TÜVRheinland®
Precisely Right.

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**19660226 001**		**Seite 1 von 197** *Page 1 of 197*
Auftraggeber: *Client:*	**Ulterius Technologies, LLC** **1625 North Waterfront** **Parkway Suite 250** **Wichita, KS 67206-6641** **United States**		
Gegenstand der Prüfung: *Test item:*	**Flat Data Network (FDN)**		
Bezeichnung: *Identification:*	**FDN40-4, FDN40-6,** **FDN40-6P**	**Serien-Nr.:** *Serial No.*	**Engineering Sample**
Wareneingangs-Nr.: *Receipt No.:*	**1803138977**	**Eingangsdatum:** *Date of receipt:*	**02.05.2016**
Prüfort: *Testing location:*	**Refer Page 4 of 197 for test facilities**		
Prüfgrundlage: *Test specification:*	**FCC Part 15: Subpart C** **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:*		
23.05.2016	Vinay N Sr.Engineer	Vinay. N	30.05.2016	Raghavendra Kulkarni Sr.Manager	RKulkarni
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges /*Other Aspects:* **FCC ID: 2ADJ8-FDN40**

Abkürzungen:	***P(ass)*** = ***entspricht Prüfgrundlage***		***Abbreviations:***	***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.

® TÜV, TUEV and TUV are registered trademarks. Any use or application requires prior approval.

Test Result Summary

Clause	Test Item	Result
FCC 15.247(b) (3)	Maximum conducted (average) output power	Pass
FCC 15.247(a) (2)	DTS Bandwidth	Pass
FCC 15.247(e)	Maximum Power Spectral Density	Pass
FCC 15.247(d)	Emissions in non-restricted frequency bands	Pass
FCC 15.209 / FCC 15.205	Spurious Radiated Emissions and Restricted Bands of Operation	Pass
FCC 15.207	Conducted Emissions on a.c Power Lines	Pass

Note: Conducted measurements are done according to the procedure given in KDB No558074 D01 DTS Meas Guidance v03r05 & 662911 D01 Multiple Transmitter Output v02r01.

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 8

Radiated Emission Test 8

Test Results 9

Maximum Average Conducted Output Power — Section 15.247(b) (3) 9
Maximum Power Spectral Density — Section 15.247(e) 50
DTS Bandwidth — Section 15.247(a) (2) 89
Emissions in non-restricted frequency bands — Section 15.247(d) 125
Radiated Spurious Emissions and 179
Restricted Bands of Operation — Section 15.209 and 15.205 179
Conducted Emission Test on a.c. Power Line — Section 15.207 195

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

List of Test and Measurement Instruments

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	23.11.2016	Yearly	Spurious Radiated Emissions
Broadband Antenna	Frankonia	ALX-4000	ALX-4000-806	20.01.2017	Yearly	
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	22.12.2016	Yearly	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	14.03.2017	Yearly	
Emission Horn Antenna	ETS Lindgren	116706	00107323	02.11.2016	Yearly	
Anechoic Chamber	Frankonia	-	-	-	-	
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	23.04.2017	Yearly	Antenna - Port Conducted Tests
Signal Analyzer	Rohde & Schwarz	FSV7	101644	07.12.1016	Yearly	

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

Multi Service Business Gateway that provides routing, switching, security services for SMB, ROBO, etc. type Access CPE environments

Ratings and System Details

Frequency Range	2400MHz – 2480MHz	
No. of channel	Refer page 5 of 197	
Channel Spacing	5MHz	
Transmitted Power	802.11b	**19.49 dBm / 89.12mW**
	802.11g	**17.49 dBm / 56.14mW**
	802.11nHT20	**23.02 dBm / 200.58mW**
	802.11nHT40	**22.23 dBm / 167.22mW**
Data Rate	802.11b: 1,2, 5.5,11 Mbps 802.11g: 6, 9, 12, 18, 24, 36,48, 54 Mbps 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11nHT20: 6.5, 13, 19.5, 26, 39, 52, 58.5,65Mbps 802.11nHT40: 13.5, 27, 40.5, 54, 81, 108, 121.5, 135 Mbps	
Modulation	802.11b: DSSS with CCK 802.11g: OFDM with BPSK, QPSK, 16-QAM, 64-QAM 802.11n: OFDM with BPSK, QPSK, 16-QAM, 64-QAM	
Number of antenna	3	
Antenna Gain	3dBi @2.4GHz 5dBi @5GHz	
Supply Voltage	12V from Power Adaptor	
Dimensions	250mm (L) x 250mm (W) x50mm (H)	
Environmental Condition	Operating temperature is 0°C to 50°C Storage temperature is -10° to 70°C	

Test Conditions:

Supply Voltage: 12VDC form Power Adaptor supplied along with this product

Environmental conditions:

Temperature: +25 º C RH: 62%

Test Set-up and Operation Mode

Principle of Configuration Selection

Transmission was enabled with continuous transmission on low, mid and high channel.

Test Operation and Test Software

Test software was used to enable the continuous transmission, 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.

Antenna Port measurements are performed on the following paths

Path A – J203 Connector –ANT1
Path B – J202 Connector – ANT2
Path C – J201 Connector – ANT3

List of Antenna: Table 1

Manufacturer	Antenna Type	Antenna Part No.	Operating Frequency (GHz)
Premiertek	Monopole Antenna	ANT-5DBI-DUAL	2.4 & 5

List of Centre Frequencies: Table 2

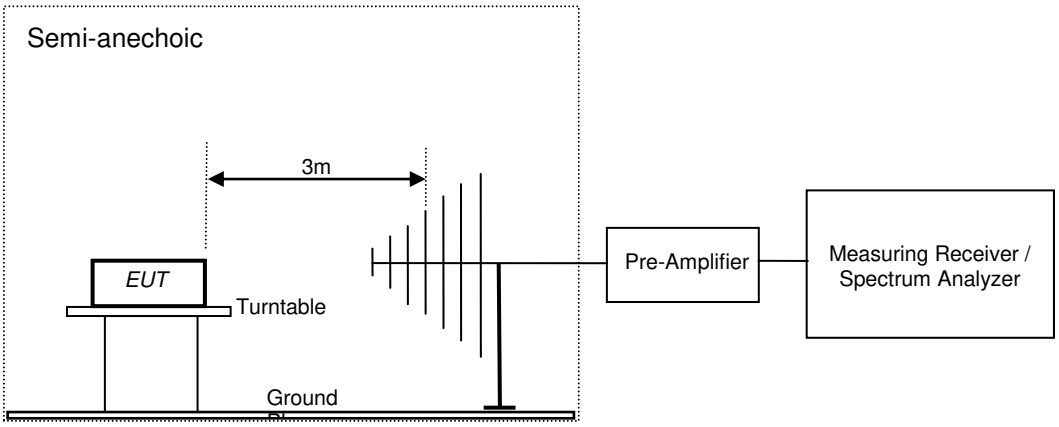
Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5 (20MHz Bandwidth)_ Wi-Fi	1	2412
	2	2417
	3	2422
	4	2427
	5	2432
	6	2437
	7	2437
	8	2447
	9	2452
	10	2457
	11	2462
2400 – 2483.5 (40MHz Bandwidth)_Wi-Fi	3	2422
	4	2427
	5	2432
	6	2437
	7	2437
	8	2447
	9	2452
	10	2457

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 for below 1GHz & 1.5m height for above 1GHz measurement, 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.

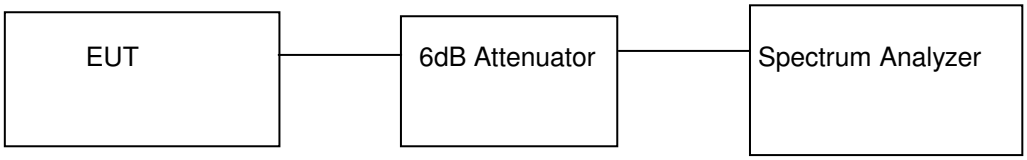


Test Results

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

Test Specification	FCC Part 15 Subpart C
Measurement Bandwidth (RBW)	1MHz
Detector Function	Average
Requirement	≤1 watt (30dBm).

Test Method:



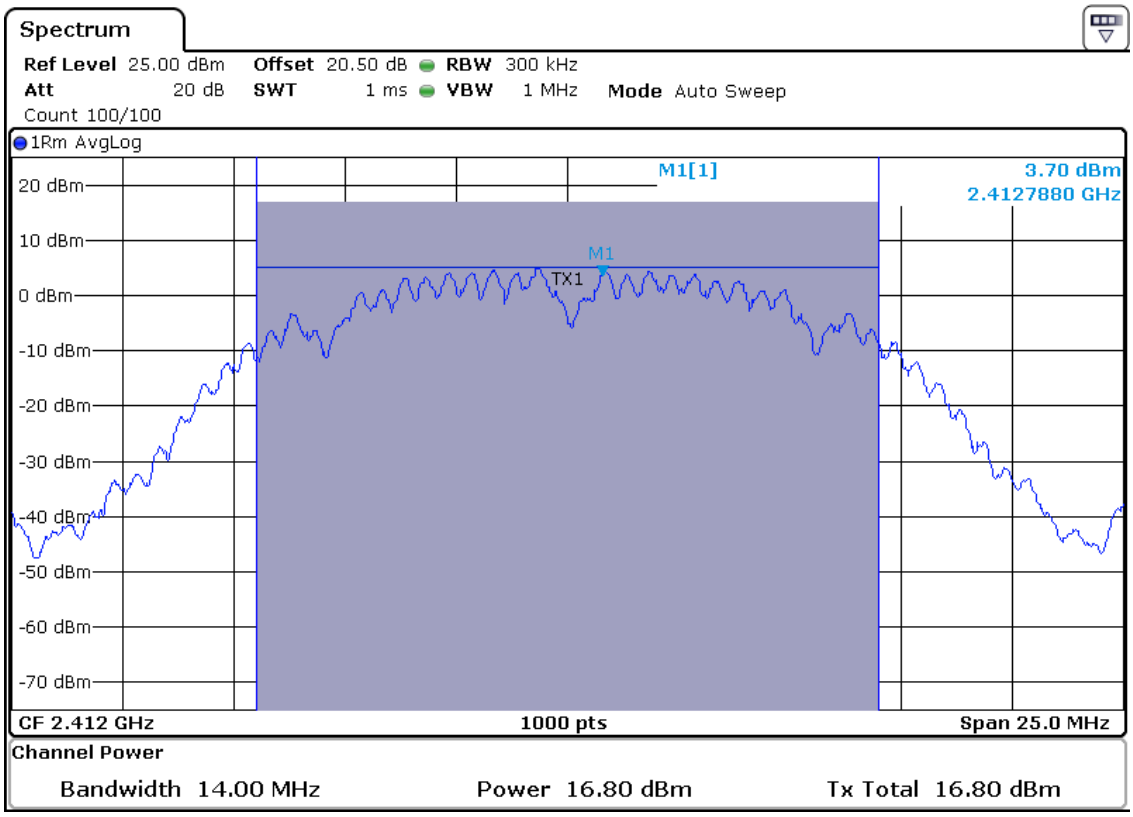
Note: For measurement of Maximum Average conducted output power method AVGSA-1 was used

Test Result: Wi-Fi

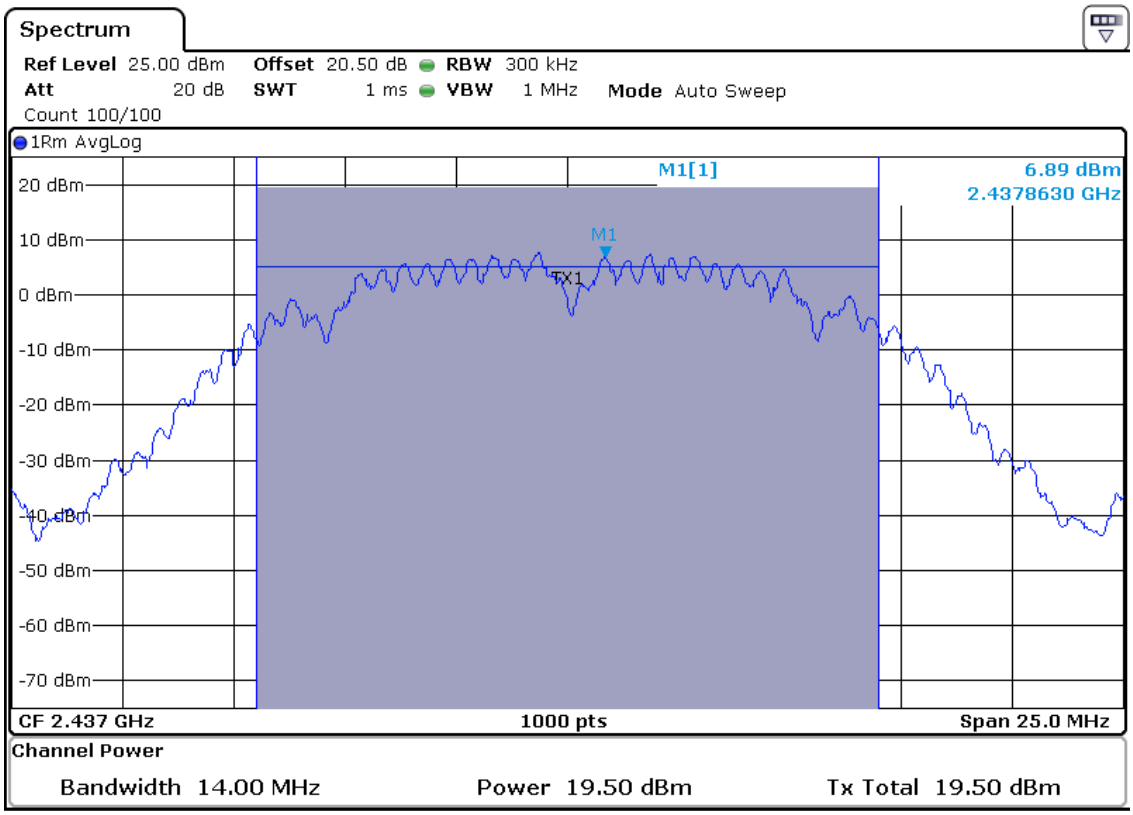
Test Results **for Path A**

Attenuator (20dB) + cable loss (0.5dB) = 20.5dB Considered in the test result

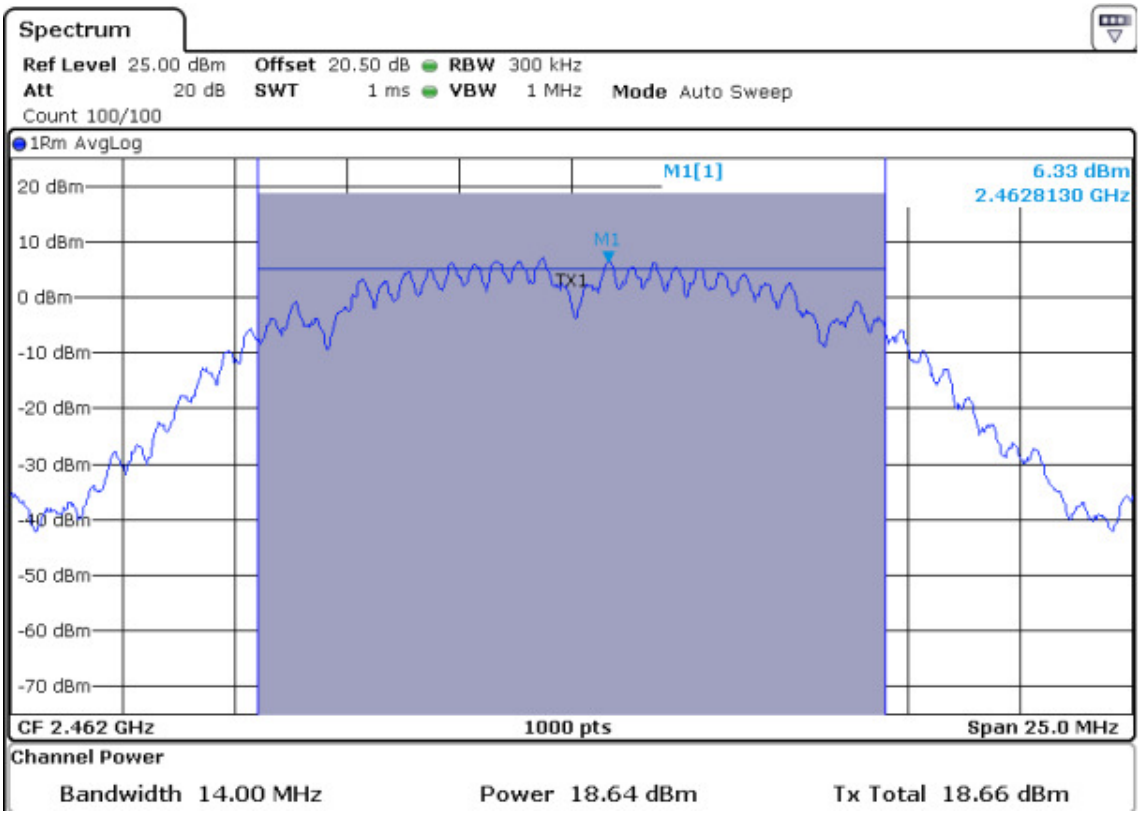
IEEE 802.11b			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
1	2412	16.80	47.86
	2437	19.50	89.12
	2462	18.64	73.11
11	2412	14.27	26.73
	2437	16.61	45.81
	2462	12.85	19.27



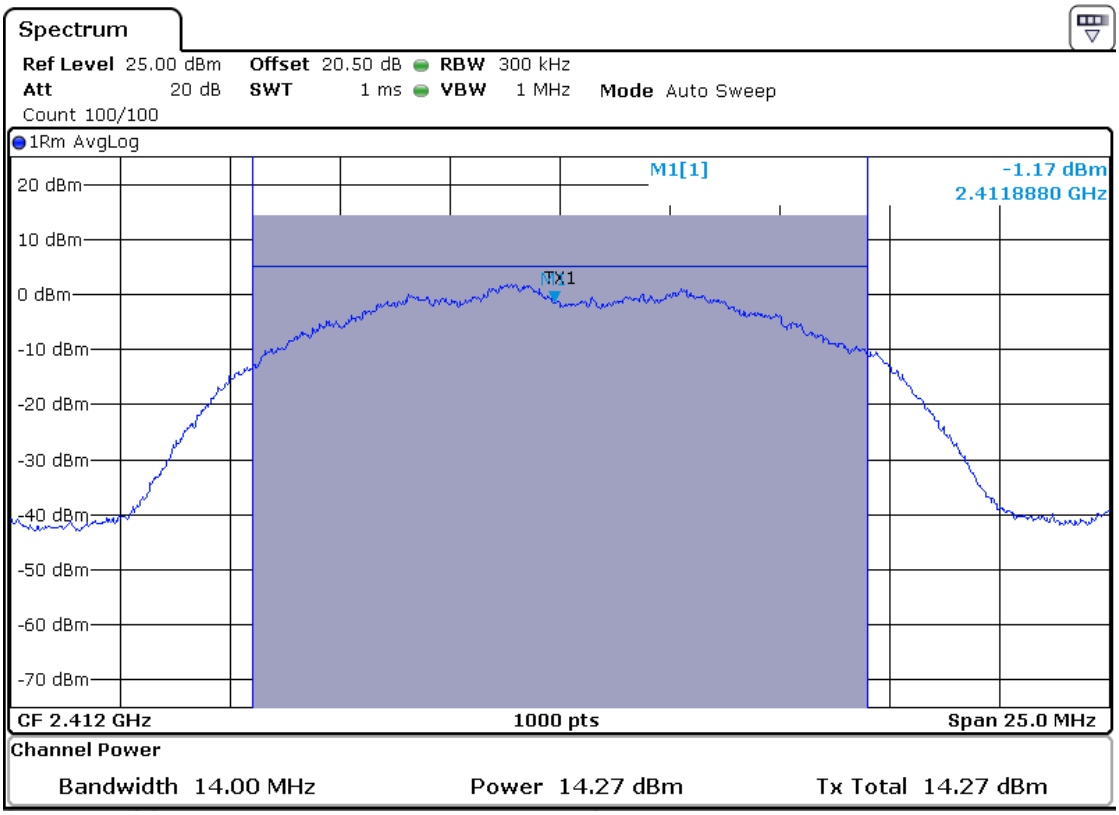
Data rate: 1 Mbps **Channel Frequency: 2412 MHz**



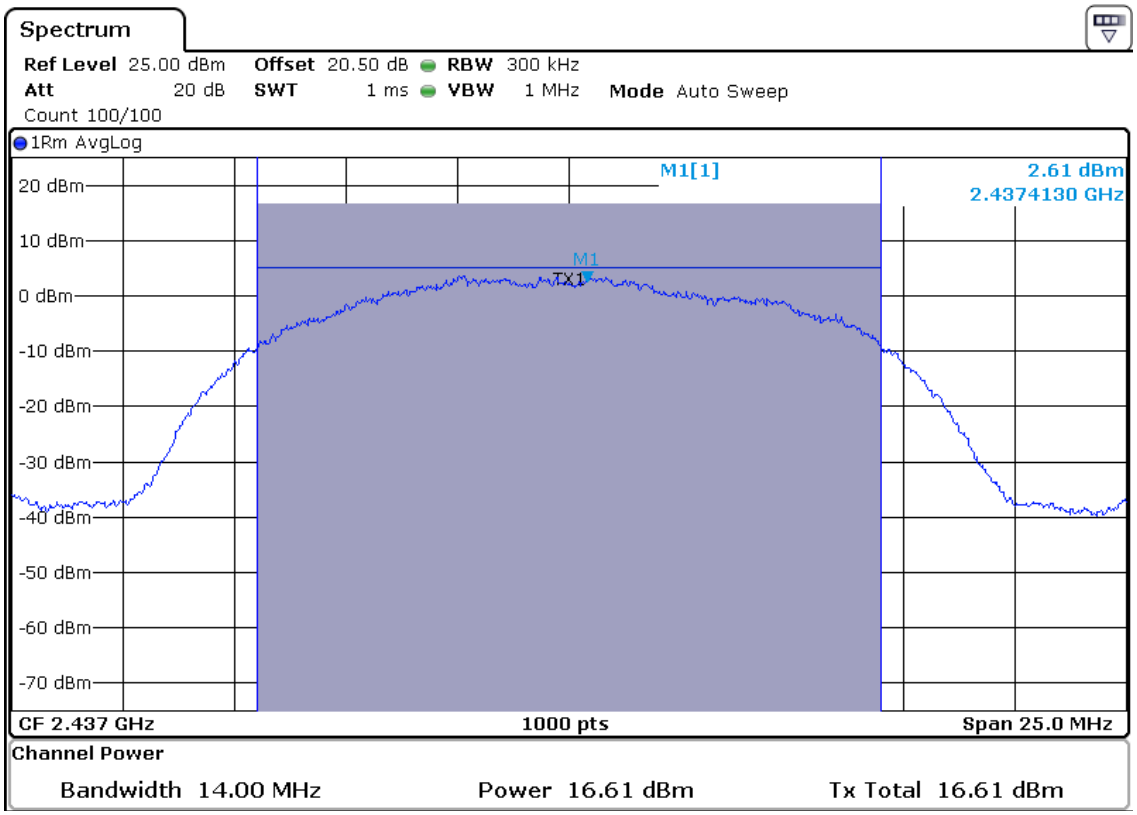
Data rate: 1 Mbps **Channel Frequency: 2437 MHz**



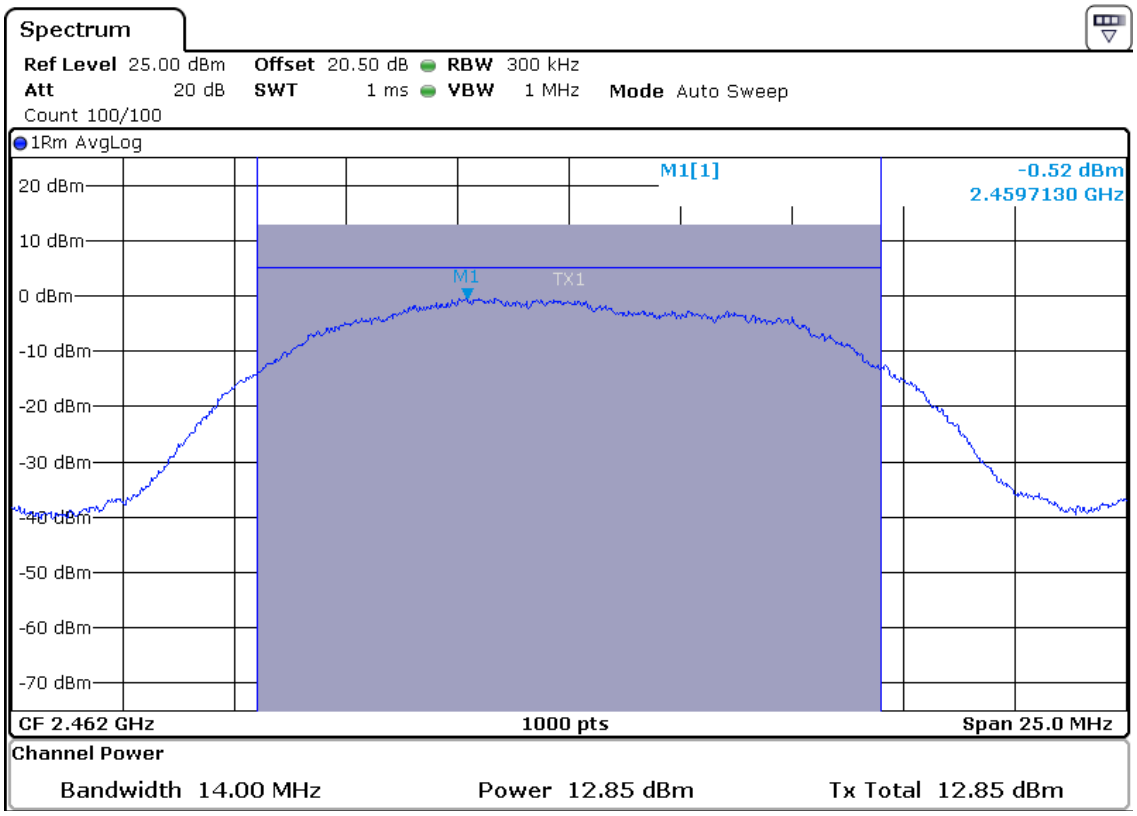
Data rate: 1 Mbps **Channel Frequency: 2462 MHz**



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

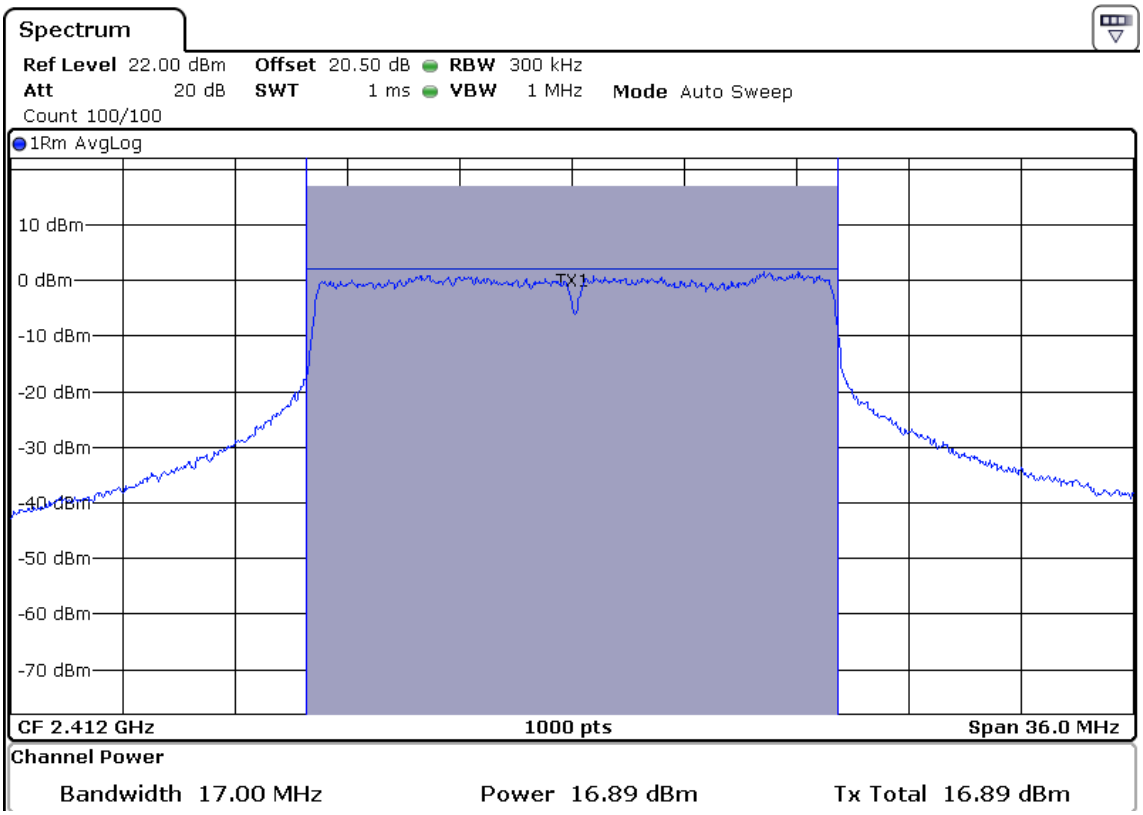


Data rate: 11 Mbps **Channel Frequency: 2437 MHz**

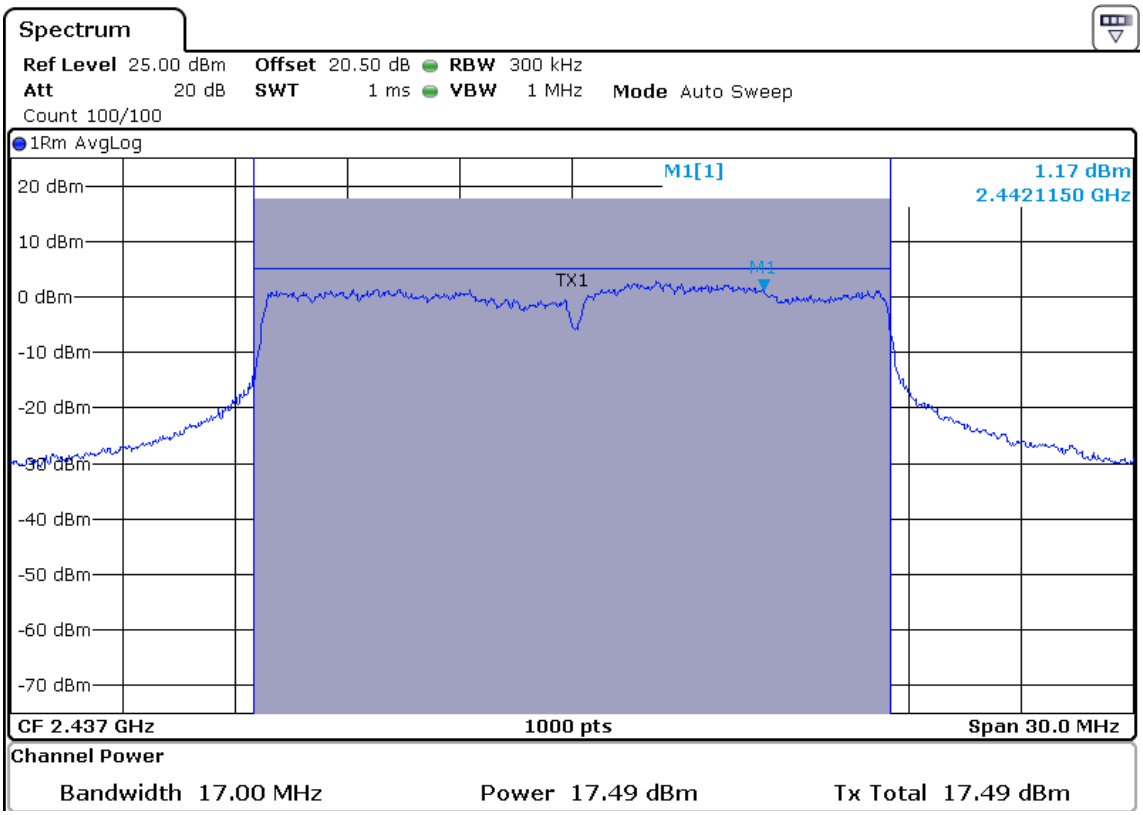


Data rate: 11 Mbps **Channel Frequency: 2462 MHz**

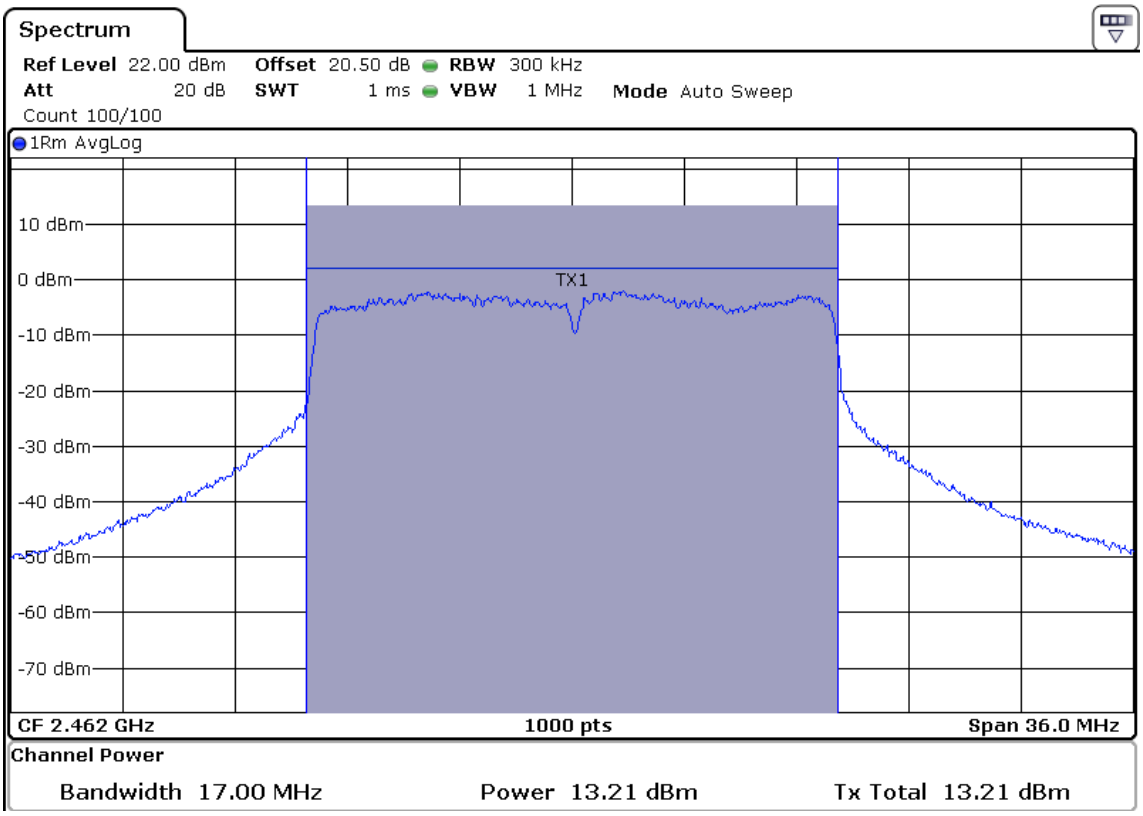
IEEE 802.11g			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
6	2412	16.89	48.86
	2437	17.49	56.10
	2462	13.21	20.94
24	2412	11.86	15.34
	2437	12.97	19.81
	2462	6.99	5.00
54	2412	0.55	1.13
	2437	5.55	3.58
	2462	3.04	2.01



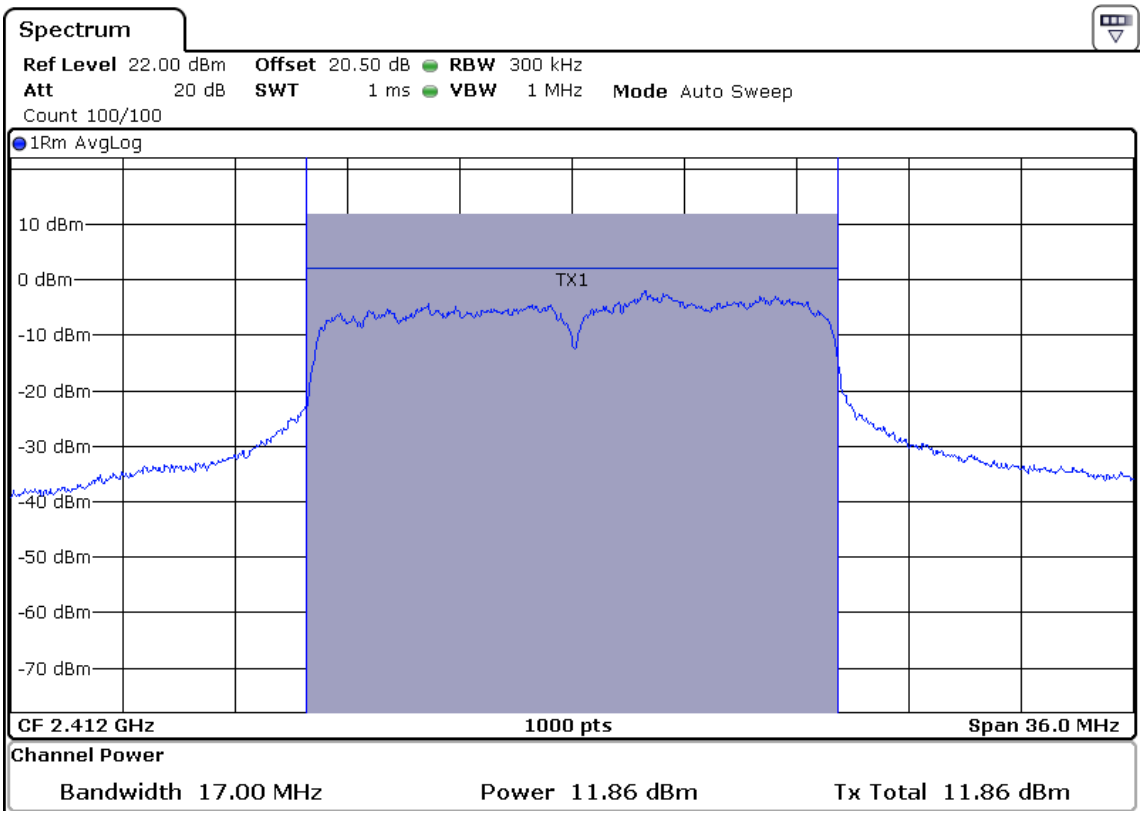
Data rate: 6 Mbps **Channel Frequency: 2412 MHz**



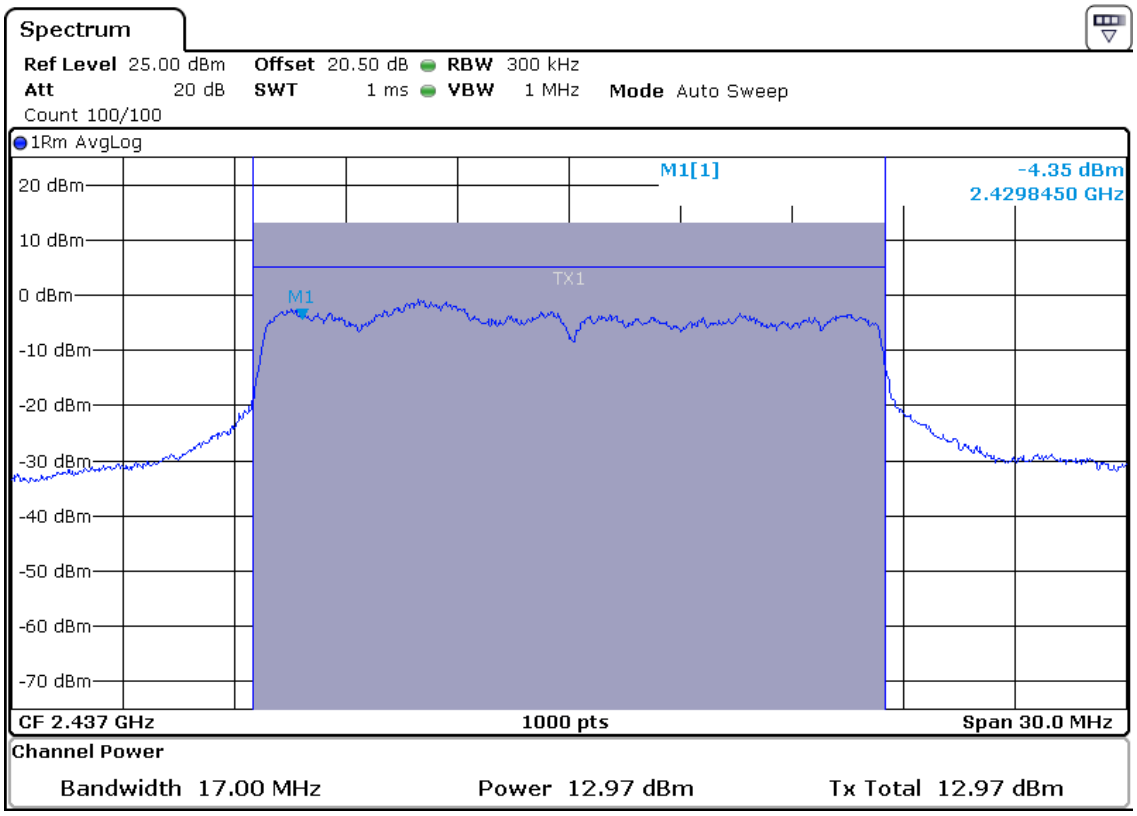
Data rate: 6 Mbps **Channel Frequency: 2437 MHz**



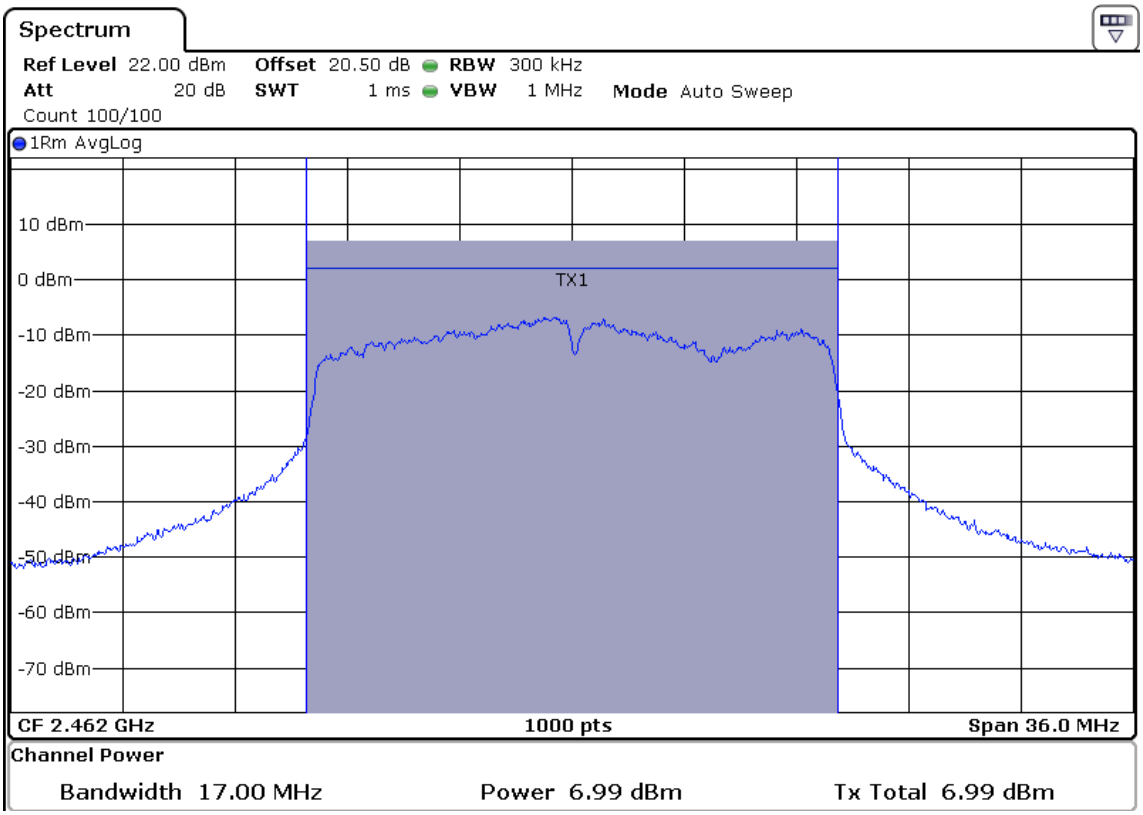
Data rate: 6 Mbps **Channel Frequency: 2462 MHz**



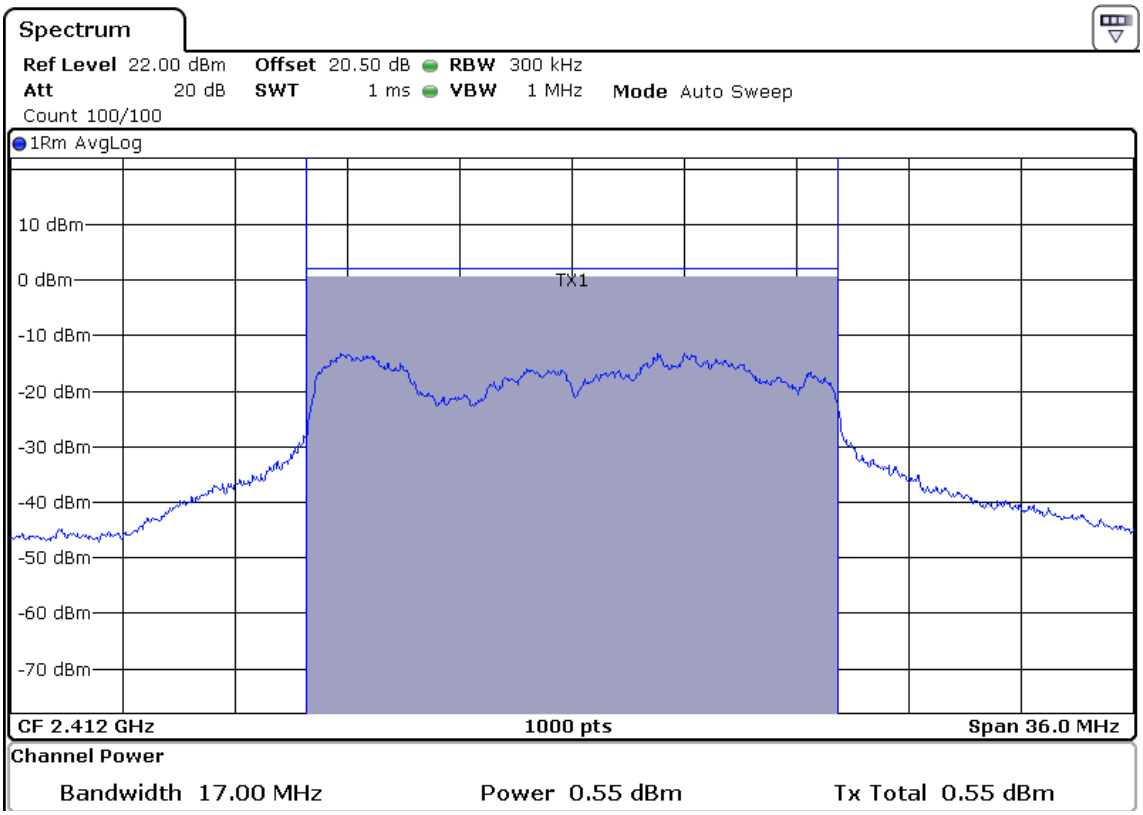
Data rate: 24 Mbps **Channel Frequency: 2412 MHz**



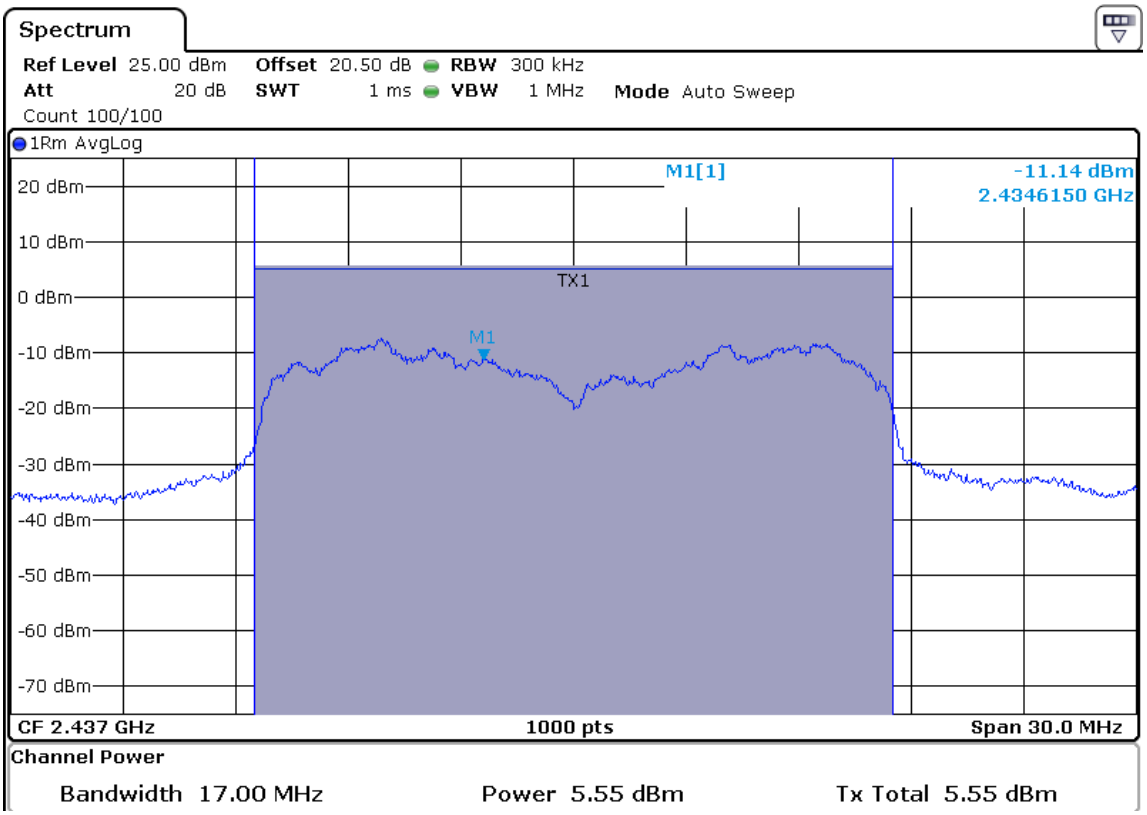
Data rate: 24 Mbps **Channel Frequency: 2437 MHz**



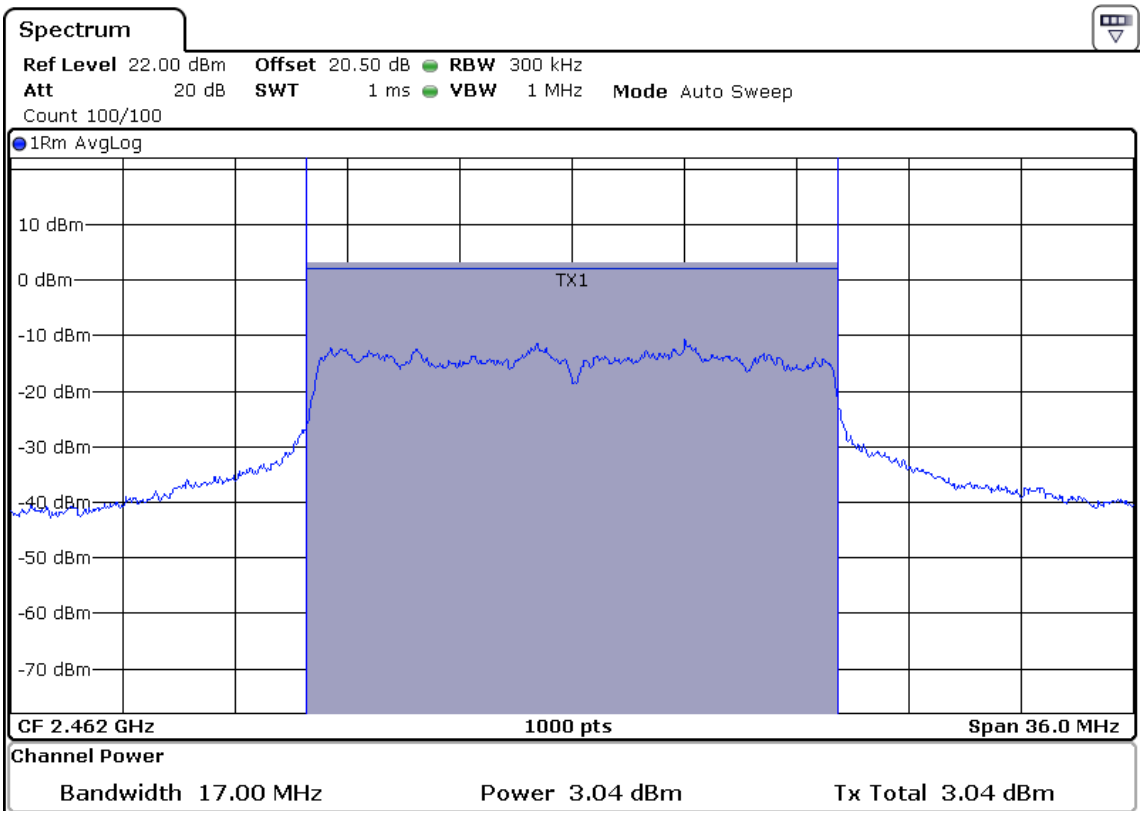
Data rate: 24 Mbps **Channel Frequency: 2462 MHz**



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

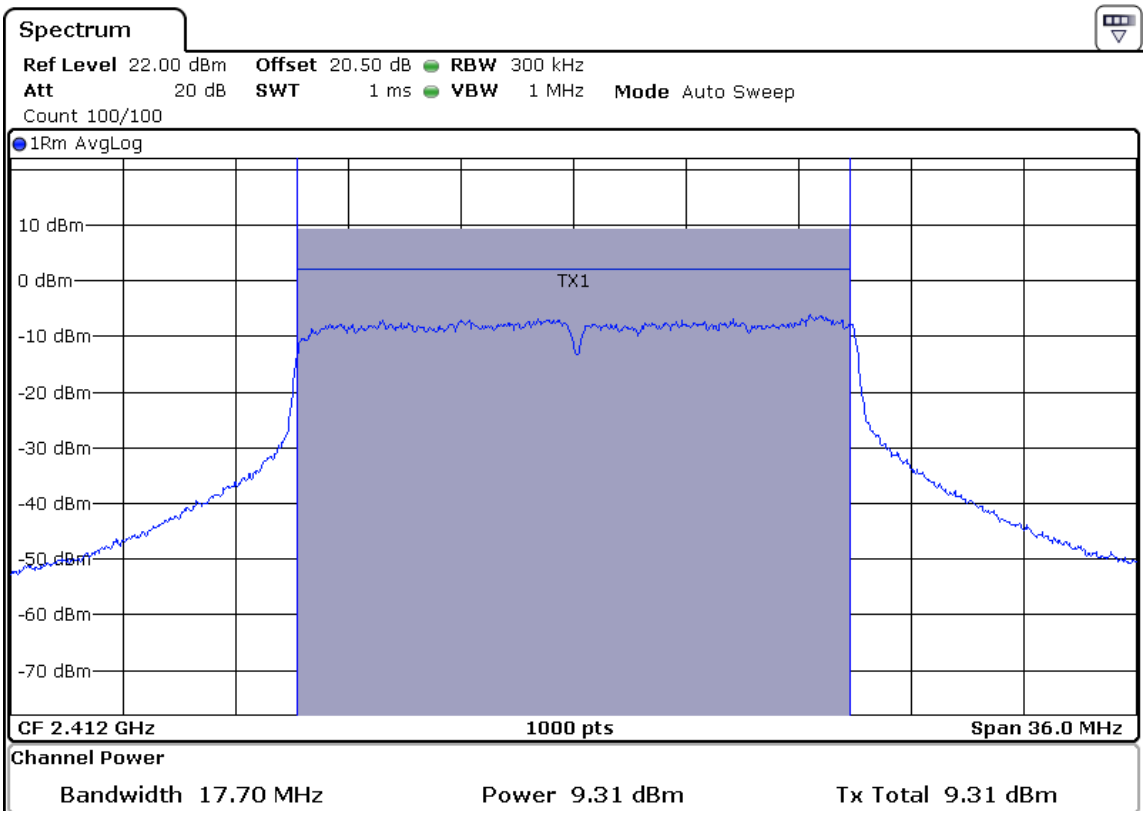


Data rate: 54 Mbps **Channel Frequency: 2437 MHz**

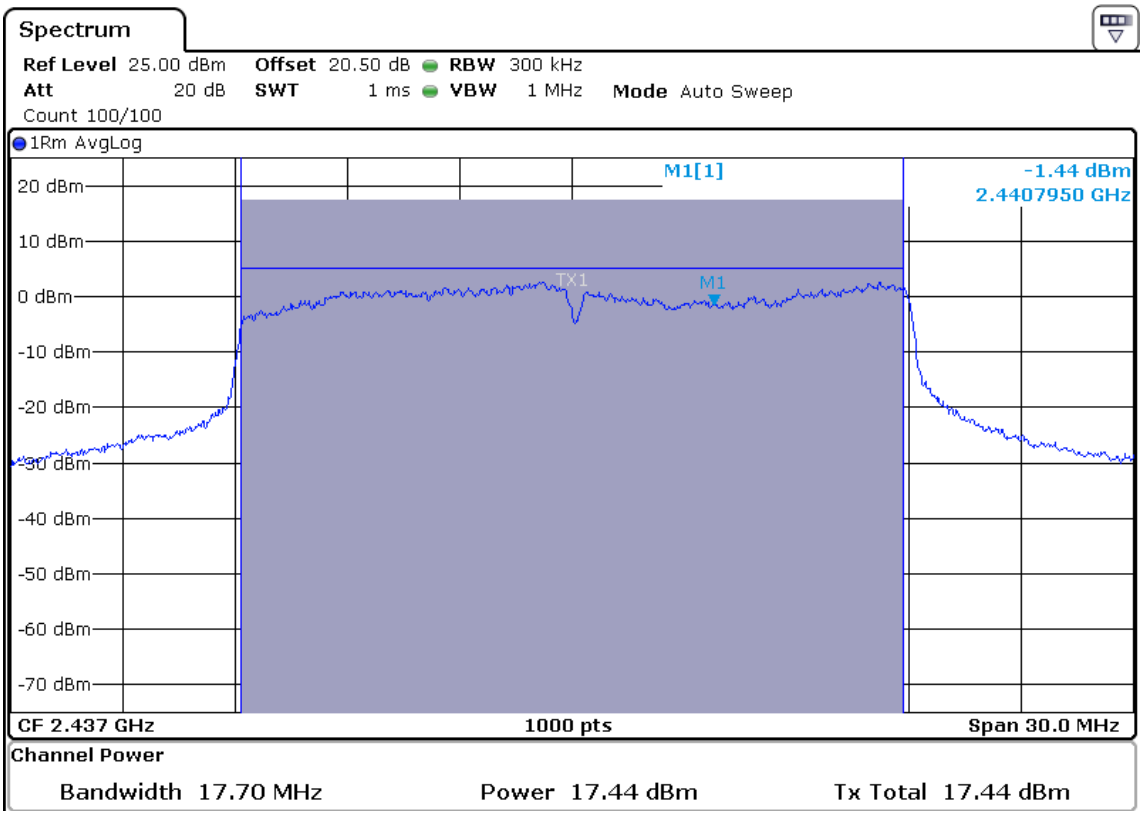


Data rate: 54 Mbps **Channel Frequency: 2462 MHz**

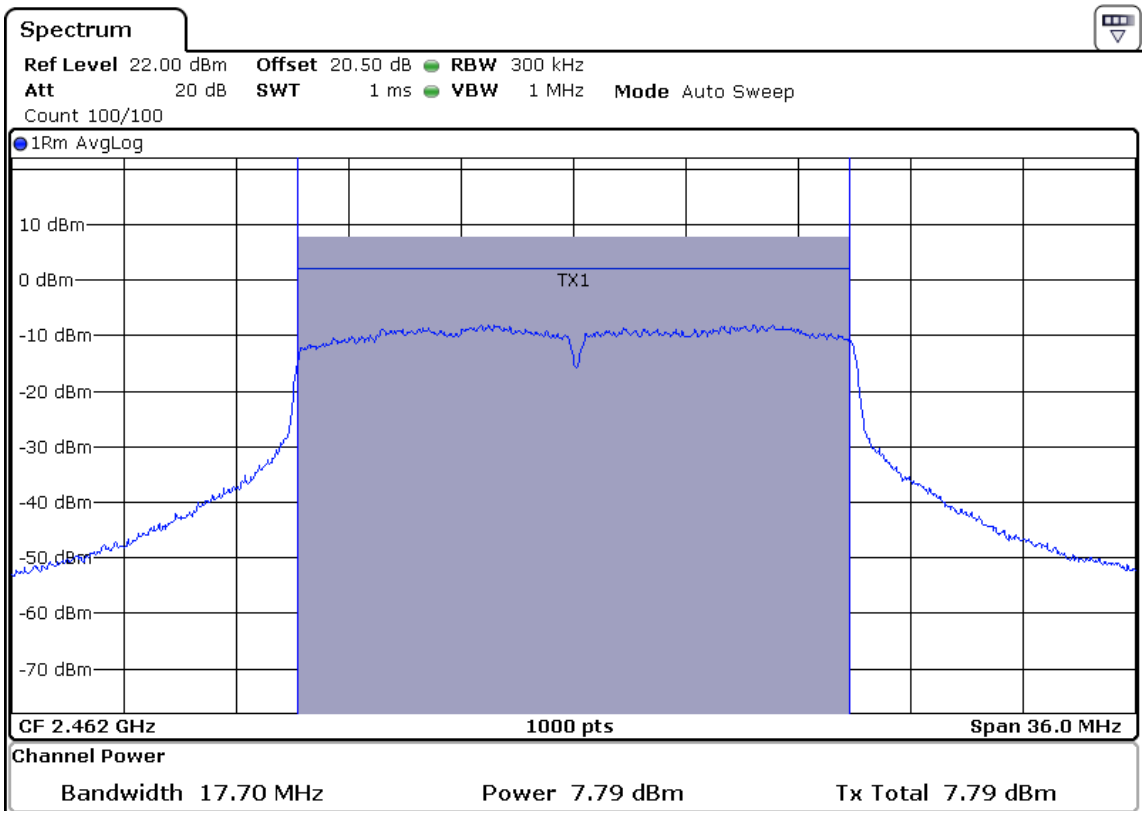
IEEE802.11nHT20			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
MCS0	2412	9.31	8.53
	2437	17.44	55.46
	2462	7.79	6.01
MCS4	2412	1.71	1.48
	2437	9.77	9.48
	2462	1.04	1.27
MCS7	2412	-3.58	0.43
	2437	4.84	3.04
	2462	-3.25	0.47



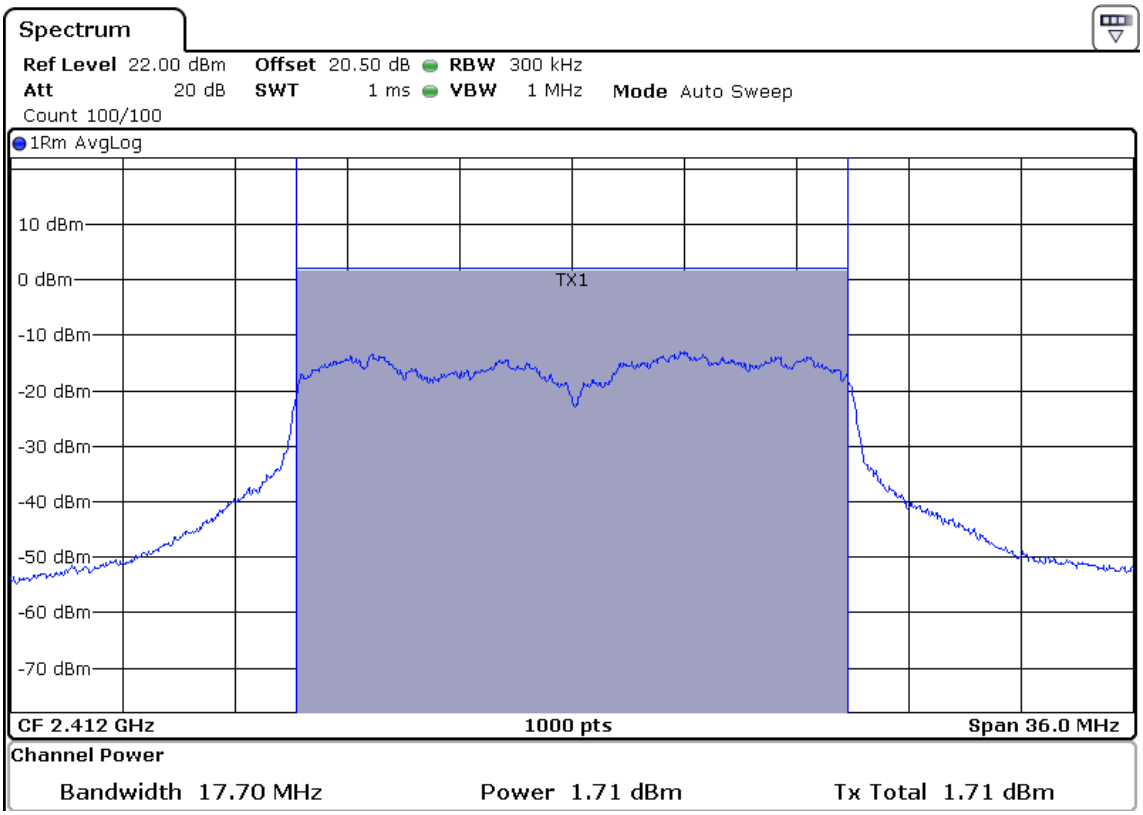
Data Rate: MCS0 **Channel Frequency: 2412 MHz**



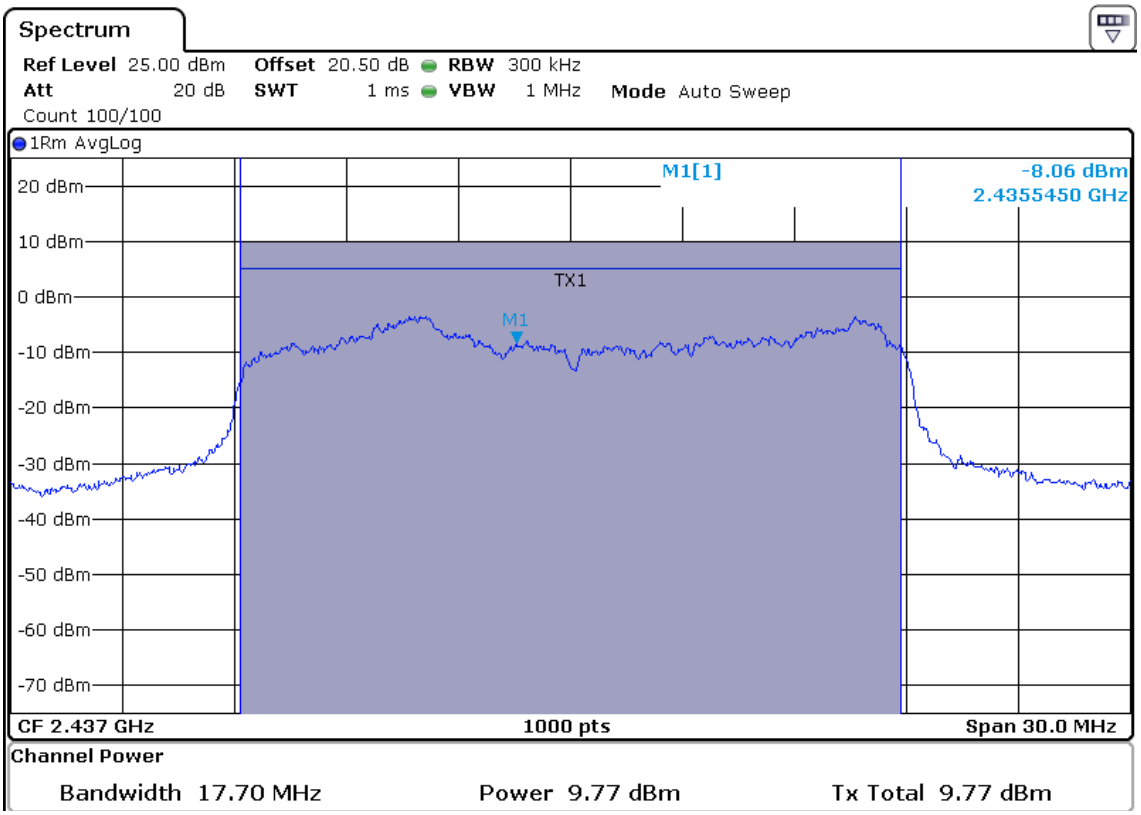
Data Rate: MCS0 **Channel Frequency: 2437 MHz**



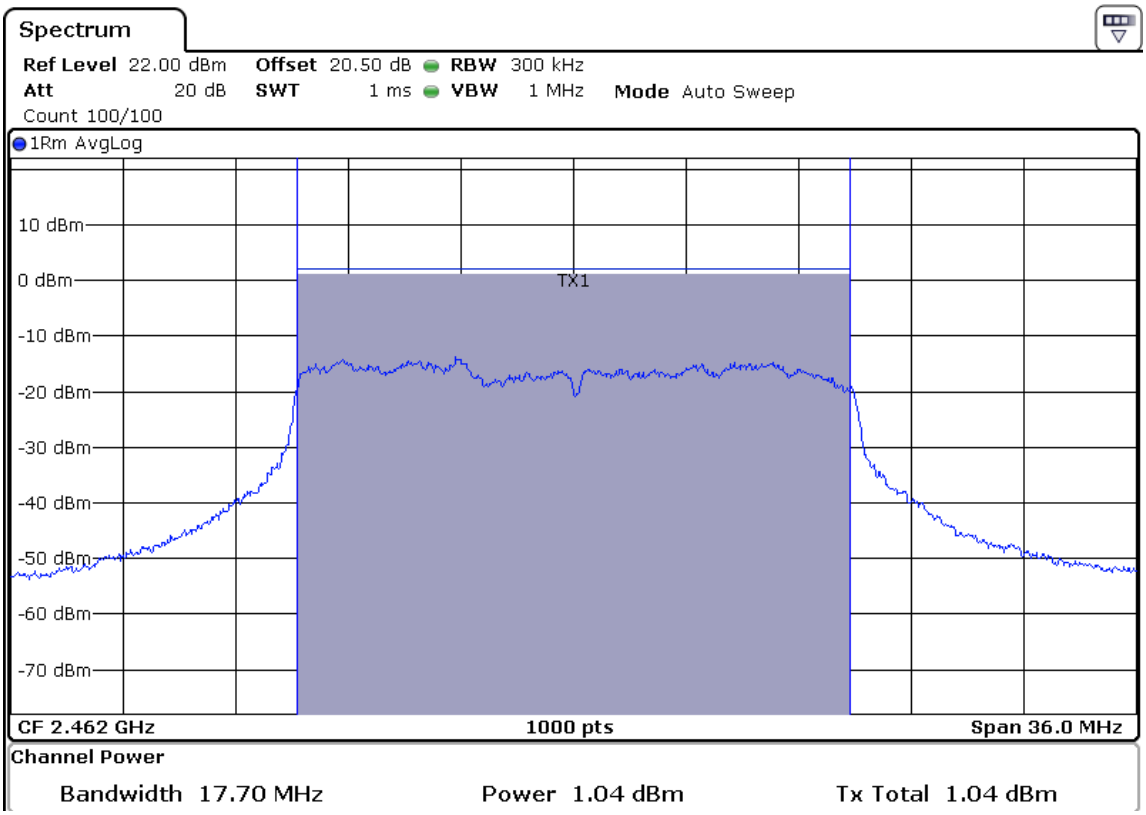
Data Rate: MCS0 **Channel Frequency: 2462 MHz**



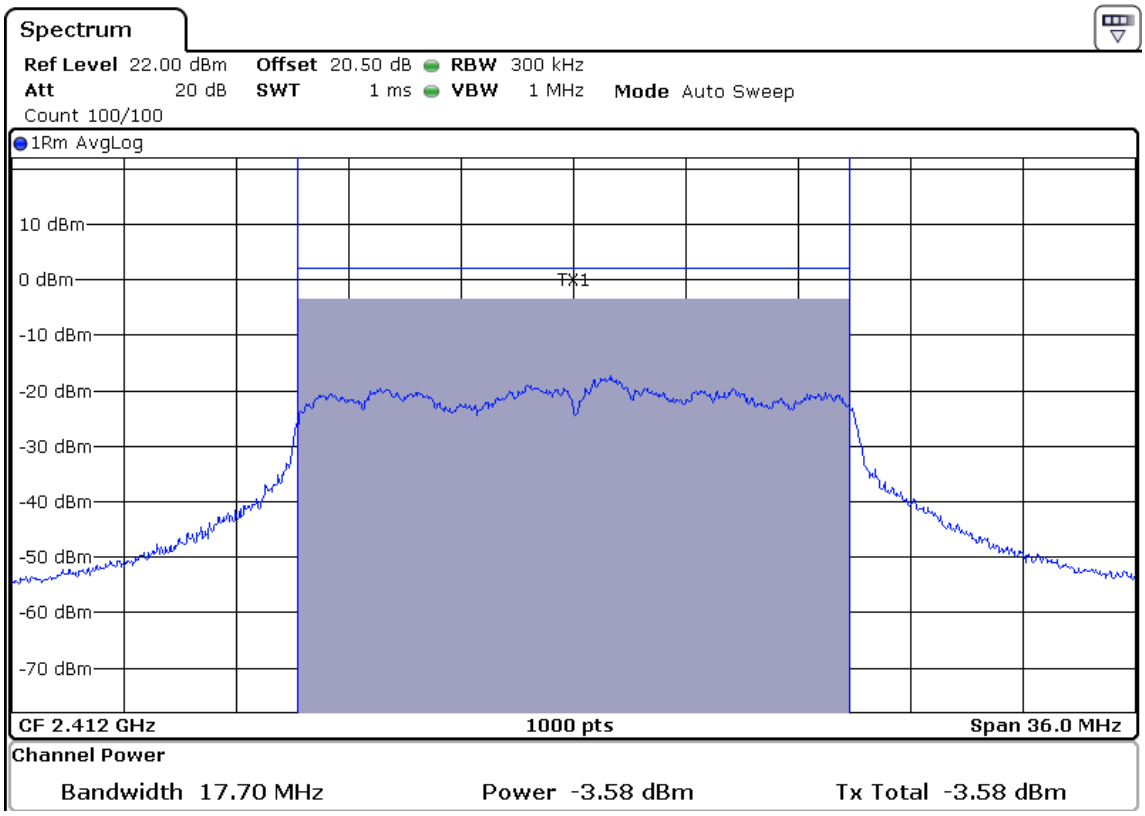
Data Rate: MCS4 **Channel Frequency: 2412 MHz**



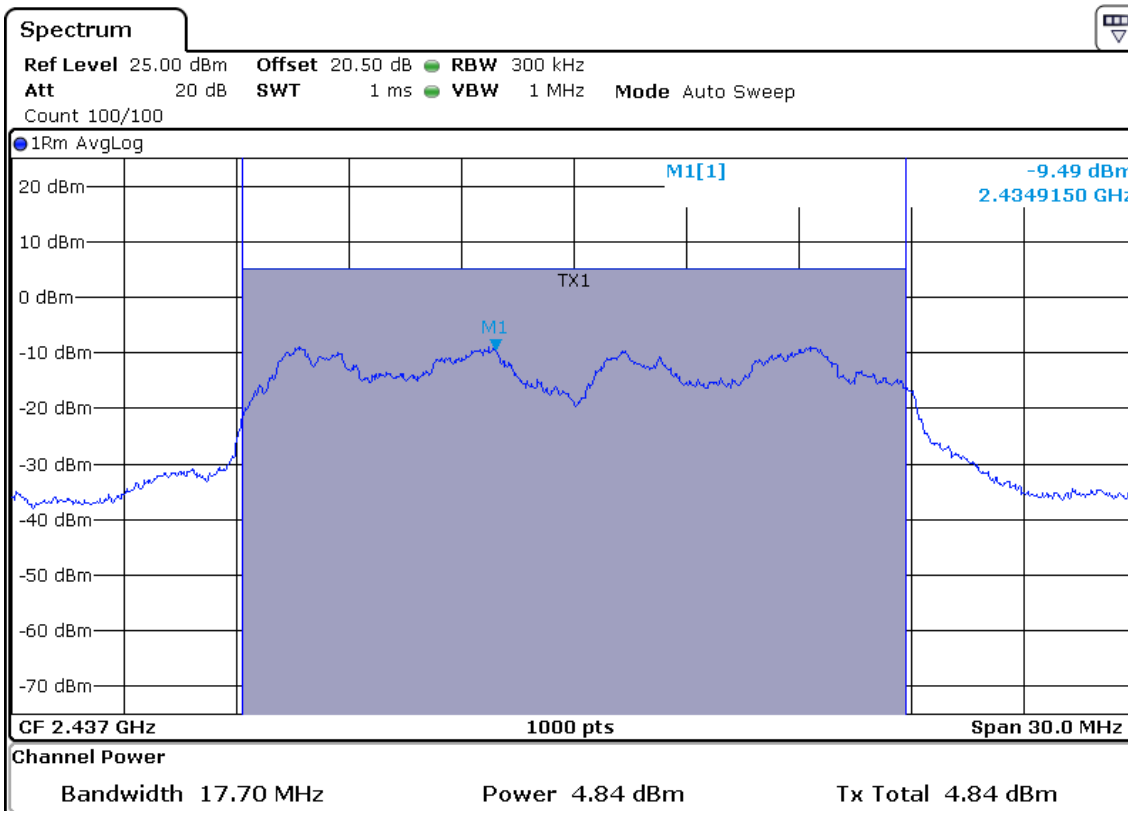
Data Rate: MCS4 **Channel Frequency: 2437 MHz**



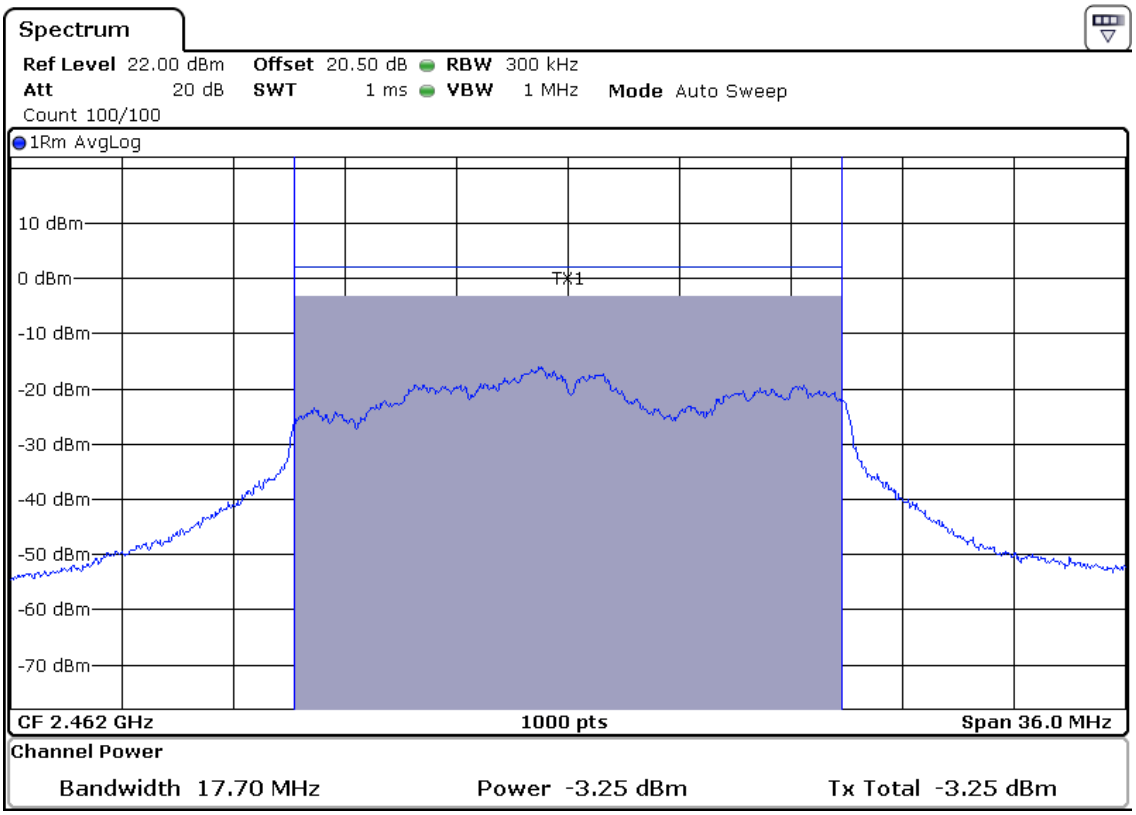
Data Rate: MCS4 **Channel Frequency: 2462 MHz**



Data Rate: MCS7 **Channel Frequency: 2412 MHz**

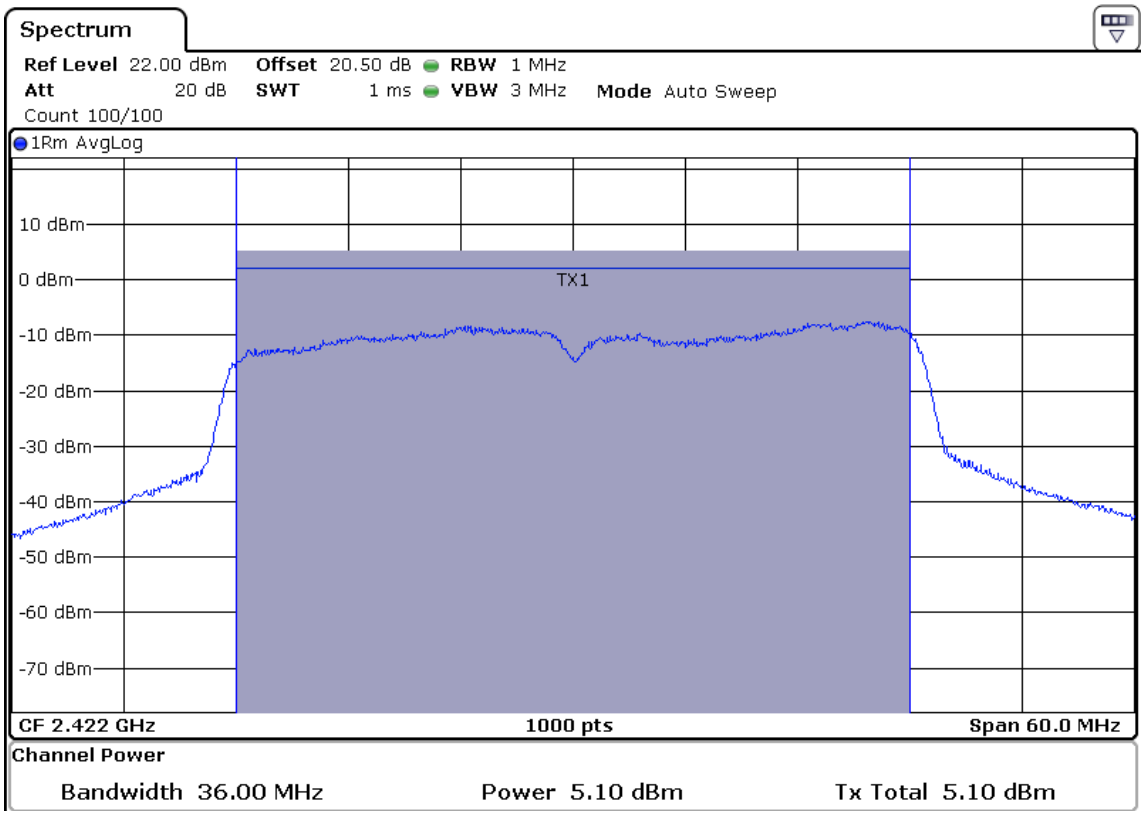


Data Rate: MCS7 **Channel Frequency: 2437 MHz**

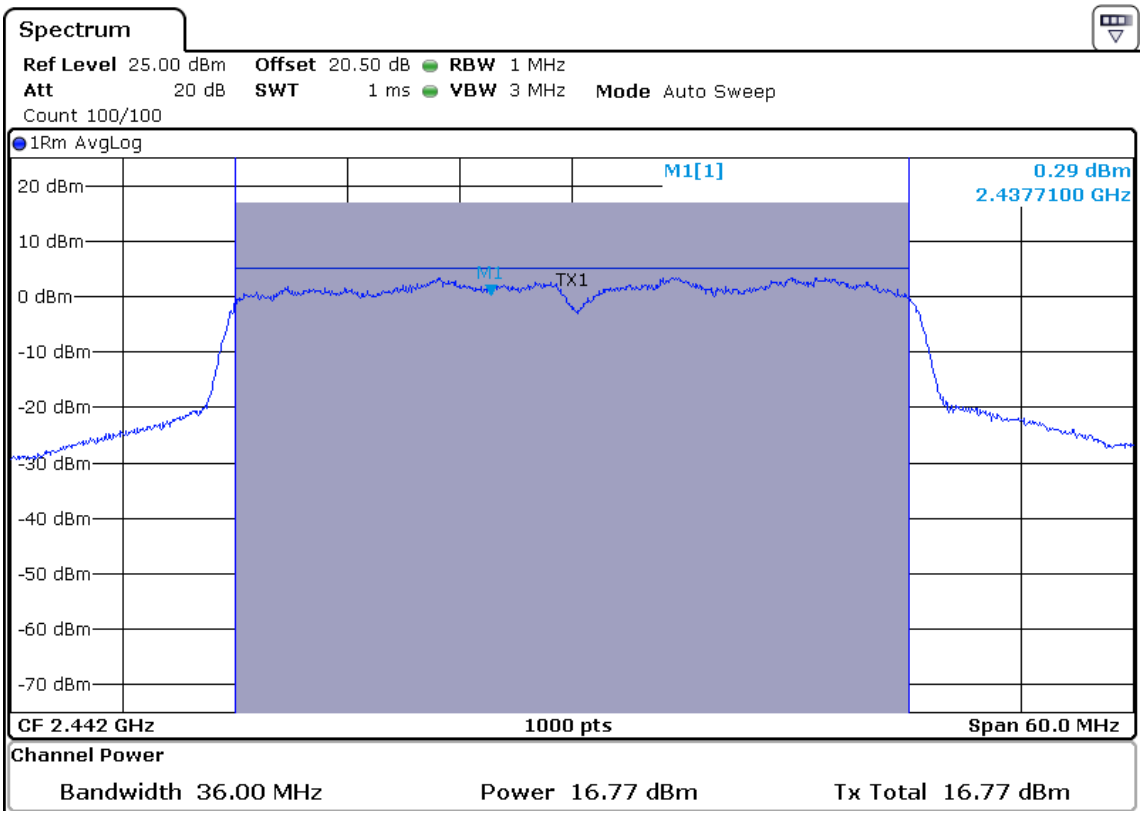


Data Rate: MCS7 **Channel Frequency: 2462 MHz**

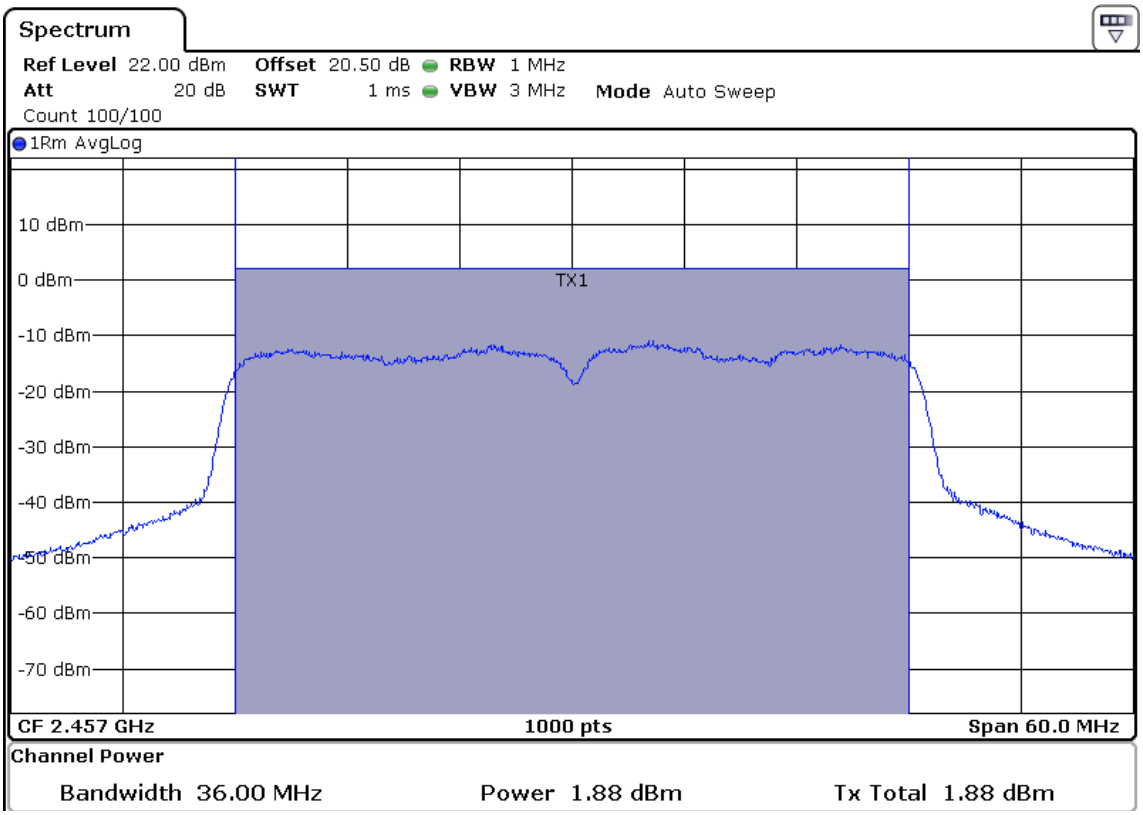
IEEE802.11n HT40			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
MCS0	2422	5.1	3.23
	2442	16.77	47.53
	2457	1.88	1.54
MCS4	2422	-7.25	0.18
	2442	2.15	1.64
	2457	-7.56	0.17
MCS7	2422	-14.14	0.038
	2442	-1.41	0.72
	2457	-9.62	0.10



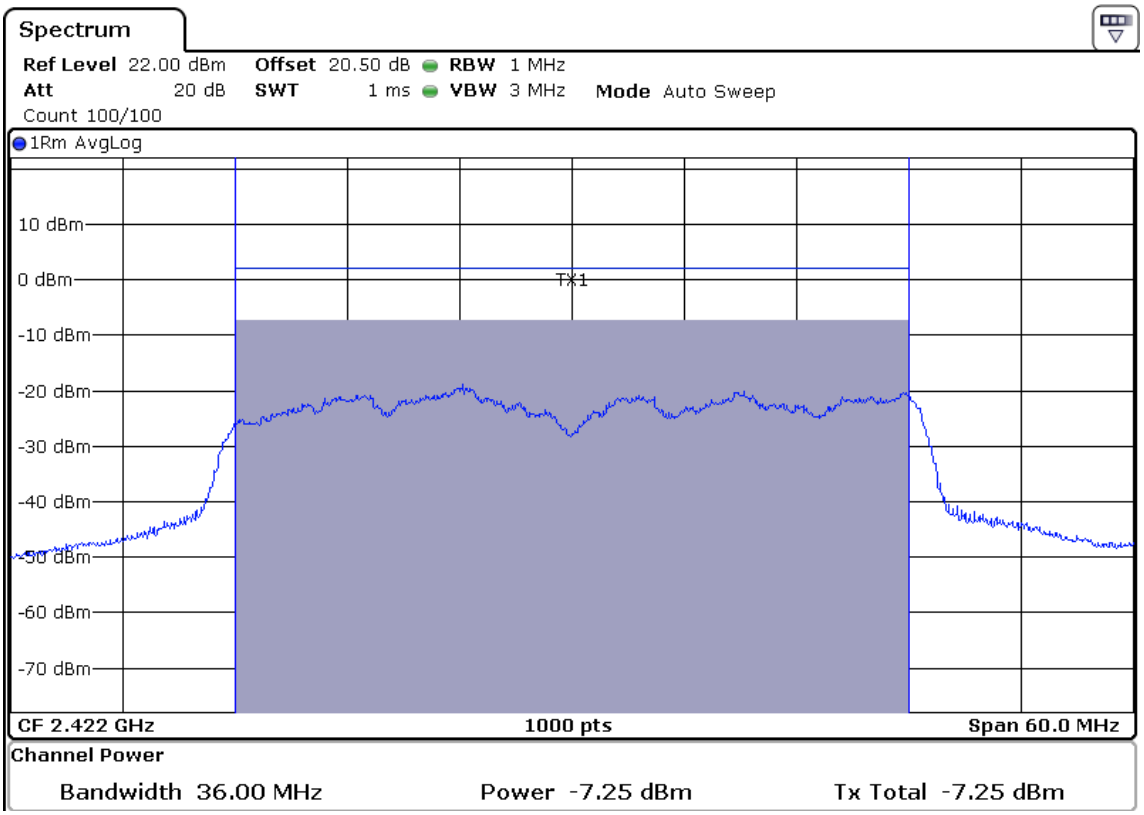
Data Rate: MCS0 **Channel Frequency: 2422 MHz**



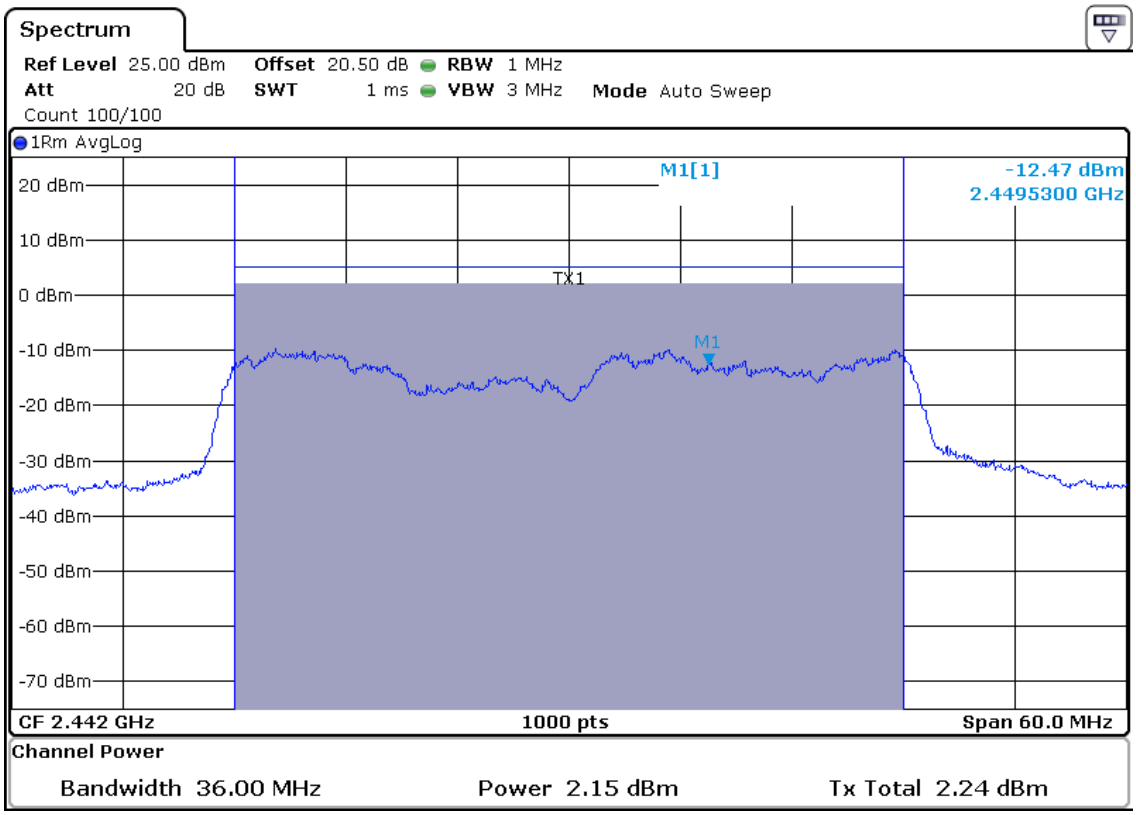
Data Rate: MCS0 **Channel Frequency: 2442 MHz**



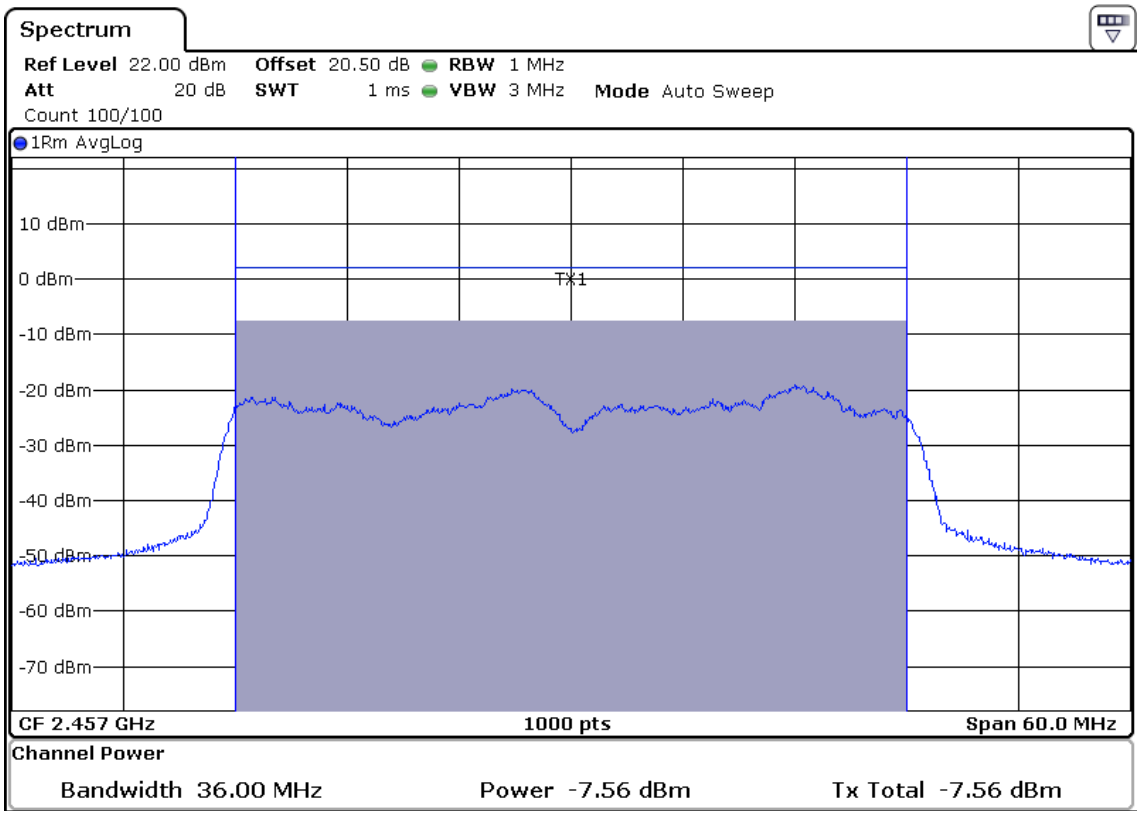
Data Rate: MCS0 **Channel Frequency: 2457 MHz**



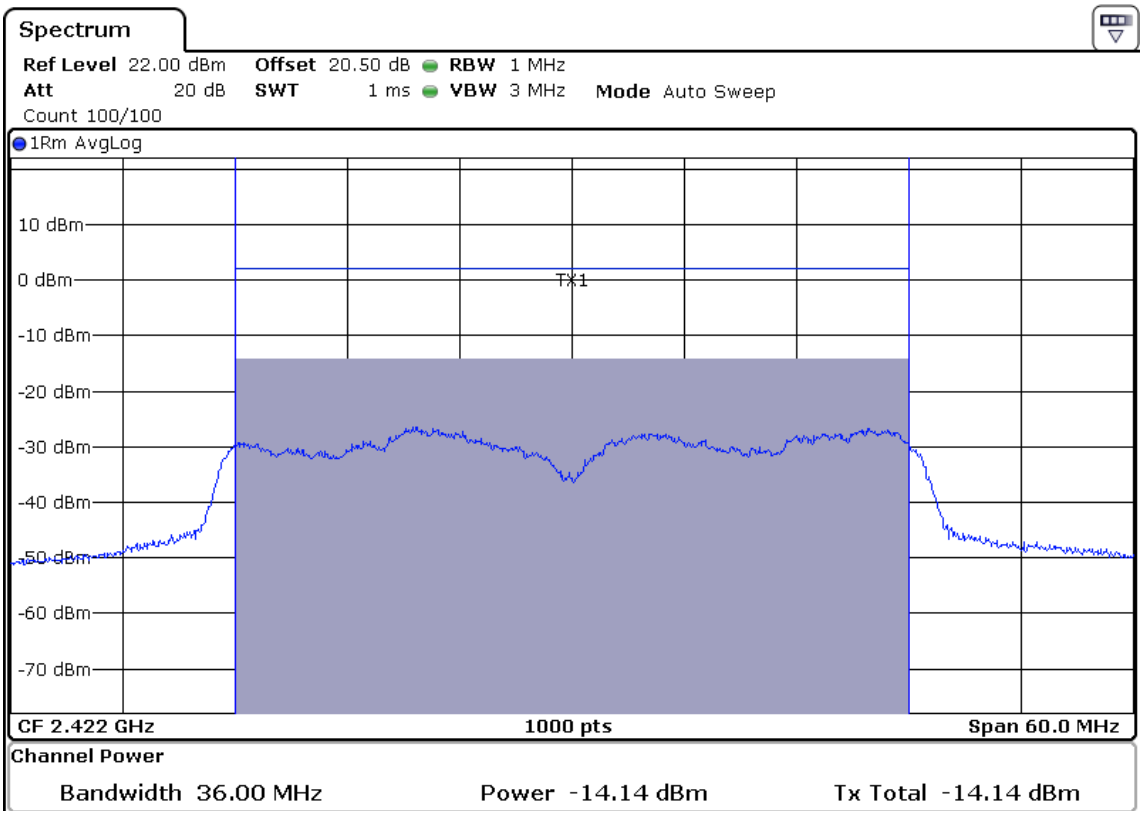
Data Rate: MCS4 **Channel Frequency: 2422 MHz**



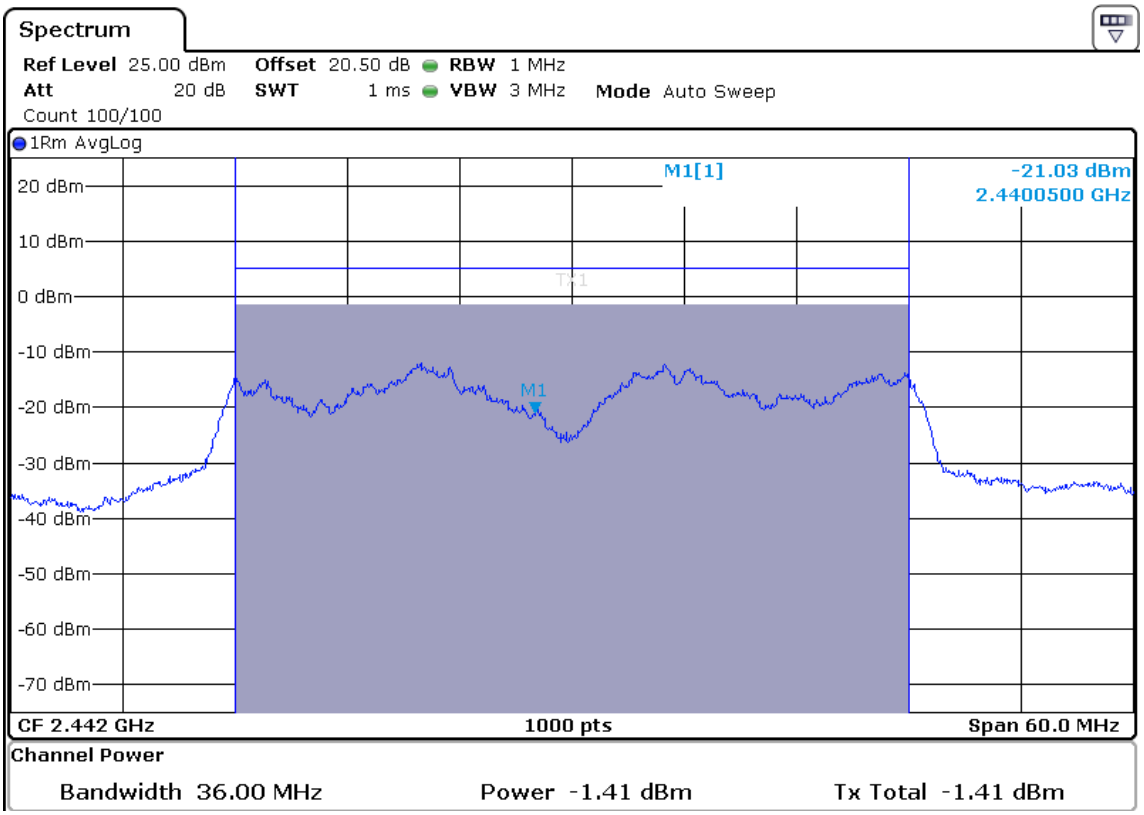
Data Rate: MCS4 **Channel Frequency: 2442 MHz**



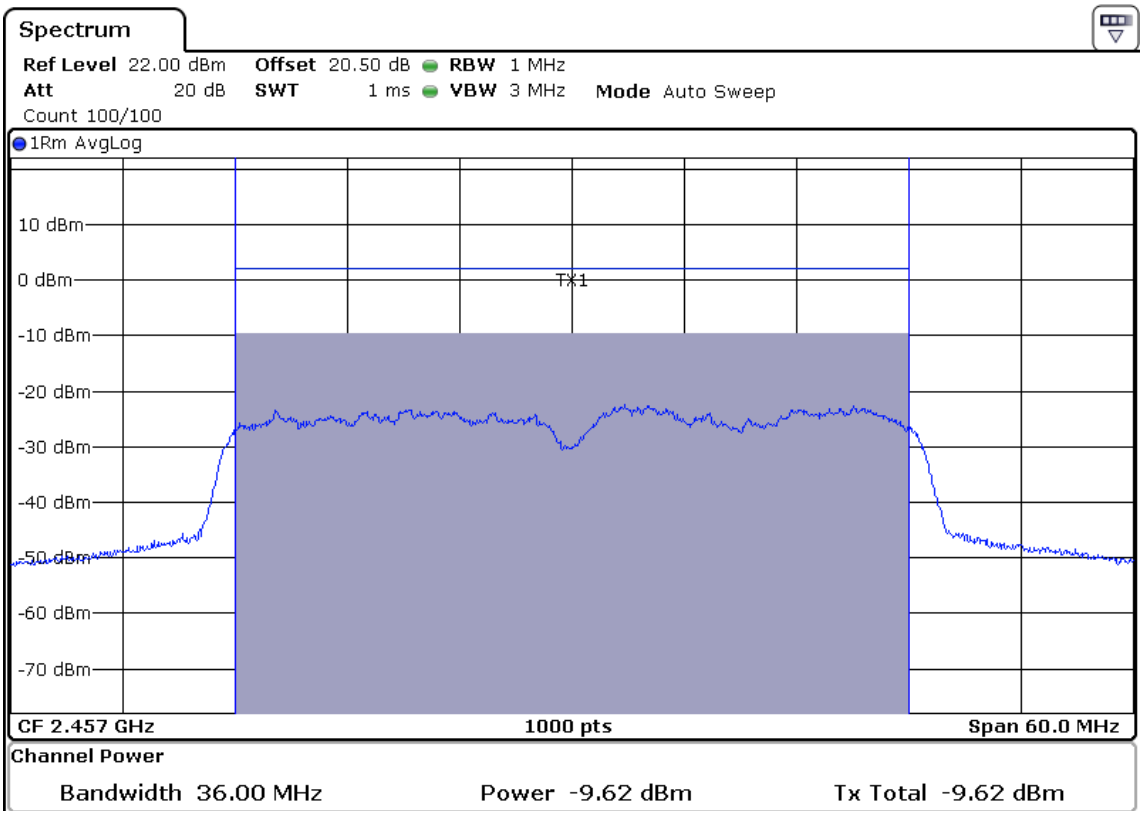
Data Rate: MCS4 **Channel Frequency: 2457 MHz**



Data Rate: MCS7 **Channel Frequency: 2422 MHz**



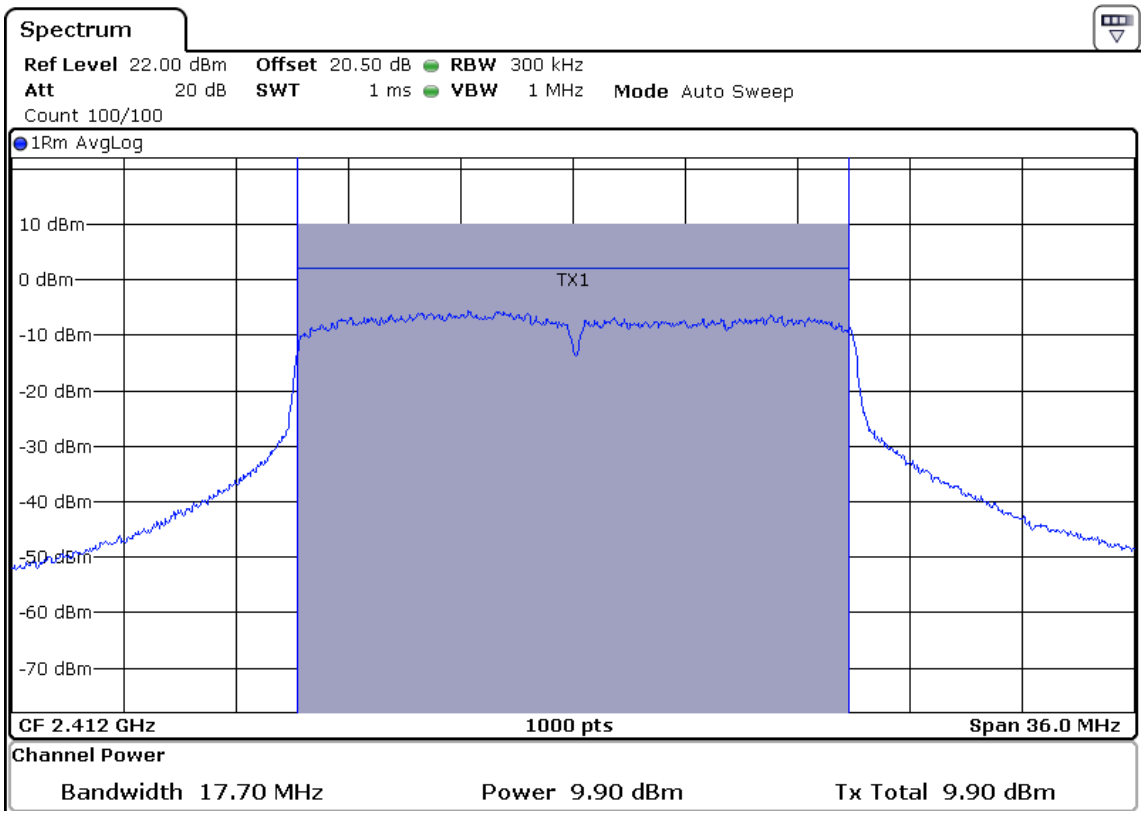
Data Rate: MCS7 **Channel Frequency: 2442 MHz**



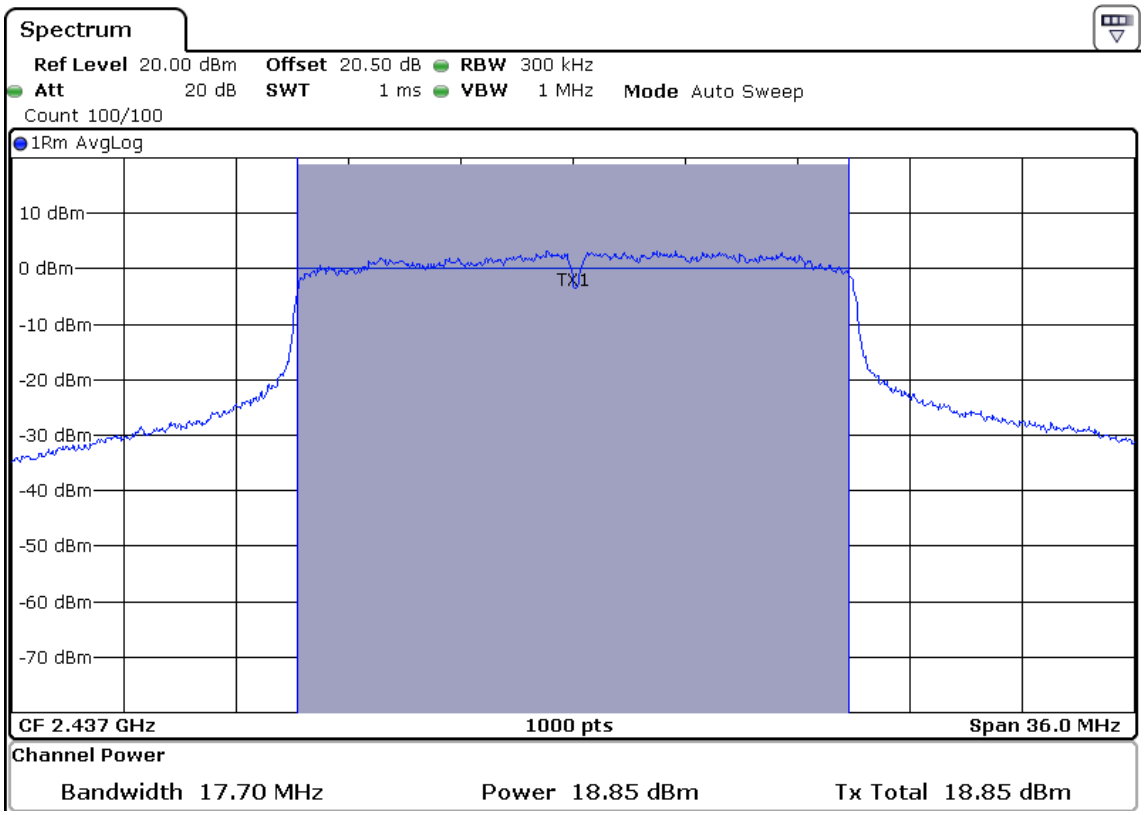
Data Rate: MCS7 **Channel Frequency: 2457 MHz**

Test Results for Path B

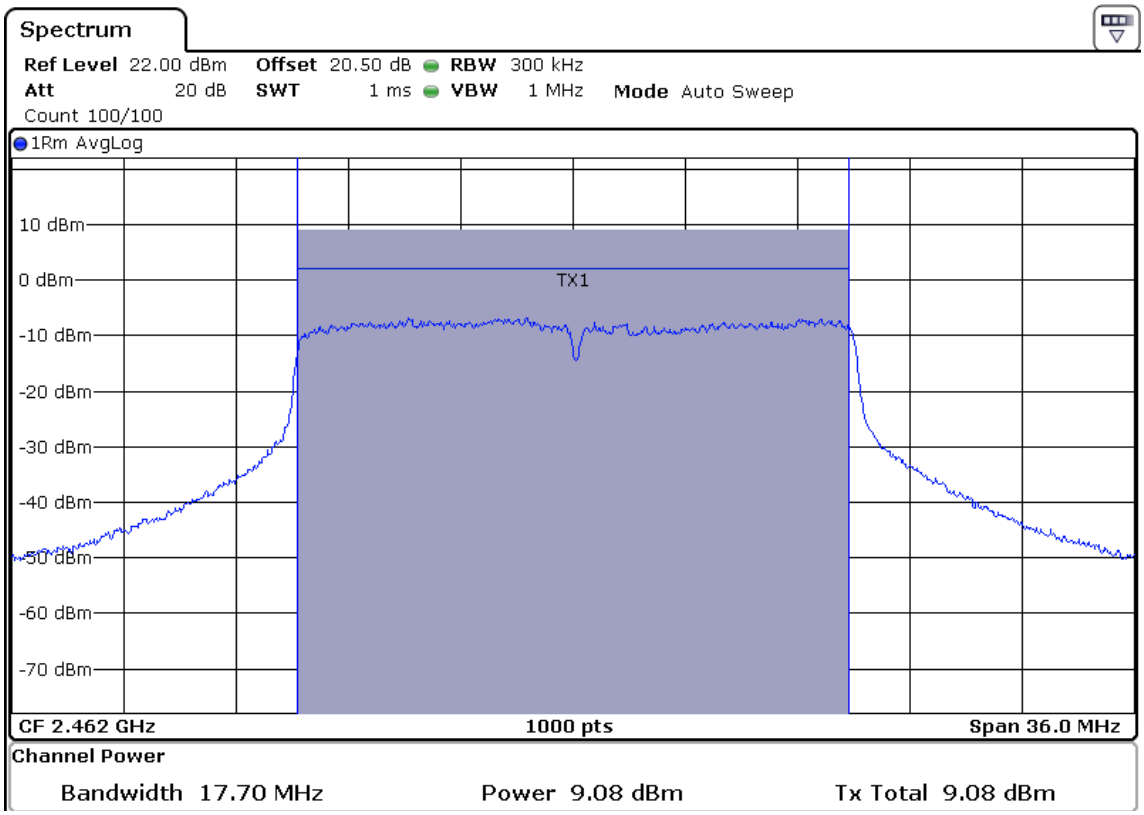
IEEE802.11nHT20			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
MCS0	2412	9.9	9.77
	2437	18.85	76.73
	2462	9.08	8.09
MCS4	2412	1.78	1.50
	2437	10.16	10.37
	2462	5.15	3.27
MCS7	2412	-3.29	0.46
	2437	4.88	3.07
	2462	0.9	1.23



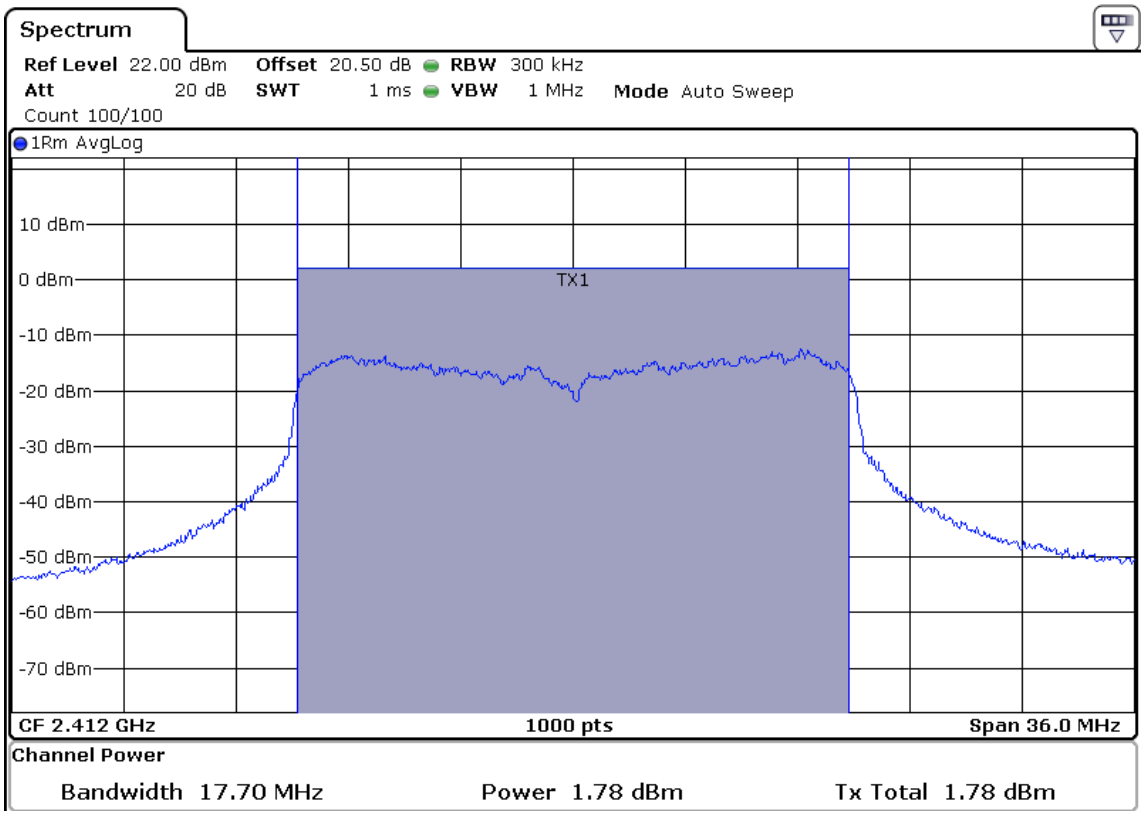
Data Rate: MCS0 **Channel Frequency: 2412 MHz**



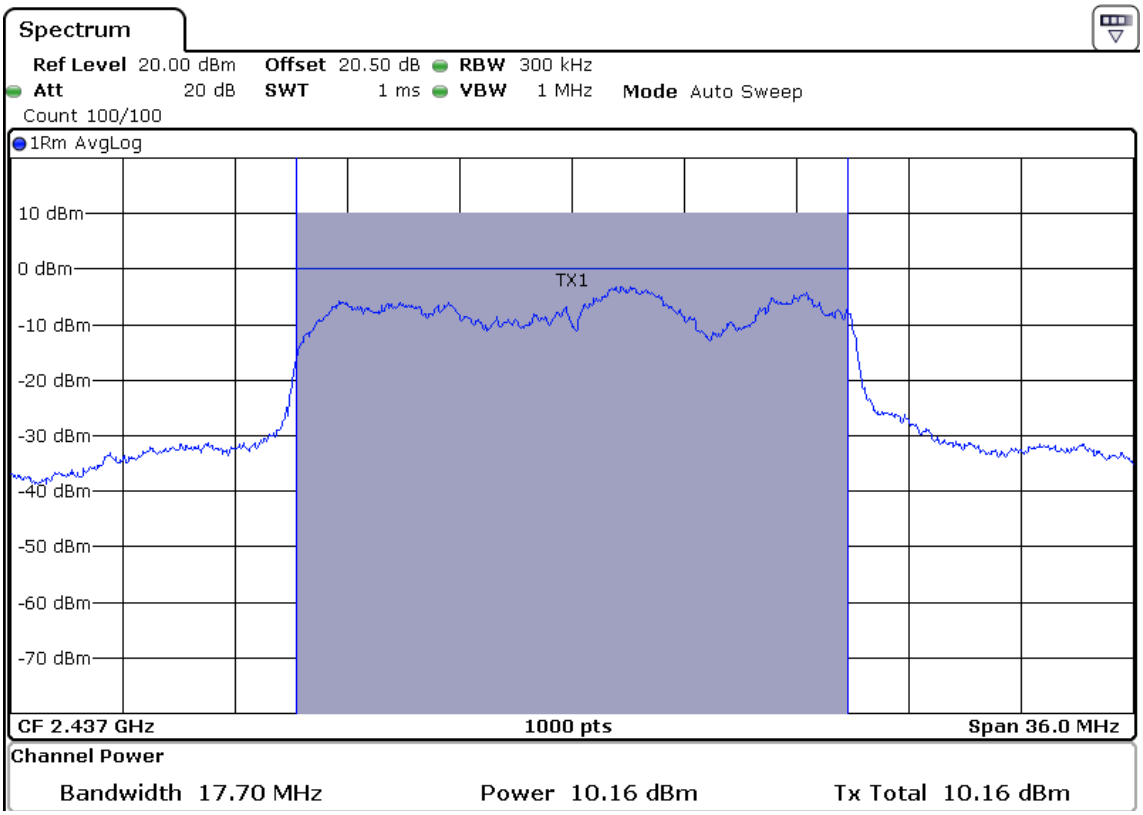
Data Rate: MCS0 **Channel Frequency: 2437 MHz**



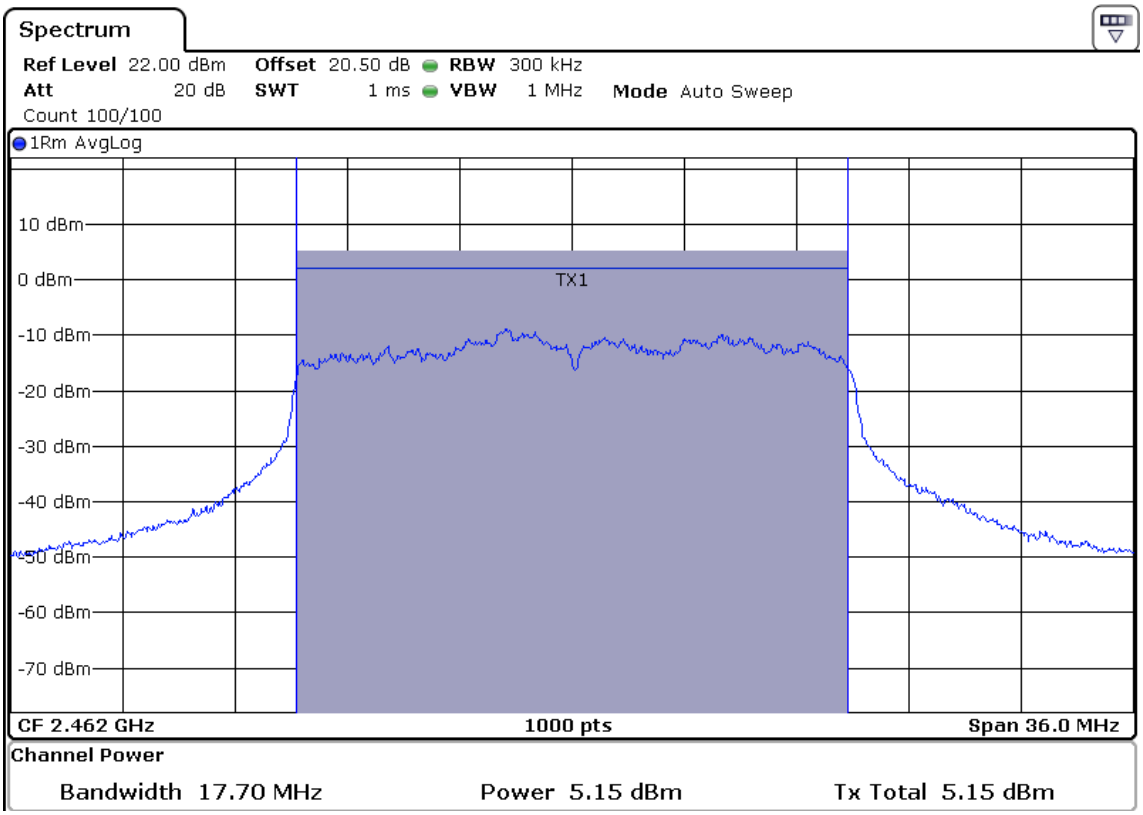
Data Rate: MCS0 **Channel Frequency: 2462 MHz**



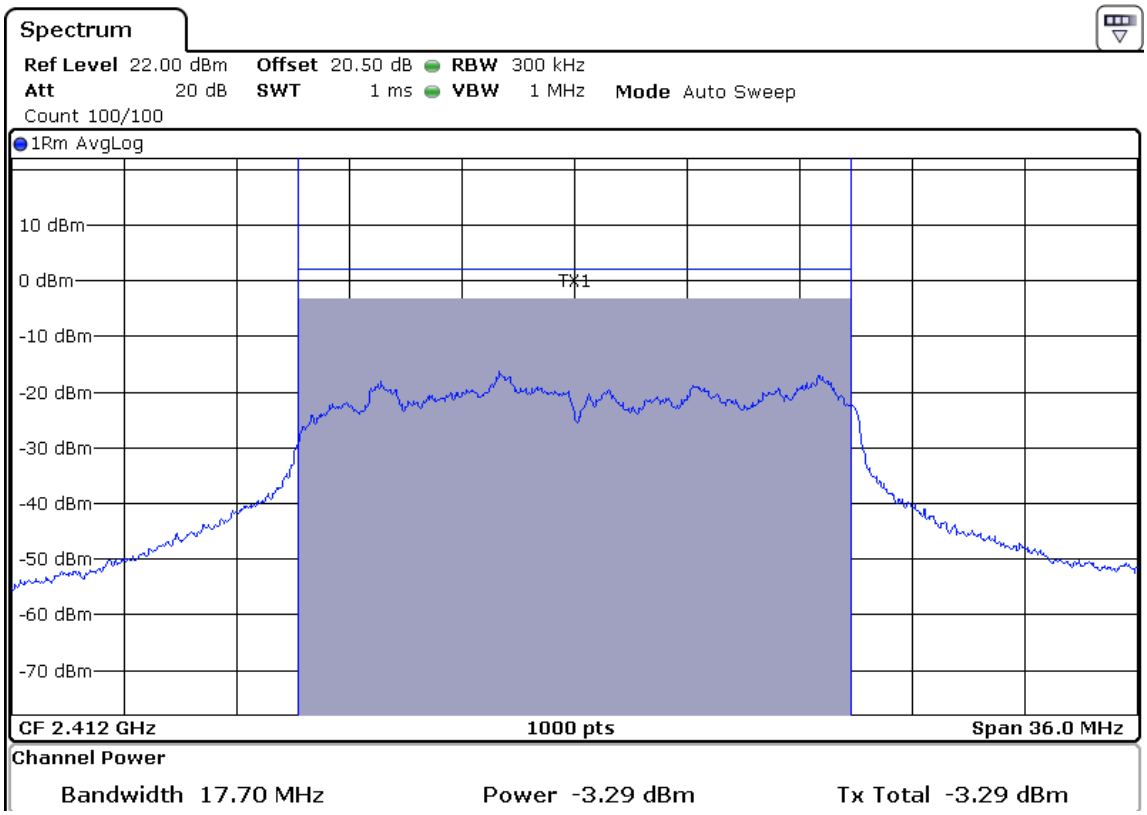
Data Rate: MCS4 **Channel Frequency: 2412 MHz**



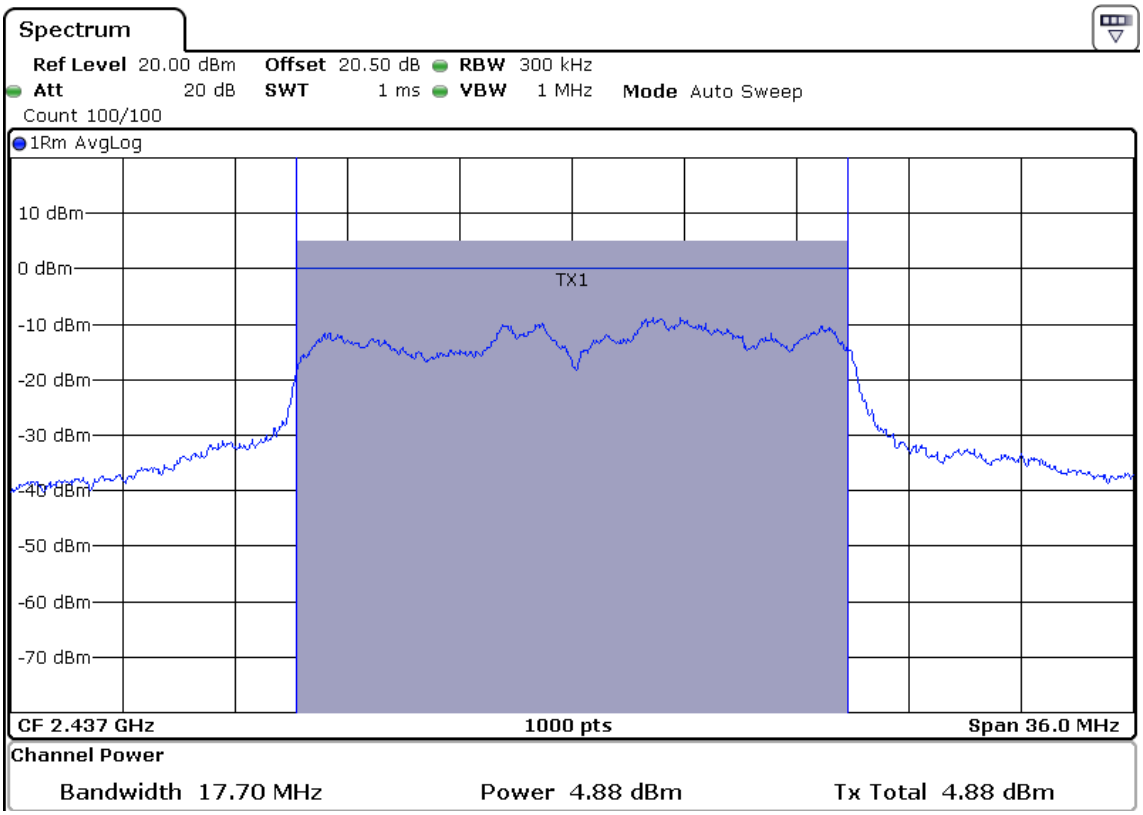
Data Rate: MCS4 **Channel Frequency: 2437 MHz**



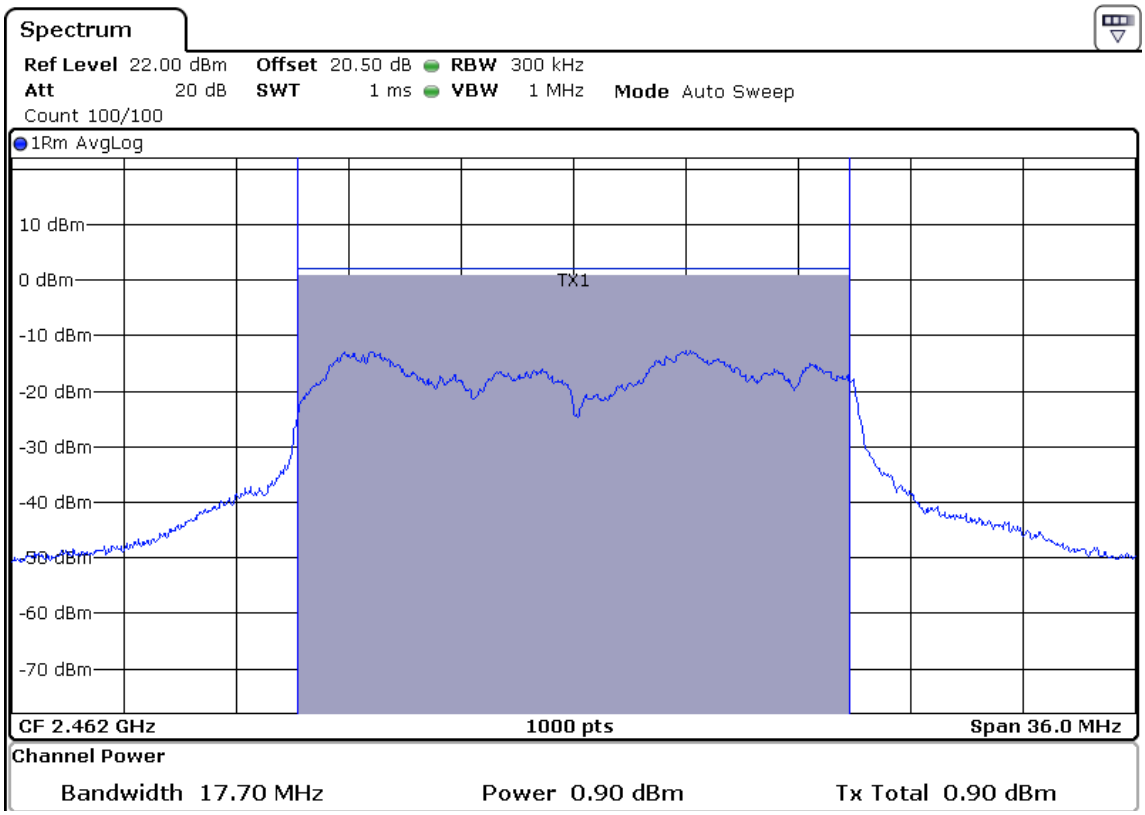
Data Rate: MCS4 **Channel Frequency: 2462 MHz**



Data Rate: MCS7 **Channel Frequency: 2412 MHz**

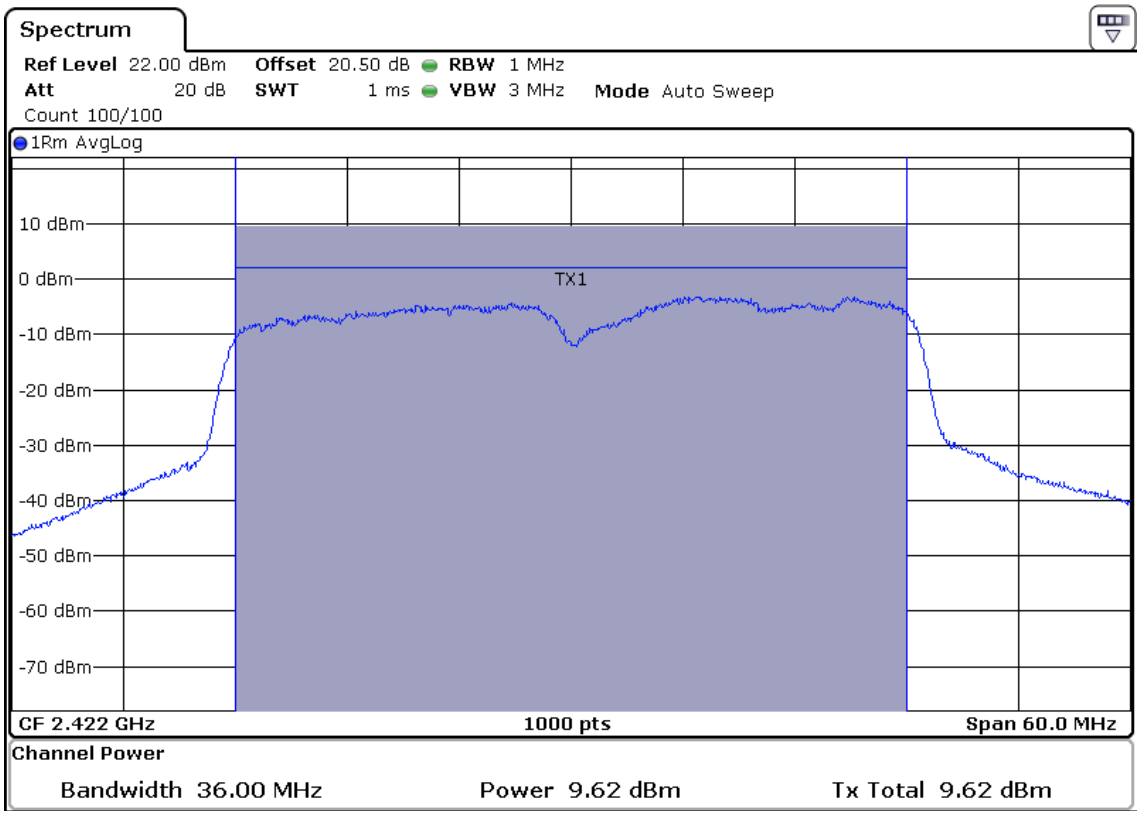


Data Rate: MCS7 **Channel Frequency: 2437 MHz**

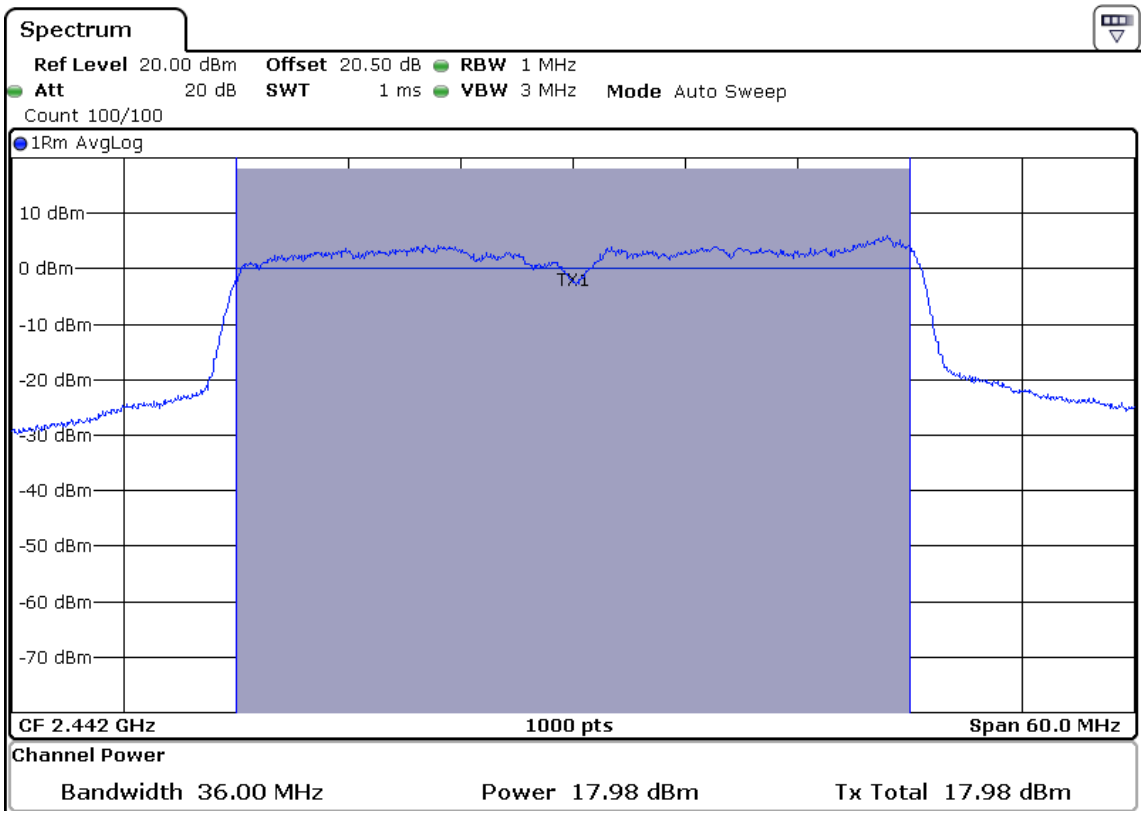


Data Rate: MCS7 **Channel Frequency: 2462 MHz**

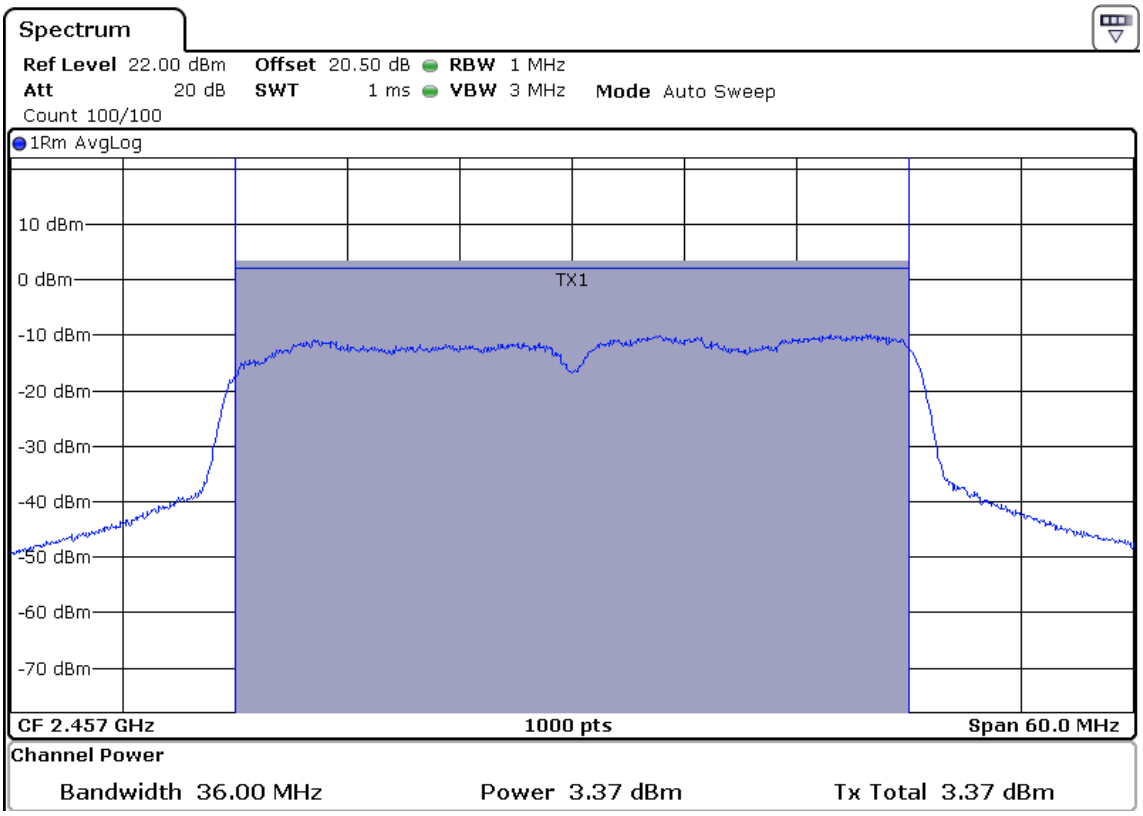
IEEE802.11nHT40			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
MCS0	2422	9.62	9.16
	2442	17.98	62.80
	2457	3.37	2.17
MCS4	2422	-3.11	0.48
	2442	3.72	2.35
	2457	-6.97	0.20
MCS7	2422	-8.31	0.14
	2442	-0.79	0.83
	2457	-7.93	0.16



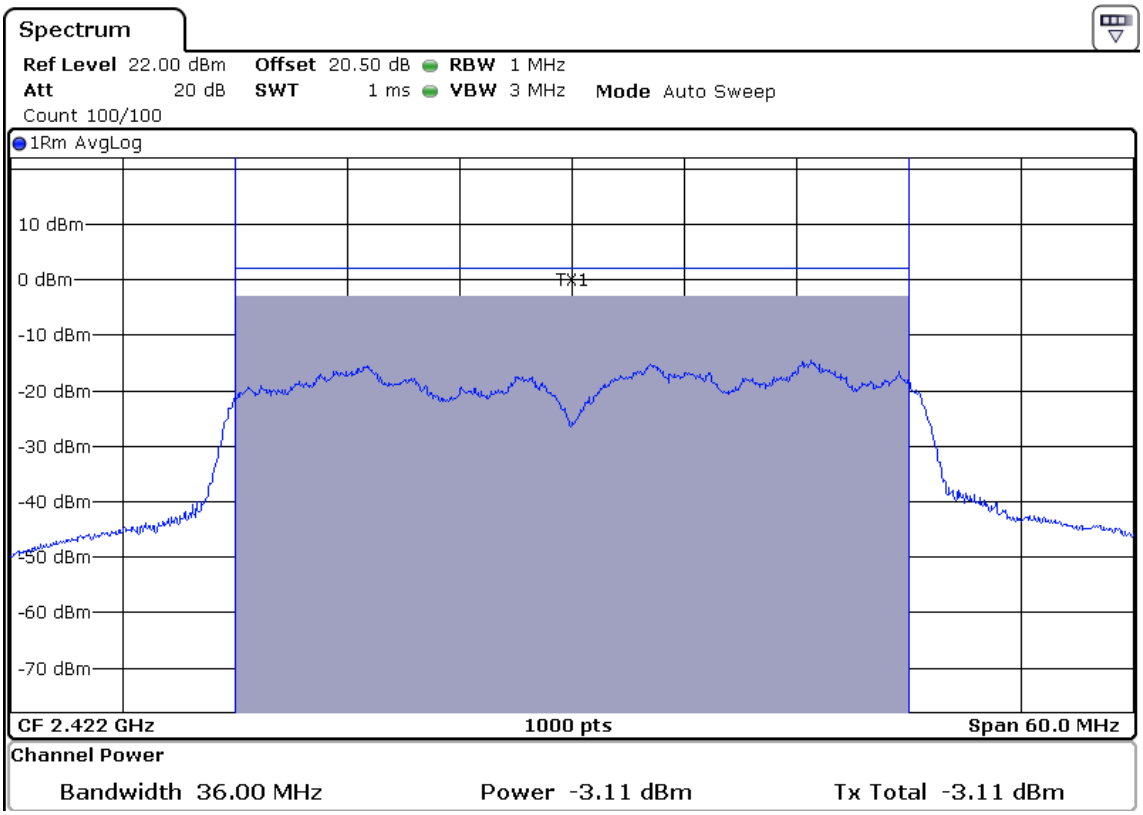
Data Rate: MCS0 **Channel Frequency: 2422 MHz**



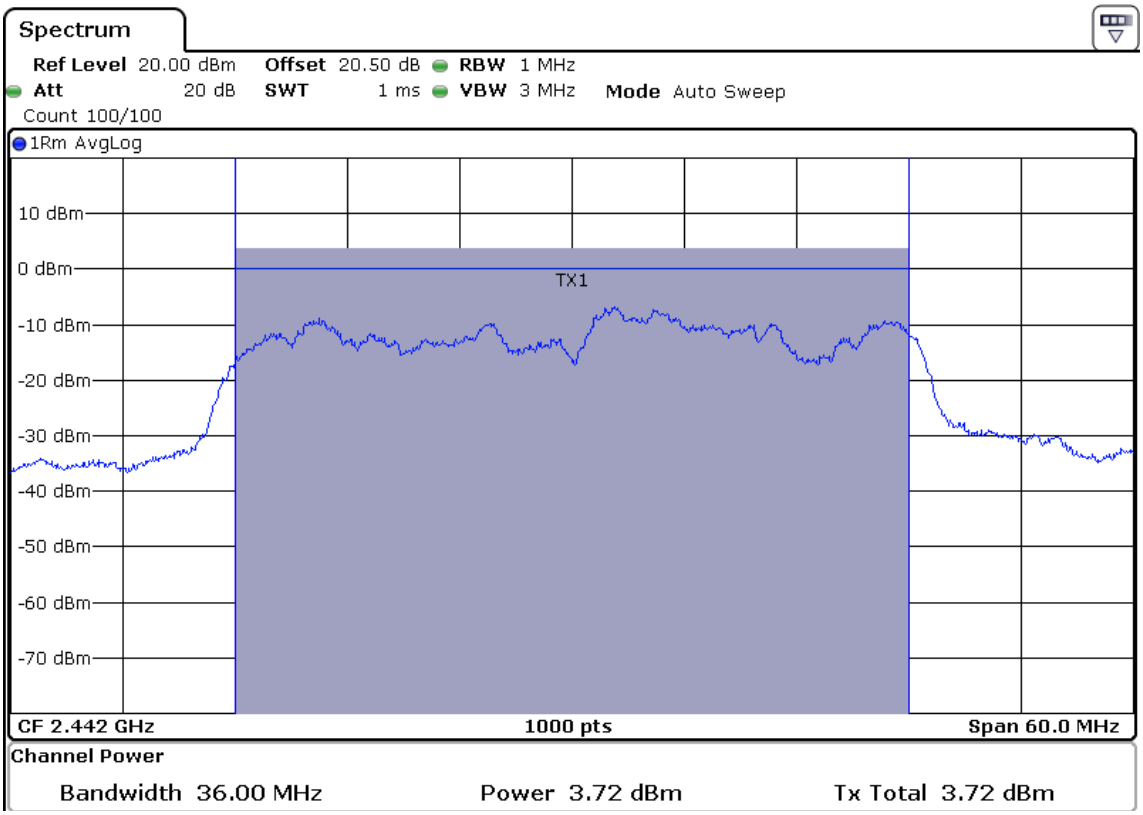
Data Rate: MCS0 **Channel Frequency: 2442 MHz**



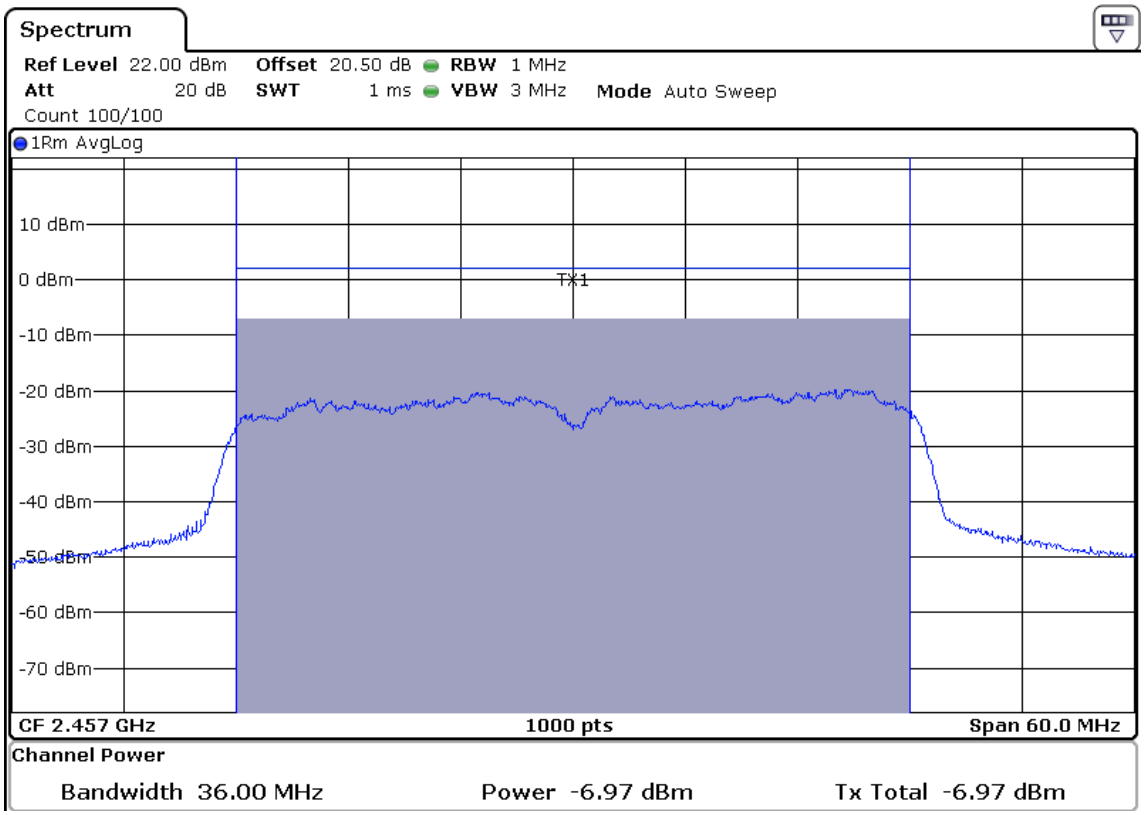
Data Rate: MCS0 **Channel Frequency: 2457 MHz**



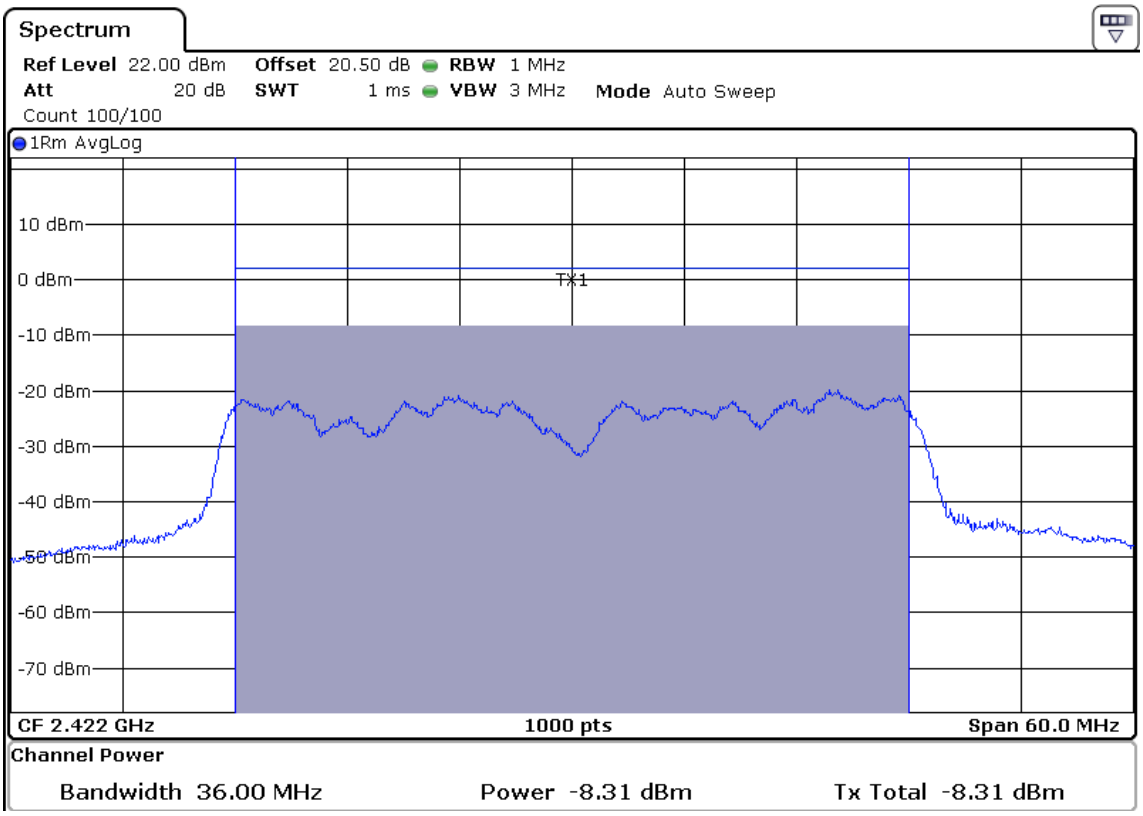
Data Rate: MCS4 **Channel Frequency: 2422 MHz**



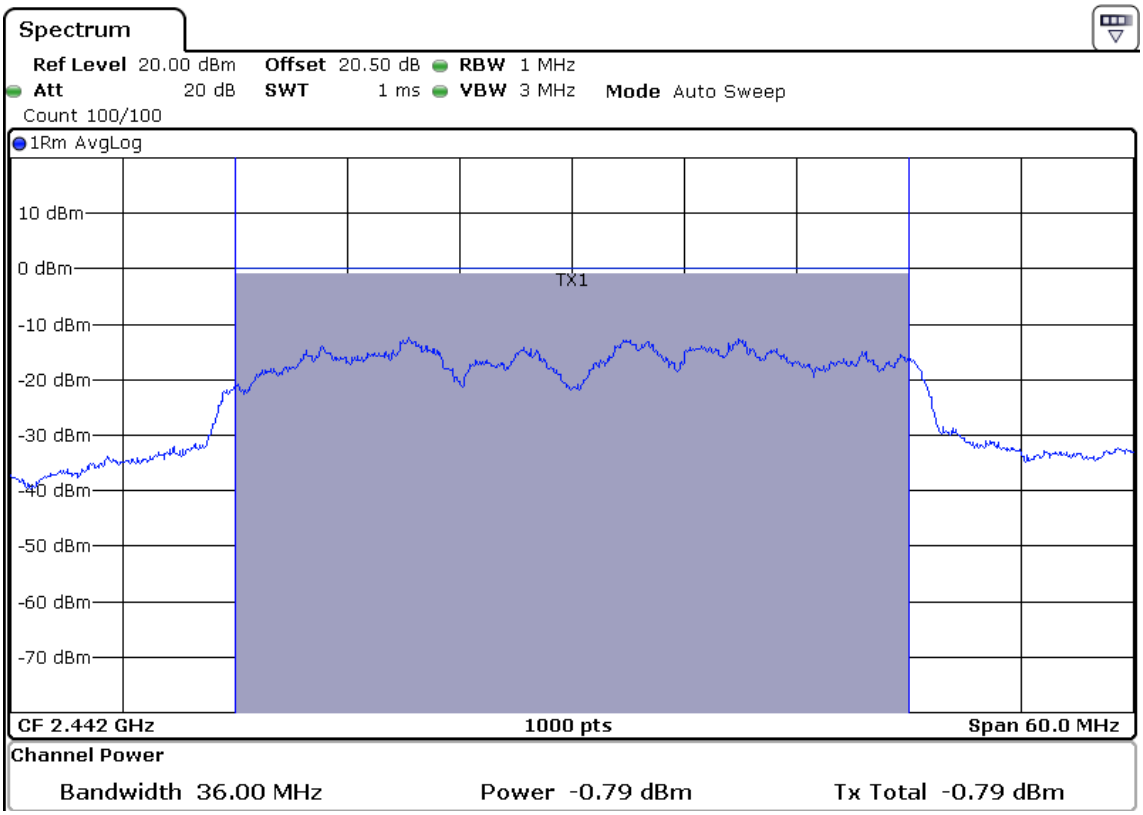
Data Rate: MCS4 **Channel Frequency: 2442 MHz**



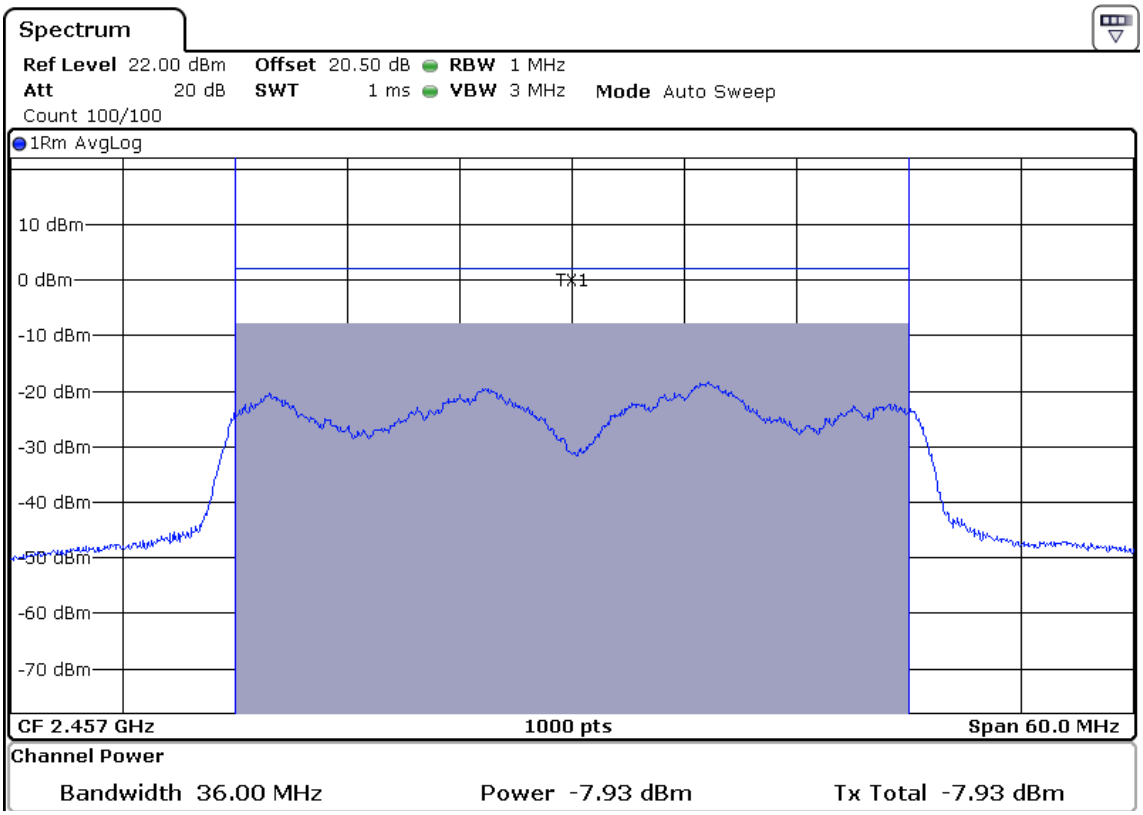
Data Rate: MCS4 **Channel Frequency: 2457 MHz**



Data Rate: MCS7 **Channel Frequency: 2422 MHz**



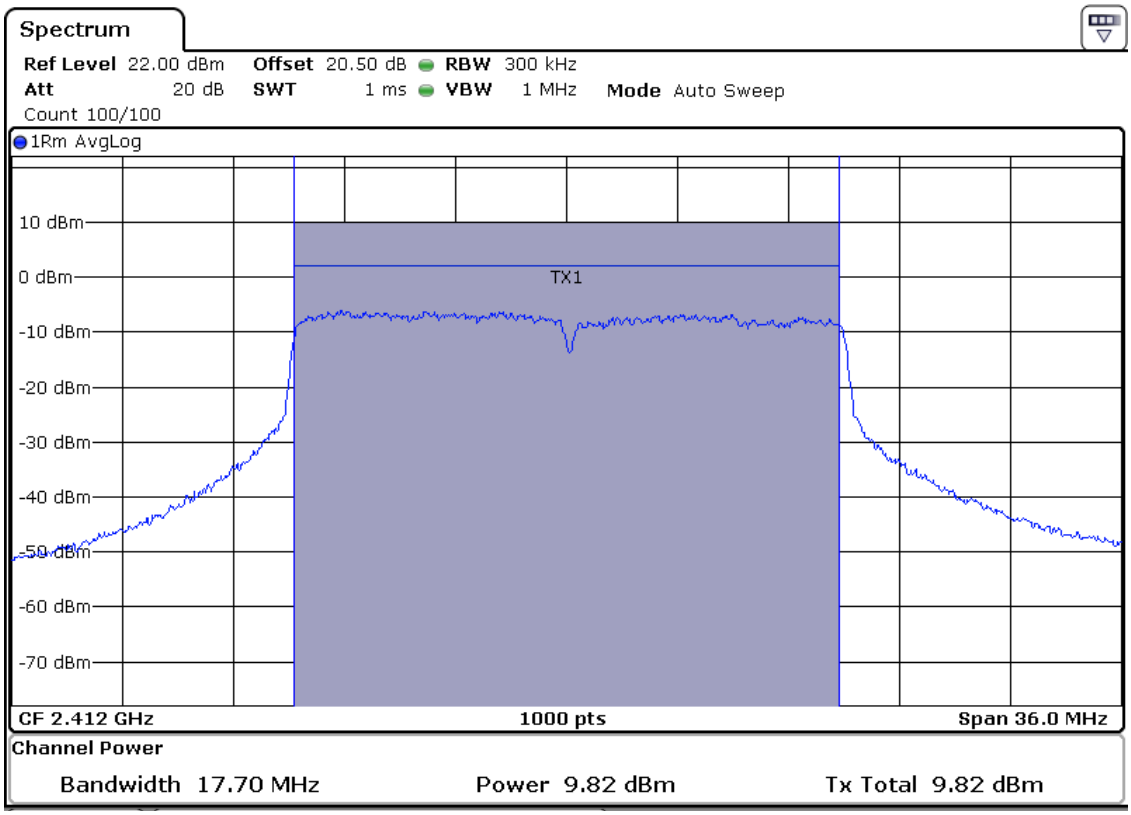
Data Rate: MCS7 **Channel Frequency: 2442 MHz**



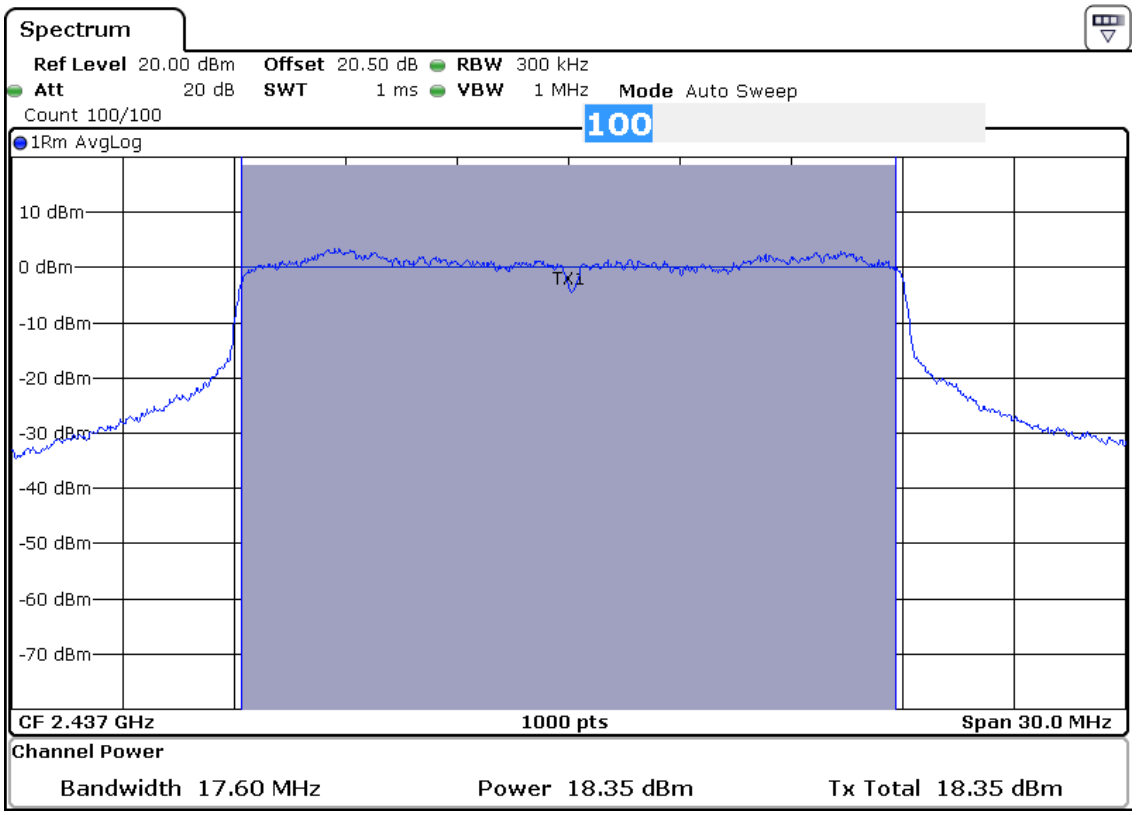
Data Rate: MCS7 **Channel Frequency: 2457 MHz**

Test Results for Path C

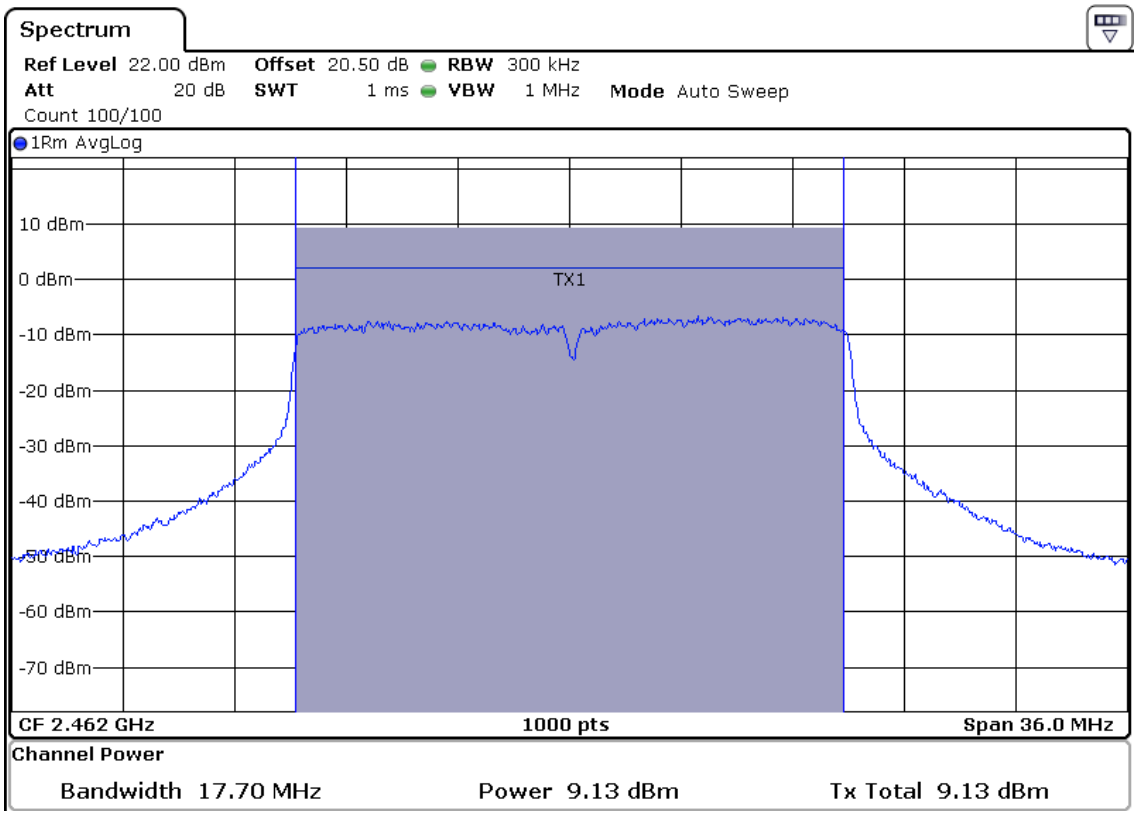
IEEE802.11nHT20			
Data Rate (Mbps)	Channel Frequency (MHz)	Average Power (dBm)	Average Power (mW)
MCS0	2412	9.82	9.59
	2437	18.35	68.39
	2462	9.13	8.18
MCS4	2412	2.39	1.73
	2437	10.71	11.77
	2462	1.35	1.36
MCS7	2412	-2.03	0.62
	2437	5.17	3.28
	2462	-1.55	0.69



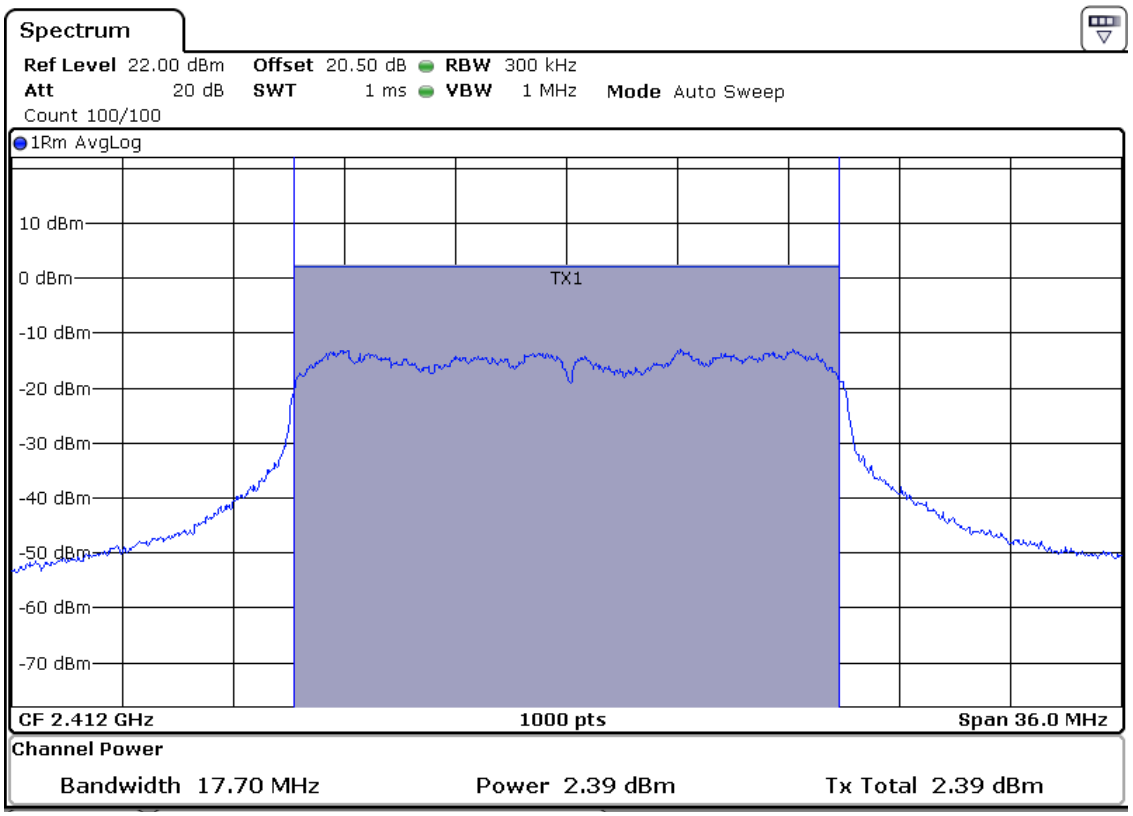
Data Rate: MCS0 **Channel Frequency: 2412 MHz**



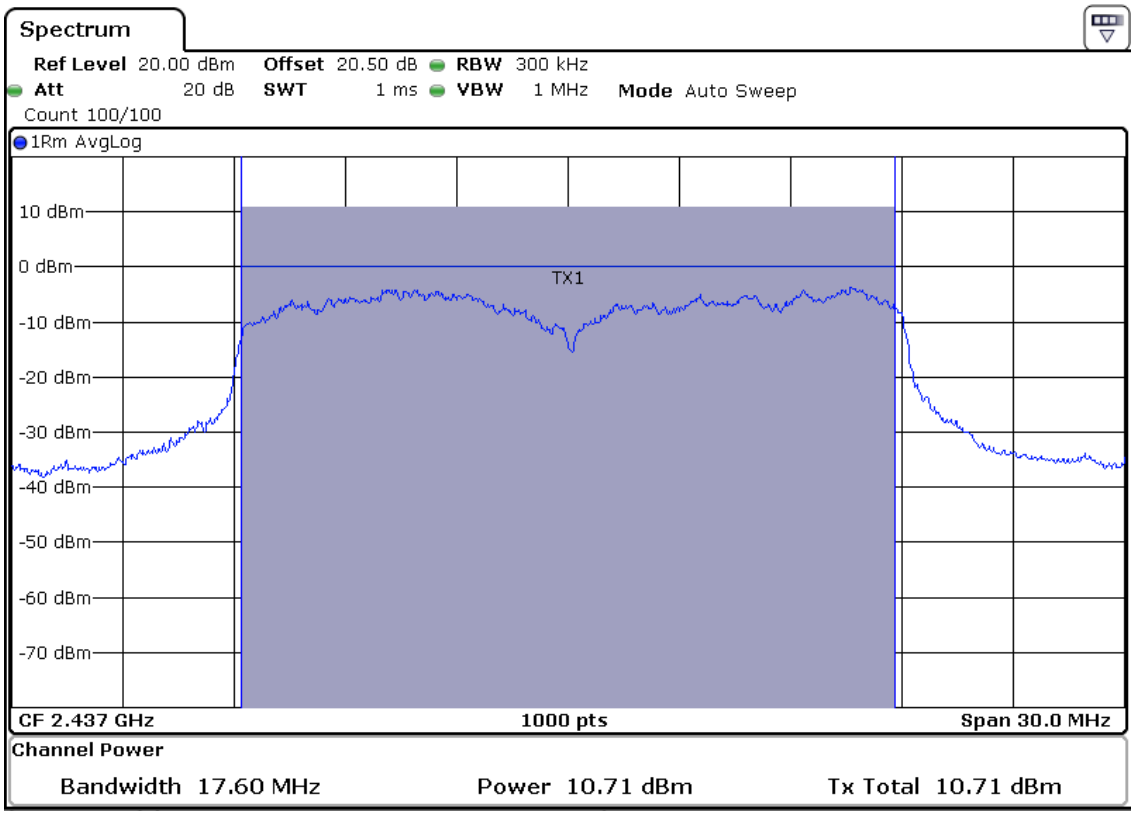
Data Rate: MCS0 **Channel Frequency: 2437 MHz**



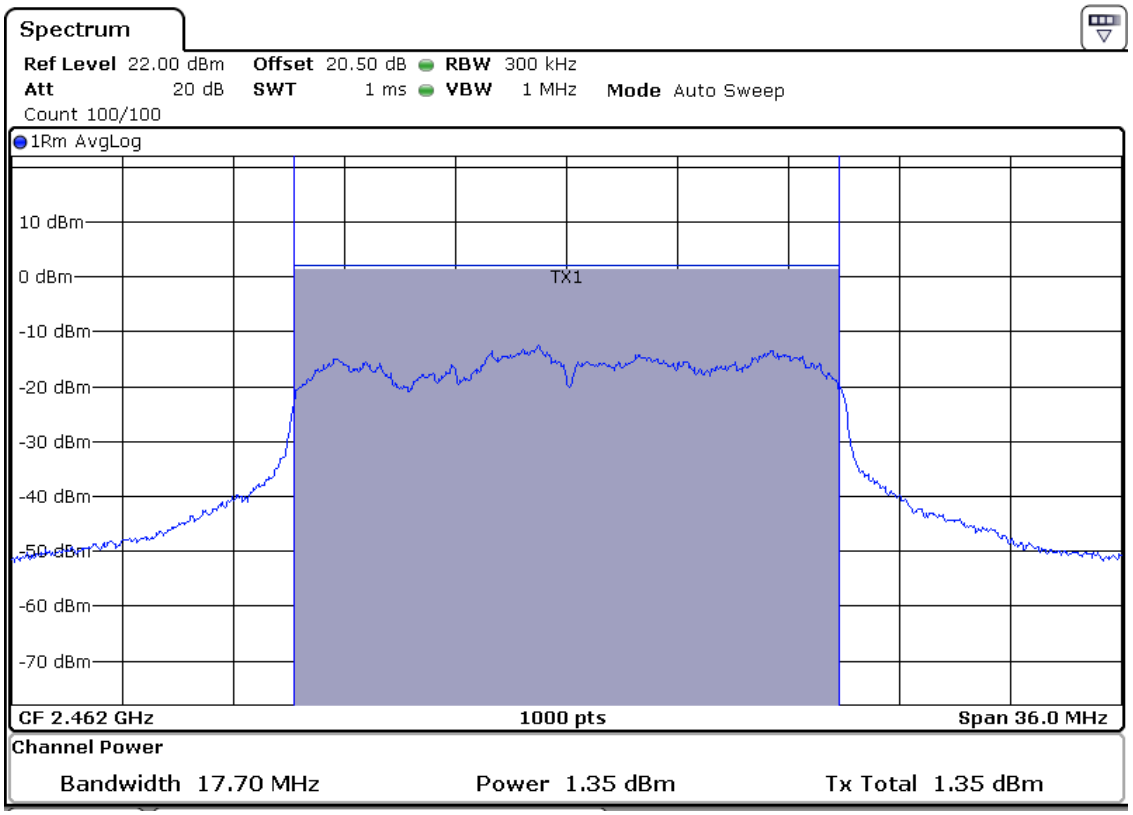
Data Rate: MCS0 **Channel Frequency: 2462 MHz**



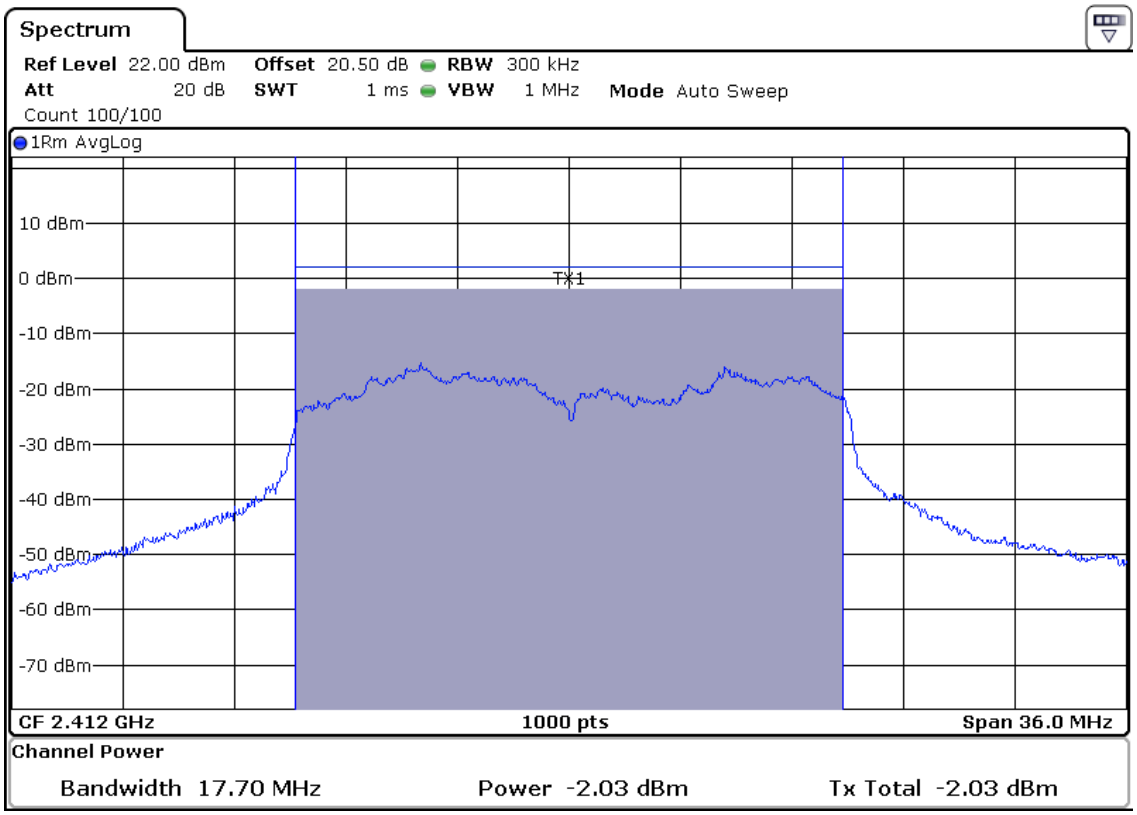
Data Rate: MCS4 **Channel Frequency: 2412 MHz**



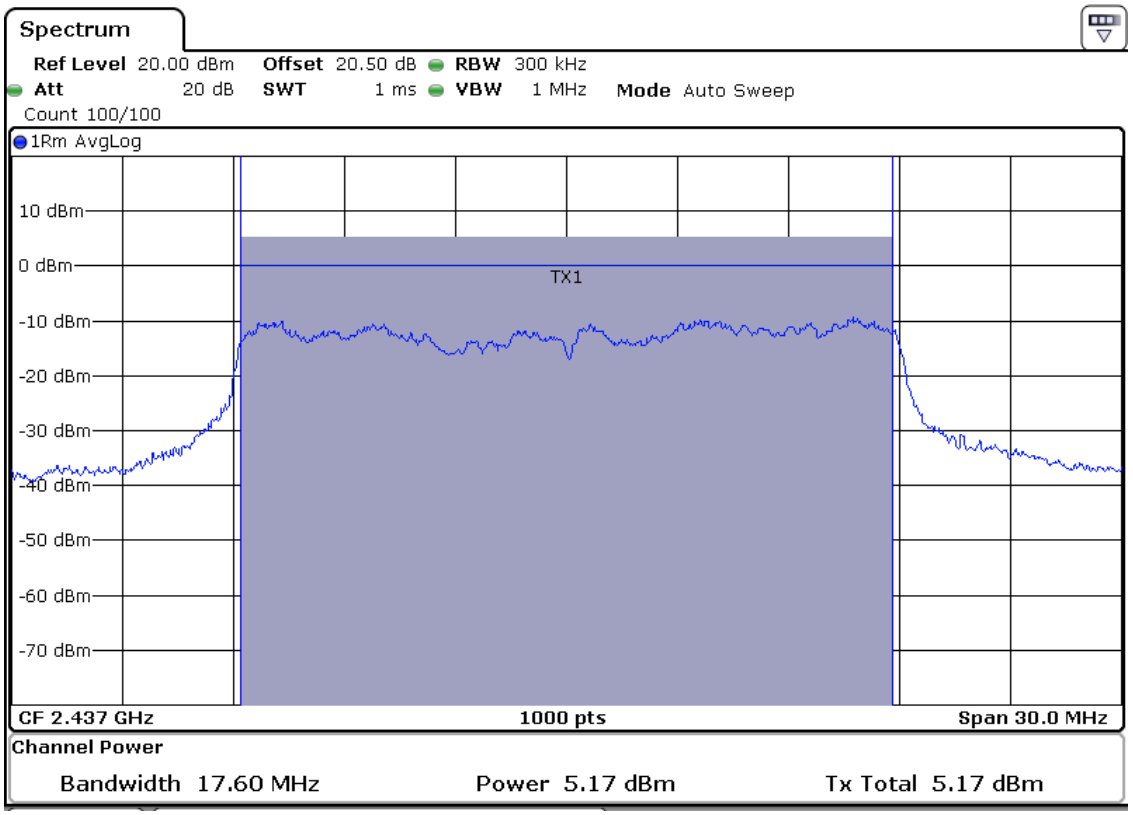
Data Rate: MCS4 **Channel Frequency: 2437 MHz**



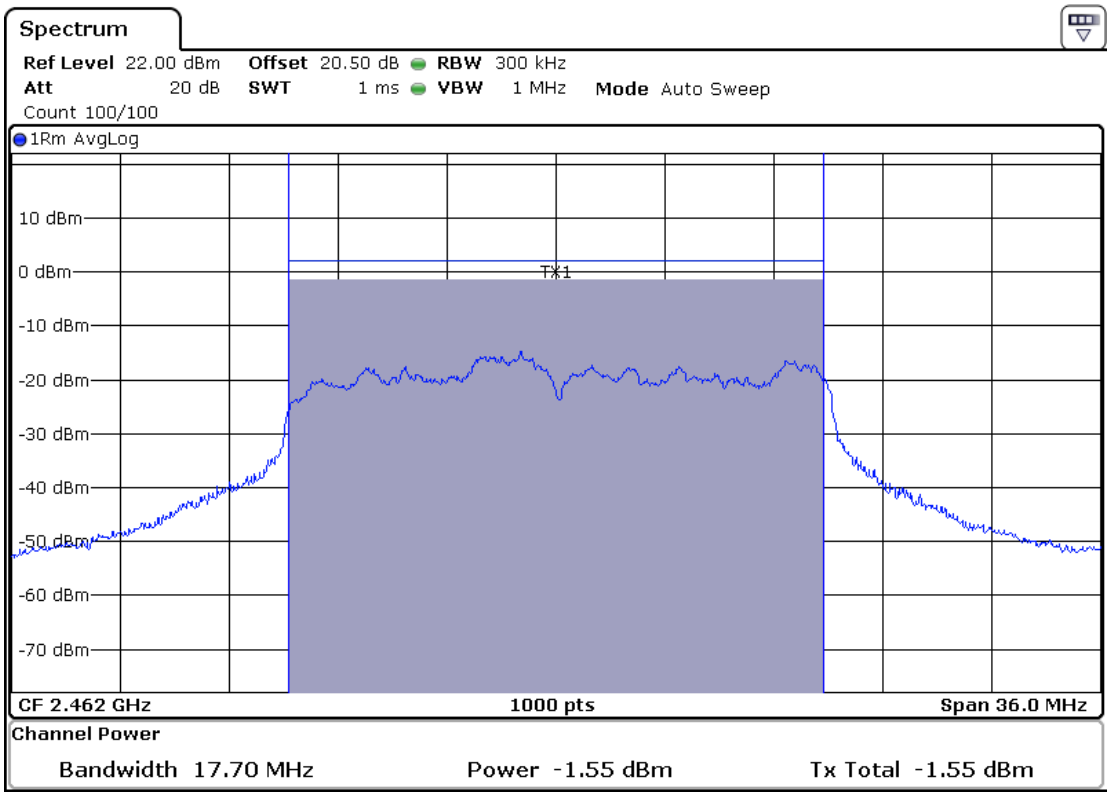
Data Rate: MCS4 **Channel Frequency: 2462 MHz**



Data Rate: MCS7 **Channel Frequency: 2412 MHz**

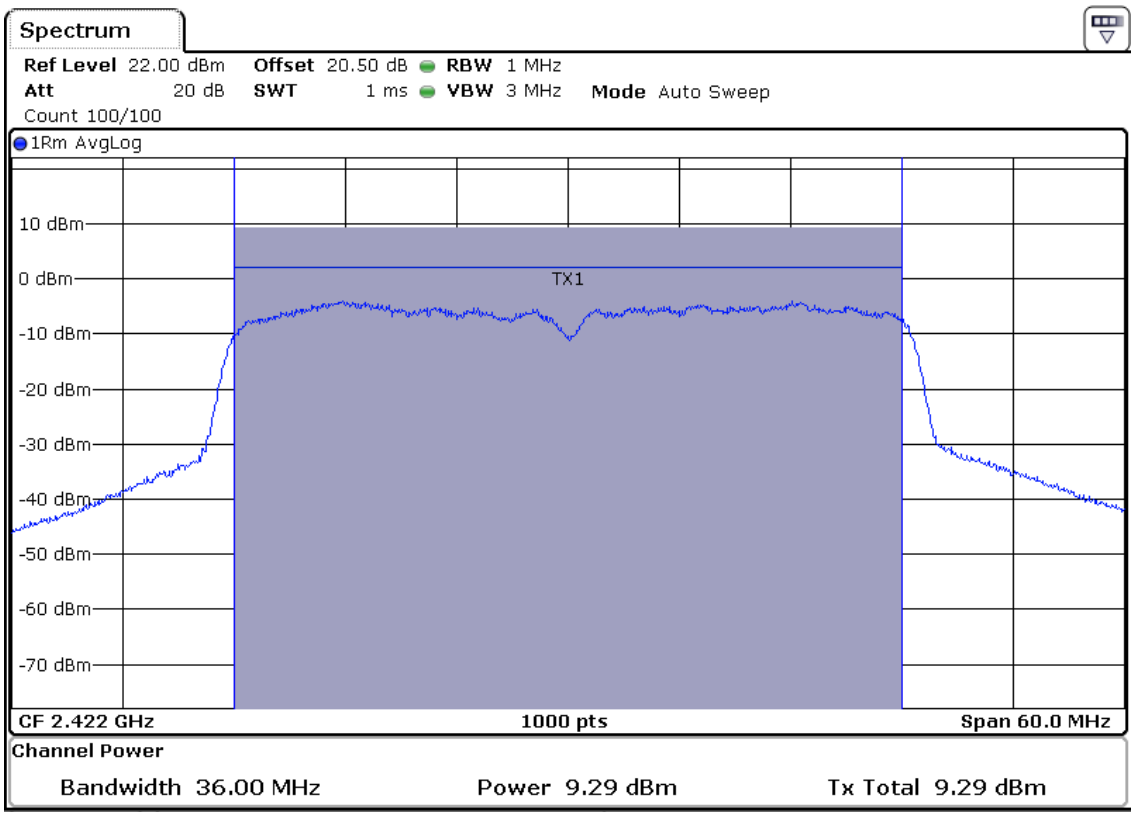


Data Rate: MCS7 **Channel Frequency: 2437 MHz**

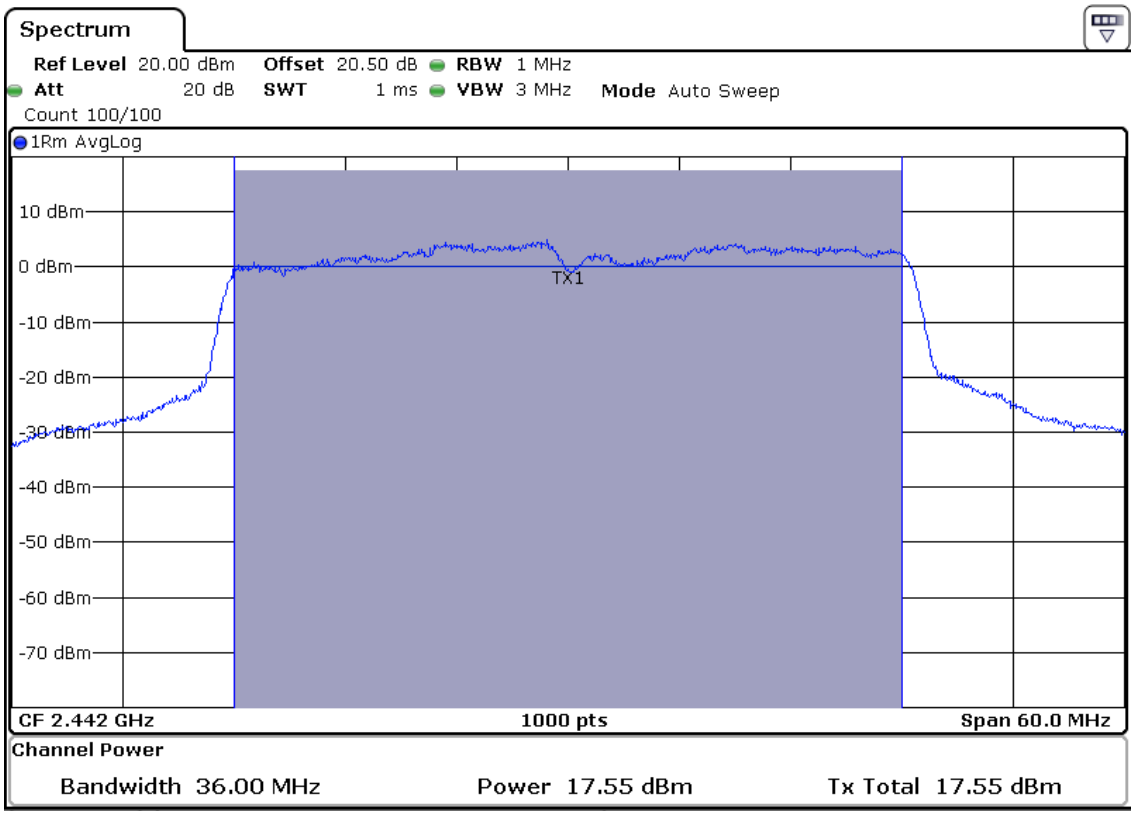


Data Rate: MCS7 **Channel Frequency: 2462 MHz**

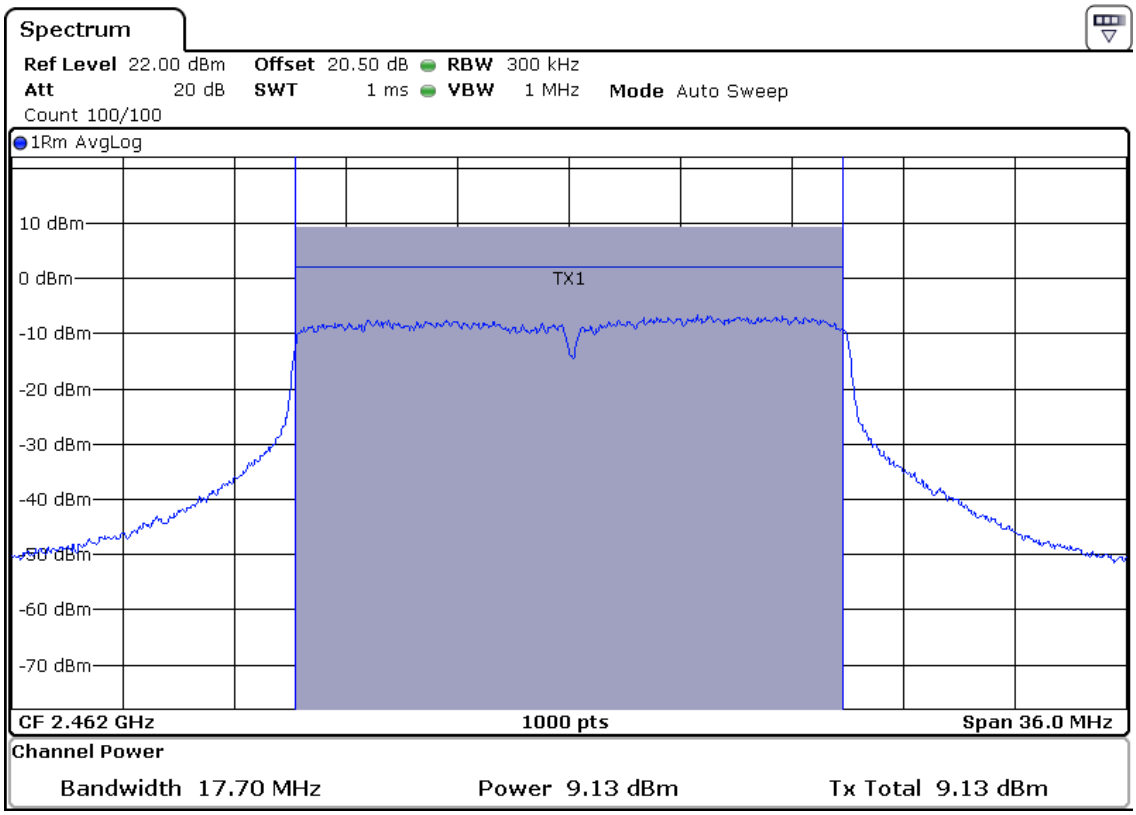
IEEE802.11n HT40			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Average Power (dBm)**	**Average Power (mW)**
MCS0	2422	9.29	8.49
	2442	17.55	56.88
	2457	2.43	1.74
MCS4	2422	-3.49	0.44
	2442	4.47	2.79
	2457	-7.33	0.18
MCS7	2422	-6.93	0.20
	2442	0.54	0.88
	2457	-8.86	0.13



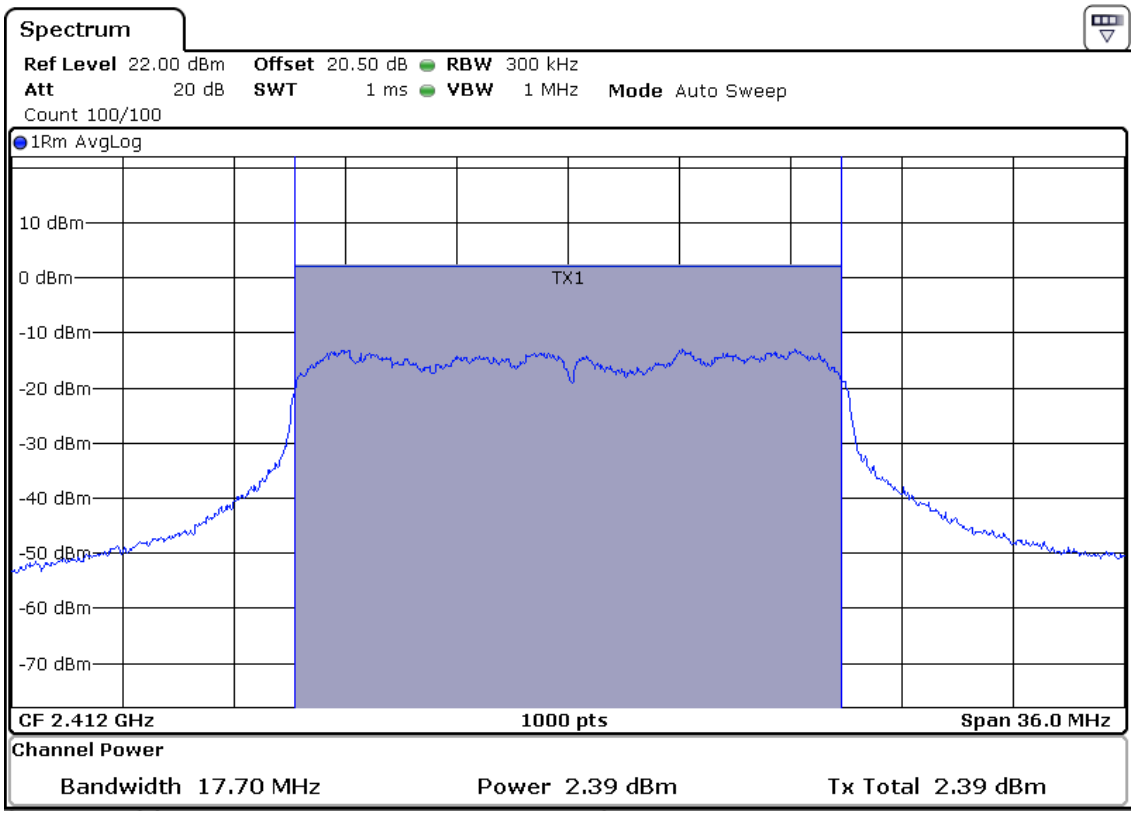
Data Rate: MCS0 **Channel Frequency: 2422 MHz**



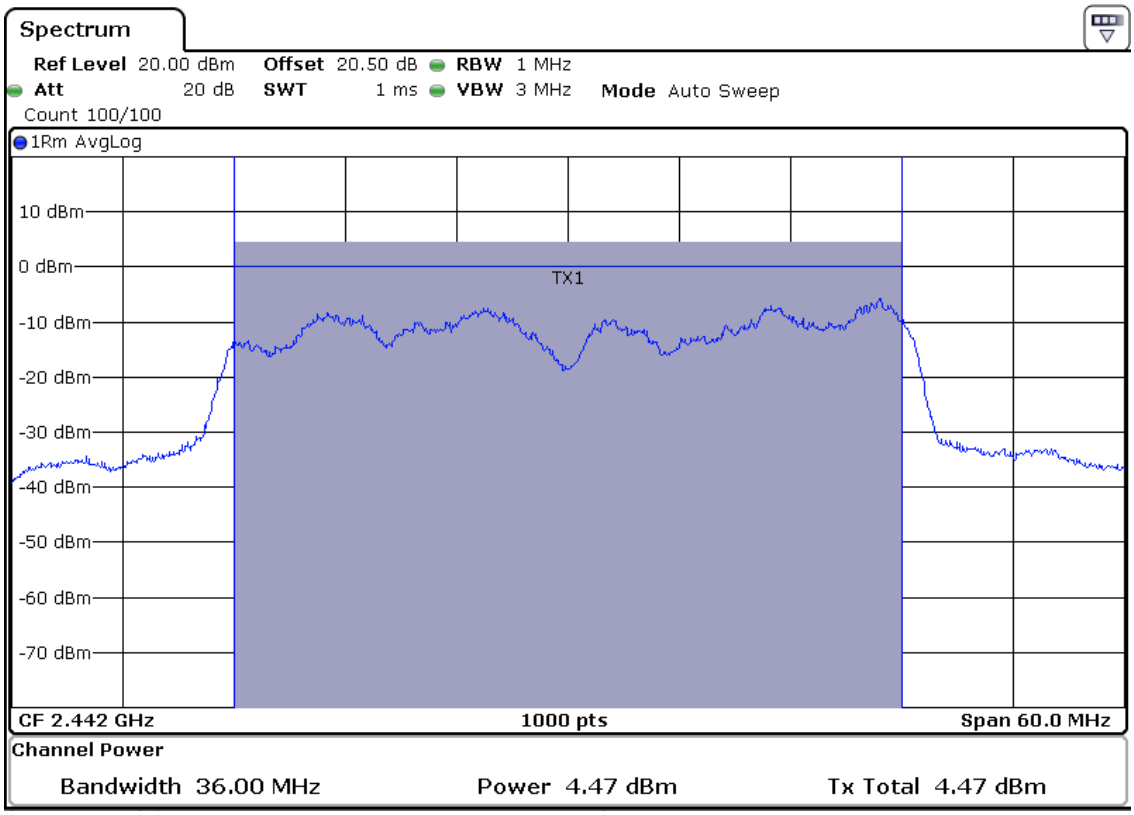
Data Rate: MCS0 **Channel Frequency: 2442 MHz**



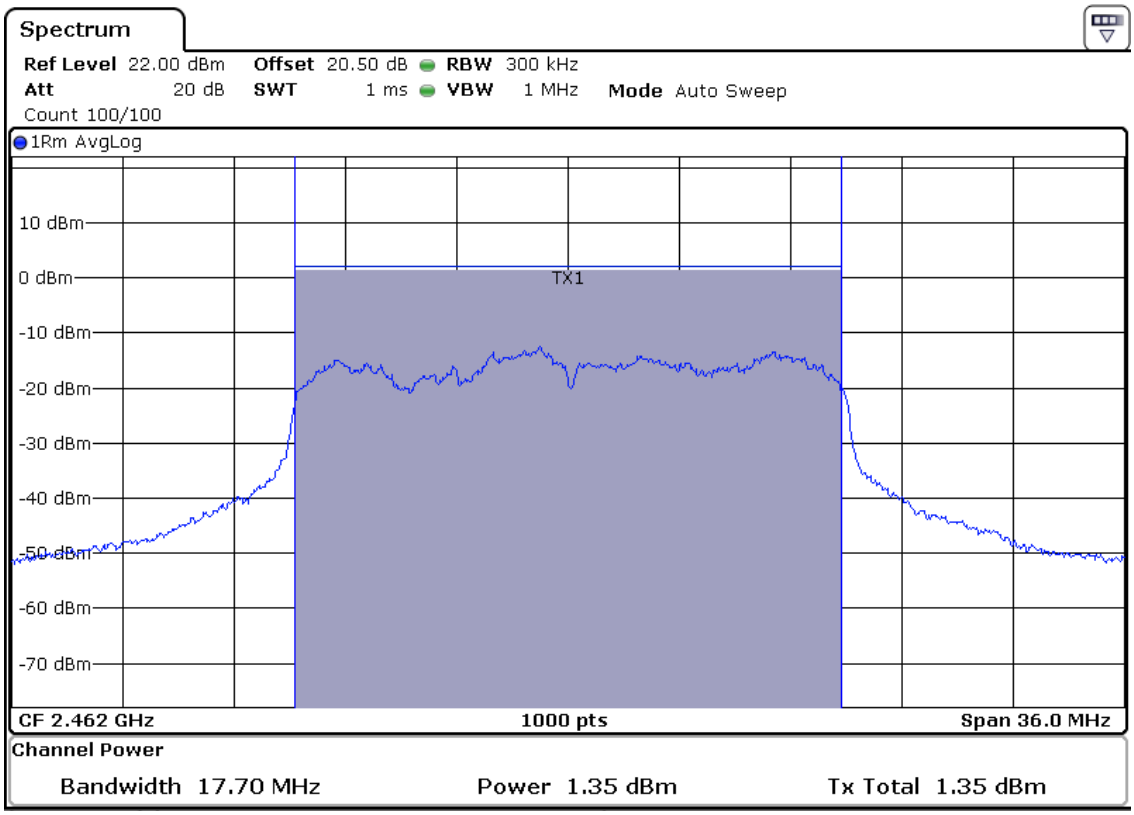
Data Rate: MCS0 **Channel Frequency: 2457 MHz**



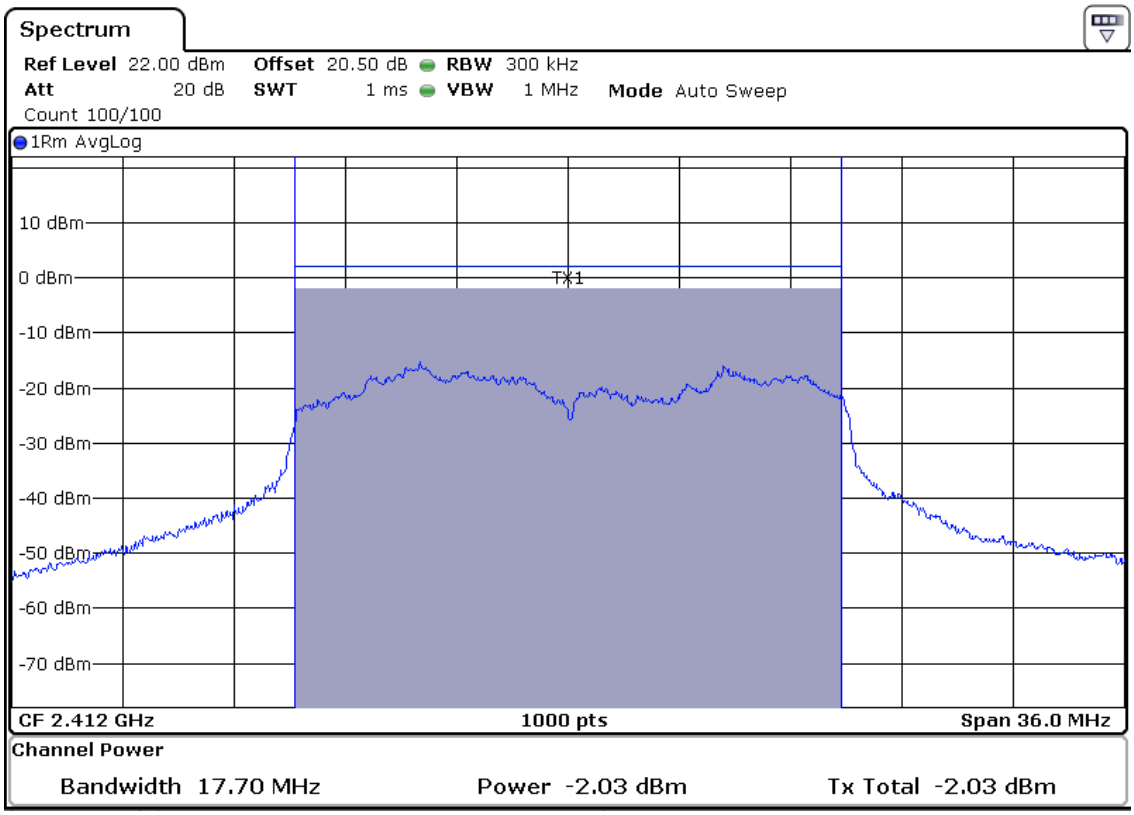
Data Rate: MCS4 **Channel Frequency: 2422 MHz**



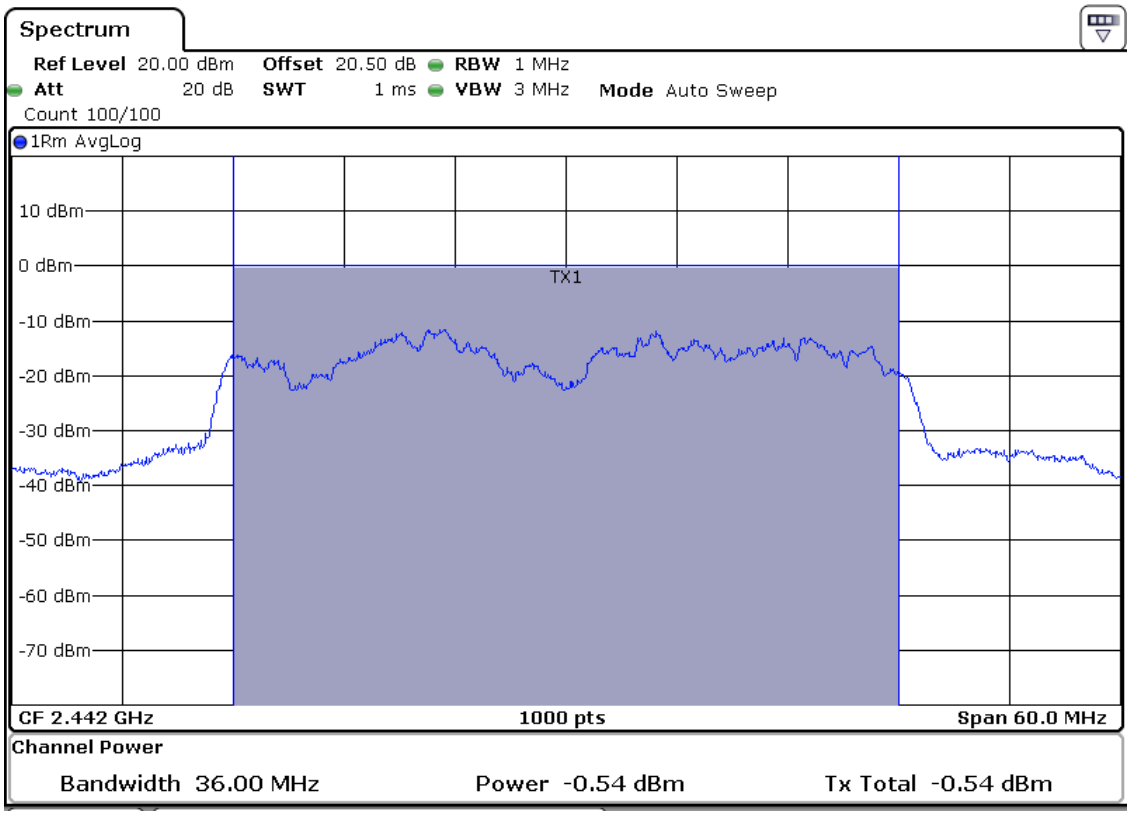
Data Rate: MCS4 **Channel Frequency: 2442 MHz**



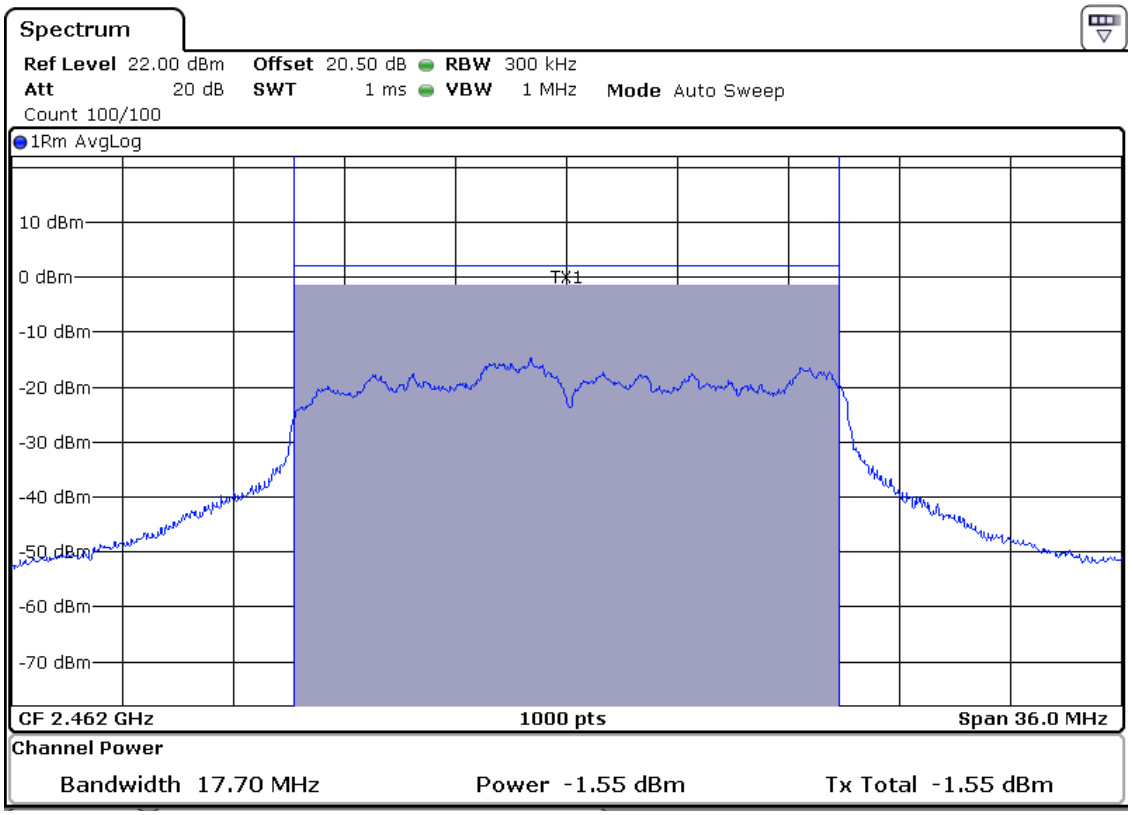
Data Rate: MCS4 **Channel Frequency: 2457 MHz**



Data Rate: MCS7 **Channel Frequency: 2422 MHz**



Data Rate: MCS7 **Channel Frequency: 2442 MHz**



Data Rate: MCS7 **Channel Frequency: 2457 MHz**

Measure and sum

Data Rate (Mbps)	Channel Frequency (MHz)	Average Power (mW) Path A	Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Remarks
1	2412	47.86	47.86	16.80	30	Pass
	2437	89.12	89.12	19.50	30	Pass
	2462	73.11	73.11	18.64	30	Pass
11	2412	26.73	26.73	14.27	30	Pass
	2437	45.81	45.81	16.61	30	Pass
	2462	19.27	19.275	12.85	30	Pass

Data Rate (Mbps)	Channel Frequency (MHz)	Average Power (mW) Path A	Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Remarks
6	2412	48.86	48.86	16.89	30	Pass
	2437	56.10	56.10	17.49	30	Pass
	2462	20.94	20.94	13.21	30	Pass
24	2412	15.34	15.34	11.86	30	Pass
	2437	19.81	19.81	12.97	30	Pass
	2462	05.00	05.00	06.99	30	Pass
54	2412	01.13	01.13	00.55	30	Pass
	2437	03.58	03.58	05.55	30	Pass
	2462	02.01	02.01	03.04	30	Pass

IEEE 802.11nHT20								
Data Rate (Mbps)	Channel Frequency (MHz)	Average Power (mW) Path A	Average Power (mW) Path B	Average Power (mW) Path C	Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Remarks
MCS0	2412	8.53	9.77	9.59	27.89	14.45	30	Pass
	2437	55.46	76.73	68.39	200.58	23.02	30	Pass
	2462	6.01	8.09	8.18	22.28	13.48	30	Pass
MCS4	2412	1.48	1.50	1.73	4.72	6.74	30	Pass
	2437	9.48	10.37	11.77	31.63	15.00	30	Pass
	2462	1.27	3.27	1.36	5.90	7.71	30	Pass
MCS7	2412	0.43	0.46	0.62	1.53	1.85	30	Pass
	2437	3.04	3.07	3.28	9.41	9.73	30	Pass
	2462	0.47	1.23	0.69	2.40	3.80	30	Pass

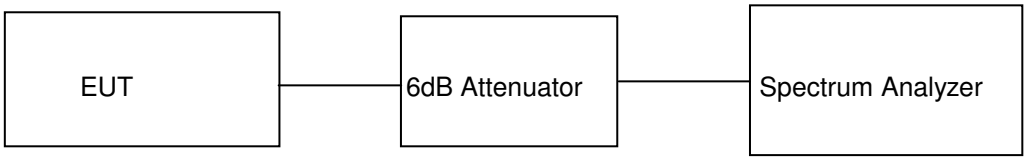
IEEE 802.11nHT40								
Data Rate (Mbps)	Channel Frequency (MHz)	Average Power (mW) Path A	Average Power (mW) Path B	Average Power (mW) Path C	Total Average Power (mW)	Total Average Power (dBm)	Limit (dBm)	Remarks
MCS0	2422	03.23	09.16	8.49	20.88	13.19	30	Pass
	2437	47.53	62.80	56.88	167.22	22.23	30	Pass
	2457	01.54	02.17	1.74	5.46	7.377	30	Pass
MCS4	2422	00.18	00.48	0.44	1.127	0.51	30	Pass
	2437	01.64	02.35	2.79	6.79	8.327	30	Pass
	2457	00.17	00.20	0.18	0.56	-2.50	30	Pass
MCS7	2422	00.03	00.14	0.20	0.38	-4.10	30	Pass
	2437	00.72	00.83	0.88	2.43	3.871	30	Pass
	2457	00.10	00.16	0.13	0.40	-3.97	30	Pass

Test Specification FCC Part 15 Section 15.247 (e)
Detector Function Average
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 as mentioned in KDB.

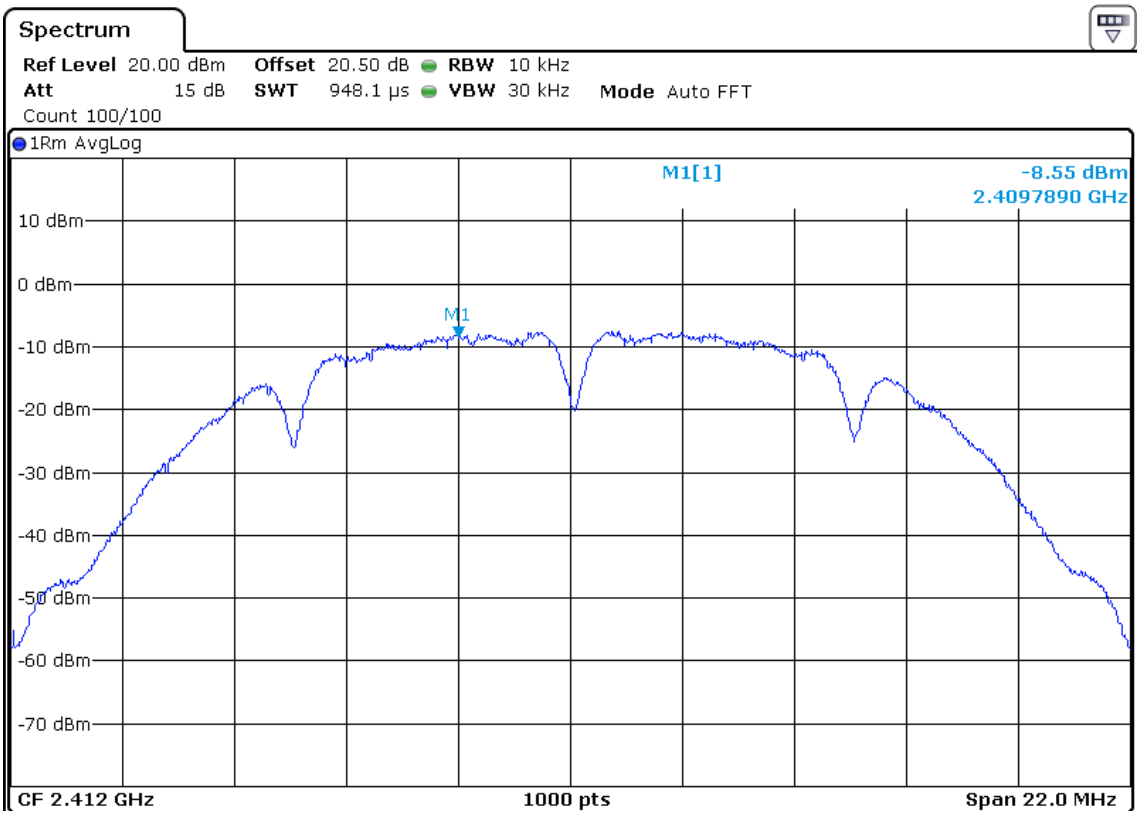
Test Method:



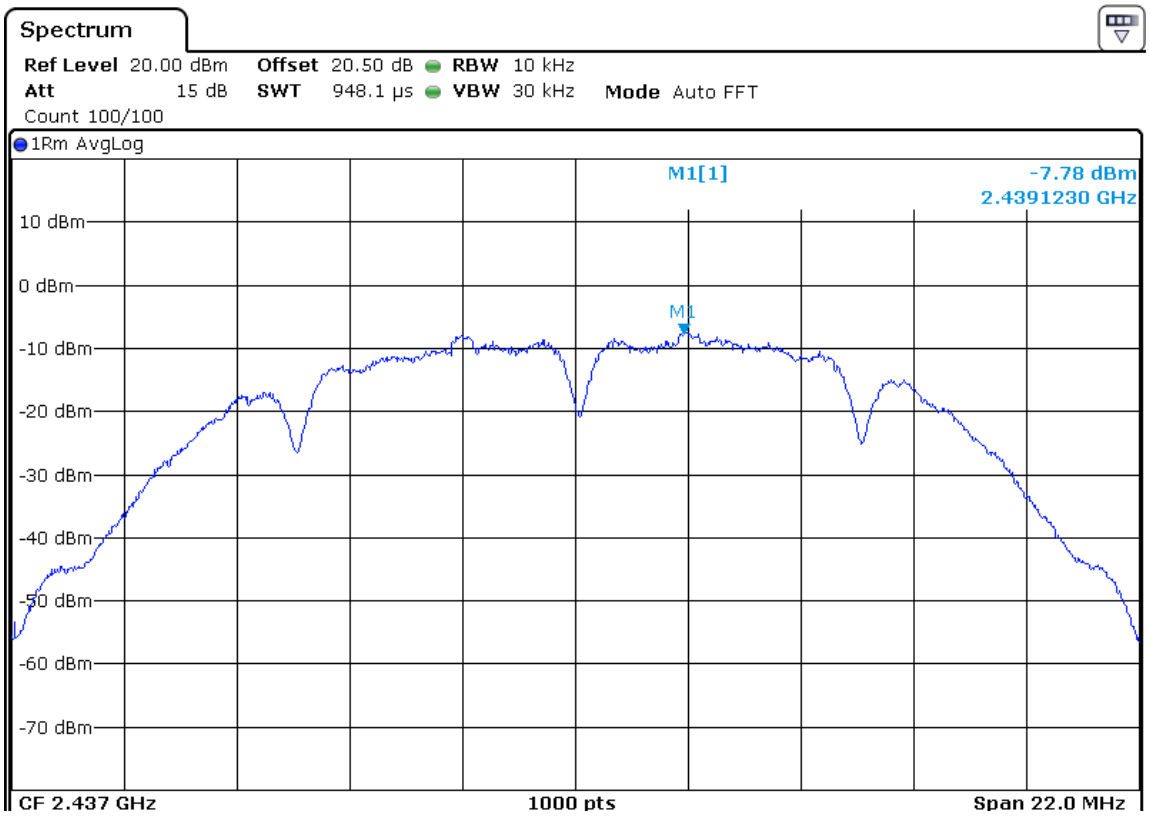
Test Result:

Attenuator (20dB) + cable loss (0.5dB) = 20.5dB Considered in the test result

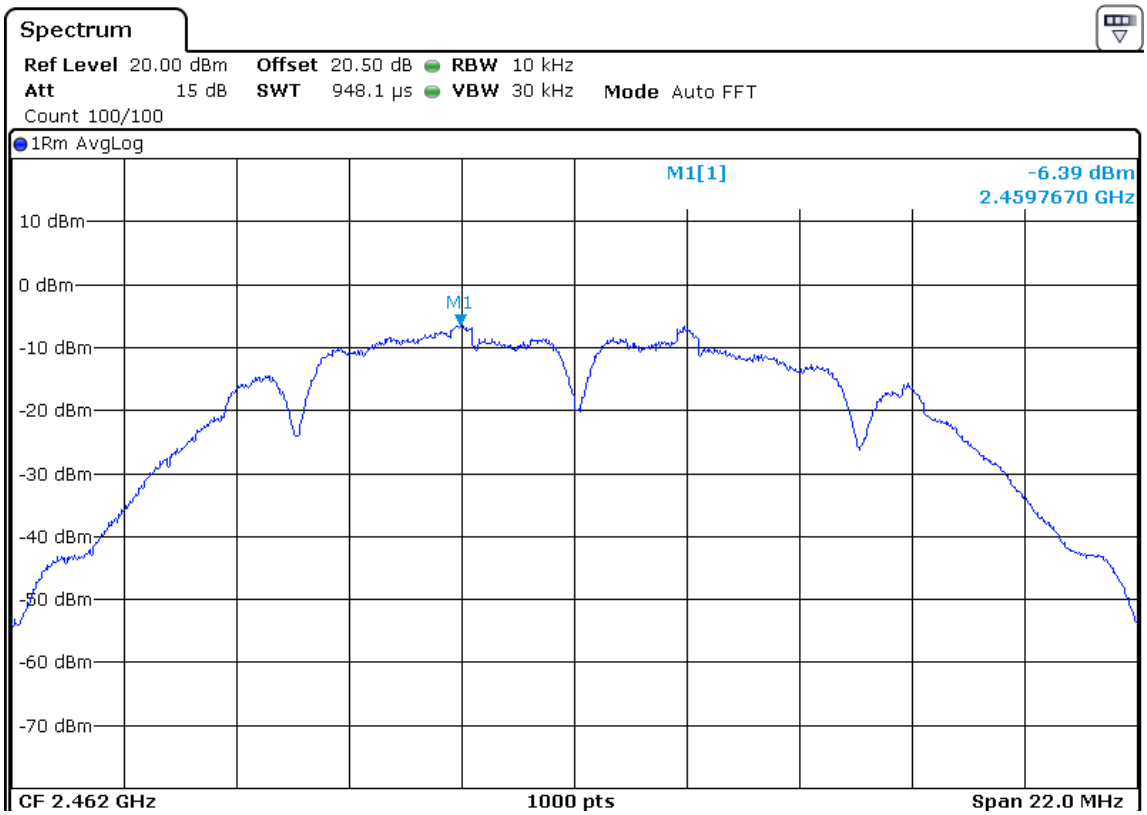
IEEE802.11b			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Total PSD (dBm)**	**Limit (dBm)**
1	2412	-3.293	8
	2437	-2.747	8
	2462	-2.425	8
11	2412	-2.783	8
	2437	-2.742	8
	2462	-2.035	8



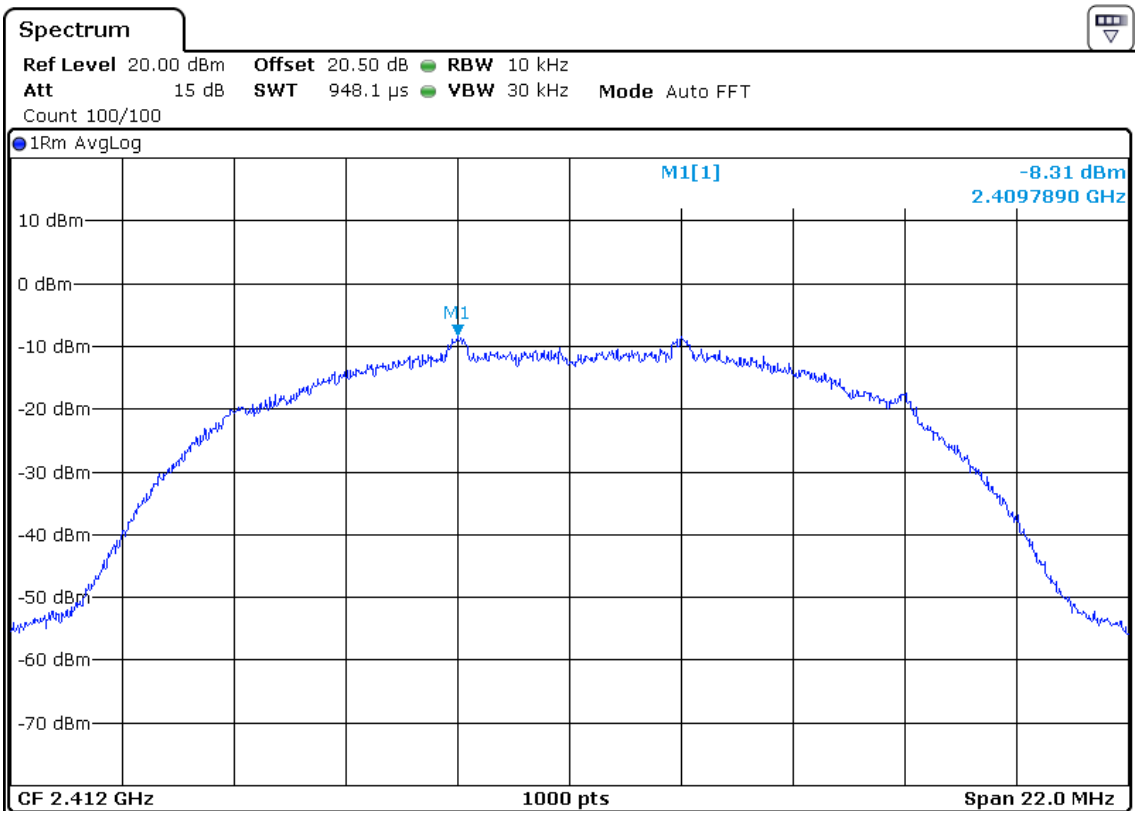
Data rate: 1 Mbps **Channel Frequency: 2412 MHz**



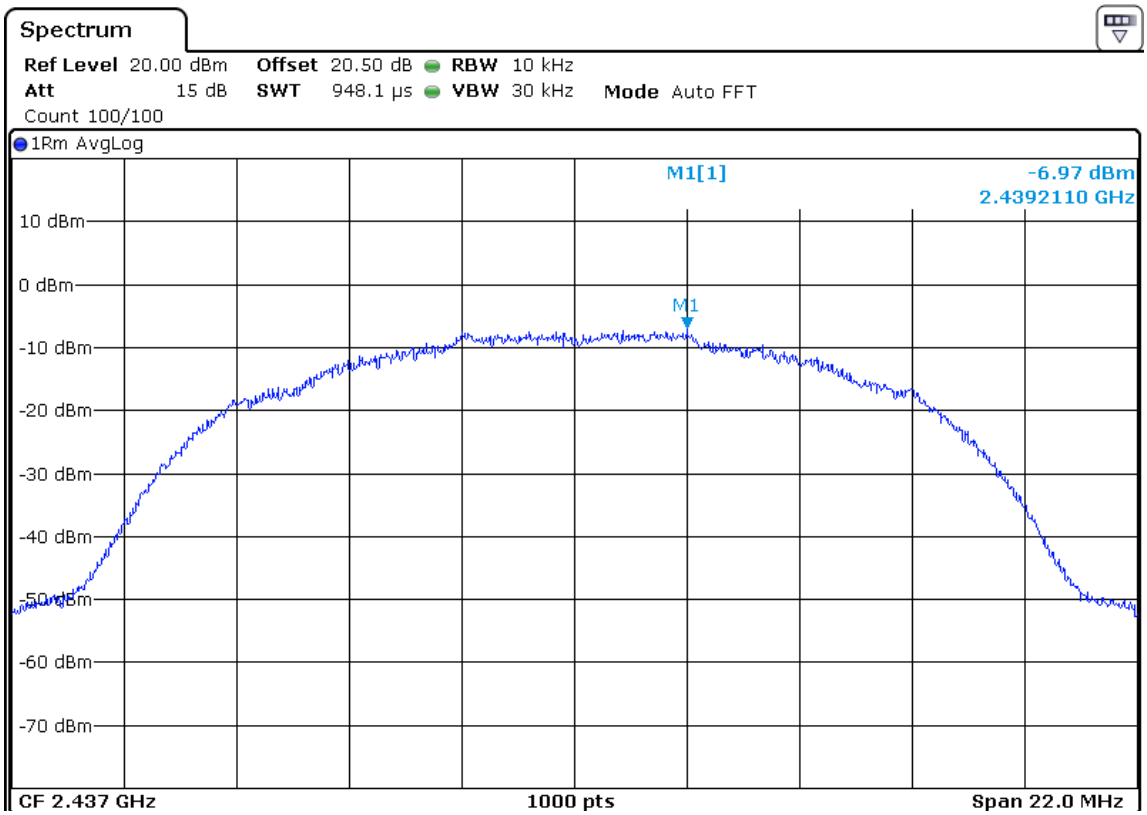
Data rate: 1 Mbps **Channel Frequency: 2437 MHz**



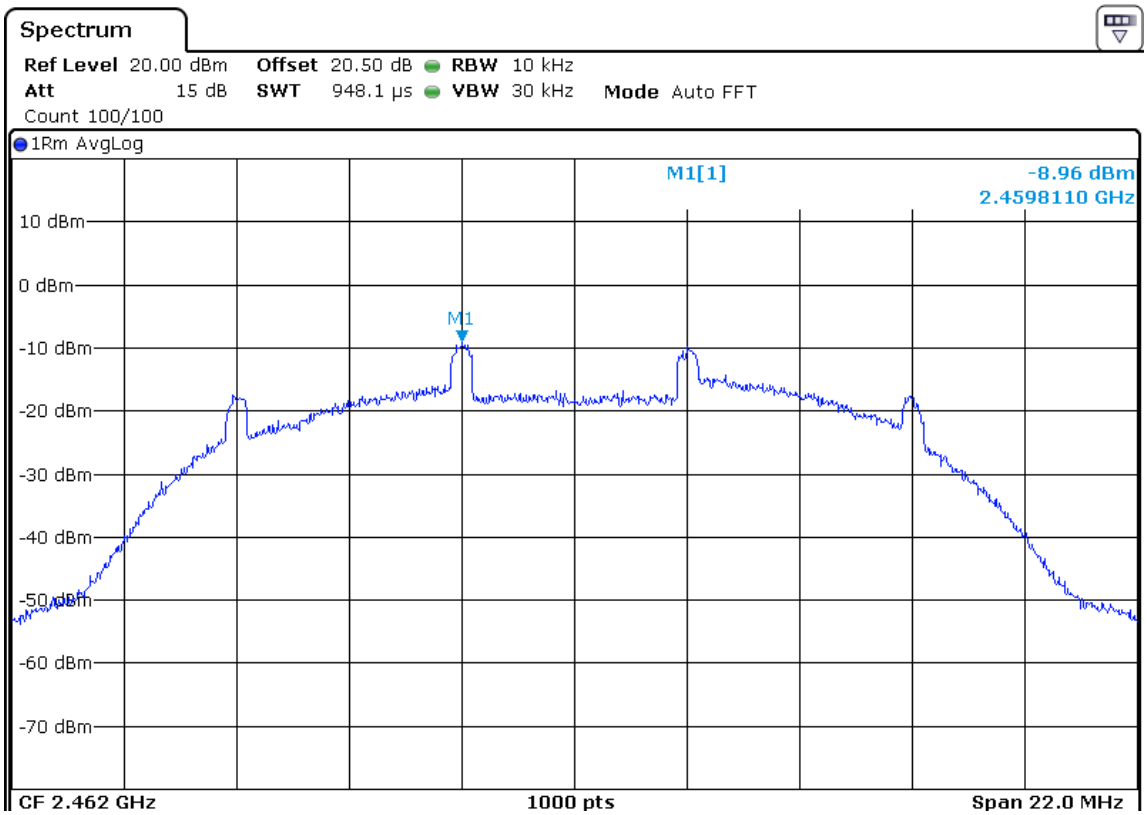
Data rate: 1 Mbps **Channel Frequency: 2462 MHz**



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

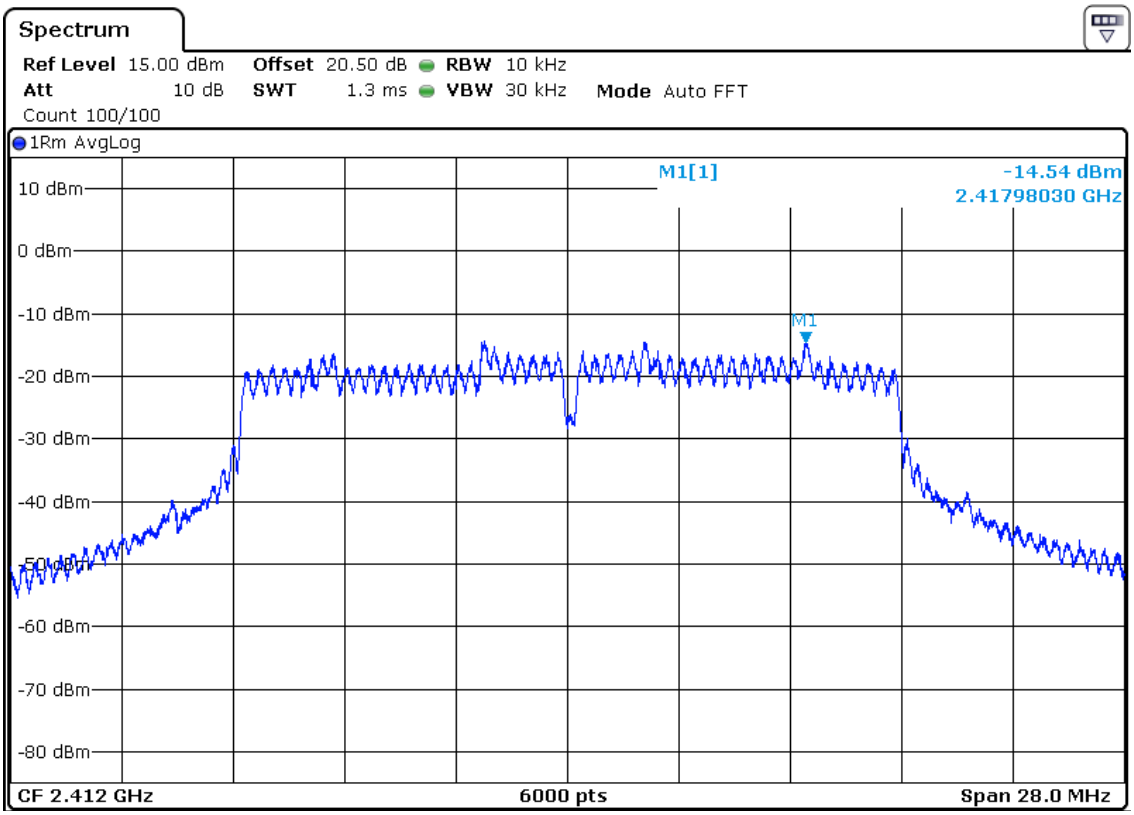


Data rate: 11 Mbps **Channel Frequency: 2437 MHz**

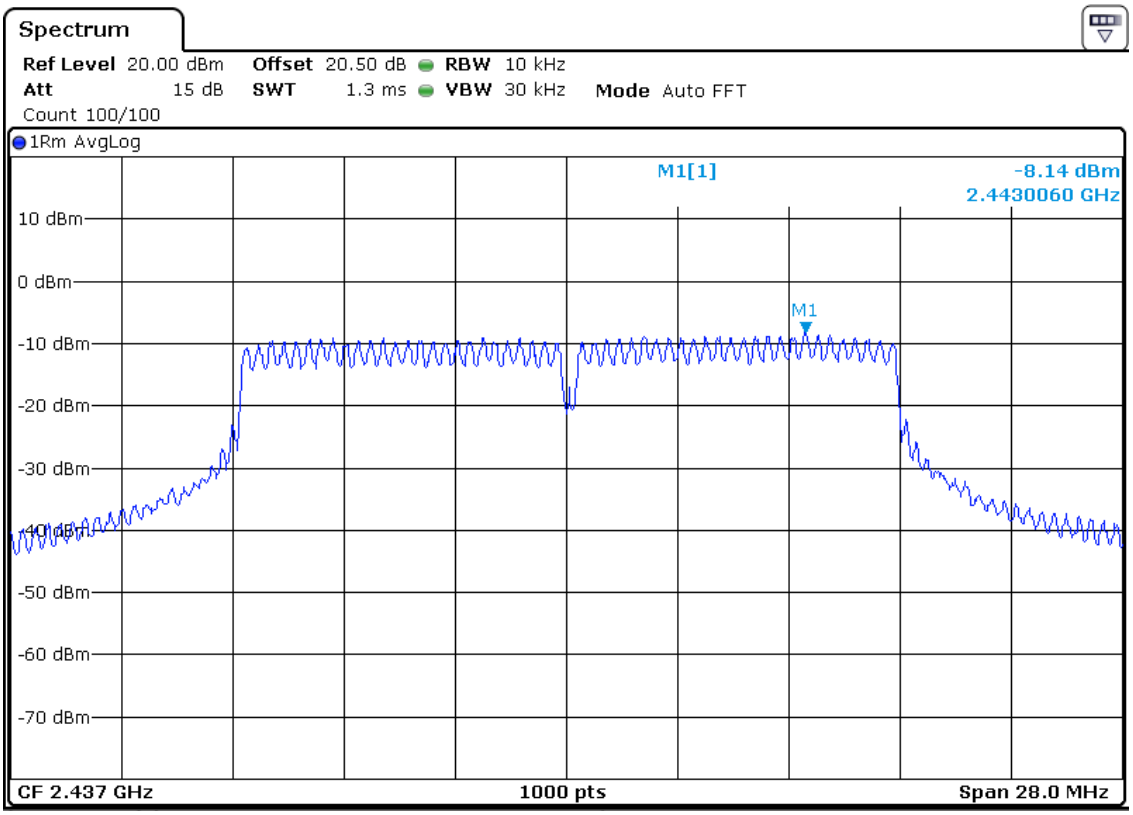


Data rate: 11 Mbps **Channel Frequency: 2462 MHz**

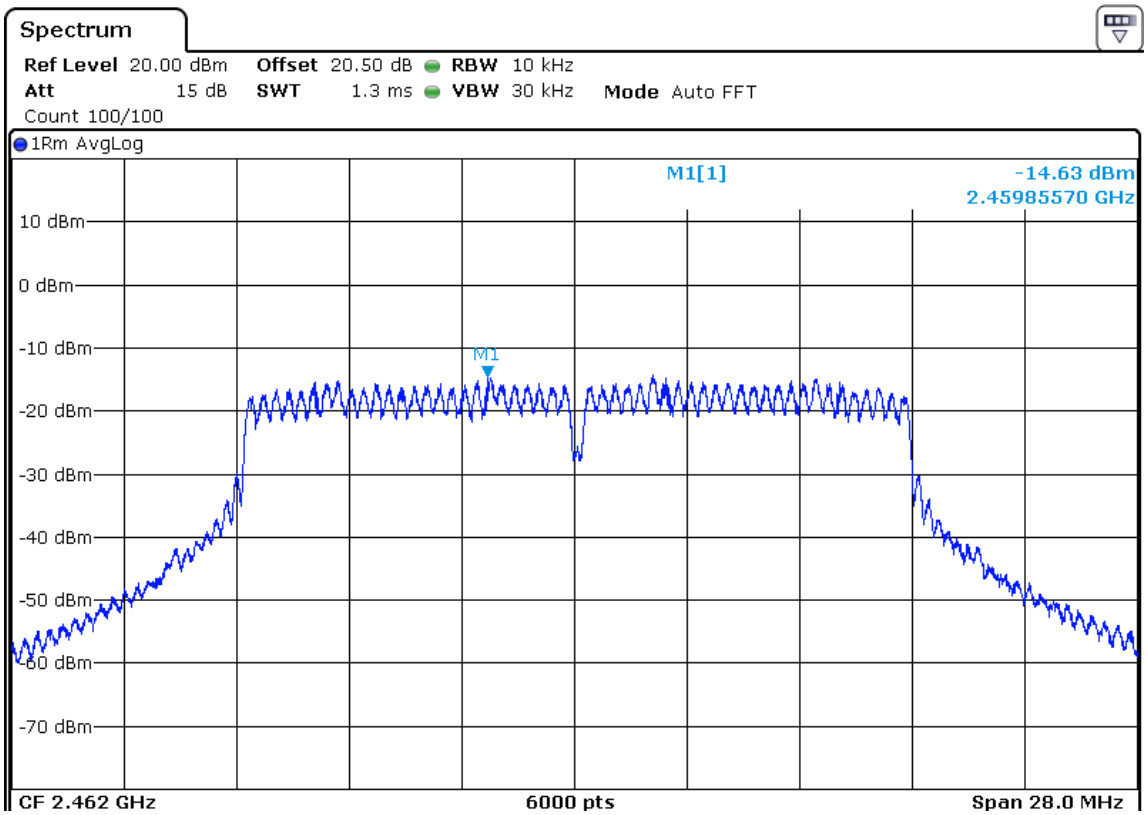
IEEE802.11g			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Total PSD (dBm)**	**Limit (dBm)**
6	2412	-5.925	8
	2437	-5.716	8
	2462	-6.027	8
24	2412	-4.205	8
	2437	-4.129	8
	2462	-3.657	8
54	2412	-2.369	8
	2437	-2.258	8
	2462	-1.946	8



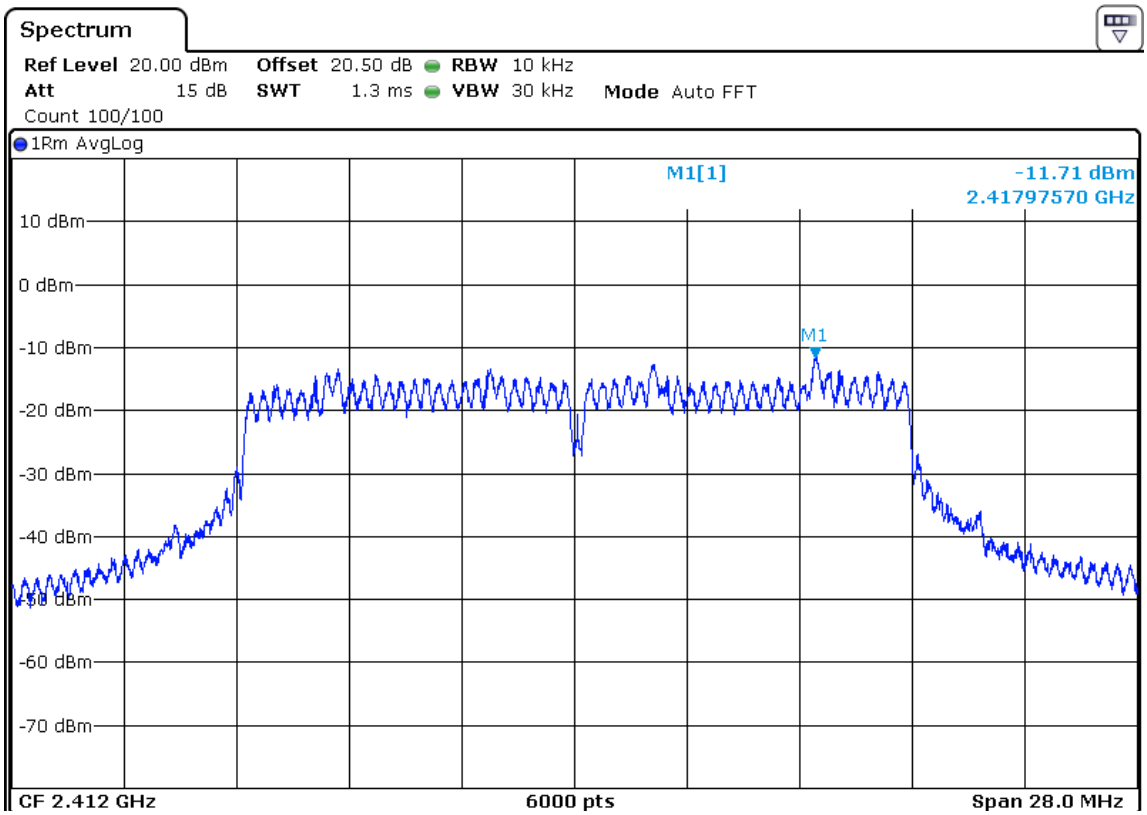
Data rate: 6 Mbps **Channel Frequency: 2412 MHz**



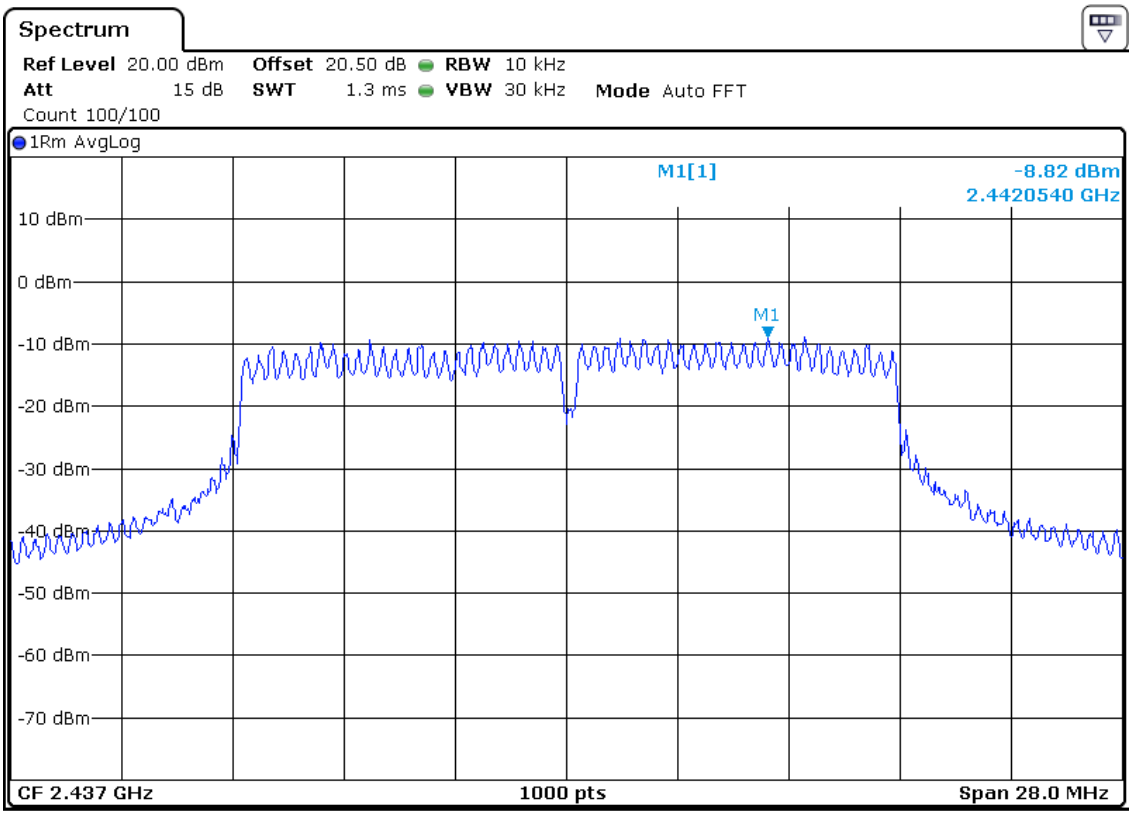
Data rate: 6 Mbps **Channel Frequency: 2437 MHz**



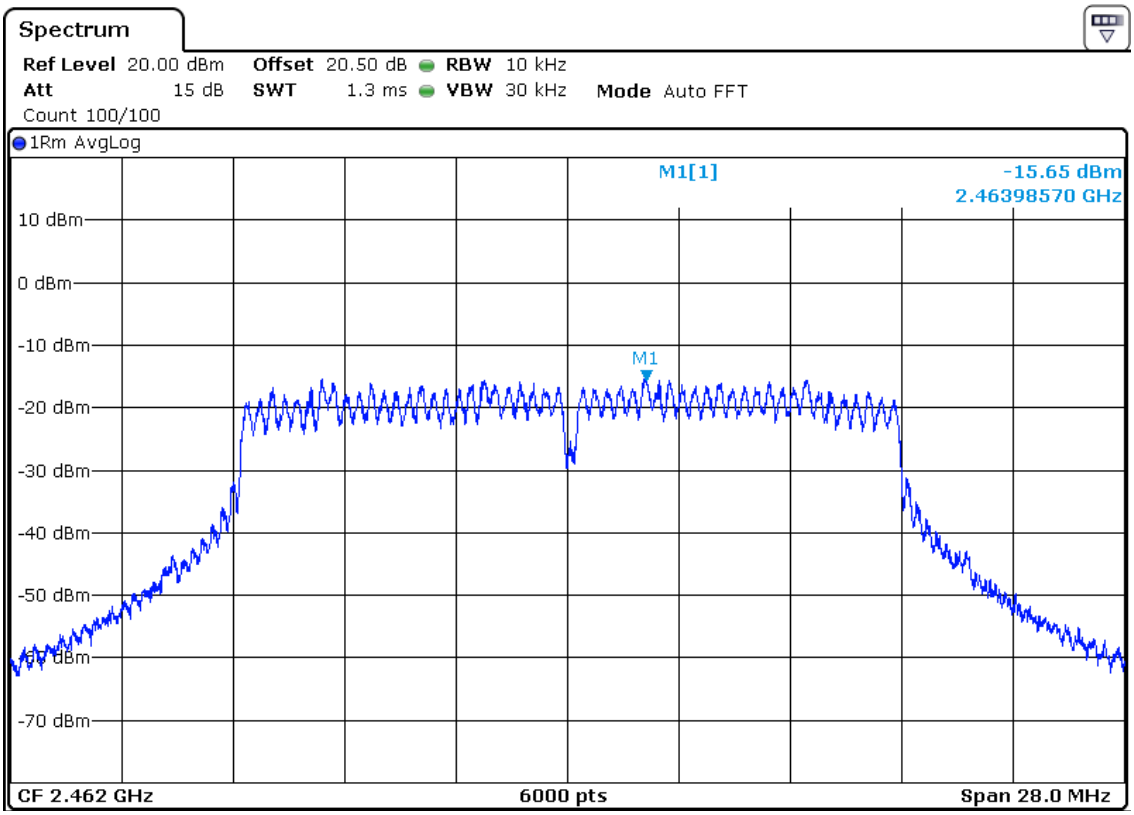
Data rate: 6 Mbps **Channel Frequency: 2462 MHz**



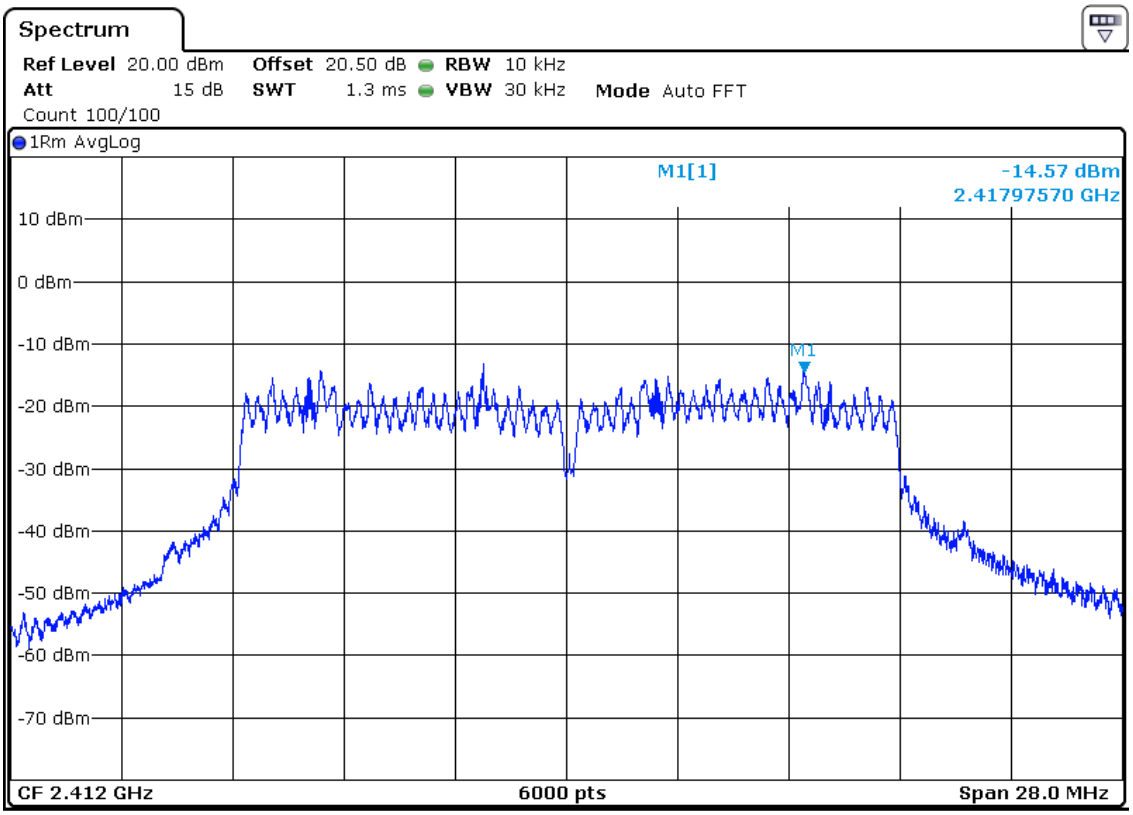
Data rate: 24 Mbps **Channel Frequency: 2412 MHz**



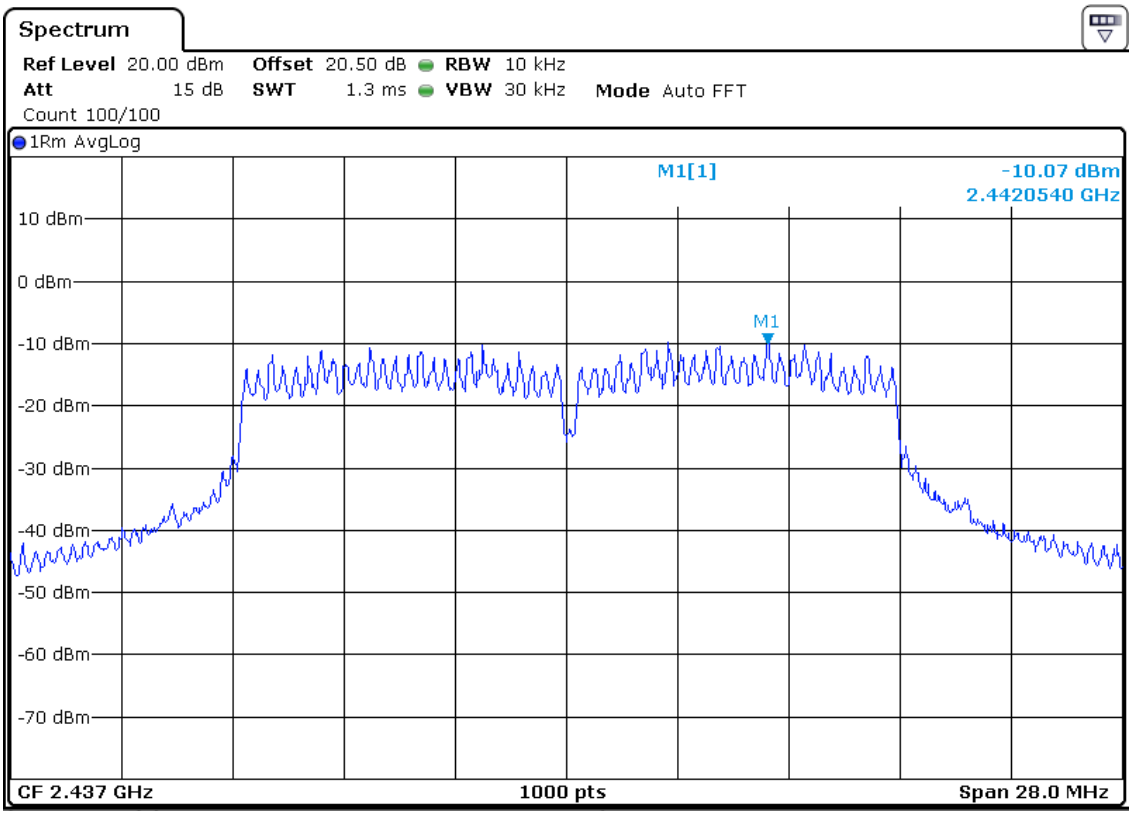
Data rate: 24 Mbps **Channel Frequency: 2437 MHz**



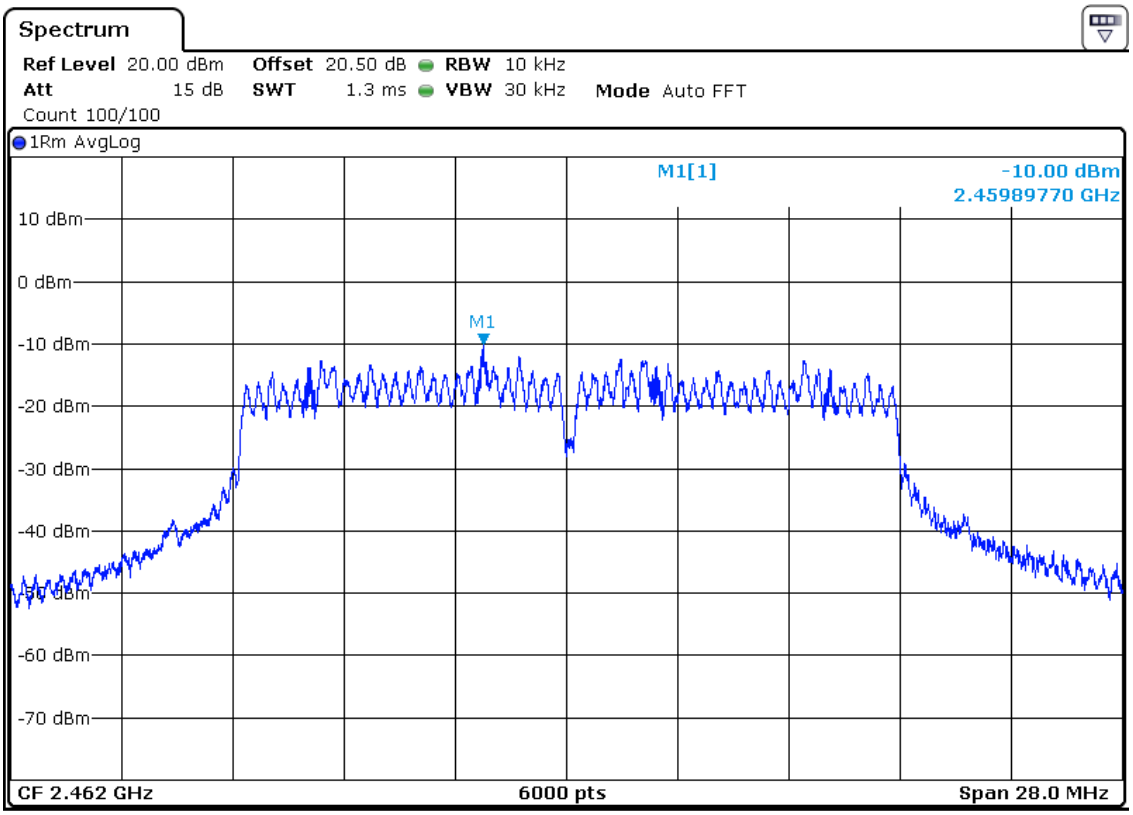
Data rate: 24 Mbps **Channel Frequency: 2462 MHz**



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



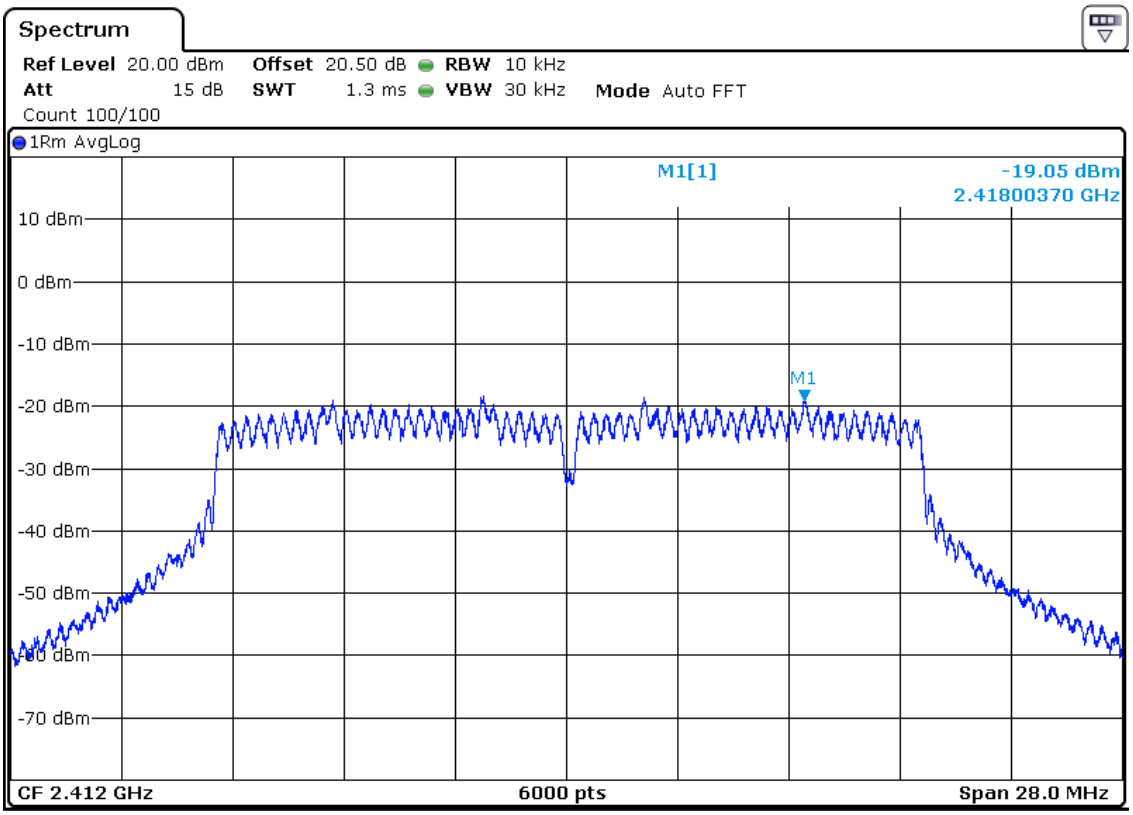
Data rate: 54 Mbps **Channel Frequency: 2437 MHz**



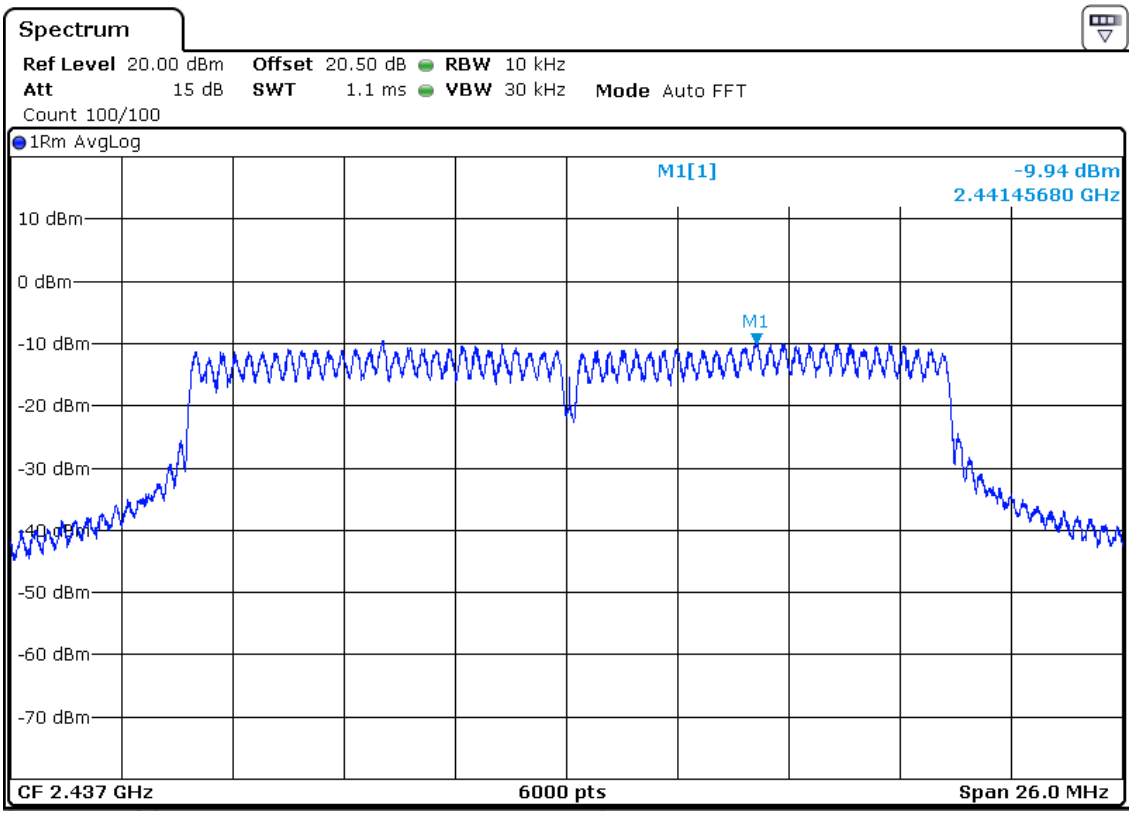
Data rate: 54 Mbps **Channel Frequency: 2462 MHz**

Measure and add 10 log (NANT) dB, NANT (Number of antenna port) –> 3

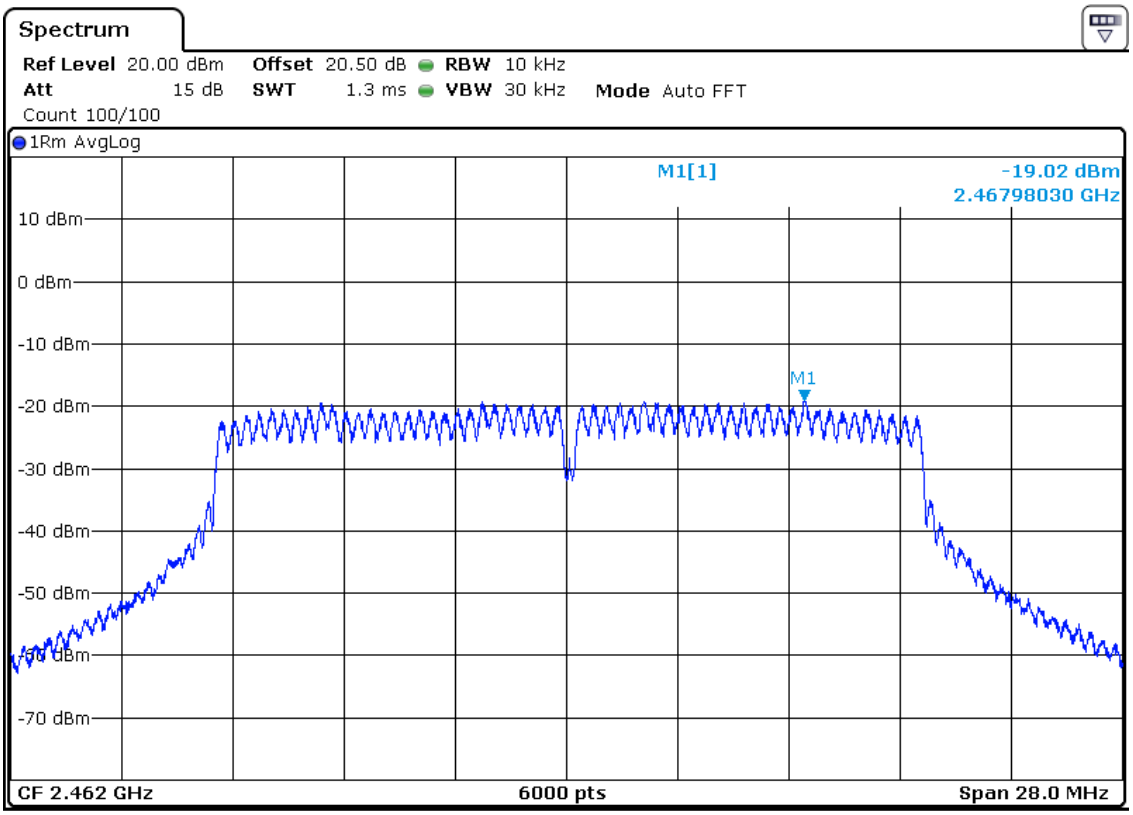
IEEE802.11nHT20					
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Measured PSD (dBm)**	**Measure & Add 10*log(3)**	**Total PSD (dBm)**	**Limit (dBm)**
MCS0	2412	-19.05	4.77	-14.28	8
	2437	-9.94	4.77	-5.17	8
	2462	-19.02	4.77	-14.25	8
MCS4	2412	-19.81	4.77	-15.04	8
	2437	-9.62	4.77	-4.85	8
	2462	-16.46	4.77	-11.69	8
MCS7	2412	-19.44	4.77	-14.67	8
	2437	-11.63	4.77	-6.86	8
	2462	-15.13	4.77	-10.36	8



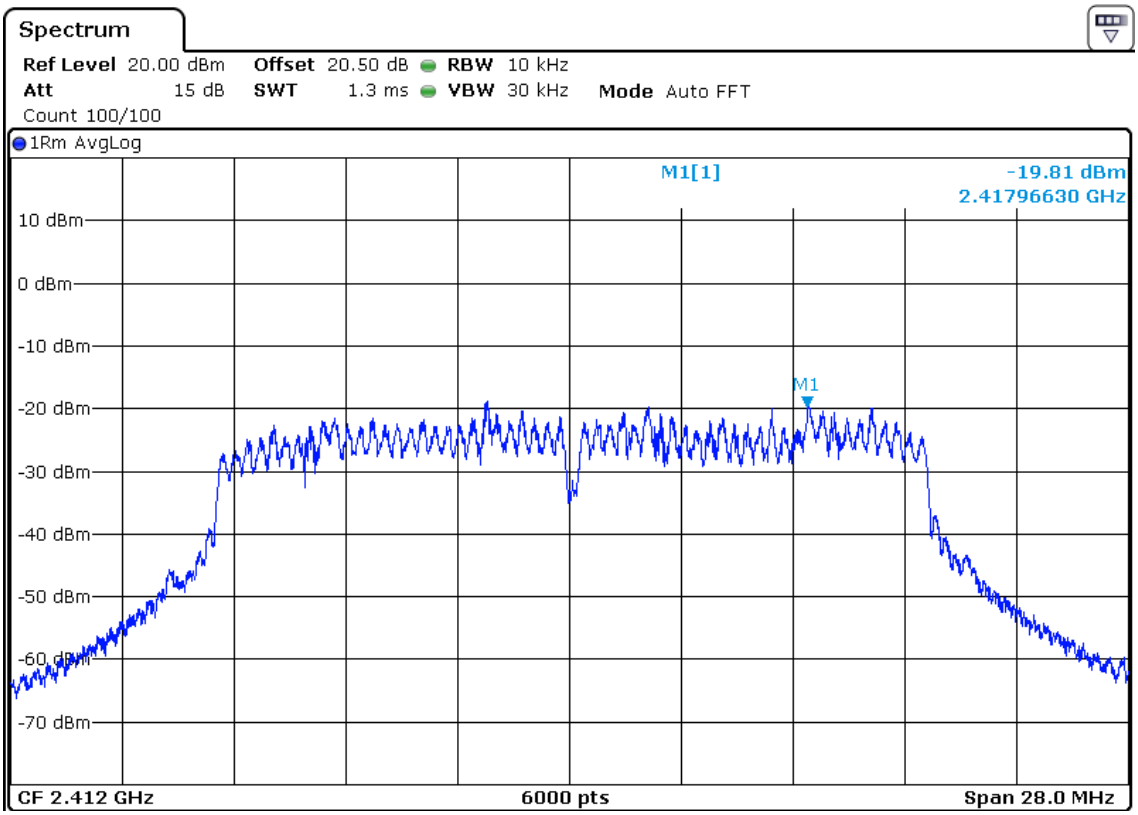
Data rate: MCS0 **Channel Frequency: 2412 MHz**



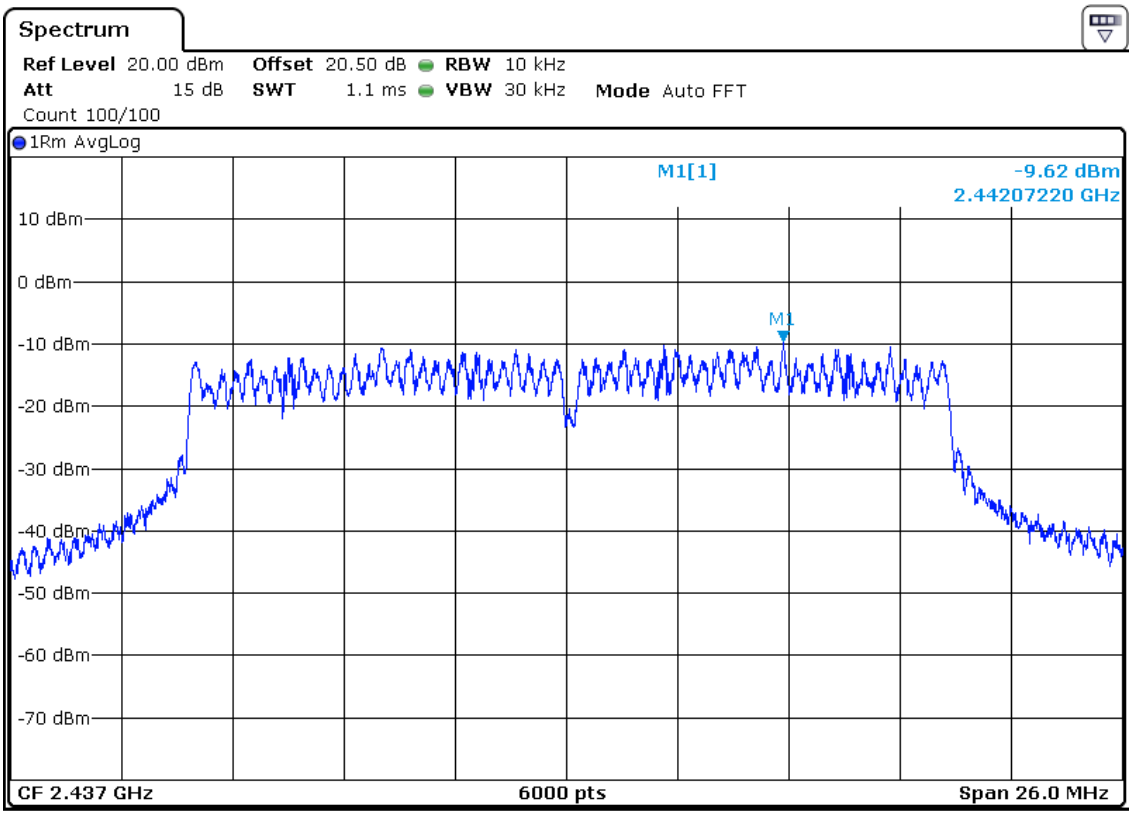
Data rate: MCS0 **Channel Frequency: 2437 MHz**



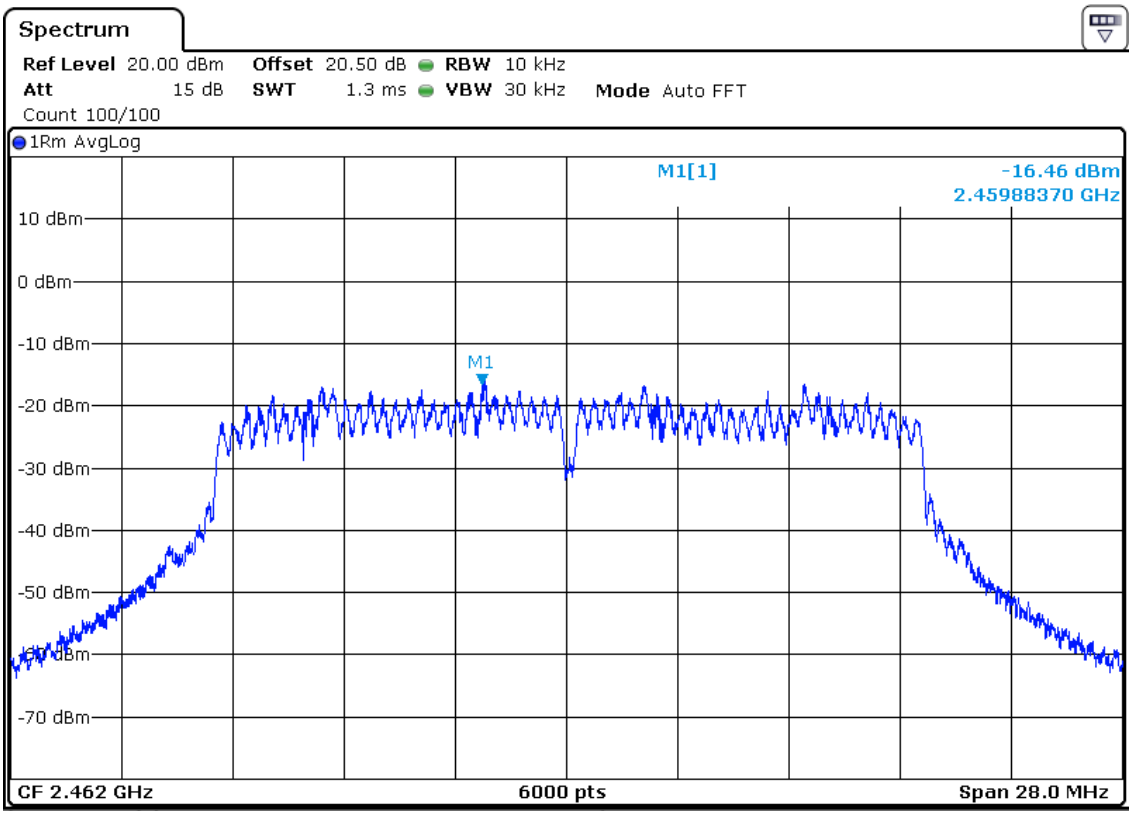
Data rate: MCS0 **Channel Frequency: 2462 MHz**



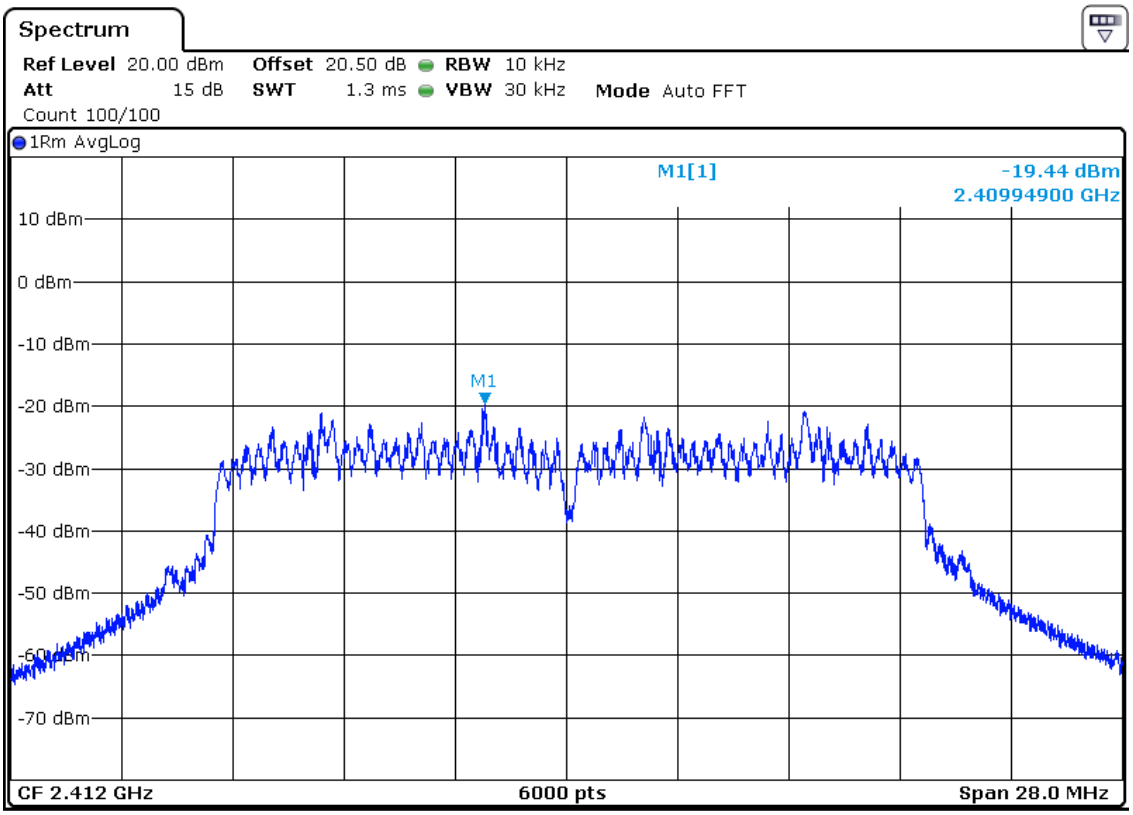
Data rate: MCS4 **Channel Frequency: 2412 MHz**



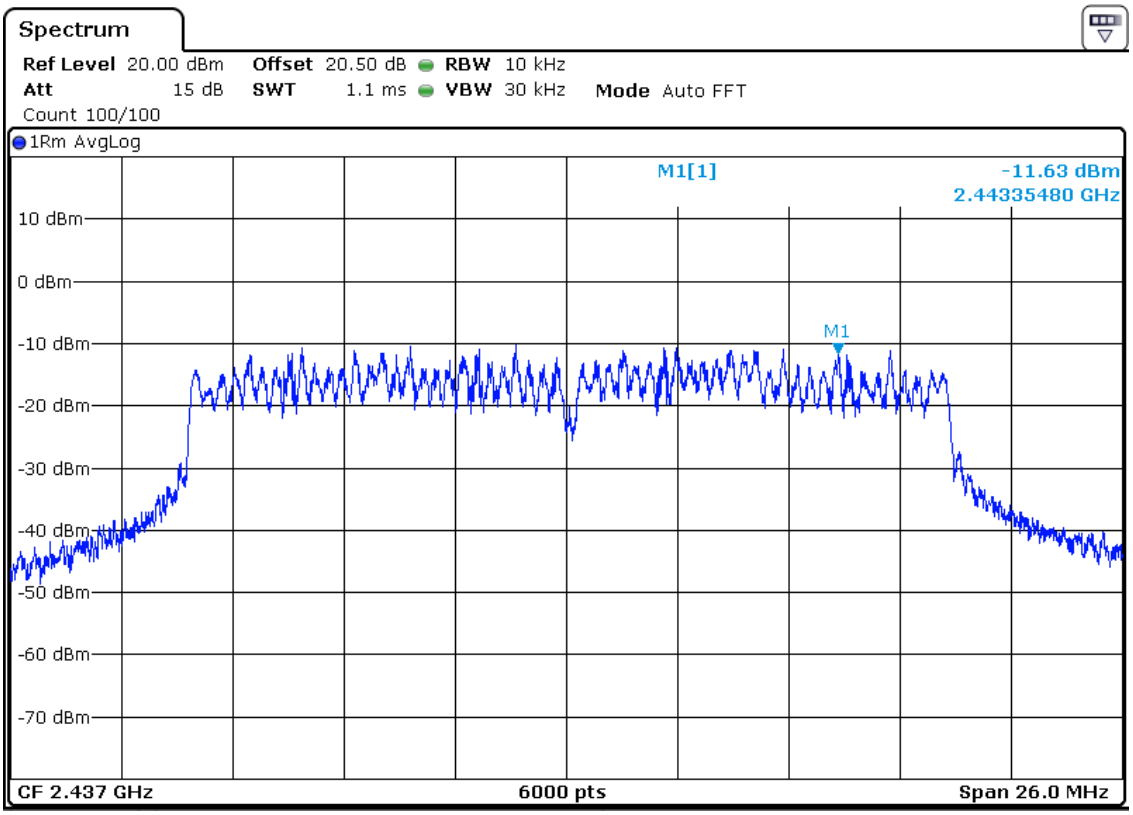
Data rate: MCS4 **Channel Frequency: 2437 MHz**



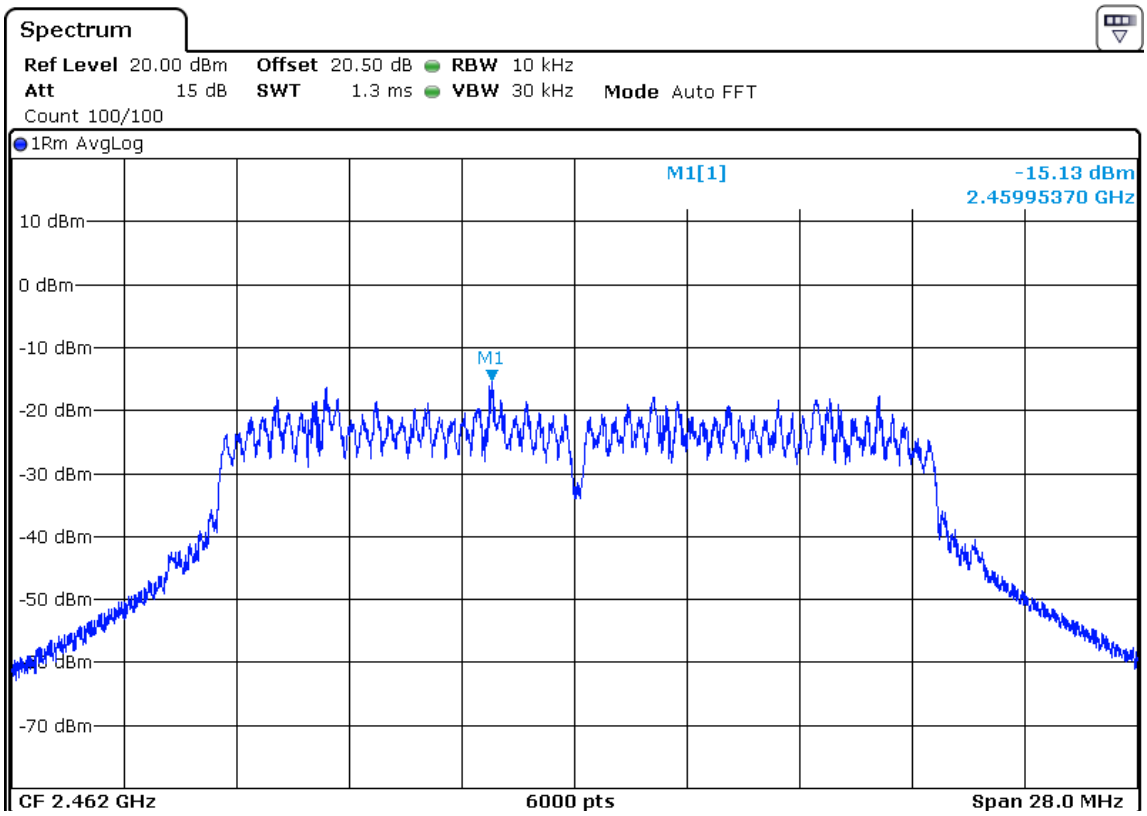
Data rate: MCS4 **Channel Frequency: 2462 MHz**



Data rate: MCS7 **Channel Frequency: 2412 MHz**

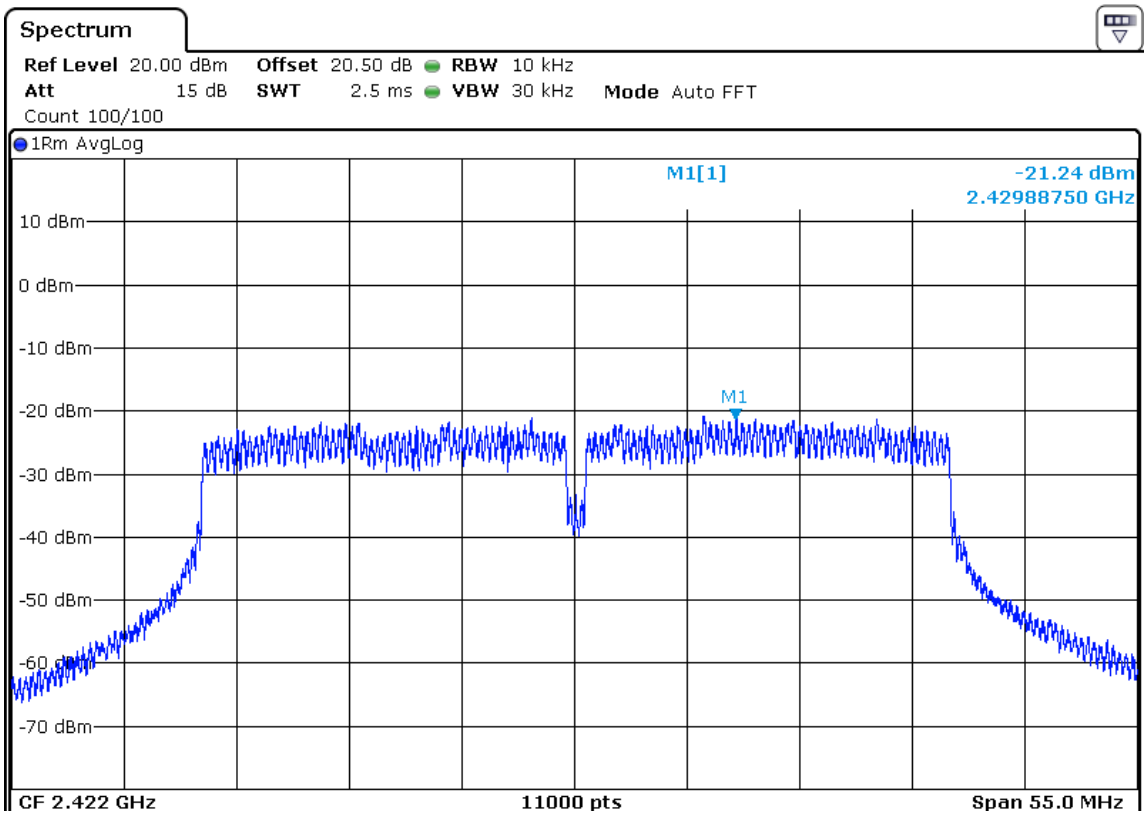


Data rate: MCS7 **Channel Frequency: 2437 MHz**

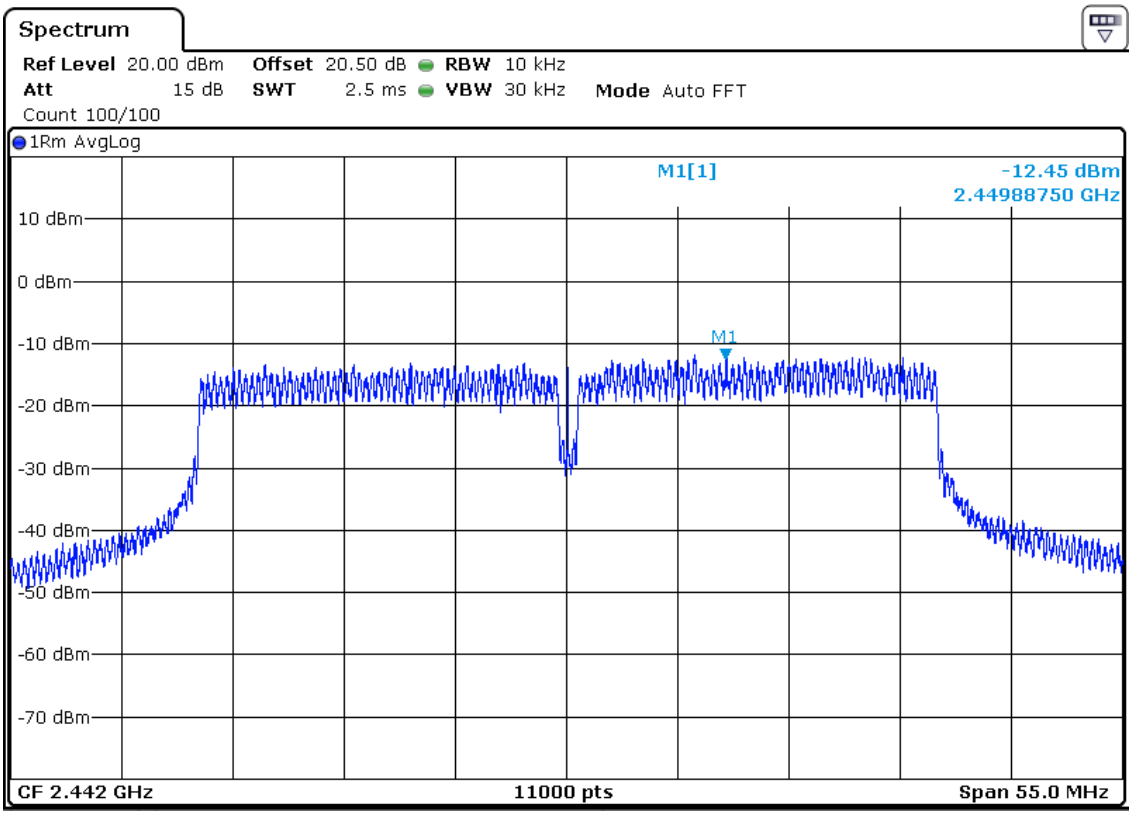


Data rate: MCS7 **Channel Frequency: 2462 MHz**

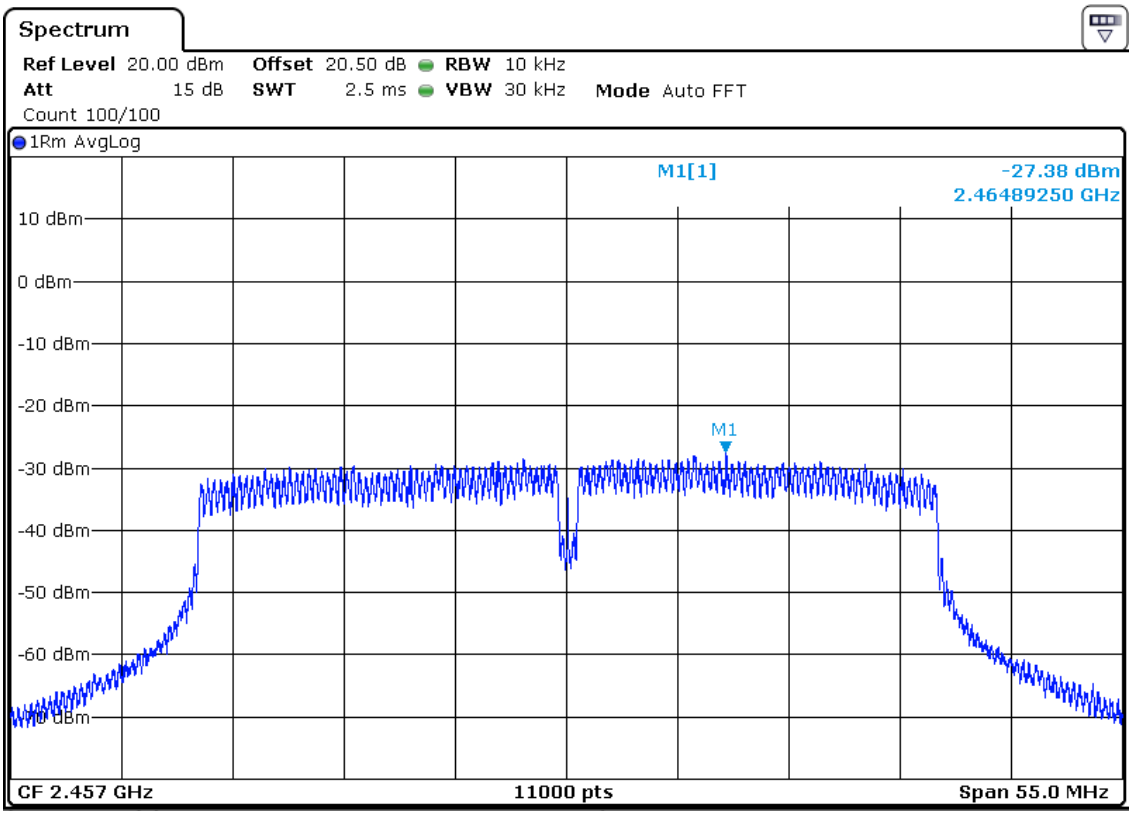
IEEE802.11nHT40					
Data Rate (Mbps)	Channel Frequency (MHz)	Measured PSD (dBm)	Measure & Add 10*log(3)	Total PSD (dBm)	Limit (dBm)
MCS0	2422	-21.24	4.77	-16.47	8
	2442	-12.45	4.77	-7.68	8
	2457	-27.38	4.77	-22.61	8
MCS4	2422	-22.13	4.77	-17.36	8
	2442	-11.96	4.77	-7.19	8
	2457	-27.25	4.77	-22.48	8
MCS7	2422	-23.87	4.77	-19.1	8
	2442	-11.94	4.77	-7.17	8
	2457	-24.23	4.77	-19.46	8



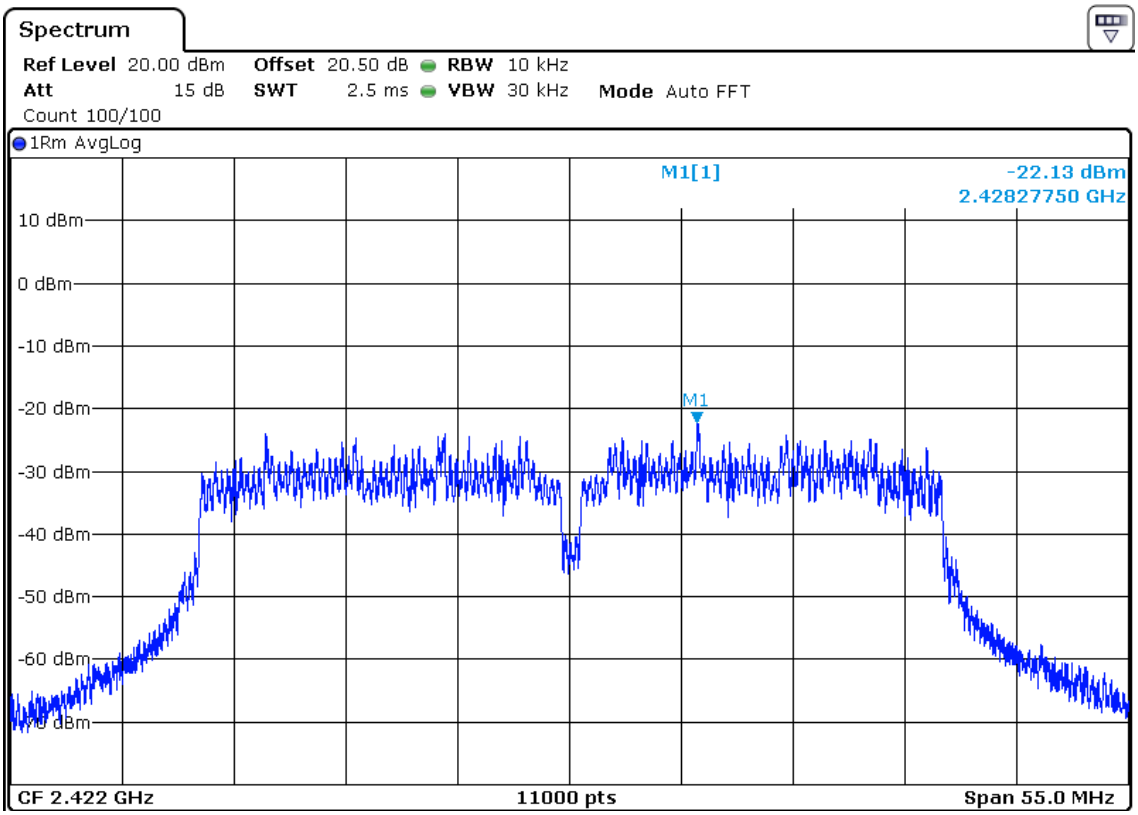
Data rate: MCS0 **Channel Frequency: 2422 MHz**



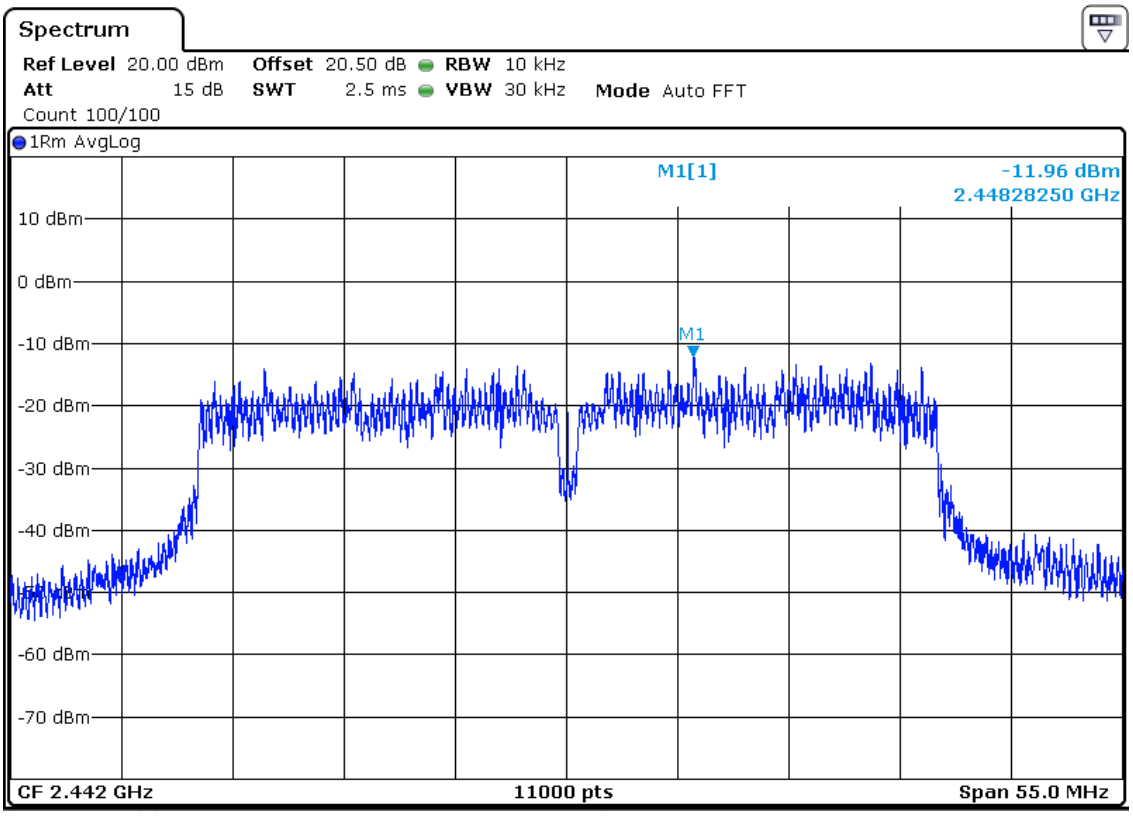
Data rate: MCS0 **Channel Frequency: 2442 MHz**



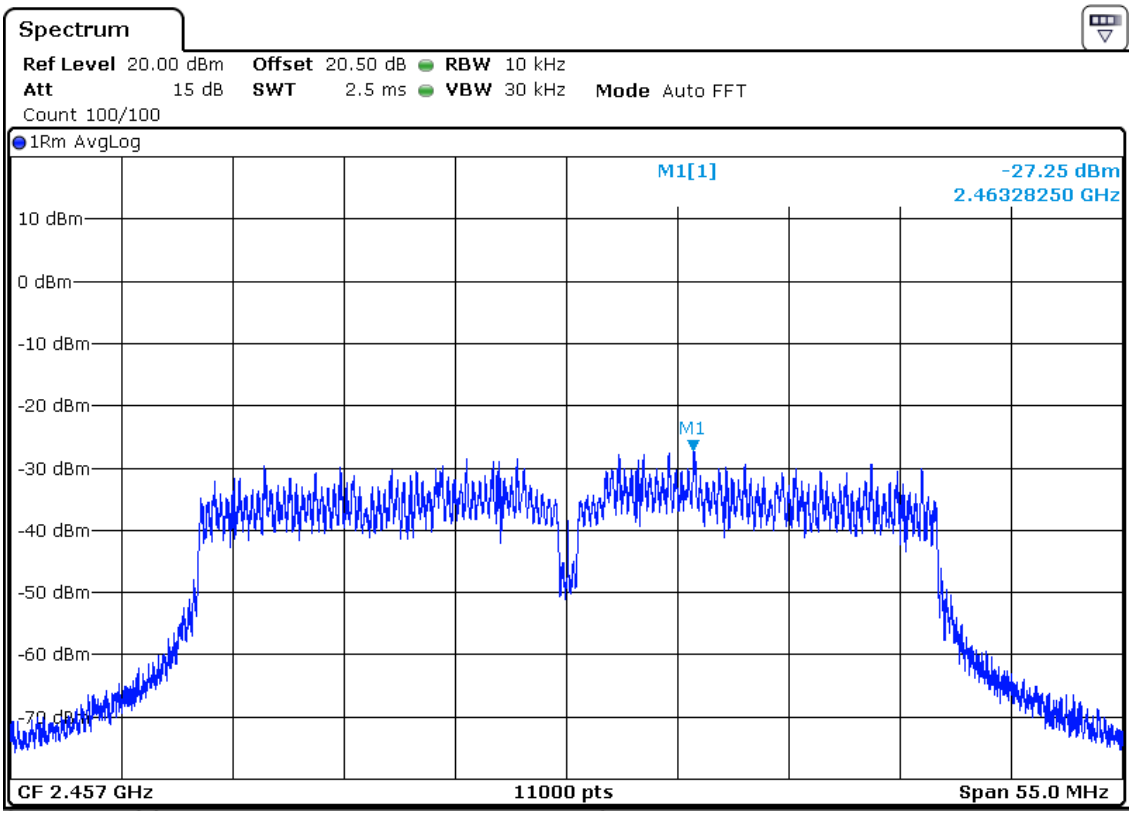
Data rate: MCS0 **Channel Frequency: 2457 MHz**



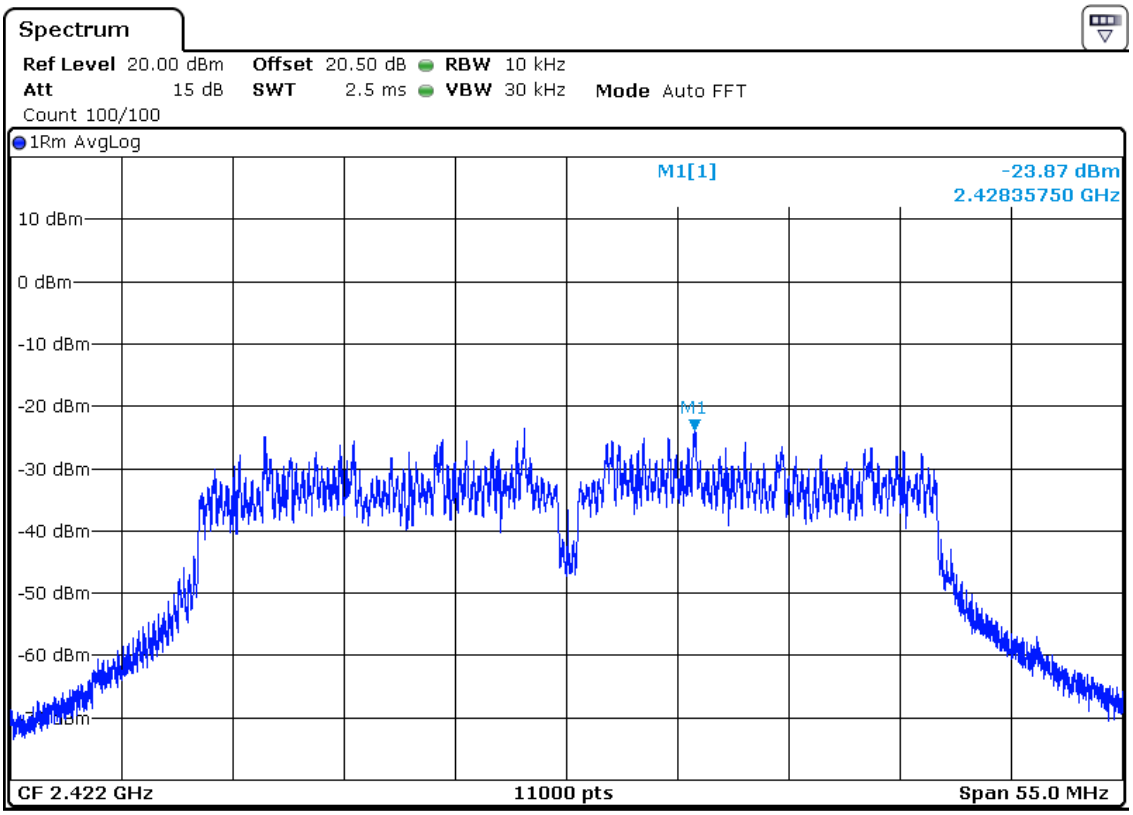
Data rate: MCS4 **Channel Frequency: 2422 MHz**



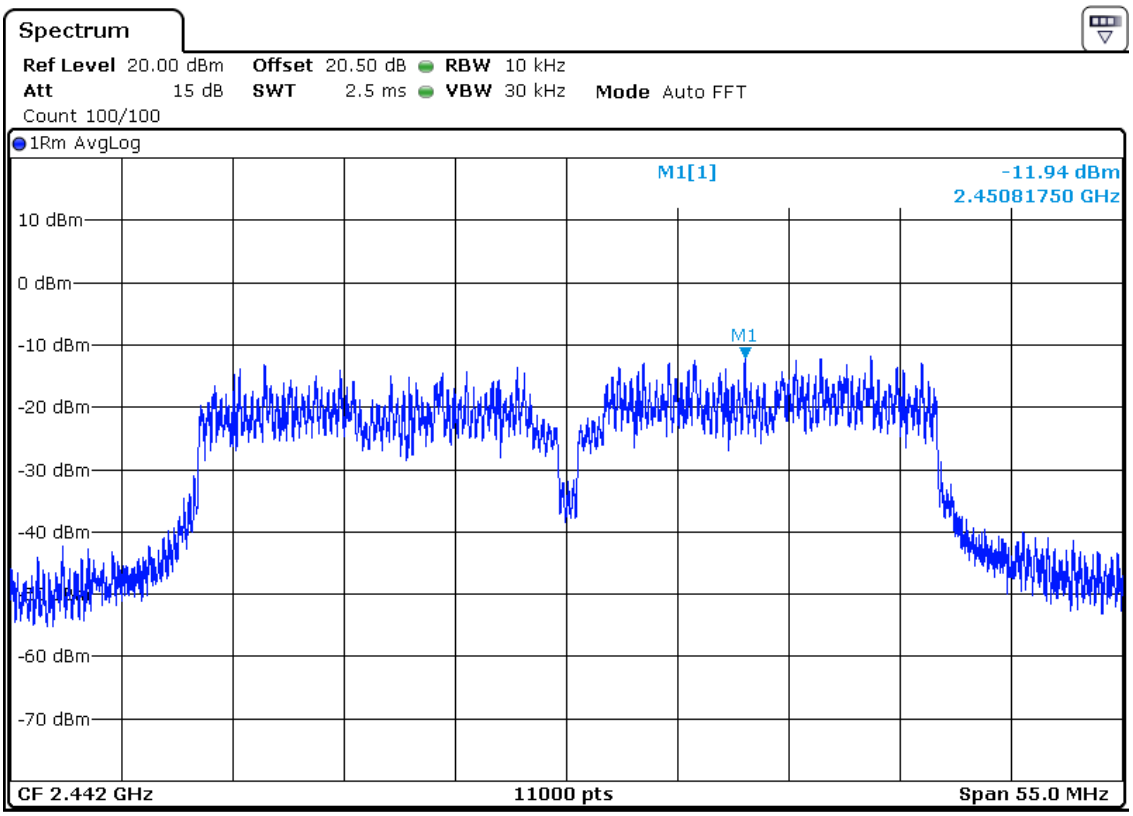
Data rate: MCS4 **Channel Frequency: 2442 MHz**



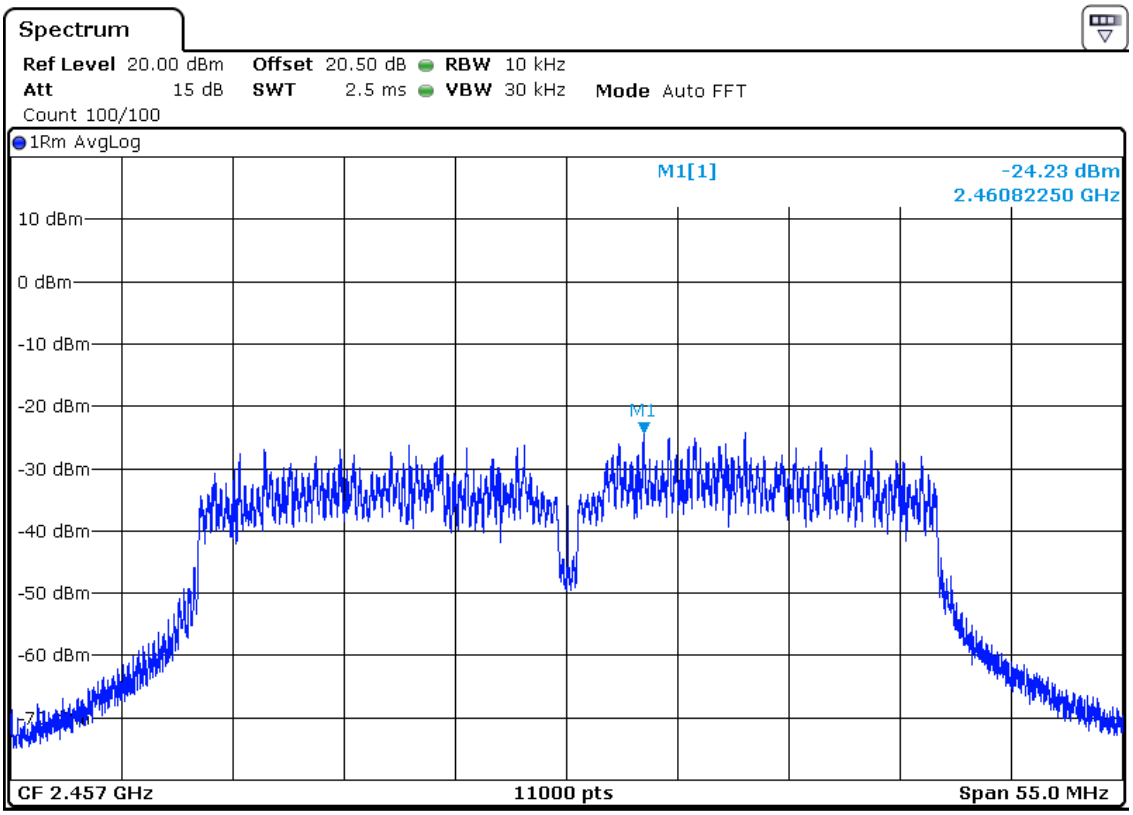
Data rate: MCS4 **Channel Frequency: 2457 MHz**



Data rate: MCS7 **Channel Frequency: 2422 MHz**



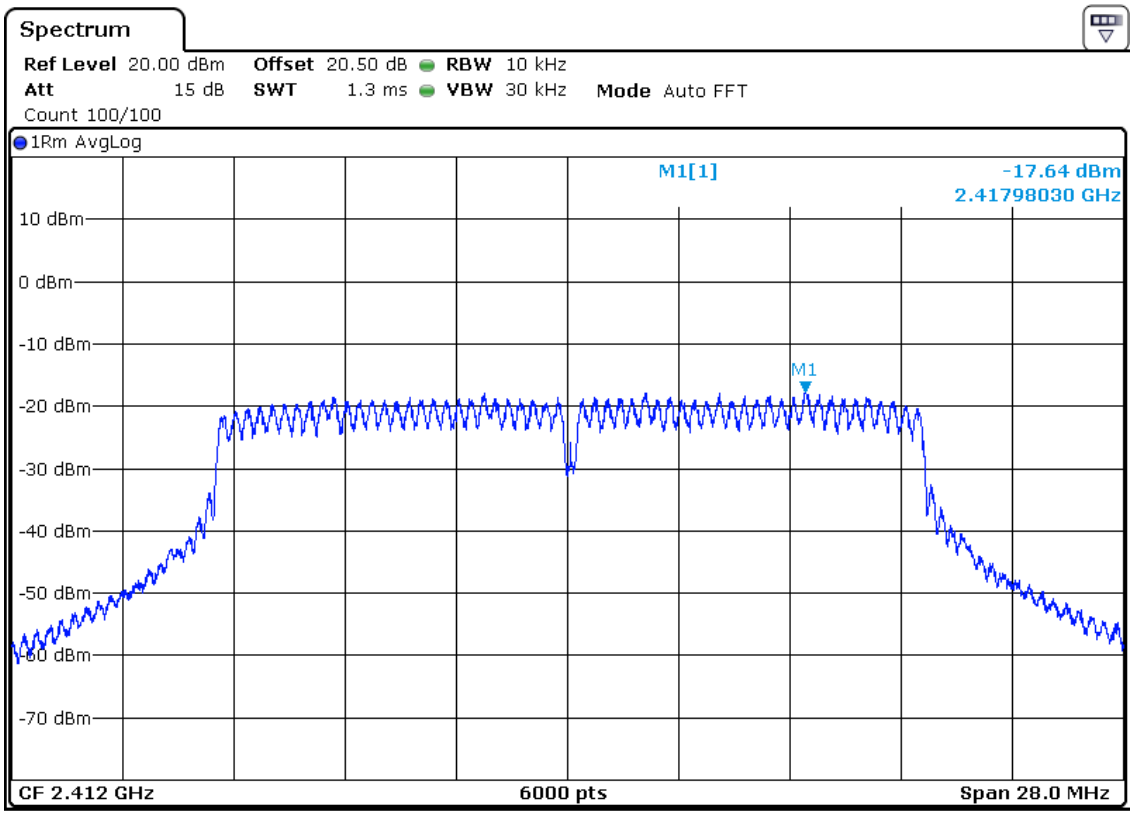
Data rate: MCS7 **Channel Frequency: 2442 MHz**



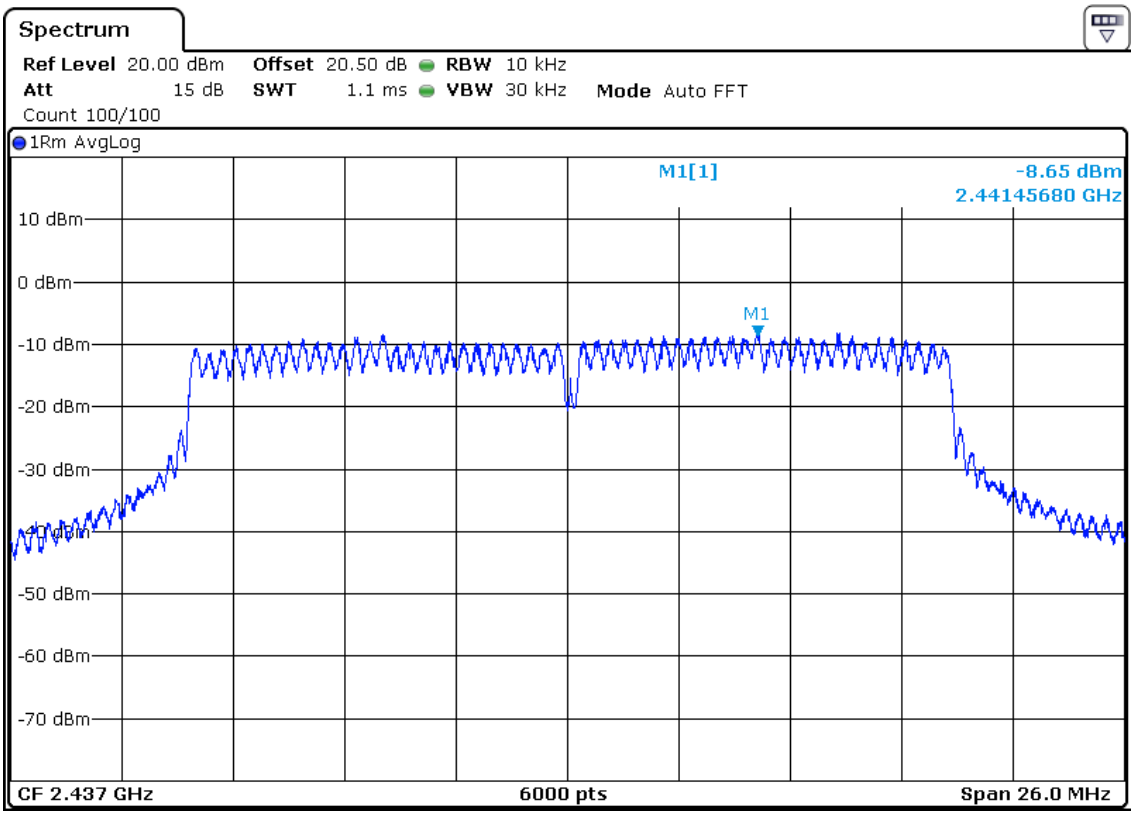
Data rate: MCS7 **Channel Frequency: 2457 MHz**

Test Results for Path B

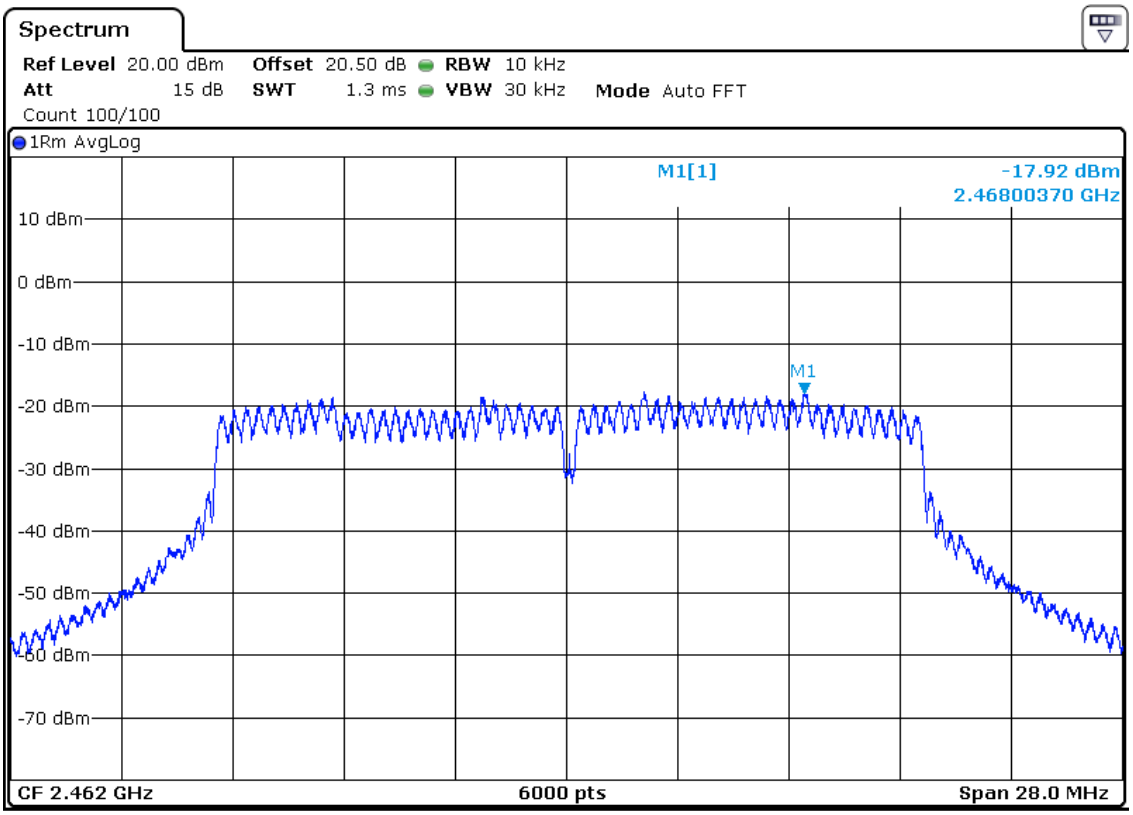
IEEE802.11nHT20					
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Total PSD (dBm)**	**Measure & Add 10*log(3)**	**Total PSD (dBm)**	**Limit (dBm)**
MCS0	2412	-17.64	4.77	-12.87	8
	2437	-08.65	4.77	-03.88	8
	2462	-17.92	4.77	-13.15	8
MCS4	2412	-18.41	4.77	-13.64	8
	2437	-07.77	4.77	-03.00	8
	2462	-14.99	4.77	-10.22	8
MCS7	2412	-16.53	4.77	-11.76	8
	2437	-09.27	4.77	-04.50	8
	2462	-15.15	4.77	-10.38	8



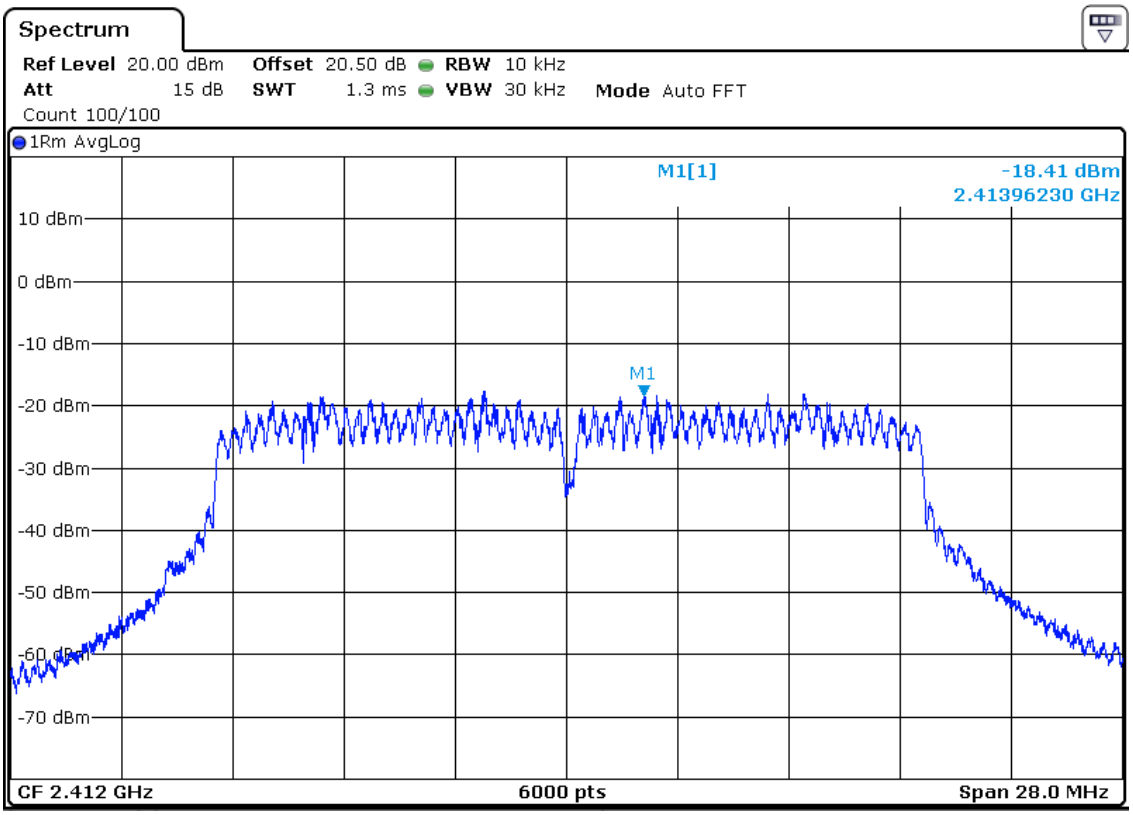
Data rate: MCS0 **Channel Frequency: 2412 MHz**



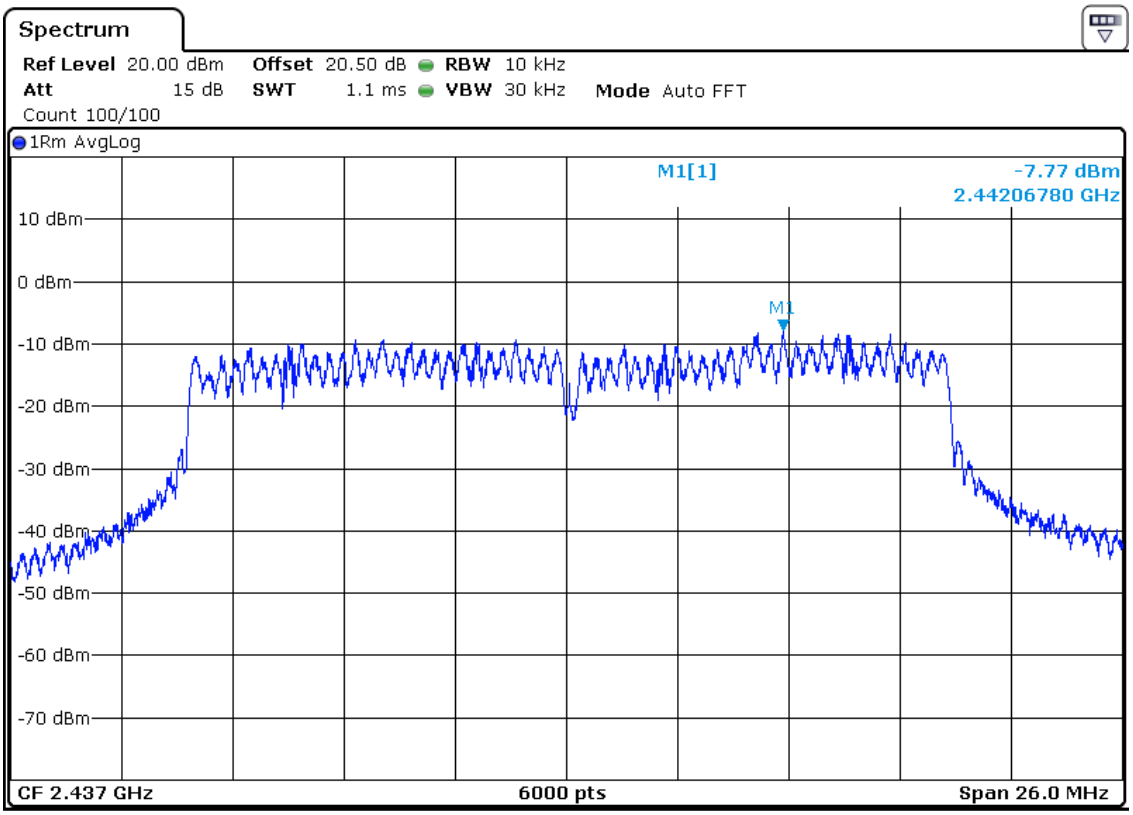
Data rate: MCS0 **Channel Frequency: 2437 MHz**



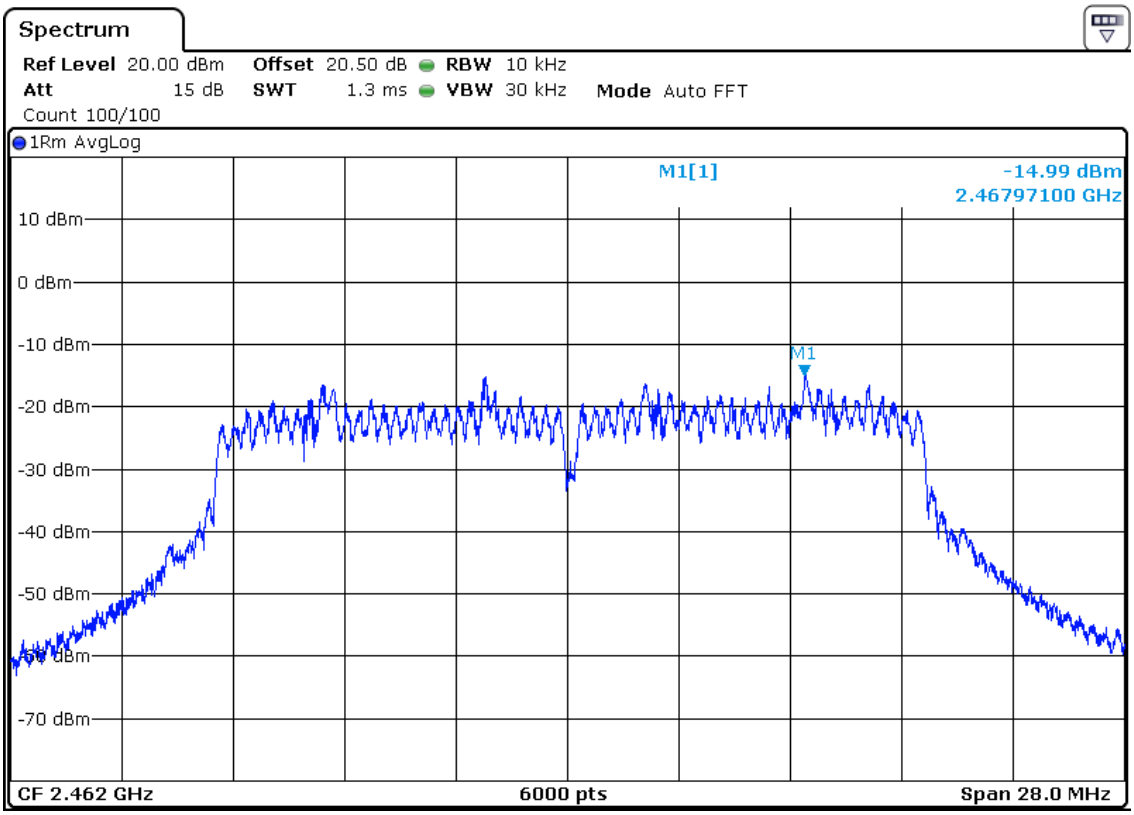
Data rate: MCS0 **Channel Frequency: 2462 MHz**



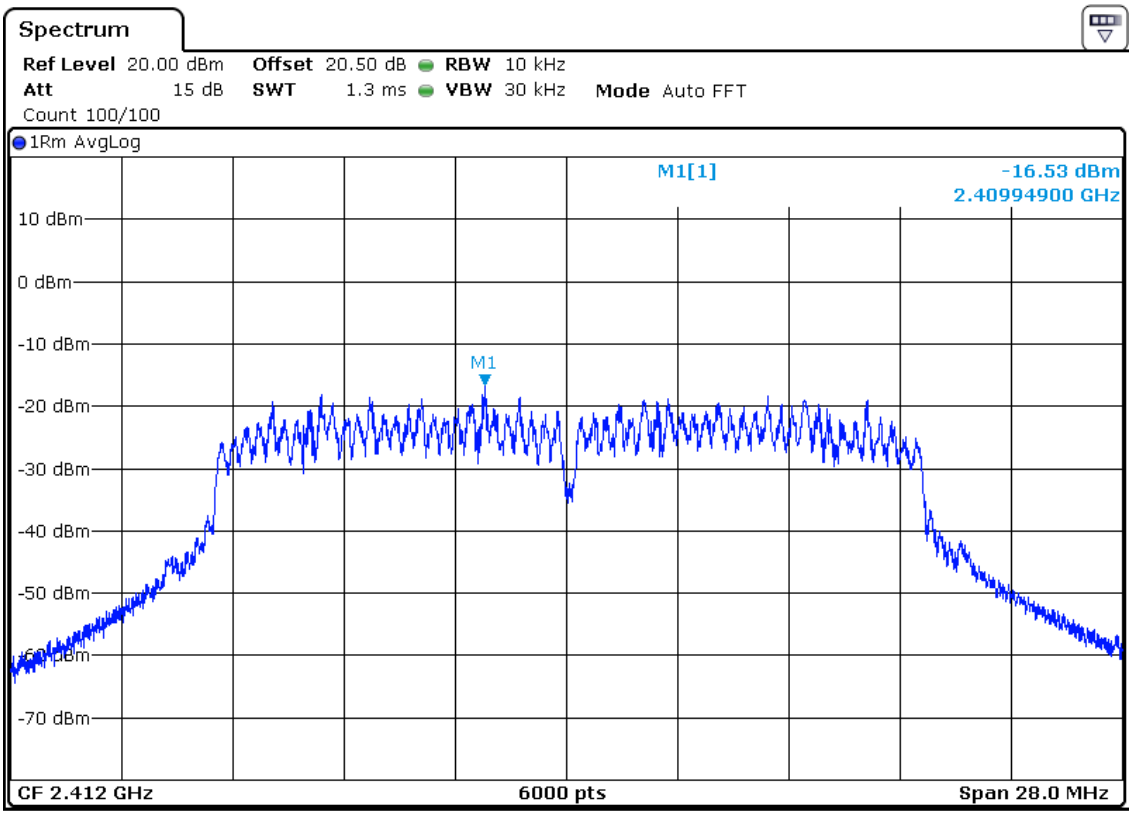
Data rate: MCS4 **Channel Frequency: 2412 MHz**



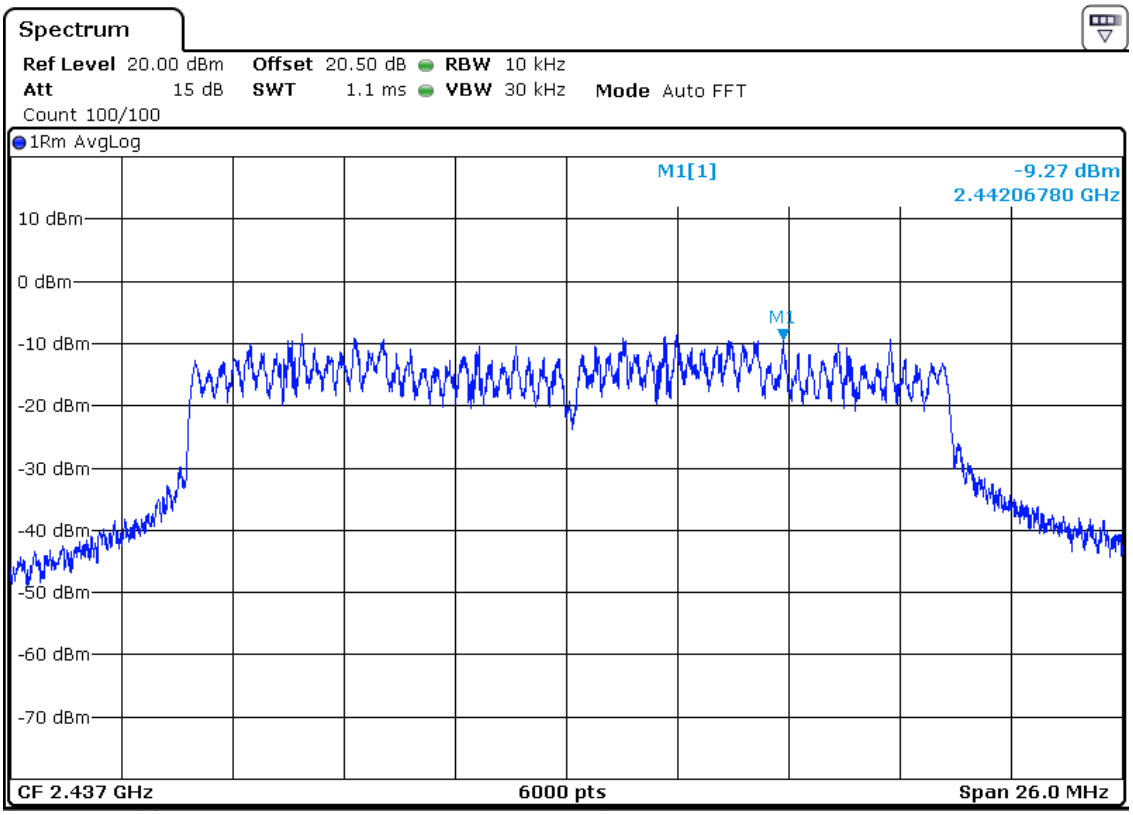
Data rate: MCS4 **Channel Frequency: 2437 MHz**



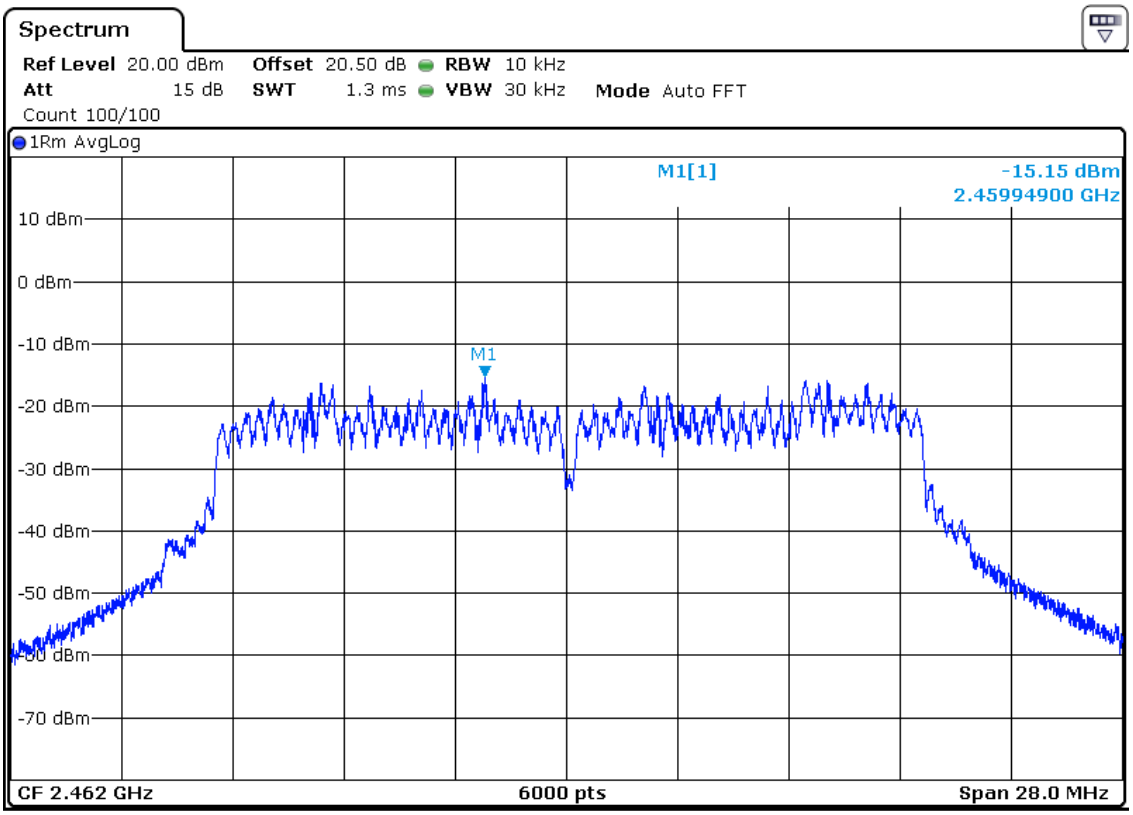
Data rate: MCS4 **Channel Frequency: 2462 MHz**



Data rate: MCS7 **Channel Frequency: 2412 MHz**

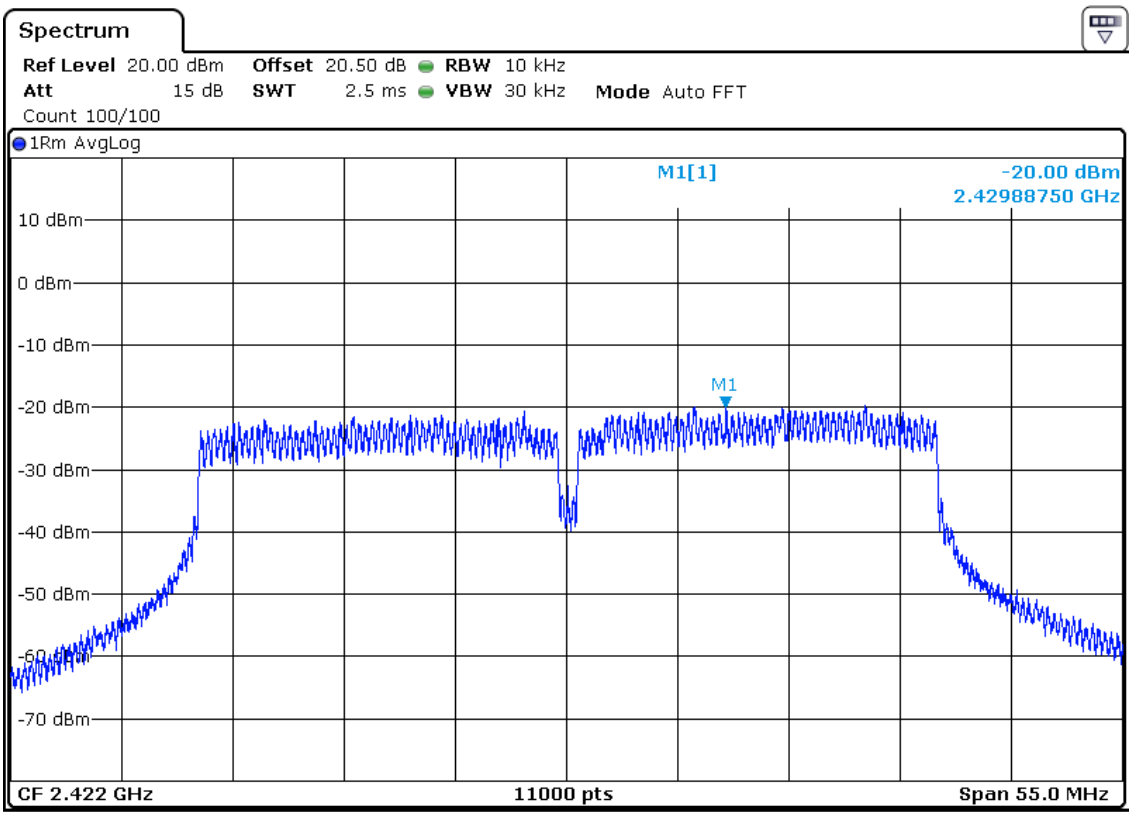


Data rate: MCS7 **Channel Frequency: 2437 MHz**

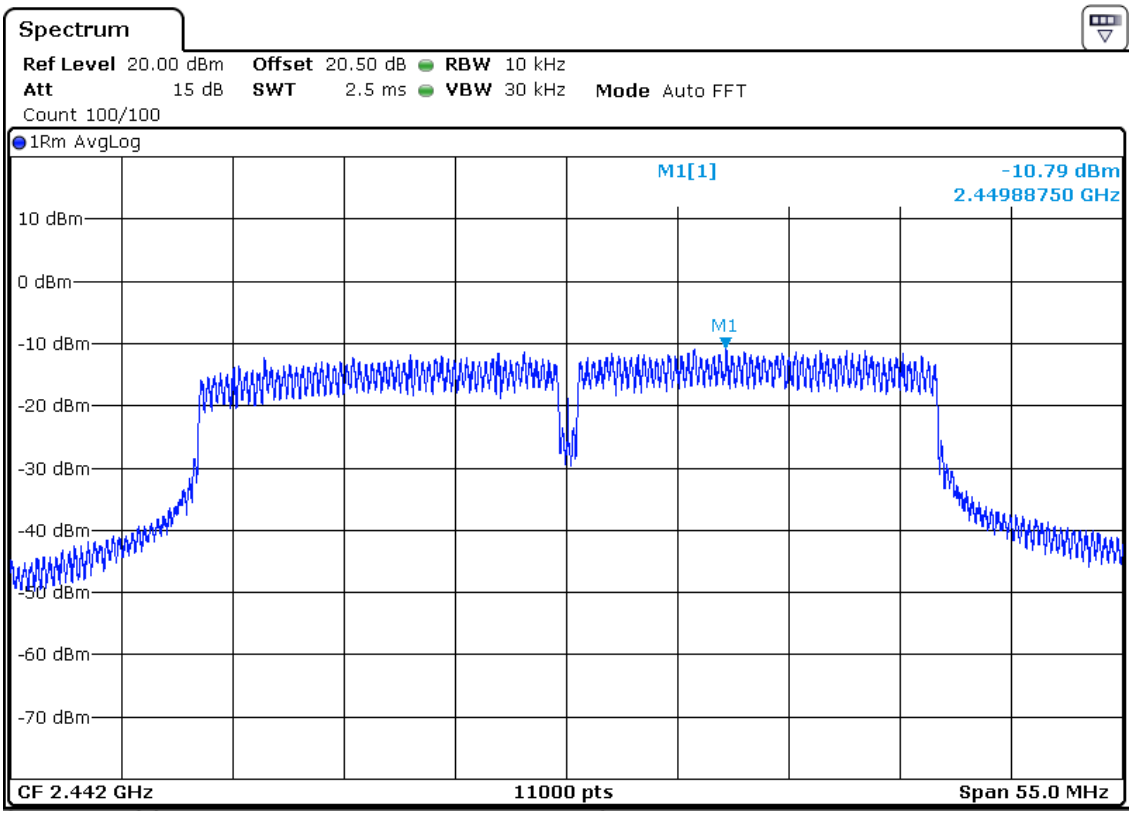


Data rate: MCS7 **Channel Frequency: 2462 MHz**

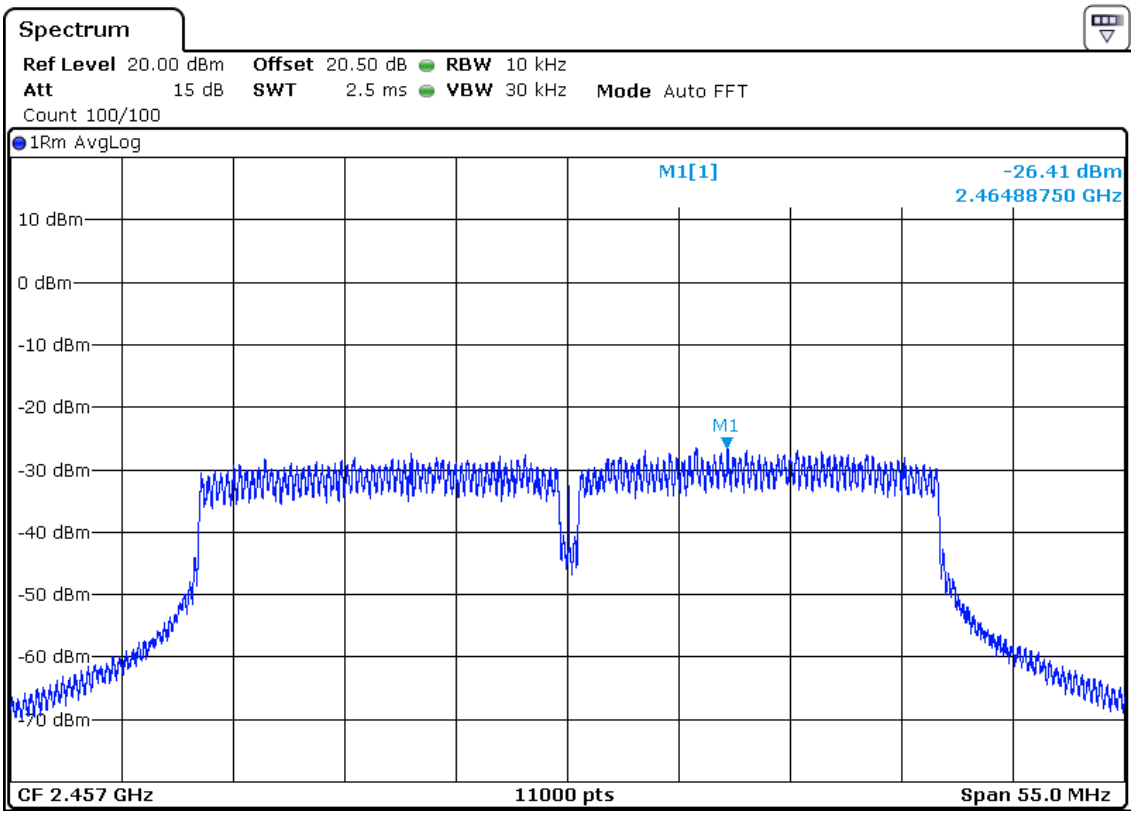
IEEE802.11nHT40					
Data Rate (Mbps)	Channel Frequency (MHz)	Measured PSD (dBm)	Measure & Add 10*log(3)	Total PSD (dBm)	Limit (dBm)
MCS0	2422	-20.00	4.77	-15.23	8
	2442	-10.79	4.77	-06.02	8
	2457	-26.41	4.77	-21.64	8
MCS4	2422	-20.86	4.77	-16.09	8
	2442	-12.14	4.77	-07.37	8
	2457	-26.23	4.77	-21.46	8
MCS7	2422	-23.23	4.77	-18.46	8
	2442	-11.59	4.77	-06.82	8
	2457	-23.75	4.77	-18.98	8



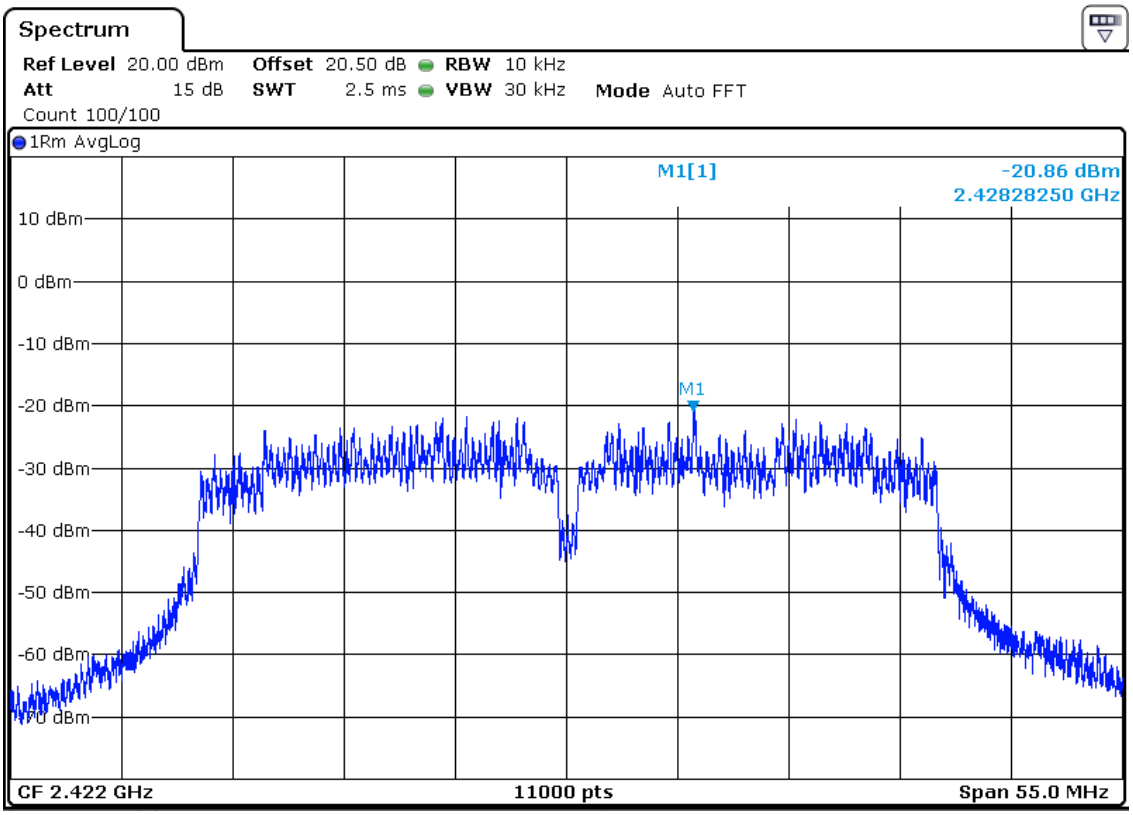
Data rate: MCS0 **Channel Frequency: 2422 MHz**



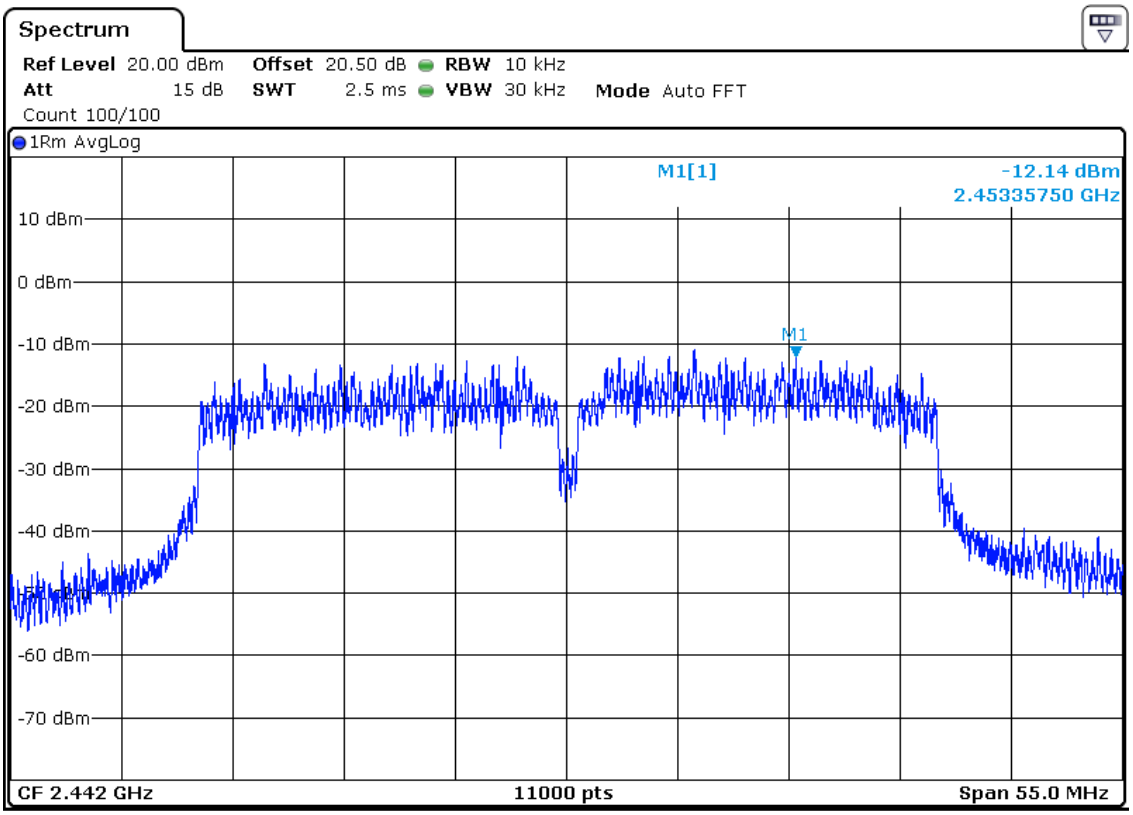
Data rate: MCS0 **Channel Frequency: 2442 MHz**



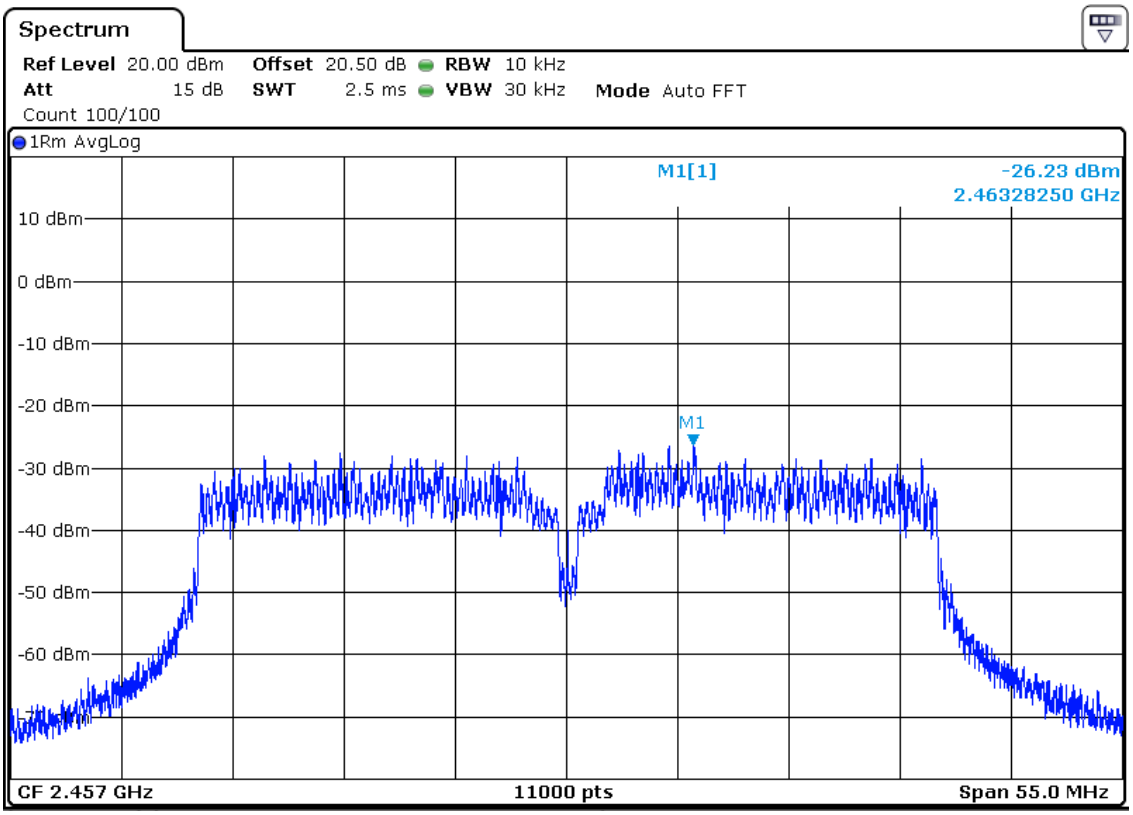
Data rate: MCS0 **Channel Frequency: 2457 MHz**



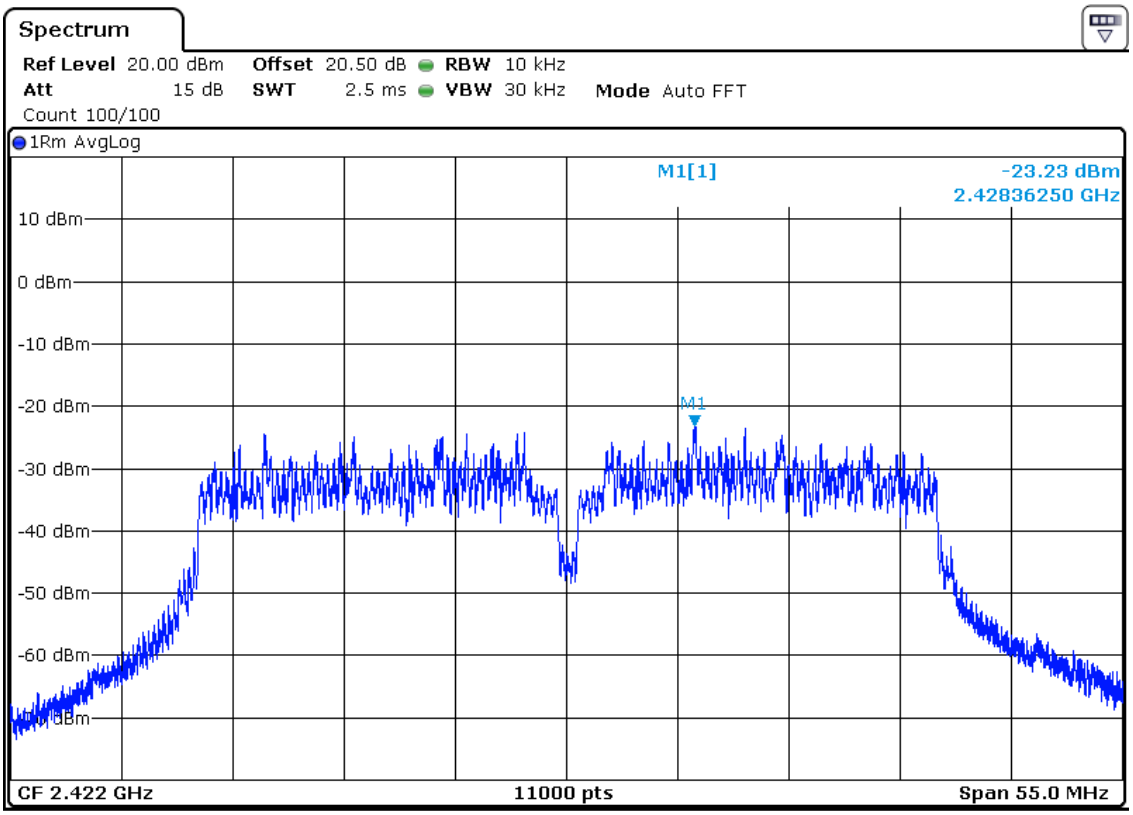
Data rate: MCS4 **Channel Frequency: 2422 MHz**



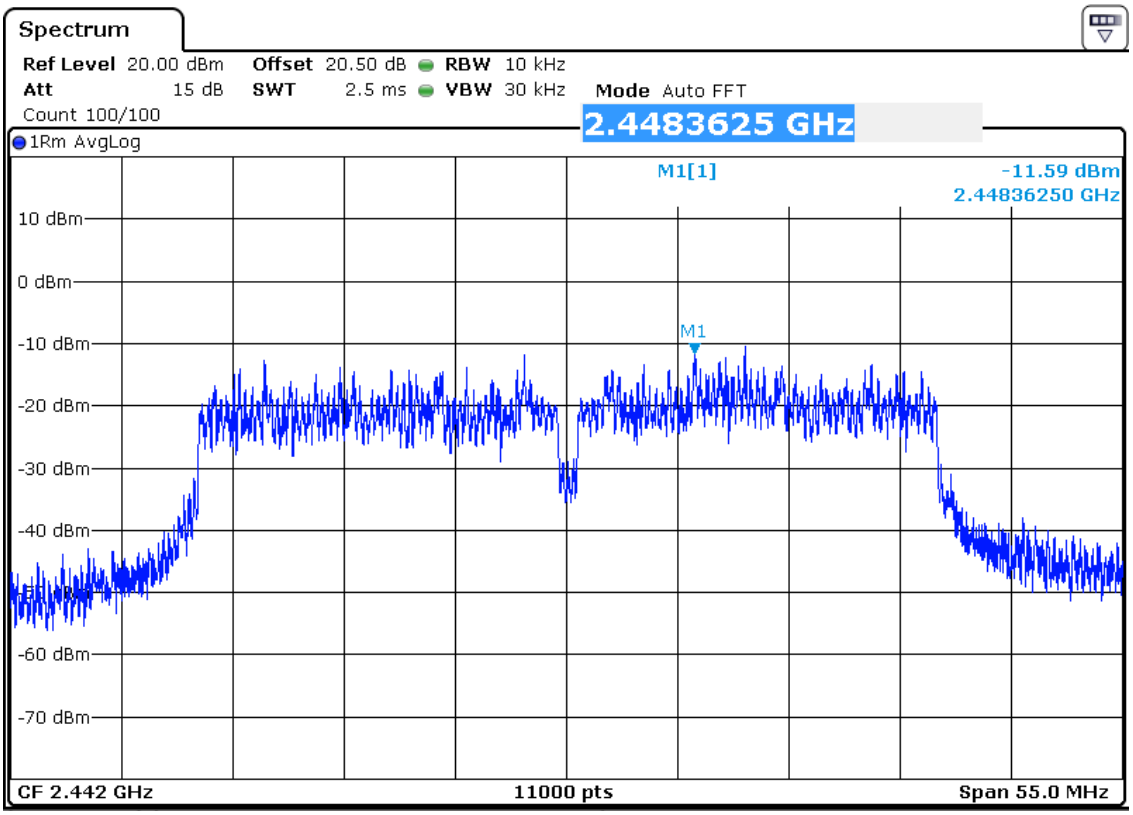
Data rate: MCS4 **Channel Frequency: 2442 MHz**



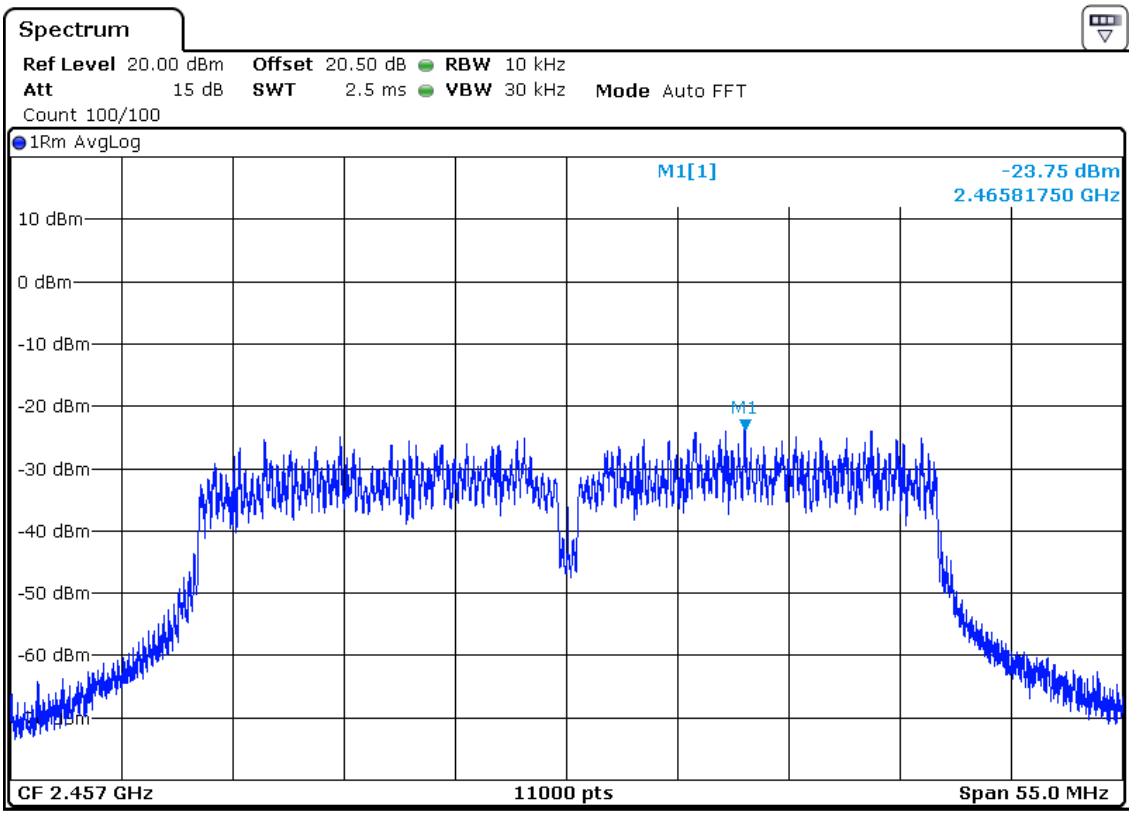
Data rate: MCS4 **Channel Frequency: 2457 MHz**



Data rate: MCS7 **Channel Frequency: 2422 MHz**



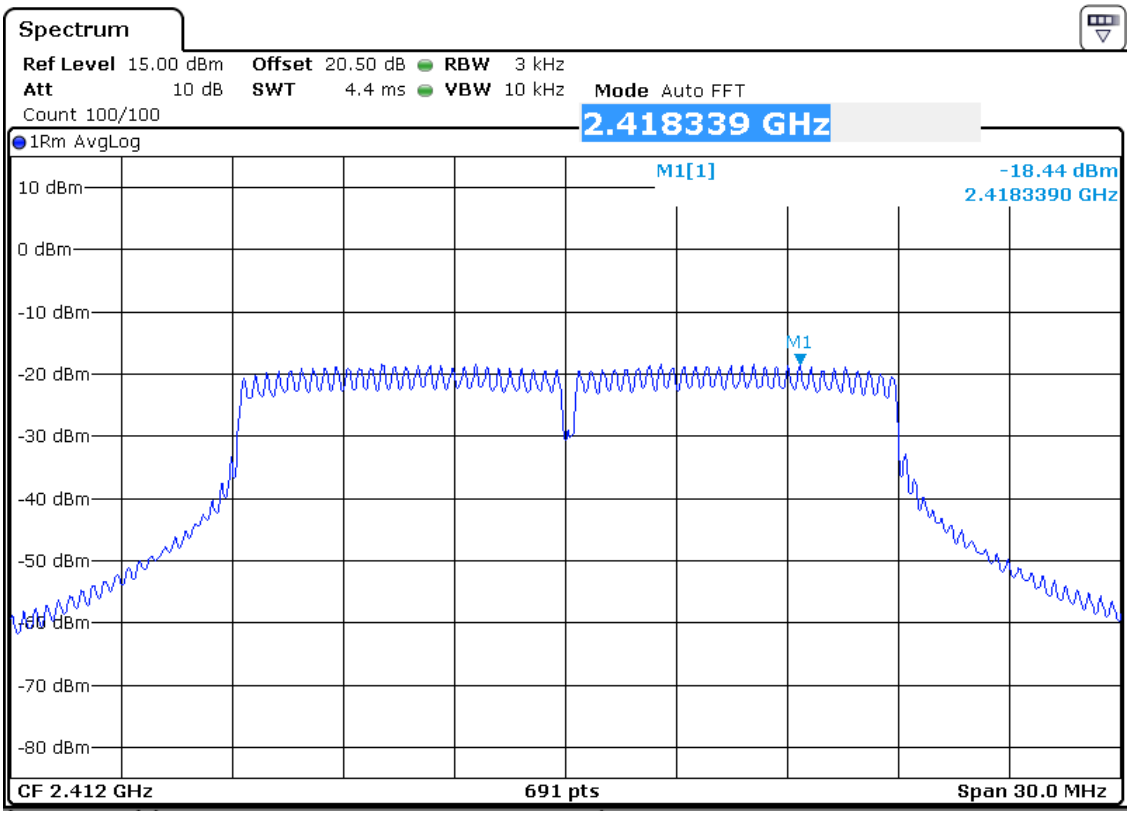
Data rate: MCS7 **Channel Frequency: 2442 MHz**



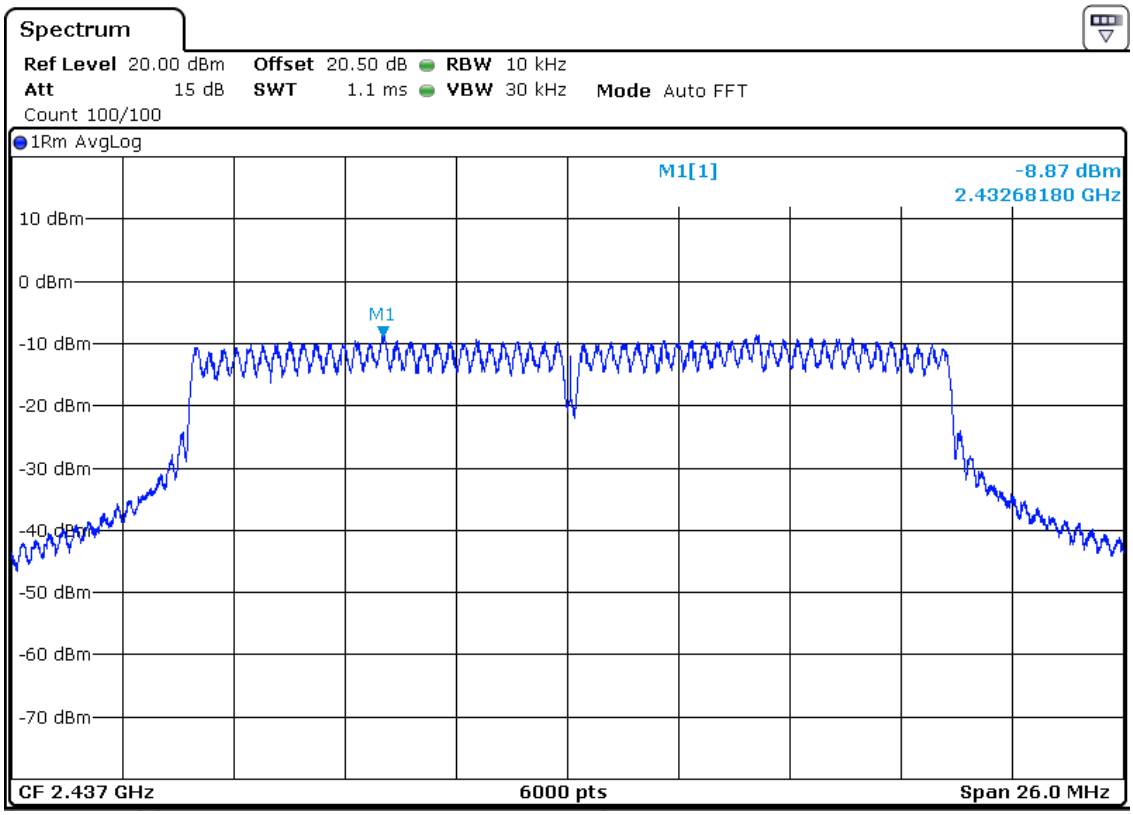
Data rate: MCS7 **Channel Frequency: 2457 MHz**

Test Results for Path C

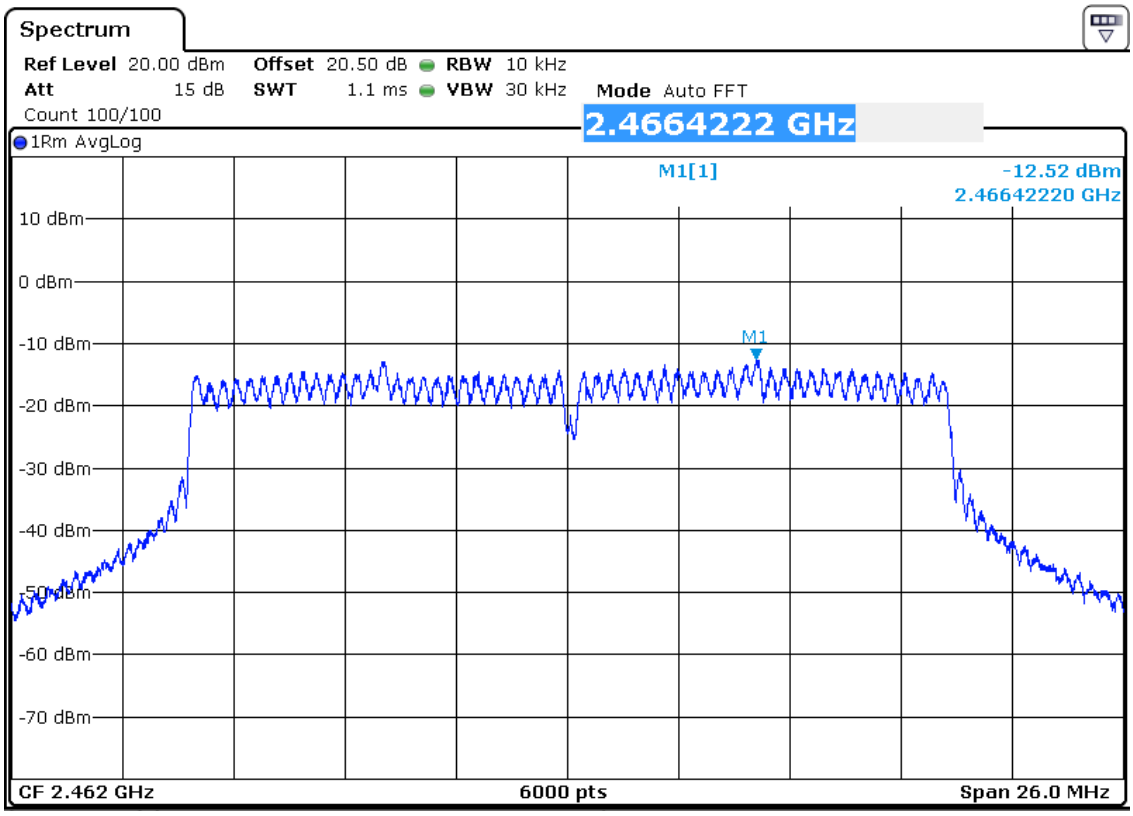
IEEE802.11nHT20					
Data Rate (Mbps)	**Channel Frequency (MHz)**	**Total PSD (dBm)**	**Measure & Add 10*log(3)**	**Total PSD (dBm)**	**Limit (dBm)**
MCS0	2412	-17.7	4.77	-12.93	8
	2437	-08.87	4.77	-04.10	8
	2462	-17.93	4.77	-13.16	8
MCS4	2412	-17.27	4.77	-12.50	8
	2437	-08.84	4.77	-04.07	8
	2462	-16.29	4.77	-11.52	8
MCS7	2412	-17.34	4.77	-12.57	8
	2437	-09.04	4.77	-04.27	8
	2462	-14.46	4.77	-9.69	8



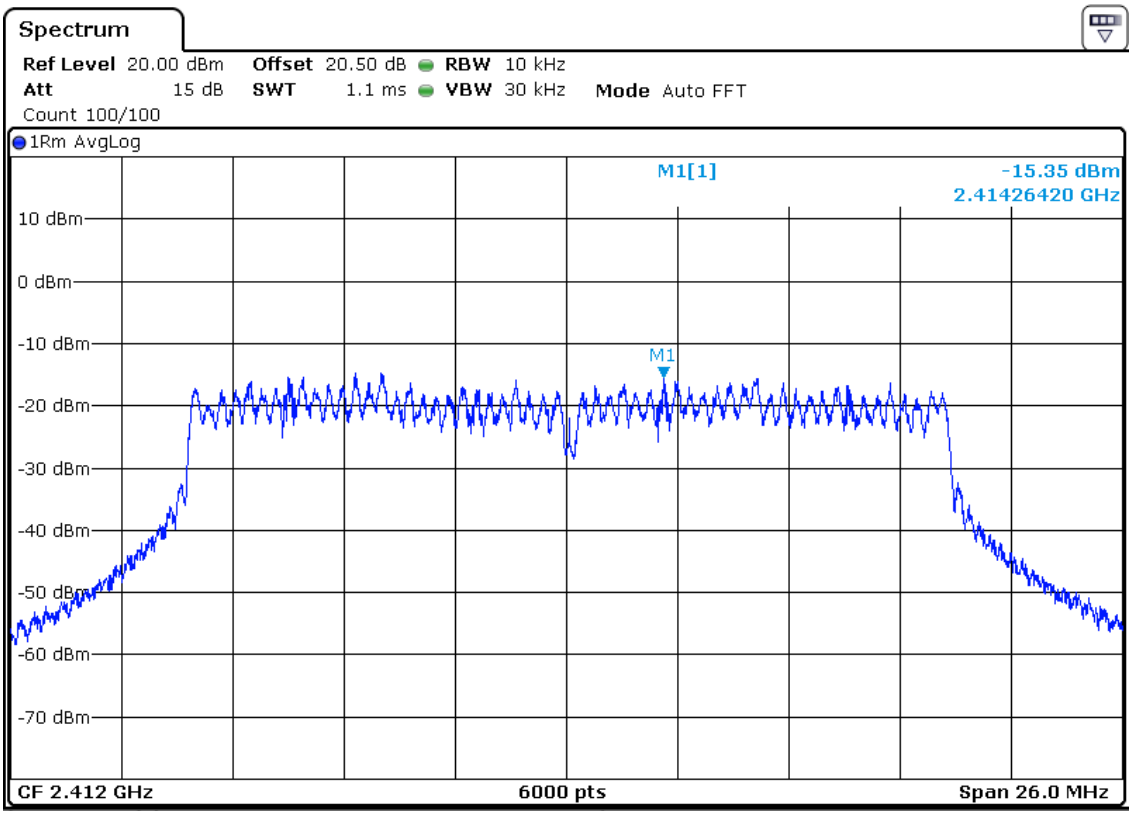
Data rate: MCS0 **Channel Frequency: 2412 MHz**



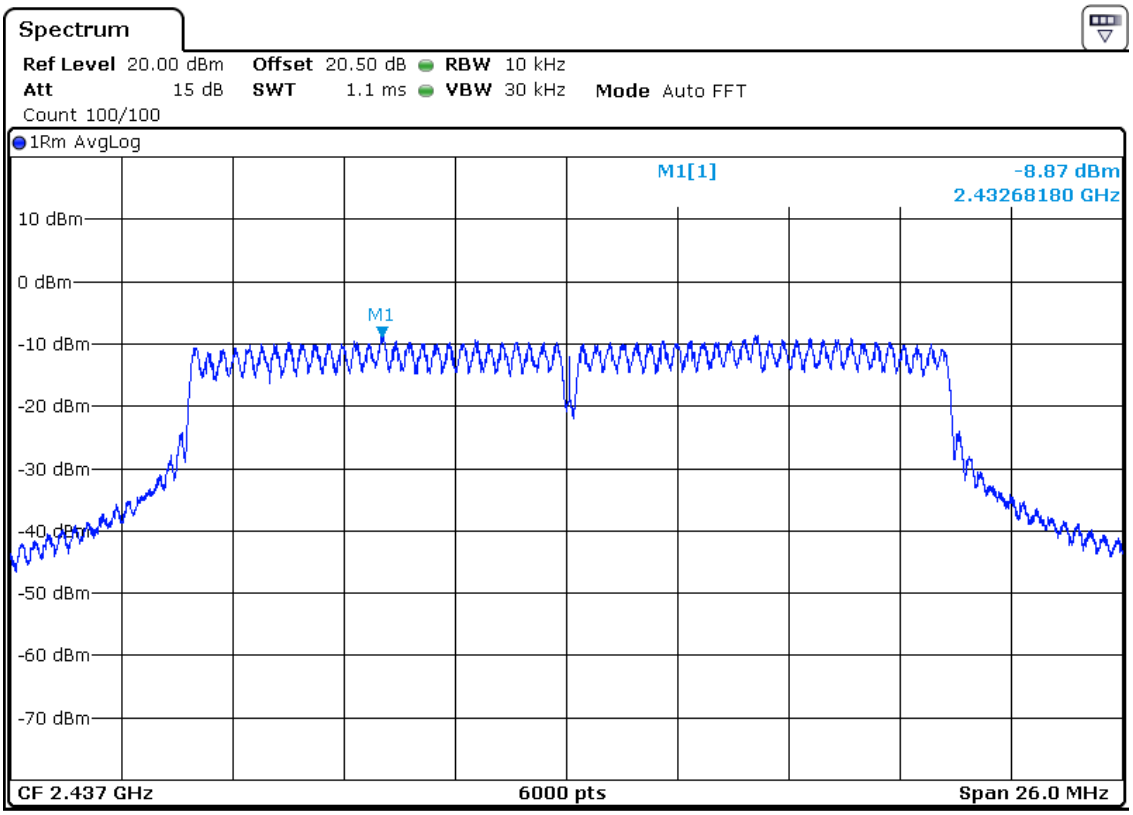
Data rate: MCS0 **Channel Frequency: 2437 MHz**



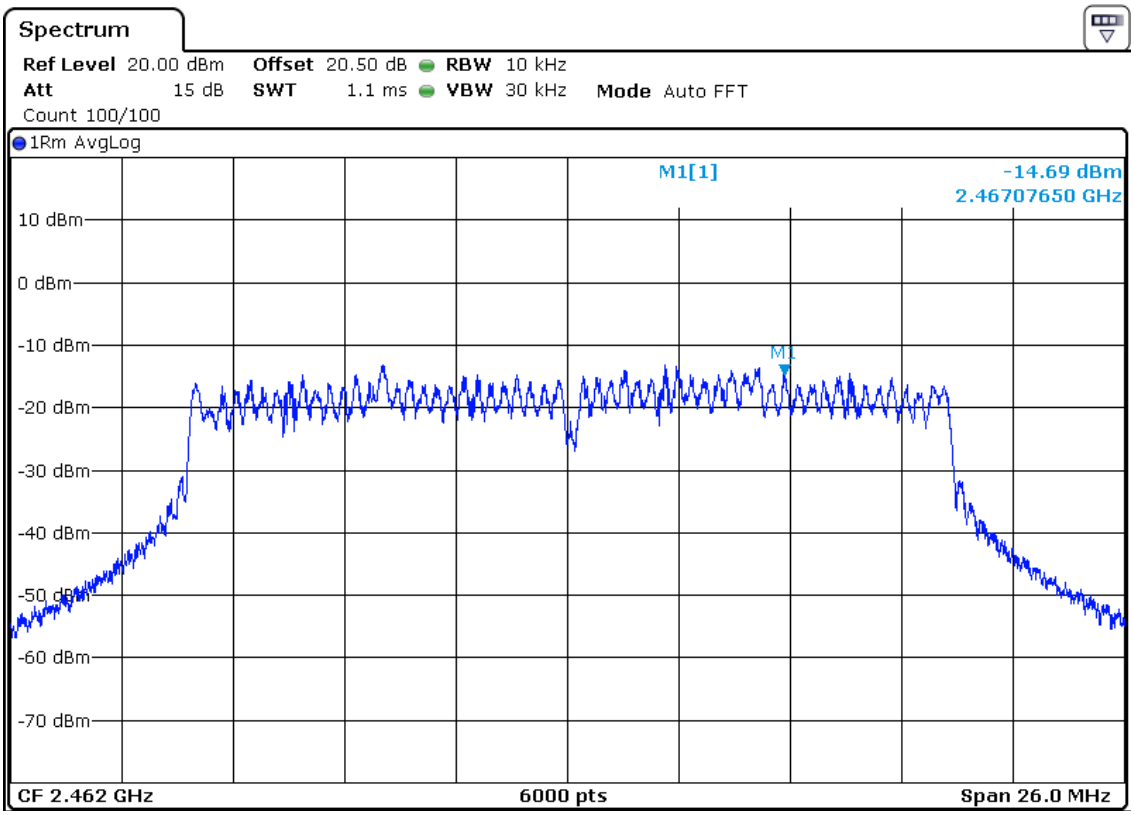
Data rate: MCS0 **Channel Frequency: 2462 MHz**



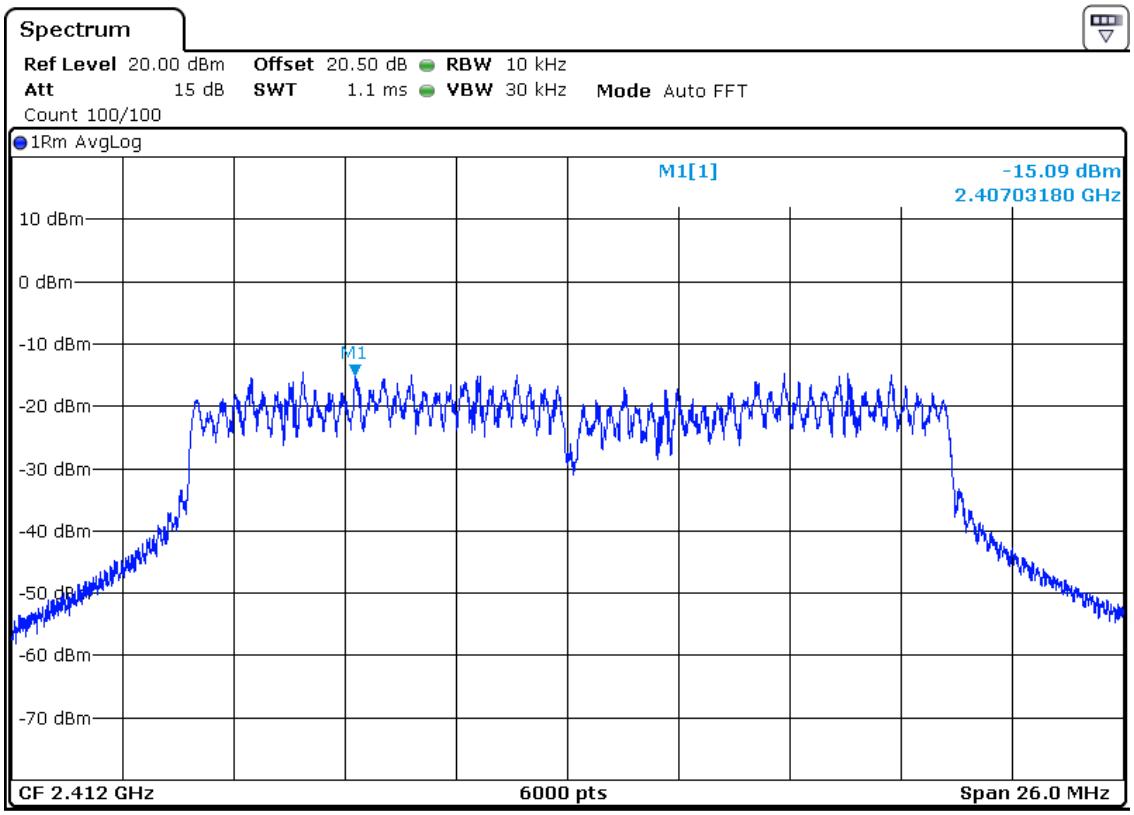
Data rate: MCS4 **Channel Frequency: 2412 MHz**



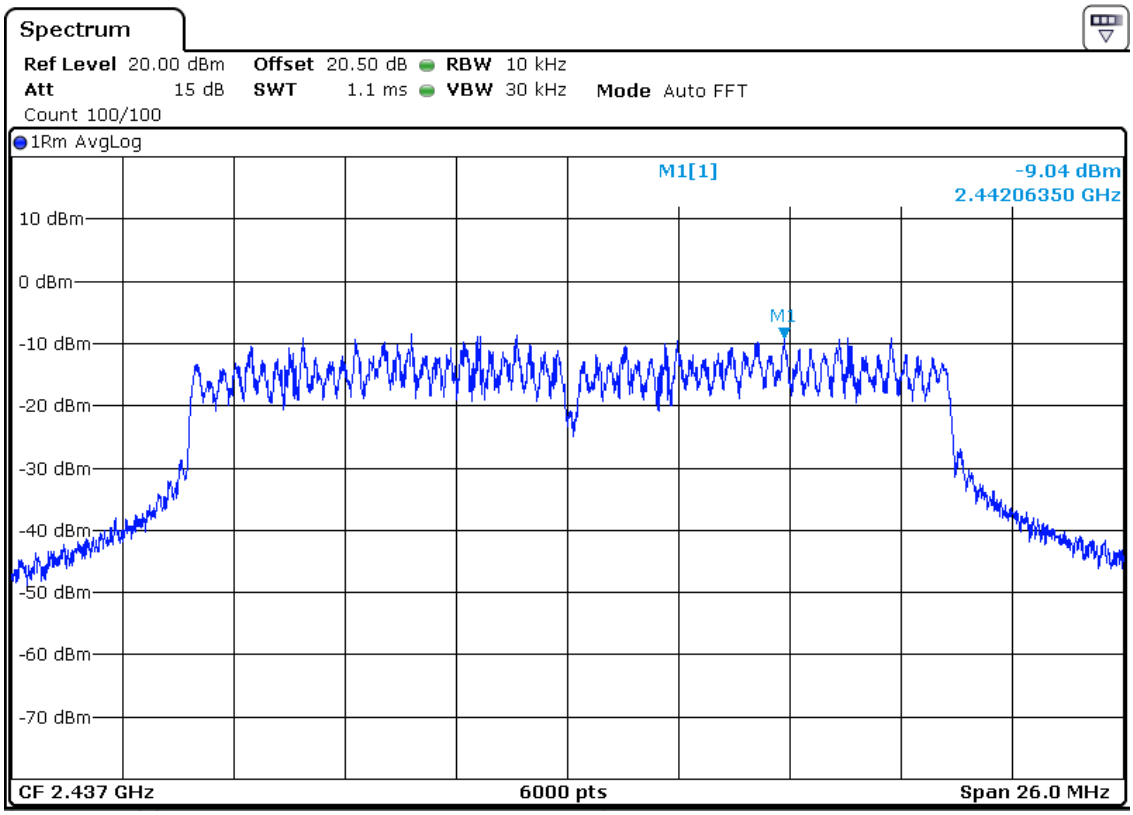
Data rate: MCS4 **Channel Frequency: 2437 MHz**



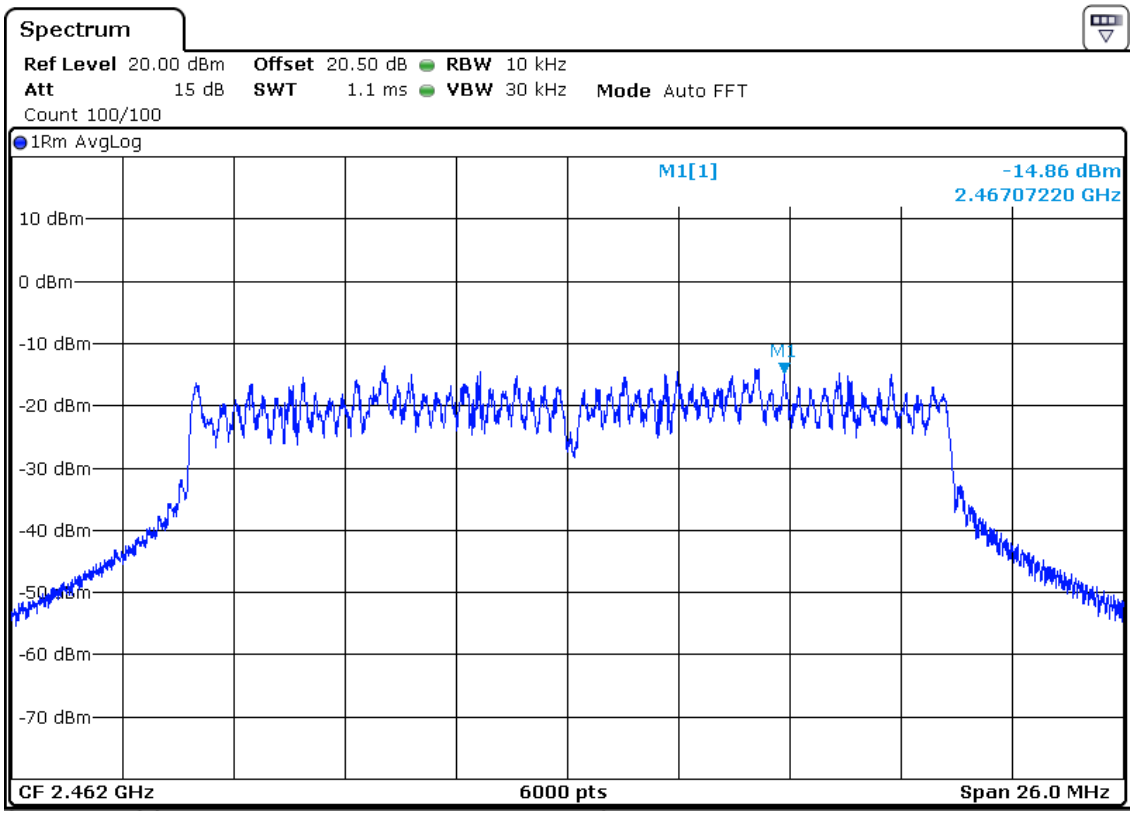
Data rate: MCS4 **Channel Frequency: 2462 MHz**



Data rate: MCS7 **Channel Frequency: 2412 MHz**

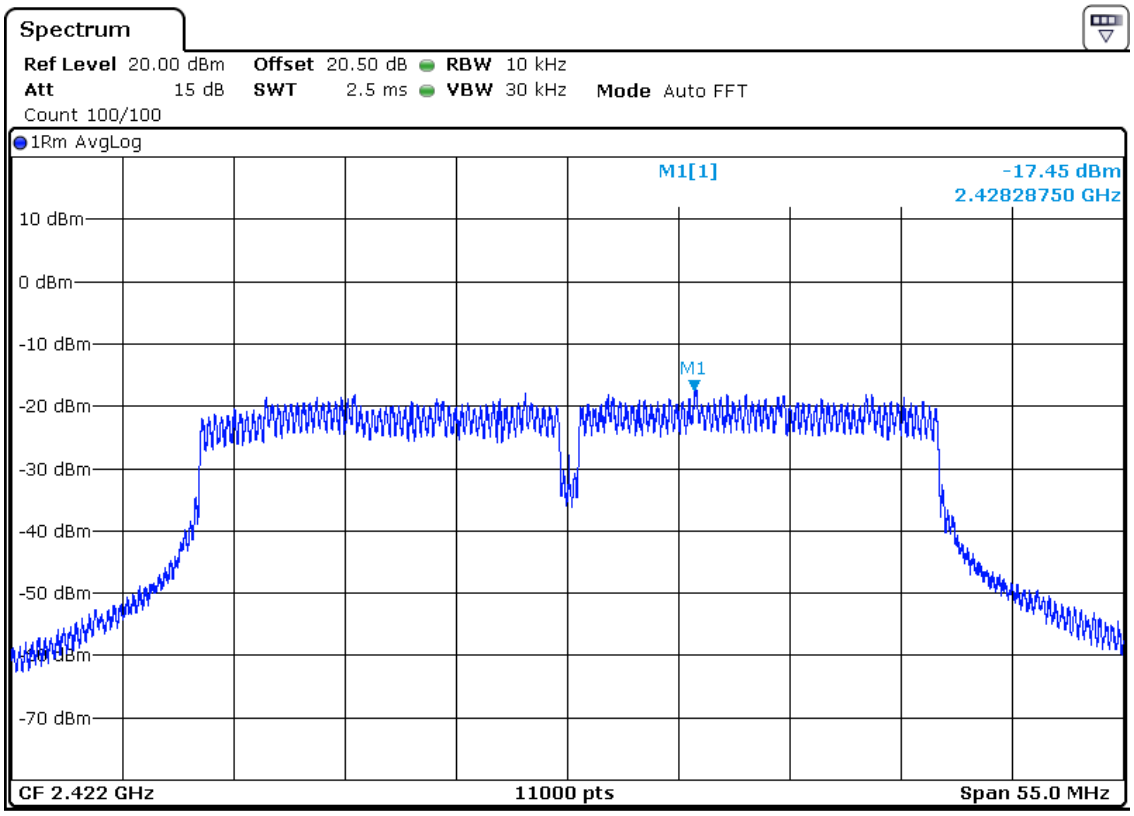


Data rate: MCS7 **Channel Frequency: 2437 MHz**

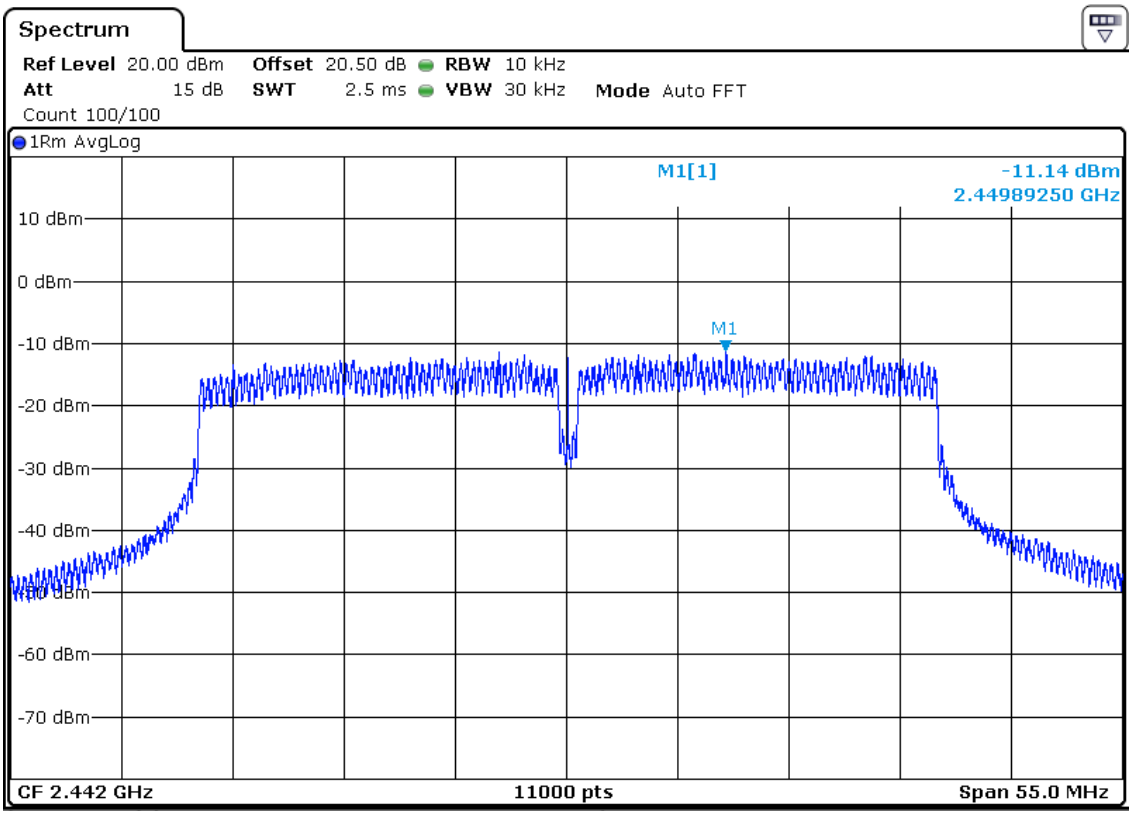


Data rate: MCS7 **Channel Frequency: 2462 MHz**

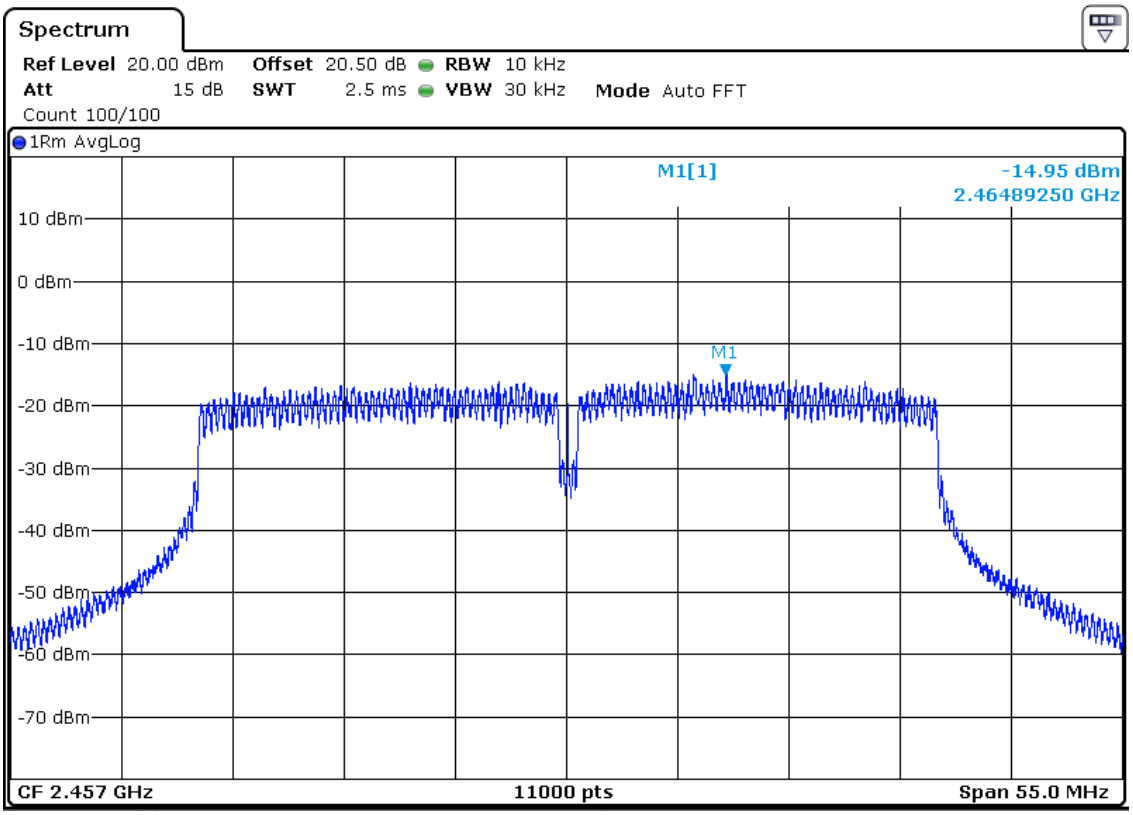
IEEE802.11nHT40					
Data Rate (Mbps)	Channel Frequency (MHz)	Measured PSD (dBm)	Measure & Add 10*log(3)	Total PSD (dBm)	Limit (dBm)
MCS0	2422	-20.60	4.77	-15.83	8
	2442	-11.14	4.77	-6.37	8
	2457	-27.00	4.77	-22.23	8
MCS4	2422	-22.20	4.77	-17.43	8
	2442	-11.25	4.77	-6.48	8
	2457	-27.27	4.77	-22.5	8
MCS7	2422	-21.08	4.77	-16.31	8
	2442	-12.07	4.77	-7.3	8
	2457	-23.93	4.77	-19.16	8



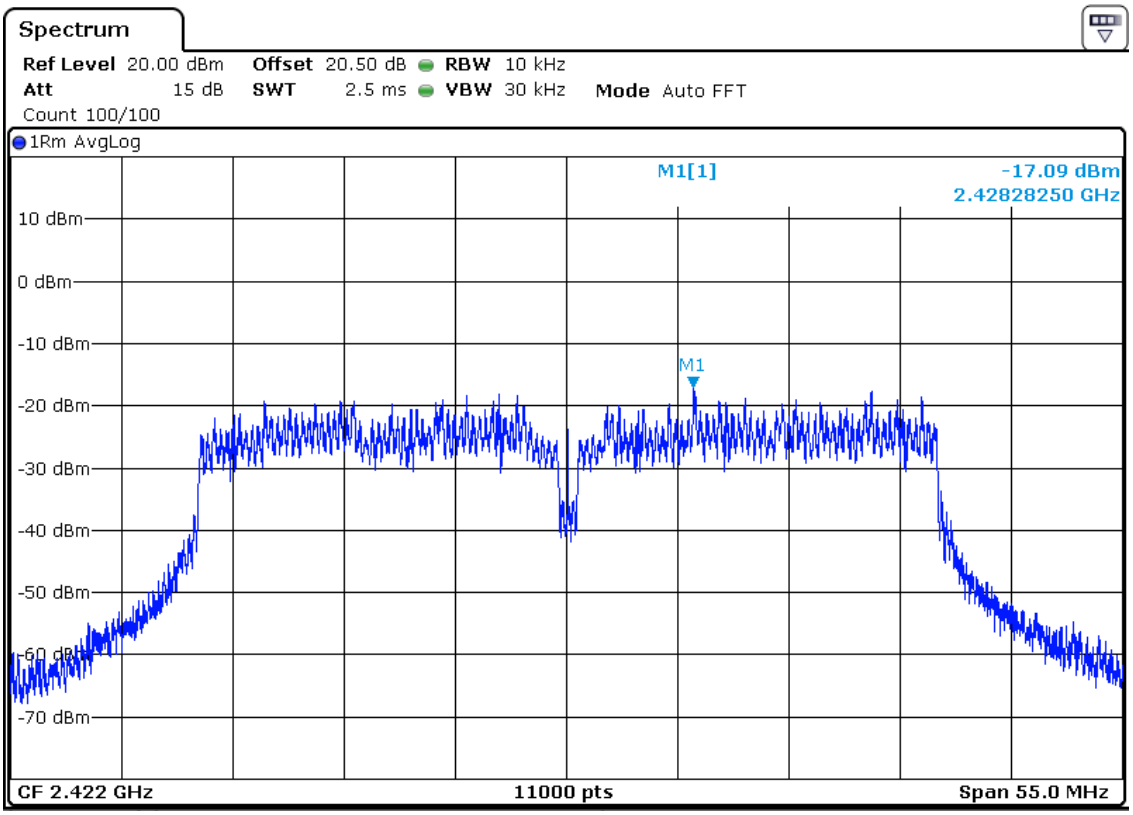
Data rate: MCS0 **Channel Frequency: 2422 MHz**



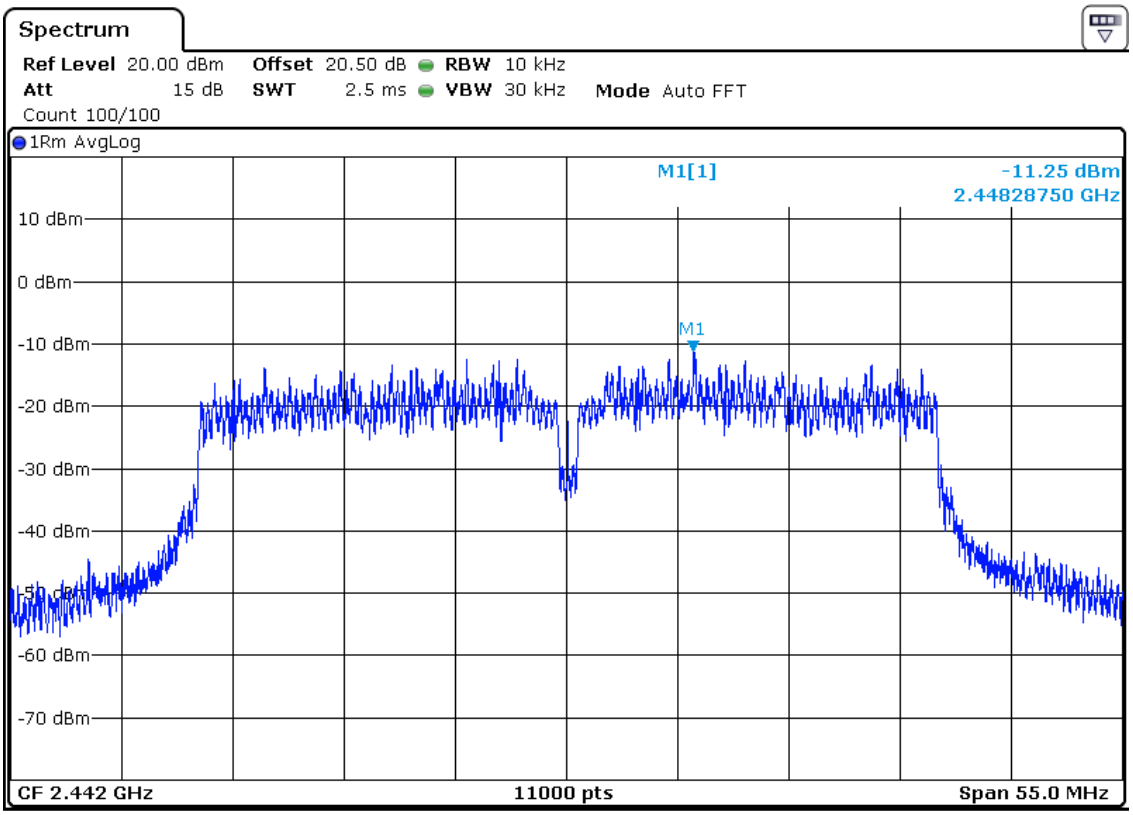
Data rate: MCS0 **Channel Frequency: 2442 MHz**



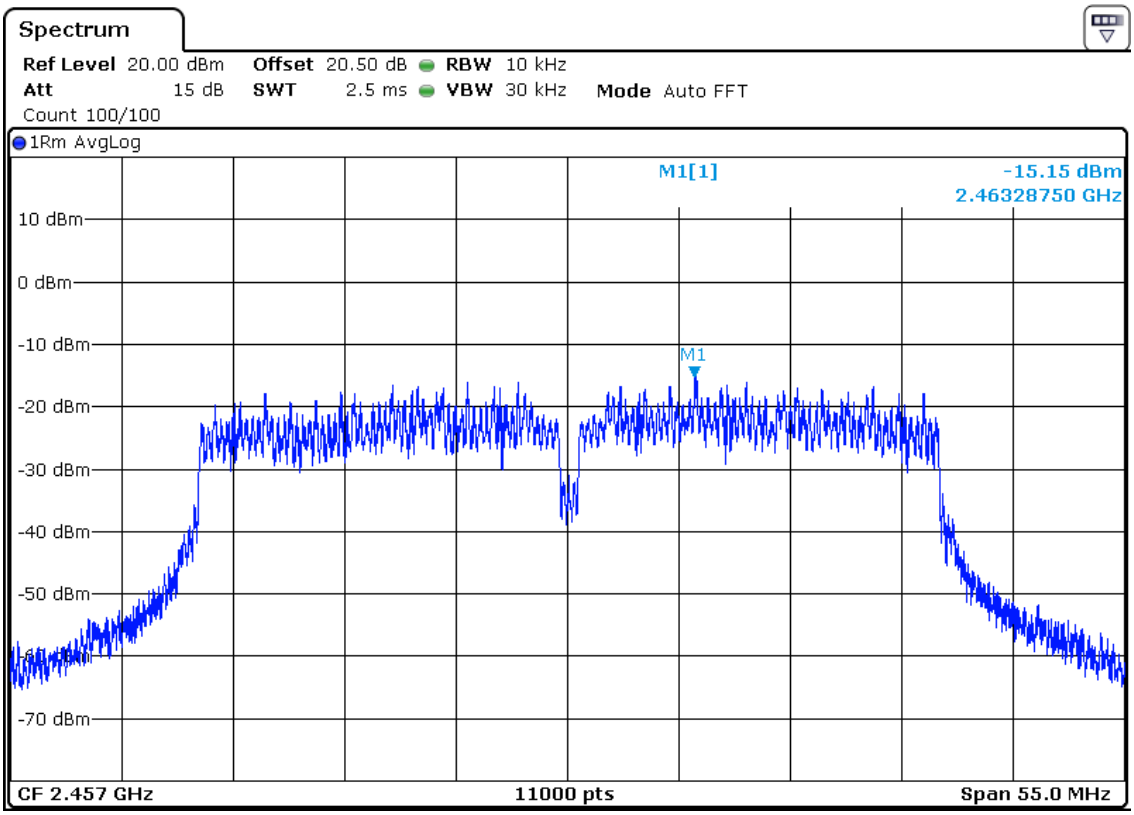
Data rate: MCS0 **Channel Frequency: 2457 MHz**



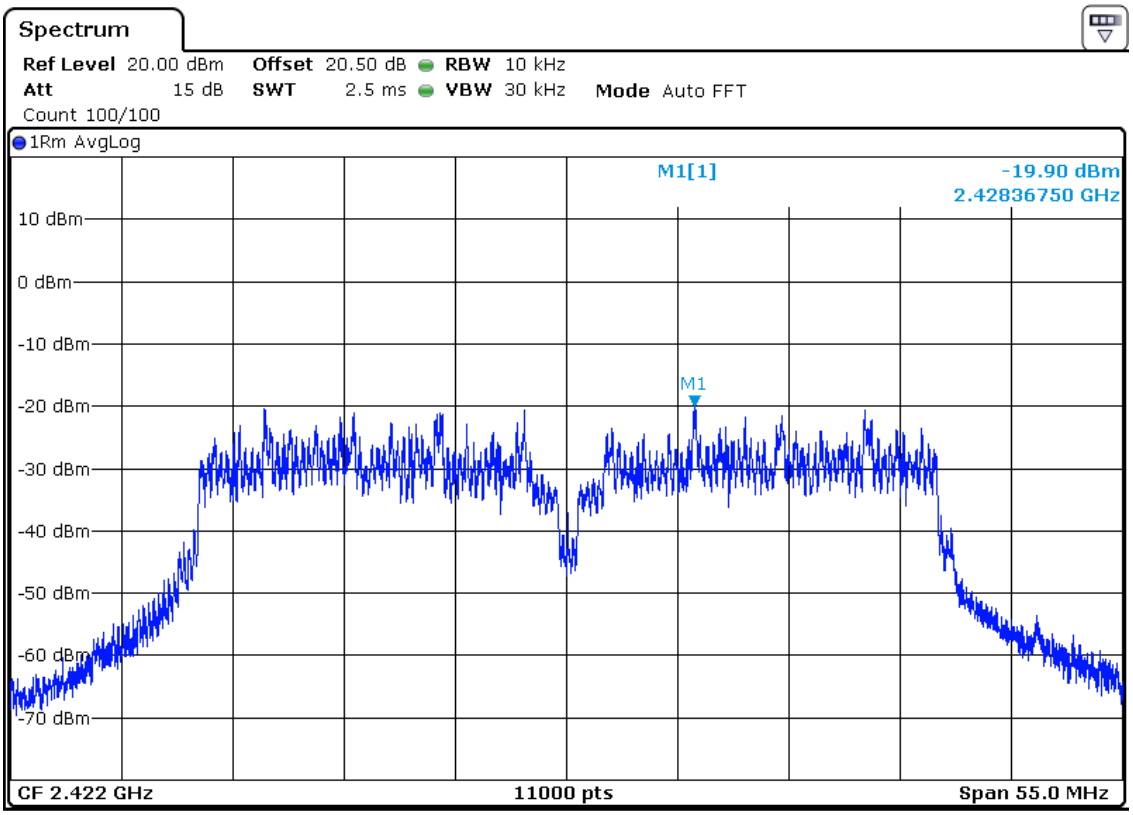
Data rate: MCS4 **Channel Frequency: 2422 MHz**



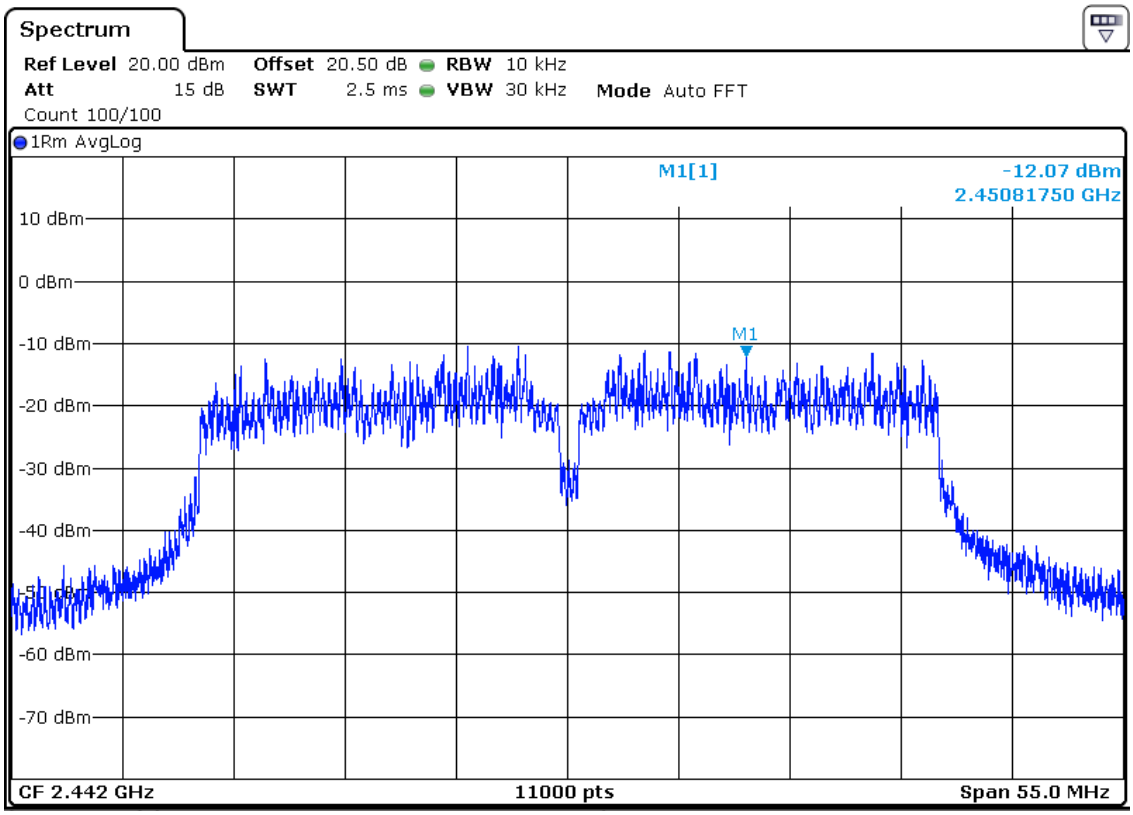
Data rate: MCS4 **Channel Frequency: 2442 MHz**



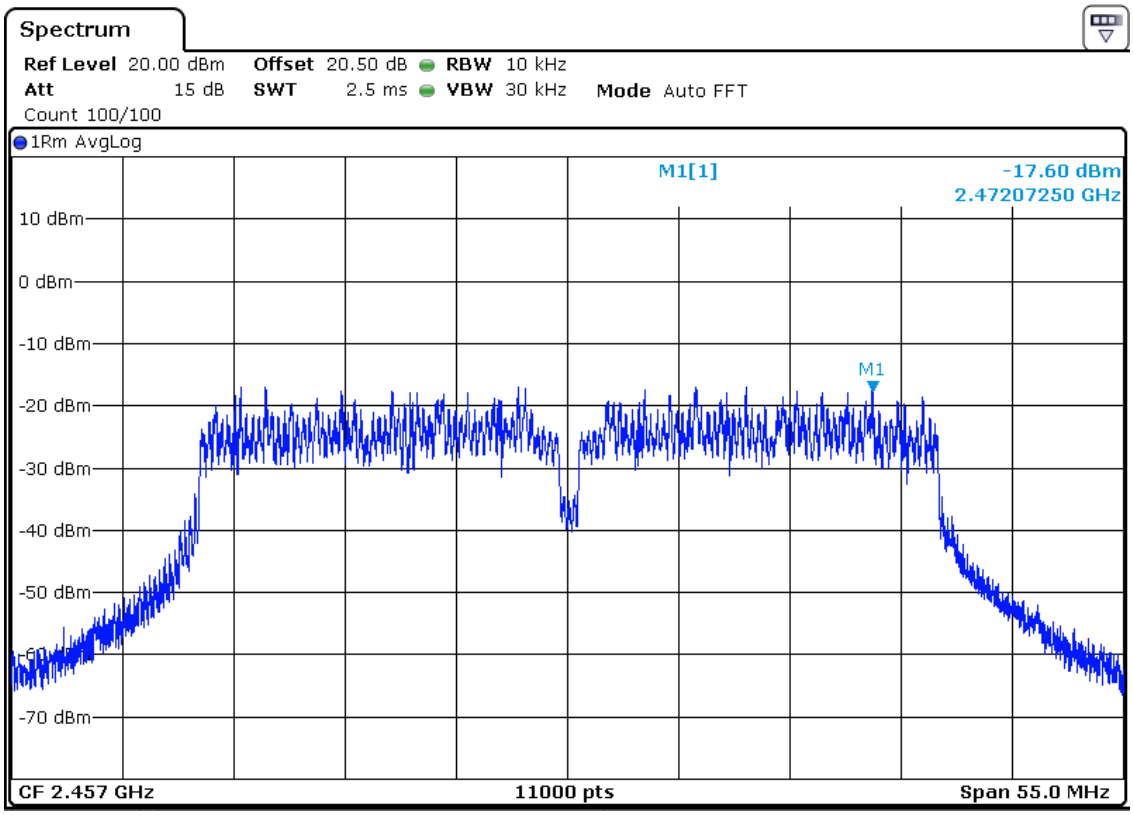
Data rate: MCS4 **Channel Frequency: 2457 MHz**



Data rate: MCS7 **Channel Frequency: 2422 MHz**



Data rate: MCS7 **Channel Frequency: 2442 MHz**

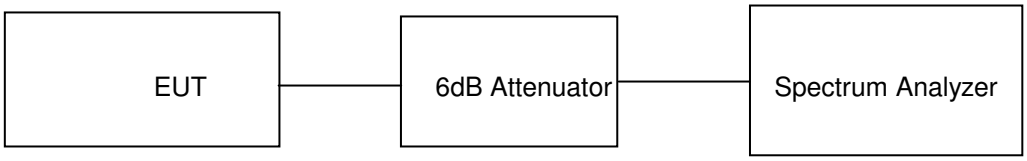


Data rate: MCS7 **Channel Frequency: 2457 MHz**

DTS Bandwidth **Section 15.247(a) (2)**
Result **Pass**

Test Specification	FCC Part 15 Section 15.247 (a) (2)
Detector Function	Peak
Requirement	The minimum 6 dB bandwidth shall be at least 500 kHz/0.5MHz.

Test Method:

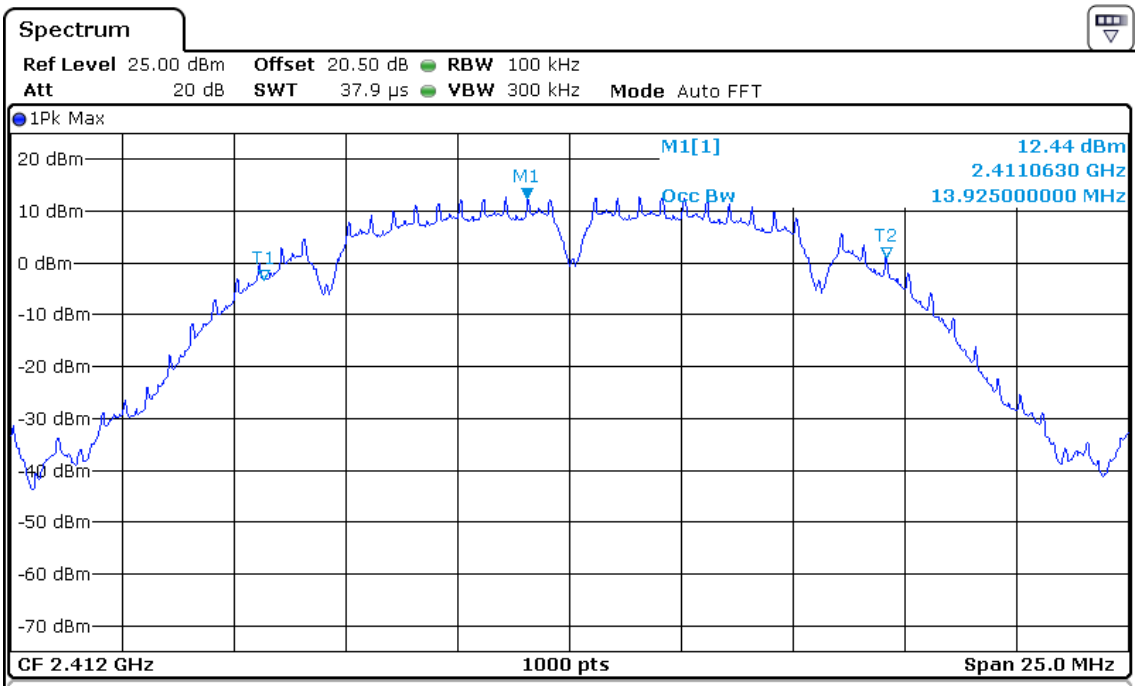


Test Result:

Attenuator (20dB) + cable loss (0.5dB) = 20.50dB Considered in the test result

IEEE802.11b			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**6 dB Bandwidth (MHz)**	**99% OBW (MHz)**
1	2412	10.1	13.92
	2437	10.1	14.02
	2462	10.1	14.02
11	2412	10.7	13.67
	2437	10.8	13.75
	2462	10.7	13.7

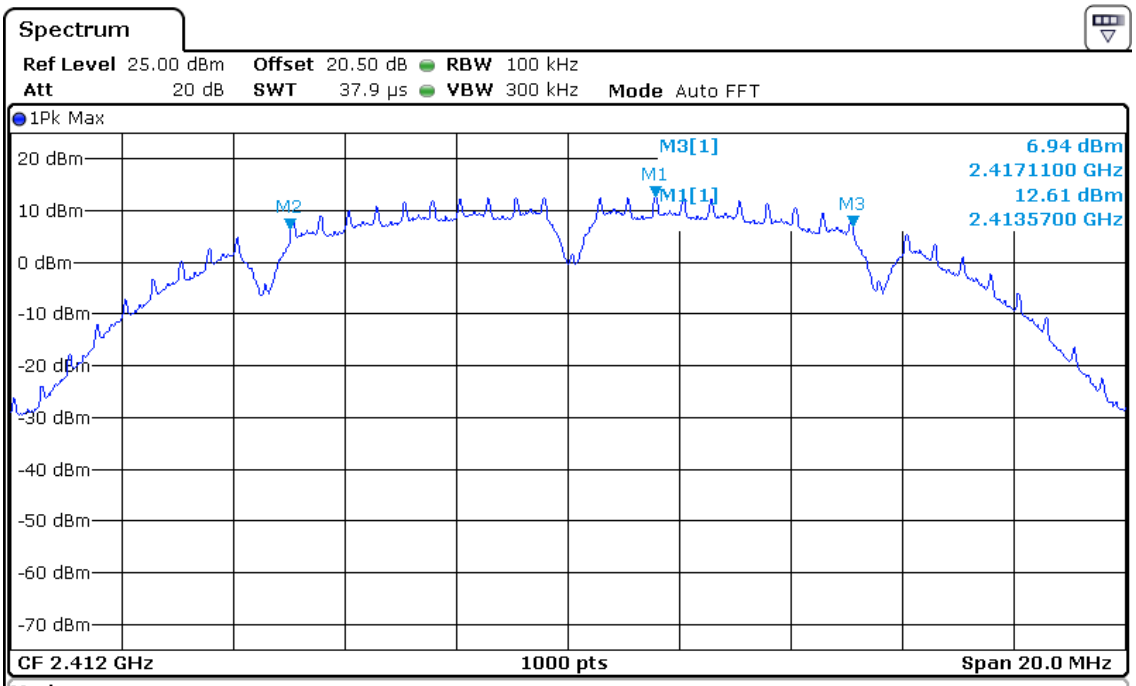
Note: Worst case results are reported



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.411063 GHz	12.44 dBm		
T1		1	2.4051625 GHz	-3.32 dBm	Occ Bw	13.925 MHz
T2		1	2.4190875 GHz	0.92 dBm		

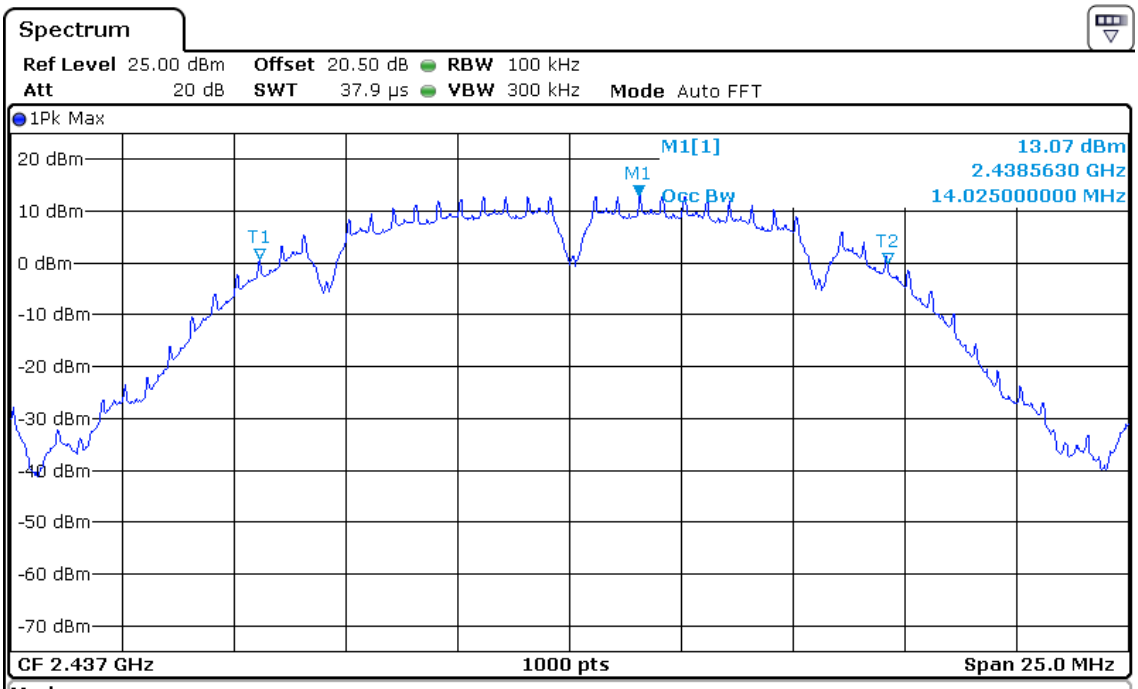
Data Rate: 1 Mbps **Channel frequency: 2412 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41357 GHz	12.61 dBm		
M2		1	2.40703 GHz	6.52 dBm		
M3		1	2.41711 GHz	6.94 dBm		

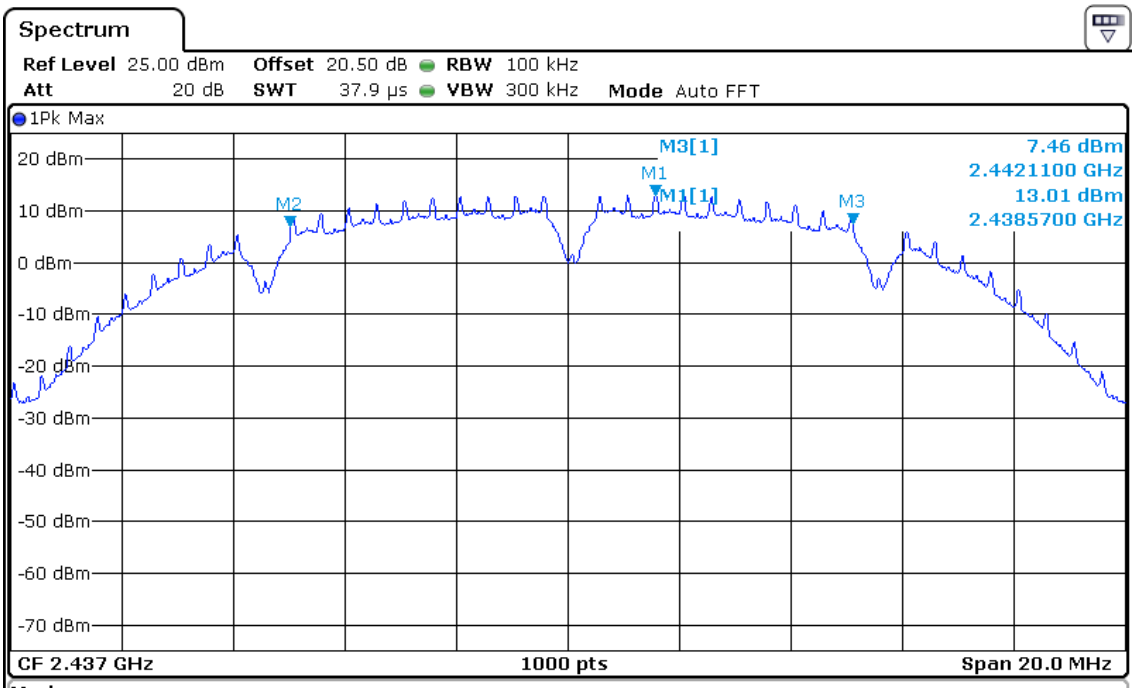
Data Rate: 1 Mbps **Channel frequency: 2412 MHz 6dB BW**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.438563 GHz	13.07 dBm		
T1		1	2.4300875 GHz	0.69 dBm	Occ Bw	14.025 MHz
T2		1	2.4441125 GHz	-0.04 dBm		

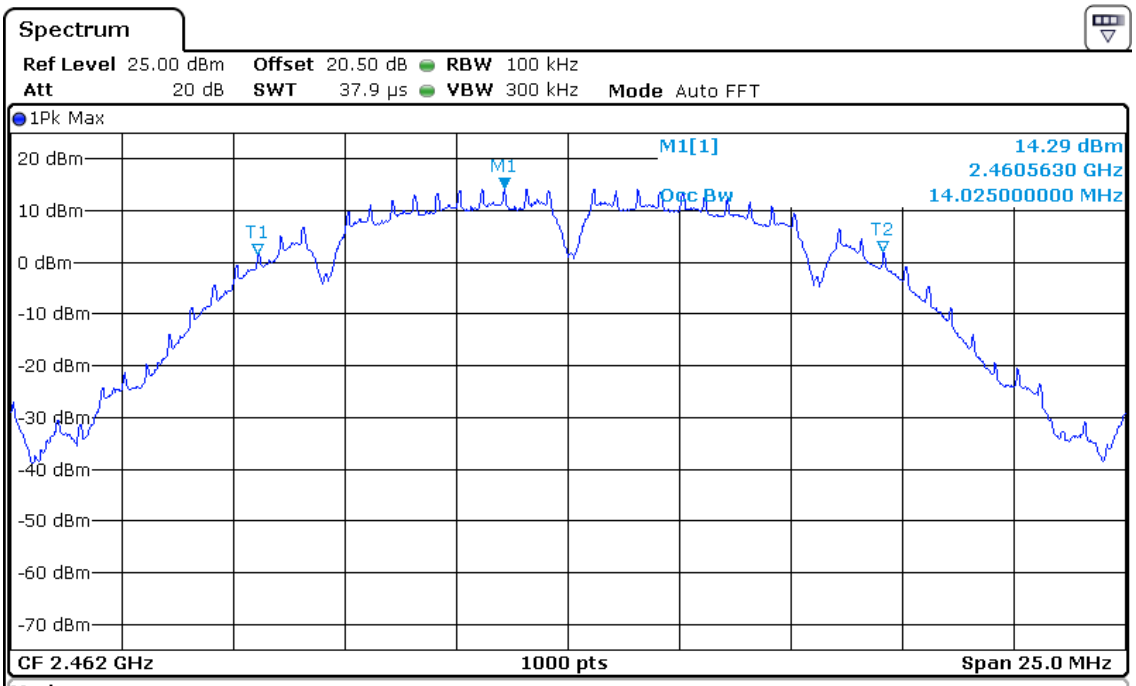
Data Rate: 1 Mbps **Channel frequency: 2437 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43857 GHz	13.01 dBm		
M2		1	2.43203 GHz	7.03 dBm		
M3		1	2.44211 GHz	7.46 dBm		

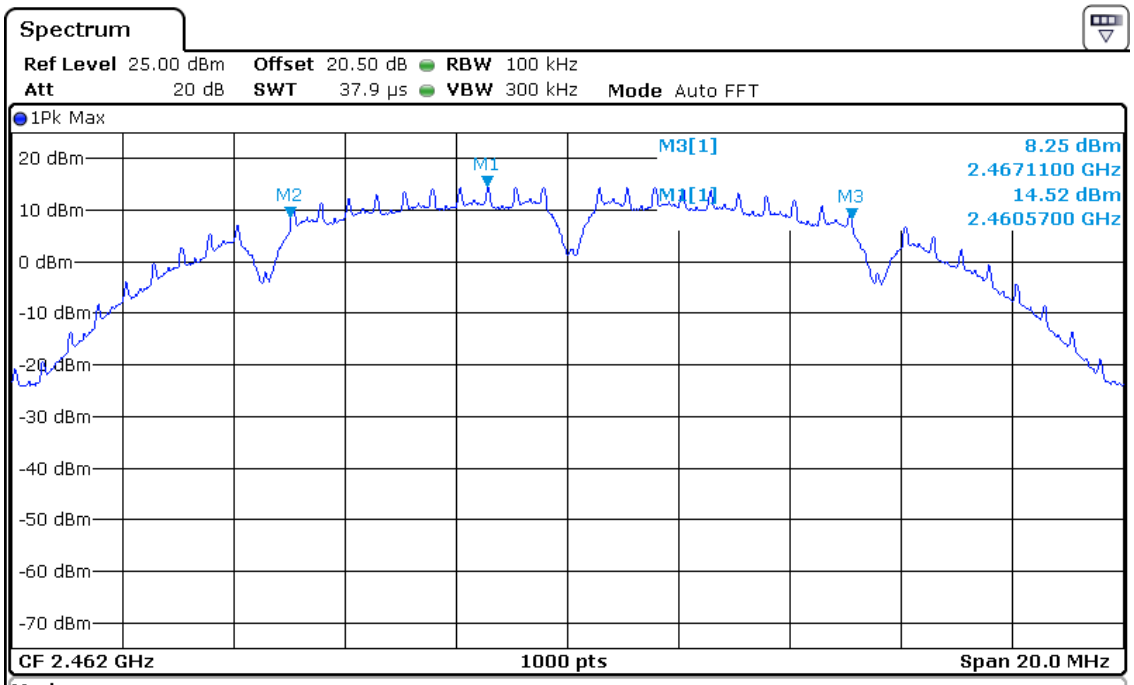
Data Rate: 1 Mbps **Channel frequency: 2437 MHz 6d BW**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.460563 GHz	14.29 dBm		
T1		1	2.4550375 GHz	1.70 dBm	Occ Bw	14.025 MHz
T2		1	2.4690625 GHz	2.09 dBm		

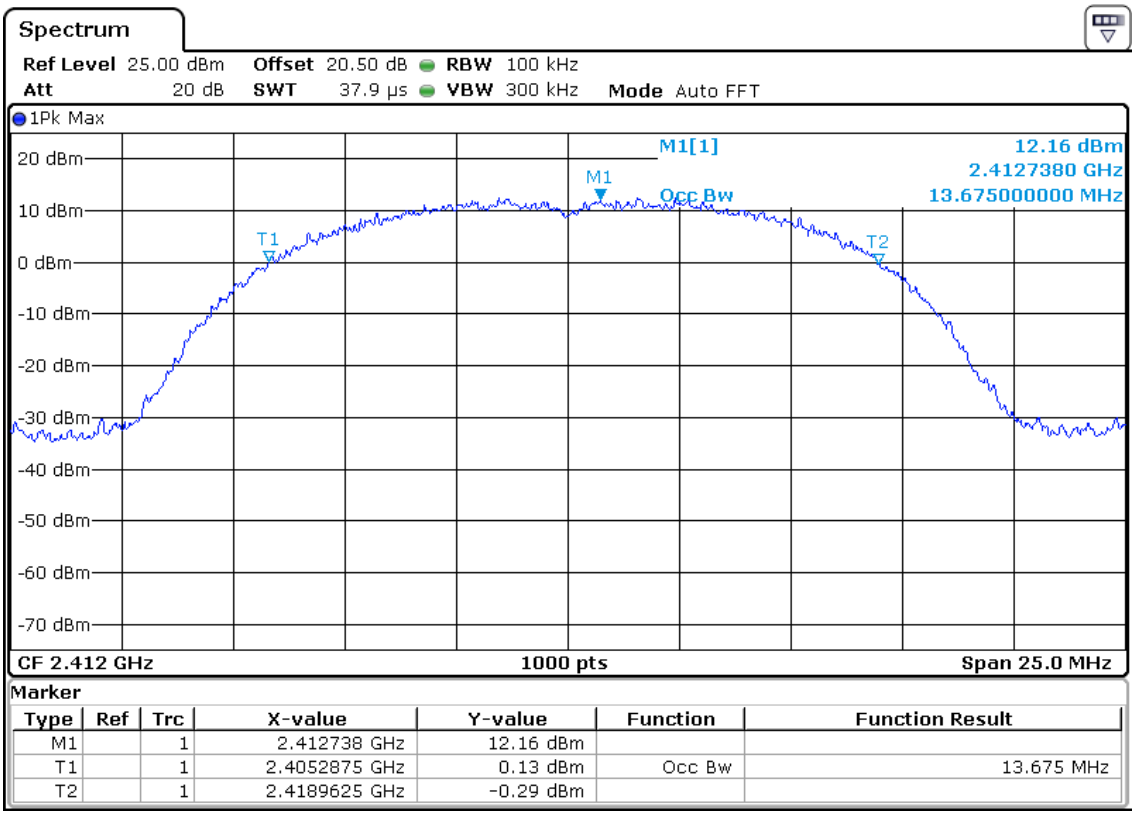
Data Rate: 1 Mbps **Channel frequency: 2462 MHz**



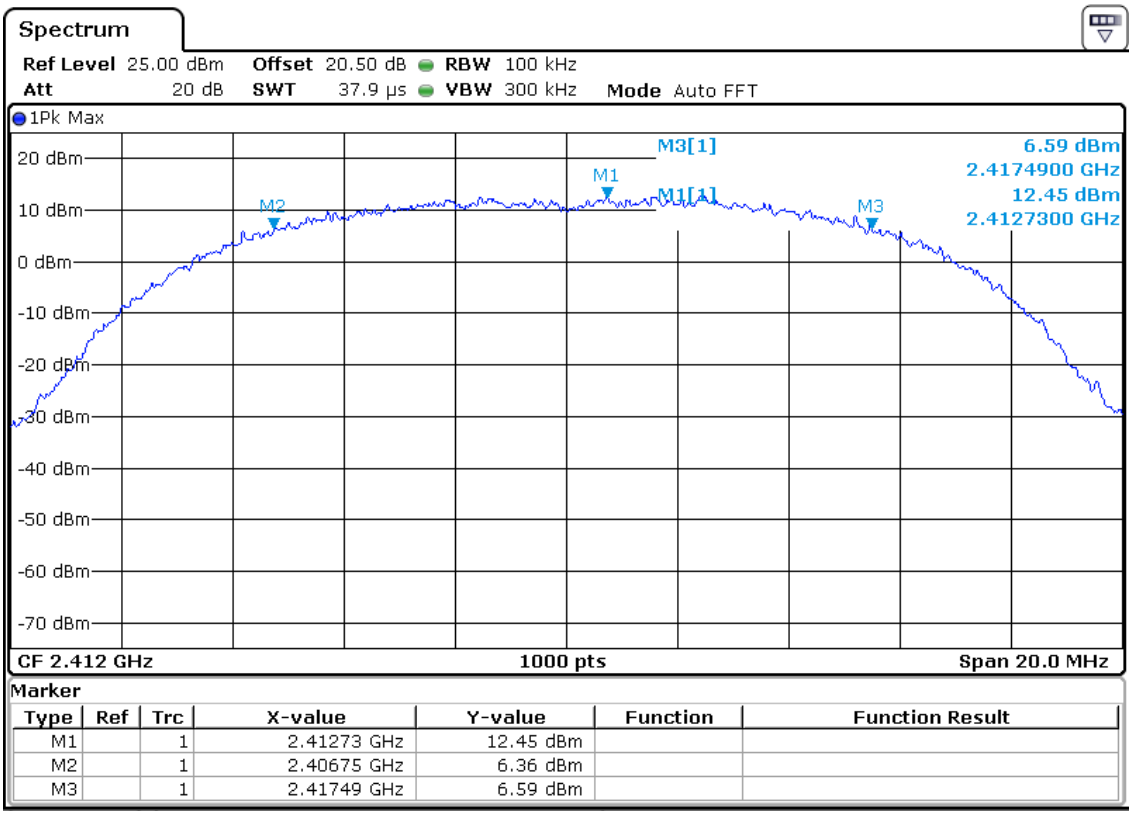
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46057 GHz	14.52 dBm		
M2		1	2.45703 GHz	8.73 dBm		
M3		1	2.46711 GHz	8.25 dBm		

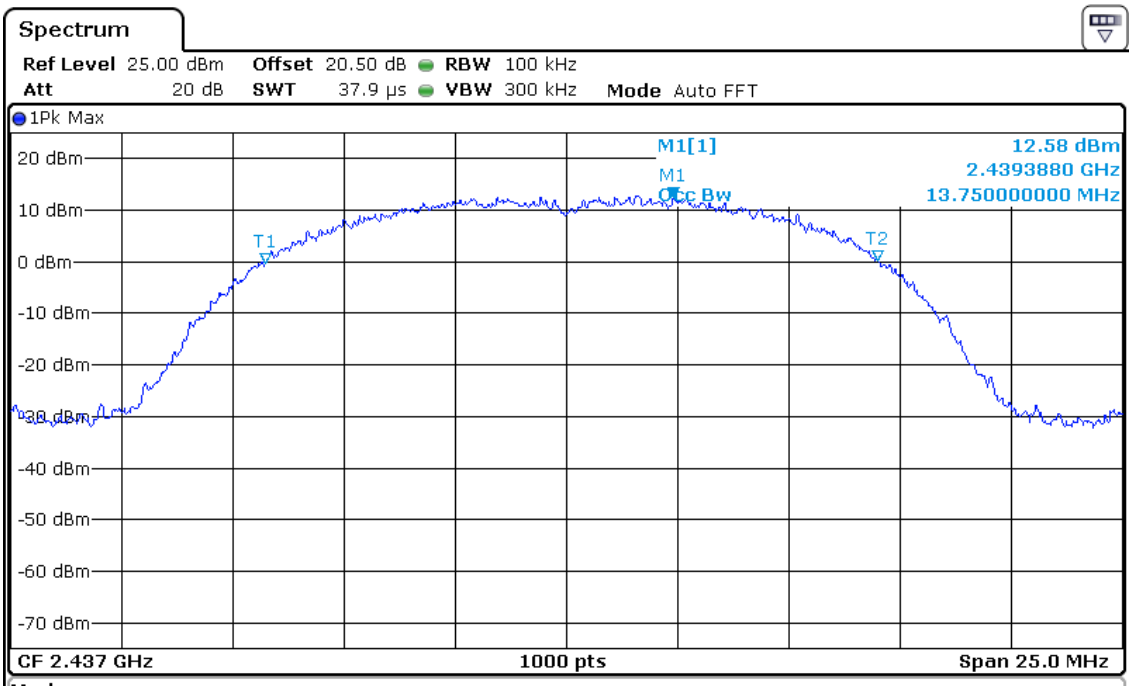
Data Rate: 1 Mbps **Channel frequency: 2462 MHz 6dB BW**



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



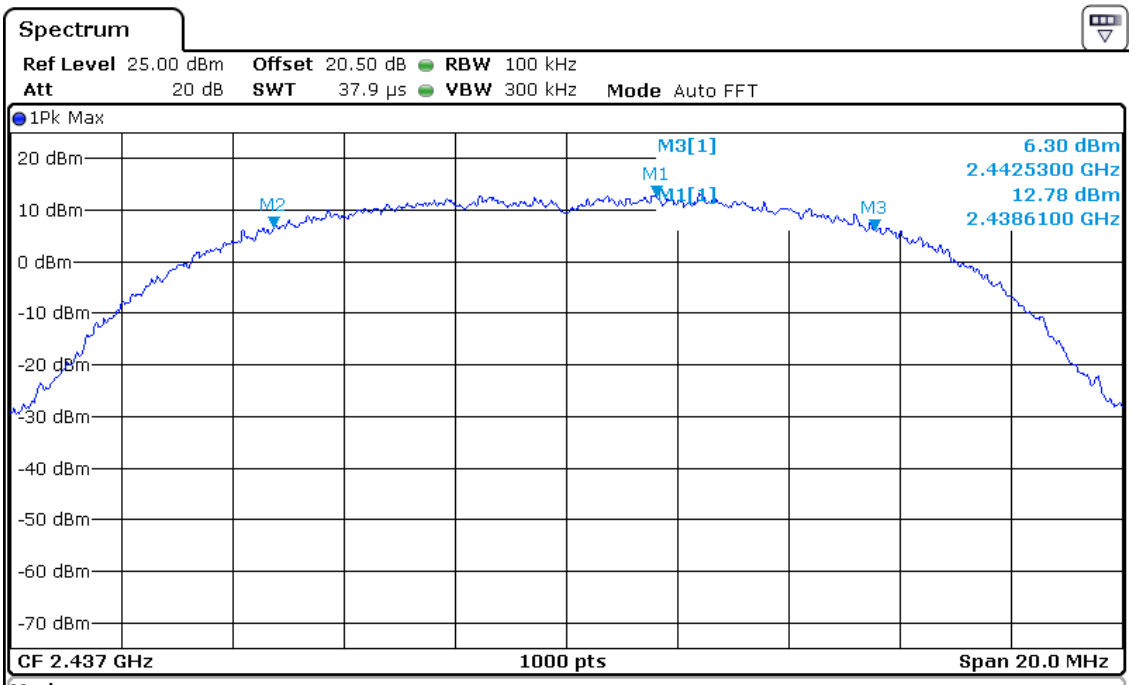
Data Rate: 11 Mbps **Channel frequencies: 2412 MHz 6db BW**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.439388 GHz	12.58 dBm		
T1		1	2.4302375 GHz	-0.37 dBm	Occ Bw	13.75 MHz
T2		1	2.4439875 GHz	0.18 dBm		

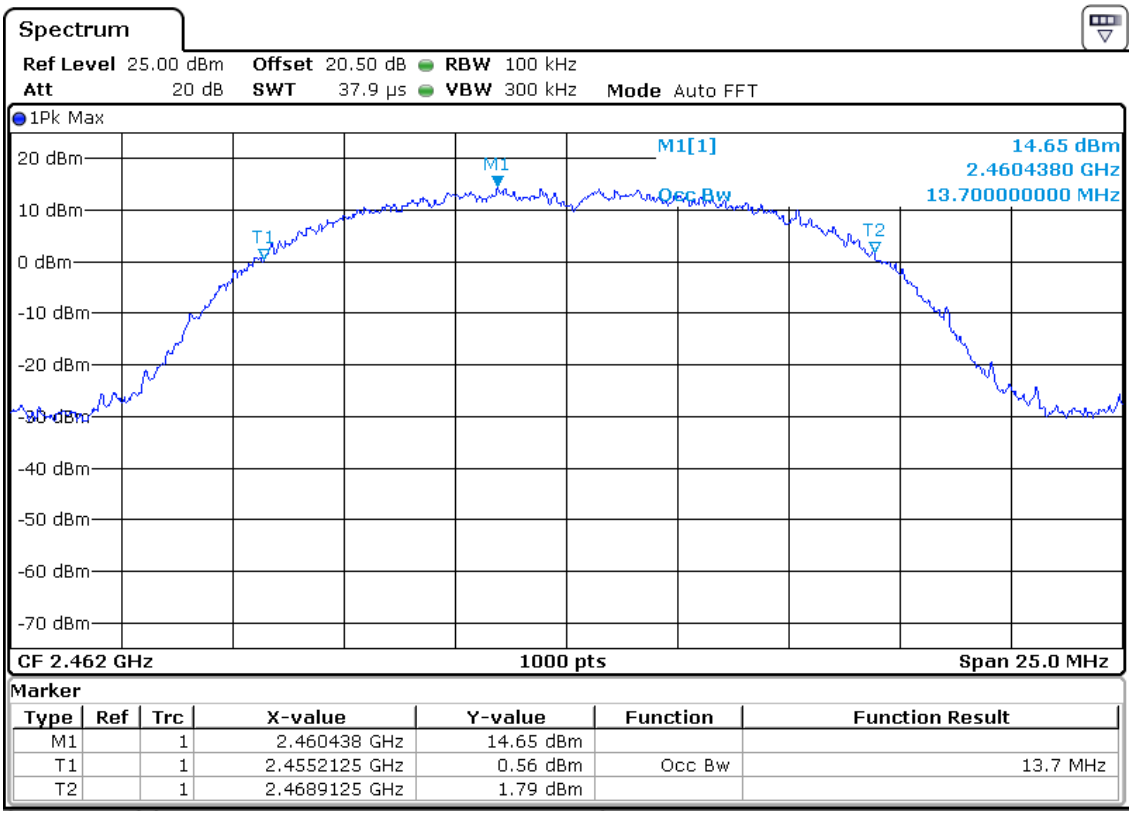
Data Rate: 11 Mbps **Channel frequency: 2437 MHz**



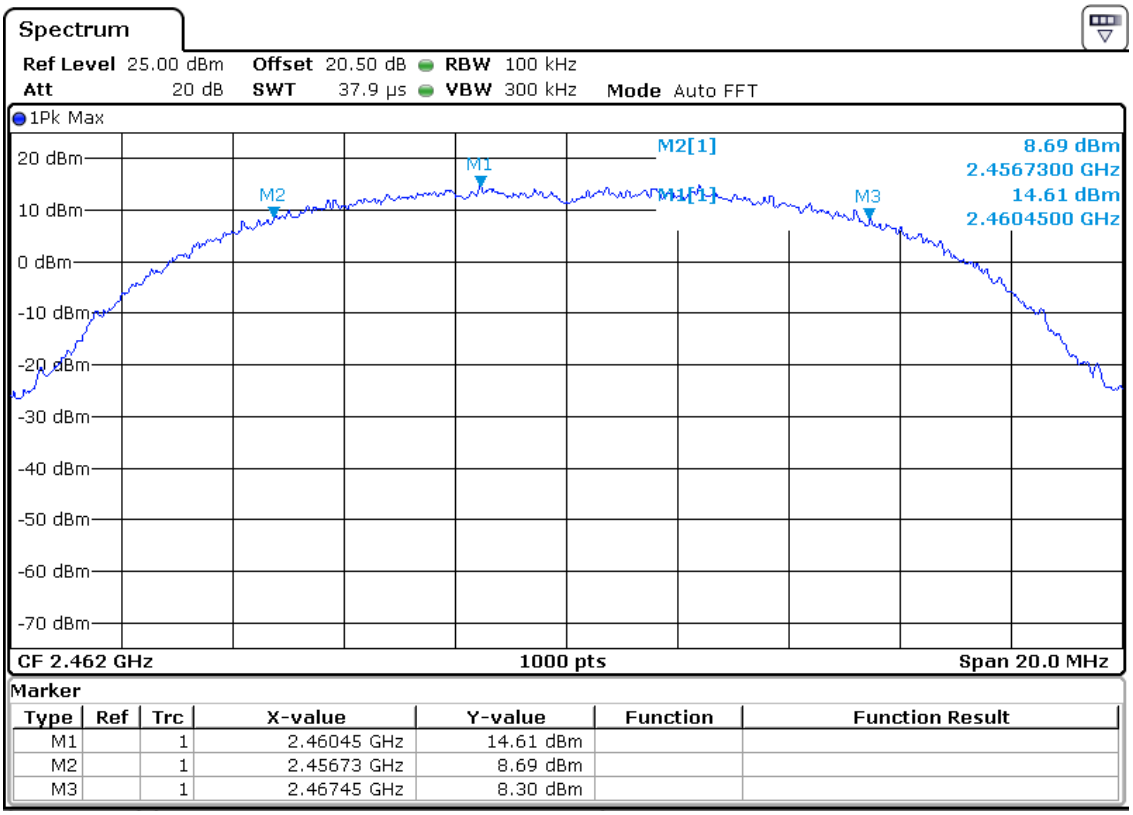
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43861 GHz	12.78 dBm		
M2		1	2.43173 GHz	6.68 dBm		
M3		1	2.44253 GHz	6.30 dBm		

Data Rate: 11 Mbps **Channel frequency: 2437 MHz 6dB BW**

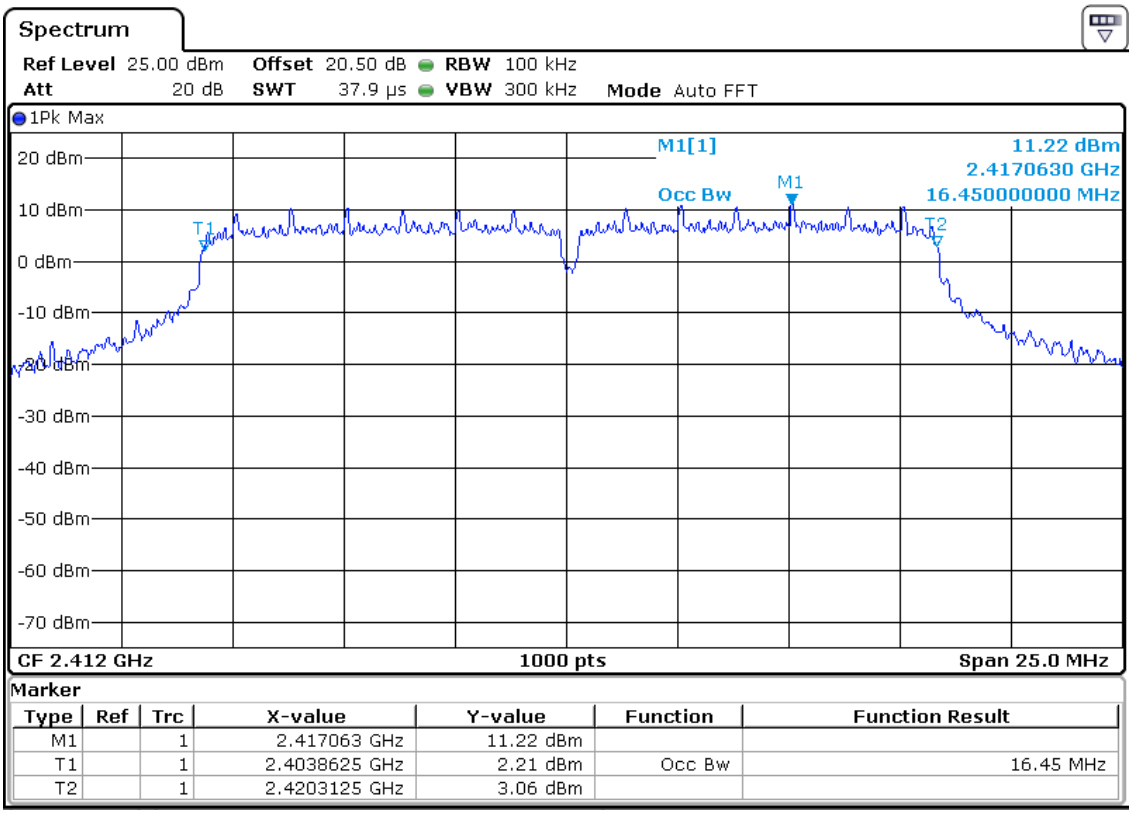


Data Rate: 11 Mbps **Channel frequency: 2462 MHz**

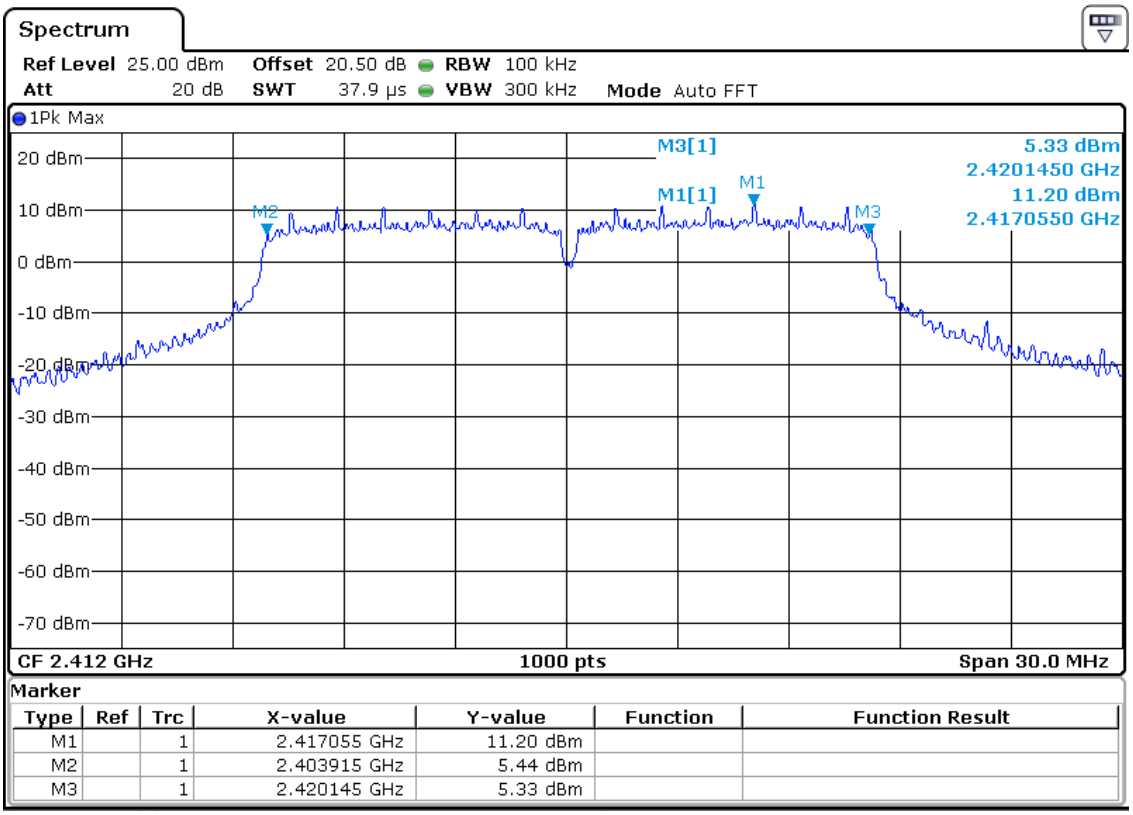


Data Rate: 11 Mbps **Channel frequency: 2462 MHz 6dB BW**

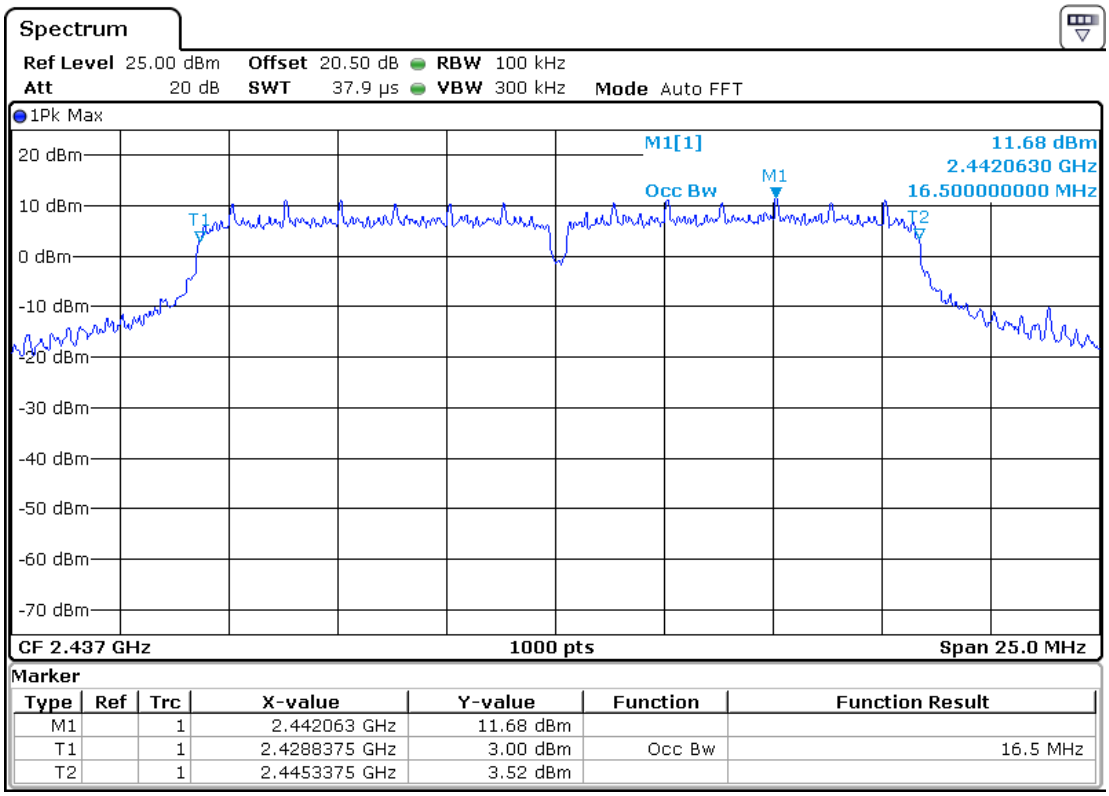
IEEE802.11g			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**6 dB Bandwidth (MHz)**	**99% OBW (MHz)**
6	2412	16.2	16.45
	2437	16.1	16.5
	2462	16.3	16.5
24	2412	16.4	16.42
	2437	16.4	16.42
	2462	16.4	16.42
54	2412	16.5	16.45
	2437	16.5	16.47
	2462	16.5	16.42



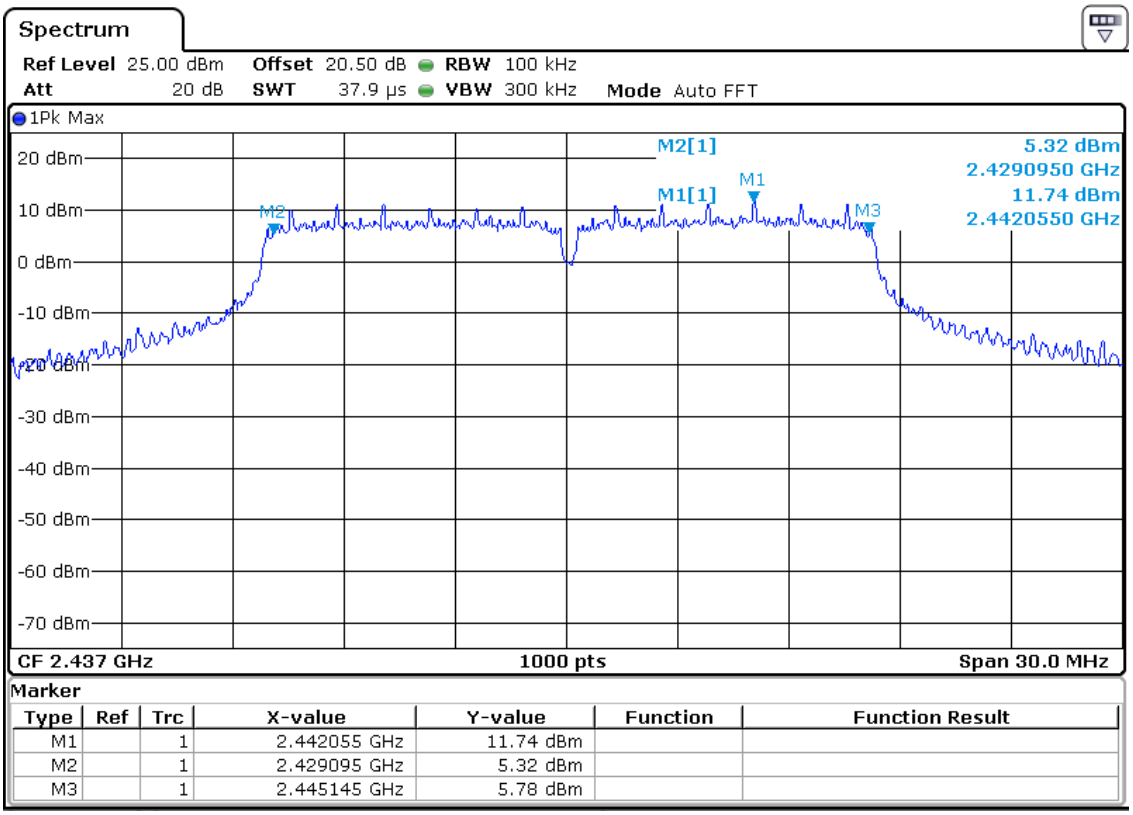
Data Rate: 6 Mbps **Channel frequencies: 2412 MHz**



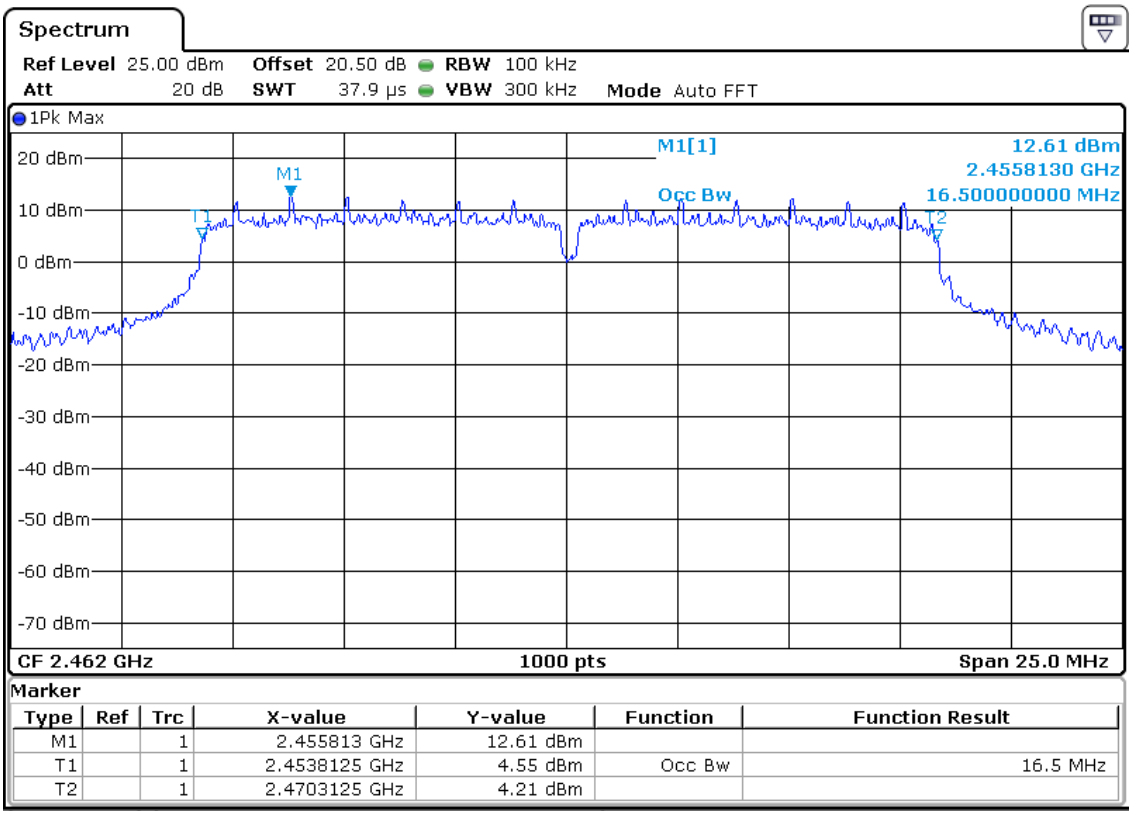
Data Rate: 6 Mbps **Channel frequencies: 2412 MHz 6dB BW**



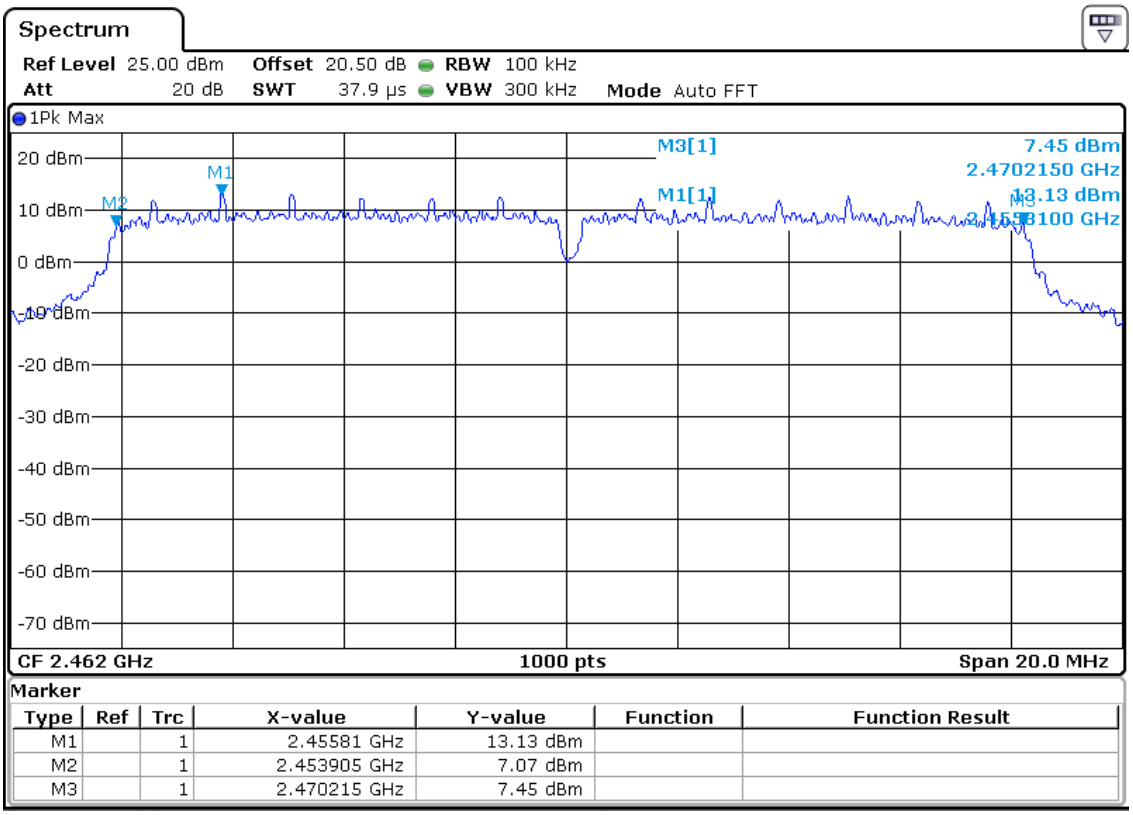
Data Rate: 6 Mbps **Channel frequencies: 2437 MHz**



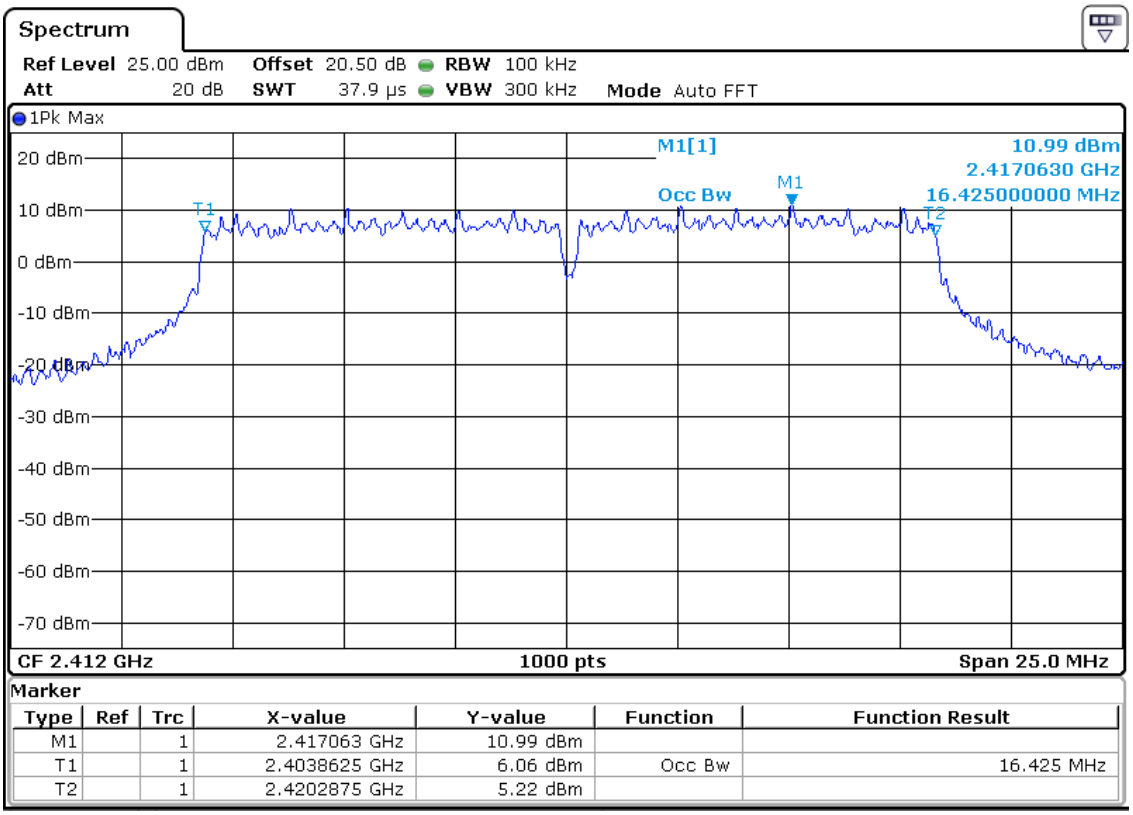
Data Rate: 6 Mbps **Channel frequencies: 2437 MHz 6dB BW**



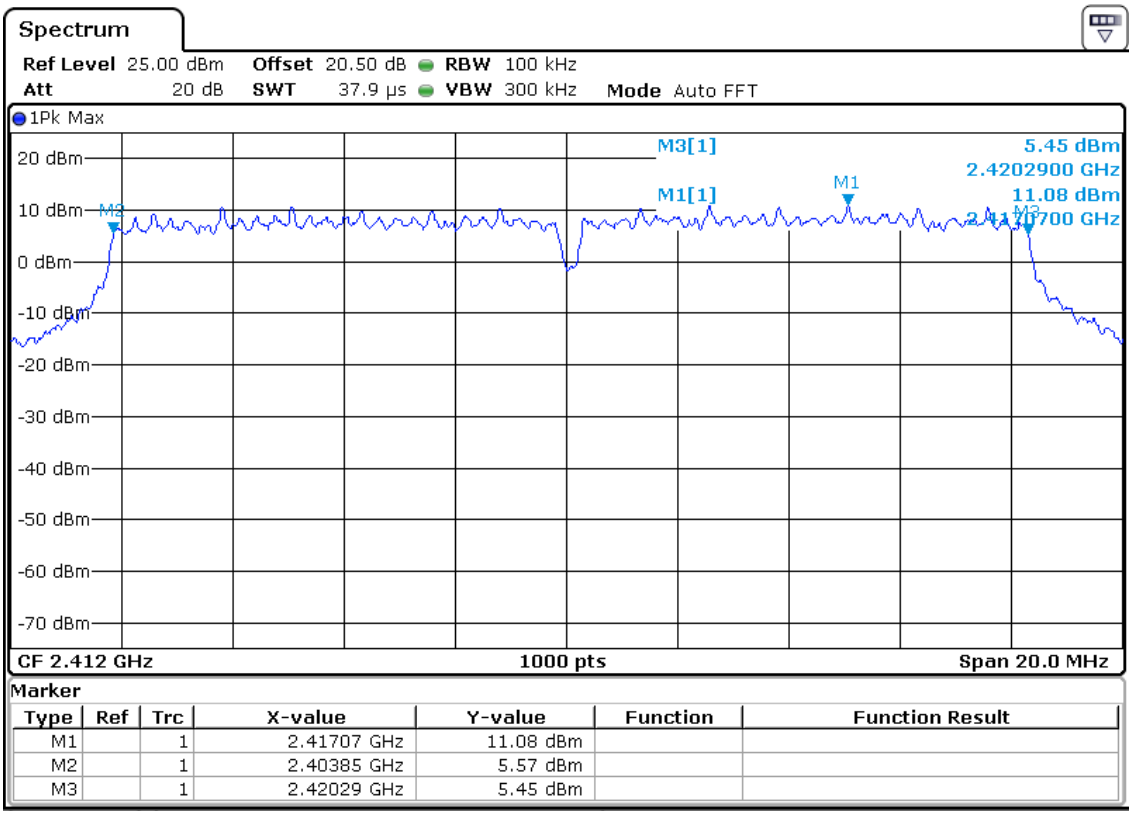
Data Rate: 6 Mbps **Channel frequencies: 2462 MHz**



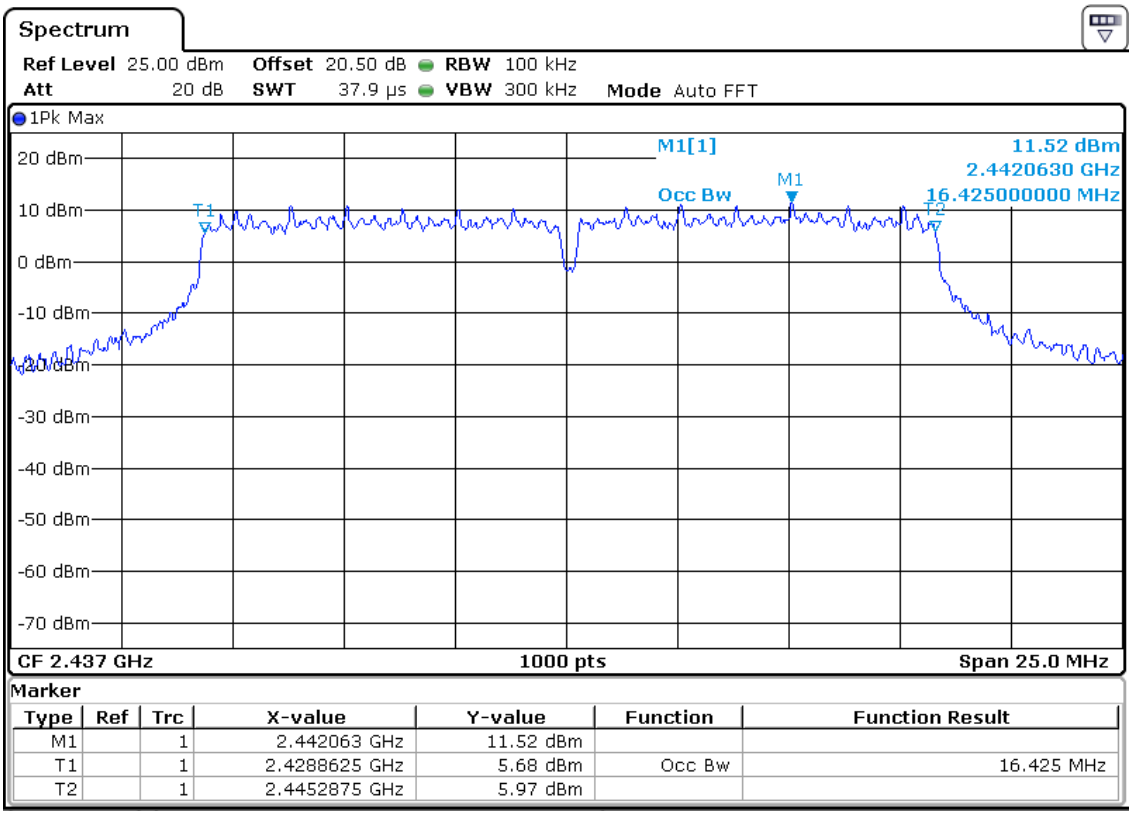
Data Rate: 6 Mbps **Channel frequencies: 2462 MHz 6dB BW**



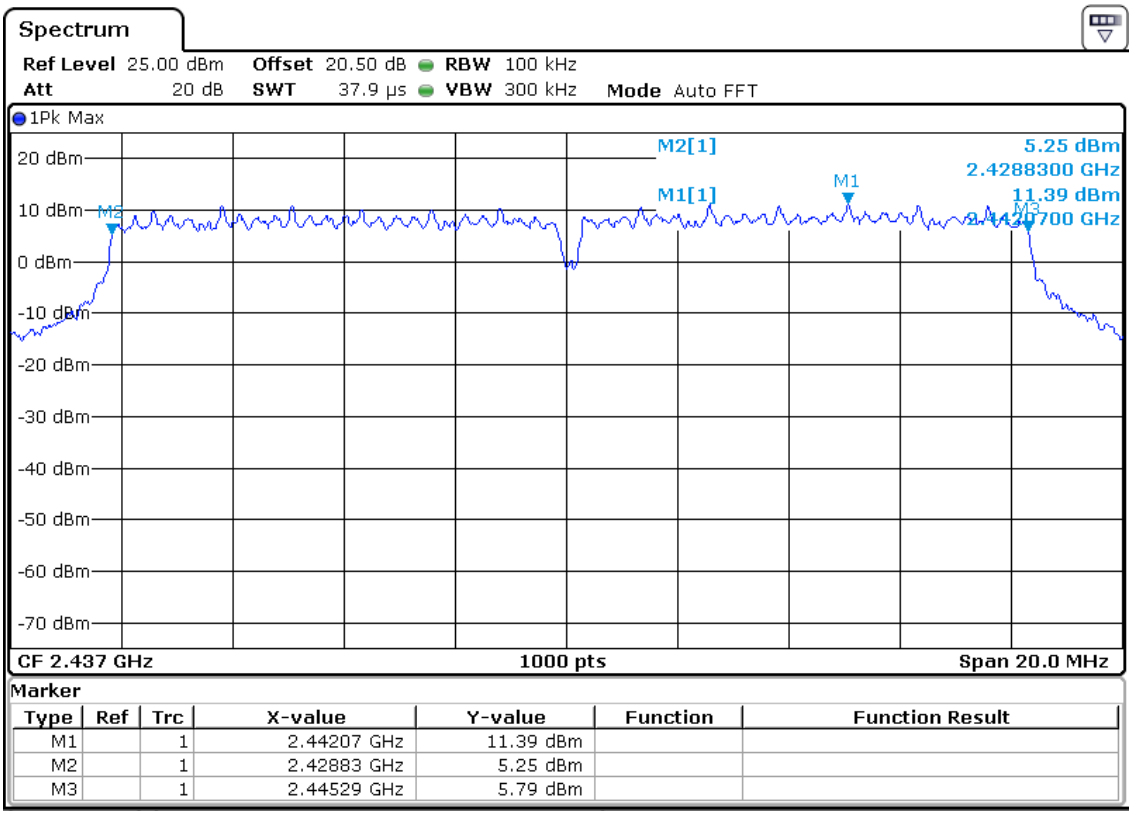
Data Rate: 24 Mbps **Channel frequencies: 2412 MHz**



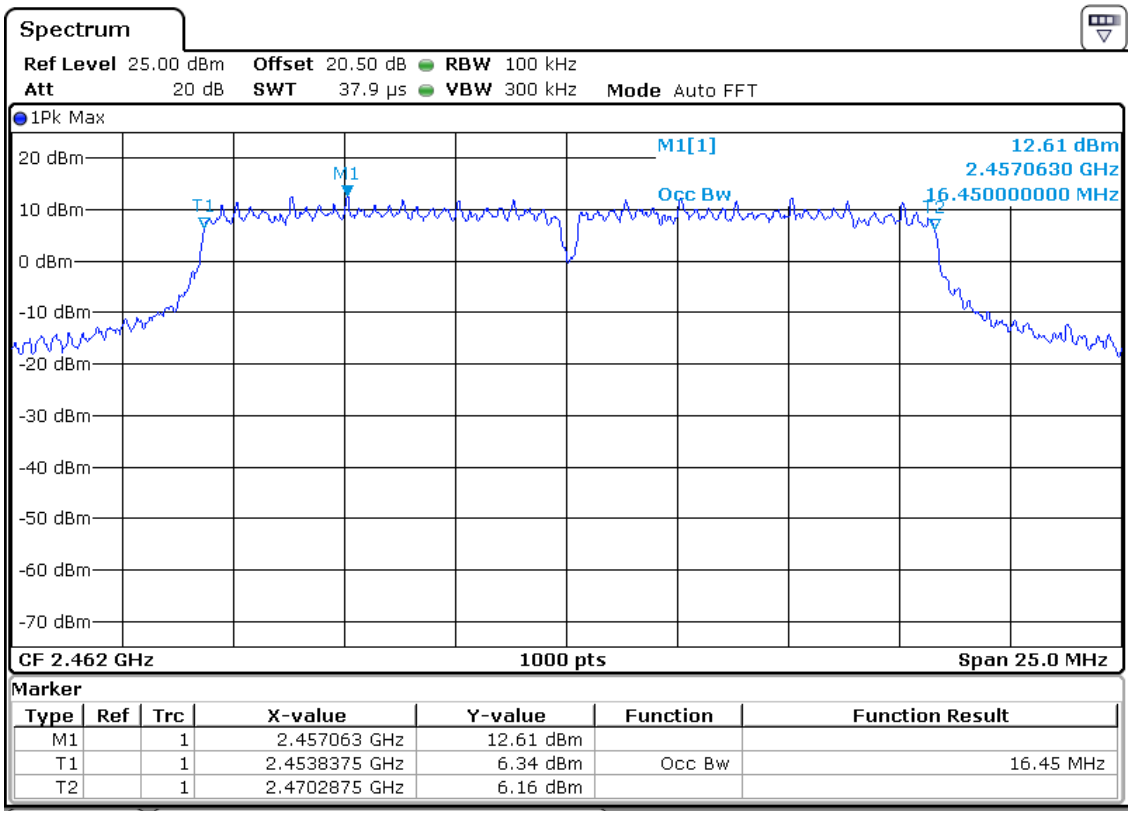
Data Rate: 24 Mbps **Channel frequencies: 2412 MHz 6dB BW**



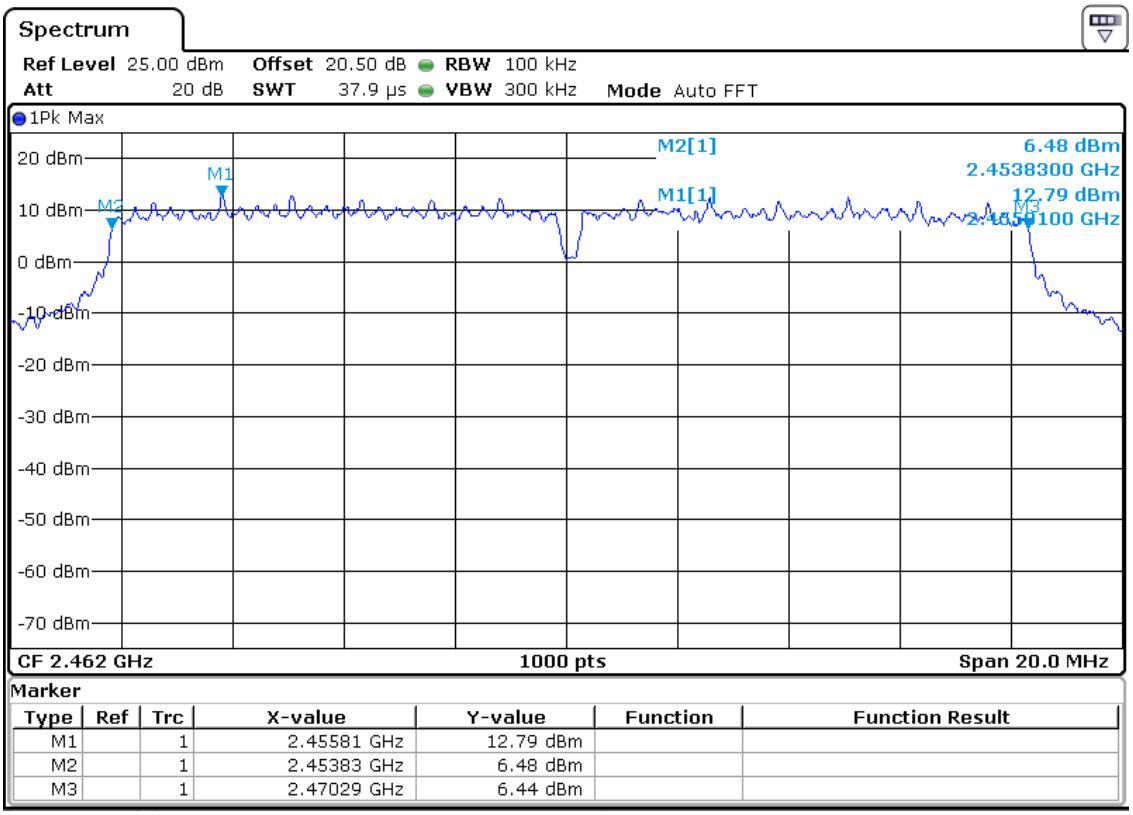
Data Rate: 24 Mbps **Channel frequencies: 2437 MHz**



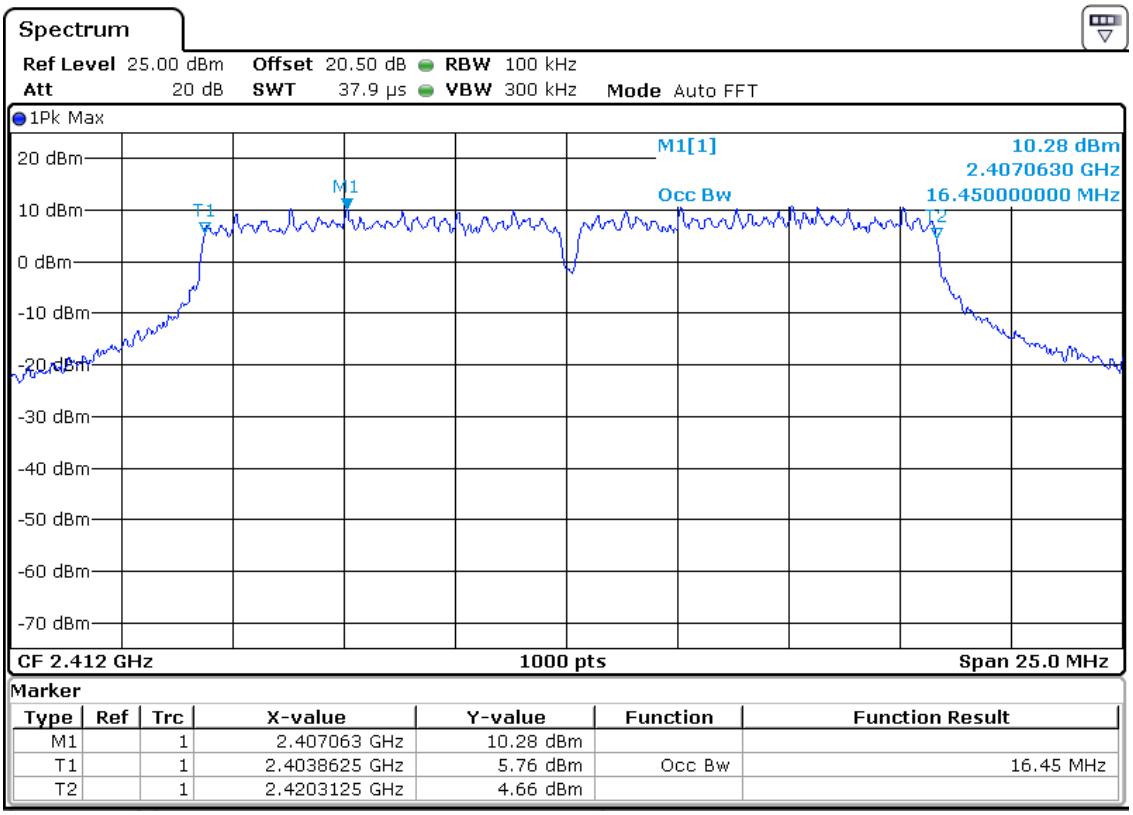
Data Rate: 24 Mbps **Channel frequencies: 2437 MHz 6dB BW**



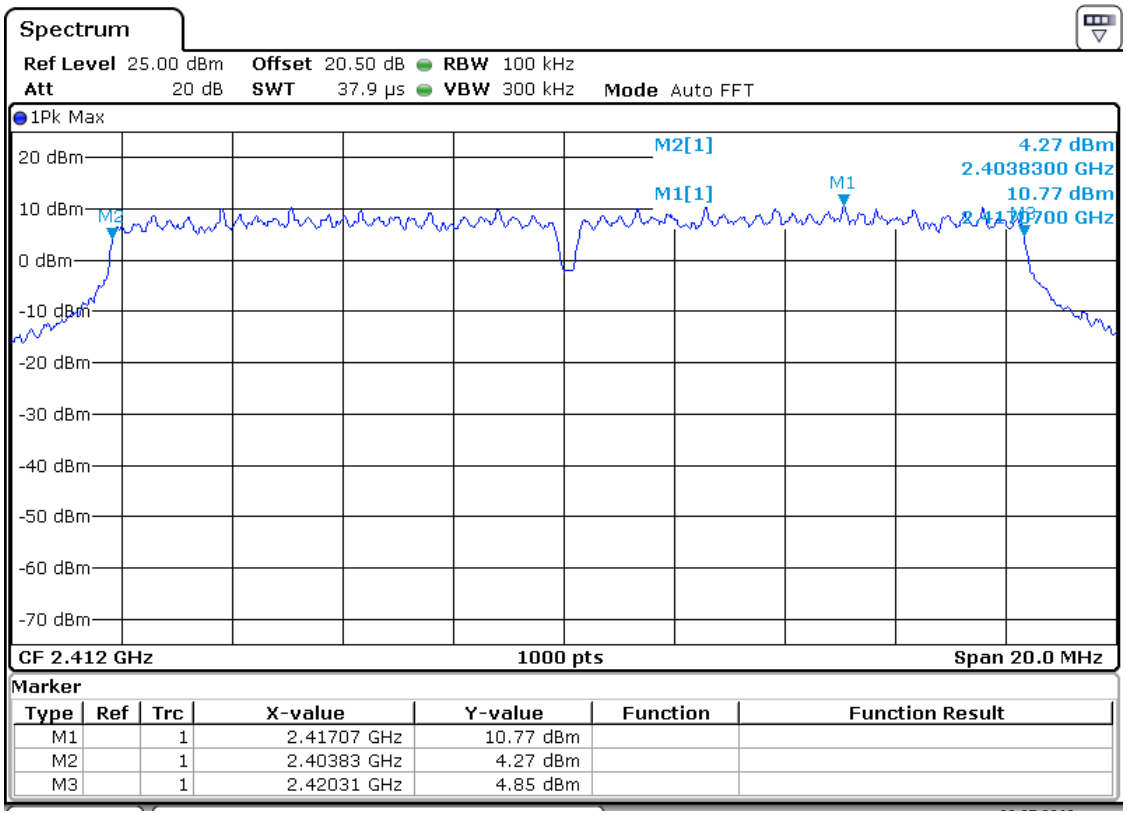
Data Rate: 24 Mbps **Channel frequencies: 2462 MHz**



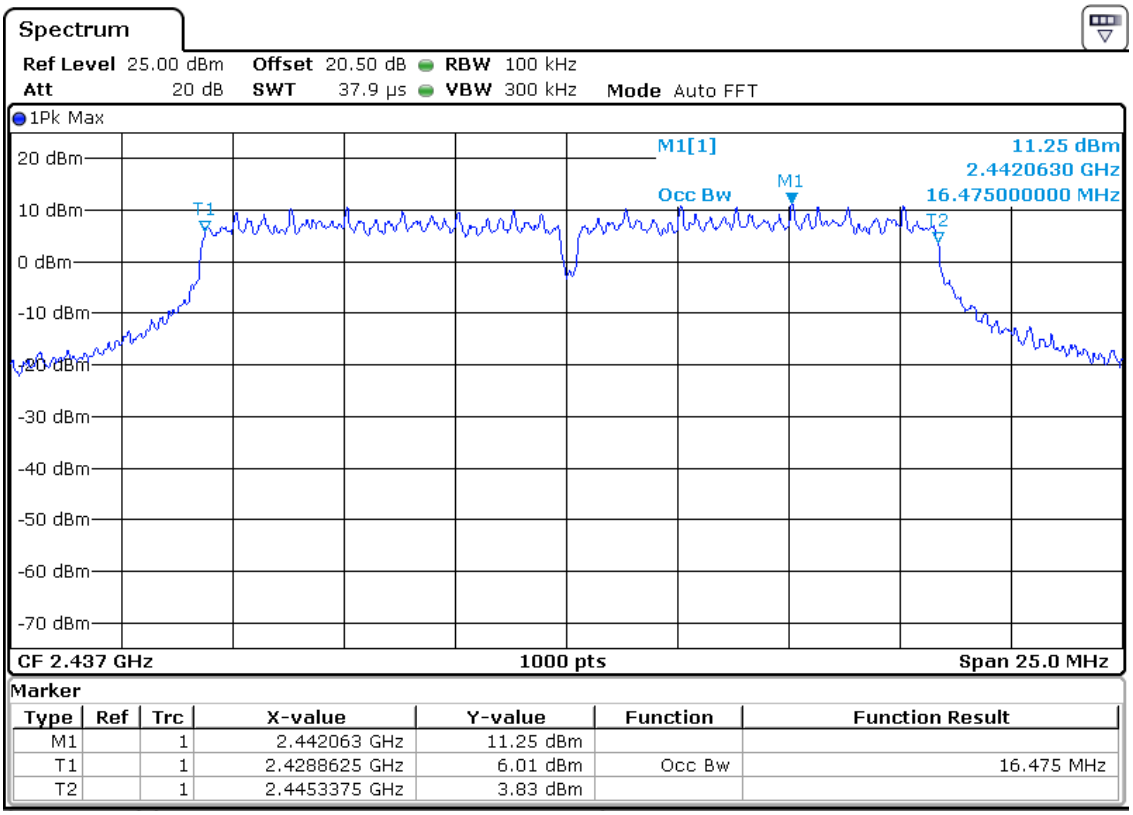
Data Rate: 24 Mbps **Channel frequencies: 2462 MHz 6dB BW**



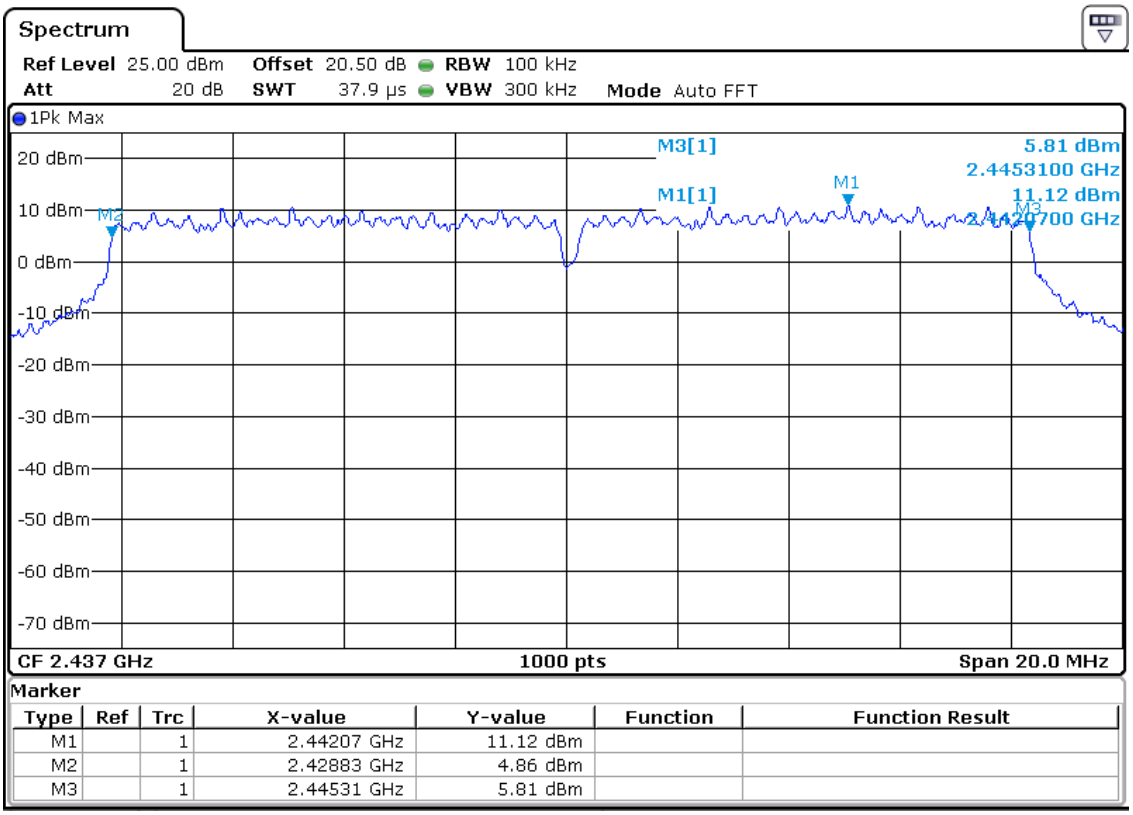
Data Rate: 54 Mbps **Channel frequencies: 2412 MHz**



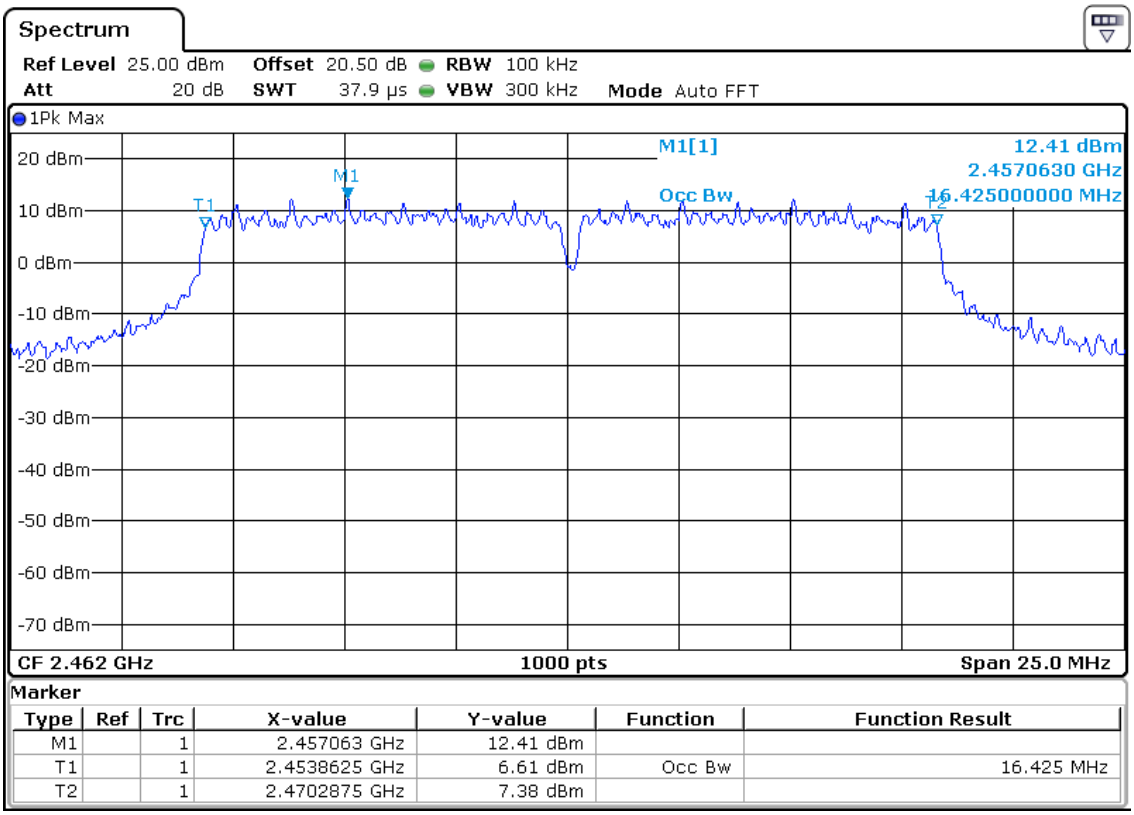
Data Rate: 54 Mbps **Channel frequencies: 2412 MHz 6dB BW**



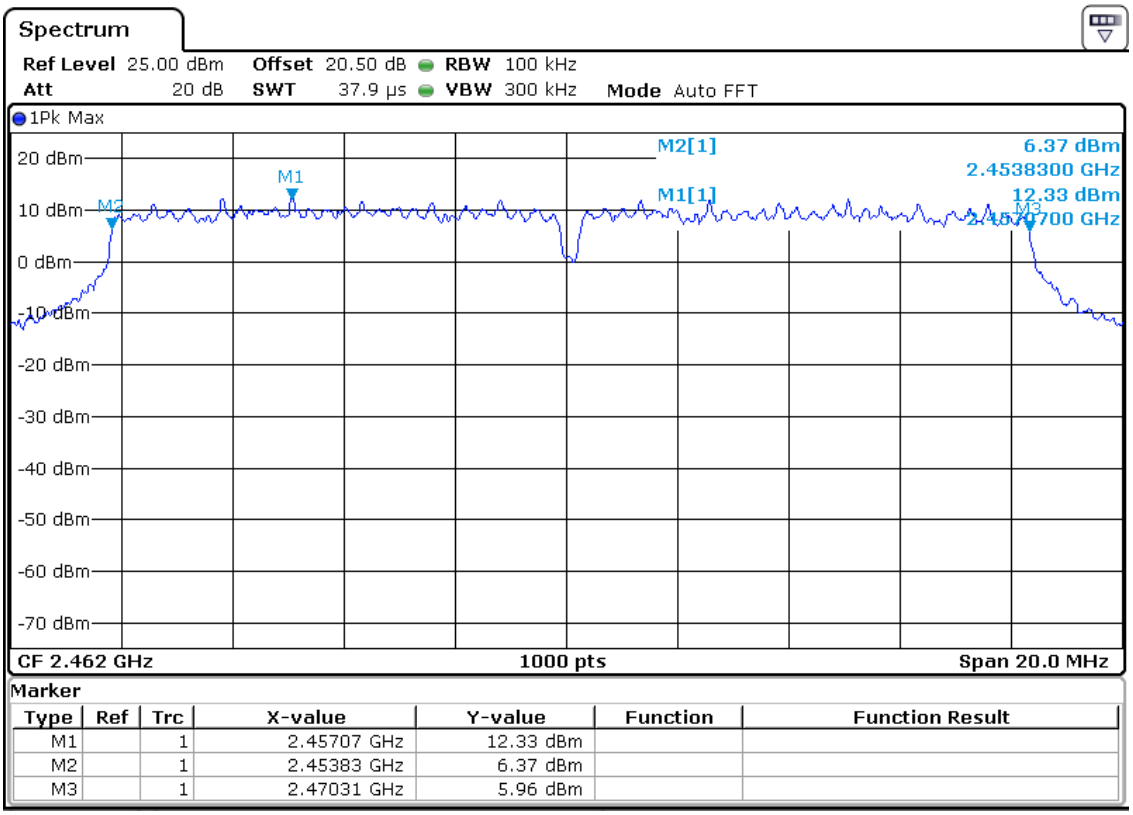
Data Rate: 54 Mbps **Channel frequencies: 2437MHz**



Data Rate: 54 Mbps **Channel frequencies: 2437 MHz 6dB BW**

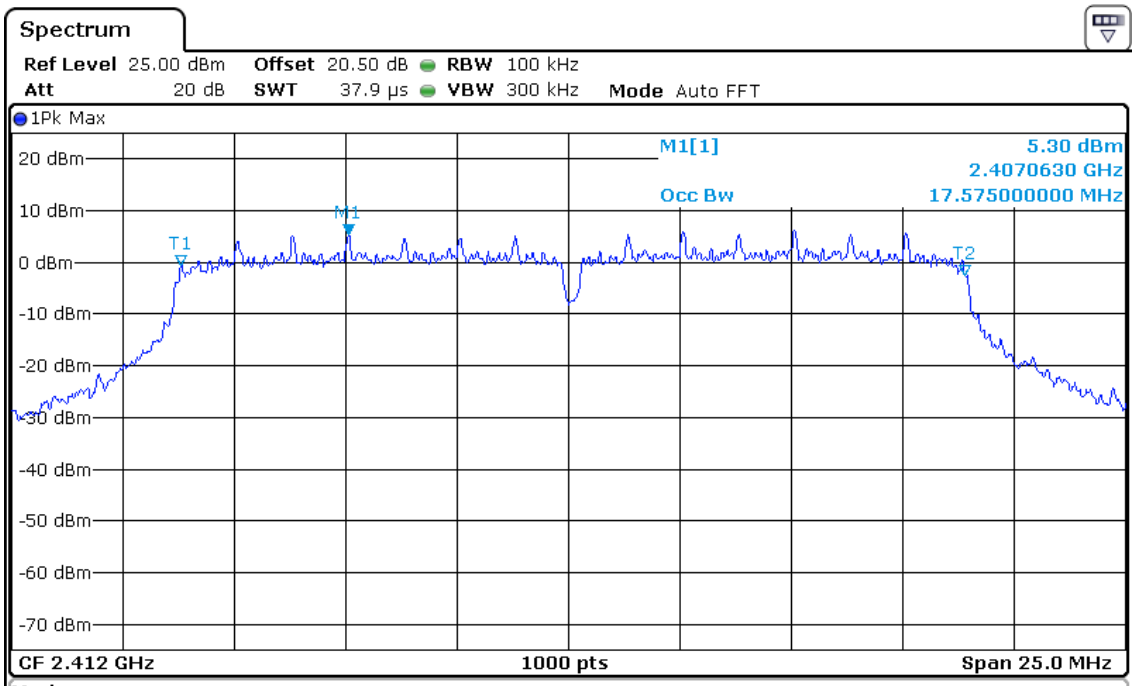


Data Rate: 54 Mbps **Channel frequencies: 2462 MHz**



Data Rate: 54 Mbps **Channel frequencies: 2462 MHz 6dB BW**

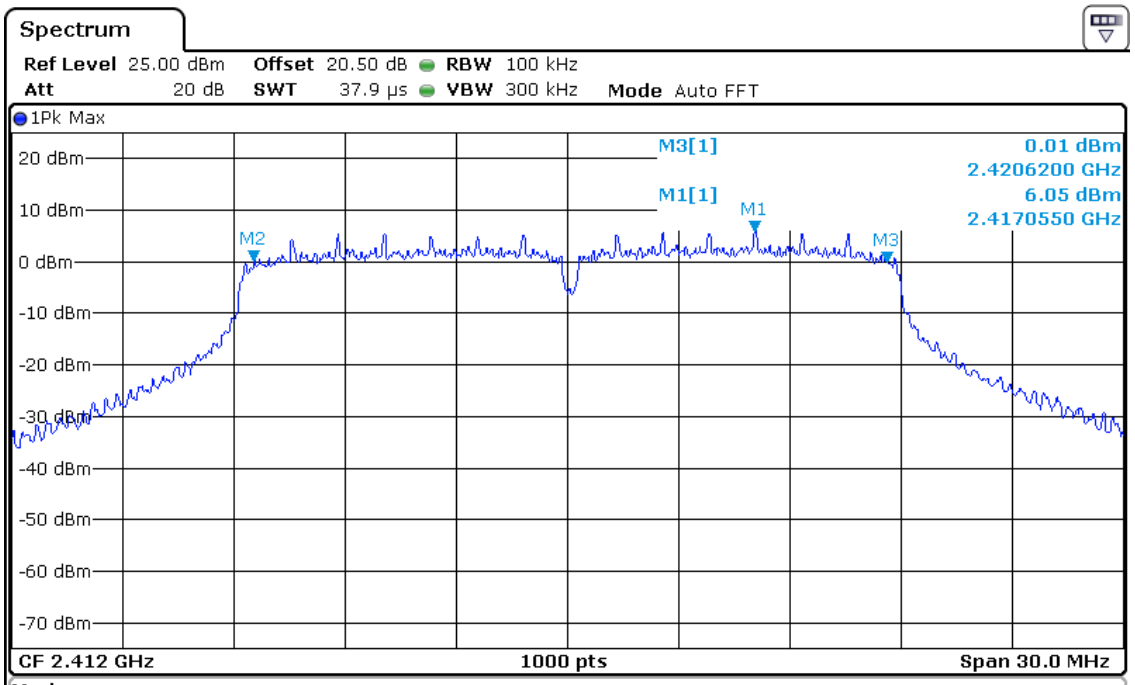
IEEE802.11nHT20			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**6 dB Bandwidth (MHz)**	**99% OBW (MHz)**
MCS0	2412	17.1	17.57
	2437	17.5	17.65
	2462	17.3	17.57
MCS4	2412	17.7	17.6
	2437	17.7	17.62
	2462	17.8	17.6
MCS7	2412	17.7	17.62
	2437	17.7	17.62
	2462	17.8	17.6



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.407063 GHz	5.30 dBm		
T1		1	2.4033125 GHz	-0.48 dBm	Occ Bw	17.575 MHz
T2		1	2.4208875 GHz	-2.63 dBm		

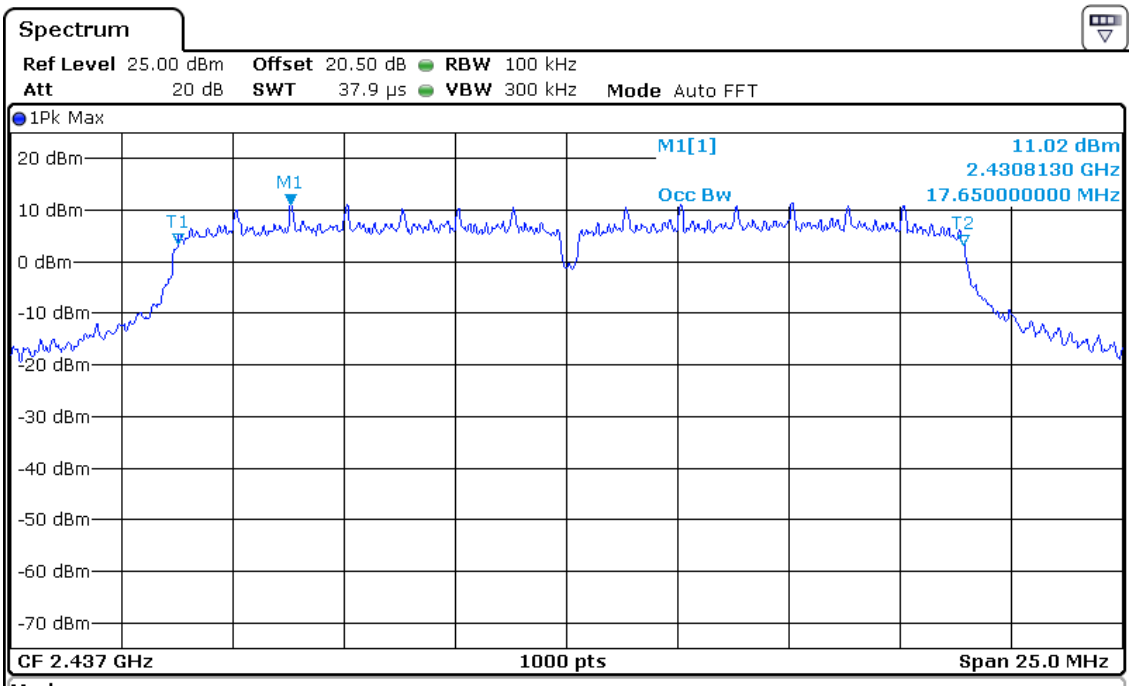
Data Rate: MCS0 **Channel: 2412 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.417055 GHz	6.05 dBm		
M2		1	2.40355 GHz	0.18 dBm		
M3		1	2.42062 GHz	0.01 dBm		

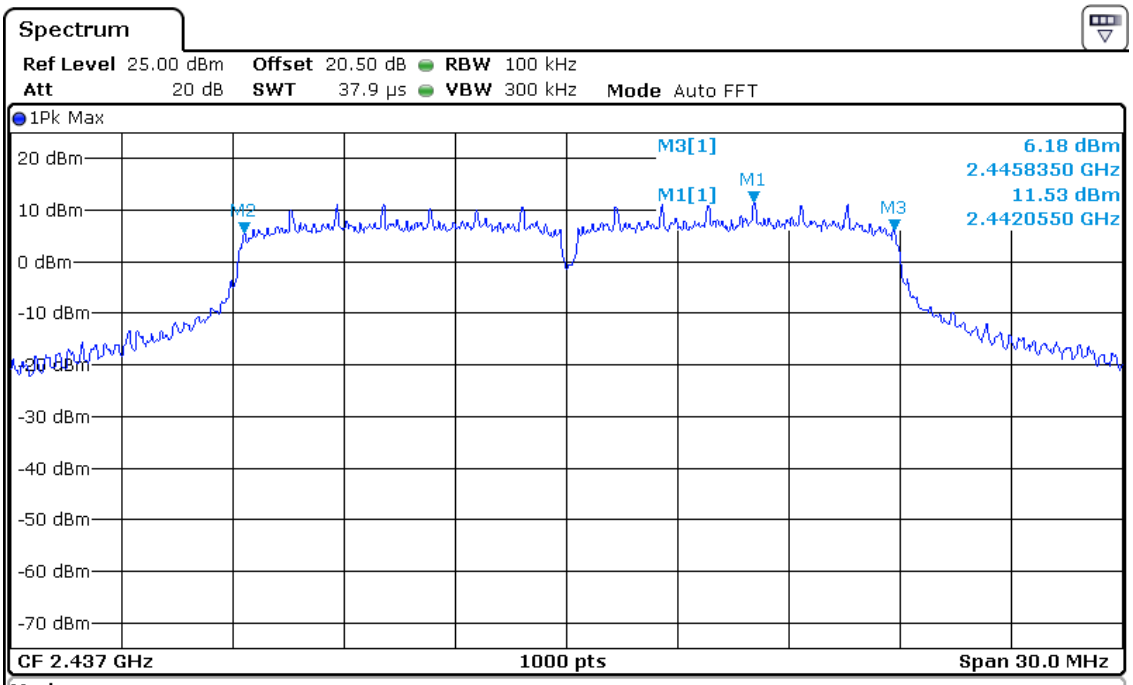
Data Rate: MCS0 **Channel: 2412 MHz 6dB BW**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.430813 GHz	11.02 dBm		
T1		1	2.4282625 GHz	3.57 dBm	Occ Bw	17.65 MHz
T2		1	2.4459125 GHz	3.14 dBm		

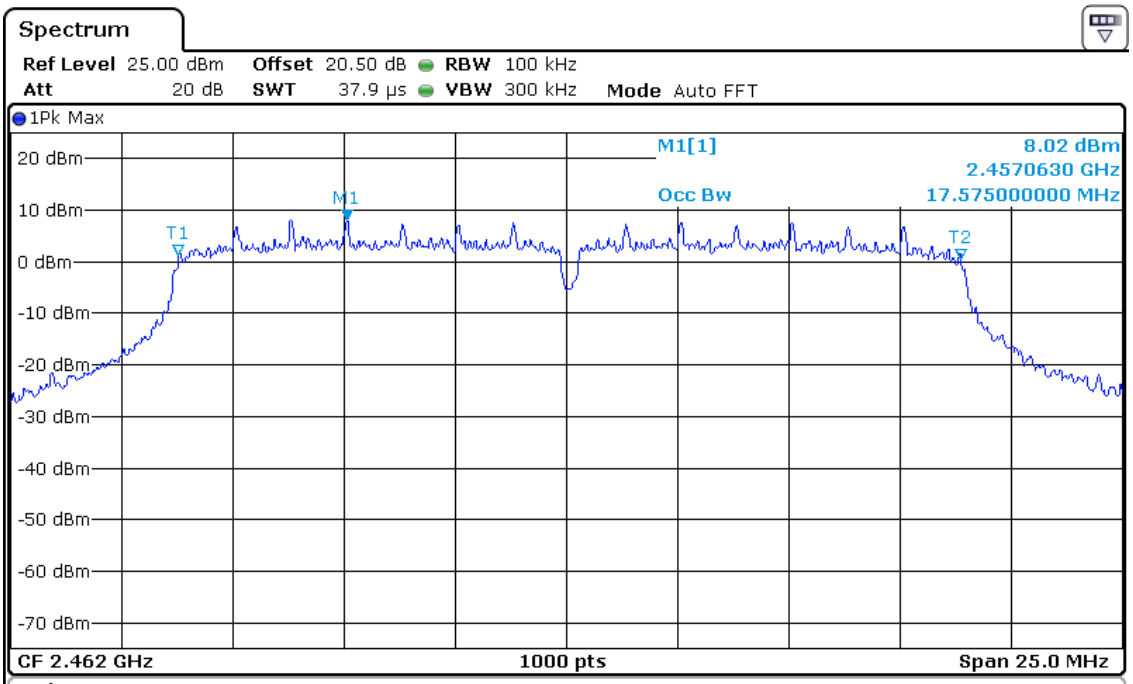
Data Rate: MCS0 **Channel: 2437 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.442055 GHz	11.53 dBm		
M2		1	2.428315 GHz	5.61 dBm		
M3		1	2.445835 GHz	6.18 dBm		

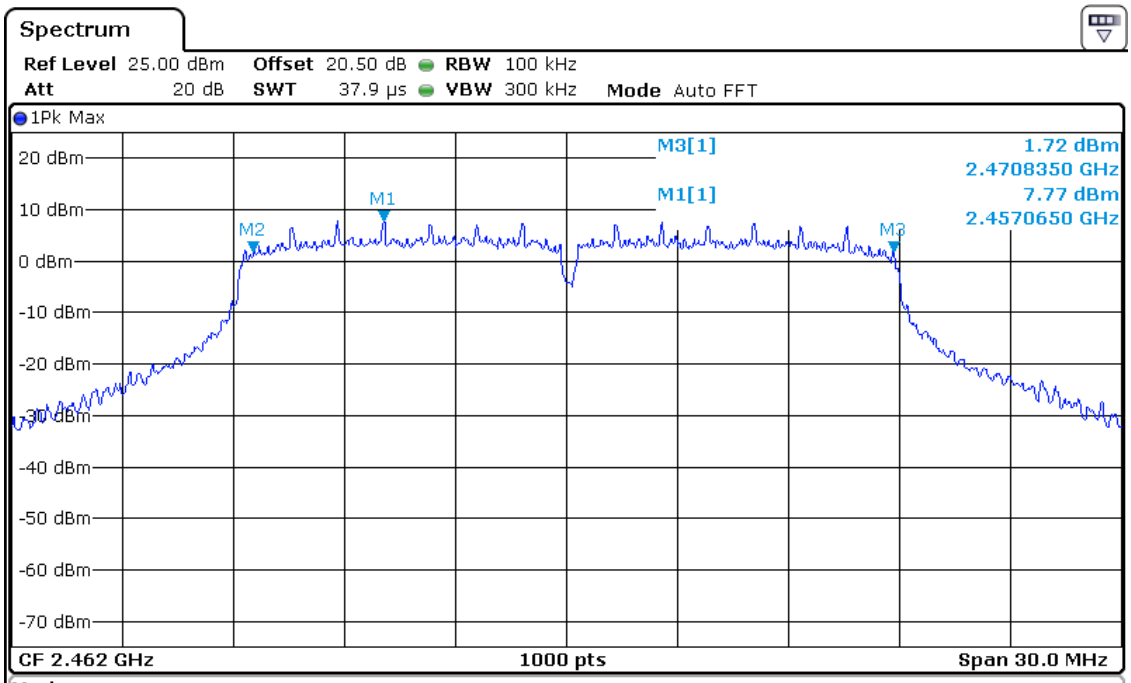
Data Rate: MCS0 **Channel: 2437 MHz 6dB BW**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.457063 GHz	8.02 dBm		
T1		1	2.4532875 GHz	1.19 dBm	Occ Bw	17.575 MHz
T2		1	2.4708625 GHz	0.57 dBm		

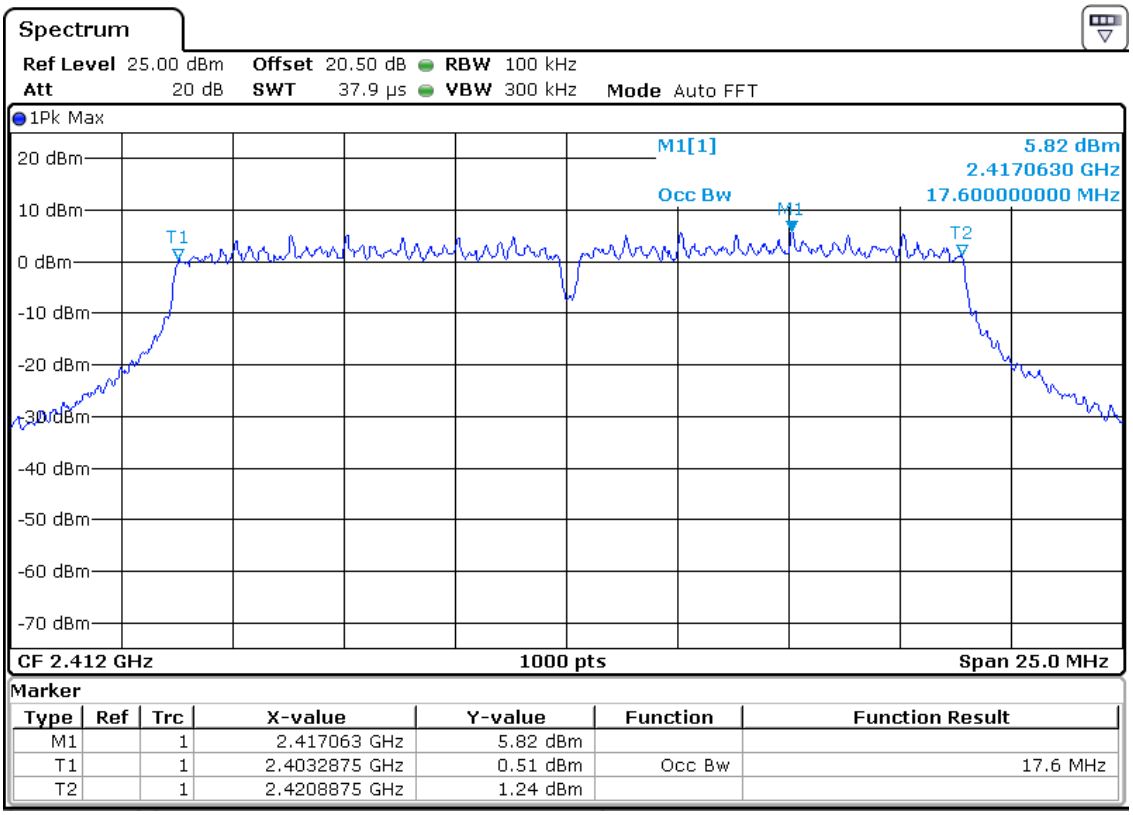
Data Rate: MCS0 **Channel: 2462 MHz**



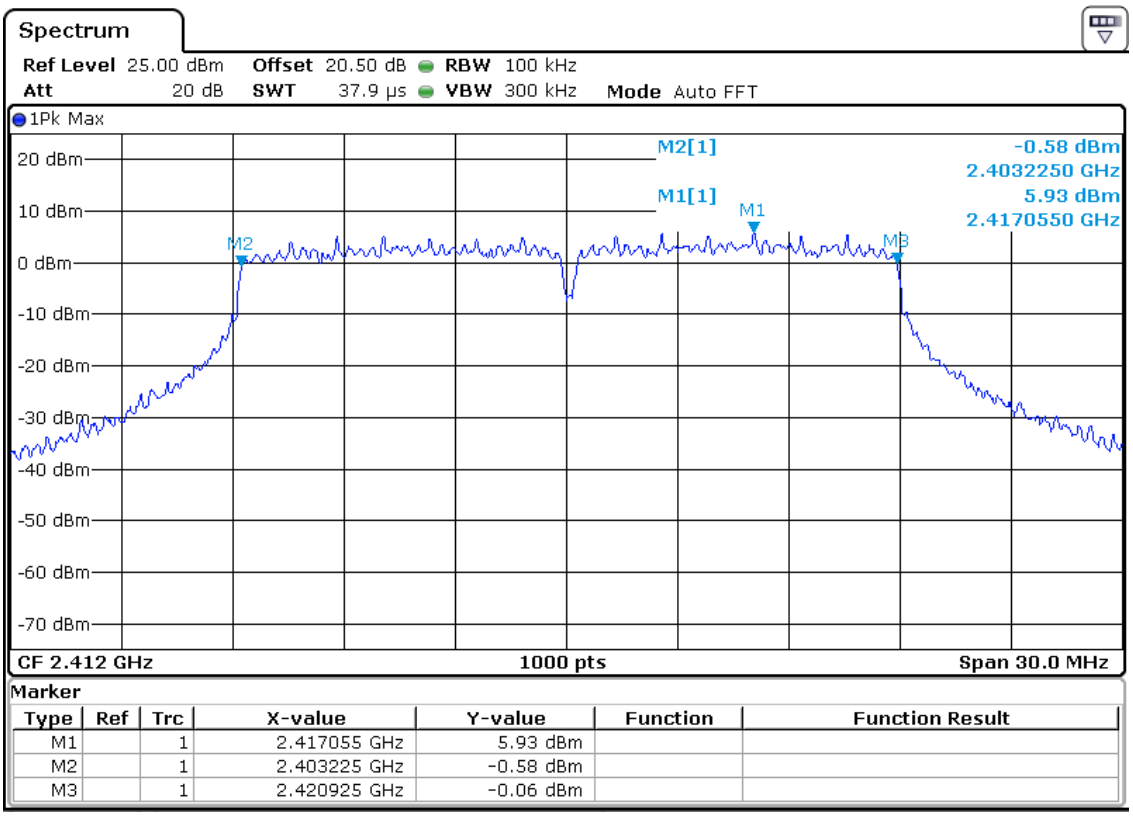
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.457065 GHz	7.77 dBm		
M2		1	2.453525 GHz	1.78 dBm		
M3		1	2.470835 GHz	1.72 dBm		

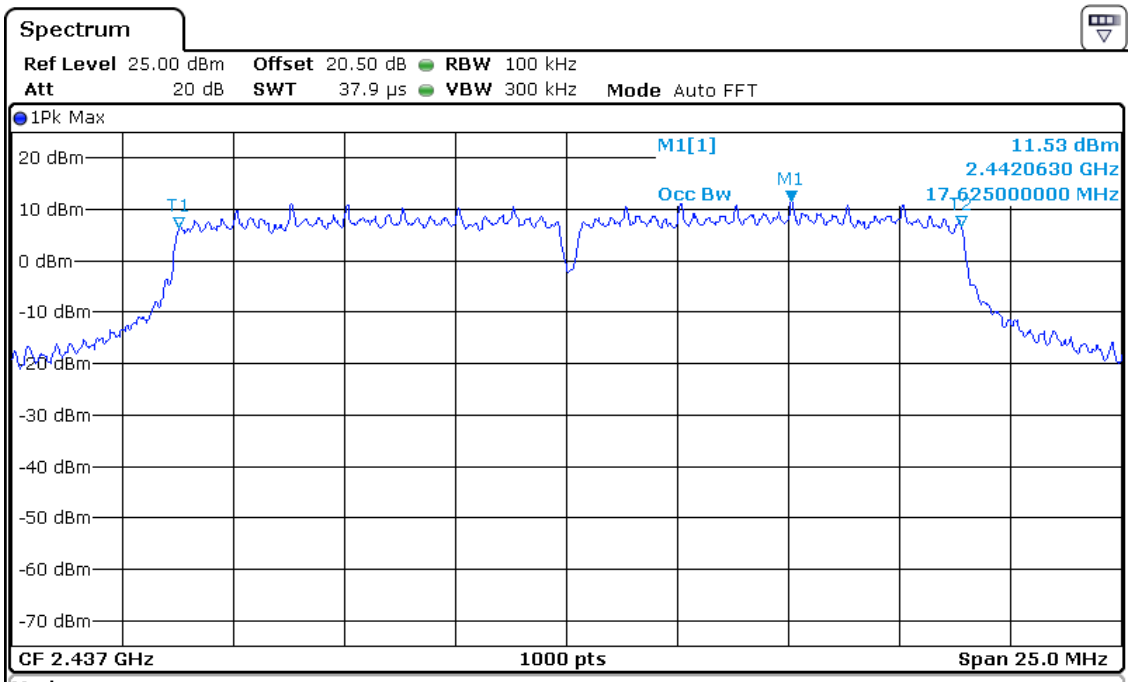
Data Rate: MCS0 **Channel: 2462 MHz 6dB BW**



Data Rate: MCS4 **Channel: 2412 MHz**



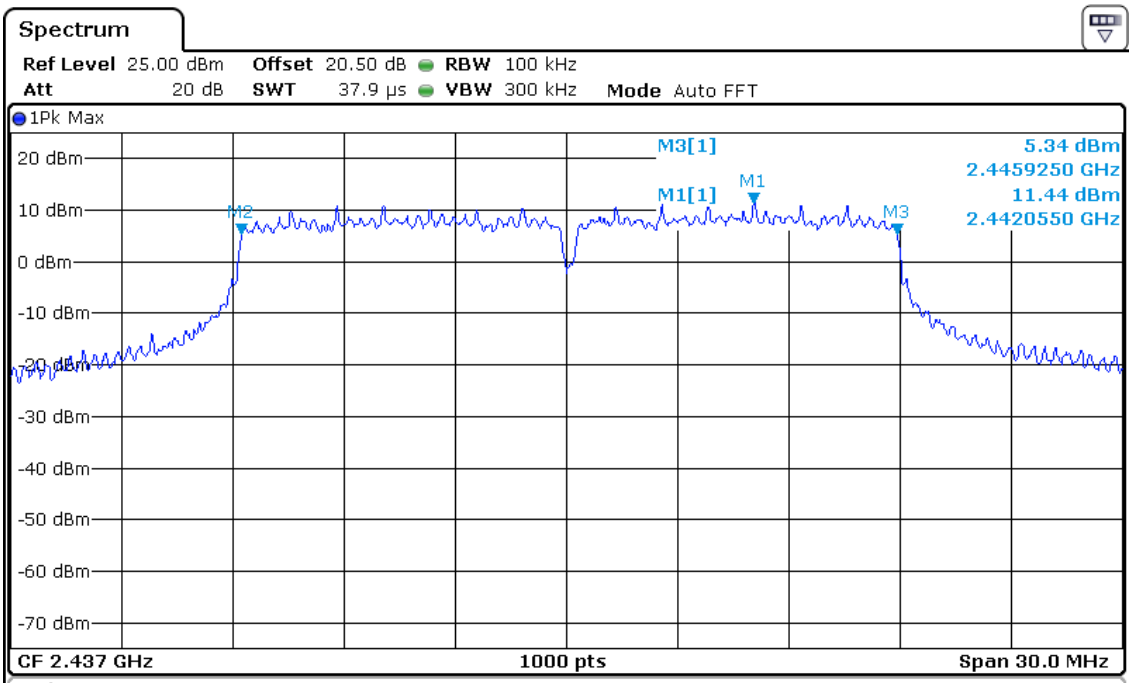
Data Rate: MCS4 **Channel: 2412 MHz 6dB BW**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.442063 GHz	11.53 dBm		
T1		1	2.4282625 GHz	6.34 dBm	Occ Bw	17.625 MHz
T2		1	2.4458875 GHz	6.67 dBm		

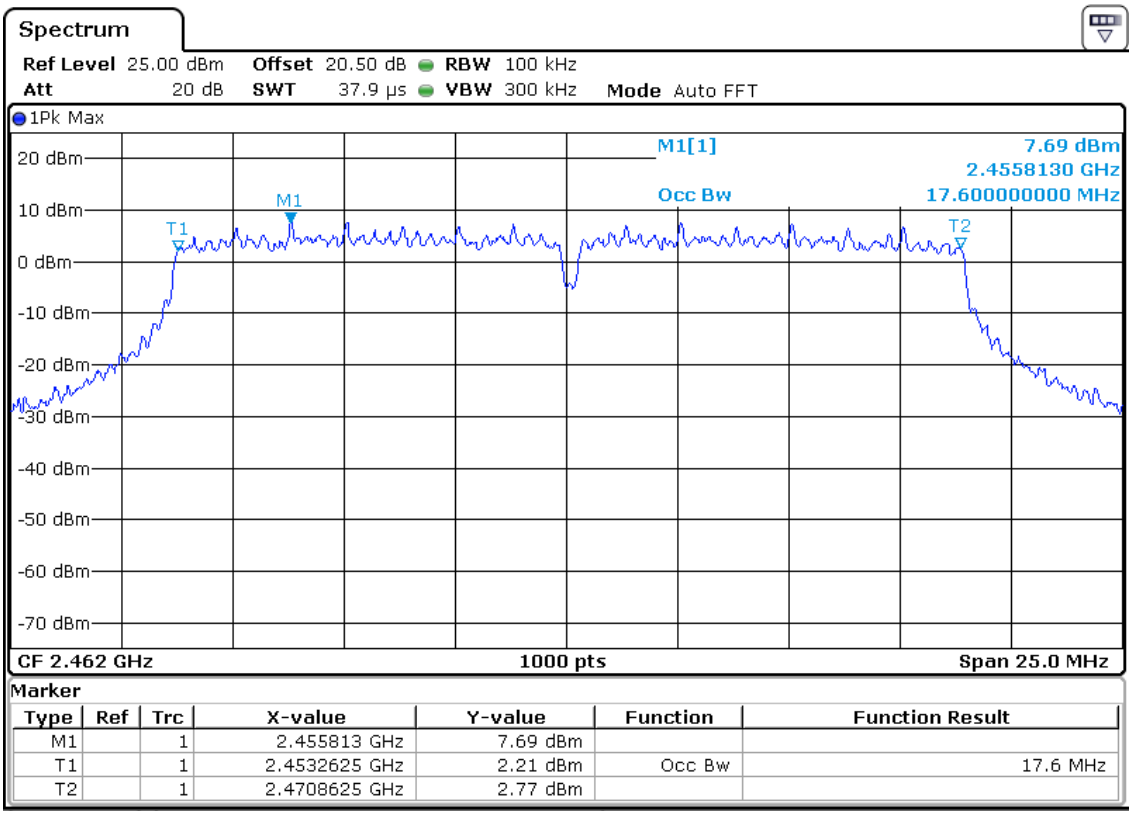
Data Rate: MCS4 **Channel: 2437 MHz**



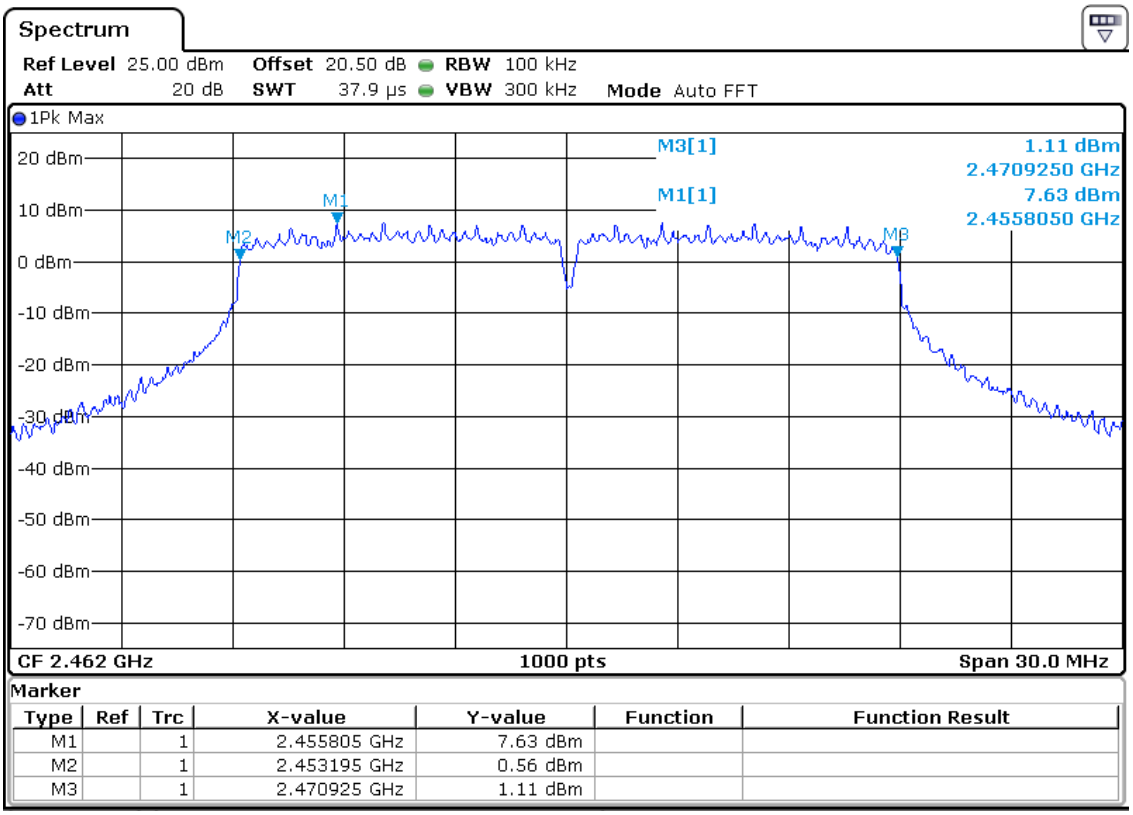
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.442055 GHz	11.44 dBm		
M2		1	2.428225 GHz	5.51 dBm		
M3		1	2.445925 GHz	5.34 dBm		

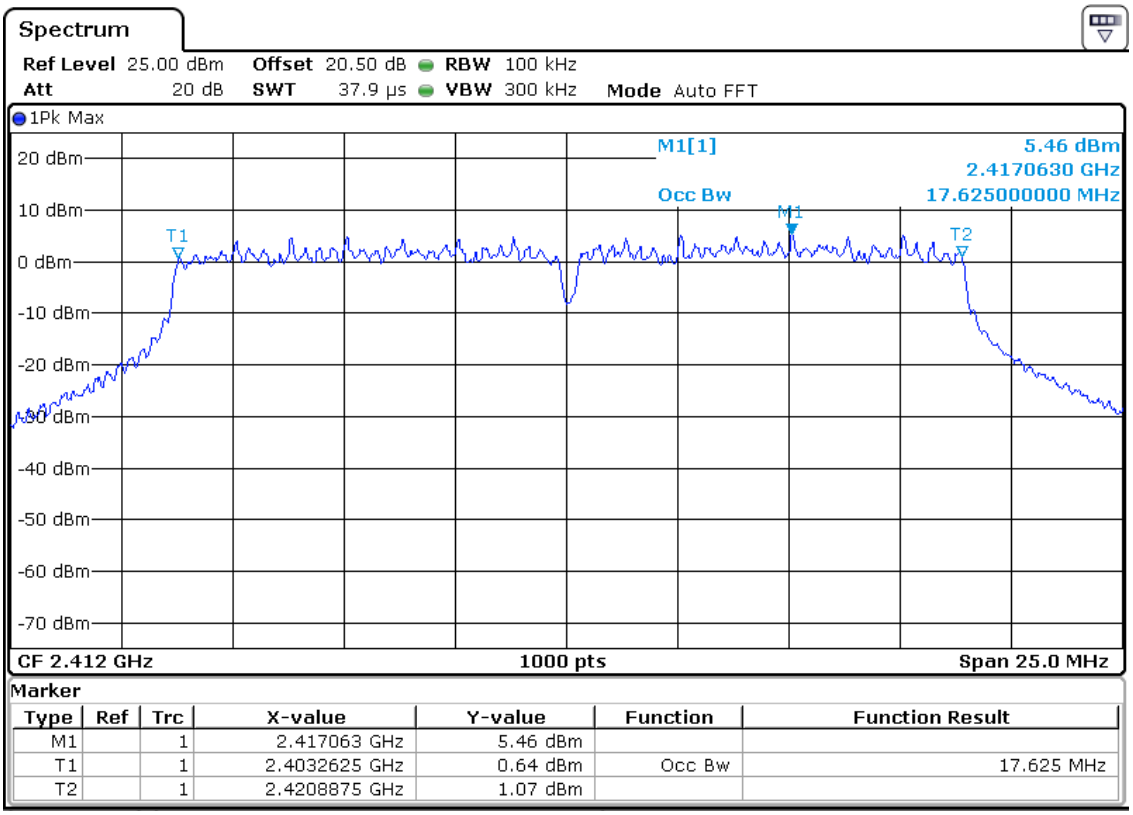
Data Rate: MCS4 **Channel: 2437 MHz 6dB BW**



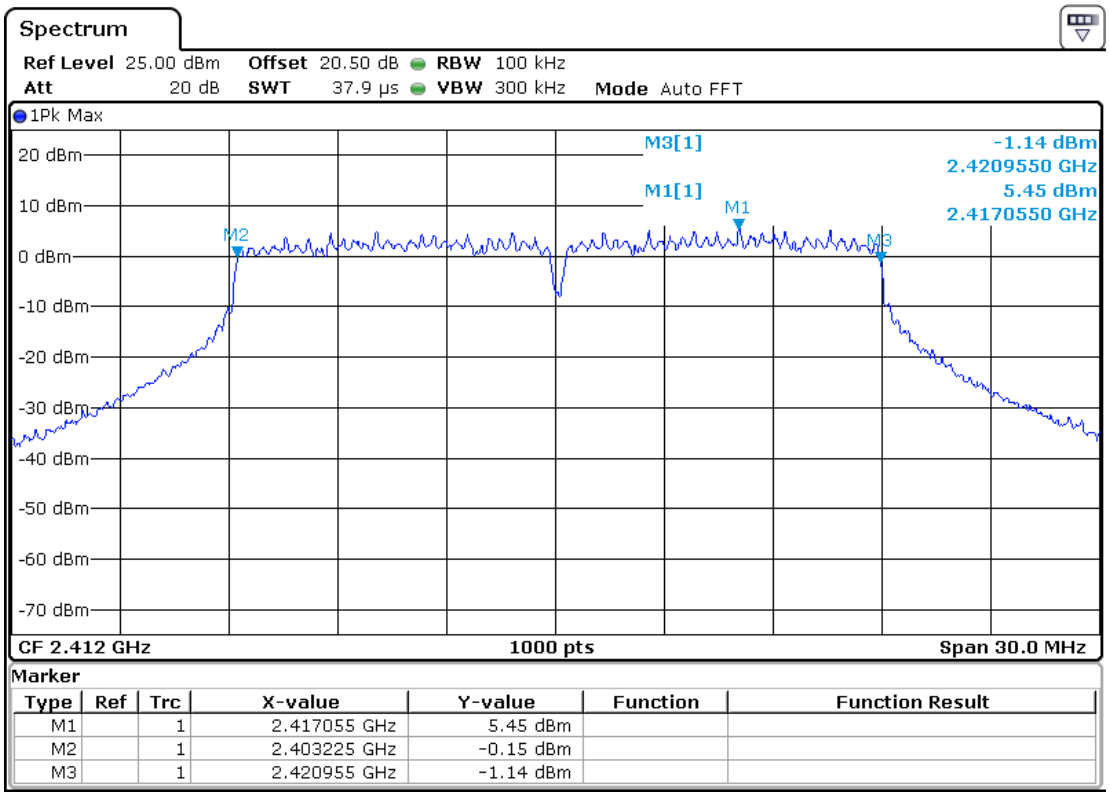
Data Rate: MCS4 **Channel: 2462 MHz**



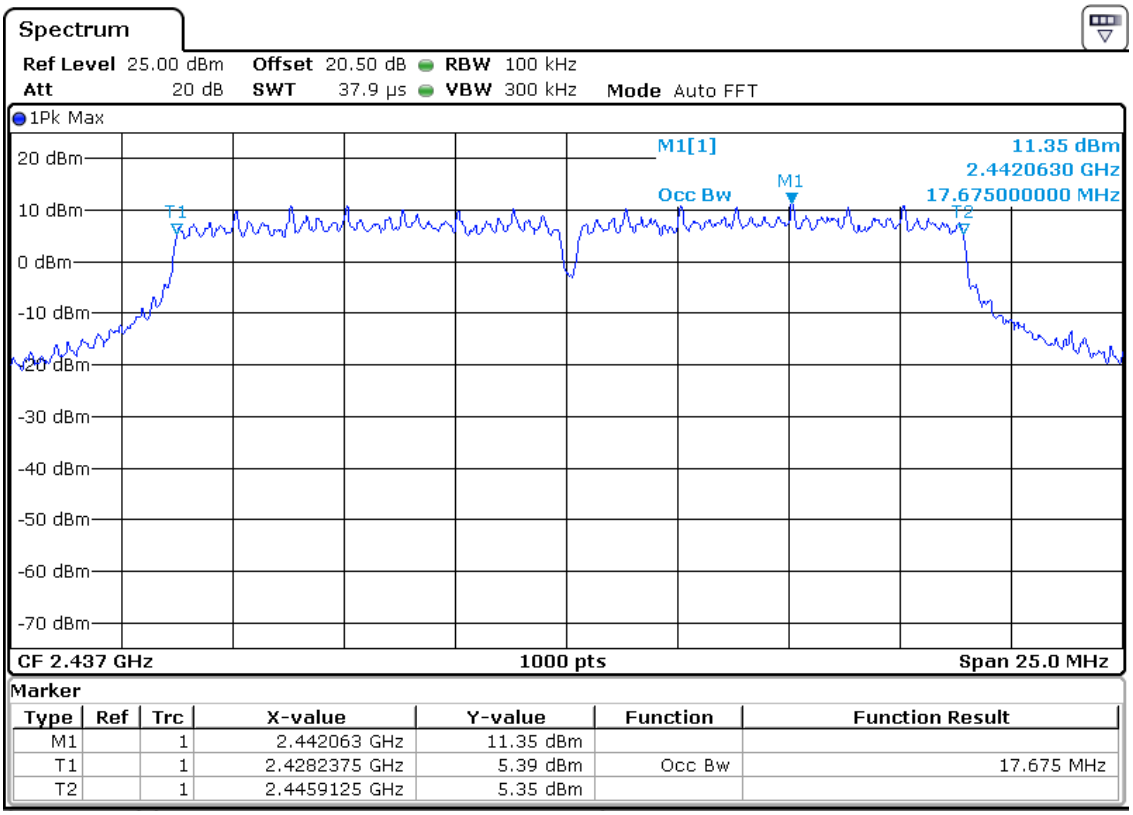
Data Rate: MCS4 **Channel: 2462 MHz 6dB BW**



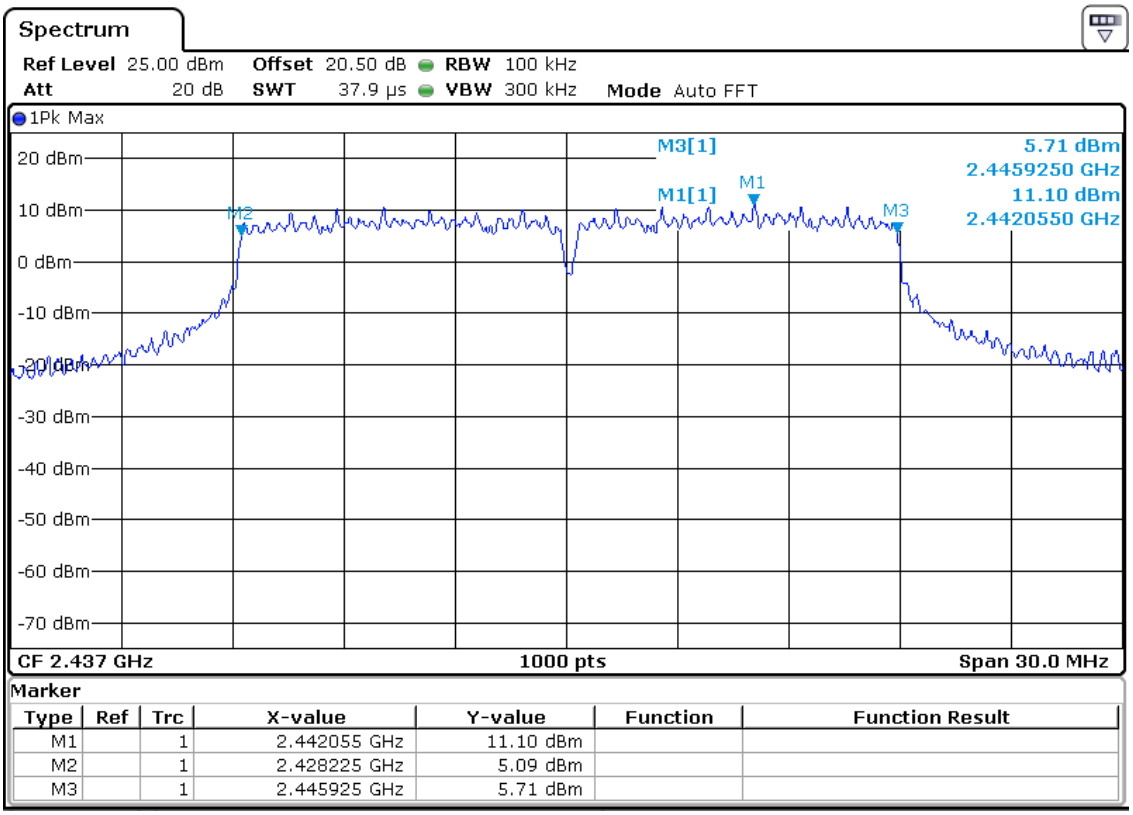
Data Rate: MCS7 **Channel: 2412 MHz**



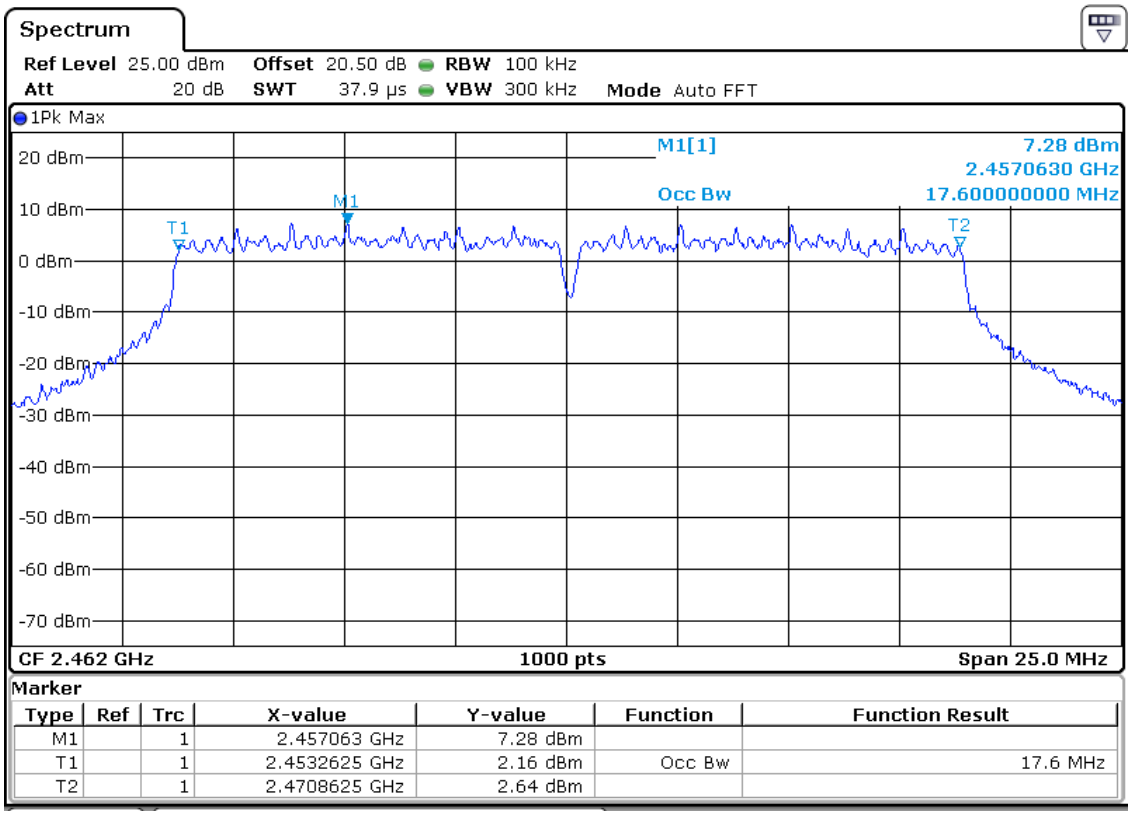
Data Rate: MCS7 **Channel: 2412 MHz 6dB BW**



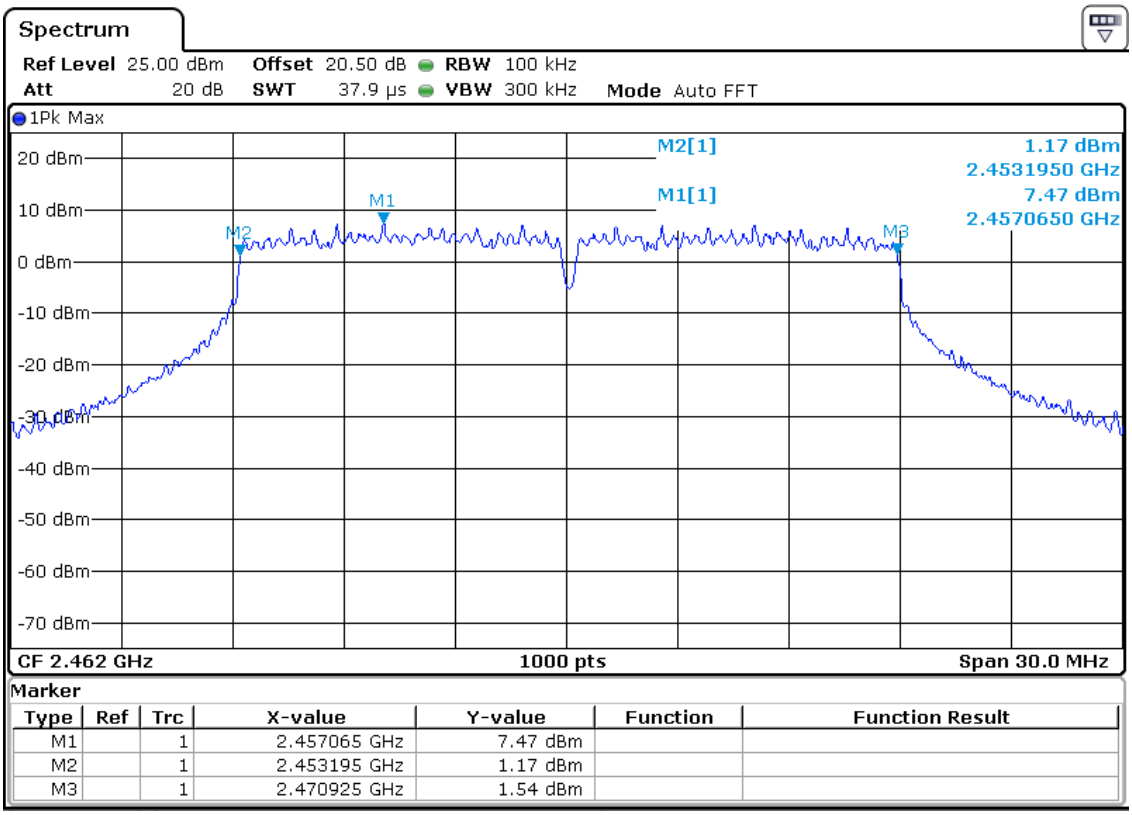
Data Rate: MCS7 **Channel: 2437MHz**



Data Rate: MCS7 **Channel: 2437 MHz 6dB BW**

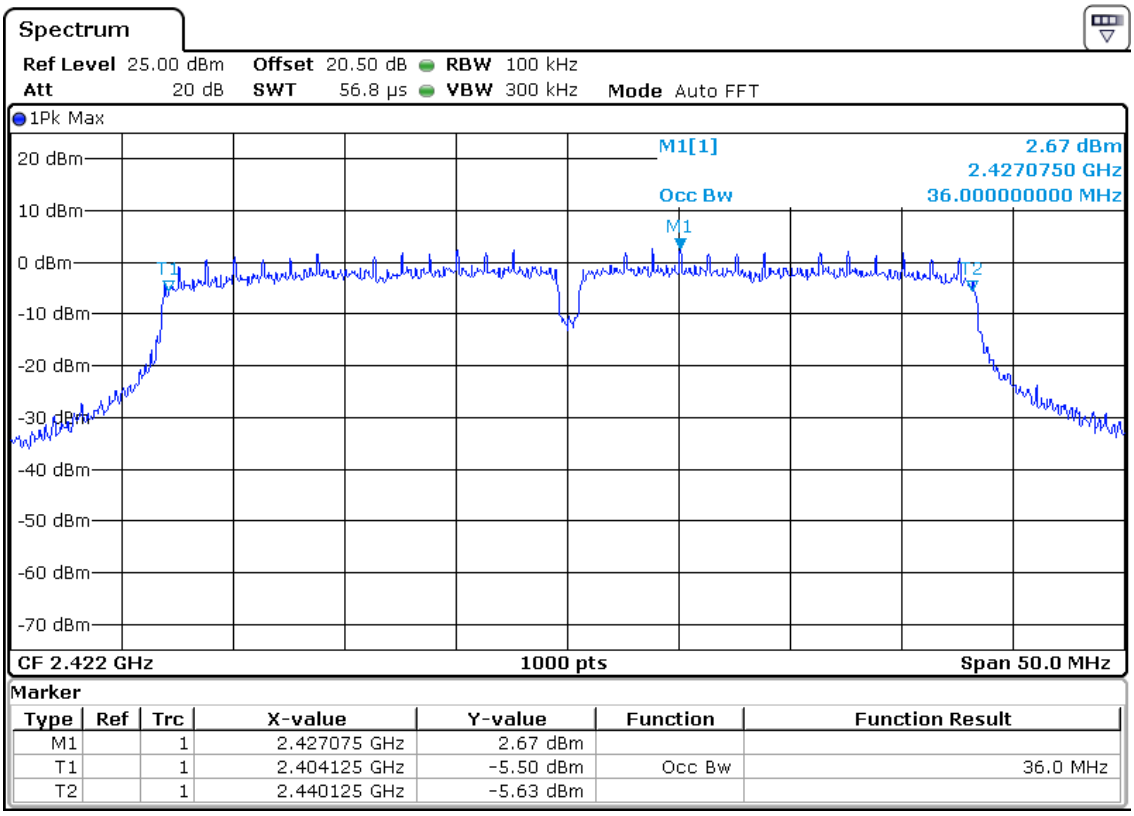


Data Rate: MCS7 **Channel: 2462 MHz**

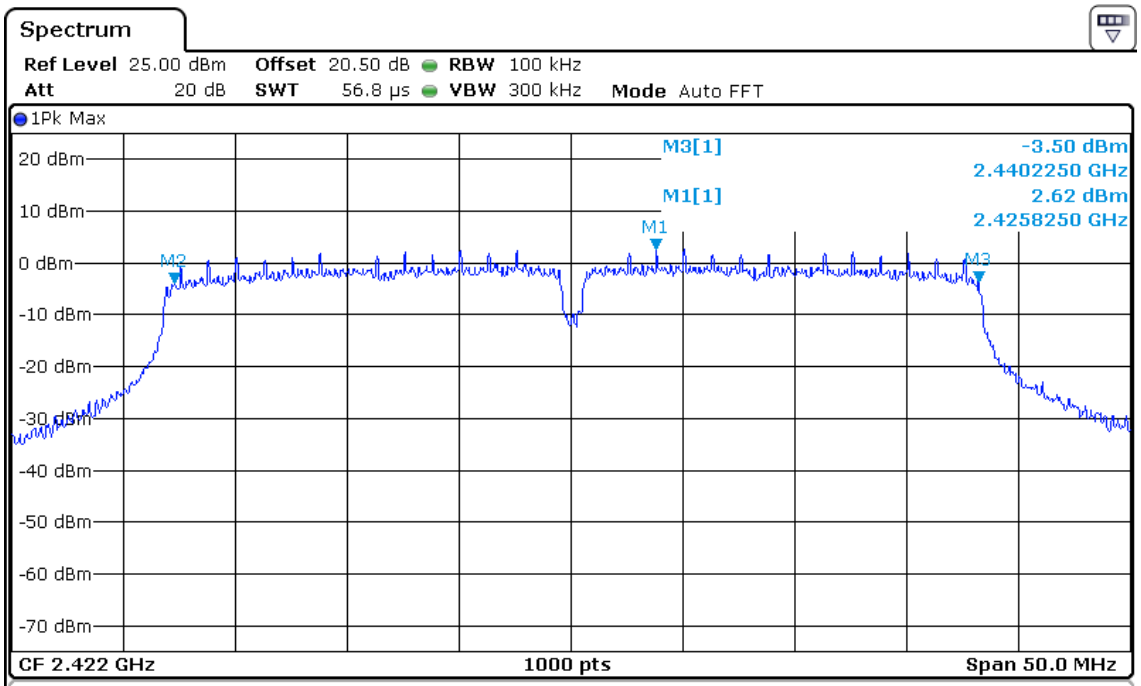


Data Rate: MCS7 **Channel: 2462 MHz 6dB BW**

IEEE802.11nHT40			
Data Rate (Mbps)	**Channel Frequency (MHz)**	**6 dB Bandwidth (MHz)**	**99% OBW (MHz)**
MCS0	2422	35.9	36
	2442	35.7	36.15
	2457	35.8	35.95
MCS4	2422	36.3	36
	2442	36.4	36.1
	2457	35.7	35.95
MCS7	2422	36.4	36.15
	2442	36.5	36.15
	2457	36.1	36.05



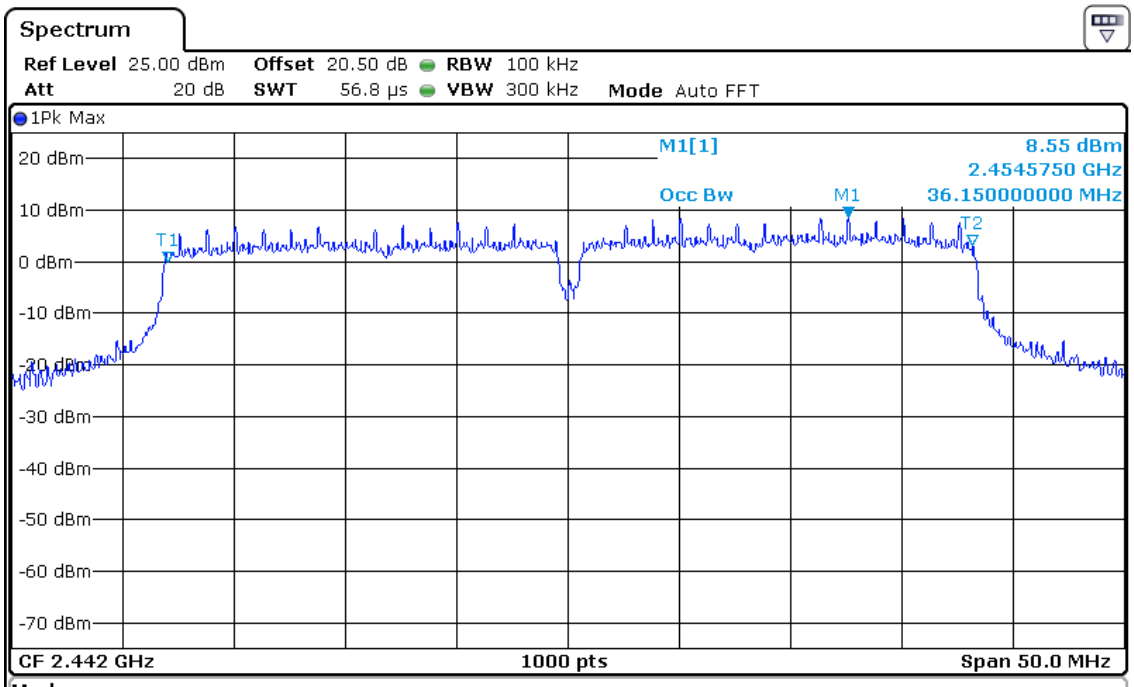
Data Rate: MCS0 **Channel: 2422 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.425825 GHz	2.62 dBm		
M2		1	2.404325 GHz	-3.90 dBm		
M3		1	2.440225 GHz	-3.50 dBm		

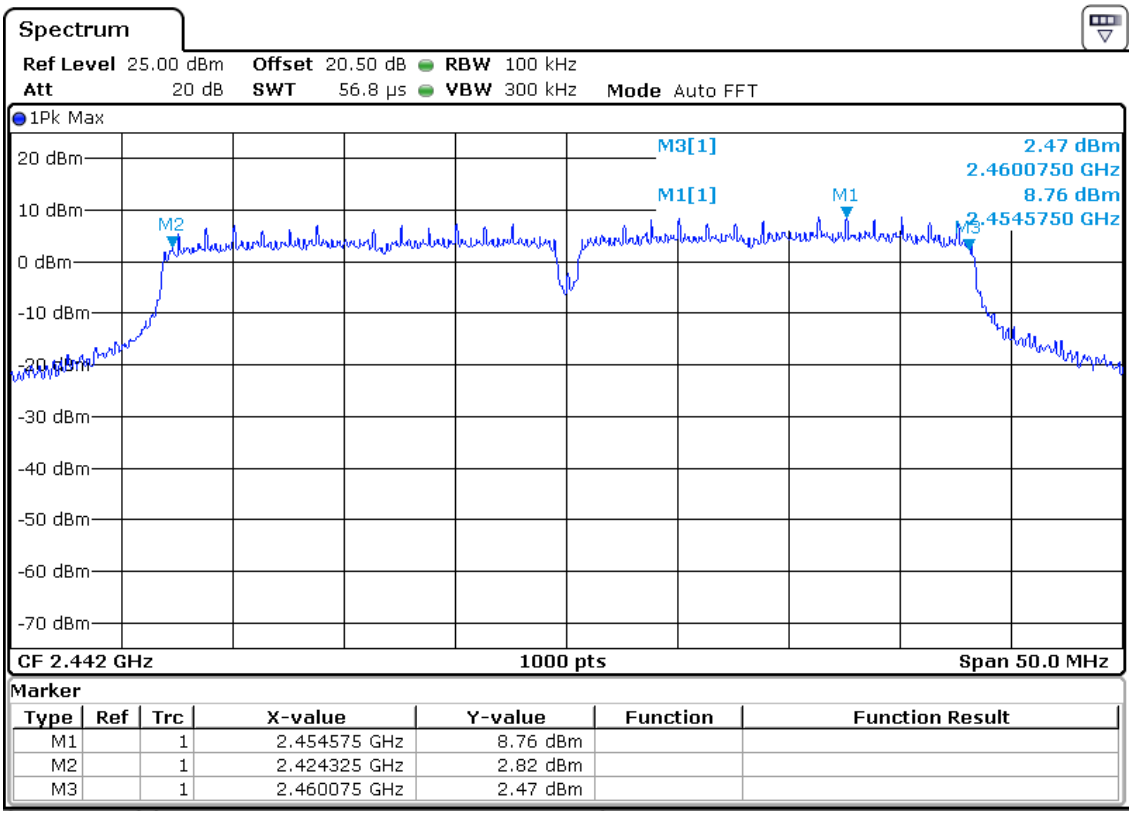
Data Rate: MCS0 **Channel: 2422 MHz 6dB BW**



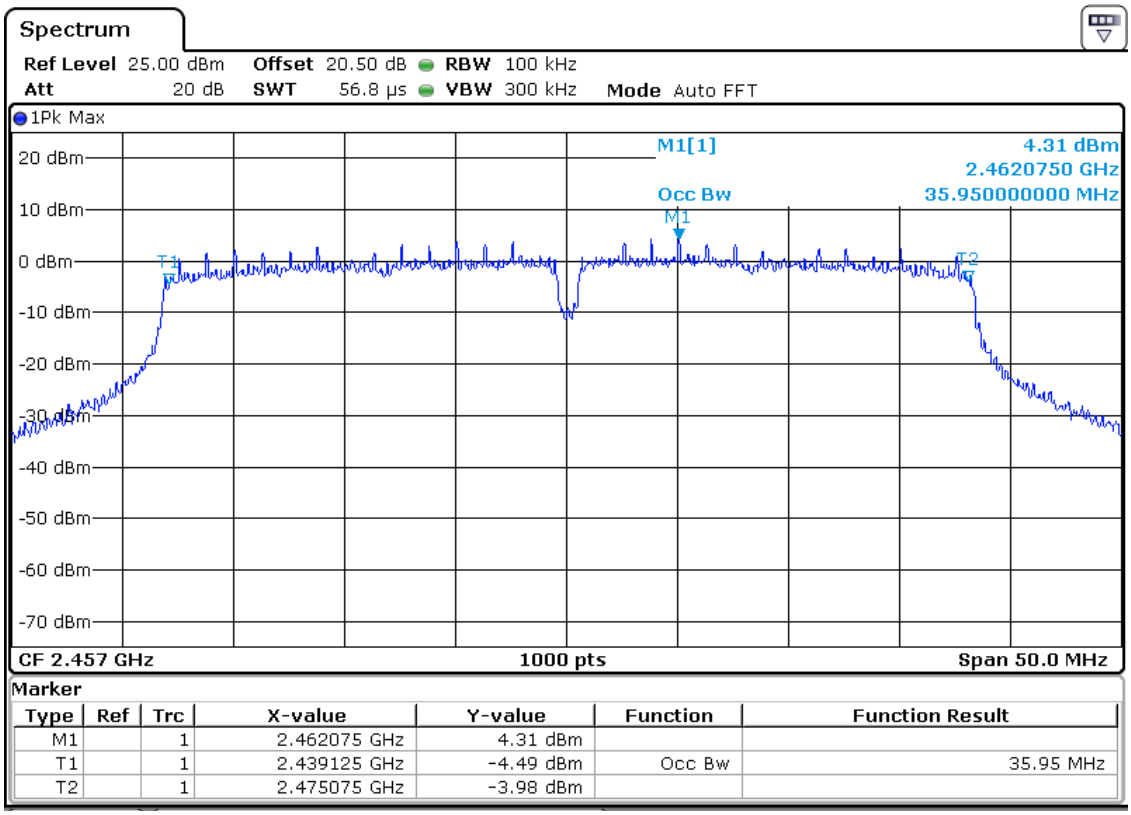
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.454575 GHz	8.55 dBm		
T1		1	2.424025 GHz	-0.13 dBm	Occ Bw	36.15 MHz
T2		1	2.460175 GHz	3.17 dBm		

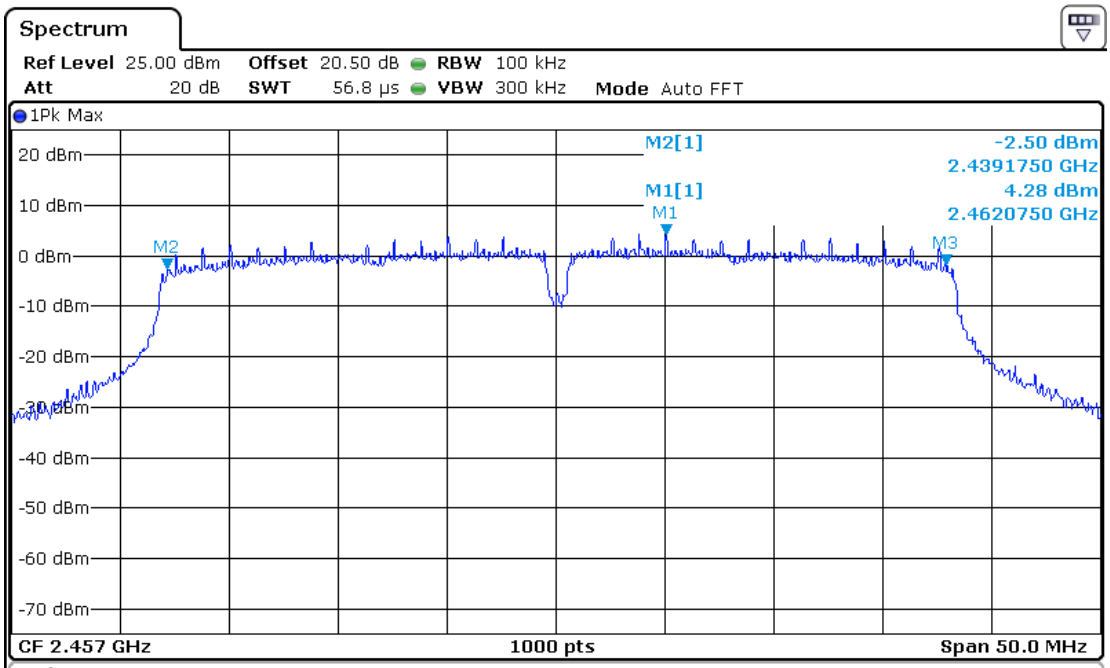
Data Rate: MCS0 **Channel: 2442 MHz**



Data Rate: MCS0 **Channel: 2442 MHz 6dB BW**



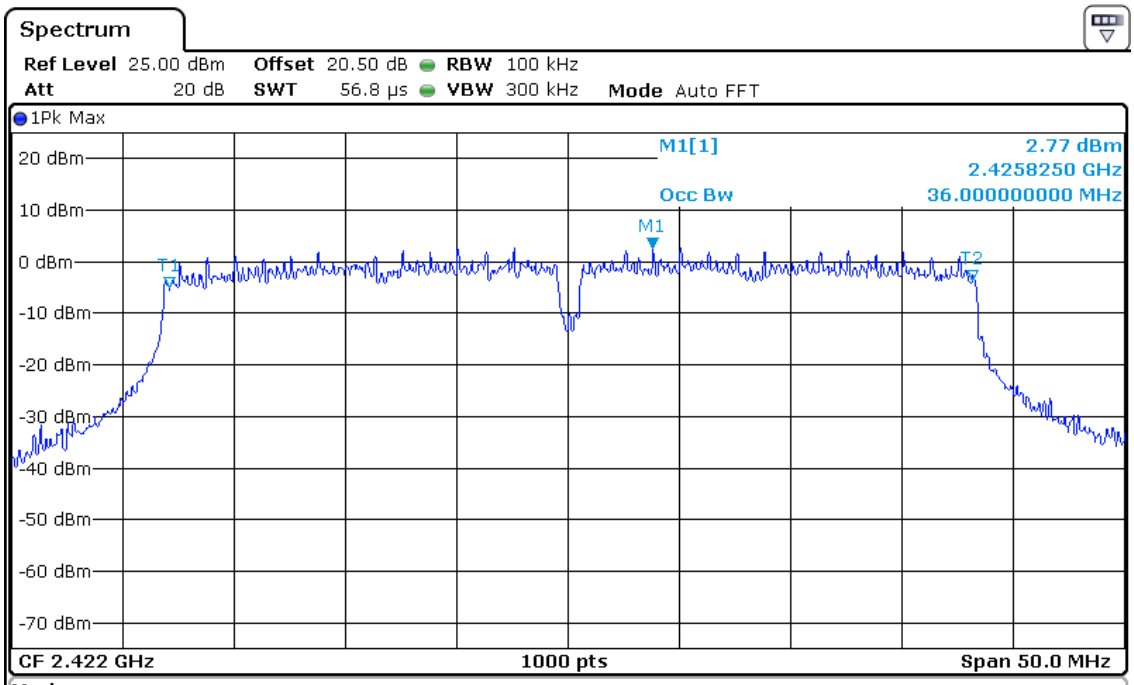
Data Rate: MCS0 **Channel: 2457 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.462075 GHz	4.28 dBm		
M2		1	2.439175 GHz	-2.50 dBm		
M3		1	2.4749 GHz	-1.78 dBm		

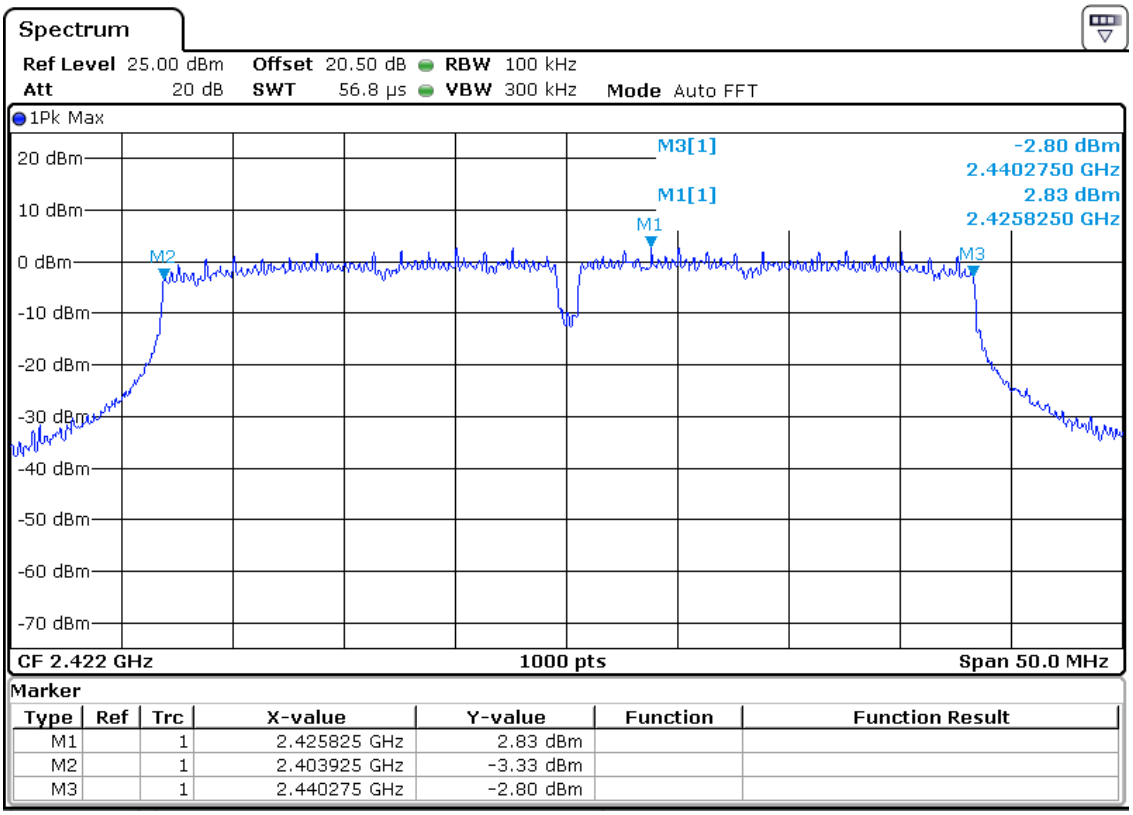
Data Rate: MCS0 **Channel: 2457 MHz 6dB BW**



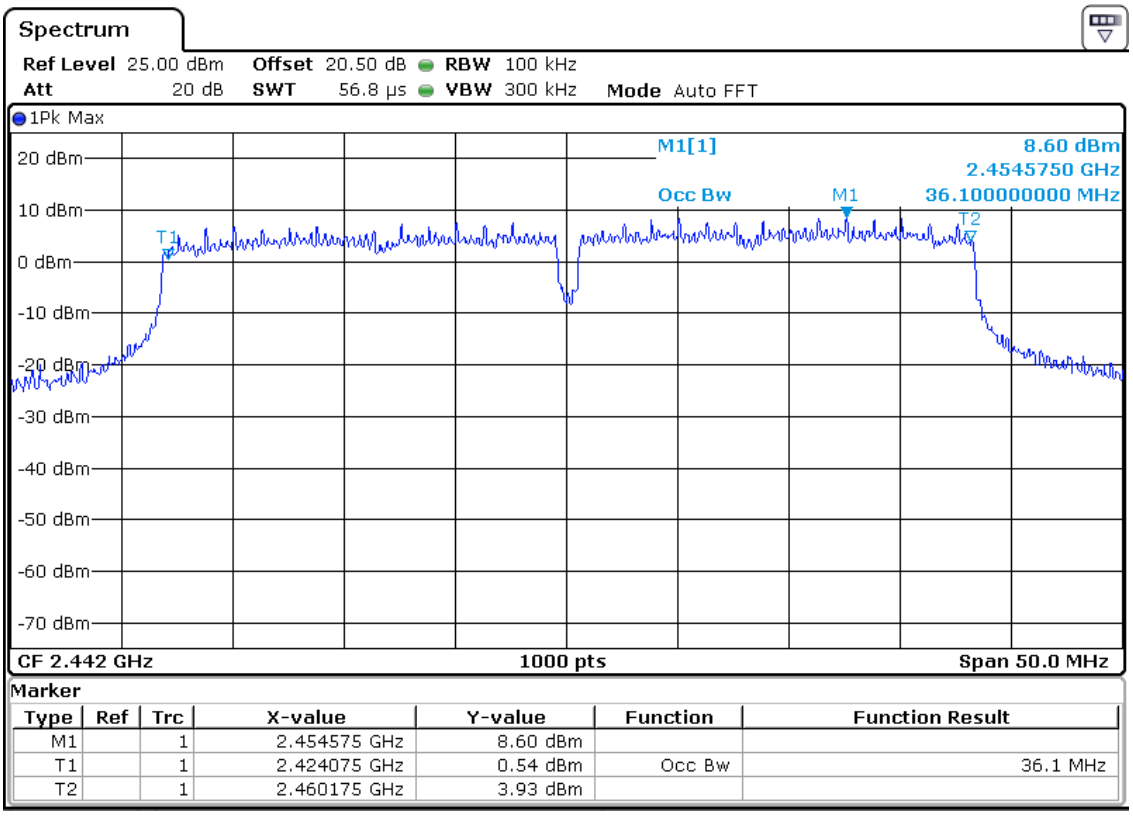
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.425825 GHz	2.77 dBm		
T1		1	2.404125 GHz	-4.88 dBm	Occ Bw	36.0 MHz
T2		1	2.440125 GHz	-3.61 dBm		

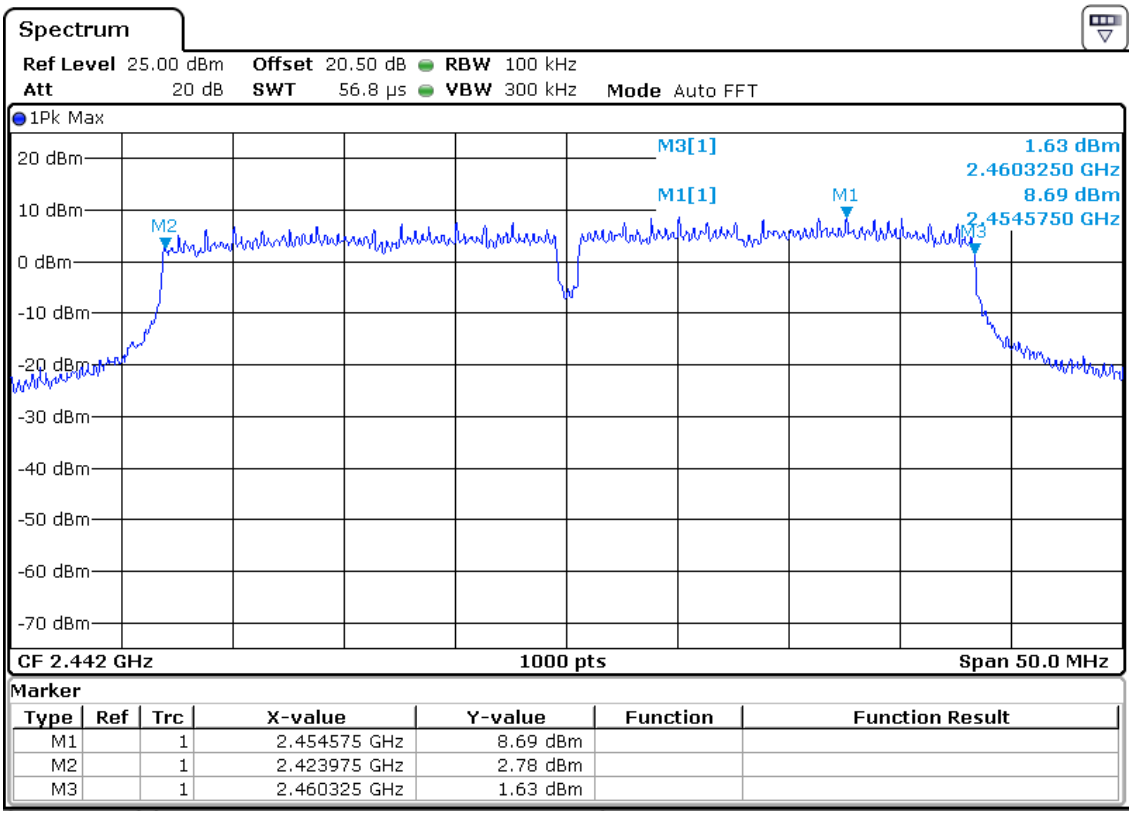
Data Rate: MCS4 **Channel: 2422 MHz**



Data Rate: MCS4 **Channel: 2422 MHz 6dB BW**



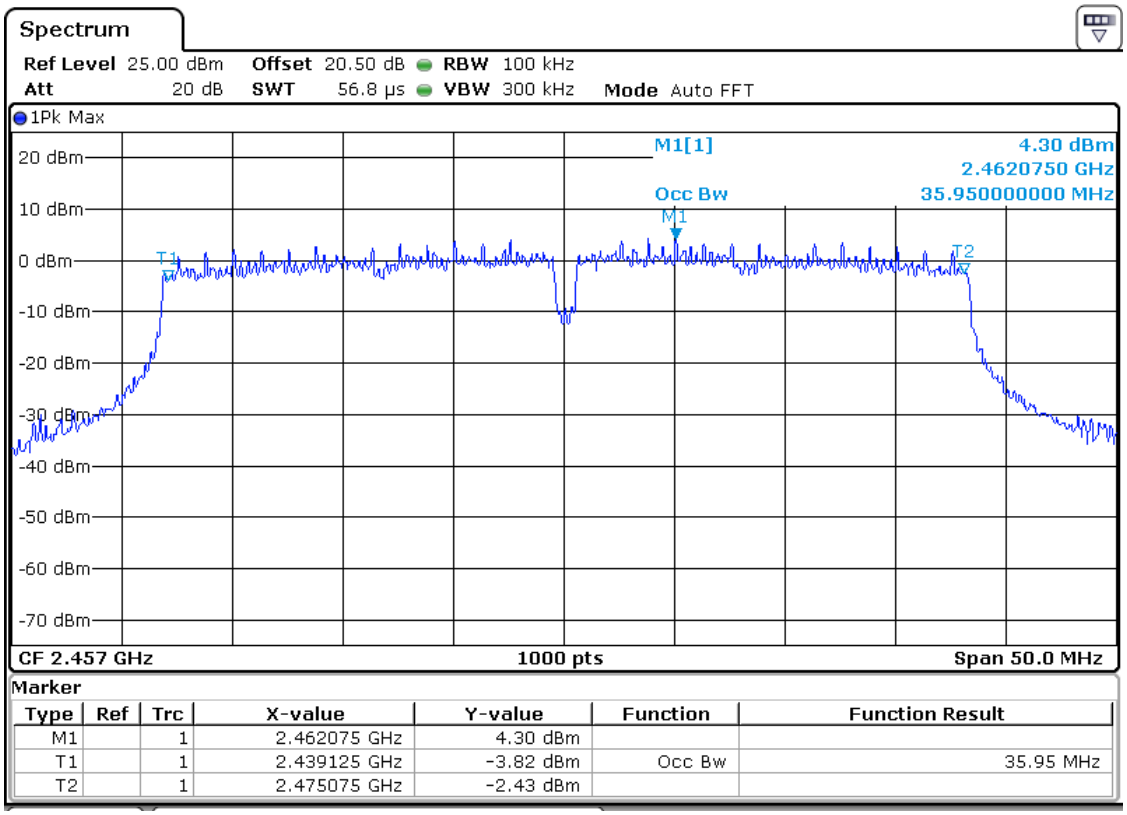
Data Rate: MCS4 **Channel: 2442 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.454575 GHz	8.69 dBm		
M2		1	2.423975 GHz	2.78 dBm		
M3		1	2.460325 GHz	1.63 dBm		

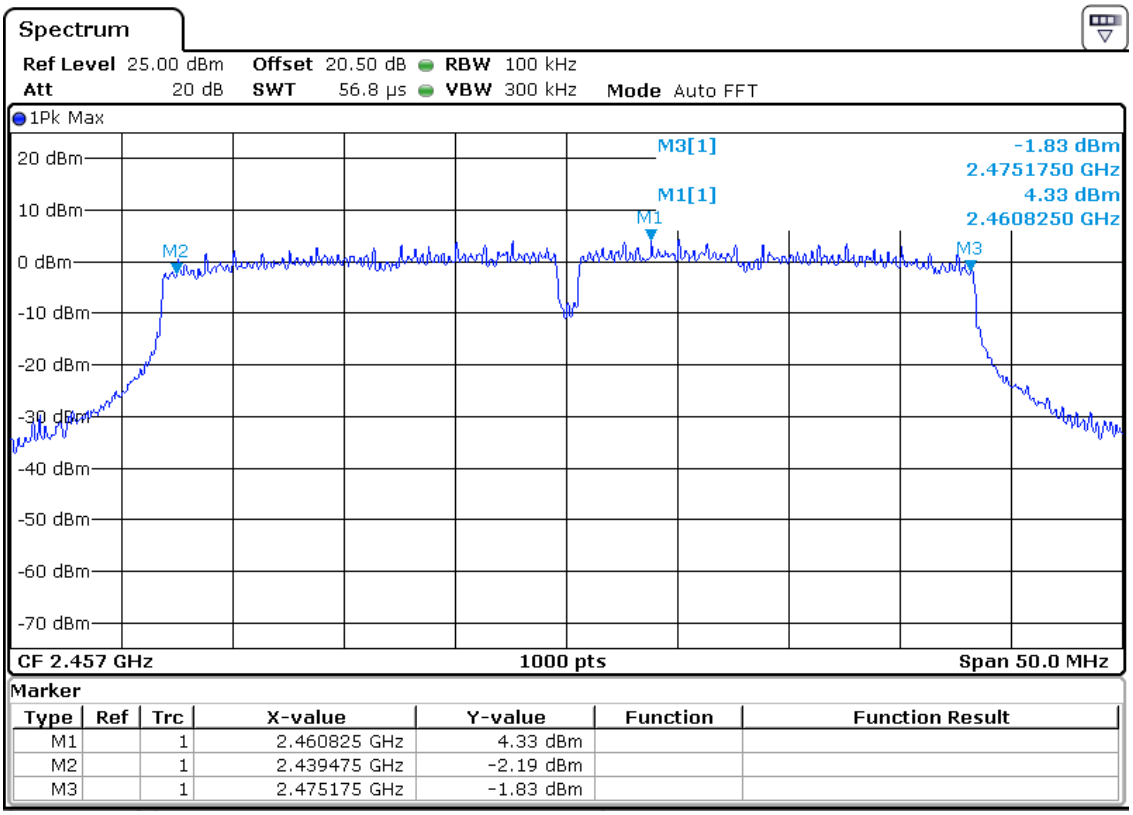
Data Rate: MCS4 **Channel: 2442 MHz 6dB BW**



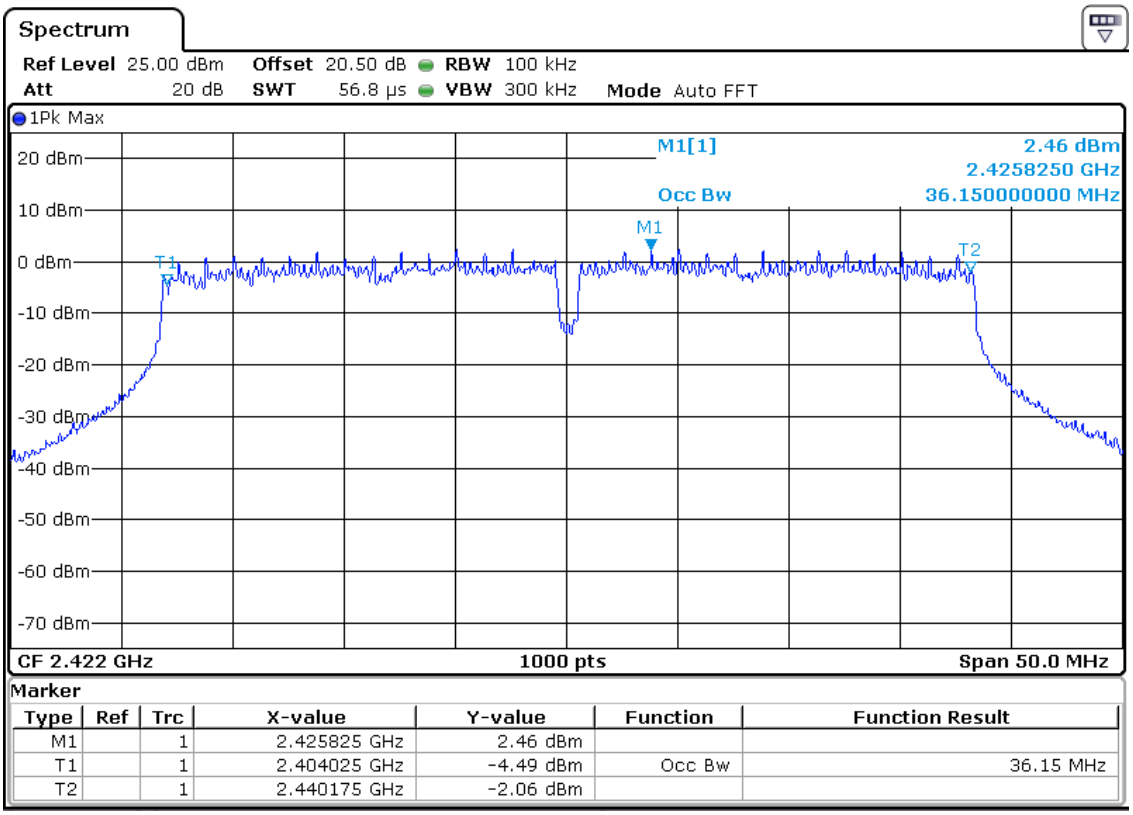
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.462075 GHz	4.30 dBm		
T1		1	2.439125 GHz	-3.82 dBm	Occ Bw	35.95 MHz
T2		1	2.475075 GHz	-2.43 dBm		

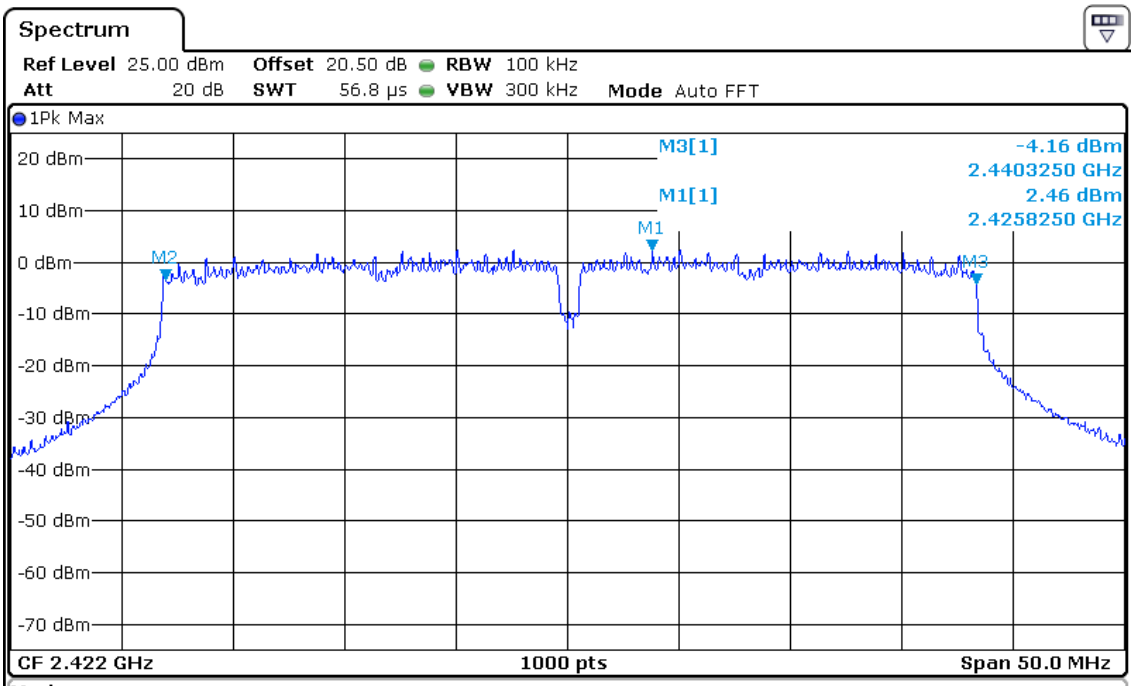
Data Rate: MCS4 **Channel: 2457 MHz**



Data Rate: MCS4 **Channel: 2457 MHz 6dB BW**



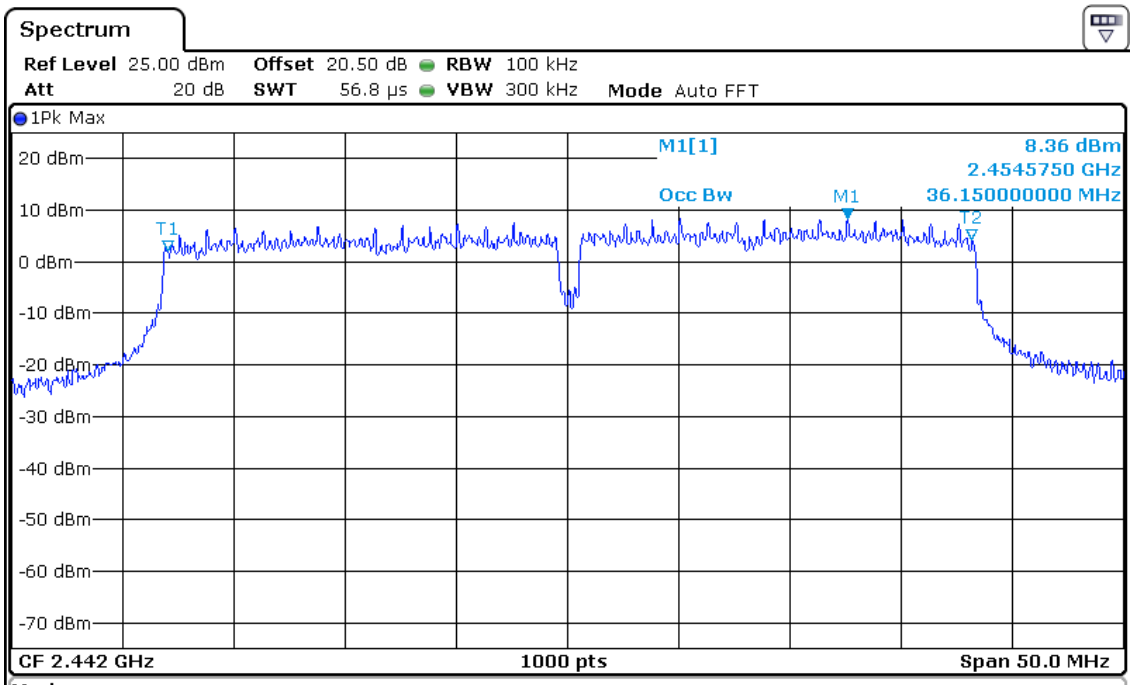
Data Rate: MCS7 **Channel: 2422 MHz**



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.425825 GHz	2.46 dBm		
M2		1	2.403975 GHz	-3.40 dBm		
M3		1	2.440325 GHz	-4.16 dBm		

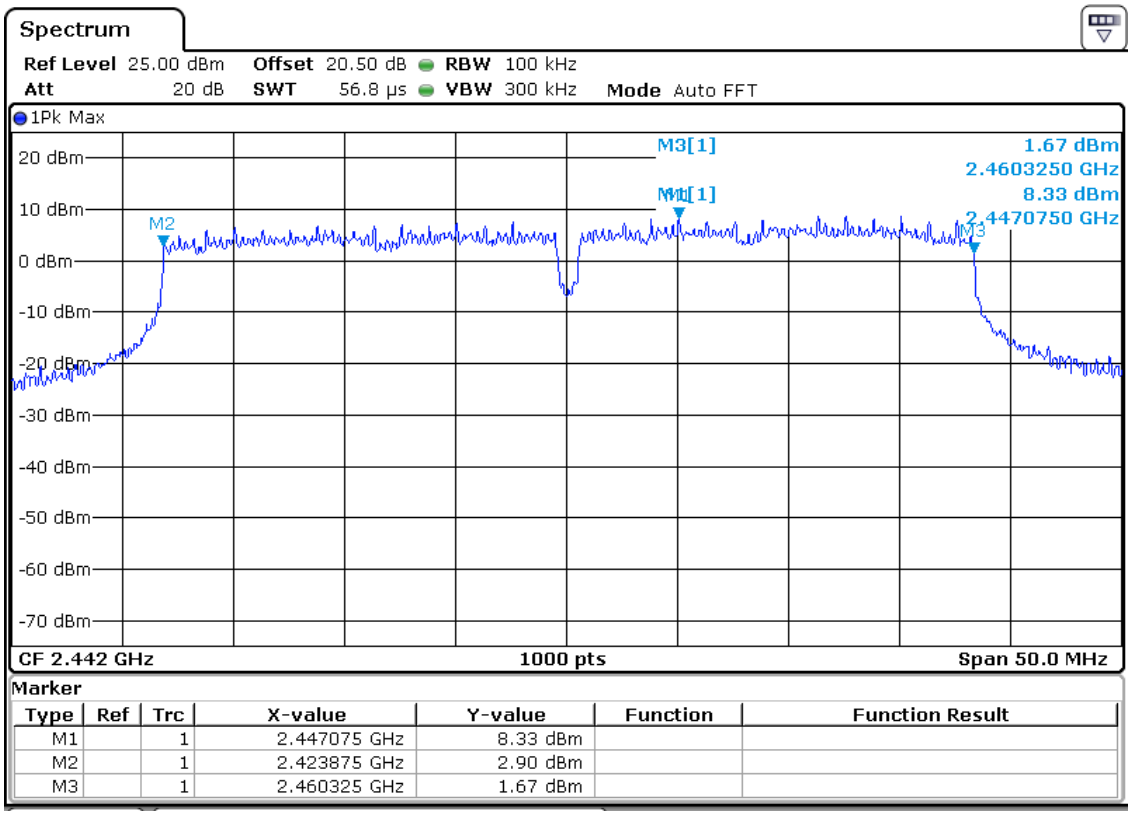
Data Rate: MCS7 **Channel: 2422 MHz 6dB BW**



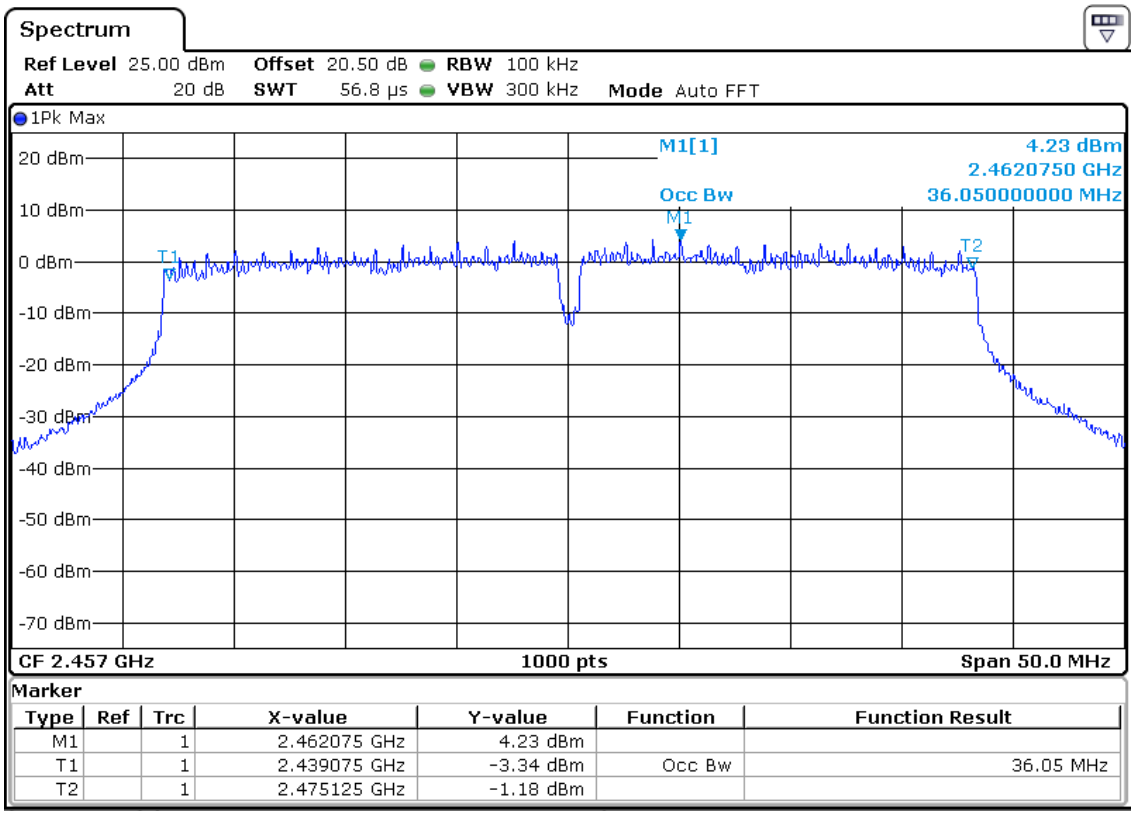
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.454575 GHz	8.36 dBm		
T1		1	2.424025 GHz	2.18 dBm	Occ Bw	36.15 MHz
T2		1	2.460175 GHz	4.18 dBm		

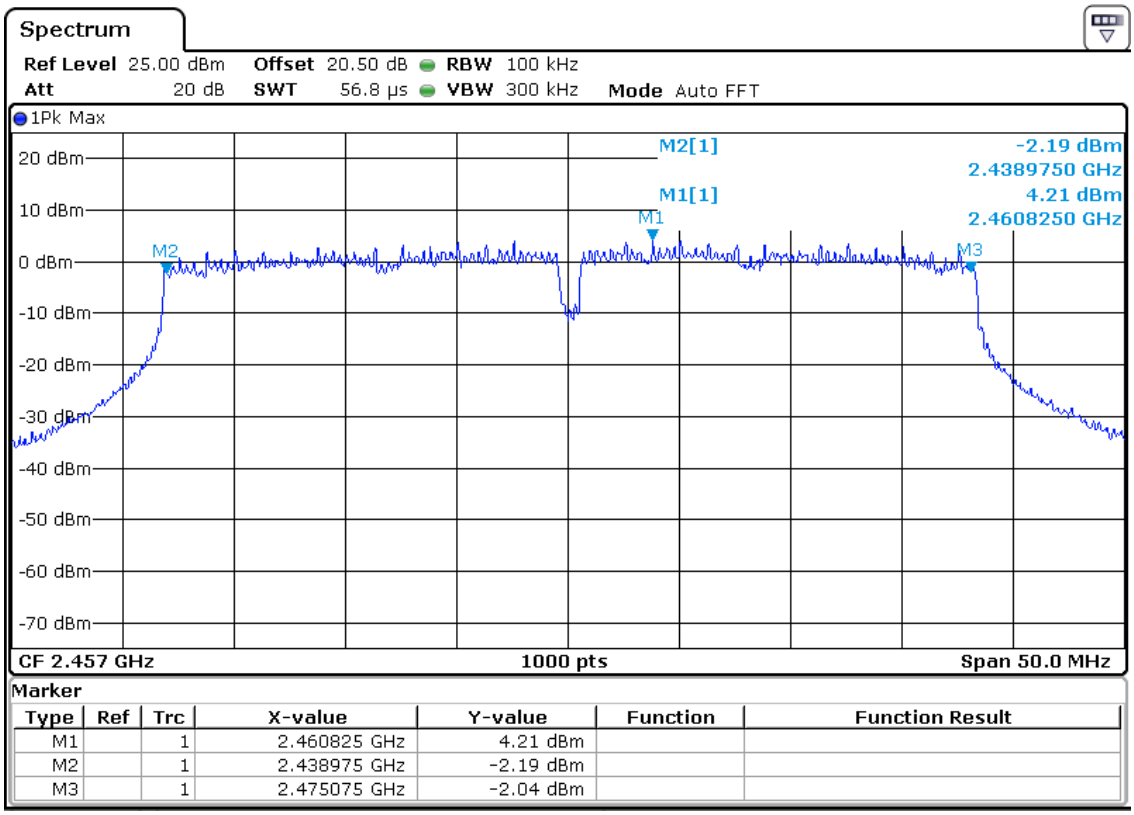
Data Rate: MCS7 **Channel: 2442MHz**



Data Rate: MCS7 **Channel: 2442 MHz 6dB BW**



Data Rate: MCS7 **Channel: 2457 MHz**



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.460825 GHz	4.21 dBm		
M2		1	2.438975 GHz	-2.19 dBm		
M3		1	2.475075 GHz	-2.04 dBm		

Data Rate: MCS7 **Channel: 2457 MHz 6dB BW**