

Appendix C

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Wi-Fi Module

Trade Mark: N/A

Test Model: EWN-1638ACX2AA

Environmental Conditions

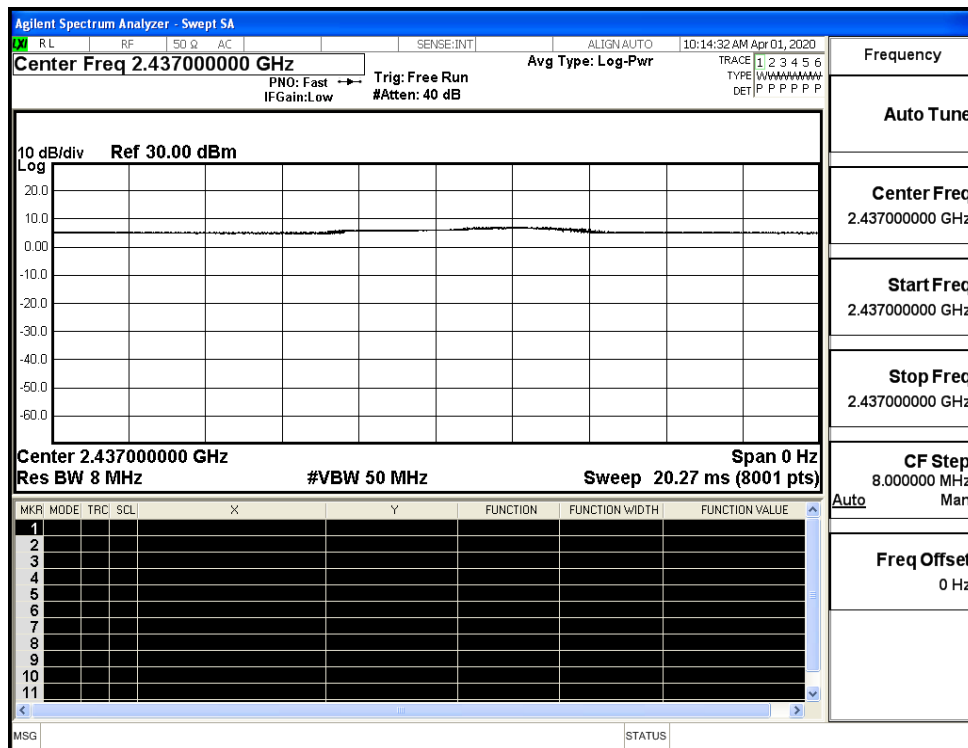
Temperature:	21.4°C
Relative Humidity:	52.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Jack Liu
Supervised by:	Li Huan

C.1 Duty Cycle

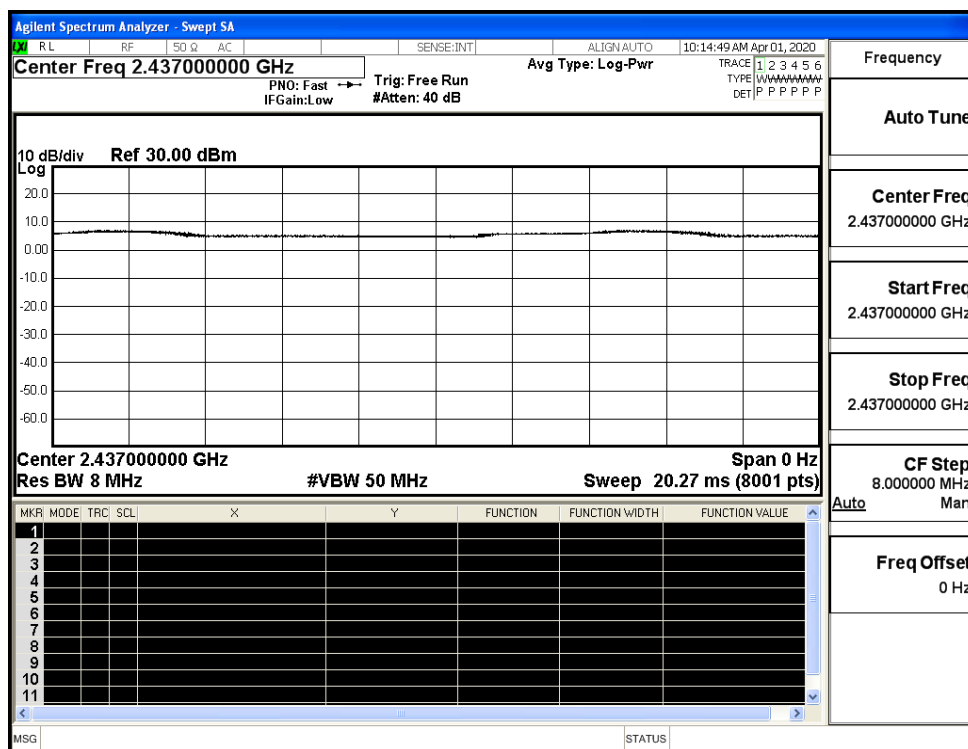
Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
11B	2437	Ant_0	100	PASS
11G	2437	Ant_0	100	PASS
11N20	2437	Ant_0	100	PASS
11N40	2437	Ant_0	100	PASS

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
11B	2437	Ant_1	100	PASS
11G	2437	Ant_1	100	PASS
11N20	2437	Ant_1	100	PASS
11N40	2437	Ant_1	100	PASS

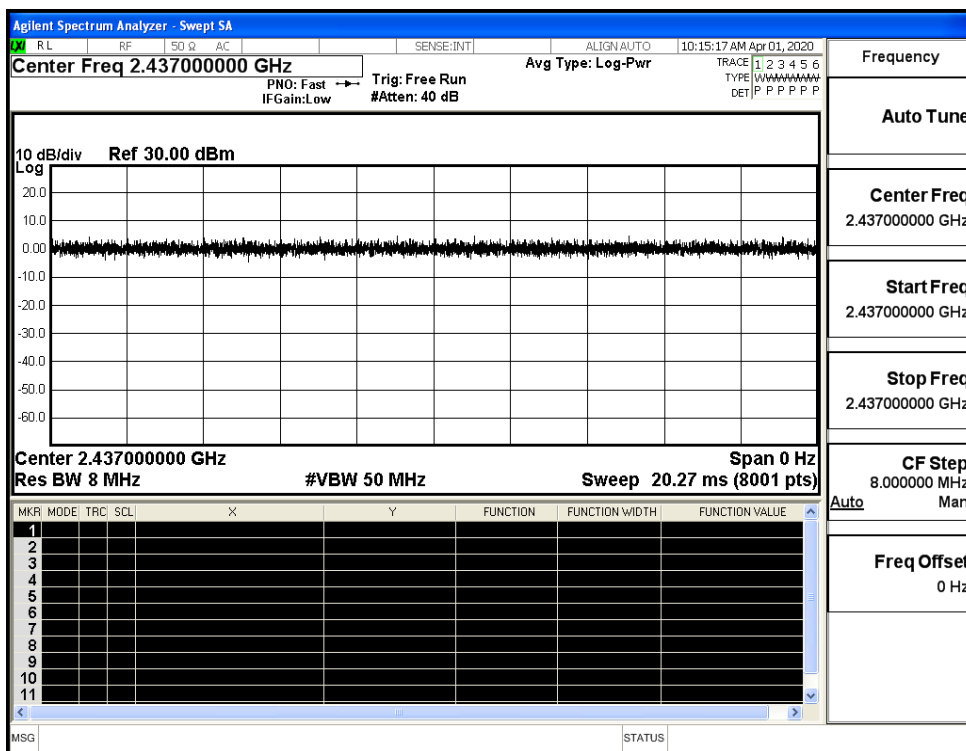
Duty Cycle_11B_2437_Ant_0



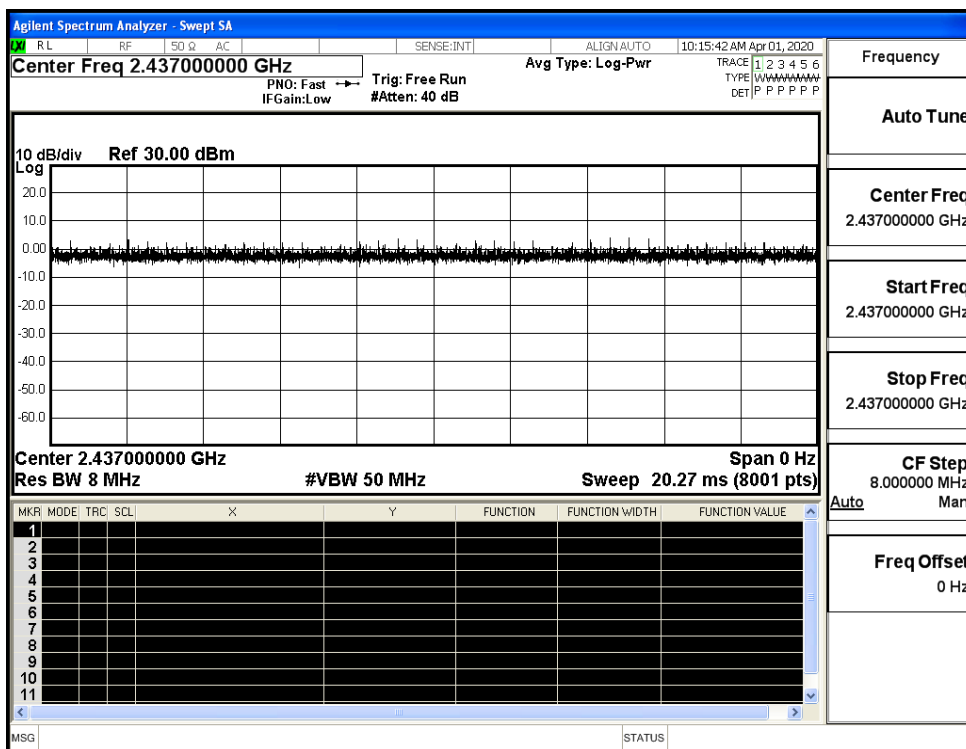
Duty Cycle_11G_2437_Ant_0



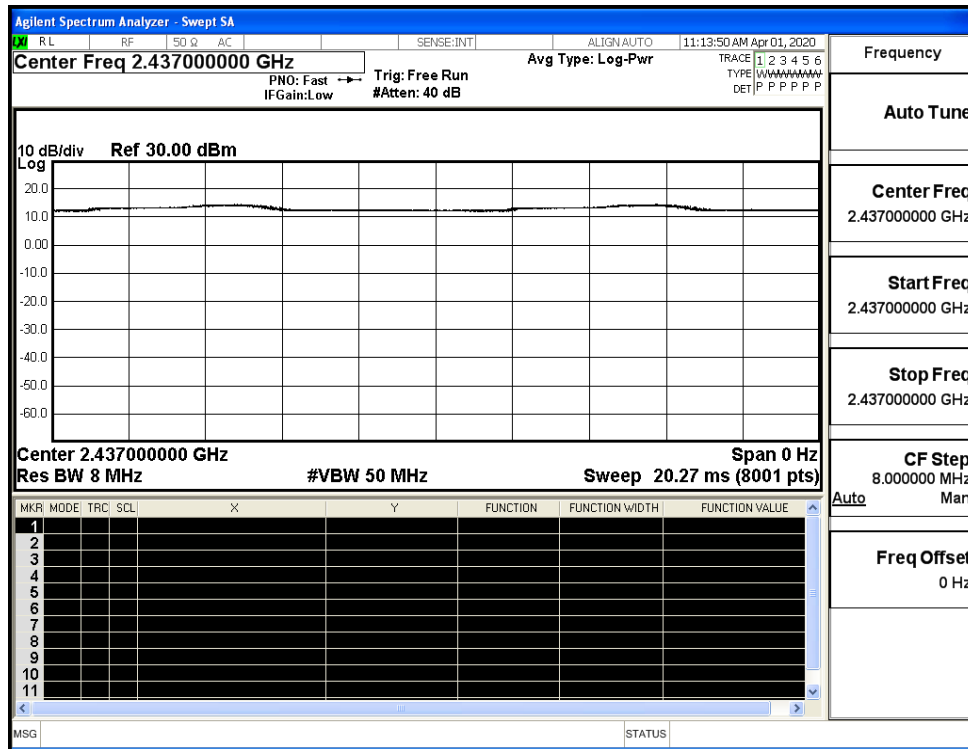
Duty Cycle_11N20_2437_Ant_0



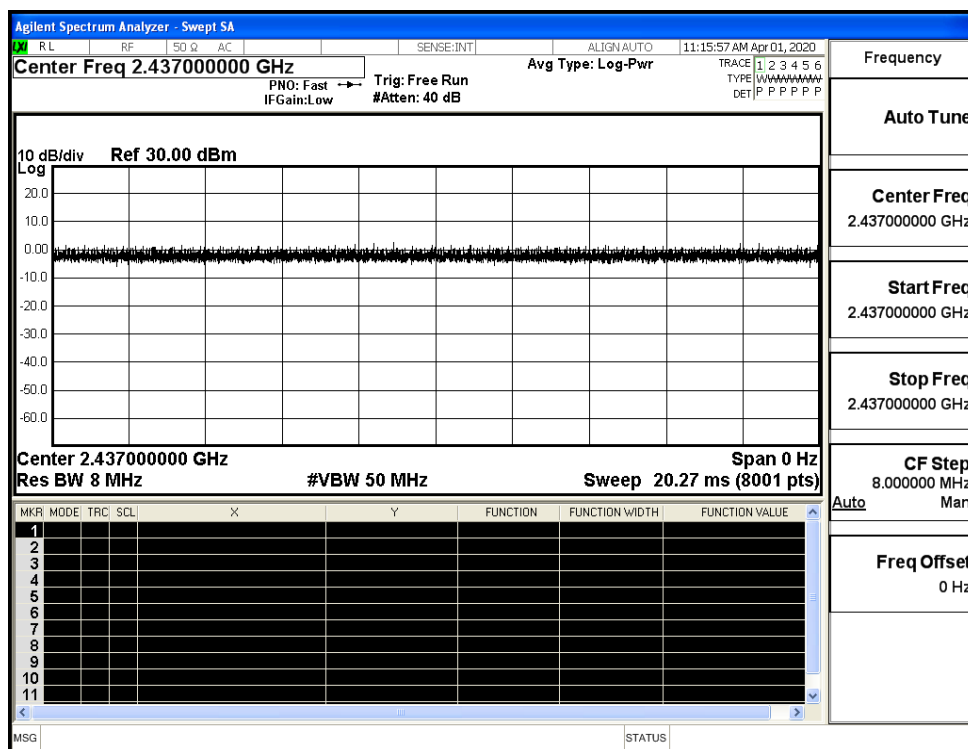
Duty Cycle_11N40_2437_Ant_0



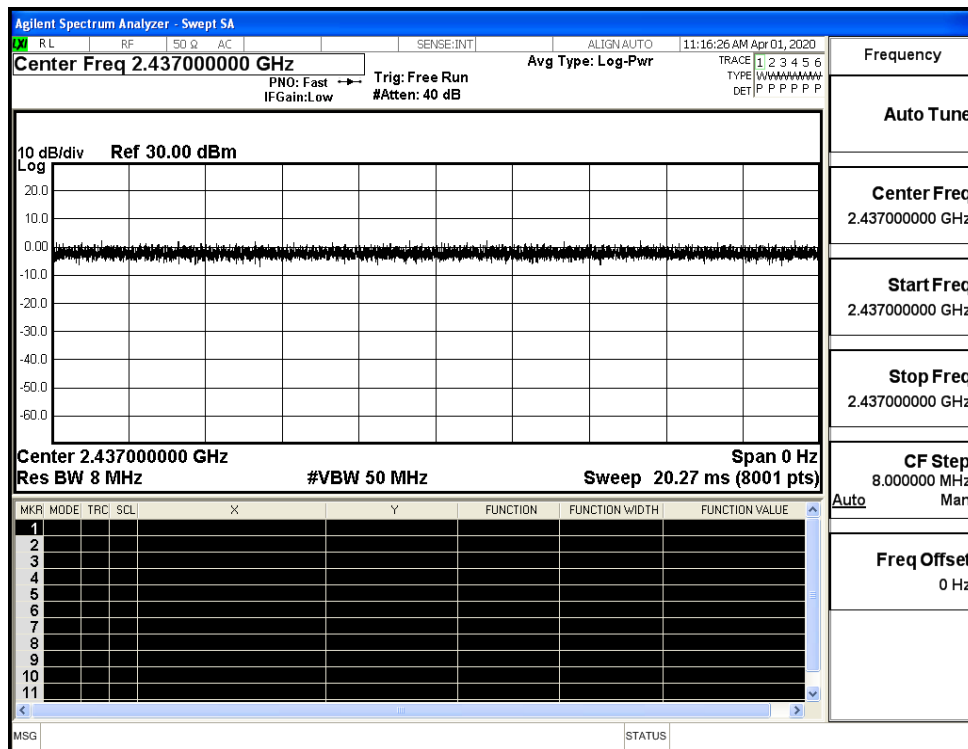
Duty Cycle_11B_2437_Ant_1



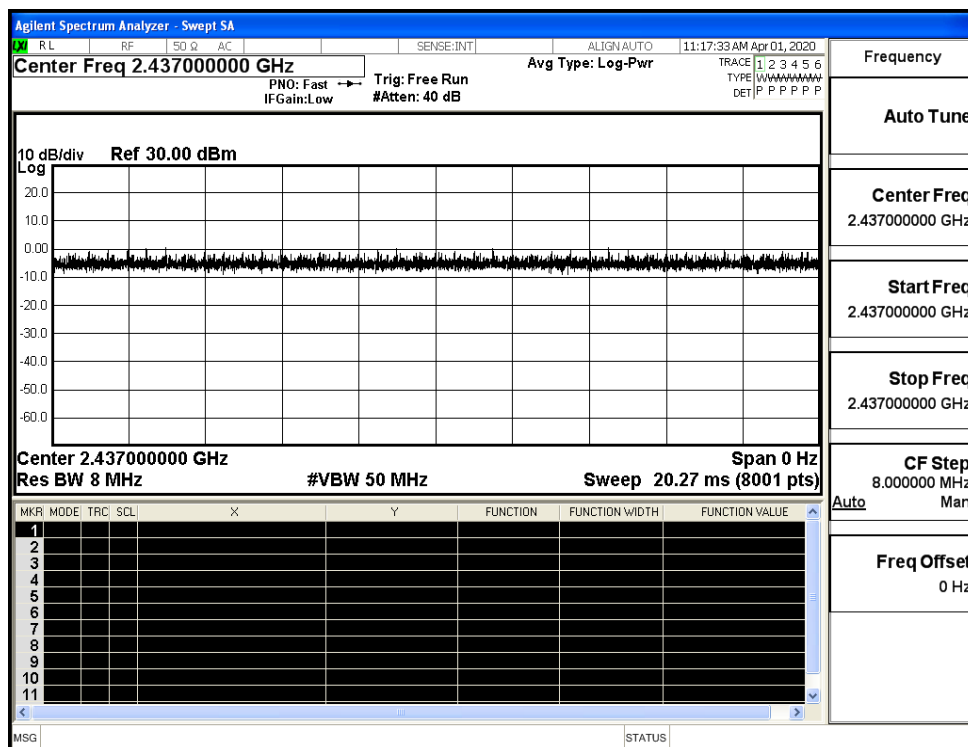
Duty Cycle_11G_2437_Ant_1



Duty Cycle_11N20_2437_Ant_1



Duty Cycle_11N40_2437_Ant_1



C.2 Maximum Conducted Output Power

Mode	Channel	Meas.Level [dBm]			Limit [dBm]	Verdict
		Ant_0	Ant_1	Sum		
11B	LCH	10.55	7.93	/	30	PASS
	MCH	10.46	8.53	/	30	PASS
	HCH	10.82	8.02	/	30	PASS
11G	LCH	13.25	10.82	/	30	PASS
	MCH	13.09	11.37	/	30	PASS
	HCH	13.38	10.28	/	30	PASS
11N20	LCH	13.69	11.55	15.76	30	PASS
	MCH	13.48	11.46	15.60	30	PASS
	HCH	13.81	10.9	15.60	30	PASS
11N40	LCH	15.02	11.84	16.73	30	PASS
	MCH	14.89	11.65	16.58	30	PASS
	HCH	14.95	11.49	16.57	30	PASS

C.3 Maximum Power Spectral Density**Ant_0**

Mode	Channel	Result [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-13.243	8	PASS
	MCH	-16.381	8	PASS
	HCH	-15.545	8	PASS
11G	LCH	-21.164	8	PASS
	MCH	-21.316	8	PASS
	HCH	-20.042	8	PASS
11N20	LCH	-19.681	8	PASS
	MCH	-19.297	8	PASS
	HCH	-20.921	8	PASS
11N40	LCH	-22.656	8	PASS
	MCH	-22.785	8	PASS
	HCH	-22.200	8	PASS

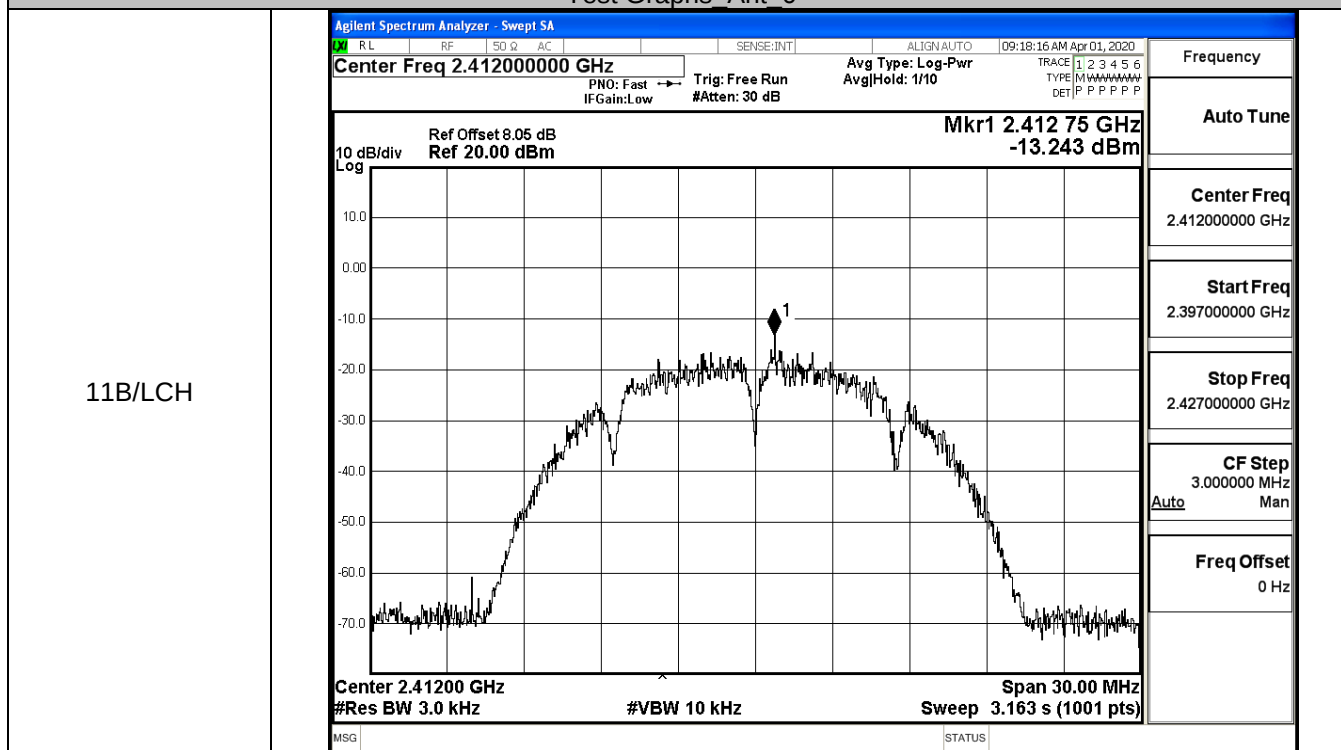
Ant_1

Mode	Channel	Result [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-24.344	8	PASS
	MCH	-23.848	8	PASS
	HCH	-24.349	8	PASS
11G	LCH	-25.510	8	PASS
	MCH	-25.071	8	PASS
	HCH	-25.755	8	PASS
11N20	LCH	-24.867	8	PASS
	MCH	-25.141	8	PASS
	HCH	-25.326	8	PASS
11N40	LCH	-24.520	8	PASS
	MCH	-26.292	8	PASS
	HCH	-26.589	8	PASS

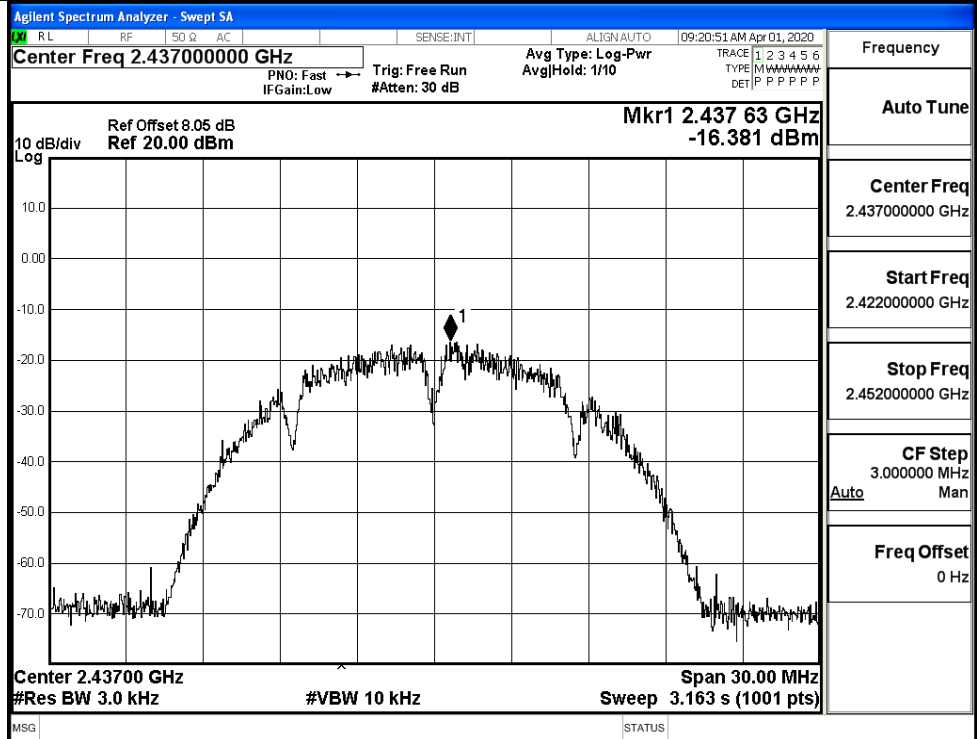
Combined Ant_0 and Ant_1

Mode	Channel	Result [dBm/3KHz]			Limit [dBm/3KHz]	Verdict
		Ant_0	Ant_1	Sum		
11N20	LCH	-19.681	-24.867	-18.532	8	PASS
	MCH	-19.297	-25.141	-18.292	8	PASS
	HCH	-20.921	-25.326	-19.577	8	PASS
11N40	LCH	-22.656	-24.520	-20.478	8	PASS
	MCH	-22.785	-26.292	-21.183	8	PASS
	HCH	-22.200	-26.589	-20.852	8	PASS

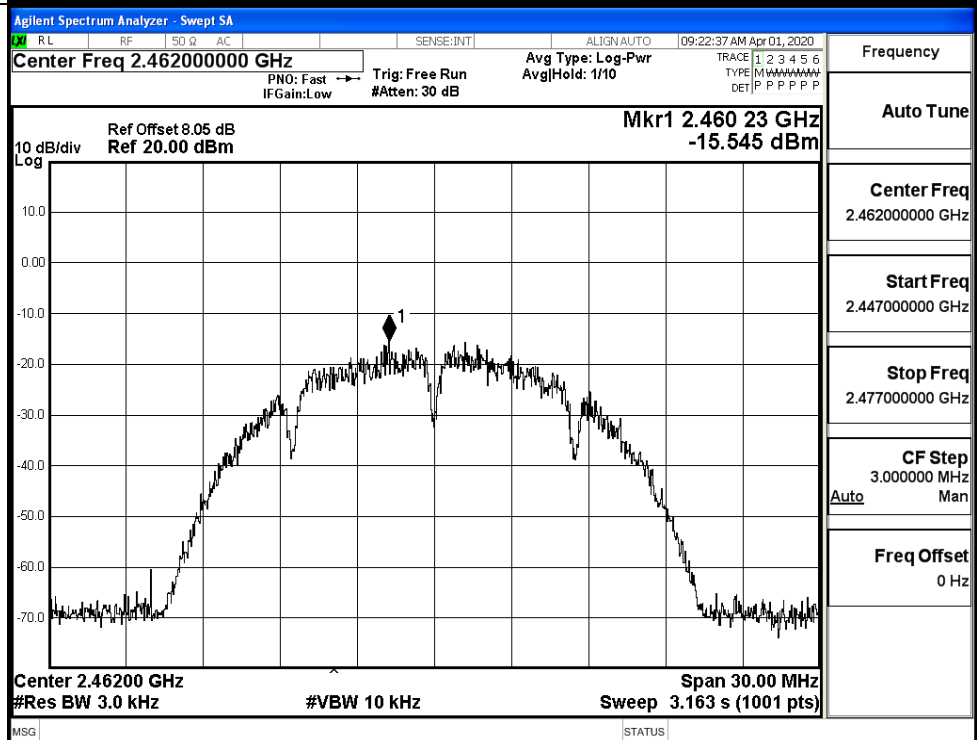
Test Graphs Ant_0



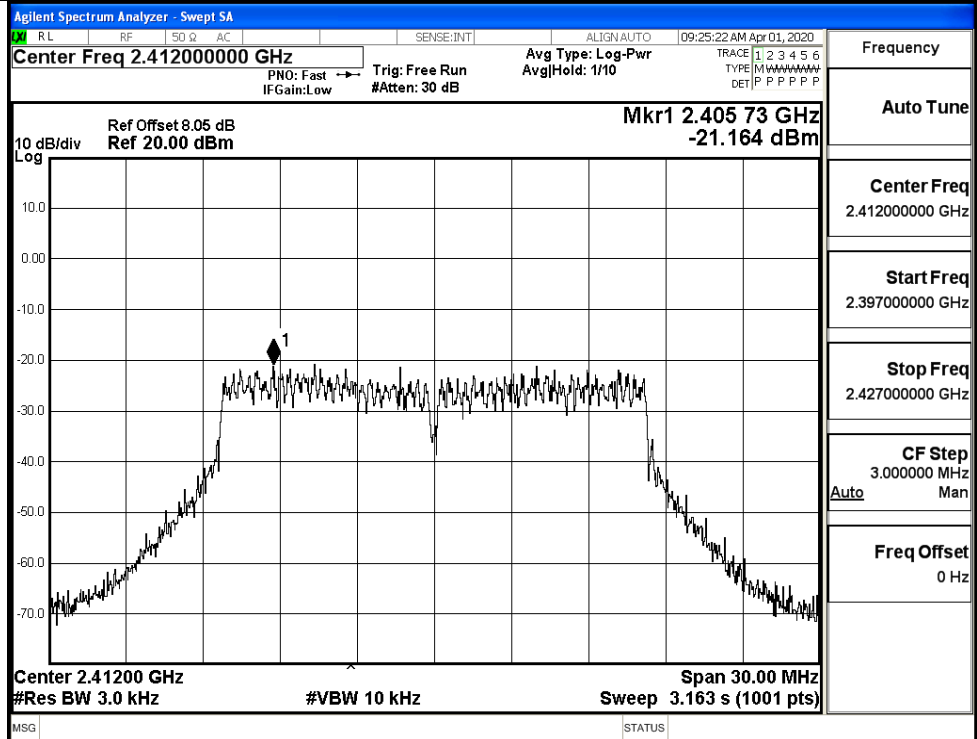
11B/MCH



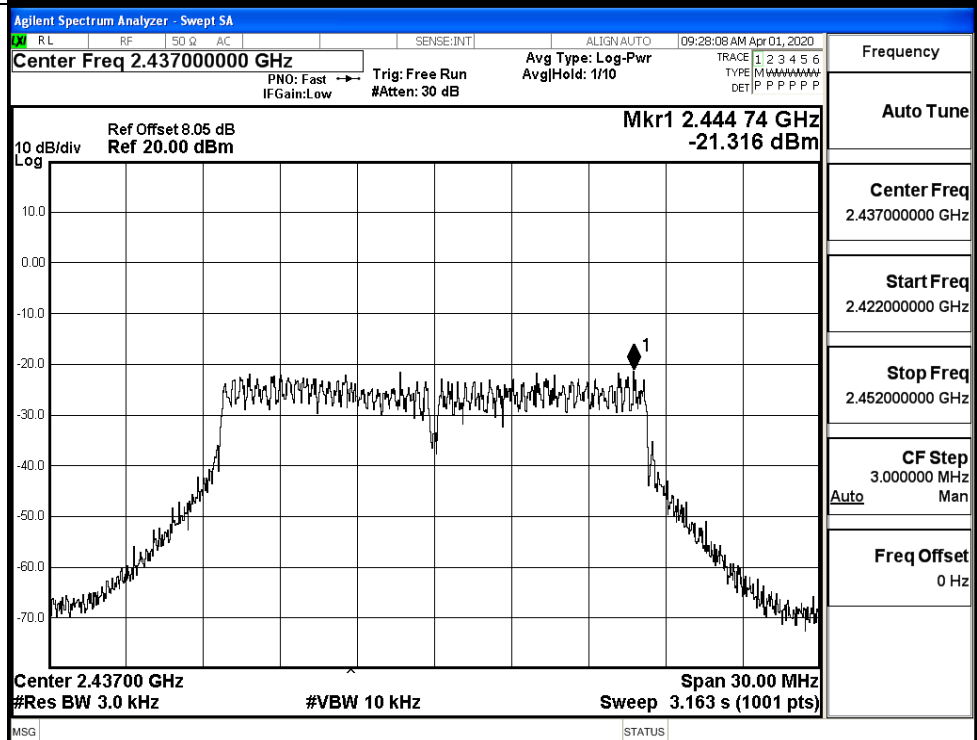
11B/HCH



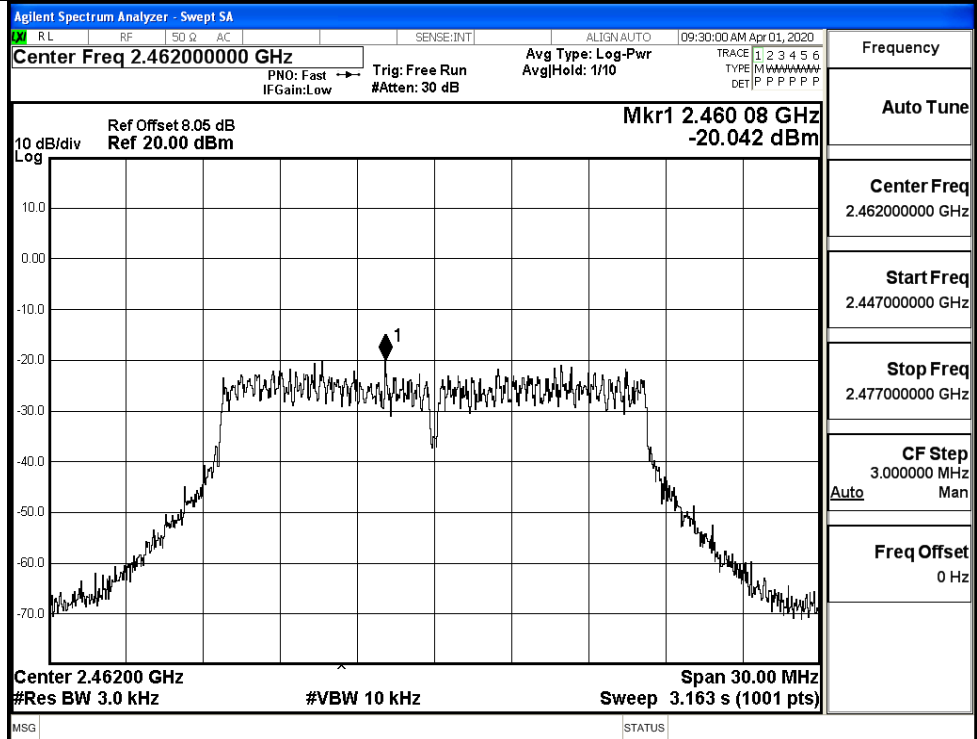
11G/LCH



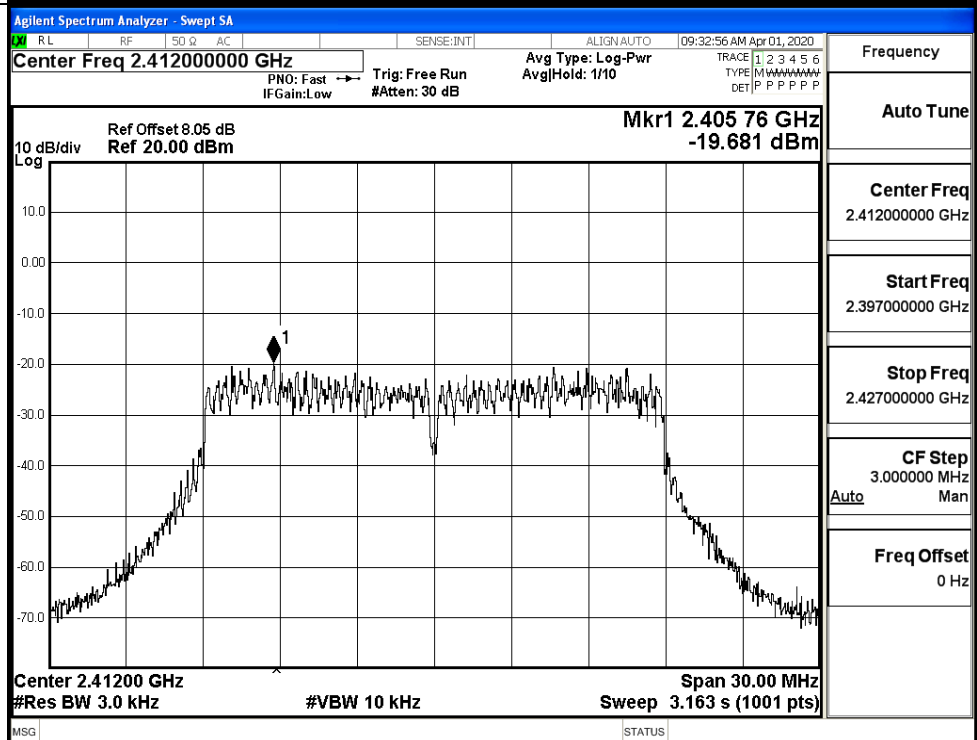
11G/MCH

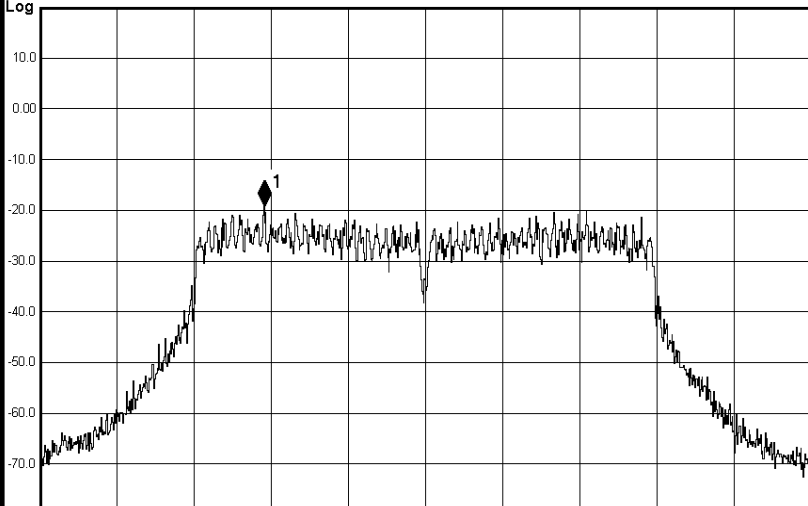
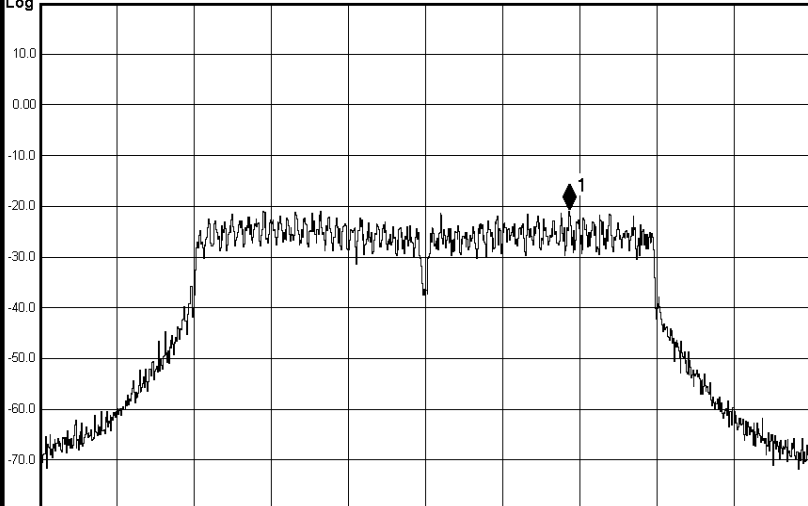


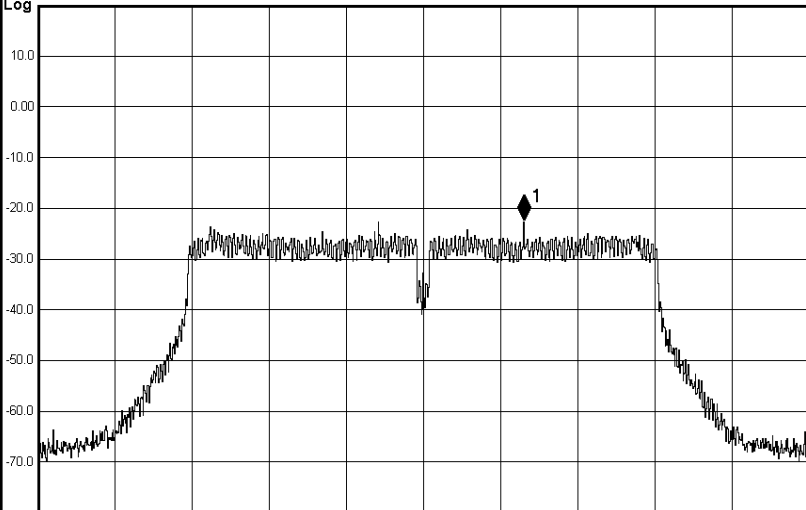
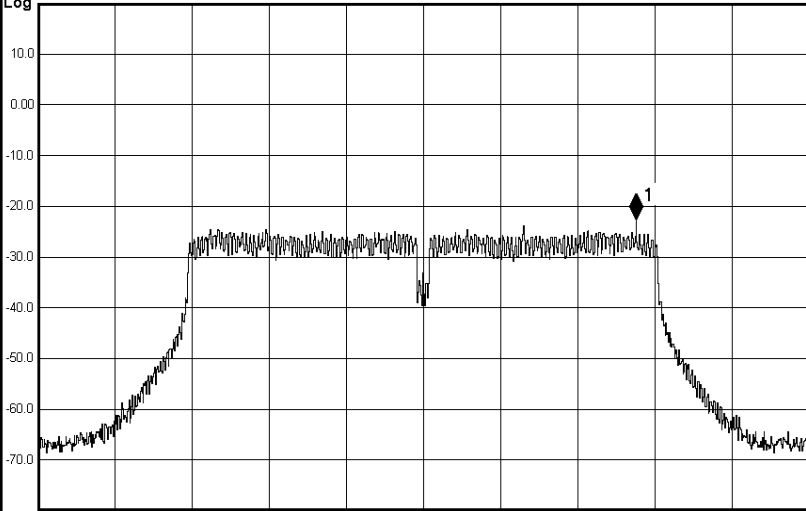
11G/HCH



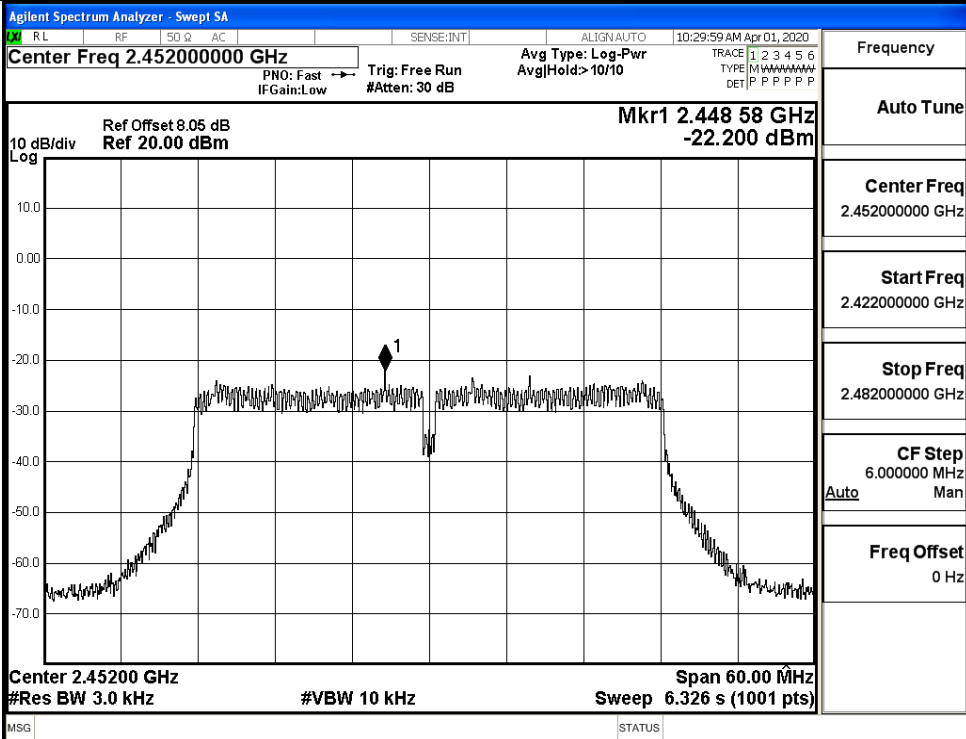
11N20SISO/LCH



11N20SISO/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 09:35:28 AM Apr 01, 2020 Center Freq 2.437000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 1/10 Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.430 73 GHz -19.297 dBm  Center 2.43700 GHz Span 30.00 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.437000000 GHz Start Freq 2.422000000 GHz Stop Freq 2.452000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 09:37:55 AM Apr 01, 2020 Center Freq 2.462000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 1/10 Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.467 58 GHz -20.921 dBm  Center 2.46200 GHz Span 30.00 MHz #Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.462000000 GHz Start Freq 2.447000000 GHz Stop Freq 2.477000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz

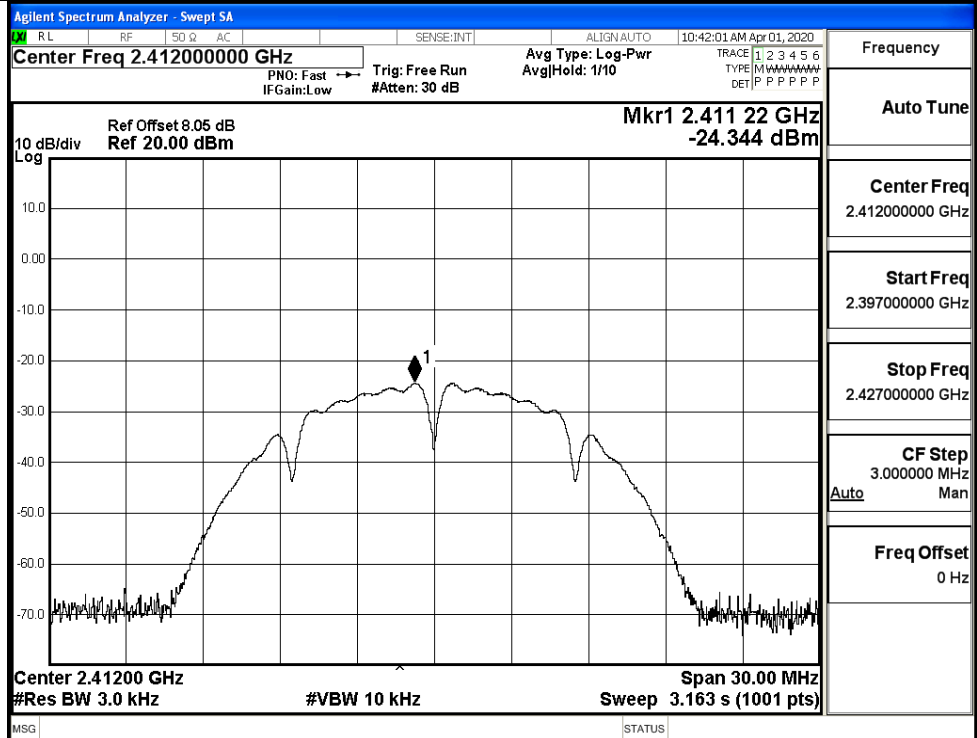
11N40SISO/LCH	Agilent Spectrum Analyzer - Swept SA Center Freq 2.422000000 GHz Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log  Center 2.42200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts) Frequency Auto Tune Center Freq 2.422000000 GHz Start Freq 2.392000000 GHz Stop Freq 2.452000000 GHz CF Step 6.000000 MHz Auto Freq Offset 0 Hz
11N40SISO/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 Span 60.00 MHz Sweep 6.326 s (1001 pts) Frequency Auto Tune Center Freq 2.437000000 GHz Start Freq 2.407000000 GHz Stop Freq 2.467000000 GHz CF Step 6.000000 MHz Auto Freq Offset 0 Hz

11N40SISO/HCH

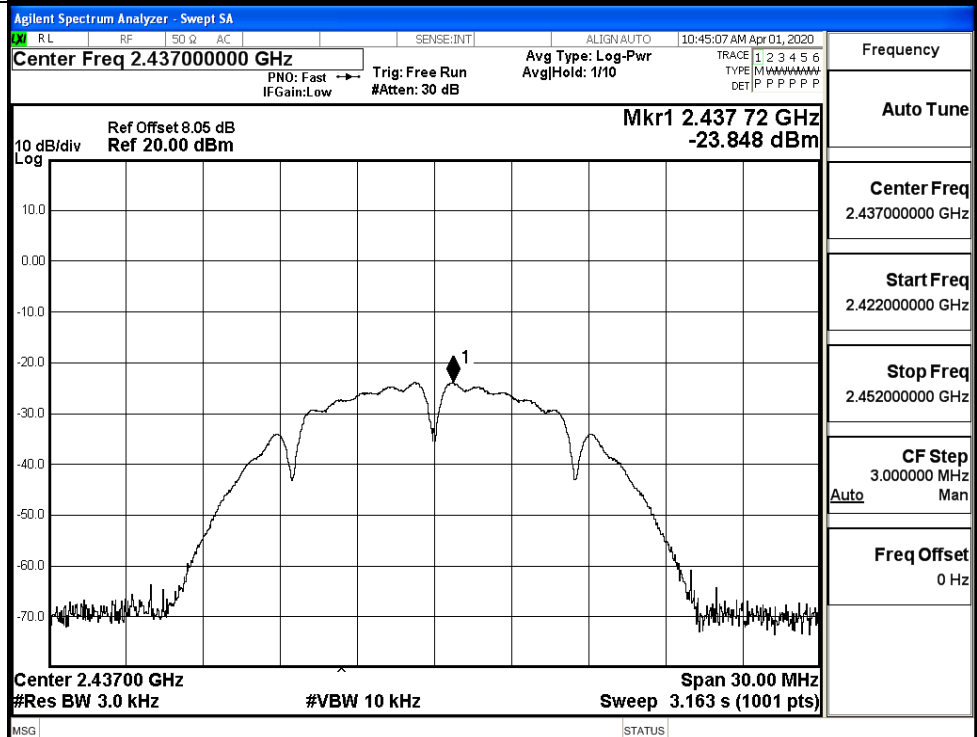


Test Graphs_Ant_1

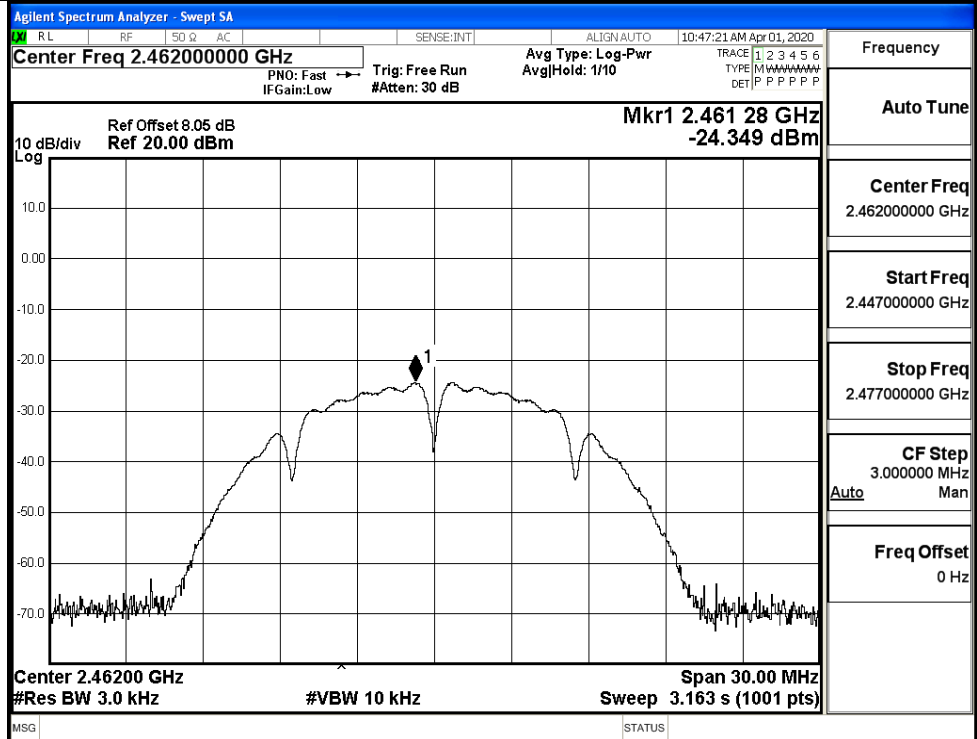
11B/LCH



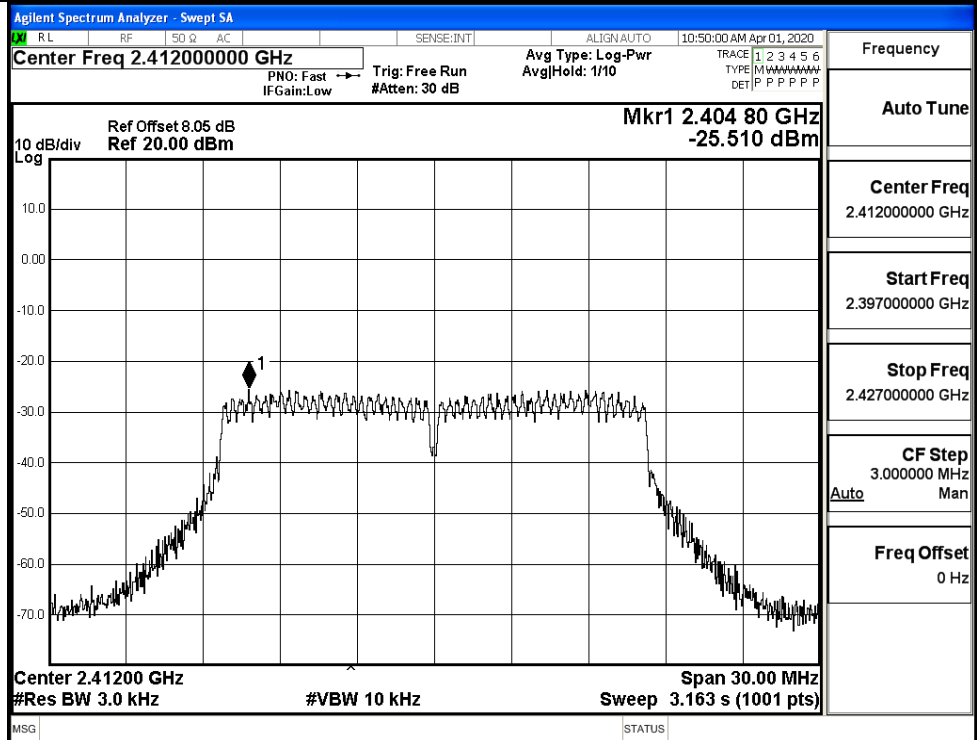
11B/MCH



11B/HCH



11G/LCH



11G/MCH

11G/HCH

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.43700000 GHz

Ref Offset 8.05 dB
Ref 20.00 dBm

Mkr1 2.439 16 GHz
-25.071 dBm

Span 30.00 MHz
Sweep 3.163 s (1001 pts)

Center 2.43700 GHz
#Res BW 3.0 kHz
#VBW 10 kHz

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.46200000 GHz

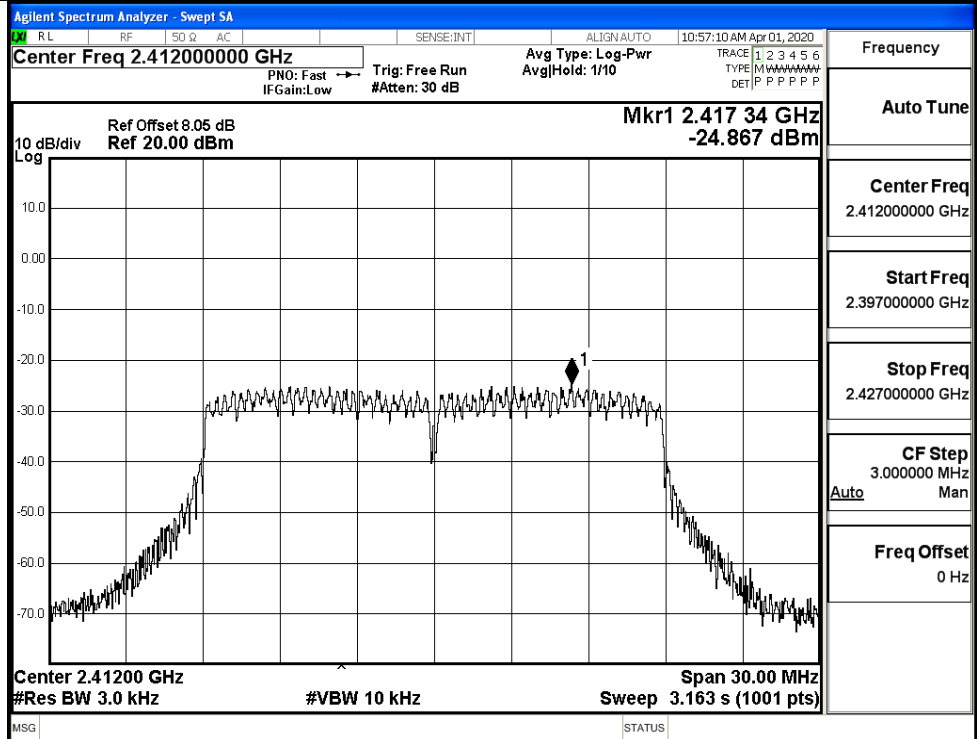
Ref Offset 8.05 dB
Ref 20.00 dBm

Mkr1 2.468 51 GHz
-25.755 dBm

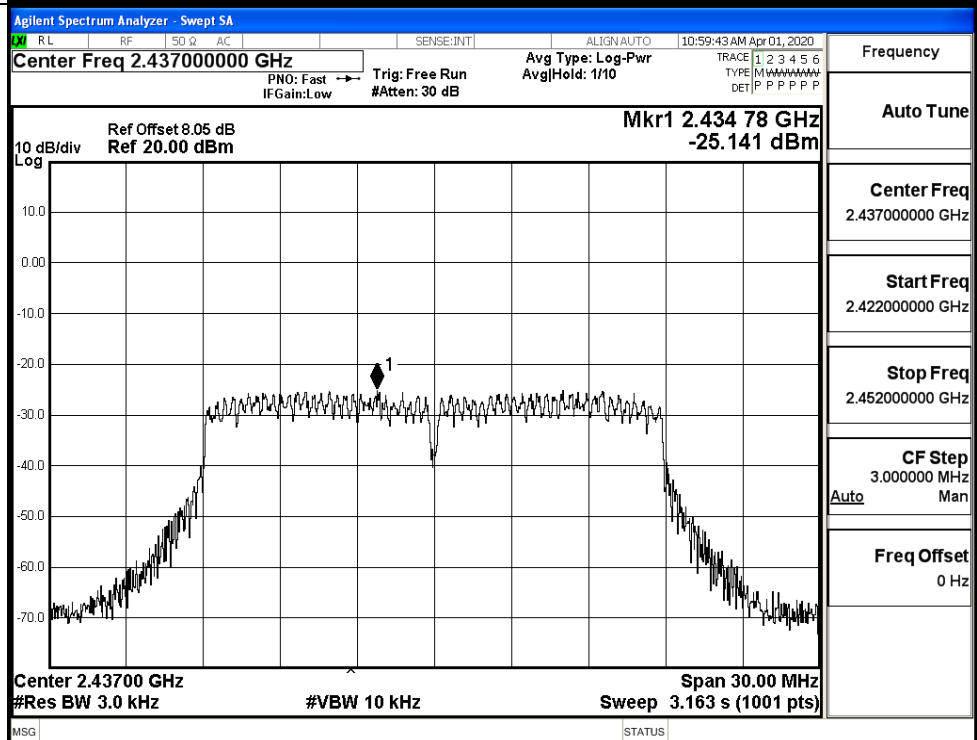
Span 30.00 MHz
Sweep 3.163 s (1001 pts)

Center 2.46200 GHz
#Res BW 3.0 kHz
#VBW 10 kHz

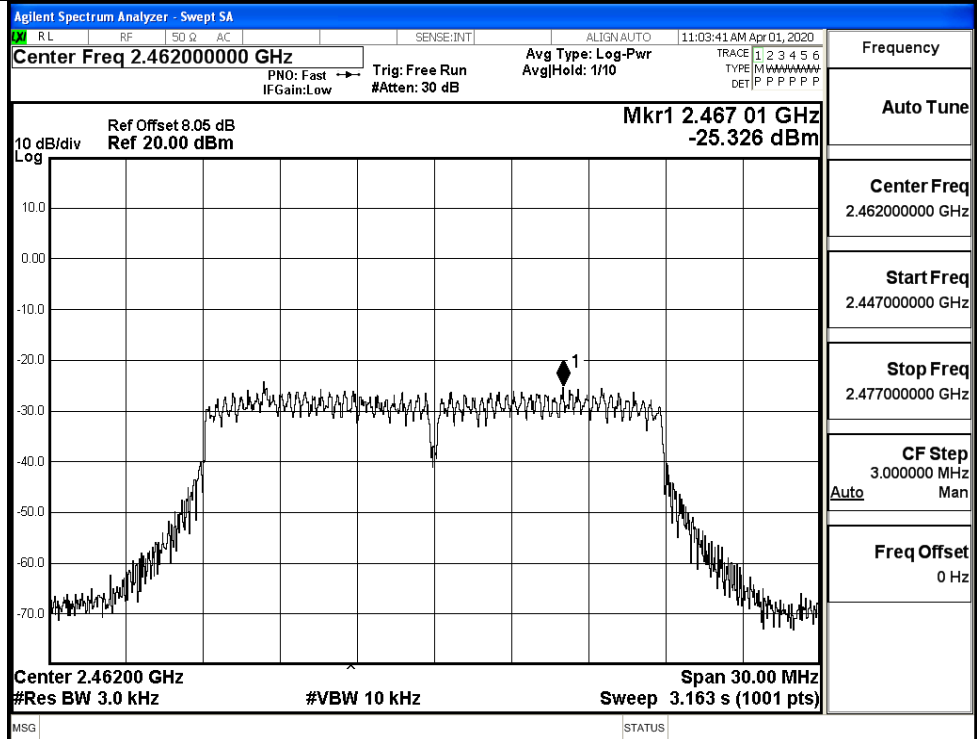
11N20SISO/LCH



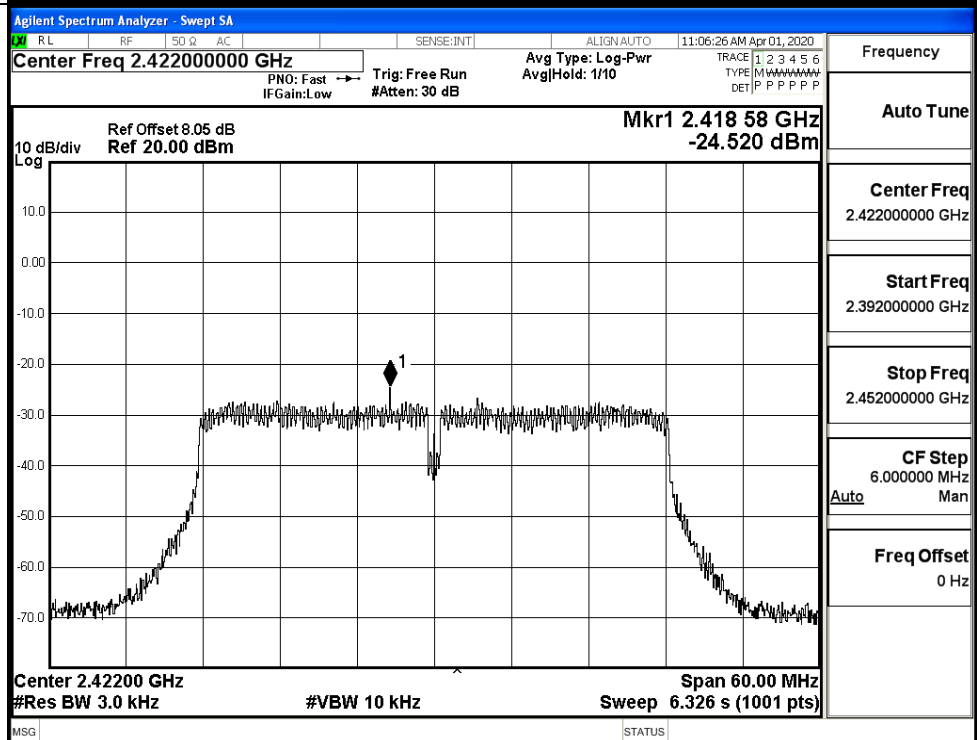
11N20SISO/MCH

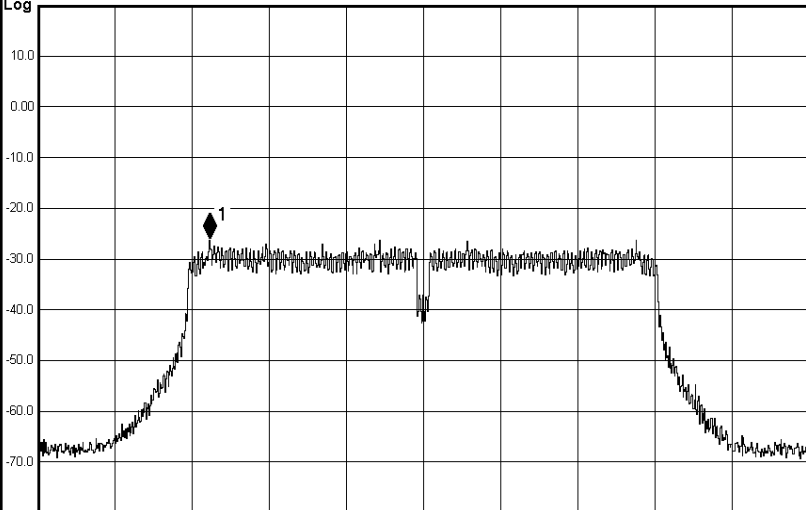
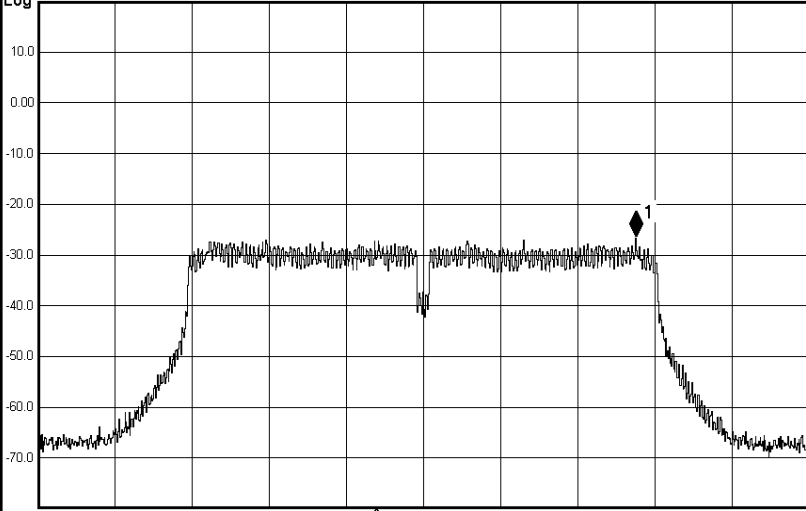


11N20SISO/HCH



11N40SISO/LCH

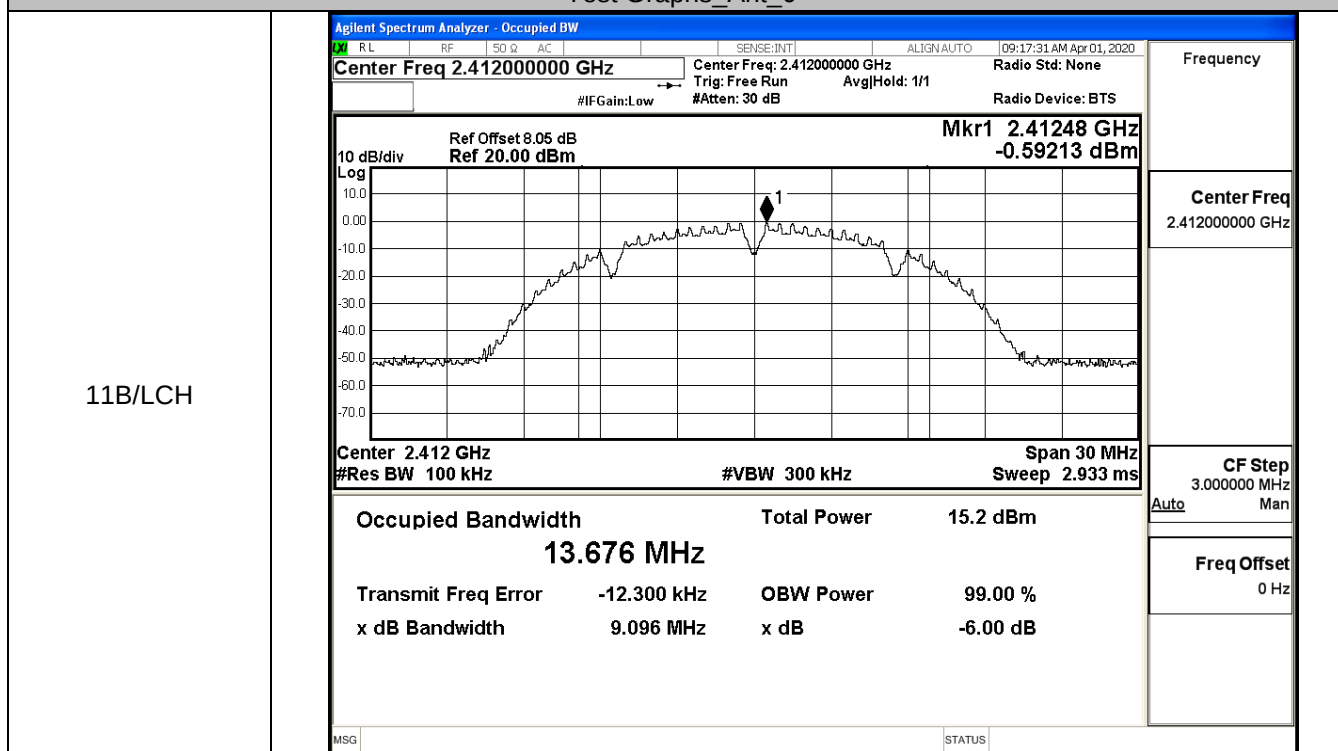


11N40SISO/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 11:21:53 AM Apr 01, 2020 Center Freq 2.437000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg Hold: 5/10 Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.420 38 GHz -26.292 dBm  Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts) Frequency Auto Tune Center Freq 2.437000000 GHz Start Freq 2.407000000 GHz Stop Freq 2.467000000 GHz CF Step 6.000000 MHz Auto Man Freq Offset 0 Hz
11N40SISO/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 11:23:35 AM Apr 01, 2020 Center Freq 2.452000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg Hold: 7/10 Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.468 50 GHz -26.589 dBm  Center 2.45200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 60.00 MHz Sweep 6.326 s (1001 pts) Frequency Auto Tune Center Freq 2.452000000 GHz Start Freq 2.422000000 GHz Stop Freq 2.482000000 GHz CF Step 6.000000 MHz Auto Man Freq Offset 0 Hz

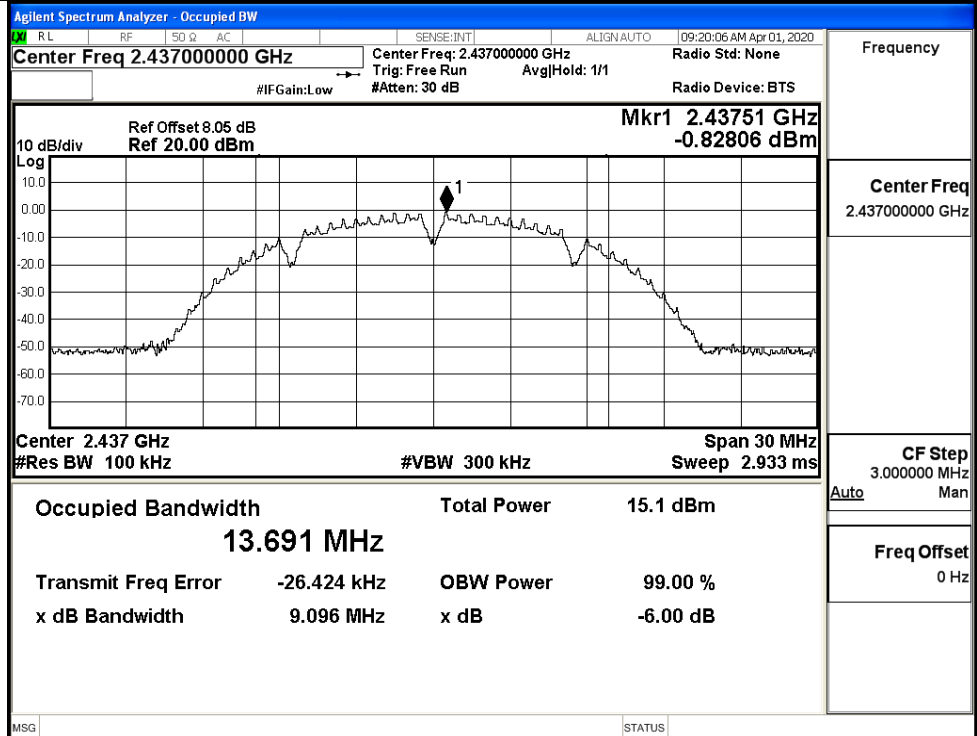
C.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]		Limit [MHz]	Verdict
		Ant_0	Ant_1		
11B	LCH	9.096	9.135	≥ 0.5	PASS
	MCH	9.096	9.138	≥ 0.5	PASS
	HCH	9.102	9.139	≥ 0.5	PASS
11G	LCH	16.35	16.53	≥ 0.5	PASS
	MCH	16.34	16.54	≥ 0.5	PASS
	HCH	16.35	16.55	≥ 0.5	PASS
11N20	LCH	17.07	17.64	≥ 0.5	PASS
	MCH	17.15	17.64	≥ 0.5	PASS
	HCH	17.07	17.66	≥ 0.5	PASS
11N40	LCH	36.10	36.52	≥ 0.5	PASS
	MCH	36.09	36.54	≥ 0.5	PASS
	HCH	36.07	36.54	≥ 0.5	PASS

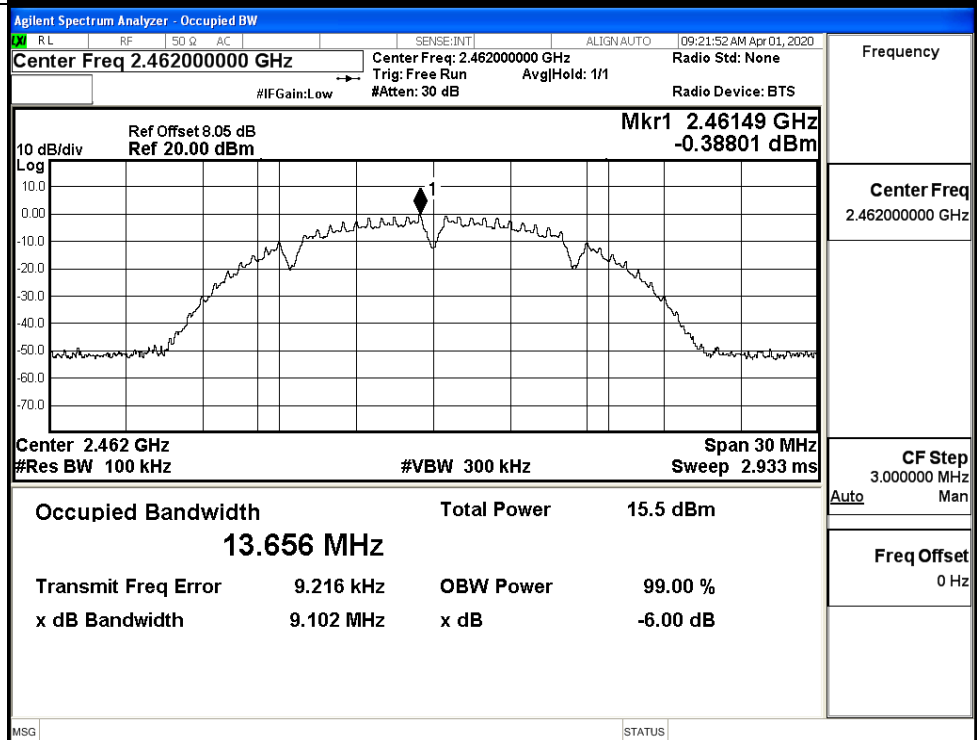
Test Graphs_Ant_0



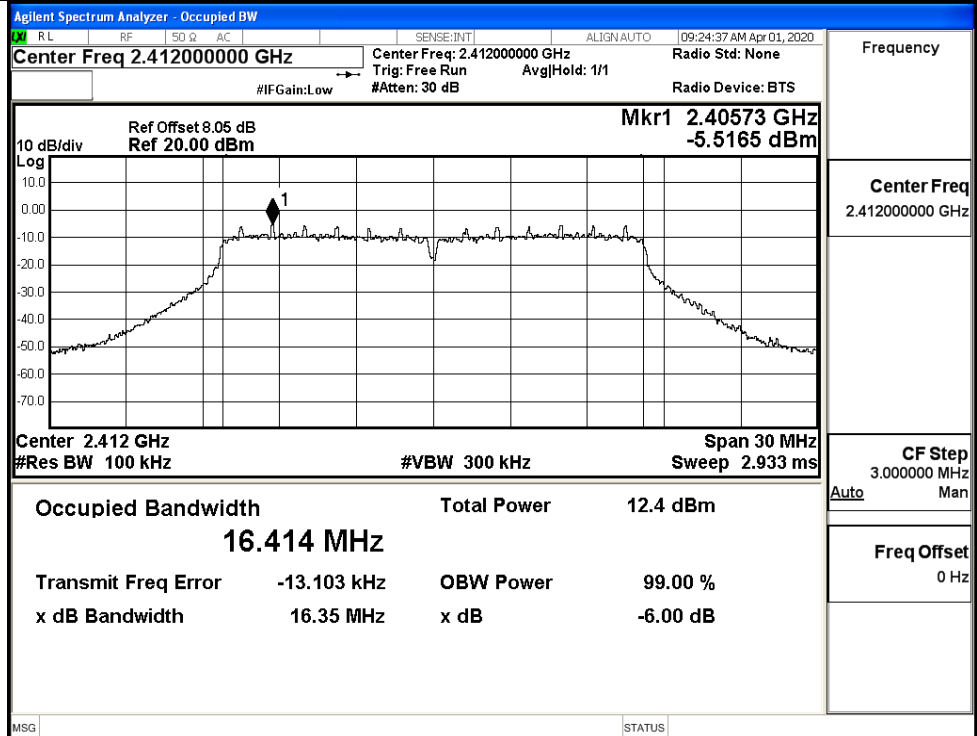
11B/MCH



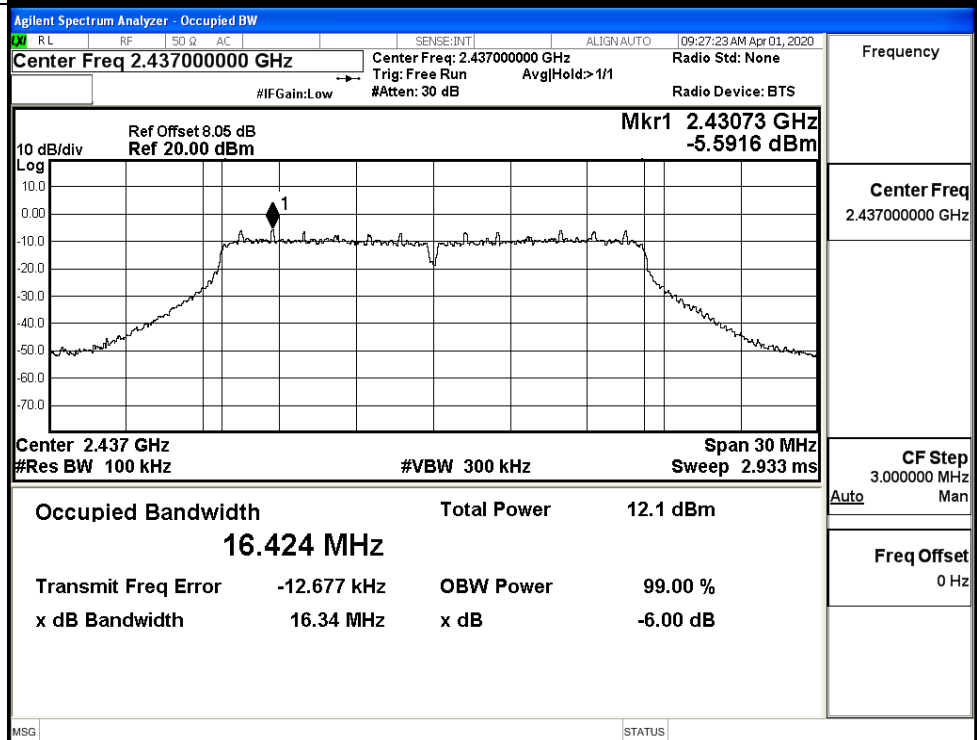
11B/HCH



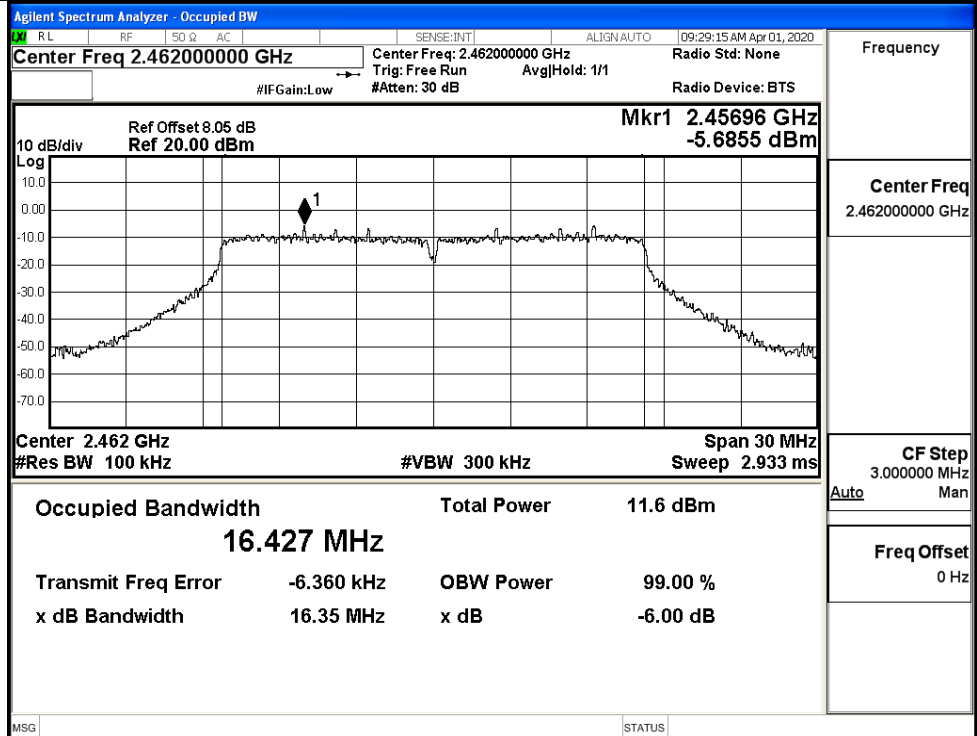
11G/LCH



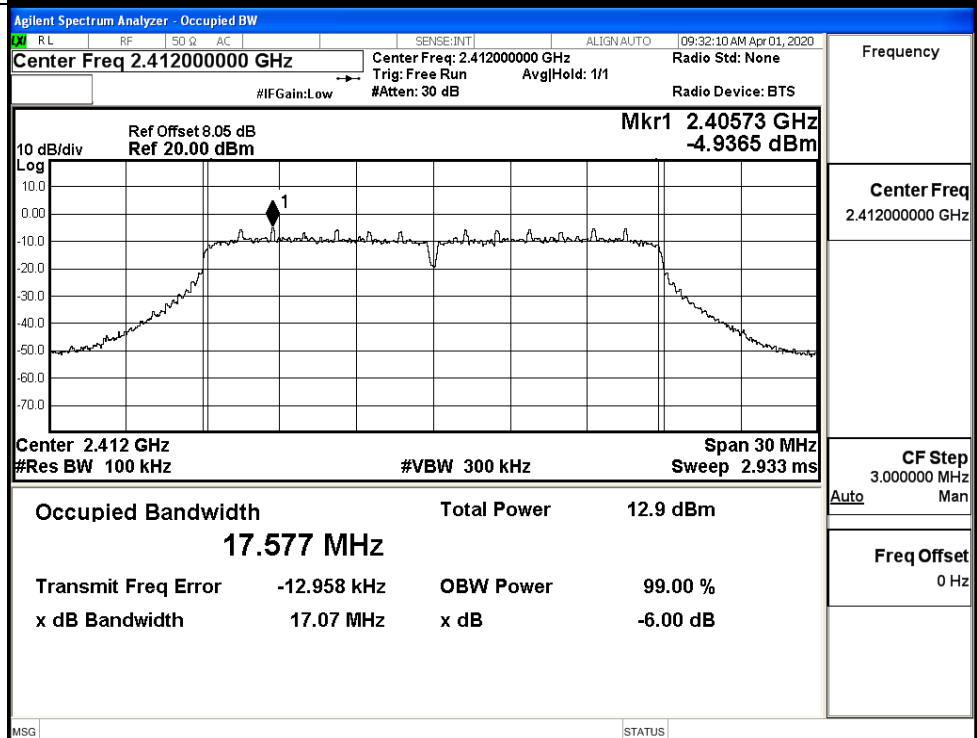
11G/MCH



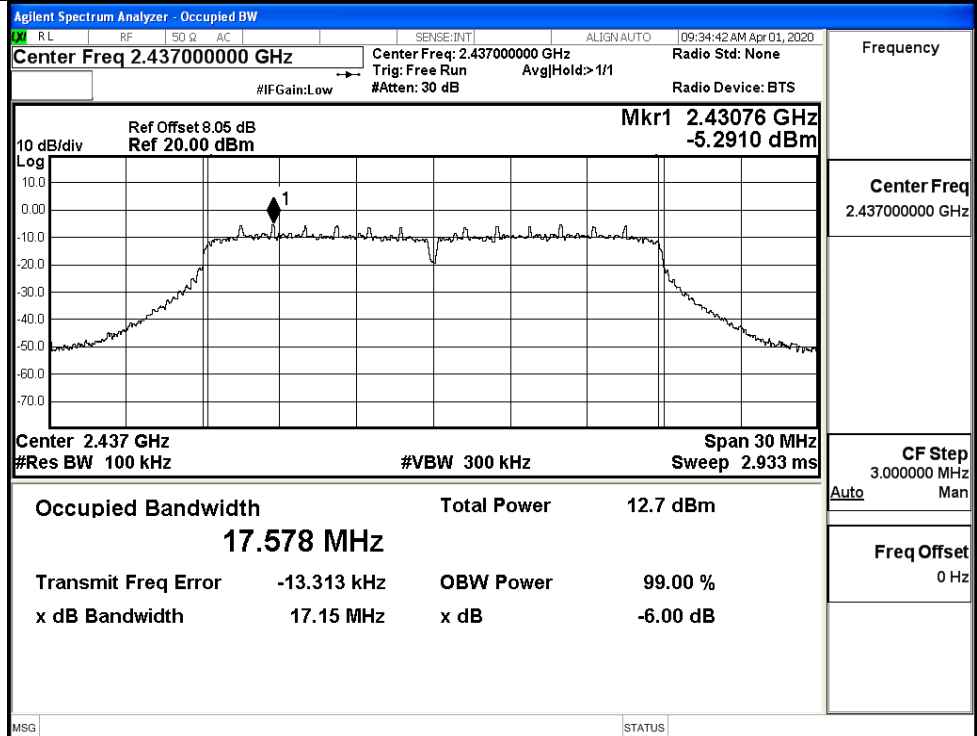
11G/HCH



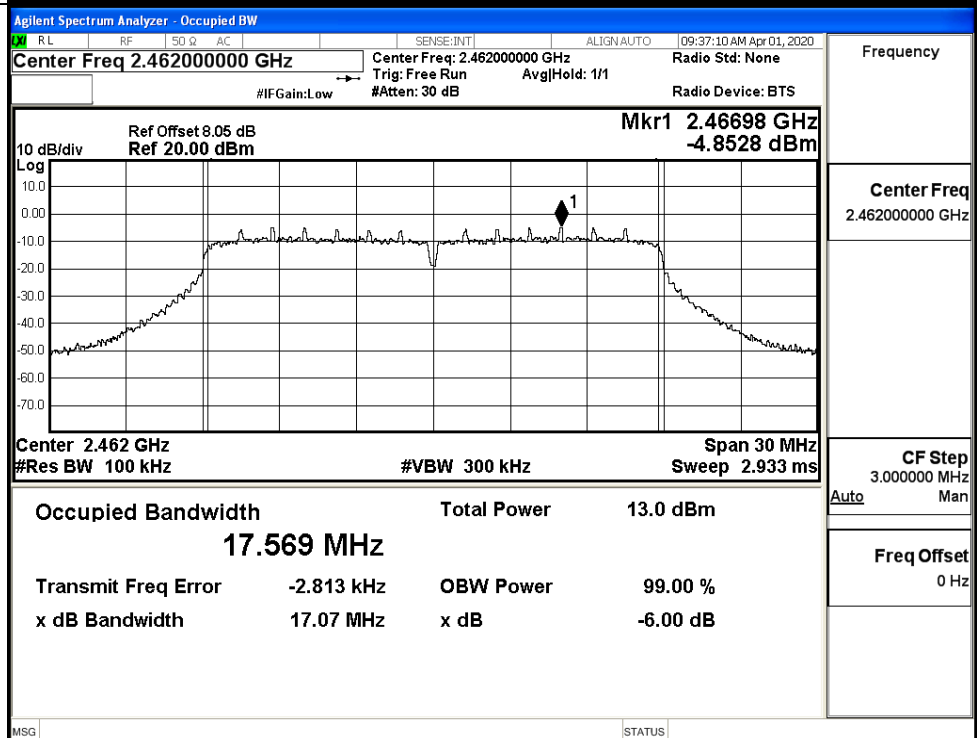
11N20SISO/LCH



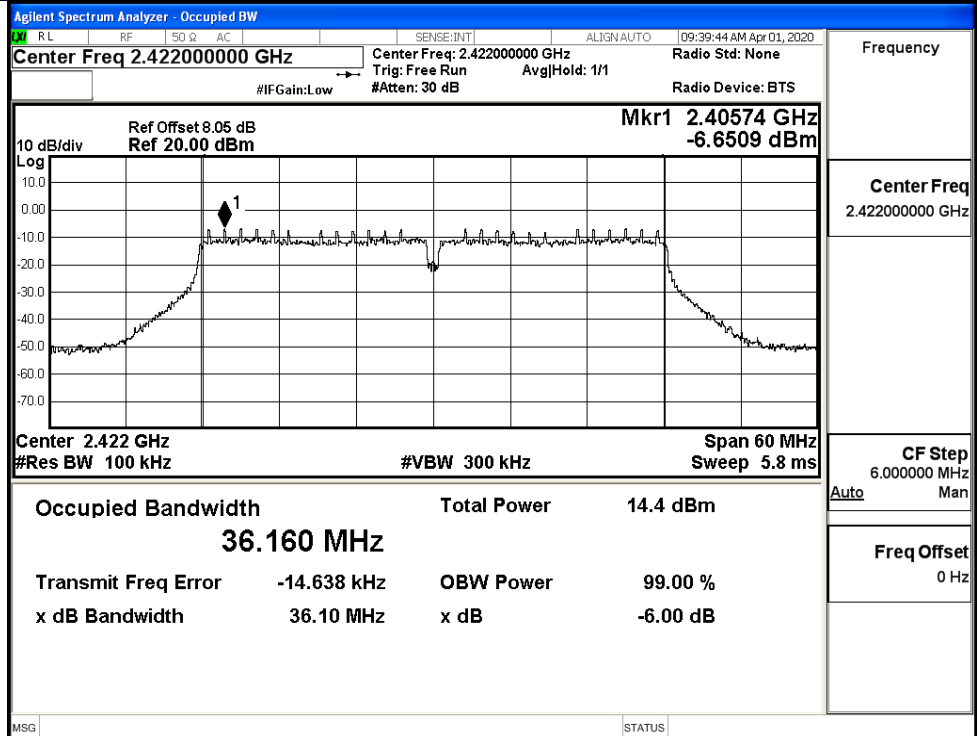
11N20SISO/MCH



11N20SISO/HCH



11N40SISO/LCH



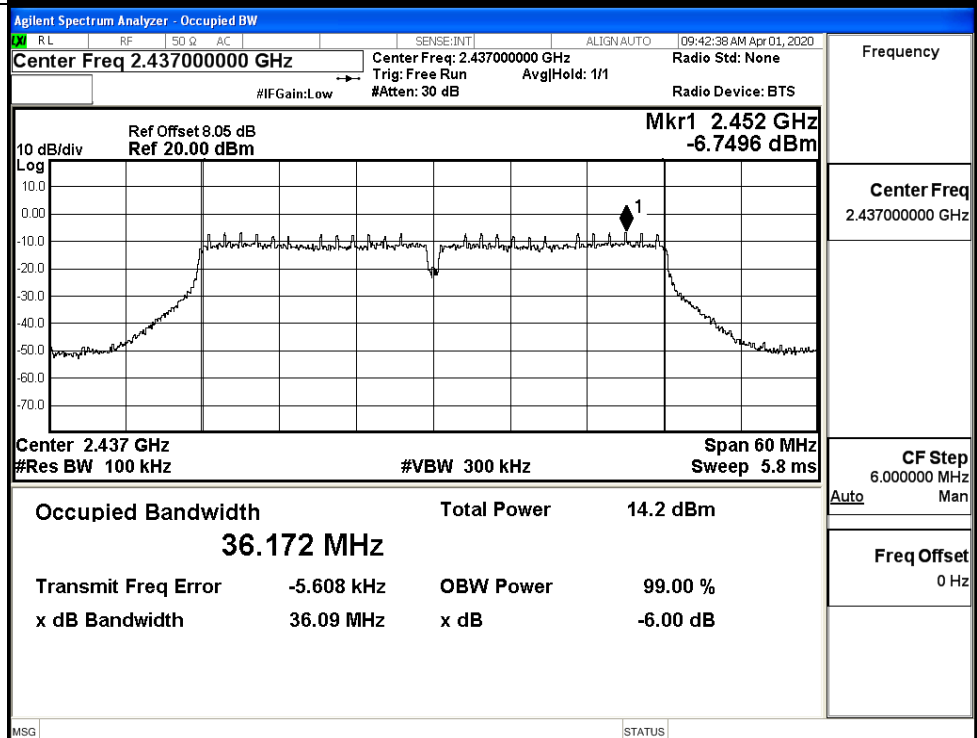
Frequency

Center Freq
2.422000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

11N40SISO/MCH



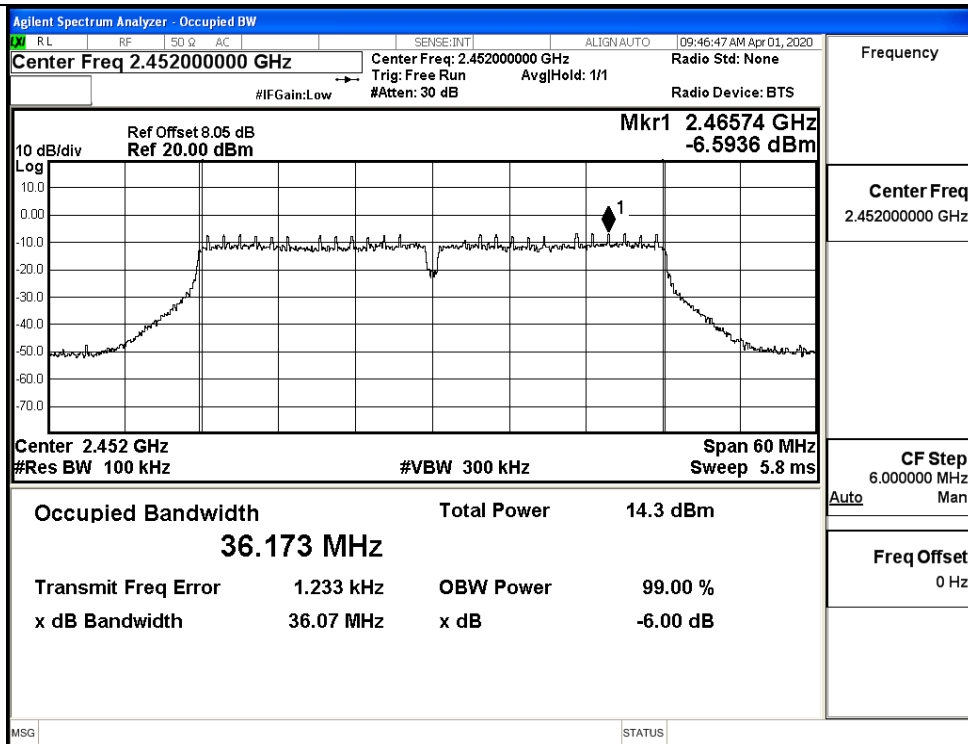
Frequency

Center Freq
2.437000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

11N40SISO/HCH



Frequency

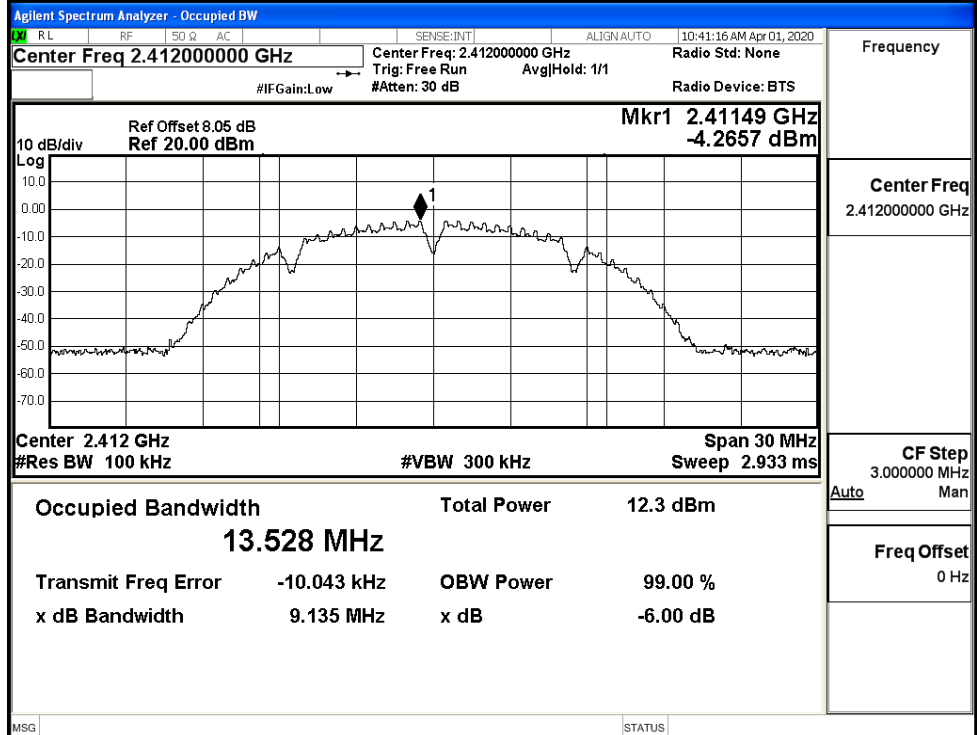
Center Freq
2.45200000 GHz

CF Step
6.000000 MHz
Auto Man

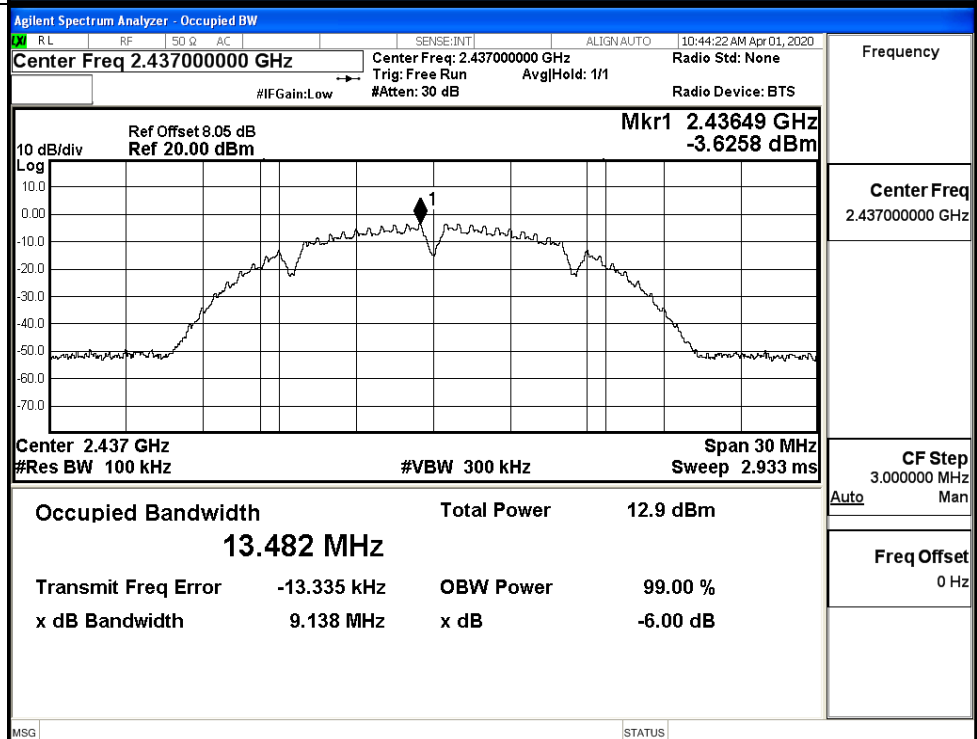
Freq Offset
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Test Graphs_Ant_1

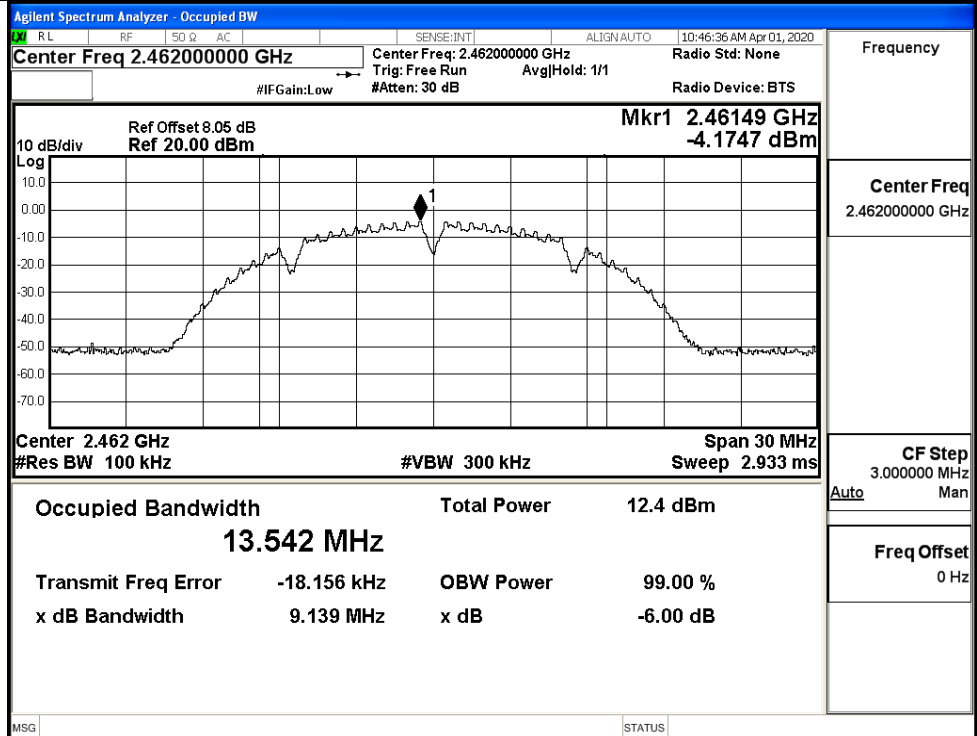
11B/LCH



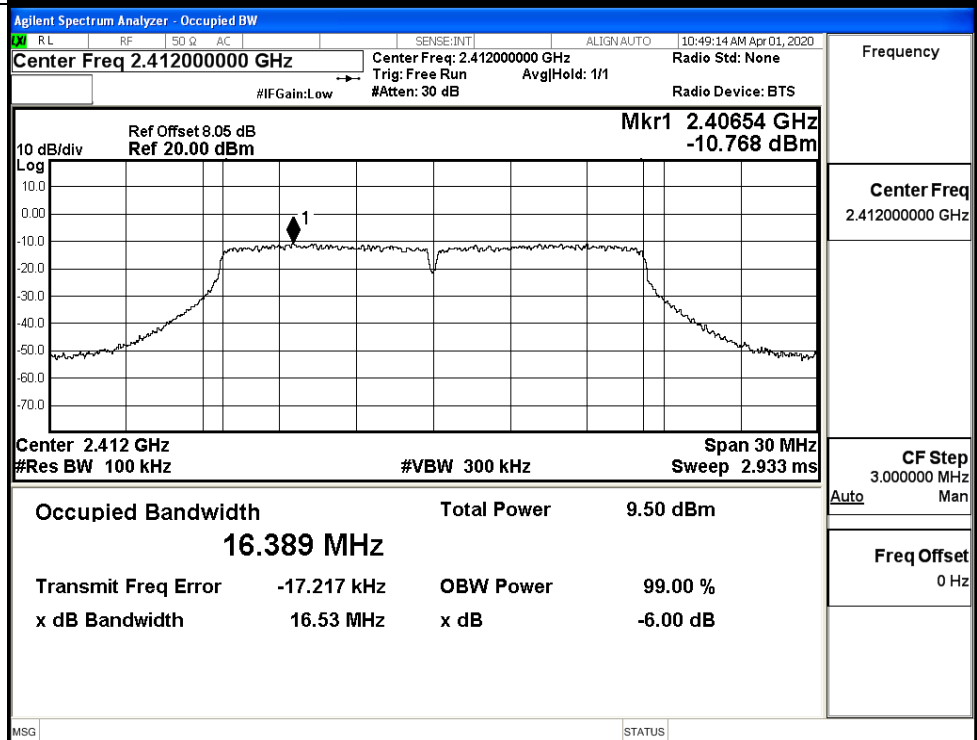
11B/MCH



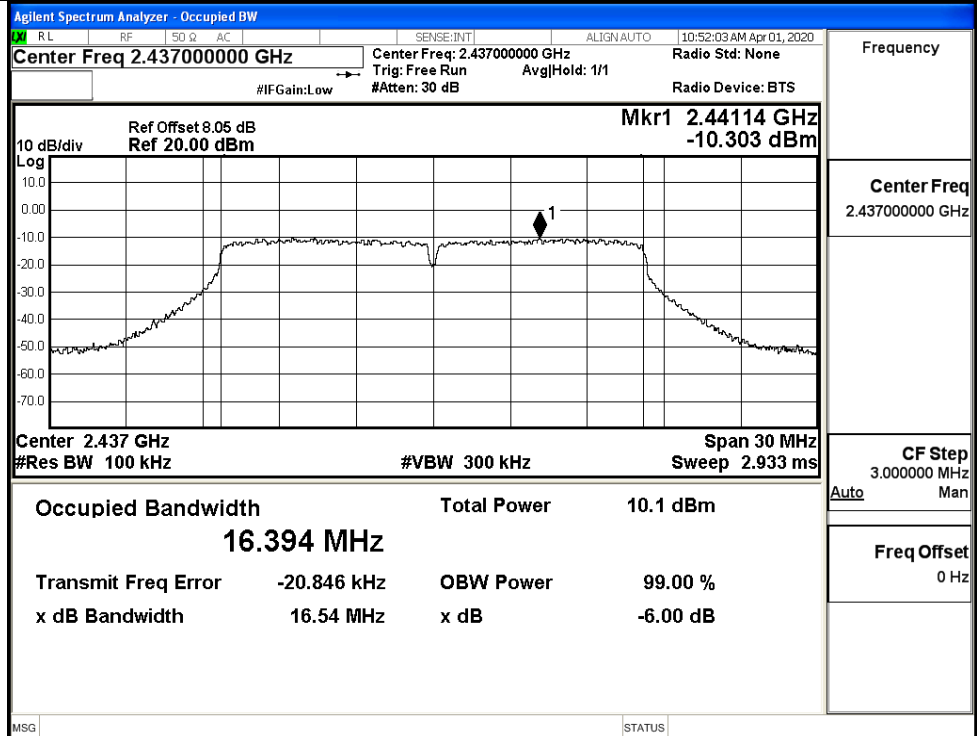
11B/HCH



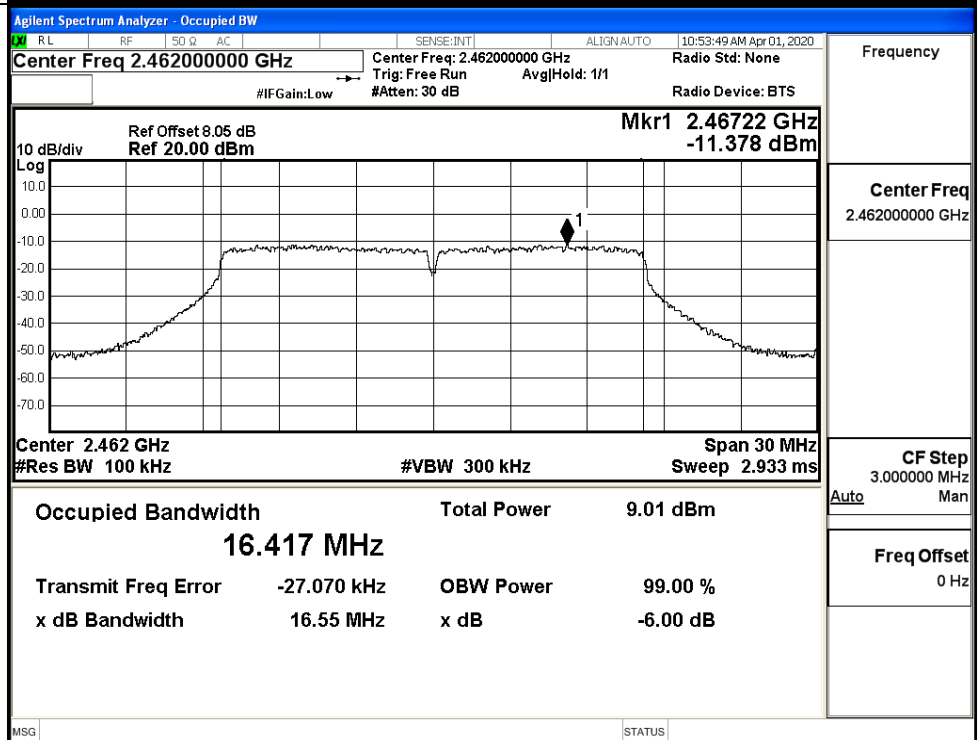
11G/LCH



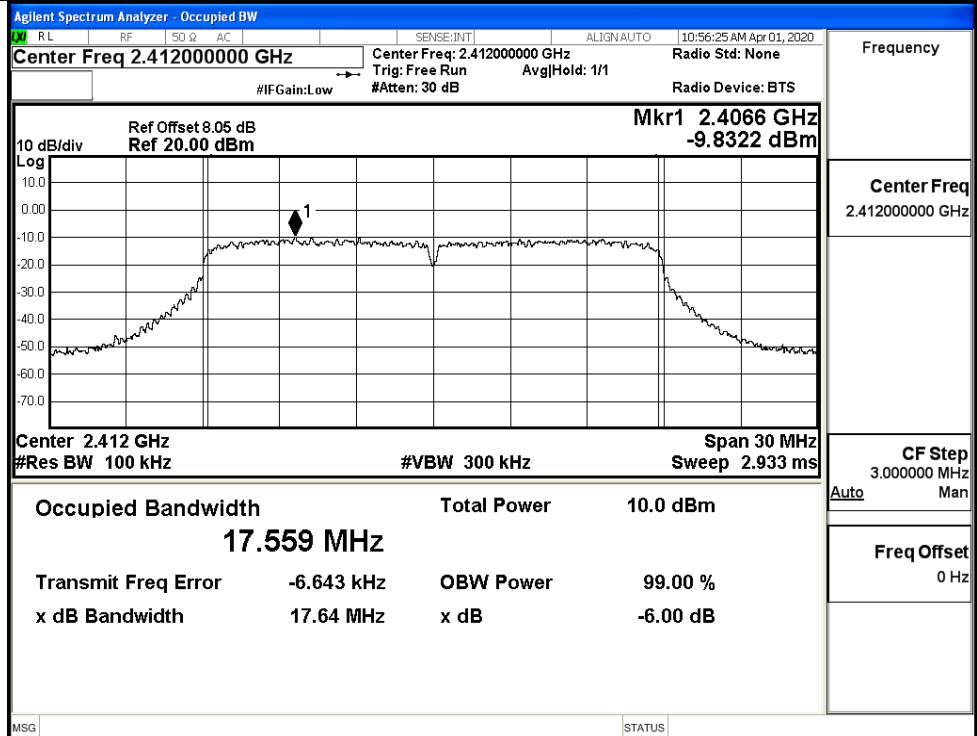
11G/MCH



11G/HCH



11N20SISO/LCH



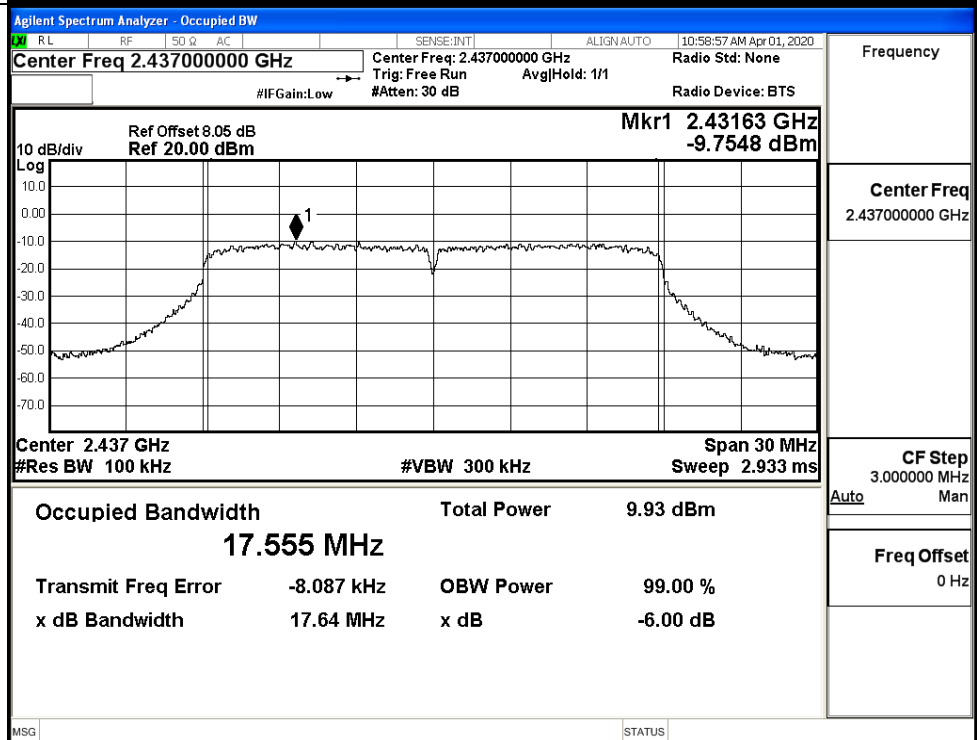
Frequency

Center Freq
2.41200000 GHz

CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

11N20SISO/MCH

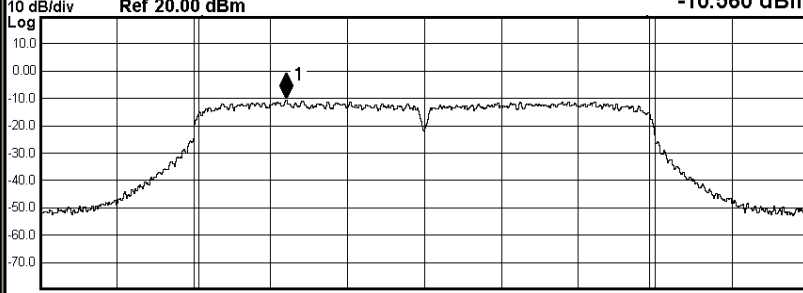


Frequency

Center Freq
2.43700000 GHz

CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

11N20SISO/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN AUTO 11:02:55 AM Apr 01, 2020 Center Freq 2.462000000 GHz Center Freq: 2.462000000 GHz Trig: Free Run Avg/Hold: 1/1 Radio Std: None Radio Device: BTS #IF Gain: Low #Atten: 30 dB Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.4566 GHz -10.560 dBm  Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.565 MHz Total Power 9.37 dBm Transmit Freq Error -14.874 kHz OBW Power 99.00 % x dB Bandwidth 17.66 MHz x dB -6.00 dB MSG STATUS
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Frequency

Center Freq

2.462000000 GHz

CF Step

3.000000 MHz

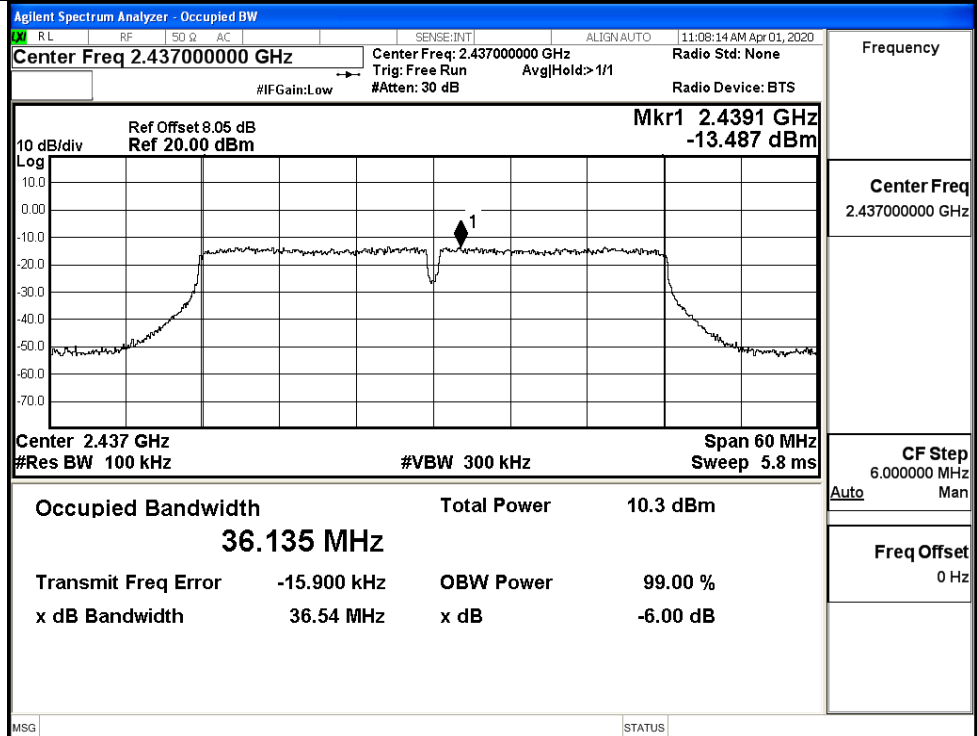
Auto

Man

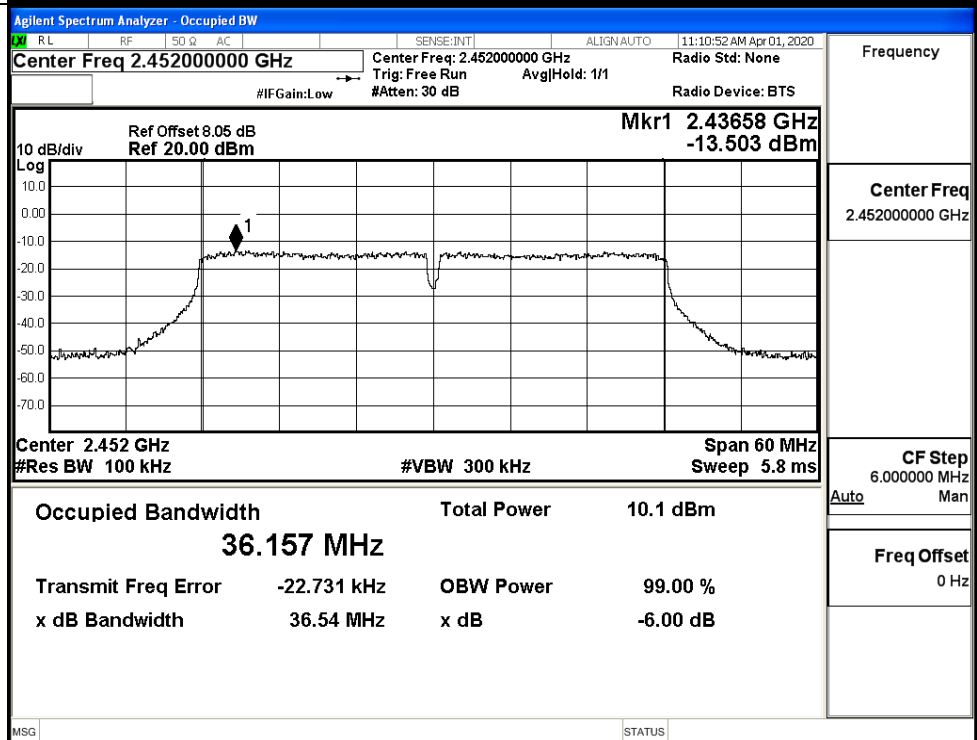
Freq Offset

0 Hz

11N40SISO/MCH



11N40SISO/HCH

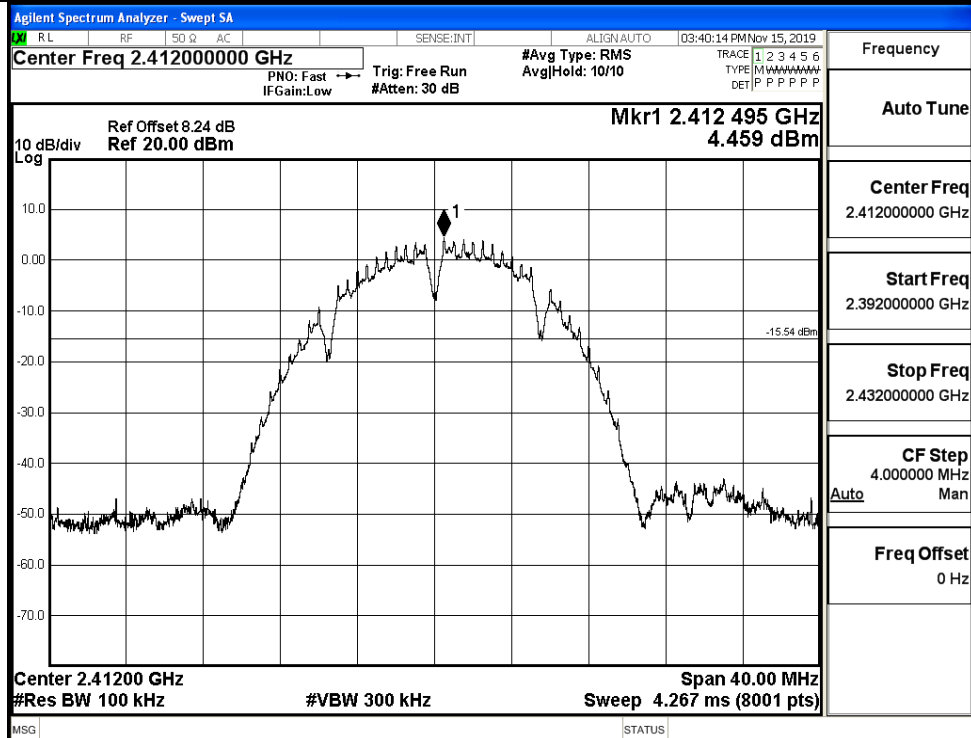


C.5 RF Conducted Spurious Emissions**Ant_0**

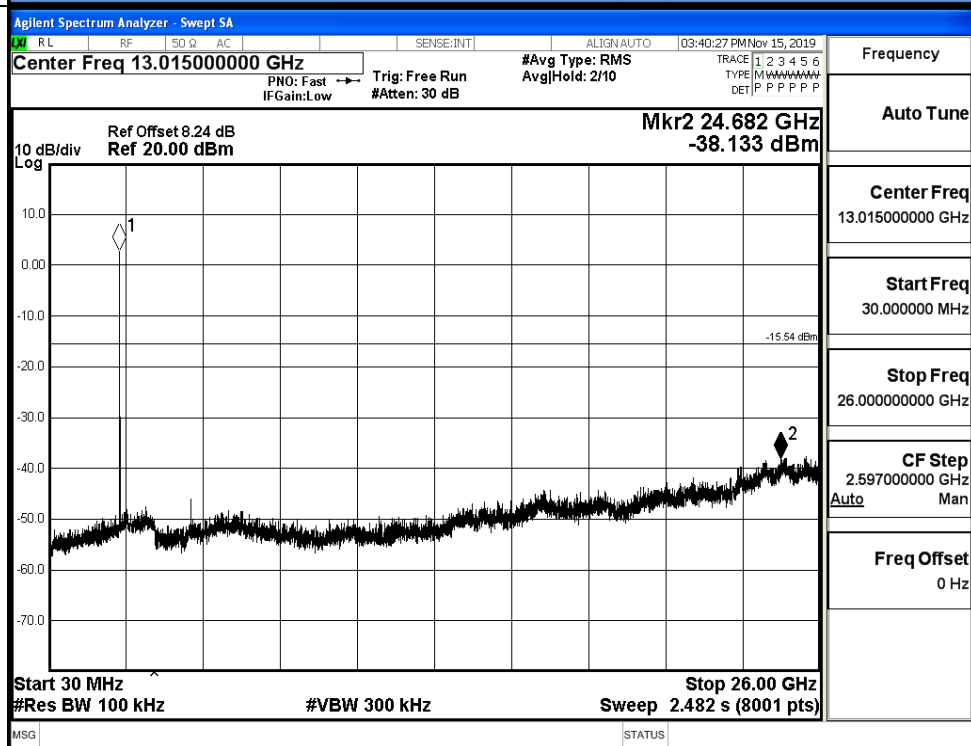
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	LCH	-0.599	-37.769	-20.599	PASS
	MCH	-0.713	-36.369	-20.713	PASS
	HCH	-0.792	-37.933	-20.792	PASS
11G	LCH	-5.802	-38.036	-25.802	PASS
	MCH	-5.76	-37.855	-25.760	PASS
	HCH	-5.614	-37.563	-25.614	PASS
11N20	LCH	-5.127	-38.232	-25.127	PASS
	MCH	-5.395	-37.957	-25.395	PASS
	HCH	-5.123	-37.371	-25.123	PASS
11N40	LCH	-6.942	-37.491	-26.942	PASS
	MCH	-6.999	-36.962	-26.999	PASS
	HCH	-6.637	-37.421	-26.637	PASS

11B LCH Graphs Ant 0

Pref/11B/LCH

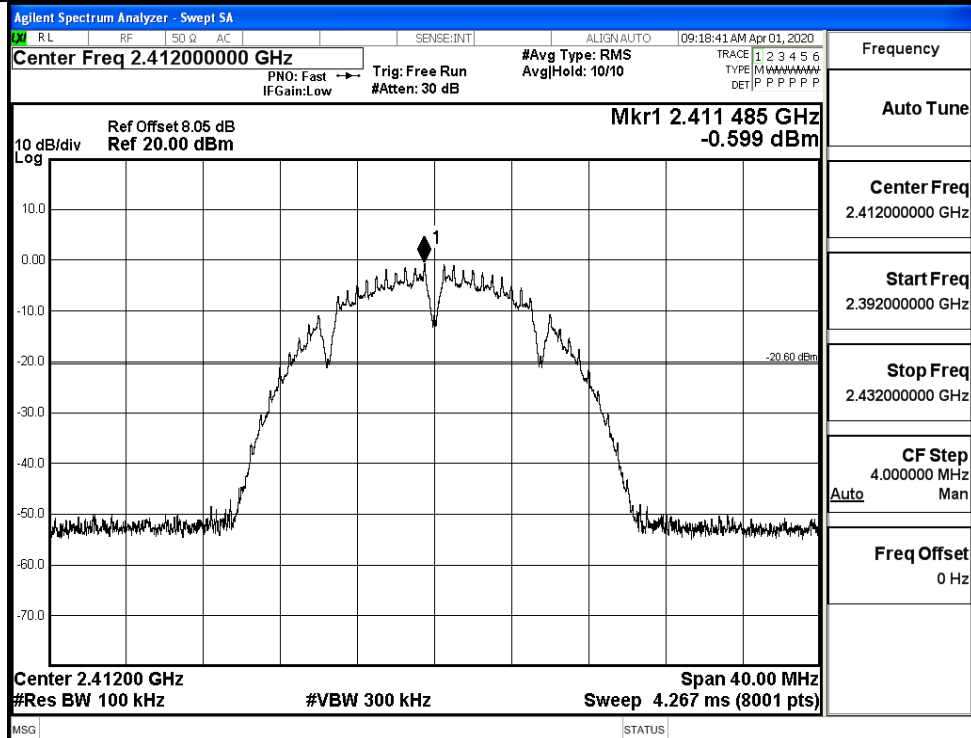


Puw/11B/LCH

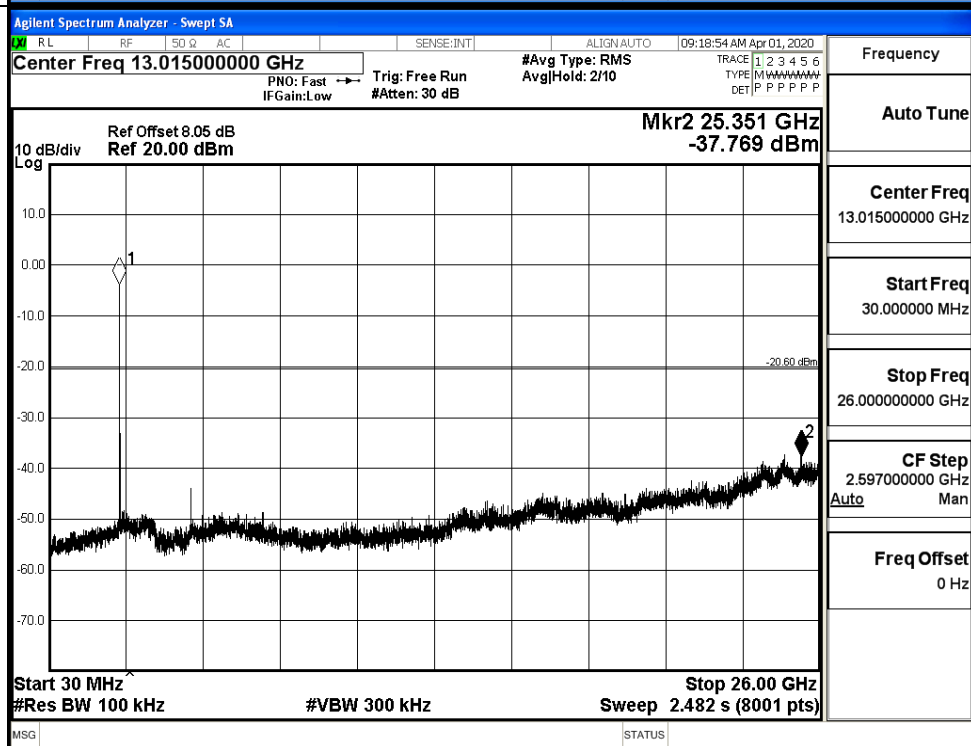


11B LCH Graphs Ant 0

Pref/11B/LCH

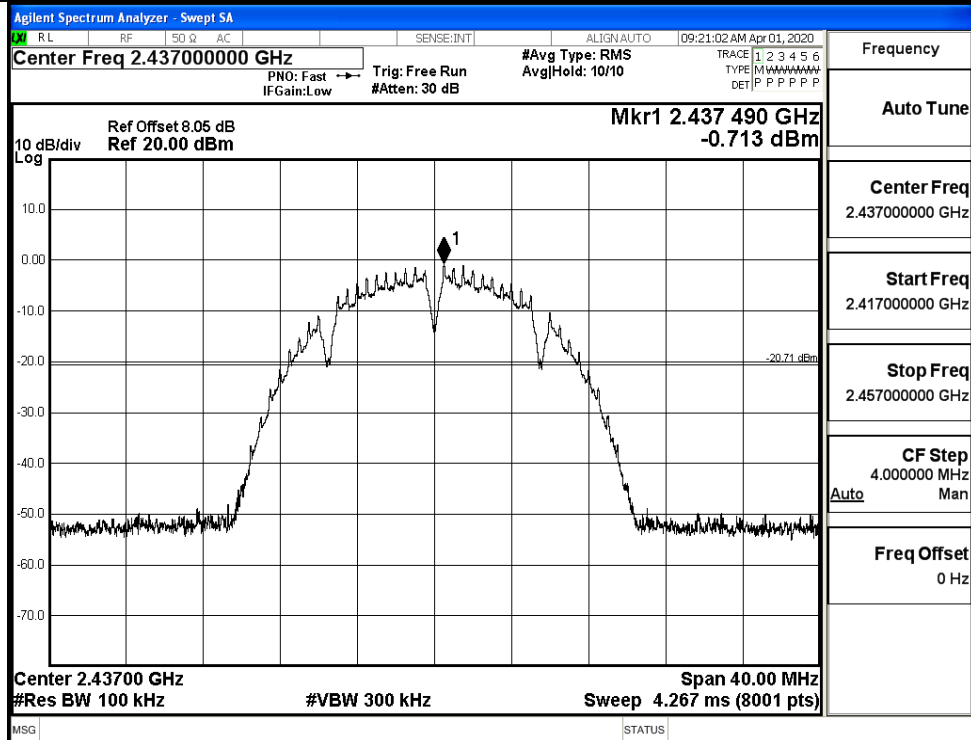


Puw/11B/LCH

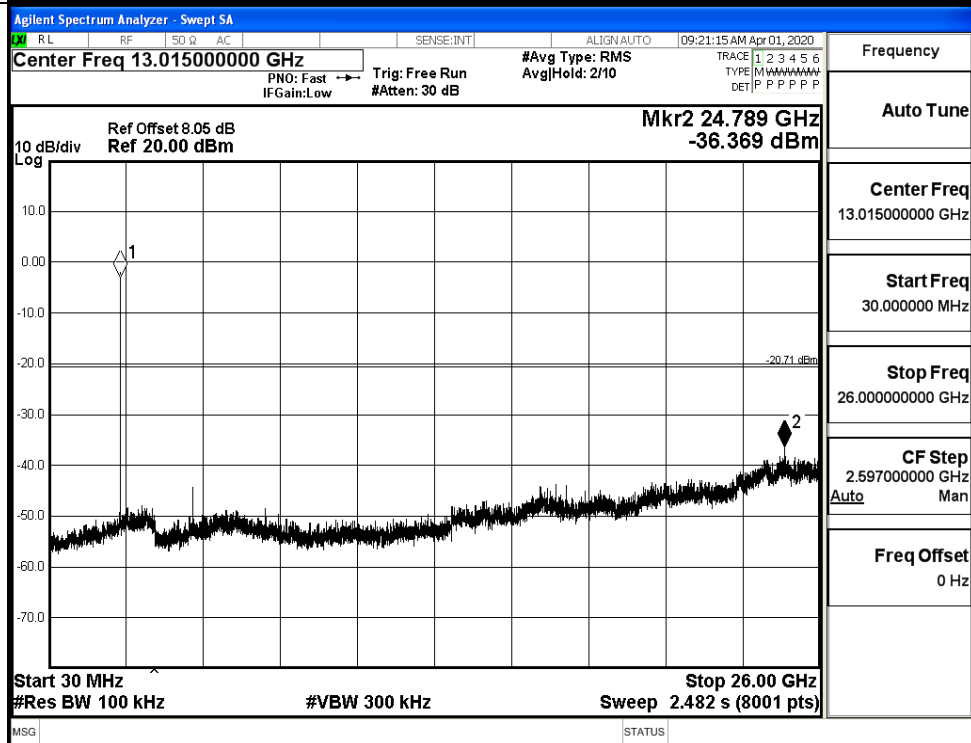


11B MCH Graphs Ant 0

Pref/11B/MCH

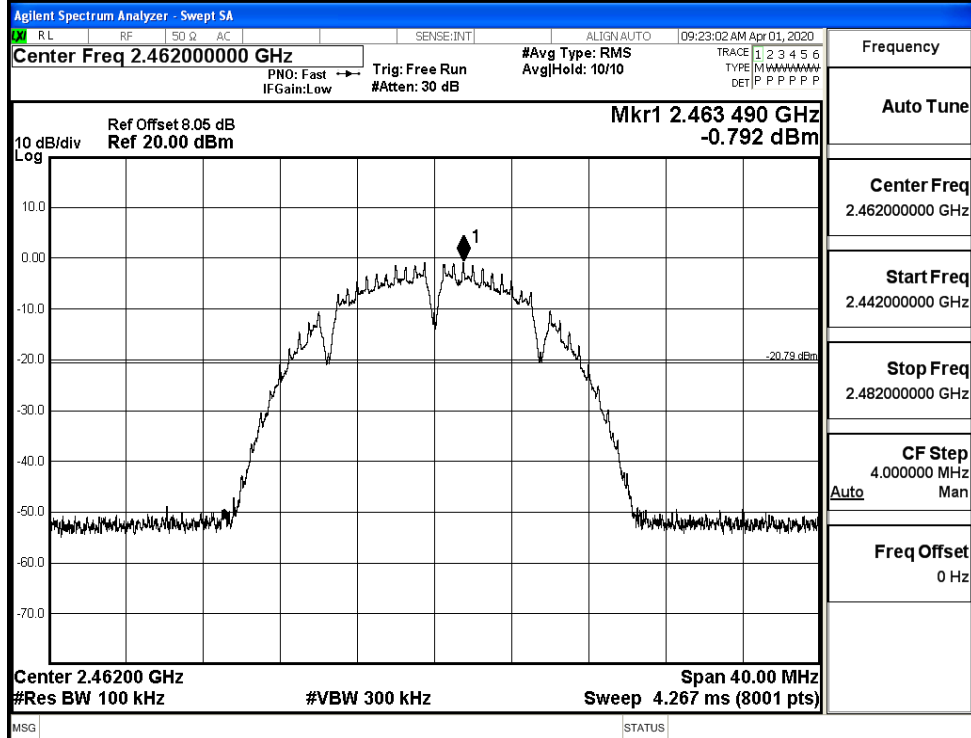


Puw/11B/MCH

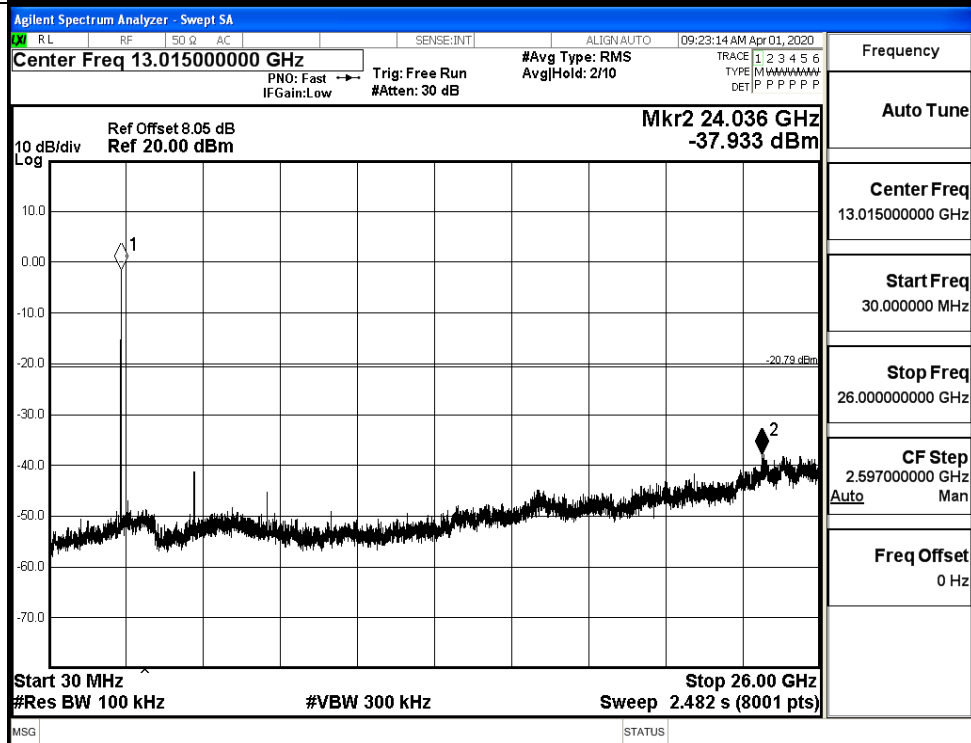


11B HCH Graphs Ant 0

Pref/11B/HCH

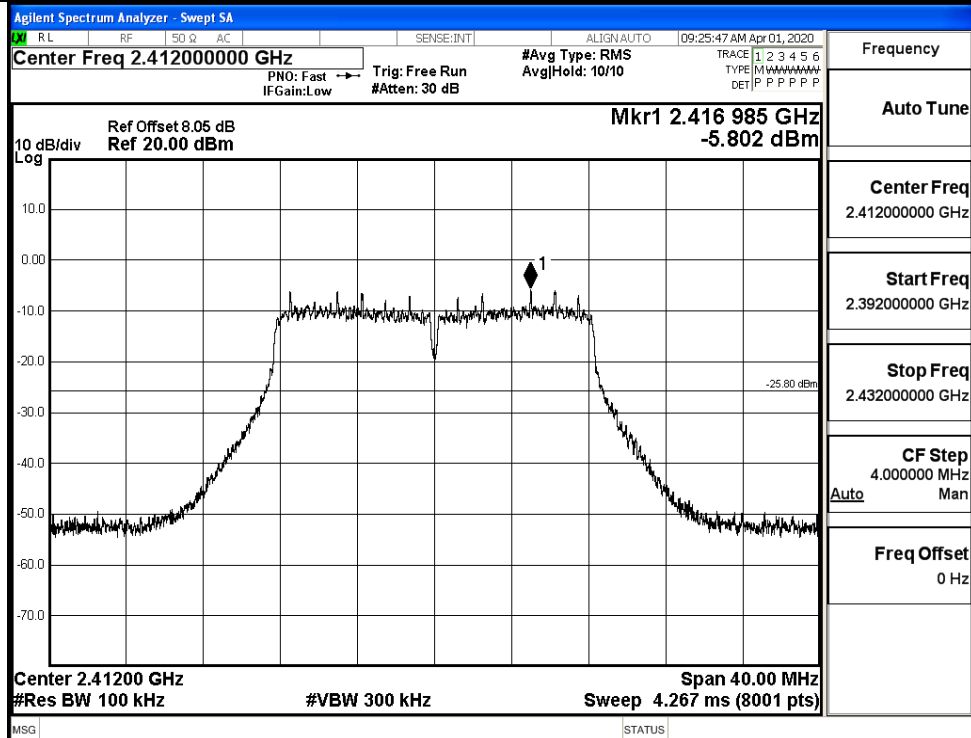


Puw/11B/HCH

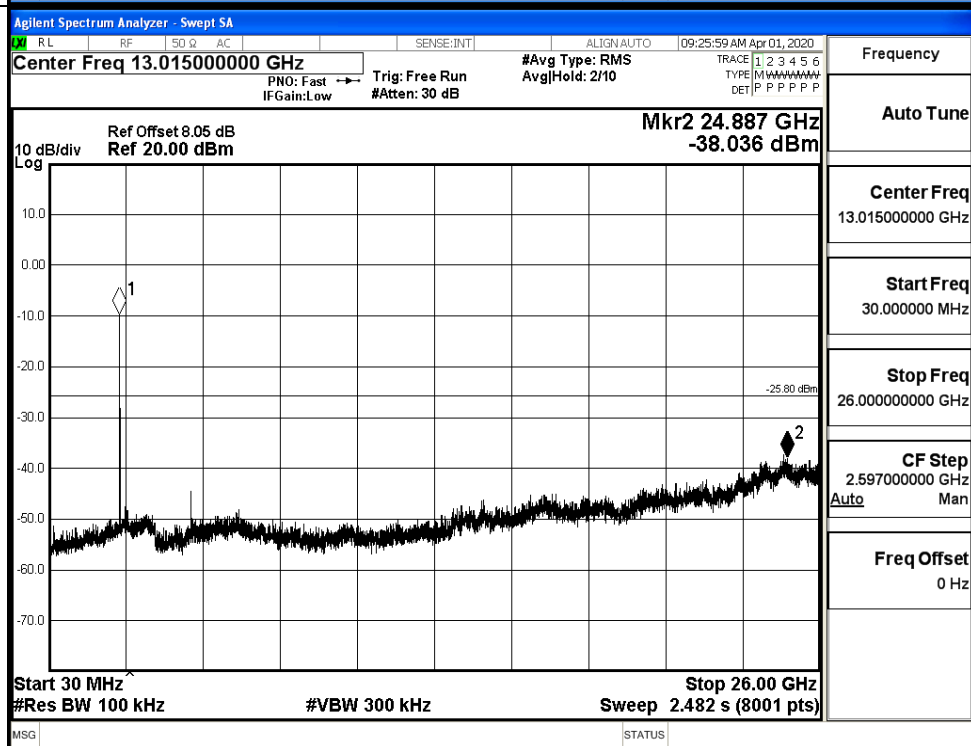


11G LCH Graphs Ant 0

Pref/11G/LCH

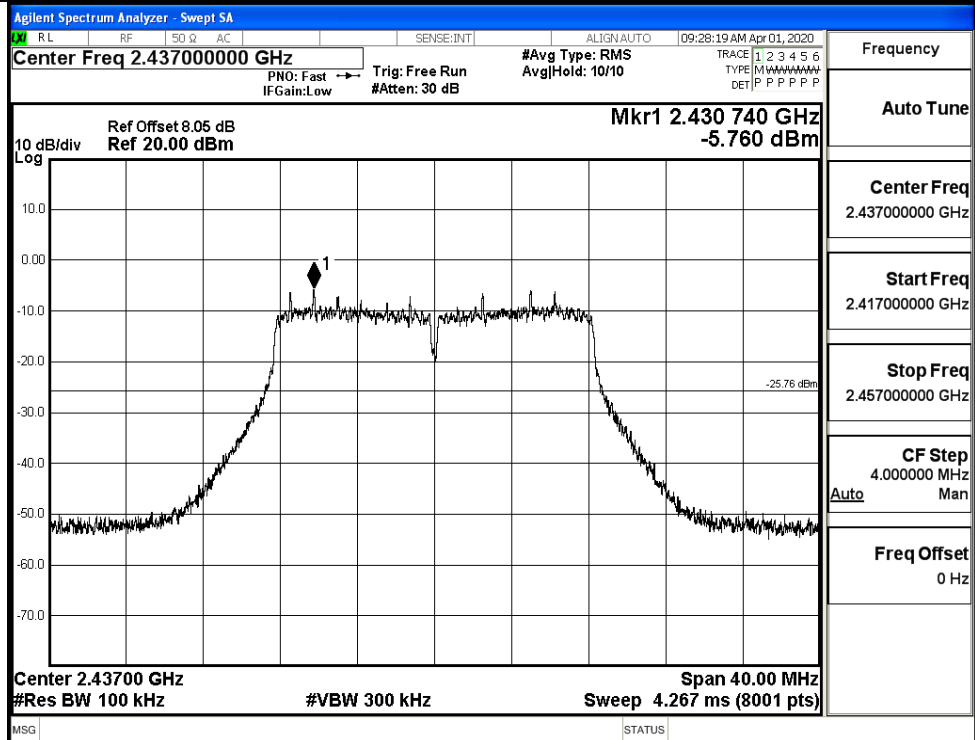


Puw/11G/LCH

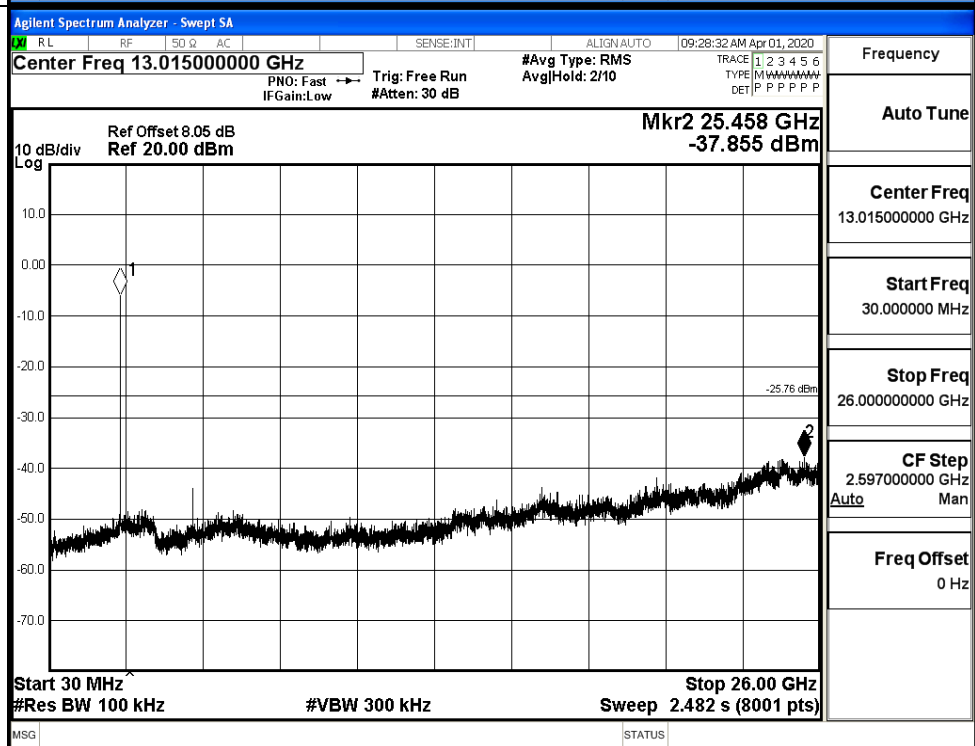


11G_MCH Graphs Ant 0

Pref/11G/MCH

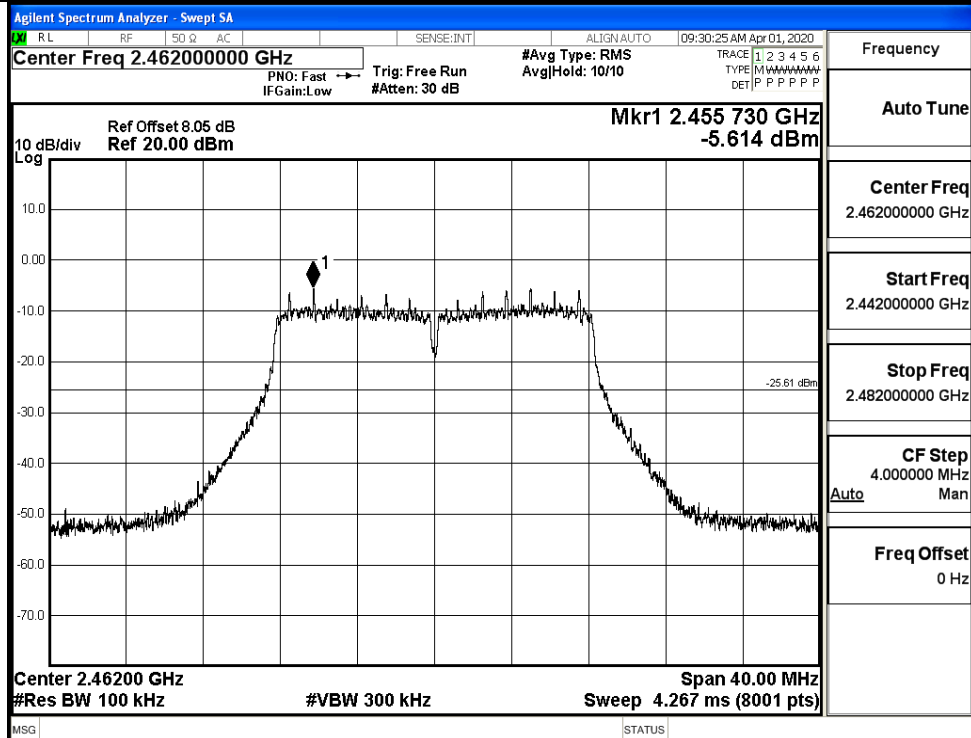


Puw/11G/MCH

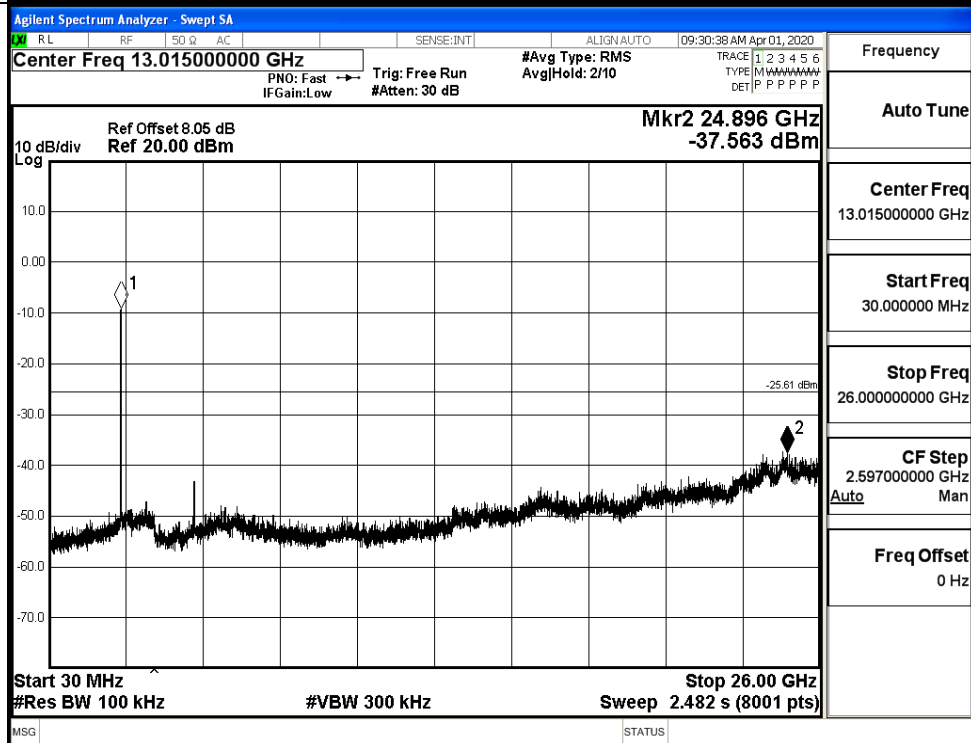


11G HCH Graphs Ant 0

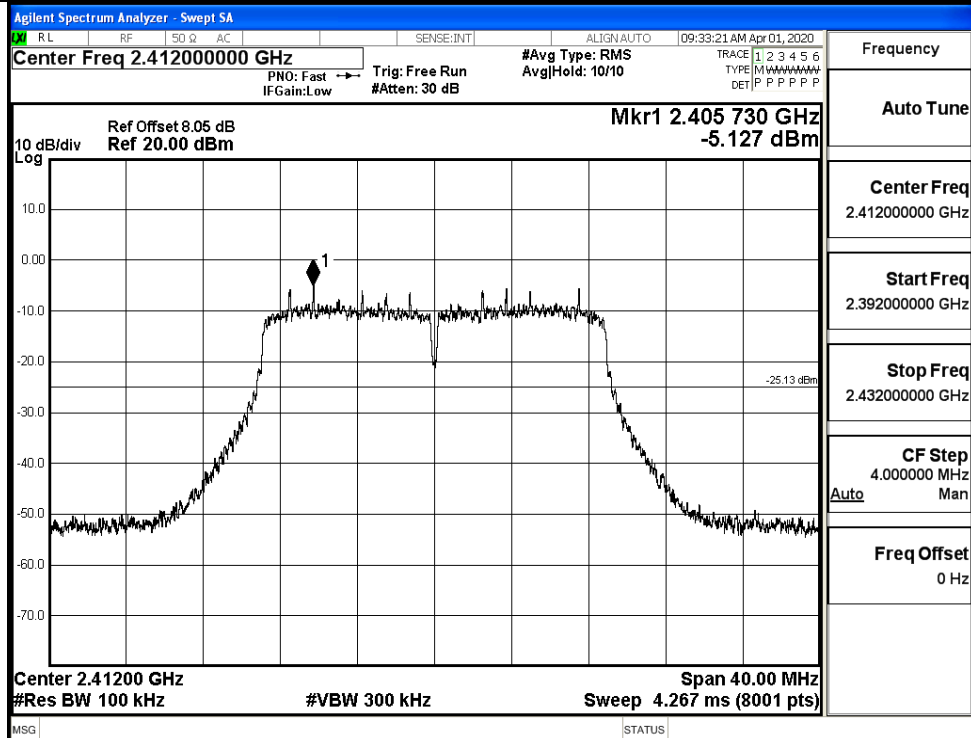
Pref/11G/HCH



Puw/11G/HCH



11N20SISO LCH Graphs Ant 0

Pref/11N20SIS
O/LCHPuw/11N20
SISO/LCH