

Appendix C

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: HyBook Plus

Trade Mark: Hyundai

Test Model: HT13FBI381SG

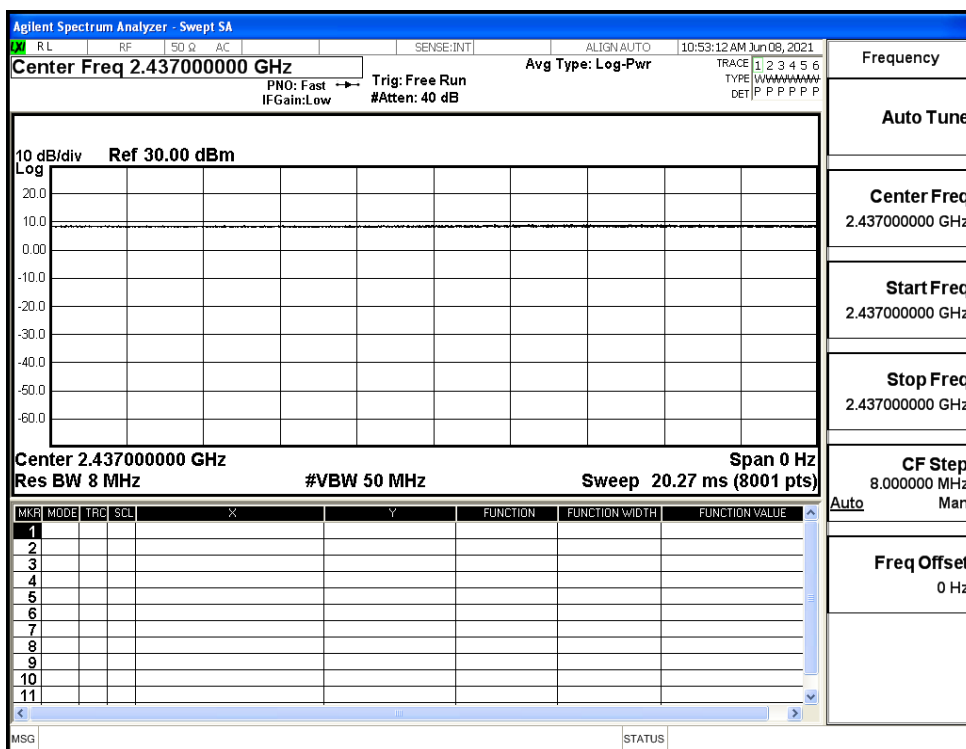
Environmental Conditions

Temperature:	22.6° C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

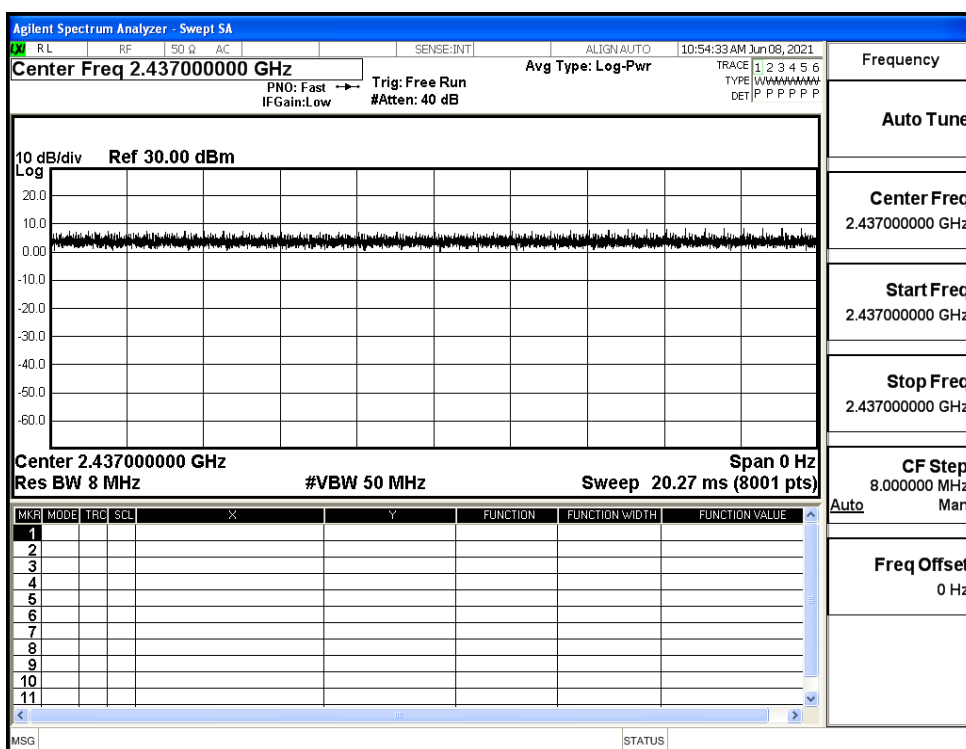
C.1 Duty Cycle

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

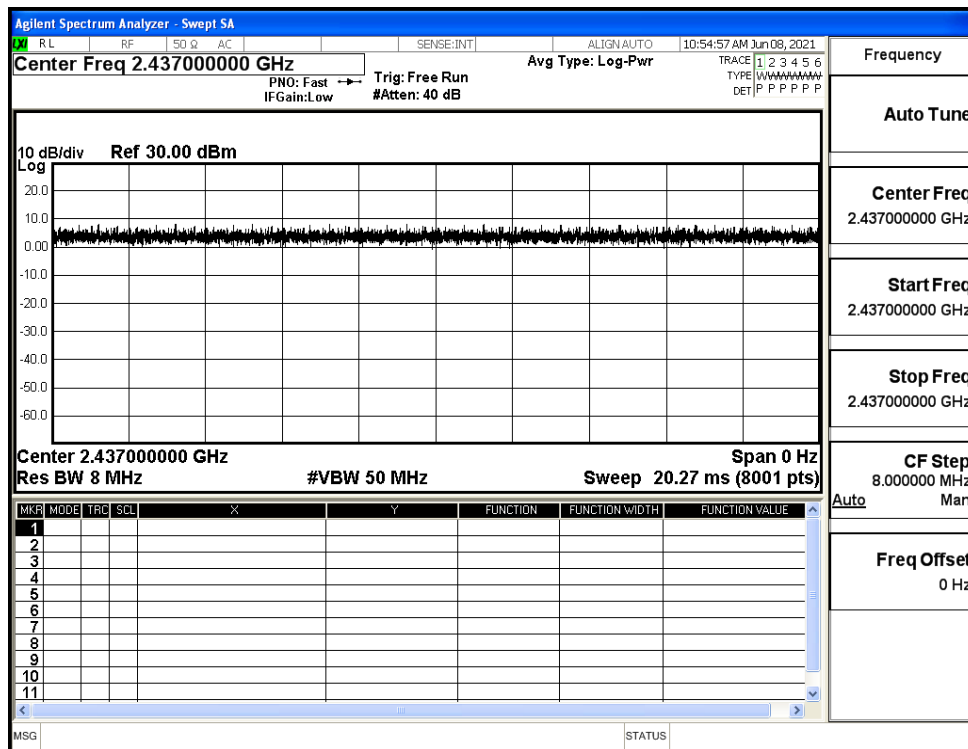
Duty Cycle_11B_2437_Ant0



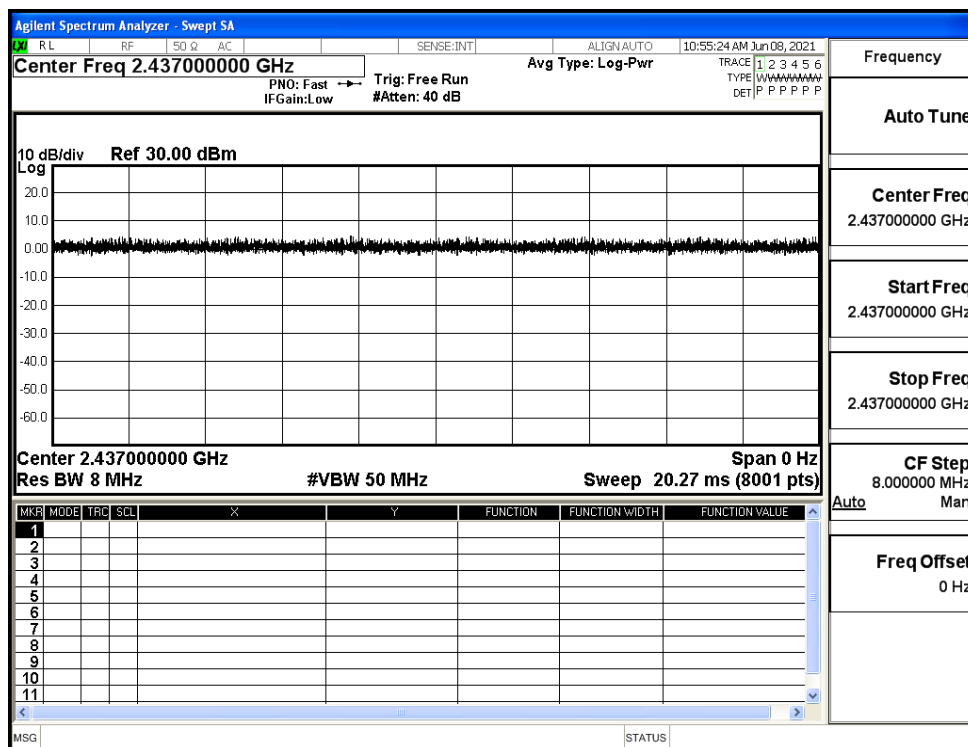
Duty Cycle_11G_2437_Ant0



Duty Cycle_11N20SISO_2437_Ant0



Duty Cycle_11N40SISO_2437_Ant0



C.2 Maximum Conducted Output Power

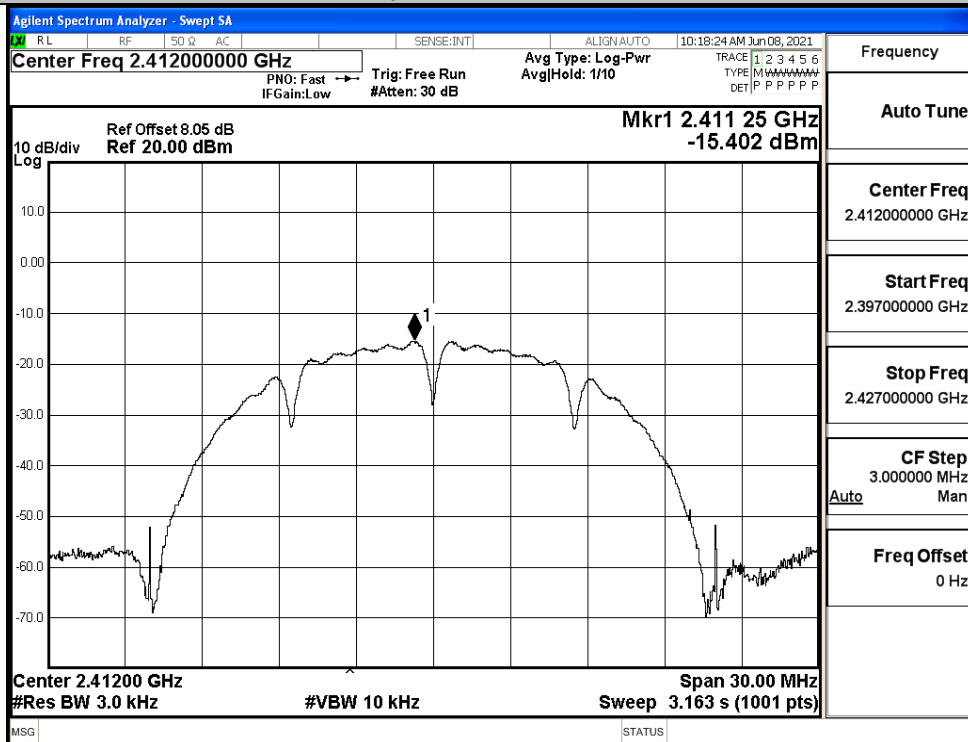
Mode	Channel	Meas.Level [dBm]	Limit [dBm]	Verdict
11B	LCH	8.42	30	PASS
	MCH	8.01	30	PASS
	HCH	8.57	30	PASS
11G	LCH	8.73	30	PASS
	MCH	8.25	30	PASS
	HCH	8.82	30	PASS
11N20SISO	LCH	8.37	30	PASS
	MCH	8.42	30	PASS
	HCH	8.95	30	PASS
11N40SISO	LCH	8.43	30	PASS
	MCH	8.13	30	PASS
	HCH	8.82	30	PASS

C.3 Maximum Power Spectral Density

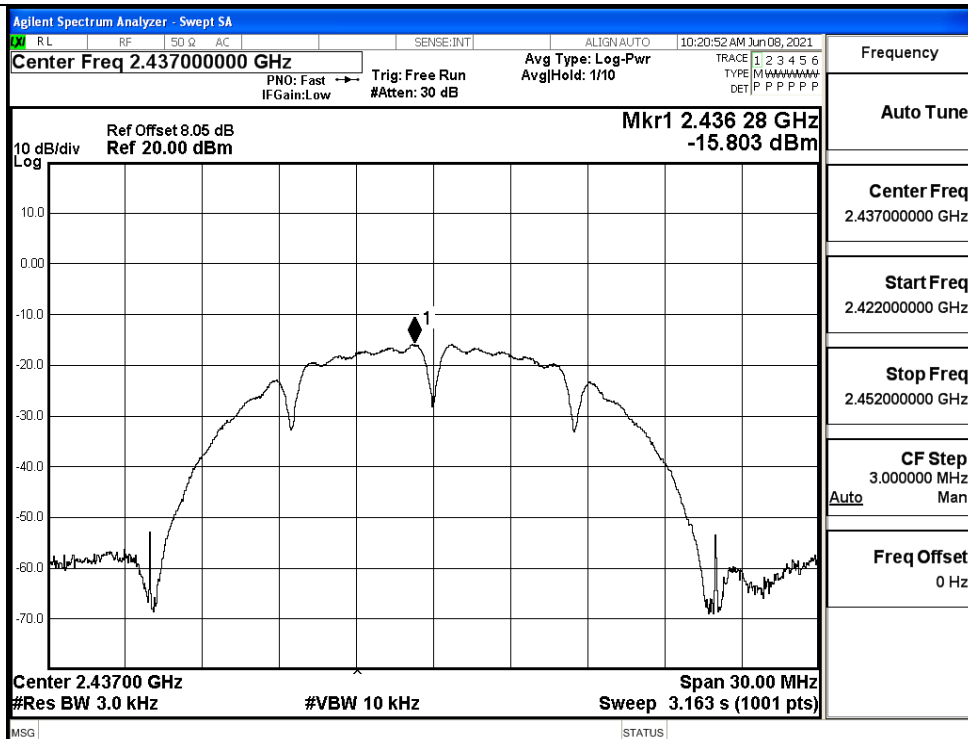
Mode	Channel	Meas.Level [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
11B	LCH	-15.402	8	PASS
	MCH	-15.803	8	PASS
	HCH	-16.307	8	PASS
11G	LCH	-18.638	8	PASS
	MCH	-18.869	8	PASS
	HCH	-19.298	8	PASS
11N20SISO	LCH	-19.004	8	PASS
	MCH	-18.775	8	PASS
	HCH	-19.061	8	PASS
11N40SISO	LCH	-20.407	8	PASS
	MCH	-20.283	8	PASS
	HCH	-21.562	8	PASS

Test Graphs

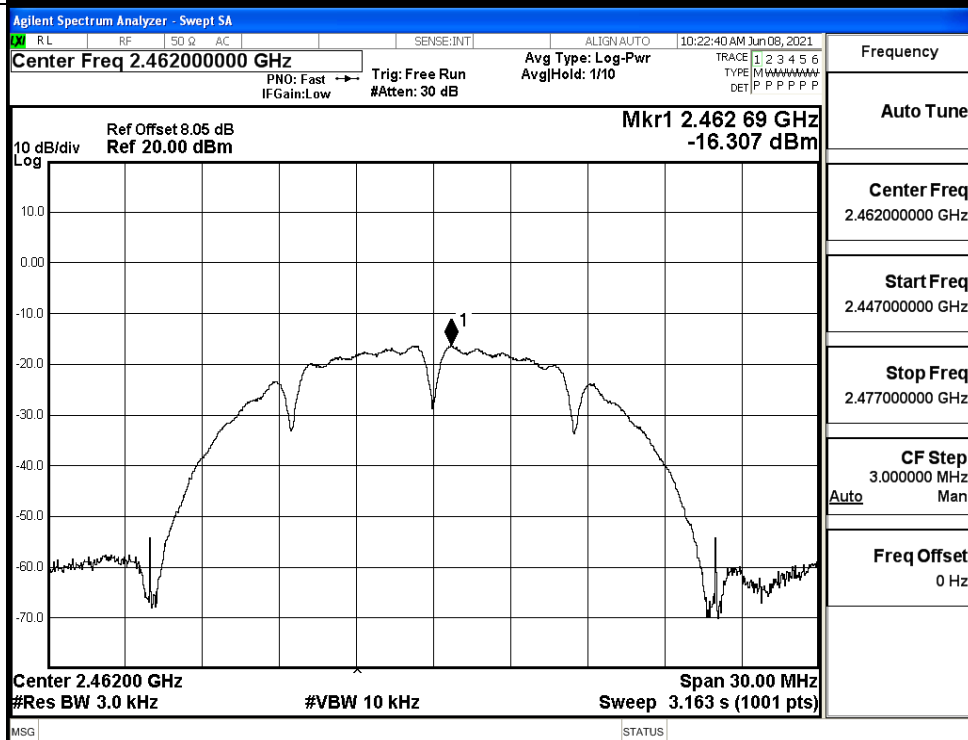
11B/LCH



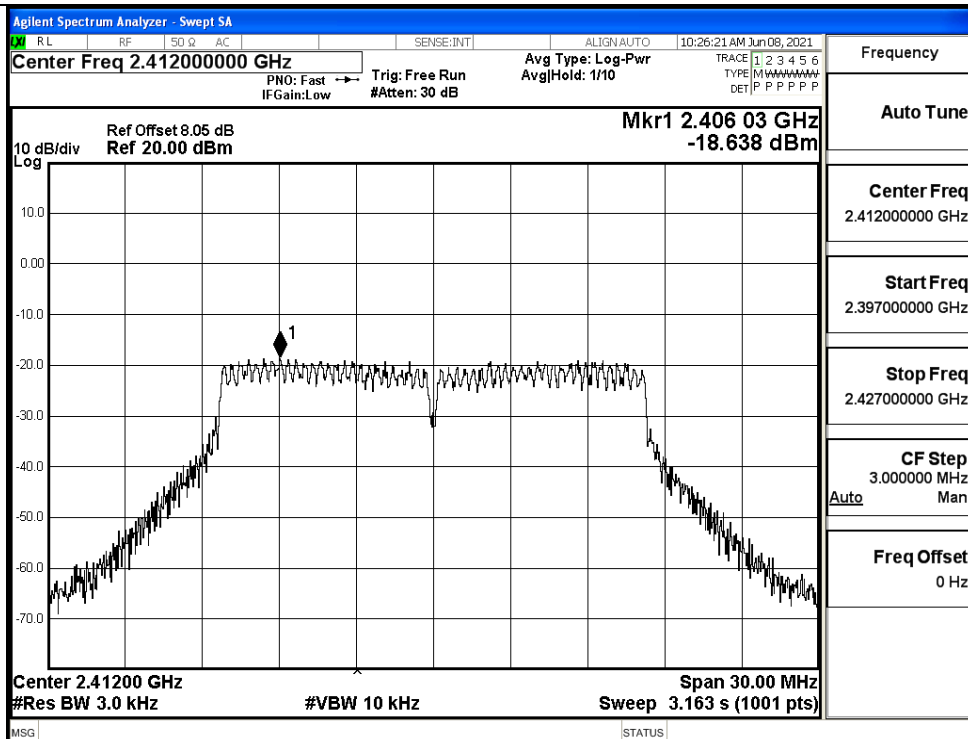
11B/MCH



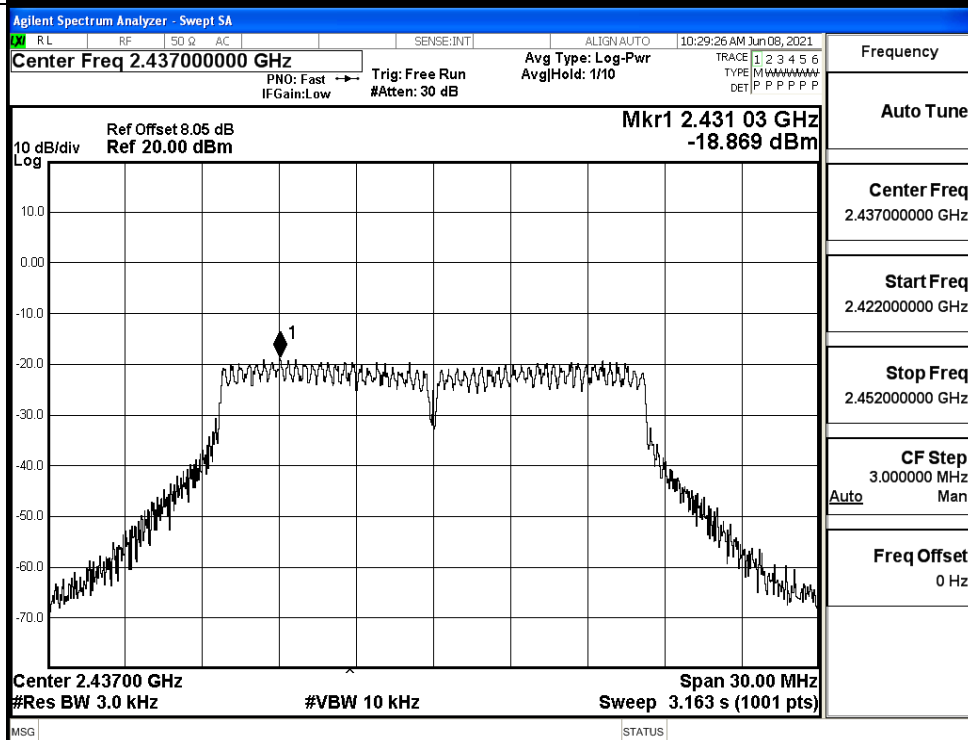
11B/HCH



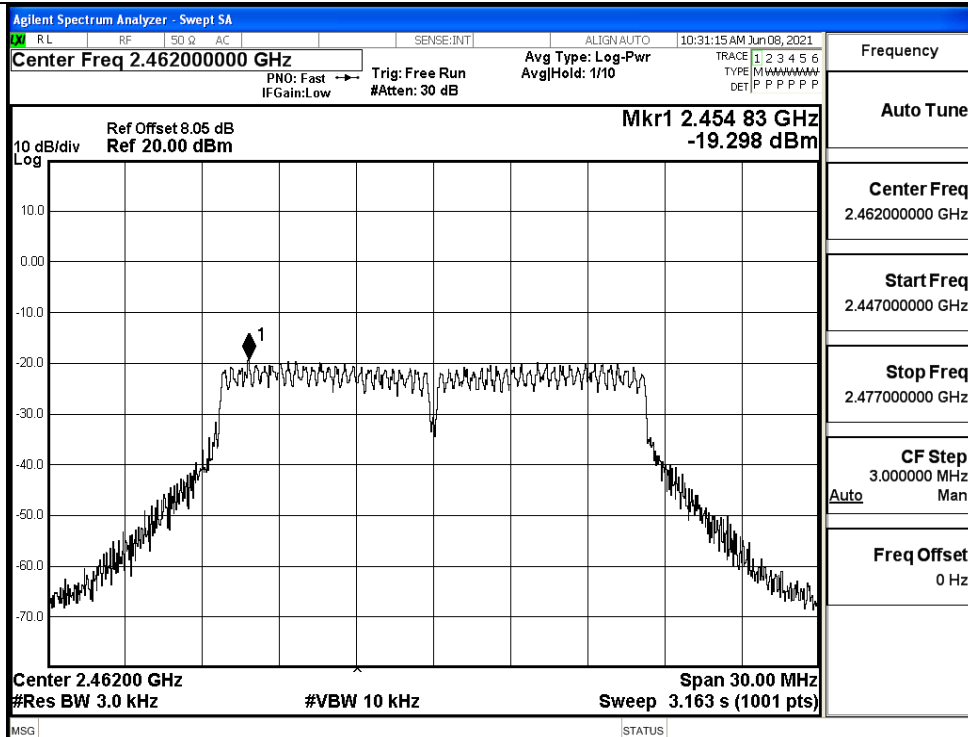
11G/LCH



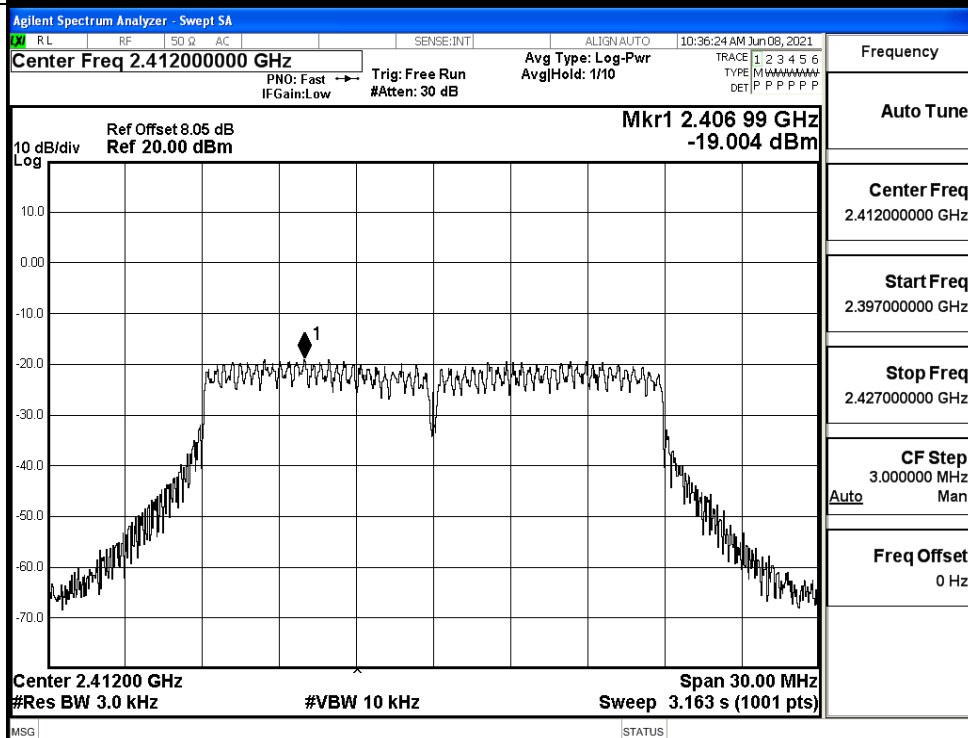
11G/MCH

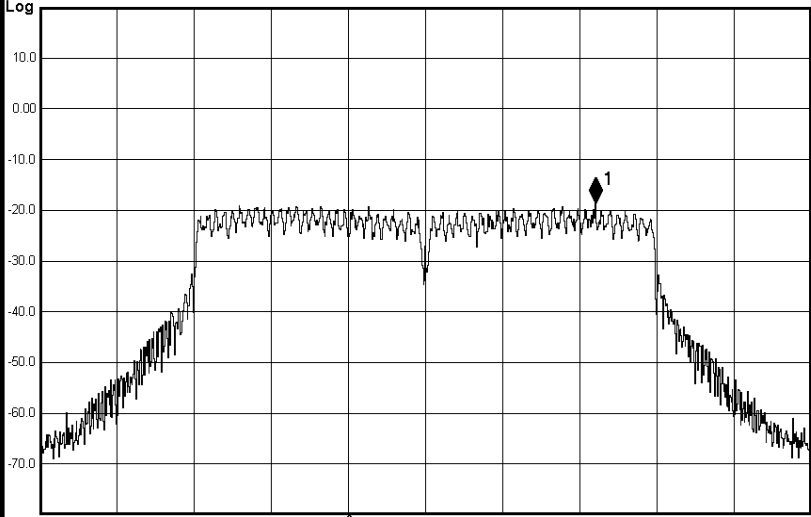
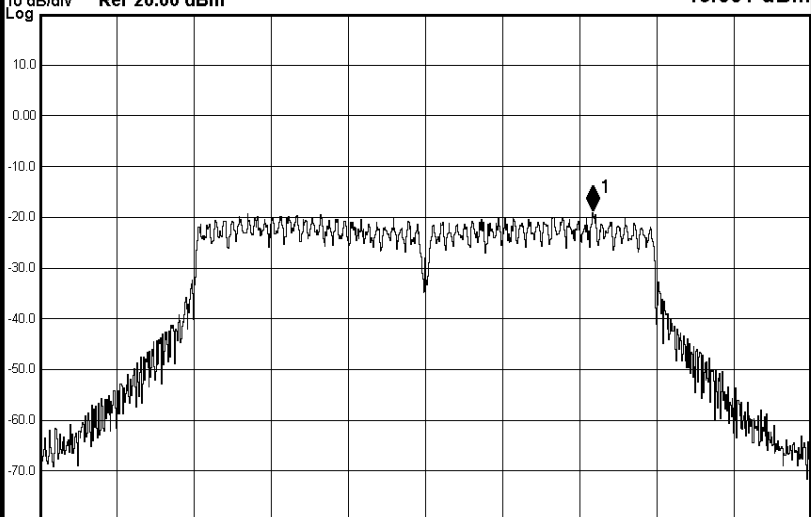


11G/HCH

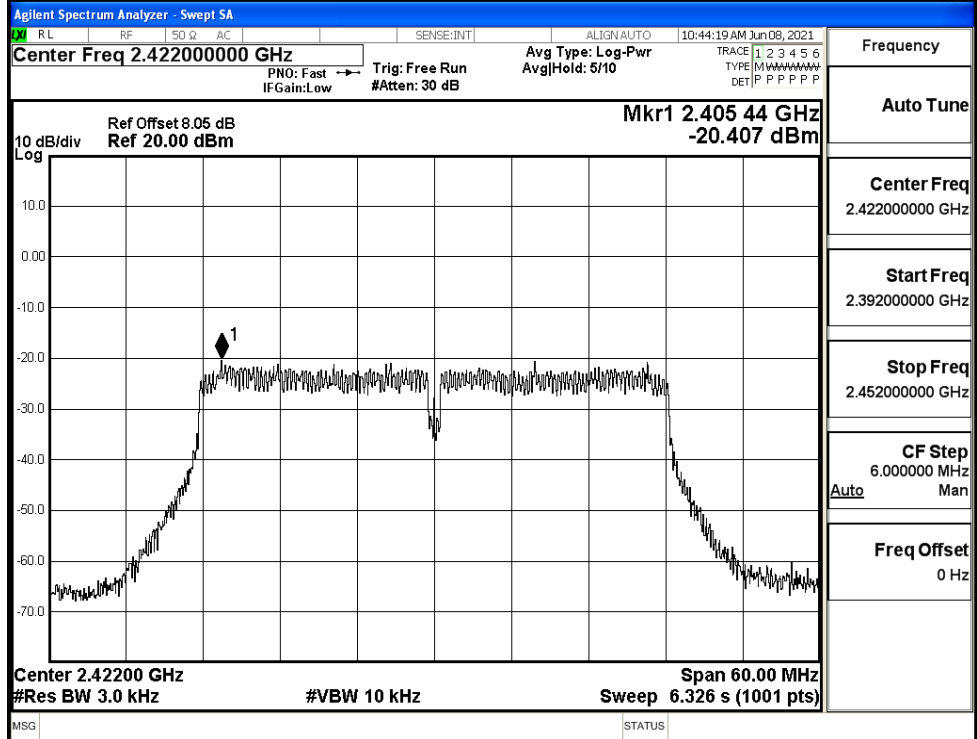


11N20SISO/LCH

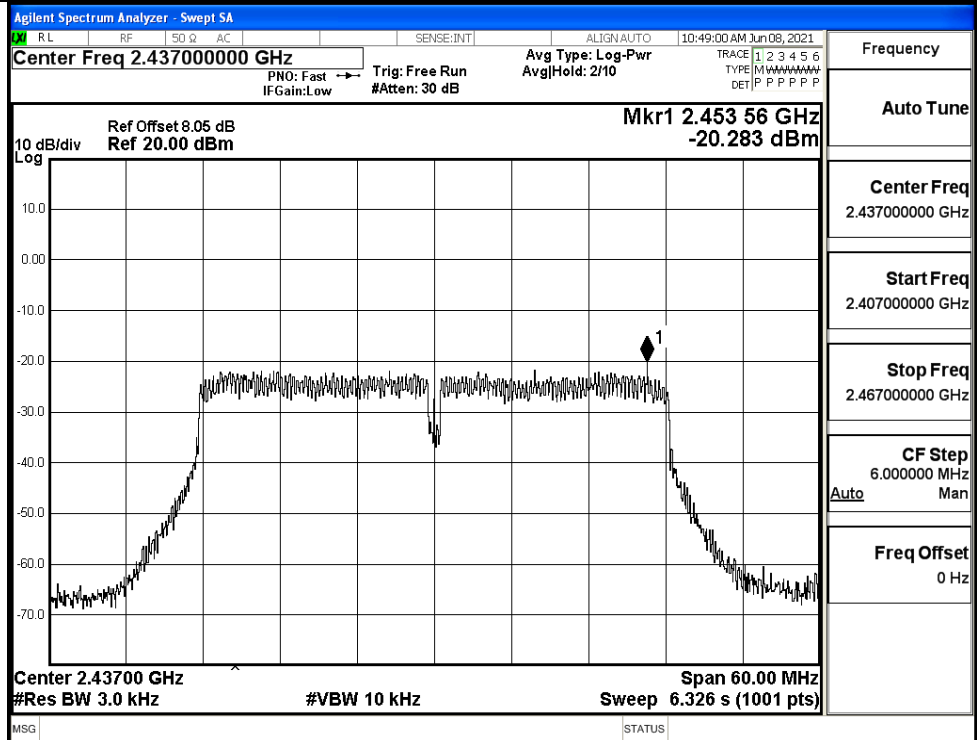


11N20SISO/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:38:53 AM Jun 08, 2021 Center Freq 2.437000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 1/10 Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log Mkr1 2.443 63 GHz -18.775 dBm Center 2.43700 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz 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 10:40:39 AM Jun 08, 2021 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 10 dB/div Log Mkr1 2.468 51 GHz -19.061 dBm Center 2.46200 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 30.00 MHz 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

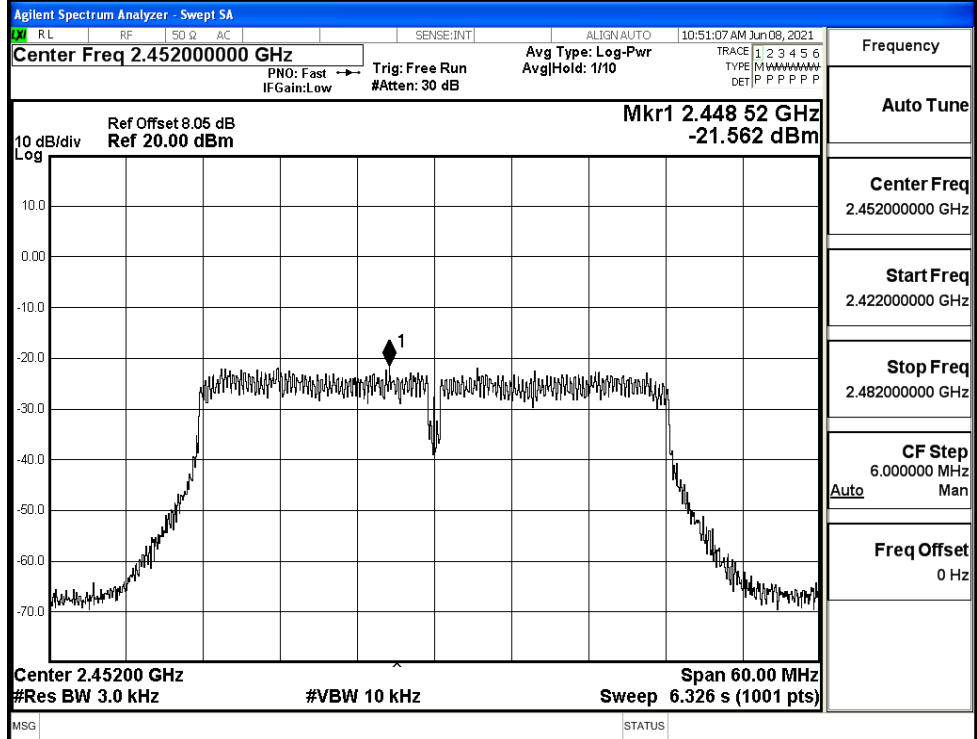
11N40SISO/LCH



11N40SISO/MCH



11N40SISO/HCH

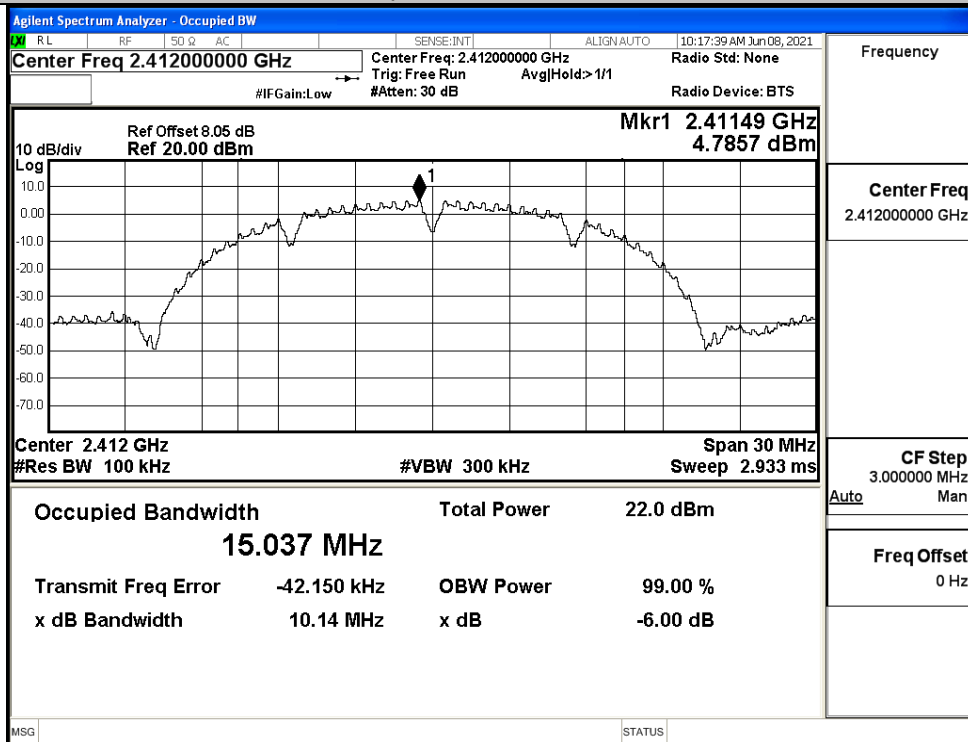


C.4 6dB Bandwidth

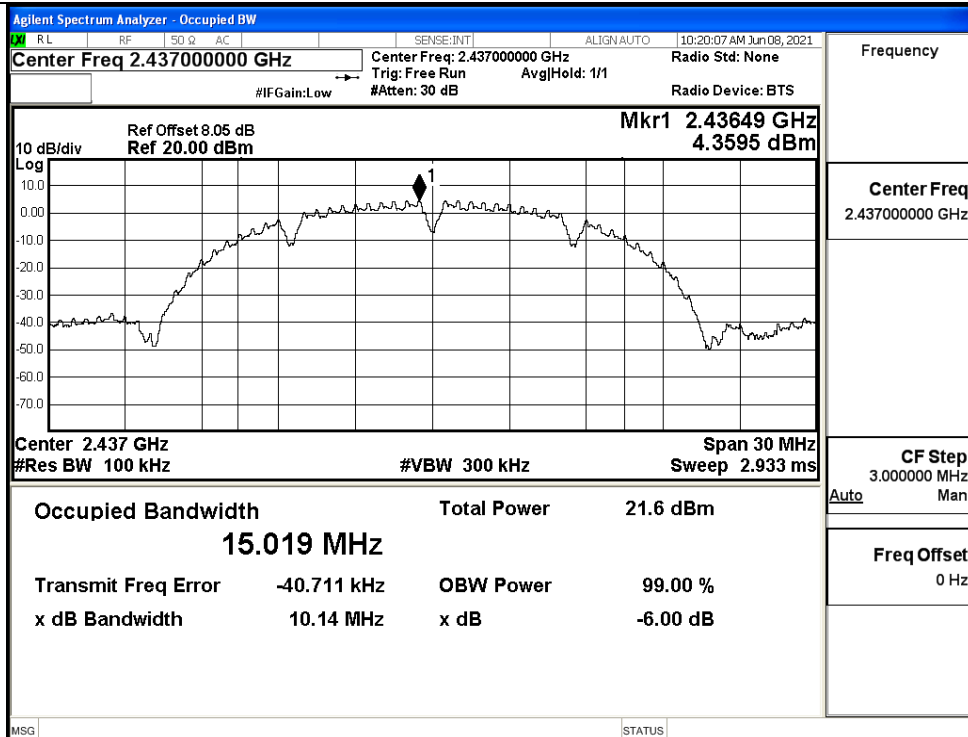
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
11B	LCH	10.14	≥ 0.5	PASS
	MCH	10.14	≥ 0.5	PASS
	HCH	10.14	≥ 0.5	PASS
11G	LCH	16.58	≥ 0.5	PASS
	MCH	16.57	≥ 0.5	PASS
	HCH	16.56	≥ 0.5	PASS
11N20SISO	LCH	17.70	≥ 0.5	PASS
	MCH	17.70	≥ 0.5	PASS
	HCH	17.70	≥ 0.5	PASS
11N40SISO	LCH	36.53	≥ 0.5	PASS
	MCH	36.51	≥ 0.5	PASS
	HCH	36.52	≥ 0.5	PASS

Test Graphs

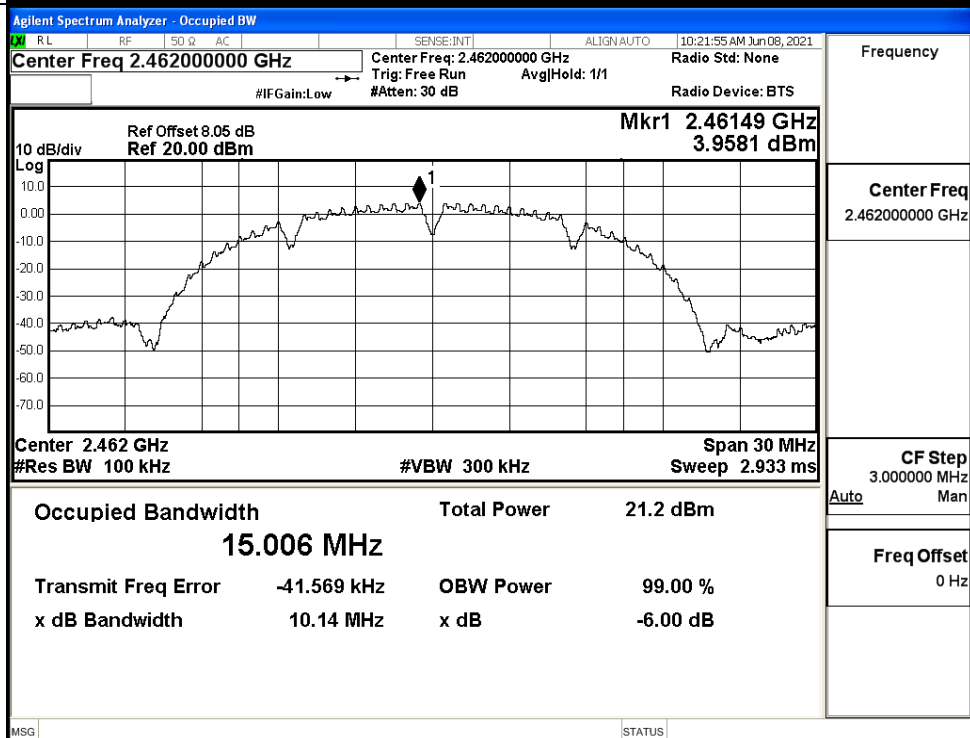
11B/LCH



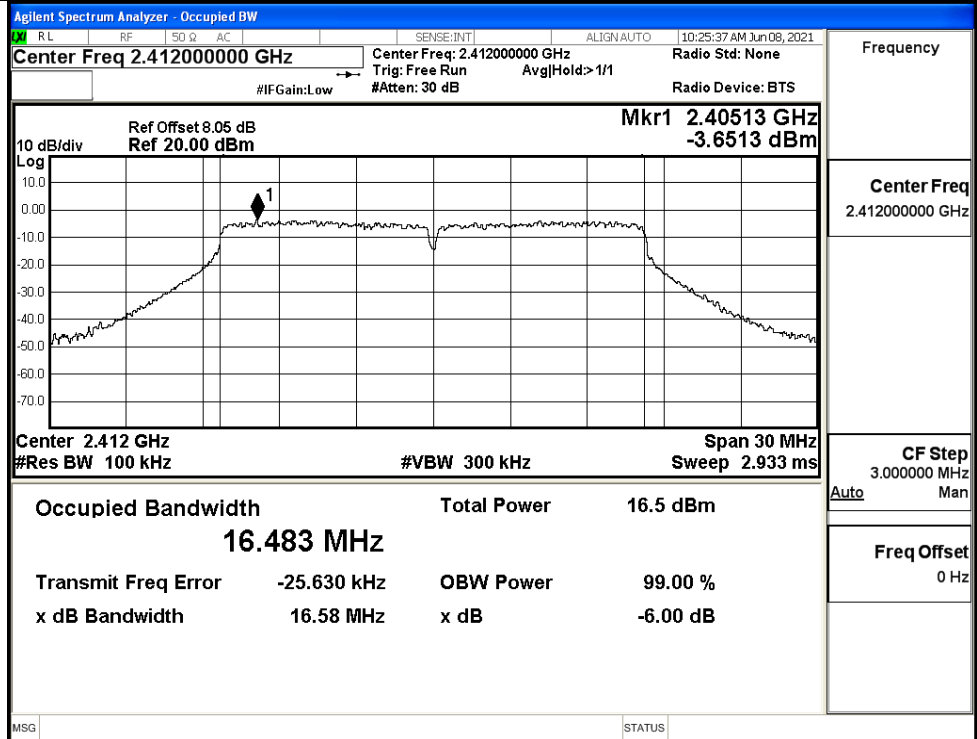
11B/MCH



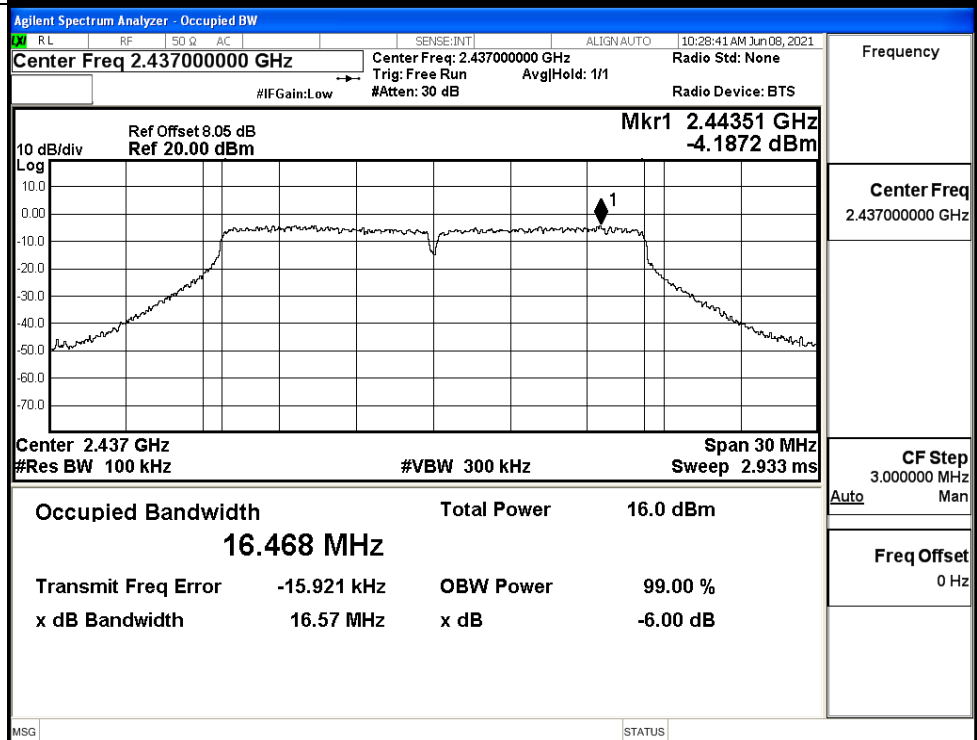
11B/HCH



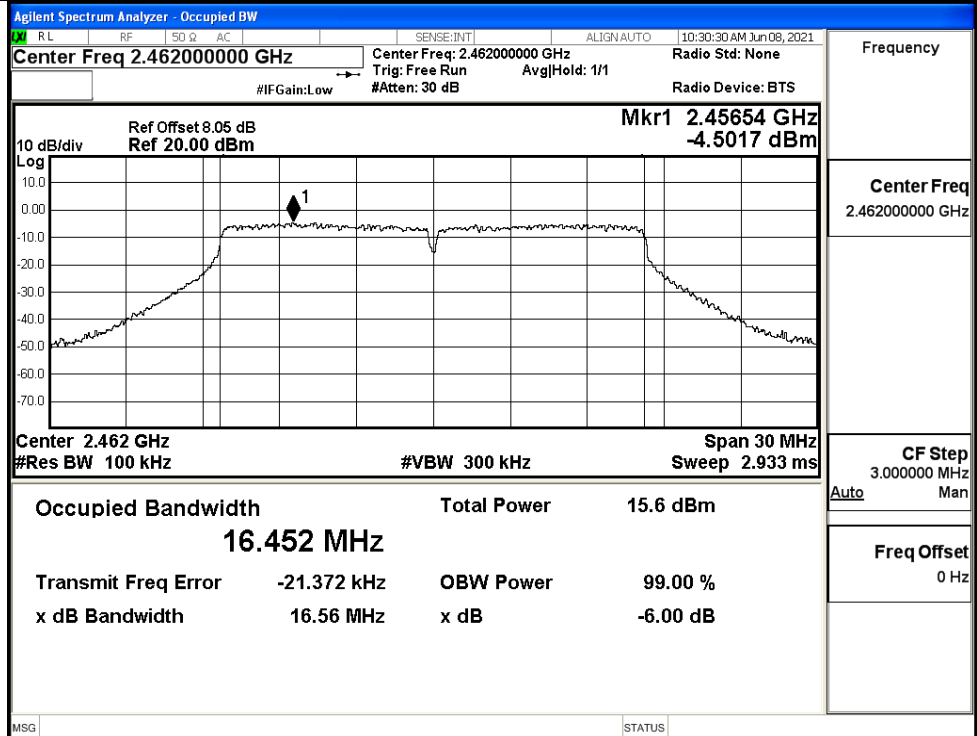
11G/LCH



11G/MCH



11G/HCH



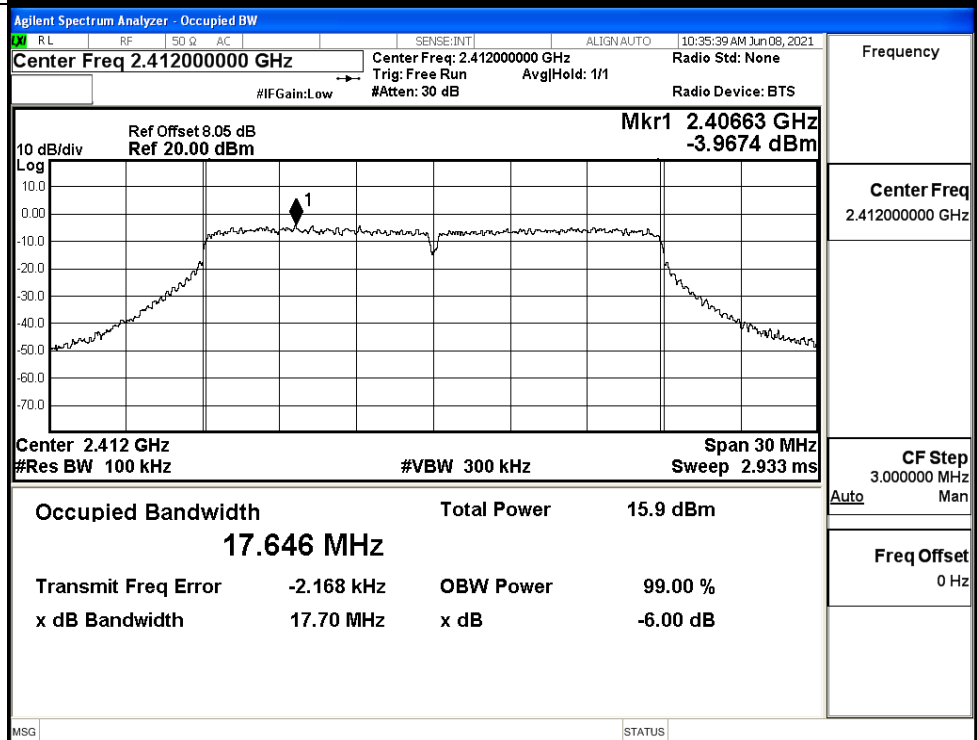
Frequency

Center Freq
2.462000000 GHz

CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

11N20SISO/LCH



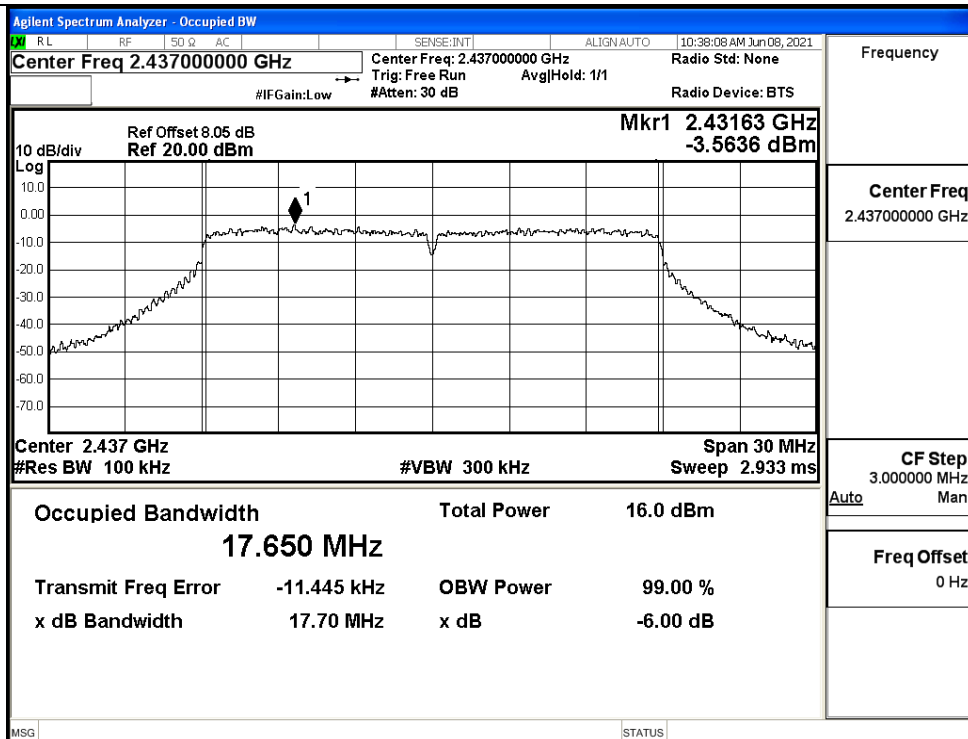
Frequency

Center Freq
2.412000000 GHz

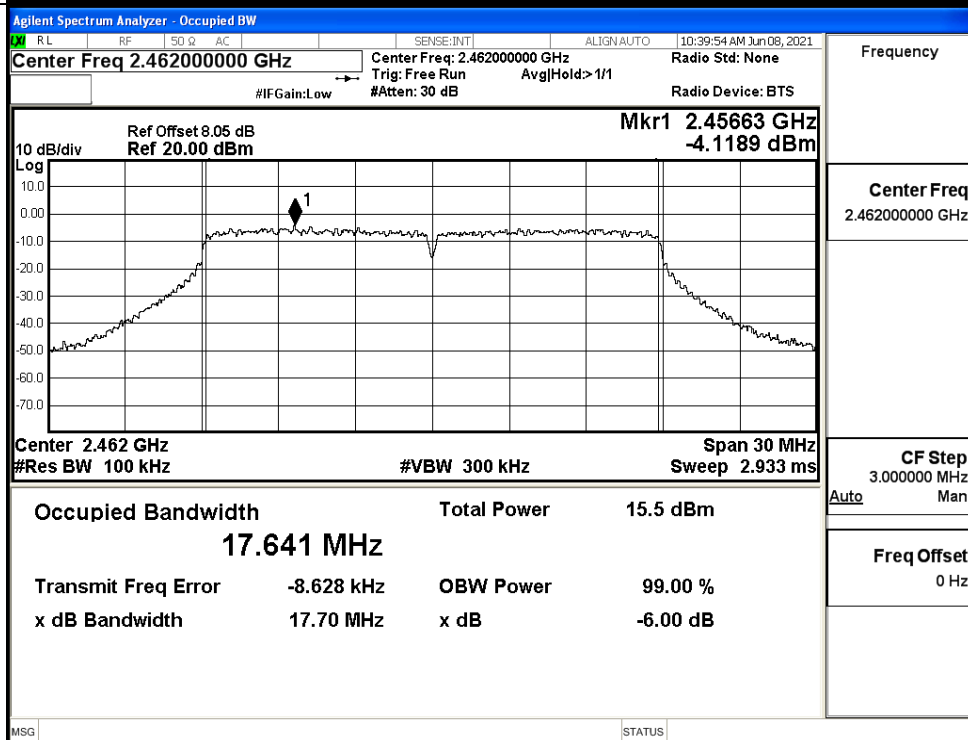
CF Step
3.000000 MHz
Auto Man

Freq Offset
0 Hz

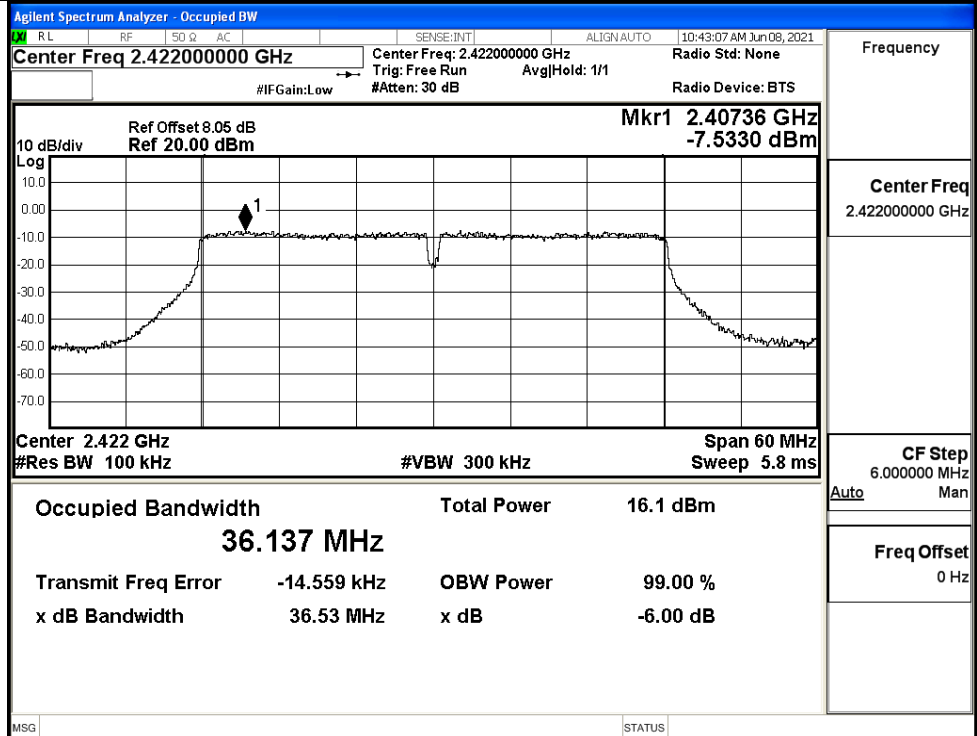
11N20SISO/MCH



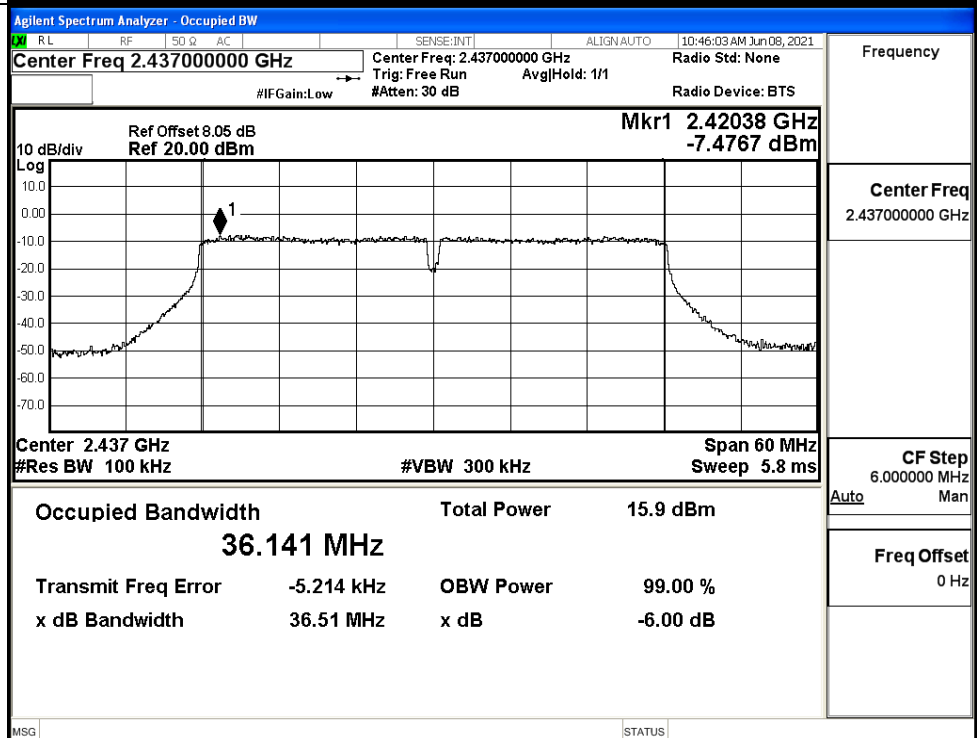
11N20SISO/HCH

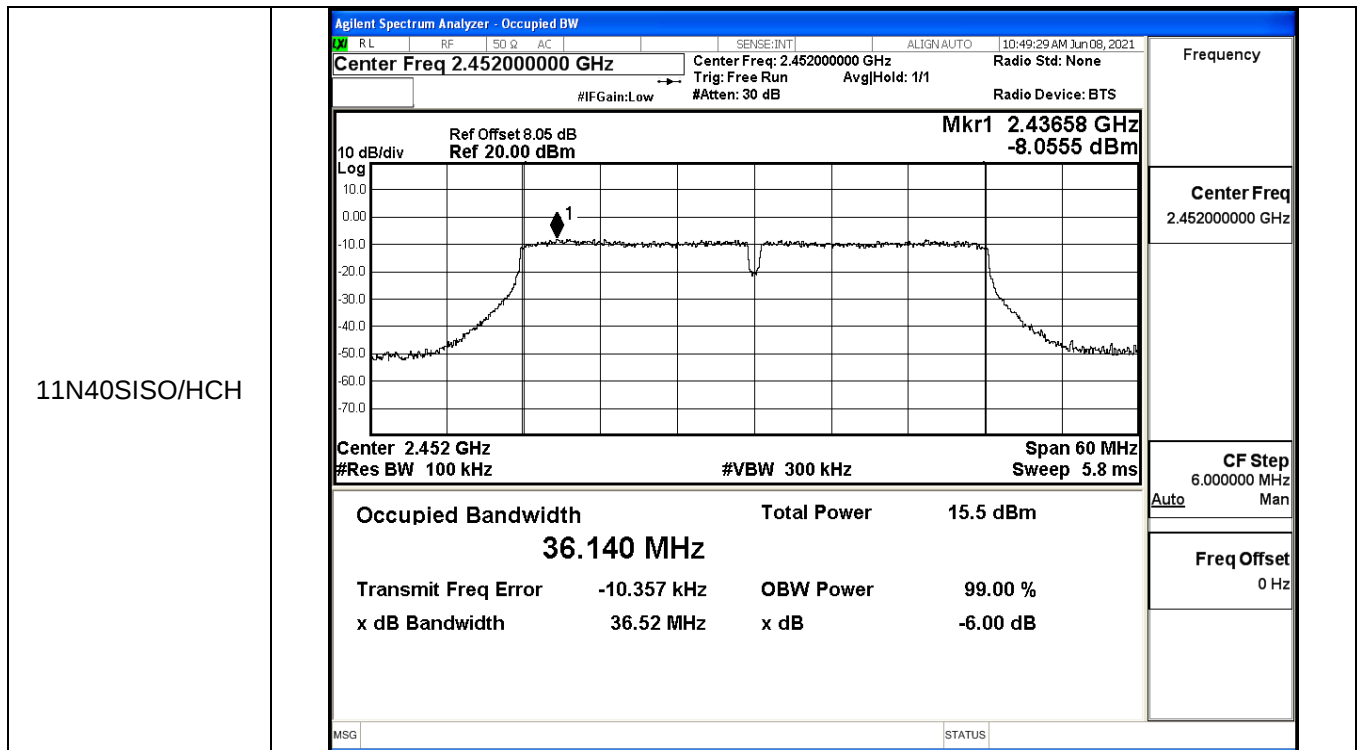


11N40SISO/LCH



11N40SISO/MCH



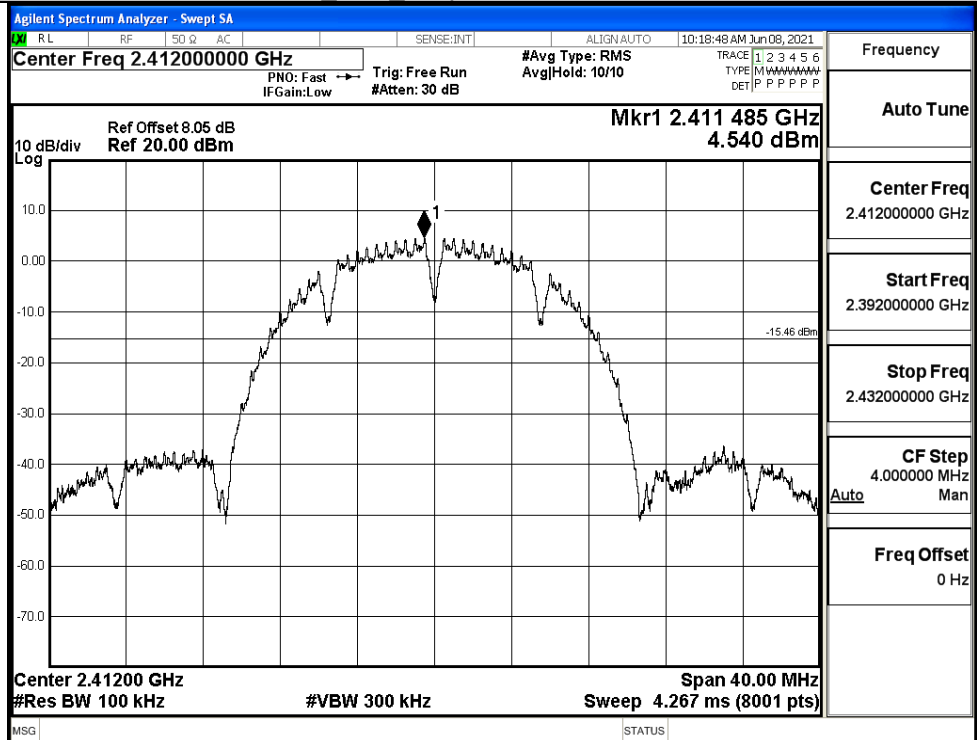


C.5 RF Conducted Spurious Emissions

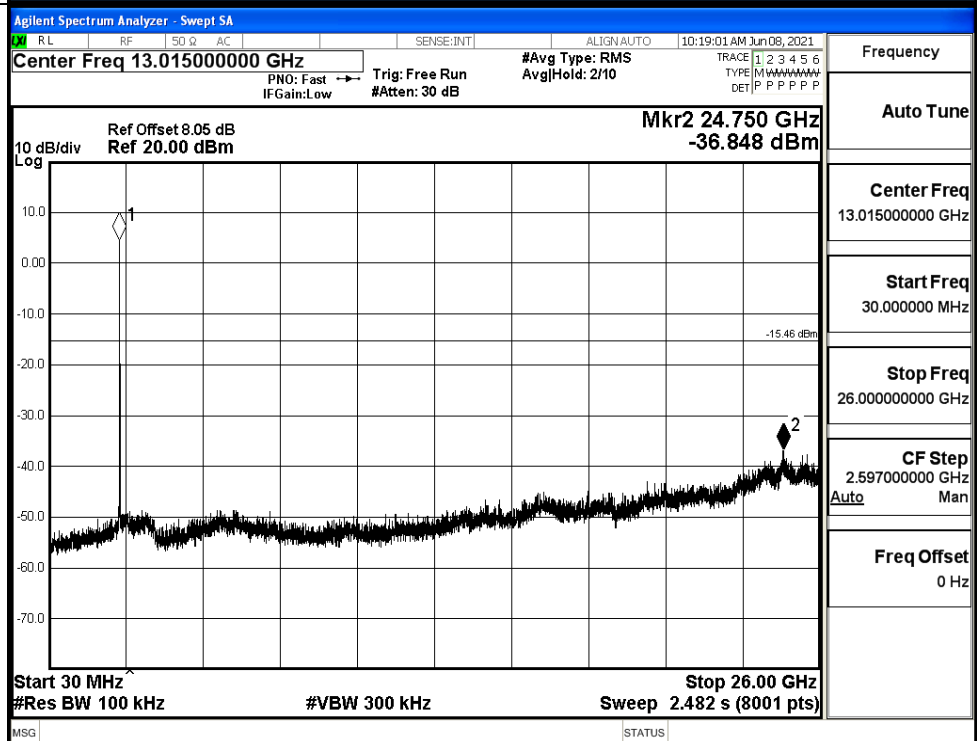
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	LCH	4.54	-36.848	-15.460	PASS
	MCH	4.145	-38.314	-15.855	PASS
	HCH	3.702	-38.340	-16.298	PASS
11G	LCH	-3.955	-38.012	-23.955	PASS
	MCH	-4.521	-37.788	-24.521	PASS
	HCH	-4.85	-38.559	-24.850	PASS
11N20 SISO	LCH	-4.032	-38.275	-24.032	PASS
	MCH	-3.858	-37.708	-23.858	PASS
	HCH	-4.625	-38.002	-24.625	PASS
11N40 SISO	LCH	-7.644	-37.704	-27.644	PASS
	MCH	-7.853	-38.469	-27.853	PASS
	HCH	-8.226	-38.232	-28.226	PASS

11B LCH Graphs

Pref/11B/LCH

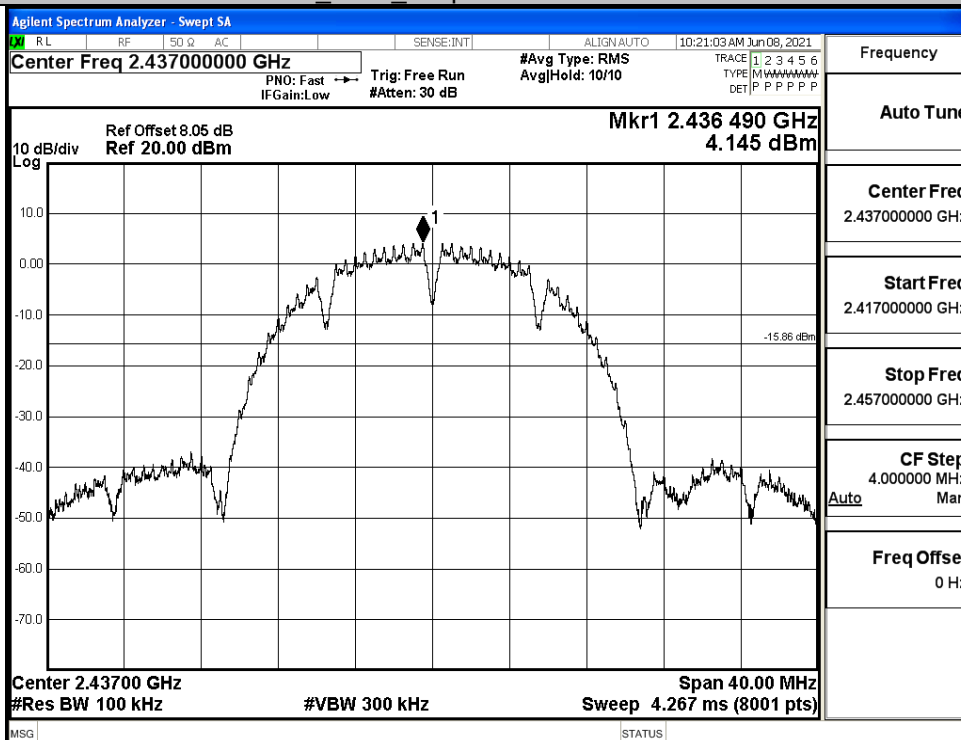


Puw/11B/LCH

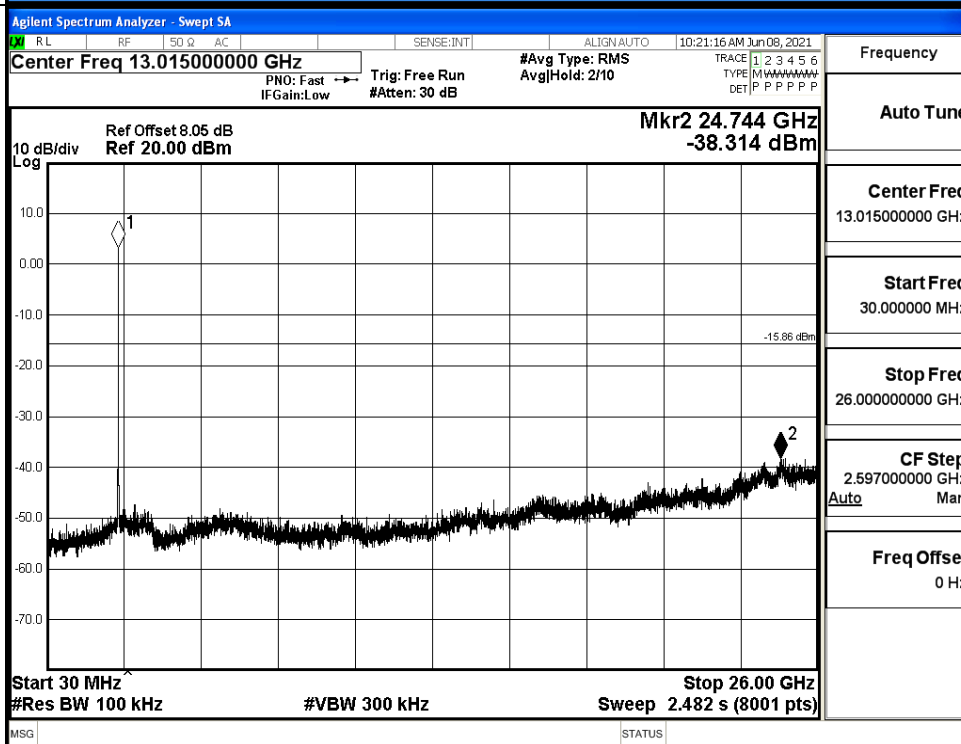


11B MCH Graphs

Pref/11B/MCH

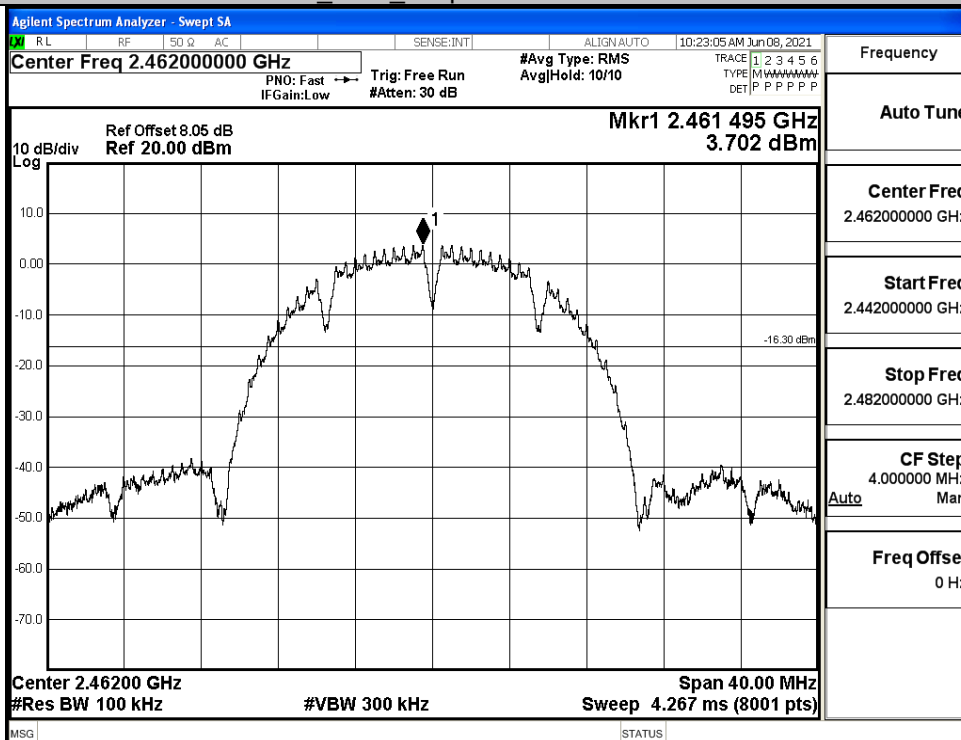


Puw/11B/MCH

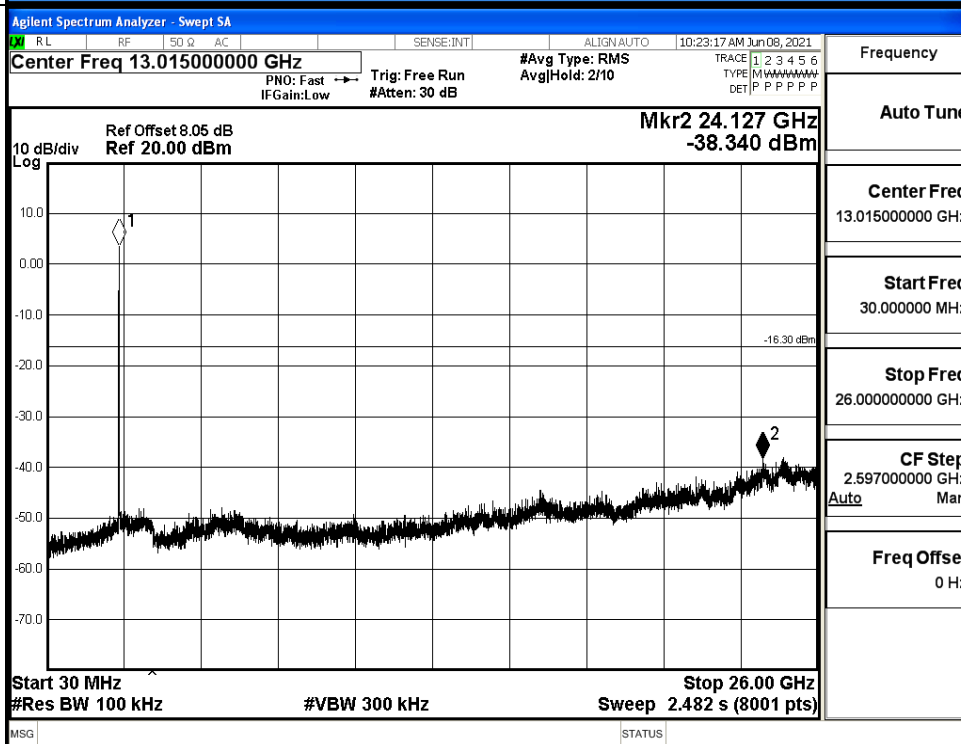


11B HCH Graphs

Pref/11B/HCH

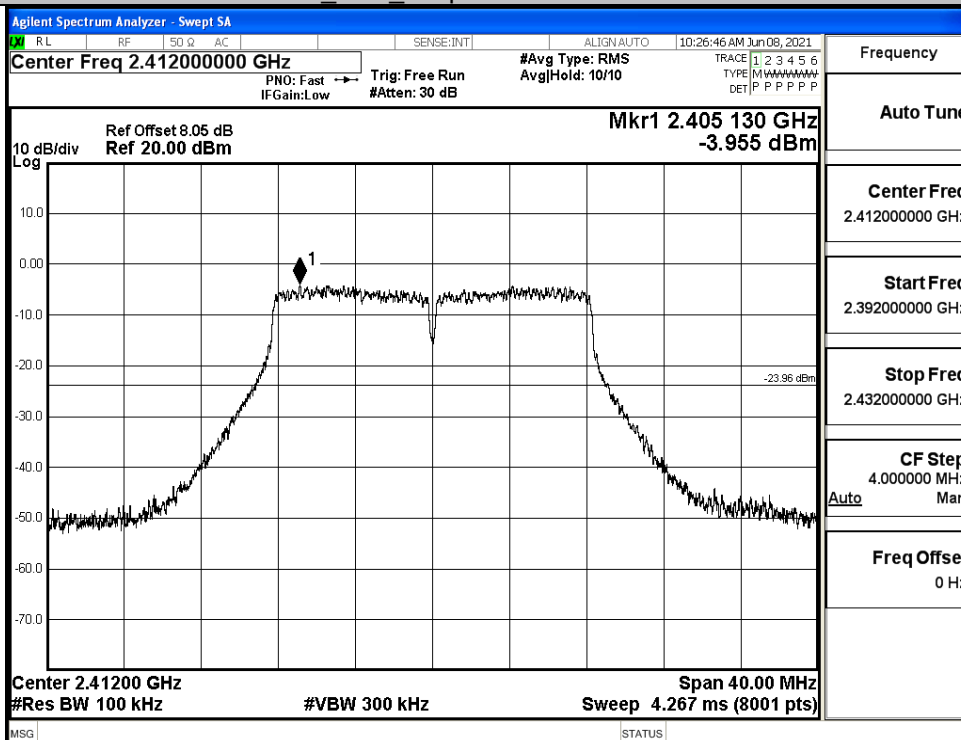


Puw/11B/HCH

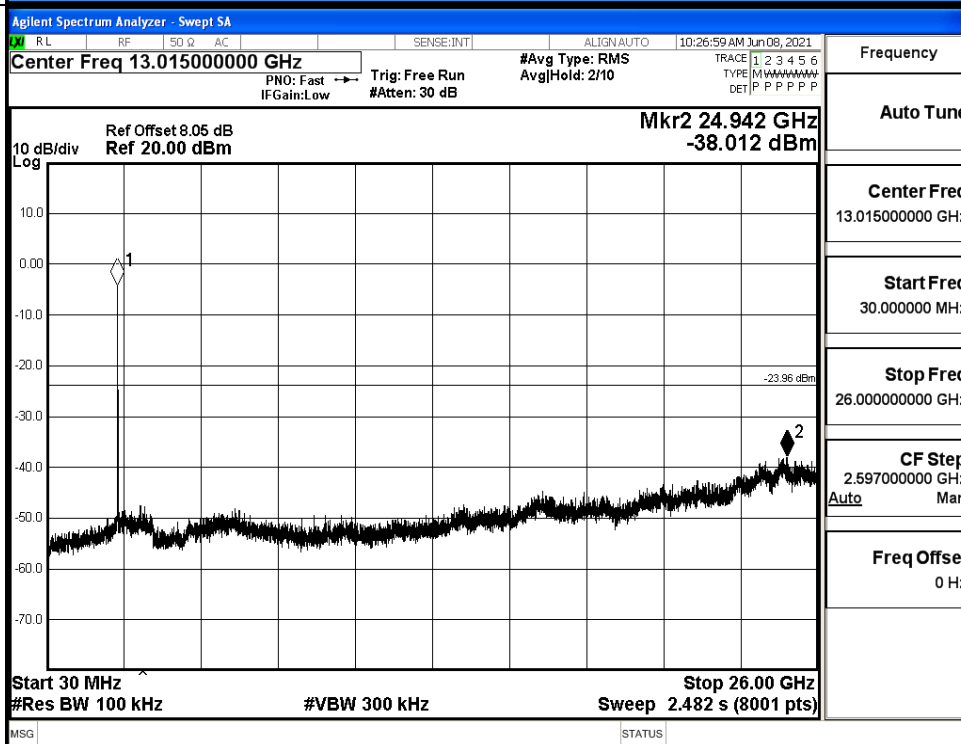


11G_LCH_Graphs

Pref/11G/LCH

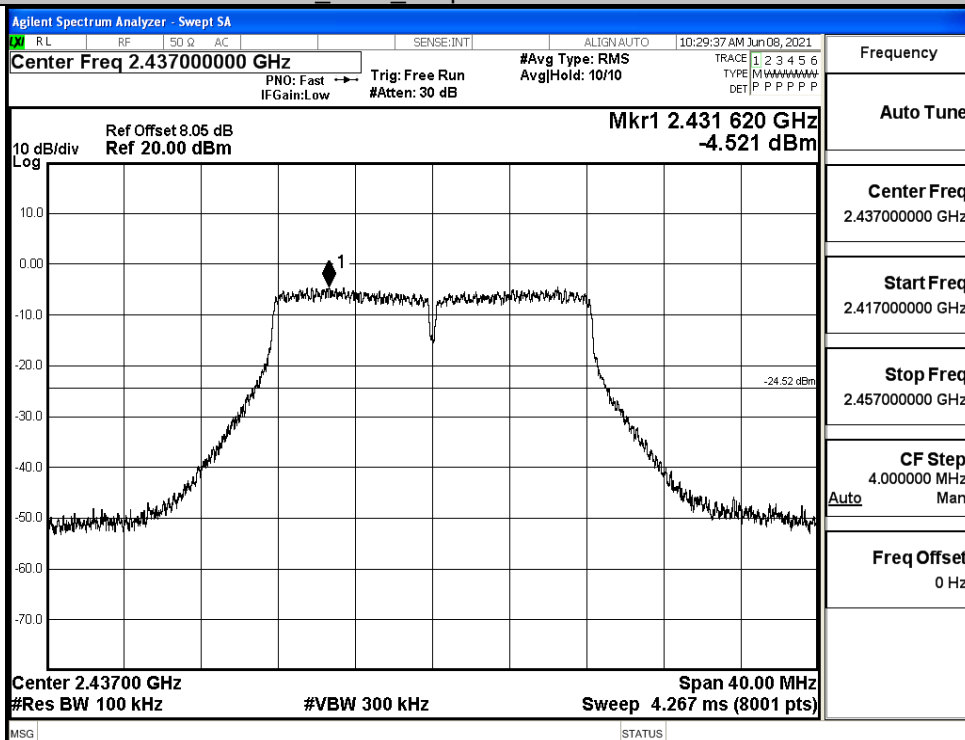


Puw/11G/LCH

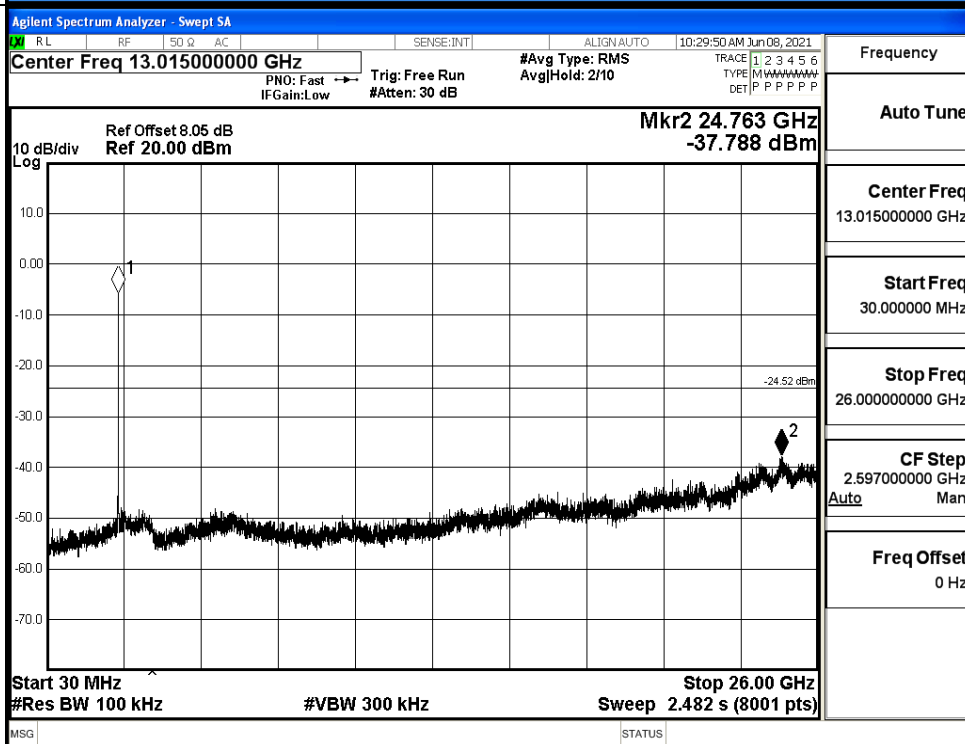


11G_MCH_Graphs

Pref/11G/MCH

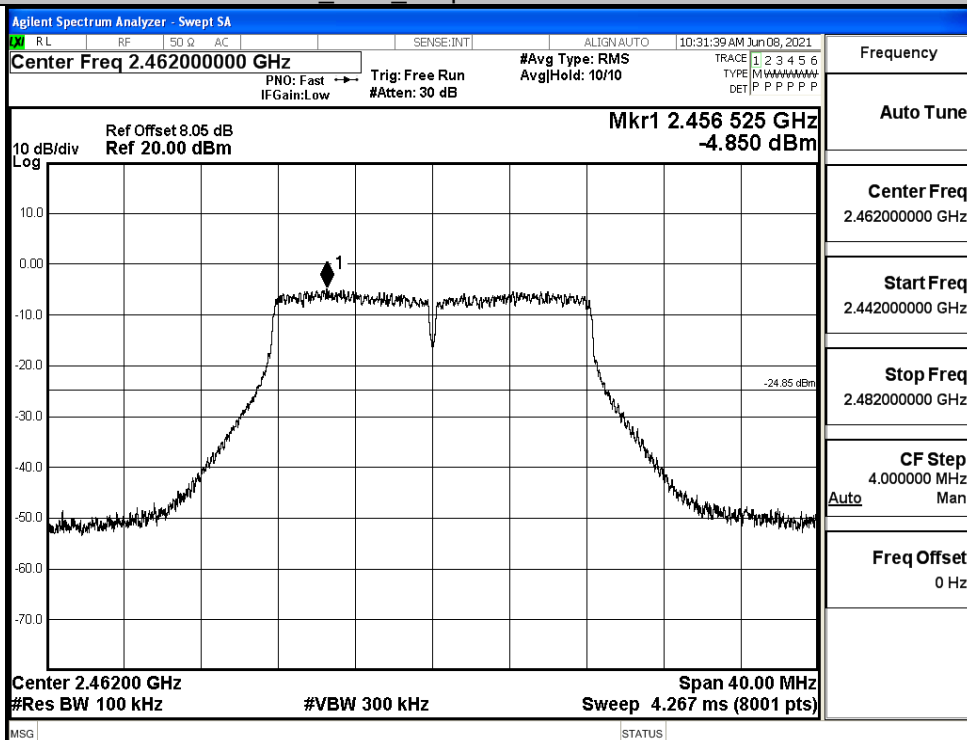


Puw/11G/MCH

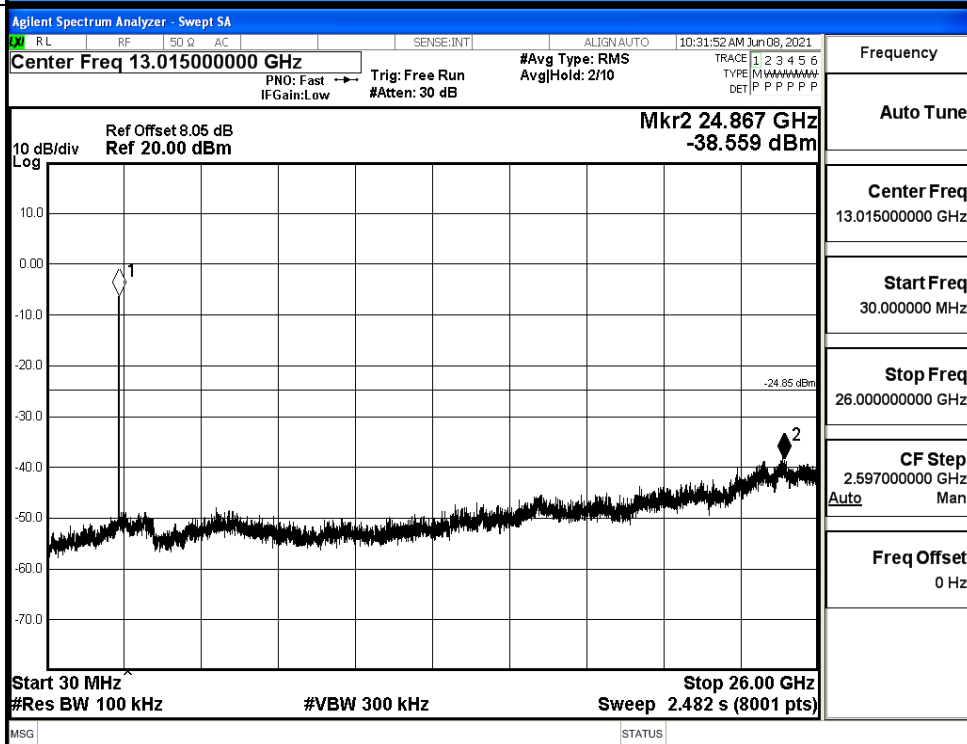


11G HCH Graphs

Pref/11G/HCH

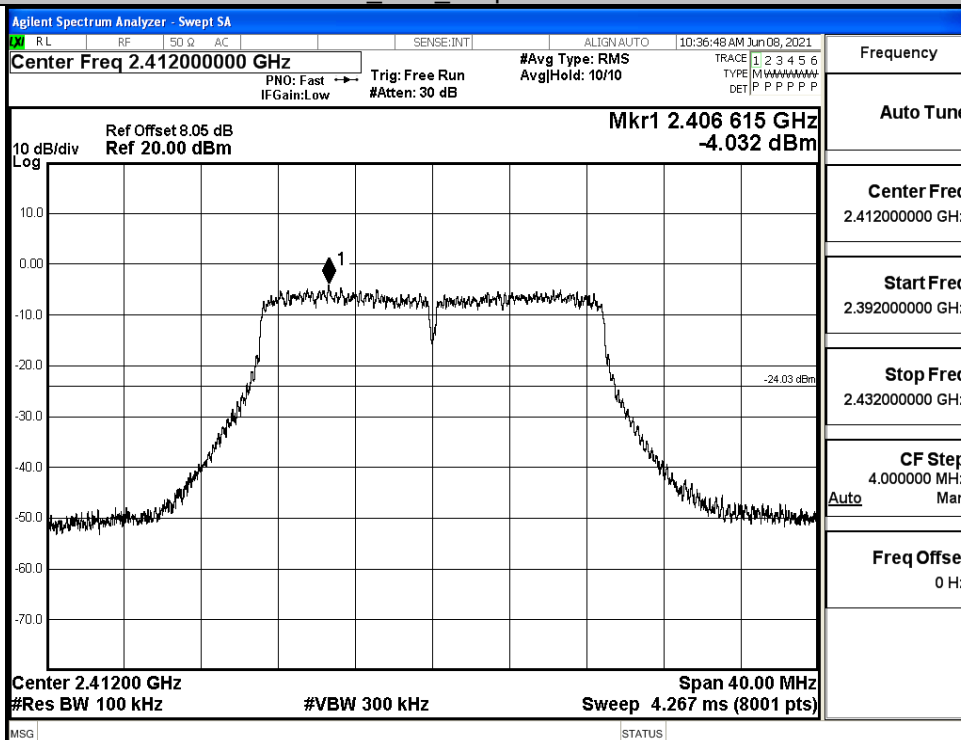


Puw/11G/HCH

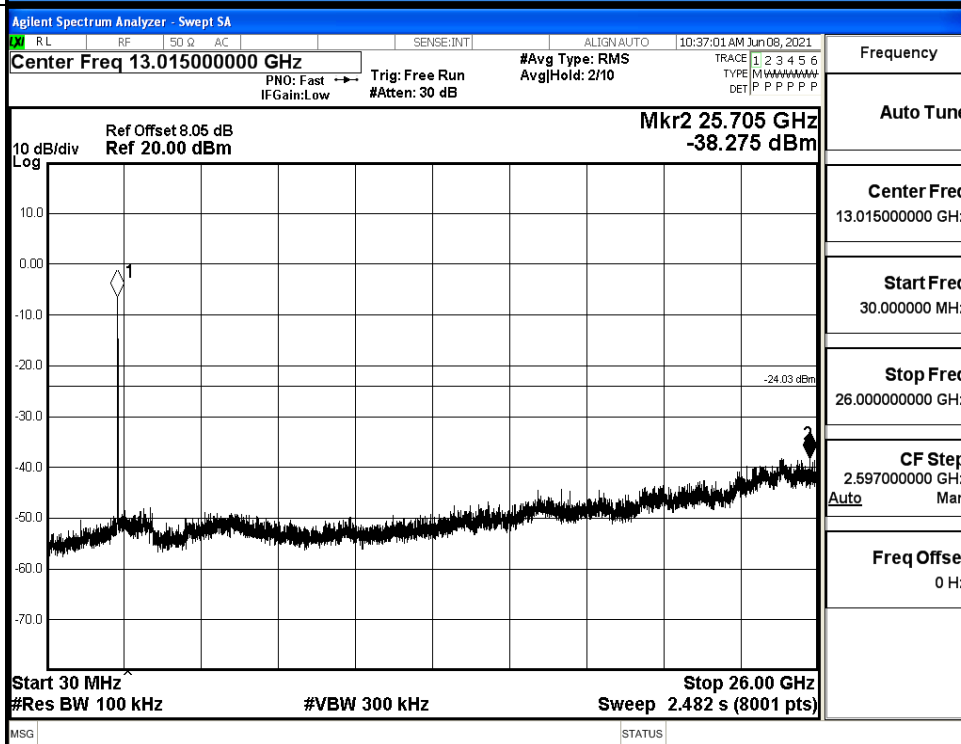


11N20SISO LCH Graphs

Pref/11N20SIS
O/LCH

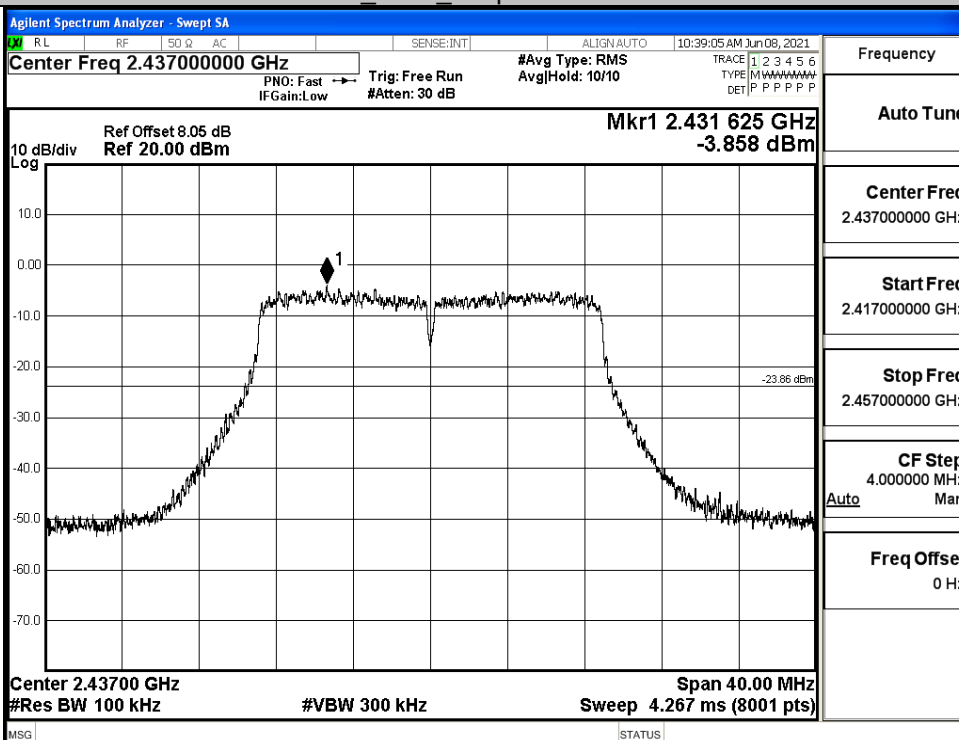


Puw/11N20
SISO/LCH

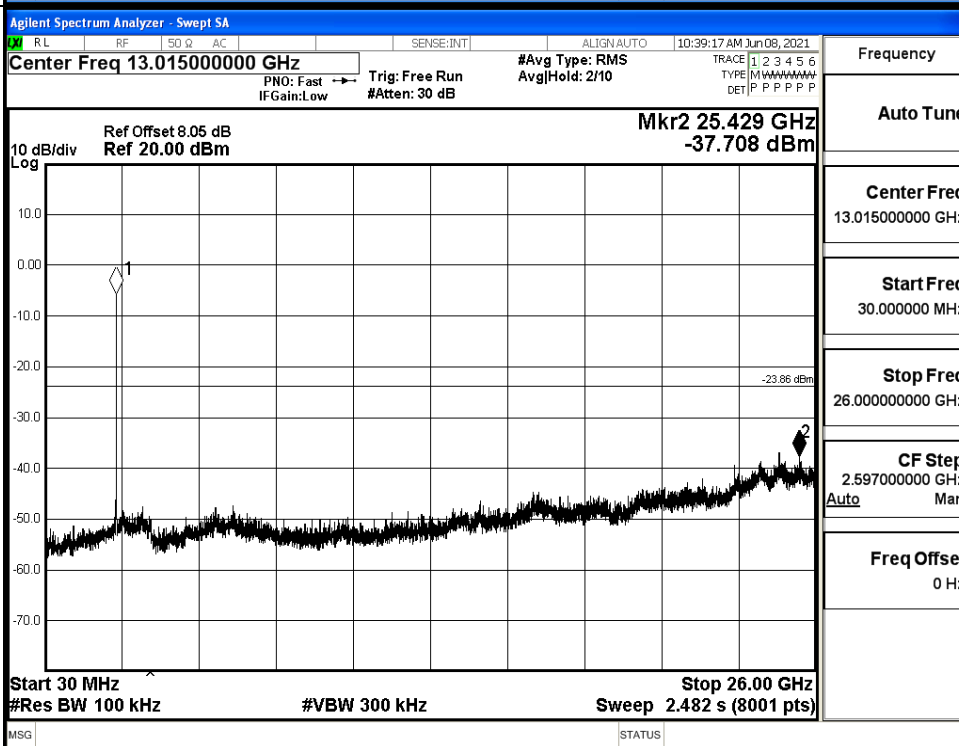


11N20SISO_MCH_Graphs

Pref/11N20
SISO/MCH

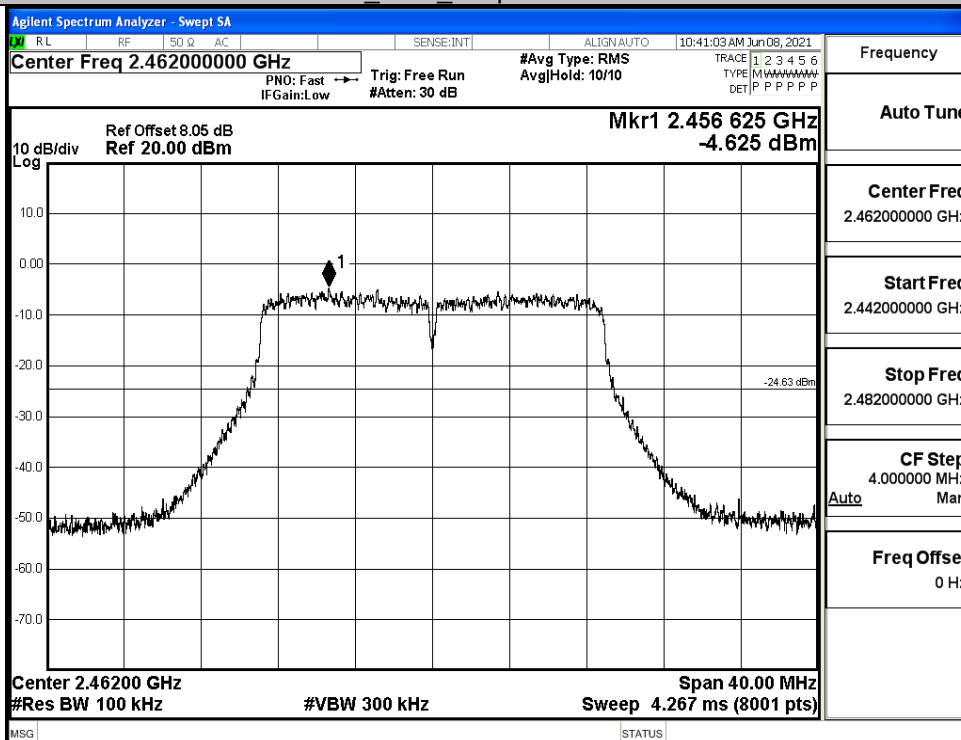


Puw/11N20
SISO/MCH

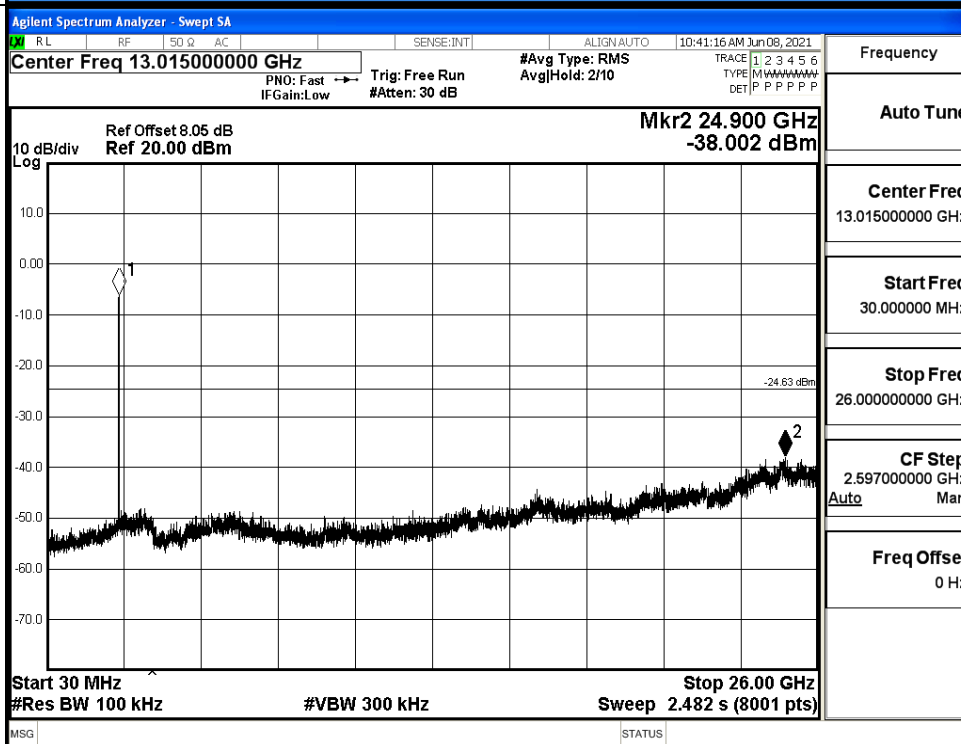


11N20SISO HCH Graphs

Pref/11N20
SISO/HCH

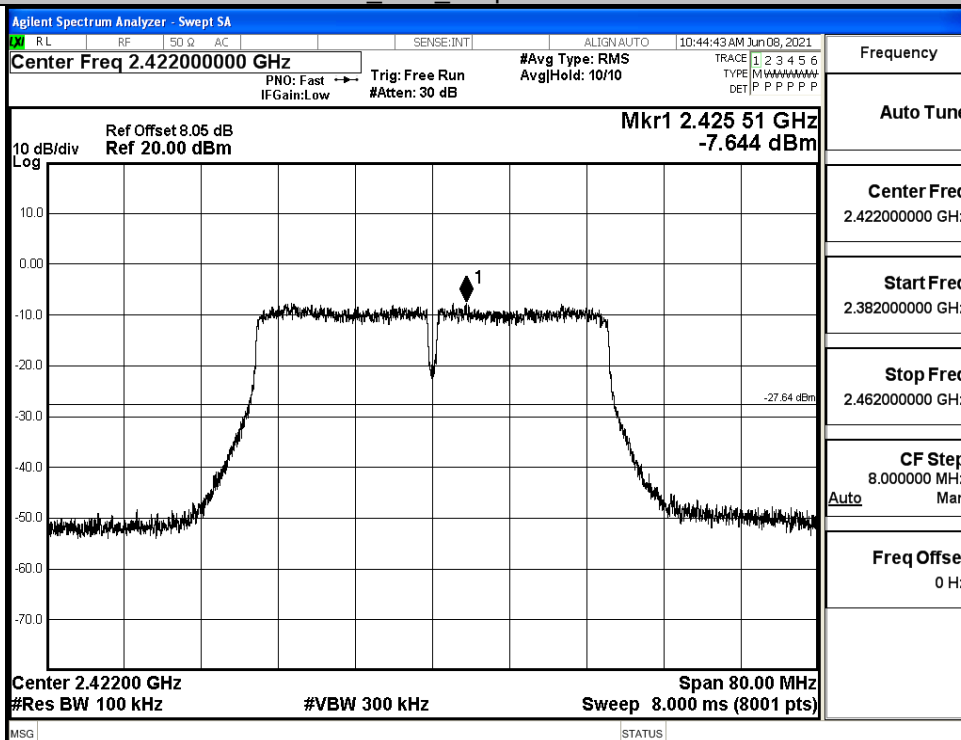


Puw/11N20
SISO/HCH

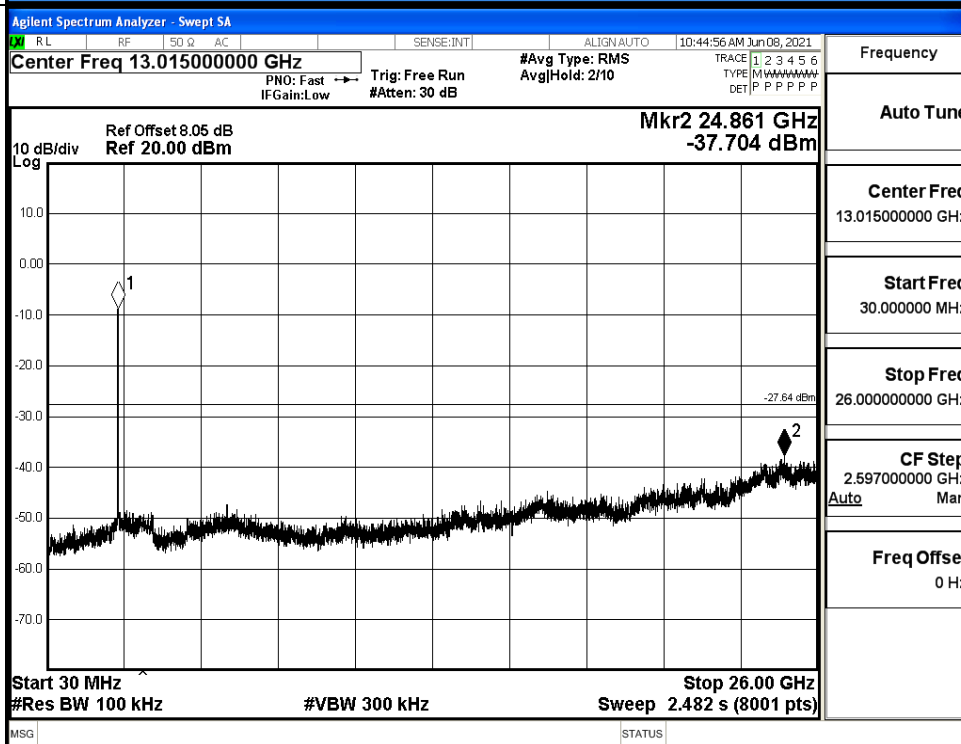


11N40SISO LCH Graphs

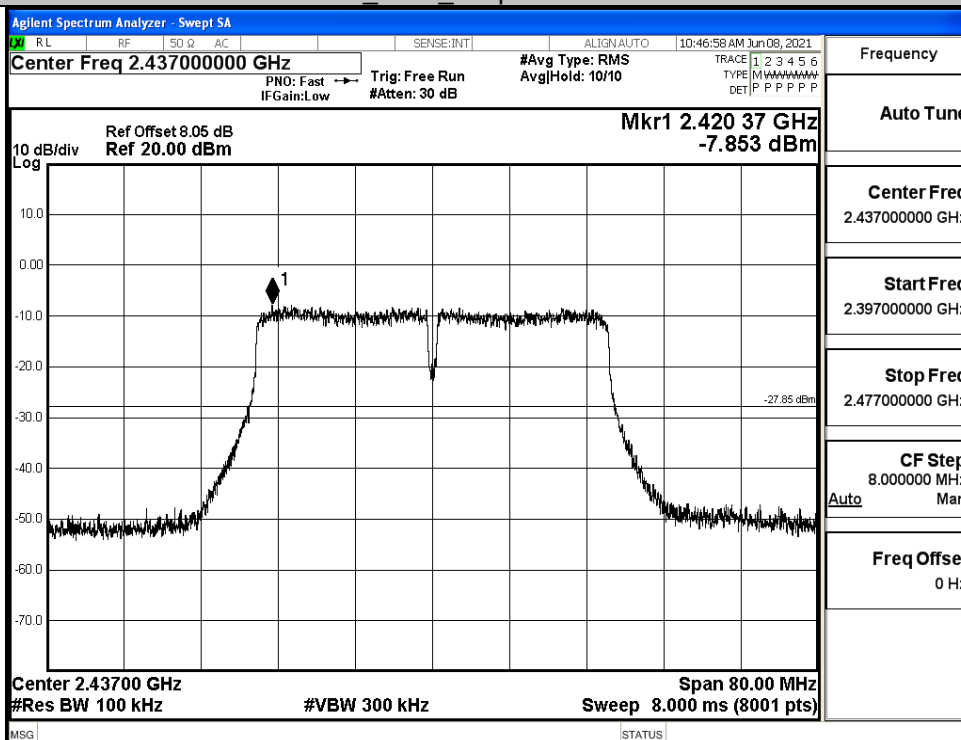
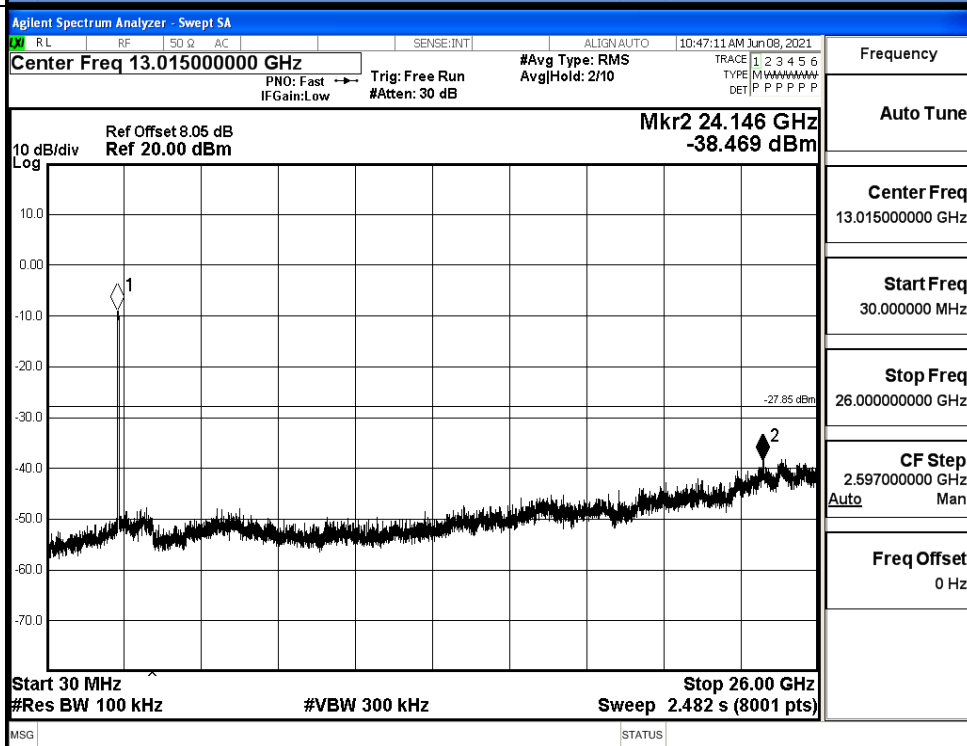
Pref/11N40
SISO/LCH



Puw/11N40
SISO/LCH

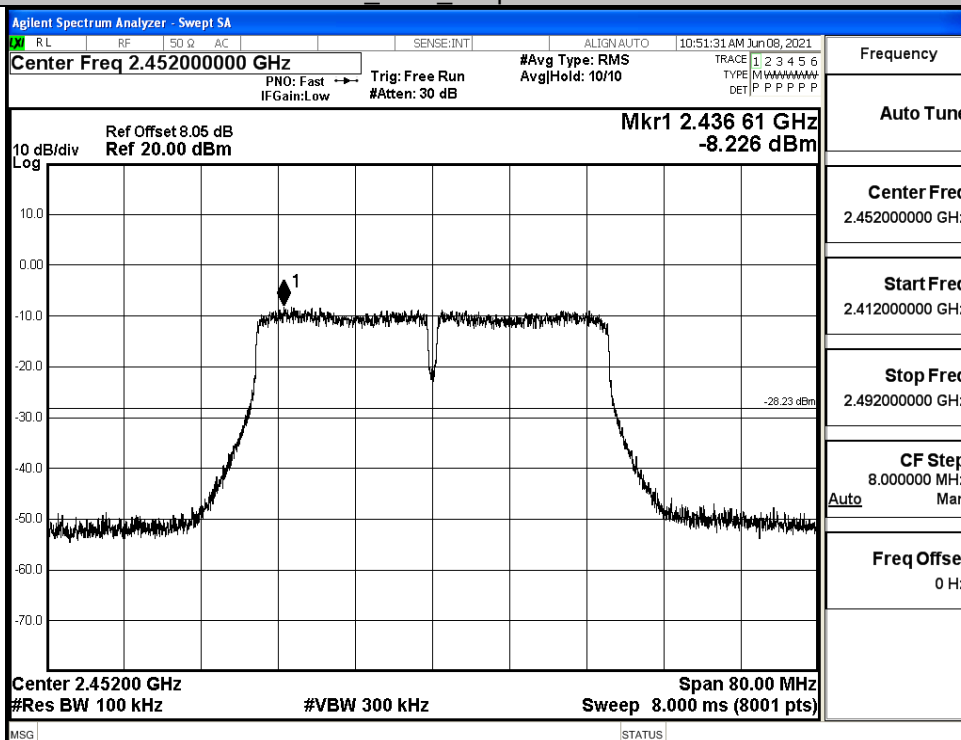


11N40SISO_MCH_Graphs

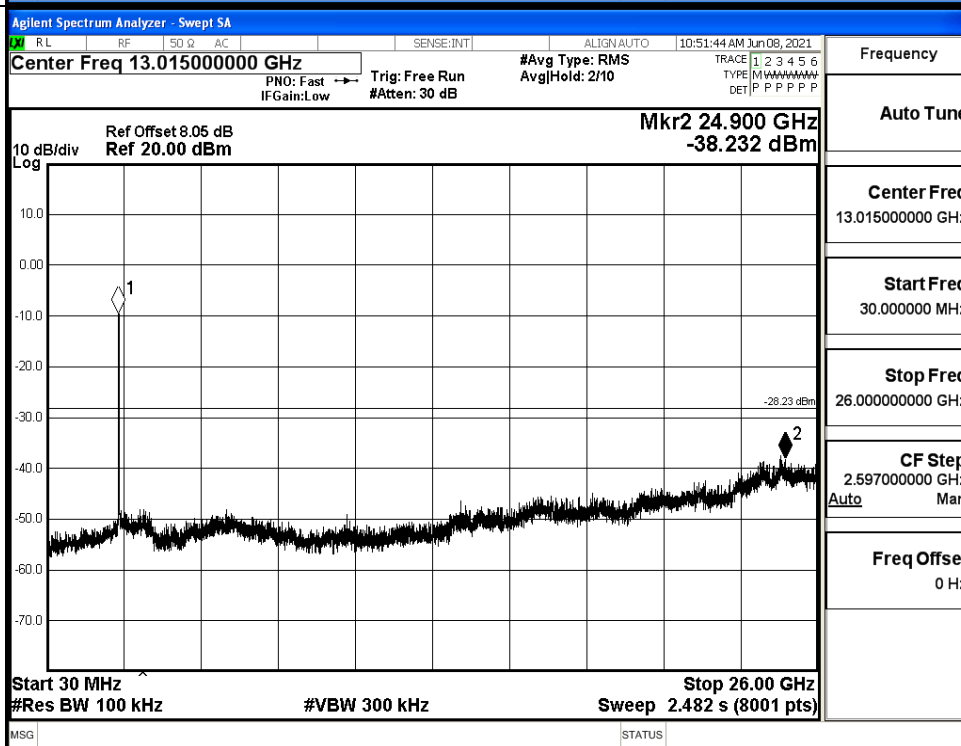
Pref/11N40
SISO/MCHPuw/11N40
SISO/MCH

11N40SISO HCH Graphs

Pref/11N40
SISO/HCH



Puw/11N40
SISO/HCH

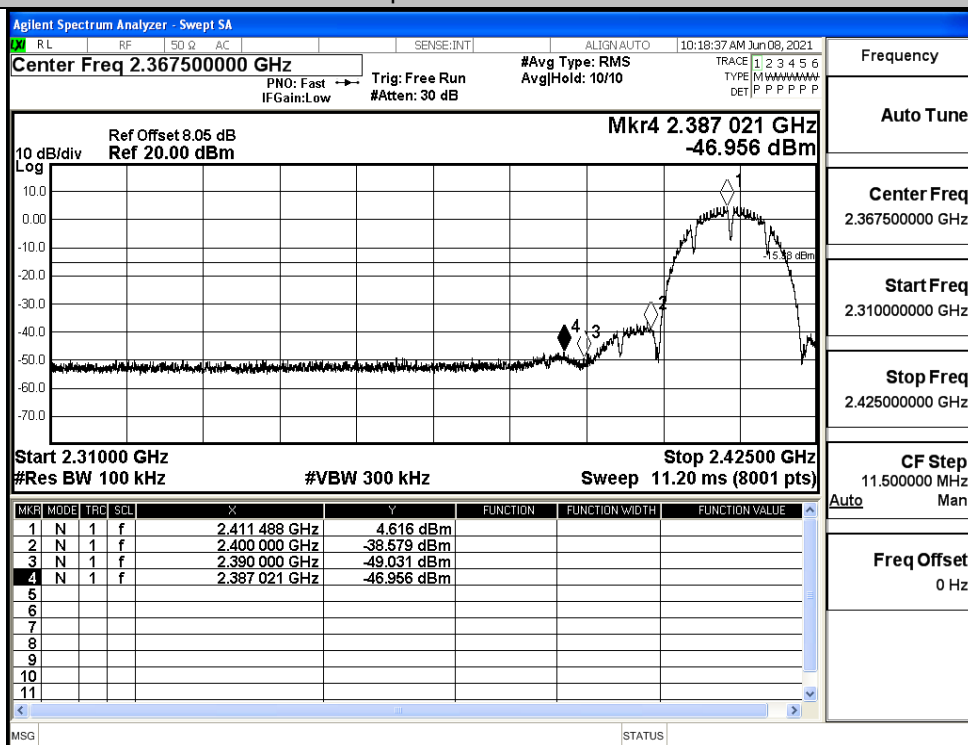


C.6 Band-edge for RF Conducted Emissions

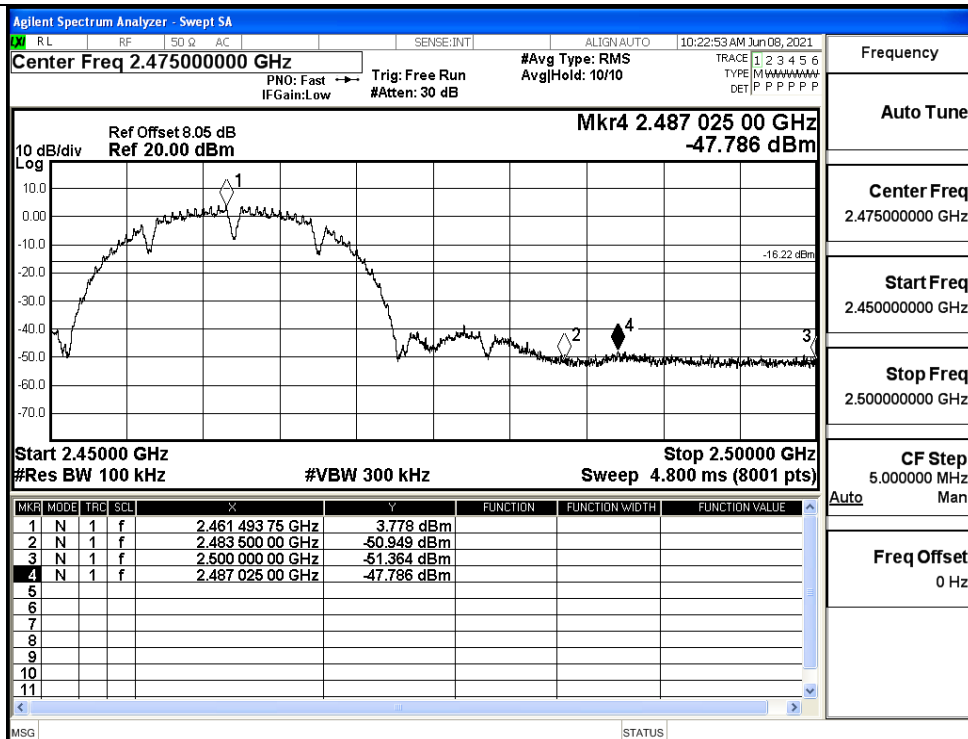
Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	4.616	-46.956	-15.38	PASS
	HCH	3.778	-47.786	-16.22	PASS
11G	LCH	-3.964	-48.503	-23.96	PASS
	HCH	-4.794	-47.849	-24.79	PASS
11N20SISO	LCH	-4.466	-48.986	-24.47	PASS
	HCH	-4.319	-47.802	-24.32	PASS
11N40SISO	LCH	-7.753	-48.242	-27.75	PASS
	HCH	-8.329	-46.192	-28.33	PASS

Test Graphs

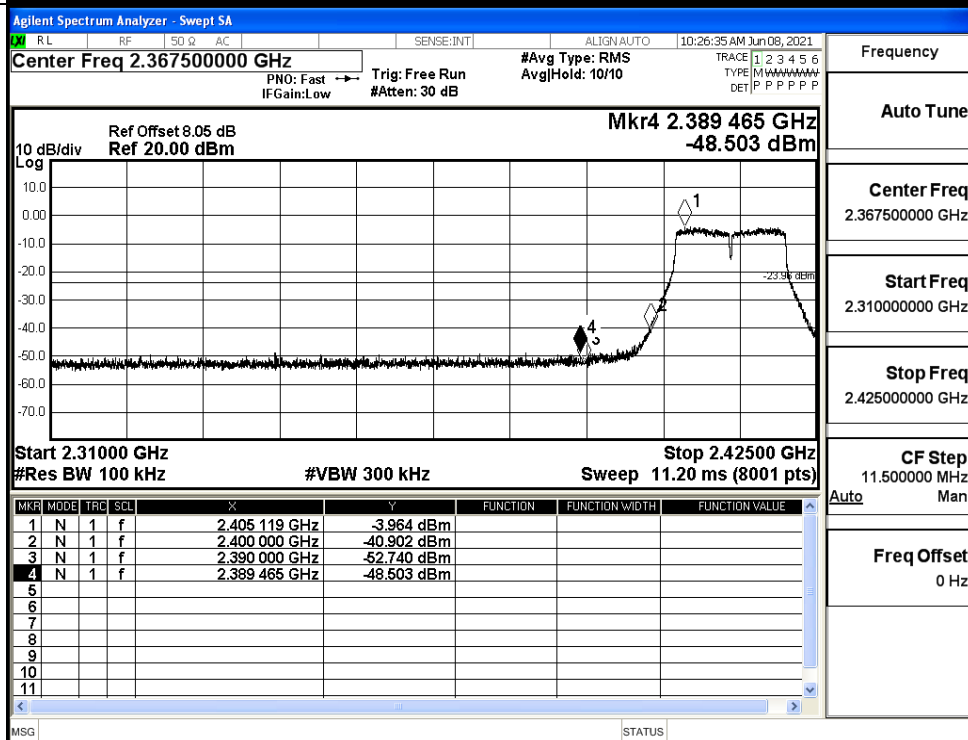
11B/LCH



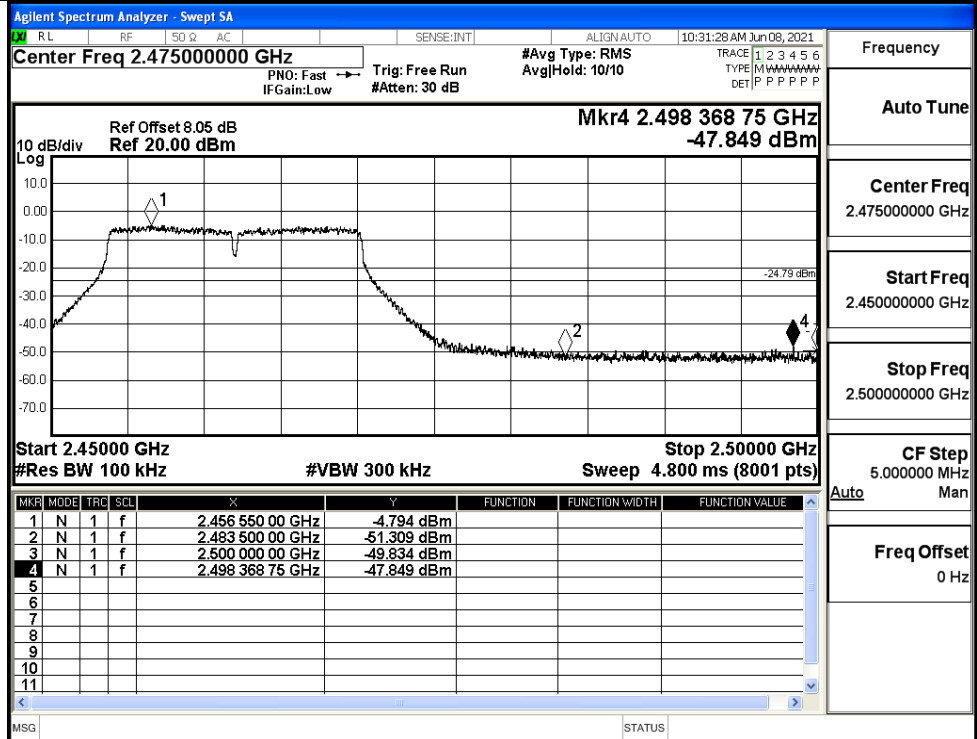
11B/HCH



11G/LCH



11G/HCH



Frequency

Auto Tune

Center Freq
2.475000000 GHz

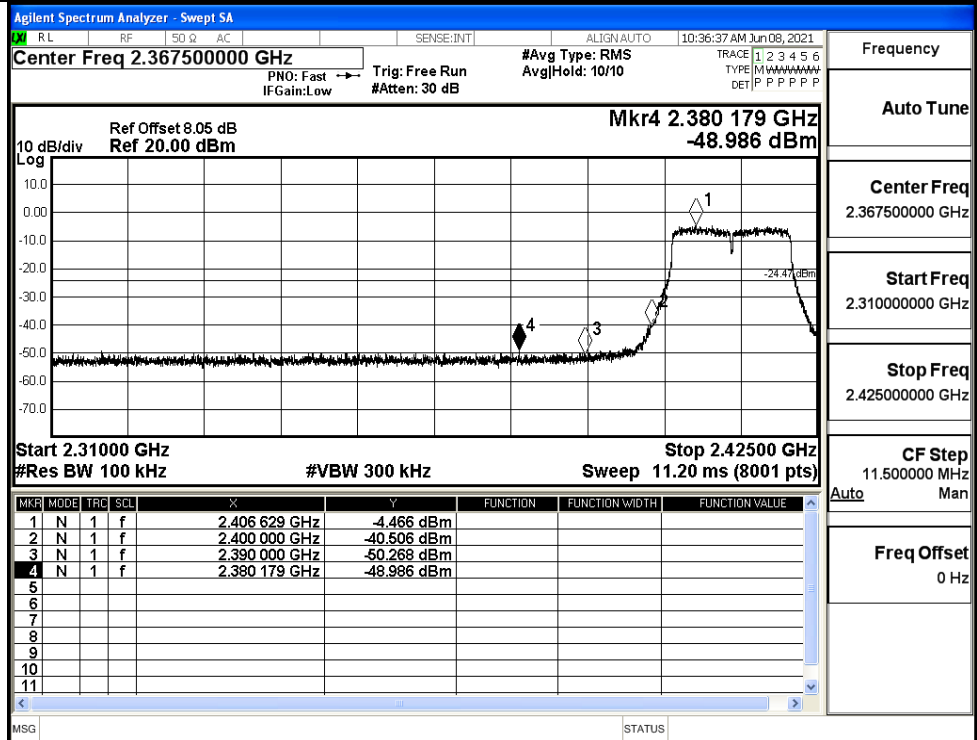
Start Freq
2.450000000 GHz

Stop Freq
2.500000000 GHz

CF Step
5.000000 MHz
Auto Man

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
Auto Man

Freq Offset
0 Hz

11N20SISO/HCH

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:40:52 AM Jun 08, 2021

Center Freq 2.475000000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg|Hold: 10/10

TRACE 1 2 3 4 5 6 TYPE [M W A W A W A W A W] DET [P P P P P P P P]

Ref Offset 8.05 dB Ref 20.00 dBm Mkr4 2.488 781 25 GHz -47.802 dBm

10 dB/div Log

Start 2.45000 GHz Stop 2.50000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 4.800 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.456 631 25 GHz	-4.319 dBm			
2	N	1	f	2.483 500 00 GHz	-50.608 dBm			
3	N	1	f	2.500 000 00 GHz	-50.847 dBm			
4	N	1	f	2.488 781 25 GHz	-47.802 dBm			
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Frequency

Auto Tune

Center Freq
2.475000000 GHz

Start Freq
2.450000000 GHz

Stop Freq
2.500000000 GHz

CF Step
5.000000 MHz
Auto Man

Freq Offset
0 Hz

11N40SISO/LCH

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:44:32 AM Jun 08, 2021

Center Freq 2.377500000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg|Hold: 10/10

TRACE 1 2 3 4 5 6 TYPE [M W A W A W A W A W] DET [P P P P P P P P]

Ref Offset 8.05 dB Ref 20.00 dBm Mkr4 2.389 971 GHz -48.242 dBm

10 dB/div Log

Start 2.31000 GHz Stop 2.44500 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 13.33 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.407 622 GHz	-7.753 dBm			
2	N	1	f	2.400 000 GHz	-41.632 dBm			
3	N	1	f	2.390 000 GHz	-50.727 dBm			
4	N	1	f	2.389 971 GHz	-48.242 dBm			
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

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

Center Freq 2.377500000 GHz

PNO: Fast

IF Gain: Low

Trig: Free Run

#Atten: 30 dB

#Avg Type: RMS

Avg|Hold: 10/10

TRACE 1 2 3 4 5 6

TYPE [M W A W A W A W A W]

DET [P P P P P P P P]

Ref Offset 8.05 dB

Ref 20.00 dBm

Mkr4 2.389 971 GHz

-48.242 dBm

10 dB/div

Log

Start 2.31000 GHz

#Res BW 100 kHz

#VBW 300 kHz

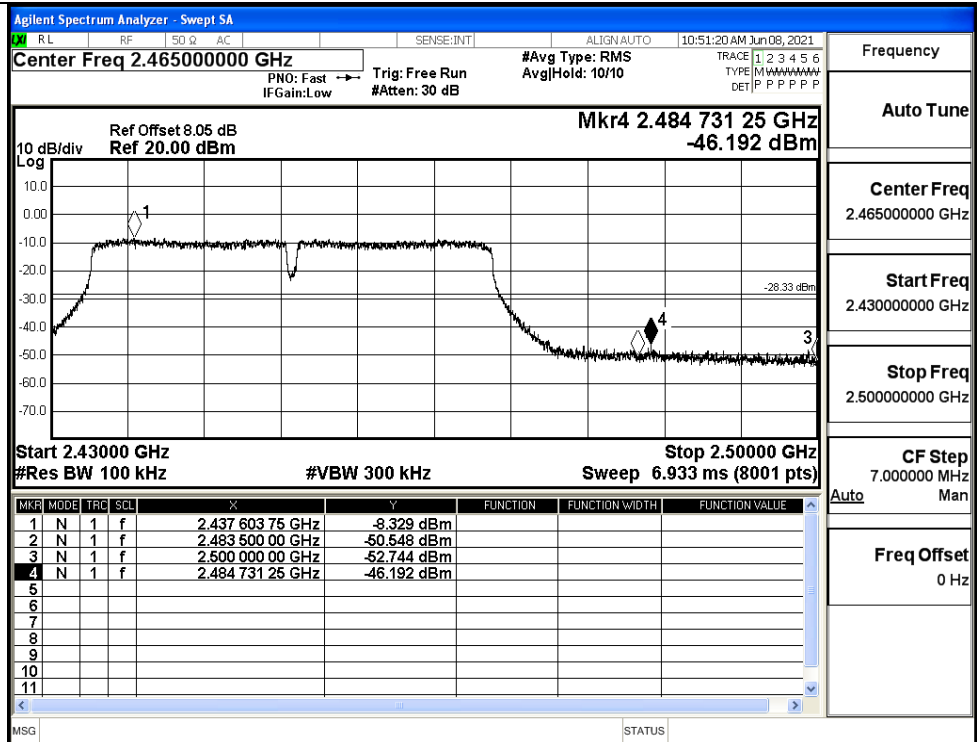
Stop 2.44500 GHz

Sweep 13.33 ms (8001 pts)

MSG

STATUS

11N40SISO/HCH



Frequency

Auto Tune

Center Freq
2.465000000 GHz

Start Freq
2.430000000 GHz

Stop Freq
2.500000000 GHz

CF Step
7.000000 MHz
Auto Man

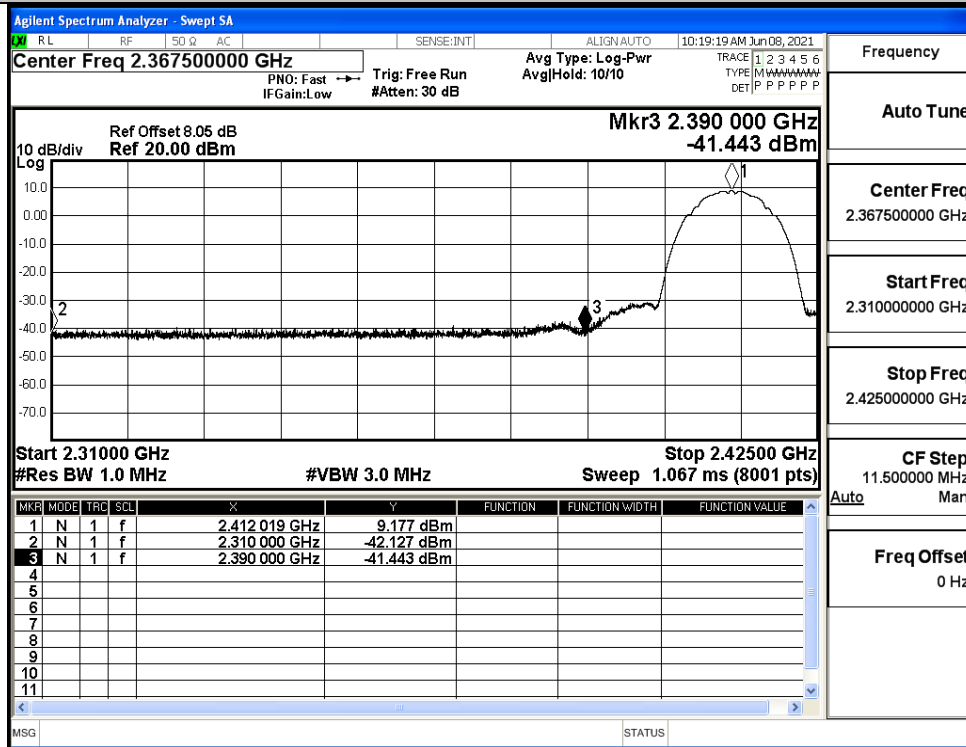
Freq Offset
0 Hz

C.7 Restrict-band band-edge measurements

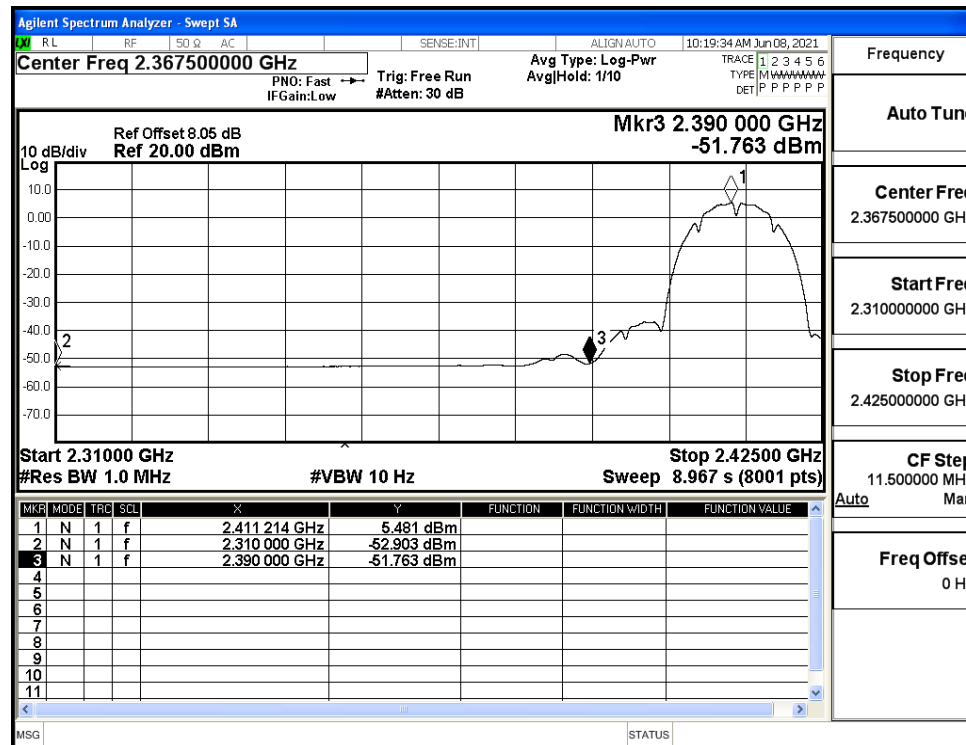
Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
11B	2412	Ant0	2310.0	-42.13	2.0	0	55.10	PEAK	74	PASS
	2412	Ant0	2310.0	-52.90	2.0	0	44.33	AV	54	PASS
	2412	Ant0	2390.0	-41.44	2.0	0	55.79	PEAK	74	PASS
	2412	Ant0	2390.0	-51.76	2.0	0	45.47	AV	54	PASS
	2462	Ant0	2483.5	-40.78	2.0	0	56.45	PEAK	74	PASS
	2462	Ant0	2483.5	-51.68	2.0	0	45.55	AV	54	PASS
	2462	Ant0	2500.0	-41.35	2.0	0	55.88	PEAK	74	PASS
	2462	Ant0	2500.0	-52.29	2.0	0	44.94	AV	54	PASS
11G	2412	Ant0	2310.0	-42.86	2.0	0	54.37	PEAK	74	PASS
	2412	Ant0	2310.0	-53.07	2.0	0	44.16	AV	54	PASS
	2412	Ant0	2390.0	-40.88	2.0	0	56.35	PEAK	74	PASS
	2412	Ant0	2390.0	-51.79	2.0	0	45.44	AV	54	PASS
	2462	Ant0	2483.5	-41.54	2.0	0	55.69	PEAK	74	PASS
	2462	Ant0	2483.5	-51.72	2.0	0	45.51	AV	54	PASS
	2462	Ant0	2500.0	-42.15	2.0	0	55.08	PEAK	74	PASS
	2462	Ant0	2500.0	-52.31	2.0	0	44.92	AV	54	PASS
11N20 SISO	2412	Ant0	2310.0	-42.50	2.0	0	54.73	PEAK	74	PASS
	2412	Ant0	2310.0	-53.06	2.0	0	44.17	AV	54	PASS
	2412	Ant0	2390.0	-38.45	2.0	0	58.78	PEAK	74	PASS
	2412	Ant0	2390.0	-51.91	2.0	0	45.32	AV	54	PASS
	2462	Ant0	2483.5	-41.26	2.0	0	55.97	PEAK	74	PASS
	2462	Ant0	2483.5	-51.45	2.0	0	45.78	AV	54	PASS
	2462	Ant0	2500.0	-41.92	2.0	0	55.31	PEAK	74	PASS
	2462	Ant0	2500.0	-52.36	2.0	0	44.87	AV	54	PASS
11N40 SISO	2422	Ant0	2310.0	-42.26	2.0	0	54.97	PEAK	74	PASS
	2422	Ant0	2310.0	-53.07	2.0	0	44.16	AV	54	PASS

	2422	Ant0	2390.0	-41.14	2.0	0	56.09	PEAK	74	PASS
	2422	Ant0	2390.0	-51.85	2.0	0	45.38	AV	54	PASS
	2452	Ant0	2483.5	-39.53	2.0	0	57.70	PEAK	74	PASS
	2452	Ant0	2483.5	-50.40	2.0	0	46.83	AV	54	PASS
	2452	Ant0	2500.0	-41.47	2.0	0	55.76	PEAK	74	PASS
	2452	Ant0	2500.0	-52.11	2.0	0	45.12	AV	54	PASS

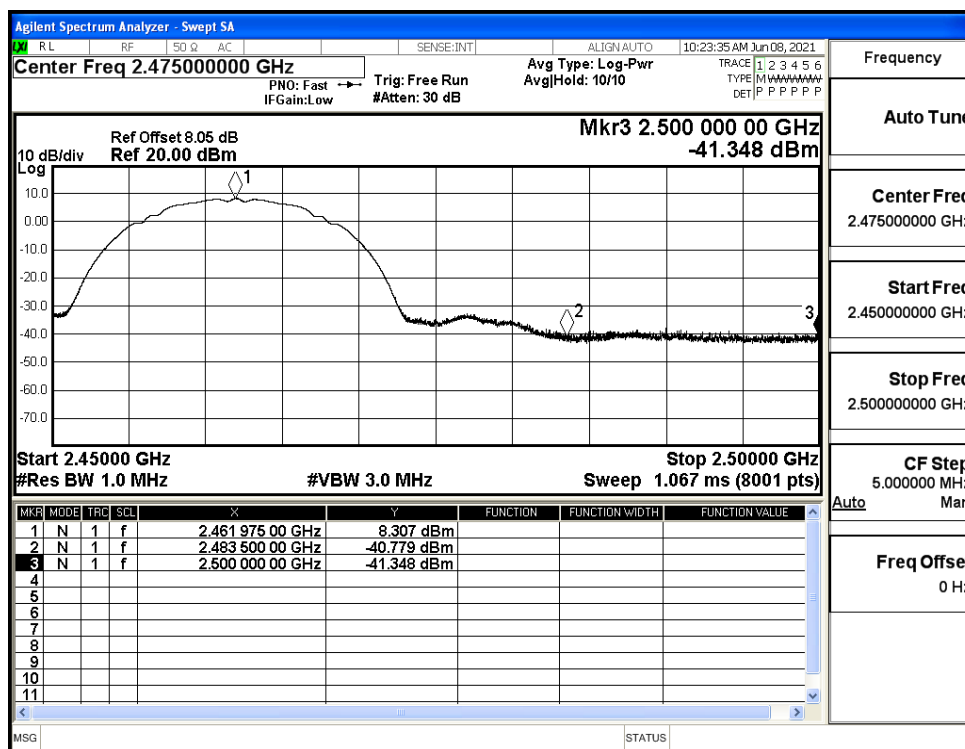
Restrict-band band-edge measurements_11B_2412_Ant0_PEAK



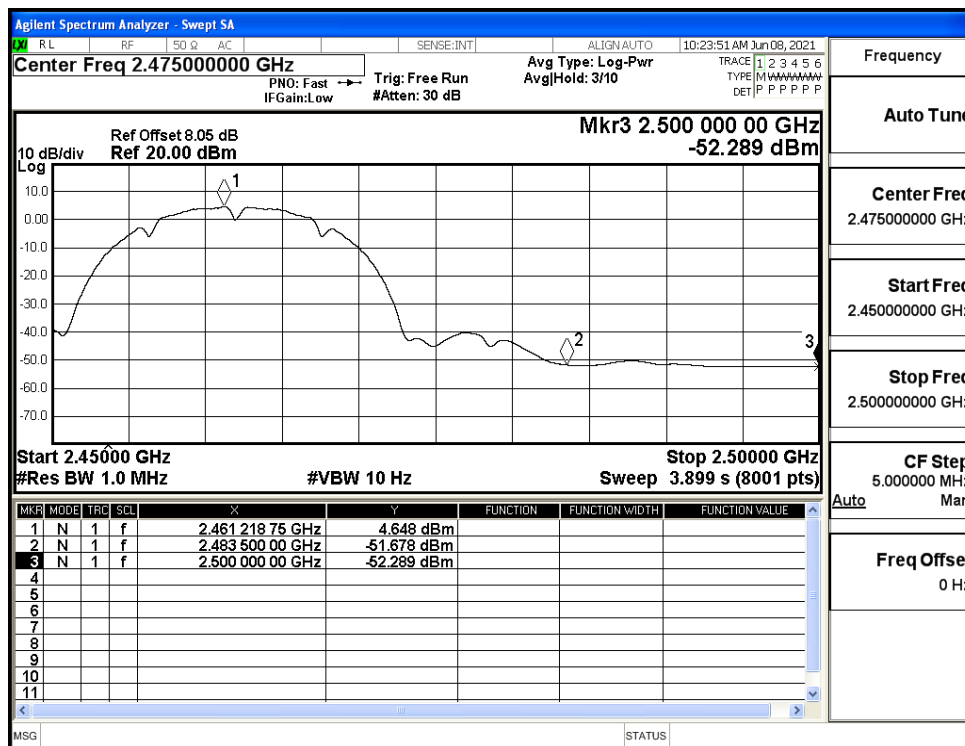
Restrict-band band-edge measurements_11B_2412_Ant0_AV



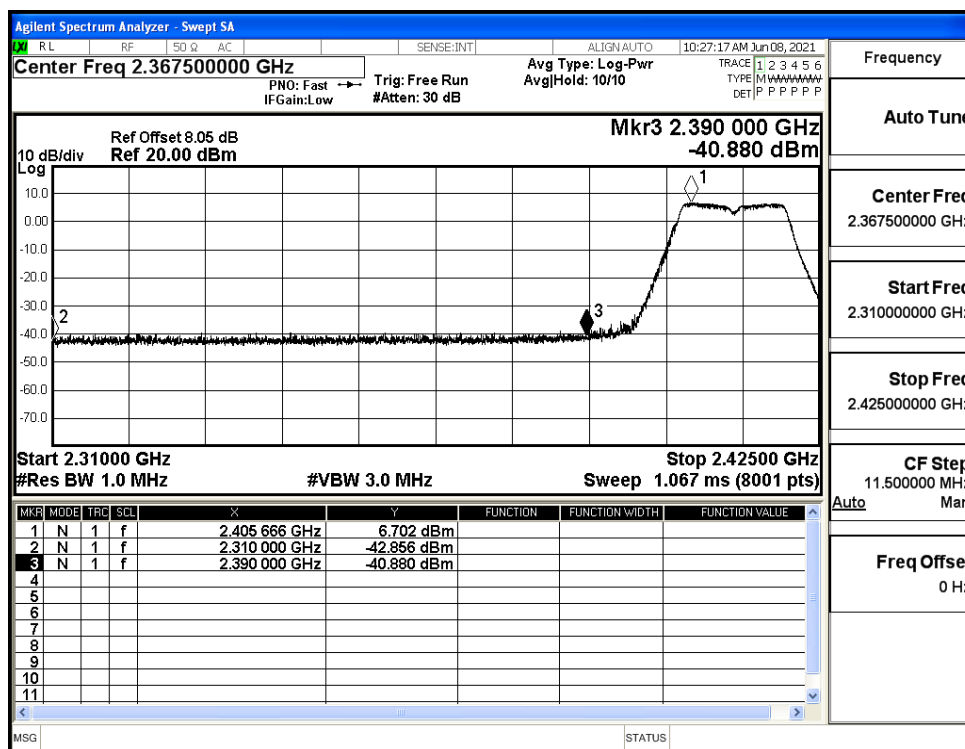
Restrict-band band-edge measurements_11B_2462_Ant0_PEAK



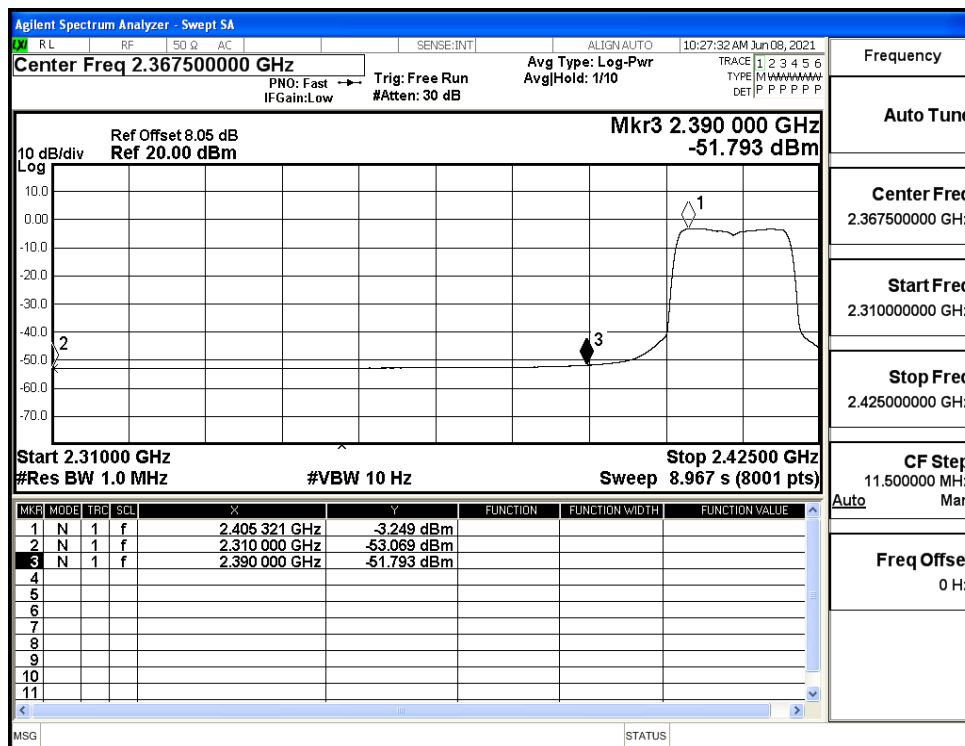
Restrict-band band-edge measurements_11B_2462_Ant0_AV



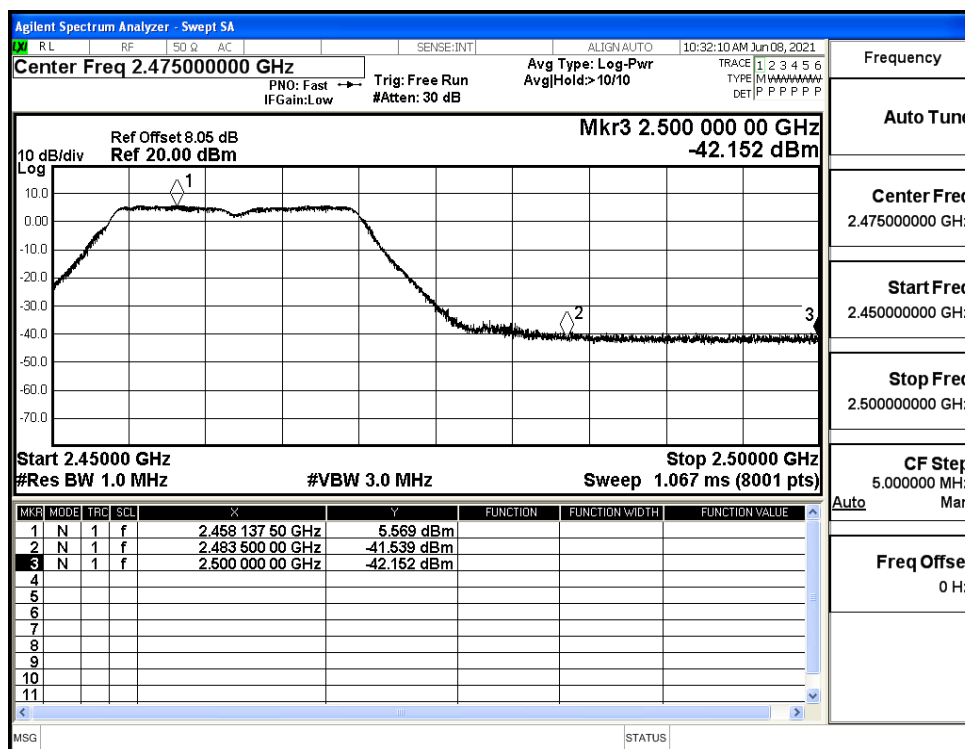
Restrict-band band-edge measurements_11G_2412_Ant0_PEAK



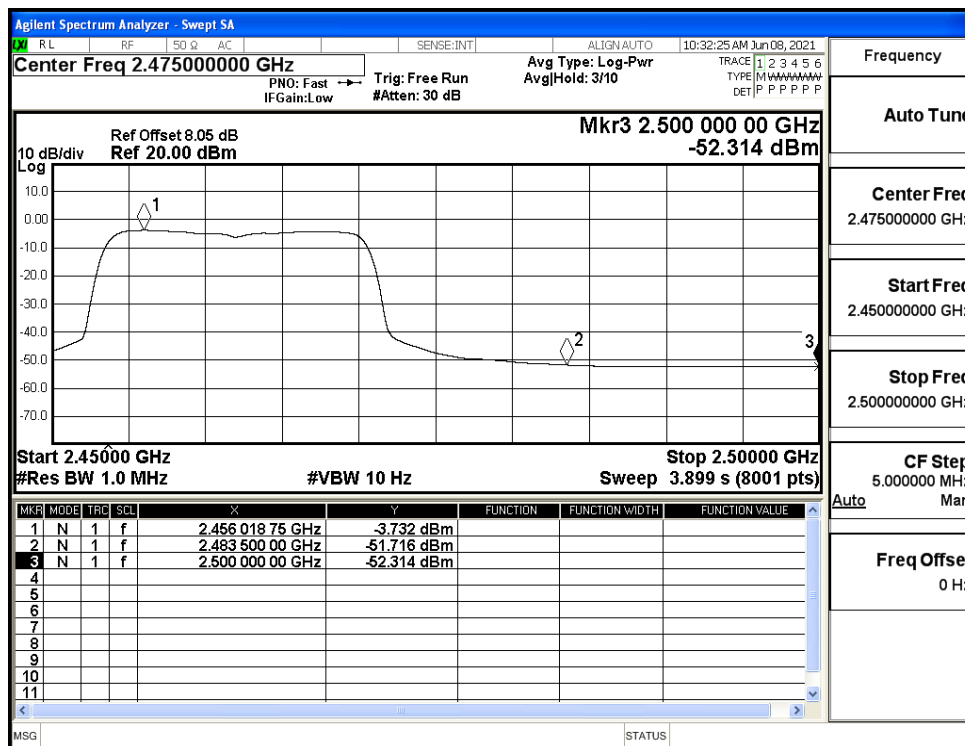
Restrict-band band-edge measurements_11G_2412_Ant0_AV



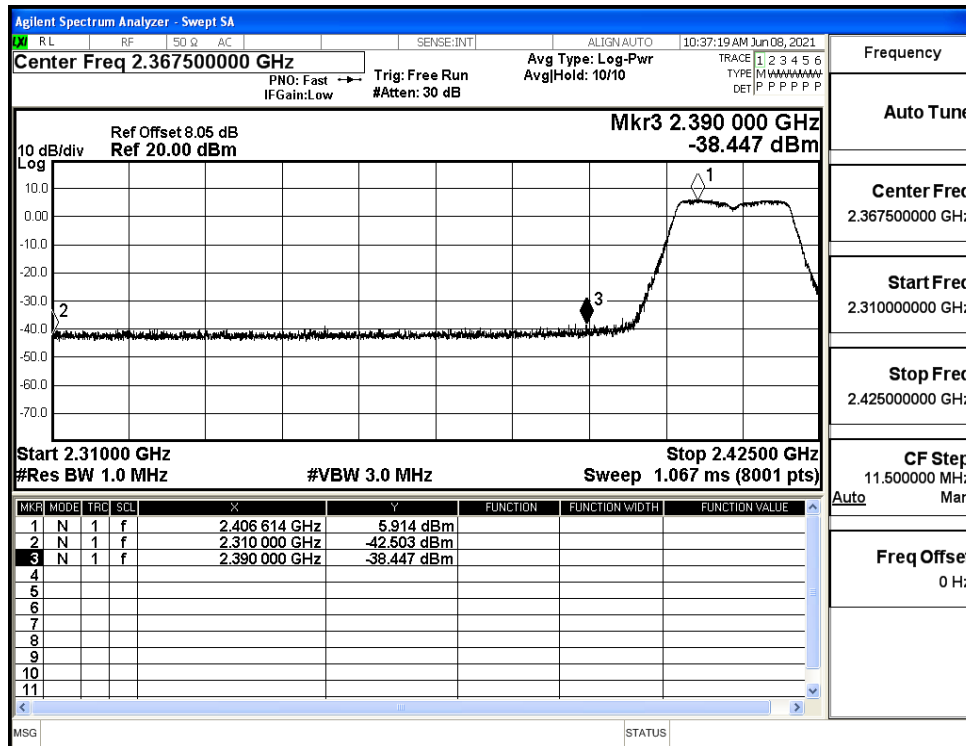
Restrict-band band-edge measurements_11G_2462_Ant0_PEAK



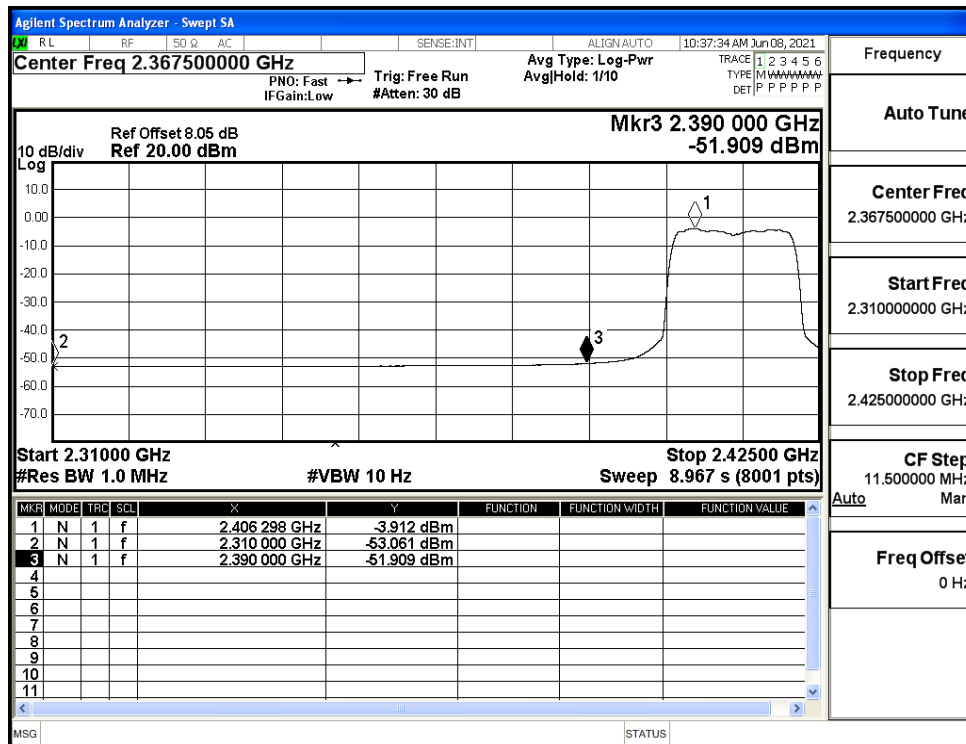
Restrict-band band-edge measurements_11G_2462_Ant0_AV



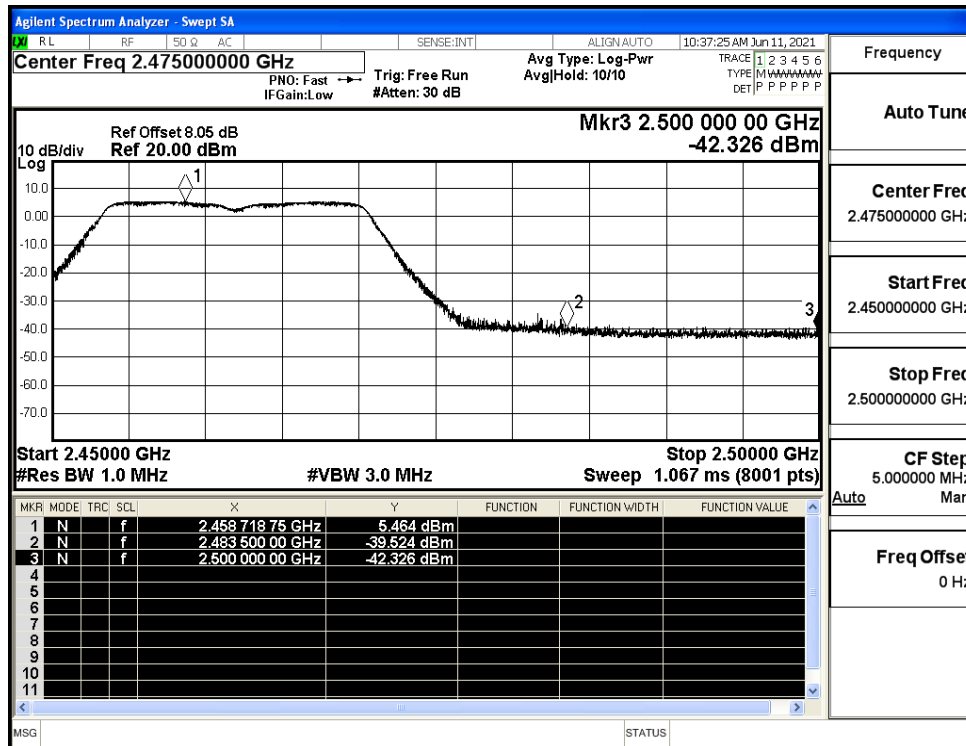
Restrict-band band-edge measurements_11N20SISO_2412_Ant0_PEAK



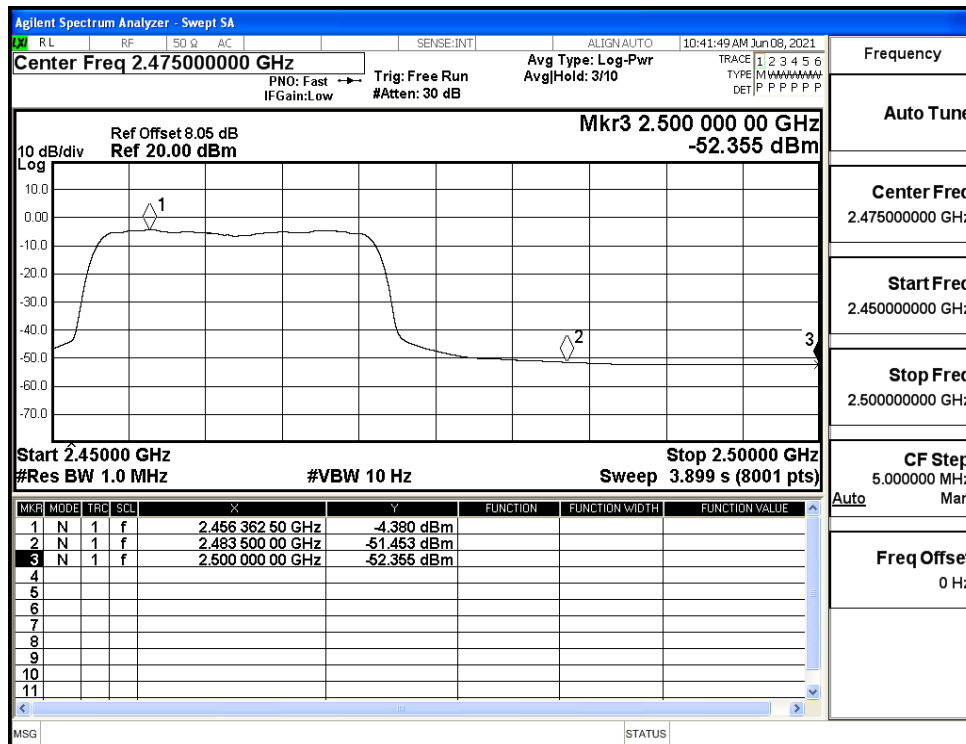
Restrict-band band-edge measurements_11N20SISO_2412_Ant0_AV



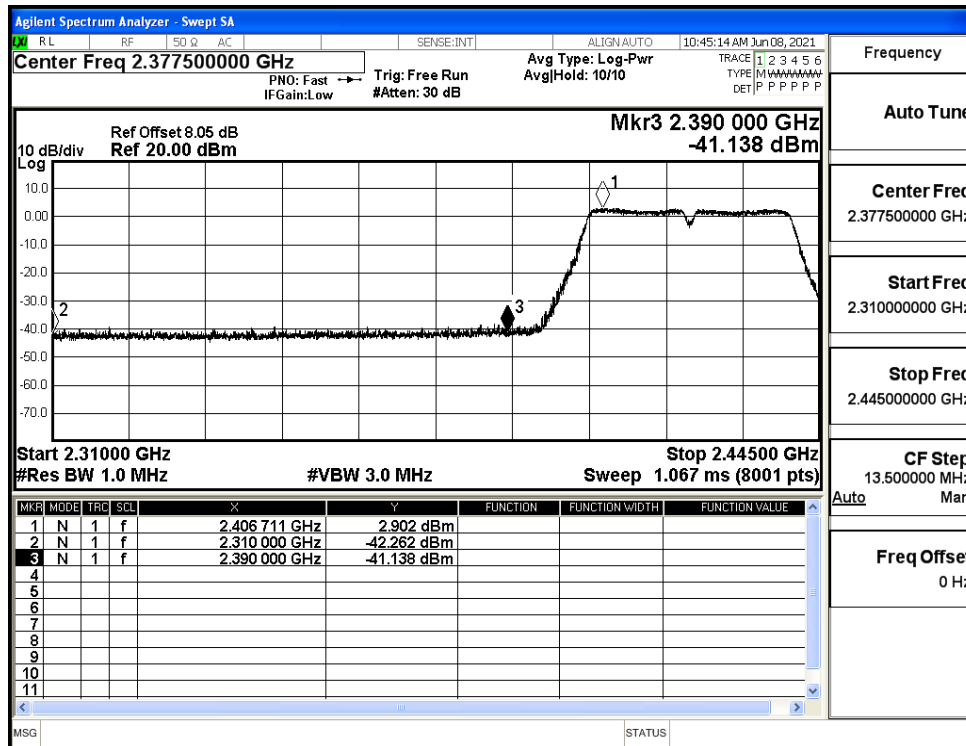
Restrict-band band-edge measurements_11N20SISO_2462_Ant0_PEAK



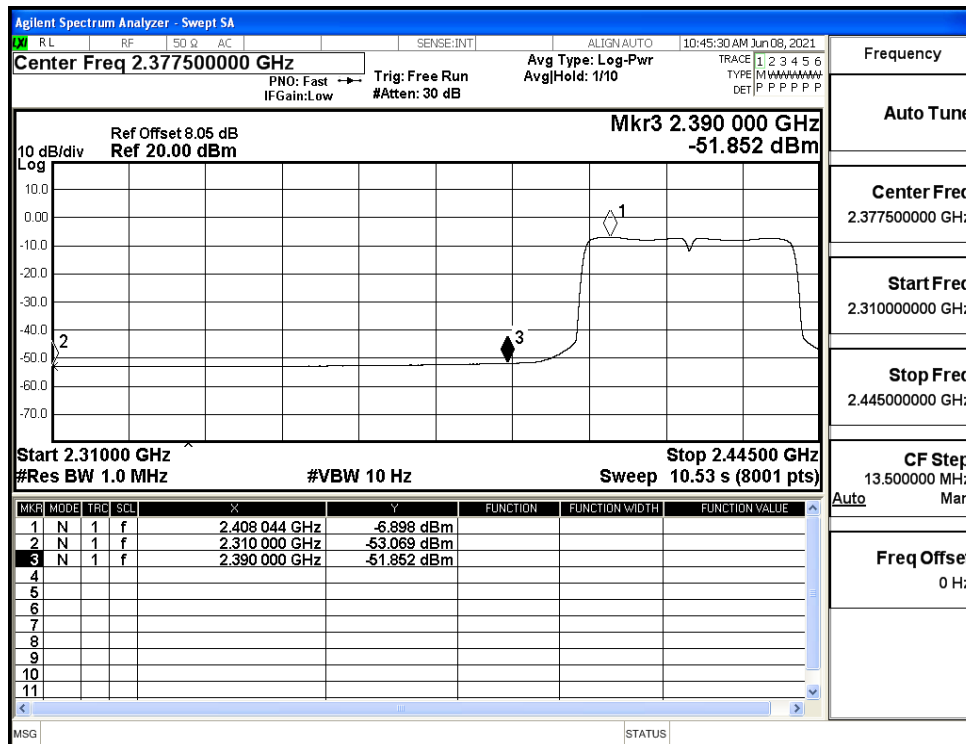
Restrict-band band-edge measurements_11N20SISO_2462_Ant0_AV



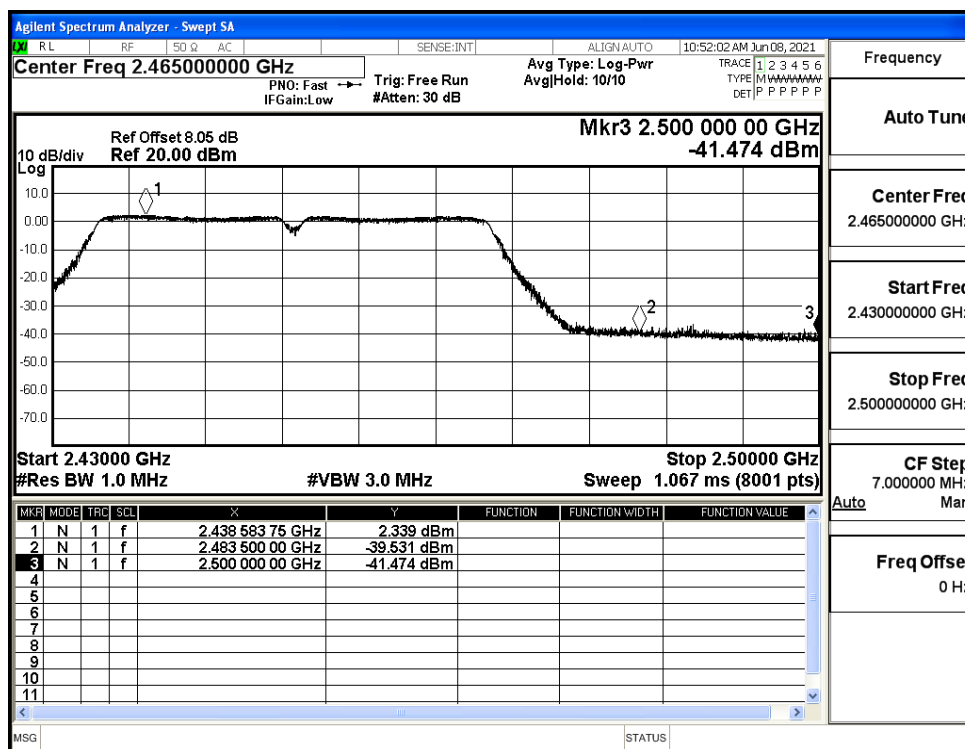
Restrict-band band-edge measurements_11N40SISO_2422_Ant0_PEAK



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

