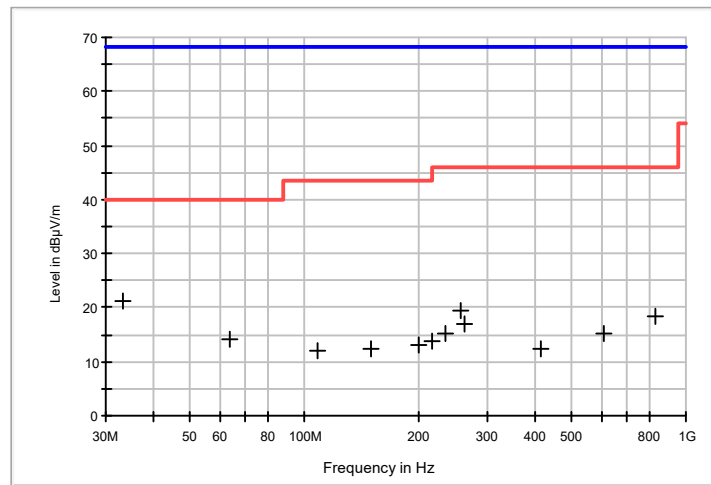




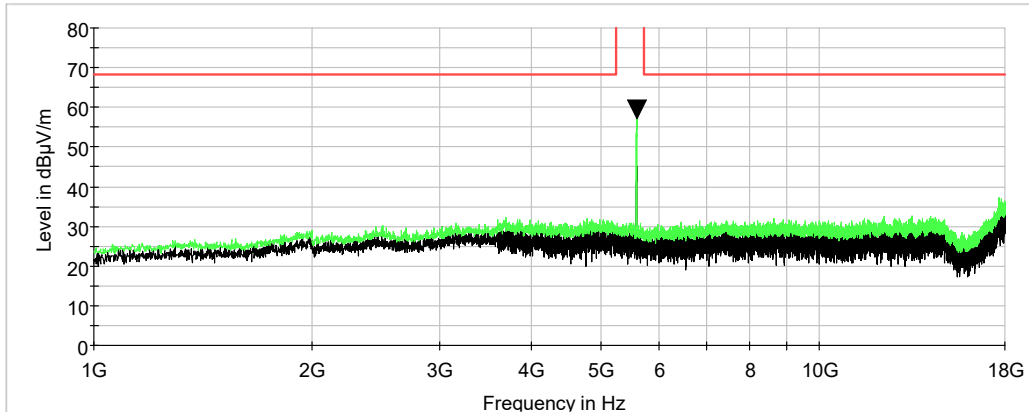
Radiated Spurious Emissions: U-NII-2C, OFDM, 30 MHz to 1000 MHz

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (degrees)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
33.280000	V	100.00	2.00	16.9	4.2	21.10	40.0	-18.9
63.560000	V	100.00	0.00	21.6	-7.3	14.30	40.0	-25.7
107.400000	V	100.00	0.00	15.6	-3.5	12.10	43.5	-31.4
149.880000	V	100.00	0.00	15.5	-3.0	12.50	43.5	-31.0
199.160000	V	100.00	0.00	15.6	-2.6	13.00	43.5	-30.5
215.080000	H	100.00	36.00	18.6	-4.6	14.00	43.5	-29.5
234.080000	H	100.00	128.00	19.0	-3.8	15.20	46.0	-30.8
256.800000	H	100.00	32.00	22.9	-3.4	19.50	46.0	-26.5
262.400000	V	100.00	0.00	19.6	-2.7	16.90	46.0	-29.1
414.520000	V	100.00	0.00	11.1	1.1	12.20	46.0	-33.8
611.400000	V	100.00	0.00	11.6	3.8	15.40	46.0	-30.6
829.080000	V	100.00	0.00	11.8	6.6	18.40	46.0	-27.6

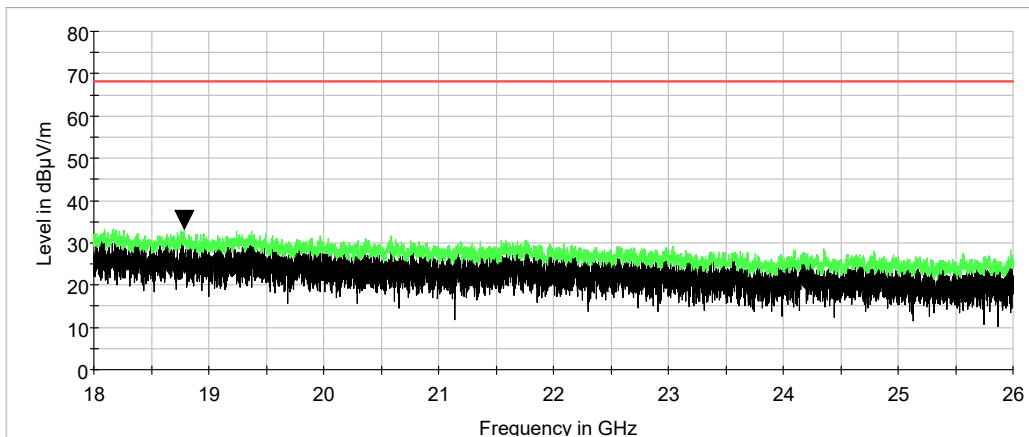




**Radiated Spurious Emissions:
U-NII-2C, OFDM, Mid Channel, 1 GHz to 18 GHz, Vertical**

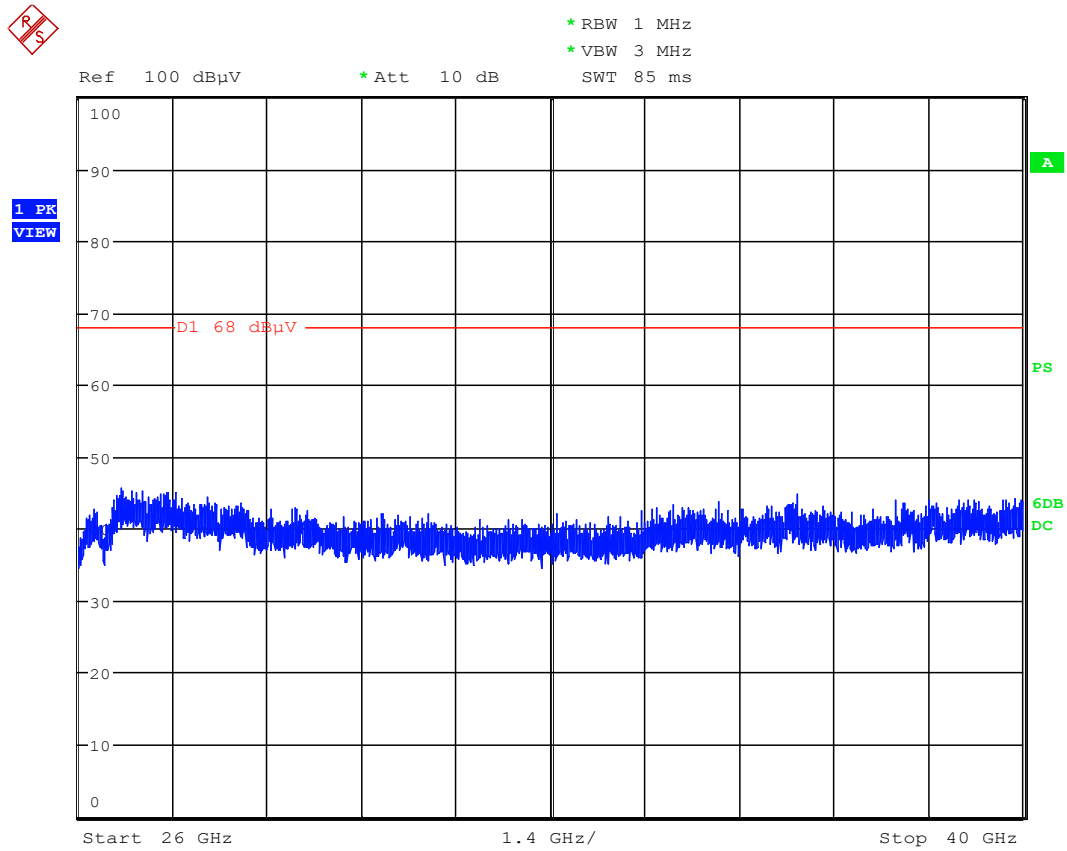


**Radiated Spurious Emissions:
U-NII-2C, OFDM, Mid Channel, 18 GHz to 26 GHz, Vertical**





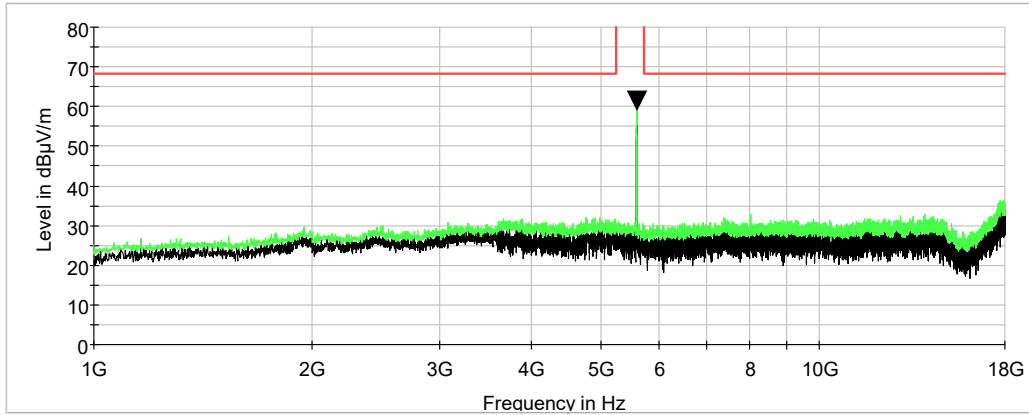
Radiated Spurious Emissions: U-NII-2C, OFDM, Mid Channel, 26 GHz to 40 GHz, Vertical



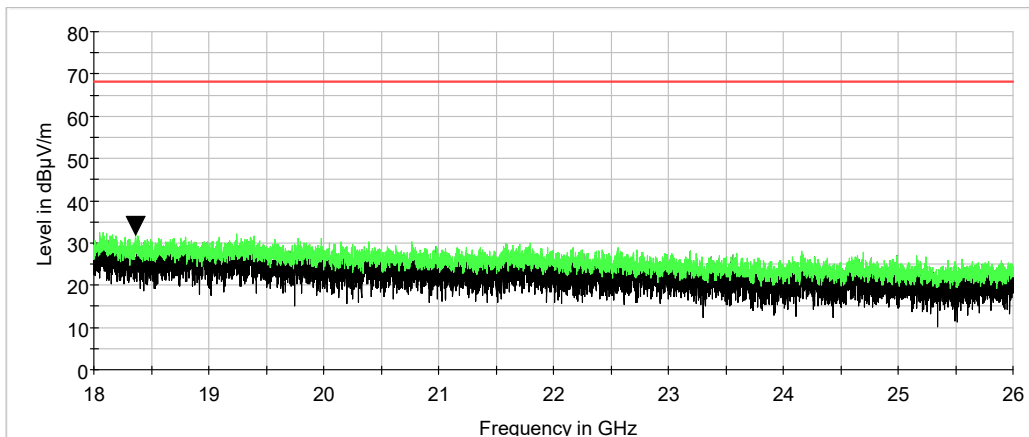
Date: 4.FEB.2020 14:43:43



**Radiated Spurious Emissions:
U-NII-2C, OFDM, Mid Channel, 1 GHz to 18 GHz, Horizontal**

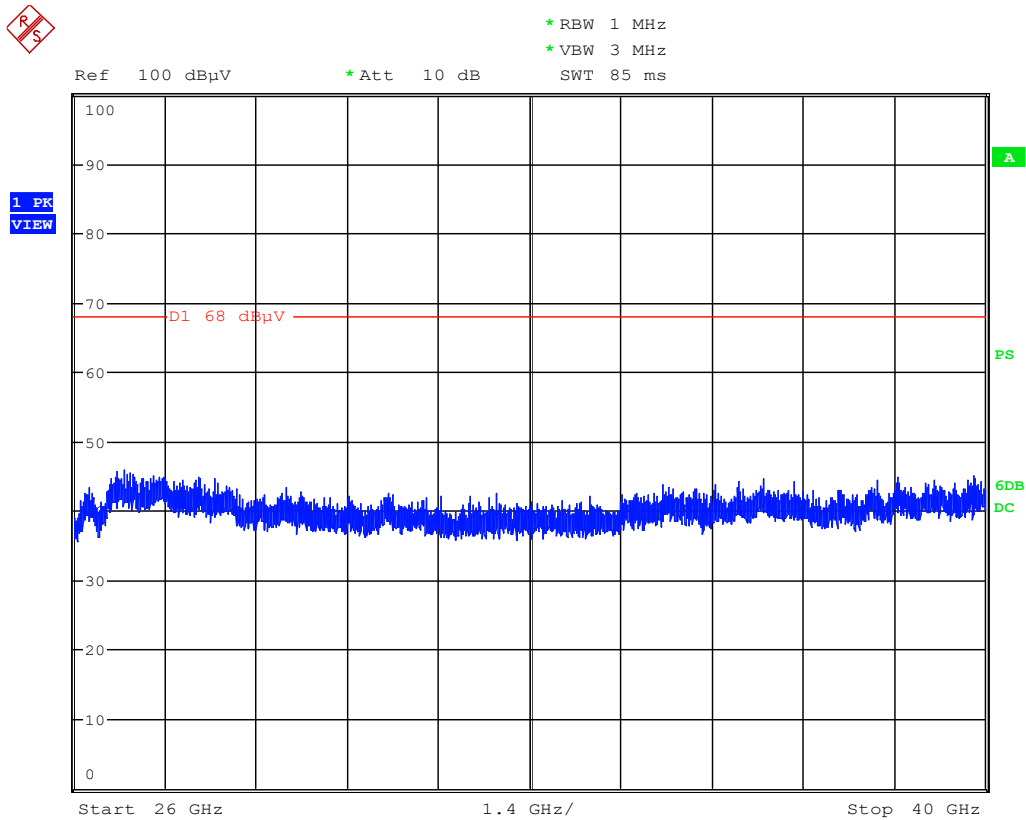


**Radiated Spurious Emissions:
U-NII-2C, OFDM, Mid Channel, 18 GHz to 26 GHz, Horizontal**





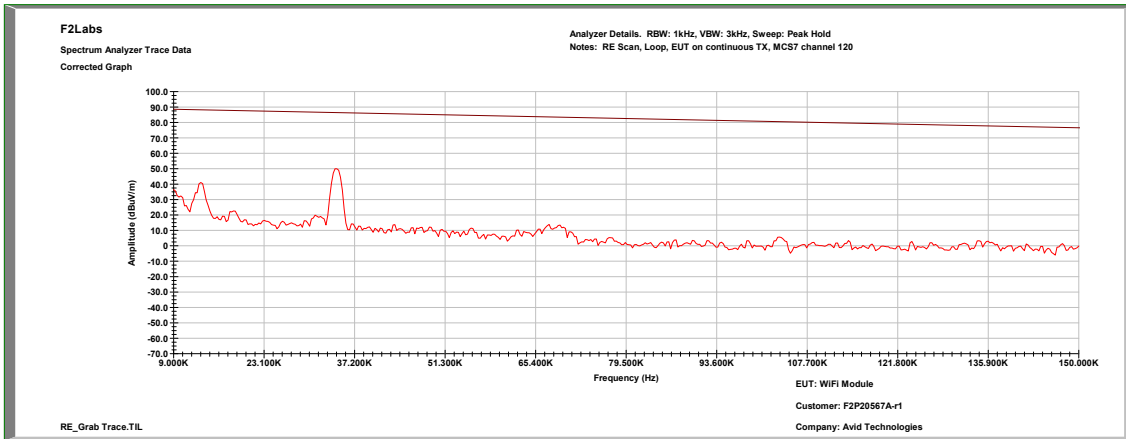
Radiated Spurious Emissions: U-NII-2C, OFDM, Mid Channel, 26 GHz to 40 GHz, Horizontal



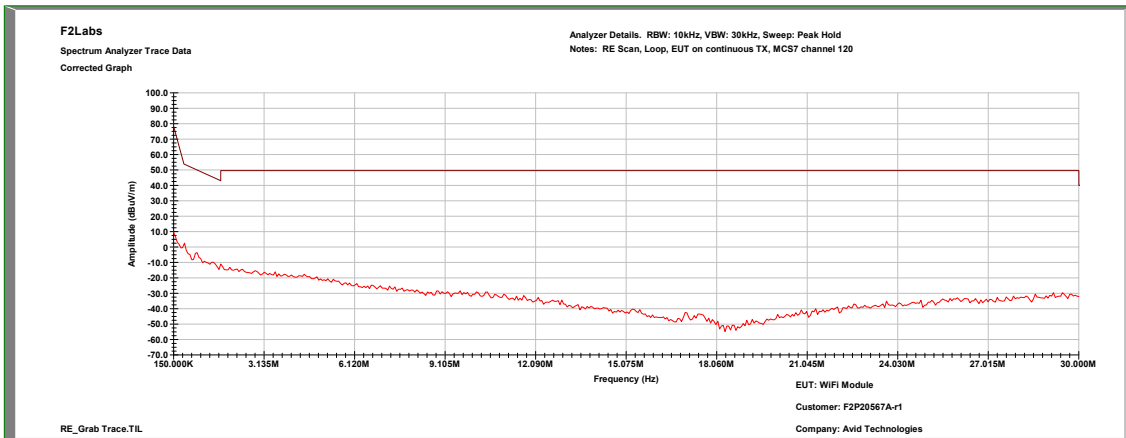
Date: 4.FEB.2020 14:44:18



Radiated Spurious Emissions: U-NII-2C, MCS7, Mid Channel, 9k to 150k

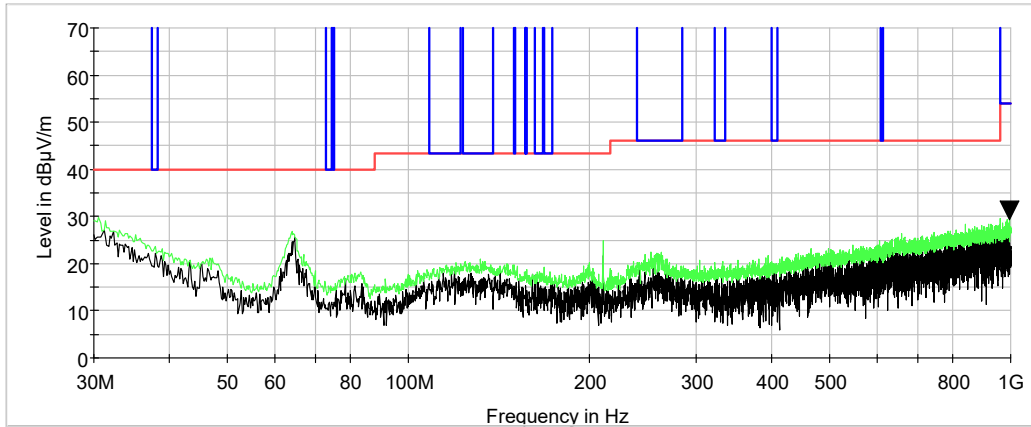


Radiated Spurious Emissions: U-NII-2C, MCS7, Mid Channel, 150k to 30 MHz

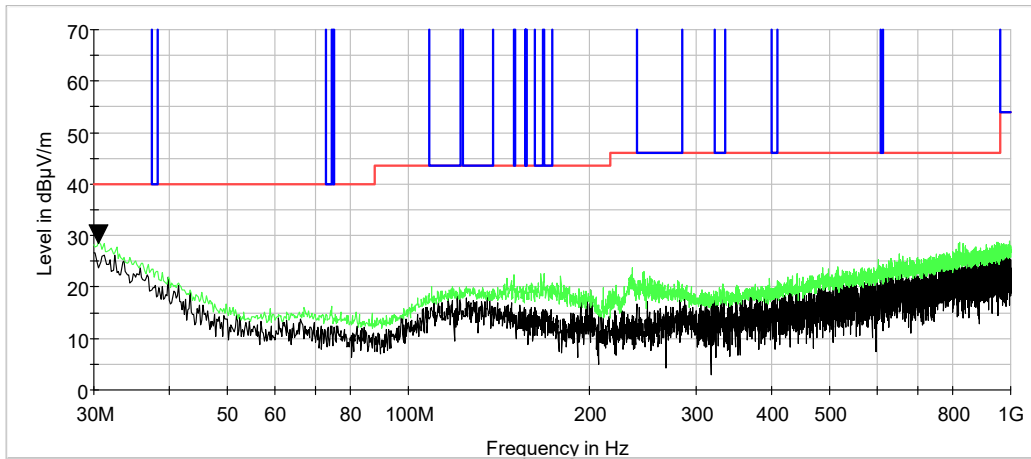




**Radiated Spurious Emissions:
U-NII-2C, MCS7, Mid Channel, 30 MHz to 1 GHz, Vertical**



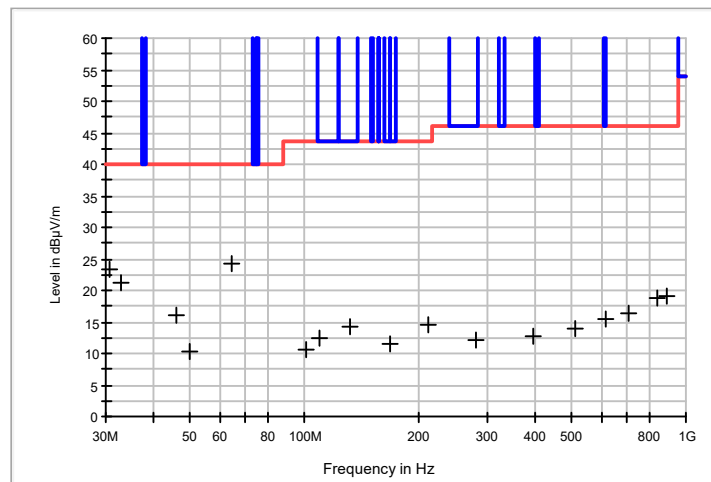
**Radiated Spurious Emissions:
U-NII-2C, MCS7, Mid Channel, 30 MHz to 1 GHz, Horizontal**





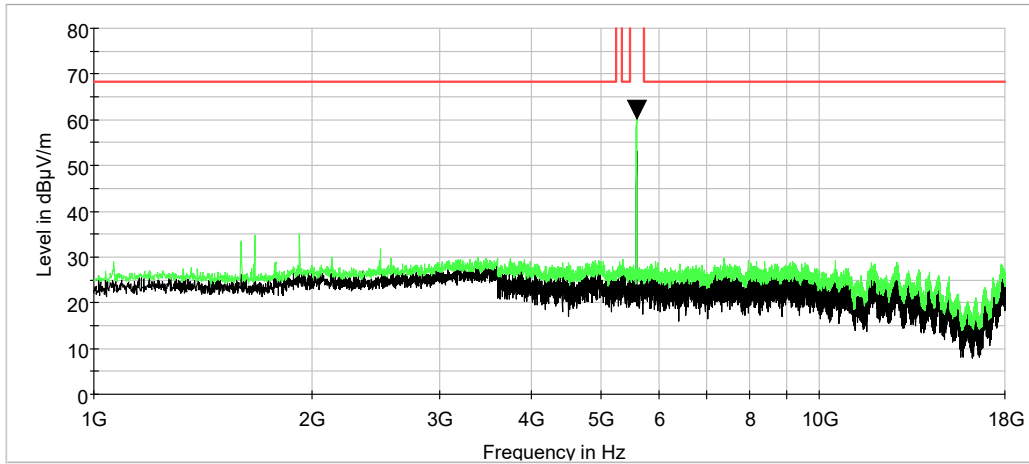
**Radiated Spurious Emissions:
U-NII-2C, MCS7, 30 MHz to 1000 MHz**

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (degrees)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.760000	V	100.00	0.00	17.2	6.1	23.30	40.0	-16.7
32.720000	H	100.00	0.00	16.6	4.6	21.20	40.0	-18.8
46.120000	V	100.00	0.00	20.9	-4.8	16.10	40.0	-23.9
49.800000	H	100.00	0.00	16.8	-6.5	10.30	40.0	-29.7
63.960000	V	100.00	100.00	31.5	-7.2	24.30	40.0	-15.7
100.440000	V	100.00	12.00	16.0	-5.4	10.60	43.5	-32.9
109.160000	H	100.00	0.00	15.5	-3.2	12.30	43.5	-31.2
131.640000	V	100.00	2.00	15.9	-1.7	14.20	43.5	-29.3
167.760000	H	100.00	0.00	15.1	-3.6	11.50	43.5	-32.0
210.440000	V	100.00	2.00	19.1	-4.7	14.40	43.5	-29.1
281.040000	H	100.00	0.00	14.1	-1.9	12.20	46.0	-33.8
395.480000	V	100.00	2.00	12.3	0.3	12.60	46.0	-33.4
511.320000	H	100.00	0.00	11.4	2.6	14.00	46.0	-32.0
613.160000	V	100.00	2.00	11.7	3.8	15.50	46.0	-30.5
704.720000	H	100.00	0.00	11.4	5.0	16.40	46.0	-29.6
839.960000	V	100.00	2.00	12.1	6.6	18.70	46.0	-27.3
890.200000	H	100.00	0.00	11.9	7.1	19.00	46.0	-27.0

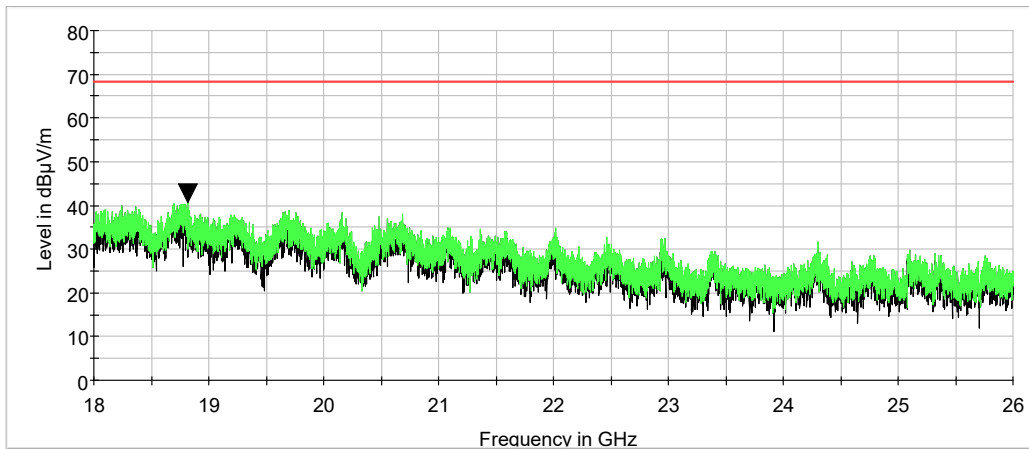




**Radiated Spurious Emissions:
U-NII-2C, MCS7, Mid Channel, 1 GHz to 18 GHz, Vertical**

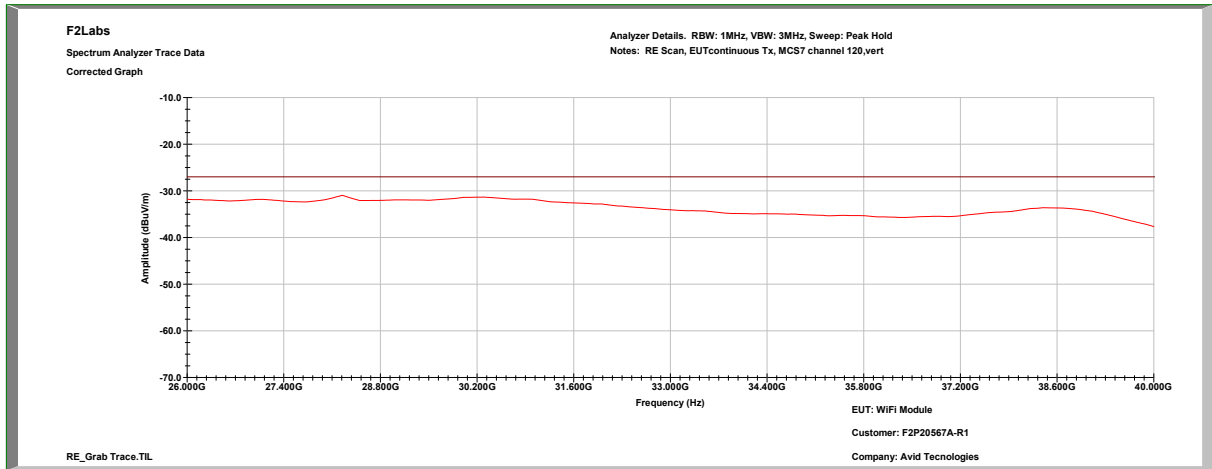


**Radiated Spurious Emissions:
U-NII-2C, MCS7, Mid Channel, 18 GHz to 26 GHz, Vertical**



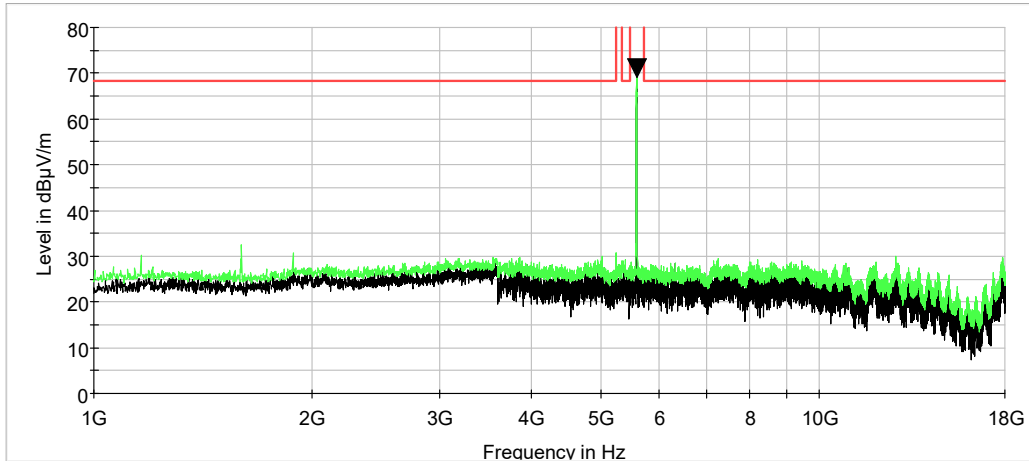


Radiated Spurious Emissions: U-NII-2C, MCS7, Mid Channel, 26 GHz to 40 GHz, Vertical

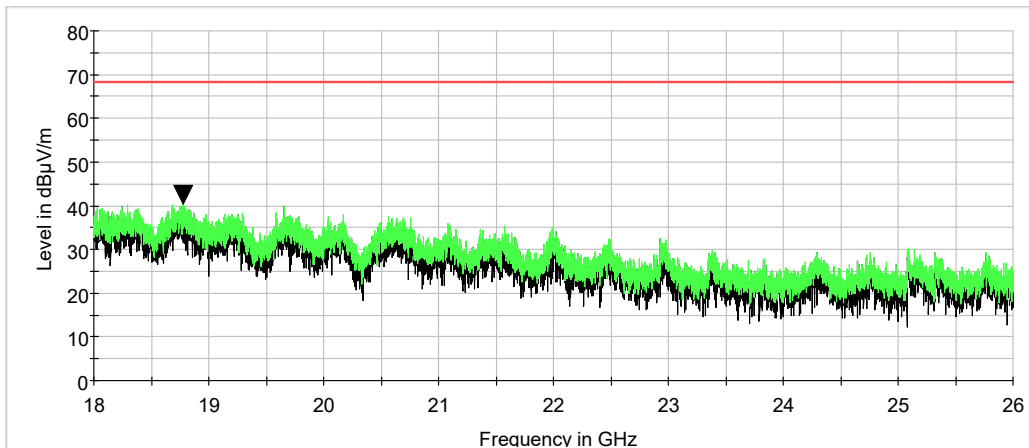




**Radiated Spurious Emissions:
U-NII-2C, MCS7, Mid Channel, 1 GHz to 18 GHz, Horizontal**

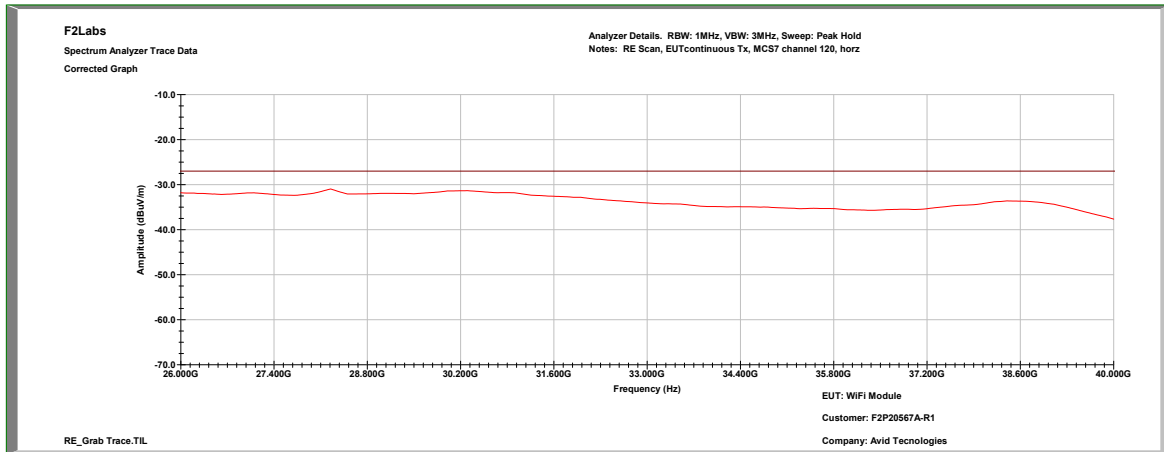


**Radiated Spurious Emissions:
U-NII-2C, MCS7, Mid Channel, 18 GHz to 26 GHz, Horizontal**





Radiated Spurious Emissions: U-NII-2C, MCS7, Mid Channel, 26 GHz to 40 GHz, Horizontal





11 VOLTAGE VARIATIONS

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery. A nominal voltage of 3.3VDC was used, and then 2.9VDC* and 3.8VDC were used as the 85% and 115% variations.

RESULTS: The results showed that the fundamental frequency did not move outside the frequency band and the output power did not increase above the limit during the variations.

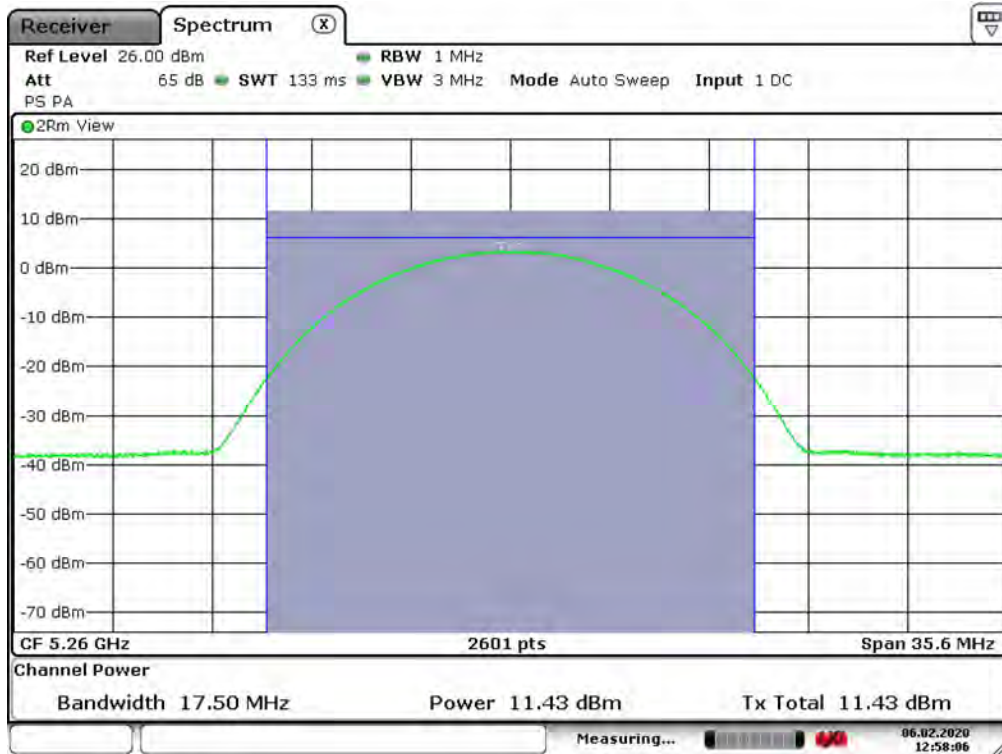
**2.9VDC was used for the low variation since the EUT shut off at 2.85VDC.*



11.1 Voltage Variations Test Data

Test Date(s):	Feb. 6, 2020	Test Engineer(s):	J. Chiller
Standards:	CFR 47 Part 15.31(e)	Air Temperature:	21.2°C
		Relative Humidity:	28%

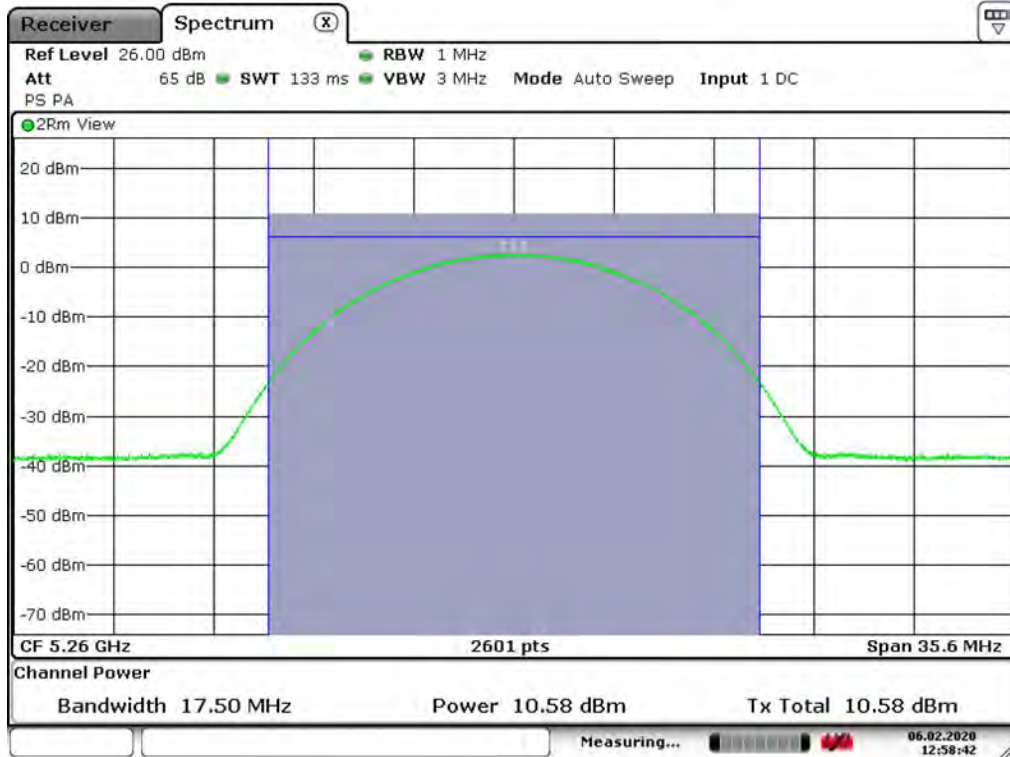
UNII 2A, CCK: Low Channel @ 85%



Date: 6.FEB.2020 12:58:06



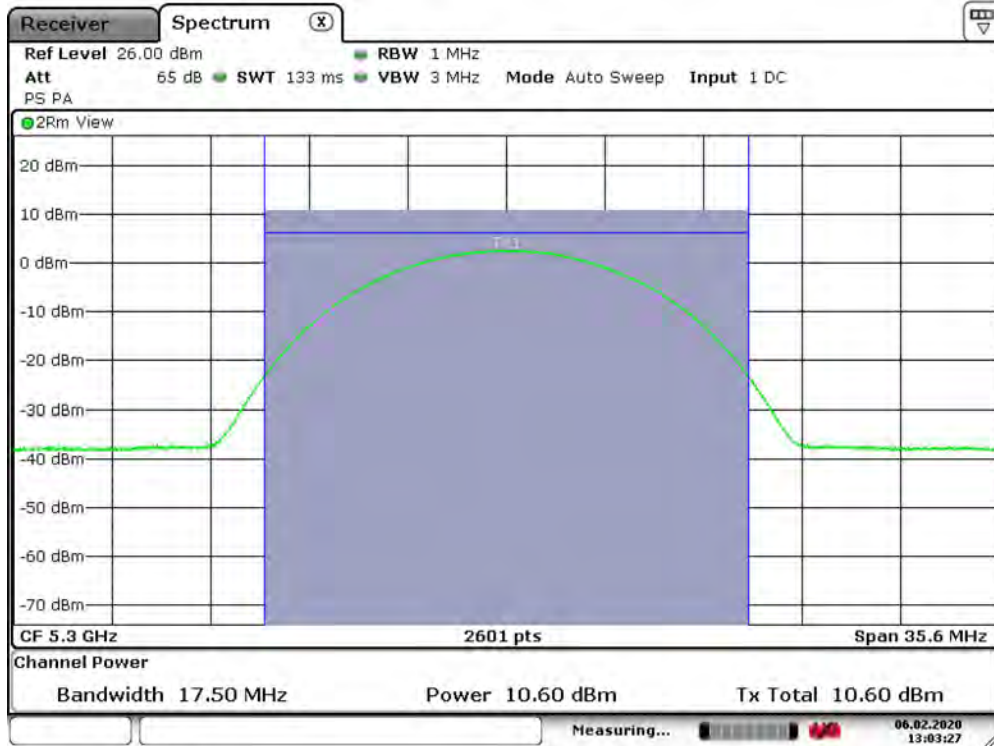
UNII 2A, CCK: Low Channel @ 115%



Date: 6.FEB.2020 12:58:41



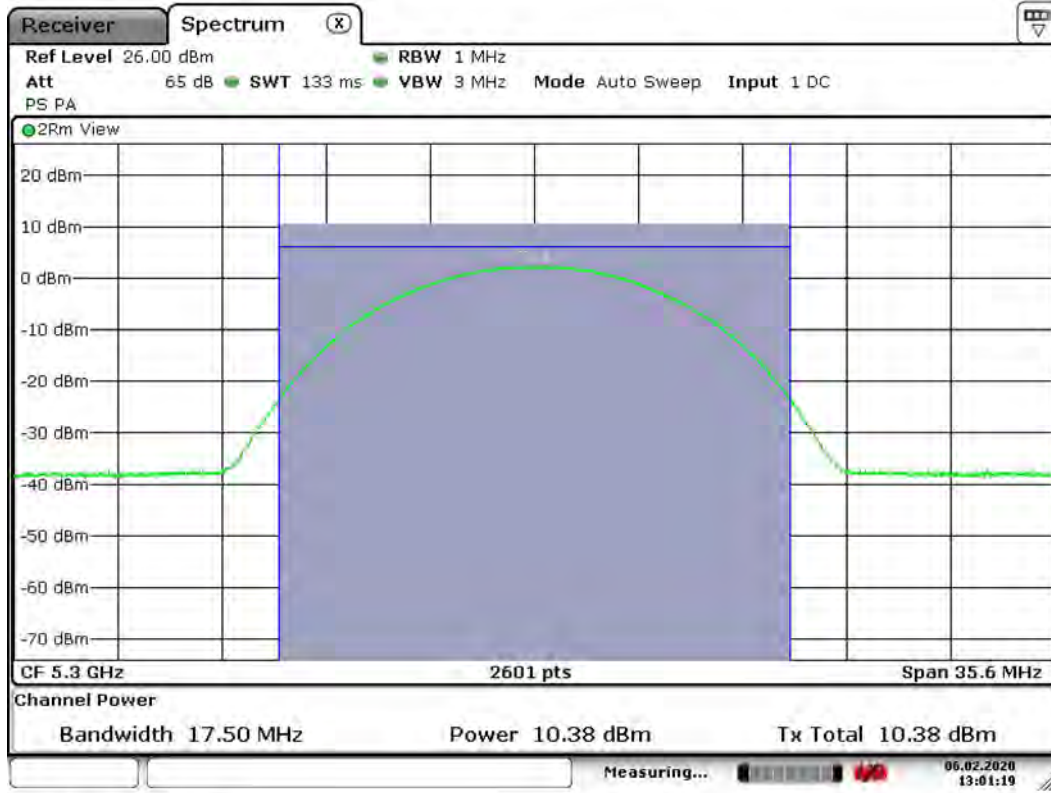
UNII 2A, CCK: Mid Channel @ 85%



Date: 6.FEB.2020 13:03:27



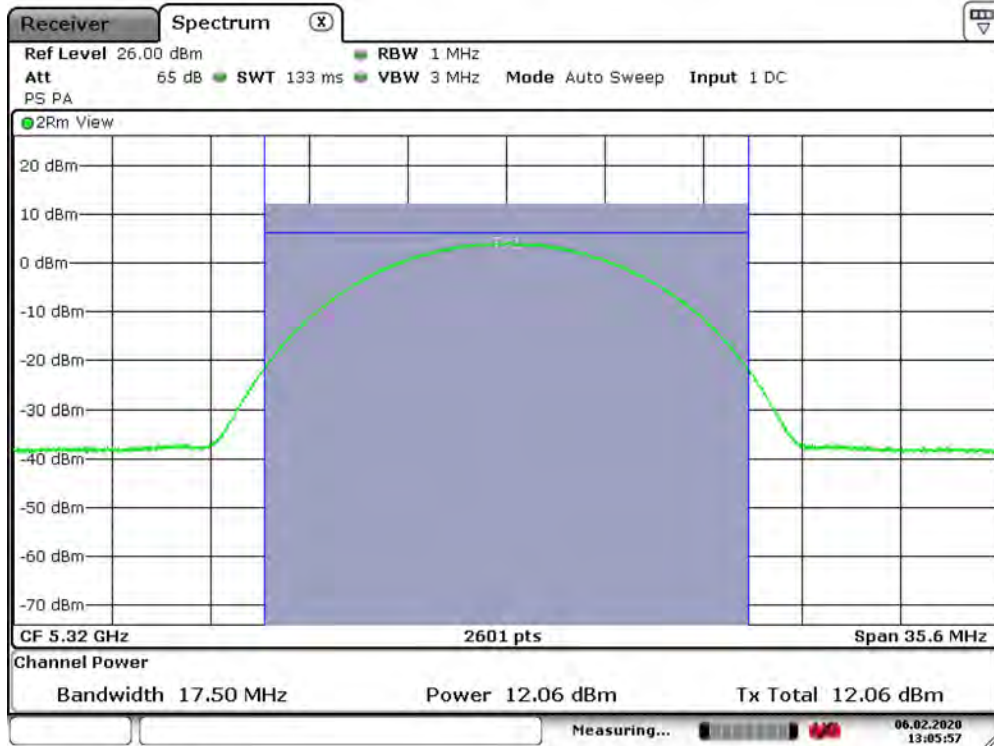
UNII 2A, CCK: Mid Channel @ 115%



Date: 6.FEB.2020 13:01:19



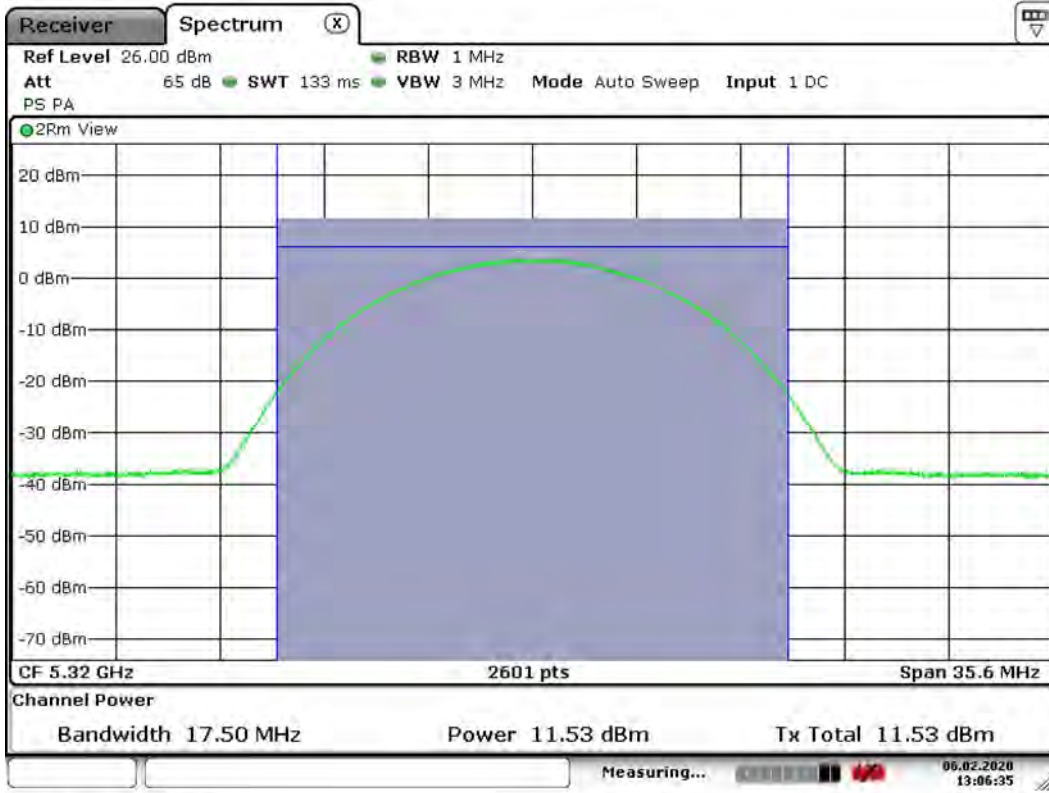
UNII 2A, CCK: High Channel @ 85%



Date: 6.FEB.2020 13:05:57



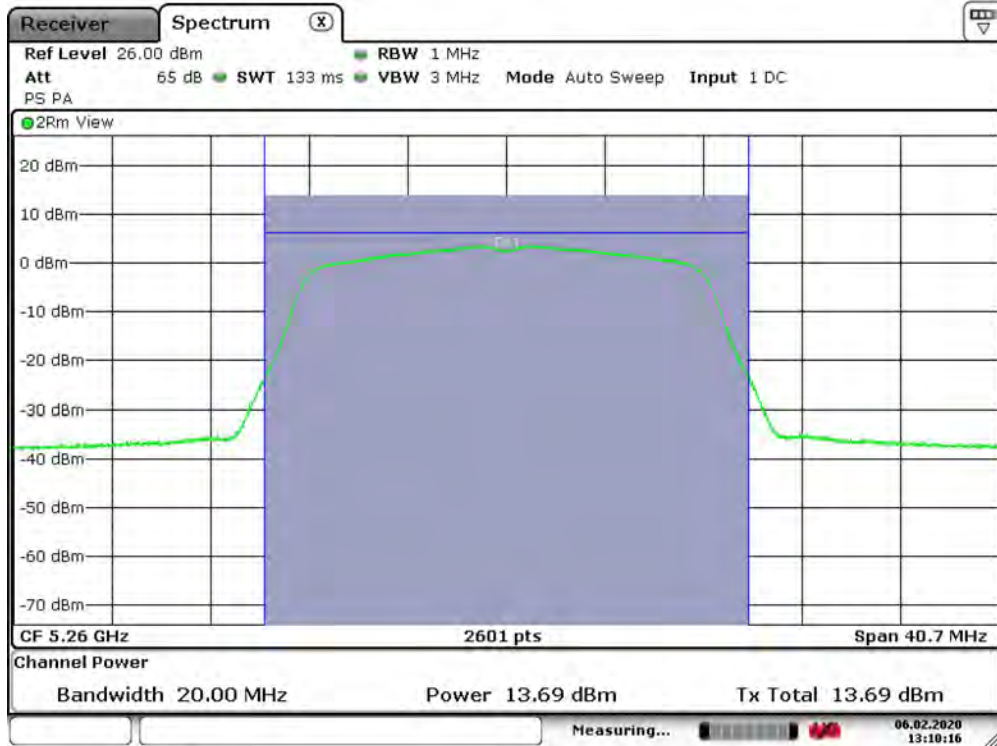
UNII 2A, CCK: High Channel @ 115%



Date: 6.FEB.2020 13:06:35



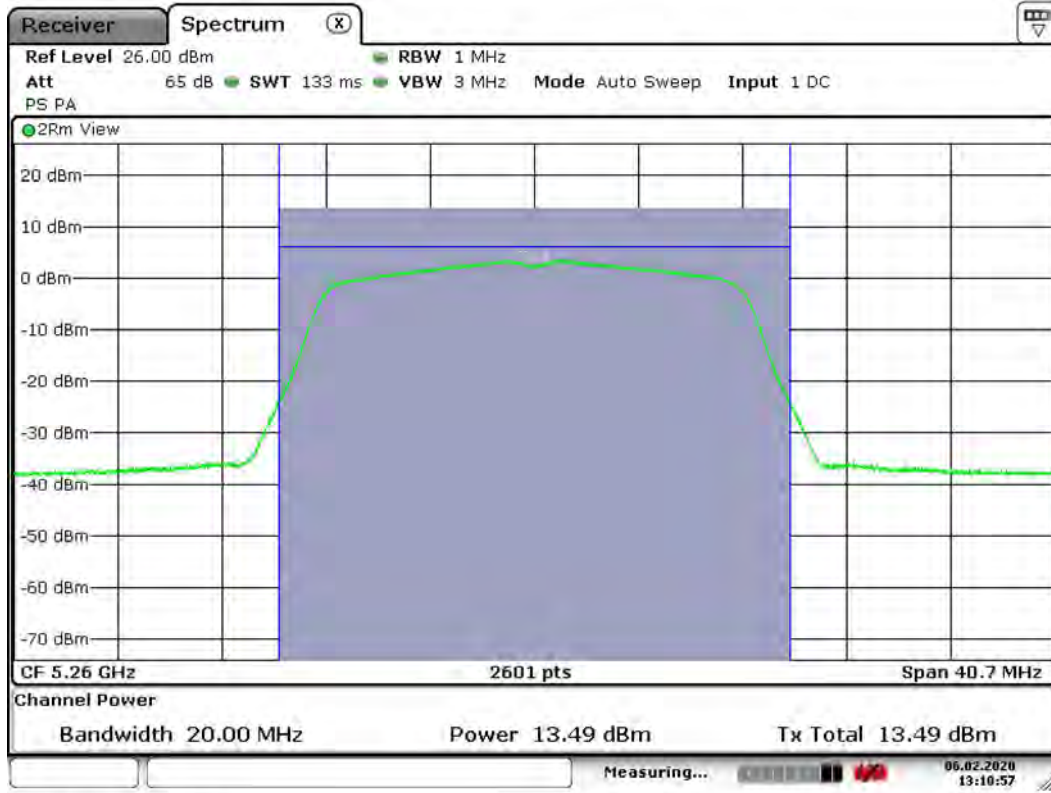
UNII 2A, OFDM: Low Channel @ 85%



Date: 6.FEB.2020 13:10:16



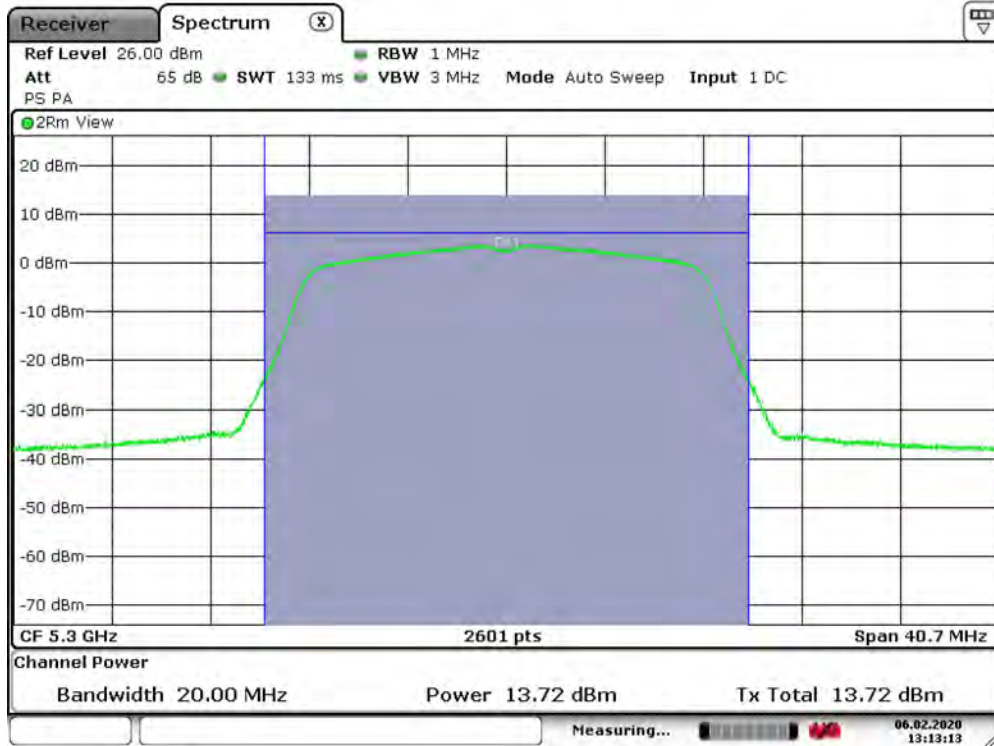
UNII 2A, OFDM: Low Channel @ 115%



Date: 6.FEB.2020 13:10:57



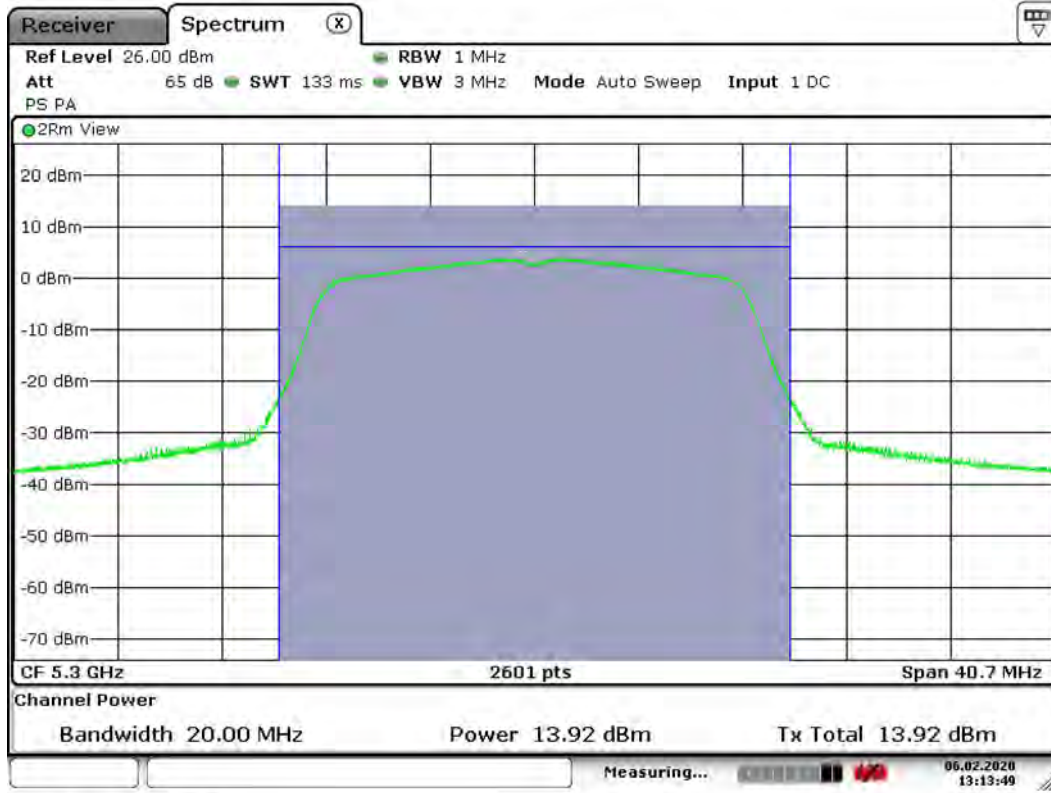
UNII 2A, OFDM: Mid Channel @ 85%



Date: 6.FEB.2020 13:13:13



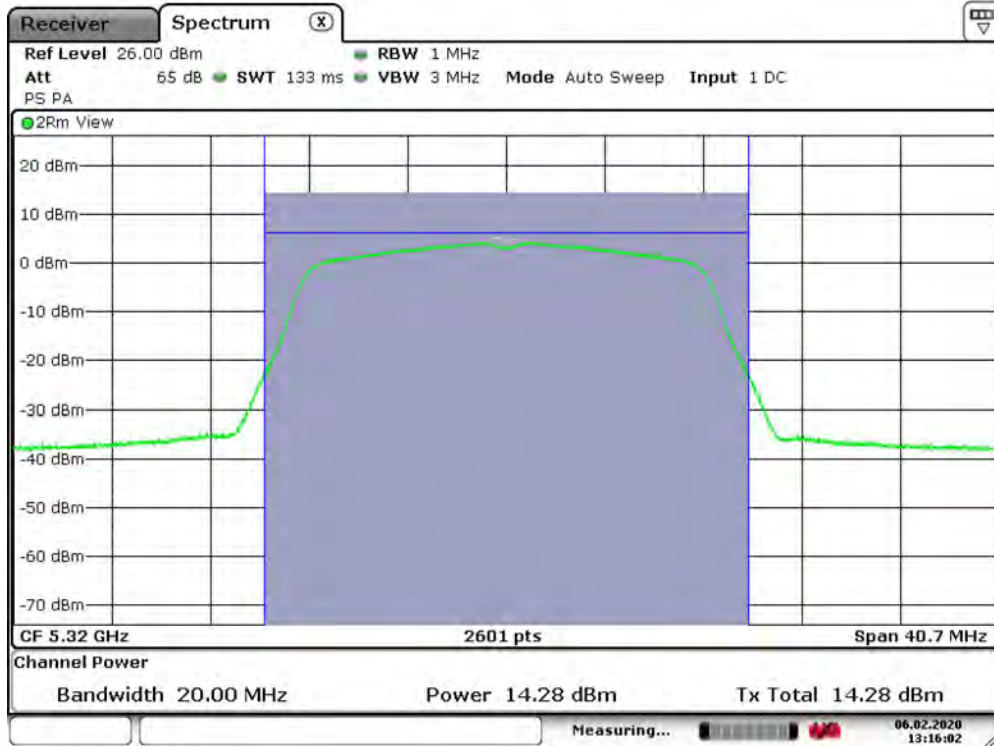
UNII 2A, OFDM: Mid Channel @ 115%



Date: 6.FEB.2020 13:13:49



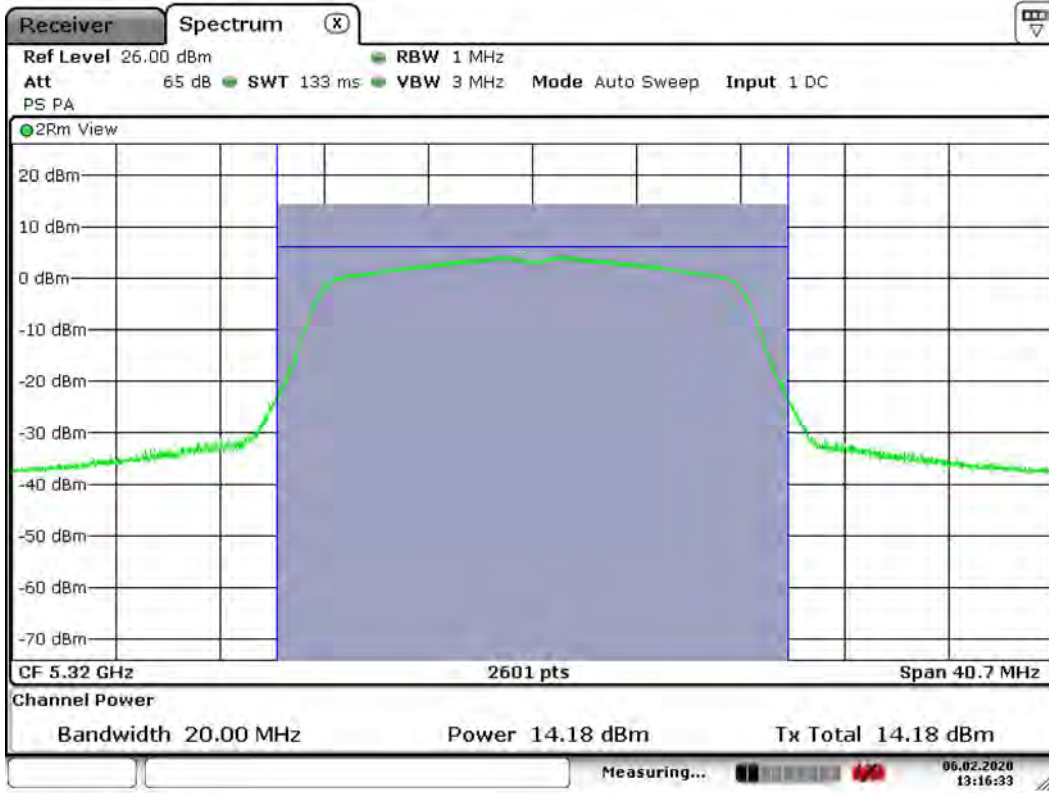
UNII 2A, OFDM: High Channel @ 85%



Date: 6.FEB.2020 13:16:02



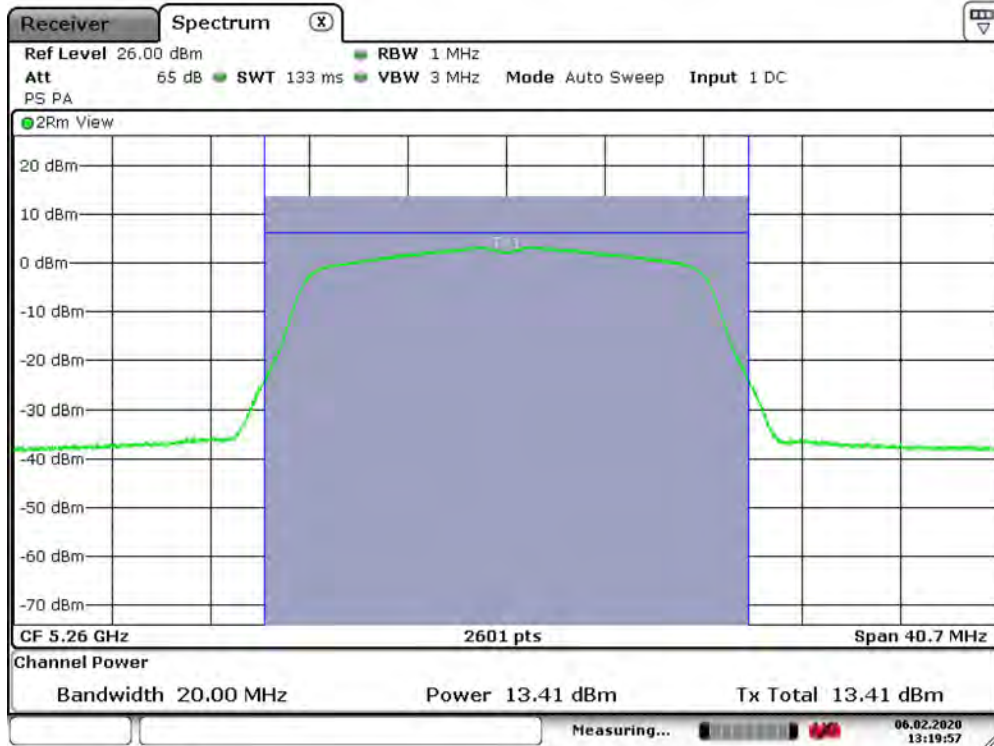
UNII 2A, OFDM: High Channel @ 115%



Date: 6.FEB.2020 13:16:33



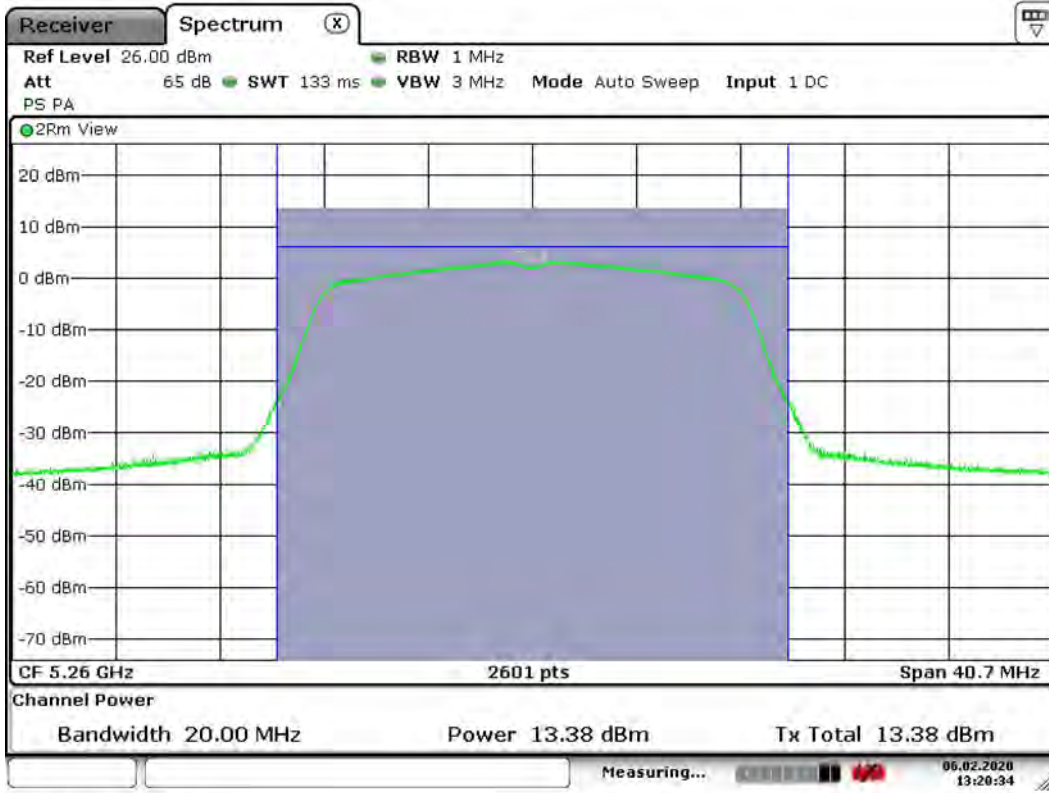
UNII 2A, MCS7: Low Channel @ 85%



Date: 6.FEB.2020 13:19:58



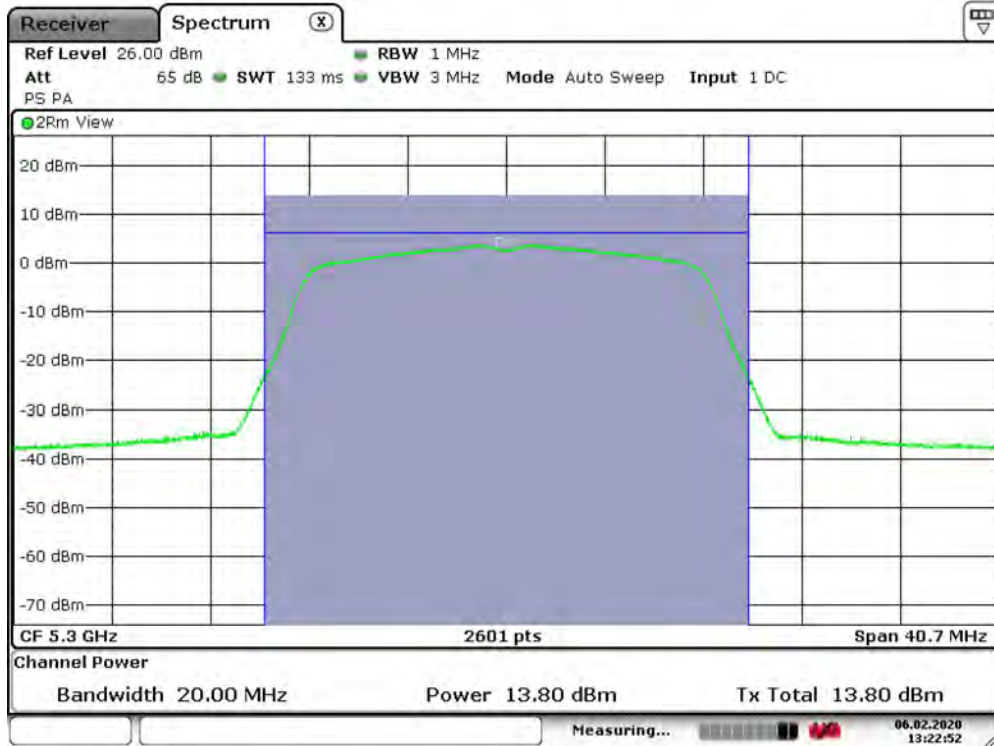
UNII 2A, MCS7: Low Channel @ 115%



Date: 6.FEB.2020 13:20:34



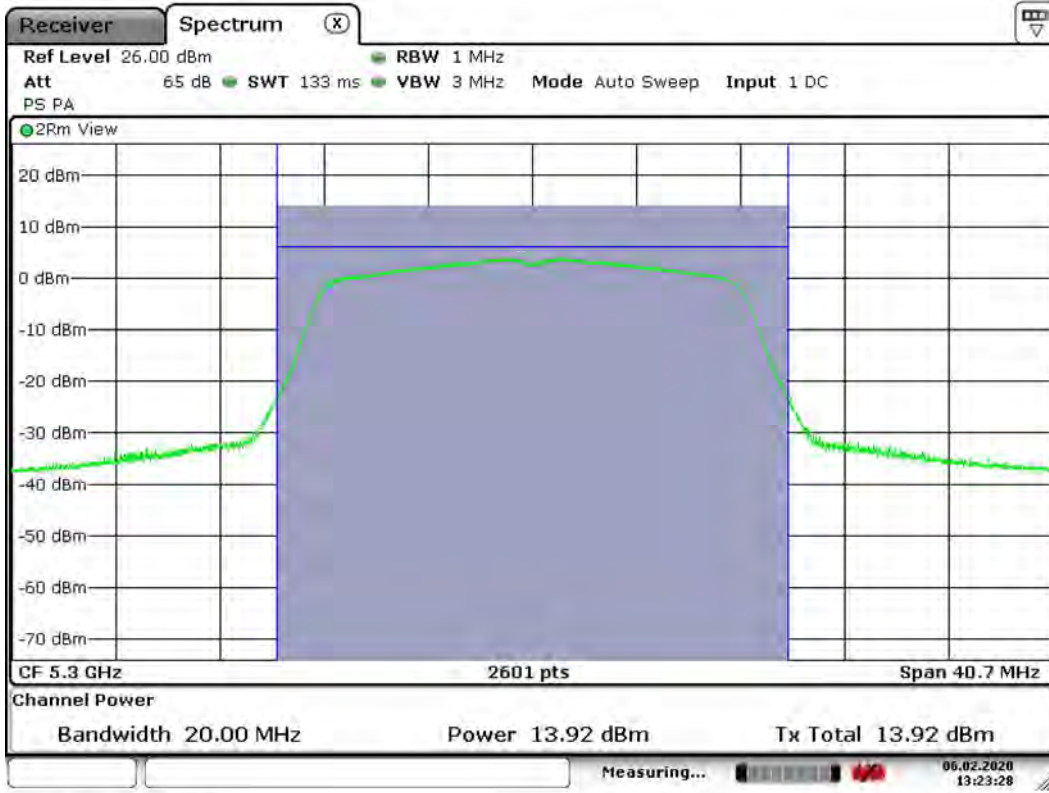
UNII 2A, MCS7: Mid Channel @ 85%



Date: 6.FEB.2020 13:22:52



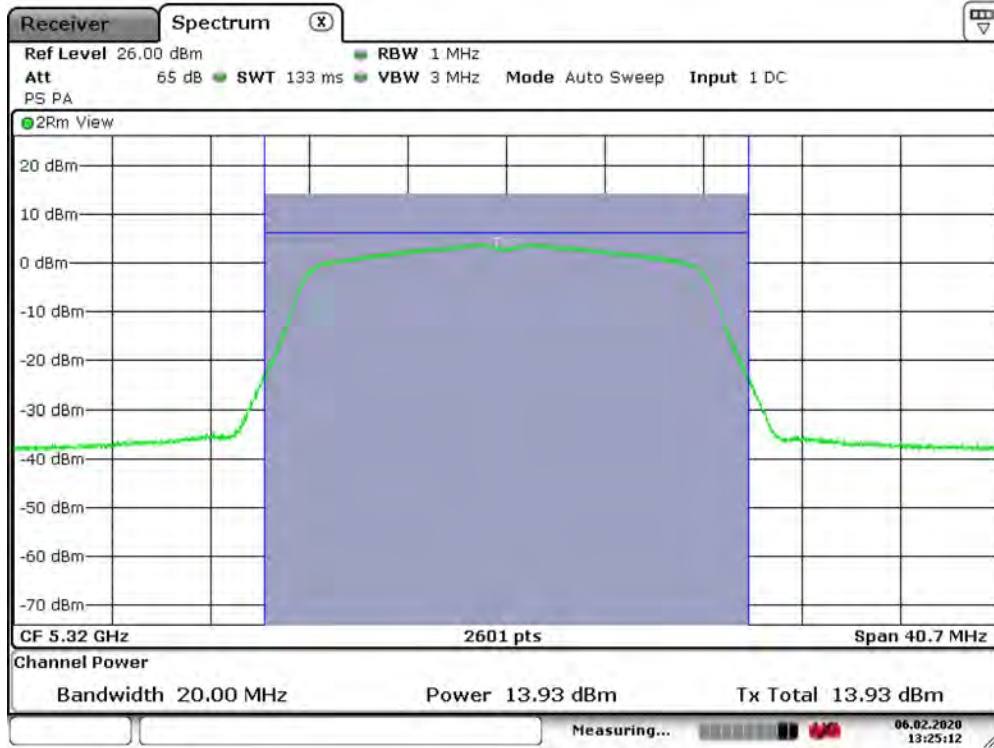
UNII 2A, MCS7: Mid Channel @ 115%



Date: 6.FEB.2020 13:23:28



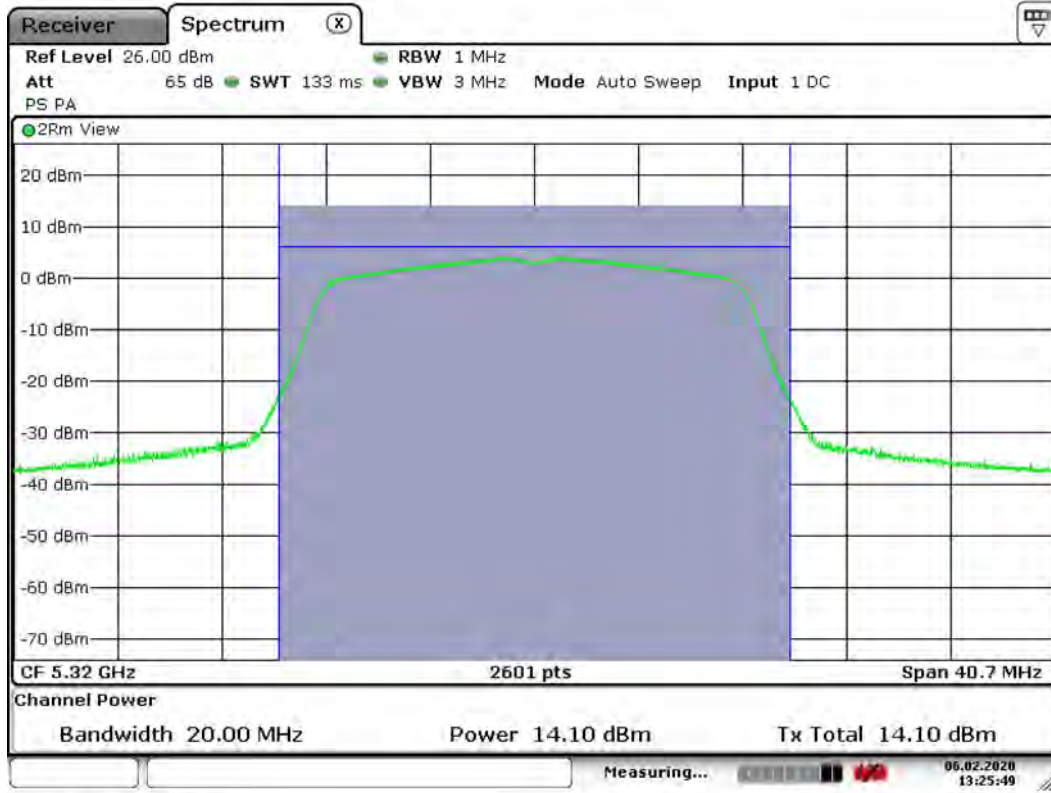
UNII 2A, MCS7: High Channel @ 85%



Date: 6.FEB.2020 13:25:12



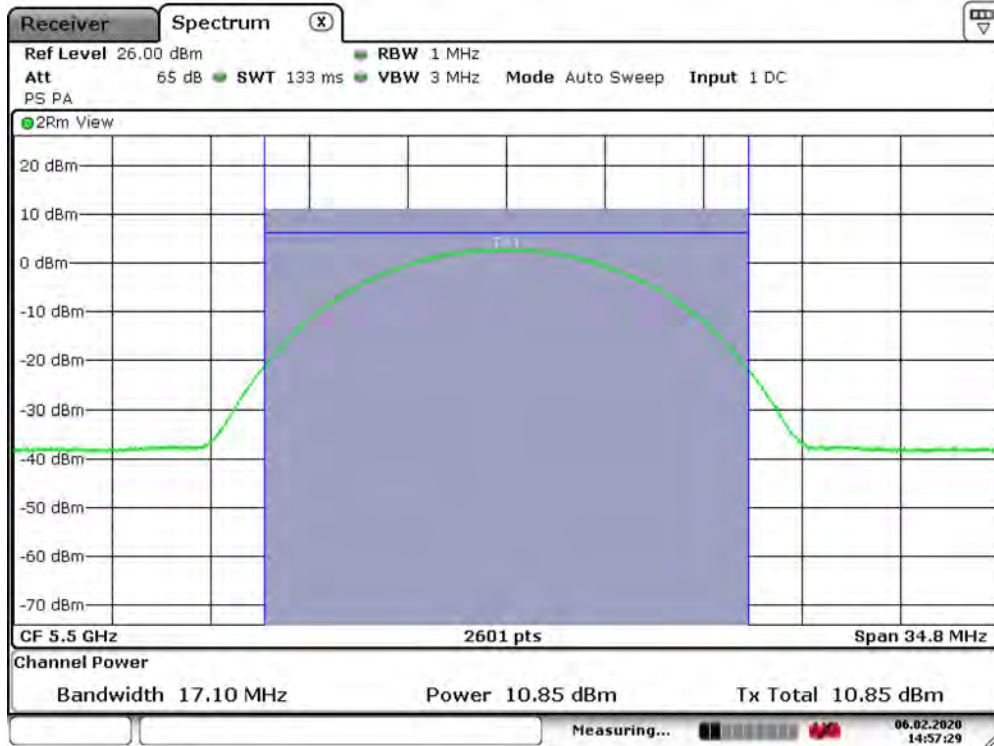
UNII 2A, MCS7: High Channel @ 115%



Date: 6.FEB.2020 13:25:49



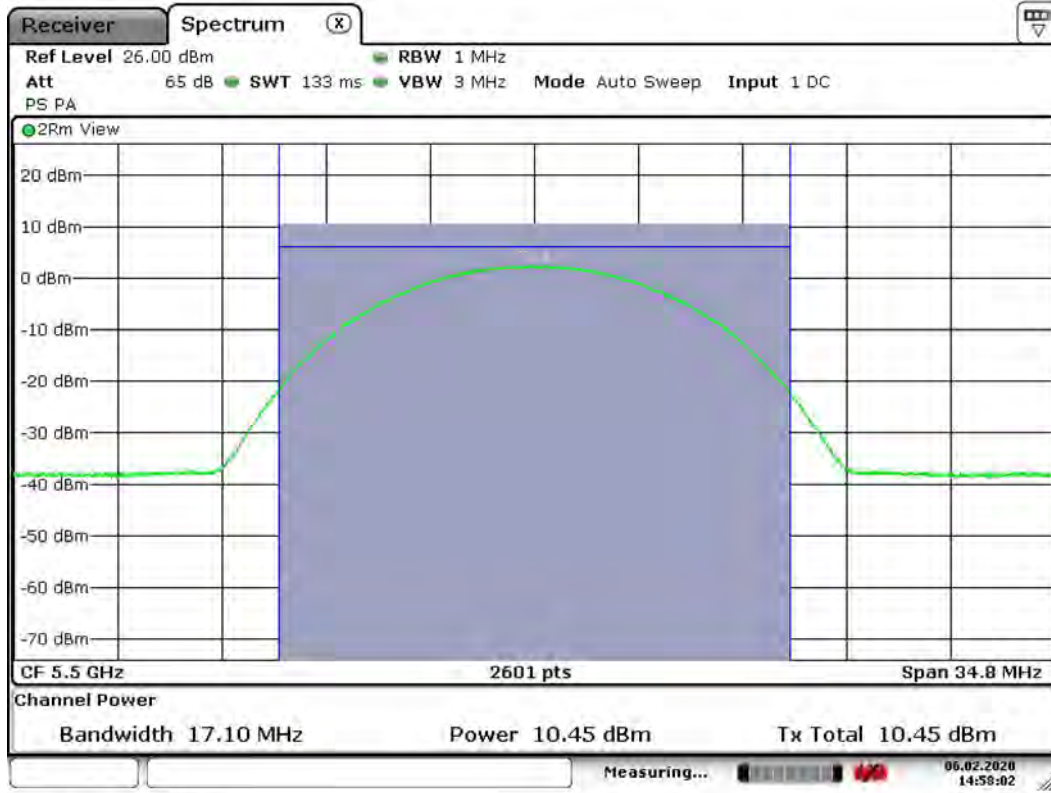
UNII 2C, CCK: Low Channel @ 85%



Date: 6.FEB.2020 14:57:29



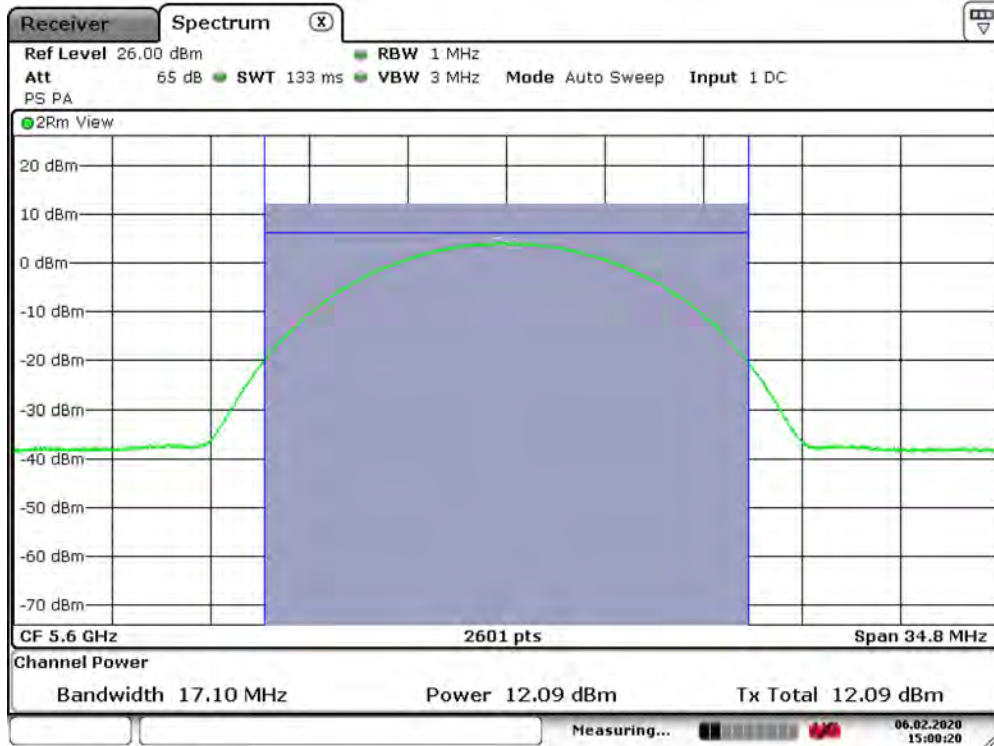
UNII 2C, CCK: Low Channel @ 115%



Date: 6.FEB.2020 14:58:03



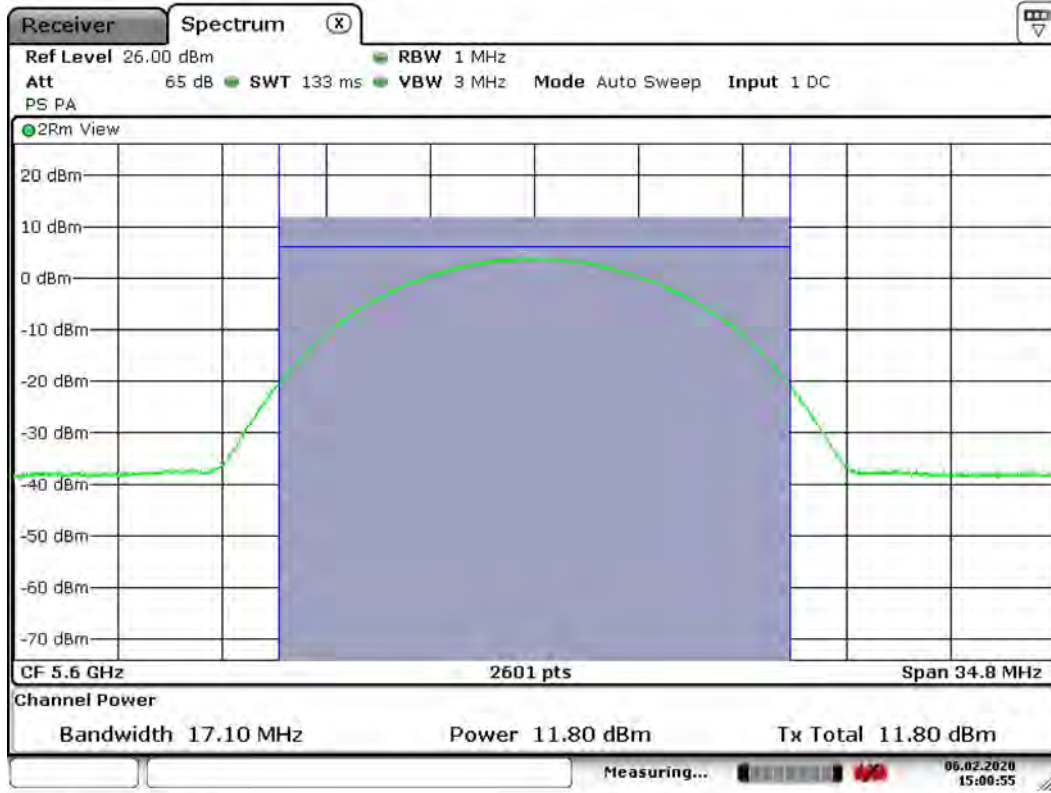
UNII 2C, CCK: Mid Channel @ 85%



Date: 6.FEB.2020 15:00:20



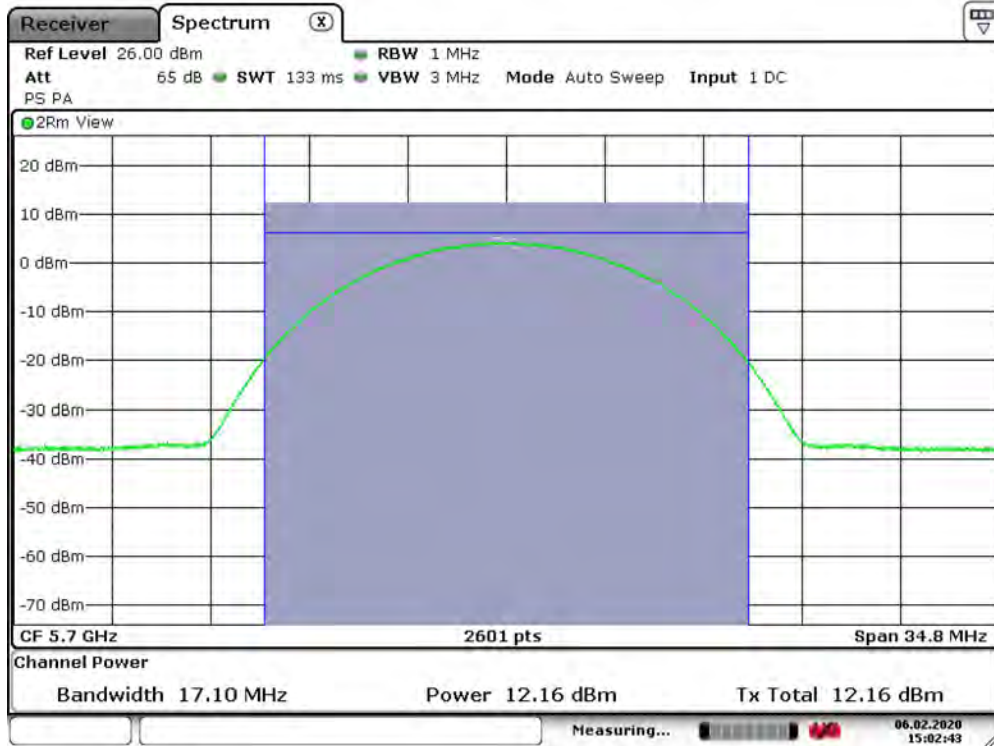
UNII 2C, CCK: Mid Channel @ 115%



Date: 6.FEB.2020 15:00:55



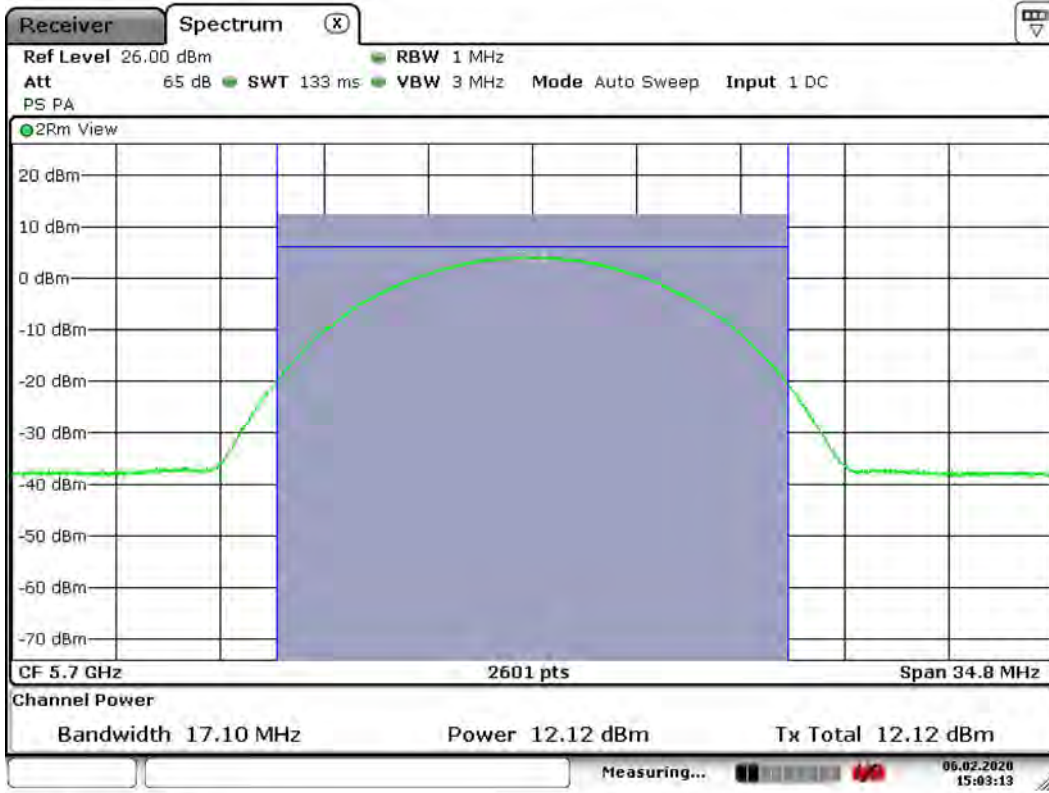
UNII 2C, CCK: High Channel @ 85%



Date: 6.FEB.2020 15:02:44



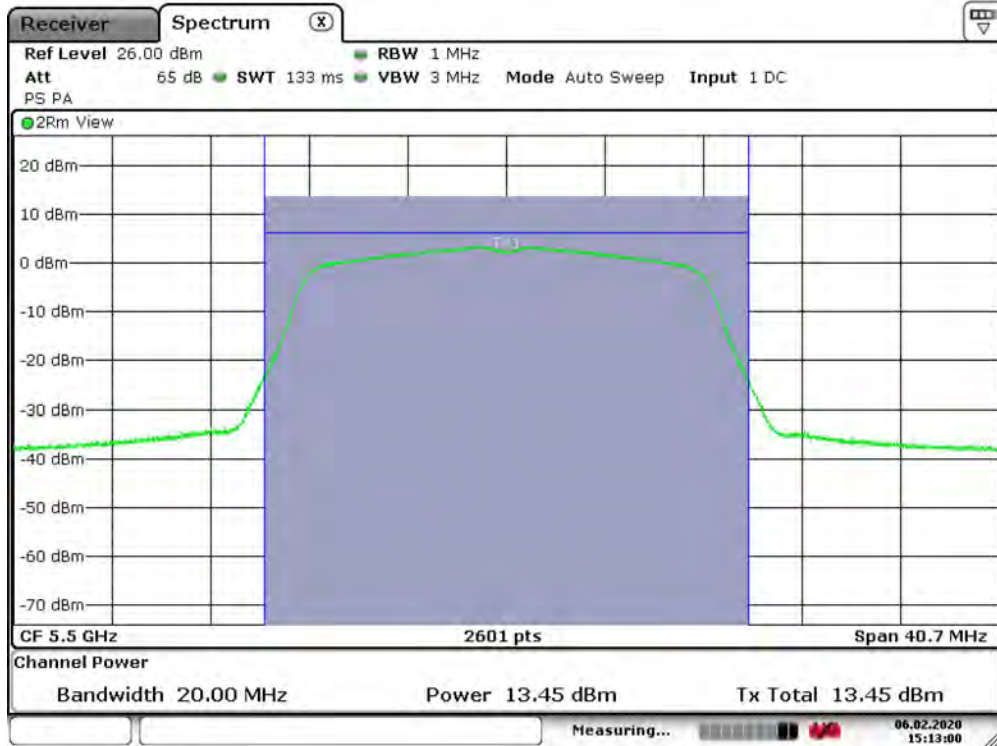
UNII 2C, CCK: High Channel @ 115%



Date: 6.FEB.2020 15:03:13



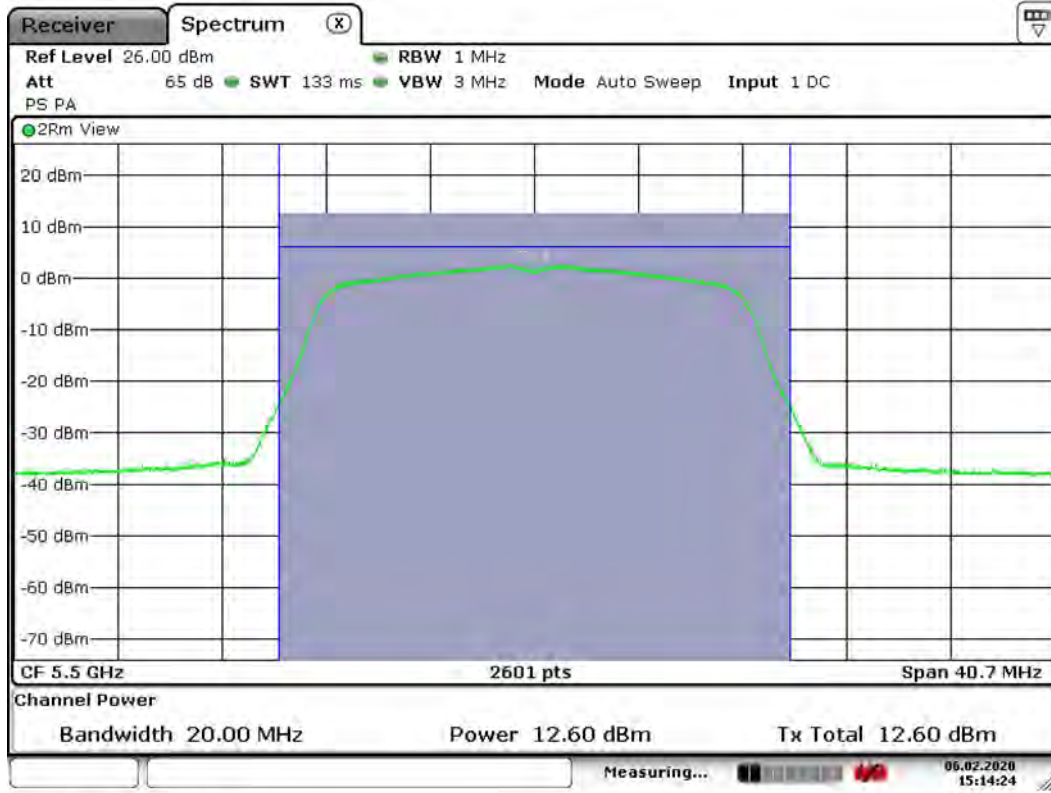
UNII 2C, OFDM: Low Channel @ 85%



Date: 6.FEB.2020 15:13:00



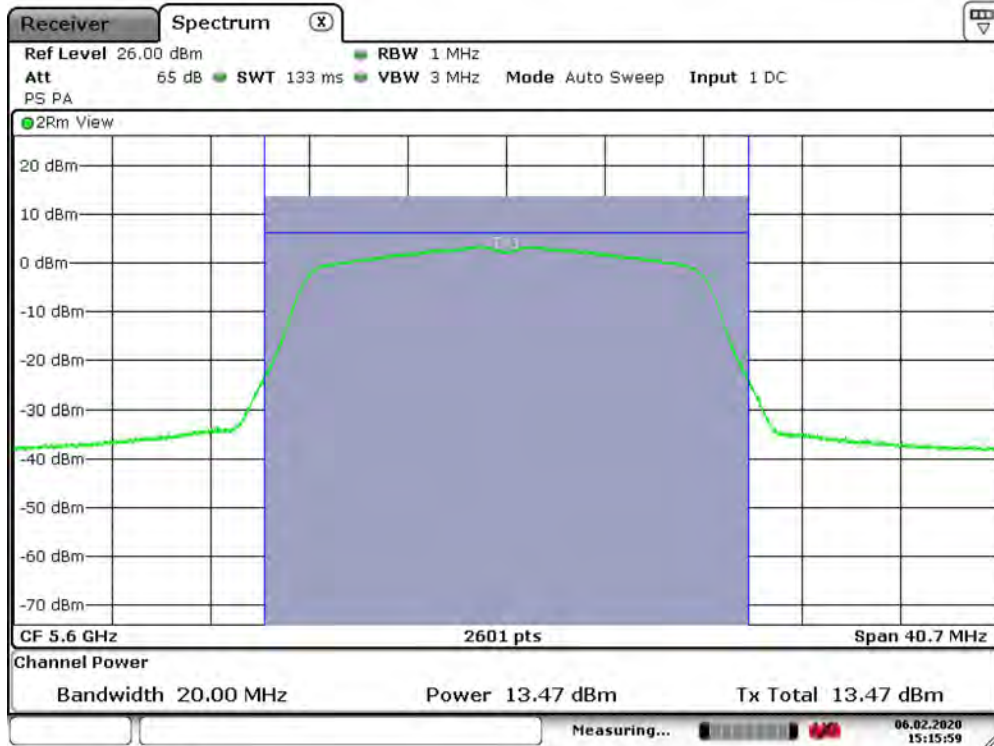
UNII 2C, OFDM: Low Channel @ 115%



Date: 6.FEB.2020 15:14:24



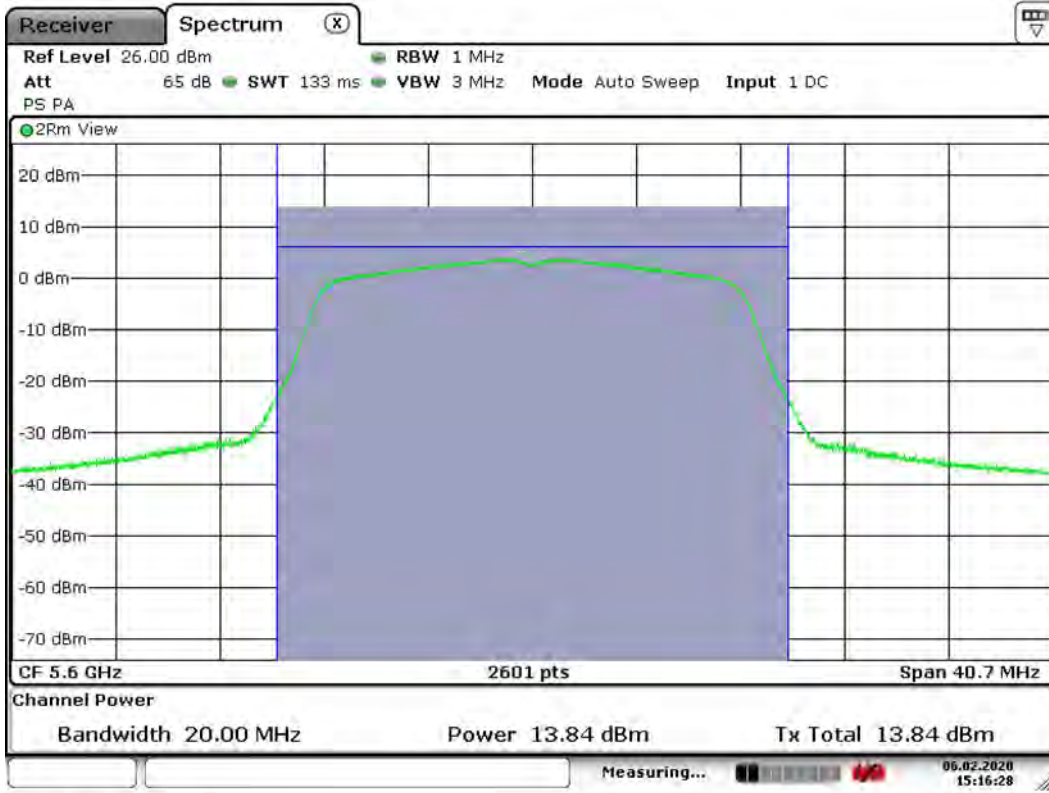
UNII 2C, OFDM: Mid Channel @ 85%



Date: 6.FEB.2020 15:15:59



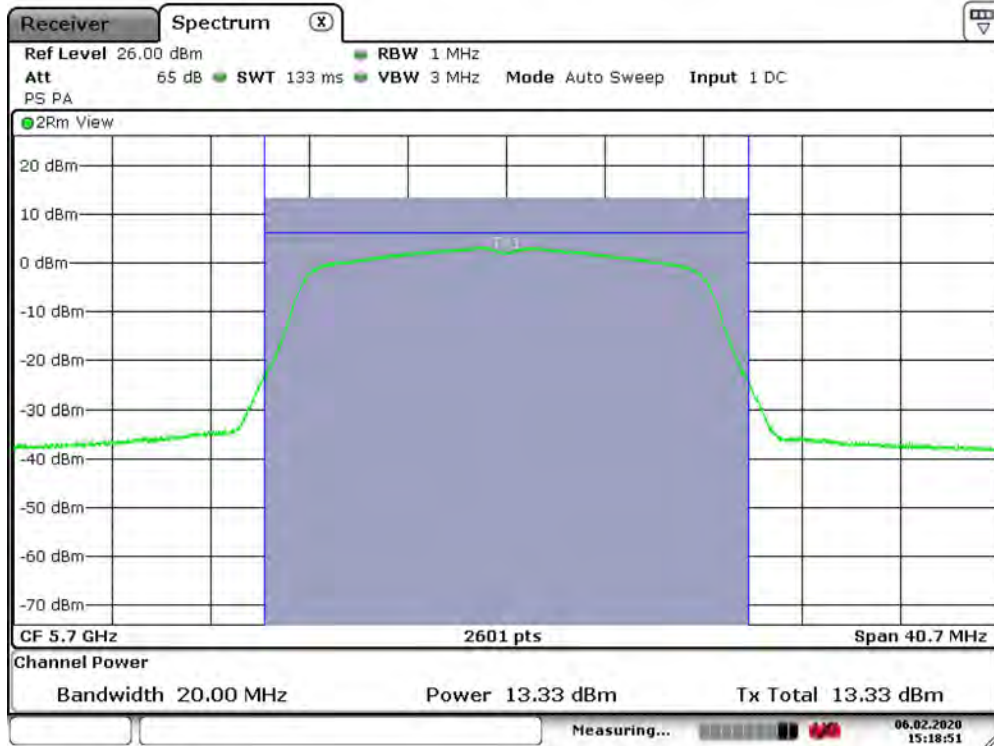
UNII 2C, OFDM: Mid Channel @ 115%



Date: 6.FEB.2020 15:16:28



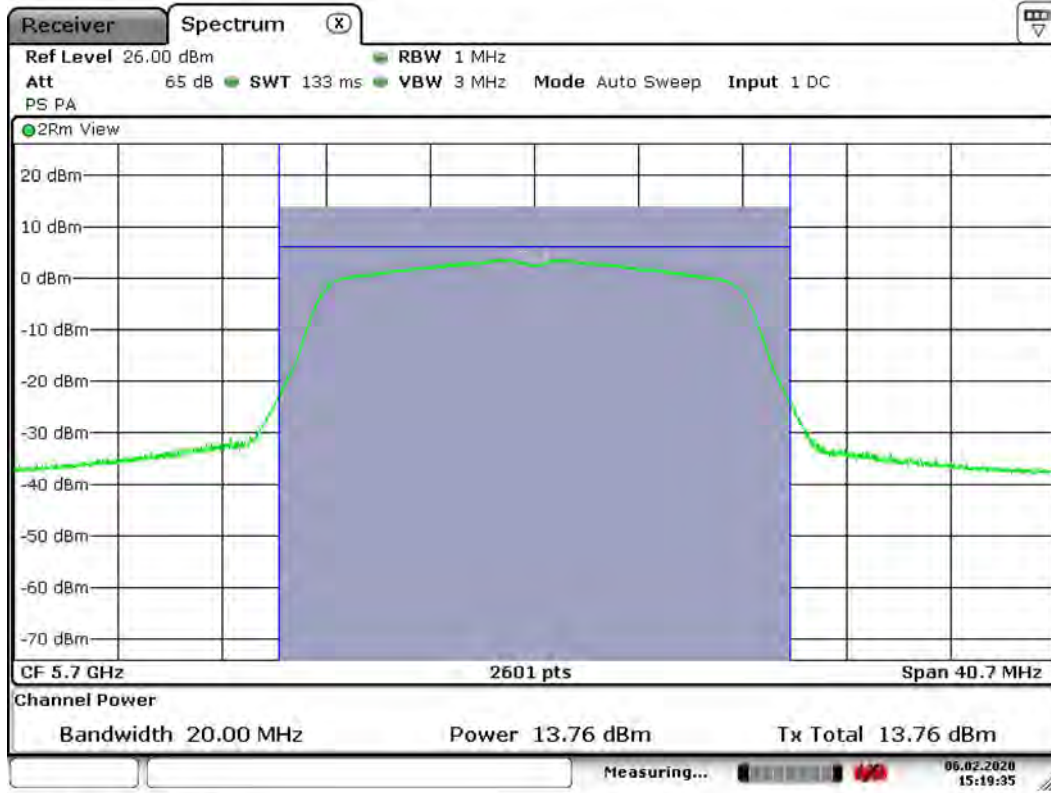
UNII 2C, OFDM: High Channel @ 85%



Date: 6.FEB.2020 15:18:51



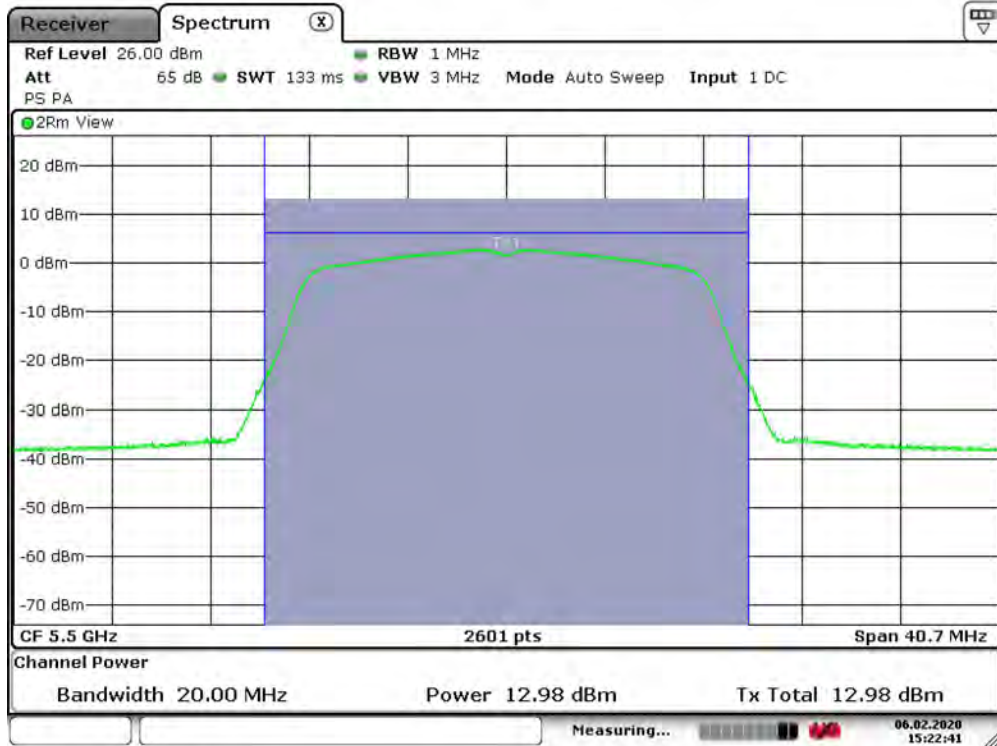
UNII 2C, OFDM: High Channel @ 115%



Date: 6.FEB.2020 15:19:35



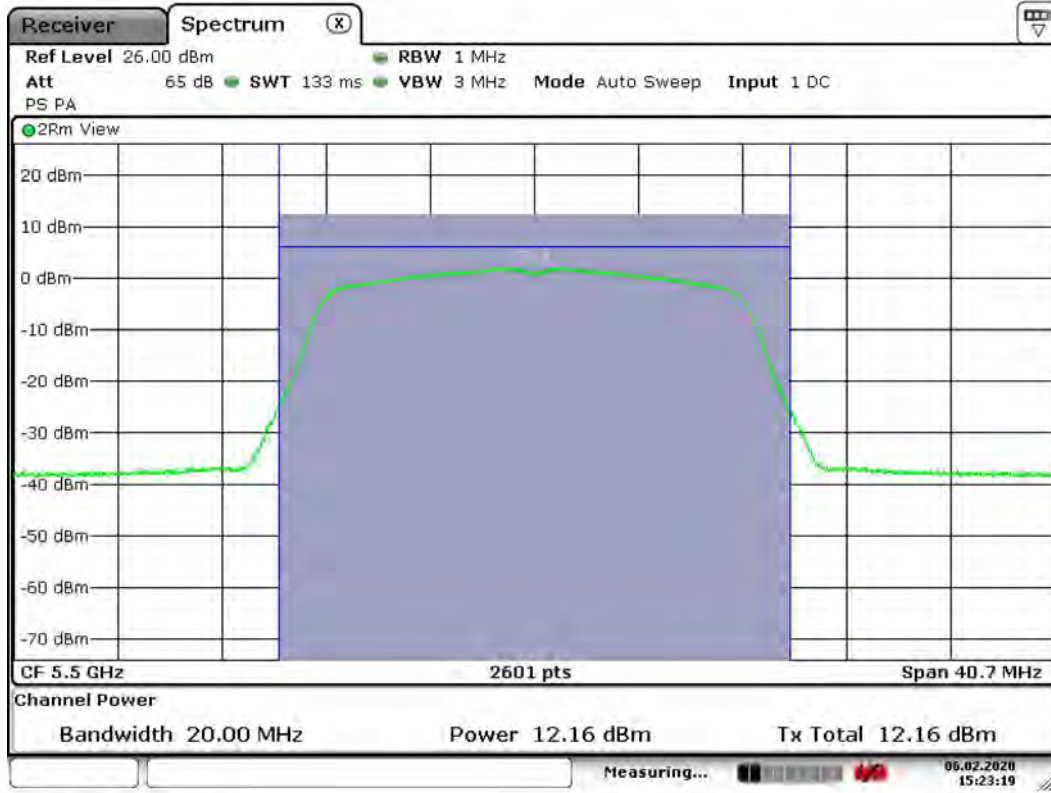
UNII 2C, MCS7: Low Channel @ 85%



Date: 6.FEB.2020 15:22:41



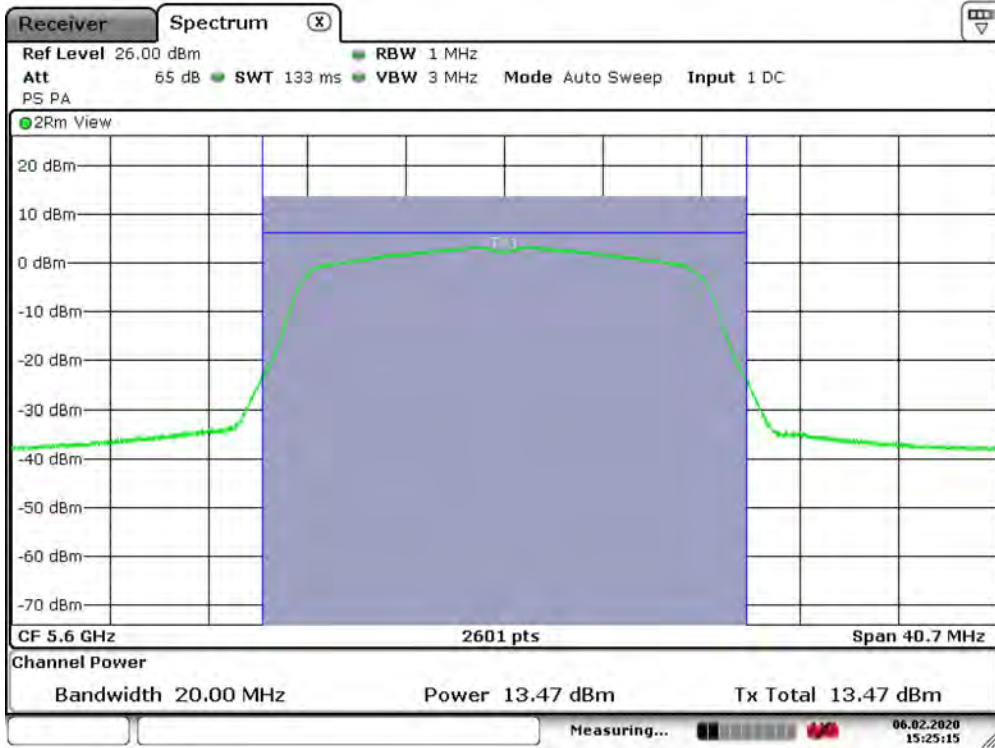
UNII 2C, MCS7: Low Channel @ 115%



Date: 6.FEB.2020 15:23:19



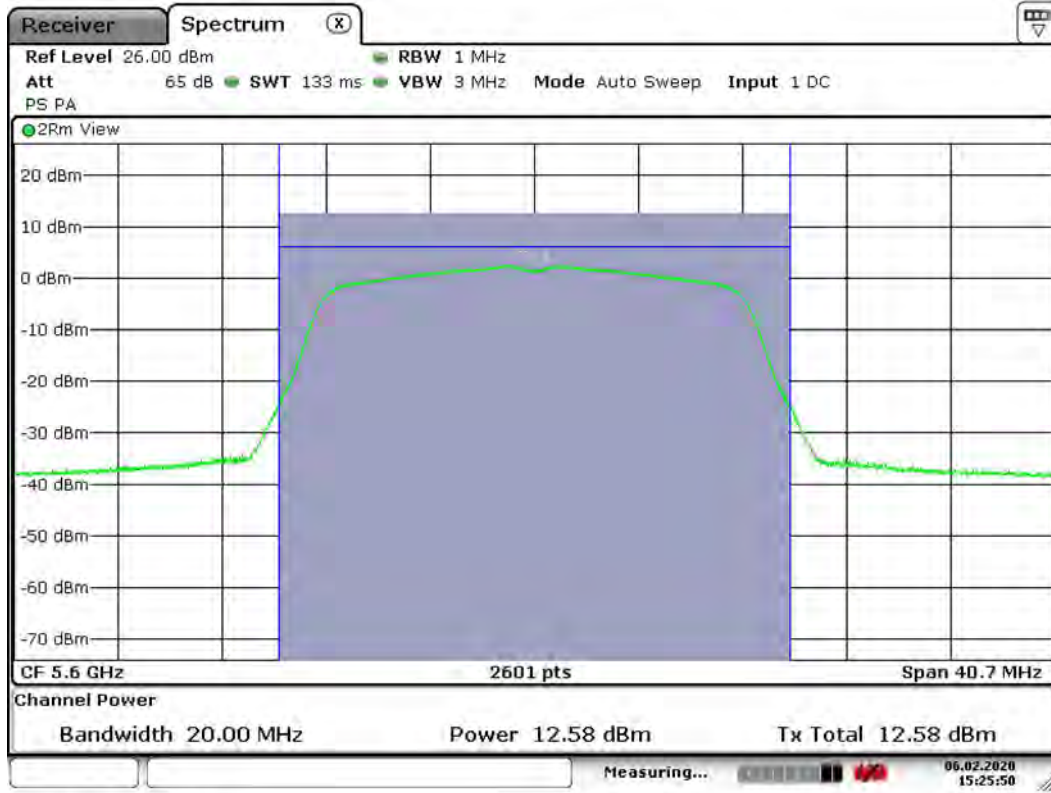
UNII 2C, MCS7: Mid Channel @ 85%



Date: 6.FEB.2020 15:25:15



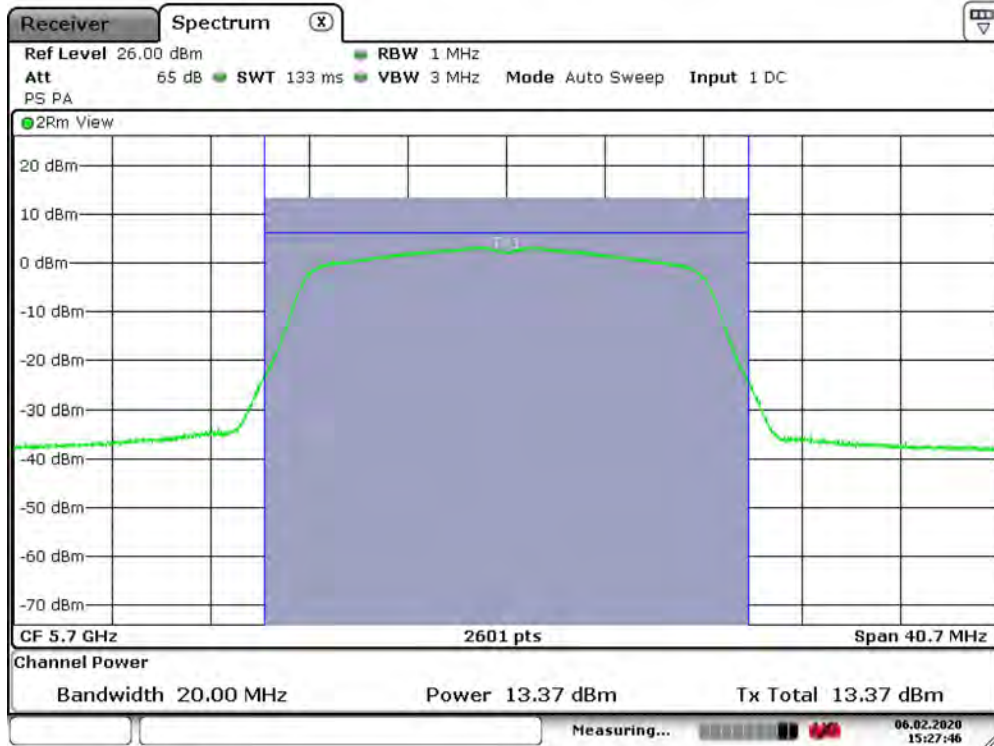
UNII 2C, MCS7: Mid Channel @ 115%



Date: 6.FEB.2020 15:25:51



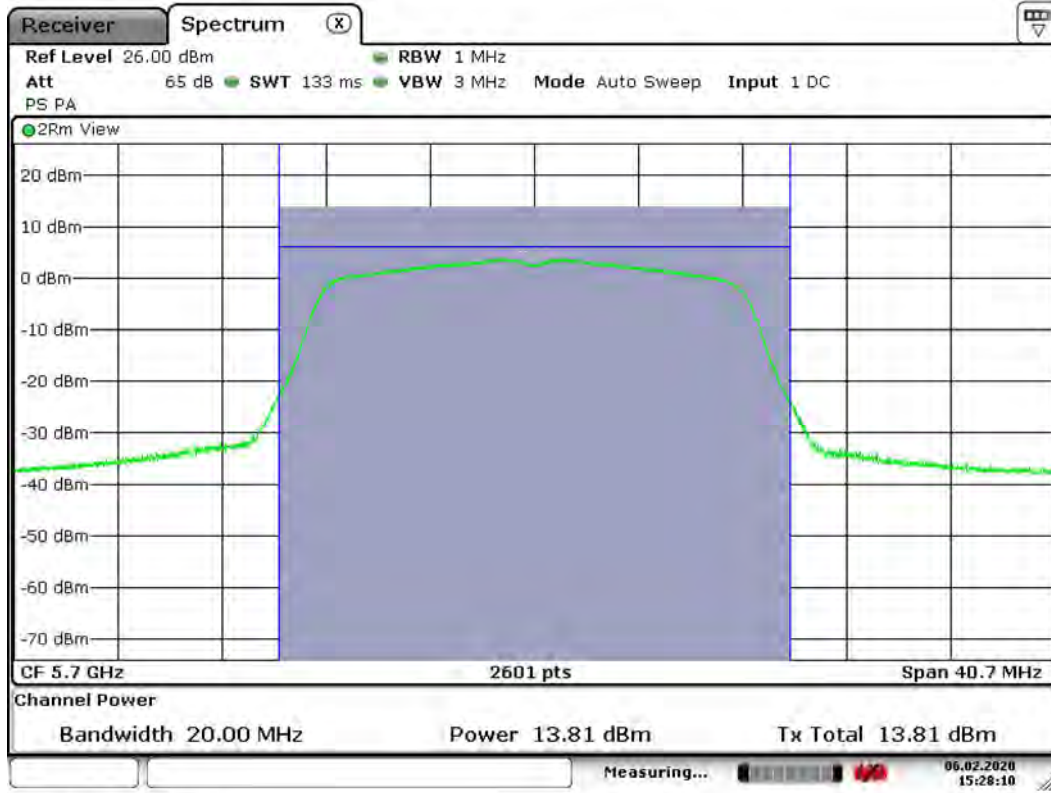
UNII 2C, MCS7: High Channel @ 85%



Date: 6.FEB.2020 15:27:46



UNII 2C, MCS7: High Channel @ 115%



Date: 6.FEB.2020 15:28:10



12 CONDUCTED EMISSIONS

12.1 Requirements

In accordance with FCC CFR 47 Part 15.207(a), "Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

12.2 Procedure

The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.

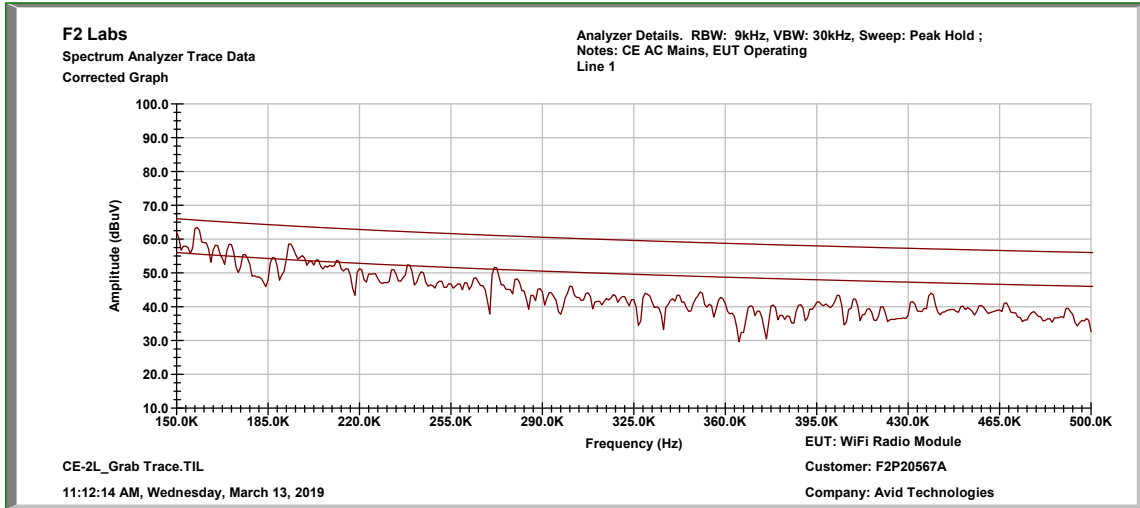


12.3 Conducted Emissions Test Data

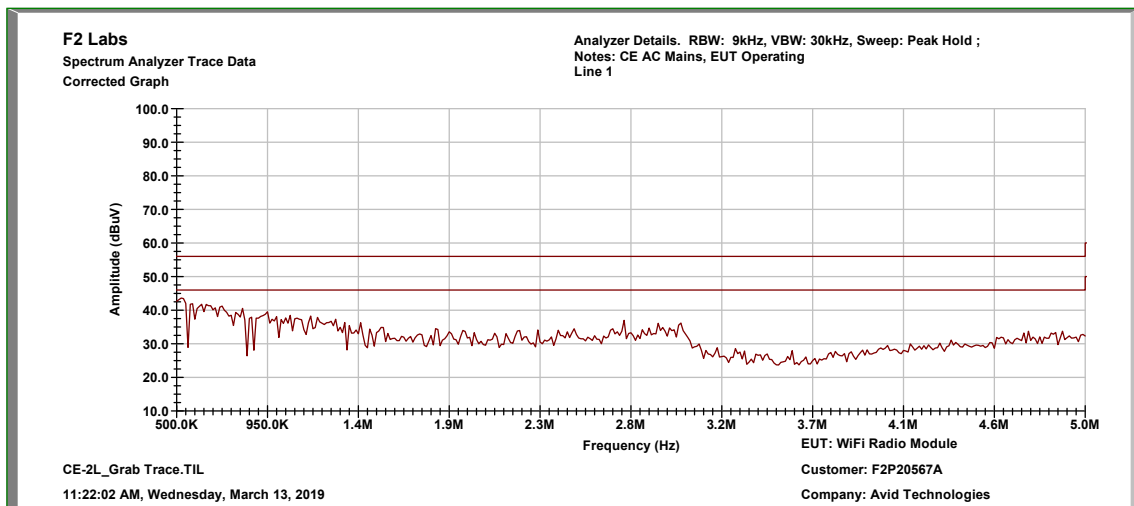
Test Date(s):	Mar. 13, 2019	Test Engineer:	J. Chiller
Rule:	15.207	Air Temperature:	20.5° C
Test Results:	Complies	Relative Humidity:	34%

Note: The data below represents worst case results of all three channels.

Conducted Test – Line 1: 0.15 MHz to 0.5 MHz

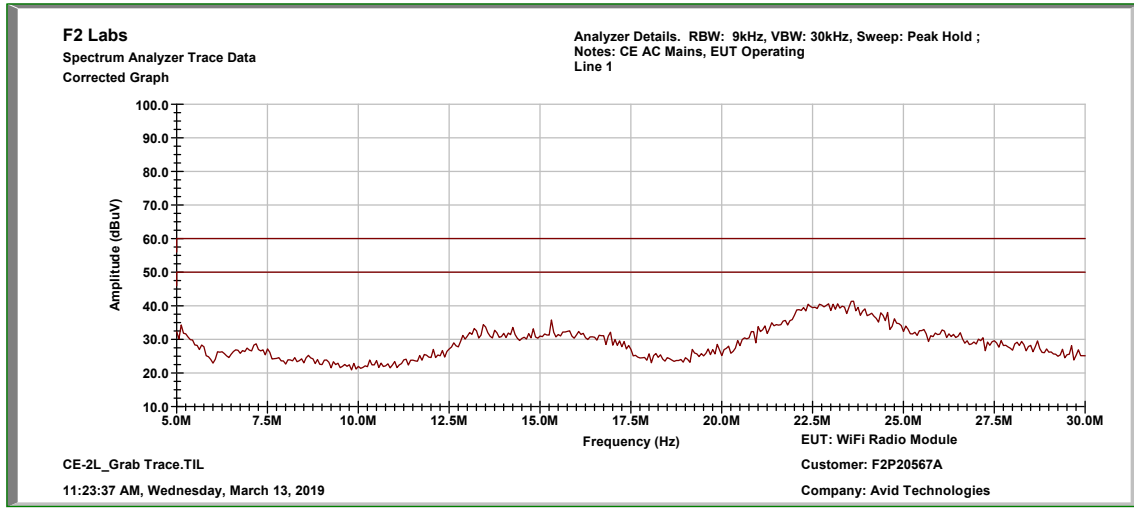


Conducted Test – Line 1: 0.5 MHz to 5.0 MHz





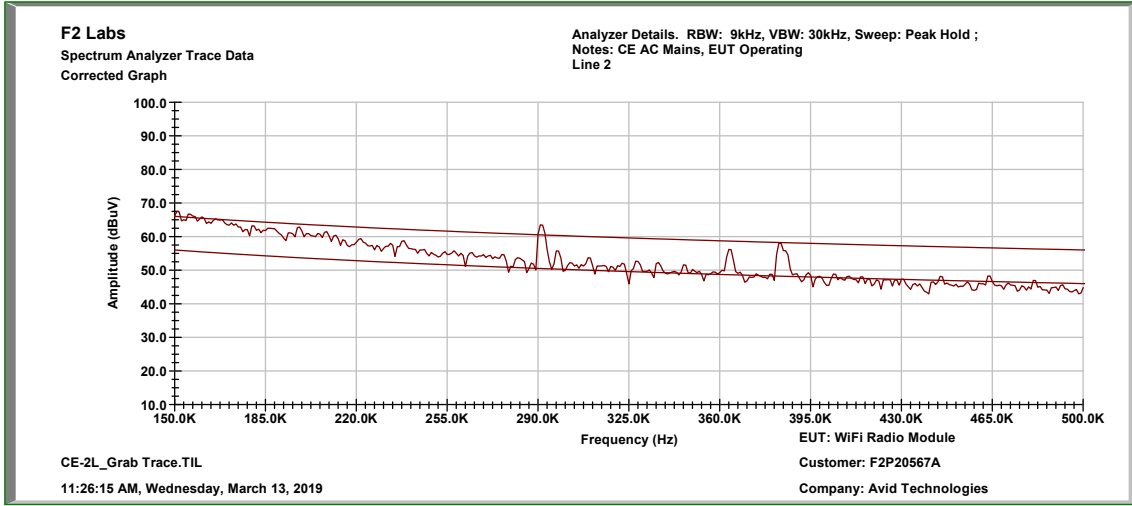
Conducted Test – Line 1: 5.0 MHz to 30.0 MHz



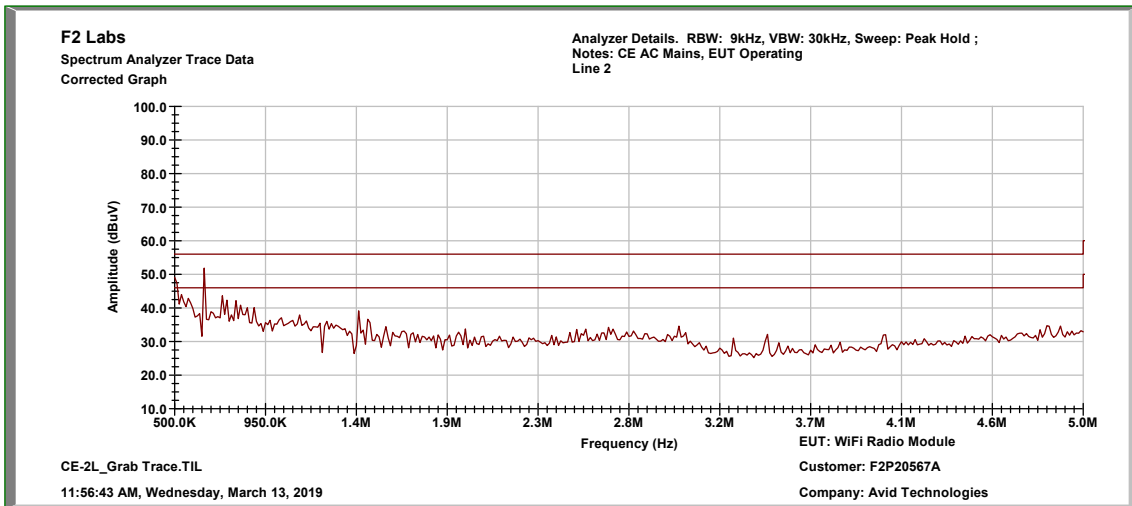
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBµV)	Adjustment (dB)	Results (dBµV)	Limit (dBµV)	Margin (dB)
1	Line 1	0.15875	Quasi-Peak	43.4	11.547	54.95	65.530	-10.6
			Average	27.33	11.547	38.88	55.530	-16.7
2	Line 1	0.16575	Quasi-Peak	42.13	11.473	53.60	65.171	-11.6
			Average	25.60	11.473	37.07	55.171	-18.1
3	Line 1	0.171000	Quasi-Peak	40.92	11.417	52.34	64.913	-12.6
			Average	22.2	11.417	33.62	54.913	-21.3
4	Line 1	0.19375	Quasi-Peak	39.15	11.176	50.33	63.875	-13.5
			Average	19.04	11.176	30.22	53.875	-23.7
5	Line 1	0.20400	Quasi-Peak	37.44	11.070	48.51	63.437	-14.9
			Average	20.4	11.070	31.47	53.437	-22.0
6	Line 1	0.212125	Quasi-Peak	36.31	10.996	47.31	63.122	-15.8
			Average	20.31	10.996	31.31	53.122	-21.8
7	Line 1	0.2725	Quasi-Peak	31.29	10.631	41.92	61.042	-19.1
			Average	13.95	10.631	24.58	51.042	-26.5



Conducted Test – Line 2: 0.15 MHz to 0.5 MHz

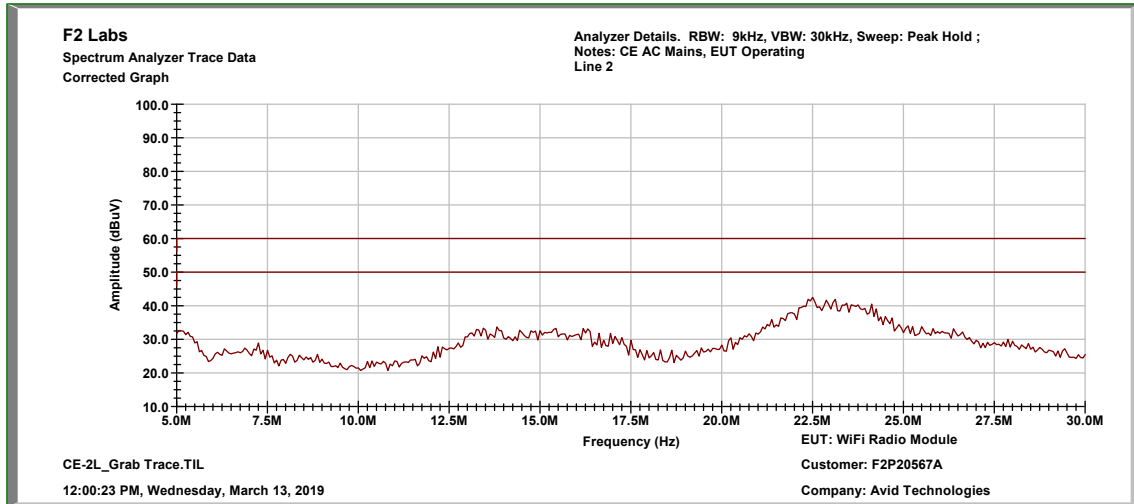


Conducted Test – Line 2: 0.5 MHz to 5.0 MHz





Conducted Test – Line 2: 5.0 MHz to 30.0 MHz

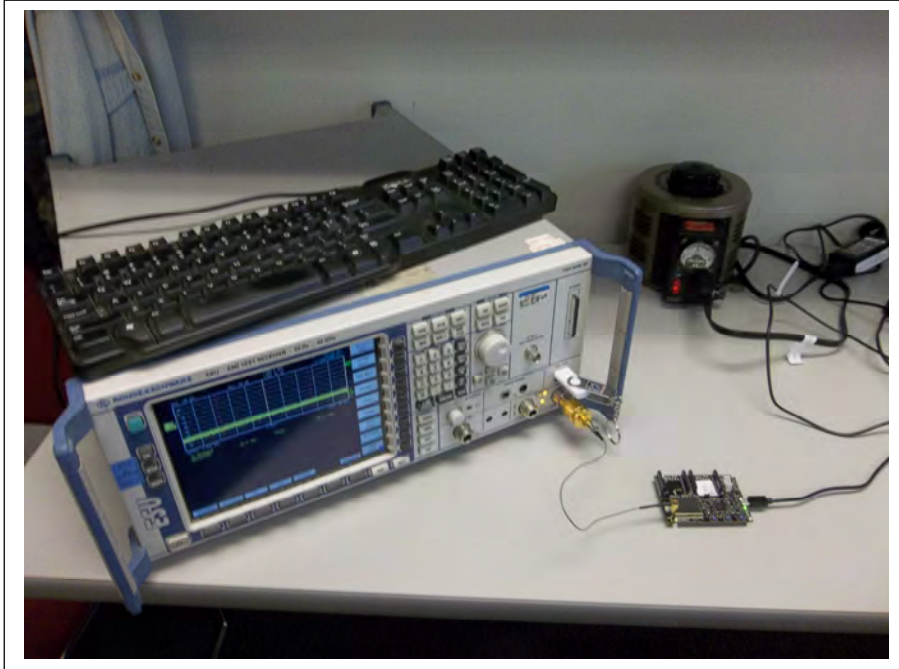


Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBµV)	Adjustment (dB)	Results (dBµV)	Limit (dBµV)	Margin (dB)
1	Line 2	0.15175	Quasi-Peak	49.78	11.640	61.42	66.00	-4.6
			Average	27.79	11.640	39.43	56.00	-16.6
2	Line 2	0.156125	Quasi-Peak	41.44	11.575	53.02	65.669	-12.7
			Average	22.7	11.575	34.28	55.669	-21.4
3	Line 2	0.161375	Quasi-Peak	42.90	11.519	54.42	65.394	-11.0
			Average	26.11	11.519	37.63	55.394	-17.8
4	Line 2	0.166625	Quasi-Peak	42.34	11.464	53.80	65.128	-11.3
			Average	25.06	11.464	36.52	55.128	-18.6
5	Line 2	0.198125	Quasi-Peak	37.6	11.310	48.91	63.690	-14.8
			Average	21.48	11.130	32.61	53.690	-21.1
6	Line 2	0.29175	Quasi-Peak	30.87	10.623	41.49	60.475	-19.0
			Average	12.55	10.623	23.17	50.475	-27.3
7	Line 2	0.297875	Quasi-Peak	32.67	10.621	43.29	60.302	-17.0
			Average	13.64	10.621	24.26	50.302	-26.0
8	Line 2	0.364375	Quasi-Peak	27.84	10.588	38.43	58.625	-20.2
			Average	7.323	10.588	17.91	48.625	-30.7
9	Line 2	0.383625	Quasi-Peak	27.56	10.578	38.14	58.201	-20.1
			Average	9.982	10.578	20.56	48.201	-27.6
10	Line 2	0.500	Quasi-Peak	23.15	10.540	33.69	56.0	-22.3
			Average	10.07	10.540	20.61	46.0	-25.4
11	Line 2	0.64625	Quasi-Peak	21.36	10.446	31.81	56.0	-24.2
			Average	6.536	10.446	16.98	46.0	-29.0



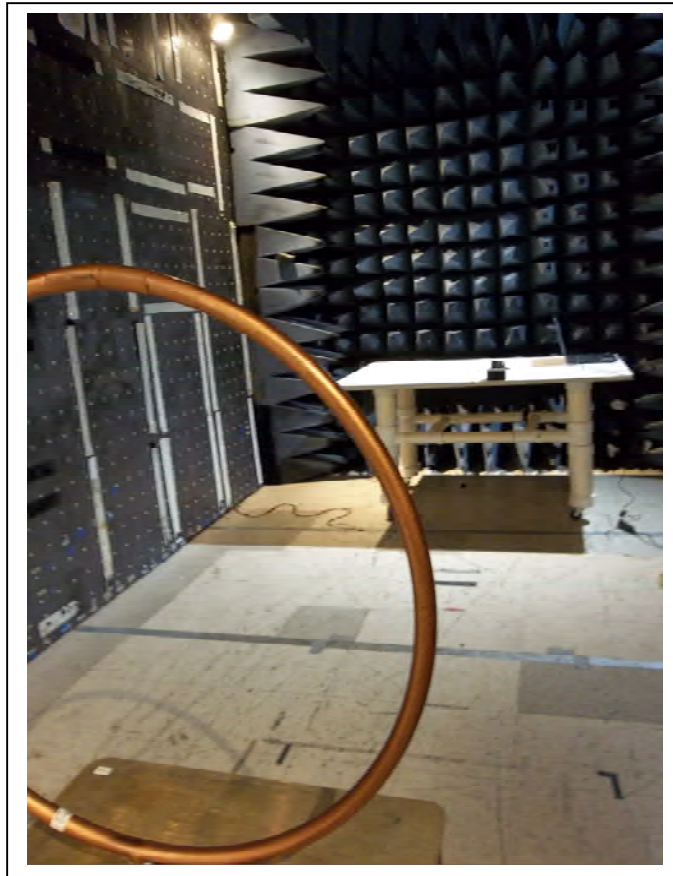
13 PHOTOGRAPHS – TEST SETUP

General Conducted Test Setup



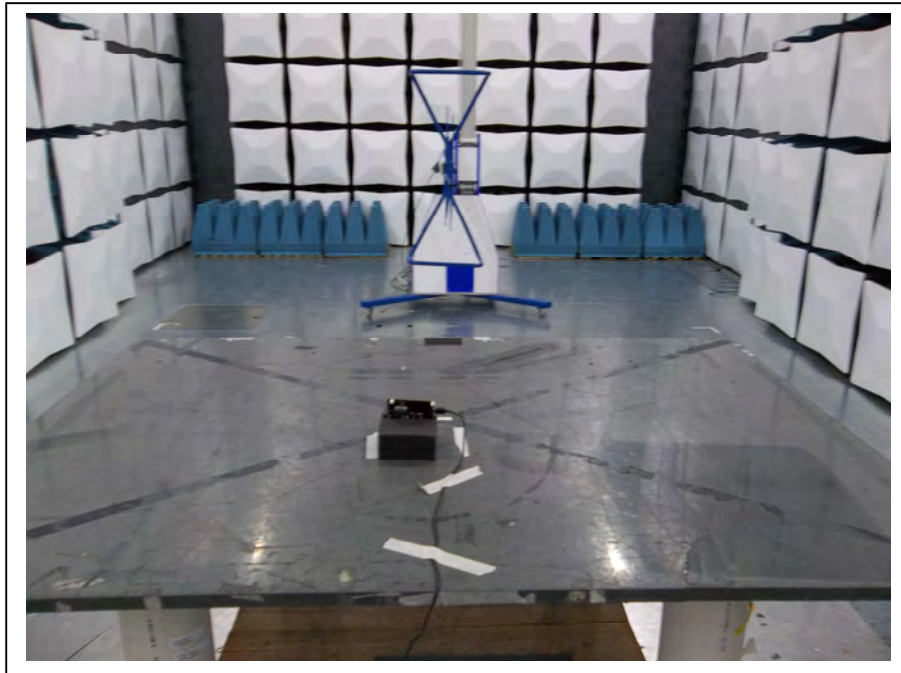


Radiated Spurious Emissions, Less Than 30 MHz

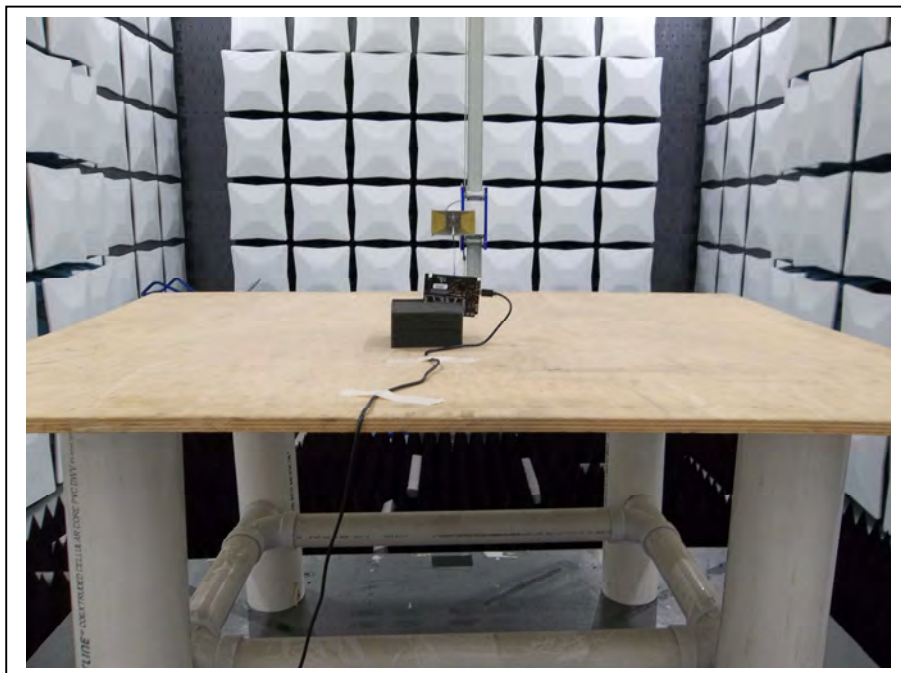




Radiated Spurious Emissions, 30 MHz to 1000 MHz

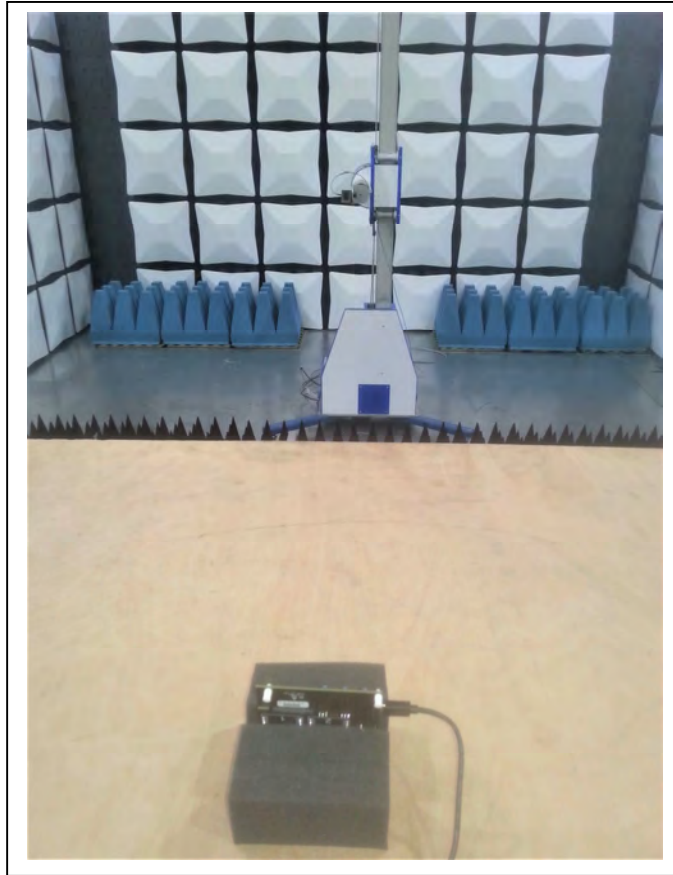


Radiated Spurious Emissions, 1 GHz to 18 GHz





Radiated Spurious Emissions, 18 GHz to 26 GHz



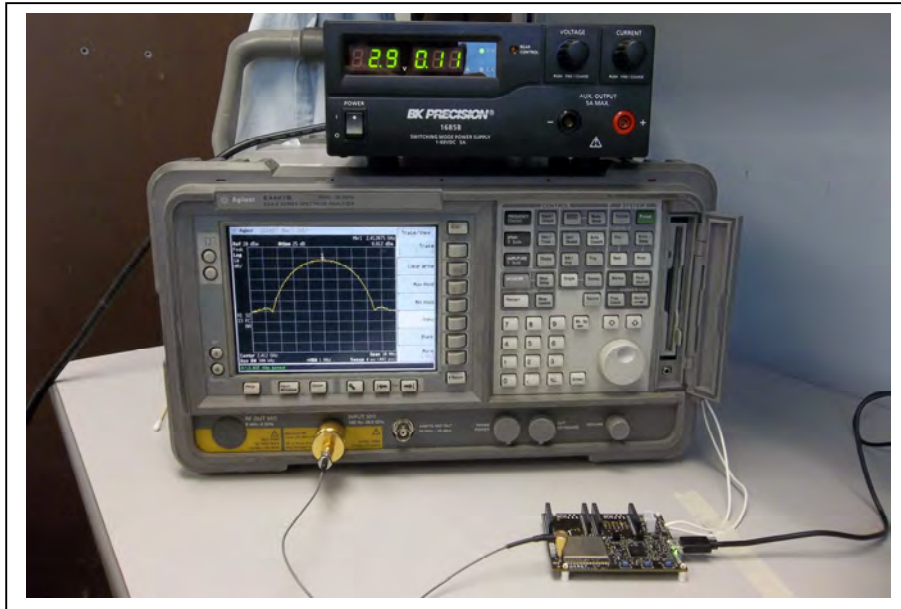


Radiated Spurious Emissions, 26 GHz to 40 GHz

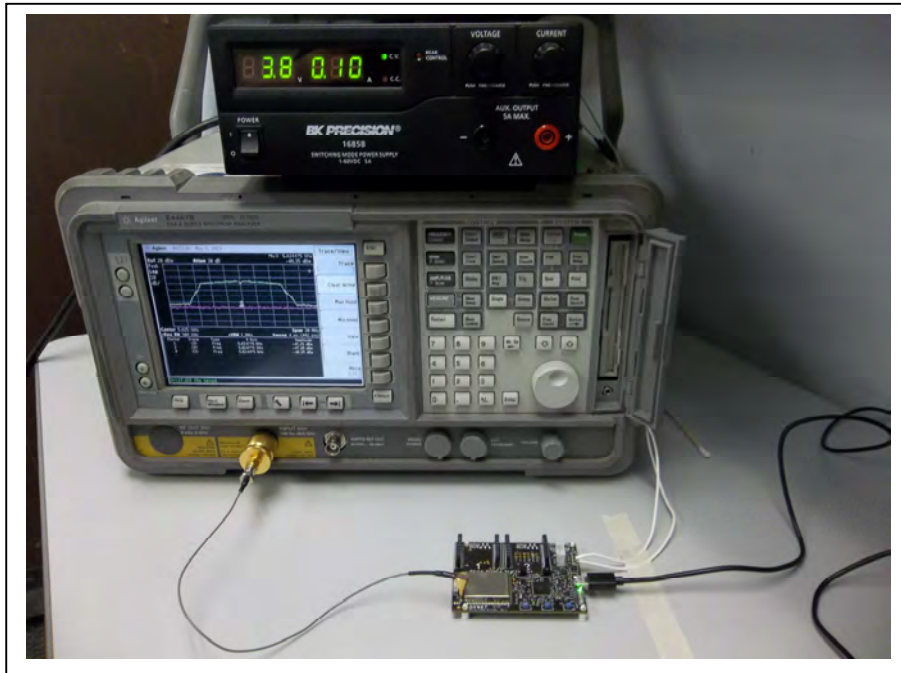




Low Voltage



High Voltage





Conducted Emissions

