

TEST REPORT

EUT Description	WLAN and BT, 2x2 PCIe M.2 1216 SD adapter card, LTE Coexistence
Brand Name	Intel® Wireless-AC 9260D2WL
Model Name	9560D2WL
FCC ID	PD99260D2L
ISED ID	1000M-9260D2L
Date of Test Start/End	2018-12-03 /2018-12-17
Features	802.11ac, Dual Band, 2x2 Wi-Fi + Bluetooth® 5 (see section 5)

Applicant	Intel Mobile Communications
Address	100 Center Point Circle, Suite 200 Columbia, South Carolina 29210 USA
Contact Person	Steven Hackett
Telephone/Fax/ Email	steven.c.hackett@intel.com

Reference Standards	FCC CFR Title 47 Part 15 C RSS-247 issue 2, RSS-Gen issue 5 (see section 1)
---------------------	---

Test Report identification	181120-01.TR04
Revision Control	Rev. 00 This test report revision replaces any previous test report revision (see section 8)

The test results relate only to the samples tested.
The test report shall not be reproduced in full, without written approval of the laboratory.

Issued by _____ Reviewed by _____

Gregory ROUSTAN
(Test Engineer Lead)

Cheiel IN
(Technical Manager)

Intel Corporation S.A.S – WRF Lab
425 rue de Goa – Le Cargo B6 - 06600, Antibes, France
Tel. +33493001400 / Fax +33493001401

Table of Contents

1. Standards, reference documents and applicable test methods	3
2. General conditions, competences and guarantees	3
3. Environmental Conditions	3
4. Test samples	4
5. EUT Features	4
6. Remarks and comments	4
7. Test Verdicts summary	5
7.1. 802.11 B/G/N 2.4GHZ	5
7.2. BLE	5
8. Document Revision History	5
Annex A. Test & System Description	6
A.1 MEASUREMENT SYSTEM	6
A.2 TEST EQUIPMENT LIST	8
A.3 MEASUREMENT UNCERTAINTY EVALUATION	9
Annex B. Test Results DTS	10
B.1 TEST CONDITIONS	10
B.2 TEST RESULTS TABLES	11
B.2.1 6dB & 99% Bandwidth	11
B.2.2 Maximum Output Power and antenna gain	14
B.2.3 Power Spectral Density	22
B.2.4 Out-of-band emission (conducted)	25
B.2.5 Radiated spurious emission	29
B.3 TEST RESULTS SCREENSHOT	44
B.3.1 6dB Bandwidth	44
B.3.2 99% Bandwidth	46
B.3.3 Maximum output power and antenna gain	48
B.3.4 Power spectral density	54
B.3.5 Out of band emissions - band-edge low (conducted)	56
B.3.6 Out of band emissions - band-edge high (conducted)	68
B.3.7 Out of band emissions - spurious	104
Annex C. Test Results BLE	128
C.1 TEST RESULTS BLE	128
C.1.1 6dB & 99% Bandwidth	128
C.1.2 Maximum Output Power and antenna gain	132
C.1.3 Power Spectral Density	138
C.1.4 Out-of-band emission (Conducted)	141
C.1.5 Radiated spurious emission	151
Annex D. Photographs	156
D.1 TEST SETUP	156
D.2 TEST SAMPLE	158

1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 15 - Subpart C – §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
2. FCC 47 CFR part 15 - Subpart C – §15.209 Radiated emission limits; general requirements.
3. ANSI C63.10-2013 – American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
4. FCC OET KDB 558074 D01 15.247 DTS Meas Guidance v05 – Guidance for Compliance Measurements on Digital Transmission Systems, frequency hopping spread spectrum system, and hybrid system devices operating under section §15.247 of the FCC rules.
5. FCC OET KDB 662911 D01 Multiple Transmitter Output v02r01.
6. RSS-247 Issue 2 – Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
7. RSS-Gen Issue 5 – General Requirements for Compliance of Radio Apparatus.

2. General conditions, competences and guarantees

- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2005 testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED Assigned Code 1000Y.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	22 °C ±3 °C
Humidity	49 % ± 16 %

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#1	181120-01.S04	RF MODULE	9260D2WL	WFM : 3413E8B01549	2018-11-20	Used for conducted tests
	180000-01.S08	EXTENDER	PCB00495	0014950414-021	2018-11-22	
	180219-01.S18	SOCKET	-	-	2018-03-08	
	170000-01.S04	LAPTOP	LATITUDE E5470	DMRKMC2	2017-05-10	
#2	181120-01.S02	MODULE	9260D2WL	WFM:3413EB0157B	2018-11-20	Radiated Spurious emission from 30 MHz to 6.4 GHz
	180001-01.S17	Socket WsP/ThP	D2W	8882-043	2018-11-22	
	180000-01.S12	EXTENDER	PCB00495 / PCB00496	ASS00495-001 4950414-028	2018-11-22	
	170209-01.S16	LAPTOP	Latitude E5470	C1HTPF2	2017-02-09	
#3	181120-01.S01	MODULE	9260D2WL	WFM:3413E8B01486	2018-11-20	Radiated Spurious emission from 6.4 GHz to 26.5 GHz
	180001-01.S16	Socket WsP/ThP	D2W	8882-017	2018-11-22	
	180000-01.S15	EXTENDER	PCB00495 / PCB00496	4950414-064	2018-11-22	
	170801-01.S10	LAPTOP	LATITUDE E7470	7KNOXF2	2017-09-07	

5. EUT Features

Brand Name	Intel® Wireless-AC 9260D2WL		
Model Name	9560D2WL		
FCC ID	PD99260D2L		
ISED ID	1000M-9260D2L		
Software Version	OEM DRTU_08048_11_1832_0G		
Driver Version	99.0.28.6 (V1.85.5)		
Prototype / Production	Production		
Supported Radios	802.11b/g/n 2.4GHz (2400.0 – 2483.5 MHz) 802.11a/n/ac 5.2GHz (5150.0 – 5350.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5850.0 MHz) Bluetooth 5 2.4GHz (2400.0 – 2483.5 MHz)		
Antenna Information	CHAIN A: PIFA antenna. WiFi 2.4GHz & 5GHz and BT CHAIN B: PIFA antenna. WiFi 2.4GHz & 5GHz		
Additional Information			

6. Remarks and comments

N/A

7. Test Verdicts summary

7.1. 802.11 b/g/n 2.4GHz

FCC part	RSS part	Test name	Verdict
15.247 (a) (2)	RSS-247 Clause 5.2 (a)	6dB Bandwidth	P
15.247 (b) (3)	RSS-247 Clause 5.4 (d)	Maximum output power and E.I.R.P	P
15.247 (e)	RSS-247 Clause 5.2 (b)	Power spectral density	P
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen Clause 8.9	Out-of-band Emission (conducted)	P
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen Clause 8.9	Out-of-band Emission (radiated)	P

7.2. BLE

FCC part	RSS part	Test name	Verdict
15.247 (a) (2)	RSS-247 Clause 5.2 (a)	6dB Bandwidth	P
15.247 (b) (3)	RSS-247 Clause 5.4 (d)	Maximum output power and E.I.R.P.	P
15.247 (e)	RSS-247 Clause 5.2 (b)	Power spectral density	P
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen Clause 8.9	Out-of-band Emissions (conducted)	P
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen Clause 8.9	Out-of-band Emissions (radiated)	P

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable

8. Document Revision History

Revision #	Date	Modified by	Revision Details
Rev. 00	2018-12-18	E. Garcia	First Issue

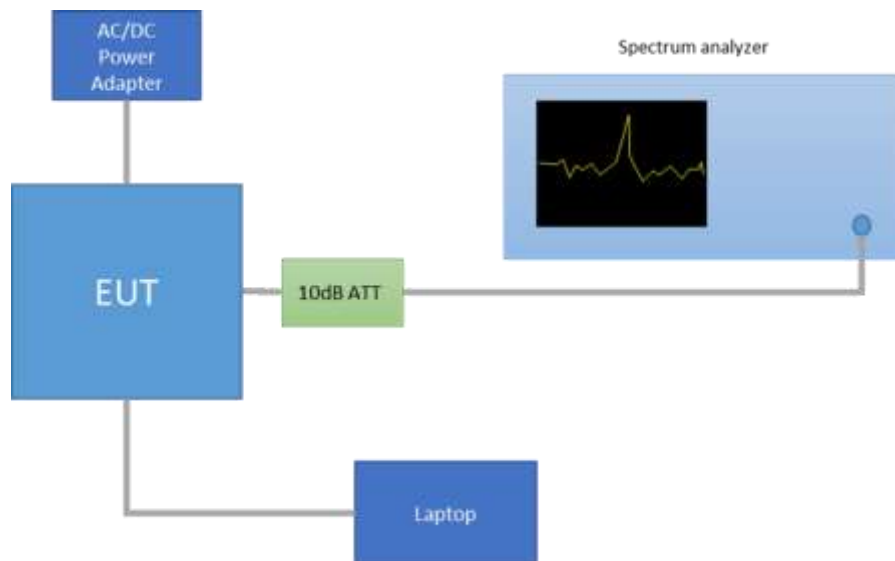
Annex A. Test & System Description

A.1 Measurement System

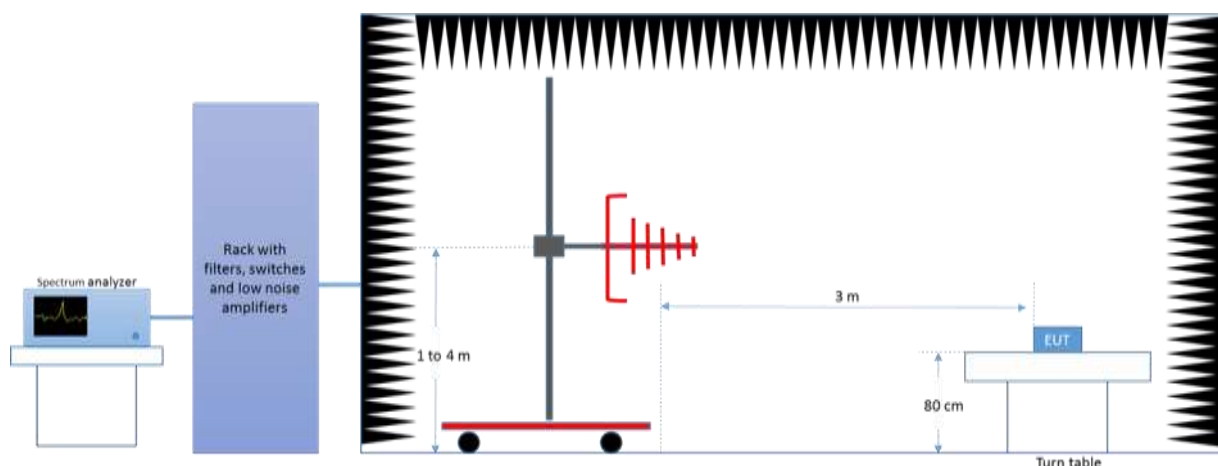
Measurements were performed using the following setups, made in accordance to the general provisions of FCC DTS Measurement KDB 558074 D01 DTS Meas Guidance.

The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary tool DRTU.

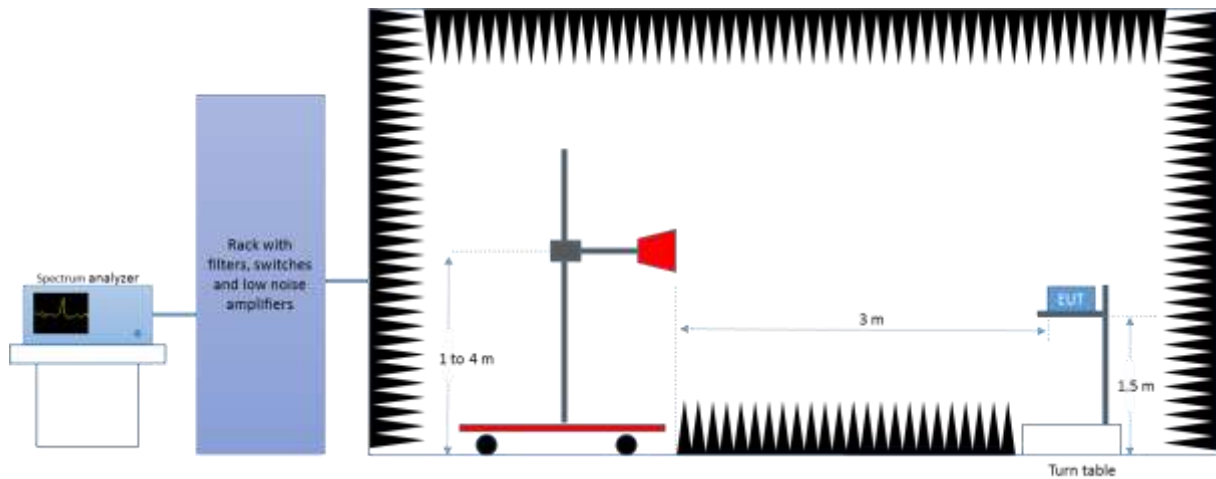
Conducted Setup



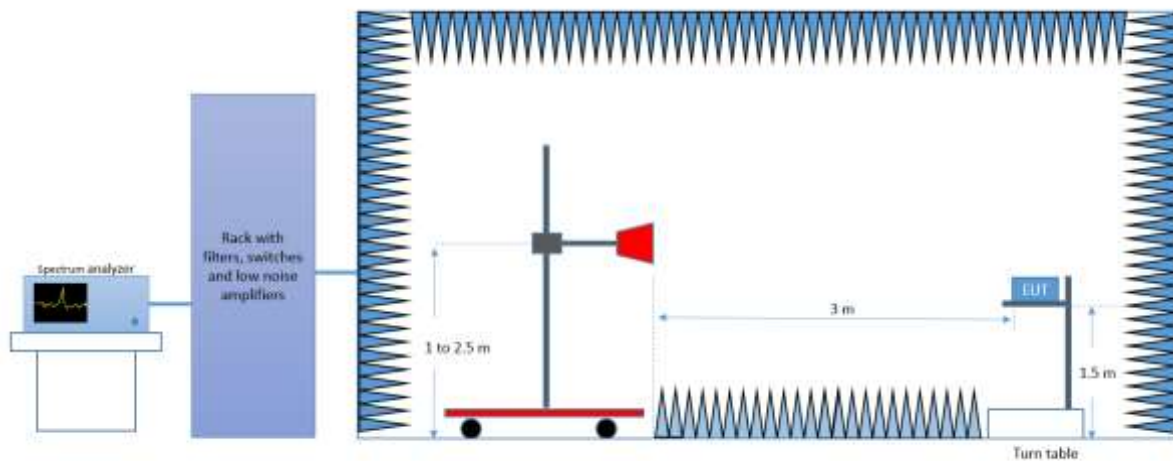
Radiated Setup 30 MHz - 1GHz



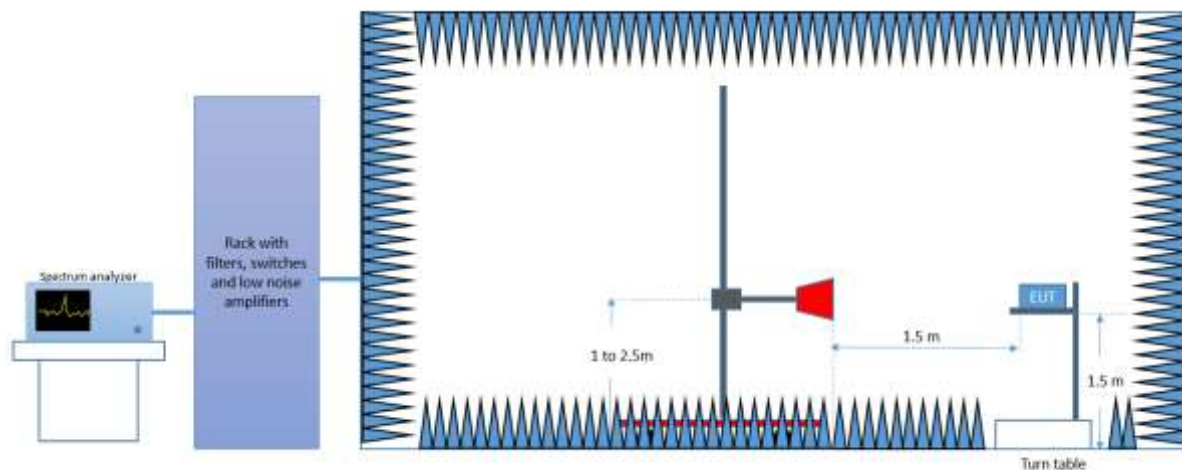
Radiated Setup 1 GHz – 6.4 GHz



Radiated Setup 6.4 GHz – 18 GHz



Radiated Setup 18 GHz – 26.5 GHz



A.2 Test Equipment List

Conducted Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0258	Spectrum analyzer	FSV30	101318	Rohde & Schwarz	2018-04-12	2020-04-12

Radiated Setup-1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2018-05-17	2020-05-17
0137	Log antenna 30 MHz – 1 GHz	3142E	00156946	ETS Lindgren	2017-12-19	2019-12-19
0325	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157734	ETS Lindgren	2017-08-22	2019-08-22
0135	Semi Anechoic chamber	FACT 3	5720	ETS Lindgren	2018-04-18	2020-04-18
0530	Measurement Software	EMC32	100623	Rohde & Schwarz	N/A	N/A
0013	Power Sensor 50MHz-18GHz	NRP-Z81	101152	Rohde & Schwarz	2018-04-16	2020-04-16
0617	Power Sensor 50MHz-18GHz	NRP-Z81	104386	Rohde & Schwarz	2018-04-16	2020-04-16

N/A: Not Applicable

Radiated Setup-2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0133	Spectrum analyzer	FSV40	101358	Rohde & Schwarz	2018-04-11	2020-04-11
0141	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2018-05-11	2020-05-11
0334	Double Ridged Horn Antenna 18 GHz – 40 GHz	3116C-PA	00196308	ETS Lindgren	2017-08-22	2019-08-22
0337	Full Anechoic chamber	RFD_FA_100	5996	ETS Lindgren	2018-04-17	2020-04-17
0329	Measurement Software	EMC32	100401	Rohde & Schwarz	N/A	N/A
0616	Power Sensor 50MHz-18GHz	NRP-Z81	104385	Rohde & Schwarz	2018-04-16	2020-04-16
0618	Power Sensor 50MHz-18GHz	NRP-Z81	104382	Rohde & Schwarz	2018-04-16	2020-04-16

N/A: Not Applicable

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty [\pm dB]
Conducted Power	± 1.0
Conducted Spurious Emission	± 2.9
Radiated tests <1GHz	± 3.8
Radiated tests 1GHz - 40 GHz	± 4.7

Annex B. Test Results DTS

B.1 Test Conditions

For 802.11b/g modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, but not simultaneously.

For 802.11n20 (20 MHz channel bandwidth), 802.11n40 (40MHz channel bandwidth) modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, and also simultaneously.

For Bluetooth Low Energy mode the EUT can transmit only at CHAIN A RF output.

The conducted RF output power at each chain was adjusted according to the client's supplied Target values (see following table) using the Intel DRTU tool and measuring the power by using a spectrum analyzer with the channel integration method according to point 9.2.2.2 (Method AVGSA-1) of KDB 558074 D01.

Measured values for adjustment were within +/-0.25 dB from the declared Target values.

2.4GHz DTS & BLE					Conducted Power, Target Value (dBm)		
Mode	BW (MHz)	Data Rate	CH #	Freq. (MHz)	SISO Chain A	SISO Chain B	MIMO at both ports A and B
802.11b	20	1Mbps	1	2412	20.00	19.50	-
			7	2442	20.50	21.00	-
			11	2462	19.50	19.50	-
			12	2467	17.00	17.50	-
			13	2472	15.00	15.00	-
802.11g	20	6Mbps	1	2412	17.00	17.00	-
			7	2442	19.00	19.50	-
			11	2462	16.50	16.50	-
			12	2467	13.50	14.00	-
			13	2472	-4.50	-4.50	-
802.11n	20	HT0 HT8*	1	2412	17.00	16.50	18.50
			7	2442	19.00	19.50	21.00
			11	2462	16.50	16.50	18.00
			12	2467	13.50	13.50	15.00
			13	2472	-4.50	-4.50	-5.00
802.11n	40	HT0 HT8*	3F	2422	15.50	15.00	17.50
			7F	2442	16.50	16.50	18.50
			9F	2452	16.00	16.00	18.00
			10F	2457	10.50	10.00	12.50
			11F	2462	4.00	4.00	5.50
Bluetooth Low Energy	2	1Mbps	0	2412	4.50	-	-
			19	2440	5.50	-	-
			39	2462	5.50	-	-

* Note: HT8 for MIMO modes only.

The following data rates were selected based on preliminary testing that identified those rates as the worst cases for output power and spurious levels at the band edges:

802.11b → 1Mbps

802.11g → 6Mbps

802.11n20 and 802.11n40 (SISO) → HT0

802.11n20 and 802.11n40 (MIMO) → HT8

Alternative channels to the lowest and highest channels per band have been also tested for Band Edge compliance.

B.2 Test Results Tables

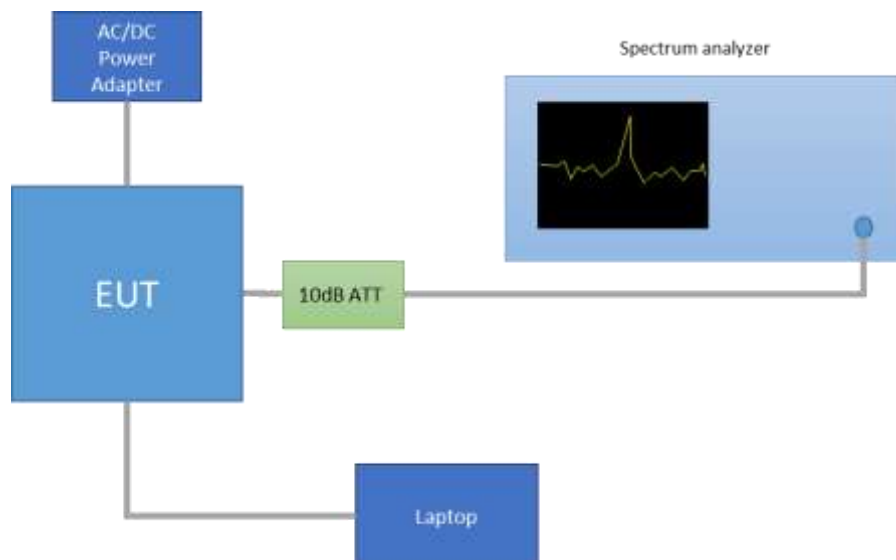
B.2.1 6dB & 99% Bandwidth

Test limits

FCC part	RSS part	Limits
15.247 (a) (2)	RSS-247 Clause 5.2 (a)	Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

The setup below was used to measure the 6dB & 99% Bandwidth. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



Results tables

Mode	Rate	Antenna	Channel	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
802.11b	1Mbps	SISO A	1	2412	10.09	13.54
			7	2442	10.10	14.55
			11	2462	10.10	13.84
			12	2467	10.07	13.67
			13	2472	9.58	13.48
		SISO B	1	2412	10.07	13.85
			7	2442	10.10	14.71
			11	2462	10.10	13.85
			12	2467	10.09	13.71
			13	2472	10.10	13.47
802.11g	6Mbps	SISO A	1	2412	16.33	16.77
			7	2442	16.33	18.60
			11	2462	16.34	16.75
			12	2467	16.33	16.71
			13	2472	16.32	16.81
		SISO B	1	2412	16.34	16.79
			7	2442	16.34	18.83
			11	2462	16.34	16.77
			12	2467	16.33	16.75
			13	2472	16.33	16.33
802.11n20	HT0	SISO A	1	2412	17.57	17.86
			7	2442	17.57	18.82
			11	2462	17.37	17.87
			12	2467	17.33	17.84
			13	2472	17.57	17.92
		SISO B	1	2412	17.55	17.85
			7	2442	17.58	19.88
			11	2462	17.59	17.87
			12	2467	17.57	17.84
			13	2472	17.57	17.91
	HT8	MIMO A	1	2412	17.57	17.82
			7	2442	17.58	18.17
			11	2462	17.60	17.84
			12	2467	17.19	17.81
			13	2472	17.58	17.95
		MIMO B	1	2412	17.60	17.79
			7	2442	17.60	17.89
			11	2462	17.58	17.81
			12	2467	17.59	17.80
			13	2472	17.58	17.94

Max Value

Mode	Rate	Antenna	Channel	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
802.11n40	HT0	SISO A	3F	2422	36.08	36.47
			7F	2442	36.08	36.48
			9F	2452	36.34	36.49
			10F	2457	30.10	36.41
			11F	2462	36.33	36.40
		SISO B	3F	2422	36.10	36.46
			7F	2442	36.08	36.48
			9F	2452	36.33	36.44
			10F	2457	36.10	36.39
			11F	2462	36.08	36.42
	HT8	MIMO A	3F	2422	35.77	36.46
			7F	2442	35.84	36.47
			9F	2452	36.34	36.48
			10F	2457	35.88	36.43
			11F	2462	35.85	36.45
		MIMO B	3F	2422	36.35	36.32
			7F	2442	36.36	36.30
			9F	2452	36.35	36.29
			10F	2457	35.78	36.25
			11F	2462	35.76	36.29

Max Value

See Section B.3.1 and Section B.3.2 for the screenshot results.

B.2.2 Maximum Output Power and antenna gain

Test limits

	Limits
FCC Part 15.247 (b) (3)	<p>(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:</p> <p>(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.</p> <p>(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.</p>
RSS-247 Clause 5.4 (d)	<p>For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).</p> <p>As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.</p>

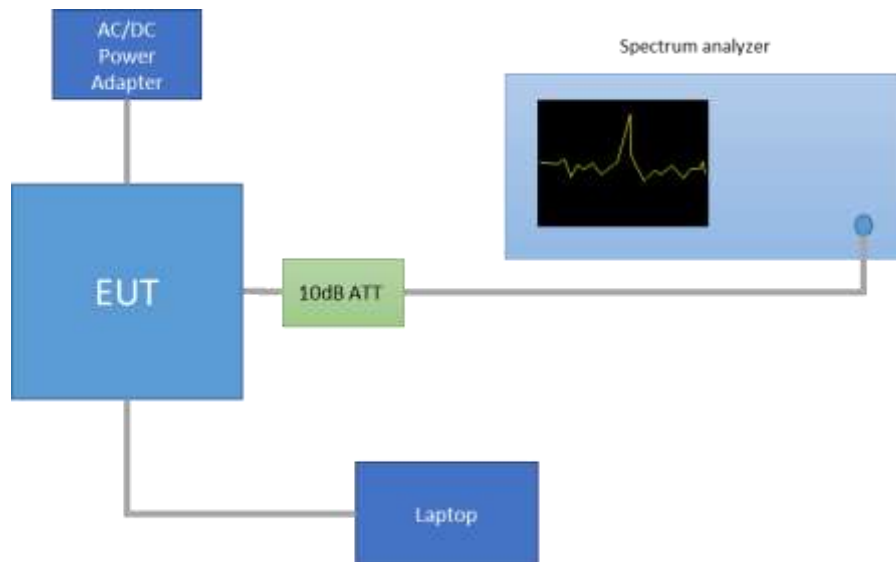
Test procedure

The Maximum Peak Conducted Output Power was measured using the channel integration method as authorized in chapter 2.0 “Power limits, definitions and device configuration” of FCC KDB 558074 D01.

For MIMO mode, according to the measure-and-sum approach defined in FCC KDB 662911 - Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically in linear power units to determine the total emission level from the device.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power. The declared maximum antenna gain is 3.24dBi.

The setup below was used to measure the maximum conducted output power. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



Results tables

Maximum peak conducted output power

Mode	Rate	CH	Freq [MHz]	Antenna	Measured Conducted Output power [dBm]	EIRP [dBm]	EIRP [mW]	Conducted power [mW]
802.11b	1Mbps	1	2412	SISO A	22.98	26.22	418.79	198.61
				SISO B	22.51	25.75	375.84	178.24
		7	2442	SISO A	24.08	27.32	539.51	255.86
				SISO B	24.16	27.40	549.54	260.62
		11	2462	SISO A	22.94	26.18	414.95	196.79
				SISO B	23.07	26.31	427.56	202.77
		12	2467	SISO A	20.31	23.55	226.46	107.40
				SISO B	20.74	23.98	250.03	118.58
		13	2472	SISO A	18.11	21.35	136.46	64.71
				SISO B	18.56	21.80	151.36	71.78
802.11g	6Mbps	1	2412	SISO A	25.86	29.10	812.83	385.48
				SISO B	25.57	28.81	760.33	360.58
		7	2442	SISO A	28.03	31.27	1339.68	635.33
				SISO B	28.37	31.61	1448.77	687.07
		11	2462	SISO A	16.75	19.99	99.77	47.32
				SISO B	25.42	28.66	734.51	348.34
		12	2467	SISO A	22.51	25.75	375.84	178.24
				SISO B	22.77	26.01	399.02	189.23
		13	2472	SISO A	4.47	7.71	5.90	2.80
				SISO B	4.33	7.57	5.71	2.71
802.11n20	HT0	1	2412	SISO A	25.69	28.93	781.63	370.68
				SISO B	25.28	28.52	711.21	337.29
		7	2442	SISO A	28.00	31.24	1330.45	630.96
				SISO B	28.41	31.65	1462.18	693.43
		11	2462	SISO A	25.29	28.53	712.85	338.06
				SISO B	25.26	28.50	707.95	335.74
		12	2467	SISO A	22.39	25.63	365.59	173.38
				SISO B	22.42	25.66	368.13	174.58
		13	2472	SISO A	4.21	7.45	5.56	2.64
				SISO B	4.25	7.49	5.61	2.66

Max Value

Min Value

Mode	Rate	CH	Freq [MHz]	Antenna	Measured Conducted Output power [dBm]	EIRP [dBm]	EIRP [mW]	Conducted power [mW]
802.11n20	HT8	1	2412	MIMO A	24.24	27.48	559.76	265.46
				MIMO B	24.28	27.52	564.94	267.92
				Combined A+B	27.27	30.51	1124.69	533.38
		7	2442	MIMO A	27.32	30.56	1137.63	539.51
				MIMO B	26.45	29.69	931.11	441.57
				Combined A+B	29.92	33.16	2068.74	981.08
		11	2462	MIMO A	23.97	27.21	526.02	249.46
				MIMO B	24.30	27.54	567.54	269.15
				Combined A+B	27.15	30.39	1093.56	518.61
		12	2467	MIMO A	20.79	24.03	252.93	119.95
				MIMO B	21.37	24.61	289.07	137.09
				Combined A+B	24.10	27.34	542.00	257.04
		13	2472	MIMO A	0.80	4.04	2.54	1.20
				MIMO B	1.24	4.48	2.81	1.33
				Combined A+B	4.04	7.28	5.34	2.53

Max Value

Min Value

Mode	Rate	CH	Freq [MHz]	Antenna	Measured Conducted Output power [dBm]	EIRP [dBm]	EIRP [mW]	Conducted power [mW]
802.11n40	HT0	3F	2422	SISO A	24.16	27.40	549.54	260.62
				SISO B	23.60	26.84	483.06	229.09
		7F	2442	SISO A	25.18	28.42	695.02	329.61
				SISO B	25.31	28.55	716.14	339.63
		9F	2452	SISO A	24.63	27.87	612.35	290.40
				SISO B	25.54	28.78	755.09	358.10
		10F	2457	SISO A	18.96	22.20	165.96	78.70
				SISO B	18.42	21.66	146.55	69.50
		11F	2462	SISO A	12.13	15.37	34.43	16.33
				SISO B	12.53	15.77	37.76	17.91
	HT8	3F	2422	MIMO A	22.99	26.23	419.76	199.07
				MIMO B	23.24	26.48	444.63	210.86
				Combined A+B	26.13	29.37	864.39	409.93
		7F	2442	MIMO A	23.85	27.09	511.68	242.66
				MIMO B	24.26	27.50	562.34	266.69
				Combined A+B	27.07	30.31	1074.02	509.35
		9F	2452	MIMO A	23.81	27.05	506.99	240.44
				MIMO B	24.18	27.42	552.08	261.82
				Combined A+B	27.01	30.25	1059.07	502.25
		10F	2457	MIMO A	18.27	21.51	141.58	67.14
				MIMO B	18.45	21.69	147.57	69.98
				Combined A+B	21.37	24.61	289.15	137.13
		11F	2462	MIMO A	10.65	13.89	24.49	11.61
				MIMO B	11.34	14.58	28.71	13.61
				Combined A+B	14.02	17.26	53.20	25.23

Max Value

Min Value

See Section B.3.3 for the screenshot results.

Maximum (Average) conducted output power*

Mode	Rate	CH	Freq [MHz]	Antenna	Measured average conducted power [dBm]	Maximum** (average) conducted output power [dBm]	EIRP [dBm]	Average Output Power [mW]
802.11b	1Mbps	1	2412	SISO A	19.84	19.84	23.08	96.38
				SISO B	19.31	19.31	22.55	85.31
		7	2442	SISO A	20.68	20.68	23.92	116.95
				SISO B	20.80	20.80	24.04	120.23
		11	2462	SISO A	19.55	19.55	22.79	90.16
				SISO B	19.66	19.66	22.90	92.47
		12	2467	SISO A	16.96	16.96	20.20	49.66
				SISO B	17.27	17.27	20.51	53.33
		13	2472	SISO A	14.88	14.88	18.12	30.76
				SISO B	15.21	15.21	18.45	33.19
802.11g	6Mbps	1	2412	SISO A	17.19	17.19	20.43	52.36
				SISO B	16.84	16.84	20.08	48.31
		7	2442	SISO A	19.03	19.03	22.27	79.98
				SISO B	19.30	19.30	22.54	85.11
		11	2462	SISO A	16.55	16.55	19.79	45.19
				SISO B	16.57	16.57	19.81	45.39
		12	2467	SISO A	13.62	13.62	16.86	23.01
				SISO B	13.99	13.99	17.23	25.06
		13	2472	SISO A	-4.28	-4.28	-1.04	0.37
				SISO B	-4.47	-4.47	-1.23	0.36
802.11n20	HT0	1	2412	SISO A	17.02	17.02	20.26	50.35
				SISO B	16.50	16.50	19.74	44.67
		7	2442	SISO A	19.04	19.04	22.28	80.17
				SISO B	19.29	19.29	22.53	84.92
		11	2462	SISO A	16.40	16.40	19.64	43.65
				SISO B	16.33	16.33	19.57	42.95
		12	2467	SISO A	13.57	13.57	16.81	22.75
				SISO B	13.61	13.61	16.85	22.96
		13	2472	SISO A	-4.64	-4.64	-1.40	0.34
				SISO B	-4.57	-4.57	-1.33	0.35

Mode	Rate	CH	Freq [MHz]	Antenna	Measured average conducted power [dBm]	Maximum** (average) conducted output power [dBm]	EIRP [dBm]	Average Output Power [mW]
802.11n20	HT8	1	2412	MIMO A	15.50	15.69	18.93	37.04
				MIMO B	14.98	15.17	18.41	32.86
				Combined A+B	18.26	18.44	21.68	69.89
		7	2442	MIMO A	18.35	18.54	21.78	71.39
				MIMO B	17.07	17.26	20.50	53.16
				Combined A+B	20.77	20.95	24.19	124.55
		11	2462	MIMO A	15.00	15.19	18.43	33.01
				MIMO B	14.89	15.08	18.32	32.18
				Combined A+B	17.96	18.14	21.38	65.19
		12	2467	MIMO A	11.86	12.05	15.29	16.02
				MIMO B	11.99	12.18	15.42	16.51
				Combined A+B	14.94	15.12	18.36	32.52
		13	2472	MIMO A	-8.07	-7.88	-4.64	0.16
				MIMO B	-8.12	-7.93	-4.69	0.16
				Combined A+B	-5.08	-4.90	-1.66	0.32

Mode	Rate	CH	Freq [MHz]	Antenna	Measured average conducted power [dBm]	Maximum** (average) conducted output power [dBm]	EIRP [dBm]	Average Output Power [mW]
802.11n40	HT0	3F	2422	SISO A	15.40	15.56	18.80	35.96
				SISO B	14.64	14.80	18.04	30.19
		7F	2442	SISO A	16.39	16.55	19.79	45.16
				SISO B	16.47	16.63	19.87	46.00
		9F	2452	SISO A	15.86	16.02	19.26	39.98
				SISO B	15.68	15.84	19.08	38.35
		10F	2457	SISO A	9.88	10.04	13.28	10.09
				SISO B	10.24	10.40	13.64	10.96
		11F	2462	SISO A	3.99	4.15	7.39	2.60
				SISO B	3.63	3.79	7.03	2.39
	HT8	3F	2422	MIMO A	14.09	14.43	17.67	27.72
				MIMO B	13.85	14.19	17.43	26.23
				Combined A+B	16.98	17.32	20.56	53.95
		7F	2442	MIMO A	14.96	15.30	18.54	33.87
				MIMO B	14.85	15.19	18.43	33.02
				Combined A+B	17.92	18.25	21.49	66.89
		9F	2452	MIMO A	14.90	15.24	18.48	33.41
				MIMO B	14.69	15.03	18.27	31.83
				Combined A+B	17.81	18.14	21.38	65.23
		10F	2457	MIMO A	9.58	9.92	13.16	9.81
				MIMO B	9.13	9.47	12.71	8.85
				Combined A+B	12.37	12.71	15.95	18.66
		11F	2462	MIMO A	1.88	2.22	5.46	1.67
				MIMO B	2.03	2.37	5.61	1.73
				Combined A+B	4.97	5.30	8.54	3.39

* Maximum (average) conducted output power are shown for indicative purpose only.

** Duty cycle compensated

B.2.3 Power Spectral Density

Test limits

FCC part	RSS part	Limits
15.247 (e)	RSS-247 Clause 5.2 (b)	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

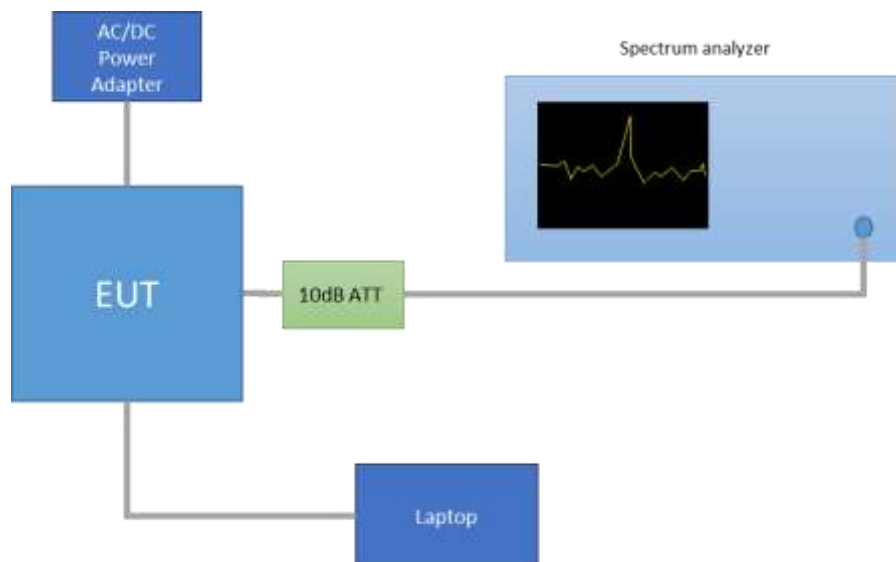
Test procedure

The peak power spectral density level in the fundamental emission was measured using the *Method PKPSD (peak PSD)* according to section 11.10.2 of ANSI C63.10-2013 – American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. This method was used for 802.11b, 802.11g, 802.11n20, 802.11n40 modes.

For MIMO mode, the *Measure and add $10 \log(N_{ANT})$ dB*, (where N_{ANT} is the number of outputs) technique was used according to the Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01.

With this technique, spectrum measurements are performed at each output of the device, and the quantity $10 \log(N_{ANT})$ dB is added to each spectrum value before comparing to the emission limit. Number of outputs = 2.

The setup below was used to measure the power spectral density. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



Results tables

Mode	Rate	Channel	Frequency [MHz]	Antenna	PSD Peak [dBm/3kHz]
802.11b	1Mbps	1	2412	SISO A	-2.61
				SISO B	-3.26
		7	2442	SISO A	-2.05
				SISO B	-1.99
		11	2462	SISO A	-3.00
				SISO B	-2.85
		12	2467	SISO A	-5.54
				SISO B	-5.12
		13	2472	SISO A	-7.58
				SISO B	-7.23
802.11g	6Mbps	1	2412	SISO A	-7.29
				SISO B	-7.46
		7	2442	SISO A	-5.25
				SISO B	-5.17
		11	2462	SISO A	-7.79
				SISO B	-7.75
		12	2467	SISO A	-10.49
				SISO B	-10.71
		13	2472	SISO A	-28.56
				SISO B	-28.69
802.11n20	HT0	1	2412	SISO A	-7.14
				SISO B	-7.44
		7	2442	SISO A	-5.11
				SISO B	-4.76
		11	2462	SISO A	-7.20
				SISO B	-7.57
		12	2467	SISO A	-9.93
				SISO B	-9.98
		13	2472	SISO A	-28.32
				SISO B	-28.83
802.11n40	HT0	3F	2422	SISO A	-12.06
				SISO B	-11.85
		7F	2442	SISO A	-10.58
				SISO B	-11.01
		9F	2452	SISO A	-11.74
				SISO B	-11.90
		10F	2457	SISO A	-17.88
				SISO B	-16.97
		11F	2462	SISO A	-23.44
				SISO B	-23.94

Max Value

MIMO modes					PSD Peak [dBm/3kHz]	
Mode	Rate	CH	Freq. [MHz]	Antenna	Measured Conducted	MIMO Combined +10·log(N _{ant})
802.11n20	HT8	1	2412	CHAIN A	-9.30	-6.29
				CHAIN B	-9.40	-6.39
		7	2442	CHAIN A	-6.43	-3.42
				CHAIN B	-7.28	-4.27
		11	2462	CHAIN A	-9.66	-6.65
				CHAIN B	-9.52	-6.51
		12	2467	CHAIN A	-13.04	-10.03
				CHAIN B	-11.86	-8.85
		13	2472	CHAIN A	-32.50	-29.49
				CHAIN B	-32.24	-29.23
802.11n40	HT8	3F	2422	CHAIN A	-13.41	-10.40
				CHAIN B	-13.40	-10.39
		7F	2442	CHAIN A	-12.64	-9.63
				CHAIN B	-12.07	-9.06
		9F	2452	CHAIN A	-12.84	-9.83
				CHAIN B	-12.92	-9.91
		10F	2457	CHAIN A	-17.79	-14.78
				CHAIN B	-17.79	-14.78
		11F	2462	CHAIN A	-25.82	-22.81
				CHAIN B	-24.79	-21.78

Max Value

See Section B.3.4 for the screenshot results

B.2.4 Out-of-band emission (conducted)

Test Limits

FCC part	RSS part	Limits																				
15.247 (d)	RSS-247 Clause 5.5	In any 100 kHz 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 20 dB below that in the 100 kHz 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.																				
15.209	RSS-Gen Clause 8.9	<p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table><tr><th>Freq Range (MHz)</th><th>Field Strength (μV/m)</th><th>Field Strength (dBμV/m)</th><th>Meas. Distance (m)</th></tr><tr><td>30-88</td><td>100</td><td>40</td><td>3</td></tr><tr><td>88-216</td><td>150</td><td>43.5</td><td>3</td></tr><tr><td>216-960</td><td>200</td><td>46</td><td>3</td></tr><tr><td>Above 960</td><td>500</td><td>54</td><td>3</td></tr></table> <p>The emission limits shown in the above table are based on measurements employing 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.</p> <p>For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p>	Freq Range (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Meas. Distance (m)	30-88	100	40	3	88-216	150	43.5	3	216-960	200	46	3	Above 960	500	54	3
Freq Range (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Meas. Distance (m)																			
30-88	100	40	3																			
88-216	150	43.5	3																			
216-960	200	46	3																			
Above 960	500	54	3																			

Test procedure

The setup below was used to measure the out-of-band emissions. The antenna terminal of the EUT is connected to the spectrum analyzer through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

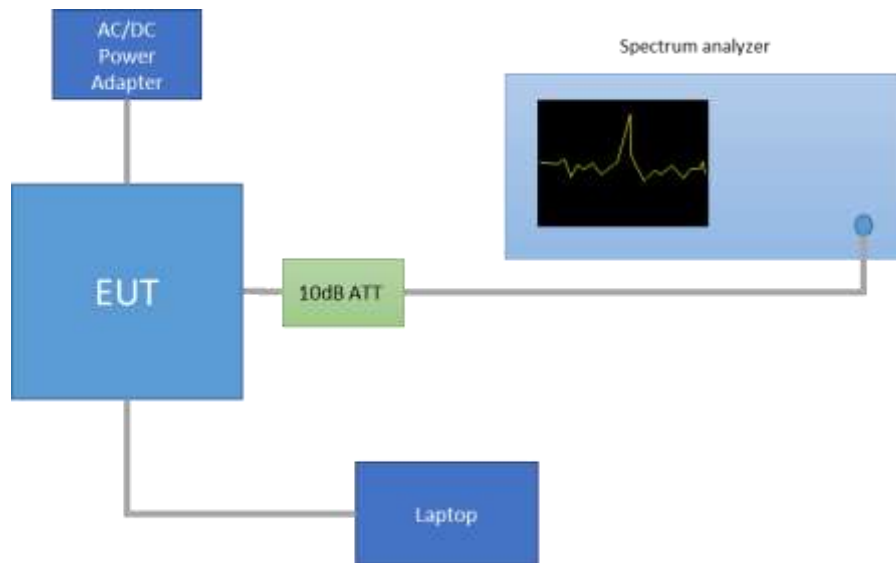
The Band Edge High, was measured using the method according to section 8.7.3 (Integration Method) of KDB 558074 D01 DTS Meas Guidance.

In case of Band Edge measurements falling in restricted bands, the declared Antenna Gain is also compensated in the graph. The declared maximum antenna gain is 3.24dBi.

For Band Edge measurements falling in restricted bands, the following limits in dBm were applied for the average detector after the conversion from the limits detailed above in dBμV/m, according to FCC 47 CFR part 15 - Subpart C – §15.209(a). The limits in dBm for peak detector are 20dB above the indicated values in the table.

§15.209(a)			Converted values	
Freq Range (MHz)	Distance (m)	Field strength (microvolts/meter)	Field strength (dB microvolts/meter)	Power (dBm)
Above 960	3	500	54.0	-41.2

The setup below was used to measure the out-of-band emissions. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



Note: these PSD_{Peak} values are shown just as a reference for the compliance of the Out-of-band Measurements. Thus the RBW used for these measurements was 100kHz.

Mode	Rate	Measured Duty Cycle [%]	Channel	Frequency [MHz]	Antenna	PSD Peak [dBm/100kHz]
802.11b	1Mbps	99.26	1	2412	SISO A	10.77
					SISO B	10.14
			7	2437	SISO A	11.44
					SISO B	11.53
			11	2462	SISO A	10.59
					SISO B	10.56
			12	2467	SISO A	7.76
					SISO B	8.27
			13	2472	SISO A	5.81
					SISO B	6.16

Mode	Rate	Measured Duty Cycle [%]	Channel	Frequency [MHz]	Antenna	PSD Peak [dBm/100kHz]
802.11g	6Mbps	97.28	1	2412	SISO A	6.42
					SISO B	6.13
			7	2437	SISO A	8.65
					SISO B	8.87
			11	2462	SISO A	6.01
					SISO B	5.85
			12	2467	SISO A	3.21
					SISO B	3.47
			13	2472	SISO A	-14.64
					SISO B	-14.78
802.11n20	HT0	98.61	1	2412	SISO A	6.33
					SISO B	5.94
			7	2442	SISO A	8.71
					SISO B	8.99
			11	2462	SISO A	5.91
					SISO B	5.73
			12	2467	SISO A	3.12
					SISO B	3.16
			13	2472	SISO A	-14.88
					SISO B	-14.78
	HT8	98.46	1	2412	MIMO A	4.79
					MIMO B	6.95
			7	2442	MIMO A	7.92
					MIMO B	6.60
			11	2462	MIMO A	4.44
					MIMO B	4.51
			12	2467	MIMO A	1.62
					MIMO B	1.85
			13	2472	MIMO A	-18.24
					MIMO B	-18.13

Mode	Rate	Measured Duty Cycle [%]	Channel	Frequency [MHz]	Antenna	PSD Peak [dBm/100kHz]
802.11n40	HT0	98.60	3F	2422	SISO A	1.30
					SISO B	0.82
			7F	2442	SISO A	2.50
					SISO B	2.53
			9F	2452	SISO A	1.64
					SISO B	1.65
			10F	2457	SISO A	-4.48
					SISO B	-3.88
			11F	2462	SISO A	-10.19
					SISO B	-10.48
	HT8	98.61	3F	2422	MIMO A	0.08
					MIMO B	-0.15
			7F	2442	MIMO A	1.19
					MIMO B	1.01
			9F	2452	MIMO A	0.84
					MIMO B	0.72
			10F	2457	MIMO A	-4.40
					MIMO B	-4.84
			11F	2462	MIMO A	-12.01
					MIMO B	-11.81

See Section B.3.5, Section B.3.6 and Section B.3.7 for the screenshot results.

B.2.5 Radiated spurious emission

Standard references

FCC part	RSS part	Limits			
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen Clause 8.9	Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):			
		Freq Range (MHz)	Field Streghth (μV/m)	Field Streghth (dBμV/m)	Meas. Distance (m)
		30-88	100	40	3
		88-216	150	43.5	3
		216-960	200	46	3
		Above 960	500	54	3
		The emission limits shown in the above table are based on measurements employing 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. For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function corresponding to 20 dB above the indicated values in the table.			

Test procedure

The setups below were used to measure the radiated spurious emissions.

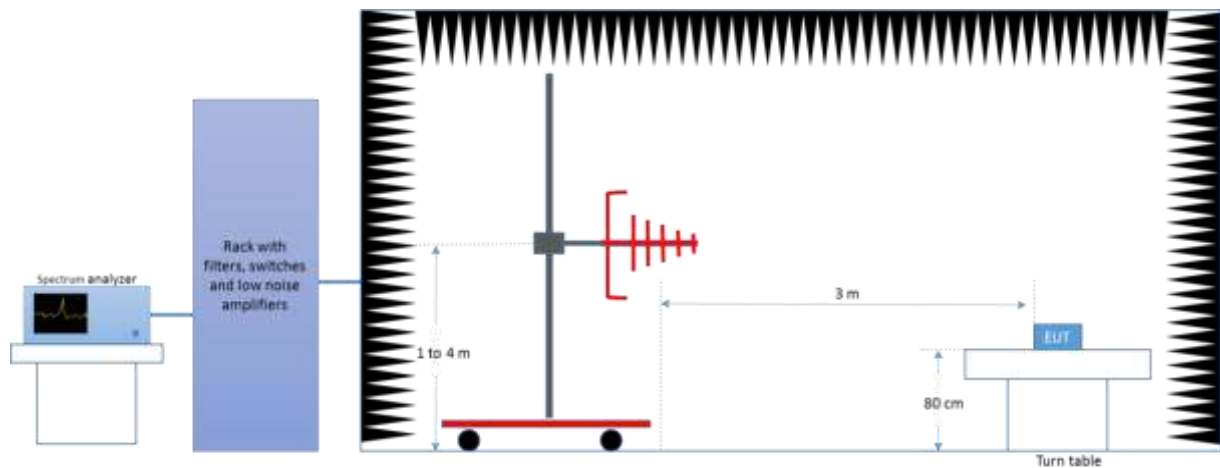
Depending of the frequency range and bands being tested, different antennas and filters were used.

The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

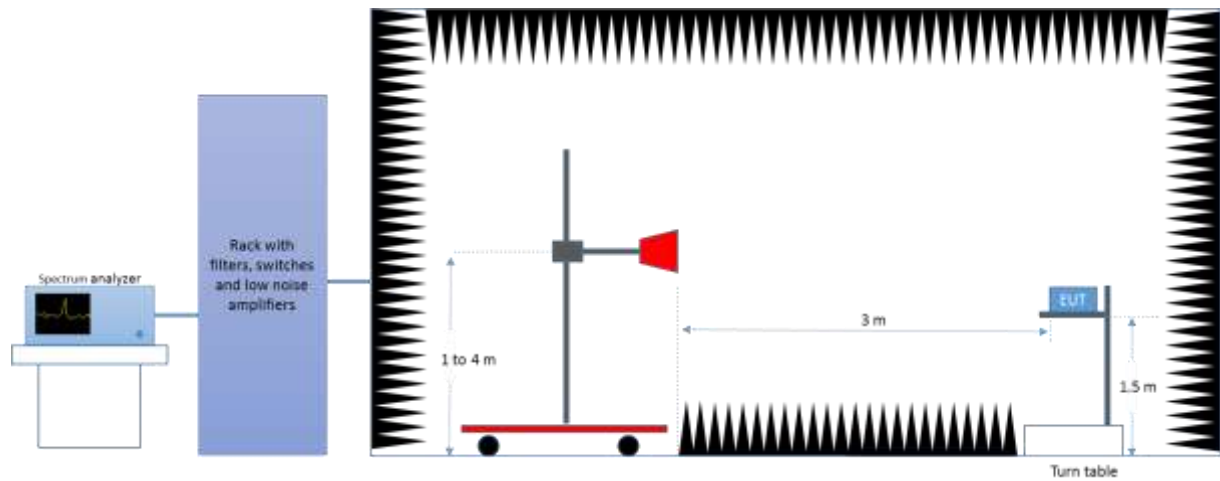
The radiated spurious emissions were measured on the worst case configuration selected from the chapter B.2.2 and using the lowest, middle and highest channels.

For technologies 802.11n20, 802.11n40 the worst case in terms of spurious emissions found among the low, mid and high channels were tested on chain A and B separately is used to perform the test in MIMO mode (Chain A+B).

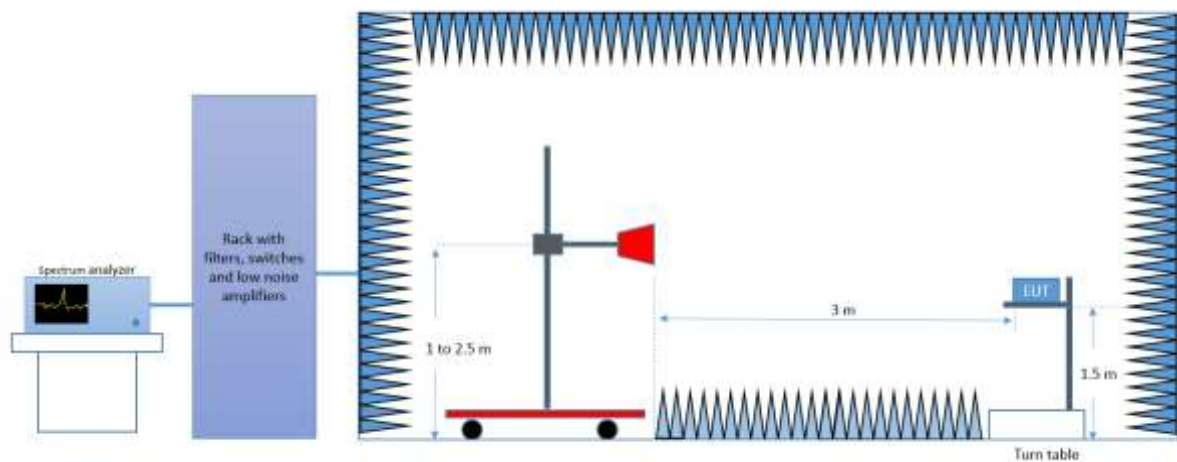
Radiated Setup 30 MHz - 1GHz



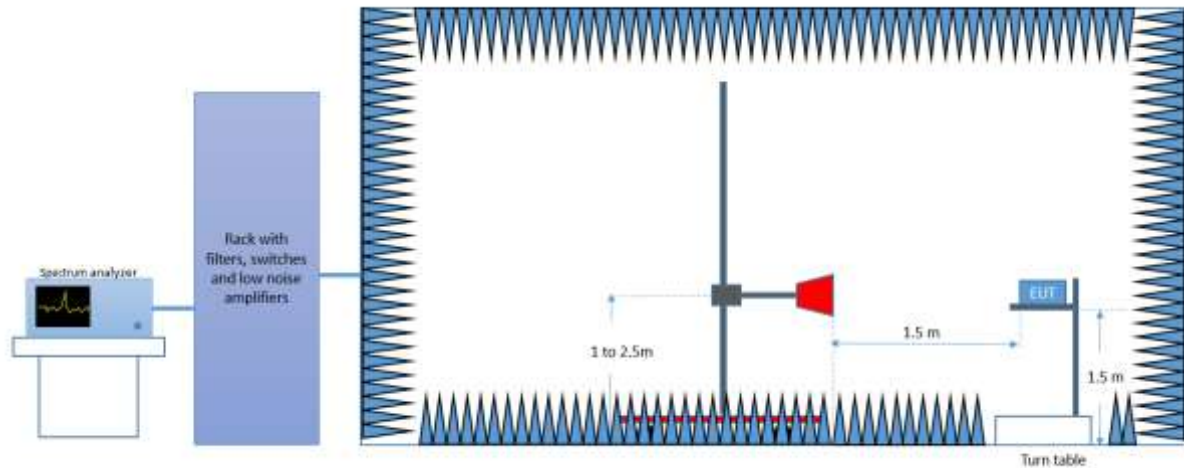
Radiated Setup 1 GHz – 6.4 GHz



Radiated Setup 6.4 GHz – 18 GHz



Radiated Setup 18 GHz – 26.5 GHz



Sample Calculation

The field strength is deduced from the radiated measurement using the following equation:

$$E = 126.8 - 20 \cdot \log(\lambda) + P - G$$

where

E is the field strength of the emission at the measurement distance, in dB μ V/m

P is the power measured at the output of the test antenna, in dBm

λ is the wavelength of the emission under investigation $[300/f_{MHz}]$, in m

G is the gain of the test antenna, in dBi

NOTE – The measured power P includes all applicable instrument correction factors up to the connection to the test

Antenna e.g. cable losses, amplifier gains.

For field strength measurements made at other than the distance at which the applicable limit is specified, the field strength of the emission at the distance specified by the limit is deduced as follows:

$$E_{SpecLimit} = E_{Meas} + 20 \cdot \log(D_{Meas}/D_{SpecLimit})$$

where

$E_{SpecLimit}$ is the field strength of the emission at the distance specified by the limit, in dB μ V/m

E_{Meas} is the field strength of the emission at the measurement distance, in dB μ V/m

D_{Meas} is the measurement distance, in m

$D_{SpecLimit}$ is the distance specified by the limit, in m

Test Results

30 MHz – 26.5 GHz, 802.11b, 1Mbps, Chain A

Radiated Spurious – CH1

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBμV/m	dBμV/m	dBμV/m	dB
127.5	34.1	---	43.6	9.4
6315.8	55.5	---	74.0	18.5
6316.9	---	45.0	54.0	9.0
7237.6	---	46.5	54.0	7.5
7237.6	53.7	---	74.0	20.3
25939.8	---	38.3	54.0	15.7
25943.3	49.0	---	74.0	25.0

Radiated Spurious – CH7

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBμV/m	dBμV/m	dBμV/m	dB
126.9	35.0	---	43.6	8.5
6328.2	---	44.9	54.0	9.1
6328.2	56.6	---	74.0	17.5
7326.1	---	40.0	54.0	14.0
7342.0	50.4	---	74.0	23.6
25936.3	---	38.7	54.0	15.3
25951.5	49.4	---	74.0	24.6

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
375.1	36.7	---	46.0	9.3
1195.0	---	32.6	54.0	21.4
1196.5	44.1	---	74.0	30.0
7382.6	---	38.2	54.0	15.8
7385.5	50.0	---	74.0	24.0
25909.8	---	38.4	54.0	15.6
25919.6	49.6	---	74.0	24.4

30 MHz – 26.5 GHz, 802.11b, 1Mbps, Chain B

Radiated Spurious – CH1

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
127.6	34.1	---	43.6	9.5
6318.4	---	44.4	54.0	9.6
6318.4	56.3	---	74.0	17.7
7234.2	---	39.4	54.0	14.6
7243.4	49.7	---	74.0	24.3
25932.9	---	38.2	54.0	15.8
25936.3	48.2	---	74.0	25.8

Radiated Spurious – CH7

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
126.9	33.4	---	43.6	10.2
6326.0	56.3	---	74.0	17.7
6326.7	---	44.8	54.0	9.2
7319.8	49.2	---	74.0	24.8
7328.5	---	38.9	54.0	15.1
19535.8	---	41.0	54.0	13.0
19536.1	46.8	---	74.0	27.2

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.6	---	46.0	10.4
1195.0	---	32.7	54.0	21.3
1199.5	44.6	---	74.0	29.4
7383.6	---	37.8	54.0	16.2
7388.9	49.1	---	74.0	24.9
25939.0	---	38.4	54.0	15.6
25947.2	49.1	---	74.0	24.9

30 MHz – 26.5 GHz, 802.11g, 6Mbps, Chain A

Radiated Spurious – CH1

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBμV/m	dBμV/m	dBμV/m	dB
624.0	36.0	---	46.0	10.0
1195.5	---	32.9	54.0	21.1
1199.0	43.7	---	74.0	30.3
7234.7	---	42.0	54.0	12.0
7234.7	53.0	---	74.0	21.0
25918.8	48.7	---	74.0	25.3
25940.3	---	38.2	54.0	15.8

Radiated Spurious – CH7

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBμV/m	dBμV/m	dBμV/m	dB
624.0	36.2	---	46.0	9.8
5810.3	55.1	---	74.0	18.9
5829.6	---	43.4	54.0	10.6
7325.1	---	40.0	54.0	14.0
7328.5	50.9	---	74.0	23.1
25936.1	48.8	---	74.0	25.2
25953.6	---	38.3	54.0	15.7

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.6	---	46.0	10.4
6302.2	56.6	---	74.0	17.4
6326.7	---	44.9	54.0	9.1
7381.7	50.4	---	74.0	23.6
7388.4	---	38.8	54.0	15.2
25936.3	49.0	---	74.0	25.0
25944.0	---	38.4	54.0	15.6

30 MHz – 26.5 GHz, 802.11g, 6Mbps, Chain B

Radiated Spurious – CH1

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.1	---	46.0	10.9
5962.2	55.7	---	74.0	18.3
6016.6	---	43.5	54.0	10.5
7234.2	49.8	---	74.0	24.2
7236.2	---	39.7	54.0	14.3
25953.9	49.4	---	74.0	24.6
25956.5	---	38.3	54.0	15.7

Radiated Spurious – CH7

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBμV/m	dBμV/m	dBμV/m	dB
624.0	36.0	---	46.0	10.0
1196.5	---	32.9	54.0	21.1
1198.5	45.7	---	74.0	28.3
7325.6	---	39.9	54.0	14.1
7339.6	50.5	---	74.0	23.5
25951.8	---	38.3	54.0	15.7
25958.4	48.4	---	74.0	25.6

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBμV/m	dBμV/m	dBμV/m	dB
624.0	34.3	---	46.0	11.7
5840.1	55.1	---	74.0	18.9
5841.6	---	43.7	54.0	10.3
7382.1	48.3	---	74.0	25.7
7384.6	---	37.5	54.0	16.5
25945.1	---	38.2	54.0	15.8
25970.6	49.2	---	74.0	24.8

30 MHz – 26.5 GHz, 802.11n20, HT0, Chain A

Radiated Spurious – CH1

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	46.0	10.2
6166.9	---	44.1	54.0	9.9
6188.1	56.1	---	74.0	17.9
7229.9	51.8	---	74.0	22.2
7236.7	---	41.0	54.0	13.0
25894.1	48.9	---	74.0	25.1
25918.5	---	38.3	54.0	15.7

Radiated Spurious – CH7

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.3	---	46.0	10.7
6306.3	55.8	---	74.0	18.2
6317.3	---	44.8	54.0	9.2
7322.2	---	39.2	54.0	14.8
7326.6	49.5	---	74.0	24.5
25917.2	49.4	---	74.0	24.6
25943.8	---	38.5	54.0	15.5

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	46.0	10.2
6304.4	---	44.5	54.0	9.5
6331.6	57.8	---	74.0	16.2
7384.1	49.0	---	74.0	25.0
7388.9	---	38.7	54.0	15.3
25909.8	---	38.4	54.0	15.6
25917.5	48.9	---	74.0	25.1

30 MHz – 26.5 GHz, 802.11n20, HT0, Chain B

Radiated Spurious – CH1

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.0	---	46.0	10.0
5830.3	55.0	---	74.0	19.0
5838.2	---	43.5	54.0	10.5
7235.2	---	39.1	54.0	14.9
7236.7	49.7	---	74.0	24.3
25907.9	---	38.5	54.0	15.5
25941.9	48.9	---	74.0	25.1

Radiated Spurious – CH7

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
727.1	35.4	---	46.0	10.6
5816.3	54.7	---	74.0	19.3
5829.6	---	43.4	54.0	10.6
7324.6	50.3	---	74.0	23.7
7330.9	---	39.6	54.0	14.4
19535.8	---	37.8	54.0	16.2
19536.9	45.6	---	74.0	28.4
25944.0	---	38.3	54.0	15.7
25961.6	48.6	---	74.0	25.4

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.5	---	46.0	10.5
6298.4	56.5	---	74.0	17.5
6317.3	---	44.9	54.0	9.2
7387.0	---	37.8	54.0	16.2
7392.8	48.9	---	74.0	25.1
19695.8	46.4	---	74.0	27.6
19695.8	---	37.6	54.0	16.4
25947.8	48.5	---	74.0	25.5
25958.9	---	38.5	54.0	15.5

30 MHz – 26.5 GHz, 802.11n20, HT0, Chain A+B

Radiated Spurious – CH11

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.9	35.1	---	43.6	8.5
624.0	35.7	---	46.0	10.3
1196.5	---	33.8	54.0	20.2
1198.5	45.6	---	74.0	28.5
7375.4	48.9	---	74.0	25.1
7385.0	---	39.2	54.0	14.8
25949.9	---	38.4	54.0	15.6
25958.4	49.6	---	74.0	24.4

30 MHz – 26.5 GHz, 802.11n40, HT0, Chain A

Radiated Spurious – CH3F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
623.9	34.9	---	46.0	11.1
6310.8	---	45.2	54.0	8.8
6325.2	57.3	---	74.0	16.7
7260.3	---	38.6	54.0	15.4
7262.8	49.5	---	74.0	24.5
25916.7	49.4	---	74.0	24.6
25940.6	---	38.6	54.0	15.4

Radiated Spurious – CH6F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.7	---	46.0	9.3
1196.5	---	33.7	54.0	20.3
1198.0	45.0	---	74.0	29.0
7329.5	48.0	---	74.0	26.0
7331.9	---	37.1	54.0	16.9
25943.8	48.7	---	74.0	25.3
25953.1	---	38.3	54.0	15.7

Radiated Spurious – CH9F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	37.3	---	46.0	8.8
1197.0	---	33.0	54.0	21.0
1198.0	44.8	---	74.0	29.2
7358.5	48.4	---	74.0	25.6
7359.4	---	37.5	54.0	16.5
25937.4	49.4	---	74.0	24.6
25951.8	---	38.4	54.0	15.6

30 MHz – 26.5 GHz, 802.11n40, HT0, Chain B

Radiated Spurious – CH3F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.7	---	46.0	10.3
6260.6	---	44.2	54.0	9.8
6322.6	57.4	---	74.0	16.6
7265.2	48.9	---	74.0	25.1
7273.9	---	37.7	54.0	16.3
25918.5	48.5	---	74.0	25.5
25952.0	---	38.4	54.0	15.6

Radiated Spurious – CH6F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	37.0	---	46.0	9.0
1195.5	45.3	---	74.0	28.7
1197.0	---	33.8	54.0	20.2
7310.6	---	37.1	54.0	16.9
7326.1	49.0	---	74.0	25.0
19496.0	46.8	---	74.0	27.2
19496.0	---	39.3	54.0	14.7
25682.1	---	38.0	54.0	16.0
25693.0	49.7	---	74.0	24.3

Radiated Spurious – CH9F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	37.3	---	46.0	8.7
1197.0	---	33.8	54.0	20.2
1198.0	45.8	---	74.0	28.2
7354.6	---	37.1	54.0	16.9
7357.0	47.8	---	74.0	26.2
19615.5	46.5	---	74.0	27.5
19616.1	---	37.7	54.0	16.3
25913.5	48.5	---	74.0	25.5
25940.9	---	38.6	54.0	15.4

30 MHz – 26.5 GHz, 802.11n40, HT0, Chain A+B

Radiated Spurious – CH9F

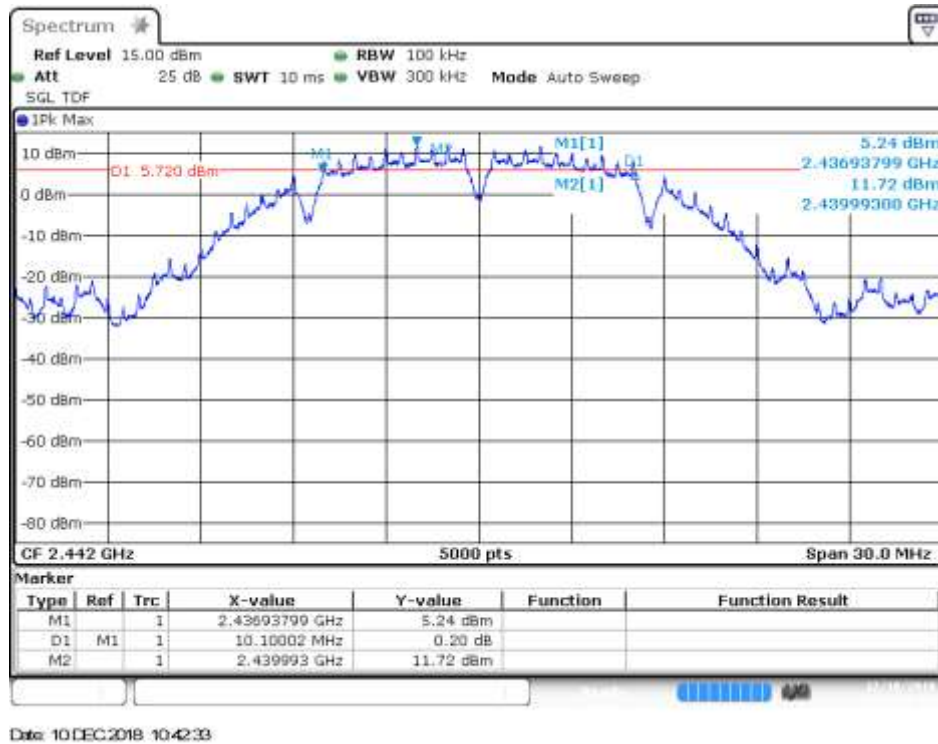
Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.9	36.1	---	43.6	7.5
624.0	37.1	---	46.0	8.9
1195.5	---	33.4	54.0	20.6
1199.0	44.8	---	74.0	29.2
7352.7	---	38.1	54.0	15.9
7365.2	49.3	---	74.0	24.7
25934.0	48.0	---	74.0	26.0
25950.2	---	38.1	54.0	15.9

B.3 Test Results Screenshot

B.3.1 6dB Bandwidth

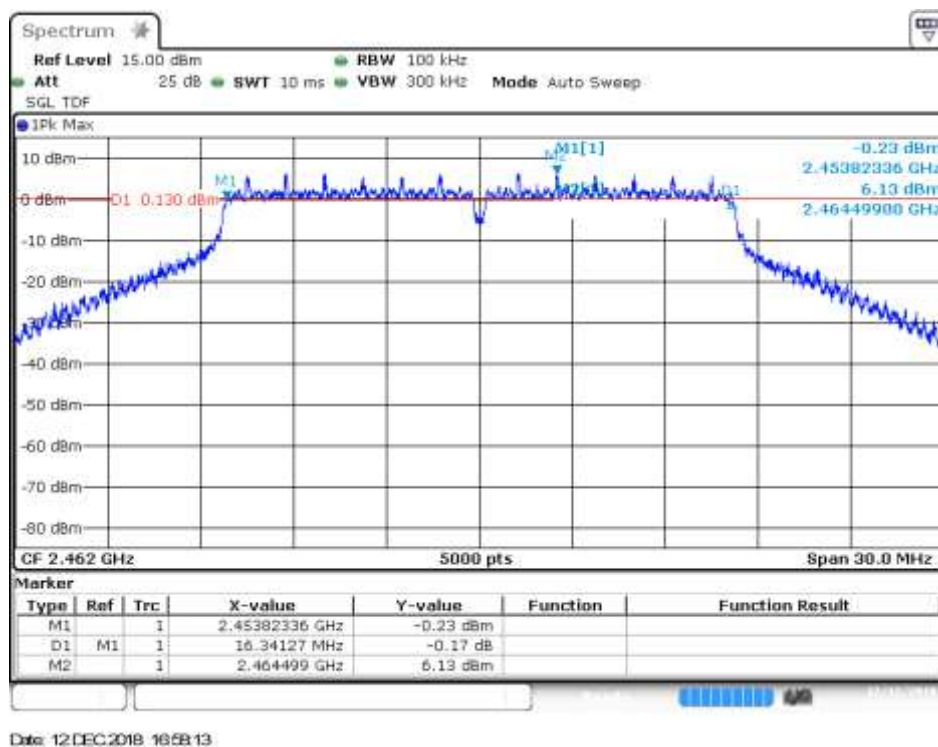
SISO-A, 802.11b, 1Mbps

Channel 7



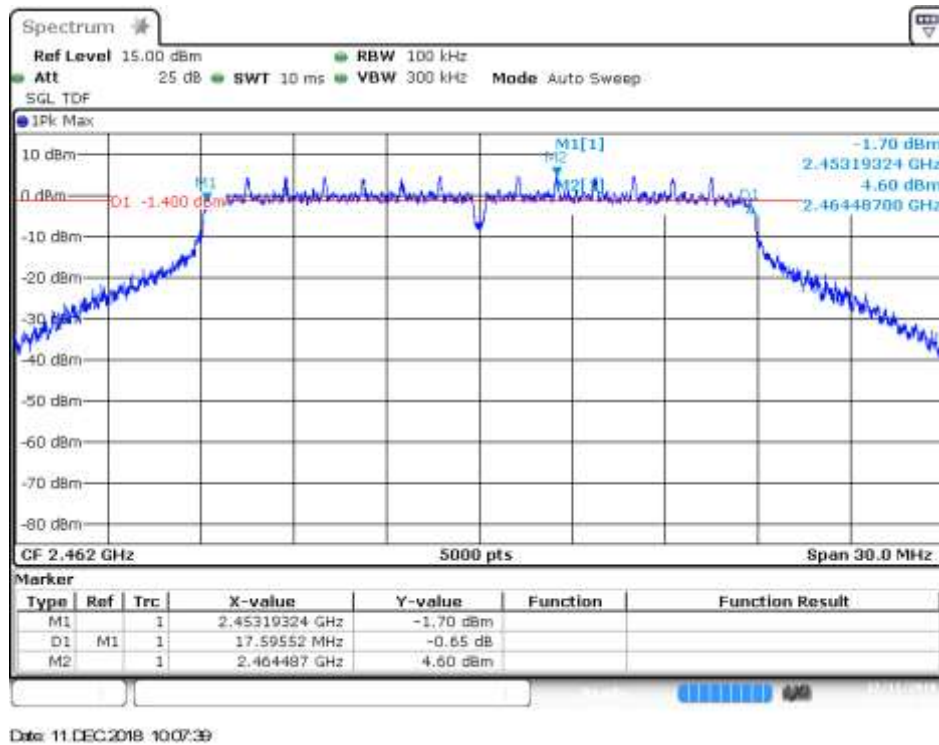
SISO-A, 802.11g, 6Mbps

Channel 11



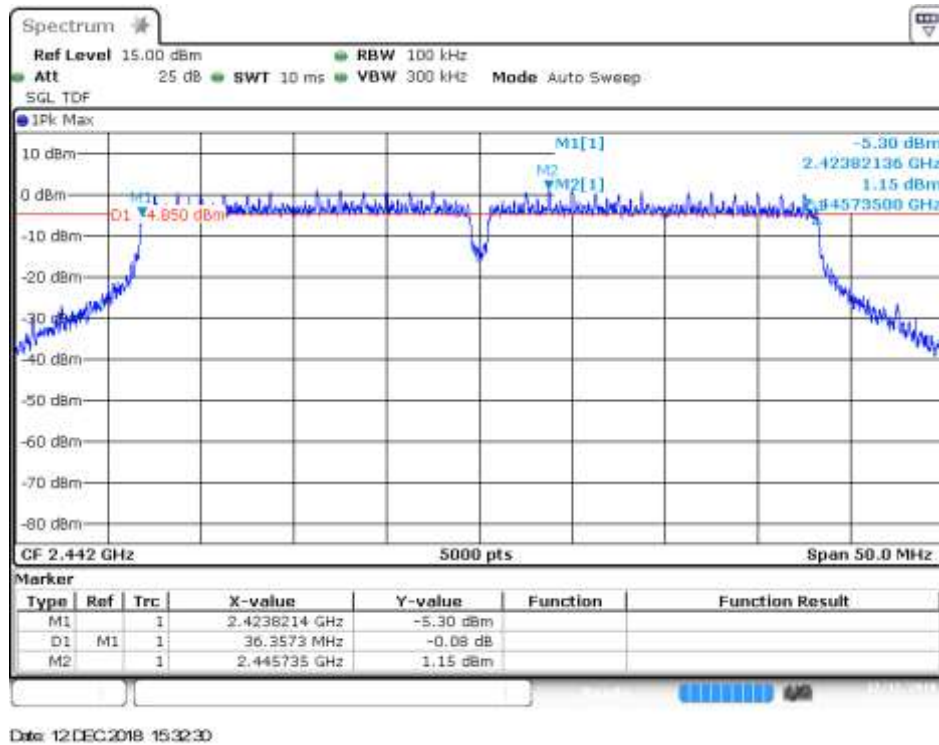
MIMO-A, 802.11n20, HT8

Channel 11



MIMO-B, 802.11n40, HT8

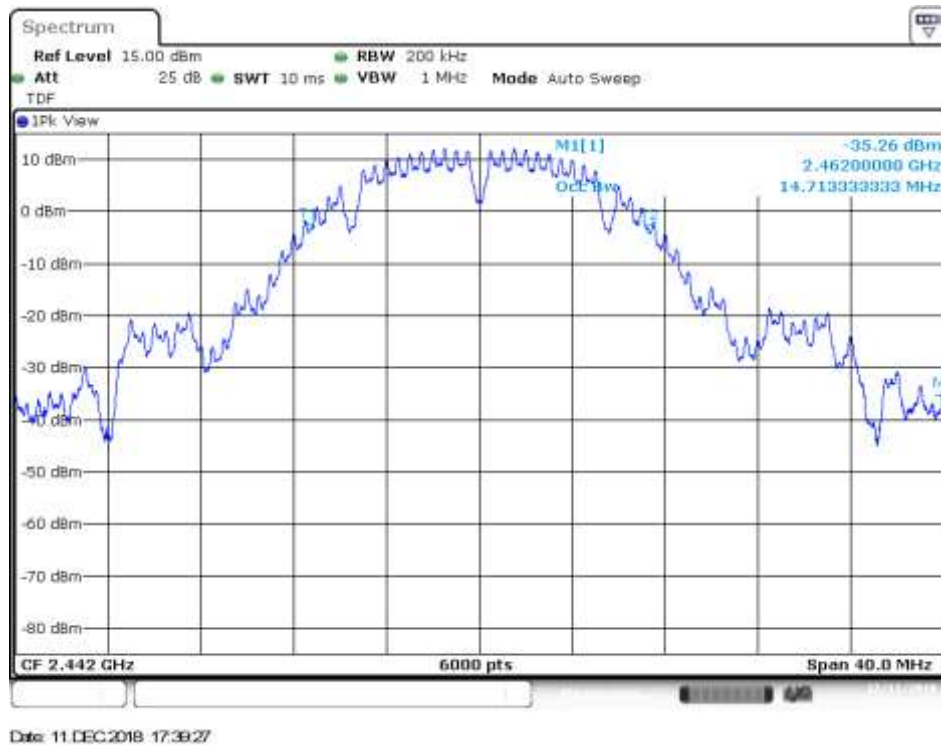
Channel 7F



B.3.2 99% Bandwidth

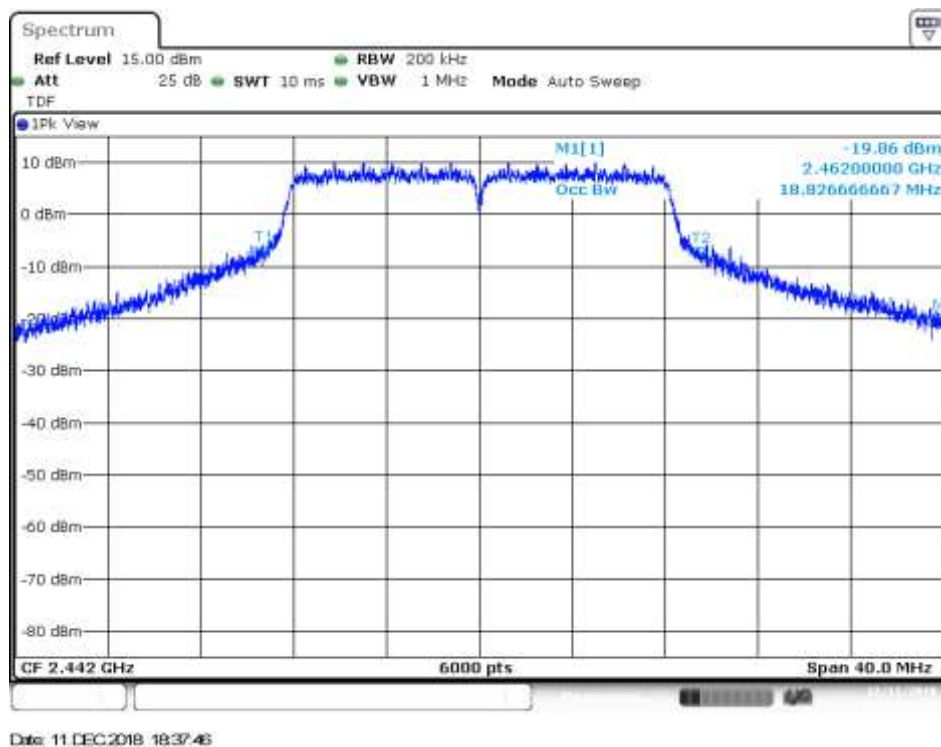
SISO-B, 802.11b, 1Mbps

Channel 7



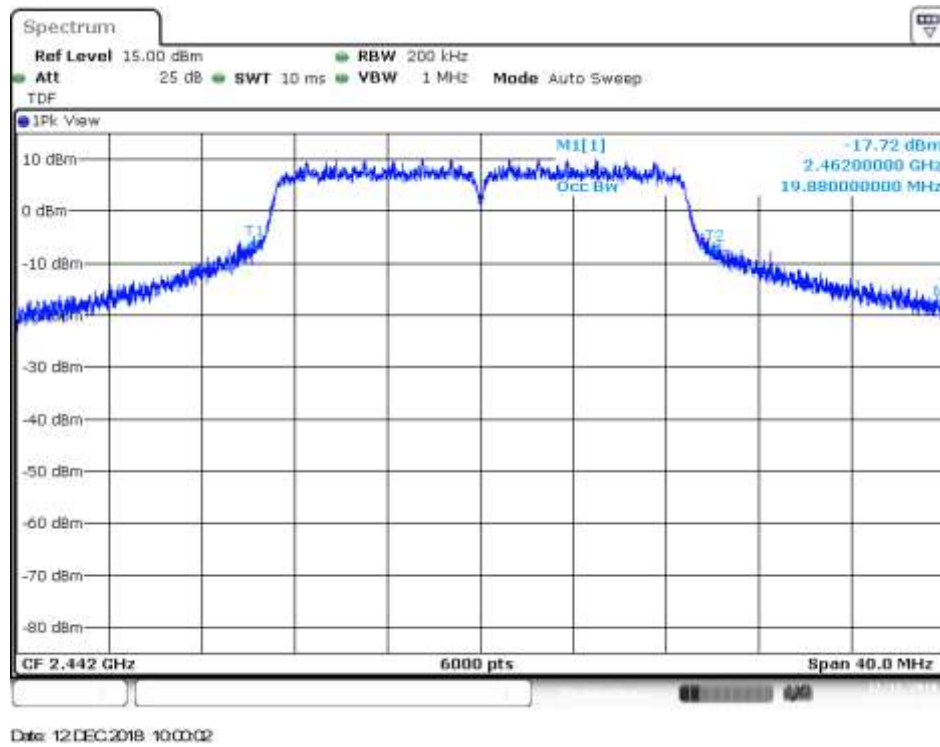
SISO-B, 802.11g, 6Mbps

Channel 7



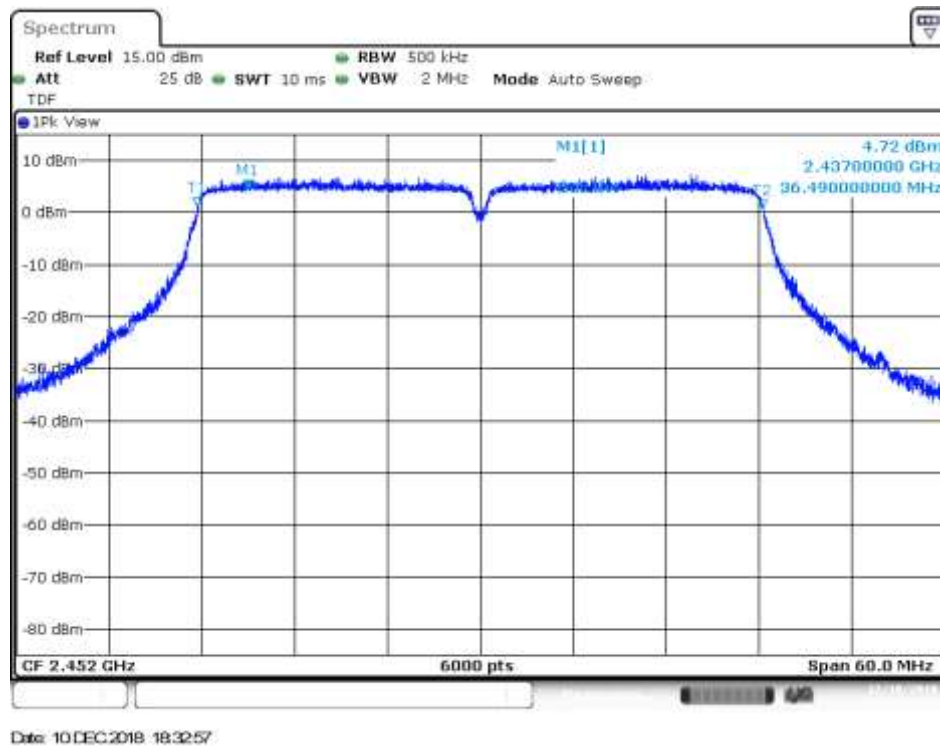
SISO-B, 802.11n20, HT0

Channel 7



SISO-A, 802.11n40, HT0

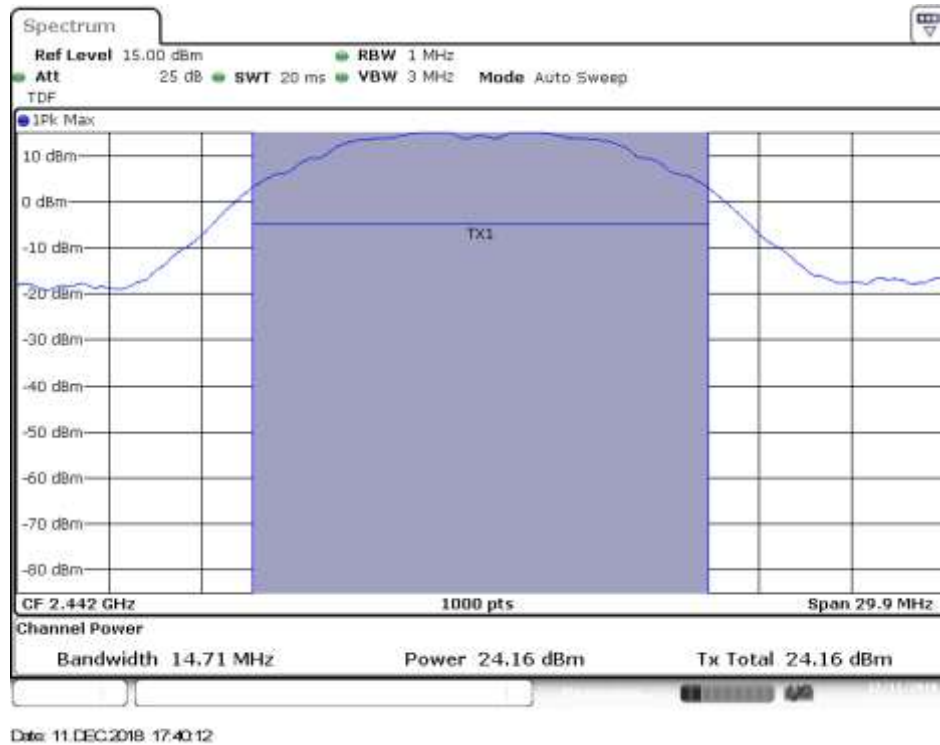
Channel 9F



B.3.3 Maximum output power and antenna gain

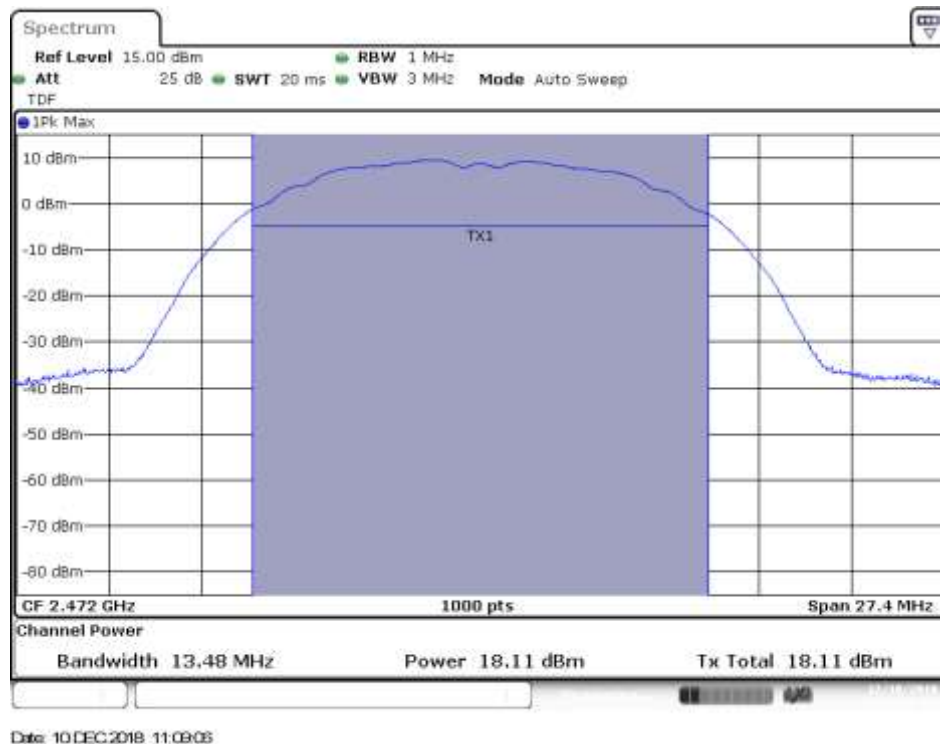
SISO-B, 802.11b, 1Mbps

Channel 7



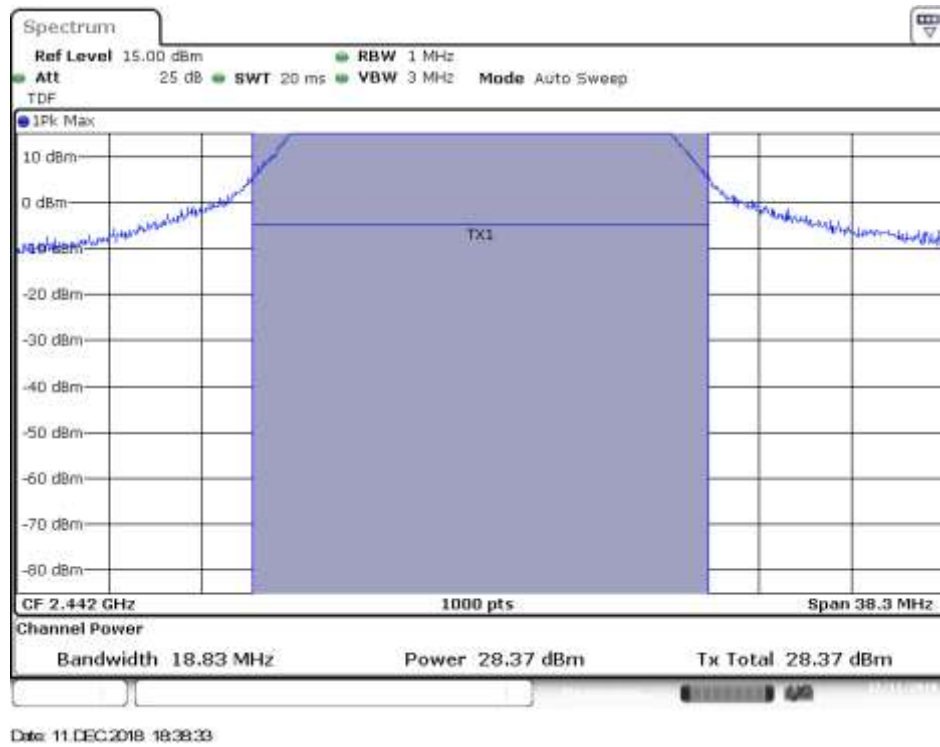
SISO-A, 802.11b, 1Mbps

Channel 13



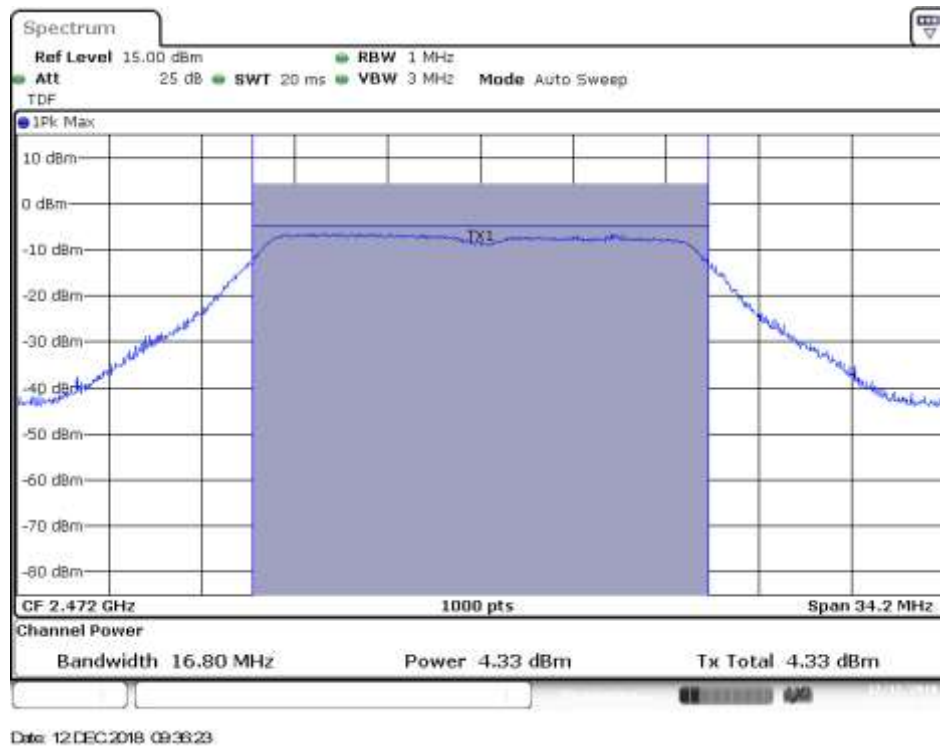
SISO-B, 802.11g, 6Mbps

Channel 7



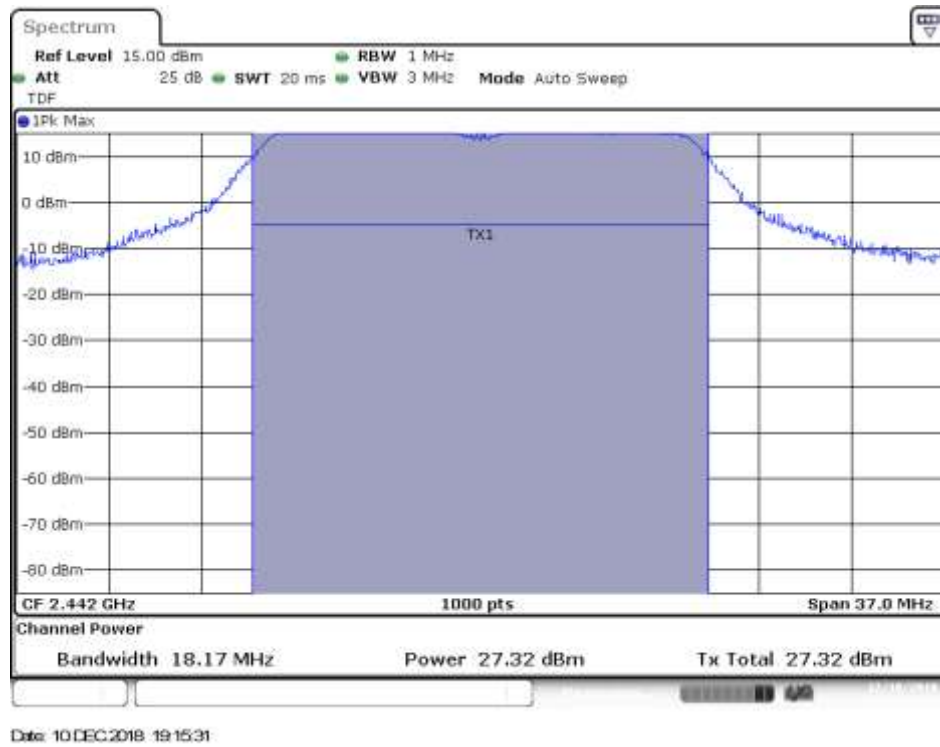
SISO-B, 802.11g, 6Mbps

Channel 13



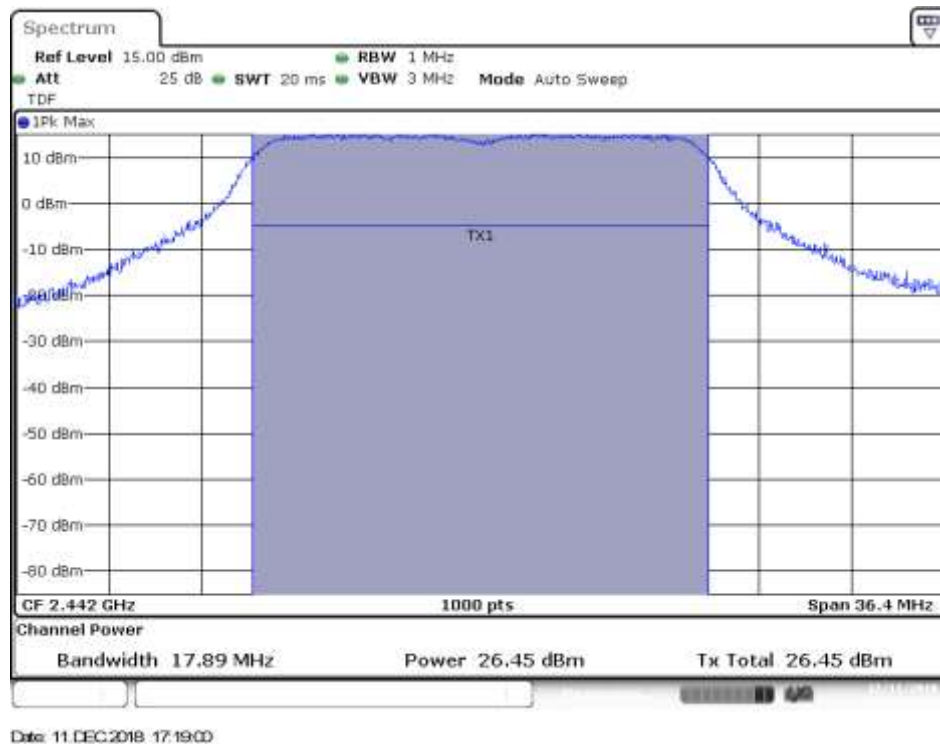
MIMO-A, 802.11n20, HT8

Channel 7



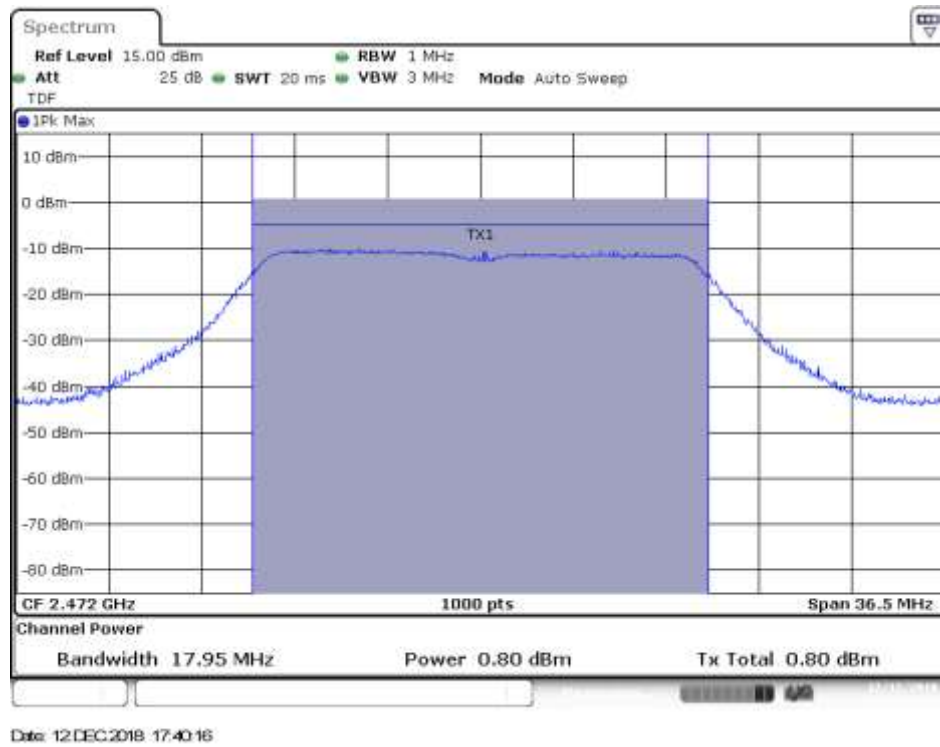
MIMO-B, 802.11n20, HT8

Channel 7



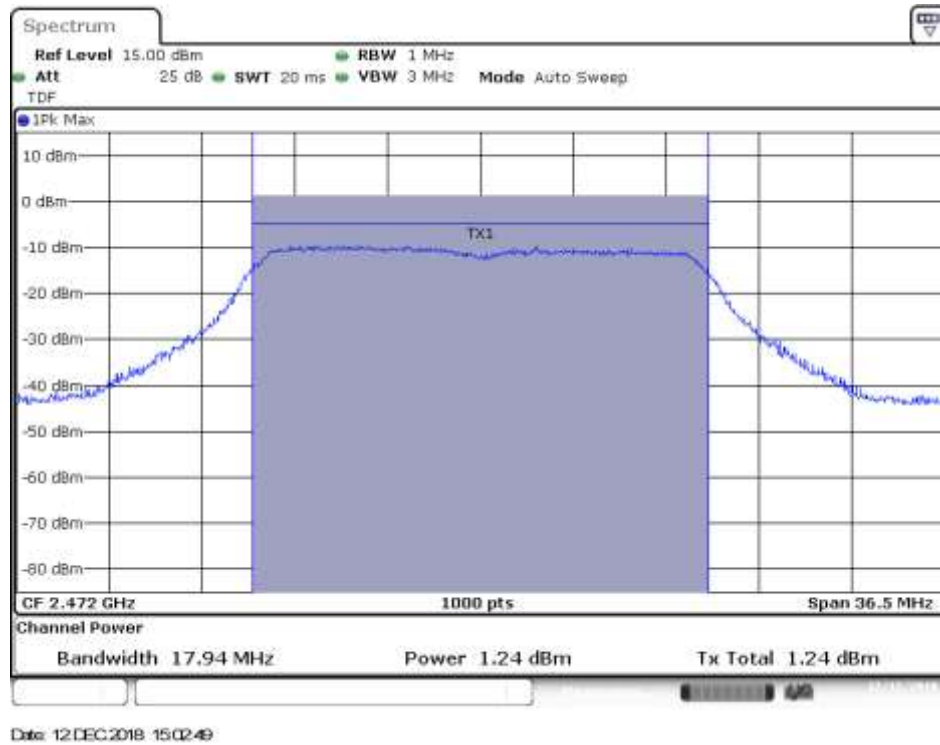
MIMO-A, 802.11n20, HT8

Channel 13



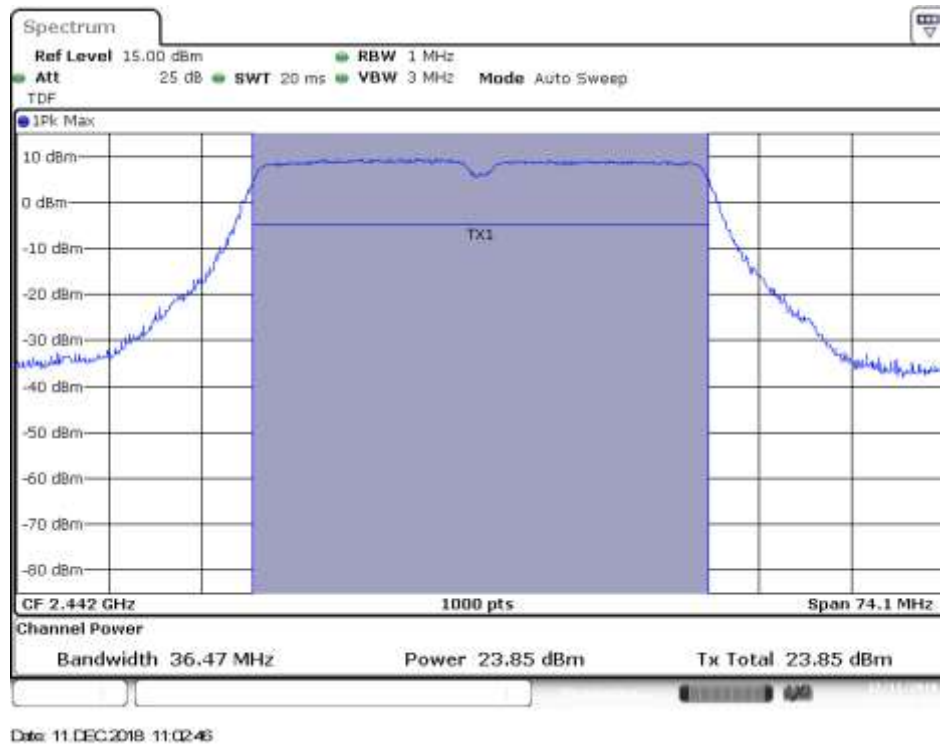
MIMO-B, 802.11n20, HT8

Channel 13



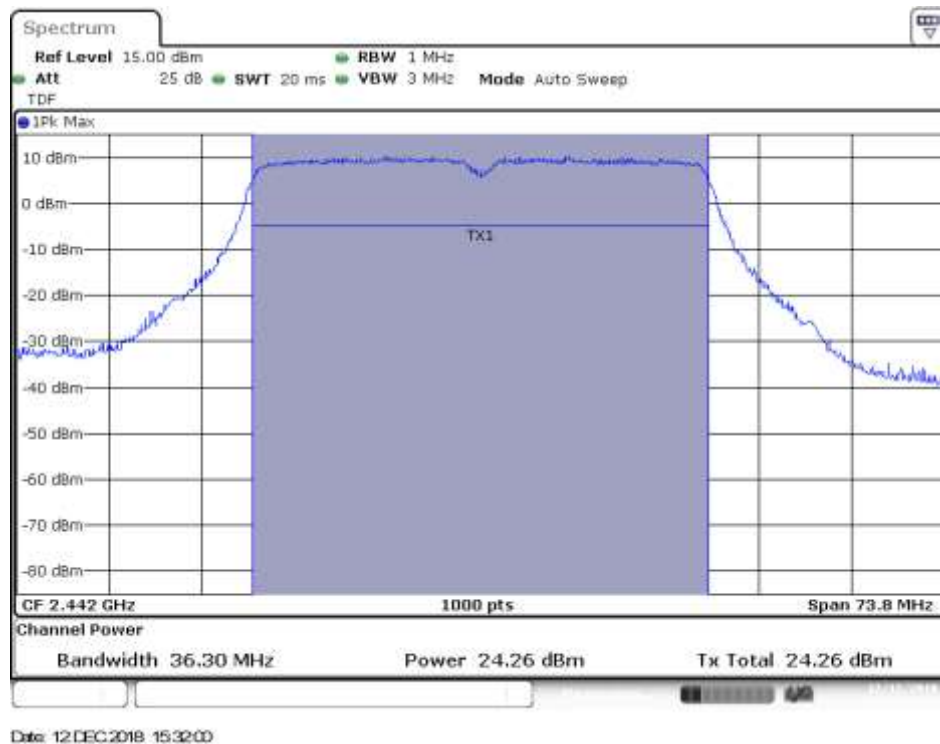
MIMO-A, 802.11n40, HT8

Channel 7F



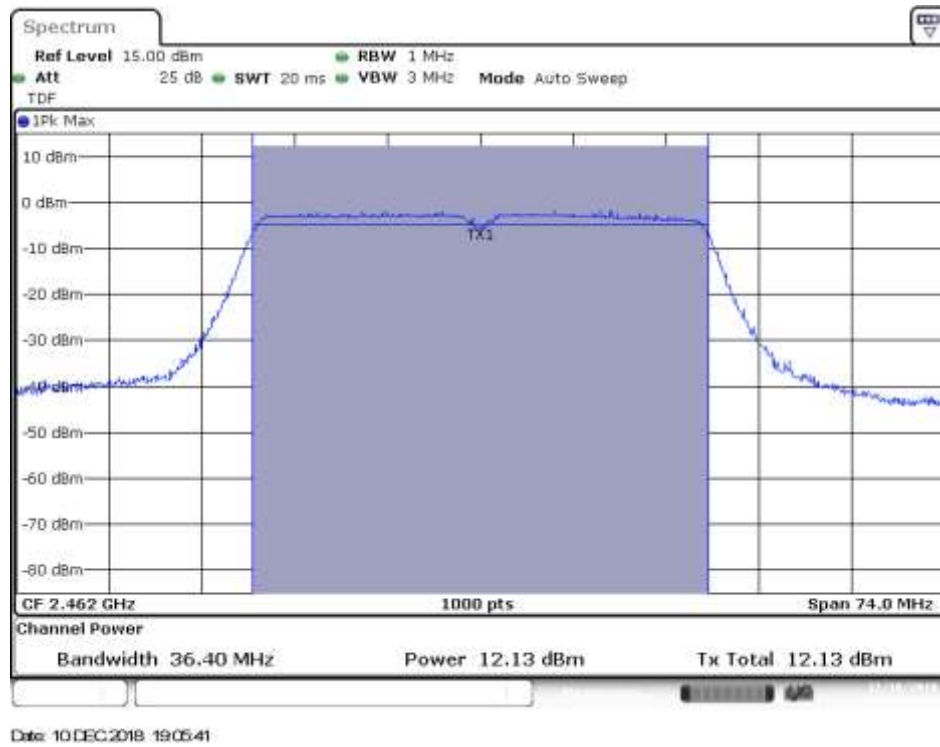
MIMO-B, 802.11n40, HT8

Channel 7F



SISO-A, 802.11n40, HT0

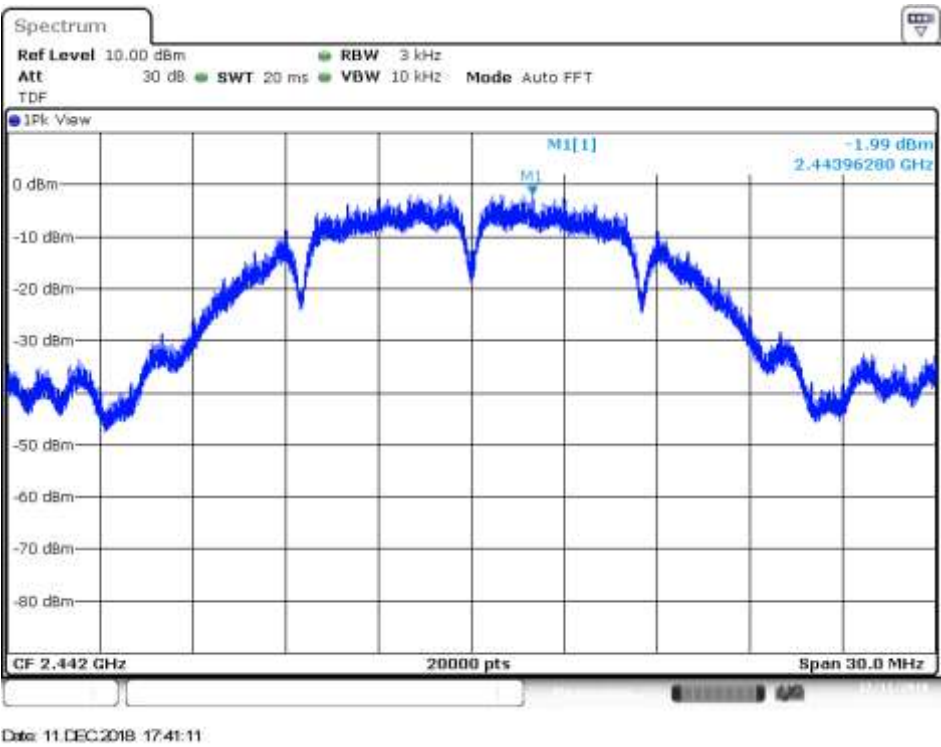
Channel 11F



B.3.4 Power spectral density

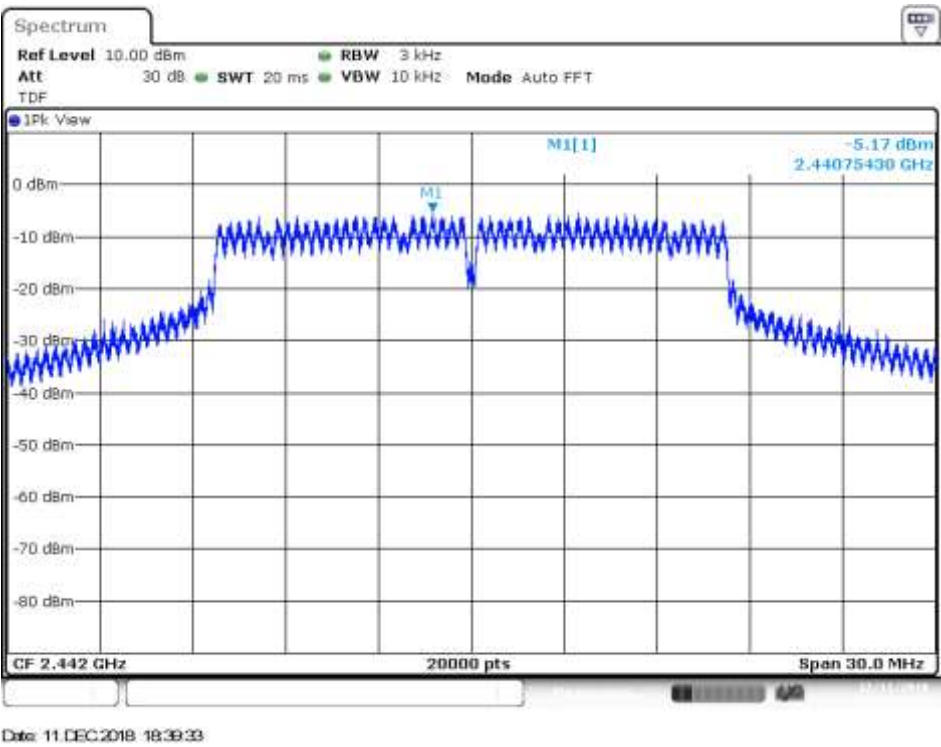
SISO-B, 802.11b, 1Mbps

Channel 7



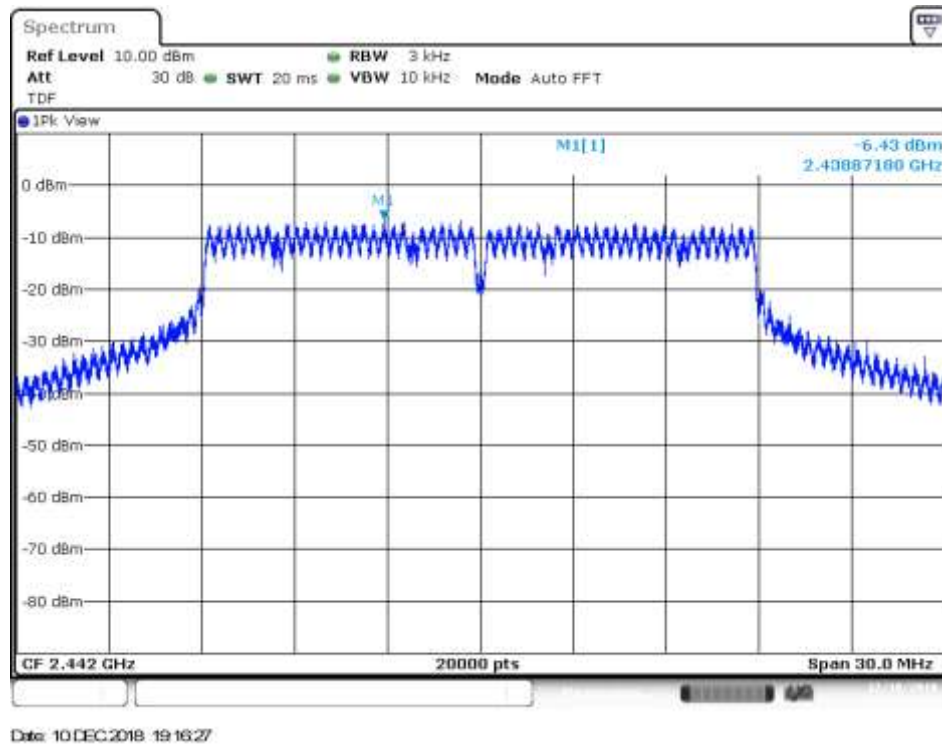
SISO-B, 802.11g, 6Mbps

Channel 7



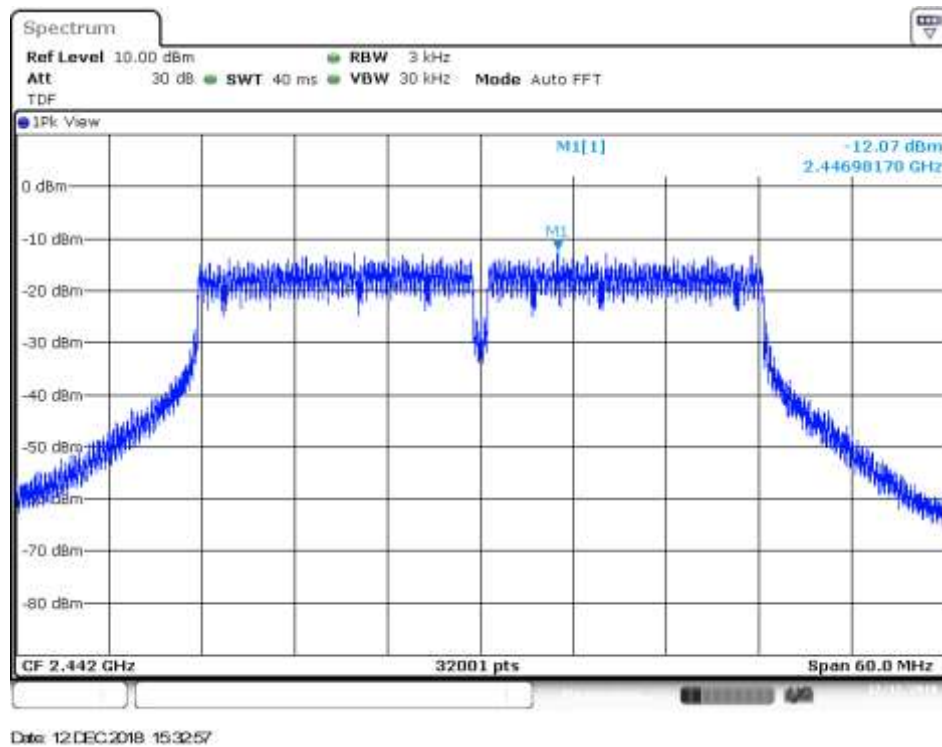
MIMO-A, 802.11n20, HT8

Channel 7



MIMO-B, 802.11n40, HT8

Channel 7F

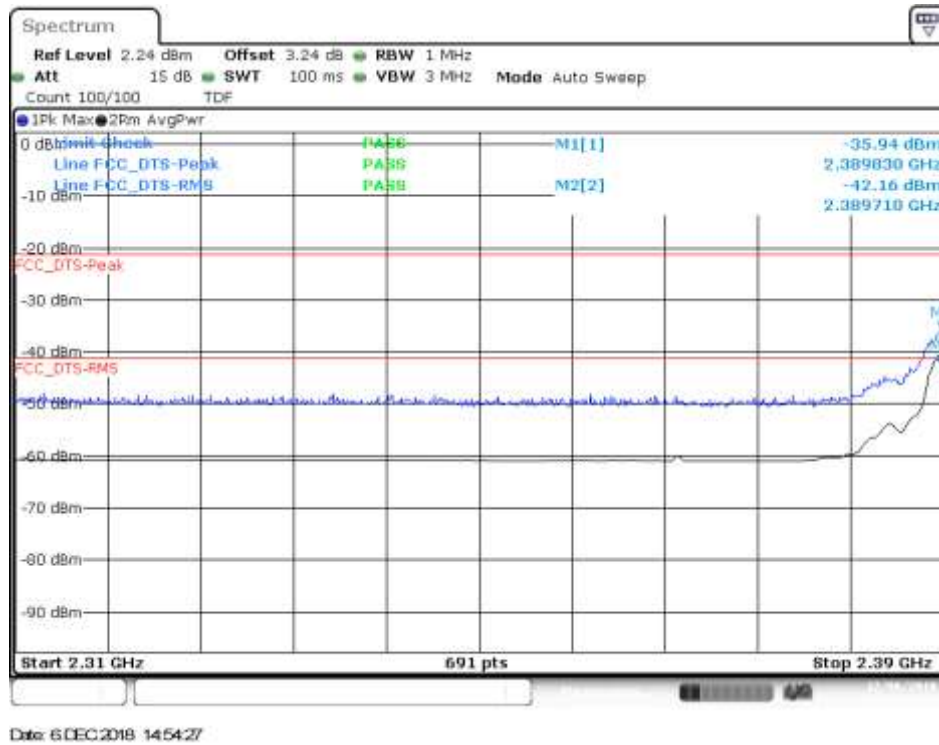


B.3.5 Out of band emissions - band-edge low (conducted)

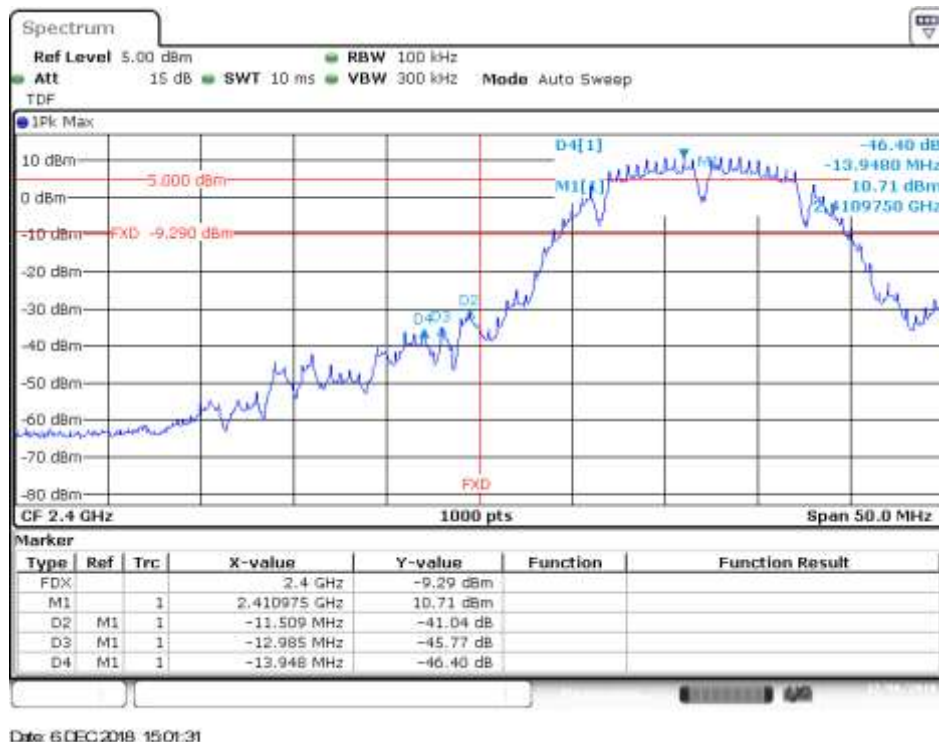
SISO-A, 802.11b, 1Mbps

Channel 1

BE Low Freq Section



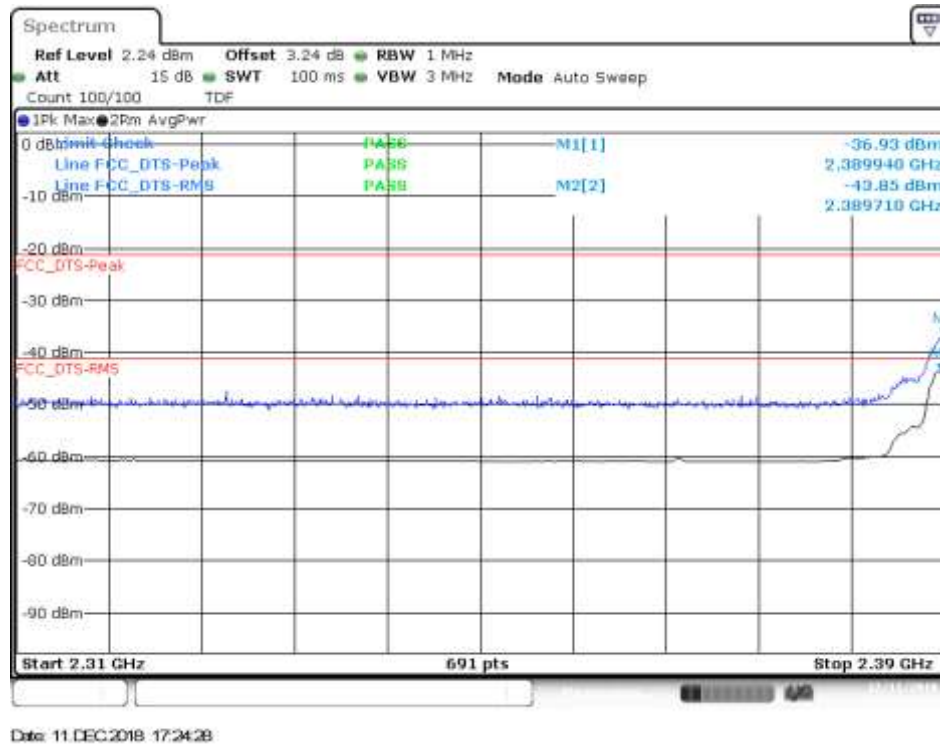
BE Low (Non Restricted)



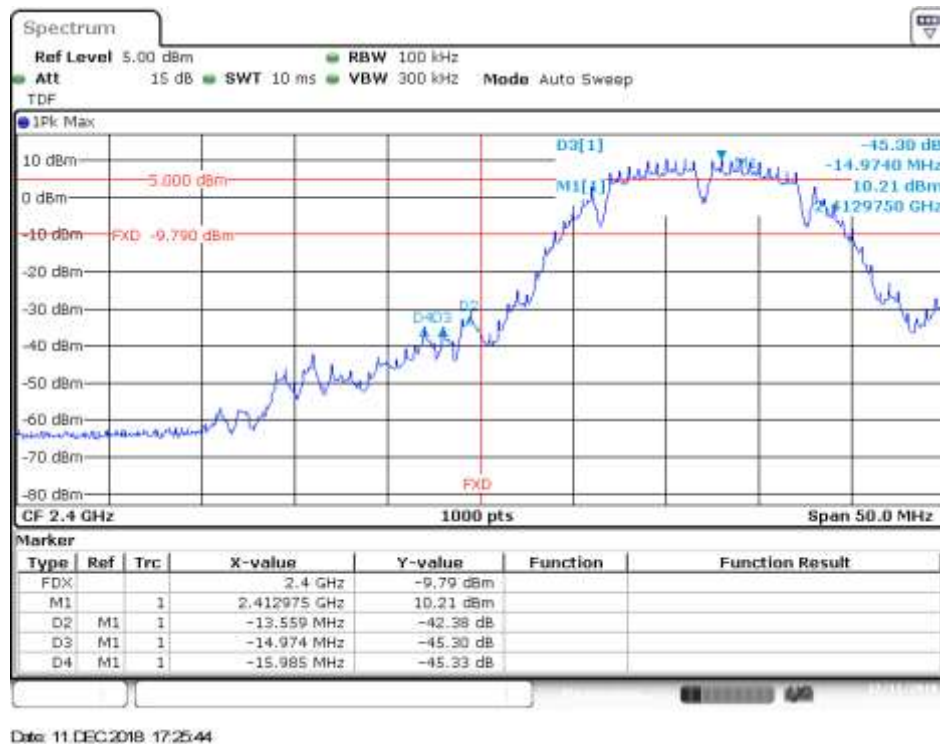
SISO-B, 802.11b, 1Mbps

Channel 1

BE Low Freq Section



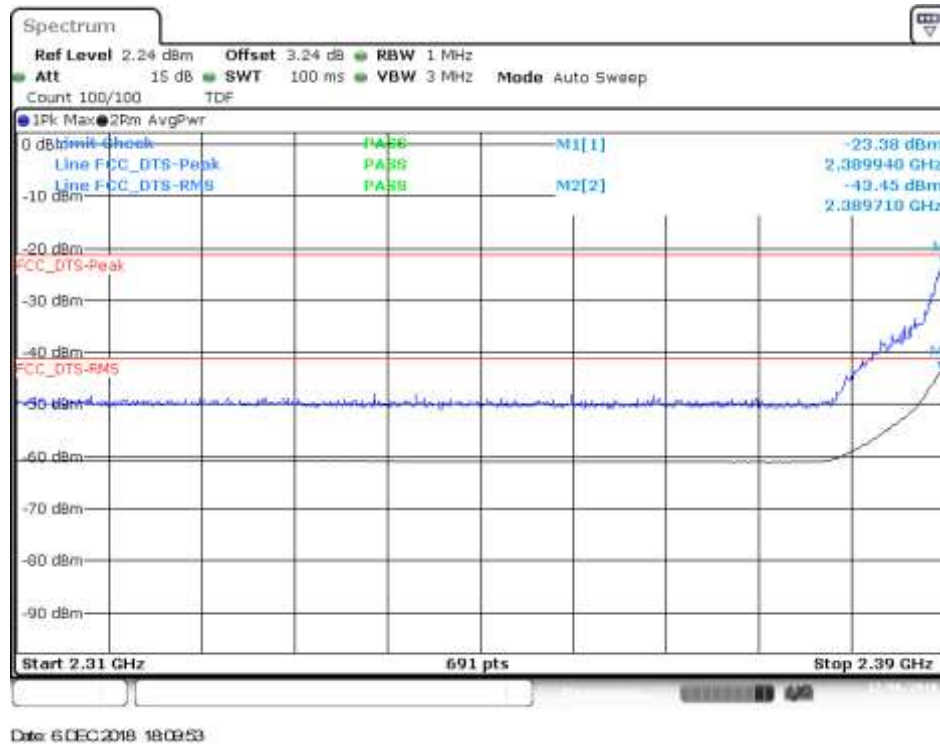
BE Low (Non Restricted)



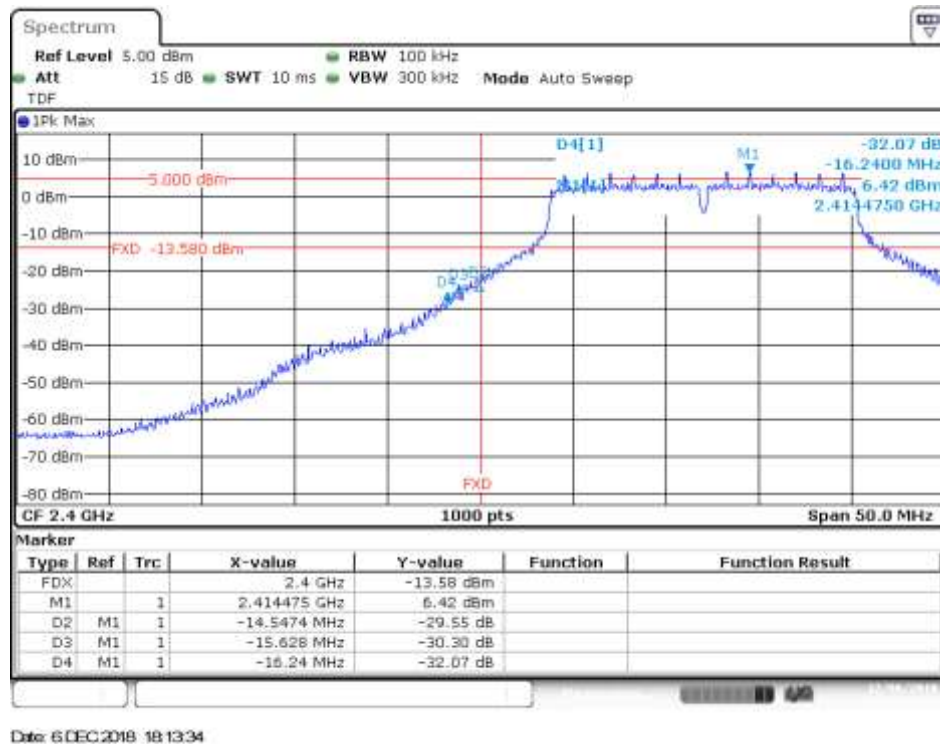
SISO-A, 802.11g, 6Mbps

Channel 1

BE Low Freq Section



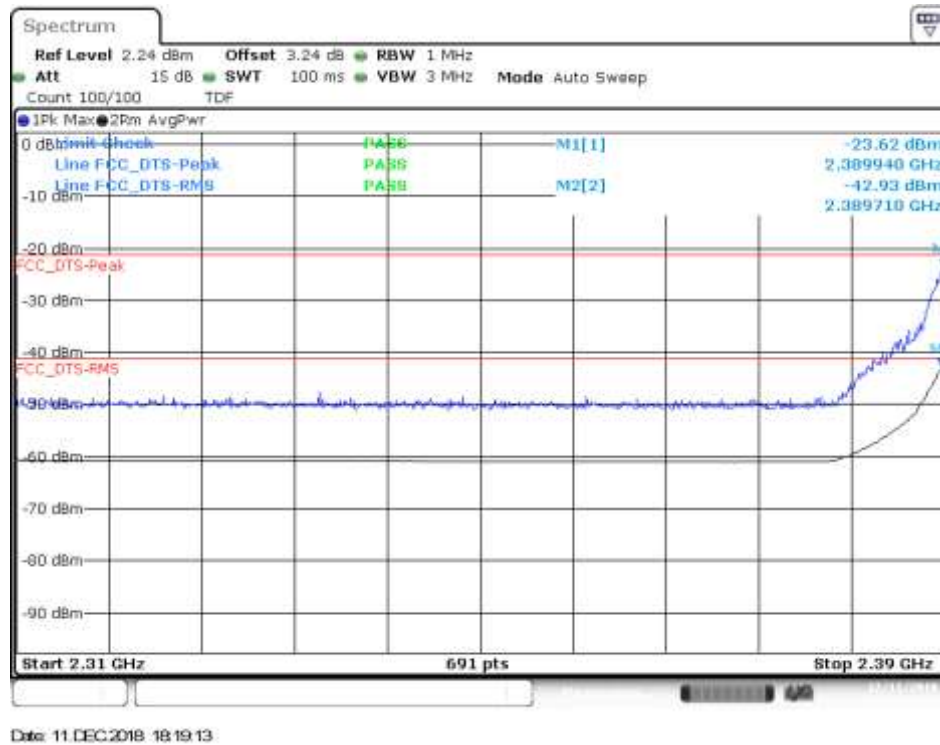
BE Low (Non Restricted)



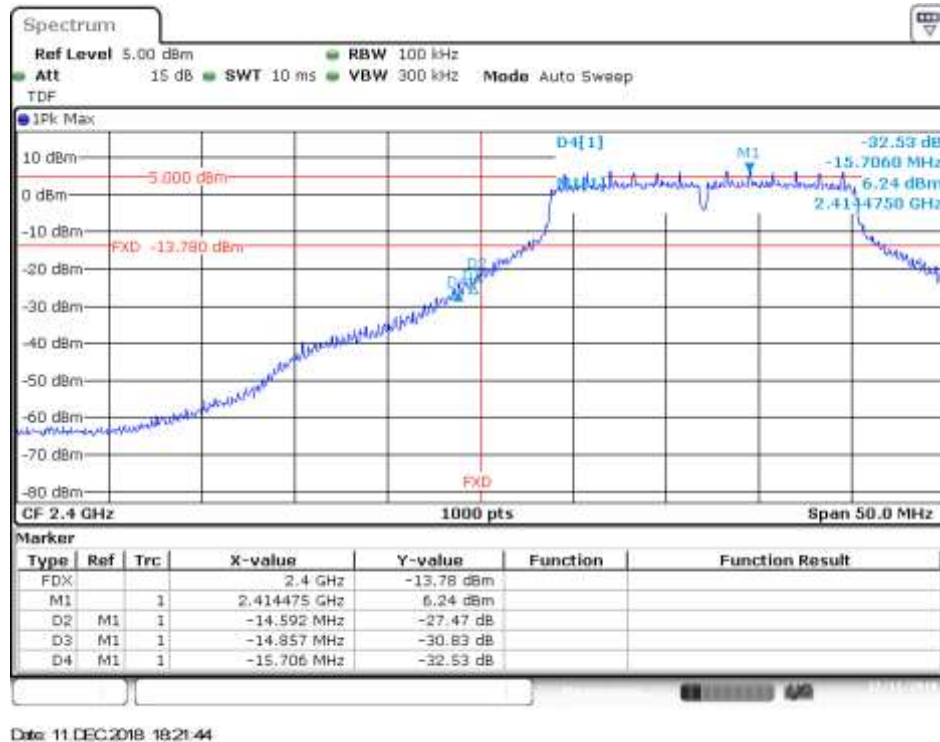
SISO-B, 802.11g, 6Mbps

Channel 1

BE Low Freq Section



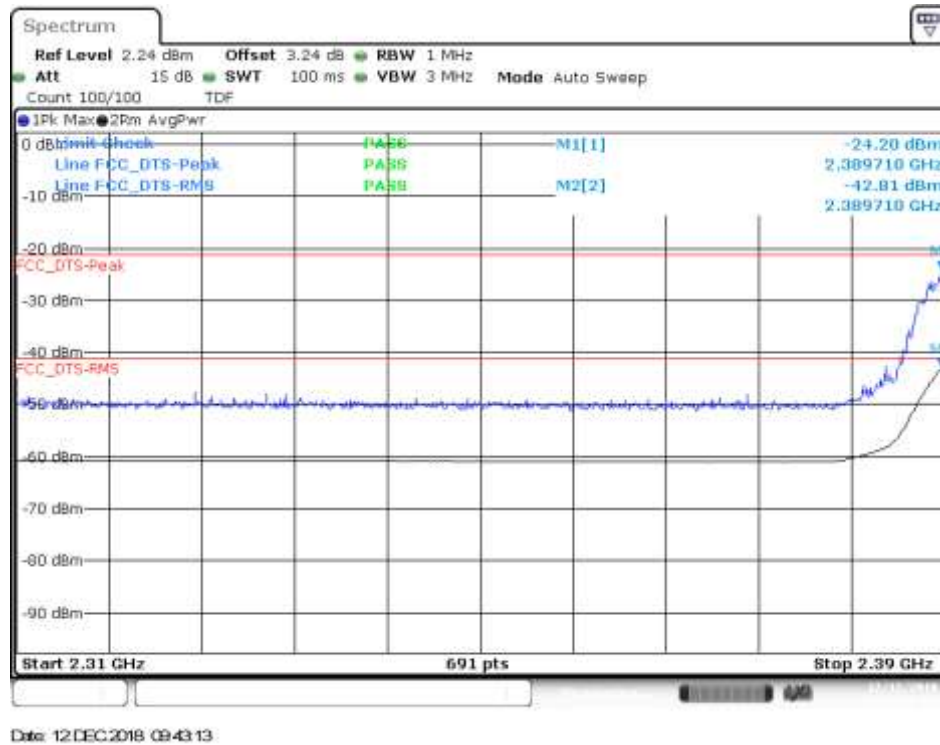
BE Low (Non Restricted)



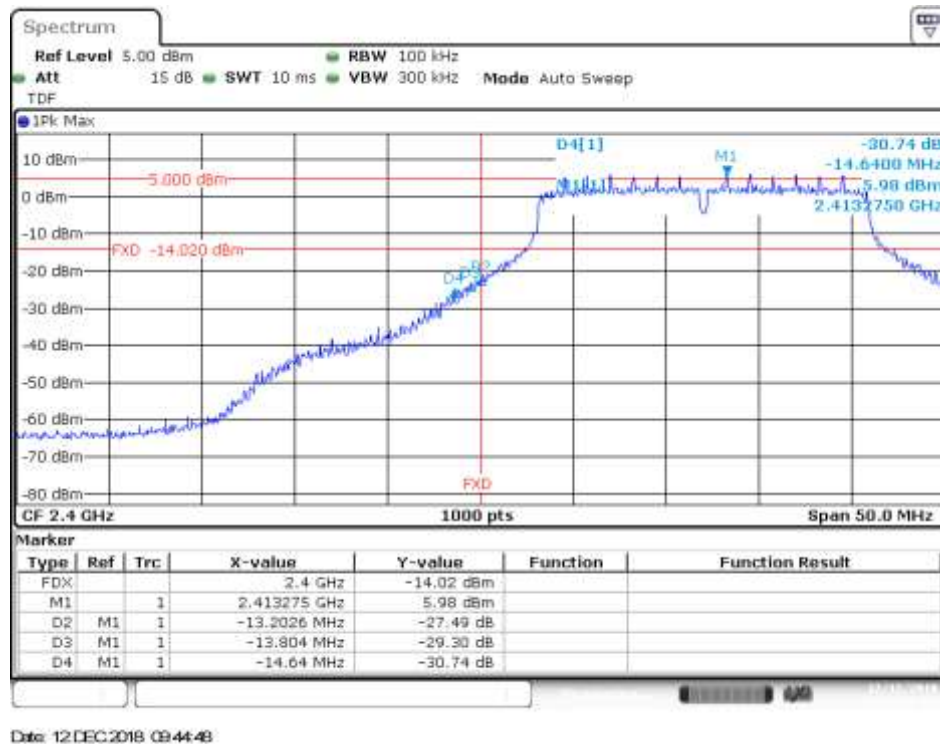
SISO-B, 802.11n20, HT0

Channel 1

BE Low Freq Section



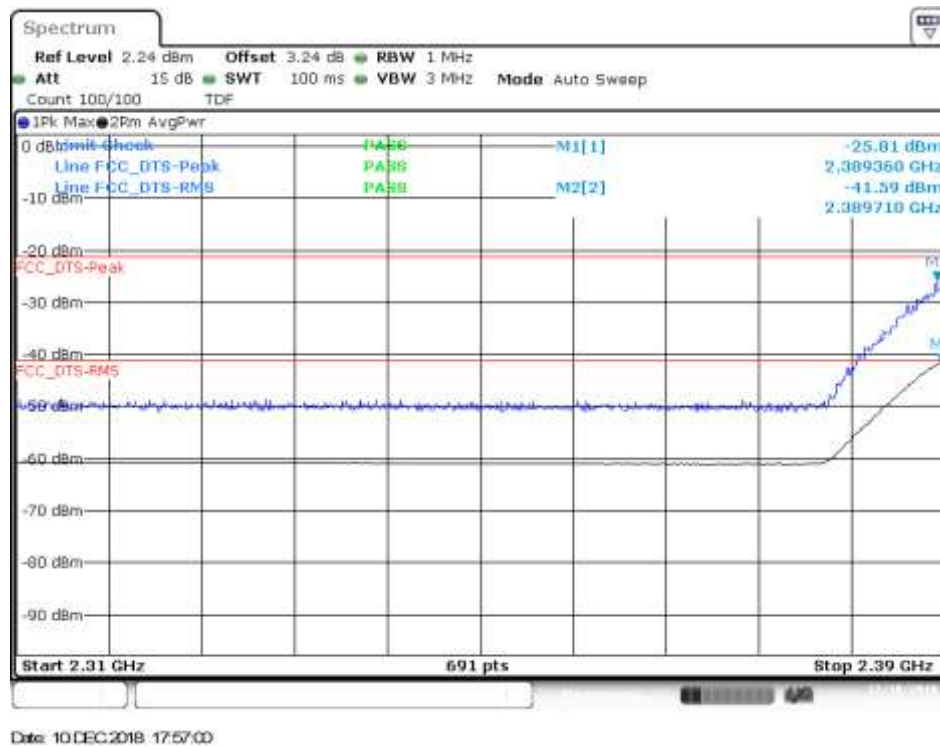
BE Low (Non Restricted)



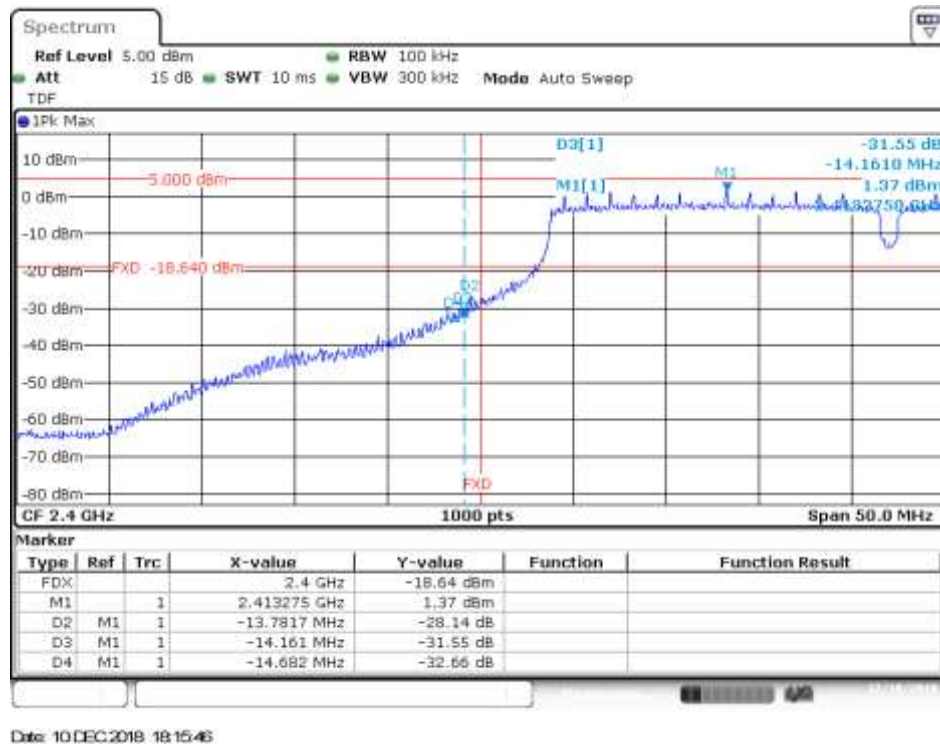
SISO-A, 802.11n40, HT0

Channel 3F

BE Low Freq Section



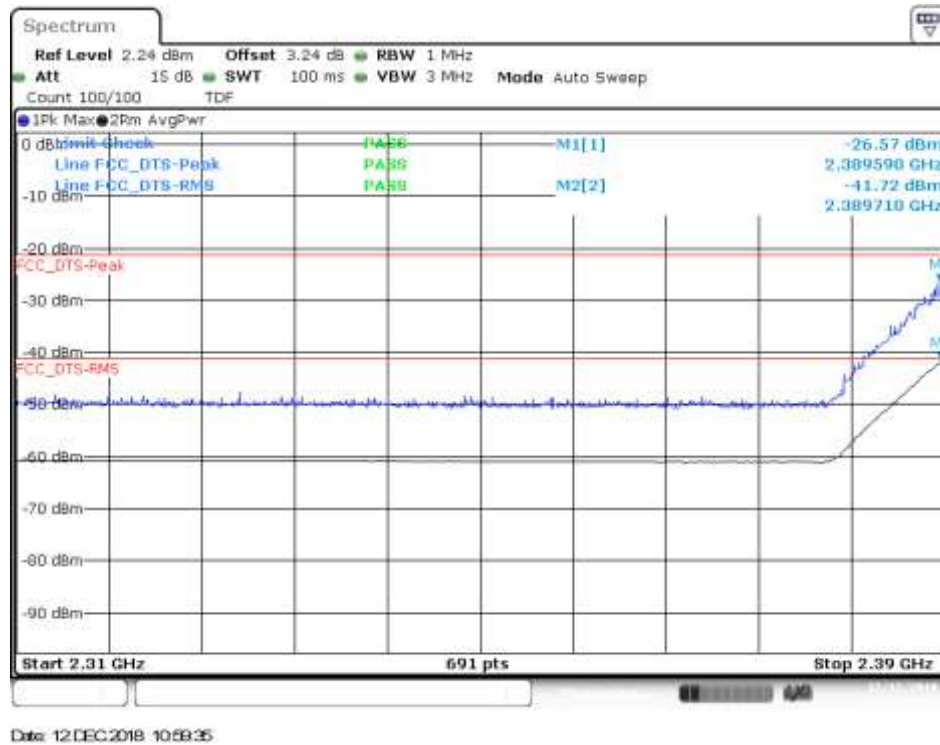
BE Low (Non Restricted)



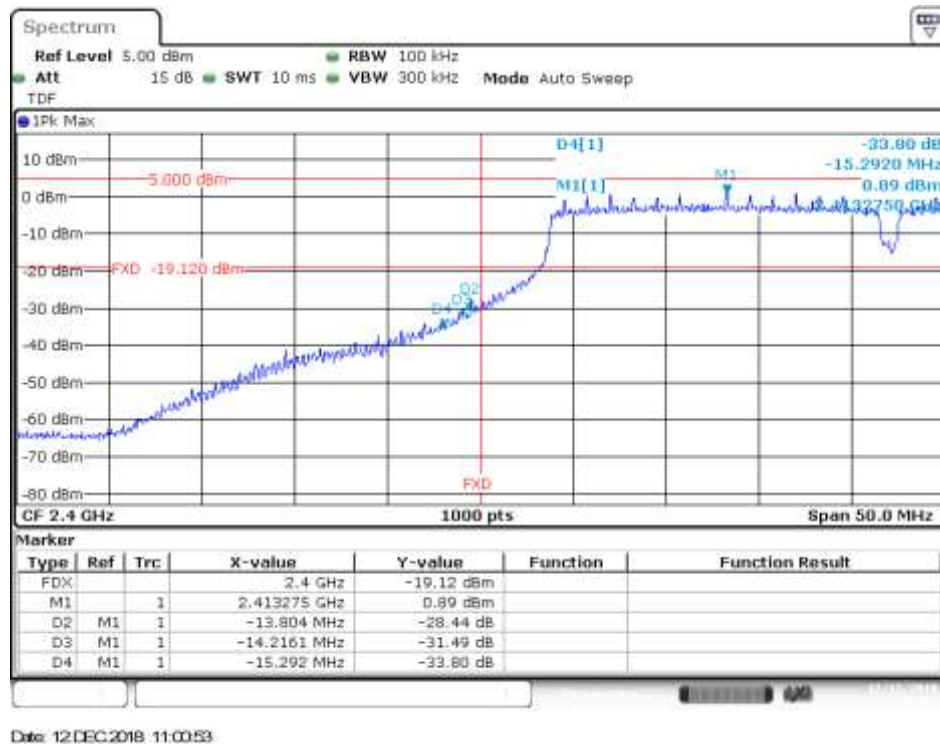
SISO-B, 802.11n40, HT0

Channel 3F

BE Low Freq Section



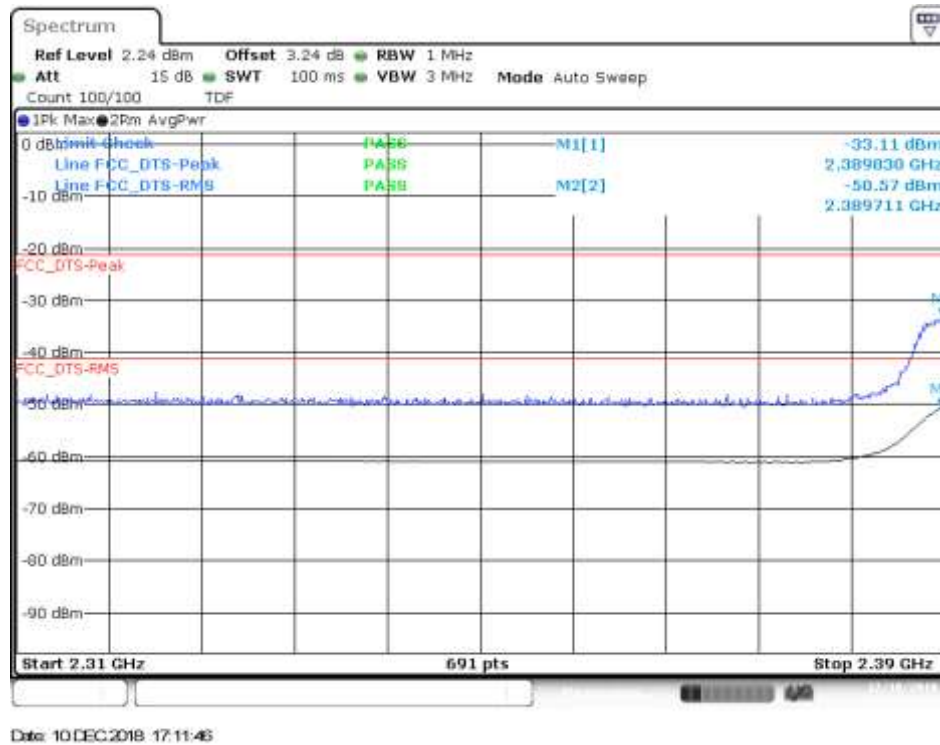
BE Low (Non Restricted)



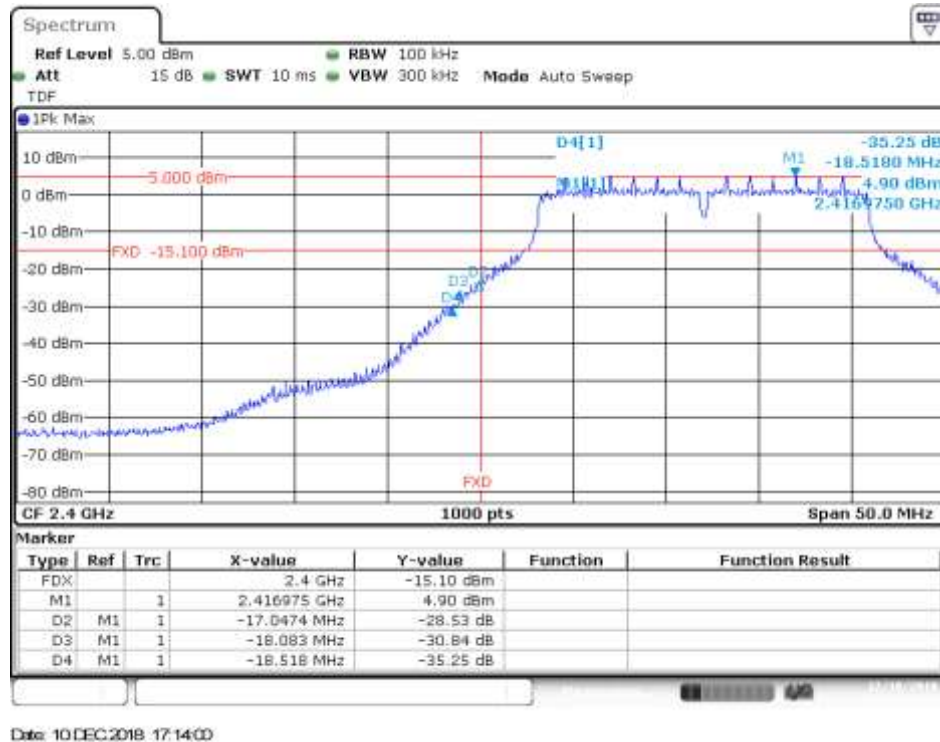
MIMO-A, 802.11n20, HT8

Channel 1

BE Low Freq Section



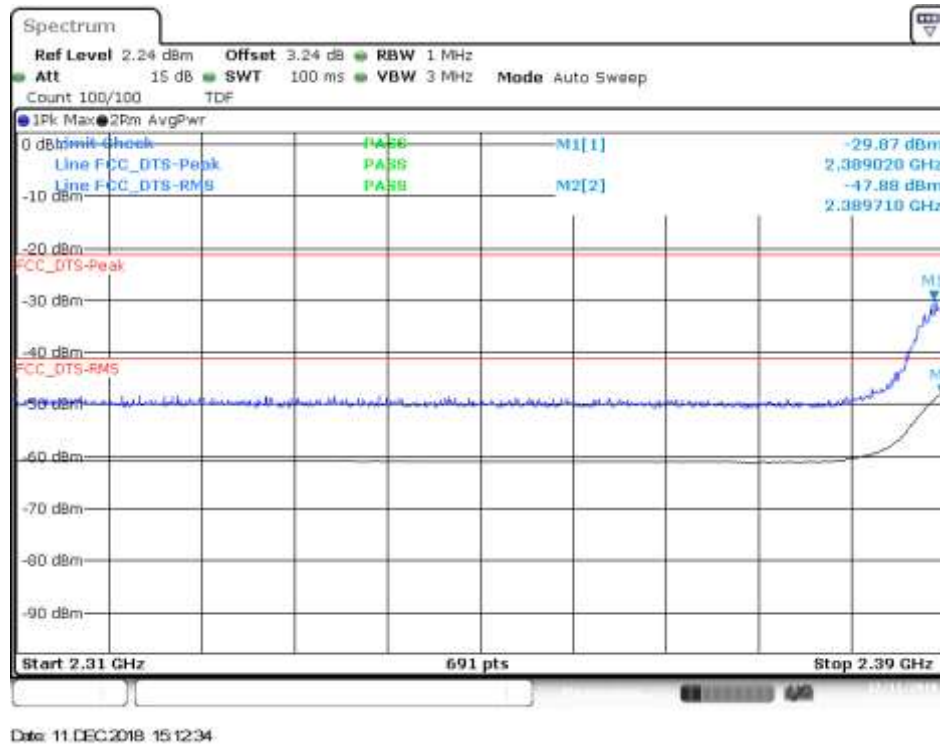
BE Low (Non Restricted)



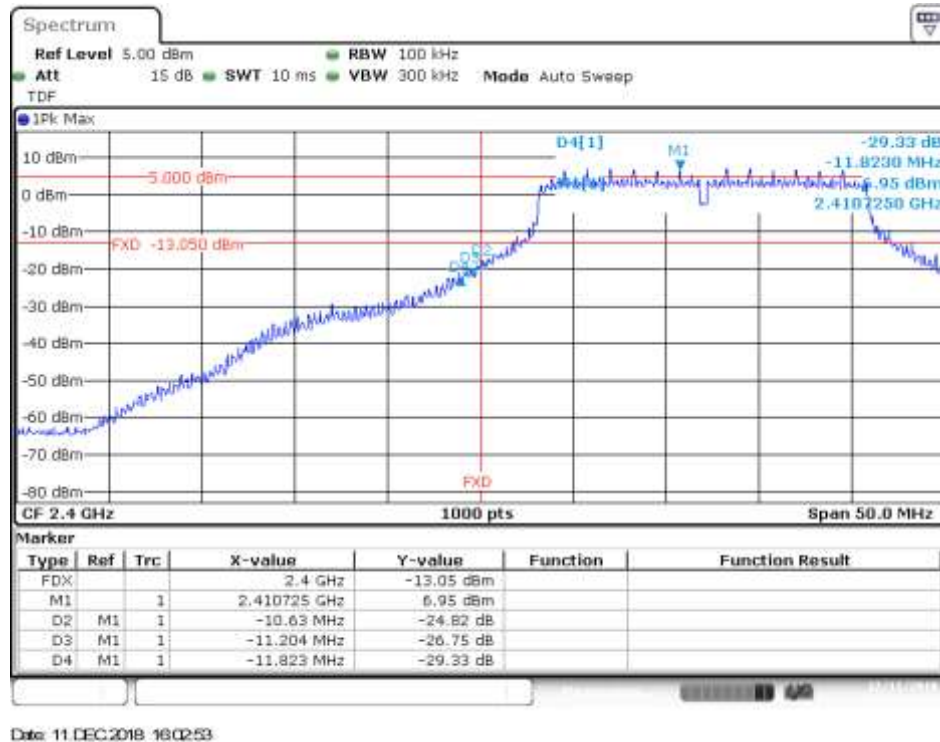
MIMO-B, 802.11n20, HT8

Channel 1

BE Low Freq Section



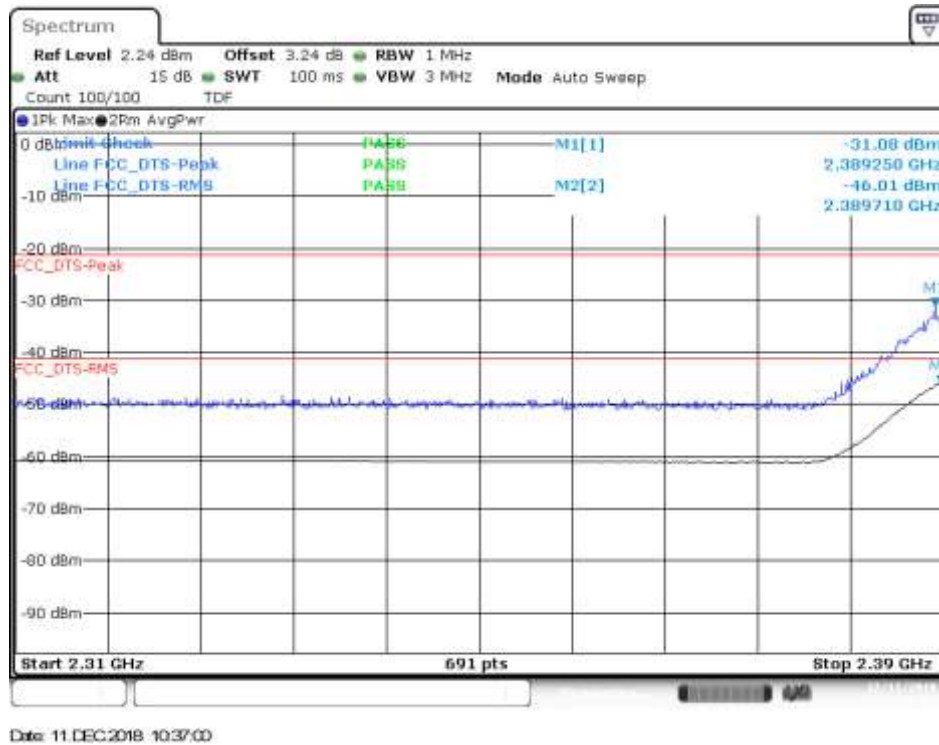
BE Low (Non Restricted)



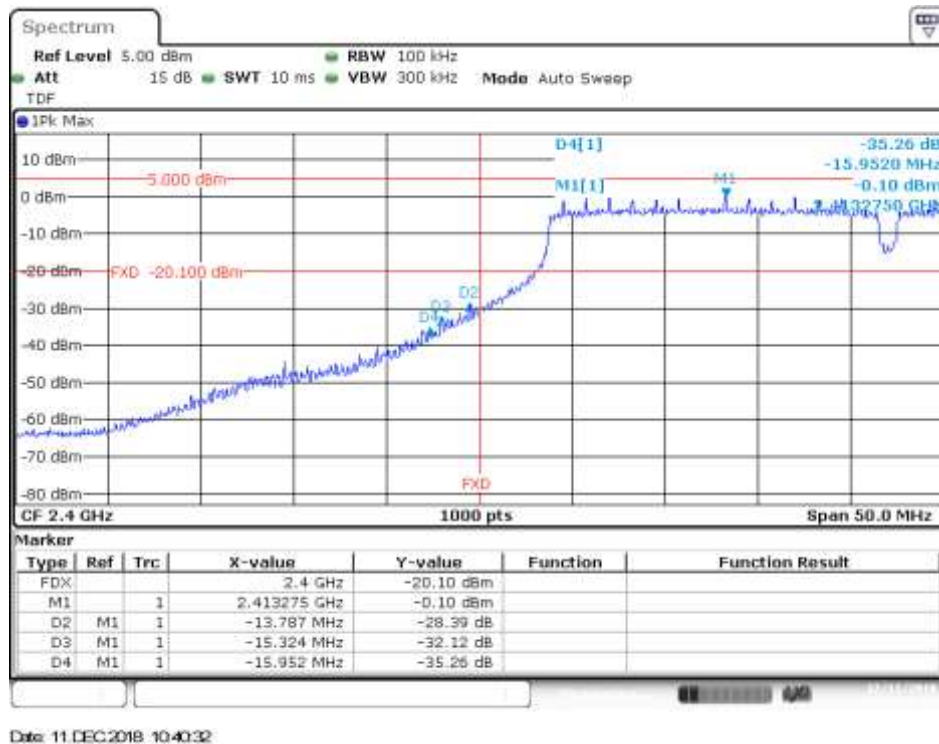
MIMO-A, 802.11n40, HT8

Channel 3F

BE Low Freq Section



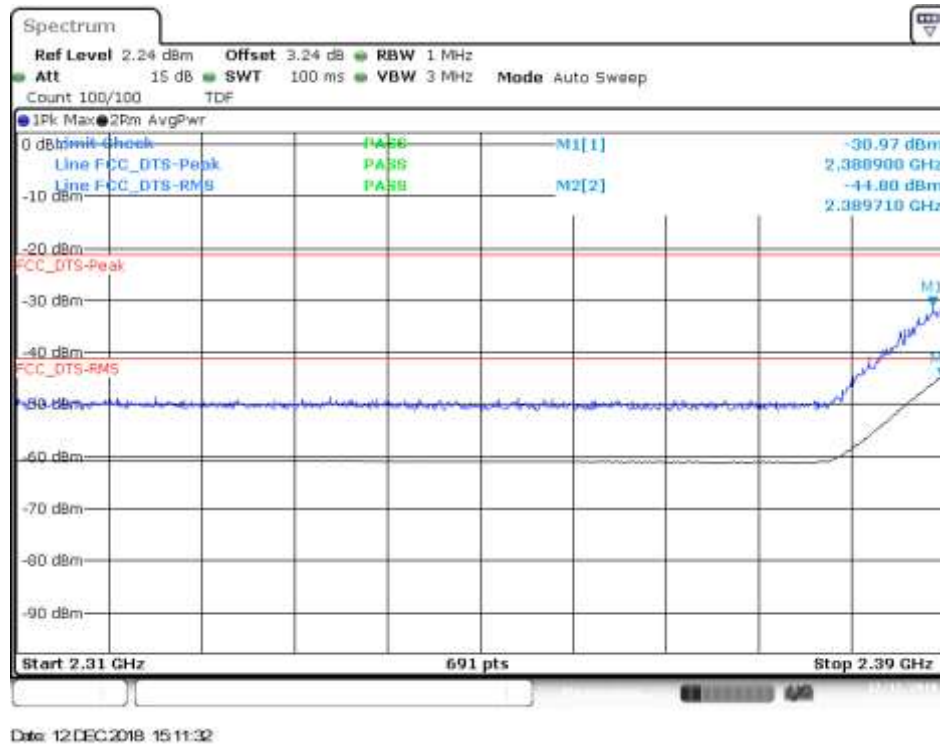
BE Low (Non Restricted)



MIMO-B, 802.11n40, HT8

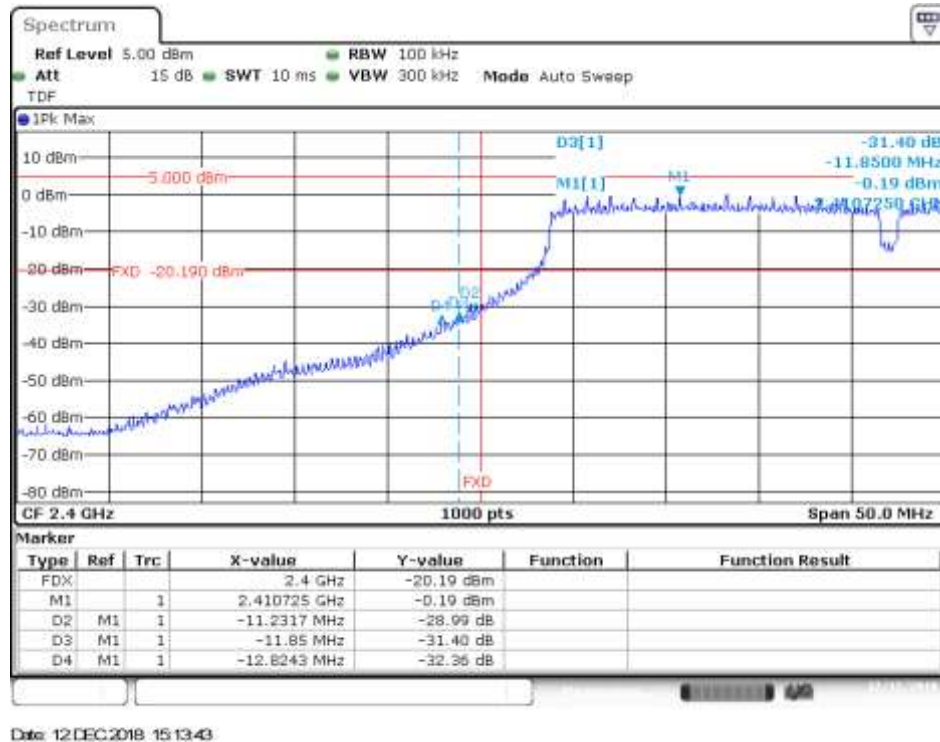
Channel 3F

BE Low Freq Section



Channel 3F

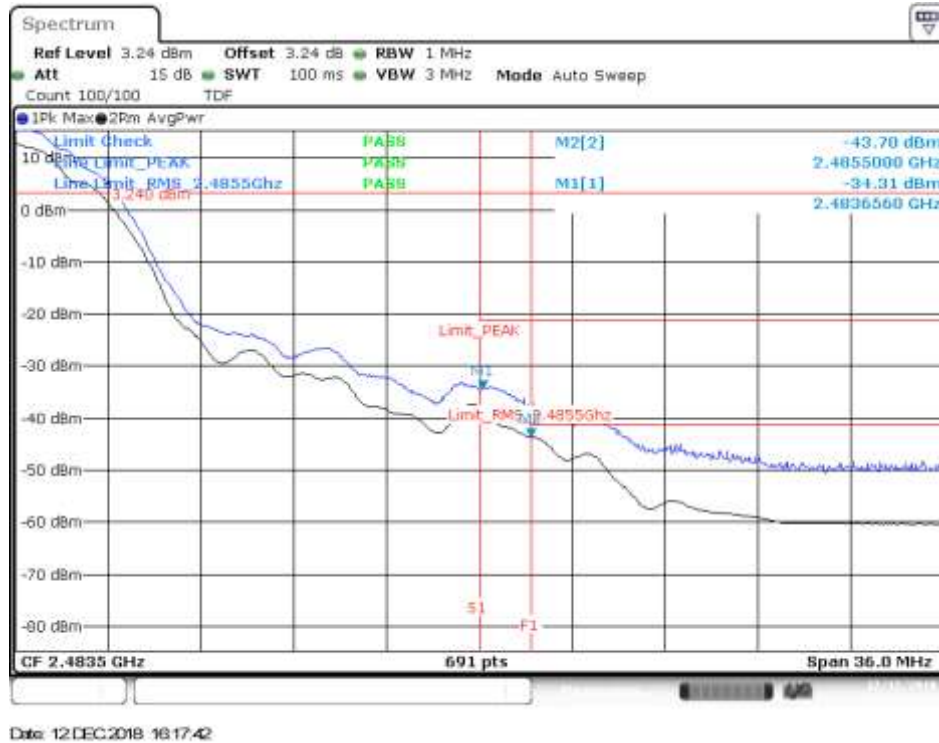
BE Low (Non Restricted)



B.3.6 Out of band emissions - band-edge high (conducted)

SISO-A, 802.11b, 1Mbps

Channel 11 - BE High Freq Section (restricted)



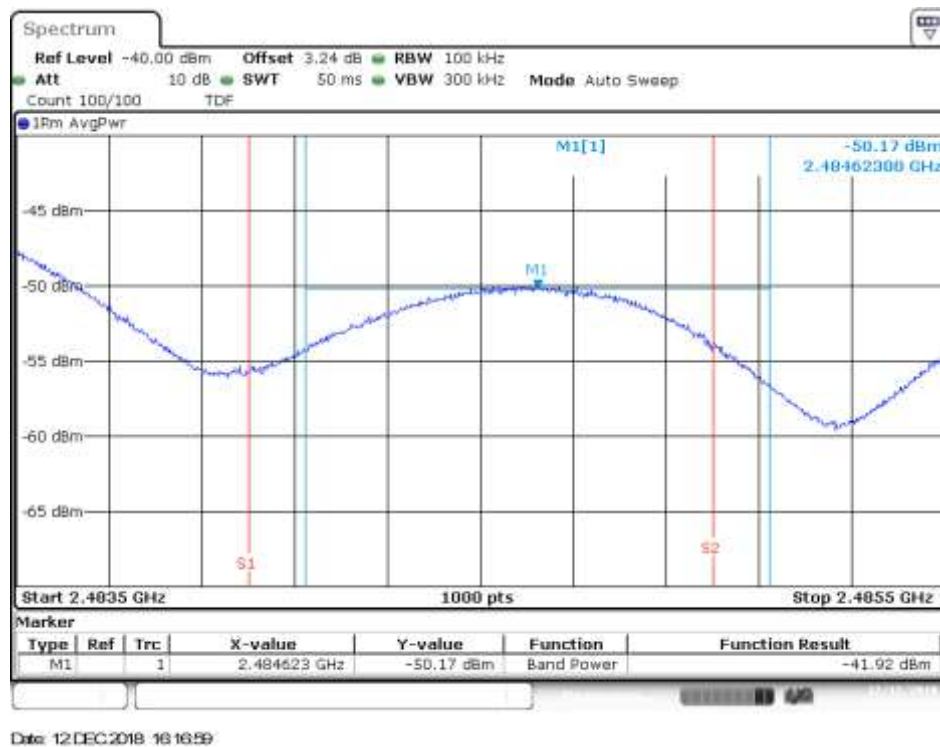
Channel 12 - BE High Freq Section (restricted)



Channel 13 - BE High Freq Section (restricted)

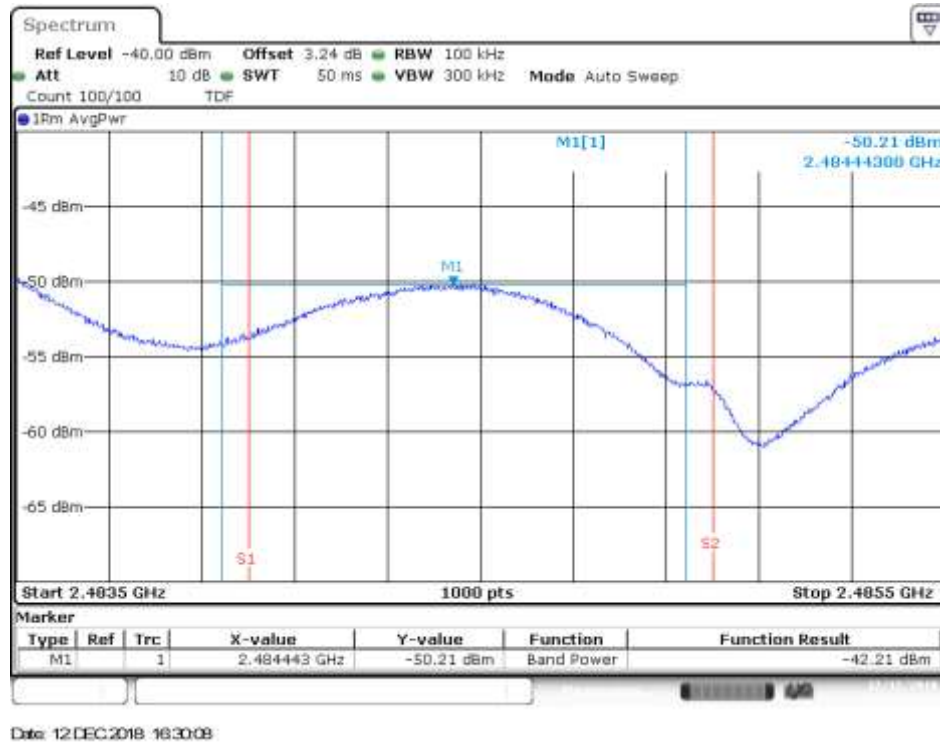


Channel 11 - BE High Freq Section RMS within 2MHz (restricted)

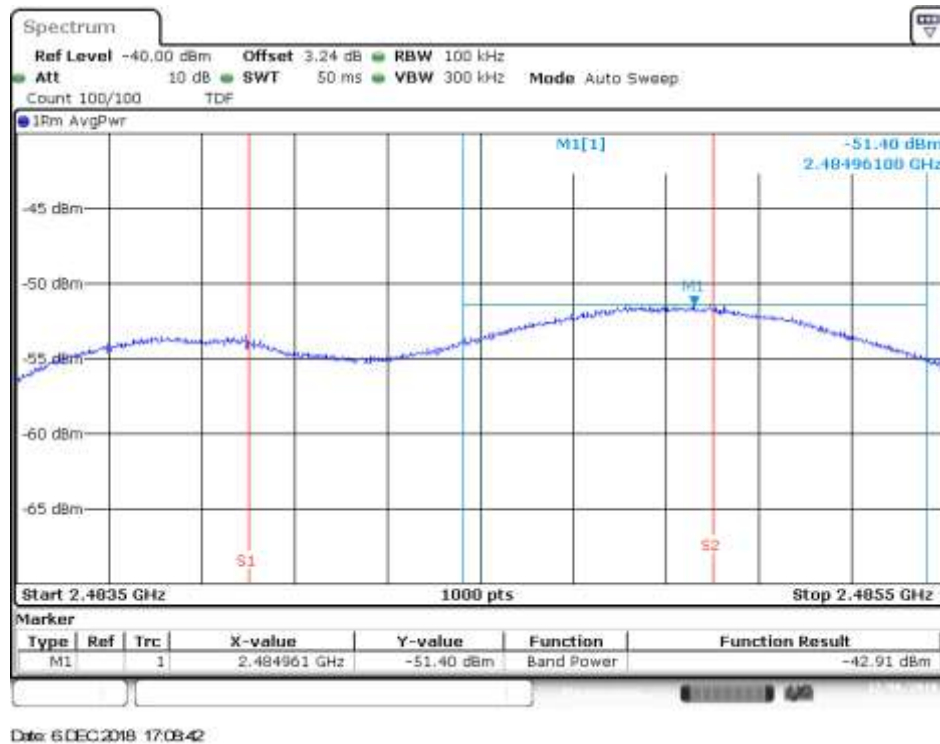


Test Report N° 181120-01.TR04

Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

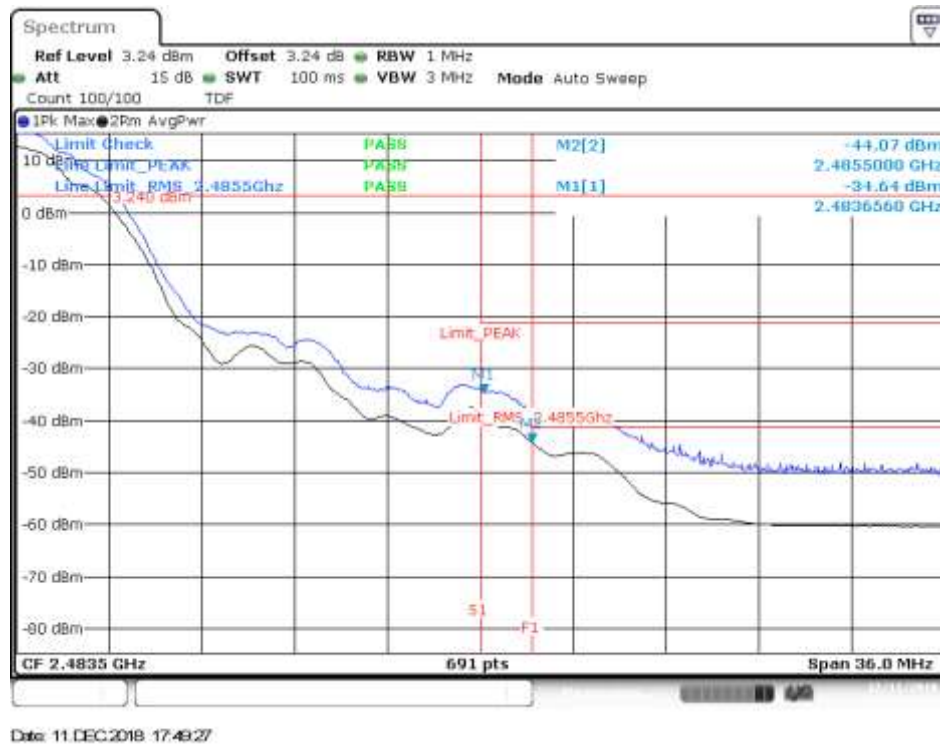


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

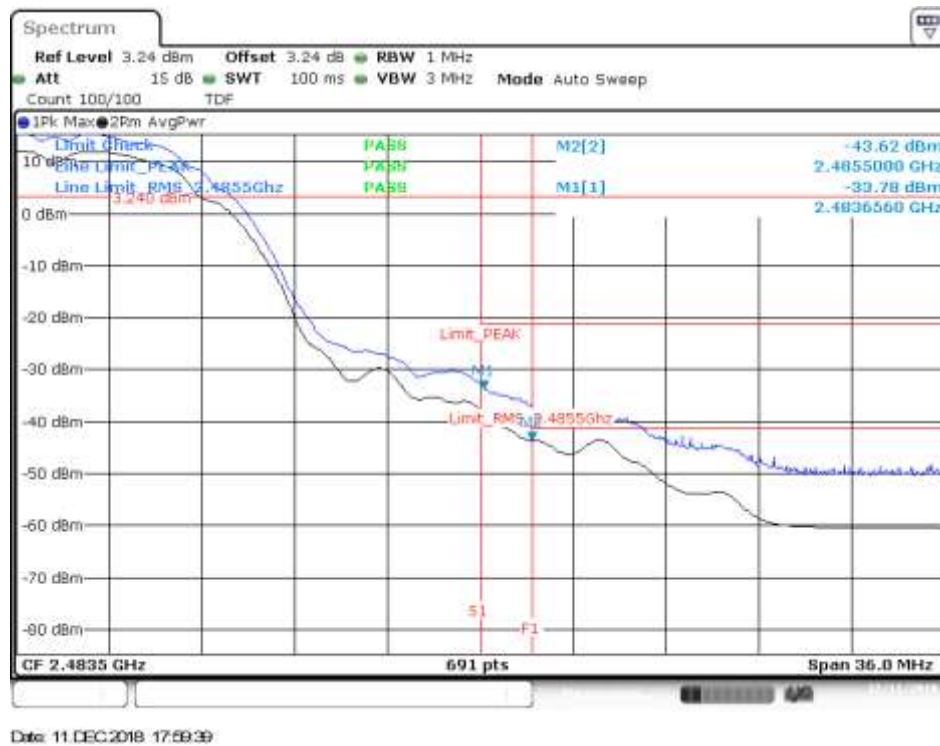


SISO-B, 802.11b, 1Mbps

Channel 11 - BE High Freq Section (restricted)



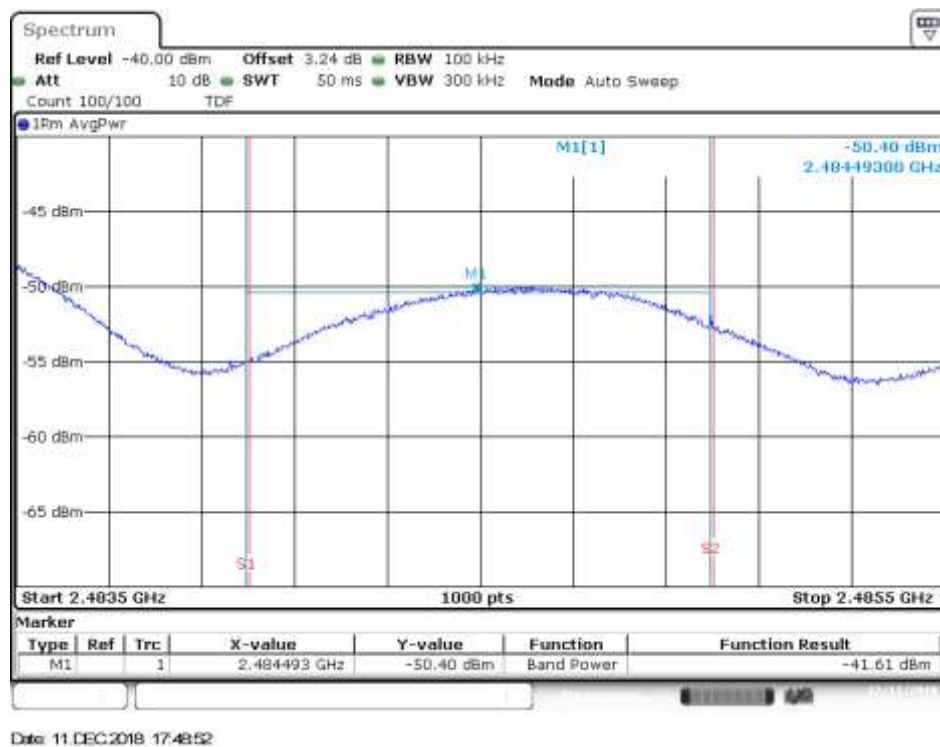
Channel 12 - BE High Freq Section (restricted)



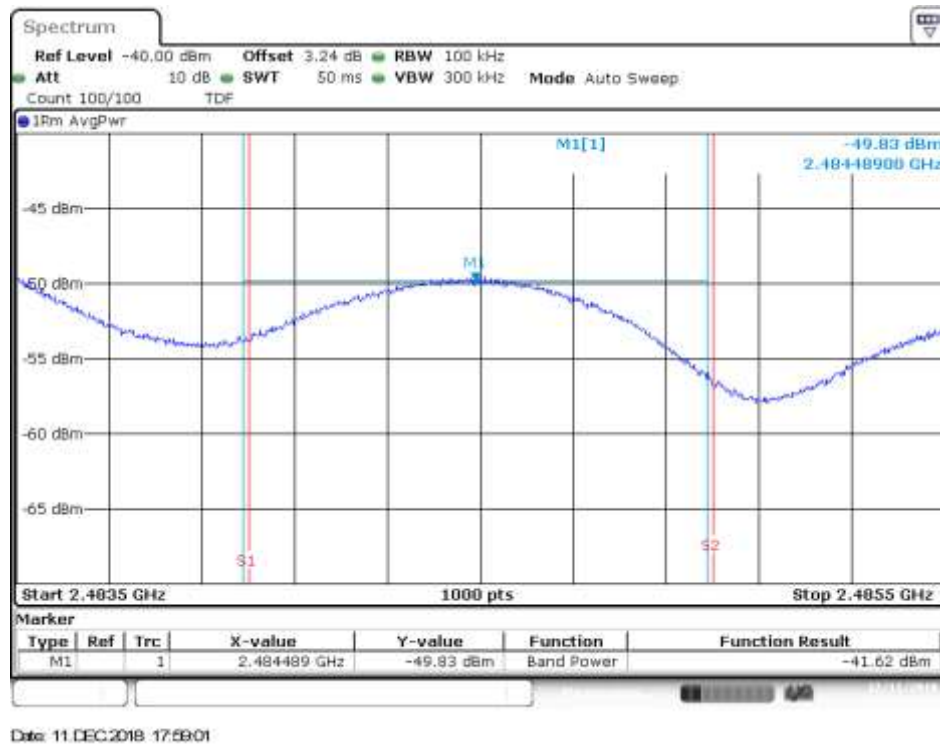
Channel 13 - BE High Freq Section (restricted)



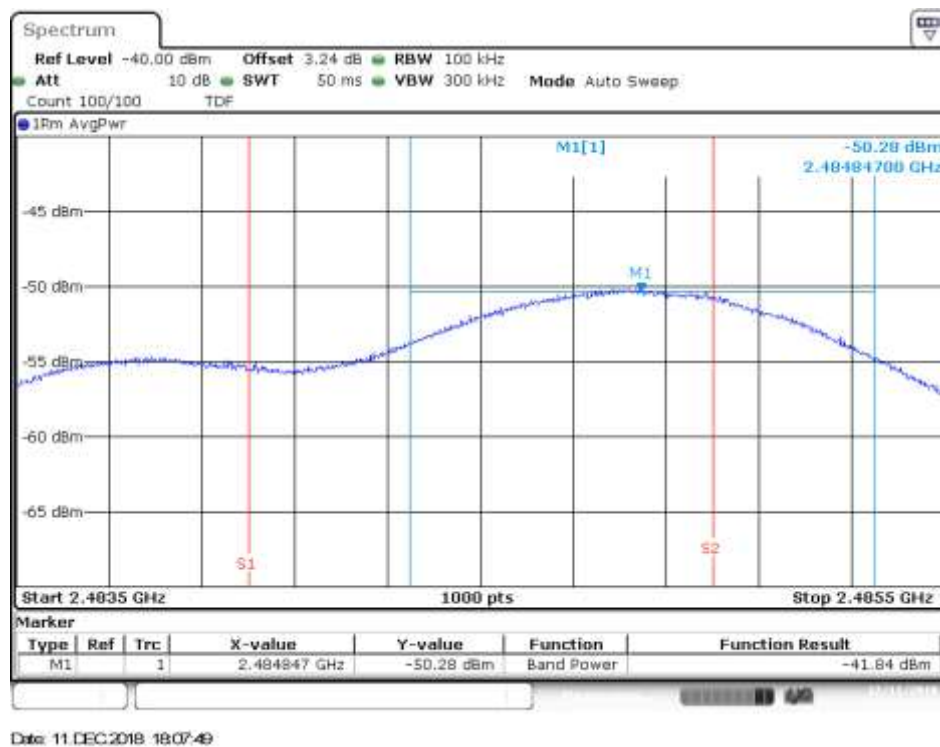
Channel 11 - BE High Freq Section RMS within 2MHz (restricted)



Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

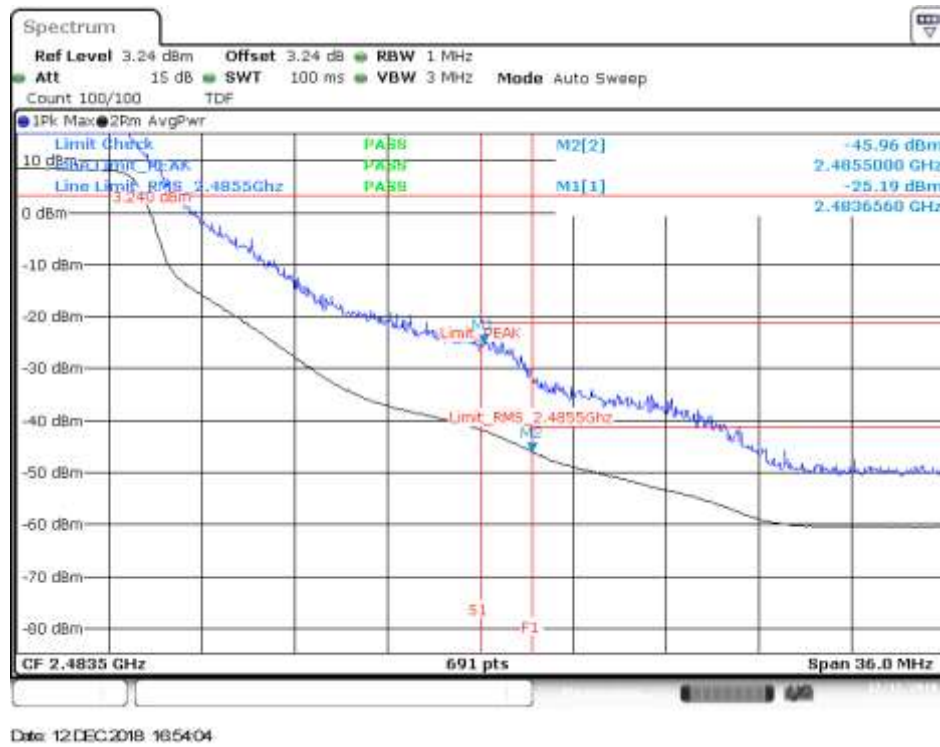


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

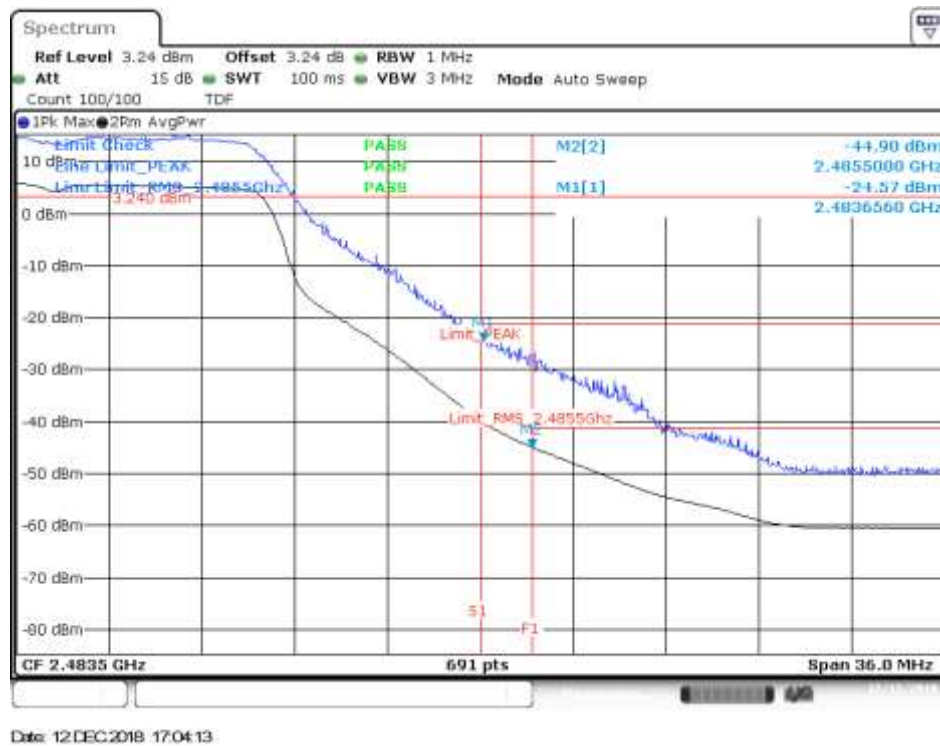


SISO-A, 802.11g, 6Mbps

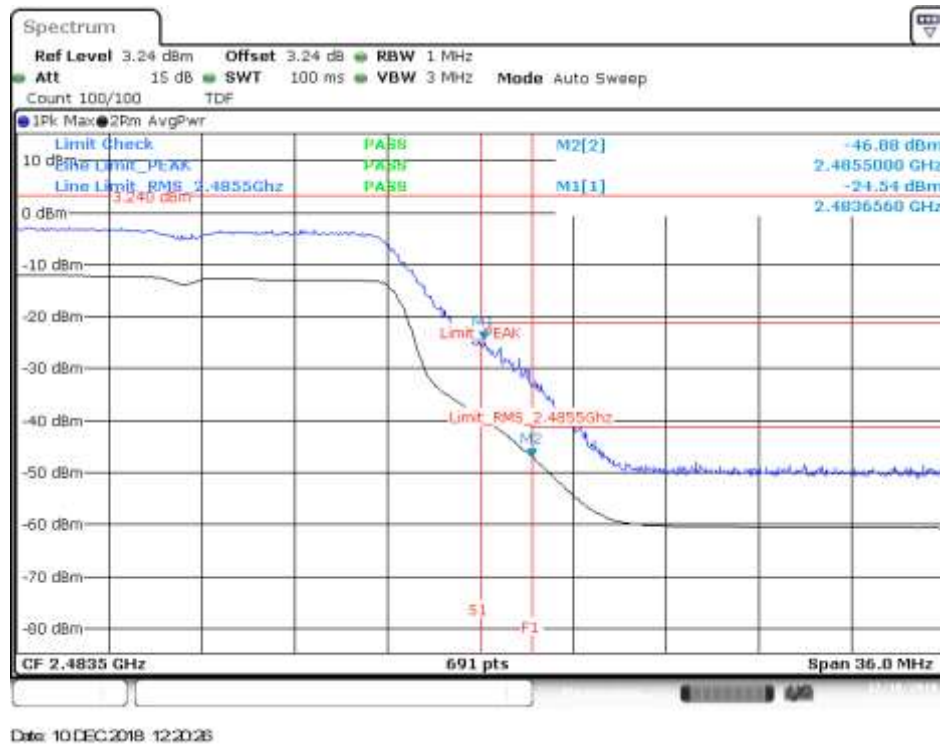
Channel 11 - BE High Freq Section (restricted)



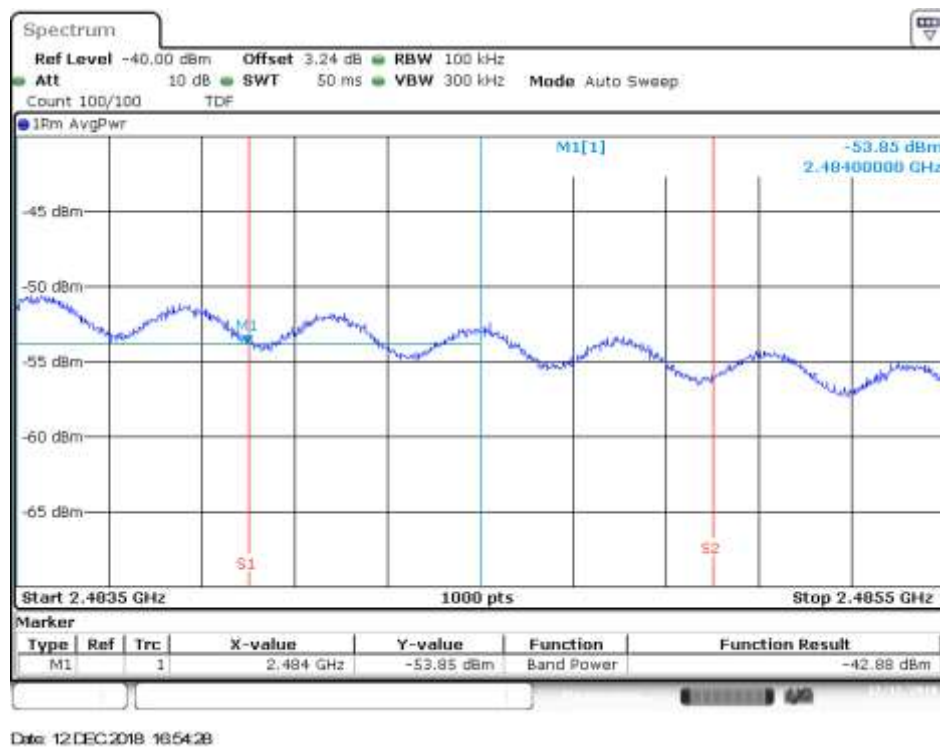
Channel 12 - BE High Freq Section (restricted)



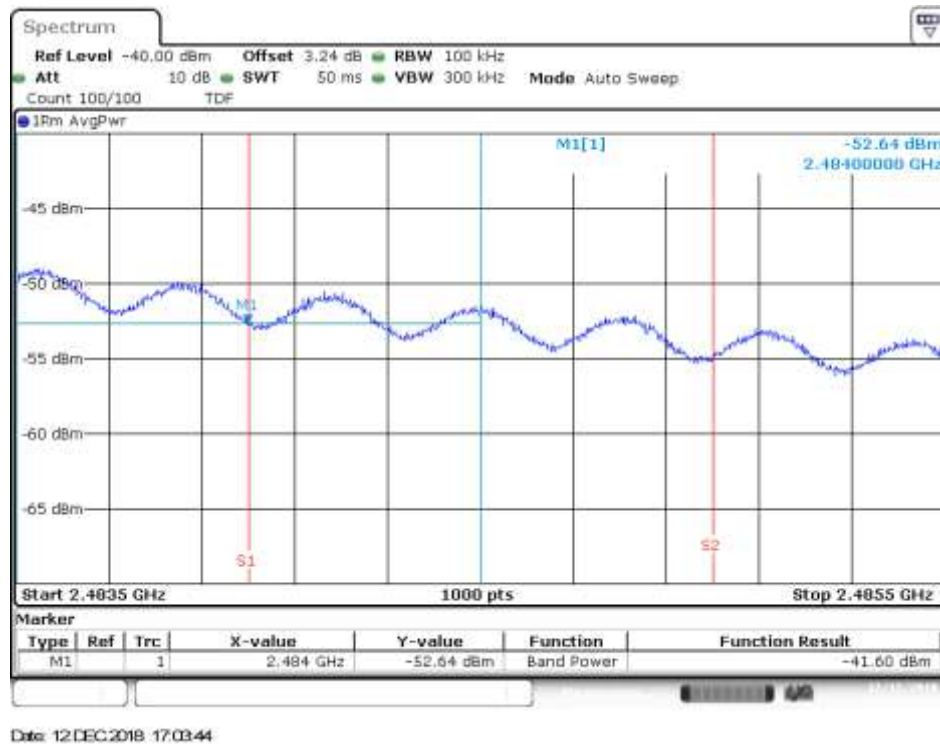
Channel 13 - BE High Freq Section (restricted)



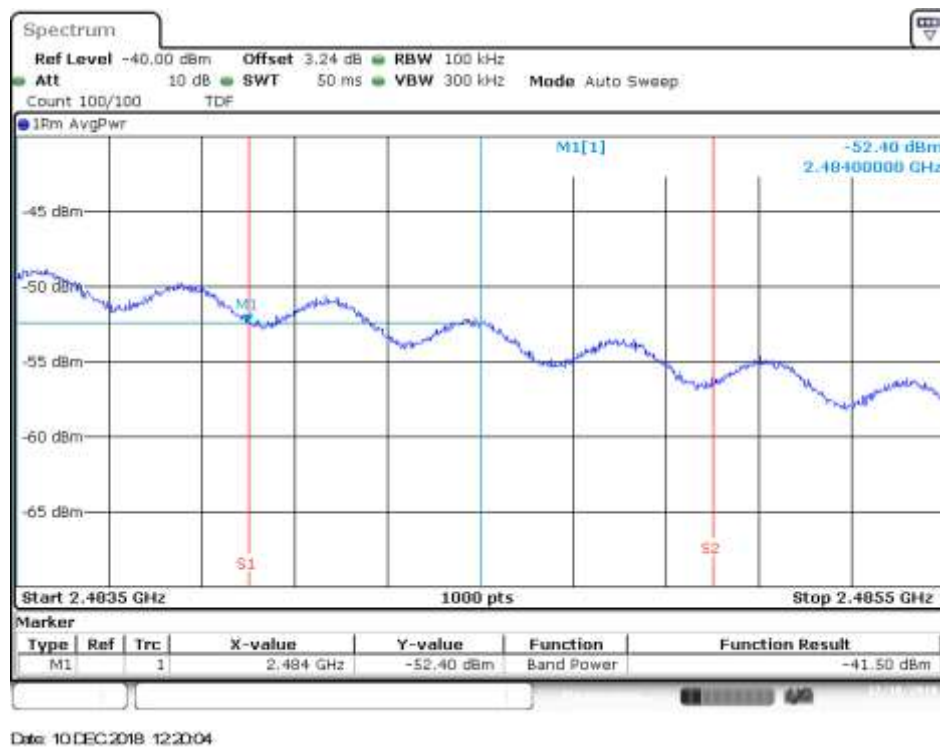
Channel 11 - BE High Freq Section RMS within 2MHz (restricted)



Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

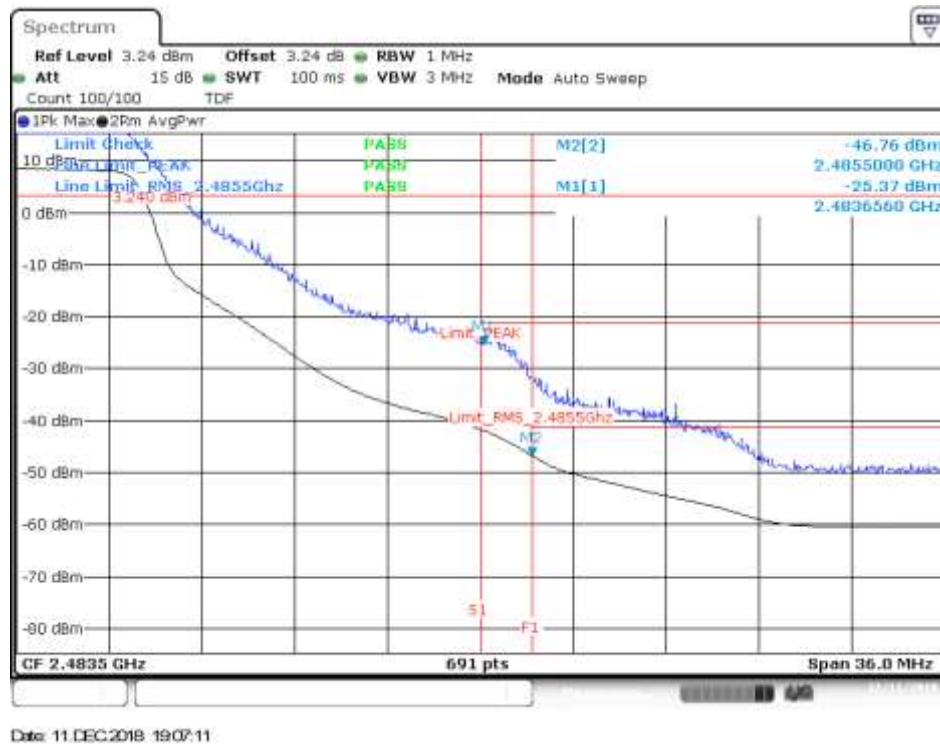


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

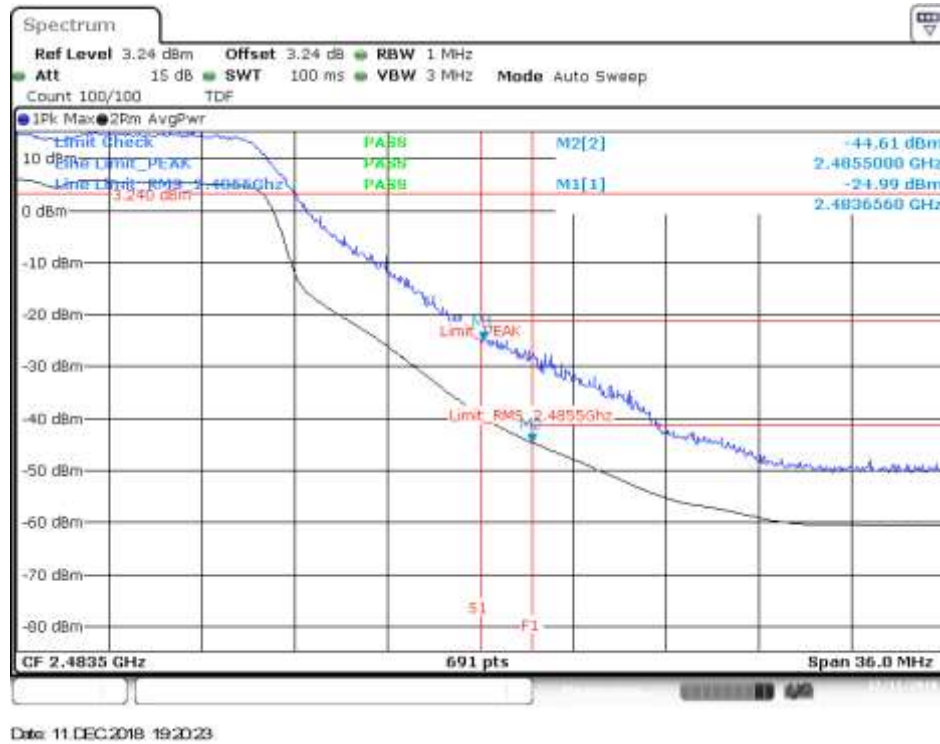


SISO-B, 802.11g, 6Mbps

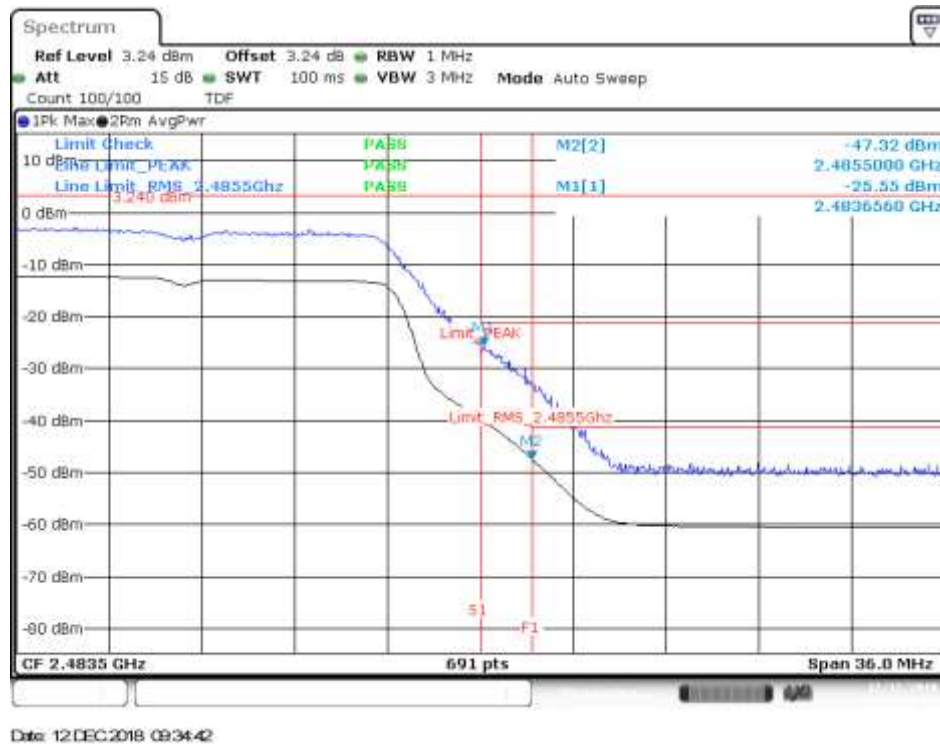
Channel 11 - BE High Freq Section (restricted)



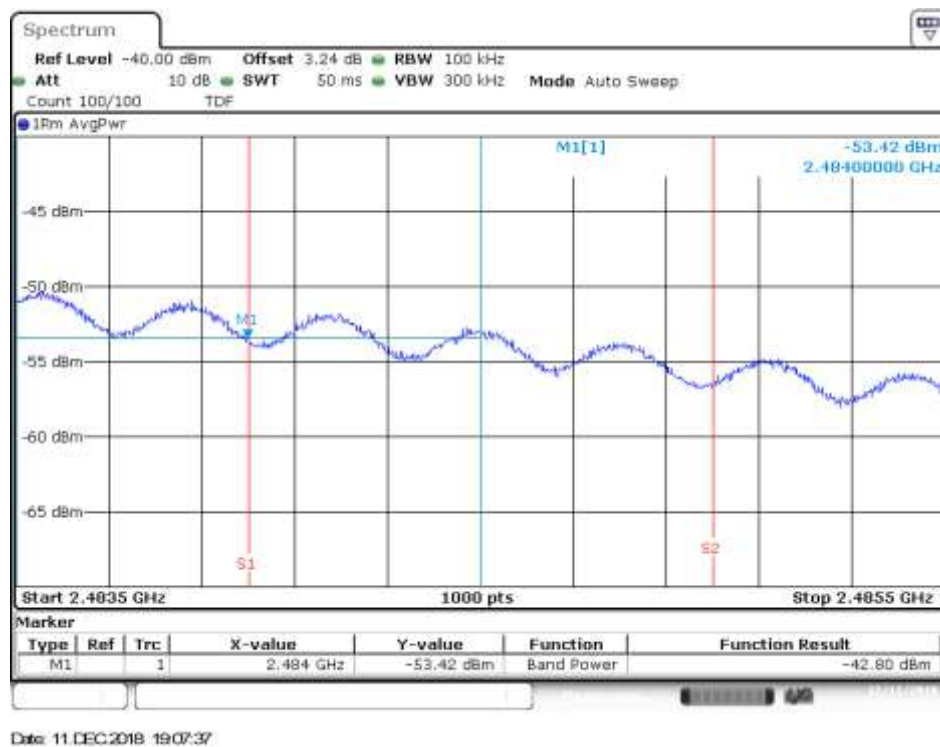
Channel 12 - BE High Freq Section (restricted)



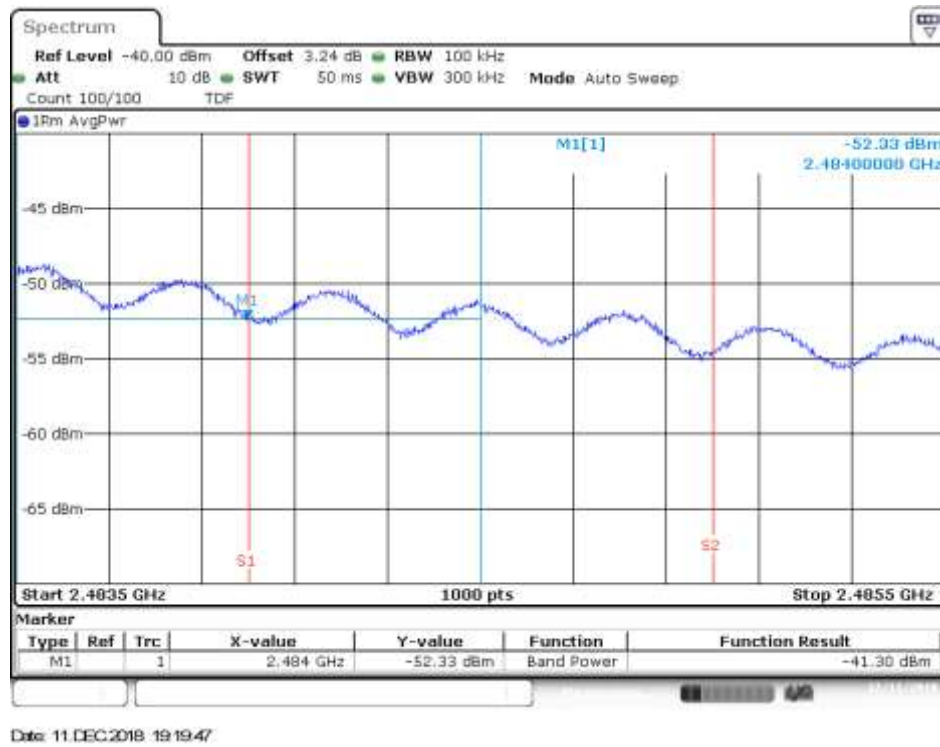
Channel 13 - BE High Freq Section (restricted)



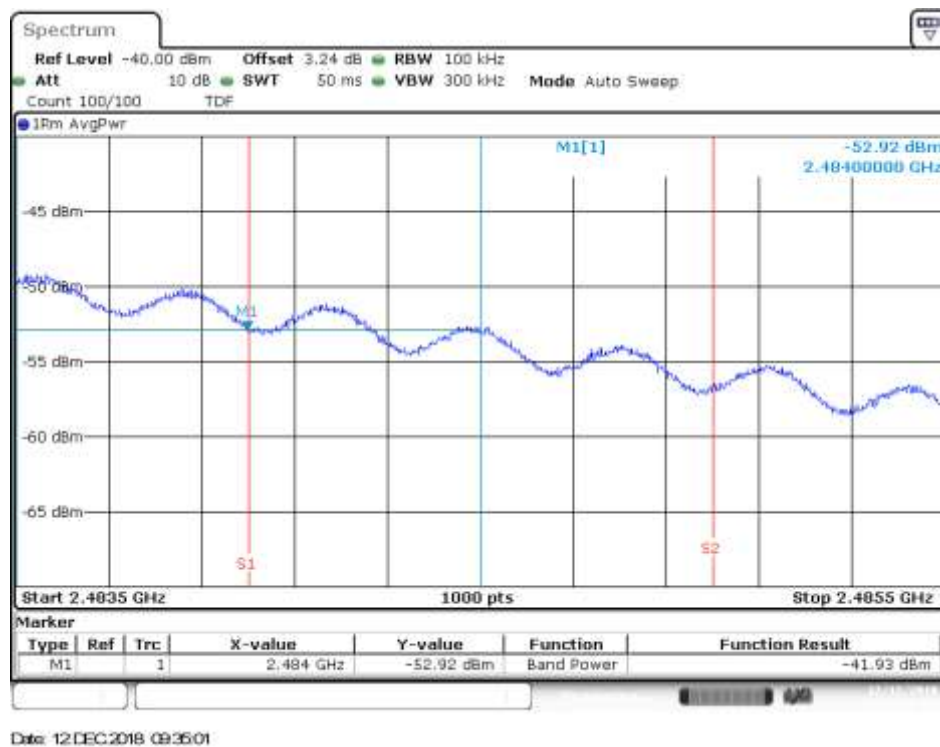
Channel 11 - BE High Freq Section RMS within 2MHz (restricted)



Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

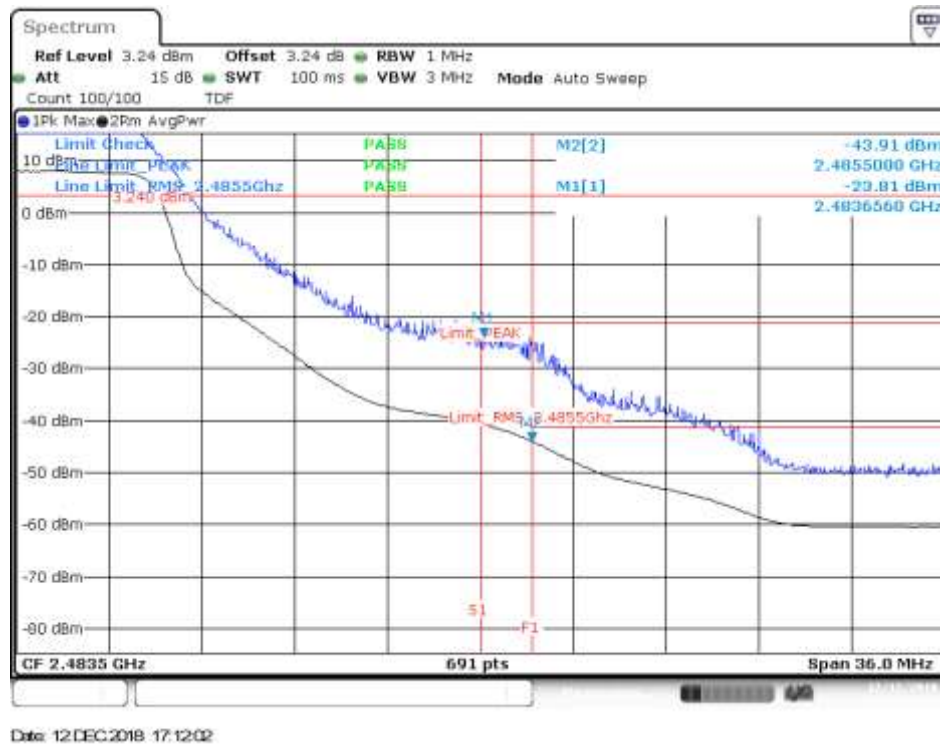


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

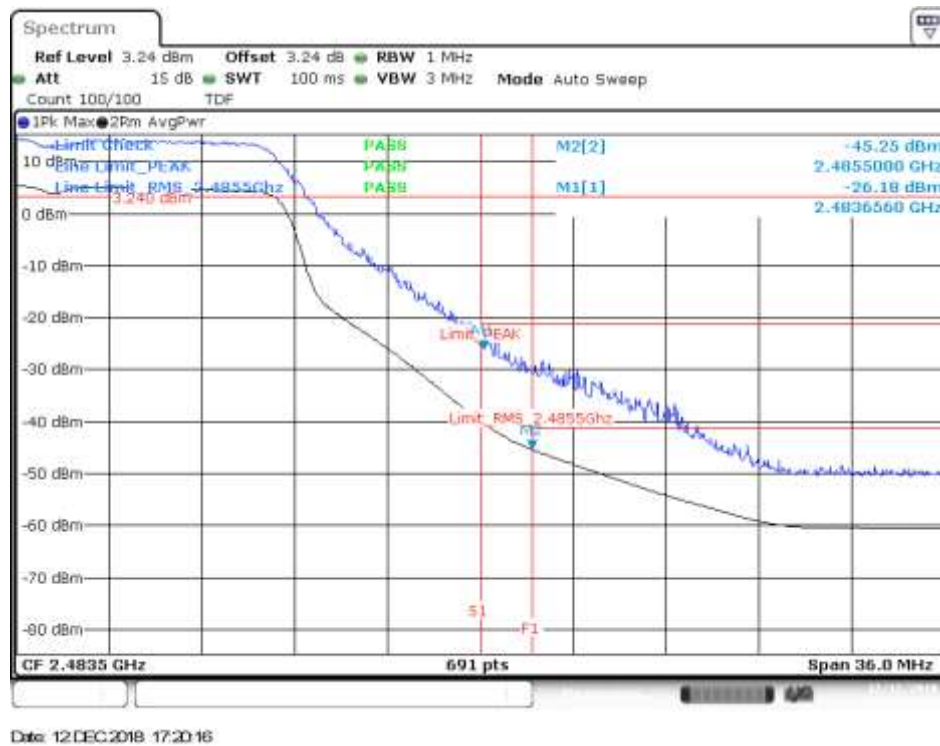


SISO-A, 802.11n20, HT0

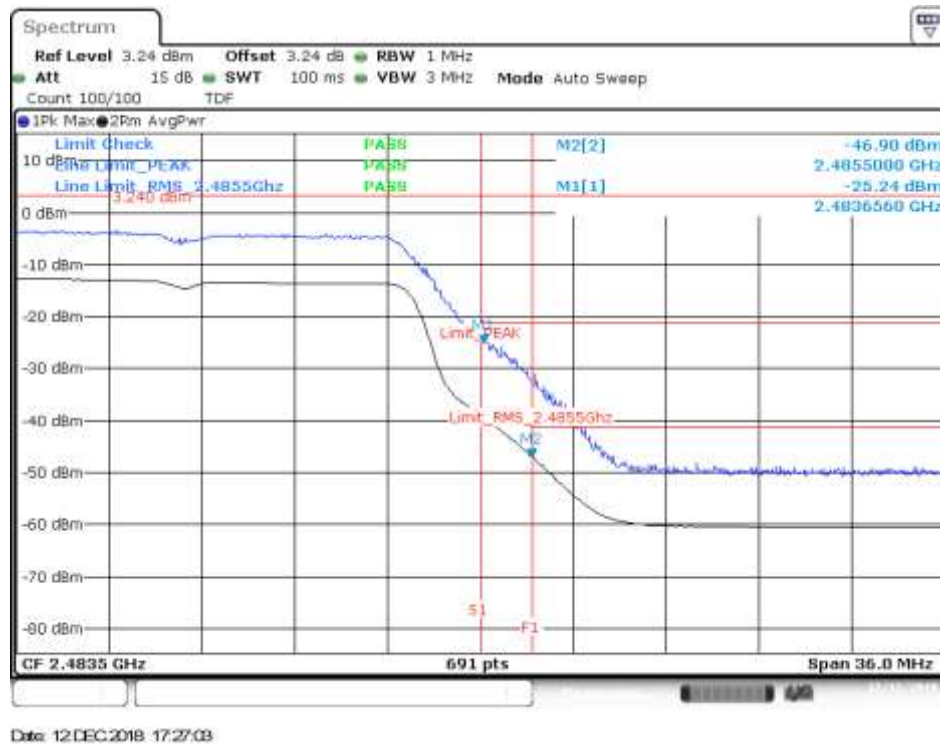
Channel 11 - BE High Freq Section (restricted)



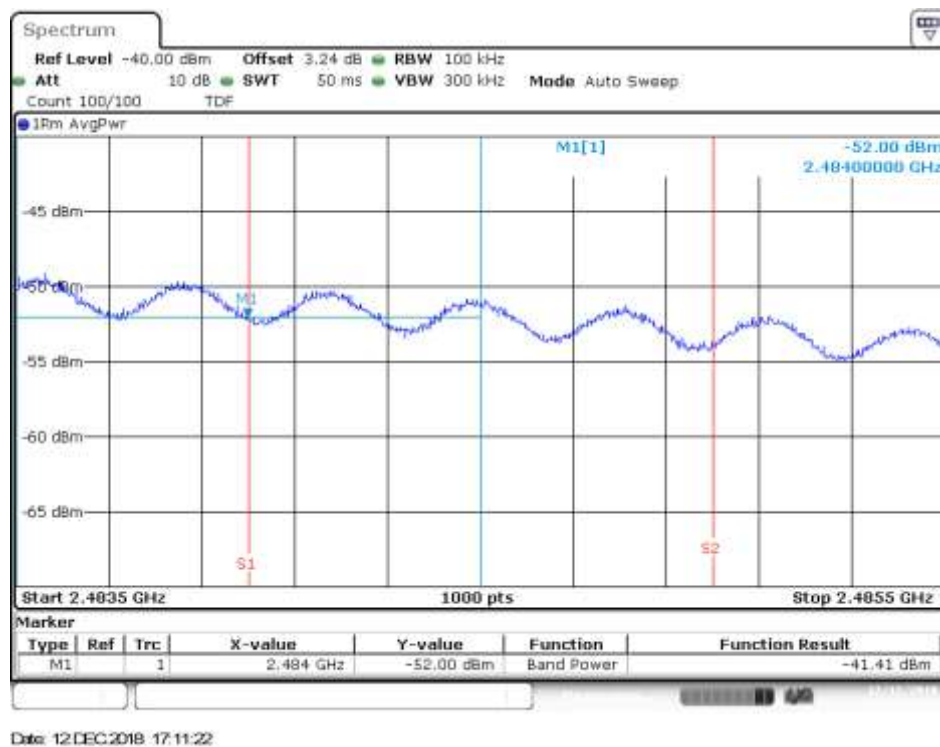
Channel 12 - BE High Freq Section (restricted)



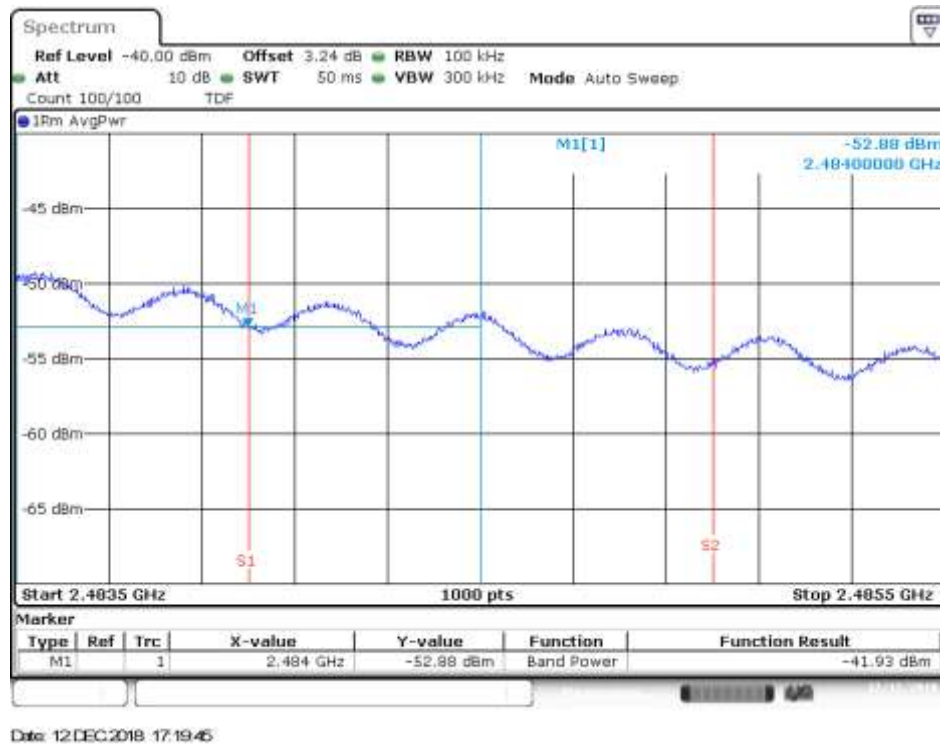
Channel 13 - BE High Freq Section (restricted)



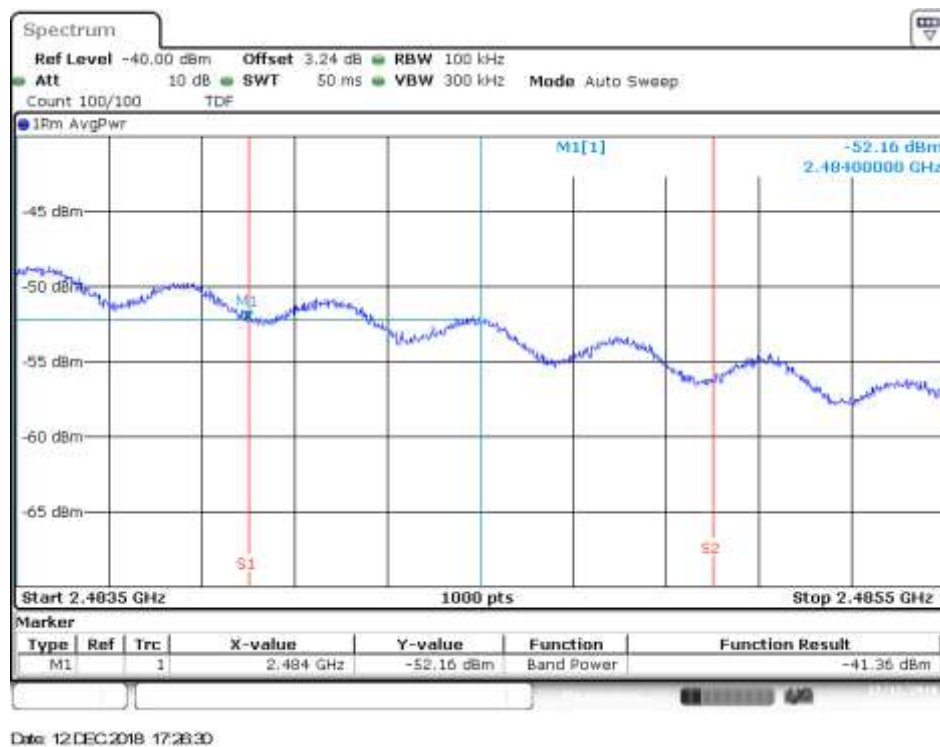
Channel 11 - BE High Freq Section RMS within 2MHz (restricted)



Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

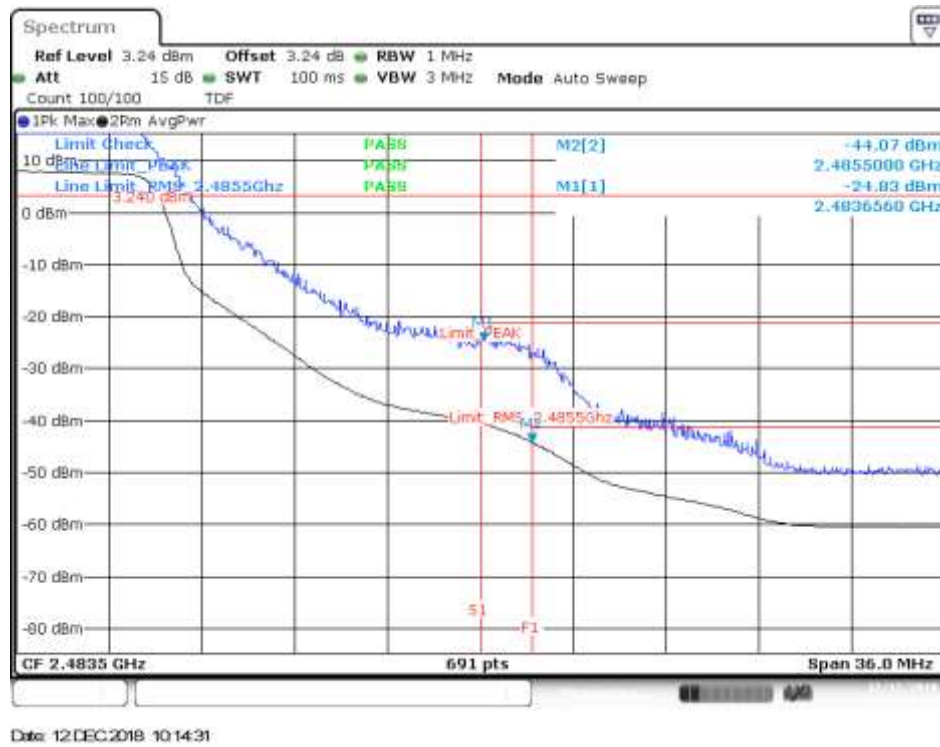


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

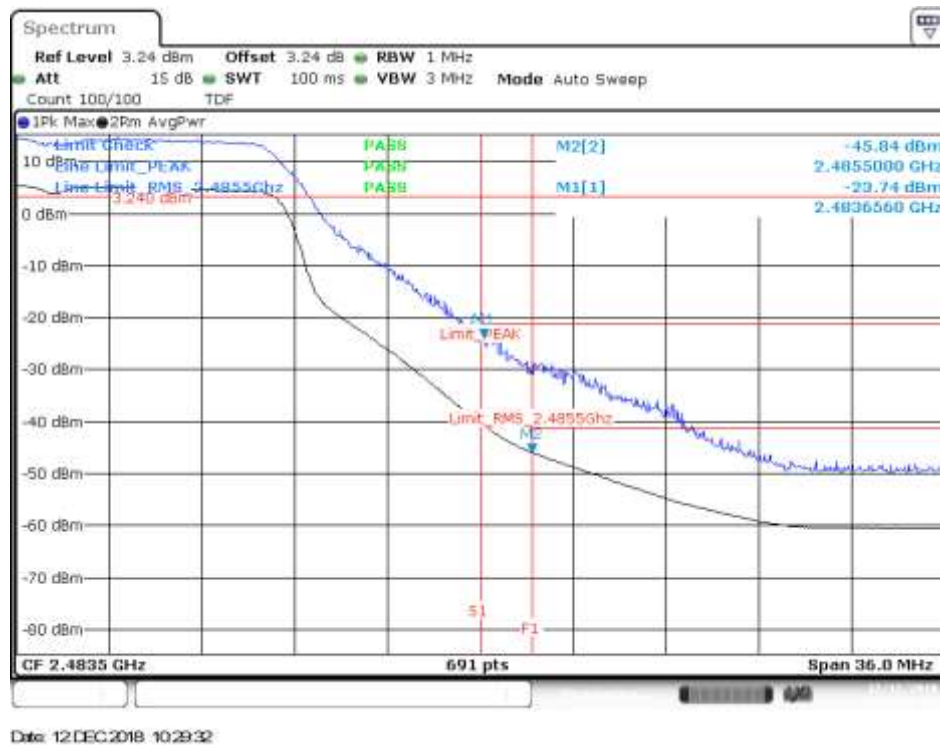


SISO-B, 802.11n20, HT0

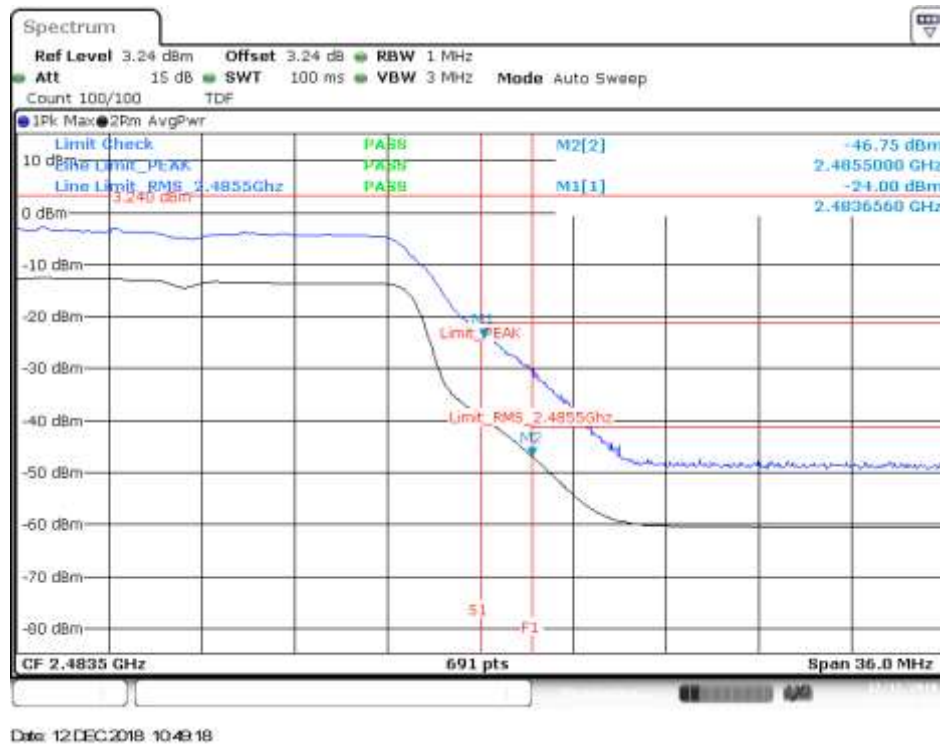
Channel 11 - BE High Freq Section (restricted)



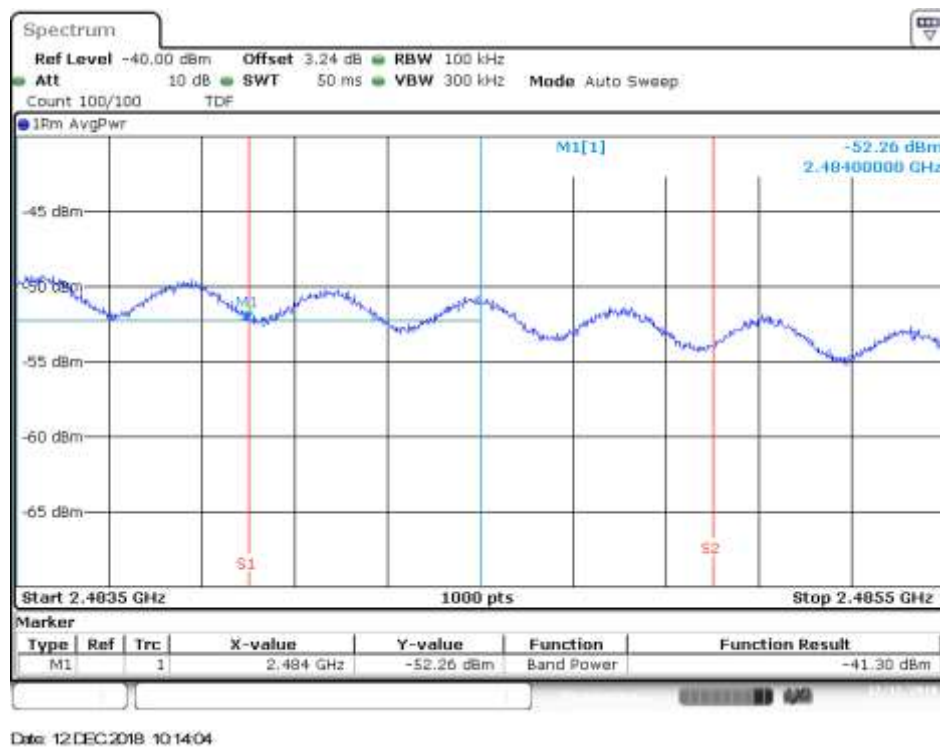
Channel 12 - BE High Freq Section (restricted)



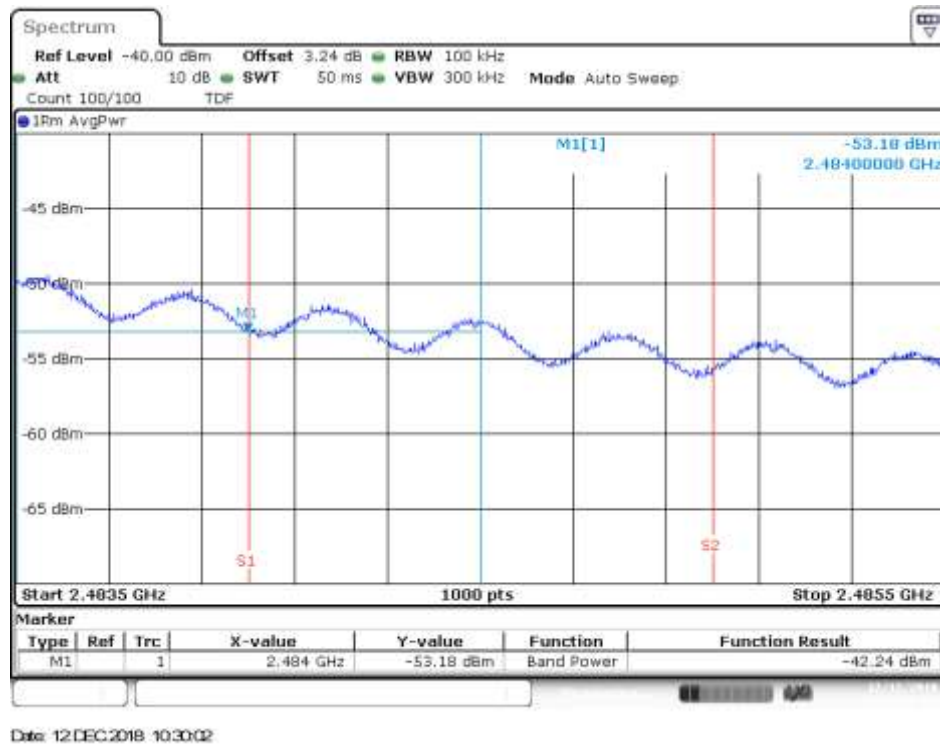
Channel 13 - BE High Freq Section (restricted)



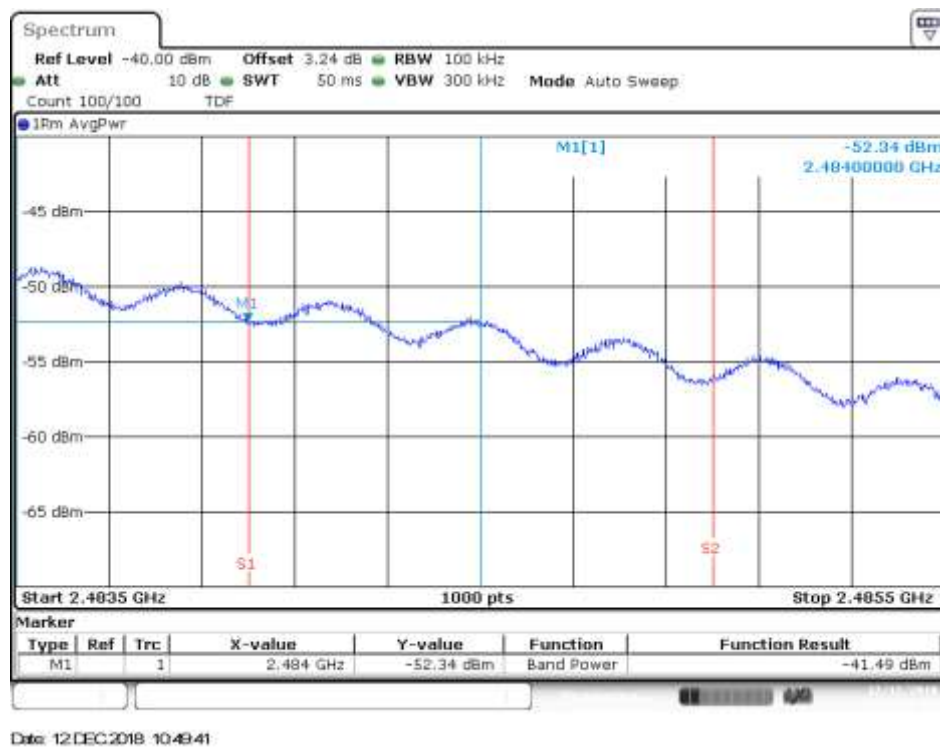
Channel 11 - BE High Freq Section RMS within 2MHz (restricted)



Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

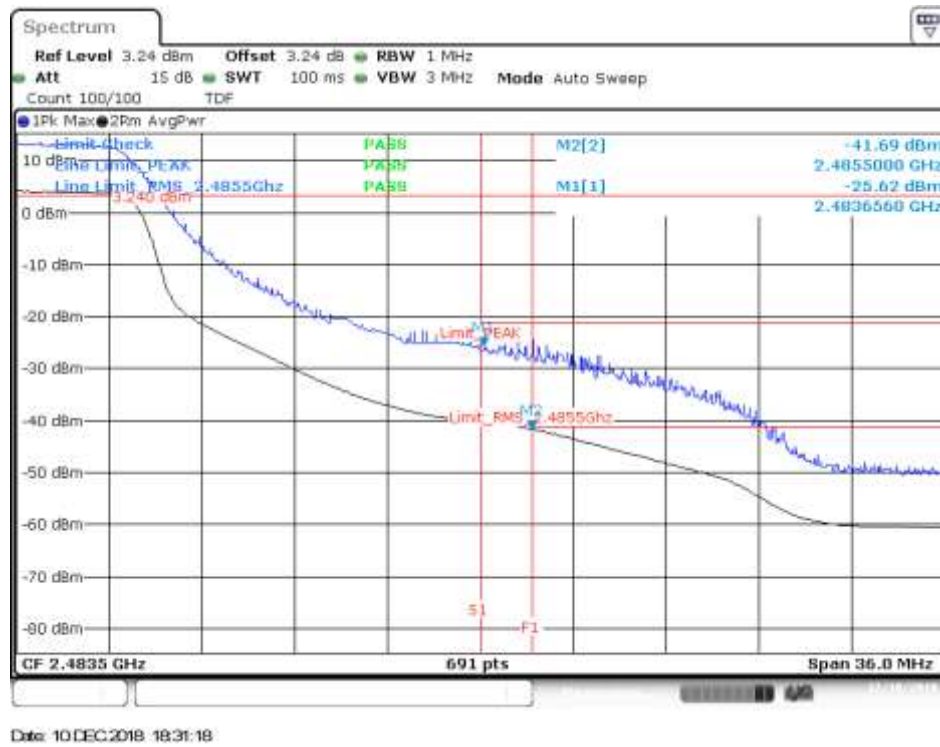


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

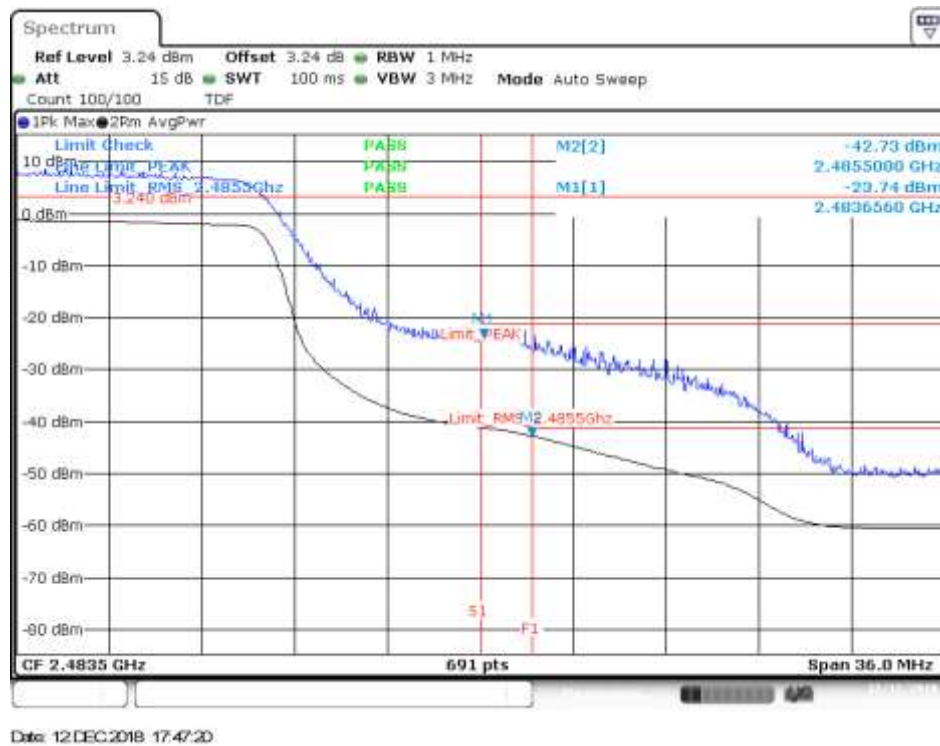


SISO-A, 802.11n40, HT0

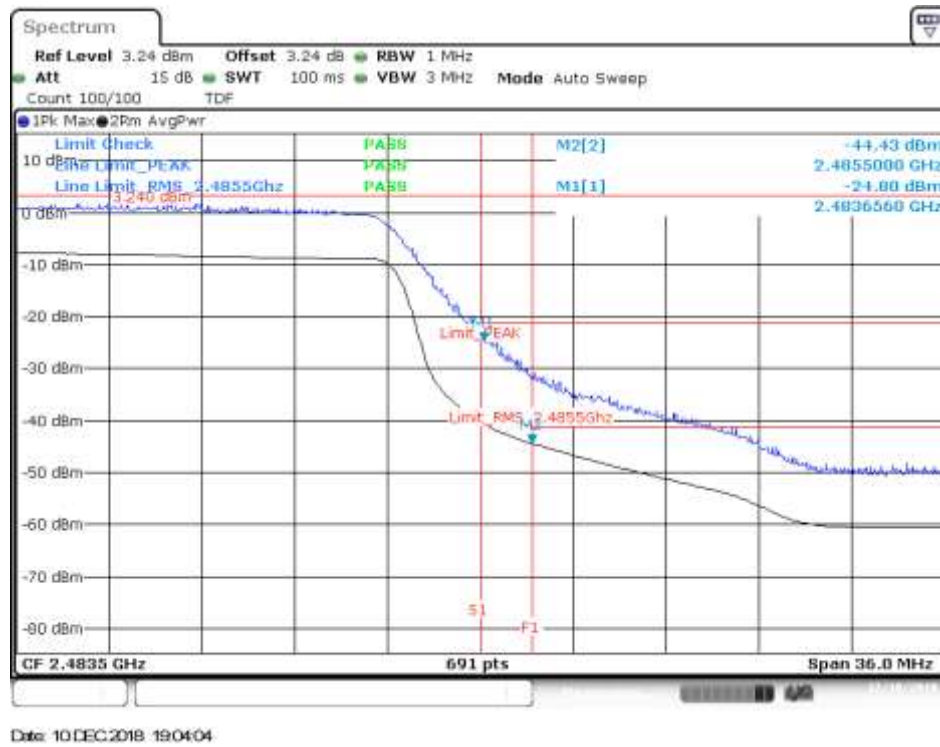
Channel 9F - BE High Freq Section (restricted)



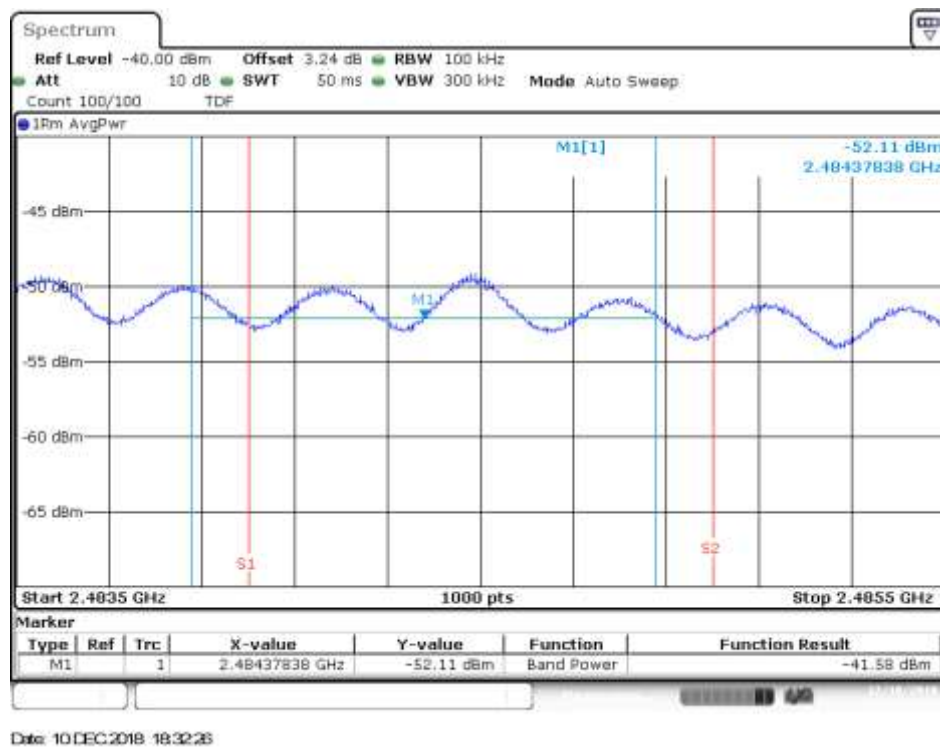
Channel 10F - BE High Freq Section (restricted)



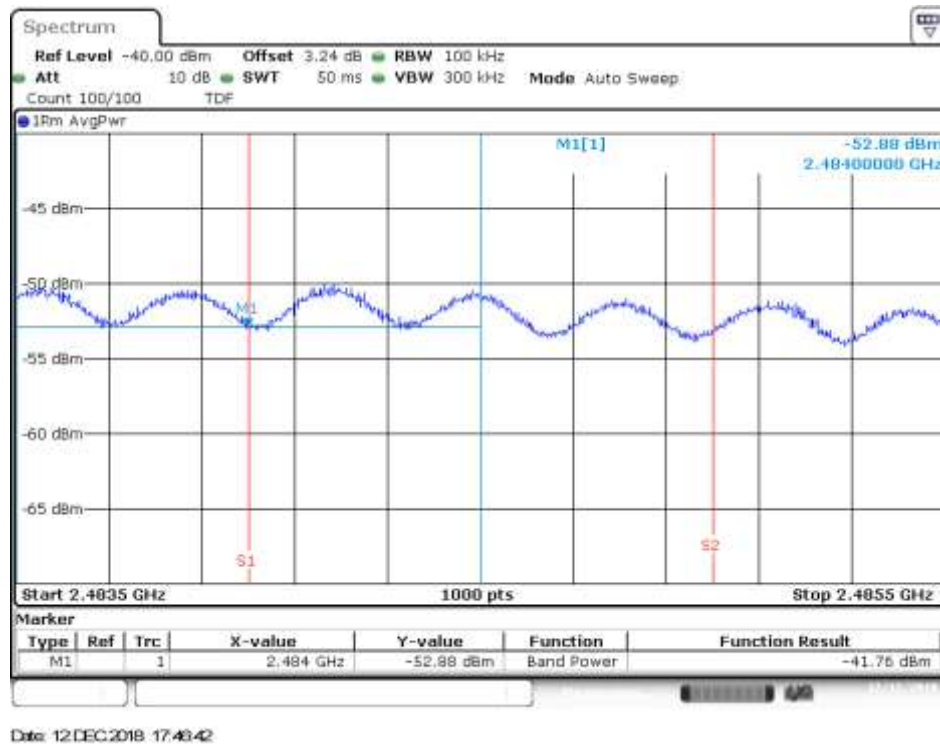
Channel 11F - BE High Freq Section (restricted)



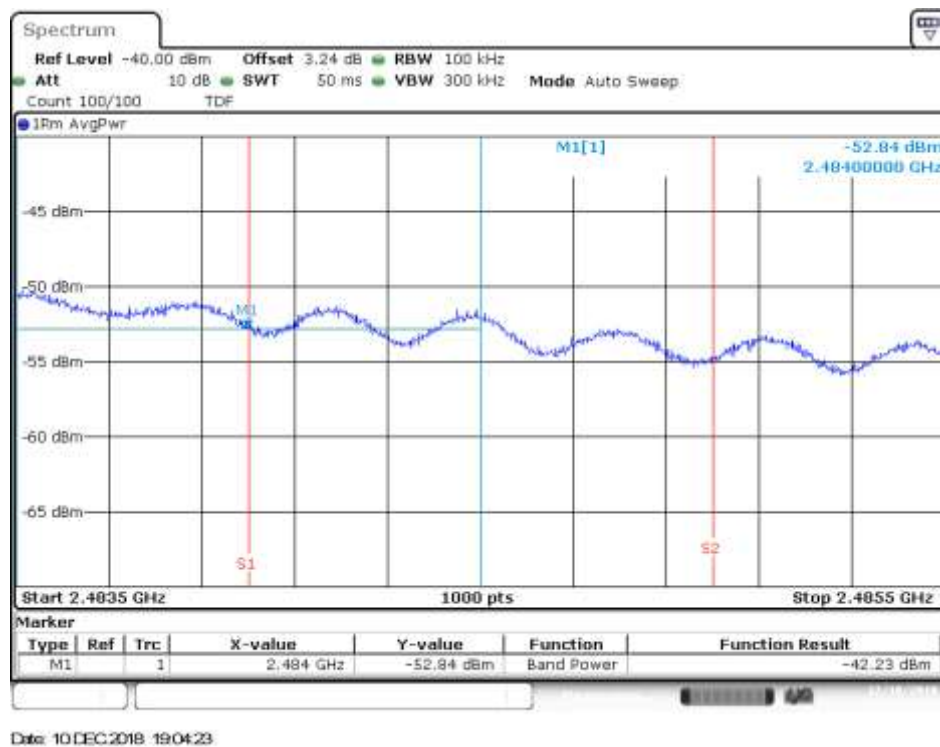
Channel 9F - BE High Freq Section RMS within 2MHz (restricted)



Channel 10F - BE High Freq Section RMS within 2MHz (restricted)

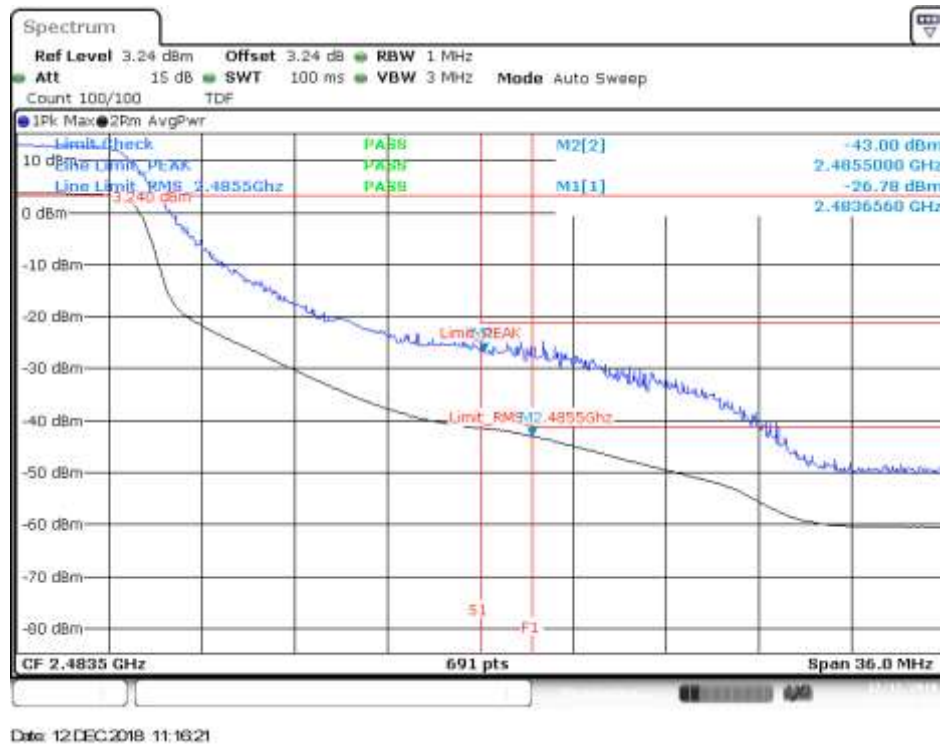


Channel 11F - BE High Freq Section RMS within 2MHz (restricted)

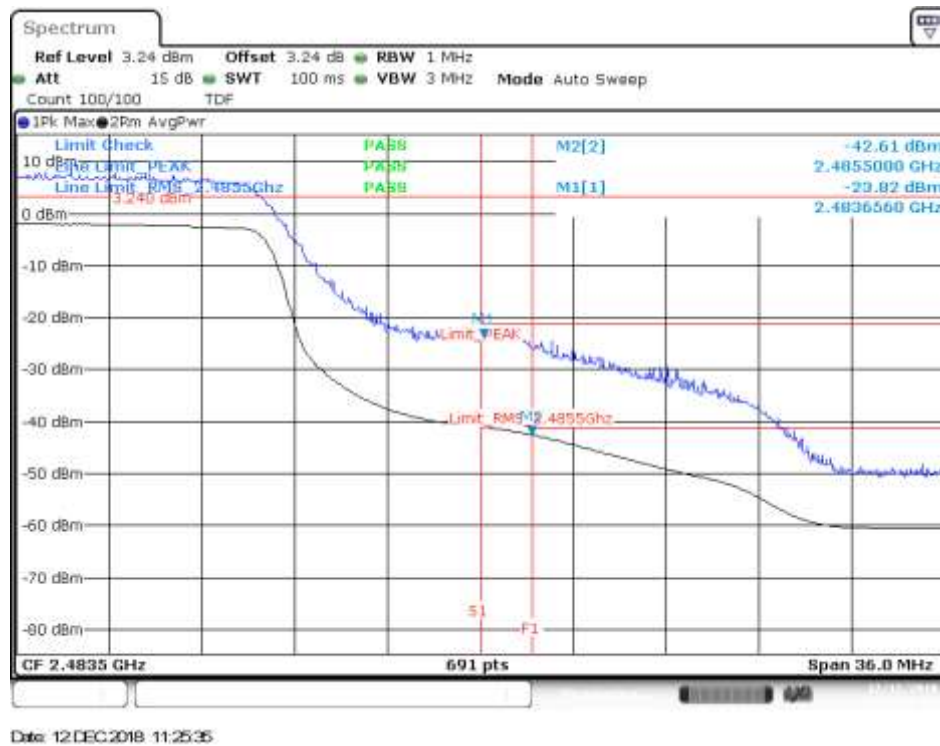


SISO-B, 802.11n40, HT0

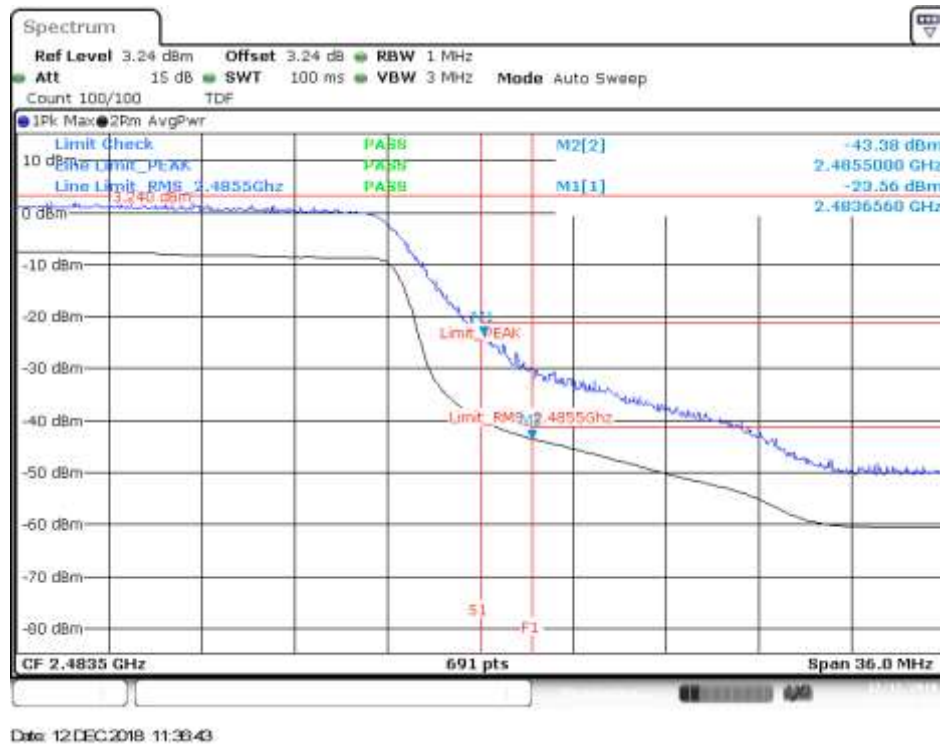
Channel 9F - BE High Freq Section (restricted)



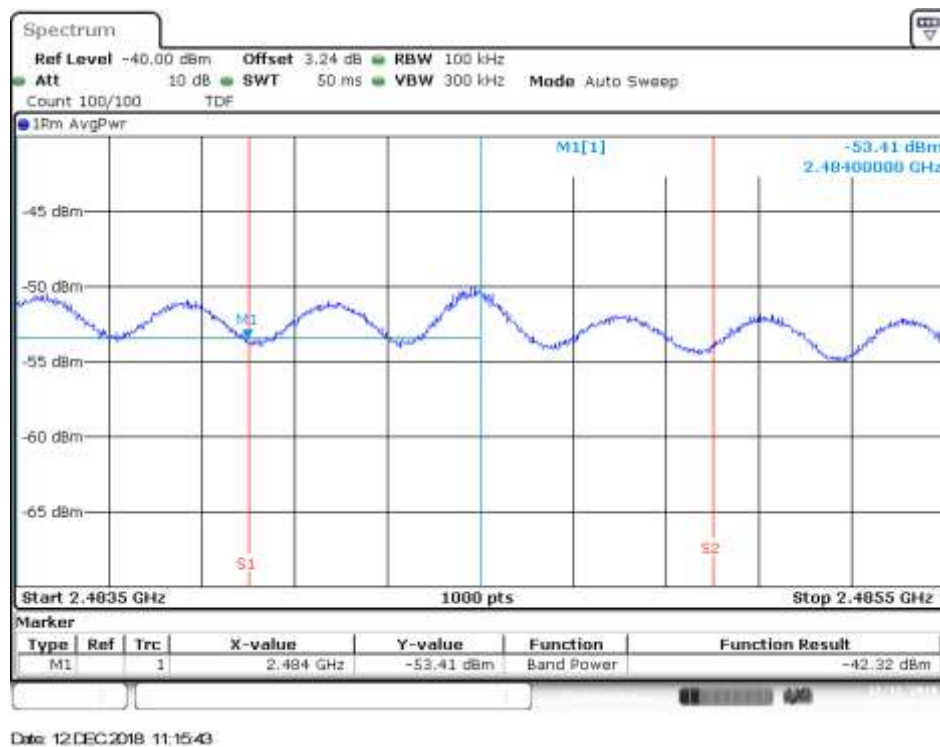
Channel 10F - BE High Freq Section (restricted)



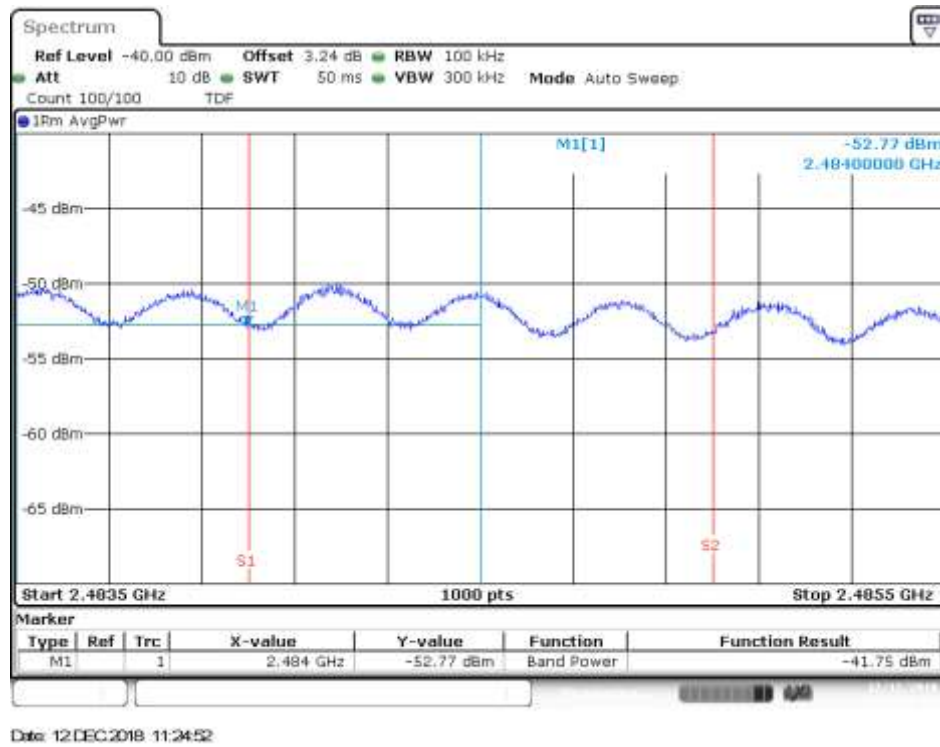
Channel 11F - BE High Freq Section (restricted)



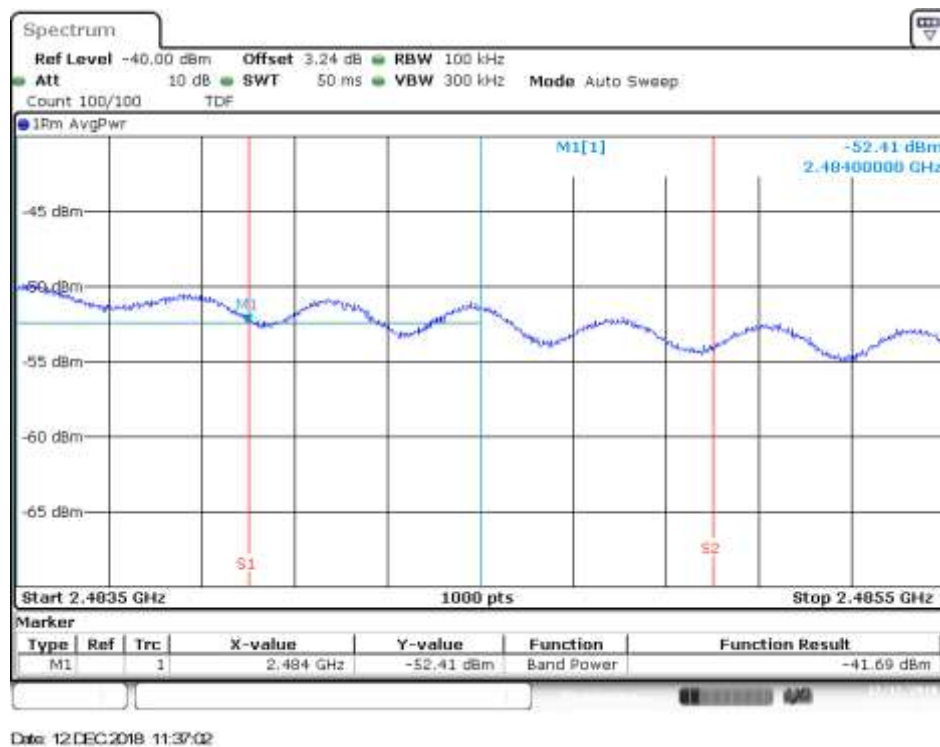
Channel 9F - BE High Freq Section RMS within 2MHz (restricted)



Channel 10F - BE High Freq Section RMS within 2MHz (restricted)

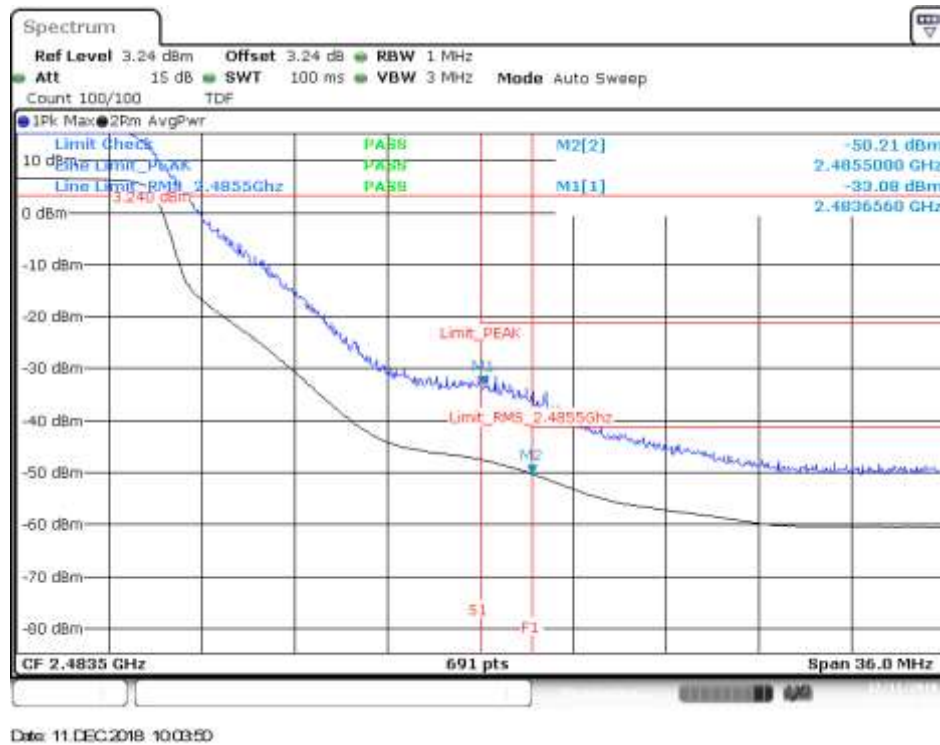


Channel 11F - BE High Freq Section RMS within 2MHz (restricted)



MIMO-A, 802.11n20, HT8

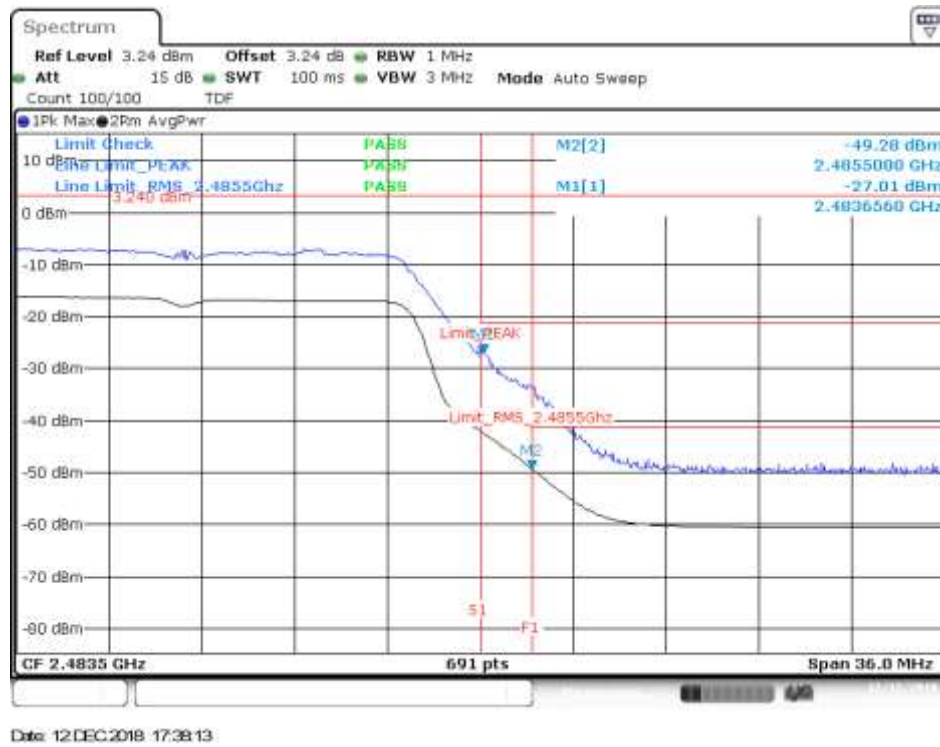
Channel 11 - BE High Freq Section (restricted)



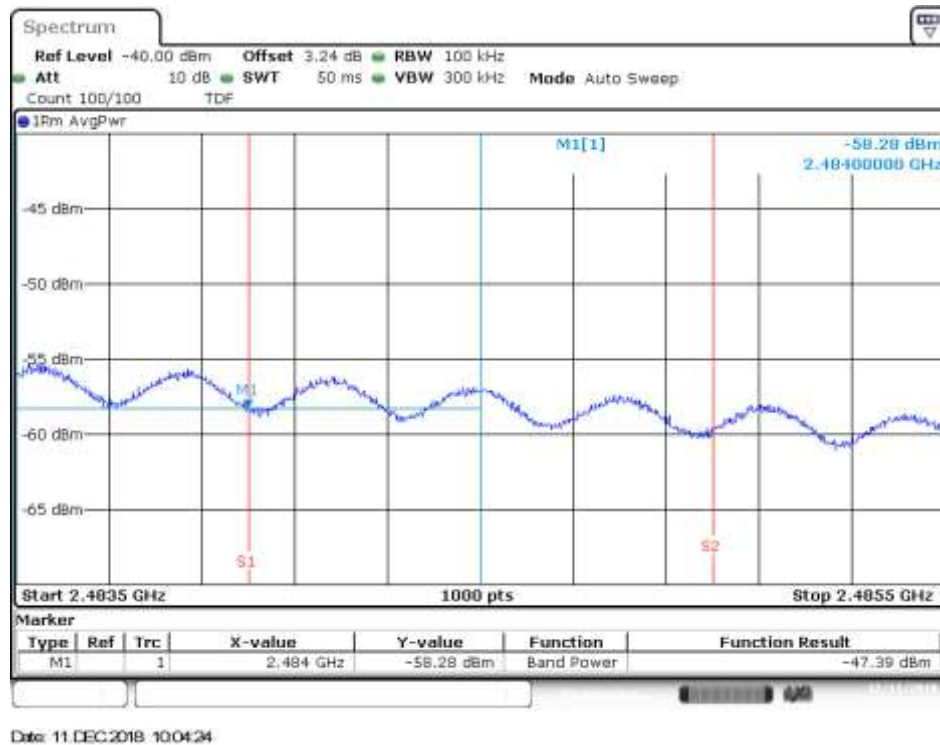
Channel 12 - BE High Freq Section (restricted)



Channel 13 - BE High Freq Section (restricted)

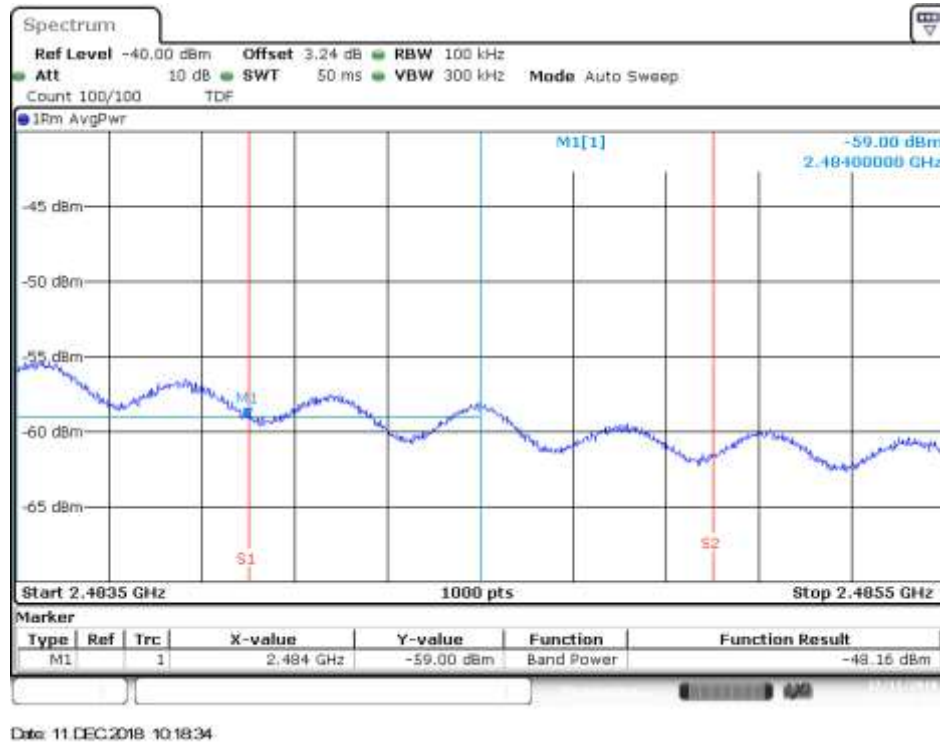


Channel 11 - BE High Freq Section RMS within 2MHz (restricted)

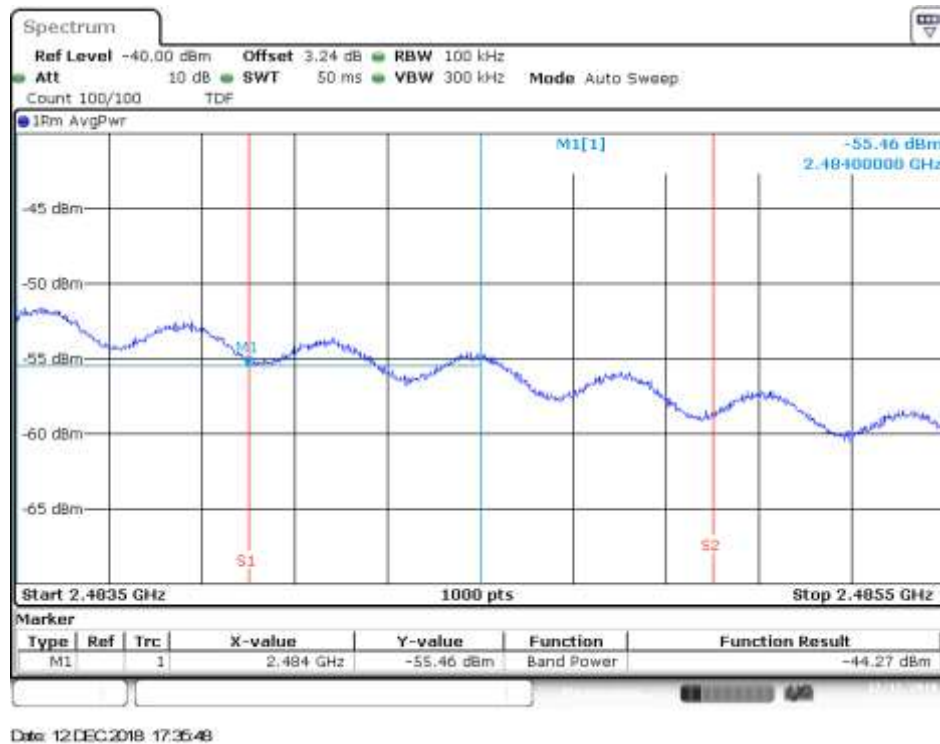


Test Report N° 181120-01.TR04

Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

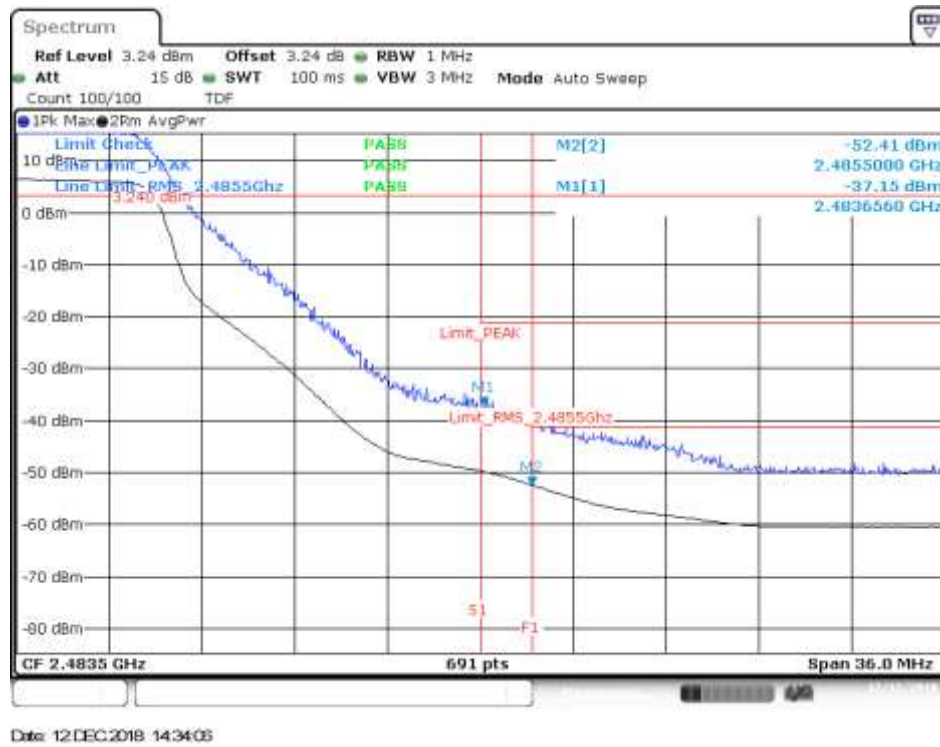


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

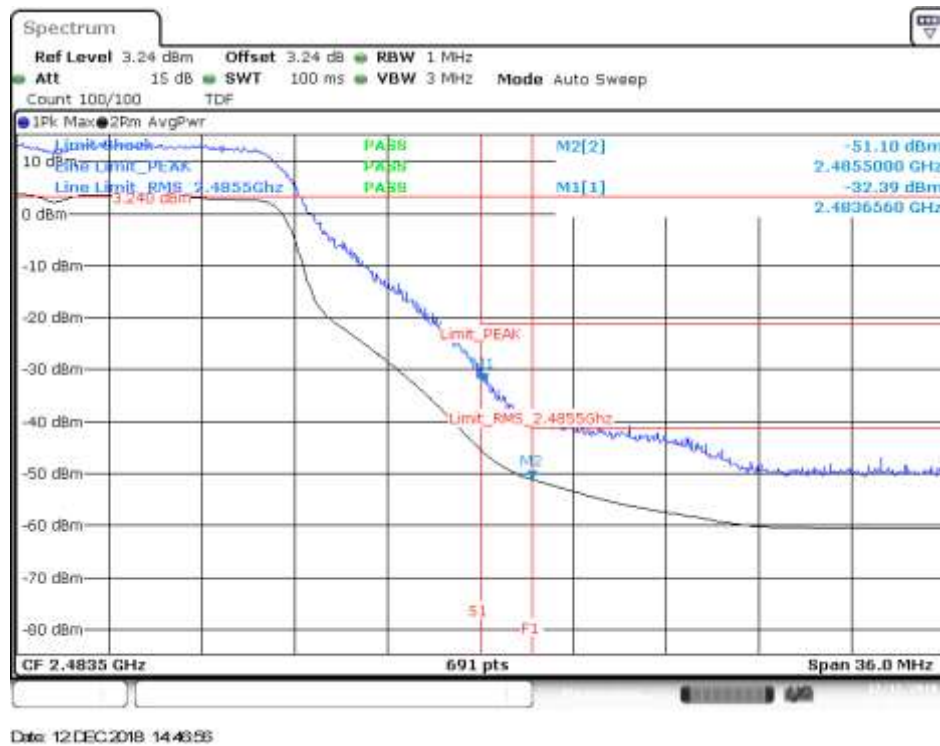


MIMO-B, 802.11n20, HT8

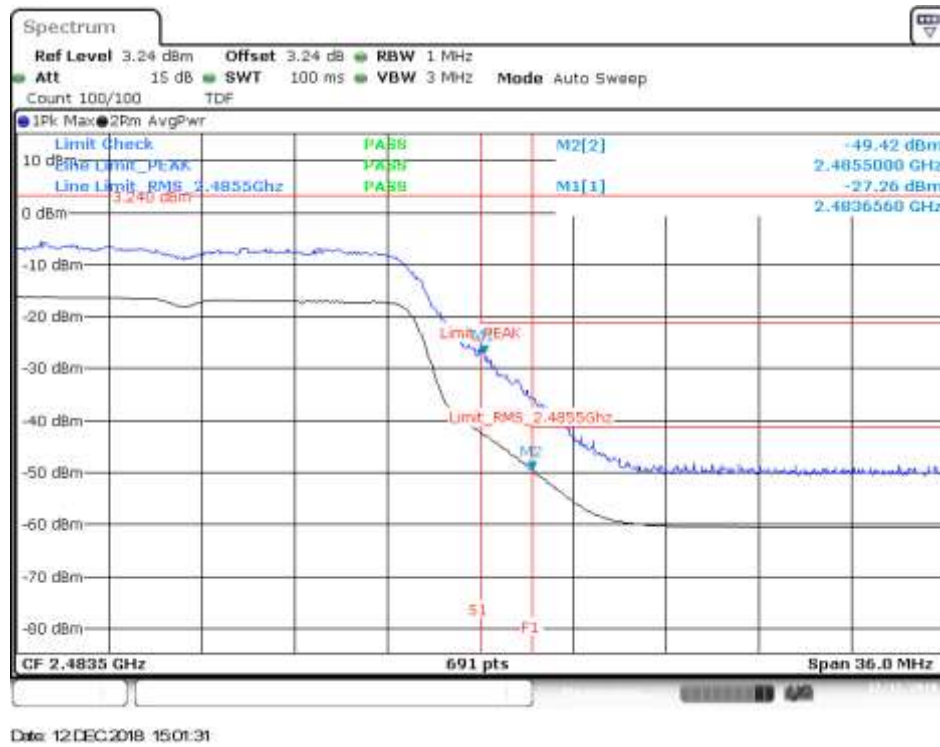
Channel 11 - BE High Freq Section (restricted)



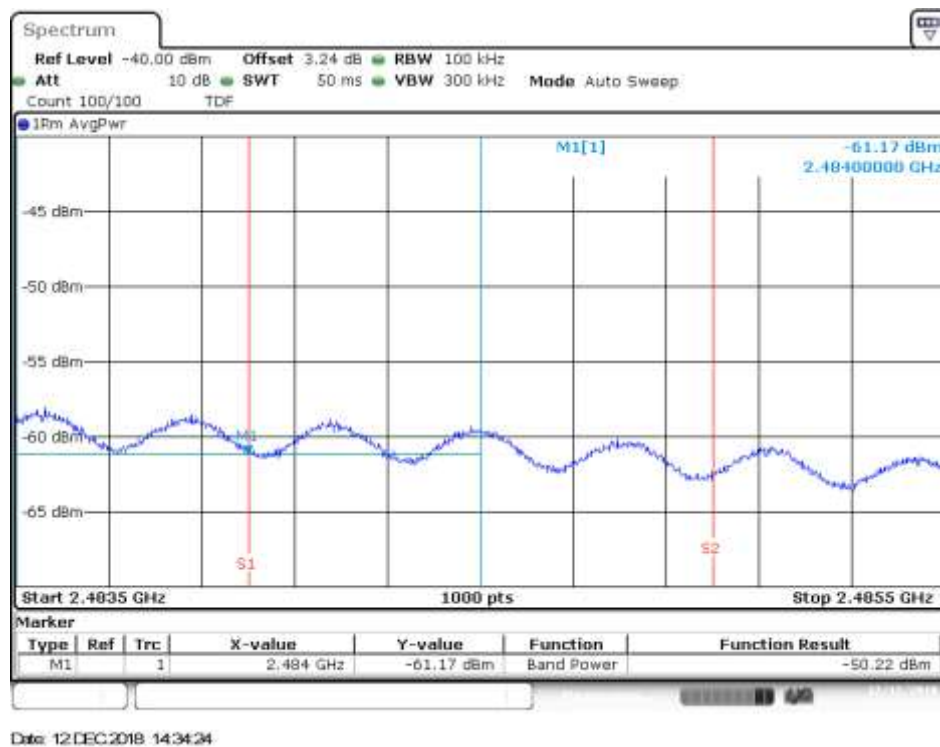
Channel 12 - BE High Freq Section (restricted)



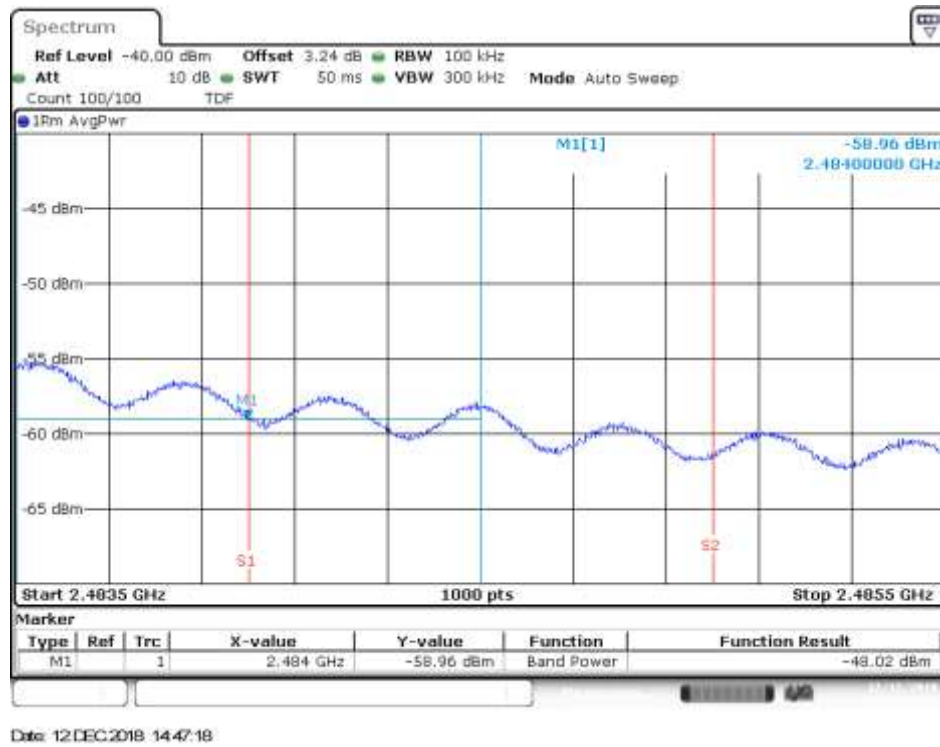
Channel 13 - BE High Freq Section (restricted)



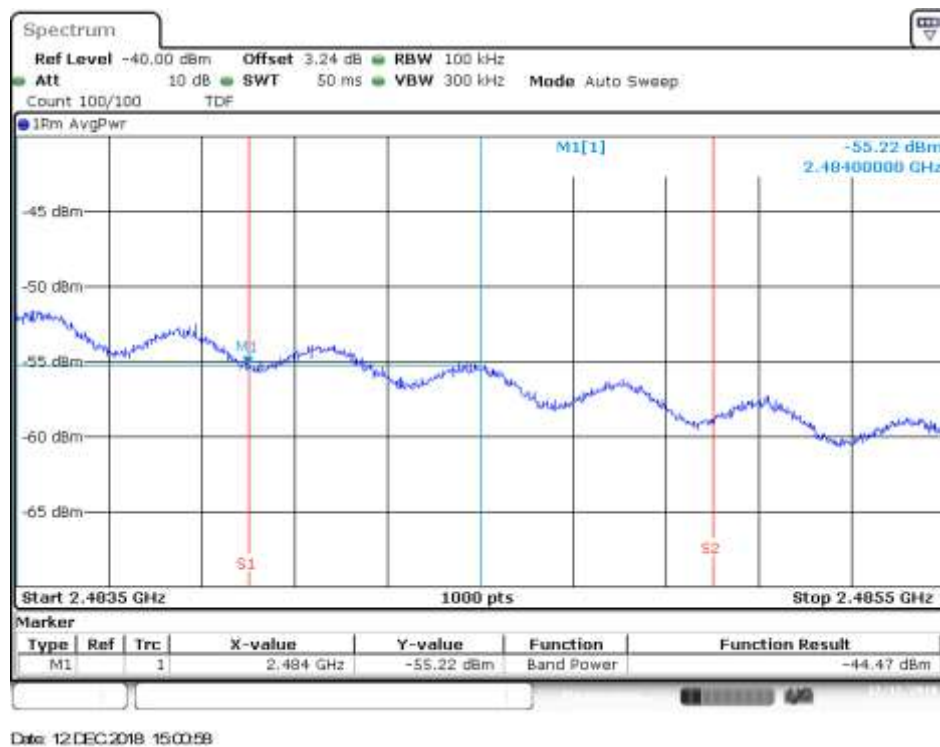
Channel 11 - BE High Freq Section RMS within 2MHz (restricted)



Channel 12 - BE High Freq Section RMS within 2MHz (restricted)

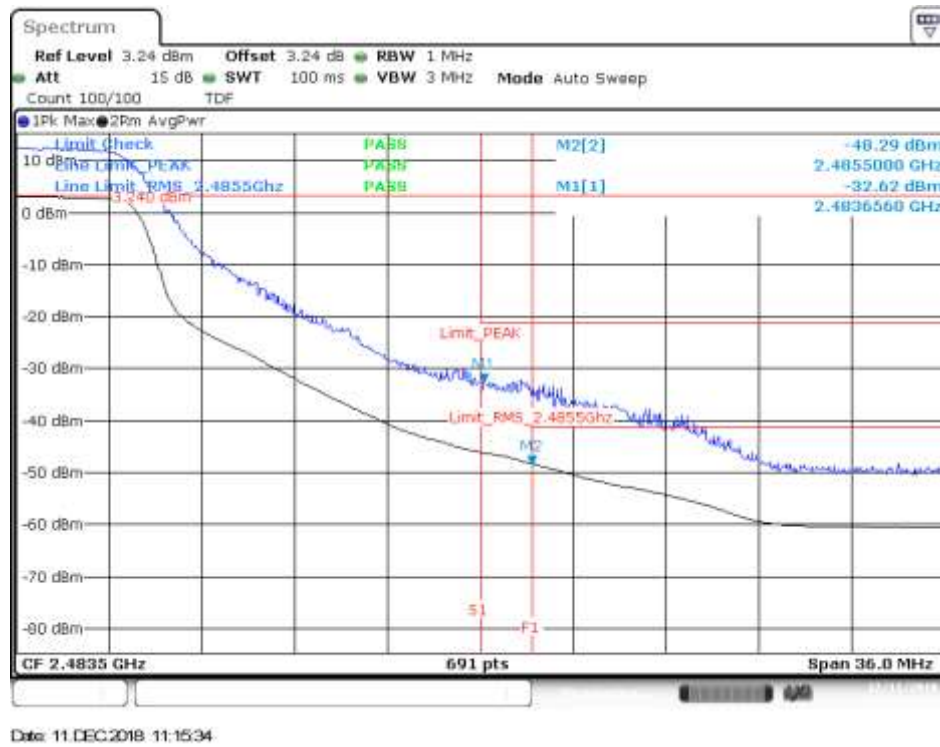


Channel 13 - BE High Freq Section RMS within 2MHz (restricted)

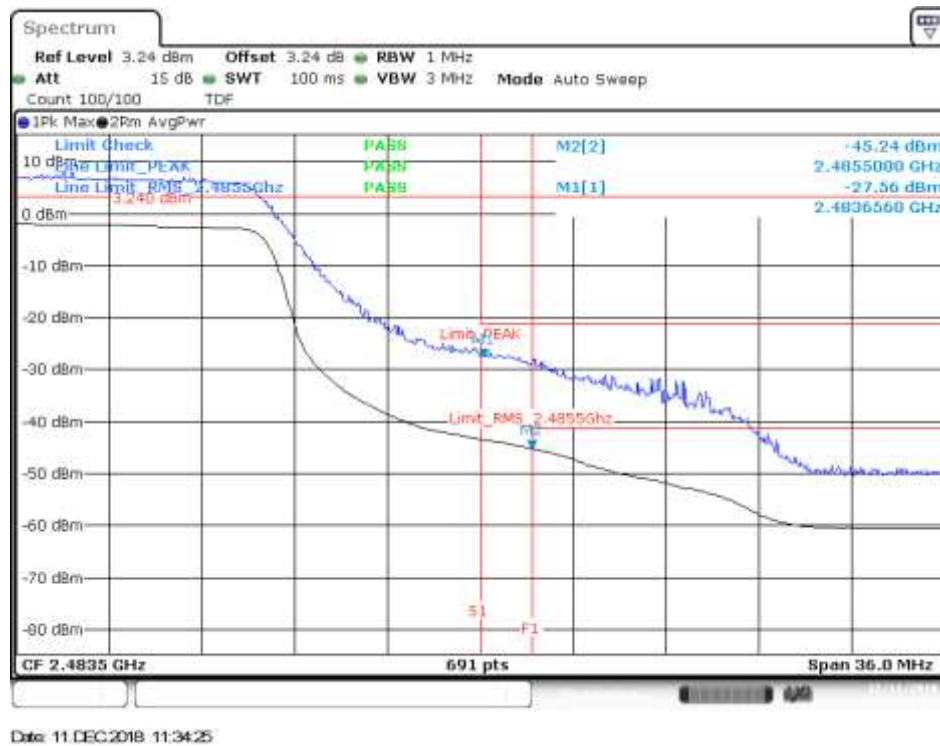


MIMO-A, 802.11n40, HT8

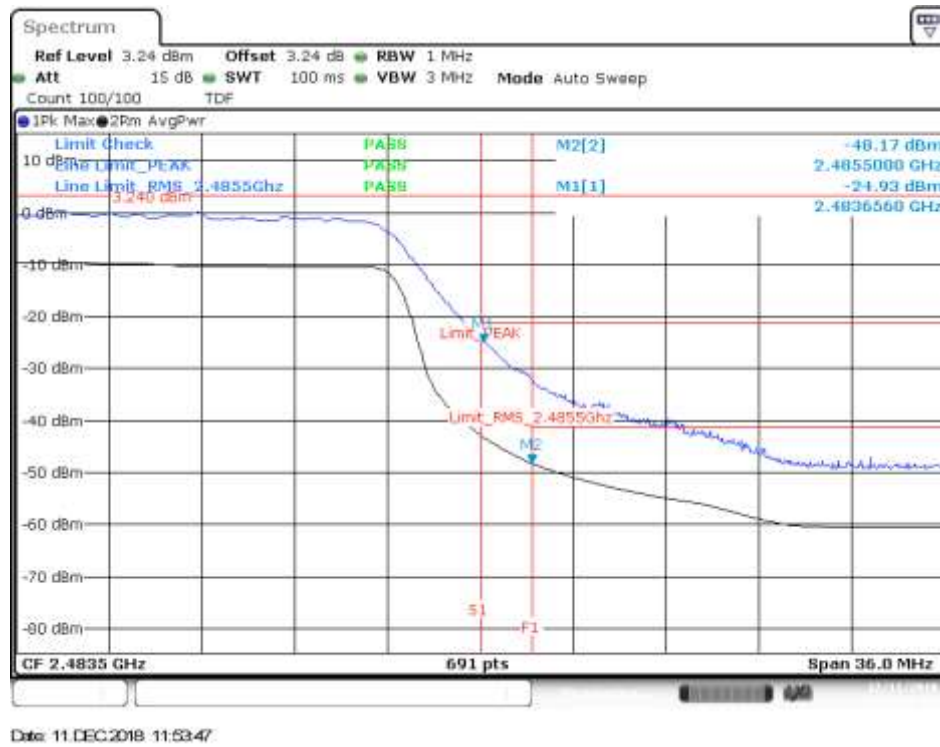
Channel 9F - BE High Freq Section (restricted)



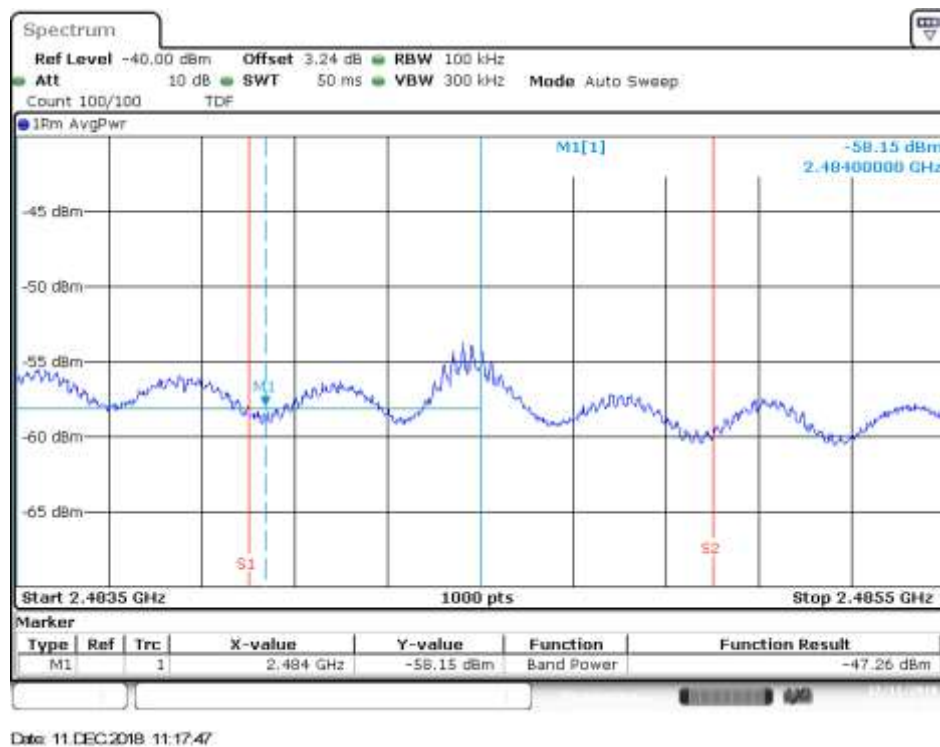
Channel 10F - BE High Freq Section (restricted)



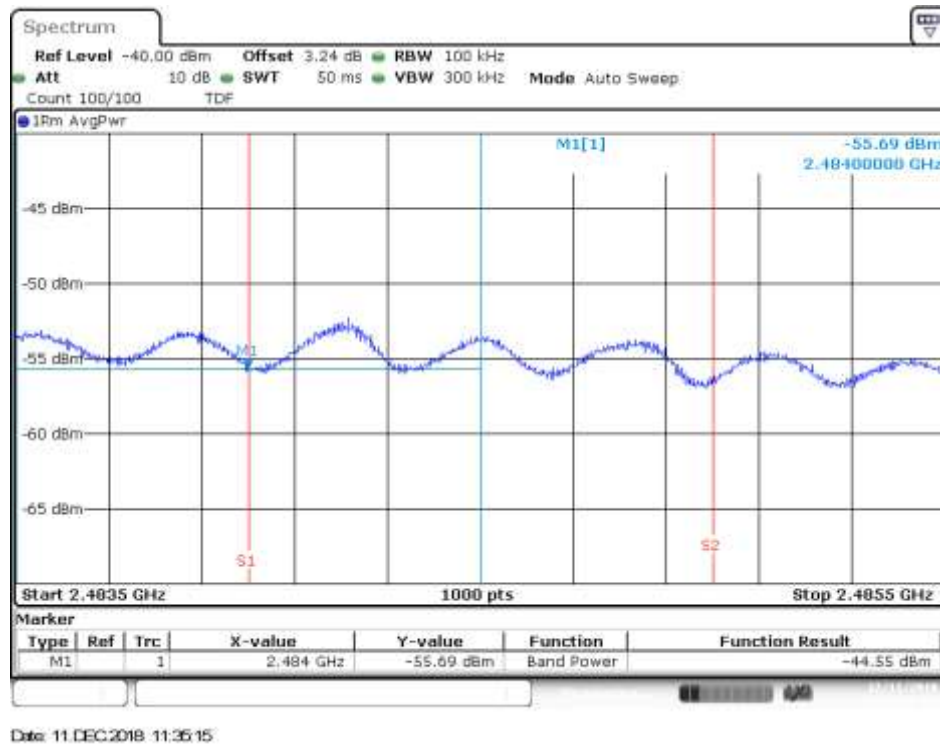
Channel 11F - BE High Freq Section (restricted)



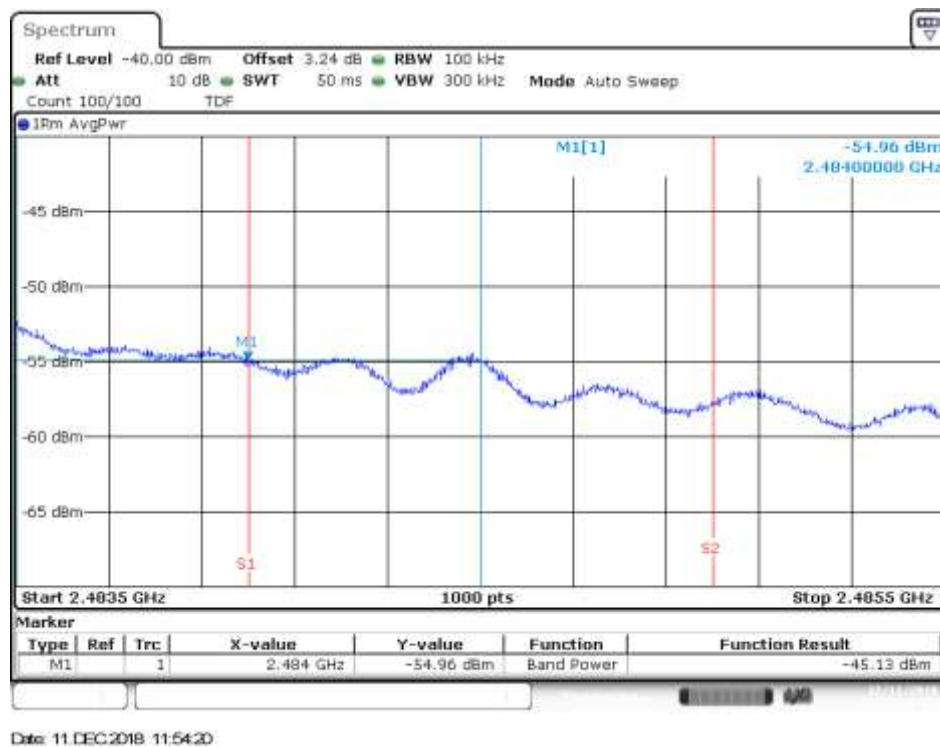
Channel 9F - BE High Freq Section RMS within 2MHz (restricted)



Channel 10F - BE High Freq Section RMS within 2MHz (restricted)

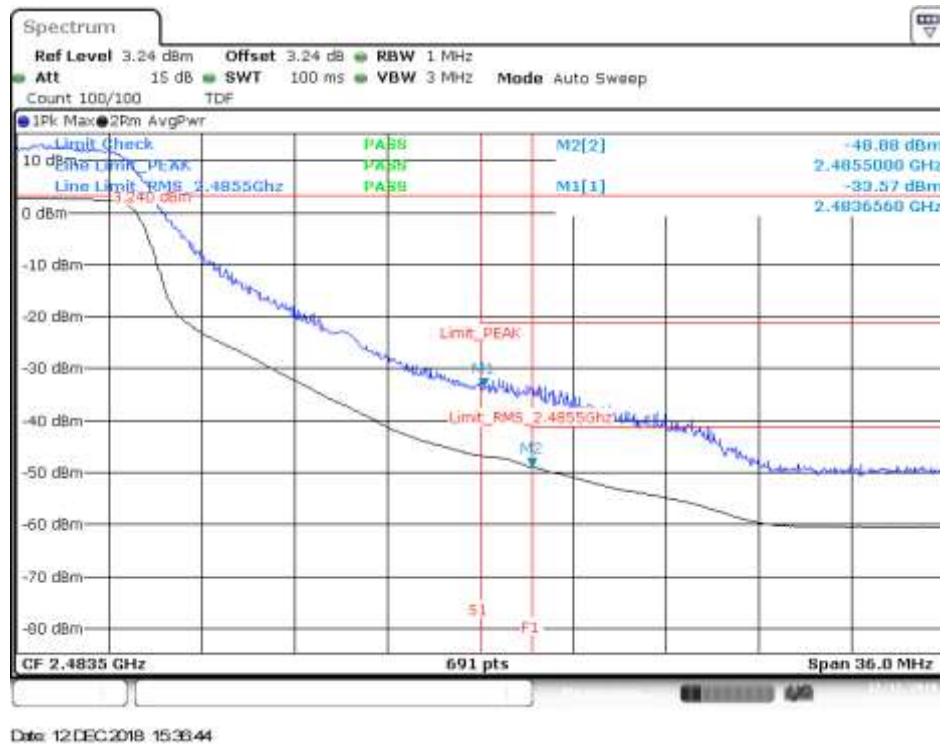


Channel 11F - BE High Freq Section RMS within 2MHz (restricted)

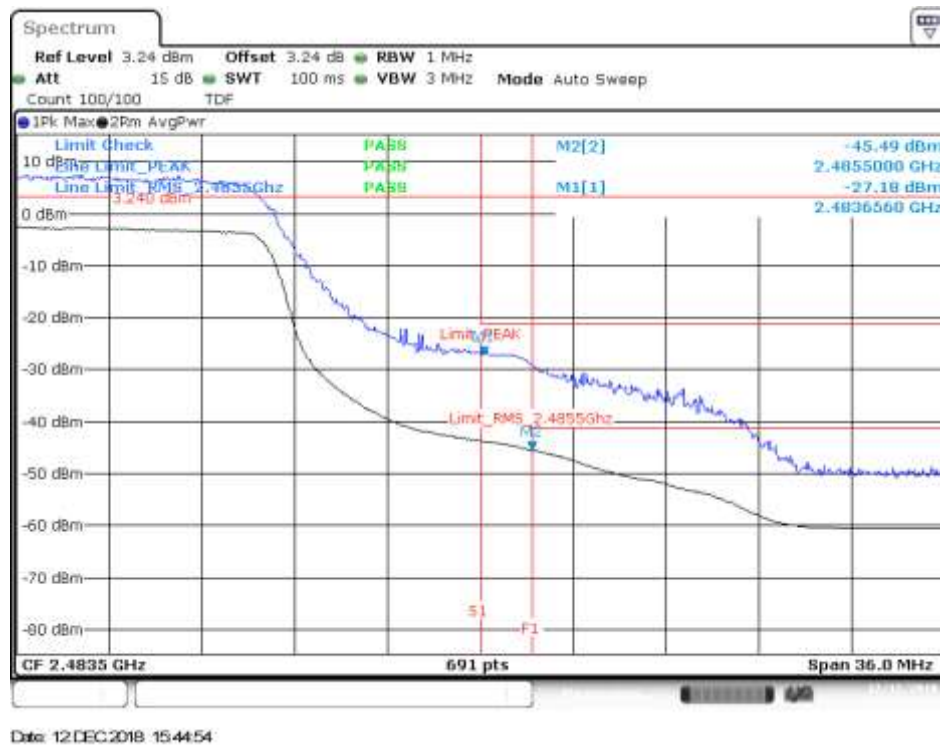


MIMO-B, 802.11n40, HT8

Channel 9F - BE High Freq Section (restricted)



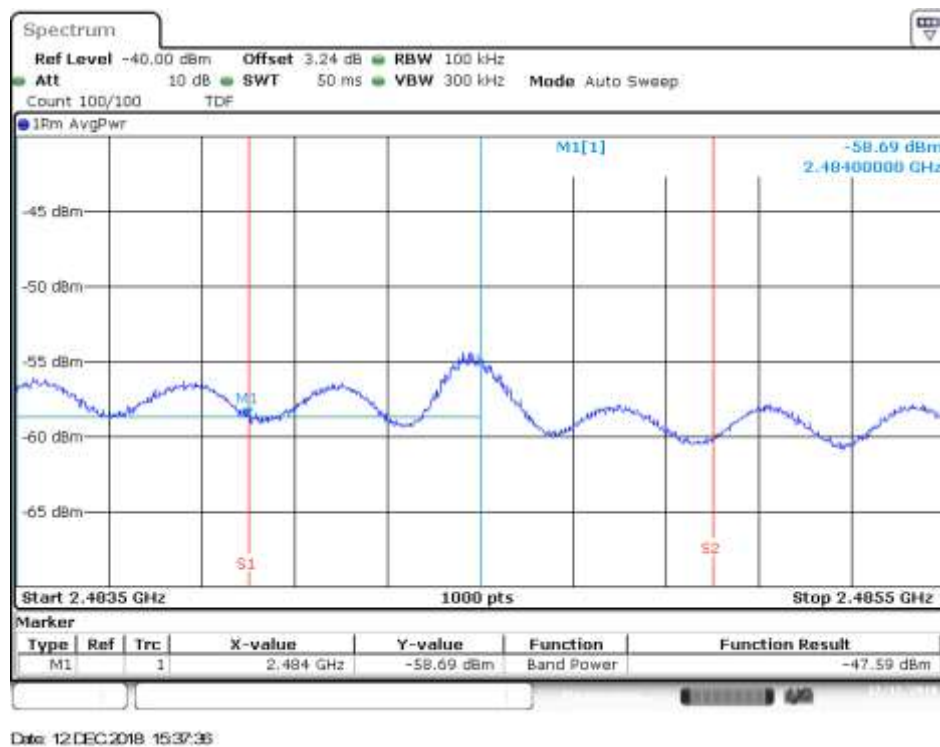
Channel 10F - BE High Freq Section (restricted)



Channel 11F - BE High Freq Section (restricted)

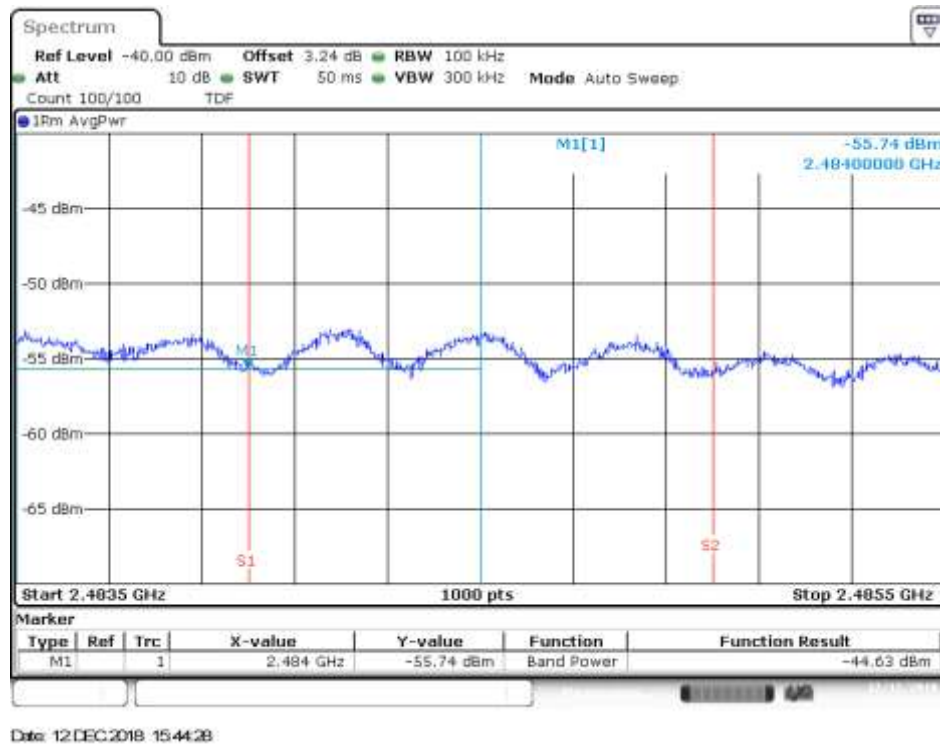


Channel 9F - BE High Freq Section RMS within 2MHz (restricted)

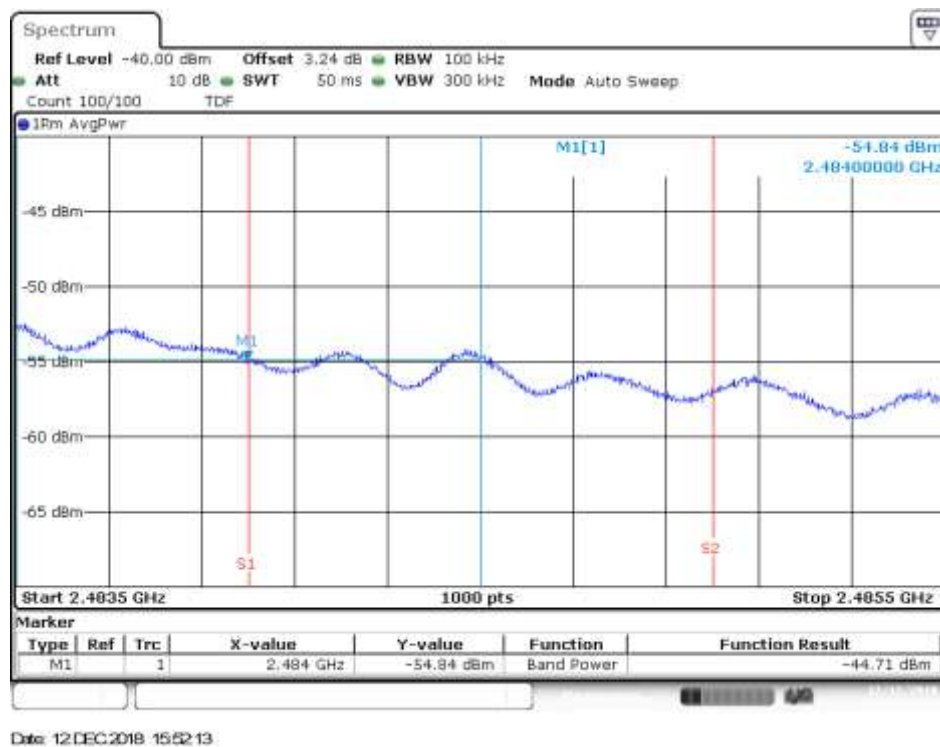


Test Report N° 181120-01.TR04

Channel 10F - BE High Freq Section RMS within 2MHz (restricted)



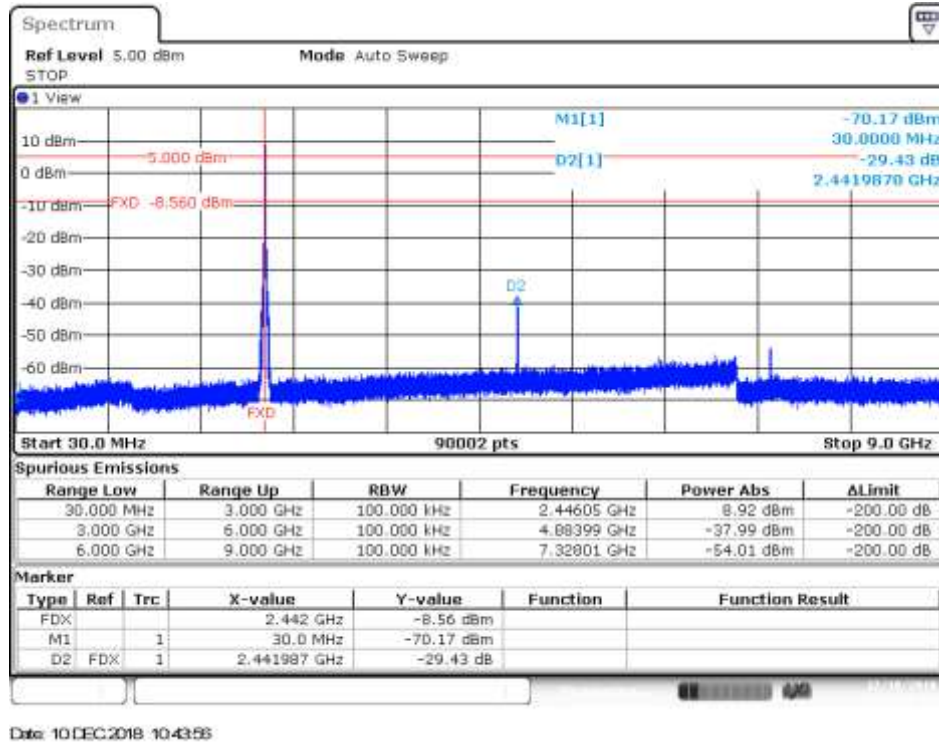
Channel 11F - BE High Freq Section RMS within 2MHz (restricted)



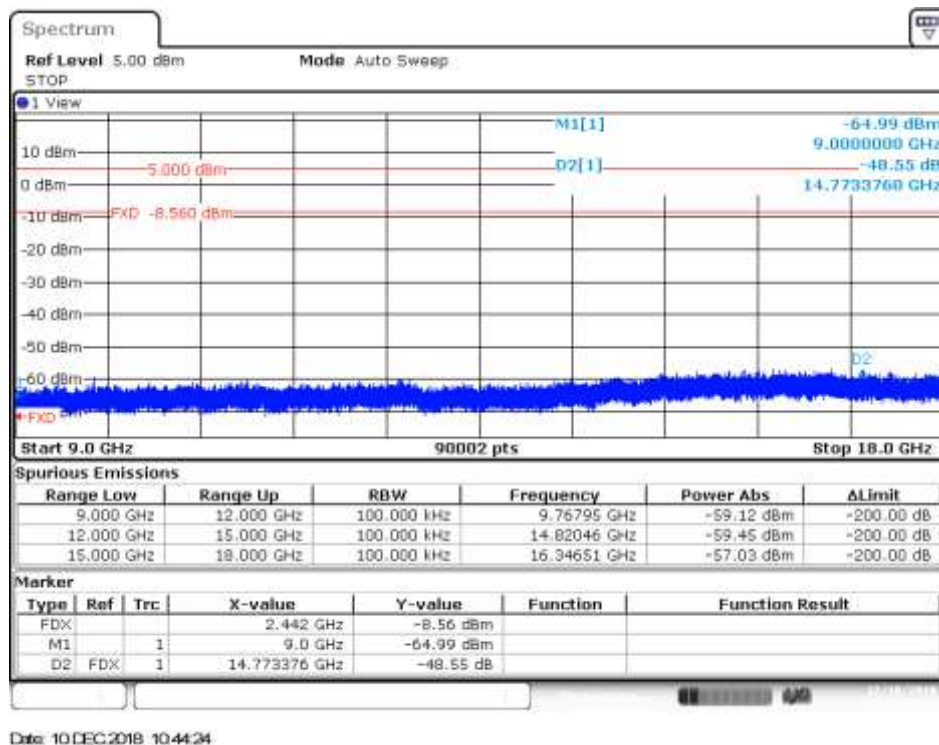
B.3.7 Out of band emissions - spurious

SISO-A, 802.11b, 1Mbps

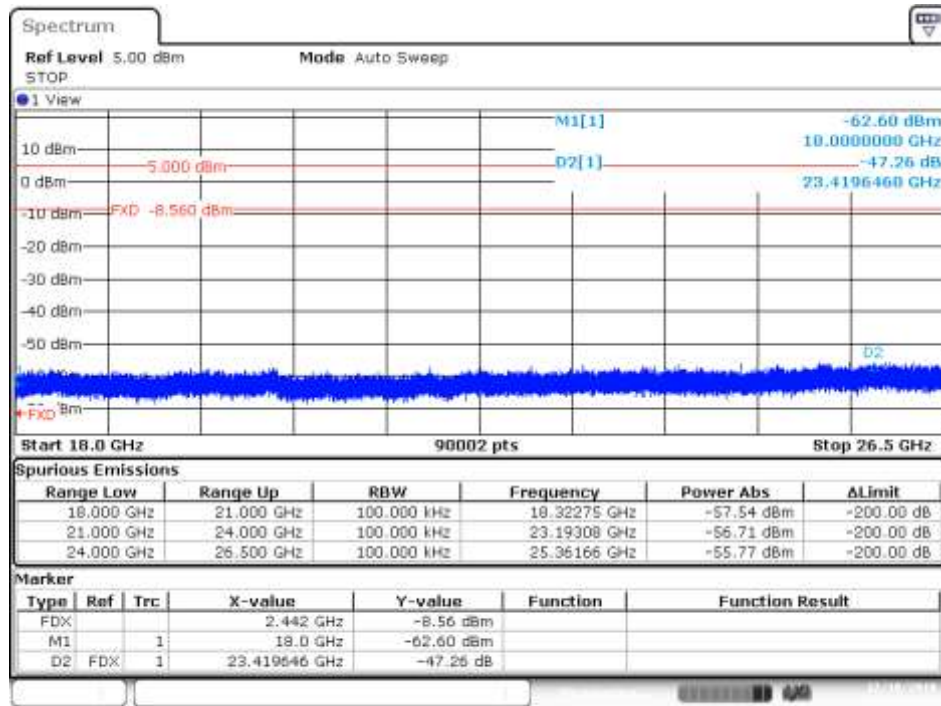
Channel 7 - Range 30MHz to 9GHz - Delta Marker Measurement



Channel 7 - Range 9GHz to 18GHz - Delta Marker Measurement



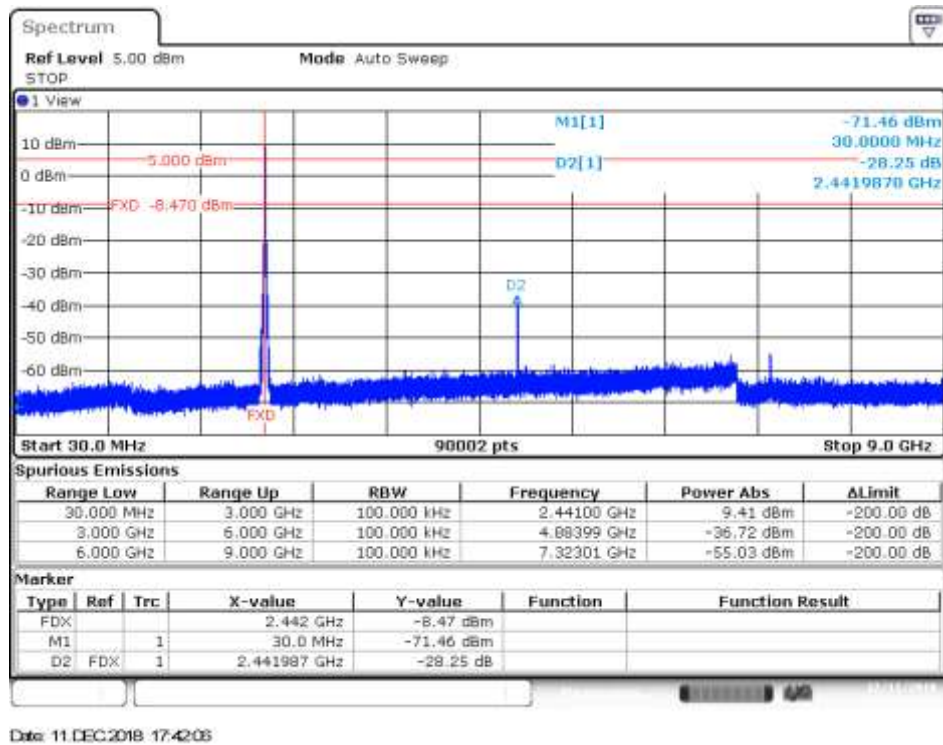
Channel 7 - Range 18GHz to 26.5GHz - Delta Marker Measurement



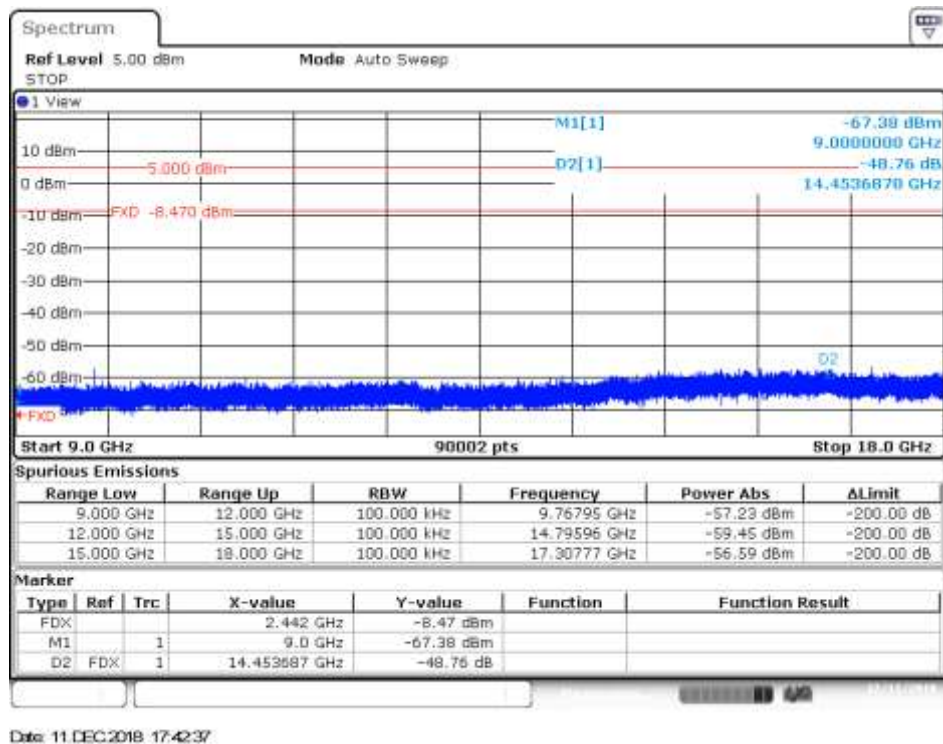
Date: 10 DEC 2018 10:44:54

SISO-B, 802.11b, 1Mbps

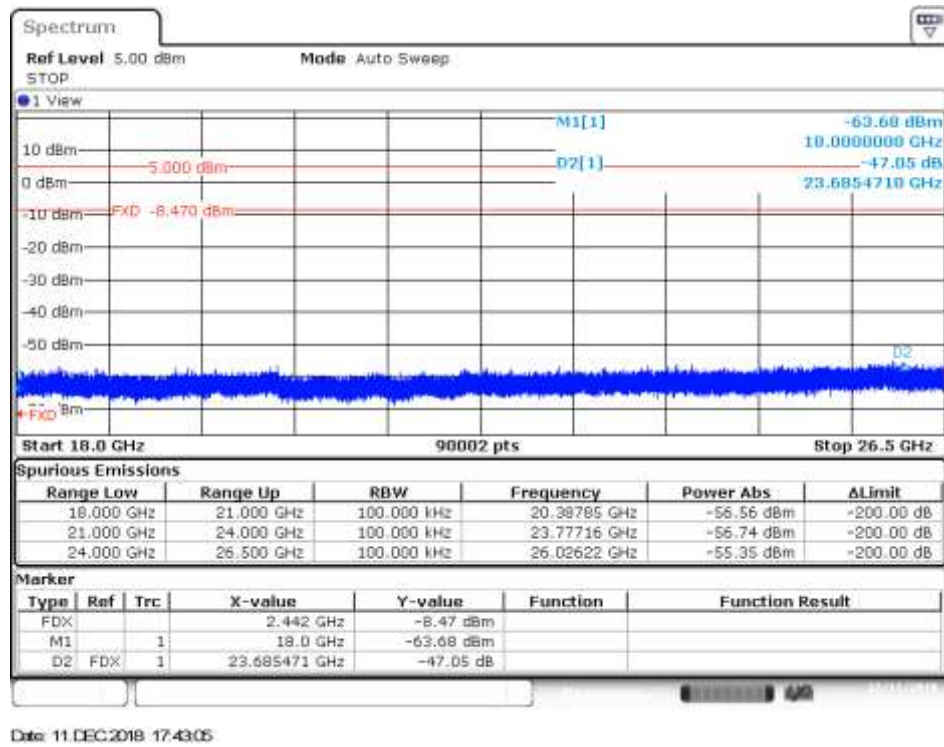
Channel 7 - Range 30MHz to 9GHz - Delta Marker Measurement



Channel 7 - Range 9GHz to 18GHz - Delta Marker Measurement



Channel 7 - Range 18GHz to 26.5GHz - Delta Marker Measurement



Channel 7 - Range 18GHz to 26.5GHz - Delta Marker Measurement

