

Appendix B

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Smart Gateway

Trade Mark: HEIMAN

Test Model: HS1GW-E-2

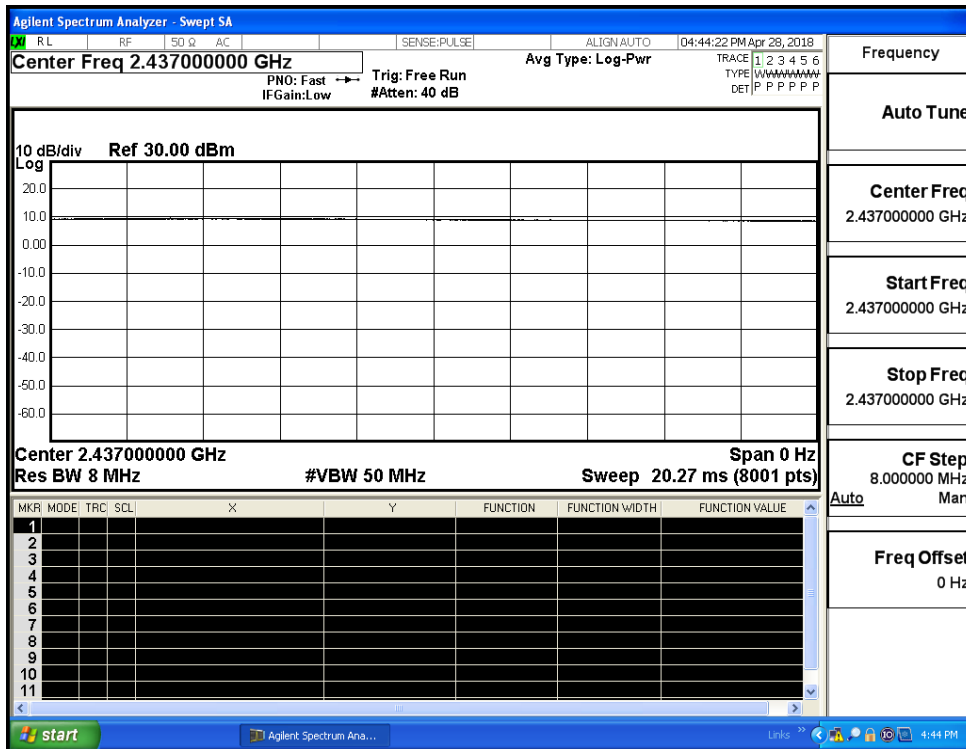
Environmental Conditions

Temperature:	22.6 ° C
Relative Humidity:	51.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom.Liu
Supervised by:	Jayden.Zhuo

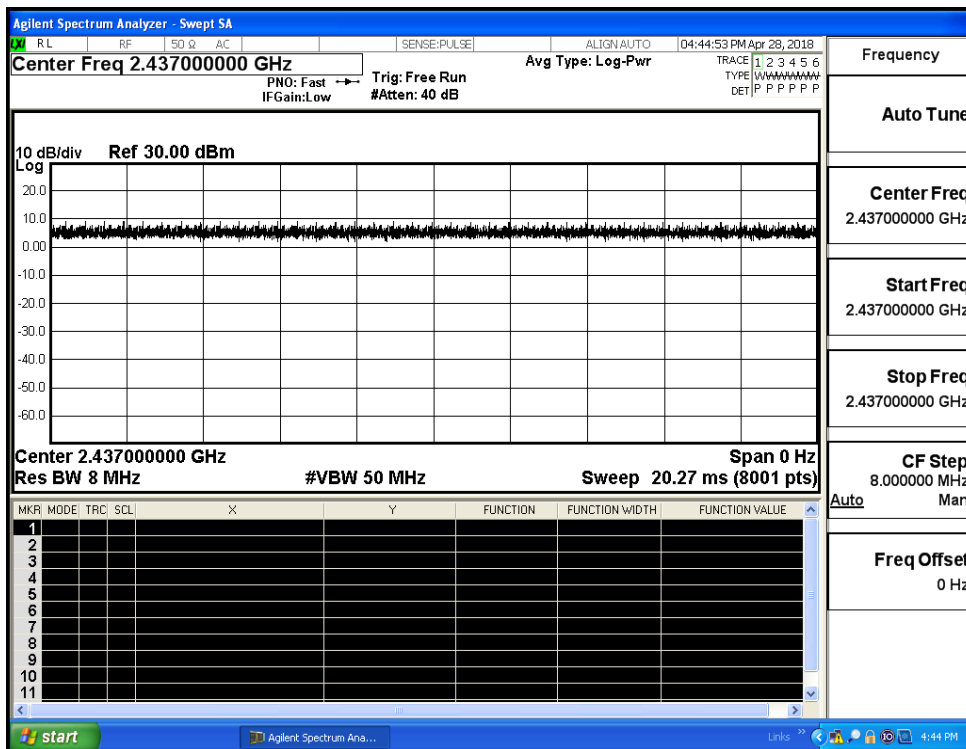
B.1 Duty Cycle

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
11B	2437	Ant0	100	PASS
11G	2437	Ant0	100	PASS
11N20SISO	2437	Ant0	100	PASS
11N40SISO	2437	Ant0	100	PASS

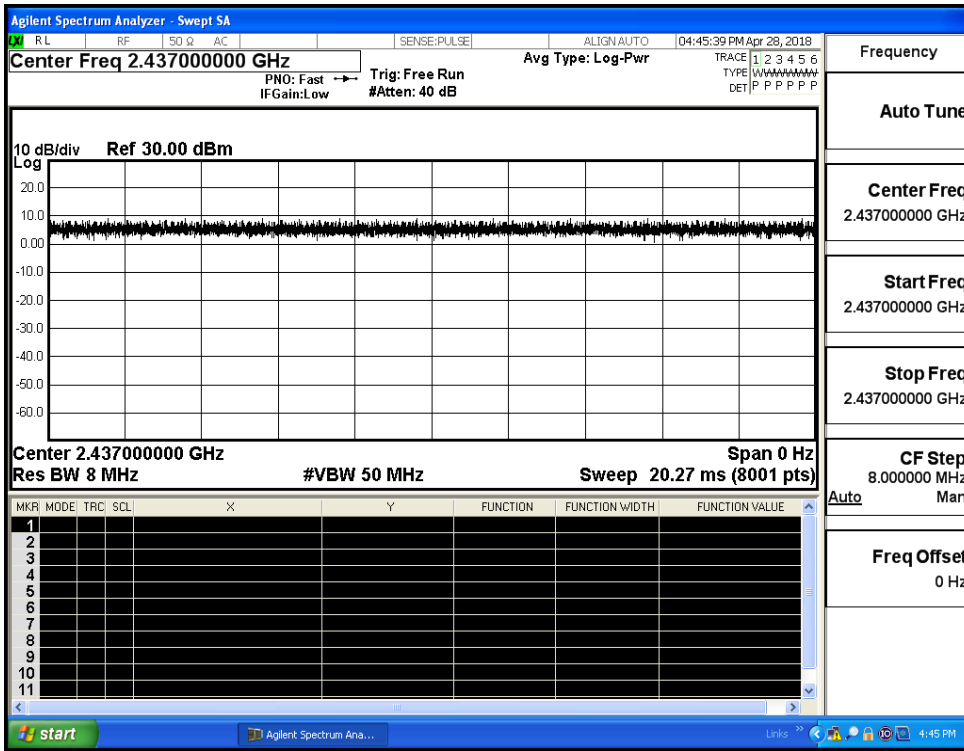
Duty Cycle_11B_2437_Ant0



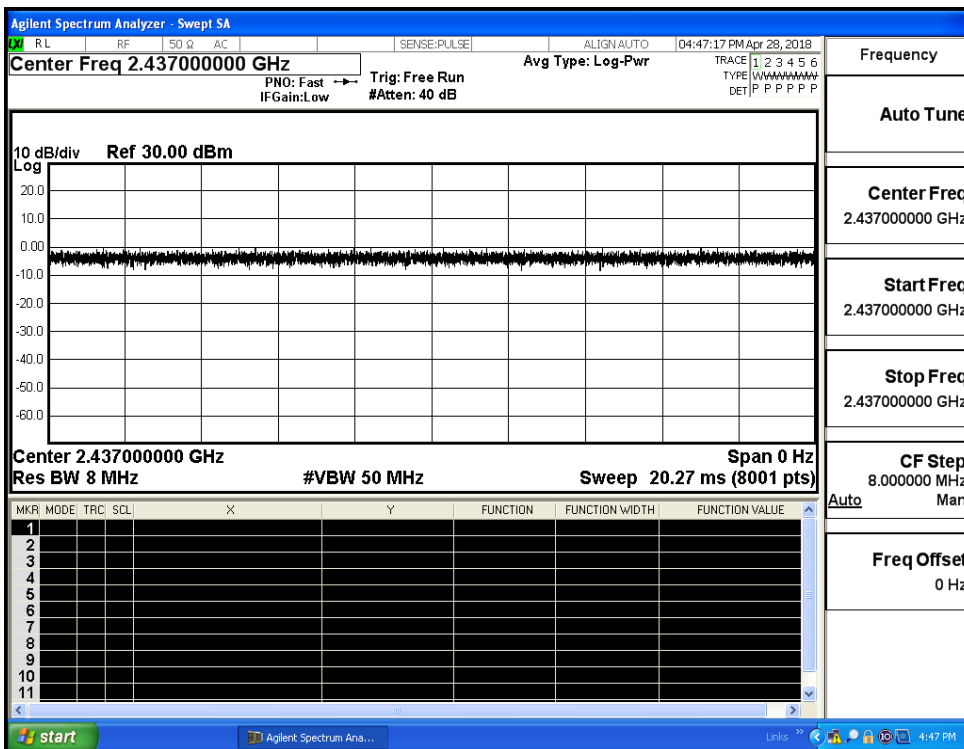
Duty Cycle_11G_2437_Ant0



Duty Cycle_11N20SISO_2437_Ant0



Duty Cycle_11N40SISO_2437_Ant0

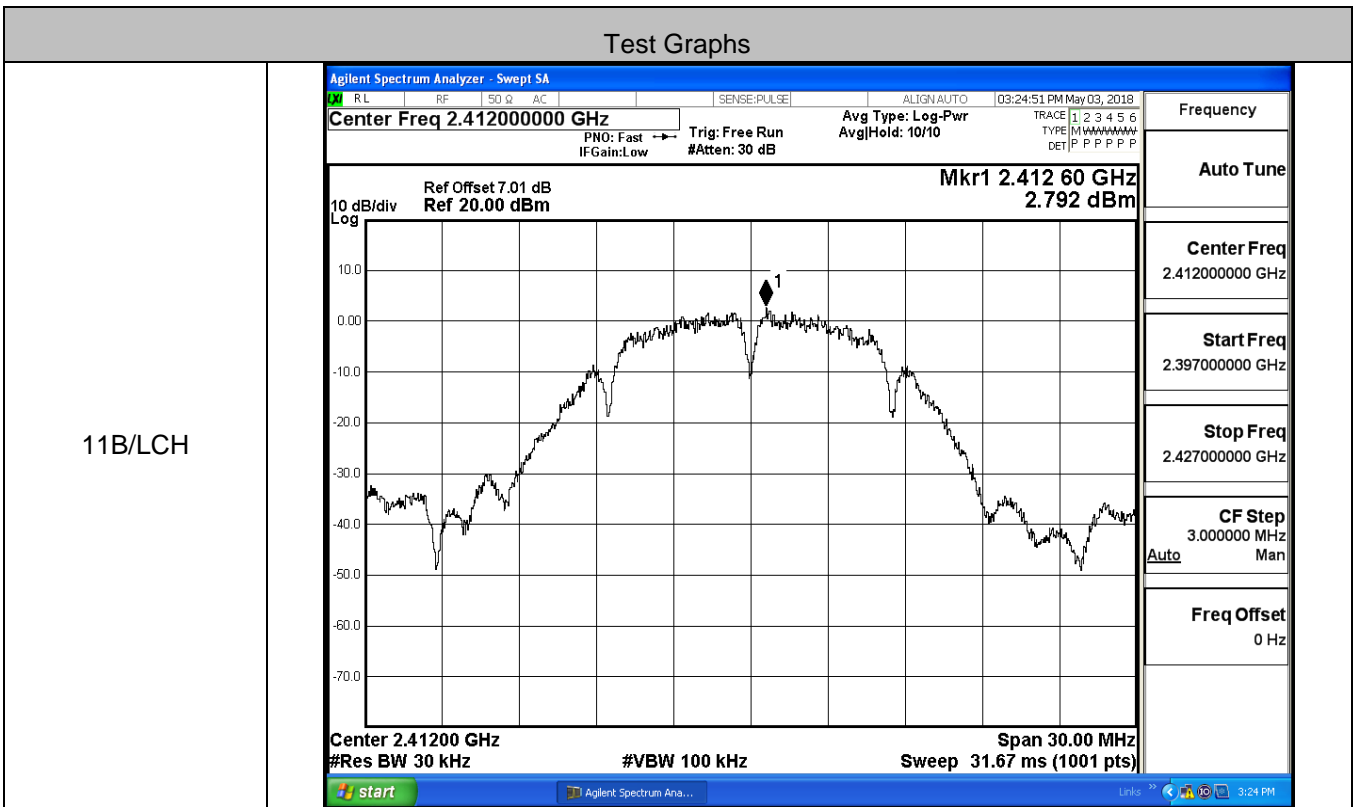


B.2 Maximum Conducted Output Power

Mode	Channel	Meas.Level [dBm]	Limit [dBm]	Verdict
11B	LCH	18.65	30	PASS
	MCH	18.77	30	PASS
	HCH	18.62	30	PASS
11G	LCH	18.33	30	PASS
	MCH	18.15	30	PASS
	HCH	18.24	30	PASS
11N20SISO	LCH	17.32	30	PASS
	MCH	17.59	30	PASS
	HCH	17.66	30	PASS
11N40SISO	LCH	16.32	30	PASS
	MCH	16.89	30	PASS
	HCH	16.78	30	PASS

B.3 Maximum Power Spectral Density

Mode	Channel	Meas.Level [dBm/30KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	2.792	8	PASS
	MCH	2.423	8	PASS
	HCH	2.818	8	PASS
11G	LCH	-2.014	8	PASS
	MCH	-2.726	8	PASS
	HCH	-1.785	8	PASS
11N20SISO	LCH	-2.403	8	PASS
	MCH	-1.960	8	PASS
	HCH	-1.822	8	PASS
11N40SISO	LCH	-6.189	8	PASS
	MCH	-5.579	8	PASS
	HCH	-5.622	8	PASS



11B/MCH



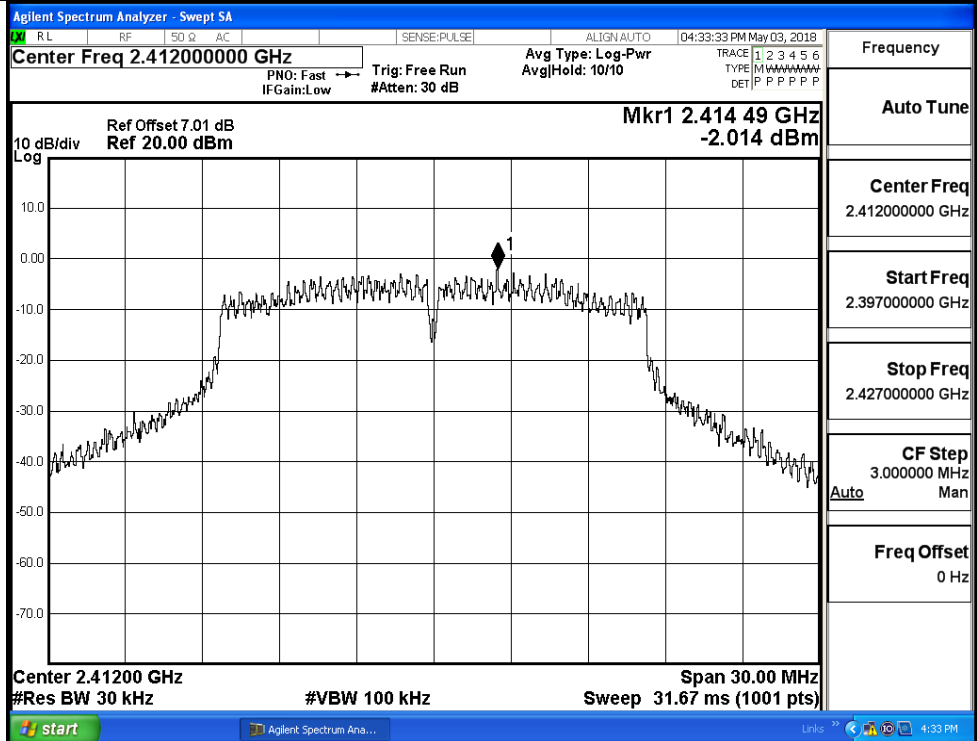
Frequency
Auto Tune
Center Freq 2.43700000 GHz
Start Freq 2.42200000 GHz
Stop Freq 2.45200000 GHz
CF Step 3.000000 MHz Auto Man
Freq Offset 0 Hz

11B/HCH

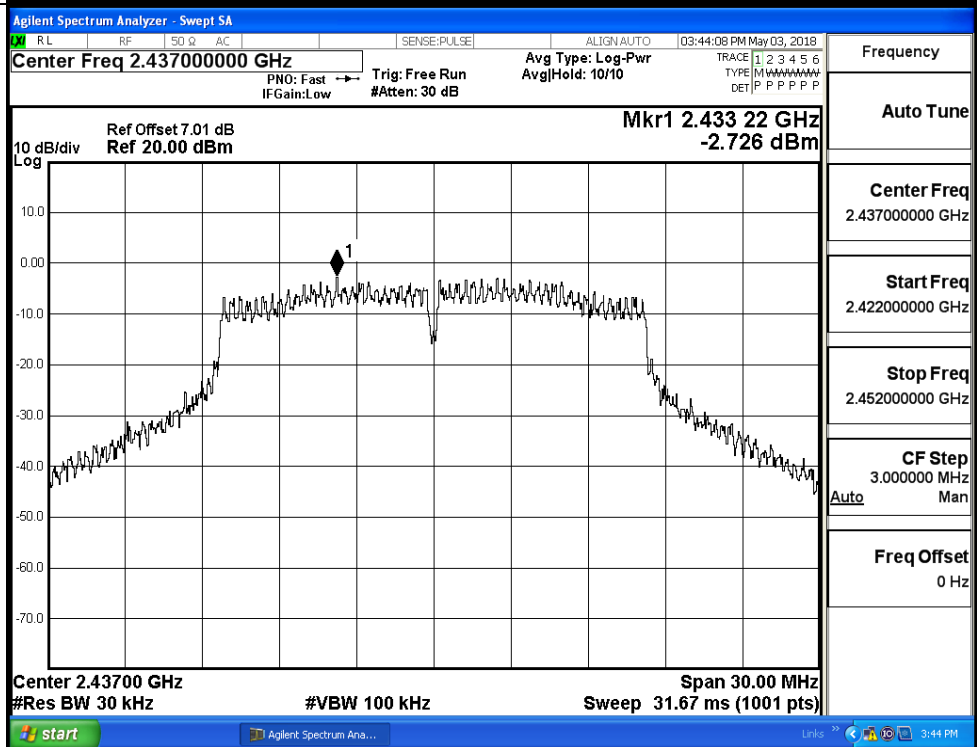


Frequency
Auto Tune
Center Freq 2.46200000 GHz
Start Freq 2.44700000 GHz
Stop Freq 2.47700000 GHz
CF Step 3.000000 MHz Auto Man
Freq Offset 0 Hz

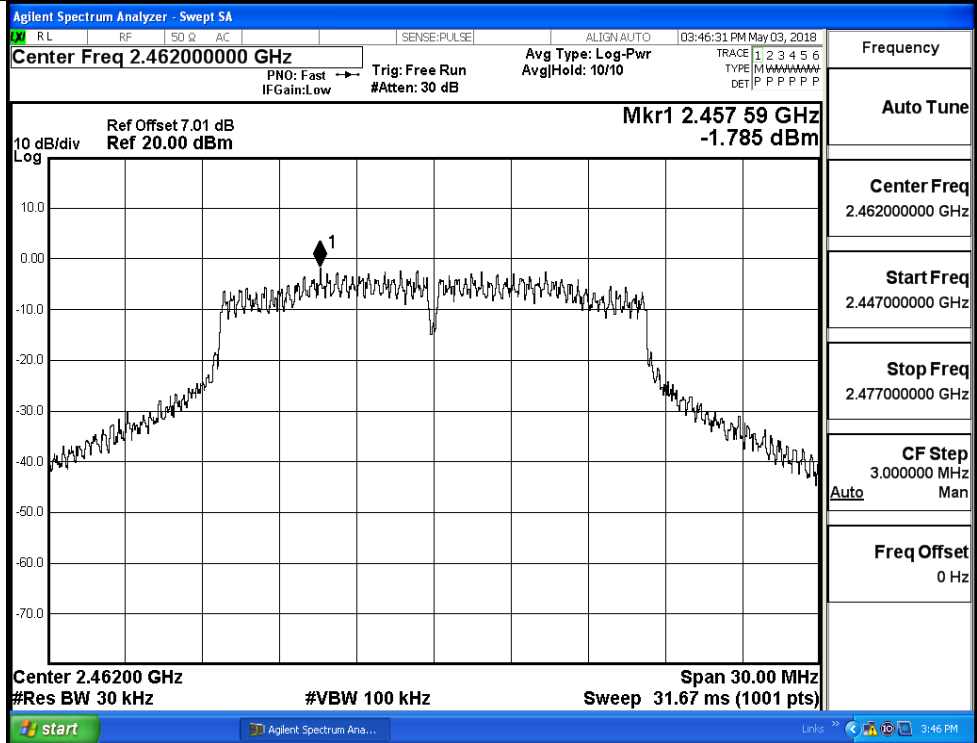
11G/LCH



11G/MCH

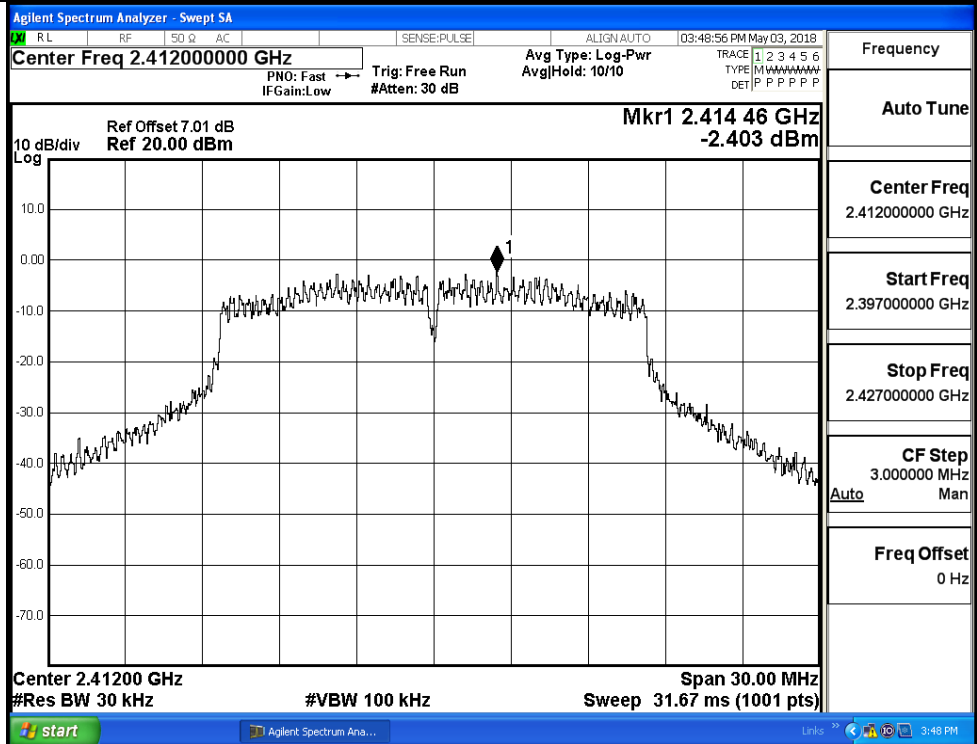


11G/HCH



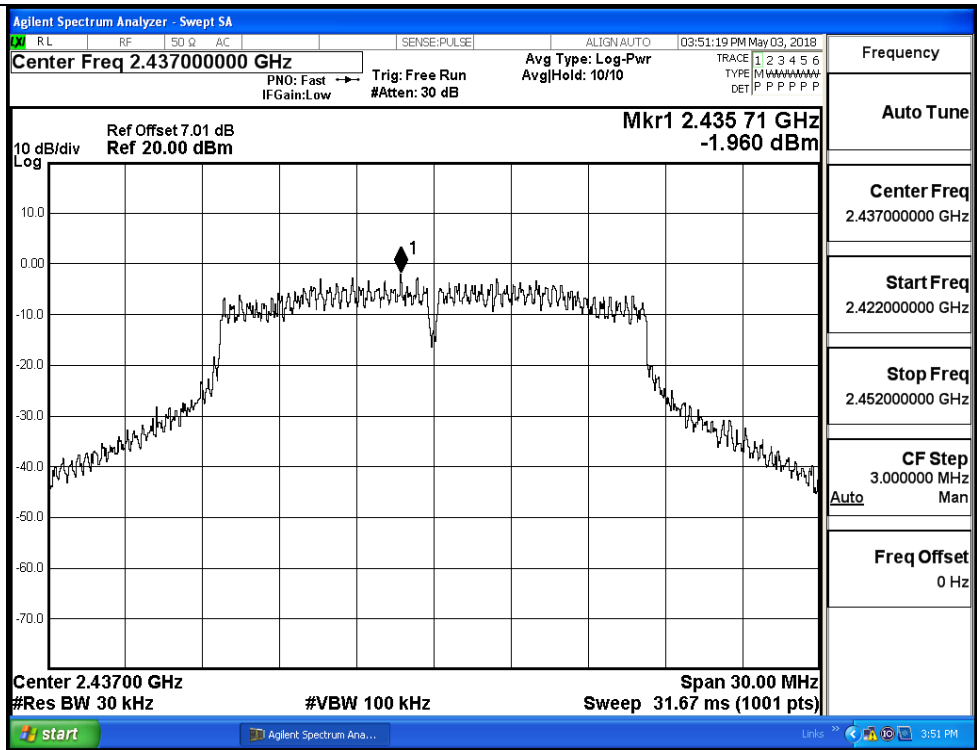
Frequency
Auto Tune
Center Freq 2.46200000 GHz
Start Freq 2.447000000 GHz
Stop Freq 2.477000000 GHz
CF Step 3.000000 MHz Auto Man
Freq Offset 0 Hz

11N20SISO/LCH

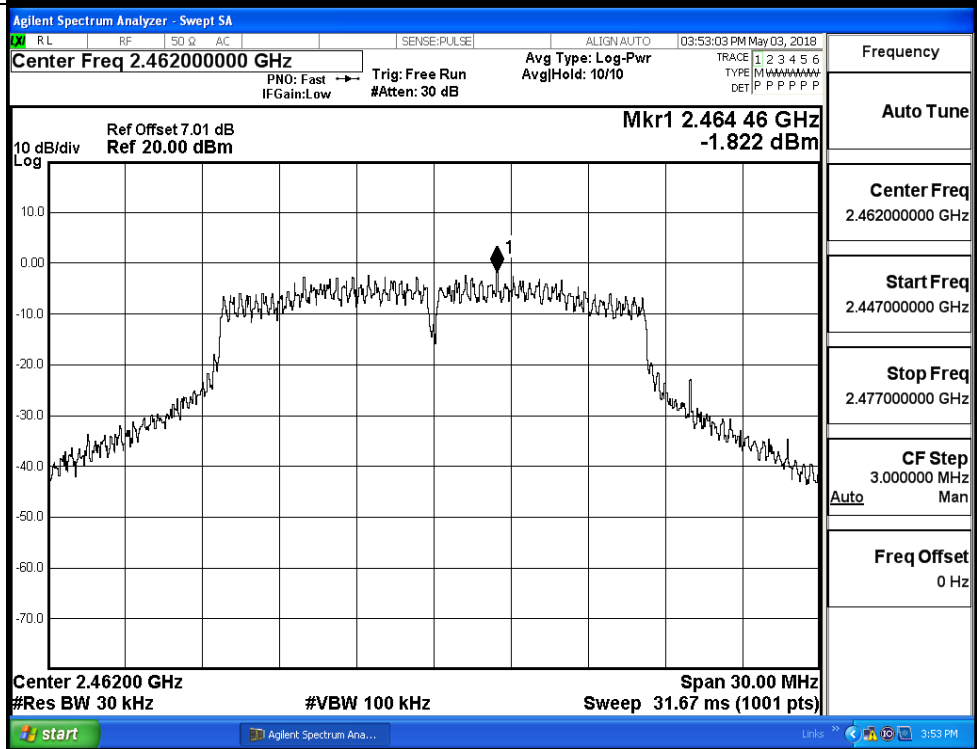


Frequency
Auto Tune
Center Freq 2.412000000 GHz
Start Freq 2.397000000 GHz
Stop Freq 2.427000000 GHz
CF Step 3.000000 MHz Auto Man
Freq Offset 0 Hz

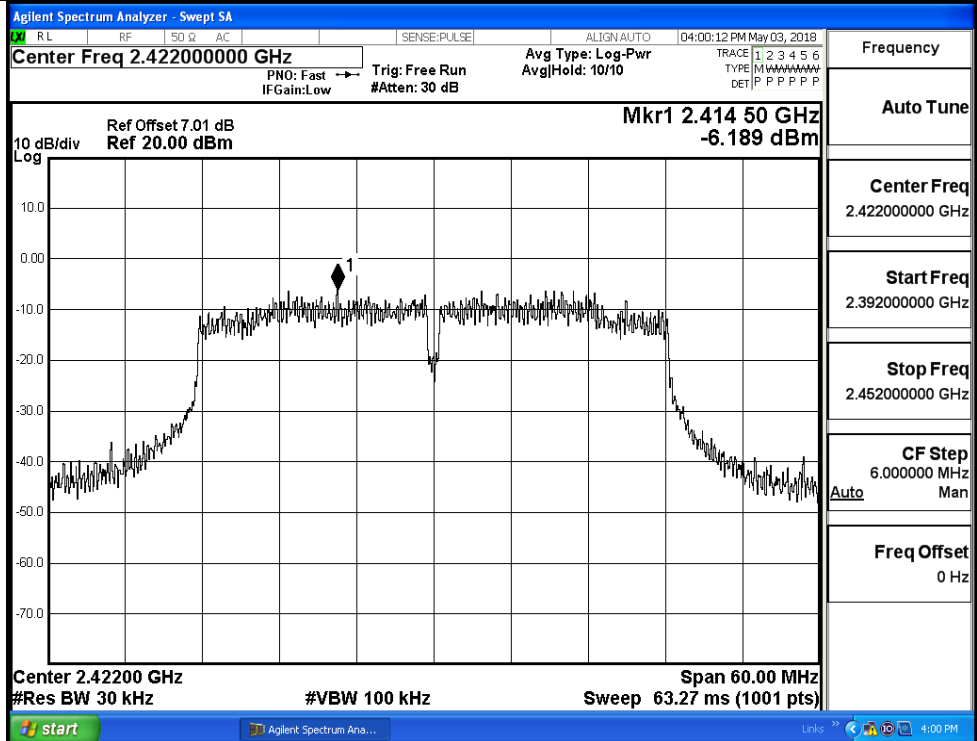
11N20SISO/MCH



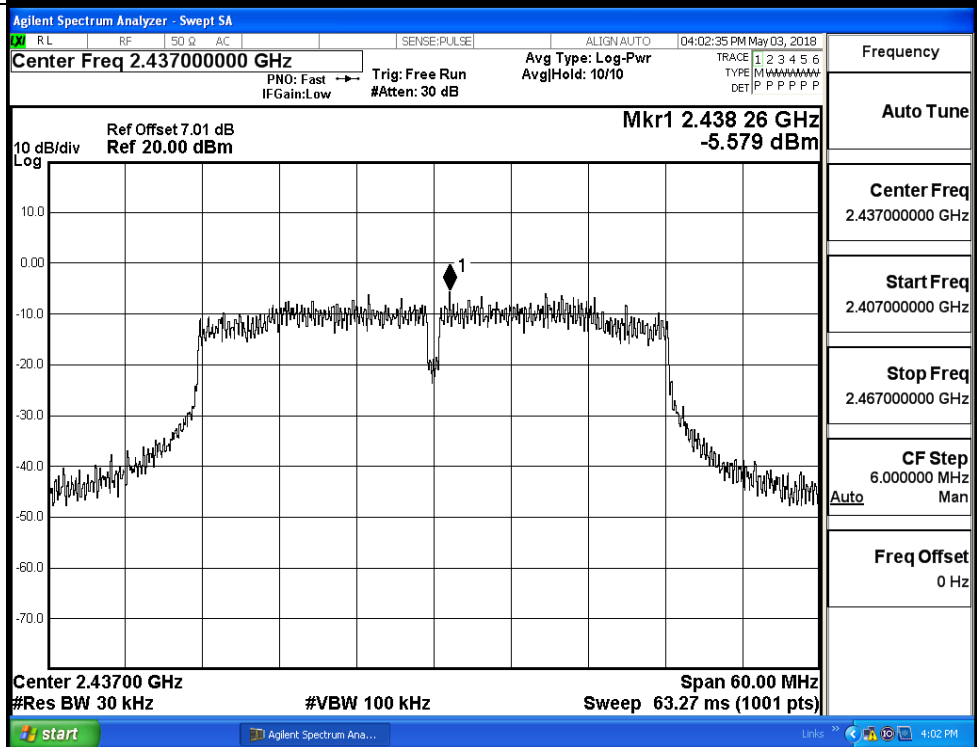
11N20SISO/HCH

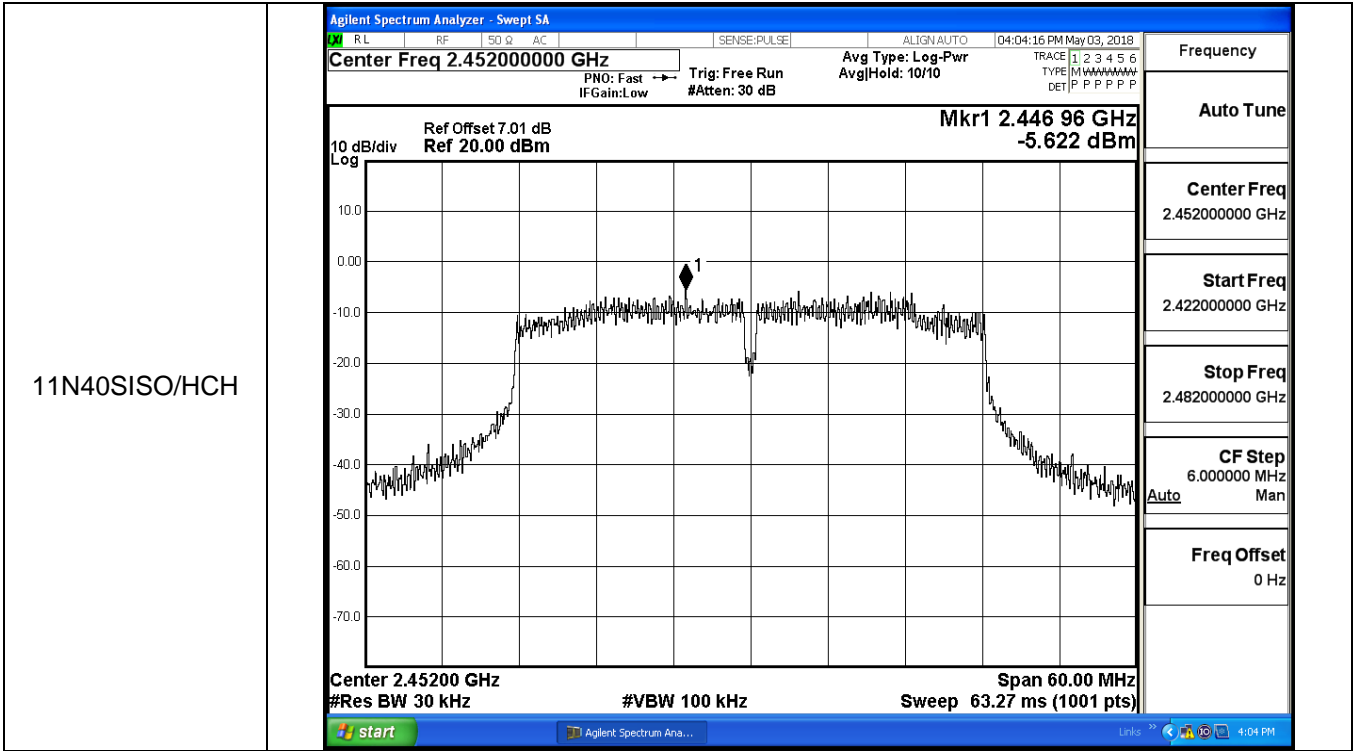


11N40SISO/LCH



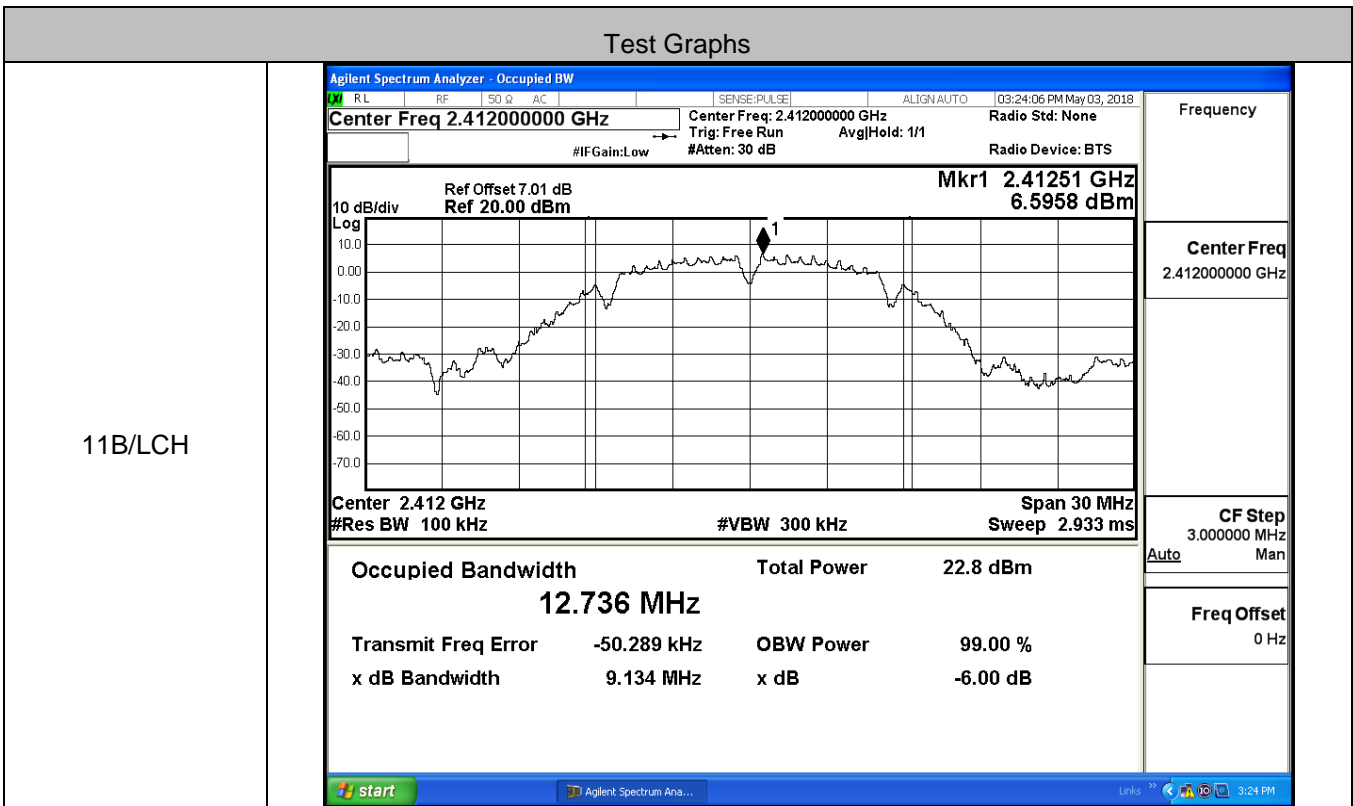
11N40SISO/MCH



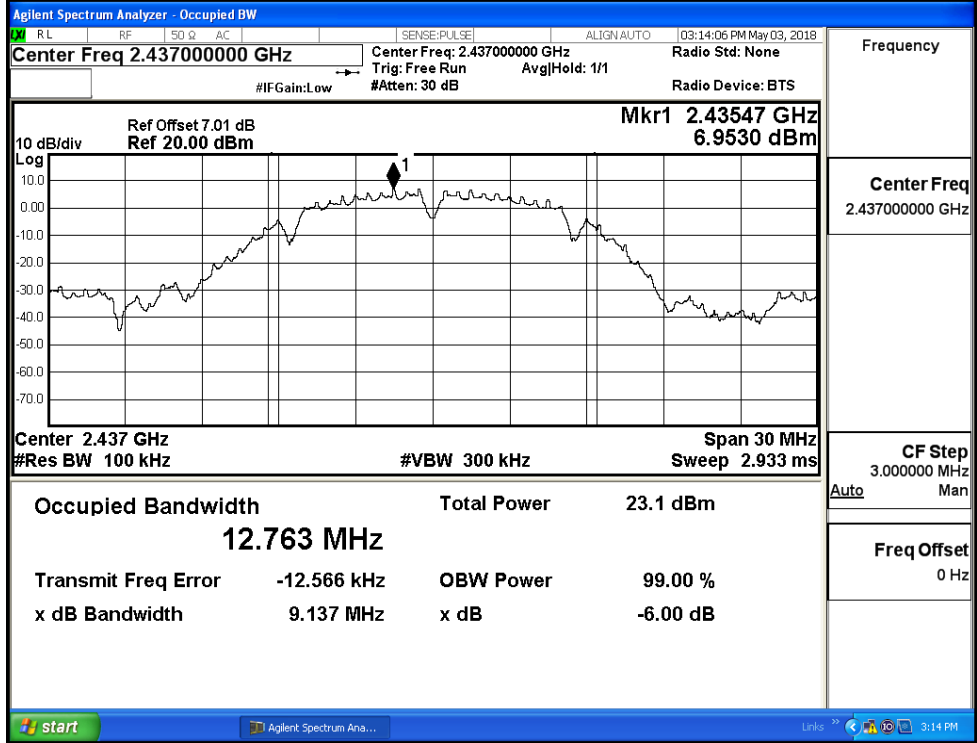


B.4 6dB Bandwidth

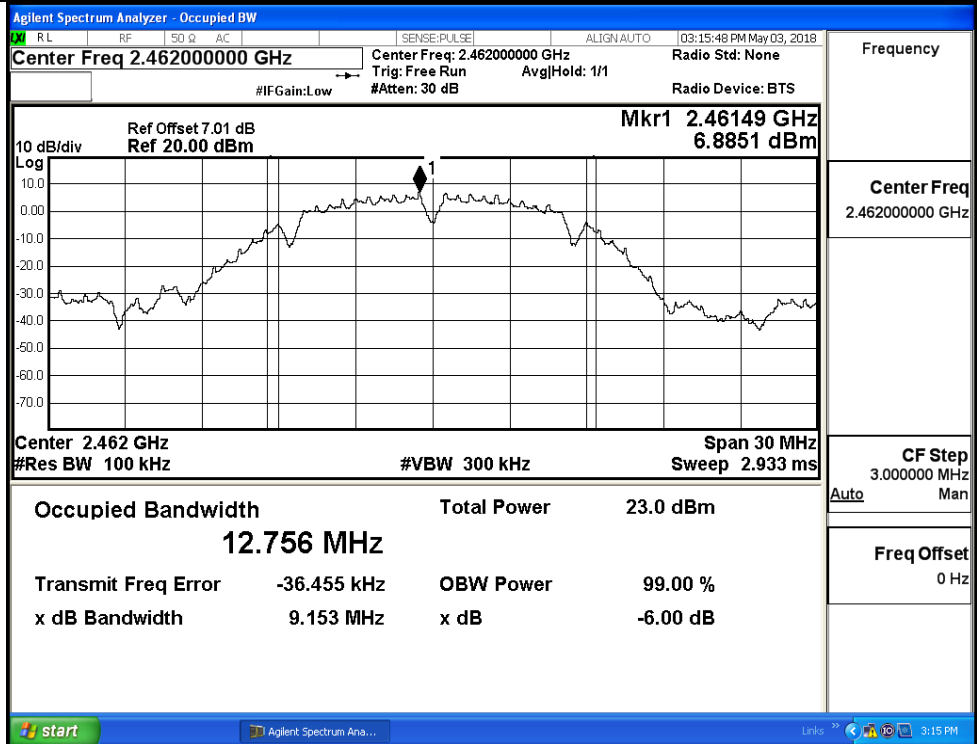
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	LCH	9.134	≥0.5	PASS
	MCH	9.137	≥0.5	PASS
	HCH	9.153	≥0.5	PASS
11G	LCH	15.09	≥0.5	PASS
	MCH	15.15	≥0.5	PASS
	HCH	15.10	≥0.5	PASS
11N20SISO	LCH	15.14	≥0.5	PASS
	MCH	15.14	≥0.5	PASS
	HCH	15.10	≥0.5	PASS
11N40SISO	LCH	35.15	≥0.5	PASS
	MCH	35.14	≥0.5	PASS
	HCH	35.16	≥0.5	PASS



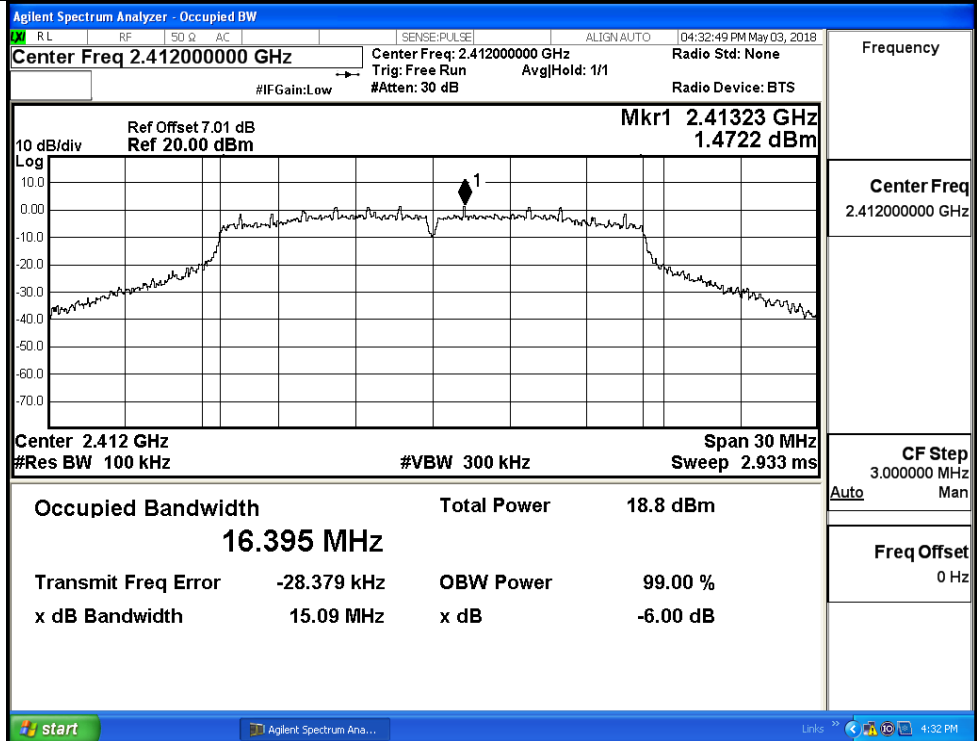
11B/MCH



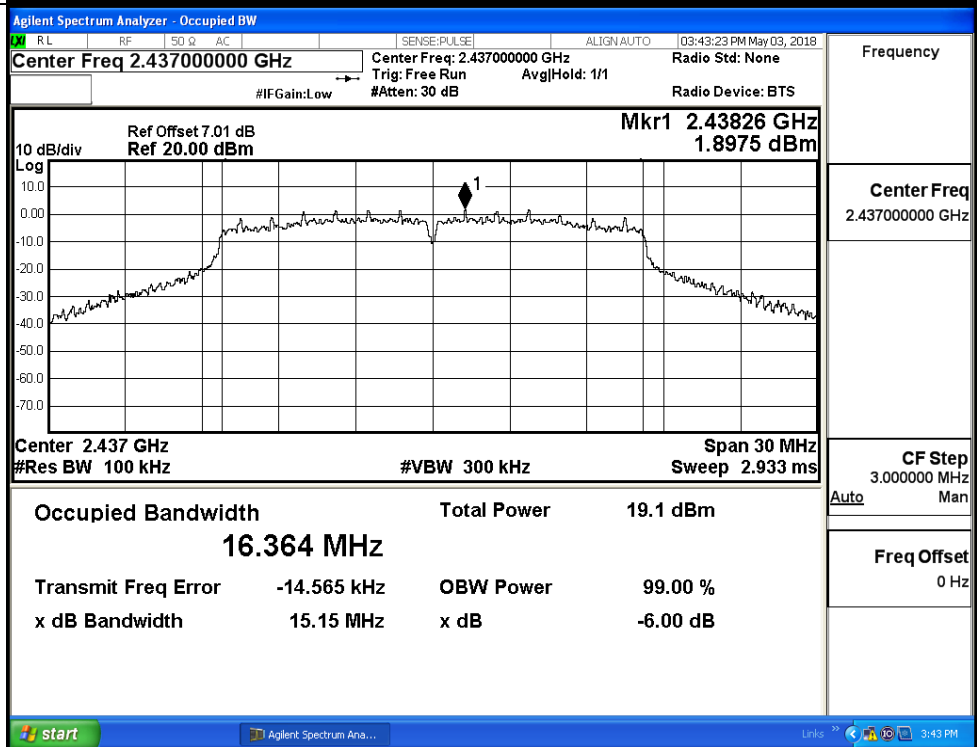
11B/HCH



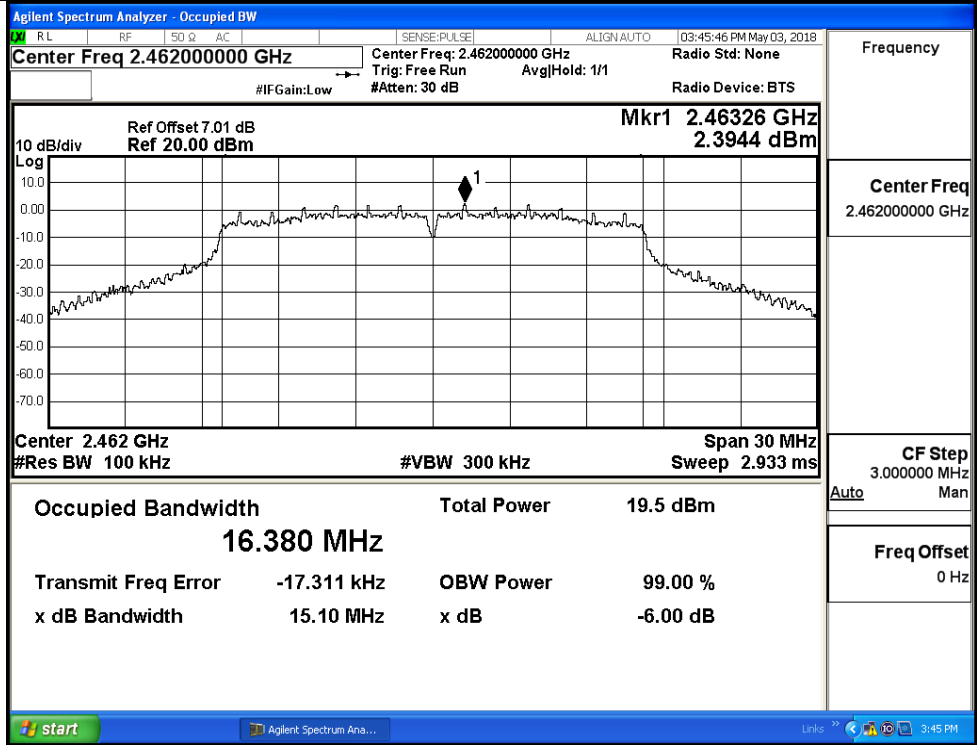
11G/LCH



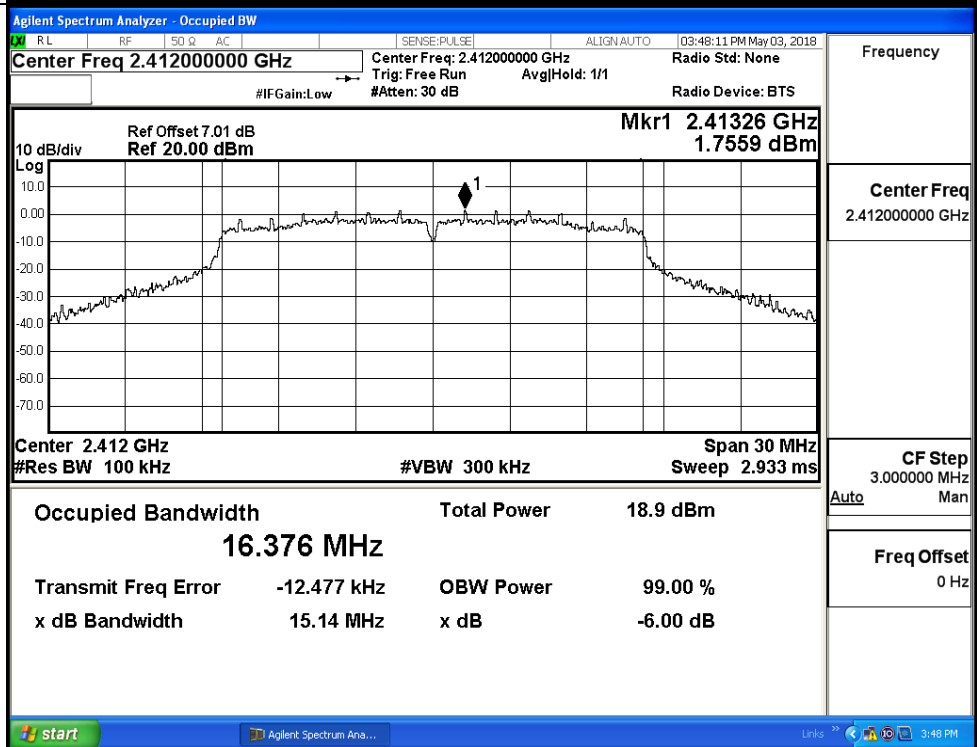
11G/MCH



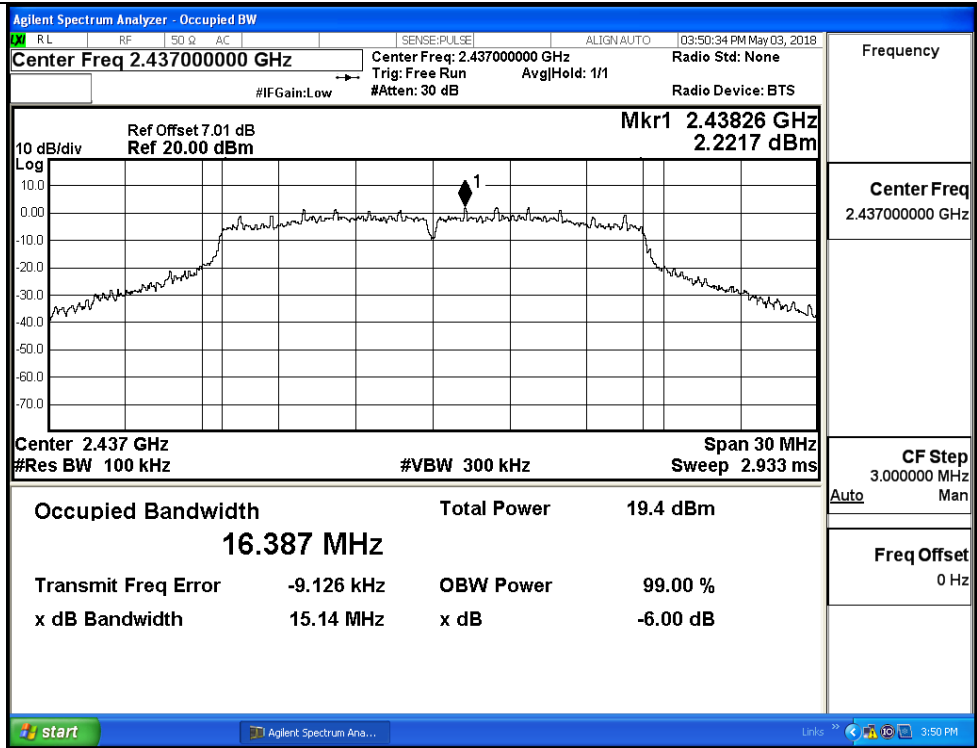
11G/HCH



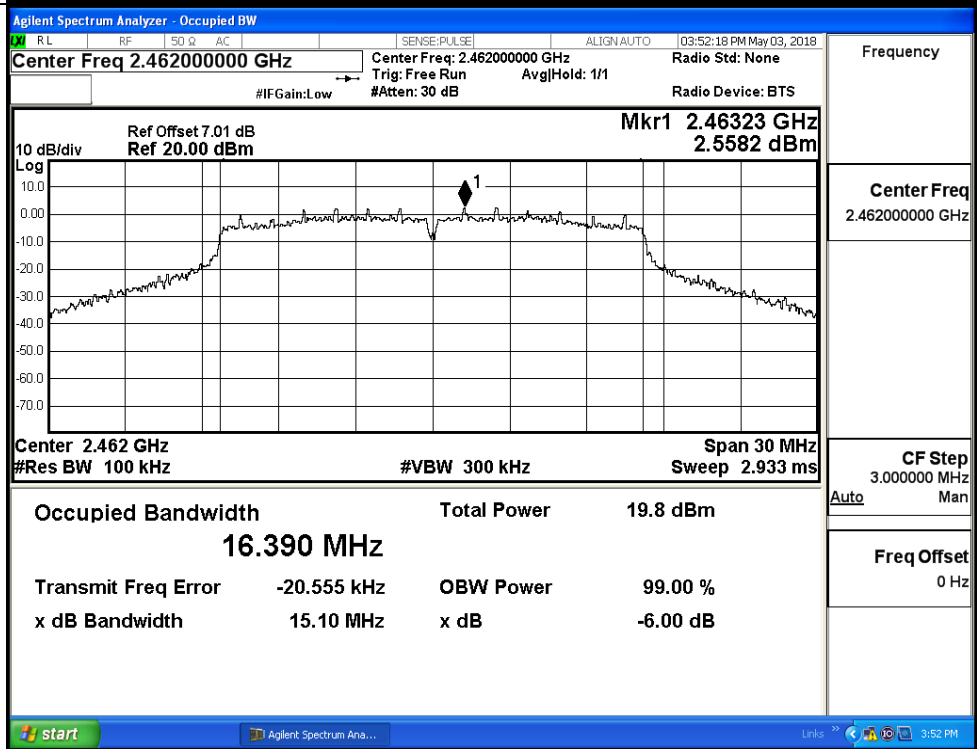
11N20SISO/LCH



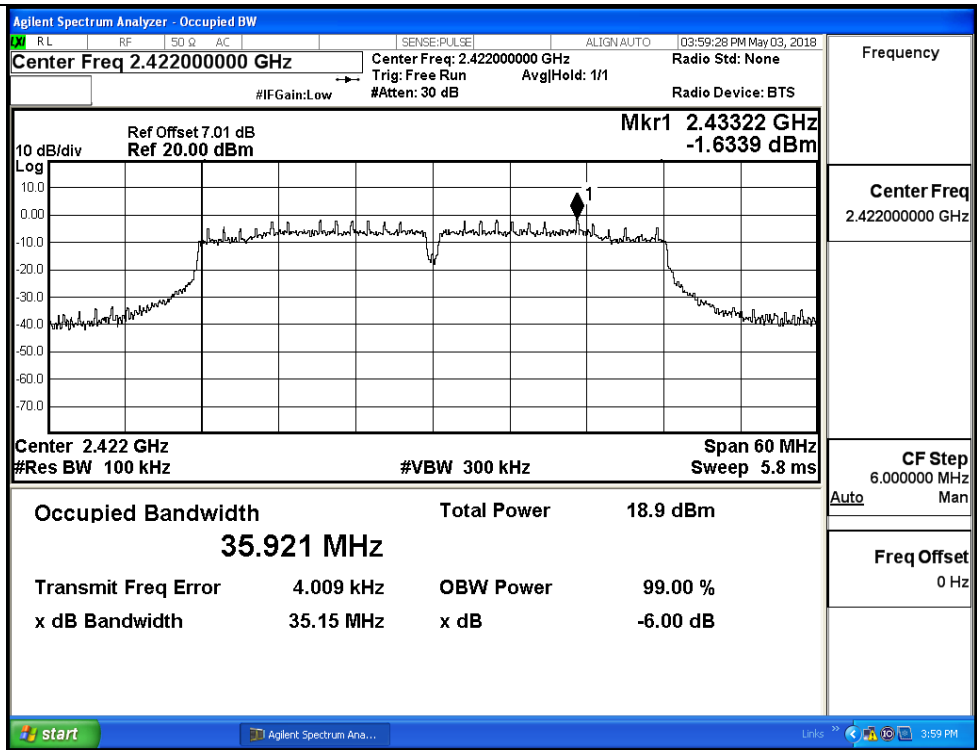
11N20SISO/MCH



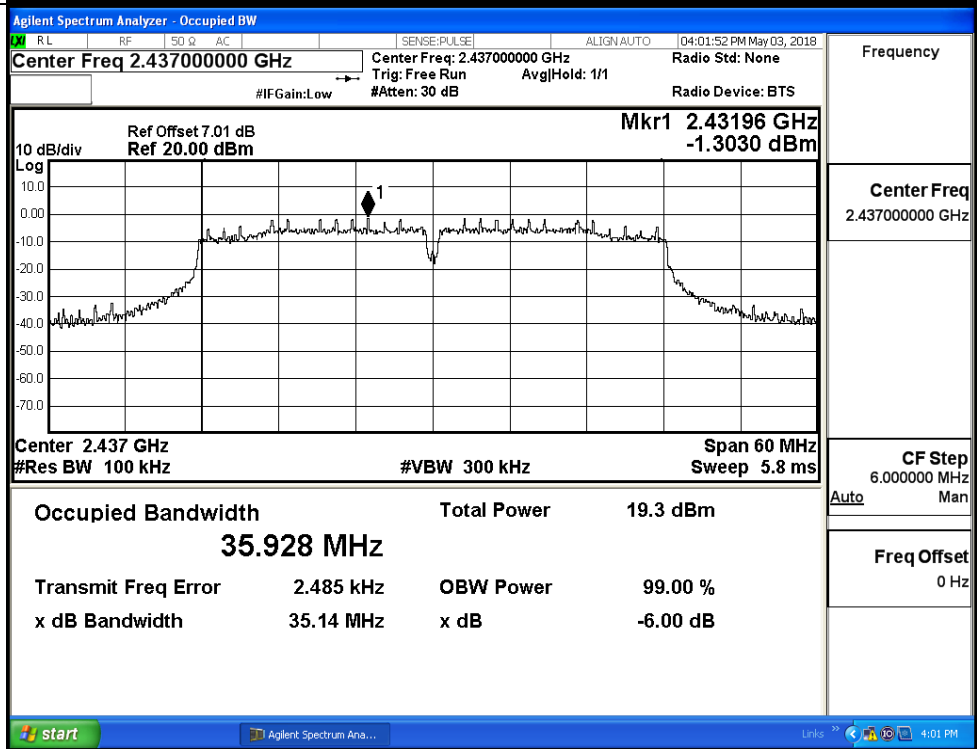
11N20SISO/HCH



11N40SISO/LCH



11N40SISO/MCH



11N40SISO/HCH

Agilent Spectrum Analyzer - Occupied BW

RL	RF	50 Ω	AC
SENSE: PULSE		ALIGN: AUTO	
04:03:32 PM May 03, 2018			

Center Freq 2.45200000 GHz
Center Freq: 2.45200000 GHz
Radio Std: None

#IFGain: Low
Trig: Free Run
Avg/Hold: 1/1
Radio Device: BTS

Ref Offset 7.01 dB
Mkr1 2.45698 GHz

Ref 20.00 dBm
-0.76535 dBm

Center 2.452 GHz
#VBW 300 kHz
Span 60 MHz

#Res BW 100 kHz
Sweep 5.8 ms

Occupied Bandwidth	Total Power	19.8 dBm
35.886 MHz		
Transmit Freq Error	-13.007 kHz	OBW Power
x dB Bandwidth	35.16 MHz	x dB
		99.00 %
		-6.00 dB

CF Step
6.000000 MHz

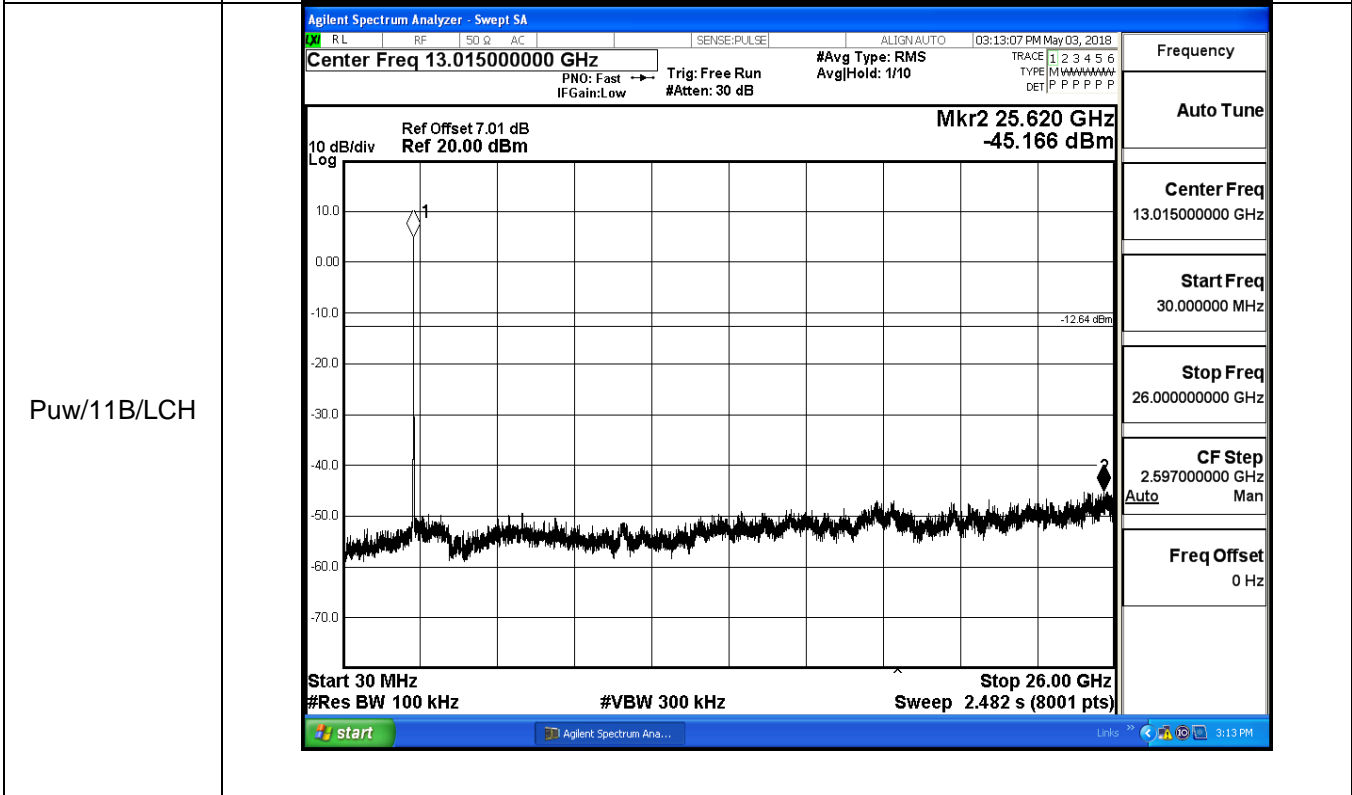
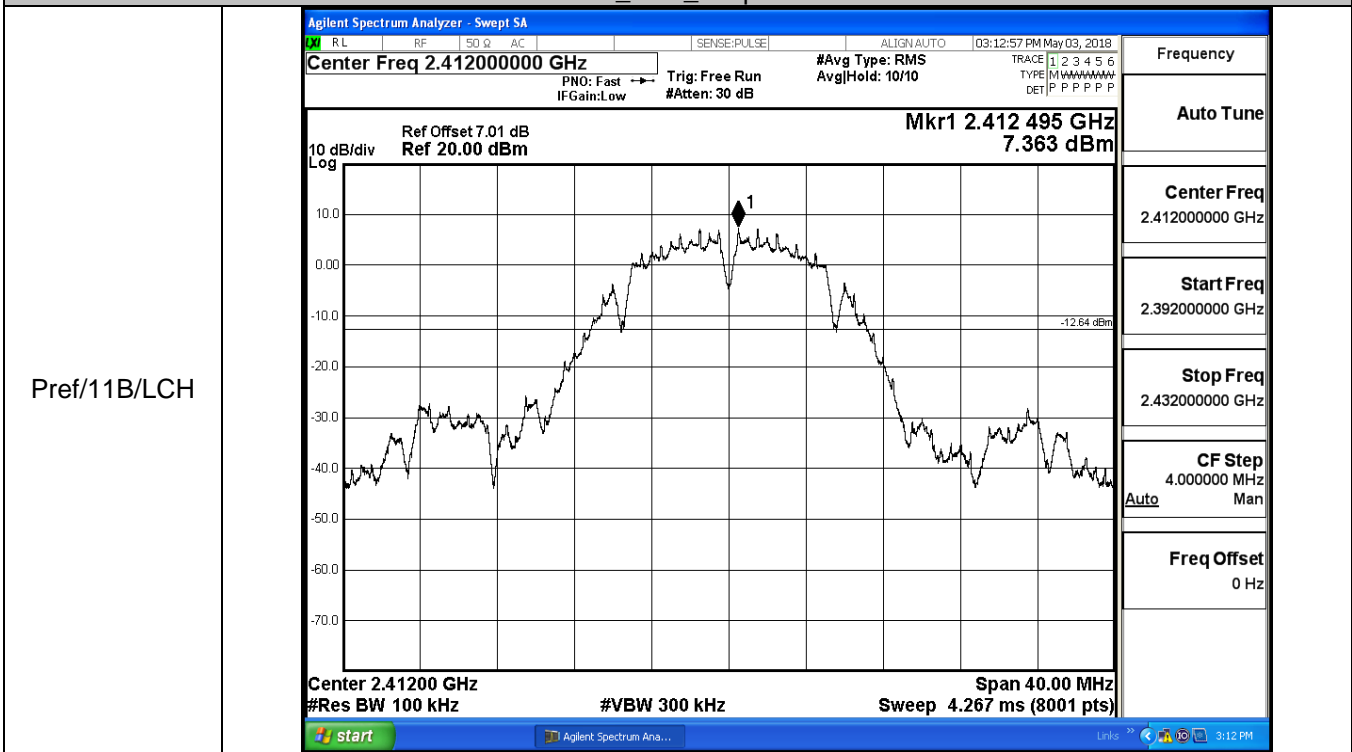
Auto
Man

Freq Offset
0 Hz

B.5 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	LCH	7.363	-45.166	-12.637	PASS
	MCH	7.407	-43.999	-12.593	PASS
	HCH	7.485	-42.619	-12.515	PASS
11G	LCH	2.542	-43.085	-17.458	PASS
	MCH	2.479	-44.093	-17.521	PASS
	HCH	3.122	-44.717	-16.878	PASS
11N20 SISO	LCH	1.982	-43.993	-18.018	PASS
	MCH	2.266	-44.303	-17.734	PASS
	HCH	2.803	-44.148	-17.197	PASS
11N40 SISO	LCH	-0.877	-44.324	-20.877	PASS
	MCH	-0.784	-44.158	-20.784	PASS
	HCH	-0.257	-44.347	-20.257	PASS

11B_LCH_Graphs

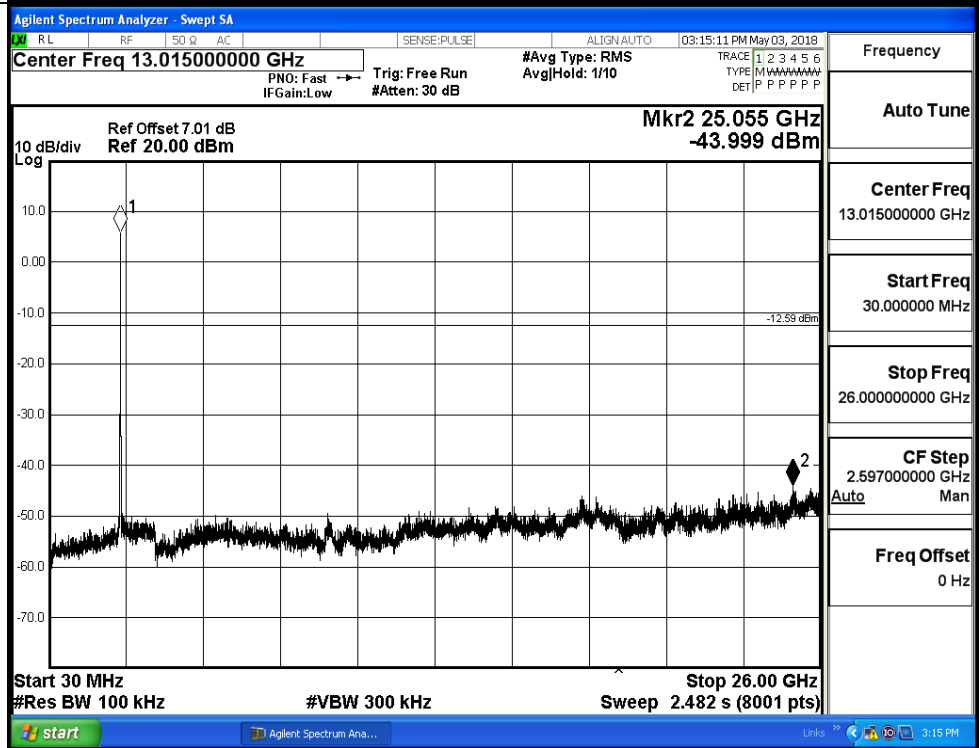


11B_MCH_Graphs

Pref/11B/MCH



Puw/11B/MCH

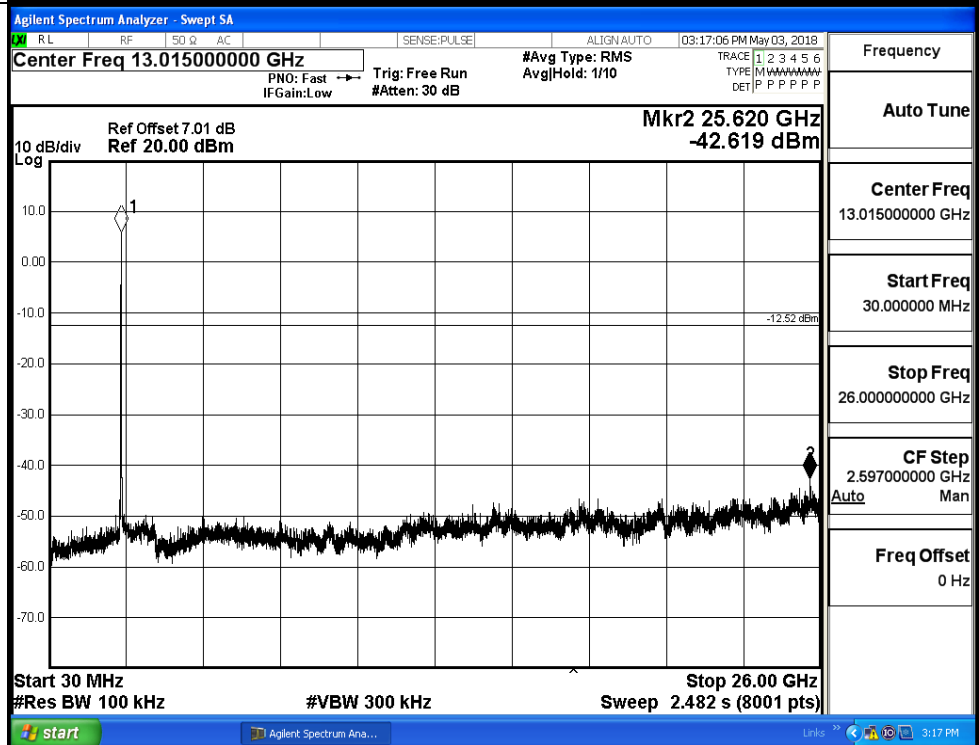


11B_HCH_Graphs

Pref/11B/HCH

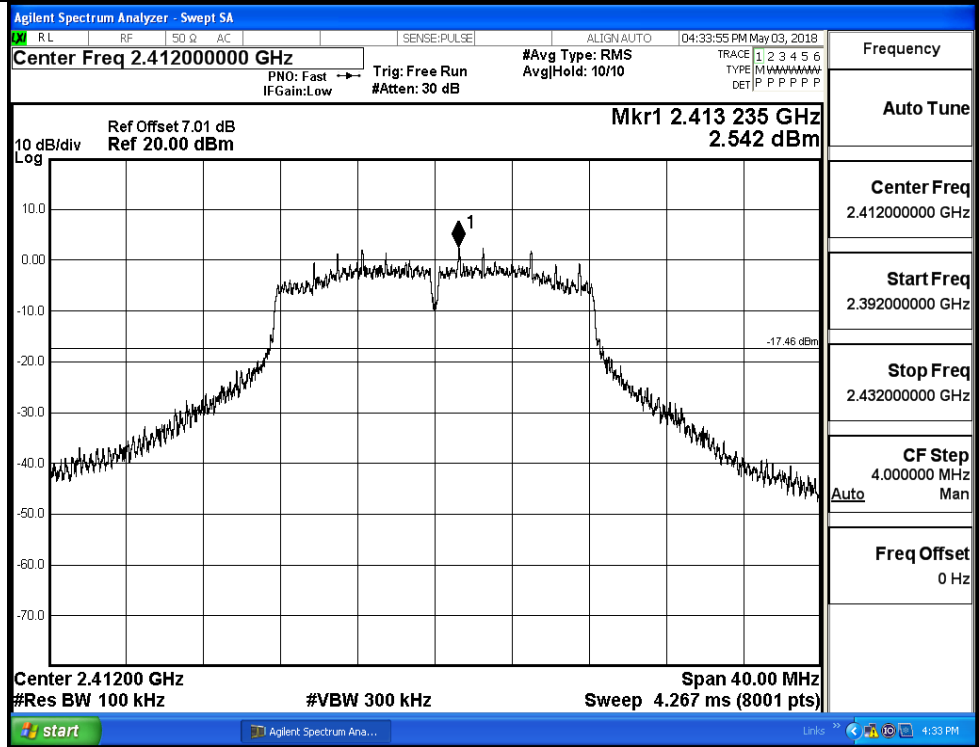


Puw/11B/HCH

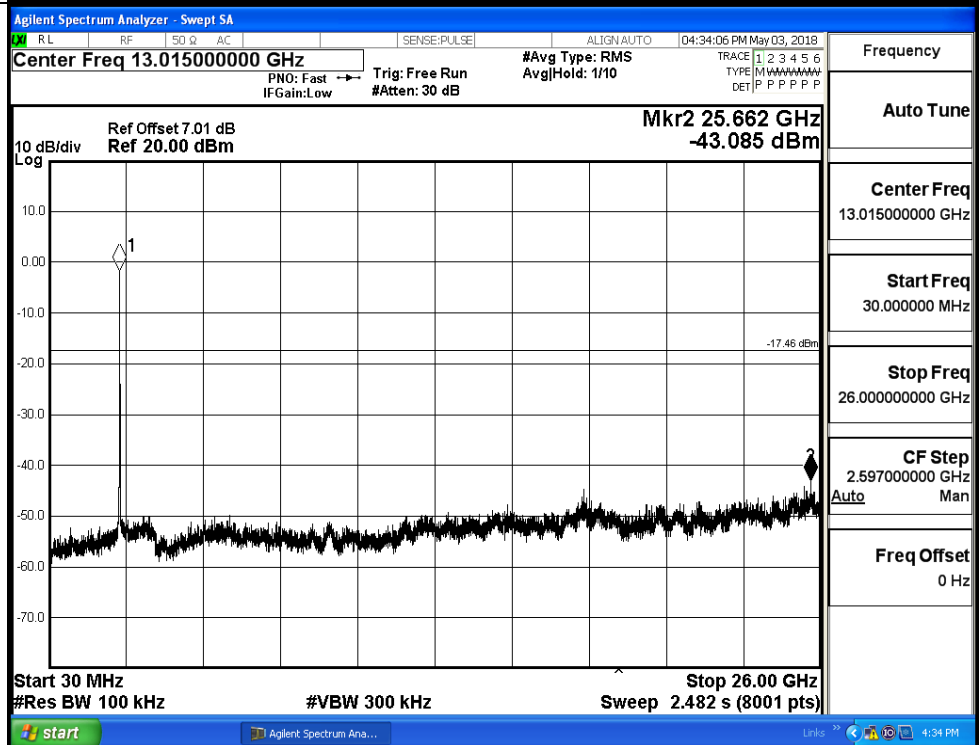


11G_LCH_Graphs

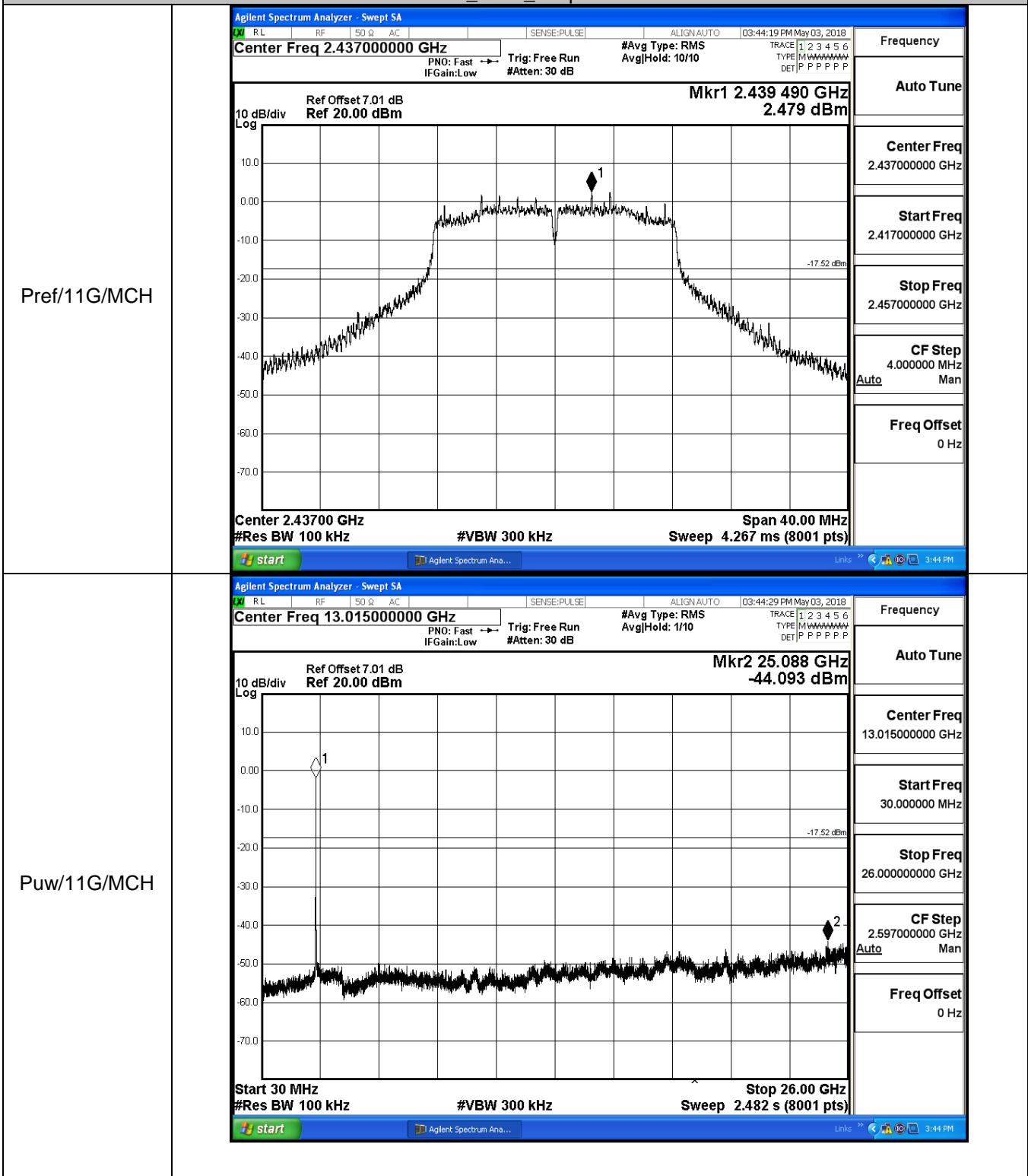
Pref/11G/LCH



Puw/11G/LCH

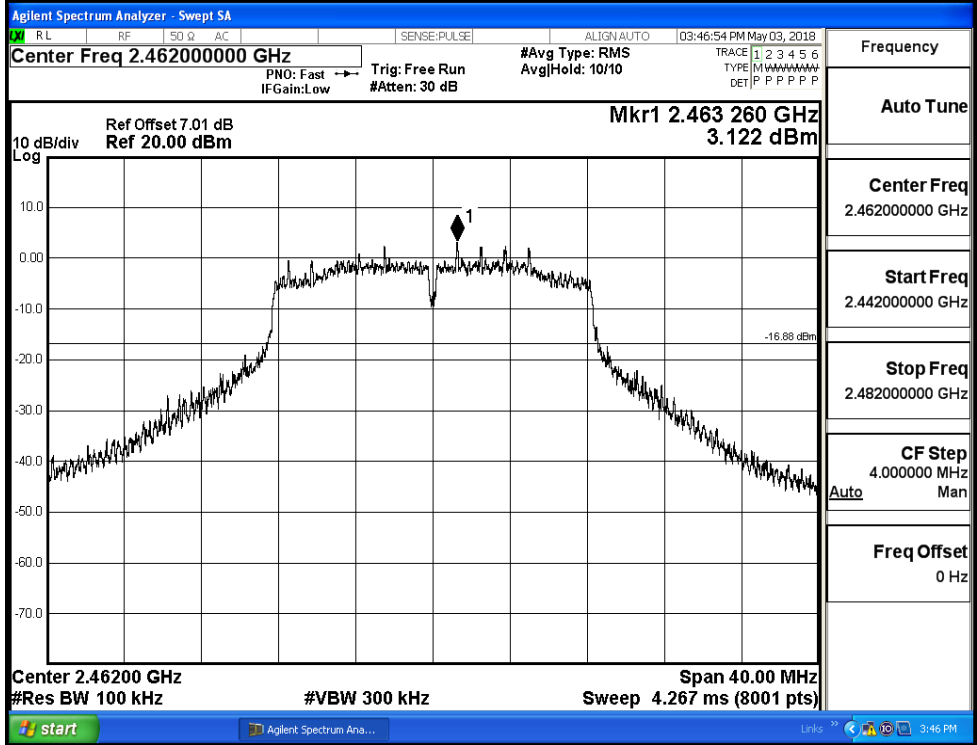


11G_MCH_Graphs



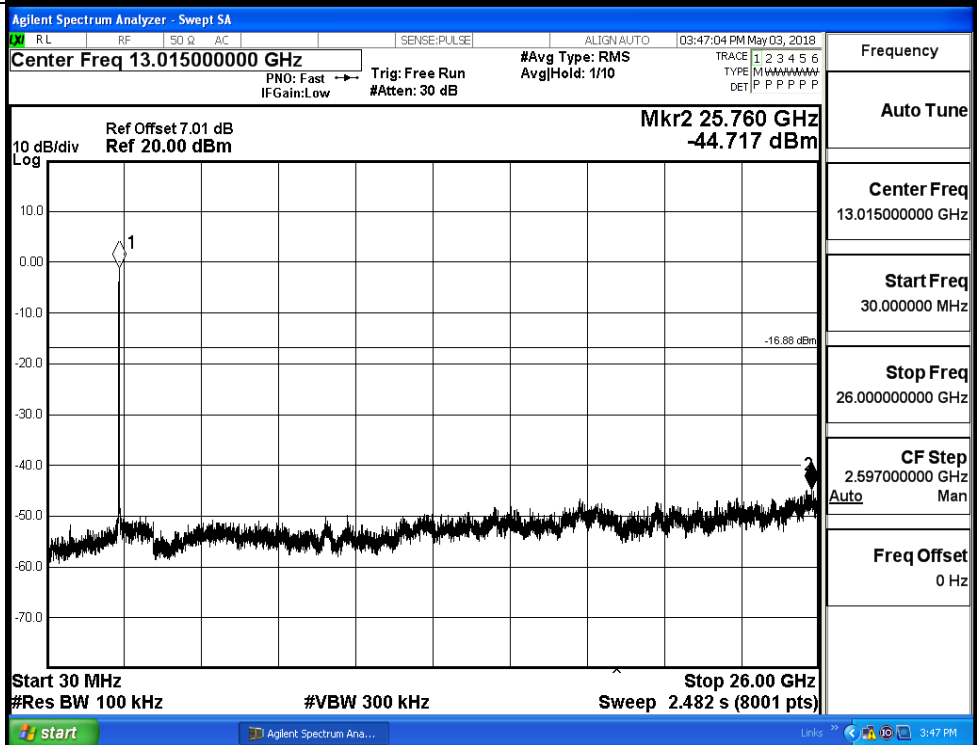
11G_HCH_Graphs

Pref/11G/HCH



Frequency
Auto Tune
Center Freq 2.462000000 GHz
Start Freq 2.442000000 GHz
Stop Freq 2.482000000 GHz
CF Step 4.000000 MHz Auto Man
Freq Offset 0 Hz

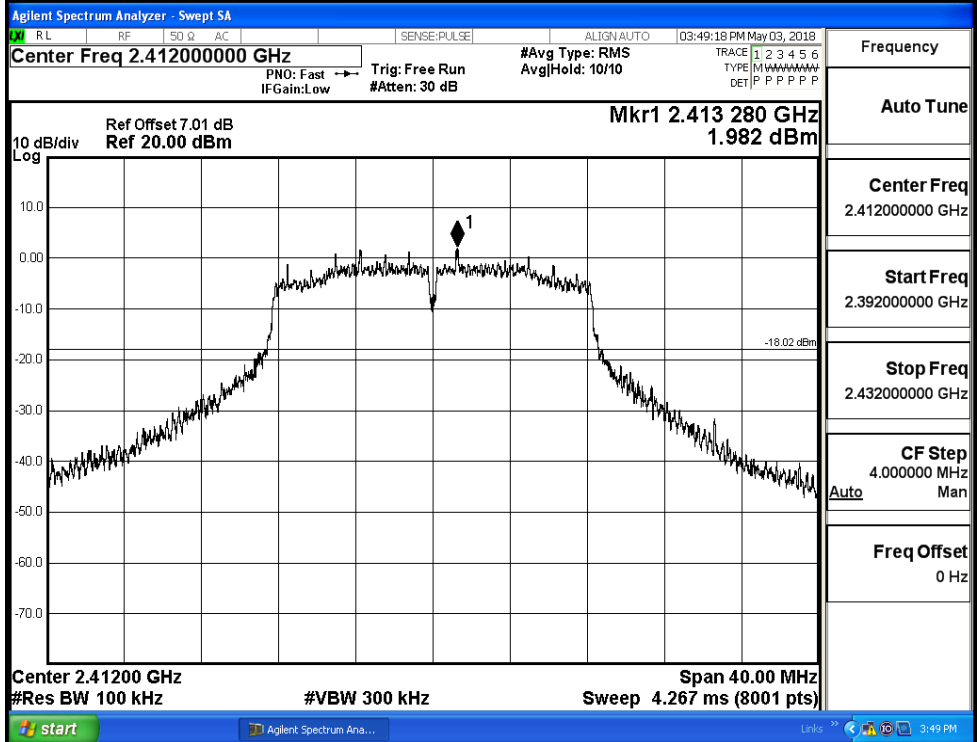
Puw/11G/HCH



Frequency
Auto Tune
Center Freq 13.015000000 GHz
Start Freq 30.0000000 MHz
Stop Freq 26.000000000 GHz
CF Step 2.597000000 GHz Auto Man
Freq Offset 0 Hz

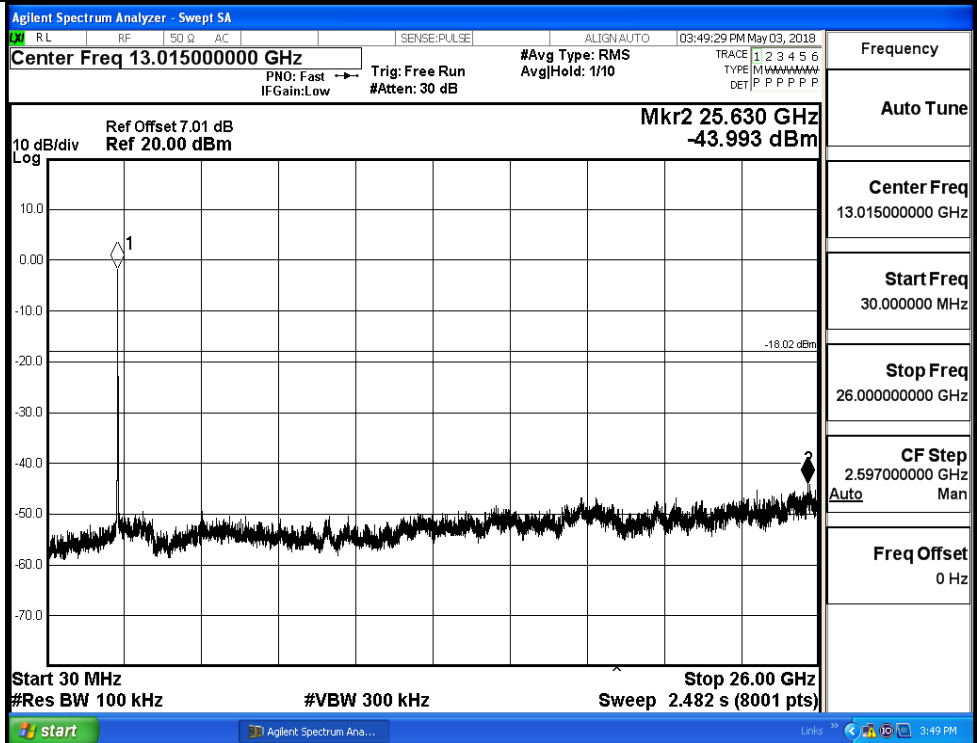
11N20SISO_LCH_Graphs

Pref/11N20SIS
O/LCH



Frequency
Auto Tune
Center Freq 2.412000000 GHz
Start Freq 2.392000000 GHz
Stop Freq 2.432000000 GHz
CF Step 4.000000 MHz Auto
Freq Offset 0 Hz

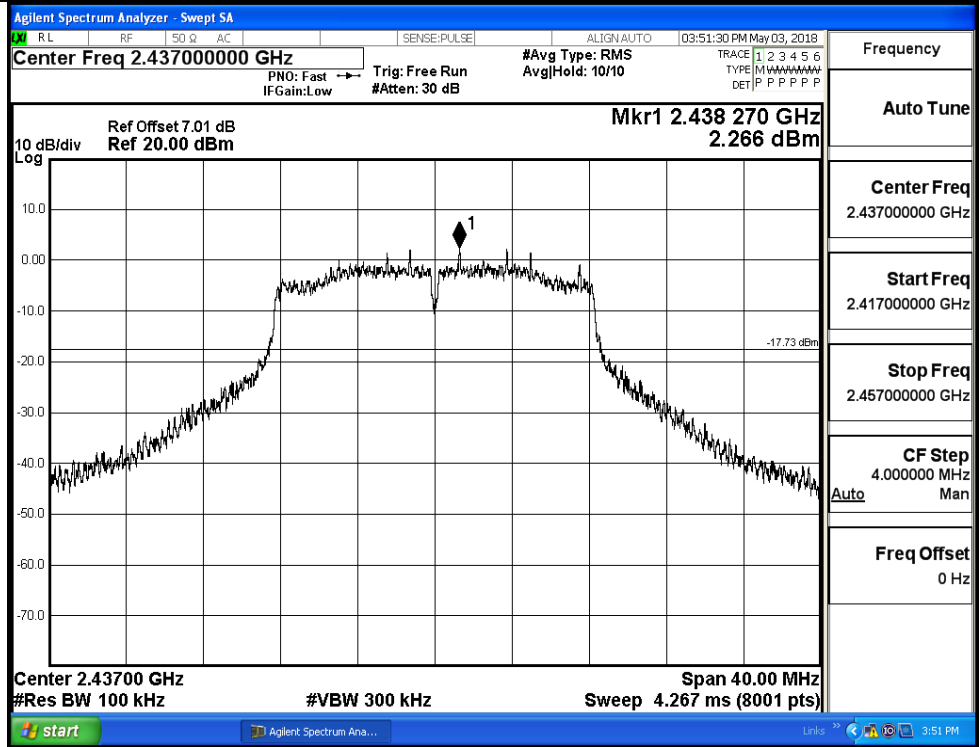
Puw/11N20
SISO/LCH



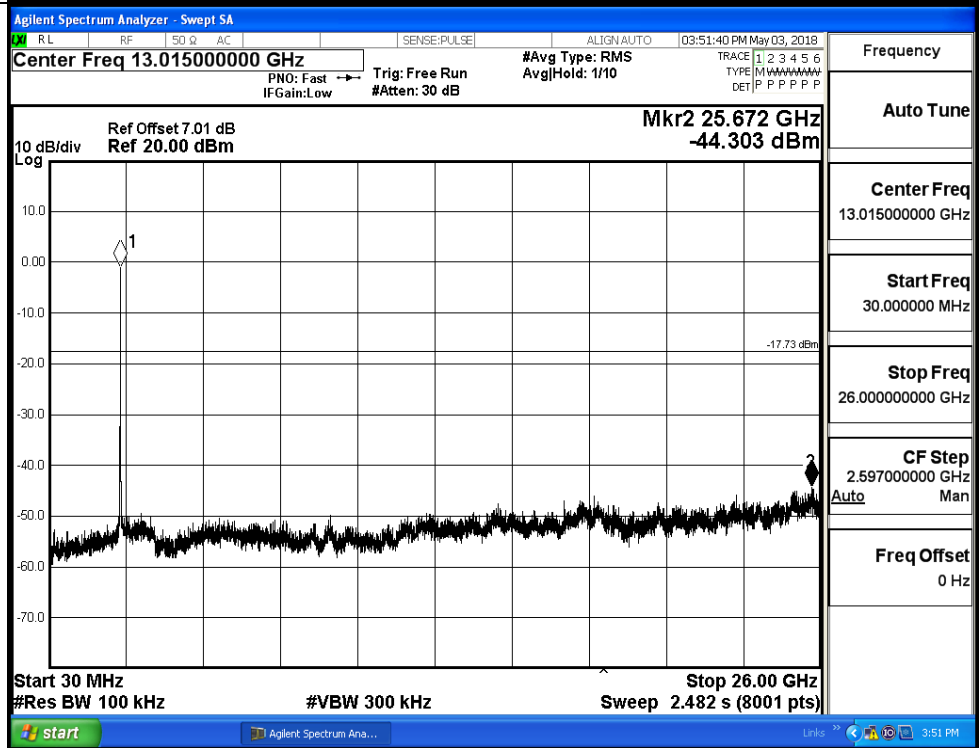
Frequency
Auto Tune
Center Freq 13.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 26.000000000 GHz
CF Step 2.597000000 GHz Auto
Freq Offset 0 Hz

11N20SISO_MCH_Graphs

Pref/11N20
SISO/MCH

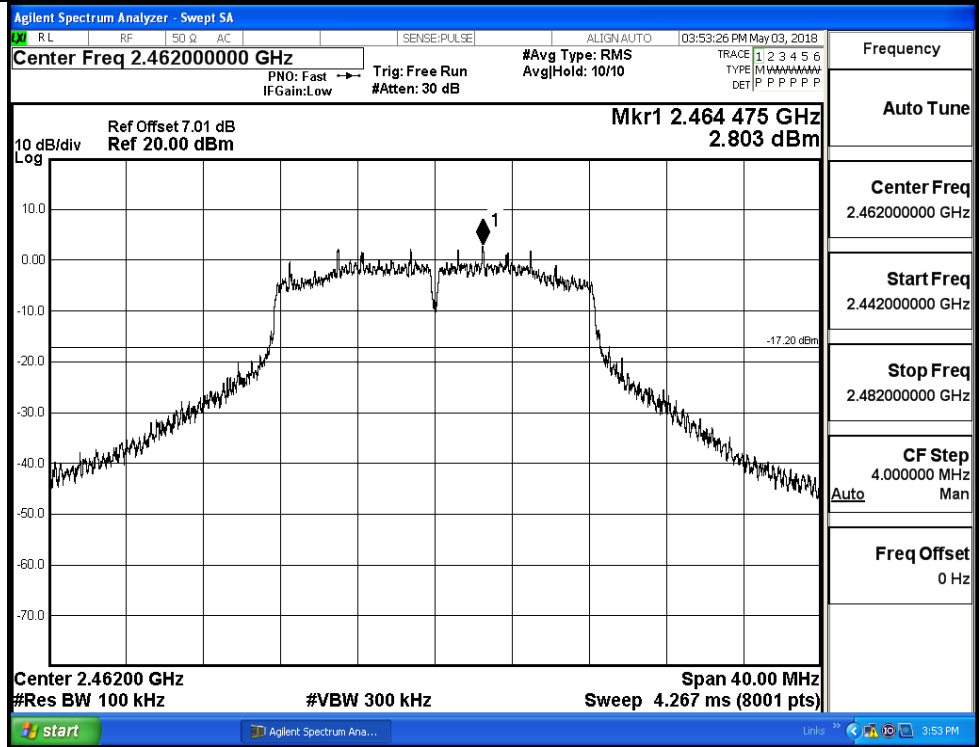


Puw/11N20
SISO/MCH

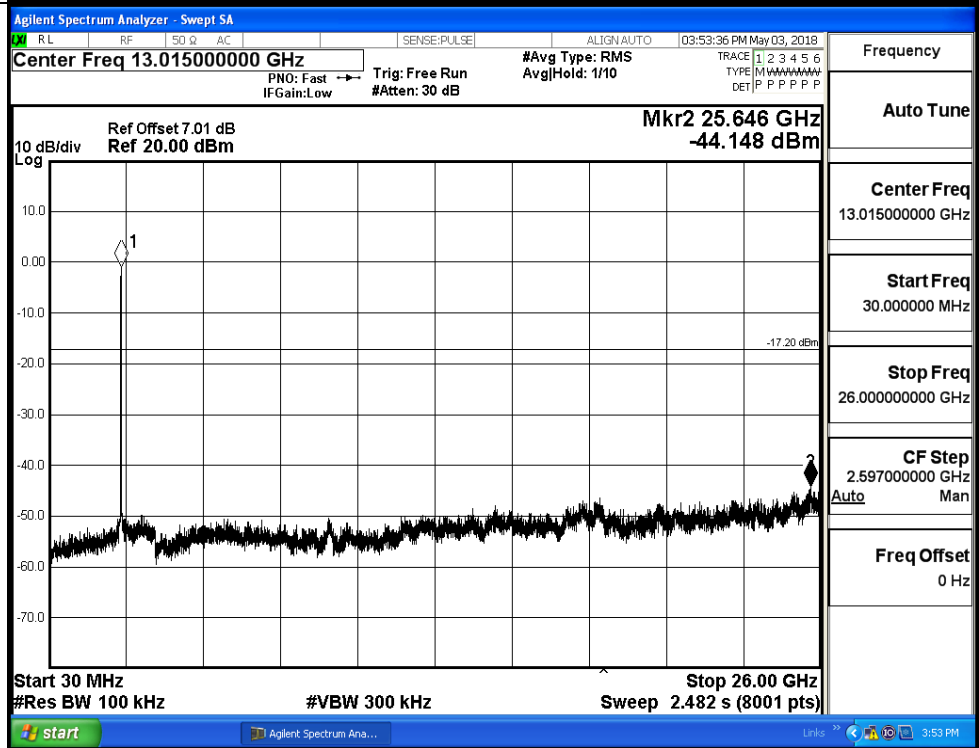


11N20SISO_HCH_Graphs

Pref/11N20
SISO/HCH

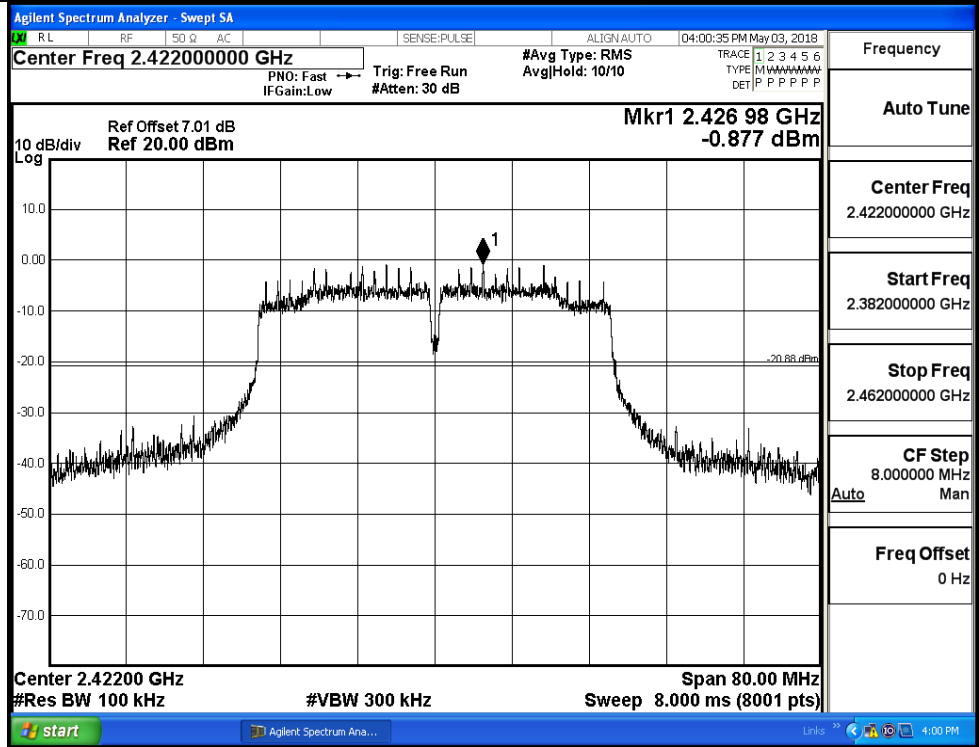


Puw/11N20
SISO/HCH

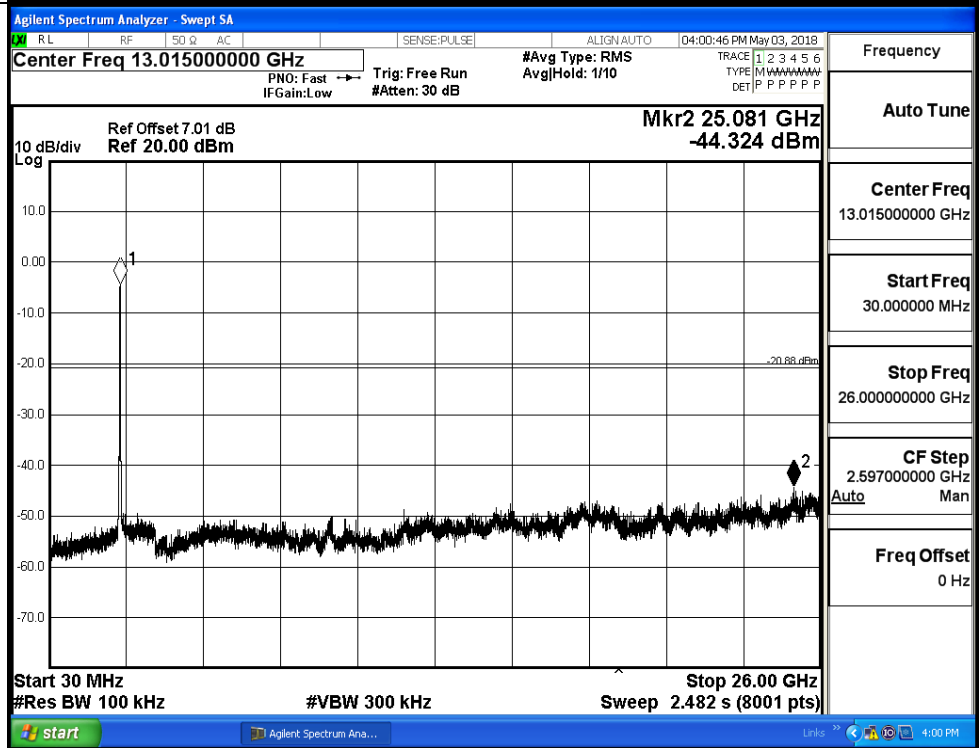


11N40SISO_LCH_Graphs

Pref/11N40
SISO/LCH

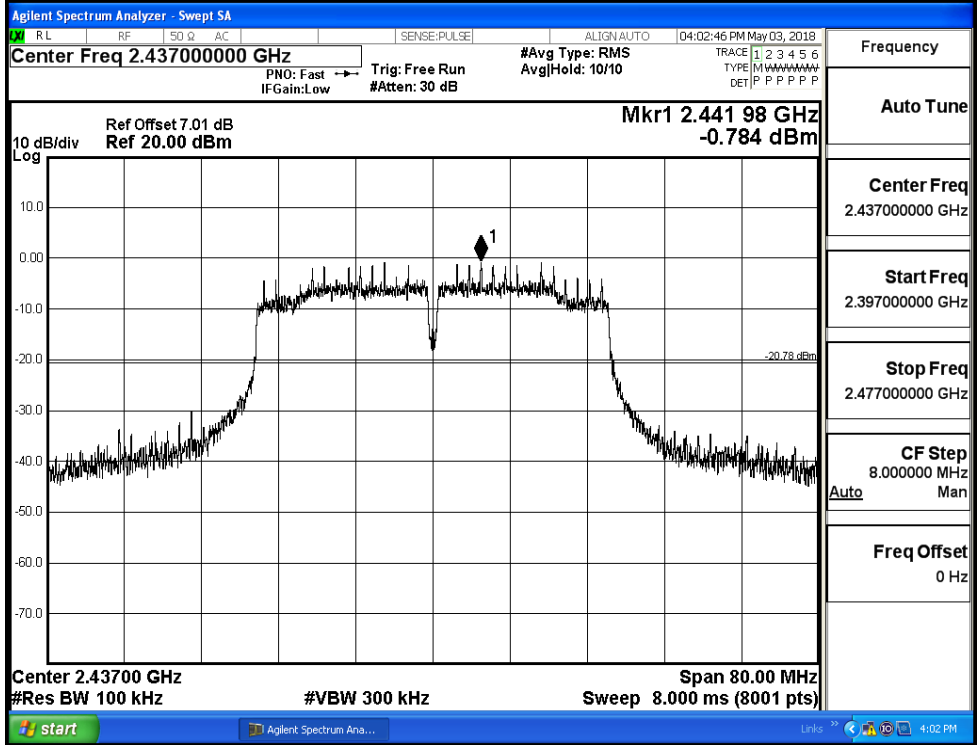


Puw/11N40
SISO/LCH

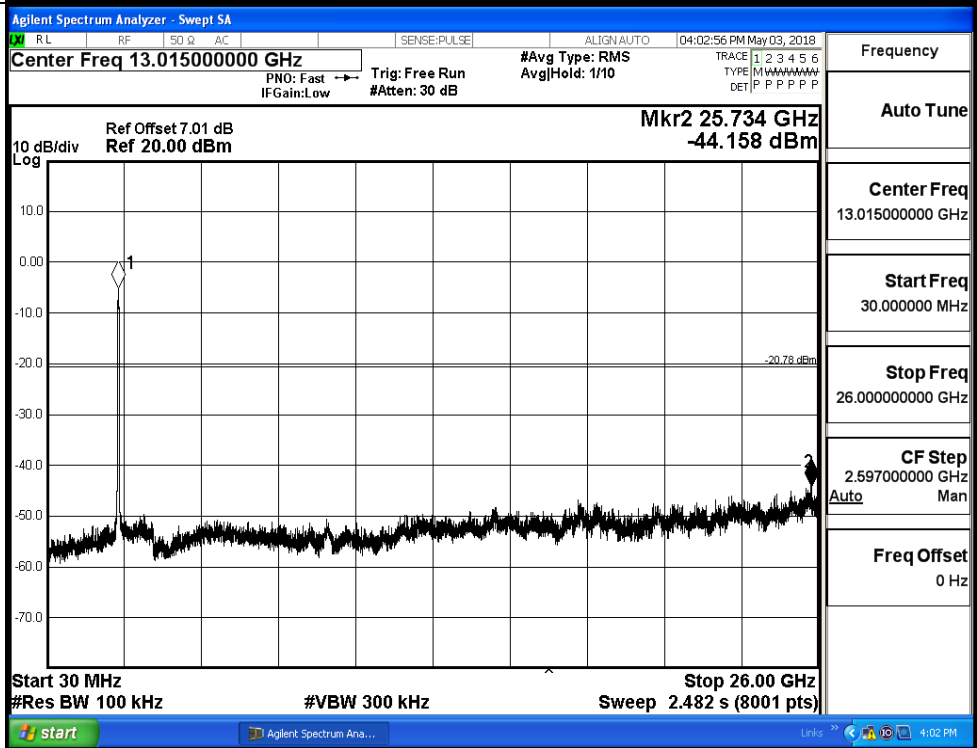


11N40SISO_MCH_Graphs

Pref/11N40
SISO/MCH

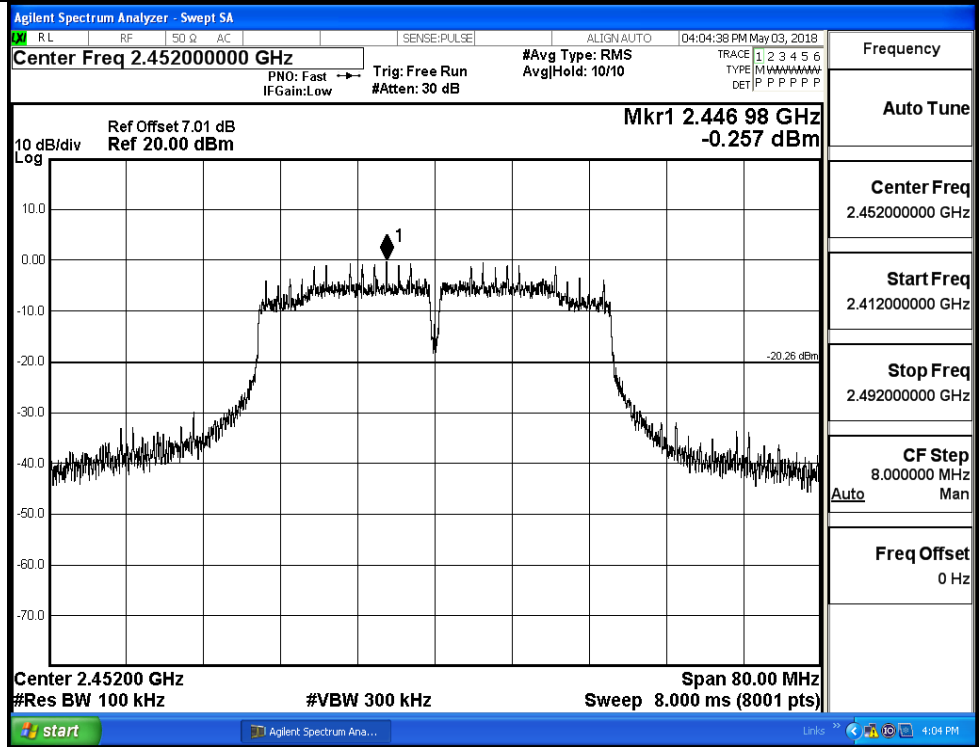


Puw/11N40
SISO/MCH

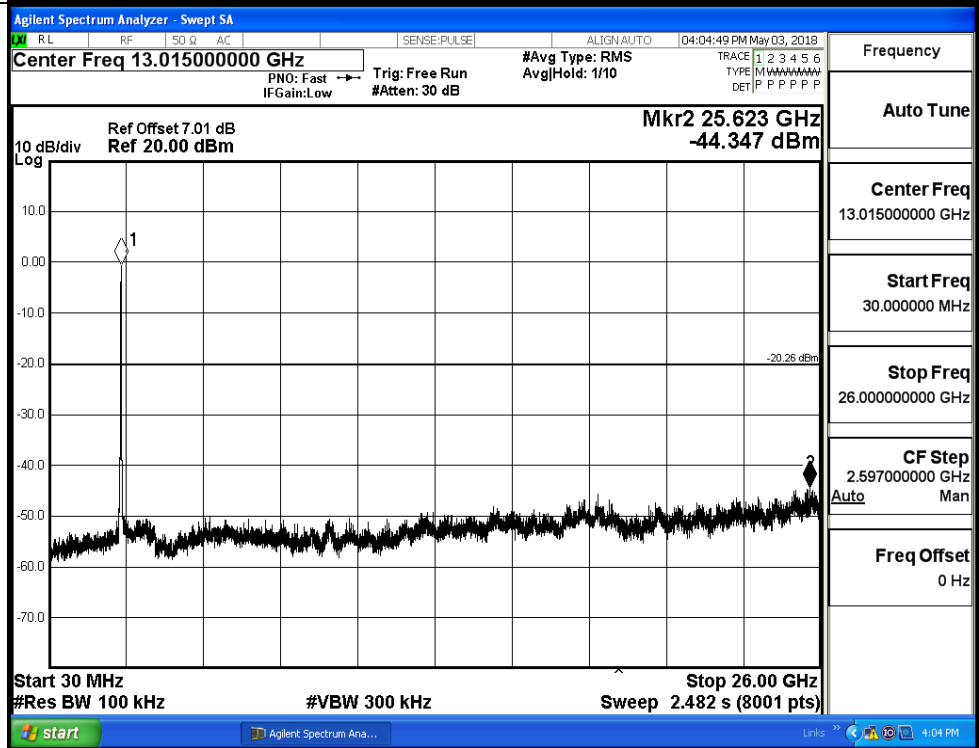


11N40SISO_HCH_Graphs

Pref/11N40
SISO/HCH

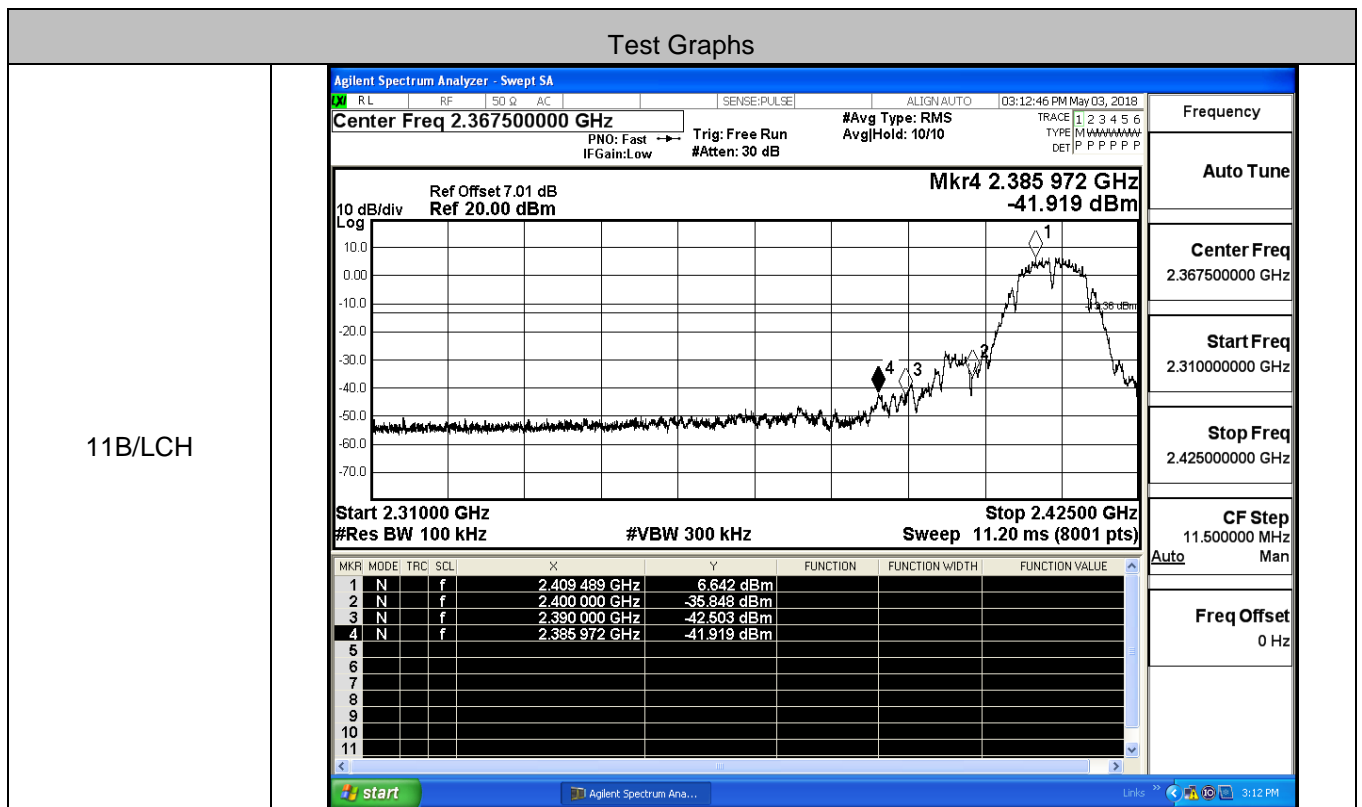


Puw/11N40
SISO/HCH

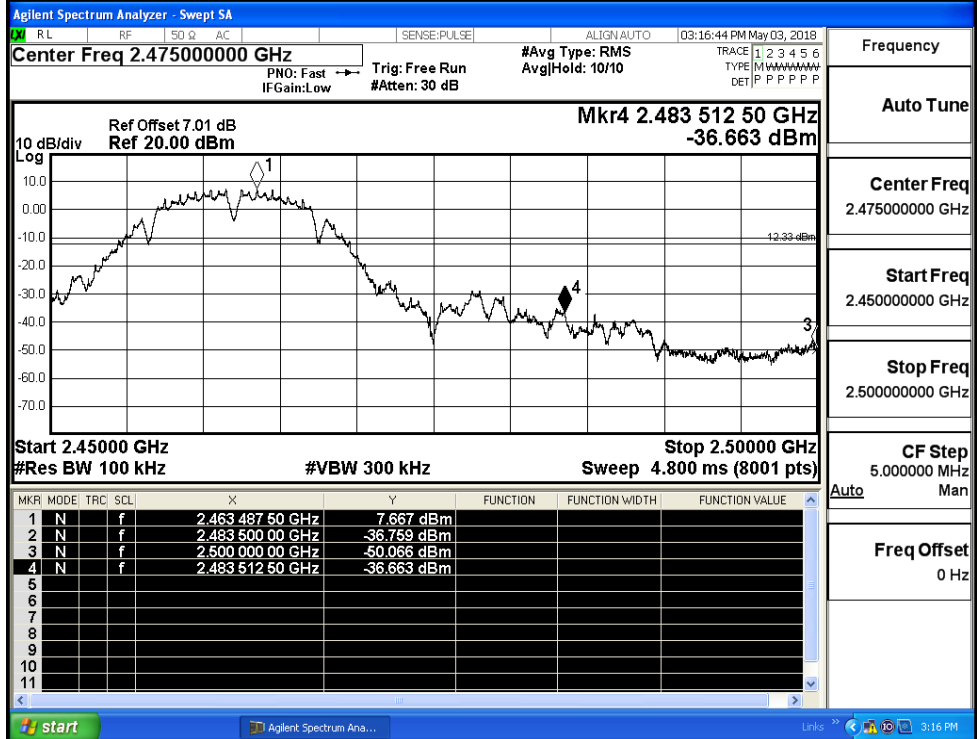


B.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	6.642	-41.919	-13.36	PASS
	HCH	7.667	-36.663	-12.33	PASS
11G	LCH	2.376	-42.215	-17.62	PASS
	HCH	2.817	-44.425	-17.18	PASS
11N20SISO	LCH	2.080	-42.214	-17.92	PASS
	HCH	3.211	-45.228	-16.79	PASS
11N40SISO	LCH	-0.892	-33.304	-20.89	PASS
	HCH	-0.403	-36.093	-20.4	PASS

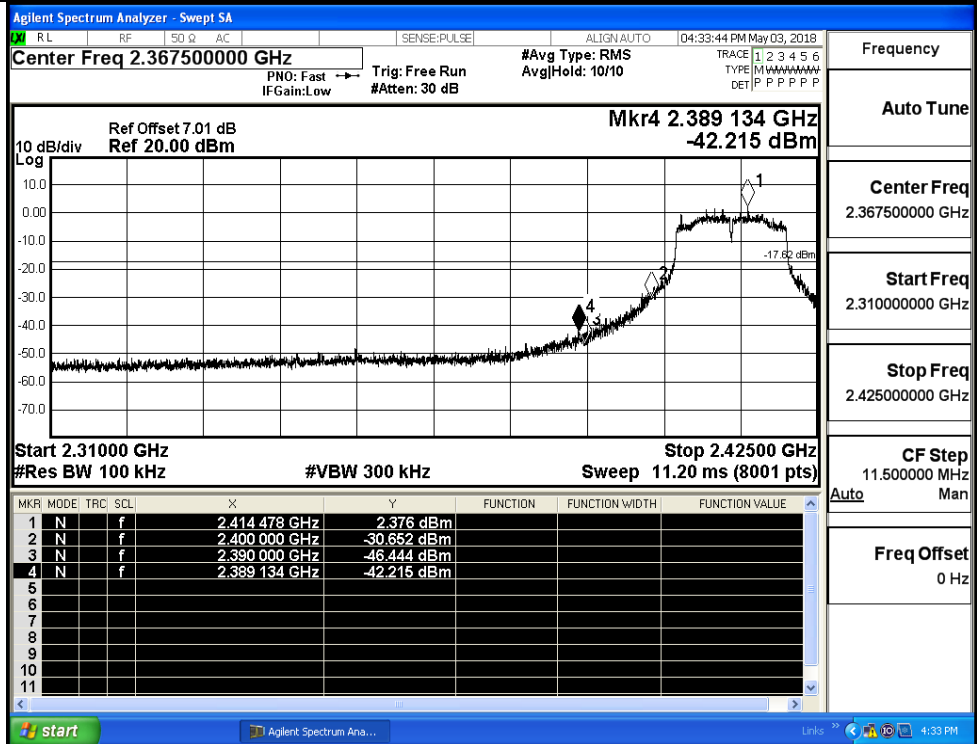


11B/HCH



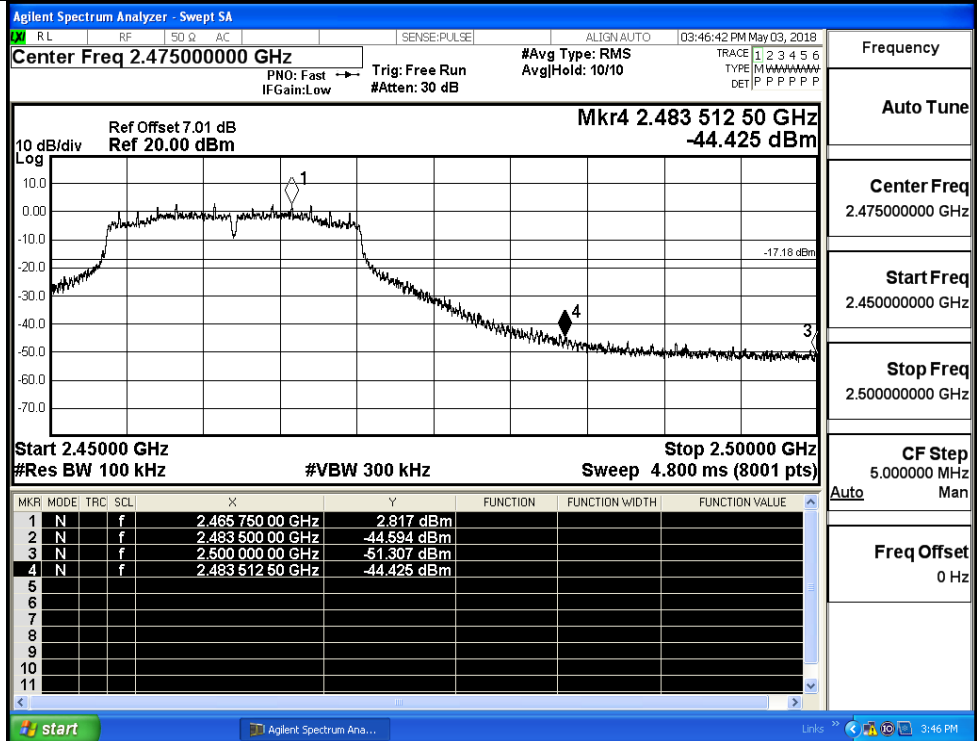
Frequency
 Auto Tune
 Center Freq
 2.47500000 GHz
 Start Freq
 2.45000000 GHz
 Stop Freq
 2.50000000 GHz
 CF Step
 5.000000 MHz
 Freq Offset
 0 Hz

11G/LCH

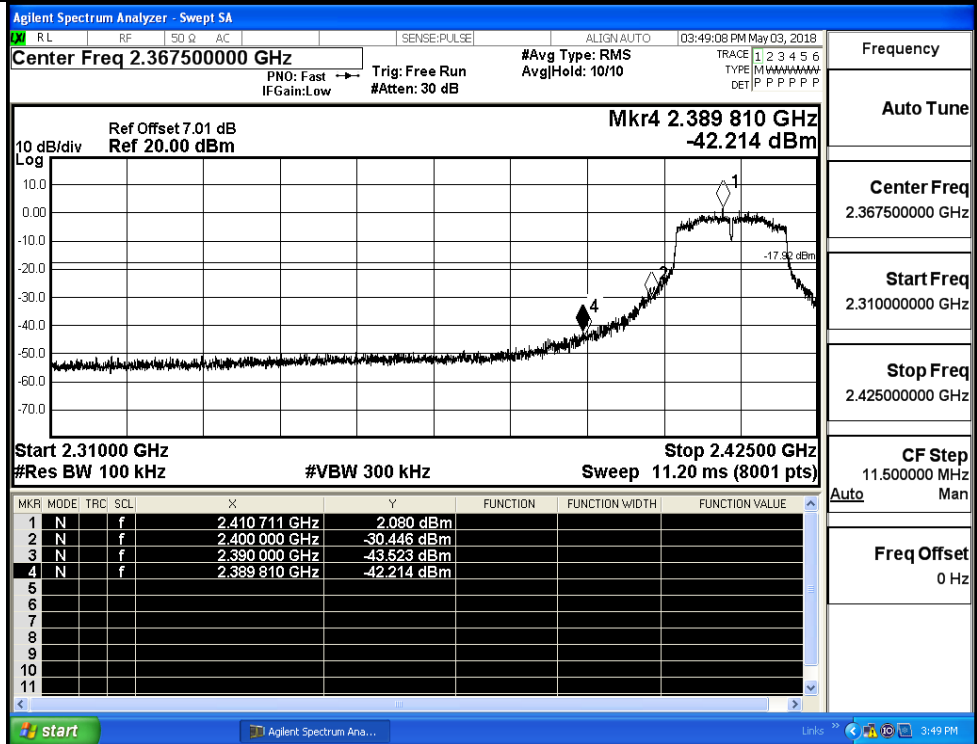


Frequency
 Auto Tune
 Center Freq
 2.36750000 GHz
 Start Freq
 2.31000000 GHz
 Stop Freq
 2.42500000 GHz
 CF Step
 11.500000 MHz
 Freq Offset
 0 Hz

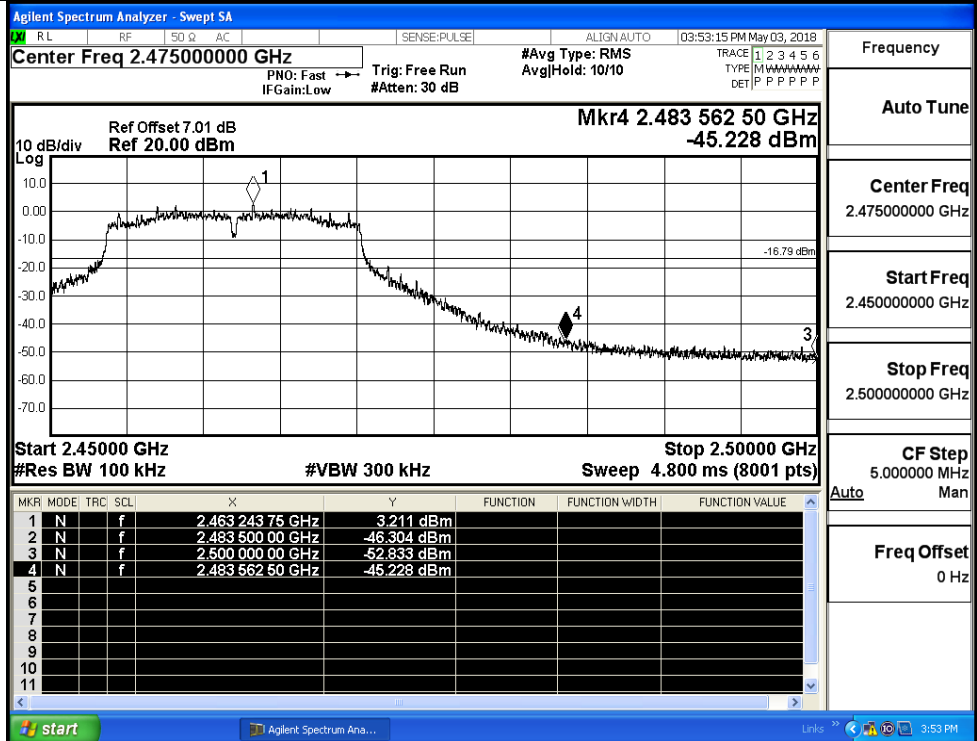
11G/HCH



11N20SISO/LCH

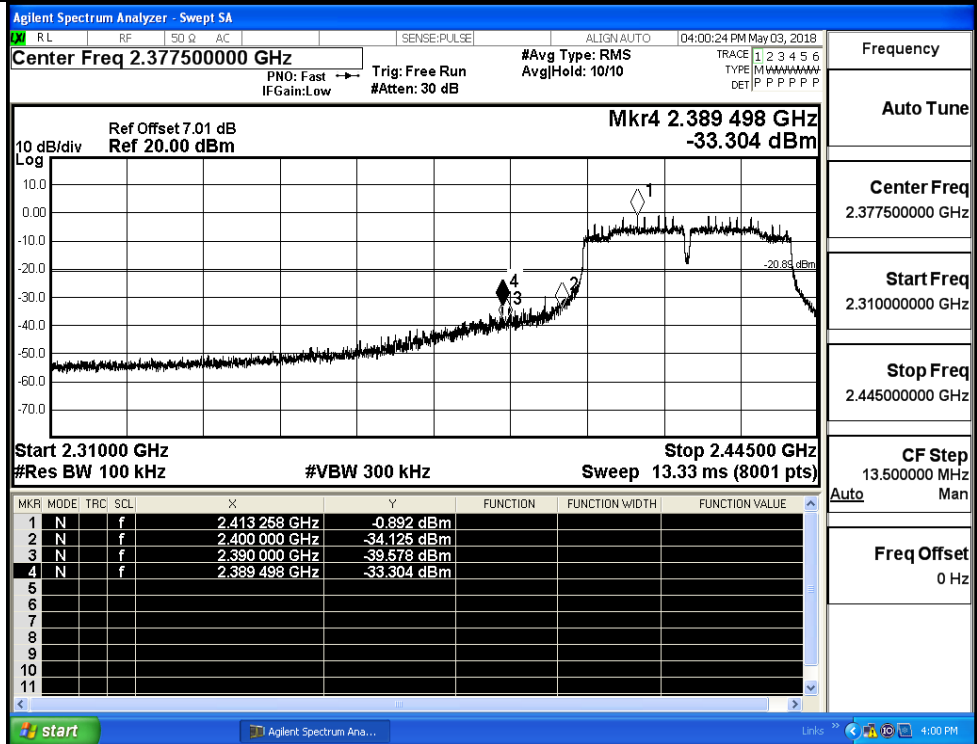


11N20SISO/HCH



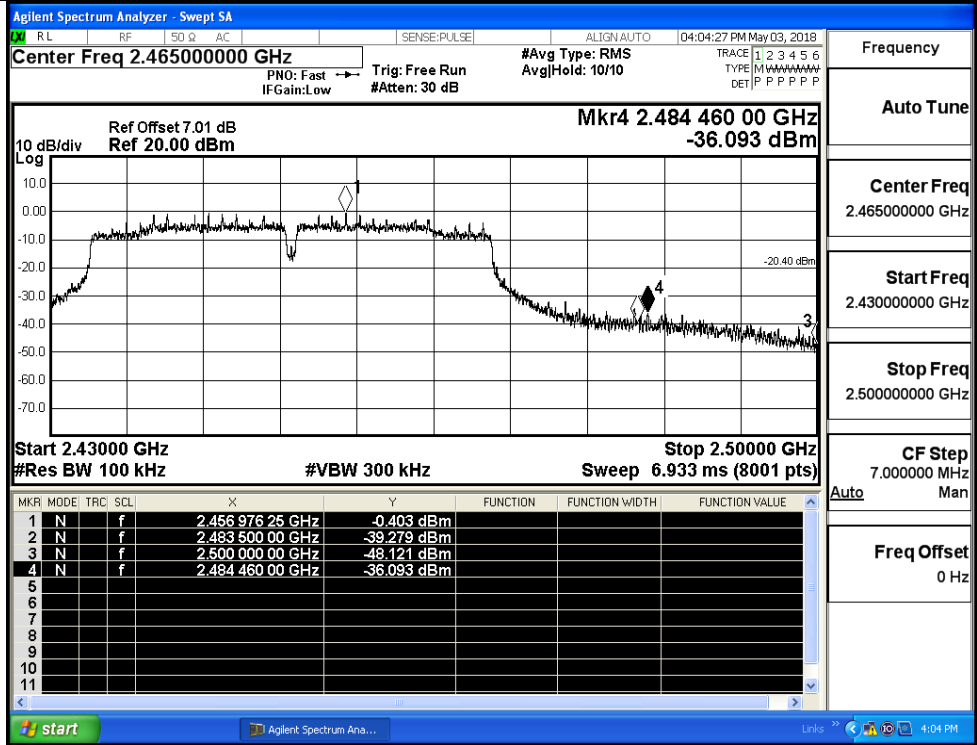
Frequency
Auto Tune
Center Freq
2.475000000 GHz
Start Freq
2.450000000 GHz
Stop Freq
2.500000000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz

11N40SISO/LCH



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

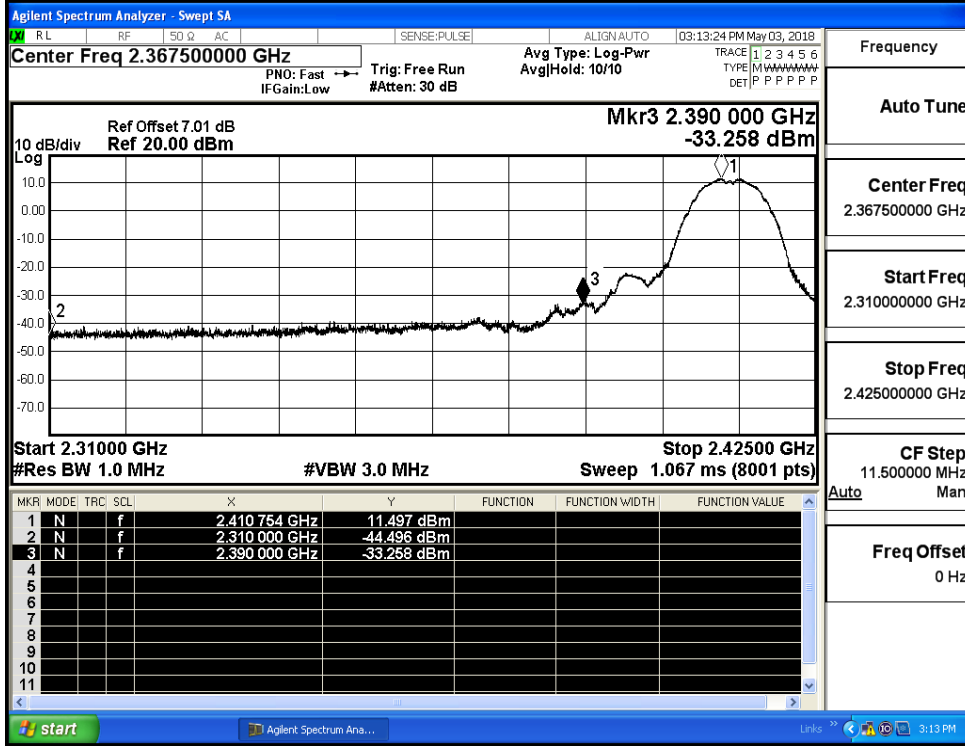


B.7 Restrict-band band-edge measurements

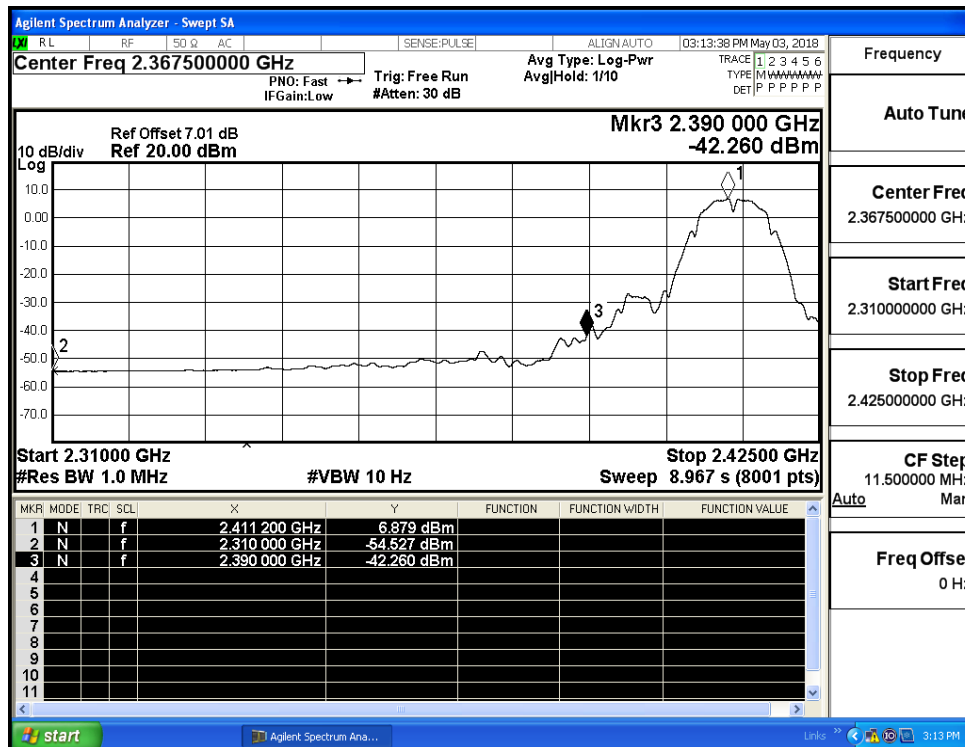
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBu V/m]	Verdict
11B	2412	Ant0	2310.0	-44.50	2.0	0	50.76	PEAK	74	PASS
	2412	Ant0	2310.0	-54.53	2.0	0	40.73	AV	54	PASS
	2412	Ant0	2390.0	-33.26	2.0	0	62.00	PEAK	74	PASS
	2412	Ant0	2390.0	-42.26	2.0	0	53.00	AV	54	PASS
	2462	Ant0	2483.5	-42.79	2.0	0	52.47	PEAK	74	PASS
	2462	Ant0	2483.5	-52.05	2.0	0	43.20	AV	54	PASS
	2462	Ant0	2500.0	-43.23	2.0	0	52.03	PEAK	74	PASS
	2462	Ant0	2500.0	-53.49	2.0	0	41.77	AV	54	PASS
11G	2412	Ant0	2310.0	-44.53	2.0	0	50.73	PEAK	74	PASS
	2412	Ant0	2310.0	-54.63	2.0	0	40.62	AV	54	PASS
	2412	Ant0	2390.0	-33.87	2.0	0	61.38	PEAK	74	PASS
	2412	Ant0	2390.0	-45.22	2.0	0	50.04	AV	54	PASS
	2462	Ant0	2483.5	-32.14	2.0	0	63.12	PEAK	74	PASS
	2462	Ant0	2483.5	-47.29	2.0	0	47.96	AV	54	PASS
	2462	Ant0	2500.0	-41.29	2.0	0	53.96	PEAK	74	PASS
	2462	Ant0	2500.0	-51.94	2.0	0	43.32	AV	54	PASS
11N20 SISO	2412	Ant0	2310.0	-43.82	2.0	0	51.44	PEAK	74	PASS
	2412	Ant0	2310.0	-54.58	2.0	0	40.68	AV	54	PASS
	2412	Ant0	2390.0	-32.66	2.0	0	62.60	PEAK	74	PASS
	2412	Ant0	2390.0	-45.68	2.0	0	49.57	AV	54	PASS
	2462	Ant0	2483.5	-34.34	2.0	0	60.92	PEAK	74	PASS
	2462	Ant0	2483.5	-47.37	2.0	0	47.89	AV	54	PASS
	2462	Ant0	2500.0	-42.27	2.0	0	52.99	PEAK	74	PASS
	2462	Ant0	2500.0	-51.91	2.0	0	43.35	AV	54	PASS
11N40 SISO	2422	Ant0	2310.0	-45.09	2.0	0	50.17	PEAK	74	PASS
	2422	Ant0	2310.0	-54.83	2.0	0	40.43	AV	54	PASS

	2422	Ant0	2390.0	-36.41	2.0	0	58.85	PEAK	74	PASS
	2422	Ant0	2390.0	-47.15	2.0	0	48.11	AV	54	PASS
	2452	Ant0	2483.5	-40.21	2.0	0	55.04	PEAK	74	PASS
	2452	Ant0	2483.5	-50.70	2.0	0	44.56	AV	54	PASS
	2452	Ant0	2500.0	-41.92	2.0	0	53.33	PEAK	74	PASS
	2452	Ant0	2500.0	-53.05	2.0	0	42.20	AV	54	PASS

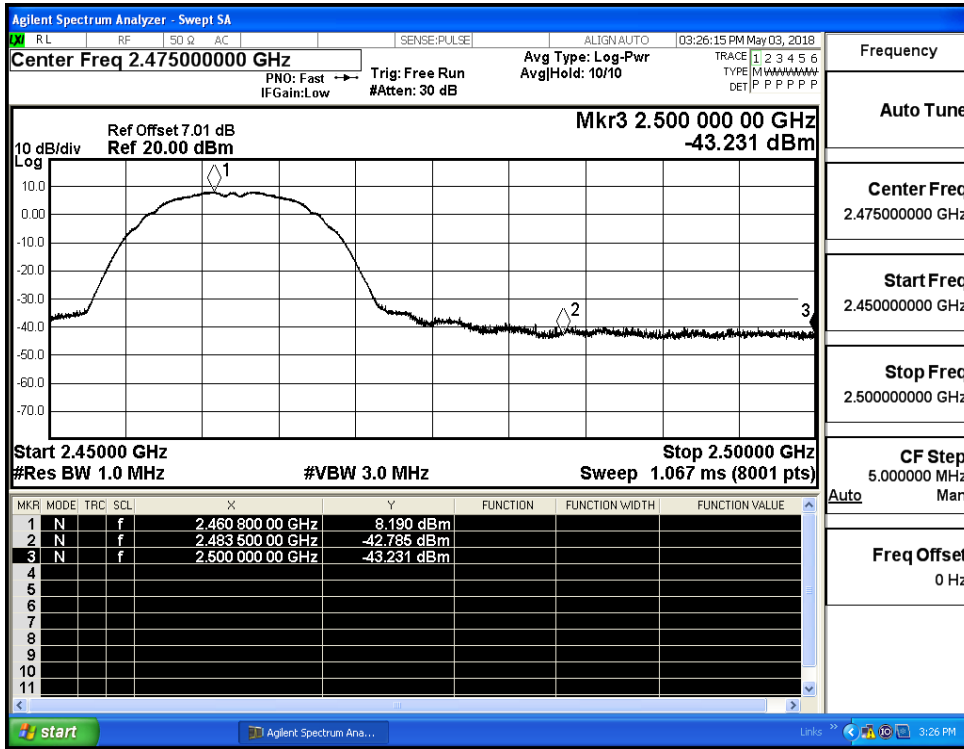
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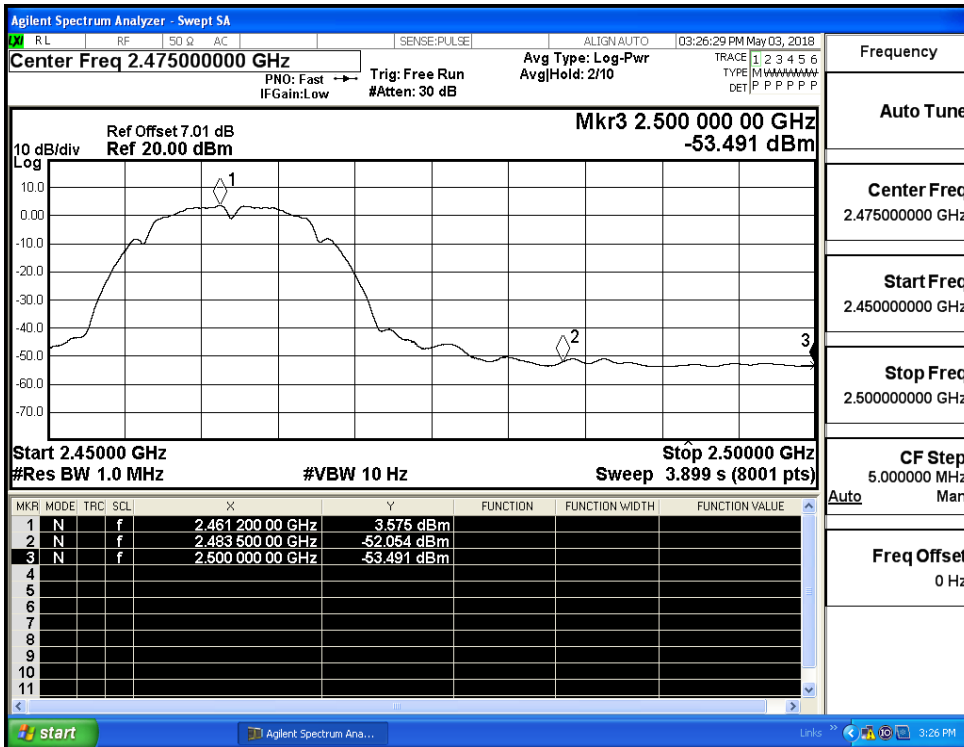
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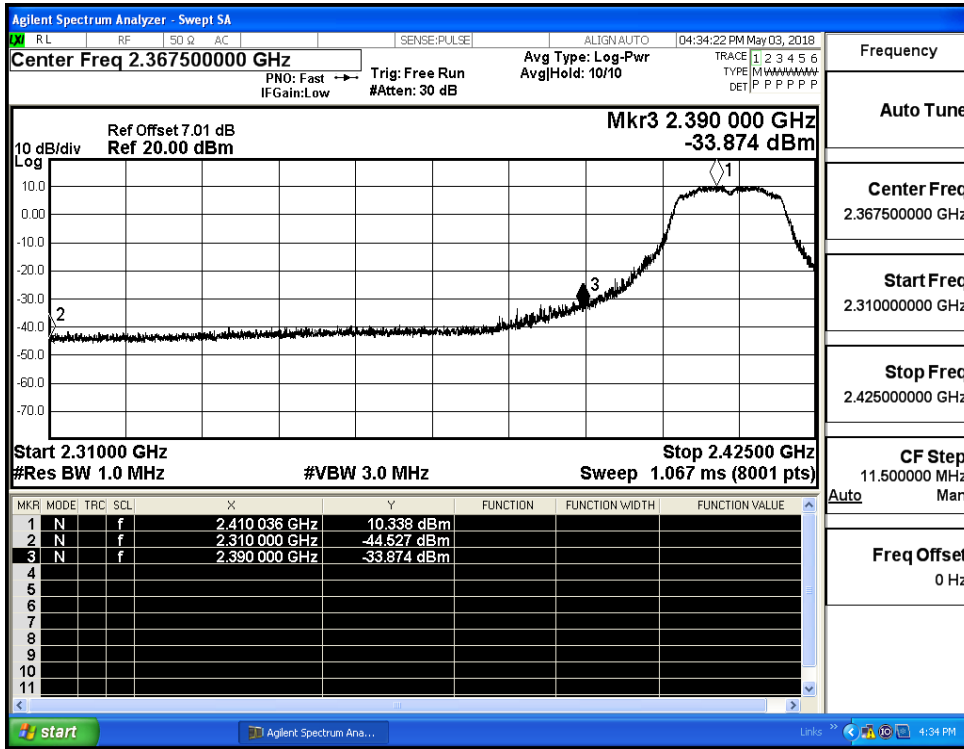
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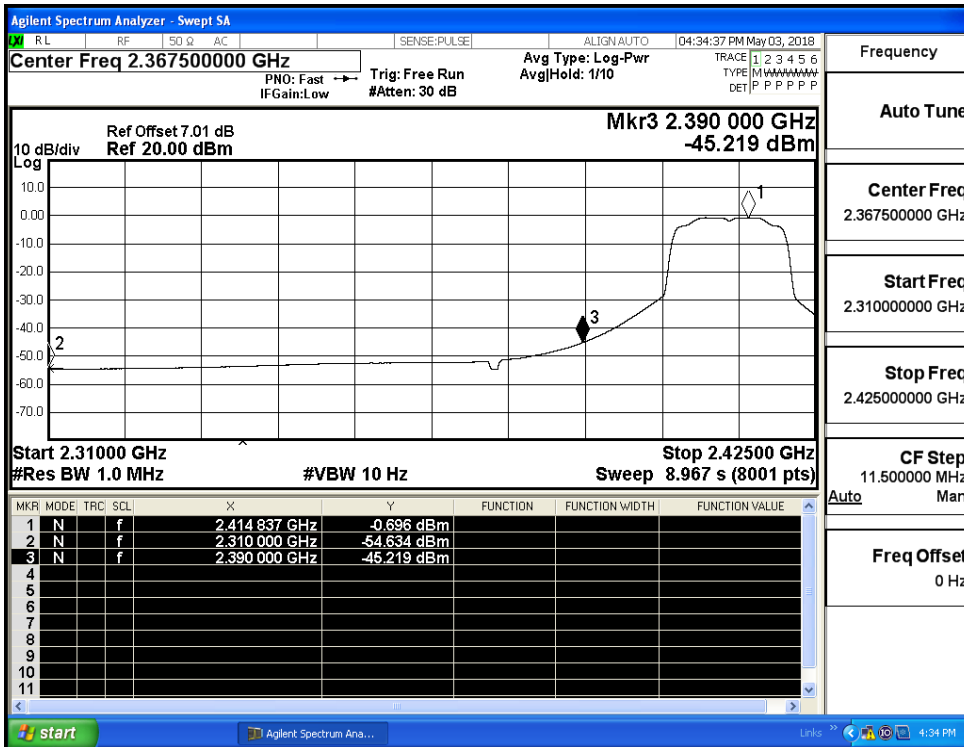
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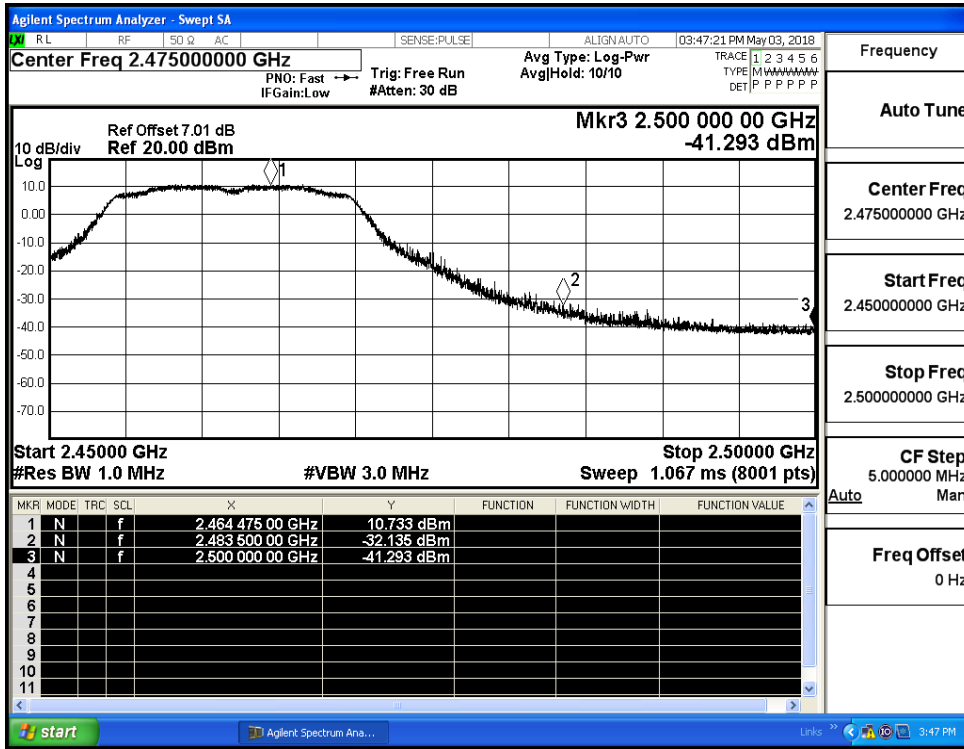
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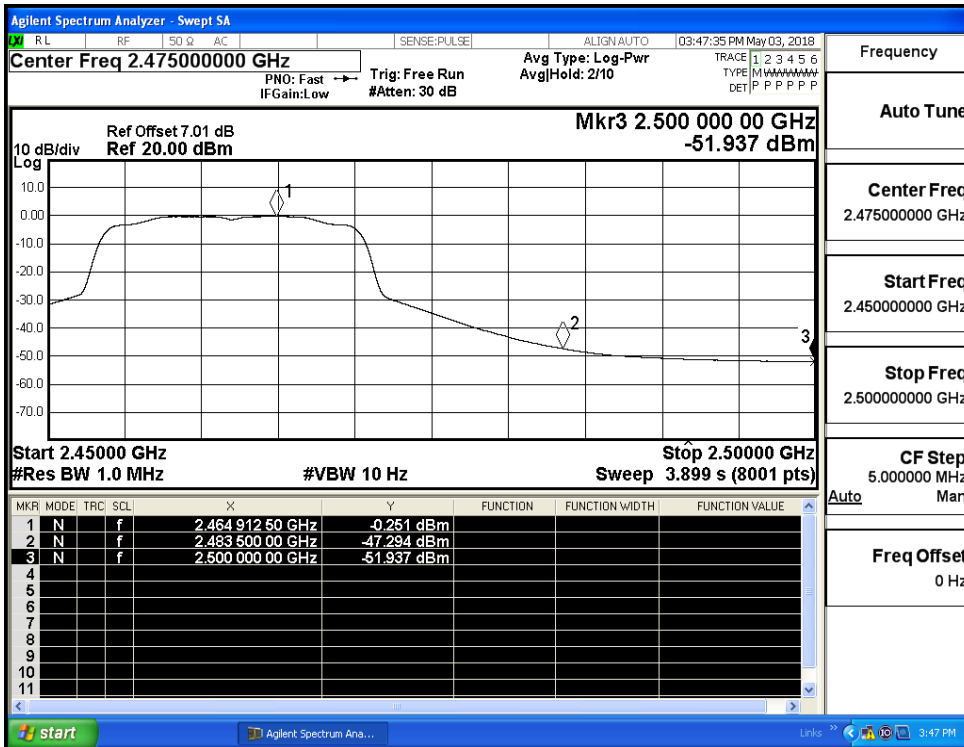
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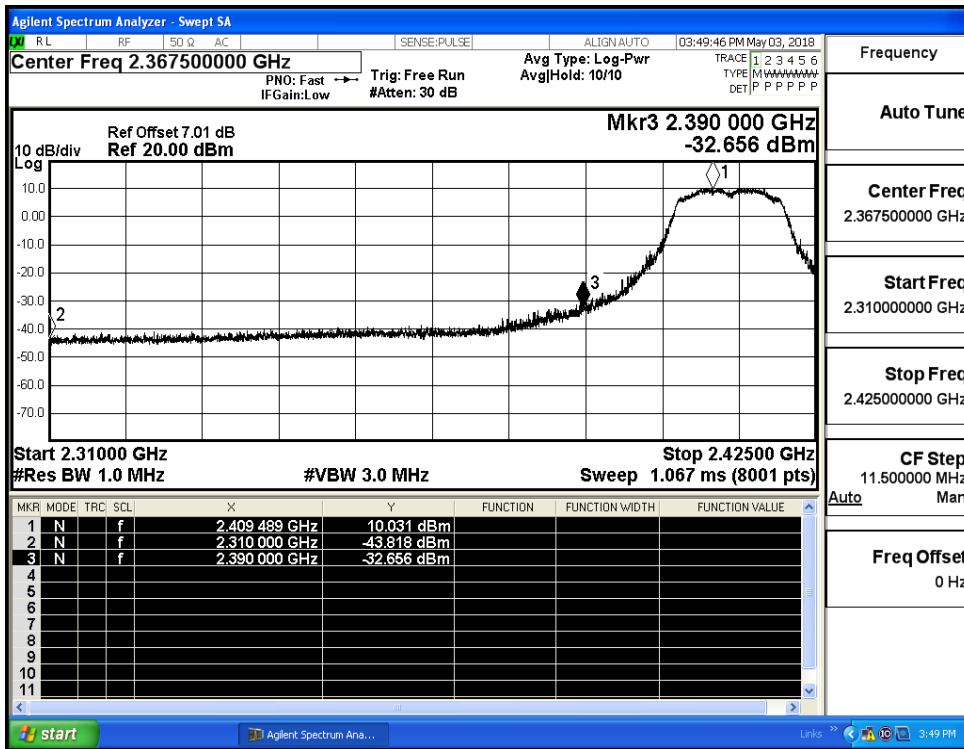
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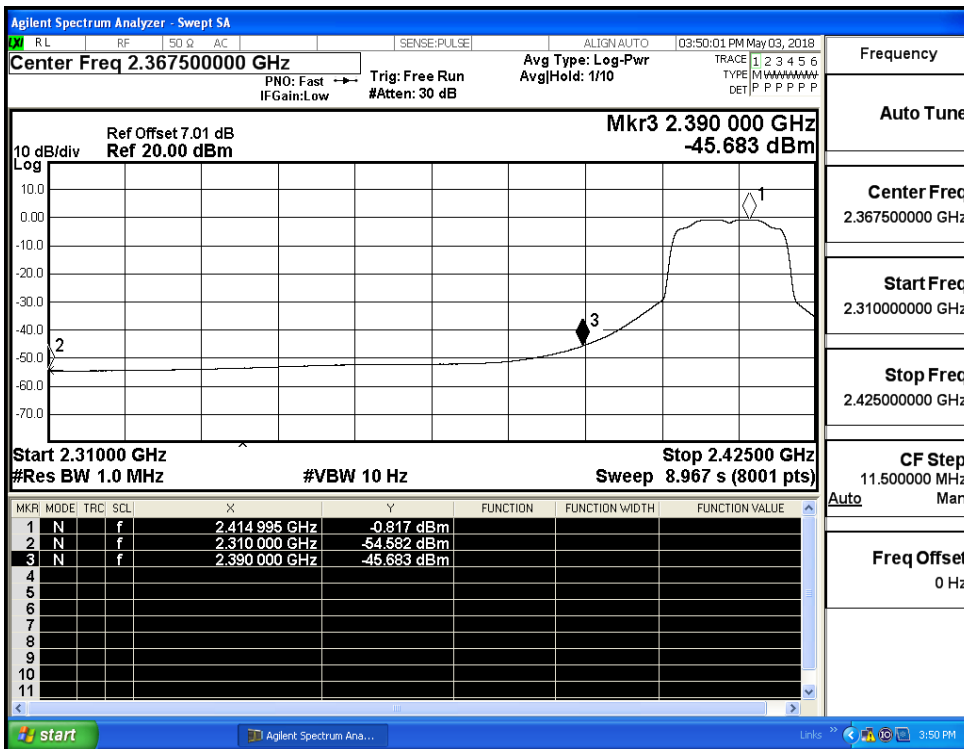
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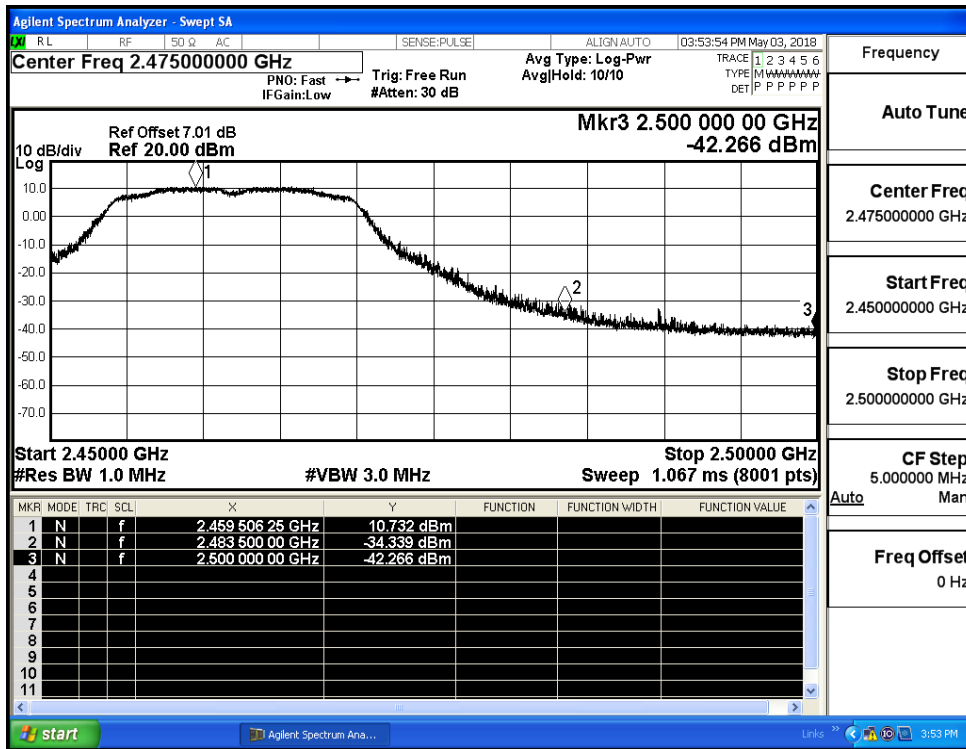
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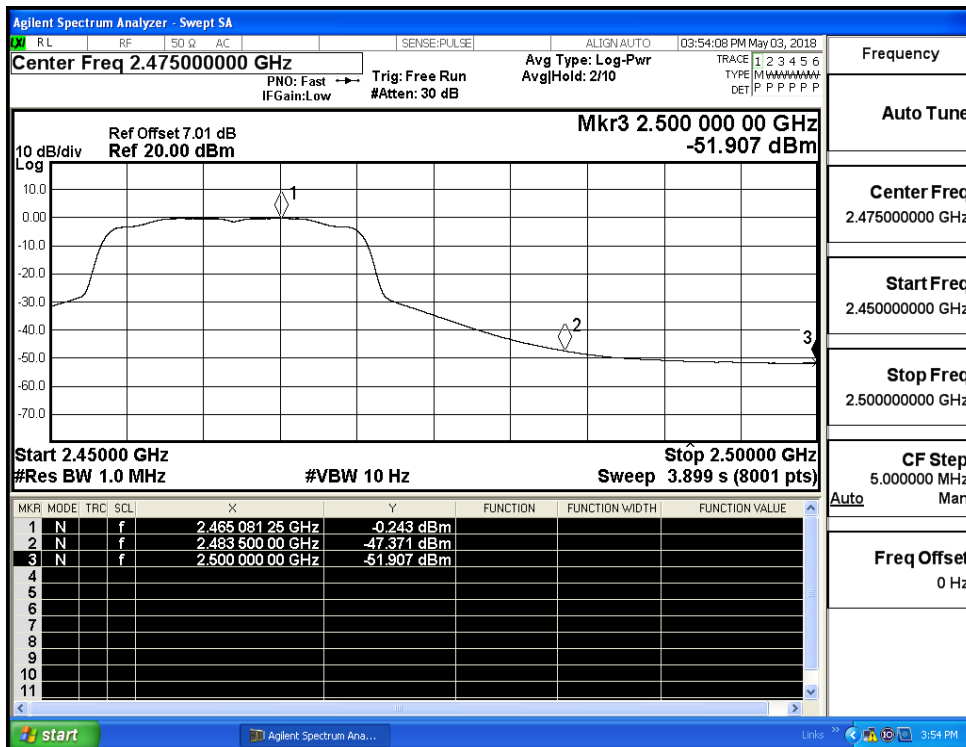
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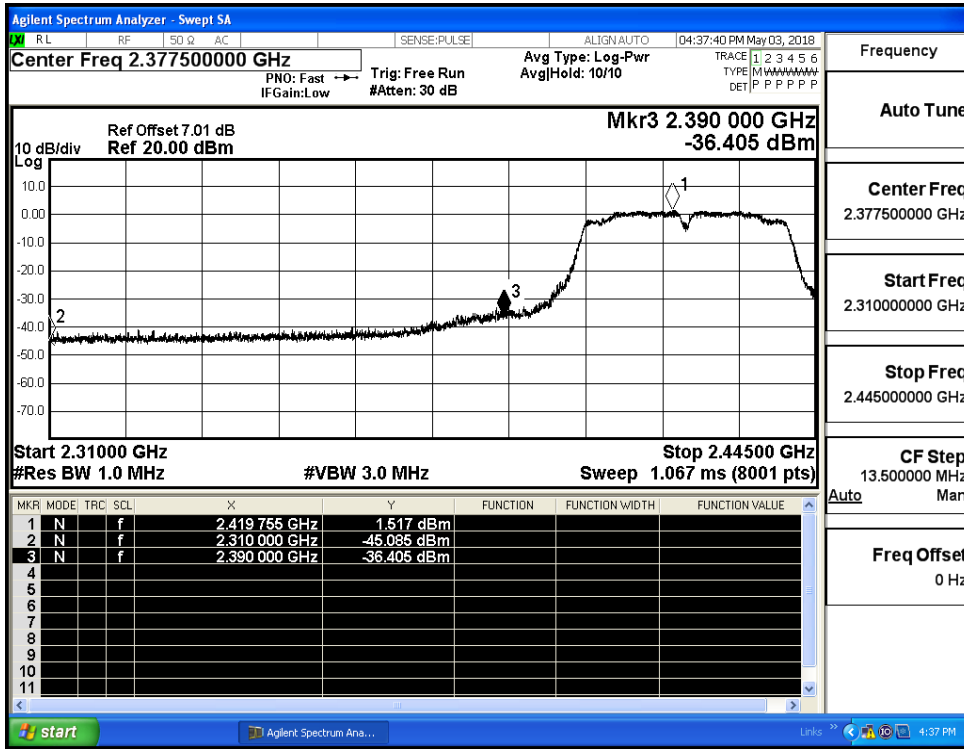
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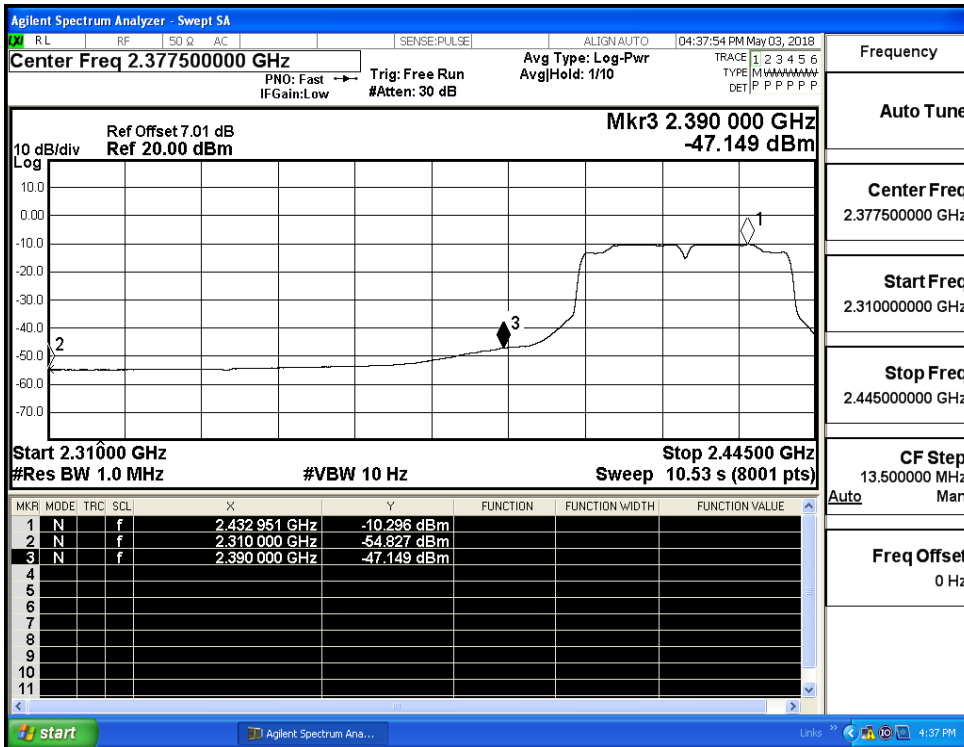
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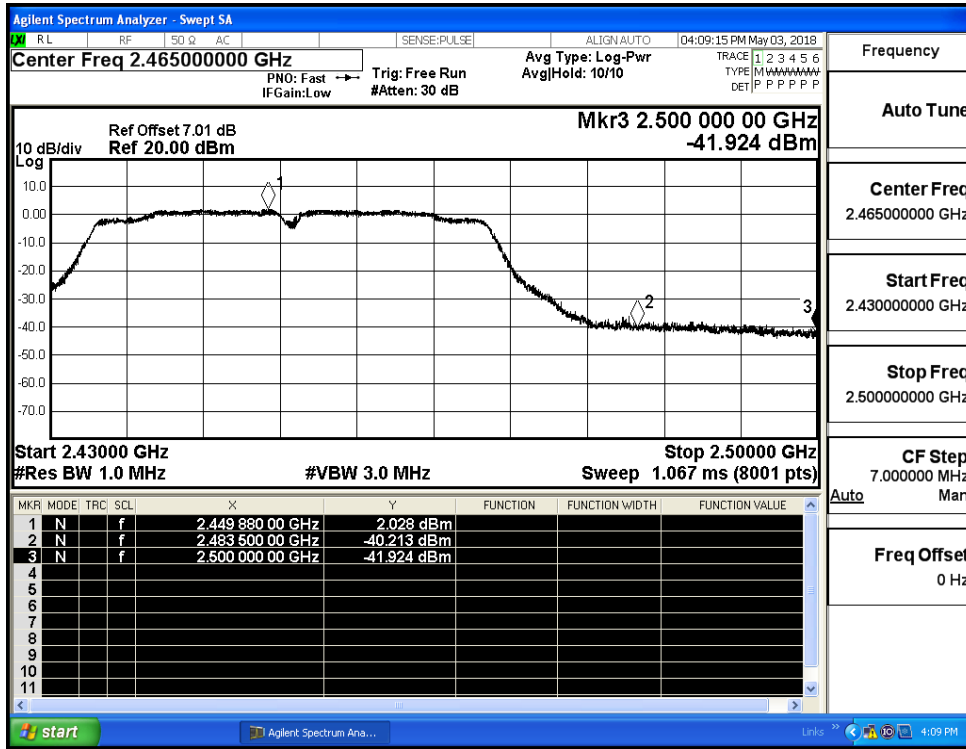
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Restrict-band band-edge measurements_11N40SISO_2422_Ant0_AV



Restrict-band band-edge measurements_11N40SISO_2452_Ant0_PEAK



Restrict-band band-edge measurements_11N40SISO_2452_Ant0_AV

