

Appendix C

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Knock Knock Smart Doorbell

Trade Mark: Smartech

Test Model: DB-190001

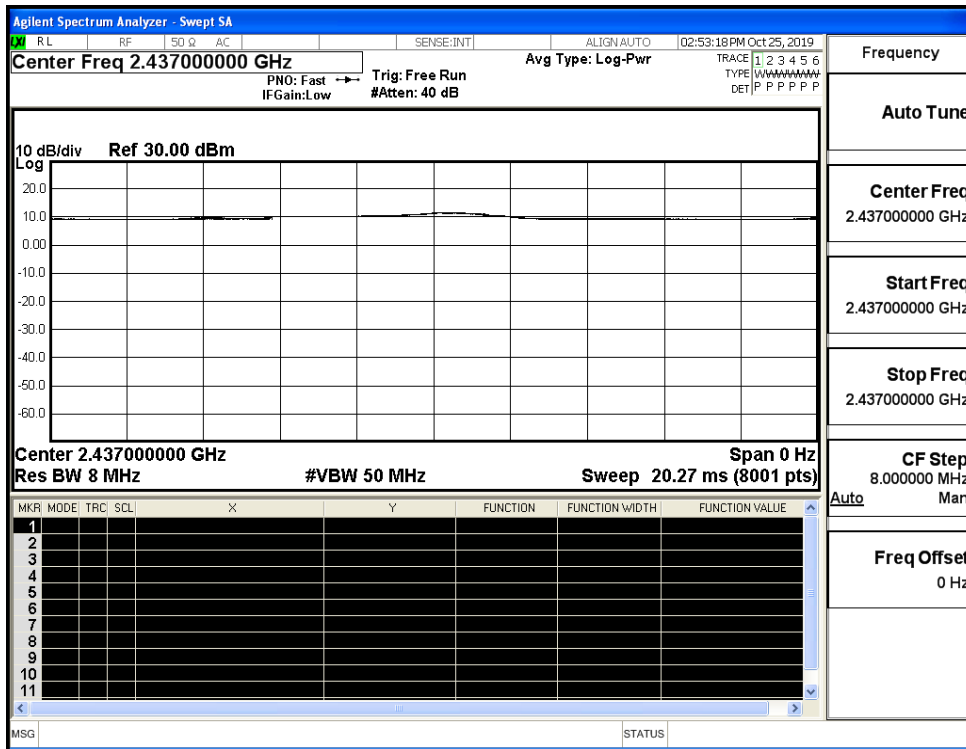
Environmental Conditions

Temperature:	23.3 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	JK ZHOU
Supervised by:	Wang.Chuang

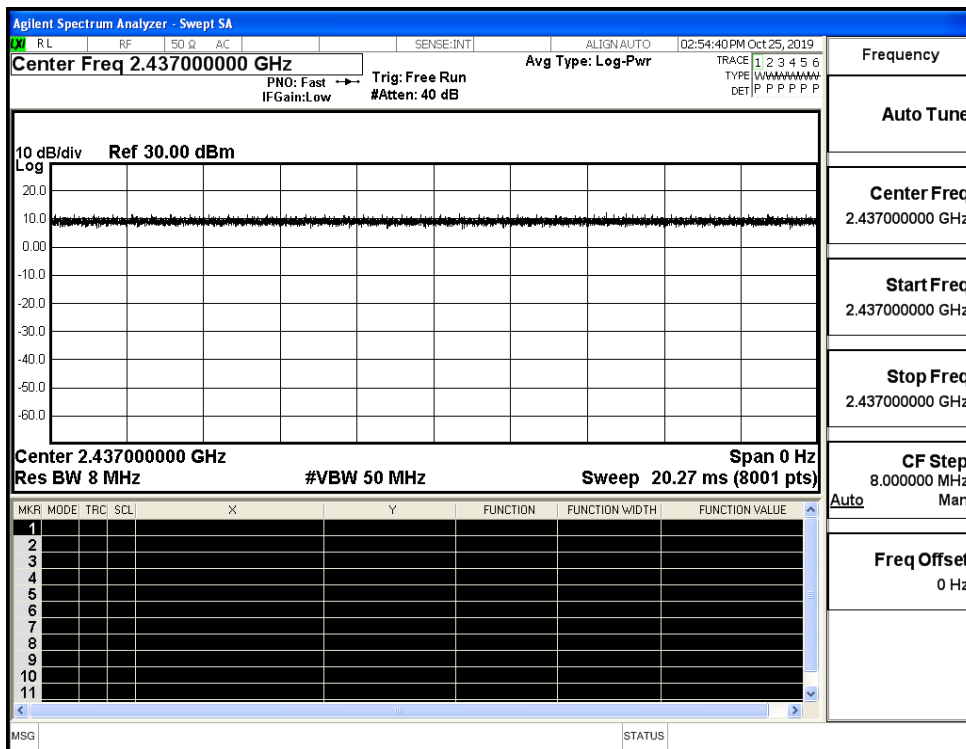
C.1 Duty Cycle

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

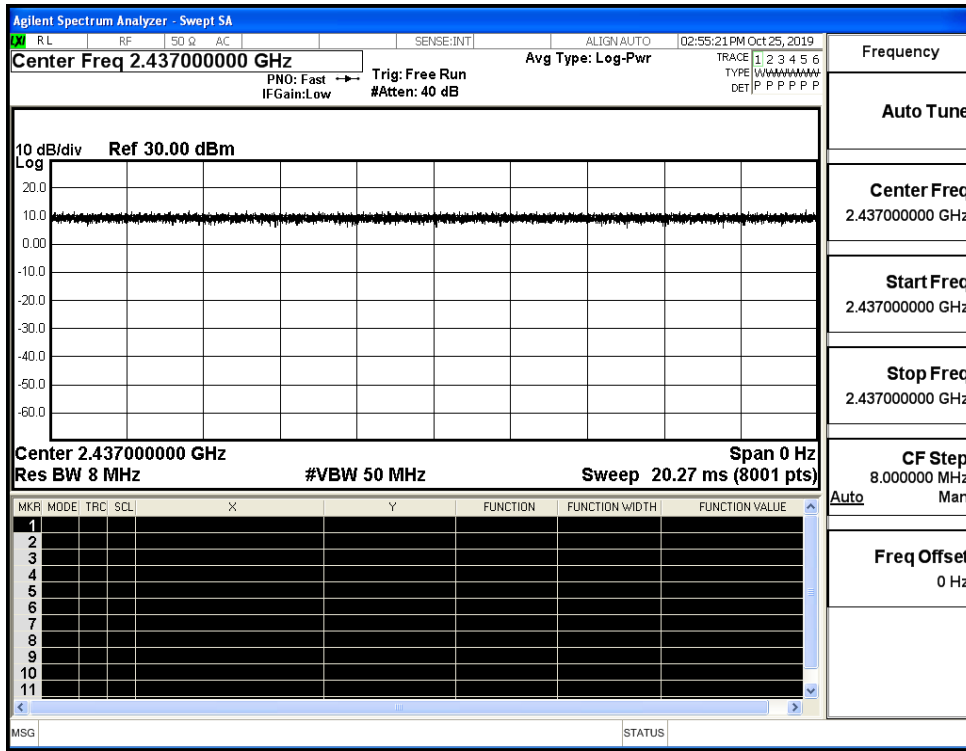
Duty Cycle_11B_2437_Ant1



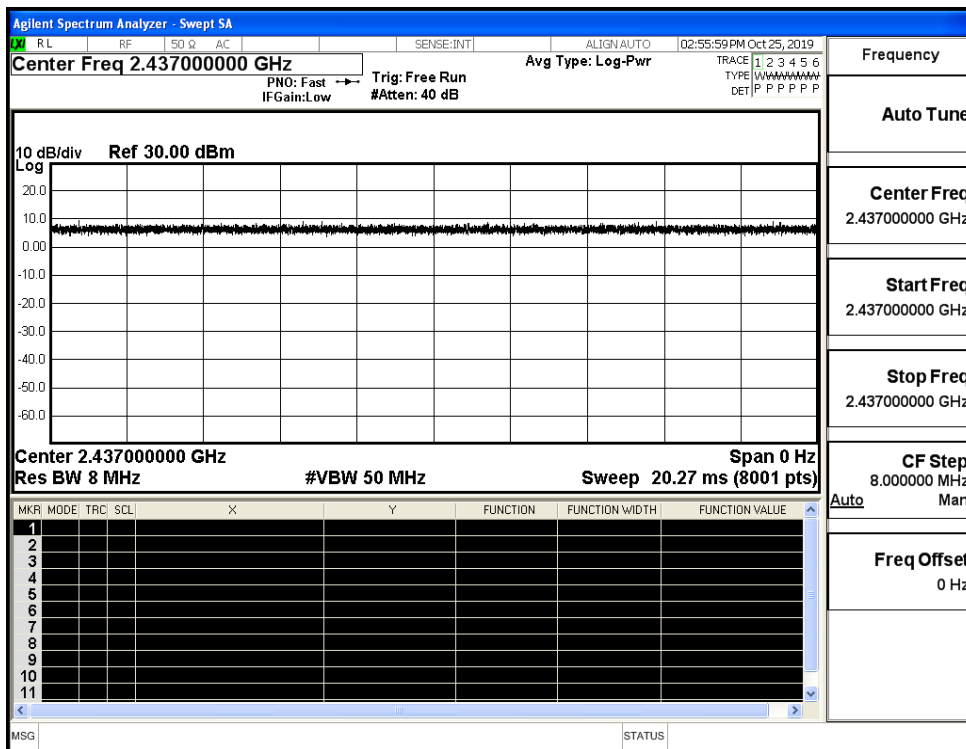
Duty Cycle_11G_2437_Ant1



Duty Cycle_11N20SISO_2437_Ant1



Duty Cycle_11N40SISO_2437_Ant1

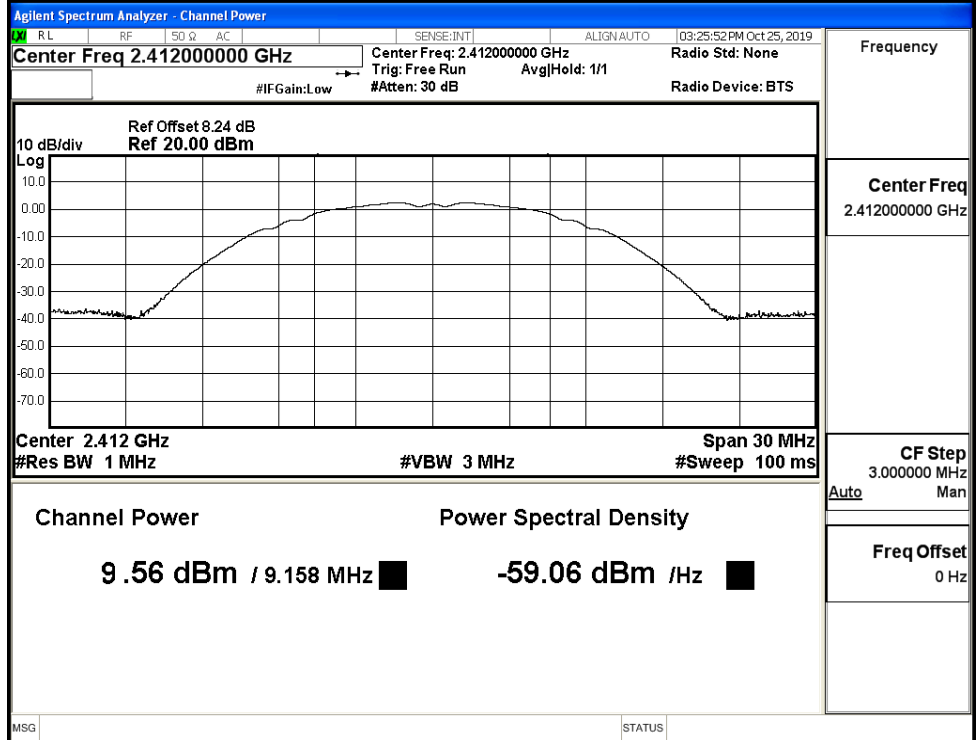


C.2 Maximum Conducted Output Power

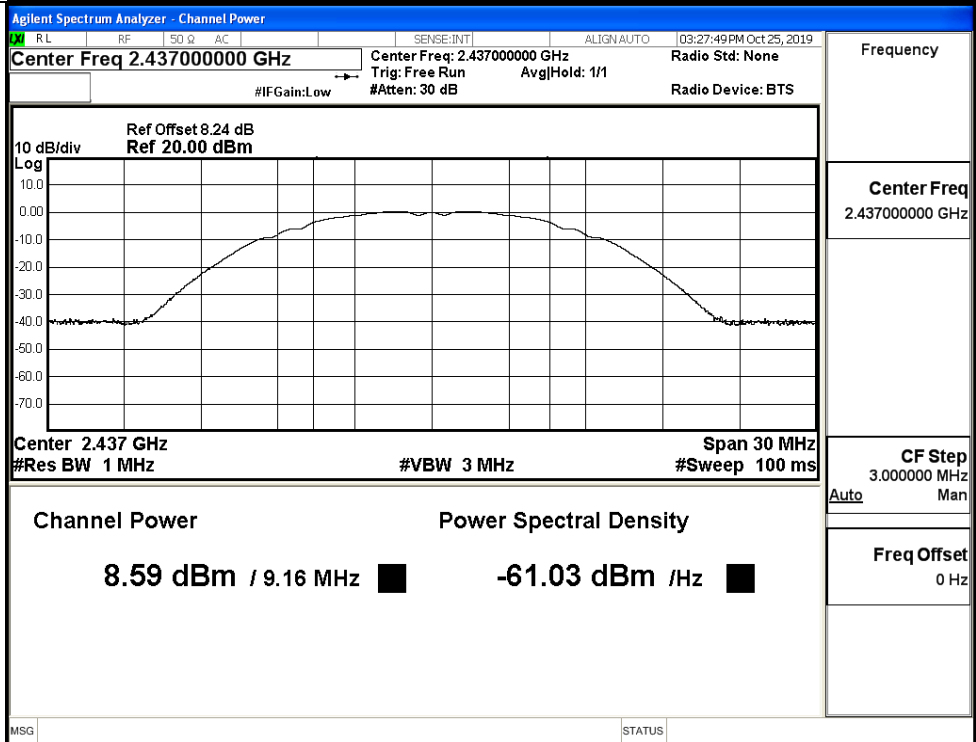
Mode	Channel	Meas.Level [dBm]	Limit [dBm]	Verdict
11B	LCH	9.56	30	PASS
	MCH	8.59	30	PASS
	HCH	7.56	30	PASS
11G	LCH	7.99	30	PASS
	MCH	7.78	30	PASS
	HCH	7.47	30	PASS
11N20SISO	LCH	8.18	30	PASS
	MCH	7.69	30	PASS
	HCH	8.15	30	PASS
11N40SISO	LCH	7.66	30	PASS
	MCH	7.72	30	PASS
	HCH	8.18	30	PASS

Test Graphs

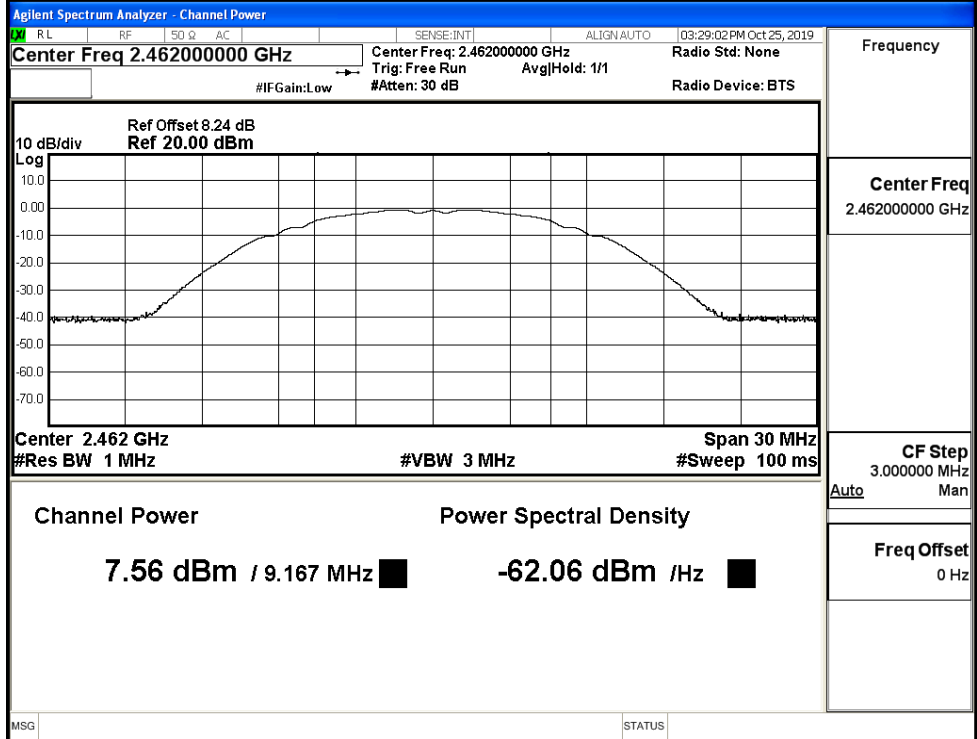
11B/LCH



11B/MCH

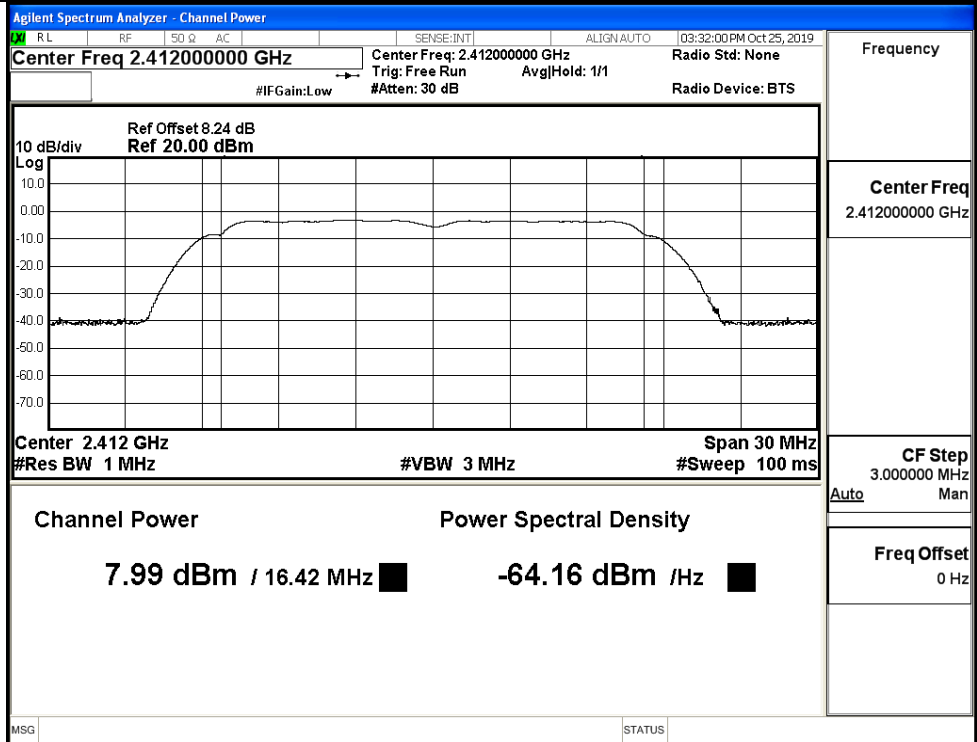


11B/HCH



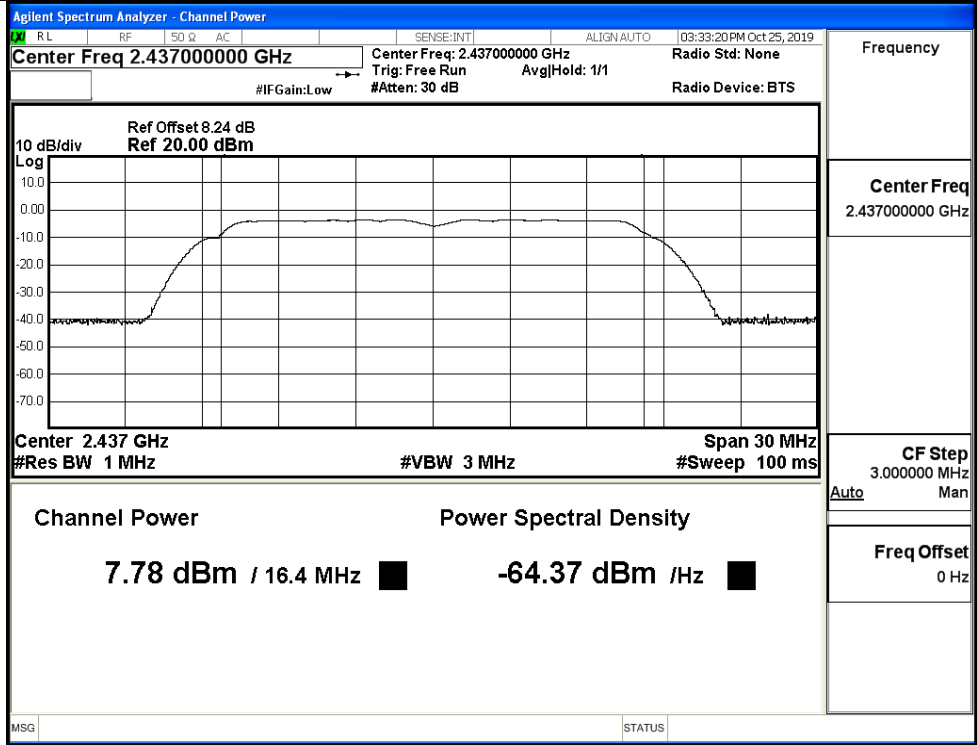
Frequency	2.46200000 GHz
Center Freq	2.46200000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

11G/LCH

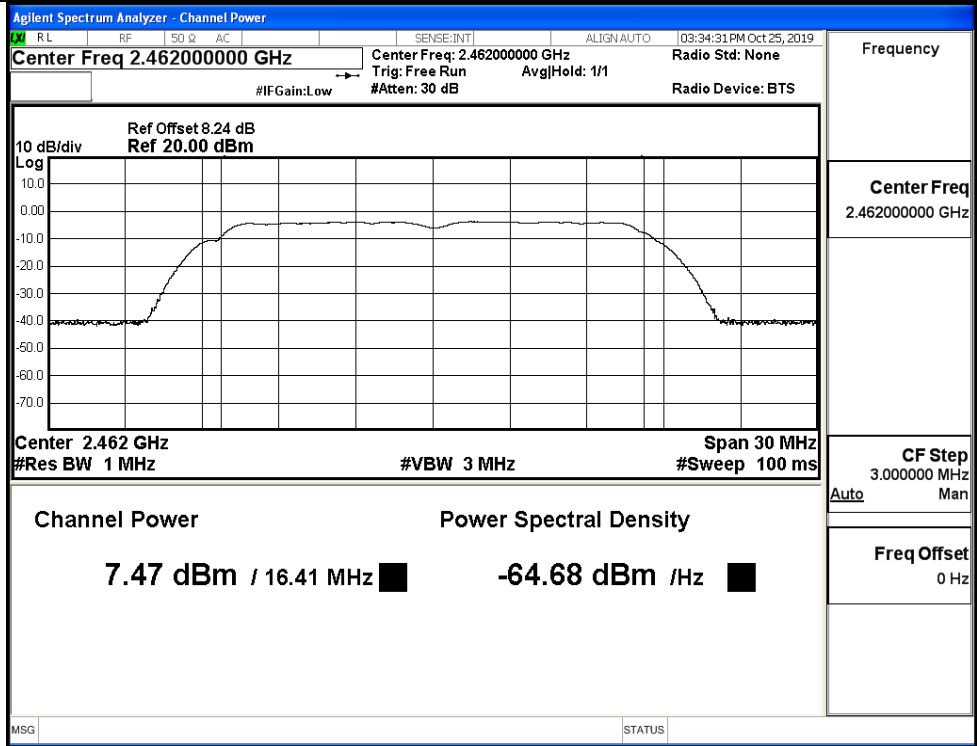


Frequency	2.41200000 GHz
Center Freq	2.41200000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

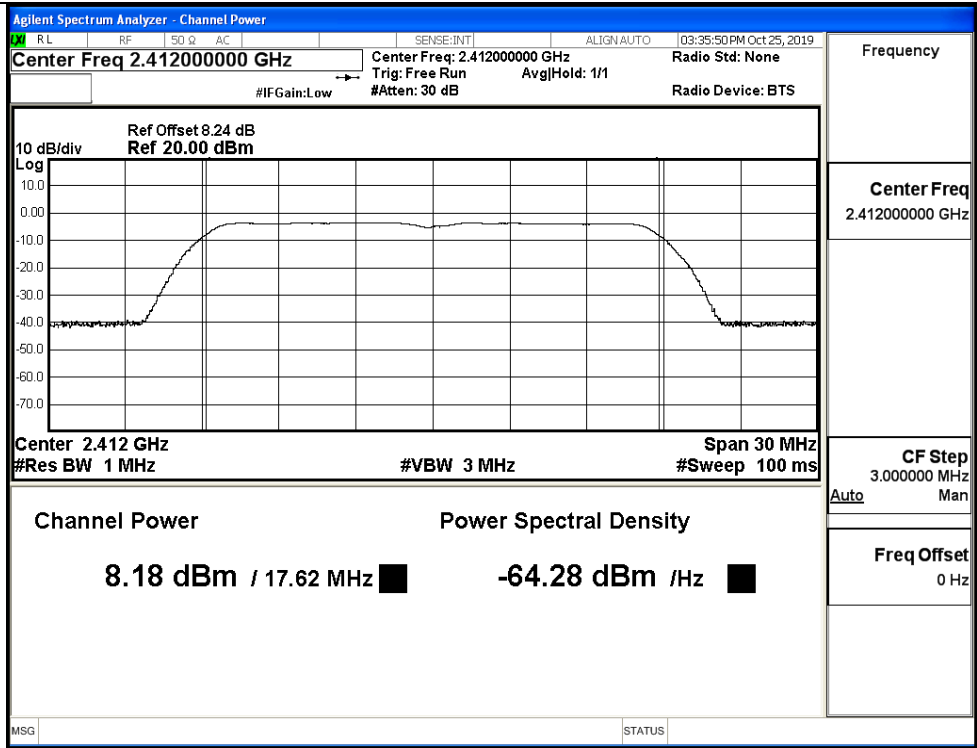
11G/MCH



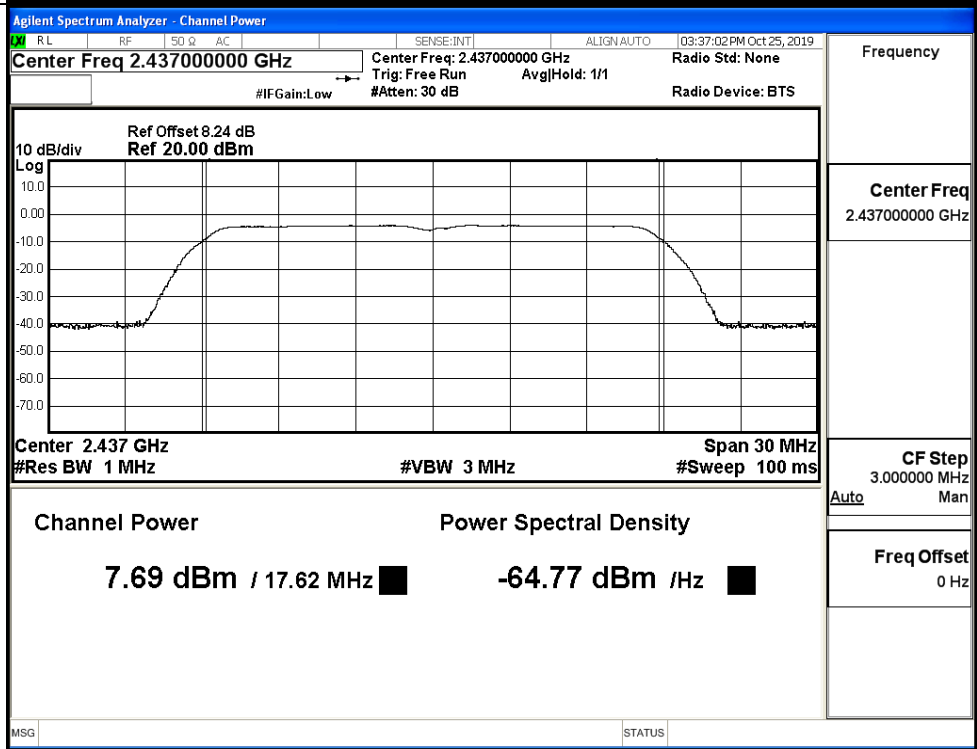
11G/HCH



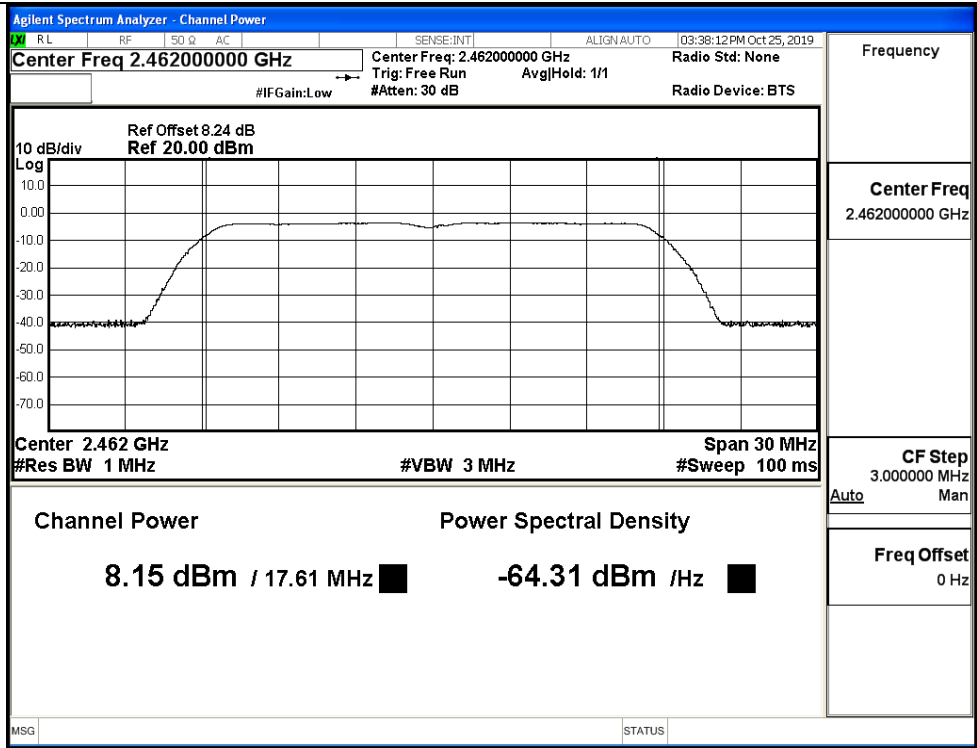
11N20SISO/LCH



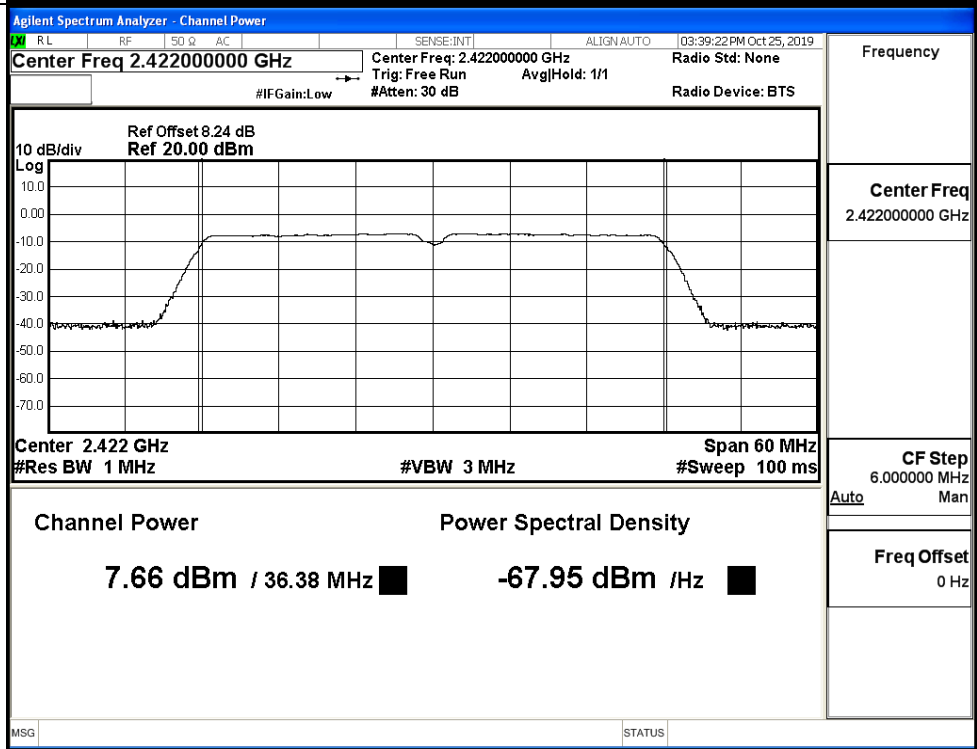
11N20SISO/MCH



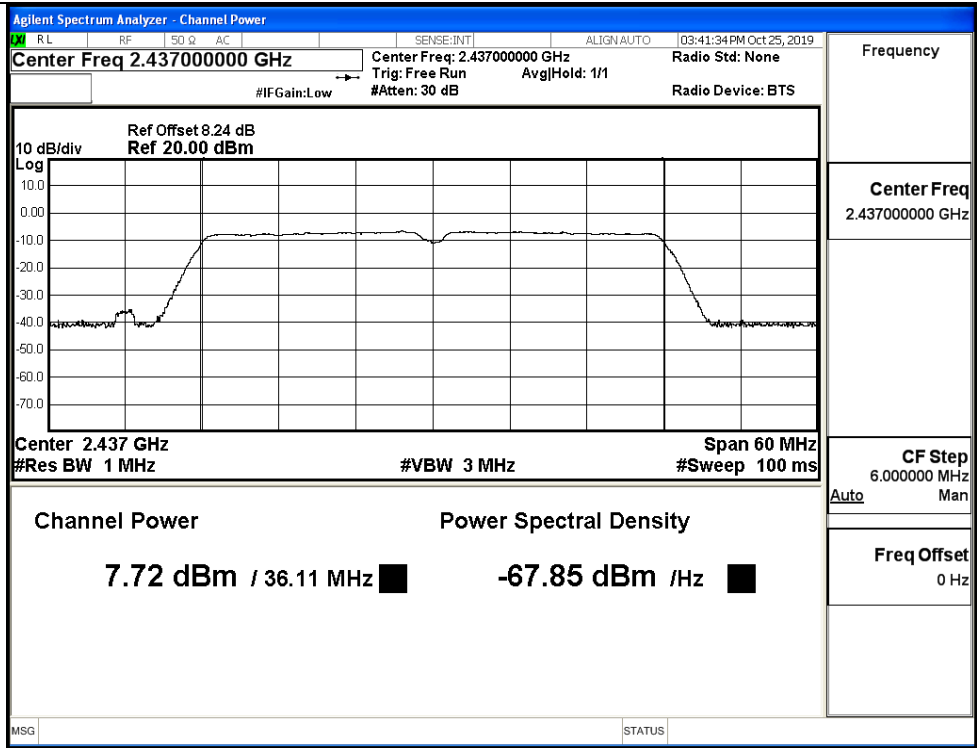
11N20SISO/HCH



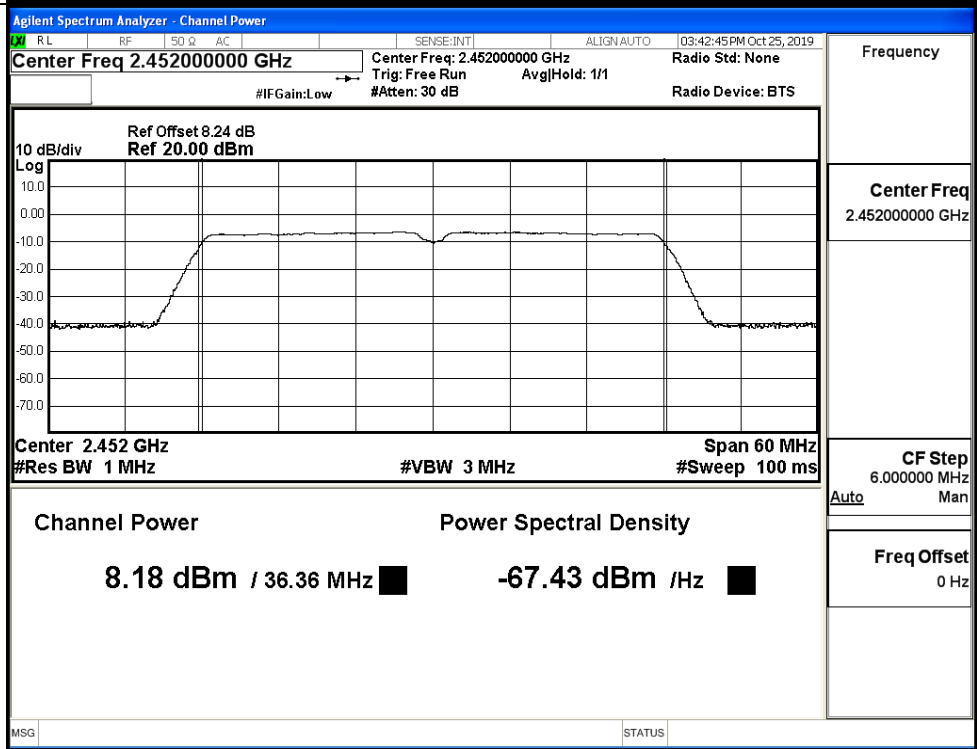
11N40SISO/LCH



11N40SISO/MCH

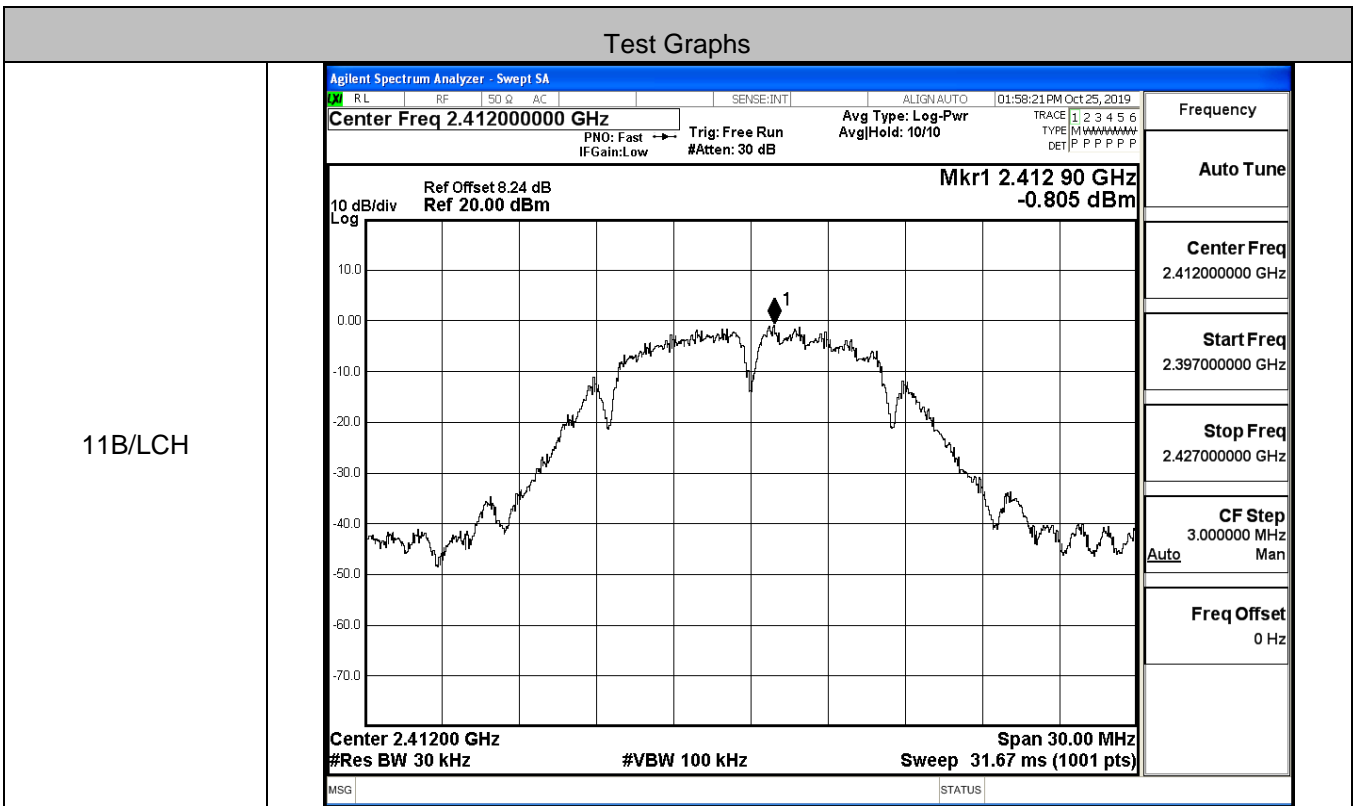


11N40SISO/HCH

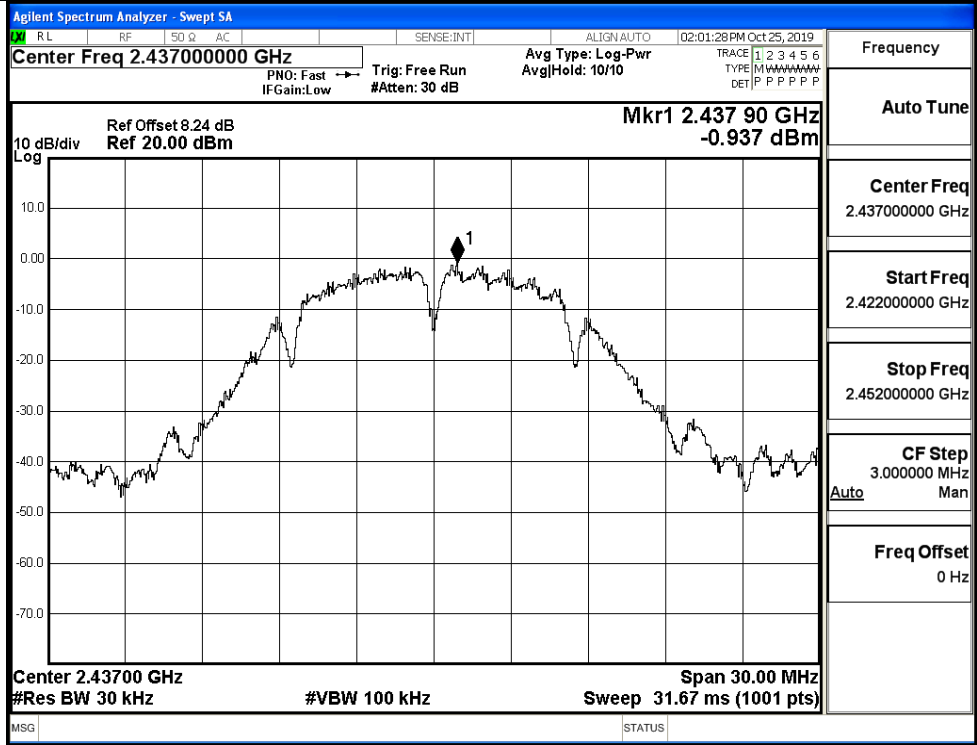


C.3 Maximum Power Spectral Density

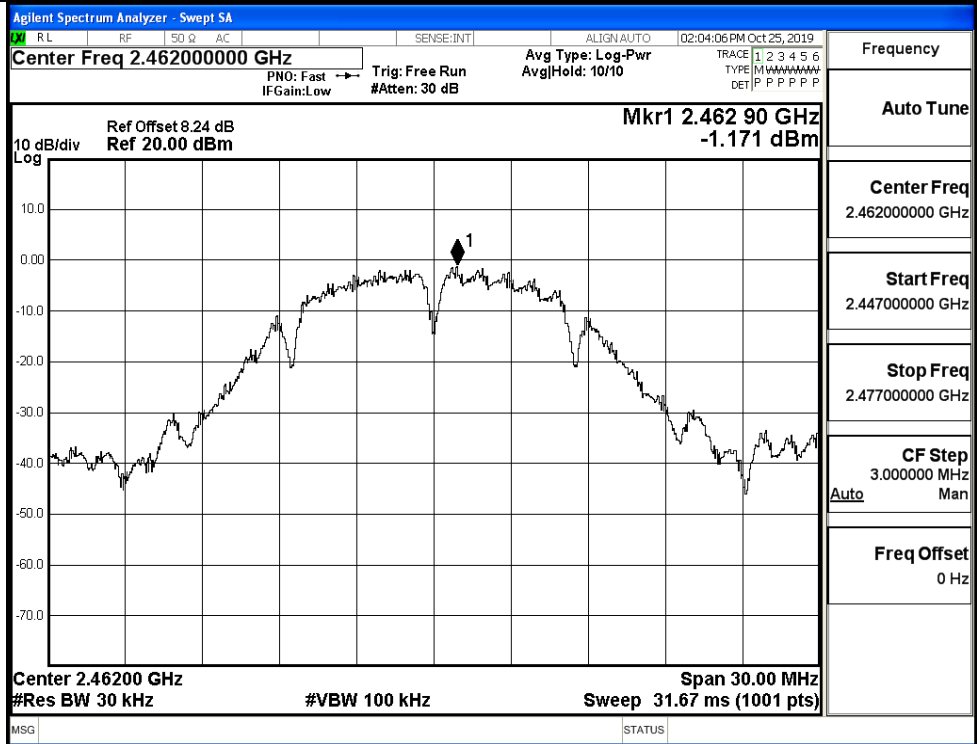
Mode	Channel	Meas.Level [dBm/30KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-0.805	8	PASS
	MCH	-0.937	8	PASS
	HCH	-1.171	8	PASS
11G	LCH	-6.500	8	PASS
	MCH	-6.678	8	PASS
	HCH	-6.722	8	PASS
11N20SISO	LCH	-5.686	8	PASS
	MCH	-5.572	8	PASS
	HCH	-5.953	8	PASS
11N40SISO	LCH	-9.799	8	PASS
	MCH	-9.342	8	PASS
	HCH	-9.388	8	PASS



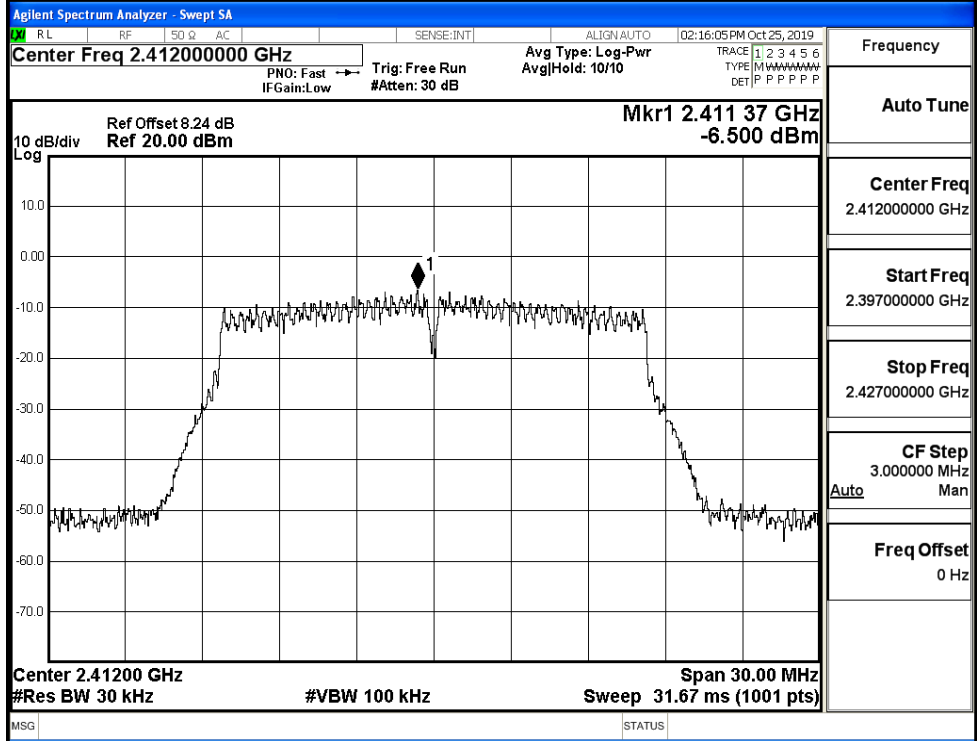
11B/MCH



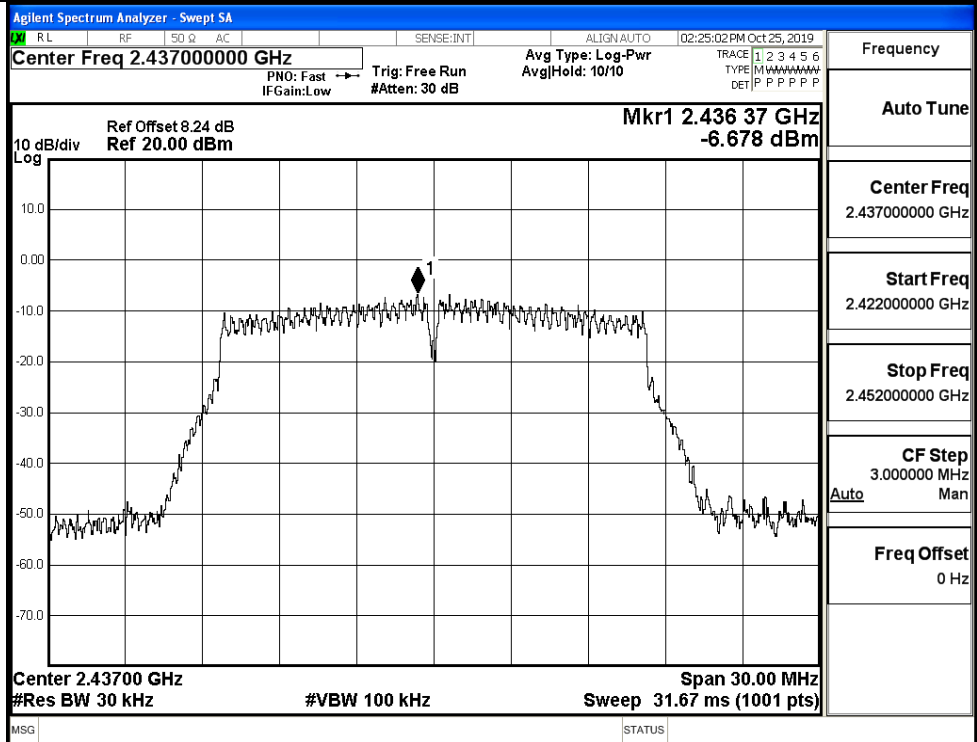
11B/HCH



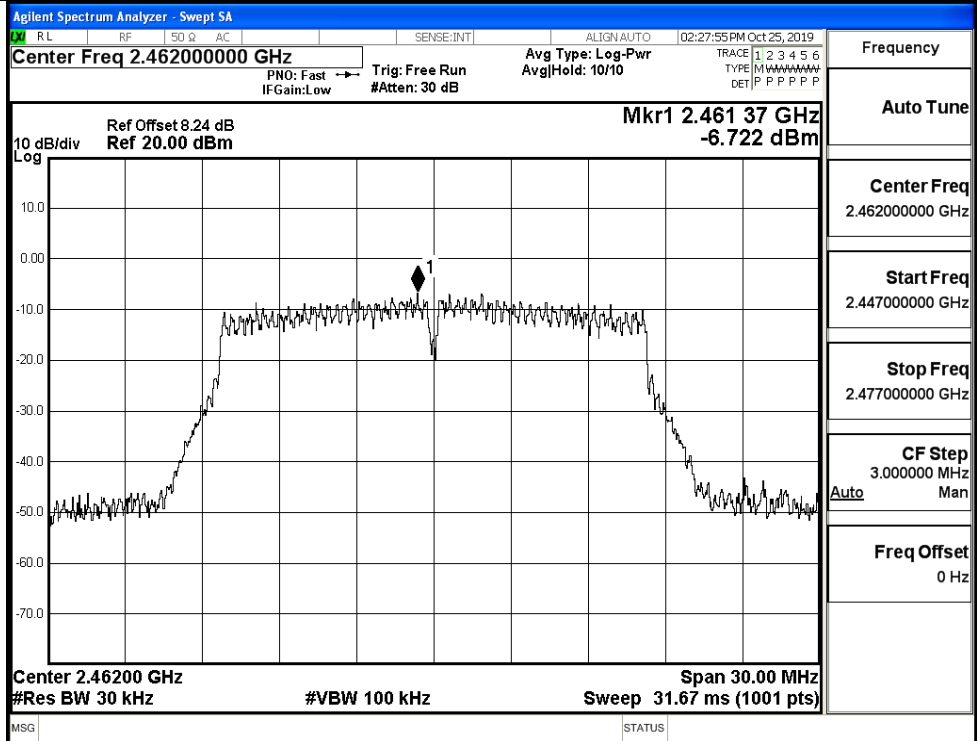
11G/LCH



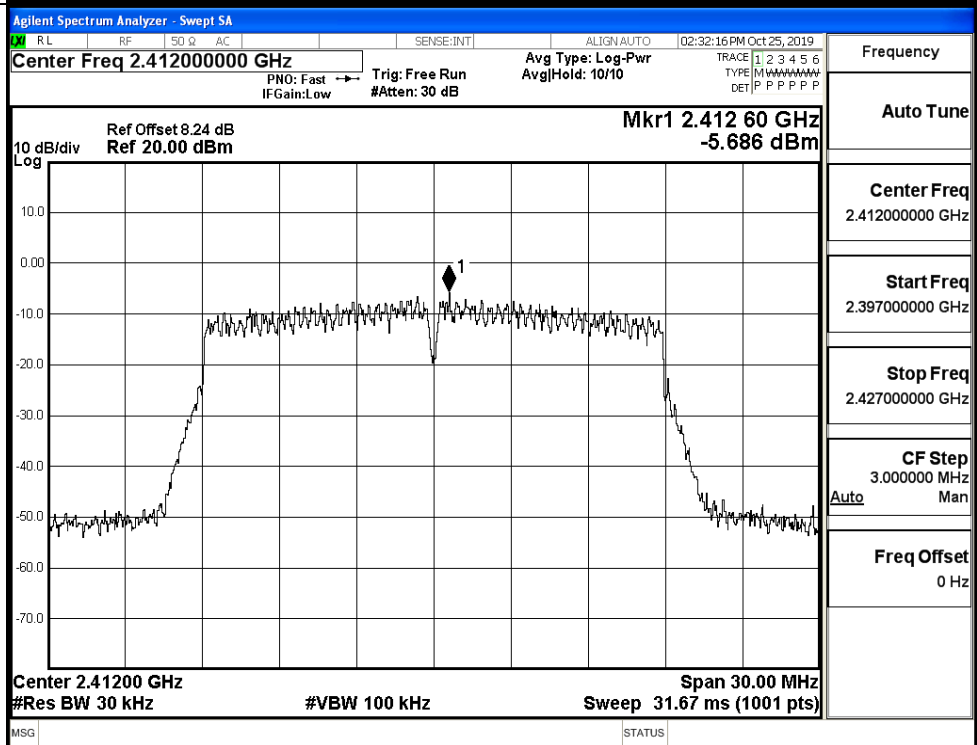
11G/MCH



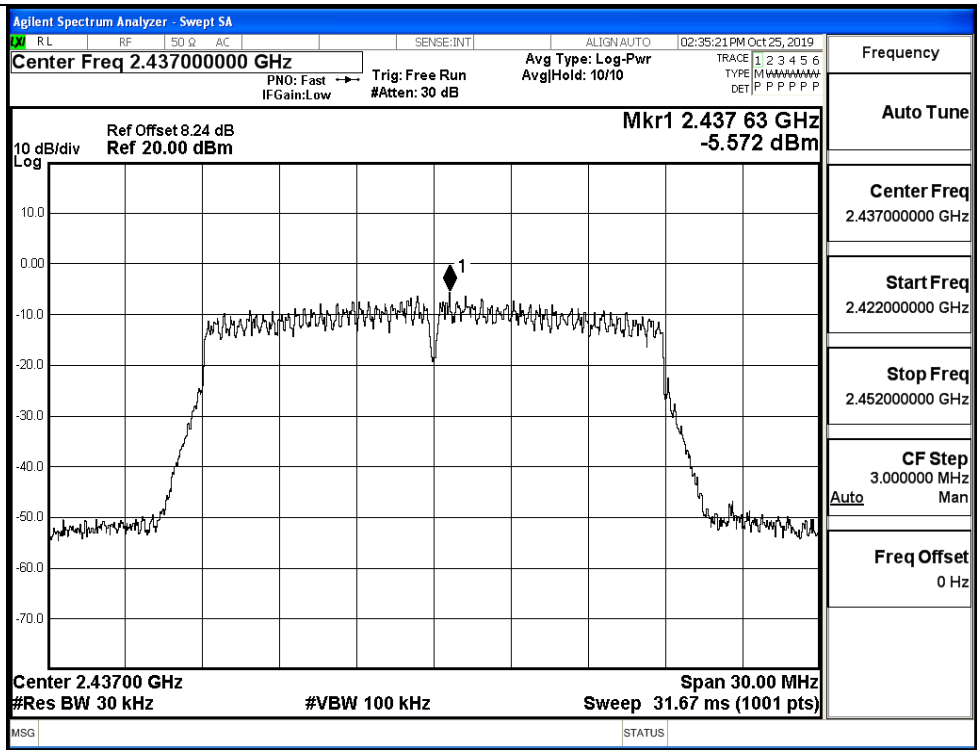
11G/HCH



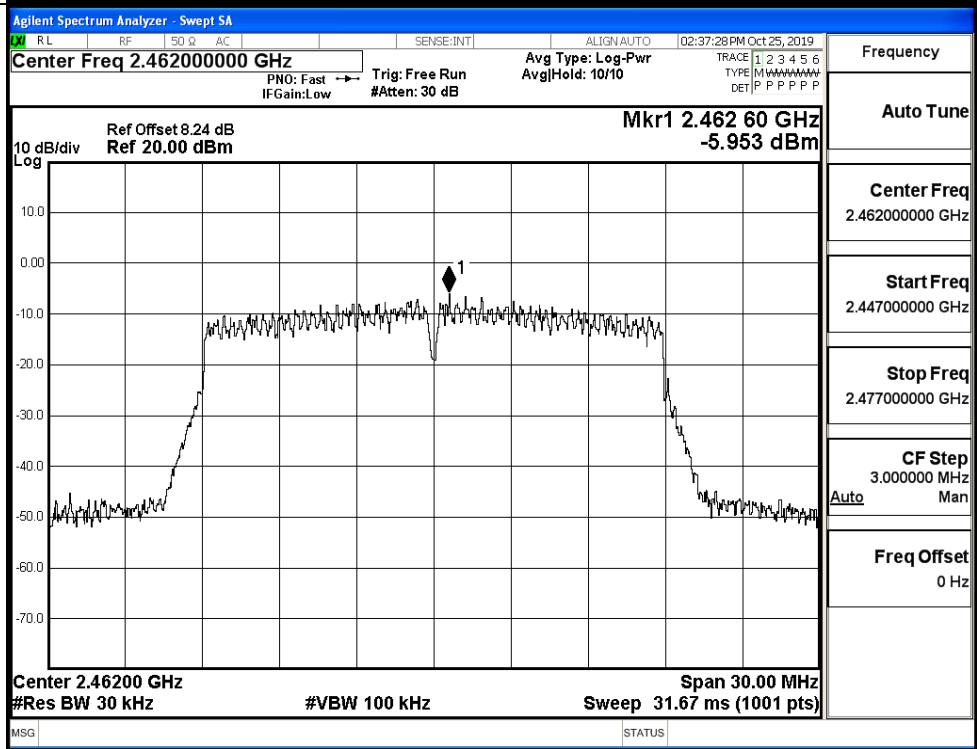
11N20SISO/LCH



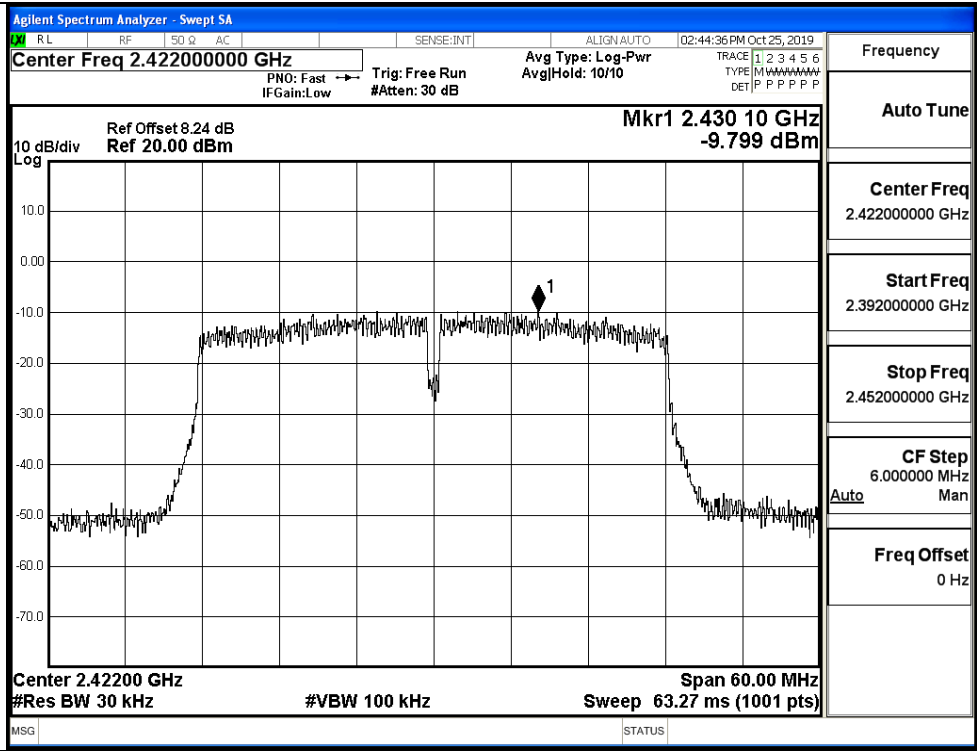
11N20SISO/MCH



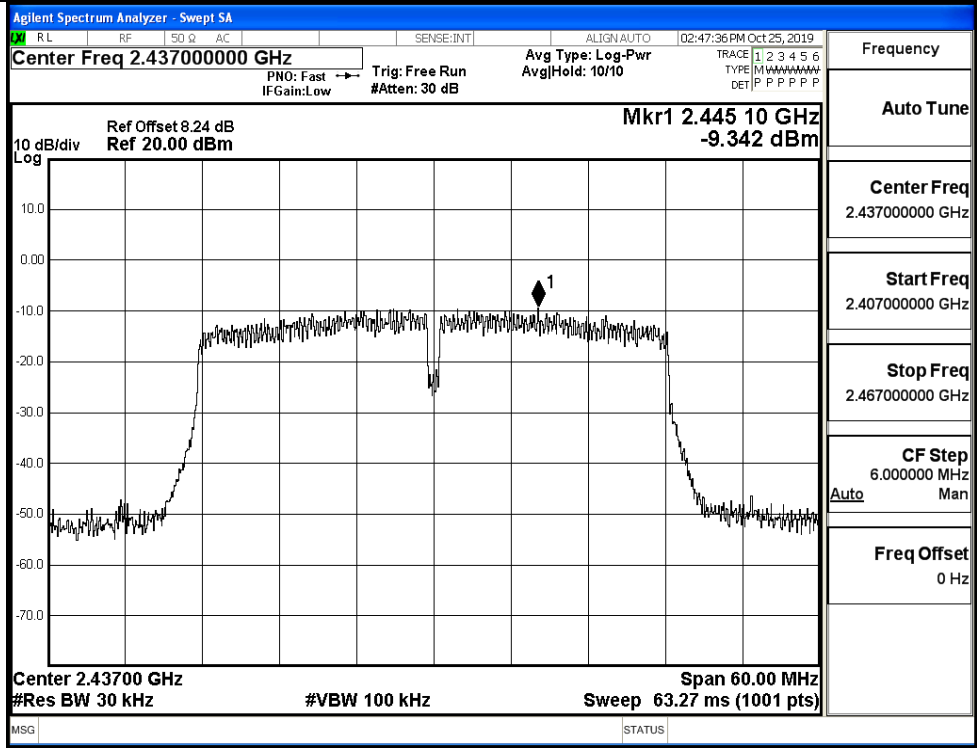
11N20SISO/HCH



11N40SISO/LCH

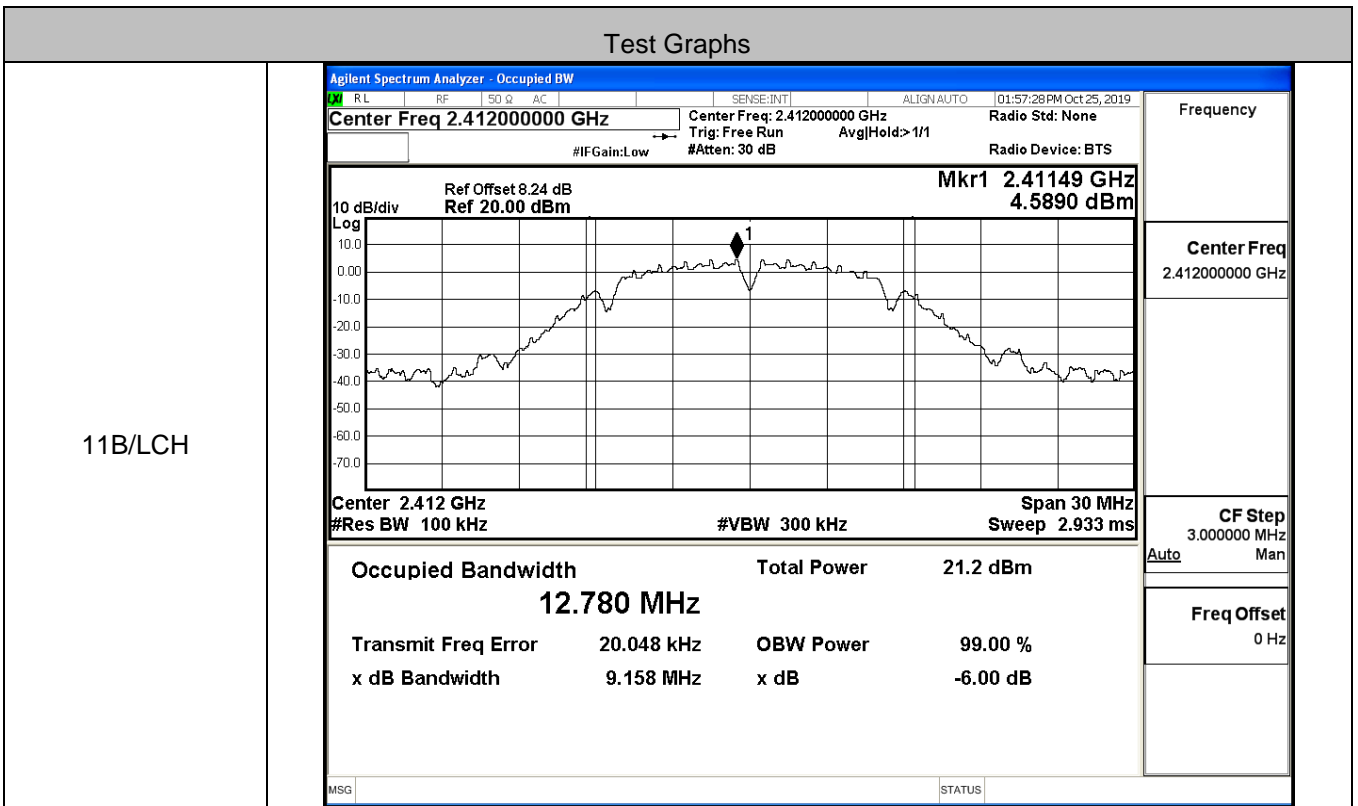


11N40SISO/MCH



C.4 6dB Bandwidth

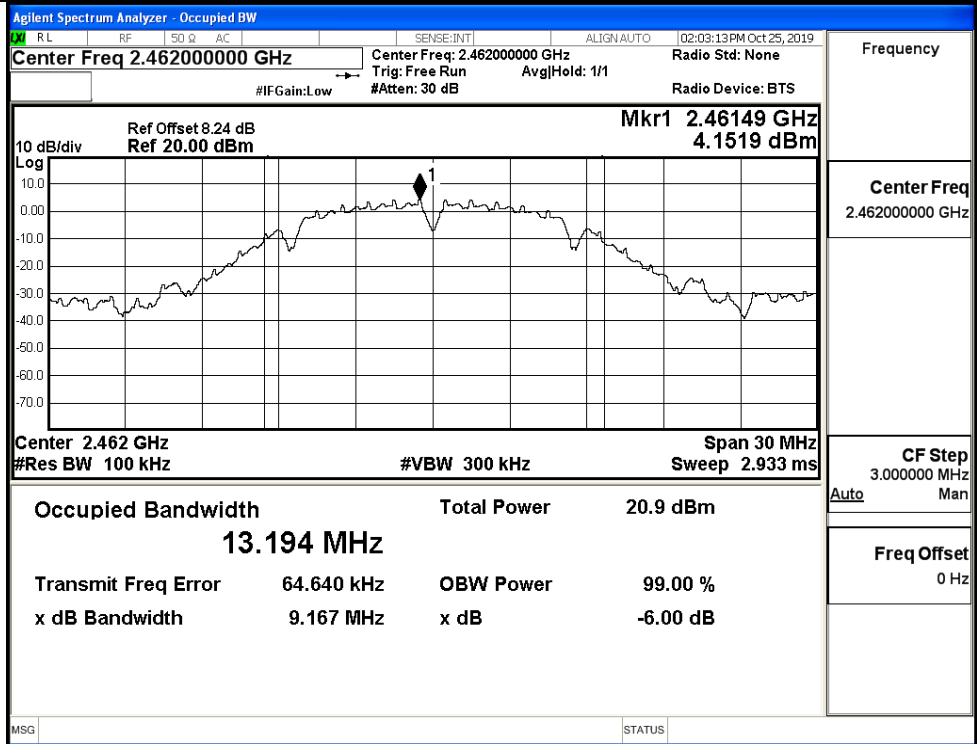
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	LCH	9.158	≥0.5	PASS
	MCH	9.160	≥0.5	PASS
	HCH	9.167	≥0.5	PASS
11G	LCH	16.42	≥0.5	PASS
	MCH	16.40	≥0.5	PASS
	HCH	16.41	≥0.5	PASS
11N20SISO	LCH	17.62	≥0.5	PASS
	MCH	17.62	≥0.5	PASS
	HCH	17.61	≥0.5	PASS
11N40SISO	LCH	36.38	≥0.5	PASS
	MCH	36.11	≥0.5	PASS
	HCH	36.36	≥0.5	PASS



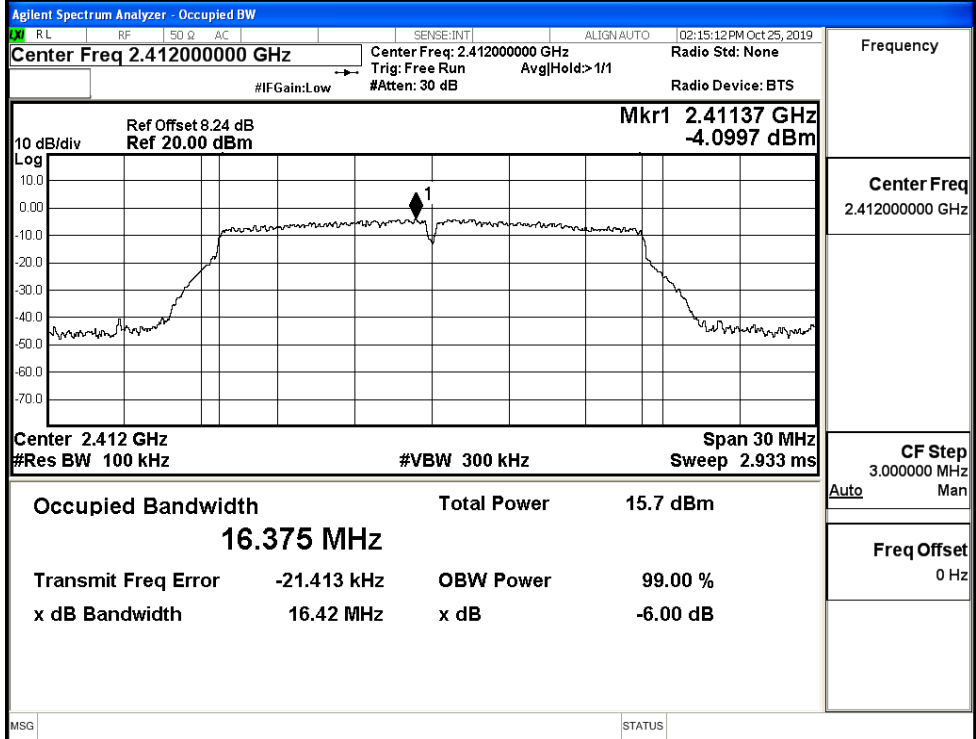
11B/MCH



11B/HCH

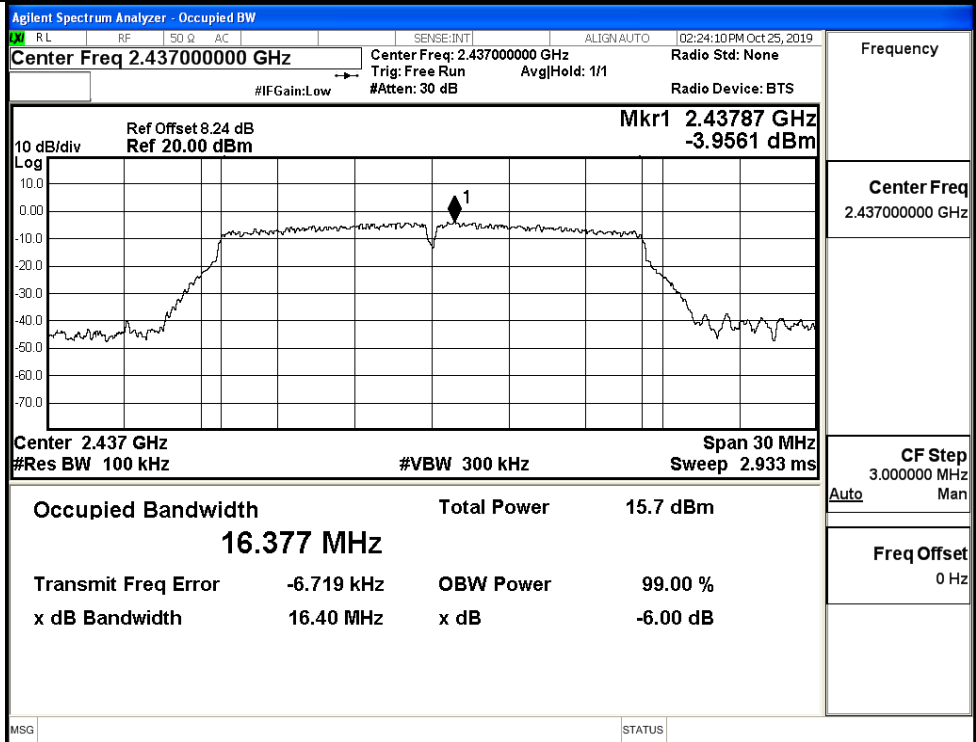


11G/LCH



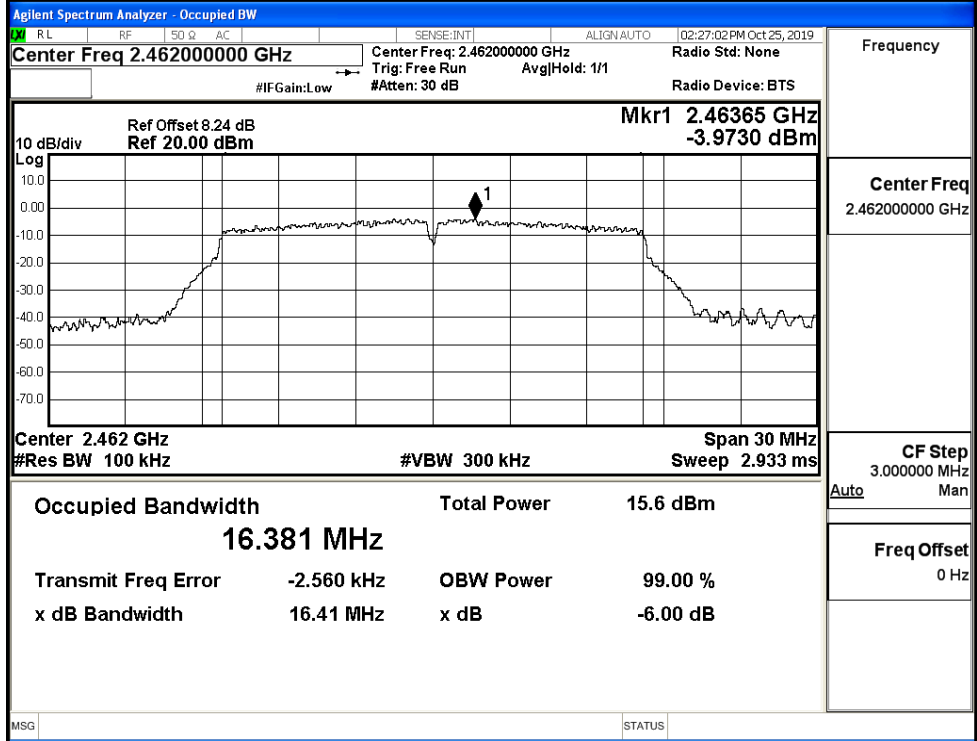
Frequency	2.41200000 GHz
Center Freq	2.41200000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

11G/MCH



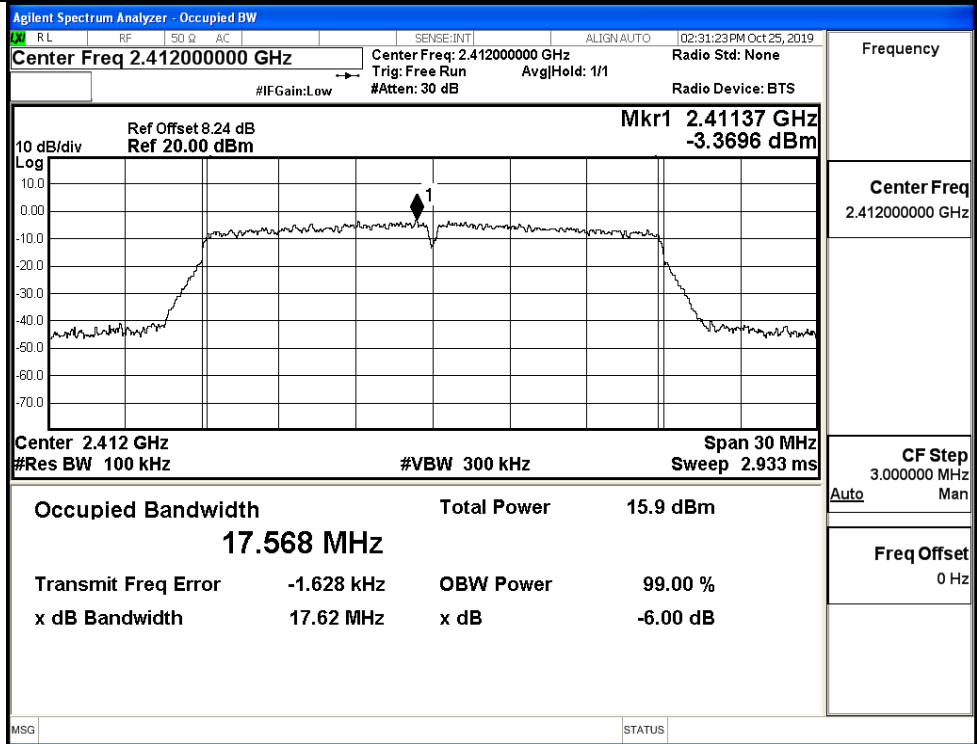
Frequency	2.43700000 GHz
Center Freq	2.43700000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

11G/HCH



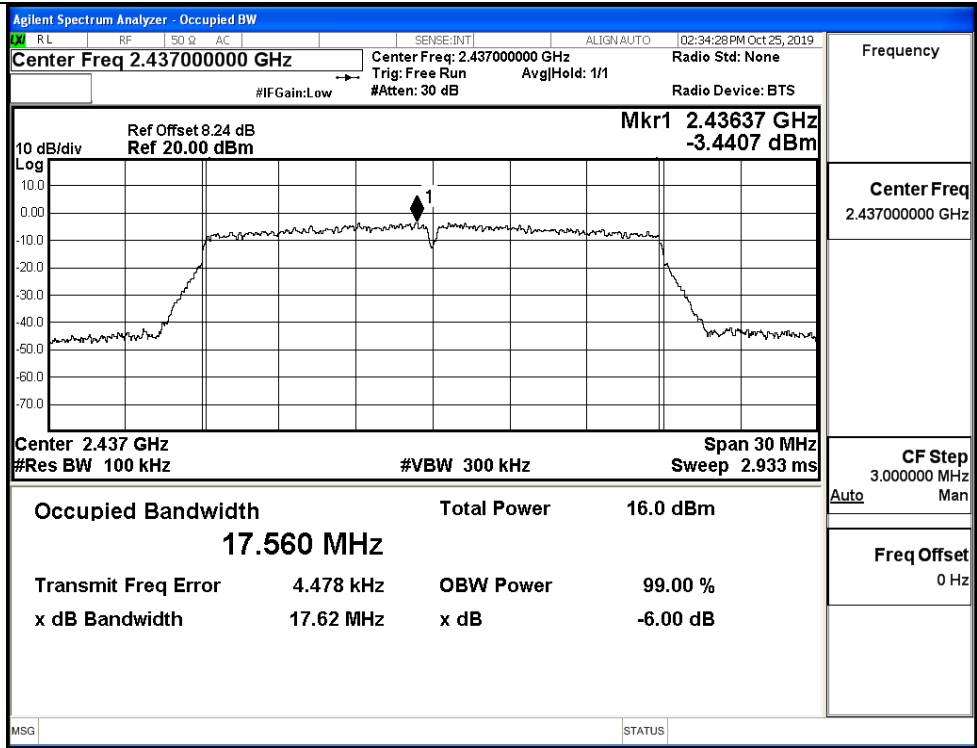
Frequency	2.46200000 GHz
Center Freq	2.46200000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

11N20SISO/LCH

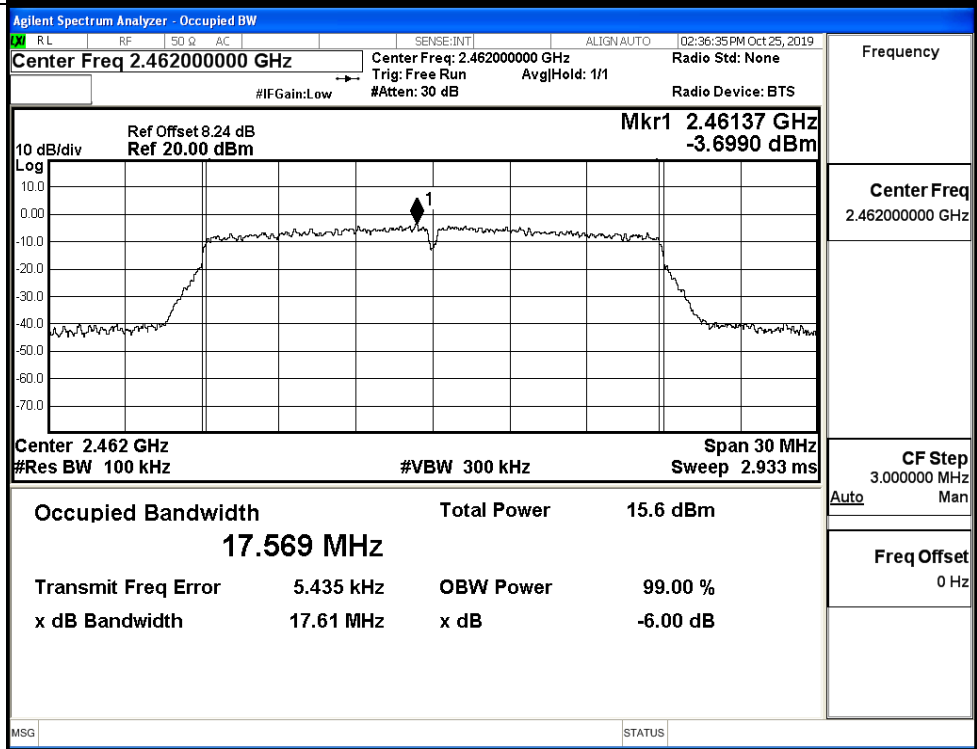


Frequency	2.41200000 GHz
Center Freq	2.41200000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

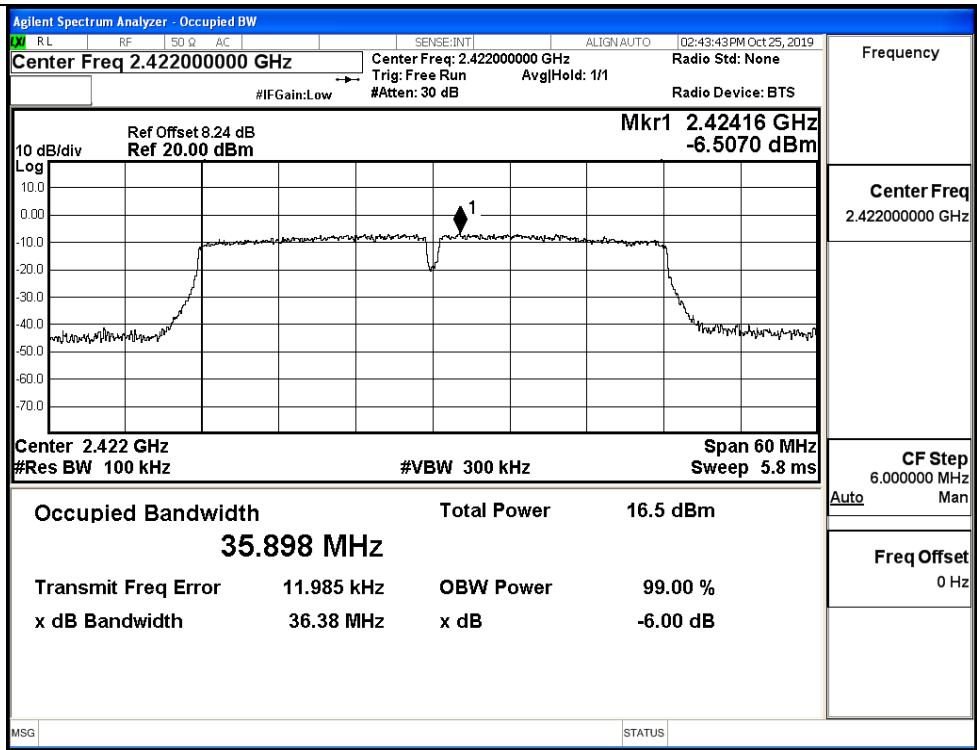
11N20SISO/MCH



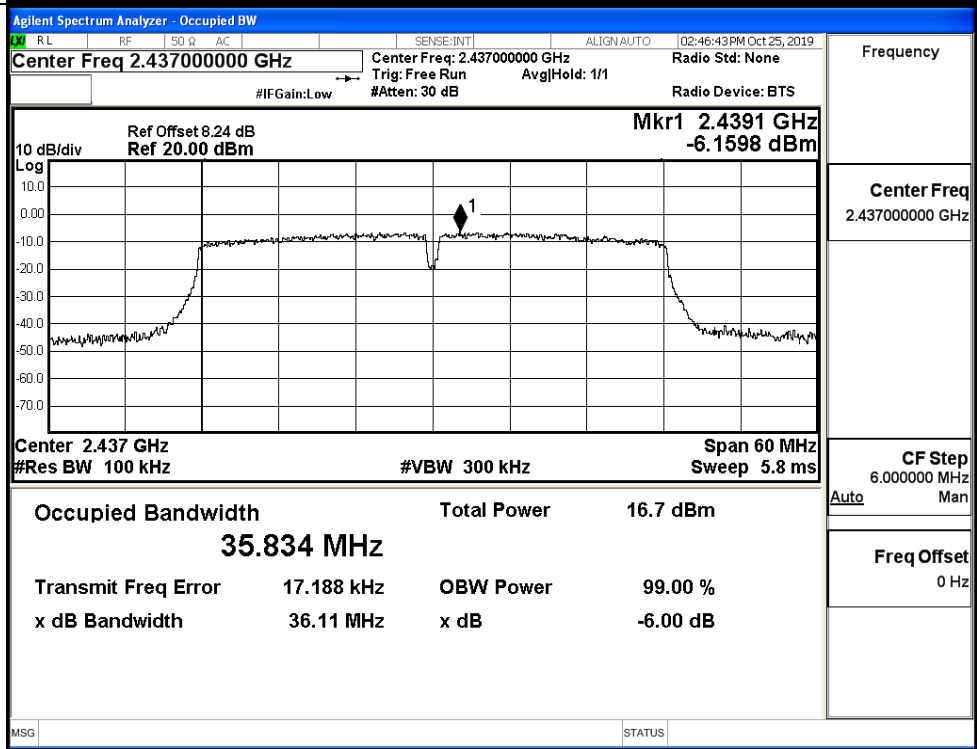
11N20SISO/HCH

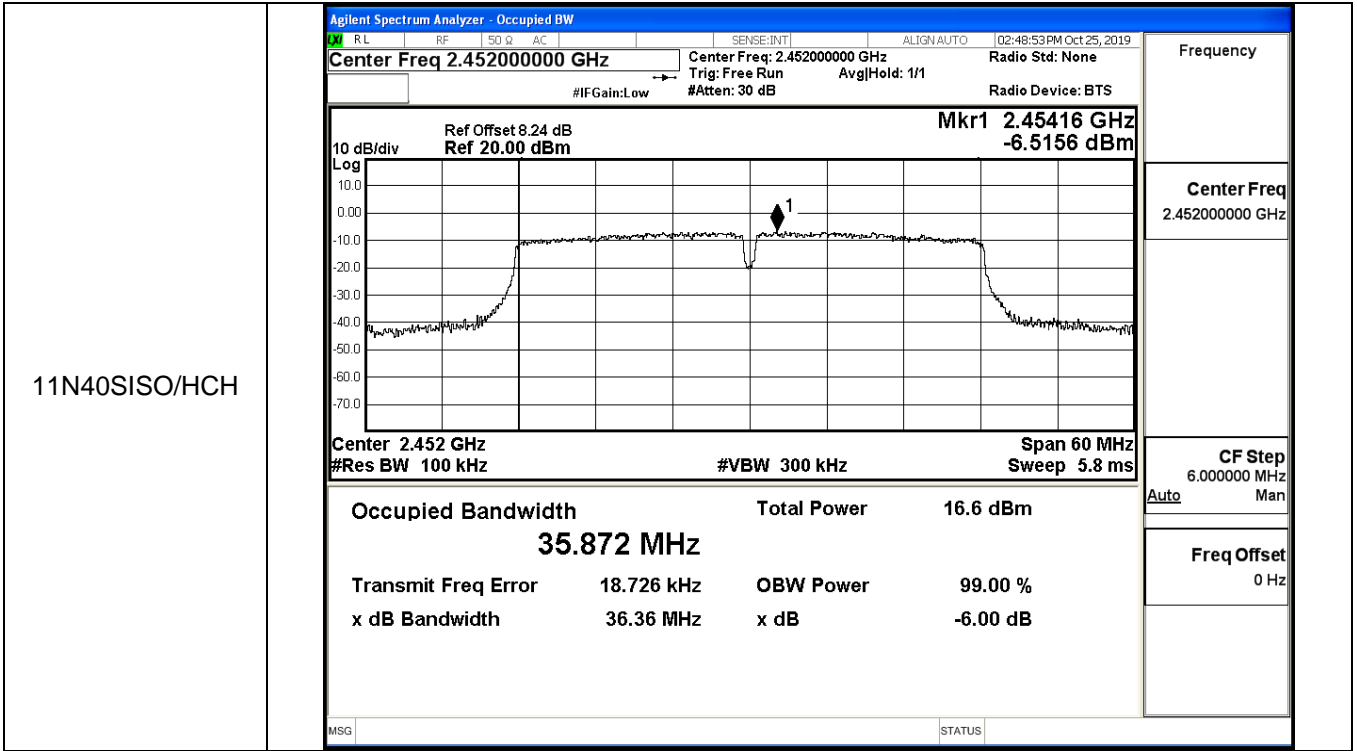


11N40SISO/LCH



11N40SISO/MCH





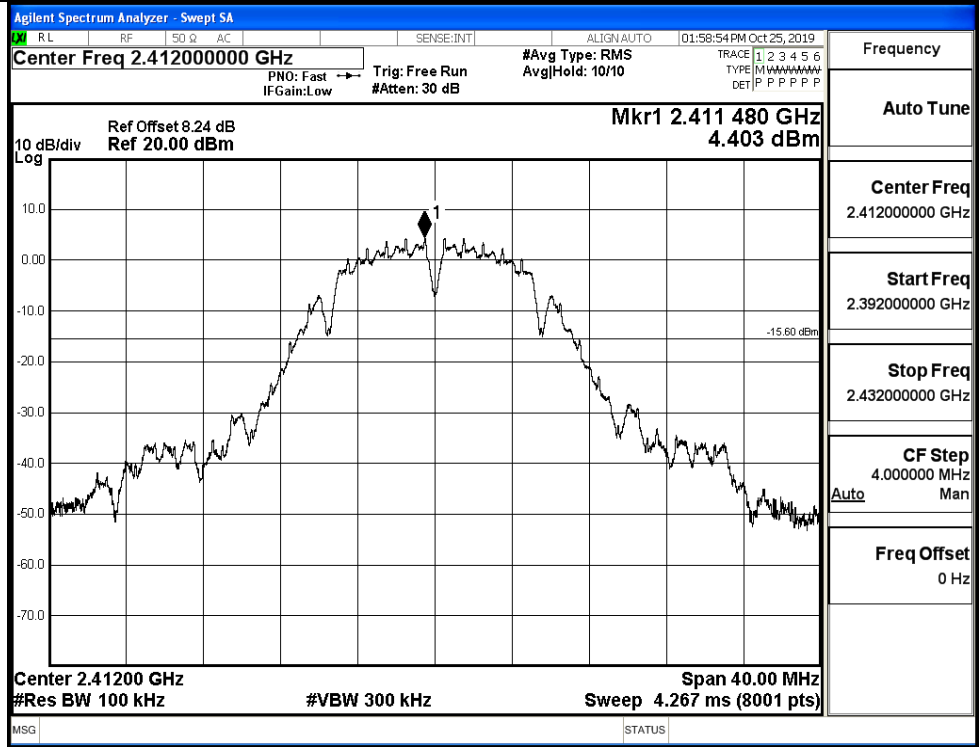
C.5 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdic
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					t
11B	LCH	4.403	-37.286	-15.597	PASS
	MCH	4.322	-37.622	-15.678	PASS
	HCH	4.088	-37.476	-15.912	PASS
11G	LCH	-4.199	-37.305	-24.199	PASS
	MCH	-3.986	-37.199	-23.986	PASS
	HCH	-3.986	-37.636	-23.986	PASS
11N20 SISO	LCH	-3.52	-37.169	-23.520	PASS
	MCH	-3.672	-37.706	-23.672	PASS
	HCH	-3.764	-37.191	-23.764	PASS
11N40 SISO	LCH	-6.398	-37.039	-26.398	PASS
	MCH	-6.577	-36.890	-26.577	PASS
	HCH	-6.611	-36.978	-26.611	PASS

11B_LCH_Graphs

Pref/11B/LCH

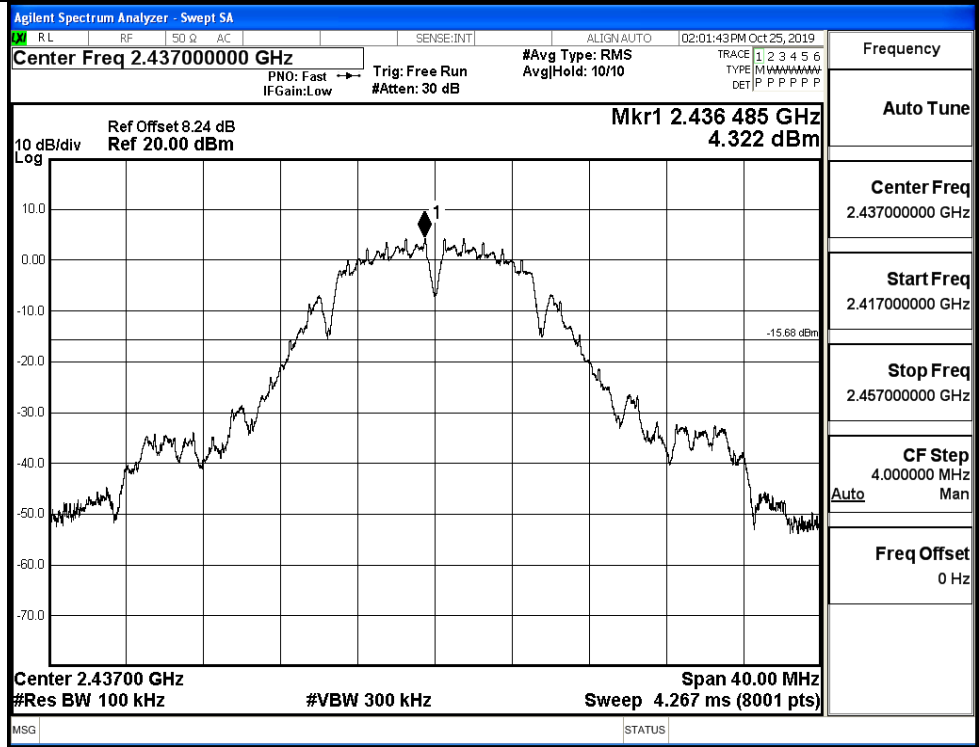


Puw/11B/LCH



11B_MCH_Graphs

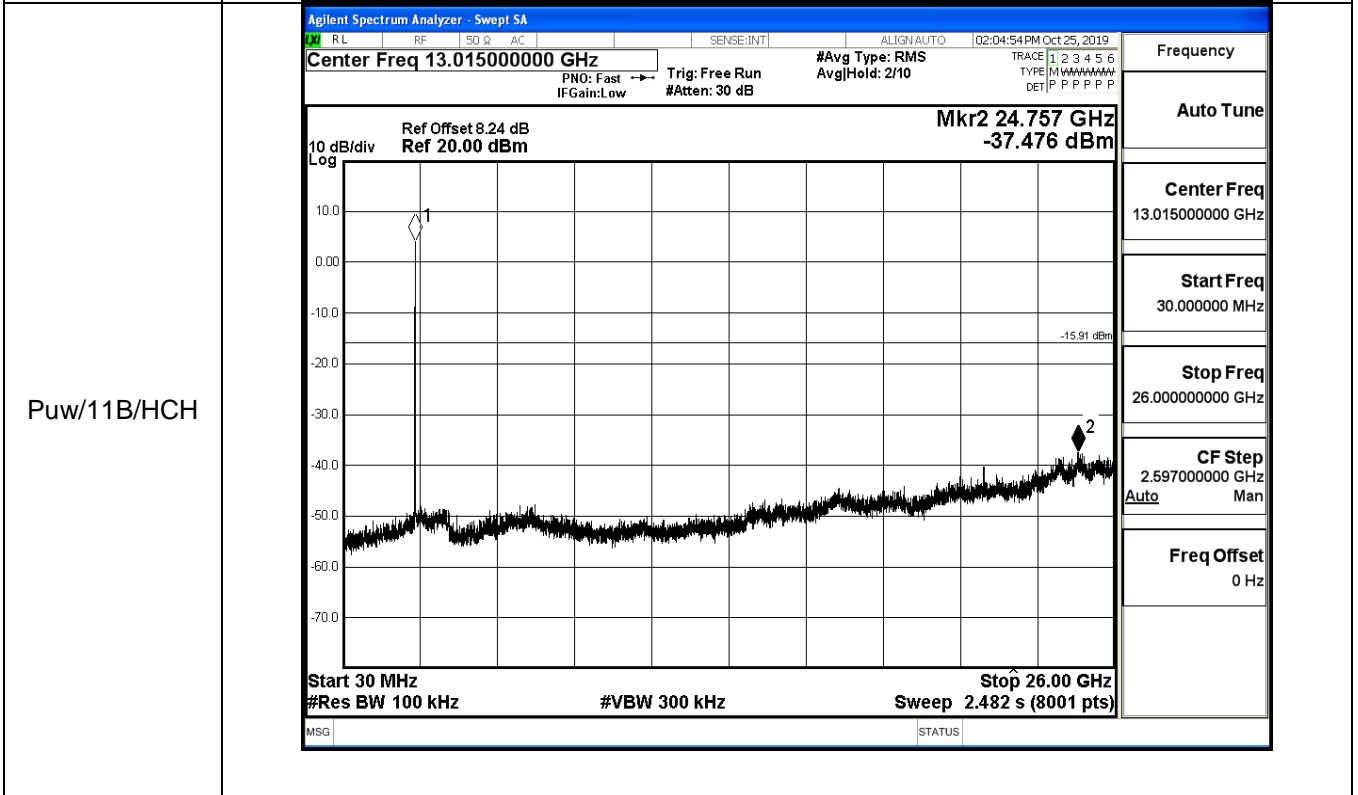
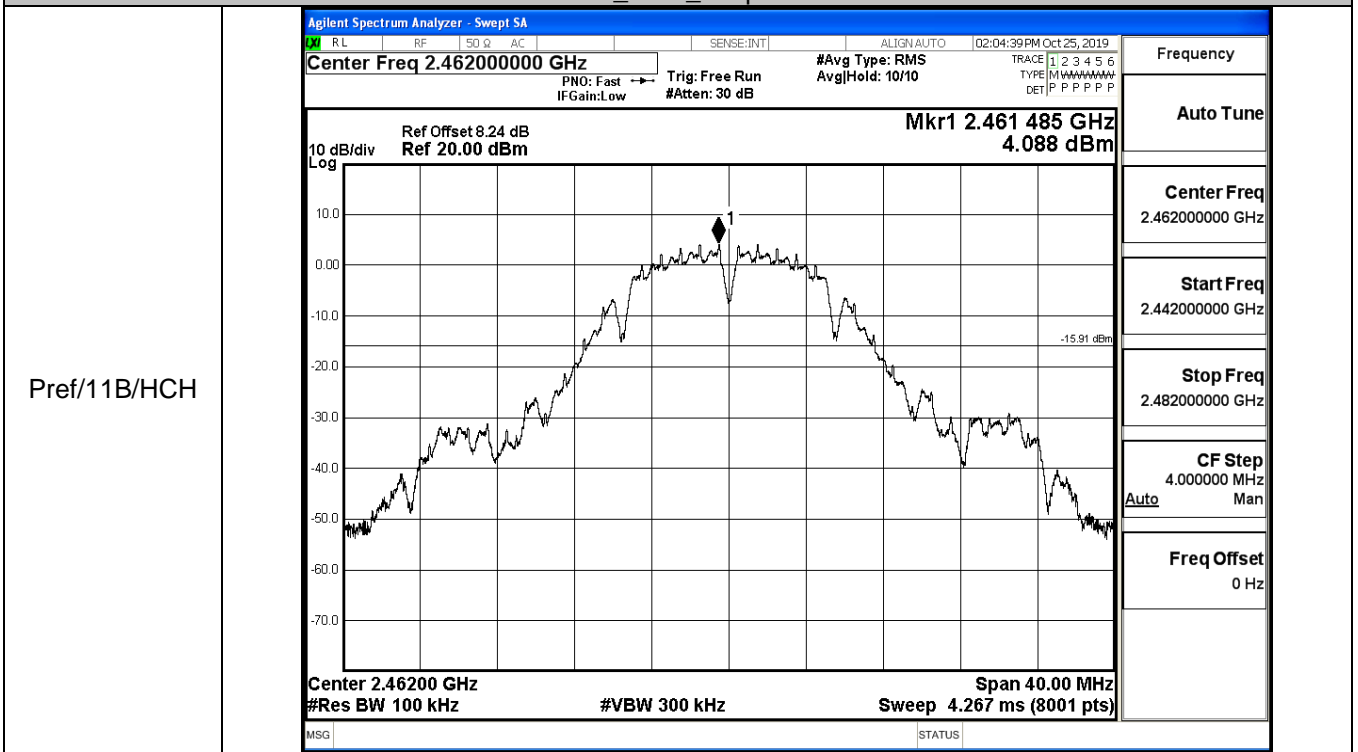
Pref/11B/MCH



Puw/11B/MCH

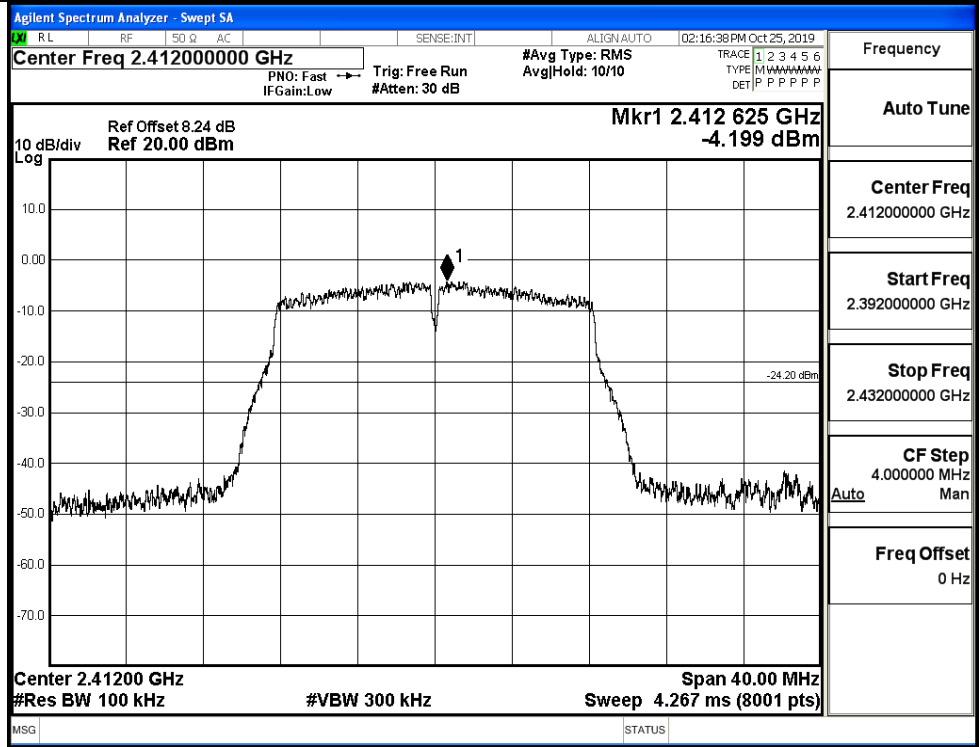


11B_HCH_Graphs



11G_LCH_Graphs

Pref/11G/LCH

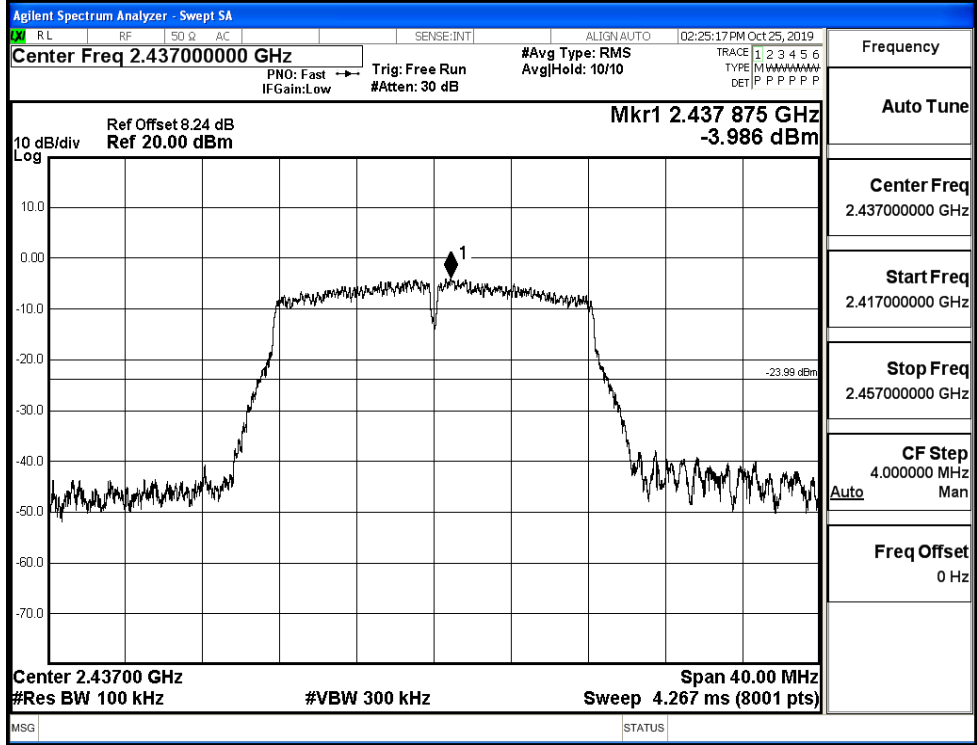


Puw/11G/LCH

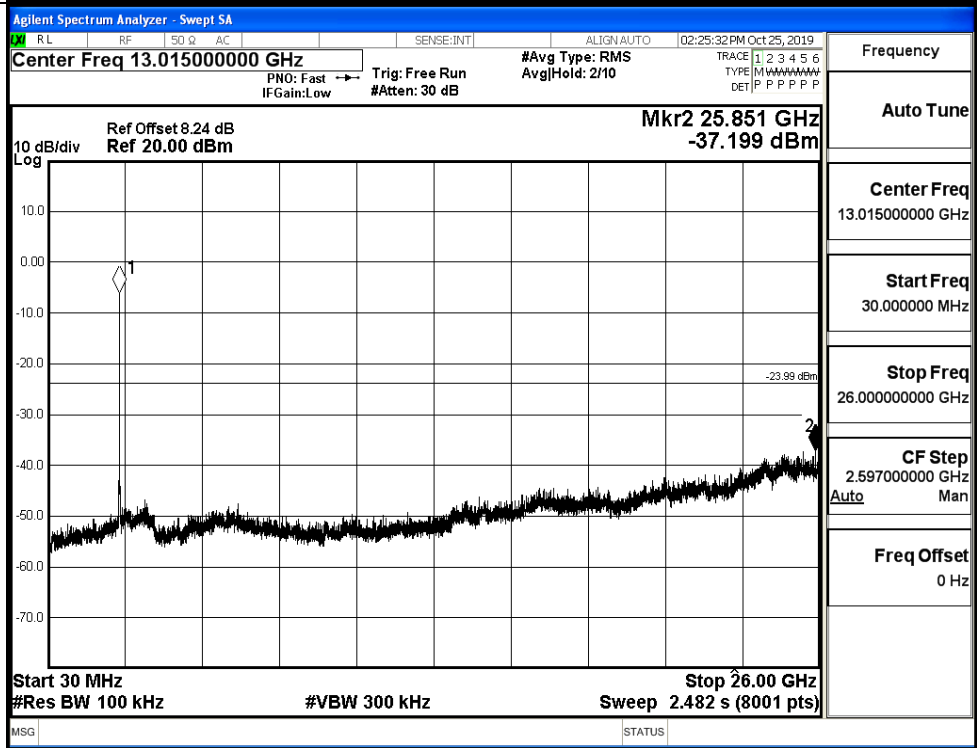


11G_MCH_Graphs

Pref/11G/MCH

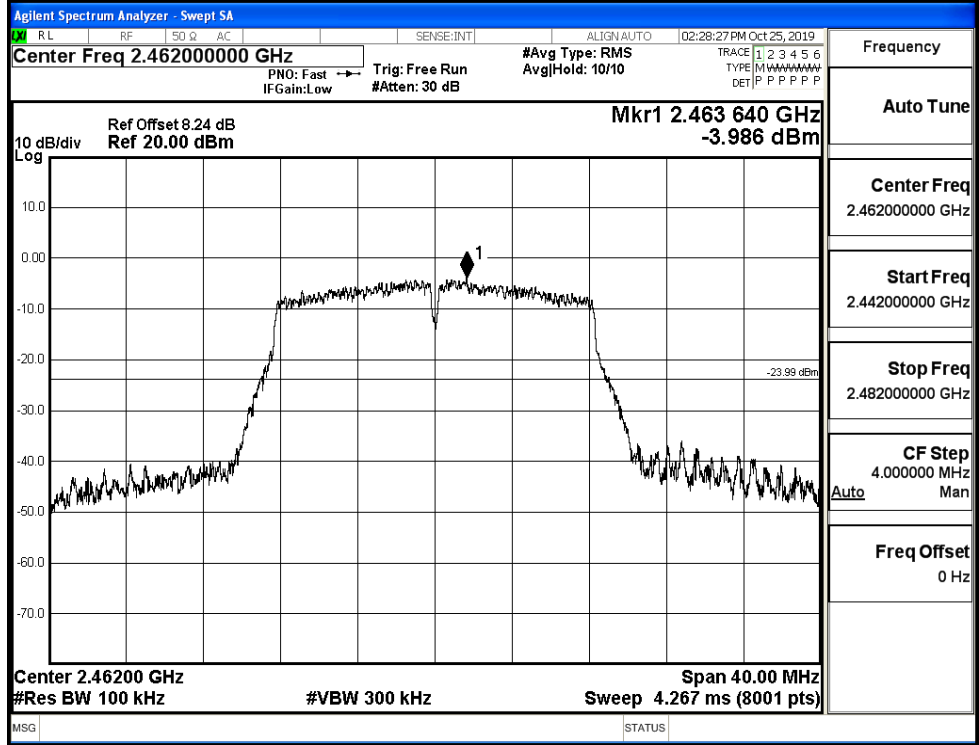


Puw/11G/MCH

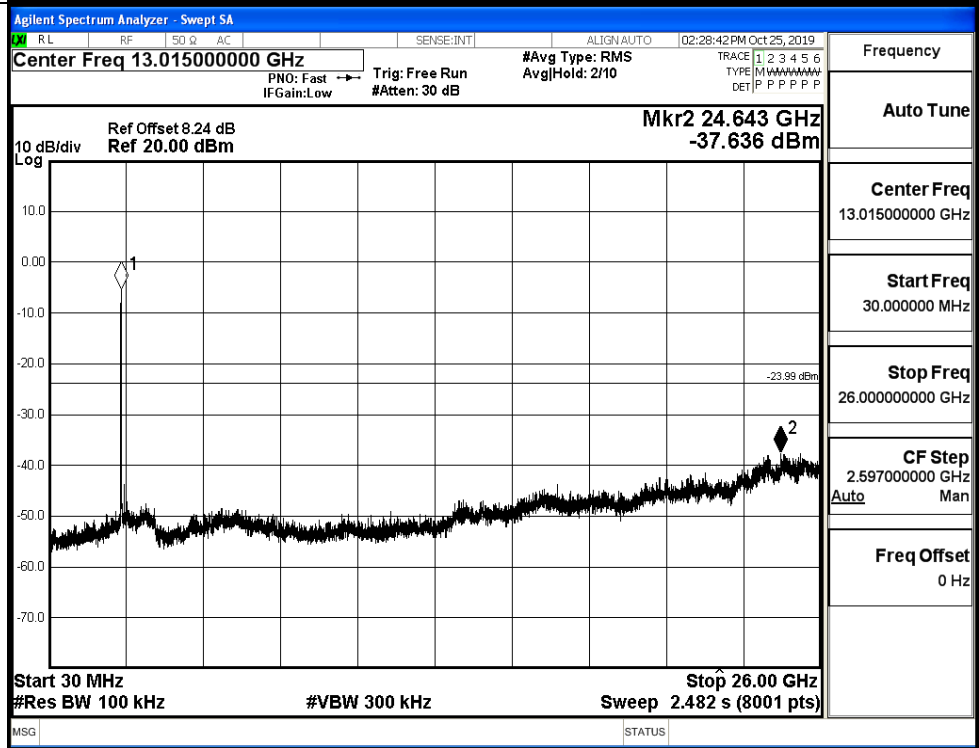


11G_HCH_Graphs

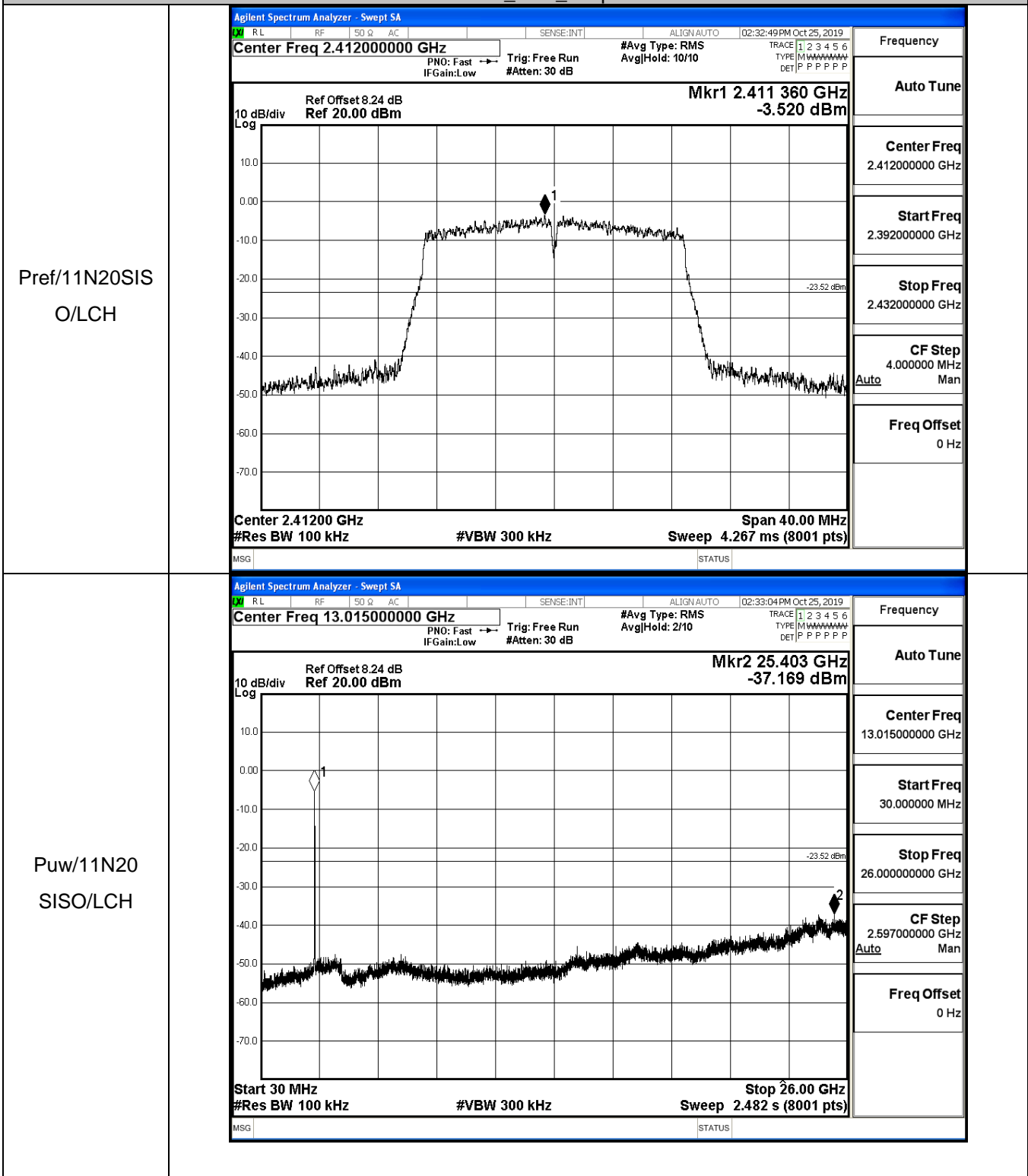
Pref/11G/HCH



Puw/11G/HCH

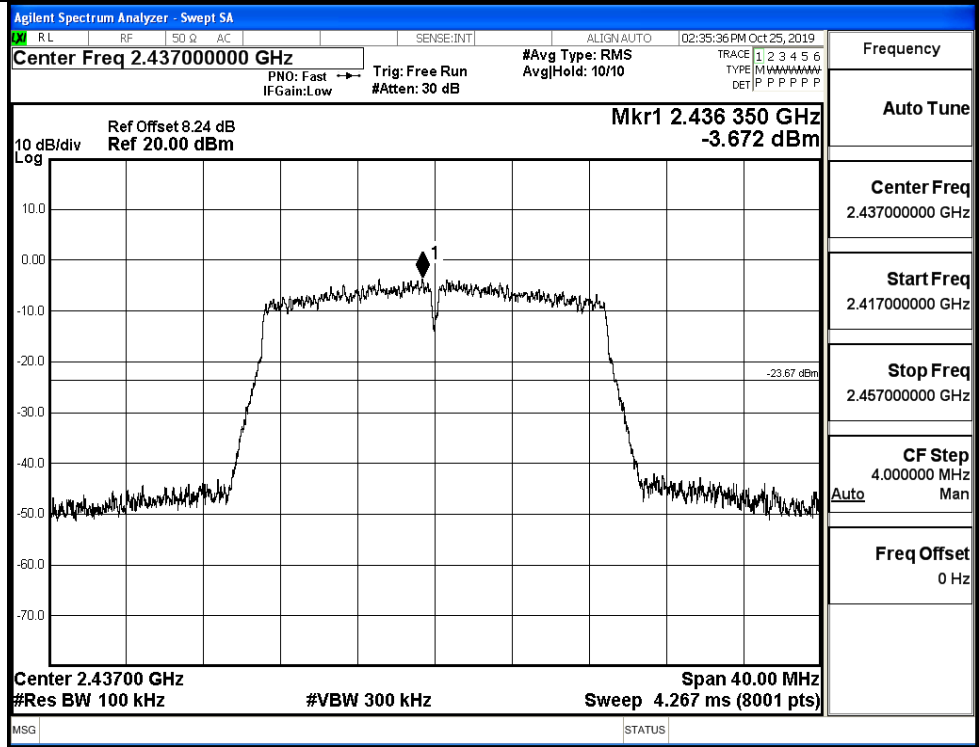


11N20SISO_LCH_Graphs

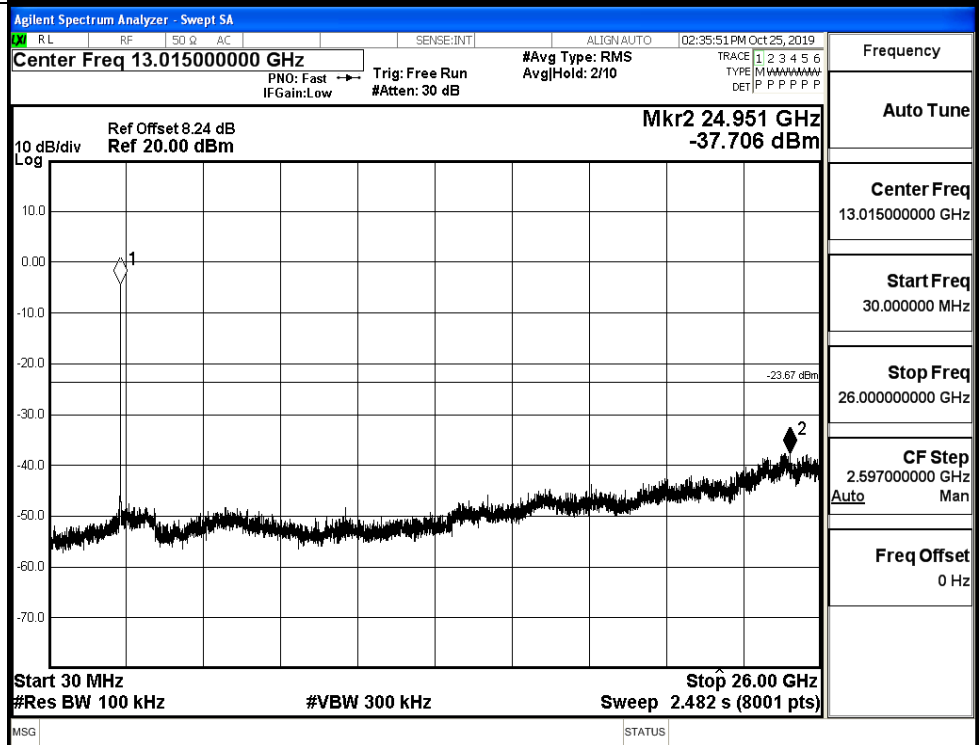


11N20SISO_MCH_Graphs

Pref/11N20
SISO/MCH

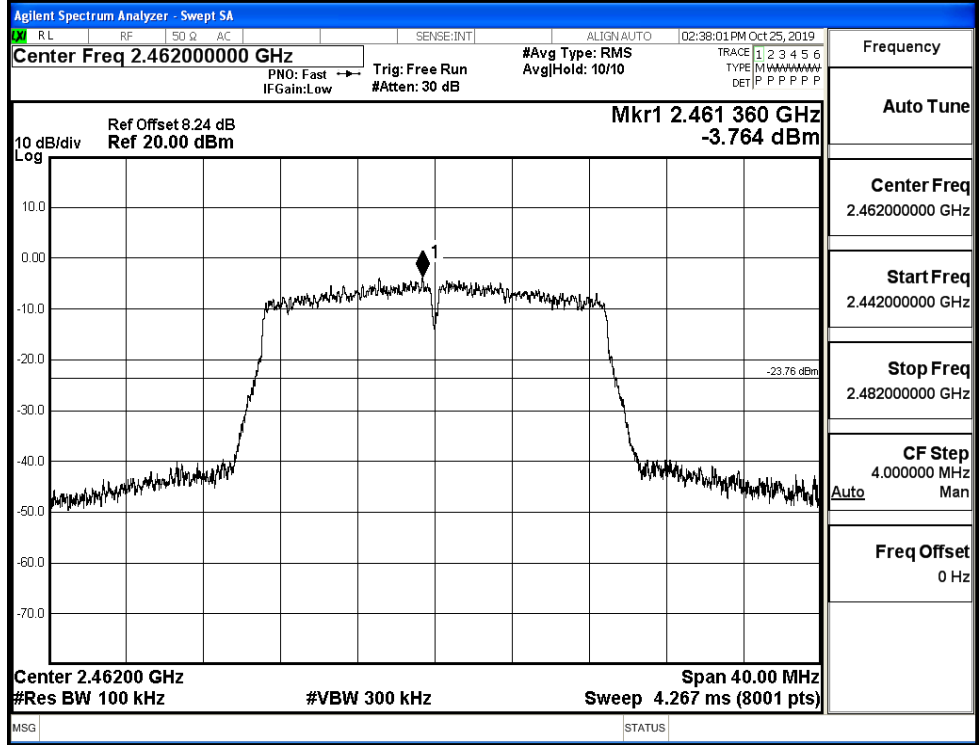


Puw/11N20
SISO/MCH

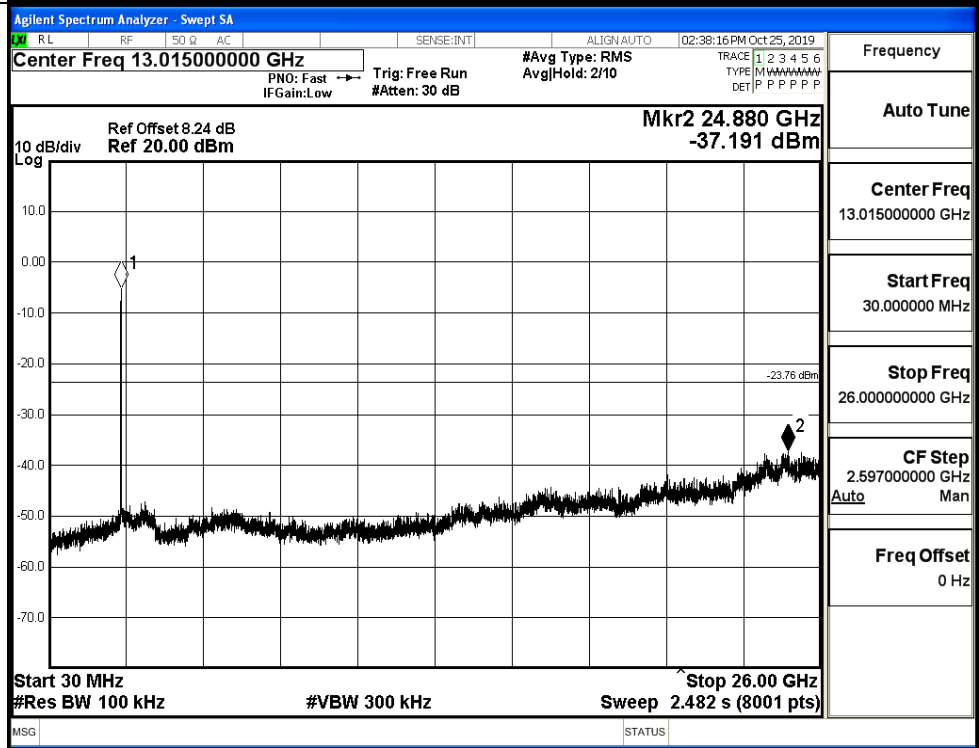


11N20SISO_HCH_Graphs

Pref/11N20
SISO/HCH

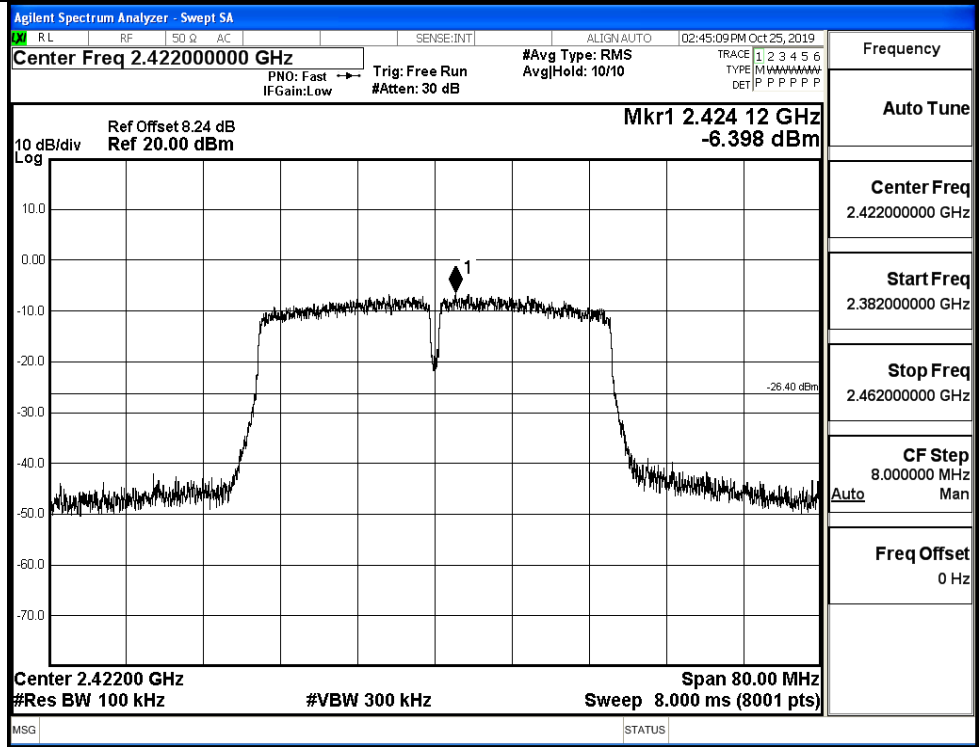


Puw/11N20
SISO/HCH

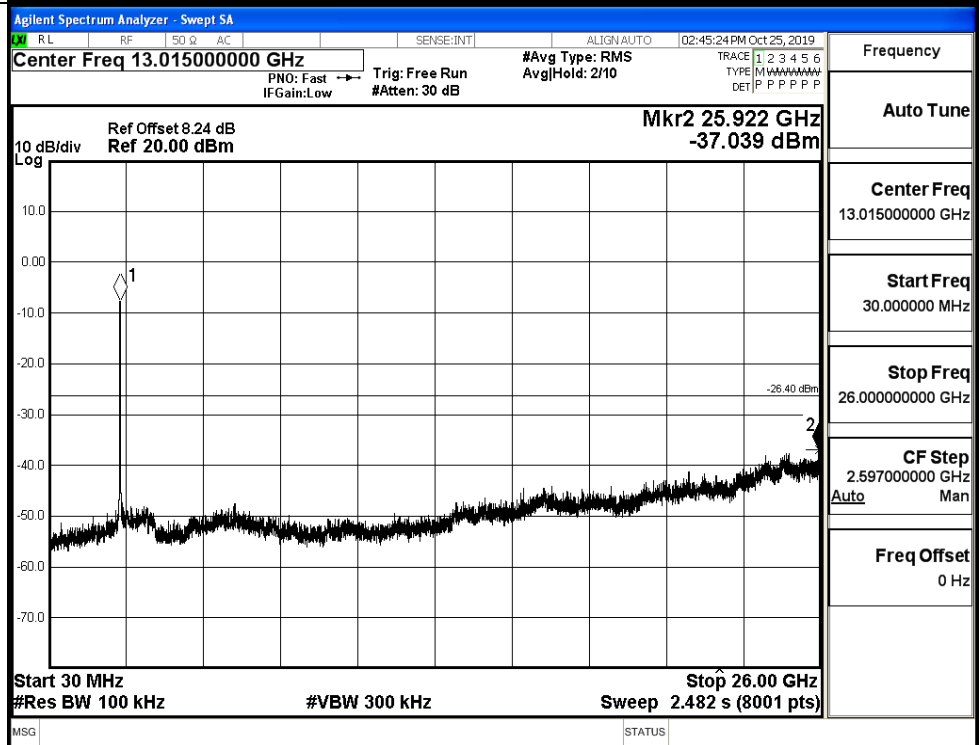


11N40SISO_LCH_Graphs

Pref/11N40
SISO/LCH

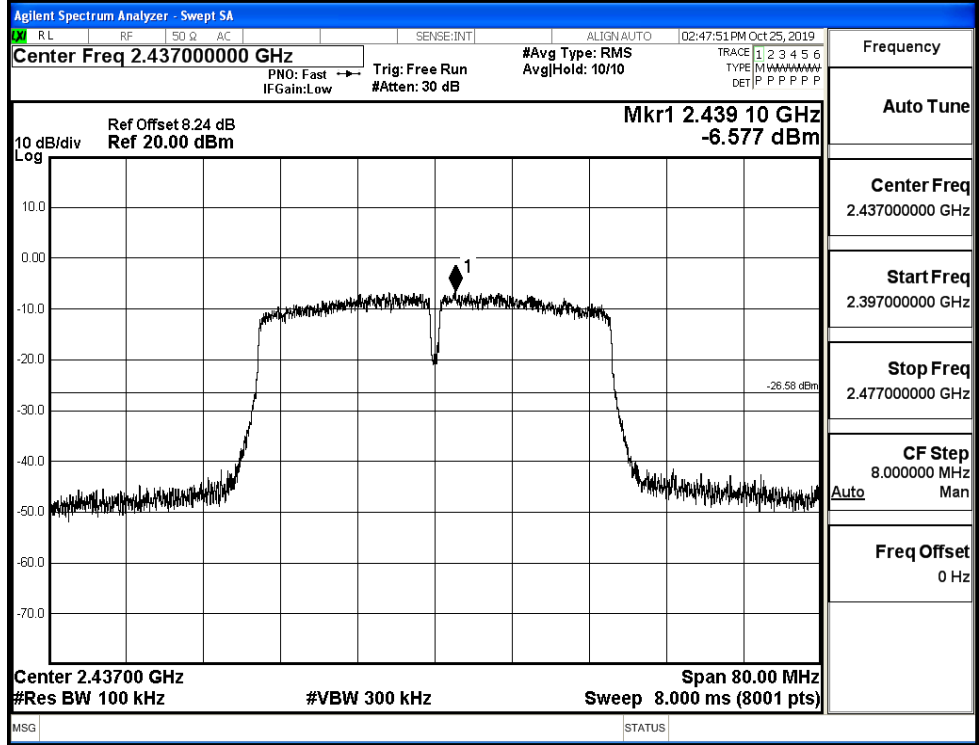


Puw/11N40
SISO/LCH

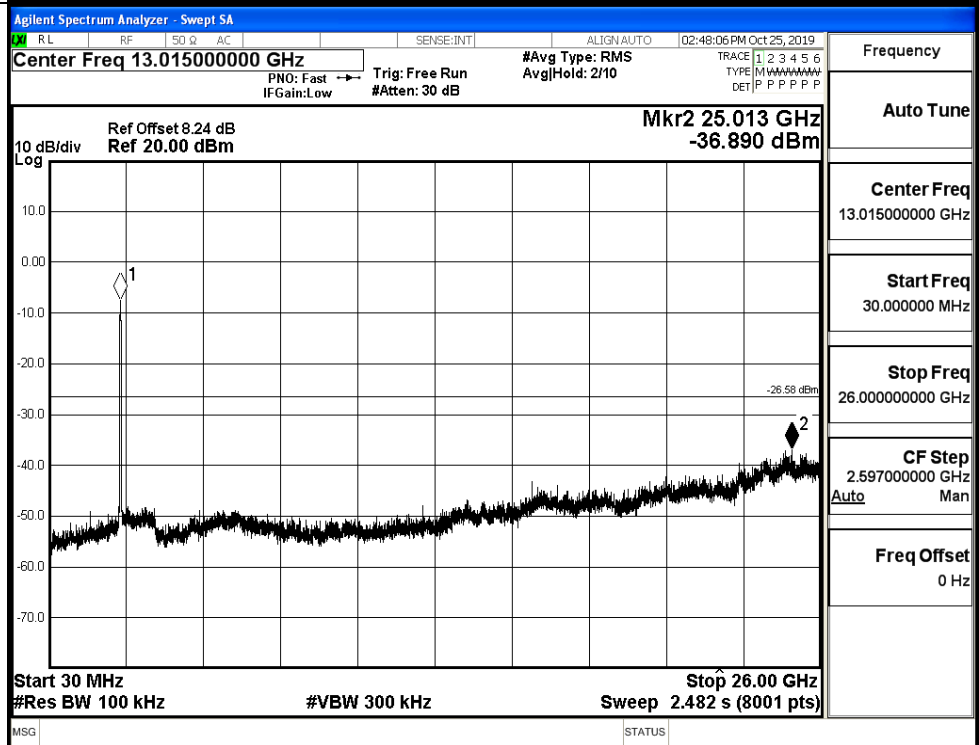


11N40SISO_MCH_Graphs

Pref/11N40
SISO/MCH

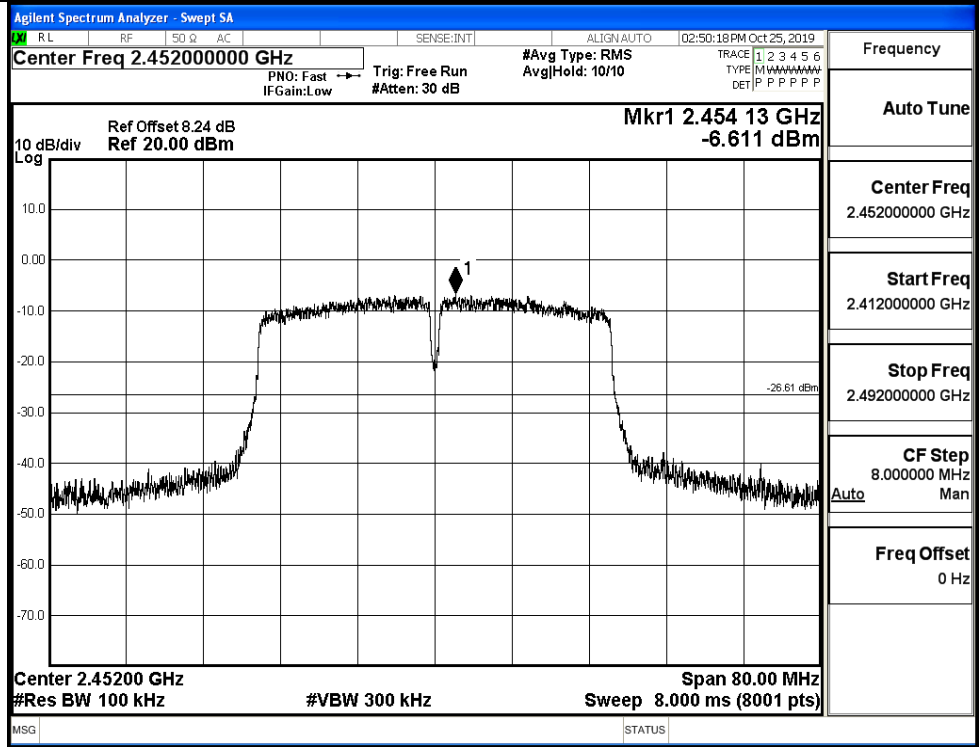


Puw/11N40
SISO/MCH

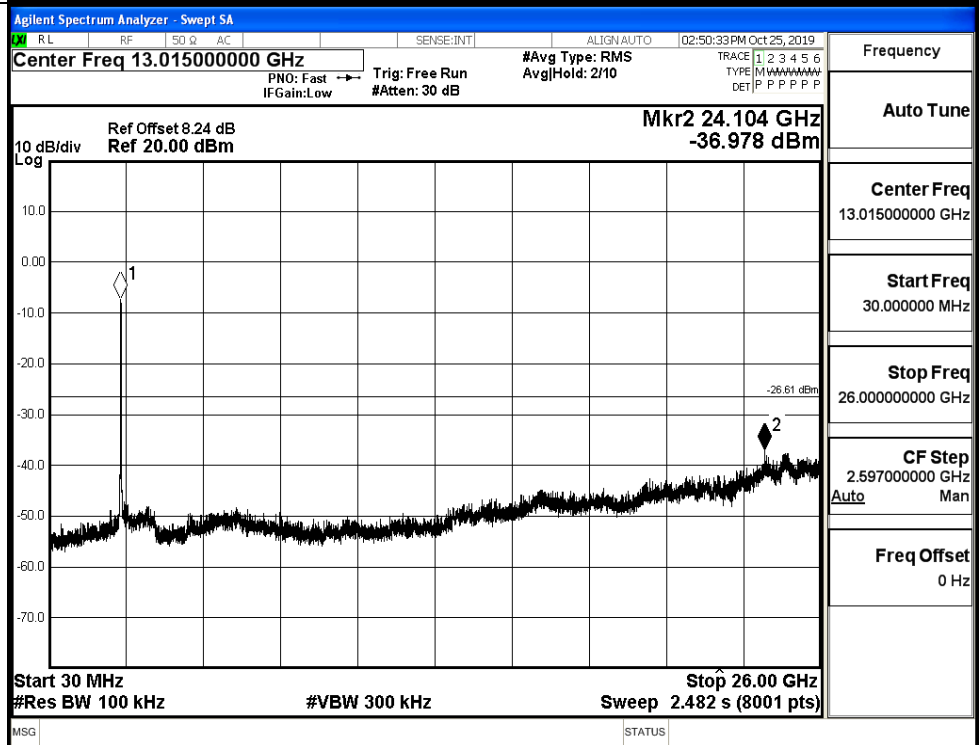


11N40SISO_HCH_Graphs

Pref/11N40
SISO/HCH

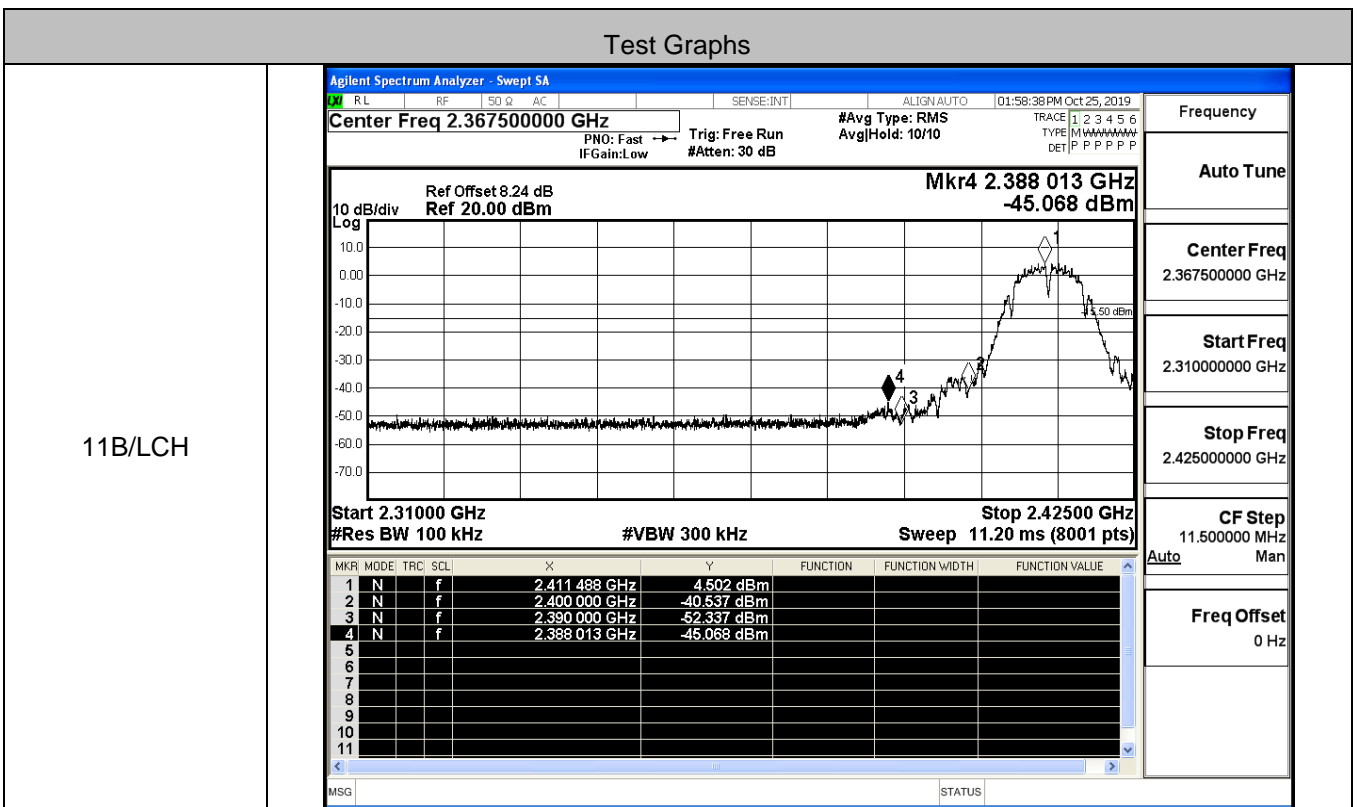


Puw/11N40
SISO/HCH

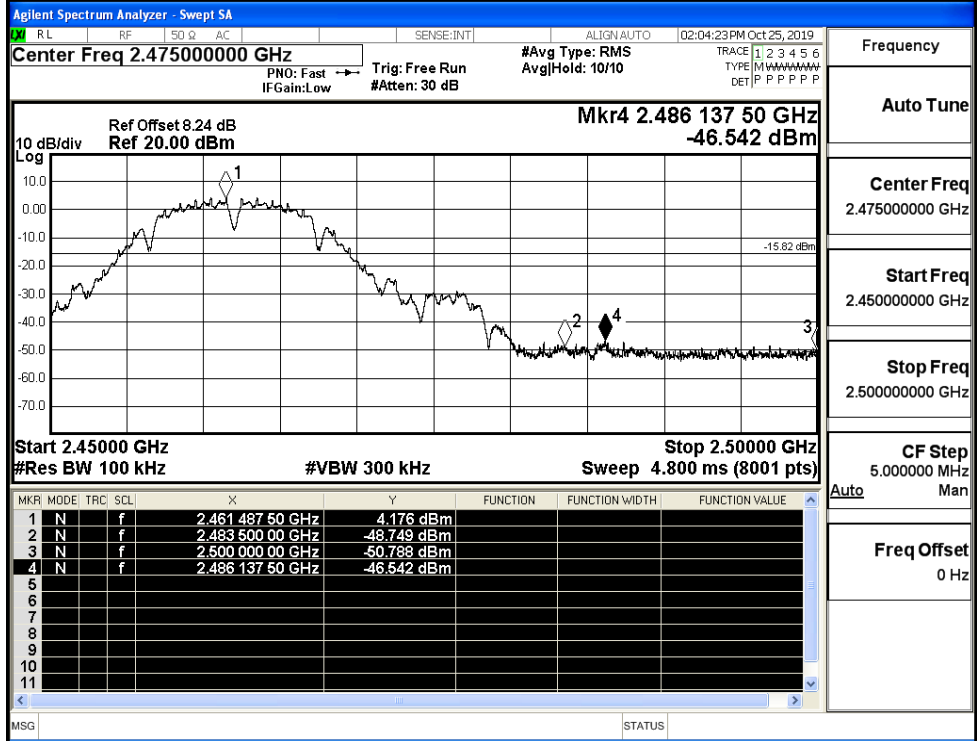


C.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	4.502	-45.068	-15.5	PASS
	HCH	4.176	-46.542	-15.82	PASS
11G	LCH	-4.297	-46.676	-24.3	PASS
	HCH	-3.977	-46.401	-23.98	PASS
11N20SISO	LCH	-3.447	-46.828	-23.45	PASS
	HCH	-3.649	-44.952	-23.65	PASS
11N40SISO	LCH	-6.504	-44.512	-26.5	PASS
	HCH	-6.718	-41.902	-26.72	PASS

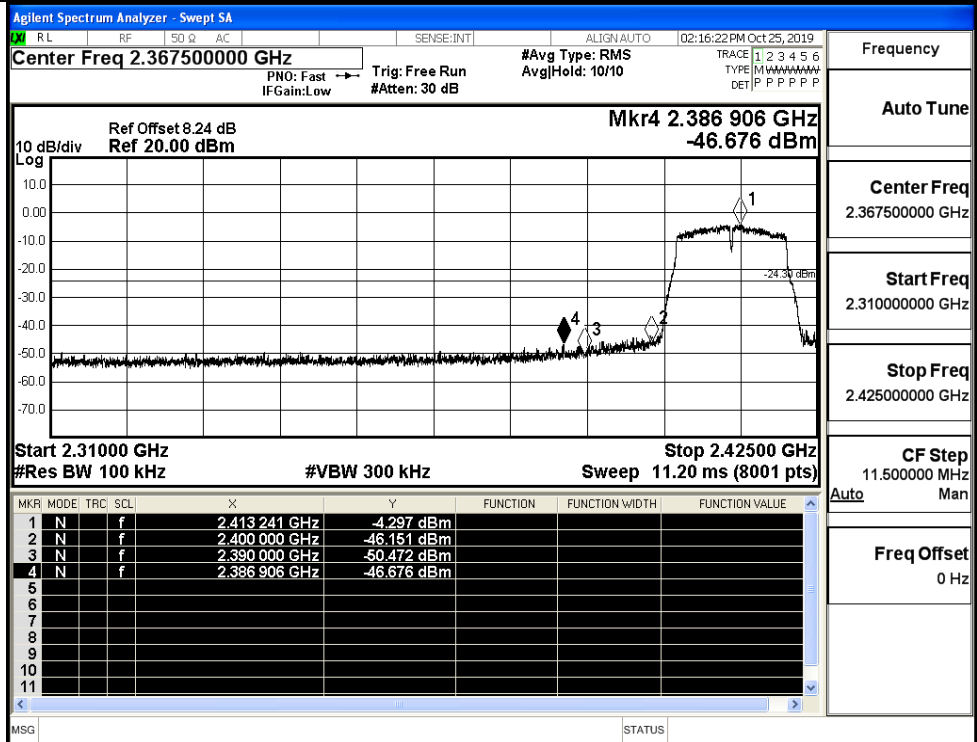


11B/HCH



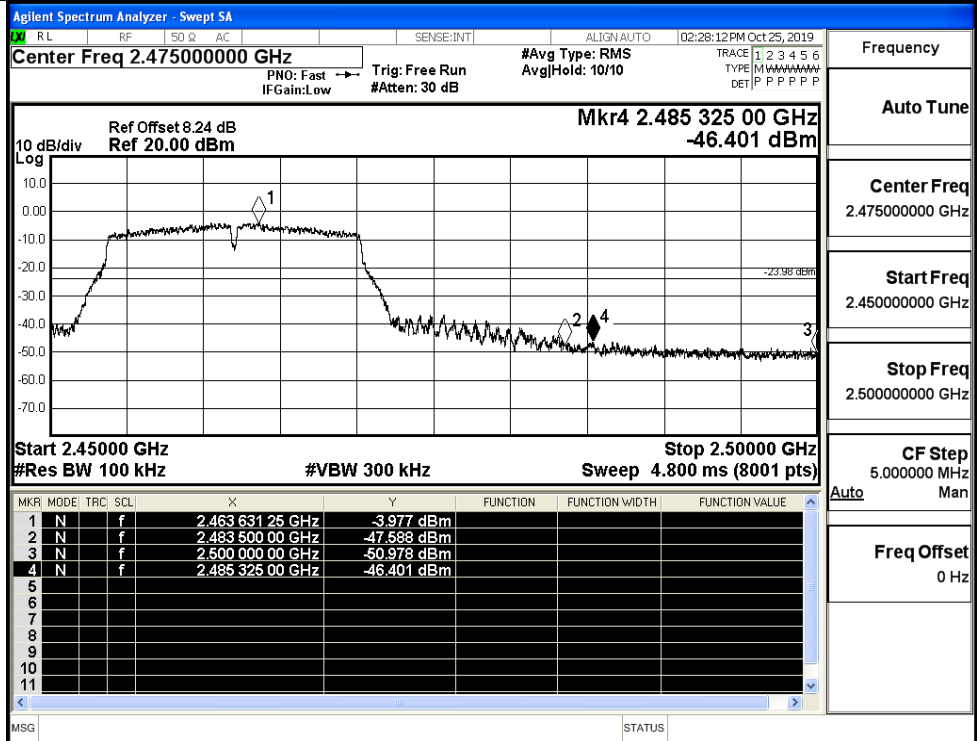
Frequency	2.475000000 GHz
Auto Tune	
Center Freq	2.475000000 GHz
Start Freq	2.450000000 GHz
Stop Freq	2.500000000 GHz
CF Step	5.000000 MHz
Freq Offset	0 Hz

11G/LCH



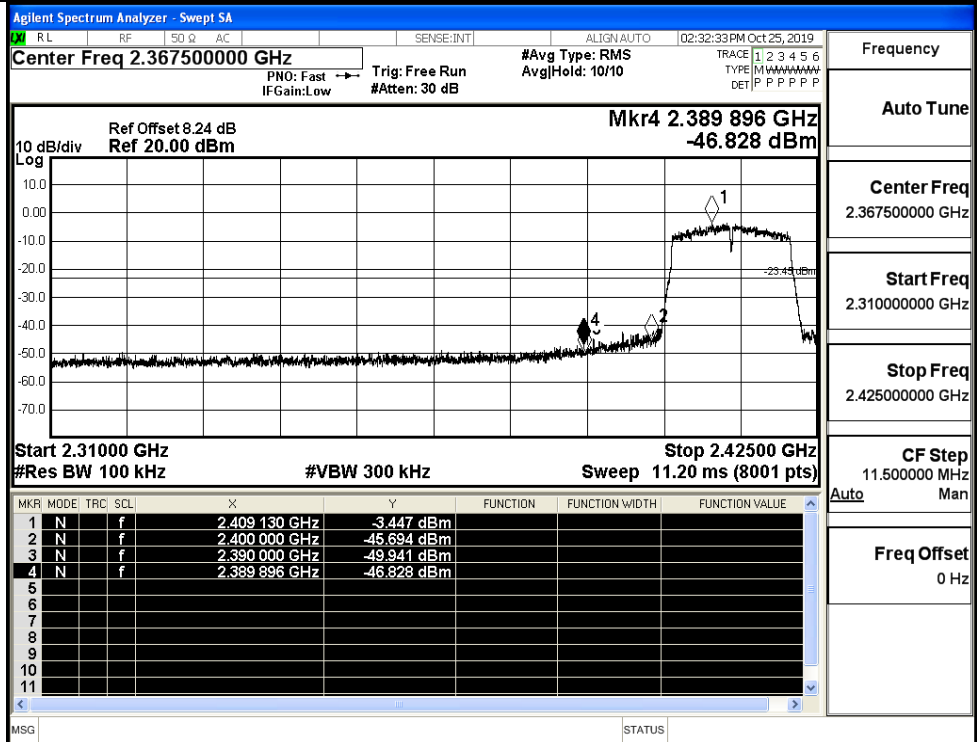
Frequency	2.367500000 GHz
Auto Tune	
Center Freq	2.367500000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.425000000 GHz
CF Step	11.500000 MHz
Freq Offset	0 Hz

11G/HCH



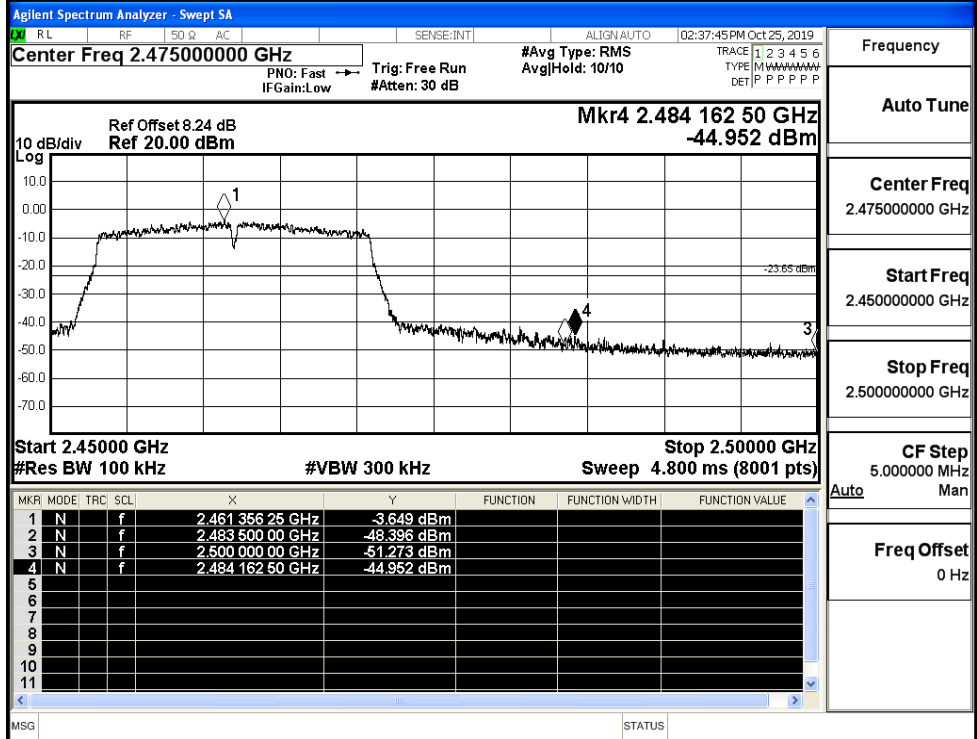
Frequency	2.47500000 GHz
Auto Tune	
Center Freq	2.47500000 GHz
Start Freq	2.45000000 GHz
Stop Freq	2.50000000 GHz
CF Step	5.000000 MHz
Freq Offset	0 Hz

11N20SISO/LCH



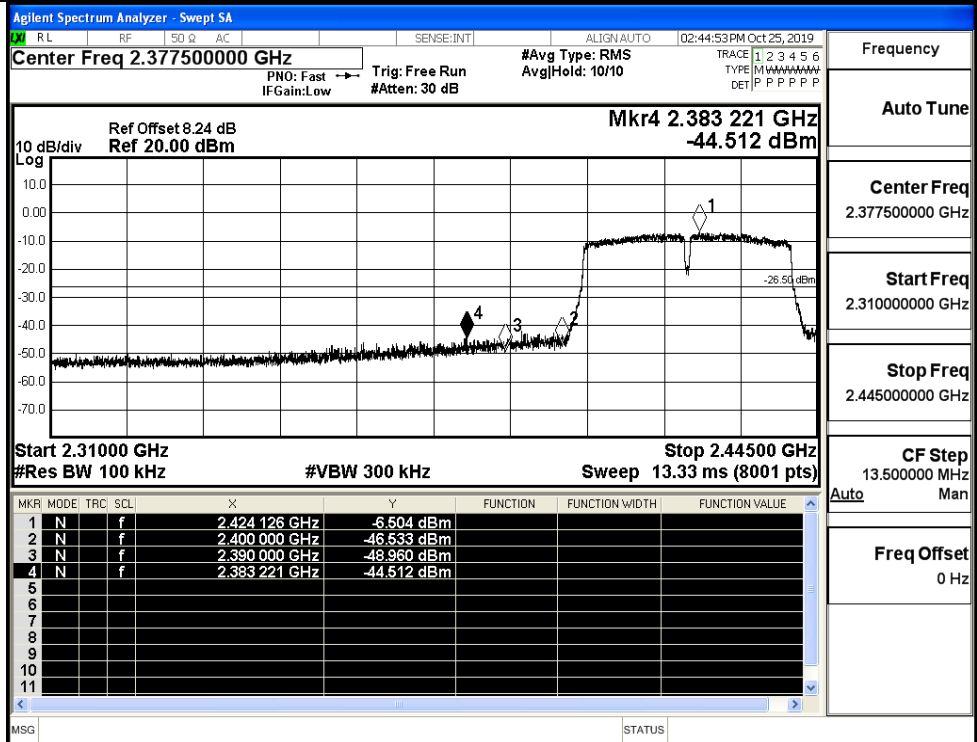
Frequency	2.36750000 GHz
Auto Tune	
Center Freq	2.36750000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.42500000 GHz
CF Step	11.500000 MHz
Freq Offset	0 Hz

11N20SISO/HCH



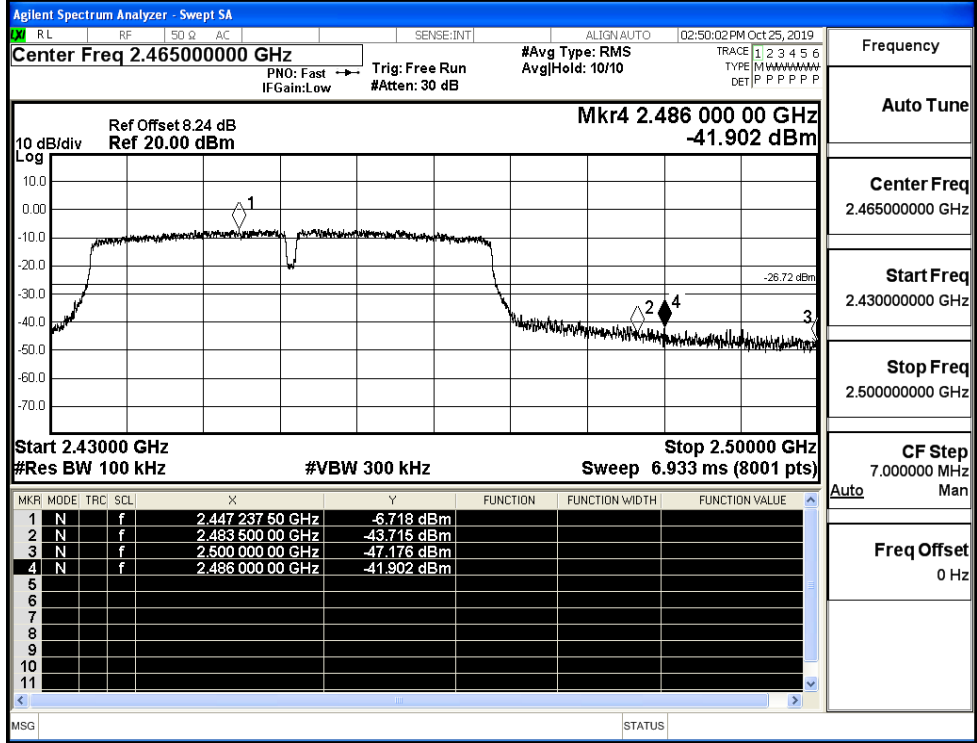
Frequency	2.475000000 GHz
Auto Tune	
Center Freq	2.475000000 GHz
Start Freq	2.450000000 GHz
Stop Freq	2.500000000 GHz
CF Step	5.000000 MHz
Freq Offset	0 Hz

11N40SISO/LCH



Frequency	2.377500000 GHz
Auto Tune	
Center Freq	2.377500000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.445000000 GHz
CF Step	13.500000 MHz
Freq Offset	0 Hz

11N40SISO/HCH



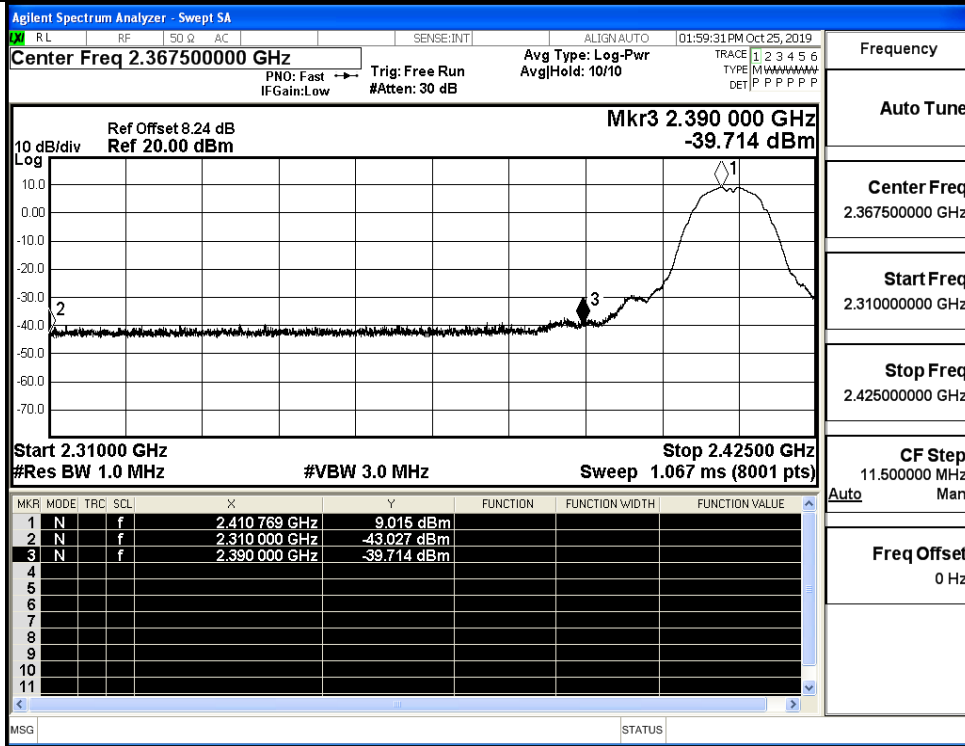
Frequency
Auto Tune
Center Freq 2.46500000 GHz
Start Freq 2.43000000 GHz
Stop Freq 2.50000000 GHz
CF Step 7.000000 MHz
Freq Offset 0 Hz

C.7 Restrict-band band-edge measurements

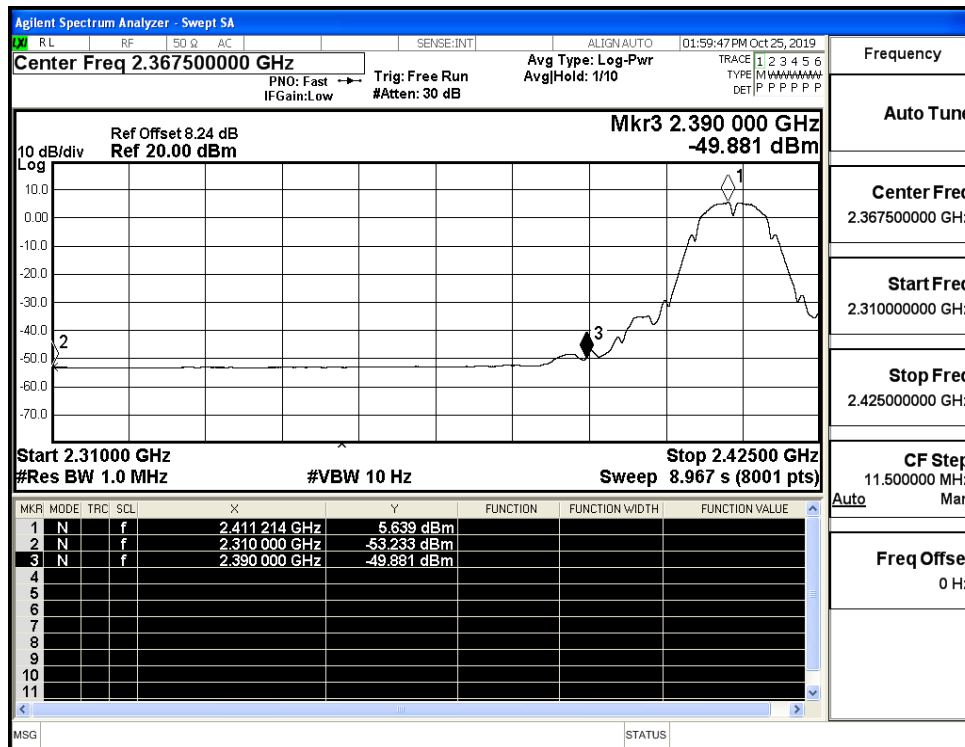
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBu V/m]	Verdict
11B	2412	Ant1	2310.0	-43.03	3.0	0	55.20	PEAK	74	PASS
	2412	Ant1	2310.0	-53.23	3.0	0	45.00	AV	54	PASS
	2412	Ant1	2390.0	-39.71	3.0	0	58.52	PEAK	74	PASS
	2412	Ant1	2390.0	-49.88	3.0	0	48.35	AV	54	PASS
	2462	Ant1	2483.5	-40.32	3.0	0	57.91	PEAK	74	PASS
	2462	Ant1	2483.5	-49.45	3.0	0	48.78	AV	54	PASS
	2462	Ant1	2500.0	-42.07	3.0	0	56.16	PEAK	74	PASS
	2462	Ant1	2500.0	-51.86	3.0	0	46.37	AV	54	PASS
11G	2412	Ant1	2310.0	-42.09	3.0	0	56.14	PEAK	74	PASS
	2412	Ant1	2310.0	-53.20	3.0	0	45.03	AV	54	PASS
	2412	Ant1	2390.0	-36.99	3.0	0	61.24	PEAK	74	PASS
	2412	Ant1	2390.0	-50.13	3.0	0	48.10	AV	54	PASS
	2462	Ant1	2483.5	-30.17	3.0	0	68.06	PEAK	74	PASS
	2462	Ant1	2483.5	-49.58	3.0	0	48.65	AV	54	PASS
	2462	Ant1	2500.0	-40.37	3.0	0	57.86	PEAK	74	PASS
	2462	Ant1	2500.0	-51.48	3.0	0	46.75	AV	54	PASS
11N20 SISO	2412	Ant1	2310.0	-42.60	3.0	0	55.63	PEAK	74	PASS
	2412	Ant1	2310.0	-53.14	3.0	0	45.09	AV	54	PASS
	2412	Ant1	2390.0	-34.40	3.0	0	63.83	PEAK	74	PASS
	2412	Ant1	2390.0	-49.77	3.0	0	48.46	AV	54	PASS
	2462	Ant1	2483.5	-34.38	3.0	0	63.85	PEAK	74	PASS
	2462	Ant1	2483.5	-49.52	3.0	0	48.71	AV	54	PASS
	2462	Ant1	2500.0	-39.95	3.0	0	58.28	PEAK	74	PASS
	2462	Ant1	2500.0	-51.41	3.0	0	46.82	AV	54	PASS
11N40 SISO	2422	Ant1	2310.0	-42.90	3.0	0	55.33	PEAK	74	PASS
	2422	Ant1	2310.0	-53.13	3.0	0	45.10	AV	54	PASS

	2422	Ant1	2390.0	-35.71	3.0	0	62.52	PEAK	74	PASS
	2422	Ant1	2390.0	-47.64	3.0	0	50.59	AV	54	PASS
	2452	Ant1	2483.5	-30.70	3.0	0	67.53	PEAK	74	PASS
	2452	Ant1	2483.5	-45.03	3.0	0	53.20	AV	54	PASS
	2452	Ant1	2500.0	-35.85	3.0	0	62.38	PEAK	74	PASS
	2452	Ant1	2500.0	-49.16	3.0	0	49.07	AV	54	PASS

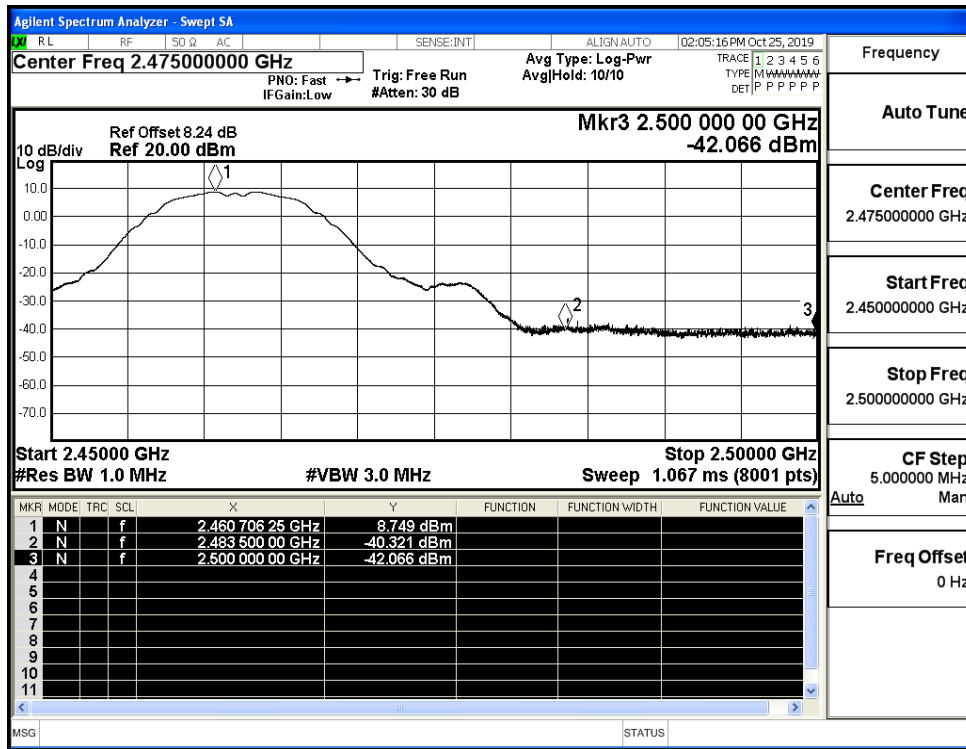
Restrict-band band-edge measurements_11B_2412_Ant1_PEAK



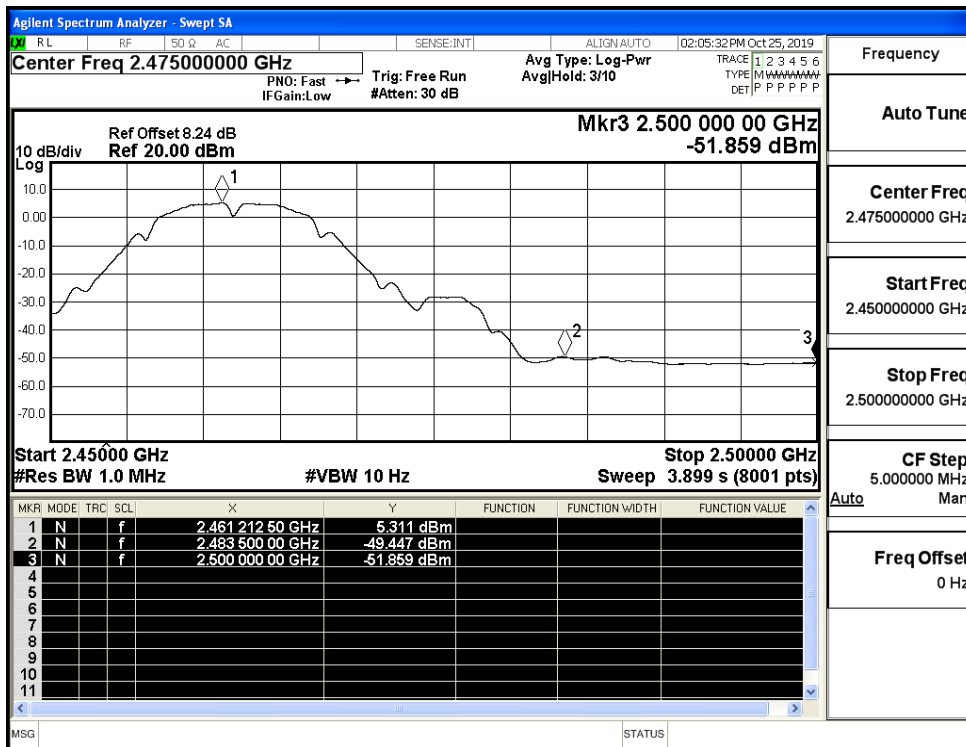
Restrict-band band-edge measurements_11B_2412_Ant1_AV



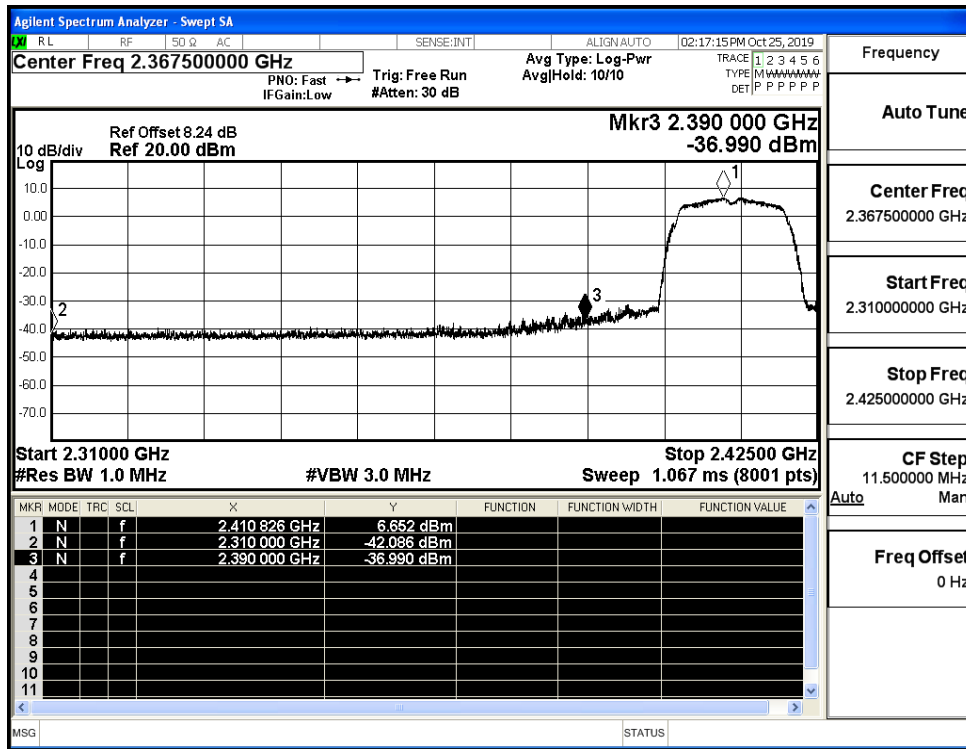
Restrict-band band-edge measurements_11B_2462_Ant1_PEAK



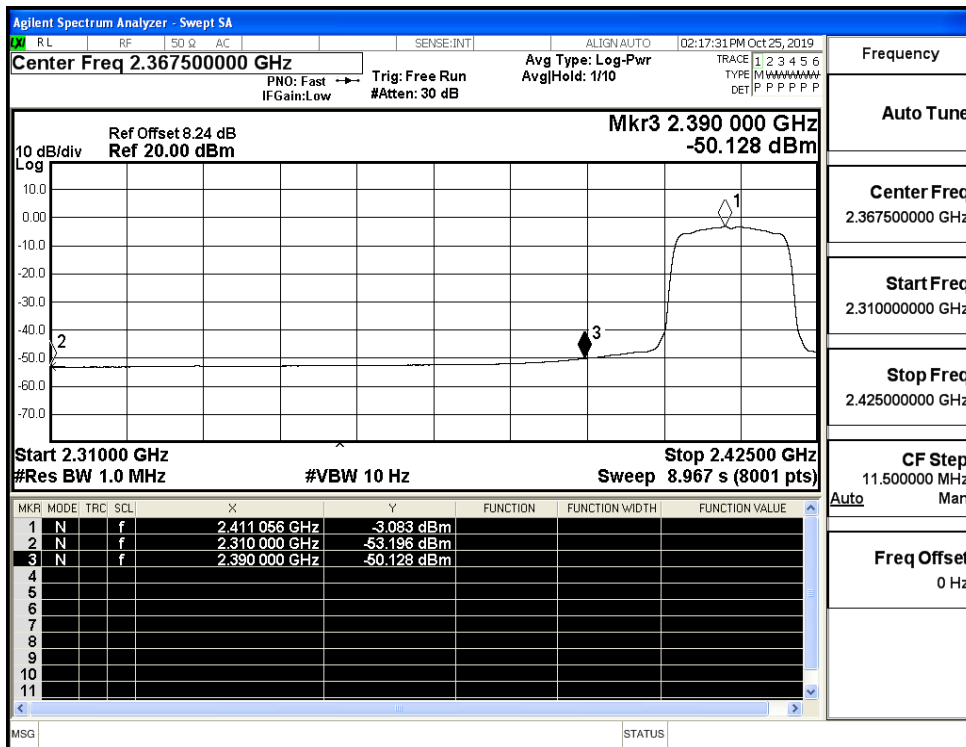
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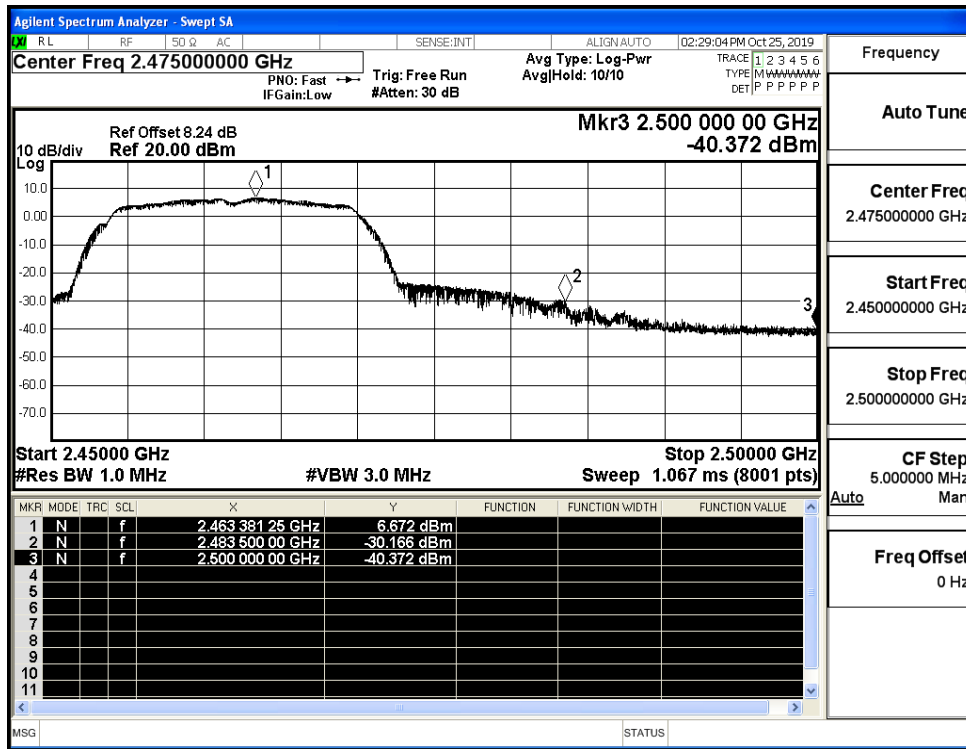
Restrict-band band-edge measurements_11G_2412_Ant1_PEAK



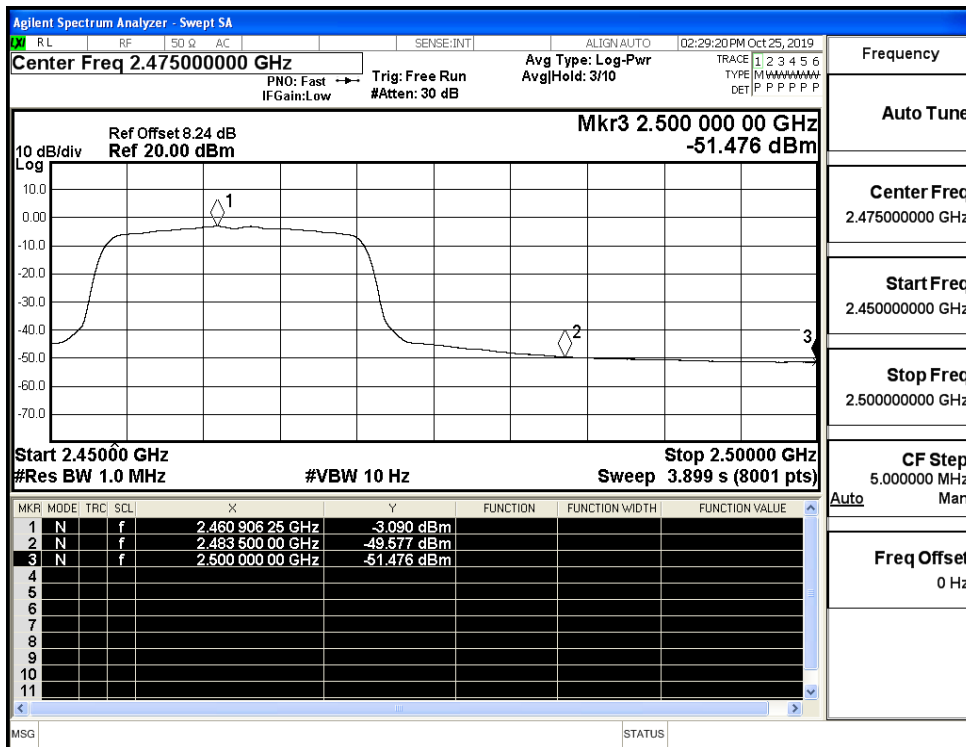
Restrict-band band-edge measurements_11G_2412_Ant1_AV



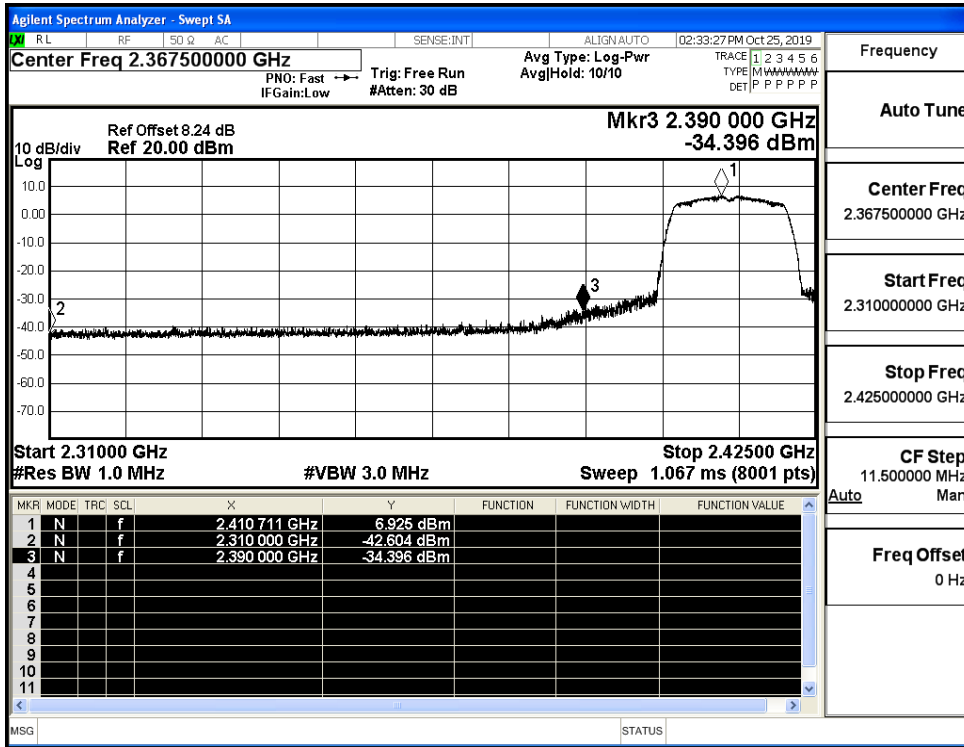
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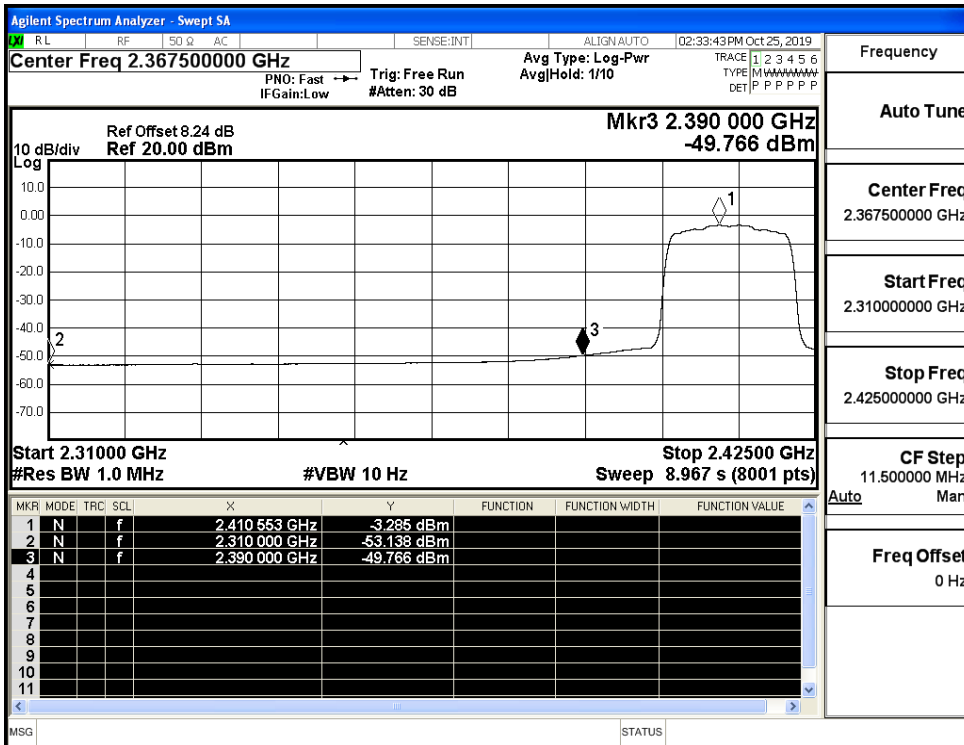
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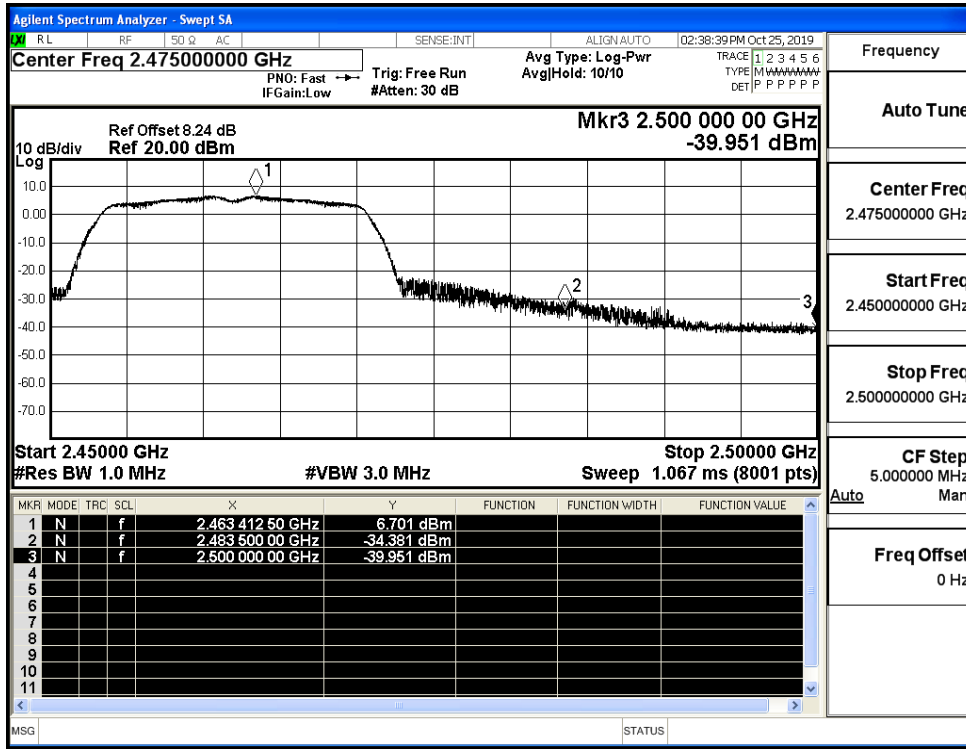
Restrict-band band-edge measurements_11N20SISO_2412_Ant1_PEAK



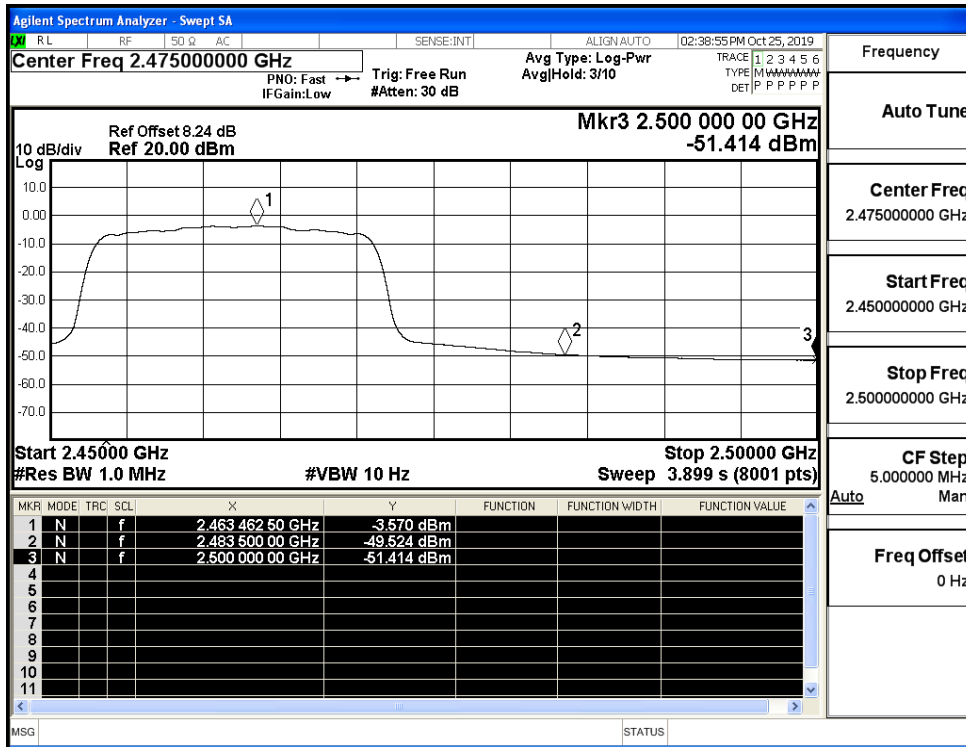
Restrict-band band-edge measurements_11N20SISO_2412_Ant1_AV



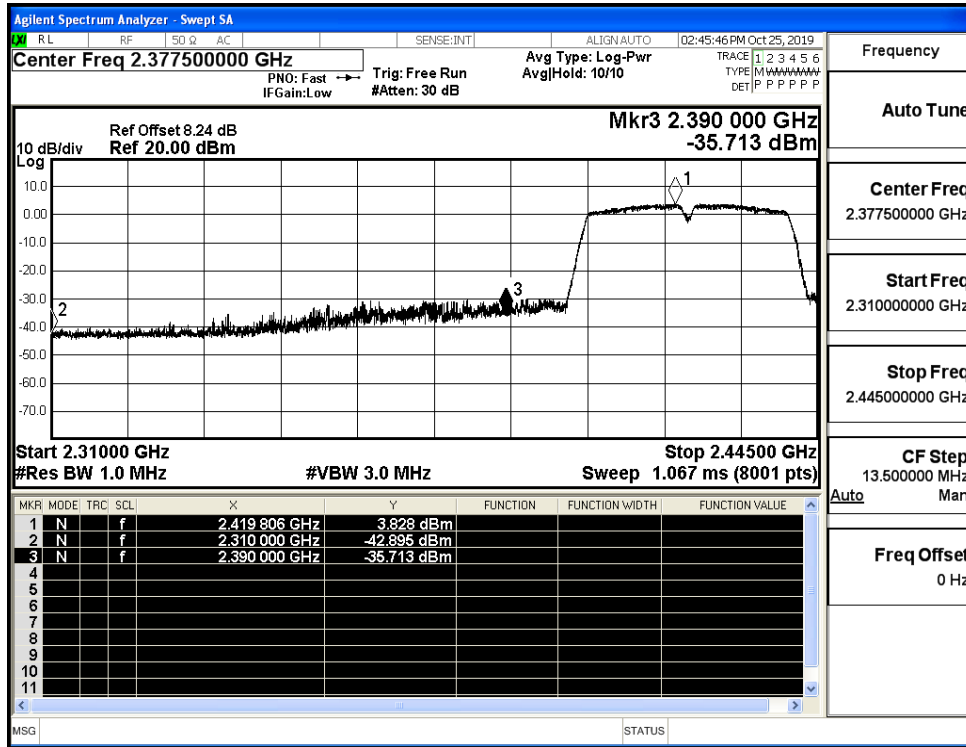
Restrict-band band-edge measurements_11N20SISO_2462_Ant1_PEAK



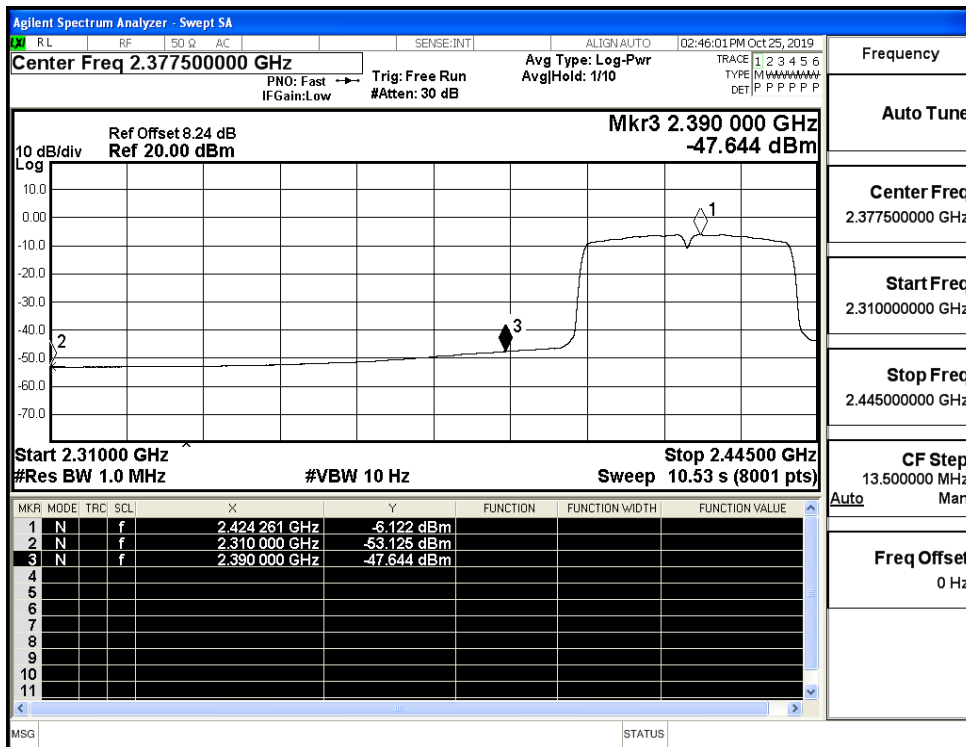
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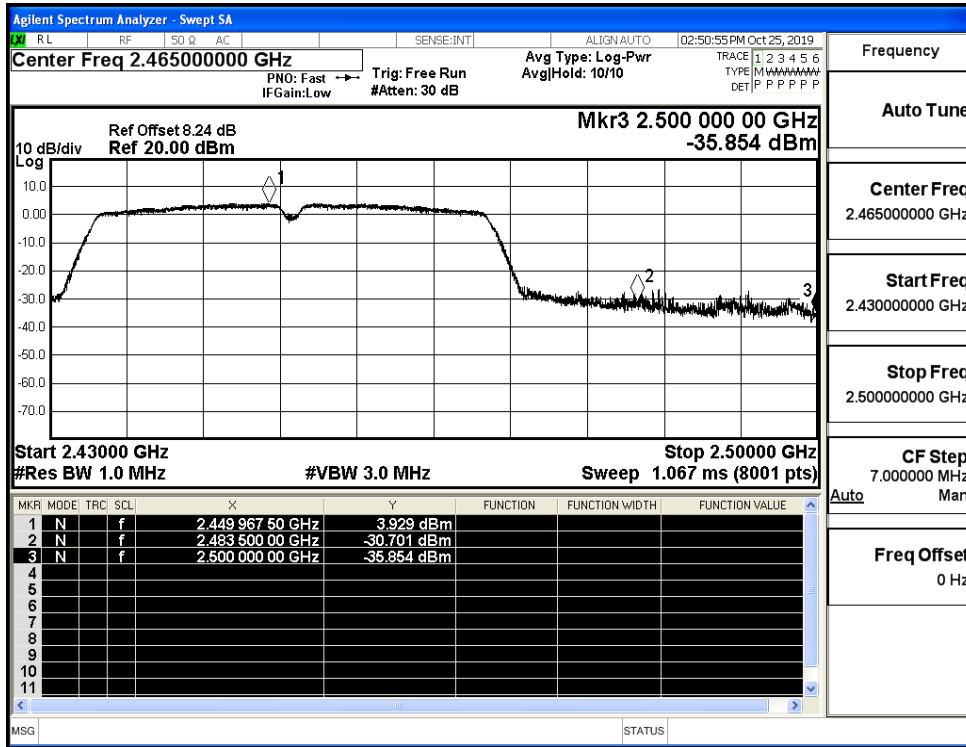
Restrict-band band-edge measurements_11N40SISO_2422_Ant1_PEAK



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

