

Appendix A

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Smart bulb

Trade Mark: 

Test Model: Smart bulb GU10

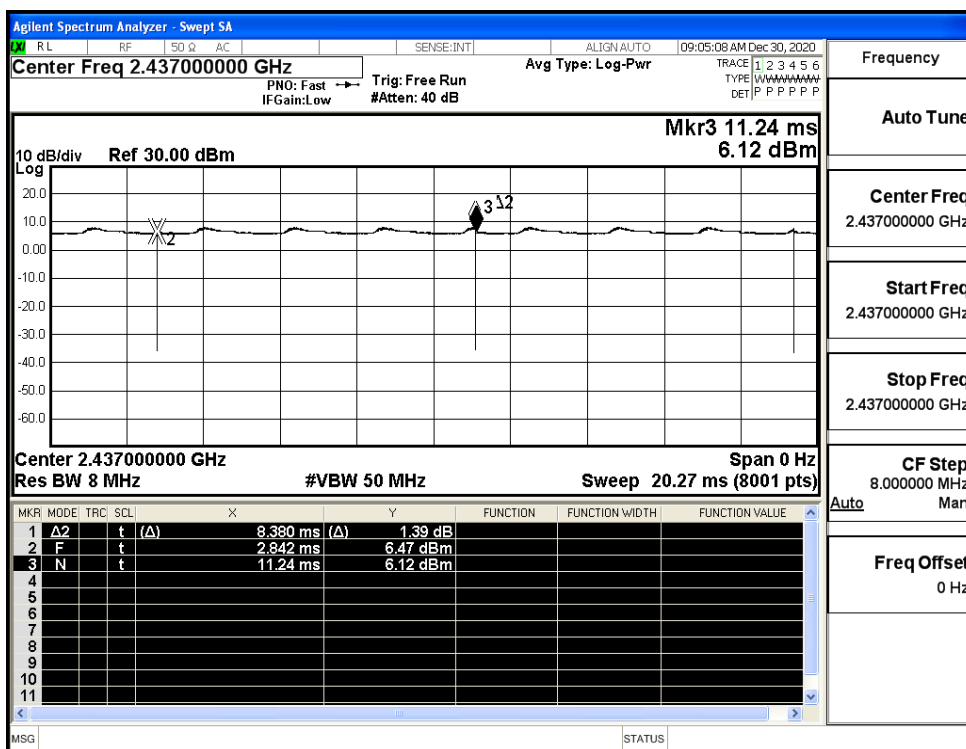
Environmental Conditions

Temperature:	23.2 ° C
Relative Humidity:	54.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

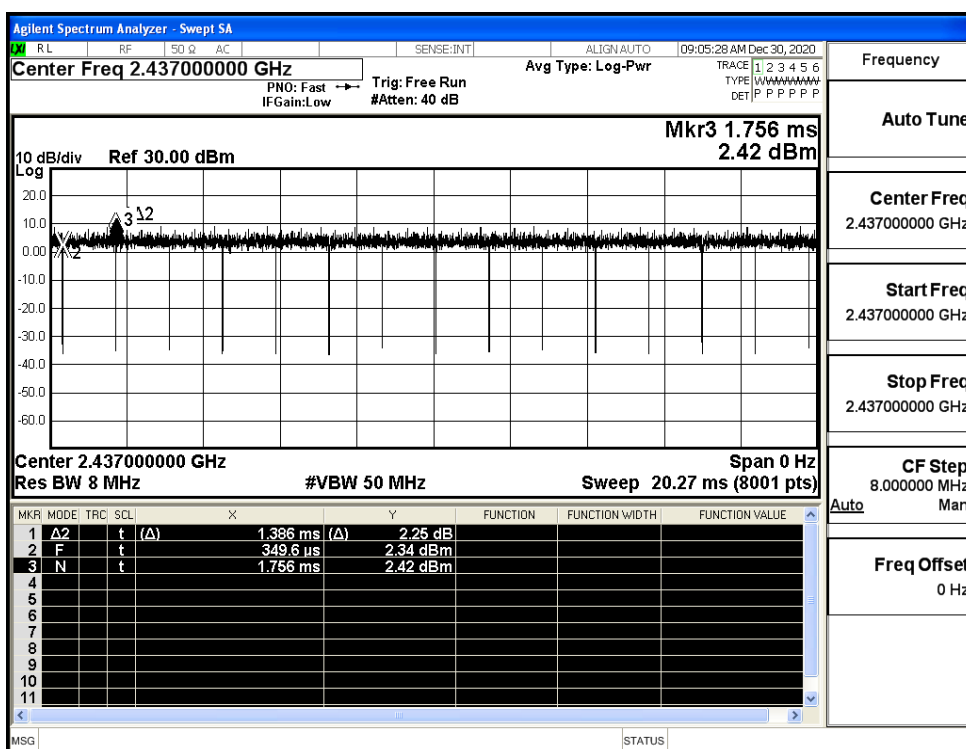
A.1 Duty Cycle

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
11B	2437	Ant1	99.79	PASS
11G	2437	Ant1	98.56	PASS
11N20SISO	2437	Ant1	98.65	PASS
11N40SISO	2437	Ant1	98.07	PASS

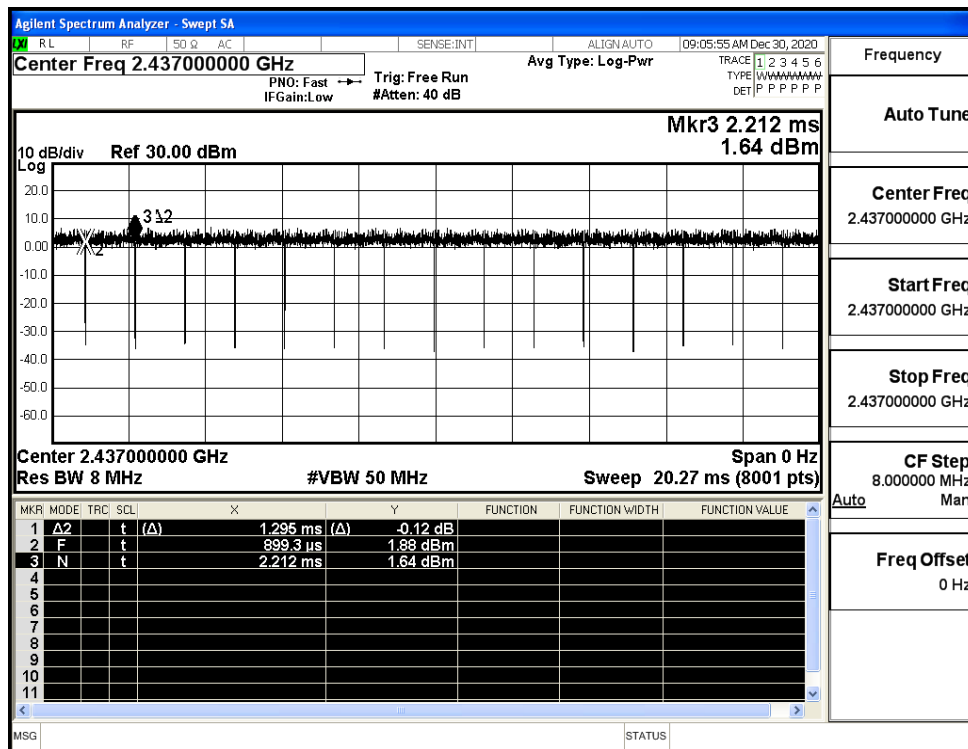
Duty Cycle_11B_2437_Ant1



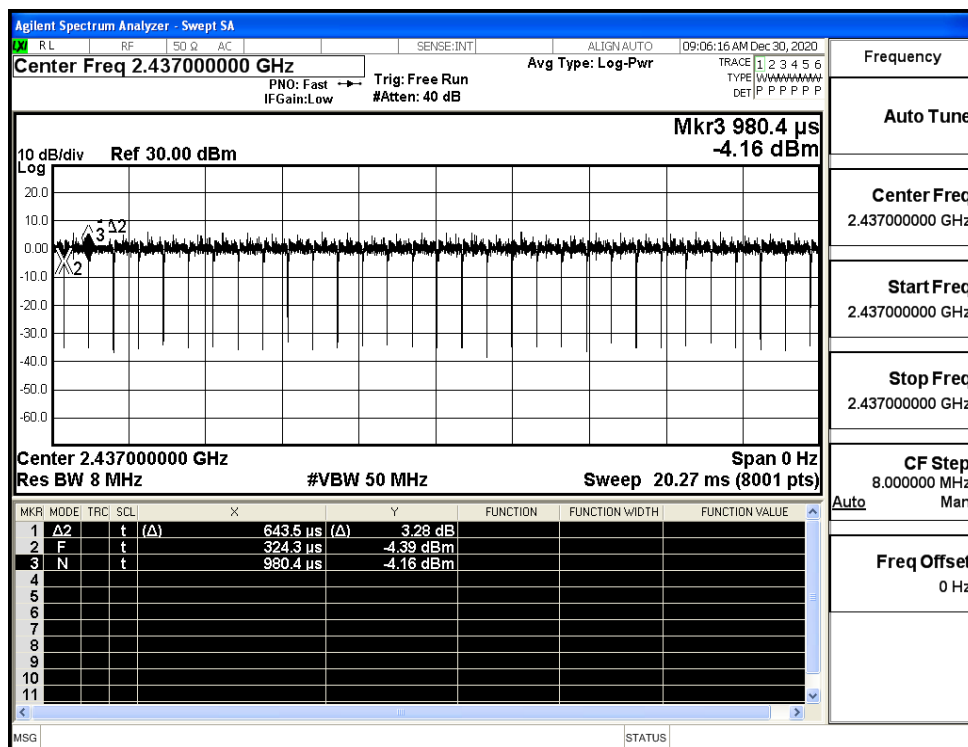
Duty Cycle_11G_2437_Ant1



Duty Cycle_11N20SISO_2437_Ant1



Duty Cycle_11N40SISO_2437_Ant1



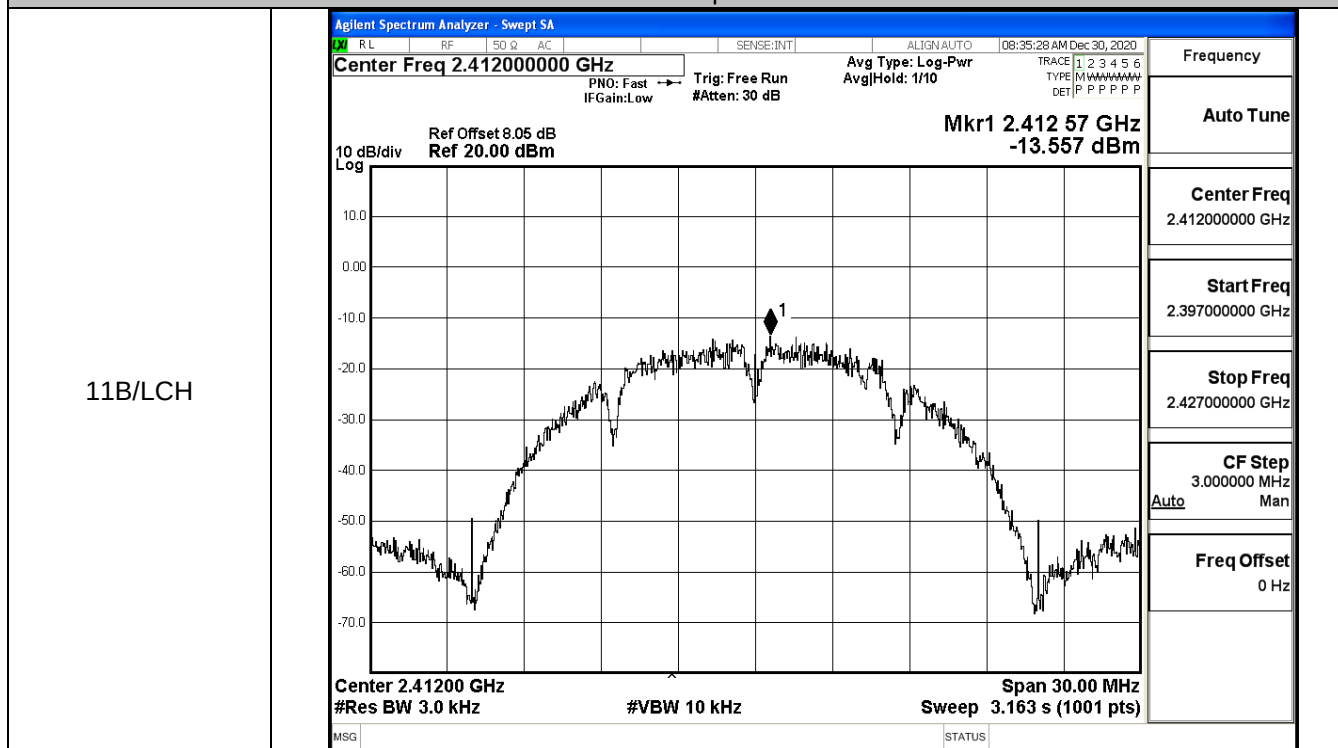
A.2 Maximum Conducted Output Power

Mode	Channel	Meas.Level [dBm]	Limit [dBm]	Verdict
11B	LCH	14.18	30	PASS
	MCH	15.19	30	PASS
	HCH	15.92	30	PASS
11G	LCH	13.02	30	PASS
	MCH	14.73	30	PASS
	HCH	15.71	30	PASS
11N20SISO	LCH	13.15	30	PASS
	MCH	14.54	30	PASS
	HCH	15.47	30	PASS
11N40SISO	LCH	14.57	30	PASS
	MCH	15.95	30	PASS
	HCH	15.79	30	PASS

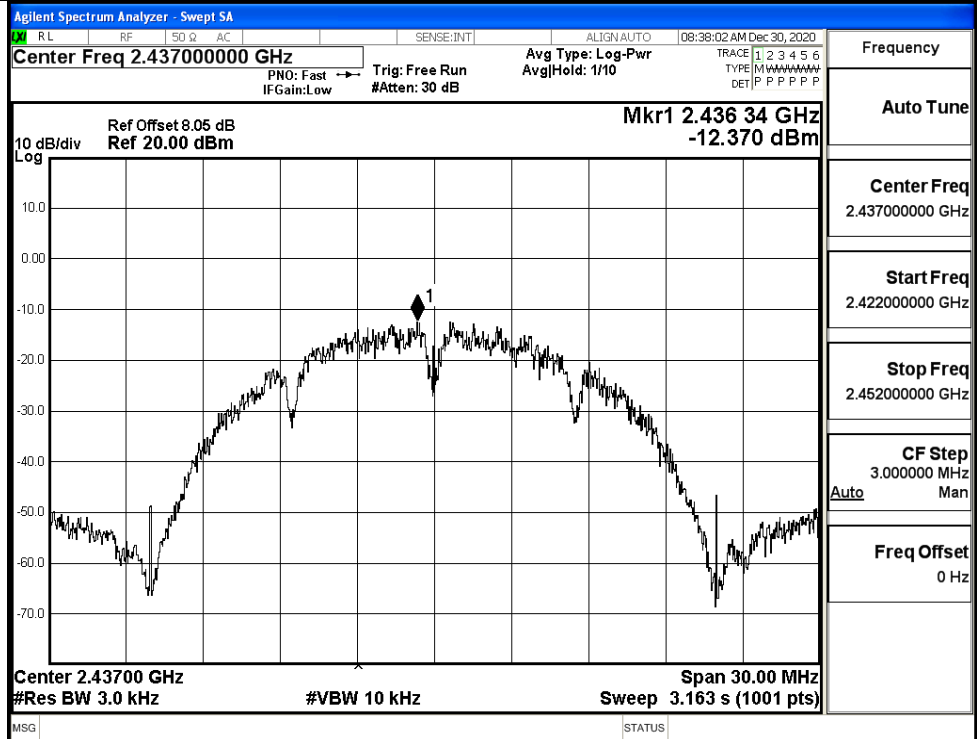
A.3 Maximum Power Spectral Density

Mode	Channel	Meas.Level [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-13.557	8	PASS
	MCH	-12.370	8	PASS
	HCH	-10.862	8	PASS
11G	LCH	-18.760	8	PASS
	MCH	-17.764	8	PASS
	HCH	-16.472	8	PASS
11N20SISO	LCH	-19.262	8	PASS
	MCH	-16.555	8	PASS
	HCH	-16.306	8	PASS
11N40SISO	LCH	-18.419	8	PASS
	MCH	-18.166	8	PASS
	HCH	-17.382	8	PASS

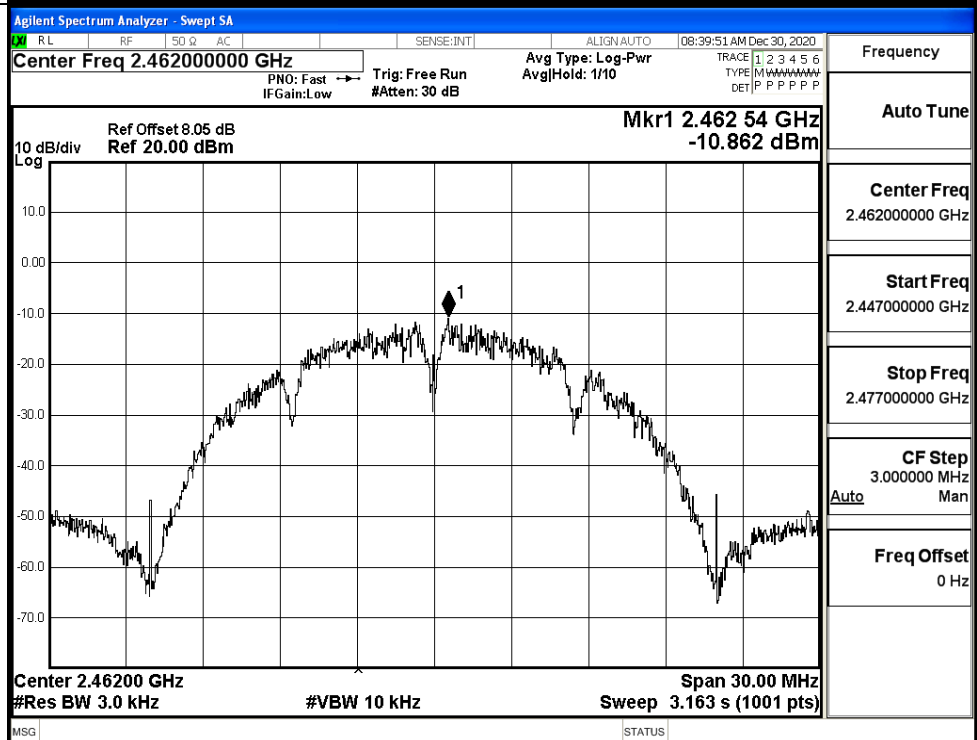
Test Graphs



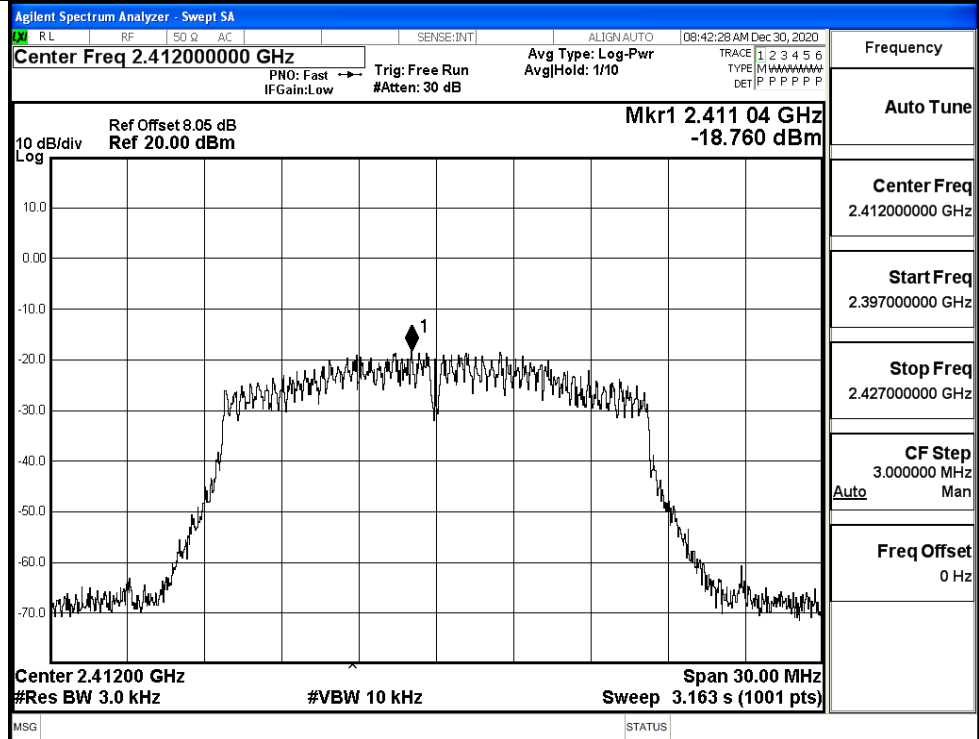
11B/MCH



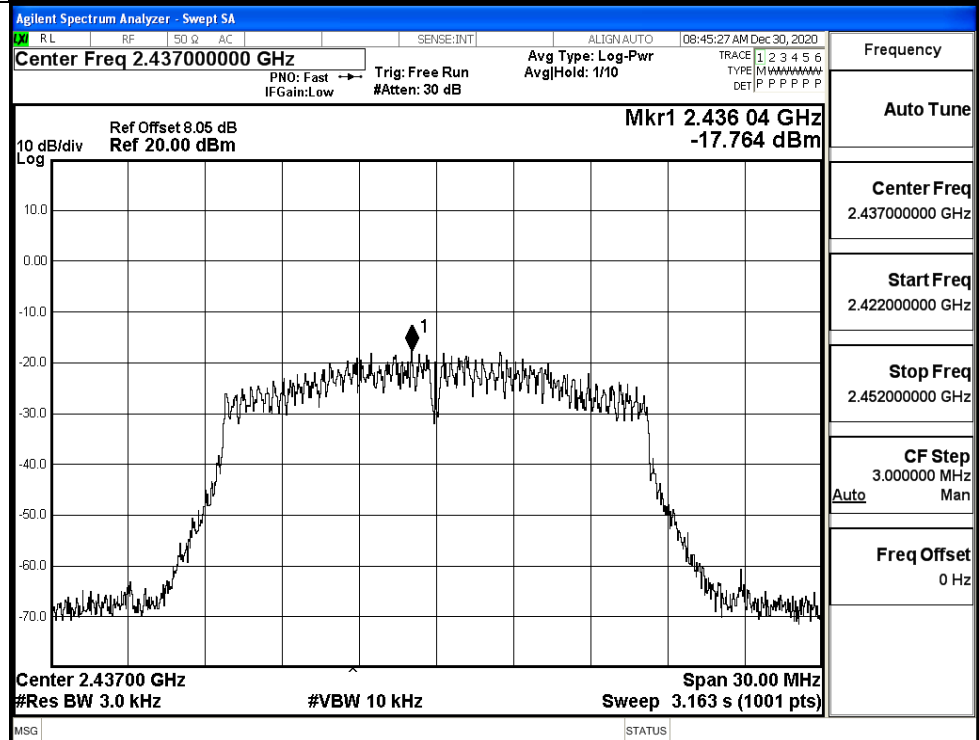
11B/HCH



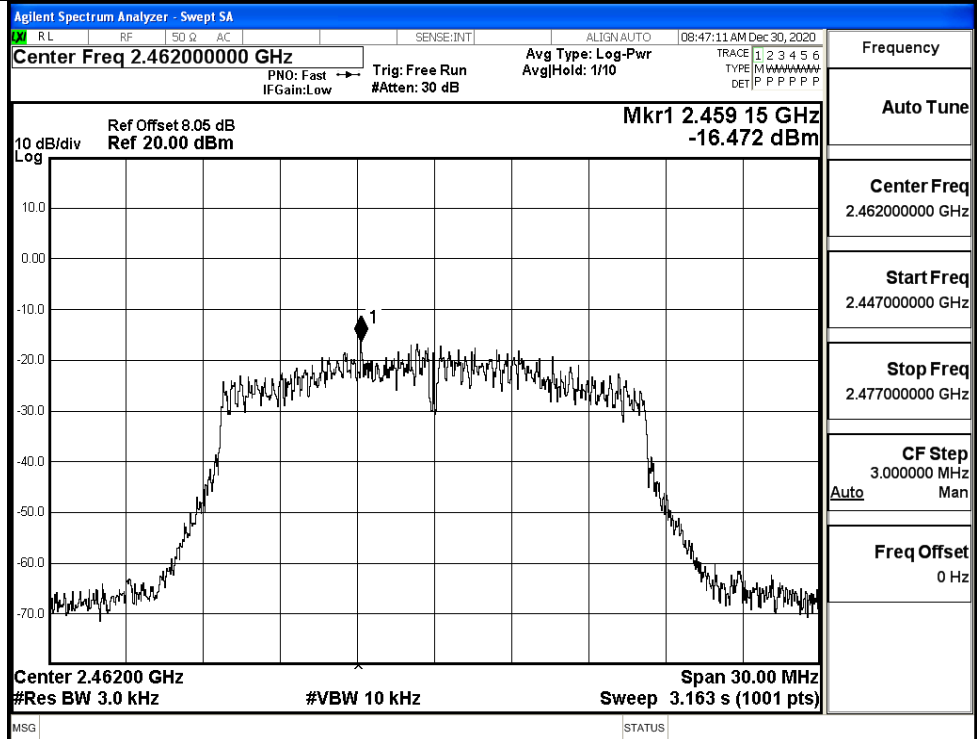
11G/LCH



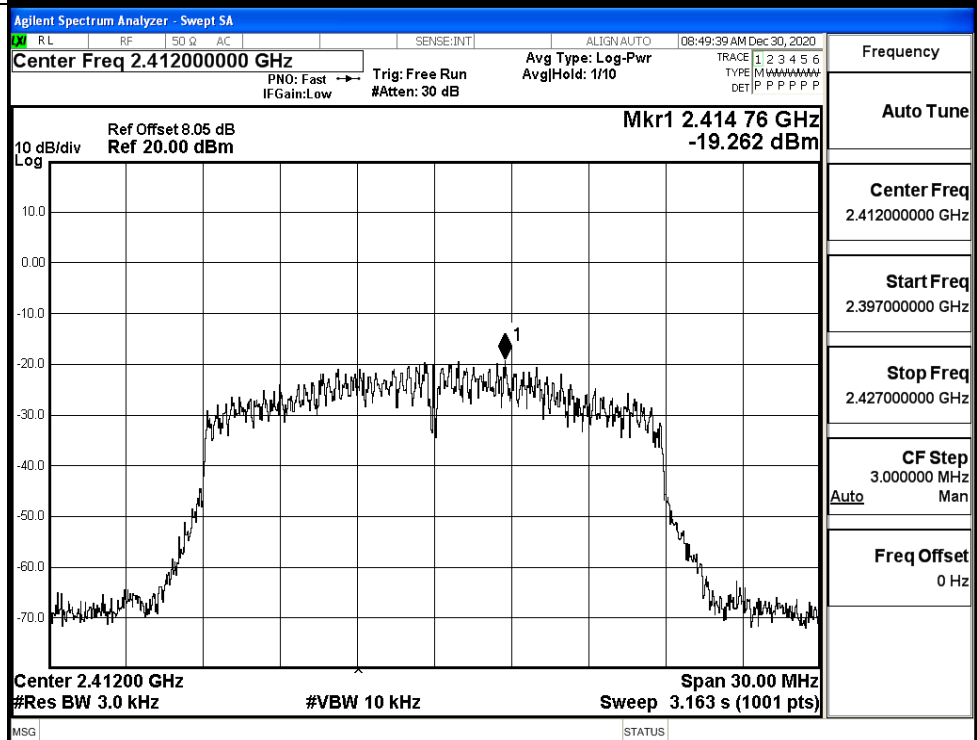
11G/MCH

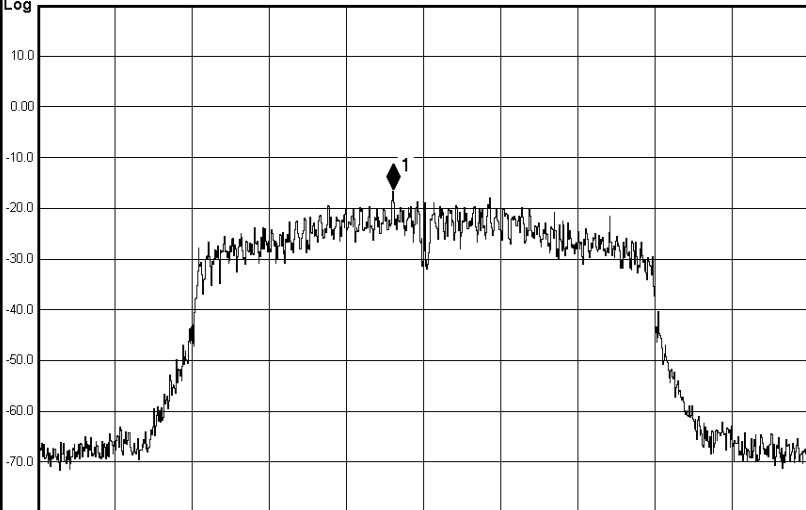
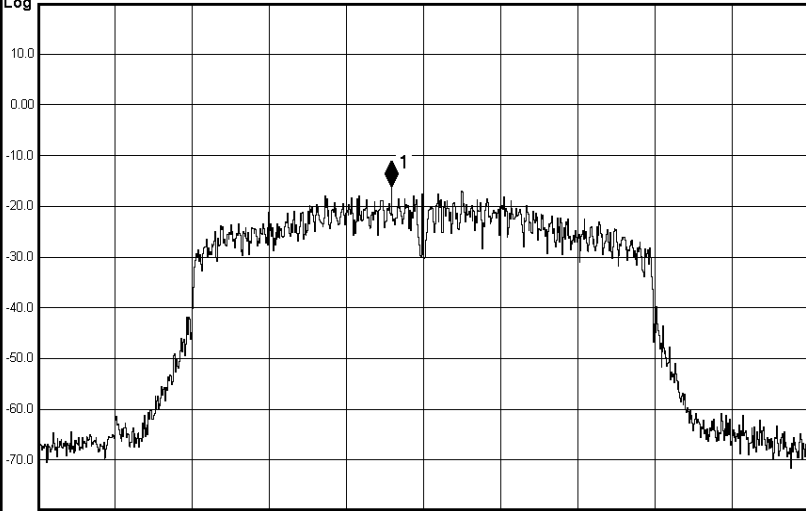


11G/HCH

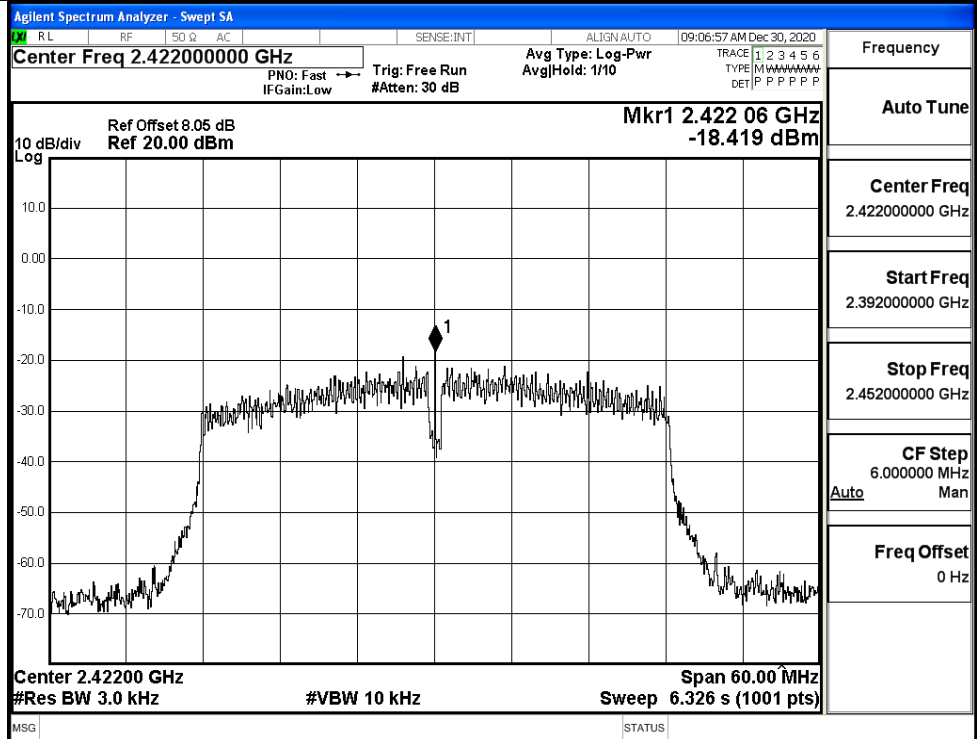


11N20SISO/LCH

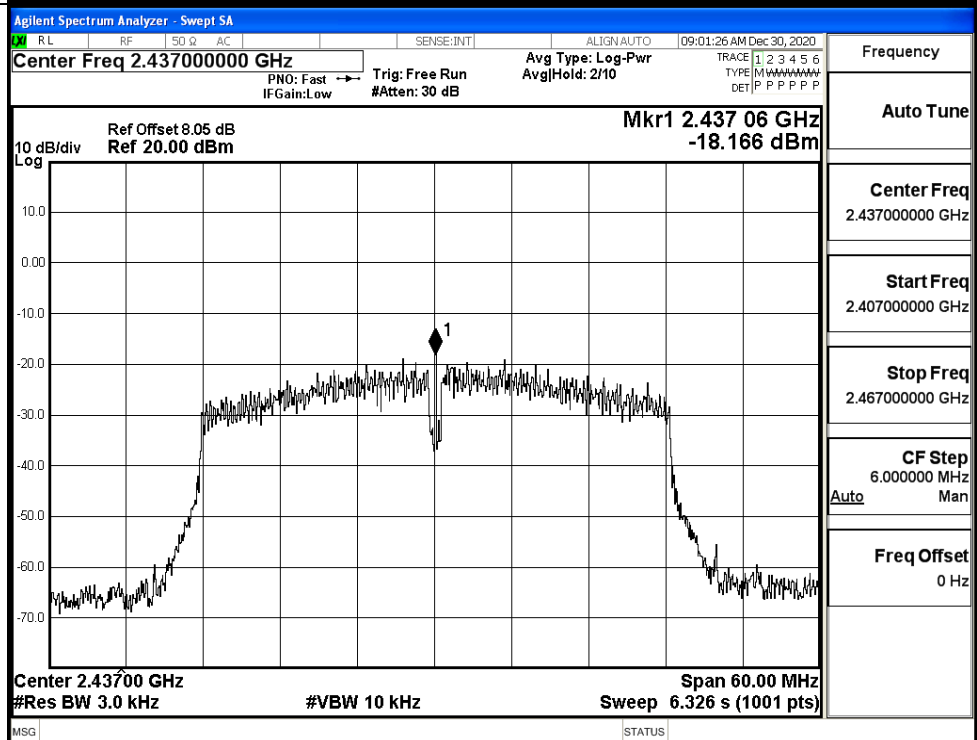


11N20SISO/MCH	Agilent Spectrum Analyzer - Swept SA Center Freq 2.437000000 GHz Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log  Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts) Frequency Auto Tune Center Freq 2.437000000 GHz Start Freq 2.422000000 GHz Stop Freq 2.452000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/HCH	Agilent Spectrum Analyzer - Swept SA Center Freq 2.462000000 GHz Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log  Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts) 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

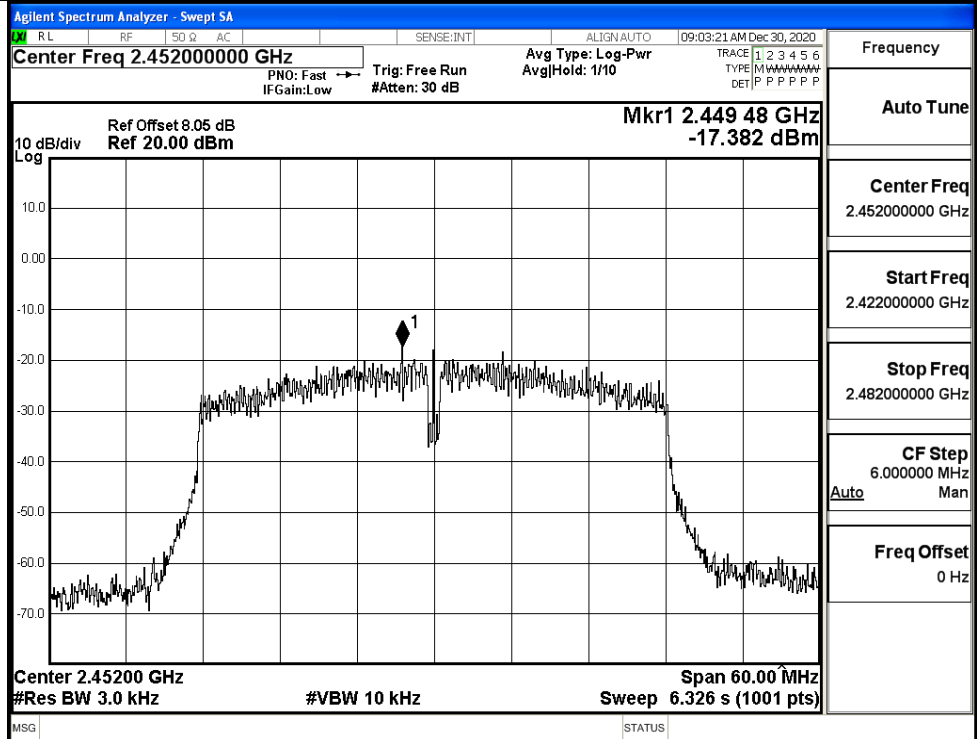
11N40SISO/LCH



11N40SISO/MCH



11N40SISO/HCH

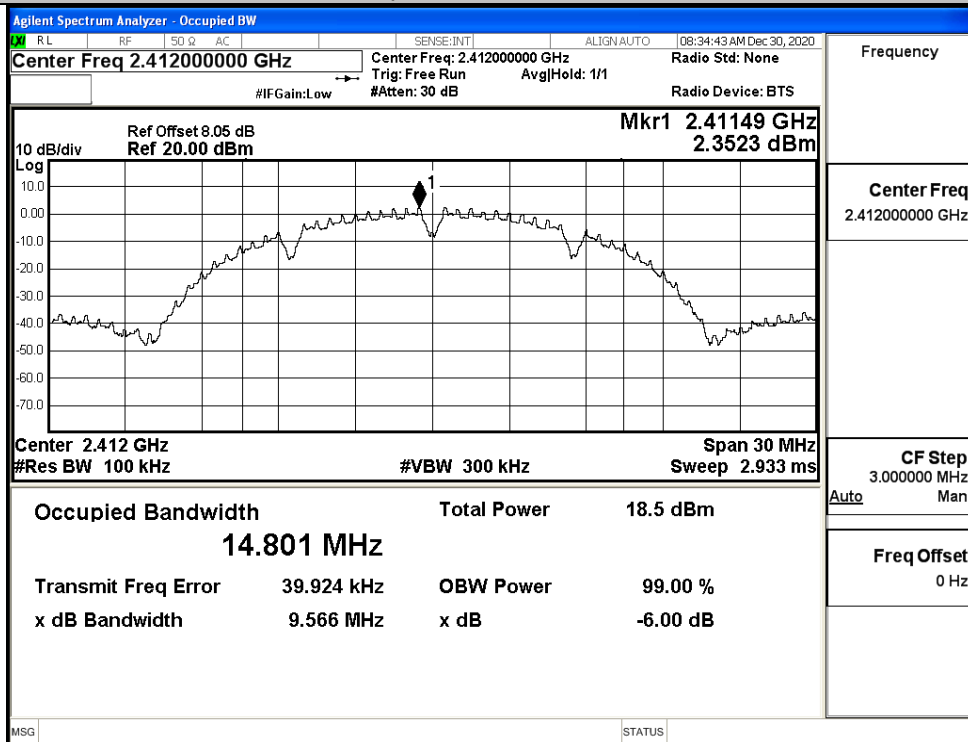


A.4 6dB Bandwidth

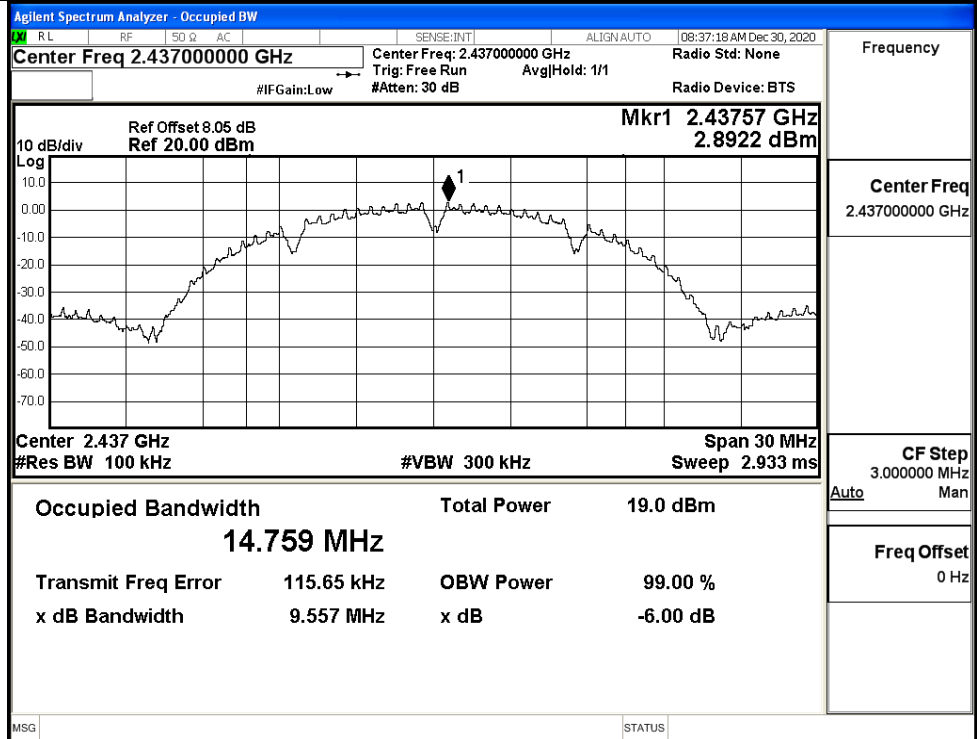
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	LCH	9.566	≥ 0.5	PASS
	MCH	9.557	≥ 0.5	PASS
	HCH	9.927	≥ 0.5	PASS
11G	LCH	13.78	≥ 0.5	PASS
	MCH	11.27	≥ 0.5	PASS
	HCH	12.55	≥ 0.5	PASS
11N20SISO	LCH	13.81	≥ 0.5	PASS
	MCH	13.82	≥ 0.5	PASS
	HCH	12.58	≥ 0.5	PASS
11N40SISO	LCH	33.85	≥ 0.5	PASS
	MCH	33.81	≥ 0.5	PASS
	HCH	33.79	≥ 0.5	PASS

Test Graphs

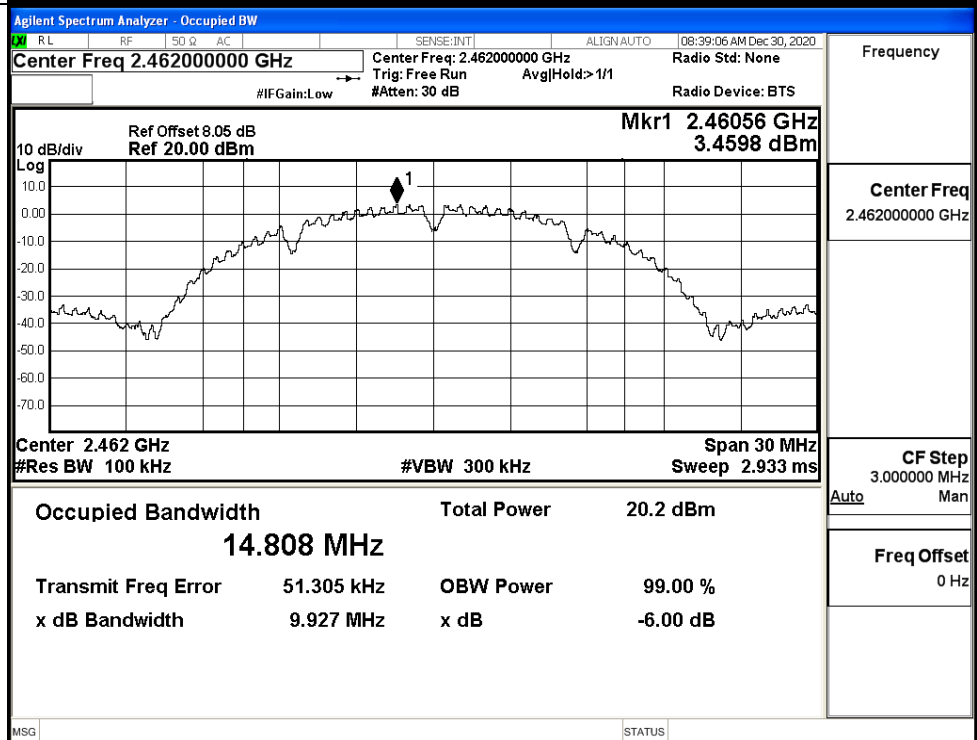
11B/LCH



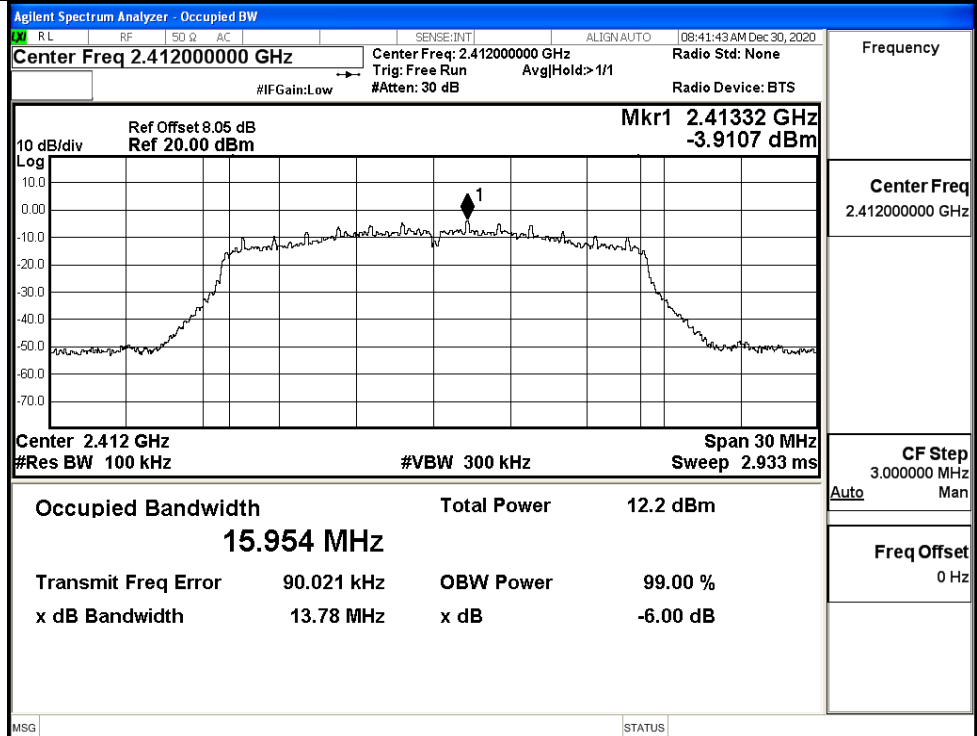
11B/MCH



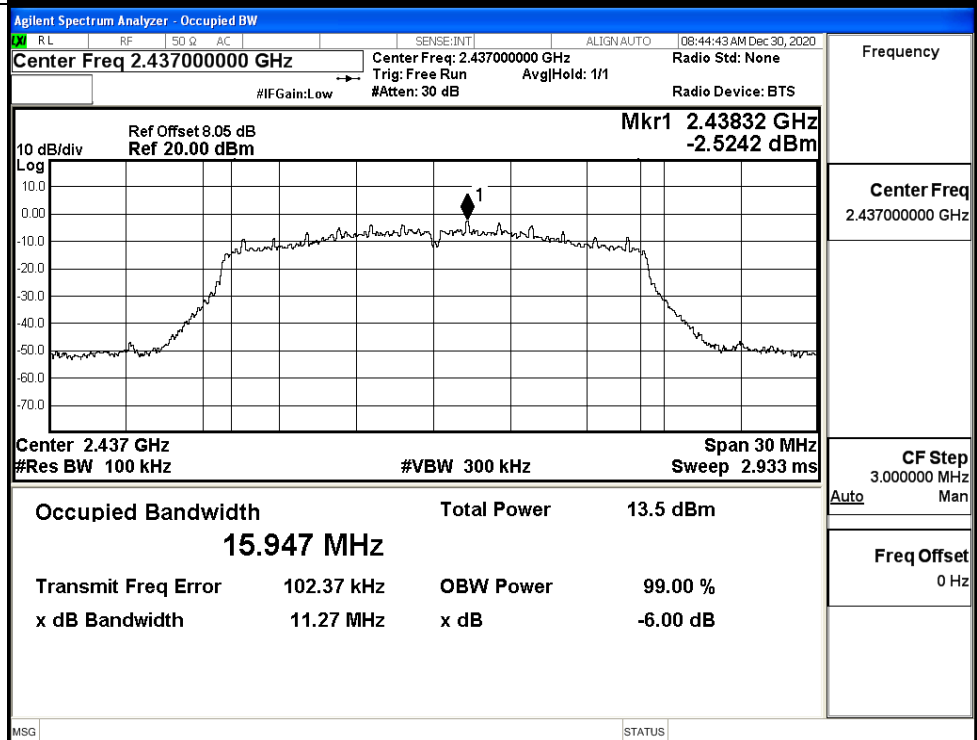
11B/HCH



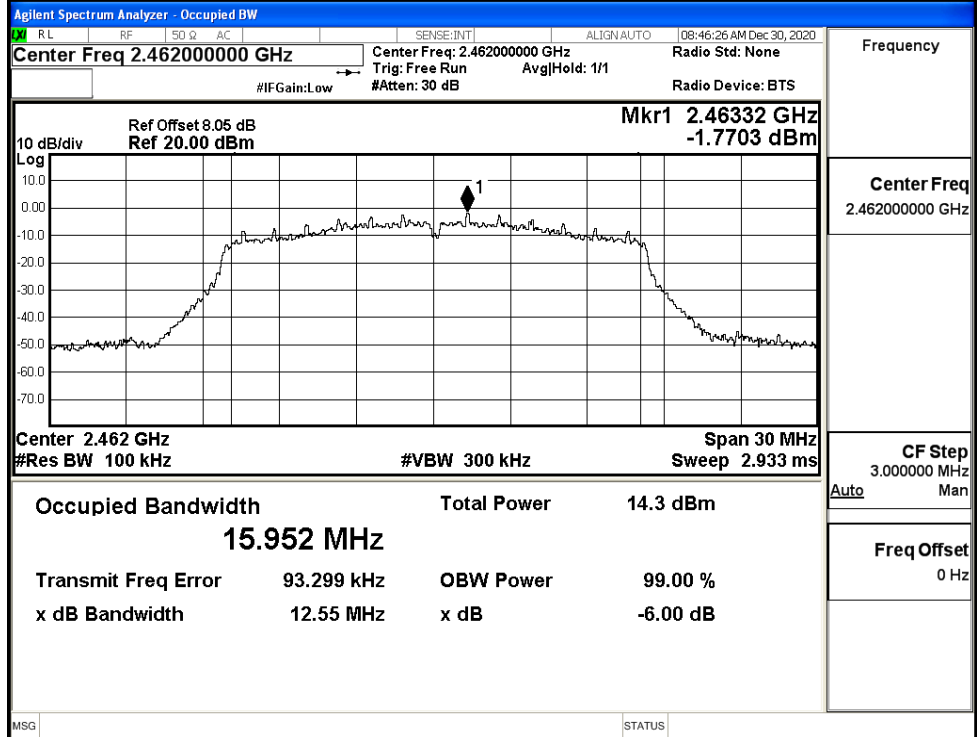
11G/LCH



11G/MCH



11G/HCH



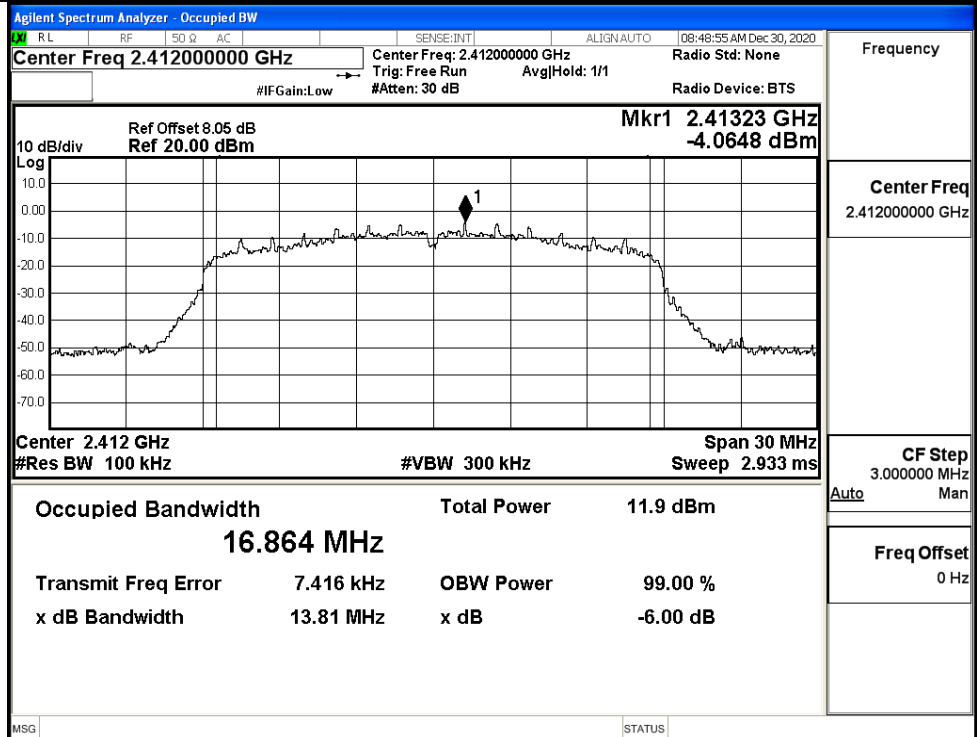
Frequency

Center Freq
2.46200000 GHz

CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

11N20SISO/LCH



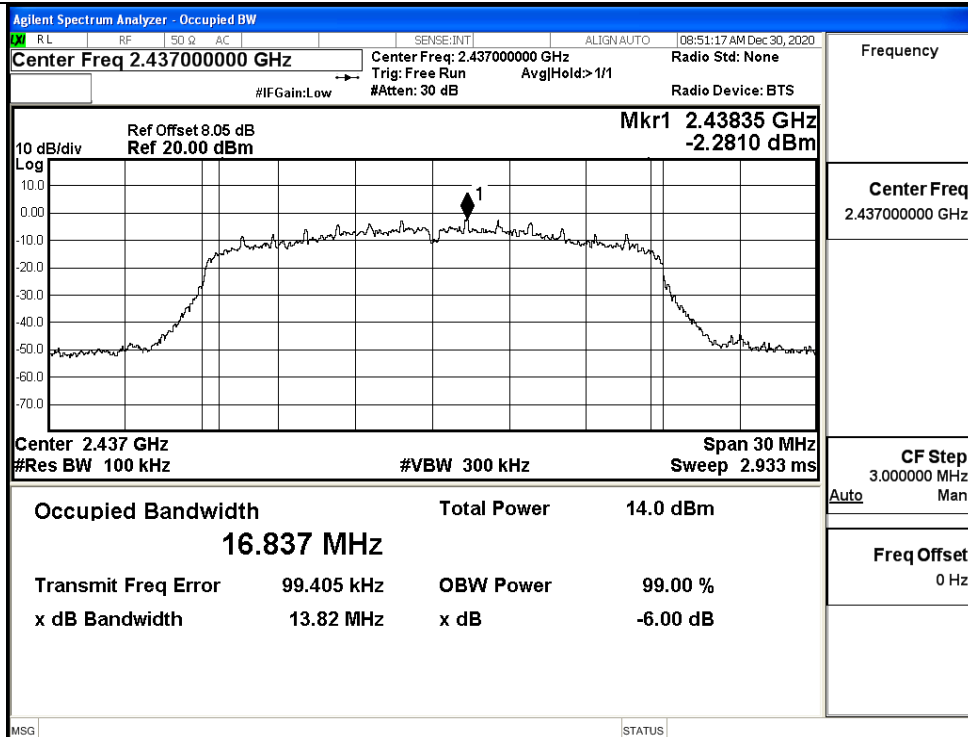
Frequency

Center Freq
2.41200000 GHz

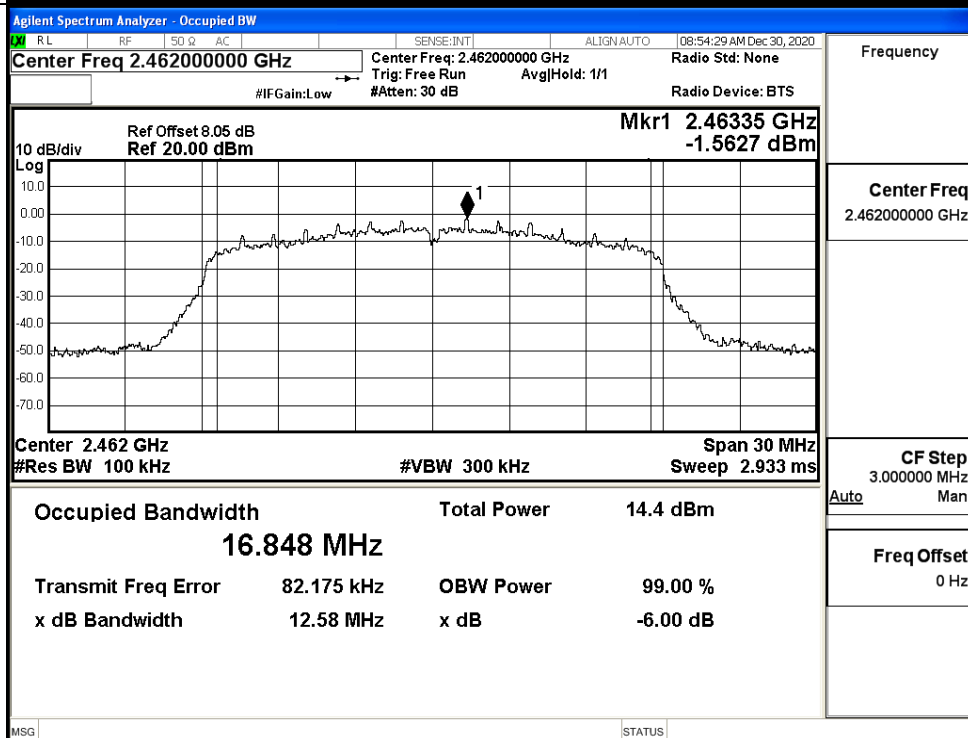
CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

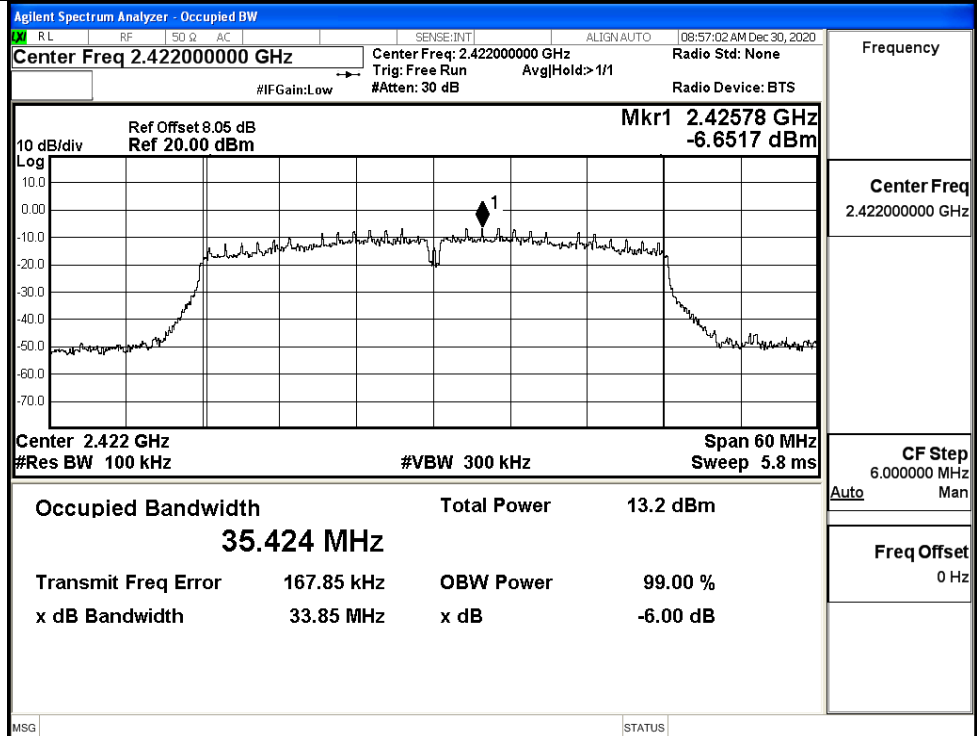
11N20SISO/MCH



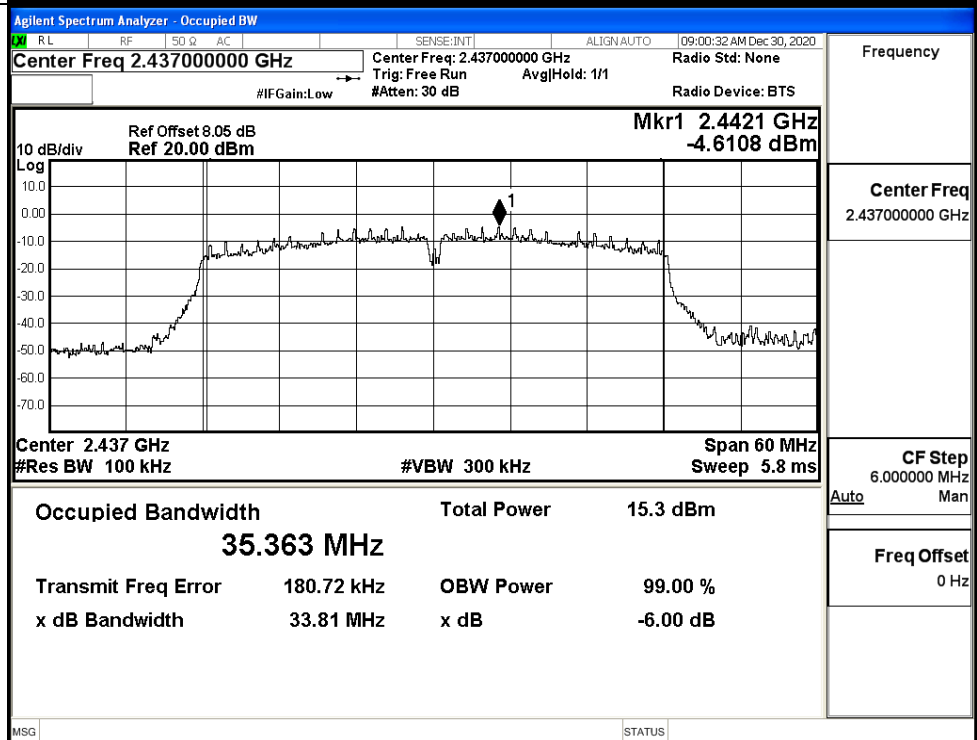
11N20SISO/HCH



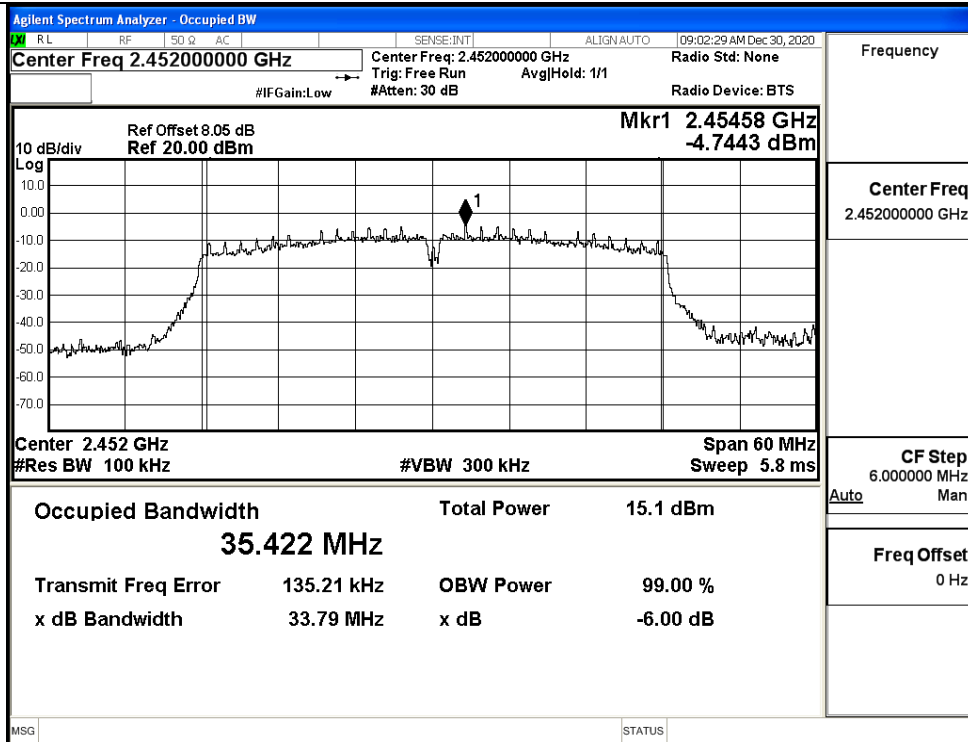
11N40SISO/LCH



11N40SISO/MCH



11N40SISO/HCH



Frequency

Center Freq
2.45200000 GHz

CF Step
6.000000 MHz
Auto Man

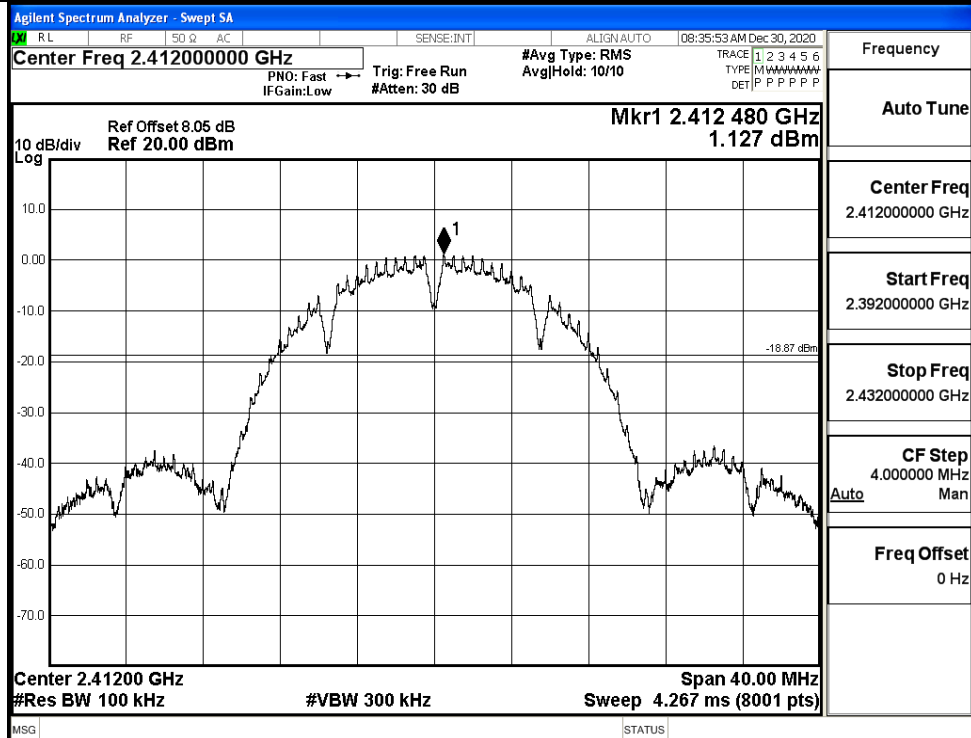
Freq Offset
0 Hz

A.5 RF Conducted Spurious Emissions

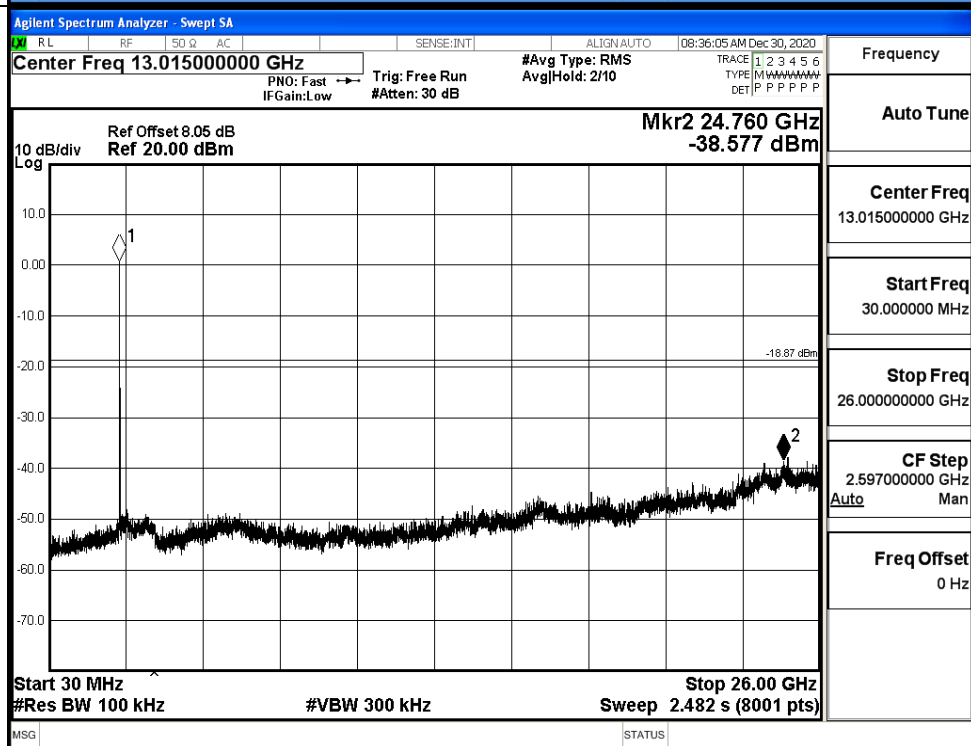
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	LCH	1.127	-38.577	-18.873	PASS
	MCH	3.153	-39.097	-16.847	PASS
	HCH	3.485	-38.732	-16.515	PASS
11G	LCH	-3.306	-38.439	-23.306	PASS
	MCH	-1.996	-38.315	-21.996	PASS
	HCH	-1.518	-38.701	-21.518	PASS
11N20 SISO	LCH	-3.413	-38.695	-23.413	PASS
	MCH	-2.355	-37.782	-22.355	PASS
	HCH	-0.991	-38.115	-20.991	PASS
11N40 SISO	LCH	-5.688	-38.020	-25.688	PASS
	MCH	-4.716	-37.898	-24.716	PASS
	HCH	-4.286	-38.402	-24.286	PASS

11B LCH Graphs

Pref/11B/LCH

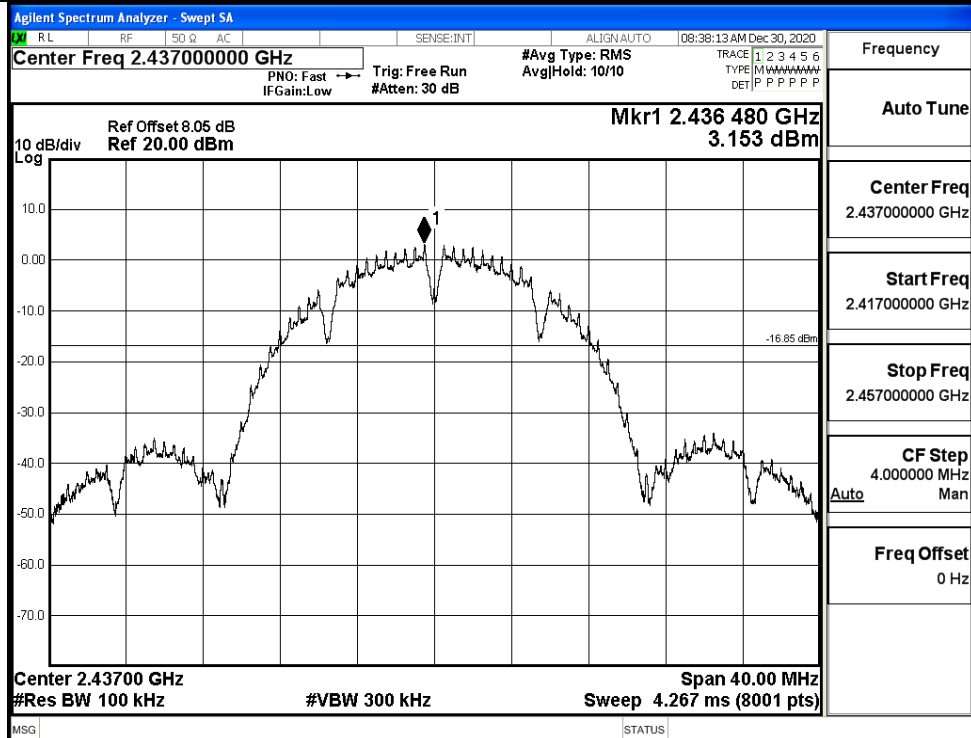


Puw/11B/LCH

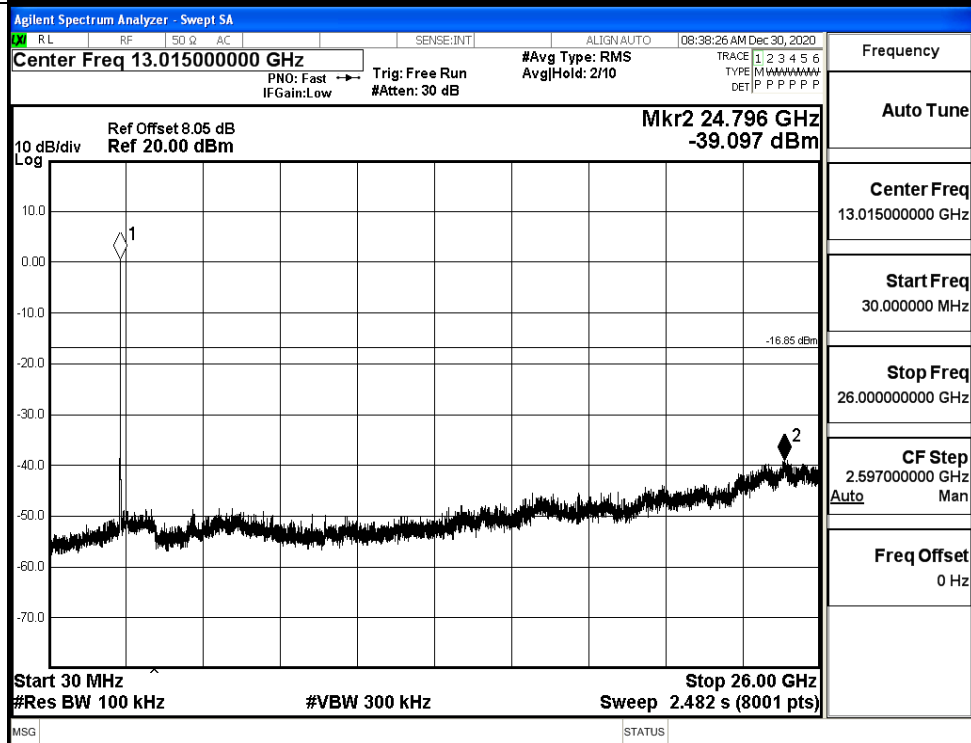


11B MCH Graphs

Pref/11B/MCH

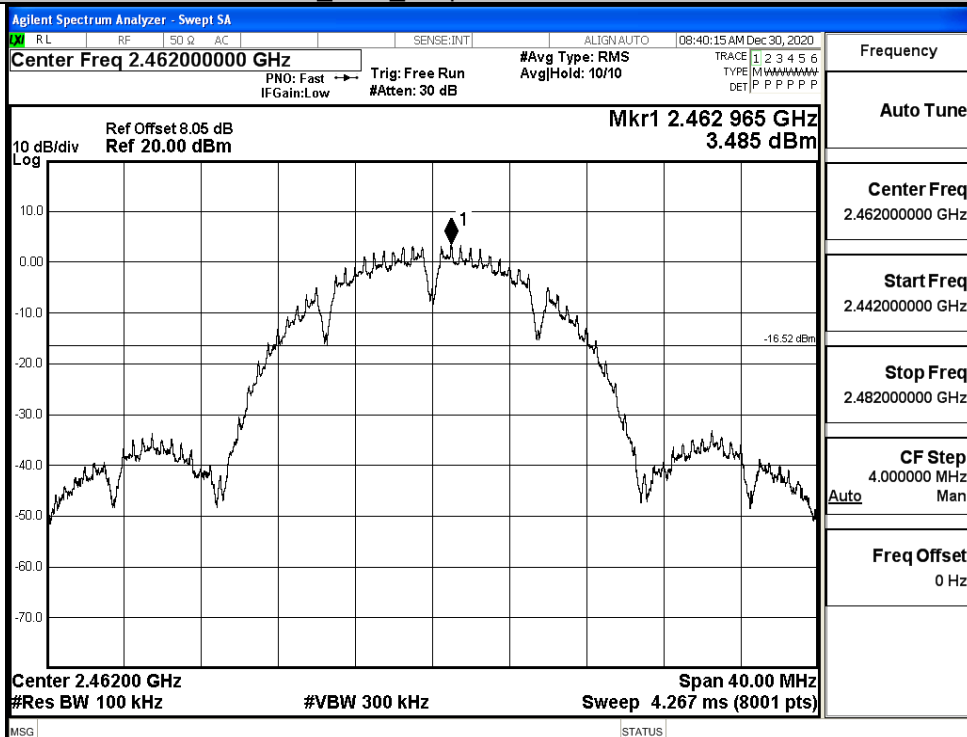


Puw/11B/MCH

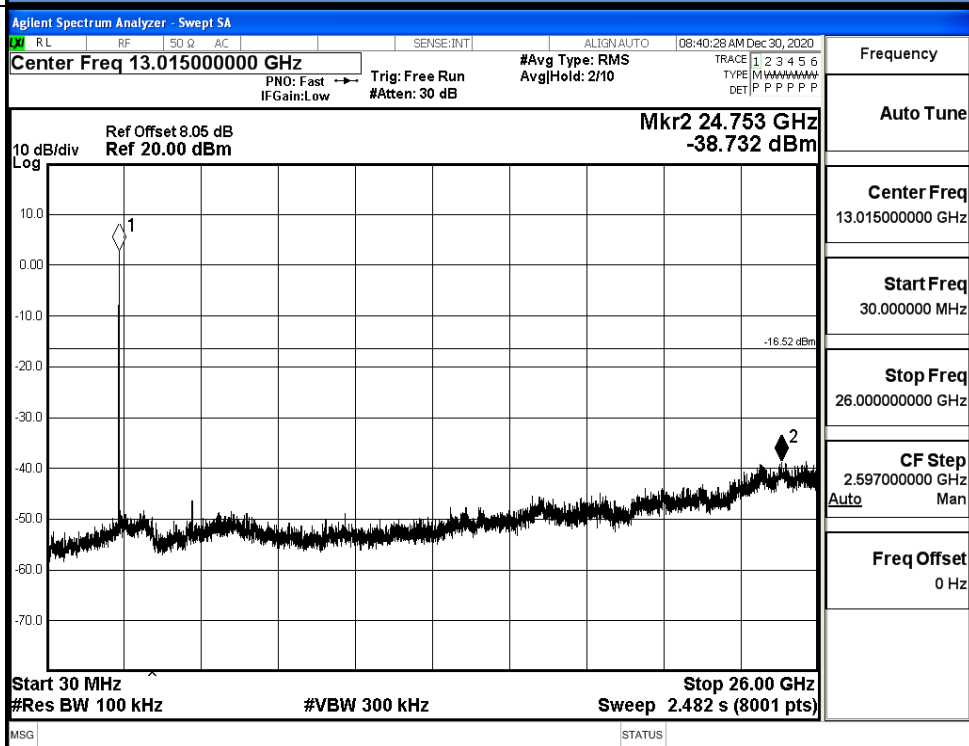


11B HCH Graphs

Pref/11B/HCH

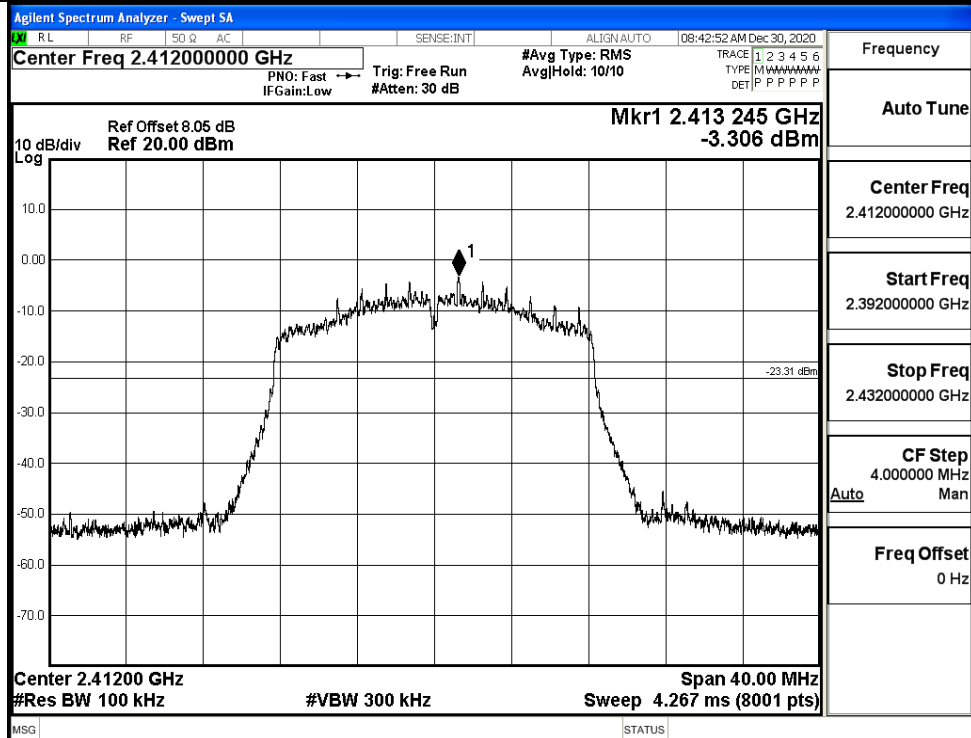


Puw/11B/HCH

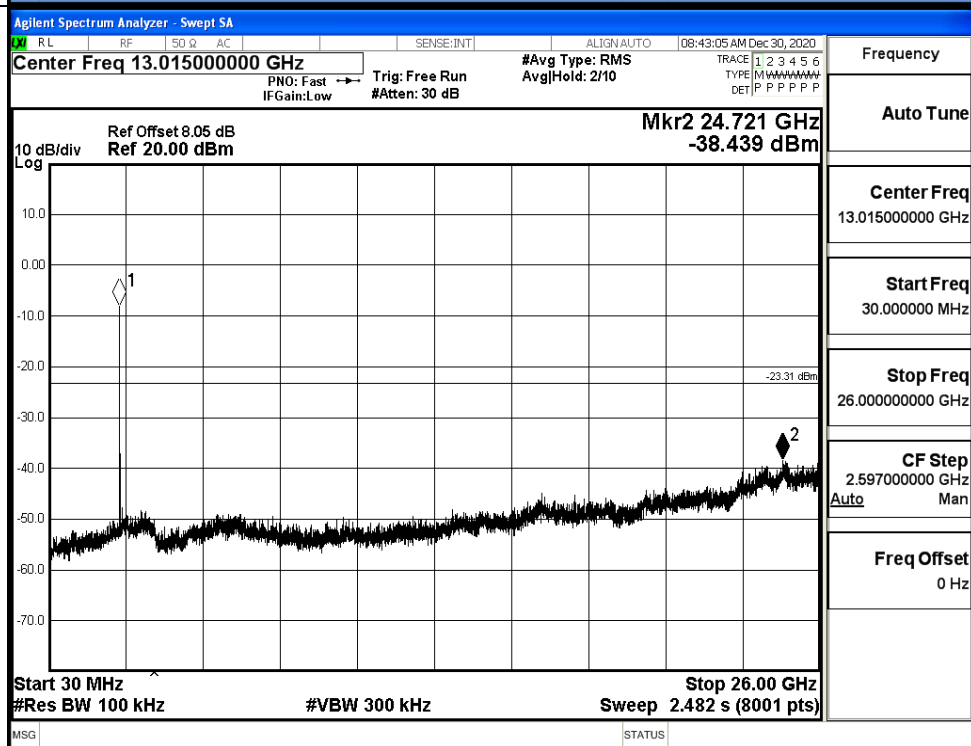


11G LCH Graphs

Pref/11G/LCH

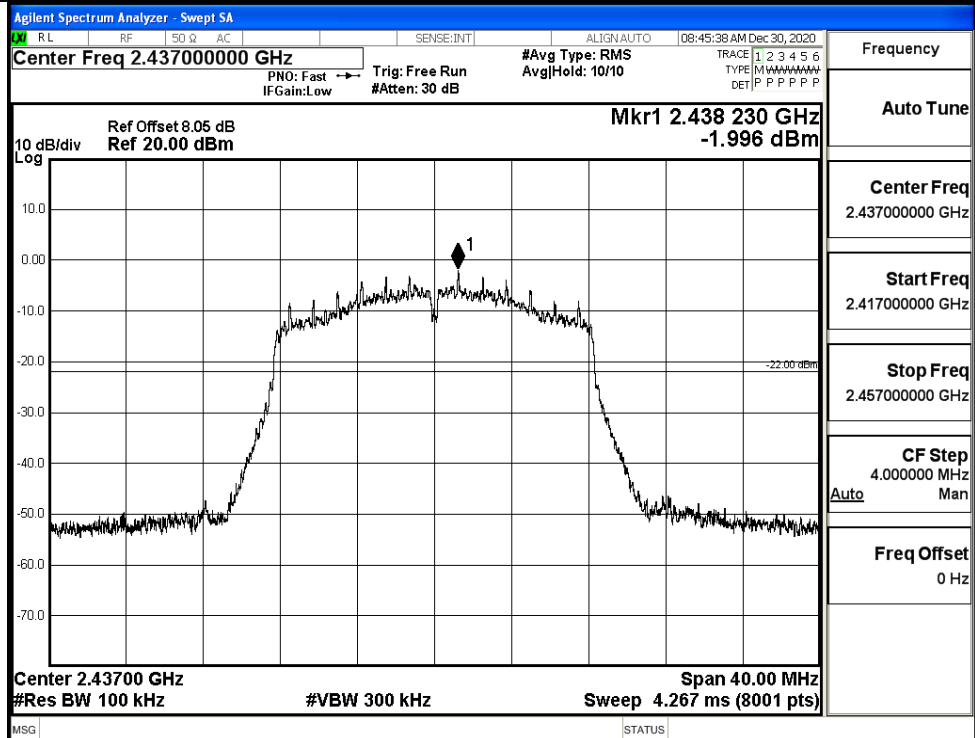


Puw/11G/LCH

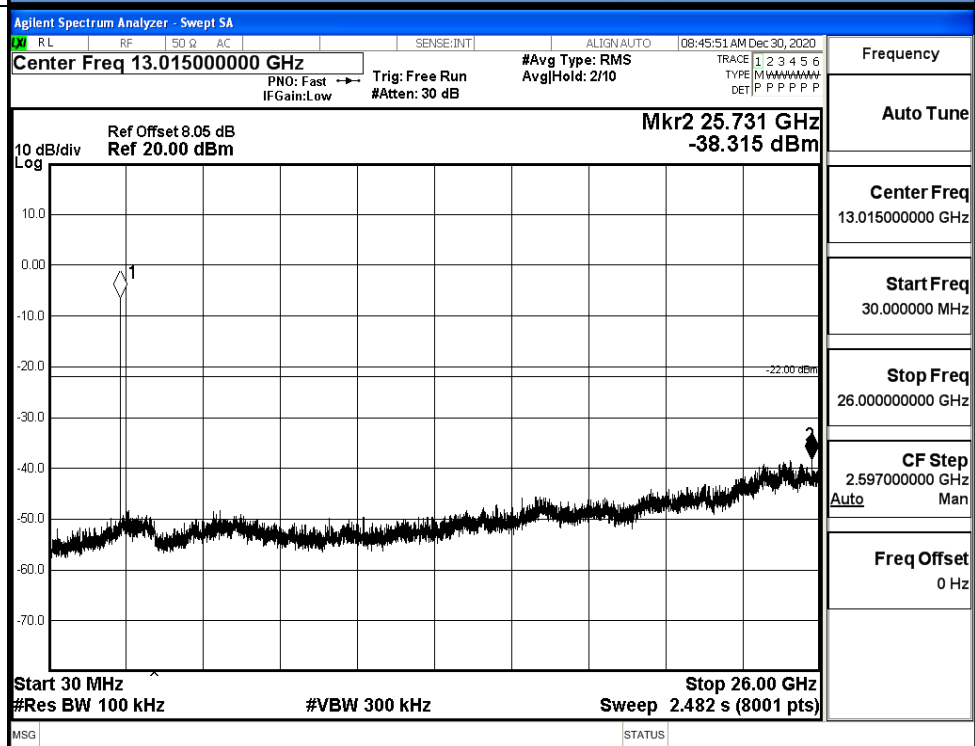


11G MCH Graphs

Pref/11G/MCH

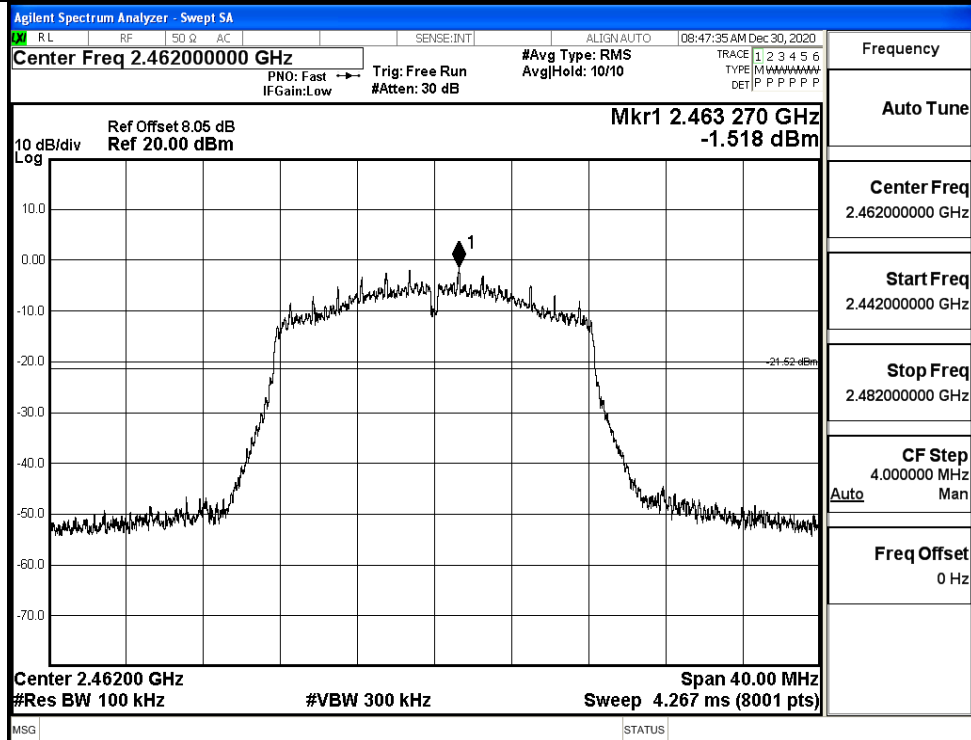


Puw/11G/MCH

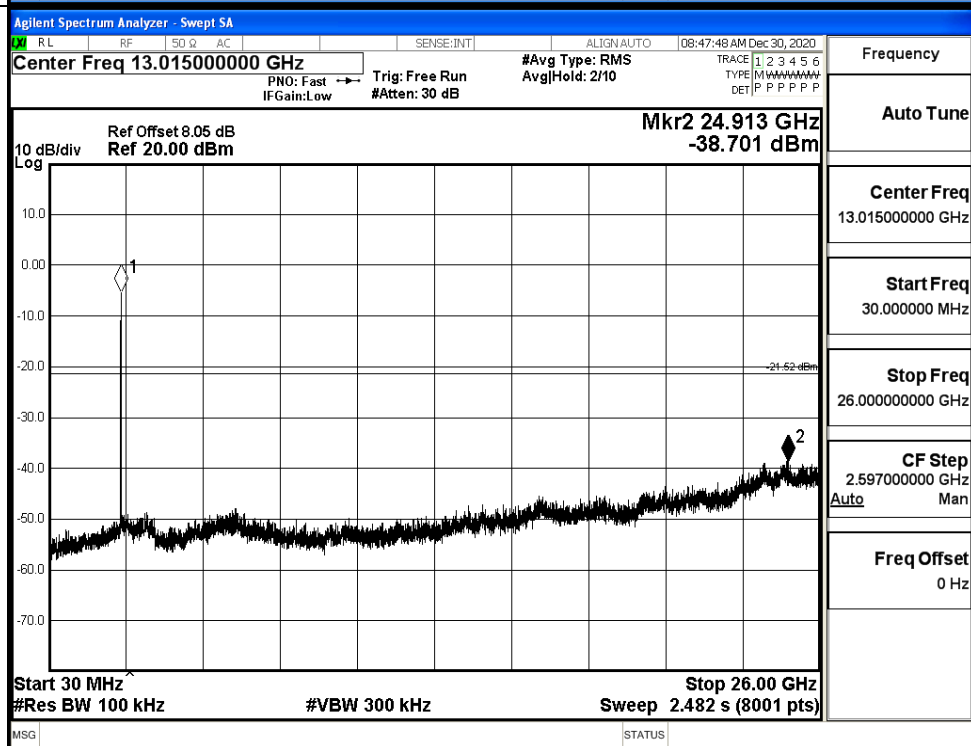


11G HCH Graphs

Pref/11G/HCH

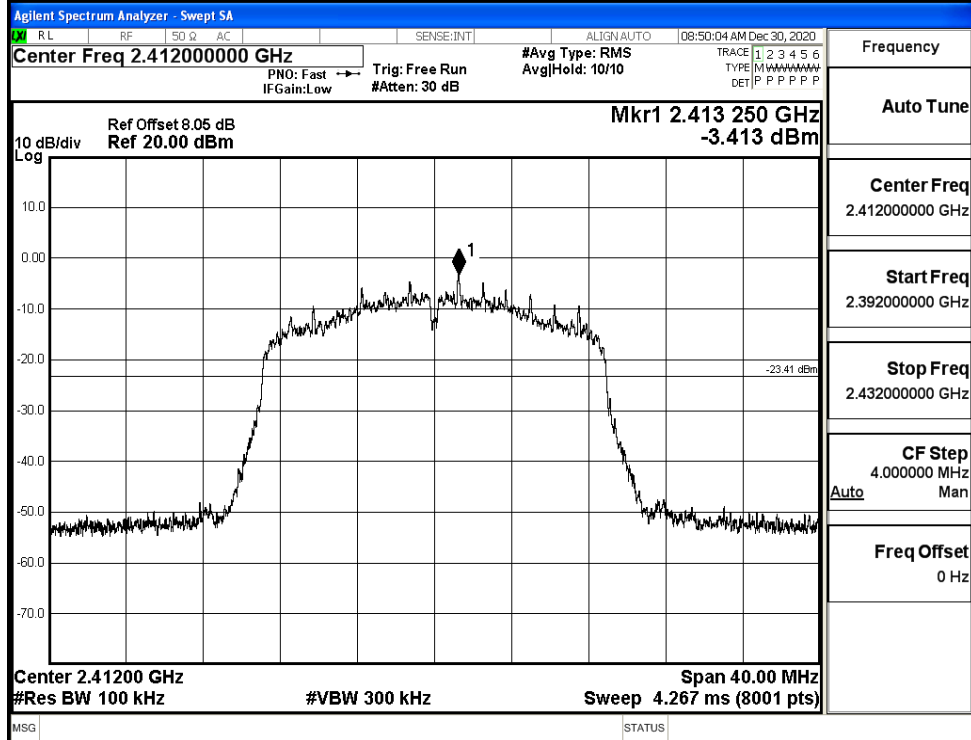


Puw/11G/HCH

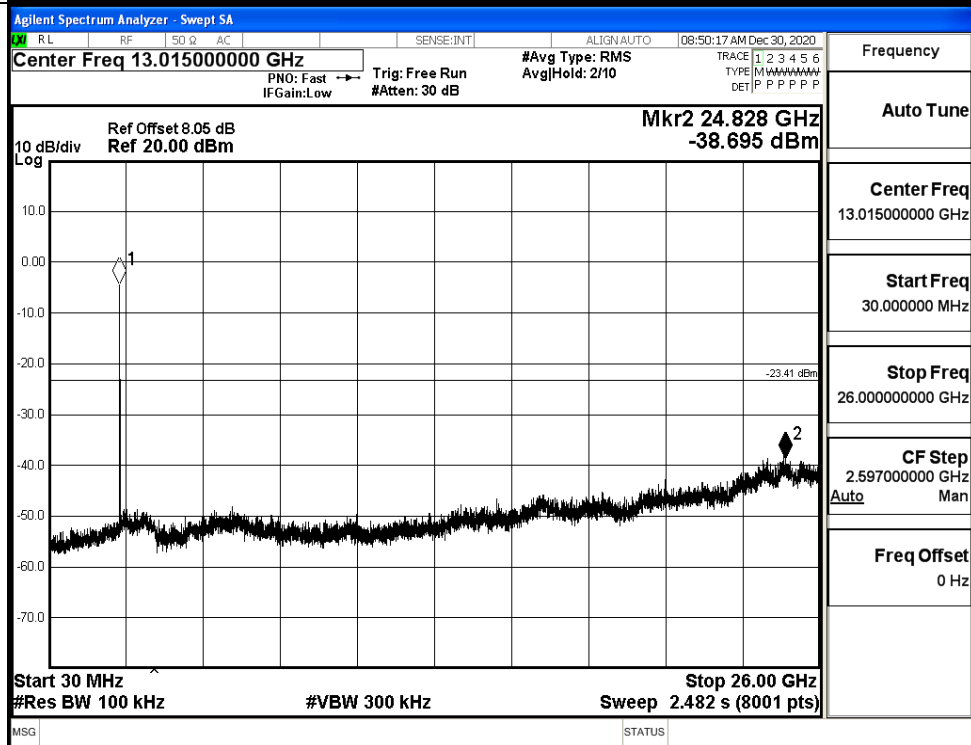


11N20SISO LCH Graphs

Pref/11N20SIS
O/LCH

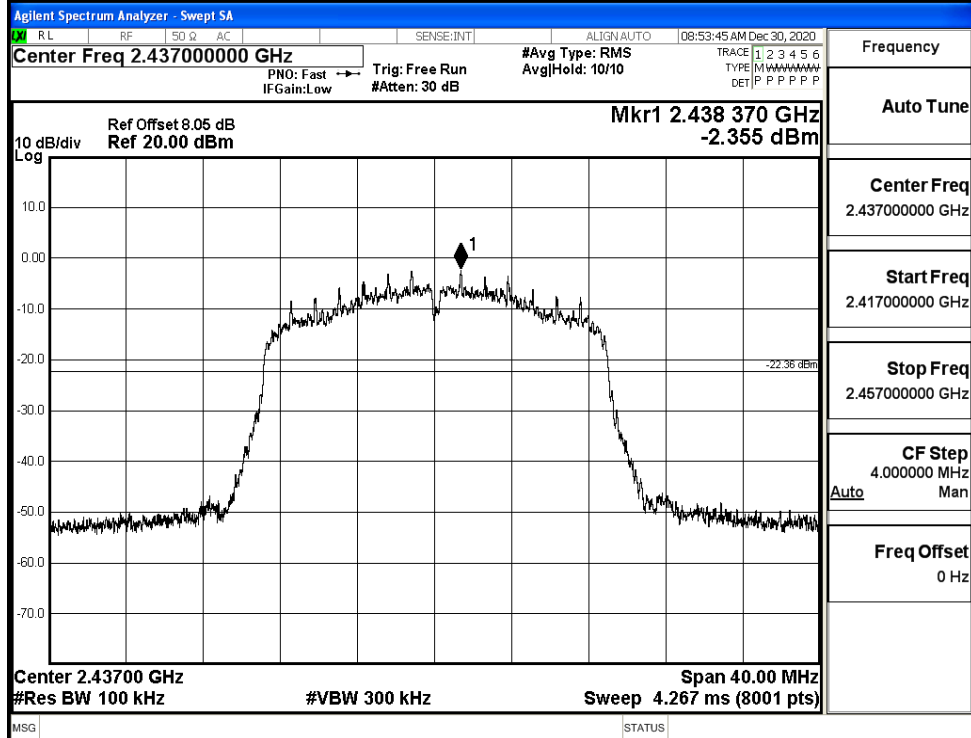


Puw/11N20
SISO/LCH

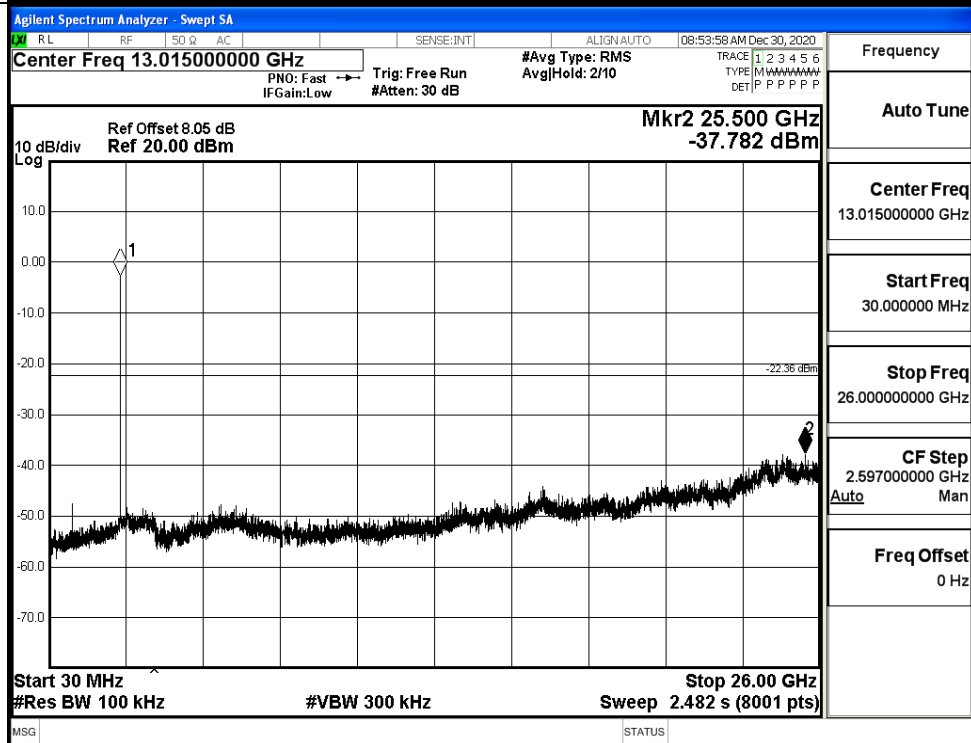


11N20SISO_MCH_Graphs

Pref/11N20
SISO/MCH

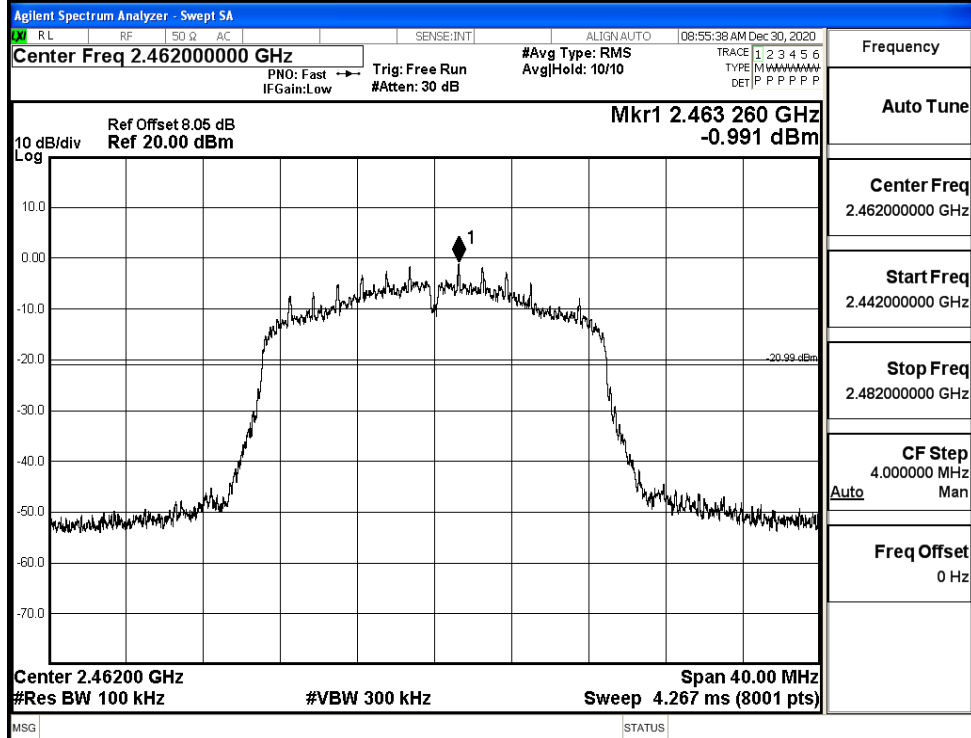


Puw/11N20
SISO/MCH

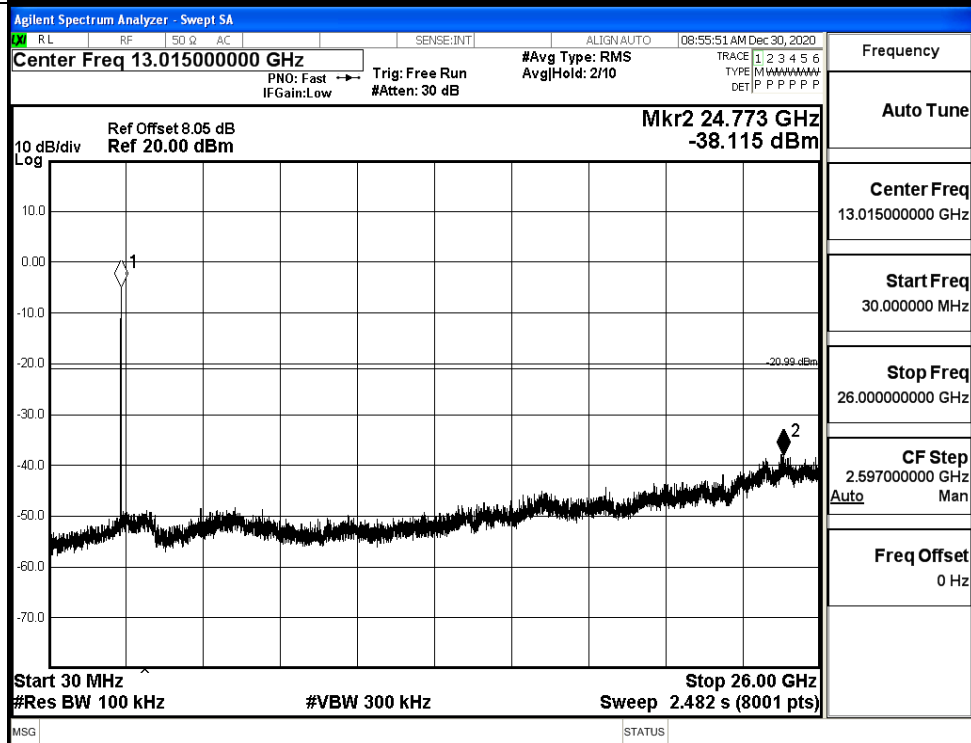


11N20SISO HCH Graphs

Pref/11N20
SISO/HCH

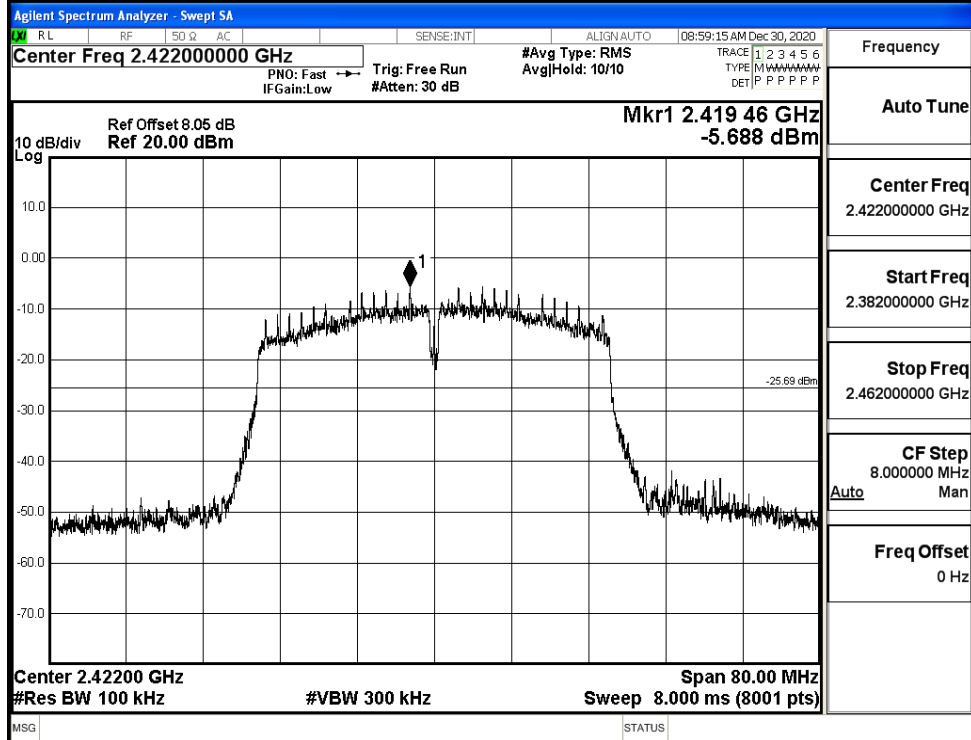


Puw/11N20
SISO/HCH

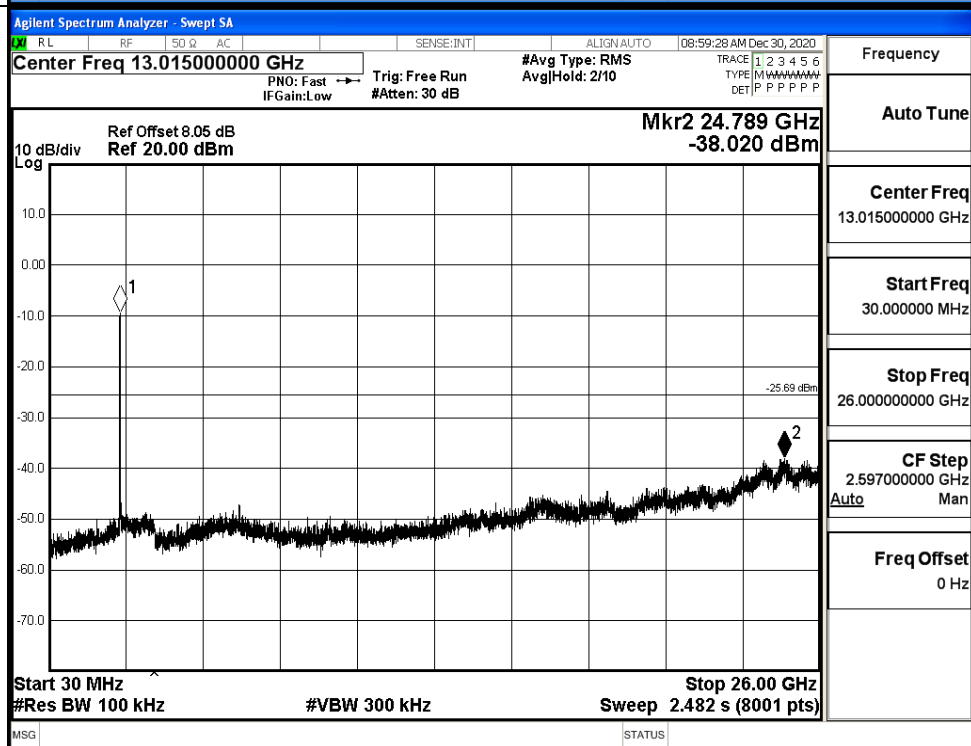


11N40SISO LCH Graphs

Pref/11N40
SISO/LCH

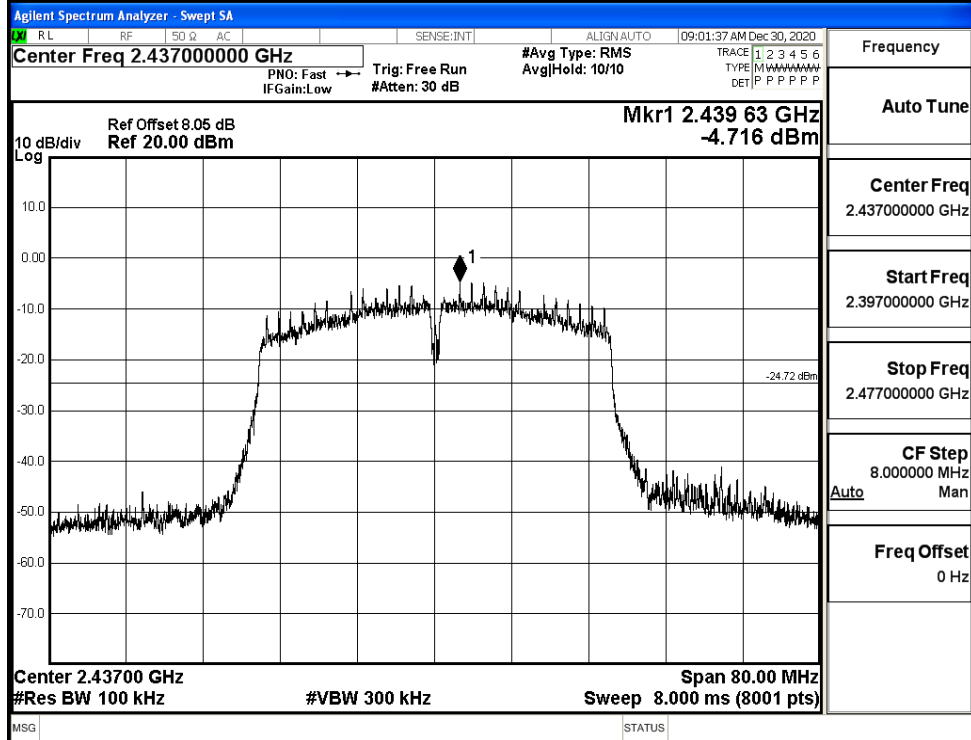


Puw/11N40
SISO/LCH

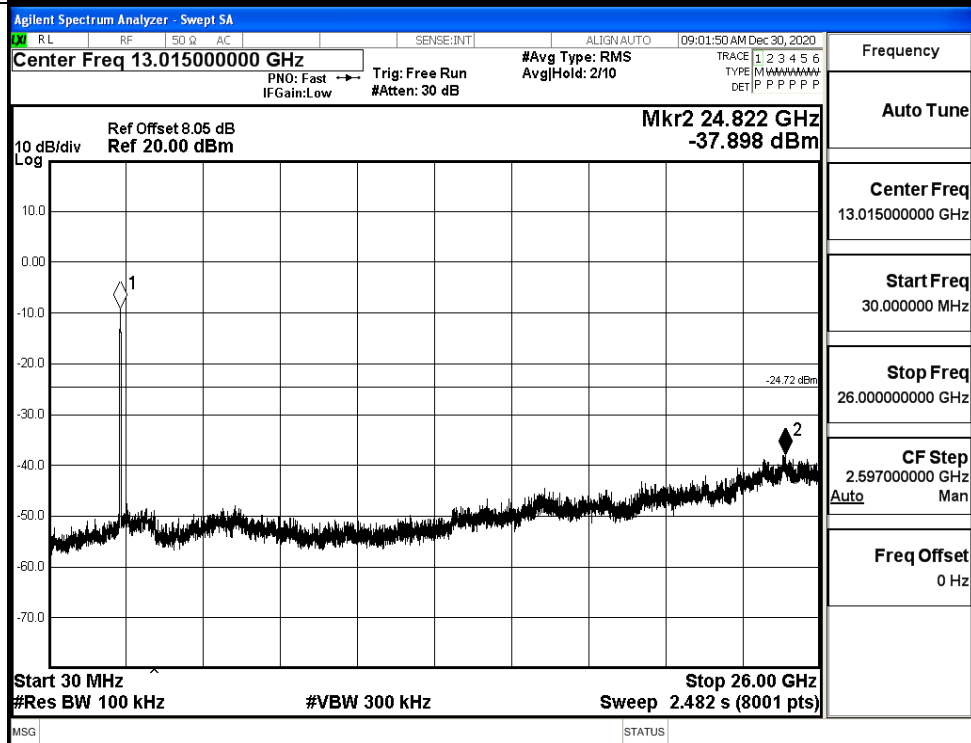


11N40SISO_MCH_Graphs

Pref/11N40
SISO/MCH

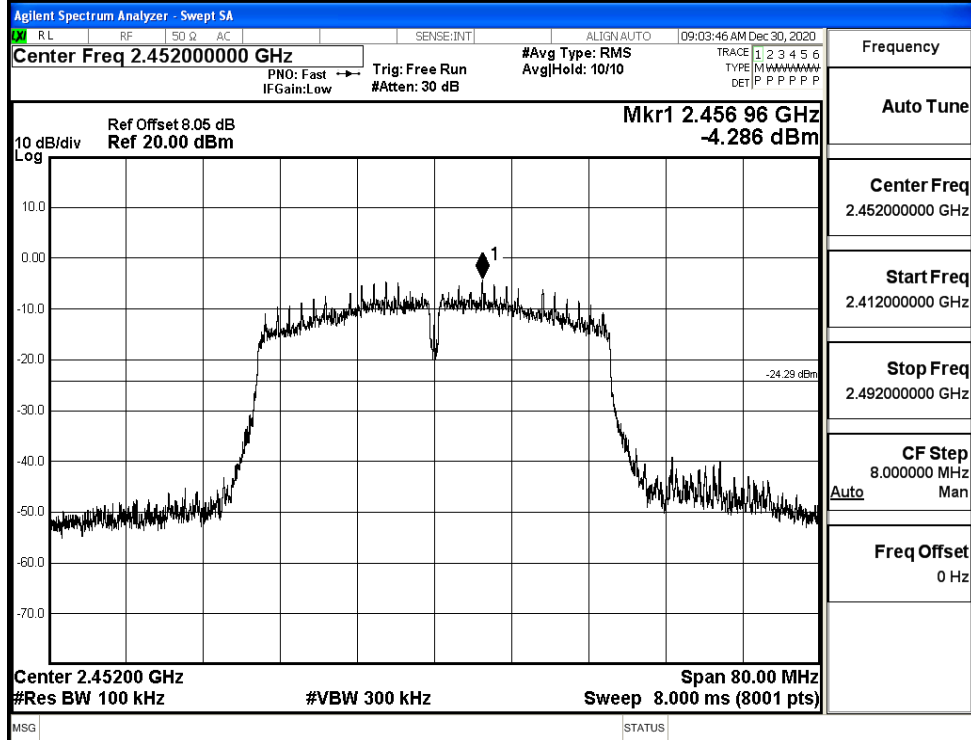


Puw/11N40
SISO/MCH

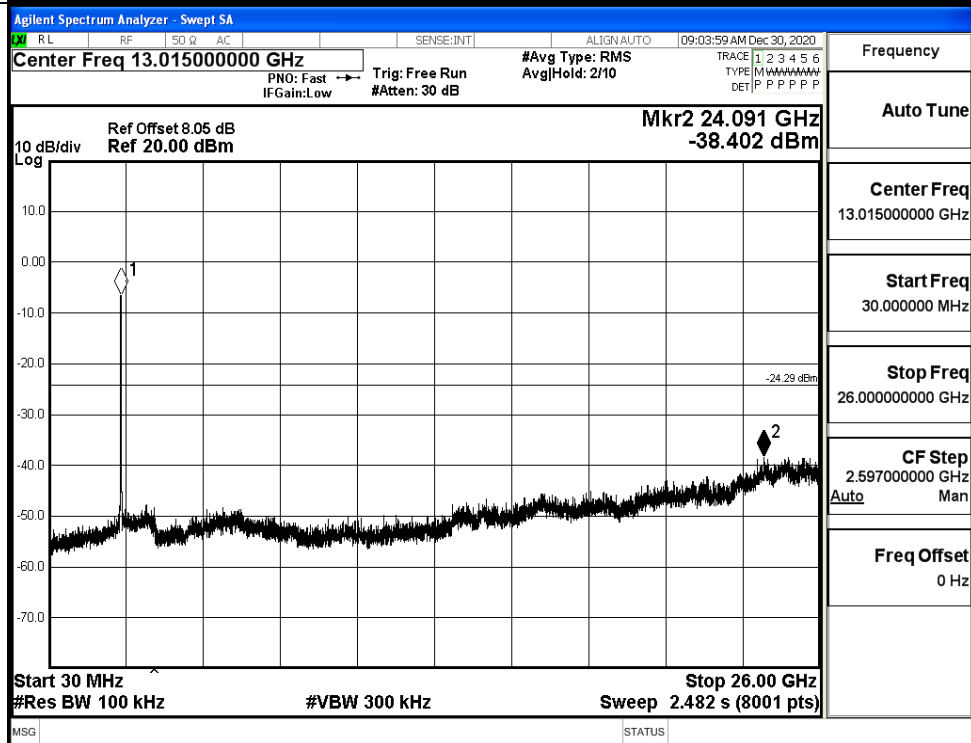


11N40SISO HCH Graphs

Pref/11N40
SISO/HCH



Puw/11N40
SISO/HCH

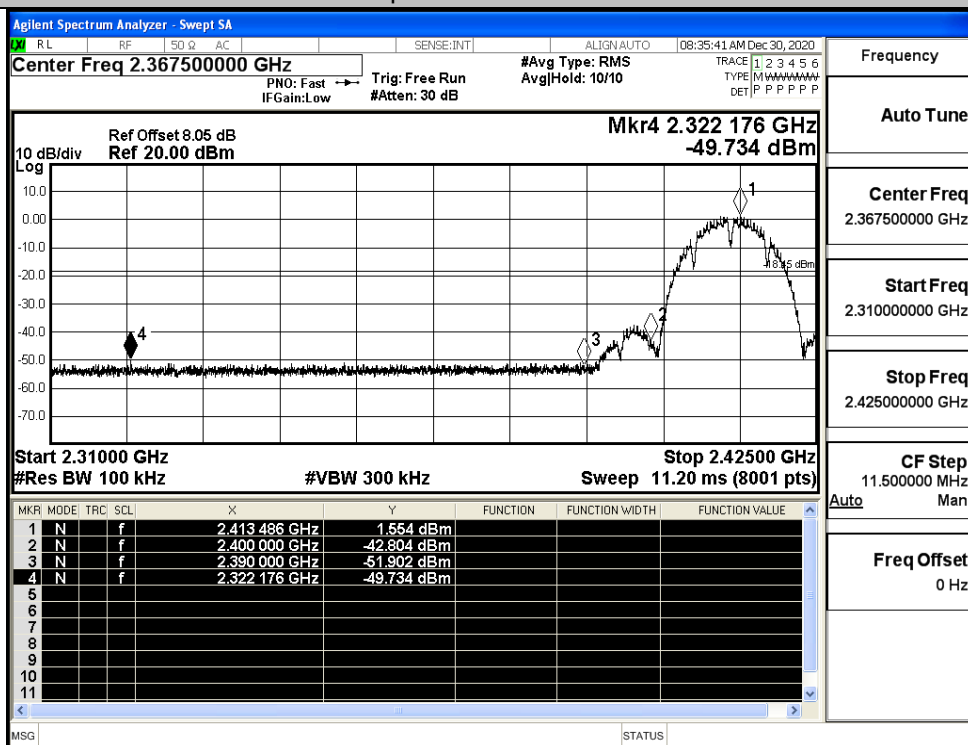


A.6 Band-edge for RF Conducted Emissions

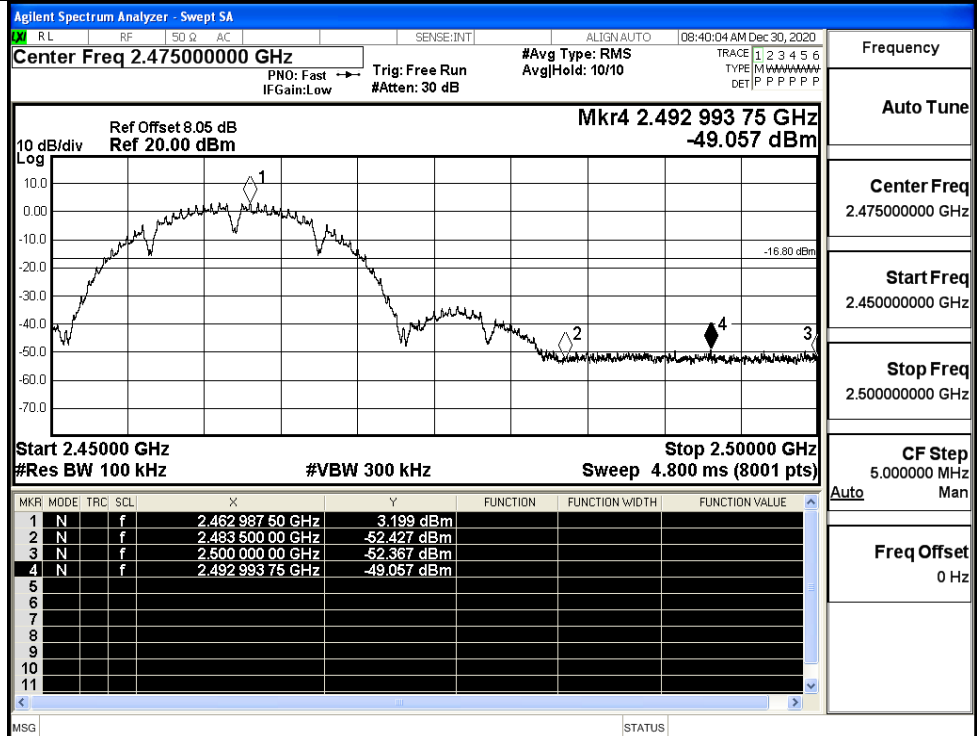
Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	1.554	-49.734	-18.45	PASS
	HCH	3.199	-49.057	-16.8	PASS
11G	LCH	-4.127	-49.507	-24.13	PASS
	HCH	-1.199	-48.884	-21.2	PASS
11N20SISO	LCH	-3.743	-50.198	-23.74	PASS
	HCH	-1.178	-48.589	-21.18	PASS
11N40SISO	LCH	-5.494	-48.908	-25.49	PASS
	HCH	-4.049	-43.297	-24.05	PASS

Test Graphs

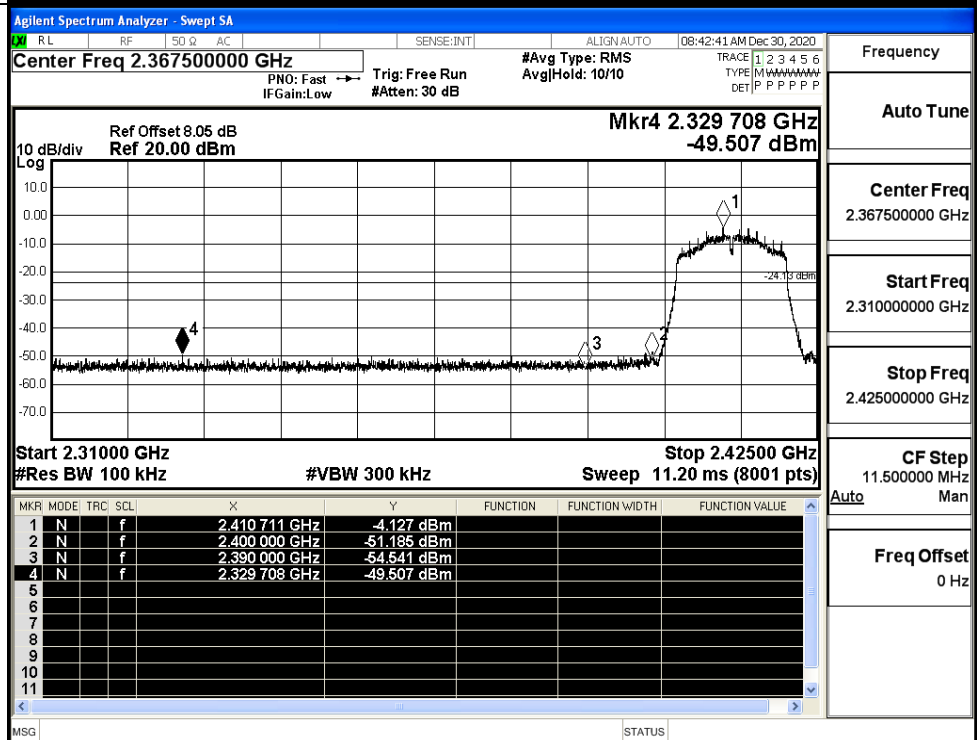
11B/LCH



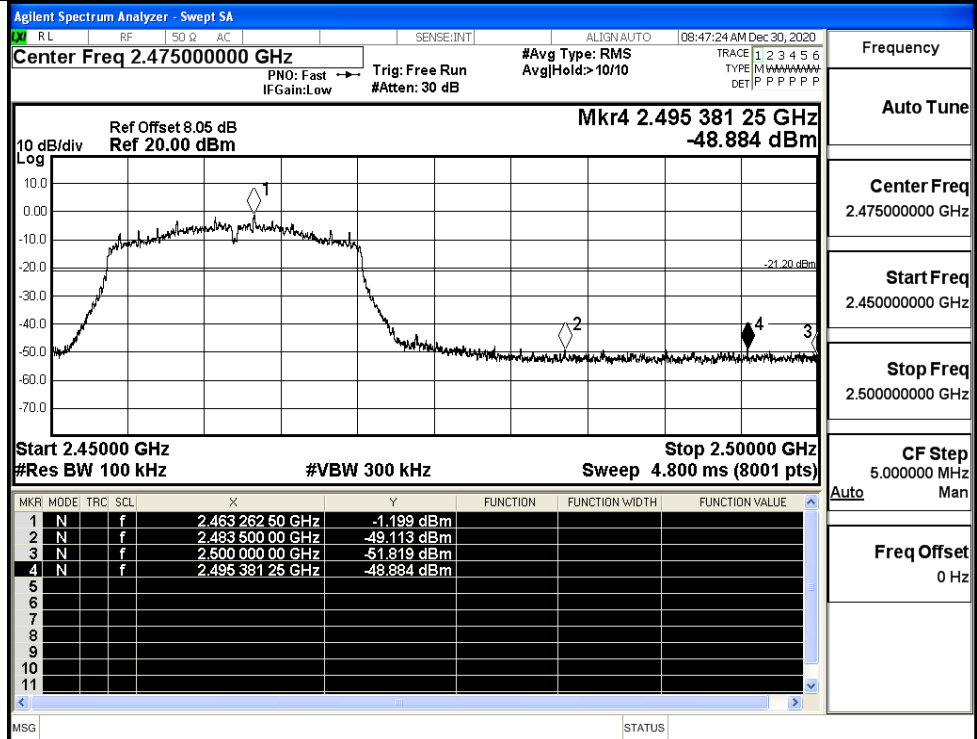
11B/HCH



11G/LCH



11G/HCH



Frequency

Auto Tune

Center Freq
2.475000000 GHz

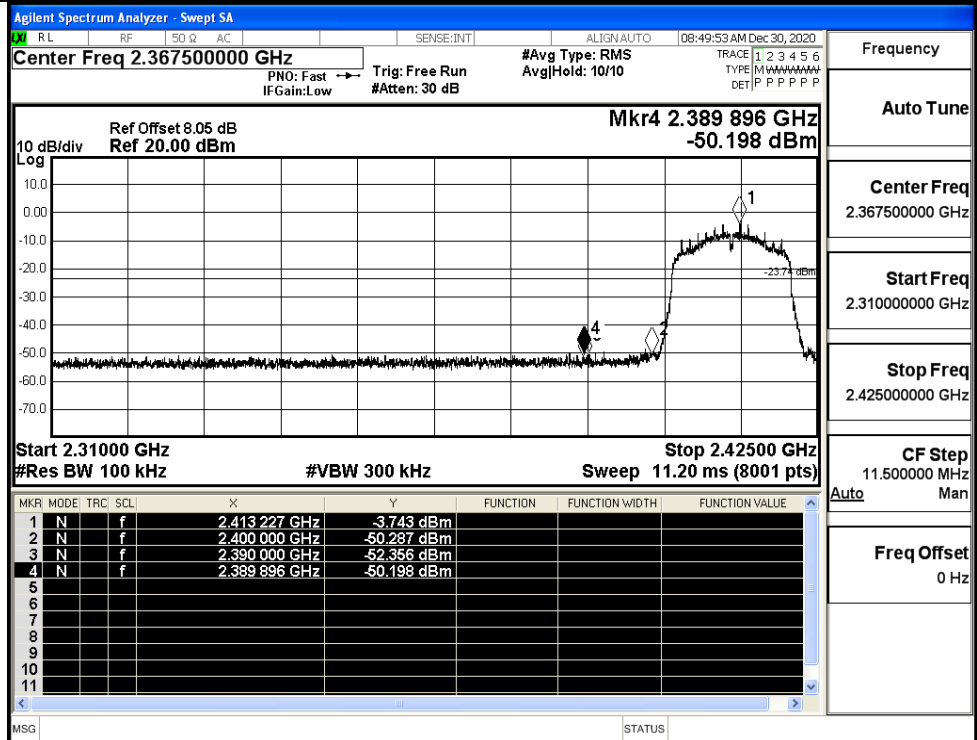
Start Freq
2.450000000 GHz

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 2.499 962 50 GHz -48.589 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	2.463 275 00 GHz	-1.178 dBm			
2	N		f	2.483 500 00 GHz	-52.095 dBm			
3	N		f	2.500 000 00 GHz	-50.586 dBm			
4	N		f	2.499 962 50 GHz	-48.589 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 2.386 562 GHz -48.908 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	2.425 695 GHz	-5.494 dBm			
2	N		f	2.400 000 GHz	-49.846 dBm			
3	N		f	2.390 000 GHz	-50.914 dBm			
4	N		f	2.386 562 GHz	-48.908 dBm			

Frequency

Auto Tune

Center Freq 2.377500000 GHz

Start Freq 2.310000000 GHz

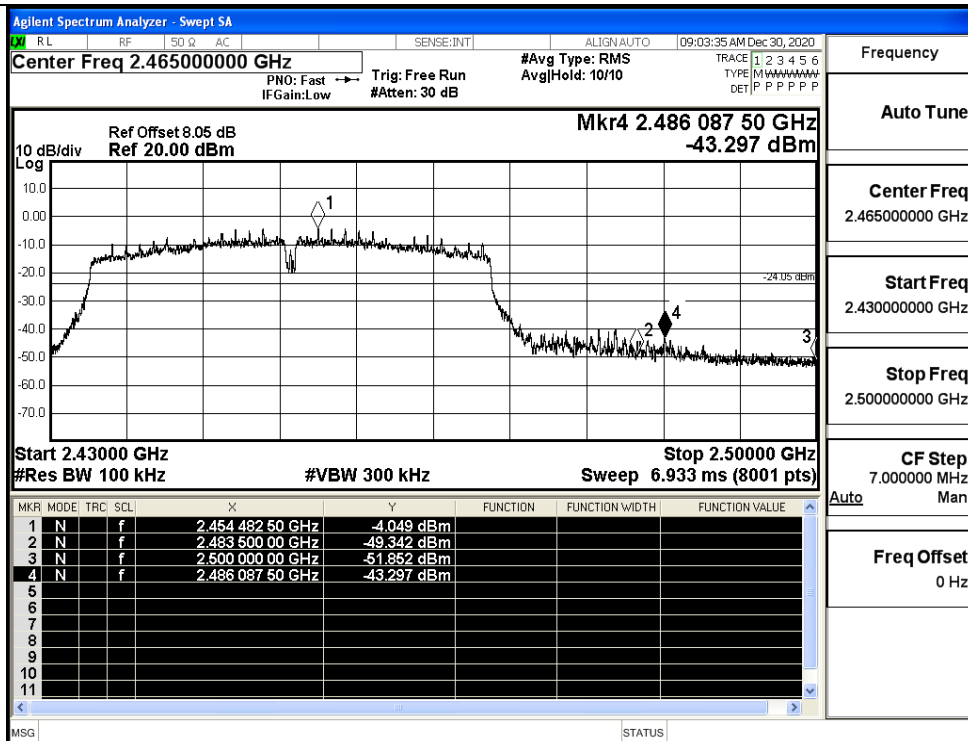
Stop Freq 2.445000000 GHz

CF Step 13.500000 MHz

Auto Man

Freq Offset 0 Hz

11N40SISO/HCH



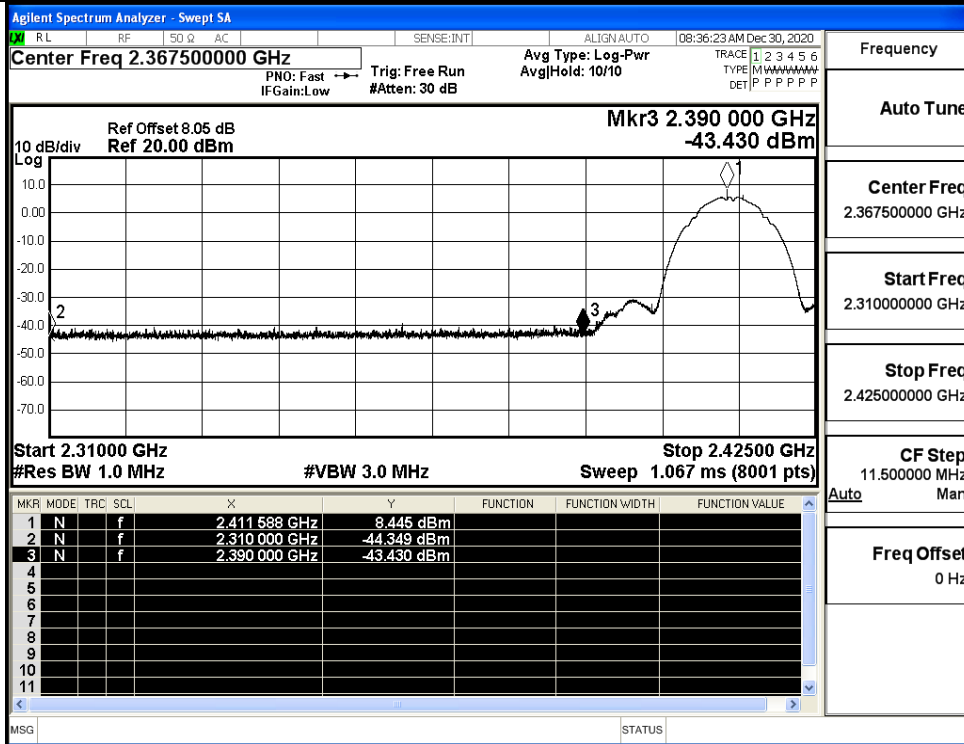
Frequency
Auto Tune
Center Freq 2.465000000 GHz
Start Freq 2.430000000 GHz
Stop Freq 2.500000000 GHz
CF Step 7.000000 MHz
Auto Man
Freq Offset 0 Hz

A.7 Restrict-band band-edge measurements

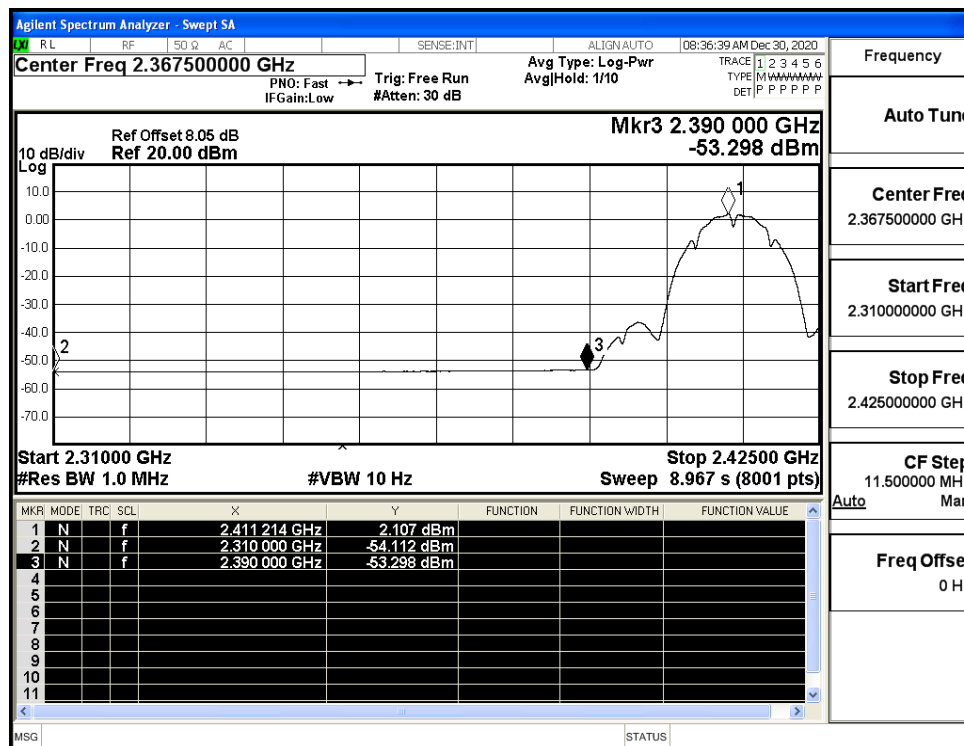
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
11B	2412	Ant1	2310.0	-44.35	2.0	0	52.88	PEAK	74	PASS
	2412	Ant1	2310.0	-54.11	2.0	0	43.12	AV	54	PASS
	2412	Ant1	2390.0	-43.43	2.0	0	53.80	PEAK	74	PASS
	2412	Ant1	2390.0	-53.30	2.0	0	43.93	AV	54	PASS
	2462	Ant1	2483.5	-43.00	2.0	0	54.23	PEAK	74	PASS
	2462	Ant1	2483.5	-52.54	2.0	0	44.69	AV	54	PASS
	2462	Ant1	2500.0	-43.20	2.0	0	54.03	PEAK	74	PASS
	2462	Ant1	2500.0	-52.56	2.0	0	44.67	AV	54	PASS
11G	2412	Ant1	2310.0	-43.44	2.0	0	53.79	PEAK	74	PASS
	2412	Ant1	2310.0	-54.05	2.0	0	43.18	AV	54	PASS
	2412	Ant1	2390.0	-43.09	2.0	0	54.14	PEAK	74	PASS
	2412	Ant1	2390.0	-53.52	2.0	0	43.71	AV	54	PASS
	2462	Ant1	2483.5	-42.18	2.0	0	55.05	PEAK	74	PASS
	2462	Ant1	2483.5	-52.60	2.0	0	44.63	AV	54	PASS
	2462	Ant1	2500.0	-42.03	2.0	0	55.20	PEAK	74	PASS
	2462	Ant1	2500.0	-52.43	2.0	0	44.80	AV	54	PASS
11N20 SISO	2412	Ant1	2310.0	-43.51	2.0	0	53.72	PEAK	74	PASS
	2412	Ant1	2310.0	-53.99	2.0	0	43.24	AV	54	PASS
	2412	Ant1	2390.0	-43.45	2.0	0	53.78	PEAK	74	PASS
	2412	Ant1	2390.0	-53.45	2.0	0	43.78	AV	54	PASS
	2462	Ant1	2483.5	-40.80	2.0	0	56.43	PEAK	74	PASS
	2462	Ant1	2483.5	-52.34	2.0	0	44.89	AV	54	PASS
	2462	Ant1	2500.0	-41.14	2.0	0	56.09	PEAK	74	PASS
	2462	Ant1	2500.0	-52.15	2.0	0	45.08	AV	54	PASS
11N40 SISO	2422	Ant1	2310.0	-43.58	2.0	0	53.65	PEAK	74	PASS
	2422	Ant1	2310.0	-53.65	2.0	0	43.58	AV	54	PASS
	2422	Ant1	2390.0	-40.59	2.0	0	56.64	PEAK	74	PASS

	2422	Ant1	2390.0	-52.09	2.0	0	45.14	AV	54	PASS
	2452	Ant1	2483.5	-35.96	2.0	0	61.27	PEAK	74	PASS
	2452	Ant1	2483.5	-48.68	2.0	0	48.55	AV	54	PASS
	2452	Ant1	2500.0	-40.57	2.0	0	56.66	PEAK	74	PASS
	2452	Ant1	2500.0	-51.98	2.0	0	45.25	AV	54	PASS

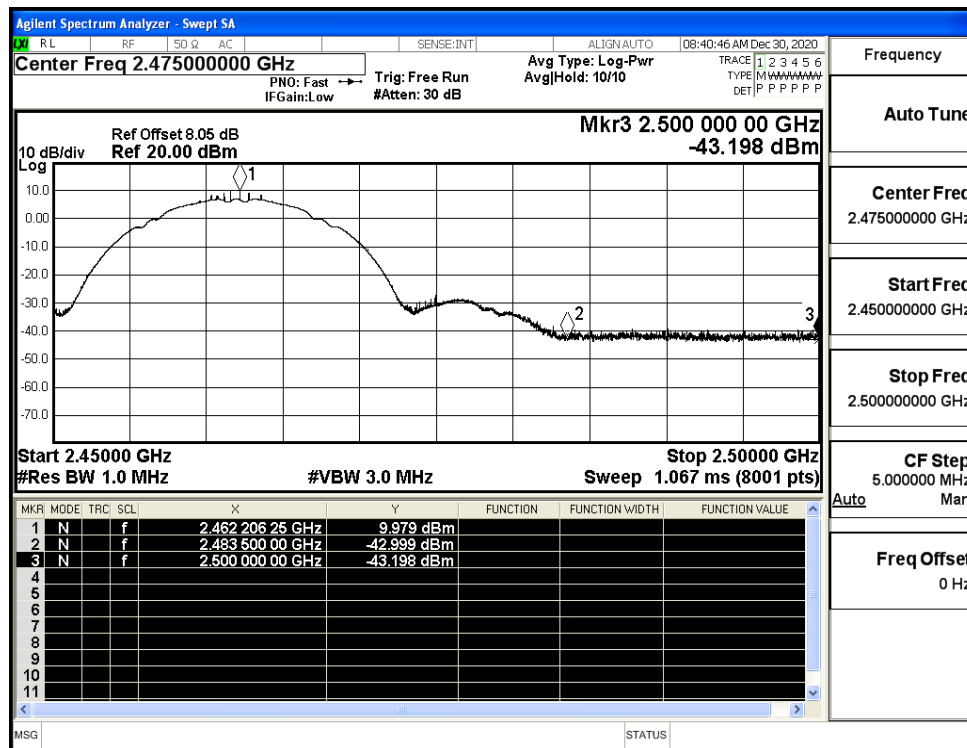
Restrict-band band-edge measurements_11B_2412_Ant1_PEAK



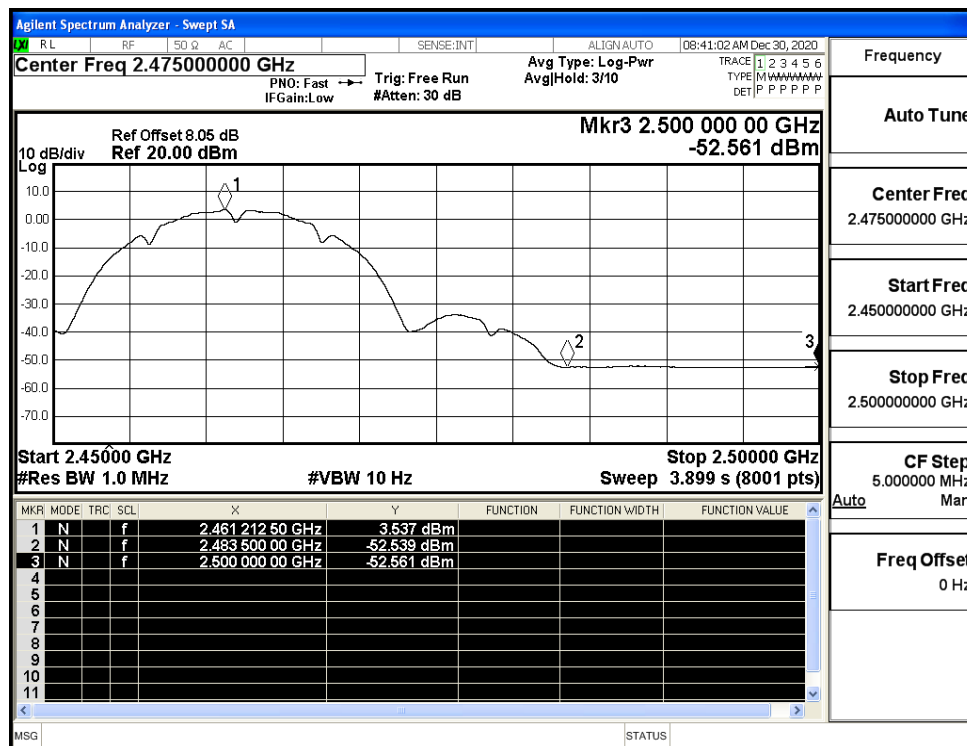
Restrict-band band-edge measurements_11B_2412_Ant1_AV



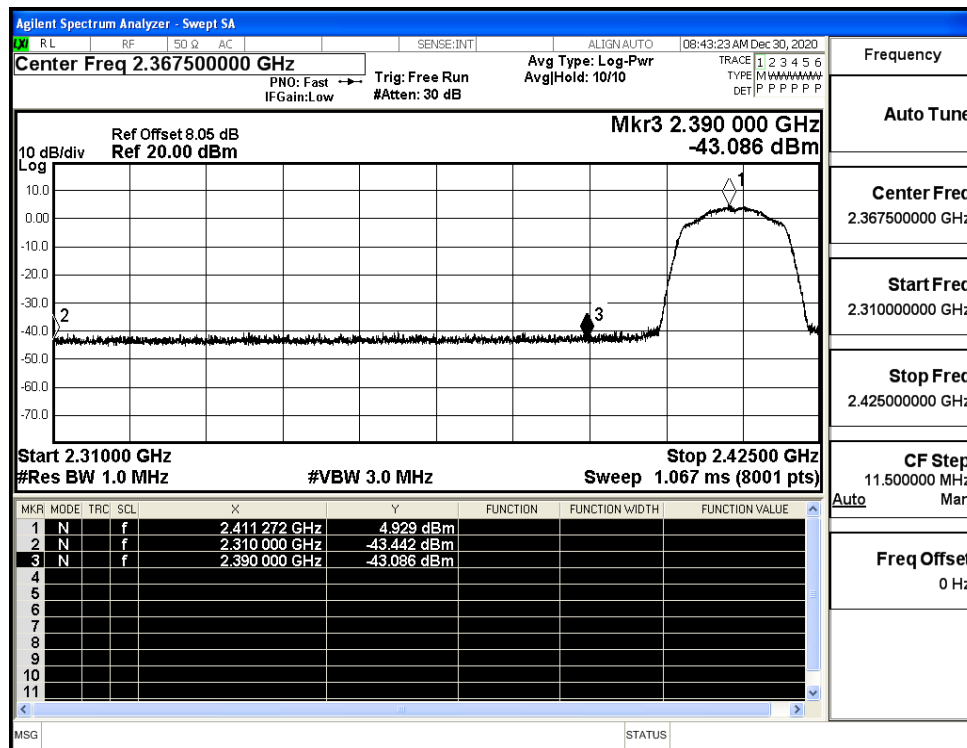
Restrict-band band-edge measurements_11B_2462_Ant1_PEAK



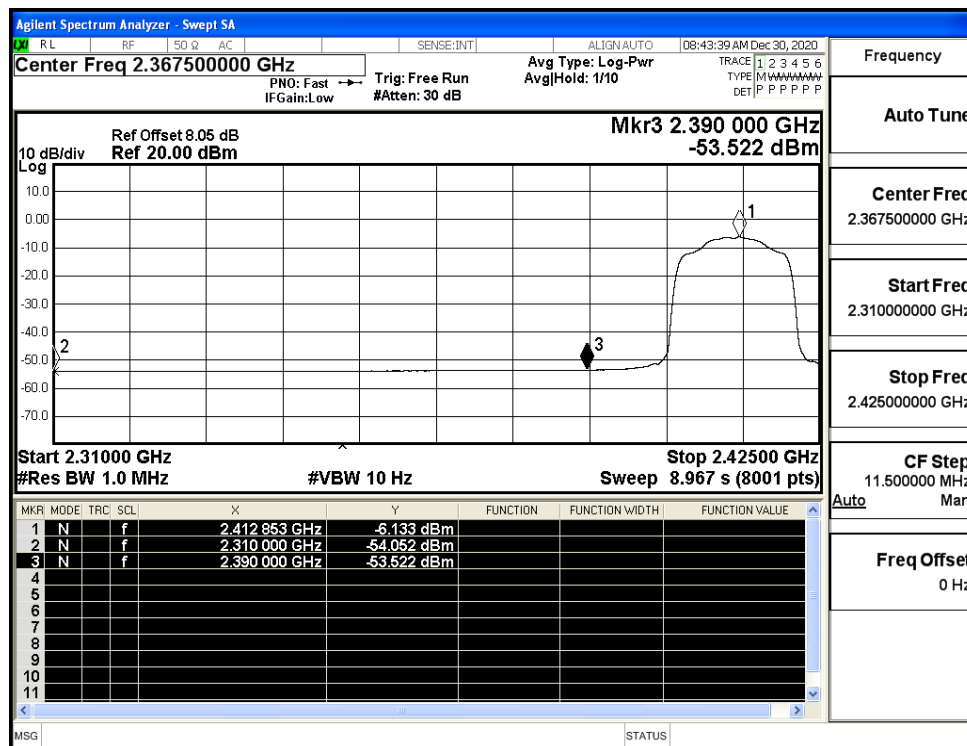
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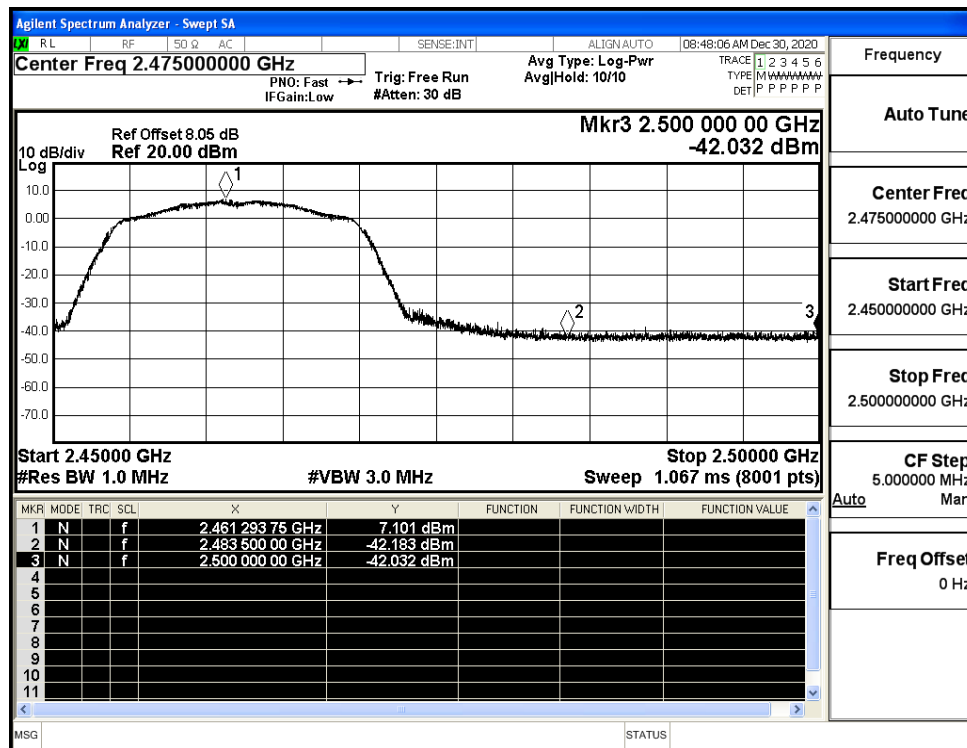
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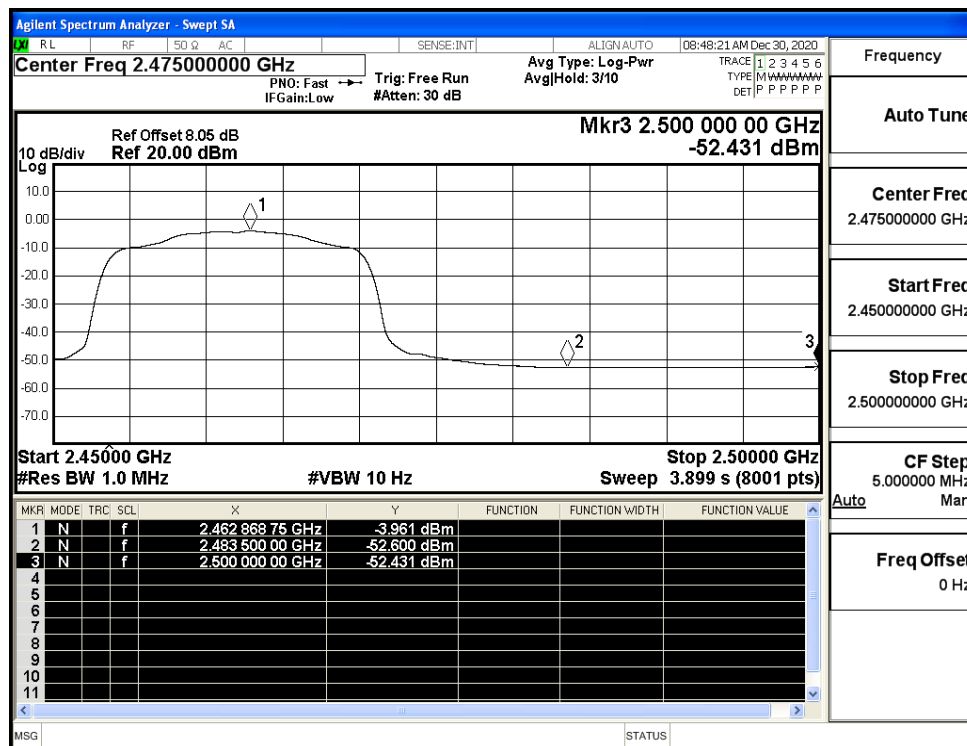
Restrict-band band-edge measurements_11G_2412_Ant1_AV



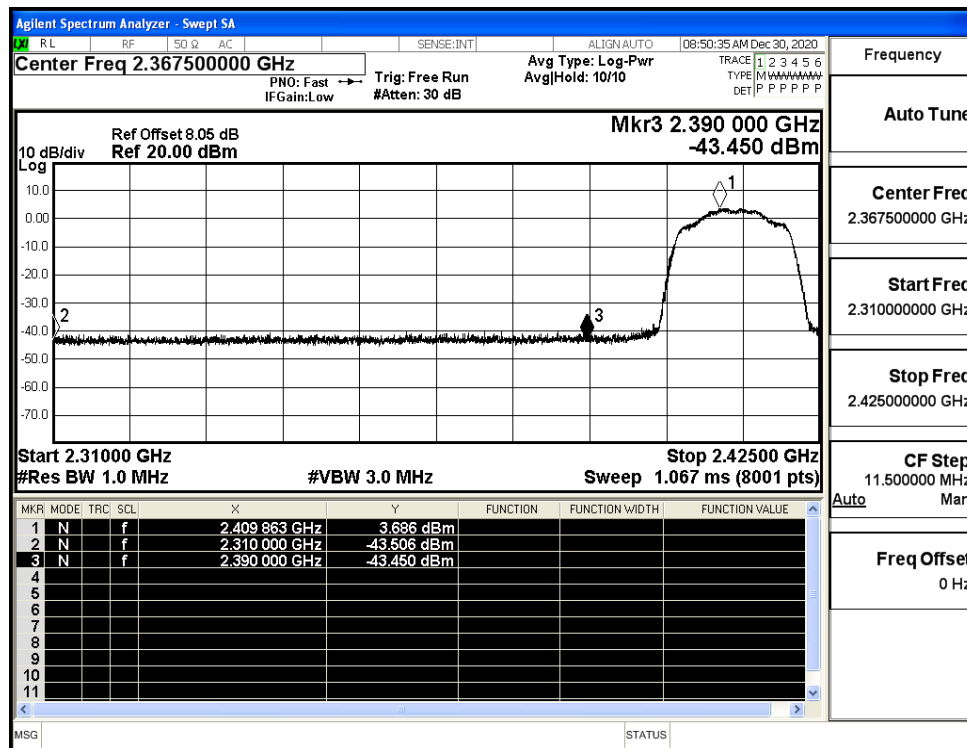
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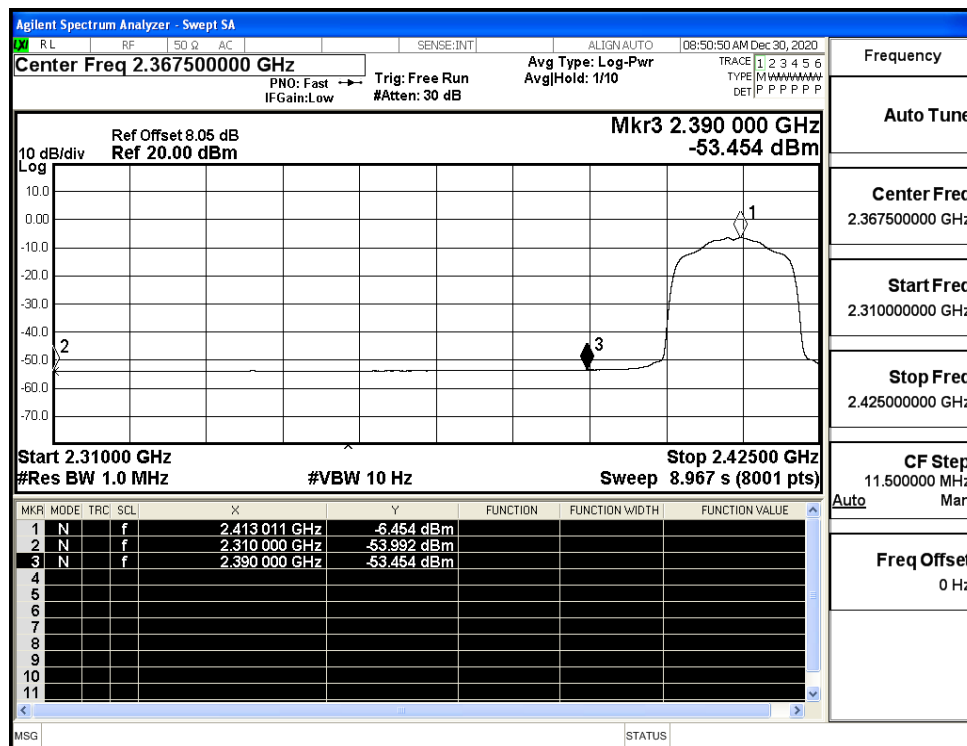
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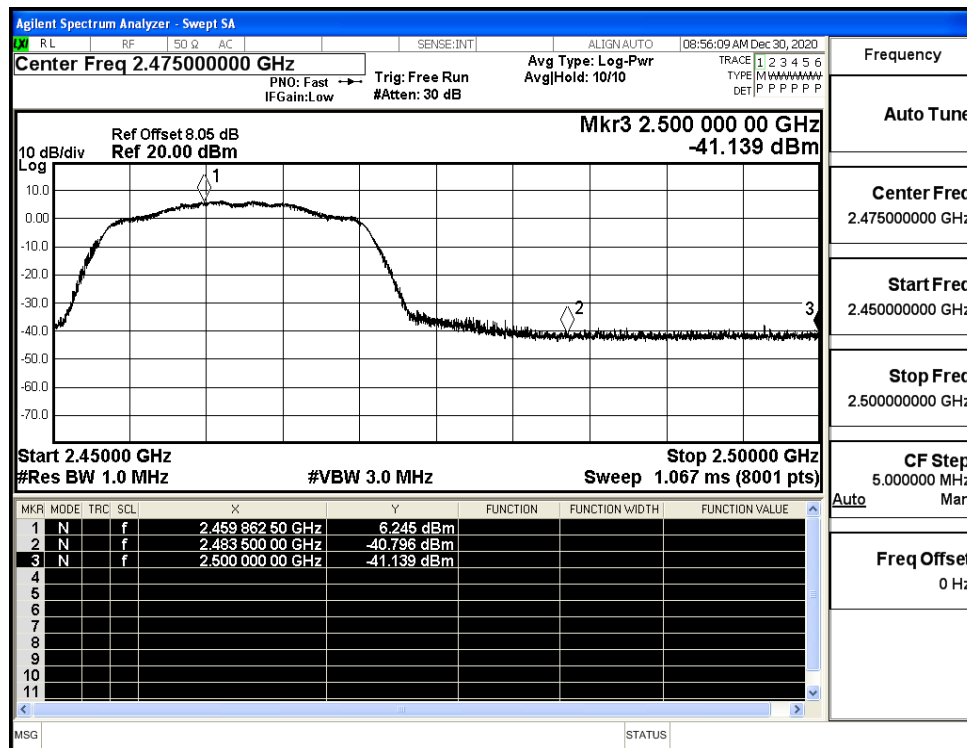
Restrict-band band-edge measurements_11N20SISO_2412_Ant1_PEAK



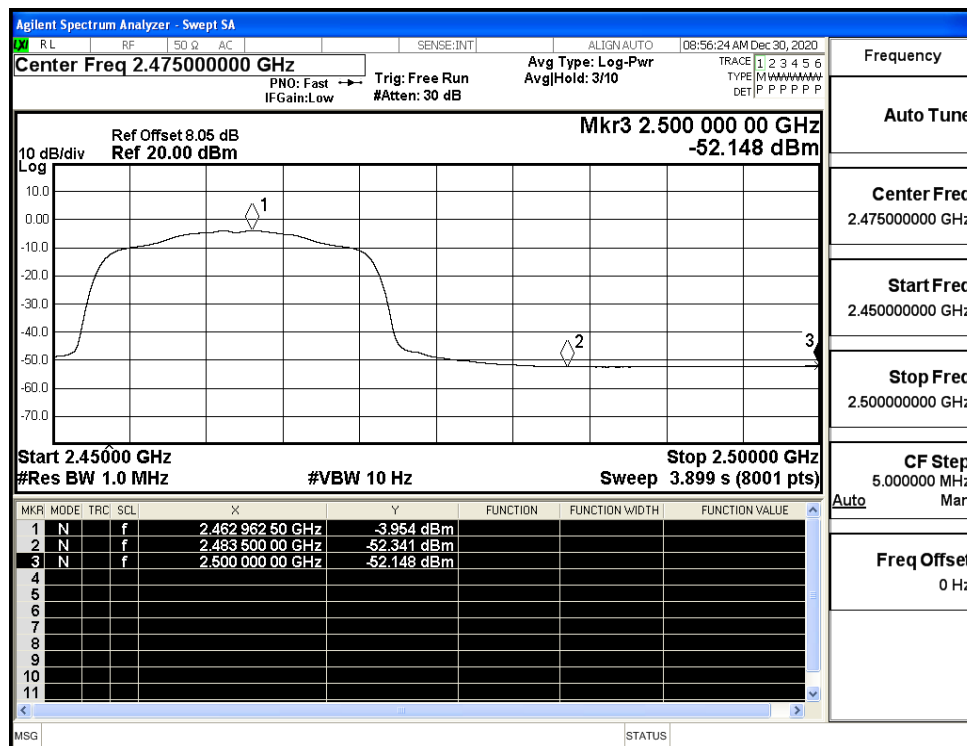
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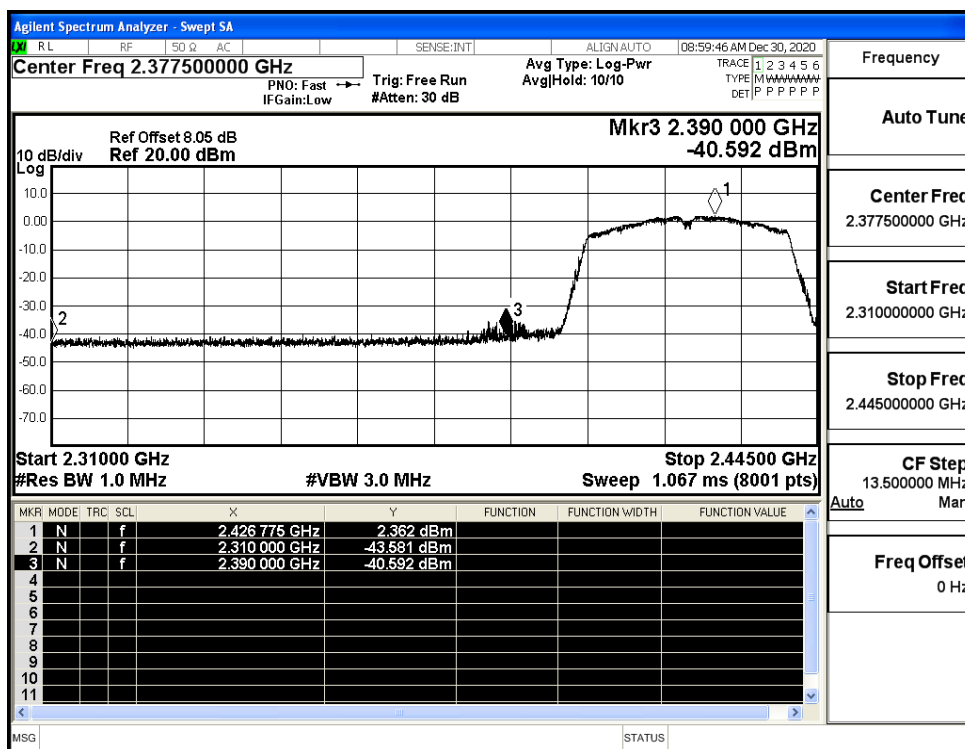
Restrict-band band-edge measurements_11N20SISO_2462_Ant1_PEAK



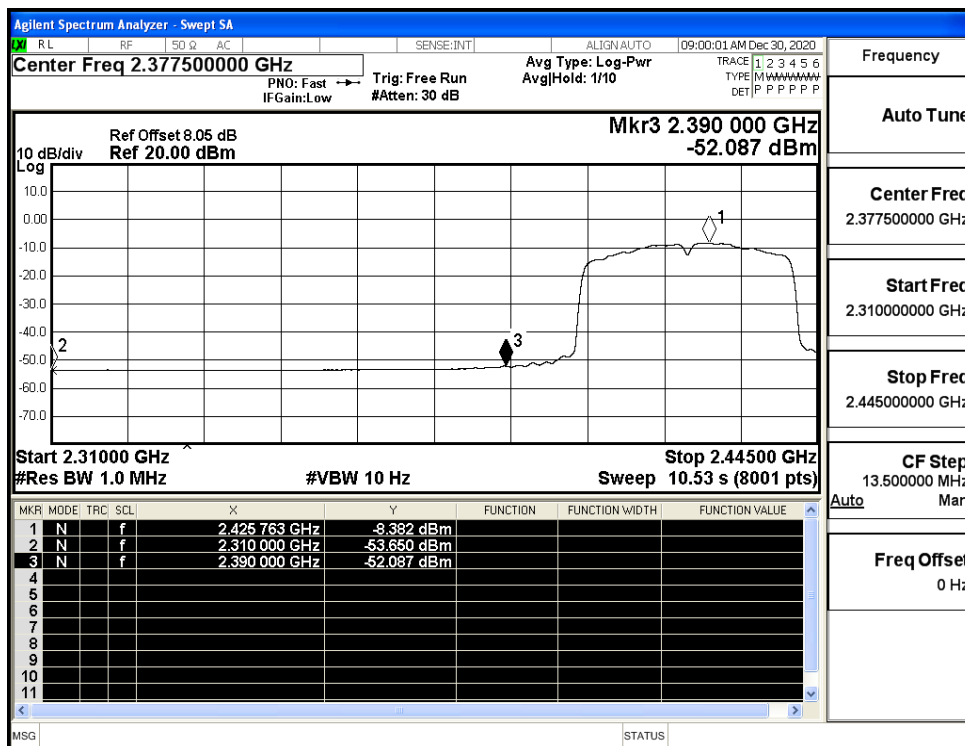
Restrict-band band-edge measurements_11N20SISO_2462_Ant1_AV



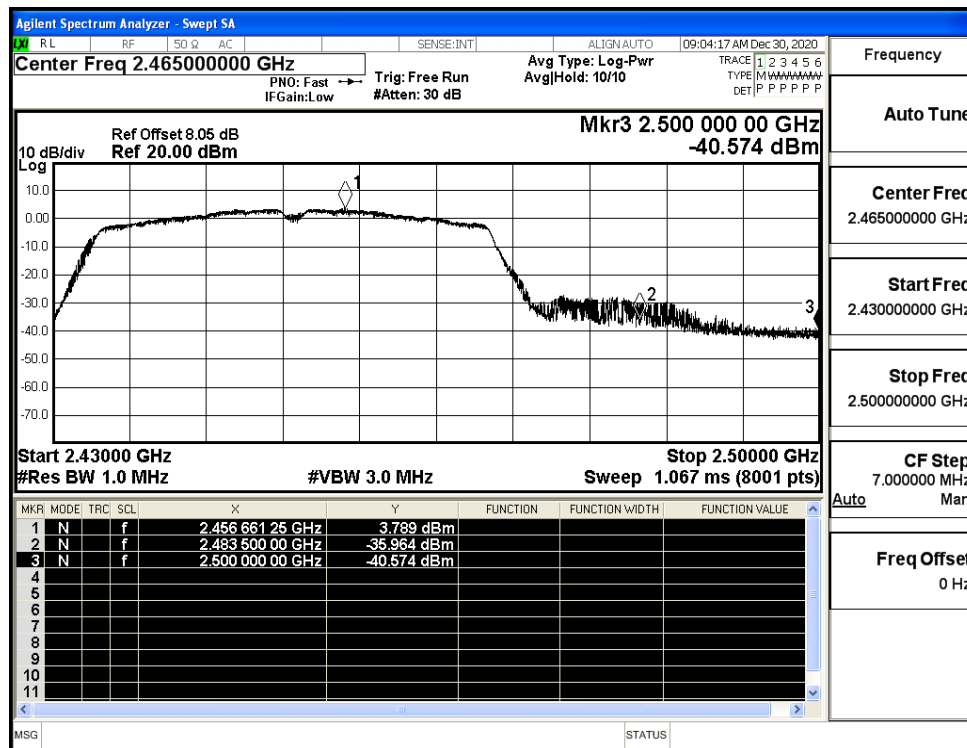
Restrict-band band-edge measurements_11N40SISO_2422_Ant1_PEAK



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

