21.7, 28.9, 39, 57.8, 65Mbps	
Number of antenna	One	
Antenna Gain and Antenna type	Internal mount and cable connection, 2.36dBi	
Supply Voltage to Module	3.1V – 3.6V DC from Host device	
Environmental	Operational Temperature: -40ºC to 85º C	

Test Conditions:

Supply Voltage: 5V DC from USB

Environmental conditions:

Temperature: +24 º C RH: 62%

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

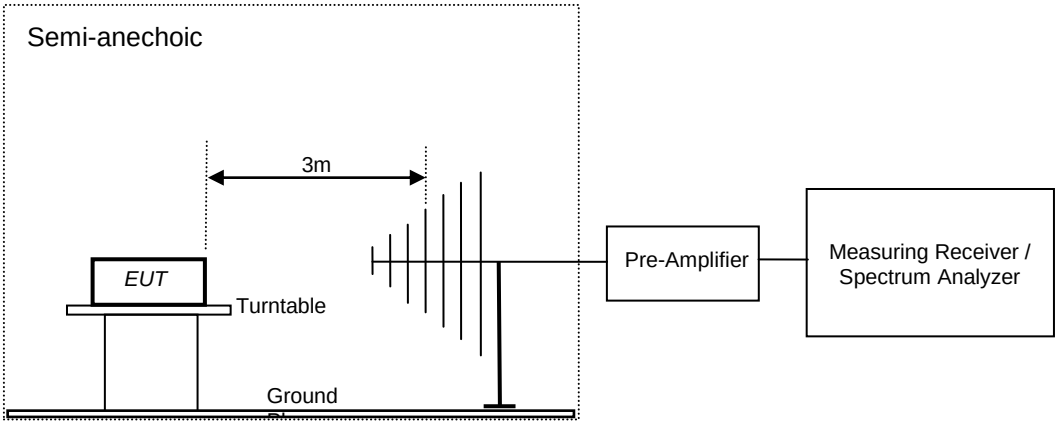
For Radiated spurious emissions, the tests were performed for all data rates and only worst case results are reported in this report.

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 on turntable for below 1GHz and 1.5meter for above 1GHz measurements and the EUT is 3 meters far from the measuring antenna. 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.



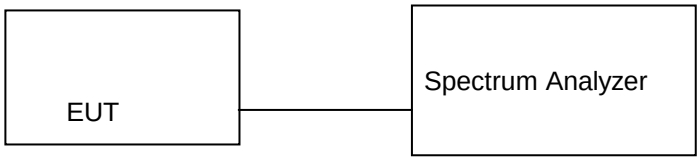
Test Results

Maximum Average Conducted Output Power **Section 15.247(b) (3)**

Result **Pass**

Test Specification	FCC Part 15 Subpart C
Measurement Bandwidth (RBW)	300 kHz/1MHz
Requirement	<1 watt (30dBm).

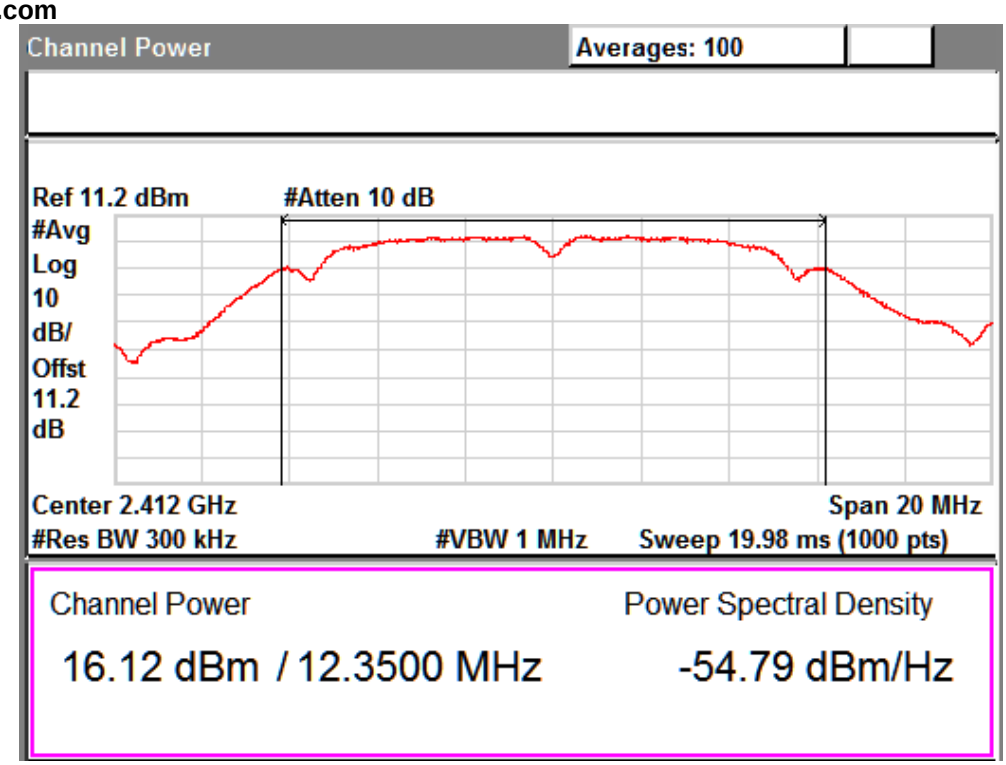
Test Method:



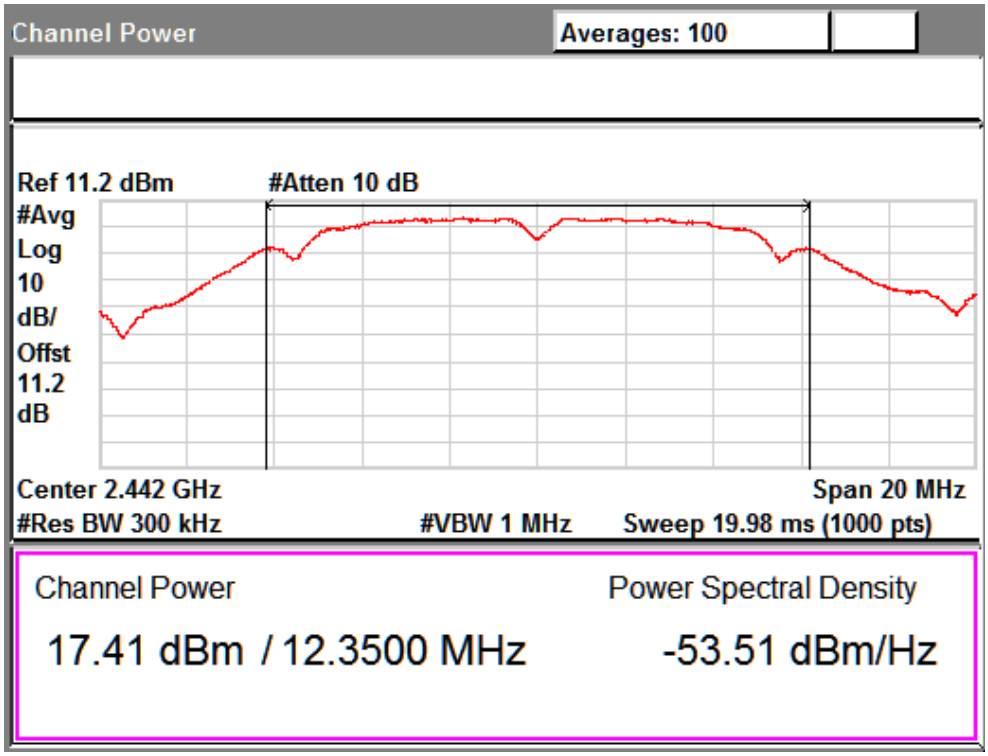
Note: For measurement of Maximum Average conducted output power method AVGSA-1 was used

Test Result: Wi-Fi

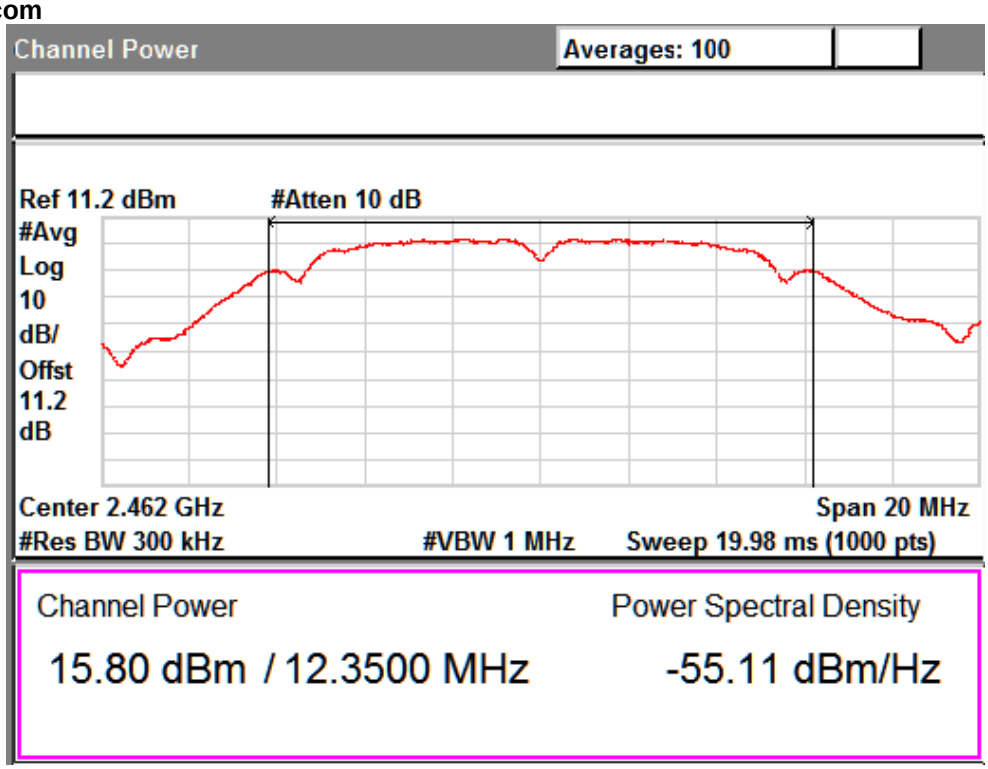
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)	Margin (dB)
b	1	2412.00	16.12	30.00	-13.88
		2442.00	17.41	30.00	-12.59
		2462.00	15.80	30.00	-14.20
	11	2412.00	16.79	30.00	-13.41
		2442.00	17.40	30.00	-12.60
		2462.00	16.53	30.00	-13.47



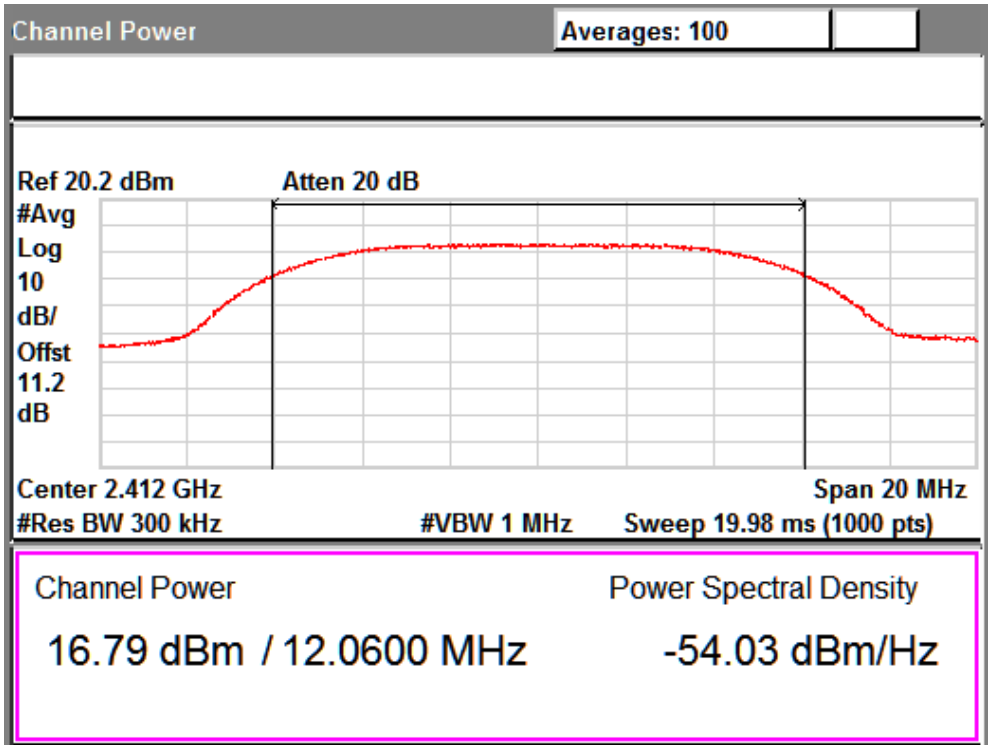
Data rate: 1 Mbps **Channel Frequency: 2412 MHz**



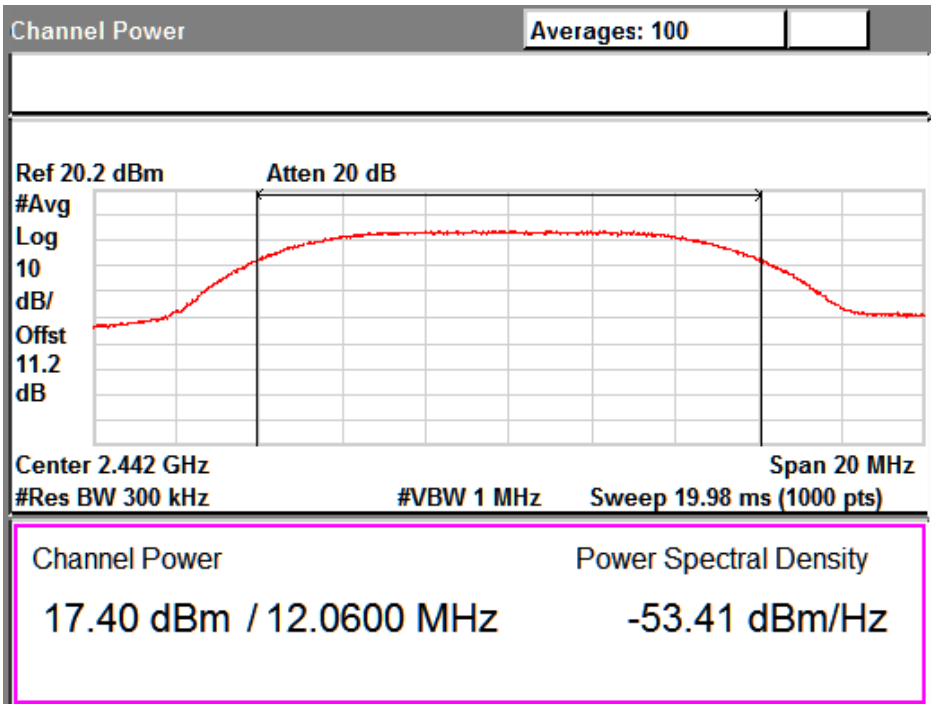
Data rate: 1 Mbps **Channel Frequency: 2442 MHz**



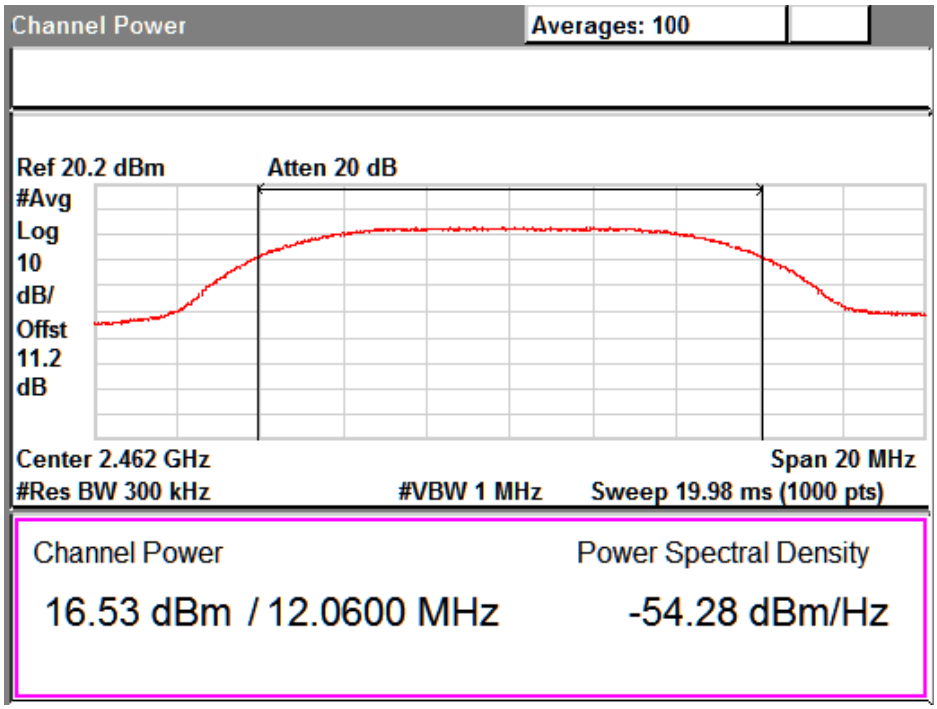
Data rate: 1 Mbps **Channel Frequency: 2462 MHz**



Data rate: 11 Mbps **Channel Frequency: 2412 MHz**

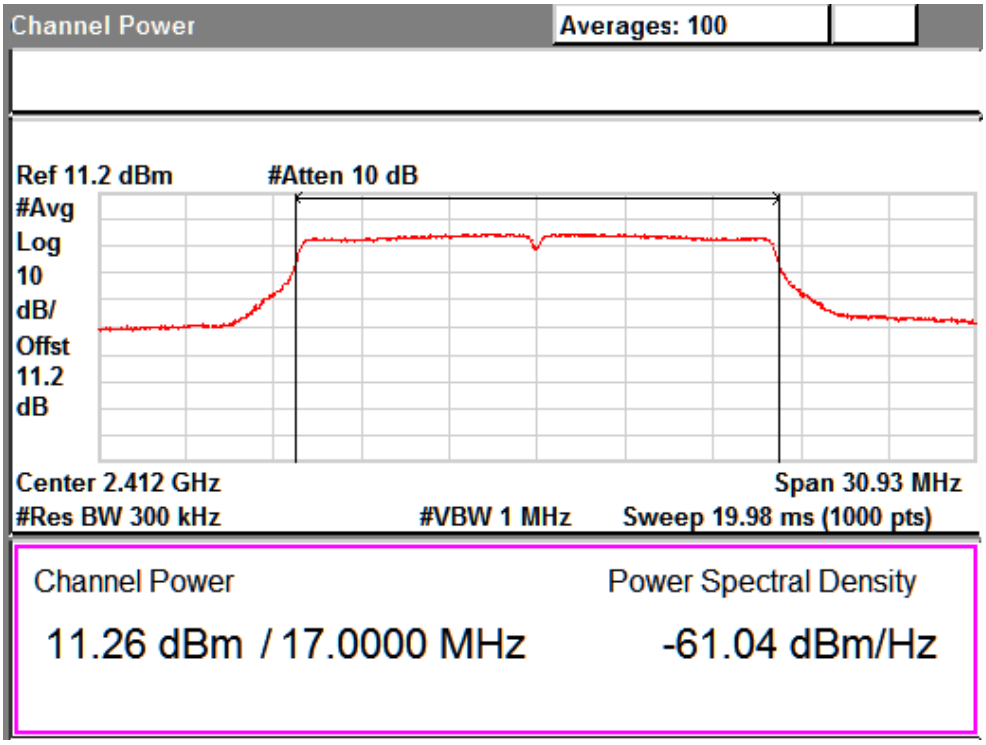


Data rate: 11 Mbps **Channel Frequency: 2442 MHz**

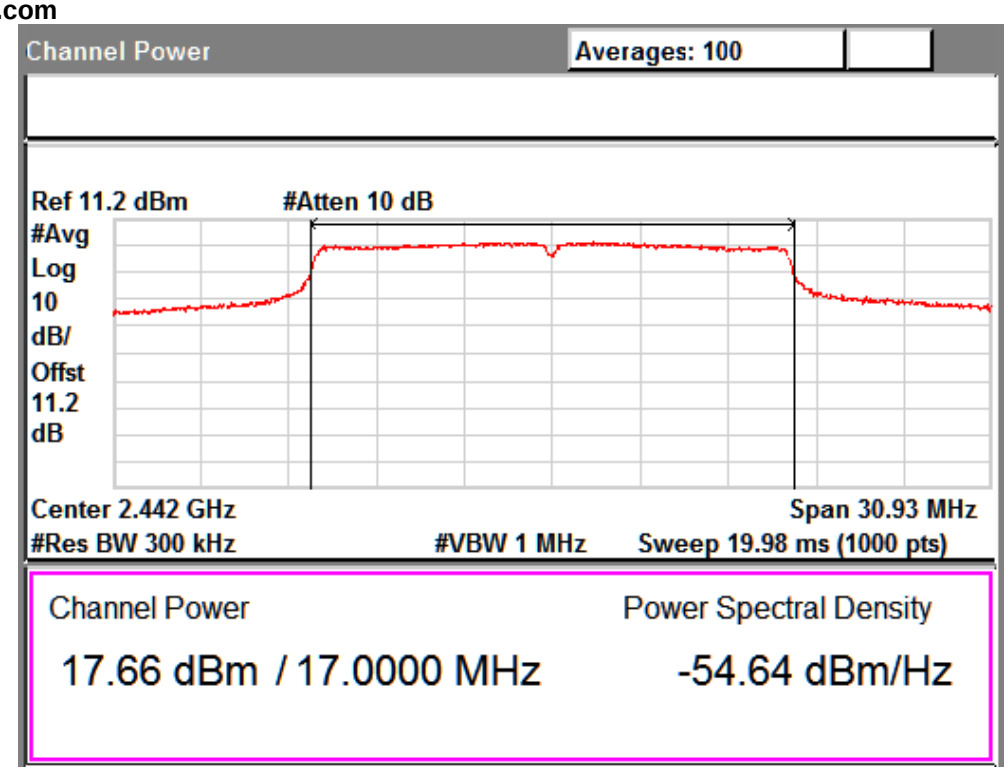


Data rate: 11 Mbps **Channel Frequency: 2462 MHz**

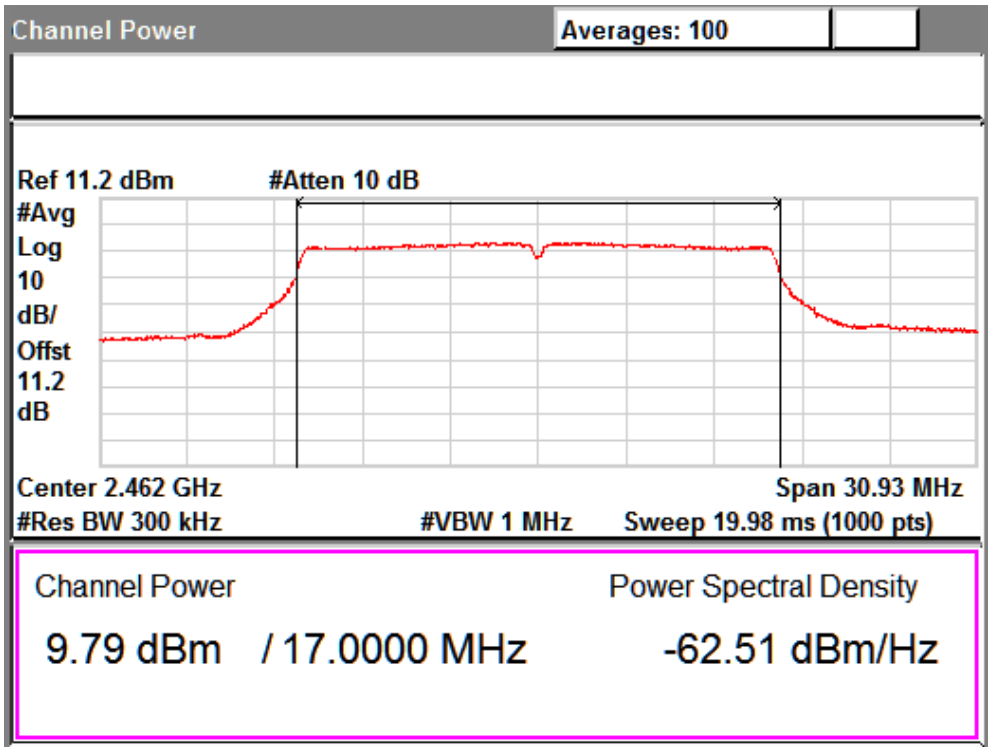
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)	Margin (dB)
g	6	2412	11.26	30.00	-18.74
		2442	17.66	30.00	-12.34
		2462	09.79	30.00	-20.21
	24	2412	11.09	30.00	-18.91
		2442	17.69	30.00	-12.31
		2462	10.30	30.00	-19.7
	54	2412	11.18	30.00	-18.82
		2442	17.74	30.00	-12.26
		2462	10.29	30.00	-19.71



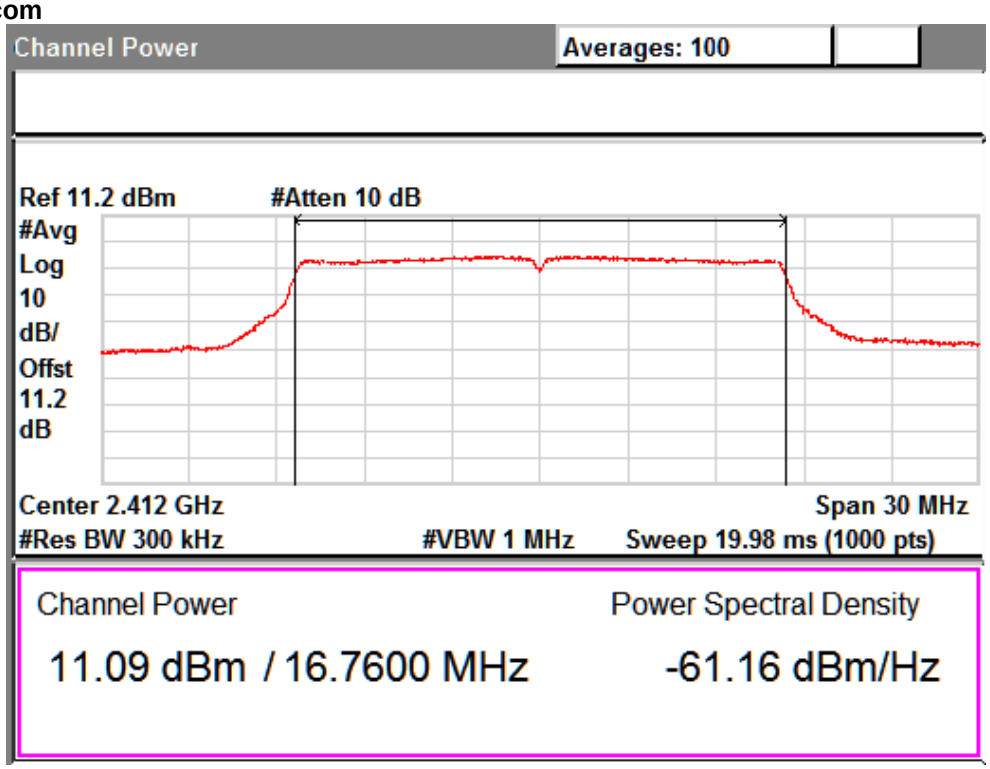
Data rate: 6 Mbps **Channel Frequency: 2412 MHz**



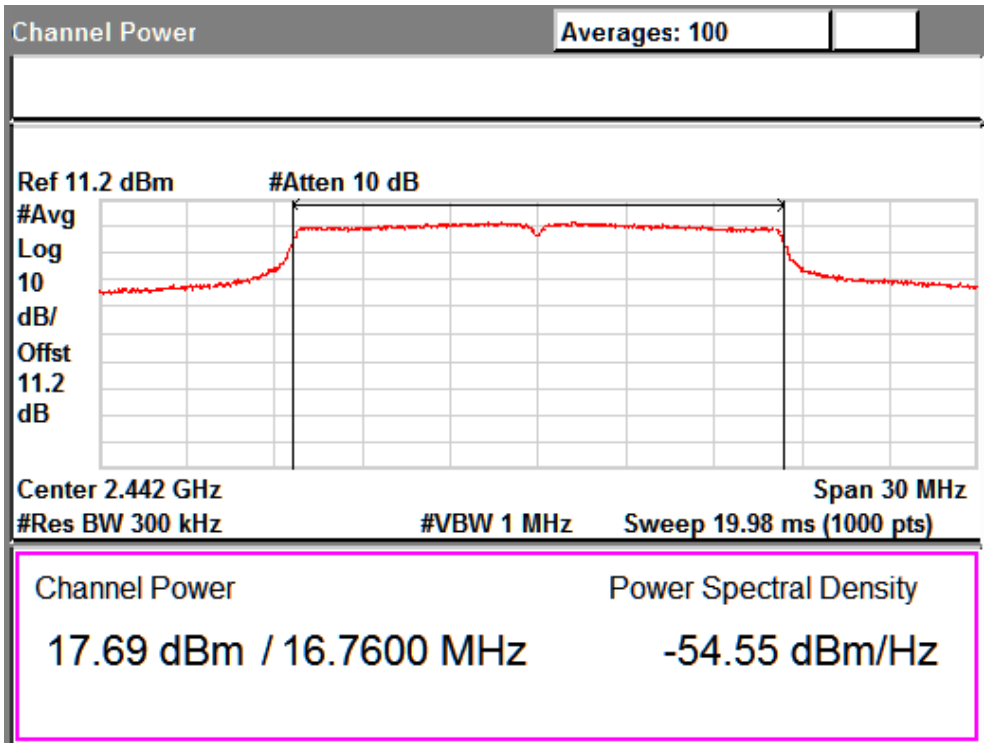
Data rate: 6 Mbps **Channel Frequency: 2442 MHz**



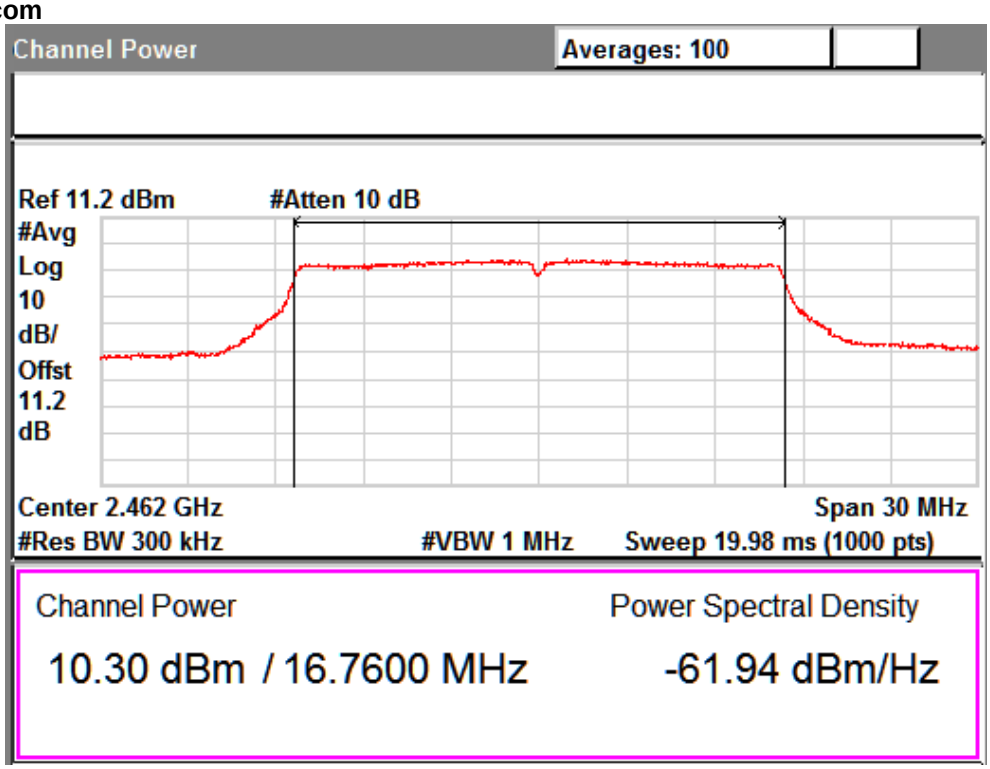
Data rate: 6 Mbps **Channel Frequency: 2462 MHz**



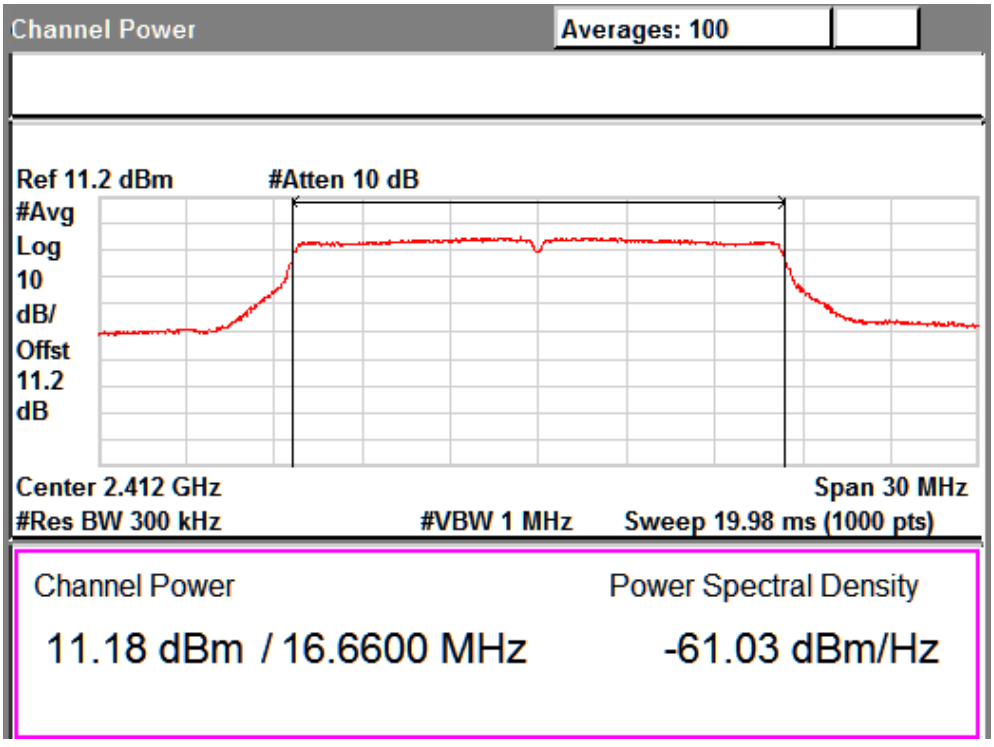
Data rate: 24 Mbps **Channel Frequency: 2412 MHz**



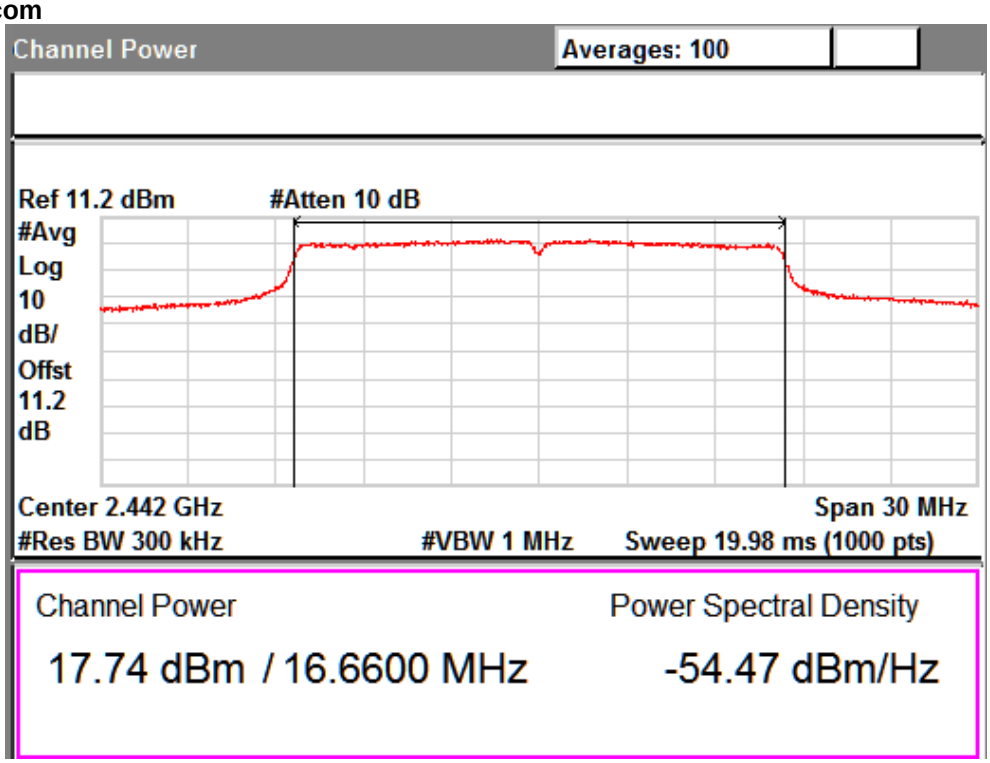
Data rate: 24 Mbps **Channel Frequency: 2442 MHz**



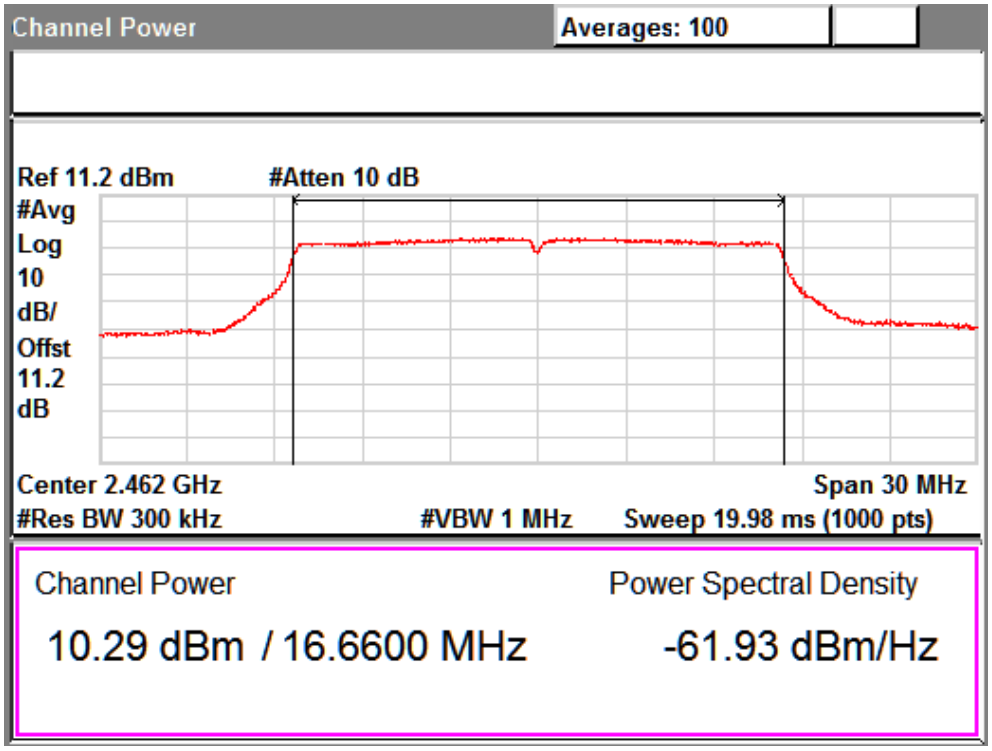
Data rate: 24 Mbps **Channel Frequency: 2462 MHz**



Data rate: 54 Mbps **Channel Frequency: 2412 MHz**

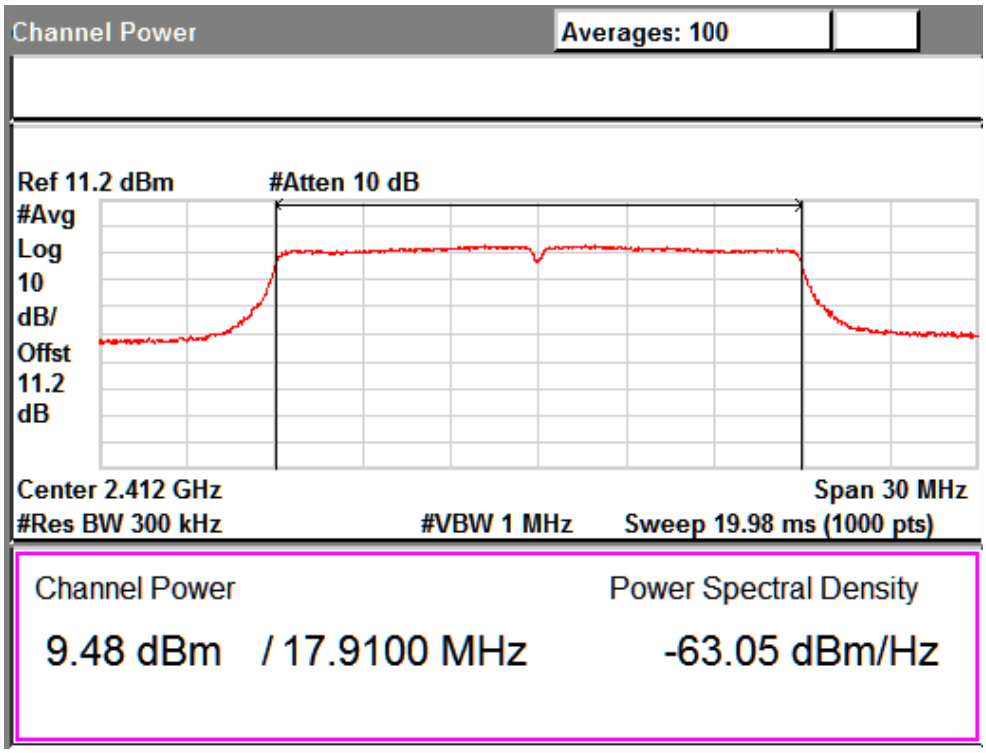


Data rate: 54 Mbps **Channel Frequency: 2442 MHz**

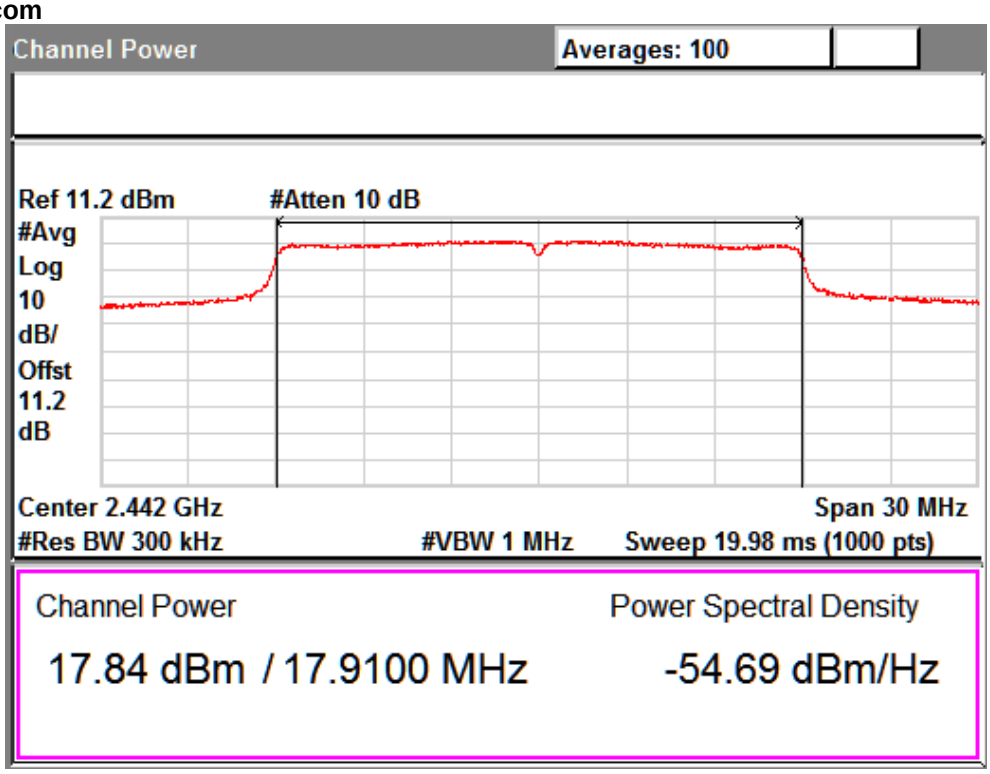


Data rate: 54 Mbps **Channel Frequency: 2462 MHz**

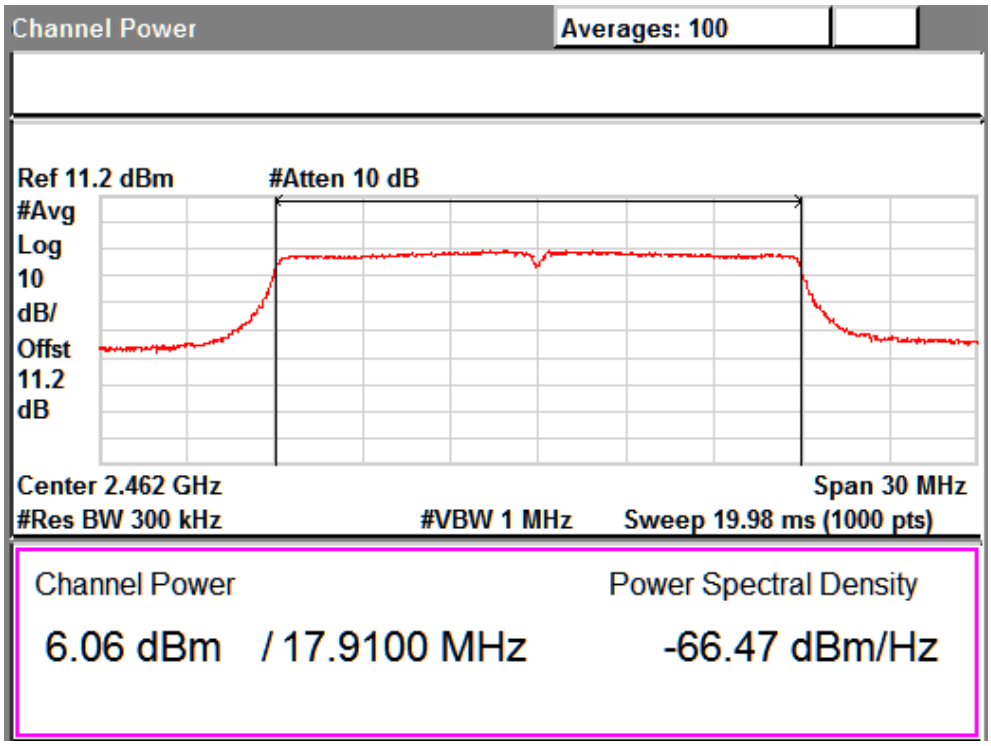
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)	Margin (dB)
n	6.5	2412.00	09.48	30.00	-20.52
		2442.00	17.84	30.00	-12.16
		2462.00	06.06	30.00	-23.94
	39	2412.00	09.84	30.00	-20.16
		2442.00	17.68	30.00	-12.32
		2462.00	08.07	30.00	-21.93
	65	2412.00	09.38	30.00	-20.62
		2442.00	17.85	30.00	-12.15
		2462.00	08.07	30.00	-21.93



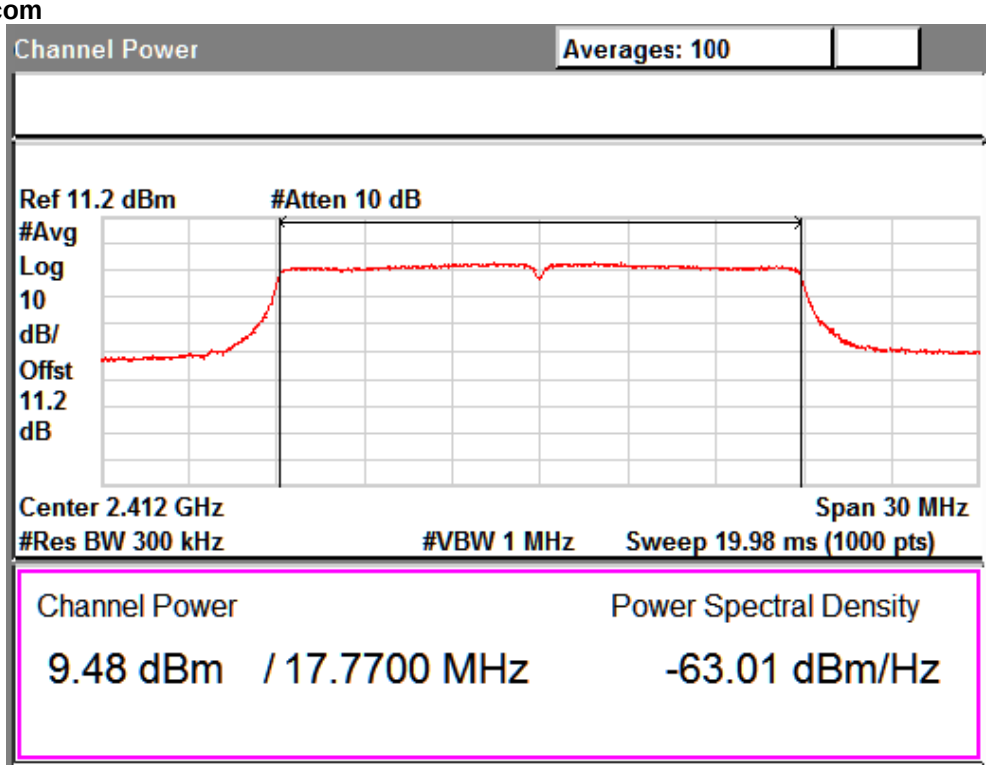
Data Rate: 6.5 Mbps **Channel Frequency: 2412 MHz**



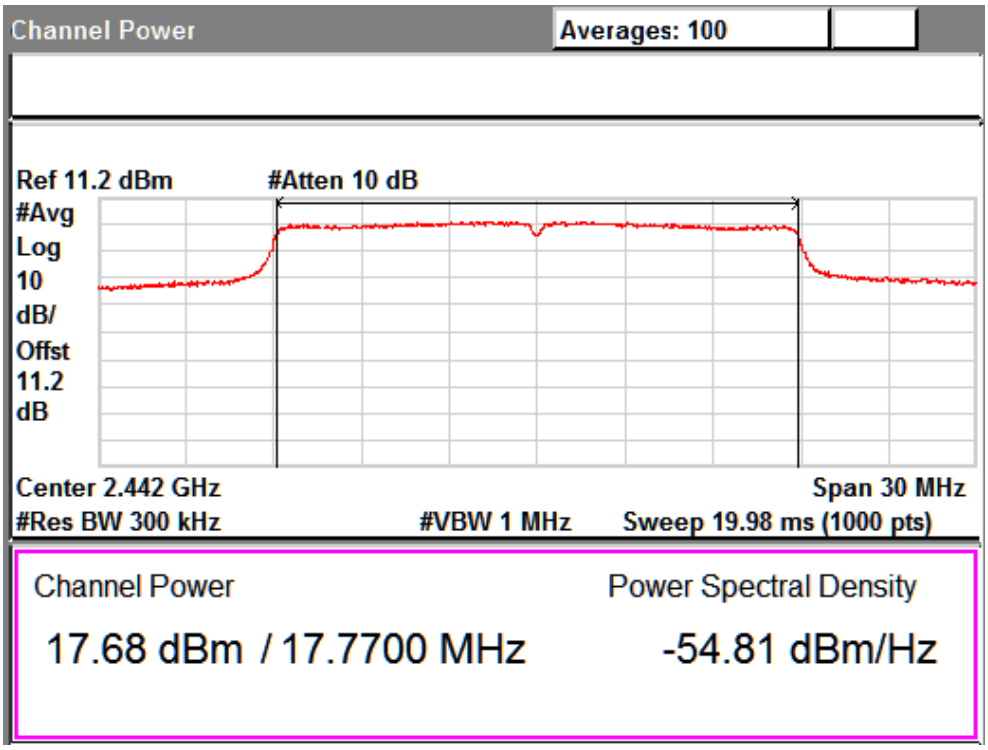
Data Rate: 6.5 Mbps **Channel Frequency: 2442 MHz**



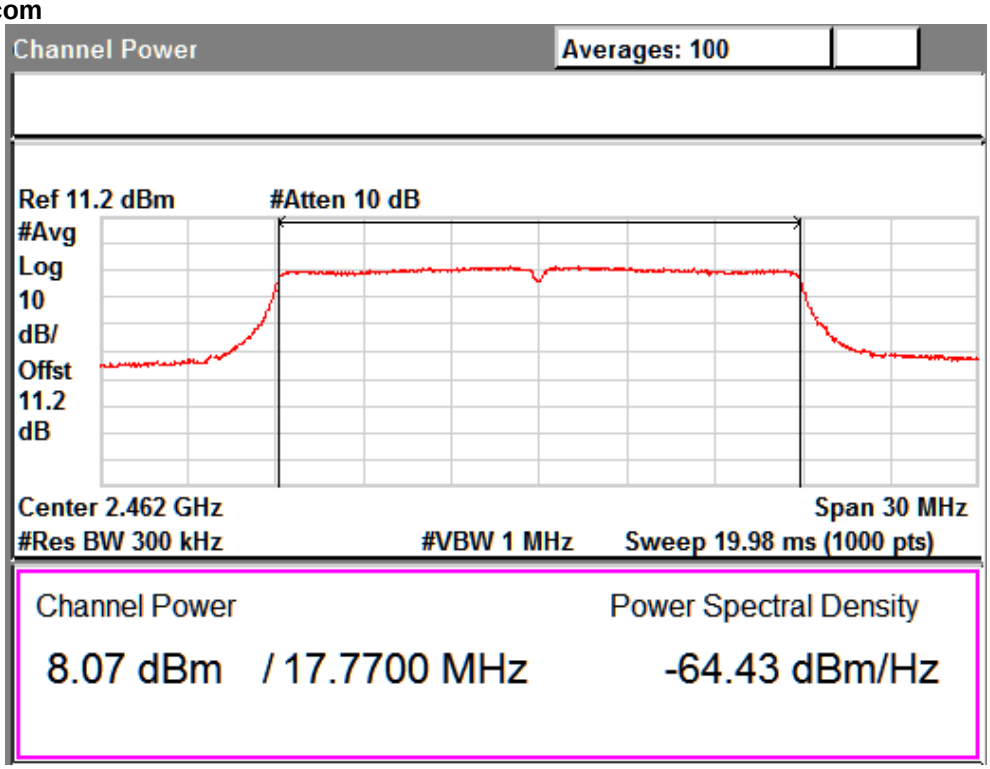
Data Rate: 6.5 Mbps **Channel Frequency: 2462 MHz**



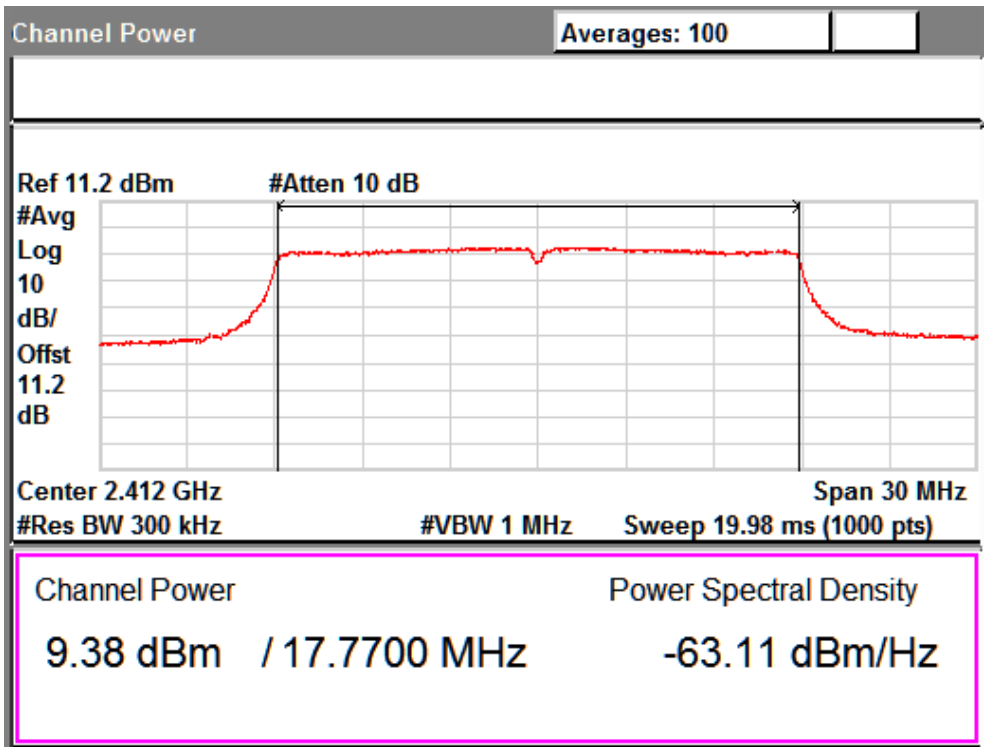
Data Rate: 39 Mbps **Channel Frequency: 2412 MHz**



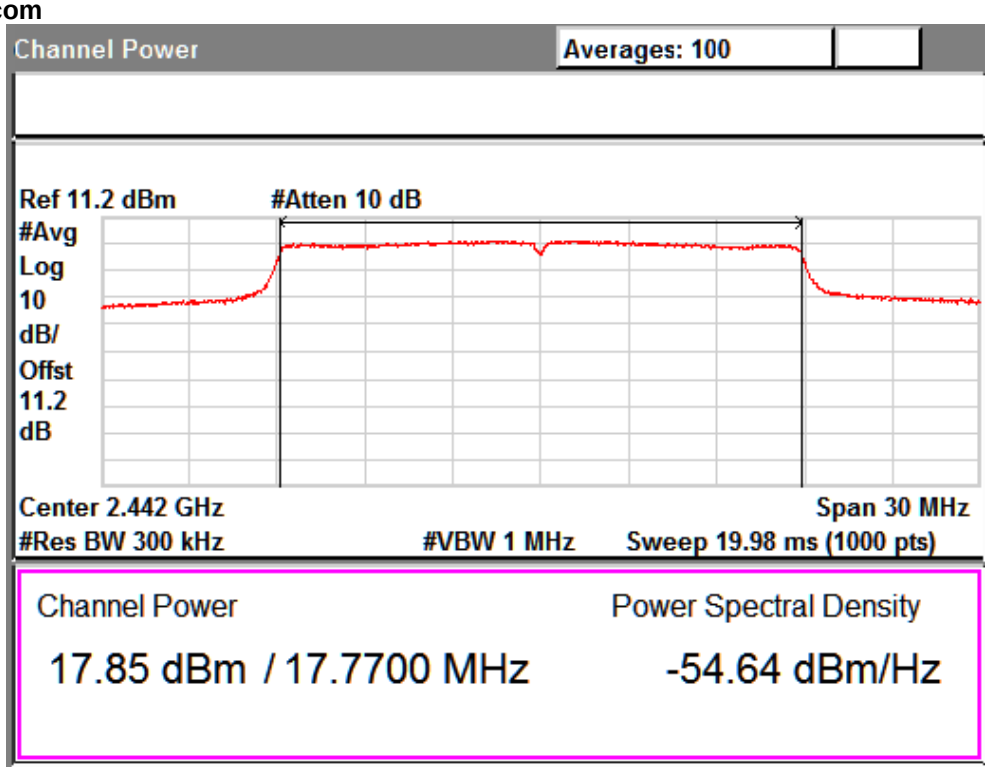
Data Rate: 39 Mbps **Channel Frequency: 2442 MHz**



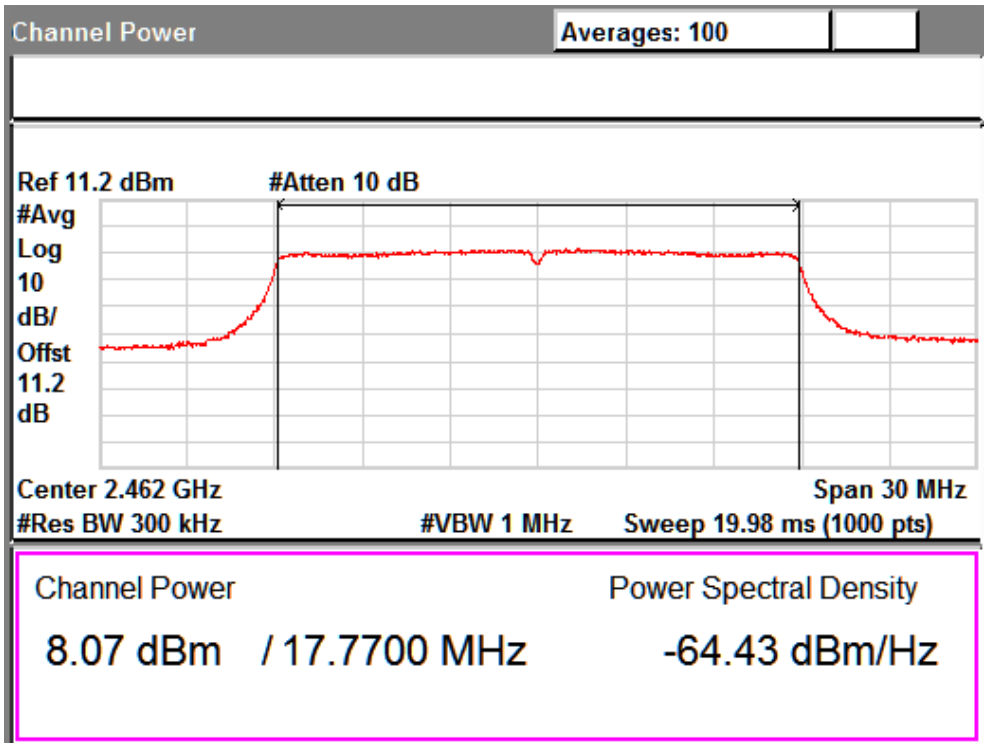
Data Rate: 39 Mbps **Channel Frequency: 2462 MHz**



Data Rate: 65 Mbps **Channel Frequency: 2412 MHz**



Data Rate: 65 Mbps **Channel Frequency: 2442 MHz**



Data Rate: 65 Mbps **Channel Frequency: 2462 MHz**

Maximum Power Spectral Density **Section 15.247(e)**

Result **Pass**

Test Specification FCC Part 15 Section 15.247 (e)
Detector Function Peak
Requirement

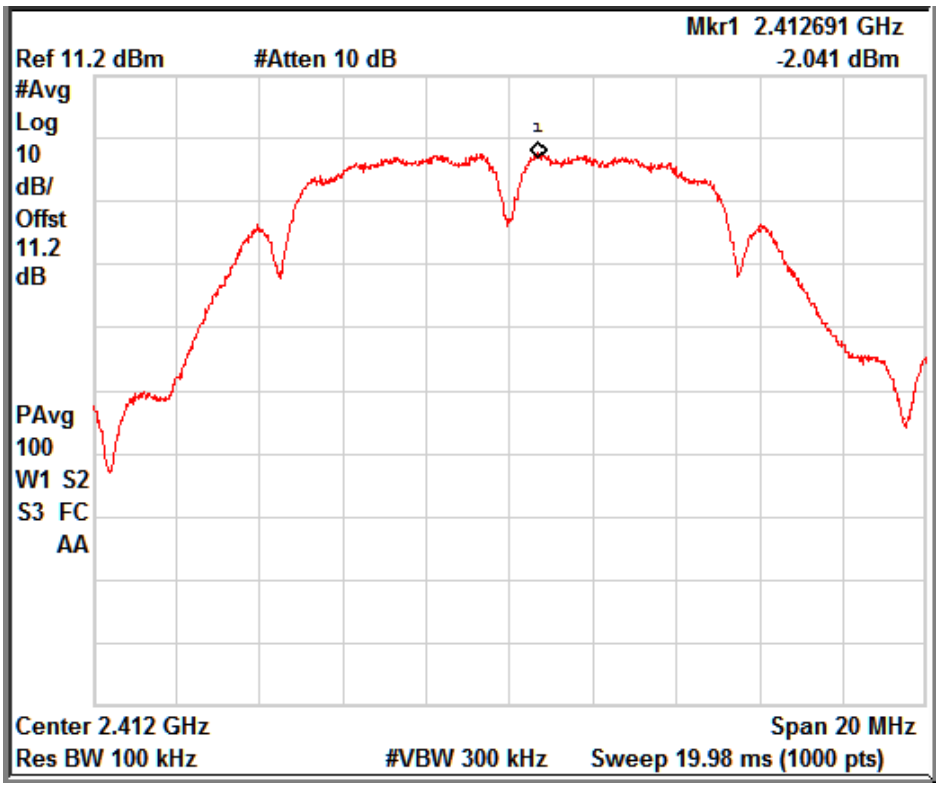
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm.

Note: For measurement of Maximum power spectral density option 1 was used

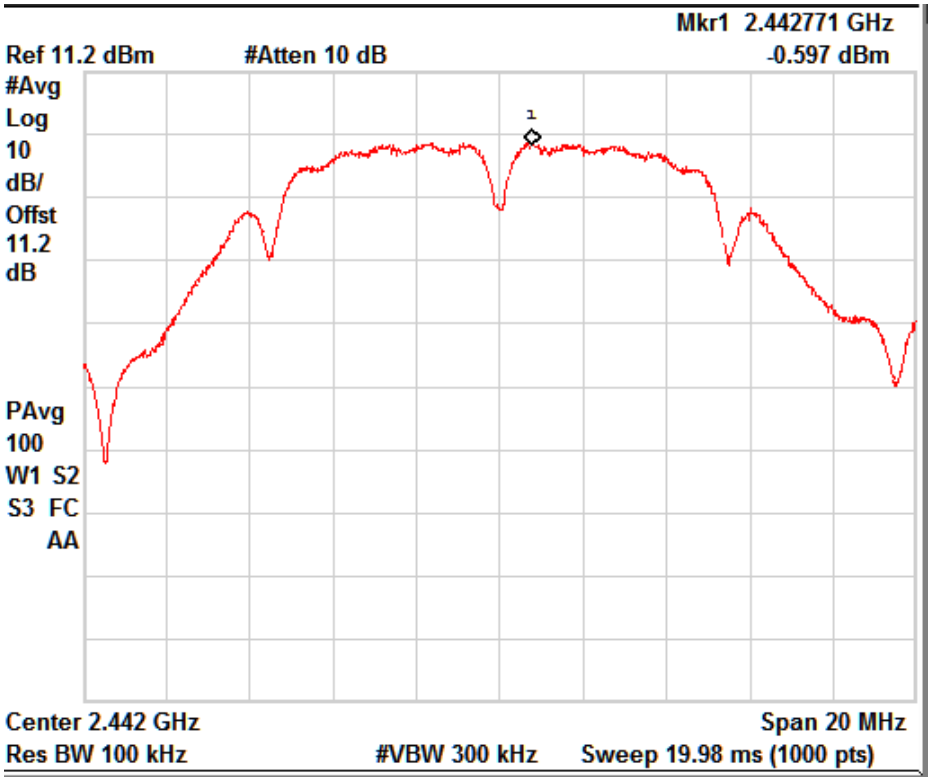
Test Method:

Test Result:

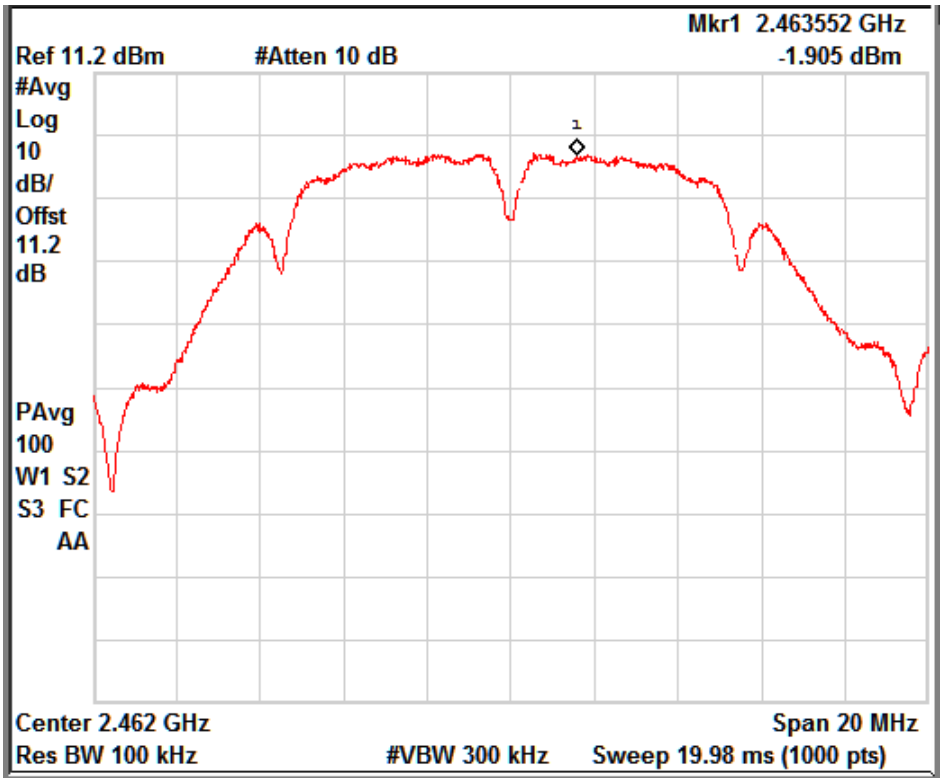
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
b	1	2412.00	-02.04	8.00	-10.04
		2442.00	-00.59	8.00	-08.59
		2462.00	-01.90	8.00	-09.90
	11	2412.00	-00.95	8.00	-08.95
		2442.00	-00.97	8.00	-08.97
		2462.00	-01.17	8.00	-09.17



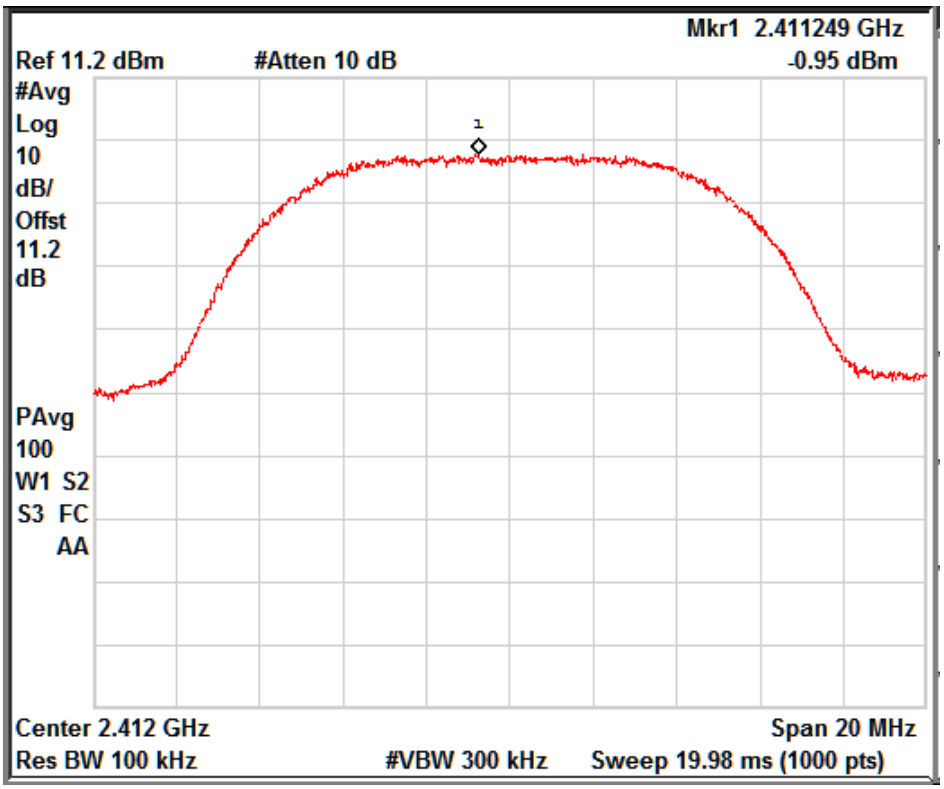
Data rate: 1 Mbps **Channel Frequency: 2412 MHz**



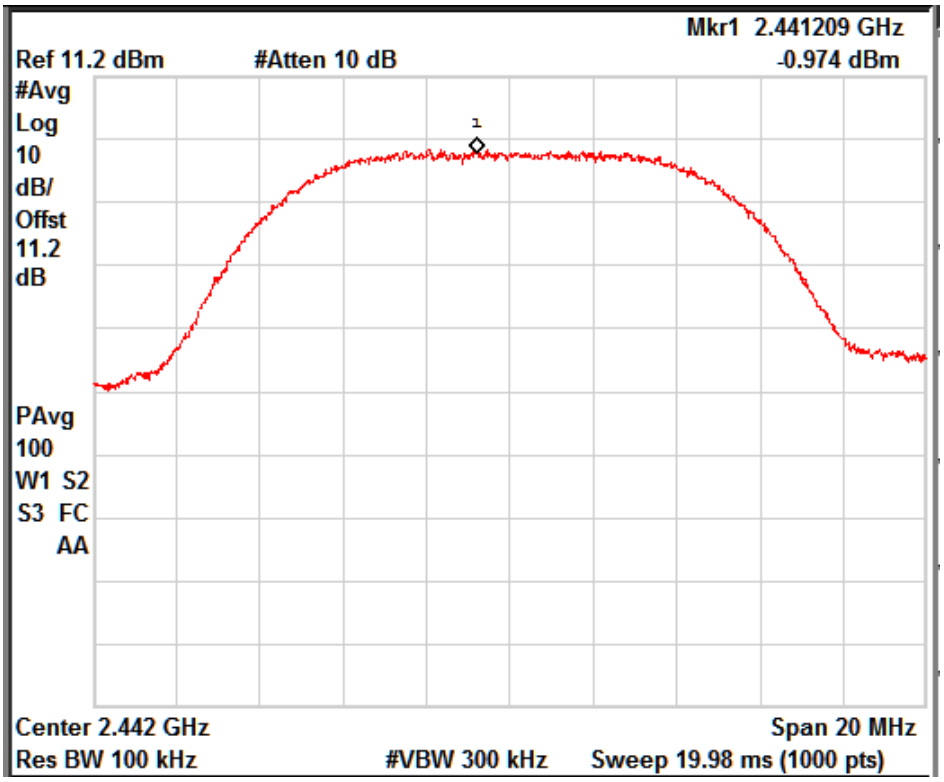
Data rate: 1 Mbps **Channel Frequency: 2442 MHz**



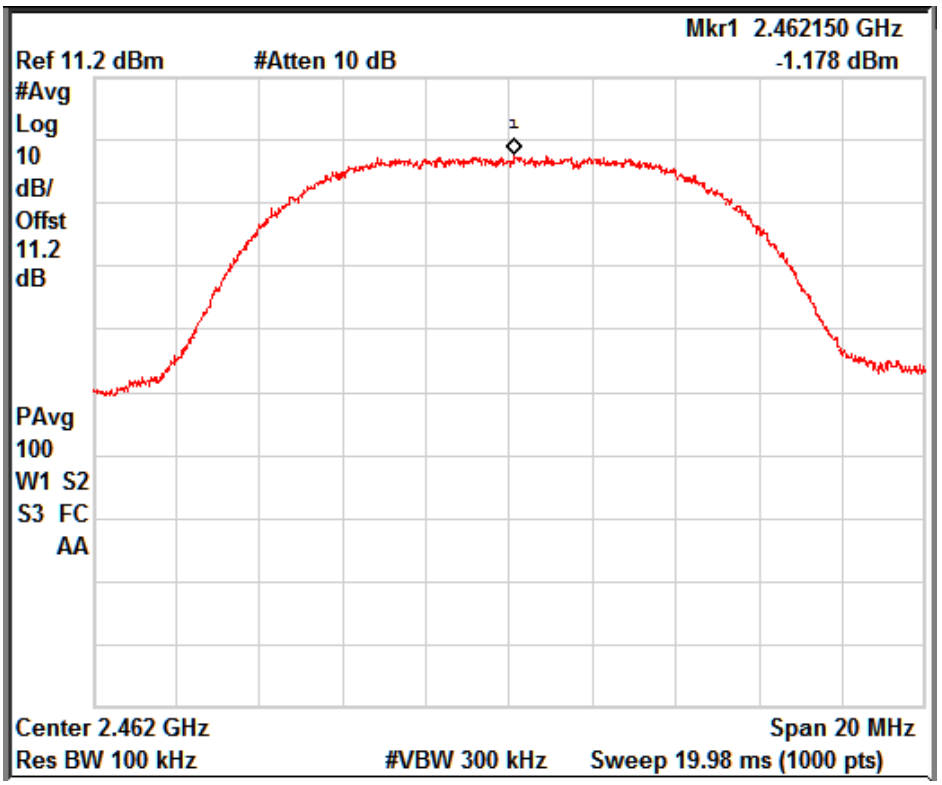
Data rate: 1 Mbps **Channel Frequency: 2462 MHz**



Data rate: 11 Mbps **Channel Frequency: 2412 MHz**

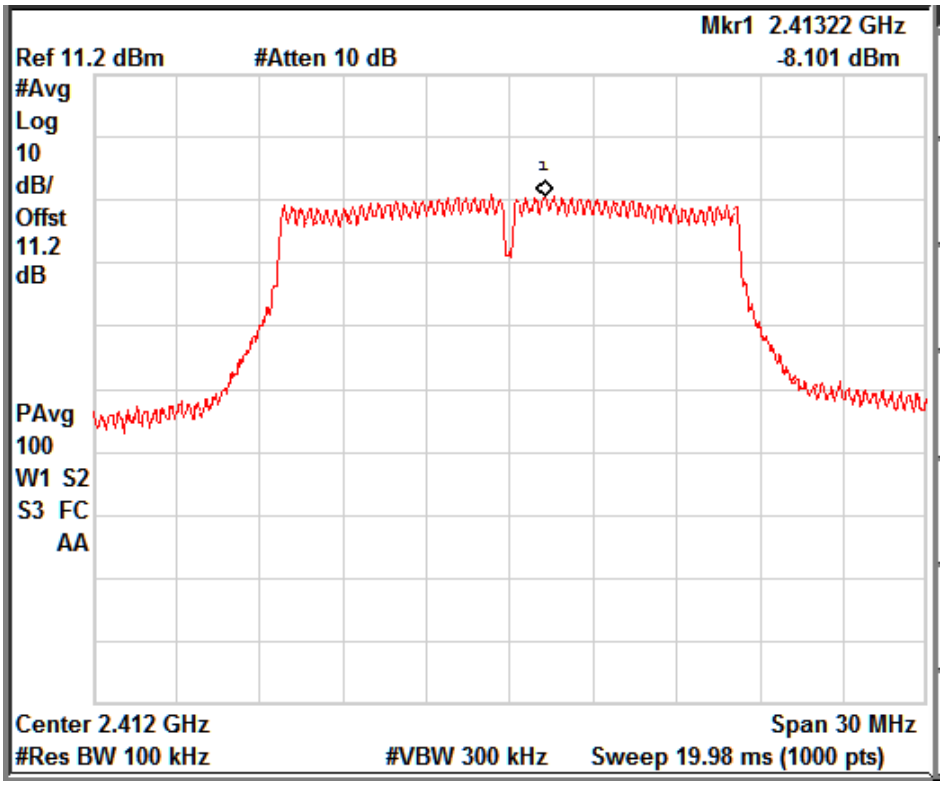


Data rate: 11 Mbps **Channel Frequency: 2442 MHz**

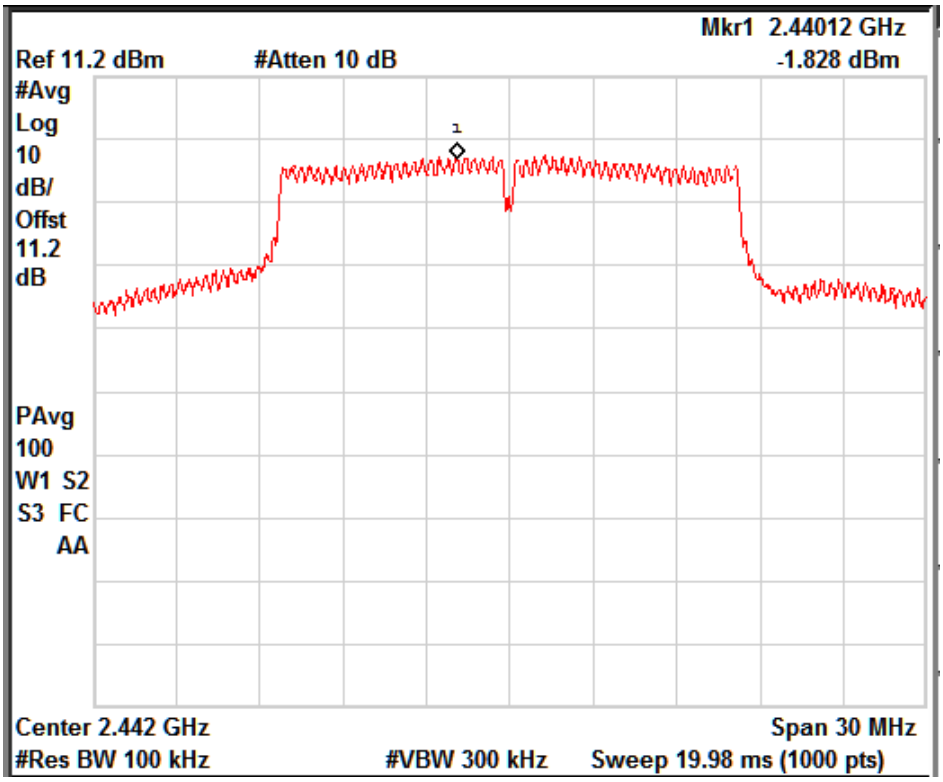


Data rate: 11 Mbps **Channel Frequency: 2462 MHz**

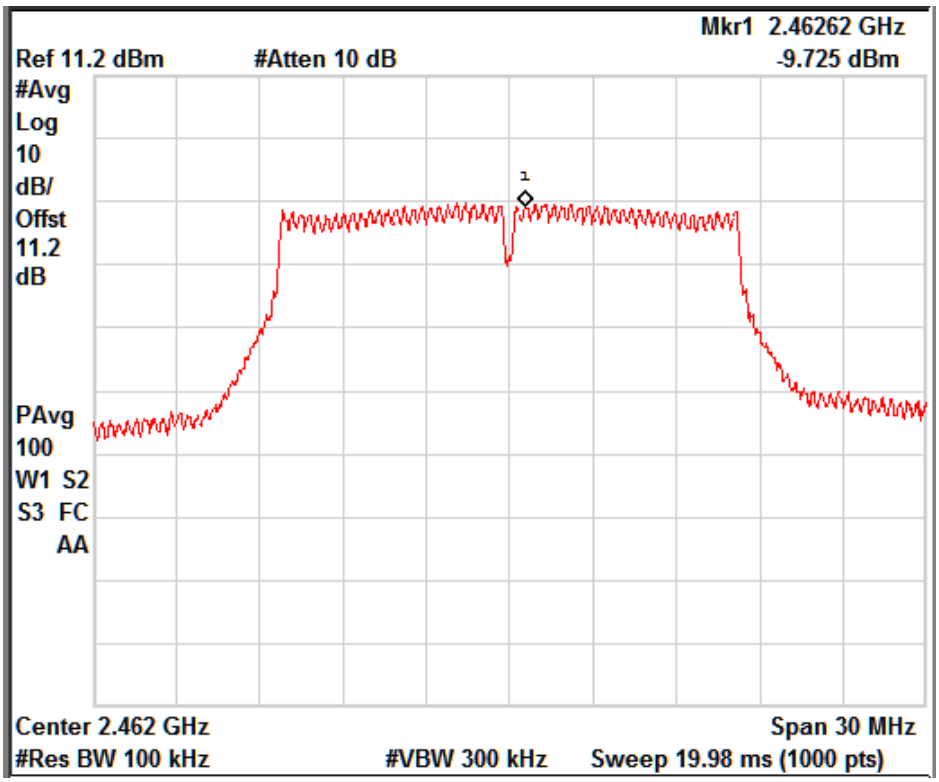
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
g	6	2412.00	-08.10	8.00	-16.10
		2442.00	-01.82	8.00	-09.82
		2462.00	-09.72	8.00	-17.72
	24	2412.00	-08.38	8.00	-16.38
		2442.00	-01.90	8.00	-09.90
		2462.00	-09.04	8.00	-17.04
	54	2412.00	-08.54	8.00	-16.54
		2442.00	-01.60	8.00	-09.60
		2462.00	-09.51	8.00	-17.51



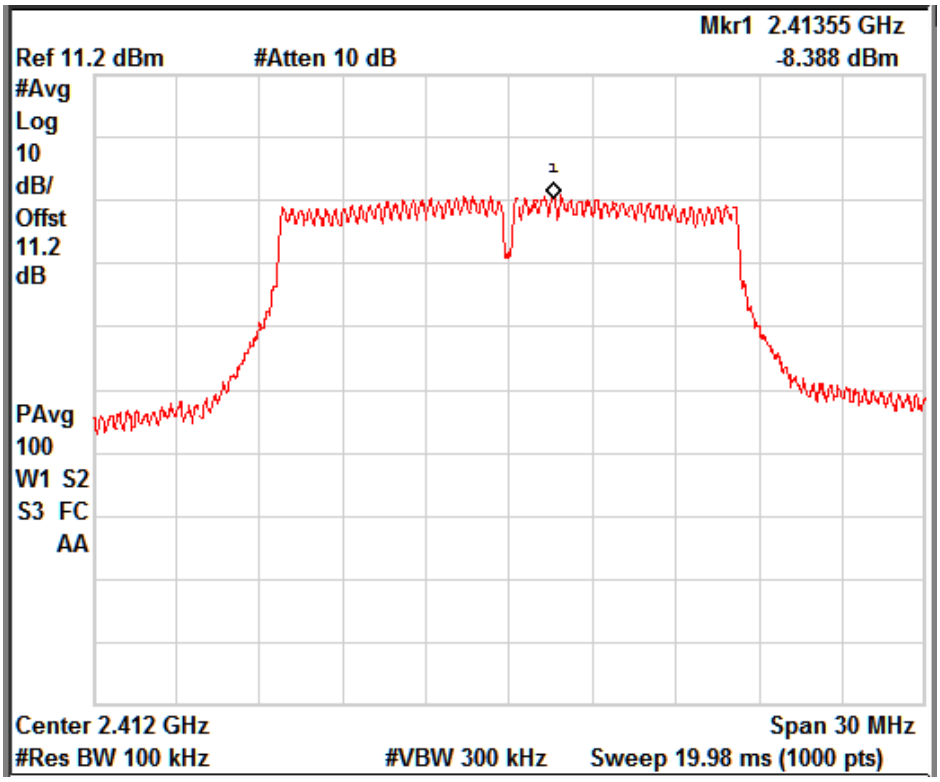
Data rate: 6 Mbps **Channel Frequency: 2412 MHz**



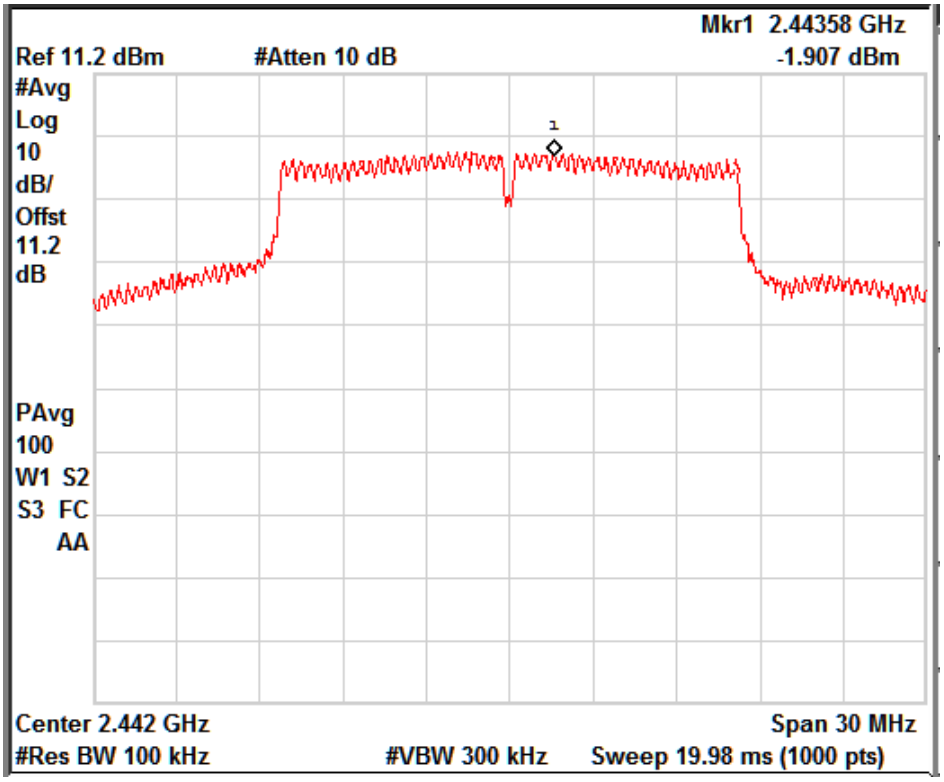
Data rate: 6 Mbps **Channel Frequency: 2442 MHz**



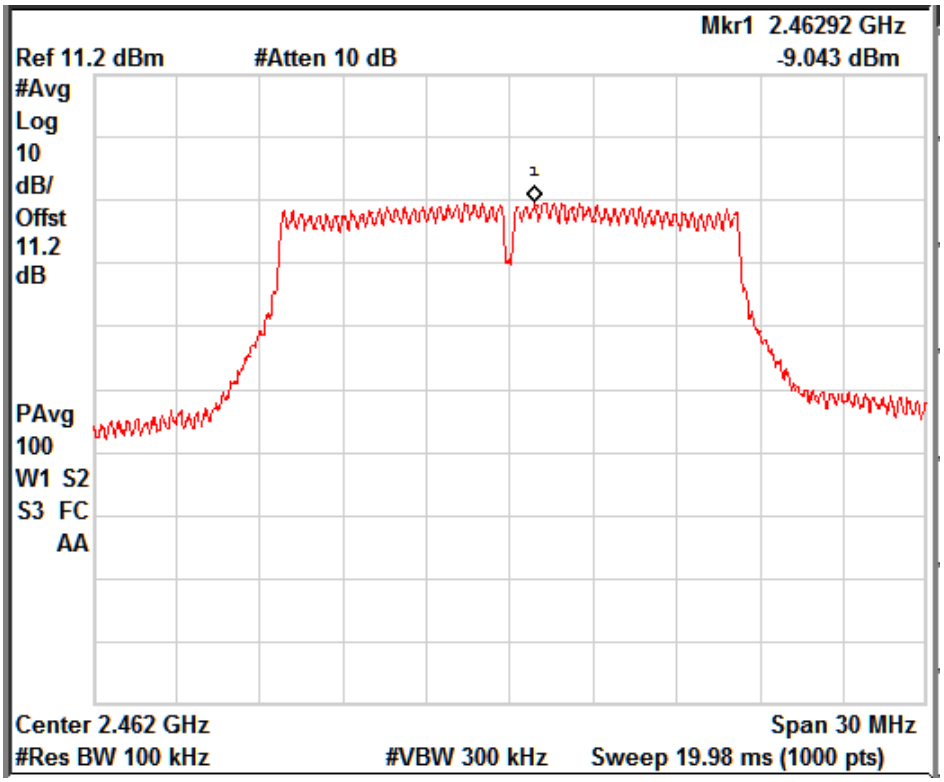
Data rate: 6 Mbps **Channel Frequency: 2462 MHz**



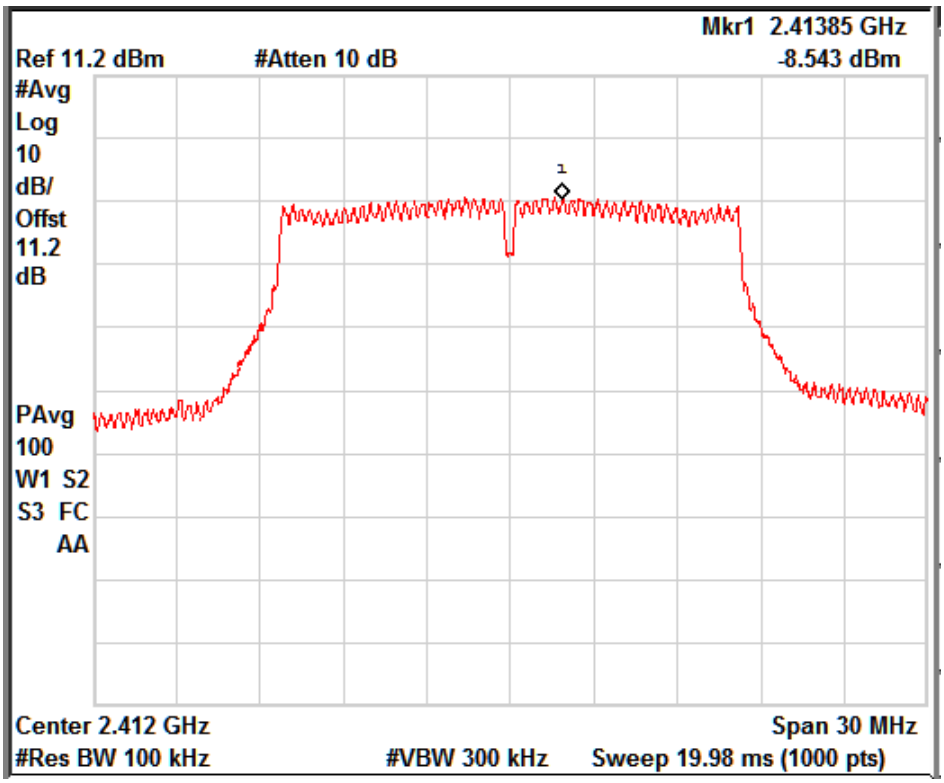
Data rate: 24 Mbps **Channel Frequency: 2412 MHz**



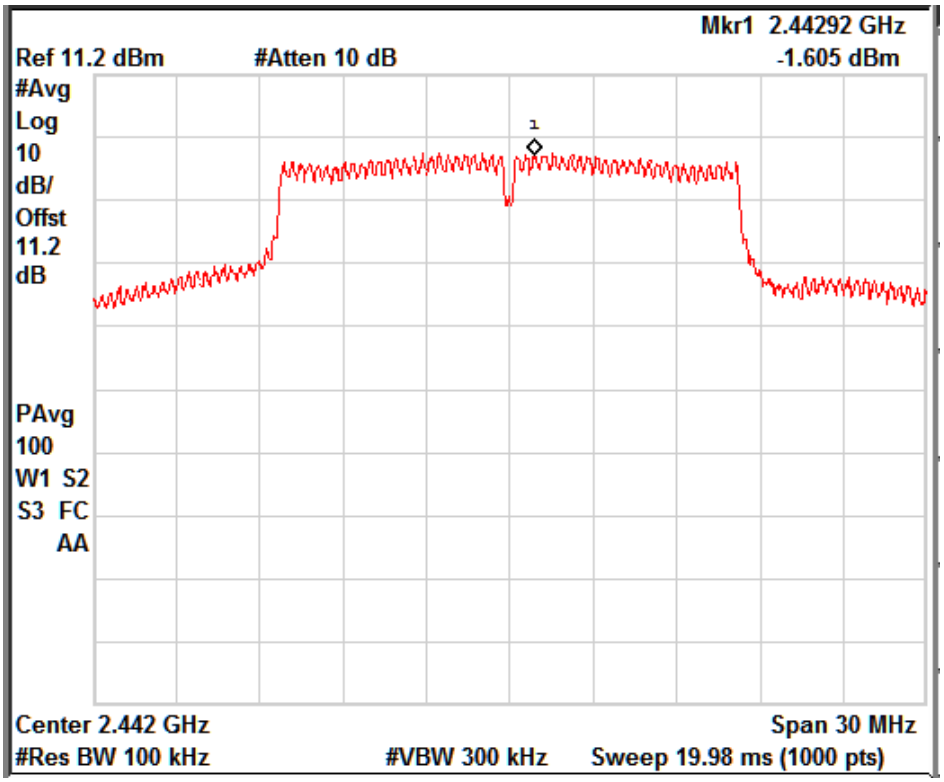
Data rate: 24 Mbps **Channel Frequency: 2442 MHz**



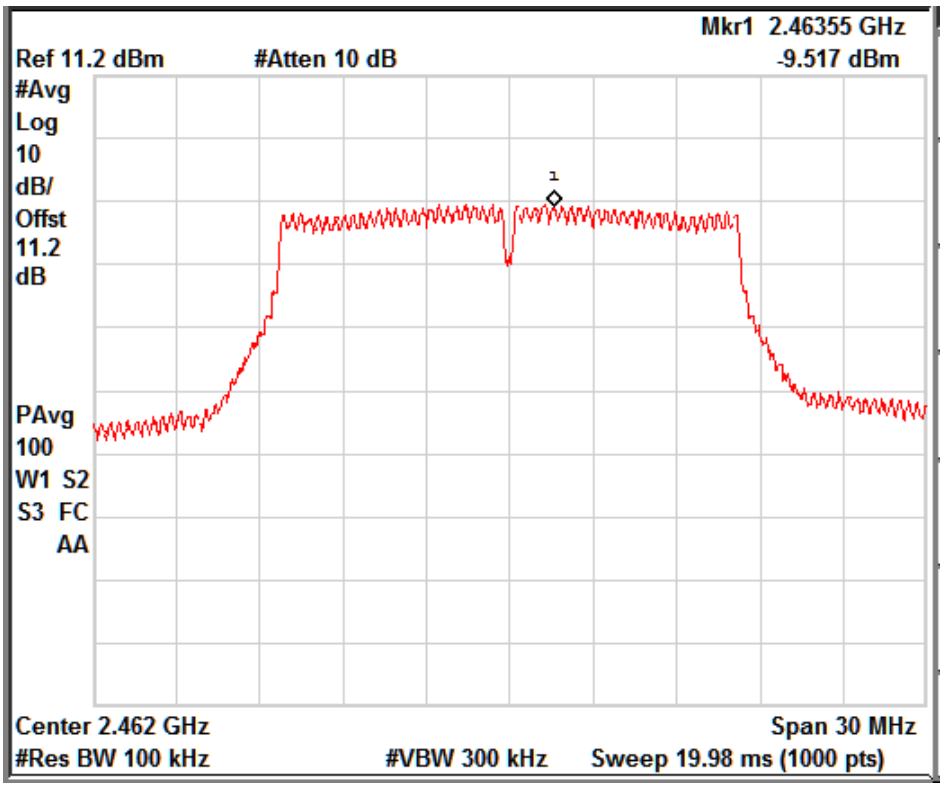
Data rate: 24 Mbps **Channel Frequency: 2462 MHz**



Data rate: 54 Mbps **Channel Frequency: 2412 MHz**

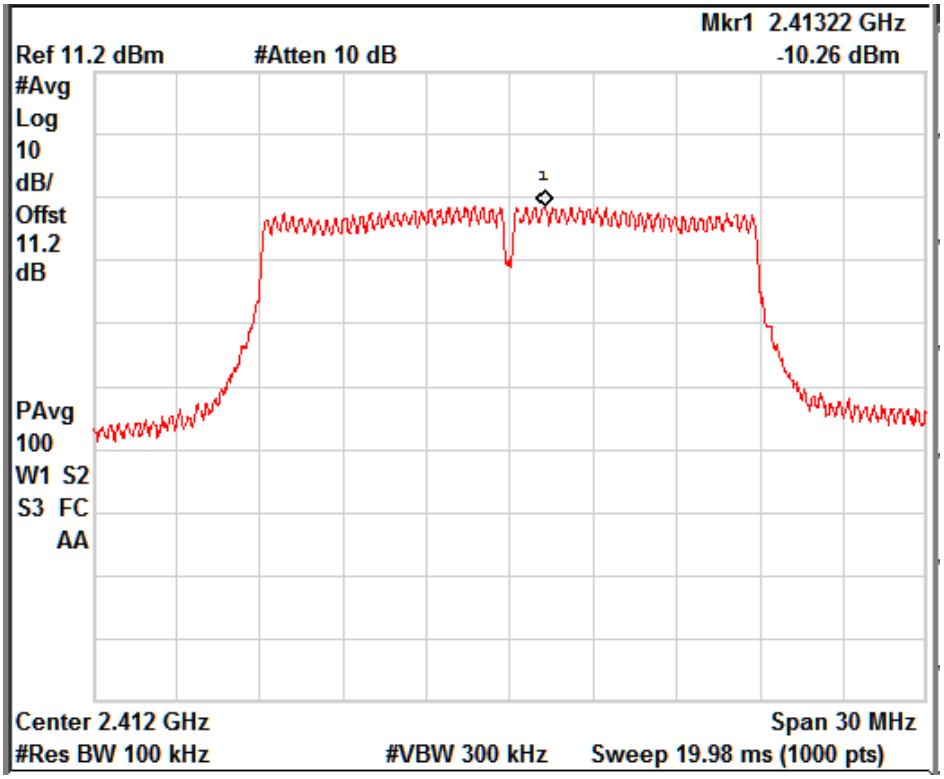


Data rate: 54 Mbps **Channel Frequency: 2442 MHz**

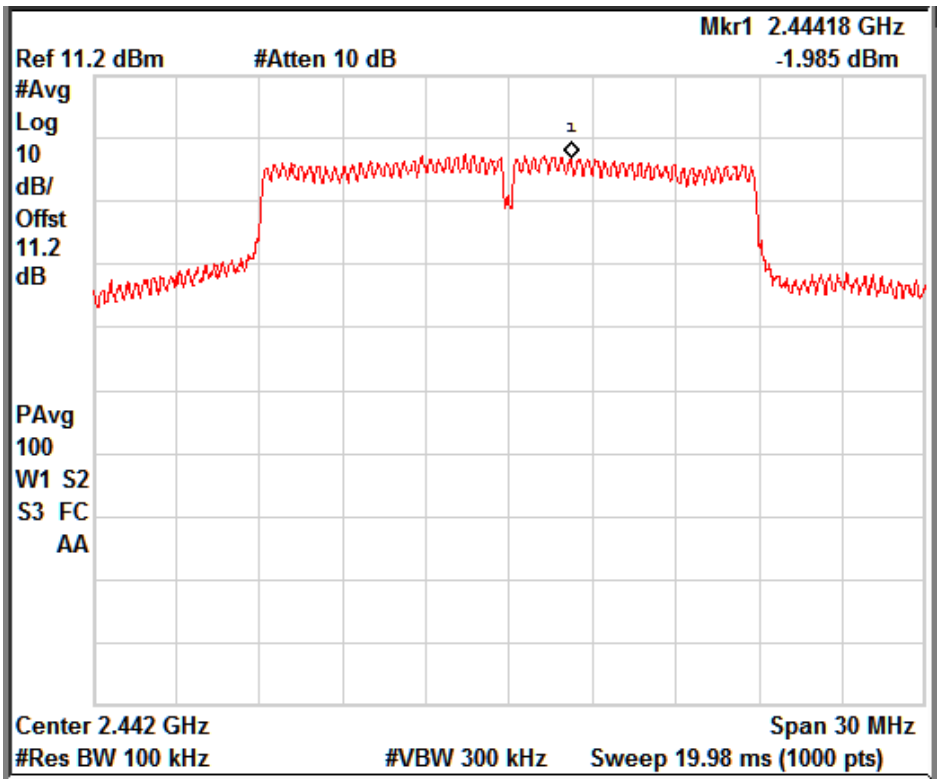


Data rate: 54 Mbps **Channel Frequency: 2462 MHz**

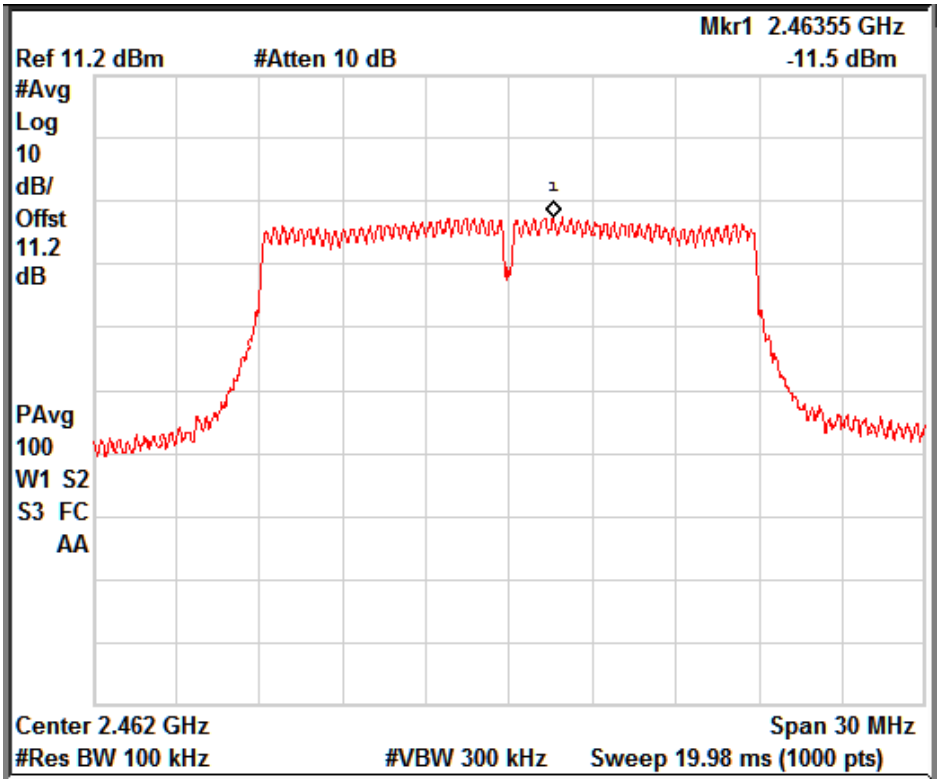
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
n	6.5	2412.00	-10.26	8.00	-18.26
		2442.00	-01.98	8.00	-09.98
		2462.00	-11.50	8.00	-19.50
	39	2412.00	-10.76	8.00	-18.76
		2442.00	-01.32	8.00	-09.32
		2462.00	-11.61	8.00	-19.61
	65	2412.00	-10.55	8.00	-18.55
		2442.00	-01.27	8.00	-09.27
		2462.00	-11.53	8.00	-19.53



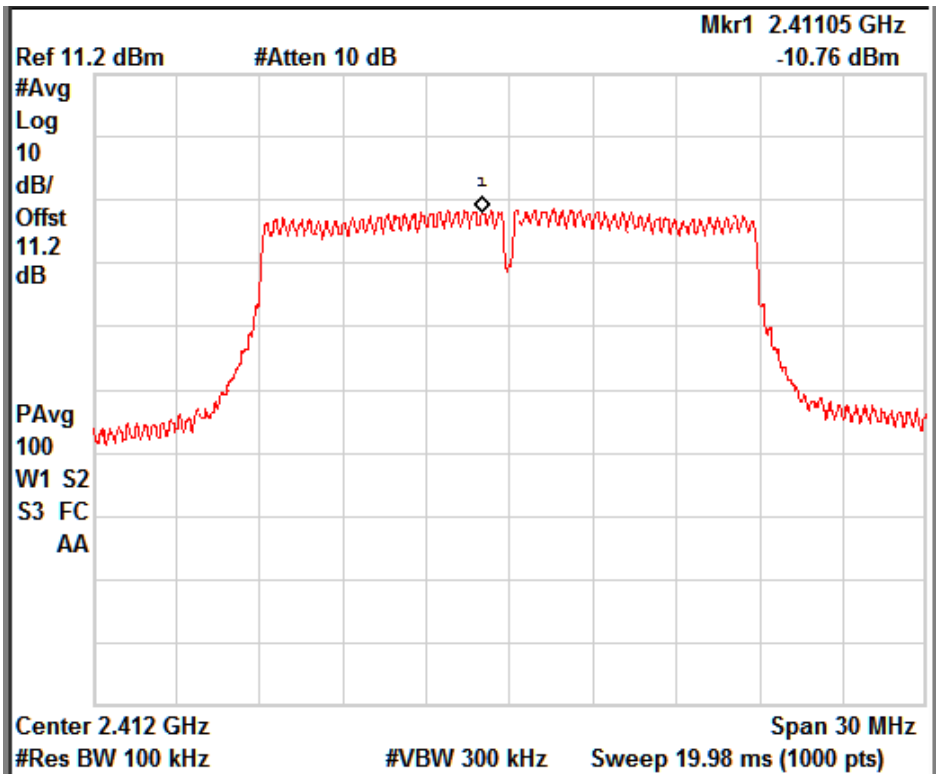
Data rate: 6.5 Mbps **Channel Frequency: 2412 MHz**



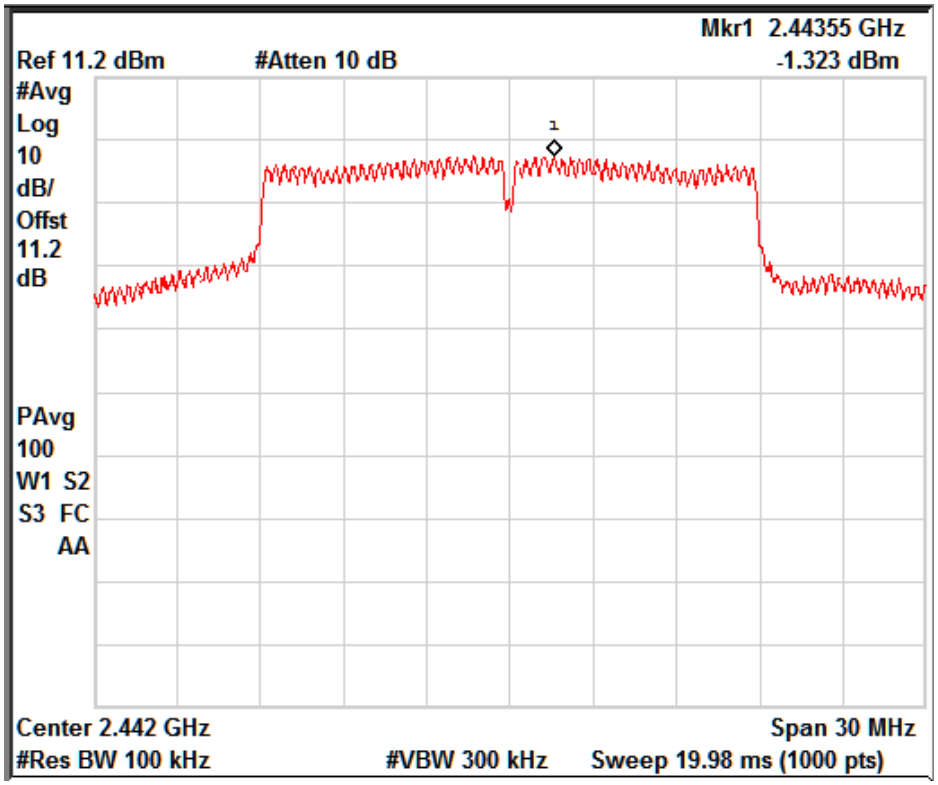
Data rate: 6.5 Mbps **Channel Frequency: 2442 MHz**



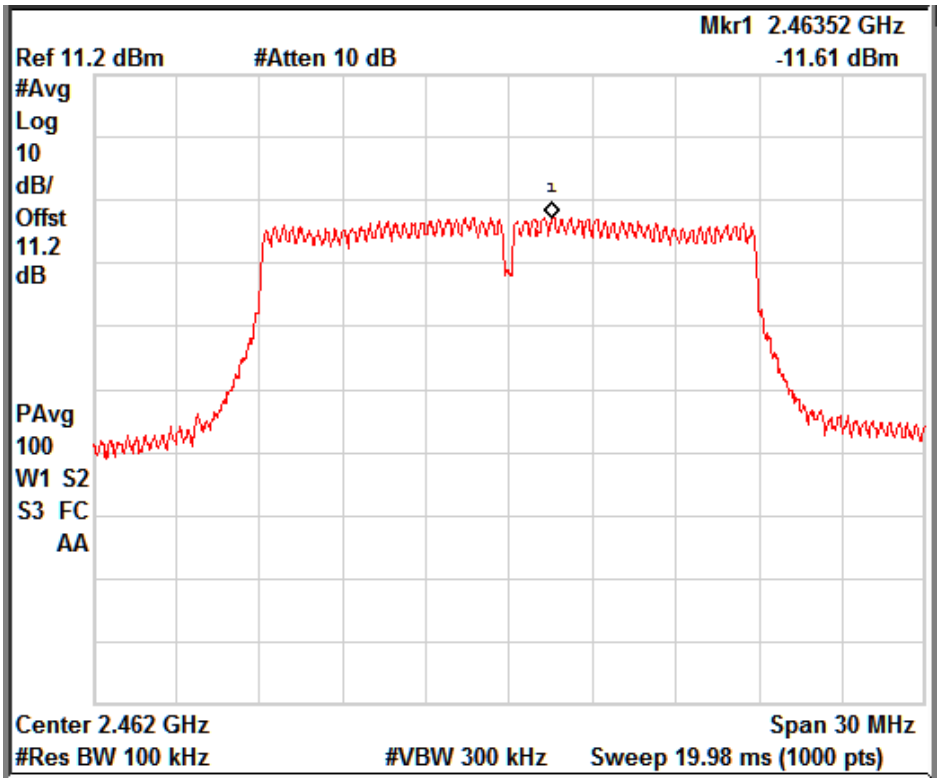
Data rate: 6.5 Mbps **Channel Frequency: 2462 MHz**



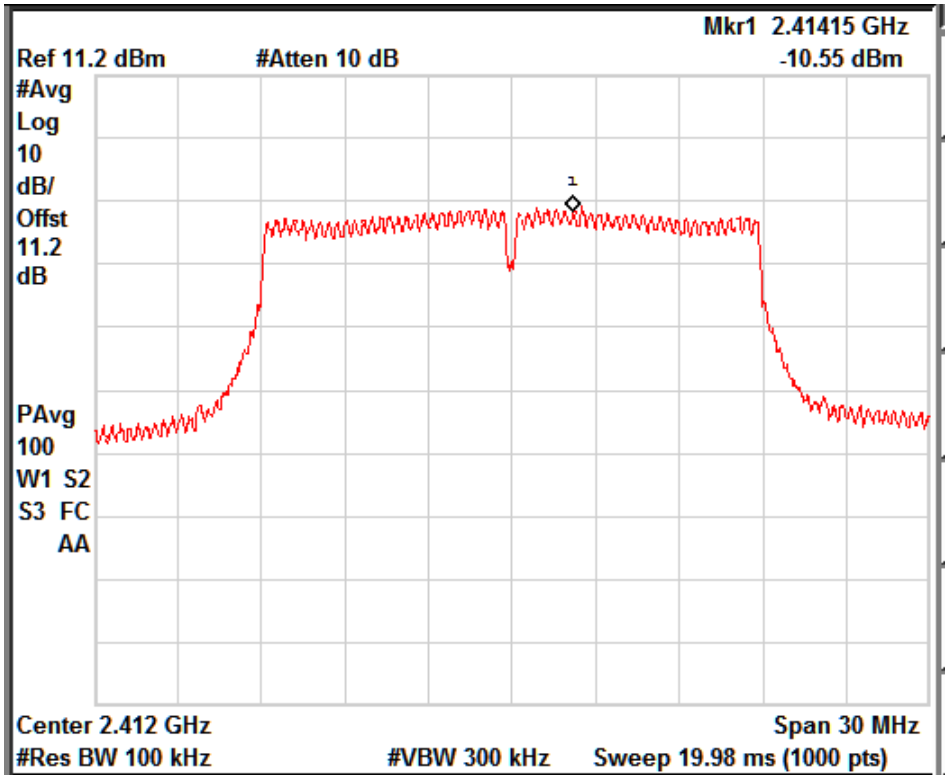
Data rate: 39 Mbps **Channel Frequency: 2412 MHz**



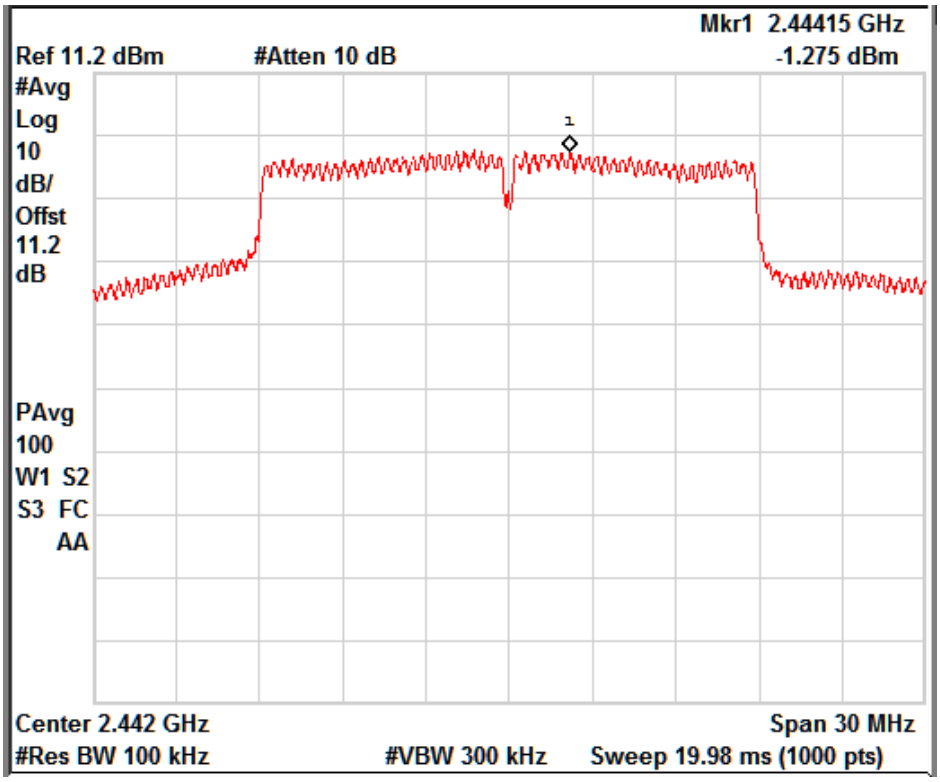
Data rate: 39 Mbps **Channel Frequency: 2442 MHz**



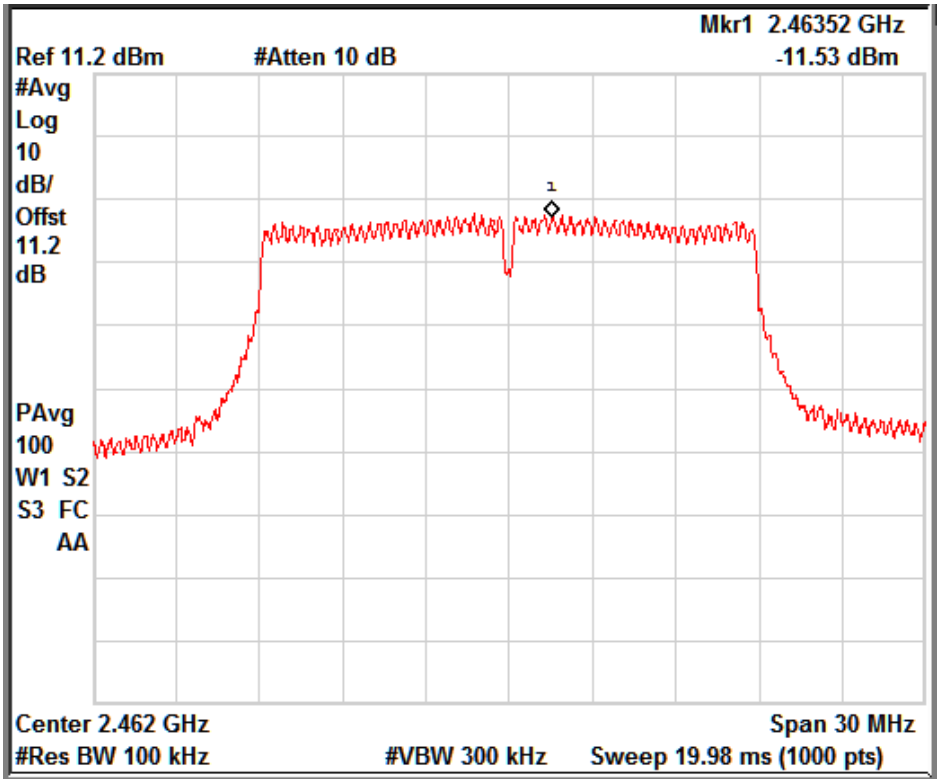
Data rate: 39 Mbps **Channel Frequency: 2462 MHz**



Data rate: 65 Mbps **Channel Frequency: 2412 MHz**



Data rate: 65 Mbps **Channel Frequency: 2442 MHz**



Data rate: 65 Mbps **Channel Frequency: 2462 MHz**

6 dB Bandwidth **Section 15.247(a) (2)**

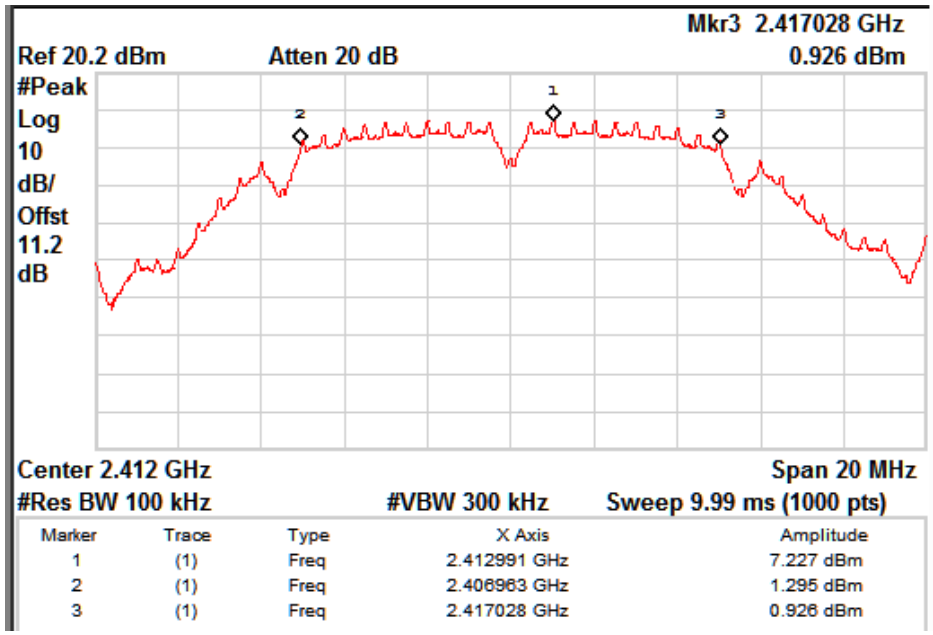
Result **Pass**

Test Specification FCC Part 15 Section 15.247 (a) (2)
Requirement The minimum 6 dB bandwidth shall be at least 500 kHz.

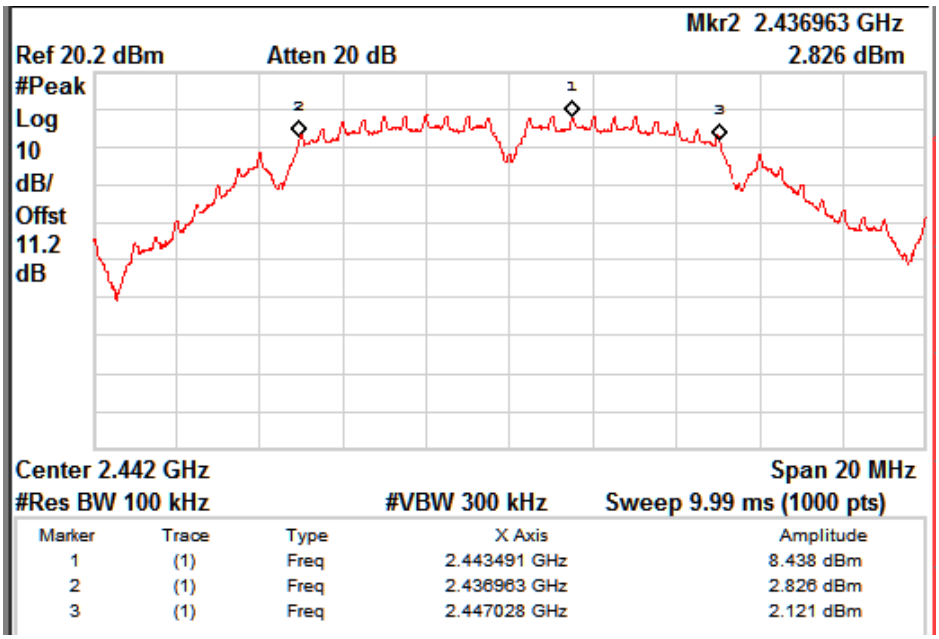
Test Method:

Test Result:

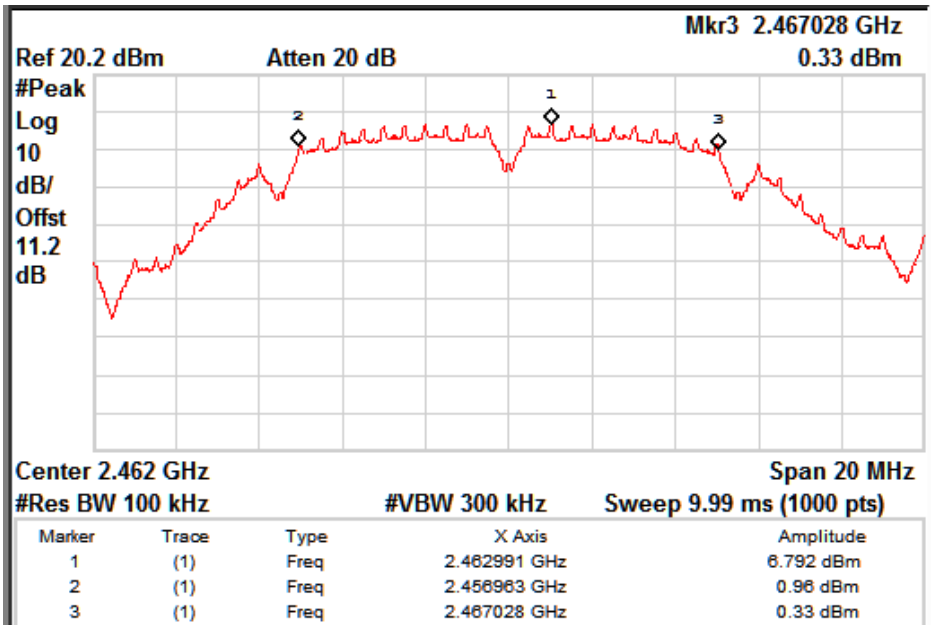
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)
b	1	2412.00	2406.963	2417.028	10.065	12.069
		2442.00	2436.963	2447.028	10.065	12.359
		2462.00	2456.963	2467.028	10.065	12.166
	11	2412.00	2407.203	2416.788	9.585	11.958
		2442.00	2437.203	2446.707	9.504	12.065
		2462.00	2457.003	2466.788	9.785	11.960



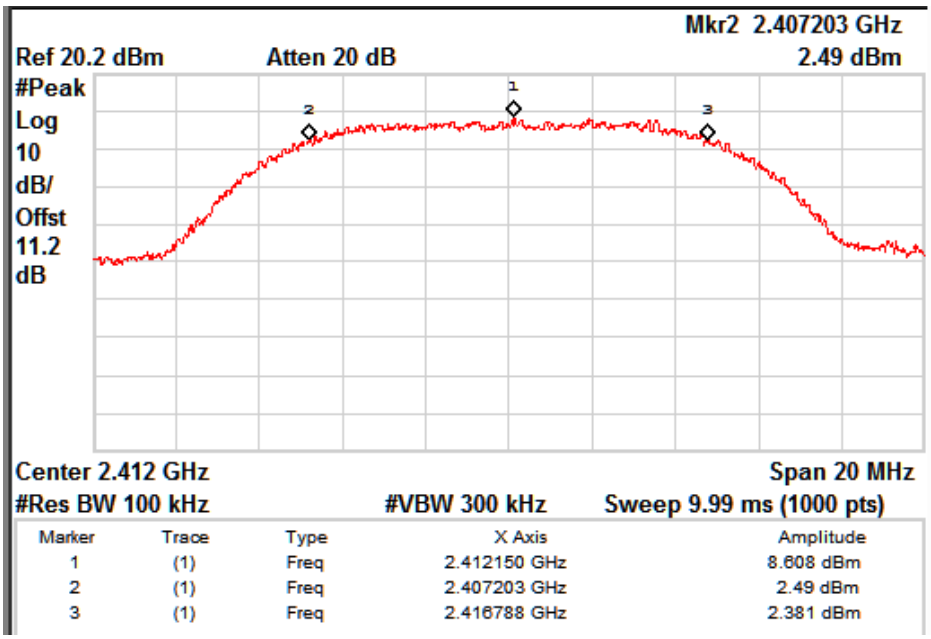
Data Rate: 1 Mbps **Channel frequency: 2412 MHz**



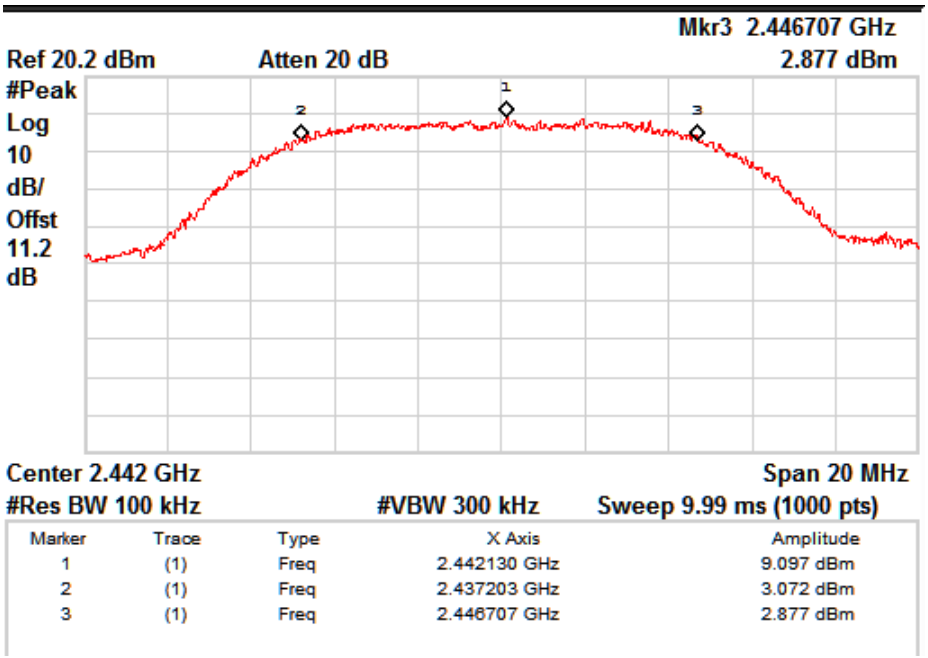
Data Rate: 1 Mbps **Channel frequency: 2442 MHz**



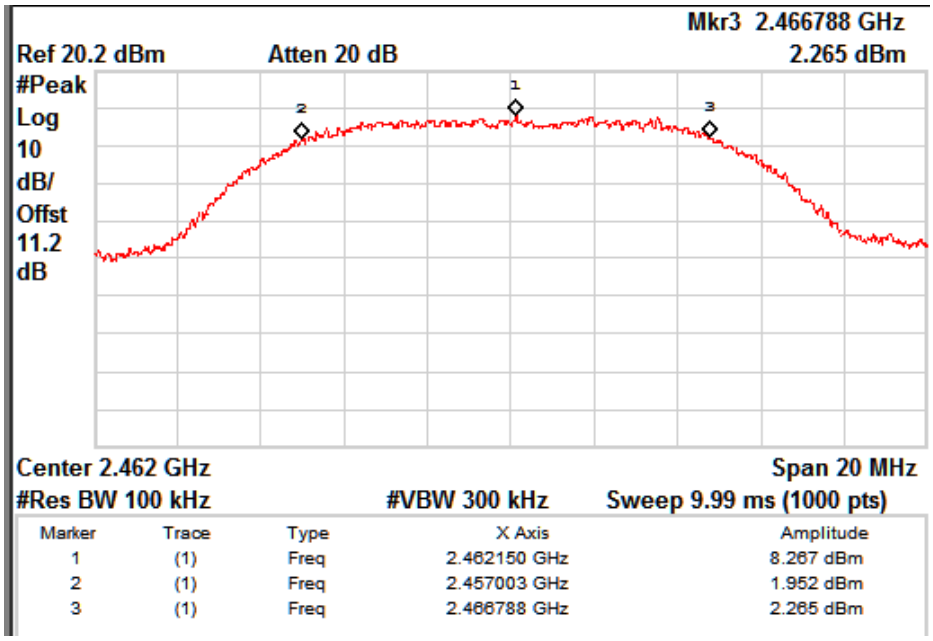
Data Rate: 1 Mbps **Channel frequency: 2462 MHz**



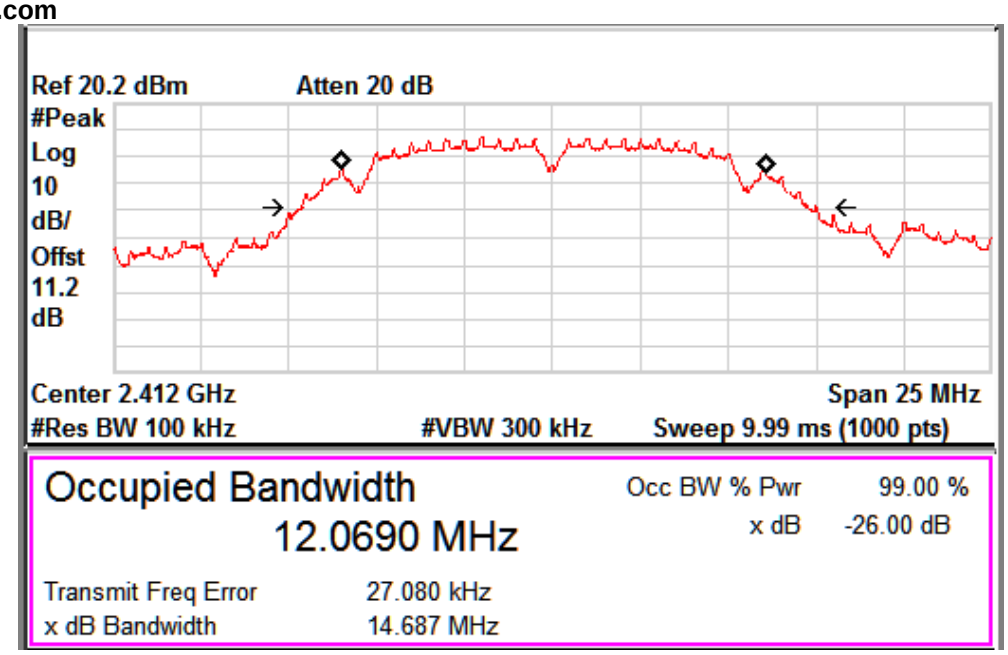
Data Rate: 11 Mbps **Channel frequencies: 2412 MHz**



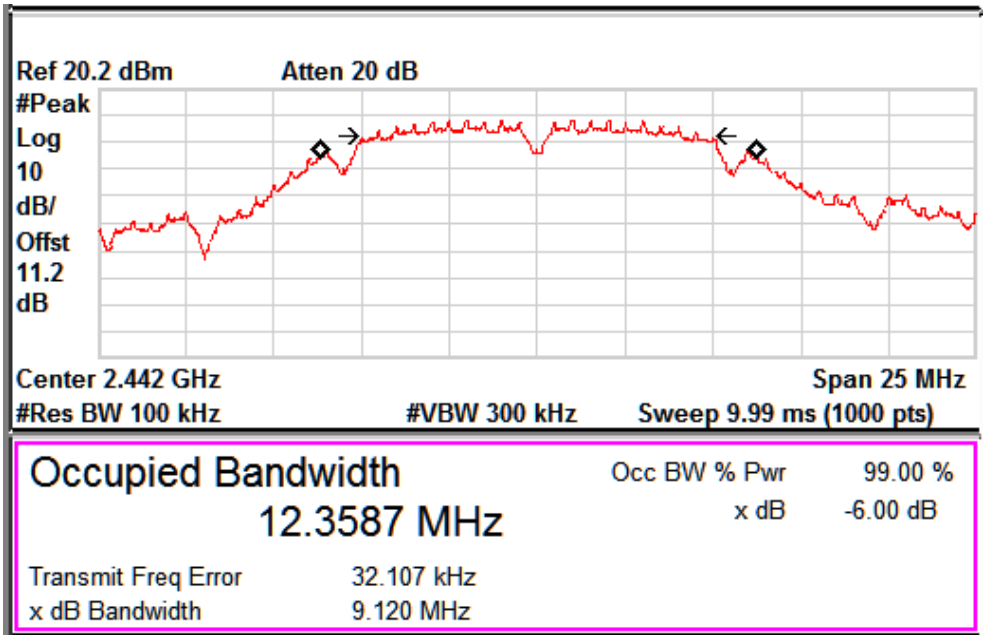
Data Rate: 11 Mbps **Channel frequency: 2442 MHz**



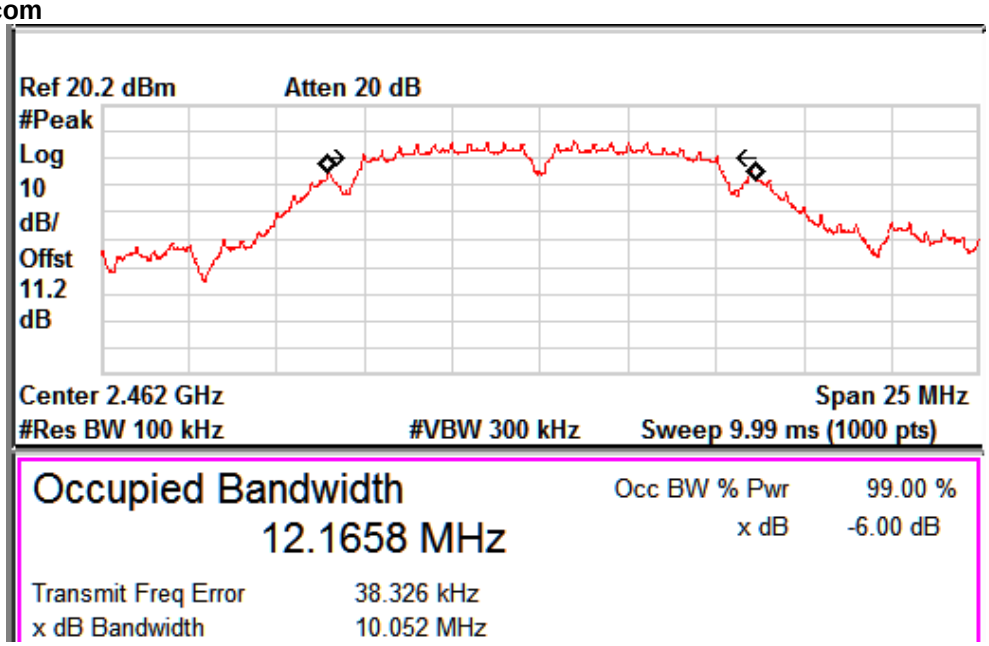
Data Rate: 11 Mbps **Channel frequency: 2462 MHz**



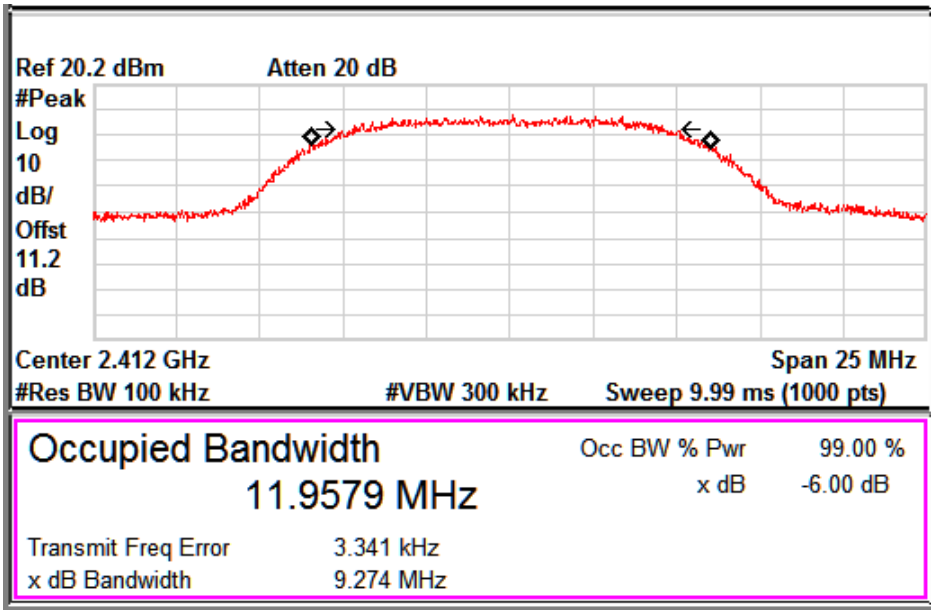
Data rate: 1 Mbps **99% Occupied Bandwidth: Channel 2412MHz**



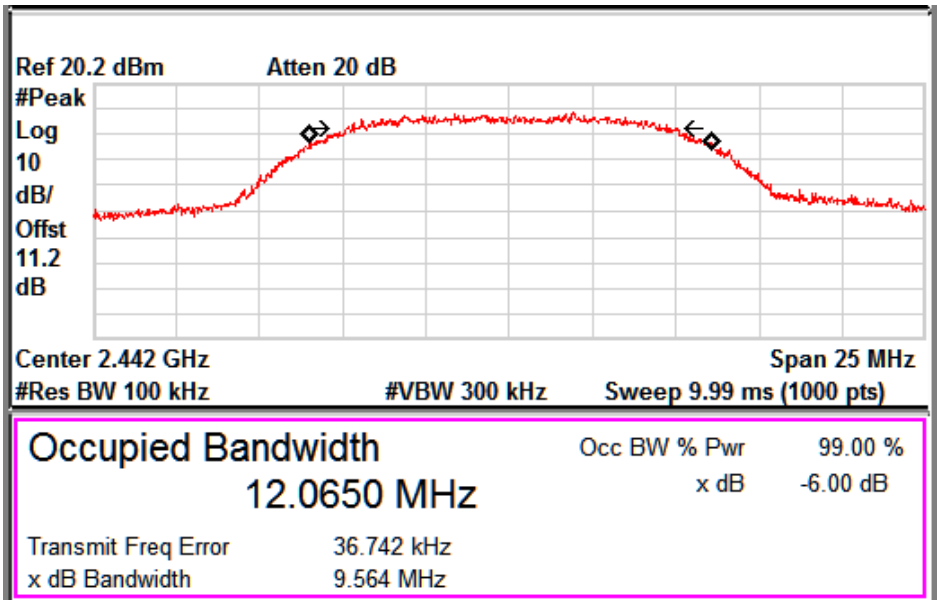
Data rate: 1 Mbps **99% Occupied Bandwidth: Channel 2442MHz**



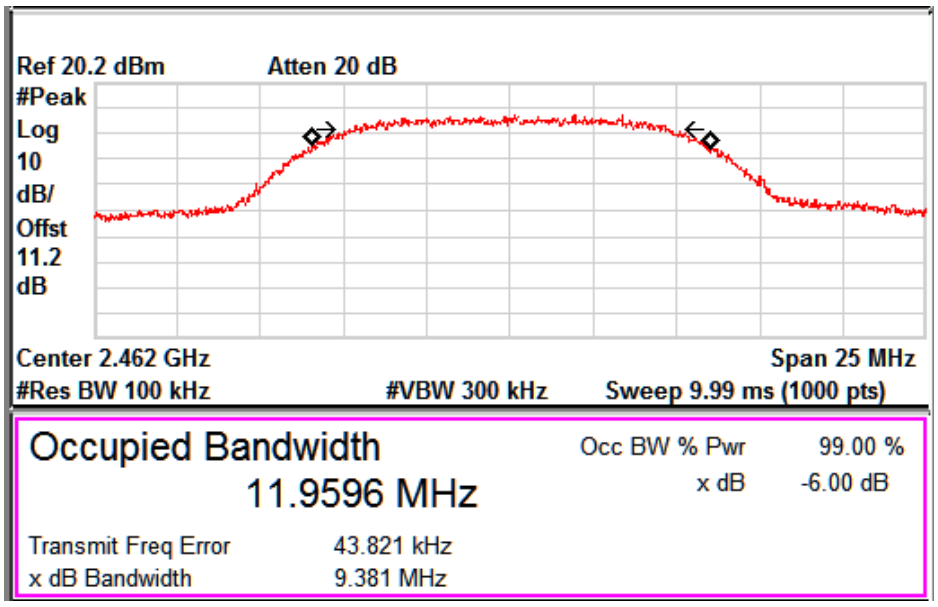
Data rate: 1 Mbps **99% Occupied Bandwidth: Channel 2462MHz**



Data rate: 11 Mbps **99% Occupied Bandwidth: Channel 2412MHz**

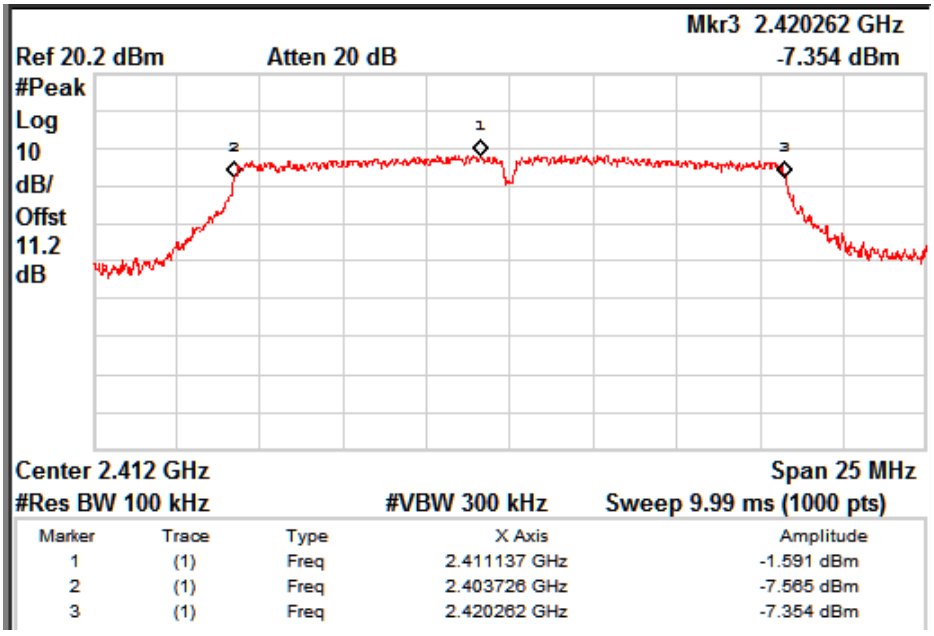


Data rate: 11 Mbps **99% Occupied Bandwidth: Channel 2442MHz**

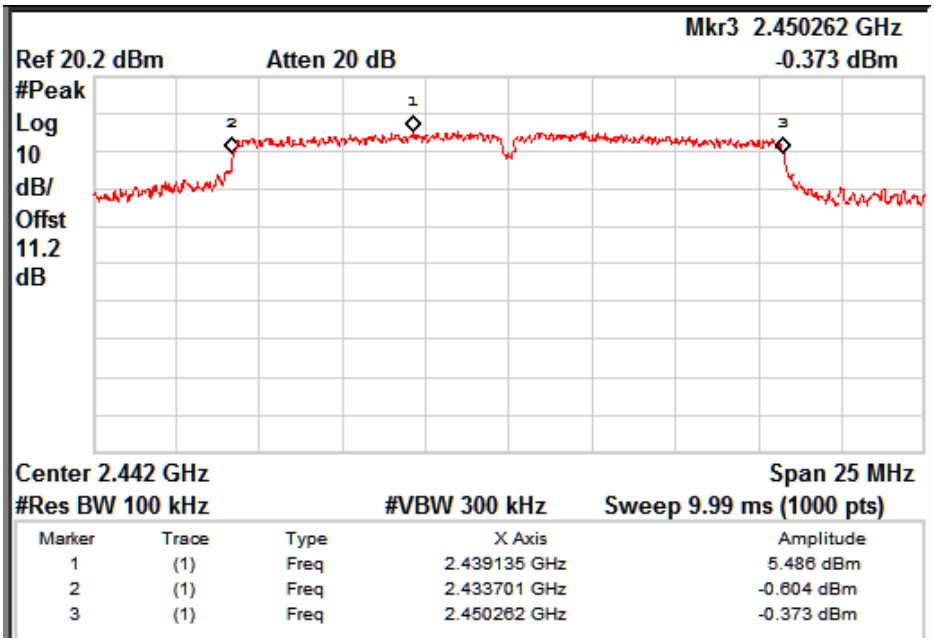


Data rate: 11 Mbps **99% Occupied Bandwidth: Channel 2462MHz**

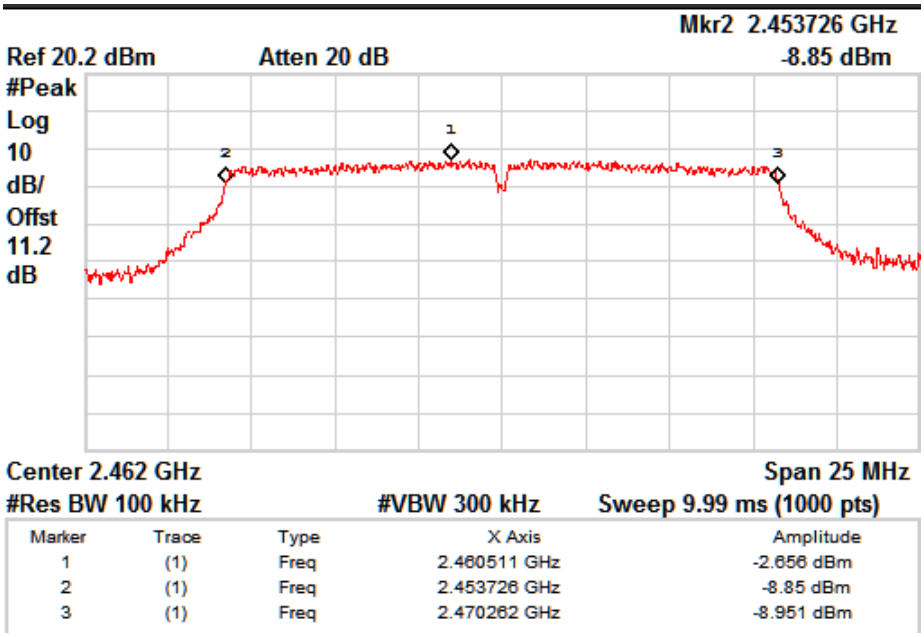
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)
g	6	2412.00	2403.726	2420.262	16.536	16.493
		2442.00	2433.701	2450.262	16.561	17.009
		2462.00	2453.726	2470.262	16.536	16.493
	24	2412.00	2403.726	2420.262	16.536	16.425
		2442.00	2433.726	2450.237	16.511	16.767
		2462.00	2453.701	2470.262	16.561	16.448
	54	2412.00	2403.726	2420.262	16.536	16.446
		2442.00	2433.726	2450.237	16.511	16.663
		2462.00	2453.701	2470.262	16.561	16.458



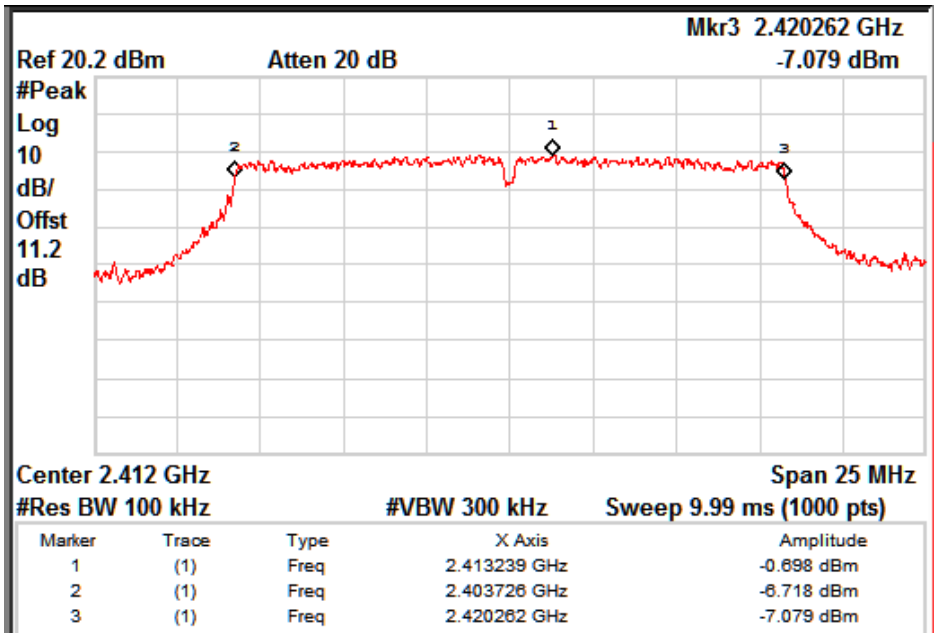
Data Rate: 6 Mbps **Channel frequencies: 2412 MHz**



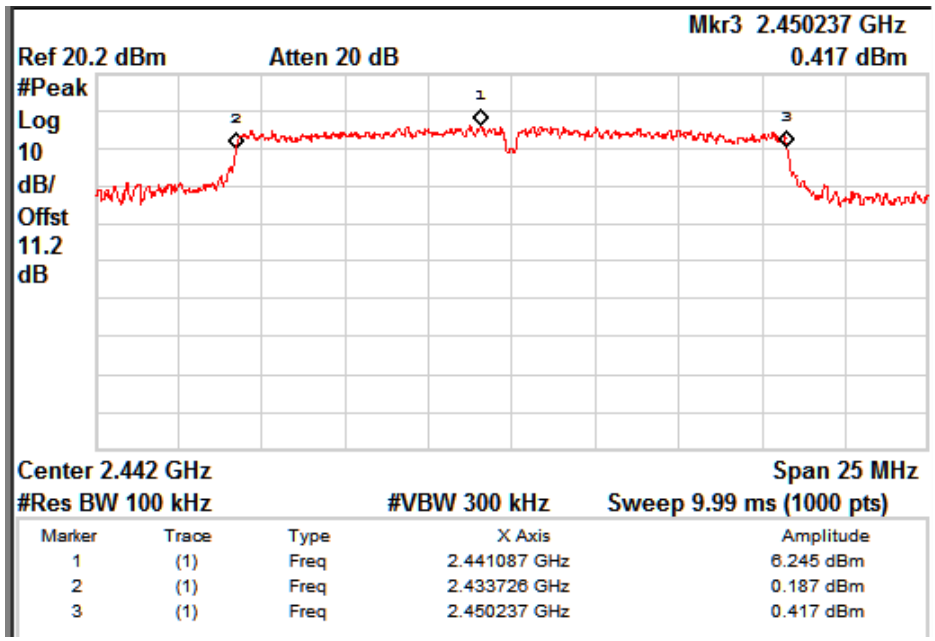
Data Rate: 6 Mbps **Channel frequencies: 2442 MHz**



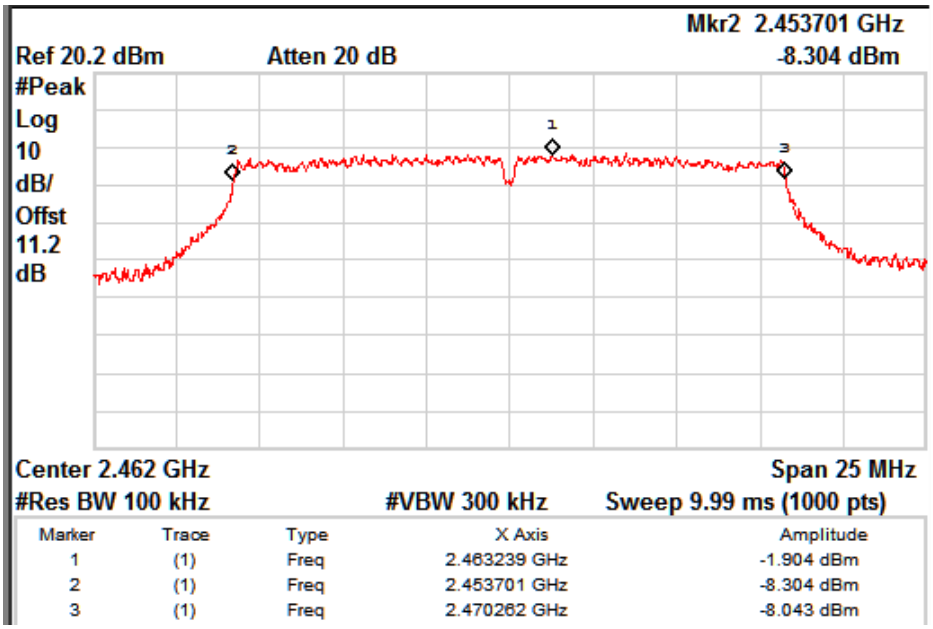
Data Rate: 6 Mbps **Channel frequencies: 2462 MHz**



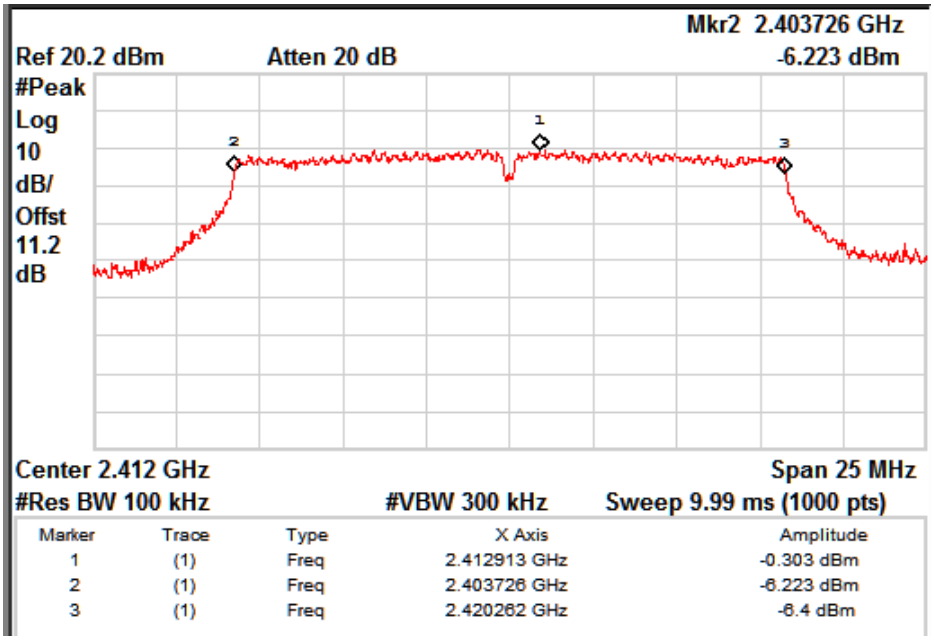
Data Rate: 24 Mbps **Channel frequencies: 2412 MHz**



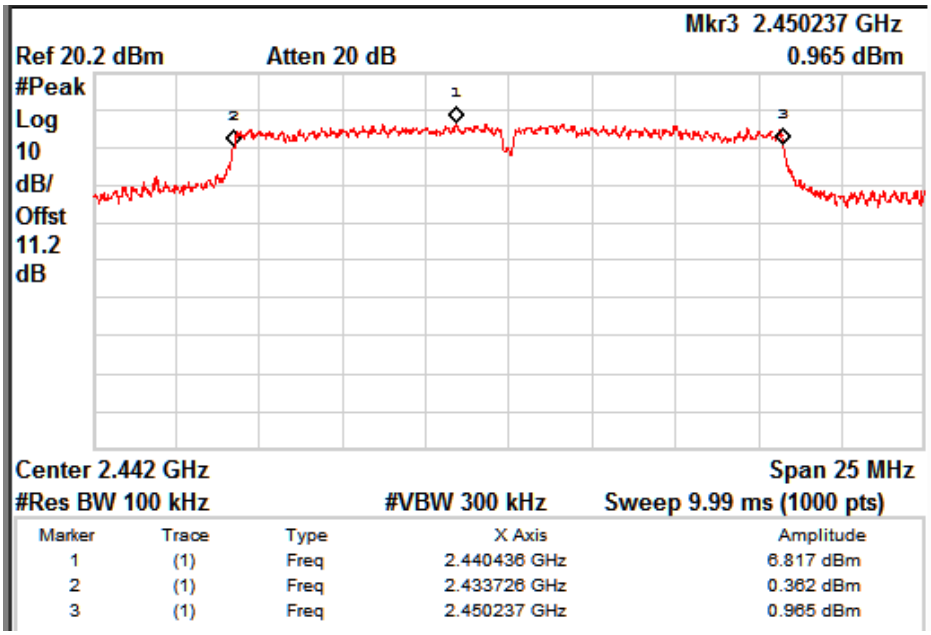
Data Rate: 24 Mbps **Channel frequencies: 2442 MHz**



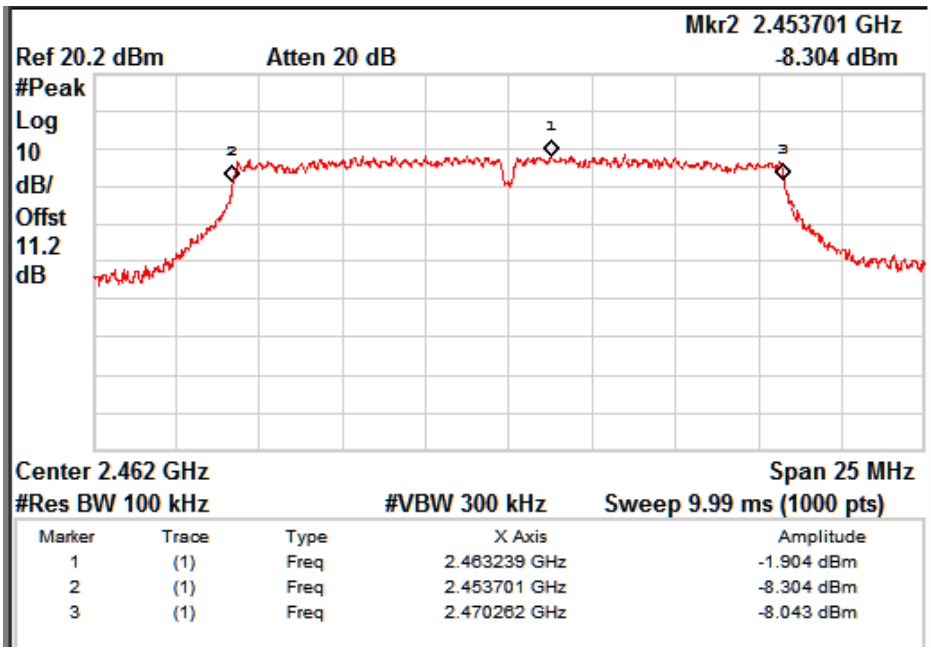
Data Rate: 24 Mbps **Channel frequencies: 2462 MHz**



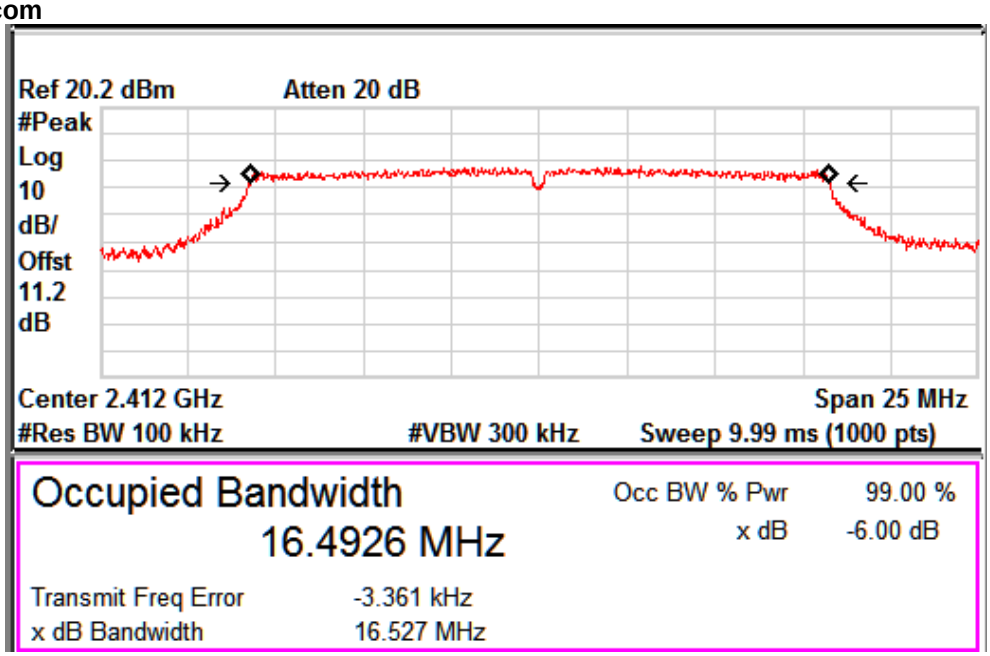
Data Rate: 54 Mbps **Channel frequencies: 2412 MHz**



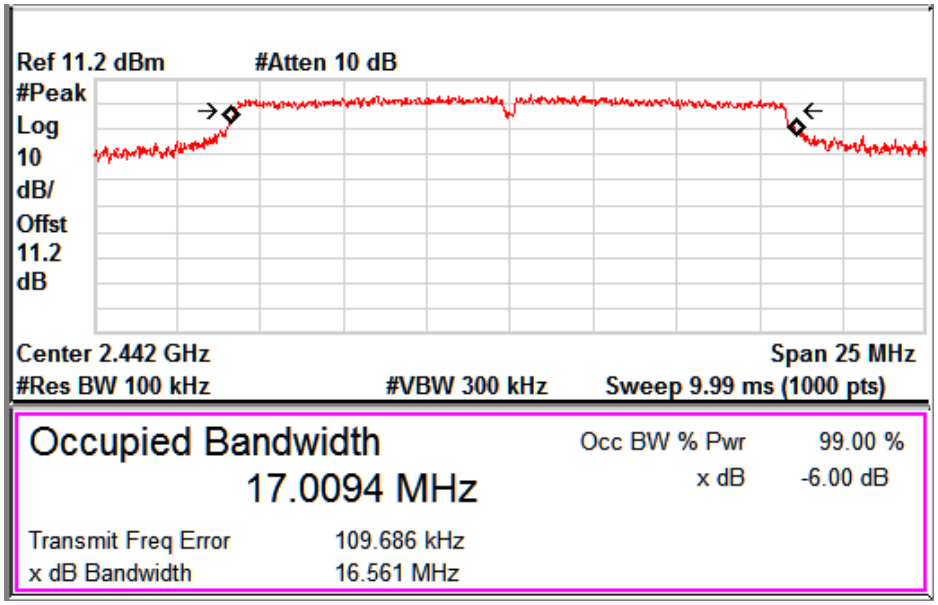
Data Rate: 54 Mbps **Channel frequencies: 2442MHz**



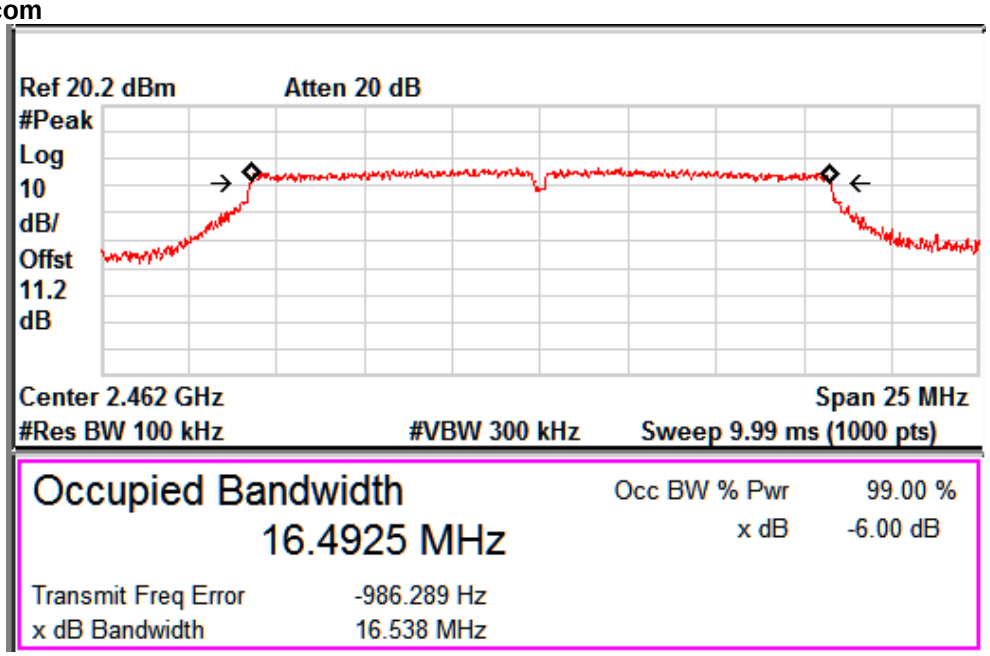
Data Rate: 54 Mbps **Channel frequencies: 2472 MHz**



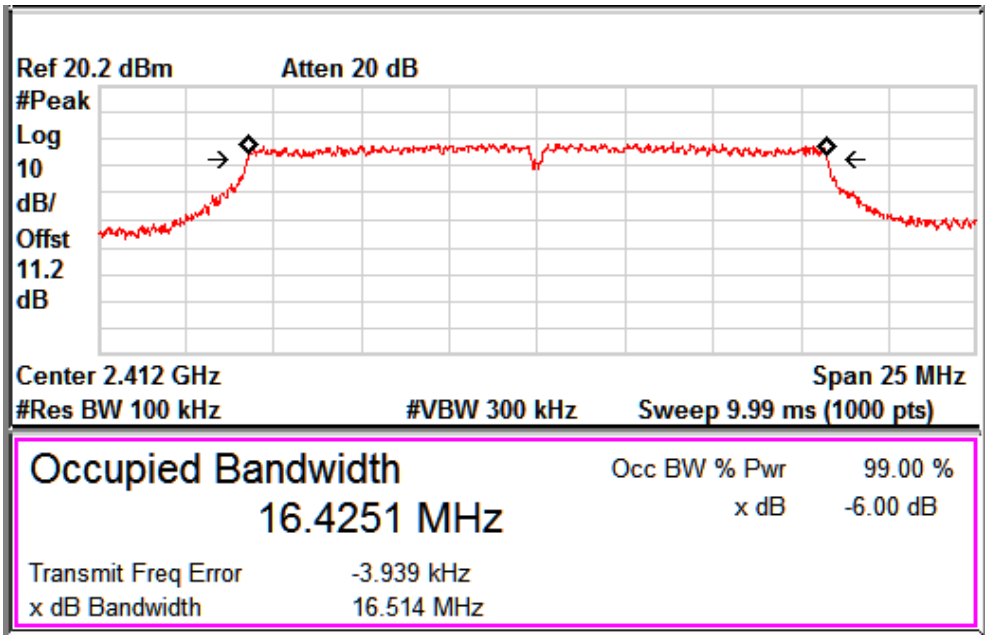
Data Rate: 6 Mbps **99% Occupied Bandwidth: Channel 2412MHz**



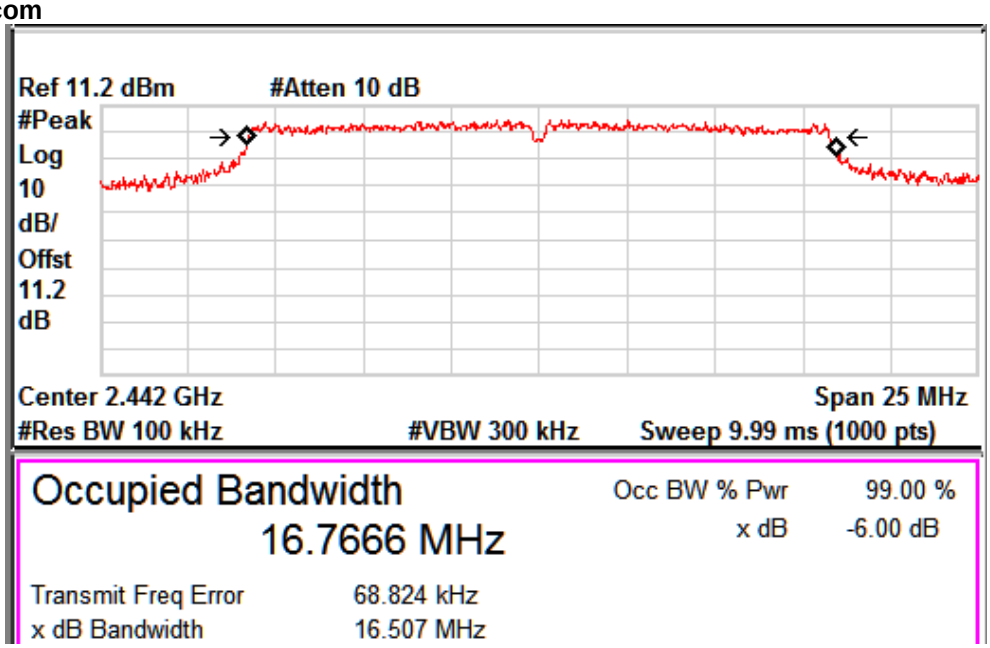
Data Rate: 6 Mbps **99% Occupied Bandwidth: Channel 2442MHz**



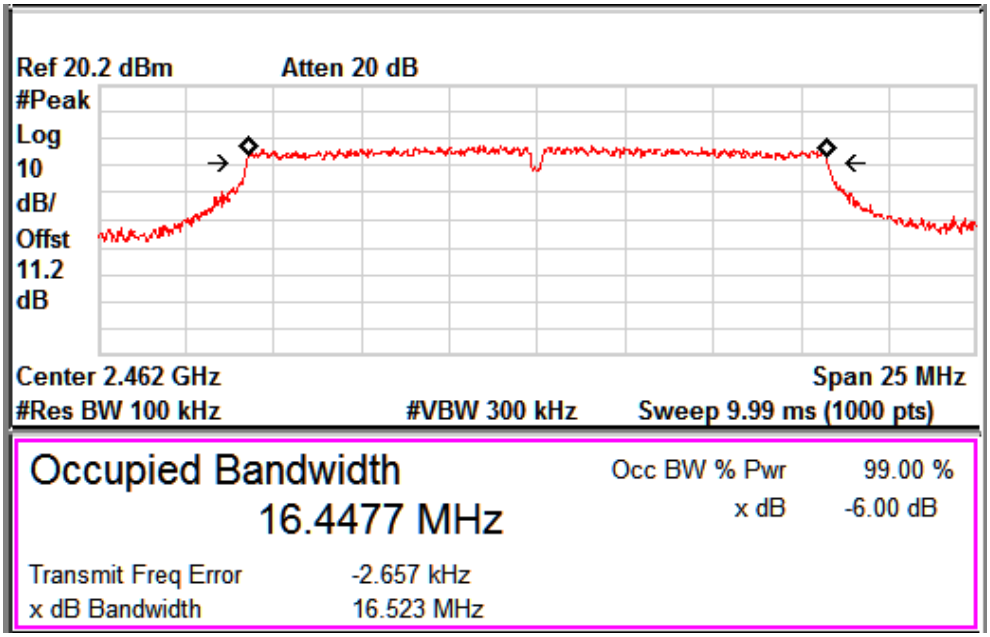
Data Rate: 6 Mbps **99% Occupied Bandwidth: Channel 2462MHz**



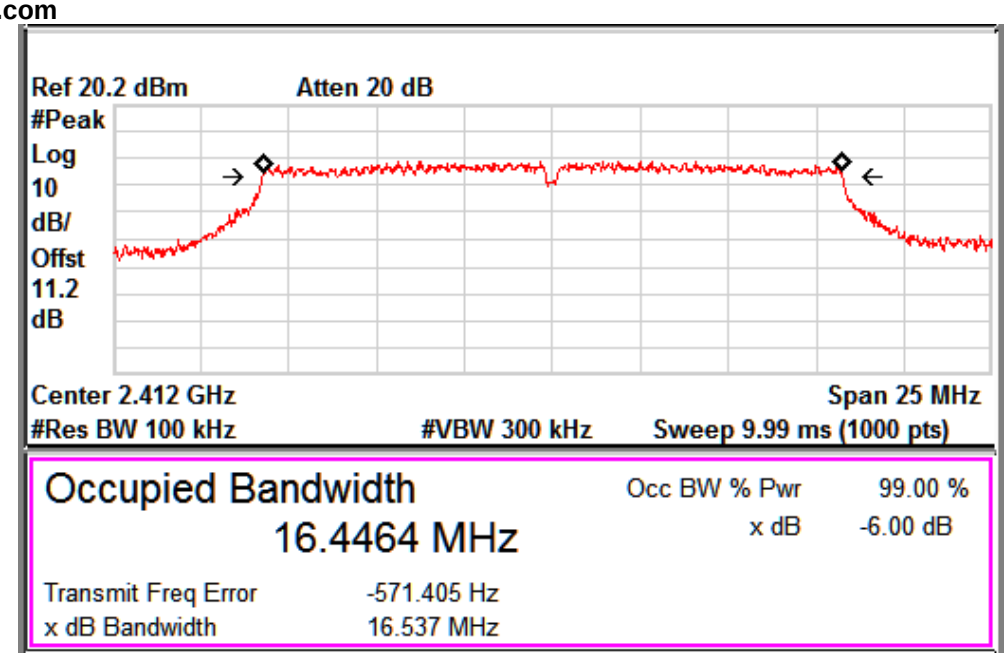
Data Rate: 24 Mbps **99% Occupied Bandwidth: Channel 2412MHz**



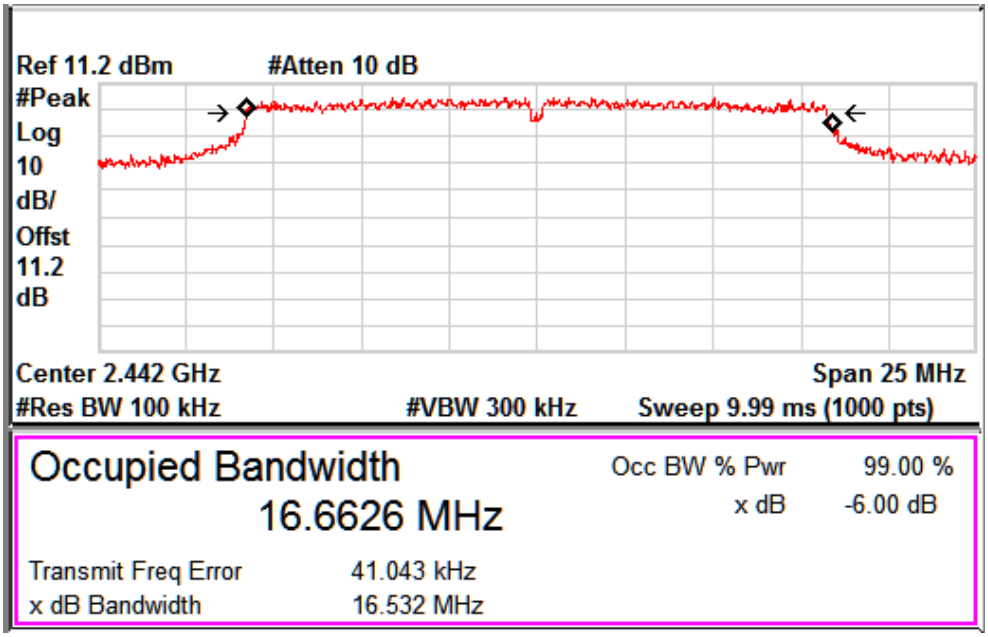
Data Rate: 24 Mbps **99% Occupied Bandwidth: Channel 2442MHz**



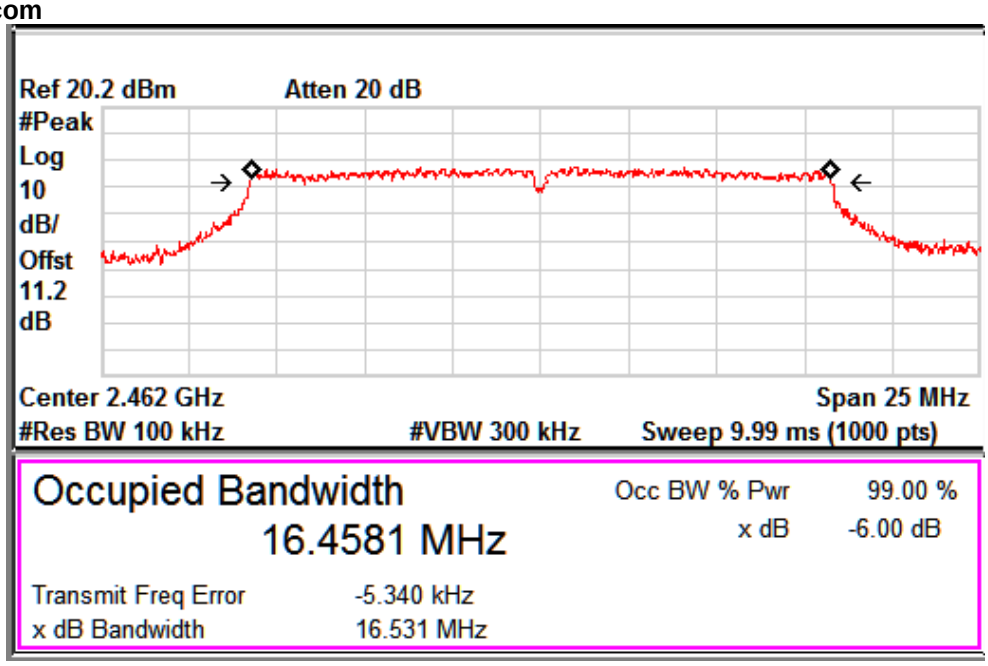
Data Rate: 24 Mbps **99% Occupied Bandwidth: Channel 2462MHz**



Data Rate: 54 Mbps **99% Occupied Bandwidth: Channel 2412MHz**

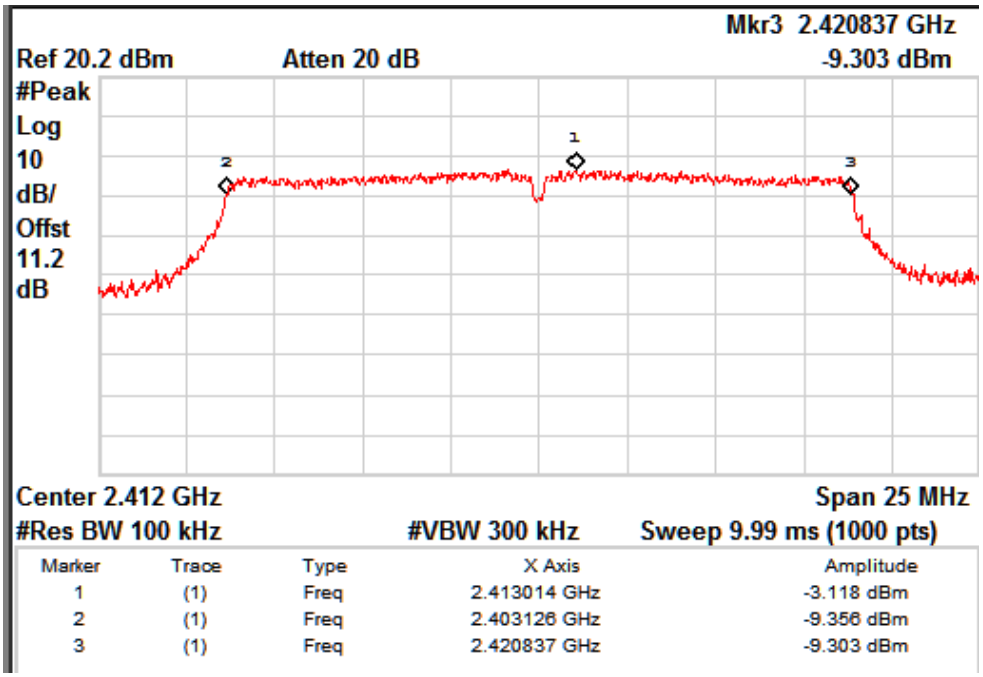


Data Rate: 54 Mbps **99% Occupied Bandwidth: Channel 2442MHz**

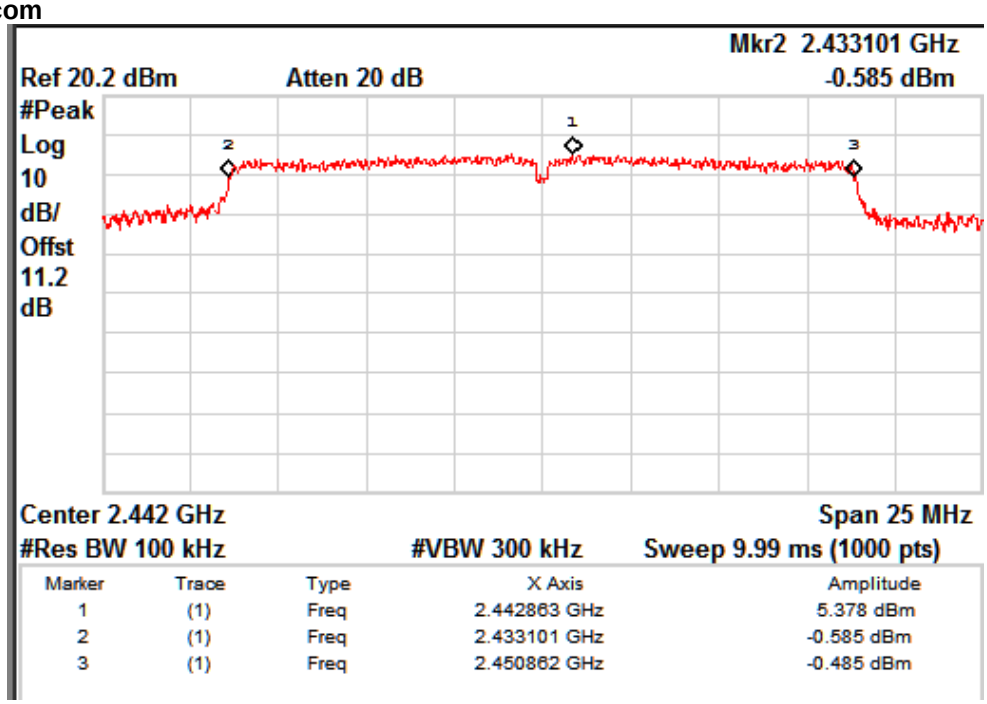


Data Rate: 54 Mbps **99% Occupied Bandwidth: Channel 2462MHz**

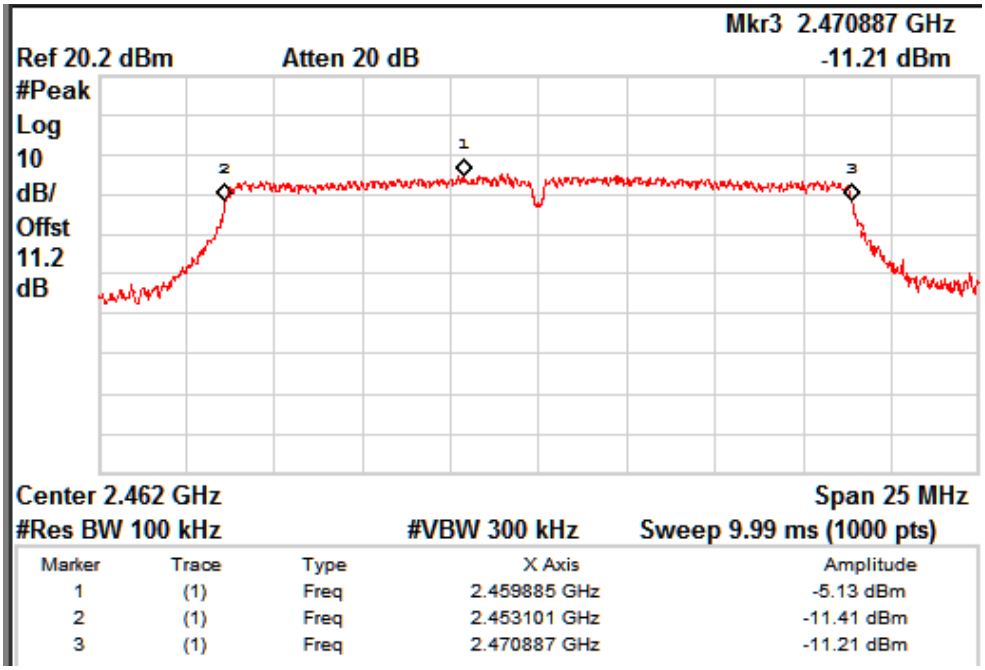
802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)
n	6.5	2412.00	2403.126	2420.837	17.711	17.632
		2442.00	2433.101	2450.862	17.761	17.916
		2462.00	2453.101	2470.887	17.786	17.639
	39	2412.00	2403.101	2420.837	17.736	17.620
		2442.00	2433.101	2450.862	17.761	17.773
		2462.00	2453.101	2470.887	17.786	17.614
	65	2412.00	2403.101	2420.862	17.761	17.617
		2442.00	2433.101	2450.887	17.786	17.773
		2462.00	2453.101	2470.887	17.786	17.629



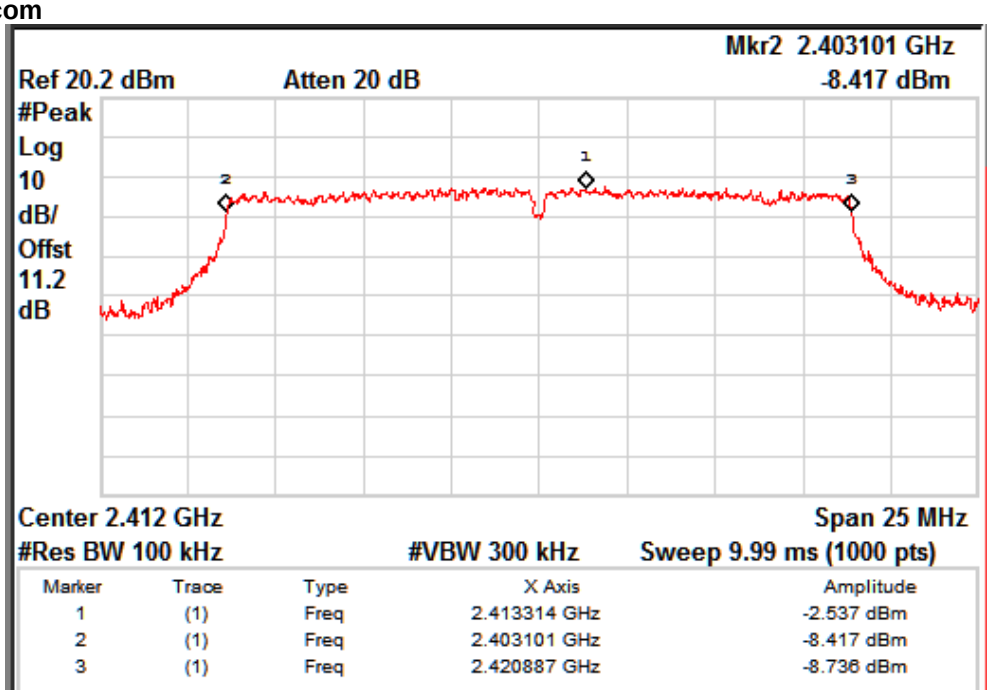
Data Rate: 6.5 Mbps **Channel: 2412 MHz**



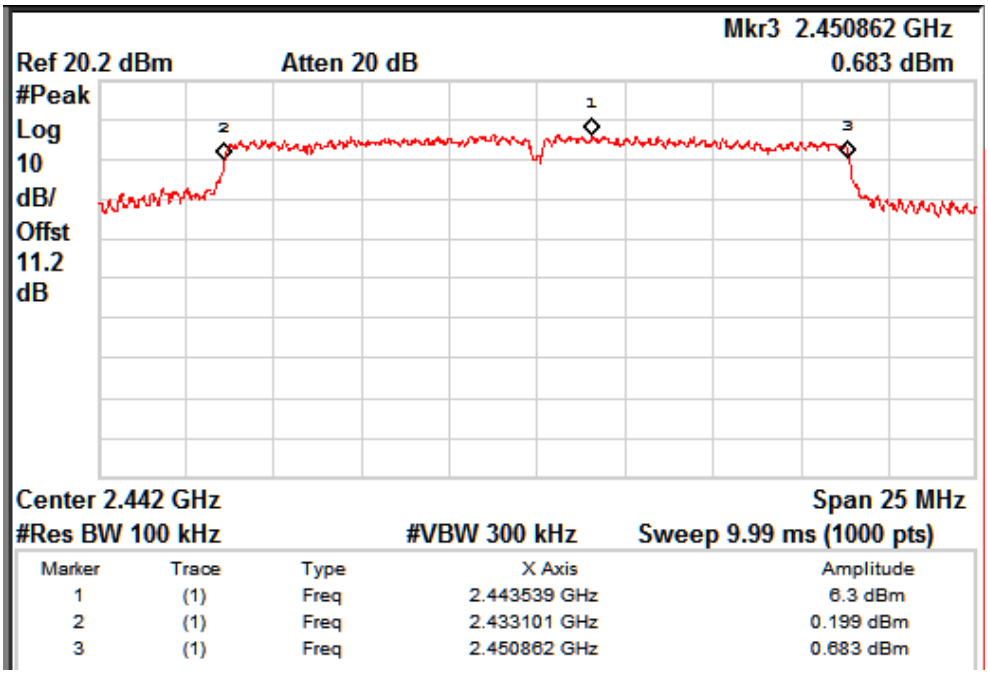
Data Rate: 6.5 Mbps **Channel: 2442 MHz**



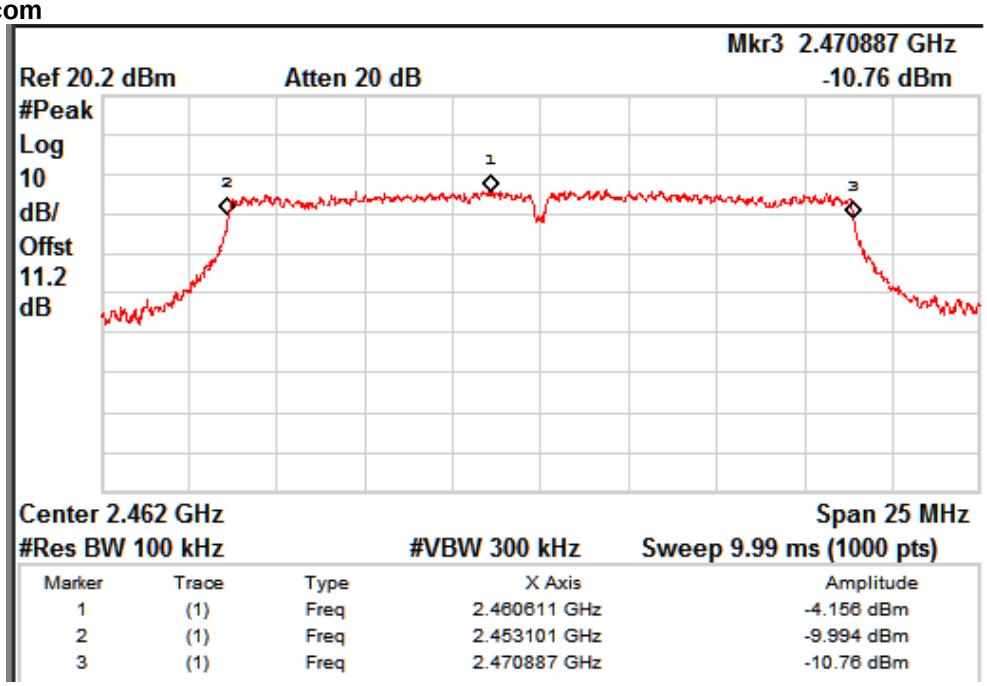
Data Rate: 6.5 Mbps **Channel: 2462 MHz**



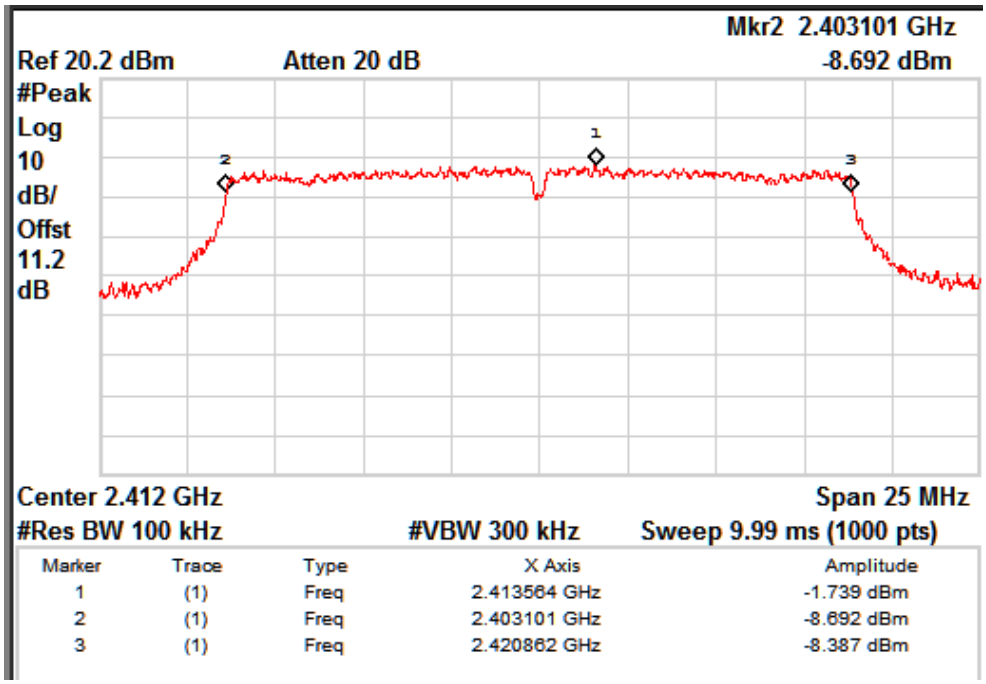
Data Rate: 39 Mbps **Channel: 2412 MHz**



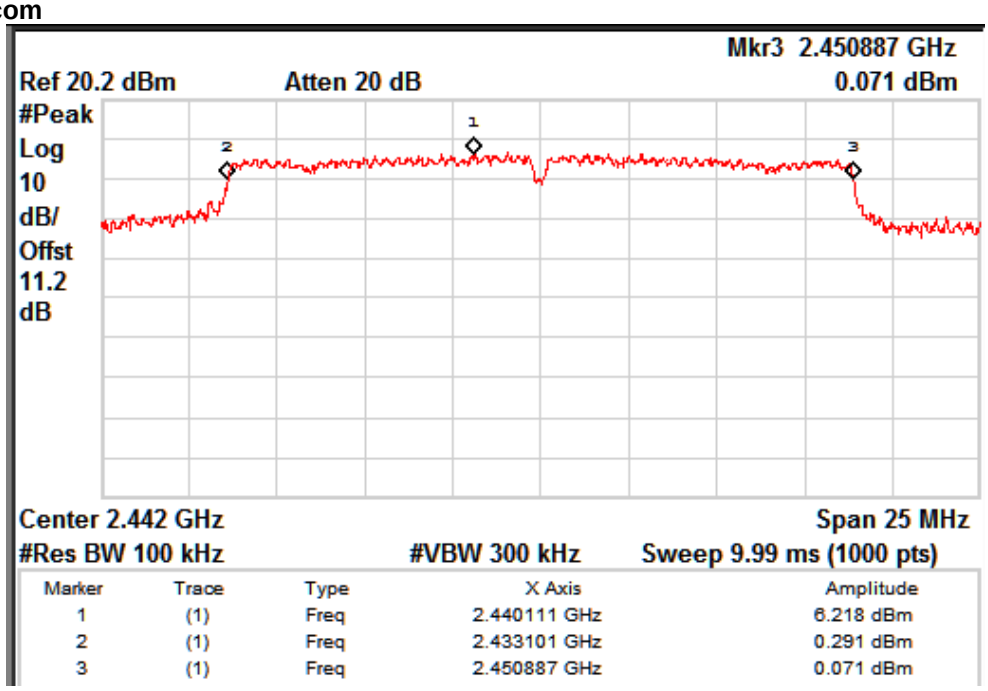
Data Rate: 39 Mbps **Channel: 2442 MHz**



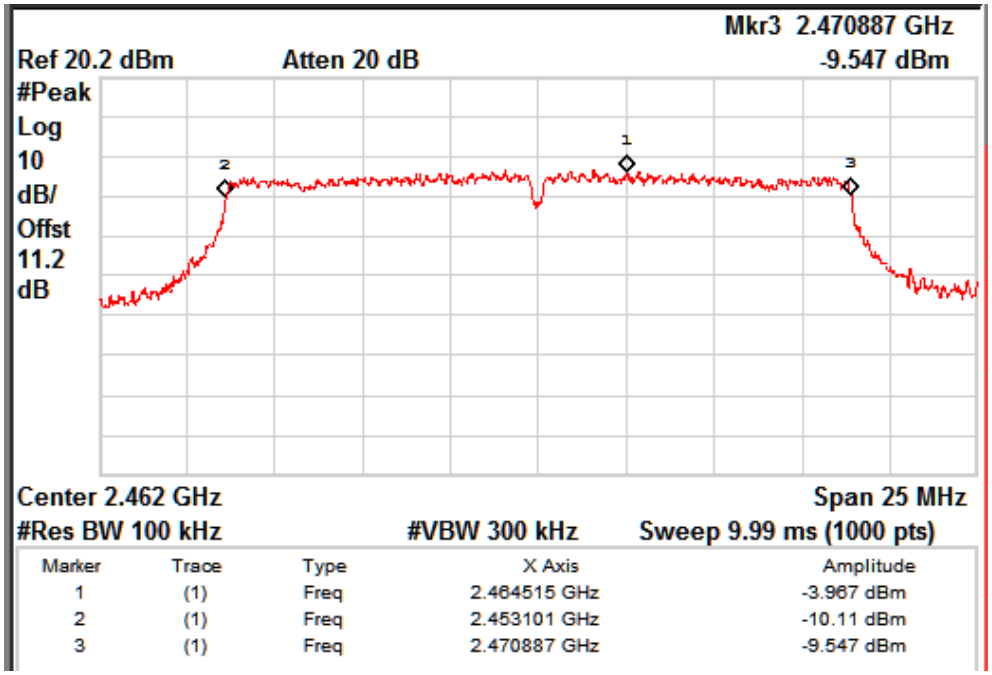
Data Rate: 39 Mbps **Channel: 2462 MHz**



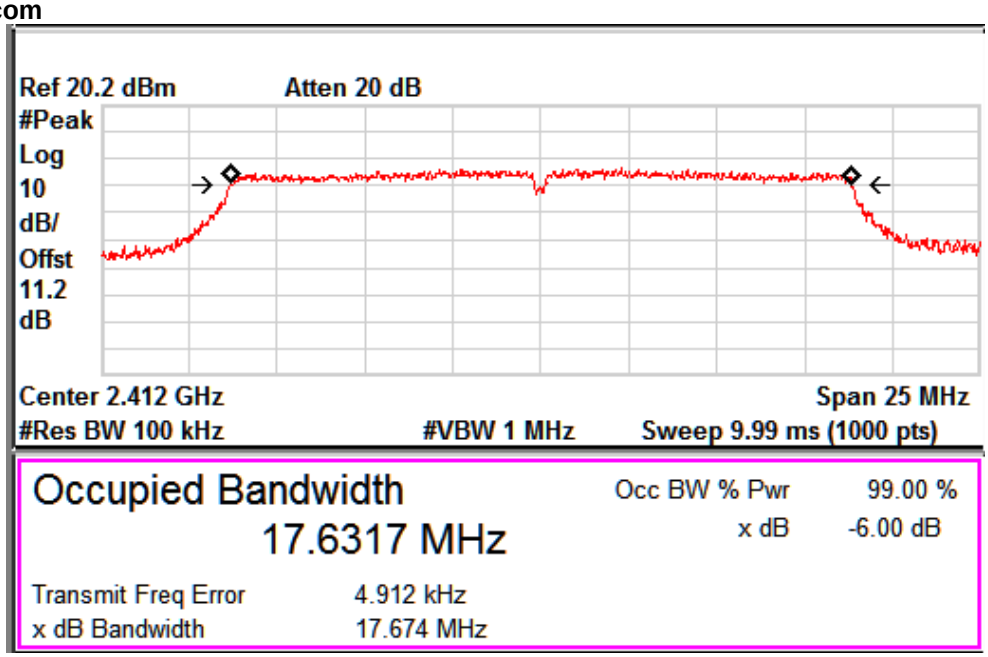
Data Rate: 65 Mbps **Channel: 2412 MHz**



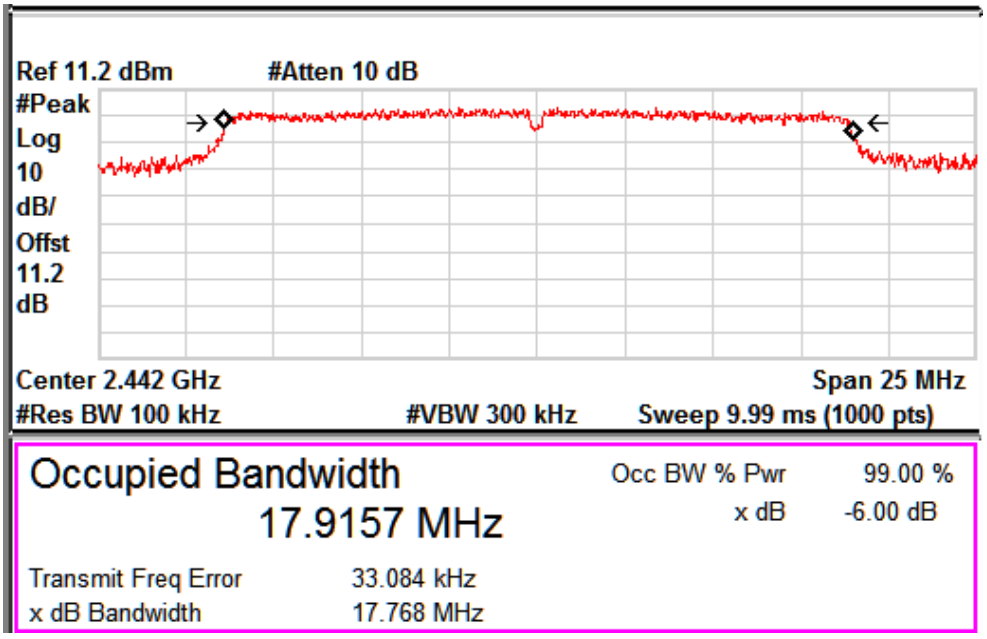
Data Rate: 65 Mbps **Channel: 2442MHz**



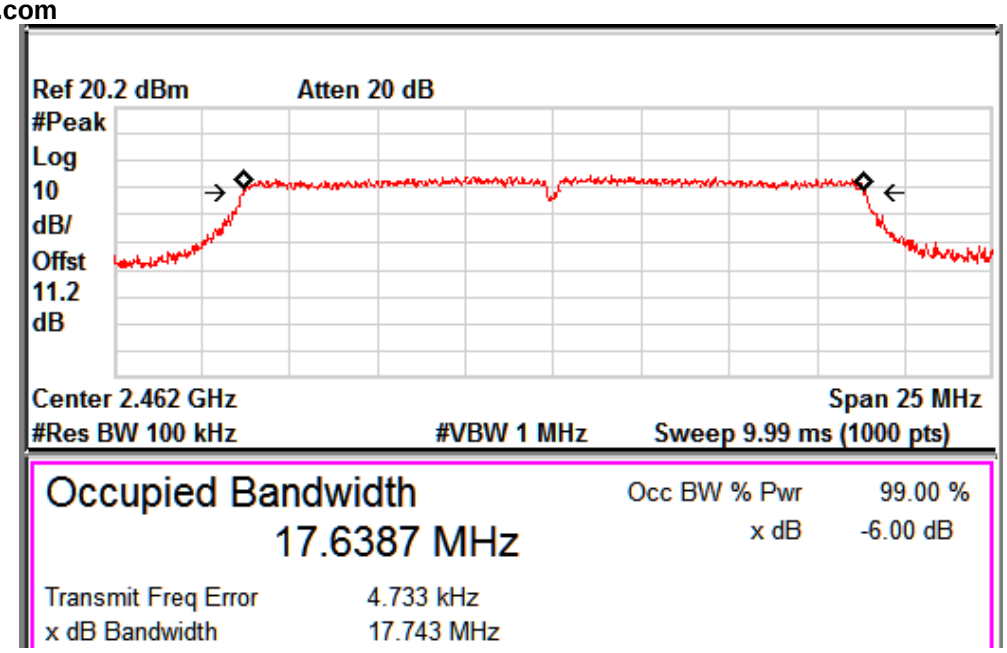
Data Rate: 65 Mbps **Channel: 2462 MHz**



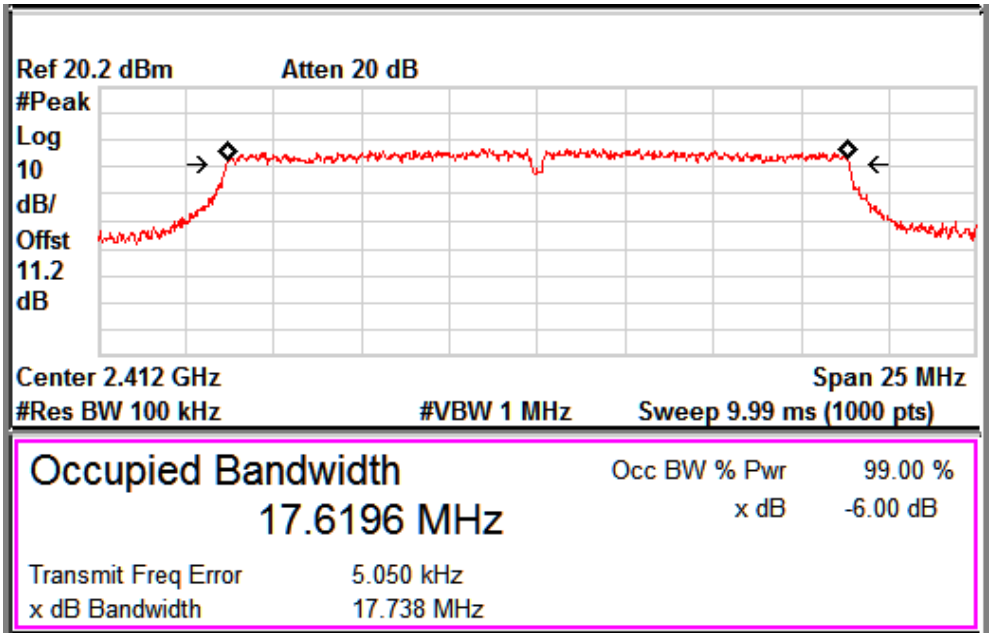
Data Rate: 6.5 Mbps **99% Occupied Bandwidth: Channel 2412MHz**



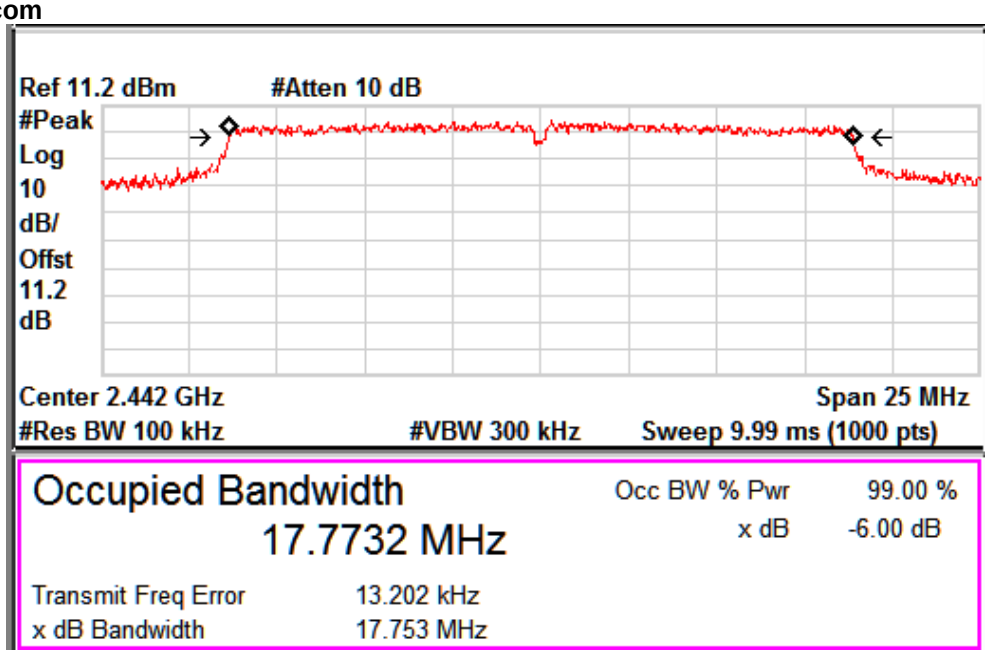
Data Rate: 6.5 Mbps **99% Occupied Bandwidth: Channel 2442MHz**



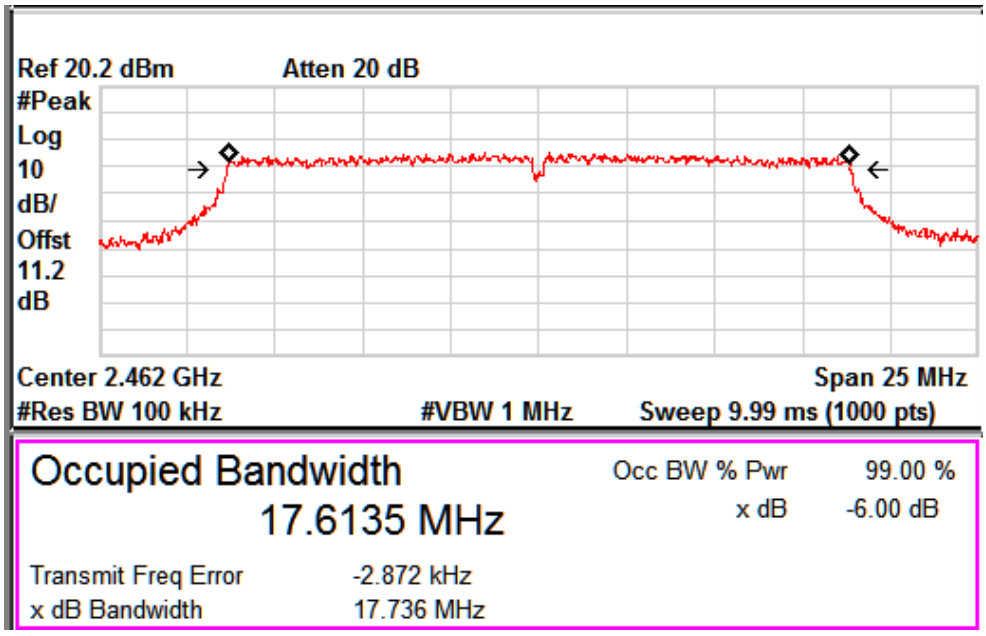
Data Rate: 6.5 Mbps **99% Occupied Bandwidth: Channel 2462MHz**



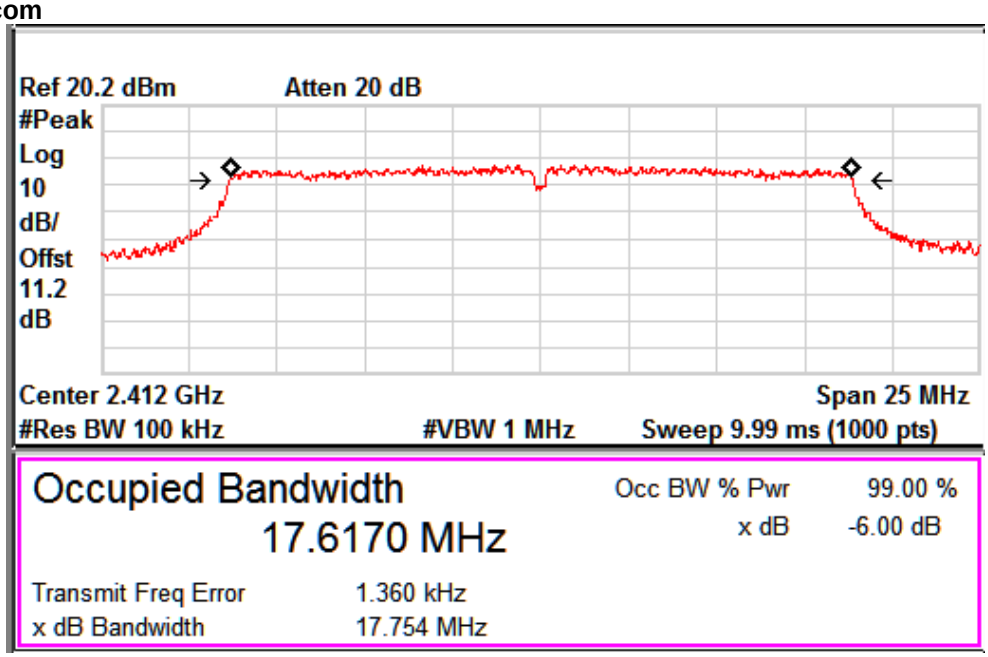
Data Rate: 39 Mbps **99% Occupied Bandwidth: Channel 2412MHz**



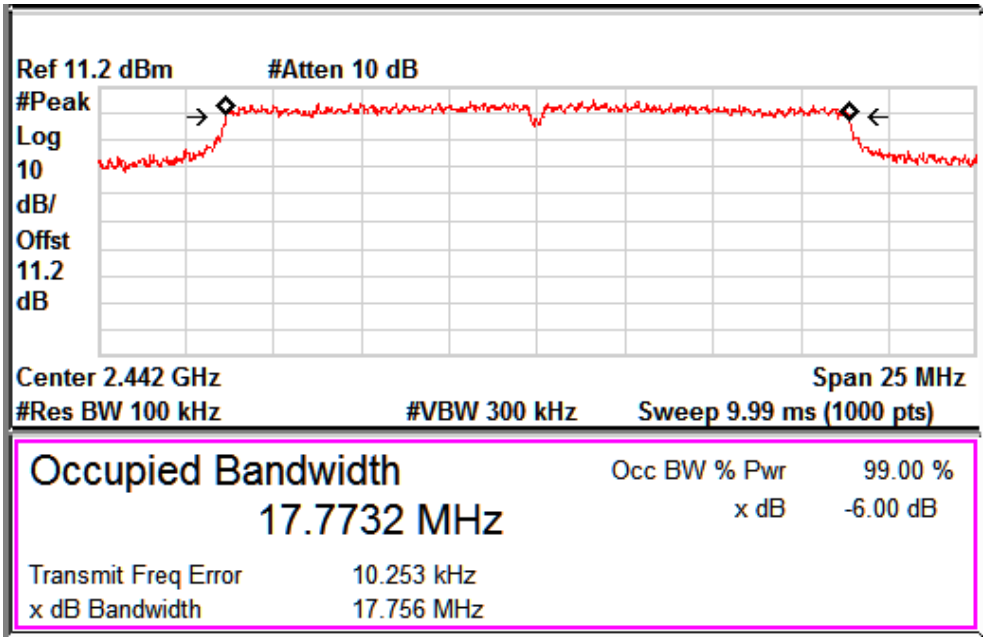
Data Rate: 39 Mbps **99% Occupied Bandwidth: Channel 2442MHz**



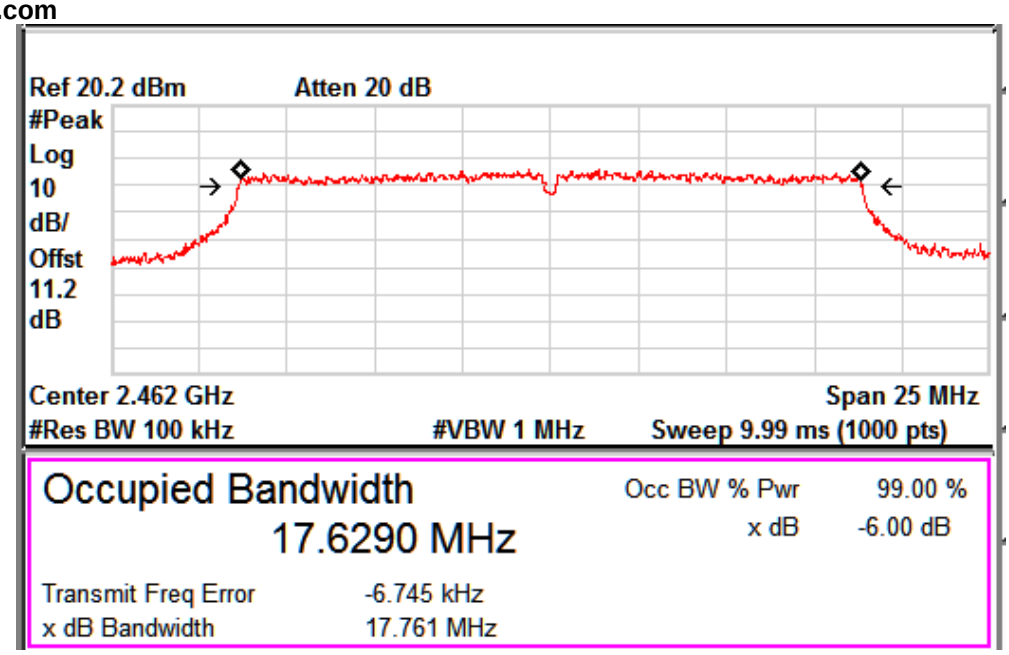
Data Rate: 39 Mbps **99% Occupied Bandwidth: Channel 2462MHz**



Data Rate: 65 Mbps **99% Occupied Bandwidth: Channel 2412MHz**



Data Rate: 65 Mbps **99% Occupied Bandwidth: Channel 2442MHz**



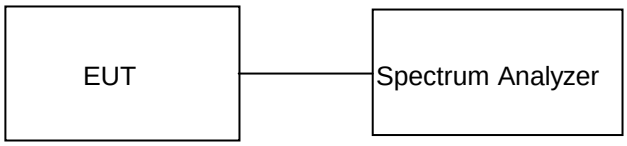
Data Rate: 65 Mbps **99% Occupied Bandwidth: Channel 2462MHz**

Band-edge Compliance **Section 15.247(d)**

Result **Pass**

Test Specification	FCC Part 15 Section 15.247(d)
Detector Function	Peak
Requirement	In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

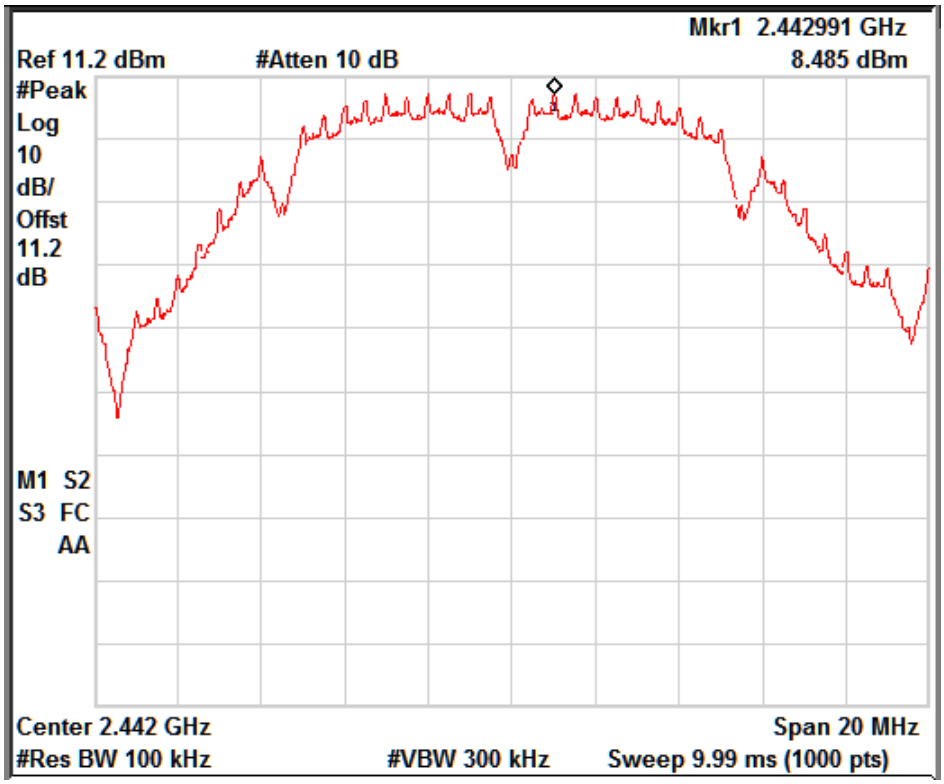
Test Method:



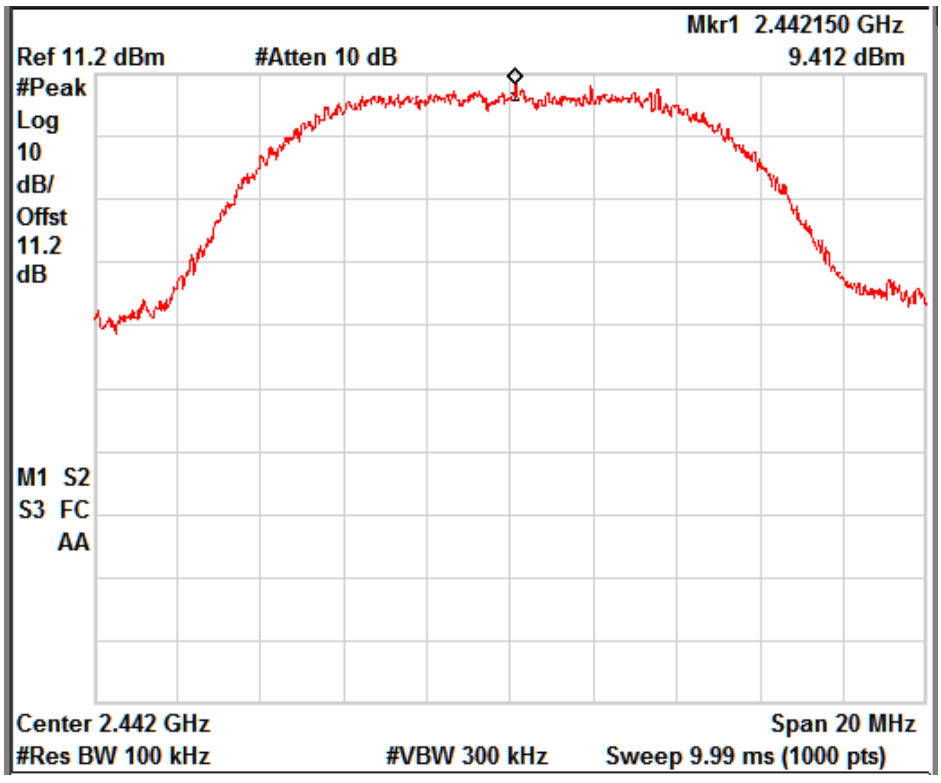
Test Result: Wi-Fi

802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Value at Band Edge		Reference Value B (dBm)	Band Edge Value A-B (dBc)	Limit (dBc)
			Frequency (MHz)	Value A (dBm)			
b	1	2412	2397.05	-35.13	8.48	-43.61	-30.00
		2462	2483.5	-39.52	8.48	-48.00	-30.00
	11	2412	2397.49	-29.49	9.41	-38.90	-30.00
		2462	2484.43	-42.22	9.41	-51.63	-30.00

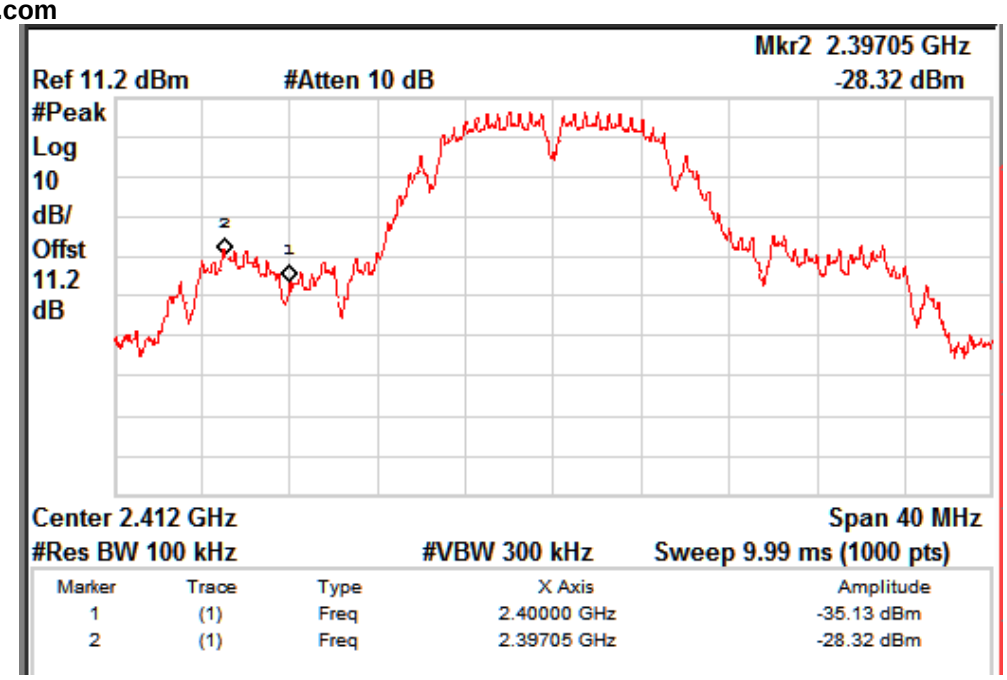
Note: The channel no. 7 (2442 MHz) found to contain the maximum PSD level and is used to establish the reference level.



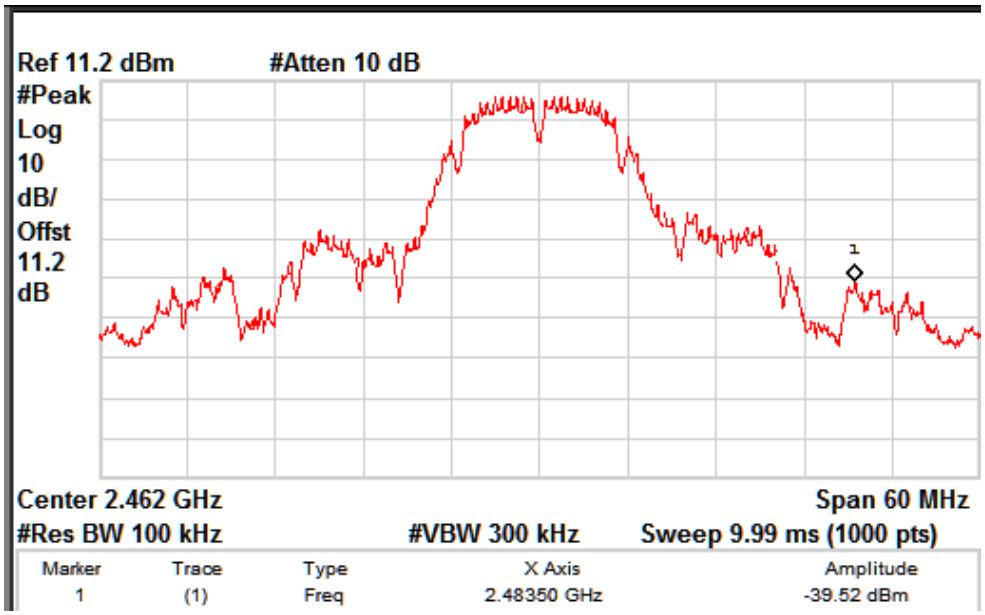
Reference Level Plot: 1Mbps



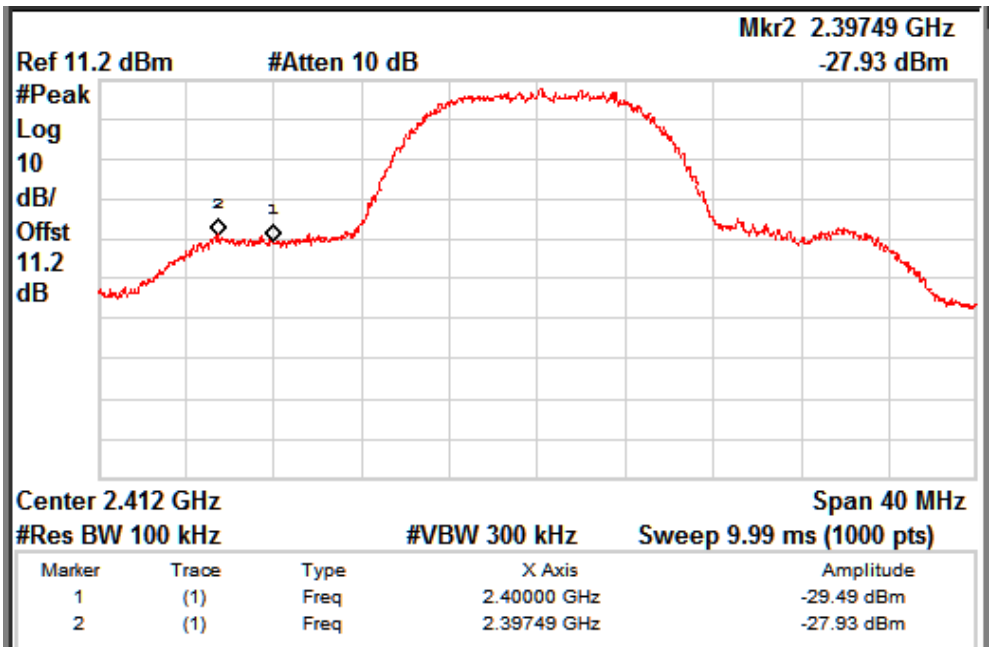
Reference Level Plot: 11Mbps



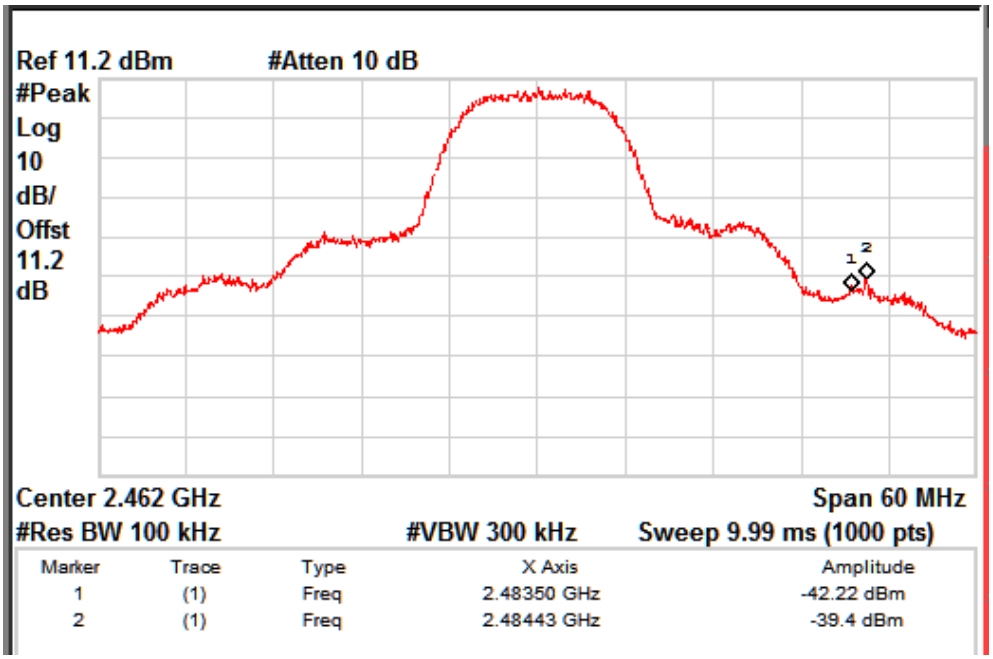
Data Rate: 1 Mbps **Channel frequency: 2412 MHz**



Data Rate: 1 Mbps **Channel frequency: 2462 MHz**



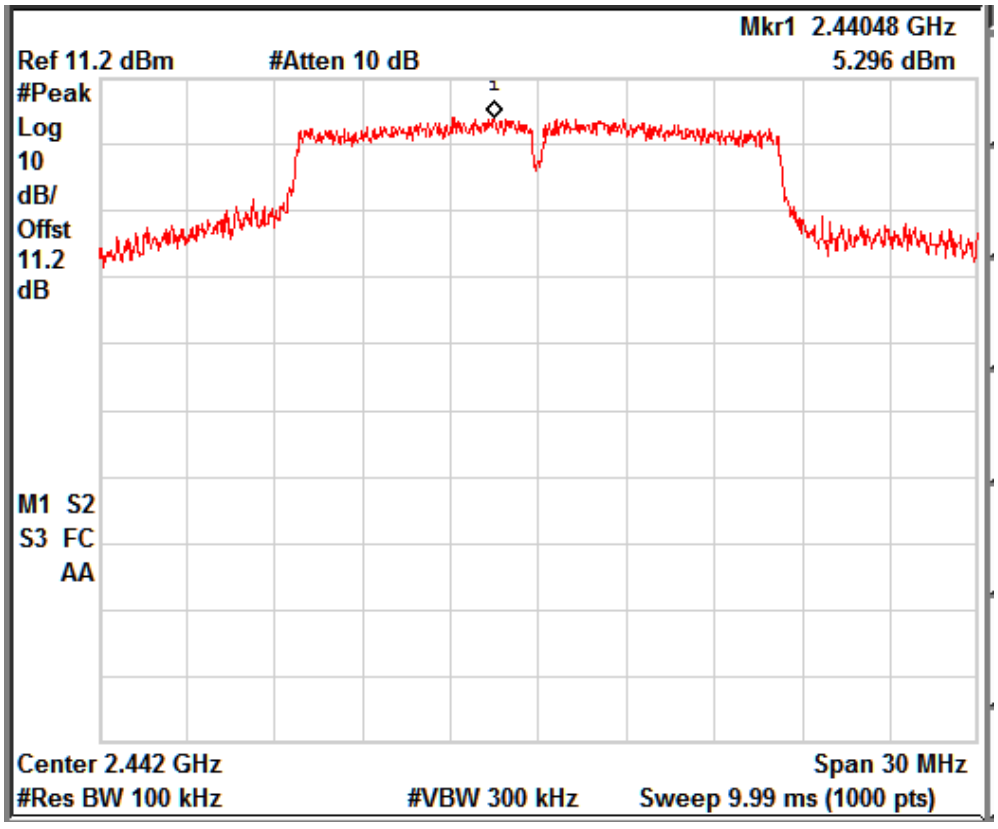
Data Rate: 11 Mbps **Channel frequency: 2412 MHz**



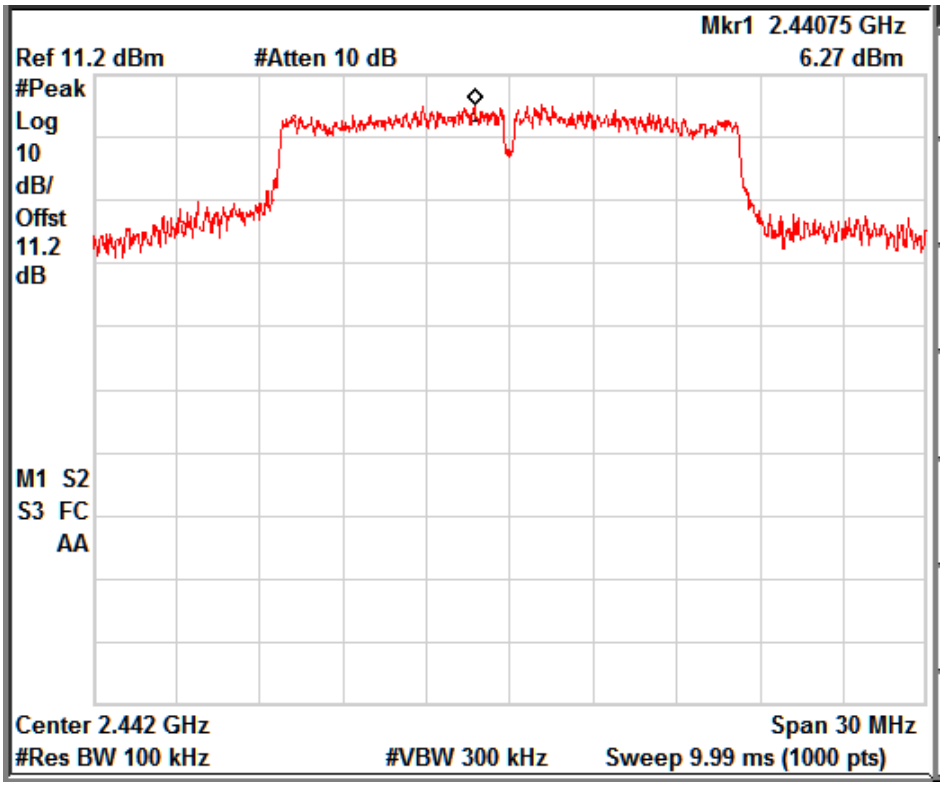
Data Rate: 11 Mbps **Channel frequency: 2462 MHz**

802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Value at Band Edge		Reference Value B (dBm)	Band Edge Value A-B (dBc)	Limit (dBc)
			Frequency (MHz)	Value A (dBm)			
g	6	2412	2398.61	-32.97	5.30	-38.27	-30.00
		2462	2483.5	-39.82	5.30	-45.12	-30.00
	24	2412	2395.8	-33.14	6.27	-39.41	-30.00
		2462	2483.5	-38.74	6.27	-45.01	-30.00
	54	2412	2439.885	-30.82	6.09	-36.91	-30.00
		2462	2483.5	-38.64	6.09	-44.73	-30.00

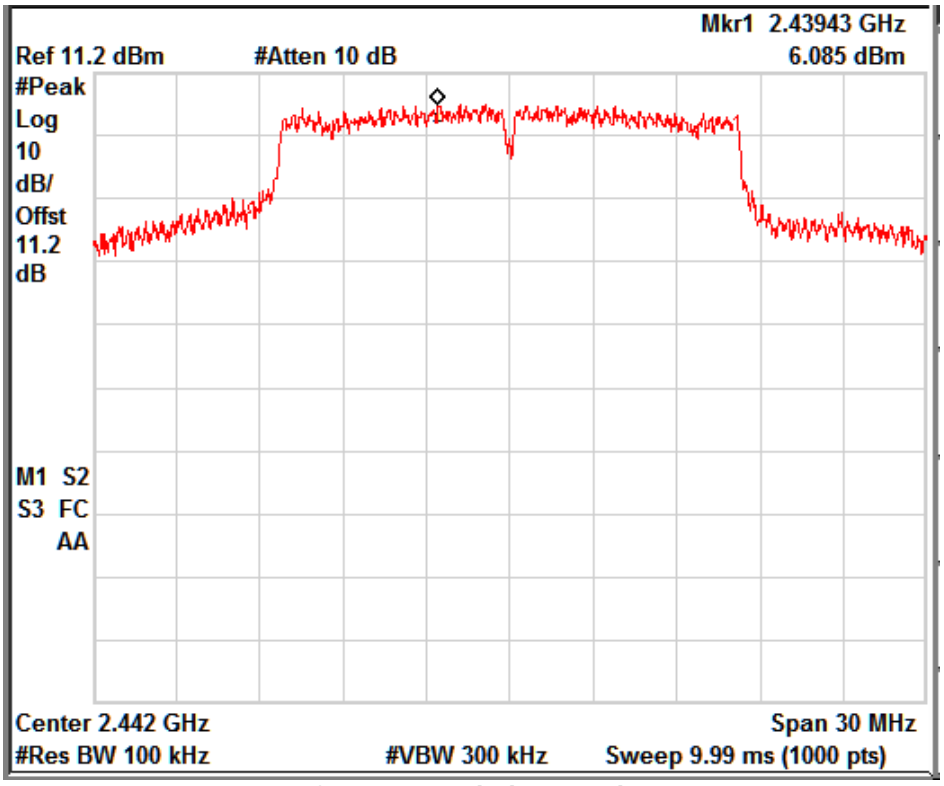
Note: The channel no. 7 (2442 MHz) found to contain the maximum PSD level and is used to establish the reference level.



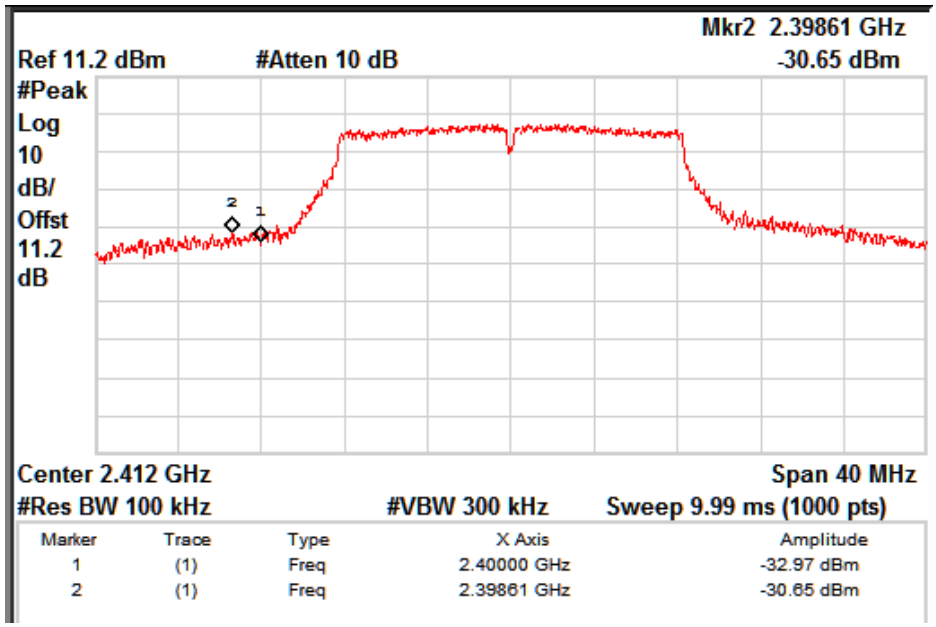
Reference Level Plot: 6 Mbps



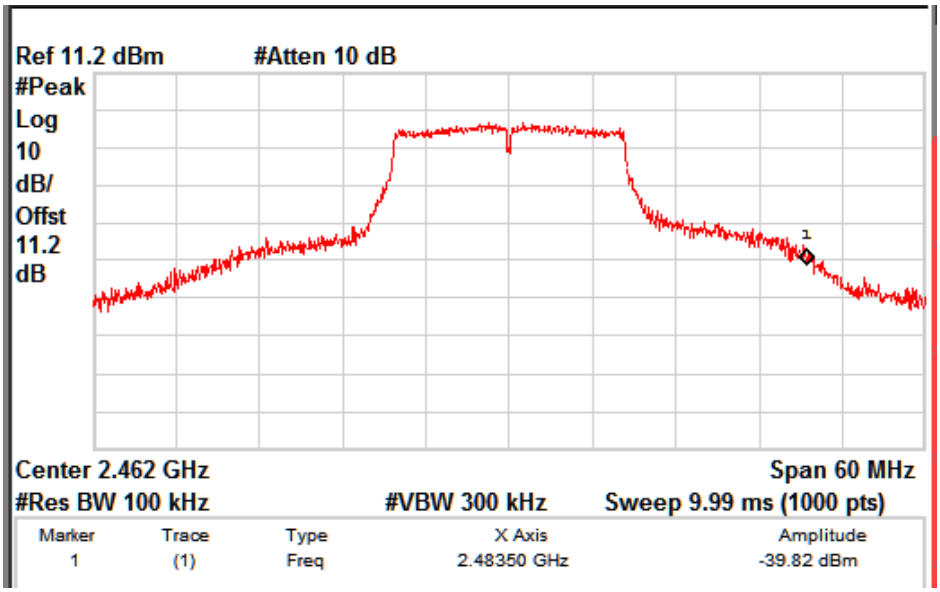
Reference Level Plot: 24 Mbps



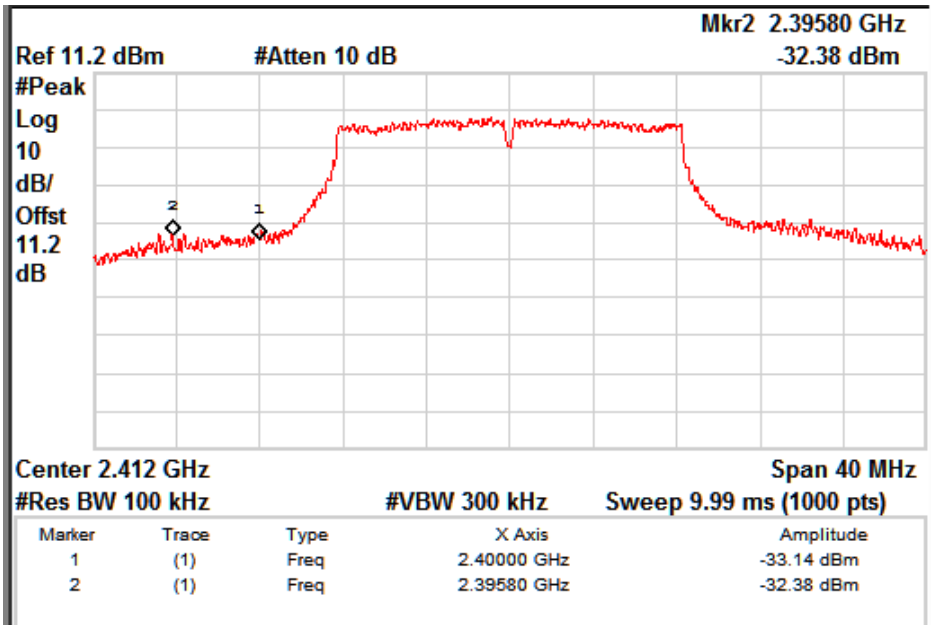
Reference Level Plot: 54 Mbps



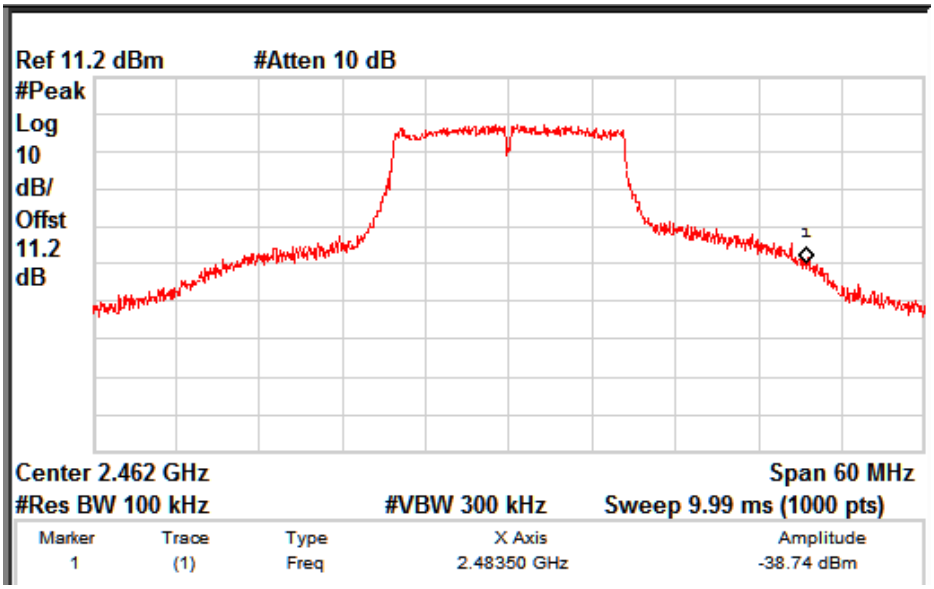
Data Rate: 6 Mbps **Channel frequency: 2412 MHz**



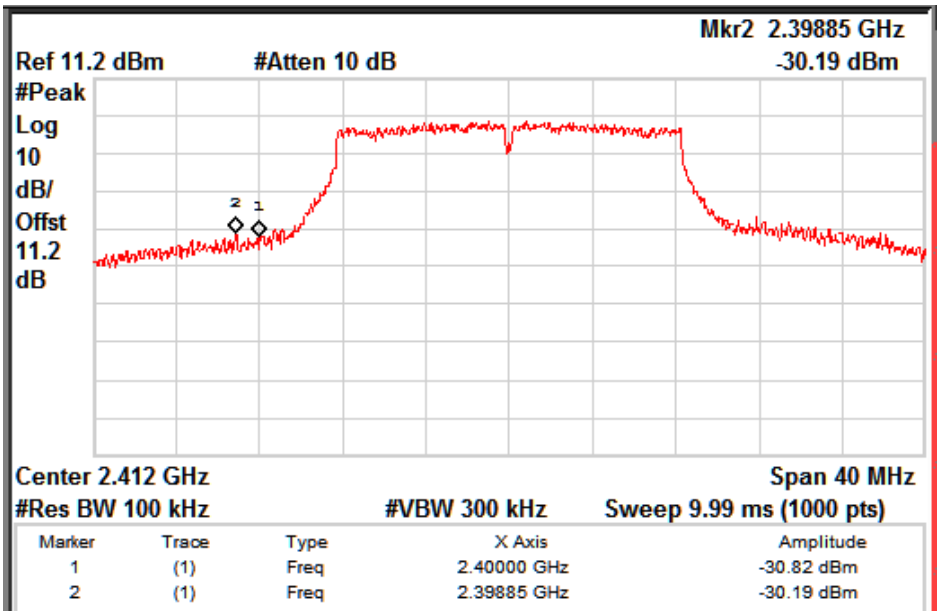
Data Rate: 6 Mbps **Channel frequency: 2462 MHz**



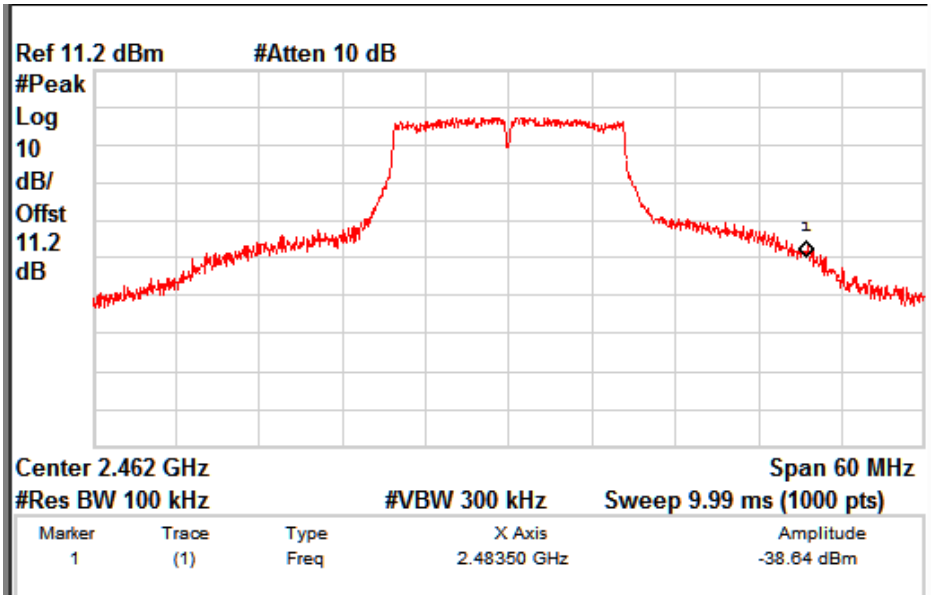
Data Rate: 24 Mbps **Channel frequency: 2412 MHz**



Data Rate: 24 Mbps **Channel frequency: 2462 MHz**



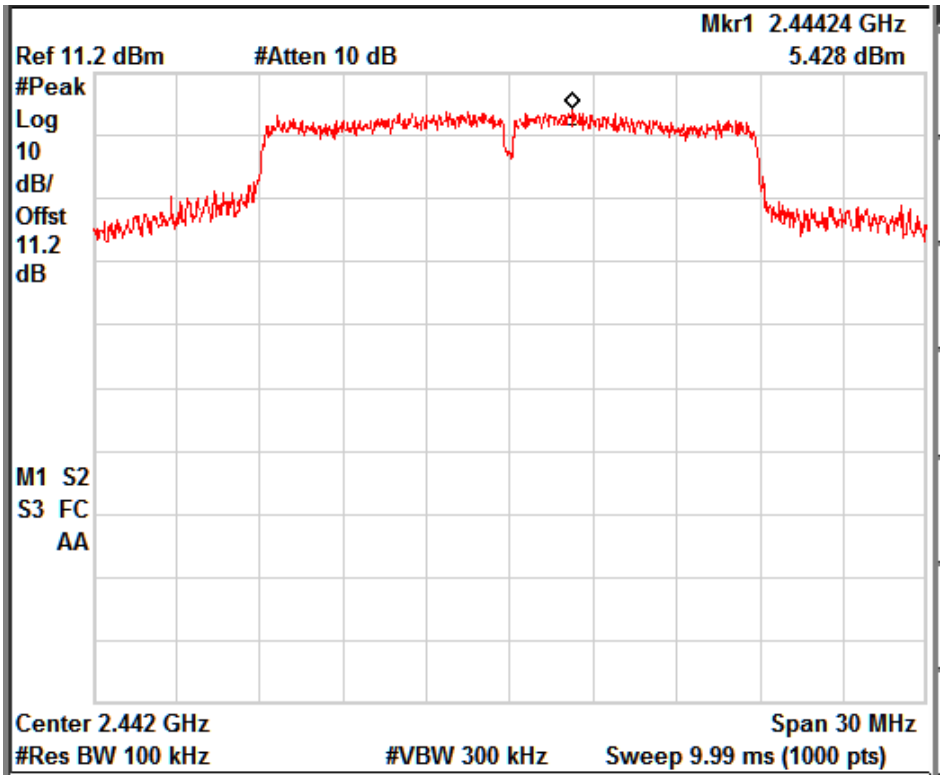
Data Rate: 54 Mbps **Channel frequency: 2412 MHz**



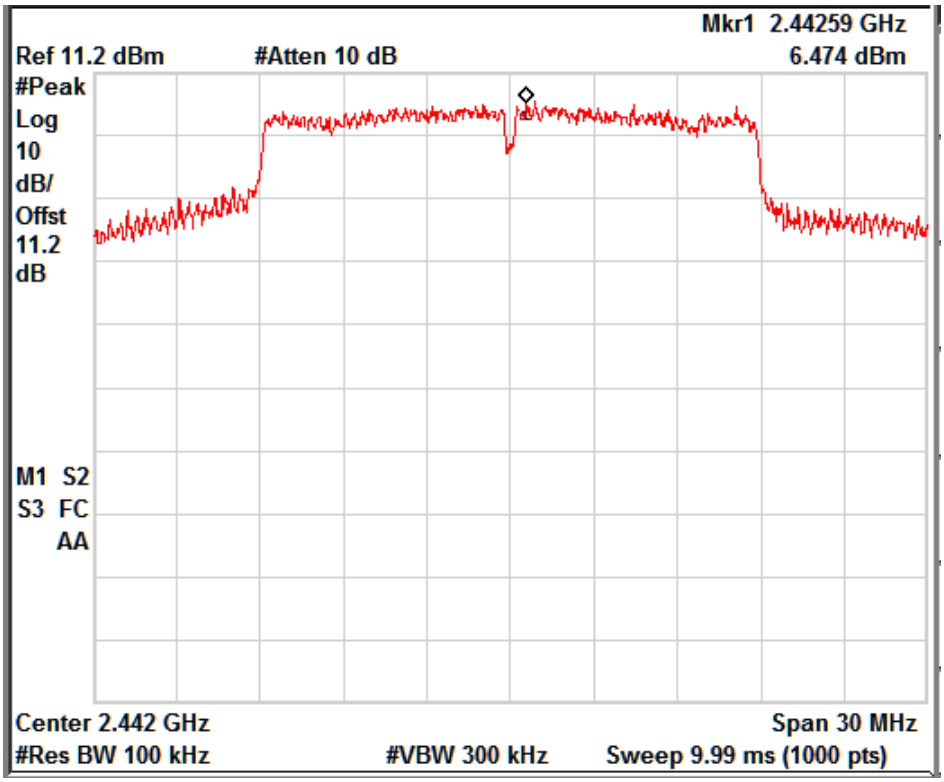
Data Rate: 54 Mbps **Channel frequency: 2462 MHz**

802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Value at Band Edge		Reference Value B (dBm)	Band Edge Value A-B (dBc)	Limit (dBc)
			Frequency (MHz)	Value A (dBm)			
n	MCS0 (6.5)	2412	2398.57	-34.39	5.43	-39.82	-30.00
		2462	2483.5	-39.43	5.43	-44.86	-30.00
	MCS4 (39)	2412	2400	-34.29	6.47	-40.76	-30.00
		2462	2483.5	-39.60	6.47	-46.07	-30.00
	MCS7 (65)	2412	2399.85	-35.67	6.25	-41.92	-30.00
		2462	2483.5	-38.76	6.25	-45.01	-30.00

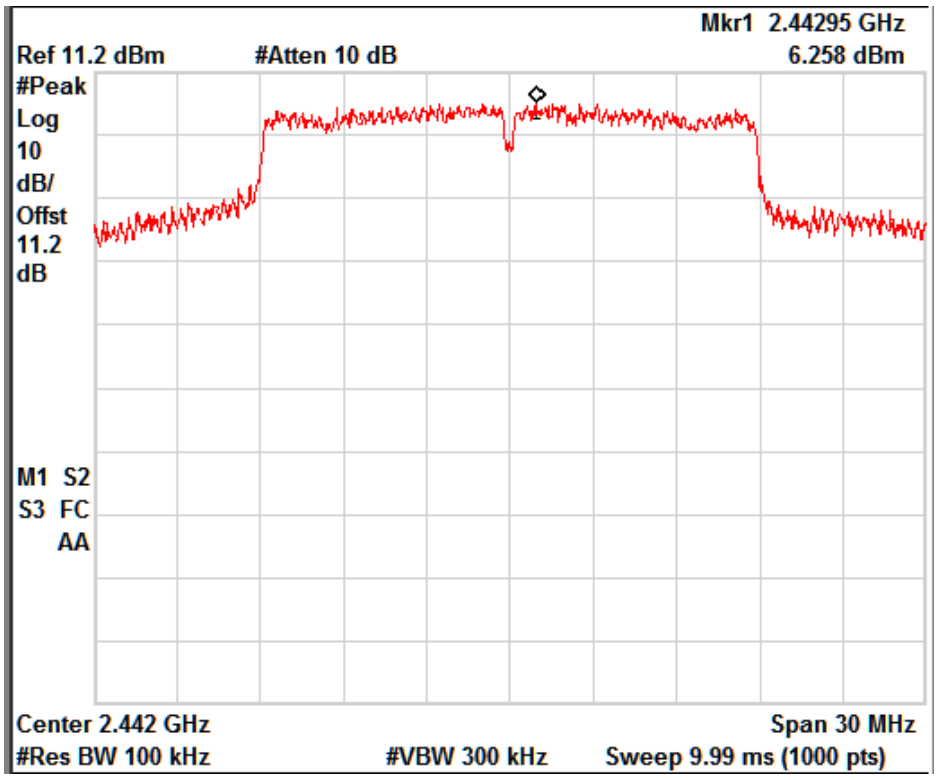
Note: The channel no. 7 (2442 MHz) found to contain the maximum PSD level and is used to establish the reference level.



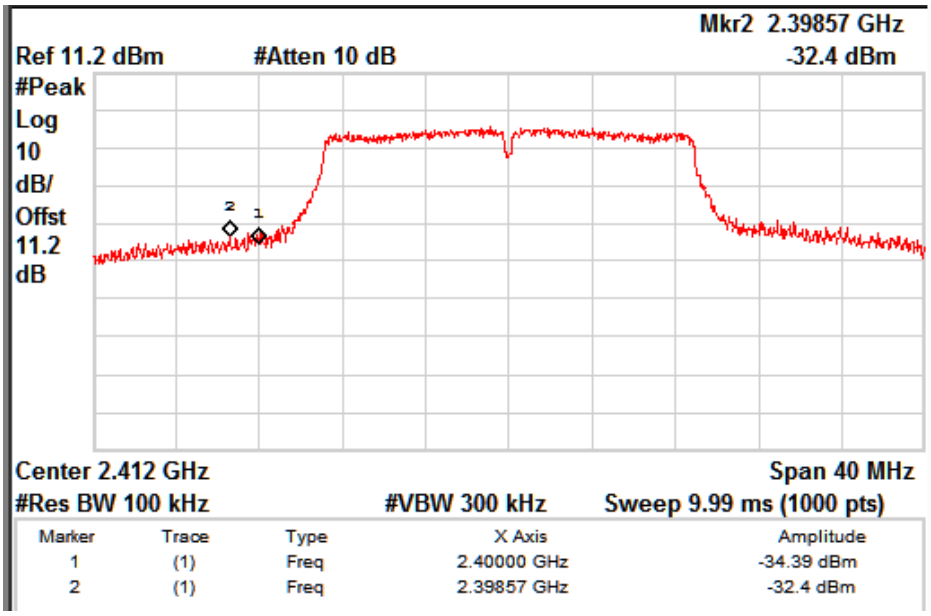
Reference Level Plot: 6.5 Mbps



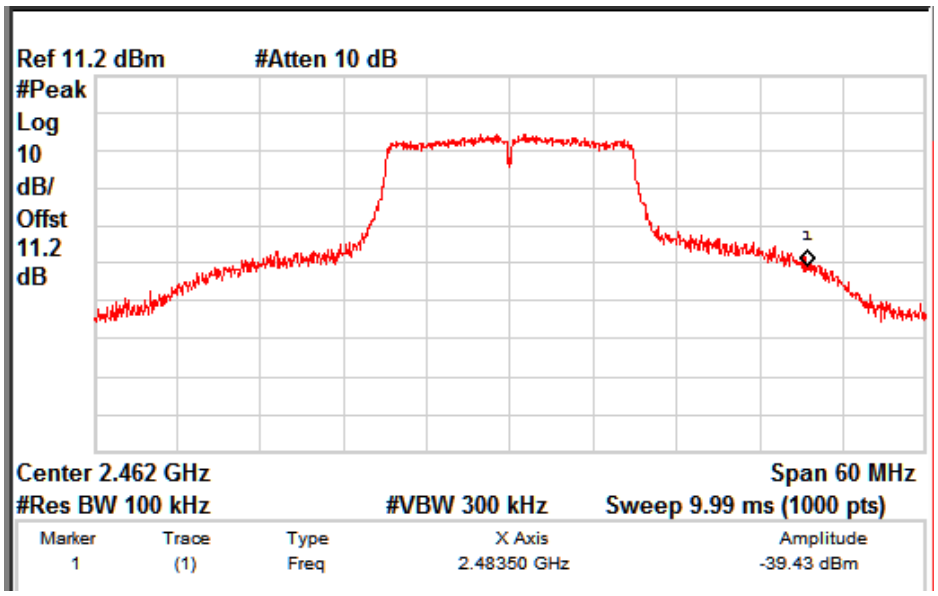
Reference Level Plot: 39 Mbps



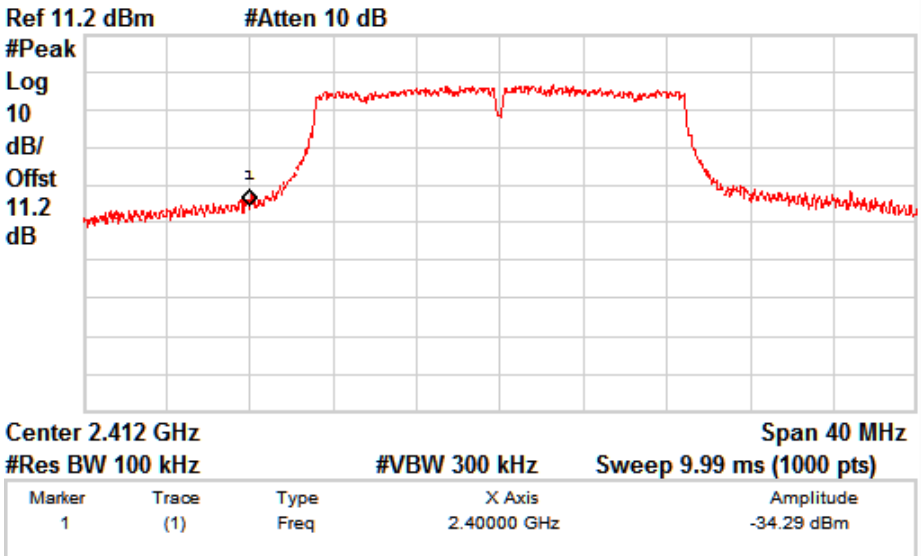
Reference Level Plot: 65 Mbps



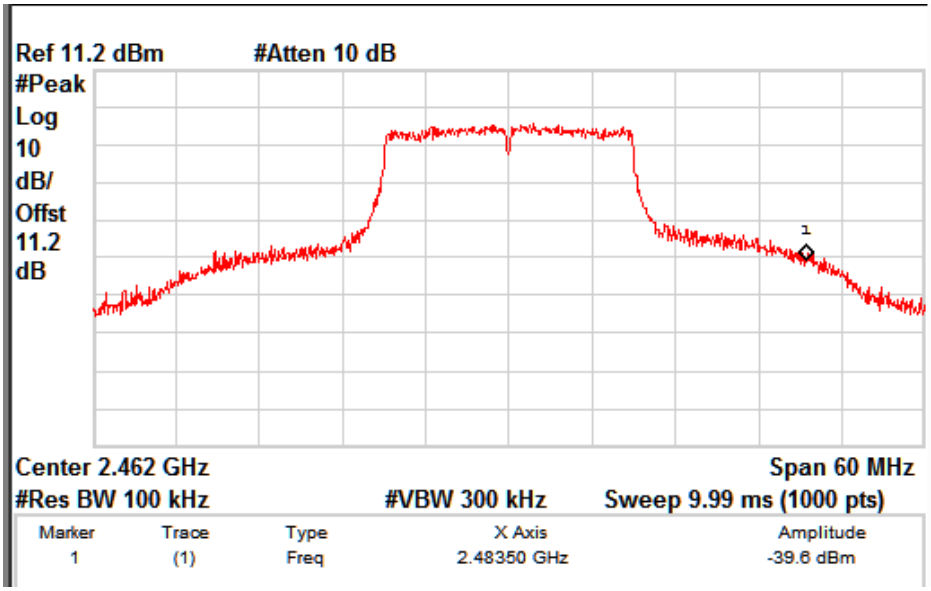
Data Rate: 6.5 Mbps **Channel frequency: 2412 MHz**



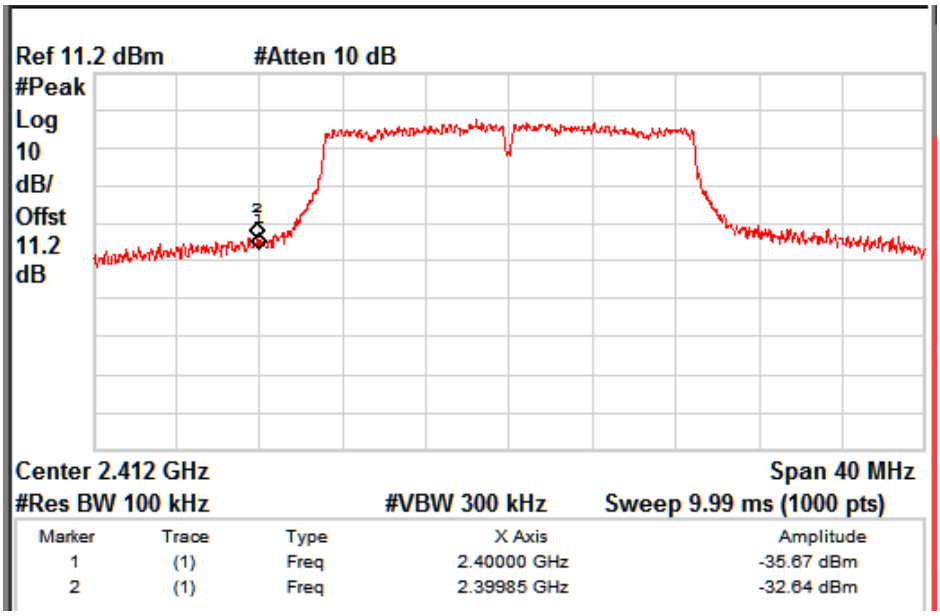
Data Rate: 6.5 Mbps **Channel frequency: 2462 MHz**



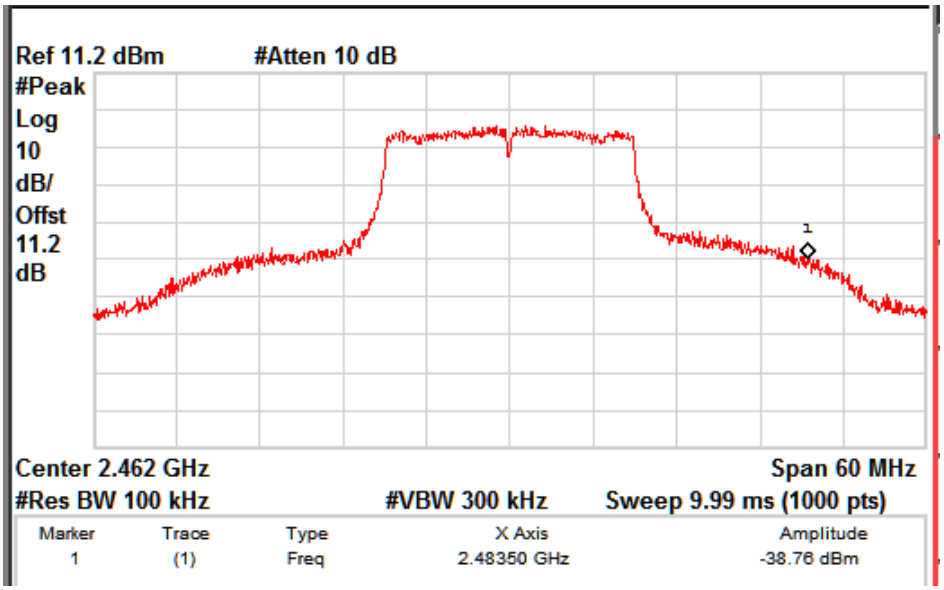
Data Rate: 39 Mbps **Channel frequency: 2412 MHz**



Data Rate: 39 Mbps **Channel frequency: 2462 MHz**



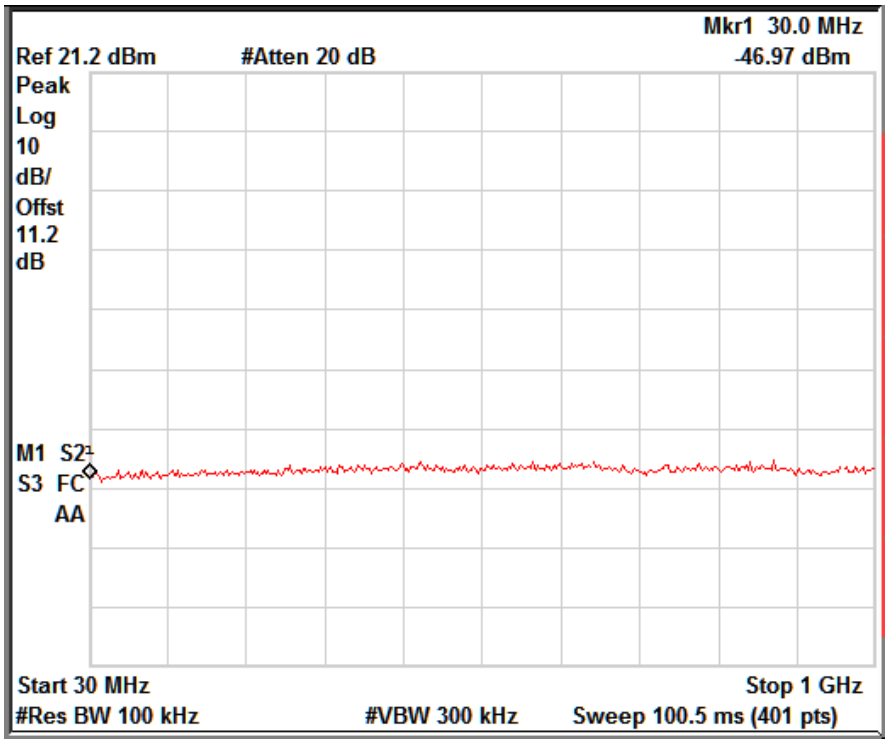
Data Rate: 65 Mbps **Channel frequency: 2412 MHz**

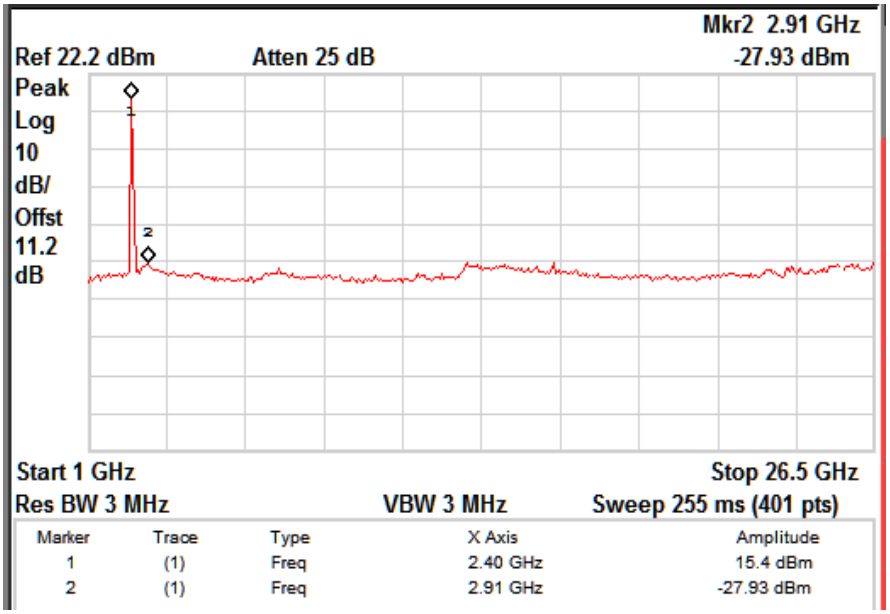


Data Rate: 65 Mbps **Channel frequency: 2462 MHz**

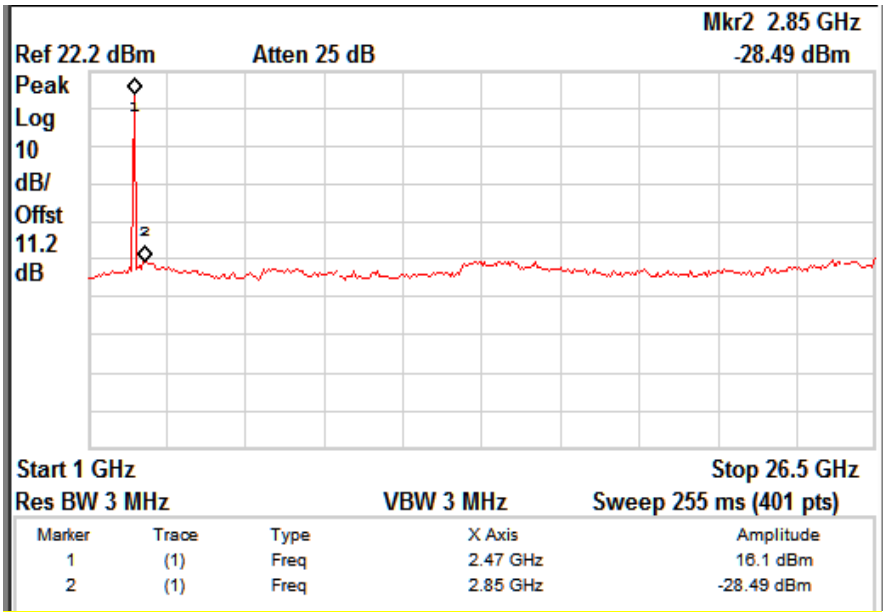
Conducted Spurious Emission

WiFi

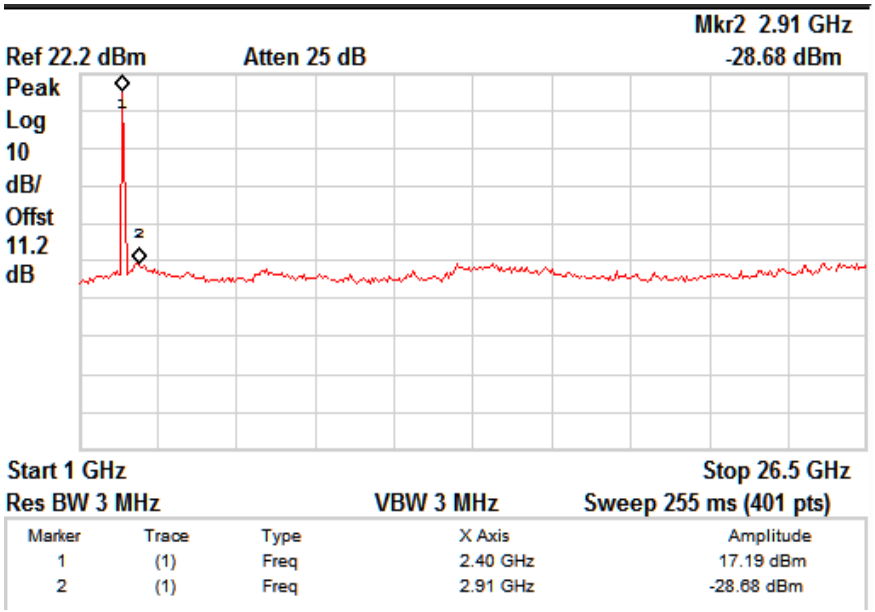




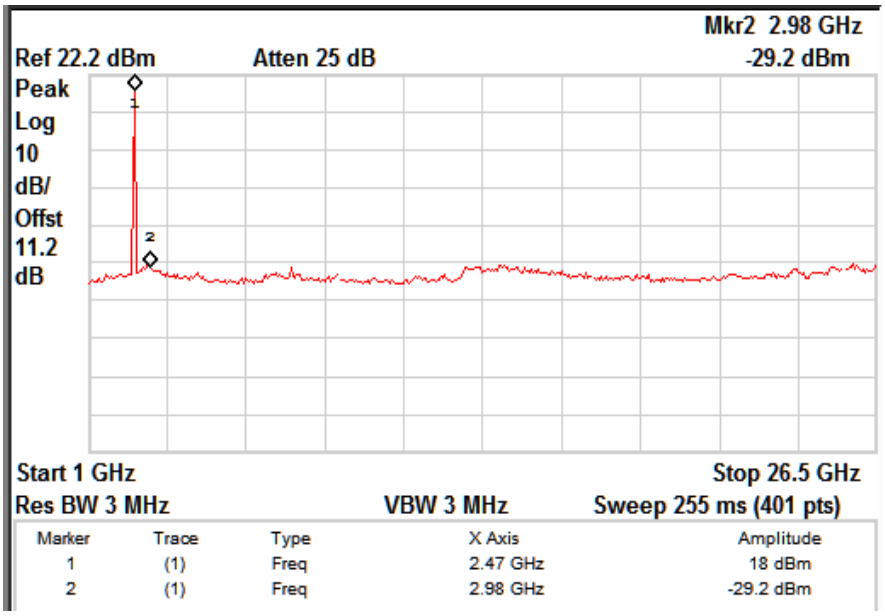
Data Rate: 1Mbps **Channel frequency: 2412 MHz**



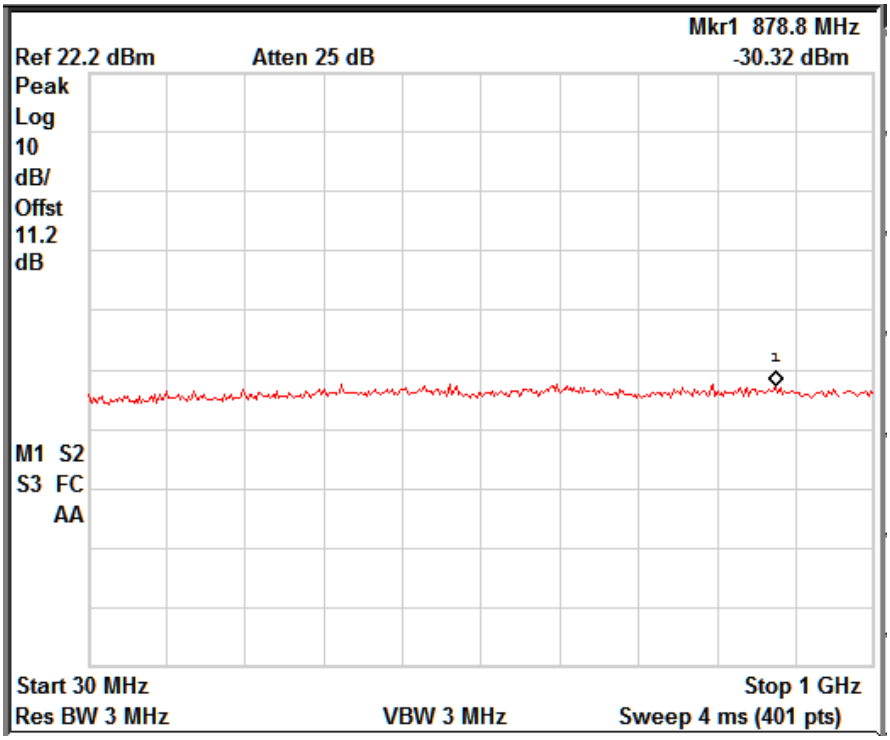
Data Rate: 1Mbps **Channel frequency: 2462 MHz**

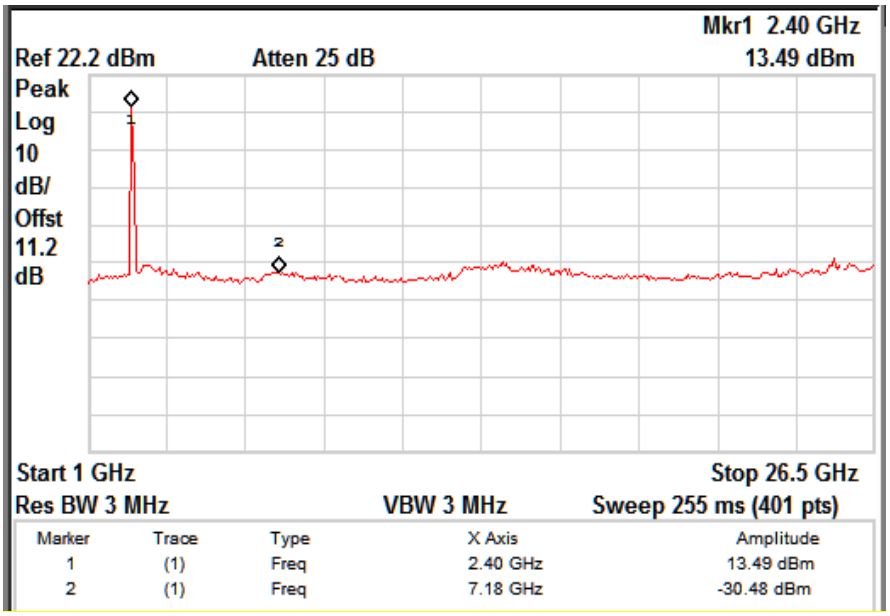


Data Rate: 11Mbps **Channel frequency: 2412 MHz**

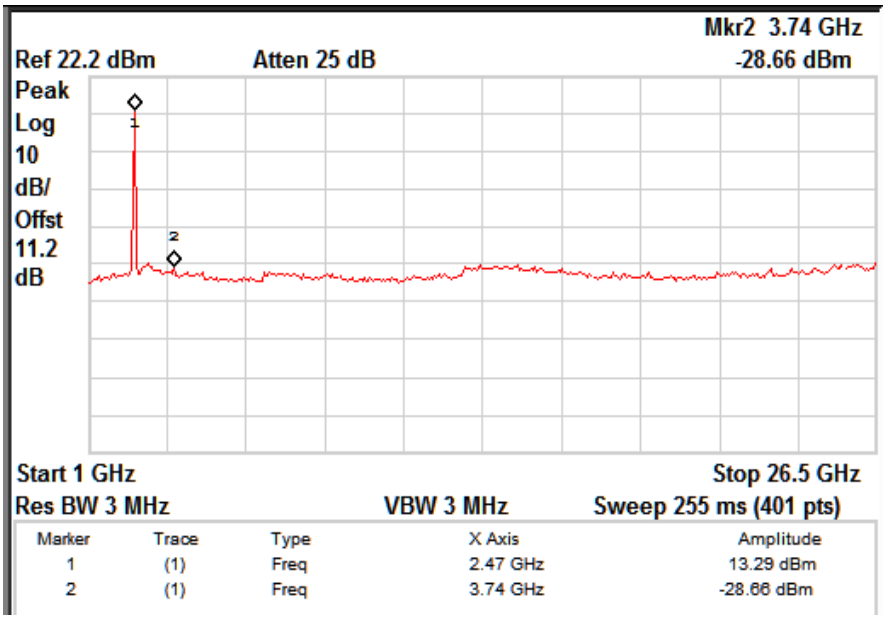


Data Rate: 11Mbps **Channel frequency: 2462 MHz**

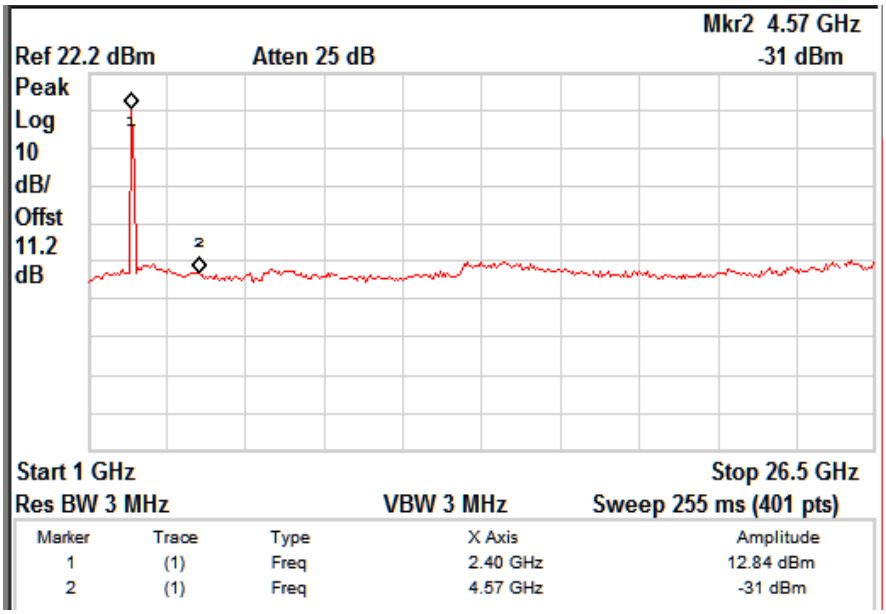




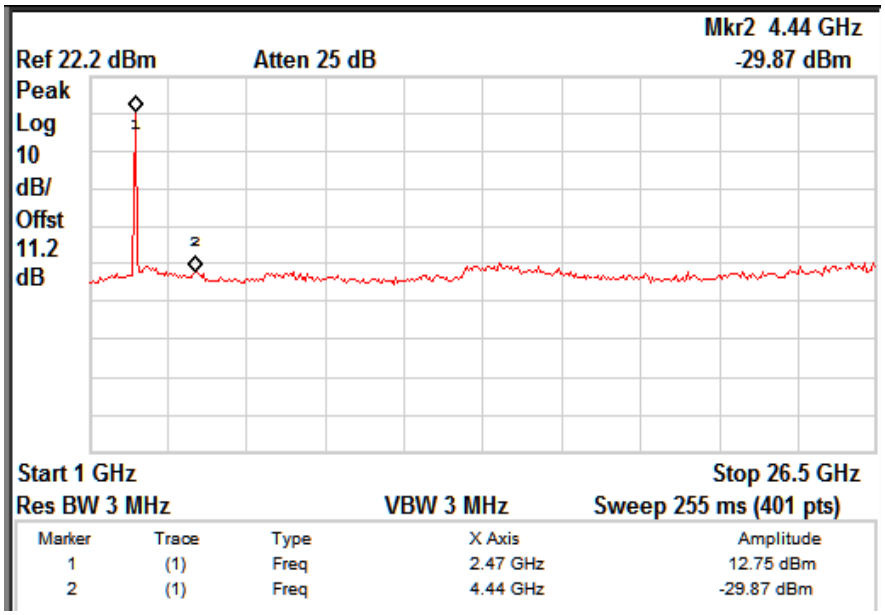
Data Rate: 6Mbps **Channel frequency: 2412 MHz**



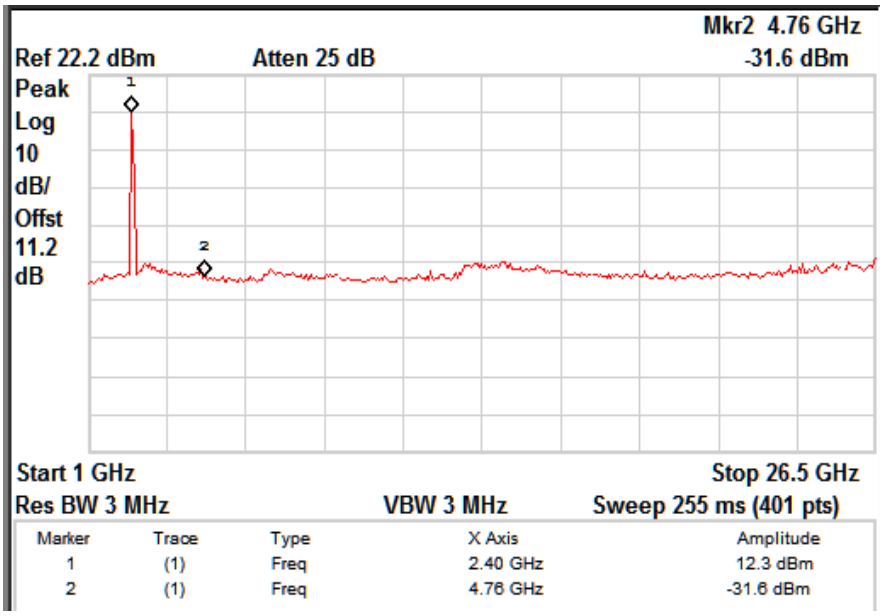
Data Rate: 6Mbps **Channel frequency: 2462 MHz**



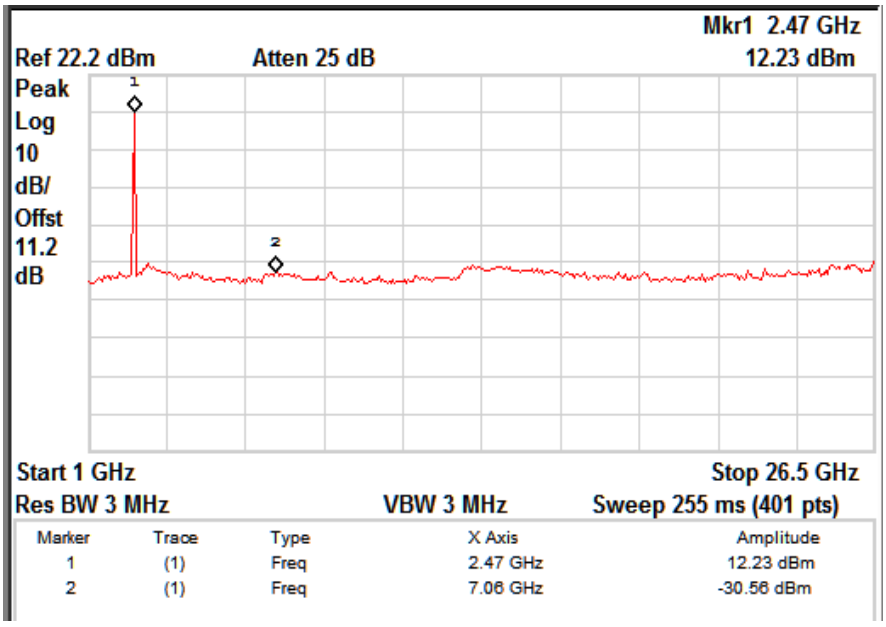
Data Rate: 24Mbps **Channel frequency: 2412 MHz**



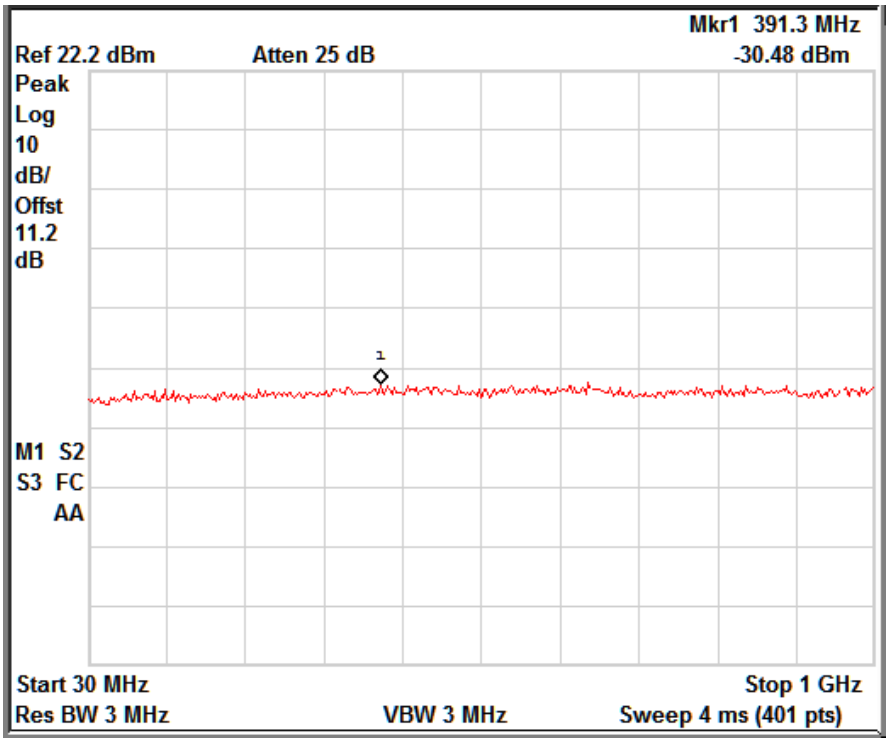
Data Rate: 24Mbps **Channel frequency: 2462 MHz**

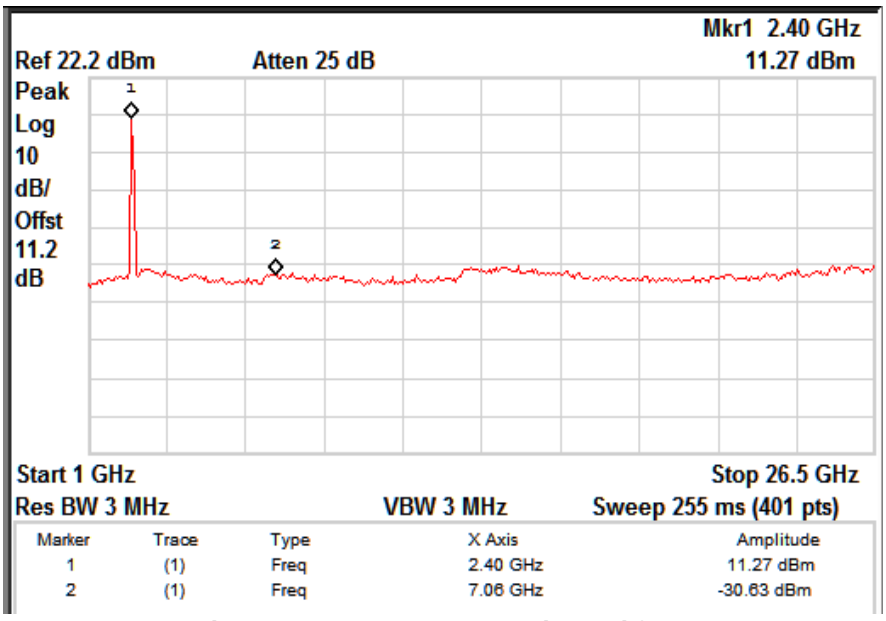


Data Rate: 54Mbps **Channel frequency: 2412 MHz**

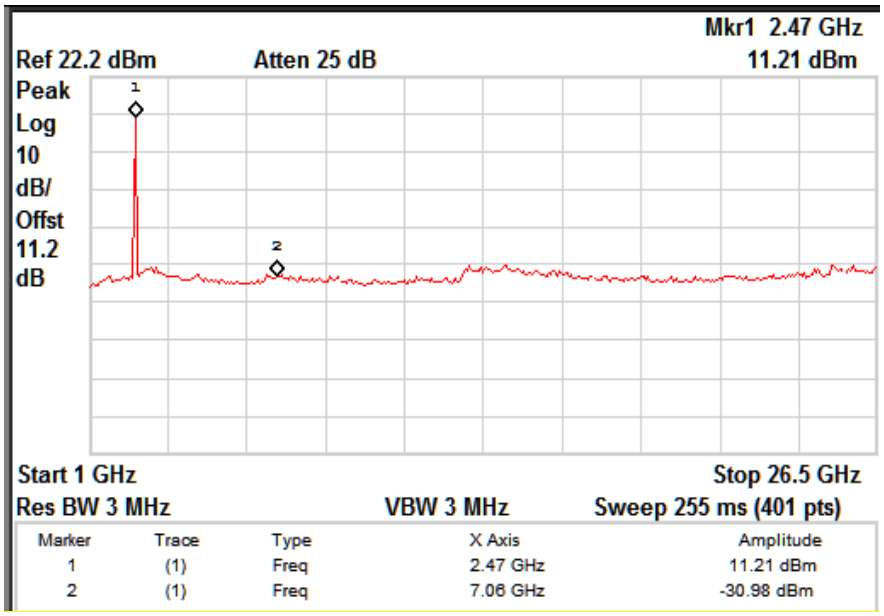


Data Rate: 54Mbps **Channel frequency: 2462 MHz**

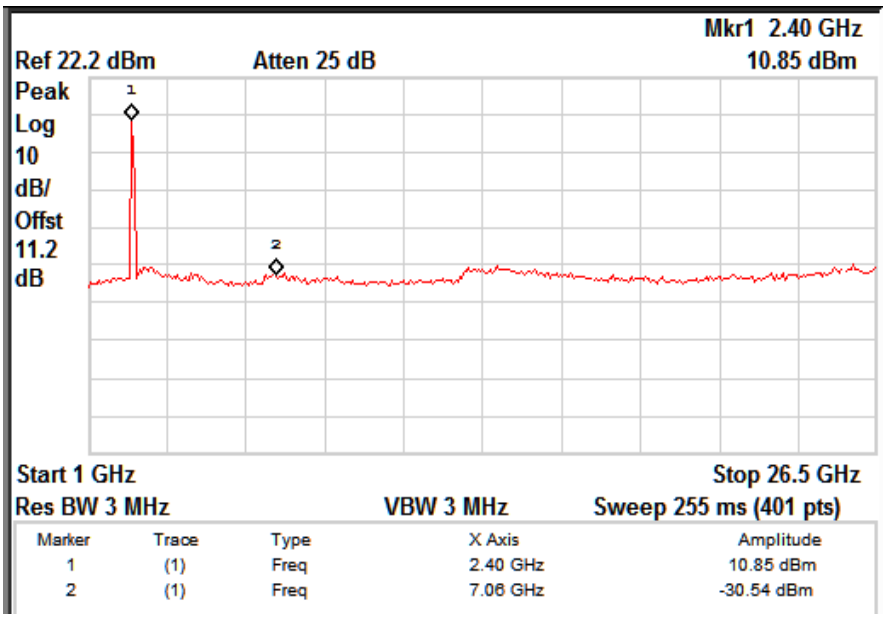




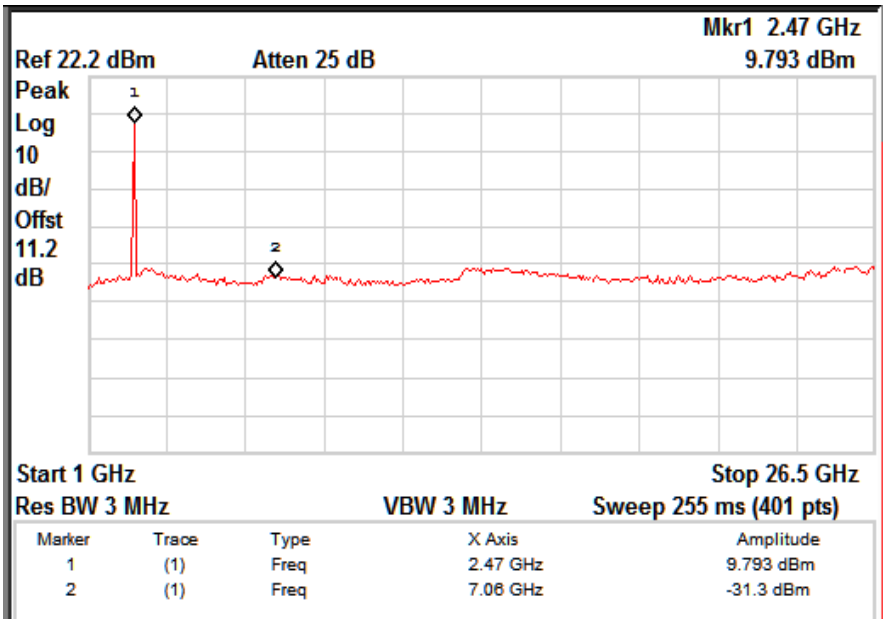
Data Rate: 6.5 Mbps **Channel frequency: 2412 MHz**



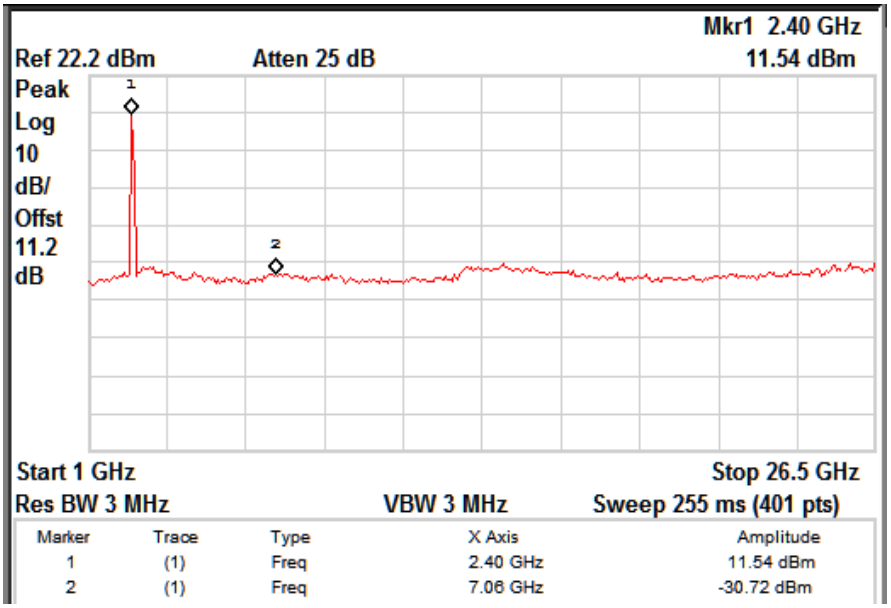
Data Rate: 6.5 Mbps **Channel frequency: 2462 MHz**



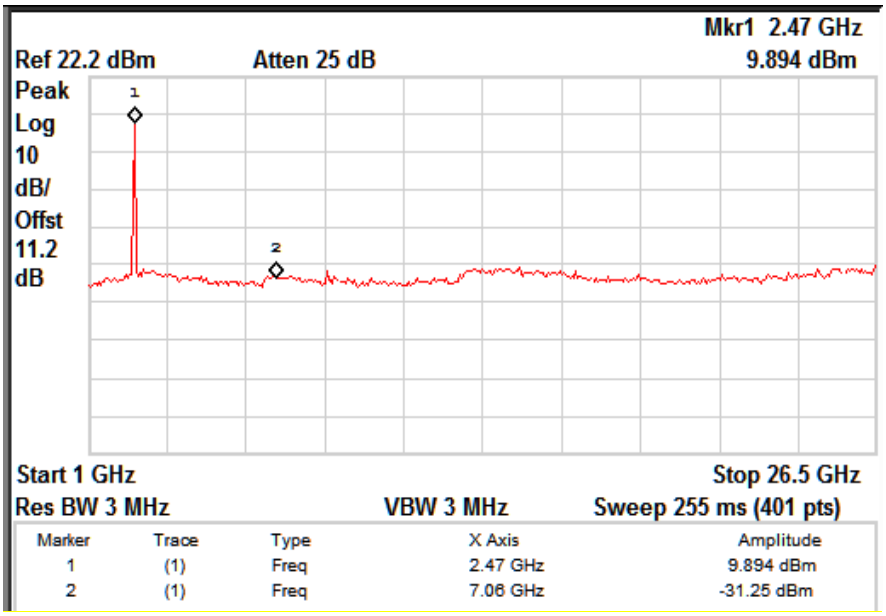
Data Rate: 39 Mbps **Channel frequency: 2412 MHz**



Data Rate: 39 Mbps **Channel frequency: 2462 MHz**



Data Rate: 65 Mbps **Channel frequency: 2412 MHz**



Data Rate: 65 Mbps **Channel frequency: 2462 MHz**

Spurious Radiated Emissions and

Restricted Bands of Operation **Section 15.209 and 15.205**

Result **Pass**

Test Specification	FCC Part 15 Section 15.209 &15.205
Test Method	ANSI C63.10-2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3m
Detection	QP for frequency below 1GHz, Average for frequency above 1GHz
Requirement	As per the limits mentioned in the bellow table

Limit for Radiated Emission of Section 15.209:

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/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 49.5dBµV/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.

Test results:

For frequency Range 9kHz - 1 GHz

No emissions found in this frequency range.

For frequency above 1GHz

Test results for worst case data rate are listed below.

802.11 b mode

mode	Data rates	Channel	Polarization	Frequency	measured value dBuv/m	limit dBuv/m	margin dB
b	1	Low	V	2390(Pk)	45.94	74	-28.06
				2390(Av)	39.52	54	-14.48
				2412(Pk)	90.49	*	-
				2412(Av)	87.7	*	-
				4824(Pk)	52.76	74	-21.24
				4824(Av)	45.9	54	-8.1
			H	2390(Pk)	56.37	74	-17.63
				2390(Av)	51.2	54	-2.8
				2412(Pk)	104.49	*	-
				2412(Av)	101.57	*	-
				4824(Pk)	53.8	74	-20.2
				4824(Av)	47.86	54	-6.14
		MID	V	4874(Pk)	51.26	74	-22.74
				4874(Av)	40.49	54	-13.51
			H	4874(Pk)	51.02	74	-22.98
				4874(Av)	40.74	54	-13.26
		High	V	2483.5(Pk)	49.96	74	-24.04
				2483.5(Av)	33.11	54	-20.89
				2462(Pk)	94.47	*	-
				2462(Av)	86.43	*	-
				4924(Pk)	54.48	74	-19.52
				4924(Av)	47.46	54	-6.54
			H	2483.5(Pk)	57.73	74	-16.27
				2483.5(Av)	46.44	54	-7.56
				2462(Pk)	109.02	*	-
				2462(Av)	100.75	*	-
				4924(Pk)	54.99	74	-19.01
				4924(Av)	50.22	54	-3.78
	11	Low	V	2390(Pk)	44.64	74	-29.36
				2390(Av)	32.97	54	-21.03
				2412(Pk)	94.5	*	-

				2412(Av)	86.59	*	-
				4824(Pk)	52.22	74	-21.78
				4824(Av)	38.8	54	-15.2
			H	2390(Pk)	57.73	74	-16.27
				2390(Av)	46.61	54	-7.39
				2412(Pk)	109.02	*	-
				2412(Av)	100.88	*	-
				4824(Pk)	52.14	74	-21.86
				4824(Av)	39.03	54	-14.97
		MID	V	4874(Pk)	49.83	74	-24.17
				4874(Av)	37.86	54	-16.14
			H	4874(Pk)	49.84	74	-24.16
				4874(Av)	38	54	-16
		High	V	2483.5(Pk)	44.21	74	-29.79
				2483.5(Av)	34.2	54	-19.8
				2462(Pk)	95.82	*	-
				2462(Av)	87.85	*	-
				4924(Pk)	51.79	74	-22.21
				4924(Av)	39.68	54	-14.32
			H	2483.5(Pk)	56.19	74	-17.81
				2483.5(Av)	47.31	54	-6.69
				2462(Pk)	110.25	*	-
				2462(Av)	102.52	*	-
				4924(Pk)	53.77	74	-20.23
				4924(Av)	41.35	54	-12.65

802.11 g mode

mode	Data rates	Channel	Polarization	Frequency	Measured value dBuv/m	limit dBuv/m	margin dB
g	6	Low	V	2390(Pk)	50.63	74	-23.37
				2390(Av)	35.81	54	-18.19
				2412(Pk)	88.72	*	-
				2412(Av)	79.48	*	-
				4824(Pk)	50.73	74	-23.27
				4824(Av)	37.64	54	-16.36
				2390(Pk)	45.76	74	-28.24
				2390(Av)	30.98	54	-23.02
				2417(Pk)	95.32	*	-
				2417(Av)	86.23	*	-
				4834(Pk)	49.66	74	-24.34
				4834(Av)	39.77	54	-14.23

			H	2390(Pk)	65.58	74	-8.42
				2390(Av)	49.7	54	-4.3
				2412(Pk)	102.91	*	-
				2412(Av)	93.53	*	-
				4824(Pk)	50.6	74	-23.4
				4824(Av)	37.85	54	-16.15
				2390(Pk)	61.22	74	-12.78
				2390(Av)	45.65	54	-8.35
				2417(Pk)	106.98	*	-
				2417(Av)	98.13	*	-
				4834(Pk)	52.23	74	-21.77
				4834(Av)	40.13	54	-13.87
		Mid	V	4874(Pk)	50.04	74	-23.96
				4874(Av)	38.49	54	-15.51
			H	4874(Pk)	50.58	74	-23.42
				4874(Av)	38.58	54	-15.42
		High	V	2483.5(Pk)	57.56	74	-16.44
				2483.5(Av)	38.47	54	-15.53
				2462(Pk)	89.02	*	-
				2462(Av)	79.33	*	-
				4924(Pk)	51.11	74	-22.89
				4924(Av)	38.06	54	-15.94
				2483.5(Pk)	52.22	74	-21.78
				2483.5(Av)	33.88	54	-20.12
				2457(Pk)	95.52	*	-
				2457(Av)	88.95	*	-
				4914(Pk)	50.10	74	-23.9
				4914(Av)	37.76	54	-16.24
			H	2483.5(Pk)	70.92	74	-3.08
				2483.5(Av)	53.32	54	-0.68
				2462(Pk)	103.74	*	-
				2462(Av)	94.04	*	-
				4924(Pk)	50.41	74	-23.59
				4924(Av)	38.4	54	-15.6
				2483.5(Pk)	66.46	74	-7.54
				2483.5(Av)	49.34	54	-4.66
				2457(Pk)	107.02	*	-
				2457(Av)	98.23	*	-
				4914(Pk)	52.11	74	-21.89
				4914(Av)	40.06	54	-13.94
	24	Low	V	2390(Pk)	48.66	74	-25.34
				2390(Av)	35.65	54	-18.35
				2412(Pk)	89.91	*	-

				2412(Av)	79.37	*	-
				4824(Pk)	49.48	74	-24.52
				4824(Av)	37.71	54	-16.29
			H	2390(Pk)	66.91	74	-7.09
				2390(Av)	50.26	54	-3.74
				2412(Pk)	104.04	*	-
				2412(Av)	93.54	*	-
				4824(Pk)	50.81	74	-23.19
				4824(Av)	37.87	54	-16.13
		Mid	V	4874(Pk)	50.41	74	-23.59
				4874(Av)	38.06	54	-15.94
			H	4874(Pk)	50.27	74	-23.73
				4874(Av)	38.32	54	-15.68
		High	V	2483.5(Pk)	50.66	74	-23.34
				2483.5(Av)	31.93	54	-22.07
				2462(Pk)	82.01	*	-
				2462(Av)	71.34	*	-
				4924(Pk)	50.41	74	-23.59
				4924(Av)	38.06	54	-15.94
			H	2483.5(Pk)	69.49	74	-4.51
				2483.5(Av)	52.4	54	-1.6
				2462(Pk)	104.42	*	-
				2462(Av)	94.13	*	-
				4924(Pk)	50.27	74	-23.73
				4924(Av)	38.38	54	-15.62
	54	Low	V	2390(Pk)	54.64	74	-19.36
				2390(Av)	36.76	54	-17.24
				2412(Pk)	89.55	*	-
				2412(Av)	79.55	*	-
				4824(Pk)	50.21	74	-23.79
				4824(Av)	37.61	54	-16.39
			H	2390(Pk)	67.43	74	-6.57
				2390(Av)	49.88	54	-4.12
				2412(Pk)	103.86	*	-
				2412(Av)	93.77	*	-
				4824(Pk)	49.98	74	-24.02
				4824(Av)	49.98	54	-4.02
		High	V	2483.5(Pk)	52.25	74	-21.75
				2483.5(Av)	36.87	54	-17.13
				2462(Pk)	89.39	*	-
				2462(Av)	79.66	*	-
				4924(Pk)	50.13	74	-23.87
				4924(Av)	38.06	54	-15.94

			H	2483.5(Pk)	68.42	74	-5.58
				2483.5(Av)	52.72	54	-1.28
				2462(Pk)	103.72	*	-
				2462(Av)	94.21	*	-
				4924(Pk)	50.72	74	-23.28
				4924(Av)	50.8	54	-3.2

802.11 n mode

mode	Data rates	channel	Polarization	Frequency	measured value dBuv/m	limit dBuv/m	margin dB
n	MCS0	Low	V	2390(Pk)	58.74	74	-15.26
				2390(Av)	37.87	54	-16.13
				2412(Pk)	87.87	*	-
				2412(Av)	78.49	*	-
				4824(Pk)	49.85	74	-24.15
				4824(Av)	37.74	54	-16.26
			H	2390(Pk)	70.34	74	-3.66
				2390(Av)	50.87	54	-3.13
				2412(Pk)	101.2	*	-
				2412(Av)	92.6	*	-
				4824(Pk)	50.38	74	-23.62
				4824(Av)	37.8	54	-16.2
		Mid	V	4874(Pk)	50.32	74	-23.68
				4874(Av)	38.15	54	-15.85
			H	4874(Pk)	50.3	74	-23.7
				4874(Av)	38.54	54	-15.46
		High	V	2483.5(Pk)	59.3	74	-14.7
				2483.5(Av)	39.35	54	-14.65
				2462(Pk)	89.27	*	-
				2462(Av)	79.76	*	-
				4924(Pk)	50.68	74	-23.32
				4924(Av)	38.13	54	-15.87
			H	2483.5(Pk)	72.21	74	-1.79
				2483.5(Av)	53.62	54	-0.38
				2462(Pk)	101.85	*	-
				2462(Av)	92.77	*	-
				4924(Pk)	50.83	74	-23.17
				4924(Av)	38.31	54	-15.69
	MCS4	Low	V	2390(Pk)	55.95	74	-18.05
				2390(Av)	40.55	54	-13.45

				2412(Pk)	92.3	*	-
				2412(Av)	82.43	*	-
				4824(Pk)	50.36	74	-23.64
				4824(Av)	37.61	54	-16.39
			H	2390(Pk)	66.77	74	-7.23
				2390(Av)	50.98	54	-3.02
				2412(Pk)	102.58	*	-
				2412(Av)	92.16	*	-
				4824(Pk)	50.74	74	-23.26
				4824(Av)	37.79	54	-16.21
		Mid	V	4874(Pk)	38.41	74	-35.59
				4874(Av)	38.46	54	-15.54
			H	4874(Pk)	50.78	74	-23.22
				4874(Av)	38.51	54	-15.49
		High	V	2483.5(Pk)	55.51	74	-18.49
				2483.5(Av)	41.26	54	-12.74
				2462(Pk)	89.25	*	-
				2462(Av)	79.19	*	-
				4924(Pk)	50.17	74	-23.83
				4924(Av)	38.04	54	-15.96
			H	2483.5(Pk)	66.79	74	-7.21
				2483.5(Av)	51.88	54	-2.12
				2462(Pk)	103.12	*	-
				2462(Av)	92.18	*	-
				4924(Pk)	49.94	74	-24.06
				4924(Av)	38.11	54	-15.89
	MCS7	Low	V	2390(Pk)	56.03	74	-17.97
				2390(Av)	39.21	54	-14.79
				2412(Pk)	91.27	*	-
				2412(Av)	79.65	*	-
				4824(Pk)	50.46	74	-23.54
				4824(Av)	37.68	54	-16.32
			H	2390(Pk)	65.97	74	-8.03
				2390(Av)	50.67	54	-3.33
				2412(Pk)	103.2	*	-
				2412(Av)	91.73	*	-
				4824(Pk)	50.62	74	-23.38
				4824(Av)	37.74	54	-16.26
		Mid	V	4874(Pk)	51.09	74	-22.91
				4874(Av)	38.38	54	-15.62
			H	4874(Pk)	50.64	74	-23.36
				4874(Av)	38.48	54	-15.52
		High	V	2483.5(Pk)	54.49	74	-19.51

				2483.5(Av)	41.34	54	-12.66
				2462(Pk)	90.8	*	-
				2462(Av)	80.13	*	-
				4924(Pk)	50.46	74	-23.54
				4924(Av)	38.04	54	-15.96
			H	2483.5(Pk)	67.79	74	-6.21
				2483.5(Av)	51.93	54	-2.07
				2462(Pk)	102.44	*	-
				2462(Av)	92.61	*	-
				4924(Pk)	50.62	74	-23.38
				4924(Av)	38.17	54	-15.83

Conducted Emission Test on A.C. Power Line **Section 15.207**

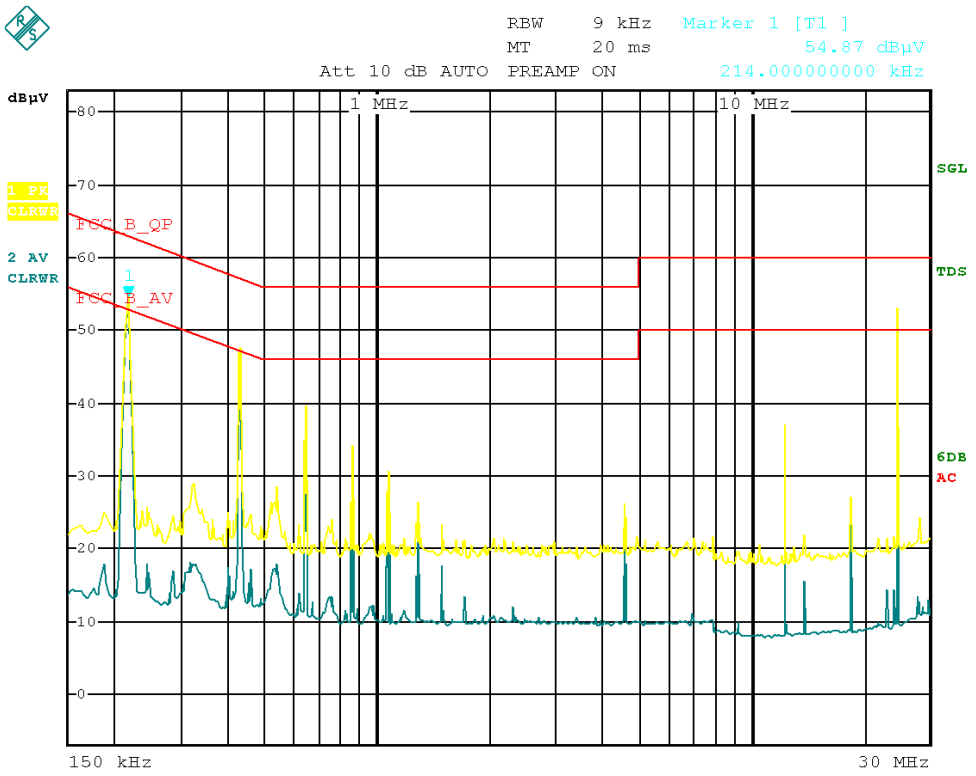
Result **Pass**

Test Specification	:	FCC Part 15 Section 15.207
Test Method	:	ANSI C63.10-2013
Testing Location	:	Screened room
Measurement Bandwidth	:	9kHz
Frequency Range	:	150kHz – 30MHz
Supply Voltage	:	120VAC,60Hz

Limit of section 15.207

Frequency of emission (MHz)	QP Limit (dBµV)	AV Limit (dBµV/m)
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

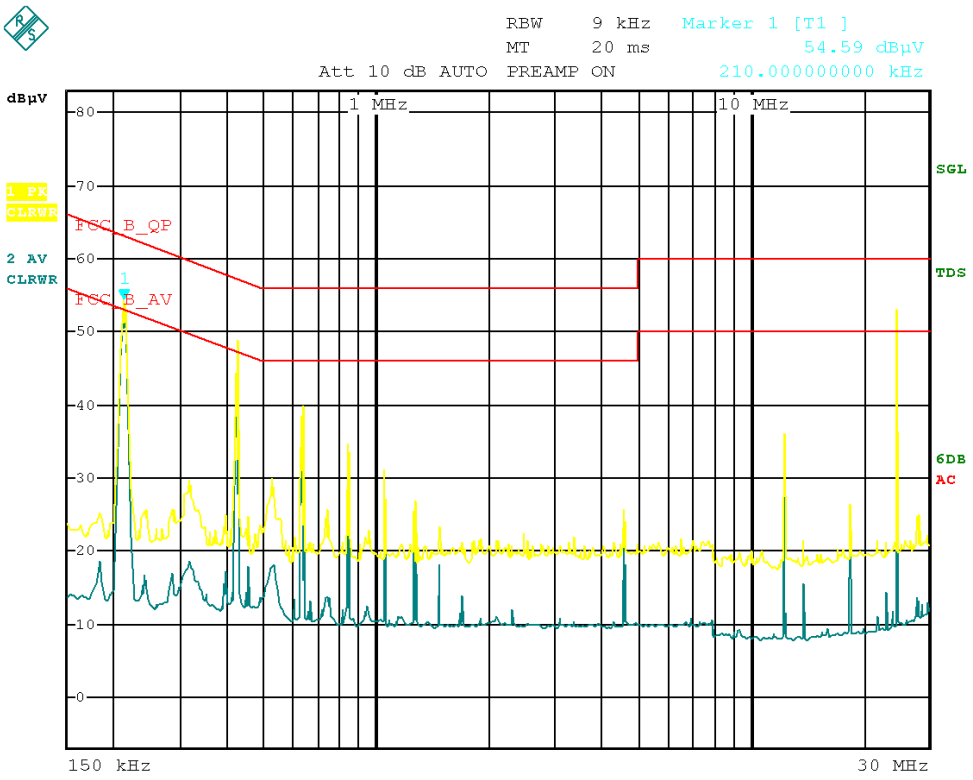
* Decreases with the logarithm of the frequency



Line Graph

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC_B_QP		
Trace2:	FCC_B_AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	24.578 MHz	52.42 L1	-7.57
1 Quasi Peak	214 kHz	52.49 L1	-10.55
2 Average	12.29 MHz	36.01 L1	-13.98
2 Average	430 kHz	33.05 L1	-14.19
1 Quasi Peak	12.29 MHz	35.91 L1	-24.08
1 Quasi Peak	430 kHz	32.27 L1	-24.98
2 Average	642 kHz	20.54 L1	-25.45
2 Average	858 kHz	10.08 L1	-35.91
1 Quasi Peak	642 kHz	19.72 L1	-36.27
1 Quasi Peak	858 kHz	15.09 L1	-40.90

Line: Table



Neutral: Graph

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC_B_QP		
Trace2:	FCC_B_AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	422 kHz	44.38 N	-3.02
1 Quasi Peak	24.578 MHz	52.45 N	-7.54
1 Quasi Peak	210 kHz	54.43 N	-8.76
1 Quasi Peak	422 kHz	43.99 N	-13.41
2 Average	12.29 MHz	34.97 N	-15.02
2 Average	634 kHz	25.64 N	-20.35
2 Average	842 kHz	22.81 N	-23.18
1 Quasi Peak	12.29 MHz	34.90 N	-25.09
1 Quasi Peak	634 kHz	24.70 N	-31.29
1 Quasi Peak	842 kHz	22.86 N	-33.13

Neutral: Table

Power level Settings used during testing:

		Channels									
		1		2		7		10		11	
Mode	Data Rate	Tx Power	Attenuation to antenna Gain	Tx Power	Attenuation to antenna Gain	Tx power	Attenuation to antenna Gain	Tx Power	Attenuation to antenna Gain	Tx power	Attenuation to antenna Gain
802.11 b	1Mbps	16	3	16	3	16	3	16	3	16	3
	11Mbps	16	3	16	3	16	3	16	3	16	3
802.11 g	6Mbps	11	3	18	3	18	3	18	3	10	3
	24Mbps	11	3	18	3	18	3	18	3	10	3
	54Mbps	11	3	18	3	18	3	18	3	10	3
802.11 n_20MHz	MCS0	10	3	18	4	18	4	18	4	9	3
	MCS4	10	3	18	4	18	4	18	4	9	3
	MCS7	10	3	18	4	18	4	18	4	9	3