

Appendix A

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Smart Doorbell
Trade Mark: BOSMA, OWLET HOME
Test Model: Sentry Plus

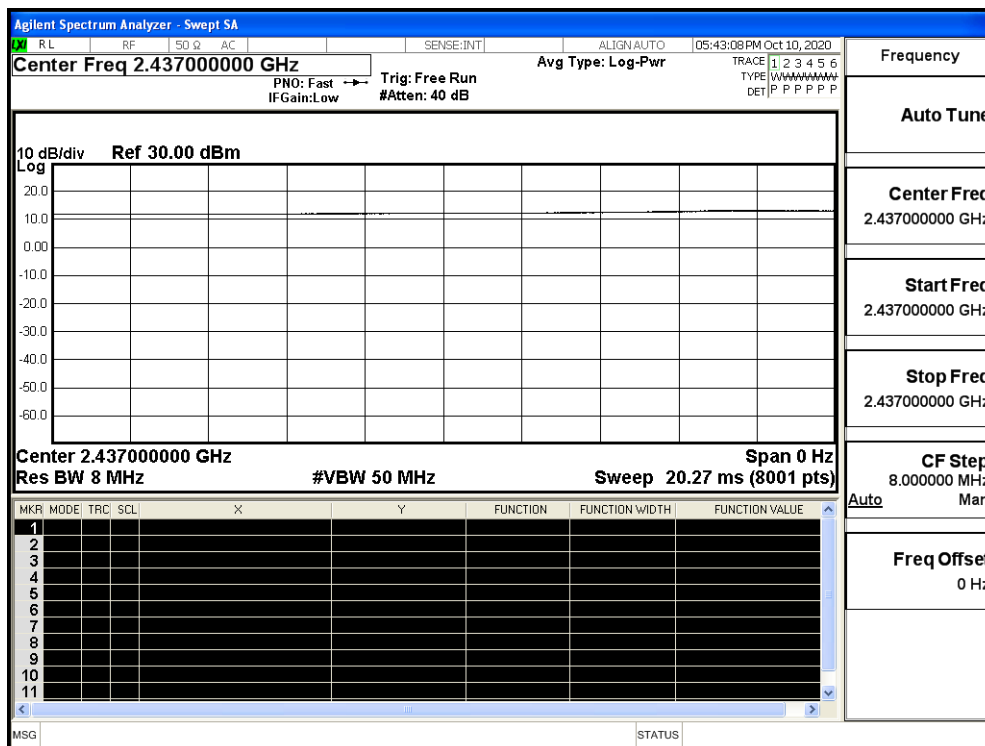
Environmental Conditions

Temperature:	23.2 ° C
Relative Humidity:	53.7%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

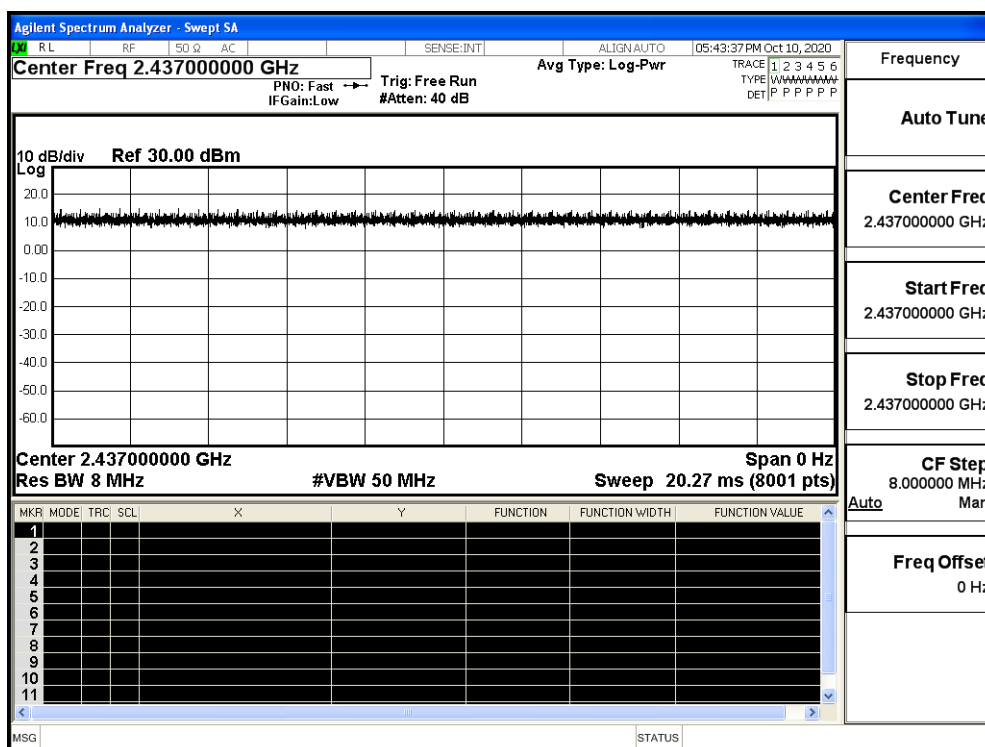
A.1 Duty Cycle

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
11B	2437	Ant1	100	PASS
11G	2437	Ant1	100	PASS
11N20SISO	2437	Ant1	100	PASS
11N40SISO	2437	Ant1	100	PASS

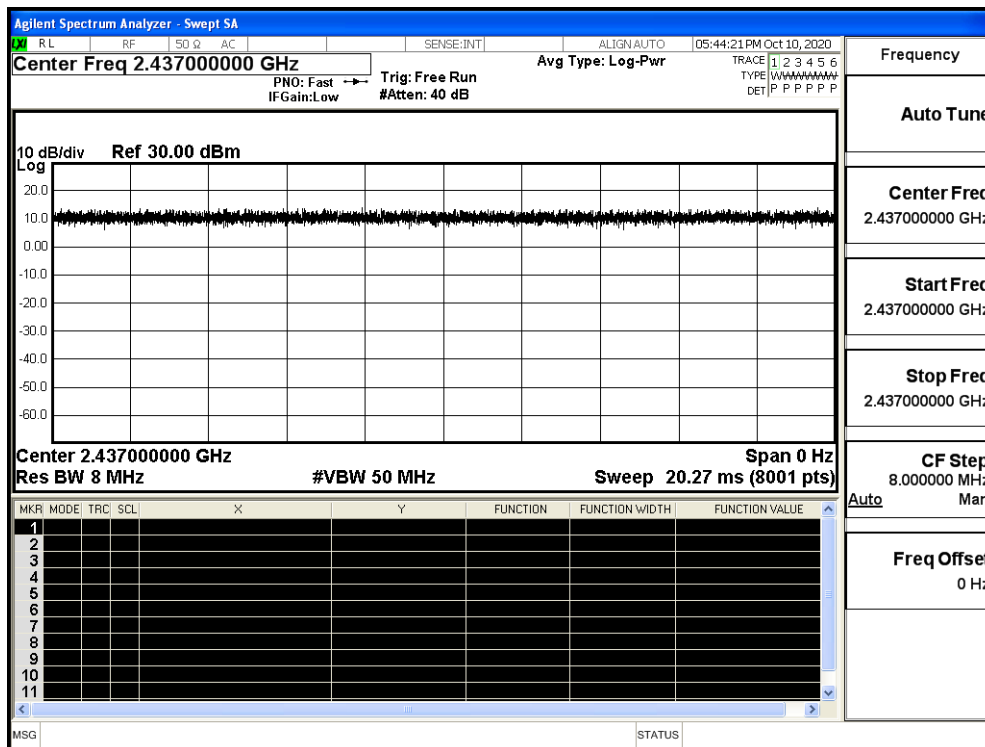
Duty Cycle_11B_2437_Ant1



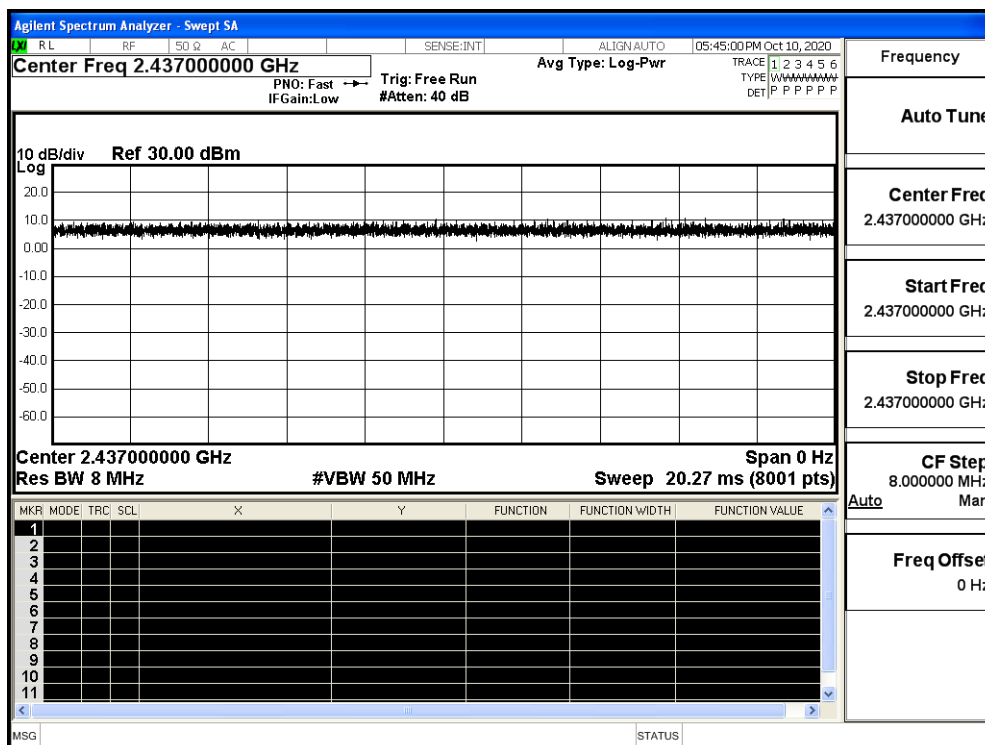
Duty Cycle_11G_2437_Ant1



Duty Cycle_11N20SISO_2437_Ant1



Duty Cycle_11N40SISO_2437_Ant1



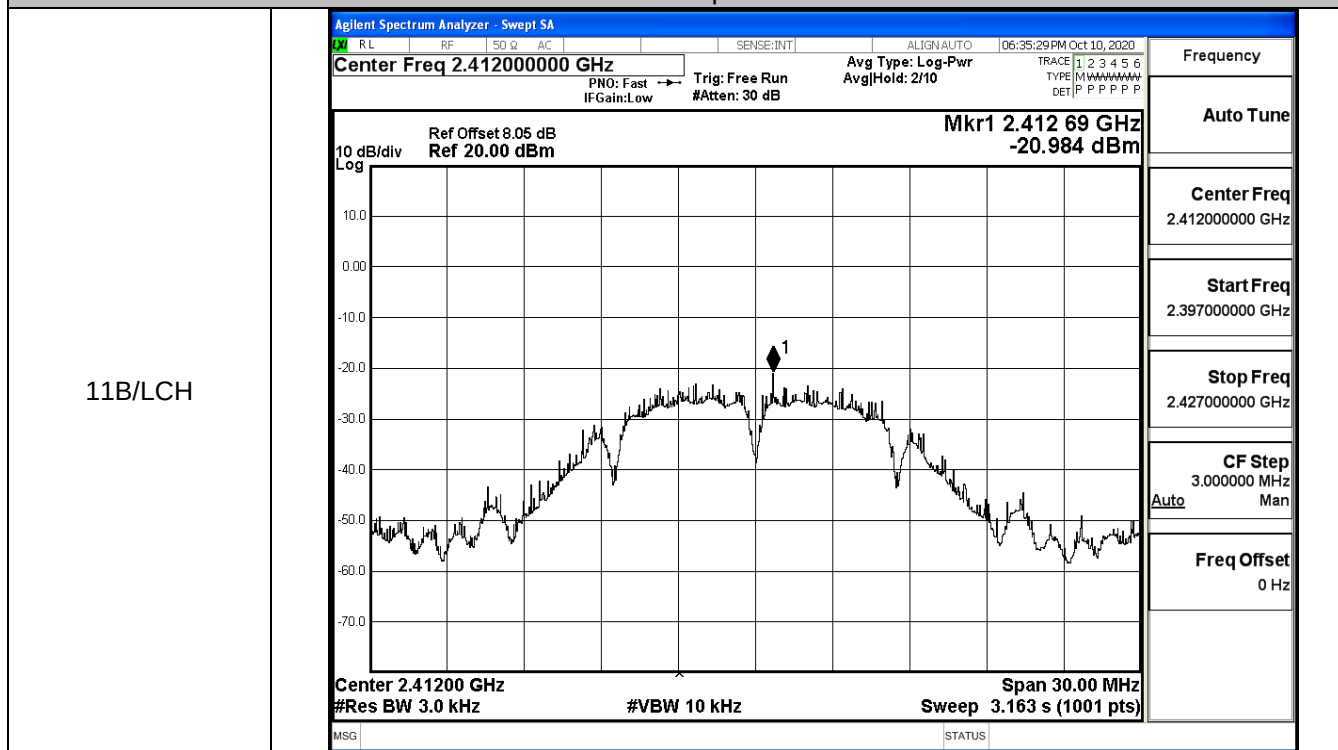
A.2 Maximum Conducted Output Power

Mode	Channel	Meas.Level [dBm]	Limit [dBm]	Verdict
11B	LCH	7.36	30	PASS
	MCH	7.46	30	PASS
	HCH	8.69	30	PASS
11G	LCH	10.94	30	PASS
	MCH	9.91	30	PASS
	HCH	9.06	30	PASS
11N20SISO	LCH	11.09	30	PASS
	MCH	10.07	30	PASS
	HCH	9.17	30	PASS
11N40SISO	LCH	10.83	30	PASS
	MCH	10.19	30	PASS
	HCH	9.59	30	PASS

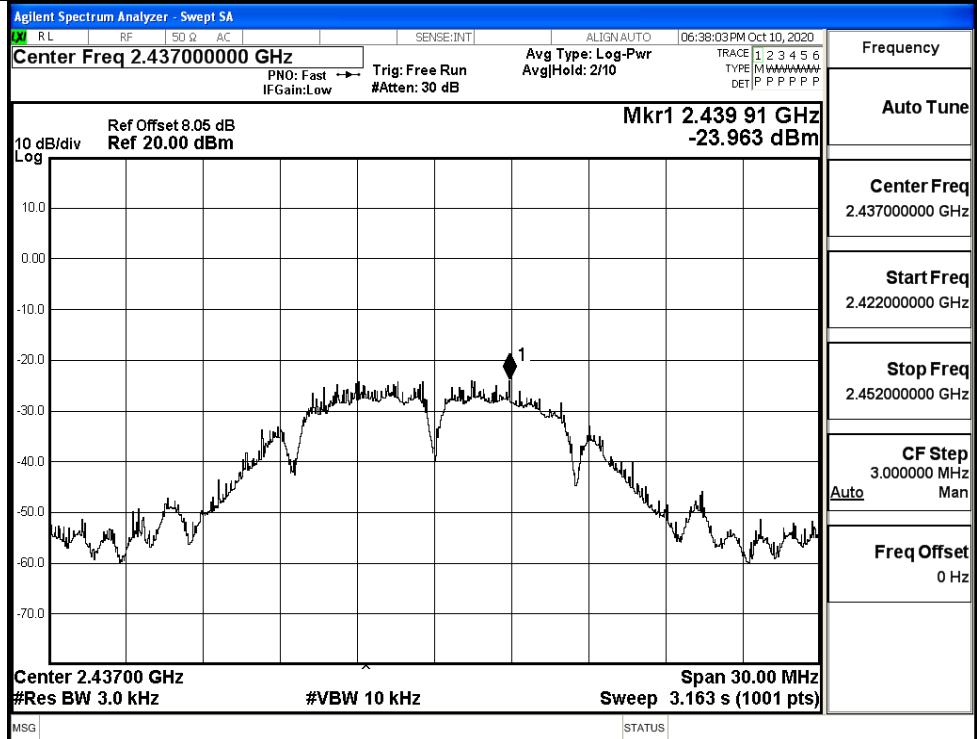
A.3 Maximum Power Spectral Density

Mode	Channel	Meas.Level [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-20.984	8	PASS
	MCH	-23.963	8	PASS
	HCH	-23.469	8	PASS
11G	LCH	-24.739	8	PASS
	MCH	-25.569	8	PASS
	HCH	-26.610	8	PASS
11N20SISO	LCH	-24.946	8	PASS
	MCH	-25.427	8	PASS
	HCH	-26.407	8	PASS
11N40SISO	LCH	-26.198	8	PASS
	MCH	-27.204	8	PASS
	HCH	-28.688	8	PASS

Test Graphs



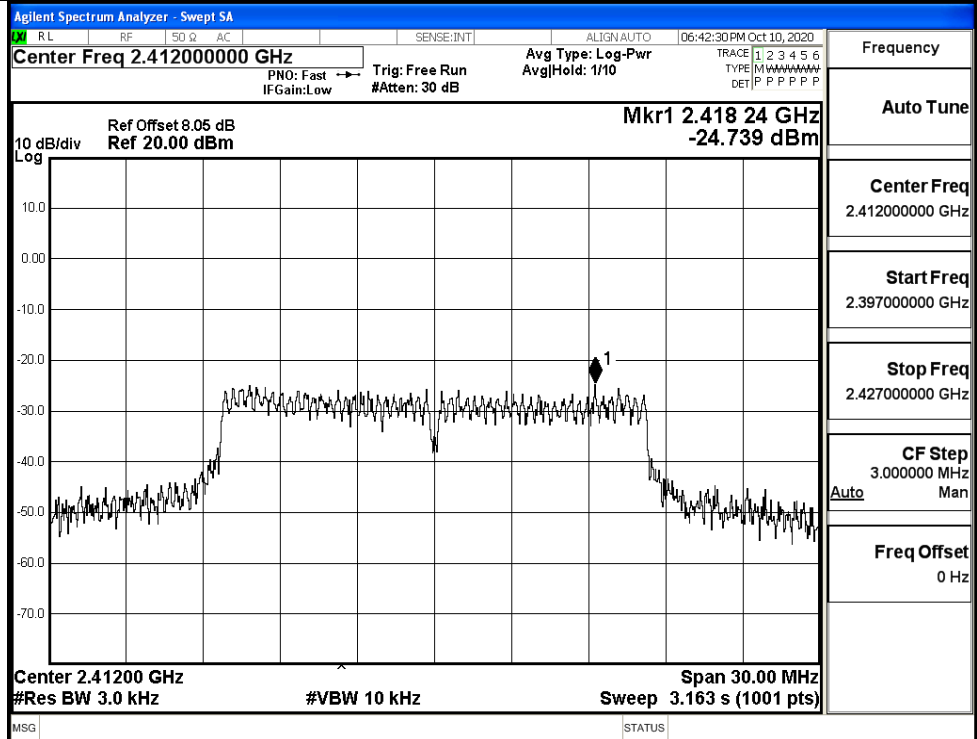
11B/MCH



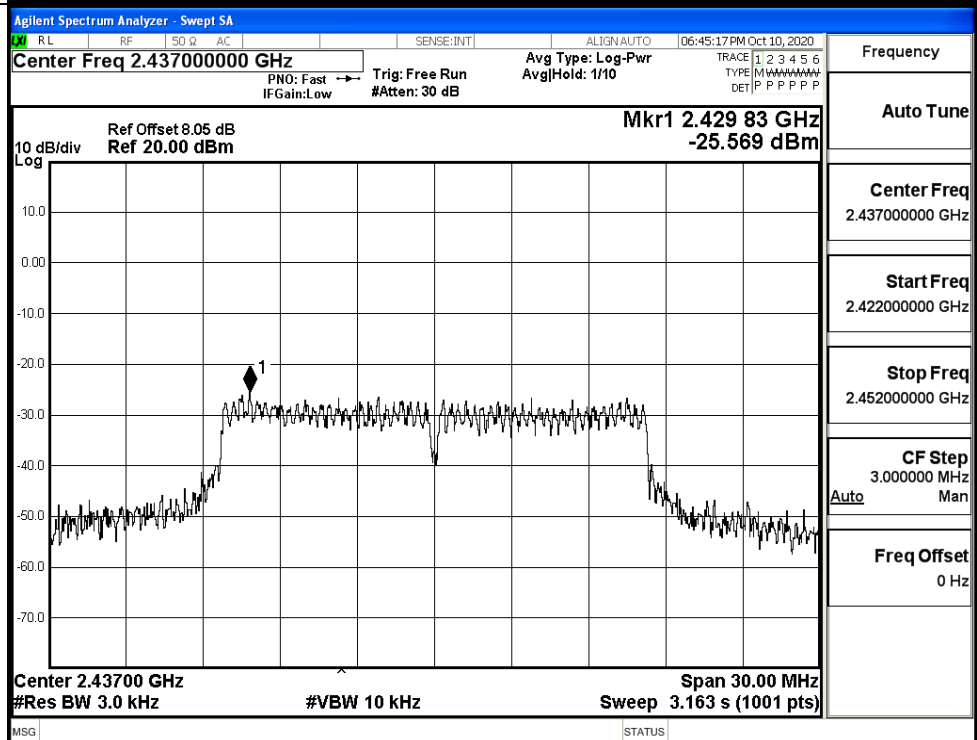
11B/HCH



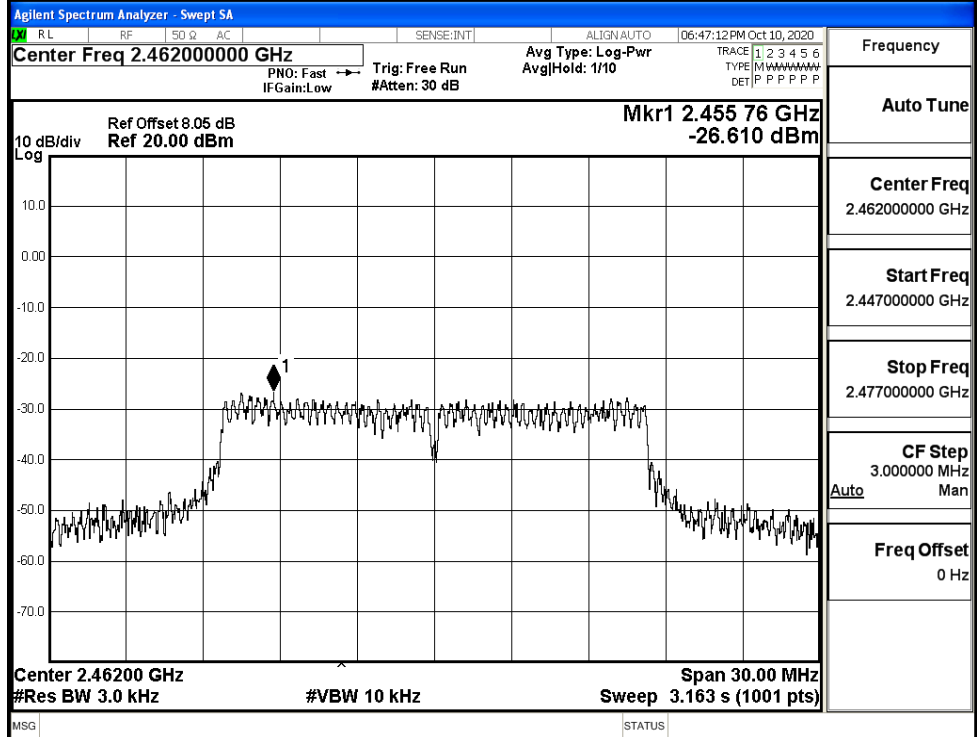
11G/LCH



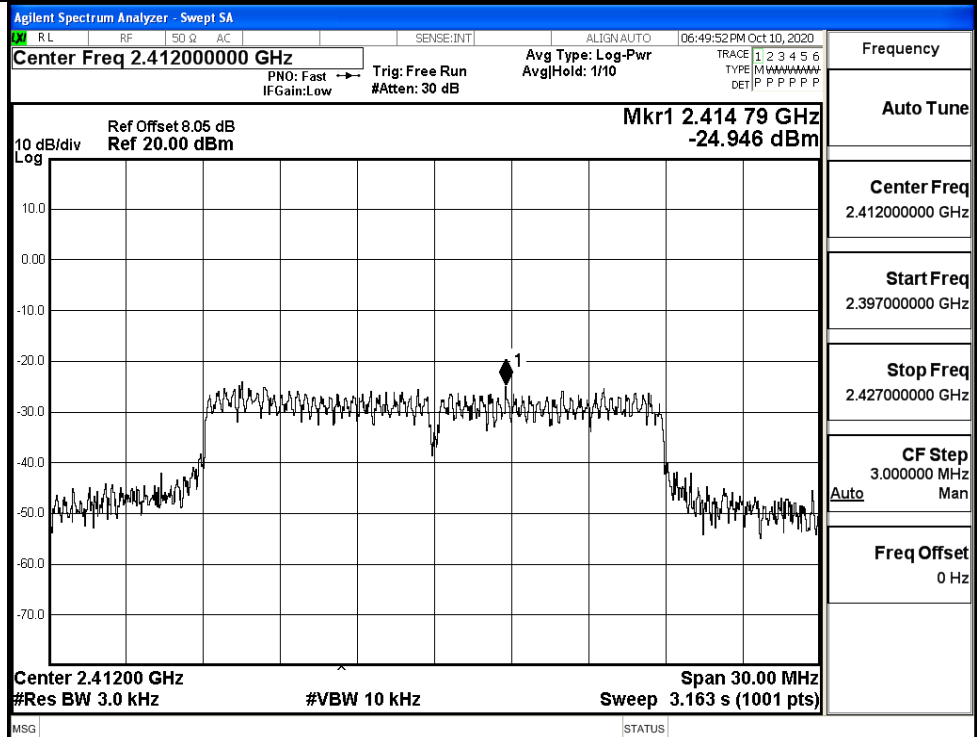
11G/MCH

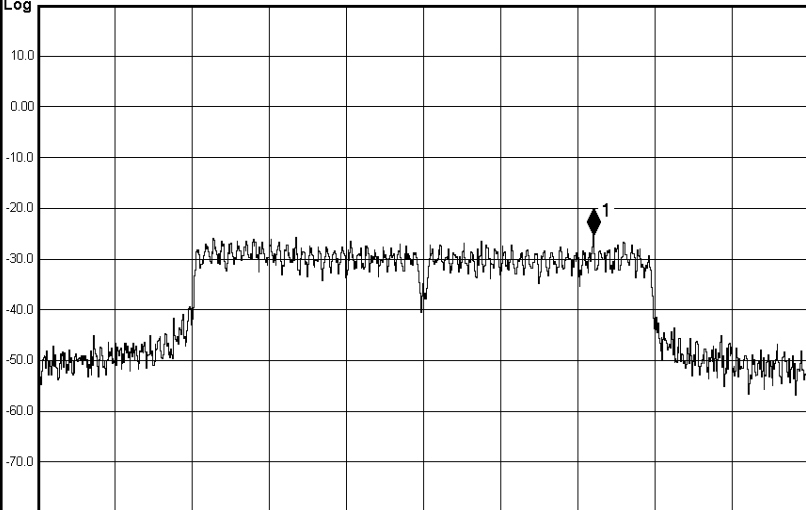
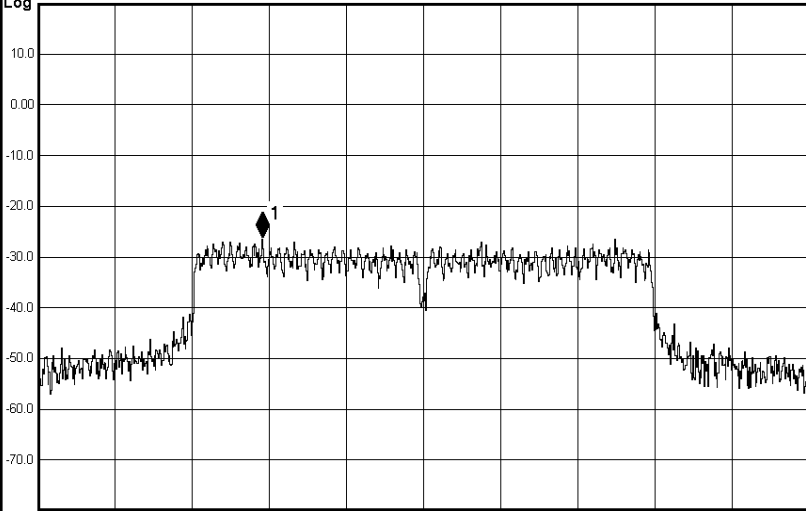


11G/HCH

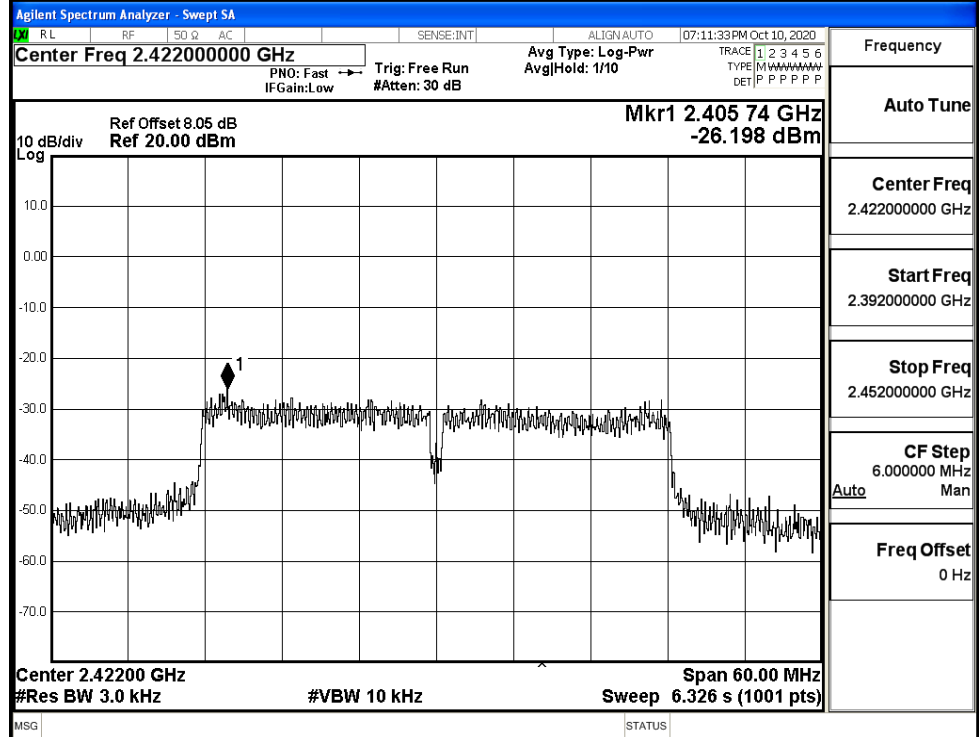


11N20SISO/LCH

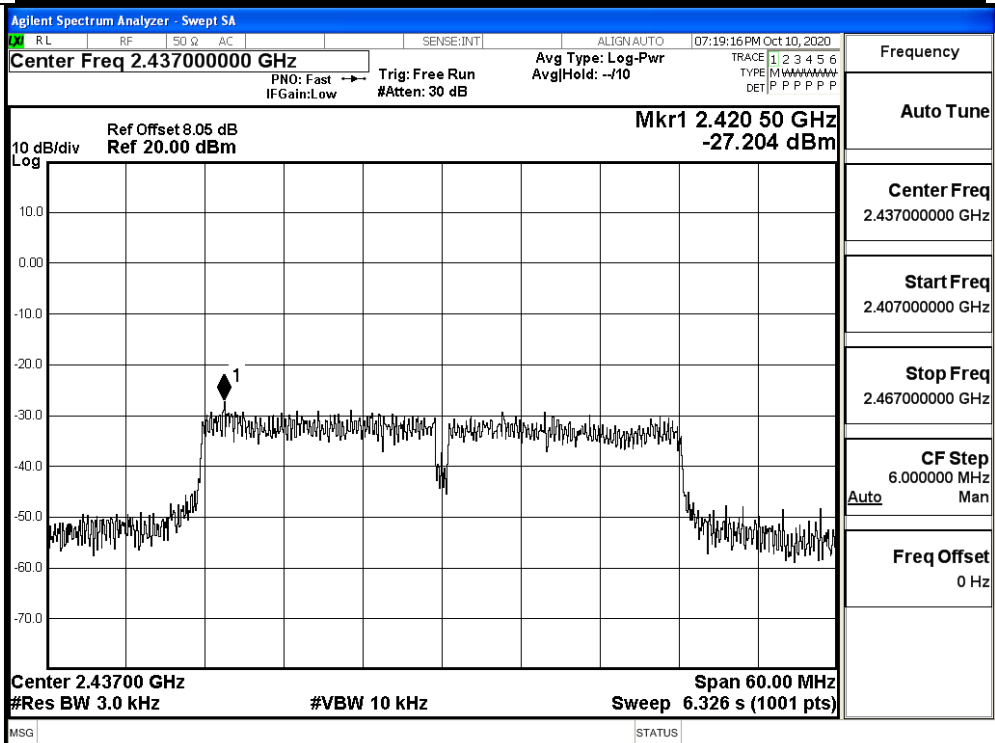


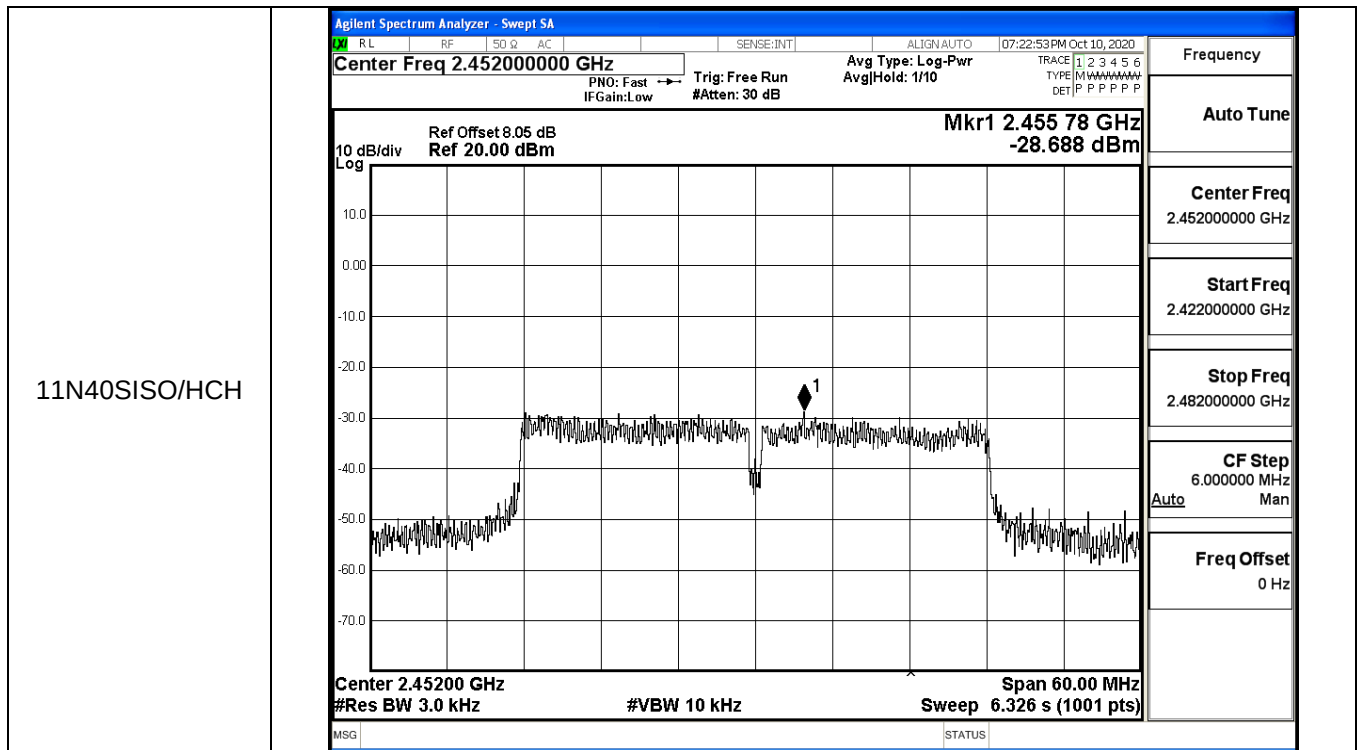
11N20SISO/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 06:52:30 PM Oct 10, 2020 Center Freq 2.437000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg Hold: 1/10 Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.443 63 GHz -25.427 dBm  Center 2.43700 GHz Span 30.00 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.437000000 GHz Start Freq 2.422000000 GHz Stop Freq 2.452000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 07:04:56 PM Oct 10, 2020 Center Freq 2.462000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg Hold: 1/10 Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.455 73 GHz -26.407 dBm  Center 2.46200 GHz Span 30.00 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.462000000 GHz Start Freq 2.447000000 GHz Stop Freq 2.477000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz

11N40SISO/LCH



11N40SISO/MCH



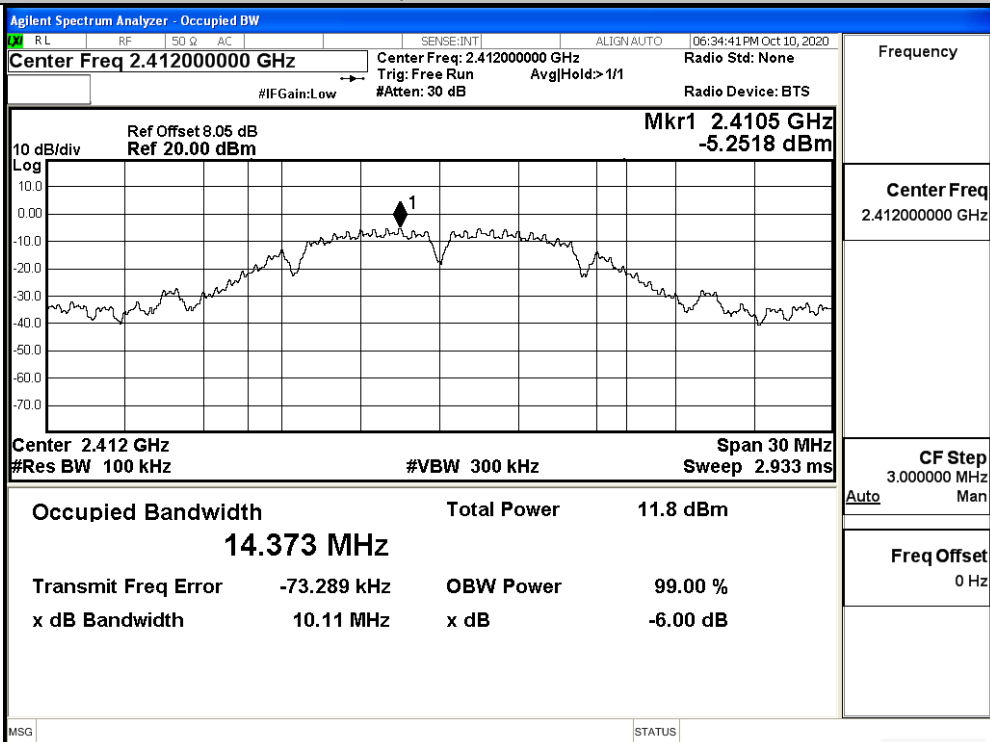


A.4 6dB Bandwidth

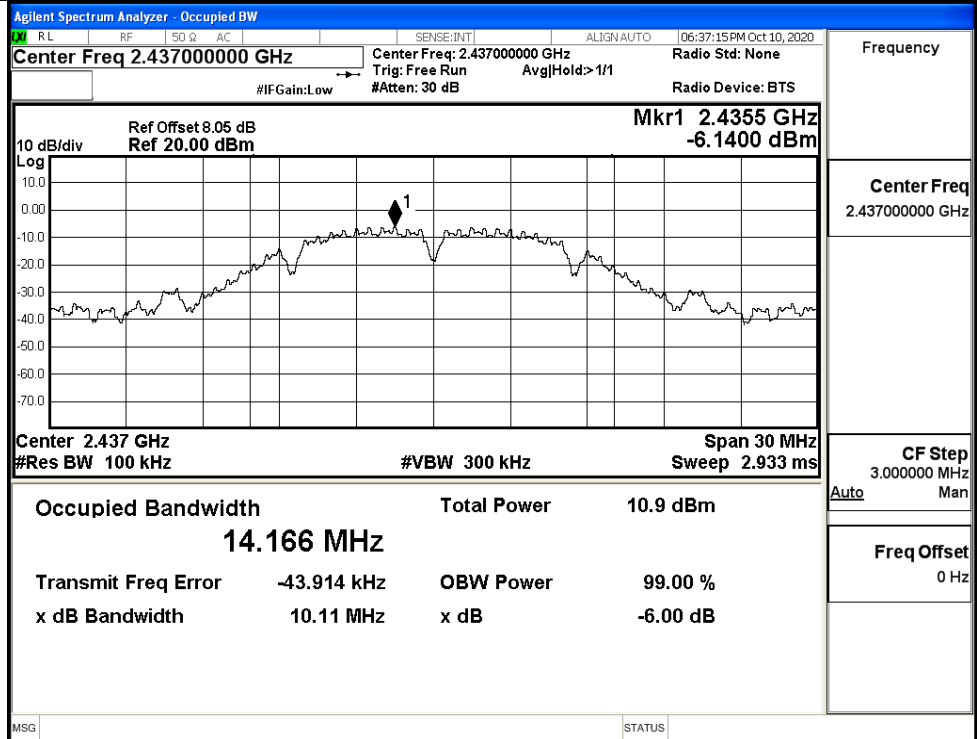
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	LCH	10.11	≥ 0.5	PASS
	MCH	10.11	≥ 0.5	PASS
	HCH	10.11	≥ 0.5	PASS
11G	LCH	16.35	≥ 0.5	PASS
	MCH	16.35	≥ 0.5	PASS
	HCH	16.38	≥ 0.5	PASS
11N20SISO	LCH	17.01	≥ 0.5	PASS
	MCH	17.30	≥ 0.5	PASS
	HCH	17.08	≥ 0.5	PASS
11N40SISO	LCH	35.79	≥ 0.5	PASS
	MCH	35.80	≥ 0.5	PASS
	HCH	35.95	≥ 0.5	PASS

Test Graphs

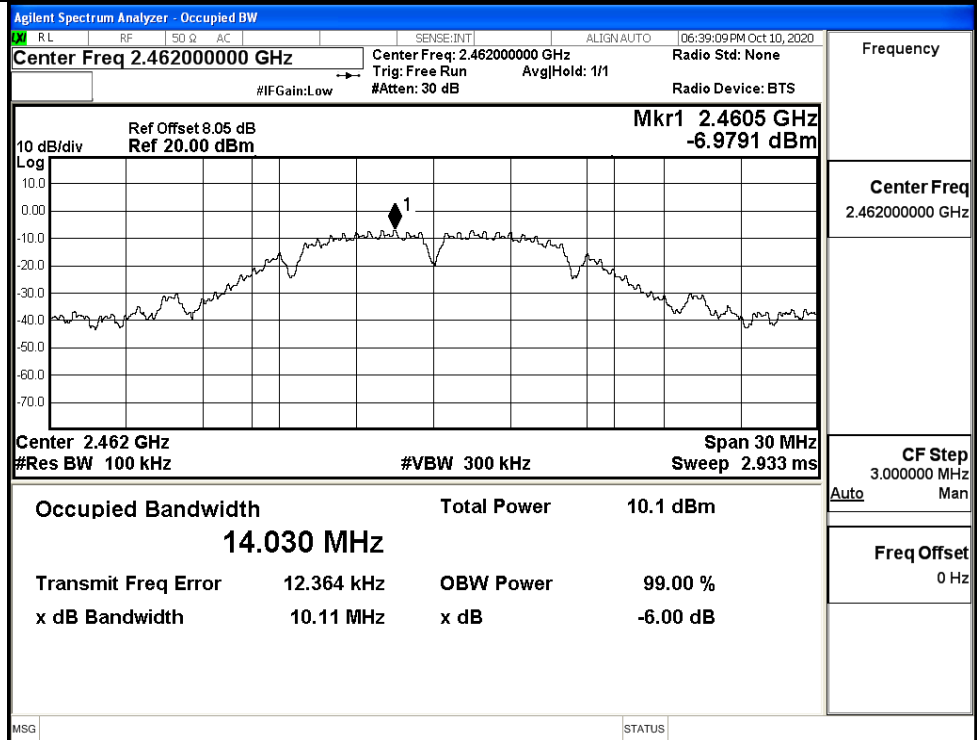
11B/LCH



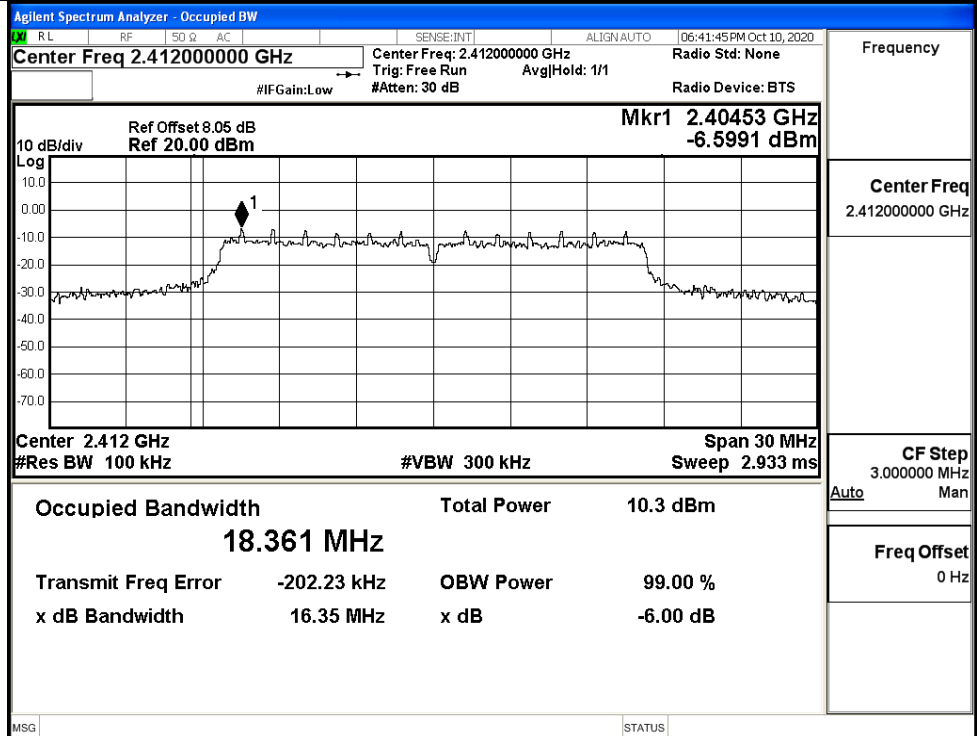
11B/MCH



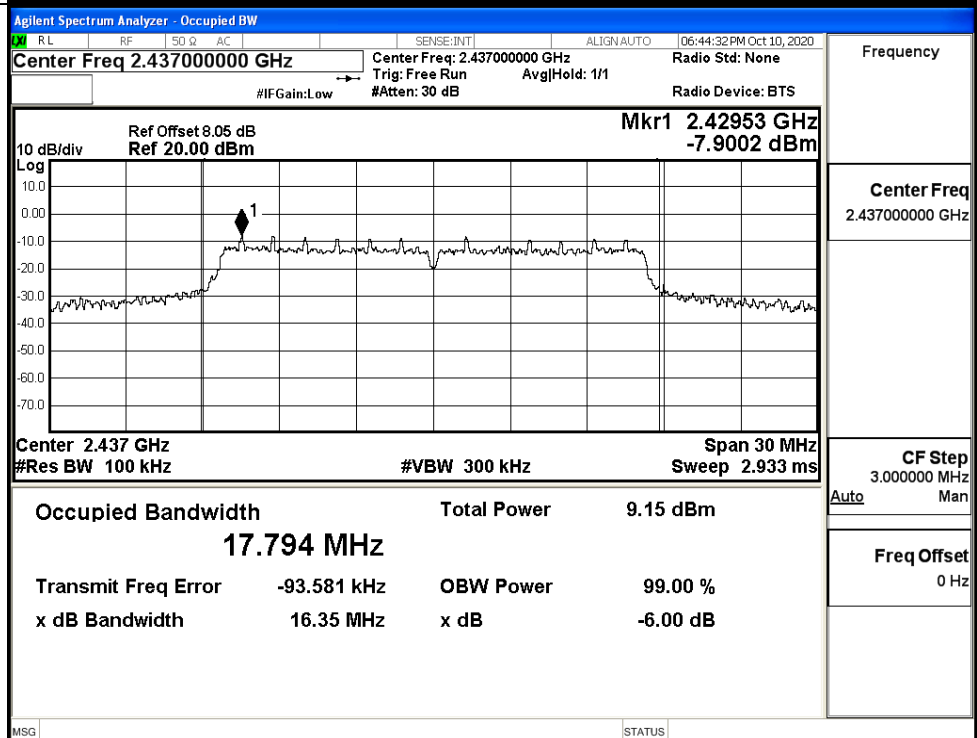
11B/HCH



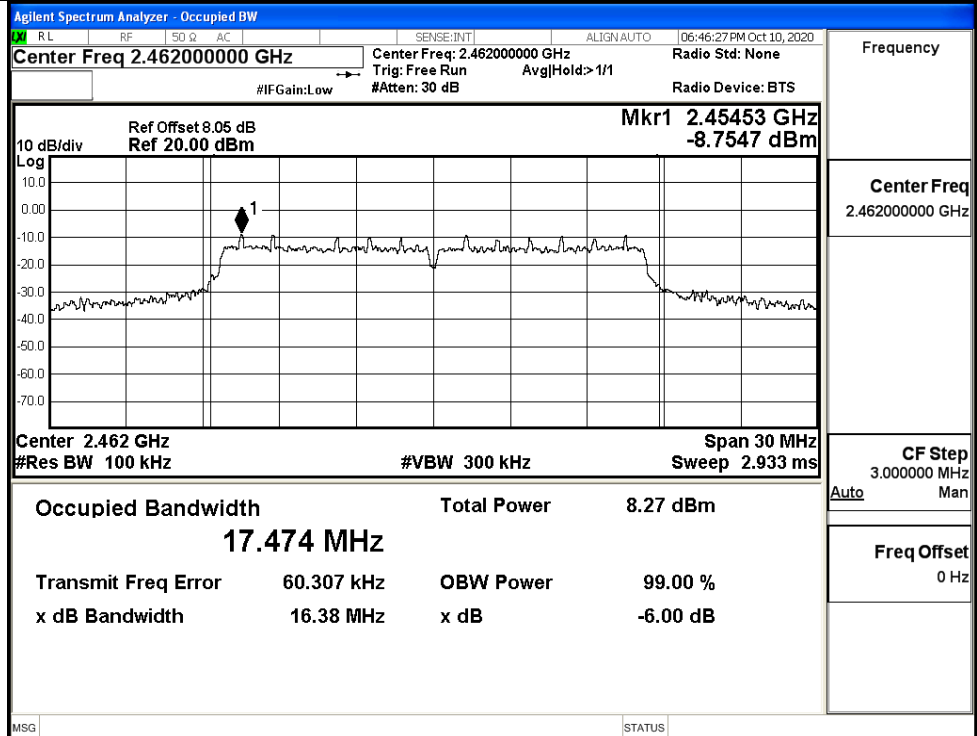
11G/LCH



11G/MCH



11G/HCH



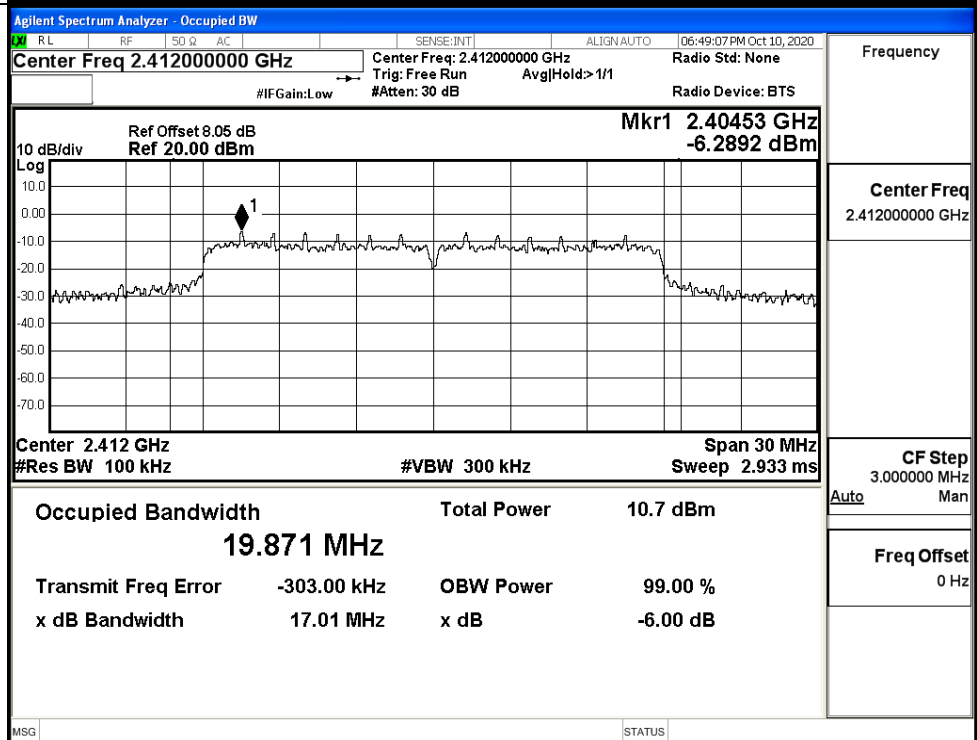
Frequency

Center Freq
2.46200000 GHz

CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

11N20SISO/LCH

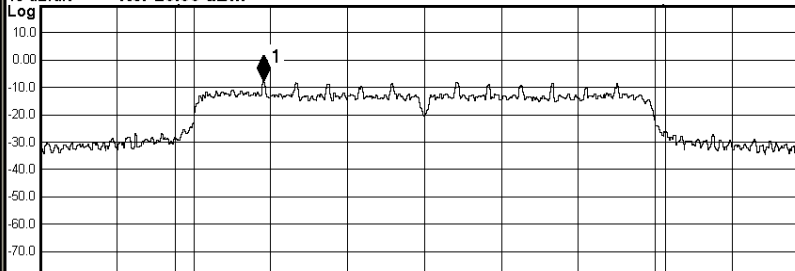
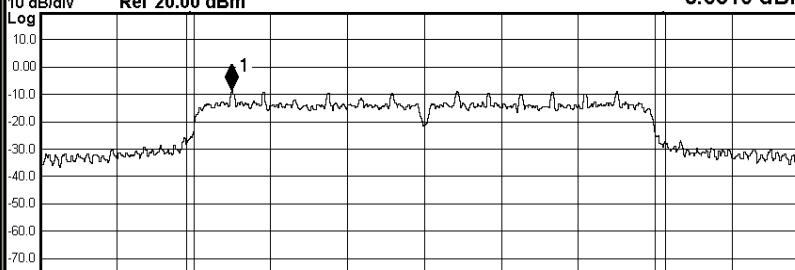


Frequency

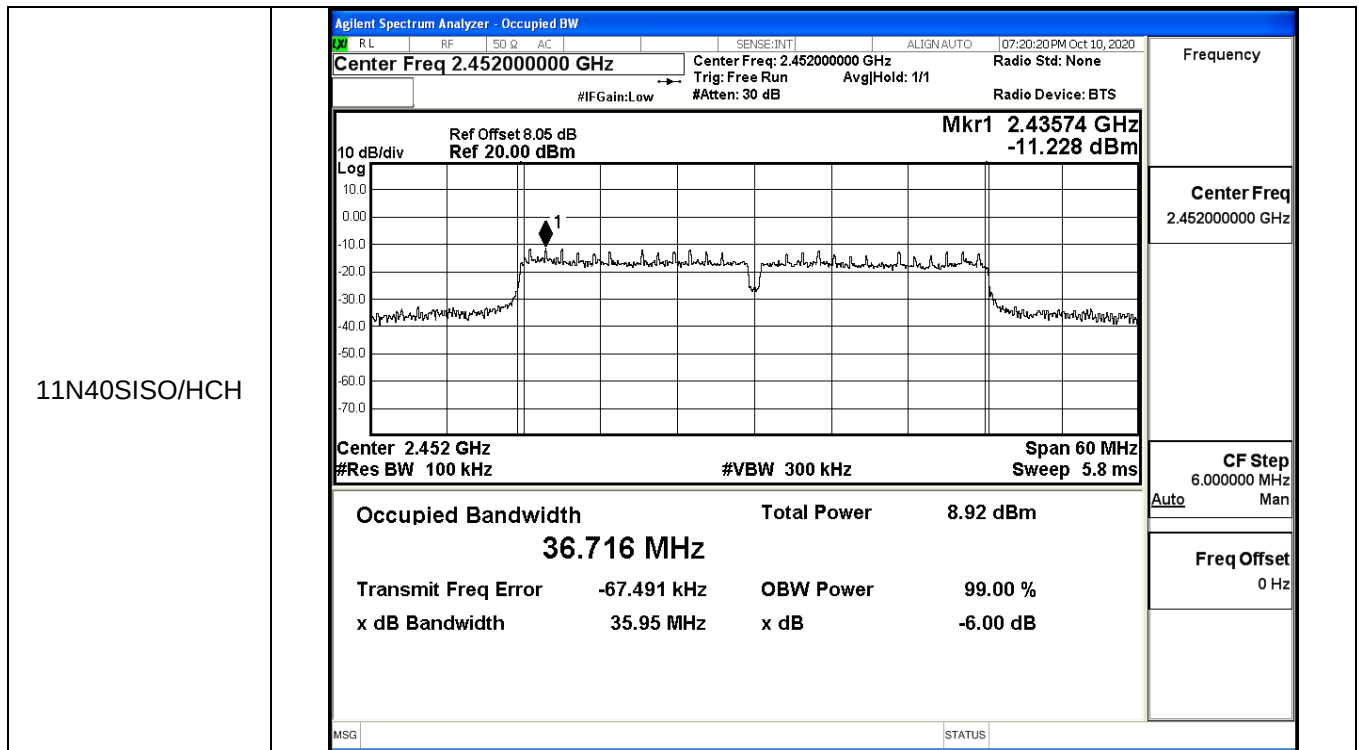
Center Freq
2.41200000 GHz

CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

11N20SISO/MCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 06:51:45 PM Oct 10, 2020 Center Freq 2.437000000 GHz Center Freq: 2.437000000 GHz Trig: Free Run Avg/Hold: 1/1 Radio Std: None #IF Gain: Low #Atten: 30 dB Radio Device: BTS 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.43073 GHz -7.9383 dBm  Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 19.037 MHz Total Power 9.56 dBm Transmit Freq Error -146.14 kHz OBW Power 99.00 % x dB Bandwidth 17.30 MHz x dB -6.00 dB MSG STATUS	Frequency Center Freq 2.437000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:04:10 PM Oct 10, 2020 Center Freq 2.462000000 GHz Center Freq: 2.462000000 GHz Trig: Free Run Avg/Hold: 1/1 Radio Std: None #IF Gain: Low #Atten: 30 dB Radio Device: BTS 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.4545 GHz -8.5310 dBm  Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 18.572 MHz Total Power 8.71 dBm Transmit Freq Error 88.984 kHz OBW Power 99.00 % x dB Bandwidth 17.08 MHz x dB -6.00 dB MSG STATUS	Frequency Center Freq 2.462000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz

[illegible]

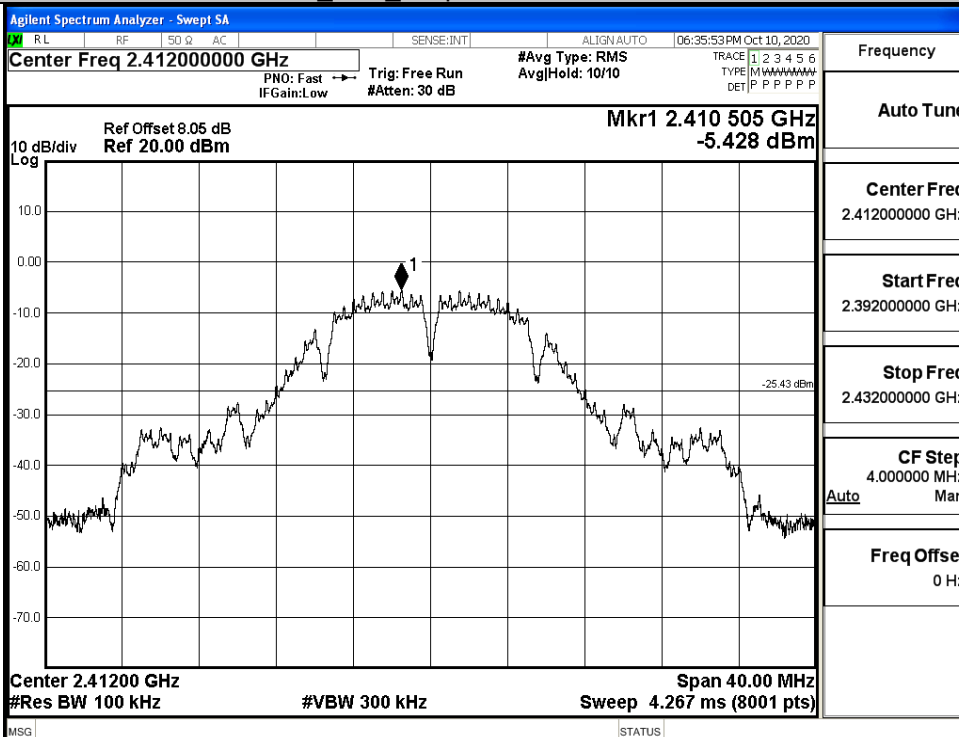


A.5 RF Conducted Spurious Emissions

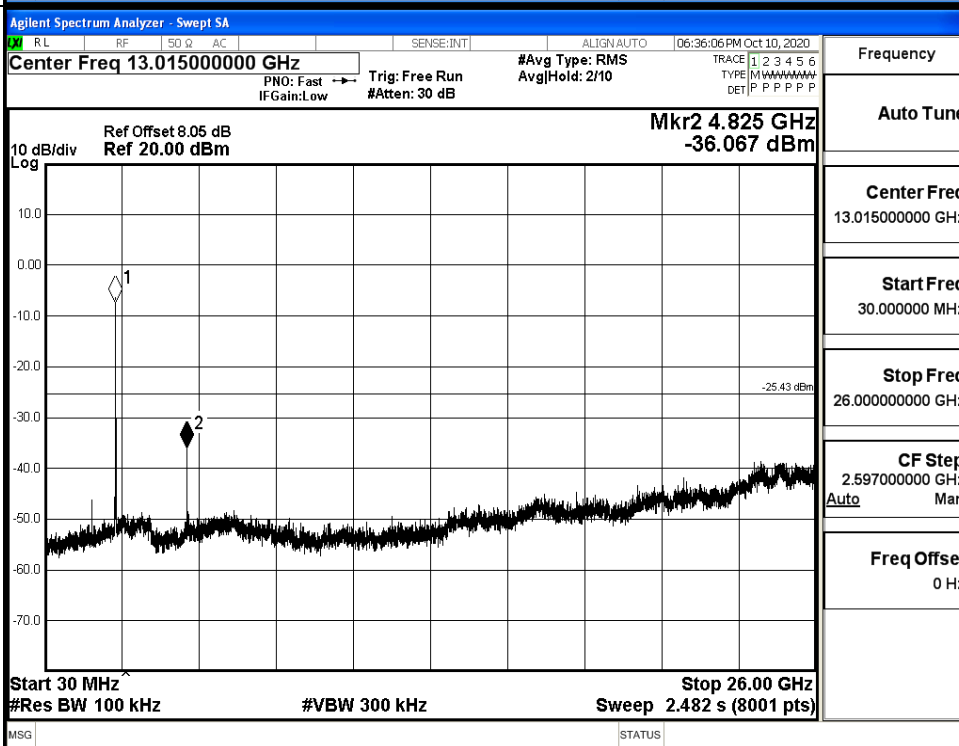
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	LCH	-5.428	-36.067	-25.428	PASS
	MCH	-6.396	-35.680	-26.396	PASS
	HCH	-7.235	-37.274	-27.235	PASS
11G	LCH	-7.556	-38.222	-27.556	PASS
	MCH	-7.901	-38.481	-27.901	PASS
	HCH	-9.57	-37.484	-29.570	PASS
11N20 SISO	LCH	-6.591	-37.962	-26.591	PASS
	MCH	-8.09	-38.462	-28.090	PASS
	HCH	-8.637	-38.957	-28.637	PASS
11N40 SISO	LCH	-9.953	-37.634	-29.953	PASS
	MCH	-10.872	-37.836	-30.872	PASS
	HCH	-11.339	-38.162	-31.339	PASS

11B LCH Graphs

Pref/11B/LCH

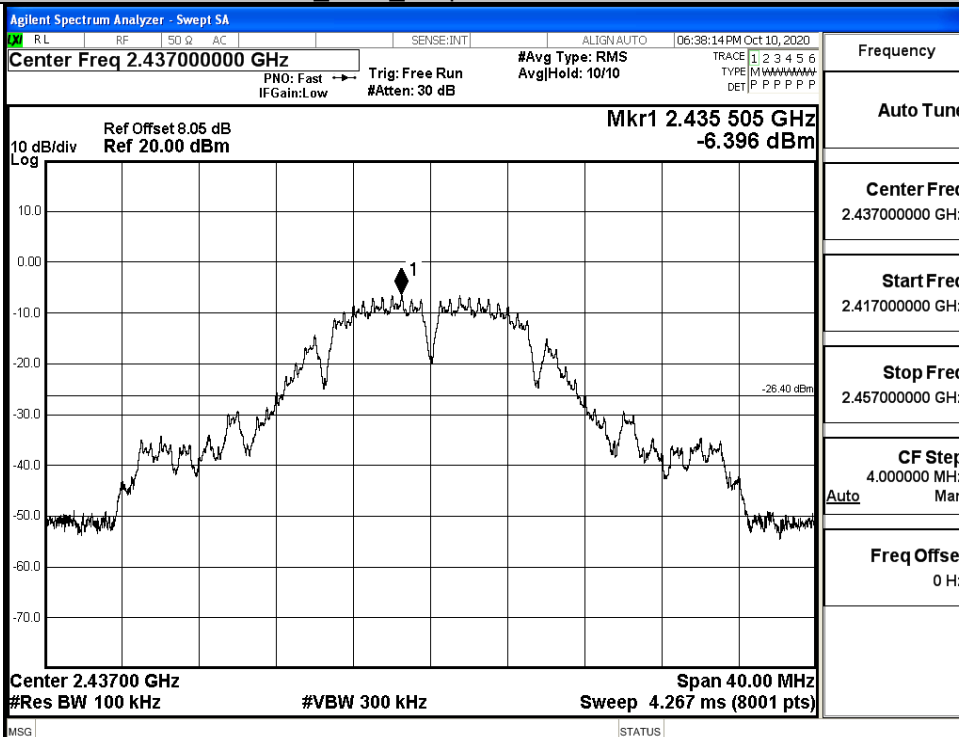


Puw/11B/LCH

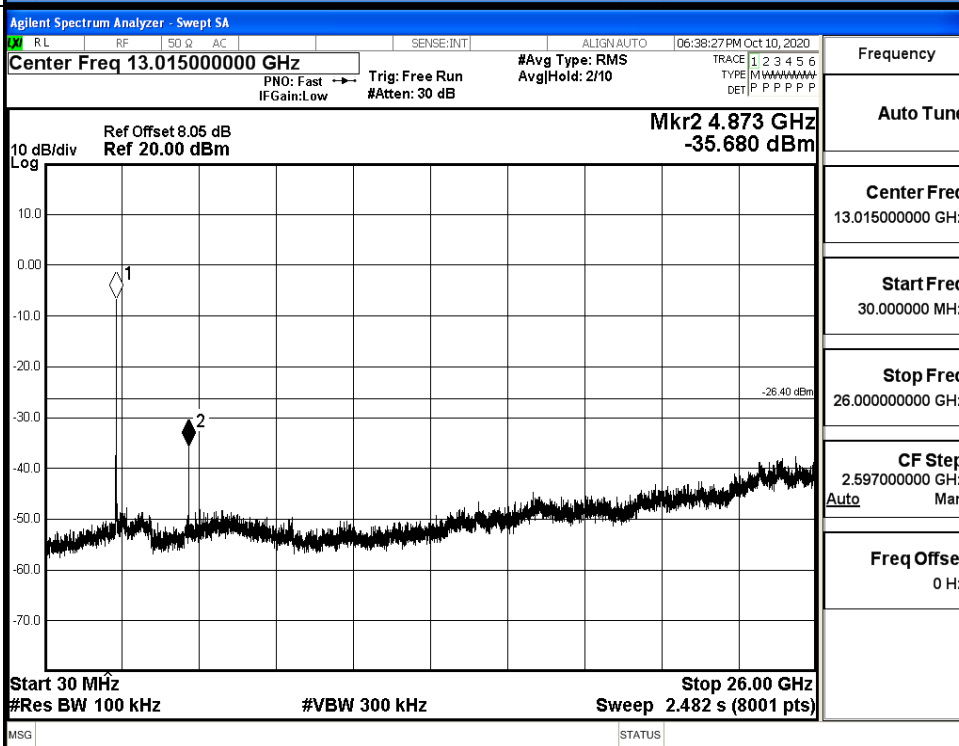


11B MCH Graphs

Pref/11B/MCH

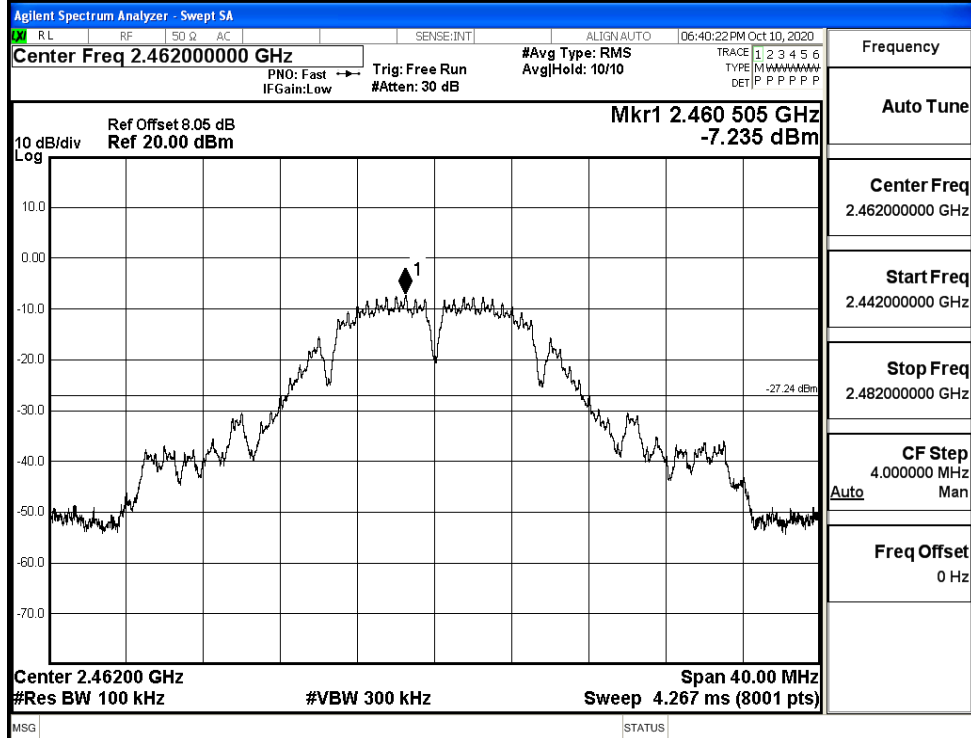


Puw/11B/MCH

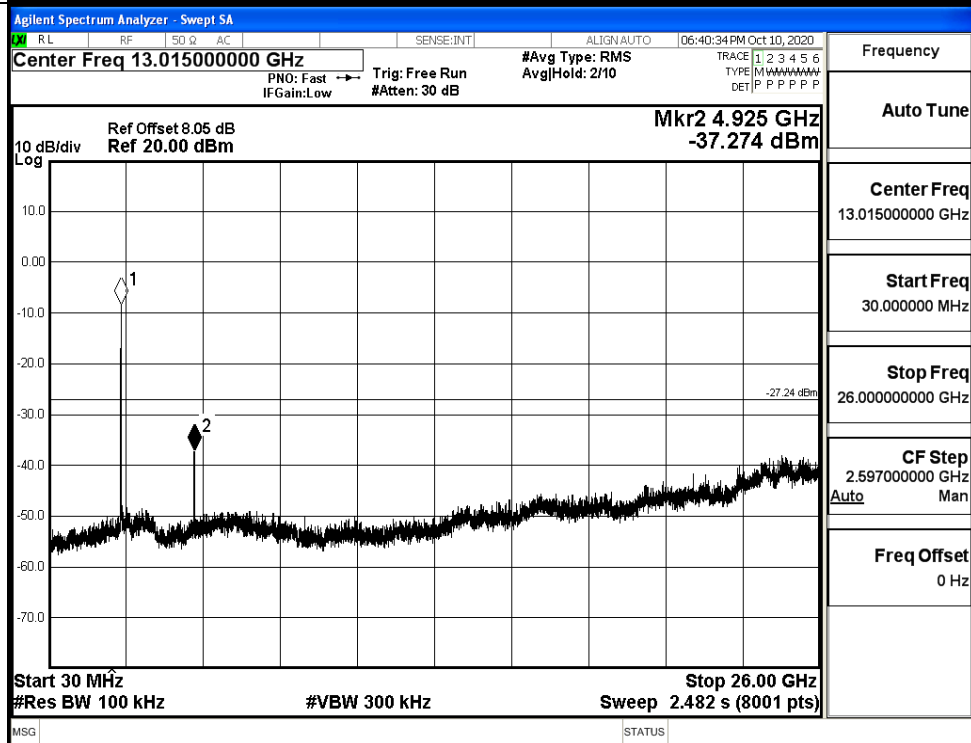


11B HCH Graphs

Pref/11B/HCH

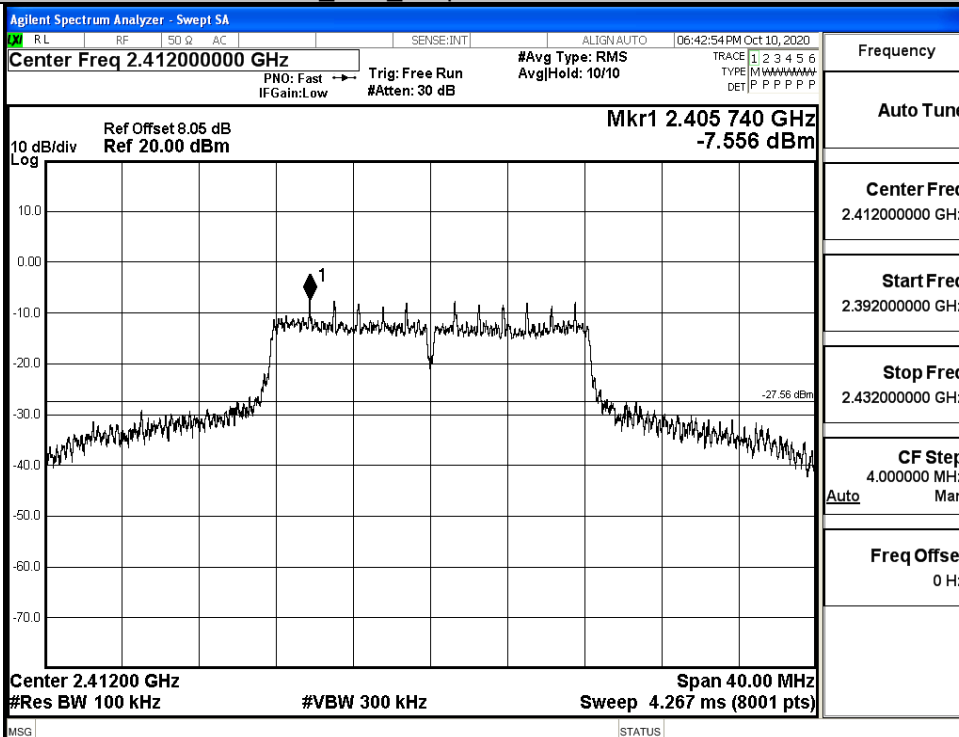


Puw/11B/HCH

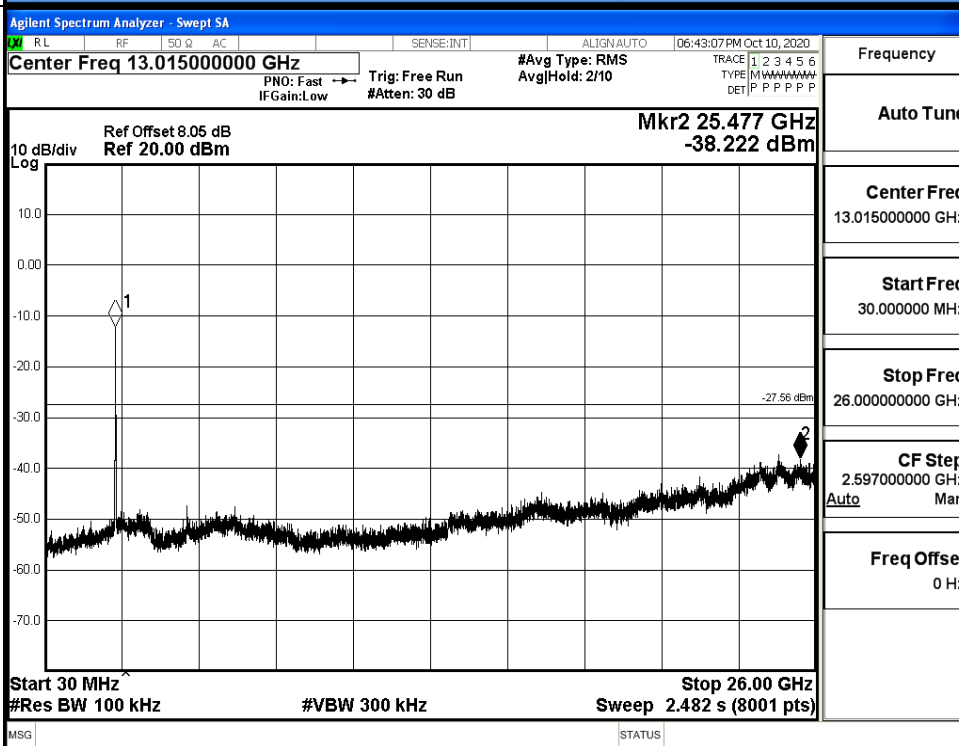


11G LCH Graphs

Pref/11G/LCH

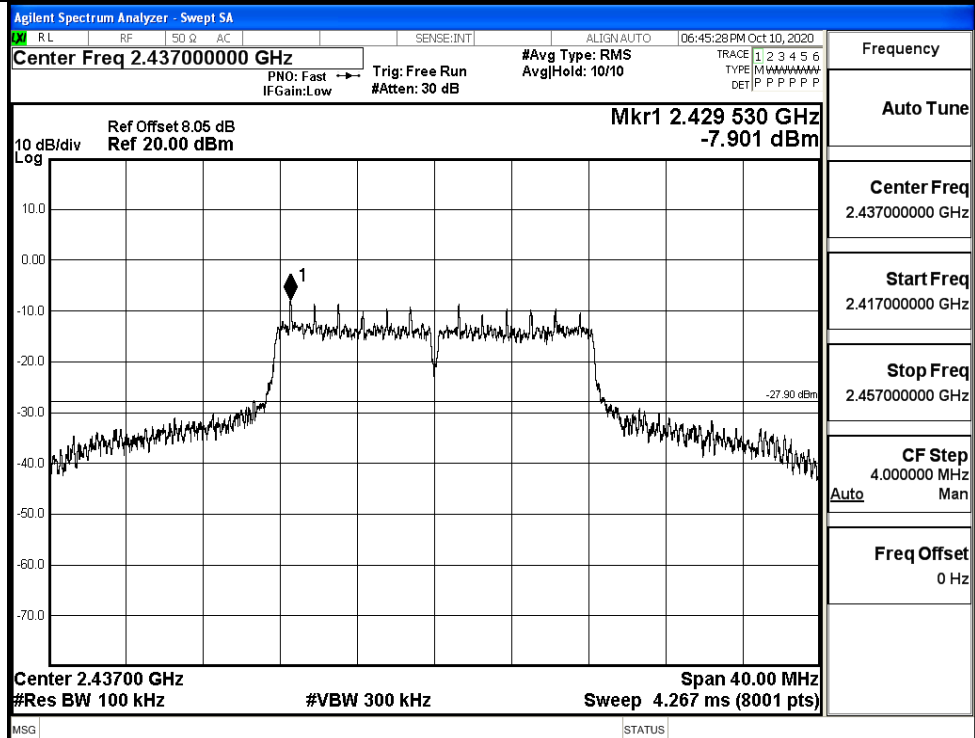


Puw/11G/LCH

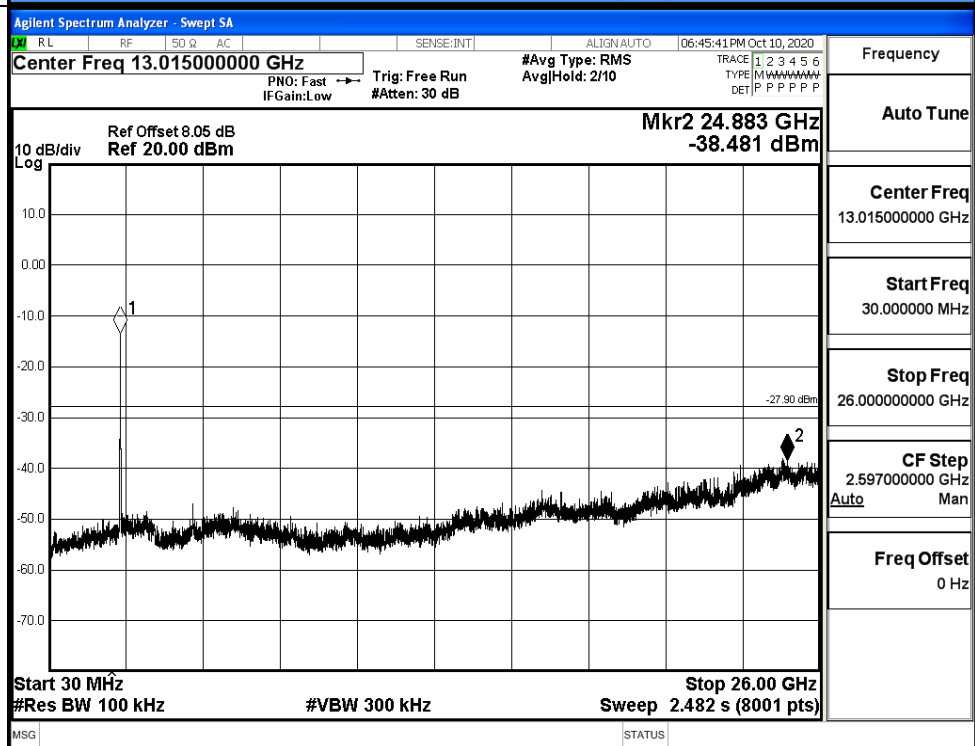


11G MCH Graphs

Pref/11G/MCH

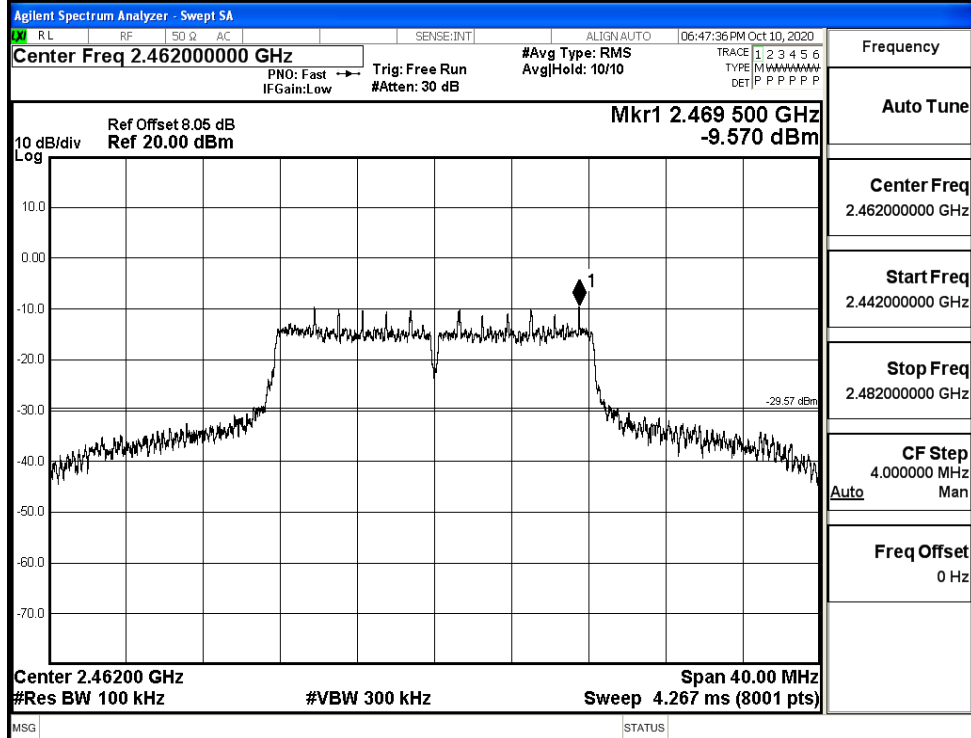


Puw/11G/MCH

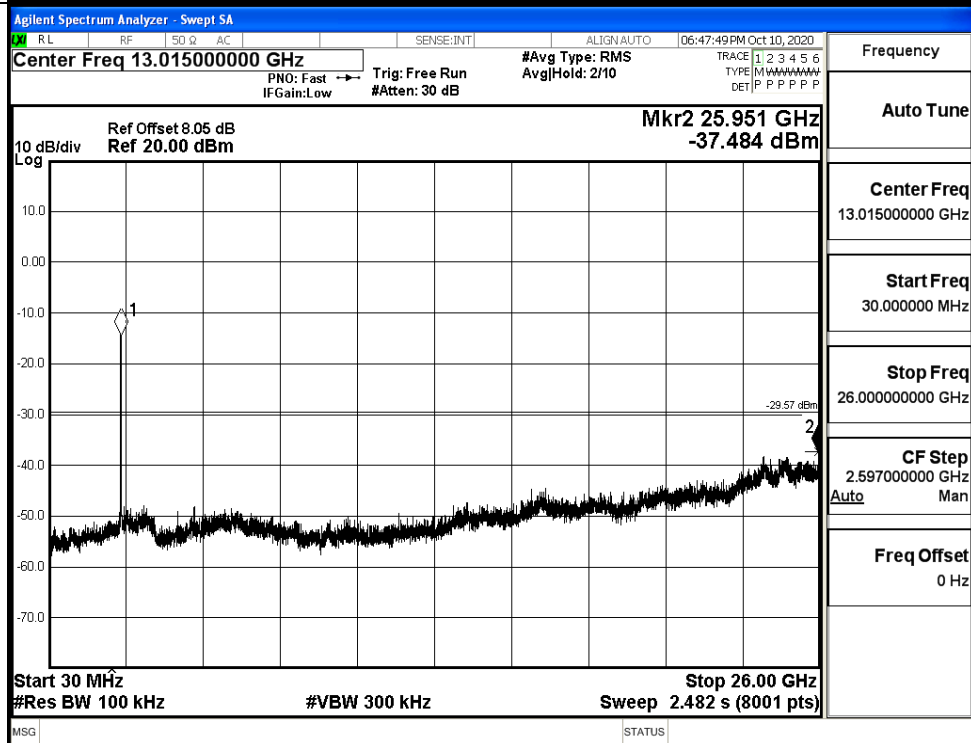


11G HCH Graphs

Pref/11G/HCH

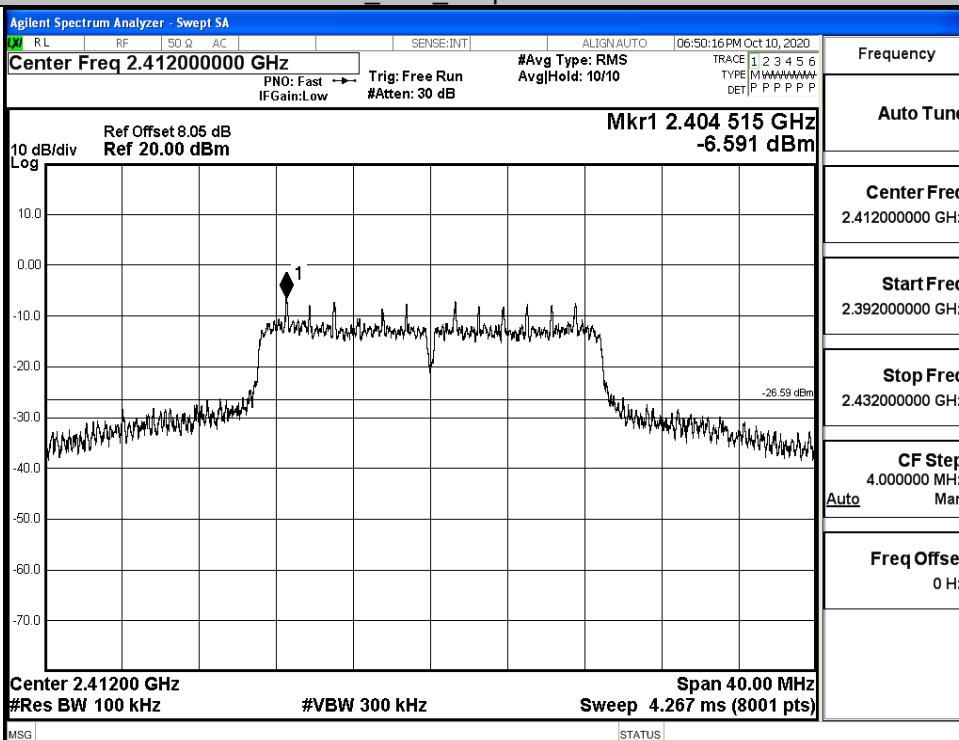


Puw/11G/HCH

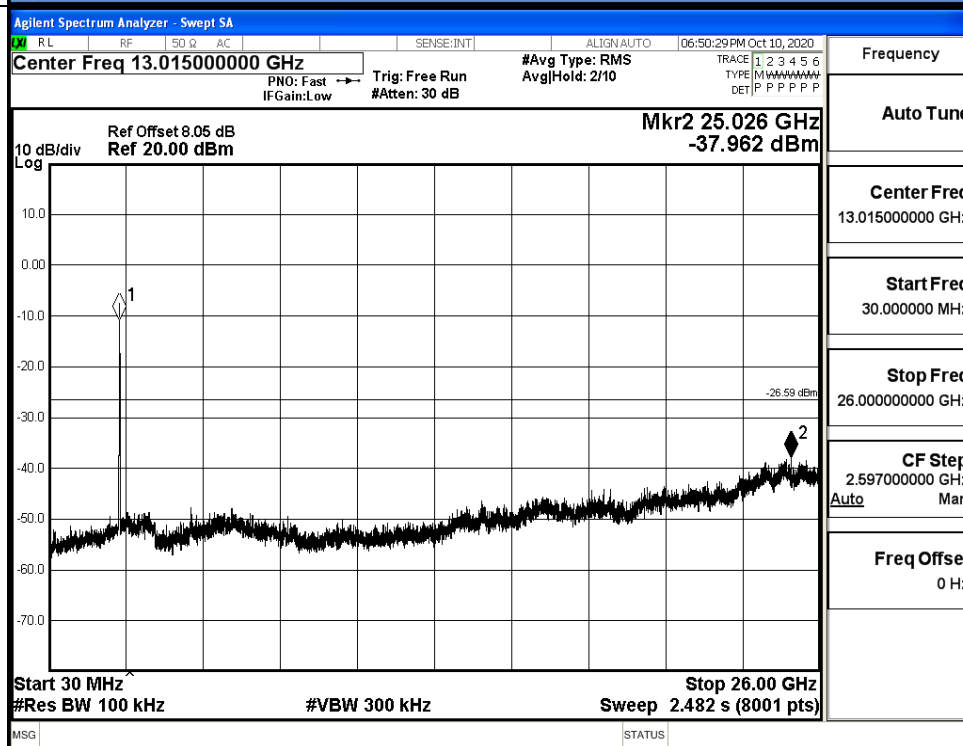


11N20SISO LCH Graphs

Pref/11N20SIS
O/LCH

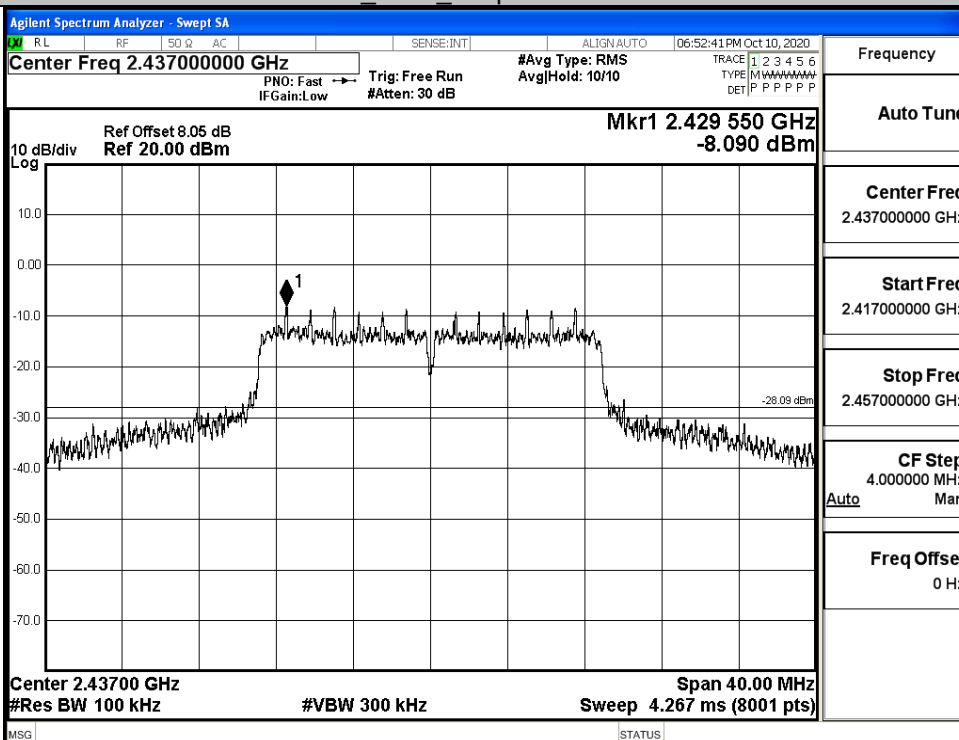


Puw/11N20
SISO/LCH

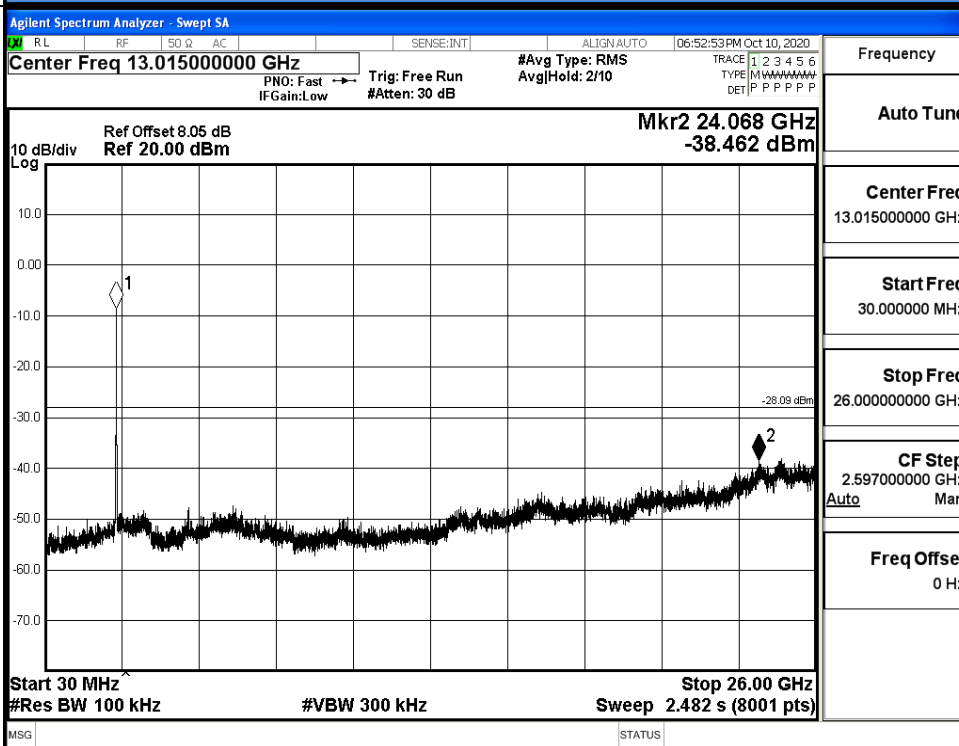


11N20SISO_MCH_Graphs

Pref/11N20
SISO/MCH

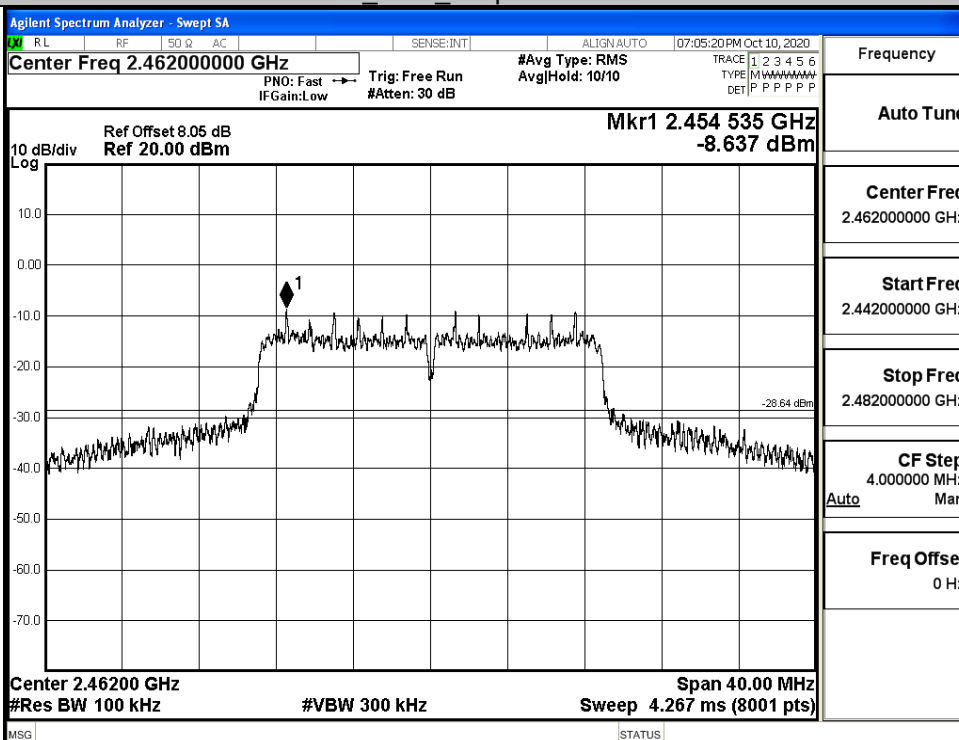


Puw/11N20
SISO/MCH

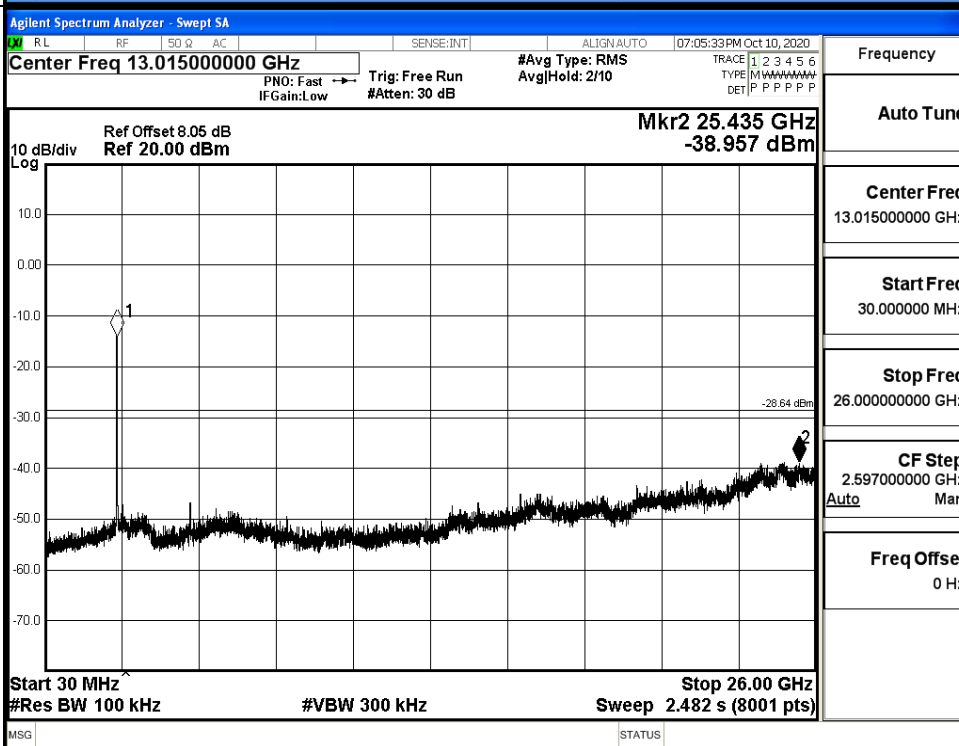


11N20SISO HCH Graphs

Pref/11N20
SISO/HCH

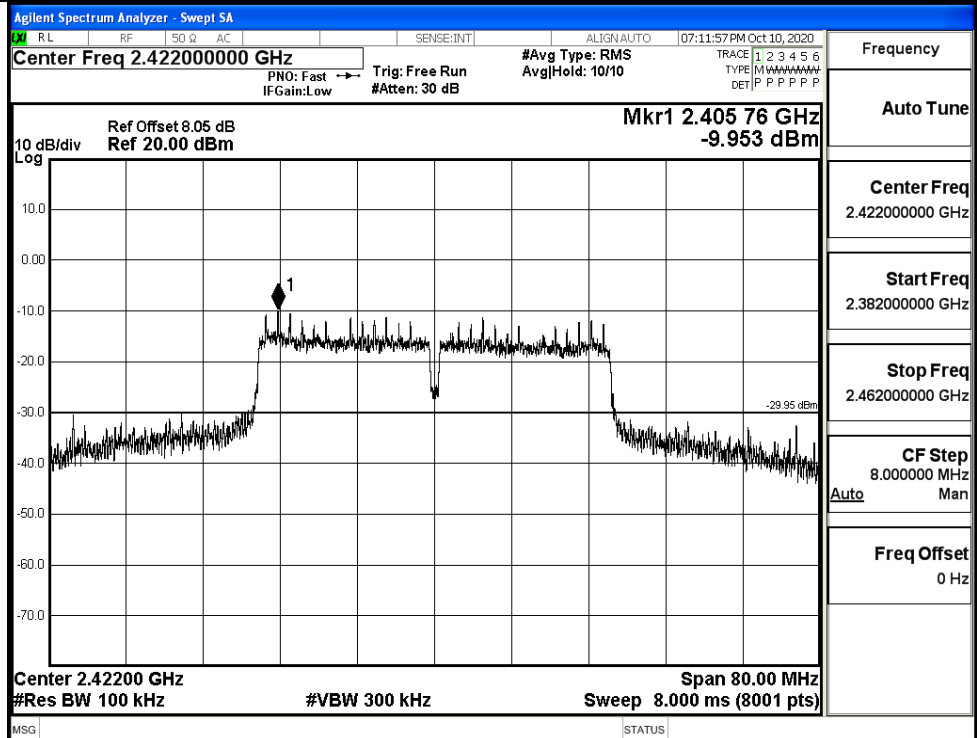


Puw/11N20
SISO/HCH

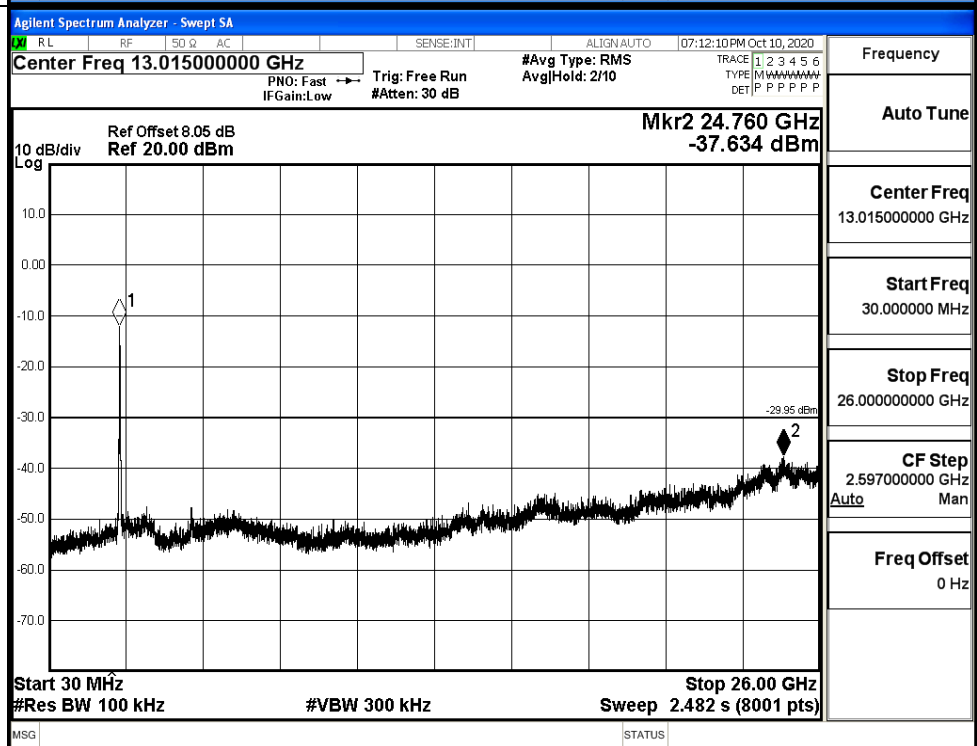


11N40SISO LCH Graphs

Pref/11N40
SISO/LCH

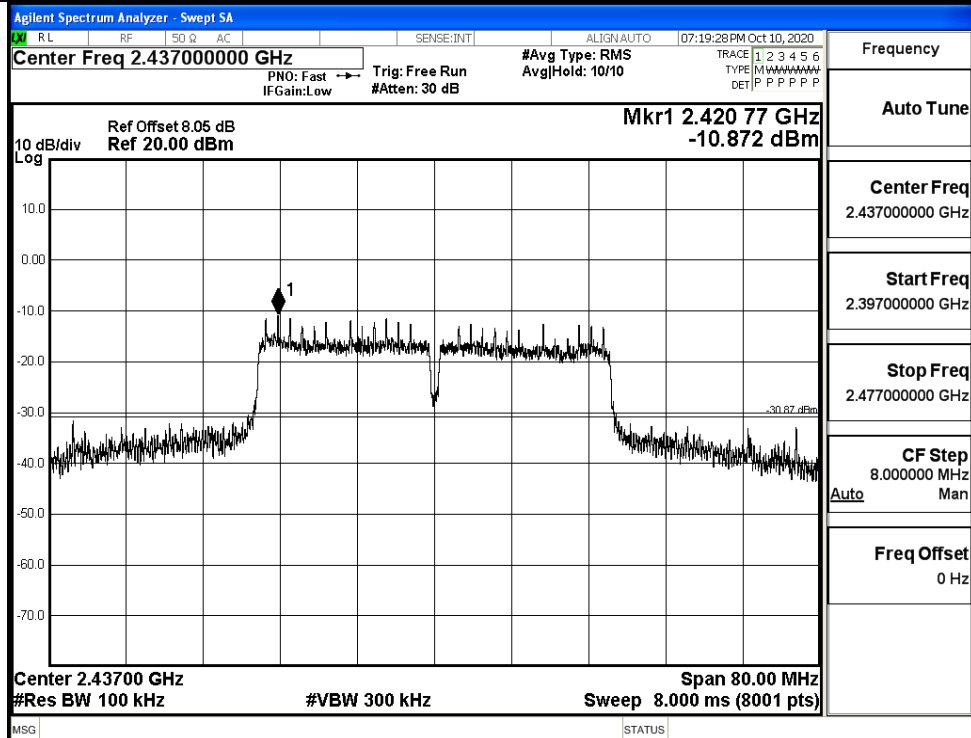


Puw/11N40
SISO/LCH

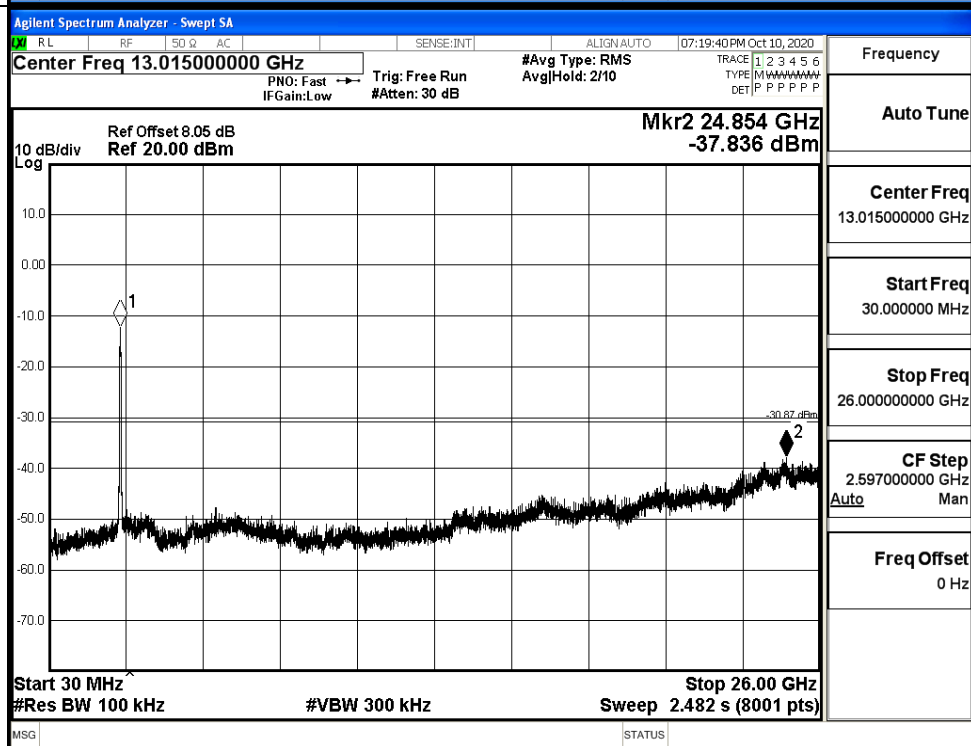


11N40SISO_MCH_Graphs

Pref/11N40
SISO/MCH

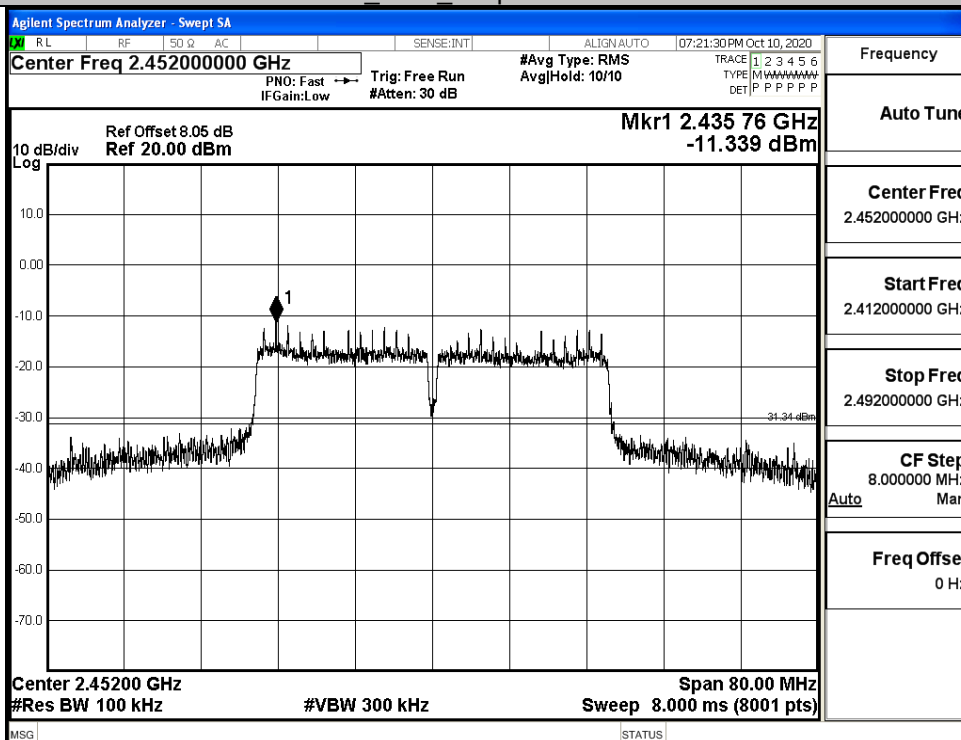


Puw/11N40
SISO/MCH

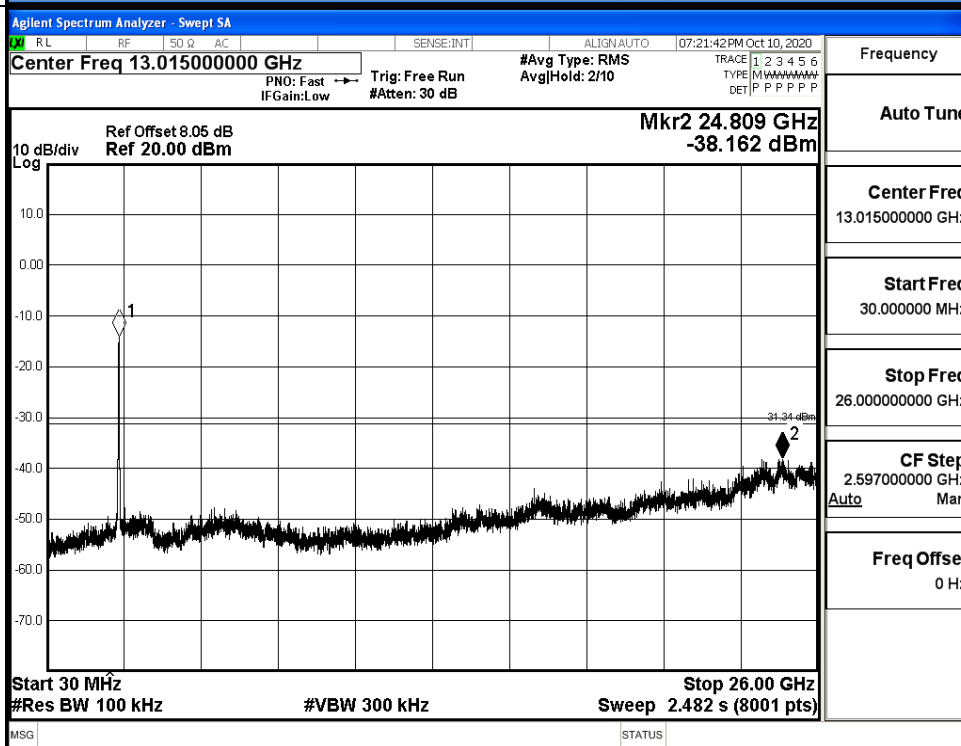


11N40SISO HCH Graphs

Pref/11N40
SISO/HCH



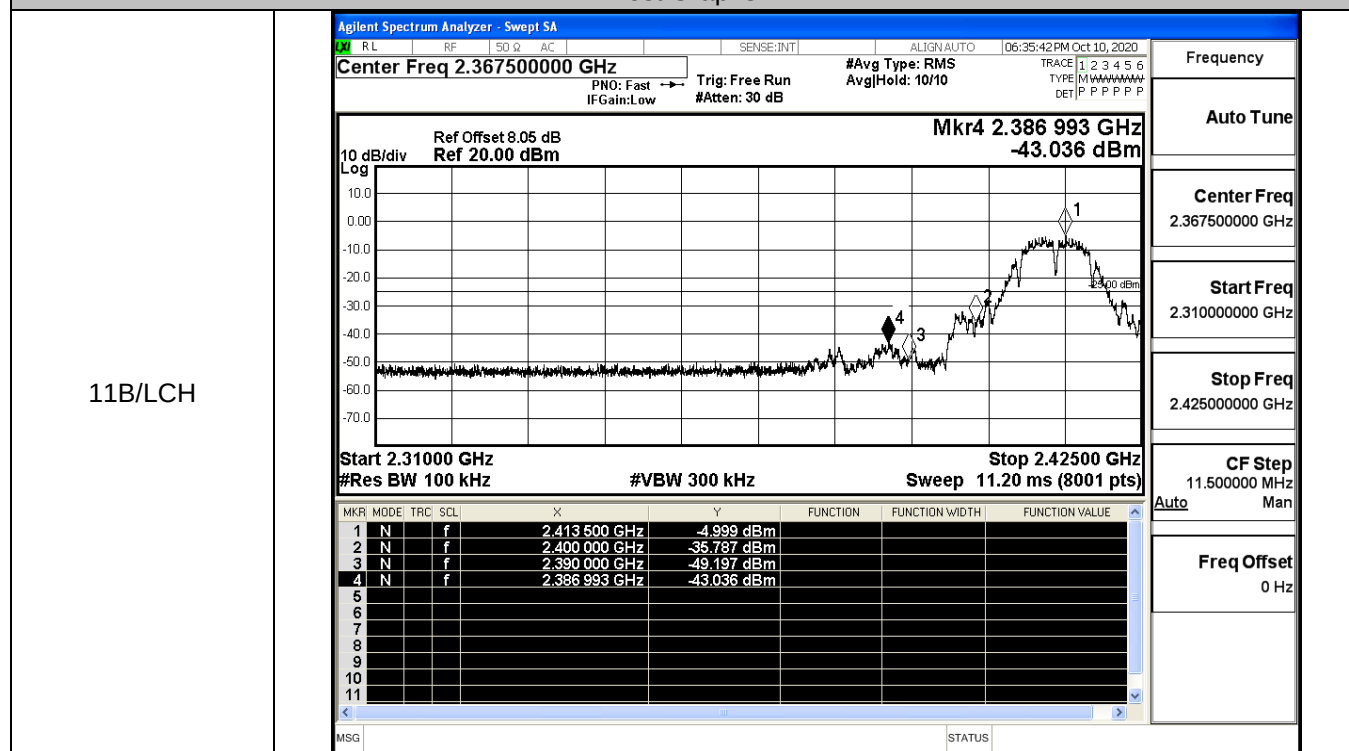
Puw/11N40
SISO/HCH



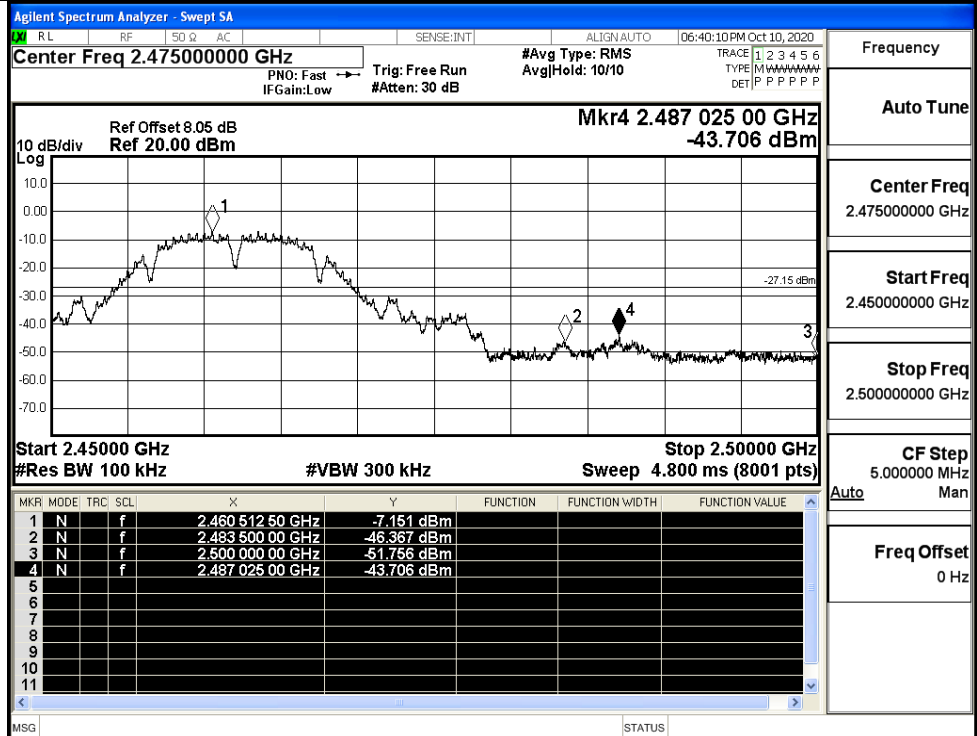
A.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	-4.999	-43.036	-25	PASS
	HCH	-7.151	-43.706	-27.15	PASS
11G	LCH	-7.120	-40.364	-27.12	PASS
	HCH	-9.029	-41.714	-29.03	PASS
11N20SISO	LCH	-7.508	-36.912	-27.51	PASS
	HCH	-9.148	-38.151	-29.15	PASS
11N40SISO	LCH	-10.232	-31.605	-30.23	PASS
	HCH	-11.738	-33.734	-31.74	PASS

Test Graphs



11B/HCH



Frequency

Auto Tune

Center Freq
2.475000000 GHz

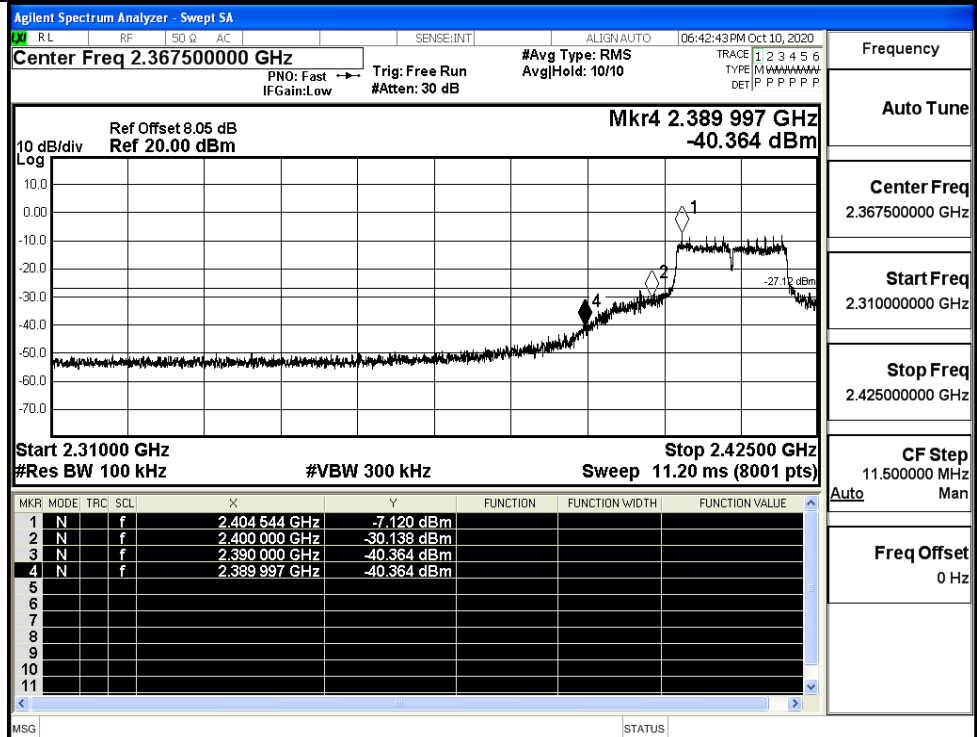
Start Freq
2.450000000 GHz

Stop Freq
2.500000000 GHz

CF Step
5.000000 MHz

Freq Offset
0 Hz

11G/LCH



Frequency

Auto Tune

Center Freq
2.367500000 GHz

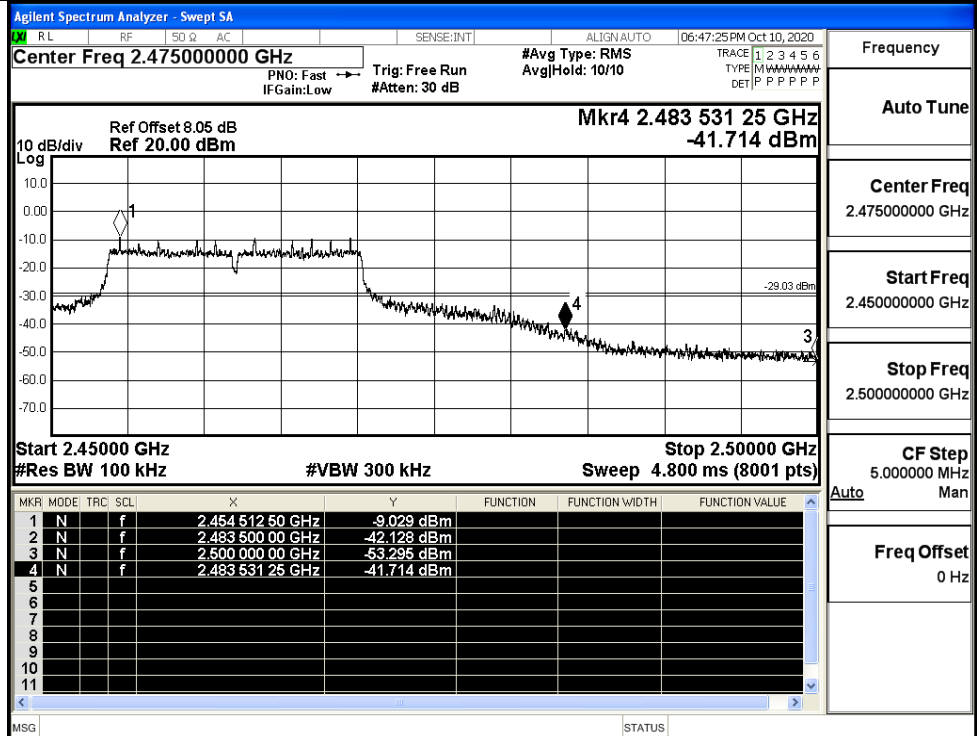
Start Freq
2.310000000 GHz

Stop Freq
2.425000000 GHz

CF Step
11.500000 MHz

Freq Offset
0 Hz

11G/HCH



Frequency

Auto Tune

Center Freq
2.475000000 GHz

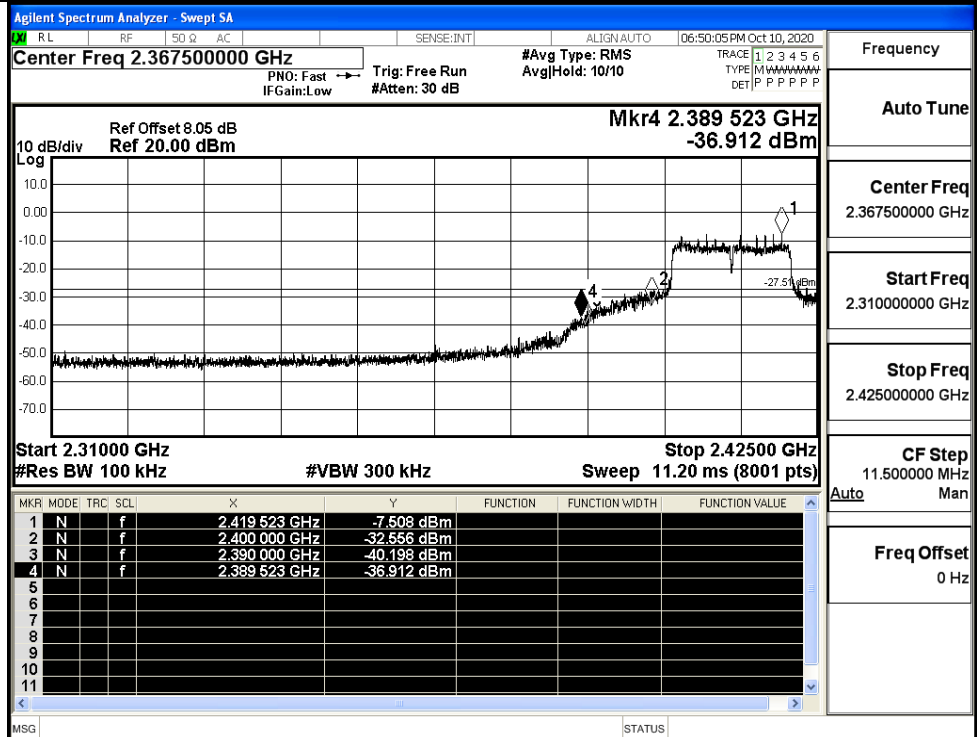
Start Freq
2.450000000 GHz

Stop Freq
2.500000000 GHz

CF Step
5.000000 MHz

Freq Offset
0 Hz

11N20SISO/LCH



Frequency

Auto Tune

Center Freq
2.367500000 GHz

Start Freq
2.310000000 GHz

Stop Freq
2.425000000 GHz

CF Step
11.500000 MHz

Freq Offset
0 Hz

11N20SISO/HCH

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.475000000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHold: 10/10

Ref Offset 8.05 dB Ref 20.00 dBm

Mkr4 2.483 568 75 GHz -38.151 dBm

10 dB/div Log

Start 2.45000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.50000 GHz Sweep 4.800 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.469 500 00 GHz	-9.148 dBm			
2	N		f	2.483 500 00 GHz	-38.105 dBm			
3	N		f	2.500 000 00 GHz	-52.336 dBm			
4	N		f	2.483 568 75 GHz	-38.151 dBm			

Frequency

Auto Tune

Center Freq 2.475000000 GHz

Start Freq 2.450000000 GHz

Stop Freq 2.500000000 GHz

CF Step 5.000000 MHz

Auto Man

Freq Offset 0 Hz

11N40SISO/LCH

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.377500000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHold: 10/10

Ref Offset 8.05 dB Ref 20.00 dBm

Mkr4 2.384 486 GHz -31.605 dBm

10 dB/div Log

Start 2.31000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.44500 GHz Sweep 13.33 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.405 732 GHz	-10.232 dBm			
2	N		f	2.400 000 GHz	-34.040 dBm			
3	N		f	2.390 000 GHz	-37.663 dBm			
4	N		f	2.384 486 GHz	-31.605 dBm			

Frequency

Auto Tune

Center Freq 2.377500000 GHz

Start Freq 2.310000000 GHz

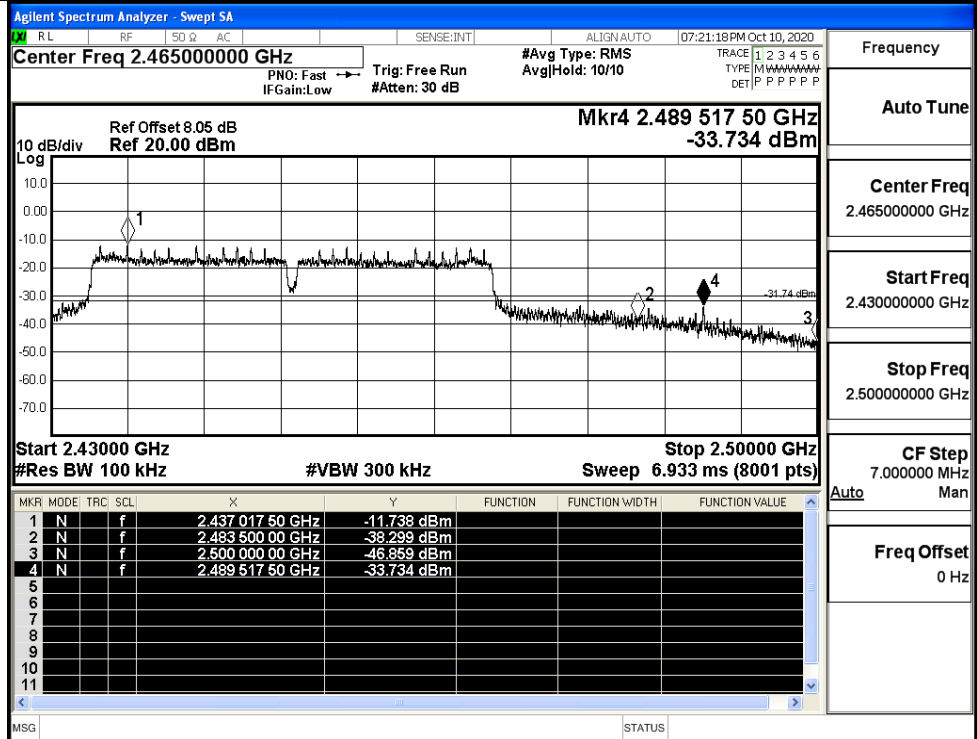
Stop Freq 2.445000000 GHz

CF Step 13.500000 MHz

Auto Man

Freq Offset 0 Hz

11N40SISO/HCH

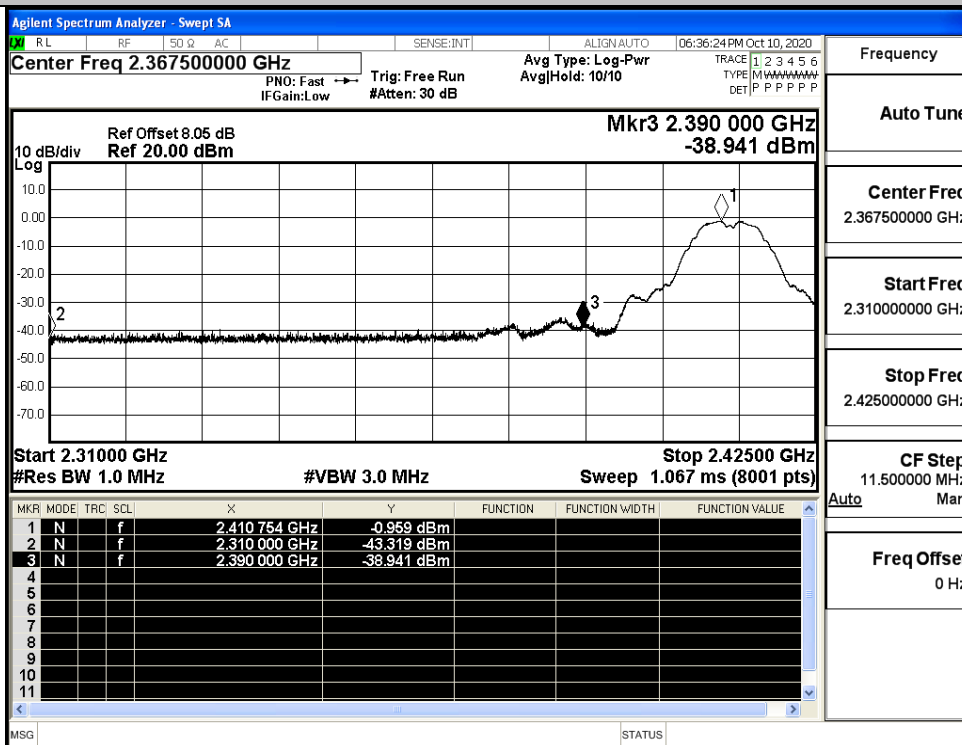


A.7 Restrict-band band-edge measurements

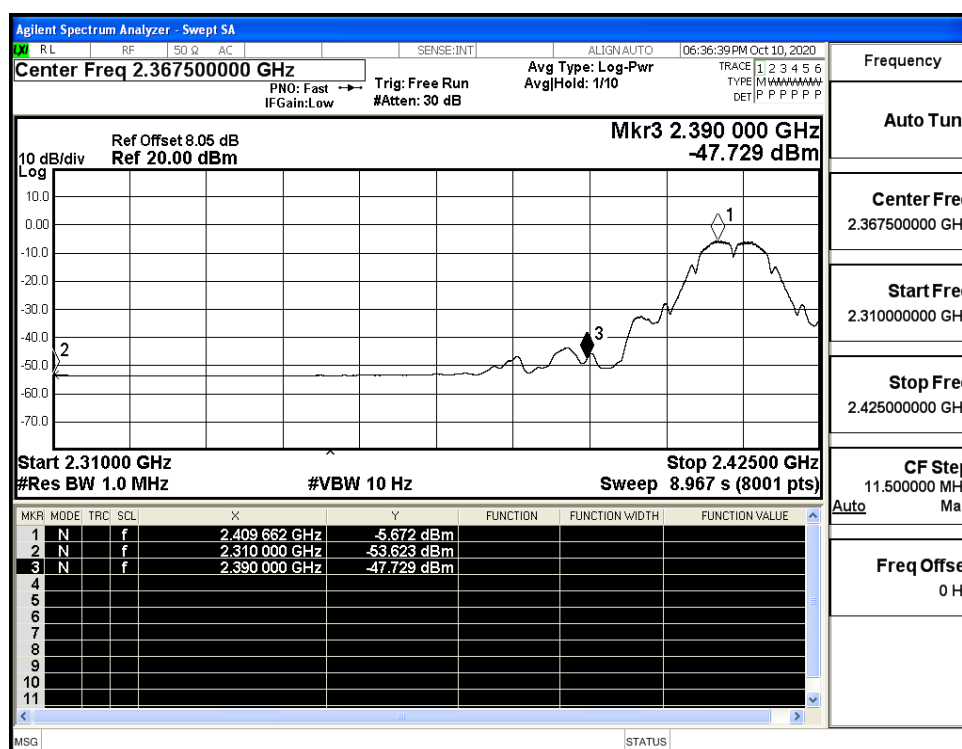
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
11B	2412	Ant1	2310.0	-43.32	3.0	0	54.94	PEAK	74	PASS
	2412	Ant1	2310.0	-53.62	3.0	0	44.64	AV	54	PASS
	2412	Ant1	2390.0	-38.94	3.0	0	59.32	PEAK	74	PASS
	2412	Ant1	2390.0	-47.73	3.0	0	50.53	AV	54	PASS
	2462	Ant1	2483.5	-39.66	3.0	0	58.6	PEAK	74	PASS
	2462	Ant1	2483.5	-47.92	3.0	0	50.34	AV	54	PASS
	2462	Ant1	2500.0	-42.72	3.0	0	55.54	PEAK	74	PASS
	2462	Ant1	2500.0	-52.59	3.0	0	45.67	AV	54	PASS
11G	2412	Ant1	2310.0	-42.38	3.0	0	55.88	PEAK	74	PASS
	2412	Ant1	2310.0	-53.49	3.0	0	44.77	AV	54	PASS
	2412	Ant1	2390.0	-27.49	3.0	0	70.77	PEAK	74	PASS
	2412	Ant1	2390.0	-44.57	3.0	0	53.69	AV	54	PASS
	2462	Ant1	2483.5	-31.11	3.0	0	67.15	PEAK	74	PASS
	2462	Ant1	2483.5	-46.31	3.0	0	51.95	AV	54	PASS
	2462	Ant1	2500.0	-40.24	3.0	0	58.02	PEAK	74	PASS
	2462	Ant1	2500.0	-52.03	3.0	0	46.23	AV	54	PASS
11N20 SISO	2412	Ant1	2310.0	-42.35	3.0	0	55.91	PEAK	74	PASS
	2412	Ant1	2310.0	-53.51	3.0	0	44.75	AV	54	PASS
	2412	Ant1	2390.0	-24.88	3.0	0	73.38	PEAK	74	PASS
	2412	Ant1	2390.0	-44.71	3.0	0	53.55	AV	54	PASS
	2462	Ant1	2483.5	-27.99	3.0	0	70.27	PEAK	74	PASS
	2462	Ant1	2483.5	-44.98	3.0	0	53.28	AV	54	PASS
	2462	Ant1	2500.0	-41.30	3.0	0	56.96	PEAK	74	PASS
	2462	Ant1	2500.0	-51.78	3.0	0	46.48	AV	54	PASS
11N40 SISO	2422	Ant1	2310.0	-43.37	3.0	0	54.89	PEAK	74	PASS
	2422	Ant1	2310.0	-53.43	3.0	0	44.83	AV	54	PASS

	2422	Ant1	2390.0	-27.58	3.0	0	70.68	PEAK	74	PASS
	2422	Ant1	2390.0	-44.73	3.0	0	53.53	AV	54	PASS
	2452	Ant1	2483.5	-28.49	3.0	0	69.77	PEAK	74	PASS
	2452	Ant1	2483.5	-45.07	3.0	0	53.19	AV	54	PASS
	2452	Ant1	2500.0	-34.47	3.0	0	63.79	PEAK	74	PASS
	2452	Ant1	2500.0	-48.68	3.0	0	49.58	AV	54	PASS

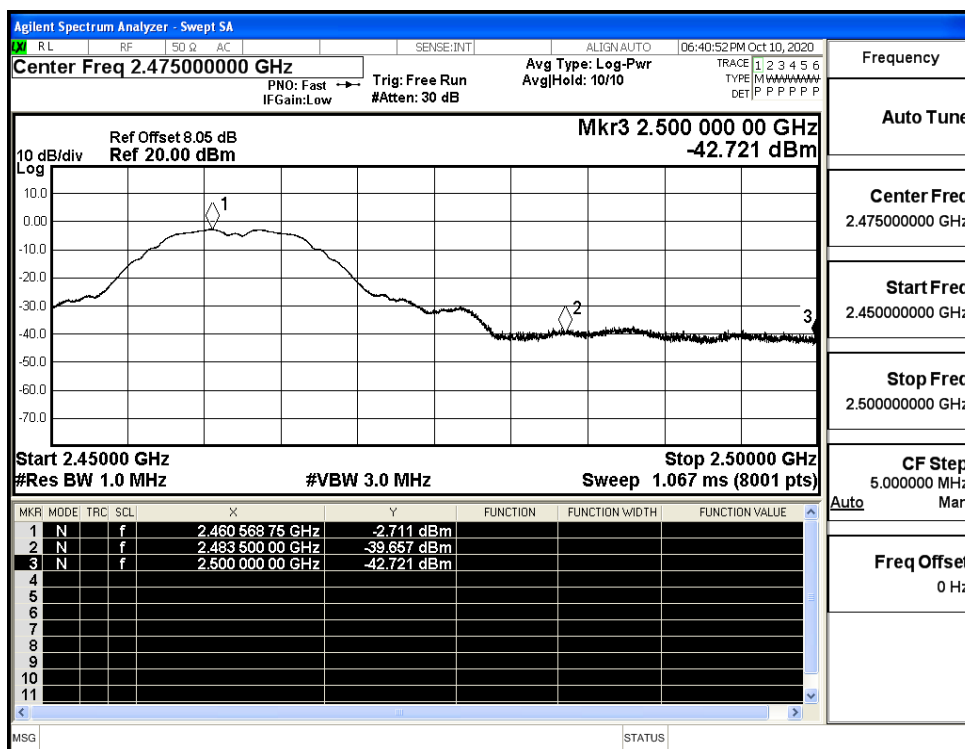
Restrict-band band-edge measurements_11B_2412_Ant1_PEAK



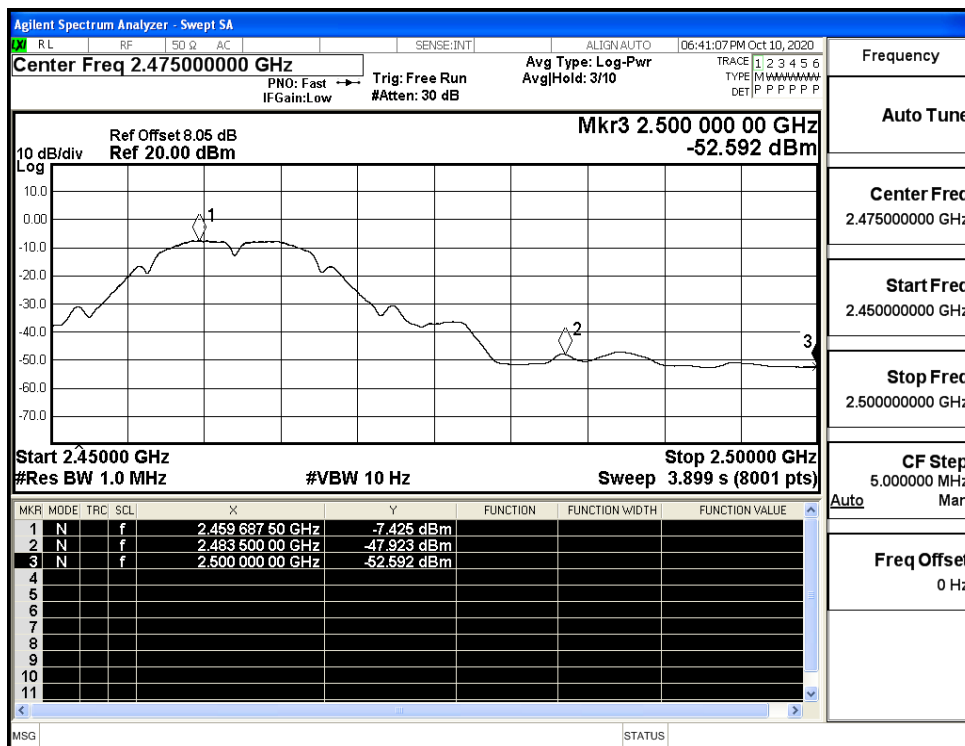
Restrict-band band-edge measurements_11B_2412_Ant1_AV



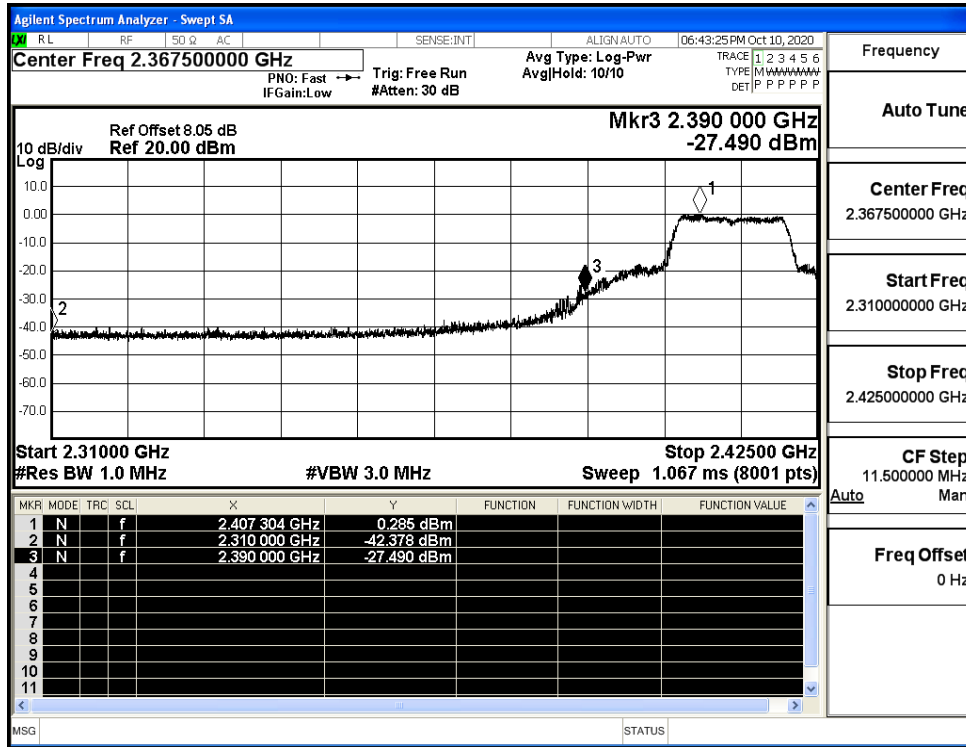
Restrict-band band-edge measurements_11B_2462_Ant1_PEAK



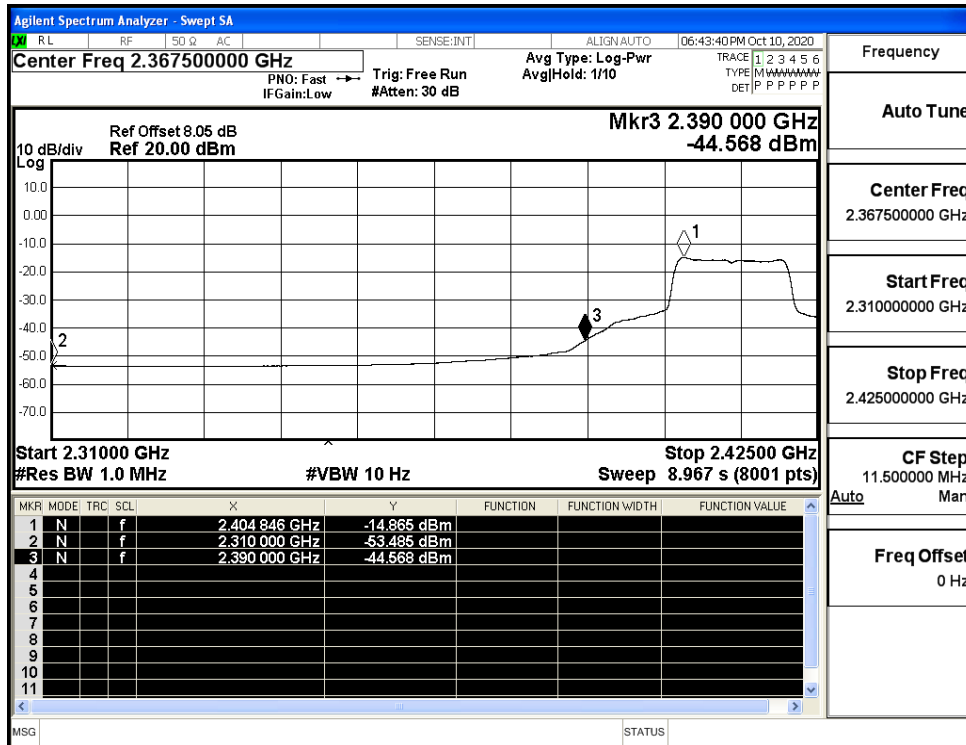
Restrict-band band-edge measurements_11B_2462_Ant1_AV



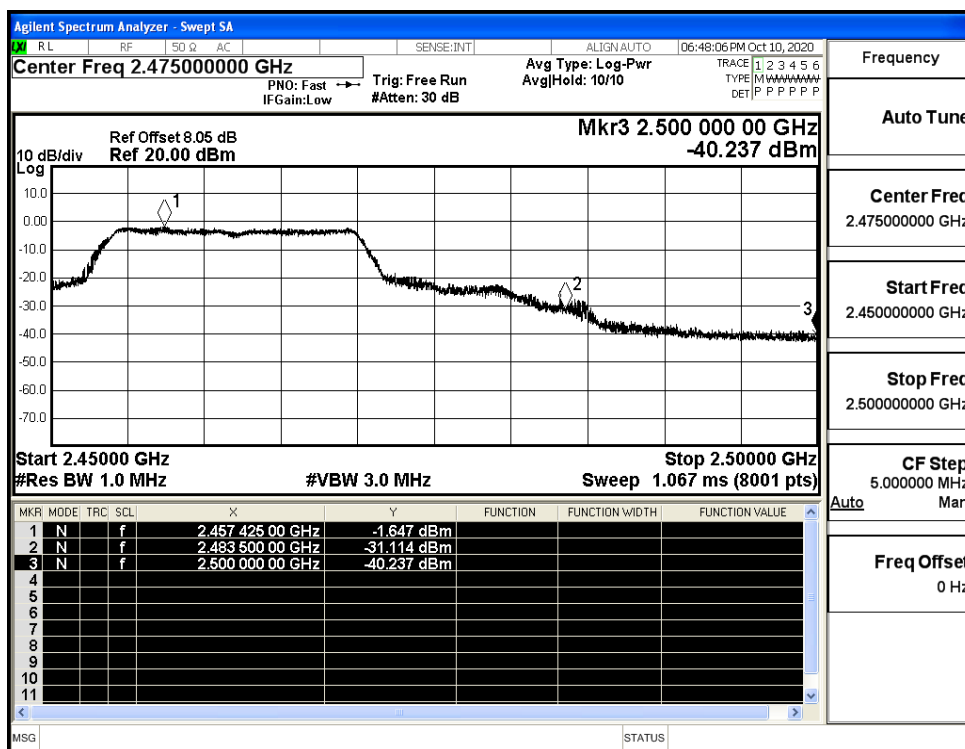
Restrict-band band-edge measurements_11G_2412_Ant1_PEAK



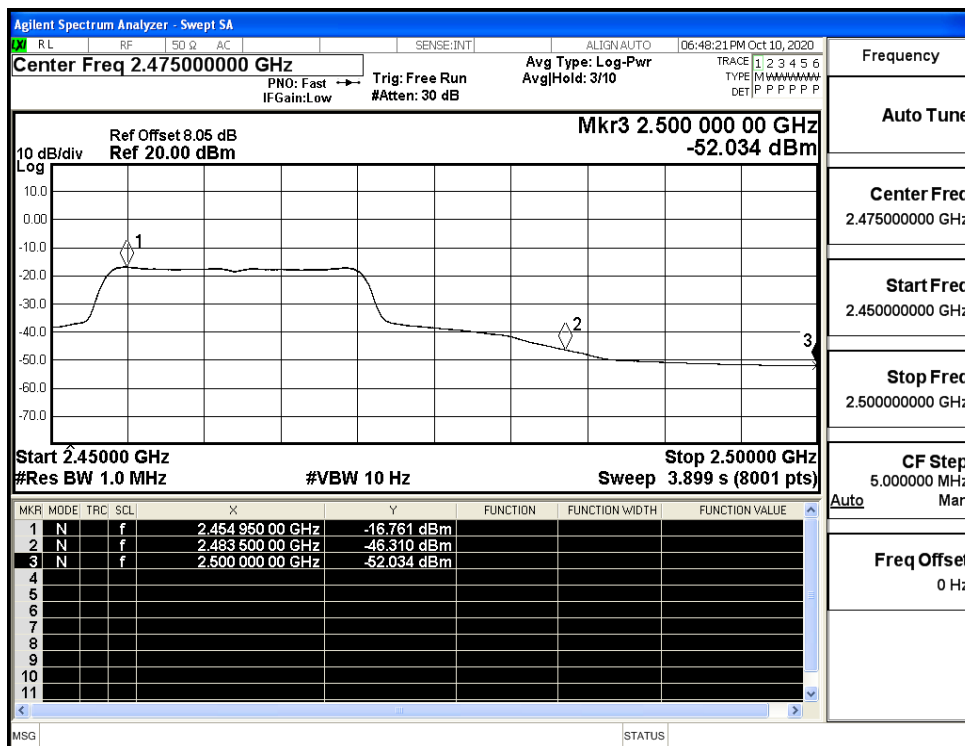
Restrict-band band-edge measurements_11G_2412_Ant1_AV



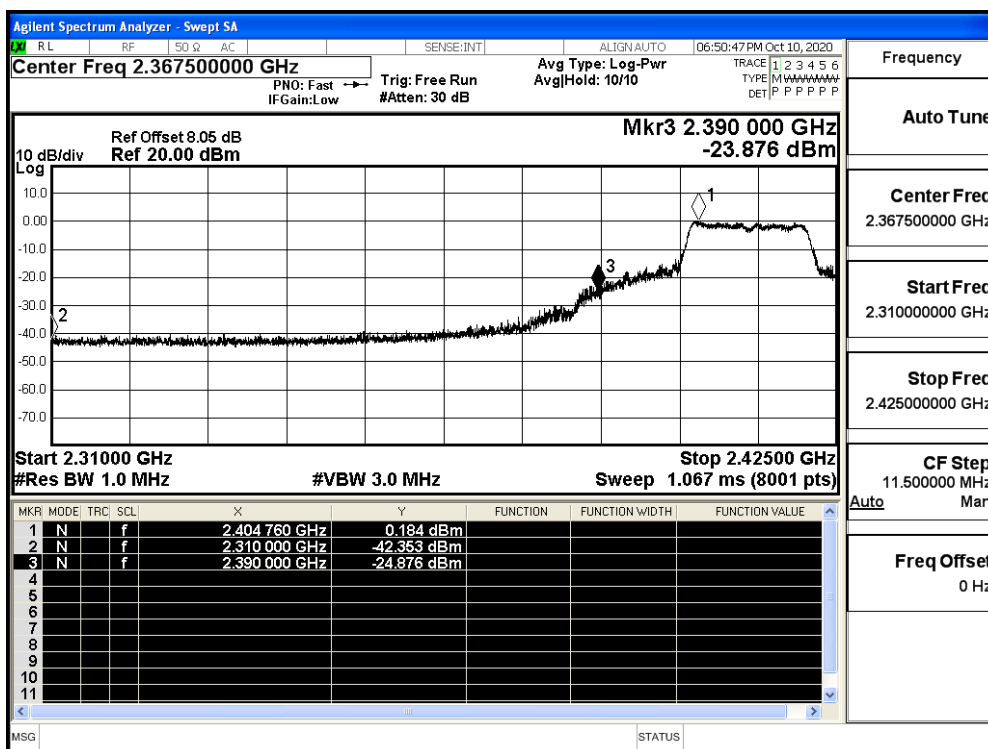
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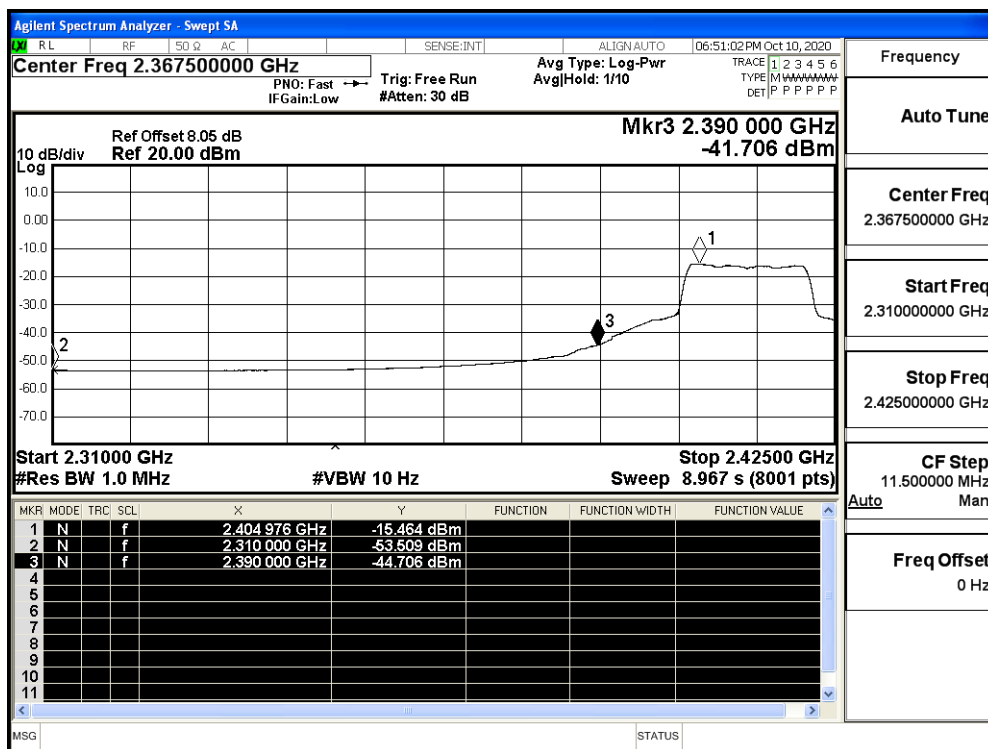
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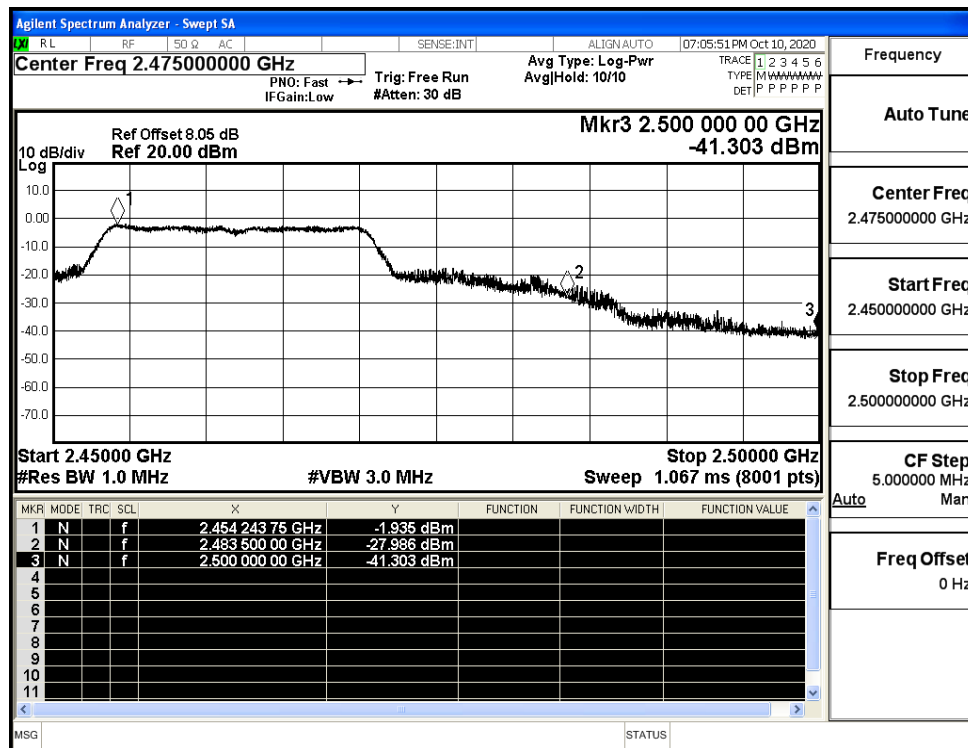
Restrict-band band-edge measurements_11N20SISO_2412_Ant1_PEAK



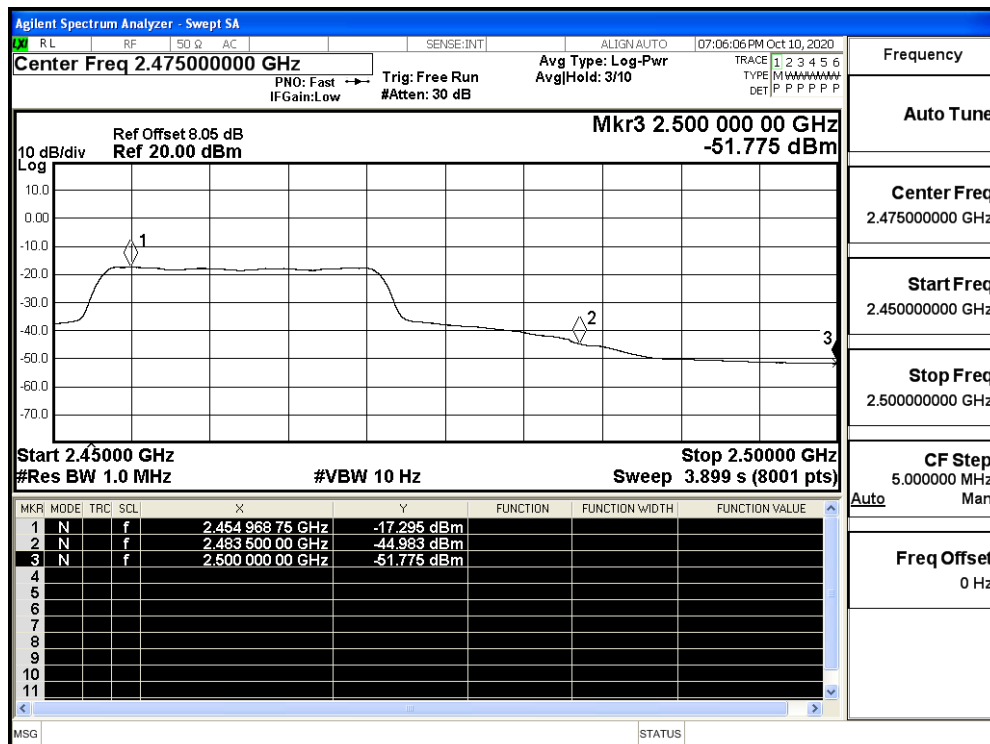
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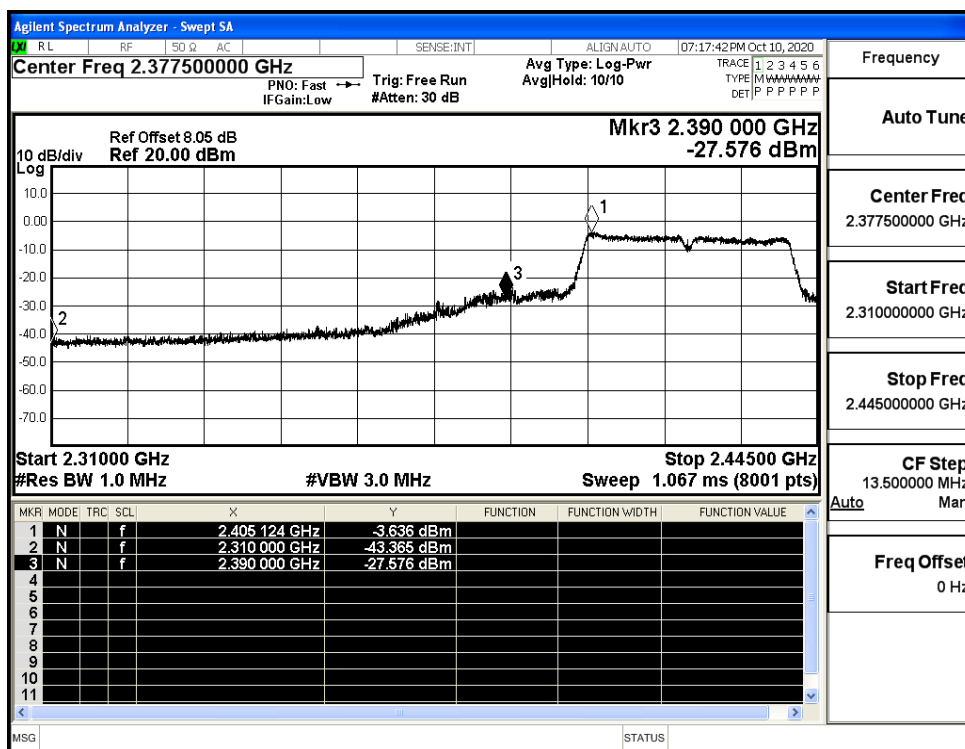
Restrict-band band-edge measurements_11N20SISO_2462_Ant1_PEAK



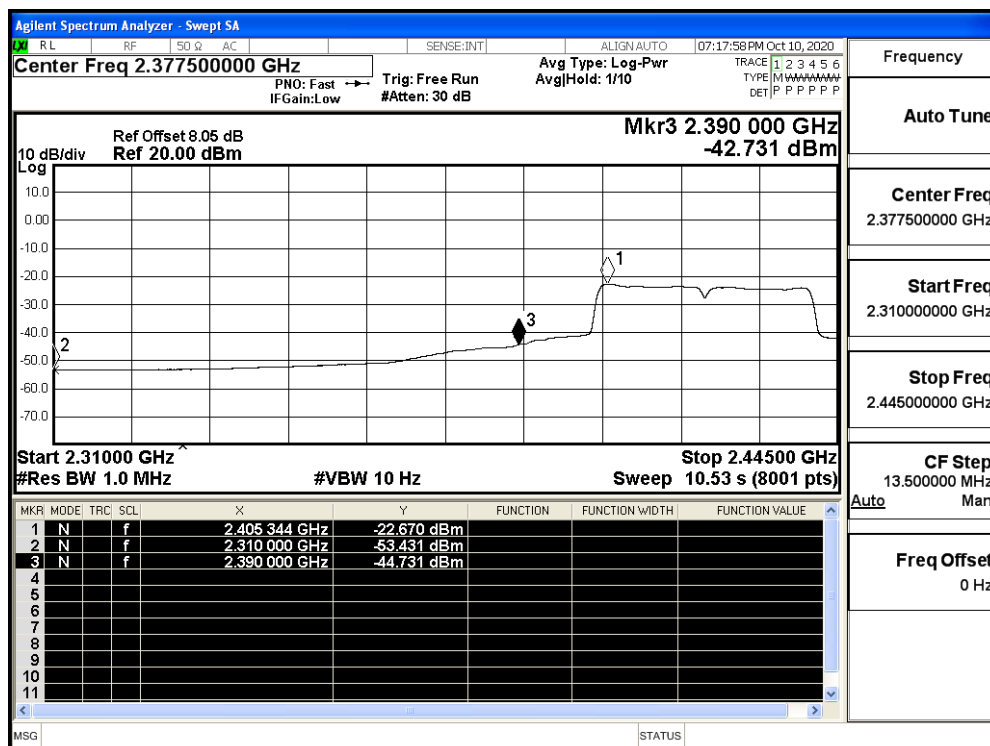
Restrict-band band-edge measurements_11N20SISO_2462_Ant1_AV



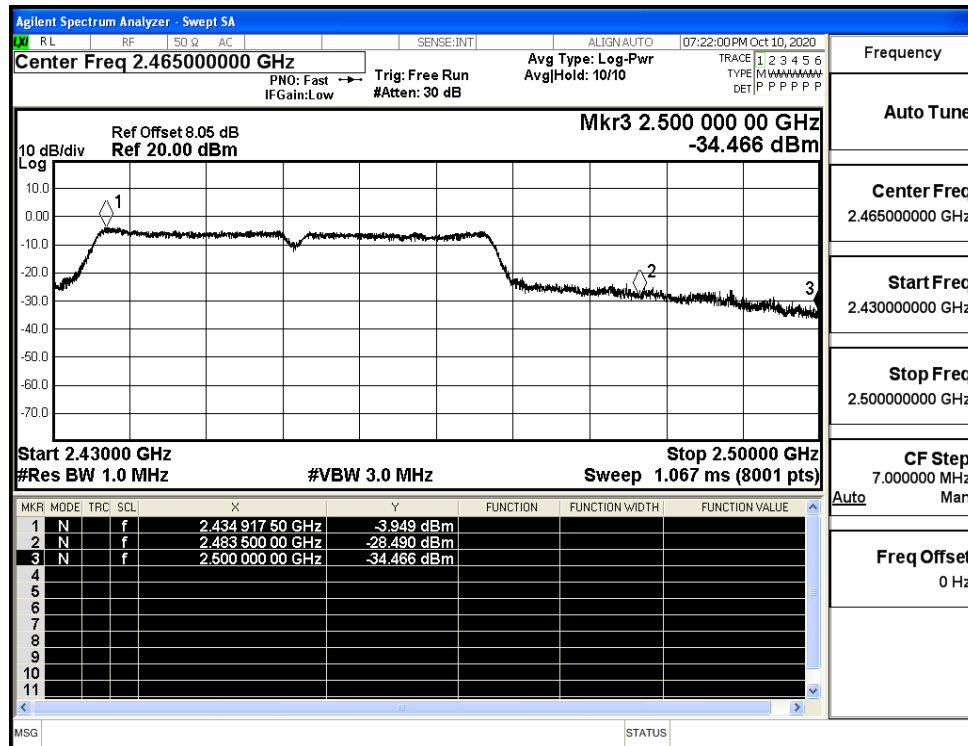
Restrict-band band-edge measurements_11N40SISO_2422_Ant1_PEAK



Restrict-band band-edge measurements_11N40SISO_2422_Ant1_AV



Restrict-band band-edge measurements_11N40SISO_2452_Ant1_PEAK



Restrict-band band-edge measurements_11N40SISO_2452_Ant1_AV

