



TESTING CERT #3478.01



TEST REPORT

EUT Description	WiGig, WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Brand Name	Intel® Tri Band Wireless-AC 18265
Model Name	18265NGW, 18265NGW LC
Serial Number	TA#: J30458-002 WFM: 34:13:E8:34:41:60 / 34:13:E8:44:A8:B2 / 34:13:E8:34:54:98 / 34:13:E8:44:CF:34 BDM: 34:13:E8:34:41:64 / 34:13:E8:44:A8:B6 /34:13:E8:34:54:9C / 34:13:E8:44:CF:38 (see section 4)
FCC/IC ID	FCC ID: PD918265NG / IC ID: 1000M-18265NG
Antenna type	Universe Technology
Hardware/Software Version	HW cfg:33.10 Test SW: DRTU version 03789_1_9_0G (driver version: 19.1.0.1) Test SW RSE DTS: DRTU version 03293_1_8_9G (driver version: 19.1.0.1)
Date of Sample Receipt	2016-08-30
Date of Test Start/End	2016-09-15 / 2016-10-11
Features	WiGig + 802.11 a/b/g/n/ac Wireless LAN + BDR/EDR 2.1 + BLE 4.2 (see section 5)

Applicant	Intel Mobile Communications
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Reference Standards	FCC CFR Title 47 Part 15C RSS-247 issue 1, RSS-Gen issue 4 (see section 1)
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Test Report number	160830-01.TR04
Revision Control	Rev. 00

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

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1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 15 - Subpart C – §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
2. FCC 47 CFR part 15 - Subpart C – §15.209 Radiated emission limits; general requirements.
3. FCC OET KDB 558074 D01 DTS Meas Guidance v03r05 – Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.
4. 662911 D01 Multiple Transmitter Output v02r01.
5. RSS-247 Issue 1 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
6. RSS-Gen Issue 4 - General Requirements for Compliance of Radio Apparatus.
7. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is a testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA).
- ✓ Intel Mobile Communications Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm listed by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications 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.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

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

Temperature	23 °C ± 3 °C
Humidity	50 % ± 20 %

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of reception	Note
#01	160830-01.S01	WiGig / WiFi / BT Module	18265NGW	WFM: 34:13:E8:34:41:60 BDM: 34:13:E8:34:41:64 WGM: 34:13:E8:34:41:65	2016-08-30	Used for conducted tests
	150818-01.S01	Extender board	PCB00432	4324612-083	2015-08-17	
	160107-01.S21	Switching power supply	SPU60-102	08741181 1350	2016-01-07	
	150202-02.S22	Laptop	DELL Latitude E5440	8P8YN32	2016-02-10	
	15081801.S12	PCI Extender	PCB00284	2843512-012	2015-08-17	
	160107-01.S23	PCI Cable	N/A	N/A	2016-07-01	
	15051101.S07	USB Cable	N/A	N/A	2015-05-12	
	15081801.S27	Express Card Adapter	N/A	000874	2015-08-19	
	160321-01.S13	AC/DC Adapter	DA90PM130	N/A	2016-04-14	
#02	160830-01.S06	WiGig / WiFi / BT Module	18265NGW	WFM: 34:13:E8:44:A8:B2 BDM: 34:13:E8:44:A8:B6 WGM: 34:13:E8:44:A8:B7	2016-08-30	Used for radiated tests (from 30MHz to 1 GHz and 18GHz to 26.5GHz)
	160830-01.S38	Extender board	PCB00469	ASS00469-001 4694213-099	2016-09-27	
	15051101.S09	Laptop	DELL E5440	9FSYN32	2015-05-12	
#03	160830-01.S12	WiGig / WiFi / BT Module	18265NGW	WFM: 34:13:E8:34:54:98 BDM: 34:13:E8:34:54:9C WGM: 34:13:E8:34:54:9D	2016-08-30	Used for DTS radiated tests (from 1GHz to 18 GHz) except the cases indicated in #04 note
	160830-01.S21	Extender Rev-2	PCB00469	4694213-245	2016-09-02	
	160202-02.S29	Control Laptop	Dell Latitude E6430	D41QVY1	2016-03-18	
	160202-02.S19	PCI Extender	PCB00284	ASS0248 2480614-071	2016-02-10	
	160202-02.S20	Express Card Adapter	Not available	600010757	2016-02-12	

Sample	Control #	Description	Model	Serial #	Date of reception	Note
#04	160830-01.S11	WiGig / WiFi / BT Module	18265NGW	WFM: 34:13:E8:44:CF:34 BDM: 34:13:E8:44:CF:38 WGM: 34:13:E8:44:CF:39	2016-08-30	Used for: BLE radiated tests (from 1GHz to 18 GHz) and 802.11n20 Channel 1 Chain A+B from 1GHz to 18 GHz
	160830-01.S21	Extender Rev-2	PCB00469	4694213-245	2016-09-02	
	160202-02.S29	Control Laptop	Dell Latitude E6430	D41QVY1	2016-03-18	
	160202-02.S19	PCI Extender	PCB00284	ASS0248 2480614-071	2016-02-10	
	160202-02.S20	Express Card Adapter	Not available	600010757	2016-02-12	

NA: Not Applicable

5. EUT features

These are the detailed bands and modes supported by the Equipment Under Test:

WiGig	60GHz (57.24 – 63.72 GHz)
802.11b/g/n	2.4GHz (2400.0 – 2483.5 MHz)
802.11a/n/ac	5.2GHz (5150.0 – 5250.0 MHz) 5.3GHz (5250.0 – 5350.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5850.0 MHz)
BDR/EDR 2.1 BLE 4.2	2.4GHz (2400.0 – 2483.5 MHz)

6. Remarks and comments

N/A

7. Test Verdicts summary

7.1. 802.11 b/g/n 2.4GHz

FCC part	RSS part	Test name	Verdict
15.247 (a) (2)	RSS-247 Clause 5.2 (1)	6dB Bandwidth	P
15.247 (b) (3)	RSS-247 Clause 5.4 (4)	Maximum output power and E.I.R.P.	P
15.247 (e)	RSS-247 Clause 5.2 (2)	Power spectral density	P
15.247 (d) 15.209	RSS-247 Clause 5.5	Out-of-band Emissions (conducted)	P
15.247 (d) 15.209	RSS-247 Clause 5.5	Out-of-band Emissions (radiated)	P

7.2. BLE

FCC part	RSS part	Test name	Verdict
15.247 (a) (2)	RSS-247 Clause 5.2 (1)	6dB Bandwidth	P
15.247 (b) (3)	RSS-247 Clause 5.4 (4)	Maximum output power and E.I.R.P.	P
15.247 (e)	RSS-247 Clause 5.2 (2)	Power spectral density	P
15.247 (d) 15.209	RSS-247 Clause 5.5	Out-of-band Emissions (conducted)	P
15.247 (d) 15.209	RSS-247 Clause 5.5	Out-of-band Emissions (radiated)	P

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

8. Document Revision History

Revision #	Date	Modified by	Details
Rev. 00	2016-10-21	G. Roustan	First issue
Rev. 00	2016-09-27	I. Kharrat M.Lefebvre	First issue

Annex A. Test & System Description

A.1 Test Conditions

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

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

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

The conducted RF output power at each chain was adjusted according to the client's supplied Target values (see following table) using the Intel DRTU tool and measuring the power by using a spectrum analyzer with the channel integration method according to point II) E) 2) e) (Method SA-2 Alternative) of KDB 789033 D02.

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

2.4GHz DTS & BLE					Conducted Power, Target Value (dBm)		
Mode	BW (MHz)	Data Rate	CH #	Freq. (MHz)	SISO Chain A	SISO Chain B	MIMO at both ports A and B
802.11b	20	1Mbps	1	2412	18.5	19.0	-
			7	2442	21.0	20.5	-
			11	2462	17.5	17.5	-
			12	2467	16.5	16.0	-
			13	2472	15.0	14.5	-
802.11g	20	6Mbps	1	2412	19.0	19.0	-
			7	2442	21.0	21.0	-
			11	2462	18.5	18.5	-
			12	2467	14.0	15.5	-
			13	2472	-2.0	-3.0	-
802.11n	20	HT0 HT8*	1	2412	18.0	18.5	20.5
			7	2442	20.5	21.0	21
			11	2462	16.0	16.0	19
			12	2467	11.0	11.5	14.5
			13	2472	-1.5	-3.0	-2.5
802.11n	40	HT0 HT8*	3F	2422	18.5	19.5	18.5
			7F	2442	18.5	18	20
			9F	2452	17	17	18.5
			10F	2457	14	13.5	14.5
			11F	2462	-2	-2.5	-2
Bluetooth Low Energy	2	1Mbps	0	2412	-	8	-
			19	2440	-	9	-
			39	2462	-	7.5	-

* Note: HT8 for MIMO modes only.

Alternative channels to the highest channel have been also tested for Band Edge compliance.

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

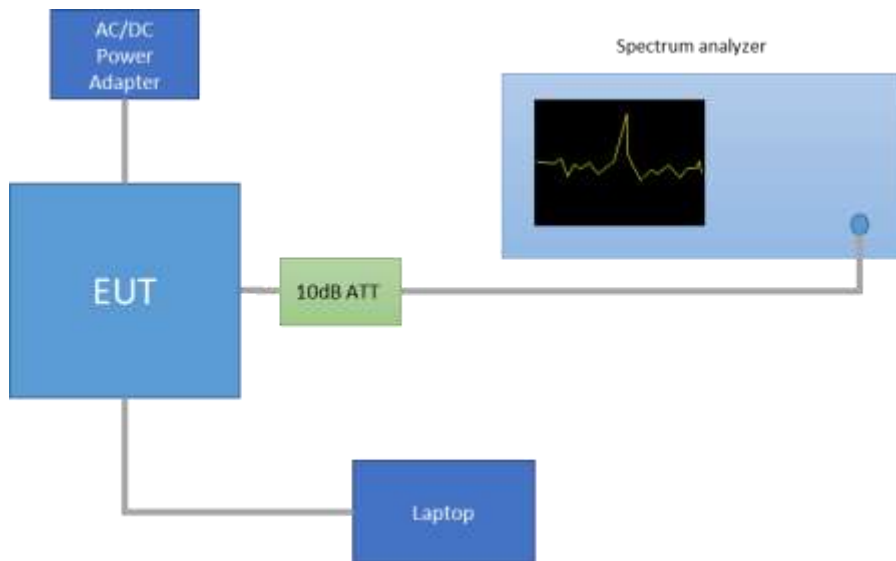
802.11b → 1Mbps
 802.11g → 6Mbps
 802.11n20 and 802.11n40 (SISO) → HT0
 802.11n20 and 802.11n40 (MIMO) → HT8

A.2 Measurement system

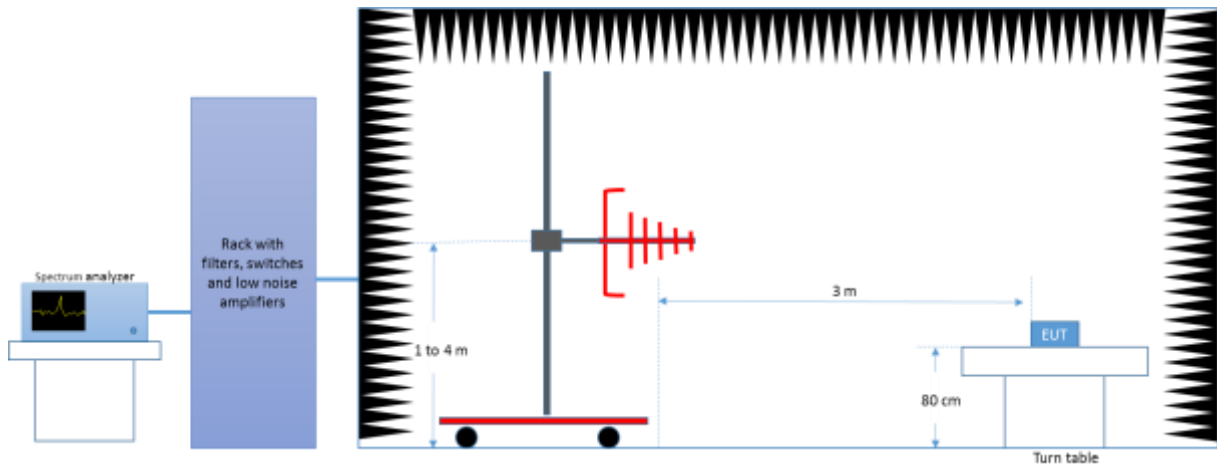
Measurements were performed using the following setups, made in accordance to the general provisions of FCC DTS Measurement KDB 558074 D01 DTS Meas Guidance.

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

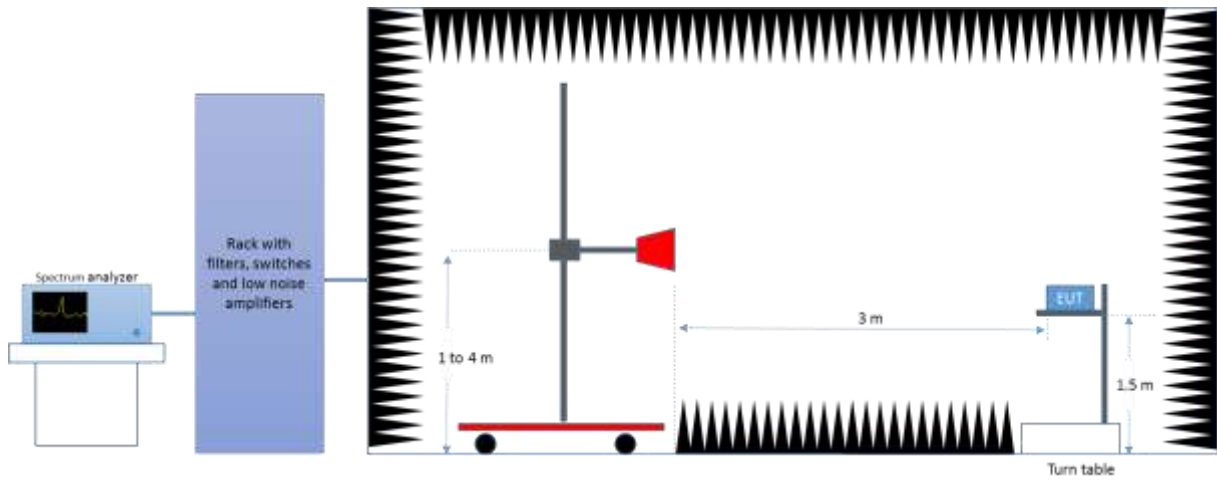
Conducted Setup



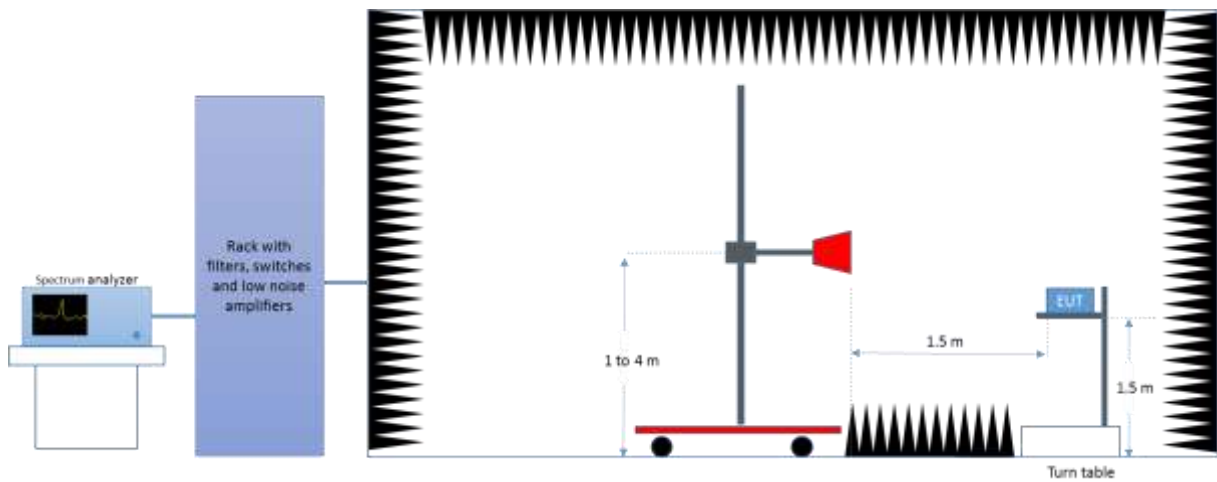
Radiated Setup < 1GHz



Radiated Setup 1GHz - 18GHz



Radiated Setup > 18GHz



A.3 Test Equipment List

Conducted Setup

ID#	Device	Type/Model	Serial Number	Manufacturer	Cal. Date	Cal. Due Date
0310	Spectrum analyzer	FSV30	101425	Rohde & Schwarz	2015-03-25	2017-03-25

Radiated Setup

ID#	Device	Type/Model	Serial Number	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
0248	Double Ridge Antenna with preamplifier 1 GHz – 18 GHz	3117	00167062	ETS Lindgren	2016-07-26	2018-07-26
0141	Double Ridge Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2016-04-13	2018-04-13
0343	Horn Antenna 6.4 GHz – 18 GHz	3117-PA	00201875	ETS Lindgren	2015-07-16	2017-07-16
0409	PreAmplifier	3117-PA	00157993	ETS Lindgren	N/A	N/A
0139	Horn Antenna 18 GHz - 26.5 GHz	114514	00167100	ETS Lindgren	2016-03-16	2018-03-16
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
0038	Power Meter	ML2487B	952010	ANRITSU	2015-09-24	2017-09-24

A.4 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 test < 1GHz	± 3.8
Radiated test 1GHz - 40 GHz	± 4.7

Annex B. Test Results DTS

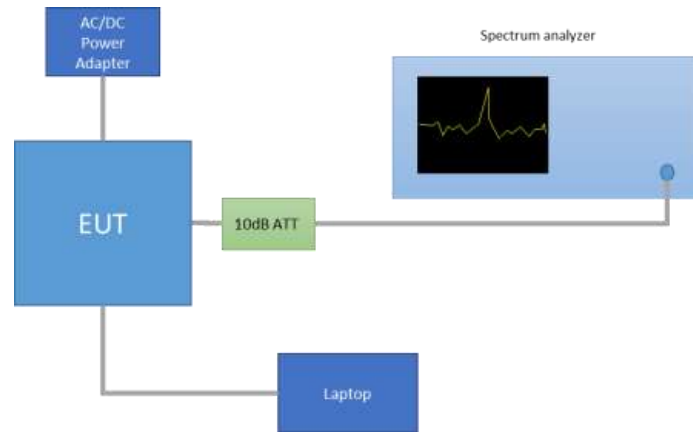
B.1 6dB & 99% Bandwidth

Test limits:

FCC part	RSS part	Limits
15.247 (a) (2)	RSS-247 Clause 5.2 (1)	Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure:

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

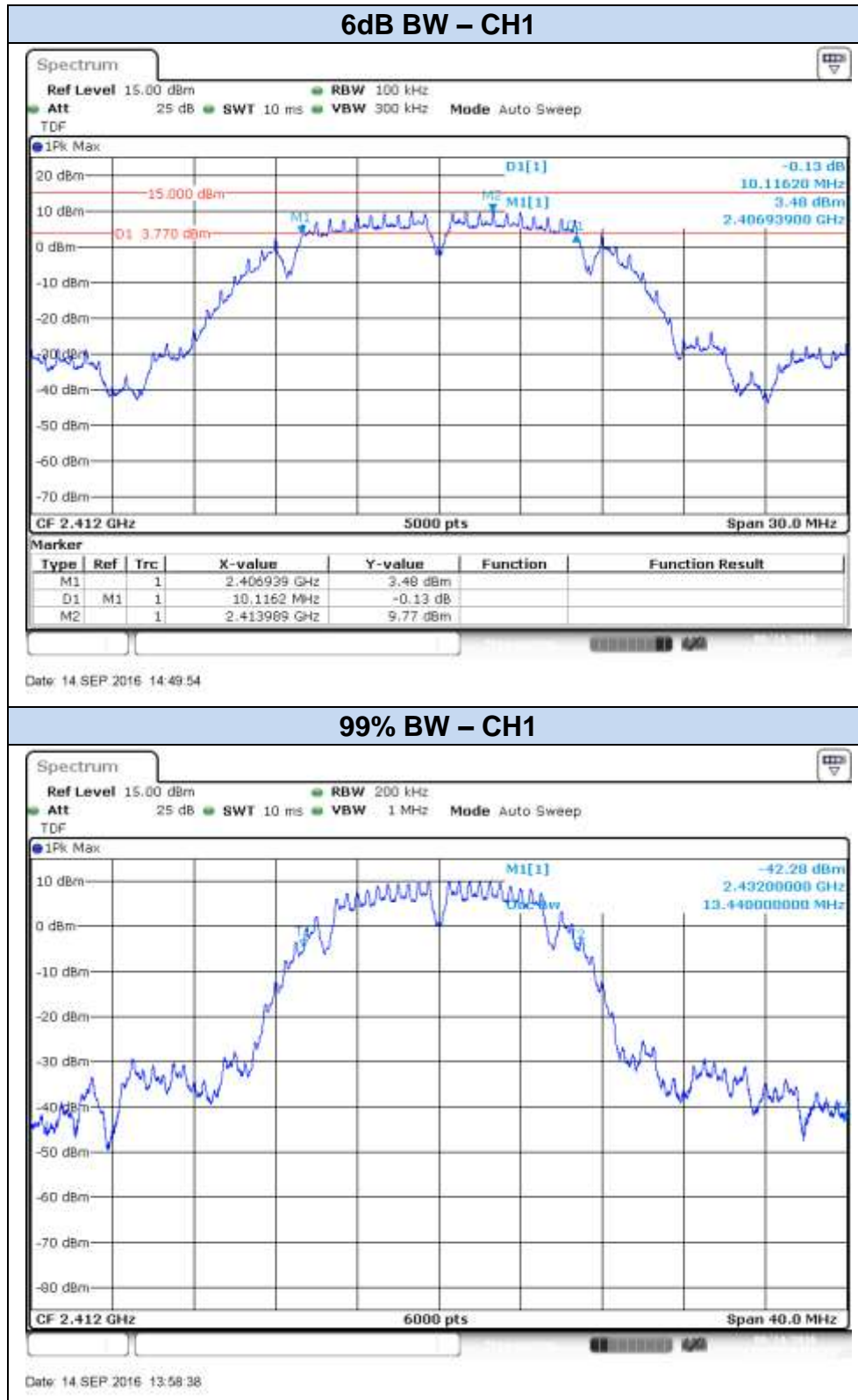


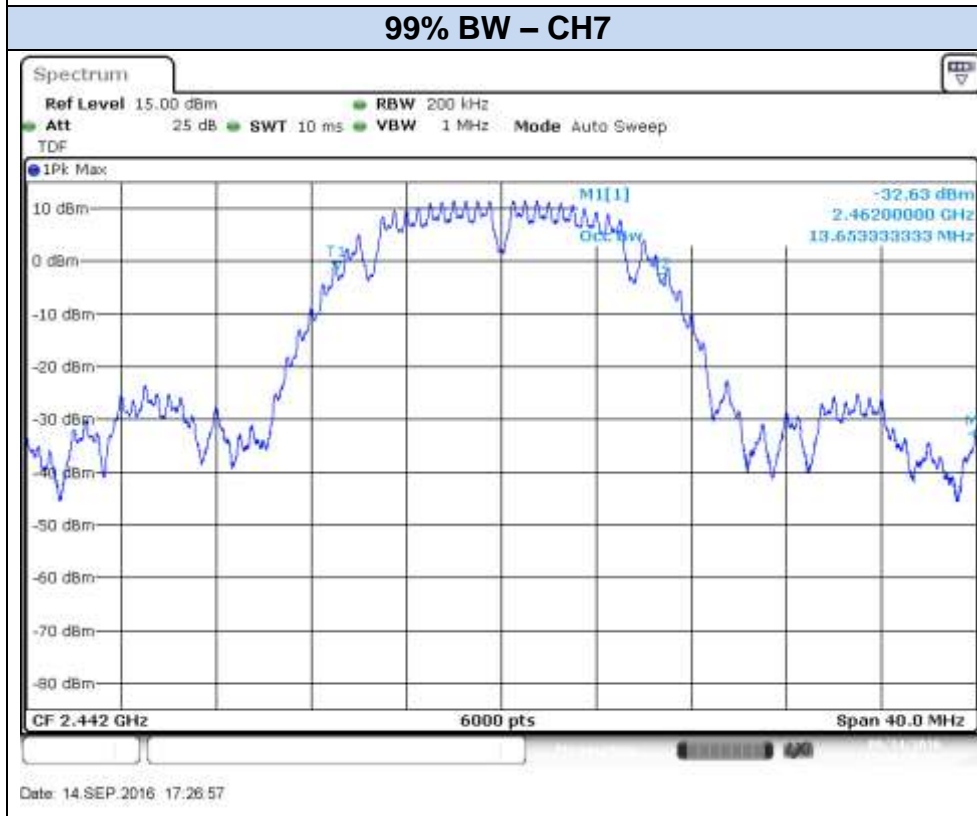
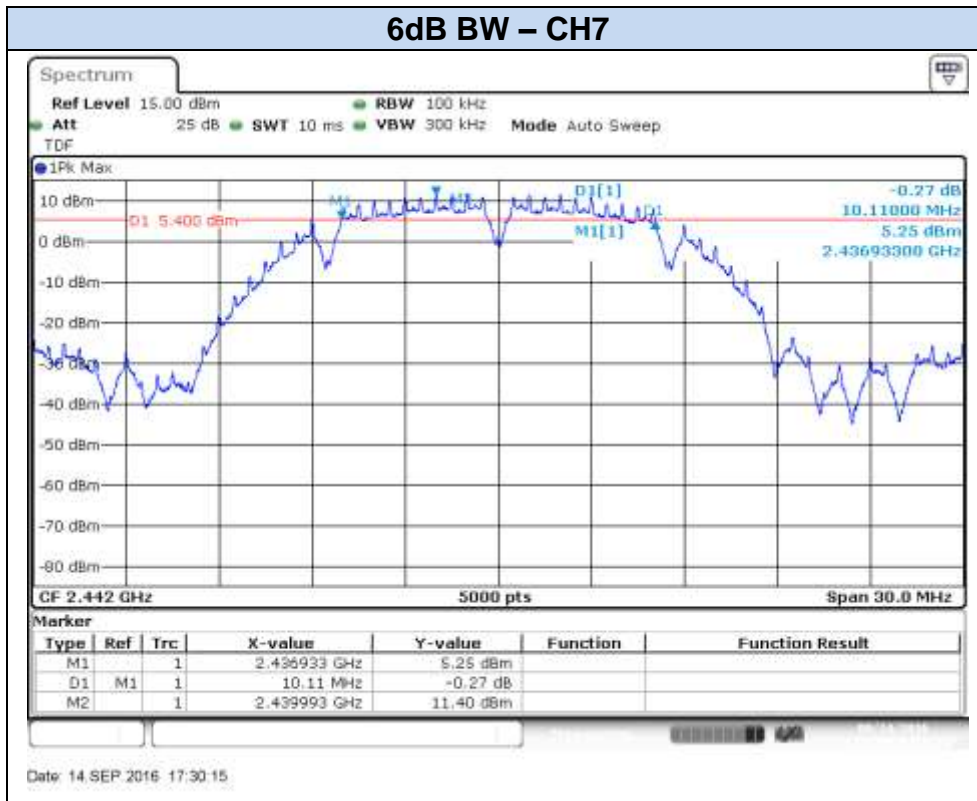
Results tables:

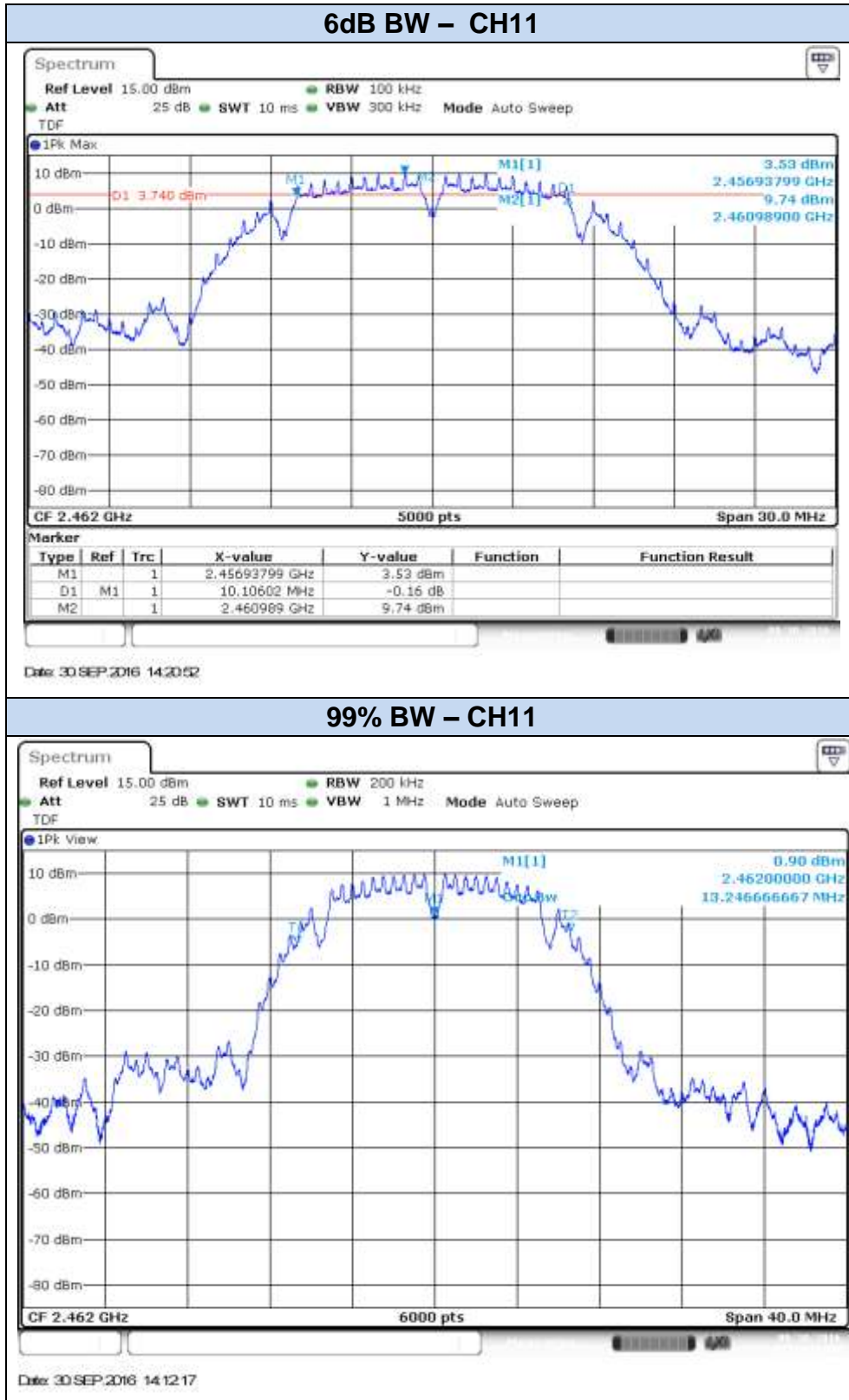
Mode	Rate	Antenna	Channel	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
802.11b	1Mbps	SISO CHAIN A	1	2412	10.12	13.44
			7	2442	10.11	13.65
			11	2462	10.11	13.25
			12	2467	10.09	13.34
			13	2472	10.10	13.53
		SISO CHAIN B	1	2412	10.10	13.30
			7	2442	10.11	13.57
			11	2462	10.11	13.40
			12	2467	10.11	13.53
			13	2472	10.11	13.69
802.11g	6Mbps	SISO CHAIN A	1	2412	15.71	16.81
			7	2442	15.28	19.36
			11	2462	15.12	16.42
			12	2467	15.12	16.41
			13	2472	15.33	16.53
		SISO CHAIN B	1	2412	15.43	16.65
			7	2442	15.14	19.17
			11	2462	15.34	16.55
			12	2467	15.33	16.51
			13	2472	15.47	16.61
802.11n20	HT0	SISO CHAIN A	1	2412	16.08	17.79
			7	2442	16.12	20.30
			11	2462	15.12	17.57
			12	2467	15.11	17.57
			13	2472	15.70	17.67
		SISO CHAIN B	1	2412	15.95	17.71
			7	2442	15.14	20.00
			11	2462	15.47	17.62
			12	2467	16.31	17.69
			13	2472	16.33	17.77
	HT8	MIMO CHAIN A	1	2412	15.95	17.74
			7	2442	15.15	17.72
			11	2462	15.12	17.57
			12	2467	15.11	17.58
			13	2472	15.71	17.71
		MIMO CHAIN B	1	2412	15.71	17.69
7	2442		16.32	17.67		
11	2462		16.33	17.64		
12	2467		16.35	17.69		
13	2472		16.92	17.75		

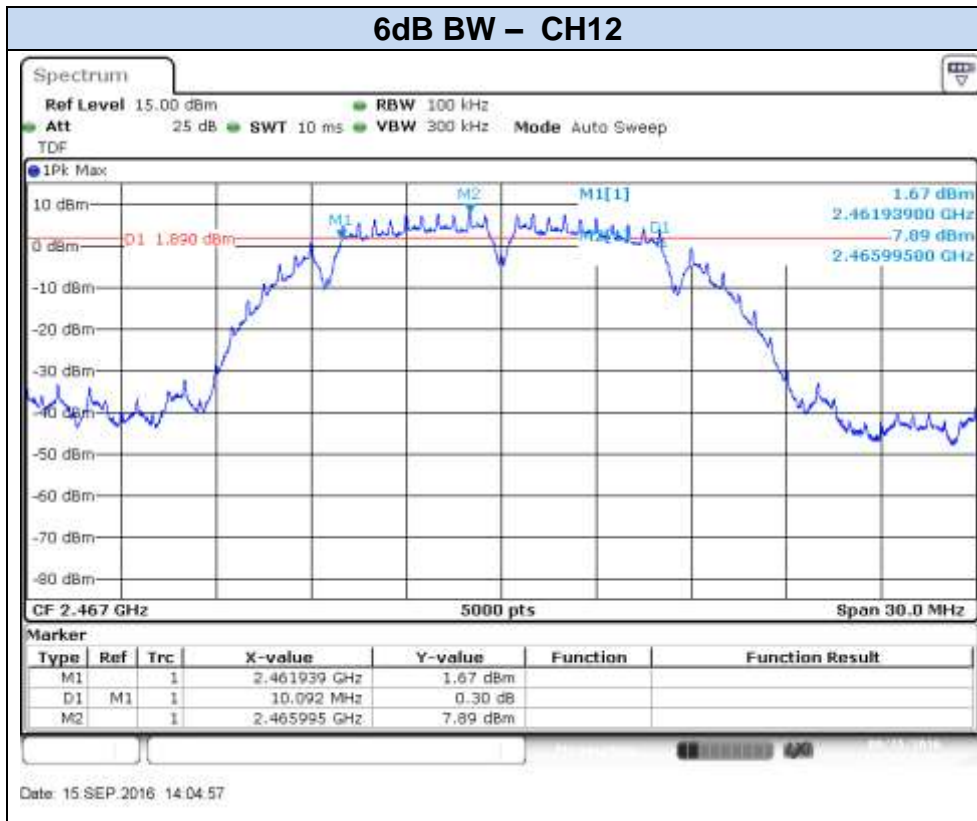
Mode	Rate	Antenna	Channel	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
802.11n40	HT0	SISO CHAIN A	3F	2422	32.59	36.09
			7F	2442	35.09	36.20
			9F	2452	32.15	36.05
			10F	2457	31.36	36.04
			11F	2462	31.35	36.05
		SISO CHAIN B	3F	2422	32.60	36.14
			7F	2442	35.10	36.20
			9F	2452	35.07	36.00
			10F	2457	32.58	36.20
			11F	2462	32.59	36.21
	HT8	MIMO CHAIN A	3F	2422	32.59	36.13
			7F	2442	35.10	36.25
			9F	2452	35.11	36.22
			10F	2457	32.61	36.07
			11F	2462	32.58	36.12
		MIMO CHAIN B	3F	2422	32.61	35.89
			7F	2442	35.10	35.96
			9F	2452	32.61	35.94
			10F	2457	32.59	35.90
			11F	2462	32.60	36.04

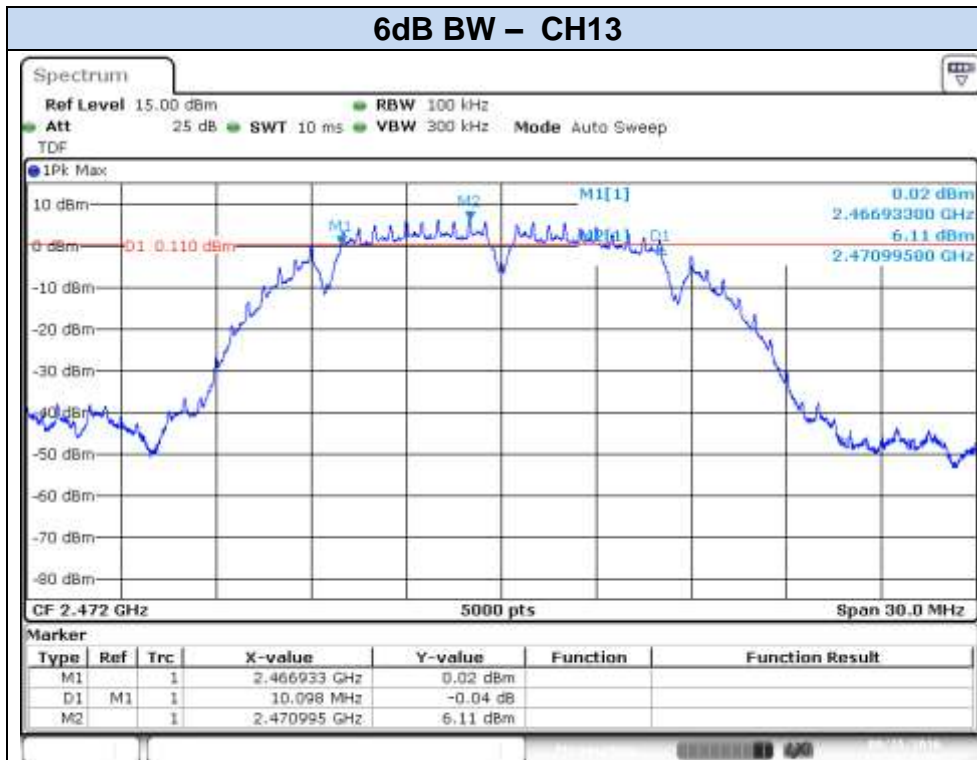
Max Value

Results screenshot:**802.11b, 1Mbps (SISO) – Chain A**

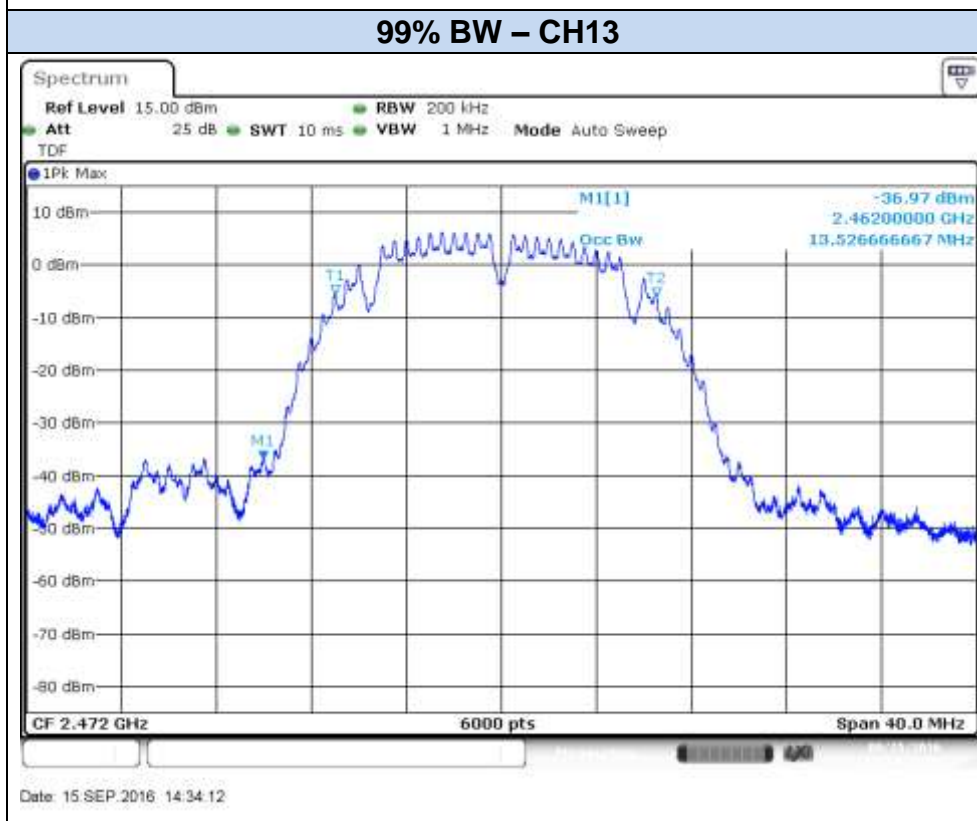




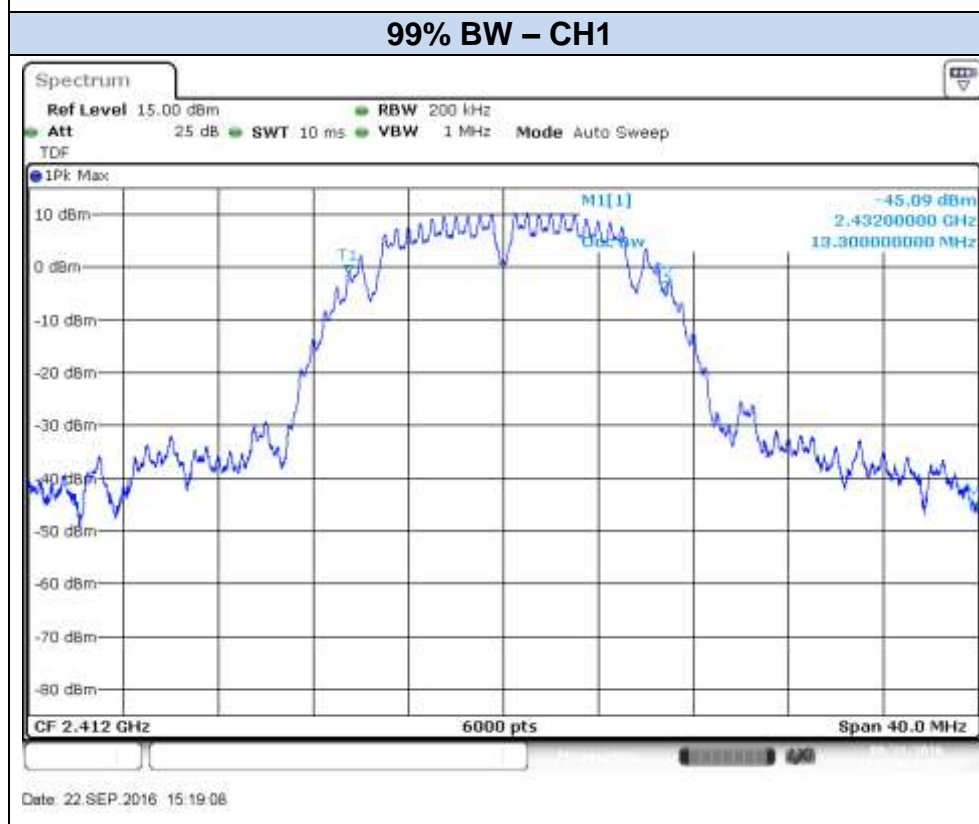
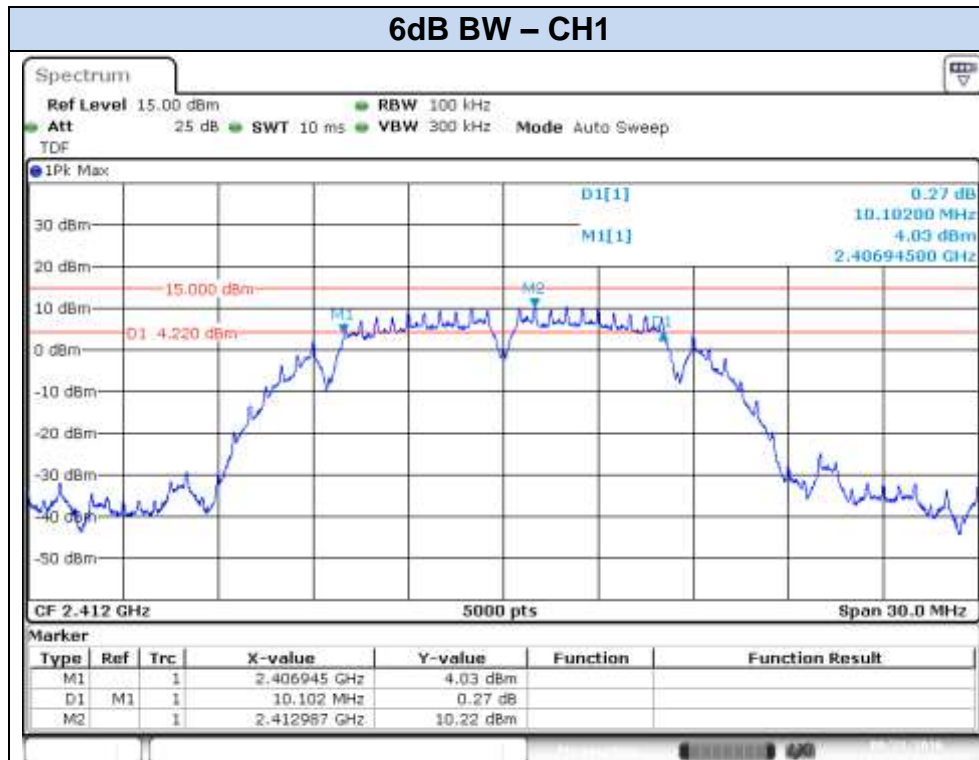


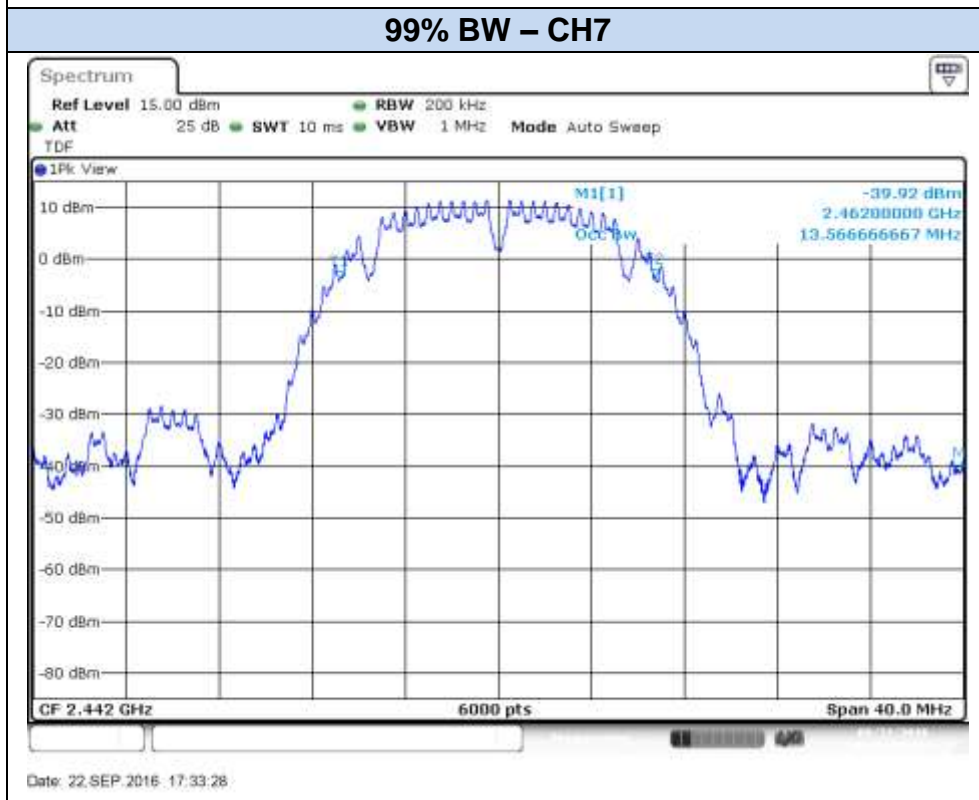
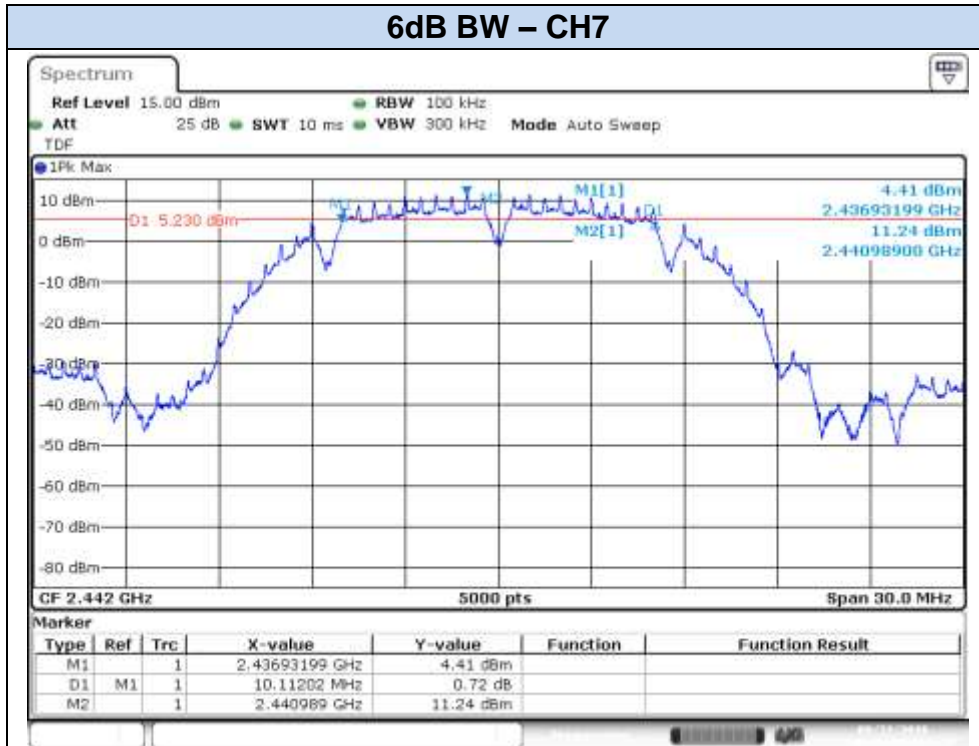


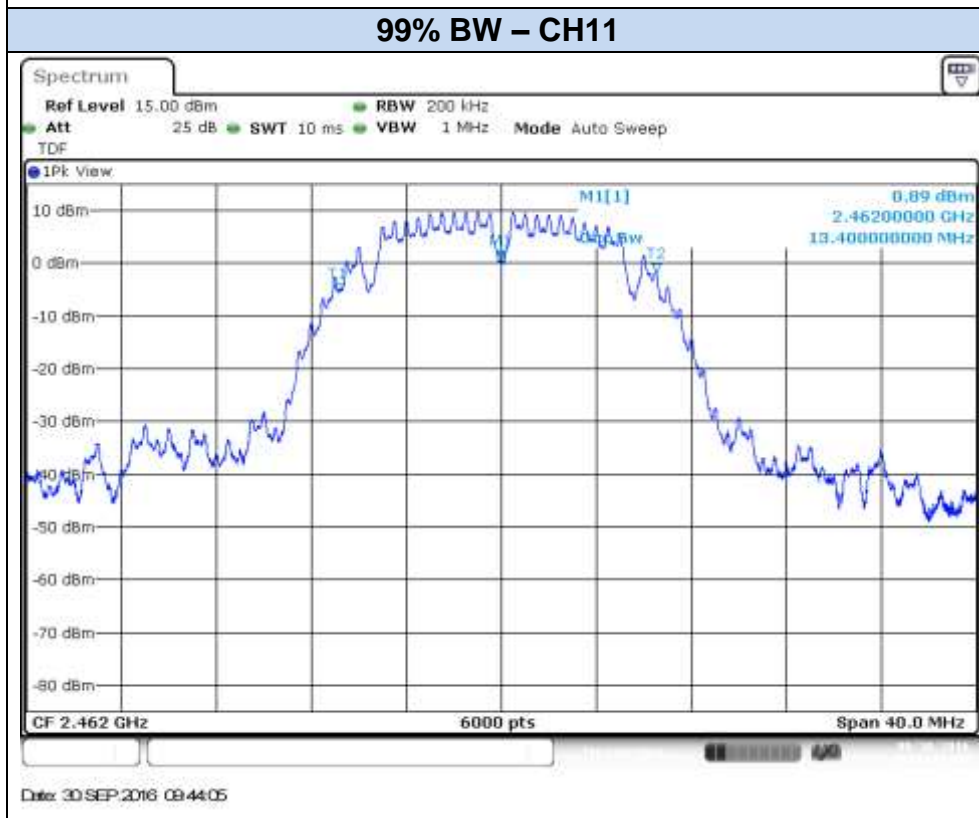
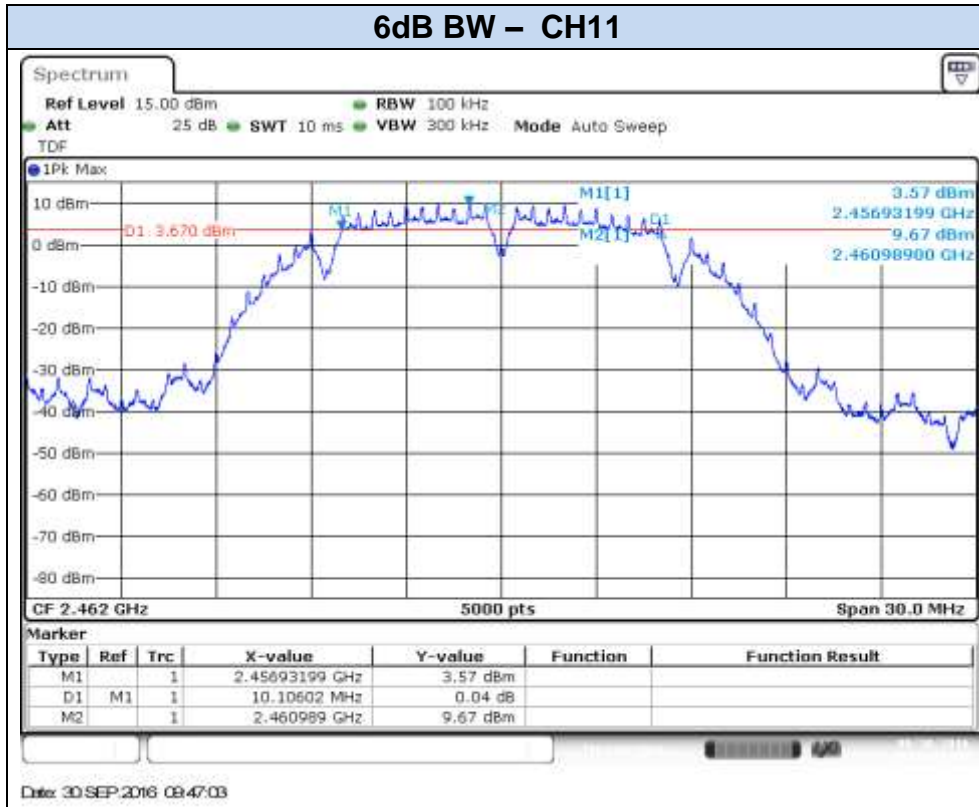
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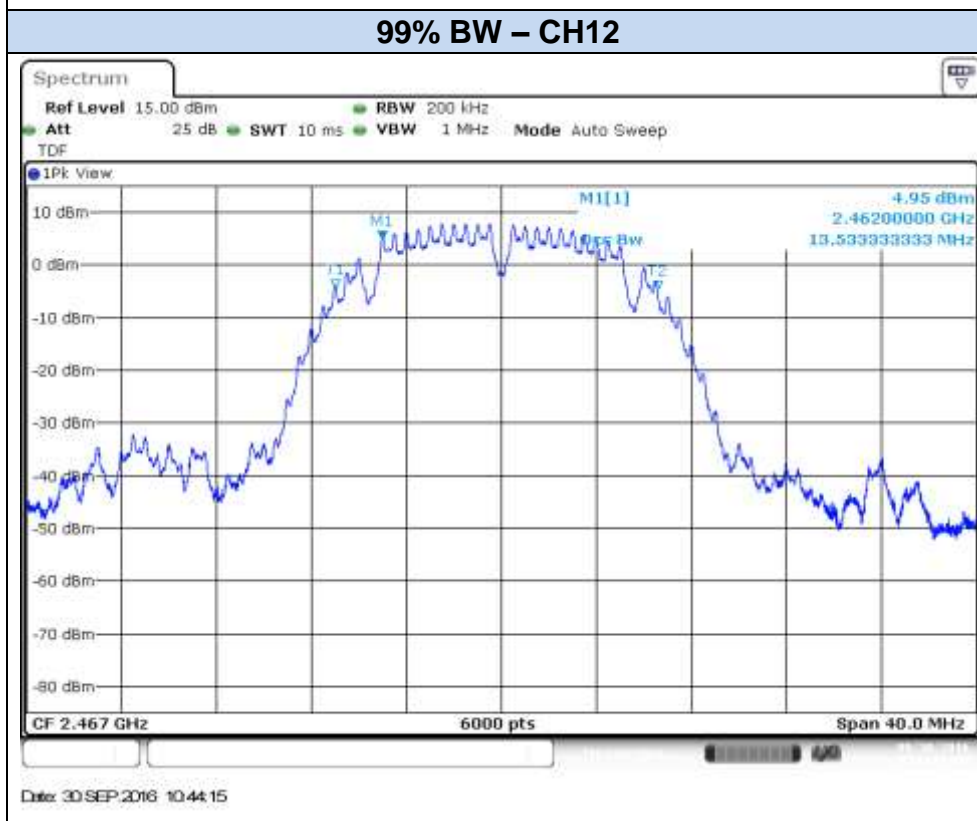
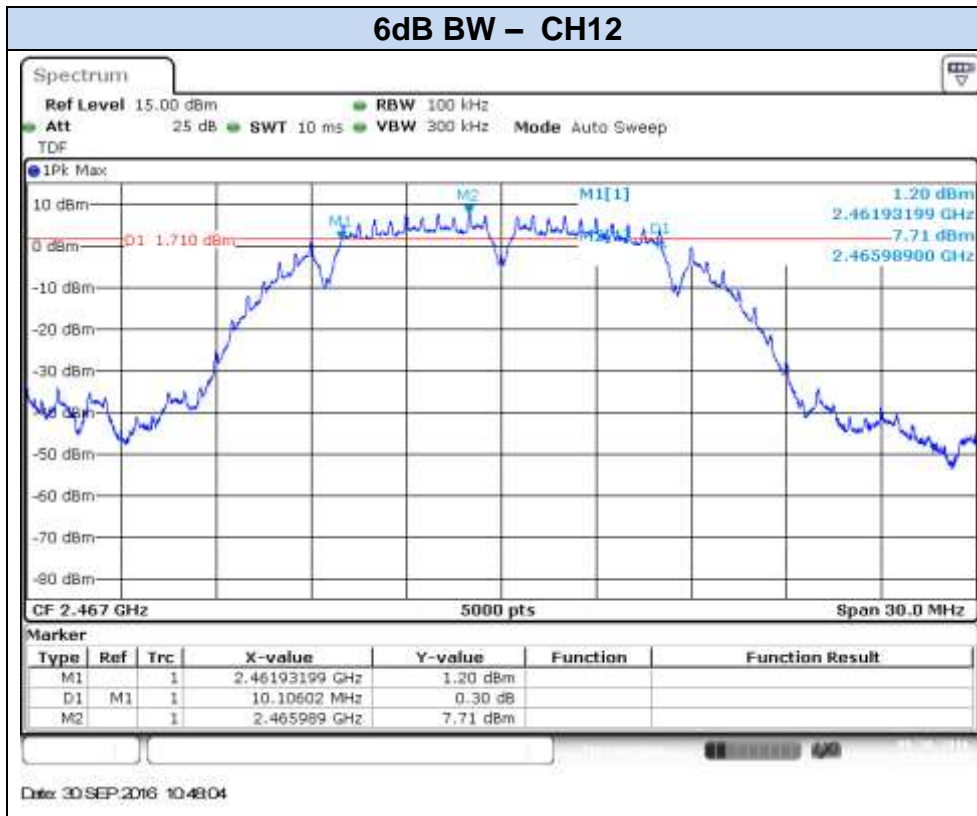


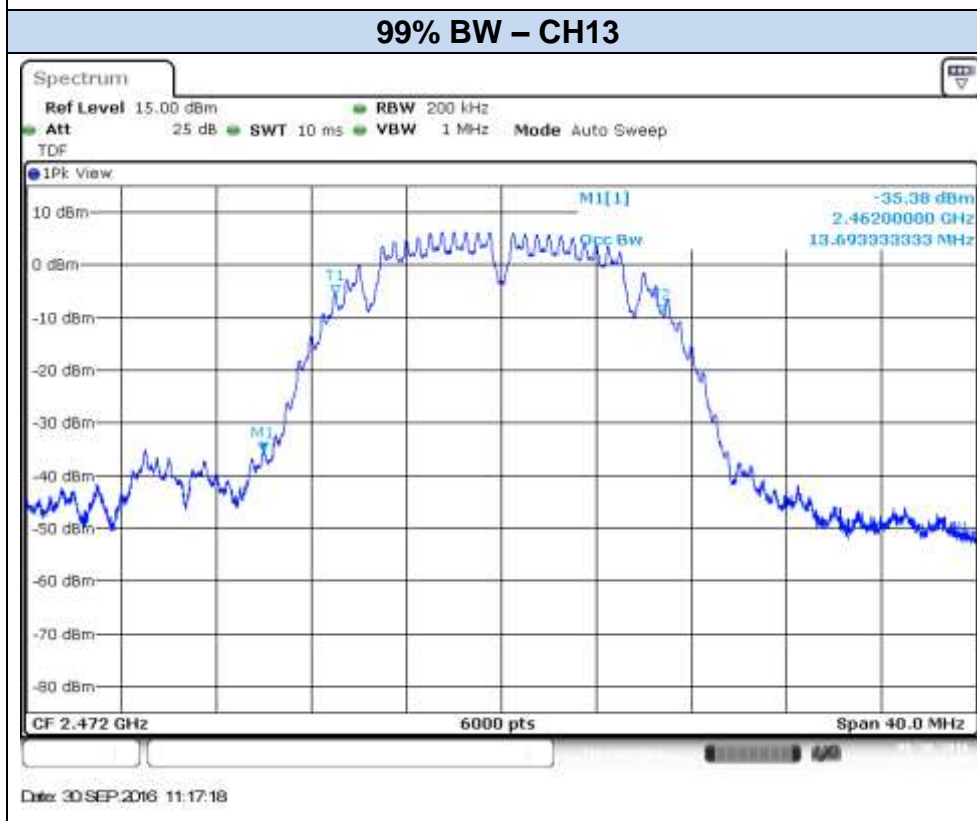
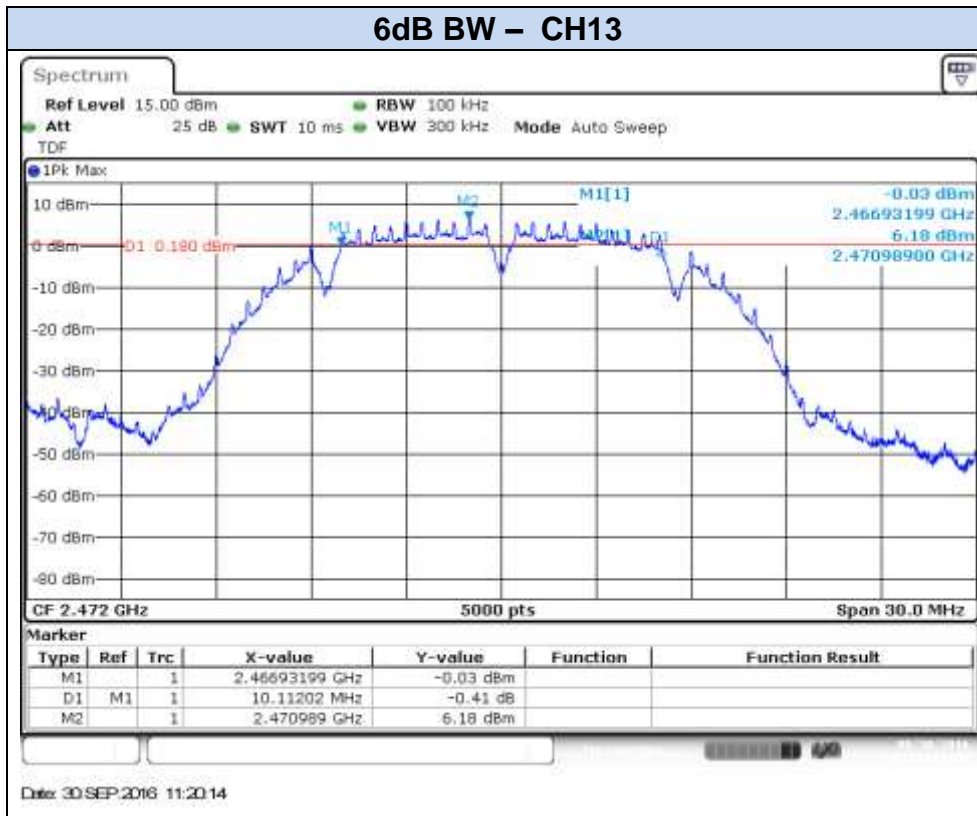
Date: 15 SEP 2016 14:34:12

802.11b, 1Mbps (SISO) – Chain B

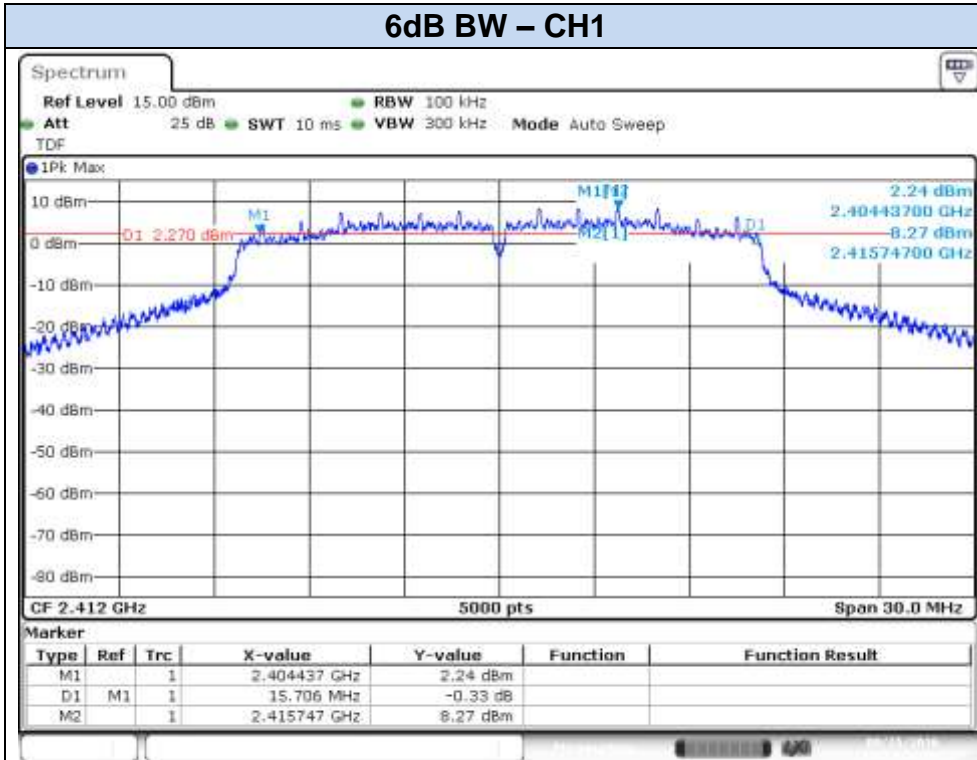




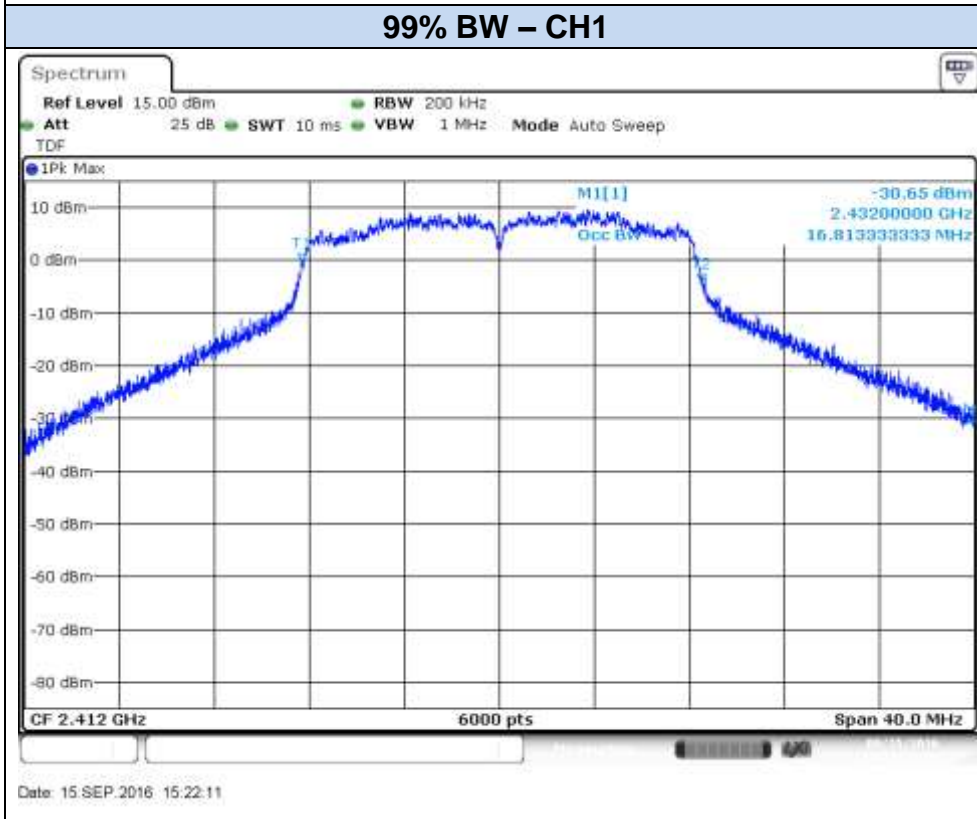




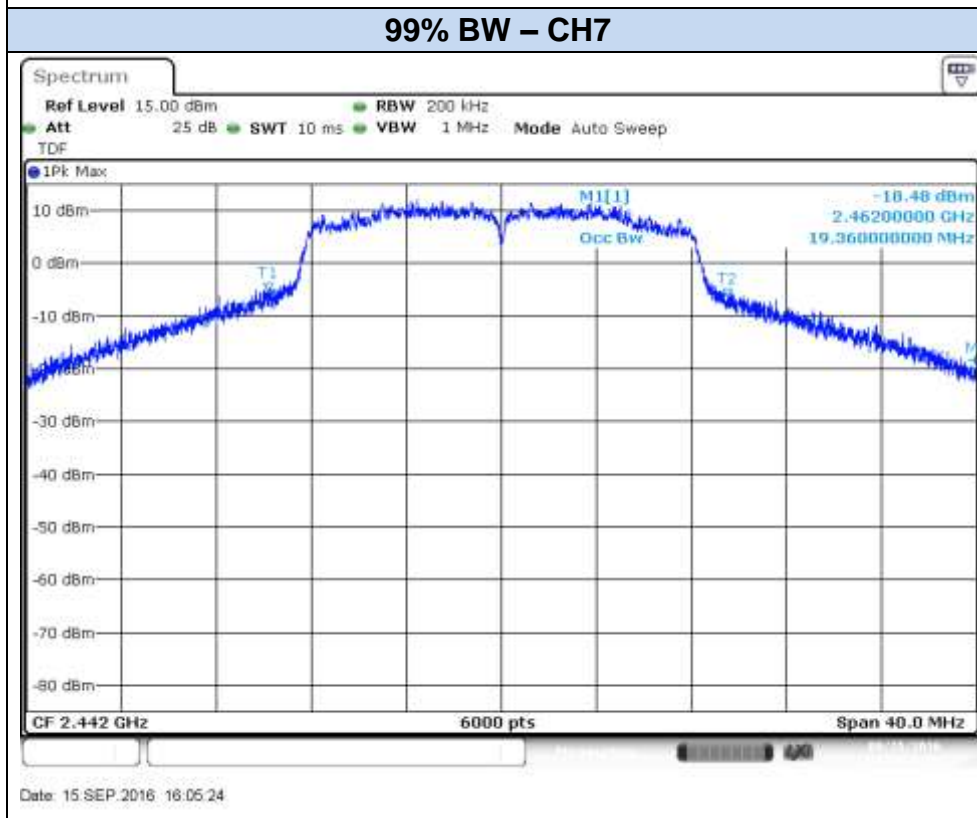
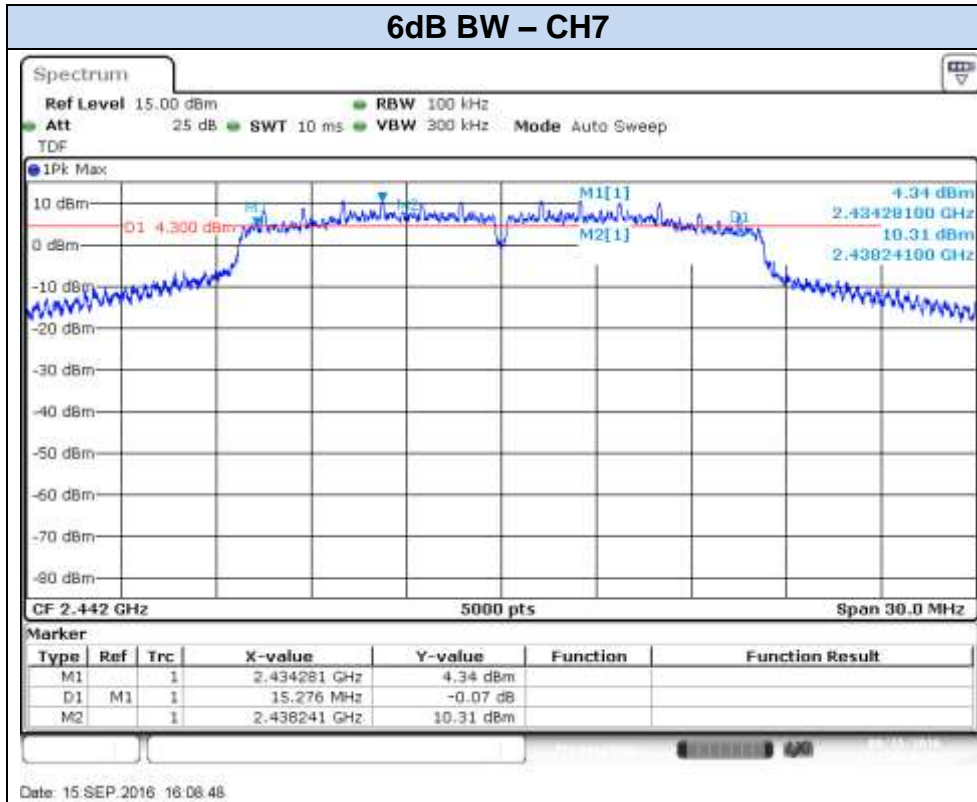
802.11g, 6Mbps (SISO) – Chain A

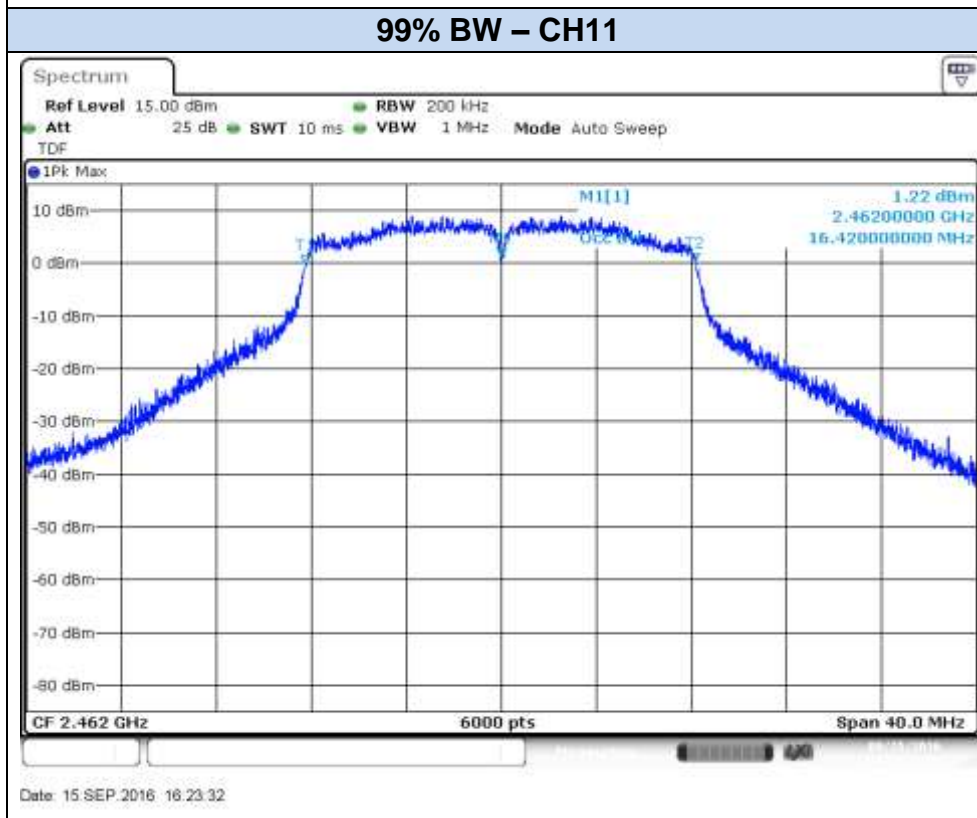
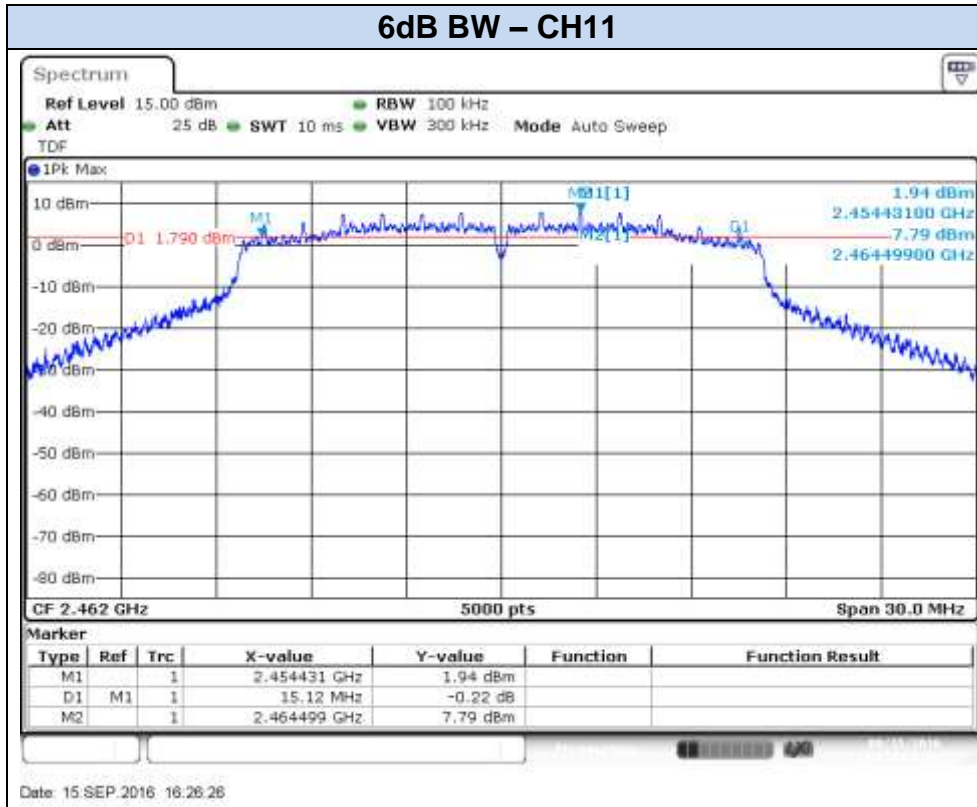


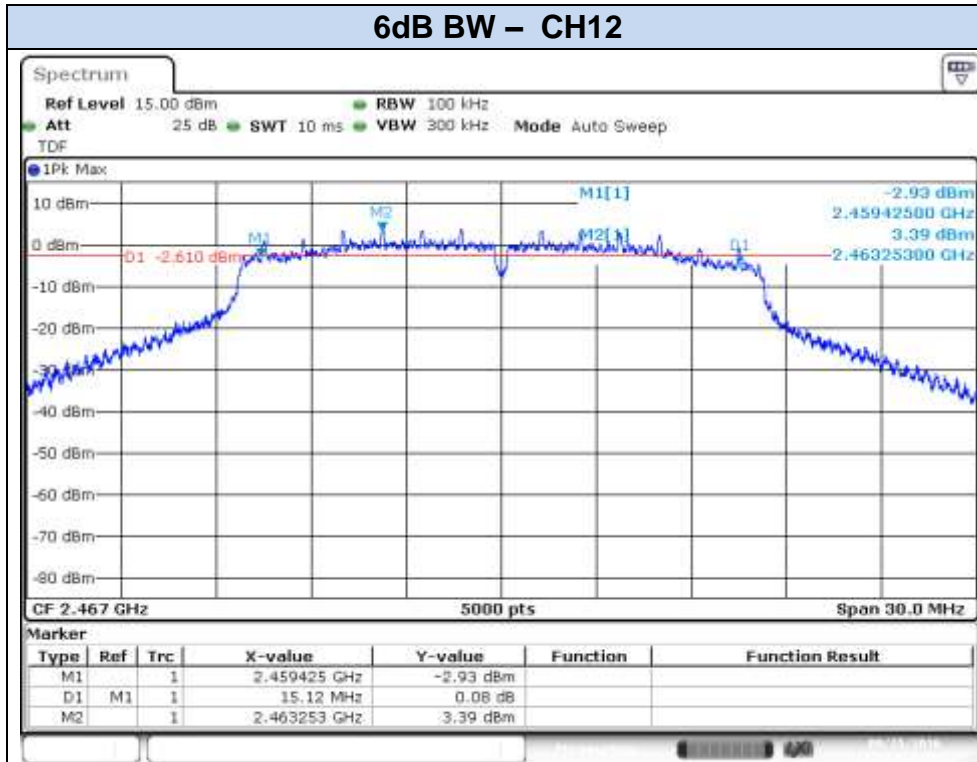
Date: 15 SEP 2016 15:24:24



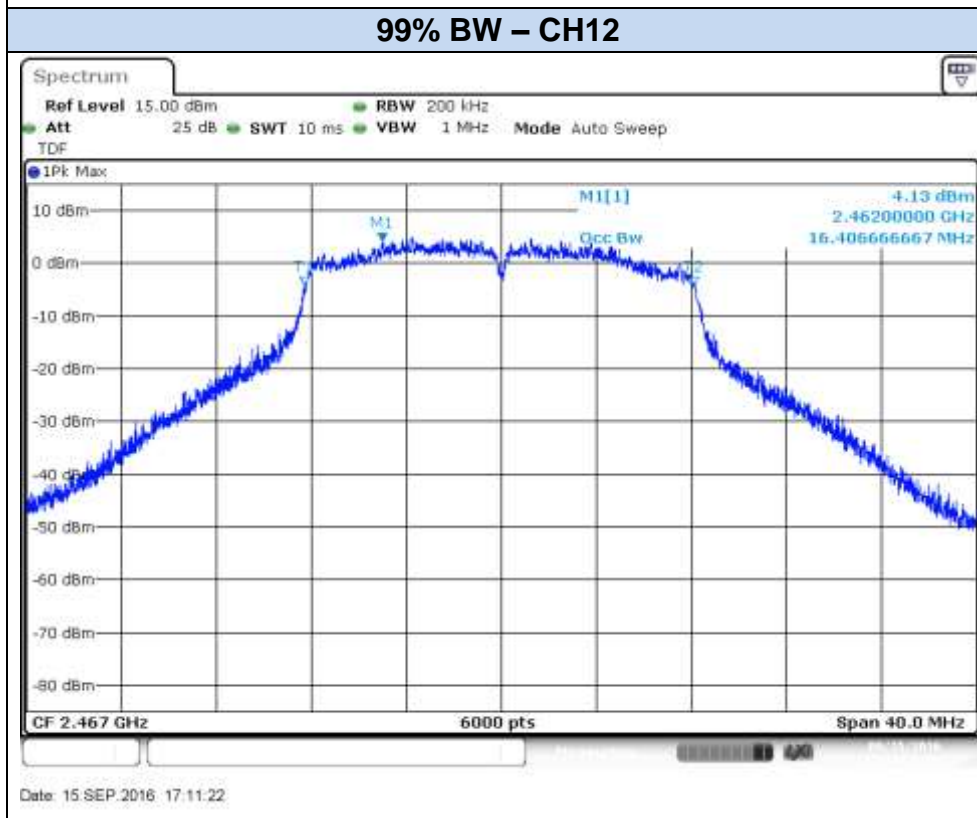
Date: 15 SEP 2016 15:22:11



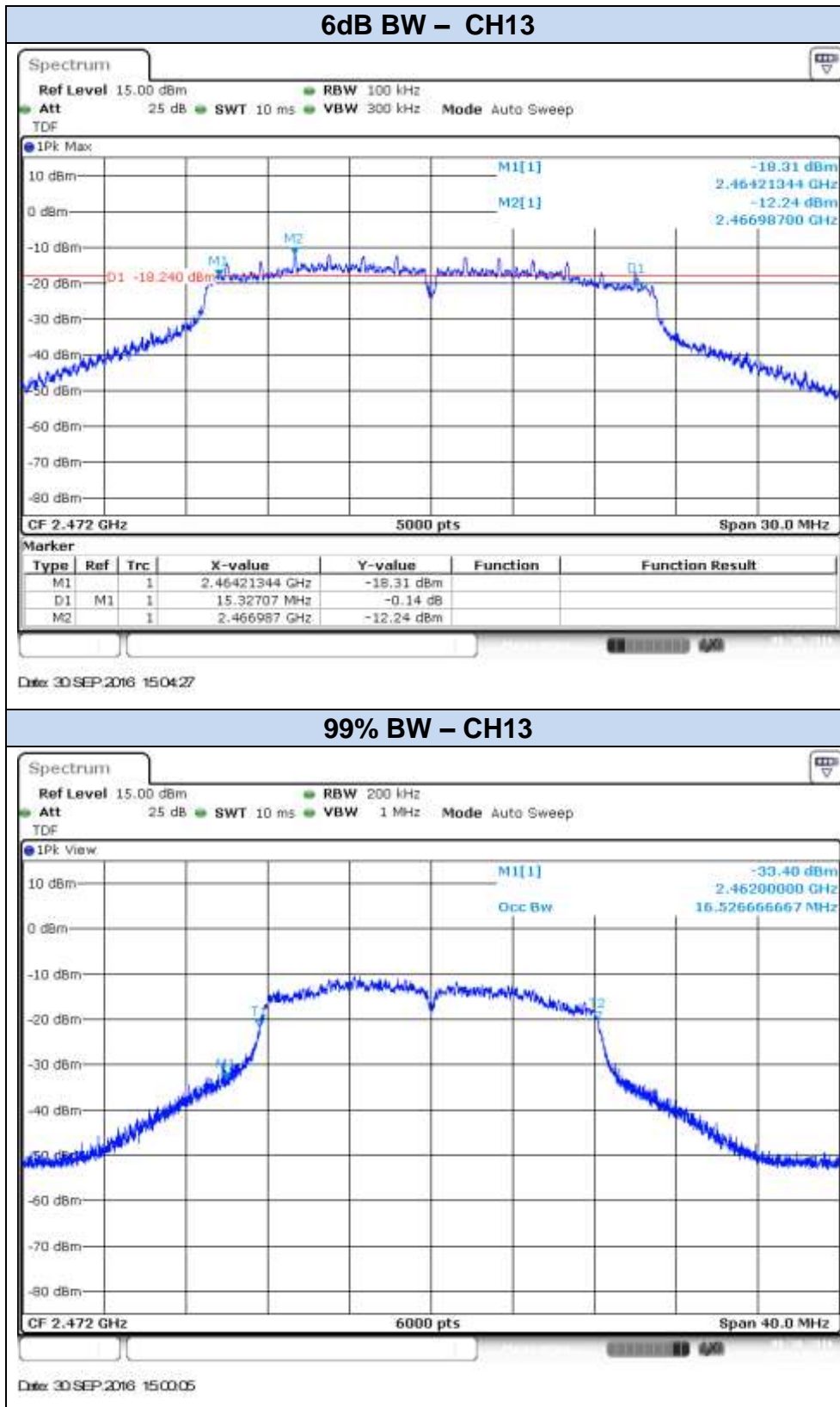




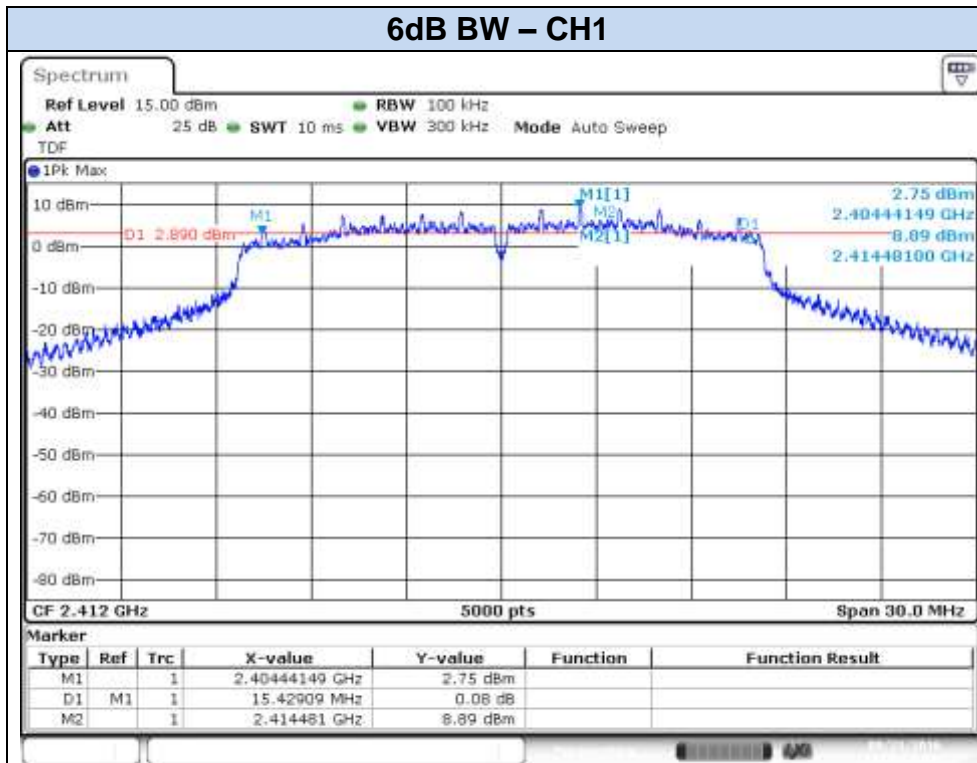
Date: 15 SEP 2016 17:14:50



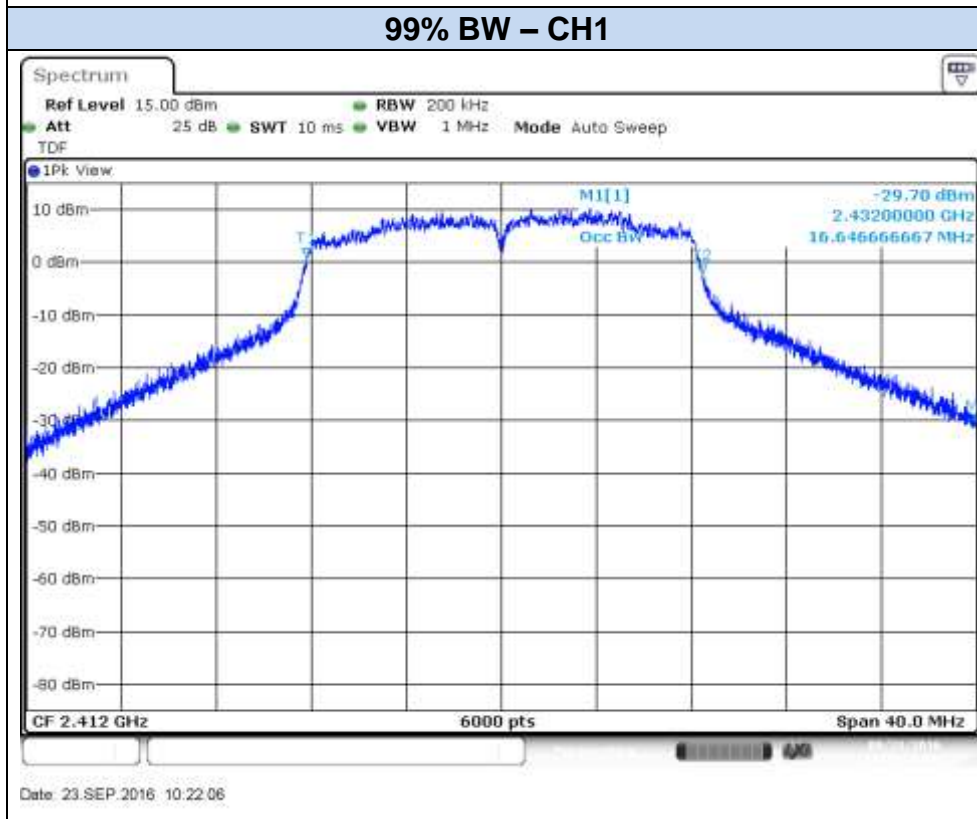
Date: 15 SEP 2016 17:11:22



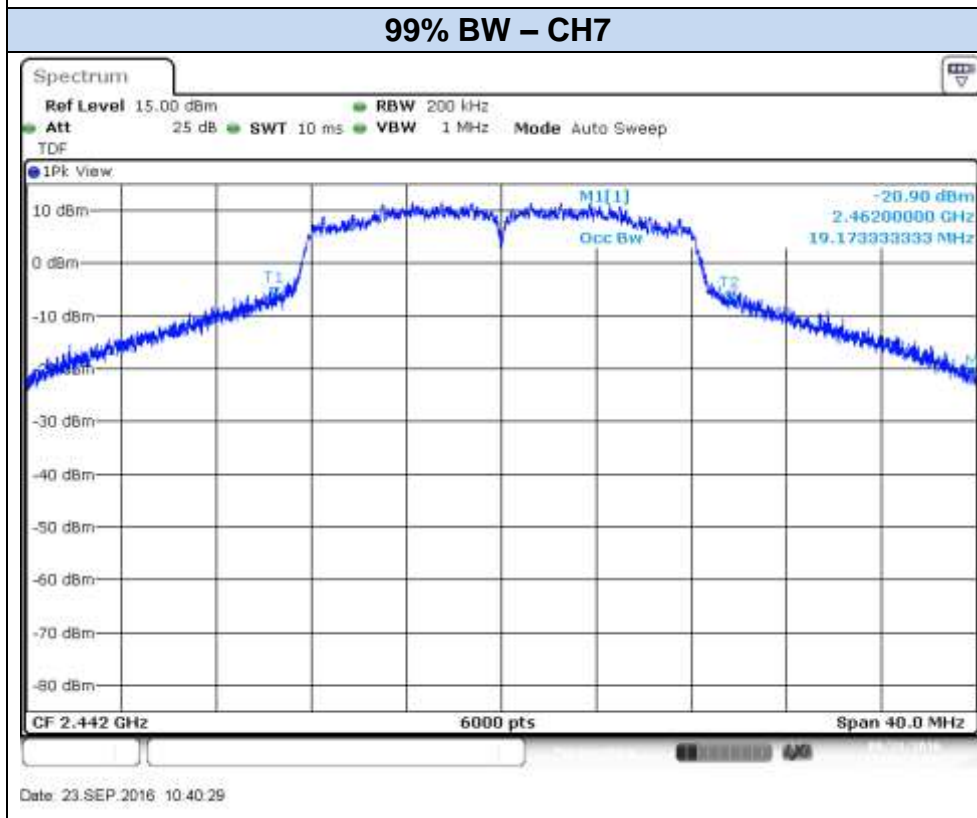
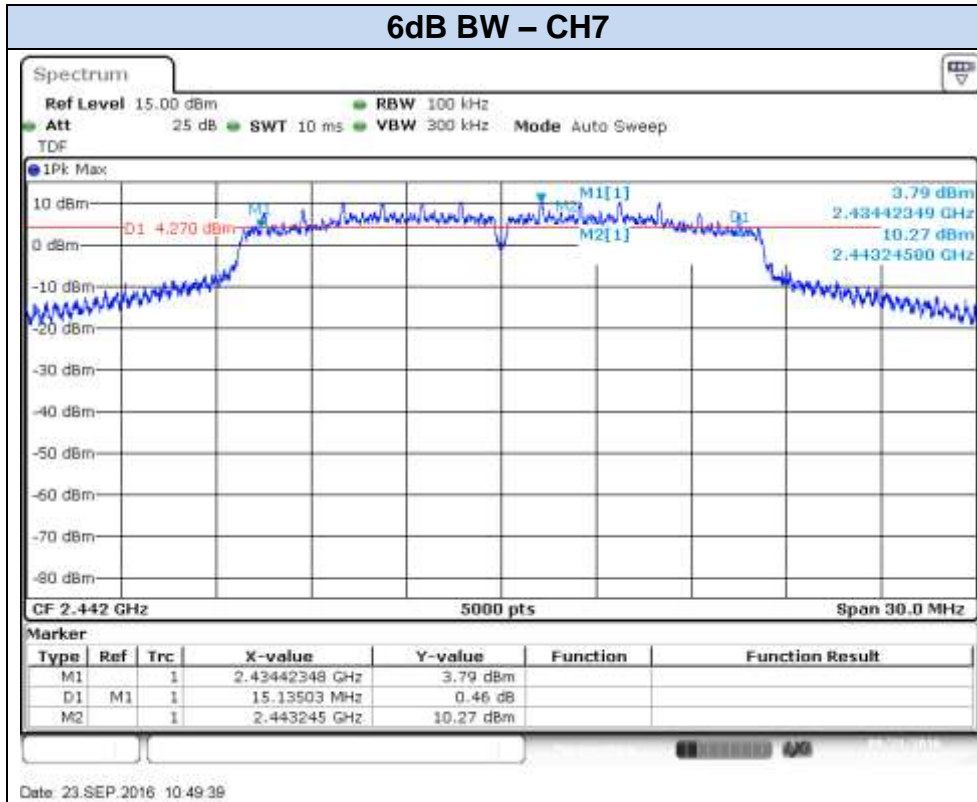
802.11g, 6Mbps (SISO) – Chain B

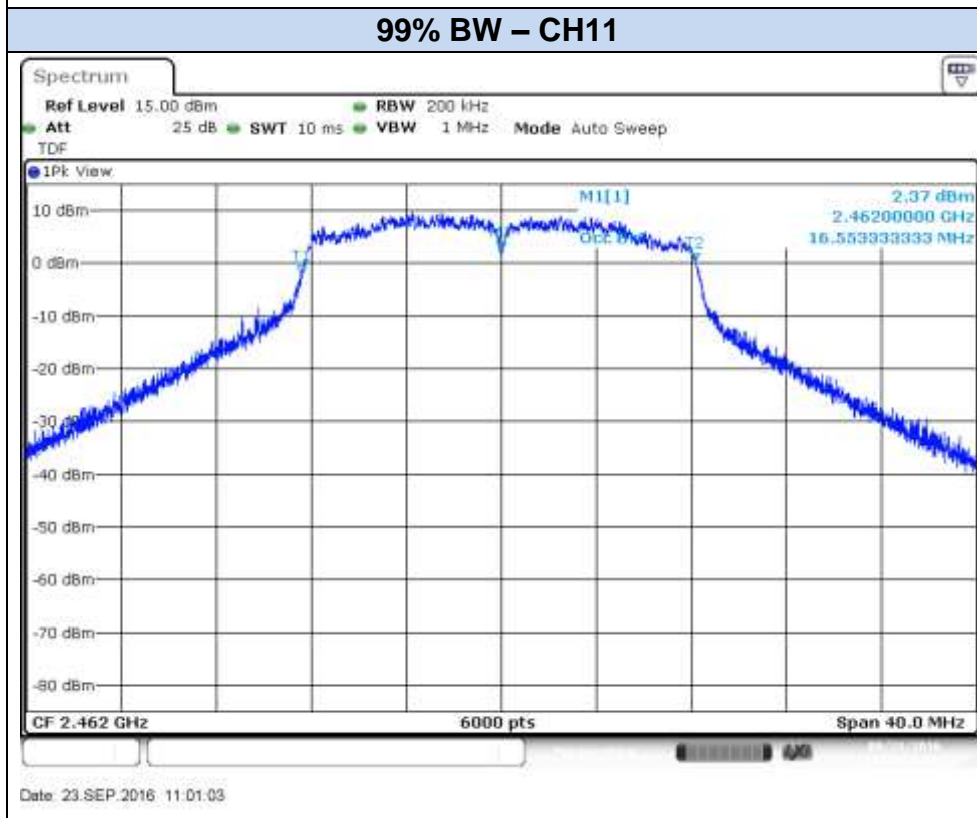
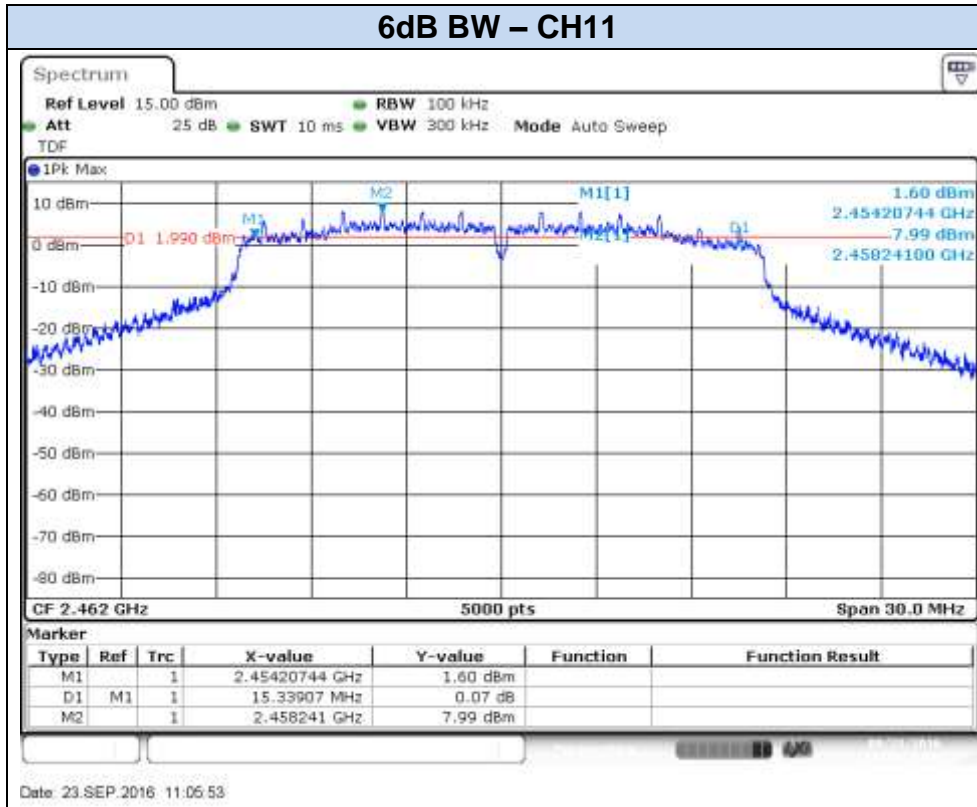


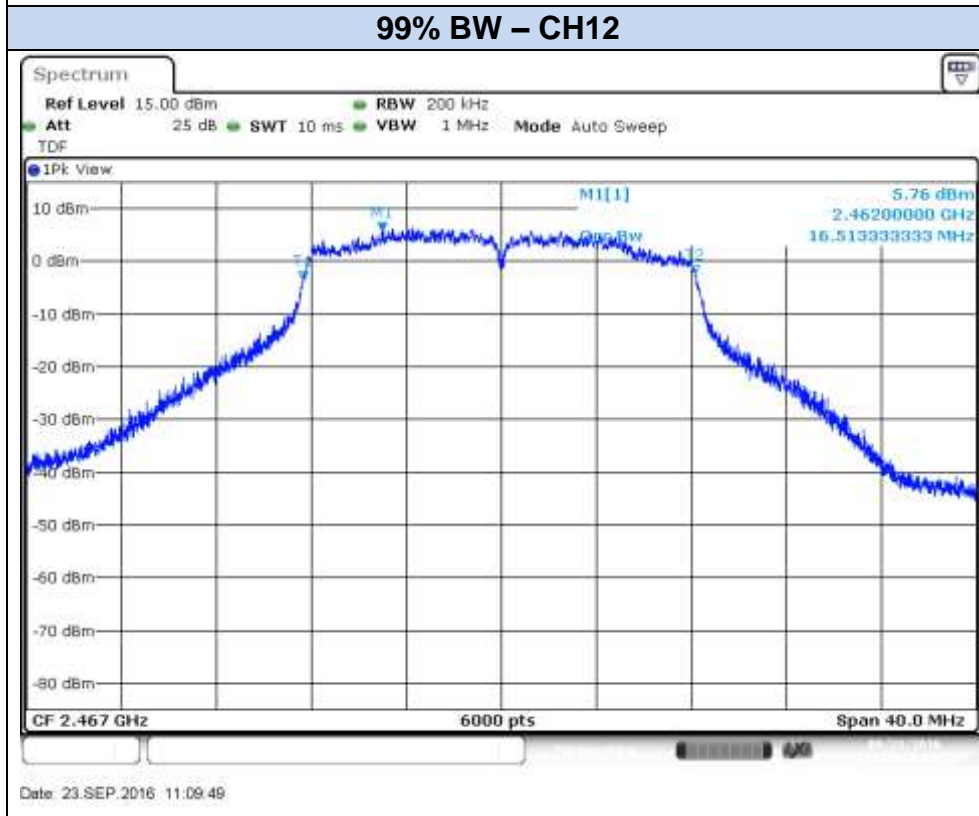
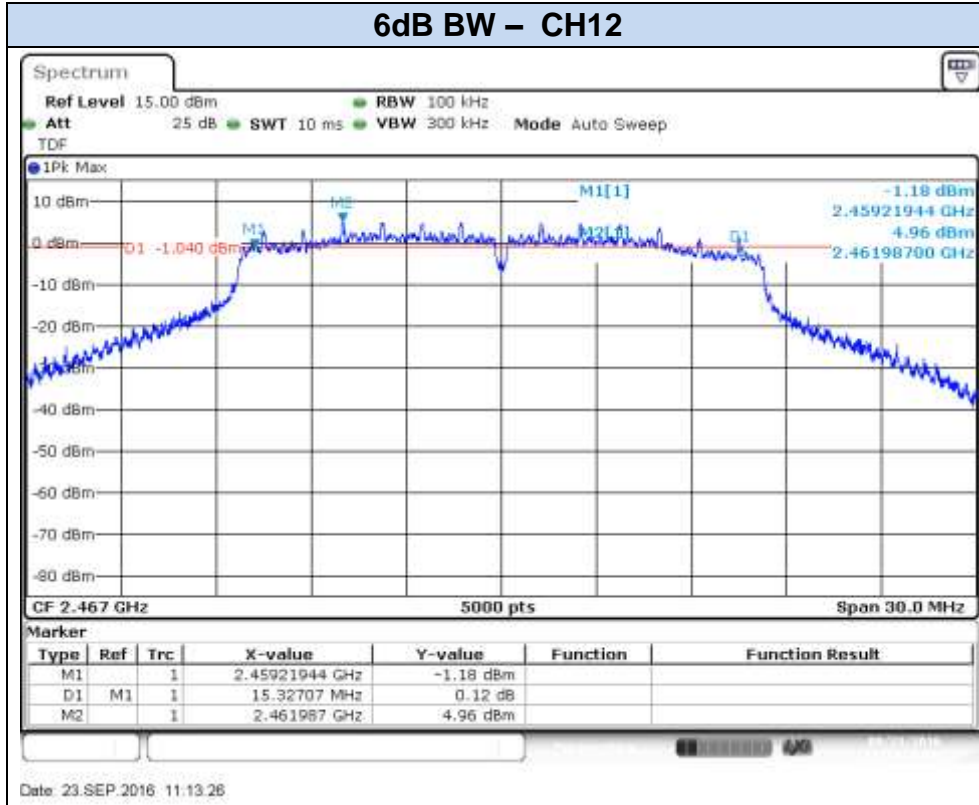
Date: 23.SEP.2016 10:38:09

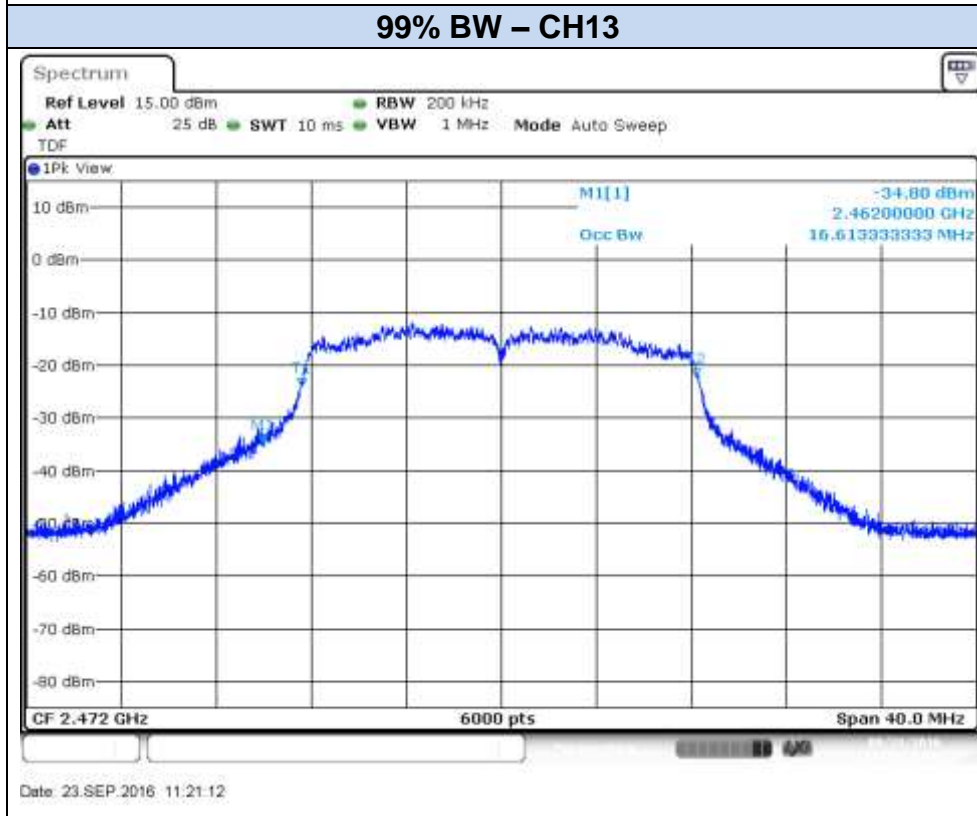
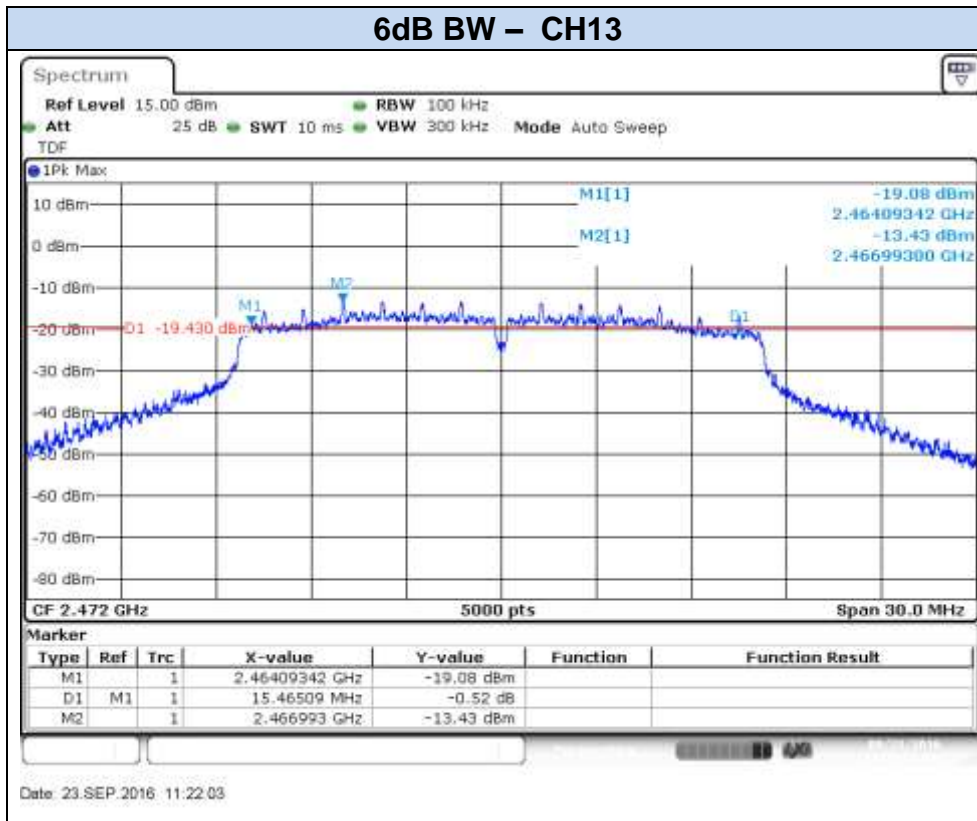


Date: 23.SEP.2016 10:22:06

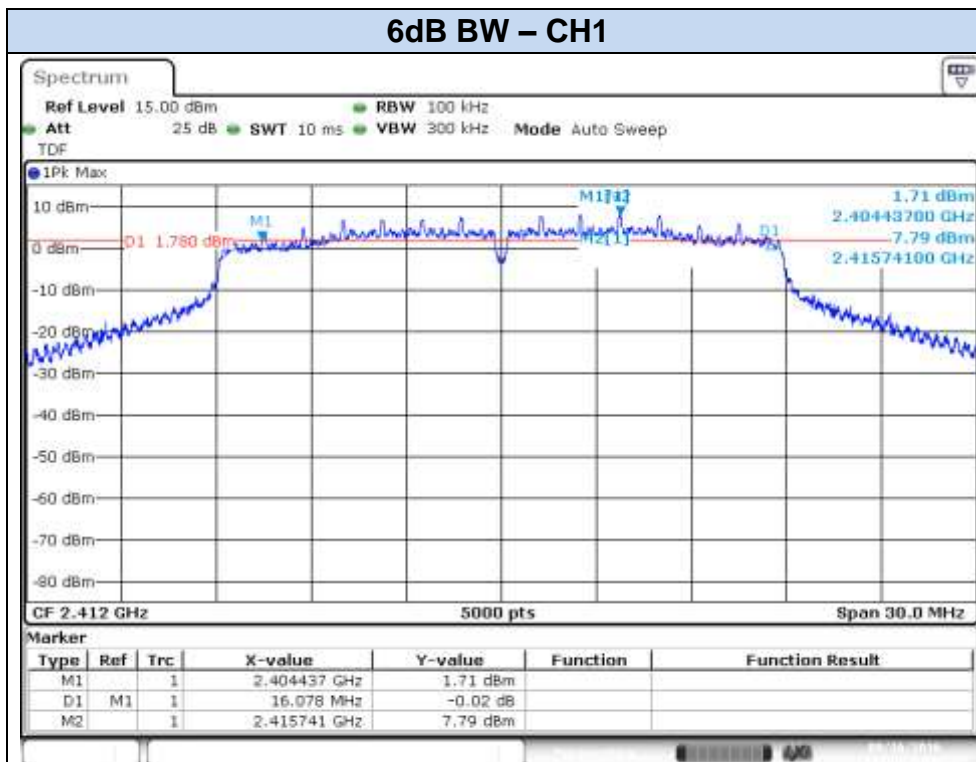




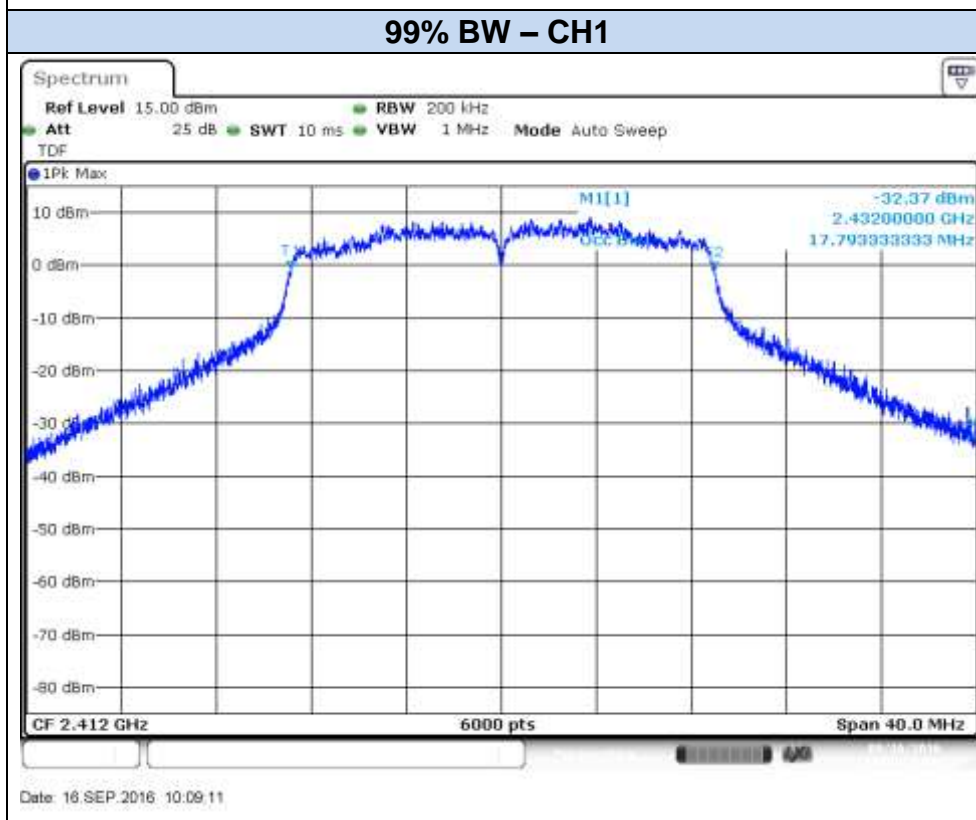




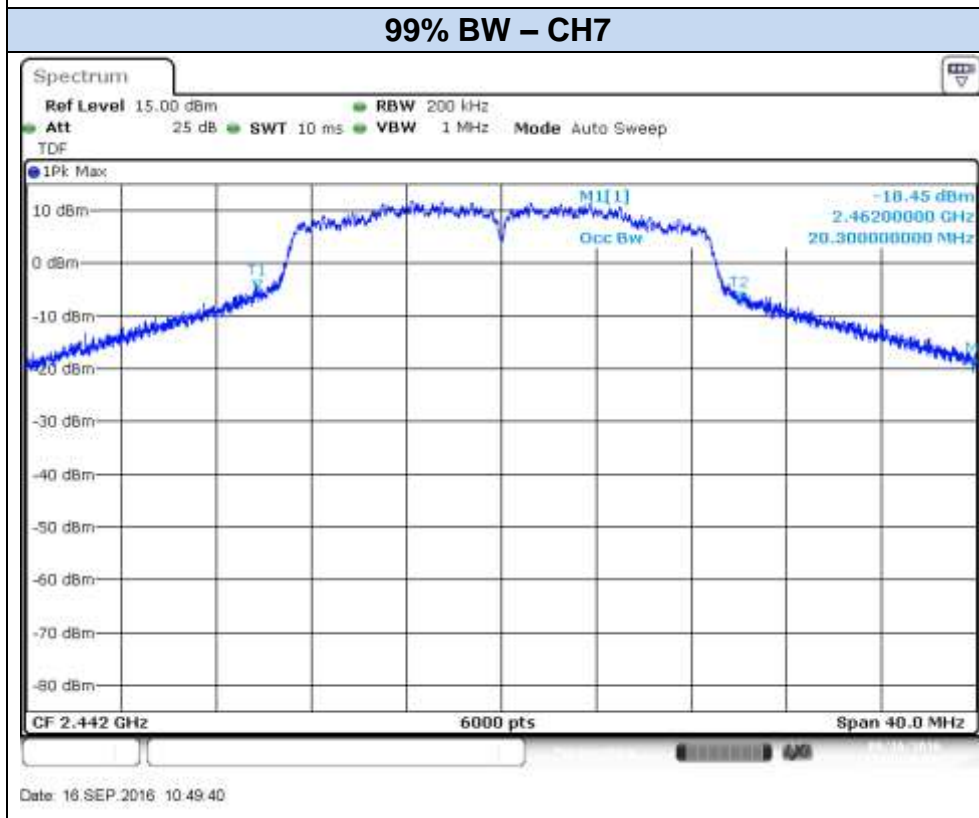
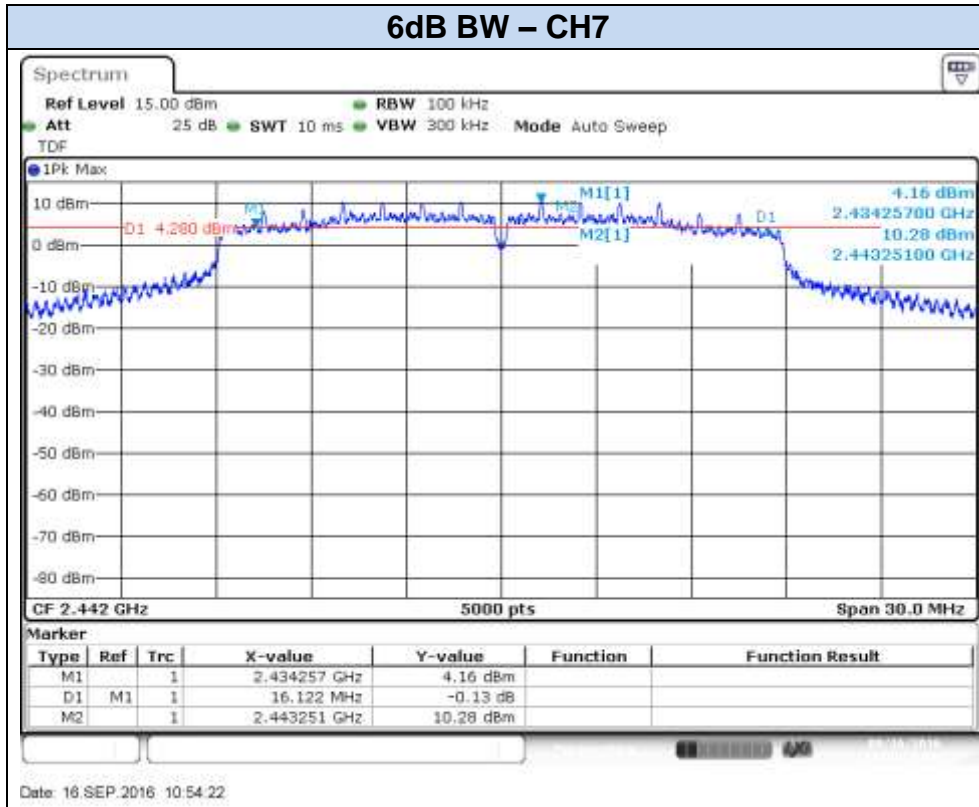
802.11n20, HT0 (SISO) – Chain A

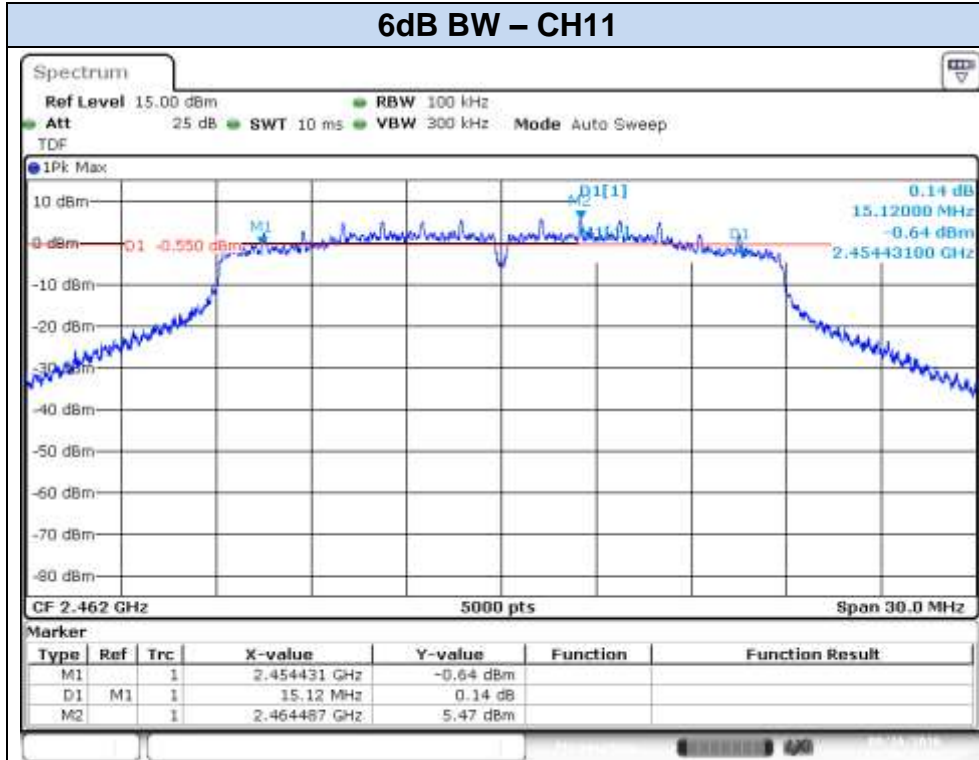


Date: 16 SEP 2016 10:14:17

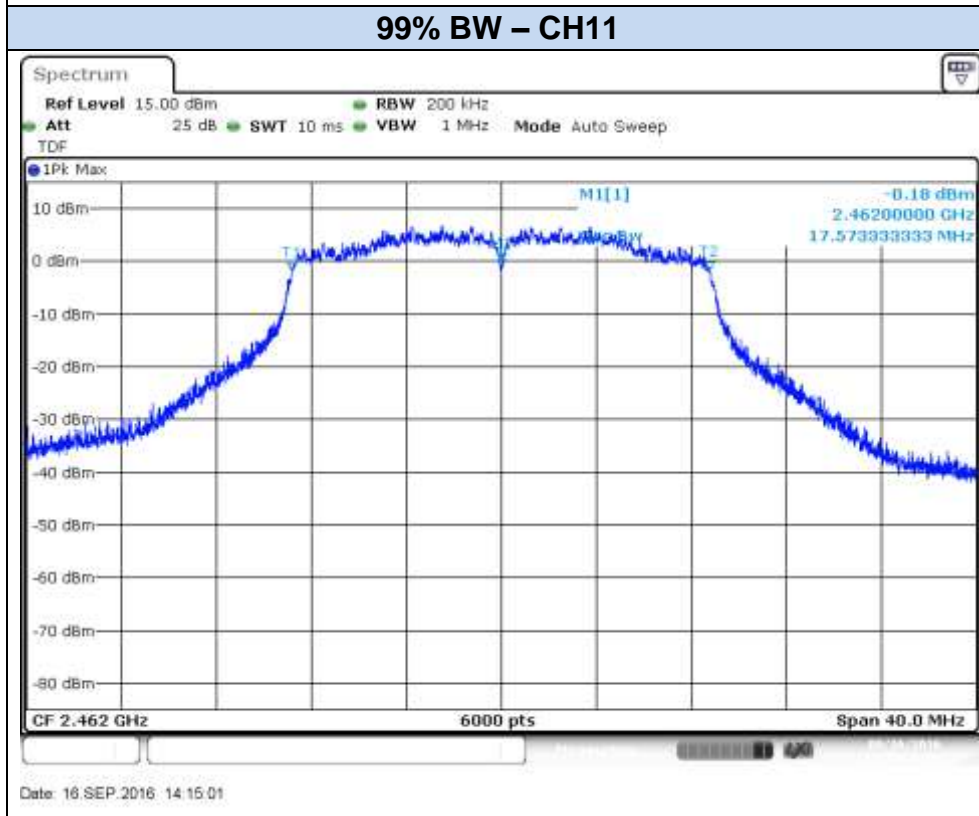


Date: 16 SEP 2016 10:09:11

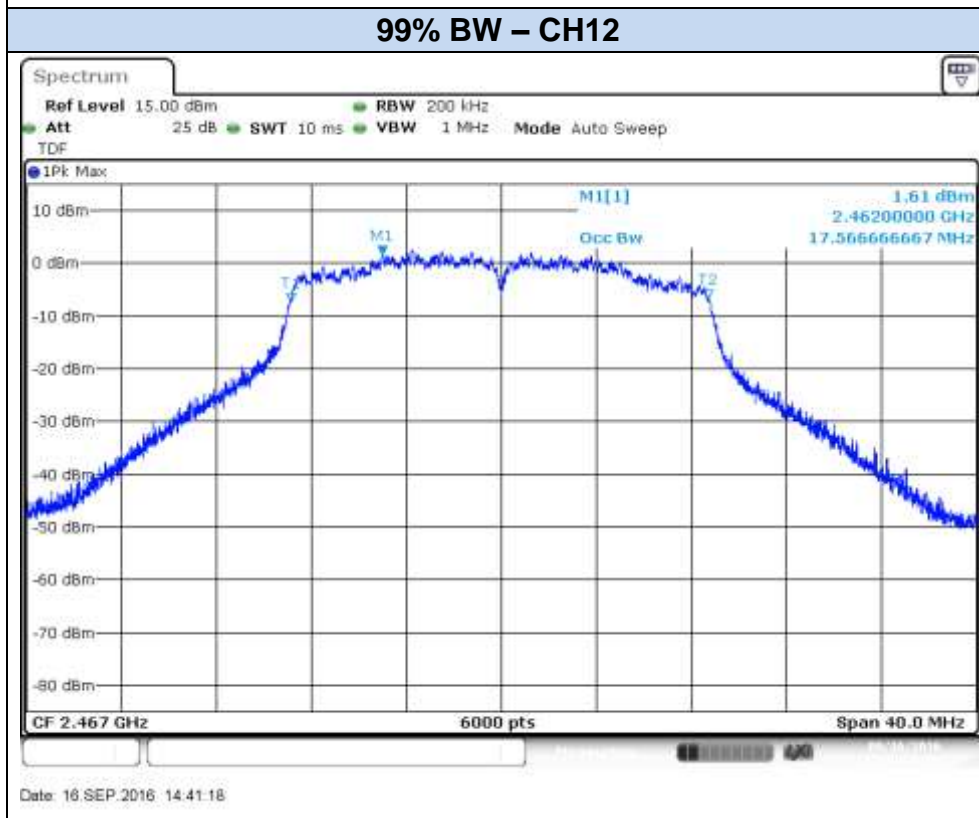
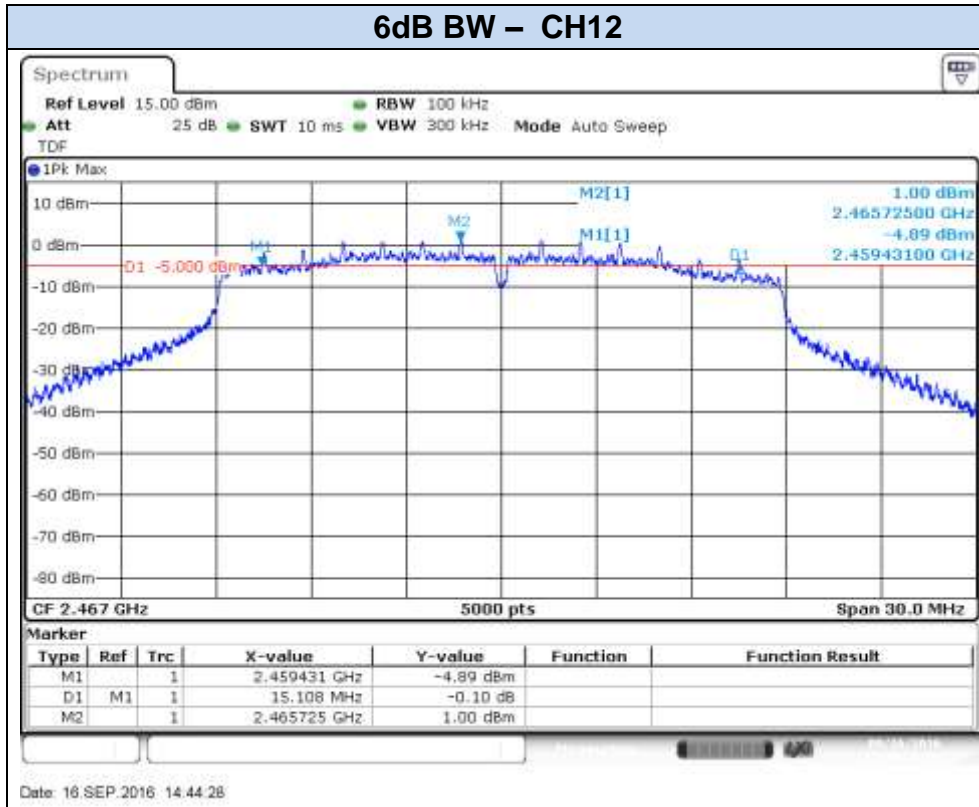


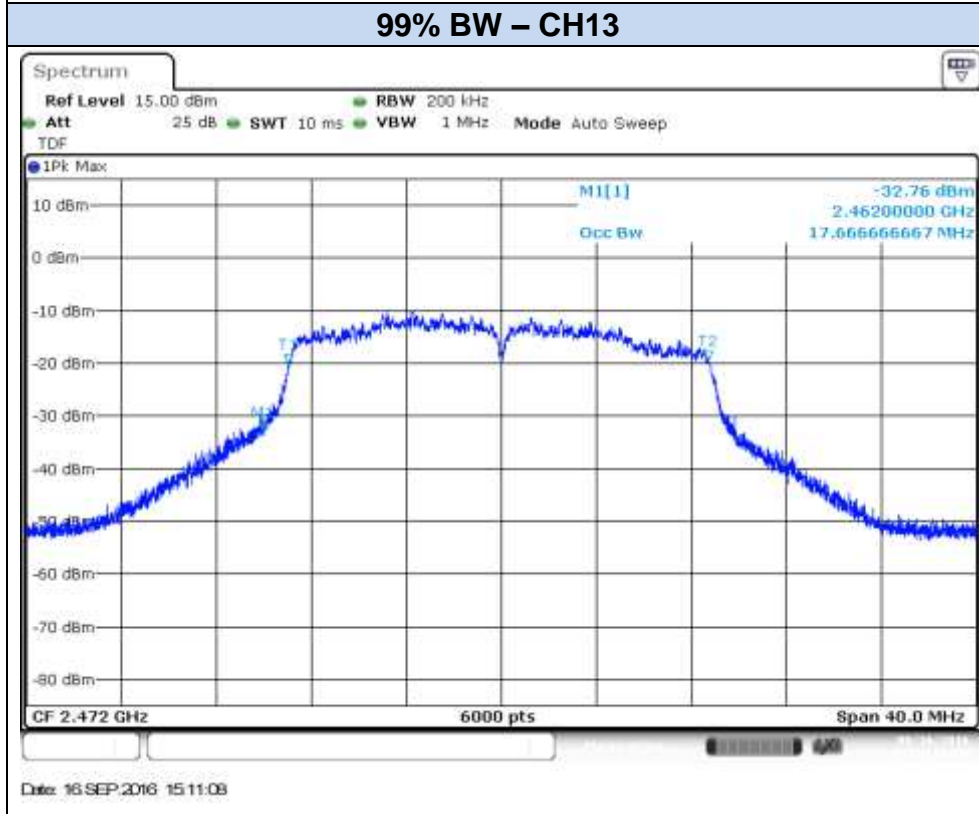
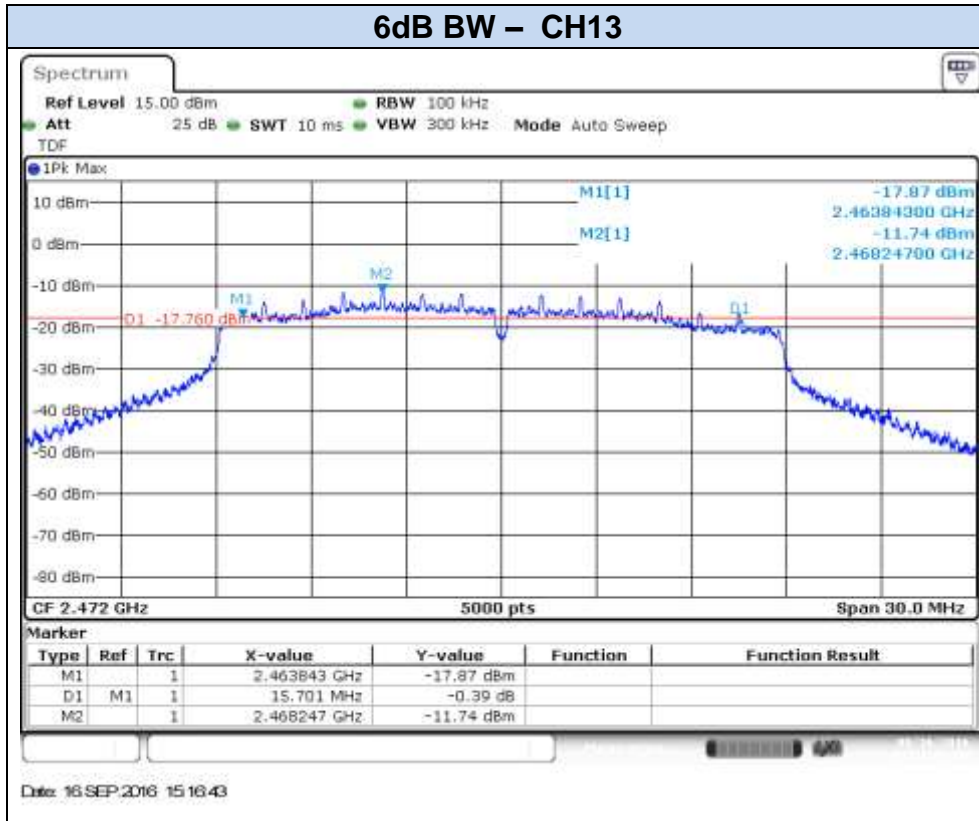


Date: 16 SEP 2016 14:18:37

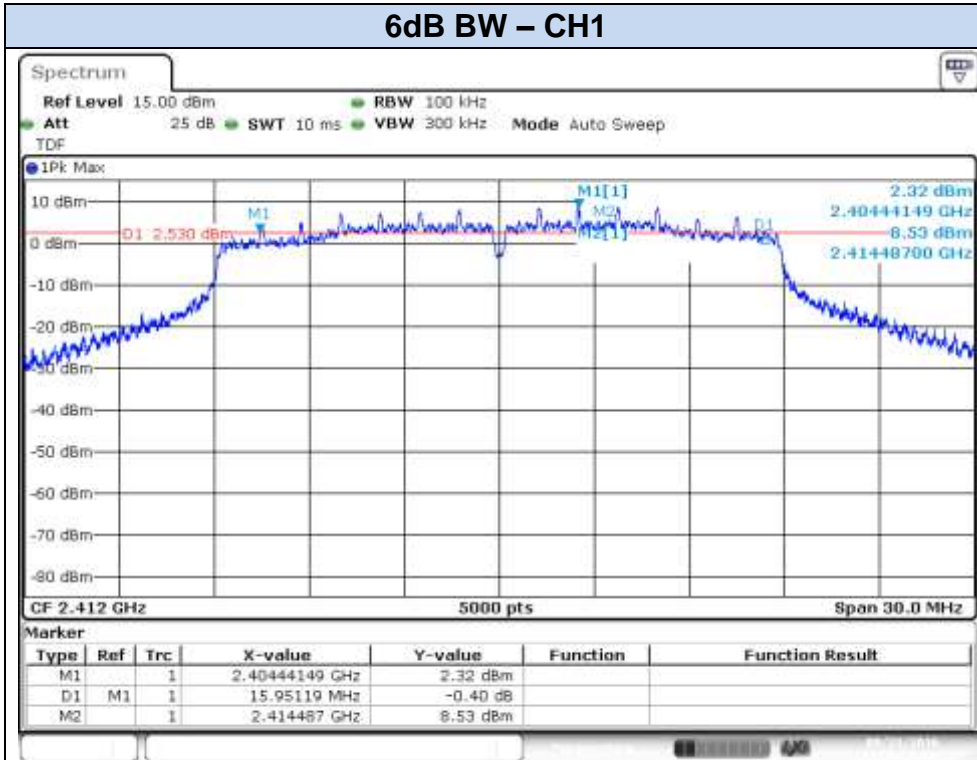


Date: 16 SEP 2016 14:15:01

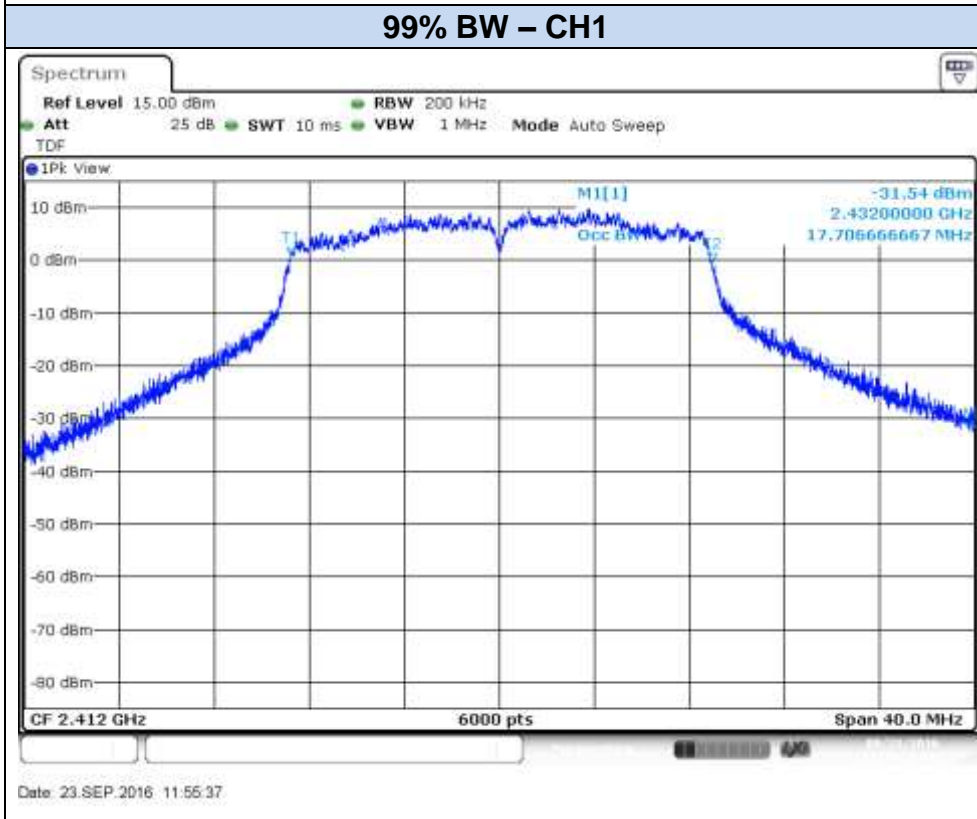




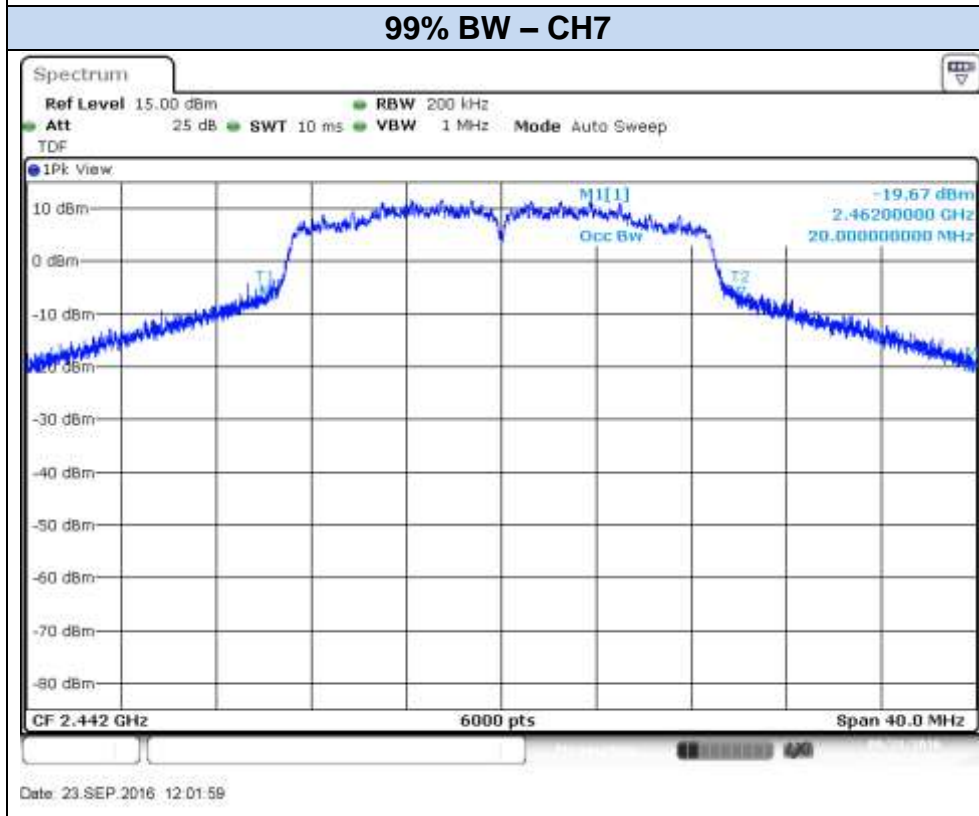
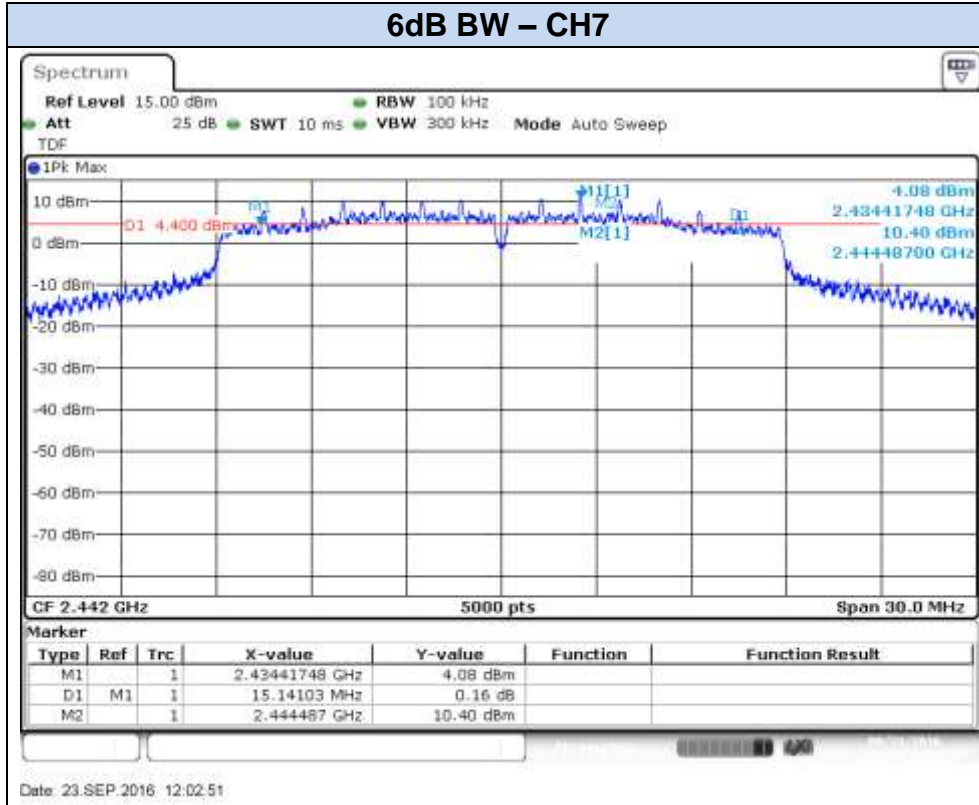
802.11n20, HT0 (SISO) – Chain B

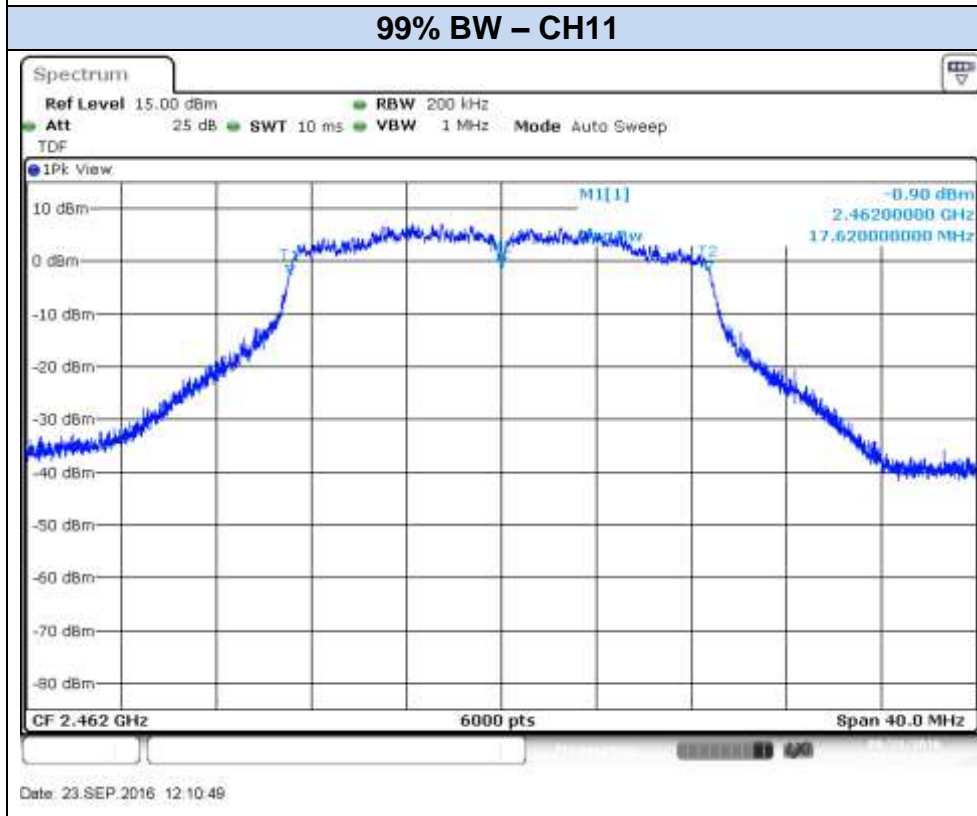
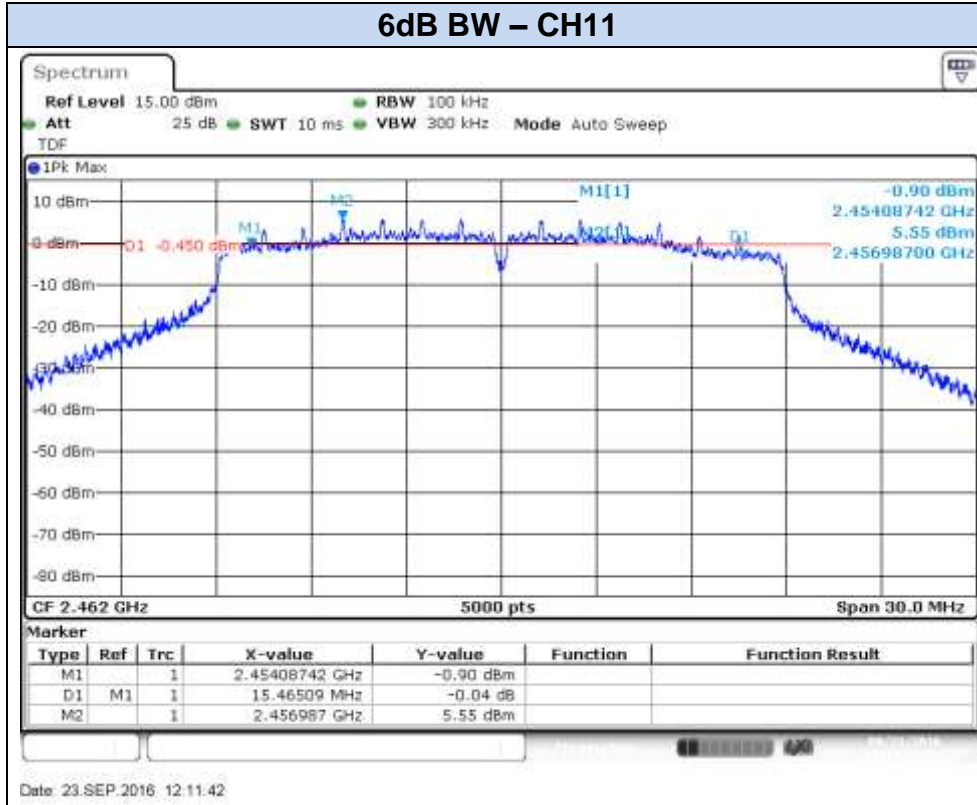


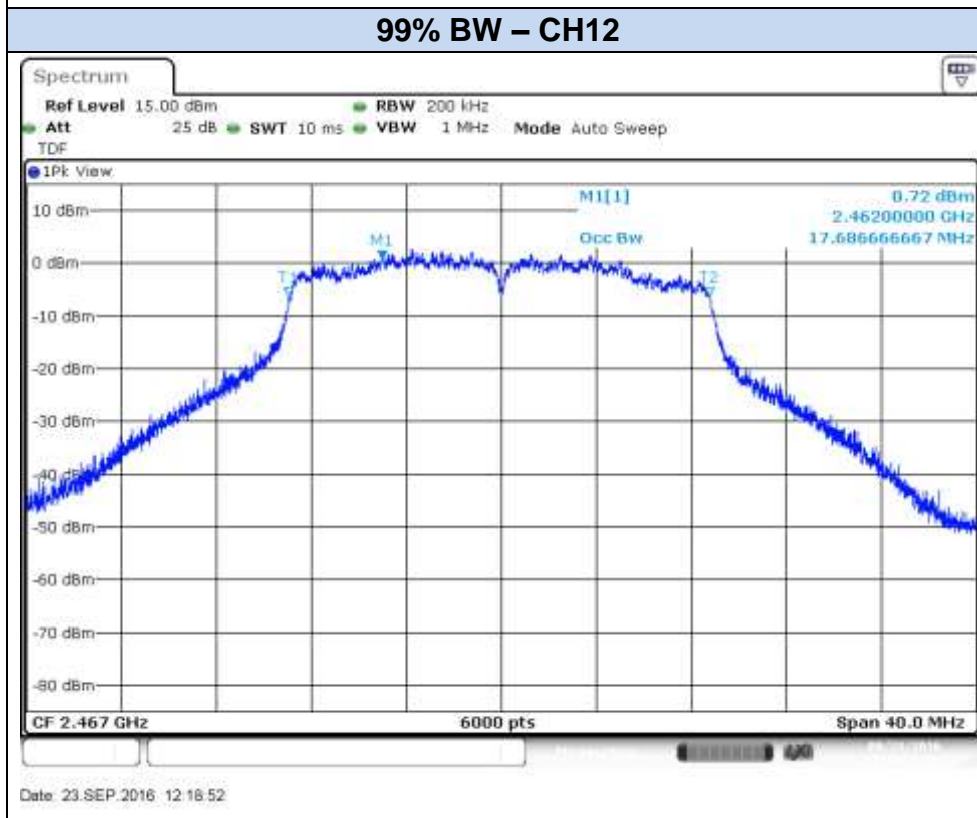
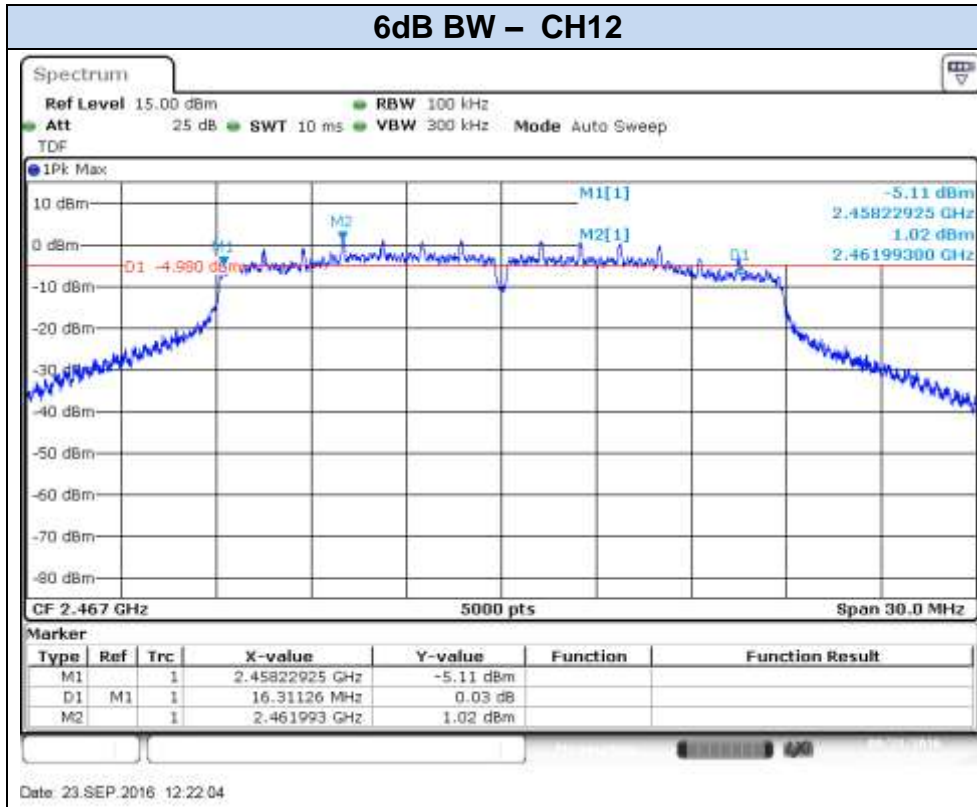
Date: 23.SEP.2016 11:59:21

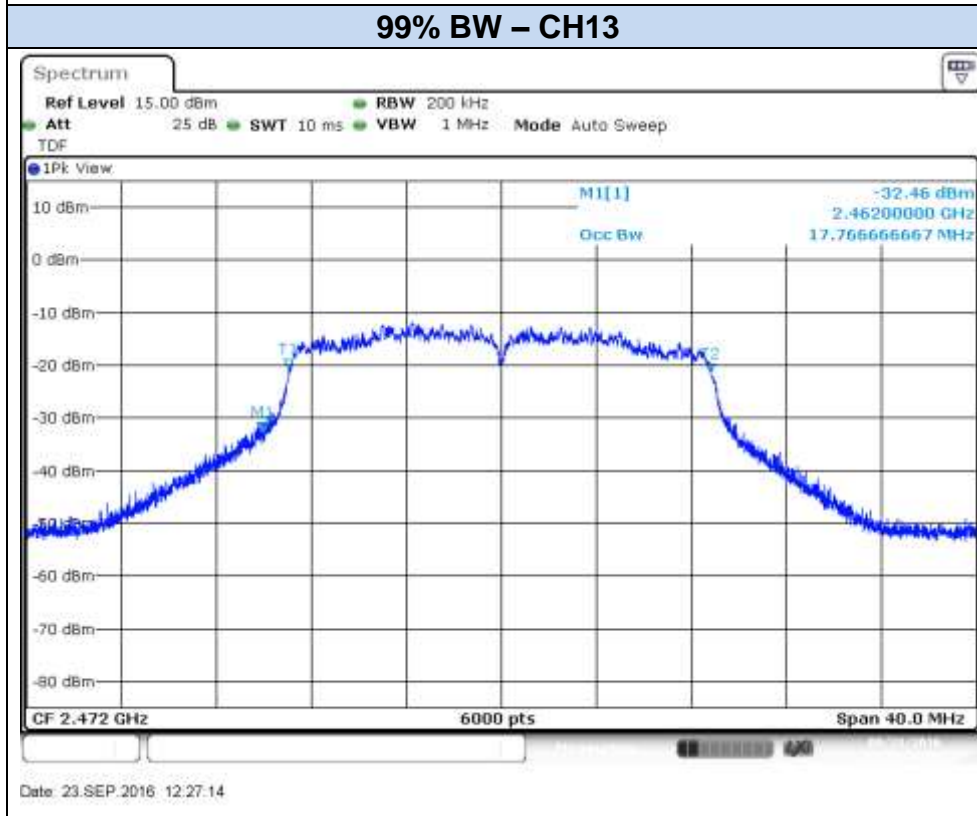
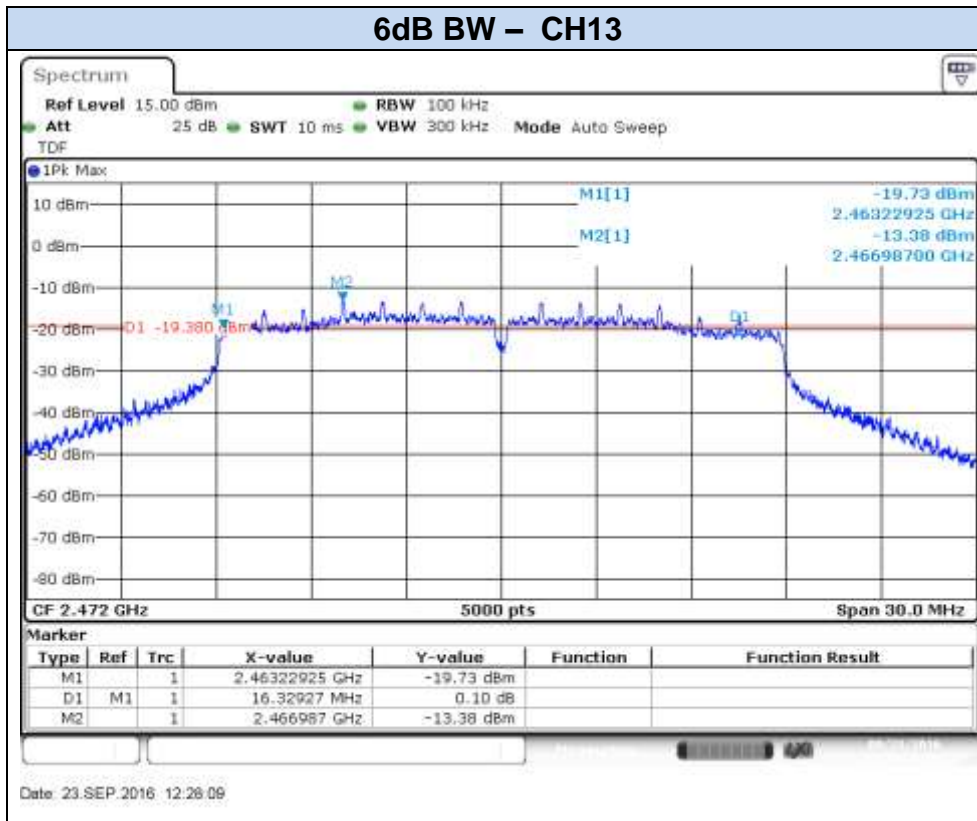


Date: 23.SEP.2016 11:56:37

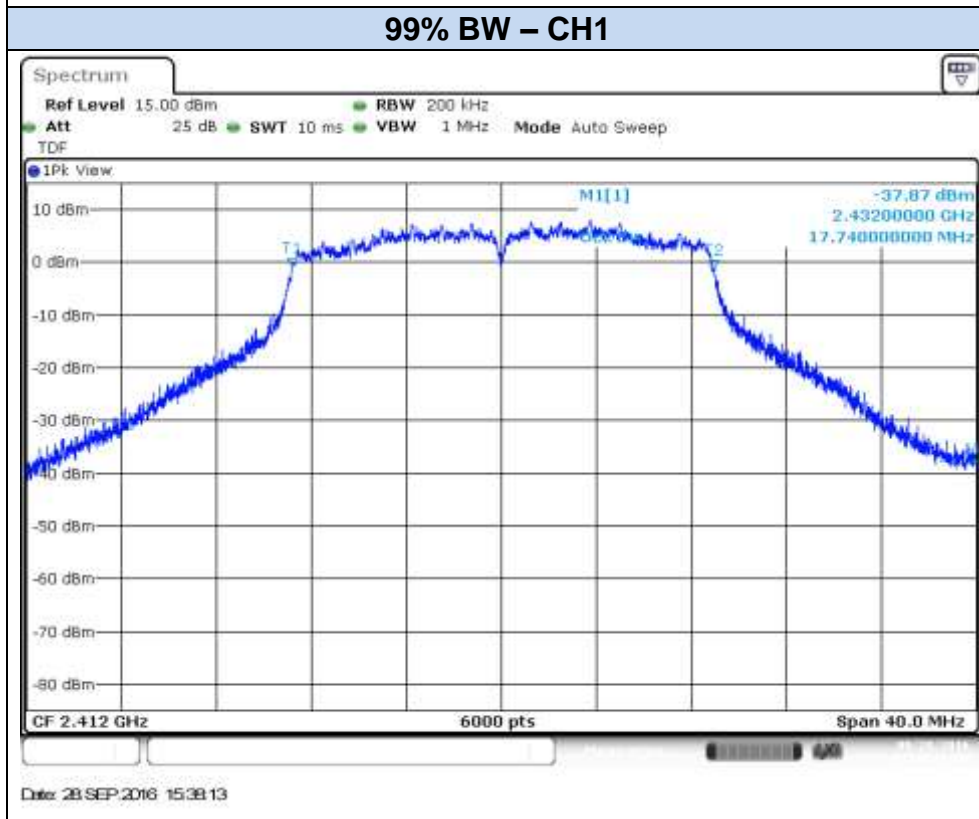
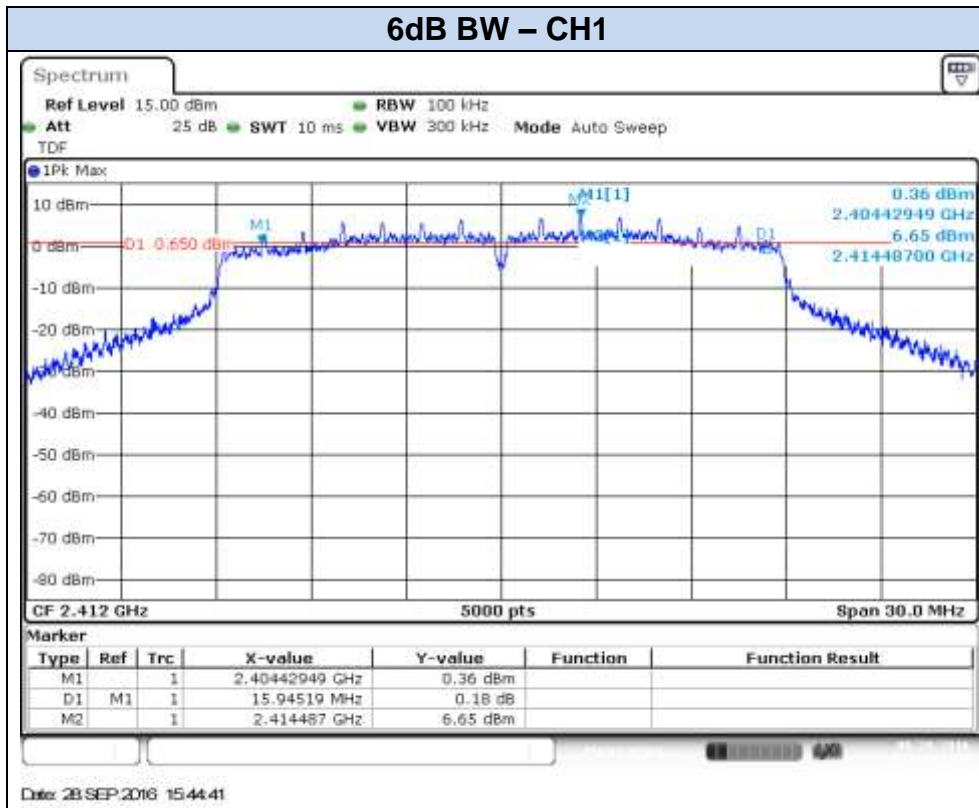


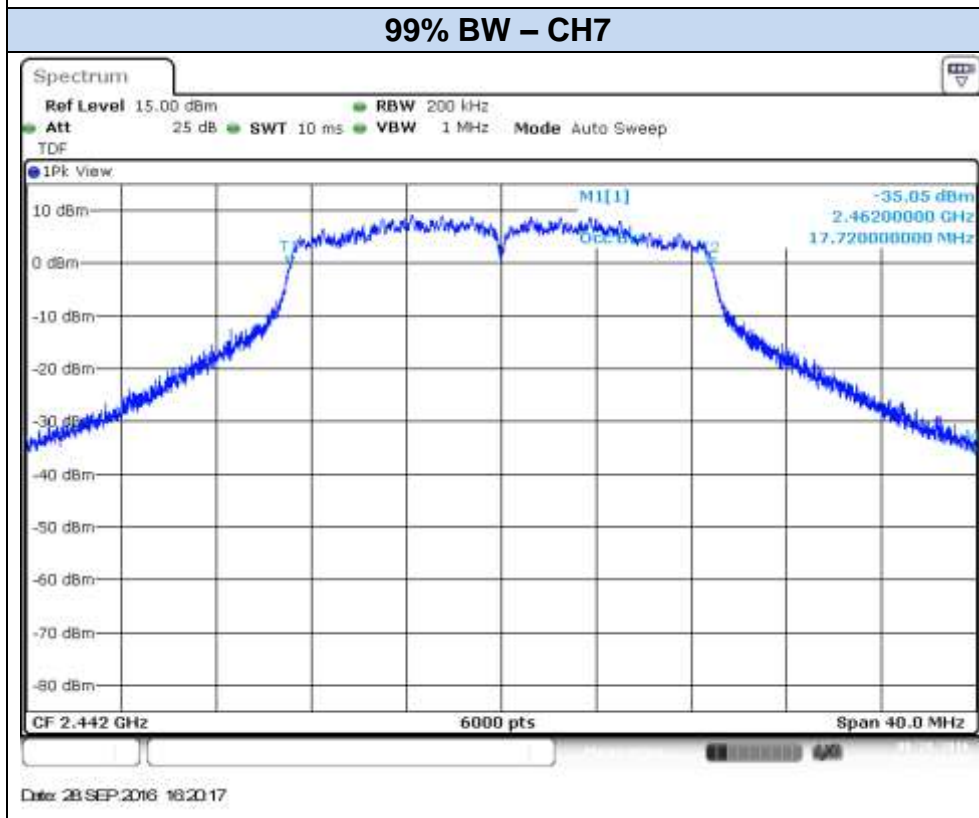
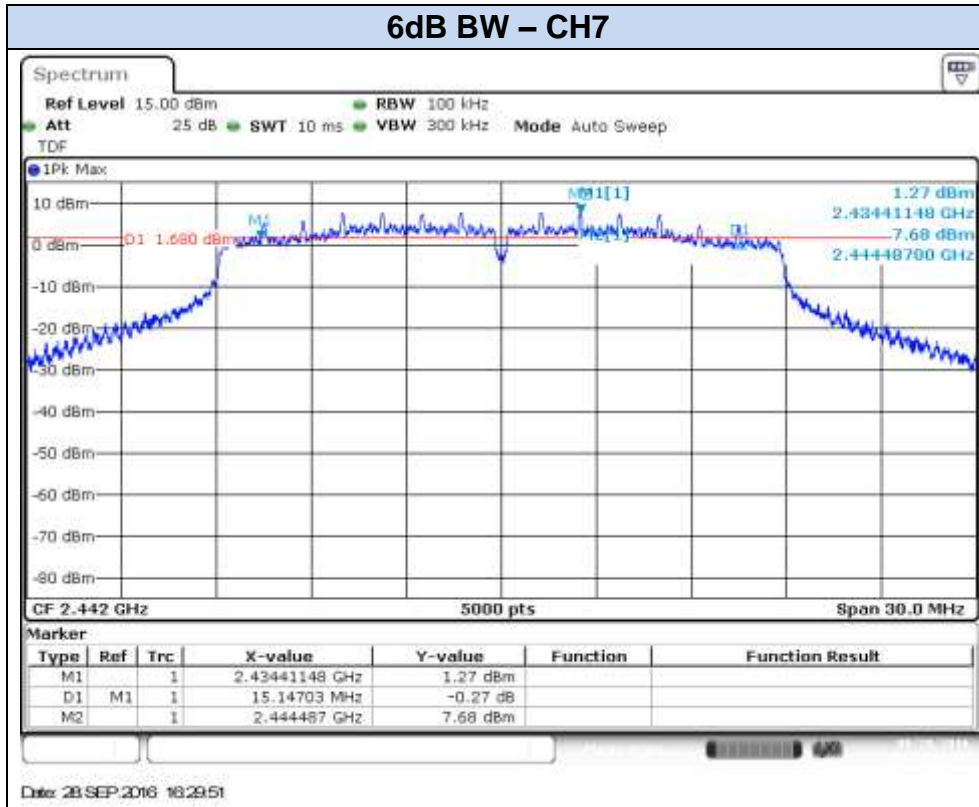


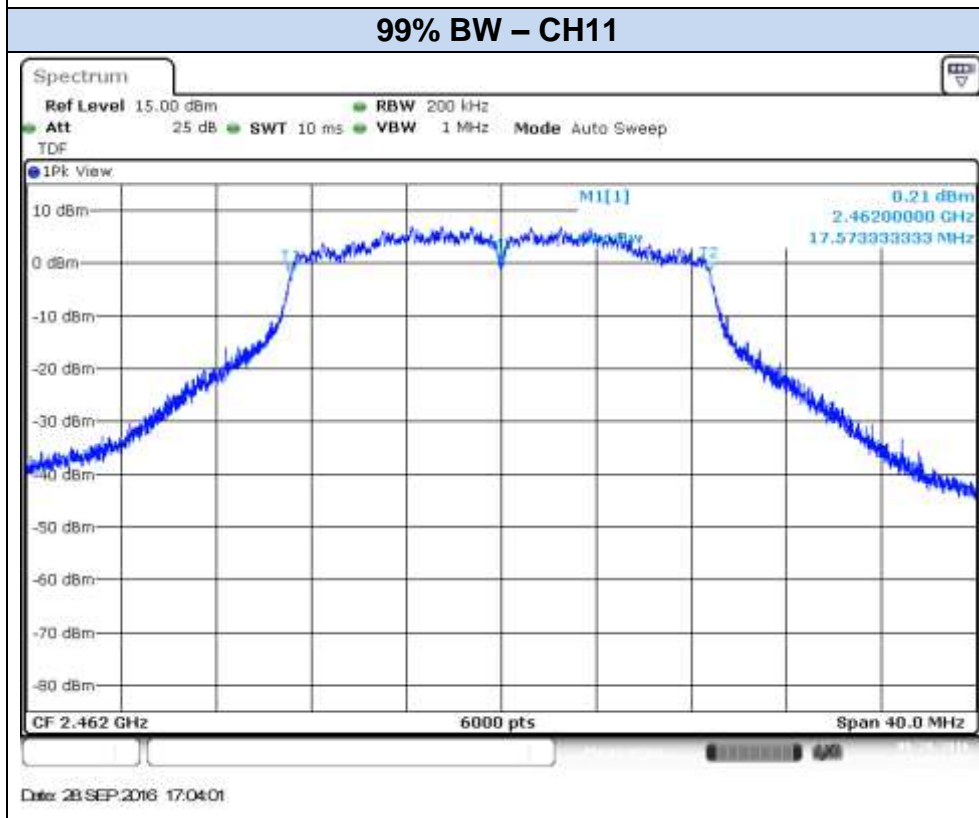
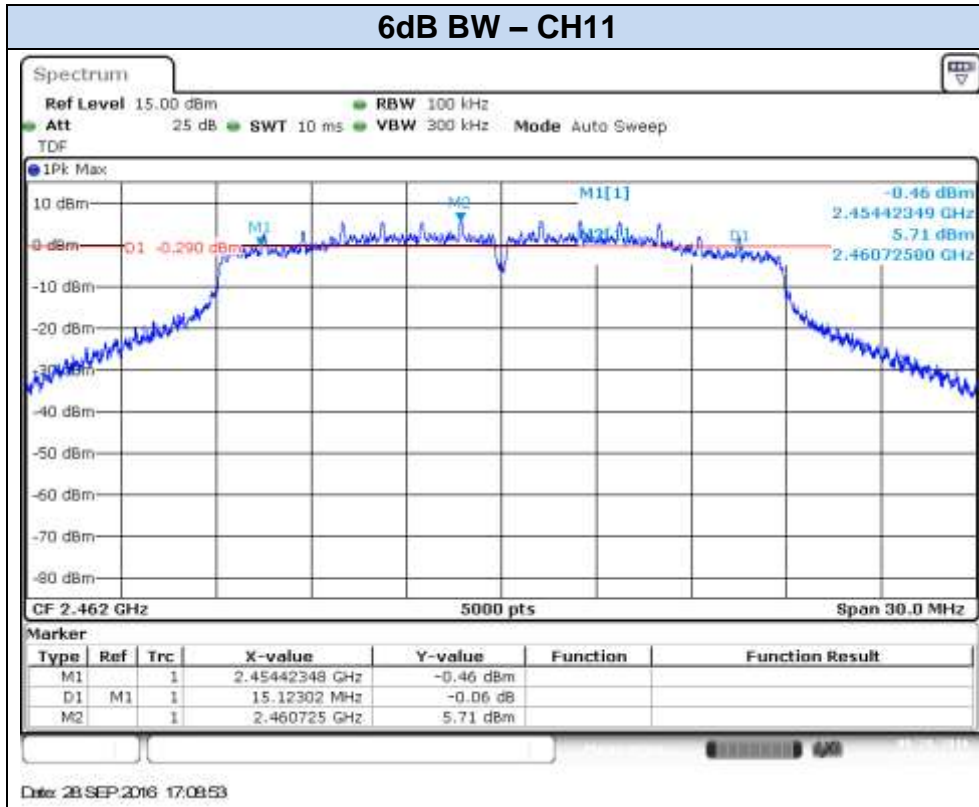


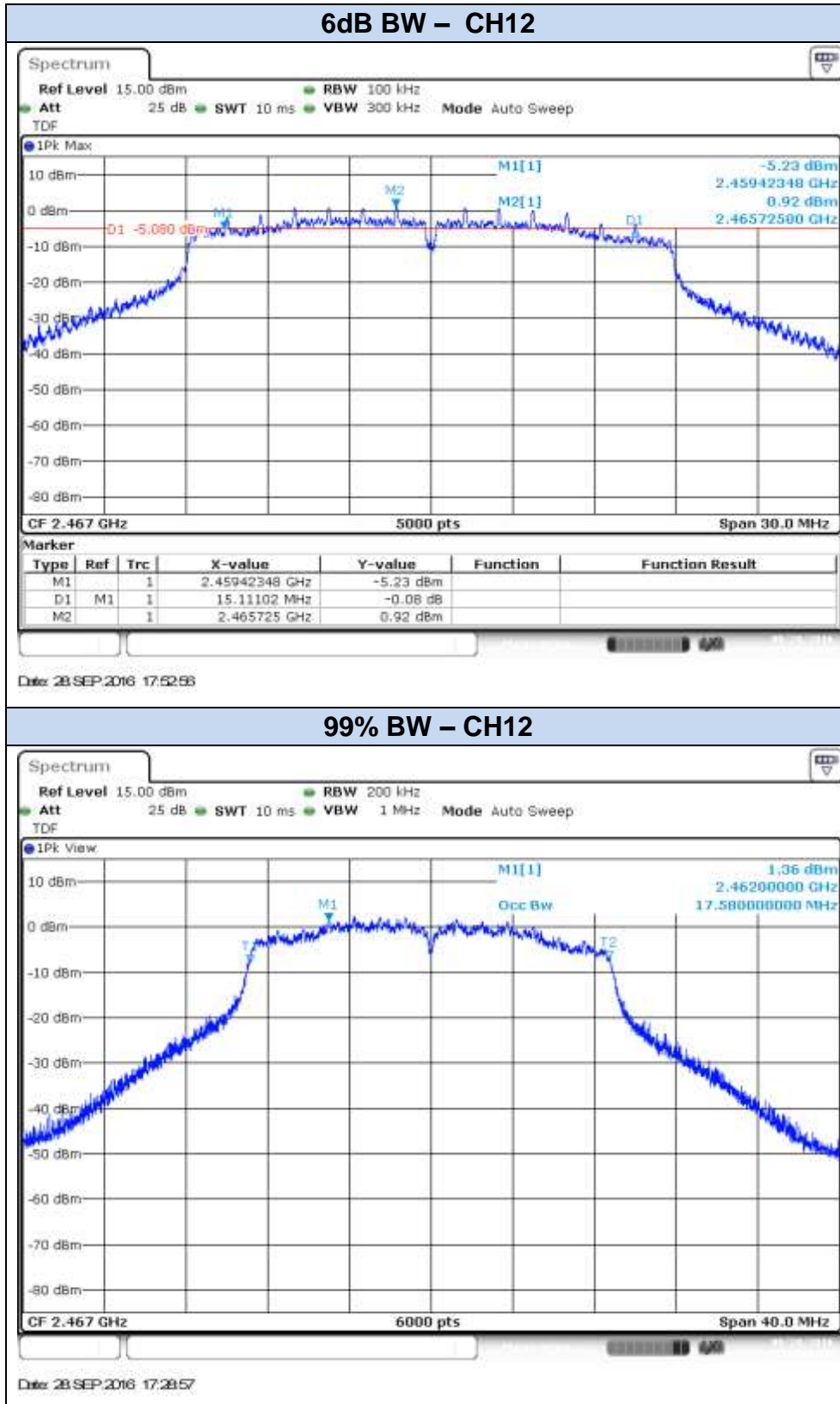


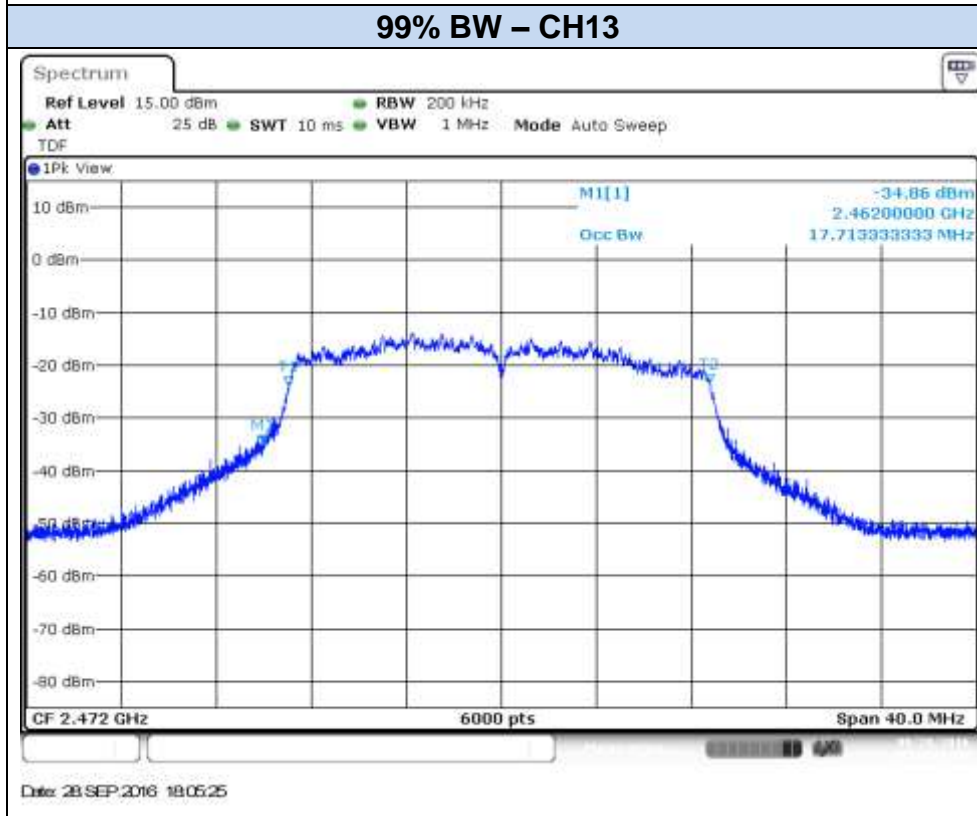
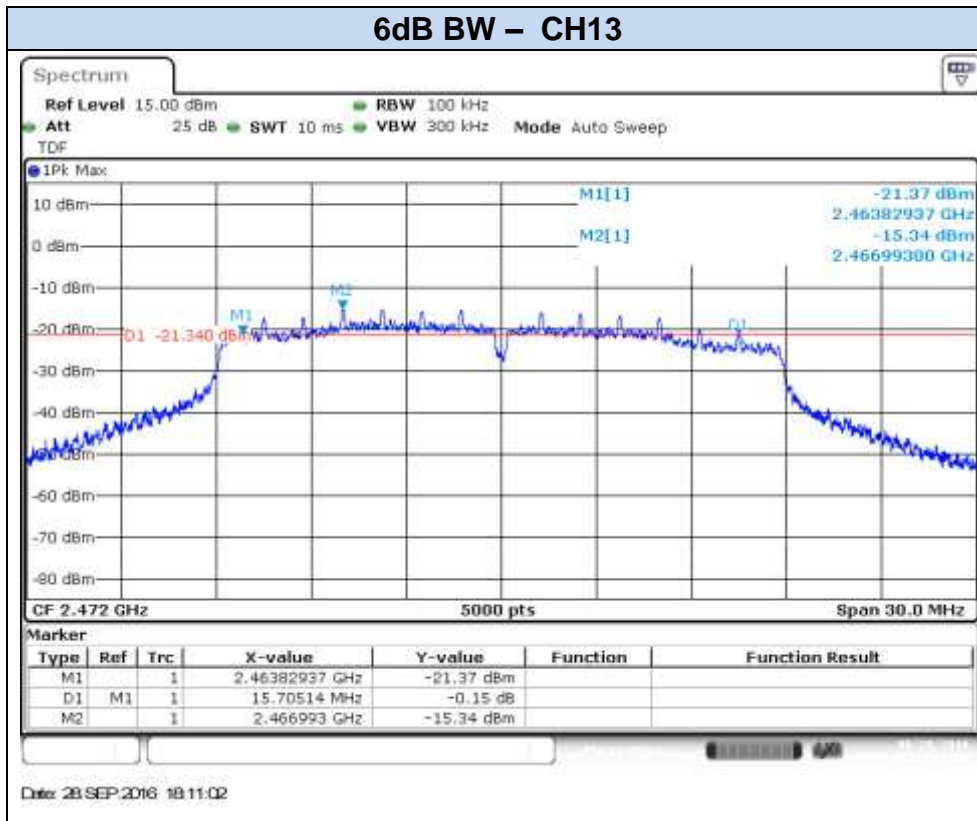
802.11n20, HT0 (MIMO) – Chain A



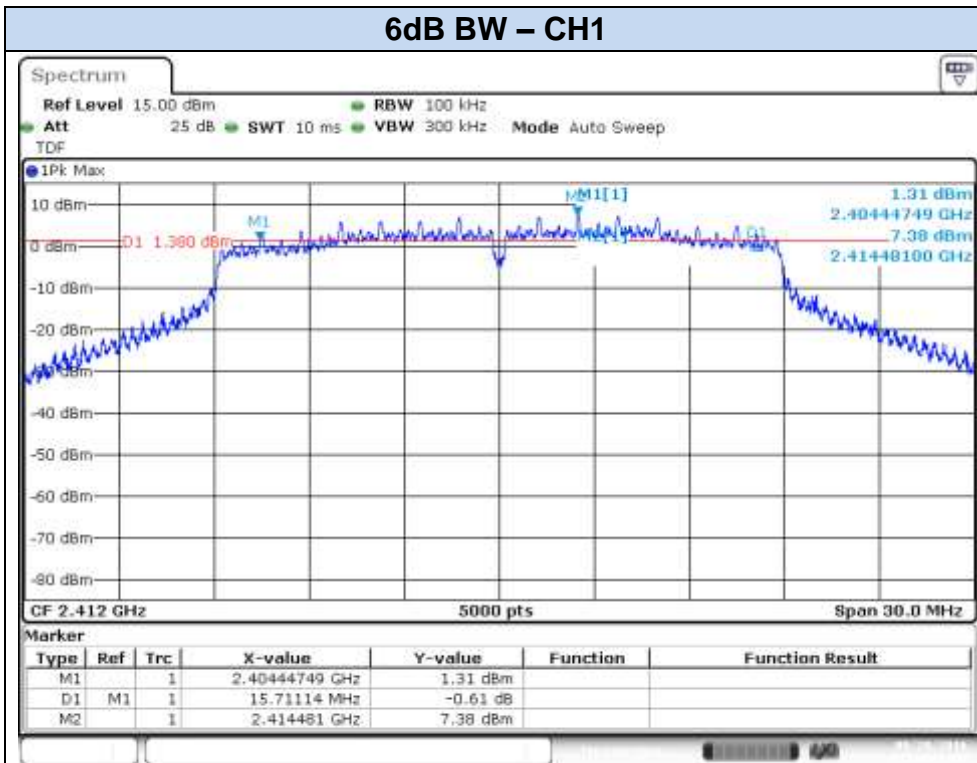




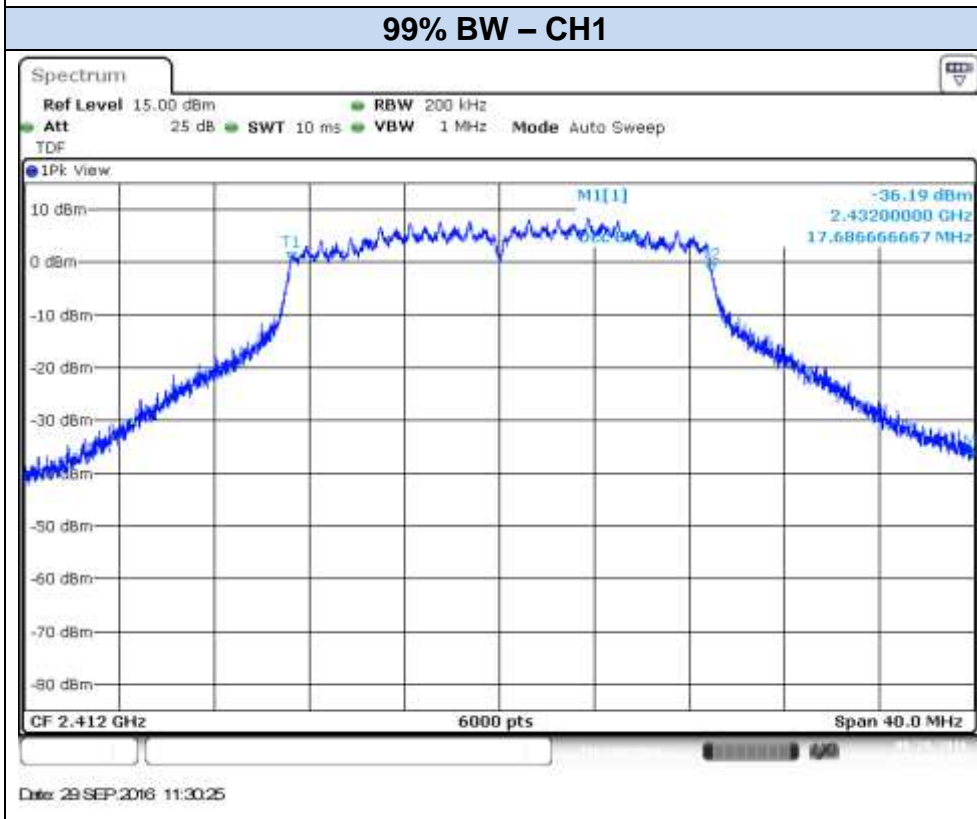




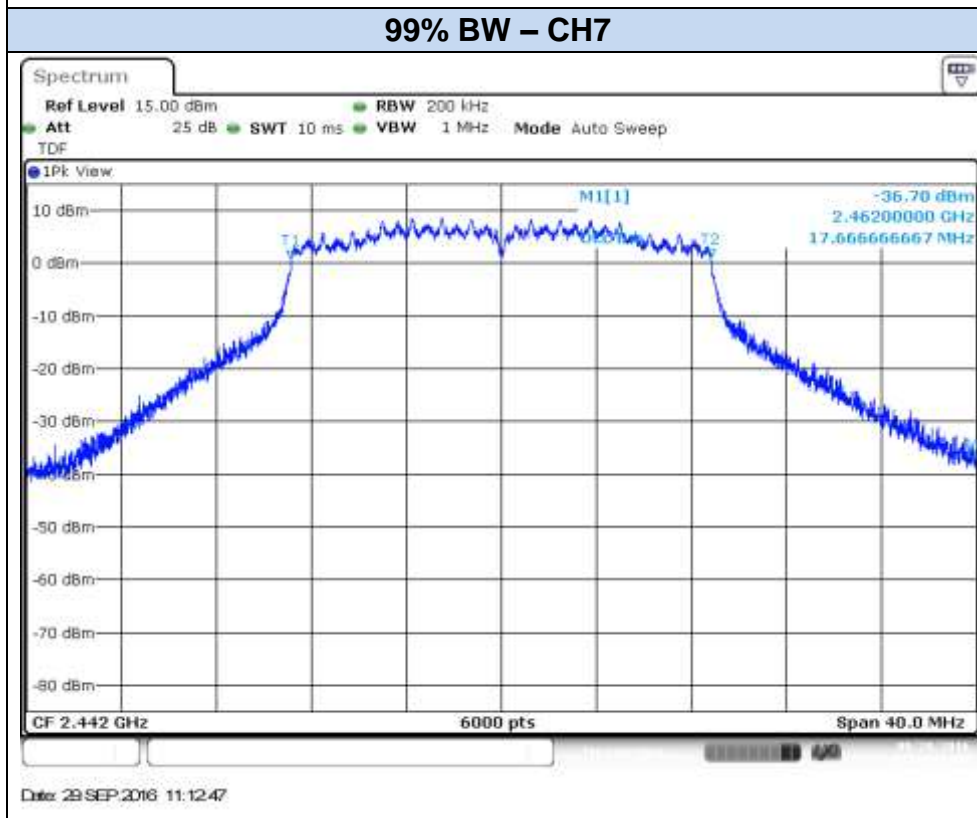
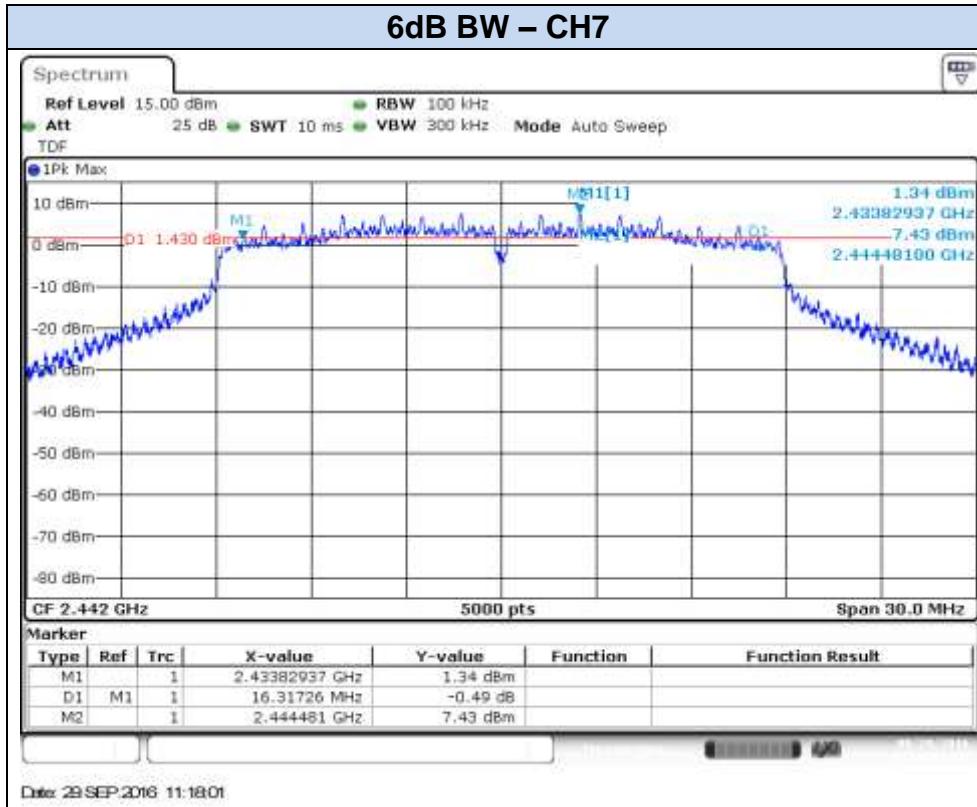
802.11n20, HT0 (MIMO) – Chain B

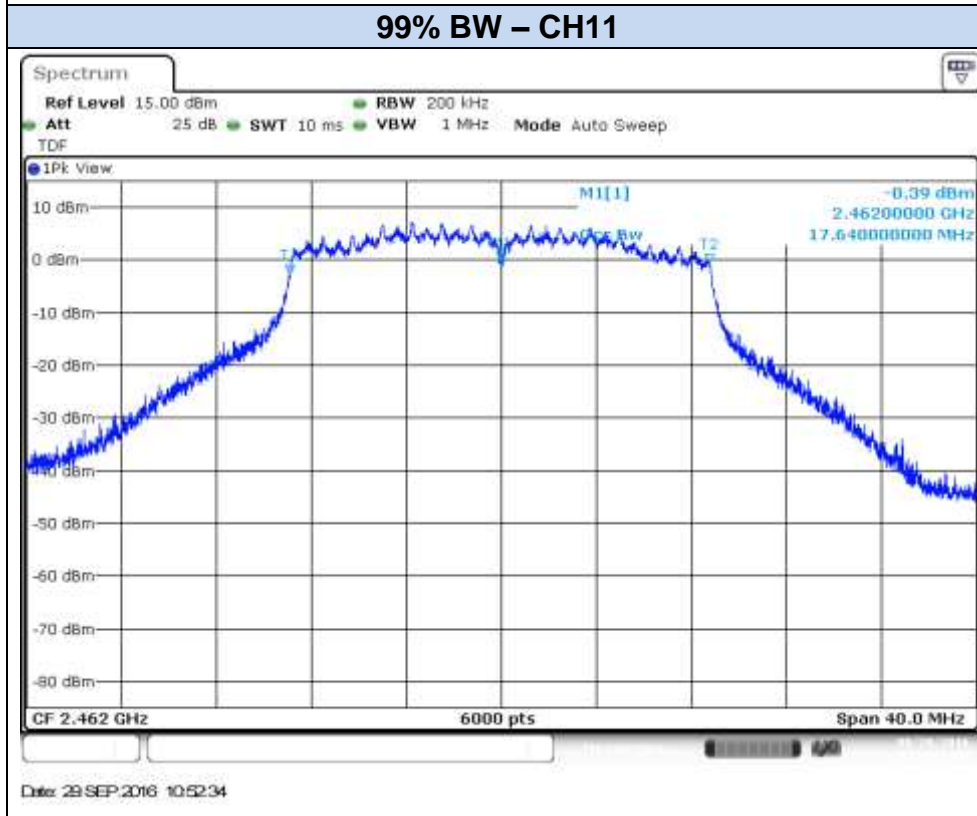
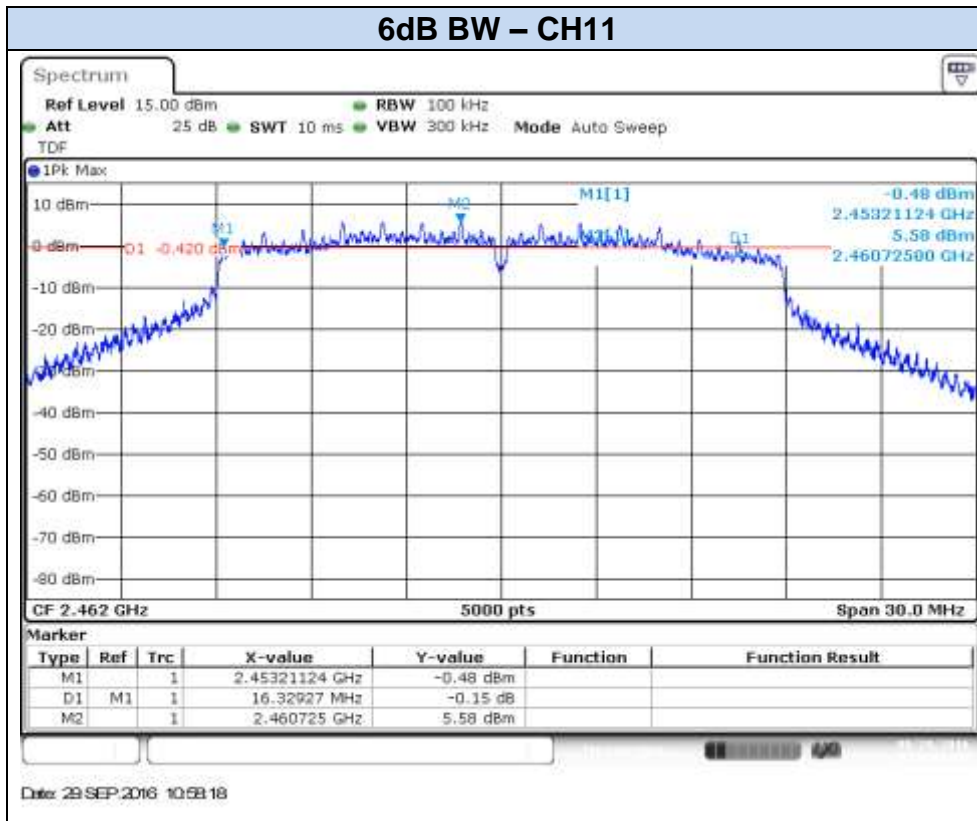


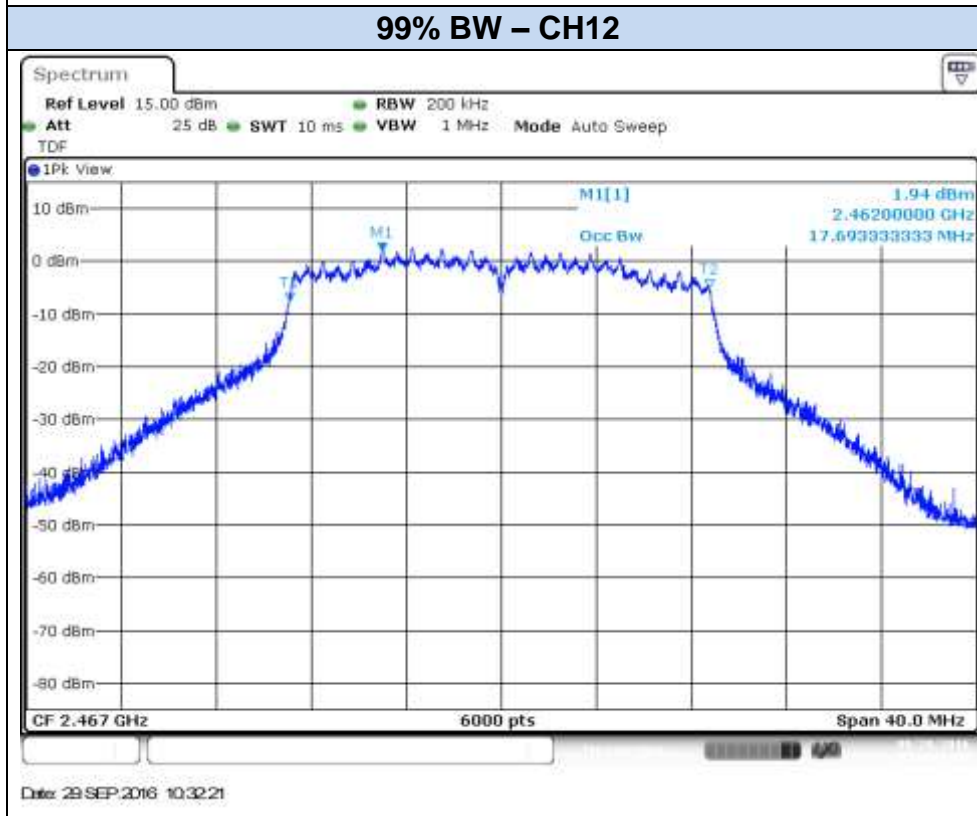
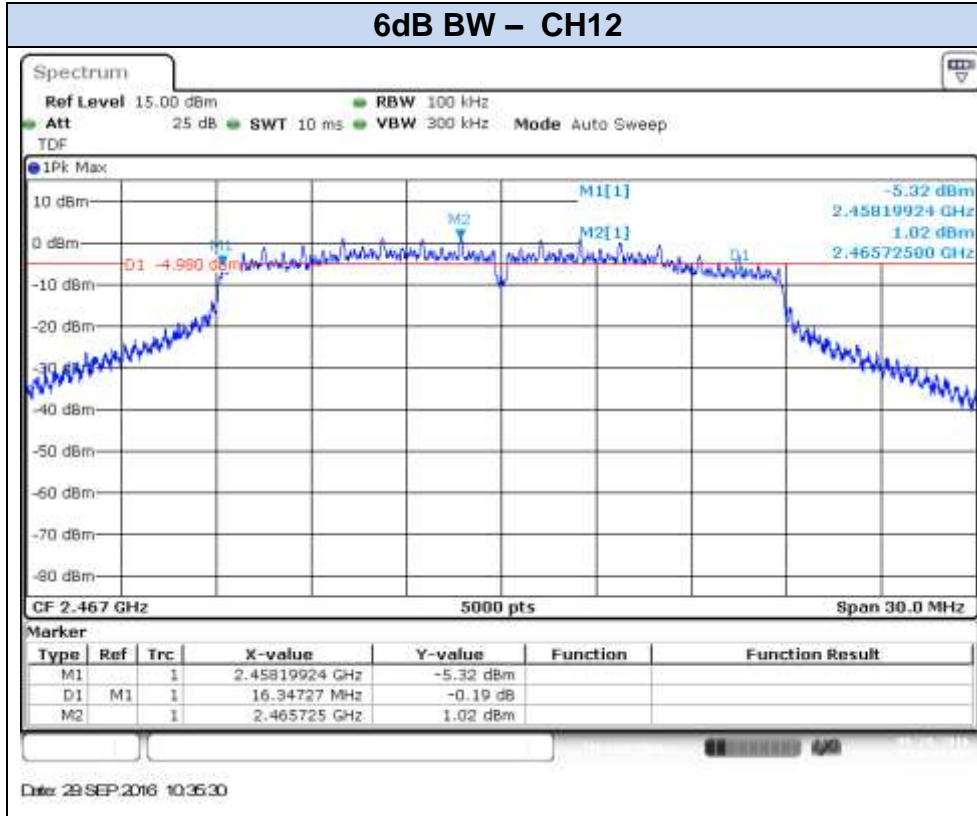
Date: 29 SEP 2016 11:37:20

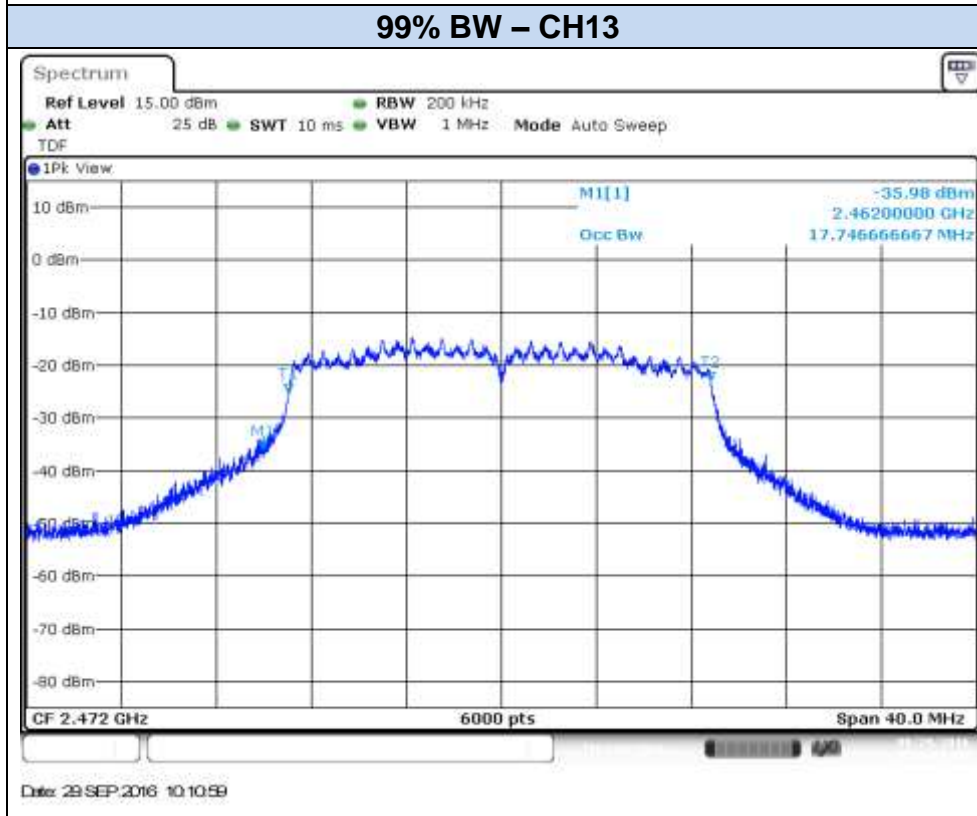
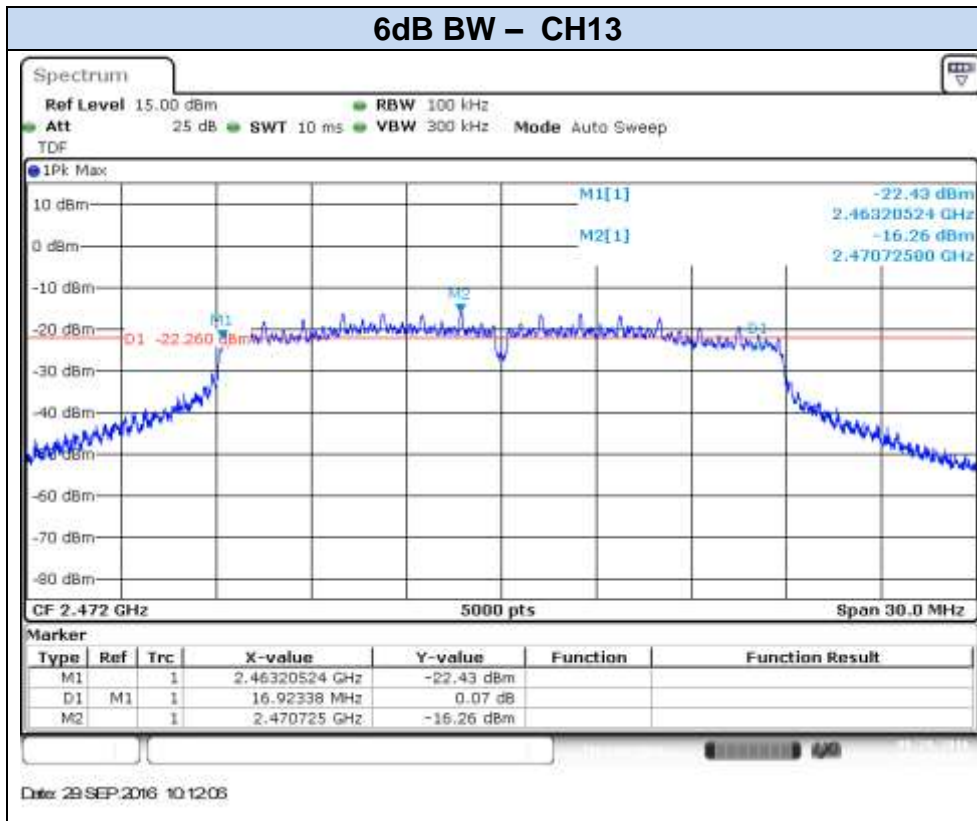


Date: 29 SEP 2016 11:30:25

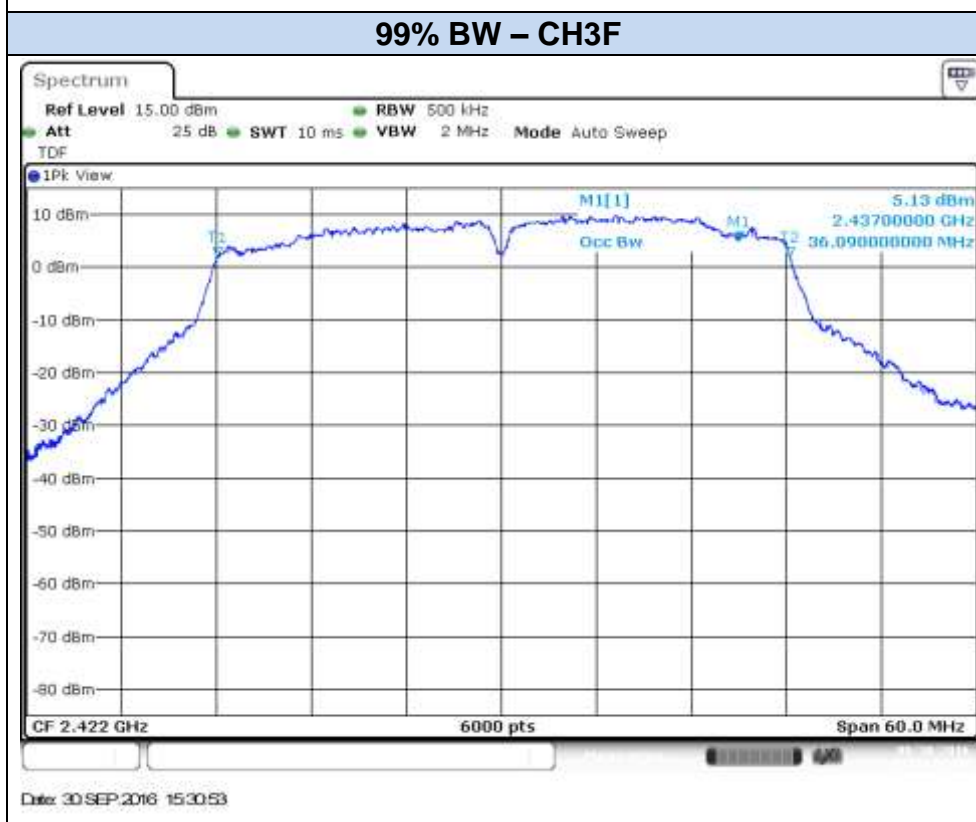
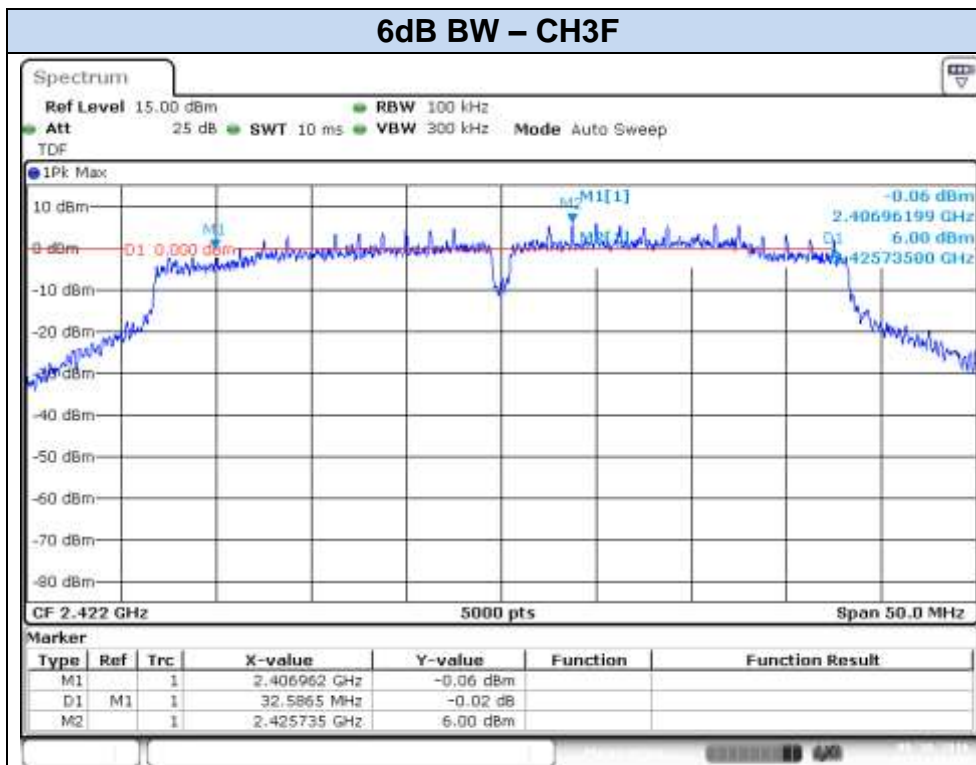


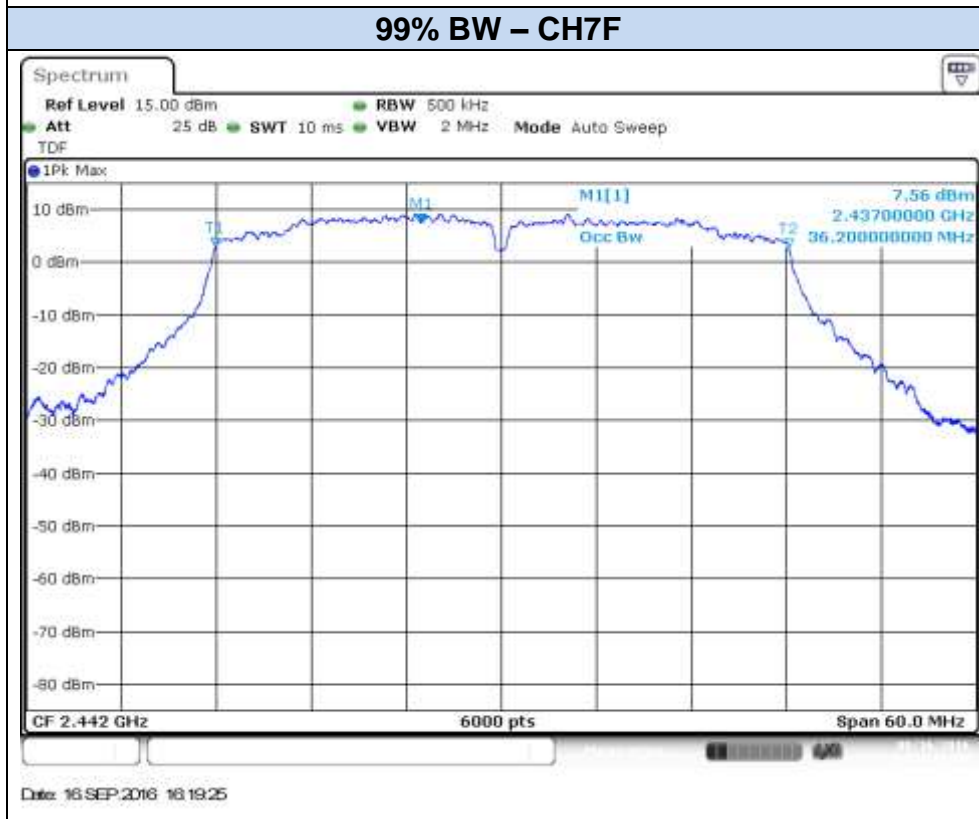
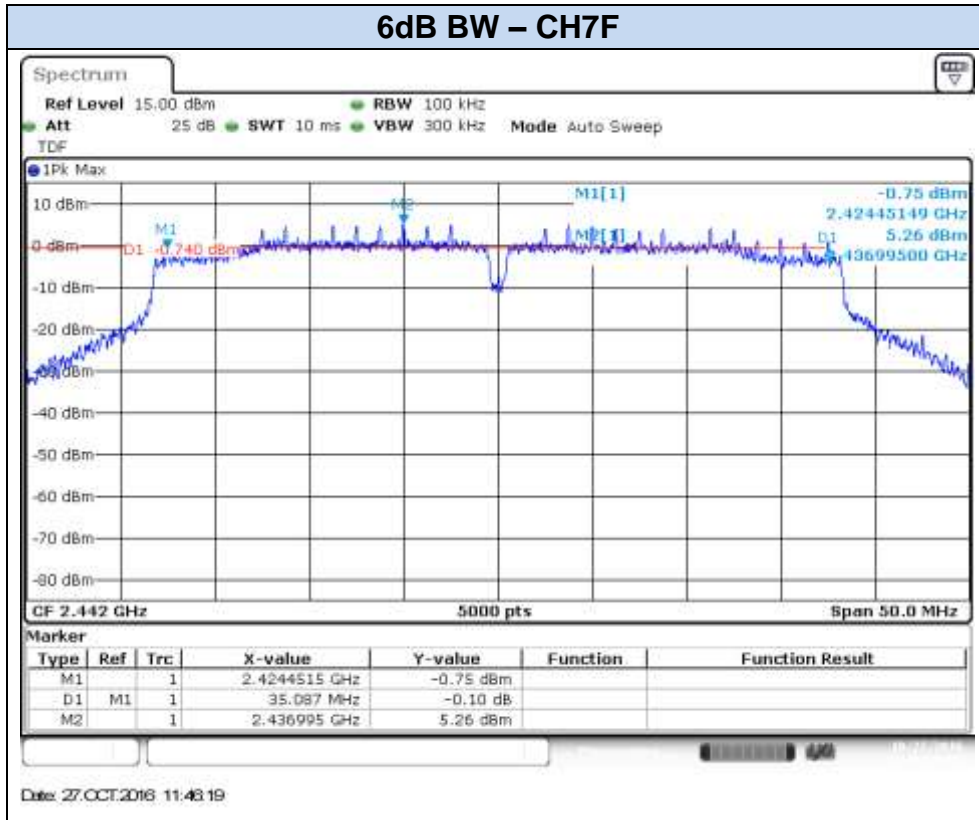


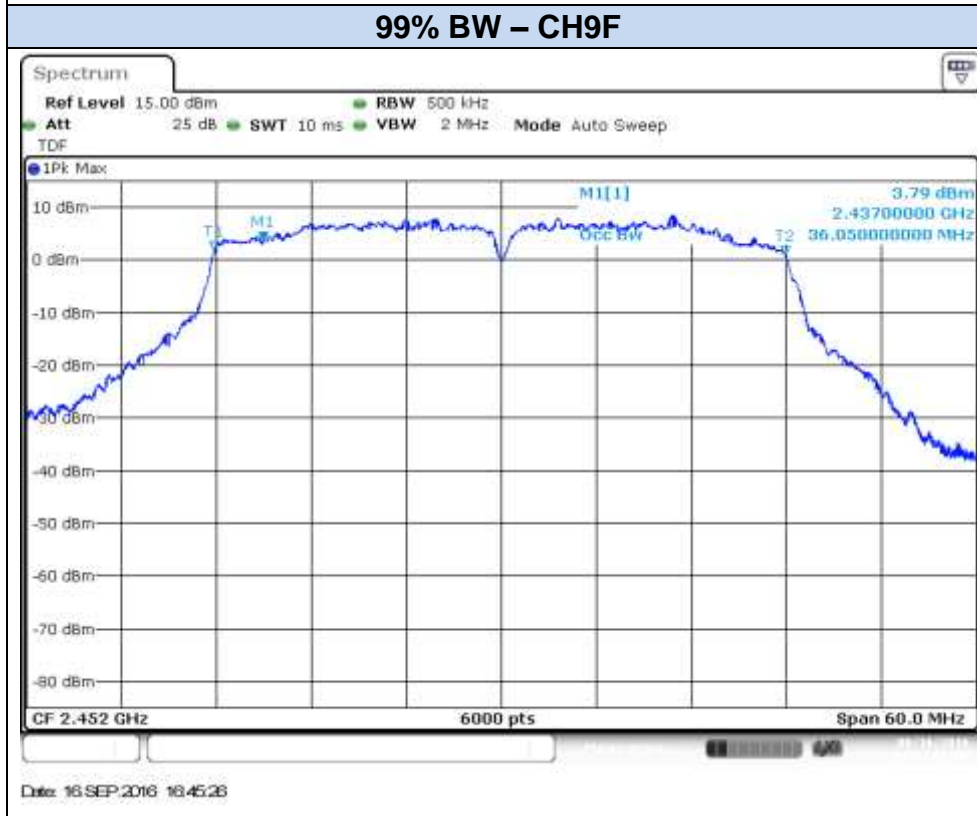
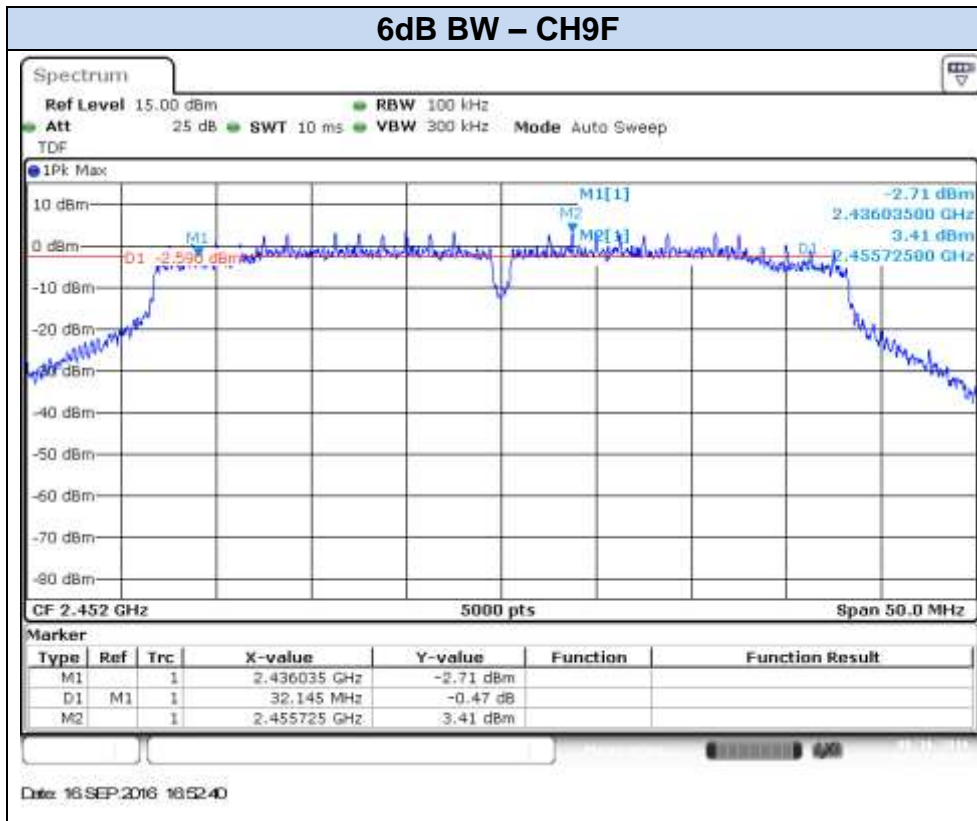


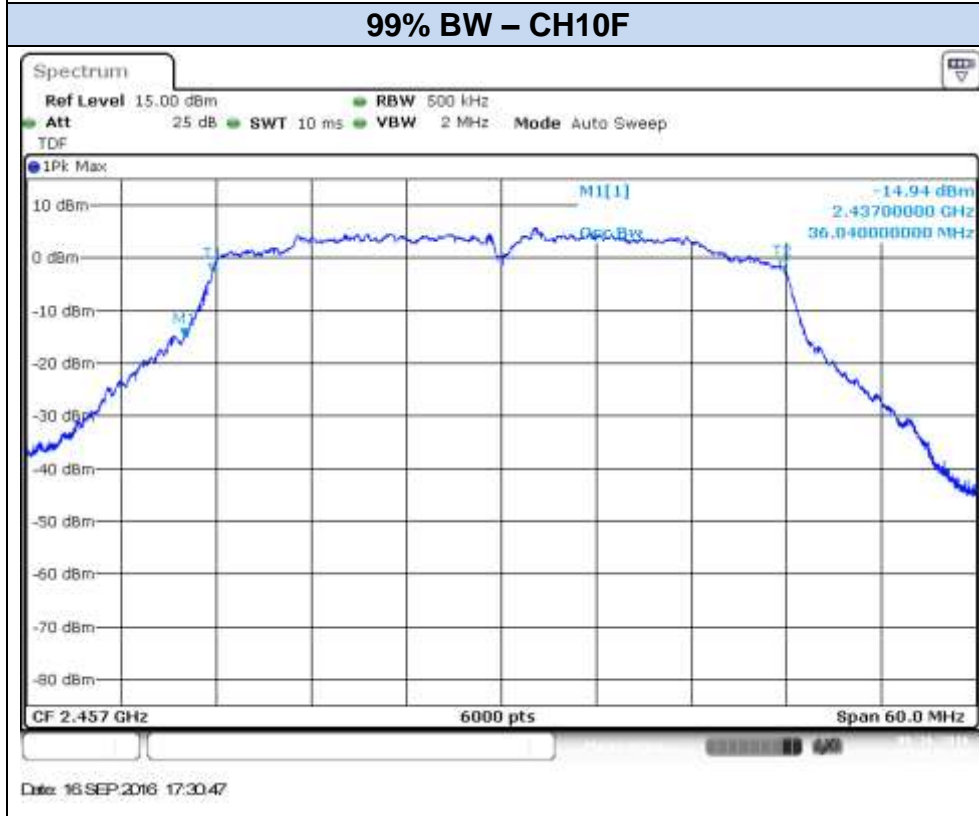
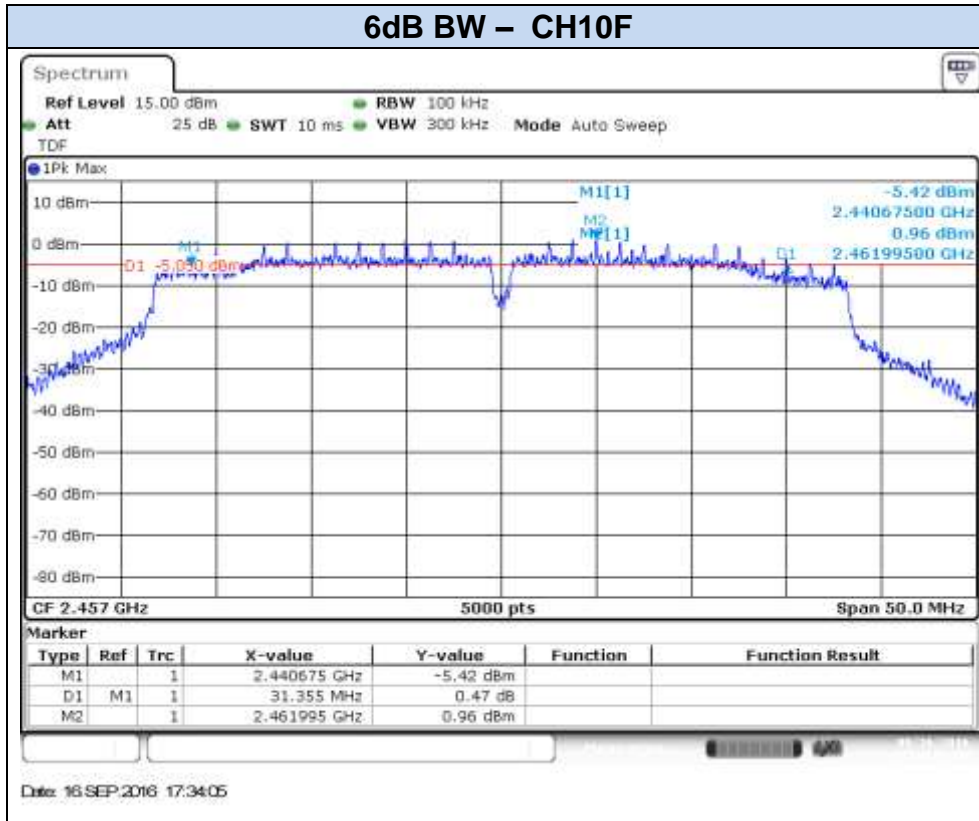


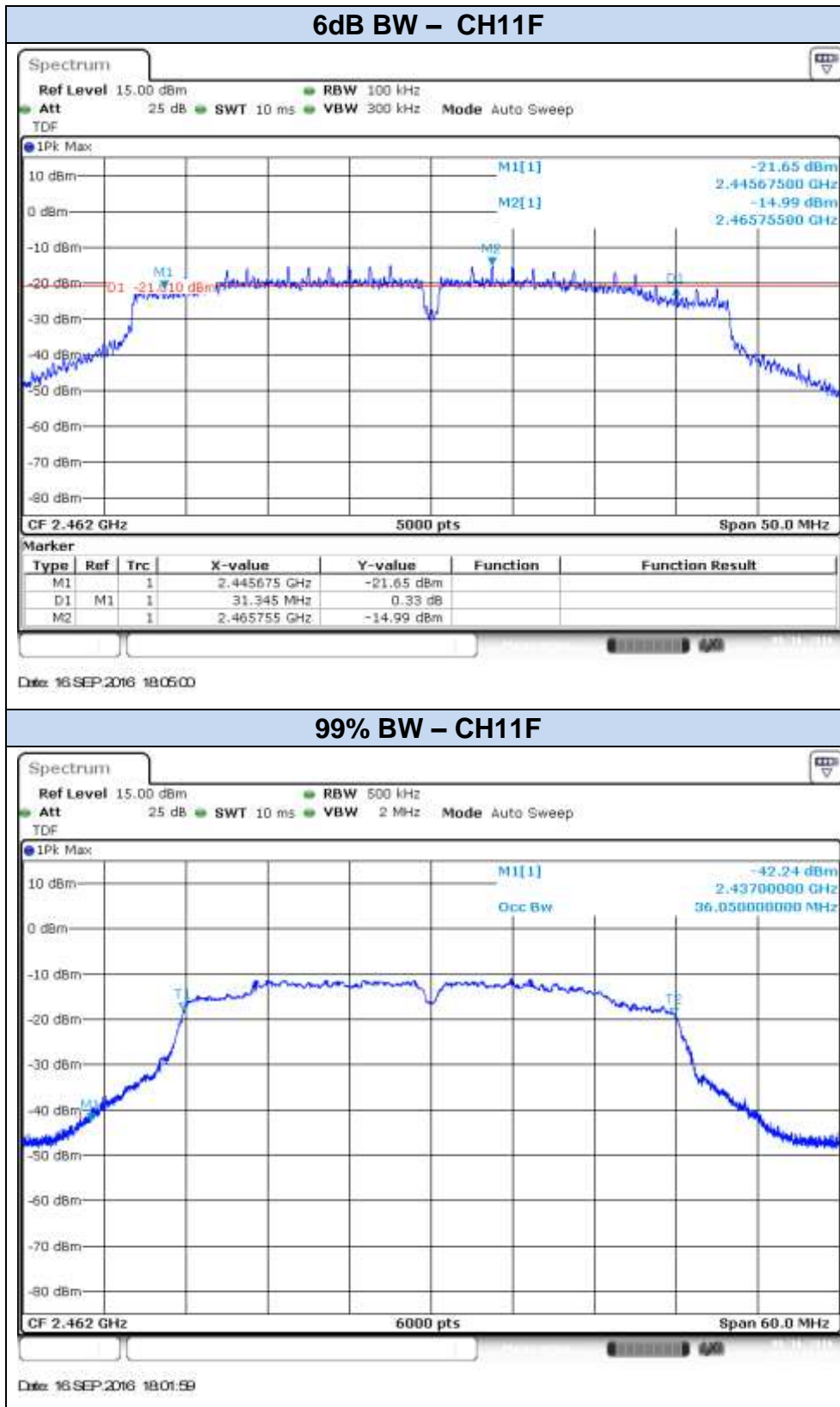
802.11n40, HT0 (SISO) – Chain A



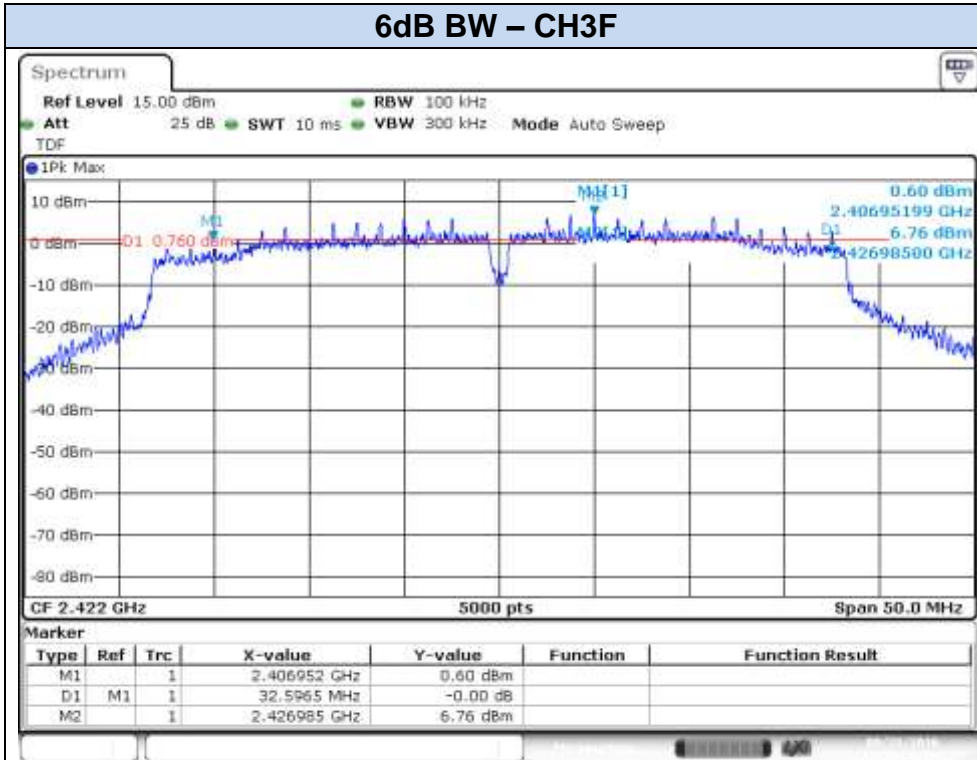




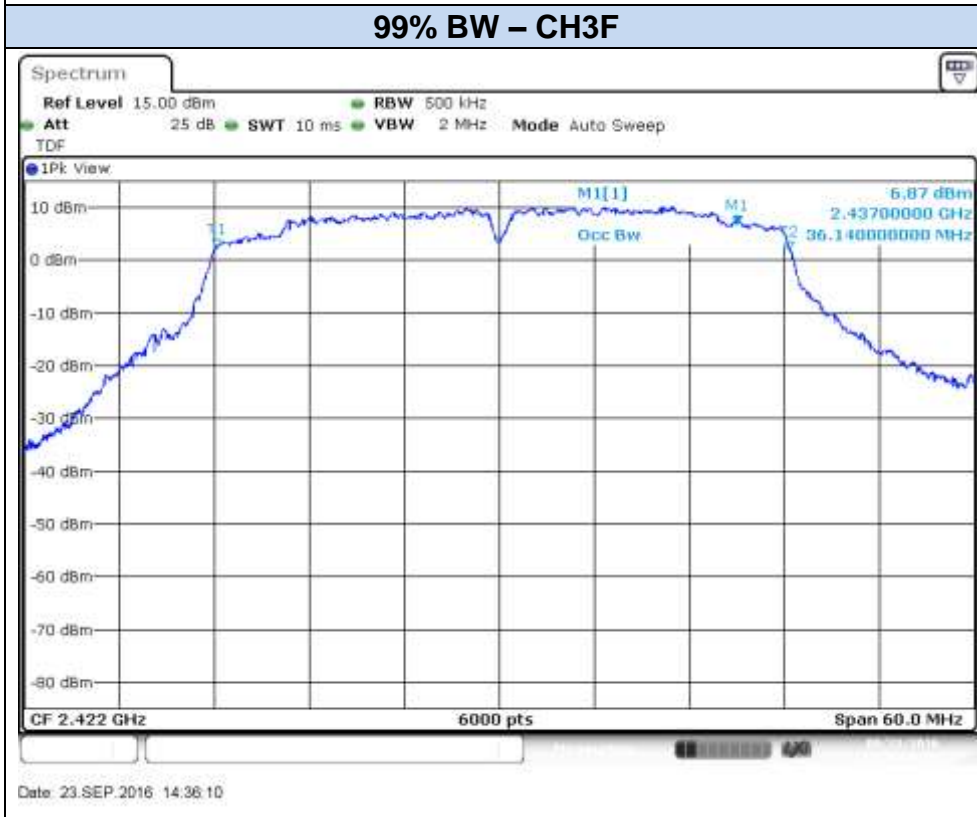




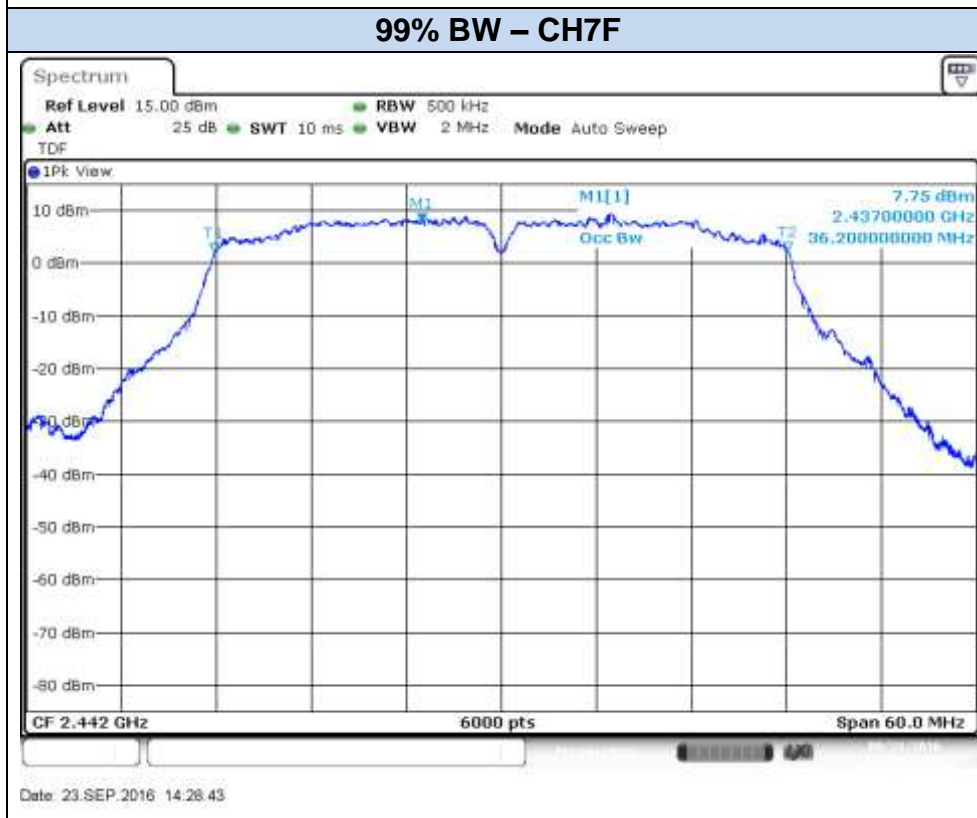
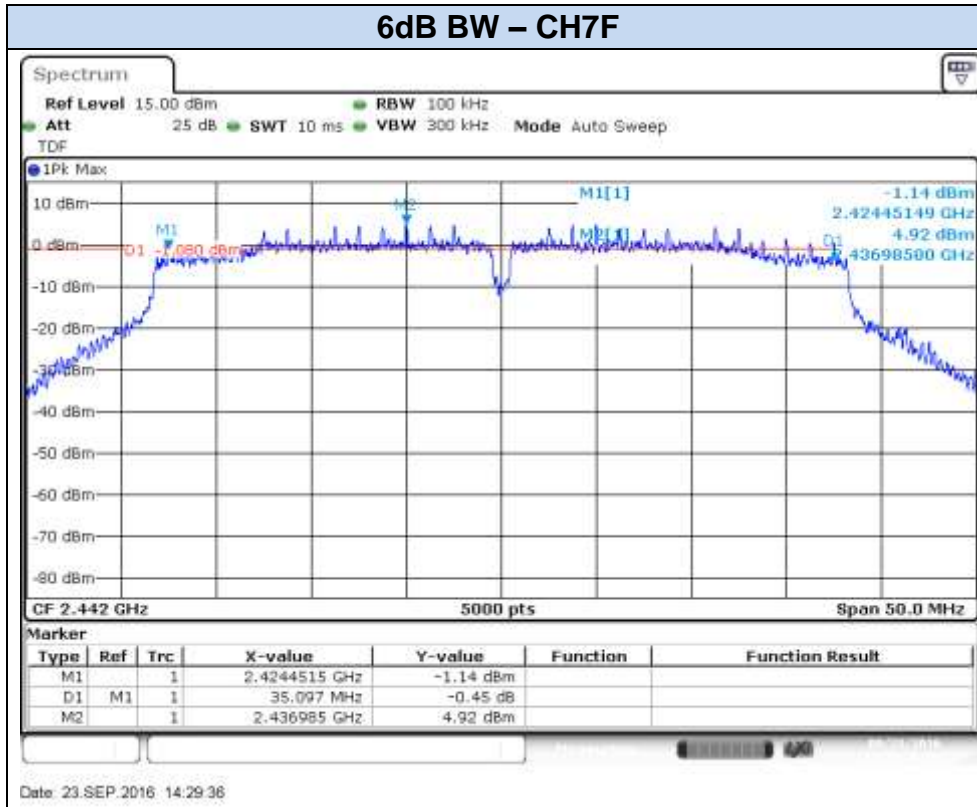
802.11n40, HT0 (SISO) – Chain B

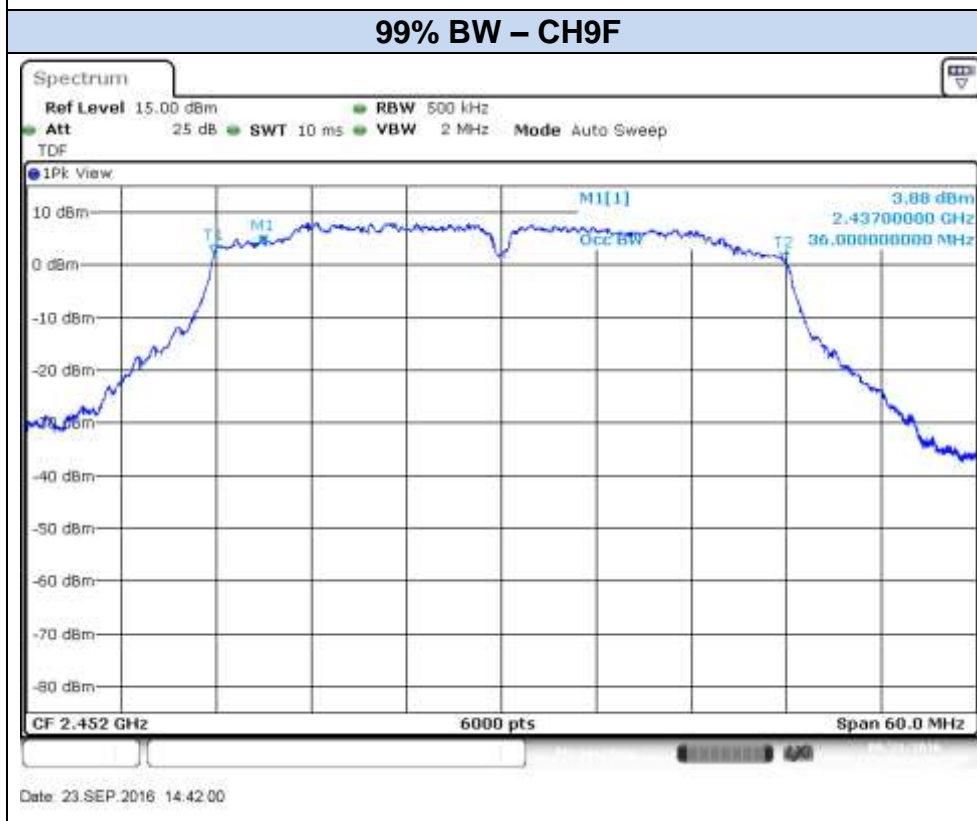
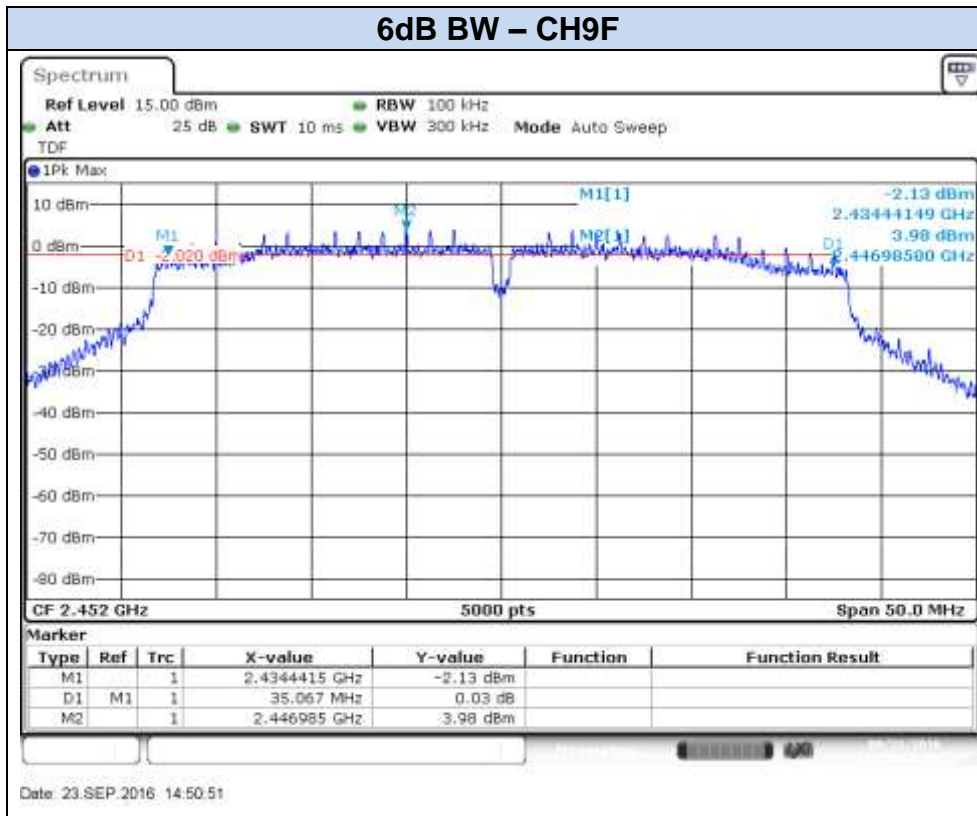


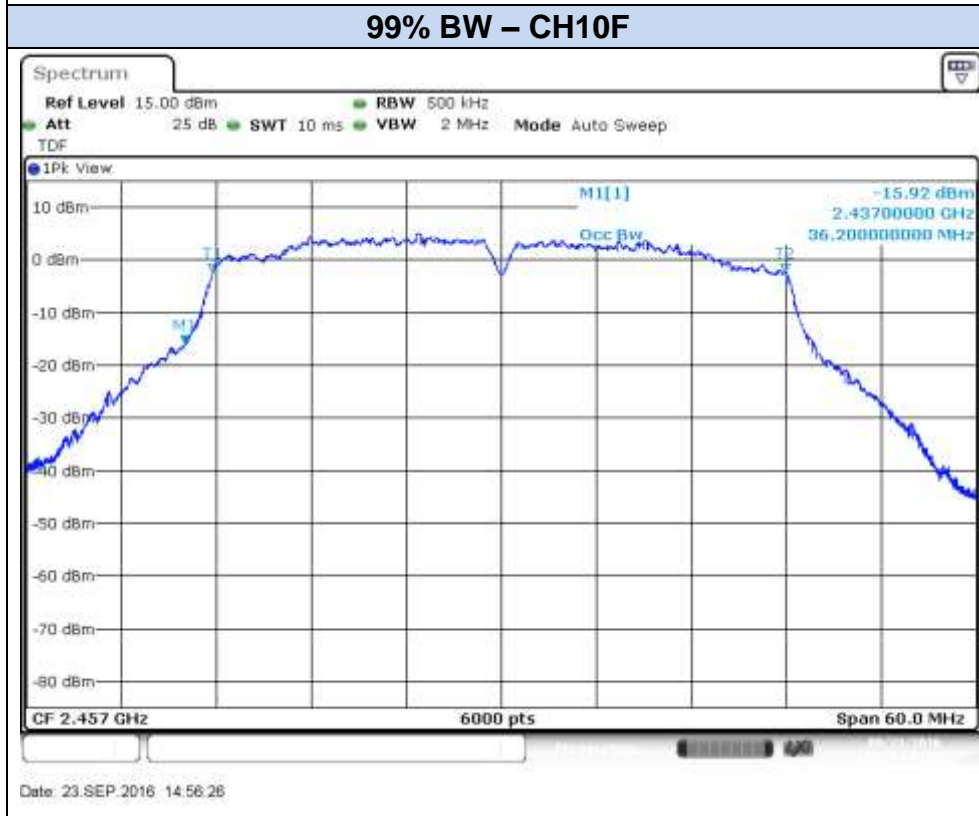
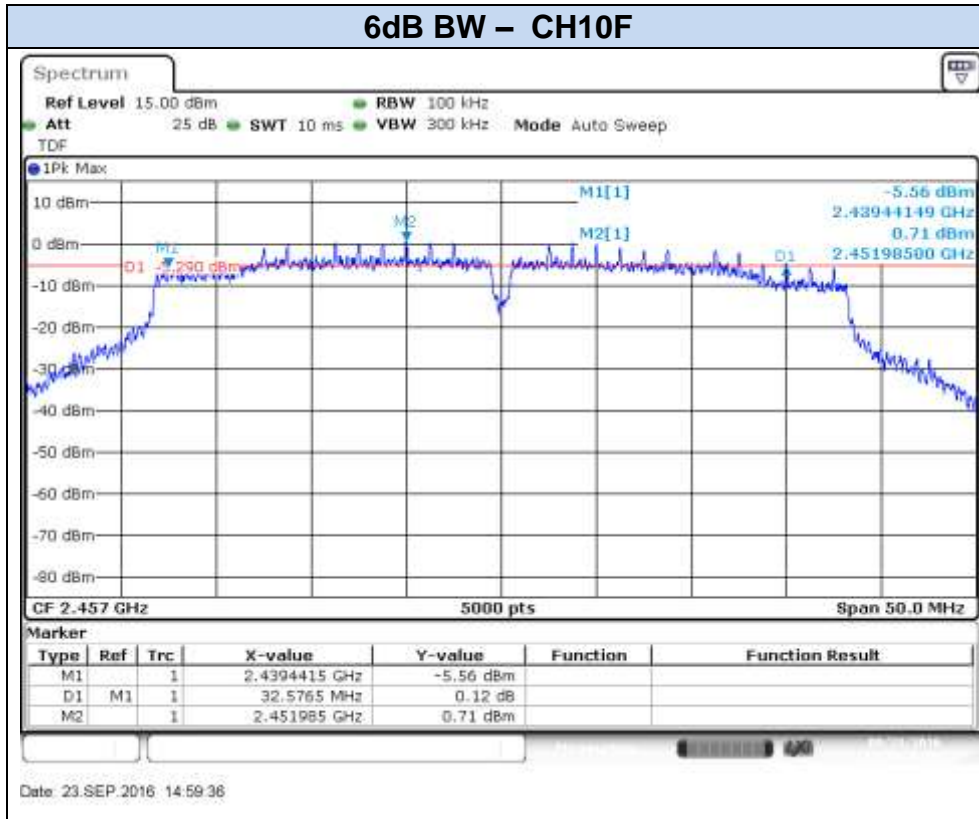
Date: 23.SEP.2016 14:18:03

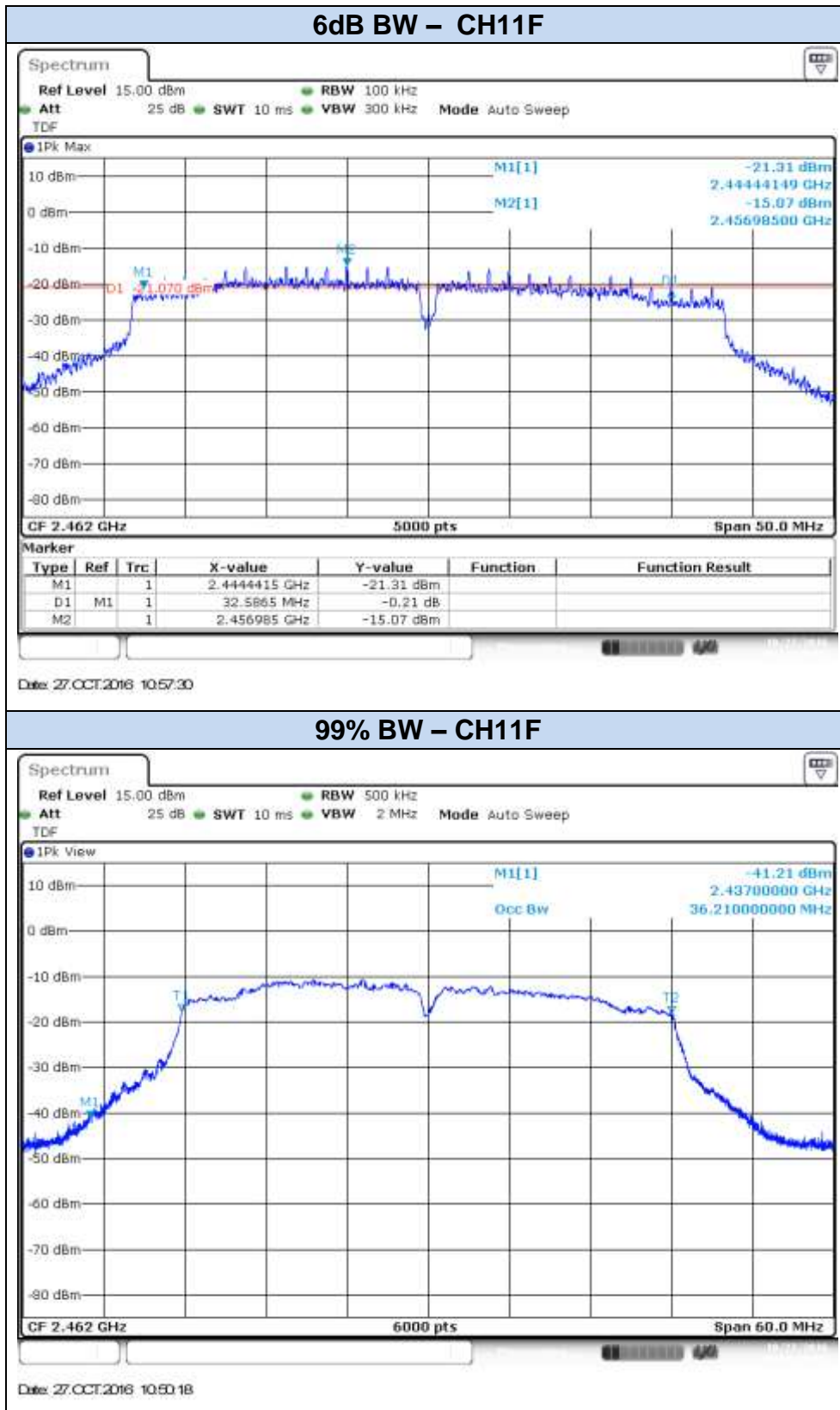


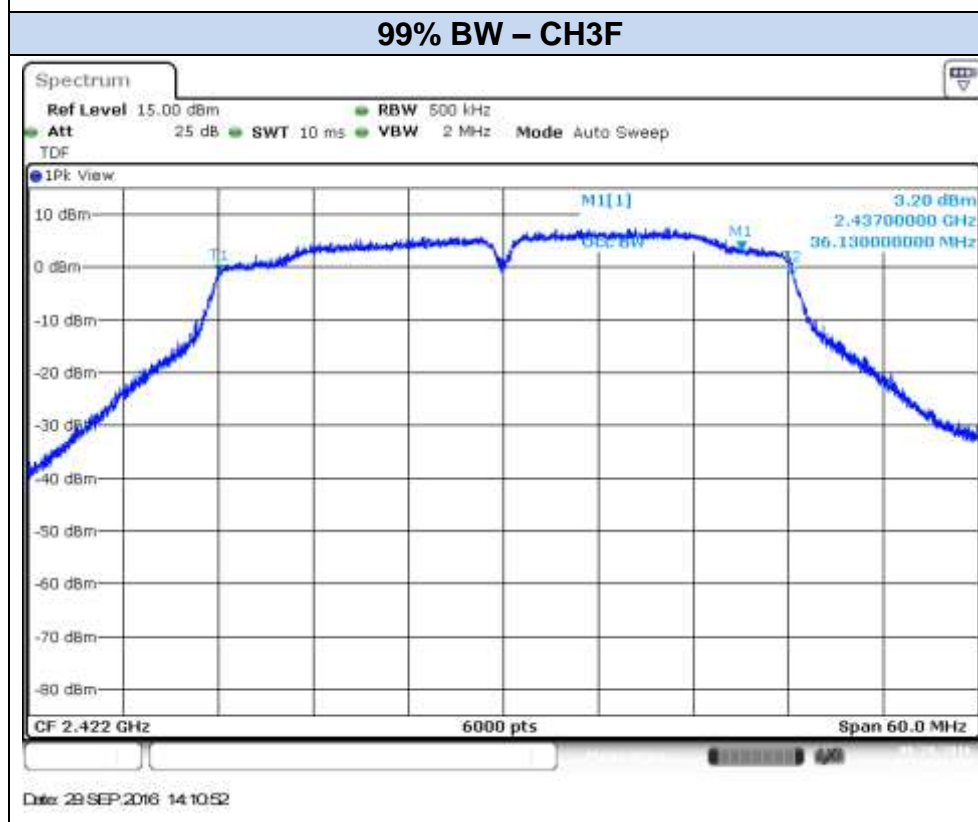
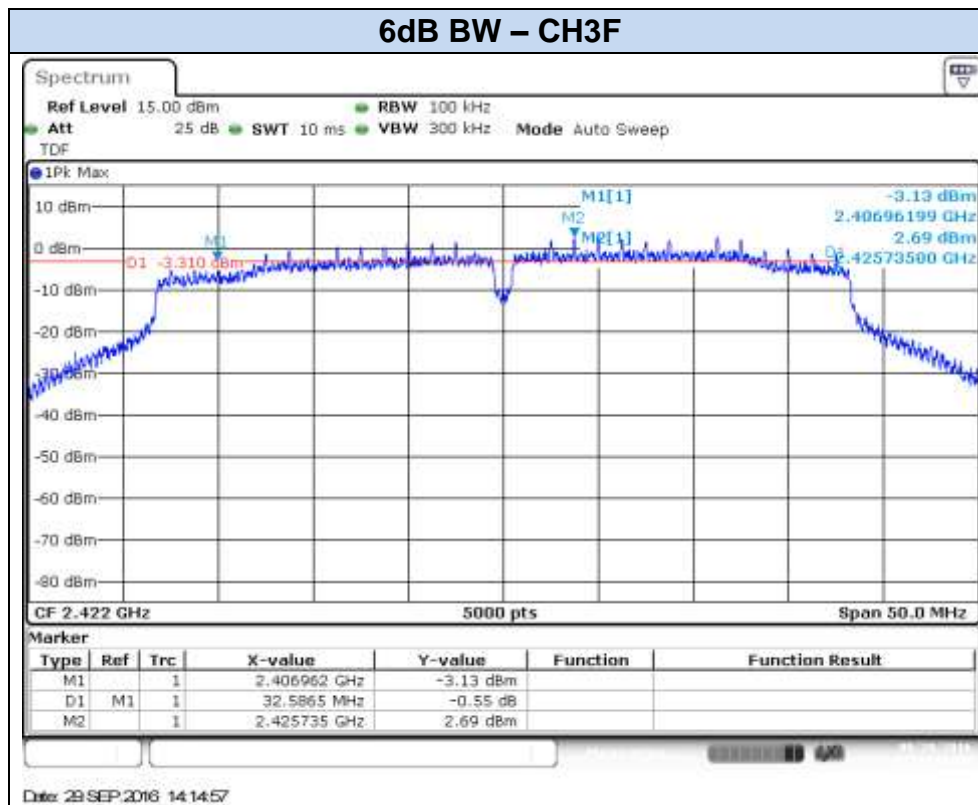
Date: 23.SEP.2016 14:38:10

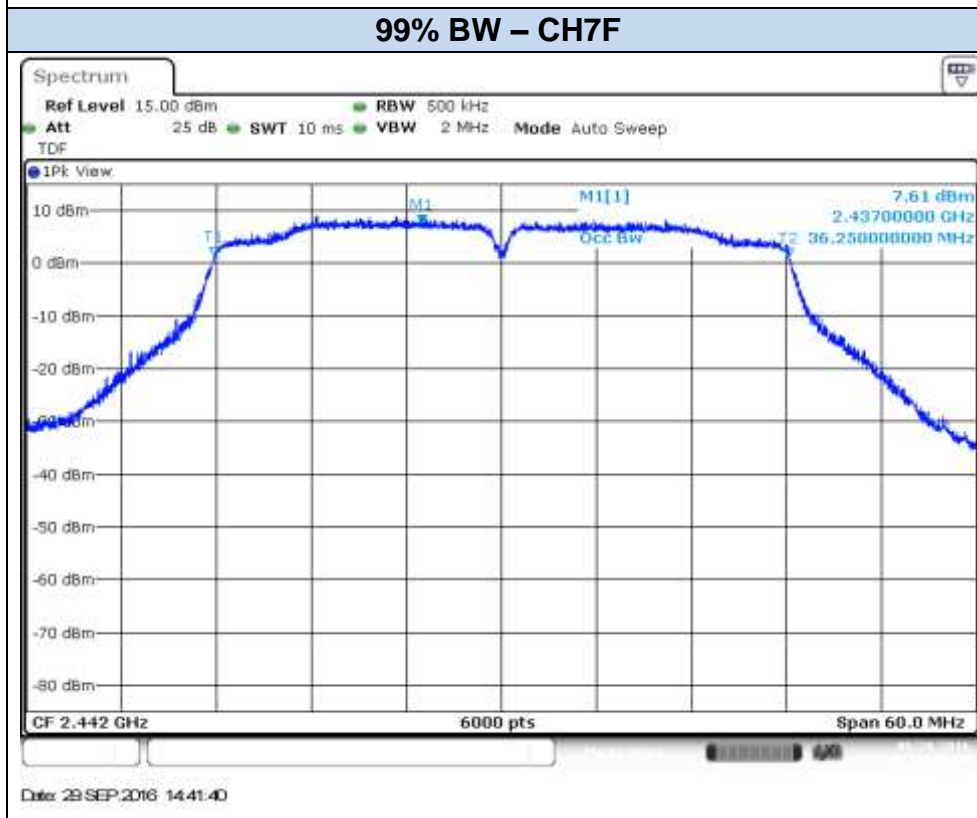
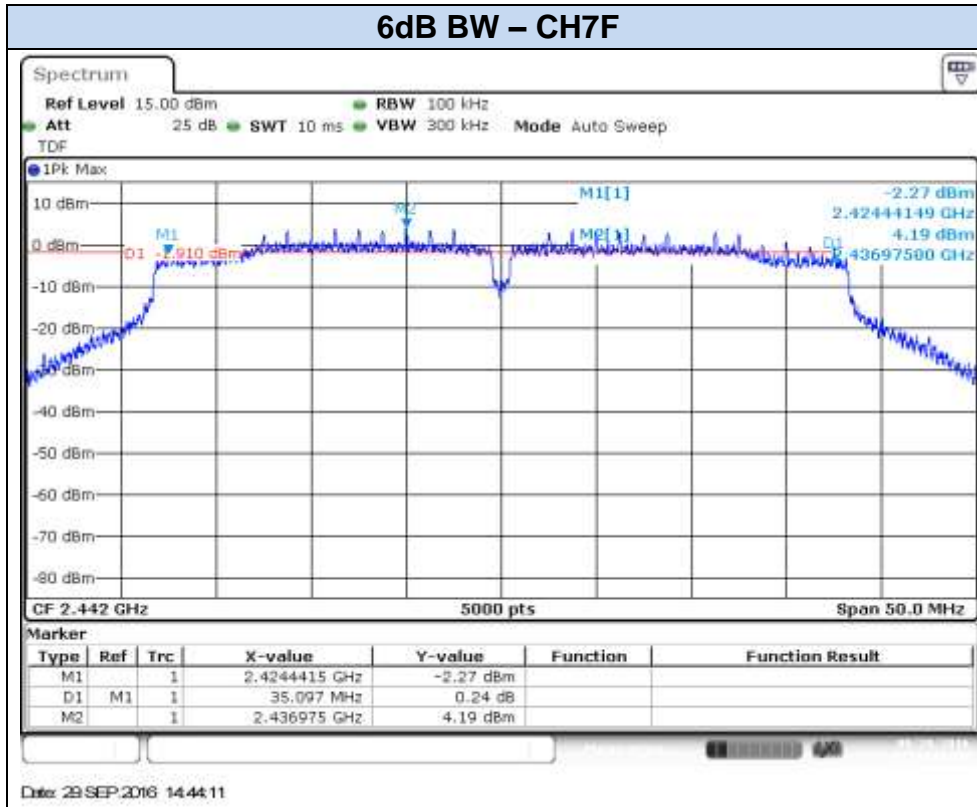


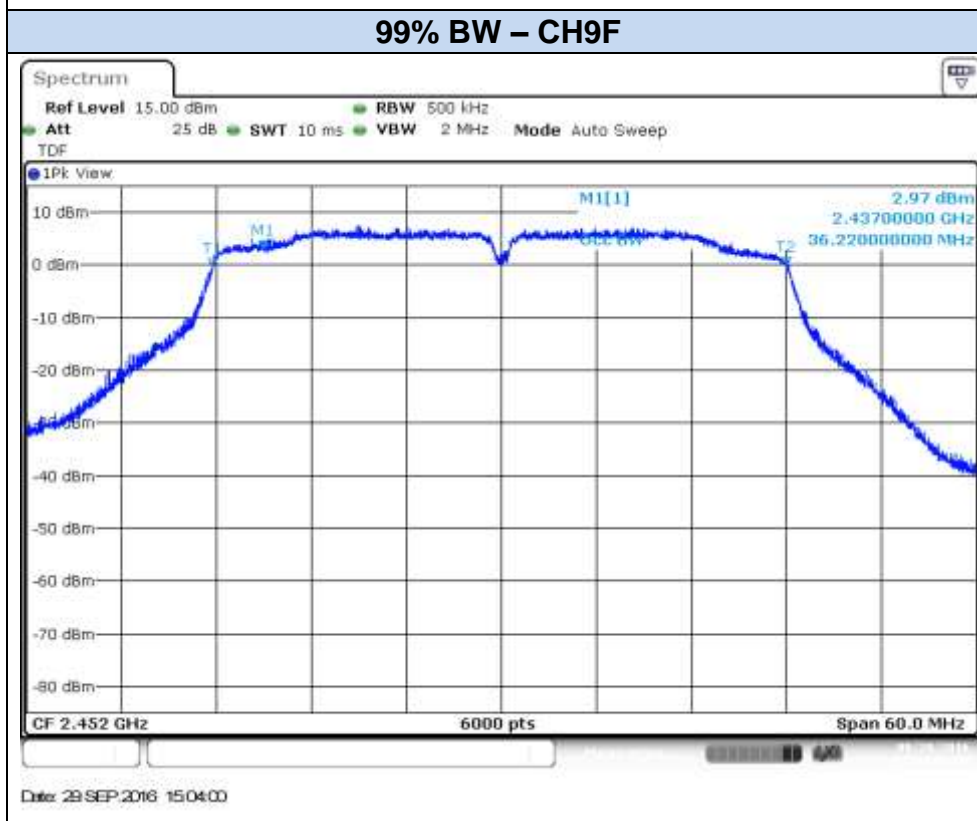
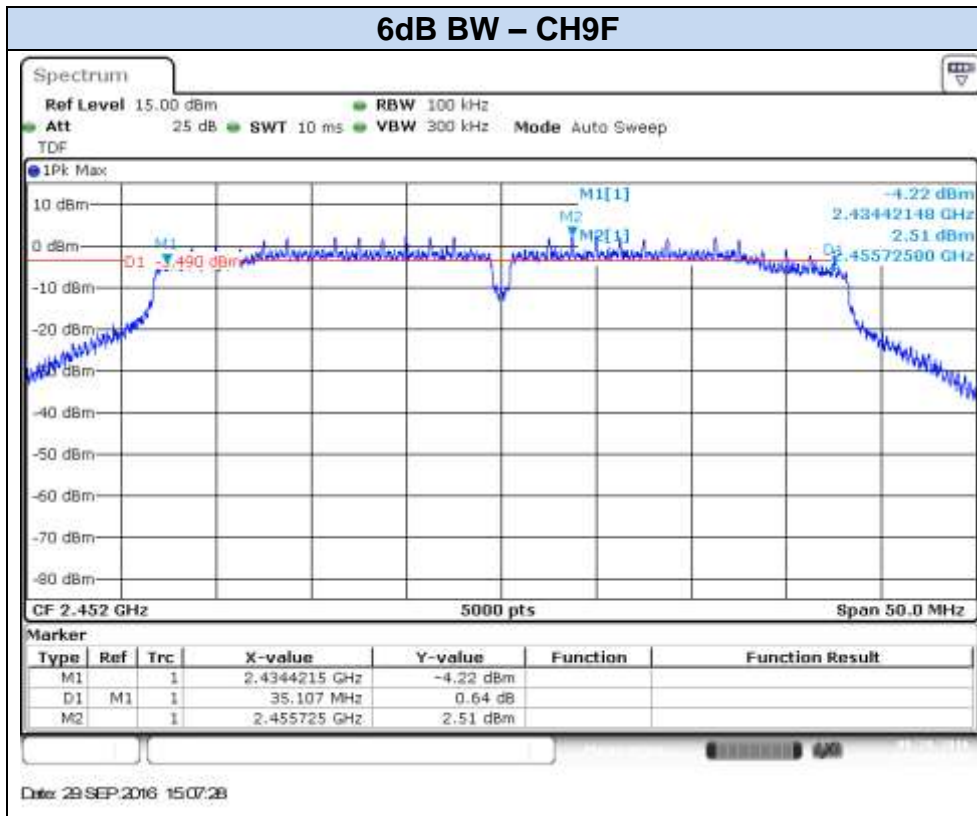


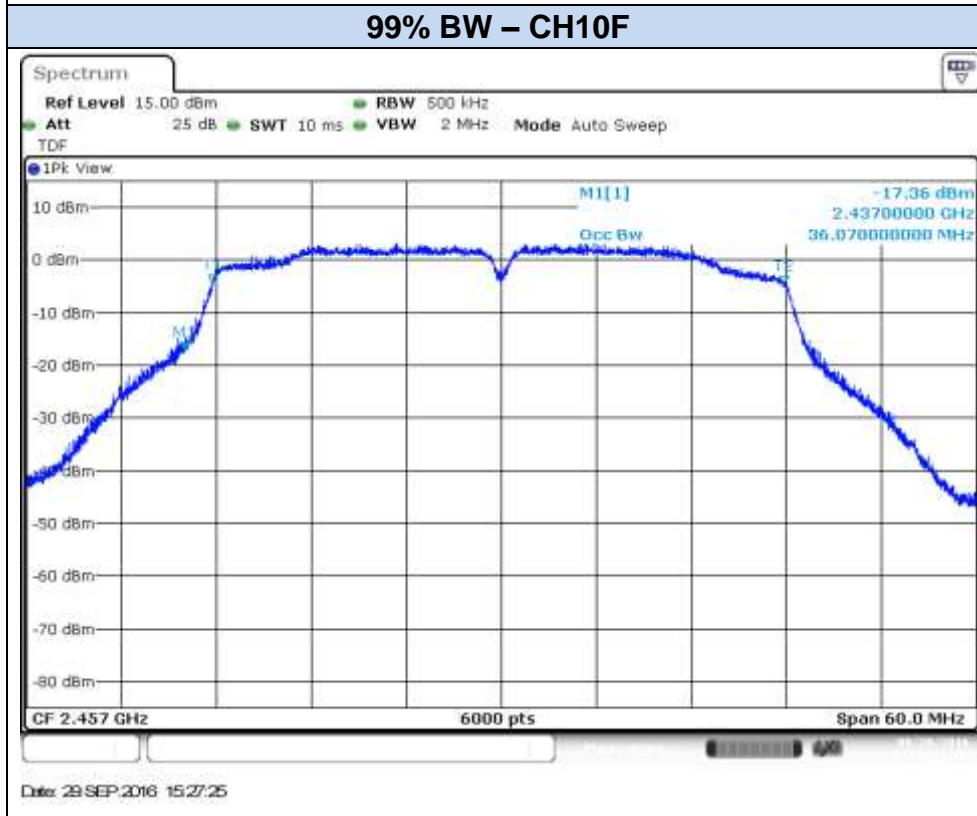
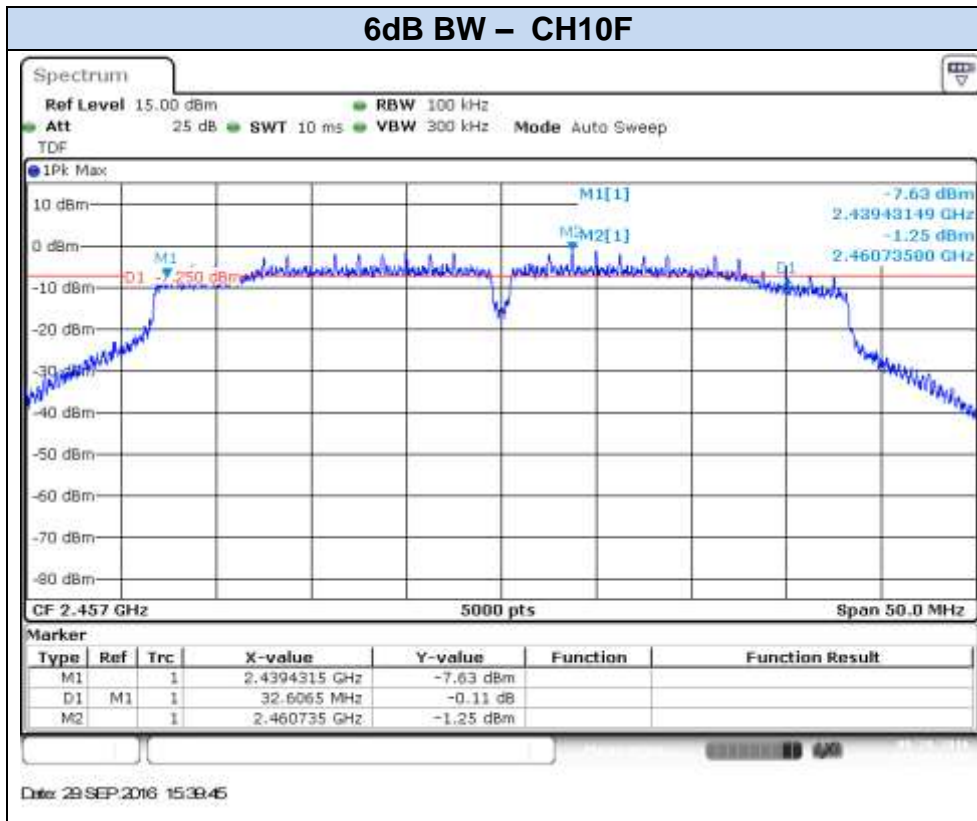


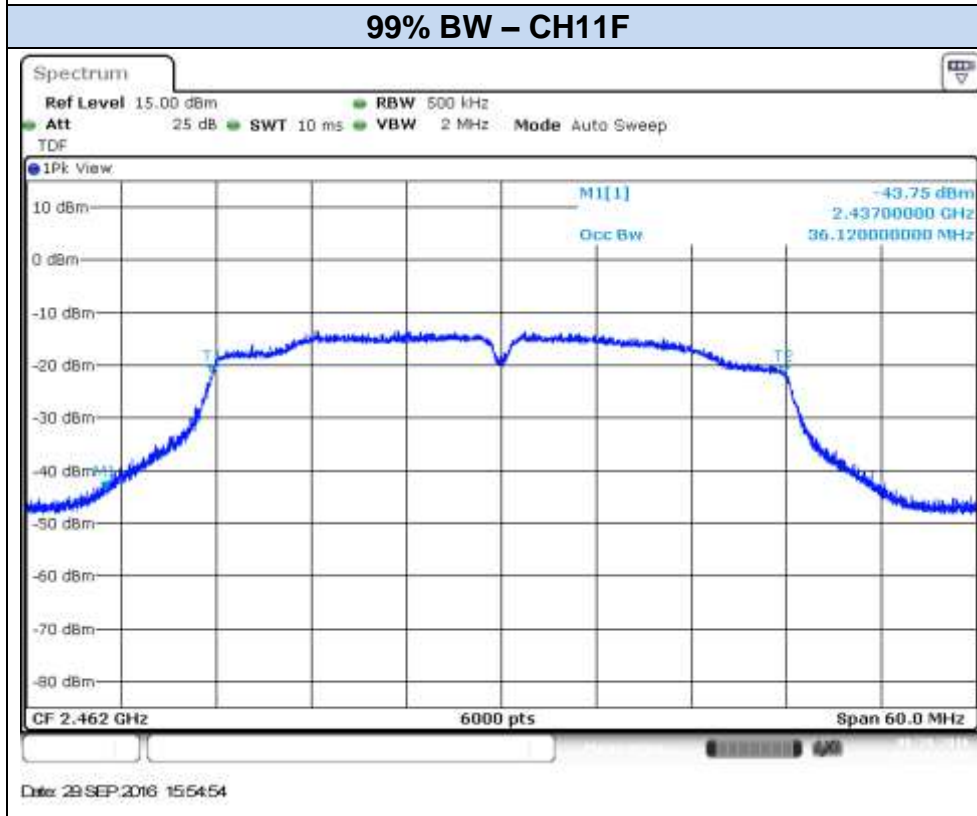
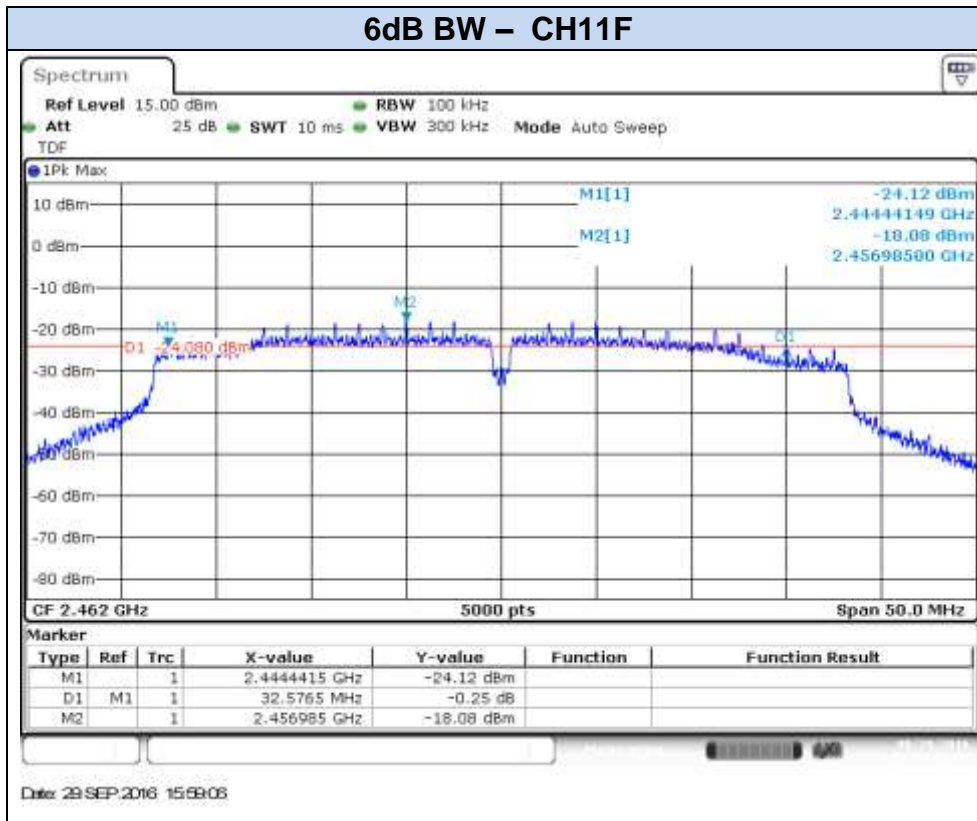


802.11n40, HT8 (MIMO) – Chain A

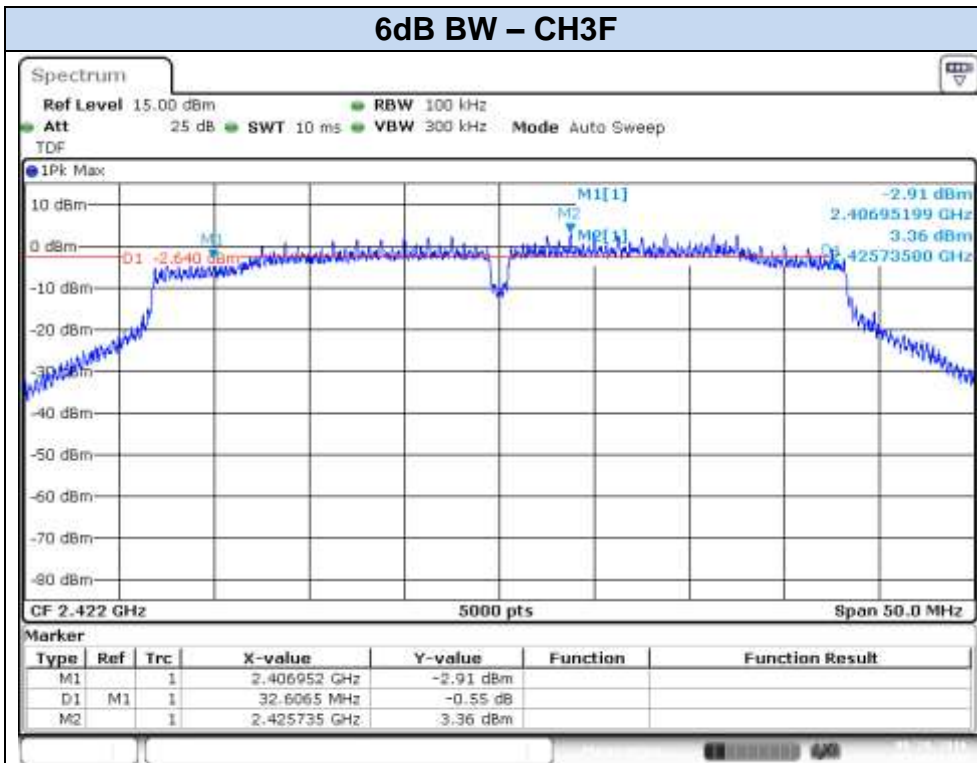




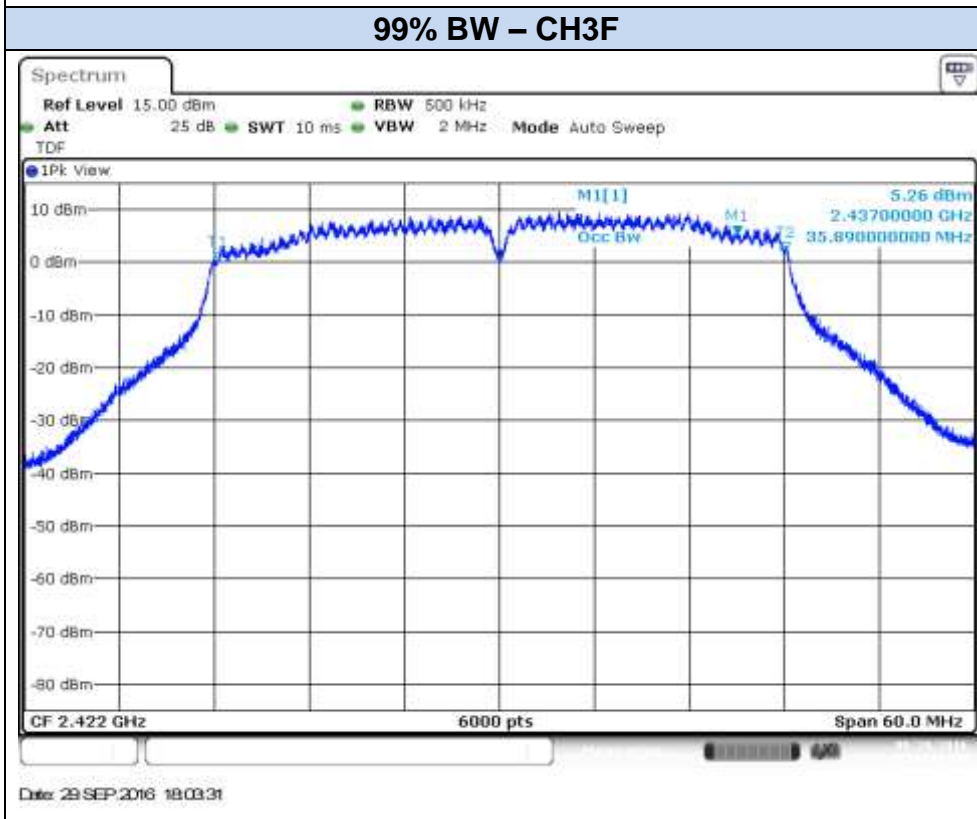




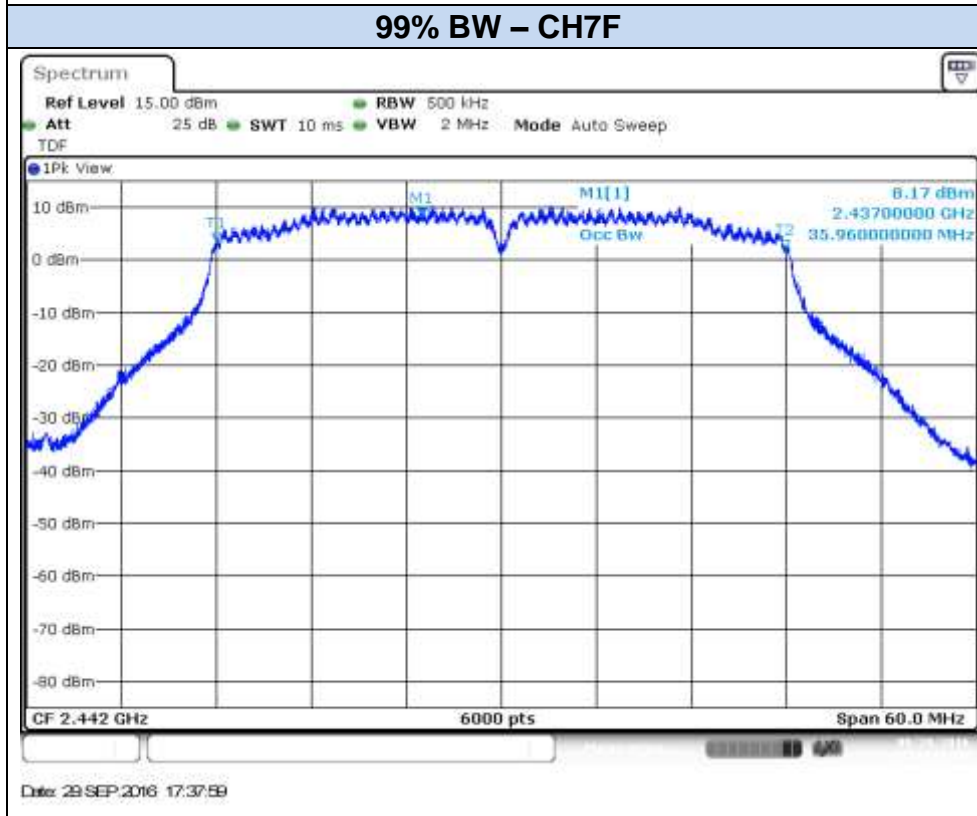
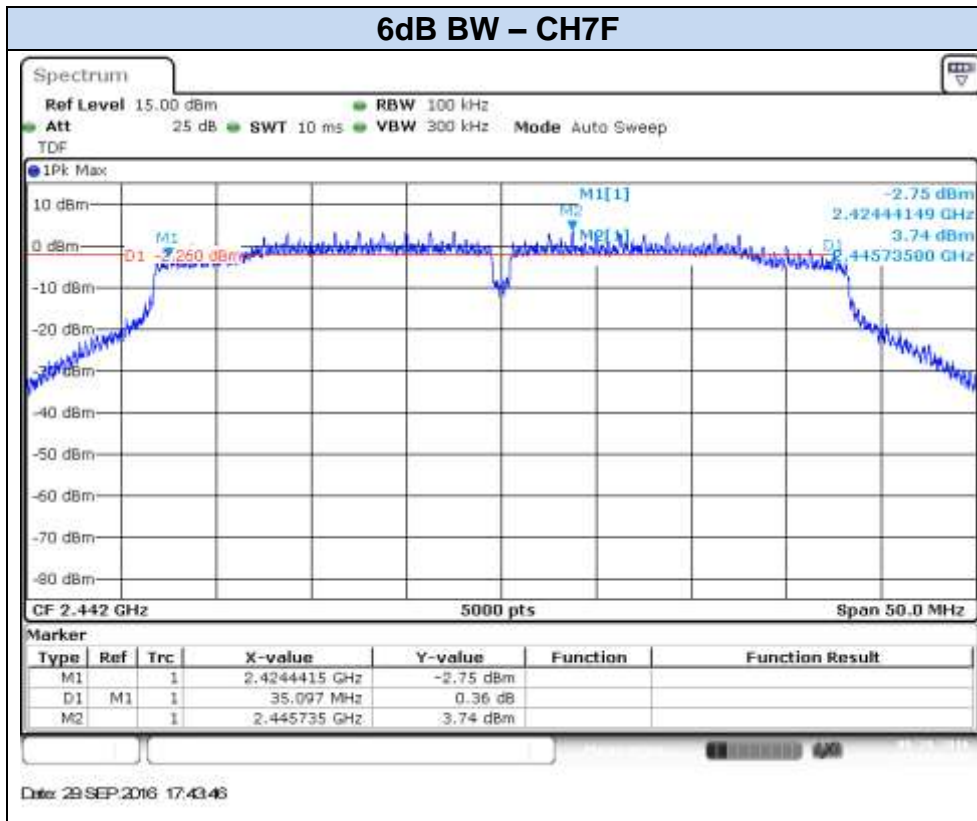
802.11n40, HT8 (MIMO) – Chain B

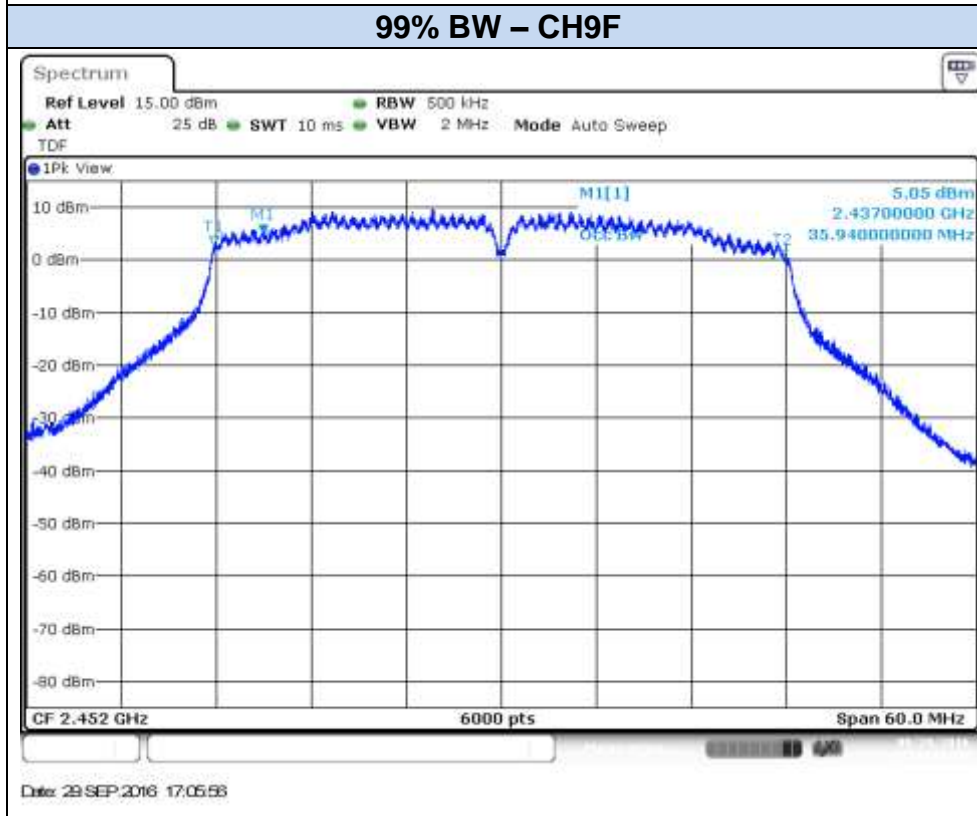
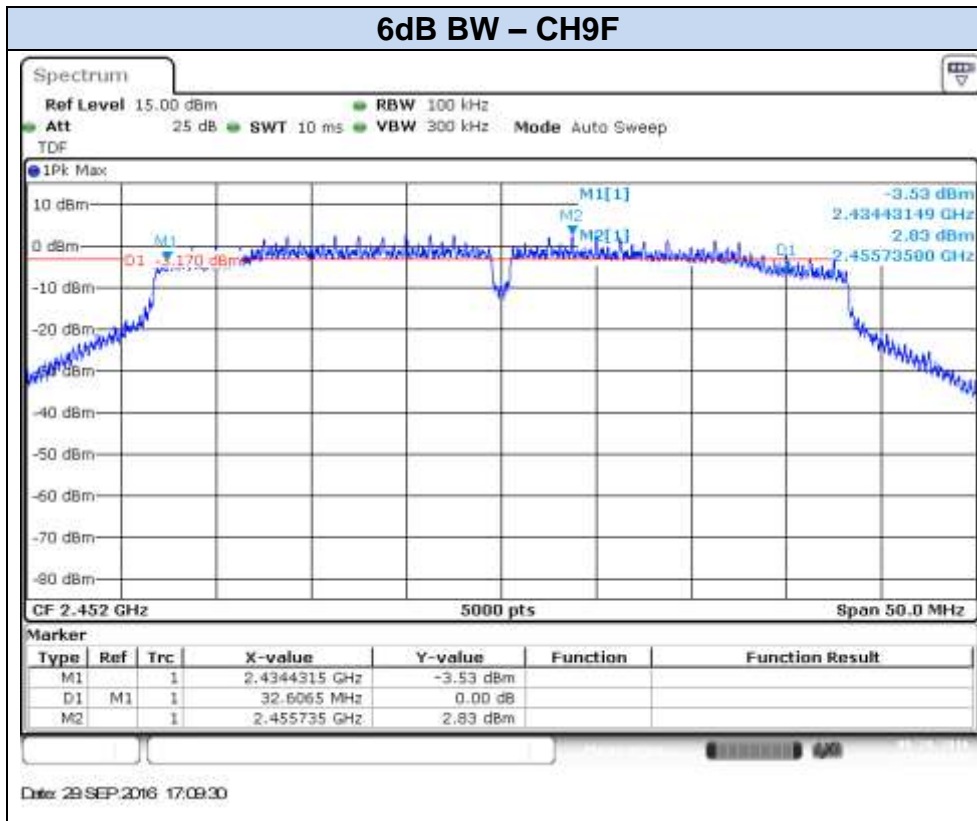


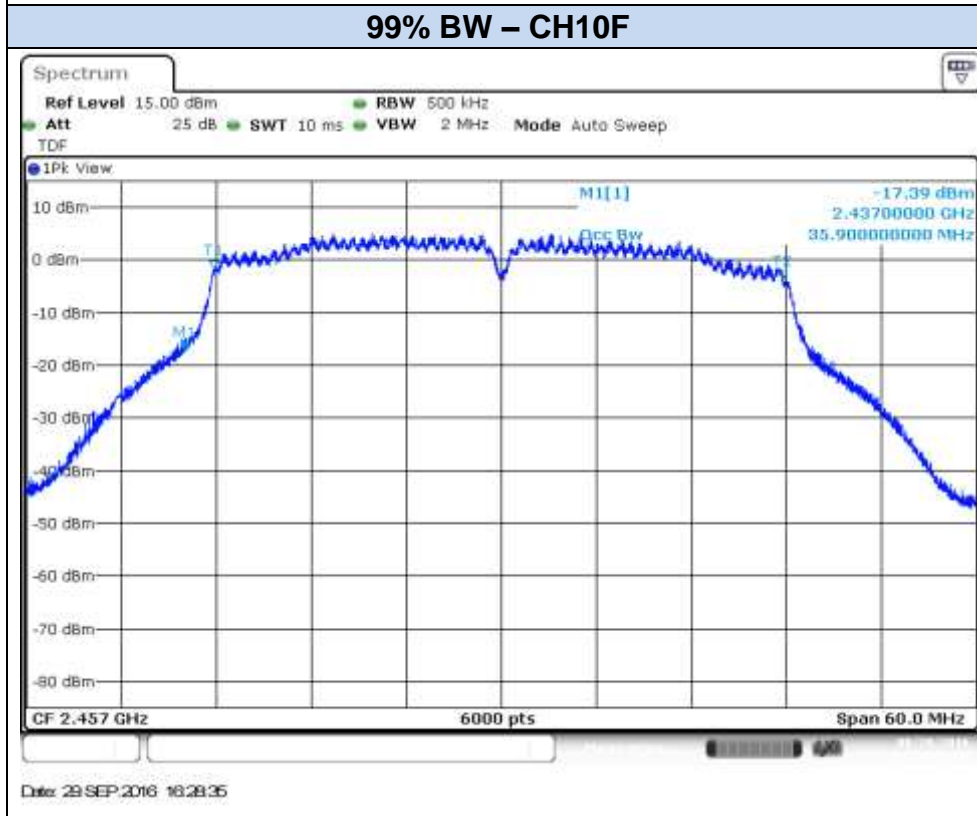
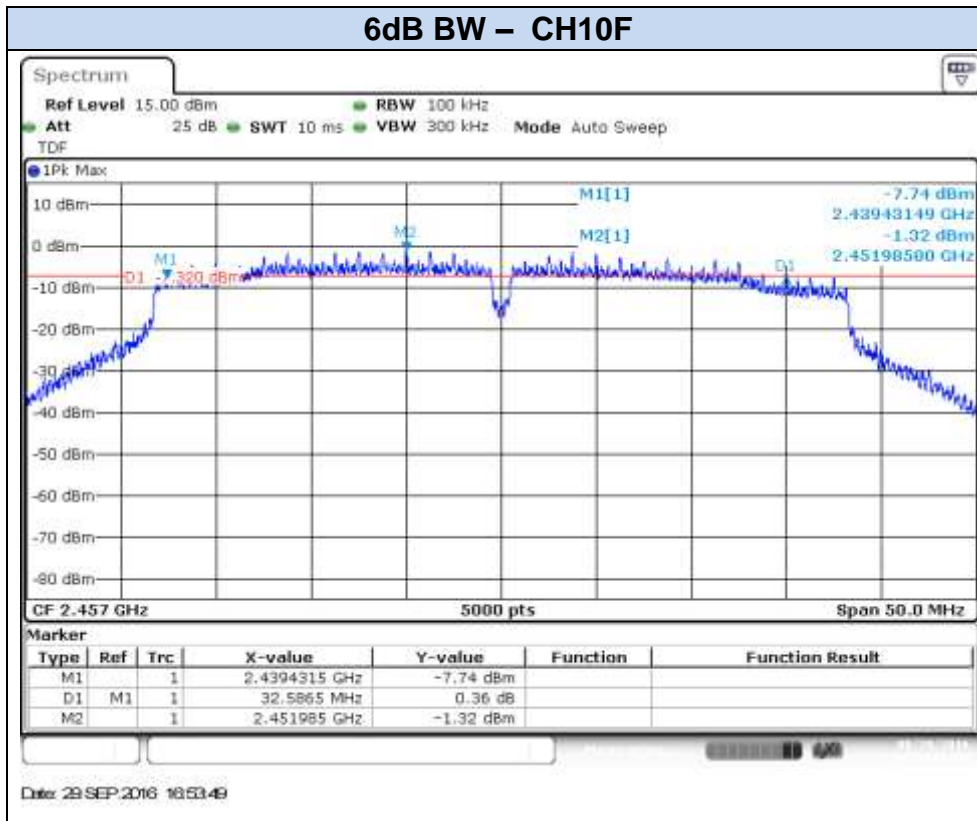
Date: 29 SEP 2016 18:03:23

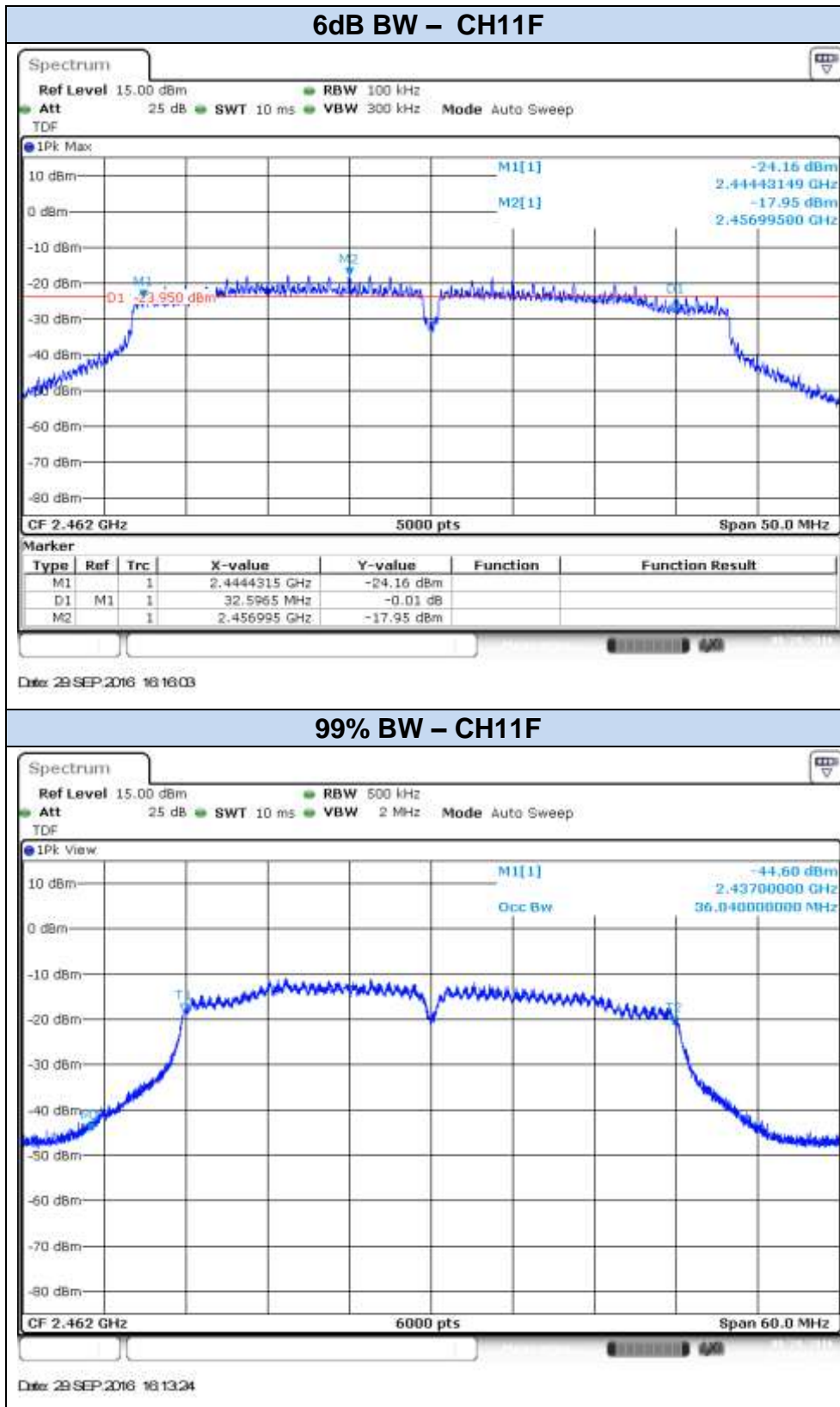


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B.2 Maximum Output Power and antenna gain

Test limits:

	Limits
<p>FCC Part 15.247 (b) (3)</p>	<p>(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:</p> <p>(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.</p> <p>(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.</p>
<p>RSS-247 Clause 5.4 (4)</p>	<p>For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.</p> <p>As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.</p>

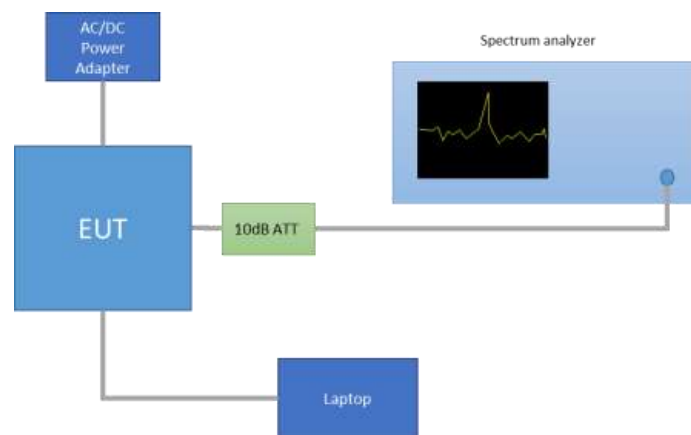
Test procedure:

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

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

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

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



Results tables:

Maximum peak conducted output power.

Mode	Rate	CH	Freq [MHz]	Antenna	Measured Conducted Output power [dBm]	EIRP [dBm]	EIRP [mW]	Conducted power [mW]	
802.11b	1Mbps	1	2412	SISO A	21.34	24.58	287.08	136.14	
				SISO B	21.66	24.90	309.03	146.55	
		7	2442	SISO A	23.42	26.66	463.45	219.79	
				SISO B	23.27	26.51	447.71	212.32	
		11	2462	SISO A	20.24	23.48	222.84	105.68	
				SISO B	20.19	23.43	220.29	104.47	
	12	2467	SISO A	18.95	22.19	165.58	78.52		
			SISO B	18.45	21.69	147.57	69.98		
	13	2472	SISO A	17.48	20.72	118.03	55.98		
			SISO B	17.12	20.36	108.64	51.52		
	802.11g	6Mbps	1	2412	SISO A	27.20	30.44	1106.62	524.81
					SISO B	27.76	31.00	1258.93	597.04
7			2442	SISO A	29.28	32.52	1786.49	847.23	
				SISO B	29.31	32.55	1798.87	853.10	
11			2462	SISO A	26.66	29.90	977.24	463.45	
				SISO B	26.96	30.20	1047.13	496.59	
12		2467	SISO A	22.22	25.46	351.56	166.72		
			SISO B	23.76	27.00	501.19	237.68		
13		2472	SISO A	6.29	9.53	8.97	4.26		
			SISO B	5.32	8.56	7.18	3.40		
802.11n20		HT0	1	2412	SISO A	26.42	29.66	924.70	438.53
					SISO B	26.93	30.17	1039.92	493.17
	7		2442	SISO A	29.03	32.27	1686.55	799.83	
				SISO B	28.94	32.18	1651.96	783.43	
	11		2462	SISO A	24.05	27.29	535.80	254.10	
				SISO B	24.20	27.44	554.63	263.03	
	12	2467	SISO A	19.38	22.62	182.81	86.70		
			SISO B	19.59	22.83	191.87	90.99		
	13	2472	SISO A	6.50	9.79	9.53	4.52		
			SISO B	5.33	8.57	7.19	3.41		

Max Value

Min Value

Mode	Rate	CH	Freq [MHz]	Antenna	Measured Conducted Output power [dBm]	EIRP [dBm]	EIRP [mW]	Conducted power [mW]
802.11n20	HT8	1	2412	MIMO A	25.20	28.44	698.23	331.13
				MIMO B	26.16	29.40	870.96	413.05
				Combined A+B	28.72	31.96	1569.20	744.18
		7	2442	MIMO A	26.40	29.64	920.45	436.52
				MIMO B	26.71	29.95	988.55	468.81
				Combined A+B	29.57	32.81	1909.00	905.33
		11	2462	MIMO A	24.22	27.46	557.19	264.24
				MIMO B	24.83	28.07	641.21	304.09
				Combined A+B	27.55	30.79	1198.40	568.33
		12	2467	MIMO A	19.20	22.44	175.39	83.18
				MIMO B	20.20	23.44	220.80	104.71
				Combined A+B	22.74	25.98	396.19	187.89
		13	2472	MIMO A	2.94	6.18	4.15	1.97
				MIMO B	3.22	6.46	4.43	2.10
				Combined A+B	6.09	9.33	8.58	4.07

Max Value

Min Value

Mode	Rate	CH	Freq [MHz]	Antenna	Measured Conducted Output power [dBm]	EIRP [dBm]	EIRP [mW]	Conducted power [mW]	
802.11n40	HT0	3F	2422	SISO A	26.61	29.85	966.05	458.14	
				SISO B	27.51	30.75	1188.50	563.64	
		7F	2442	SISO A	26.65	29.89	974.99	462.38	
				SISO B	26.41	29.65	922.57	437.52	
		9F	2452	SISO A	24.94	28.18	657.66	311.89	
				SISO B	25.33	28.57	719.45	341.19	
		10F	2457	SISO A	22.22	25.46	351.56	166.72	
				SISO B	21.59	24.83	304.09	144.21	
		11F	2462	SISO A	6.08	9.32	8.55	4.06	
				SISO B	5.77	9.01	7.96	3.78	
		HT8	3F	2422	MIMO A	23.84	27.08	510.50	242.10
					MIMO B	25.05	28.29	674.53	319.89
	Combined A+B				27.50	30.74	1185.03	561.99	
	7F		2442	MIMO A	25.87	29.11	814.70	386.37	
				MIMO B	26.21	29.45	881.05	417.83	
				Combined A+B	29.05	32.29	1695.75	804.20	
	9F		2452	MIMO A	24.60	27.84	608.14	288.40	
				MIMO B	24.92	28.16	654.64	310.46	
				Combined A+B	27.77	31.01	1262.77	598.86	
	10F		2457	MIMO A	20.28	23.52	224.91	106.66	
				MIMO B	20.61	23.85	242.66	115.08	
				Combined A+B	23.46	26.70	467.57	221.74	
	11F	2462	MIMO A	3.43	6.67	4.65	2.20		
			MIMO B	4.02	7.26	5.32	2.52		
Combined A+B			6.75	9.99	9.97	4.73			

Max Value

Min Value

Maximum (average) conducted output power*

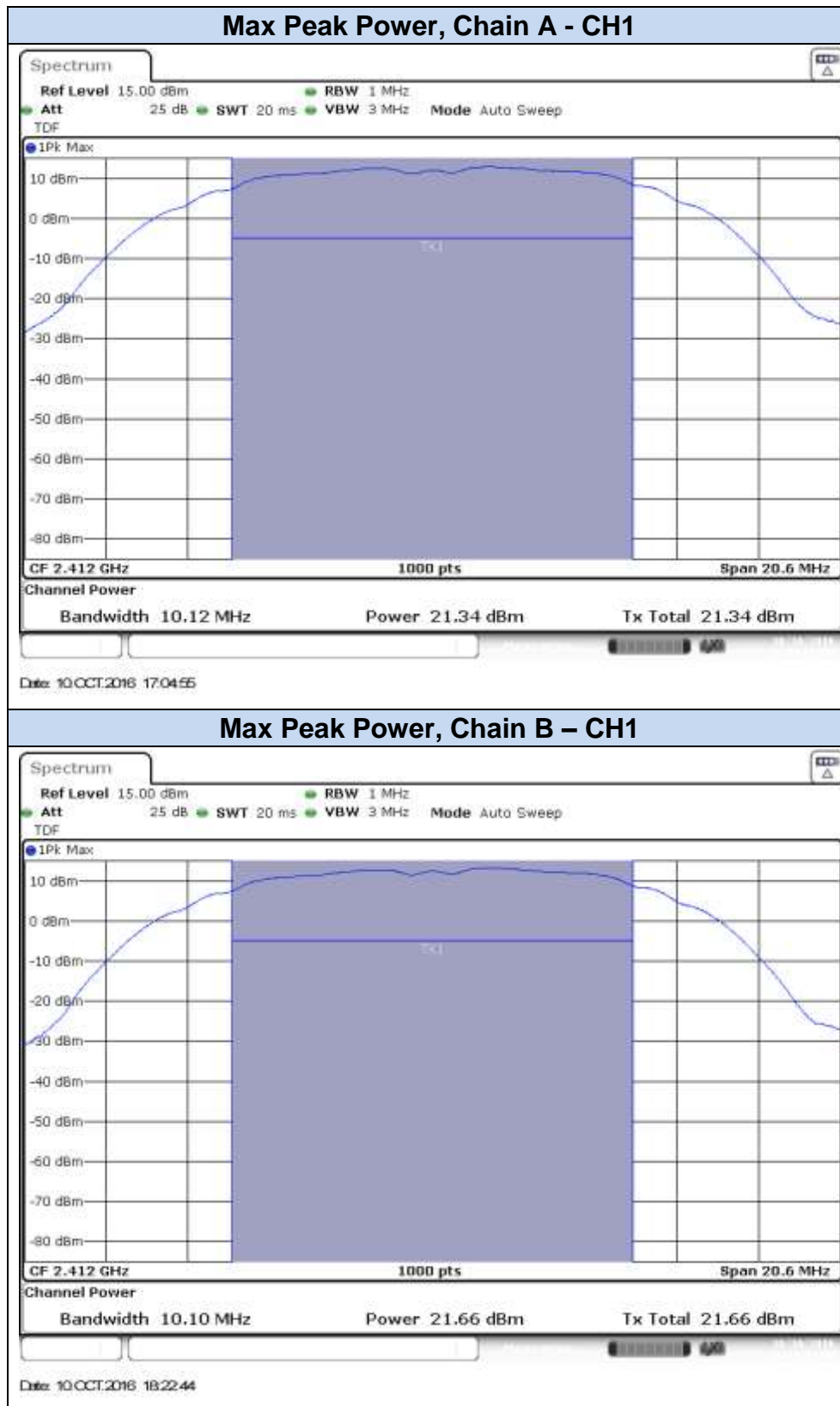
Mode	Rate	CH	Freq [MHz]	Antenna	Measured average conducted power [dBm]	Maximum** (average) conducted output power [dBm]	EIRP [dBm]	Average Output Power [mW]		
802.11b	1Mbps	1	2412	SISO A	18.70	18.70	21.94	74.13		
				SISO B	19.07	19.07	22.31	80.72		
		7	2442	SISO A	20.82	20.82	24.06	120.78		
				SISO B	20.68	20.68	23.92	116.95		
		11	2462	SISO A	17.57	17.57	20.81	57.15		
				SISO B	17.56	17.56	20.80	57.02		
		12	2467	SISO A	16.29	16.29	19.53	42.56		
				SISO B	15.77	15.77	19.01	37.76		
		13	2472	SISO A	14.79	14.79	18.03	30.13		
				SISO B	14.44	14.44	17.68	27.80		
		802.11g	6Mbps	1	2412	SISO A	18.76	18.76	22.00	75.16
						SISO B	19.24	19.24	22.48	83.95
7	2442			SISO A	20.88	20.88	24.12	122.46		
				SISO B	20.75	20.75	23.99	118.85		
11	2462			SISO A	18.40	18.40	21.64	69.18		
				SISO B	18.66	18.66	21.90	73.45		
12	2467			SISO A	13.93	13.93	17.17	24.72		
				SISO B	15.54	15.54	18.78	35.81		
13	2472			SISO A	-2.00	-2.00	1.24	0.63		
				SISO B	-2.91	-2.91	0.33	0.51		
802.11n20	HTO			1	2412	SISO A	18.22	18.22	21.46	66.37
						SISO B	18.73	18.73	21.97	74.64
		7	2442	SISO A	20.69	20.69	23.93	117.22		
				SISO B	20.76	20.76	24.00	119.12		
		11	2462	SISO A	15.84	15.84	19.08	38.37		
				SISO B	16.13	16.13	19.37	41.02		
		12	2467	SISO A	11.17	11.17	14.41	13.09		
				SISO B	11.35	11.35	14.59	13.65		
		13	2472	SISO A	-1.66	-1.66	1.58	0.68		
				SISO B	-2.91	-2.91	0.33	0.51		

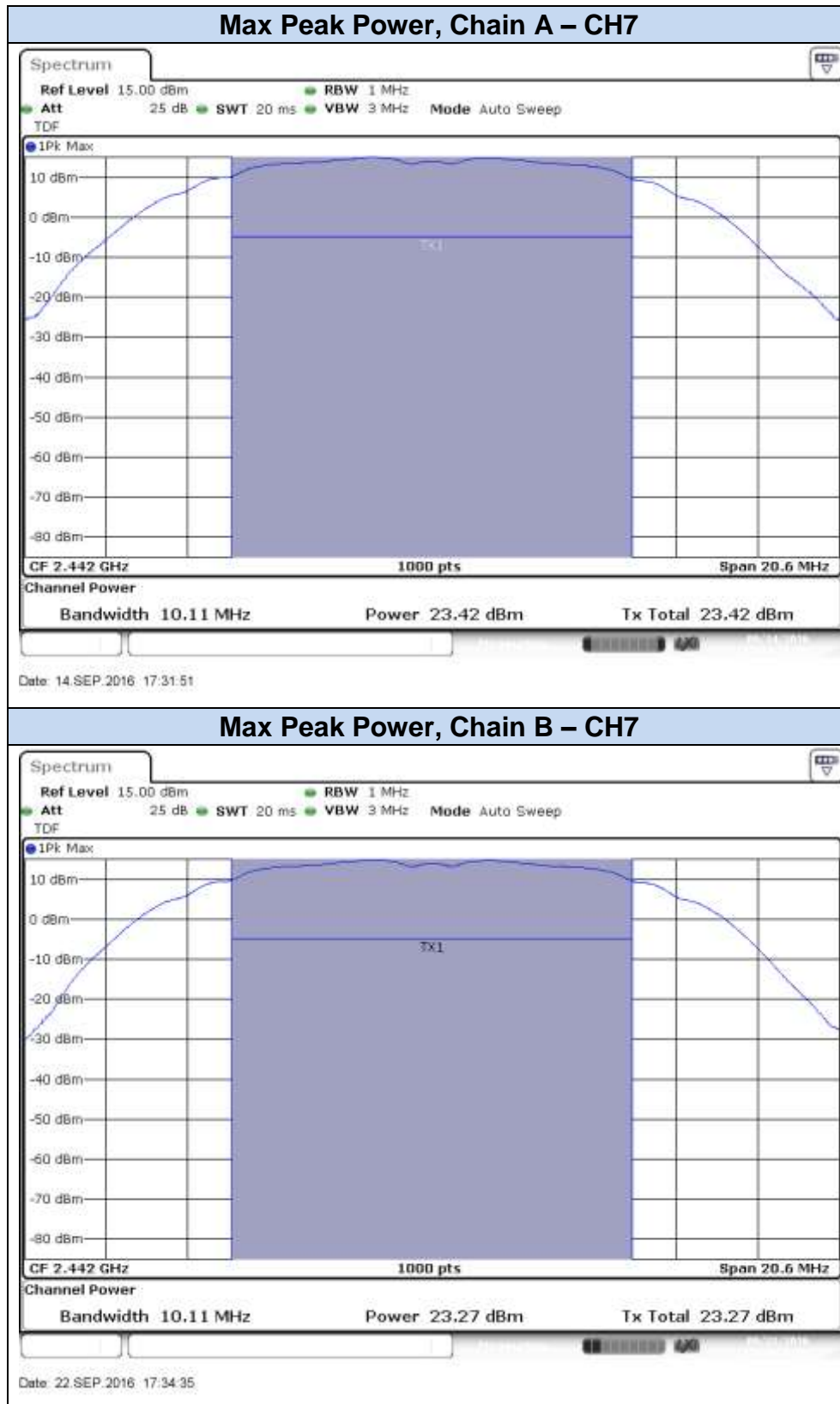
Mode	Rate	CH	Freq [MHz]	Antenna	Measured average conducted power [dBm]	Maximum** (average) conducted output power [dBm]	EIRP [dBm]	Average Output Power [mW]
802.11n20	HT8	1	2412	MIMO A	16.98	17.17	20.41	52.07
				MIMO B	17.29	17.48	20.72	55.92
				Combined A+B	20.15	20.33	23.57	108.00
		7	2442	MIMO A	18.30	18.49	21.73	70.57
				MIMO B	17.77	17.96	21.20	62.46
				Combined A+B	21.05	21.24	24.48	133.03
		11	2462	MIMO A	16.02	16.21	19.45	41.74
				MIMO B	15.92	16.11	19.35	40.79
				Combined A+B	18.98	19.17	22.41	82.54
		12	2467	MIMO A	10.94	11.13	14.37	12.96
				MIMO B	11.24	11.43	14.67	13.89
				Combined A+B	14.10	14.29	17.53	26.85
		13	2472	MIMO A	-5.34	-5.15	-1.91	0.31
				MIMO B	-5.80	-5.61	-2.37	0.27
				Combined A+B	-2.55	-2.37	0.87	0.58

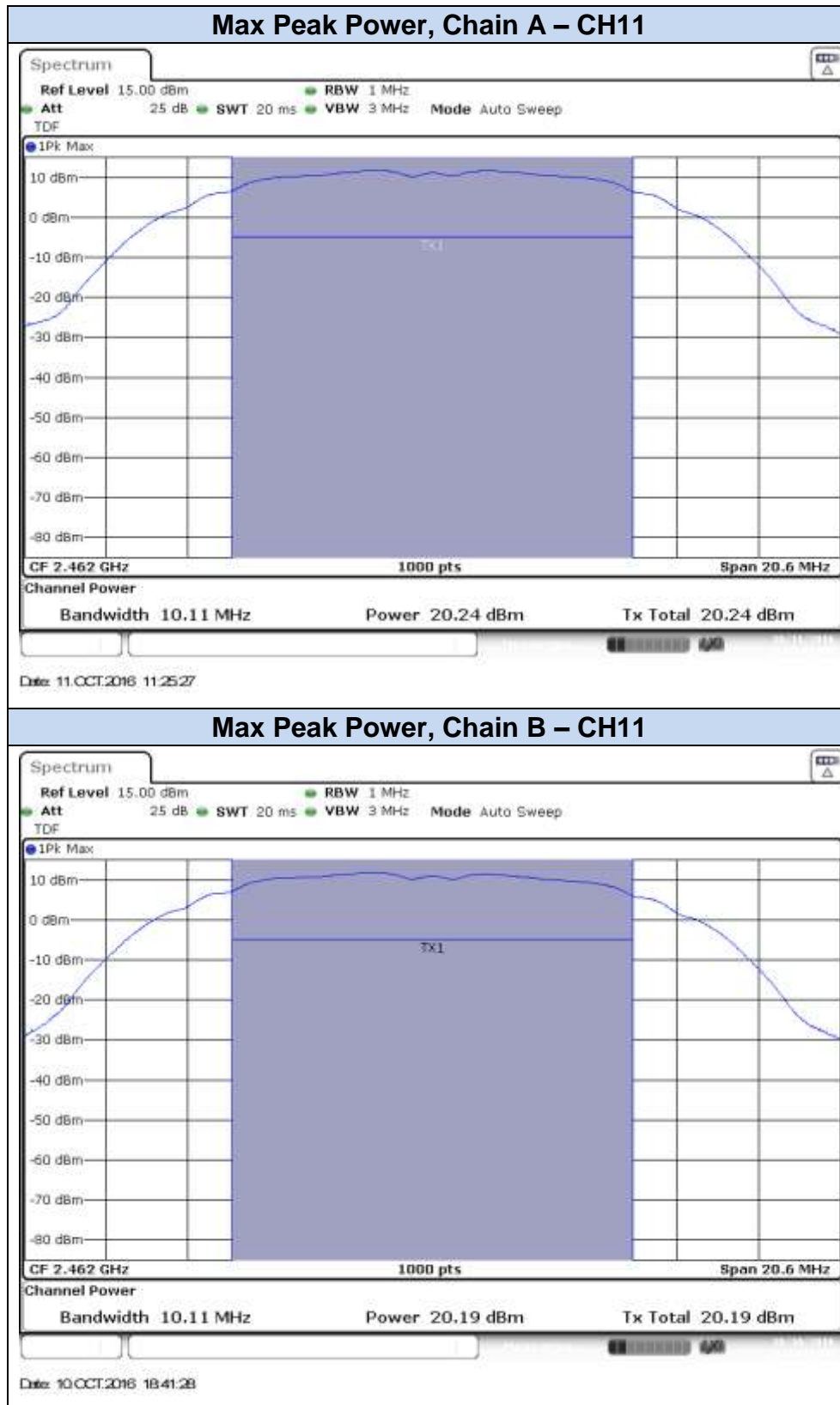
Mode	Rate	CH	Freq [MHz]	Antenna	Measured average conducted power [dBm]	Maximum** (average) conducted output power [dBm]	EIRP [dBm]	Average Output Power [mW]	
802.11n40	HT0	3F	2422	SISO A	18.41	18.57	21.81	71.87	
				SISO B	19.13	19.29	22.53	84.83	
		7F	2442	SISO A	18.17	18.33	21.57	68.01	
				SISO B	18.00	18.16	21.40	65.39	
		9F	2452	SISO A	16.69	16.85	20.09	48.37	
				SISO B	16.99	17.15	20.39	51.83	
		10F	2457	SISO A	13.95	14.11	17.35	25.74	
				SISO B	13.29	13.45	16.69	22.11	
		11F	2462	SISO A	-2.12	-1.96	1.28	0.64	
				SISO B	-2.47	-2.31	0.93	0.59	
		HT8	3F	2422	MIMO A	14.90	15.10	18.34	32.34
					MIMO B	15.58	15.78	19.02	37.83
	Combined A+B				18.26	18.46	21.70	70.17	
	7F		2442	MIMO A	16.80	17.00	20.24	50.10	
				MIMO B	16.64	16.84	20.08	48.28	
				Combined A+B	19.73	19.93	23.17	98.38	
	9F		2452	MIMO A	15.51	15.71	18.95	37.22	
				MIMO B	15.52	15.72	18.96	37.31	
				Combined A+B	18.53	18.72	21.96	74.53	
	10F		2457	MIMO A	11.36	11.56	14.80	14.32	
				MIMO B	11.23	11.43	14.67	13.89	
				Combined A+B	14.31	14.50	17.74	28.21	
	11F	2462	MIMO A	-5.49	-5.29	-2.05	0.30		
			MIMO B	-5.37	-5.17	-1.93	0.30		
Combined A+B			-2.42	-2.22	1.02	0.60			

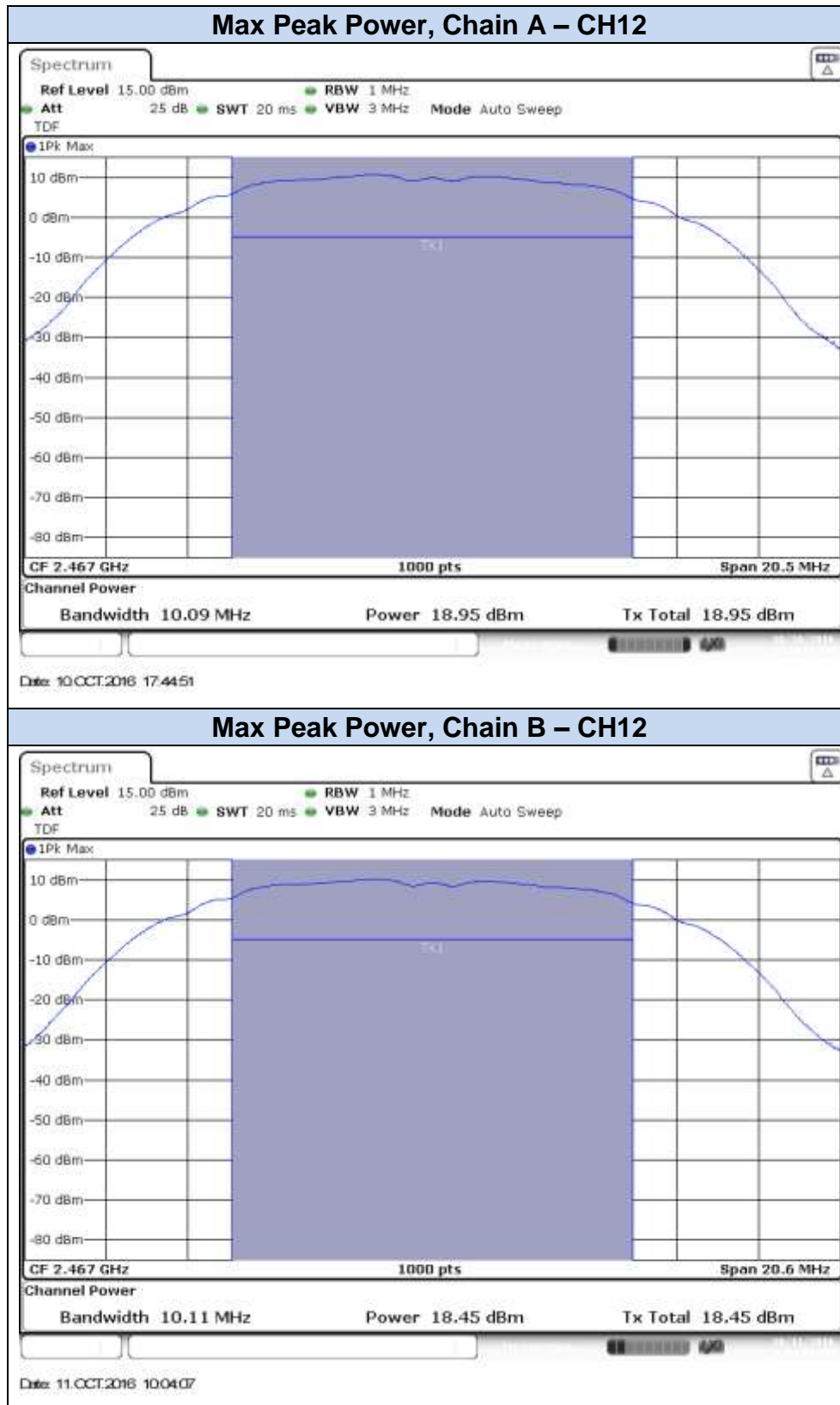
* Maximum (average) conducted output power are shown for indicative purpose only.

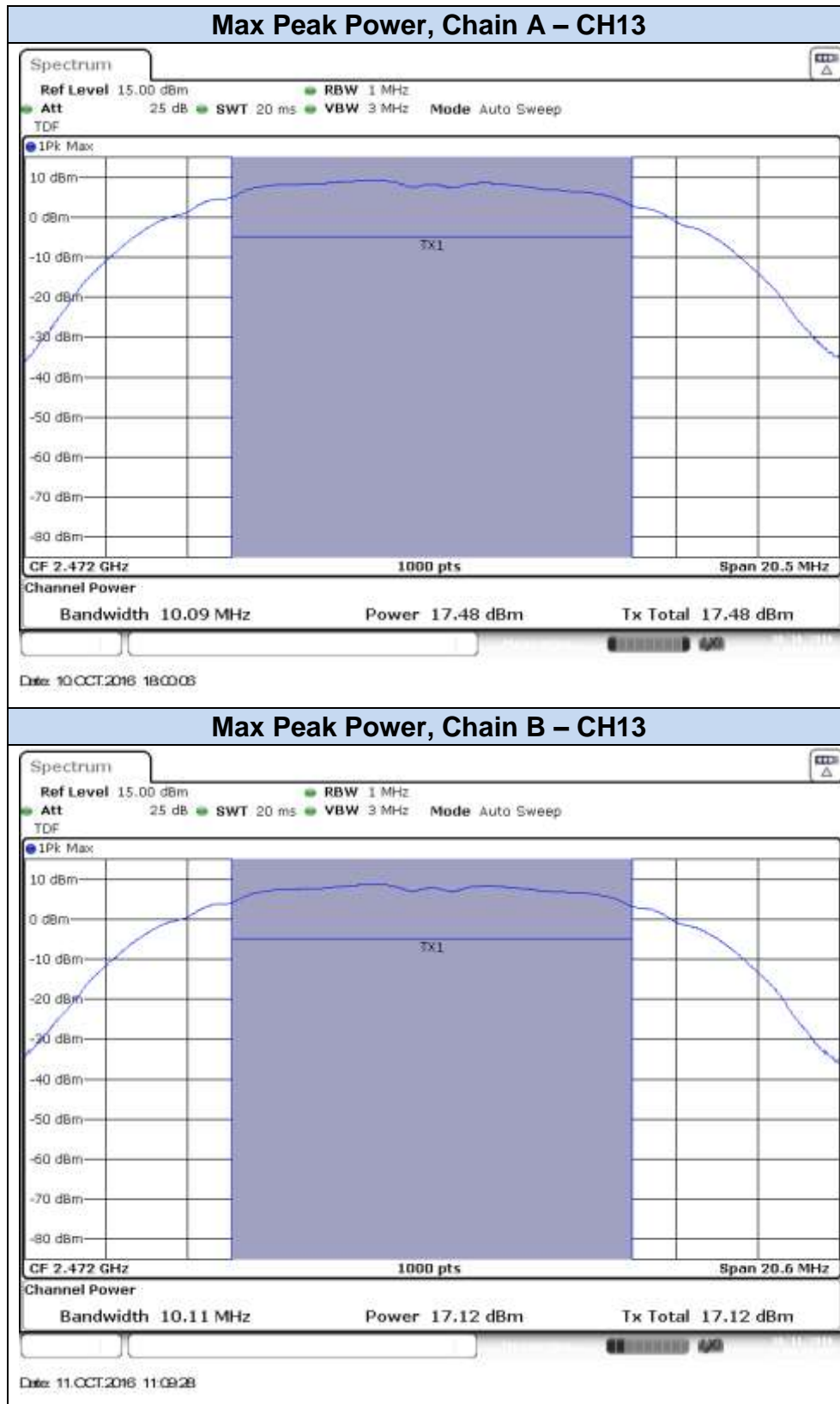
** Duty cycle compensated

Results screenshot**802.11b, 1Mbps**

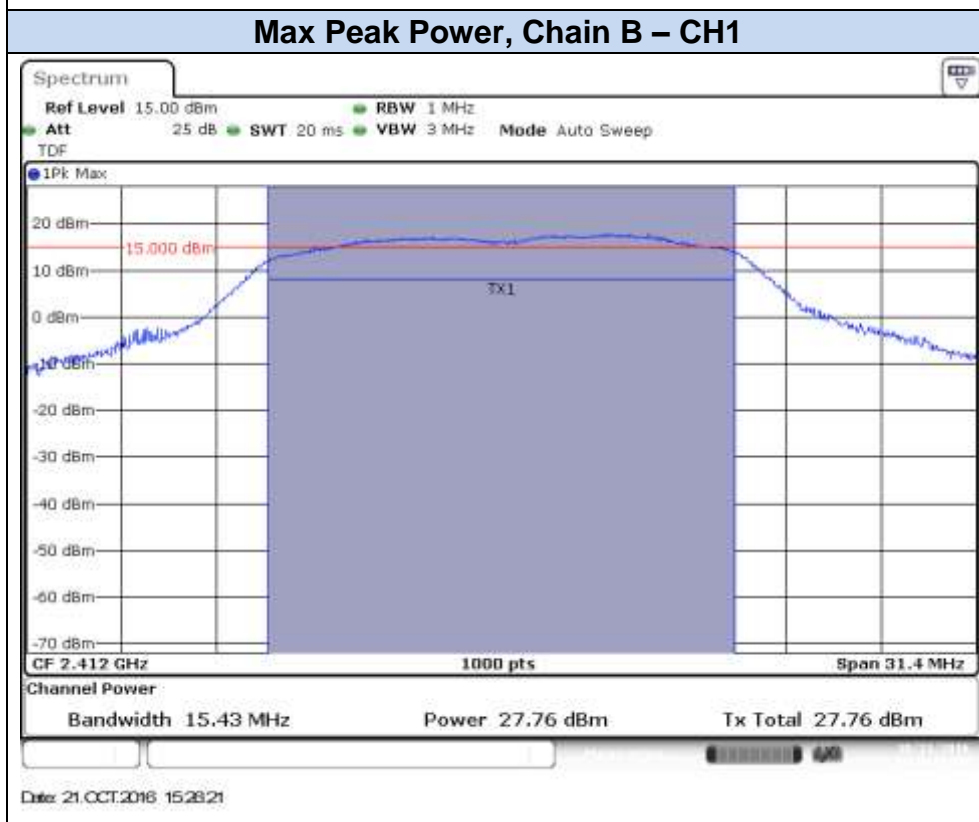
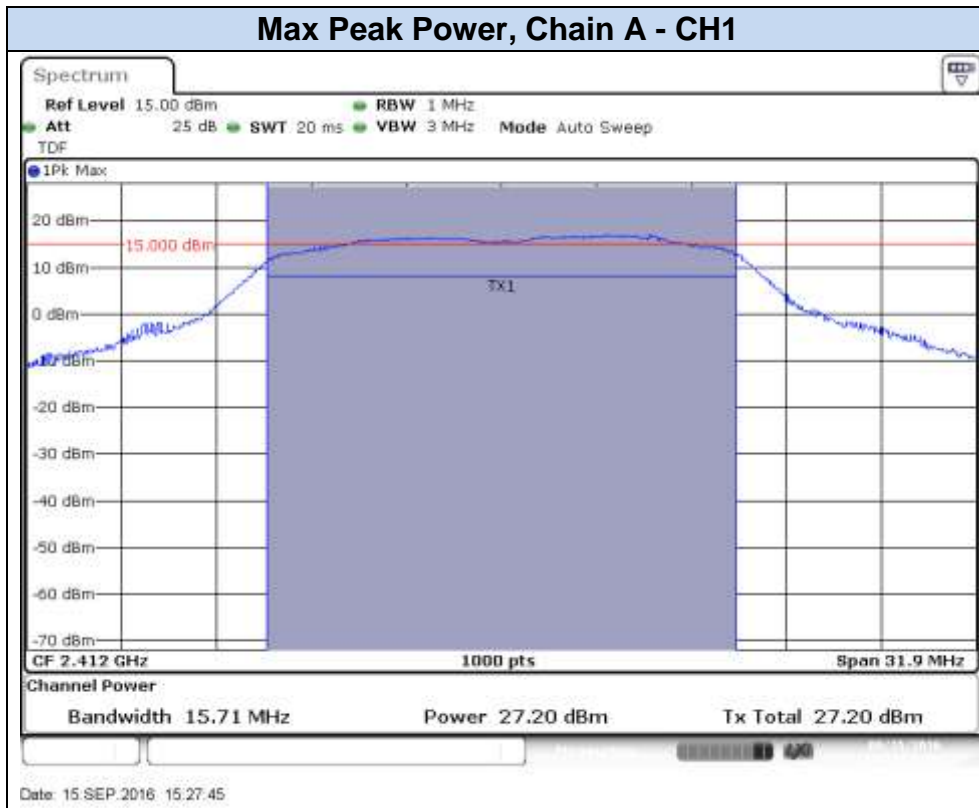


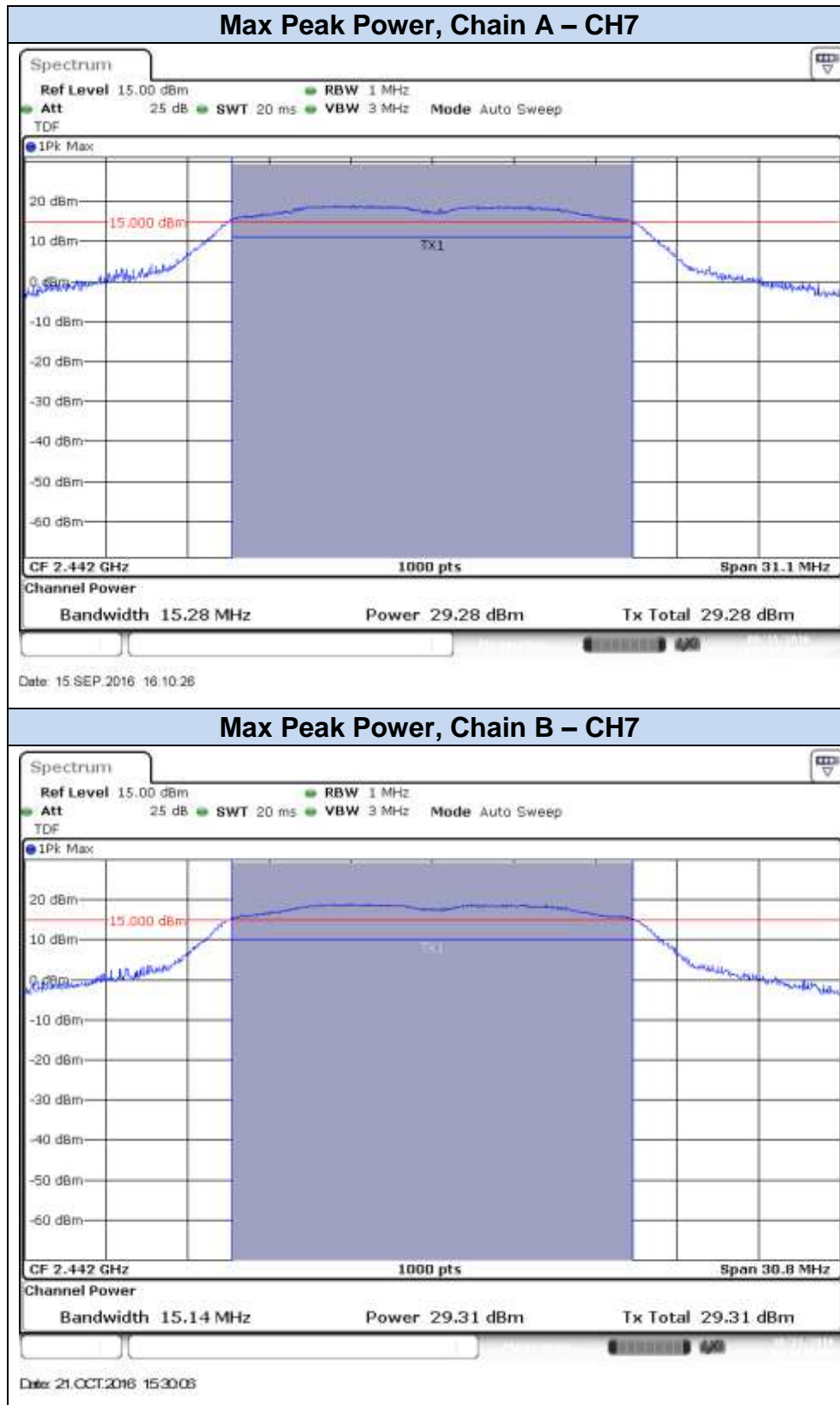


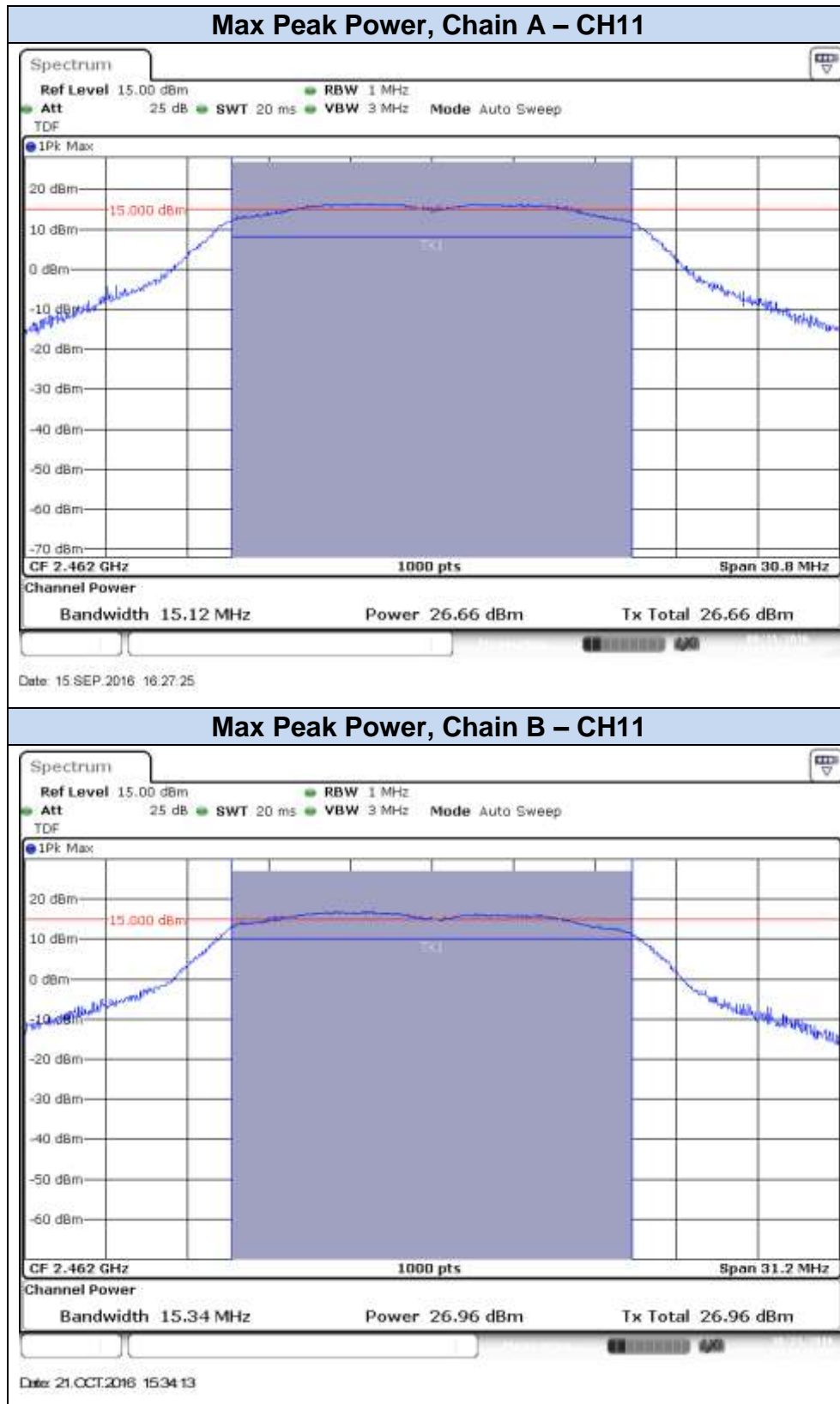


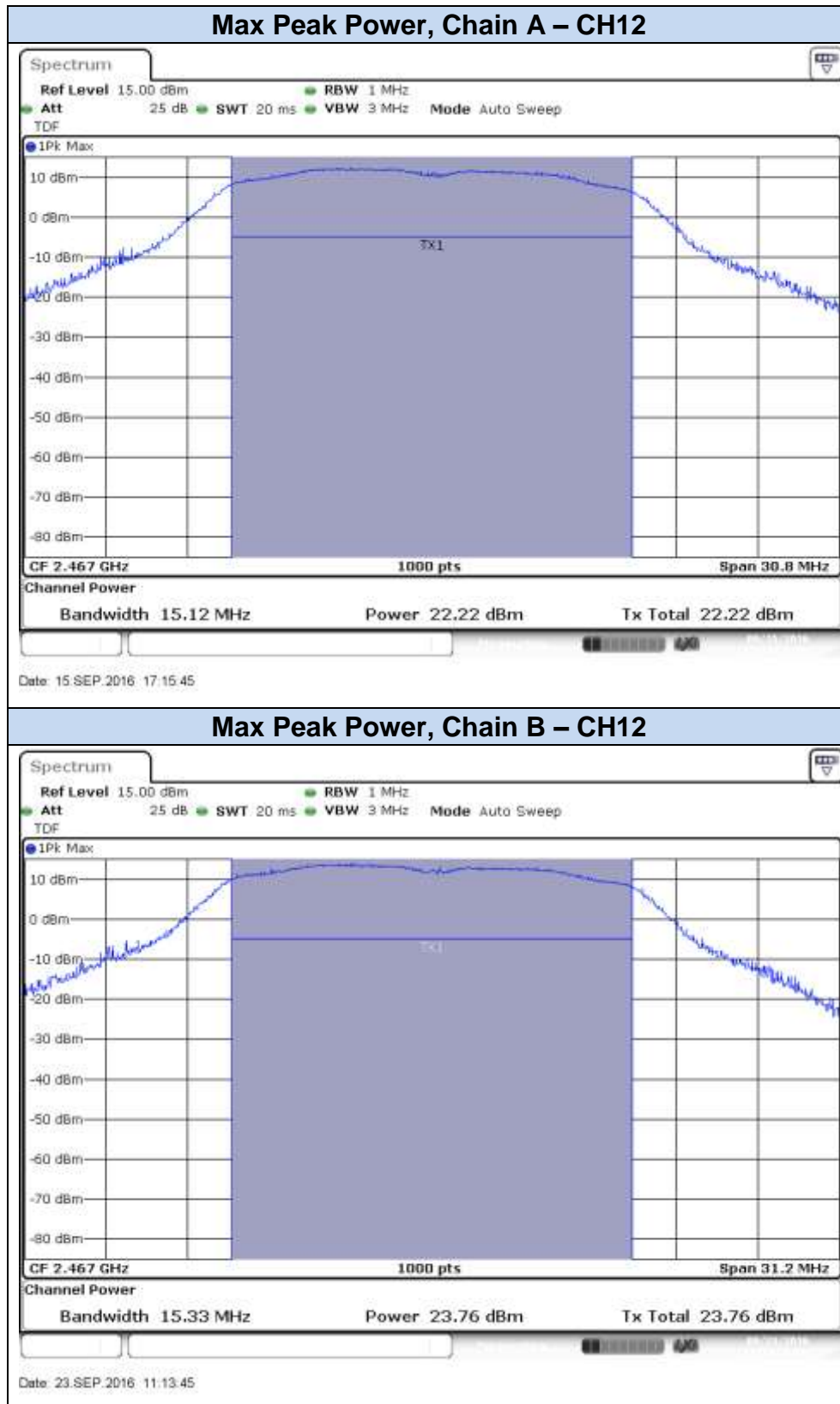


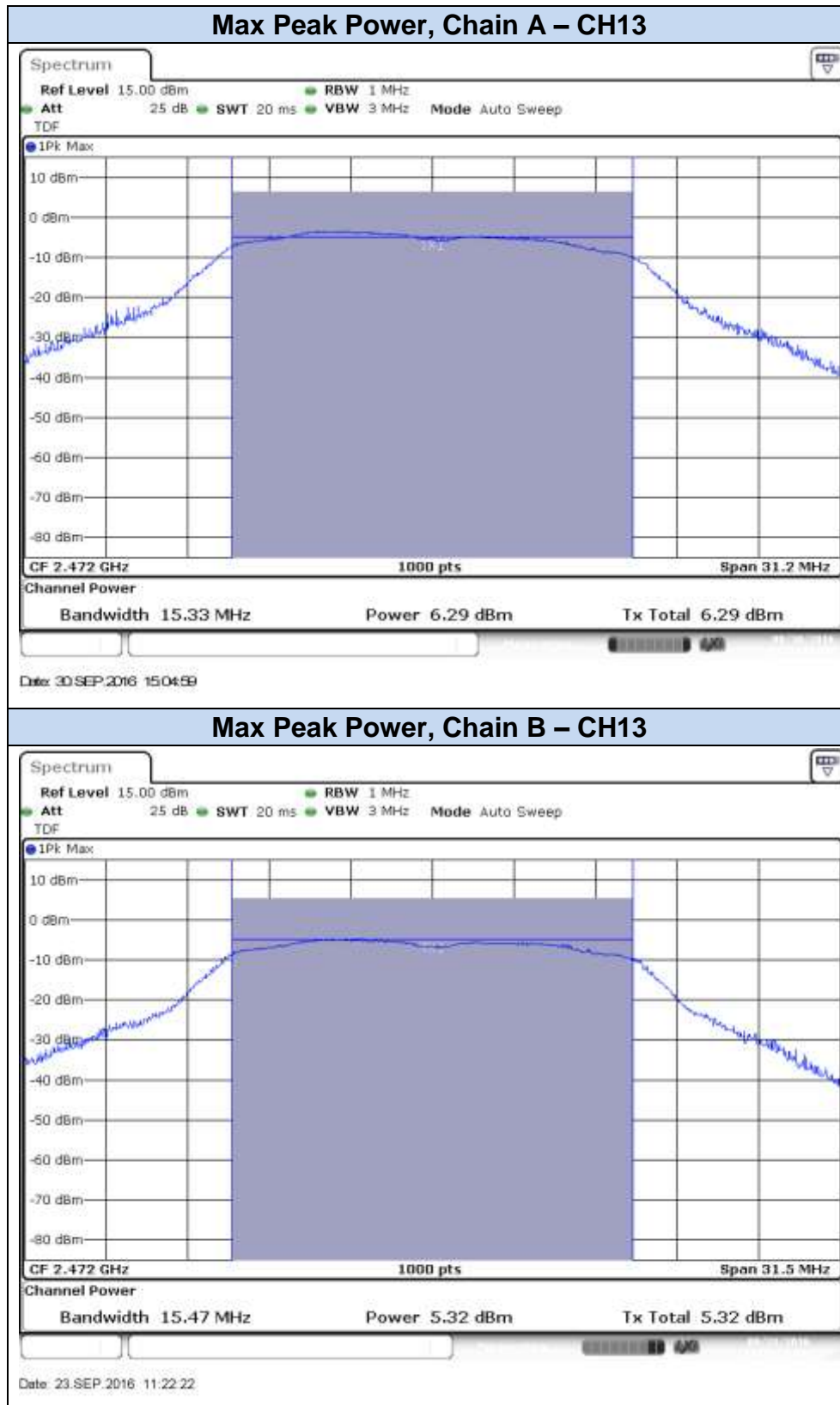
802.11g, 6Mbps

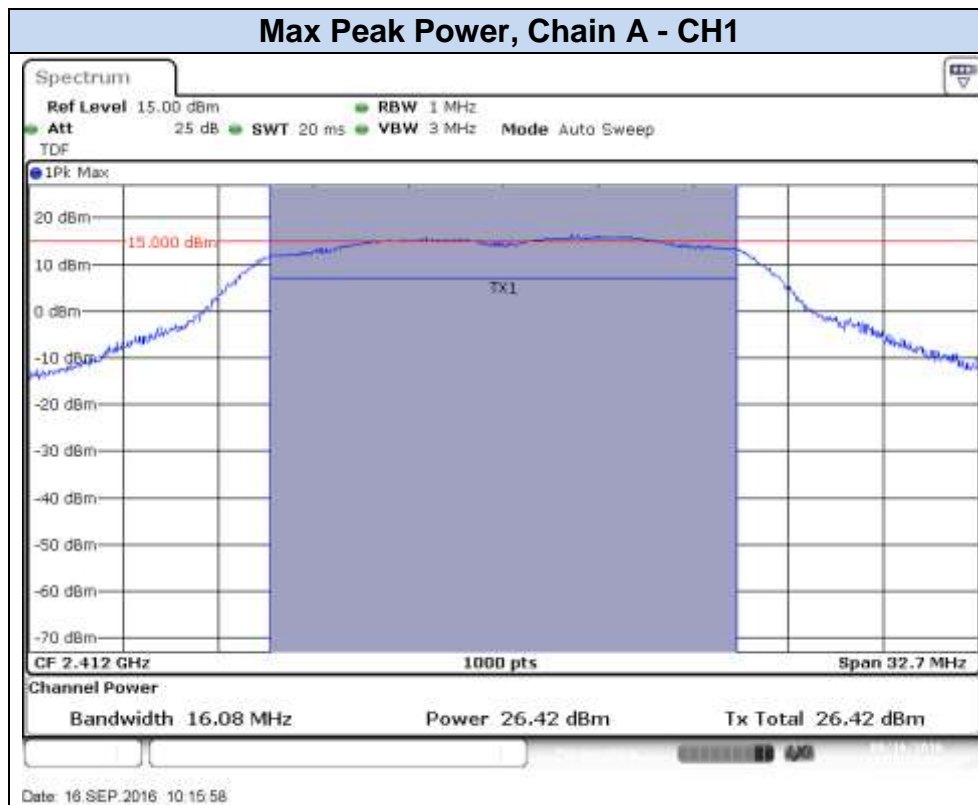
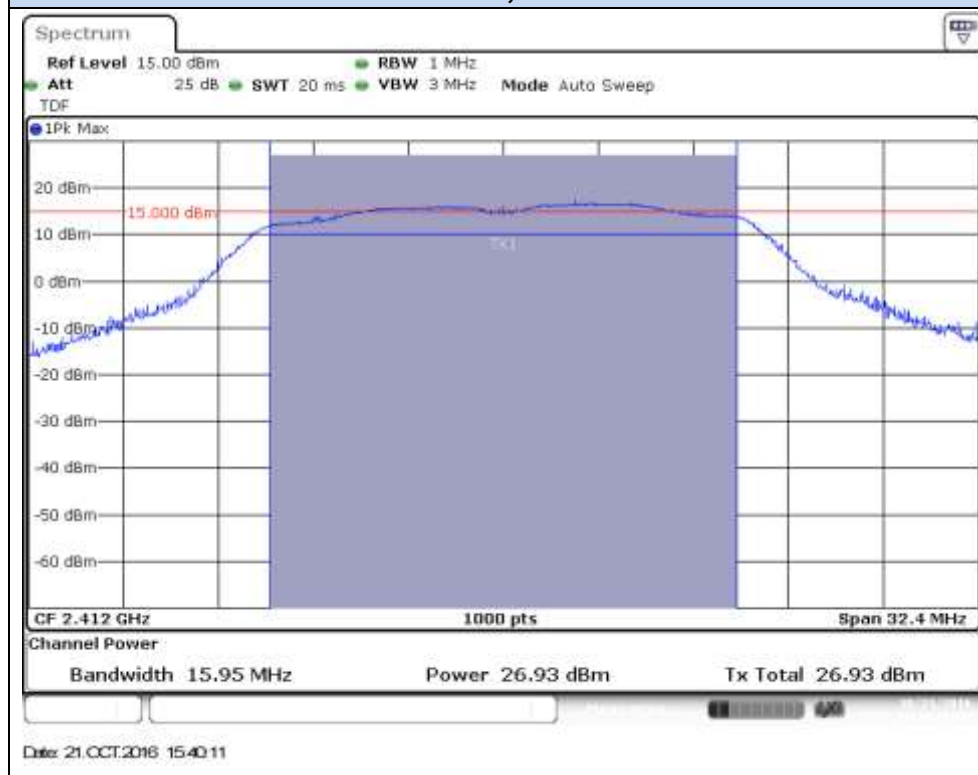


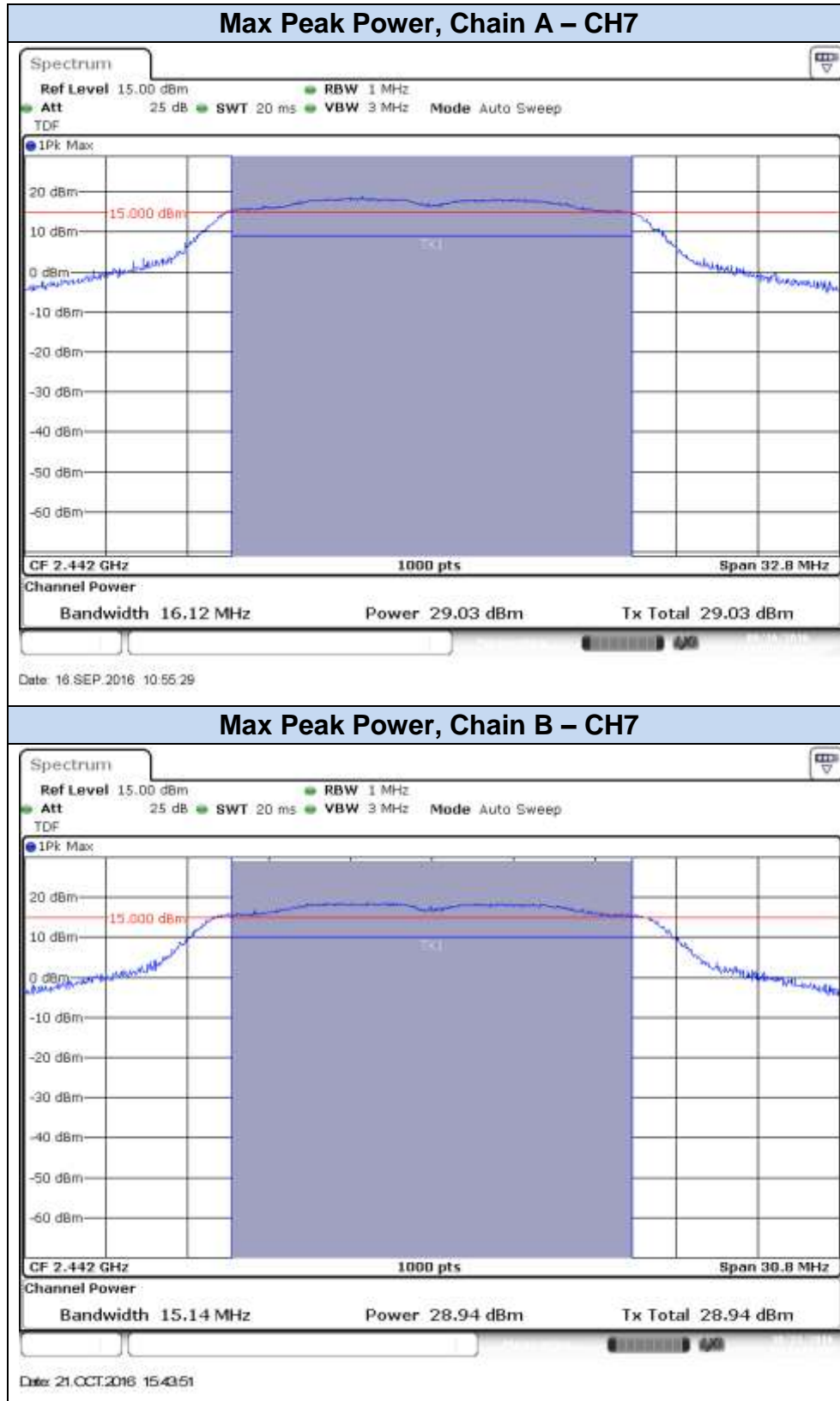


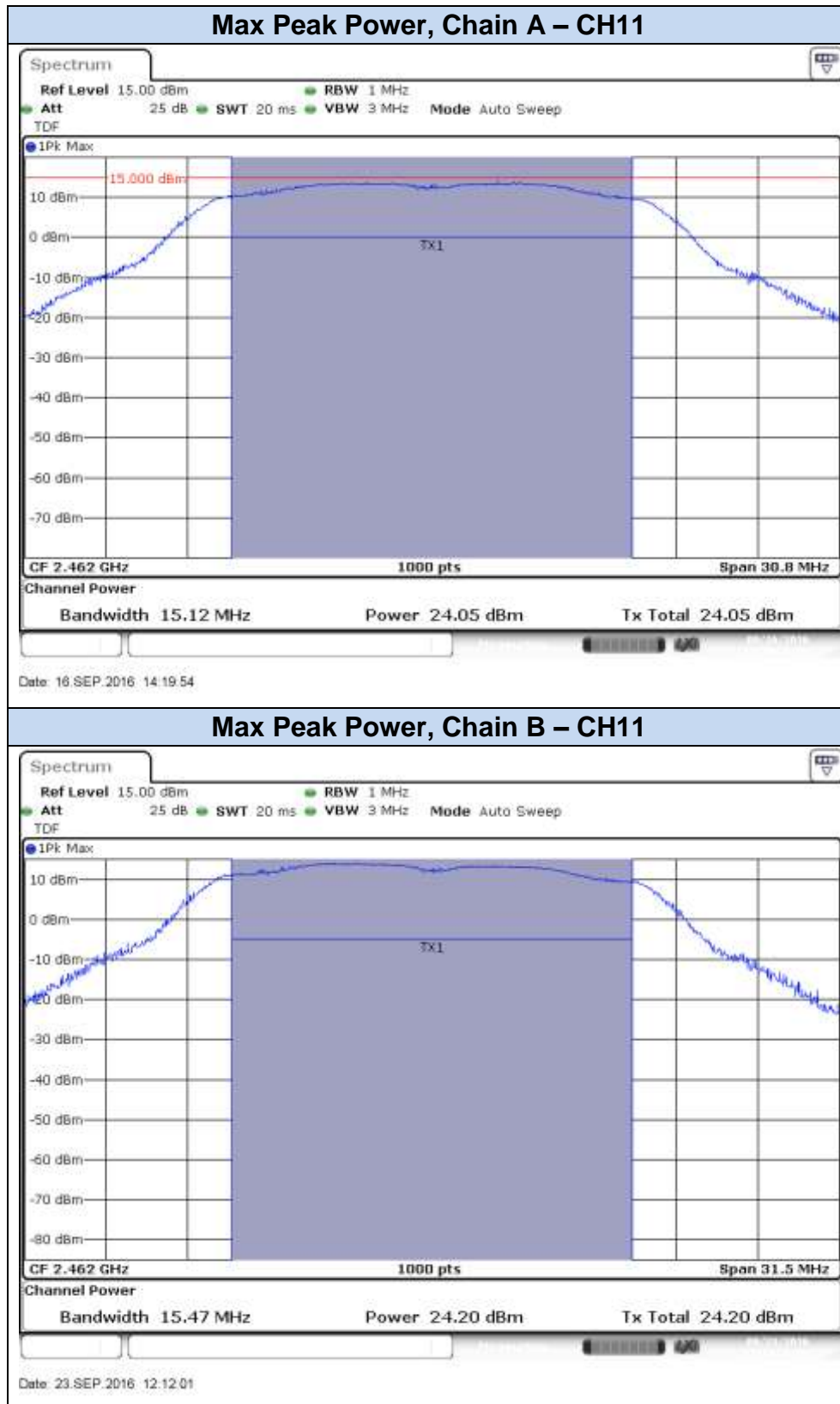


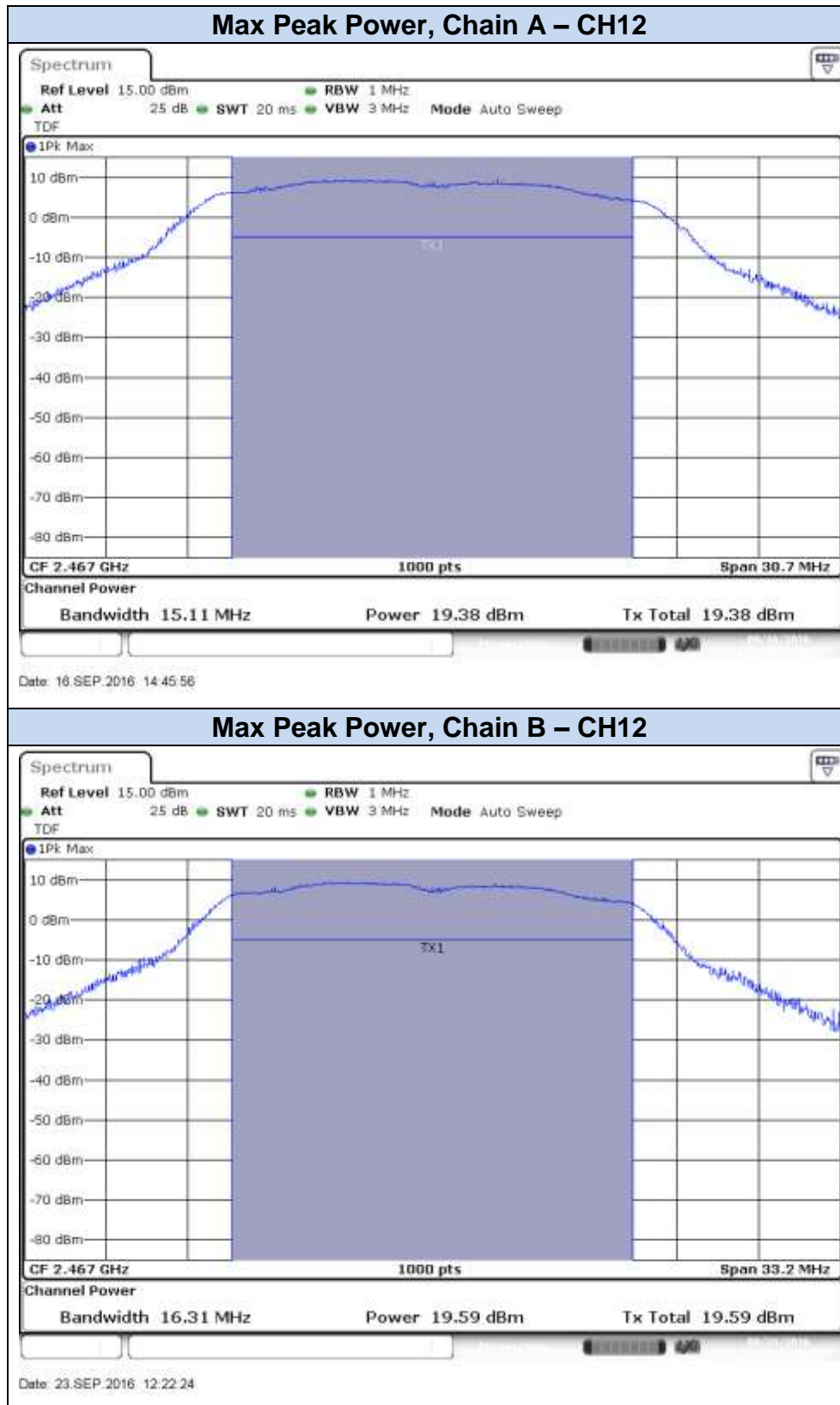


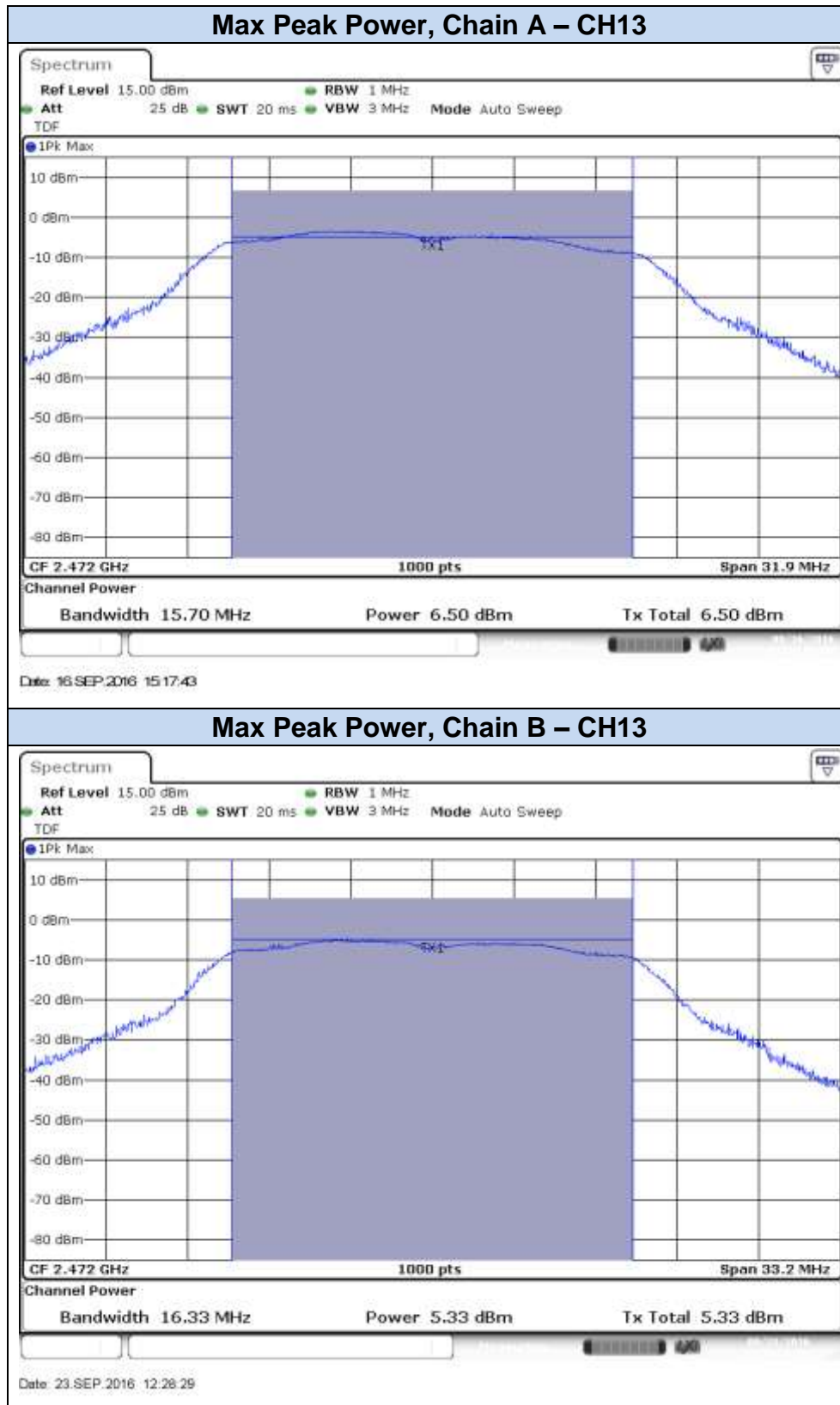


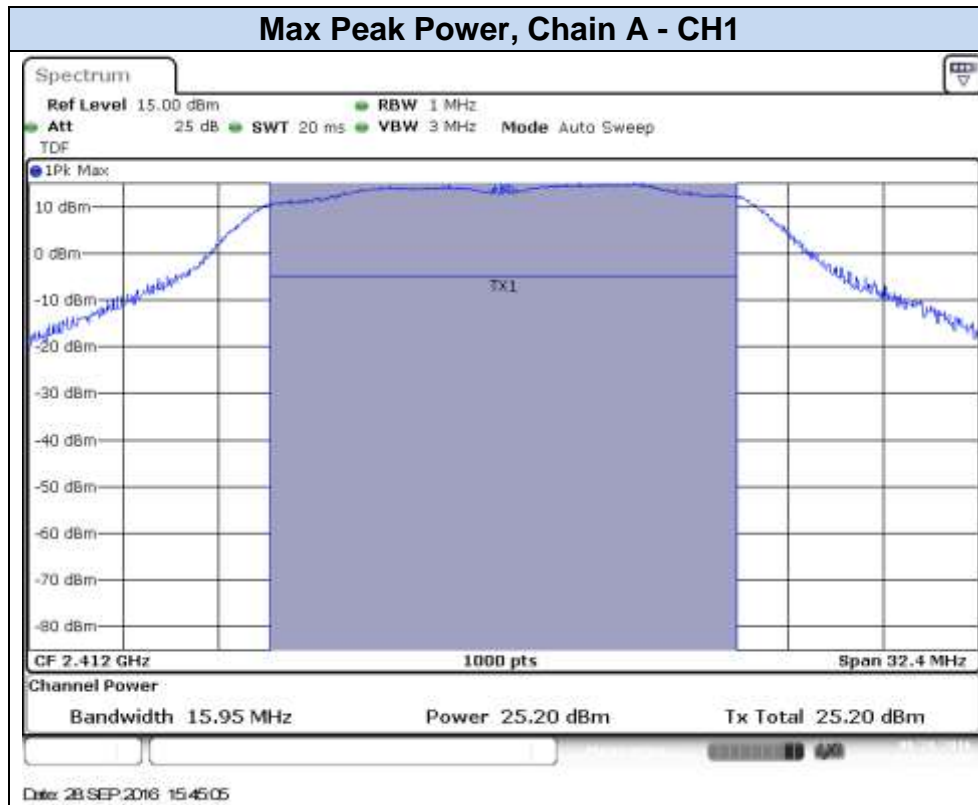
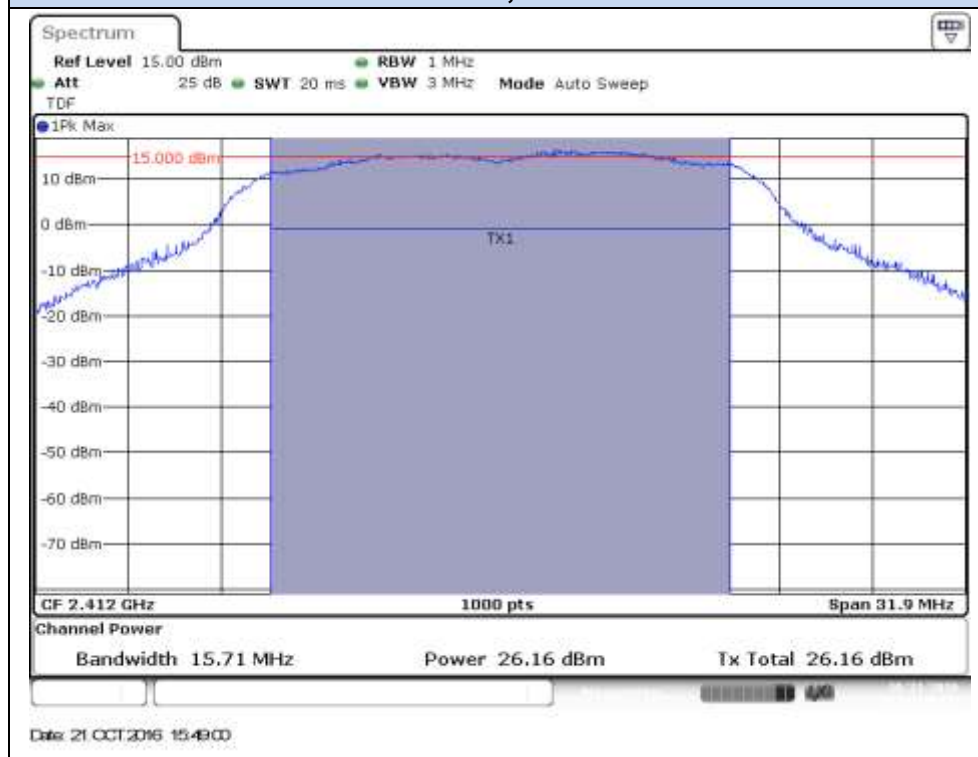
802.11n20 (SISO), HT0**Max Peak Power, Chain A - CH1****Max Peak Power, Chain B - CH1**

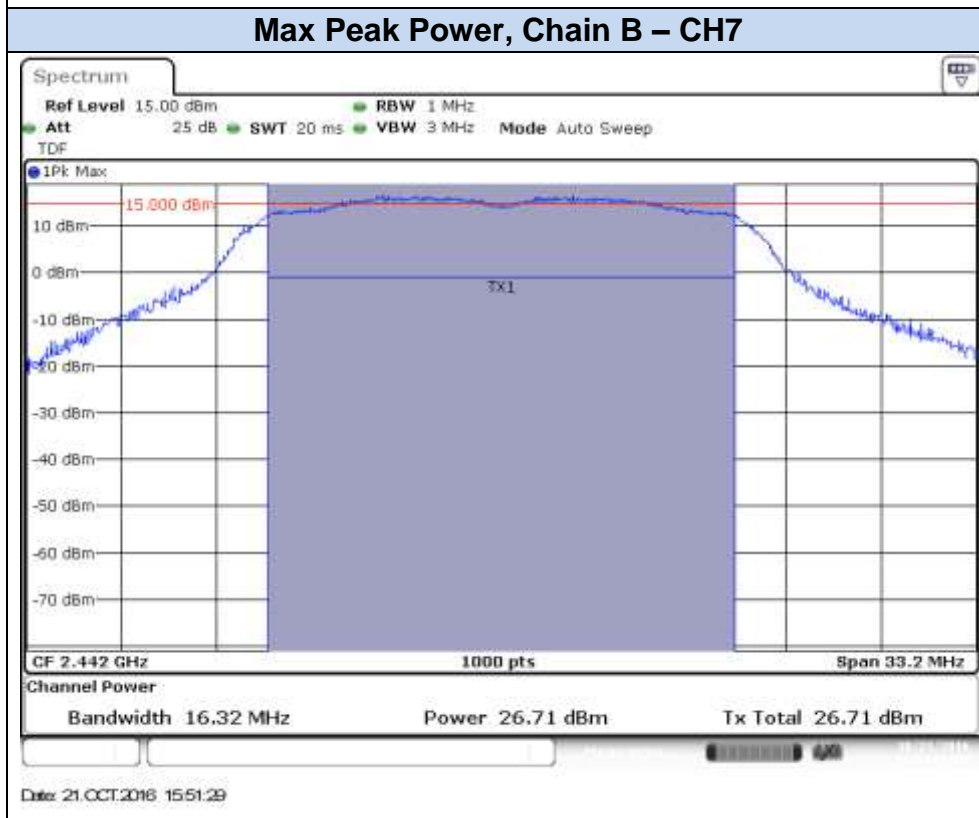
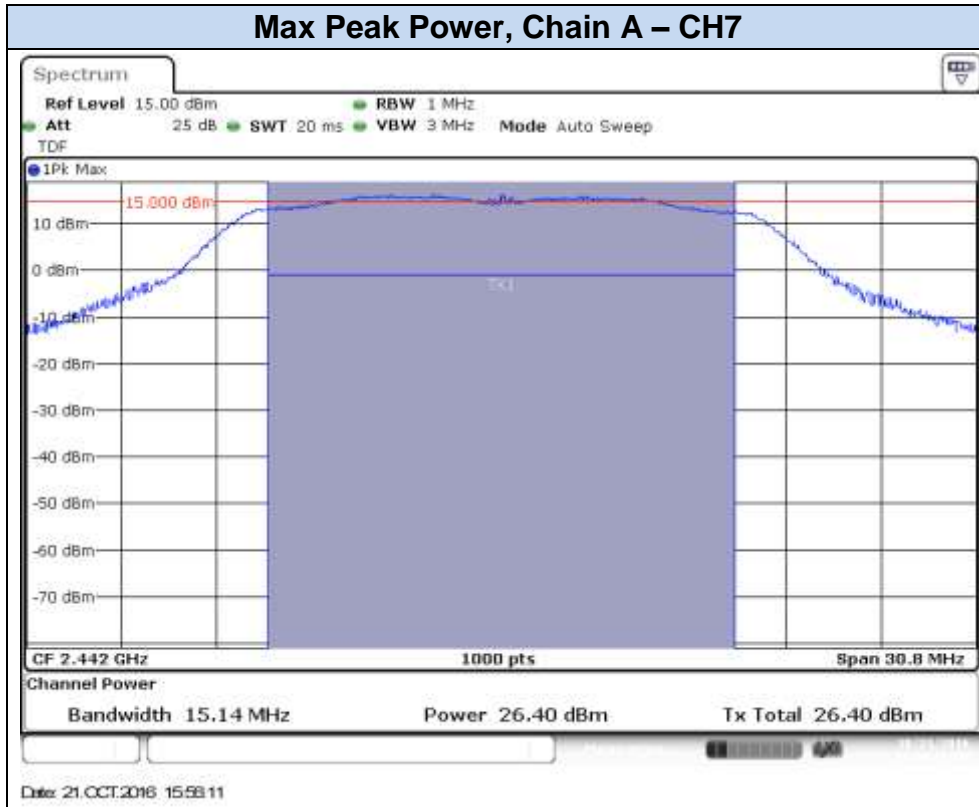


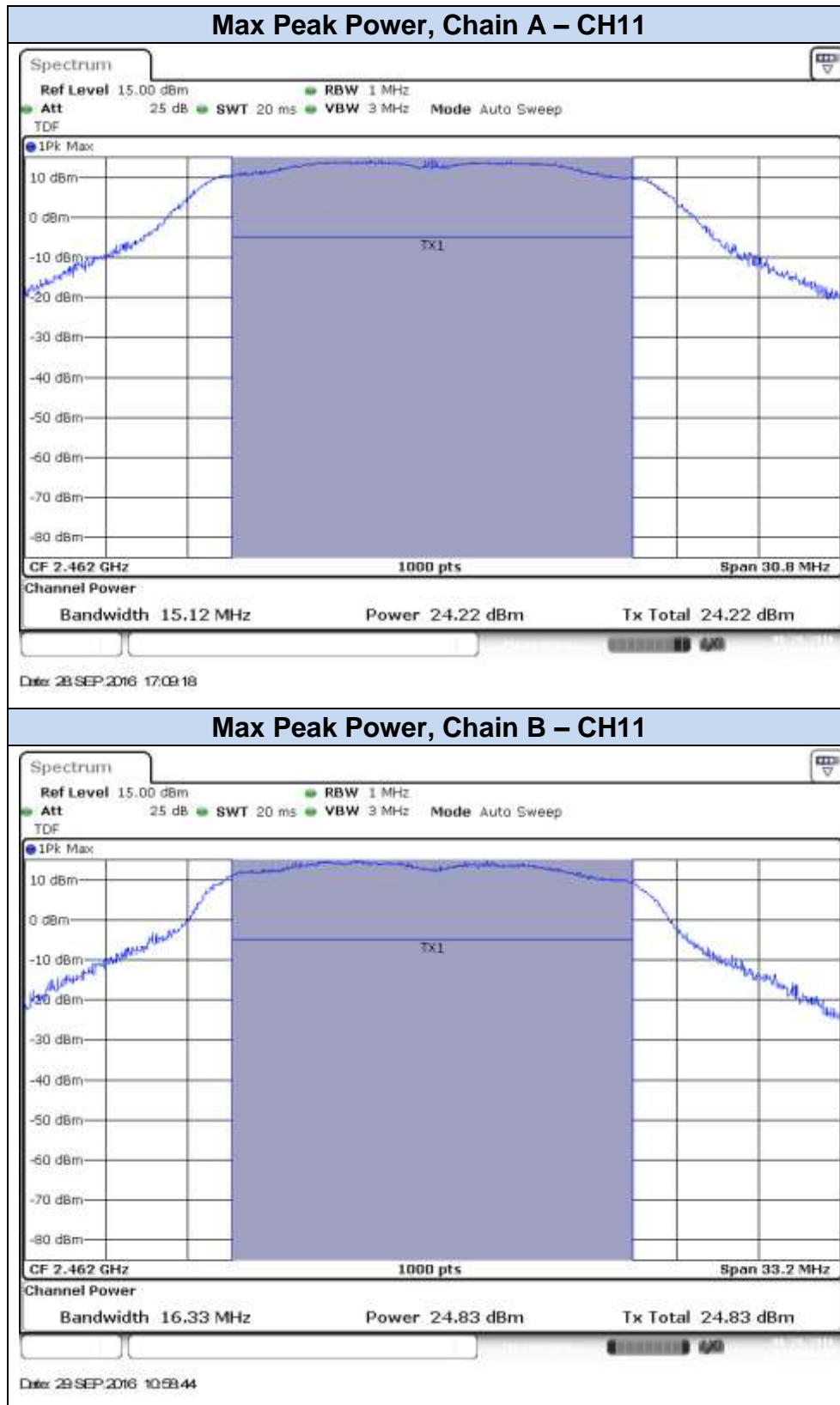


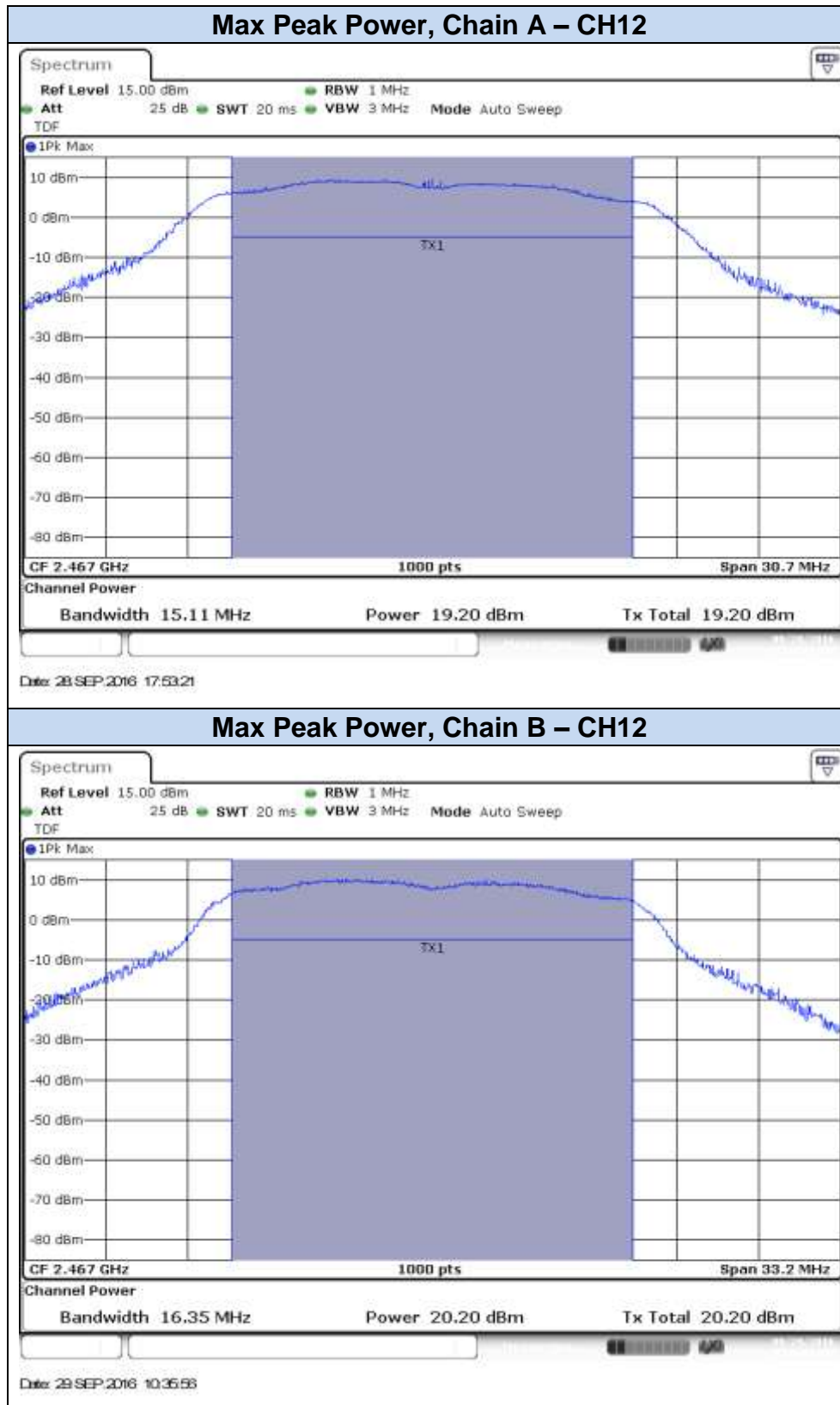


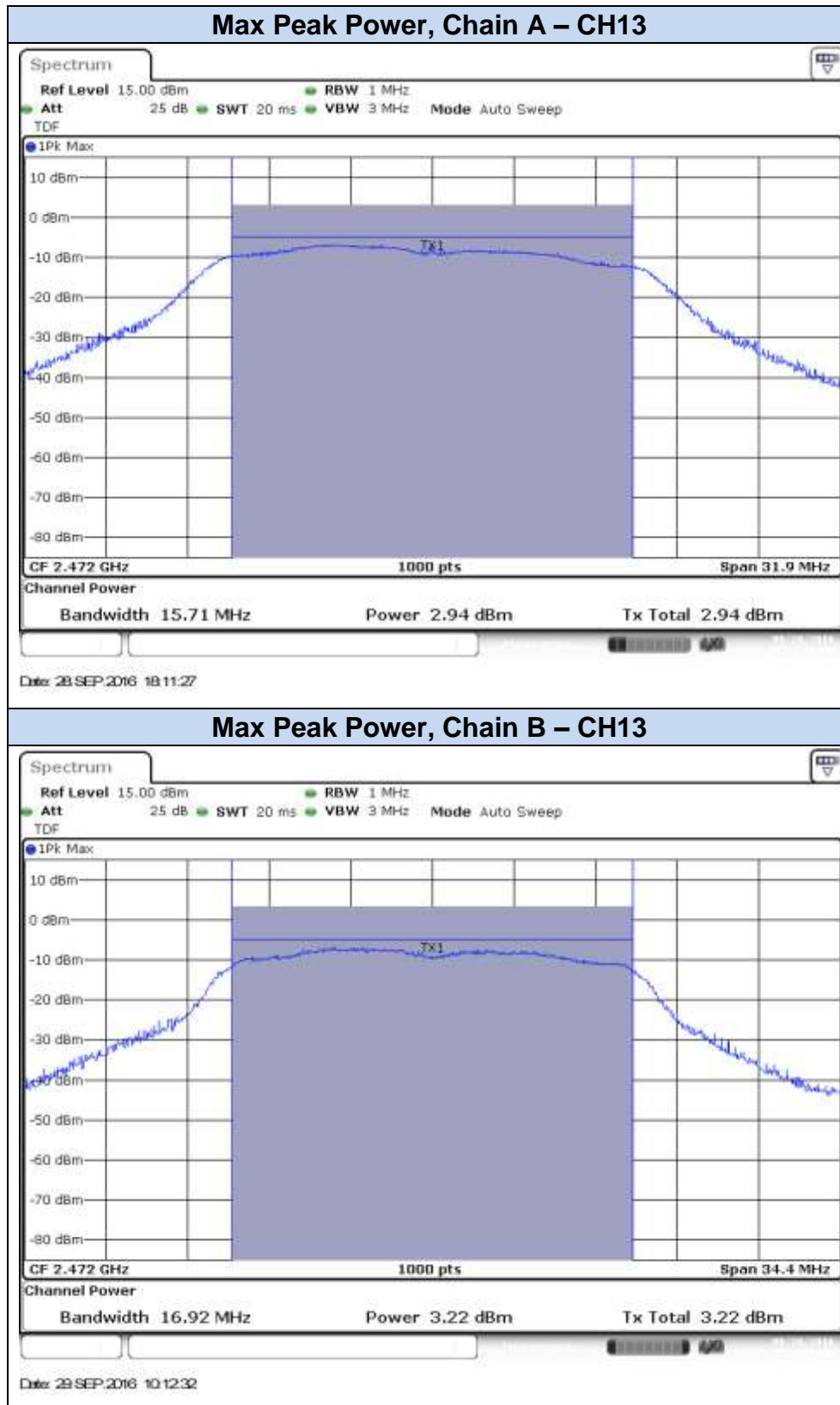


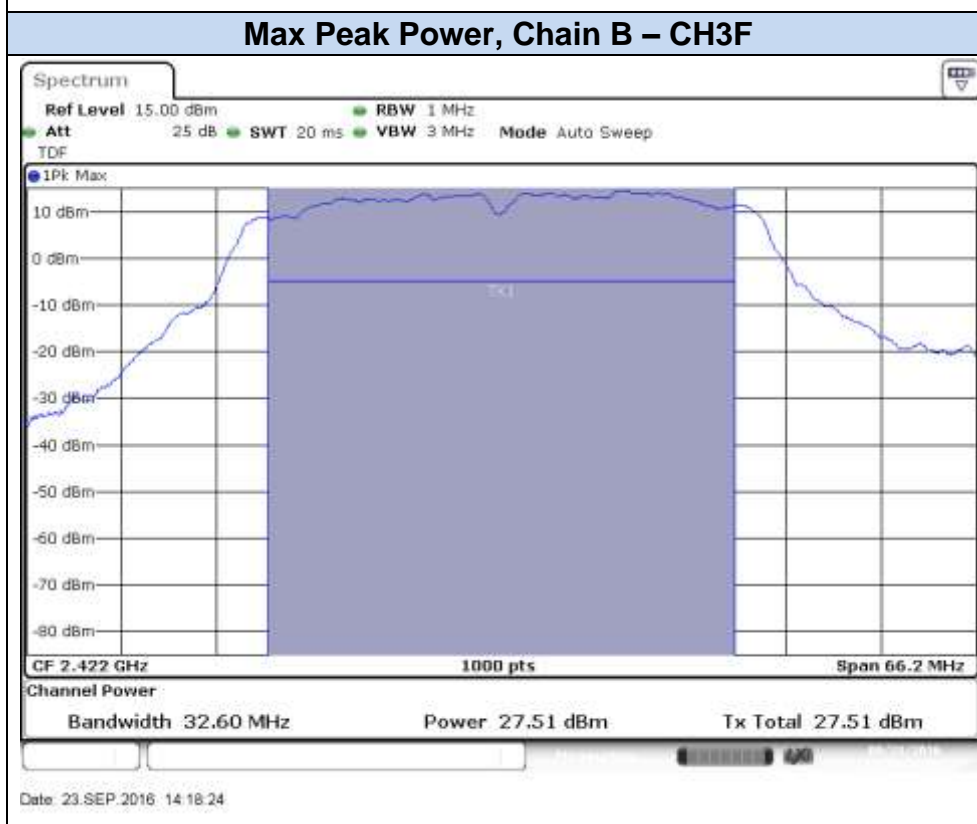
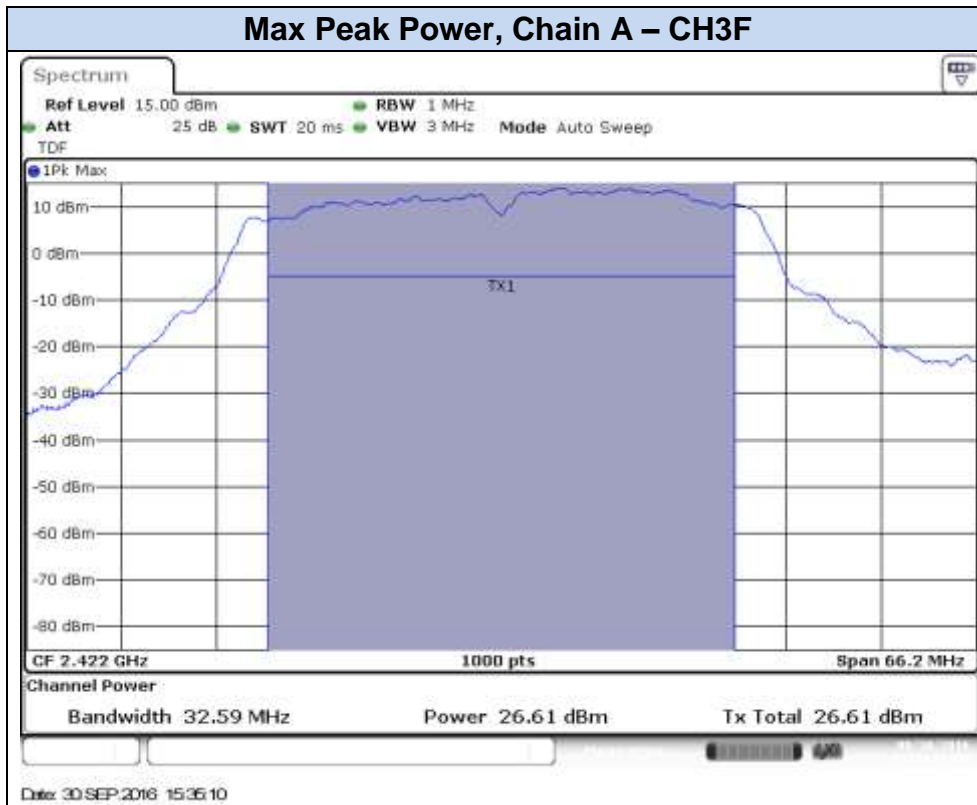
802.11n20 (MIMO), HT8**Max Peak Power, Chain A - CH1****Max Peak Power, Chain B - CH1**

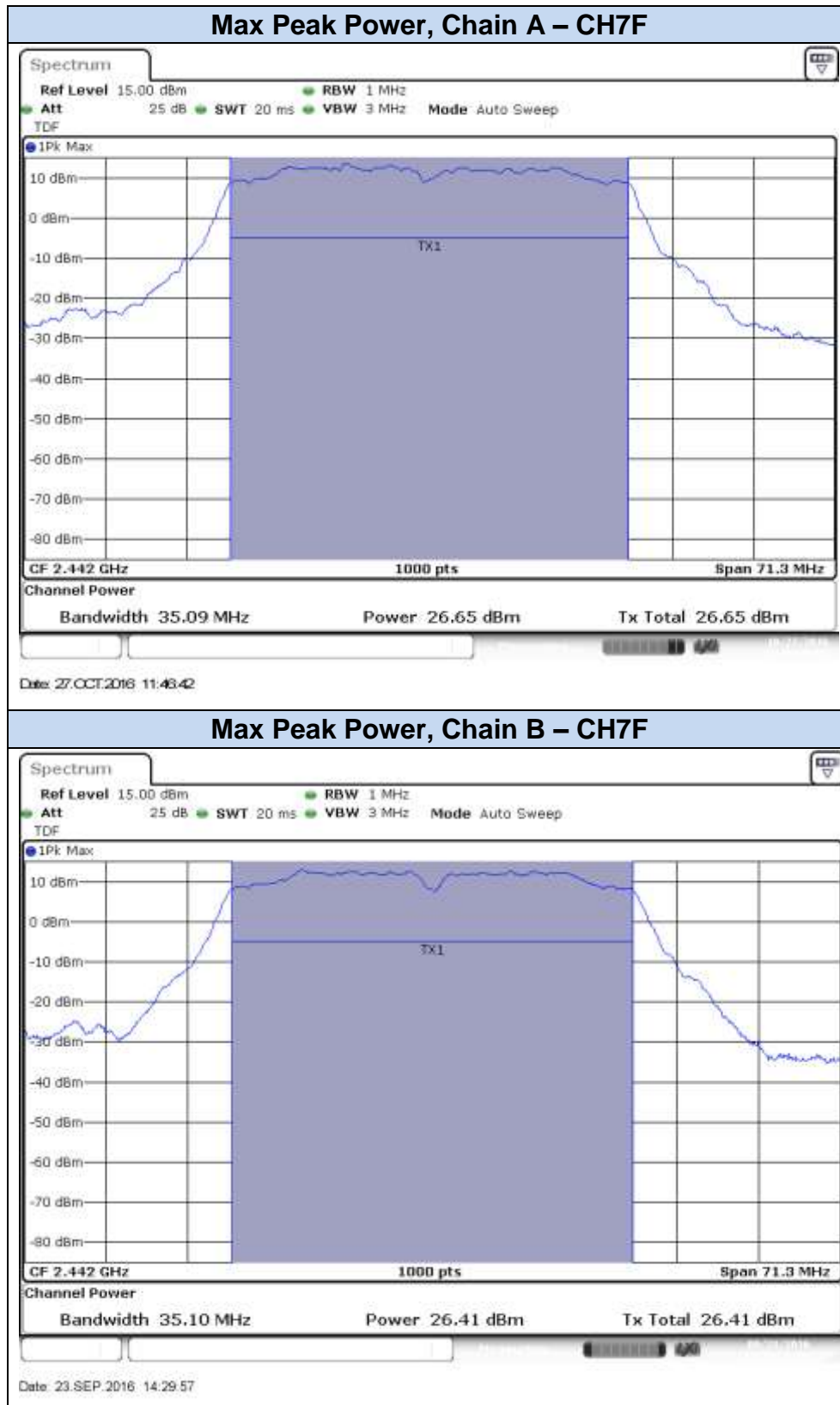


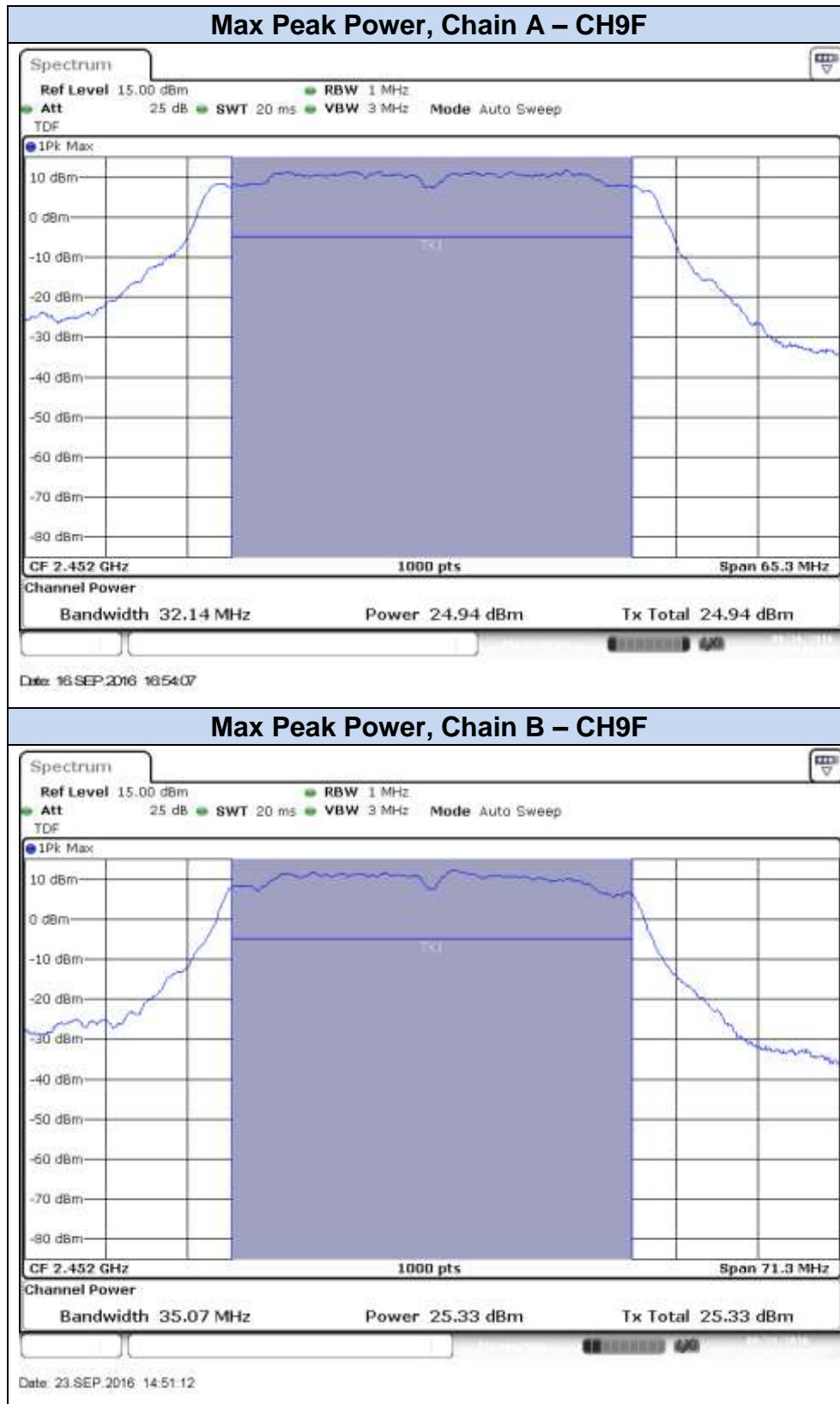


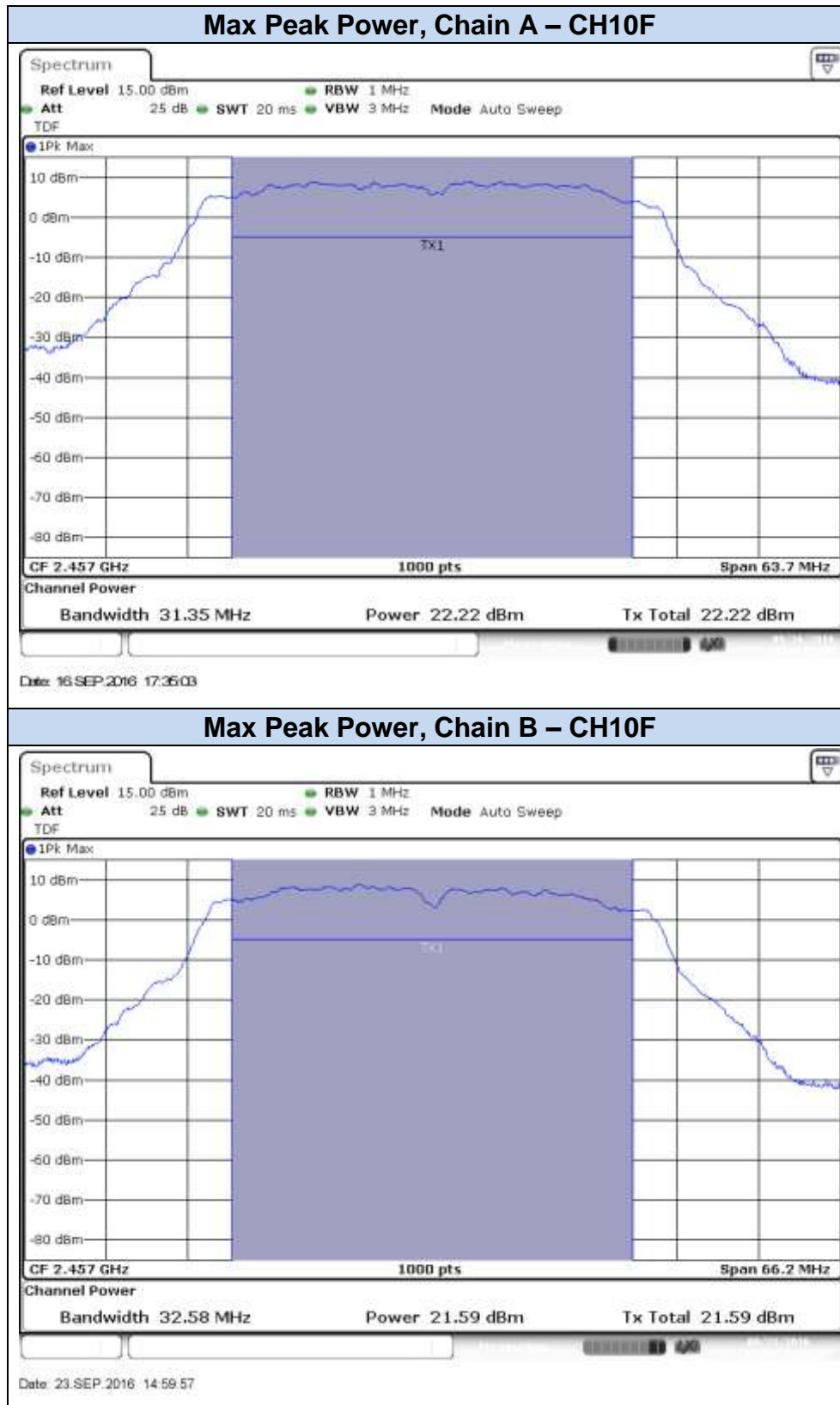


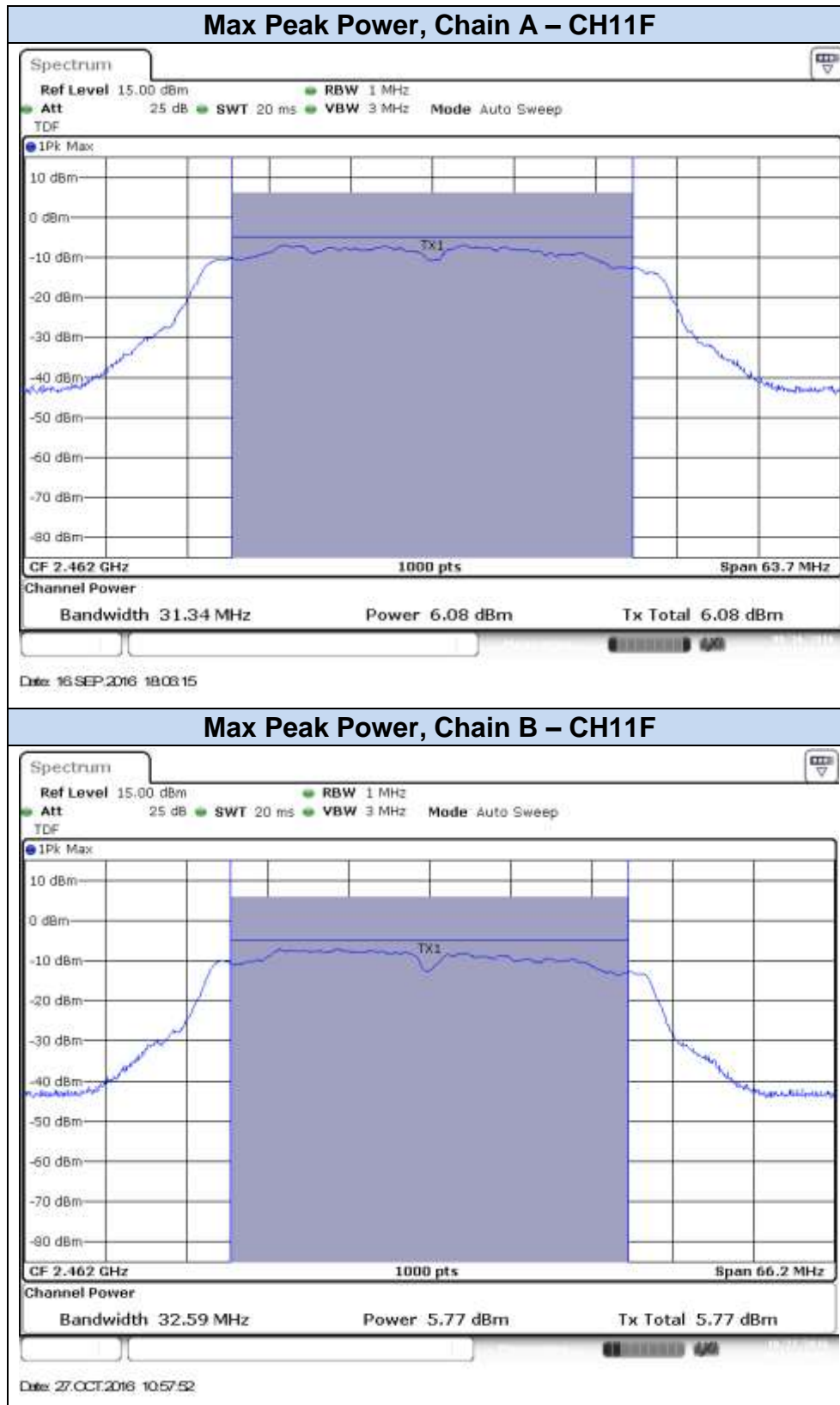


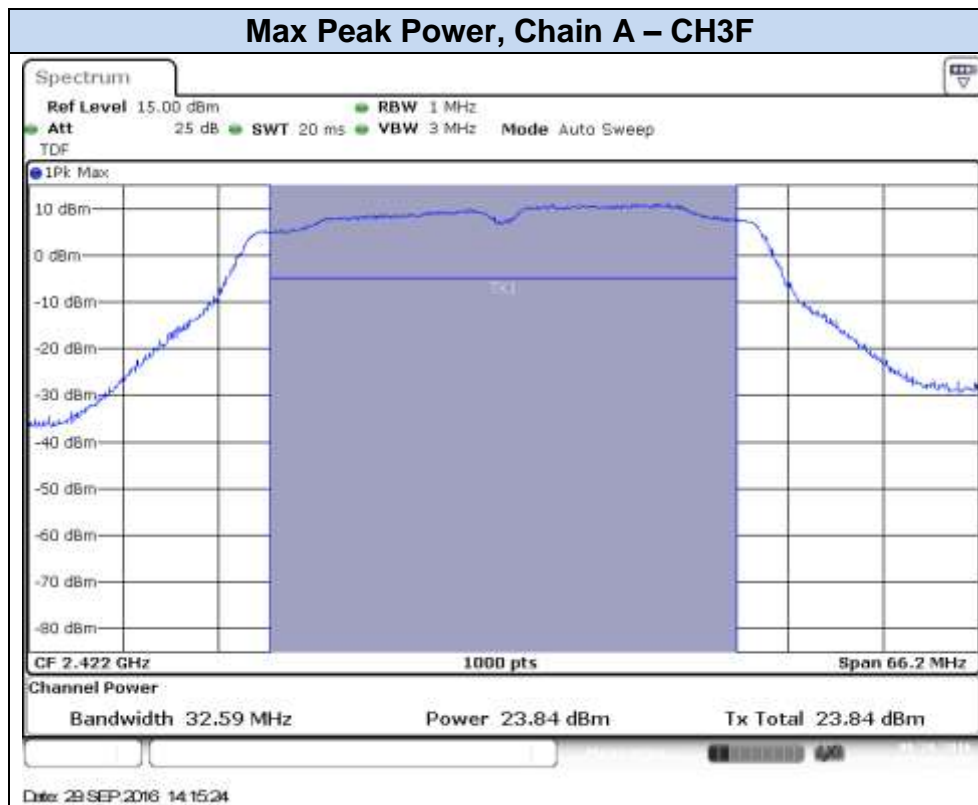
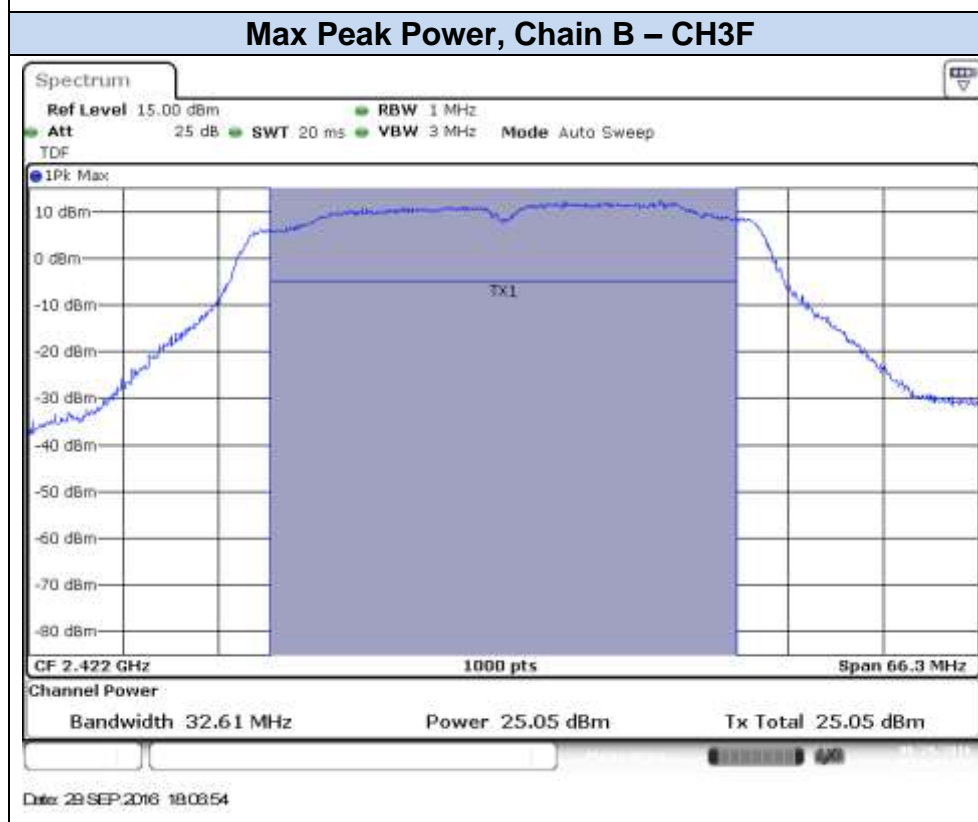
802.11n40 (SISO), HT0

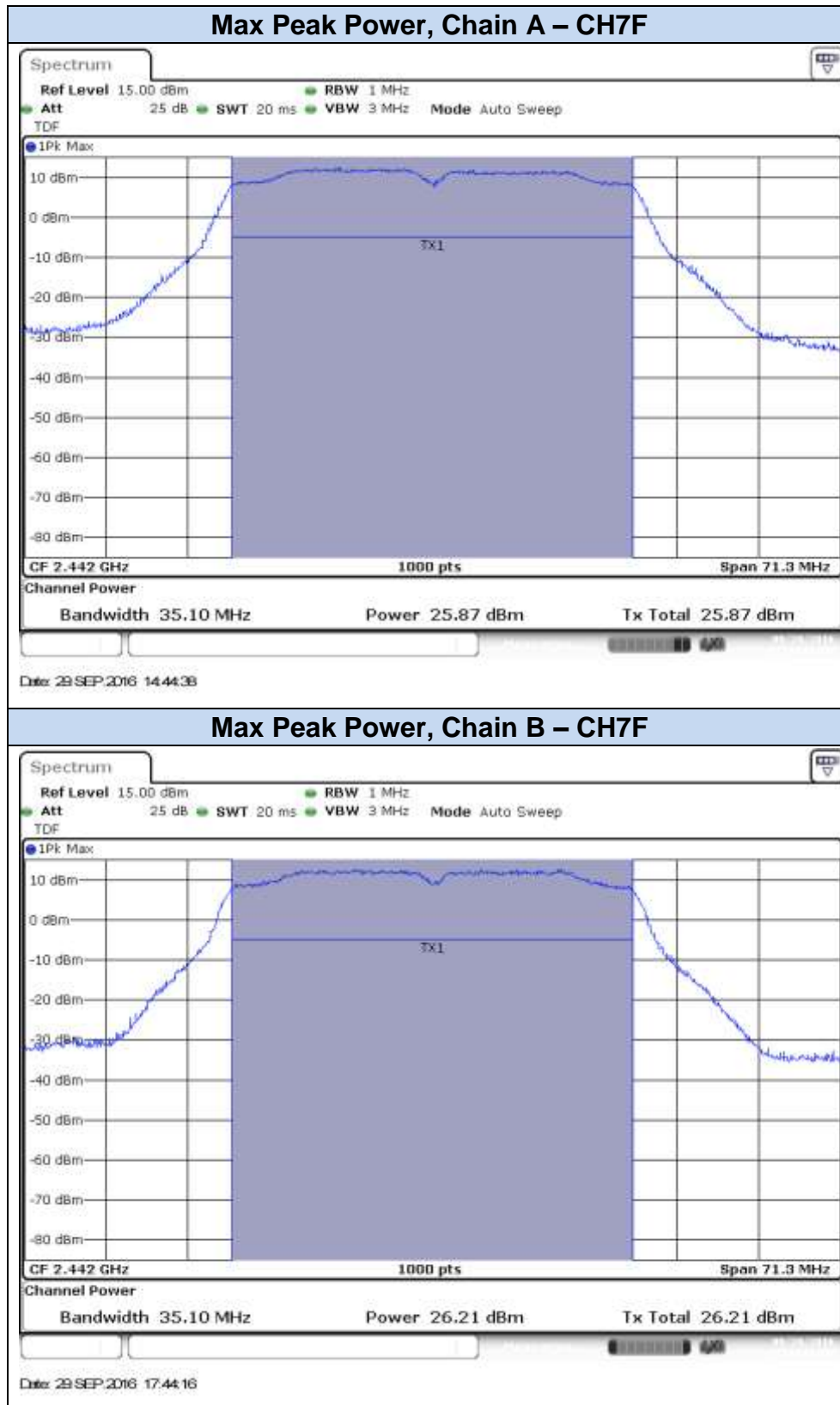


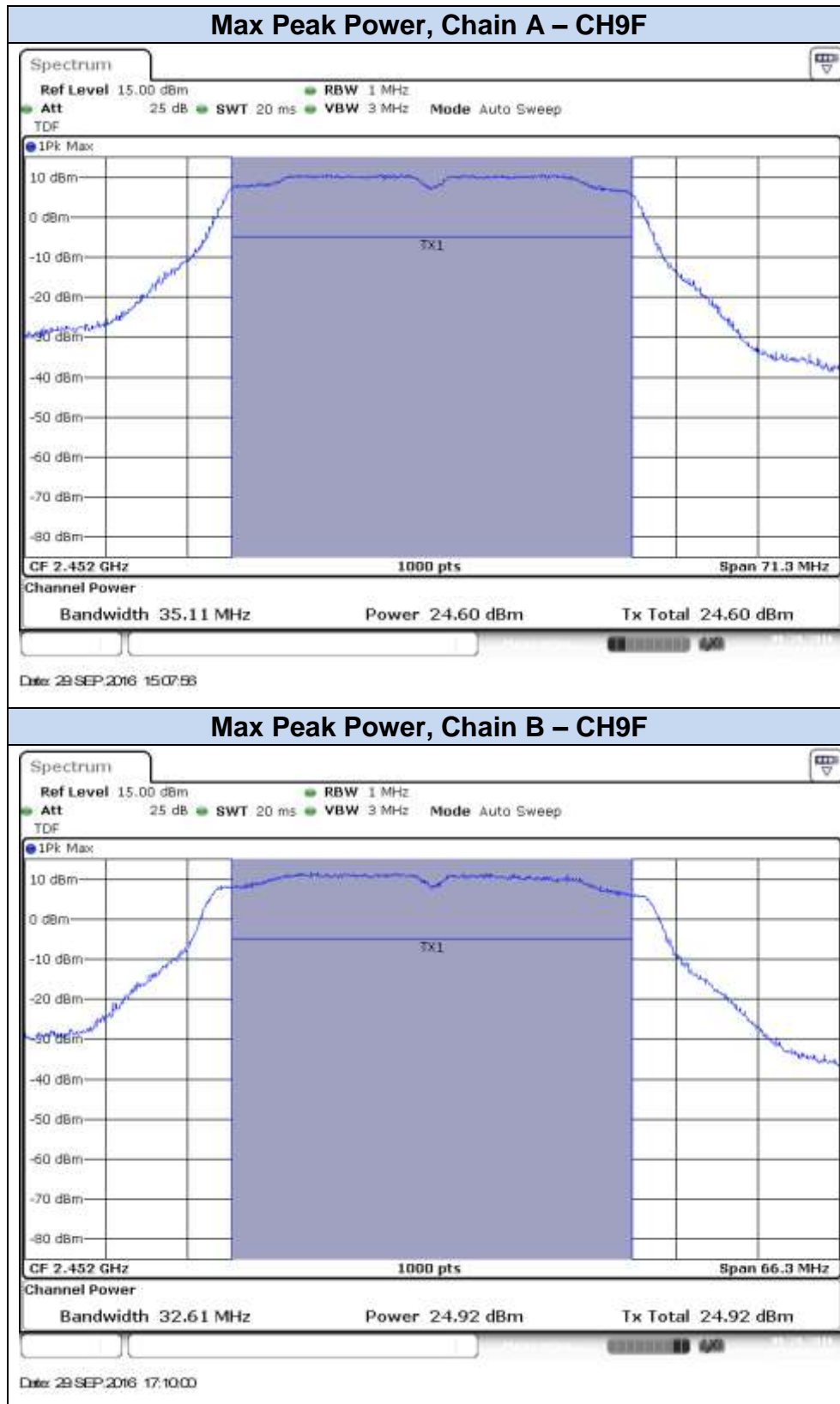


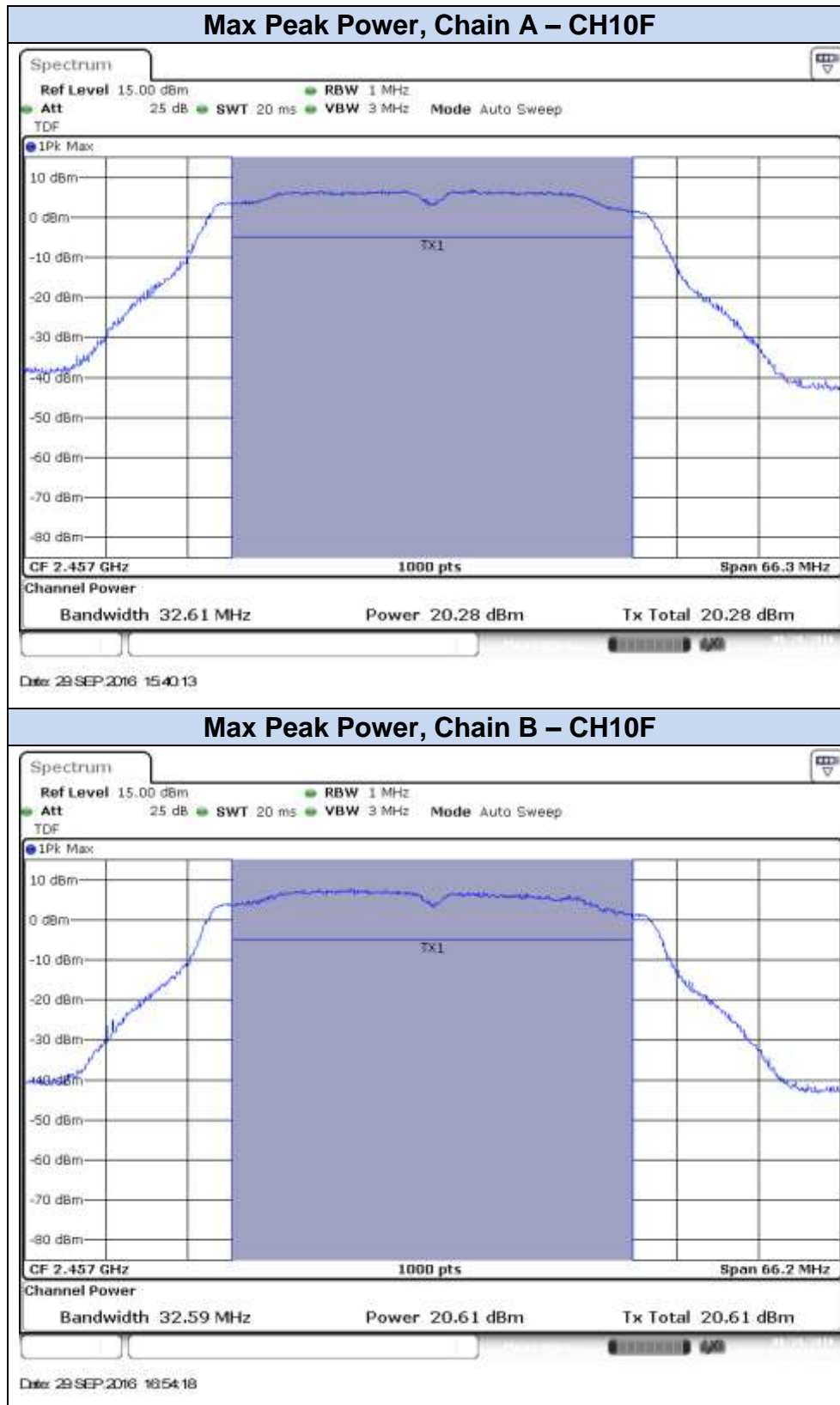


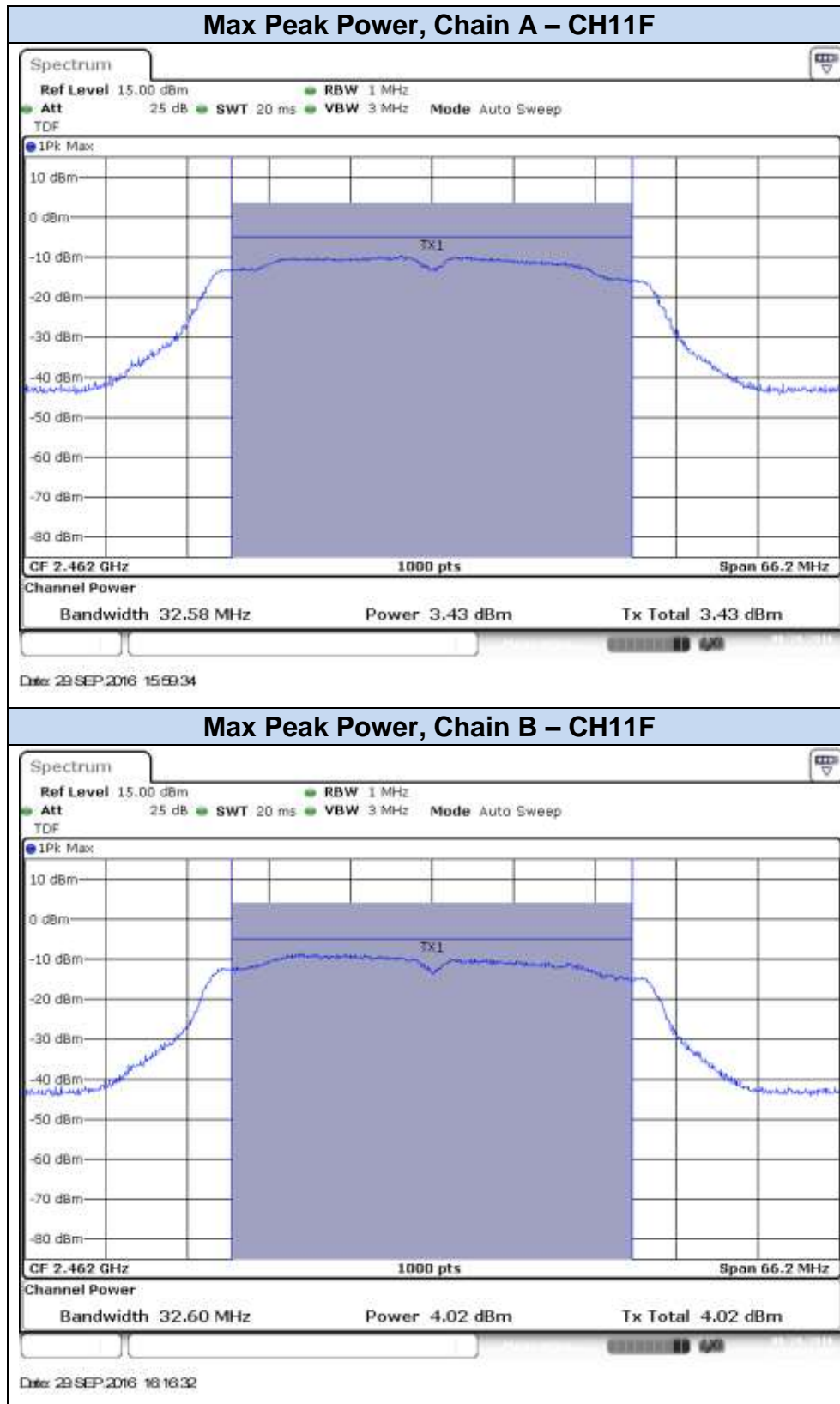


802.11n40 (MIMO), HT8**Max Peak Power, Chain A – CH3F****Max Peak Power, Chain B – CH3F**









B.3 Power Spectral Density

Test limits:

FCC part	RSS part	Limits
15.247 (e)	RSS-247 Clause 5.2 (2)	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test procedure:

The peak power spectral density level in the fundamental emission was measured using the *Method PKPSD (peak PSD)* according to point 10.2 of KDB 558074 D01 DTS Meas Guidance. This method was used for 802.11b, 802.11g, 802.11n20 and 802.11n40 modes.

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

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

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

