

## Appendix A

### RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Orb Pro

Trade Mark: netvue

Test Model: NI-3231

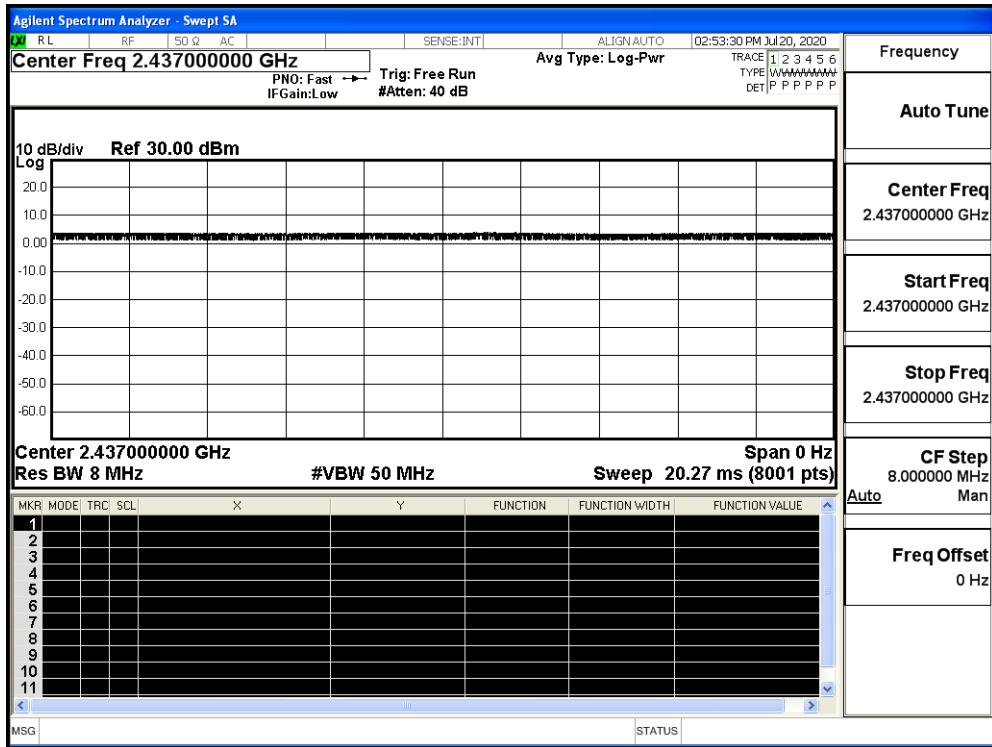
#### Environmental Conditions

Temperature:	23.8° C
Relative Humidity:	53.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

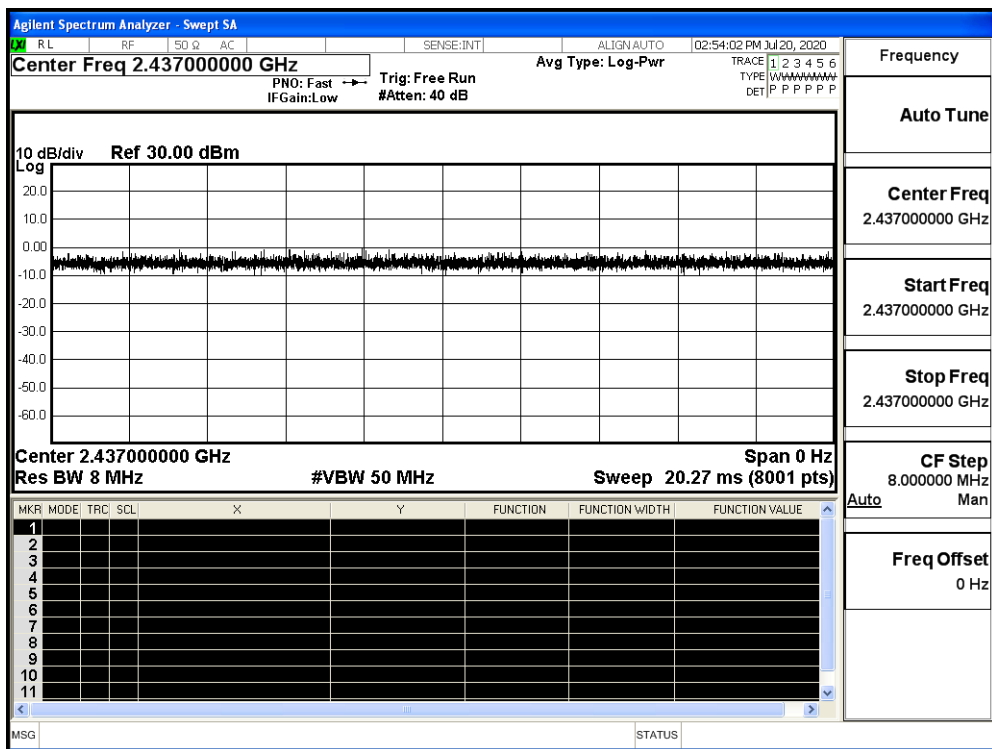
#### A.1 Duty Cycle

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

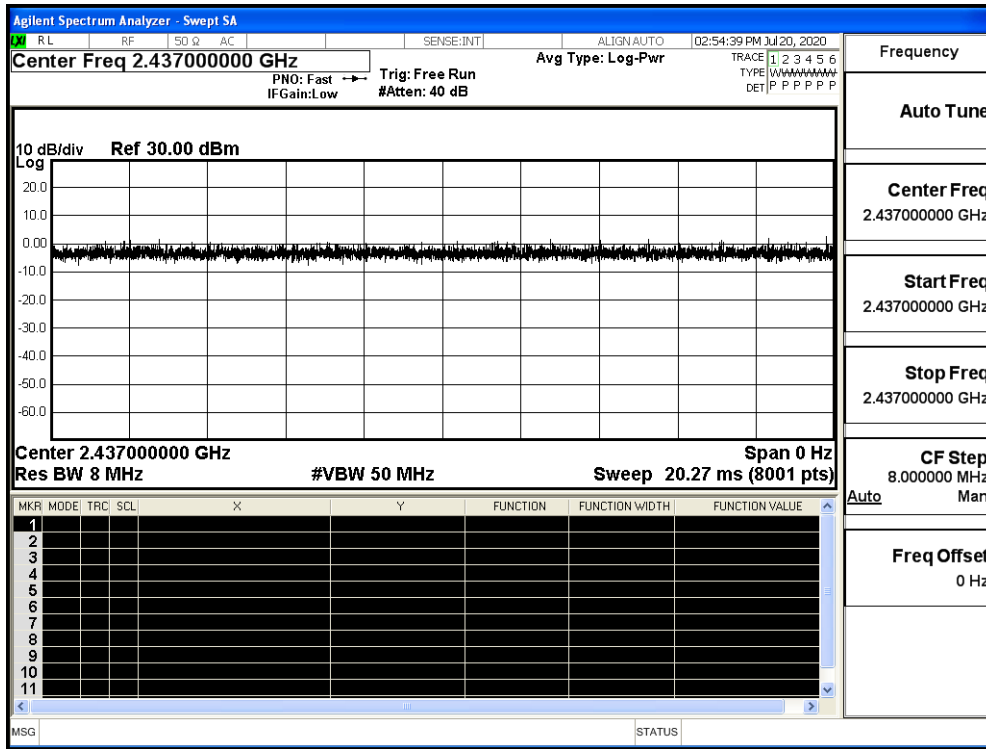
Duty Cycle\_11B\_2437\_Ant1



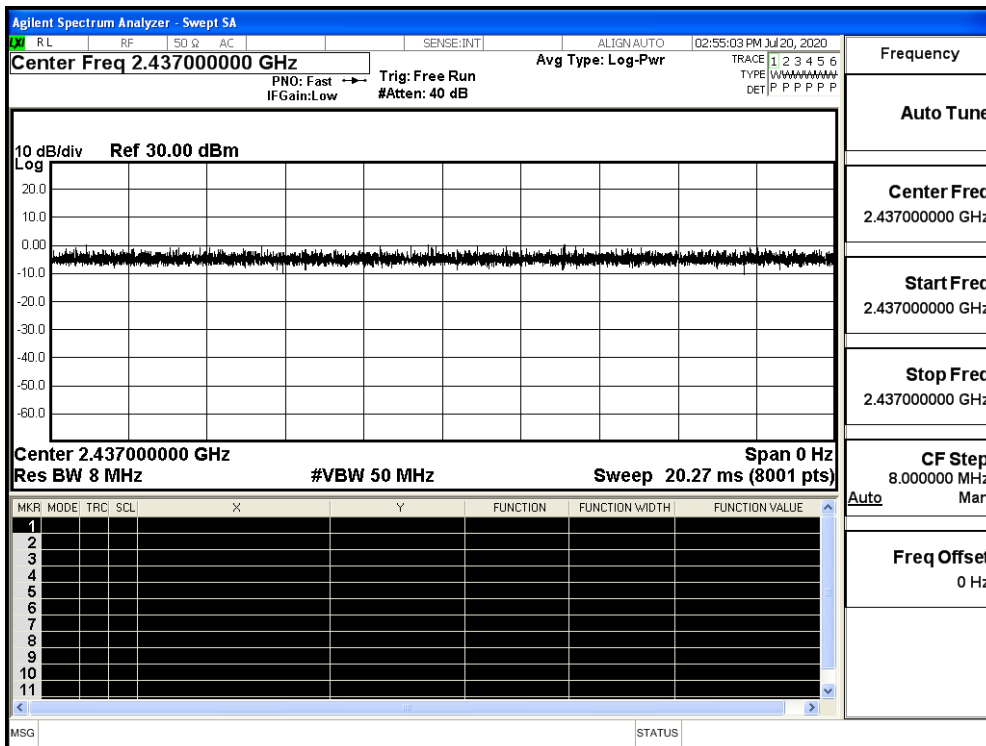
Duty Cycle\_11G\_2437\_Ant1



Duty Cycle\_11N20SISO\_2437\_Ant1



Duty Cycle\_11N40SISO\_2437\_Ant1



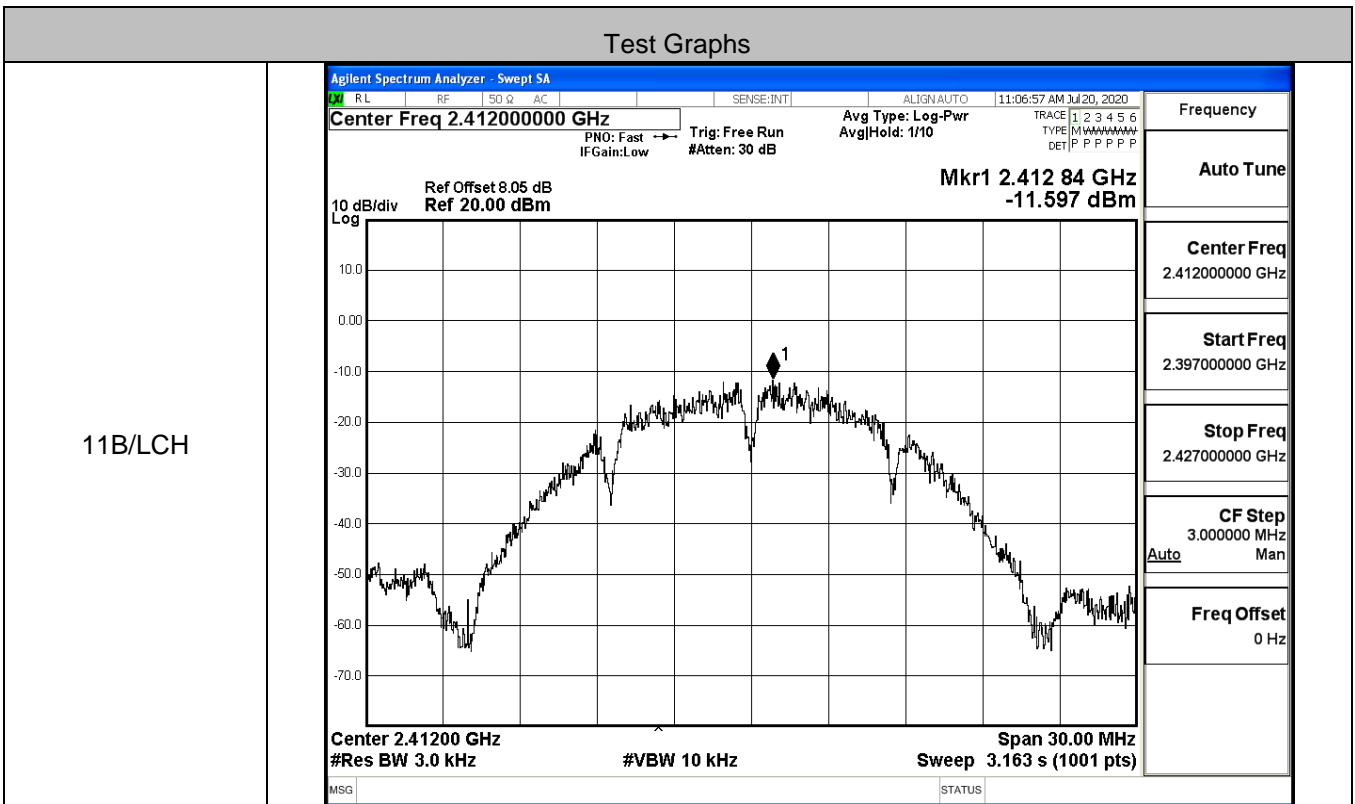
**A.2 Maximum Conducted Output Power**

Mode	Channel	Meas.Level [dBm]	Limit [dBm]	Verdict
11B	LCH	14.56	30	PASS
	MCH	14.1	30	PASS
	HCH	13.45	30	PASS
11G	LCH	14.09	30	PASS
	MCH	13.47	30	PASS
	HCH	13.65	30	PASS
11N20SISO	LCH	16.99	30	PASS
	MCH	16.43	30	PASS
	HCH	16.95	30	PASS
11N40SISO	LCH	15.26	30	PASS
	MCH	15.62	30	PASS
	HCH	17.31	30	PASS

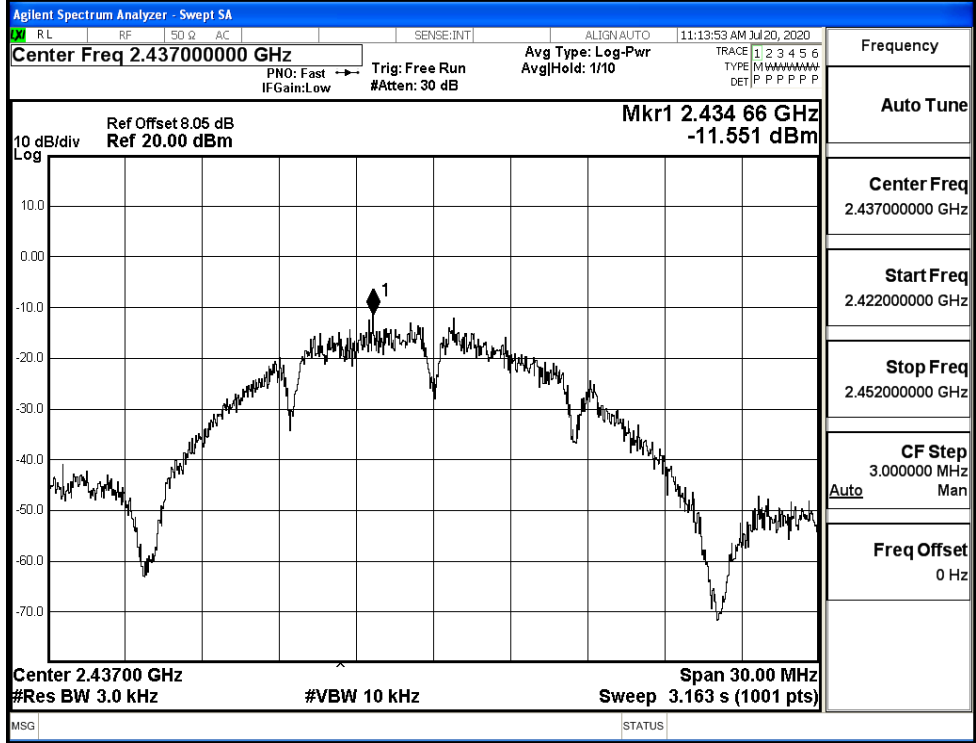
### A.3 Maximum Power Spectral Density

Mode	Channel	Meas.Level [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-11.597	8	PASS
	MCH	-11.551	8	PASS
	HCH	-12.233	8	PASS
11G	LCH	-15.617	8	PASS
	MCH	-15.389	8	PASS
	HCH	-16.926	8	PASS
11N20SISO	LCH	-16.245	8	PASS
	MCH	-15.317	8	PASS
	HCH	-16.149	8	PASS
11N40SISO	LCH	-15.914	8	PASS
	MCH	-14.955	8	PASS
	HCH	-16.578	8	PASS

#### Test Graphs

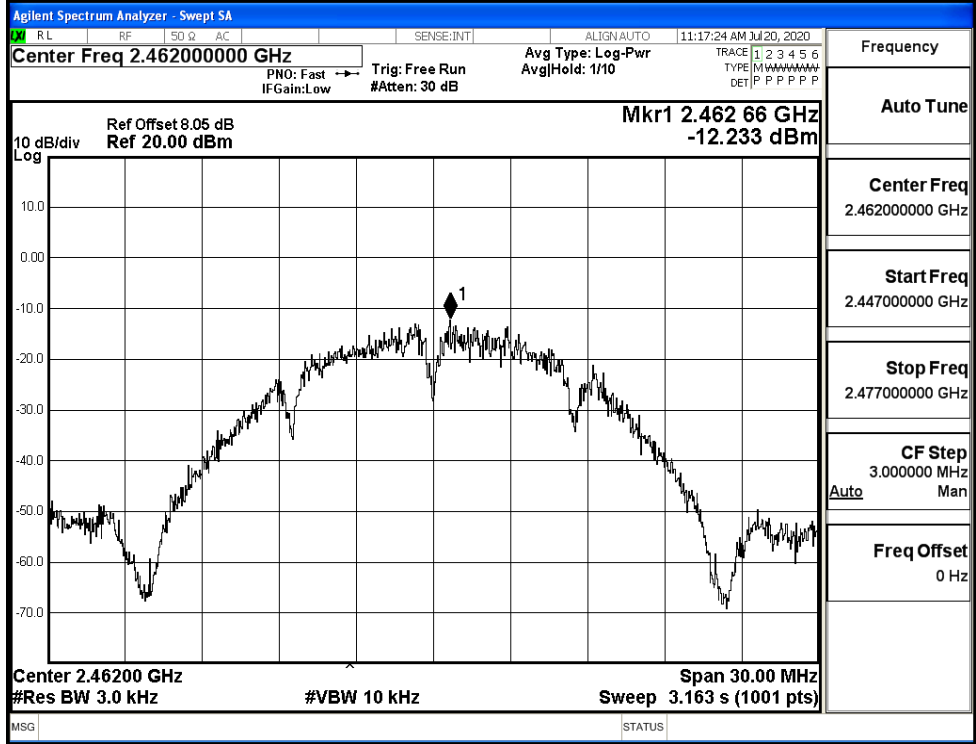


11B/MCH



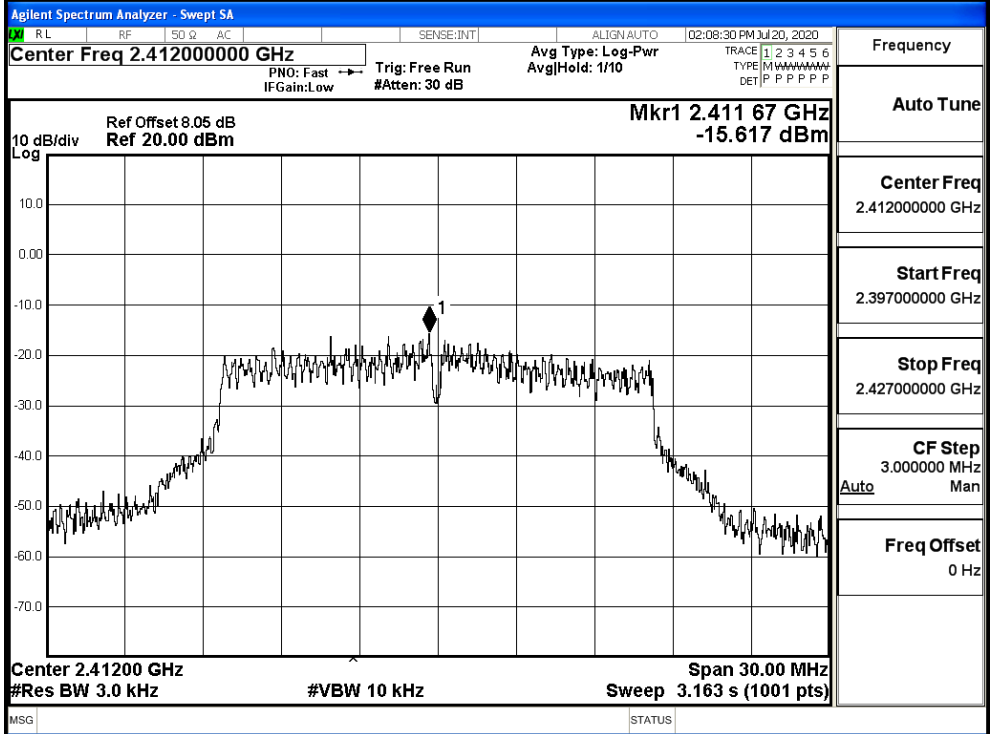
Frequency	2.437000000 GHz
Auto Tune	
Center Freq	2.437000000 GHz
Start Freq	2.422000000 GHz
Stop Freq	2.452000000 GHz
CF Step	3.000000 MHz Auto Man
Freq Offset	0 Hz

11B/HCH

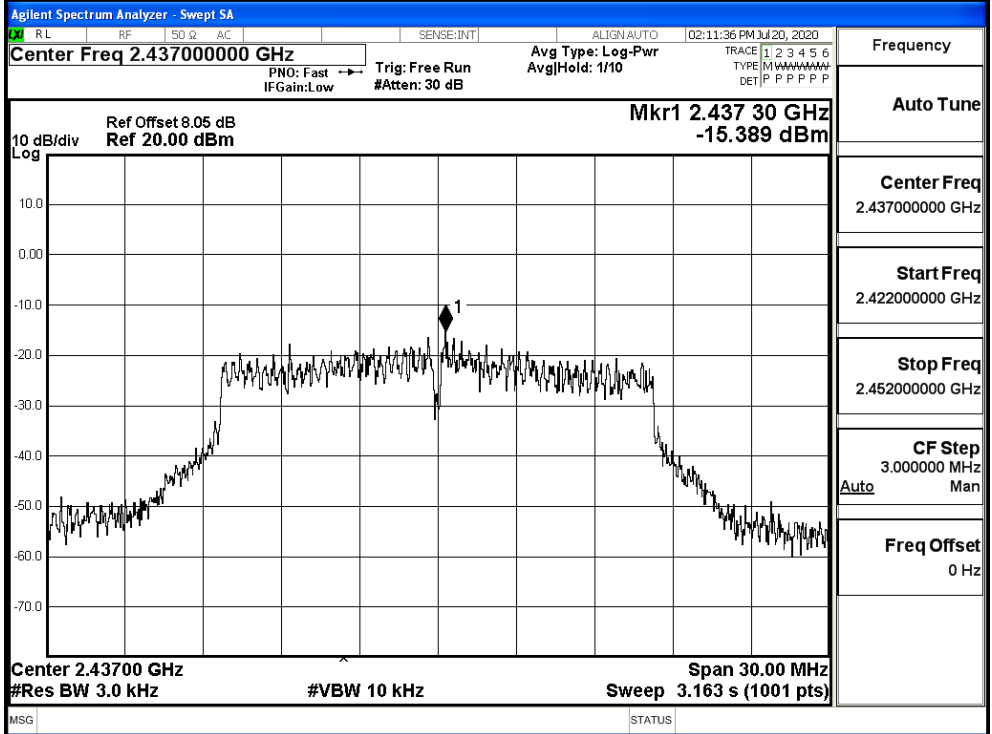


Frequency	2.462000000 GHz
Auto Tune	
Center Freq	2.462000000 GHz
Start Freq	2.447000000 GHz
Stop Freq	2.477000000 GHz
CF Step	3.000000 MHz Auto Man
Freq Offset	0 Hz

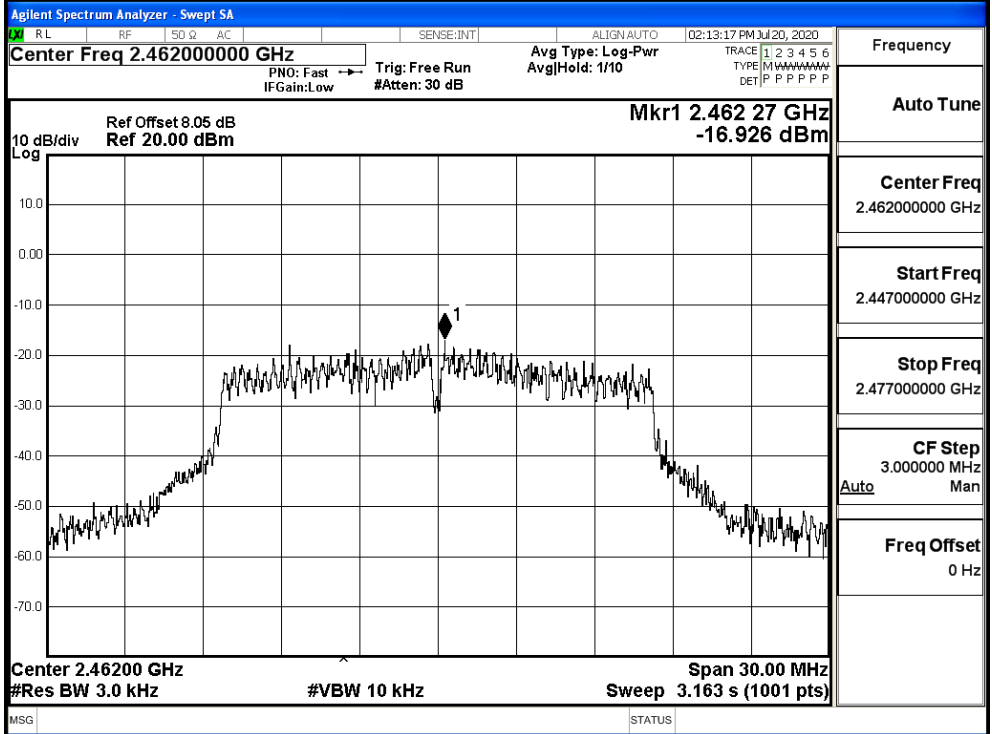
11G/LCH



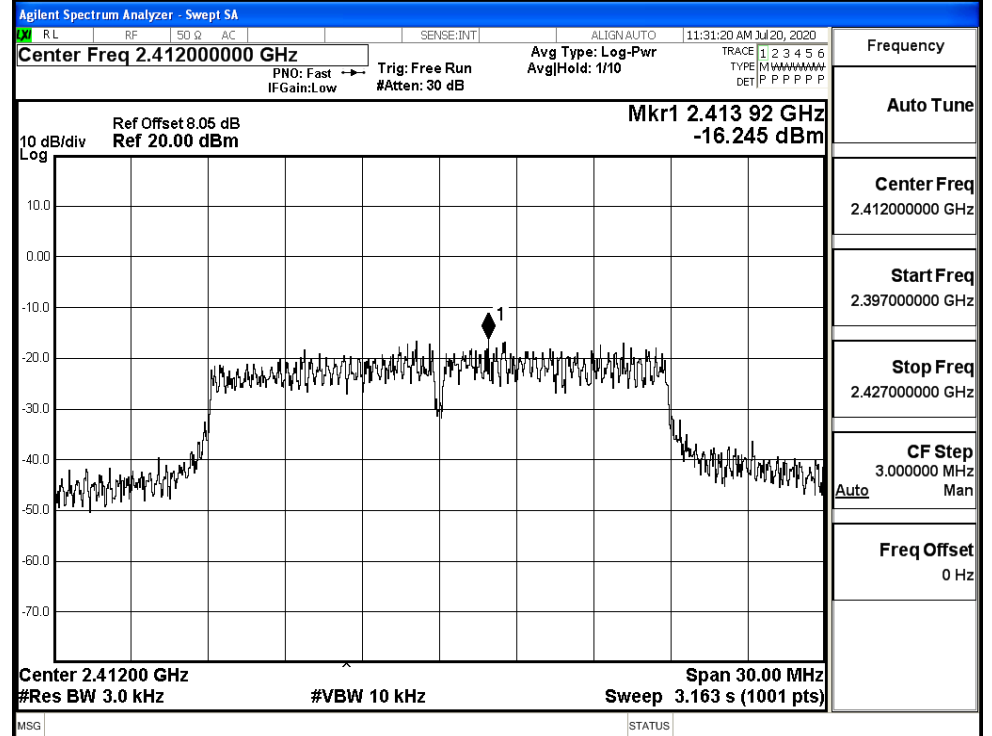
11G/MCH



11G/HCH

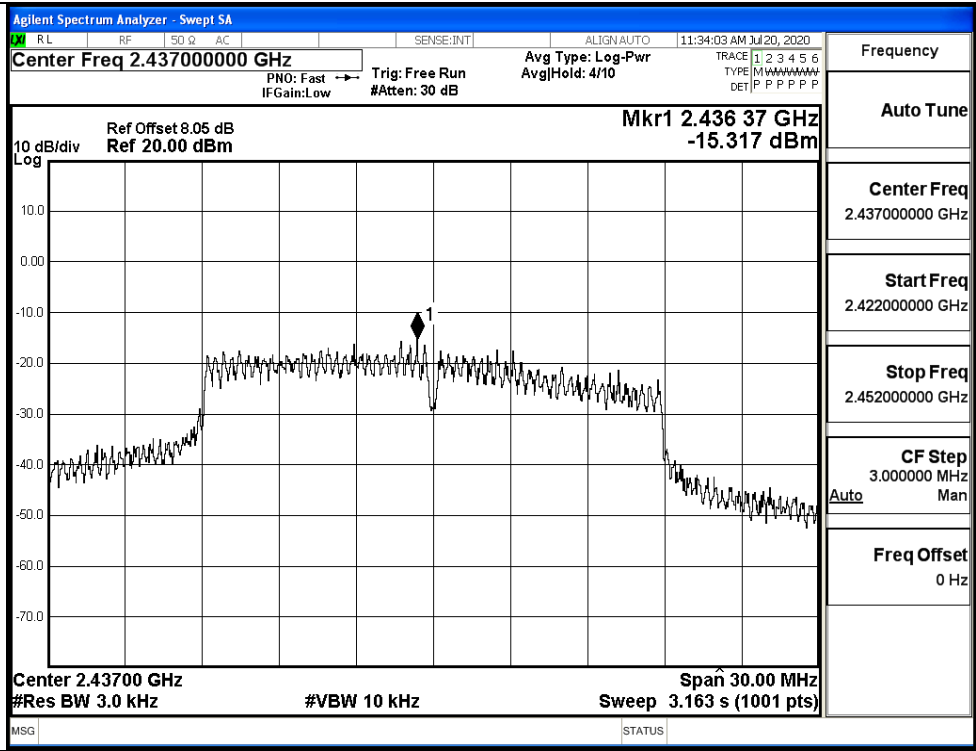


11N20SISO/LCH

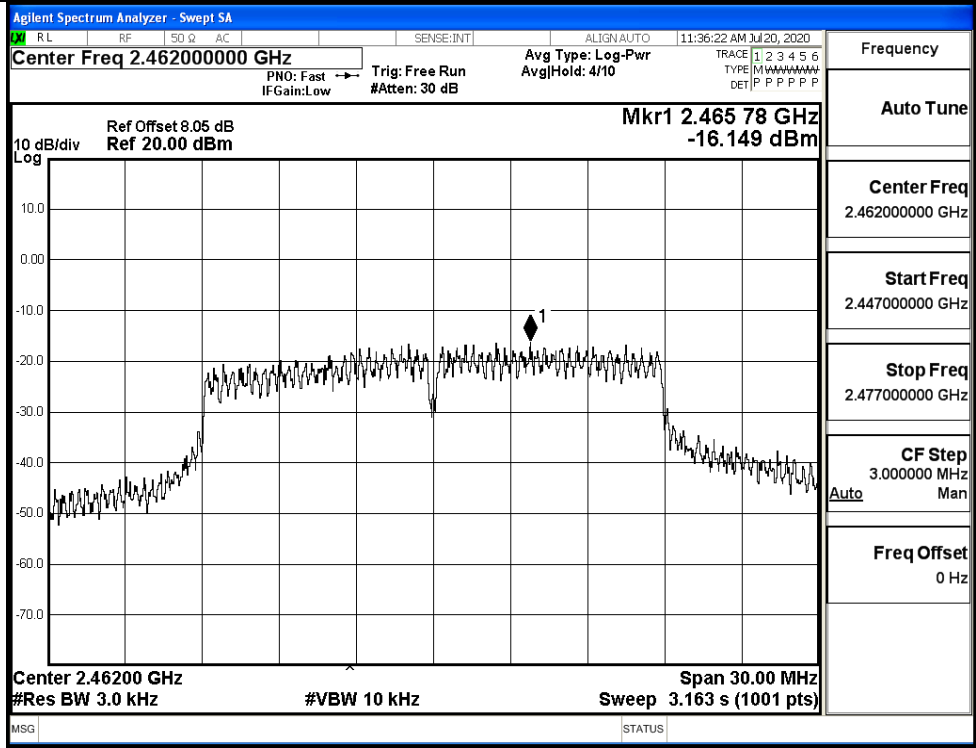




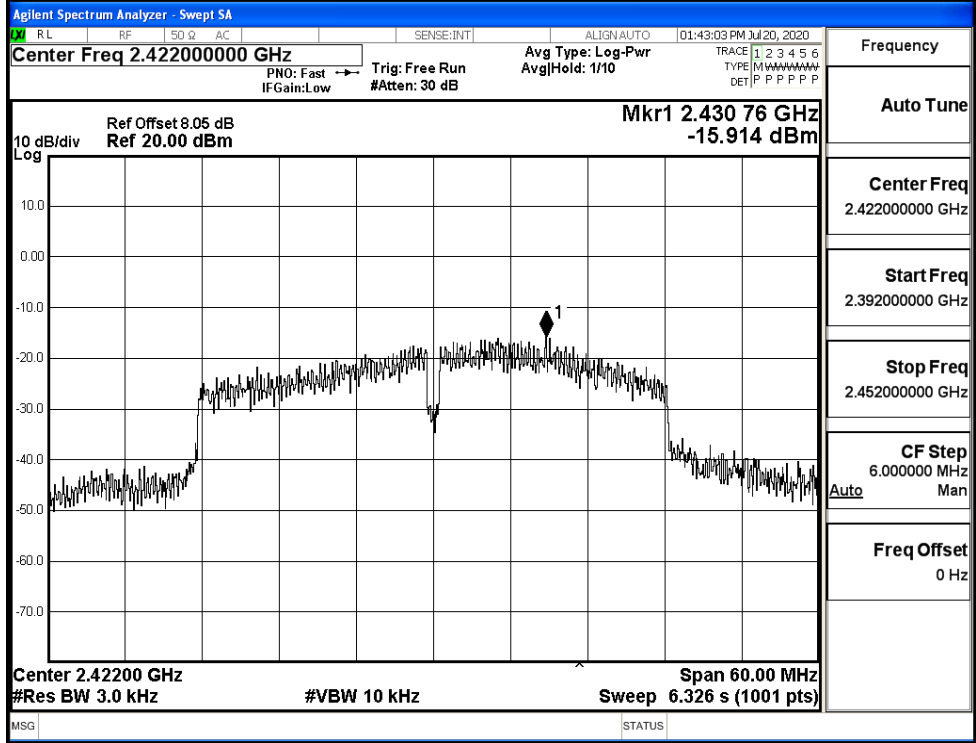
11N20SISO/MCH



11N20SISO/HCH

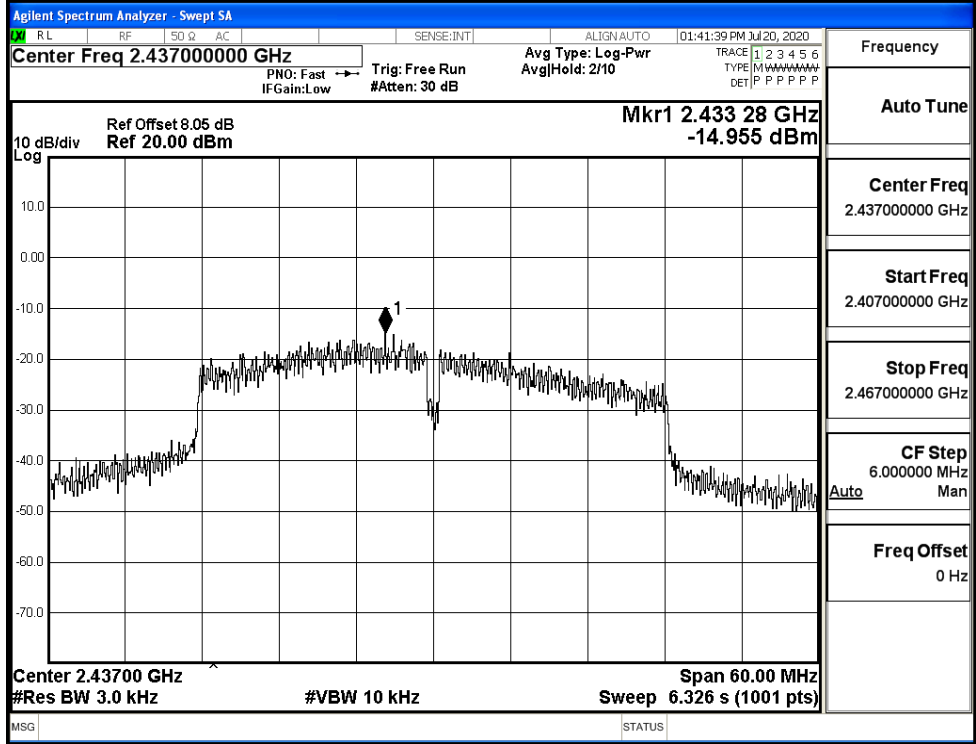


11N40SISO/LCH



Frequency
Auto Tune
Center Freq 2.42200000 GHz
Start Freq 2.392000000 GHz
Stop Freq 2.452000000 GHz
CF Step 6.000000 MHz Auto Man
Freq Offset 0 Hz

11N40SISO/MCH



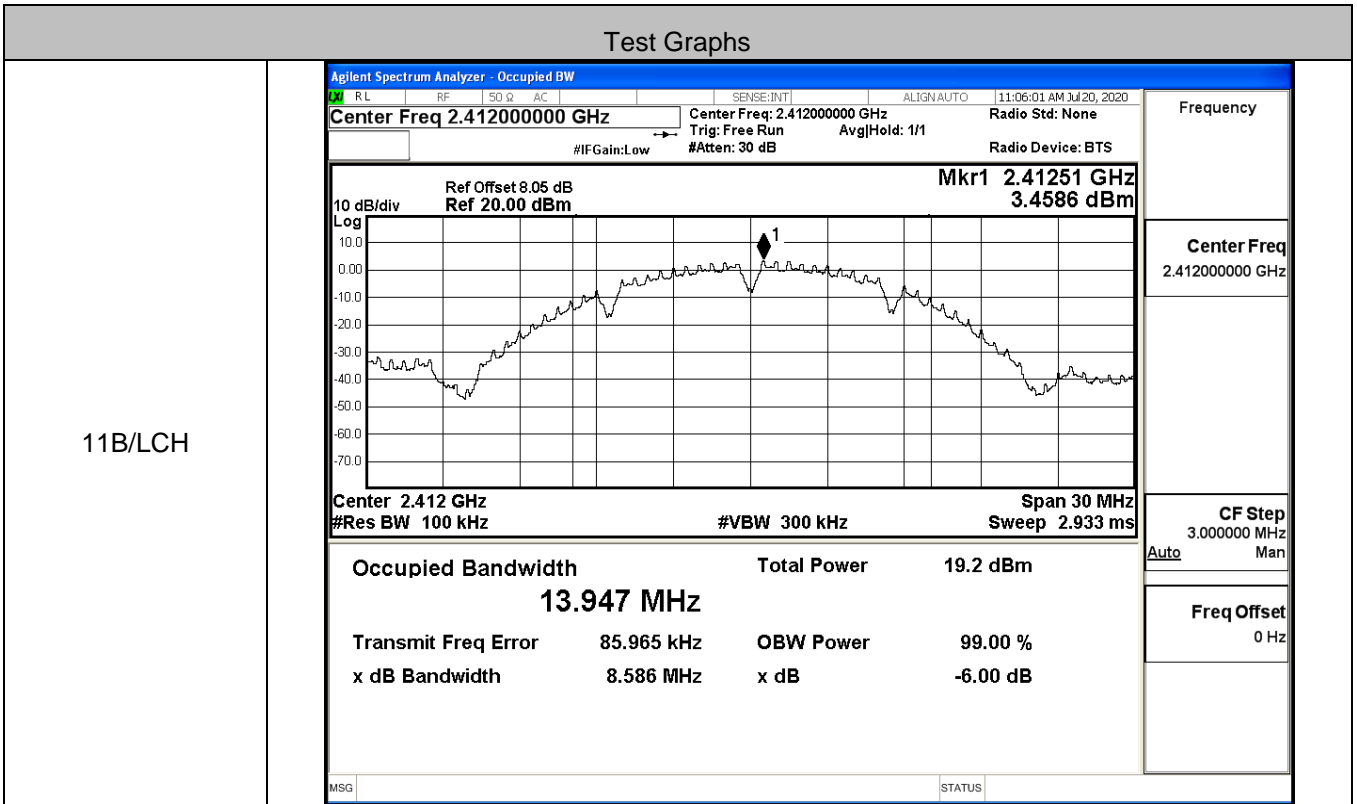
Frequency
Auto Tune
Center Freq 2.43700000 GHz
Start Freq 2.407000000 GHz
Stop Freq 2.467000000 GHz
CF Step 6.000000 MHz Auto Man
Freq Offset 0 Hz



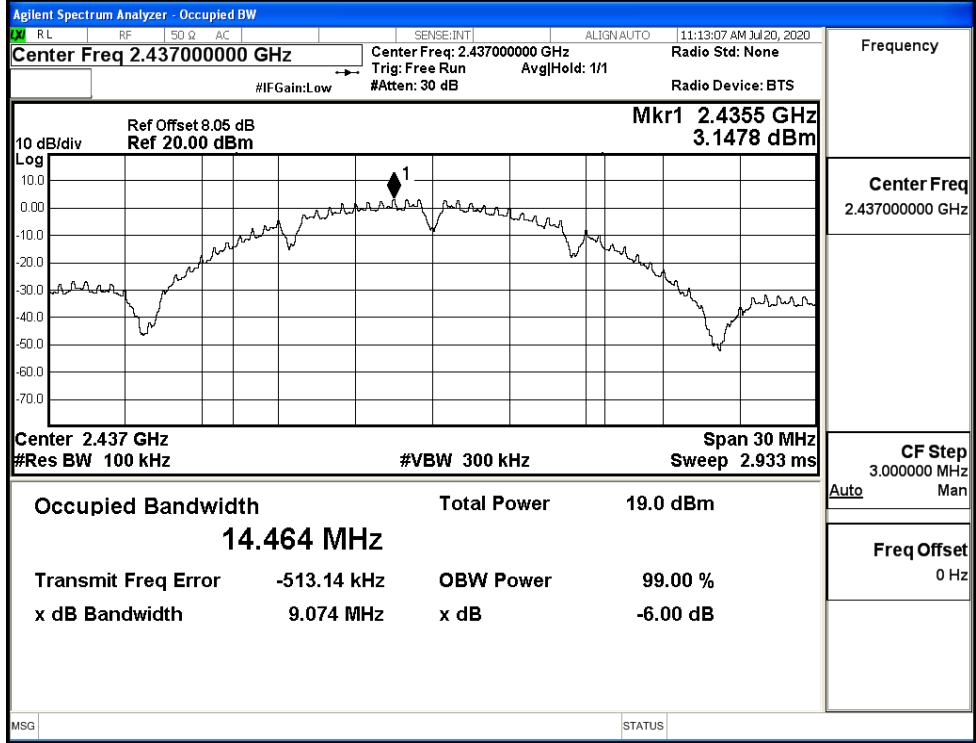
**A.4 6dB Bandwidth**

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	LCH	8.586	≥0.5	PASS
	MCH	9.074	≥0.5	PASS
	HCH	8.587	≥0.5	PASS
11G	LCH	16.56	≥0.5	PASS
	MCH	16.55	≥0.5	PASS
	HCH	16.57	≥0.5	PASS
11N20SISO	LCH	16.37	≥0.5	PASS
	MCH	16.31	≥0.5	PASS
	HCH	16.36	≥0.5	PASS
11N40SISO	LCH	36.49	≥0.5	PASS
	MCH	36.48	≥0.5	PASS
	HCH	36.43	≥0.5	PASS

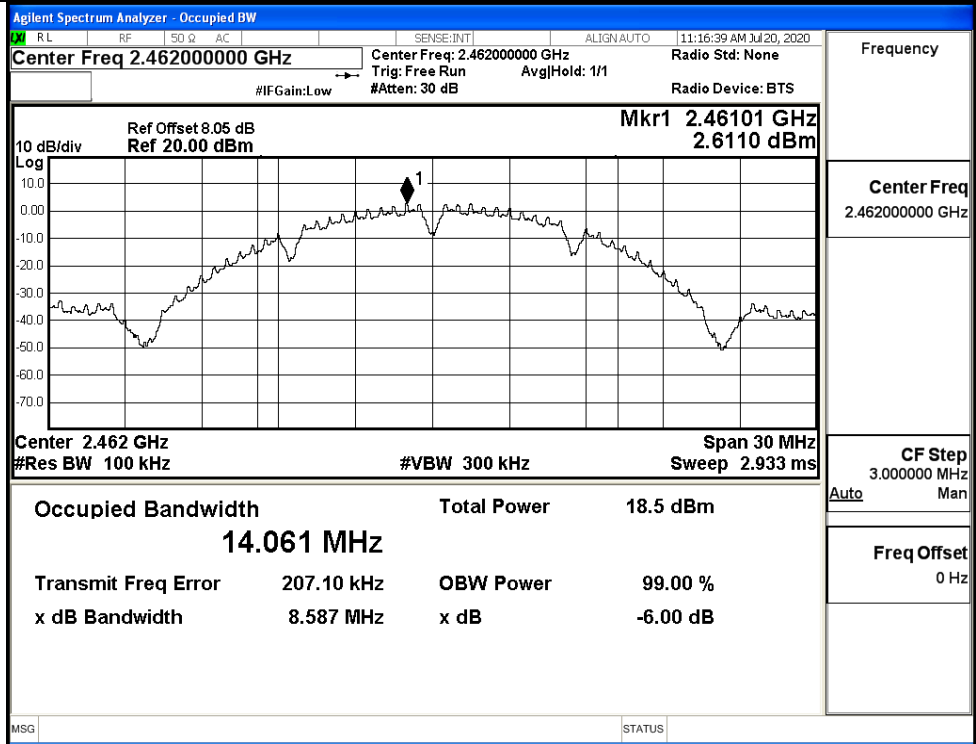
**Test Graphs**



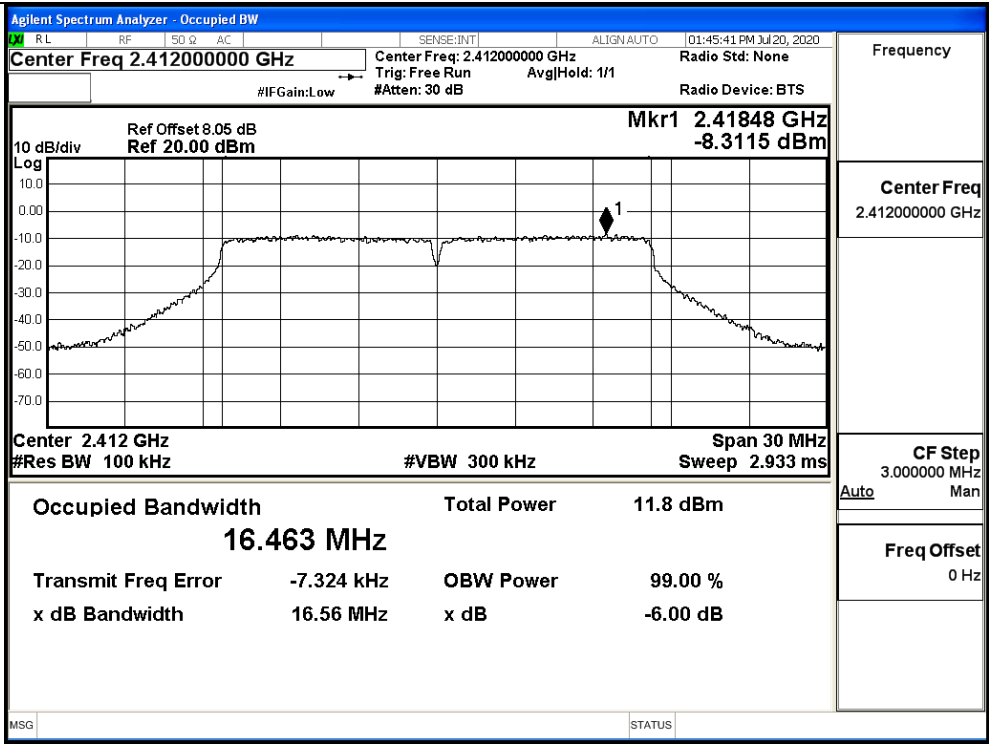
11B/MCH



11B/HCH

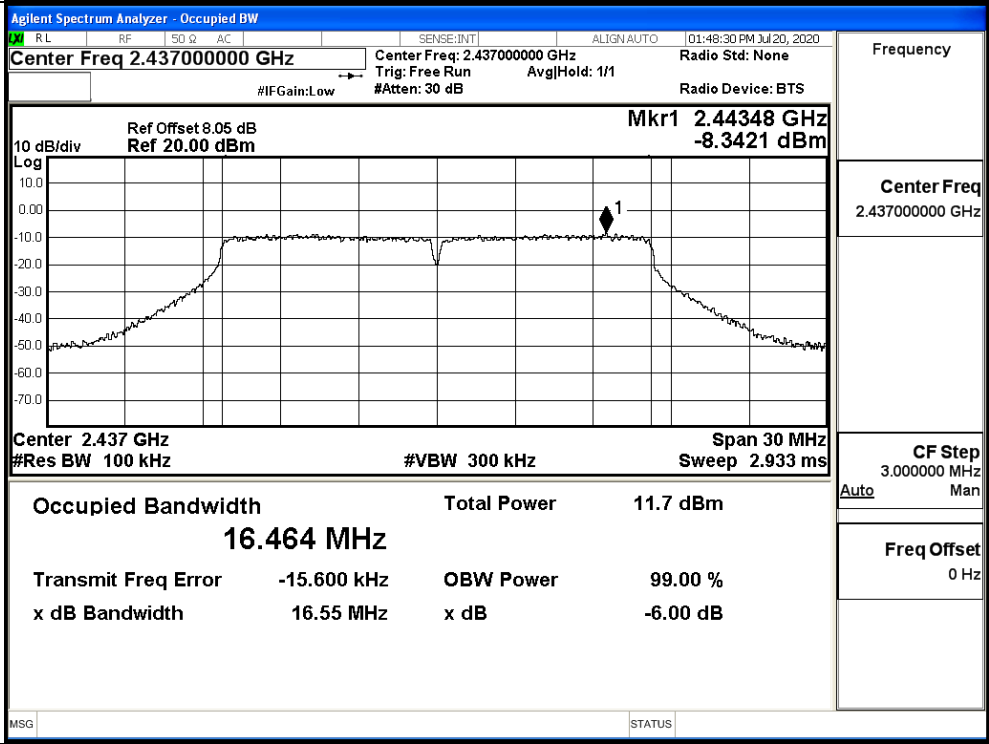


11G/LCH



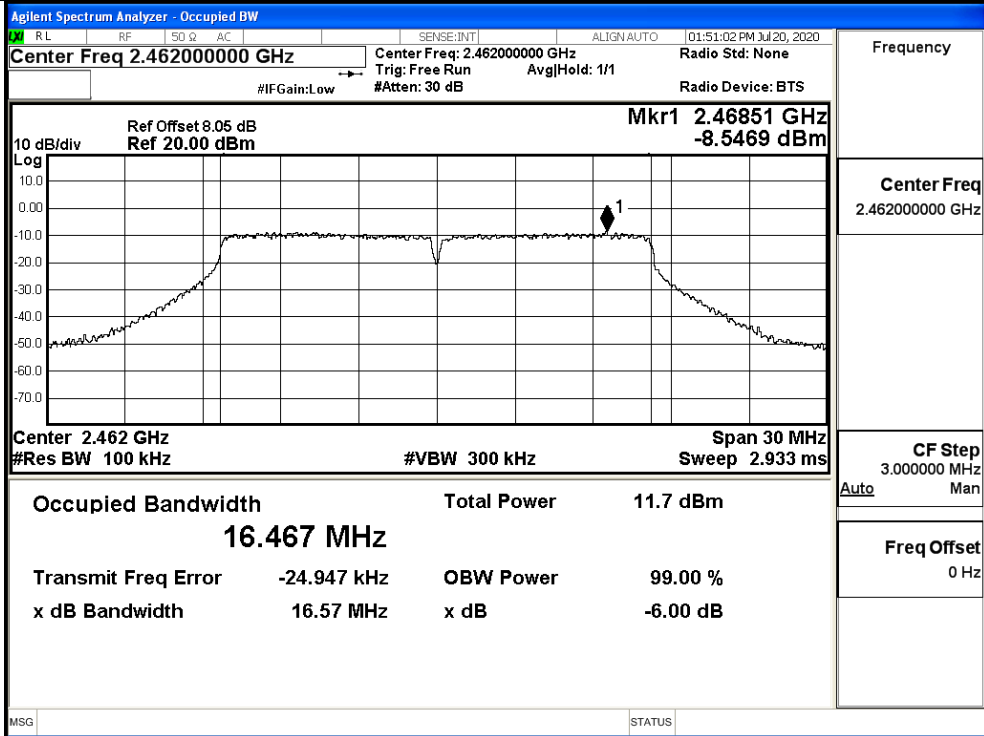
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Center Freq	2.41200000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

11G/MCH

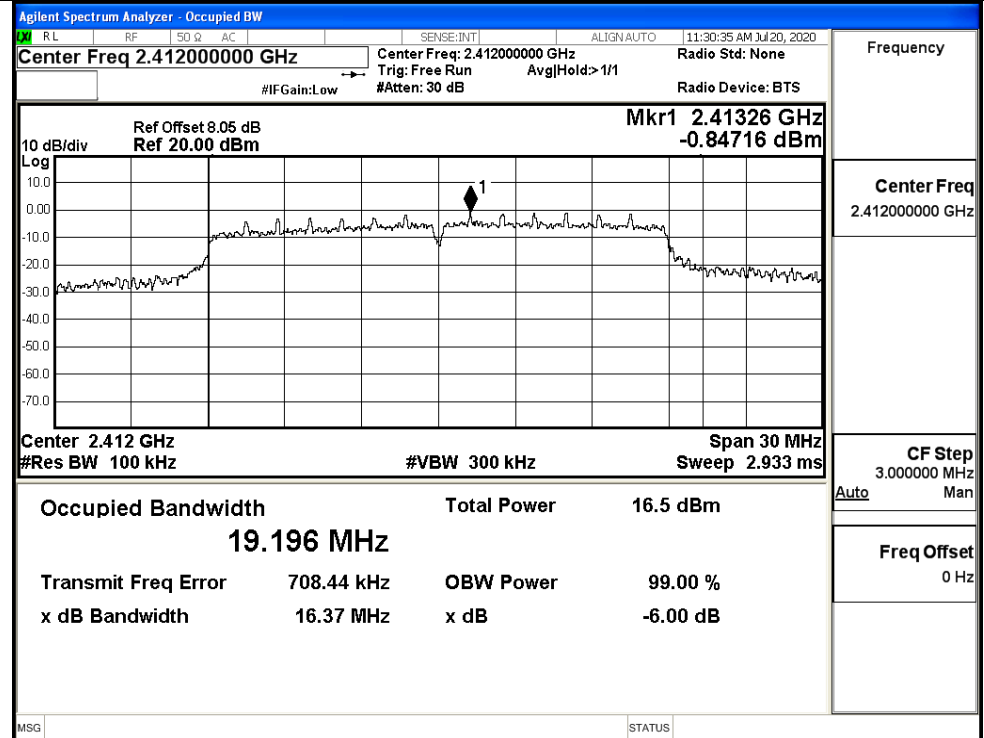


Frequency	2.43700000 GHz
Center Freq	2.437000000 GHz
CF Step	3.000000 MHz
Auto	Man
Freq Offset	0 Hz

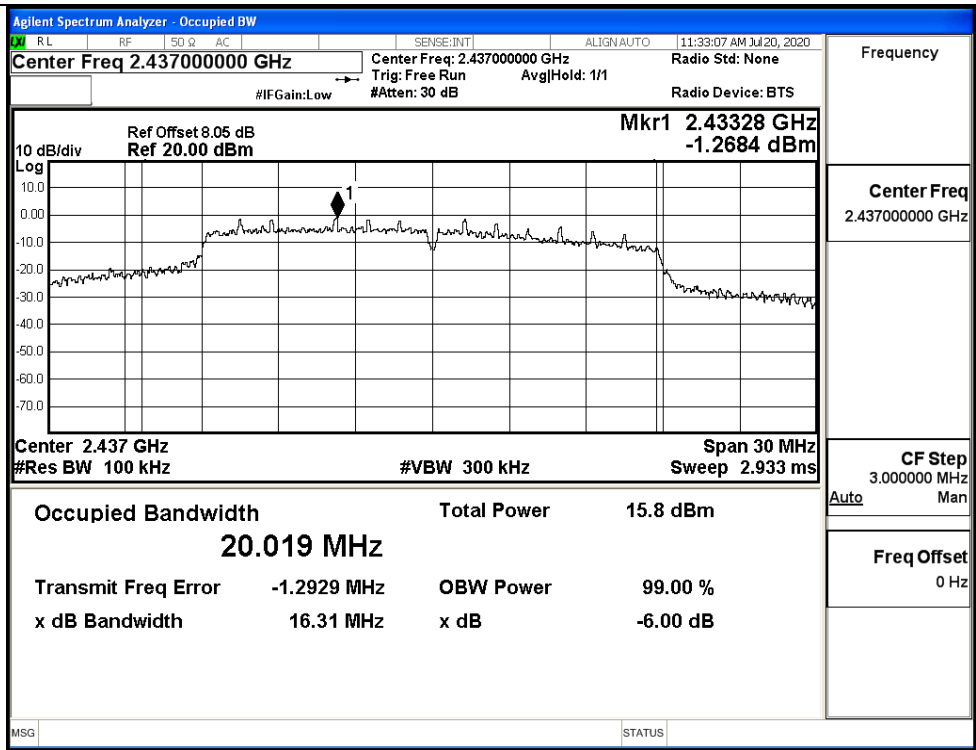
11G/HCH



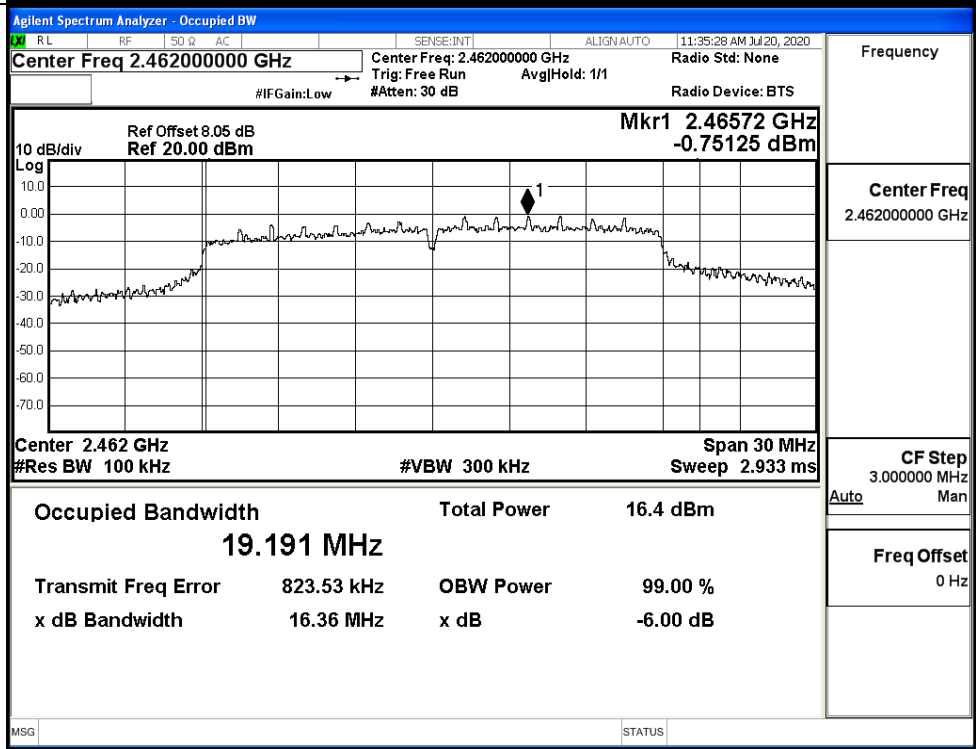
11N20SISO/LCH



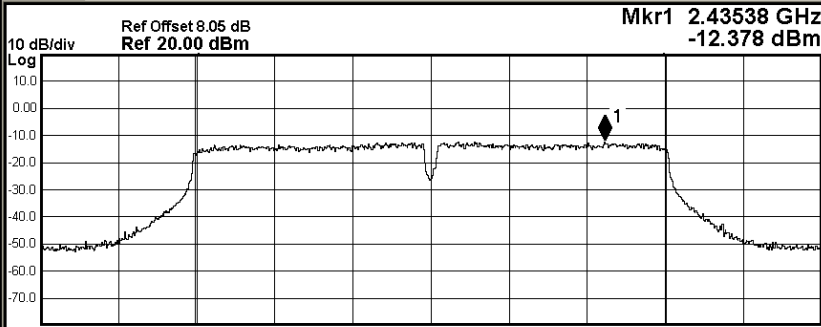
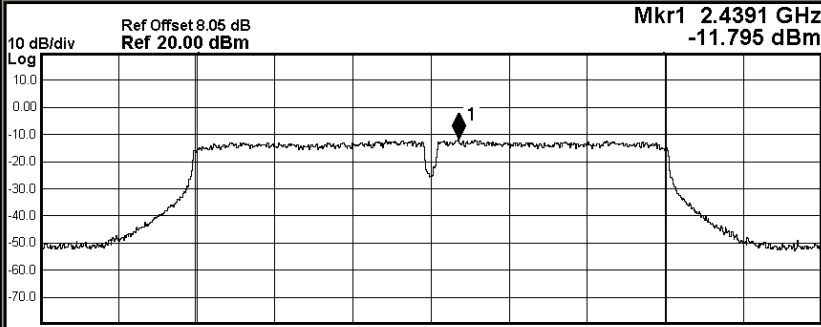
11N20SISO/MCH



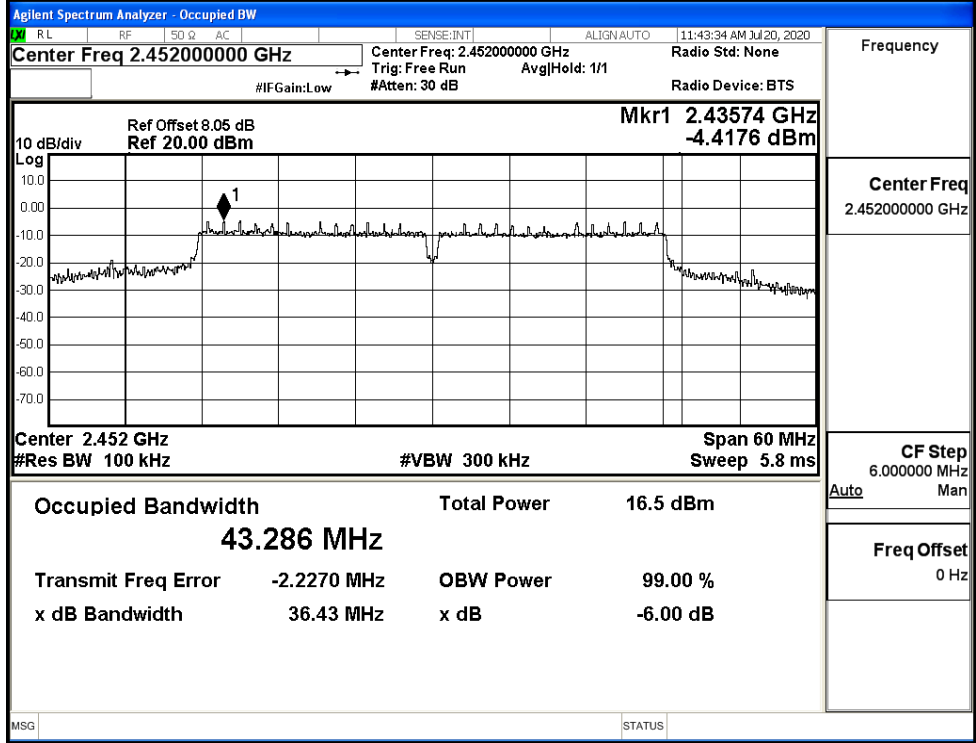
11N20SISO/HCH





<p>11N40SISO/LCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>RL RF SQ Ω AC SENSE:INT ALIGN AUTO 02:02:21 PM Jul 20, 2020</p> <p>Center Freq 2.422000000 GHz Center Freq: 2.422000000 GHz Radio Std: None          Trig: Free Run Avg Hold: 1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref Offset 8.05 dB Mkr1 2.43538 GHz          Log Ref 20.00 dBm -12.378 dBm</p>  <p>Center 2.422 GHz Span 60 MHz          #Res BW 100 kHz #VBW 300 kHz Sweep 5.8 ms</p> <p>Occupied Bandwidth Total Power 11.1 dBm  <b>36.114 MHz</b></p> <p>Transmit Freq Error 23.655 kHz OBW Power 99.00 %          x dB Bandwidth 36.49 MHz x dB -6.00 dB</p> <p>MSG STATUS</p>	<p>Frequency</p> <p>Center Freq 2.422000000 GHz</p> <p>CF Step 6.000000 MHz Auto Man</p> <p>Freq Offset 0 Hz</p>
<p>11N40SISO/MCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>RL RF SQ Ω AC SENSE:INT ALIGN AUTO 02:05:03 PM Jul 20, 2020</p> <p>Center Freq 2.437000000 GHz Center Freq: 2.437000000 GHz Radio Std: None          Trig: Free Run Avg Hold: 1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <p>10 dB/div Ref Offset 8.05 dB Mkr1 2.4391 GHz          Log Ref 20.00 dBm -11.795 dBm</p>  <p>Center 2.437 GHz Span 60 MHz          #Res BW 100 kHz #VBW 300 kHz Sweep 5.8 ms</p> <p>Occupied Bandwidth Total Power 11.6 dBm  <b>36.114 MHz</b></p> <p>Transmit Freq Error 11.562 kHz OBW Power 99.00 %          x dB Bandwidth 36.48 MHz x dB -6.00 dB</p> <p>MSG STATUS</p>	<p>Frequency</p> <p>Center Freq 2.437000000 GHz</p> <p>CF Step 6.000000 MHz Auto Man</p> <p>Freq Offset 0 Hz</p>

11N40SISO/HCH

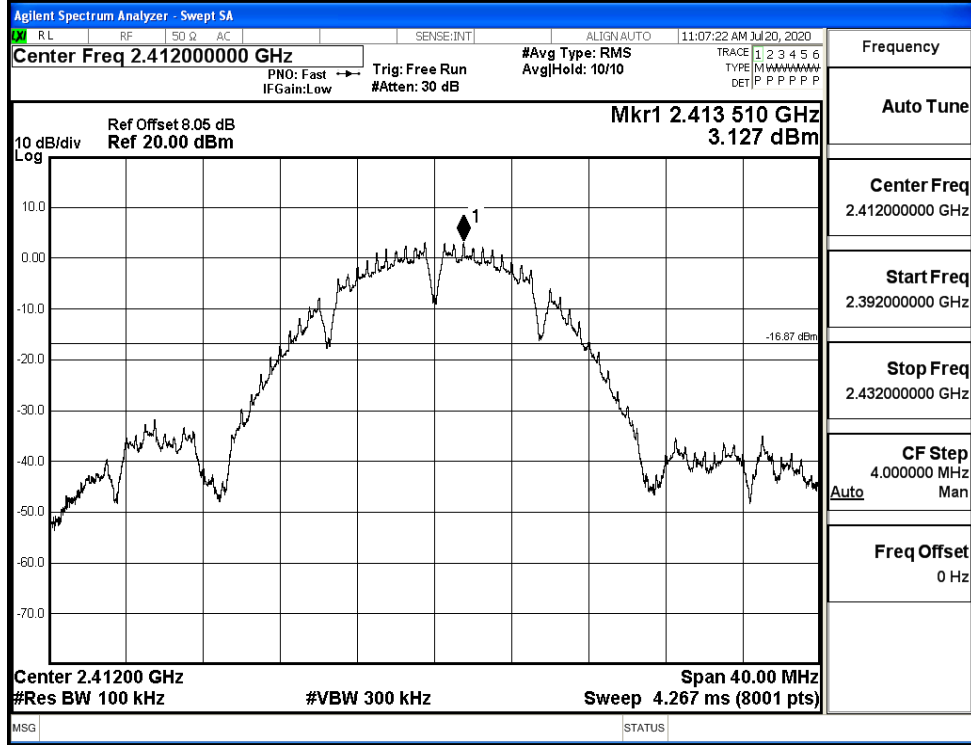


**A.5 RF Conducted Spurious Emissions**

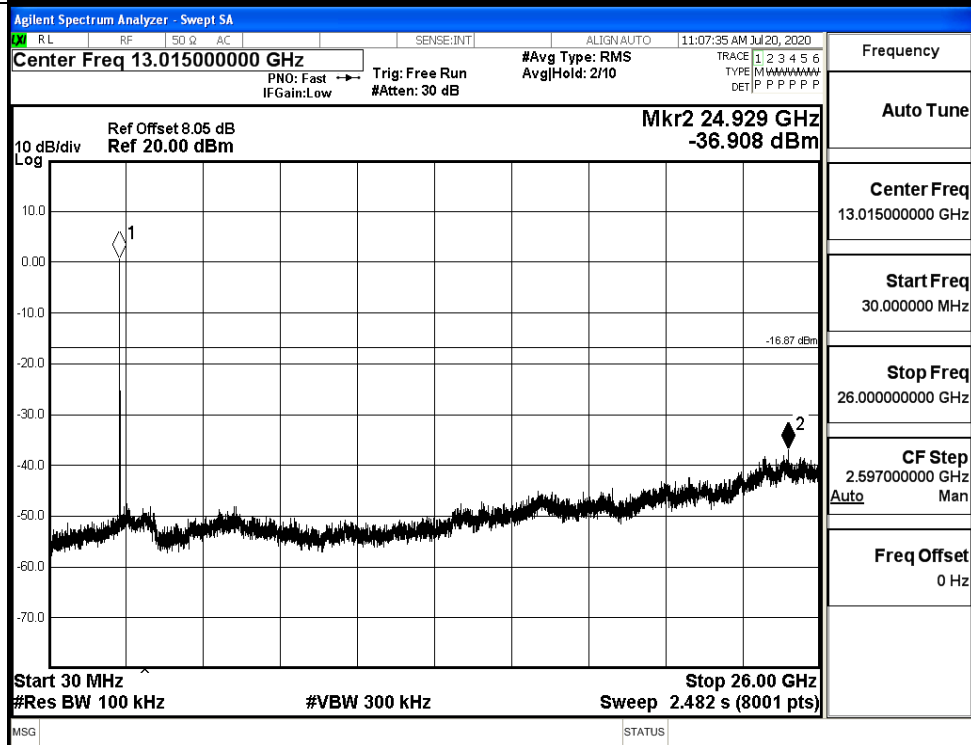
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	LCH	3.127	-36.908	-16.873	PASS
	MCH	2.409	-37.352	-17.591	PASS
	HCH	2.595	-38.247	-17.405	PASS
11G	LCH	-2.575	-37.948	-22.575	PASS
	MCH	-3.253	-38.061	-23.253	PASS
	HCH	-3.638	-38.228	-23.638	PASS
11N20 SISO	LCH	-0.869	-38.735	-20.869	PASS
	MCH	-1.565	-38.122	-21.565	PASS
	HCH	-0.835	-38.297	-20.835	PASS
11N40 SISO	LCH	-1.93	-37.142	-21.930	PASS
	MCH	-1.717	-37.816	-21.717	PASS
	HCH	-4.882	-38.156	-24.882	PASS

11B\_LCH\_Graphs

Pref/11B/LCH

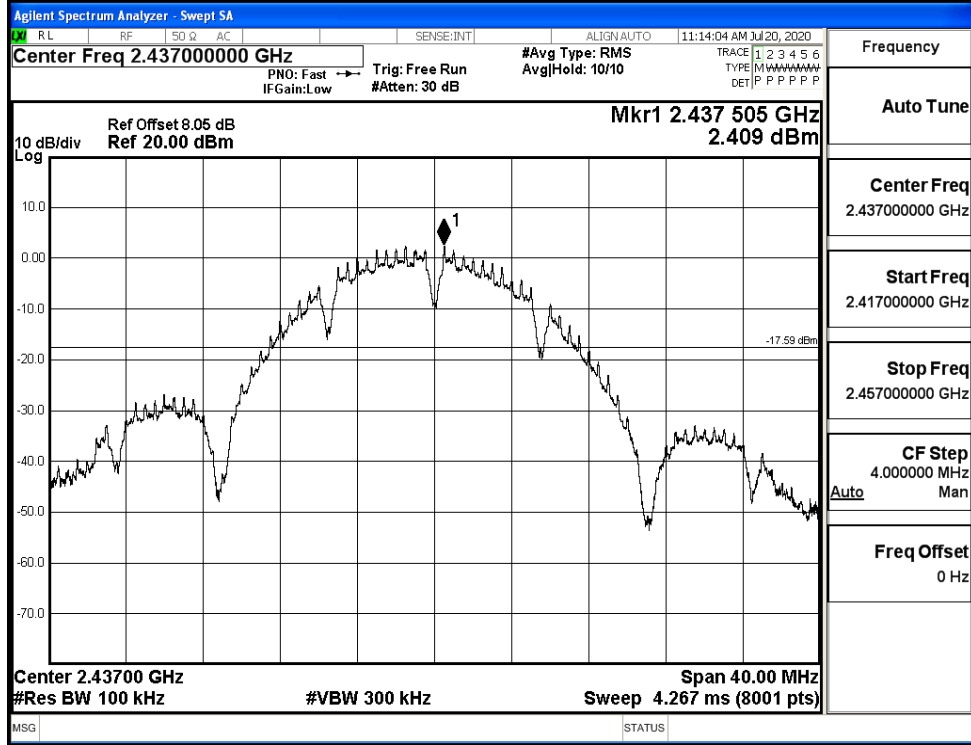


Puw/11B/LCH

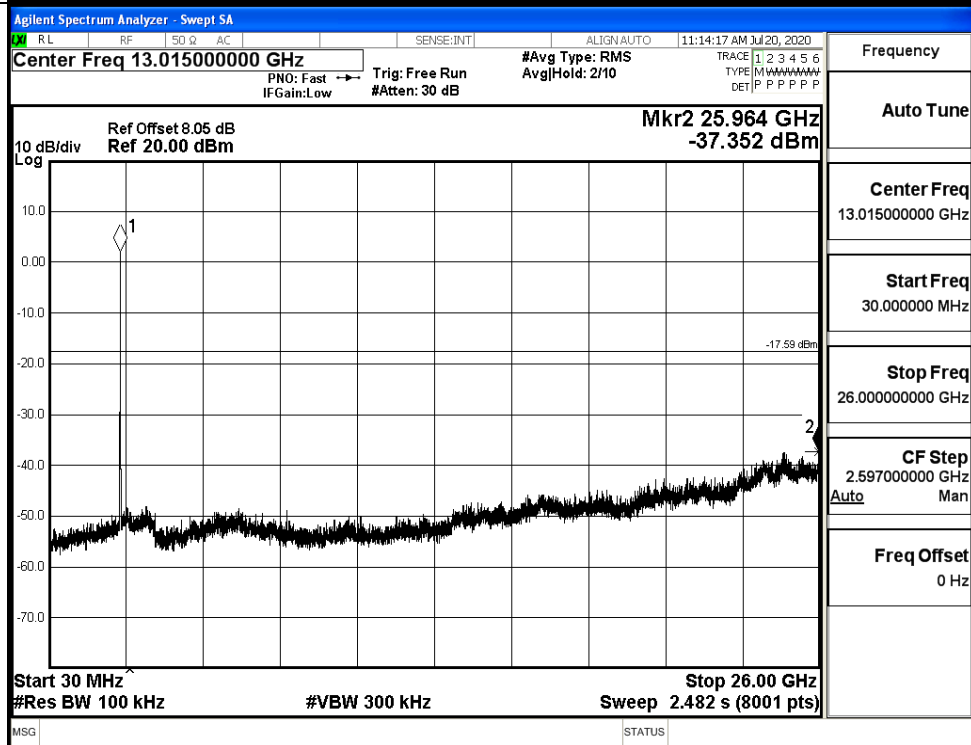


11B\_MCH\_Graphs

Pref/11B/MCH

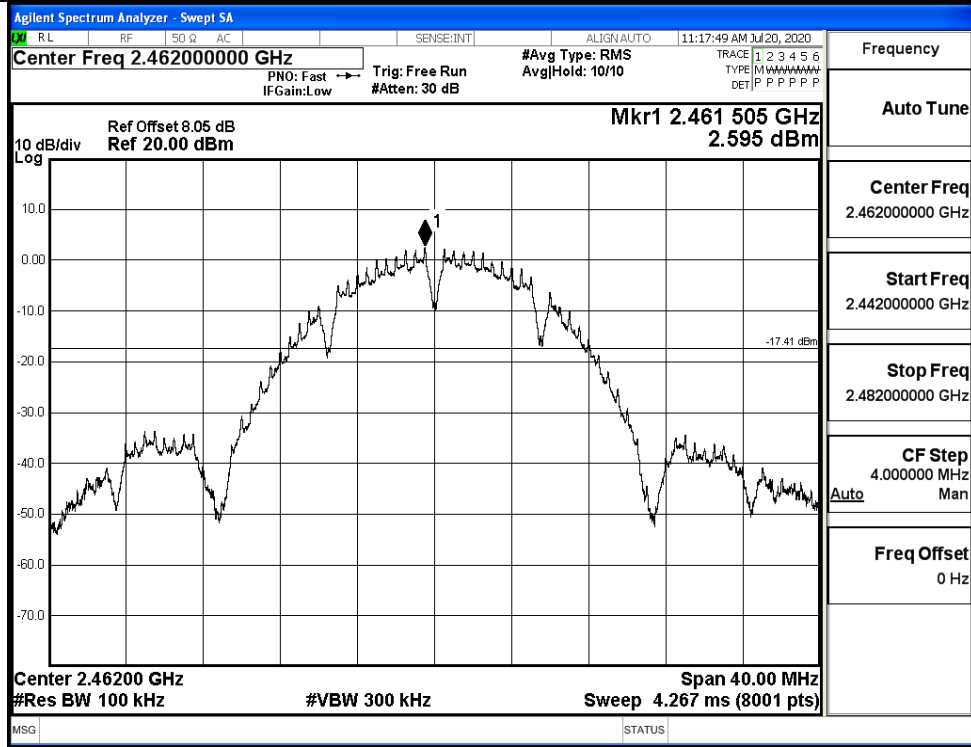


Puw/11B/MCH

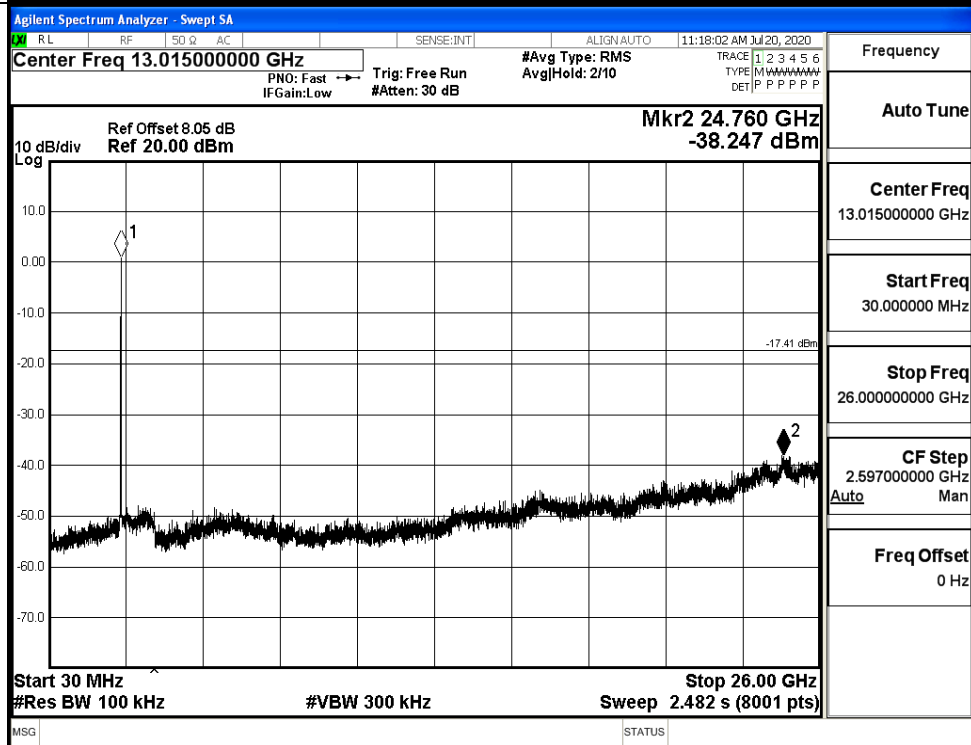


11B\_HCH\_Graphs

Pref/11B/HCH

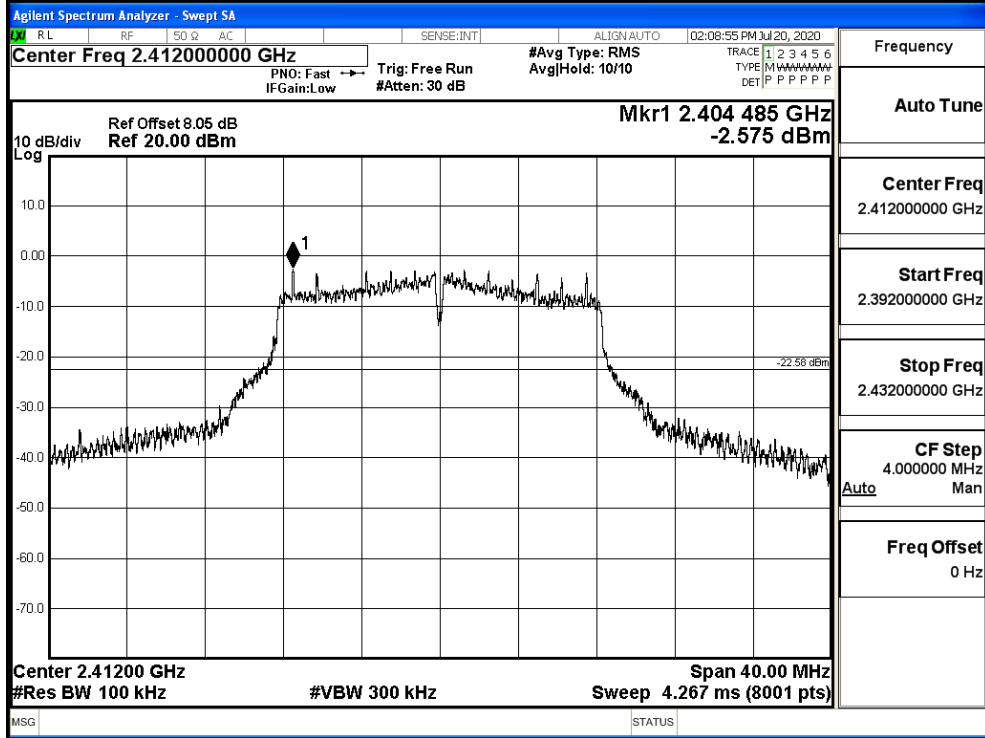


Puw/11B/HCH

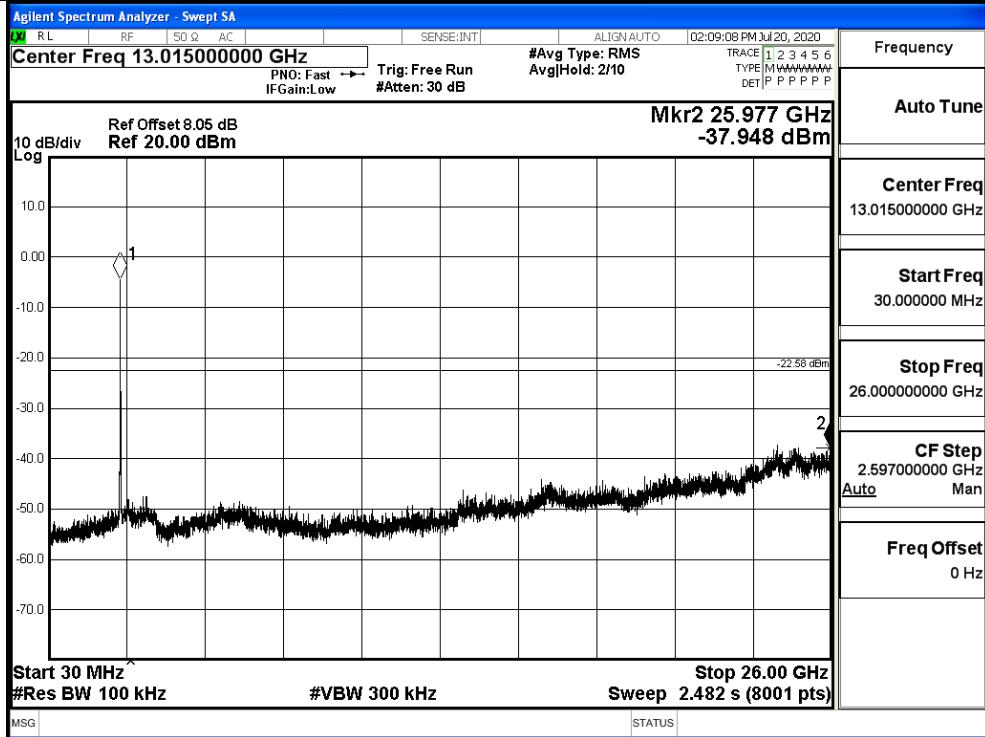


11G\_LCH\_Graphs

Pref/11G/LCH

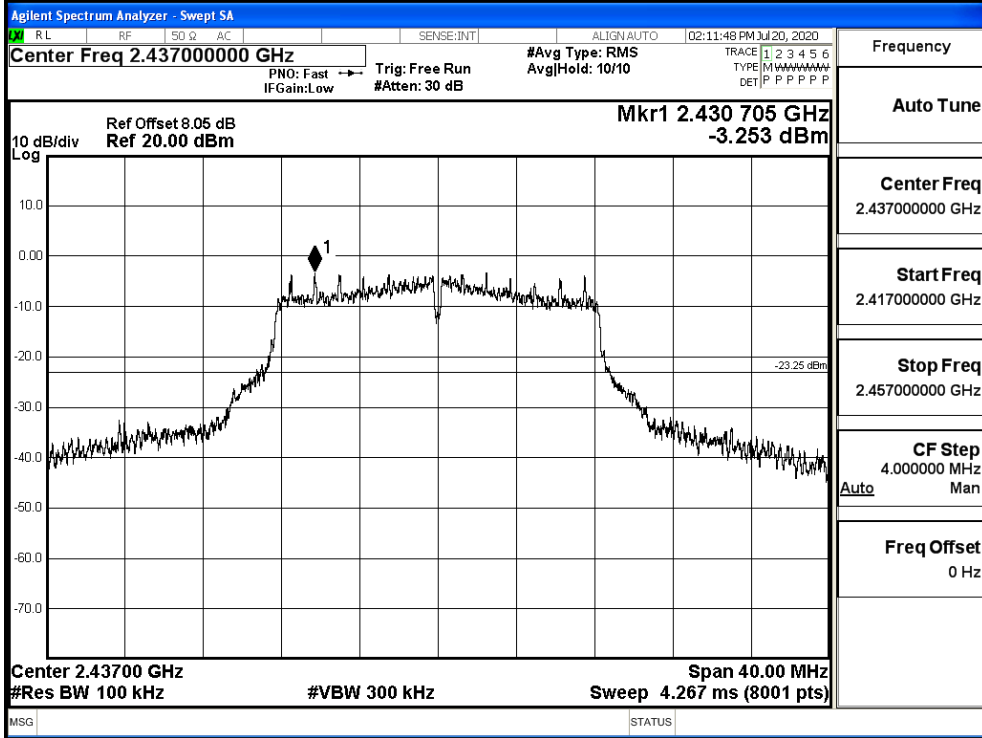


Puw/11G/LCH

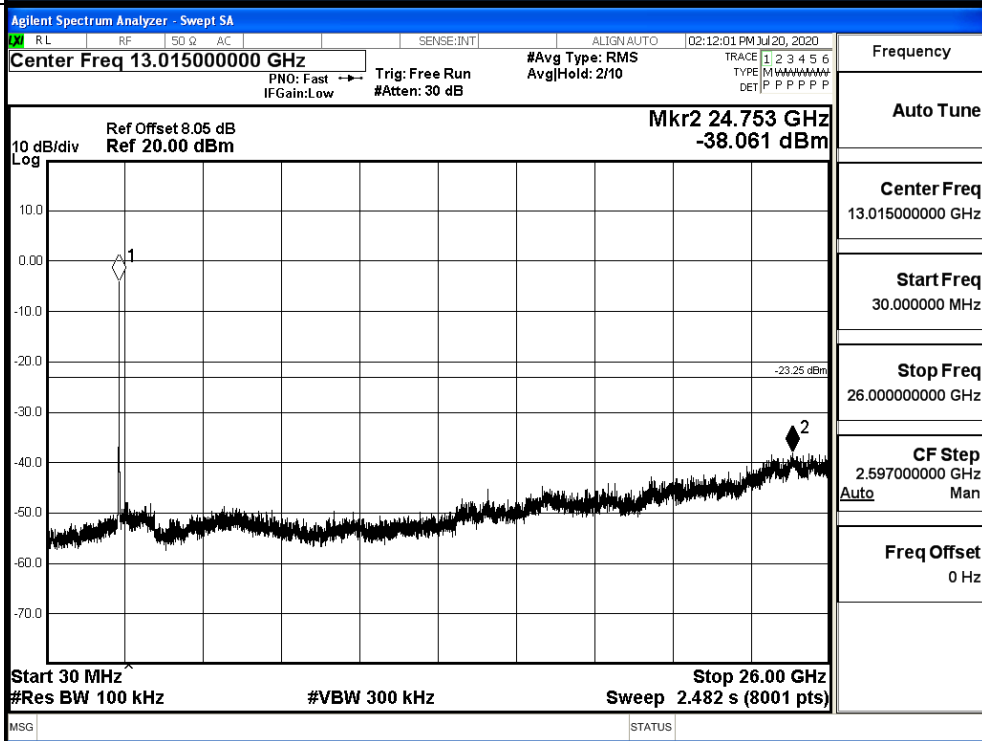


11G\_MCH\_Graphs

Pref/11G/MCH



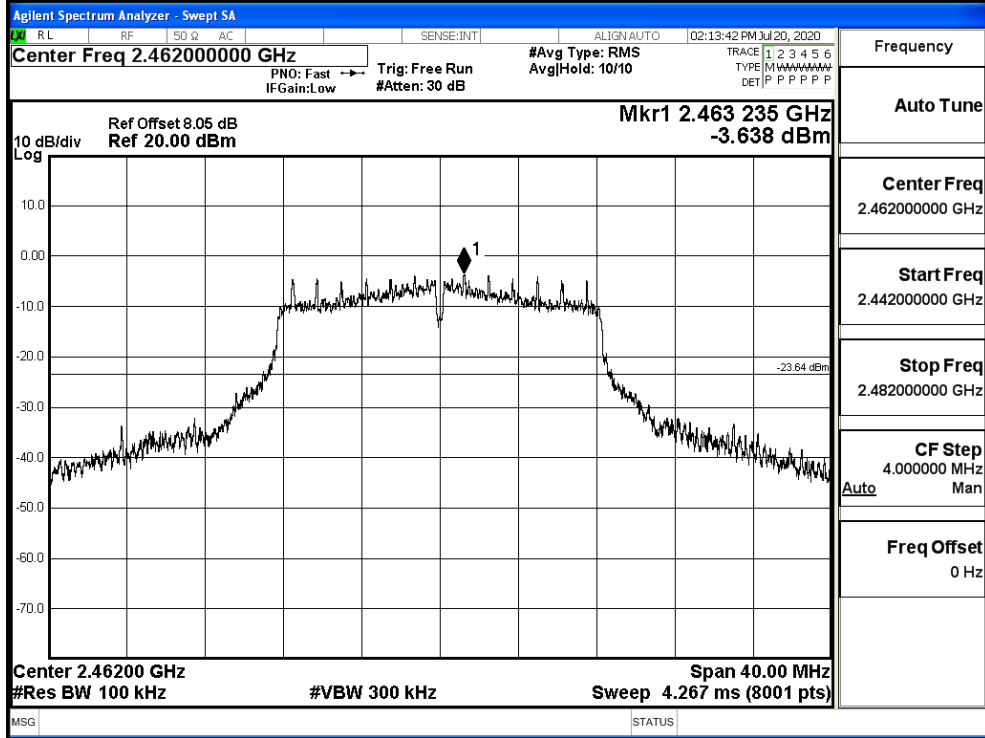
Puw/11G/MCH



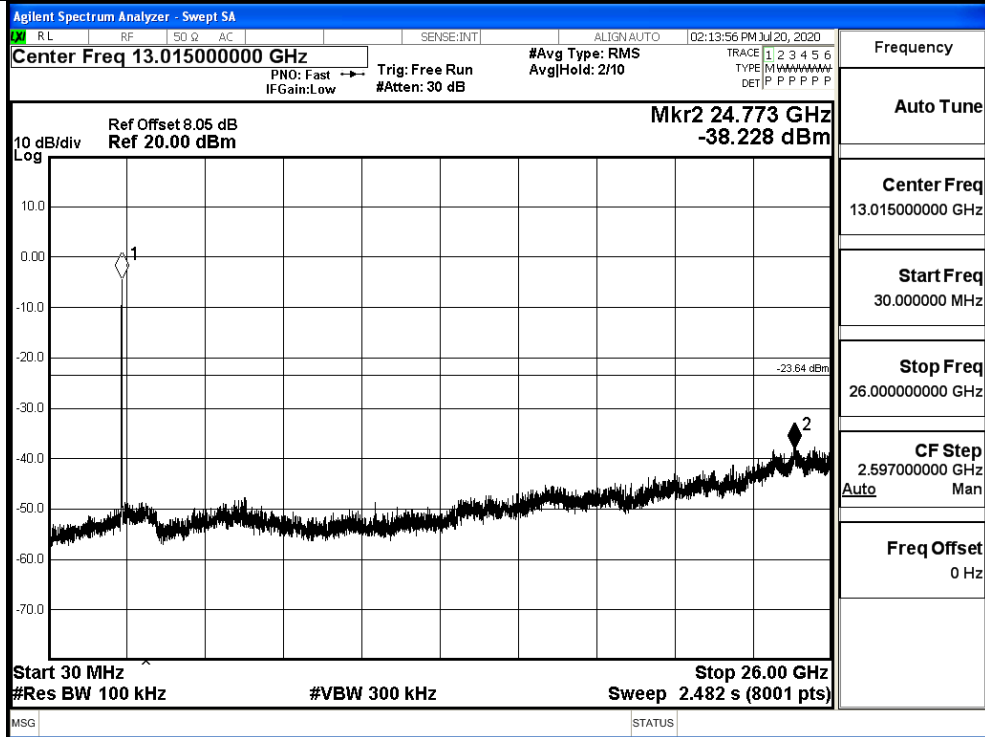


11G\_HCH\_Graphs

Pref/11G/HCH

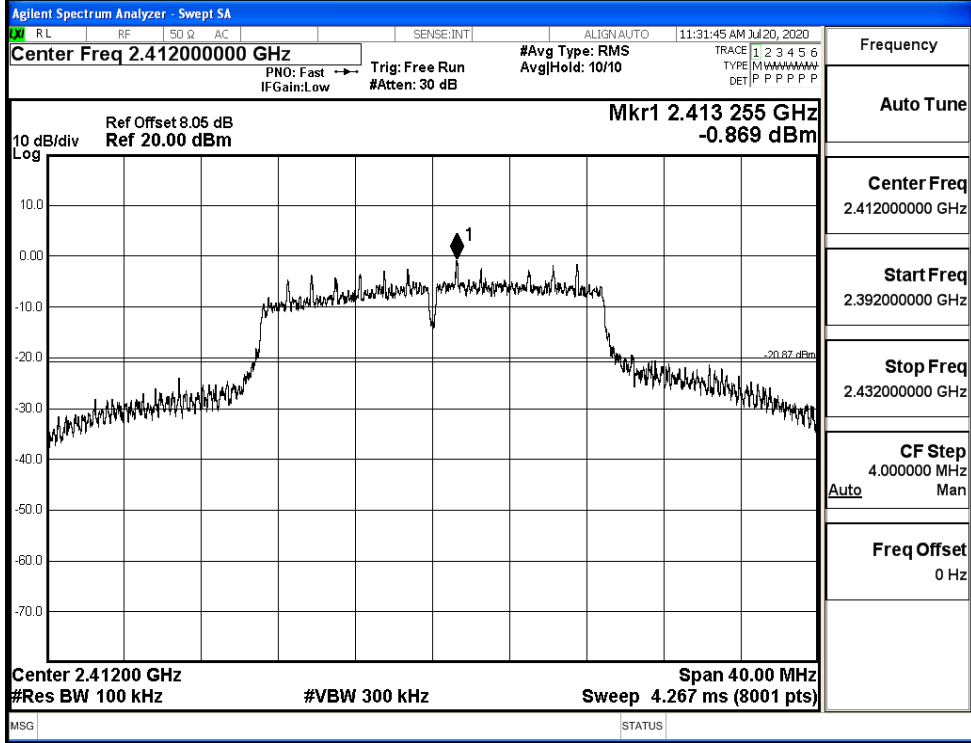


Puw/11G/HCH

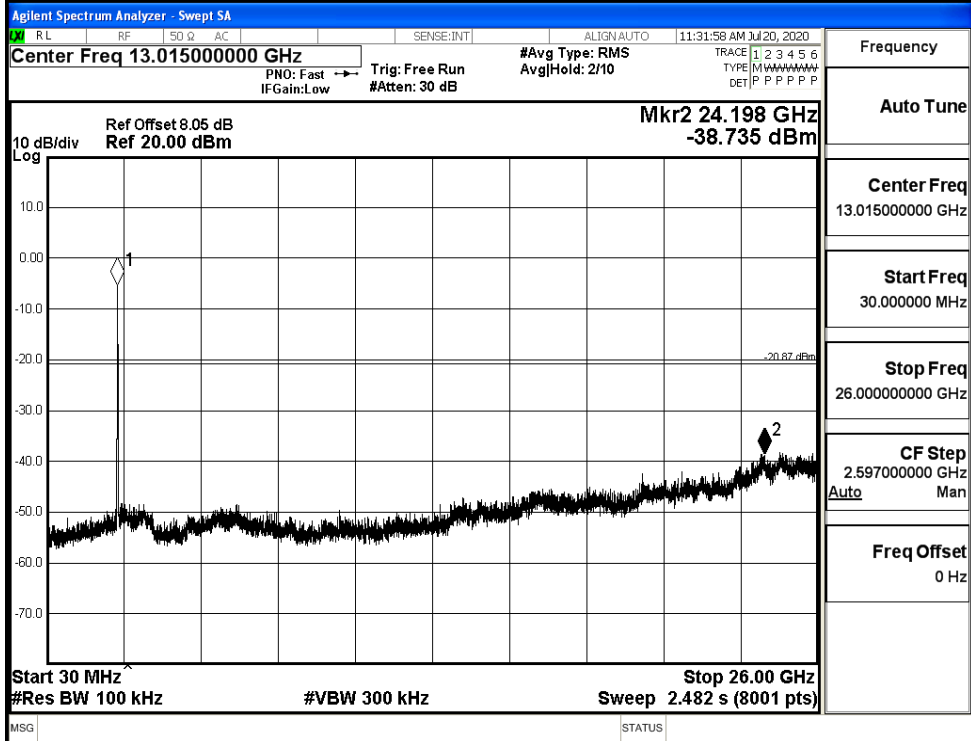


11N20SISO\_LCH\_Graphs

Pref/11N20SIS  
O/LCH

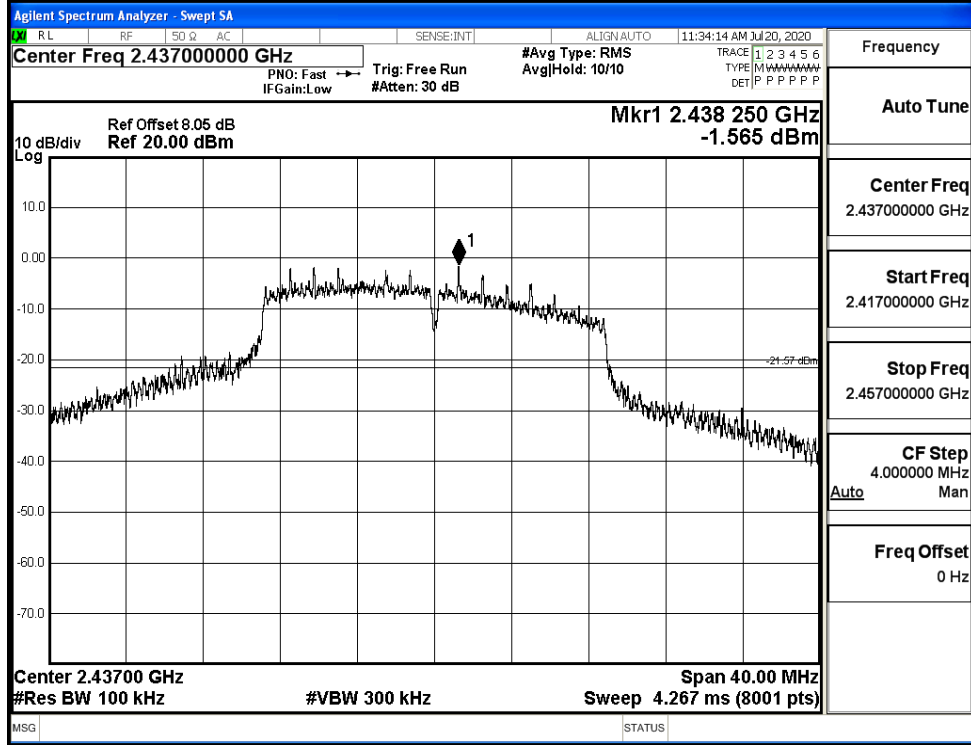


Puw/11N20  
SISO/LCH

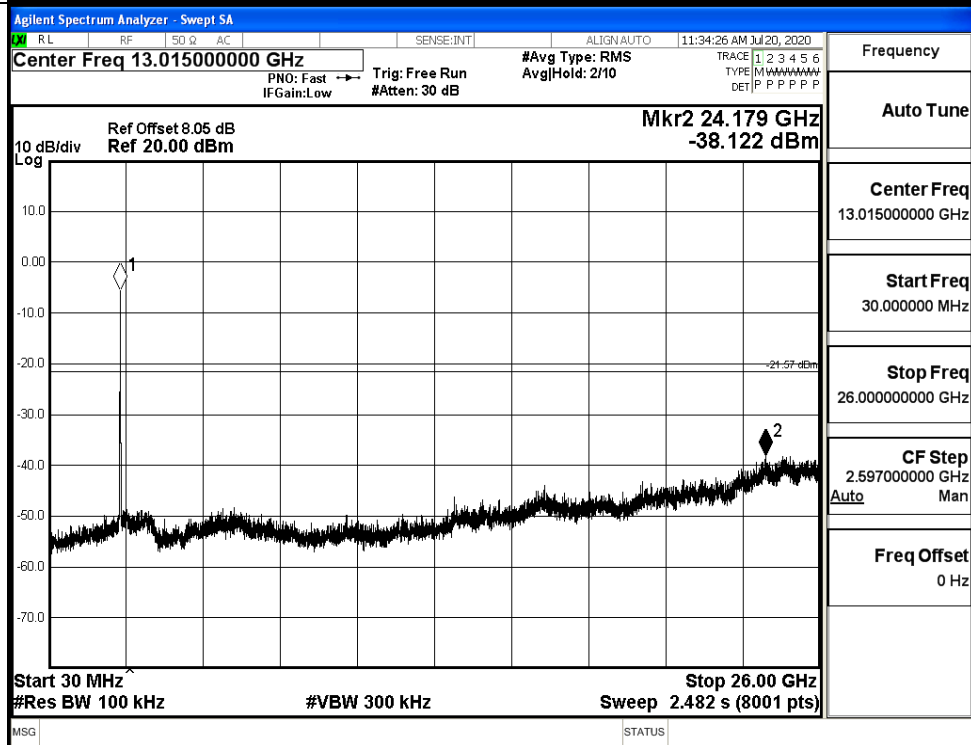


11N20SISO\_MCH\_Graphs

Pref/11N20  
SISO/MCH

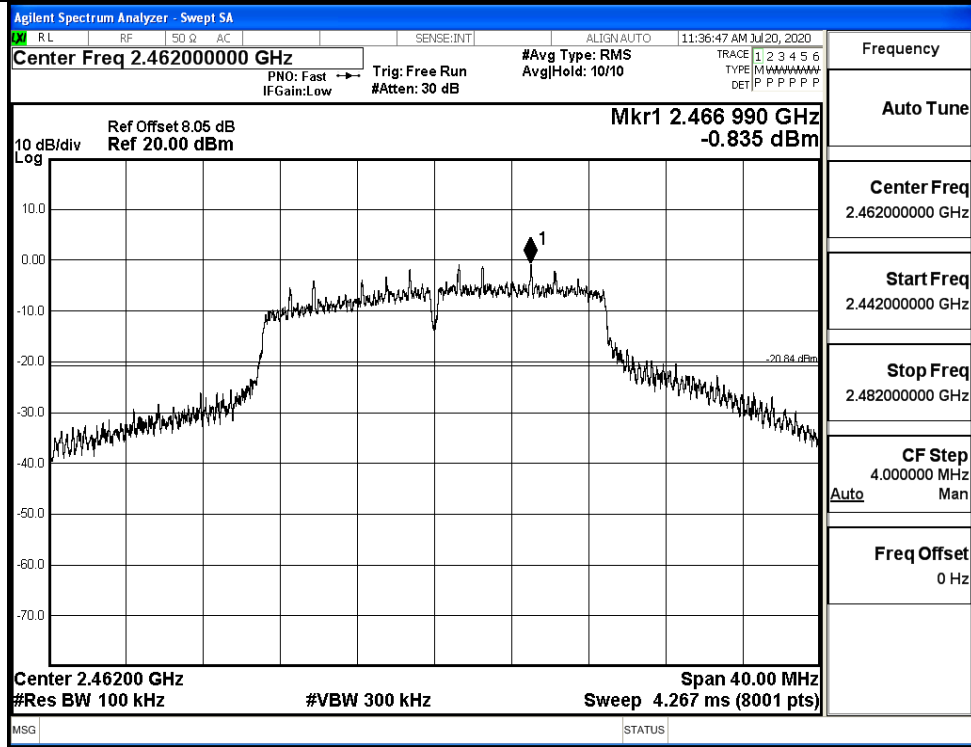


Puw/11N20  
SISO/MCH

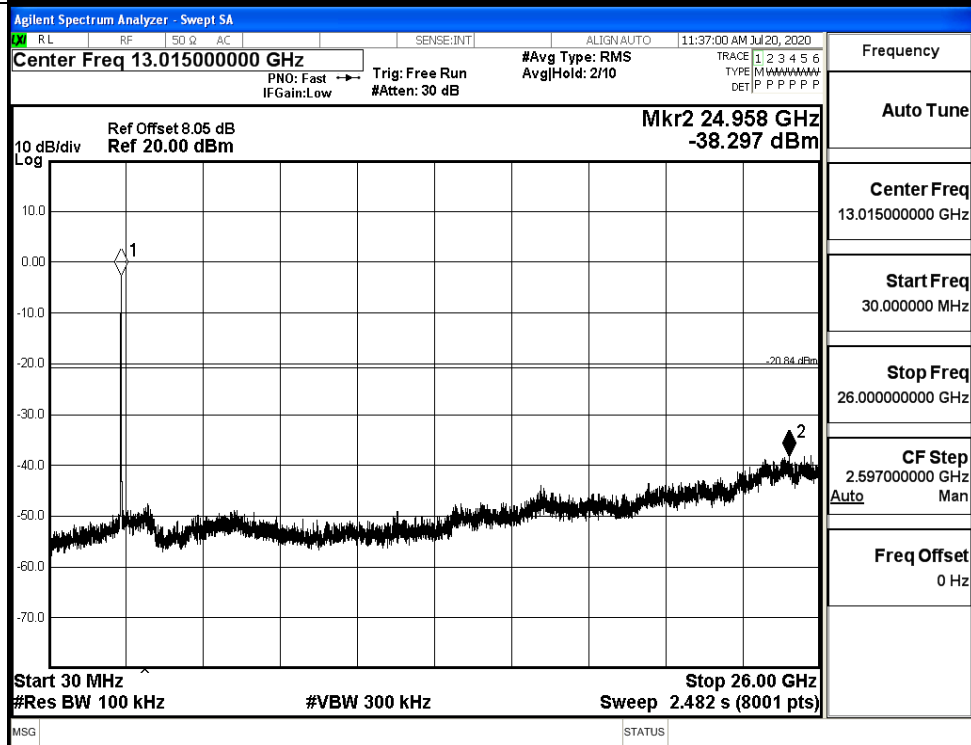


11N20SISO\_HCH\_Graphs

Pref/11N20  
SISO/HCH

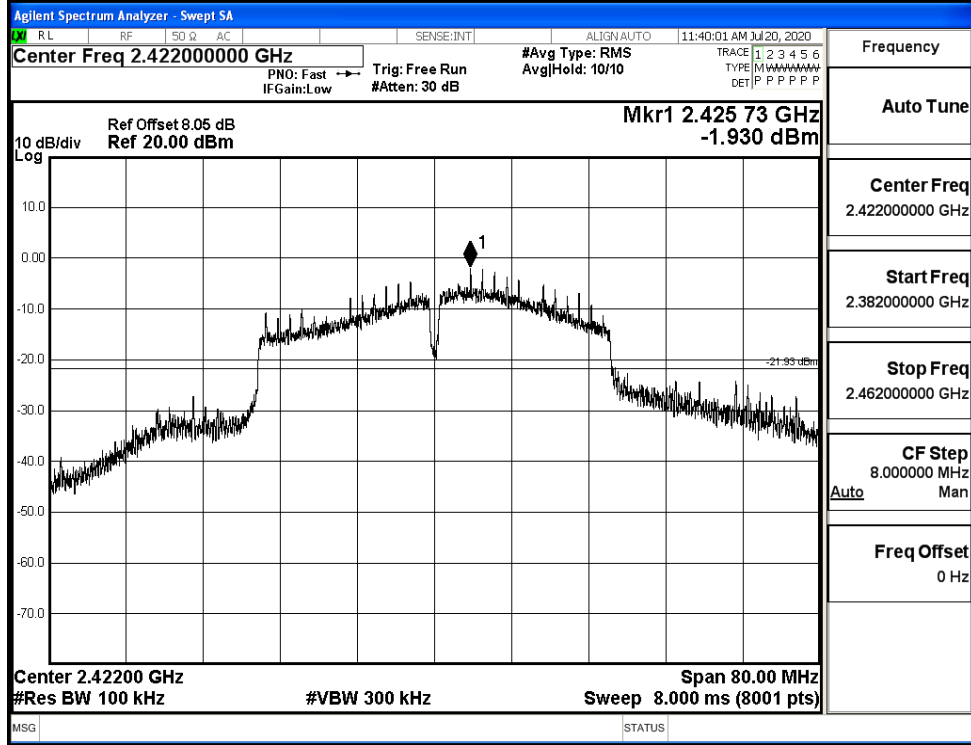


Puw/11N20  
SISO/HCH

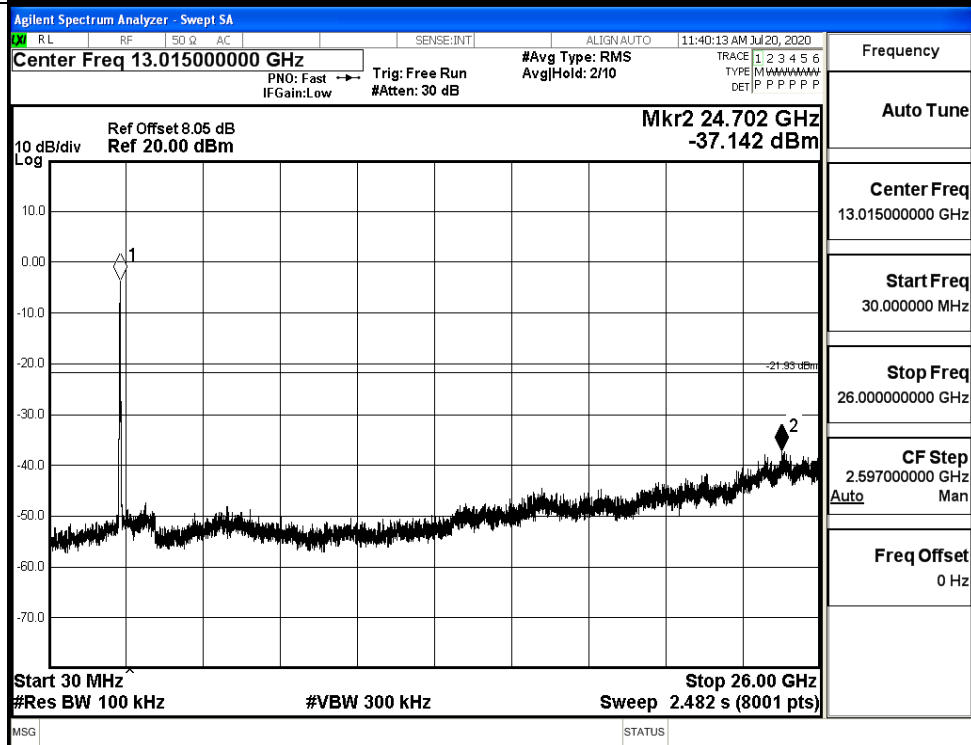


11N40SISO\_LCH\_Graphs

Pref/11N40  
SISO/LCH

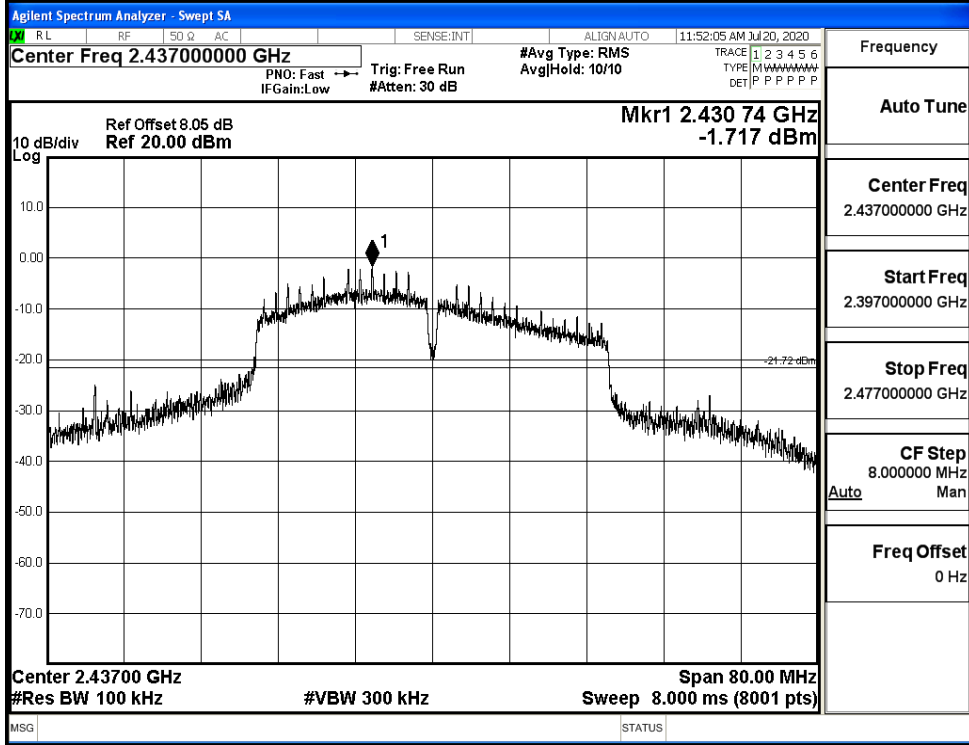


Puw/11N40  
SISO/LCH

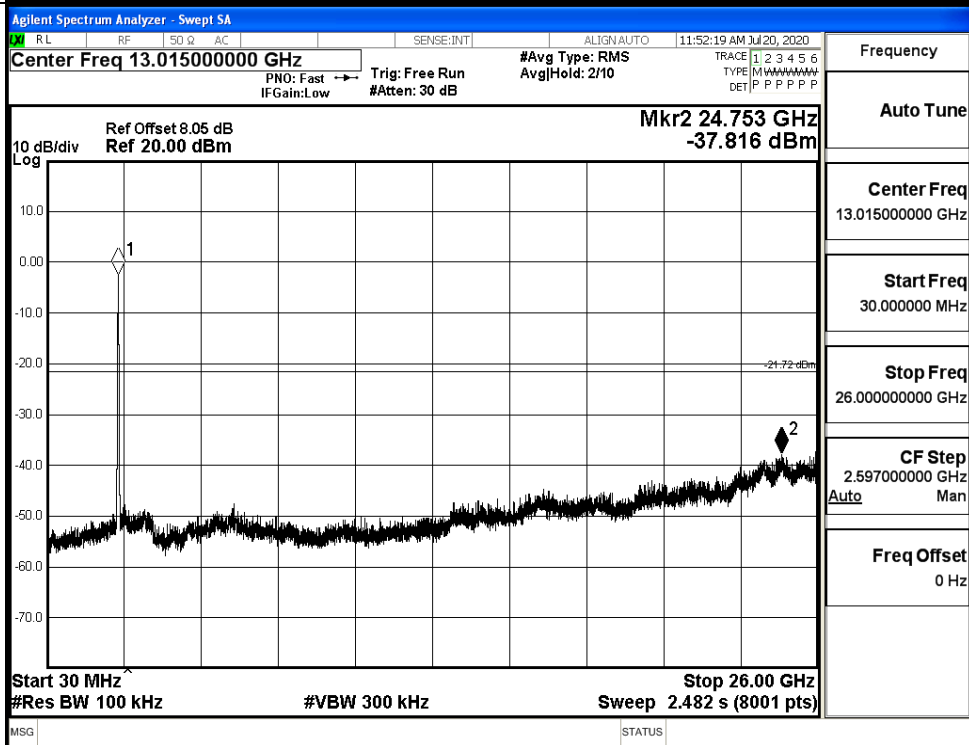


11N40SISO\_MCH\_Graphs

Pref/11N40  
SISO/MCH

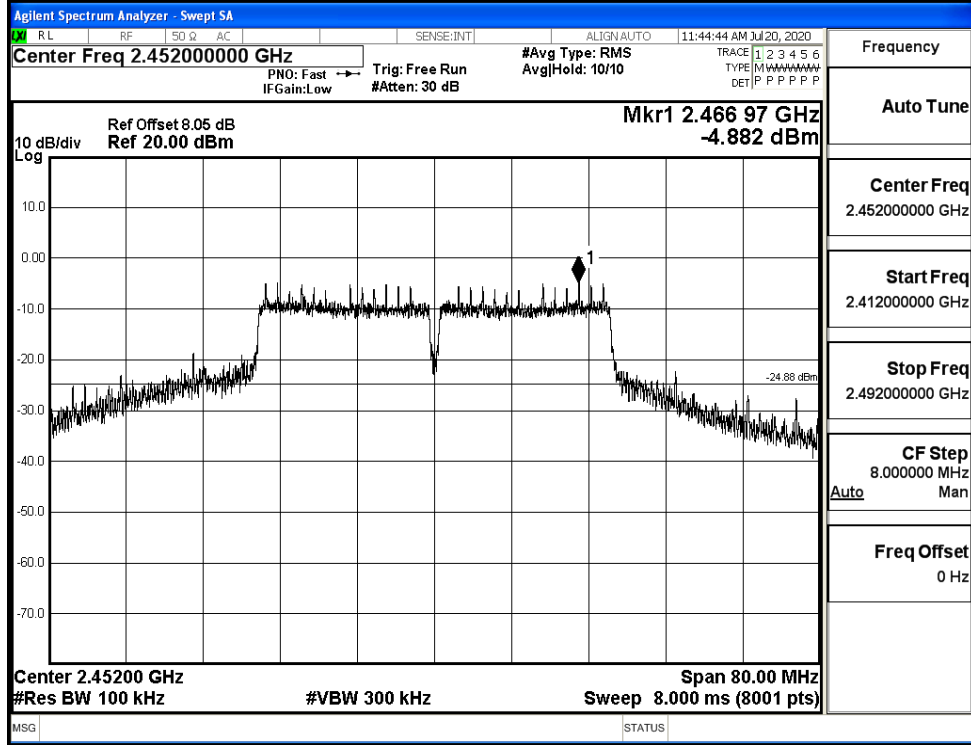


Puw/11N40  
SISO/MCH

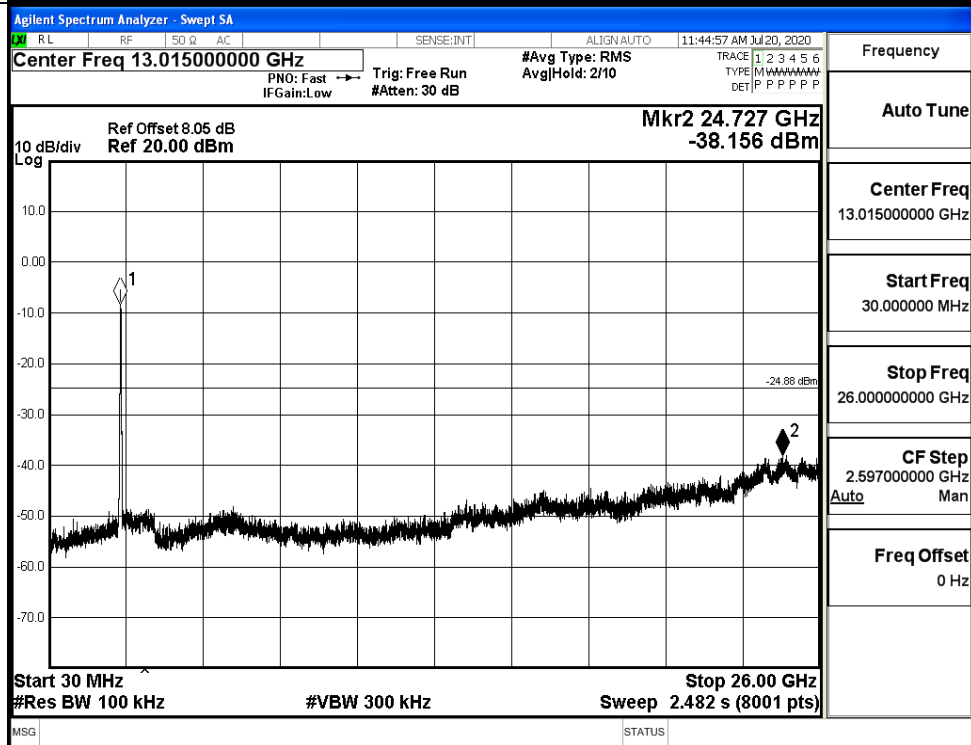


11N40SISO\_HCH\_Graphs

Pref/11N40  
SISO/HCH

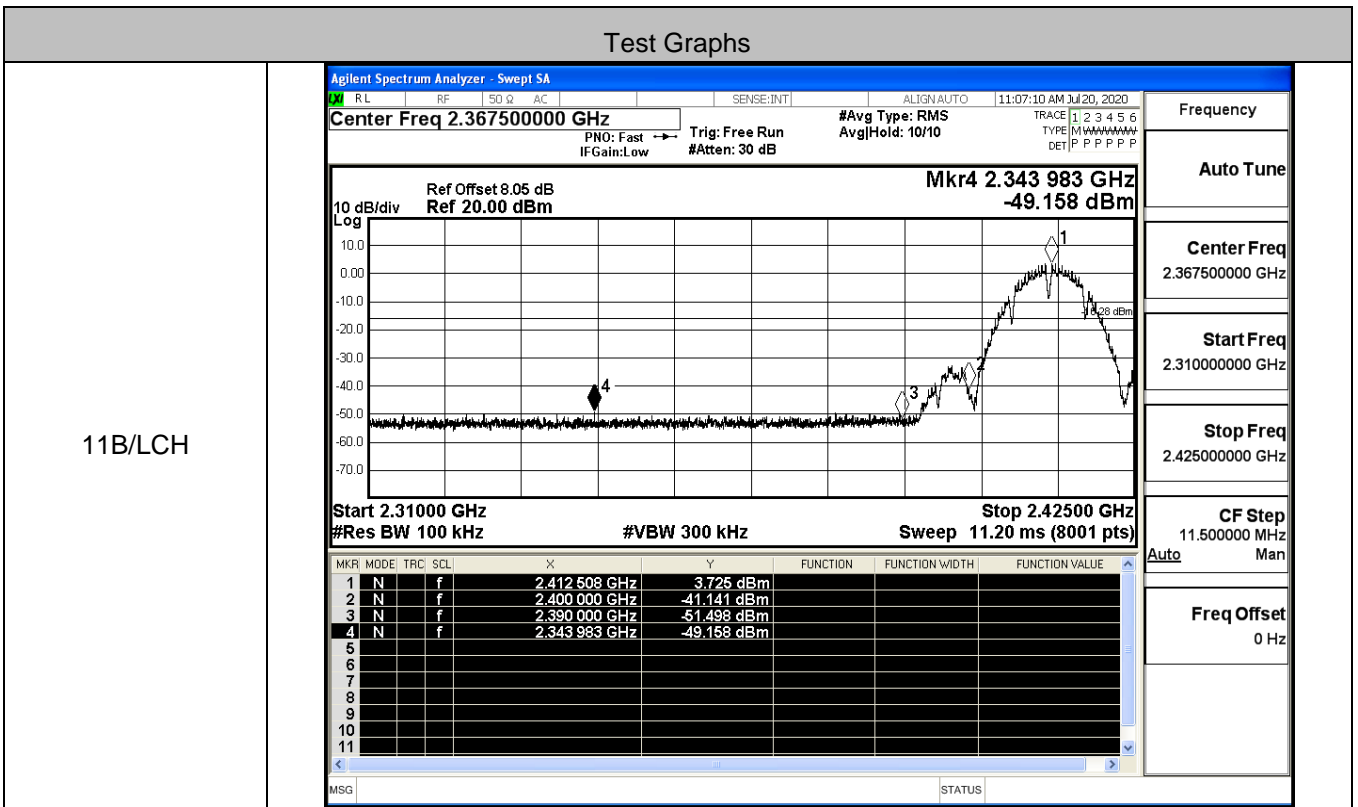


Puw/11N40  
SISO/HCH



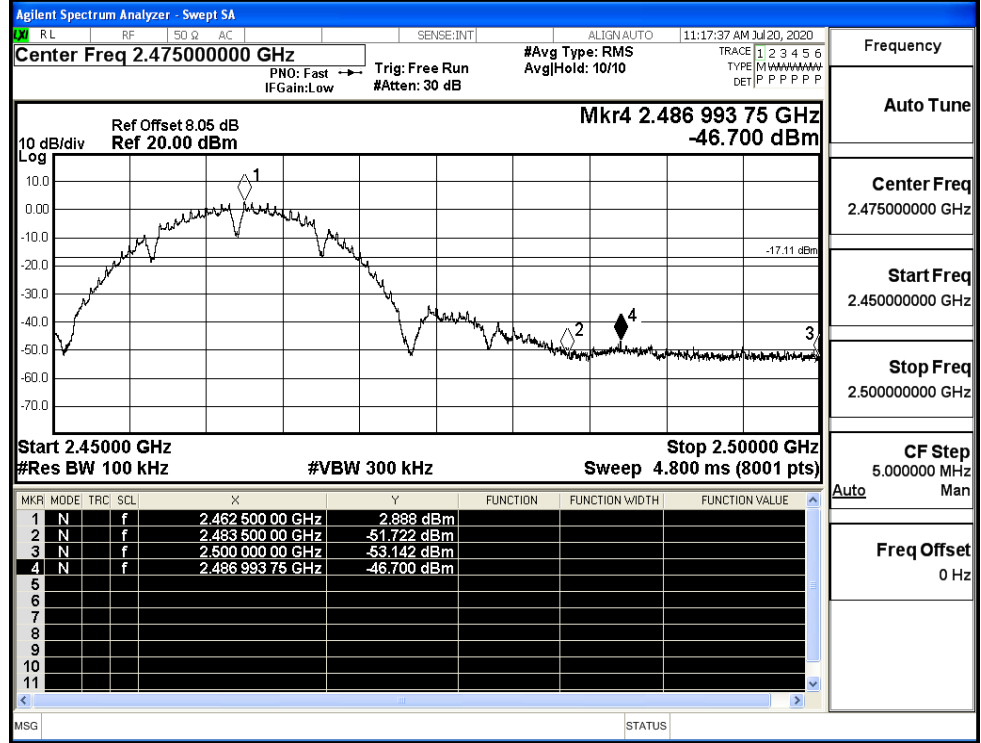
### A.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	3.725	-49.158	-16.28	PASS
	HCH	2.888	-46.700	-17.11	PASS
11G	LCH	-2.472	-39.713	-22.47	PASS
	HCH	-3.485	-43.774	-23.49	PASS
11N20SISO	LCH	-1.229	-36.386	-21.23	PASS
	HCH	-0.870	-35.973	-20.87	PASS
11N40SISO	LCH	-1.812	-37.142	-21.81	PASS
	HCH	-4.458	-26.620	-24.46	PASS



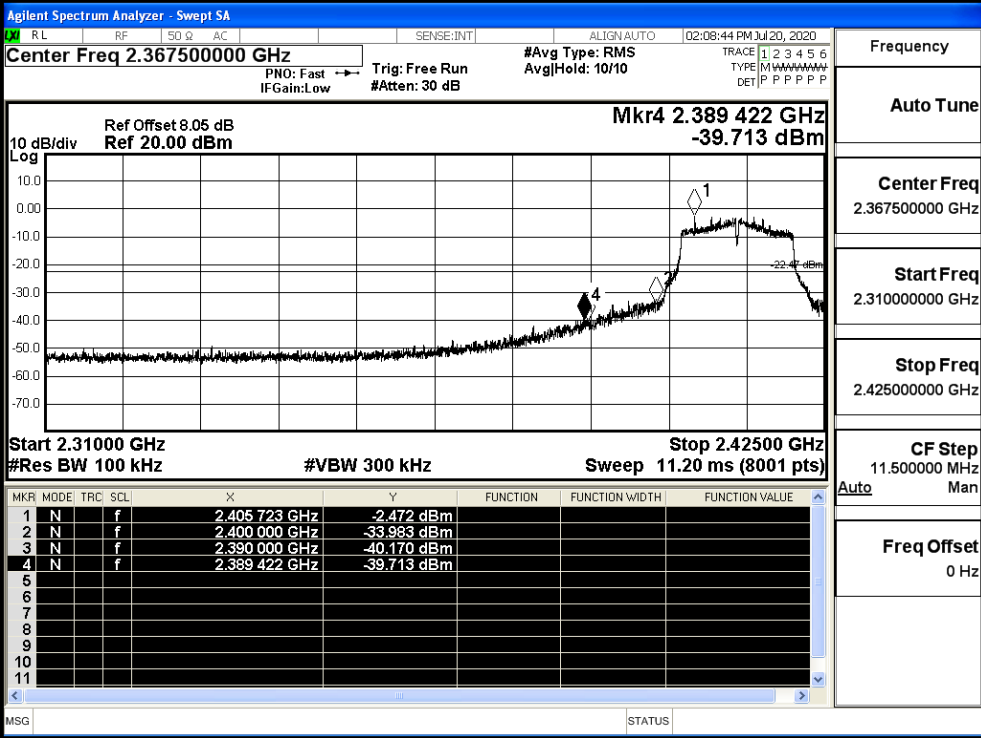


11B/HCH



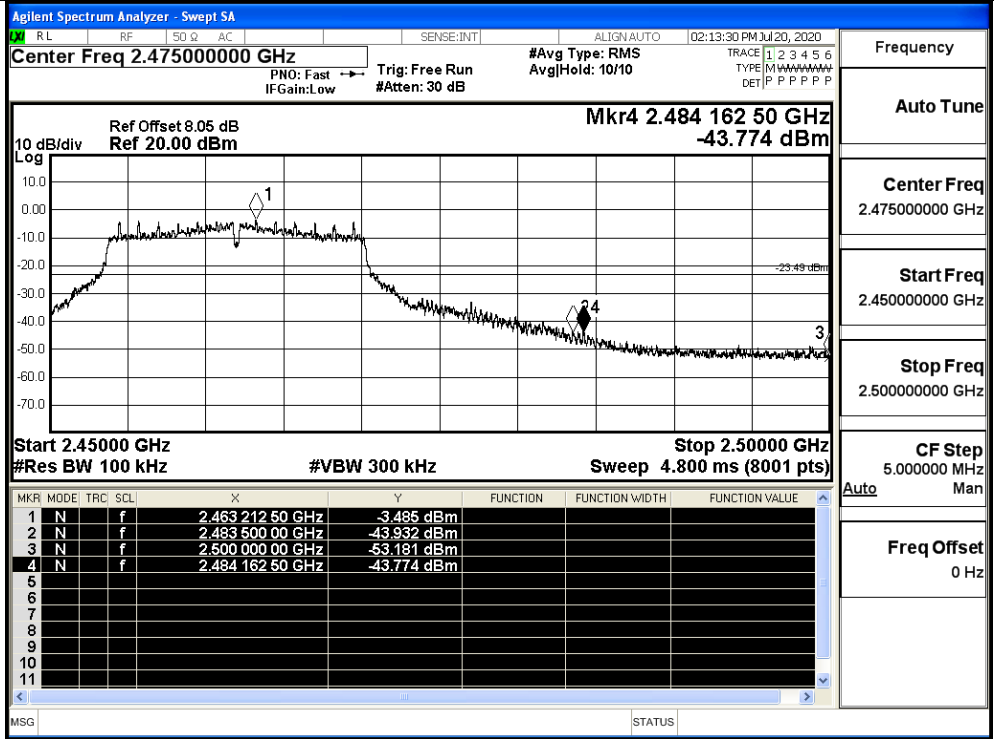
Frequency	
Auto Tune	
Center Freq	2.47500000 GHz
Start Freq	2.45000000 GHz
Stop Freq	2.50000000 GHz
CF Step	5.000000 MHz
Freq Offset	0 Hz

11G/LCH



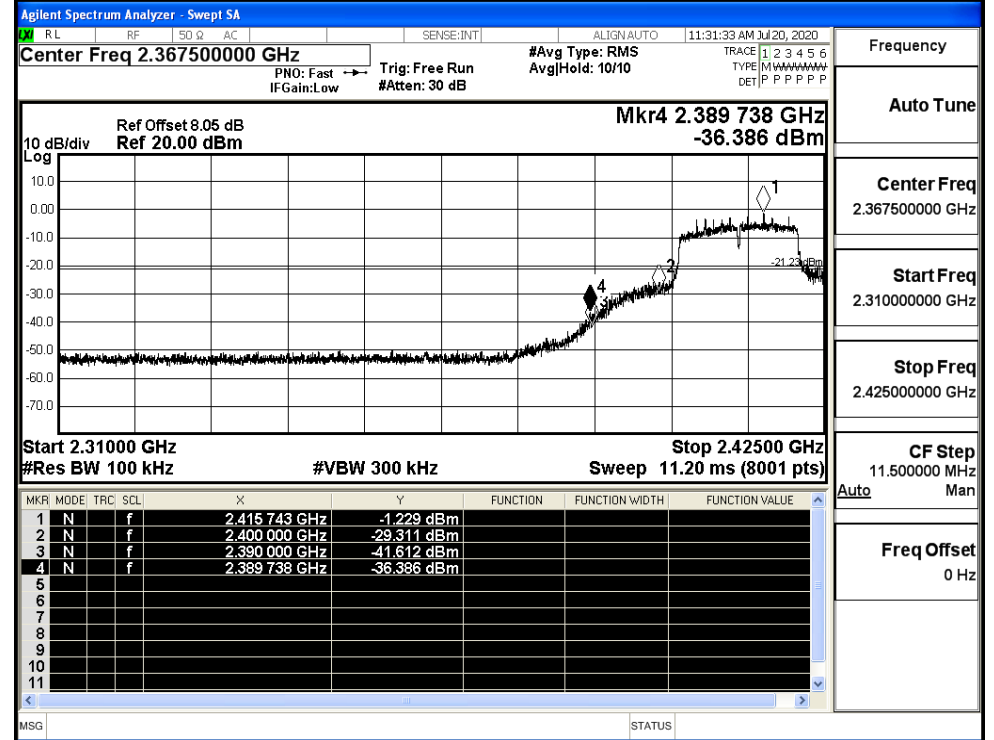
Frequency	
Auto Tune	
Center Freq	2.36750000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.42500000 GHz
CF Step	11.500000 MHz
Freq Offset	0 Hz

11G/HCH



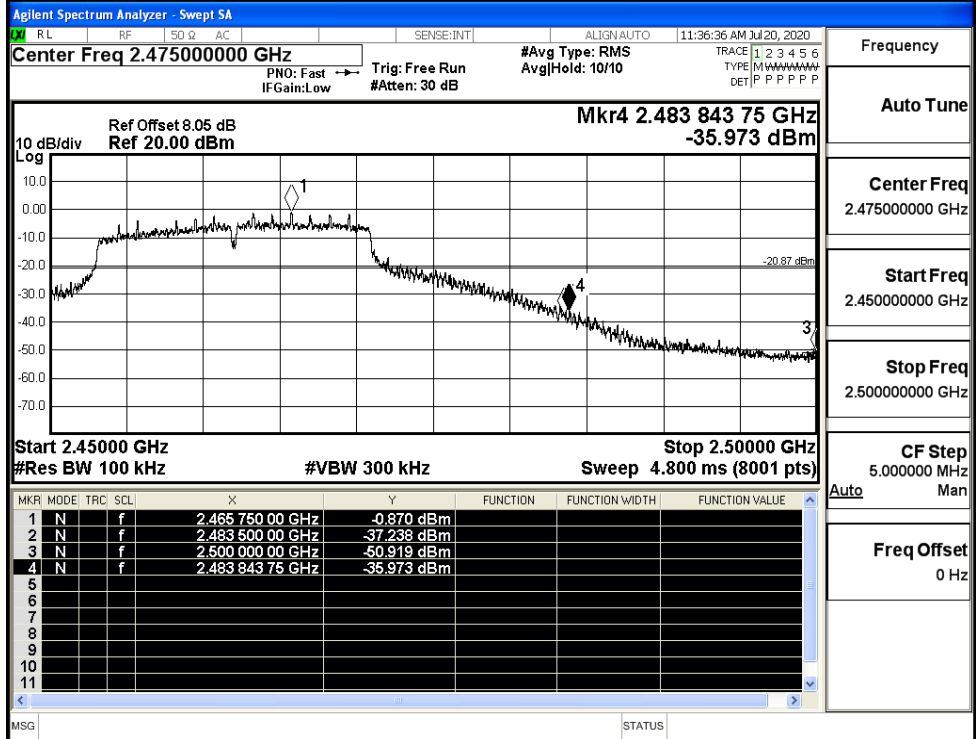
Frequency	
Auto Tune	
Center Freq	2.475000000 GHz
Start Freq	2.450000000 GHz
Stop Freq	2.500000000 GHz
CF Step	5.000000 MHz
Freq Offset	0 Hz

11N20SISO/LCH



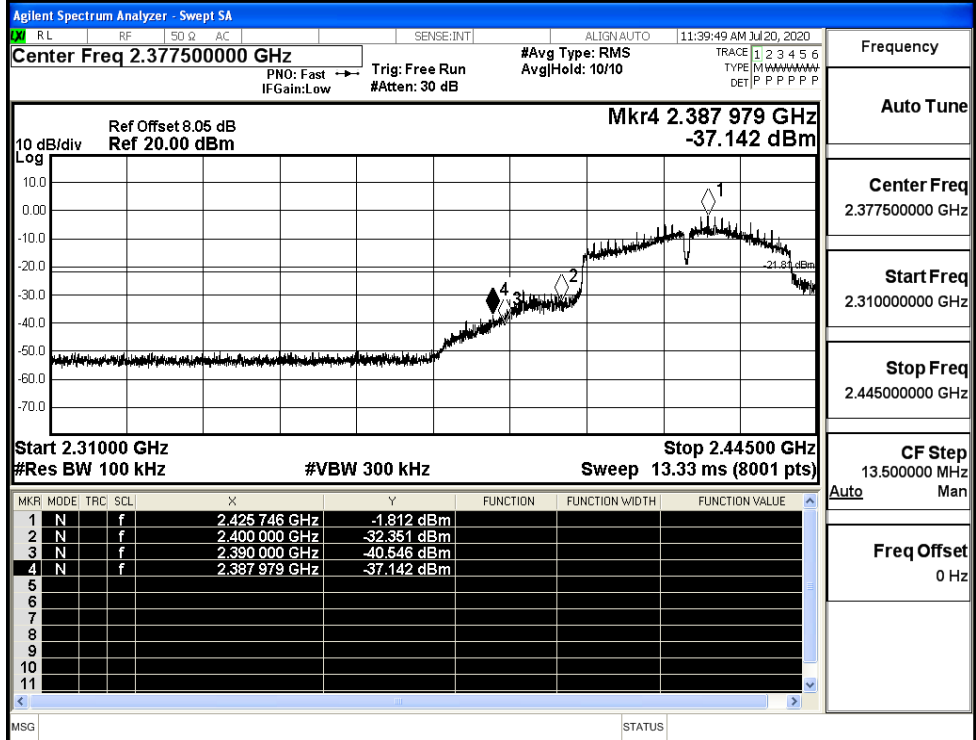
Frequency	
Auto Tune	
Center Freq	2.367500000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.425000000 GHz
CF Step	11.500000 MHz
Freq Offset	0 Hz

11N20SISO/HCH



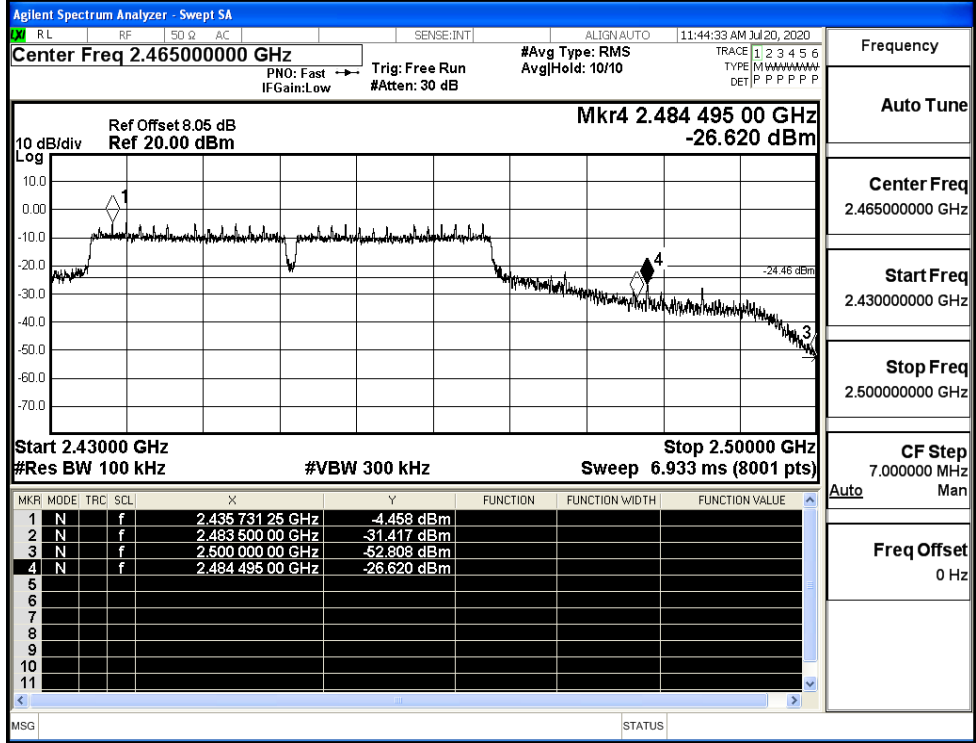
Frequency	2.47500000 GHz
Auto Tune	
Center Freq	2.47500000 GHz
Start Freq	2.45000000 GHz
Stop Freq	2.50000000 GHz
CF Step	5.000000 MHz
Freq Offset	0 Hz

11N40SISO/LCH



Frequency	2.37750000 GHz
Auto Tune	
Center Freq	2.37750000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.44500000 GHz
CF Step	13.500000 MHz
Freq Offset	0 Hz

11N40SISO/HCH

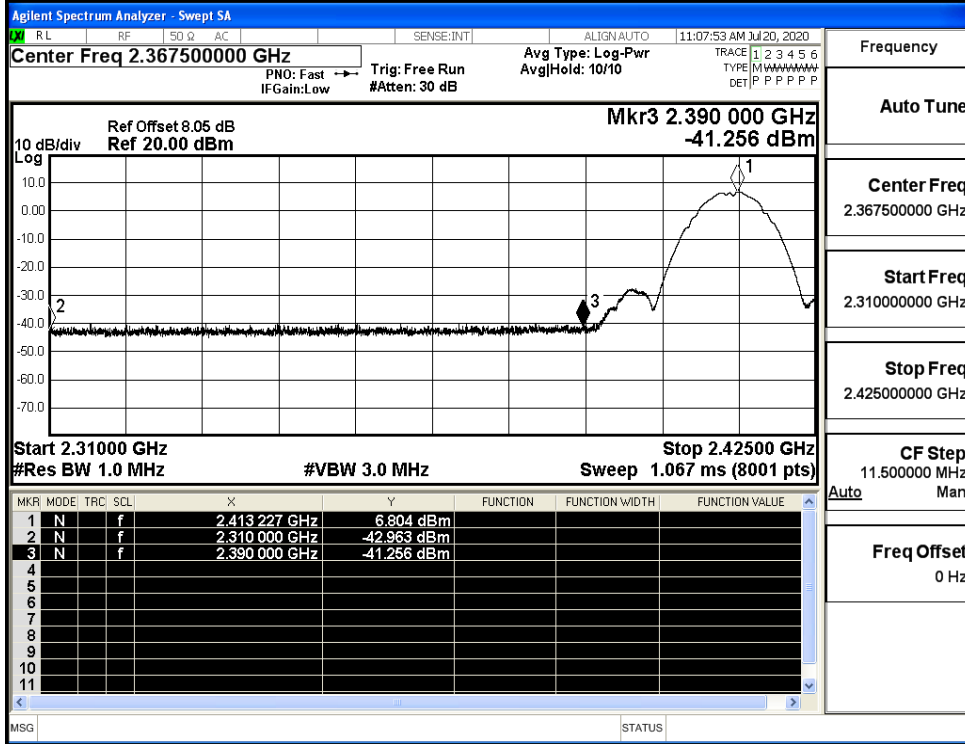


## A.7 Restrict-band band-edge measurements

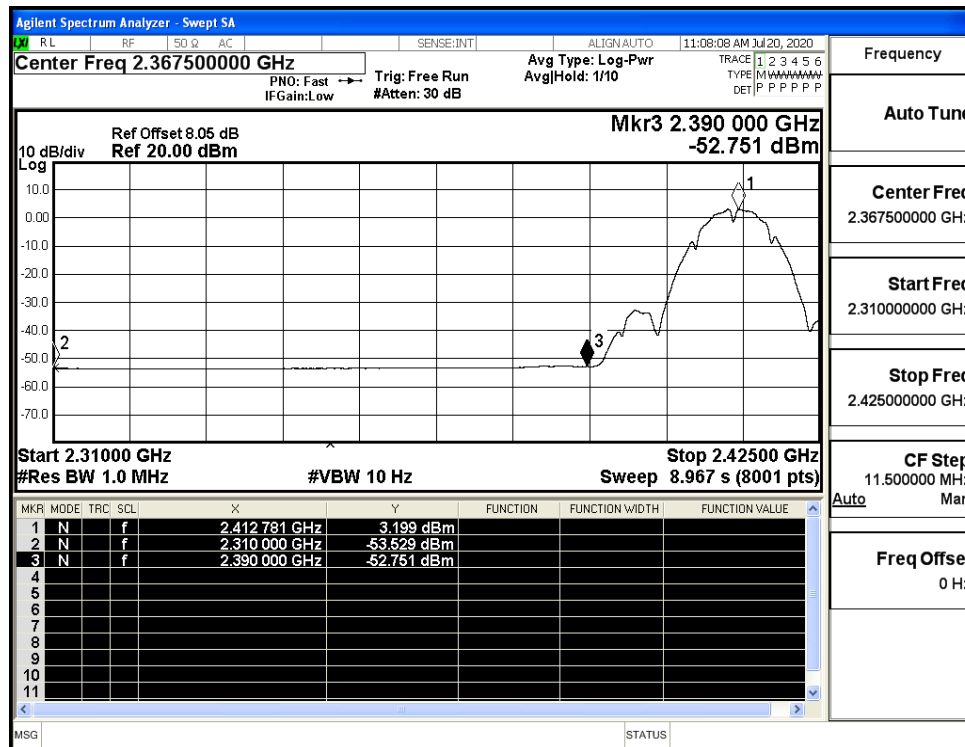
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBu V/m]	Verdict
11B	2412	Ant1	2310.0	-42.96	3.2	0	55.5	PEAK	74	PASS
	2412	Ant1	2310.0	-53.53	3.2	0	44.93	AV	54	PASS
	2412	Ant1	2390.0	-41.26	3.2	0	57.2	PEAK	74	PASS
	2412	Ant1	2390.0	-52.75	3.2	0	45.71	AV	54	PASS
	2462	Ant1	2483.5	-40.66	3.2	0	57.8	PEAK	74	PASS
	2462	Ant1	2483.5	-51.30	3.2	0	47.16	AV	54	PASS
	2462	Ant1	2500.0	-41.42	3.2	0	57.04	PEAK	74	PASS
	2462	Ant1	2500.0	-52.54	3.2	0	45.92	AV	54	PASS
11G	2412	Ant1	2310.0	-43.17	3.2	0	55.29	PEAK	74	PASS
	2412	Ant1	2310.0	-53.46	3.2	0	45.00	AV	54	PASS
	2412	Ant1	2390.0	-41.65	3.2	0	56.81	PEAK	74	PASS
	2412	Ant1	2390.0	-52.83	3.2	0	45.63	AV	54	PASS
	2462	Ant1	2483.5	-42.05	3.2	0	56.41	PEAK	74	PASS
	2462	Ant1	2483.5	-52.47	3.2	0	45.99	AV	54	PASS
	2462	Ant1	2500.0	-42.96	3.2	0	55.5	PEAK	74	PASS
	2462	Ant1	2500.0	-52.41	3.2	0	46.05	AV	54	PASS
11N20 SISO	2412	Ant1	2310.0	-43.08	3.2	0	55.38	PEAK	74	PASS
	2412	Ant1	2310.0	-53.49	3.2	0	44.97	AV	54	PASS
	2412	Ant1	2390.0	-39.96	3.2	0	58.5	PEAK	74	PASS
	2412	Ant1	2390.0	-52.23	3.2	0	46.23	AV	54	PASS
	2462	Ant1	2483.5	-42.20	3.2	0	56.26	PEAK	74	PASS
	2462	Ant1	2483.5	-52.21	3.2	0	46.25	AV	54	PASS
	2462	Ant1	2500.0	-42.25	3.2	0	56.21	PEAK	74	PASS
	2462	Ant1	2500.0	-52.49	3.2	0	45.97	AV	54	PASS
11N40 SISO	2422	Ant1	2310.0	-41.38	3.2	0	57.08	PEAK	74	PASS
	2422	Ant1	2310.0	-53.50	3.2	0	44.96	AV	54	PASS

	2422	Ant1	2390.0	-42.21	3.2	0	56.25	PEAK	74	PASS
	2422	Ant1	2390.0	-52.45	3.2	0	46.01	AV	54	PASS
	2452	Ant1	2483.5	-33.70	3.2	0	64.76	PEAK	74	PASS
	2452	Ant1	2483.5	-50.50	3.2	0	47.96	AV	54	PASS
	2452	Ant1	2500.0	-41.93	3.2	0	56.53	PEAK	74	PASS
	2452	Ant1	2500.0	-52.45	3.2	0	46.01	AV	54	PASS

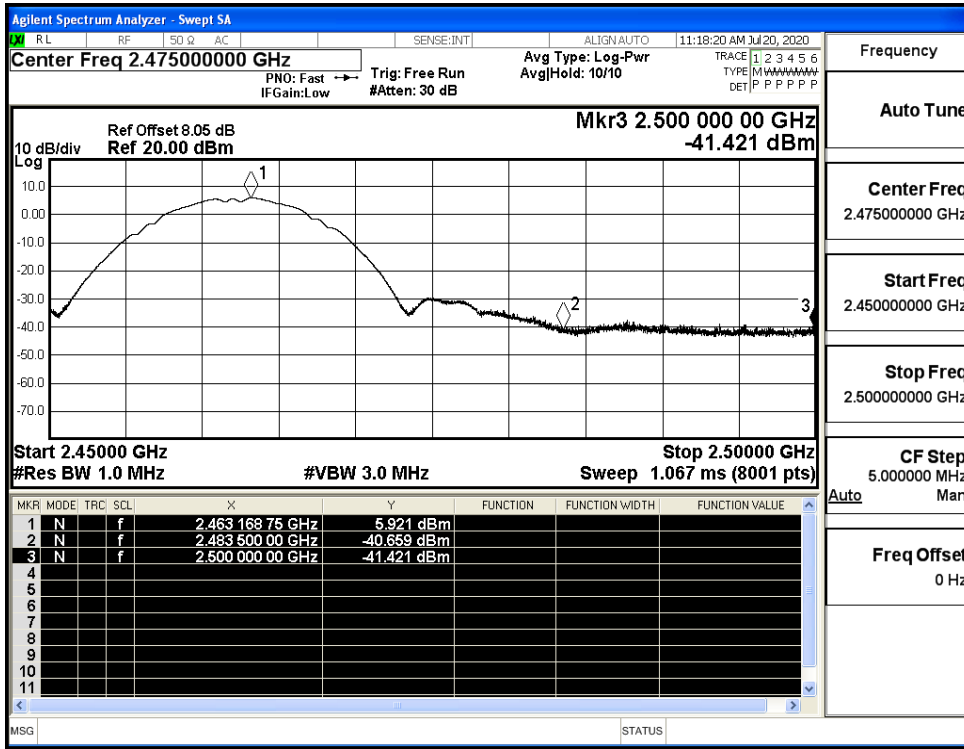
Restrict-band band-edge measurements\_11B\_2412\_Ant1\_PEAK



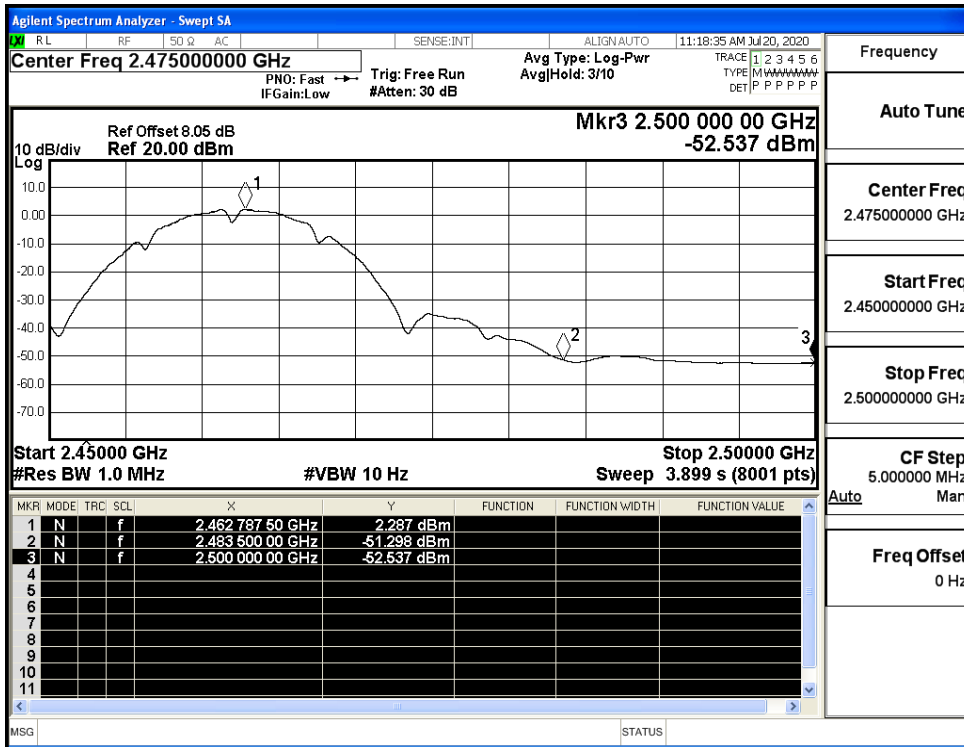
Restrict-band band-edge measurements\_11B\_2412\_Ant1\_AV



Restrict-band band-edge measurements\_11B\_2462\_Ant1\_PEAK

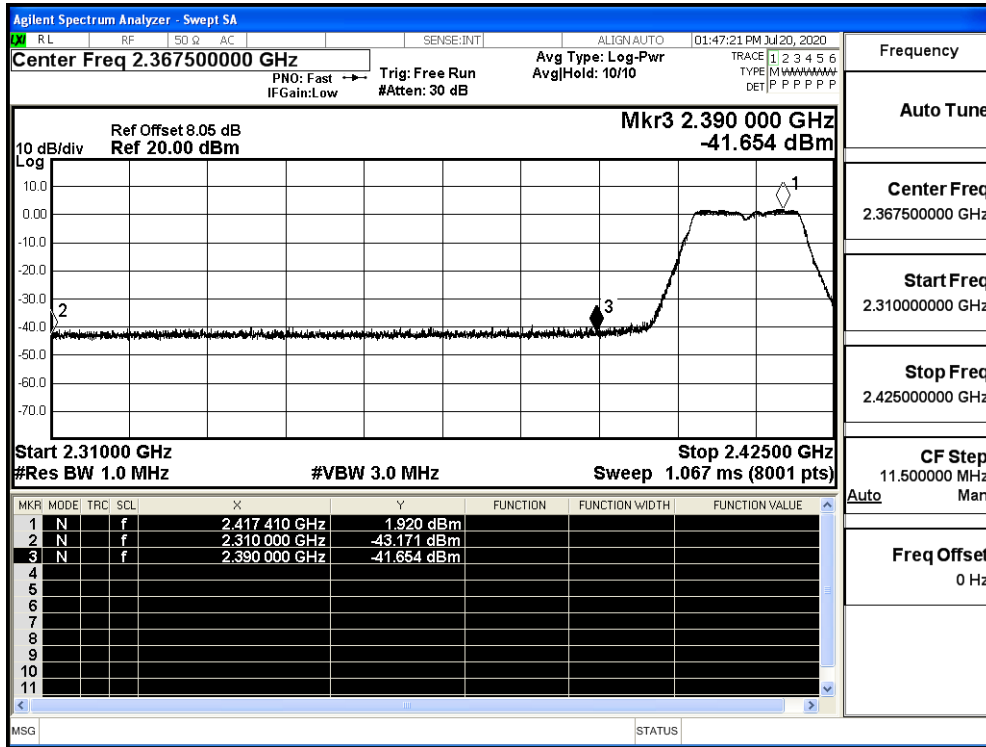


Restrict-band band-edge measurements\_11B\_2462\_Ant1\_AV

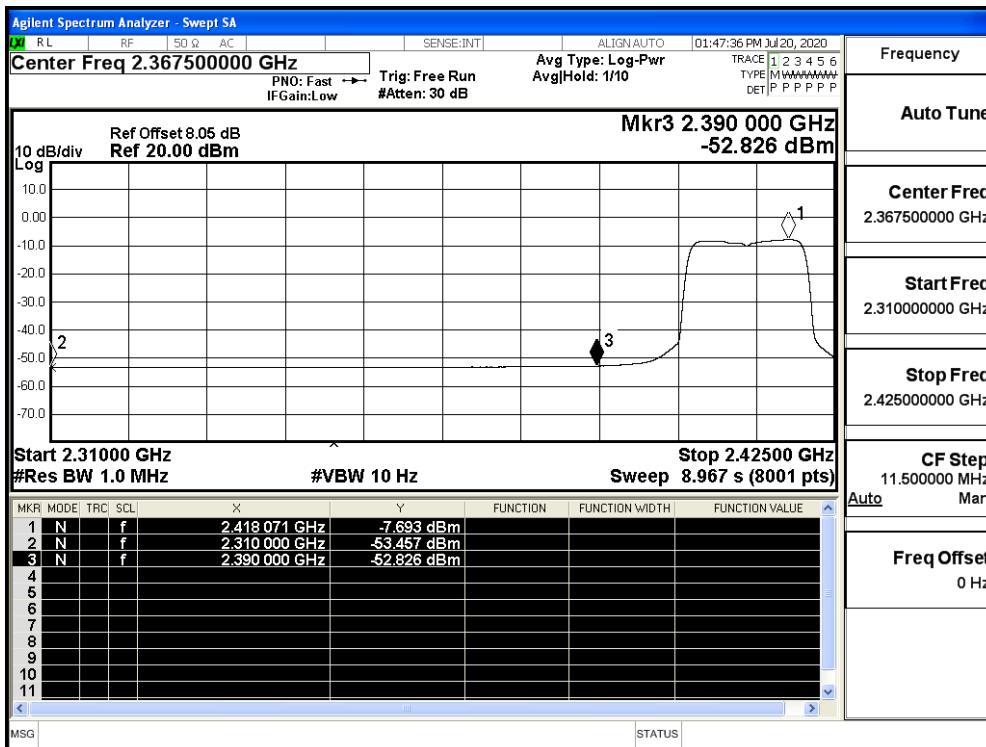




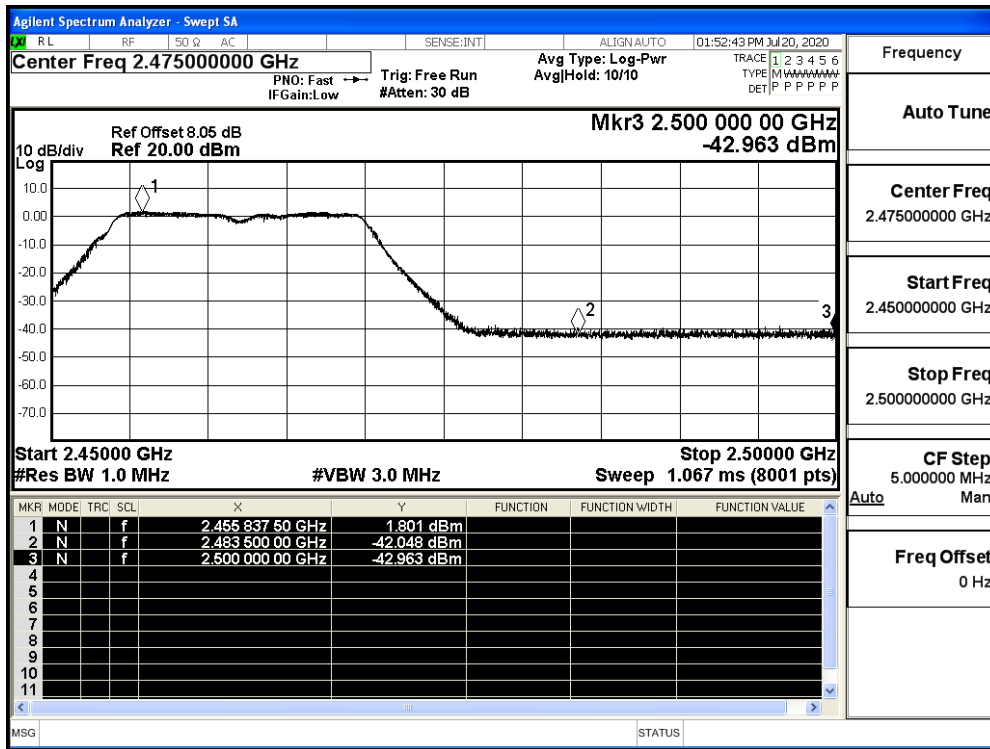
Restrict-band band-edge measurements\_11G\_2412\_Ant1\_PEAK



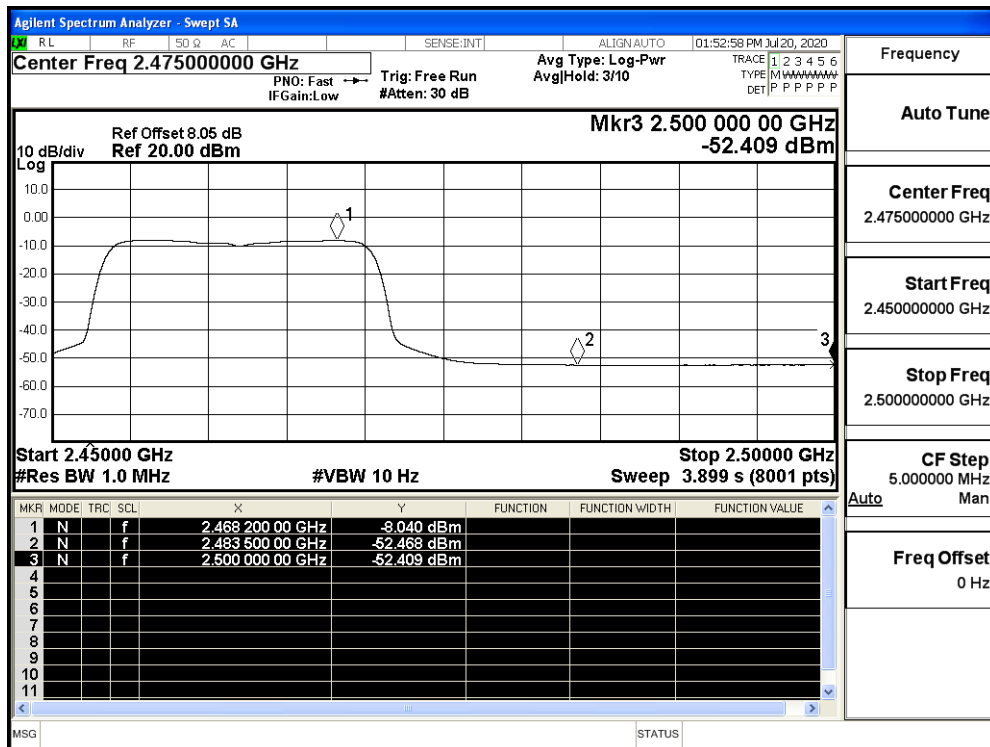
Restrict-band band-edge measurements\_11G\_2412\_Ant1\_AV



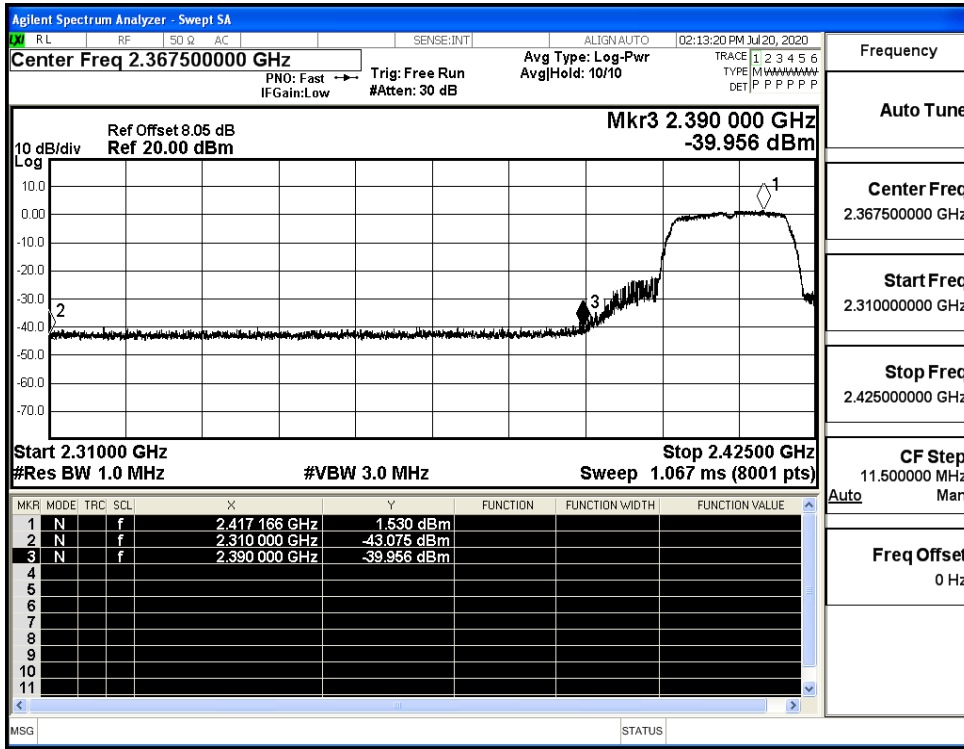
Restrict-band band-edge measurements\_11G\_2462\_Ant1\_PEAK



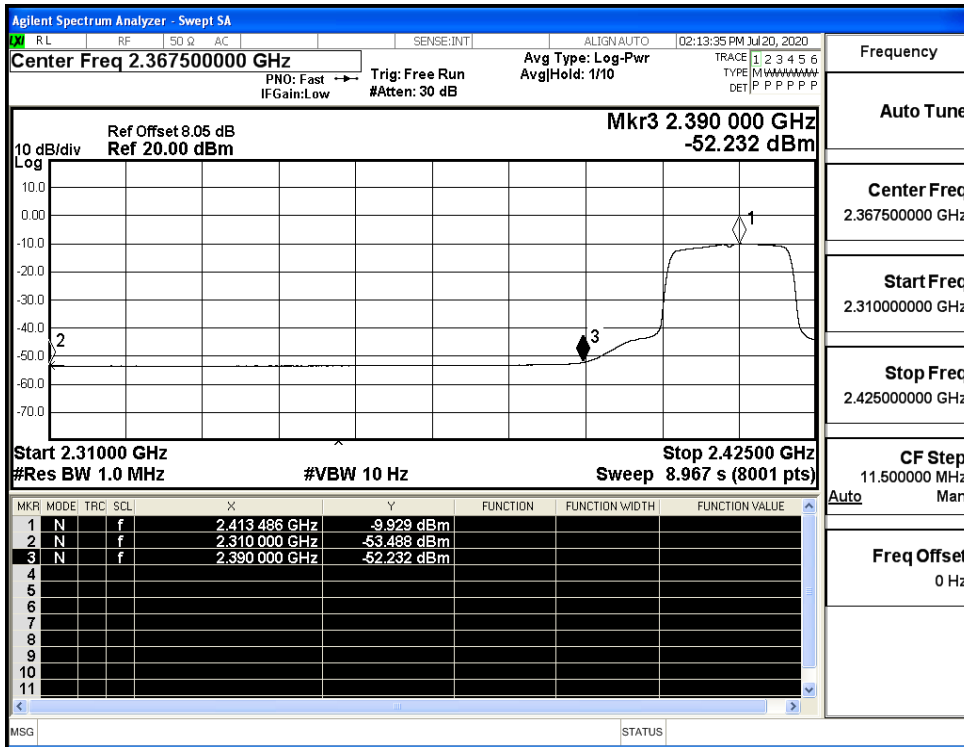
Restrict-band band-edge measurements\_11G\_2462\_Ant1\_AV



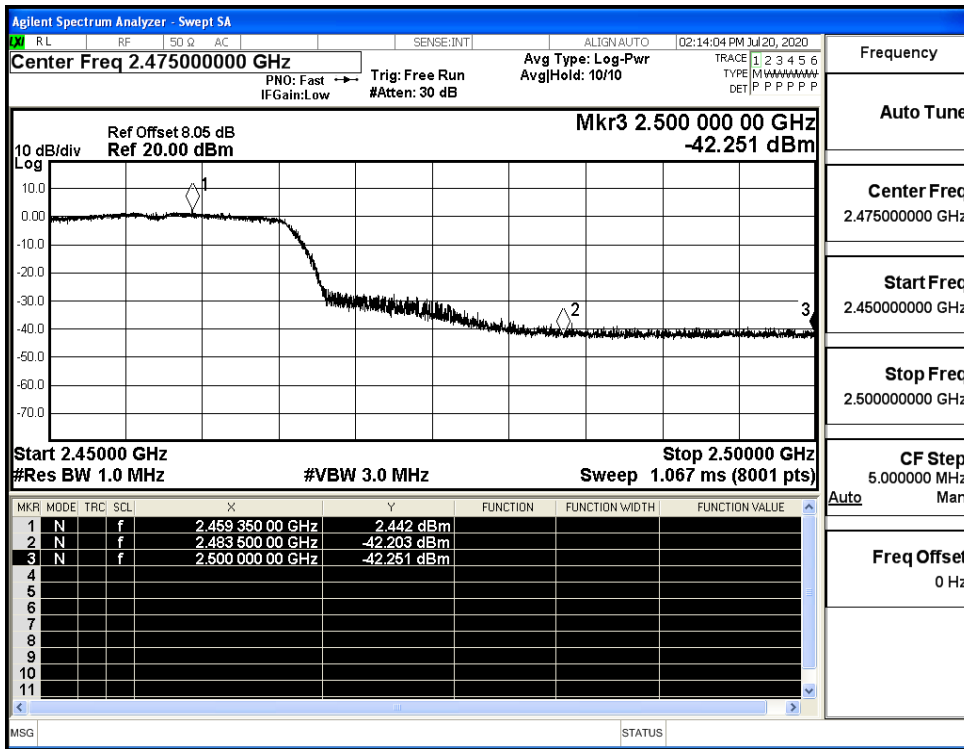
Restrict-band band-edge measurements\_11N20SISO\_2412\_Ant1\_PEAK



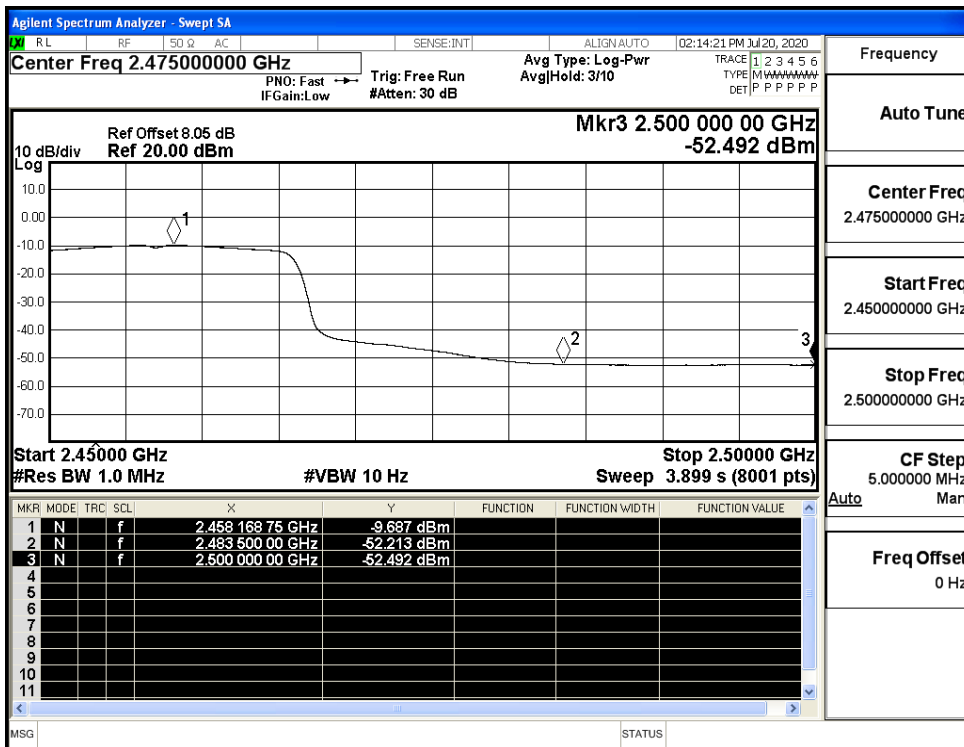
Restrict-band band-edge measurements\_11N20SISO\_2412\_Ant1\_AV



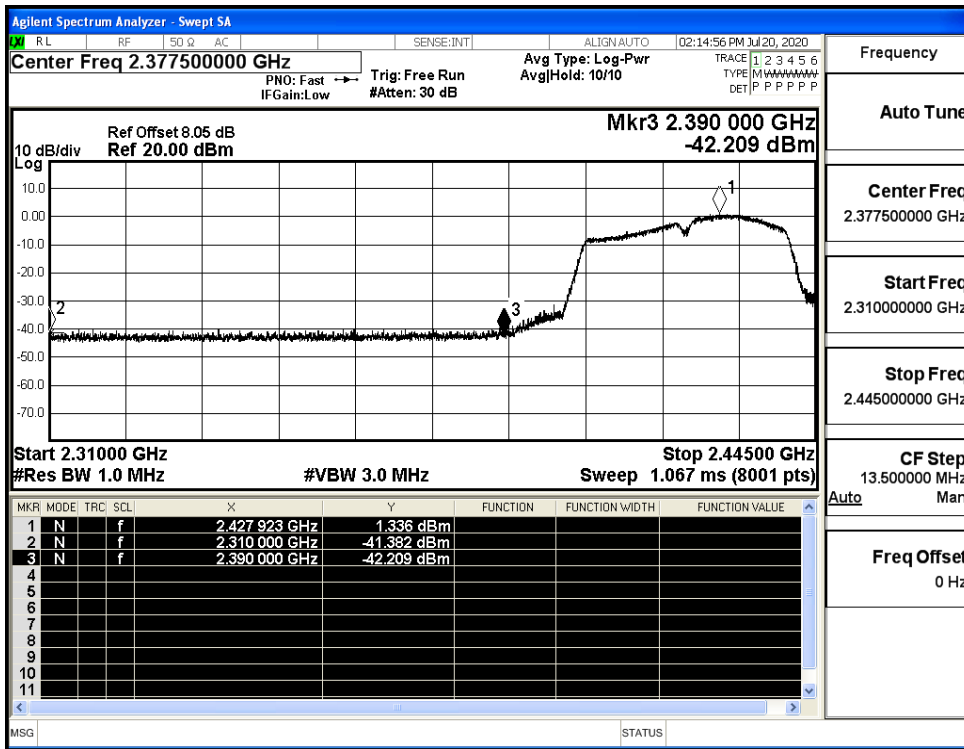
Restrict-band band-edge measurements\_11N20SISO\_2462\_Ant1\_PEAK



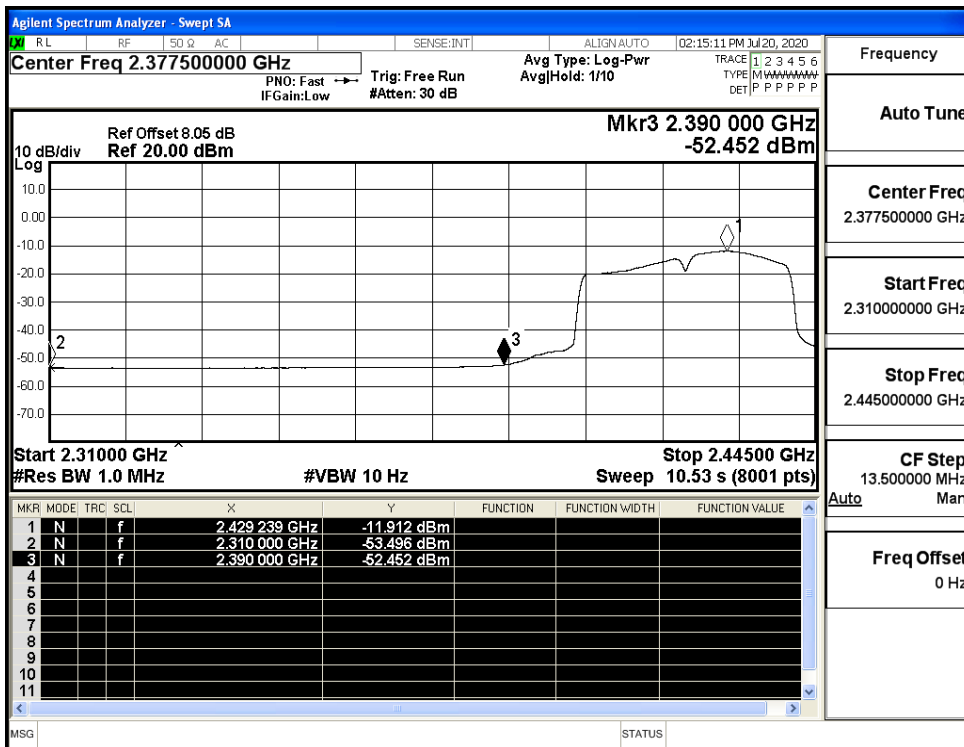
Restrict-band band-edge measurements\_11N20SISO\_2462\_Ant1\_AV



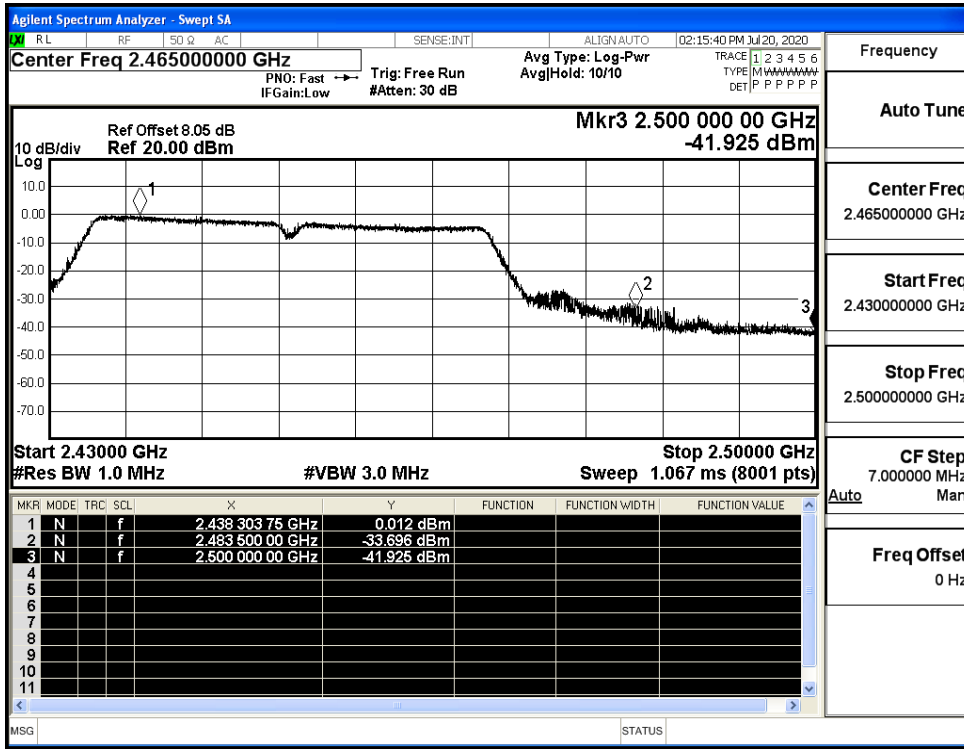
Restrict-band band-edge measurements\_11N40SISO\_2422\_Ant1\_PEAK



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

