

## Appendix A

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

Product Name: RADIO TRANSMITTER

Trade Mark: NEEWER

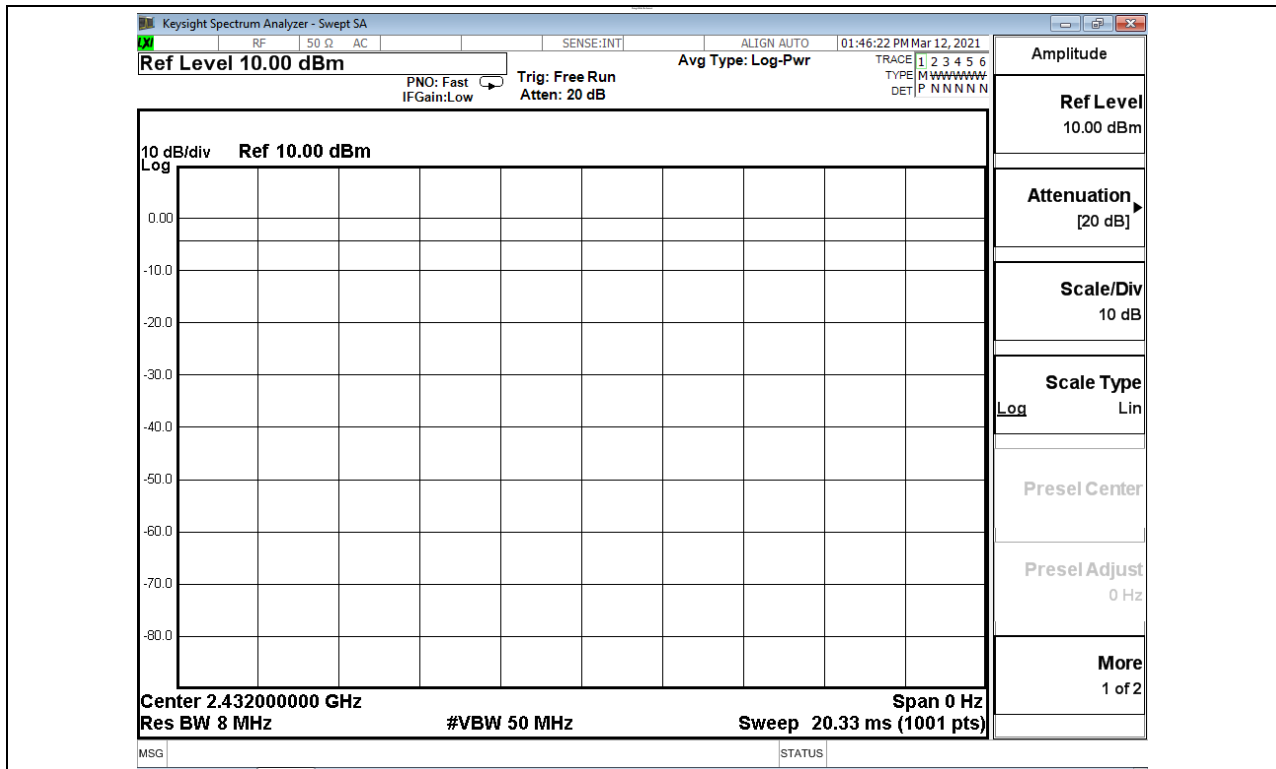
Test Model: VC-818TX

#### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

#### A.1 Duty Cycle

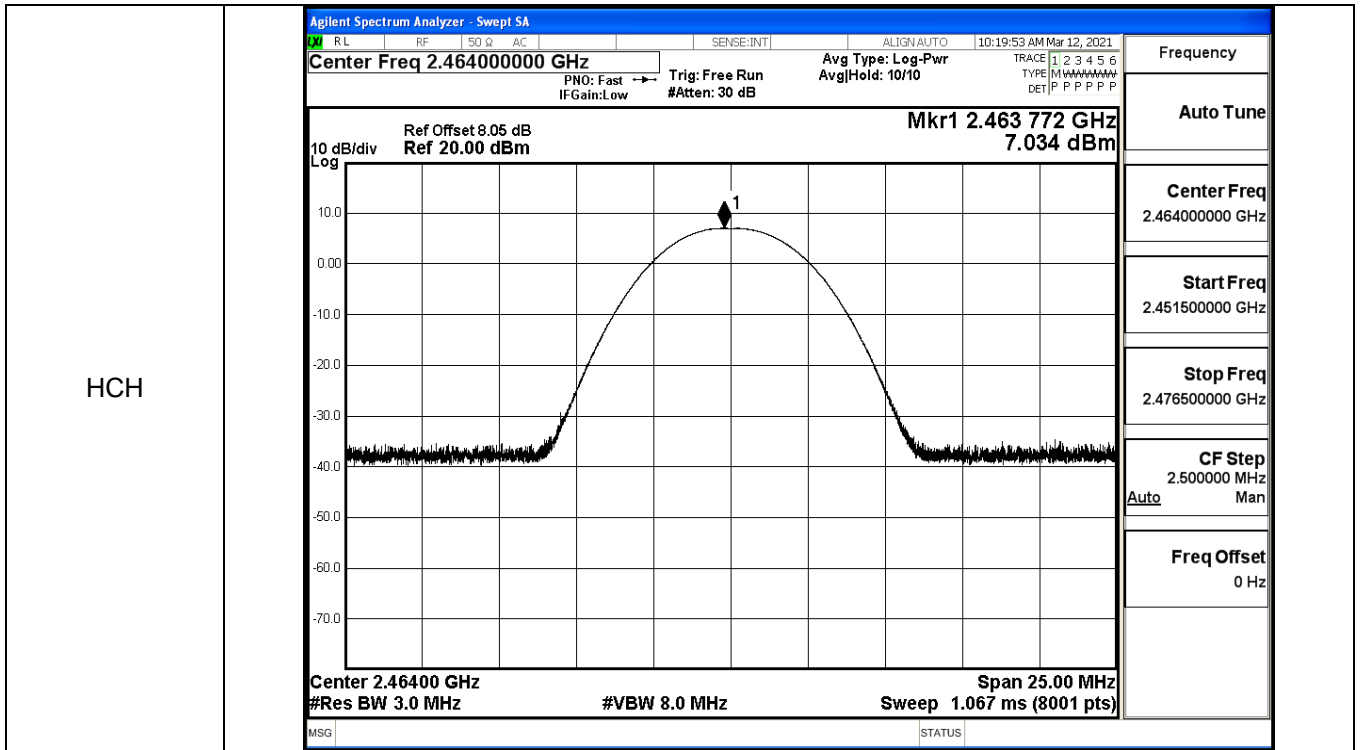
Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
GFSK	2432	Ant1	100	PASS



### A.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
GFSK	LCH	6.902	30	PASS
GFSK	MCH	7.742	30	PASS
GFSK	HCH	7.034	30	PASS

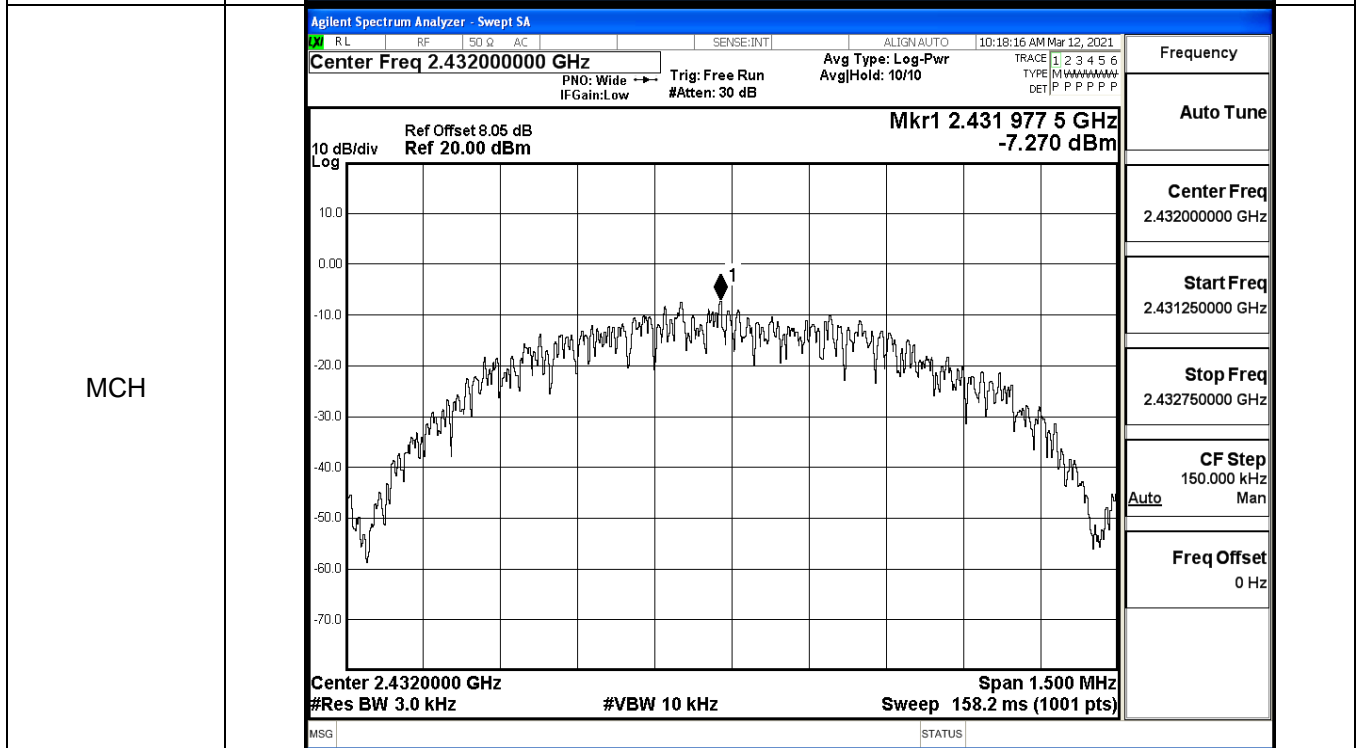
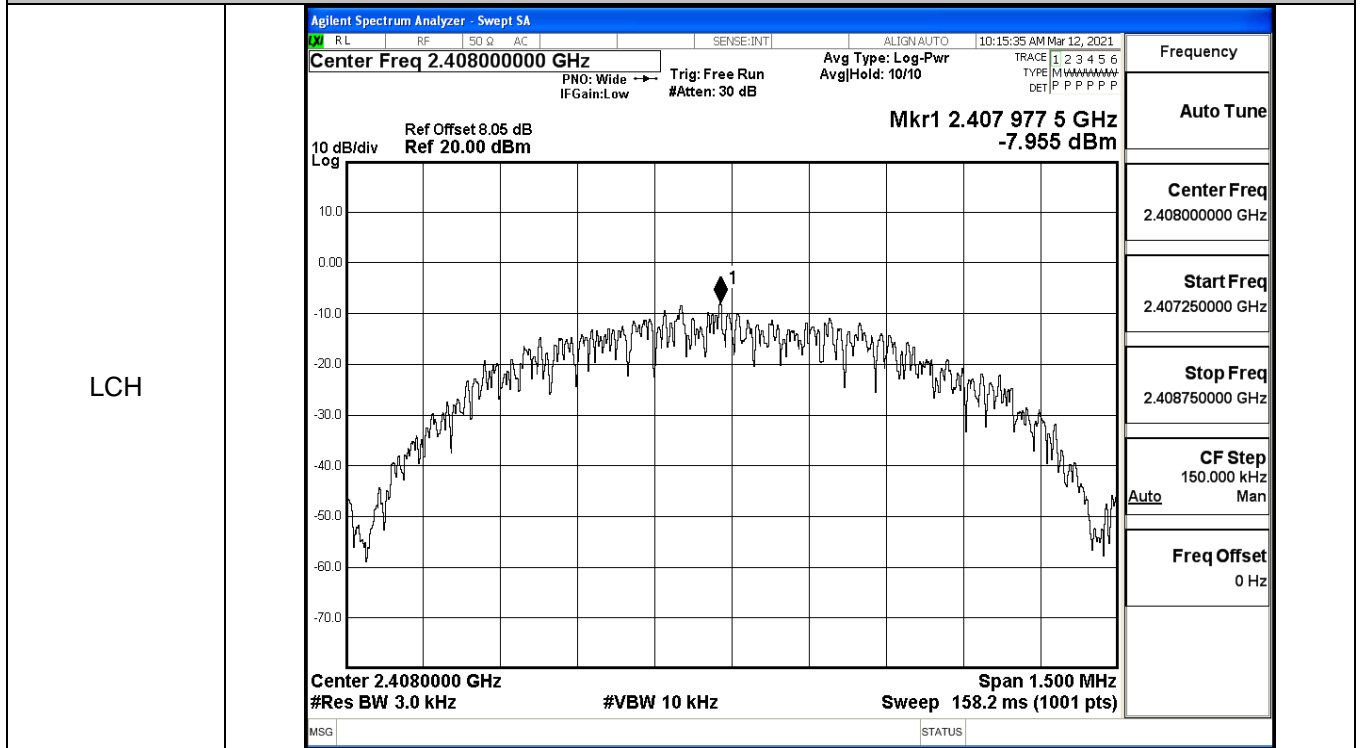
Test Graphs	
LCH	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.40800000 GHz</p> <p>Mkr1 2.408 194 GHz 6.902 dBm</p> <p>Center 2.40800 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> </div>
MCH	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.43200000 GHz</p> <p>Mkr1 2.432 059 GHz 7.742 dBm</p> <p>Center 2.43200 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> </div>

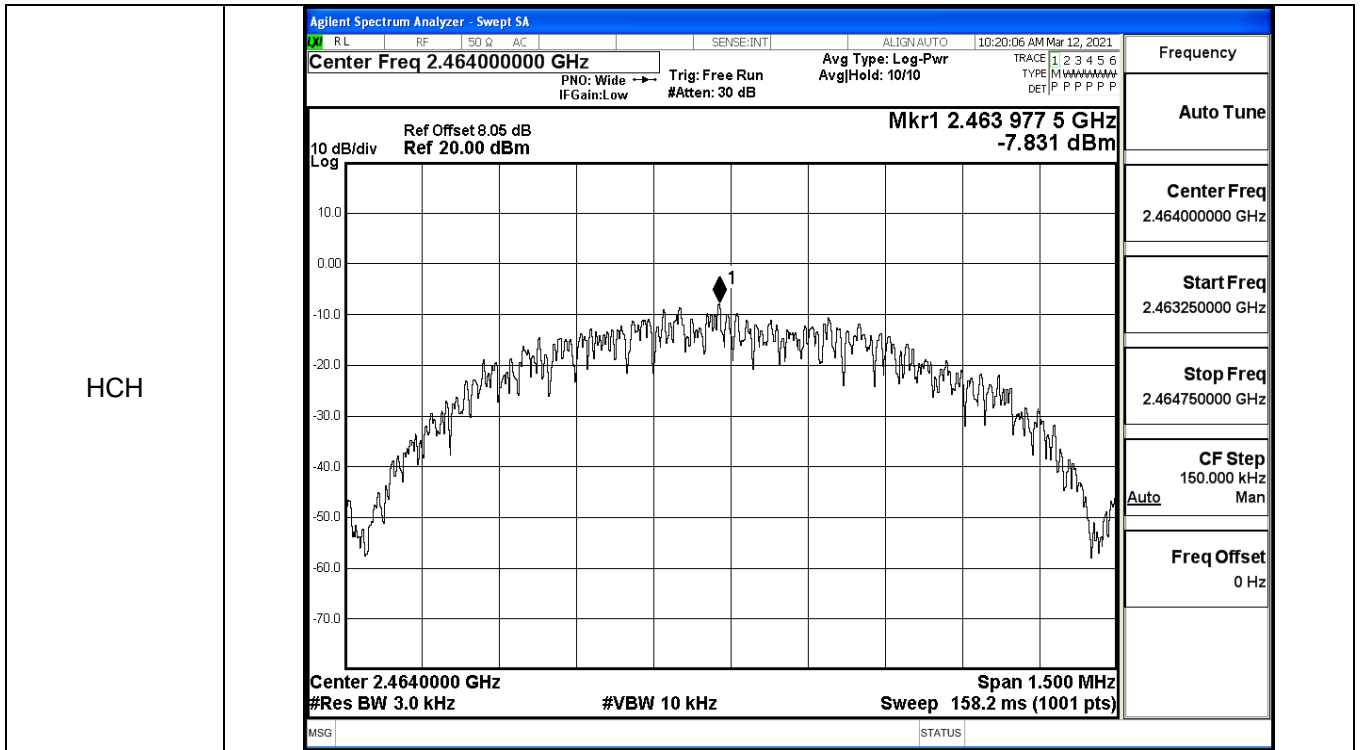


### A.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
GFSK	LCH	-7.955	8	PASS
GFSK	MCH	-7.270	8	PASS
GFSK	HCH	-7.831	8	PASS

#### Test Graphs

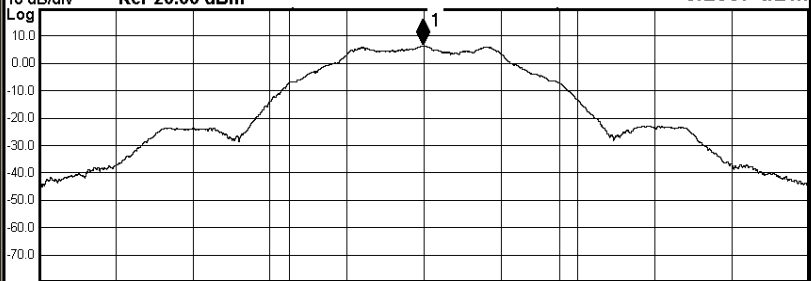


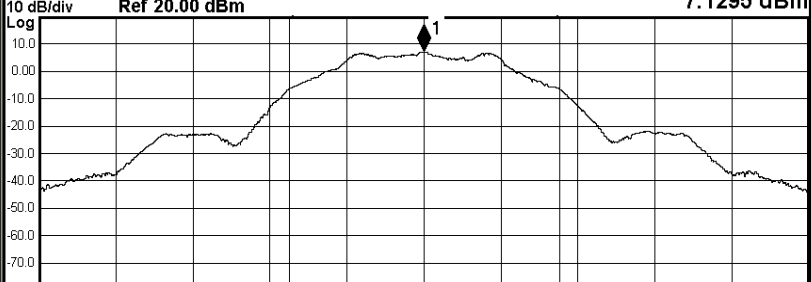


**A.4 6dB Bandwidth**

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.6694	≥0.5	PASS
GFSK	MCH	0.6679	≥0.5	PASS
GFSK	HCH	0.6690	≥0.5	PASS

**Test Graphs**

LCH	<p style="font-size: small; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: x-small; margin: 0;">RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 10:27:45 AM Mar 12, 2021</p> <p style="font-size: small; margin: 0;">Center Freq 2.408000000 GHz Center Freq: 2.408000000 GHz Radio Std: None</p> <p style="font-size: x-small; margin: 0;">Trig: Free Run AvgHold&gt;1/1</p> <p style="font-size: x-small; margin: 0;">#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px;"> <p style="font-size: x-small; margin: 0;">10 dB/div Ref Offset 8.05 dB Mkr1 2.4079974 GHz</p> <p style="font-size: x-small; margin: 0;">Log Ref 20.00 dBm 6.2887 dBm</p>  </div> <p style="font-size: x-small; margin: 0;">Center 2.408 GHz Span 3 MHz</p> <p style="font-size: x-small; margin: 0;">#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table style="width: 100%; font-size: x-small; border-collapse: collapse;"> <tr> <td style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">13.1 dBm</td> </tr> <tr> <td style="text-align: center;"><b>1.0485 MHz</b></td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>3.290 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>669.4 kHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>99.00 %</td> </tr> <tr> <td></td> <td></td> <td>-6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p>	Occupied Bandwidth	Total Power	13.1 dBm	<b>1.0485 MHz</b>			Transmit Freq Error	3.290 kHz	OBW Power	x dB Bandwidth	669.4 kHz	x dB			99.00 %			-6.00 dB	<p style="font-size: x-small; margin: 0;">Frequency</p> <hr/> <p style="font-size: x-small; margin: 0;">Center Freq 2.408000000 GHz</p> <hr/> <p style="font-size: x-small; margin: 0;">CF Step 300.000 kHz Auto Man</p> <hr/> <p style="font-size: x-small; margin: 0;">Freq Offset 0 Hz</p>
	Occupied Bandwidth	Total Power	13.1 dBm																	
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x dB Bandwidth	669.4 kHz	x dB																		
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		-6.00 dB																		

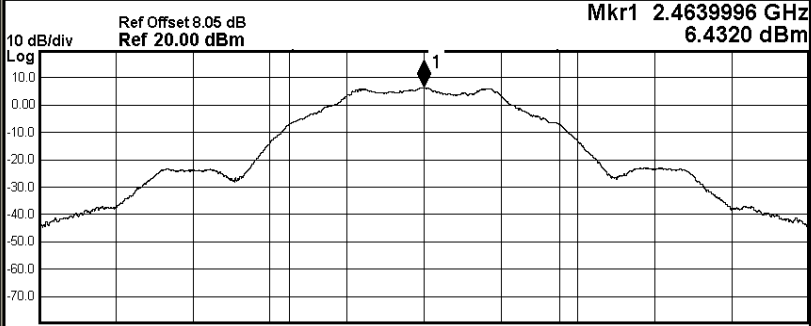
MCH	<p style="font-size: small; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: x-small; margin: 0;">RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 10:17:52 AM Mar 12, 2021</p> <p style="font-size: small; margin: 0;">Center Freq 2.432000000 GHz Center Freq: 2.432000000 GHz Radio Std: None</p> <p style="font-size: x-small; margin: 0;">Trig: Free Run AvgHold&gt;1/1</p> <p style="font-size: x-small; margin: 0;">#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px;"> <p style="font-size: x-small; margin: 0;">10 dB/div Ref Offset 8.05 dB Mkr1 2.4319993 GHz</p> <p style="font-size: x-small; margin: 0;">Log Ref 20.00 dBm 7.1295 dBm</p>  </div> <p style="font-size: x-small; margin: 0;">Center 2.432 GHz Span 3 MHz</p> <p style="font-size: x-small; margin: 0;">#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table style="width: 100%; font-size: x-small; border-collapse: collapse;"> <tr> <td style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">13.9 dBm</td> </tr> <tr> <td style="text-align: center;"><b>1.0488 MHz</b></td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>3.278 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>667.9 kHz</td> <td>x dB</td> </tr> <tr> <td></td> <td></td> <td>99.00 %</td> </tr> <tr> <td></td> <td></td> <td>-6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p>	Occupied Bandwidth	Total Power	13.9 dBm	<b>1.0488 MHz</b>			Transmit Freq Error	3.278 kHz	OBW Power	x dB Bandwidth	667.9 kHz	x dB			99.00 %			-6.00 dB	<p style="font-size: x-small; margin: 0;">Frequency</p> <hr/> <p style="font-size: x-small; margin: 0;">Center Freq 2.432000000 GHz</p> <hr/> <p style="font-size: x-small; margin: 0;">CF Step 300.000 kHz Auto Man</p> <hr/> <p style="font-size: x-small; margin: 0;">Freq Offset 0 Hz</p>
	Occupied Bandwidth	Total Power	13.9 dBm																	
	<b>1.0488 MHz</b>																			
	Transmit Freq Error	3.278 kHz	OBW Power																	
x dB Bandwidth	667.9 kHz	x dB																		
		99.00 %																		
		-6.00 dB																		

HCH

Agilent Spectrum Analyzer - Occupied BW

<input type="checkbox"/> RL	<input type="checkbox"/> RF	<input type="checkbox"/> 50 Ω	<input type="checkbox"/> AC	<input type="checkbox"/> SENSE:INT	<input type="checkbox"/> ALIGN:AUTO	10:19:42 AM Mar 12, 2021
<b>Center Freq 2.464000000 GHz</b>				Center Freq: 2.464000000 GHz	Radio Std: None	Frequency
				Trig: Free Run	AvgJHold: 1/1	
				#IFGain:Low	#Atten: 30 dB	Radio Device: BTS

Mkr1 2.4639996 GHz  
6.4320 dBm



10 dB/div  
Log  
Ref Offset 8.05 dB  
Ref 20.00 dBm

Center 2.464 GHz	#Res BW 100 kHz	#VBW 300 kHz	Span 3 MHz
		Sweep 1.067 ms	

<b>Occupied Bandwidth</b>	<b>Total Power</b>	<b>13.2 dBm</b>	
<b>1.0502 MHz</b>			
Transmit Freq Error	2.642 kHz	OBW Power	99.00 %
x dB Bandwidth	669.0 kHz	x dB	-6.00 dB

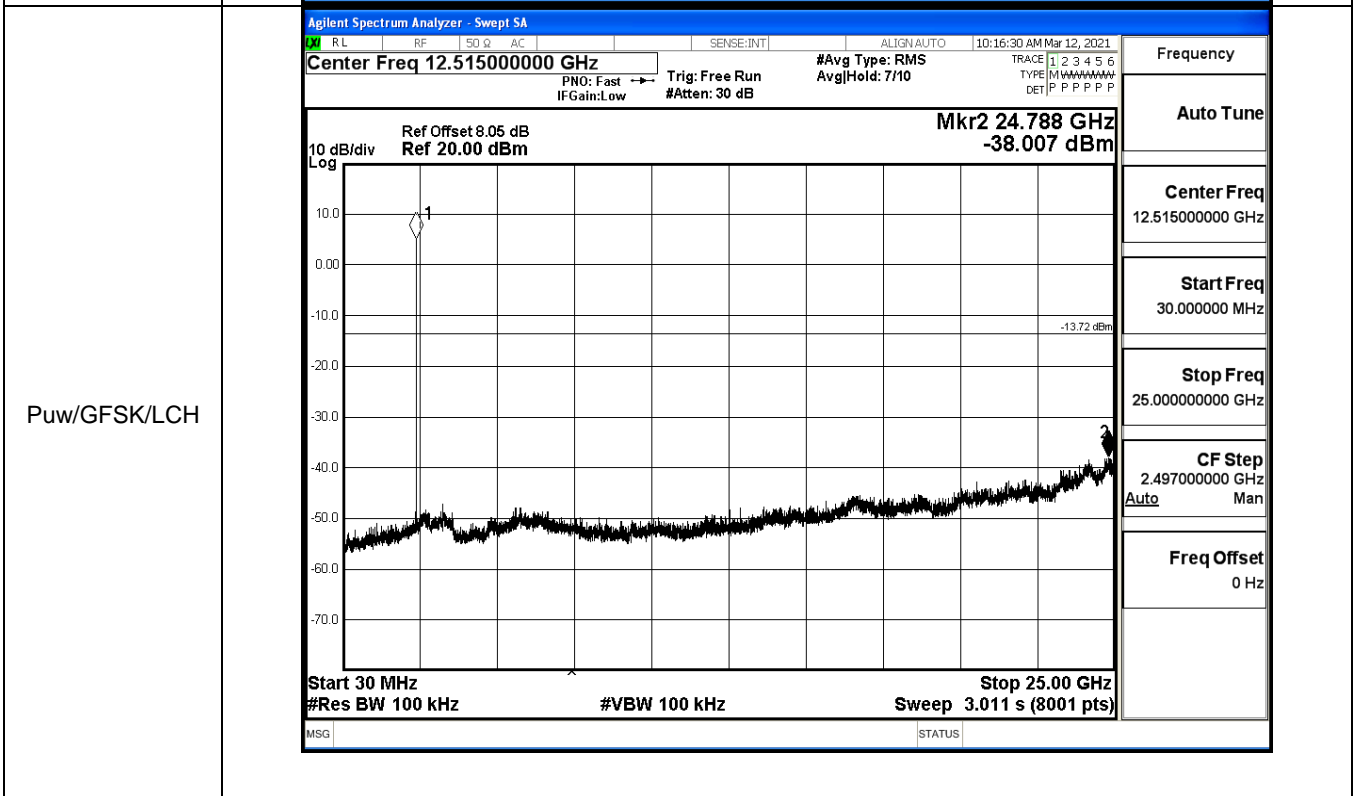
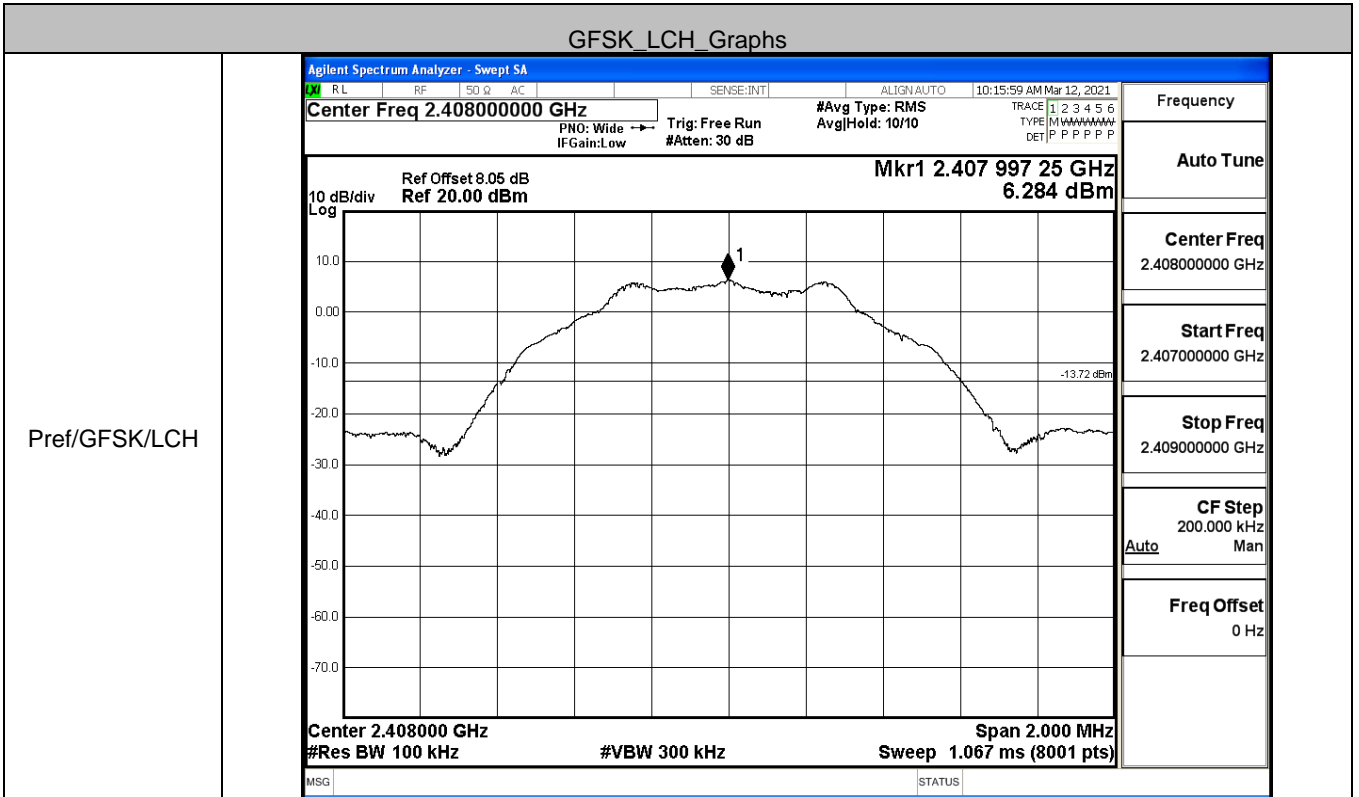
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz

MSG
STATUS

### A.5 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	6.284	-38.007	-13.716	PASS
GFSK	MCH	7.095	-37.547	-12.905	PASS
GFSK	HCH	6.426	-37.967	-13.574	PASS

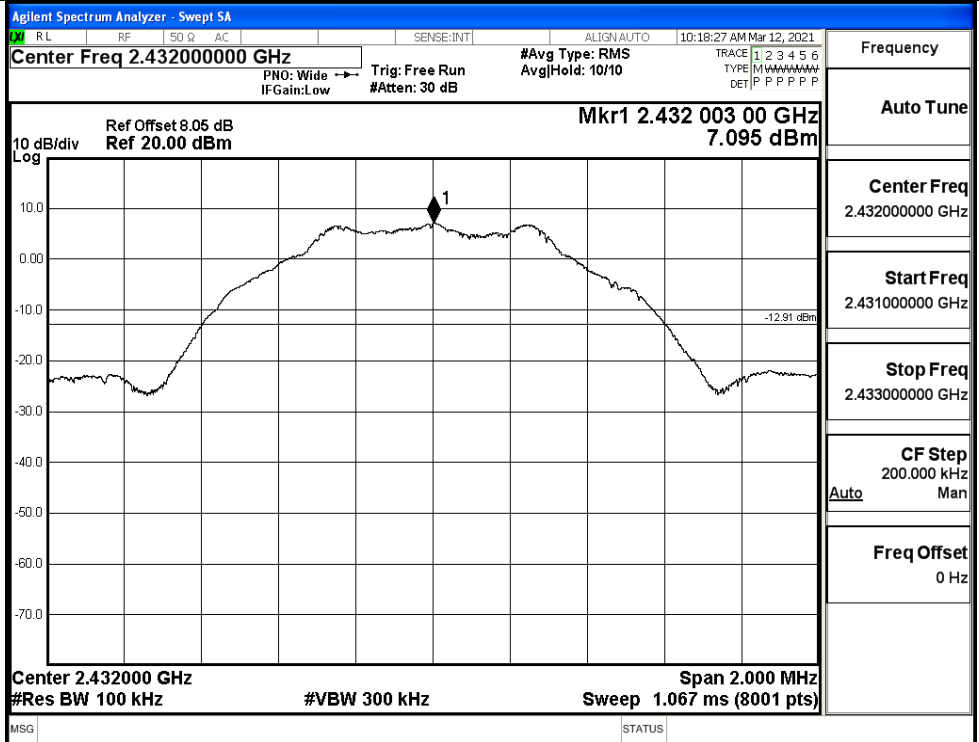
GFSK\_LCH\_Graphs



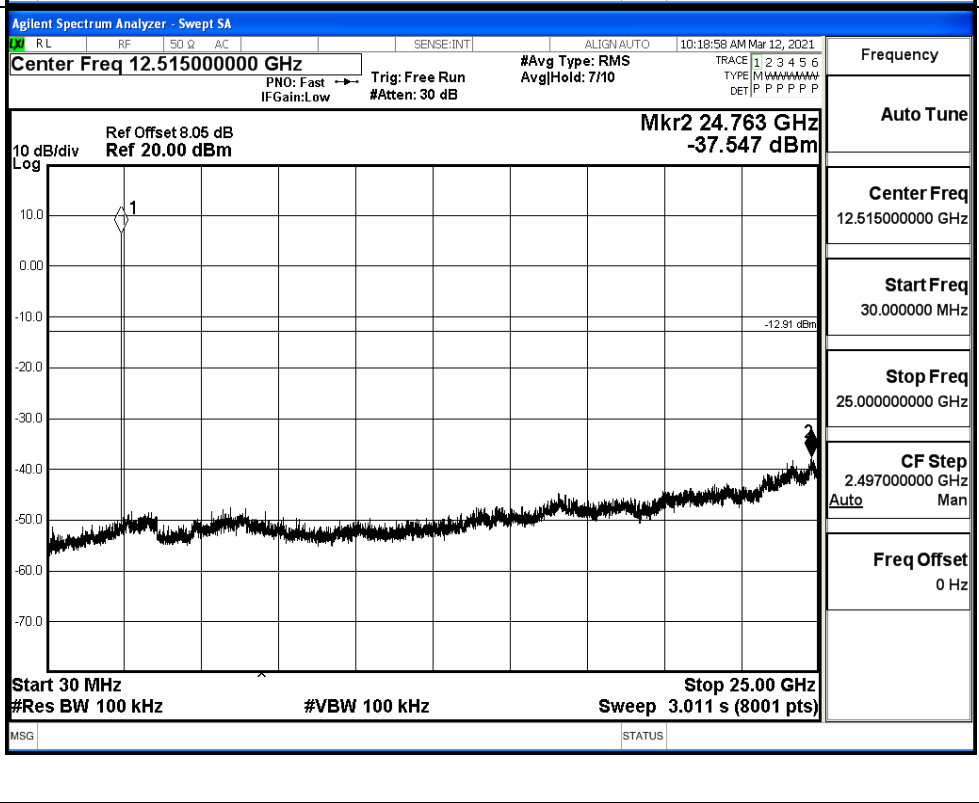


GFSK\_MCH\_Graphs

Pref/GFSK/MCH

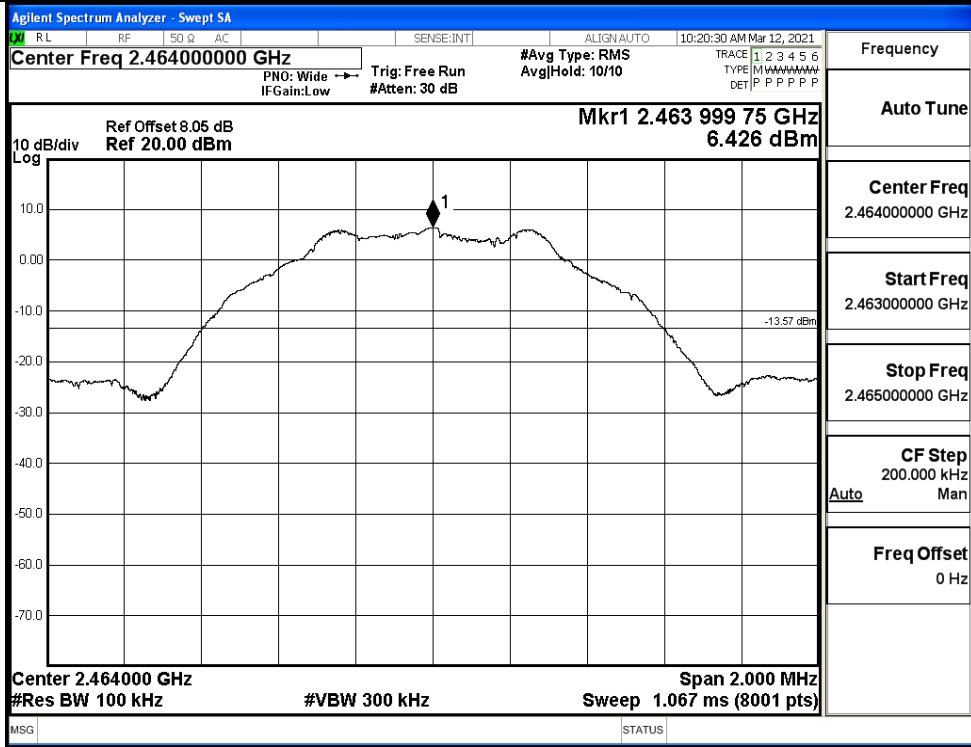


Puw/GFSK/MCH

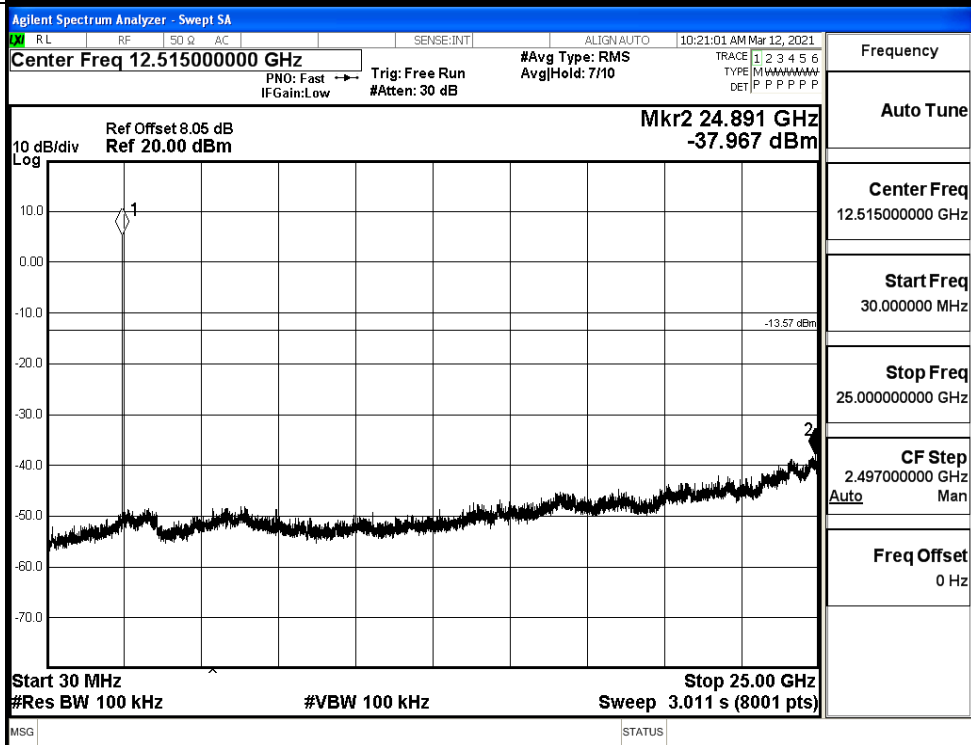


GFSK\_HCH\_Graphs

Pref/GFSK/HCH



Puw/GFSK/HCH



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

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	6.290	-50.219	-13.71	PASS
GFSK	HCH	6.406	-49.079	-13.59	PASS

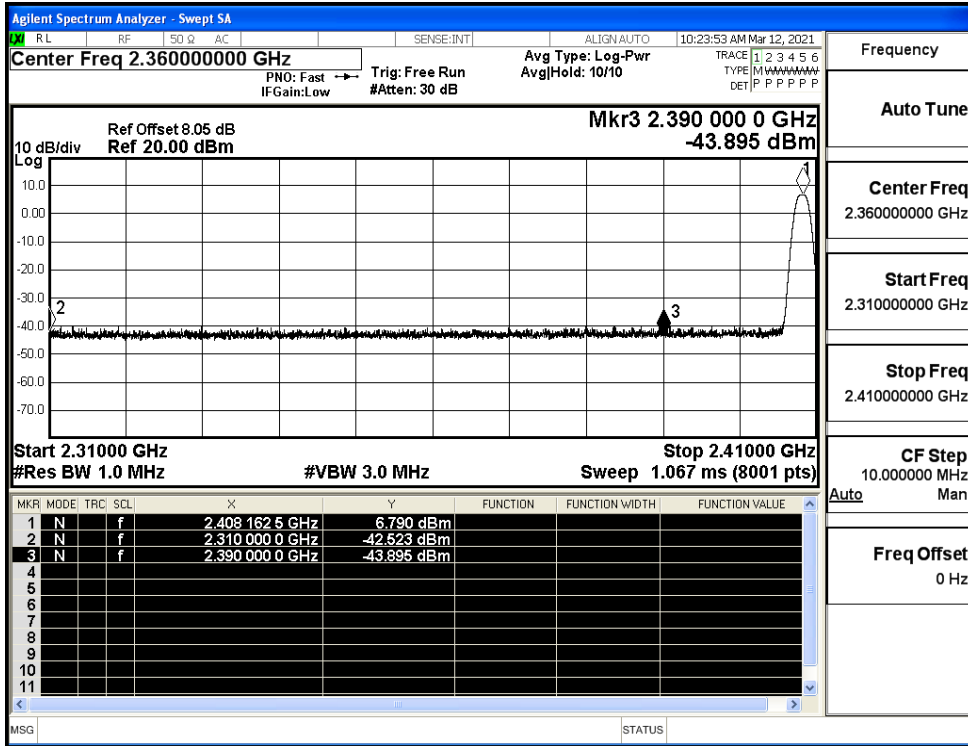
Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA                  Center Freq 2.36000000 GHz                  Max Spurious Level -50.219 dBm                  Mkr4 2.380 662 5 GHz -50.219 dBm                  Start 2.31000 GHz Stop 2.41000 GHz                  #Res BW 100 kHz #VBW 300 kHz Sweep 9.600 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>f</td><td></td><td>2.408 000 0 GHz</td><td>6.290 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.400 000 0 GHz</td><td>-52.830 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.390 000 0 GHz</td><td>-53.218 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.380 662 5 GHz</td><td>-50.219 dBm</td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.408 000 0 GHz	6.290 dBm				2	N	f		2.400 000 0 GHz	-52.830 dBm				3	N	f		2.390 000 0 GHz	-53.218 dBm				4	N	f		2.380 662 5 GHz	-50.219 dBm				Frequency Auto Tune Center Freq 2.36000000 GHz Start Freq 2.310000000 GHz Stop Freq 2.410000000 GHz CF Step 10.000000 MHz Freq Offset 0 Hz
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4	N	f		2.380 662 5 GHz	-50.219 dBm																																										
HCH	<p>Agilent Spectrum Analyzer - Swept SA                  Center Freq 2.48100000 GHz                  Max Spurious Level -49.079 dBm                  Mkr4 2.490 215 00 GHz -49.079 dBm                  Start 2.46200 GHz Stop 2.50000 GHz                  #Res BW 100 kHz #VBW 300 kHz Sweep 3.733 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>f</td><td></td><td>2.464 004 50 GHz</td><td>6.406 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.483 500 00 GHz</td><td>-52.770 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.500 000 00 GHz</td><td>-53.334 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.490 215 00 GHz</td><td>-49.079 dBm</td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.464 004 50 GHz	6.406 dBm				2	N	f		2.483 500 00 GHz	-52.770 dBm				3	N	f		2.500 000 00 GHz	-53.334 dBm				4	N	f		2.490 215 00 GHz	-49.079 dBm				Frequency Auto Tune Center Freq 2.48100000 GHz Start Freq 2.462000000 GHz Stop Freq 2.500000000 GHz CF Step 3.800000 MHz Freq Offset 0 Hz
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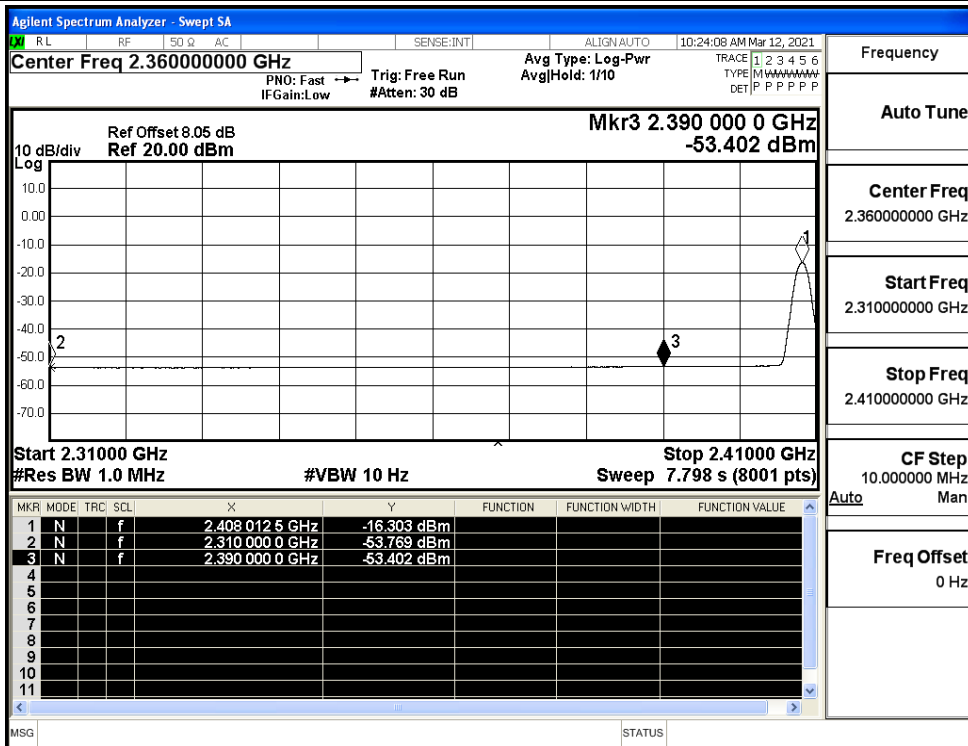
## A.7 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
GFSK	2408	Ant1	2310.0	-42.52	2.0	0	54.71	PEAK	74	PASS
		Ant1	2310.0	-53.77	2.0	0	43.46	AV	54	PASS
		Ant1	2390.0	-43.90	2.0	0	53.33	PEAK	74	PASS
		Ant1	2390.0	-53.40	2.0	0	43.83	AV	54	PASS
	2464	Ant1	2483.5	-42.46	2.0	0	54.77	PEAK	74	PASS
		Ant1	2483.5	-53.02	2.0	0	44.21	AV	54	PASS
		Ant1	2500.0	-42.86	2.0	0	54.37	PEAK	74	PASS
		Ant1	2500.0	-52.82	2.0	0	44.41	AV	54	PASS

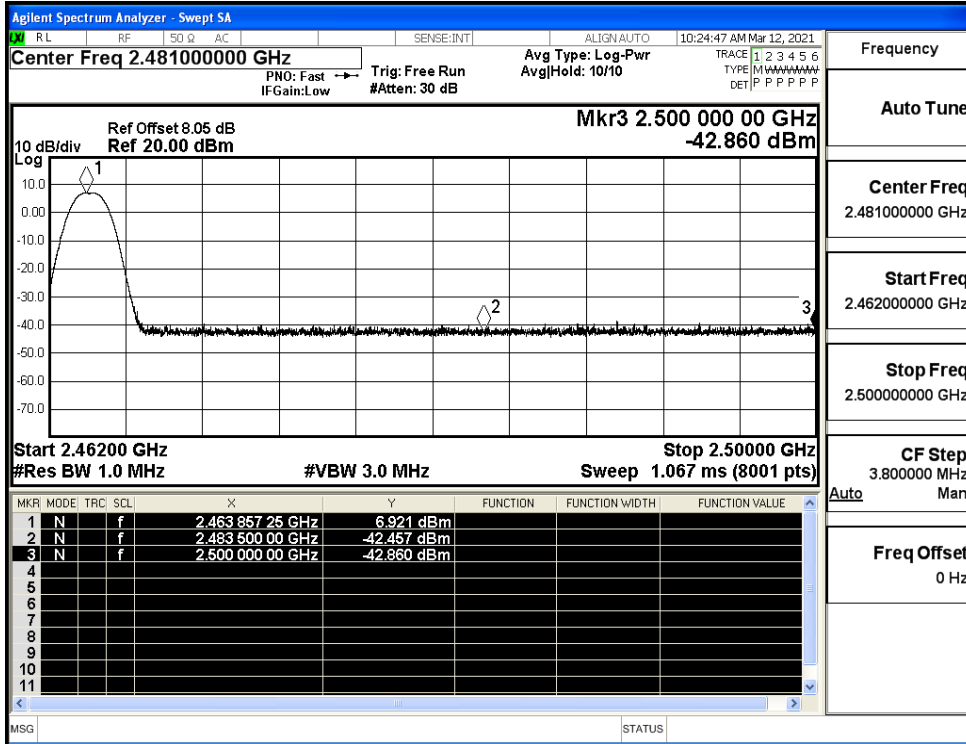
Restrict-band band-edge measurements\_GFSK\_2408\_Ant1\_PEAK



Restrict-band band-edge measurements\_GFSK\_2408\_Ant1\_AV



Restrict-band band-edge measurements\_GFSK\_2464\_Ant1\_PEAK



Restrict-band band-edge measurements\_GFSK\_2464\_Ant1\_AV

