CERTIFICATE #3478.01

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	**9260D2WL**
FCC ID	**PD99260D2L**
Date of Test Start/End	**2018-12-03 / 2018-12-18**
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 E** (see section 1)

Test Report identification	**181120-01.TR01**
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

Digitally signed by Gregory ROUSTAN
Date: 2019.01.07 11:07:44 +01'00'

Gregory ROUSTAN
(Test Engineer Lead)

Reviewed by

Digitally signed by In Cheiel
Date: 2019.01.14 10:29:12 +01'00'
Adobe Acrobat DC version: 2015.006.30464

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

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1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 15 – Subpart E – Unlicensed National Information Infrastructure Devices.
2. FCC 47 CFR part 15 - Subpart C – §15.209 Radiated emission limits; general requirements.
3. FCC OET KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 – Guidelines for compliance testing of Unlicensed National Information Infrastructure (U-NII) Devices (Part 15, Subpart E).
4. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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 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	21 ºC ±2 ºC
Humidity	40 % ± 15 %

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#1	181120-01.S03	RF MODULE	9260D2WL	WFM : 3413E8B014A4	2018-11-20	Used for conducted tests
	180001-01.S18	Socket WsP/ThP	D2W	8882-031	2017-11-22	
	170524-01.S12	EXTENDER	PCB00495	4955013-375	2018-05-29	
	170000-01.S01	LAPTOP	LATITUDE E5470	DBLMC2	2017-03-28	
#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 40 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	9260D2WL
FCC ID	PD99260D2L
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 a/n/ac– U-NII-1

FCC part	Test name	Verdict
15.407 (a) (1)	Power Limits. Maximum output power	P
15.407 (a) (1)	Peak power spectral density	P
15.407 (b) (1) 15.209	Undesirable emissions limits: Band Edge (conducted)	P
15.407 (b) (1) 15.209	Undesirable emissions limits (radiated)	P

7.2. 802.11 a/n/ac– U-NII-2A

FCC part	Test name	Verdict
15.407 (a) (2)	Power Limits. Maximum output power	P
15.407 (a) (2)	Peak power spectral density	P
15.407 (b) (2) 15.209	Undesirable emissions limits: Band Edge (conducted)	P
15.407 (b) (2) 15.209	Undesirable emissions limits (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	F. Nsengiyumva	First Issue

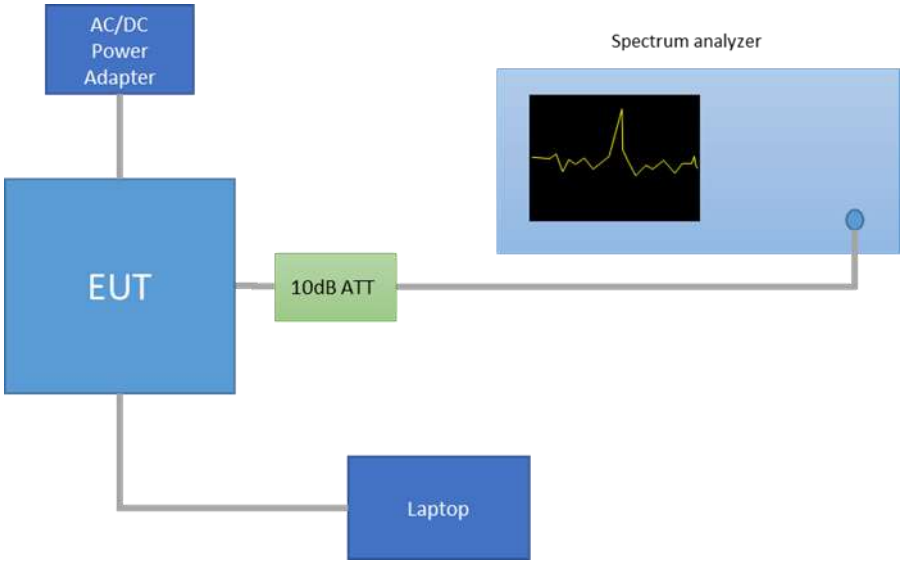
Annex A. Test & System Description

A.1 Measurement System

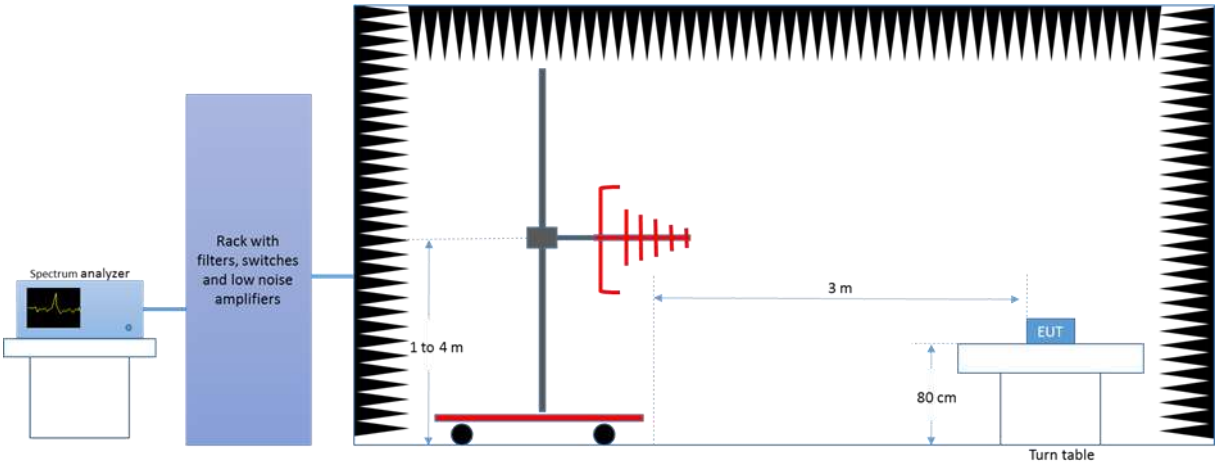
Measurements were performed using the following setups, made in accordance to the general provisions of FCC KDB 789033 D02 General UNII Test Procedures.

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.

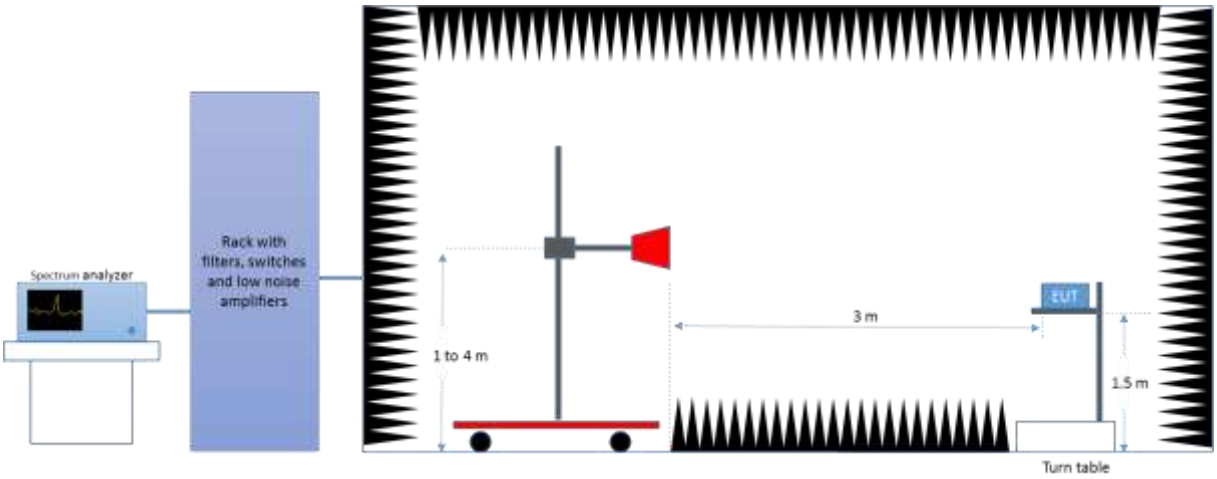
Conducted Setup



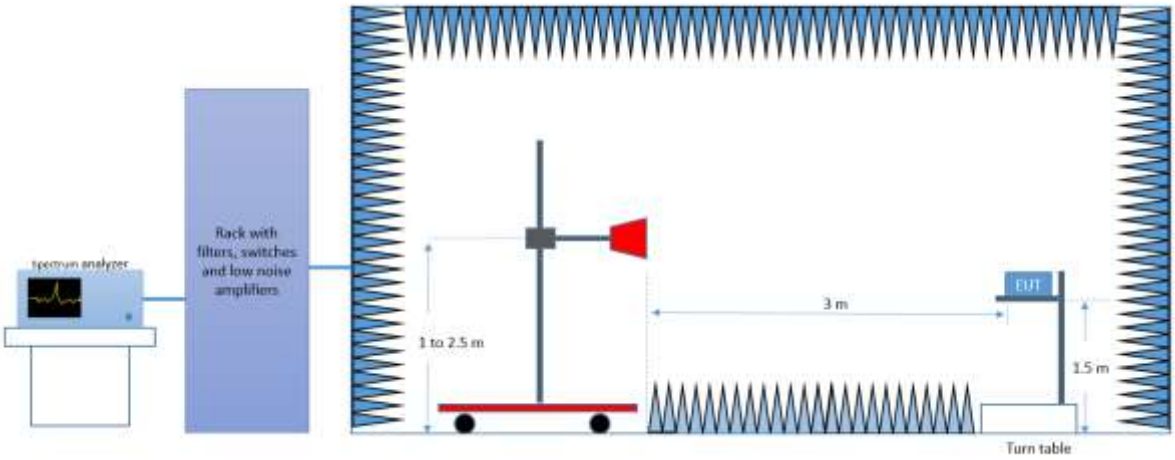
Radiated Setup 30 MHz - 1GHz



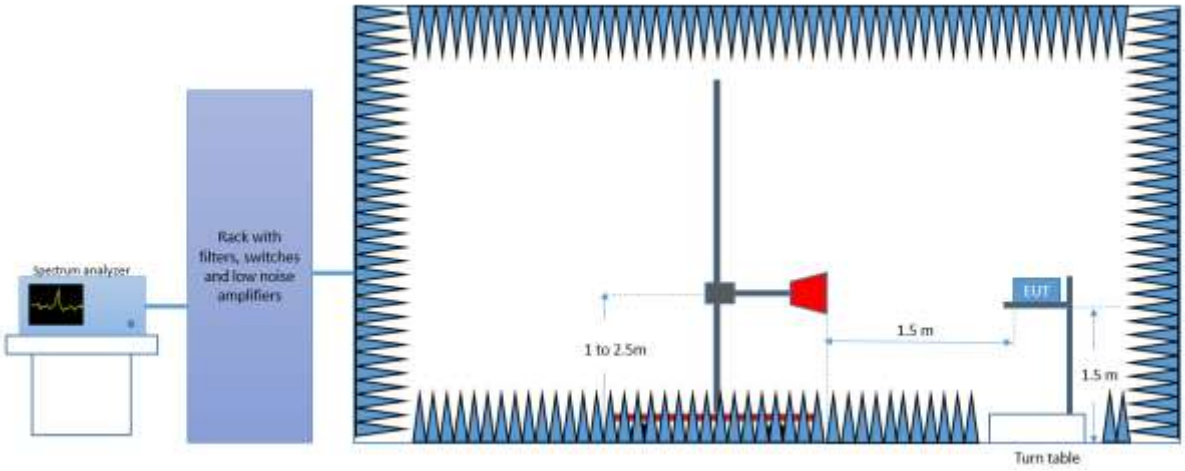
Radiated Setup 1 GHz – 6.4 GHz



Radiated Setup 6.4 GHz – 18 GHz



Radiated Setup 18 GHz – 40 GHz



A.2 Test Equipment List

Conducted Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0315	Spectrum analyzer	FSV30	103307	Rohde & Schwarz	2018-04-10	2020-04-10

Radiated Setup-1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2018-04-11	2020-04-11
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	2018-05-17	2020-05-17
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 [±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 U-NII-1 & U-NII-2A

B.1 Test Conditions

For 802.11a mode 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), 802.11ac80 (80MHz channel bandwidth) and 802.11ac160 (160MHz channel bandwidth) modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, and also simultaneously.

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 analyser with the channel integration method according to point II) E) 2) e) (Method SA-2 Alternative) of Guidance 789033 D02.
Measured values for adjustment were within +/- 0.25 dB from the declared Target values.

U-NII-1					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
802.11a	20	6Mbps	36	5180	18.5	19.0	-
			40	5200	21.0	21.0	-
			48	5240	21.0	21.0	-
802.11n	20	HT0 HT8*	36	5180	18.5	19.0	21.5
			40	5200	21.0	21.0	22.5
			48	5240	21.0	21.0	22.5
	40	HT0 HT8*	38F	5190	18.5	18.5	18.5
			46F	5230	21.0	21.0	23.0
802.11ac	80	VHT0	42	5210	18.5	18.5	17.5
802.11ac	160	VHT0	50	5250	13.5	13.0	13.5

* Note: HT8 for MIMO modes only

U-NII-2A

Mode	BW (MHz)	Data Rate	CH #	Freq. (MHz)	Conducted Power, Target Value (dBm)		
					SISO Chain A	SISO Chain B	MIMO at both ports A and B
802.11a	20	6Mbps	52	5260	21.0	21.0	-
			56	5280	21.0	21.0	-
			64	5320	18.5	18.5	-
802.11n	20	HT0 HT8*	52	5260	21.0	21.0	23.0
			56	5280	21.0	21.0	23.0
			64	5320	18.5	18.5	20.5
	40	HT0 HT8*	54F	5270	21.0	21.0	23.0
			62F	5310	16.5	16.5	19.0
802.11ac	80	VHT0	58	5290	17.0	17.0	17.0

* 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:

802.11a → 6Mbps
802.11n20 and 802.11n40 (SISO) → HT0
802.11n20 and 802.11n40 (MIMO) → HT8
802.11ac80 (SISO) → VHT0
802.11ac80 (MIMO) → VHT0
802.11ac160 (SISO) → VHT0

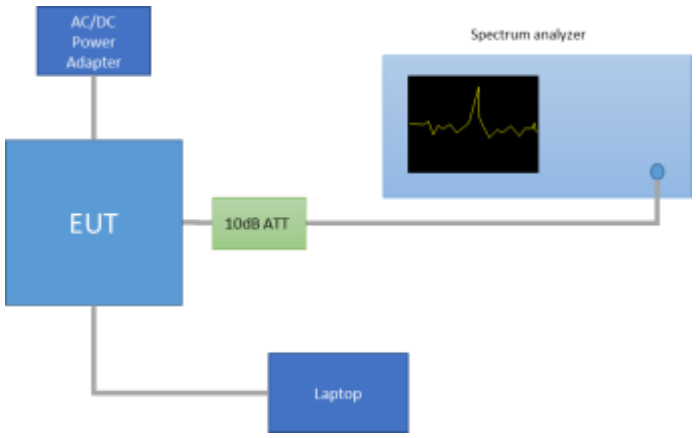
Alternative channels to the lowest and highest channels per band have been also tested for Band Edge compliance.

B.2 Test Results Tables U-NII-1

B.2.1 26dB & 99% Bandwidth

Test procedure

The setup below was used to measure the 26dB & 99% Bandwidth. 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.



Results tables

Mode	Rate	Antenna	Channel	Frequency [MHz]	26dB BW [MHz]	99% BW [MHz]
802.11a	6Mbps	SISO-A	36	5180	23.77	16.76
			40	5200	24.87	16.88
			48	5240	24.67	16.88
		SISO-B	36	5180	23.82	16.80
			40	5200	**25.33**	**16.92**
			48	5240	24.77	16.88
802.11n20	HT0	SISO-A	36	5180	23.87	17.92
			40	5200	24.77	17.96
			48	5240	25.37	17.96
		SISO-B	36	5180	23.97	17.88
			40	5200	24.98	17.92
			48	5240	**25.73**	**18.00**
	HT8	MIMO-A	36	5180	24.72	17.92
			40	5200	25.03	17.92
			48	5240	25.03	17.92
		MIMO-B	36	5180	24.82	17.88
			40	5200	23.97	17.88
			48	5240	24.67	17.80

Mode	Rate	Antenna	Channel	Frequency [MHz]	26dB BW [MHz]	99% BW [MHz]
802.11n40	HT0	SISO-A	38F	5190	44.96	36.56
			46F	5230	45.41	36.56
		SISO-B	38F	5190	44.59	36.56
			46F	5230	45.59	**36.72**
	HT8	MIMO-A	38F	5190	45.14	36.64
			46F	5230	**46.40**	36.64
		MIMO-B	38F	5190	44.41	36.40
			46F	5230	44.86	36.56
802.11ac80	VHT0	SISO-A	42	5210	83.68	**75.12**
		SISO-B	42	5210	85.02	75.12
		MIMO-A	42	5210	**86.54**	75.12
		MIMO-B	42	5210	85.39	75.00
802.11ac160	VHT0	SISO-A	50	5250	165.50	**153.00**
		SISO-B	50	5250	**165.83**	153.00
		MIMO-A	50	5250	163.84	153.00
		MIMO-B	50	5250	164.17	153.00

Max Value

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

B.2.2 Power Limits. Maximum Output power & Peak power spectral density

Test limits

FCC part	Limits
15.407 (a) (1) (iv)	For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test procedure

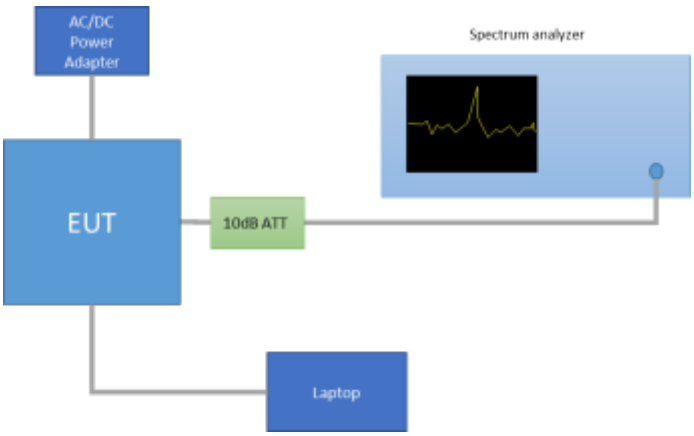
The Maximum Conducted Output Power was measured using the channel integration method according to point E) 2) e) (Method SA-2 Alternative) of KDB 789033 D02.
The maximum power spectral density (PSD) was measured using the method according to point F) (Method SA-2 Alternative) of KDB 789033 D02.

In the measure-and-sum approach for MIMO mode, 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 setup below was used to measure the maximum conducted output power and power spectral density. The antenna terminal of the EUT is connected to the spectrum analyser through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

The declared maximum antenna gain is 5dBi.



Results tables

Duty cycle

Mode	Rate	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
802.11a	6Mbps	SISO-A	2.03	2.07	98.23%
		SISO-B	2.03	2.07	98.23%
802.11n20	HT0	SISO-A	1.90	1.93	98.17%
		SISO-B	1.90	1.93	98.17%
	HT8	MIMO-A	0.97	1.02	95.72%
		MIMO-B	0.97	1.02	95.72%
802.11n40	HT0	SISO-A	0.93	0.97	96.43%
		SISO-B	0.93	0.97	96.43%
	HT8	MIMO-A	0.49	0.53	91.93%
		MIMO-B	0.49	0.53	91.93%
802.11ac80	VHT0	SISO-A	0.46	0.49	92.84%
		SISO-B	0.46	0.49	92.84%
		MIMO-A	0.26	0.31	81.72%
		MIMO-B	0.26	0.31	81.72%
802.11ac160	VTH0	SISO-A	0.25	0.28	88.28%
		SISO-B	0.25	0.28	88.28%
		MIMO-A	0.15	0.19	79.25%
		MIMO-B	0.15	0.19	79.25%

Maximum output power

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average Cond. Output Power [dBm]	Max.* Cond. Output Power [dBm]	Max.* Cond. Output Power [mW]	Max.* EIRP [dBm]
802.11a	6Mbps	36	5180	SISO-A	18.74	18.74	**74.82**	23.74
				SISO-B	18.87	18.87	77.09	23.87
		40	5200	SISO-A	21.09	21.09	128.53	26.09
				SISO-B	21.03	21.03	126.77	26.03
		48	5240	SISO-A	21.14	21.14	**130.02**	26.14
				SISO-B	21.05	21.05	127.35	26.05
802.11n20	HT0	36	5180	SISO-A	18.65	18.65	**73.28**	23.65
				SISO-B	18.82	18.82	76.21	23.82
		40	5200	SISO-A	20.83	20.83	121.06	25.83
				SISO-B	20.77	20.77	119.40	25.77
		48	5240	SISO-A	21.13	21.13	129.72	26.13
				SISO-B	21.06	21.06	127.64	26.06
	HT8	36	5180	MIMO-A	18.04	18.23	66.52	23.23
				MIMO-B	18.23	18.42	69.50	23.42
				Combined A+B	21.15	21.34	136.02	26.34
		40	5200	MIMO-A	19.59	19.78	95.06	24.78
				MIMO-B	19.41	19.60	91.20	24.60
				Combined A+B	22.51	22.70	186.25	27.70
		48	5240	MIMO-A	19.66	19.85	96.60	24.85
				MIMO-B	19.43	19.62	91.62	24.62
				Combined A+B	22.56	22.75	**188.22**	27.75
802.11n40	HT0	38F	5190	SISO-A	18.25	18.41	**69.31**	23.41
				SISO-B	18.26	18.42	69.47	23.42
		46F	5230	SISO-A	20.91	21.07	127.87	26.07
				SISO-B	20.69	20.85	121.56	25.85
	HT8	38F	5190	MIMO-A	15.21	15.58	36.10	20.58
				MIMO-B	15.34	15.71	37.20	20.71
				Combined A+B	18.29	18.65	73.30	23.65
		46F	5230	MIMO-A	19.70	20.07	101.52	25.07
				MIMO-B	19.67	20.04	100.82	25.04
				Combined A+B	22.70	23.06	**202.33**	**28.06**
802.11ac80	VHT0	42	5210	SISO-A	17.93	18.25	66.88	23.25
				SISO-B	17.96	18.28	**67.34**	23.28
				MIMO-A	13.73	14.61	28.89	19.61
				MIMO-B	13.83	14.71	29.56	19.71
				Combined A+B	16.79	17.67	**58.44**	22.67
802.11ac160	VHT0	50	5250	SISO-A	12.86	13.40	21.89	18.40
				SISO-B	12.49	13.03	**20.10**	18.03
				MIMO-A	9.26	10.27	10.64	15.27
				MIMO-B	9.56	10.57	11.40	15.57
				Combined A+B	12.42	13.43	**22.04**	18.43

* Maximum values are the duty cycle compensated values calculated from the average (measured) values

Max Value

Min Value

Maximum power spectral Density (PSD)

Mode	Rate	Channel	Freq.	Antenna	Average conducted PSD [dBm/MHz]	Maximum* conducted PSD [dBm/MHz]
802.11a	6Mbps	36	5180	SISO-A	7.13	7.13
				SISO-B	7.26	7.26
		40	5200	SISO-A	9.47	9.47
				SISO-B	9.39	9.39
		48	5240	SISO-A	9.51	9.51
				SISO-B	9.41	9.41
802.11n20	HT0	36	5180	SISO-A	6.73	6.73
				SISO-B	6.92	6.92
		40	5200	SISO-A	8.91	8.91
				SISO-B	8.85	8.85
		48	5240	SISO-A	9.21	9.21
				SISO-B	9.13	9.13
	HT8	36	5180	MIMO-A	6.12	6.31
				MIMO-B	6.36	6.55
				Combined A+B	9.25	9.44
		40	5200	MIMO-A	7.66	7.85
				MIMO-B	7.49	7.68
				Combined A+B	10.59	10.78
		48	5240	MIMO-A	7.72	7.91
				MIMO-B	7.51	7.70
				Combined A+B	10.63	10.82

Mode	Rate	Channel	Freq.	Antenna	Average conducted PSD [dBm/MHz]	Maximum* conducted PSD [dBm/MHz]
802.11n40	HT0	38F	5190	SISO-A	3.22	3.38
				SISO-B	3.20	3.36
		46F	5230	SISO-A	5.86	6.02
				SISO-B	5.62	5.78
	HT8	38F	5190	MIMO-A	0.18	0.55
				MIMO-B	0.34	0.71
				Combined A+B	3.27	3.64
		46F	5230	MIMO-A	4.63	5.00
				MIMO-B	4.65	5.02
				Combined A+B	7.65	8.02
802.11ac80	VHT0	42	5210	SISO-A	0.49	0.81
				SISO-B	0.51	0.83
				MIMO-A	-3.61	-2.73
				MIMO-B	-3.49	-2.61
				Combined A+B	-0.54	0.34
802.11ac160	VHT0	50	5250	SISO-A	-7.25	-6.71
				SISO-B	-7.66	-7.12
				MIMO-A	-10.67	-9.66
				MIMO-B	-10.40	-9.39
				Combined A+B	-7.52	-6.51

* Maximum values are the duty cycle compensated values calculated from the measured average values

See Section B.3.3 for the screenshot results.

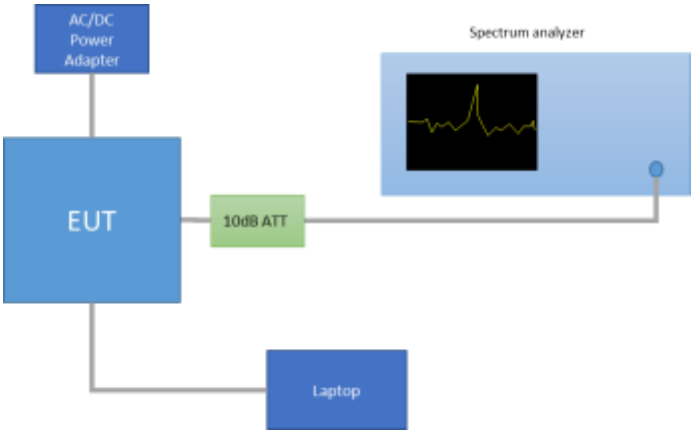
B.2.3 Undesirable emission limits : Band Edge (Conducted)

Test limits

FCC part	Limits
15.407 (b) (1)	For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
15.209	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 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 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 setup below was used to measure undesirable emissions on the Band Edge domain. 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 and the declared Antenna Gain.



For Band Edge measurements in average mode on the low frequency section, one of the two methods is used according to section G) 6) (KDB 789033 D02):

1) Method AD (Average Detection) as per paragraph II.G.6.c.
2) Method VB (Averaging using reduced video bandwidth) as per paragraph II.G.6.d.

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 5dBi.

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

See Section B.3.4 for the screenshot results.

B.2.4 Radiated spurious emission

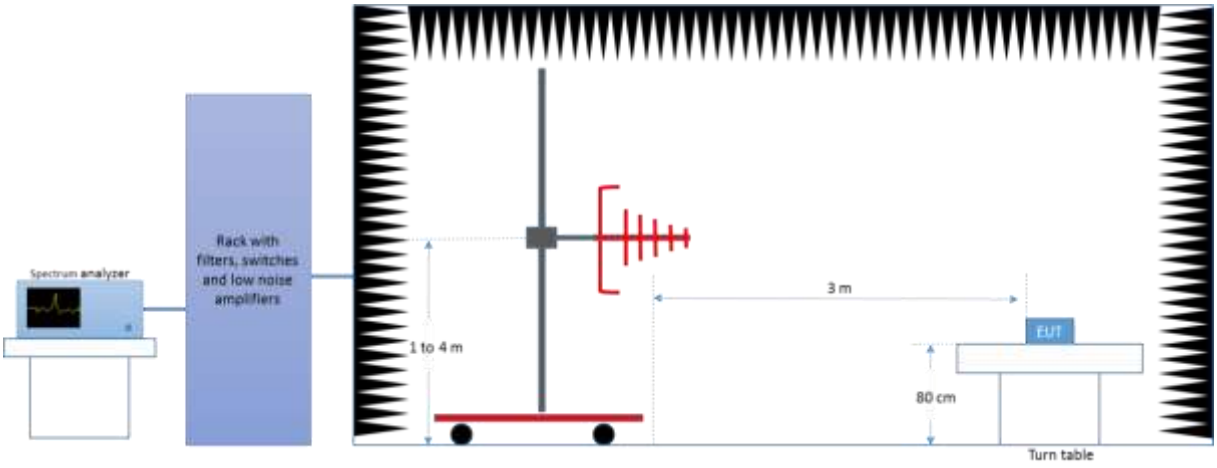
Standard references

<table>
<tr><th>FCC part</th><th>Limits</th></tr>
<tr><td>15.407 (b) (1)</td><td>For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.</td></tr>
<tr><td>15.209</td><td>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):
<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>0.009-0.490</td><td>2400/f(kHz)</td><td>-</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/f(kHz)</td><td>-</td><td>300</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>-</td><td>30</td></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>
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.</td></tr>
</table>

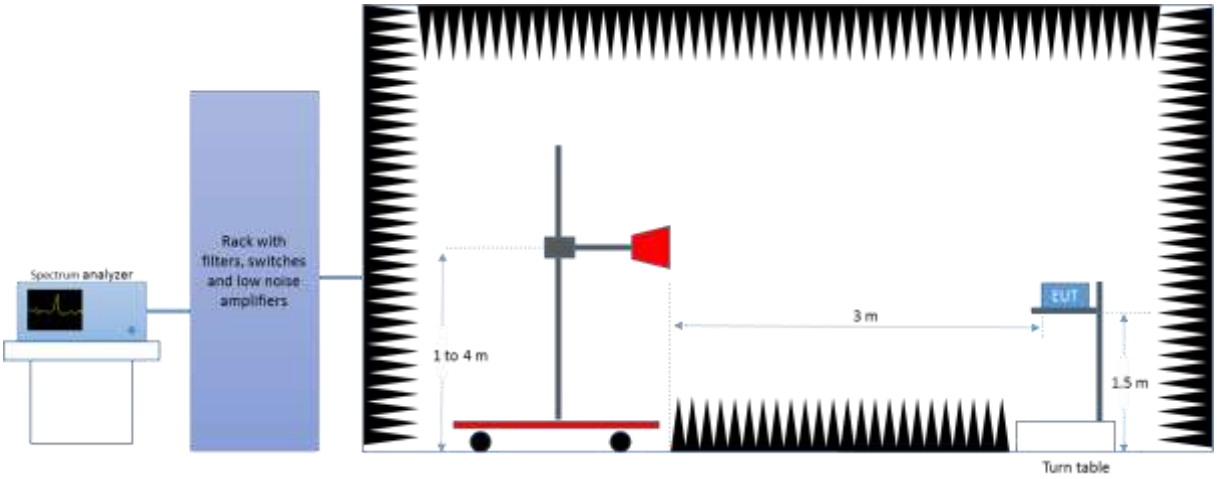
Test procedure

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, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.
The radiated spurious emission was measured on the worst case configuration selected from the chapter B.2.2 and using the low, middle and high channels.
For technologies 802.11n20, 802.11n40, 802.11ac80 and 802.11ac160 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).

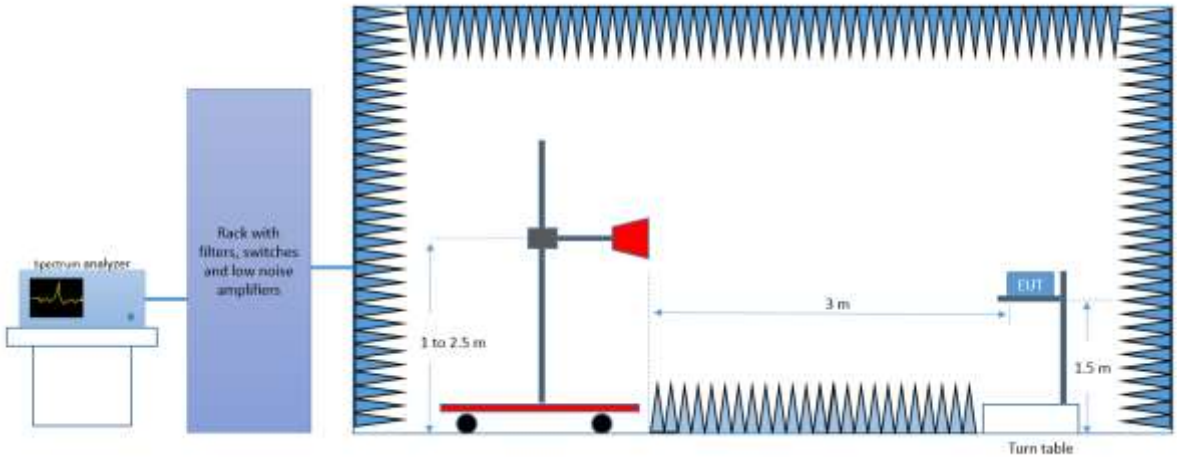
Radiated Setup 30 MHz - 1GHz



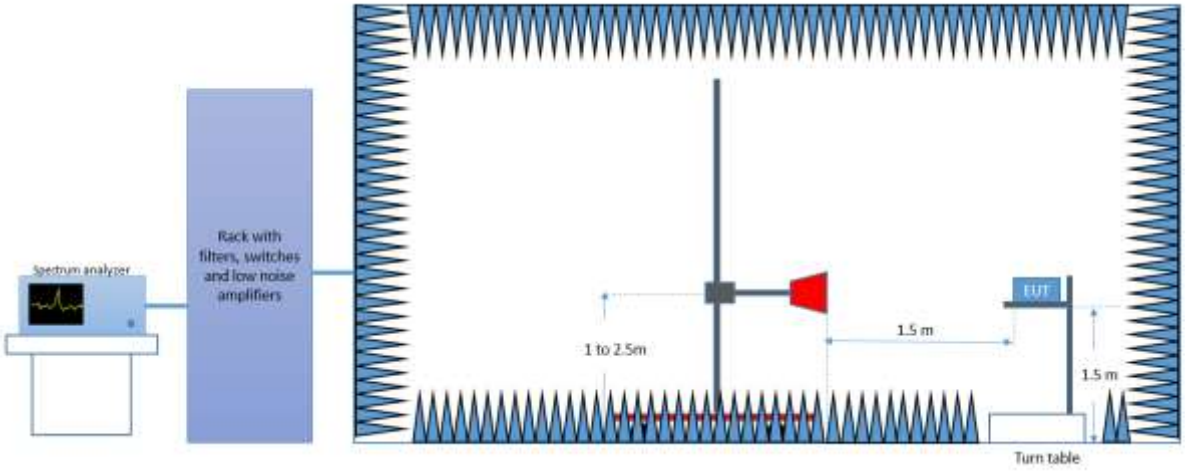
Radiated Setup 1 GHz – 6.4 GHz



Radiated Setup 6.4 GHz - 18 GHz



Radiated Setup 18 GHz - 40 GHz



Sample Calculation

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

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

where

E is the field strength of the emission at the measurement distance, in dBµV/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:

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

where

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

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

D_{Meas} is the measurement distance, in m

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

Test Results

30 MHz – 40 GHz, 802.11a, 6Mbps, Chain A

Radiated Spurious – CH36

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
127.0	**34.3**	---	43.6	9.2
1194.5	43.9	---	74.0	30.1
1197.0	---	32.3	54.0	21.7
5815.5	57.7	---	68.2	10.5
10362.4	49.4	---	68.2	18.8
15532.1	53.1	---	74.0	20.9
15535.5	---	42.8	54.0	11.2
25911.1	51.9	---	68.2	13.6

Radiated Spurious – CH40

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	32.8	---	68.2	35.4
1196.5	44.4	---	74.0	29.6
1197.0	---	33.0	54.0	21.0
5833.5	56.5	---	68.2	11.7
15600.3	---	42.0	54.0	12.0
15606.5	53.1	---	74.0	20.9
39469.3	52.6	---	68.2	15.6

Radiated Spurious – CH48

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.4	---	68.2	32.8
1034.0	46.7	---	74.0	27.3
1036.5	---	34.9	54.0	19.1
1195.5	---	32.9	54.0	21.1
1197.0	45.0	---	74.0	29.0
15716.3	51.8	---	74.0	22.2
15718.2	---	43.1	54.0	10.9
20959.3	48.2	---	74.0	25.8
20967.6	---	37.7	54.0	16.3

30 MHz – 40 GHz, 802.11a, 6Mbps, Chain B

Radiated Spurious – CH36

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
126.9	33.4	---	43.6	10.1
1195.0	45.0	---	74.0	29.0
1196.0	---	32.1	54.0	21.9
5816.5	56.1	---	68.2	12.1
10364.3	51.3	---	68.2	16.9
15538.4	---	43.8	54.0	10.2
15545.6	52.3	---	74.0	21.7
20720.0	47.4	---	74.0	26.6
20720.0	---	39.9	54.0	14.1

Radiated Spurious – CH40

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
623.9	36.2	---	68.2	32.0
1197.5	---	33.2	54.0	20.8
1197.5	45.3	---	74.0	28.7
10400.6	48.6	---	68.2	19.6
15599.8	50.9	---	74.0	23.1
15600.7	---	40.7	54.0	13.3
20799.7	46.0	---	74.0	28.0
20800.2	---	39.0	54.0	15.0

Radiated Spurious – CH48

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.7	---	68.2	31.5
1033.0	---	33.6	54.0	20.4
1035.0	44.8	---	74.0	29.2
1195.5	---	33.7	54.0	20.3
1196.5	44.9	---	74.0	29.1
16746.7	51.9	---	68.2	16.3
20959.9	---	39.5	54.0	14.5
20960.4	47.0	---	74.0	27.0

30 MHz – 40 GHz, 802.11n20, HT0, Chain A

Radiated Spurious – CH36

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.6	---	68.2	31.6
1196.0	---	32.9	54.0	21.1
1197.0	44.1	---	74.0	29.9
5824.5	**58.8**	---	68.2	9.4
10357.5	49.6	---	68.2	18.6
15536.5	---	43.7	54.0	10.3
15539.4	53.0	---	74.0	21.0
25908.2	50.8	---	68.2	17.4

Radiated Spurious – CH40

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.8	---	68.2	31.4
1195.5	44.5	---	74.0	29.5
1196.0	---	33.6	54.0	20.4
5834.0	56.9	---	68.2	11.3
15600.7	51.1	---	74.0	22.9
15601.2	---	41.3	54.0	12.7
39546.1	52.3	---	68.2	15.9

Radiated Spurious – CH48

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.9	---	68.2	32.3
1034.5	44.9	---	74.0	29.1
1035.0	---	34.7	54.0	19.3
1196.5	---	33.0	54.0	21.0
1197.0	45.2	---	74.0	28.8
15721.1	51.8	---	74.0	22.2
15723.5	---	42.6	54.0	11.4
20955.3	---	37.6	54.0	16.4
20960.7	48.2	---	74.0	25.8

30 MHz – 40 GHz, 802.11n20, HT0, Chain B

Radiated Spurious – CH36

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	68.2	32.4
1194.5	44.3	---	74.0	29.7
1195.5	---	33.2	54.0	20.8
5812.5	55.3	---	68.2	12.9
10370.1	50.0	---	68.2	18.2
15534.0	---	41.8	54.0	12.2
15536.0	51.1	---	74.0	22.9
20720.0	46.5	---	74.0	27.5
20720.0	---	39.3	54.0	14.7

Radiated Spurious – CH40

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.4	---	68.2	31.8
1195.5	---	33.4	54.0	20.6
1196.0	45.0	---	74.0	29.0
10388.5	48.5	---	68.2	19.7
15596.4	---	39.8	54.0	14.2
15610.4	51.3	---	74.0	22.7
20800.0	---	38.5	54.0	15.5
20800.2	46.0	---	74.0	28.0

Radiated Spurious – CH48

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.4	---	68.2	32.8
1035.0	43.6	---	74.0	30.4
1035.5	---	32.9	54.0	21.1
1195.0	---	33.0	54.0	21.0
1196.0	45.1	---	74.0	28.9
15709.0	51.1	---	74.0	22.9
15716.3	---	40.9	54.0	13.1
20959.6	47.6	---	74.0	26.4
20960.1	---	39.0	54.0	15.0

30 MHz – 40 GHz, 802.11n20, HT8, Chain A+B

Radiated Spurious – CH36

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.1	34.9	---	68.2	33.3
624.0	34.1	---	68.2	34.1
1195.5	---	33.1	54.0	20.9
1198.0	45.4	---	74.0	28.6
5821.5	56.3	---	68.2	11.9
15541.8	51.9	---	74.0	22.1
15546.6	---	41.7	54.0	12.3
39580.2	53.3	---	68.2	14.9

30 MHz – 40 GHz, 802.11n40, HT0, Chain A

Radiated Spurious – CH38F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.2	---	68.2	32.0
1194.5	44.5	---	74.0	29.5
1198.5	---	33.1	54.0	20.9
15555.8	52.0	---	74.0	22.0
15556.8	---	40.3	54.0	13.7
25945.1	49.8	---	68.2	18.4
39474.8	54.4	---	68.2	13.8

Radiated Spurious – CH46F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.0	---	68.2	32.2
1021.5	44.6	---	74.0	29.5
1025.5	---	33.1	54.0	20.9
1196.5	---	33.5	54.0	20.5
1196.5	45.4	---	74.0	28.6
15683.4	51.8	---	74.0	22.2
15707.1	---	40.0	54.0	14.0
39526.7	53.8	---	68.2	14.4

30 MHz – 40 GHz, 802.11n40, HT0, Chain B

Radiated Spurious – CH38F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.3	---	68.2	32.0
1197.0	---	33.4	54.0	20.6
1197.0	45.4	---	74.0	28.6
15560.6	---	39.2	54.0	14.8
15566.9	50.8	---	74.0	23.2
20760.1	---	39.5	54.0	14.5
20760.4	45.8	---	74.0	28.2

Radiated Spurious – CH46F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.1	---	68.2	32.1
1022.0	43.4	---	74.0	30.6
1022.5	---	32.0	54.0	22.0
1195.5	---	33.6	54.0	20.4
1196.0	44.8	---	74.0	29.2
16722.6	52.4	---	68.2	15.8
20920.0	46.9	---	74.0	27.1
20920.0	---	39.3	54.0	14.7

30 MHz – 40 GHz, 802.11n40, HT8, Chain A+B

Radiated Spurious – CH38F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.9	---	68.2	32.3
1195.5	44.2	---	74.0	29.8
1196.0	---	33.4	54.0	20.6
5819.0	**56.2**	---	68.2	12.0
10383.2	50.1	---	68.2	18.1
15560.1	---	41.6	54.0	12.4
15567.4	51.9	---	74.0	22.1
25958.4	48.2	---	68.2	20.0
39483.6	53.3	---	68.2	14.9

30 MHz – 40 GHz, 802.11ac80, VHT0, Chain A

Radiated Spurious – CH42

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	68.2	32.5
1194.5	46.2	---	74.0	27.8
1196.5	---	33.0	54.0	21.0
5826.5	55.7	---	68.2	12.5
16710.0	52.8	---	68.2	15.4
39451.6	53.3	---	68.2	14.9

30 MHz – 40 GHz, 802.11ac80, VHT0, Chain B

Radiated Spurious – CH42

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.3	---	68.2	32.9
1195.5	---	33.4	54.0	20.6
1196.0	45.1	---	74.0	28.9
17834.2	---	40.8	54.0	13.2
17834.2	50.2	---	74.0	23.8
20840.1	---	39.9	54.0	14.1
20840.1	46.6	---	74.0	27.4
39427.1	53.1	---	68.2	15.1

30 MHz – 40 GHz, 802.11ac80, VHT0, Chain A+B

Radiated Spurious – CH42

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.9	---	68.2	32.3
1195.0	45.7	---	74.0	28.3
1196.0	---	33.7	54.0	20.3
5833.5	**56.9**	---	68.2	11.3
16726.9	51.4	---	68.2	16.8
39583.2	53.2	---	68.2	15.0

30 MHz – 40 GHz, 802.11ac160, VHT0, Chain A

Radiated Spurious – CH50

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.1	---	68.2	33.1
1195.5	47.0	---	74.0	27.0
1196.0	---	33.2	54.0	20.8
5402.0	61.4	---	74.0	12.6
5404.5	---	**48.2**	54.0	5.8
16742.9	52.4	---	68.2	15.8
39496.3	53.3	---	68.2	14.9

30 MHz – 40 GHz, 802.11ac160, VHT0, Chain B

Radiated Spurious – CH50

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.3	---	68.2	31.9
1195.0	---	33.1	54.0	20.9
1195.5	44.3	---	74.0	29.7
5401.5	---	51.2	54.0	2.8
5402.5	63.9	---	74.0	10.1
15749.6	---	40.1	54.0	13.9
15749.6	49.9	---	74.0	24.1
16750.1	51.2	---	68.2	17.0
21000.0	46.8	---	74.0	27.2
21000.0	---	38.0	54.0	16.0

30 MHz – 40 GHz, 802.11ac160, VHT0, Chain A+B

Radiated Spurious – CH50

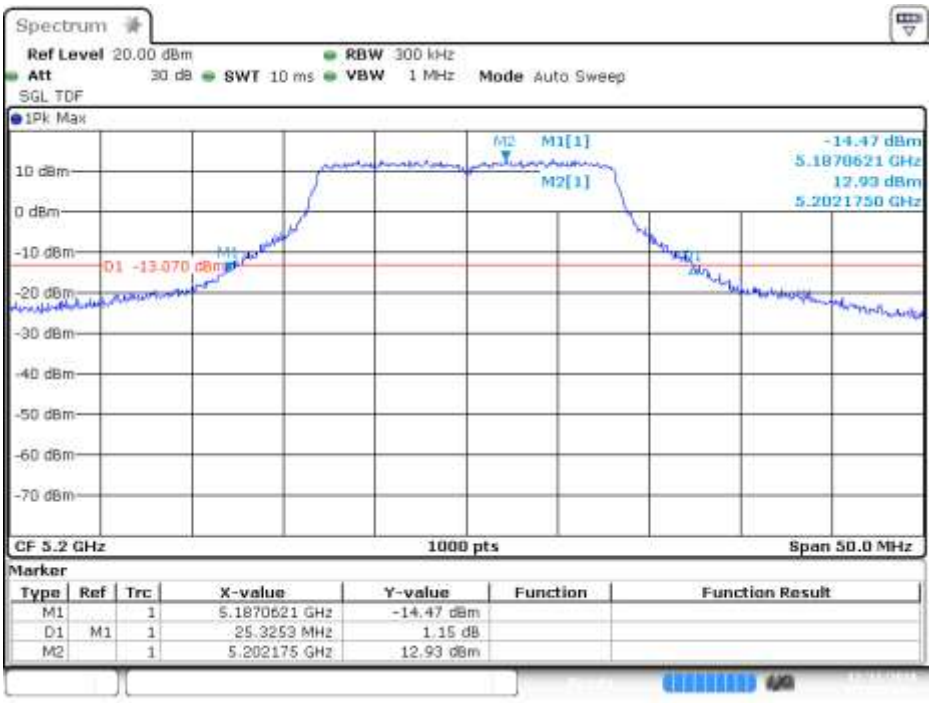
Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.3	---	68.2	32.9
1196.0	---	33.2	54.0	20.8
1196.5	45.1	---	74.0	28.9
5401.0	---	50.6	54.0	3.4
5402.5	65.2	---	74.0	8.8
15803.3	51.5	---	74.0	22.5
15803.3	---	41.7	54.0	12.3
39454.1	53.9	---	68.2	14.3

B.3 Test Results Screenshot U-NII-1

B.3.1 26dB Bandwidth

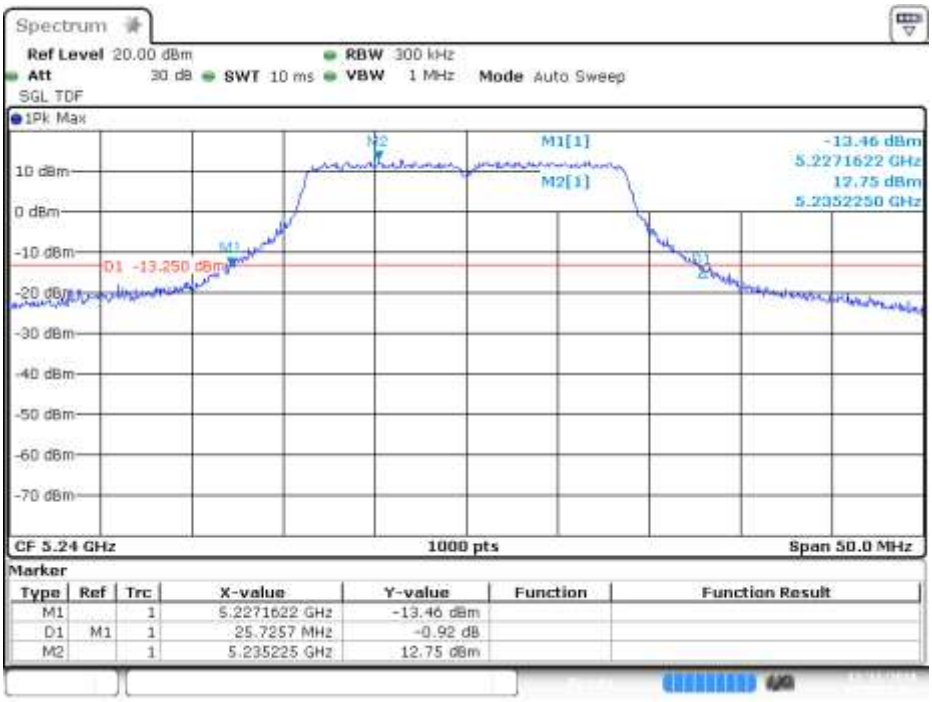
SISO-B, 802.11a, 6Mbps

Channel 40



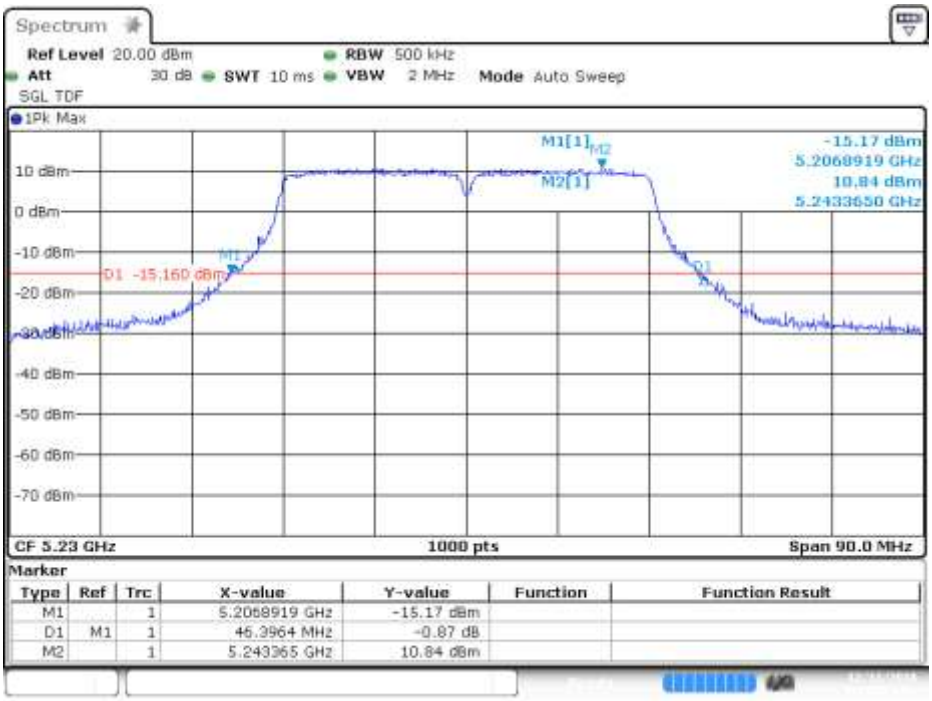
SISO-B, 802.11n20, HT0

Channel 48



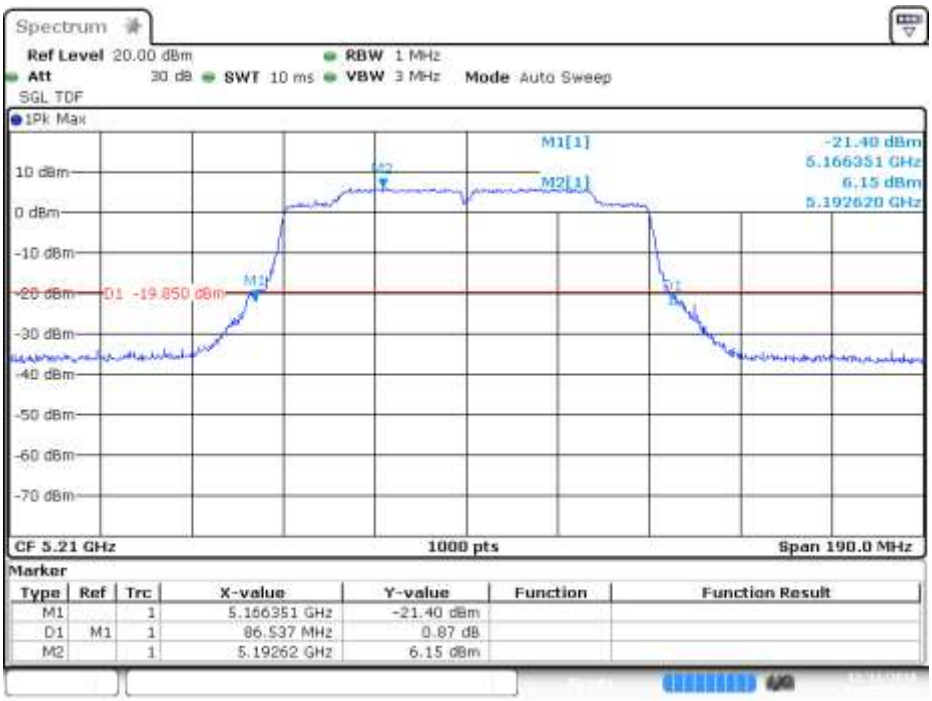
MIMO-A, 802.11n40, HT0

Channel 46F



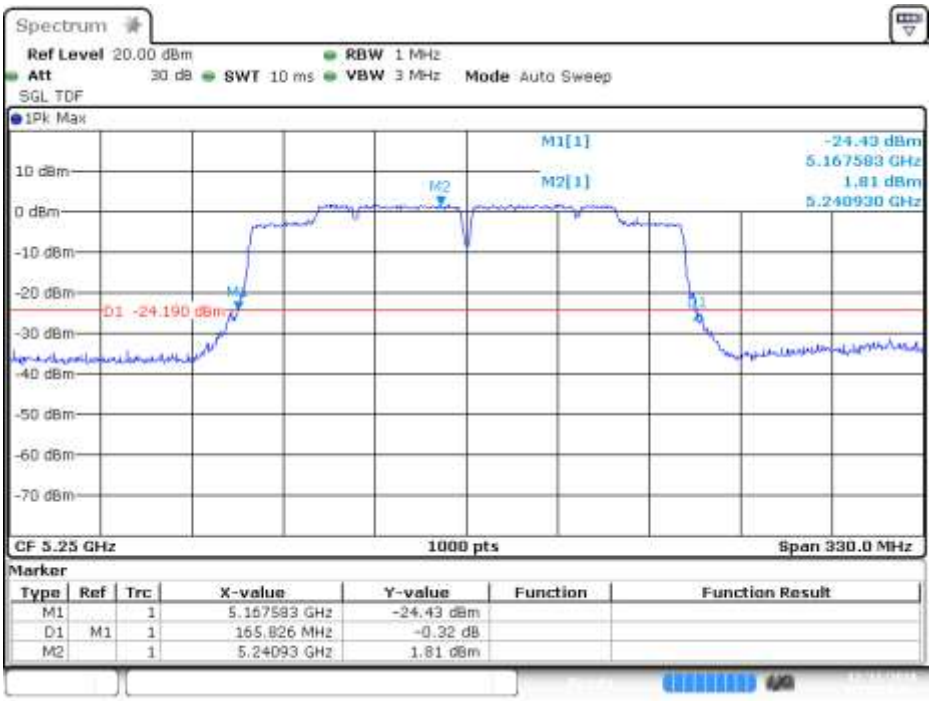
MIMO-A, 802.11ac80, VHT0

Channel 42



SISO-B, 802.11ac160, VHT0

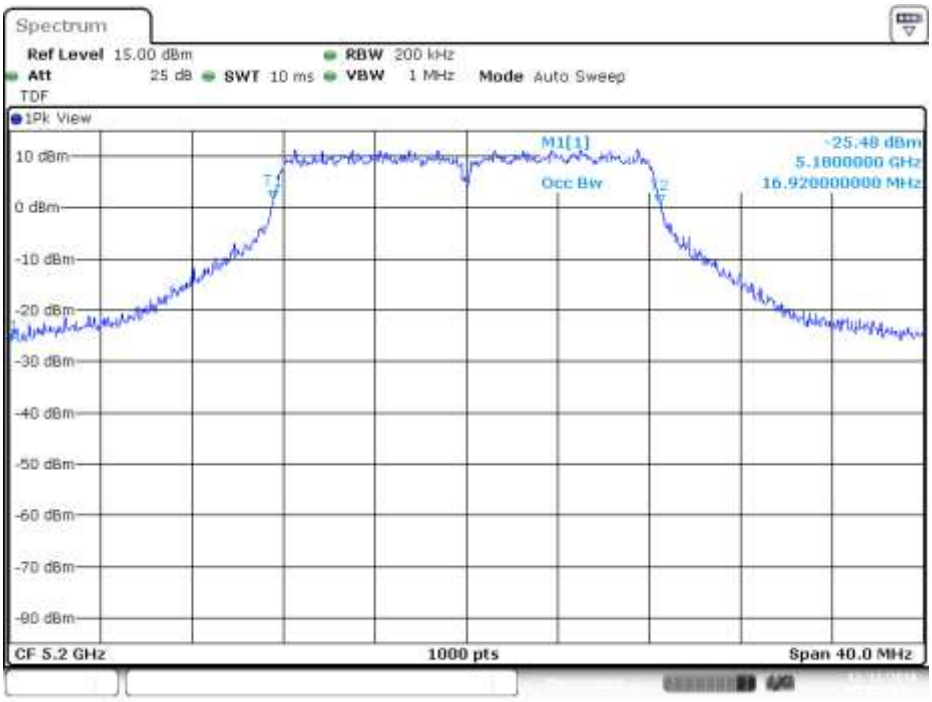
Channel 50



B.3.2 99% Bandwidth

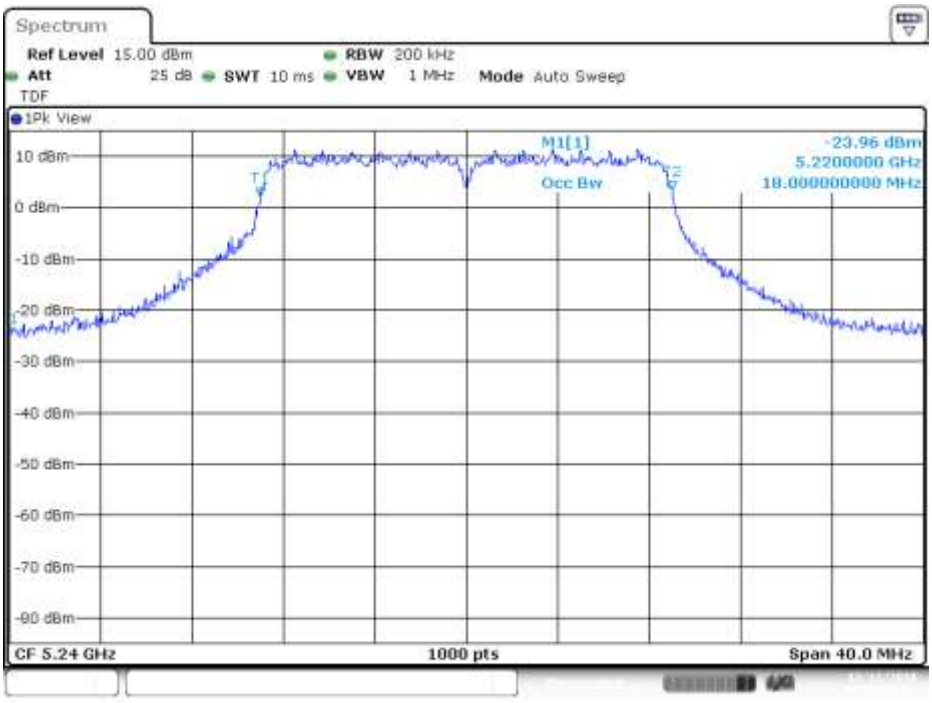
SISO-B, 802.11a, 6Mbps

Channel 40



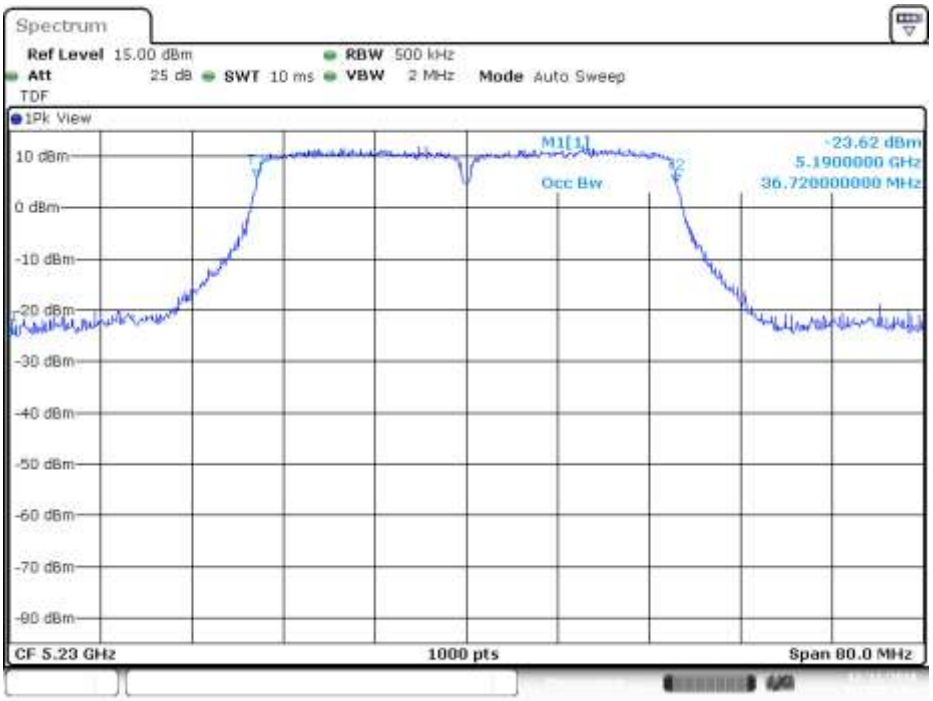
SISO-B, 802.11n20, HT0

Channel 48



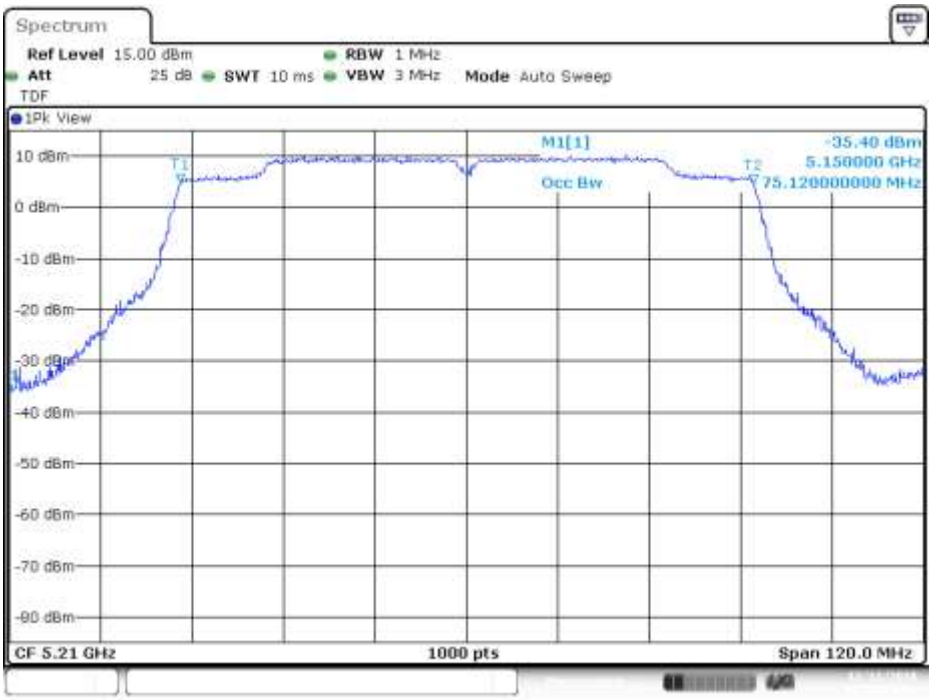
SISO-B, 802.11n40, HT0

Channel 46F



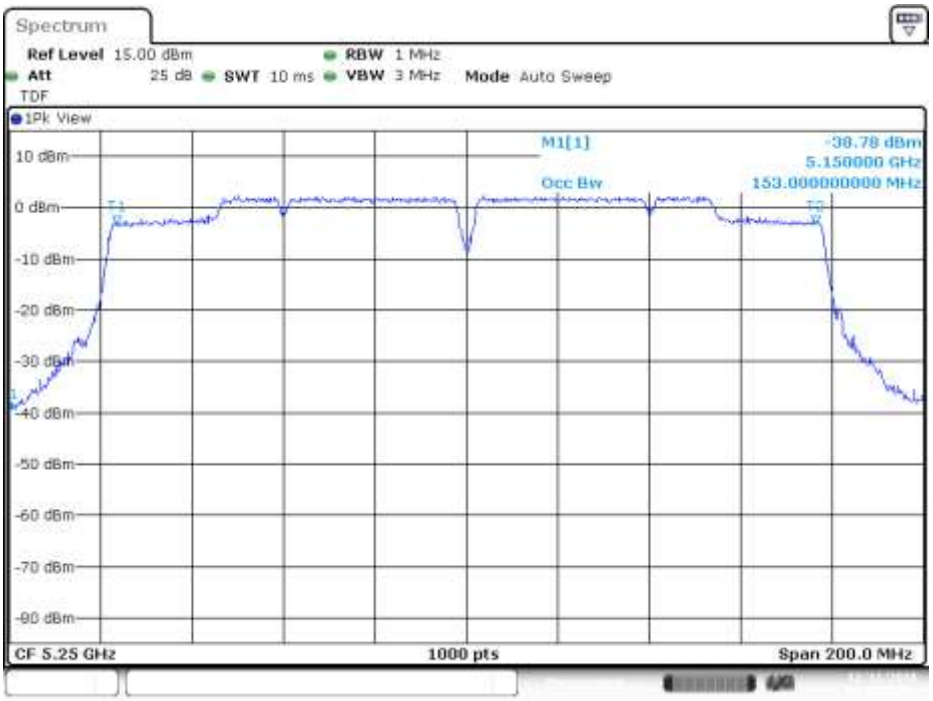
SISO-A, 802.11ac80, VHT0

Channel 42



SISO-A, 802.11ac160, VHT0

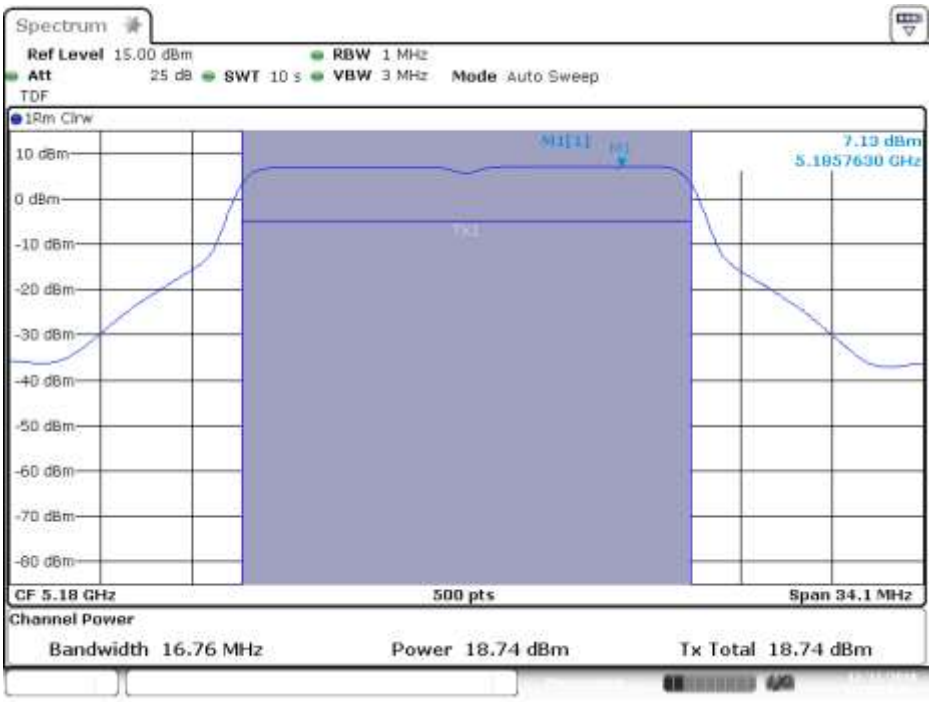
Channel 50



B.3.3 Power Limits. Maximum Output power & Peak power spectral density

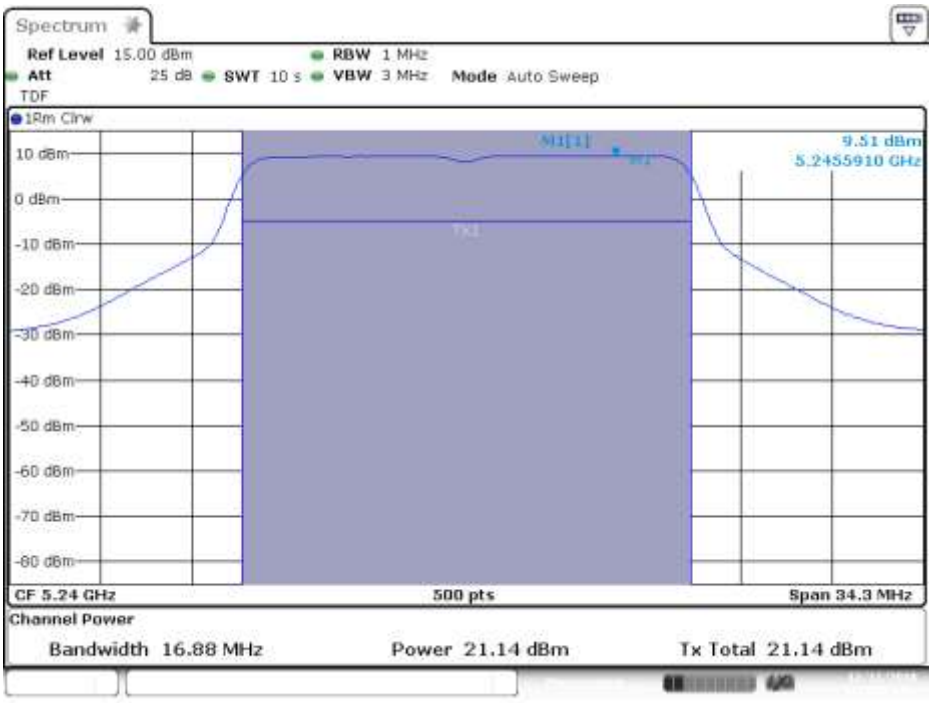
SISO-A, 802.11a, 6Mbps

Channel 36



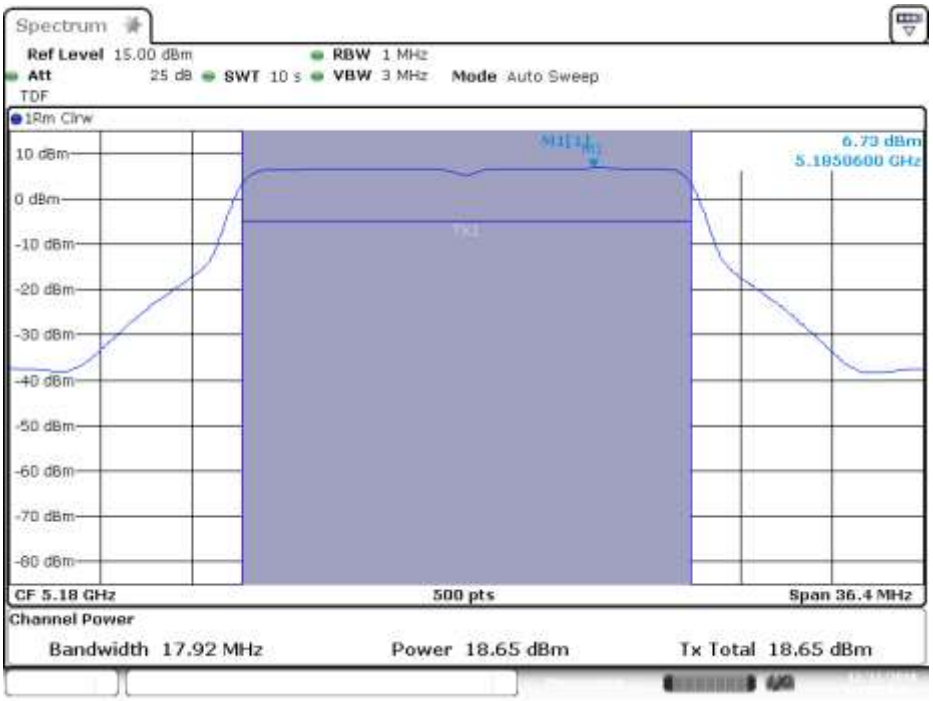
SISO-A, 802.11a, 6Mbps

Channel 48



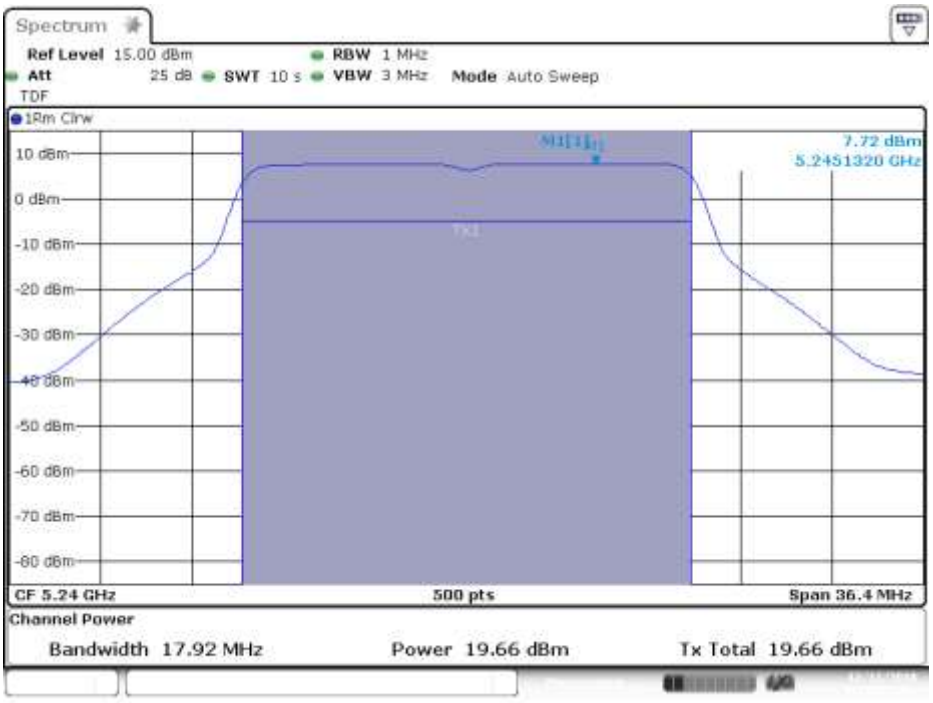
SISO-A, 802.11n20, HT0

Channel 36



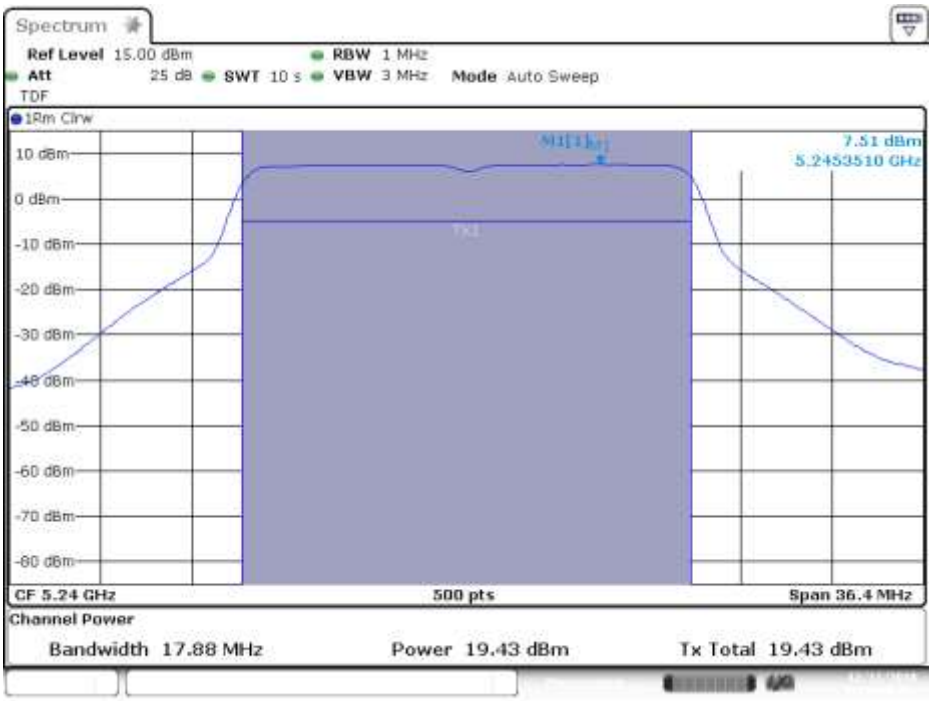
MIMO-A, 802.11n20, HT8

Channel 48



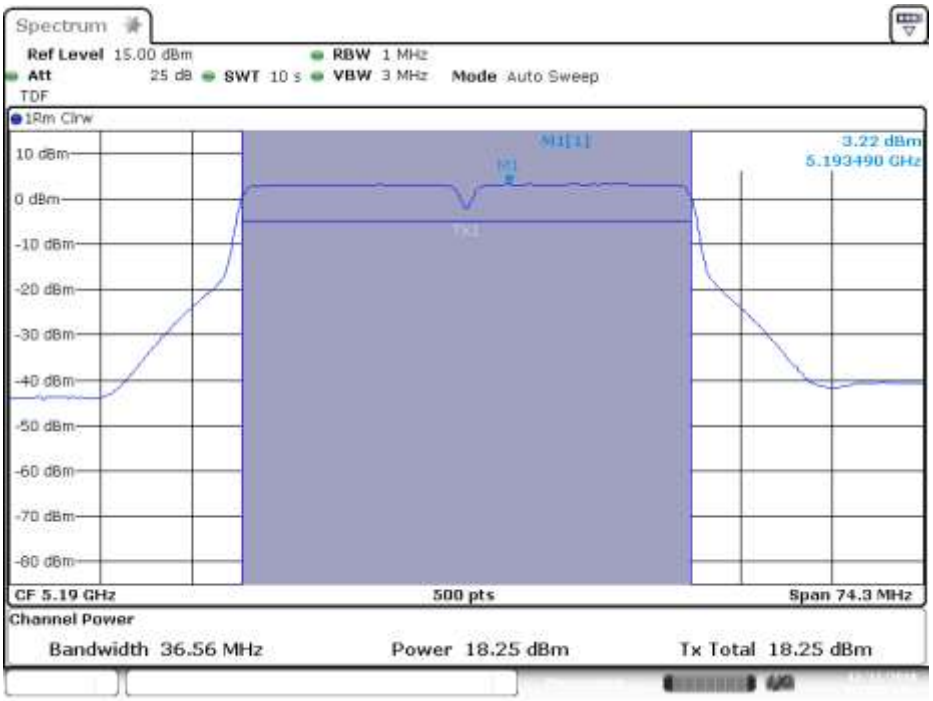
MIMO-B, 802.11n20, HT8

Channel 48



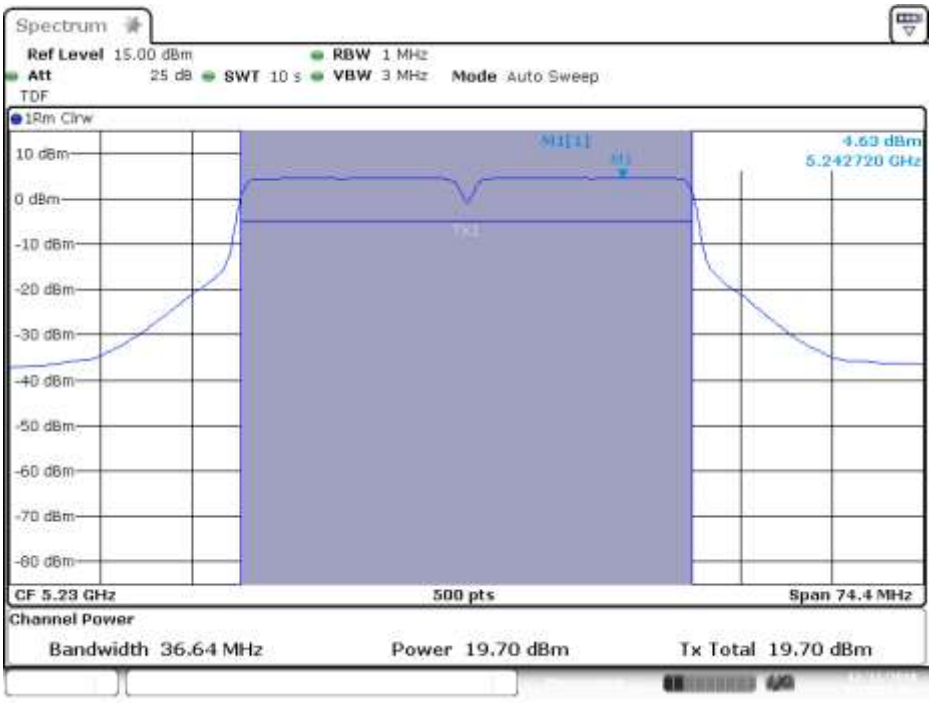
SISO-A, 802.11n40, HT8

Channel 38F



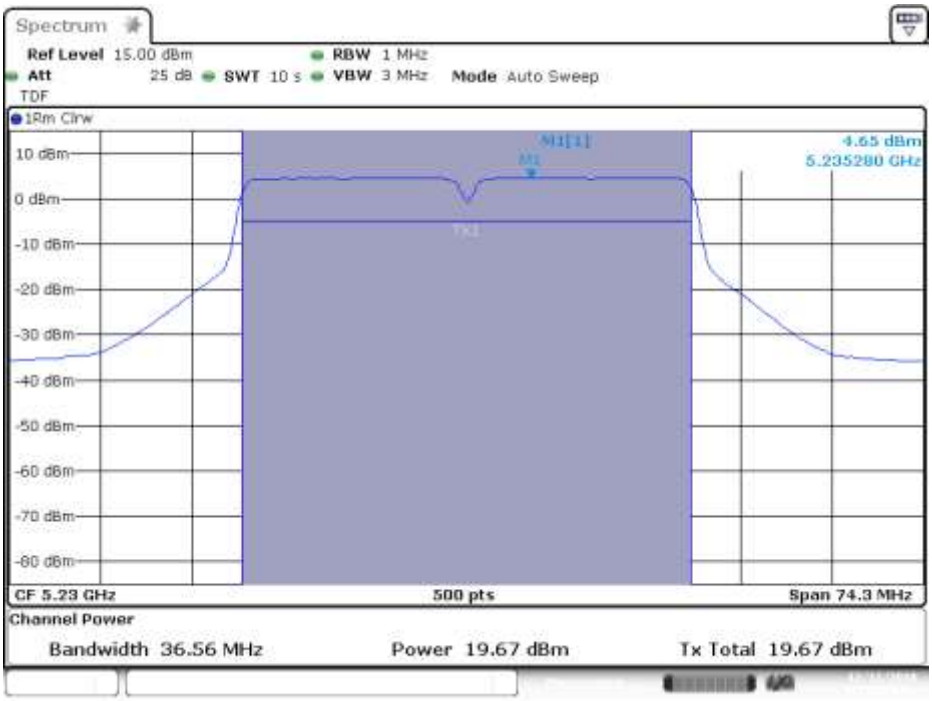
MIMO-A, 802.11n40, HT8

Channel 46F



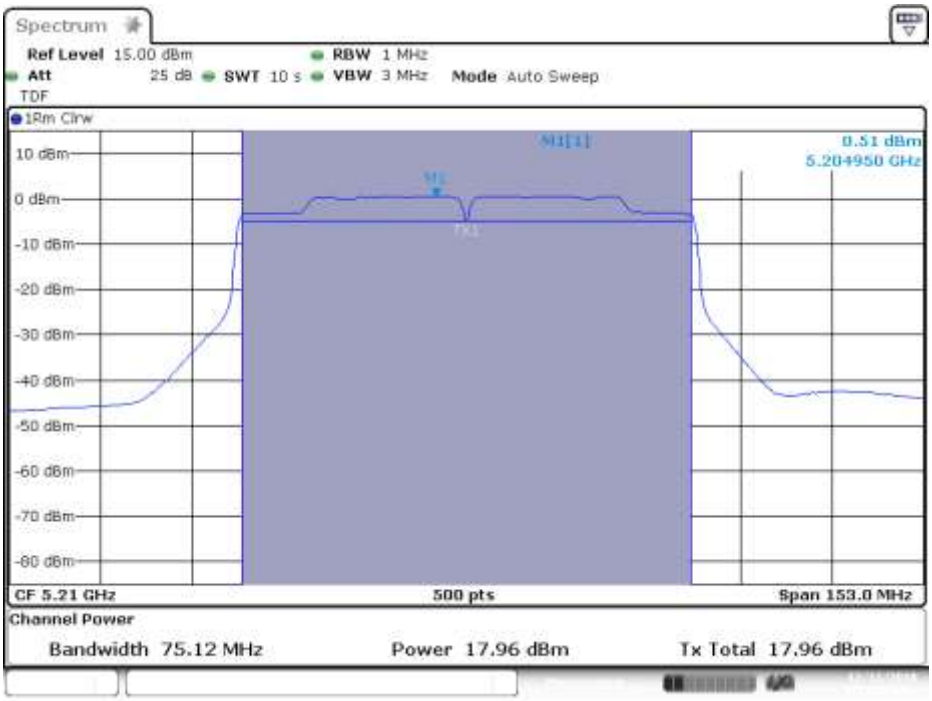
MIMO-B, 802.11n40, HT8

Channel 46F



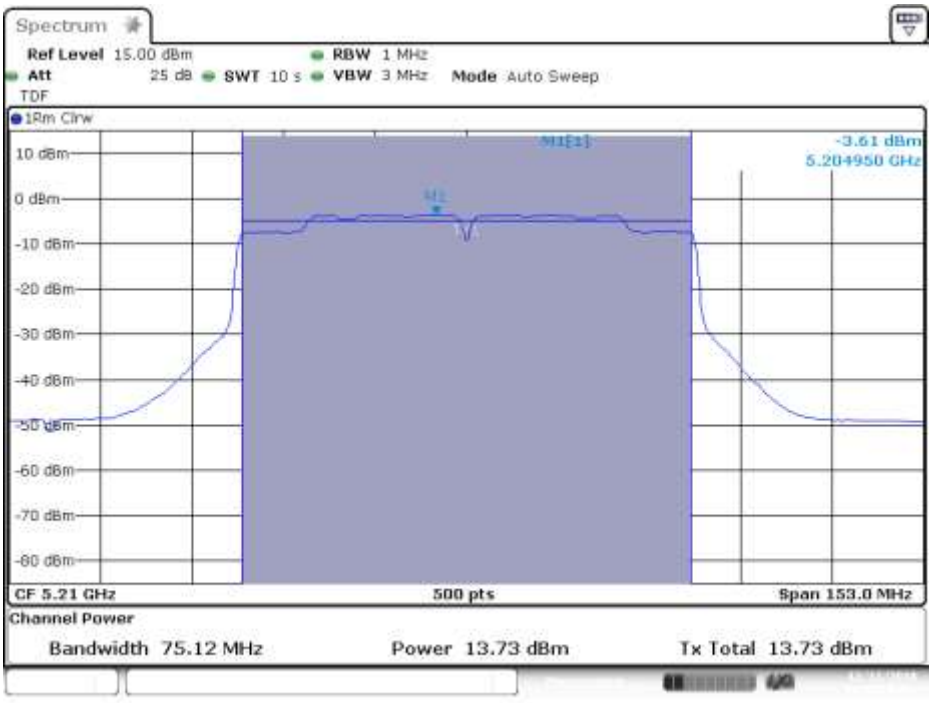
SISO-B, 802.11ac80, VHT0

Channel 42



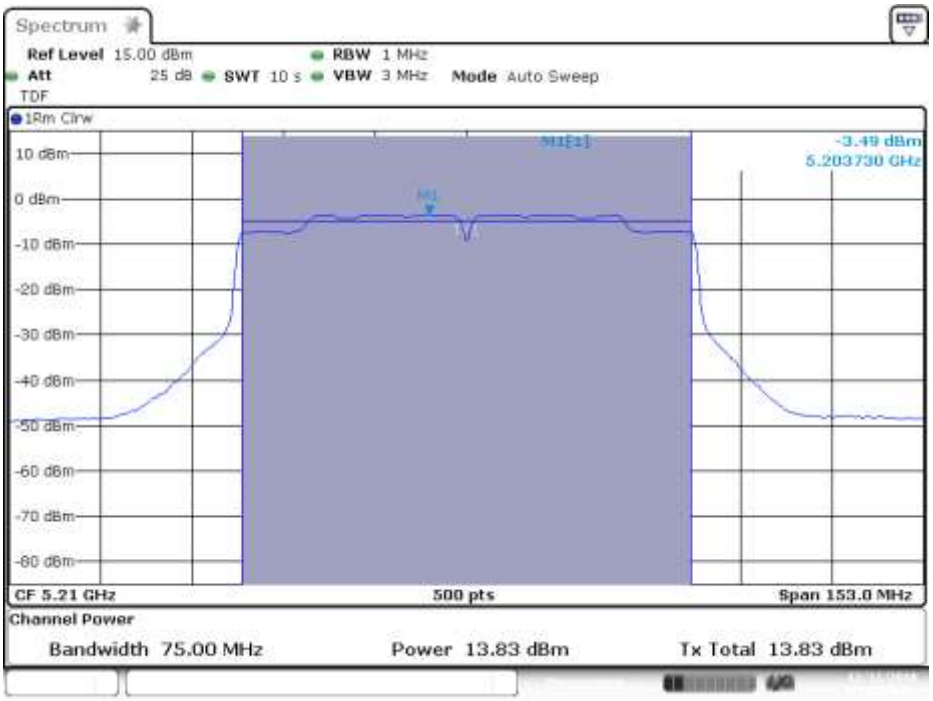
MIMO-A, 802.11ac80, VHT0

Channel 42



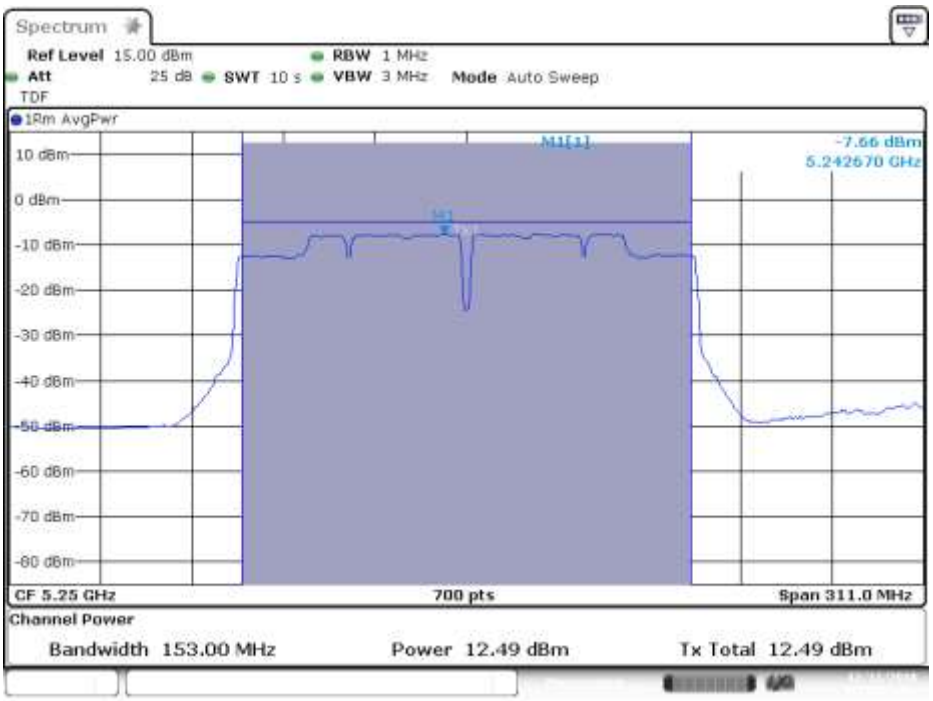
MIMO-B, 802.11ac80, VHT0

Channel 42



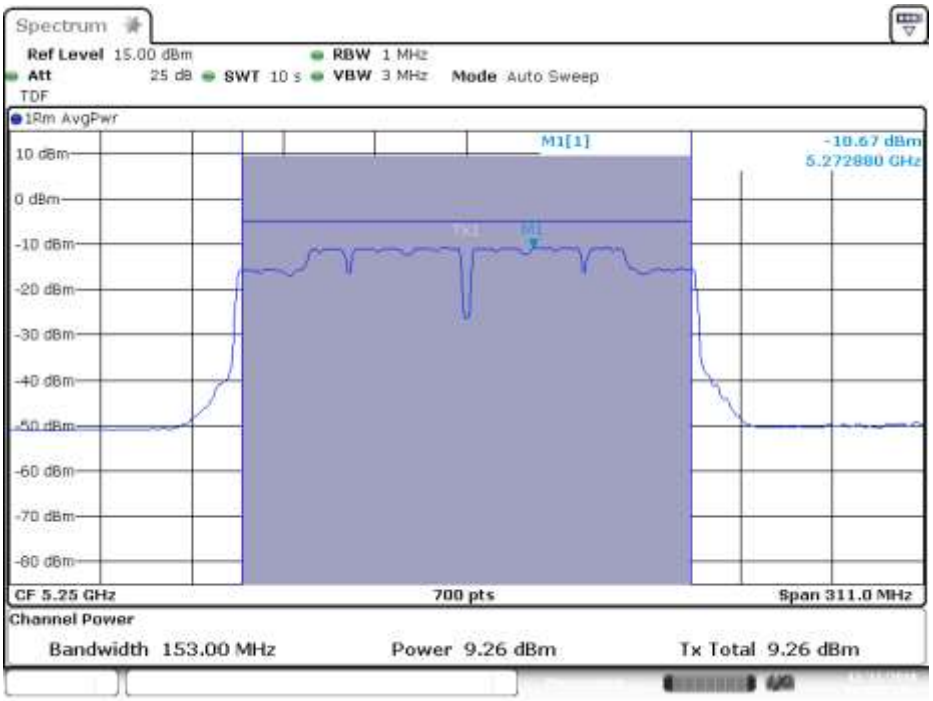
SISO-A, 802.11ac160, VHT0

Channel 50



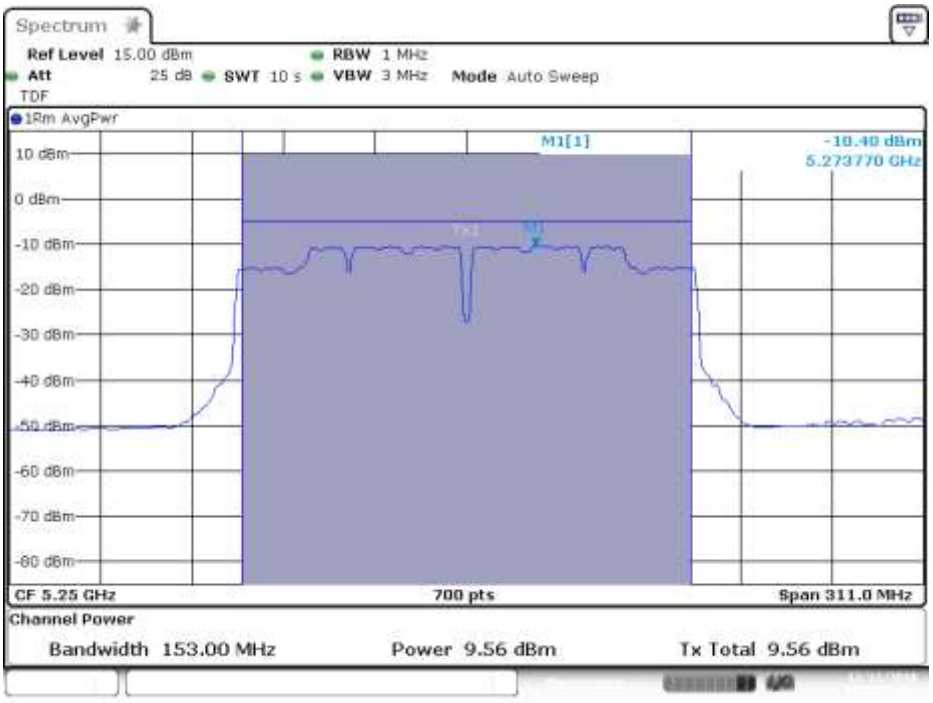
MIMO-A, 802.11ac160, VHT0

Channel 50



MIMO-B, 802.11ac160, VHT0

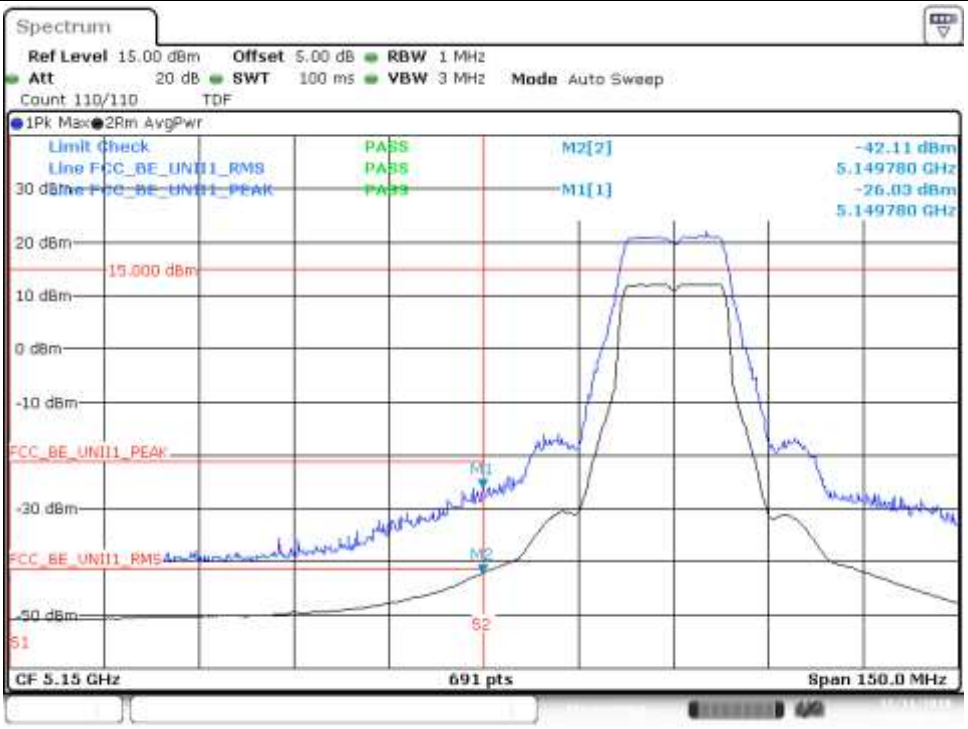
Channel 50



B.3.4 Undesirable emission limits : Band Edge (Conducted)

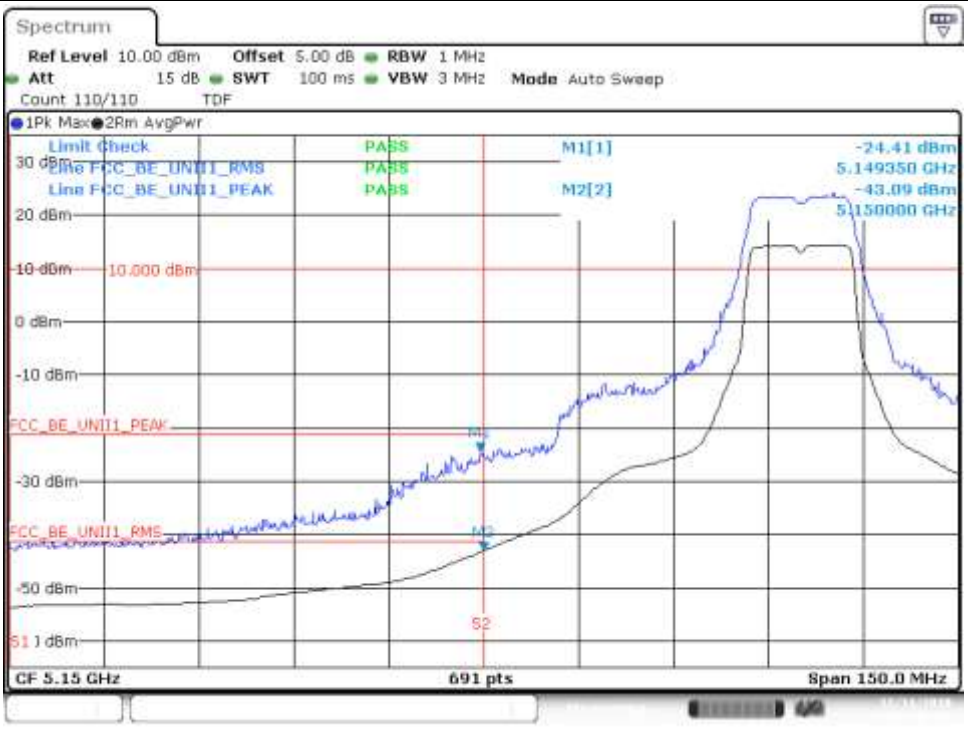
802.11a, 6Mbps – Chain A

BE Low Freq Section , Peak, RMS – CH36



Date: 11.DEC.2018 12:24:47

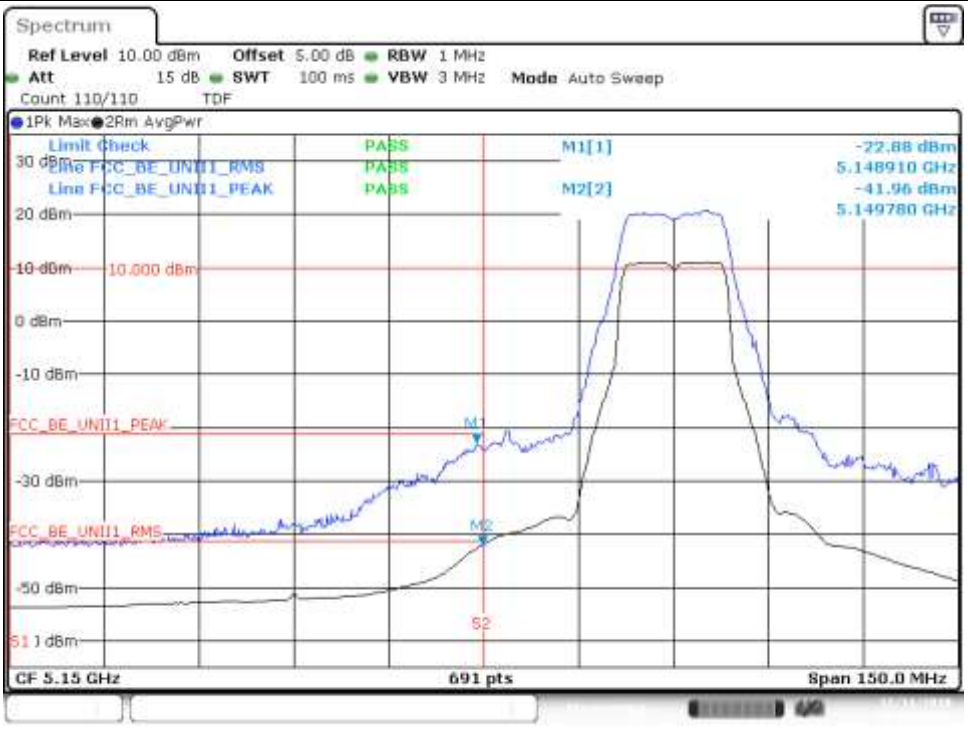
BE Low Freq Section, Peak, RMS – CH40



Date: 11.DEC.2018 12:33:17

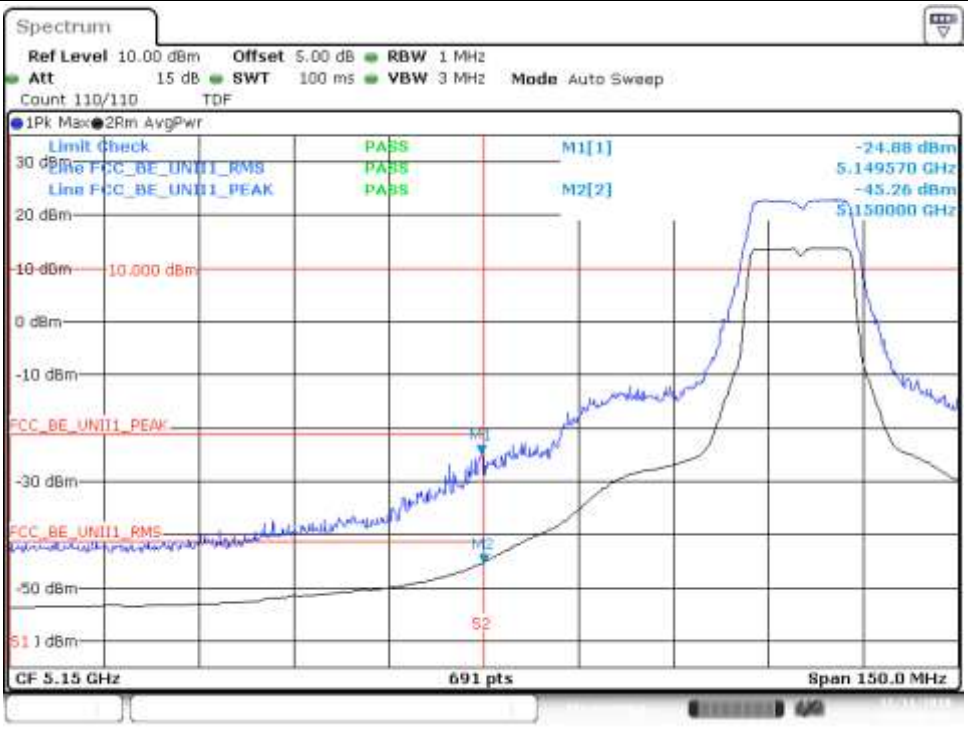
802.11a, 6Mbps – Chain B

BE Low Freq Section , Peak, RMS – CH36



Date: 11.DEC.2018 17:12:38

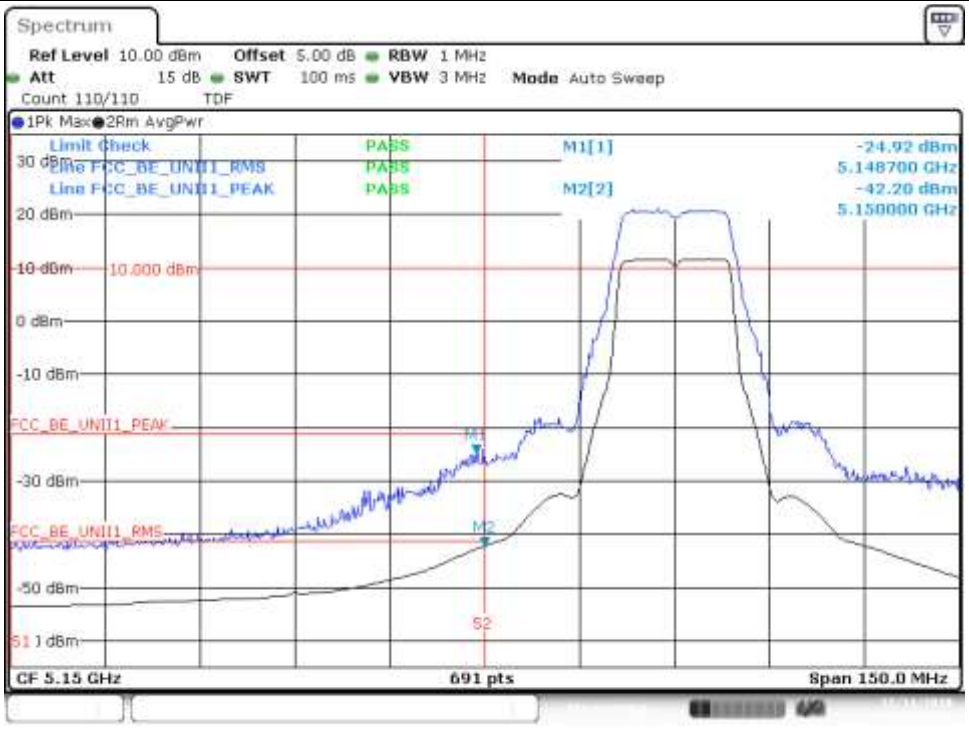
BE Low Freq Section, Peak, RMS – CH40



Date: 11.DEC.2018 17:28:11

802.11n20, HT0 (SISO) – Chain A

BE Low Freq Section, Peak, RMS – CH36



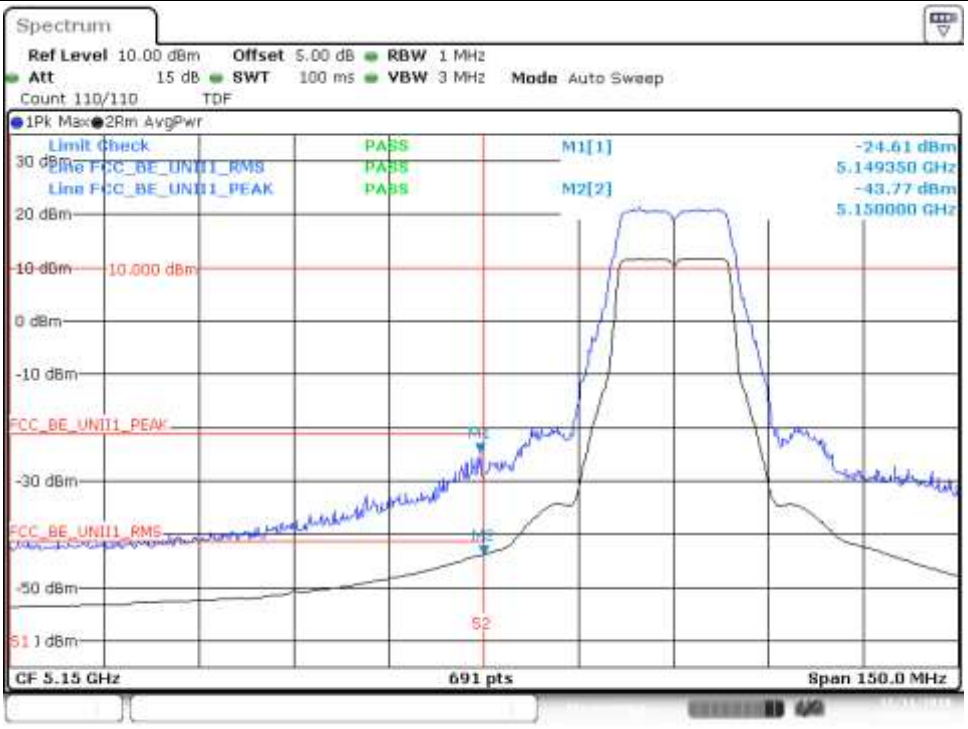
Date: 11.DEC.2018 12:43:02

BE Low Freq Section, Peak, RMS – CH40

Date: 11.DEC.2018 12:48:03

802.11n20, HT0 (SISO) – Chain B

BE Low Freq Section, Peak, RMS – CH36



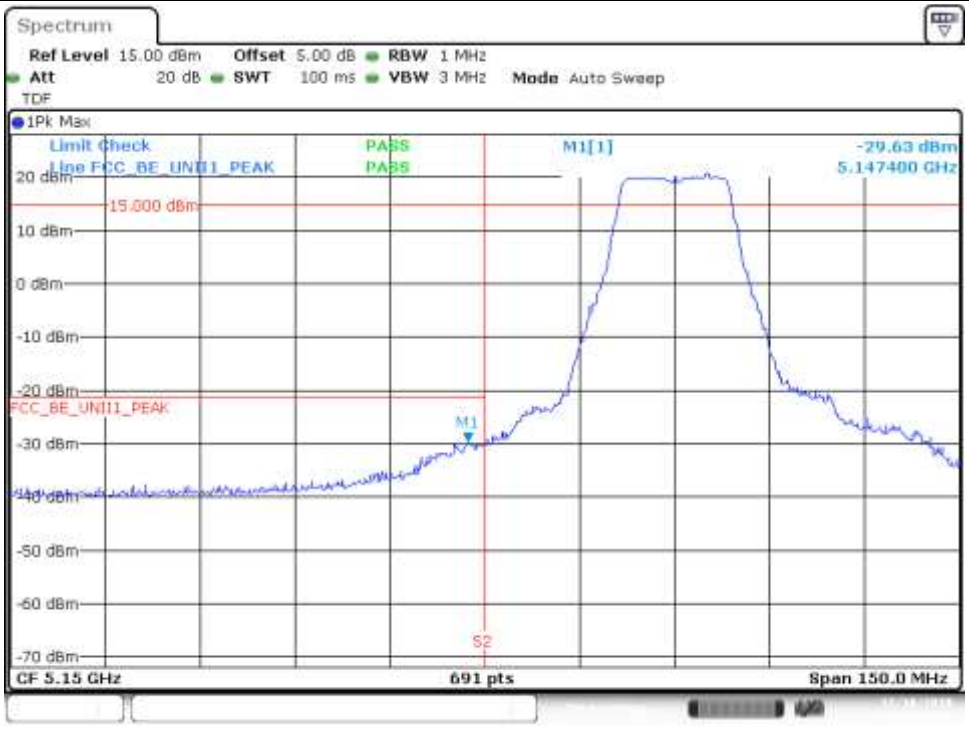
Date: 11.DEC.2018 17:34:31

BE Low Freq Section, Peak, RMS – CH40

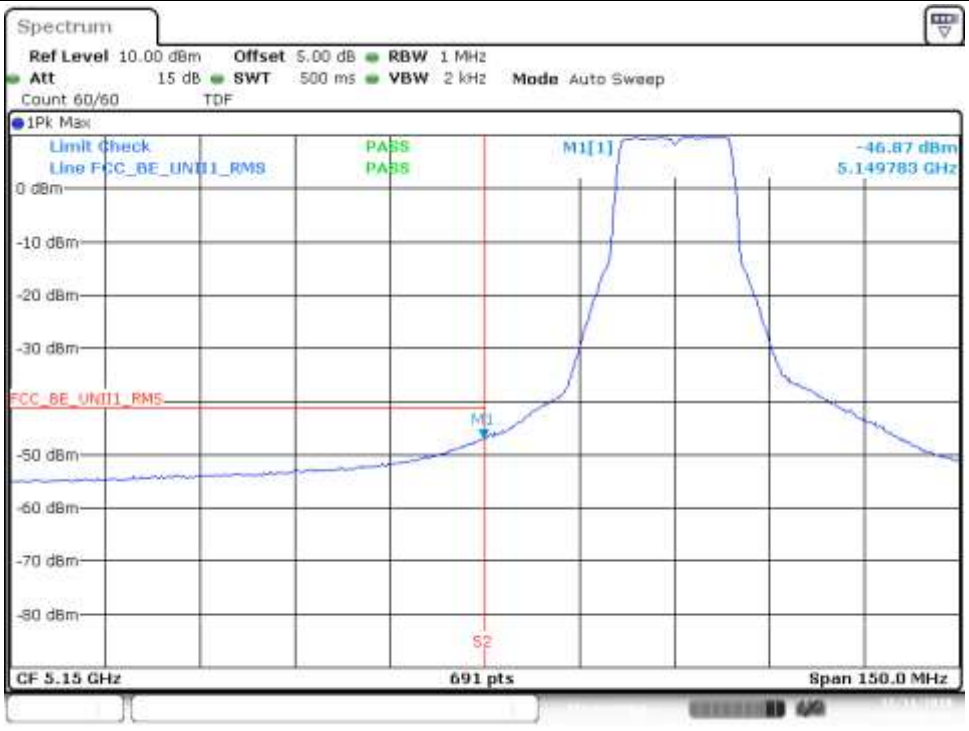
Date: 11.DEC.2018 17:46:27

802.11n20, HT8 (MIMO) – Chain A

BE Low Freq Section, Peak – CH36



BE Low Freq Section, RMS – CH36

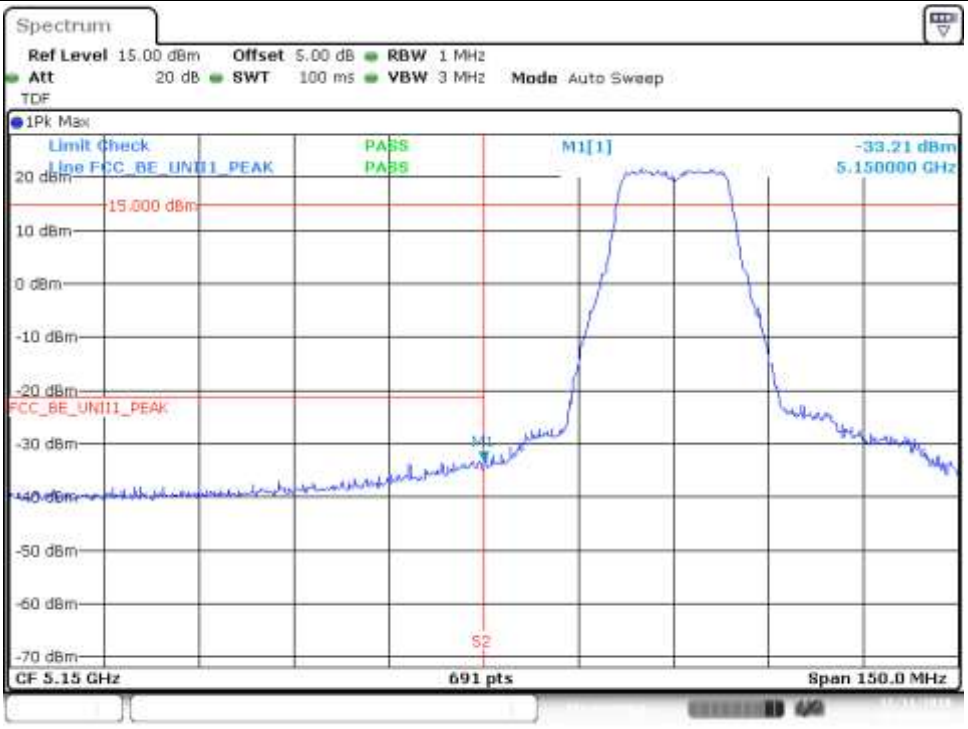


BE Low Freq Section, Peak – CH40

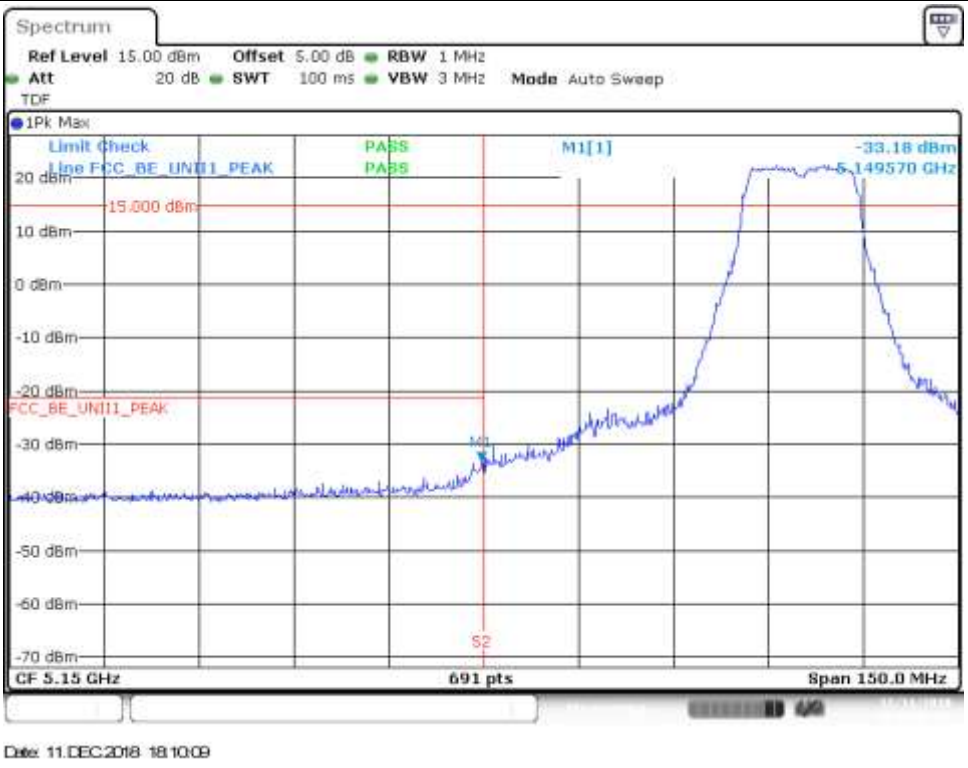

BE Low Freq Section, RMS – CH40


802.11n20, HT8 (MIMO) – Chain B

BE Low Freq Section, Peak – CH36



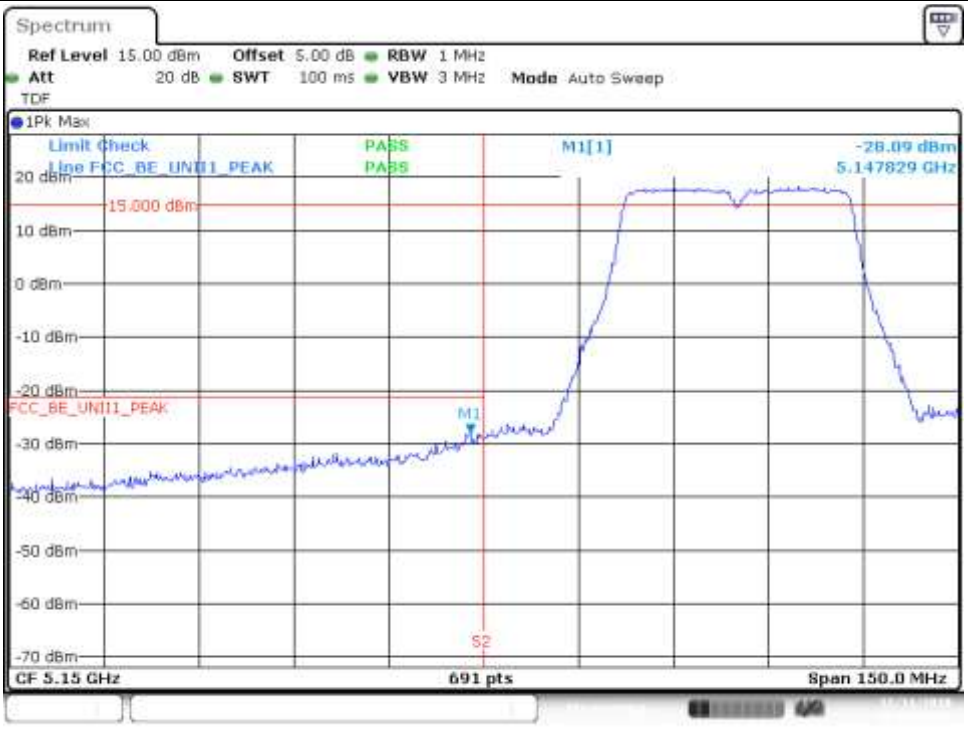
BE Low Freq Section, RMS – CH36

BE Low Freq Section, Peak – CH40


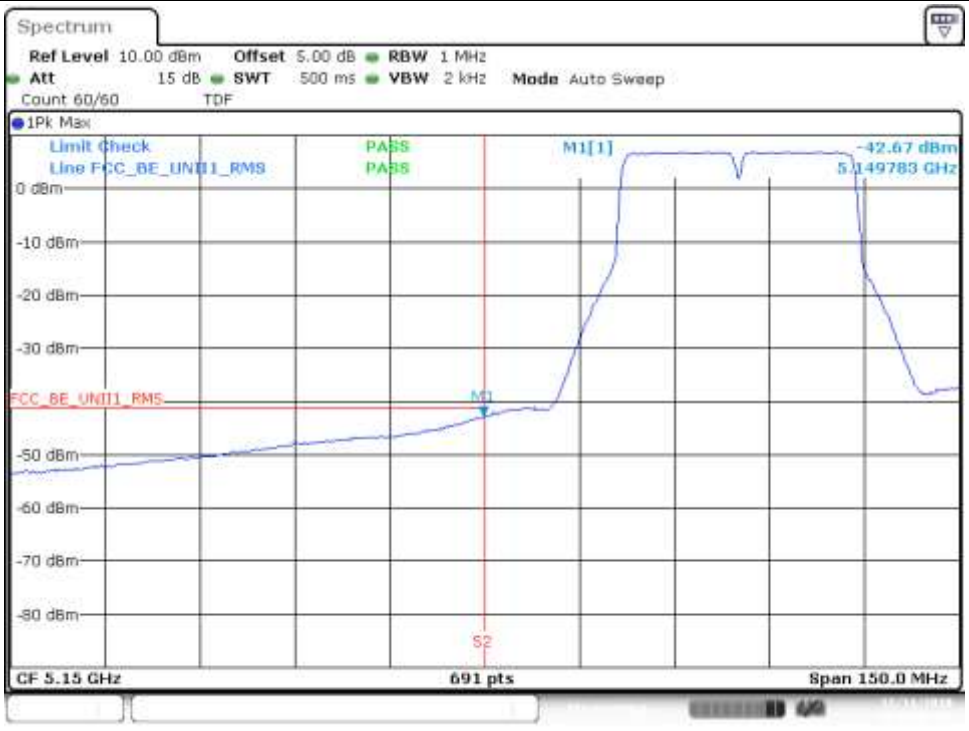
BE Low Freq Section, RMS – CH40


802.11n40, HT0 (SISO) – Chain A

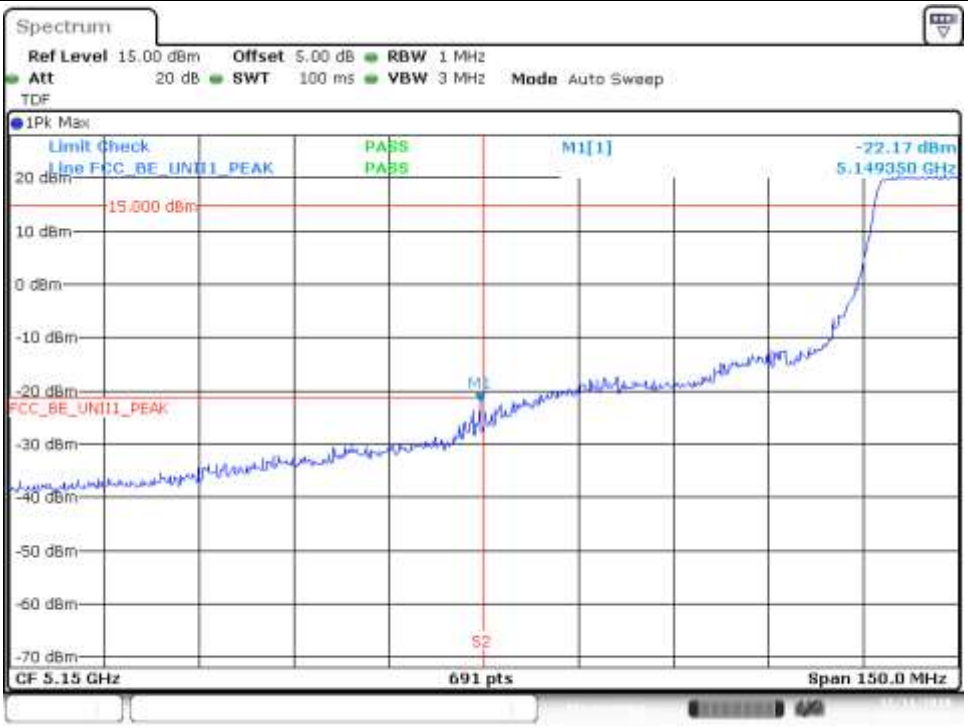
BE Low Freq Section, Peak – CH38F



BE Low Freq Section, RMS – CH38F



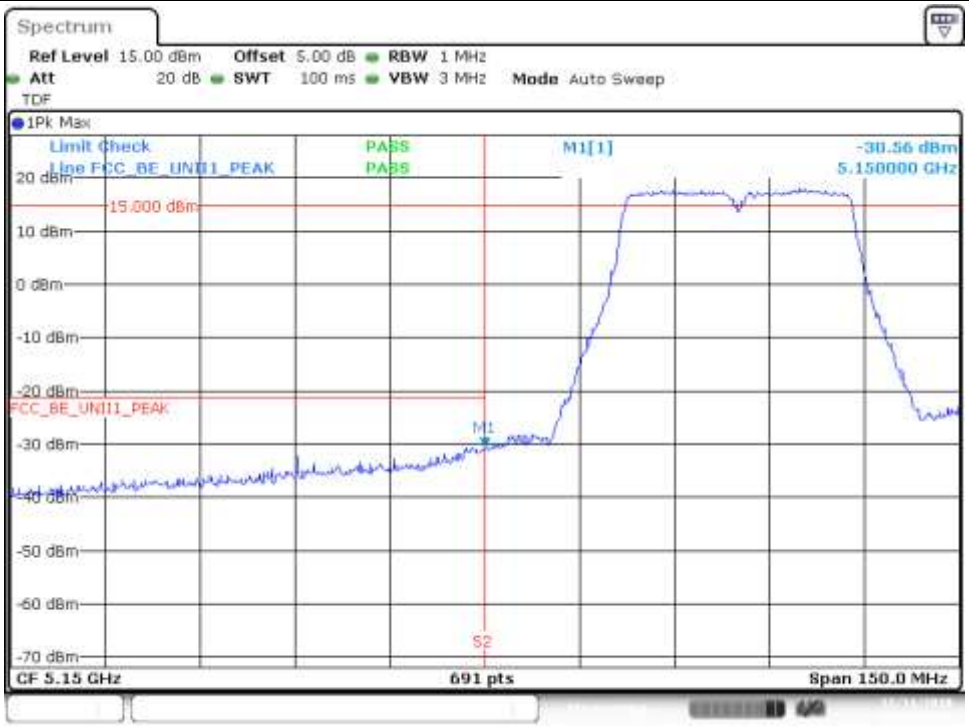
BE Low Freq Section, Peak – CH46F



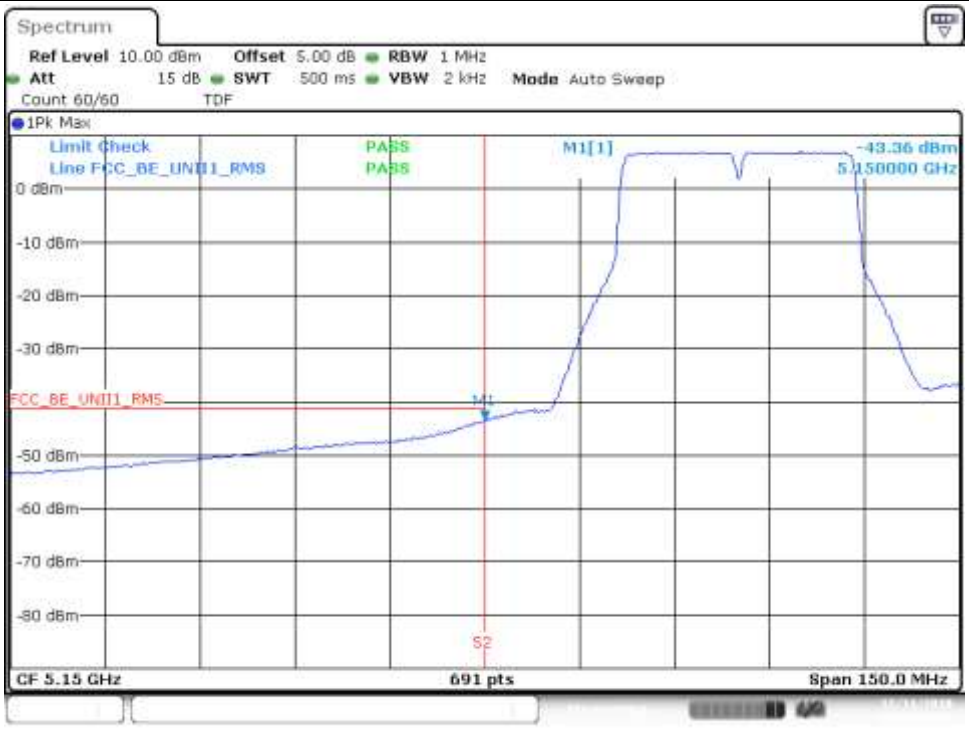
BE Low Freq Section, RMS – CH46F

802.11n40, HT0 (SISO) – Chain B

BE Low Freq Section, Peak – CH38F



BE Low Freq Section, RMS – CH38F

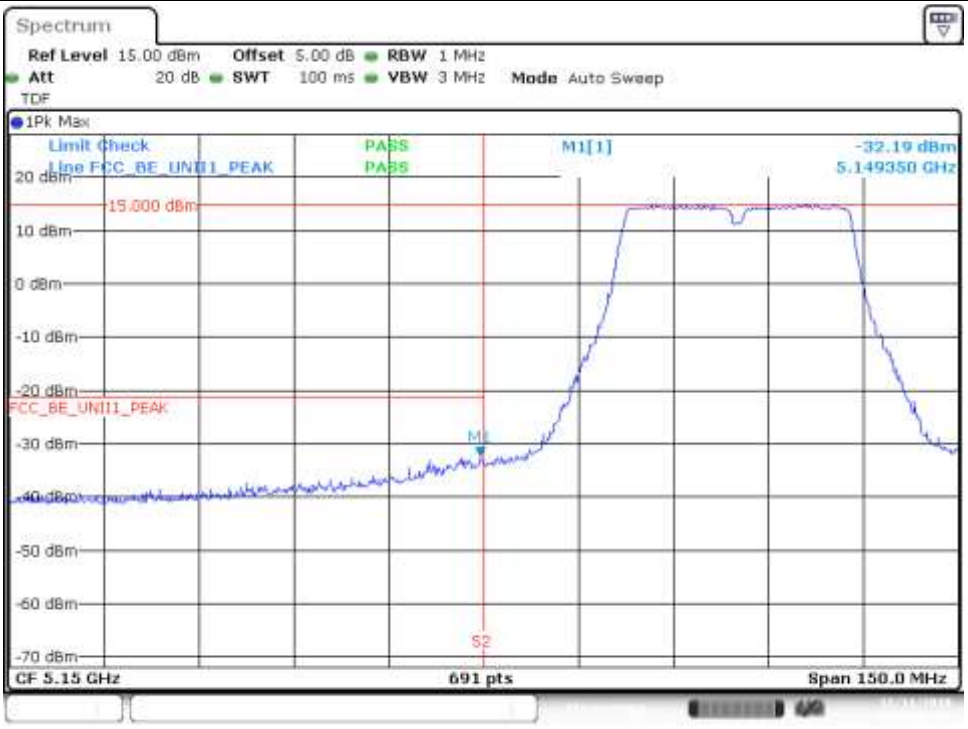


BE Low Freq Section, Peak – CH46F

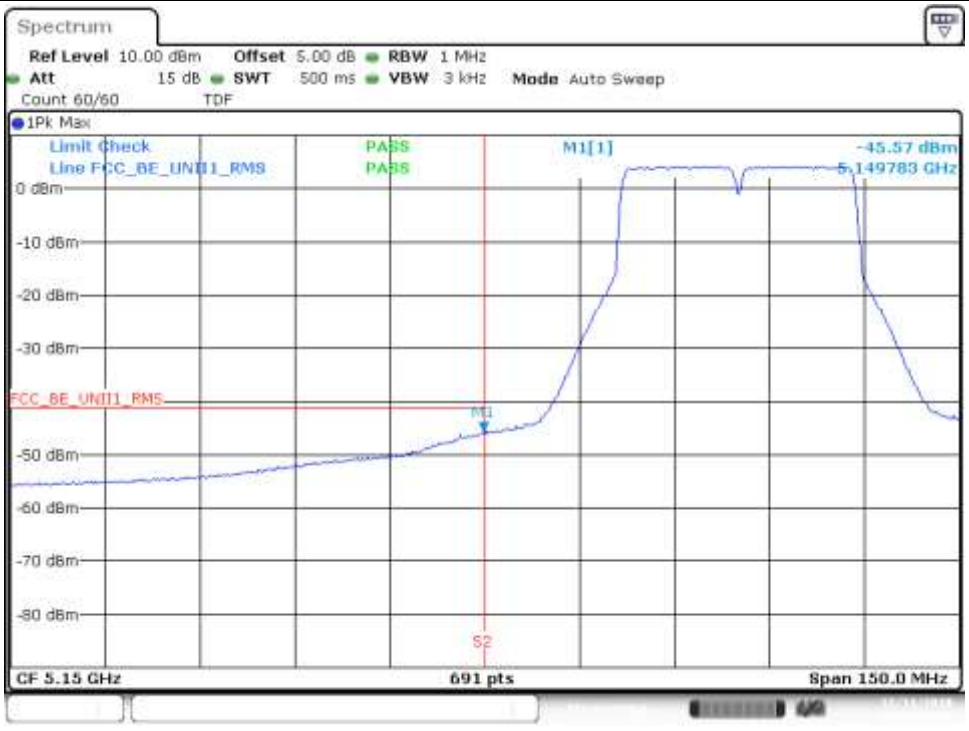
BE Low Freq Section, RMS – CH46F

802.11n40, HT8 (MIMO) – Chain A

BE Low Freq Section, Peak – CH38F



BE Low Freq Section, RMS – CH38F

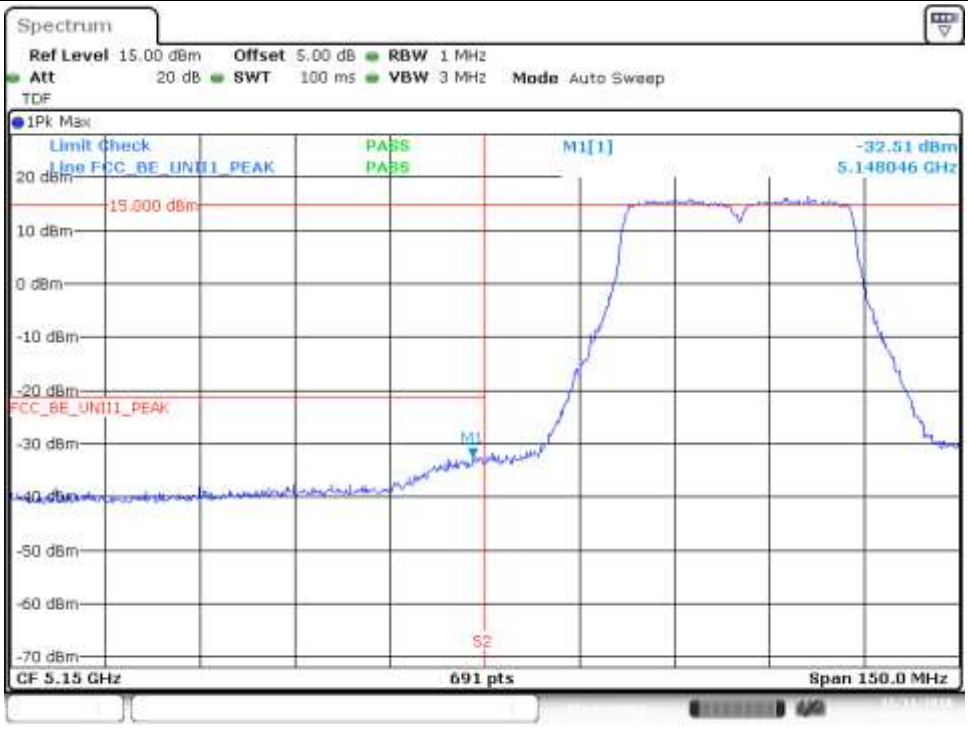


BE Low Freq Section, Peak – CH46F

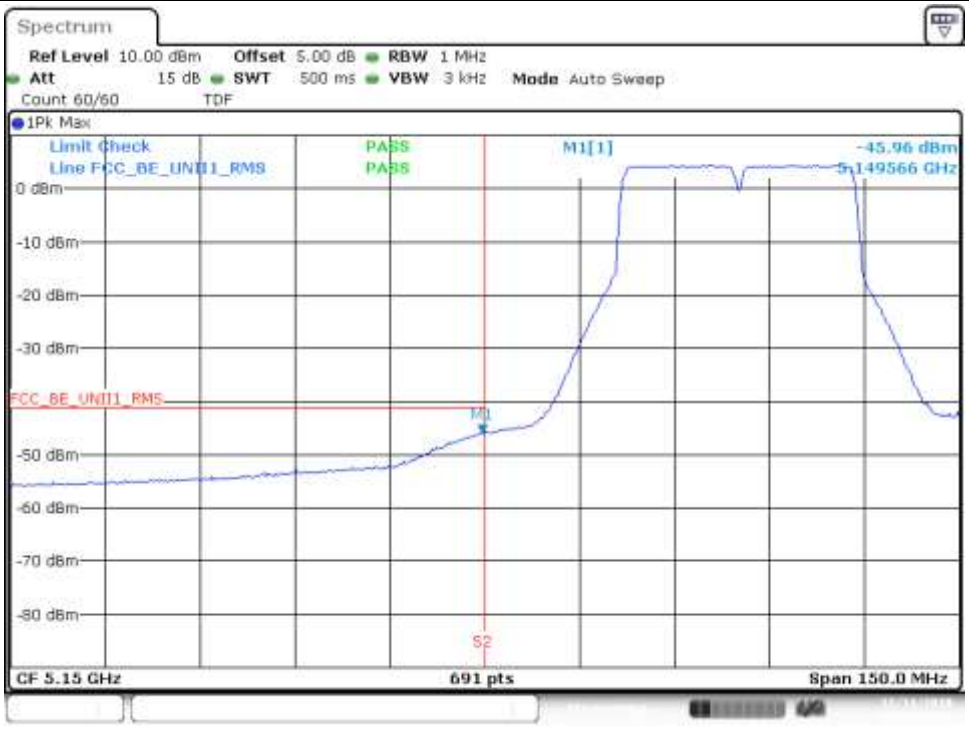

BE Low Freq Section, RMS – CH46F


802.11n40, HT8 (MIMO) – Chain B

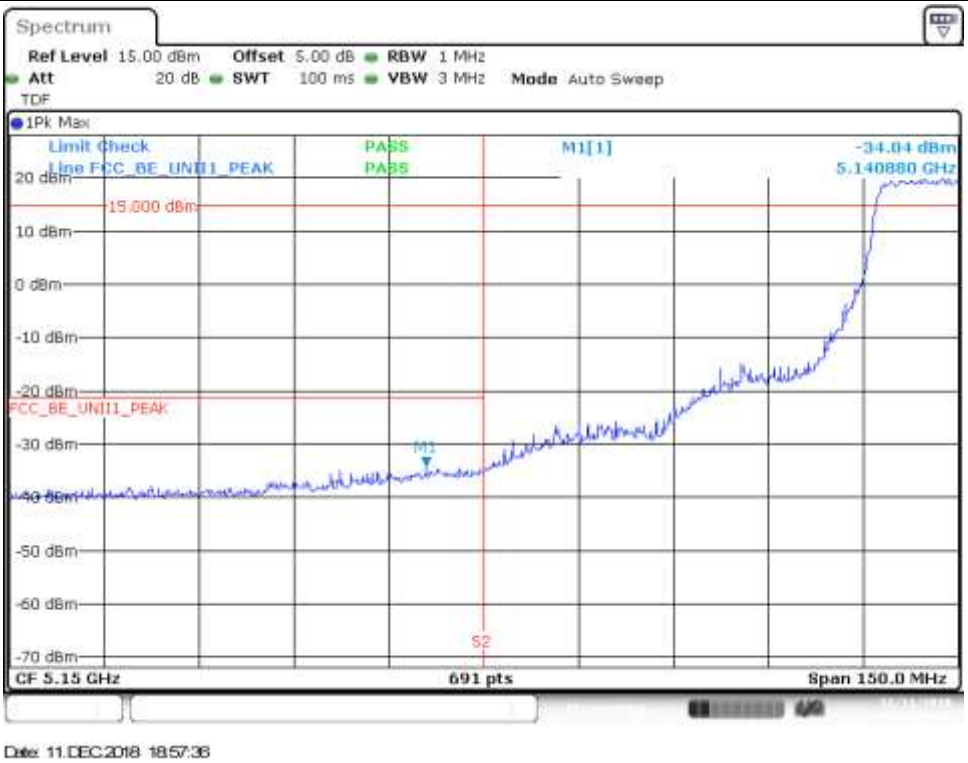
BE Low Freq Section, Peak – CH38F



BE Low Freq Section, RMS – CH38F



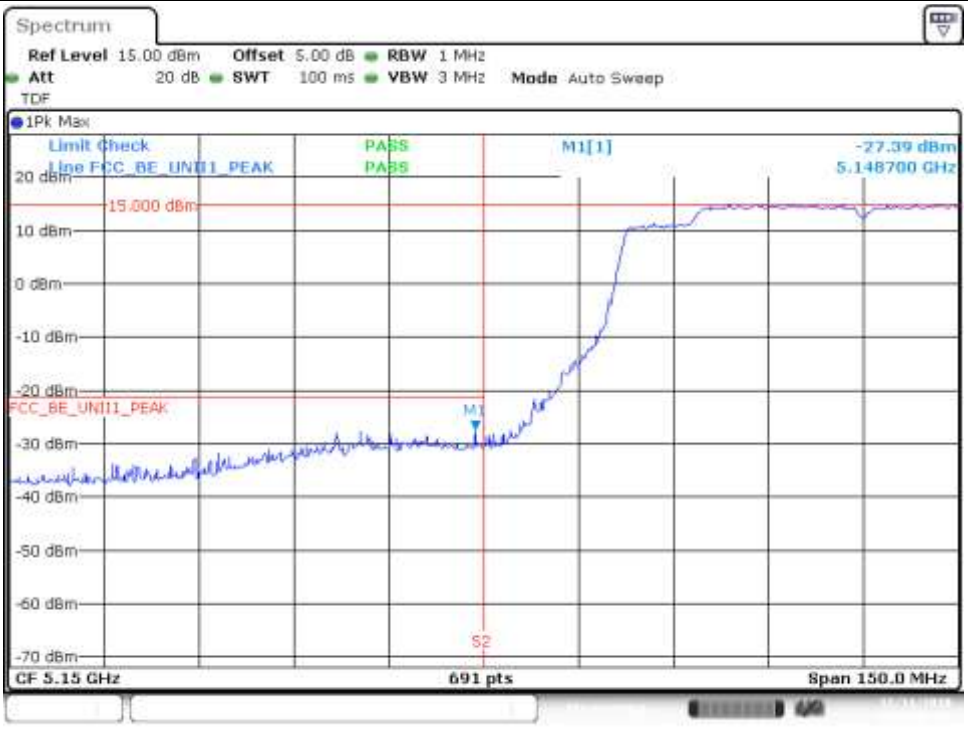
BE Low Freq Section, Peak – CH46F



BE Low Freq Section, RMS – CH46F

802.11ac80, VHT0 (SISO) – Chain A

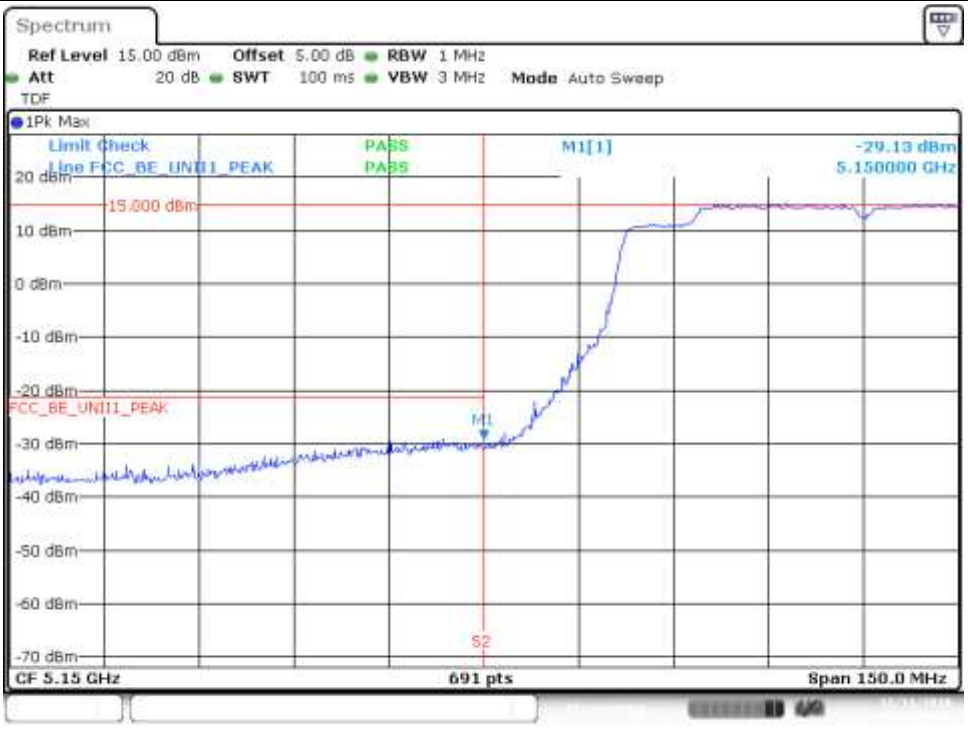
BE Low Freq Section, Peak – CH42



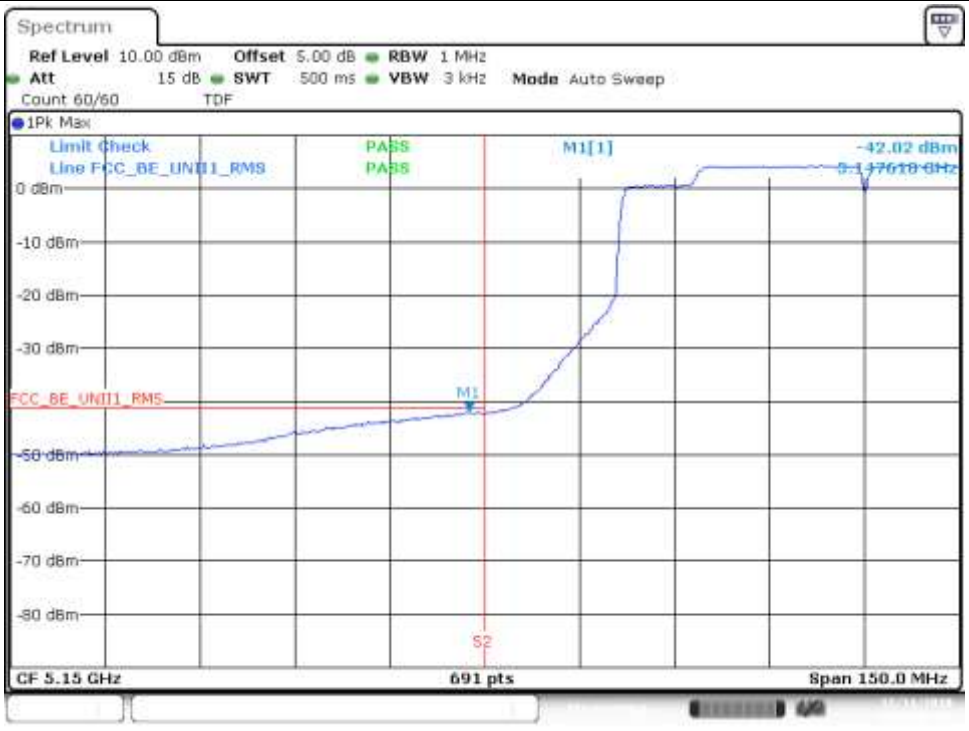
BE Low Freq Section, RMS – CH42

802.11ac80, VHT0 (SISO) – Chain B

BE Low Freq Section, Peak – CH42

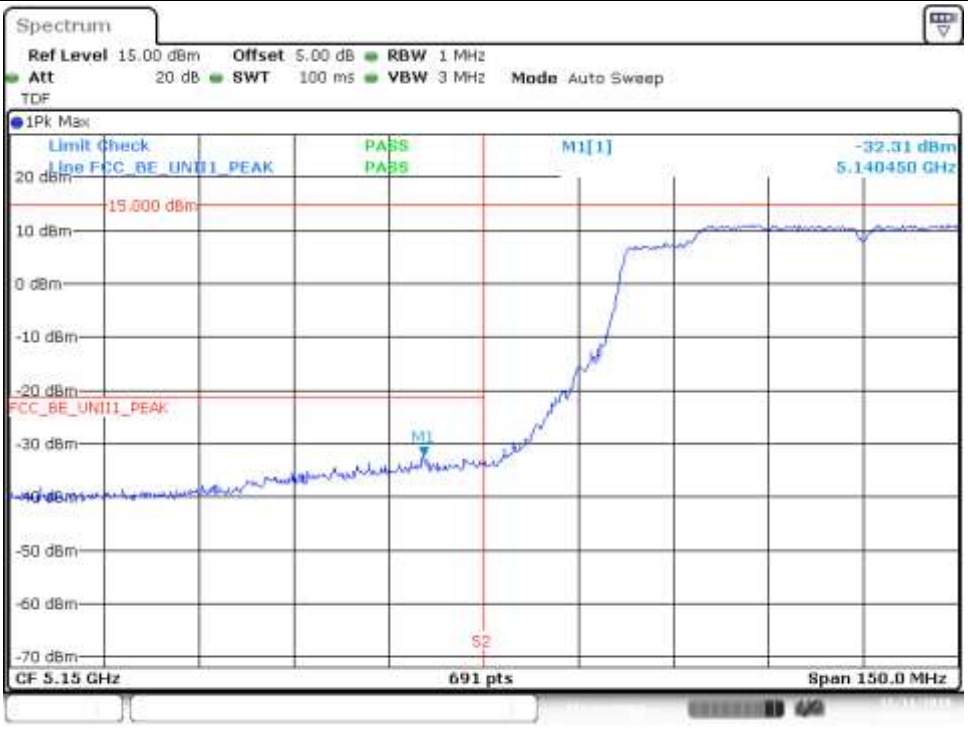


BE Low Freq Section, RMS – CH42

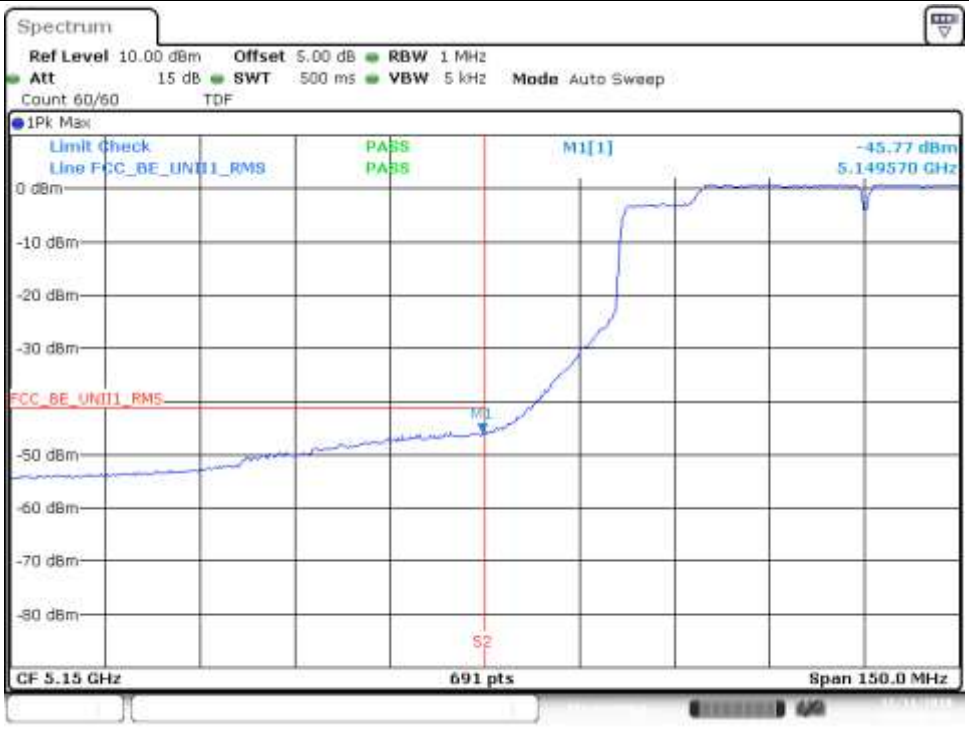


802.11ac80, VHT0 (MIMO) – Chain A

BE Low Freq Section, Peak – CH42

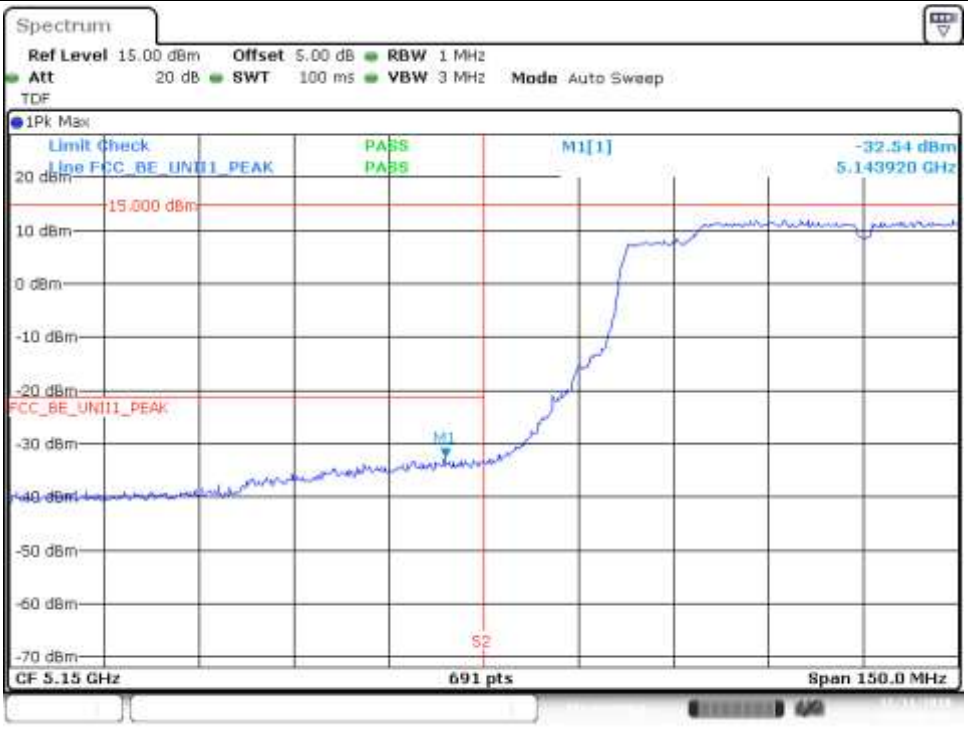


BE Low Freq Section, RMS – CH42



802.11ac80, VHT0 (MIMO) – Chain B

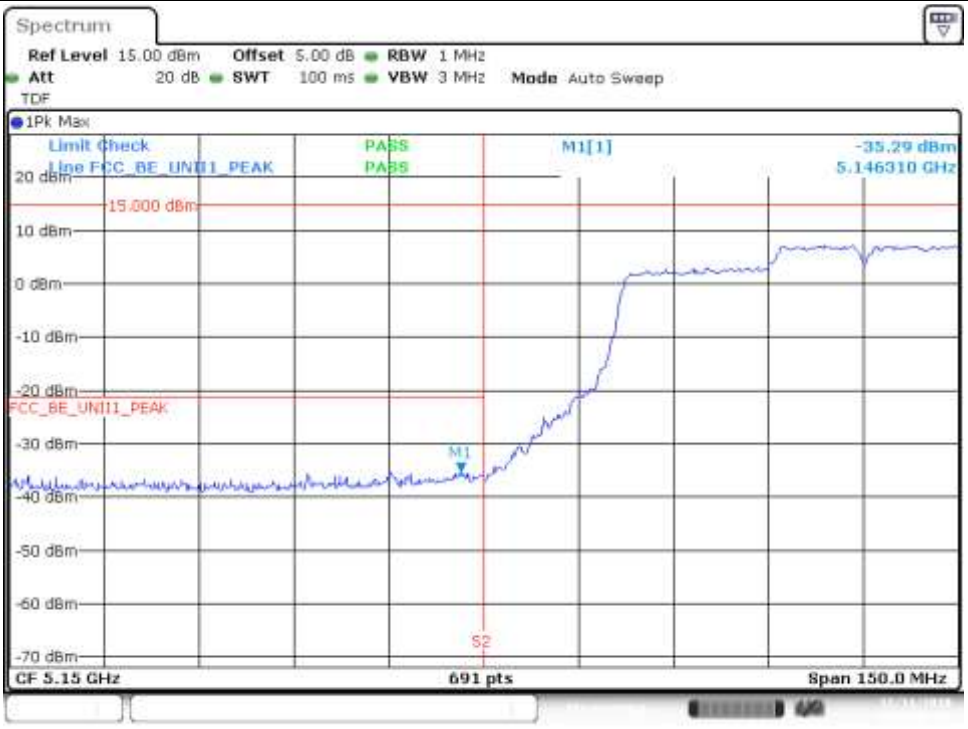
BE Low Freq Section, Peak – CH42



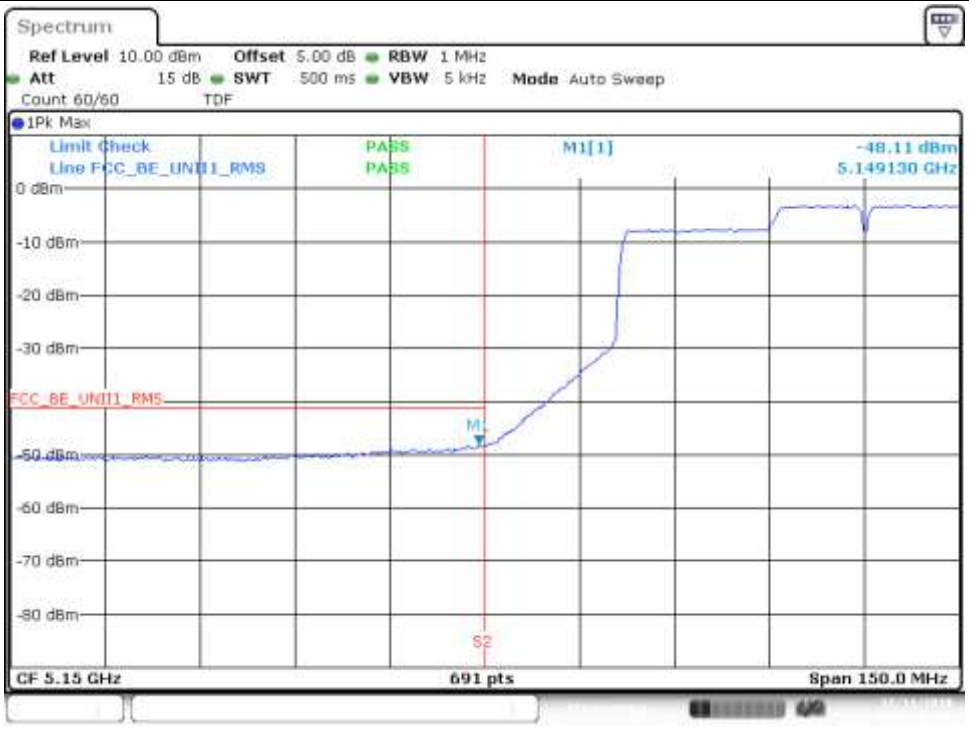
BE Low Freq Section, RMS – CH42

802.11ac160, VHT0 (SISO) – Chain A

BE Low Freq Section, Peak – CH50



BE Low Freq Section, RMS – CH50



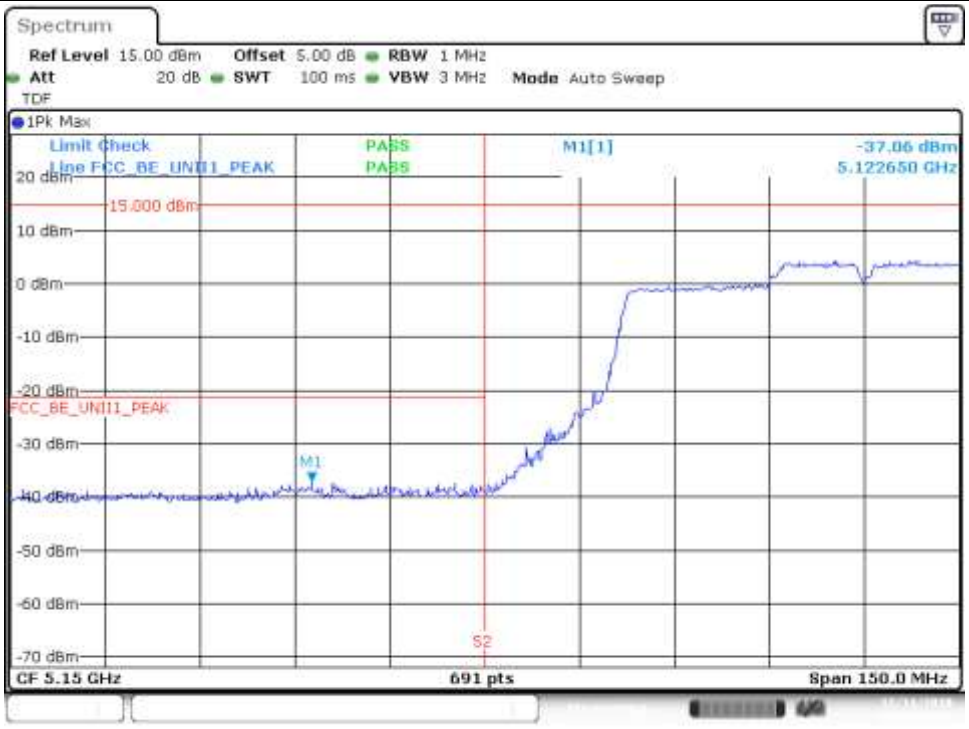
802.11ac160, VHT0 (SISO) – Chain B

BE Low Freq Section, Peak – CH50

BE Low Freq Section, RMS – CH50

802.11ac160, VHT0 (MIMO) – Chain A

BE Low Freq Section, Peak – CH50



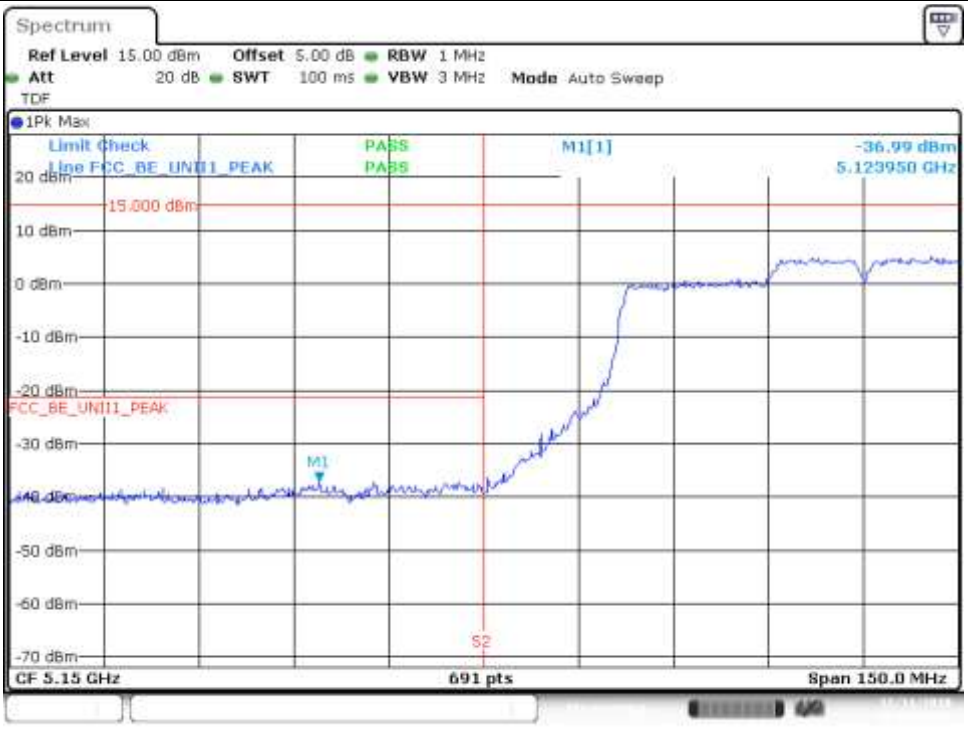
Date: 11.DEC.2018 16:32:44

BE Low Freq Section, RMS – CH50

Date: 11.DEC.2018 16:32:25

802.11ac160, VHT0 (MIMO) – Chain B

BE Low Freq Section, Peak – CH50



Date: 11.DEC.2018 20:07:37

BE Low Freq Section, RMS – CH50

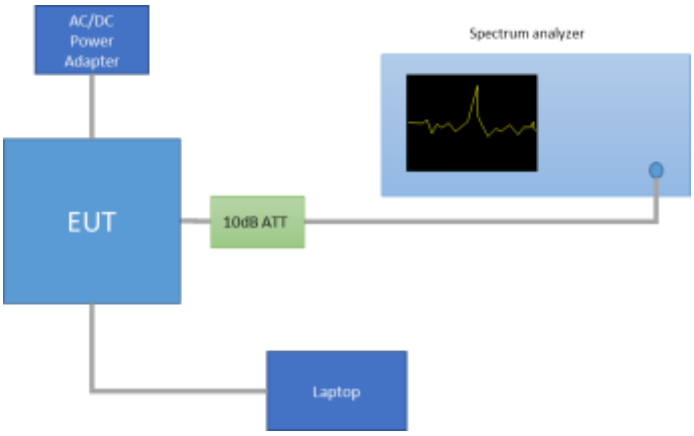
Date: 11.DEC.2018 20:07:20

B.4 Test Results Tables U-NII-2A

B.4.1 26dB & 99% Bandwidth

Test procedure

The setup below was used to measure the 26dB & 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]	26dB BW [MHz]	99% BW [MHz]
802.11a	6Mbps	SISO-A	52	5260	25.28	16.88
			56	5280	24.98	16.96
			64	5320	23.77	16.80
		SISO-B	52	5260	25.73	16.96
			56	5280	**27.08**	**17.04**
			64	5320	24.32	16.80
802.11n20	HT0	SISO-A	52	5260	25.38	17.96
			56	5280	25.38	17.96
			64	5320	24.82	17.88
		SISO-B	52	5260	26.53	**18.04**
			56	5280	**26.68**	18.04
			64	5320	24.62	17.92
	HT8	MIMO-A	52	5260	24.92	17.92
			56	5280	24.92	17.92
			64	5320	24.57	17.92
		MIMO-B	52	5260	25.63	17.96
			56	5280	24.31	17.88
			64	5320	24.67	17.88
802.11n40	HT0	SISO-A	54F	5270	45.86	**36.72**
			62F	5310	44.05	36.56
		SISO-B	54F	5270	45.41	36.72
			62F	5310	43.15	36.53
	HT8	MIMO-A	54F	5270	**45.95**	36.64
			62F	5310	44.50	36.64
		MIMO-B	54F	5270	44.86	36.48
			62F	5310	42.97	36.40
802.11ac80	VHT0	SISO-A	58	5290	86.22	**75.24**
		SISO-B	58	5290	85.41	75.24
		MIMO-A	58	5290	**87.12**	75.24
		MIMO-B	58	5290	84.14	75.00

Max Value

See Section B.5.1 and Section B.5.2 for the screenshot results.

B.4.2 Power Limits. Maximum Output power & Peak power spectral density

Test limits

FCC part	Limits
15.407 (a) (2)	For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band.

Test procedure

The Maximum Conducted Output Power was measured using the channel integration method according to point E) 2) e) (Method SA-2 Alternative) of KDB 789033 D02.

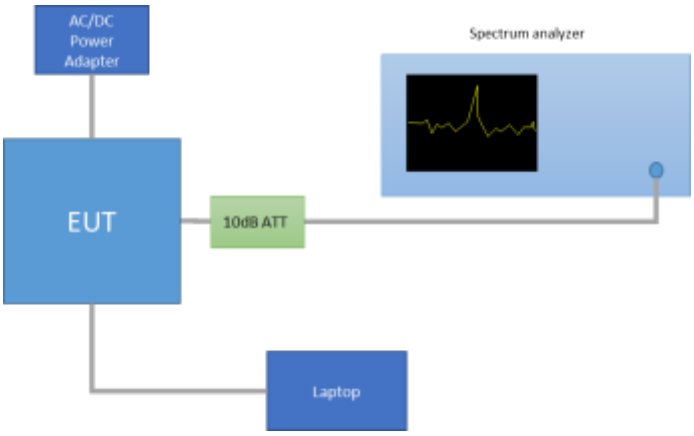
The maximum power spectral density (PSD) was measured using the method according to point F) (Method SA-2 Alternative) of KDB 789033 D02.

In the measure-and-sum approach for MIMO mode, 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 setup below was used to measure the maximum conducted output power and power spectral density. 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 declared maximum antenna gain is 5dBi.



Results tables

Duty cycle

Mode	Rate	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
802.11a	6Mbps	SISO-A	2.03	2.07	98.23%
		SISO-B	2.03	2.07	98.23%
802.11n20	HT0	SISO-A	1.90	1.93	98.17%
		SISO-B	1.90	1.93	98.17%
	HT8	MIMO-A	0.97	1.02	95.72%
		MIMO-B	0.97	1.02	95.72%
802.11n40	HT0	SISO-A	0.93	0.97	96.43%
		SISO-B	0.93	0.97	96.43%
	HT8	MIMO-A	0.49	0.53	91.93%
		MIMO-B	0.49	0.53	91.93%
802.11ac80	VHT0	SISO-A	0.46	0.49	92.84%
		SISO-B	0.46	0.49	92.84%
		MIMO-A	0.26	0.31	81.72%
		MIMO-B	0.26	0.31	81.72%

Maximum output power

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average Conducted Output Power [dBm]	Maximum* Conducted Output Power [dBm]	Maximum* Conducted Output Power [mW]	Maximum* EIRP [dBm]
802.11a	6Mbps	52	5260	SISO-A	21.20	21.20	**131.83**	26.20
				SISO-B	21.12	21.12	129.42	26.12
		56	5280	SISO-A	21.07	21.07	127.94	26.07
				SISO-B	21.18	21.18	131.22	26.18
		64	5320	SISO-A	18.62	18.62	72.78	23.62
				SISO-B	18.50	18.50	**70.79**	23.50
802.11n20	HT0	52	5260	SISO-A	21.08	21.08	128.23	26.08
				SISO-B	21.14	21.14	130.02	26.14
		56	5280	SISO-A	21.04	21.04	127.06	26.04
				SISO-B	21.14	21.14	130.02	26.14
		64	5320	SISO-A	18.56	18.56	71.78	23.56
				SISO-B	18.43	18.43	**69.66**	23.43
	HT8	52	5260	MIMO-A	19.64	19.83	96.16	24.83
				MIMO-B	19.69	19.88	97.27	24.88
				Combined A+B	22.68	22.87	**193.43**	27.87
		56	5280	MIMO-A	19.71	19.90	97.72	24.90
				MIMO-B	19.53	19.72	93.75	24.72
				Combined A+B	22.63	22.82	191.47	27.82
		64	5320	MIMO-A	17.16	17.35	54.32	22.35
				MIMO-B	17.26	17.45	55.59	22.45
				Combined A+B	20.22	20.41	109.91	25.41
802.11n40	HT0	54F	5270	SISO-A	21.08	21.24	132.98	26.24
				SISO-B	20.81	20.97	124.96	25.97
		62F	5310	SISO-A	16.28	16.44	44.03	21.44
				SISO-B	16.22	16.38	**43.43**	21.38
	HT8	54F	5270	MIMO-A	19.86	20.23	105.33	25.23
				MIMO-B	19.85	20.22	105.08	25.22
				Combined A+B	22.87	23.23	**210.41**	28.23
		62F	5310	MIMO-A	15.61	15.98	39.59	20.98
				MIMO-B	15.65	16.02	39.95	21.02
				Combined A+B	18.64	19.01	79.54	24.01
802.11ac80	VHT0	58	5290	SISO-A	16.80	17.12	**51.55**	22.12
				SISO-B	16.53	16.85	48.45	21.85
				MIMO-A	12.97	13.85	24.25	18.85
				MIMO-B	12.95	13.83	24.14	18.83
				Combined A+B	15.97	16.85	**48.39**	21.85

* Maximum values are the duty cycle compensated values calculated from the average (measured) values

Max Value

Min Value

Maximum Power Spectral Density (PSD)

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average conducted PSD [dBm/MHz]	Maximum* conducted PSD [dBm/MHz]
802.11a	6Mbps	52	5260	SISO-A	9.55	9.55
				SISO-B	9.47	9.47
		56	5280	SISO-A	9.41	9.41
				SISO-B	9.52	9.52
		64	5320	SISO-A	6.99	6.99
				SISO-B	6.87	6.87
802.11n20	HT0	52	5260	SISO-A	9.15	9.15
				SISO-B	9.19	9.19
		56	5280	SISO-A	9.10	9.10
				SISO-B	9.19	9.19
		64	5320	SISO-A	6.63	6.63
				SISO-B	6.51	6.51
	HT8	52	5260	MIMO-A	7.68	7.87
				MIMO-B	7.74	7.93
				Combined A+B	10.72	10.91
		56	5280	MIMO-A	7.76	7.95
				MIMO-B	7.64	7.83
				Combined A+B	10.71	10.90
		64	5320	MIMO-A	5.21	5.40
				MIMO-B	5.44	5.63
				Combined A+B	8.34	8.53
802.11n40	HT0	54F	5270	SISO-A	5.99	6.15
				SISO-B	5.73	5.89
		62F	5310	SISO-A	1.21	1.37
				SISO-B	1.12	1.28
	HT8	54F	5270	MIMO-A	4.80	5.17
				MIMO-B	4.83	5.20
				Combined A+B	7.83	8.19
		62F	5310	MIMO-A	0.59	0.96
				MIMO-B	0.64	1.01
				Combined A+B	3.63	3.99
802.11ac80	VHT0	58	5290	SISO-A	-0.61	-0.29
				SISO-B	-0.89	-0.57
				MIMO-A	-4.34	-3.46
				MIMO-B	-4.33	-3.45
				Combined A+B	-1.32	-0.45

* Maximum values are the duty cycle compensated values calculated from the measured average values

See Section B.5.3 for the screenshot results.

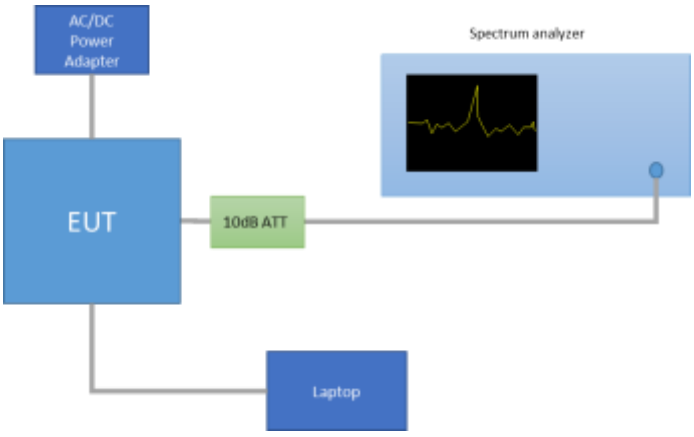
B.4.3 Undesirable emissions limits : Band Edge (Conducted)

Test limits

<table>
<tr><th>FCC part</th><th>Limits</th></tr>
<tr><td>15.407 (b) (2)</td><td>For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.</td></tr>
<tr><td>15.209</td><td>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):
<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>
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.</td></tr>
</table>

Test procedure

The setup below was used to measure undesirable emissions on the Band Edge domain. 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 and the declared Antenna Gain.



For Band Edge measurements in average mode on the low frequency section, one of the two methods is used according to section G) 6) (KDB 789033 D02):

1) Method AD (Average Detection) as per paragraph II.G.6.c.
2) Method VB (Averaging using reduced video bandwidth) as per paragraph II.G.6.d.

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 5dBi.

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)
960-25000	3	500	53.98	-41.2

See Section 0 for the screenshot results.

B.4.4 Radiated spurious emission

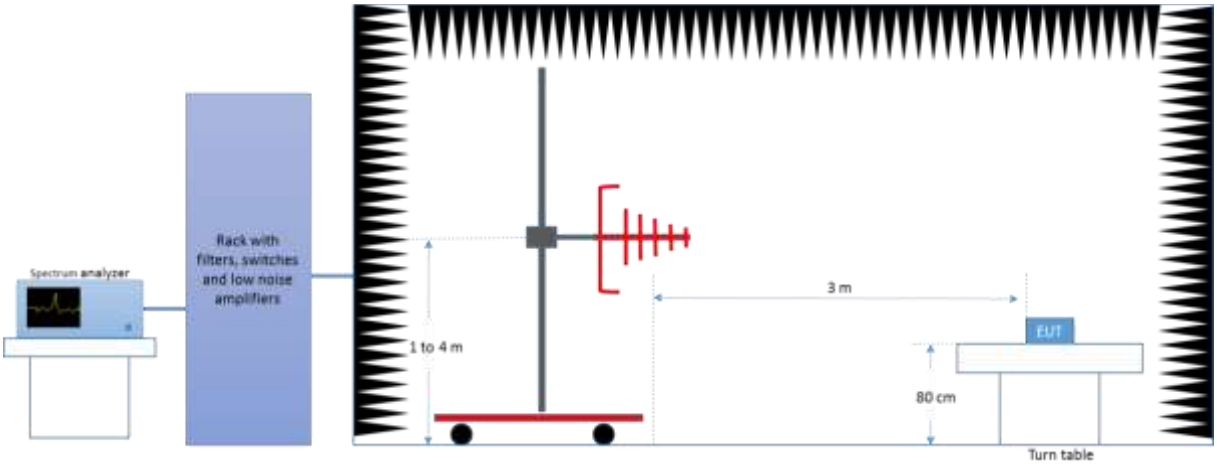
Standard references

<table>
<tr><th>FCC part</th><th>Limits</th></tr>
<tr><td>15.407 (a) (2)</td><td>For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band.</td></tr>
<tr><td>15.209</td><td>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):
<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>
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.</td></tr>
</table>

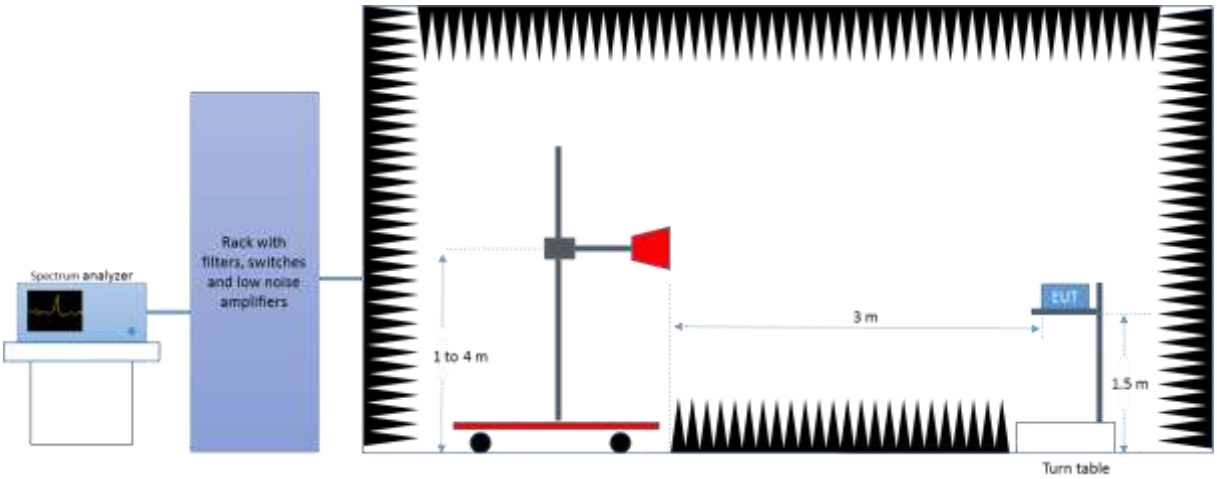
Test procedure

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, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.
The radiated spurious emission was measured on the worst case configuration selected from the chapter B.2.2 and using the low, middle and high channels.
For technologies 802.11n20, 802.11n40, 802.11ac80 and 802.11ac160 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).

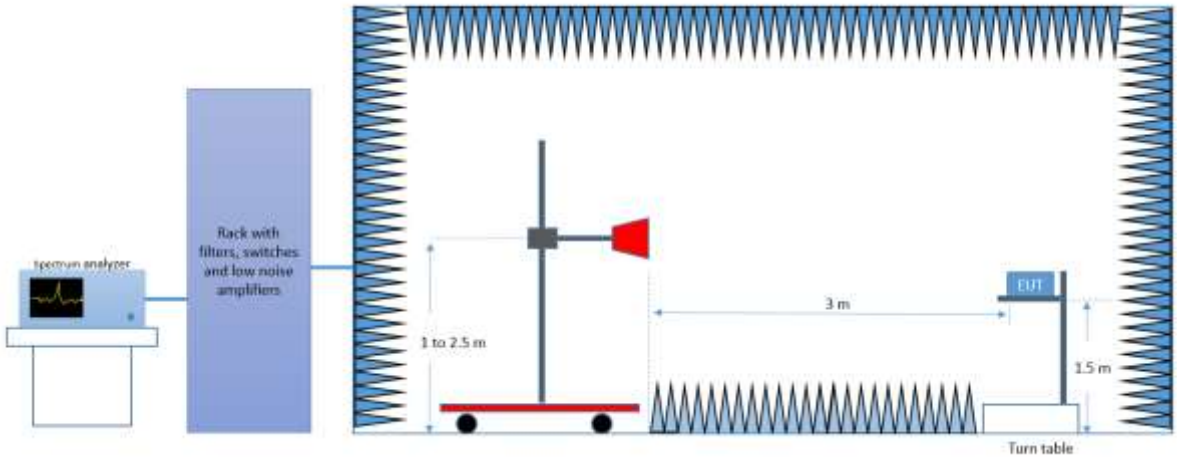
Radiated Setup 30 MHz- 1GHz



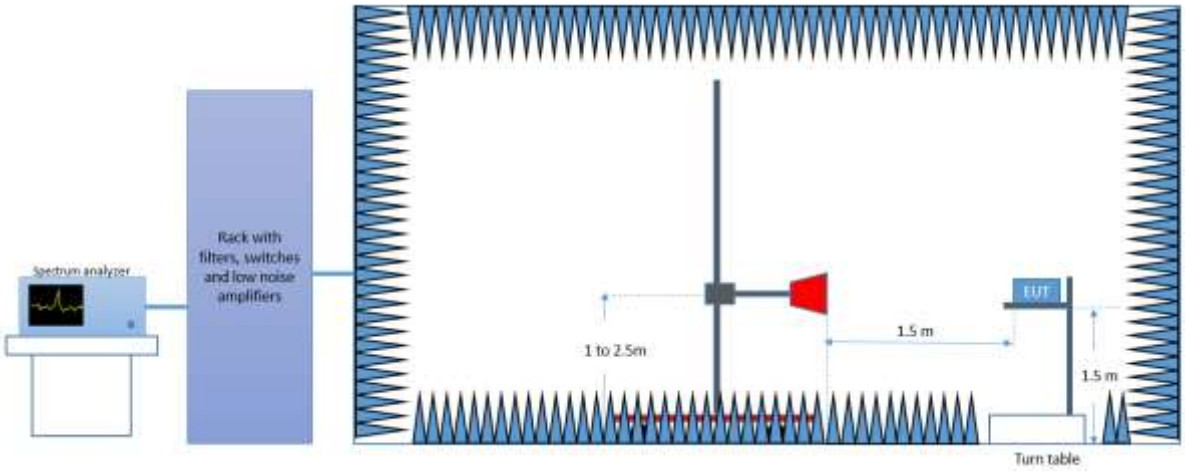
Radiated Setup 1 GHz – 6.4 GHz



Radiated Setup 6.4 GHz - 18 GHz



Radiated Setup 18 GHz - 40 GHz



Sample Calculation

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

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

where

E is the field strength of the emission at the measurement distance, in dBµV/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:

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

where

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

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

D_{Meas} is the measurement distance, in m

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

Test Results

30 MHz – 40 GHz, 802.11a, 6Mbps, Chain A

Radiated Spurious – CH52

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	68.2	32.4
1051.5	47.2	---	74.0	26.8
1053.0	---	34.8	54.0	19.2
1197.0	---	34.0	54.0	20.0
1198.0	46.0	---	74.0	28.1
15777.2	---	**44.3**	54.0	9.7
15784.9	54.3	---	74.0	19.7
21034.8	48.7	---	74.0	25.3
21044.9	---	39.4	54.0	14.6
39473.1	53.8	---	68.2	14.4

Radiated Spurious – CH56

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.5	---	68.2	32.7
1072.5	44.8	---	74.0	29.2
1076.5	---	33.9	54.0	20.1
1195.0	45.0	---	74.0	29.0
1195.5	---	32.9	54.0	21.1
15839.5	54.6	---	74.0	19.4
15840.5	---	43.8	54.0	10.2
21116.8	---	40.5	54.0	13.5
21120.3	49.2	---	74.0	24.8
26400.1	49.3	---	68.2	18.9

Radiated Spurious – CH64

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.0	---	68.2	32.2
1110.5	45.0	---	74.0	29.0
1115.0	---	33.9	54.0	20.1
1195.5	---	33.2	54.0	20.8
1207.0	43.3	---	74.0	30.7
15964.7	---	44.1	54.0	9.9
15966.6	54.2	---	74.0	19.8
39471.8	53.5	---	68.2	14.7

30 MHz – 40 GHz, 802.11a, 6Mbps, Chain B

Radiated Spurious – CH52

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	34.7	---	68.2	33.5
1051.0	44.8	---	74.0	29.2
1055.5	---	33.4	54.0	20.6
1195.0	45.2	---	74.0	28.8
1196.0	---	34.5	54.0	19.5
15772.8	51.4	---	74.0	22.6
15773.8	---	40.9	54.0	13.1
21039.8	---	39.9	54.0	14.1
21046.5	49.1	---	74.0	24.9

Radiated Spurious – CH56

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	36.4	---	68.2	31.8
1072.0	---	33.0	54.0	21.0
1077.5	45.3	---	74.0	28.7
1196.0	45.3	---	74.0	28.7
1196.5	---	33.3	54.0	20.7
15843.9	---	42.4	54.0	11.6
15847.2	53.8	---	74.0	20.2
21120.0	46.1	---	74.0	27.9
21120.0	---	38.7	54.0	15.3

Radiated Spurious – CH64

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	68.2	32.4
1112.5	---	33.2	54.0	20.8
1119.0	45.9	---	74.0	28.1
1197.0	---	33.1	54.0	20.9
1198.5	44.6	---	74.0	29.4
15964.2	53.1	---	74.0	20.9
15964.2	---	42.3	54.0	11.7
21279.7	47.5	---	74.0	26.5
21279.9	---	39.0	54.0	15.0
39487.0	53.4	---	68.2	14.8

30 MHz – 40 GHz, 802.11n20, HT0, Chain A

Radiated Spurious – CH52

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	68.2	32.5
1050.5	45.5	---	74.0	28.5
1054.5	---	34.0	54.0	20.0
1196.0	46.2	---	74.0	27.8
1196.5	---	34.1	54.0	19.9
15772.3	54.0	---	74.0	20.0
15780.1	---	42.7	54.0	11.3
21038.0	---	40.0	54.0	14.0
21041.1	50.1	---	74.0	23.9
39598.8	53.9	---	68.2	14.3

Radiated Spurious – CH56

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.9	29.4	---	68.2	38.8
624.0	34.2	---	68.2	34.0
1051.5	---	33.6	54.0	20.4
1051.5	44.2	---	74.0	29.8
1196.5	---	33.5	54.0	20.5
1196.5	45.6	---	74.0	28.4
15842.4	53.9	---	74.0	20.1
15845.8	---	43.0	54.0	11.0
21109.7	49.3	---	74.0	24.7
21121.4	---	40.1	54.0	13.9
39566.7	53.2	---	68.2	15.0

Radiated Spurious – CH64

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.9	---	68.2	32.3
731.0	40.7	---	68.2	27.5
1113.0	44.7	---	74.0	29.3
1113.5	---	33.5	54.0	20.5
1196.5	---	33.2	54.0	20.8
1198.0	44.4	---	74.0	29.6
15960.3	---	44.1	54.0	9.9
15963.7	54.4	---	74.0	19.6
20950.6	46.5	---	74.0	27.5
20954.8	---	37.3	54.0	16.7
39938.8	53.2	---	68.2	15.0

30 MHz – 40 GHz, 802.11n20, HT0, Chain B

Radiated Spurious – CH52

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.8	---	68.2	32.4
1049.5	44.5	---	74.0	29.5
1055.5	---	32.8	54.0	21.2
1195.5	---	33.9	54.0	20.1
1198.0	46.2	---	74.0	27.8
15783.0	51.3	---	74.0	22.7
15783.4	---	41.3	54.0	12.7
21039.8	---	39.0	54.0	15.0
21047.0	48.4	---	74.0	25.6
39477.3	54.0	---	68.2	14.2

Radiated Spurious – CH56

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.9	28.7	---	68.2	39.5
624.0	35.3	---	68.2	32.9
1052.5	---	34.5	54.0	19.5
1054.5	46.2	---	74.0	27.8
1196.5	---	33.3	54.0	20.7
1198.0	45.6	---	74.0	28.4
15834.2	52.3	---	74.0	21.7
15840.5	---	41.9	54.0	12.1
21120.0	---	39.0	54.0	15.0
21122.2	47.5	---	74.0	26.5
39478.6	54.3	---	68.2	13.9

Radiated Spurious – CH64

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.1	---	68.2	33.1
1115.5	---	32.3	54.0	21.7
1117.5	42.3	---	74.0	31.7
1195.5	---	33.8	54.0	20.2
1197.5	45.8	---	74.0	28.2
15951.6	51.6	---	74.0	22.4
15960.8	---	41.3	54.0	12.7
21280.2	47.7	---	74.0	26.3
21280.2	---	40.3	54.0	13.7
39495.4	53.3	---	68.2	14.9

30 MHz – 40 GHz, 802.11n20, HT8, Chain A+B

Radiated Spurious – CH64

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.2	34.9	---	68.2	33.3
624.0	35.1	---	68.2	33.1
1114.5	---	34.6	54.0	19.5
1115.0	45.7	---	74.0	28.3
1195.5	---	33.2	54.0	20.8
1195.5	45.1	---	74.0	28.9
15952.1	55.5	---	74.0	18.5
15963.7	---	**44.4**	54.0	9.6
39450.7	53.7	---	68.2	14.5

30 MHz – 40 GHz, 802.11n40, HT0, Chain A

Radiated Spurious – CH54F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.5	---	68.2	32.7
1064.5	---	31.5	54.0	22.5
1067.5	43.8	---	74.0	30.3
1194.5	44.9	---	74.0	29.1
1197.0	---	33.3	54.0	20.8
15806.6	52.4	---	74.0	21.6
15812.9	---	41.0	54.0	13.0
39463.8	53.3	---	68.2	14.9

Radiated Spurious – CH62F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.0	---	68.2	33.2
1195.5	45.2	---	74.0	28.8
1196.0	---	33.7	54.0	20.3
5963.5	55.7	---	68.2	12.5
15921.7	---	42.5	54.0	11.5
15935.7	53.0	---	74.0	21.0
39456.6	53.7	---	68.2	14.5

30 MHz – 40 GHz, 802.11n40, HT0, Chain B

Radiated Spurious – CH54F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	34.8	---	68.2	33.4
1062.0	---	32.0	54.0	22.0
1063.0	44.0	---	74.0	30.0
1194.5	44.6	---	74.0	29.4
1196.5	---	33.3	54.0	20.7
15803.3	51.5	---	74.0	22.5
15814.4	---	40.5	54.0	13.5
21079.9	48.1	---	74.0	25.9
21079.9	---	39.0	54.0	15.0
39544.0	53.1	---	68.2	15.1

Radiated Spurious – CH62F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.0	---	68.2	33.2
1196.5	---	33.3	54.0	20.7
1197.0	45.1	---	74.0	28.9
15922.2	---	40.8	54.0	13.2
15938.6	51.4	---	74.0	22.6
39491.2	53.3	---	68.2	14.9

30 MHz – 40 GHz, 802.11n40, HT8, Chain A+B

Radiated Spurious – CH62F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
199.1	35.5	---	68.2	32.7
624.0	34.8	---	68.2	33.4
1105.0	---	31.5	54.0	22.5
1105.5	44.6	---	74.0	29.4
1196.0	---	33.4	54.0	20.6
1196.5	45.2	---	74.0	28.8
15920.7	54.3	---	74.0	19.7
15928.9	---	**43.7**	54.0	10.3
39408.5	53.6	---	68.2	14.6

30 MHz – 40 GHz, 802.11ac80, HT0, Chain A

Radiated Spurious – CH58

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	34.9	---	68.2	33.3
1195.5	---	33.8	54.0	20.2
1200.0	44.4	---	74.0	29.6
5952.0	**55.5**	---	68.2	12.7
15880.6	---	40.6	54.0	13.4
15881.6	51.6	---	74.0	22.4
39605.5	53.4	---	68.2	14.8

30 MHz – 40 GHz, 802.11ac80, HT0, Chain B

Radiated Spurious – CH58

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.7	---	68.2	32.5
1194.5	44.9	---	74.0	29.1
1196.5	---	33.1	54.0	20.9
16734.2	51.9	---	68.2	16.3
21159.3	46.8	---	74.0	27.2
21159.9	---	38.5	54.0	15.5
39442.3	53.4	---	68.2	14.8

30 MHz – 40 GHz, 802.11ac80, HT8, Chain A+B

Radiated Spurious – CH58

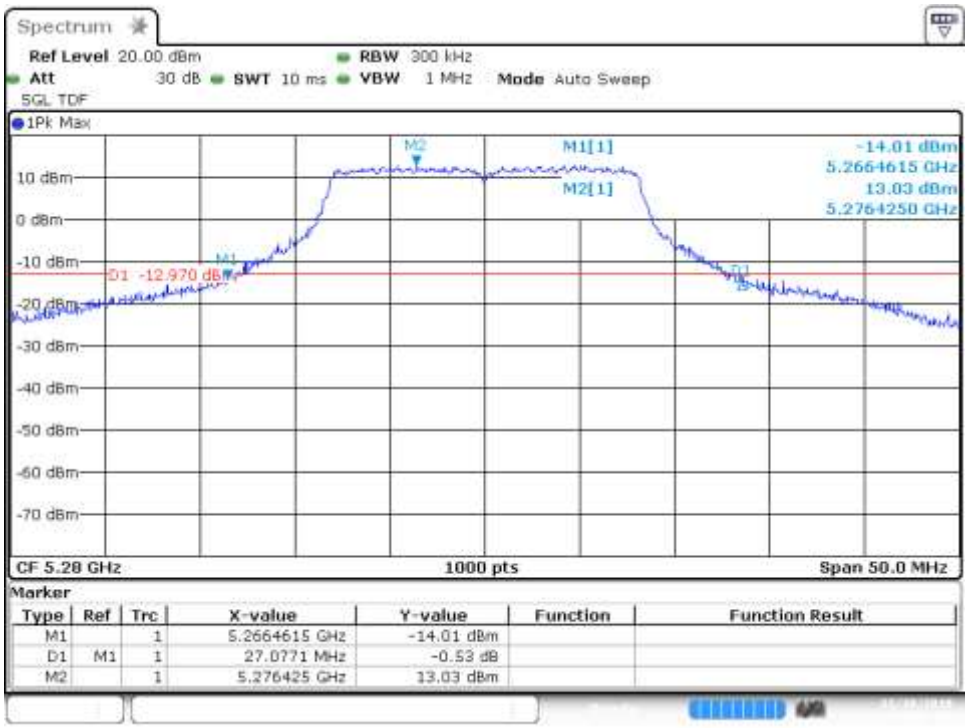
Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
624.0	35.0	---	68.2	33.2
1196.0	---	33.5	54.0	20.5
1198.5	46.5	---	74.0	27.5
15901.9	---	41.3	54.0	12.7
15904.8	52.4	---	74.0	21.6
39544.0	53.7	---	68.2	14.5

B.5 Test Results Screenshot U-NII-2A

B.5.1 26dB Bandwidth

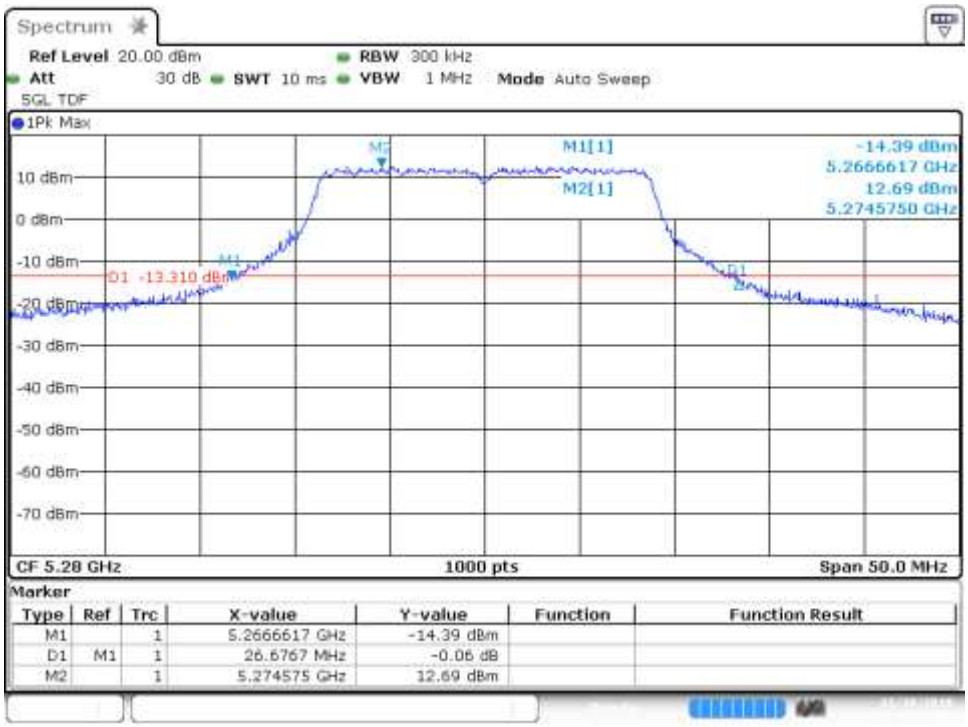
SISO-B, 802.11a, 6Mbps

Channel 56



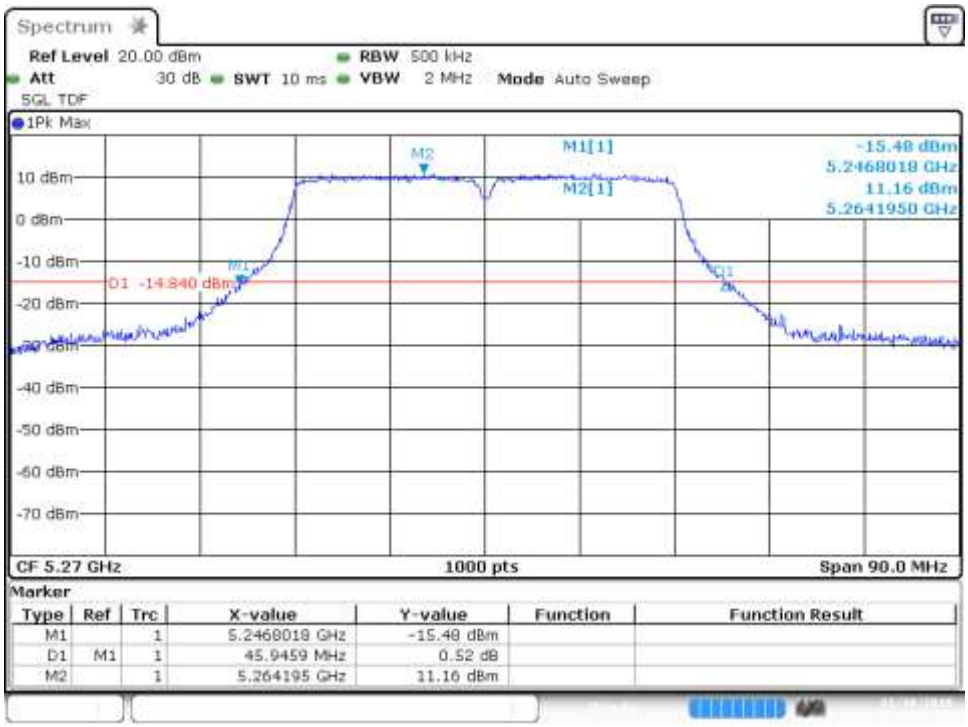
SISO-B, 802.11n20, HT0

Channel 56



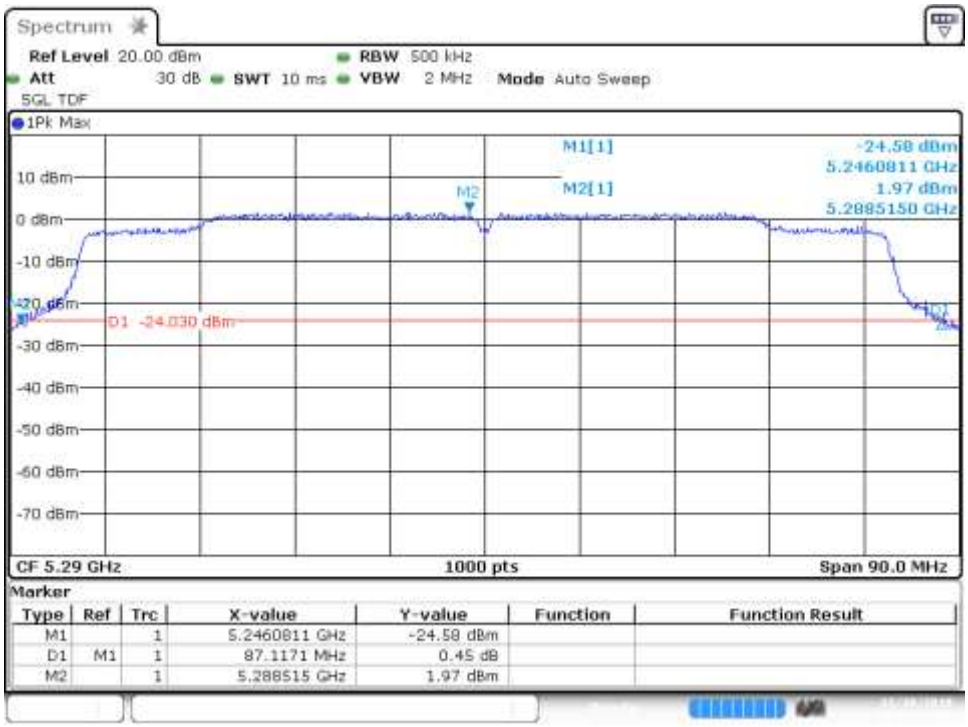
MIMO-A, 802.11n40, HT0

Channel 54F



MIMO-A, 802.11ac80, VHT0

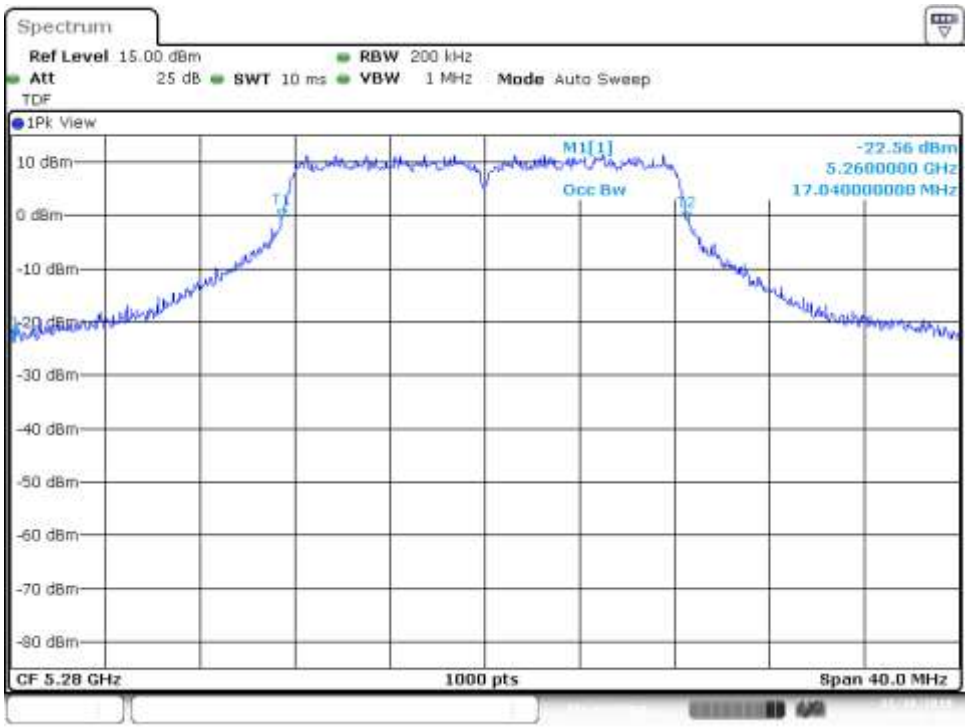
Channel 58



B.5.2 99% Bandwidth

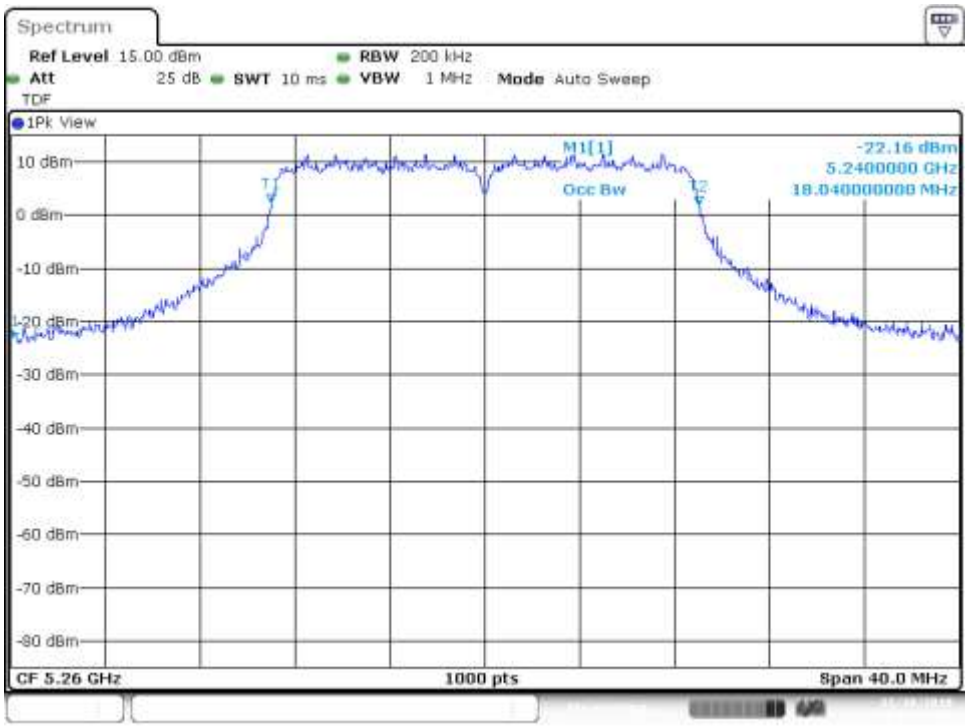
SISO-B, 802.11a, 6Mbps

Channel 56



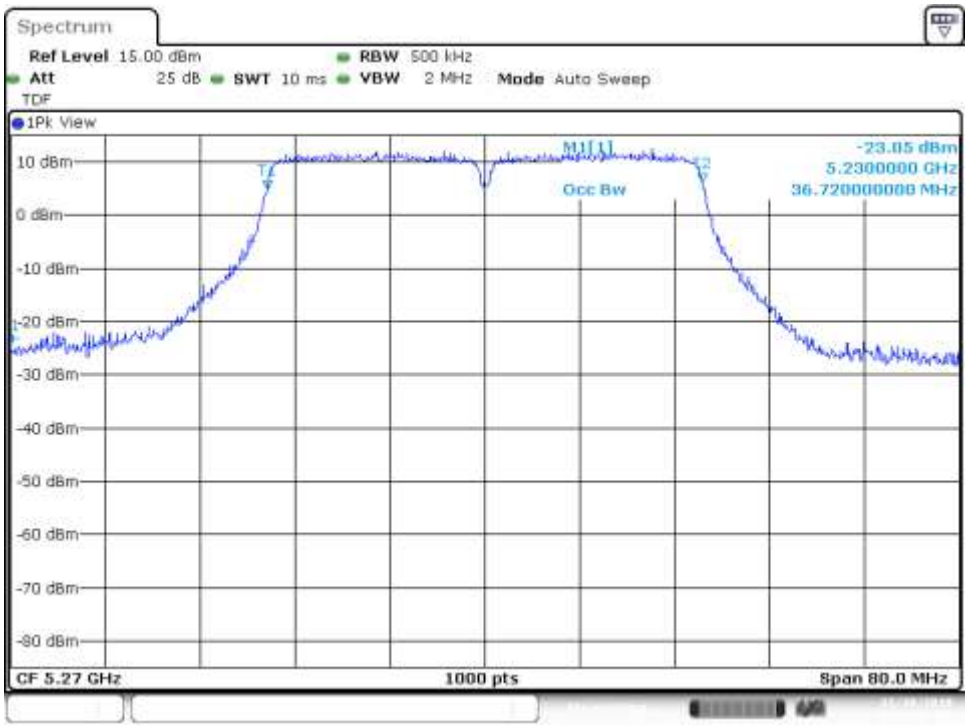
SISO-B, 802.11n20, HT0

Channel 52



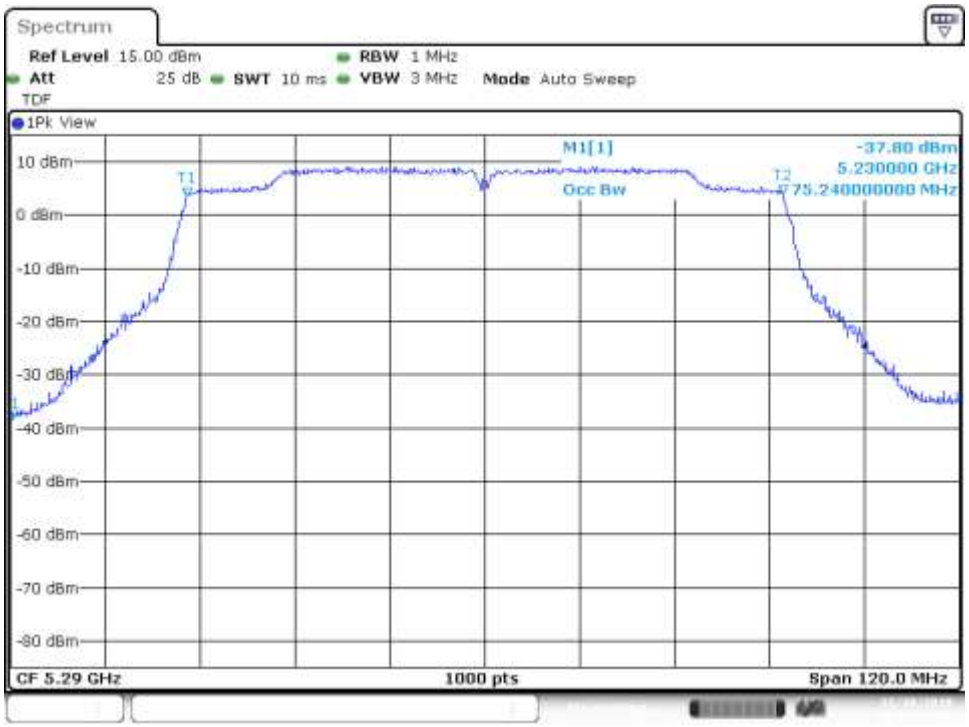
SISO-A, 802.11n40, HT0

Channel 54F



SISO-A, 802.11ac80, VHT0

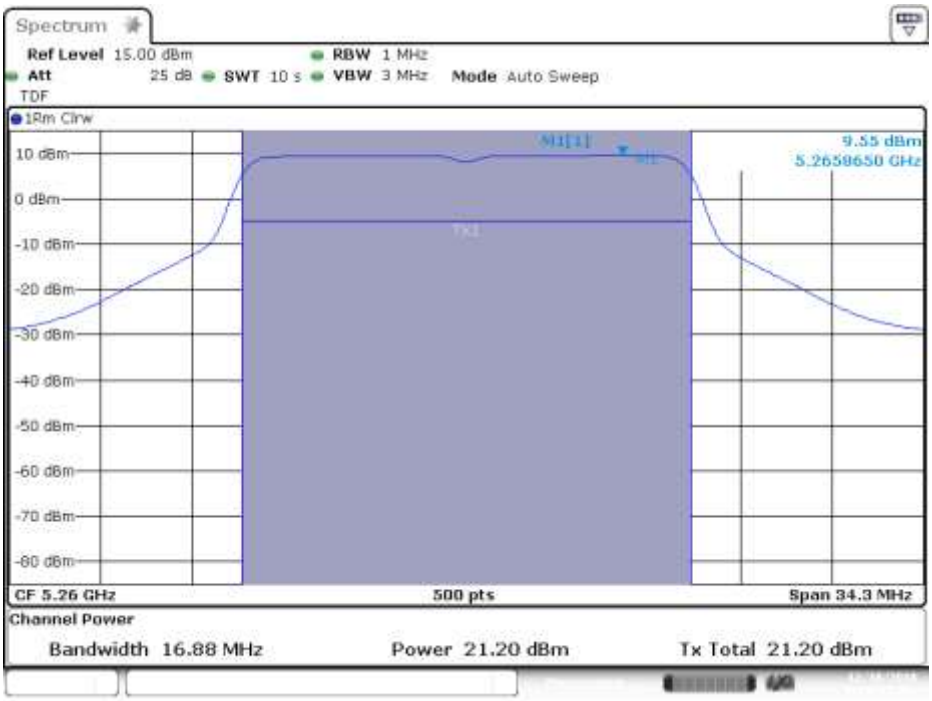
Channel 58



B.5.3 Power Limits. Maximum Output power & Peak power spectral density

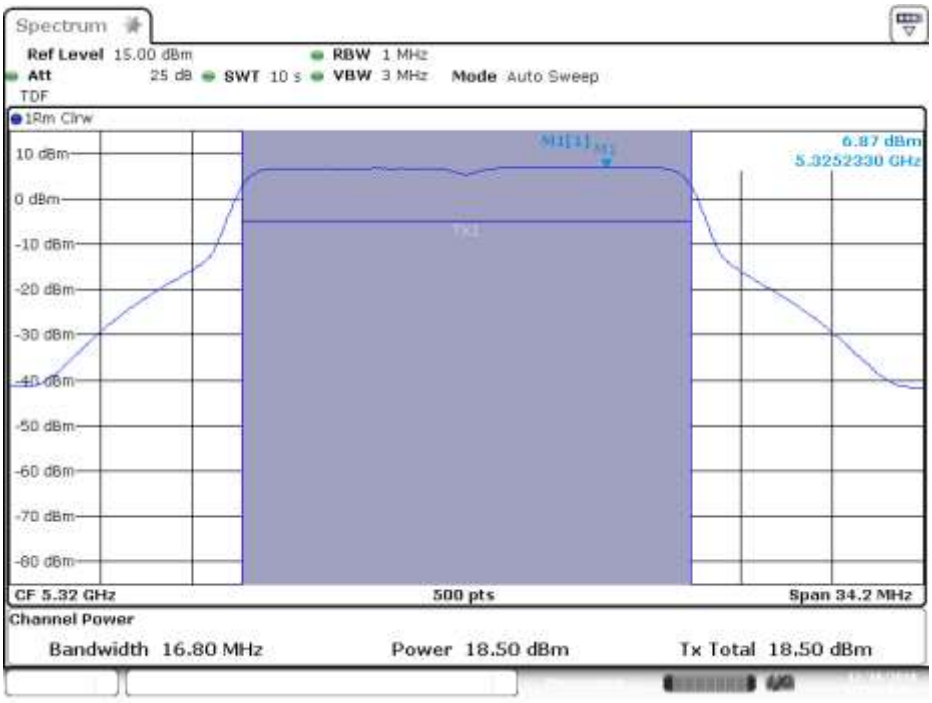
SISO-A, 802.11a, 6Mbps

Channel 52



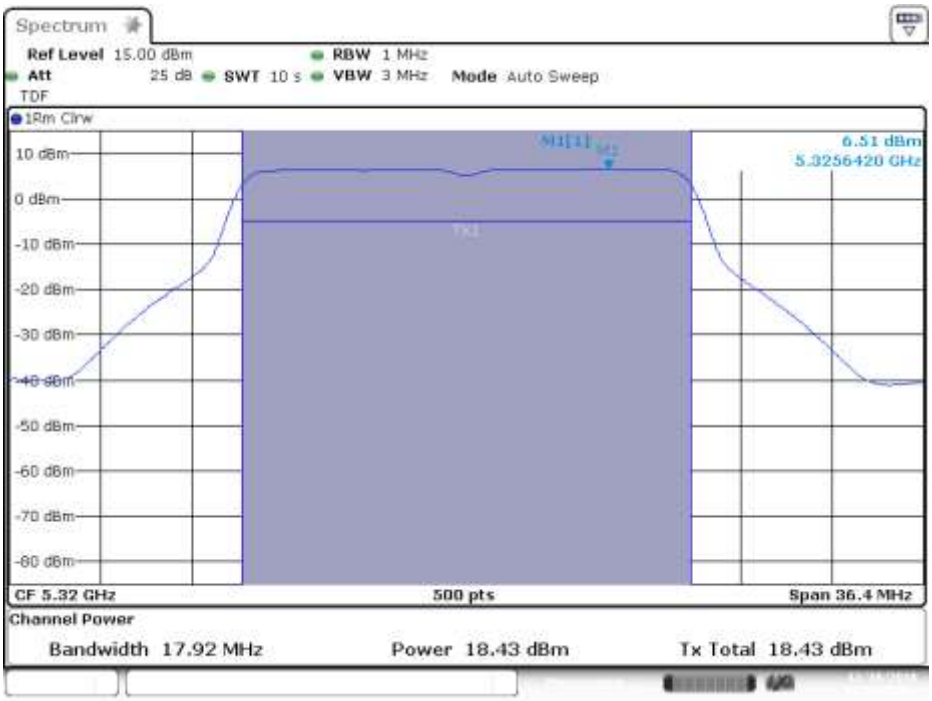
SISO-B, 802.11a, 6Mbps

Channel 64



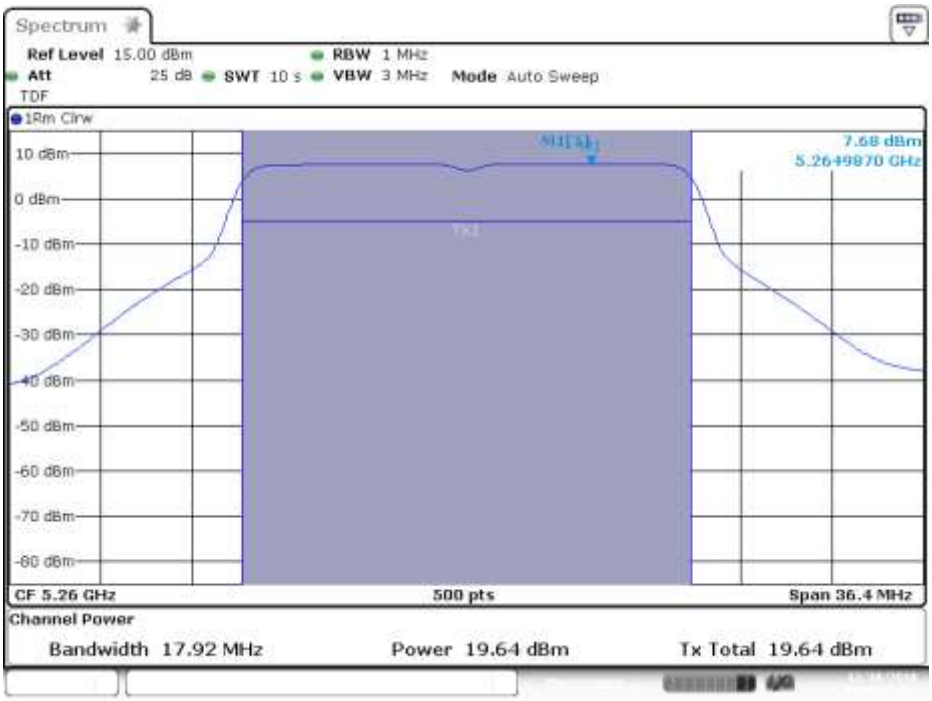
SISO-B, 802.11n20, HT0

Channel 64



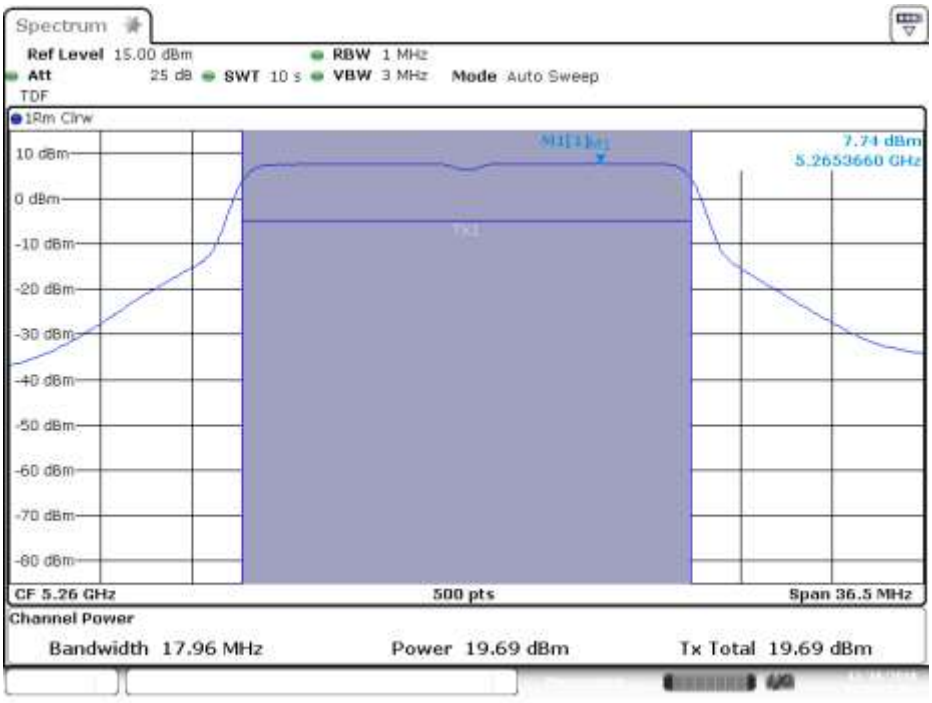
MIMO-A, 802.11n20, HT8

Channel 52



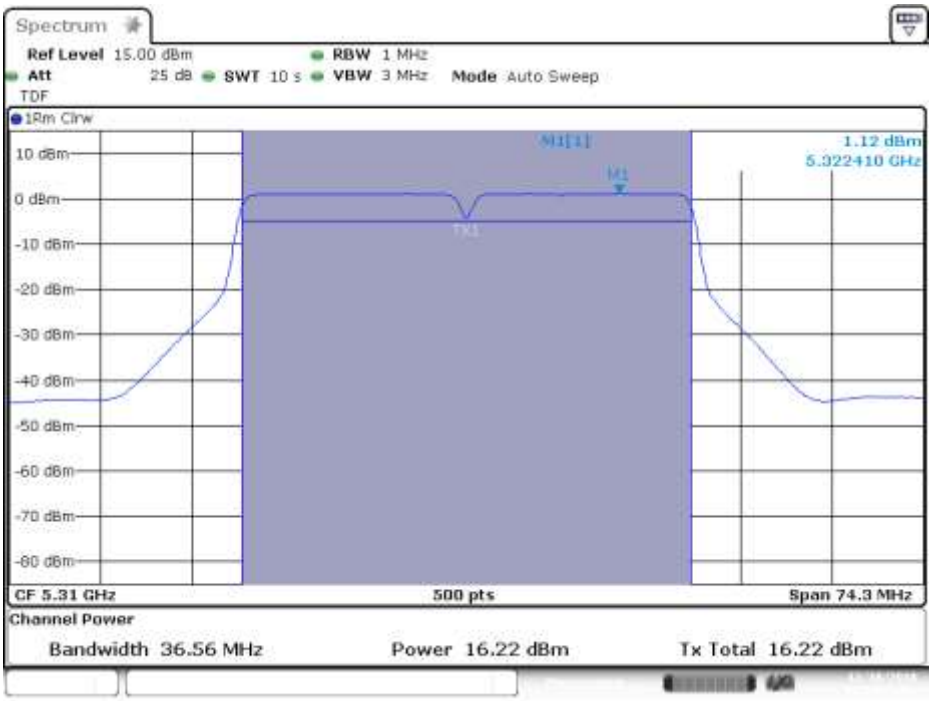
MIMO-B, 802.11n20, HT8

Channel 52



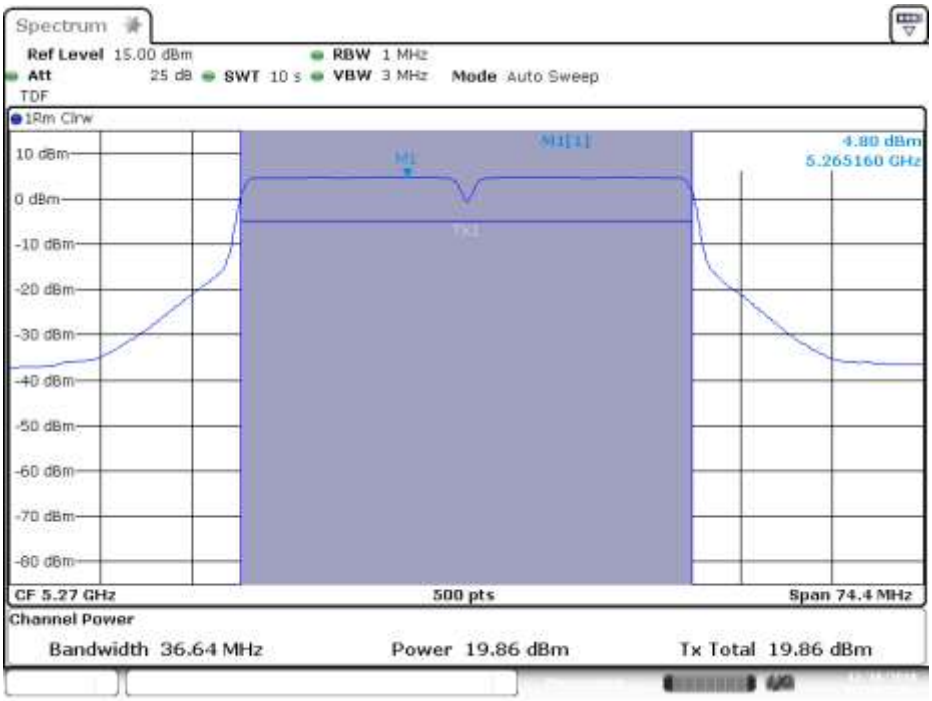
SISO-B, 802.11n40, HT0

Channel 62F



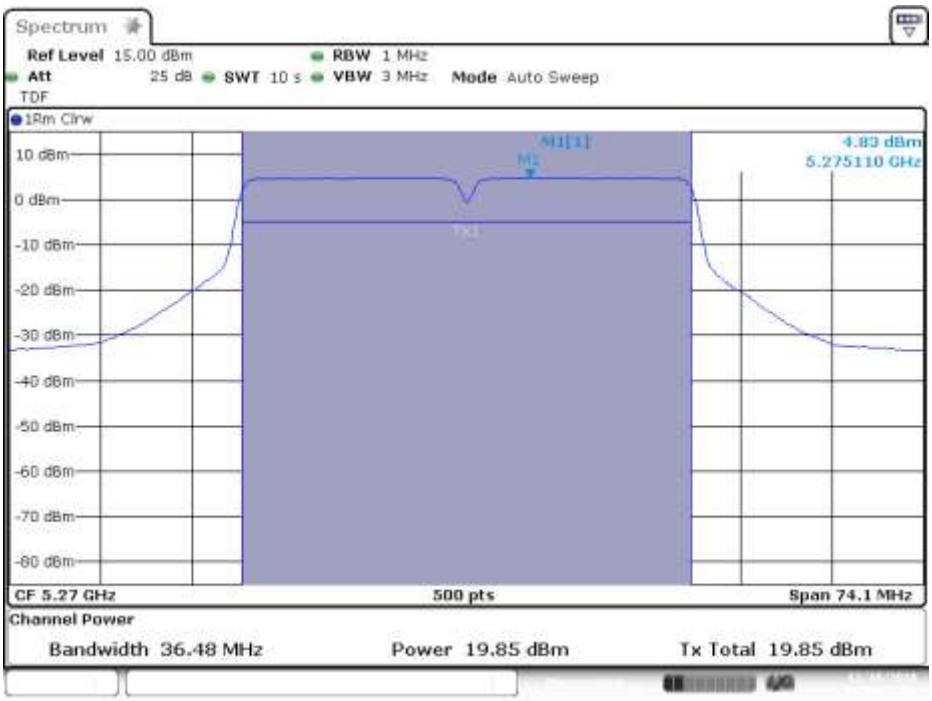
MIMO-A, 802.11n40, HT8

Channel 54F



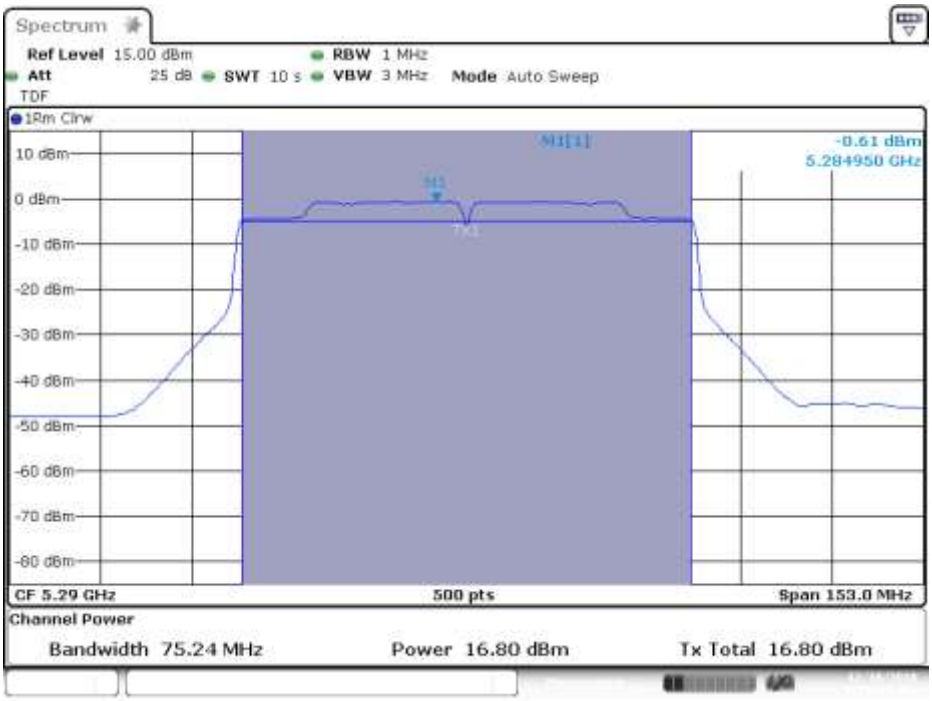
MIMO-B, 802.11n40, HT8

Channel 54F



SISO-A, 802.11ac80, VHT0

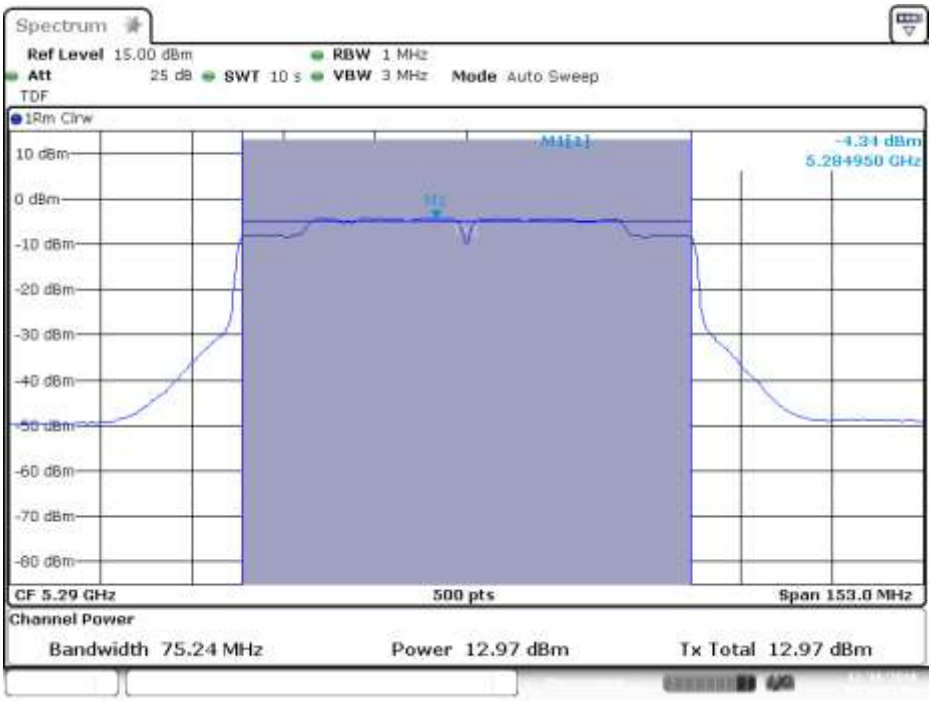
Channel 58



+

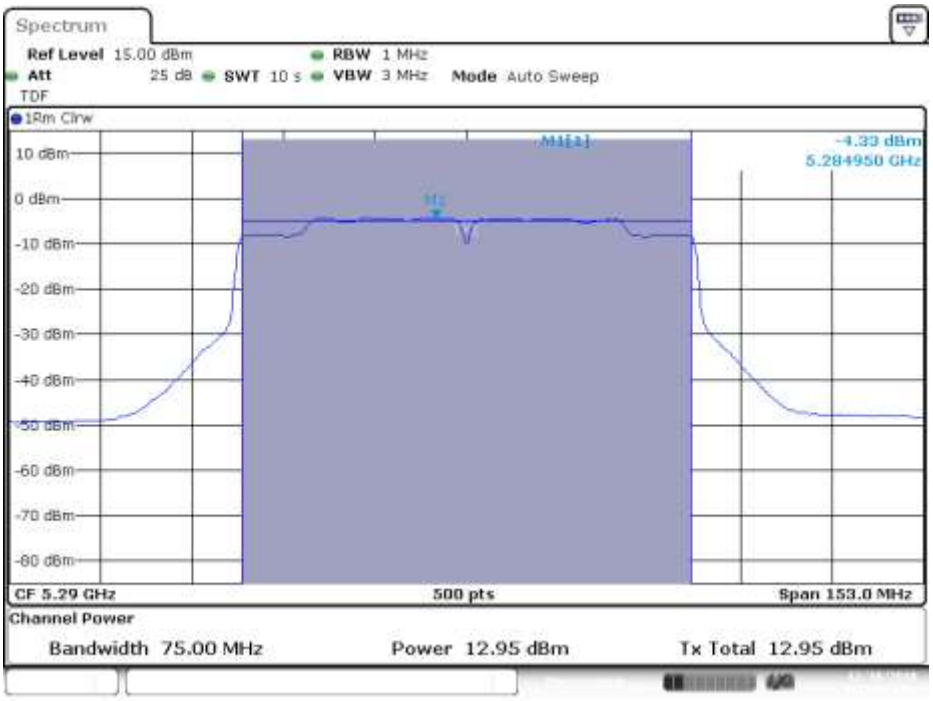
MIMO-A, 802.11ac80, VHT0

Channel 58



MIMO-B, 802.11ac80, VHT0

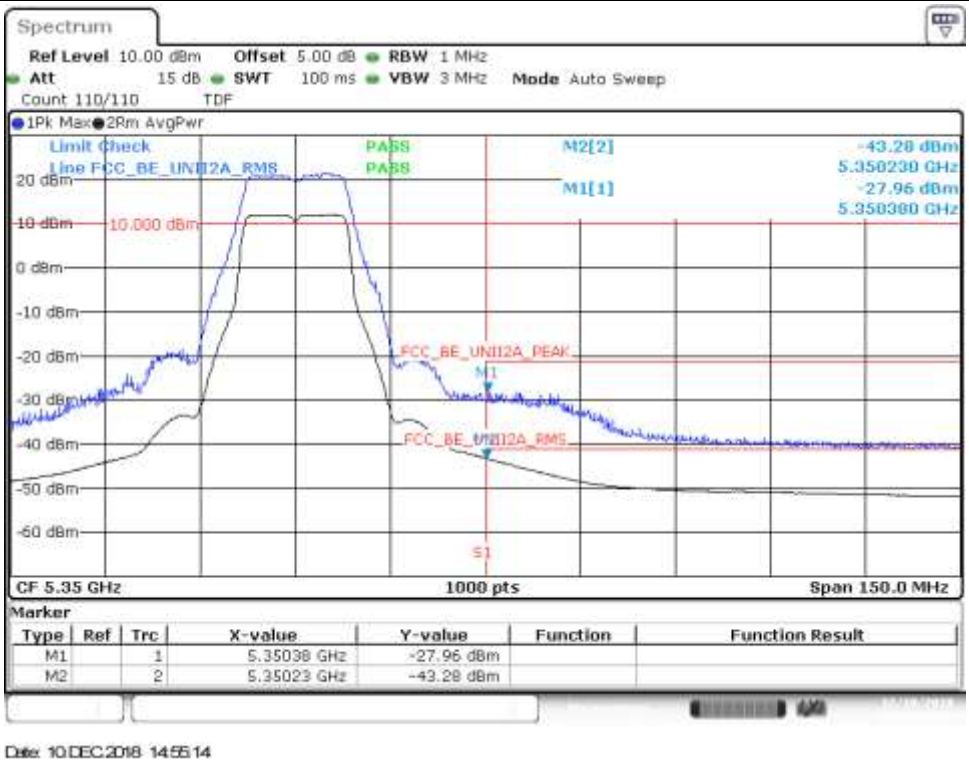
Channel 58



B.5.4 Undesirable emissions limits : Band Edge (Conducted)

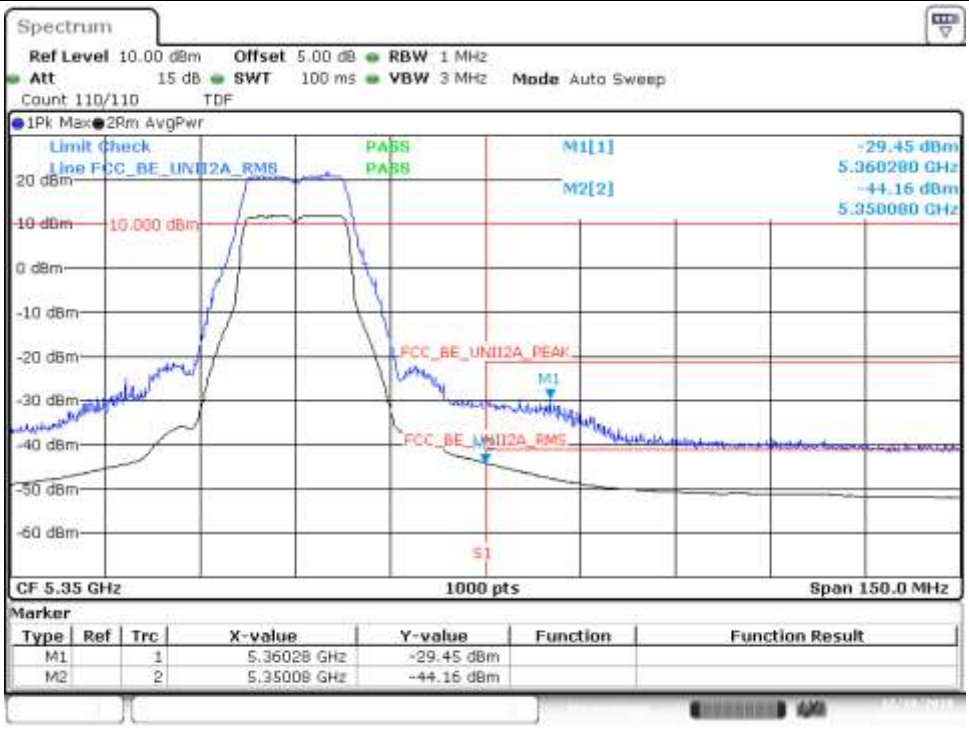
802.11a, 6Mbps – Chain A

BE High Freq Section, Peak, RMS – CH64



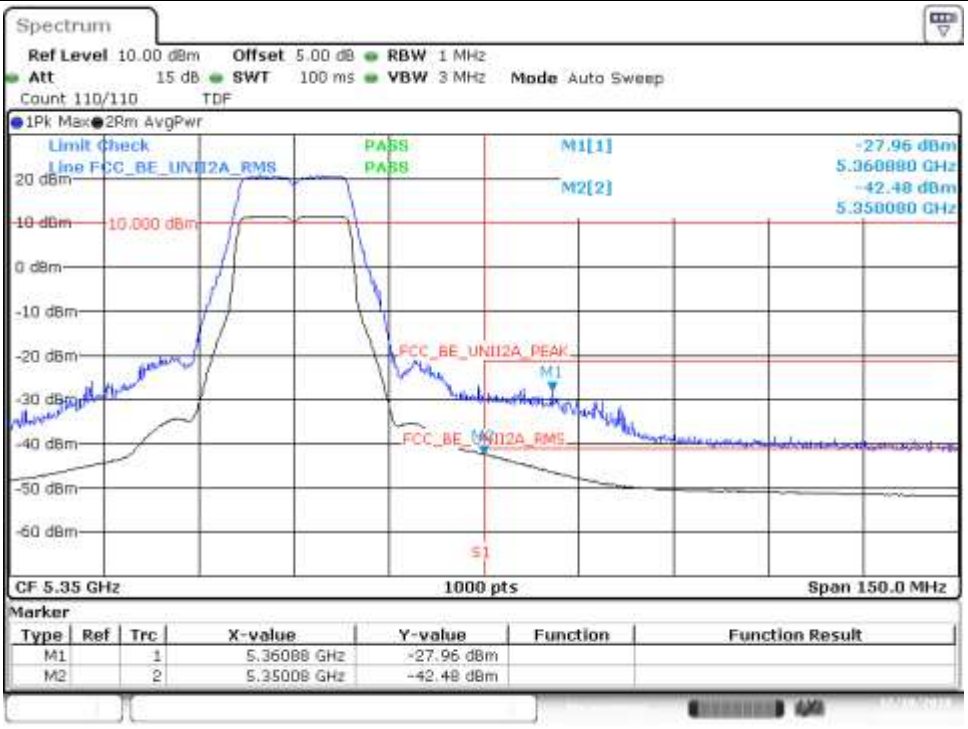
802.11a, 6Mbps – Chain B

BE High Freq Section, Peak, RMS – CH64



802.11n20, HT0 (SISO) - Chain A

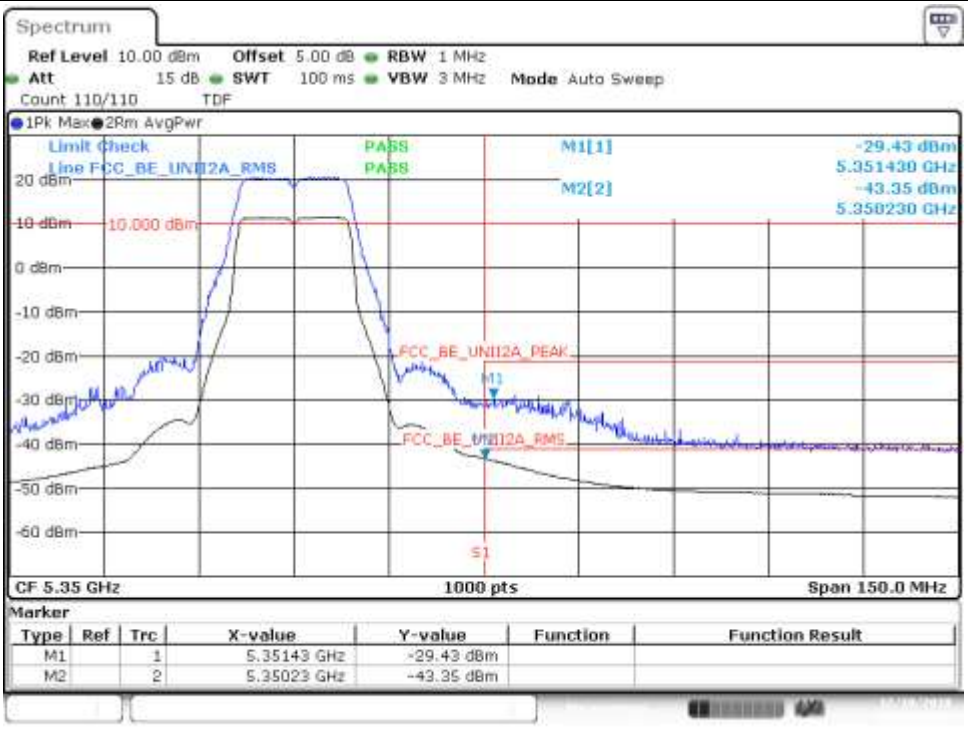
BE High Freq Section, Peak, RMS – CH64



Date: 10.DEC.2018 15:09:35

802.11n20, HT0 (SISO) - Chain B

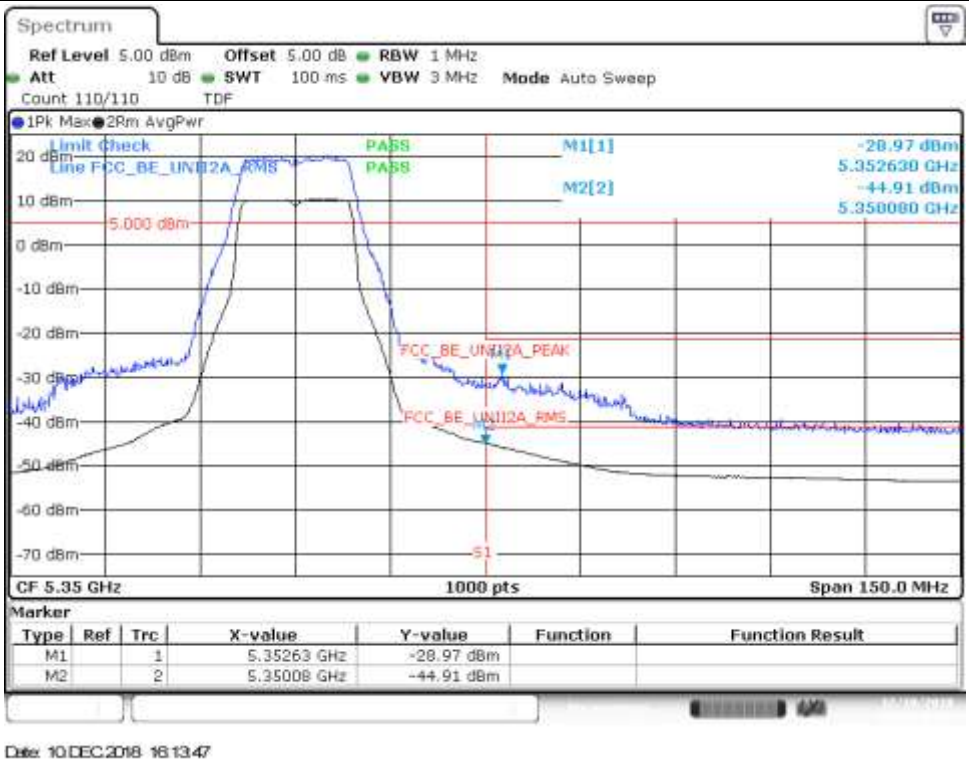
BE High Freq Section, Peak, RMS – CH64



Date: 10.DEC.2018 13:11:14

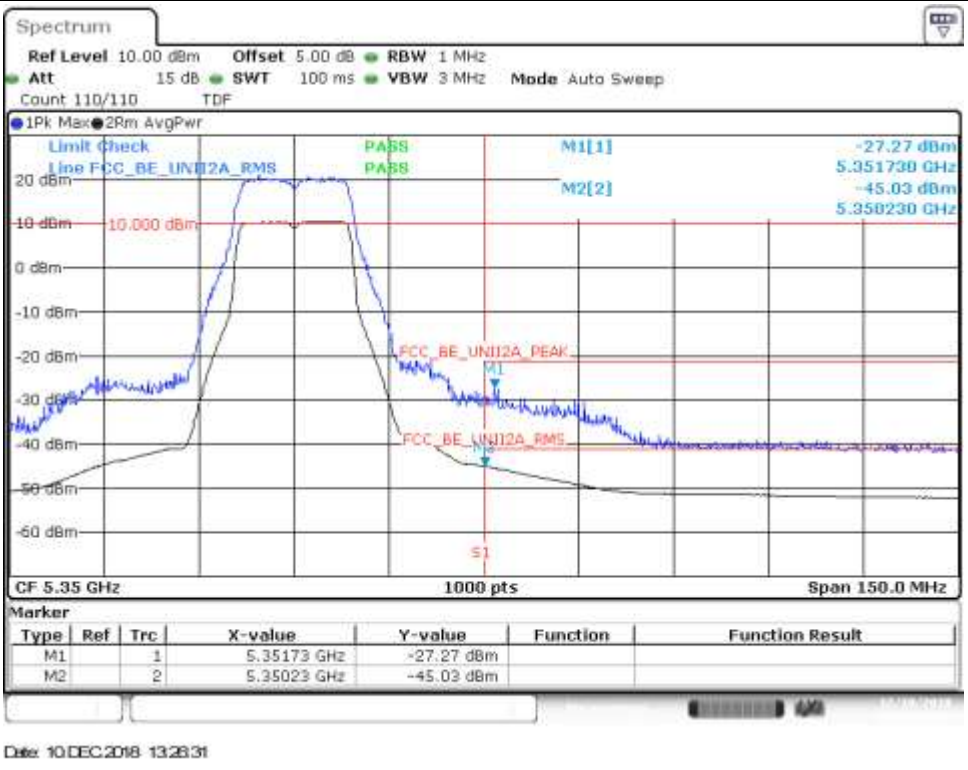
802.11n20, HT8 (MIMO) - Chain A

BE High Freq Section, Peak, RMS – CH64



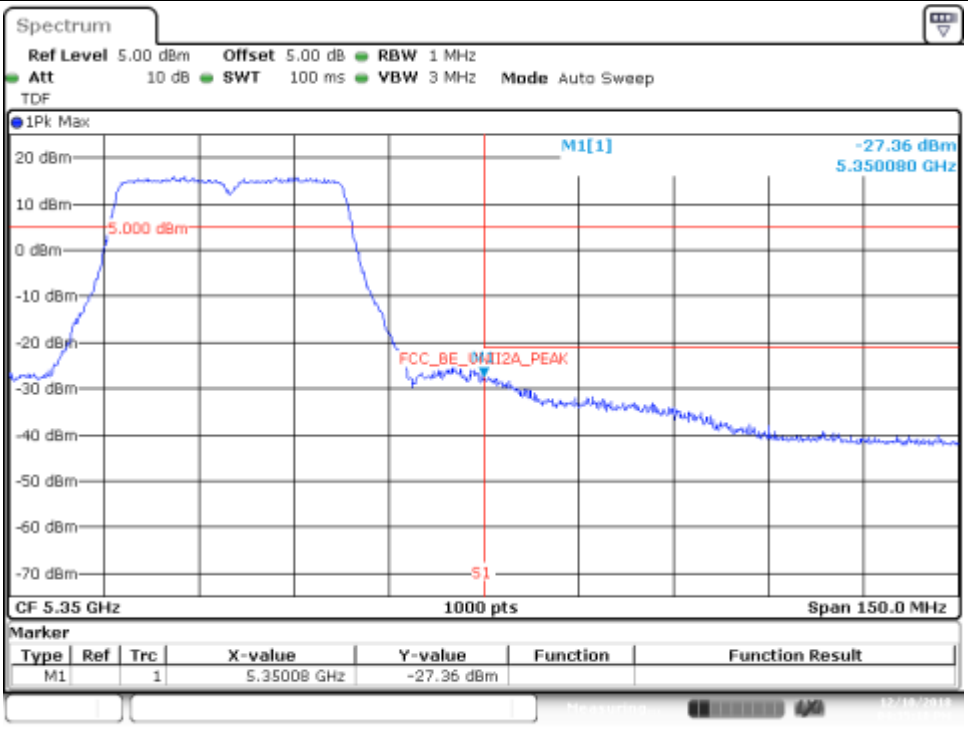
802.11n20, HT8 (MIMO) - Chain B

BE High Freq Section, Peak, RMS – CH64

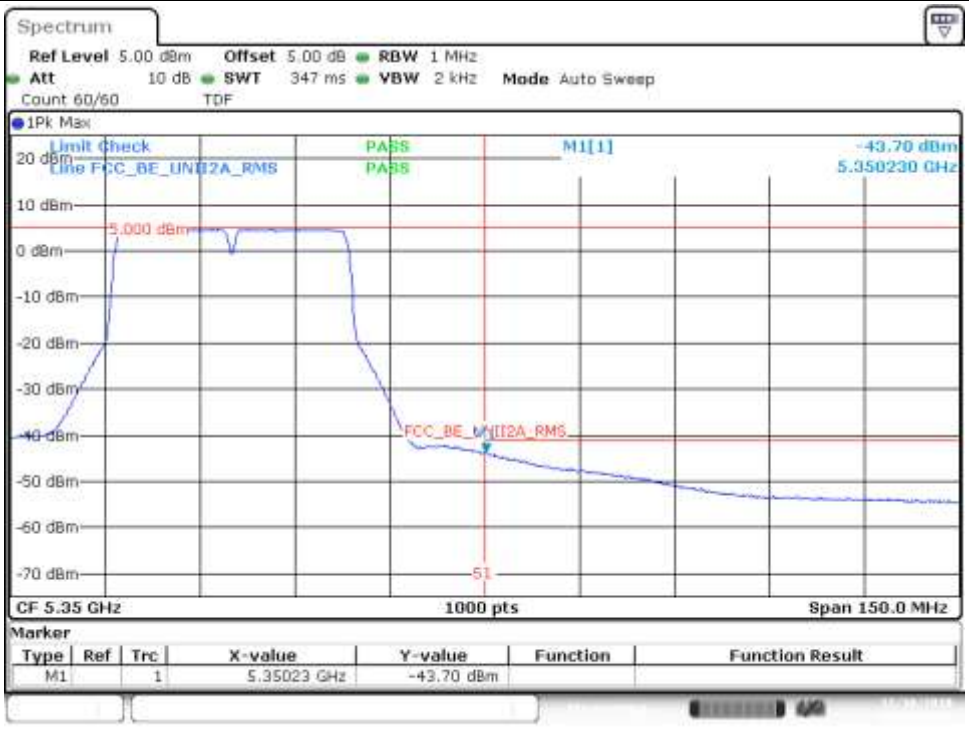


802.11n40, HT0 (SISO) - Chain A

BE High Freq Section, Peak – CH62F

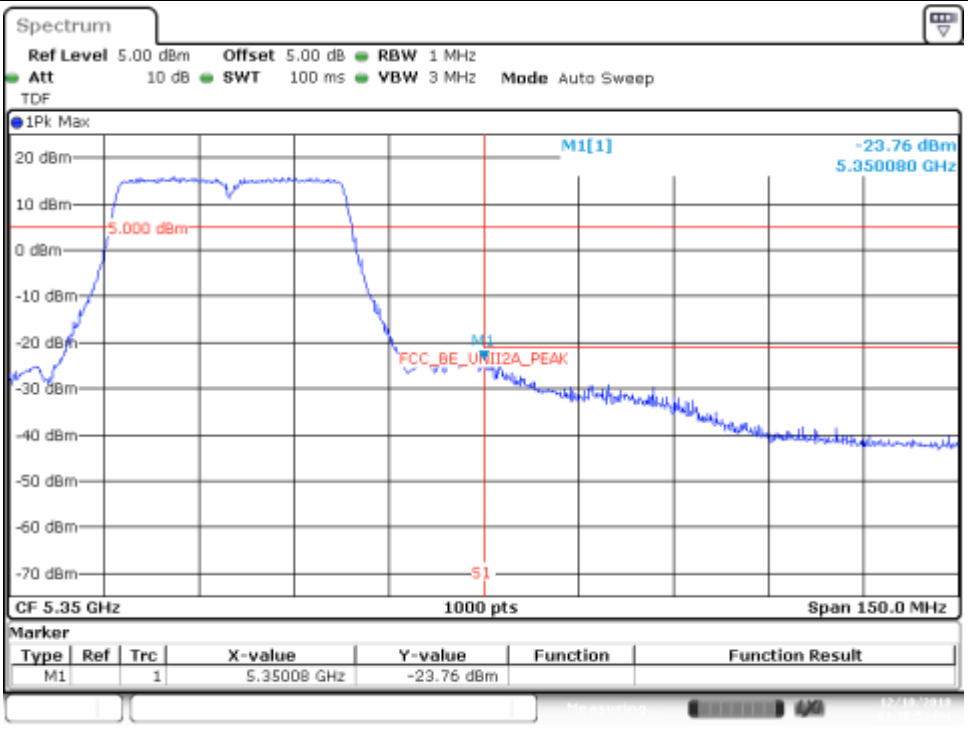


BE High Freq Section, RMS – CH54F

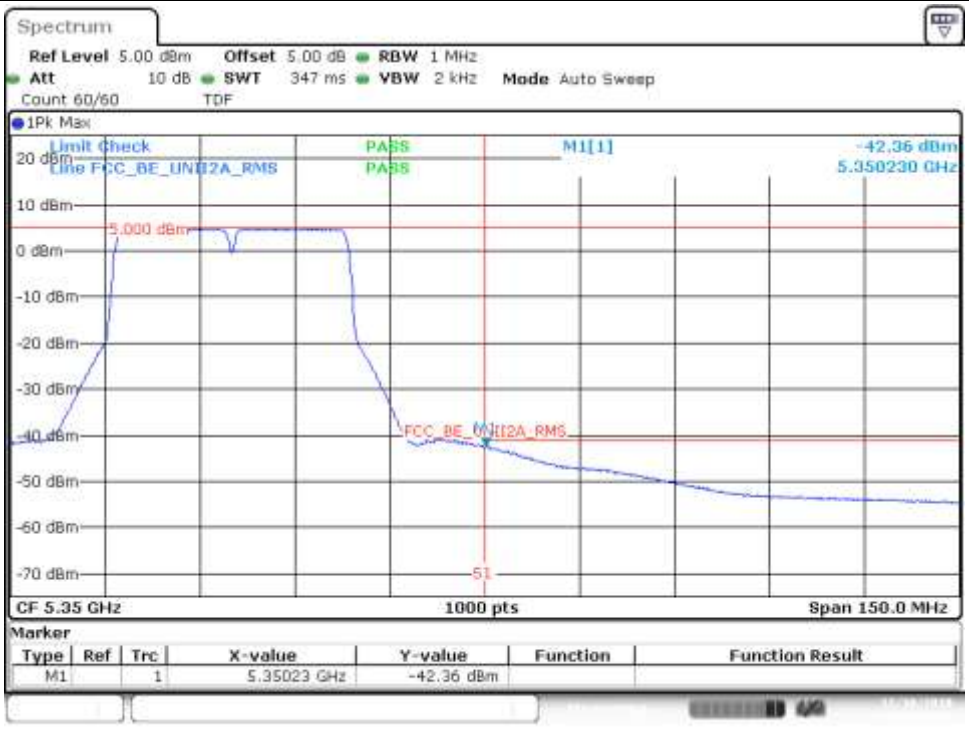


802.11n40, HT0 (SISO) - Chain B

BE High Freq Section, Peak – CH62F

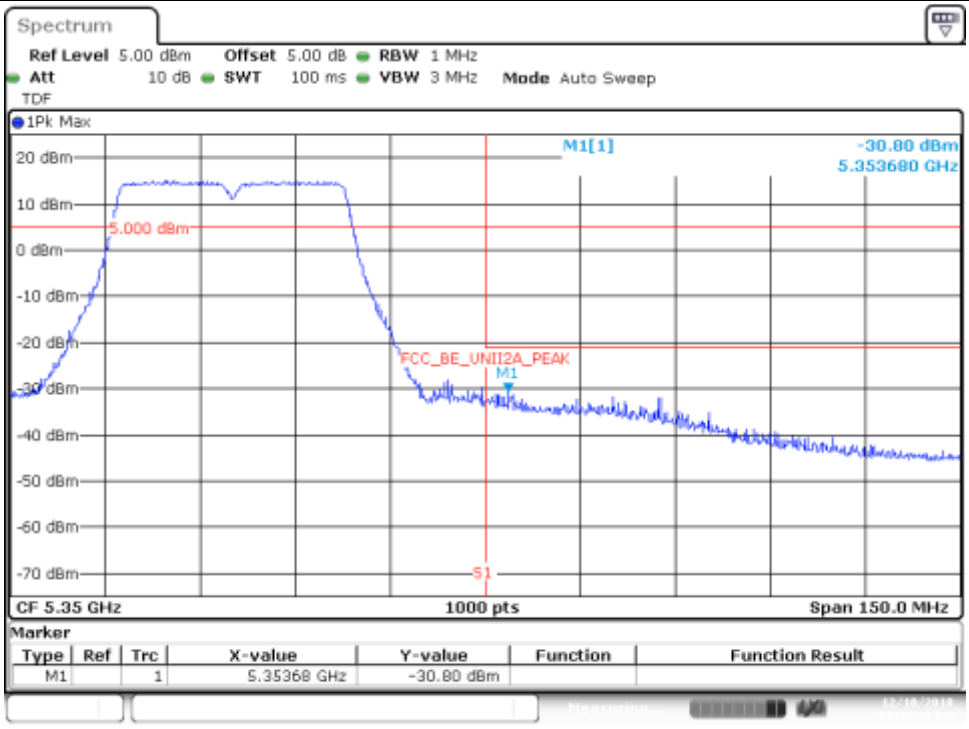


BE High Freq Section, RMS – CH62F

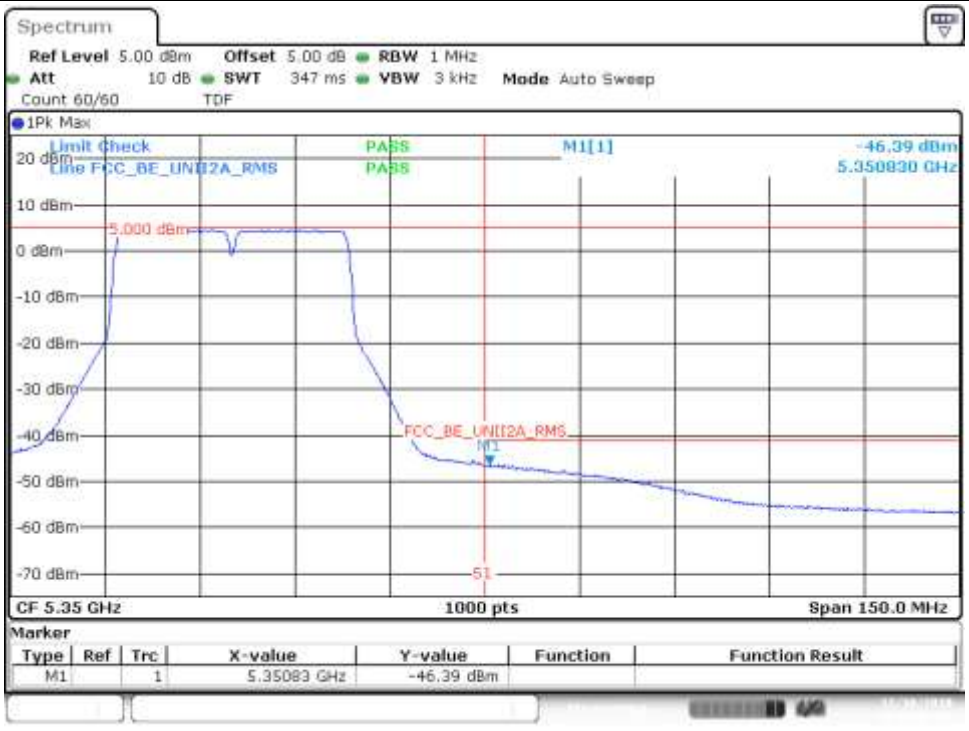


802.11n40, HT8 (MIMO) - Chain A

BE High Freq Section, Peak– CH62F

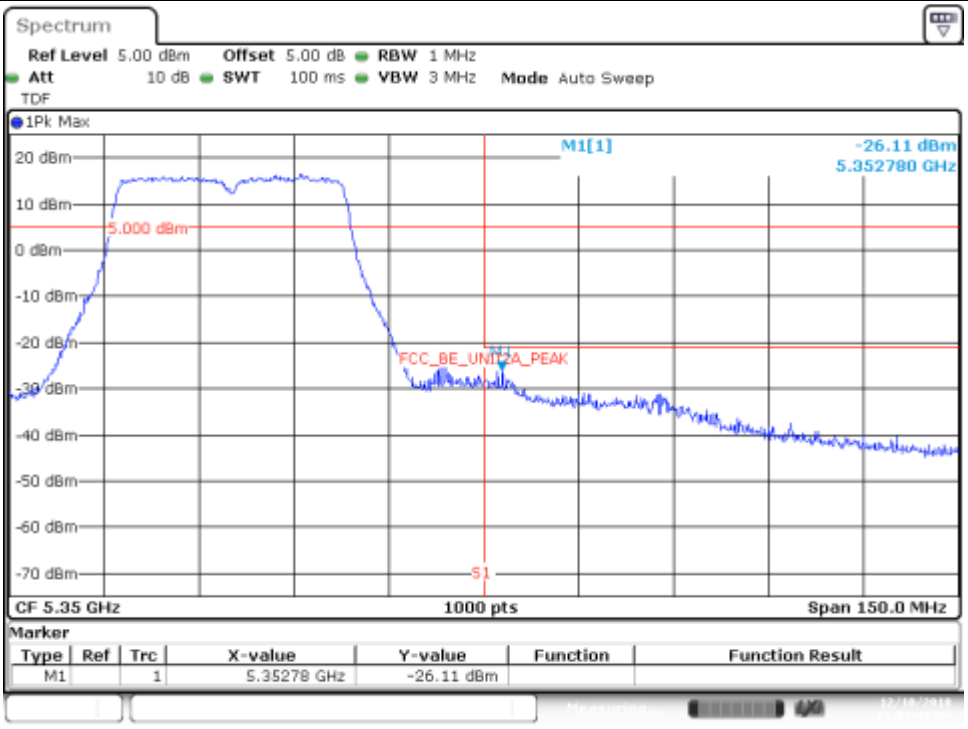


BE High Freq Section, RMS – CH62F



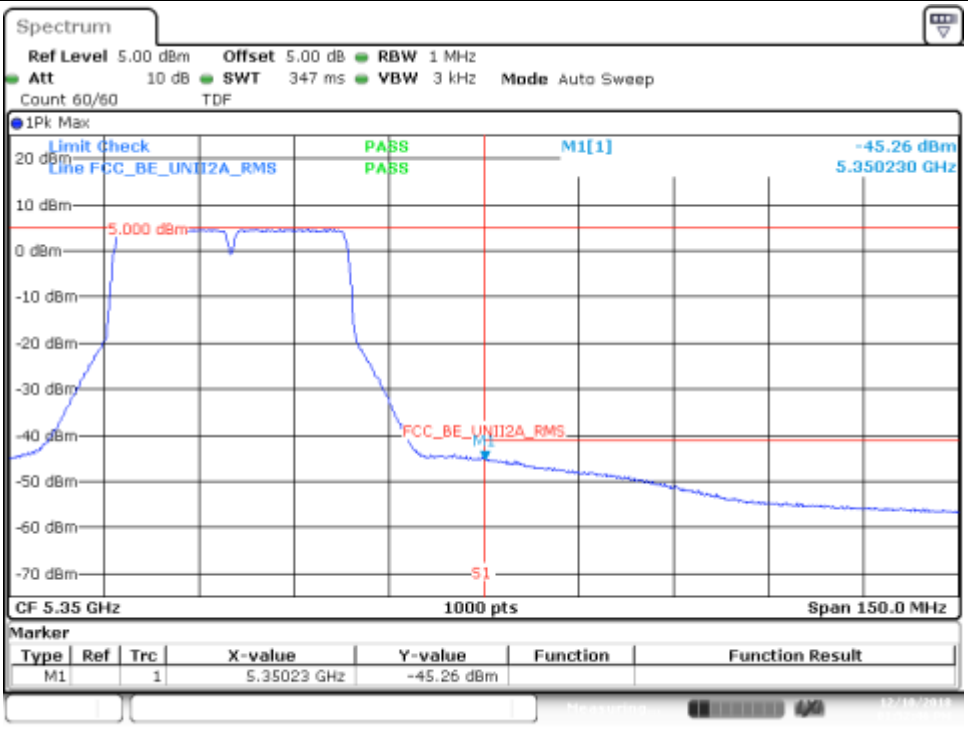
802.11n40, HT8 (MIMO) - Chain B

BE High Freq Section, Peak – CH62F



Date: 10.DEC.2018 13:53:45

BE High Freq Section, RMS – CH62F



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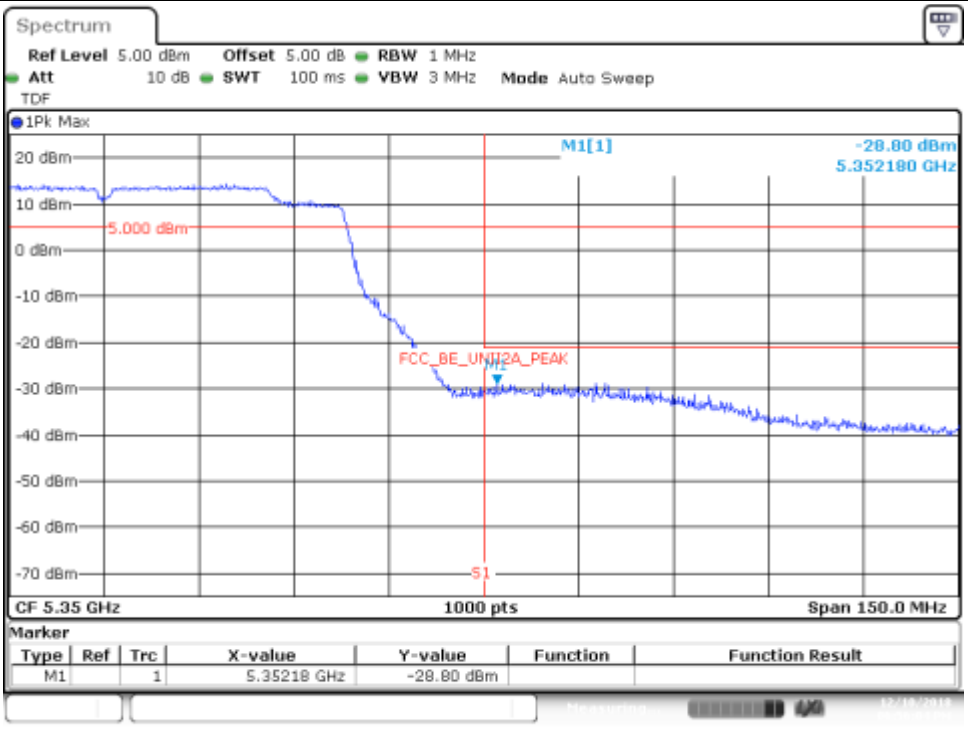
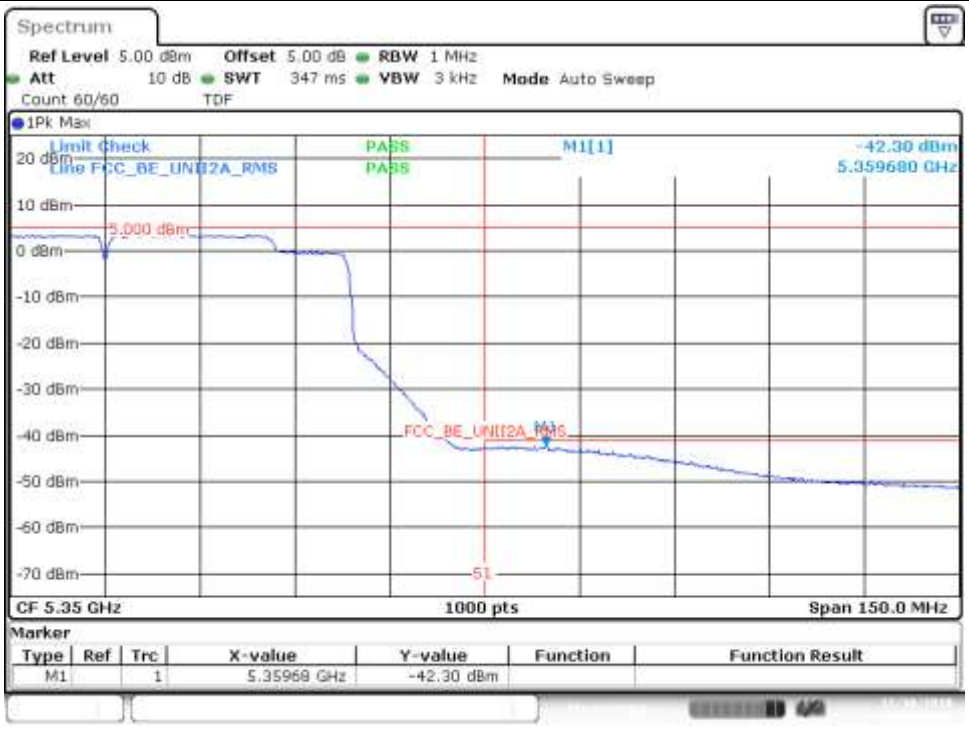
802.11ac80, VHT0 (SISO) - Chain A

BE High Freq Section, Peak – CH58



Date: 10.DEC.2018 18:58:04

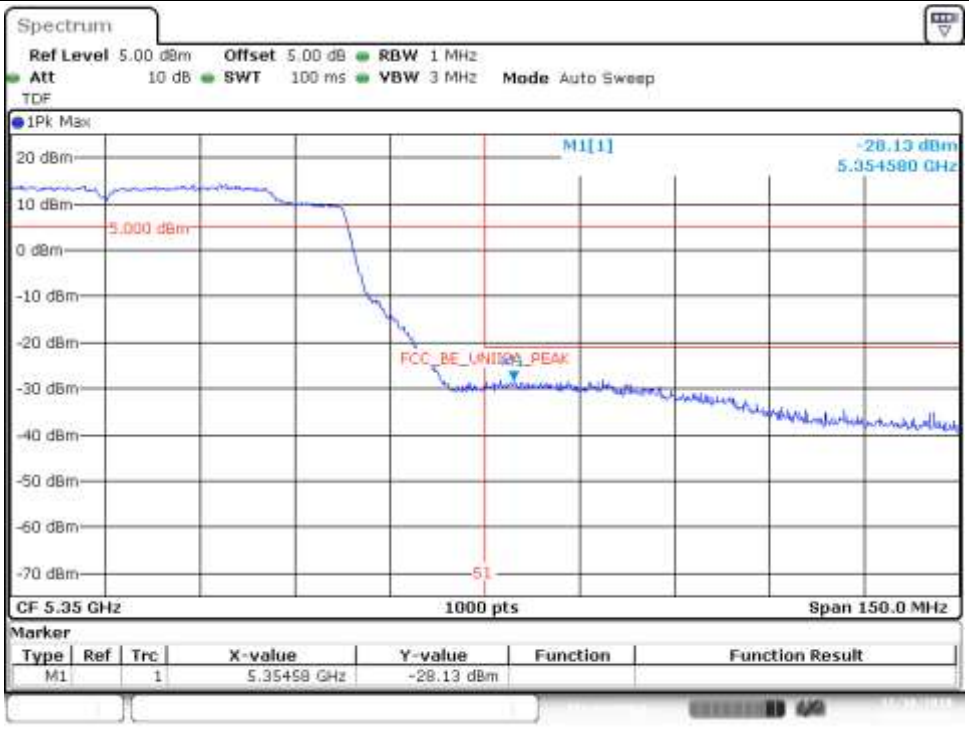
BE High Freq Section, RMS – CH58



Date: 10.DEC.2018 18:55:38

802.11ac80, VHT0 (SISO) - Chain B

BE High Freq Section, Peak – CH58



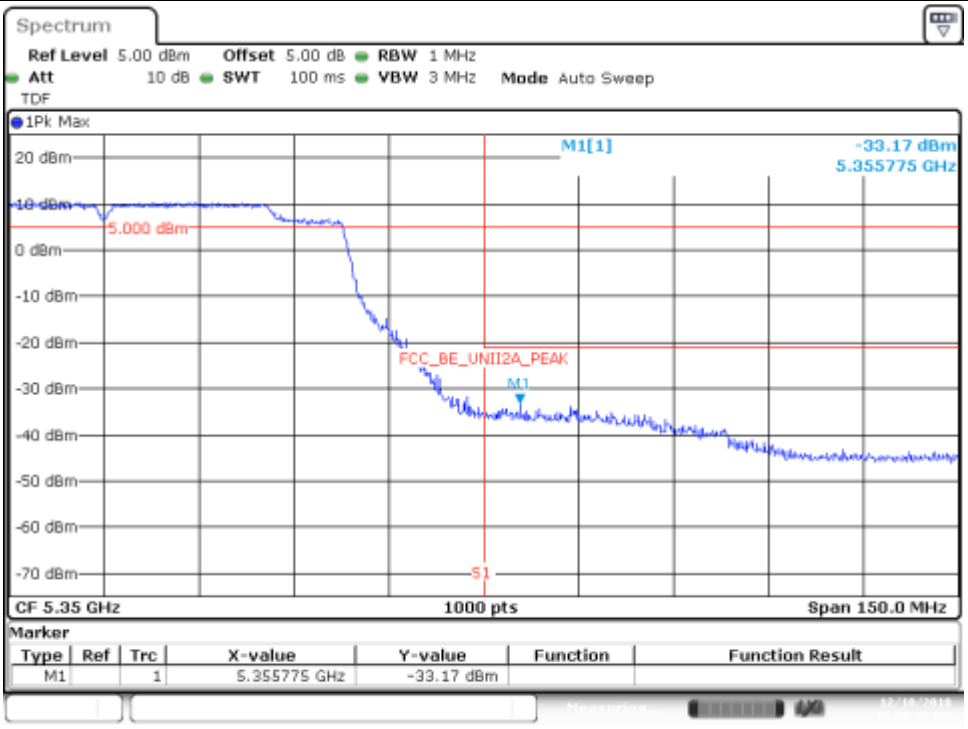
Date: 10.DEC.2018 14:08:25

BE High Freq Section, RMS – CH58

Date: 10.DEC.2018 14:24:45

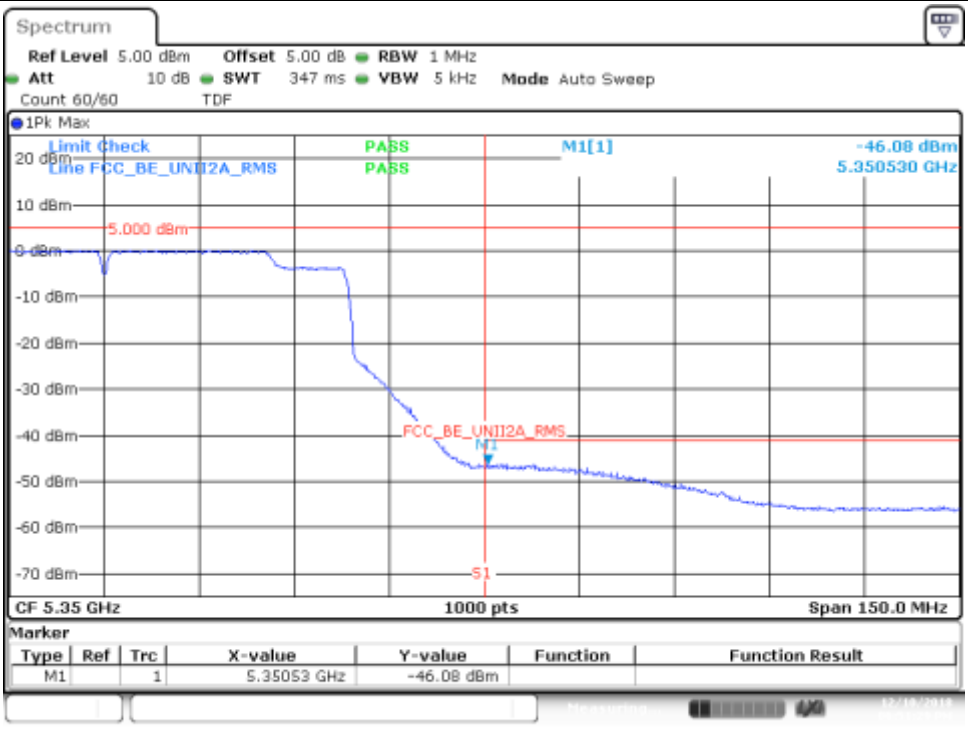
802.11ac80, VHT0 (MIMO) - Chain A

BE High Freq Section, Peak – CH58



Date: 10.DEC.2018 18:50:39

BE High Freq Section, RMS – CH58



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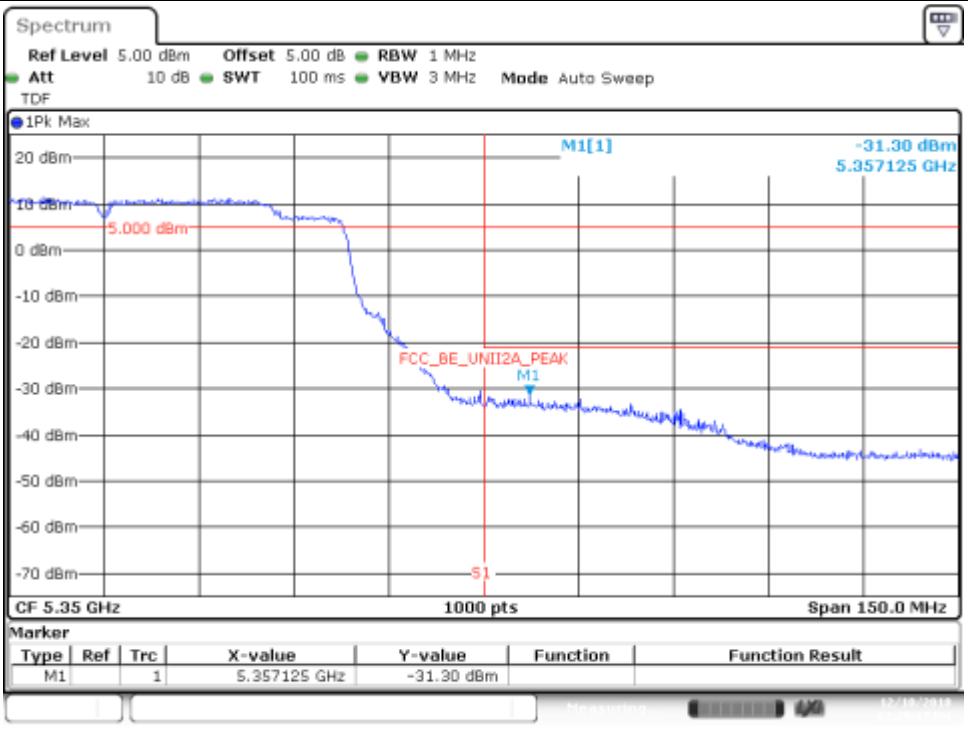
802.11ac80, VHT0 (MIMO) - Chain B

BE High Freq Section, Peak – CH58



BE High Freq Section, Peak – CH58