

## Appendix A

### RF Test Data for BT V4.2(BT LE) (Conducted Measurement)

Product Name: Aqua Illumination Nero Submersible Pump

Trade Mark: Aqua Illumination

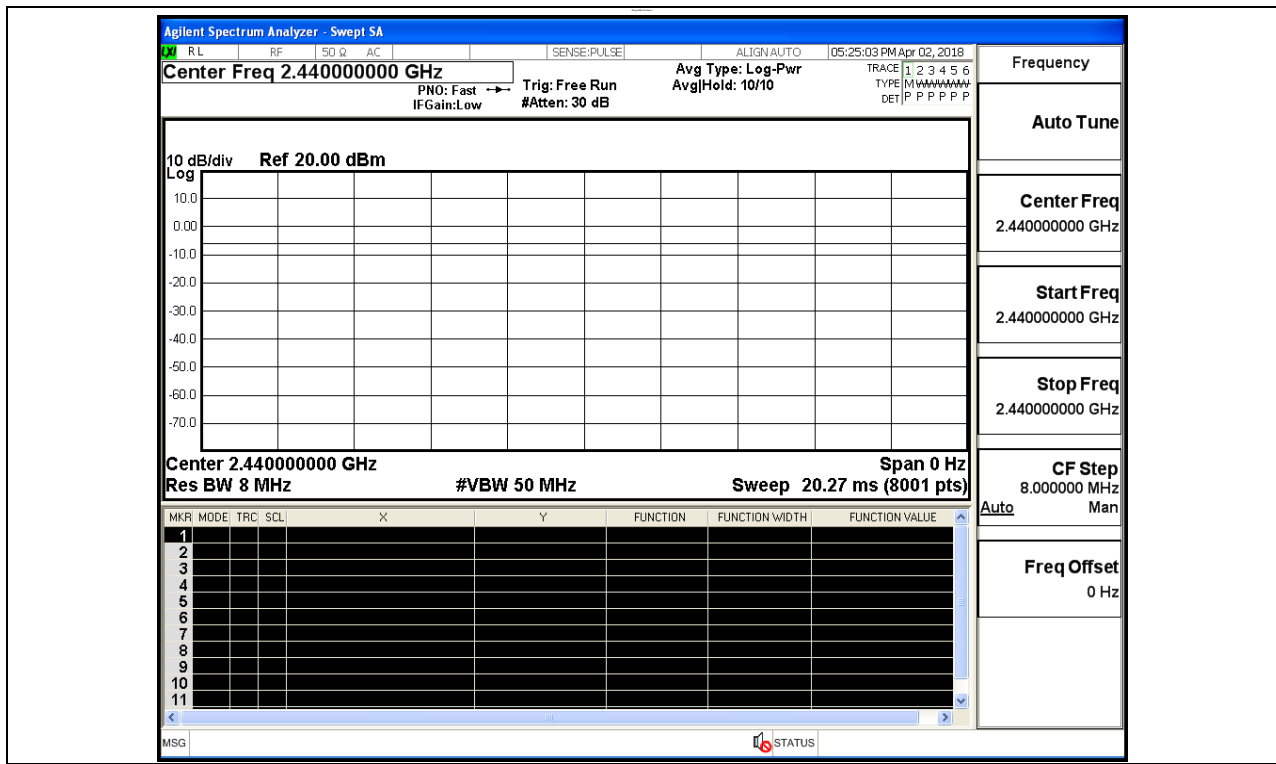
Test Model: Nero 5

#### Environmental Conditions

Temperature:	22.3 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom.Liu
Supervised by:	Jayden.zhuo

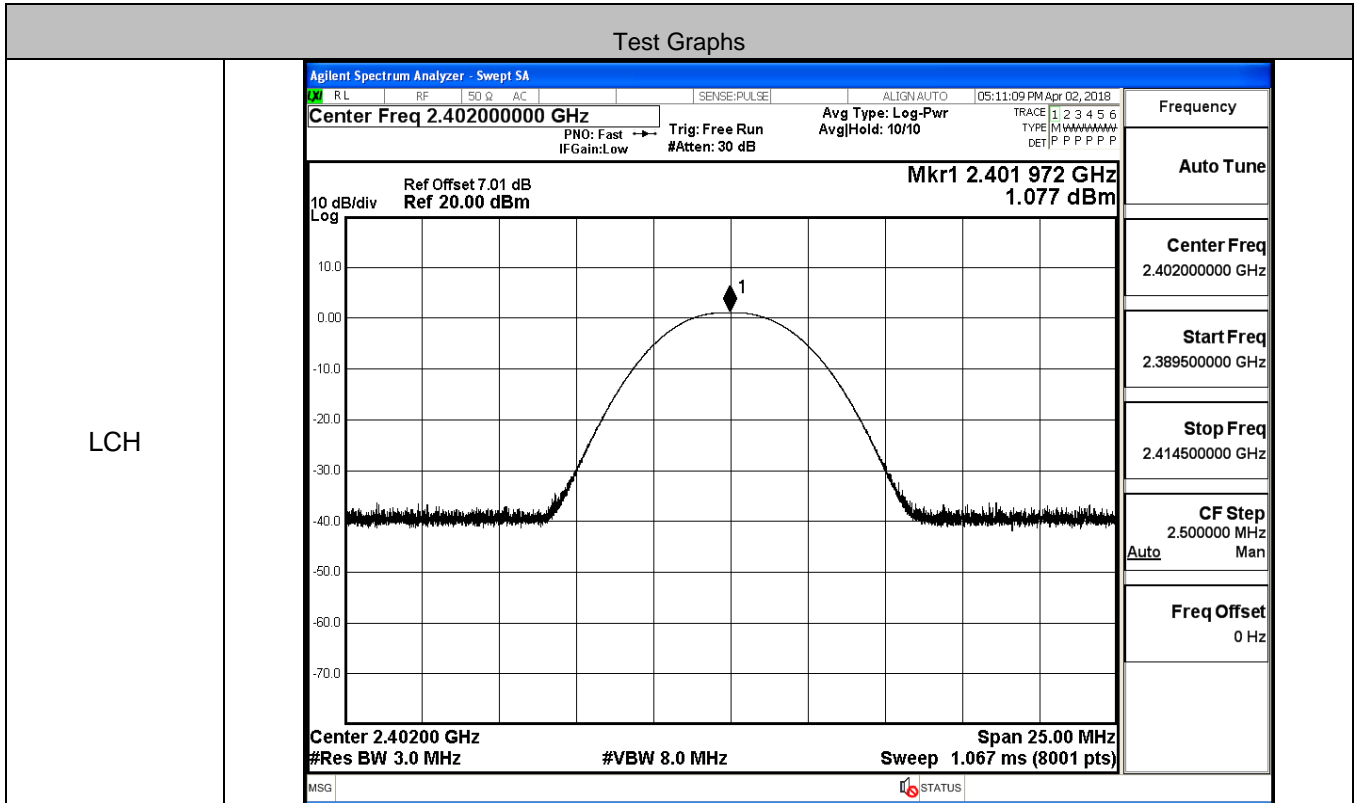
#### A.1 Duty Cycle

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BT LE	2440	Ant1	100	PASS

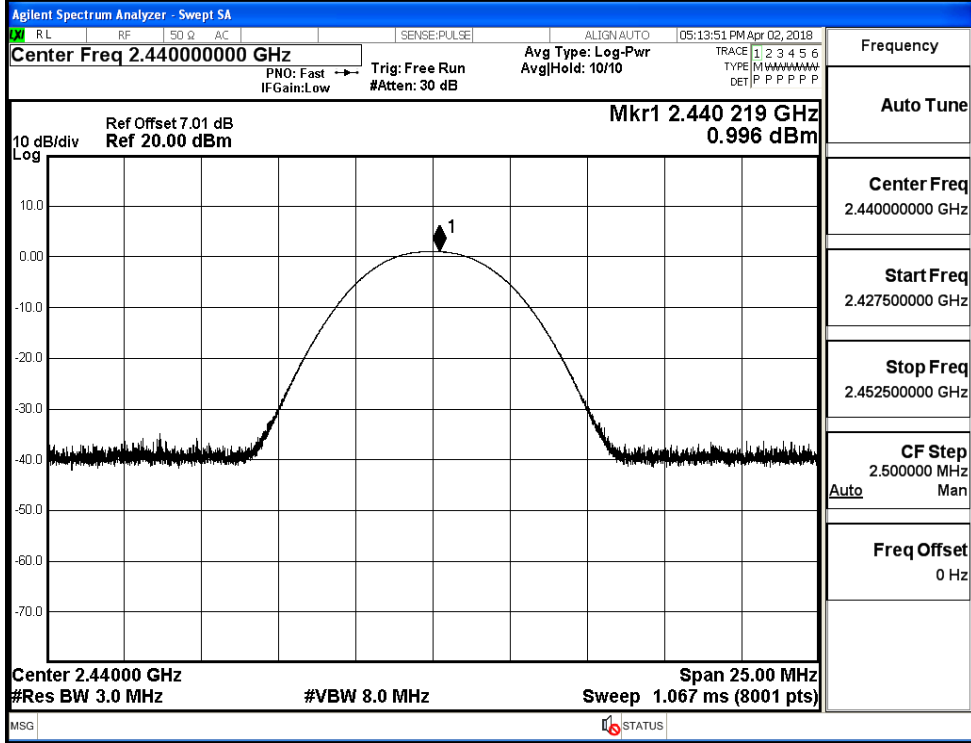


### A.2 Maximum Conducted Peak Output Power

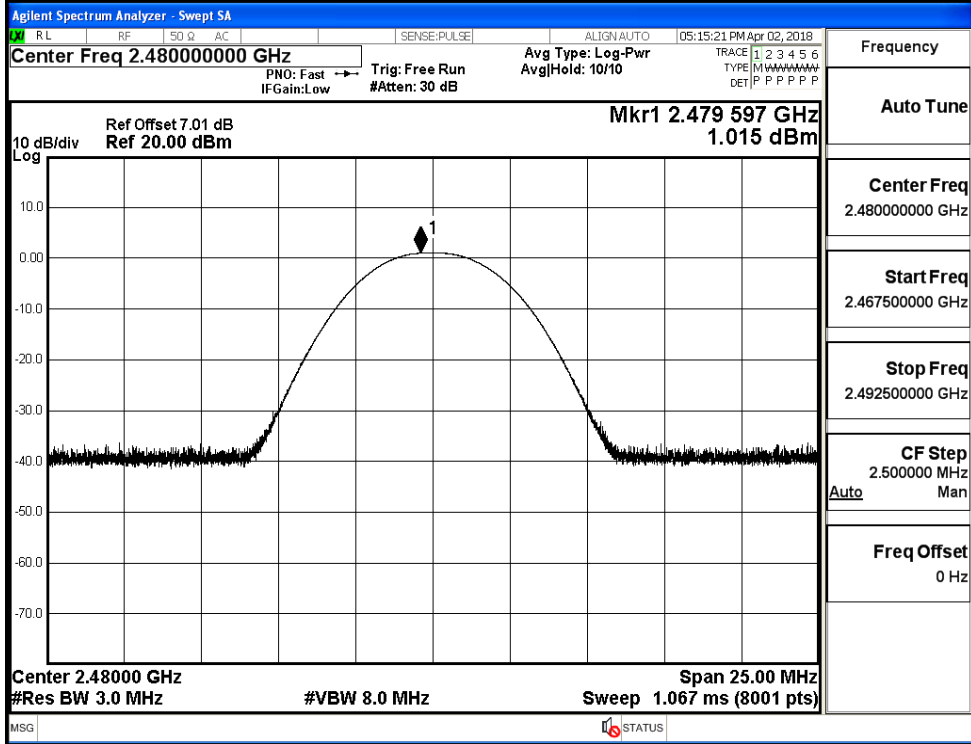
Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	1.077	30	PASS
BT LE	MCH	0.996	30	PASS
BT LE	HCH	1.015	30	PASS



MCH

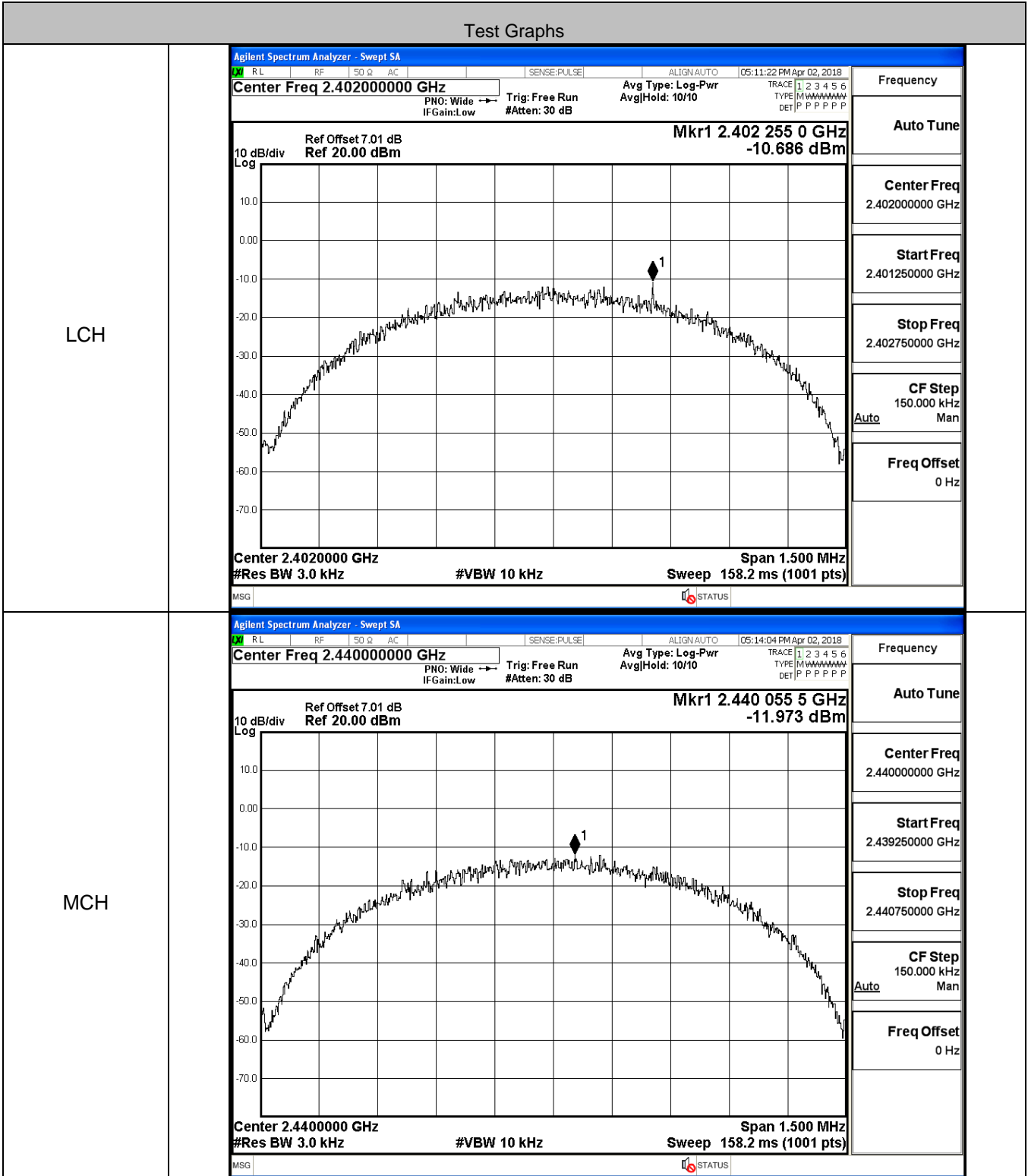


HCH

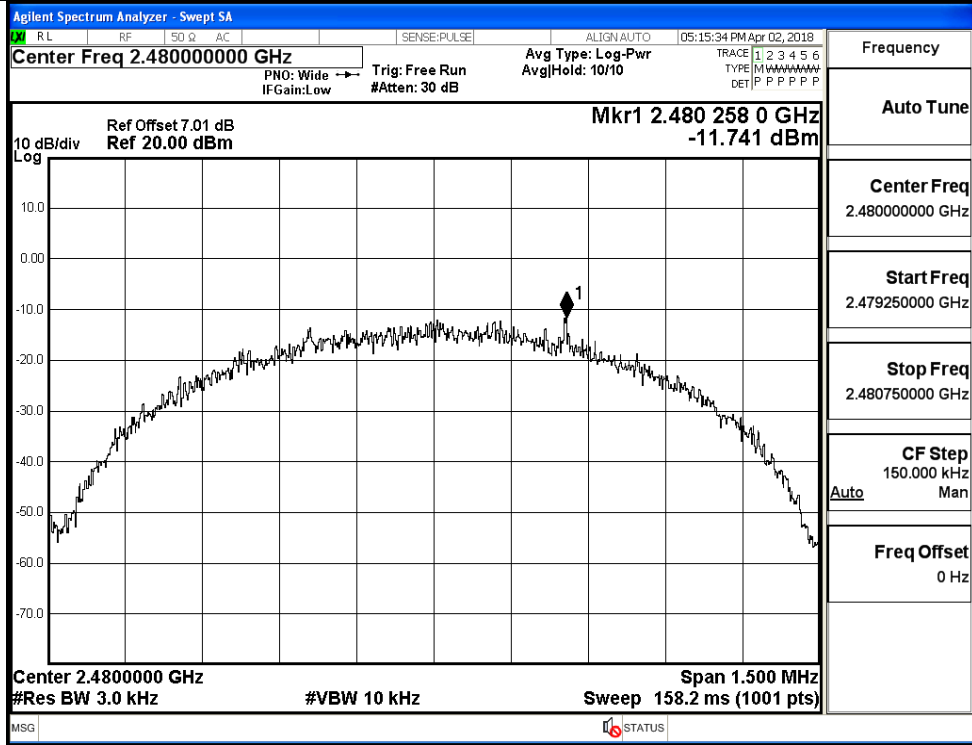


### A.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-10.686	8	PASS
BT LE	MCH	-11.973	8	PASS
BT LE	HCH	-11.741	8	PASS



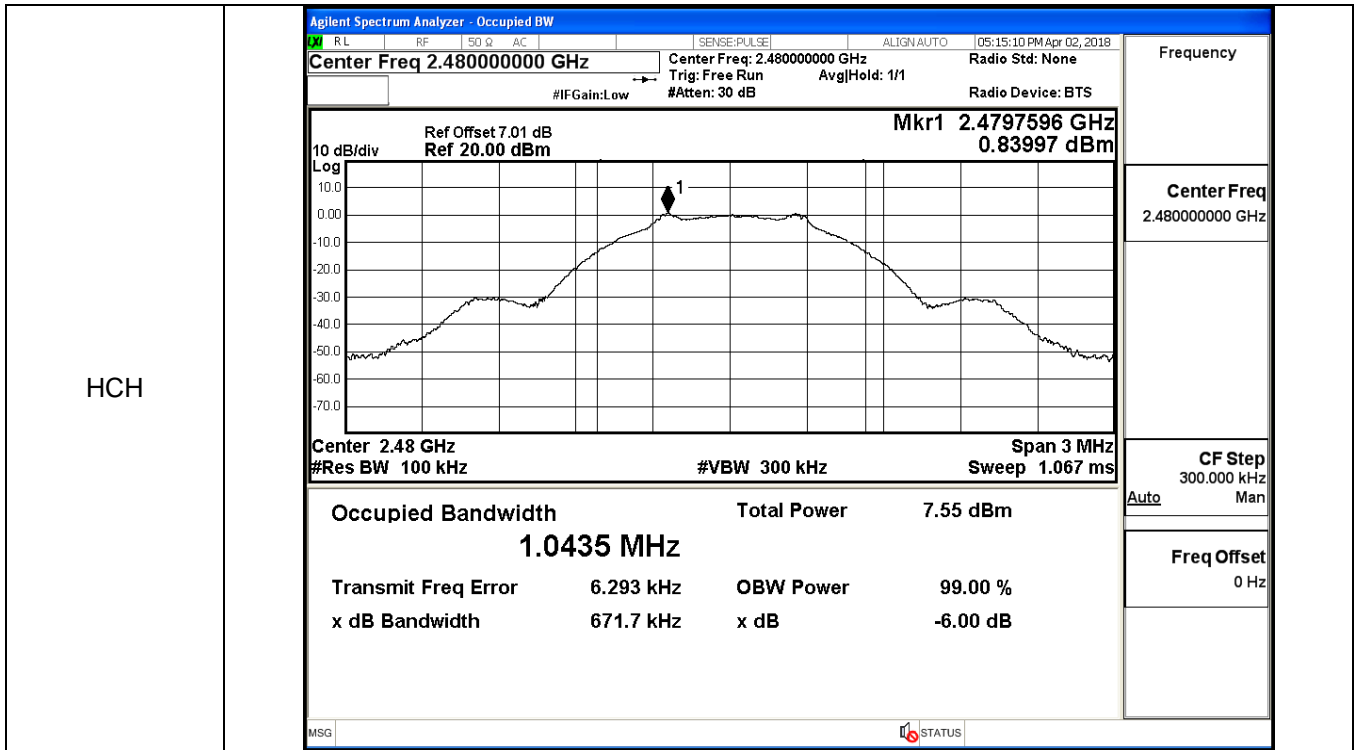
HCH



**A.4 6dB Bandwidth**

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6842	≥0.5	PASS
BT LE	MCH	0.6723	≥0.5	PASS
BT LE	HCH	0.6717	≥0.5	PASS

Test Graphs													
LCH	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: small; margin: 0;">RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 05:10:58 PM Apr 02, 2018</p> <p style="margin: 0;">Center Freq: 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None                      Trig: Free Run AvgHold: &gt;1/1                      #IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <div style="display: flex; justify-content: space-between;"> <div style="font-size: x-small;">10 dB/div Log</div> <div style="text-align: right;">Mkr1 2.4017653 GHz 0.72231 dBm</div> </div> <div style="display: flex; justify-content: space-between; font-size: x-small;"> <div>Center 2.402 GHz #Res BW 100 kHz</div> <div>#VBW 300 kHz</div> <div>Span 3 MHz Sweep 1.067 ms</div> </div> <table style="width: 100%; font-size: x-small; margin-top: 5px;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>7.55 dBm</td> </tr> <tr> <td colspan="3" style="text-align: center;"><b>1.0453 MHz</b></td> </tr> <tr> <td>Transmit Freq Error</td> <td>5.945 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>684.2 kHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	7.55 dBm	<b>1.0453 MHz</b>			Transmit Freq Error	5.945 kHz	OBW Power 99.00 %	x dB Bandwidth	684.2 kHz	x dB -6.00 dB
Occupied Bandwidth	Total Power	7.55 dBm											
<b>1.0453 MHz</b>													
Transmit Freq Error	5.945 kHz	OBW Power 99.00 %											
x dB Bandwidth	684.2 kHz	x dB -6.00 dB											
MCH	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: small; margin: 0;">RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 05:13:40 PM Apr 02, 2018</p> <p style="margin: 0;">Center Freq: 2.440000000 GHz Center Freq: 2.440000000 GHz Radio Std: None                      Trig: Free Run AvgHold: 1/1                      #IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <div style="display: flex; justify-content: space-between;"> <div style="font-size: x-small;">10 dB/div Log</div> <div style="text-align: right;">Mkr1 2.4397555 GHz 0.82024 dBm</div> </div> <div style="display: flex; justify-content: space-between; font-size: x-small;"> <div>Center 2.44 GHz #Res BW 100 kHz</div> <div>#VBW 300 kHz</div> <div>Span 3 MHz Sweep 1.067 ms</div> </div> <table style="width: 100%; font-size: x-small; margin-top: 5px;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>7.51 dBm</td> </tr> <tr> <td colspan="3" style="text-align: center;"><b>1.0408 MHz</b></td> </tr> <tr> <td>Transmit Freq Error</td> <td>7.934 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>672.3 kHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	7.51 dBm	<b>1.0408 MHz</b>			Transmit Freq Error	7.934 kHz	OBW Power 99.00 %	x dB Bandwidth	672.3 kHz	x dB -6.00 dB
Occupied Bandwidth	Total Power	7.51 dBm											
<b>1.0408 MHz</b>													
Transmit Freq Error	7.934 kHz	OBW Power 99.00 %											
x dB Bandwidth	672.3 kHz	x dB -6.00 dB											



### A.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0320	Not Specified	PASS
BT LE	MCH	1.0263	Not Specified	PASS
BT LE	HCH	1.0395	Not Specified	PASS

#### Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz</p> <p>Center Freq: 2.40200000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB</p> <p>Radio Std: None Avg/Hold: 10/10 Radio Device: BTS</p> <p>05:22:32 PM Apr 02, 2018</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 2.402 GHz #Res BW 30 kHz</p> <p>Span 2.6 MHz Sweep 3.2 ms</p> <p>#VBW 100 kHz</p> <p>Occupied Bandwidth <b>1.0320 MHz</b></p> <p>Total Power <b>9.13 dBm</b></p> <p>Transmit Freq Error <b>3.070 kHz</b></p> <p>OBW Power <b>99.00 %</b></p> <p>x dB Bandwidth <b>621.7 kHz</b></p> <p>x dB <b>-6.00 dB</b></p> <p>MSG STATUS</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 260.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
	MCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.44000000 GHz</p> <p>Center Freq: 2.44000000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB</p> <p>Radio Std: None Avg/Hold: 10/10 Radio Device: BTS</p> <p>05:24:40 PM Apr 02, 2018</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 2.44 GHz #Res BW 30 kHz</p> <p>Span 2.6 MHz Sweep 3.2 ms</p> <p>#VBW 100 kHz</p> <p>Occupied Bandwidth <b>1.0263 MHz</b></p> <p>Total Power <b>8.94 dBm</b></p> <p>Transmit Freq Error <b>2.631 kHz</b></p> <p>OBW Power <b>99.00 %</b></p> <p>x dB Bandwidth <b>594.6 kHz</b></p> <p>x dB <b>-6.00 dB</b></p> <p>MSG STATUS</p>



HCH

Agilent Spectrum Analyzer - Occupied BW

RL	RF	50 Ω	AC	SENSE:PULSE	ALIGN:AUTO	05:19:59 PM Apr 02, 2018
<b>Center Freq 2.480000000 GHz</b>			Center Freq: 2.480000000 GHz		Radio Std: None	
			Trig: Free Run		AvgHold: 10/10	
			#IFGain:Low		#Atten: 30 dB	
			Radio Device: BTS			

10 dB/div      Ref Offset 7.01 dB  
Log              Ref 20.00 dBm

Center 2.48 GHz      Span 2.6 MHz  
#Res BW 30 kHz      #VBW 100 kHz      Sweep 3.2 ms

<b>Occupied Bandwidth</b>	<b>Total Power</b>	<b>8.88 dBm</b>
<b>1.0395 MHz</b>		
Transmit Freq Error	6.916 kHz	OBW Power
x dB Bandwidth	621.1 kHz	x dB
		99.00 %
		-6.00 dB

Frequency

Center Freq  
2.480000000 GHz

CF Step  
260.000 kHz  
Auto Man

Freq Offset  
0 Hz

MSG

STATUS

### A.6 RF Conducted Spurious Emissions

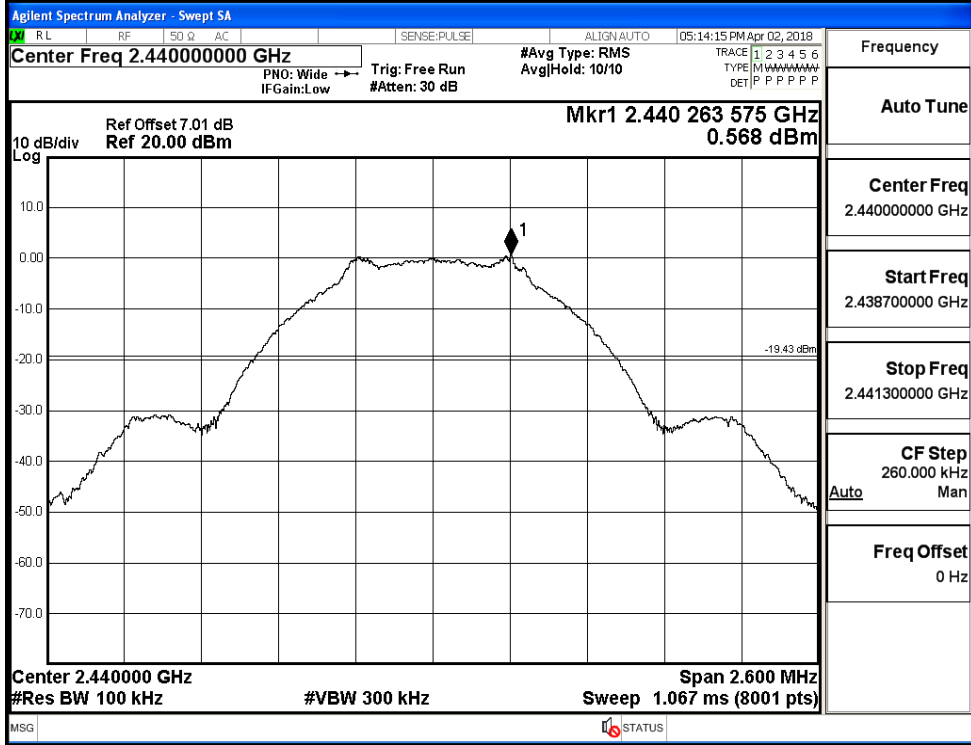
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.785	-45.169	-19.215	PASS
BT LE	MCH	0.568	-39.177	-19.432	PASS
BT LE	HCH	0.421	-45.912	-19.579	PASS

BT LE\_LCH\_Graphs

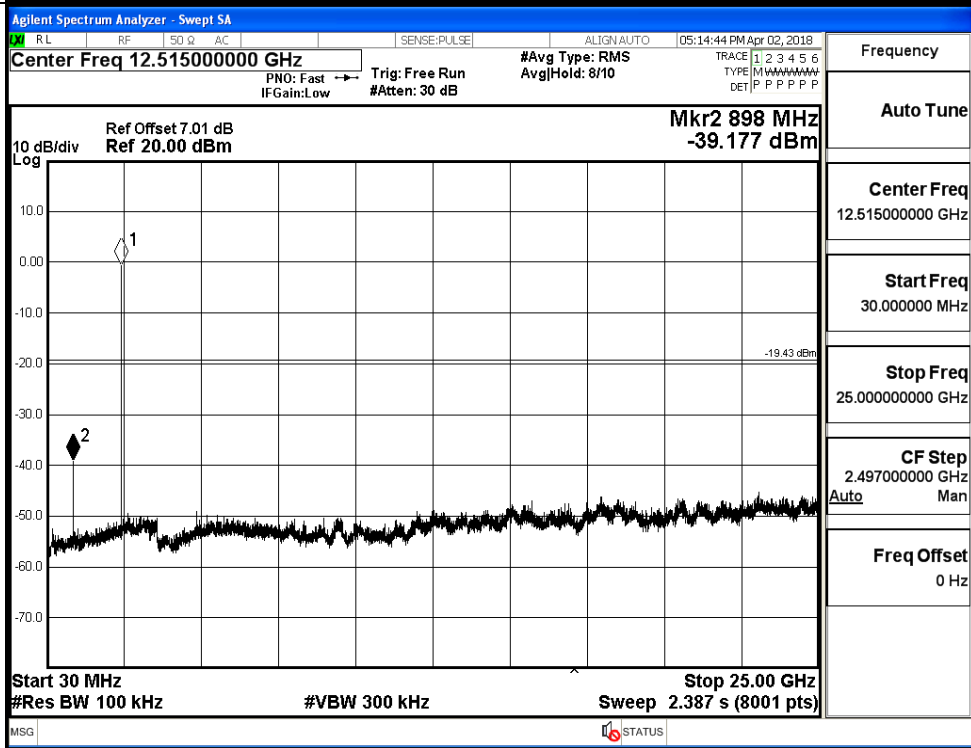
<p>Pref/BT LE/LCH</p>		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.40200000 GHz</p> <p>Mkr1 2.401 767 950 GHz 0.785 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.400700000 GHz</p> <p>Stop Freq 2.403300000 GHz</p> <p>CF Step 260.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
<p>Puw/BT LE/LCH</p>		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 12.515000000 GHz</p> <p>Mkr2 24.897 GHz -45.169 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 12.515000000 GHz</p> <p>Start Freq 30.000000 MHz</p> <p>Stop Freq 25.000000000 GHz</p> <p>CF Step 2.497000000 GHz Auto Man</p> <p>Freq Offset 0 Hz</p>

BT LE\_MCH\_Graphs

Pref/BT LE/MCH

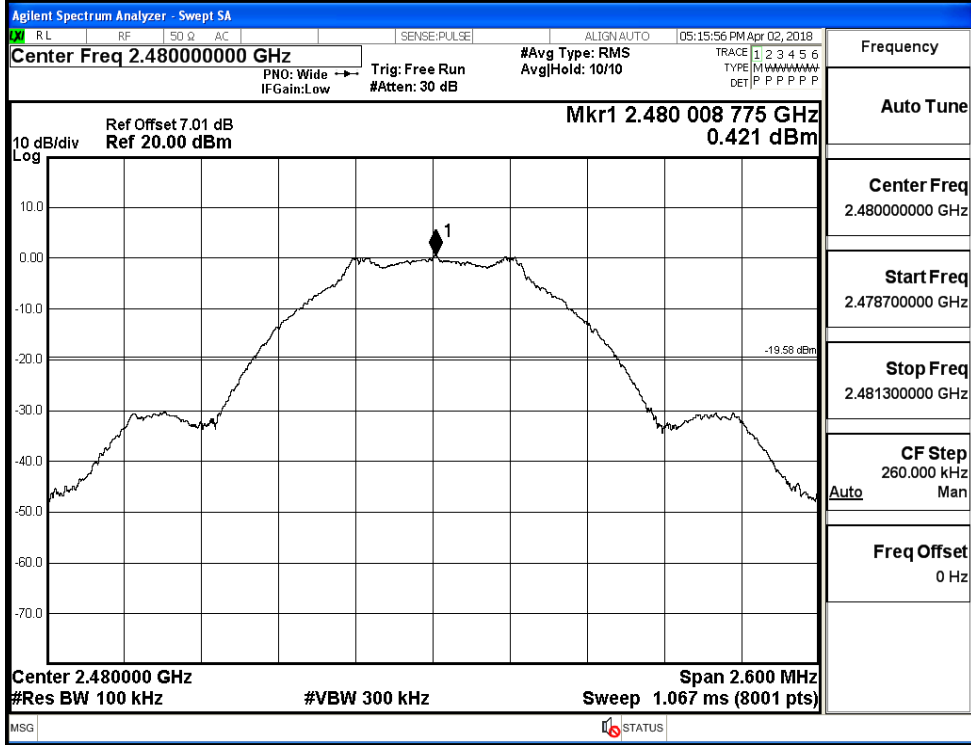


Puw/BT LE/MCH

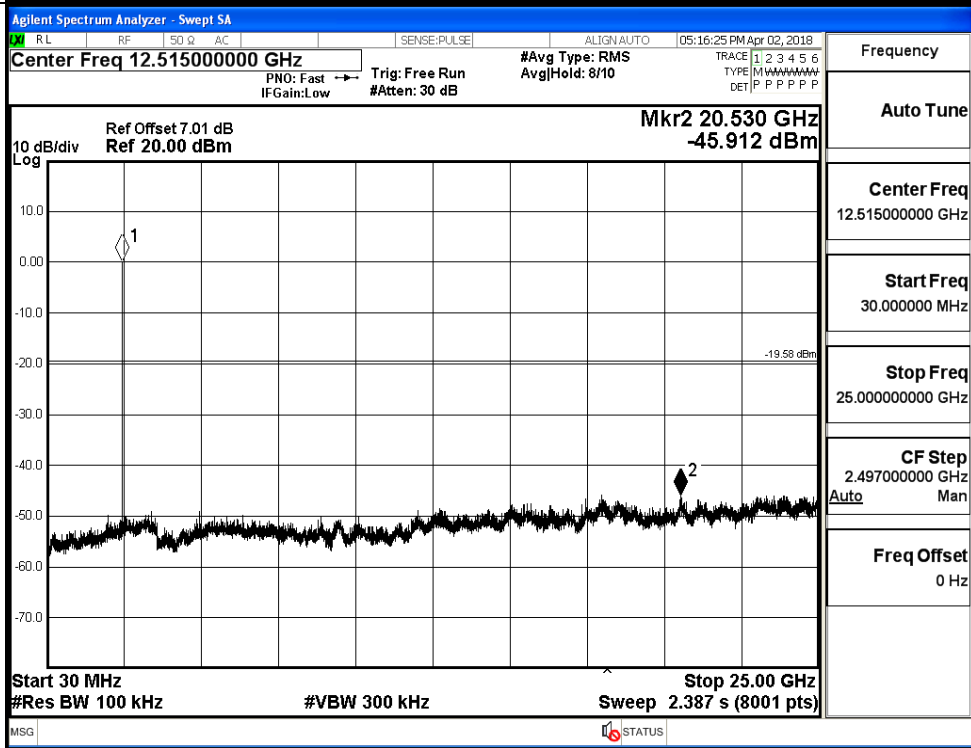


BT LE\_HCH\_Graphs

Pref/BT LE/HCH



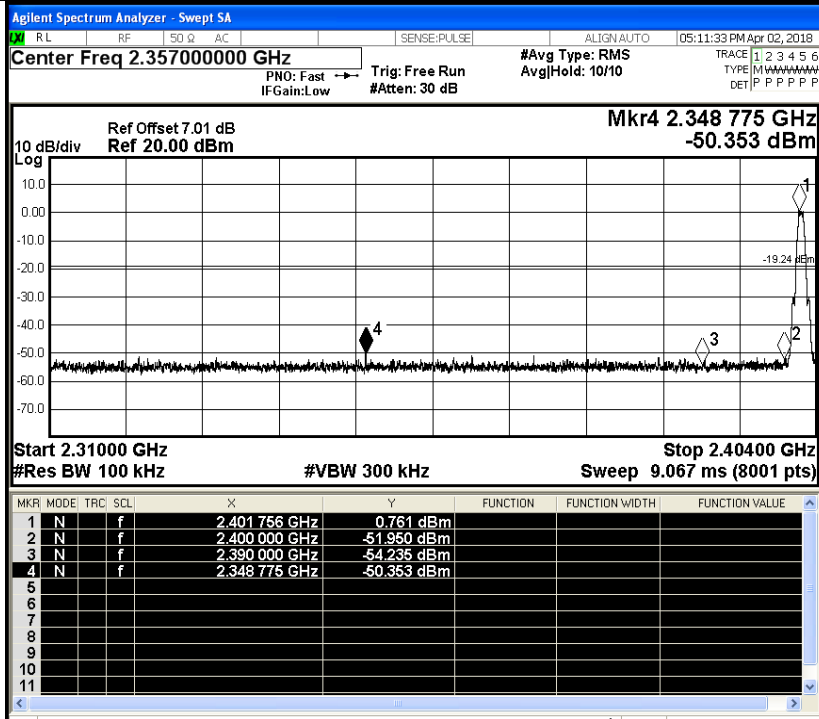
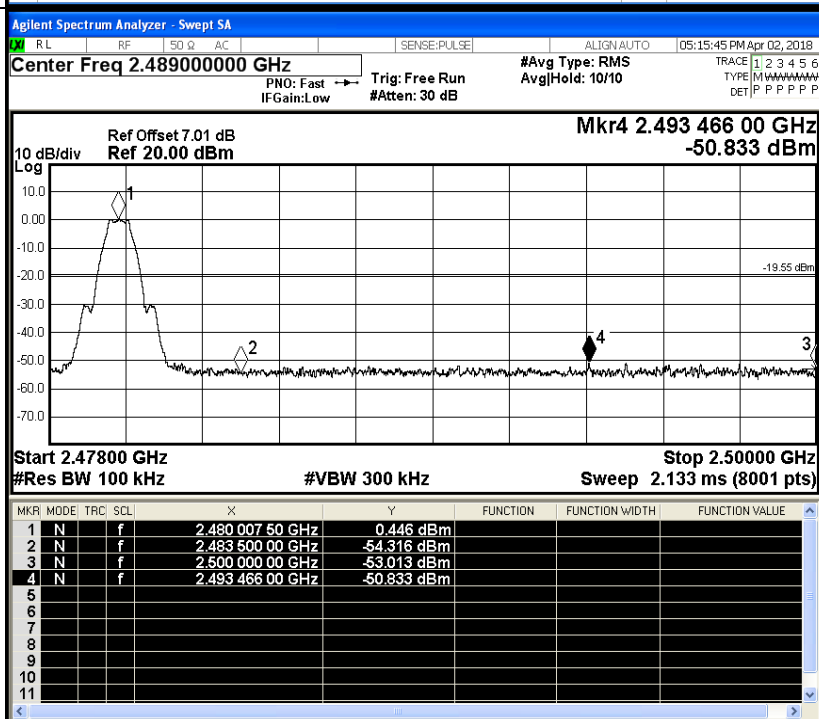
Puw/BT LE/HCH



### A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.761	-50.353	-19.24	PASS
BT LE	HCH	0.446	-50.833	-19.55	PASS

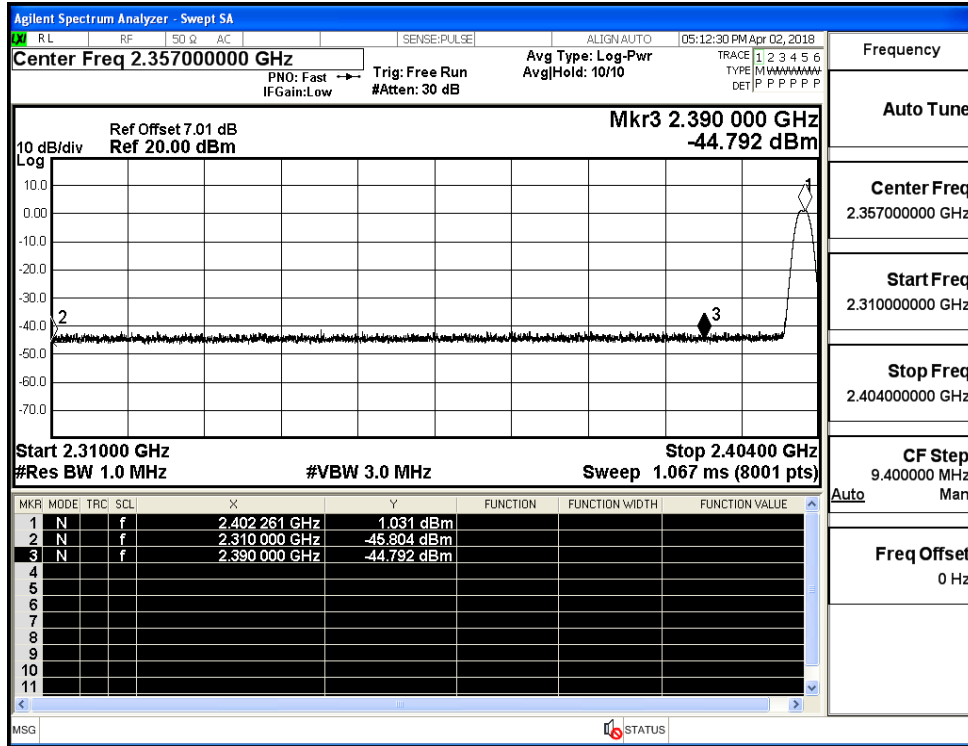
Test Graphs

LCH		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.35700000 GHz</p> <p>Start Freq 2.31000000 GHz</p> <p>Stop Freq 2.40400000 GHz</p> <p>CF Step 9.400000 MHz</p> <p>Freq Offset 0 Hz</p>
HCH		<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.48900000 GHz</p> <p>Start Freq 2.47800000 GHz</p> <p>Stop Freq 2.50000000 GHz</p> <p>CF Step 2.200000 MHz</p> <p>Freq Offset 0 Hz</p>

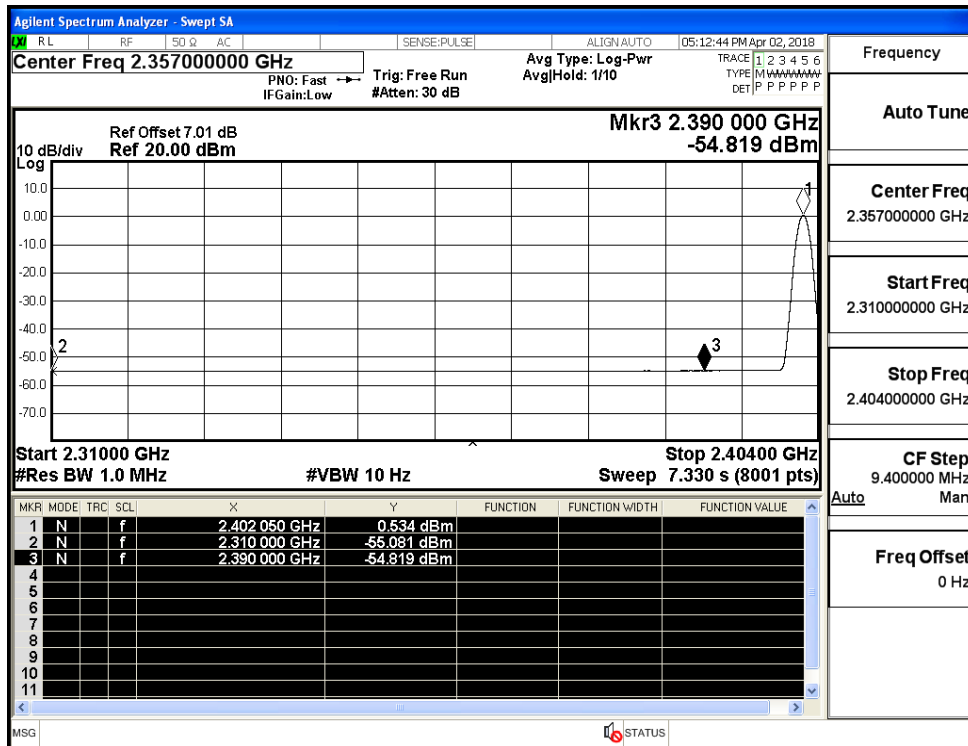
### A.8 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
BT LE	2402	Ant1	2310.0	-45.80	2.55	0	52.01	PEAK	74	PASS
		Ant1	2310.0	-55.08	2.55	0	42.73	AV	54	PASS
		Ant1	2390.0	-44.79	2.55	0	53.02	PEAK	74	PASS
		Ant1	2390.0	-54.82	2.55	0	42.99	AV	54	PASS
	2480	Ant1	2483.5	-44.50	2.55	0	53.31	PEAK	74	PASS
		Ant1	2483.5	-54.47	2.55	0	43.34	AV	54	PASS
		Ant1	2500.0	-43.43	2.55	0	54.38	PEAK	74	PASS
		Ant1	2500.0	-54.48	2.55	0	43.33	AV	54	PASS

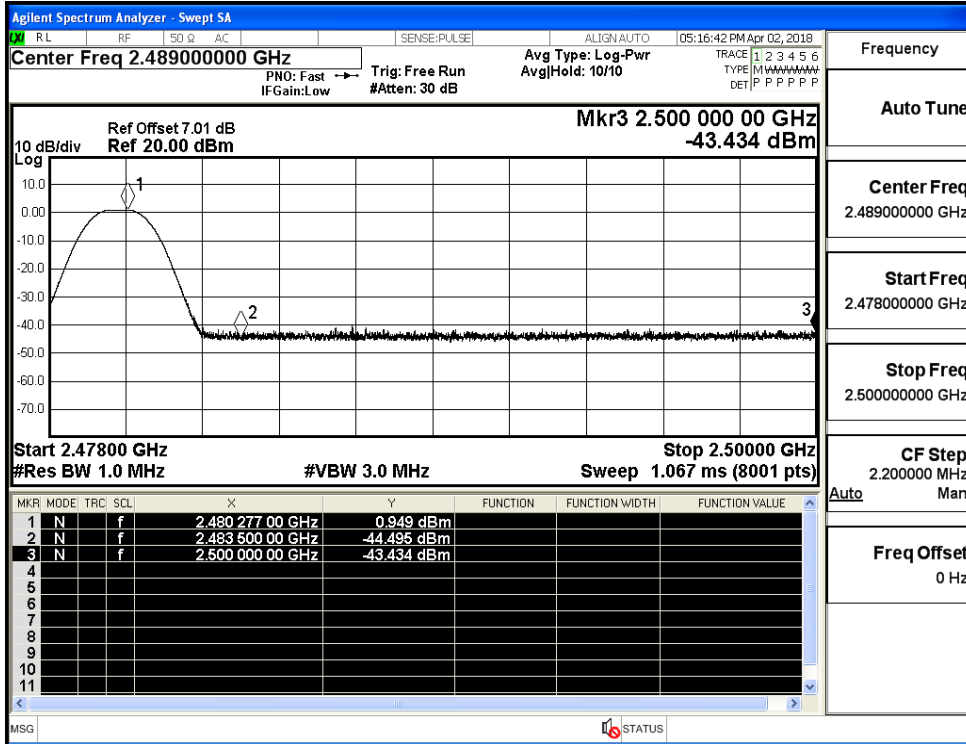
Restrict-band band-edge measurements\_BT LE\_2402\_Ant1\_PEAK



Restrict-band band-edge measurements\_BT LE\_2402\_Ant1\_AV



Restrict-band band-edge measurements\_BT LE\_2480\_Ant1\_PEAK



Restrict-band band-edge measurements\_BT LE\_2480\_Ant1\_AV

