CERTIFICATE #3478.01

TEST REPORT

EUT Description	**WLAN and BT, 2x2 PCIe M.2 2230 adapter card**
Brand Name	**Intel® Wireless-AC 9560**
Model Name	**9560NGW**
FCC ID IC ID	**PD99560NG** **1000M-9560NG**
Date of Test Start/End	**2017-05-29 / 2017-06-28**
Features	**802.11 a/b/g/n/ac Wireless LAN + 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** **RSS-247 issue 2, RSS-Gen issue 4** (see section 1)

Test Report identification	**170524-02.TR02**
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
Digitally signed by Gregory ROUSTAN Date: 2017.07.07 17:46:50 +02'00'	Digitally signed by Olivier FARGANT DN: cn=Olivier FARGANT, o=Intel Mobile Communications, ou=WRF Lab, email=olivier.fargant@intel.com, c=FR Date: 2017.07.07 19:11:38 +02'00'
Gregory ROUSTAN (Test Engineer Lead)	Olivier FARGANT (Technical Manager)

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

Printed copies are not controlled documents

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 A/N/AC – U-NII-2C ... 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 U-NII-2C ... 10
B.1 TEST CONDITIONS ... 10
B.2 TEST RESULTS TABLES ... 11
B.2.1 26dB & 99% Bandwidth ... 11
B.2.2 Power Limits. Maximum Output power & Maximum power spectral Density ... 14
B.2.3 Undesirable emission limits : Band Edge (Conducted) ... 22
B.2.4 Radiated spurious emission ... 24
B.3 TEST RESULTS SCREENSHOTS ... 56
B.3.1 26dB Bandwidth ... 56
B.3.2 99% Bandwidth ... 61
B.3.3 Maximum Output power & Maximum power spectral Density ... 66
B.3.4 Undesirable emission limits : Band Edge (Conducted) ... 74
Annex C. Photographs ... 110
C.1 TEST SETUP ... 110
C.2 TEST SAMPLE ... 112

Printed copies are not controlled documents

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 v01r04 – Guidelines for compliance testing of Unlicensed National Information Infrastructure (U-NII) Devices (Part 15, Subpart E)
4. FCC OET KDB 644545 D03 Guidance for IEEE 802.11ac v01 - GUIDANCE FOR IEEE Std 802.11ac™ DEVICES EMISSION TESTING.
5. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
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 4 - General Requirements for Compliance of Radio Apparatus.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications France 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 Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by IC, with IC 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	23 ºC ±3 ºC
Humidity	50 % ± 20 %

Printed copies are not controlled documents

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	170524-02.S01	Module	9560NGW	WFM 3413E8901EAB	2017-05-30	Used for conducted tests
	170524-02.S11	Extender Board	PCB00609_01	6092416-453	2017-05-30	
	170000-01.S03	Laptop	Latitude E5470	6Q9LMC2	2017-04-25	
#02	170524-02.S02	Module	9560NGW	WFM 3413E88FF066	2017-05-30	Used for radiated tests
	170220-02.S03	Extender Board	PCB00609_01	6092416-446	2017-02-20	
	170000-01.S13	Laptop	Latitude E5470	FT6LMC2	2017-05-30	
#03	170524-02.S06	Module	9560NGW	WFM 3413E890192E	2017-05-30	Used for radiated tests
	170524-02.S16	Extender Board	PCB00609_01	6092416-451	2017-06-15	
	161129-02.S01	Laptop	Latitude 6430U	25PVLX1	2016-06-12	

5. EUT Features

Brand Name	Intel® Wireless-AC 9560
Model Name	9560NGW
FCC/IC ID	PD99560NG
IC ID	1000M-9560NG
Software Version	10.1720.0-05195
Driver Version	99.0.28.6
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	**Main WLAN:** Slot antenna. WiFi 2.4GHz & 5GHz (DRTU CHAIN B) **Aux WLAN:** Slot antenna. WiFi 2.4GHz & 5GHz and BT (DRTU CHAIN A)
Additional Information	

6. Remarks and comments

N/A

Printed copies are not controlled documents

7. Test Verdicts summary

7.1. 802.11 a/n/ac – U-NII-2C

FCC part	RSS part	Test name	Verdict
15.407 (a) (2)	RSS-247 Clause 6.2.3.1	Power Limits. Maximum output power	P
15.407 (a) (2)	RSS-247 Clause 6.2.3.1	Peak power spectral density	P
15.407 (b) (3) 15.209(a)	RSS-247 Clause 6.2.3.2 RSS-GEN Clause 8.9	Undesirable emissions limits: Band Edge (conducted)	P
15.407 (b) (3) 15.209(a)	RSS-247 Clause 6.2.3.2 RSS-GEN Clause 8.9	Undesirable emissions limits (radiated)	P

8. Document Revision History

Revision #	Date	Modified by	Revision Details
Rev. 00	2017-07-07	B. Lavenant	First Issue

Printed copies are not controlled documents

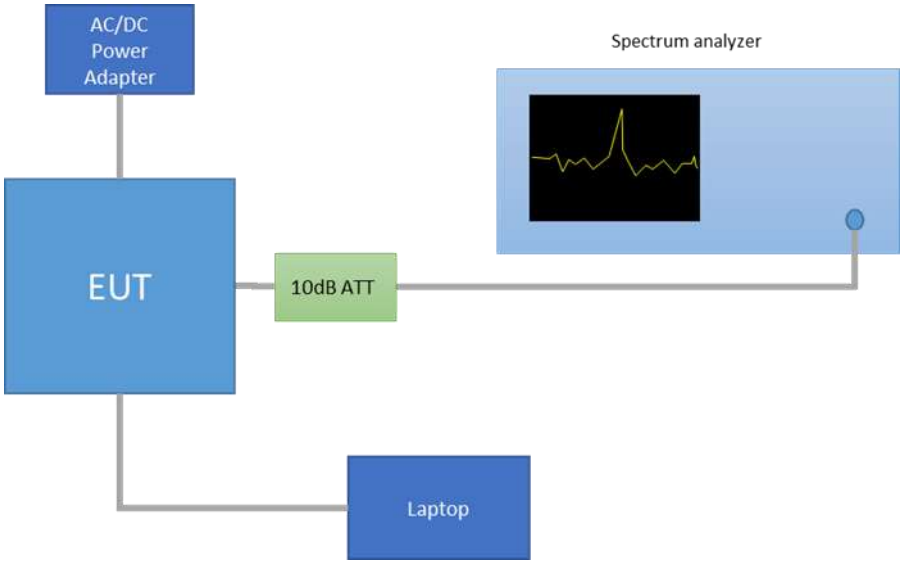
Annex A. Test & System Description

A.1 Measurement System

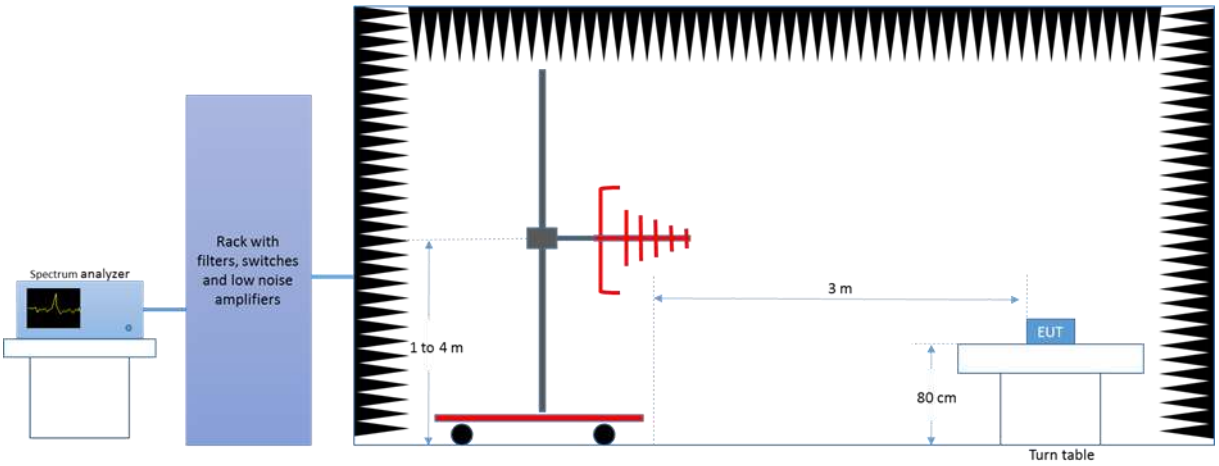
Measurements were performed using the following setups, made in accordance to the general provisions of FCC KDB 789033 D02 General UNII Test Procedures.

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

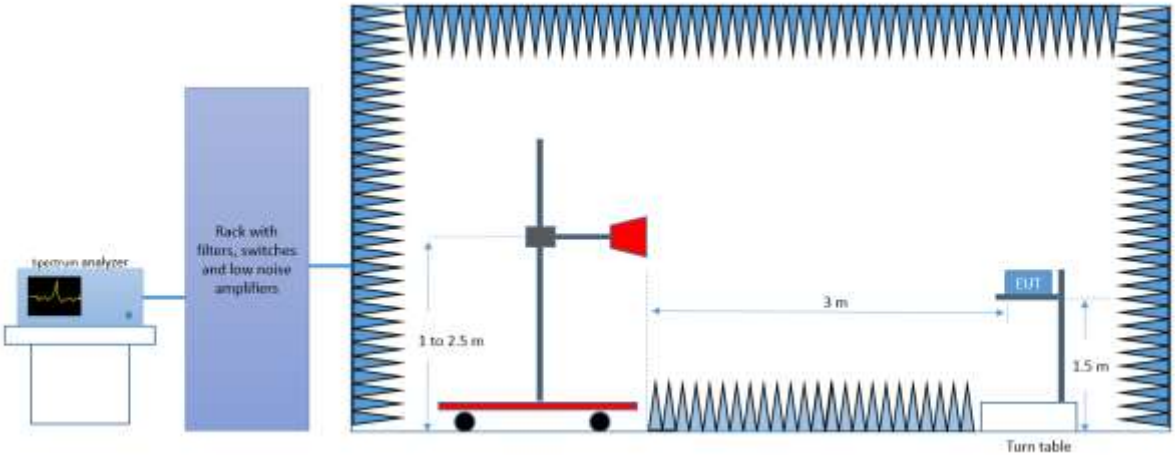


Radiated Setup < 1GHz

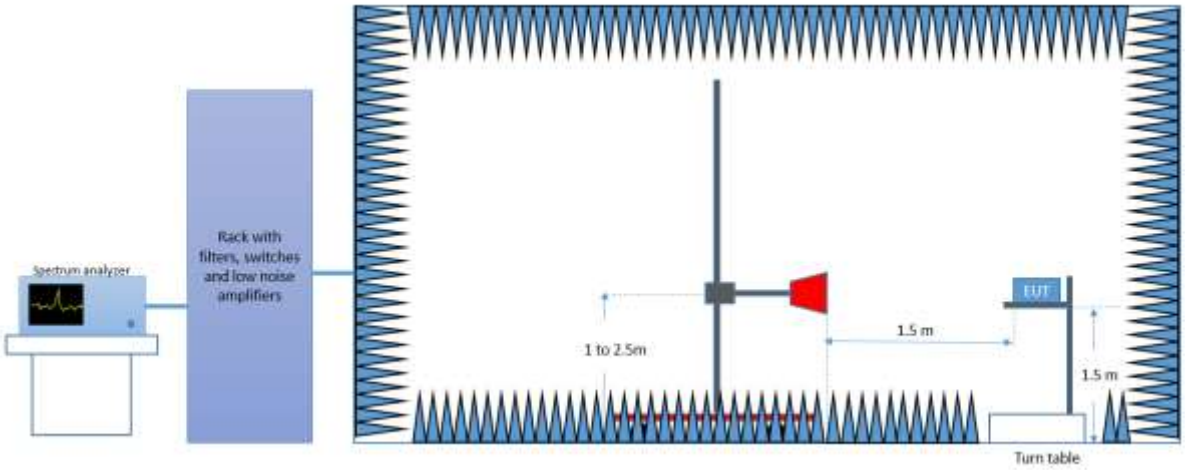


Printed copies are not controlled documents

Radiated Setup 1 GHz – 18 GHz



Radiated Setup 18 GHz – 40 GHz



Printed copies are not controlled documents

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	2017-01-30	2019-01-30

Radiated Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2016-04-15	2018-04-15
0133	Spectrum analyzer	FSV40	101358	Rohde & Schwarz	2016-04-15	2018-04-15
0137	Log antenna 30 MHz – 1 GHz	3142E	00156946	ETS Lindgren	2015-12-11	2017-12-11
0138	Horn antenna 1 GHz – 6.4 GHz	3117	00152266	ETS Lindgren	2016-03-14	2018-03-14
0141	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2016-04-13	2018-04-13
0409	PreAmplifier	3117-PA	00157993	ETS Lindgren	N/A	N/A
0334	Double Ridged Horn Antenna 18 GHz – 40 GHz	3116C-PA	00196308	ETS Lindgren	2015-07-15	2017-07-15
0135	Semi Anechoic chamber	FACT 3	5720	ETS Lindgren	2016-04-28	2018-04-28
0337	Full Anechoic chamber	RFD_FA_100	5996	ETS Lindgren	2016-04-28	2018-04-28
0329	Measurement Software	EMC32	100401	Rohde & Schwarz	N/A	N/A
0530	Measurement Software	EMC32	100623	Rohde & Schwarz	N/A	N/A
0296	Power Supply	6673A	MY41000318	Agilent	N/A	N/A
0346	Multimeter	34401A	US36054685	HP	2016-02-04	2018-02-04
0014	Power Sensor	NRP-Z57	101280	Rohde & Schwarz	2017-04-25	2019-04-25

Printed copies are not controlled documents

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

Printed copies are not controlled documents

Annex B. Test Results U-NII-2C

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 chain A 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-2C					**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	100	5500	19.50	19.50	N/A
			120	5600	21.00	21.50	N/A
			140	5700	19.00	18.50	N/A
802.11n	20	HT0 HT8*	100	5500	19.00	19.00	19.00
			120	5600	21.00	21.50	23.00
			140	5700	18.50	19.00	21.50
	40	HT0 HT8*	102F	5510	17.00	16.50	19.00
			118F	5590	21.50	21.50	24.00
			134F	5670	19.00	19.50	21.50
802.11ac	80	VHT0	106ac80	5530	18.00	17.50	18.50
			122ac80	5610	21.00	21.00	23.50
802.11ac	160	VHT0	114ac160	5570	15.00	15.00	16.50

Overlapped channels between UNII-2C and UNII-3					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
802.11n	20	HT0 HT8*	144	5720	21.00	21.00	23.00
	40	HT0 HT8*	142F	5710	20.50	21.00	23.00
802.11ac	80	VHT0	138ac80	5690	20.50	20.50	23.50

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
802.11ac160 (MIMO) → VHT0

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

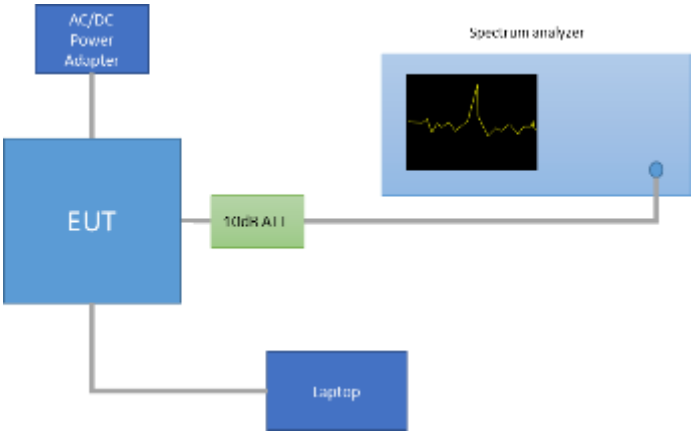
Printed copies are not controlled documents

B.2 Test Results Tables

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.



For the overlapped channels between U-NII-2C and U-NII-3 bands, and according to FCC KDB 644545 D03, the boundary frequency between the bands is used as one edge for defining the portion of the 26dB bandwidth that falls within a particular U-NII band. This rule is only applicable for the 26dB bandwidth and for those channels marked as overlapped.

Printed copies are not controlled documents

Results tables

U-NII-2C channels

Mode	Rate	Antenna	Channel	Freq. [MHz]	26dB BW [MHz]	99% BW [MHz]
802.11a	6Mbps	SISO CHAIN A	100	5500	24.02	16.84
			120	5600	**40.64**	**21.80**
			140	5700	24.67	16.92
		SISO CHAIN B	100	5500	24.47	16.76
			120	5600	39.24	20.96
			140	5700	24.17	16.84
802.11n20	HT0	SISO CHAIN A	100	5500	24.82	17.96
			120	5600	**43.04**	**22.16**
			140	5700	24.72	17.92
		SISO CHAIN B	100	5500	24.12	17.88
			120	5600	42.09	21.36
			140	5700	25.03	17.96
	HT8	MIMO CHAIN A	100	5500	24.92	17.88
			120	5600	25.32	17.92
			140	5700	**24.92**	**17.96**
		MIMO CHAIN B	100	5500	24.17	17.88
			120	5600	25.13	17.92
			140	5700	24.52	17.88
802.11n40	HT0	SISO CHAIN A	102F	36.40	45.59	36.56
			118F	36.88	**82.25**	**37.52**
			134F	36.32	46.40	36.72
		SISO CHAIN B	102F	5510	44.95	36.72
			118F	5590	50.09	36.88
			134F	5670	45.77	36.72
	HT8	MIMO CHAIN A	102F	5510	45.59	36.64
			118F	5590	**89.10**	**45.92**
			134F	5670	46.13	36.72
		MIMO CHAIN B	102F	5510	44.23	36.40
			118F	5590	44.95	36.48
			134F	5670	44.50	36.40
802.11ac80	VHT0	SISO CHAIN A	106ac80	5530	87.11	75.24
			122ac80	5610	**149.49**	**76.08**
		SISO CHAIN B	106ac80	5530	87.30	75.24
			122ac80	5610	127.81	75.84
		MIMO CHAIN A	106ac80	5530	87.68	75.24
			122ac80	5610	96.05	75.48
		MIMO CHAIN B	106ac80	5530	87.11	75.00
			122ac80	5610	**119.82**	**75.60**
802.11ac160	VHT0	SISO CHAIN A	114ac160	5570	165.17	**153.20**
		SISO CHAIN B	114ac160	5570	**165.50**	153.00
		MIMO CHAIN A	114ac160	5570	163.51	153.00
		MIMO CHAIN B	114ac160	5570	**163.84**	**153.00**

Max Value

Printed copies are not controlled documents

Overlapped channels between U-NII-2C and U-NII-3

Mode	Rate	Antenna	Channel	Freq. [MHz]	26dB BW UNII-2C [MHz]
802.11n20	HT0	SISO CHAIN A	144	5720	**21.77**
		SISO CHAIN B			21.62
	HT8	MIMO CHAIN A			**21.07**
		MIMO CHAIN B			18.92
802.11n40	HT0	SISO CHAIN A	142F	5710	**39.52**
		SISO CHAIN B			39.52
	HT8	MIMO CHAIN A			41.06
		MIMO CHAIN B			**41.68**
802.11ac80	VHT0	SISO CHAIN A	138ac80	5690	89.24
		SISO CHAIN B			**91.90**
		MIMO CHAIN A			88.29
		MIMO CHAIN B			**90.76**

Max Value

Printed copies are not controlled documents

B.2.2 Power Limits. Maximum Output power & Maximum power spectral Density

Test limits

Part	Limits
FCC 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.
RSS-247 Clause 6.2.3.1	The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Test procedure

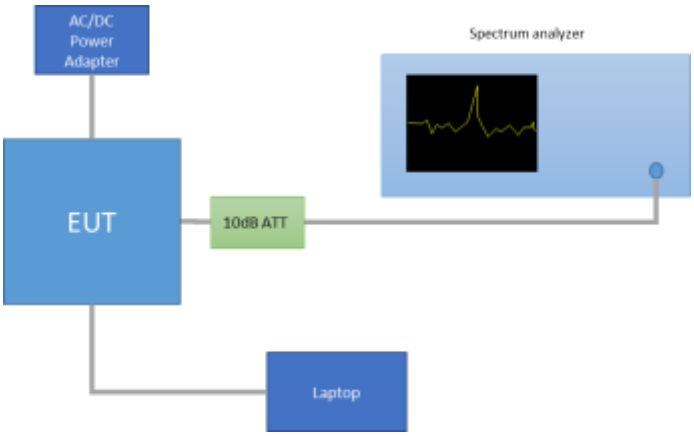
The Maximum Conducted Output Power was measured using the channel integration method according to point E) 2) e) (Method SA-2 Alternative) of KDB 789033 D02.
The maximum power spectral density (PSD) was measured using the method according to point F) (Method SA-2 Alternative) of KDB 789033 D02.

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.



For the overlapped channels between U-NII-2C and U-NII-3, and according to FCC KDB 644545 D03, the power is computed based on the portion of the emission bandwidth contained within that band. This rule is only applicable for those channels marked as overlapped

Printed copies are not controlled documents

Results tables

Duty cycle

Mode	Rate	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
802.11a	6Mbps	SISO-A	2.04	2.07	98.31%
		SISO-B	2.04	2.07	98.36%
802.11n20	HT0	SISO-A	1.90	1.93	98.24%
		SISO-B	1.90	1.93	98.08%
	HT8	MIMO-A	0.97	1.01	96.06%
		MIMO-B	0.97	1.01	96.15%
802.11n40	HT0	SISO-A	0.93	0.97	96.69%
		SISO-B	0.94	0.98	96.52%
	HT8	MIMO-A	0.49	0.53	92.45%
		MIMO-B	0.49	0.53	92.82%
802.11ac80	VHT0	SISO-A	0.46	0.49	93.10%
		SISO-B	0.46	0.49	93.09%
		MIMO-A	0.26	0.29	87.03%
		MIMO-B	0.26	0.29	87.03%
802.11ac160	VHT0	SISO-A	0.25	0.28	88.65%
		SISO-B	0.25	0.28	88.34%
		MIMO-A	0.15	0.19	79.89%
		MIMO-B	0.15	0.19	79.89%

Printed copies are not controlled documents

Maximum output power – U-NII-2C Channels

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	100	5500	SISO CHAIN A	19.26	19.26	84.33	24.26
				SISO CHAIN B	19.29	19.29	84.92	24.29
		120	5600	SISO CHAIN A	20.99	20.99	125.60	25.99
				SISO CHAIN B	21.31	21.31	**135.21**	26.31
		140	5700	SISO CHAIN A	19.01	19.01	79.62	24.01
				SISO CHAIN B	18.64	18.64	**73.11**	23.64
802.11n20	HT0	100	5500	SISO CHAIN A	19.17	19.17	82.60	24.17
				SISO CHAIN B	19.11	19.11	81.47	24.11
		120	5600	SISO CHAIN A	20.98	20.98	125.31	25.98
				SISO CHAIN B	21.32	21.32	**135.52**	26.32
		140	5700	SISO CHAIN A	18.47	18.47	**70.31**	23.47
				SISO CHAIN B	18.85	18.85	76.74	23.85
	HT8	100	5500	MIMO CHAIN A	15.81	15.98	**39.67**	20.98
				MIMO CHAIN B	16.04	16.21	41.79	21.21
				Combined A+B	18.94	19.11	81.46	24.11
		120	5600	MIMO CHAIN A	19.71	19.88	97.38	24.88
				MIMO CHAIN B	19.68	19.85	96.62	24.85
				Combined A+B	22.71	22.88	**194.00**	27.88
		140	5700	MIMO CHAIN A	17.88	18.05	63.90	23.05
				MIMO CHAIN B	18.35	18.52	71.13	23.52
				Combined A+B	21.13	21.30	135.03	26.30
802.11n40	HT0	102F	5510	SISO CHAIN A	17.02	17.17	52.08	22.17
				SISO CHAIN B	16.58	16.73	**47.14**	21.73
		118F	5590	SISO CHAIN A	21.55	21.70	**147.78**	26.70
				SISO CHAIN B	21.37	21.52	142.04	26.52
		134F	5670	SISO CHAIN A	18.73	18.88	77.20	23.88
				SISO CHAIN B	19.42	19.57	90.66	24.57
	HT8	102F	5510	MIMO CHAIN A	15.99	16.33	42.96	21.33
				MIMO CHAIN B	15.68	16.00	**39.85**	21.00
				Combined A+B	18.85	19.18	82.81	24.18
		118F	5590	MIMO CHAIN A	21.19	21.53	142.26	26.53
				MIMO CHAIN B	19.79	20.11	102.65	25.11
				Combined A+B	23.56	23.89	**244.91**	28.89
		134F	5670	MIMO CHAIN A	17.81	18.15	65.33	23.15
				MIMO CHAIN B	18.49	18.81	76.10	23.81
				Combined A+B	21.17	21.51	141.42	26.51

Printed copies are not controlled documents

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average Cond. Output Power [dBm]	Max.* Cond. Output Power [dBm]	Max.* Cond. Output Power [mW]	Max.* EIRP [dBm]
802.11ac80	VHT0	106ac80	5530	SISO CHAIN A	17.45	17.76	59.71	22.76
				SISO CHAIN B	17.32	17.63	**57.96**	22.63
				MIMO CHAIN A	14.92	15.52	**35.67**	20.52
				MIMO CHAIN B	14.94	15.54	35.84	20.54
				Combined A+B	17.94	18.54	71.51	23.54
		122ac80	5610	SISO CHAIN A	20.62	20.93	123.89	25.93
				SISO CHAIN B	20.63	20.94	**124.19**	25.94
				MIMO CHAIN A	19.31	19.91	98.02	24.91
				MIMO CHAIN B	20.15	20.75	118.94	25.75
				Combined A+B	22.76	23.36	**216.96**	28.36
802.11ac160	VHT0	114ac160	5570	SISO CHAIN A	14.65	15.17	**32.91**	20.17
				SISO CHAIN B	14.62	15.16	**32.80**	20.16
				MIMO CHAIN A	12.37	13.34	**21.60**	18.34
				MIMO CHAIN B	12.62	13.59	22.88	18.59
				Combined A+B	15.51	16.48	**44.48**	21.48

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

Max Value

Min Value

Printed copies are not controlled documents

Maximum output power – Overlapped channels between U-NII-2C and U-NII-3

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average Cond. Output Power - UNII-2C [dBm]	Max.* Cond. Output Power - UNII-2C [dBm]	Max.* Cond. Output Power - UNII-2C [mW]	Max.* EIRP UNII2C [dBm]
802.11n20	HT0	144	5720	SISO CHAIN A	19.95	20.03	**100.63**	25.03
				SISO CHAIN B	19.78	19.86	96.92	24.86
	HT8			MIMO CHAIN A	19.59	19.76	94.73	24.76
				MIMO CHAIN B	19.48	19.65	92.27	24.65
				Combined A+B	22.55	22.72	**187.00**	27.72
802.11n40	HT0	142F	5710	SISO CHAIN A	19.79	19.94	98.54	24.94
				SISO CHAIN B	19.93	20.08	**101.95**	25.08
	HT8			MIMO CHAIN A	19.60	19.94	98.65	24.94
				MIMO CHAIN B	19.97	20.29	107.00	25.29
				Combined A+B	22.80	23.13	**205.64**	28.13
802.11ac80	VHT0	138ac80	5690	SISO CHAIN A	20.29	20.60	114.82	25.60
				SISO CHAIN B	20.32	20.63	**115.64**	25.63
				MIMO CHAIN A	19.97	20.57	114.11	25.57
				MIMO CHAIN B	20.40	21.00	125.99	26.00
				Combined A+B	23.20	23.80	**240.10**	28.80

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

Max Value

Min Value

Printed copies are not controlled documents

Maximum Power Spectral Density (PSD) – U-NII-2C channels

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average conducted PSD [dBm/MHz]	Maximum* conducted PSD [dBm/MHz]
802.11a	6Mbps	100	5500	SISO CHAIN A	7.61	7.61
				SISO CHAIN B	7.64	7.64
		120	5600	SISO CHAIN A	9.24	9.24
				SISO CHAIN B	9.57	9.57
		140	5700	SISO CHAIN A	7.30	7.30
				SISO CHAIN B	6.94	6.94
802.11n20	HT0	100	5500	SISO CHAIN A	7.23	7.23
				SISO CHAIN B	7.16	7.16
		120	5600	SISO CHAIN A	8.90	8.90
				SISO CHAIN B	9.25	9.25
		140	5700	SISO CHAIN A	6.50	6.50
				SISO CHAIN B	6.85	6.85
	HT8	100	5500	MIMO CHAIN A	3.85	4.02
				MIMO CHAIN B	4.09	4.26
				Combined A+B	6.98	7.15
		120	5600	MIMO CHAIN A	7.73	7.90
				MIMO CHAIN B	7.69	7.86
				Combined A+B	10.72	10.89
		140	5700	MIMO CHAIN A	5.87	6.04
				MIMO CHAIN B	6.36	6.53
				Combined A+B	9.13	9.30

Printed copies are not controlled documents

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average Conducted. PSD [dBm/MHz]	Max.* Conducted. PSD [dBm/MHz]
802.11n40	HT0	102F	5510	SISO CHAIN A	1.93	2.08
				SISO CHAIN B	1.47	1.62
		118F	5590	SISO CHAIN A	3.46	3.61
				SISO CHAIN B	6.30	6.45
		134F	5670	SISO CHAIN A	3.65	3.80
				SISO CHAIN B	4.32	4.47
	HT8	102F	5510	MIMO CHAIN A	0.92	1.26
				MIMO CHAIN B	0.66	0.98
				Combined A+B	3.80	4.13
		118F	5590	MIMO CHAIN A	6.11	6.45
				MIMO CHAIN B	4.81	5.13
				Combined A+B	8.52	8.85
		134F	5670	MIMO CHAIN A	2.77	3.11
				MIMO CHAIN B	3.48	3.80
				Combined A+B	6.15	6.48
802.11ac80	VHT0	106ac80	5530	SISO CHAIN A	0.03	0.34
				SISO CHAIN B	-0.07	0.24
				MIMO CHAIN A	-2.31	-1.71
				MIMO CHAIN B	-2.35	-1.75
				Combined A+B	0.68	1.28
		122ac80	5610	SISO CHAIN A	3.30	3.61
				SISO CHAIN B	3.33	3.64
				MIMO CHAIN A	2.11	2.71
				MIMO CHAIN B	2.95	3.55
				Combined A+B	5.56	6.21
802.11ac160	VHT0	114ac160	5570	SISO CHAIN A	-5.44	-4.92
				SISO CHAIN B	-5.44	-4.90
				MIMO CHAIN A	-7.53	-6.56
				MIMO CHAIN B	-7.32	-6.35
				Combined A+B	-4.41	-3.44

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

Printed copies are not controlled documents

Maximum Power Spectral Density (PSD) – Overlapped channels between U-NII-2C and U-NII-3

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average conducted PSD UNII-2C [dBm/MHz]	Maximum* conducted PSD UNII-2C [dBm/MHz]
802.11n20	HT0	144	5720	SISO CHAIN A	8.91	8.99
				SISO CHAIN B	8.72	8.80
	HT8			MIMO CHAIN A	7.59	7.76
				MIMO CHAIN B	7.65	7.82
				Combined A+B	10.63	10.80
802.11n40	HT0	142F	5710	SISO CHAIN A	5.08	5.23
				SISO CHAIN B	5.18	5.33
	HT8			MIMO CHAIN A	4.94	5.28
				MIMO CHAIN B	5.26	5.58
				Combined A+B	8.11	8.45
802.11ac80	VHT0	138ac80	5690	SISO CHAIN A	3.00	3.31
				SISO CHAIN B	2.92	3.23
				MIMO CHAIN A	2.88	3.48
				MIMO CHAIN B	2.92	3.52
				Combined A+B	5.91	6.51

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

Printed copies are not controlled documents

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

Test limits

<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.407 (b) (3)</td><td>RSS-247 Clause 6.2.3.2</td><td>For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.</td></tr>
<tr><td>15.209</td><td>RSS-GEN, Clause 8.9</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>960-25000</td><td>500</td><td>54</td><td>3</td></tr>
</table>
The emission limits shown in the table above 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, the Video Bandwidth Method was used according to section G) 6) (KDB 789033 D02), with the following parameters:

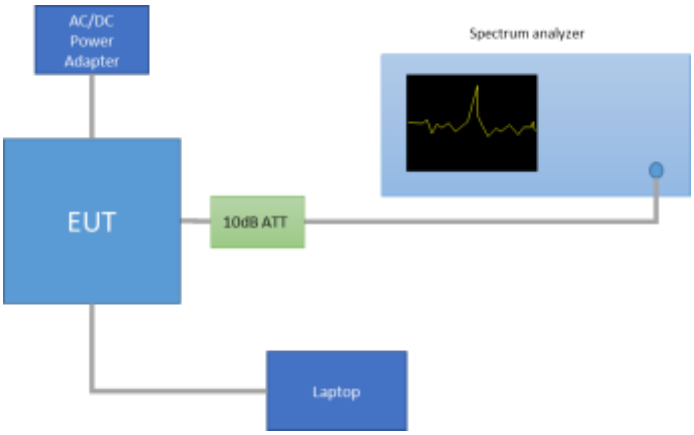
- When the duty cycle is > 98 %, VBW = 10Hz
- When the duty cycle is < 98 %, VBW > 1/T, where T is defined in section II.B.1.a

For the BE High, we use the integration method as defined in the band edge measurements section (paragraph II.G.3.d) of KDB 789033 D02.

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.

Printed copies are not controlled documents



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	-41.25

See Section B.3.4 for the screenshot results.

Printed copies are not controlled documents

B.2.4 Radiated spurious emission

Standard references

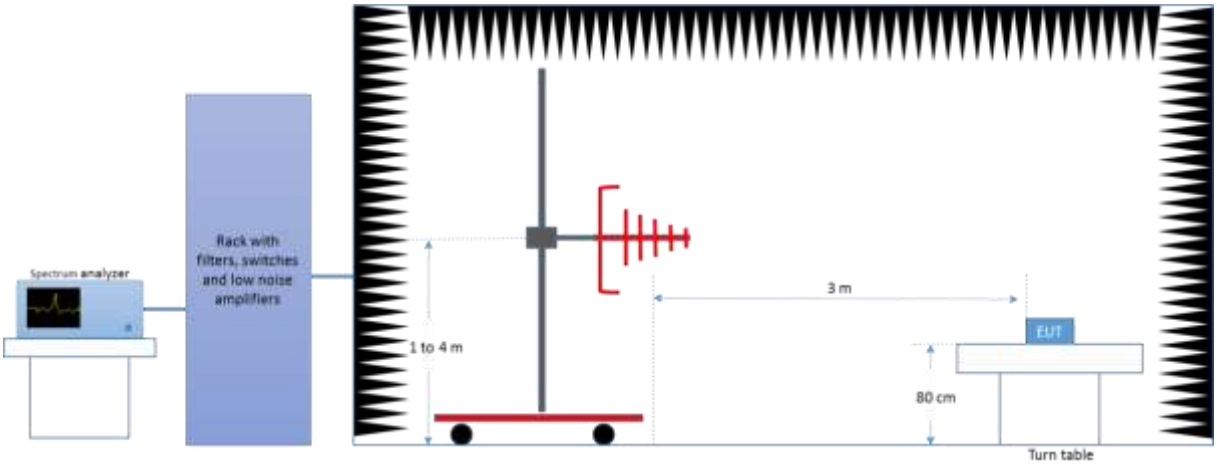
<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.407 (b) (3)</td><td>RSS-247
Clause 6.2.3.2</td><td>For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.</td></tr>
<tr><td>15.209(a)</td><td>RSS-GEN,
Clause 8.9</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

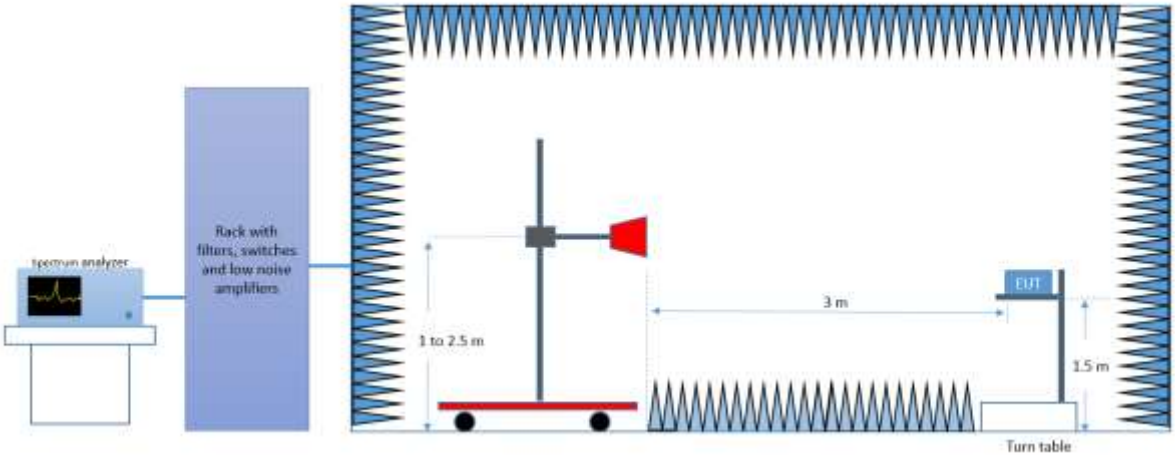
The setup below was used to measure the radiated spurious emissions.
Depending of the frequency range and bands being tested, different antennas and filters were used.
The final measurement is done by varying the antenna height, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.
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 channel.
For technologies 802.n20, 802.n40, 802.ac80 and 802.ac160 the worst case in terms of spurious emissions found among the low, mid and high channels when tested on chain A and B separately is used to perform the test in MIMO mode (Chain A+B).

Printed copies are not controlled documents

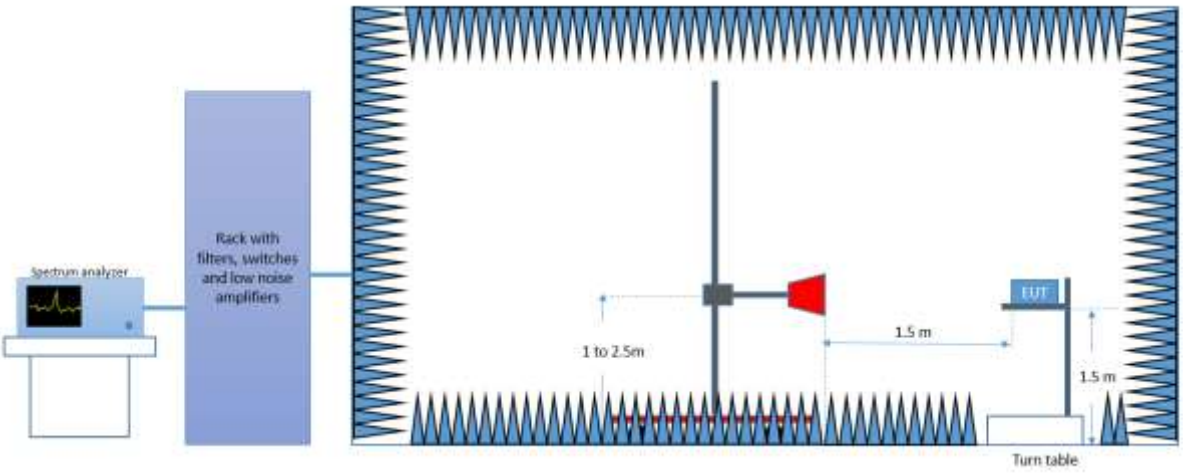
Radiated Setup < 1GHz



Radiated Setup 1 GHz - 18 GHz



Radiated Setup 18 GHz - 40 GHz



Printed copies are not controlled documents

Test Results

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

Radiated Spurious – CH100

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	33.5	40	6.5
62.5	34.6	---	40	5.5
1000.0	---	37.5	54	16.5
1000.2	46.8	---	74	27.3
1187.3	---	38.0	54	16.1
2079.5	47.7	---	74	26.4
8812.4	47.6	---	74	26.4
8826.2	---	36.2	54	17.9
17990.6	62.9	---	74	11.2
18000.0	---	**50.1**	54	3.9
21160.1	---	40.1	54	14.0
26773.8	49.4	---	74	24.6
39867.5	---	47.3	54	6.7
39920.3	57.0	---	74	17.1

Printed copies are not controlled documents

Radiated Spurious – CH120

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	30.8	---	40	9.3
62.5	---	29.0	40	11.1
1000.0	---	37.2	54	16.9
1000.0	45.6	---	74	8.5
1187.5	---	38.1	54	16.0
2169.6	51.4	---	74	22.7
11194.4	51.2	---	74	22.9
11200.2	---	41.1	54	13.0
17989.7	---	50.1	54	4.0
17993.3	61.2	---	74	12.9
22399.5	49.5	---	74	24.6
22400.1	---	41.7	54	12.3
39944.7	57.3	---	74	16.7
39998.7	---	47.4	54	6.6

Printed copies are not controlled documents

Radiated Spurious – CH140

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
332.8	37.2	---	46	8.8
332.8	---	36.3	46	9.7
1000.0	---	37.1	54	17.0
1040.5	46.2	---	74	27.8
1187.5	---	38.3	54	15.7
3120.5	50.8	---	74	23.2
11399.6	---	39.7	54	14.4
11400.0	50.8	---	74	23.3
17990.6	---	49.9	54	4.2
17993.3	60.9	---	74	13.1
22799.8	---	38.2	54	15.9
26754.8	48.4	---	74	25.7
39836.3	---	47.4	54	6.7
39864.6	58.4	---	74	15.7

Printed copies are not controlled documents

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

Radiated Spurious – CH100

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	30.3	40	9.7
62.5	32.3	---	40	7.7
1187.3	45.5	---	74	28.5
1187.5	---	38.4	54	15.7
6374.5	---	45.4	54	8.6
6375.9	58.0	---	74	16.1
16492.4	58.4	---	74	15.7
16498.7	---	47.7	54	6.4
17961.6	61.5	---	74	12.6
17996.0	---	50.0	54	4.1
22000.0	---	39.0	54	15.1
26004.3	48.7	---	74	25.4
39836.7	---	47.6	54	6.5
39870.9	57.7	---	74	16.4

Printed copies are not controlled documents

Radiated Spurious – CH120

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.6	---	27.2	40	12.8
32.6	29.1	---	40	11.0
1187.5	---	38.5	54	15.6
1187.5	45.6	---	74	28.5
6368.6	57.9	---	74	16.2
6374.0	---	45.6	54	8.5
11199.3	52.3	---	74	21.8
11199.7	---	41.7	54	12.3
17984.4	---	50.0	54	4.0
17992.4	60.8	---	74	13.3
22390.3	53.9	---	74	20.2
22400.9	---	42.7	54	11.4
39837.6	---	47.4	54	6.7
39843.9	59.0	---	74	15.1

Printed copies are not controlled documents

Radiated Spurious – CH140

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
332.8	---	32.7	46	13.4
332.8	34.3	---	46	11.8
1187.5	---	38.6	54	15.5
1187.5	44.7	---	74	29.4
6385.0	57.8	---	74	16.2
6388.0	---	45.5	54	8.6
11377.7	49.9	---	74	24.2
11412.1	---	38.4	54	15.7
17983.5	61.2	---	74	12.9
17992.9	---	50.0	54	4.0
26603.8	48.2	---	74	25.8
26817.7	---	37.9	54	16.2
39683.2	57.8	---	74	16.3
39848.1	---	47.2	54	6.9

Printed copies are not controlled documents

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

Radiated Spurious – CH100

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	32.9	40	7.1
62.5	33.5	---	40	6.6
1187.5	---	38.0	54	16.1
1187.5	45.1	---	74	29.0
6334.2	57.2	---	74	16.9
6339.4	---	45.6	54	8.4
16494.2	56.2	---	74	17.8
16500.9	---	45.9	54	8.2
17997.3	---	50.1	54	4.0
17998.2	61.6	---	74	12.5
22000.0	---	39.8	54	14.3
24338.3	48.3	---	74	25.8
39820.7	57.5	---	74	16.5
39856.6	---	47.6	54	6.5

Printed copies are not controlled documents

Radiated Spurious – CH120

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	32.4	40	7.6
62.5	33.8	---	40	6.3
1187.5	---	38.4	54	15.7
1188.0	44.5	---	74	29.6
6365.9	57.6	---	74	16.5
6369.8	---	45.7	54	8.4
11199.7	---	39.5	54	14.6
11200.6	51.5	---	74	22.6
17965.6	61.5	---	74	12.6
17994.6	---	50.2	54	3.9
22399.8	---	39.7	54	14.3
23938.8	48.5	---	74	25.6
39861.6	57.7	---	74	16.3
39891.2	---	47.3	54	6.7

Printed copies are not controlled documents

Radiated Spurious – CH140

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	30.3	---	40	9.8
62.5	---	29.0	40	11.1
1187.5	---	38.2	54	15.8
1187.5	44.4	---	74	29.6
6359.5	58.2	---	74	15.9
6361.0	---	45.5	54	8.6
11246.1	49.4	---	74	24.7
11251.5	---	37.9	54	16.2
17988.4	---	50.1	54	4.0
17996.4	61.2	---	74	12.9
22800.1	---	39.6	54	14.4
26692.8	48.1	---	74	26.0
39838.8	57.5	---	74	16.5
39848.1	---	47.2	54	6.8

Printed copies are not controlled documents

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

Radiated Spurious – CH100

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	29.9	40	10.2
62.5	31.0	---	40	9.1
1187.5	---	38.3	54	15.7
1187.5	45.6	---	74	28.5
6345.3	58.4	---	74	15.7
6348.5	---	45.6	54	8.5
16502.3	---	47.1	54	7.0
16504.0	58.7	---	74	15.4
17968.8	61.0	---	74	13.1
17985.3	---	50.1	54	4.0
21999.8	---	38.9	54	15.2
23917.6	48.3	---	74	25.7
39835.5	57.6	---	74	16.5
39838.0	---	47.7	54	6.4

Printed copies are not controlled documents

Radiated Spurious – CH120

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	34.8	40	5.2
62.5	**36.5**	---	40	3.6
1187.5	---	38.4	54	15.7
1187.5	44.9	---	74	29.2
6308.0	57.5	---	74	16.6
6312.1	---	45.4	54	8.7
11189.5	50.4	---	74	23.6
11198.8	---	40.2	54	13.9
17994.6	61.5	---	74	12.5
17999.1	---	50.0	54	4.1
22392.9	50.7	---	74	23.3
22397.2	---	41.4	54	12.7
39842.6	58.7	---	74	15.3
39875.5	---	47.2	54	6.8

Printed copies are not controlled documents

Radiated Spurious – CH140

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	31.9	40	8.1
62.5	33.2	---	40	6.8
1187.5	---	38.4	54	15.7
1187.8	44.8	---	74	29.3
6289.1	---	45.7	54	8.3
6296.2	58.1	---	74	15.9
12337.9	50.9	---	74	23.2
12366.4	---	39.0	54	15.0
17982.2	61.9	---	74	12.2
18000.0	---	50.0	54	4.0
26756.1	48.7	---	74	25.3
26820.2	---	37.8	54	16.3
39646.0	57.8	---	74	16.3
39861.2	---	47.5	54	6.5

Printed copies are not controlled documents

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

Radiated Spurious – CH120

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	32.5	---	40	7.6
62.5	---	31.2	40	8.9
1124.9	---	37.2	54	16.8
1124.9	46.4	---	74	27.7
6262.8	---	45.8	54	8.3
6271.1	57.7	---	74	16.4
22399.8	---	42.6	54	11.5
22400.3	51.1	---	74	23.0
39867.1	57.9	---	74	16.2
39989.9	---	47.2	54	6.8

Printed copies are not controlled documents

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

Radiated Spurious – CH102F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	35.7	---	40	4.3
62.5	---	34.4	40	5.6
1187.0	43.9	---	74	30.2
1187.5	---	38.6	54	15.4
6347.5	57.3	---	74	16.8
6348.0	---	45.3	54	8.7
12363.7	50.6	---	74	23.5
12385.2	---	39.2	54	14.9
17977.2	61.2	---	74	12.8
17999.6	---	50.2	54	3.8
22039.6	---	38.0	54	16.1
26791.5	48.8	---	74	25.2
39703.8	58.1	---	74	16.0
39996.6	---	47.4	54	6.7

Printed copies are not controlled documents

Radiated Spurious – CH118F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	30.0	40	10.1
32.5	32.3	---	40	7.8
1187.5	---	38.3	54	15.8
1187.8	45.3	---	74	28.7
6360.5	57.5	---	74	16.6
6360.7	---	45.3	54	8.8
12345.0	50.6	---	74	23.5
12364.2	---	39.2	54	14.9
17986.2	61.2	---	74	12.9
17997.3	---	50.2	54	3.8
22360.0	---	39.9	54	14.2
23897.1	48.3	---	74	25.7
39877.2	57.5	---	74	16.6
39892.8	---	47.1	54	6.9

Printed copies are not controlled documents

Radiated Spurious – CH134F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	30.7	40	9.4
1187.5	---	38.1	54	16.0
1187.5	44.5	---	74	29.5
6355.8	57.8	---	74	16.3
6360.5	---	45.5	54	8.6
12310.6	---	39.6	54	14.5
17023.8	58.5	---	74	15.6
17023.8	---	46.3	54	7.7
17977.2	61.1	---	74	13.0
17997.8	---	49.9	54	4.2
22679.8	---	38.3	54	15.8
25960.0	48.6	---	74	25.5
39982.7	57.6	---	74	16.4
39993.3	---	47.2	54	6.9

Printed copies are not controlled documents

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

Radiated Spurious – CH102F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	34.7	---	40	5.4
62.5	---	32.9	40	7.2
1187.3	44.4	---	74	29.6
1187.5	---	38.9	54	15.2
6270.4	58.1	---	74	16.0
6276.0	---	45.6	54	8.5
12358.8	50.7	---	74	23.3
12367.8	---	39.6	54	14.5
17983.5	61.6	---	74	12.5
17994.2	---	50.0	54	4.1
22039.9	---	38.4	54	15.6
26717.3	49.3	---	74	24.8
39807.6	---	47.4	54	6.6
39878.1	57.5	---	74	16.5

Printed copies are not controlled documents

Radiated Spurious – CH118F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	30.5	40	9.6
32.5	33.8	---	40	6.3
1187.5	---	38.2	54	15.8
1187.8	45.6	---	74	28.5
6331.0	---	45.3	54	8.8
6332.7	57.1	---	74	17.0
12018.0	---	38.7	54	15.4
12070.2	50.4	---	74	23.7
17992.0	61.7	---	74	12.4
17999.6	---	50.0	54	4.1
22352.5	---	40.4	54	13.6
22366.3	51.0	---	74	23.1
39818.2	57.9	---	74	16.2
39865.8	---	47.1	54	6.9

Printed copies are not controlled documents

Radiated Spurious – CH134F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	31.6	40	8.5
1187.5	---	39.2	54	14.9
1187.5	45.0	---	74	29.1
6370.5	58.2	---	74	15.9
6372.8	---	45.6	54	8.5
12406.1	---	39.8	54	14.2
17617.6	57.9	---	74	16.2
17649.8	---	46.9	54	7.2
17994.2	61.4	---	74	12.7
17999.6	---	50.1	54	4.0
26776.8	48.4	---	74	25.6
26824.0	---	37.9	54	16.2
39850.2	---	47.3	54	6.8
39946.8	57.5	---	74	16.6

Printed copies are not controlled documents

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

Radiated Spurious – CH102F

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
312.0	35.1	---	46	11.0
312.0	---	34.4	46	11.7
1124.7	46.0	---	74	28.1
1124.9	---	37.9	54	16.2
6269.7	---	45.8	54	8.2
6273.3	57.2	---	74	16.9
16520.6	57.6	---	74	16.5
16521.0	---	46.9	54	7.2
17997.3	---	**50.3**	54	3.7
17999.6	61.1	---	74	13.0
22039.9	---	38.4	54	15.7
25917.5	48.6	---	74	25.5
39836.3	57.5	---	74	16.5
39884.8	---	47.5	54	6.6

Printed copies are not controlled documents

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

Radiated Spurious – CH106ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	31.8	40	8.3
32.5	34.6	---	40	5.5
1187.3	---	37.8	54	16.2
1187.8	45.6	---	74	28.5
6374.5	---	45.8	54	8.3
6375.5	57.2	---	74	16.8
17627.5	57.7	---	74	16.3
17631.5	---	47.0	54	7.1
17976.4	60.8	---	74	13.3
17996.9	---	49.9	54	4.1
22119.8	---	38.2	54	15.9
26729.1	49.4	---	74	24.6
39844.3	---	47.3	54	6.8
39847.7	57.8	---	74	16.3

Printed copies are not controlled documents

Radiated Spurious – CH122ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	33.4	---	40	6.6
32.5	---	31.5	40	8.6
1124.9	---	36.4	54	17.6
1125.4	45.8	---	74	28.2
6240.9	58.0	---	74	16.1
6269.2	---	45.9	54	8.2
12356.2	---	39.7	54	14.4
17623.0	---	46.9	54	7.1
17641.7	58.6	---	74	15.5
17997.8	61.4	---	74	12.6
18000.0	---	50.0	54	4.0
22439.7	---	38.5	54	15.6
26023.5	48.5	---	74	25.5
39816.1	57.8	---	74	16.2
39842.2	---	47.4	54	6.7

Printed copies are not controlled documents

Radiated Spurious – CH138ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	29.9	40	10.2
32.5	34.6	---	40	5.5
1187.5	---	38.2	54	15.8
1187.5	44.3	---	74	29.8
6229.4	---	46.0	54	8.1
6245.6	57.9	---	74	16.2
17649.3	---	46.8	54	7.3
17666.7	58.6	---	74	15.4
17978.1	---	50.0	54	4.1
17990.2	61.1	---	74	13.0
22760.0	---	38.9	54	15.1
23948.9	48.3	---	74	25.8
39858.7	58.3	---	74	15.8
39877.7	---	47.2	54	6.8

Printed copies are not controlled documents

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

Radiated Spurious – CH106ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	33.7	40	6.3
32.5	35.2	---	40	4.9
1187.3	44.4	---	74	29.6
1187.5	---	38.1	54	16.0
6354.1	57.0	---	74	17.1
6357.5	---	45.8	54	8.3
17649.8	---	47.0	54	7.1
17662.7	58.4	---	74	15.6
17991.1	61.2	---	74	12.9
17999.6	---	49.9	54	4.2
22119.8	---	38.9	54	15.2
26821.5	48.7	---	74	25.3
39877.7	---	47.6	54	6.4
39903.8	57.7	---	74	16.4

Printed copies are not controlled documents

Radiated Spurious – CH122ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	31.3	40	8.8
32.5	34.4	---	40	5.7
1187.5	---	38.7	54	15.4
1187.8	44.7	---	74	29.4
6241.4	58.1	---	74	15.9
6249.5	---	45.7	54	8.4
12373.6	---	39.4	54	14.7
17616.8	59.5	---	74	14.5
17640.0	---	46.6	54	7.4
17978.1	61.3	---	74	12.8
17993.3	---	50.0	54	4.0
22440.2	---	39.7	54	14.4
23580.8	48.4	---	74	25.7
39819.9	---	47.1	54	6.9
39878.9	58.5	---	74	15.6

Printed copies are not controlled documents

Radiated Spurious – CH138ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	32.2	40	7.9
32.5	33.5	---	40	6.6
1249.9	46.4	---	74	27.6
1250.1	---	38.1	54	16.0
6281.7	---	45.9	54	8.1
6287.1	57.5	---	74	16.6
17512.8	58.3	---	74	15.7
17630.1	---	46.8	54	7.2
17975.9	60.8	---	74	13.2
17992.0	---	**50.2**	54	3.9
25943.8	48.1	---	74	25.9
26776.8	---	37.6	54	16.5
39851.5	58.6	---	74	15.5
39924.5	---	47.0	54	7.1

Printed copies are not controlled documents

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

Radiated Spurious – CH138ac80

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
303.7	36.0	---	46	10.0
303.7	---	34.9	46	11.1
1961.0	---	41.4	54	12.7
1961.4	51.0	---	74	23.0
6232.6	57.1	---	74	16.9
6271.6	---	46.0	54	8.1
12368.2	---	39.6	54	14.5
12400.3	50.6	---	74	23.5
17983.5	61.0	---	74	13.0
17991.1	---	50.1	54	4.0
22759.7	---	37.5	54	16.6
26748.5	48.3	---	74	25.8
39853.6	---	47.0	54	7.1
39863.3	58.6	---	74	15.5

Printed copies are not controlled documents

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

Radiated Spurious – CH114ac160

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.5	---	32.4	40	7.7
32.5	33.8	---	40	6.3
1187.0	44.6	---	74	29.4
1187.5	---	38.4	54	15.7
6251.3	---	45.9	54	8.2
6301.3	57.9	---	74	16.2
17638.2	---	47.0	54	7.1
17652.9	58.5	---	74	15.5
17992.4	---	49.9	54	4.2
18000.0	61.5	---	74	12.6
22280.0	---	42.6	54	11.5
24443.5	48.3	---	74	25.8
39813.1	57.2	---	74	16.9
39861.2	---	47.3	54	6.8

Printed copies are not controlled documents

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

Radiated Spurious – CH114ac160

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	29.7	40	10.4
62.5	30.9	---	40	9.2
1187.5	---	39.5	54	14.6
1187.5	45.0	---	74	29.1
6210.8	58.1	---	74	16.0
6227.9	---	45.8	54	8.3
17632.8	---	47.0	54	7.1
17656.0	58.1	---	74	16.0
17969.7	---	**50.1**	54	4.0
17980.8	61.3	---	74	12.8
22280.3	---	37.5	54	16.6
24632.4	49.0	---	74	25.1
39851.9	---	47.2	54	6.8
39881.9	58.2	---	74	15.8

Printed copies are not controlled documents

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

Radiated Spurious – CH114ac160

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.5	---	32.4	40	7.7
62.5	33.4	---	40	6.7
2431.0	---	40.0	54	14.0
2431.0	50.3	---	74	23.8
6176.6	57.2	---	74	16.9
6252.5	---	45.7	54	8.4
17644.9	---	46.7	54	7.3
17644.9	57.8	---	74	16.3
17987.5	---	**50.1**	54	4.0
18000.0	60.8	---	74	13.3
22279.8	---	40.5	54	13.6
24576.1	49.3	---	74	24.7
39809.3	---	47.0	54	7.1
39859.1	58.1	---	74	16.0

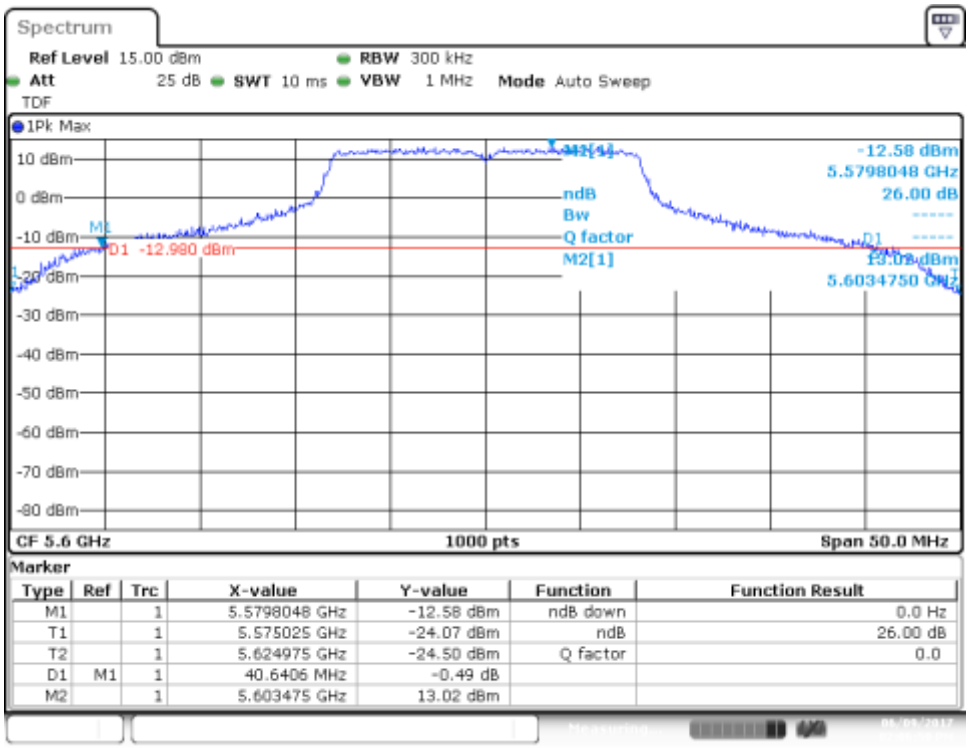
Printed copies are not controlled documents

B.3 Test Results Screenshots

B.3.1 26dB Bandwidth

SISO-A, 802.11a, 6Mbps

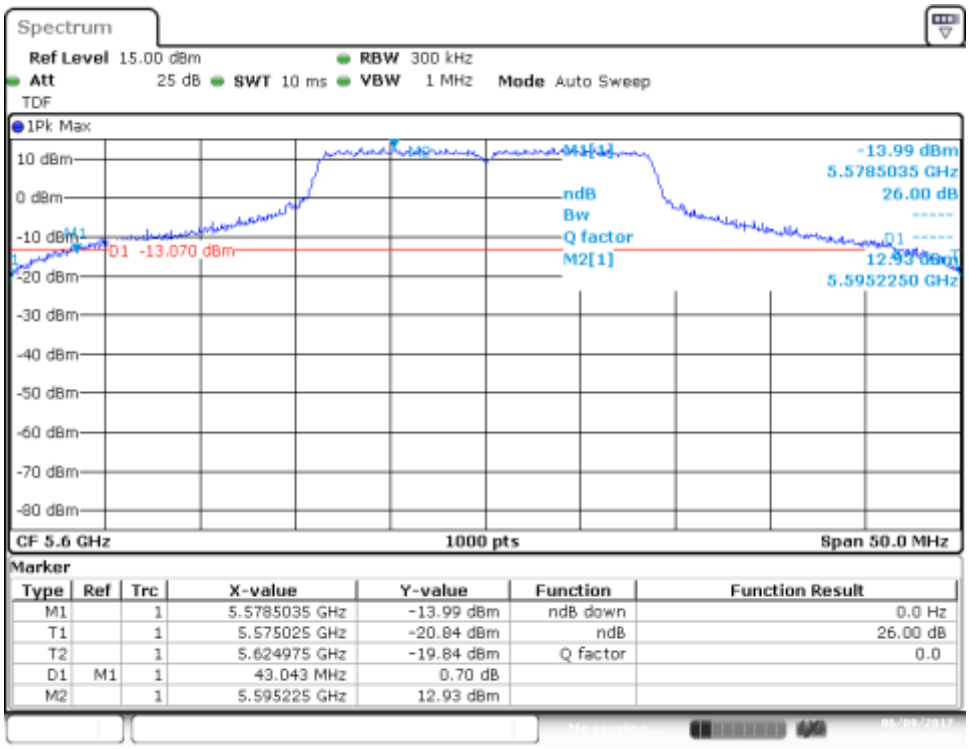
Channel 120



Printed copies are not controlled documents

SISO-A, 802.11n20, HT0

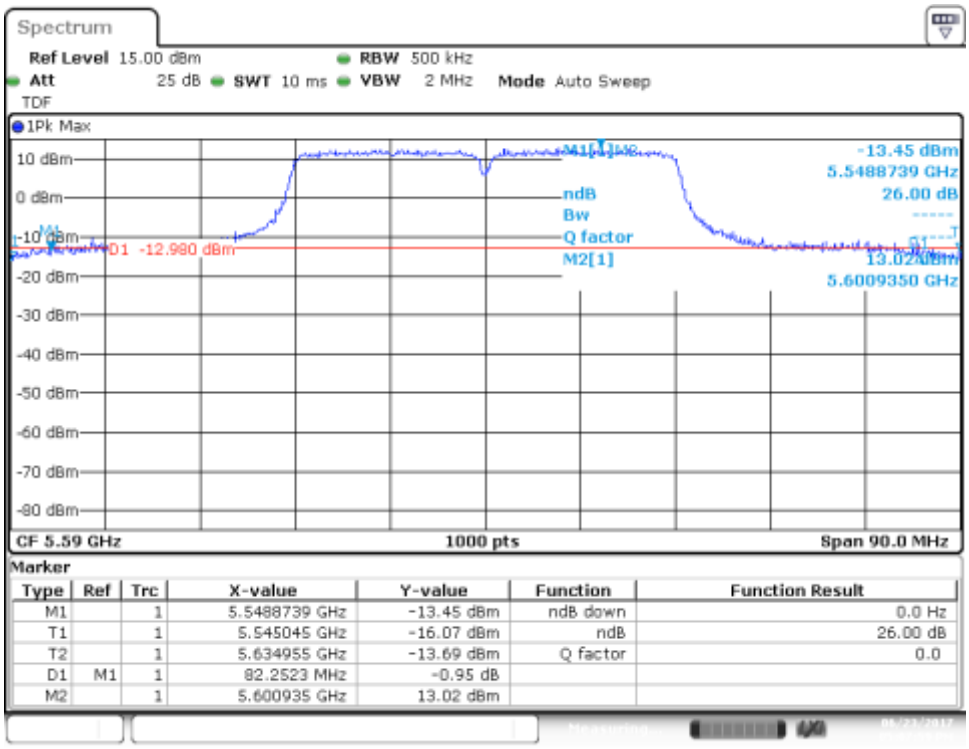
Channel 120



Printed copies are not controlled documents

SISO-A, 802.11n40, HT0

Channel 118F

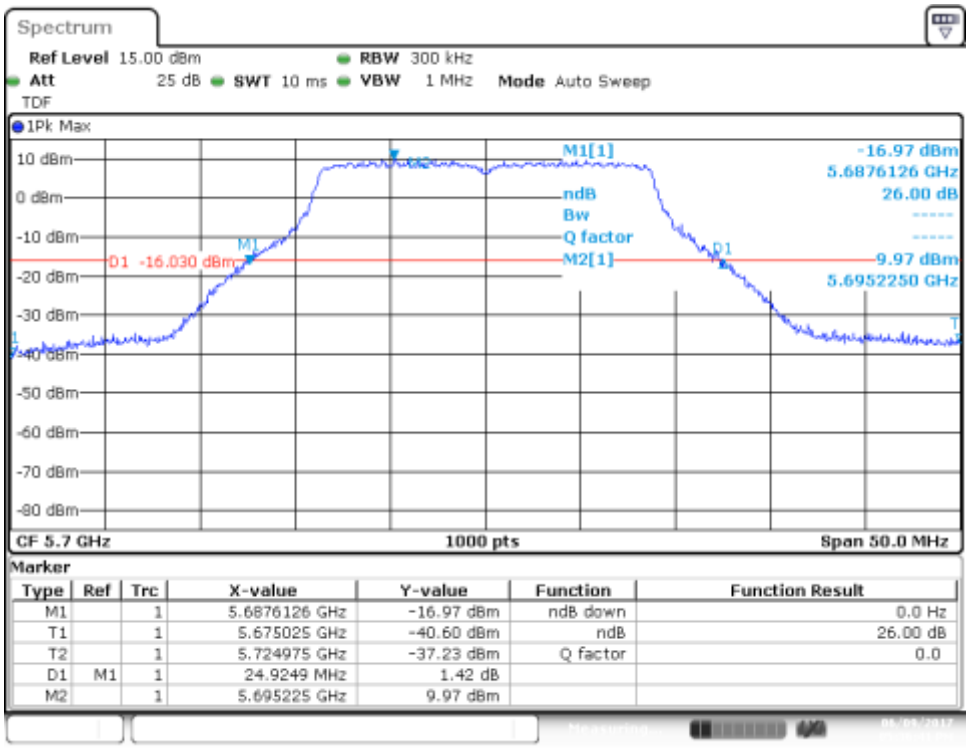


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.5488739 GHz	-13.45 dBm	ndB down	0.0 Hz
T1		1	5.545045 GHz	-16.07 dBm	ndB	26.00 dB
T2		1	5.634955 GHz	-13.69 dBm	Q factor	0.0
D1	M1	1	82.2523 MHz	-0.95 dB		
M2		1	5.600935 GHz	13.02 dBm		

Printed copies are not controlled documents

MIMO-A, 802.11n20, HT8

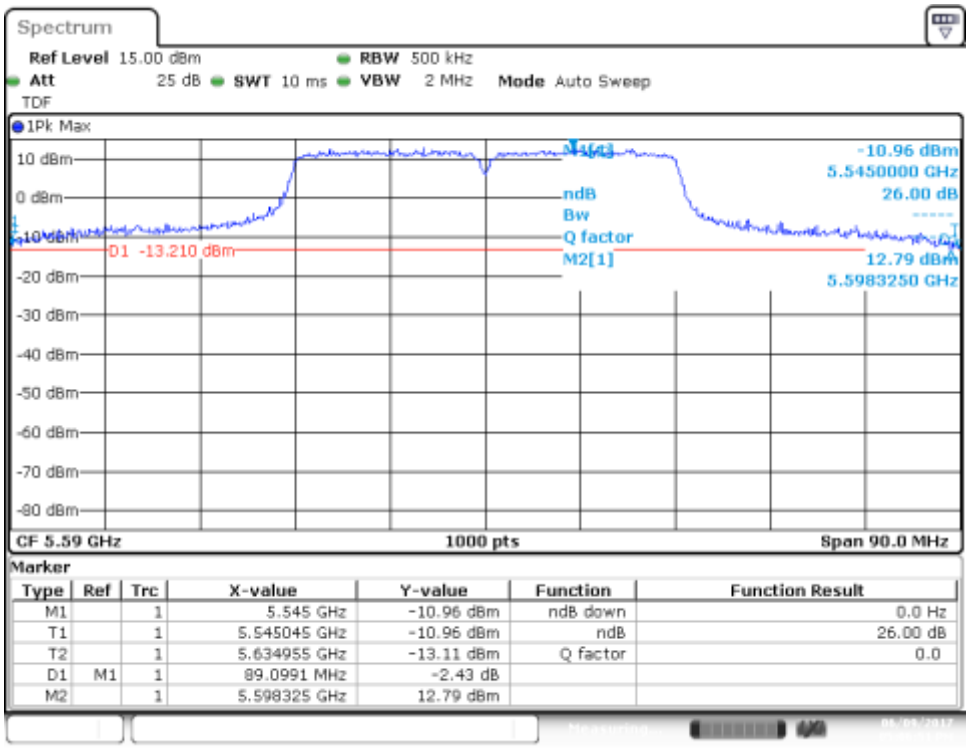
Channel 140



Printed copies are not controlled documents

MIMO-A, 802.11n40, HT8

Channel 118F

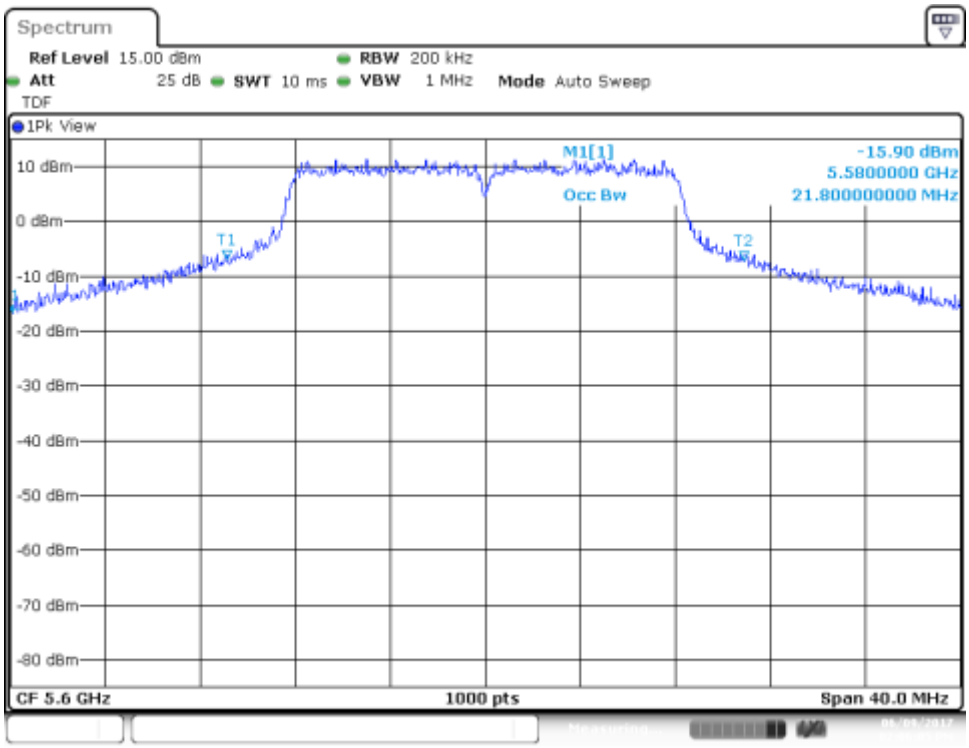


Printed copies are not controlled documents

B.3.2 99% Bandwidth

SISO-A, 802.11a, 6Mbps

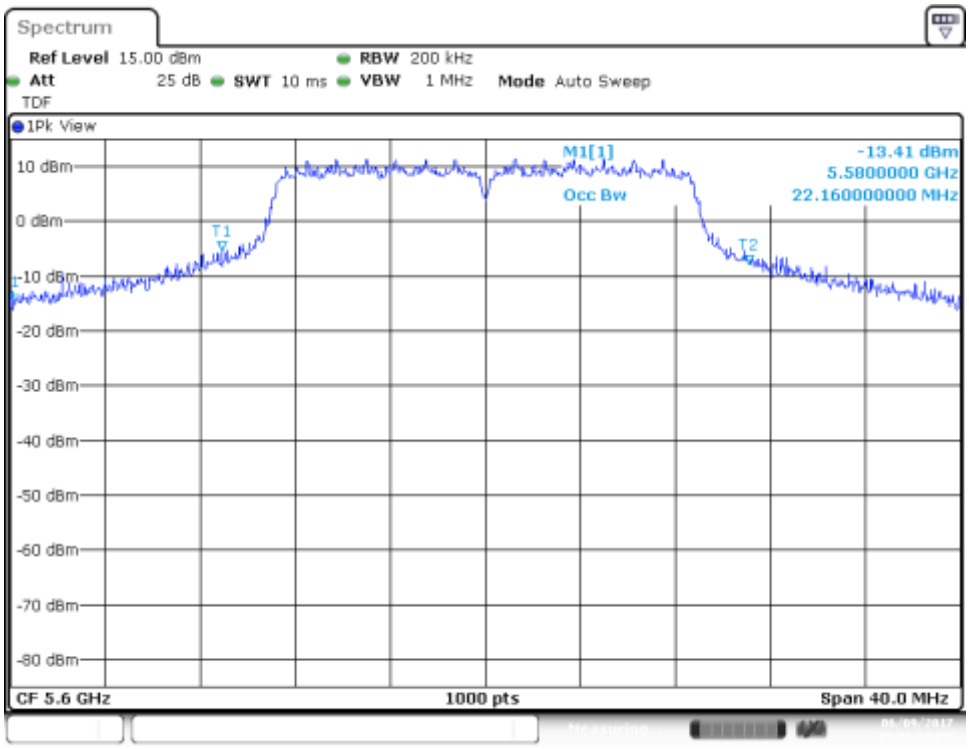
Channel 120



Printed copies are not controlled documents

SISO-A, 802.11n20, HT0

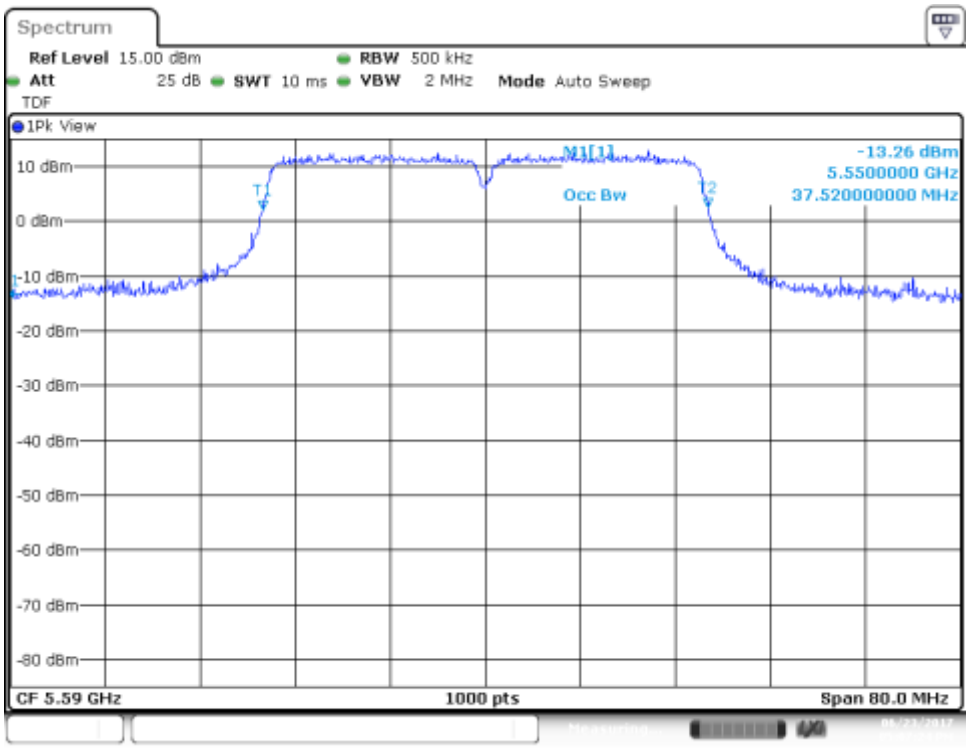
Channel 120



Printed copies are not controlled documents

SISO-A, 802.11n40, HT0

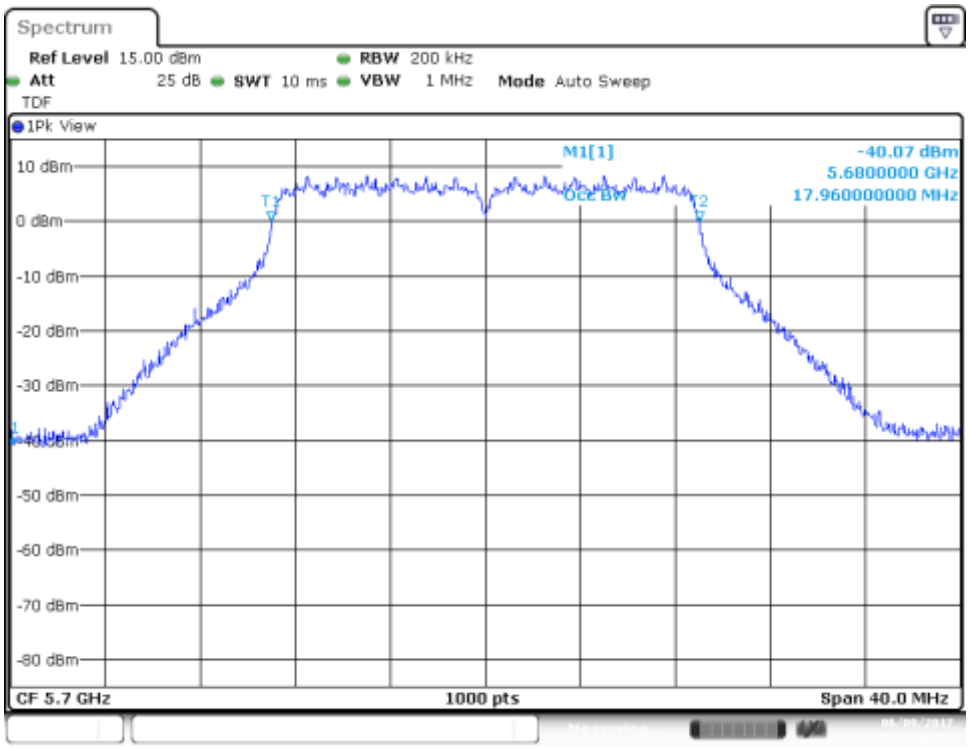
Channel 118F



Printed copies are not controlled documents

MIMO-A, 802.11n20, HT8

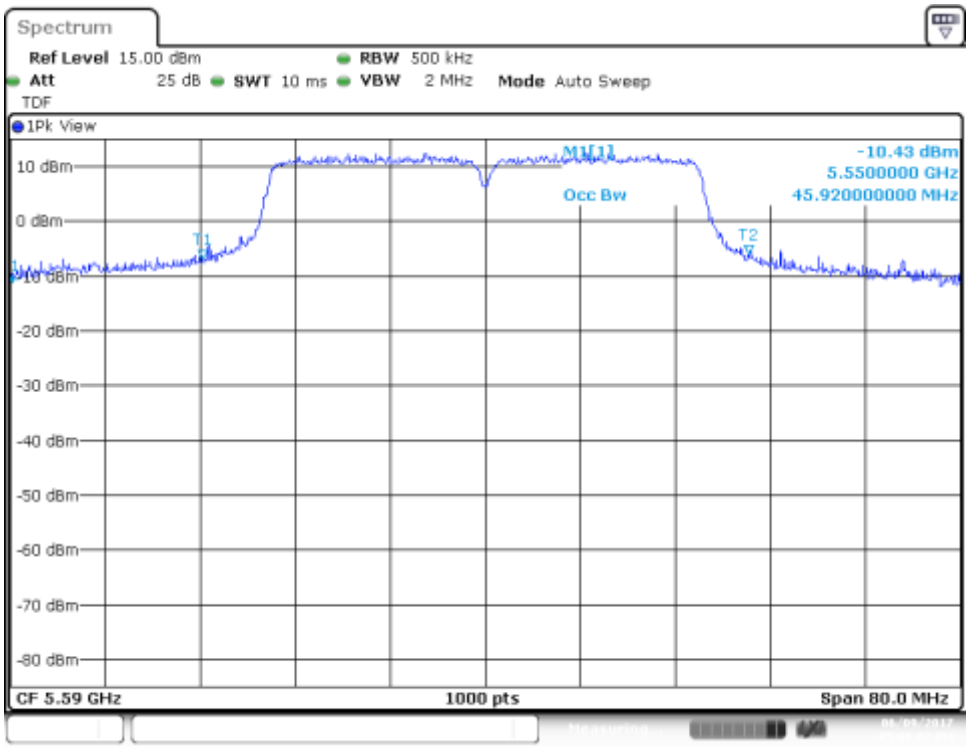
Channel 140



Printed copies are not controlled documents

MIMO-A, 802.11n40, HT8

Channel 118F

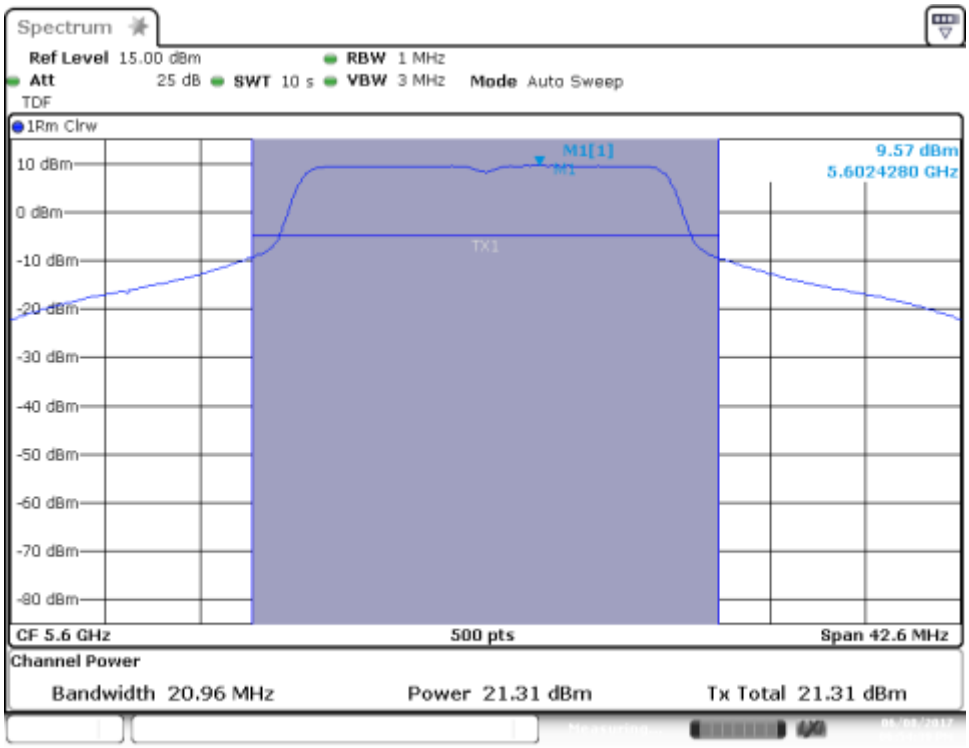


Printed copies are not controlled documents

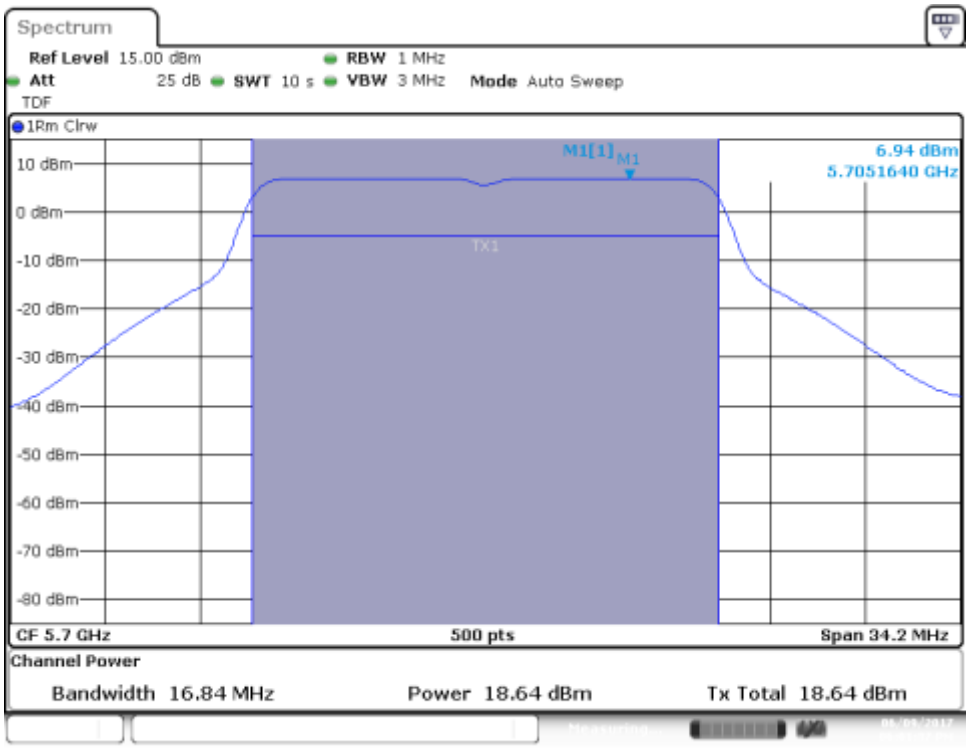
B.3.3 Maximum Output power & Maximum power spectral Density

SISO-B, 802.11a, 6Mbps

Channel 120



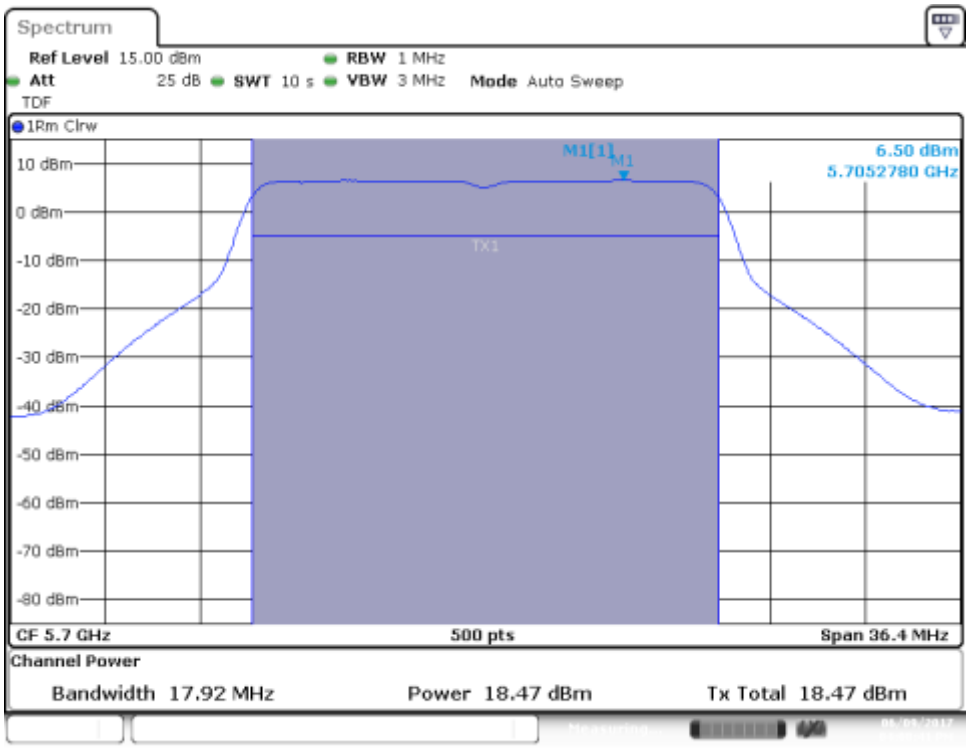
Channel 140



Printed copies are not controlled documents

SISO-A, 802.11n20, HT0

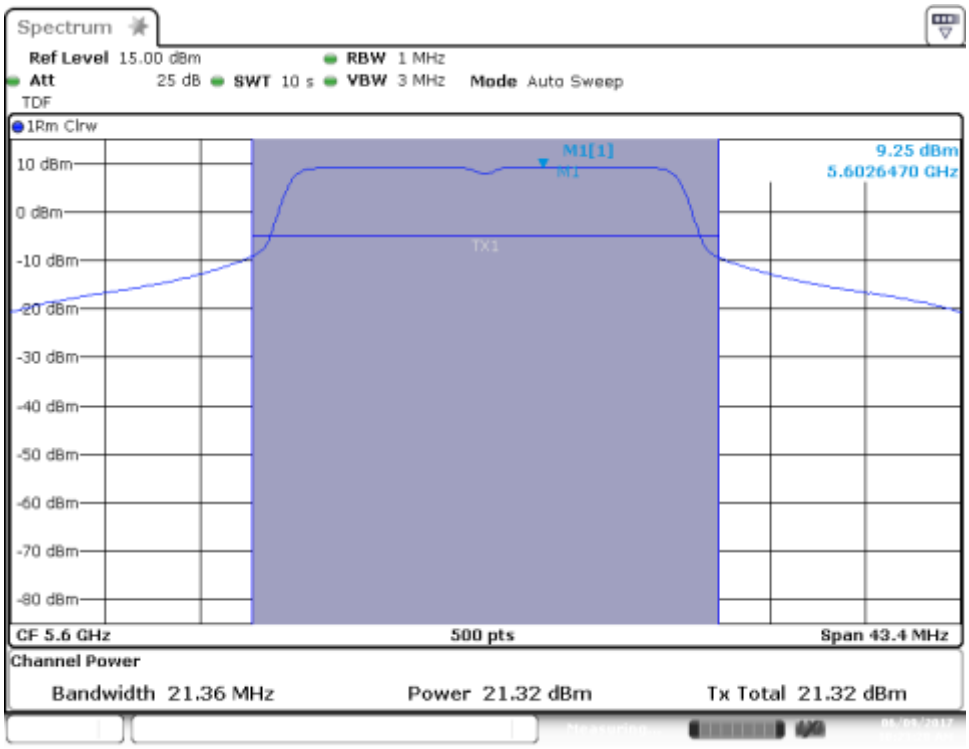
Channel 140



Printed copies are not controlled documents

SISO-B, 802.11n20, HT0

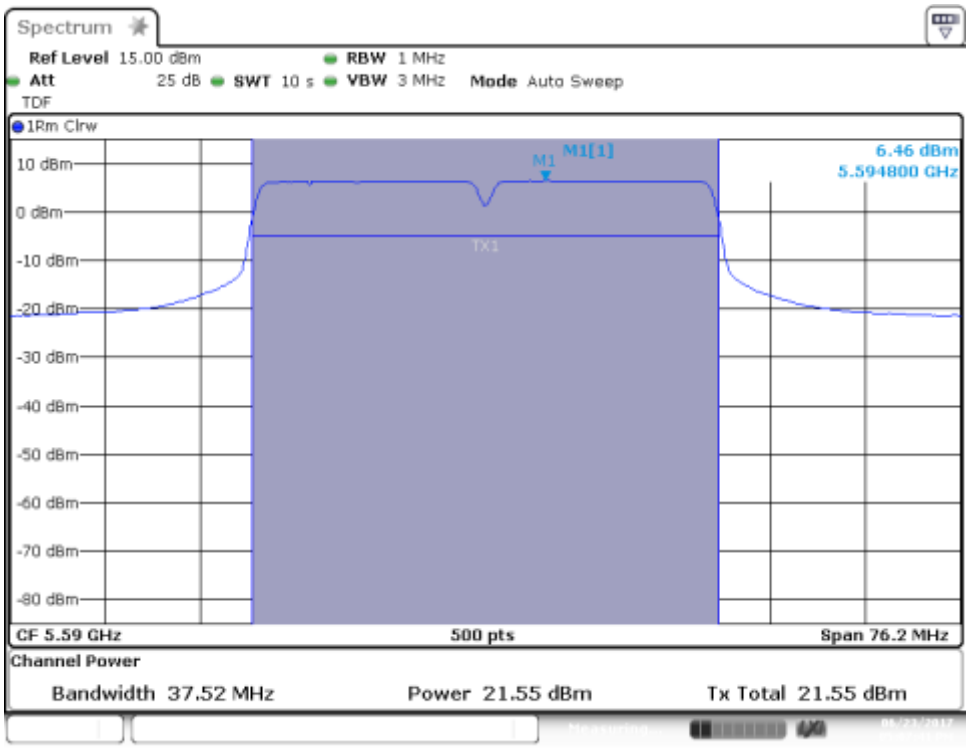
Channel 120



Printed copies are not controlled documents

SISO-A, 802.11n40, HT0

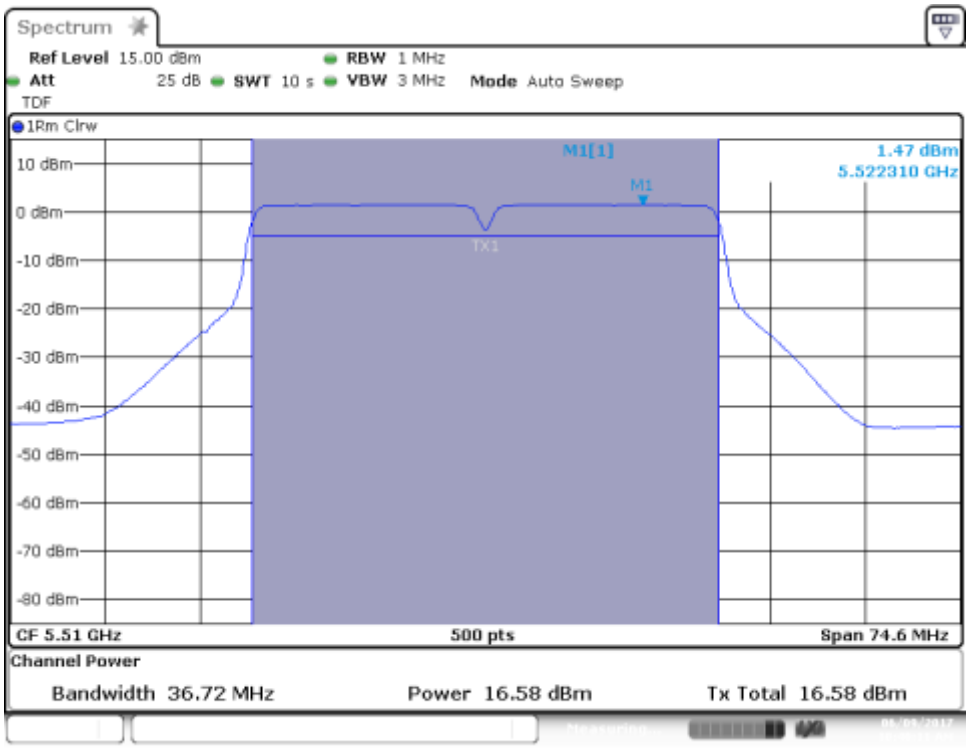
Channel 118F



Printed copies are not controlled documents

SISO-B, 802.11n40, HT0

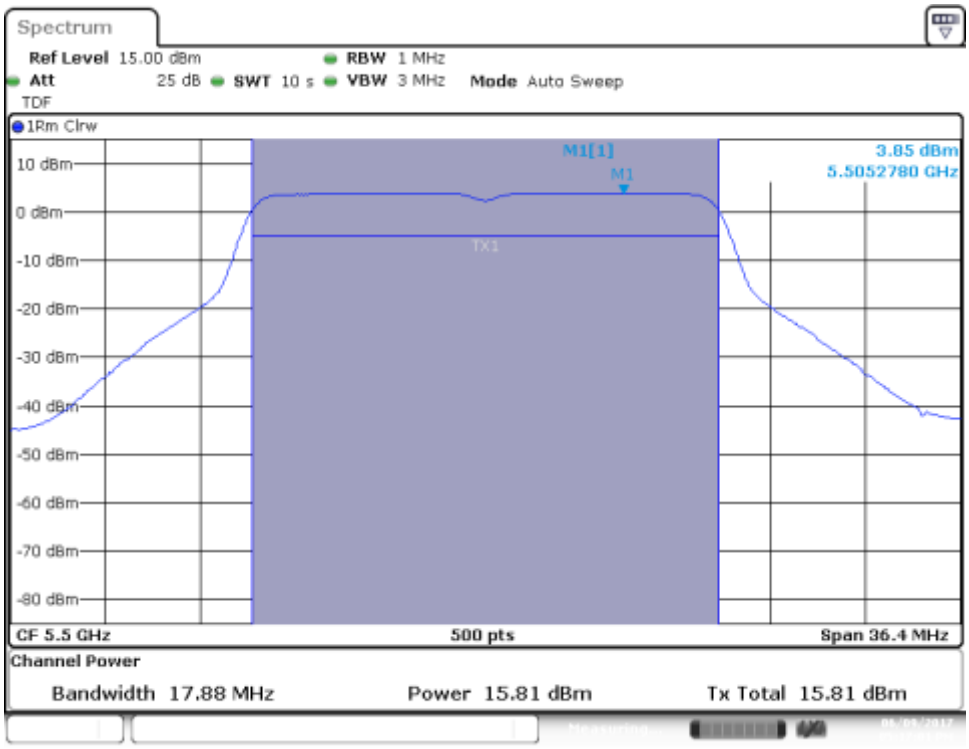
Channel 102F



Printed copies are not controlled documents

MIMO-A, 802.11n20, HT8

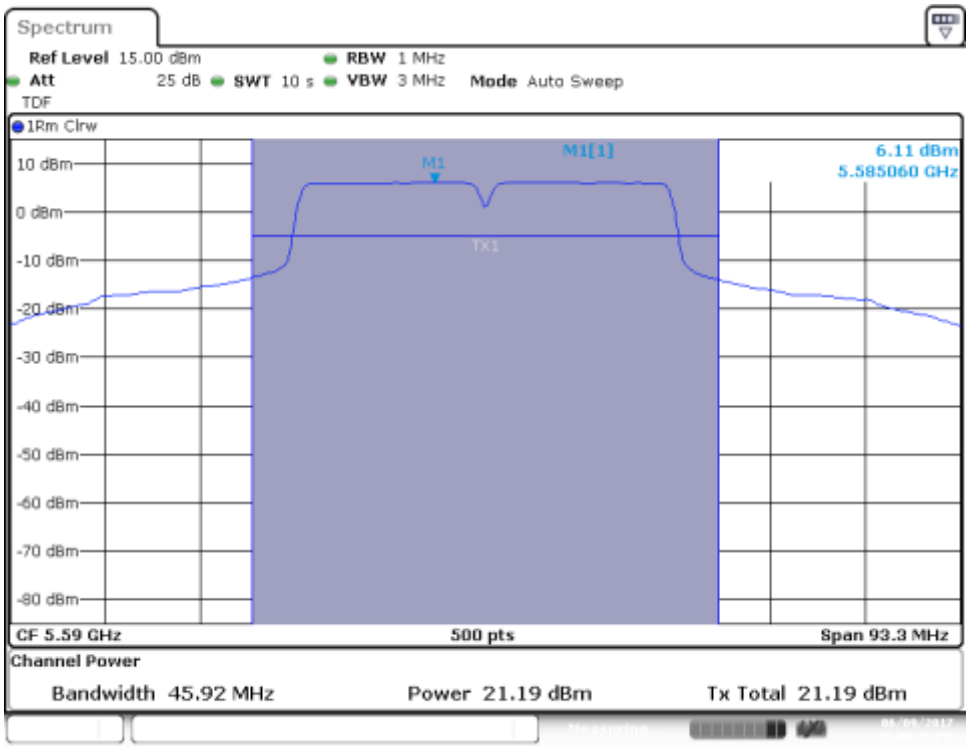
Channel 100



Printed copies are not controlled documents

MIMO-A, 802.11n40, HT8

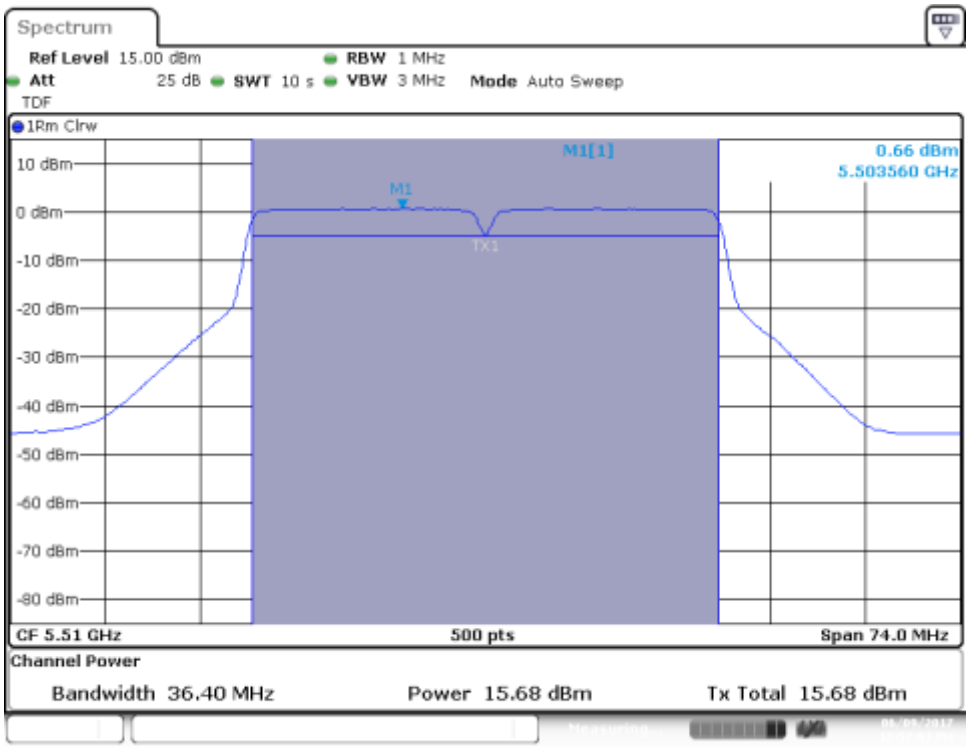
Channel 118F



Printed copies are not controlled documents

MIMO-B, 802.11n40, HT8

Channel 102F

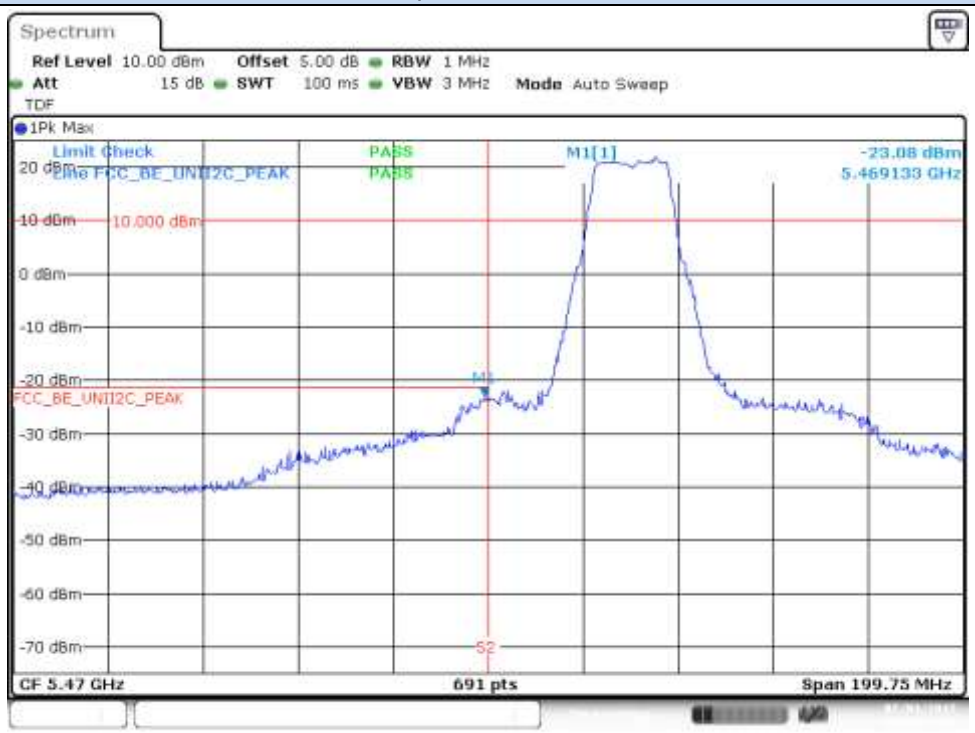


Printed copies are not controlled documents

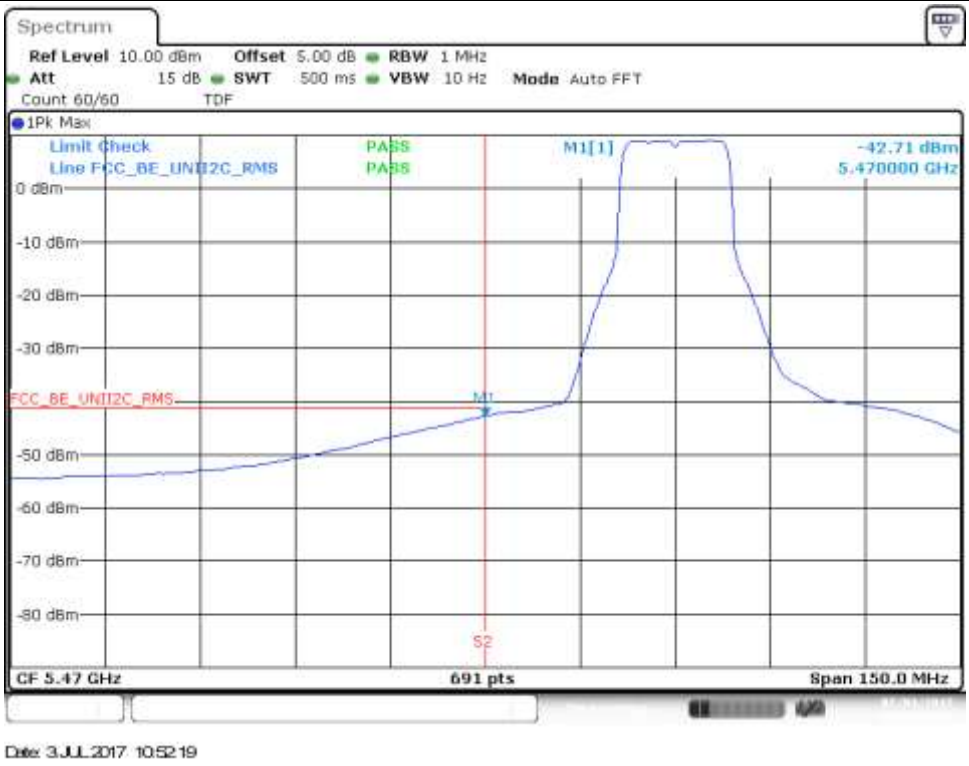
B.3.4 Undesirable emission limits : Band Edge (Conducted)

802.11a, 6Mbps – Chain A

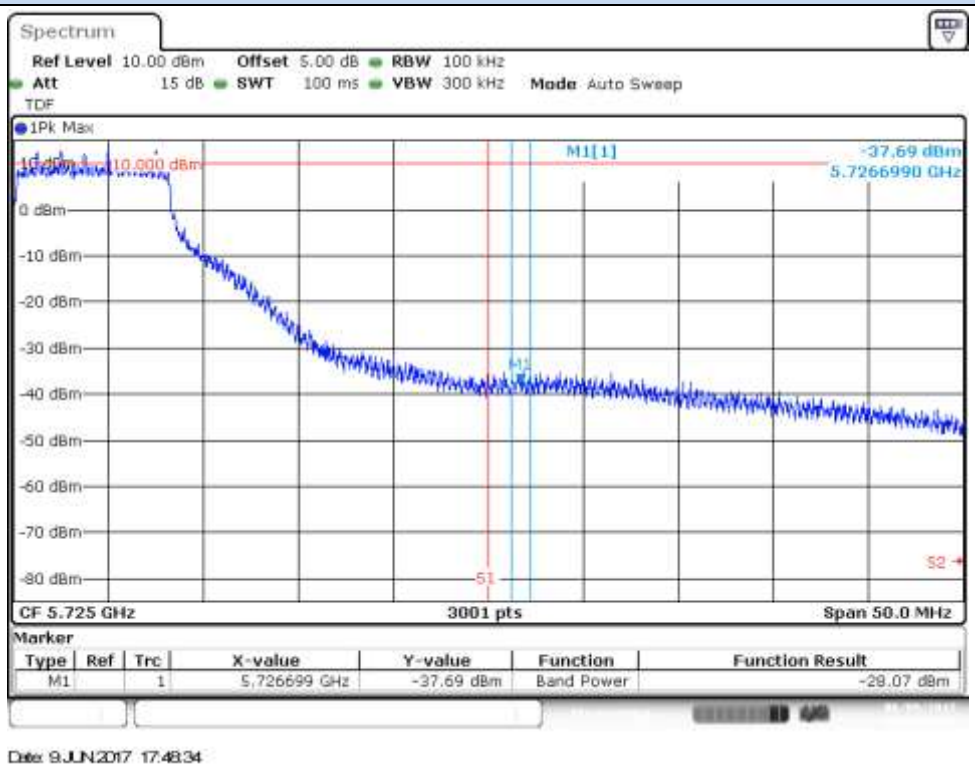
BE Low Freq Section, Peak – CH100



BE Low Freq Section, RMS – CH100



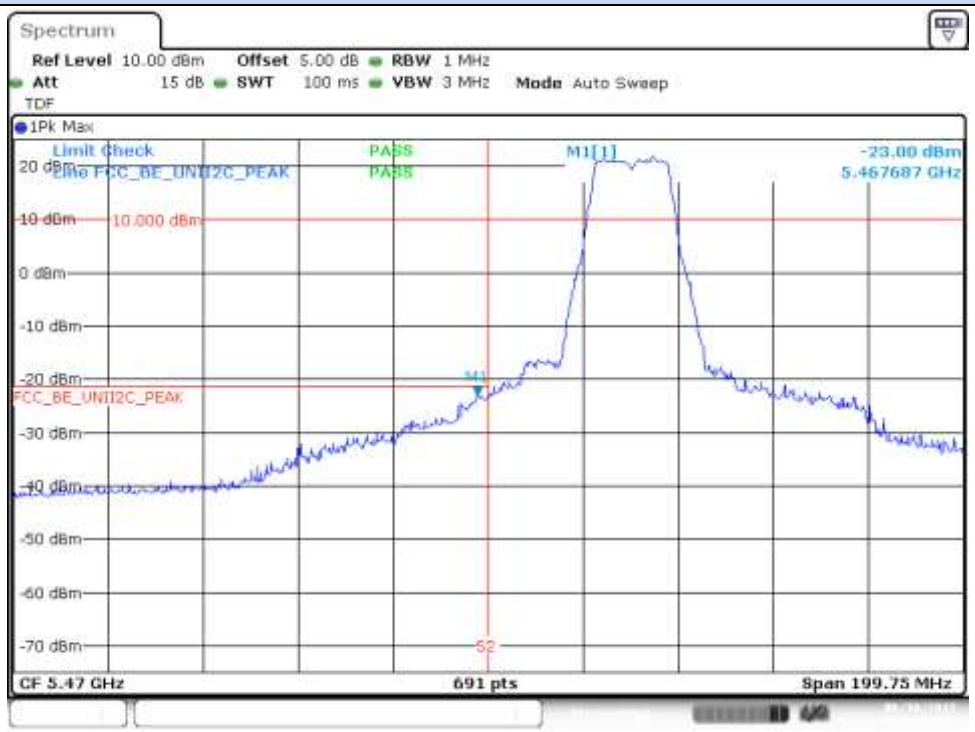
Printed copies are not controlled documents

BE High Freq Section, Peak – CH140


Printed copies are not controlled documents

802.11a, 6Mbps – Chain B

BE Low Freq Section, Peak – CH100

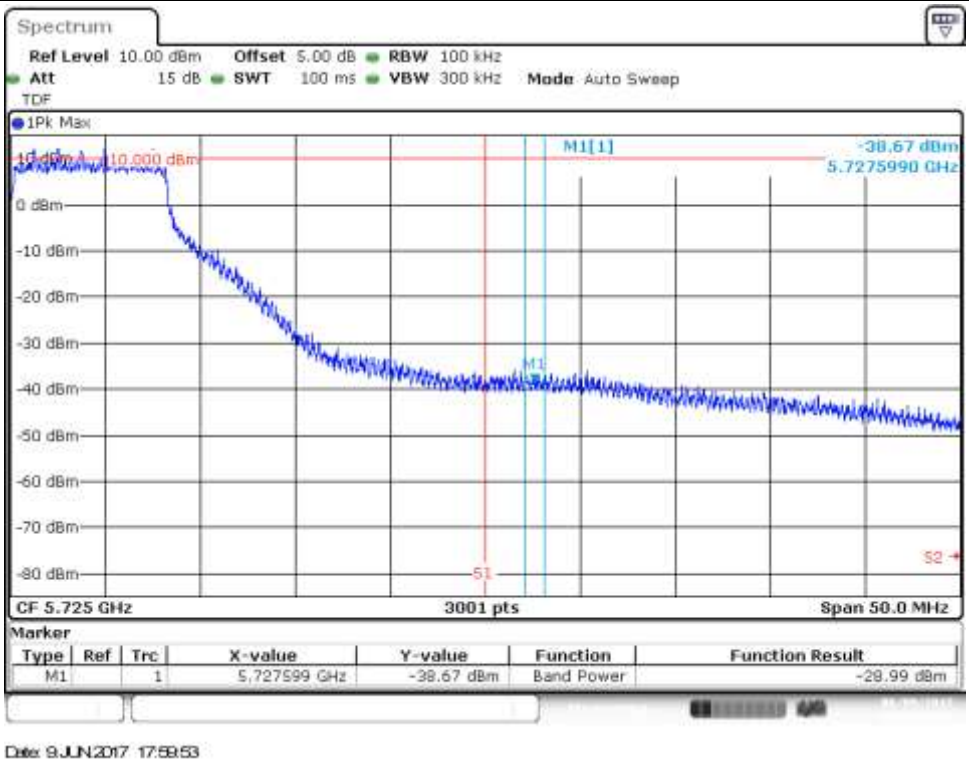


Date: 30.JUN.2017 18:48:02

BE Low Freq Section, RMS – CH100

Date: 30.JUN.2017 18:47:34

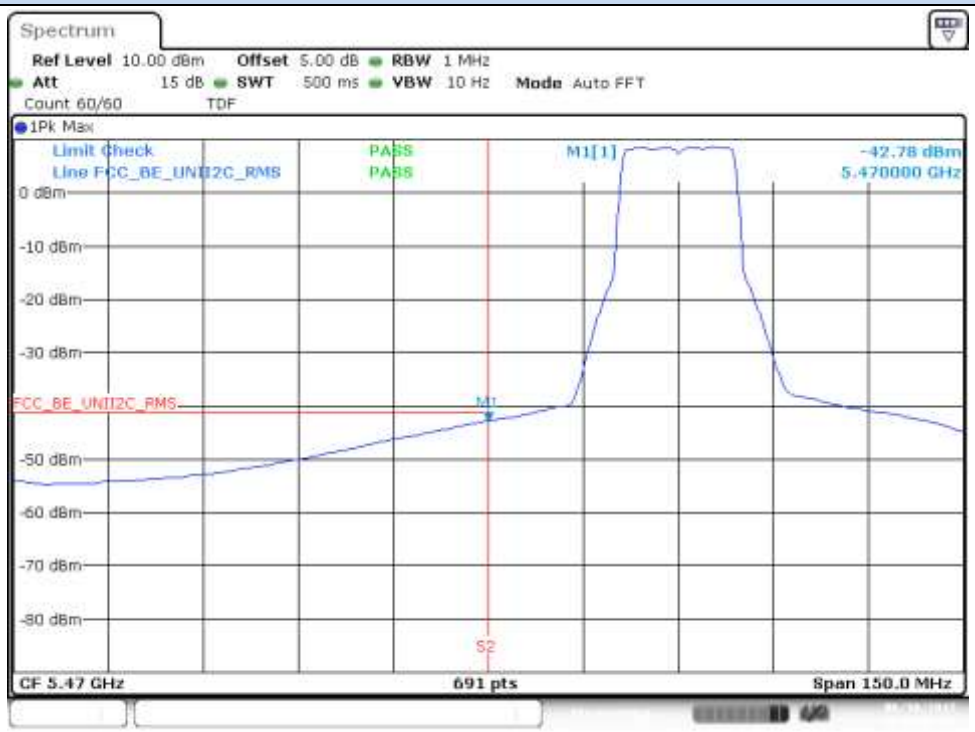
Printed copies are not controlled documents

BE High Freq Section, Peak – CH140


Printed copies are not controlled documents

802.11n20, HT0 (SISO) – Chain A

BE Low Freq Section, Peak – CH100



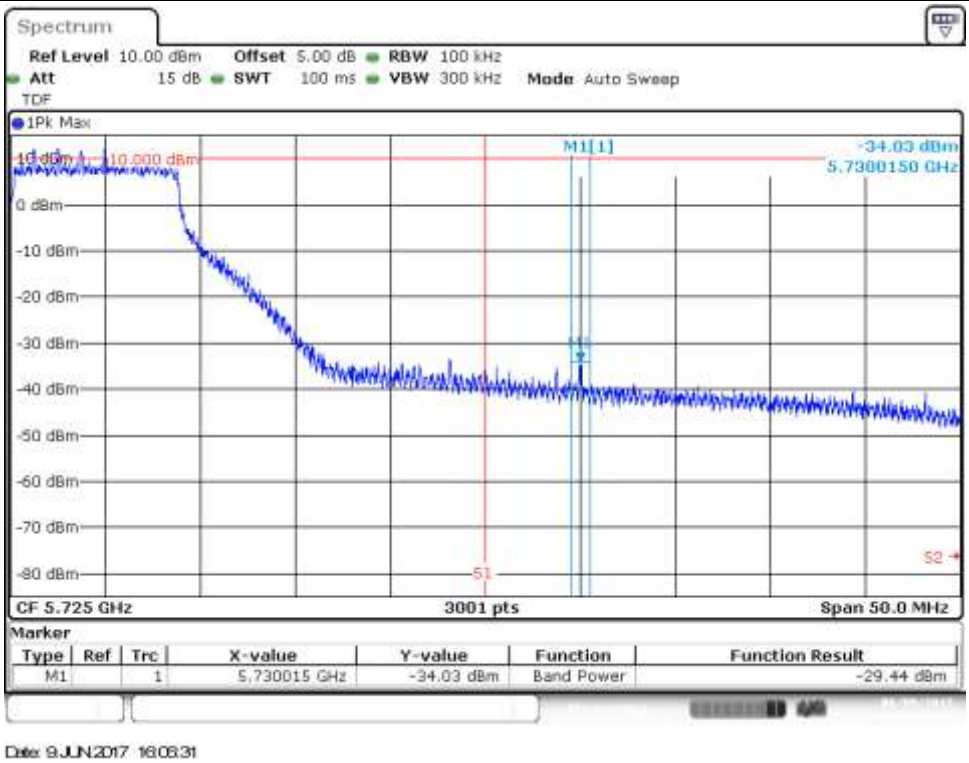
Date: 30.JUN.2017 18:38:40

BE Low Freq Section, RMS – CH100

Date: 30.JUN.2017 18:38:40

Printed copies are not controlled documents

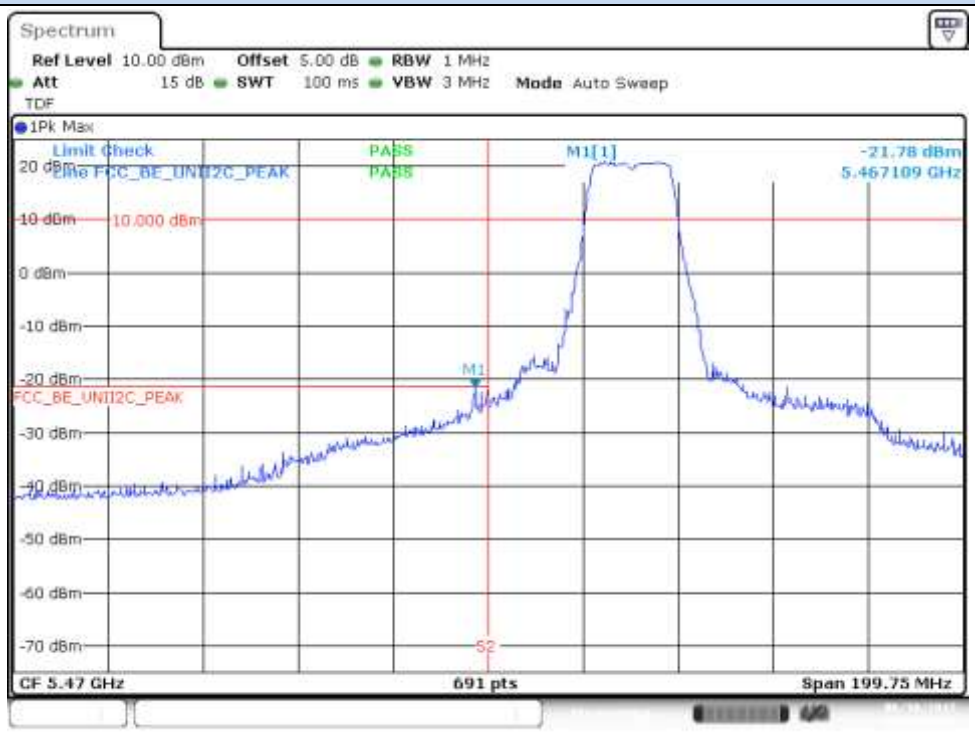
BE High Freq Section, Peak – CH140



Printed copies are not controlled documents

802.11n20, HT0 (SISO) – Chain B

BE Low Freq Section, Peak – CH100



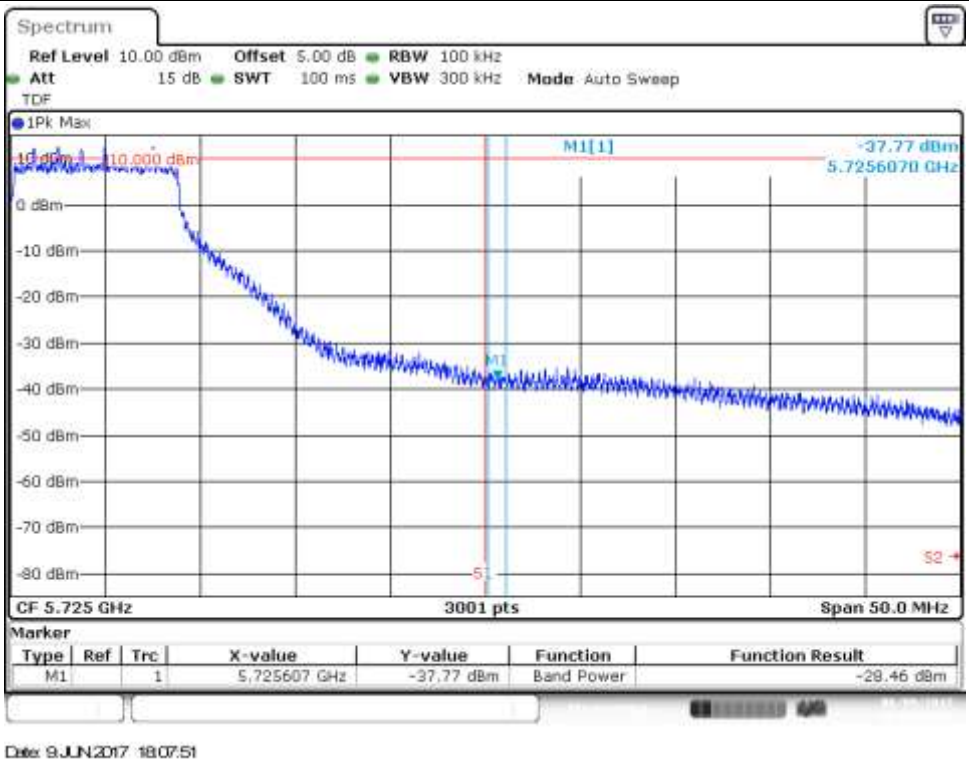
Date: 30.JUN.2017 19:01:32

BE Low Freq Section, RMS – CH100

Date: 30.JUN.2017 19:07:11

Printed copies are not controlled documents

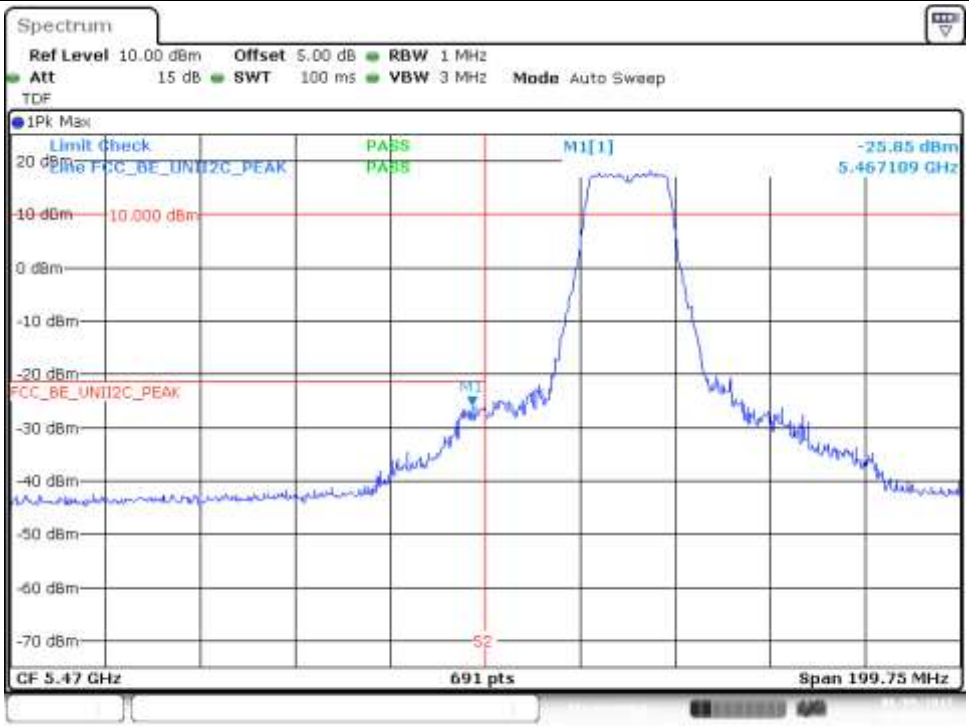
BE High Freq Section, Peak – CH140



Printed copies are not controlled documents

802.11n20, HT8 (MIMO) – Chain A

BE Low Freq Section, Peak – CH100

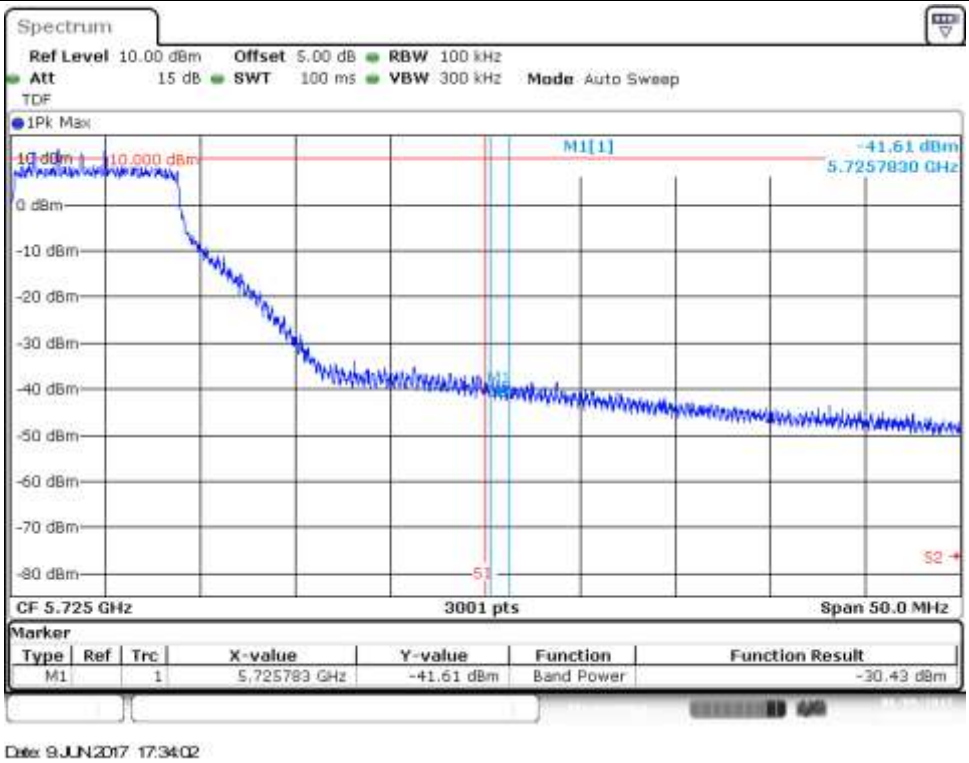


Date: 9.JUN.2017 17:15:09

BE Low Freq Section, RMS – CH100

Date: 9.JUN.2017 17:14:52

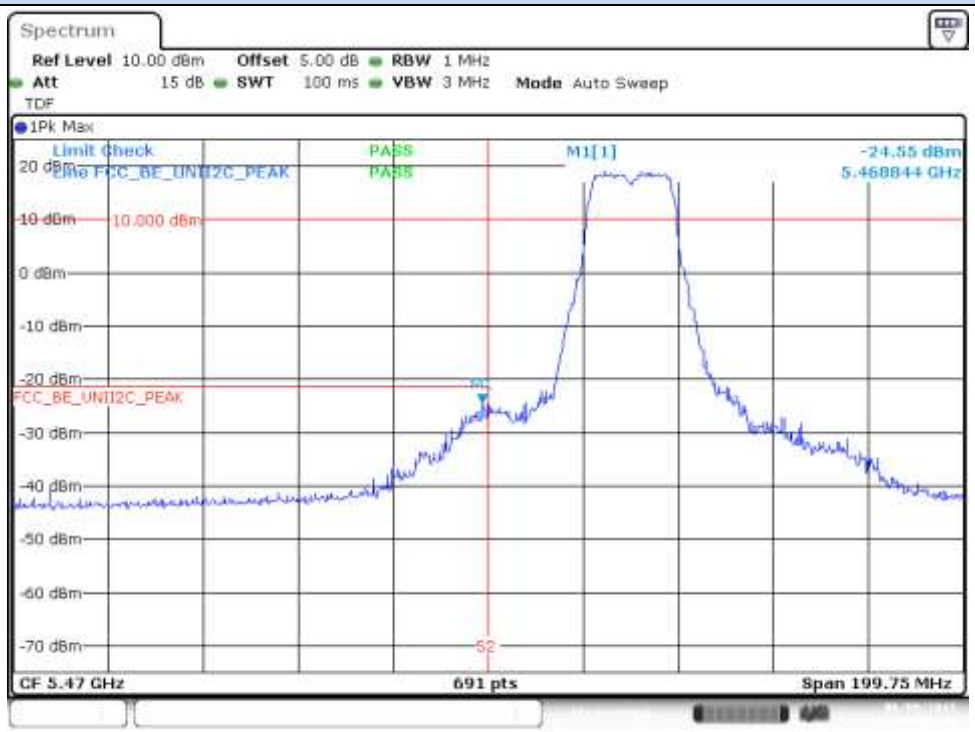
Printed copies are not controlled documents

BE High Freq Section, Peak – CH140


Printed copies are not controlled documents

802.11n20, HT8 (MIMO) – Chain B

BE Low Freq Section, Peak – CH100

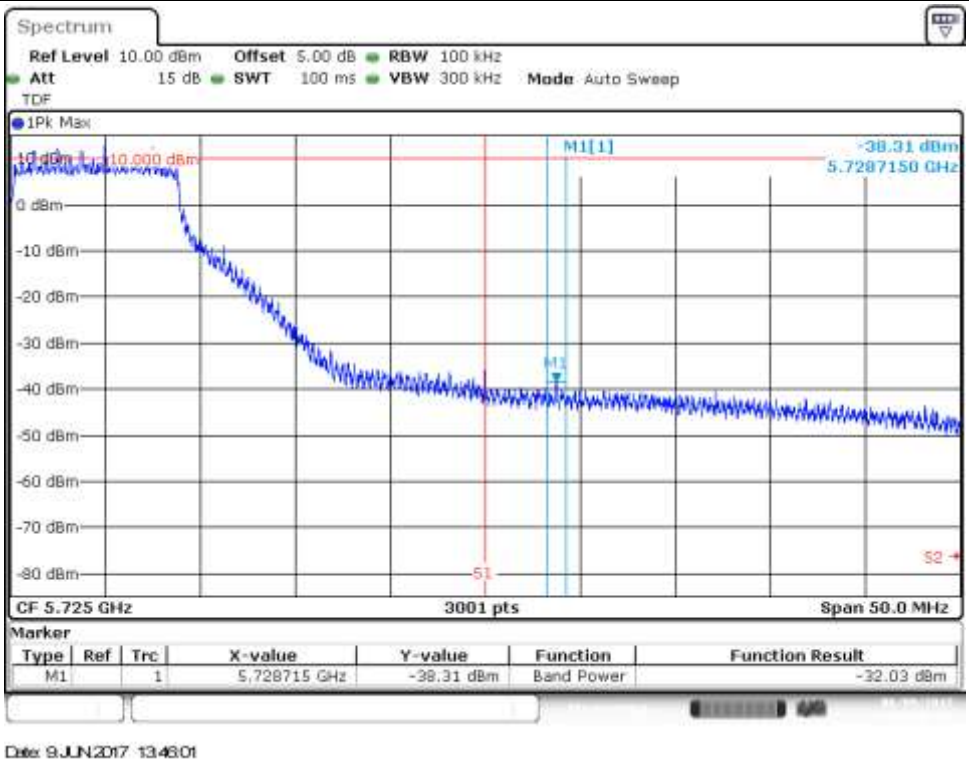


Date: 9.JUN.2017 13:36:20

BE Low Freq Section, RMS – CH100

Date: 9.JUN.2017 13:36:33

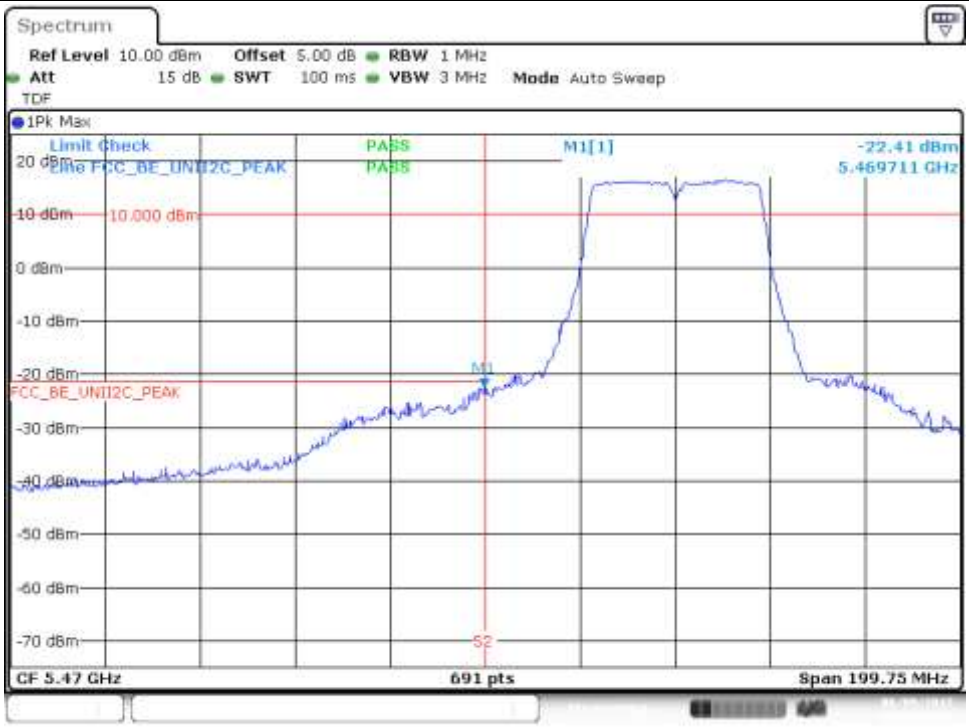
Printed copies are not controlled documents

BE High Freq Section, Peak – CH140


Printed copies are not controlled documents

802.11n40, HT0 (SISO) – Chain A

BE Low Freq Section, Peak – CH102F



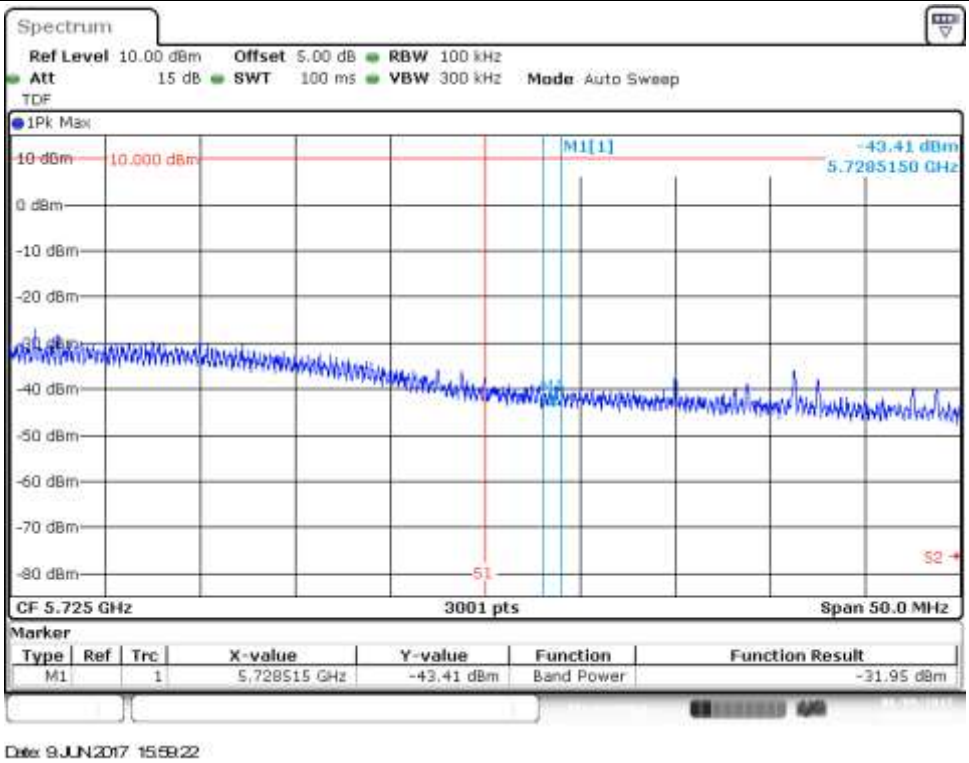
Date: 9.JUN.2017 15:45:34

BE Low Freq Section, RMS – CH102F

Date: 9.JUN.2017 15:44:24

Printed copies are not controlled documents

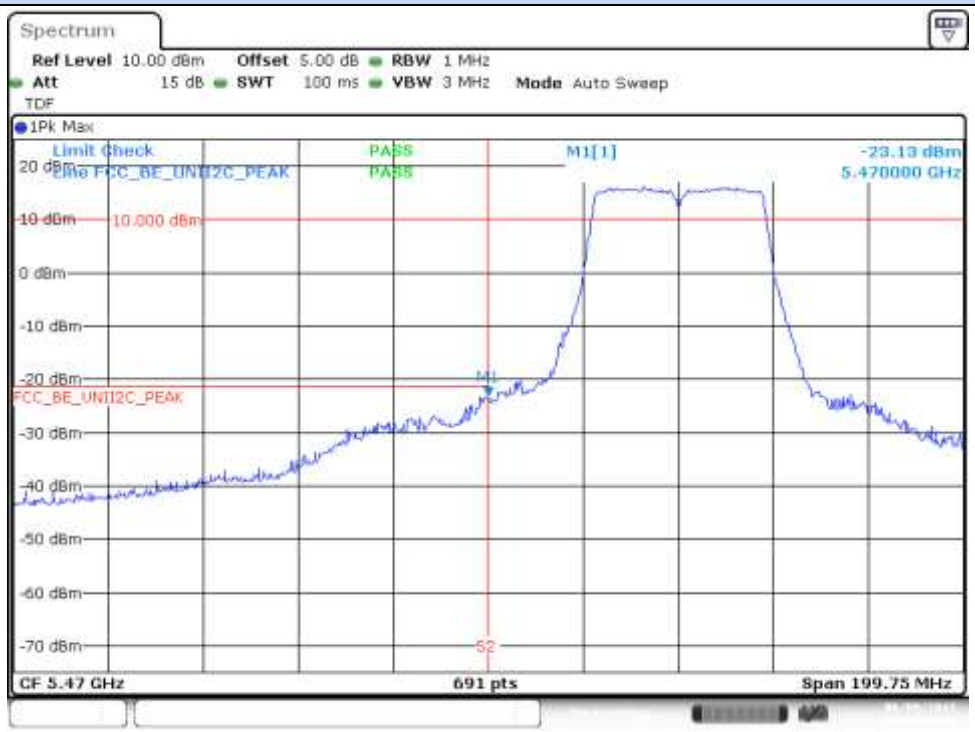
BE High Freq Section, Peak – CH134F



Printed copies are not controlled documents

802.11n40, HT0 (SISO) – Chain B

BE Low Freq Section, Peak – CH102F



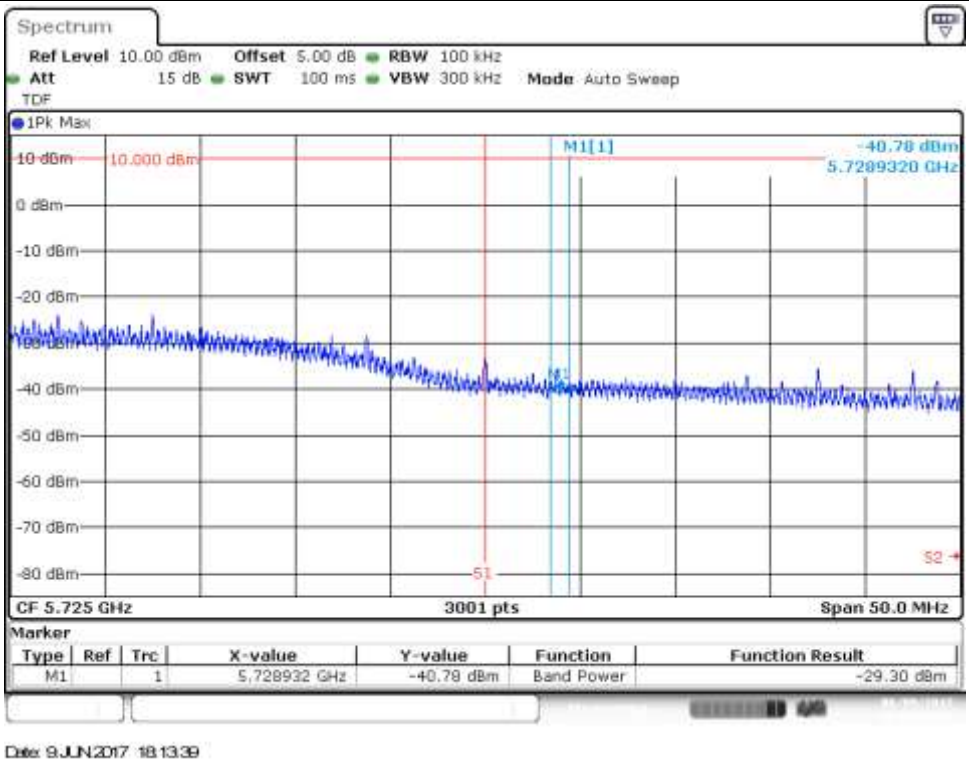
Date: 9.JUN.2017 10:39:04

BE Low Freq Section, RMS – CH102F

Date: 9.JUN.2017 10:38:16

Printed copies are not controlled documents

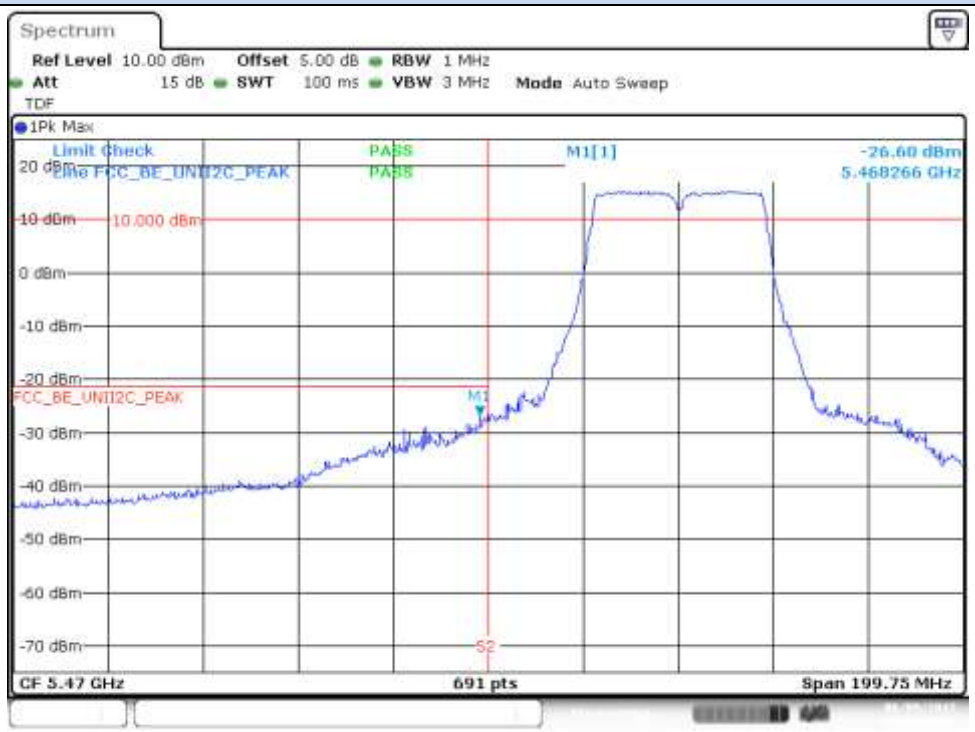
BE High Freq Section, Peak – CH134F



Printed copies are not controlled documents

802.11n40, HT8 (MIMO) – Chain A

BE Low Freq Section, Peak – CH102F



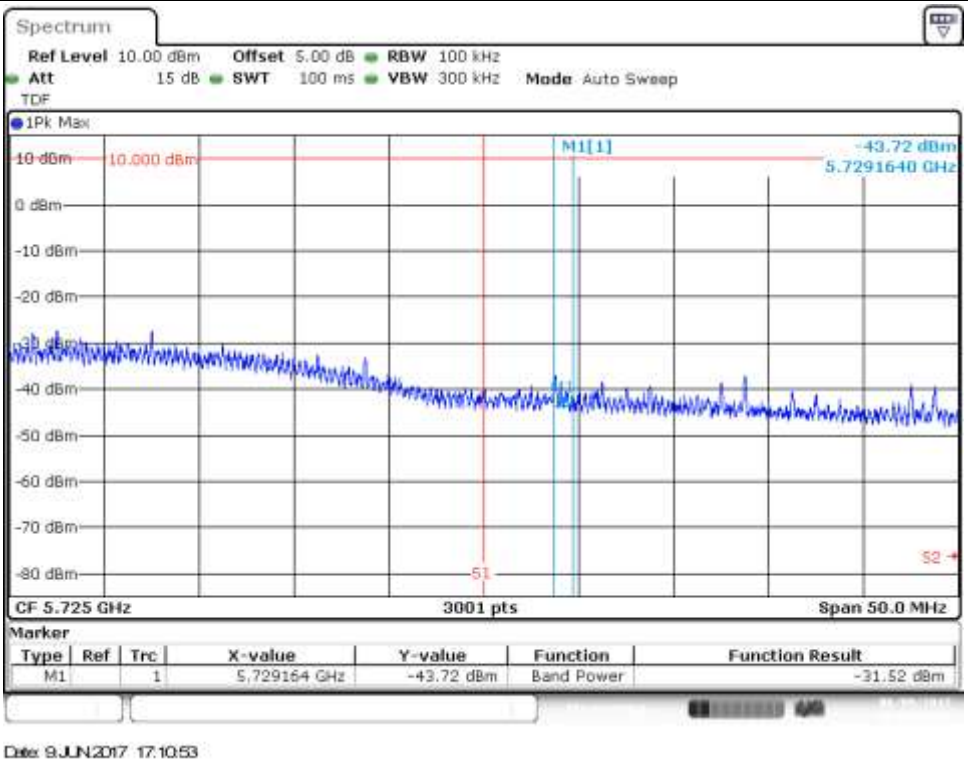
Date: 9.JUN.2017 16:57:42

BE Low Freq Section, RMS – CH102F

Date: 9.JUN.2017 16:58:58

Printed copies are not controlled documents

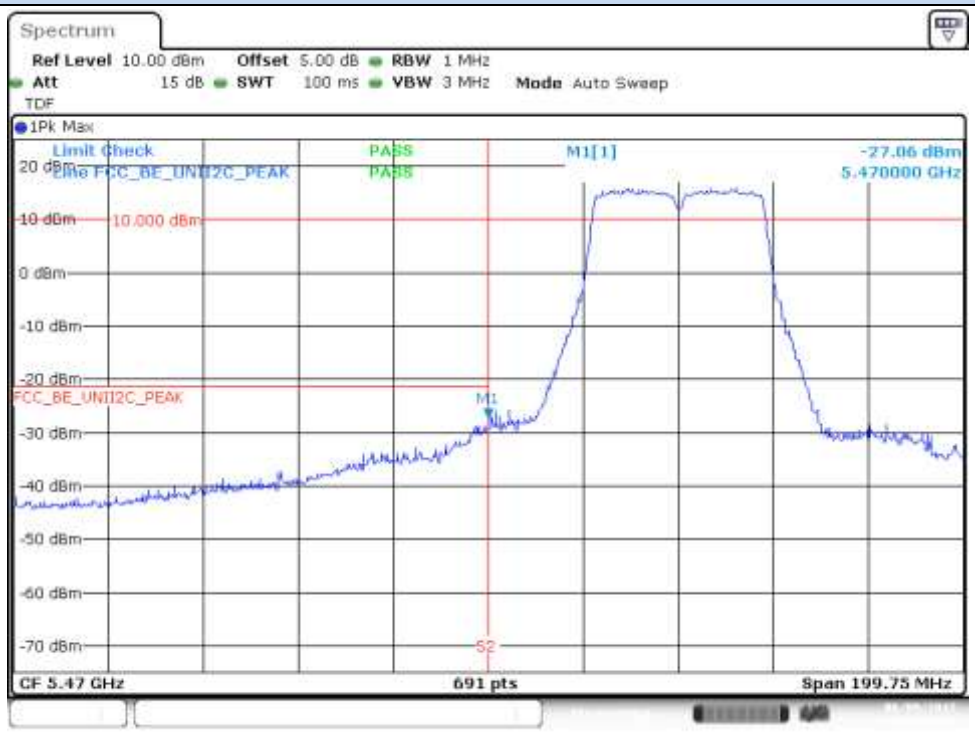
BE High Freq Section, Peak – CH134F



Printed copies are not controlled documents

802.11n40, HT8 (MIMO) – Chain B

BE Low Freq Section, Peak – CH102F



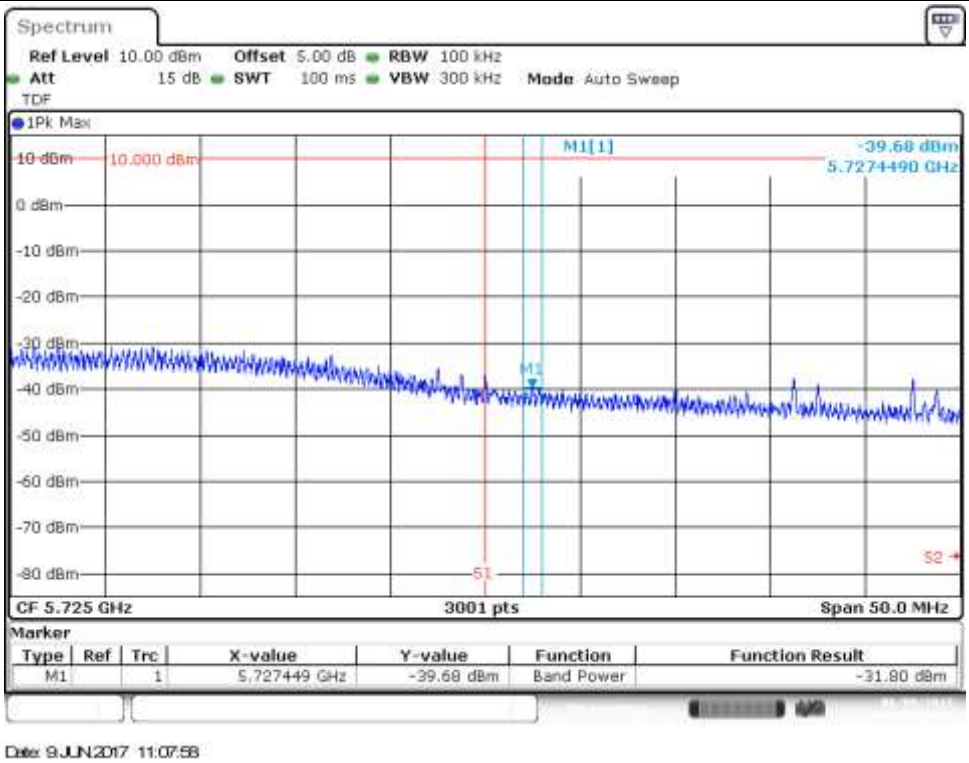
Date: 9.JUN.2017 12:55:52

BE Low Freq Section, RMS – CH102F

Date: 9.JUN.2017 12:55:33

Printed copies are not controlled documents

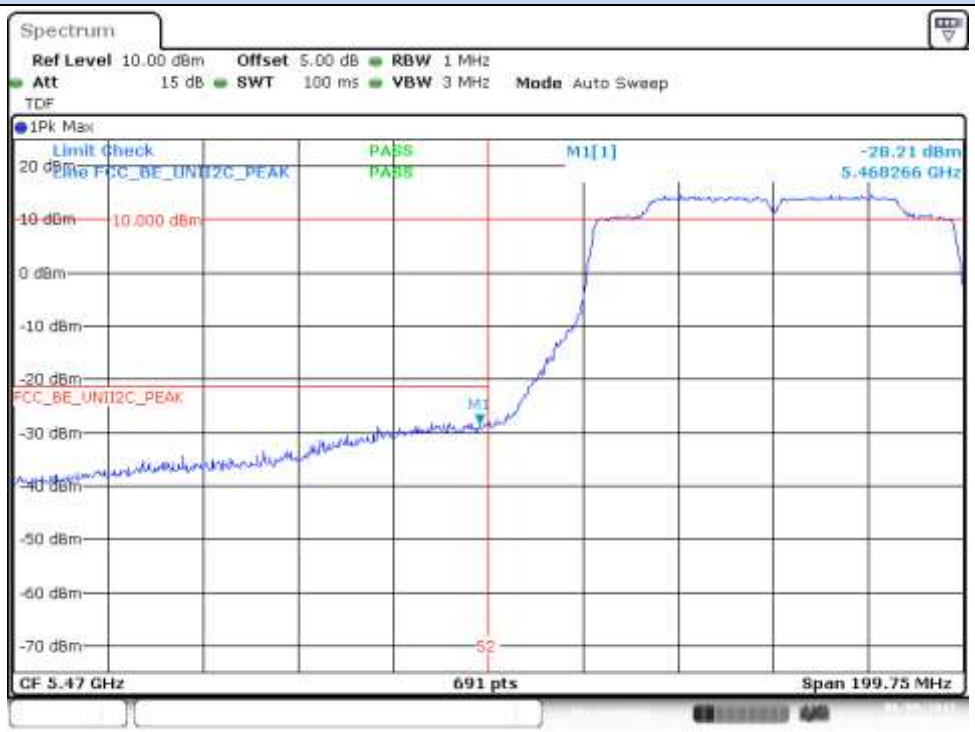
BE High Freq Section, Peak – CH134F



Printed copies are not controlled documents

802.11ac80, VHT0 (SISO) – Chain A

BE Low Freq Section, Peak – CH106ac80



Date: 9.JUN.2017 16:16:08

BE Low Freq Section, Peak – CH106ac80

Date: 9.JUN.2017 16:15:28

Printed copies are not controlled documents

BE High Freq Section, Peak – CH122ac80

Printed copies are not controlled documents

802.11ac80, VHT0 (SISO) – Chain B

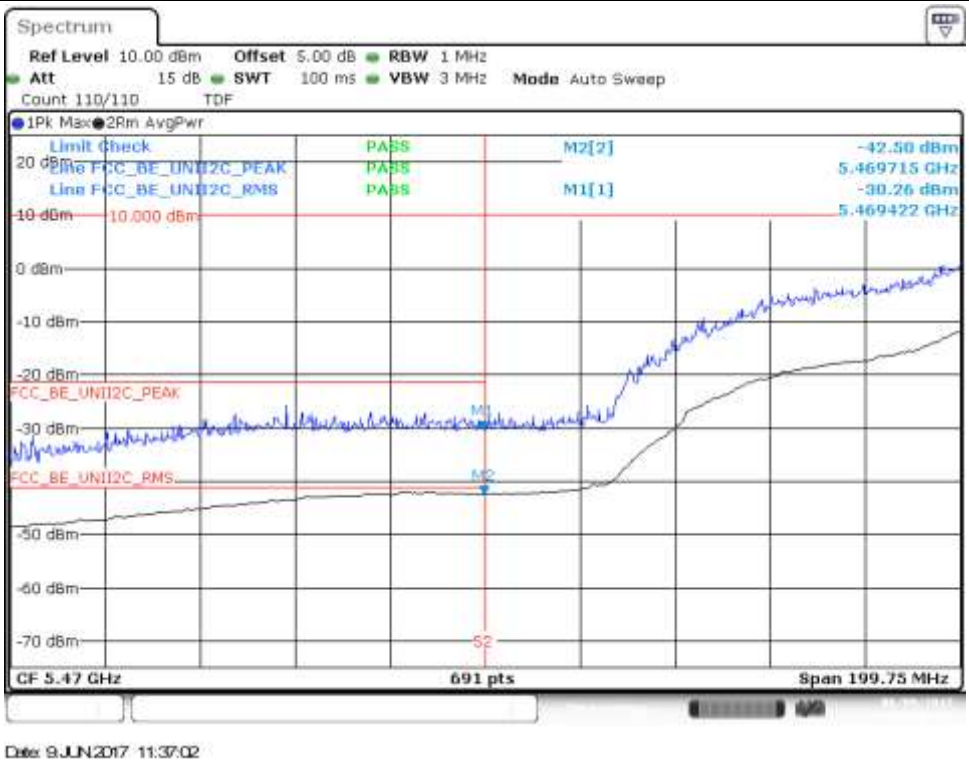
BE Low Freq Section, Peak – CH106ac80

Date: 9.JUN.2017 11:31:51

BE Low Freq Section, RMS – CH106ac80

Date: 9.JUN.2017 11:31:19

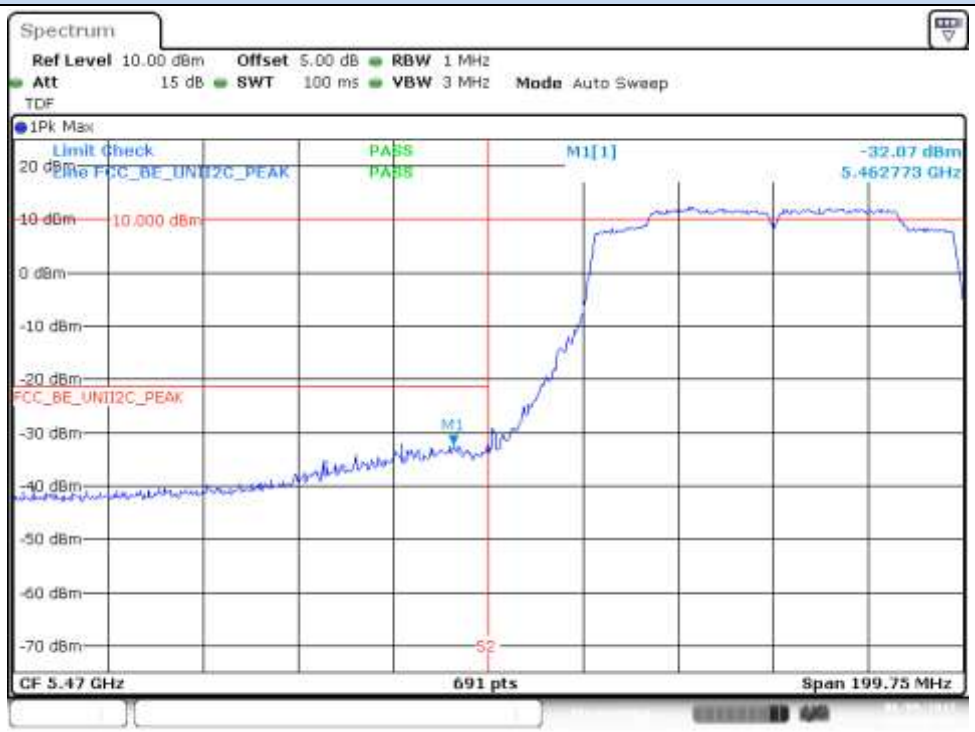
Printed copies are not controlled documents

BE High Freq Section, Peak – CH122ac80


Printed copies are not controlled documents

802.11ac80, VHT0 (MIMO) – Chain A

BE Low Freq Section, Peak – CH106ac80

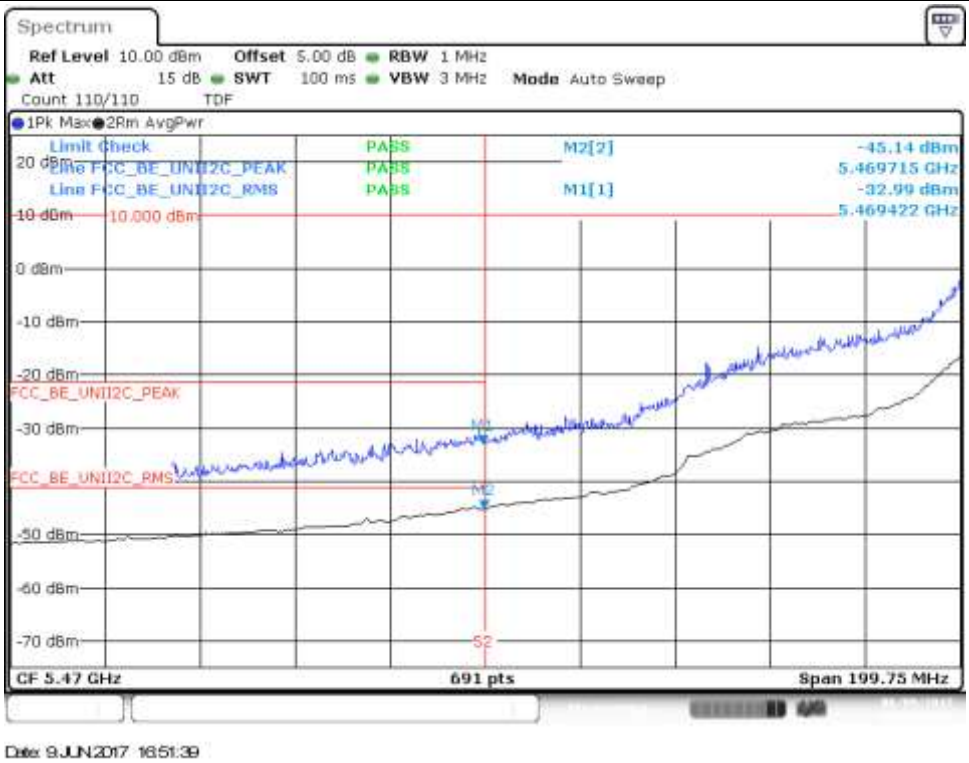


Date: 9.JUN.2017 16:43:12

BE Low Freq Section, RMS – CH106ac80

Date: 9.JUN.2017 16:42:52

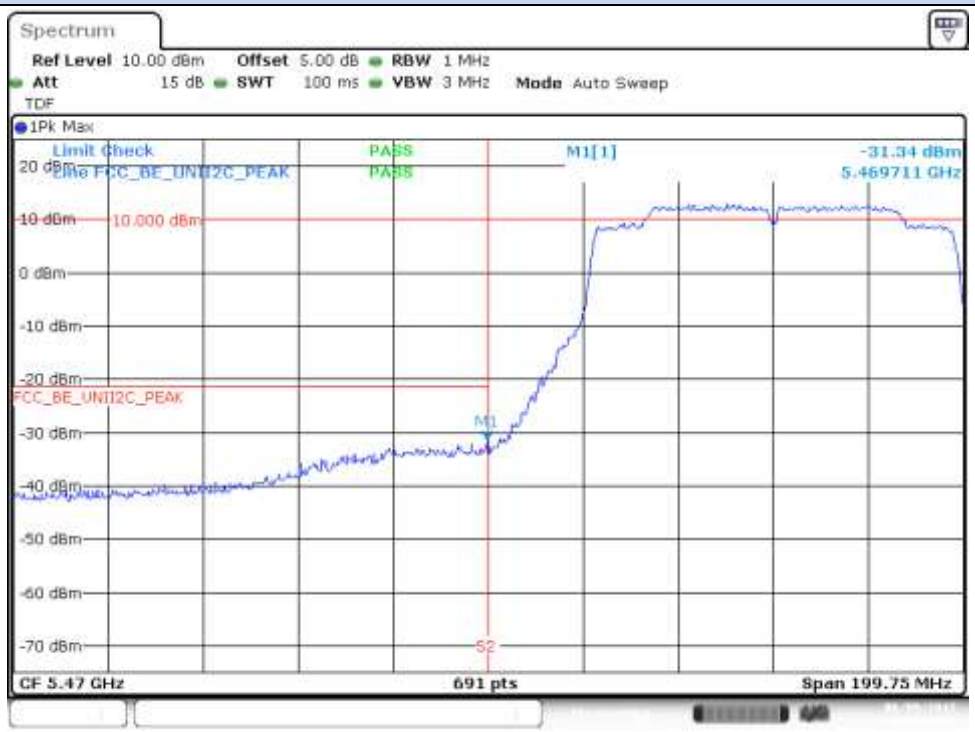
Printed copies are not controlled documents

BE High Freq Section, Peak – CH122ac80


Printed copies are not controlled documents

802.11ac80, VHT0 (MIMO) – Chain B

BE Low Freq Section, Peak – CH106ac80



Date: 9.JUN.2017 12:34:32

BE Low Freq Section, RMS – CH106ac80

Date: 9.JUN.2017 12:33:59

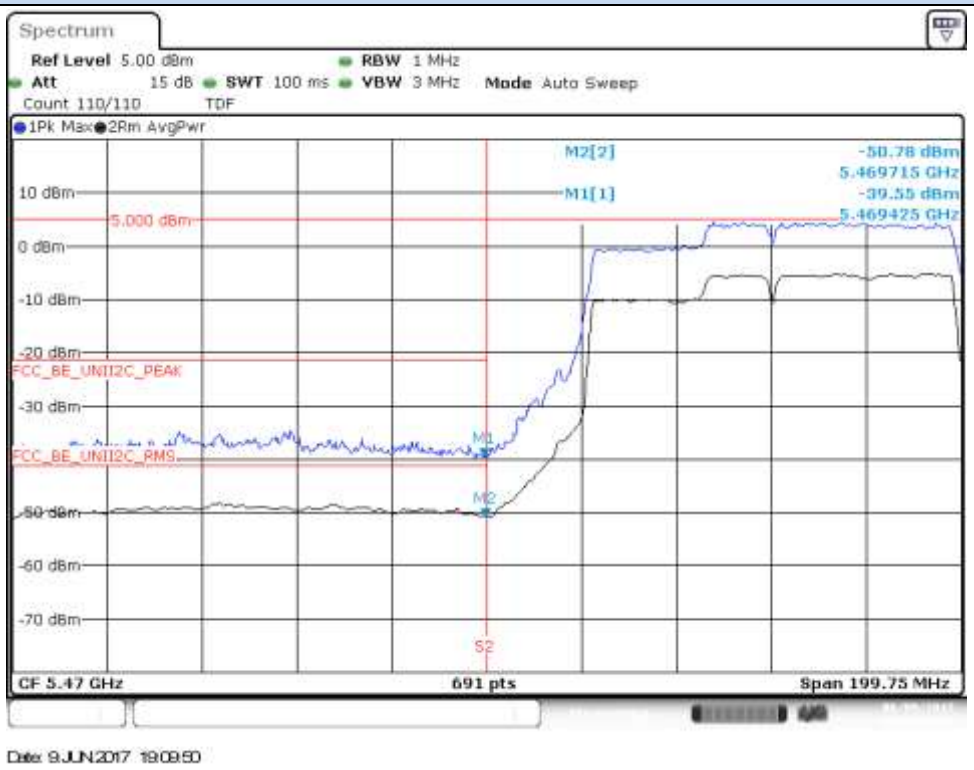
Printed copies are not controlled documents

BE High Freq Section, Peak – CH122ac80

Printed copies are not controlled documents

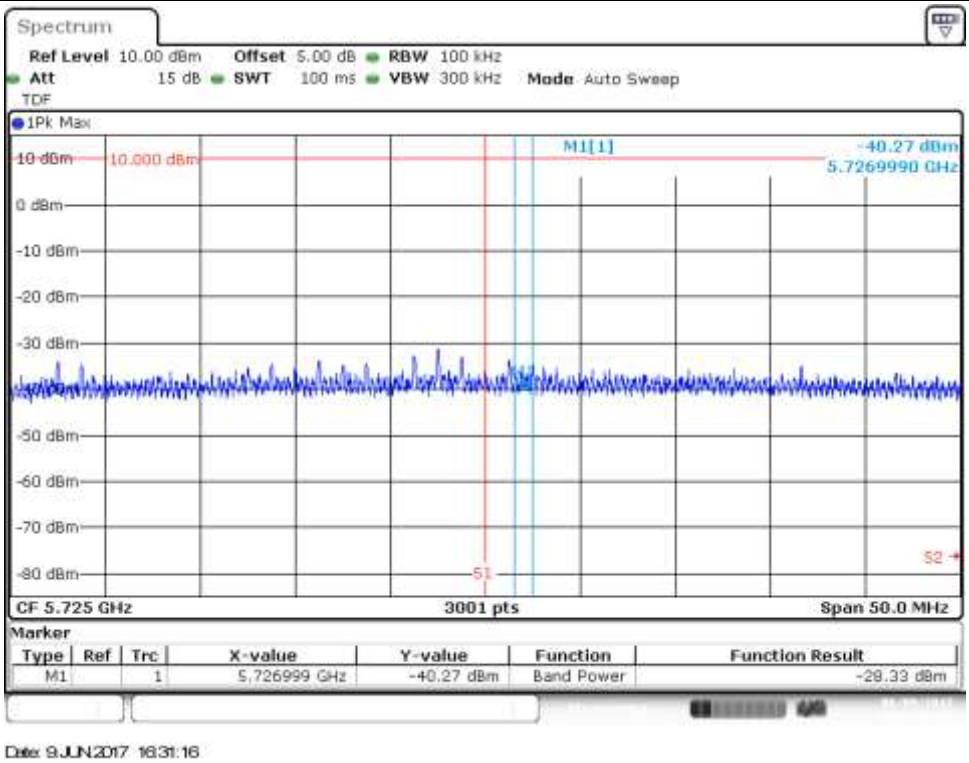
802.11ac160, VHT0 (SISO) – Chain A

BE Low Freq Section, Peak & RMS – CH114ac160



Printed copies are not controlled documents

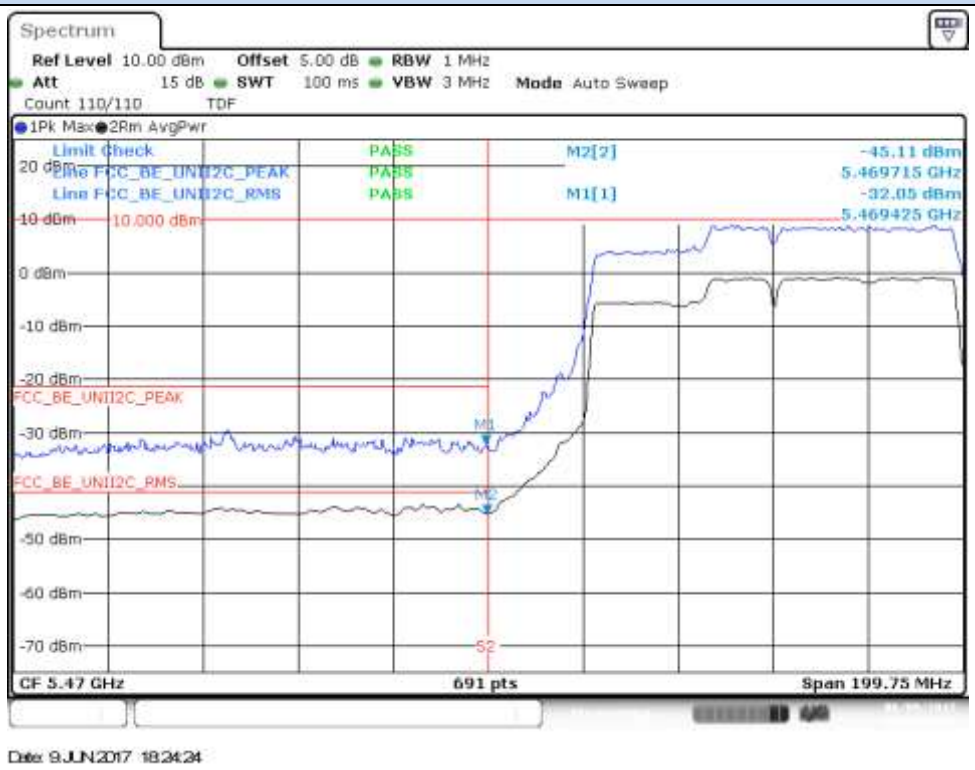
BE High Freq Section, Peak – CH114ac160



Printed copies are not controlled documents

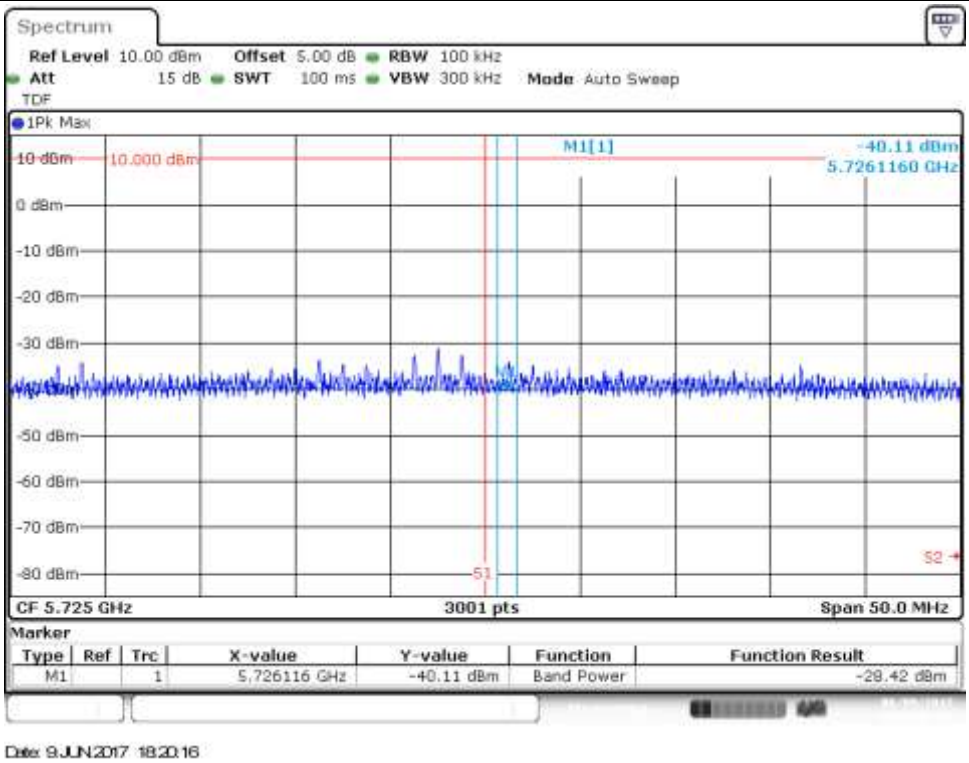
802.11ac160, VHT0 (SISO) – Chain B

BE Low Freq Section, Peak & RMS– CH114ac160



Printed copies are not controlled documents

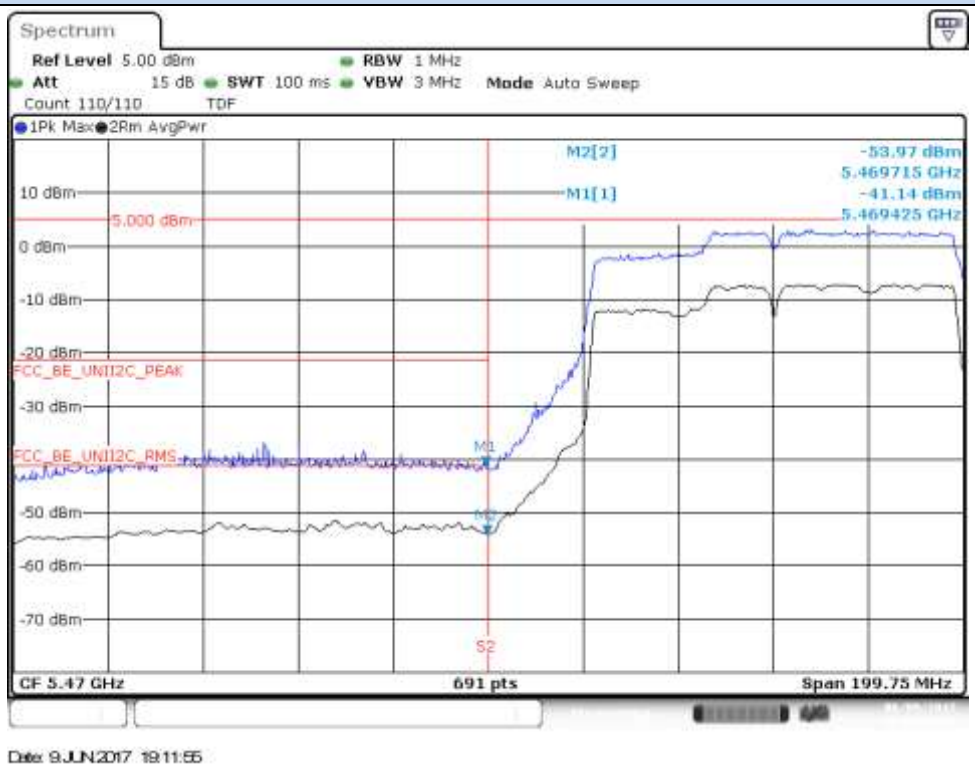
BE High Freq Section, Peak – CH114ac160



Printed copies are not controlled documents

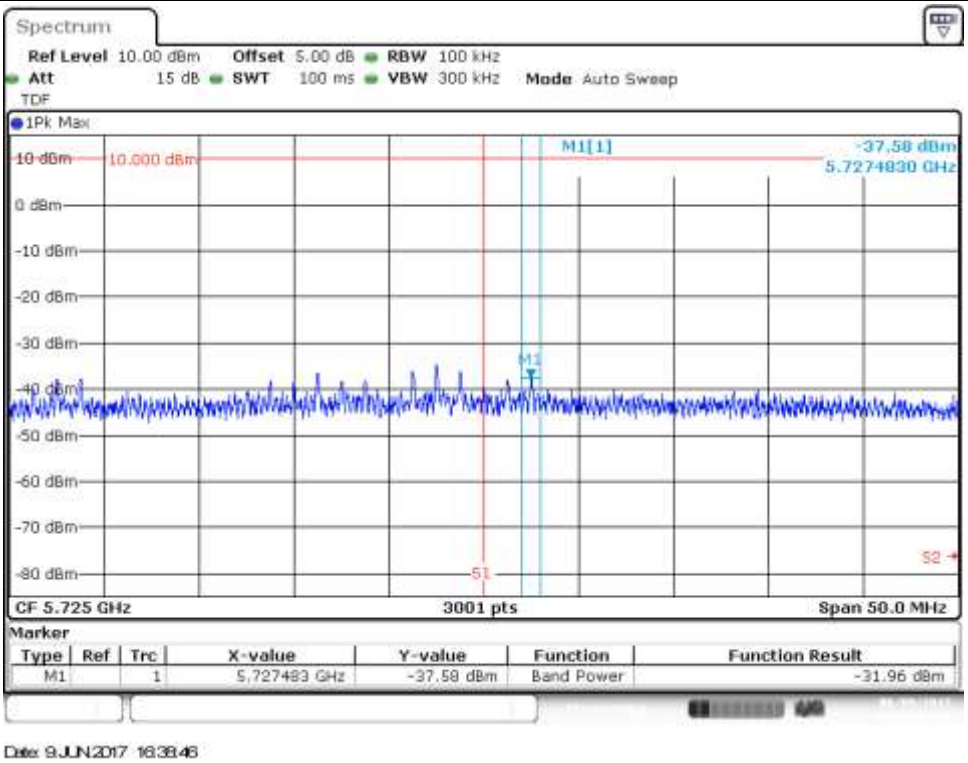
802.11ac160, VHT0 (MIMO) – Chain A

BE Low Freq Section, Peak & RMS– CH114ac160



Printed copies are not controlled documents

BE High Freq Section, Peak – CH114ac160

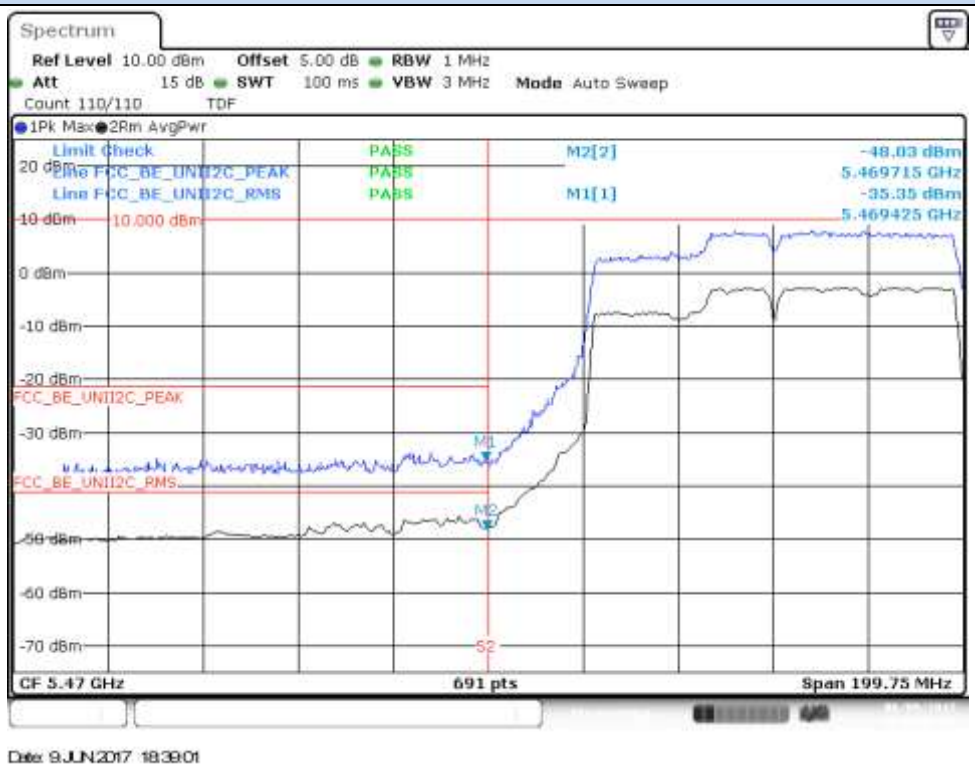


360

Printed copies are not controlled documents

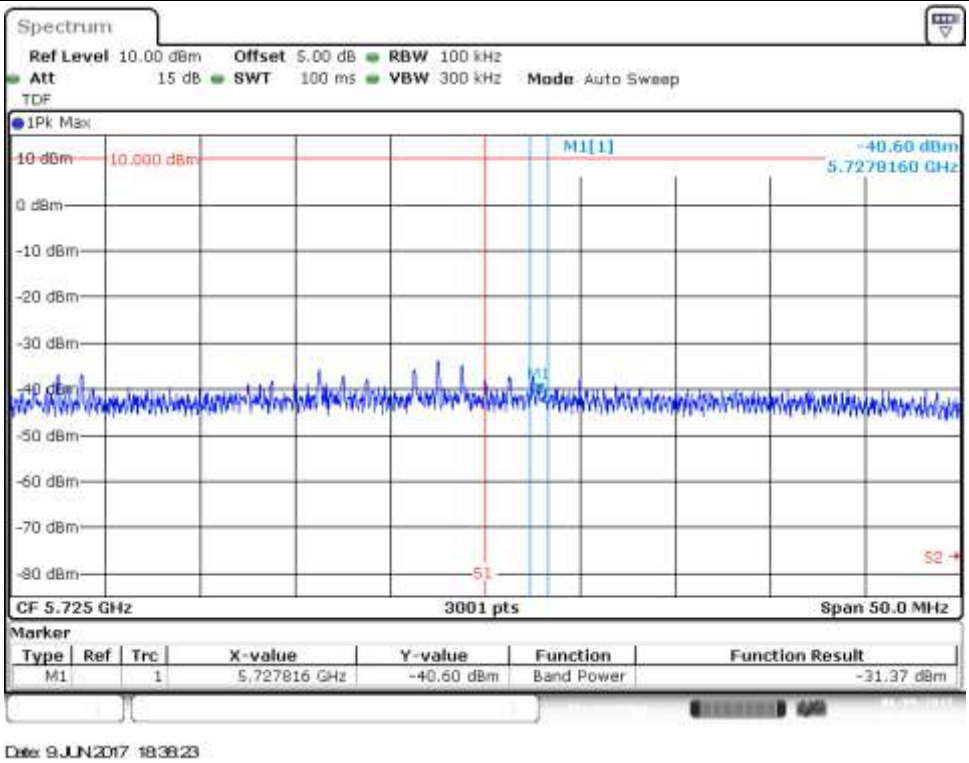
802.11ac160, VHT0 (MIMO) – Chain B

BE Low Freq Section, Peak & RMS– CH114ac160



Printed copies are not controlled documents

BE High Freq Section, Peak – CH114ac160



Printed copies are not controlled documents