

Appendix A

RF Test Data for BT V4.0 (BLE) (Conducted Measurement)

Product Name: Anemometer

Trade Mark: HORUS

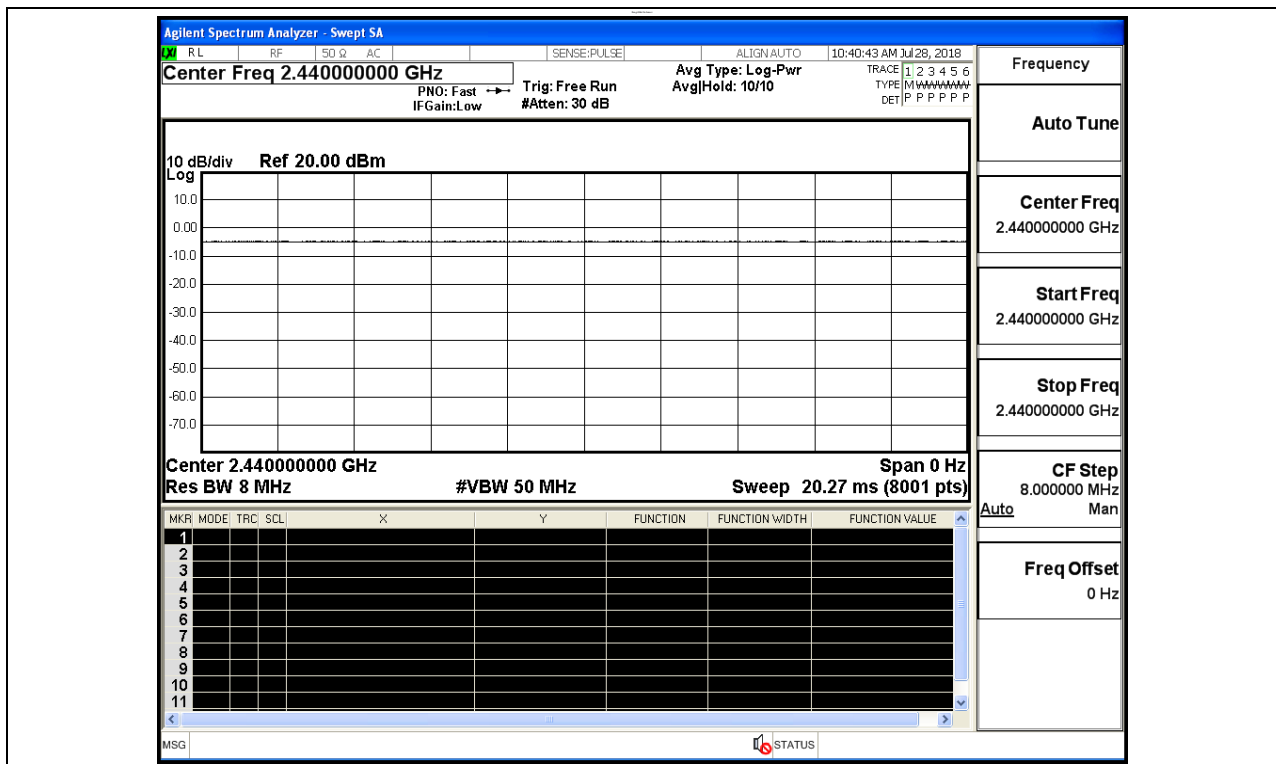
Test Model: HoVR 1.0

Environmental Conditions

Temperature:	22.7° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

A.1 Duty Cycle

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



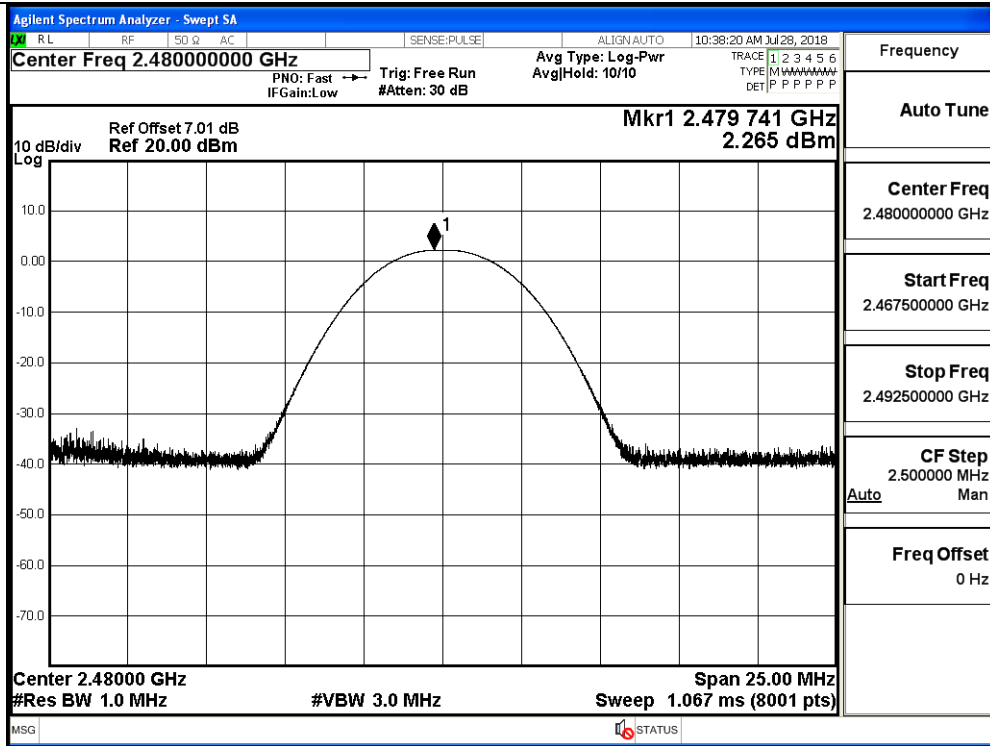
A.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	1.251	30	PASS
BT LE	MCH	2.147	30	PASS
BT LE	HCH	2.265	30	PASS

Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.40200000 GHz Avg Type: Log-Pwr Mkr1 2.402 075 GHz 1.251 dBm Ref Offset 7.01 dB Ref 20.00 dBm Center 2.40200 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 25.00 MHz Sweep 1.067 ms (8001 pts)</p>	Frequency Auto Tune Center Freq 2.40200000 GHz Start Freq 2.389500000 GHz Stop Freq 2.414500000 GHz CF Step 2.500000 MHz Auto Man Freq Offset 0 Hz
MCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.44000000 GHz Avg Type: Log-Pwr Mkr1 2.439 738 GHz 2.147 dBm Ref Offset 7.01 dB Ref 20.00 dBm Center 2.44000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 25.00 MHz Sweep 1.067 ms (8001 pts)</p>	Frequency Auto Tune Center Freq 2.44000000 GHz Start Freq 2.427500000 GHz Stop Freq 2.452500000 GHz CF Step 2.500000 MHz Auto Man Freq Offset 0 Hz

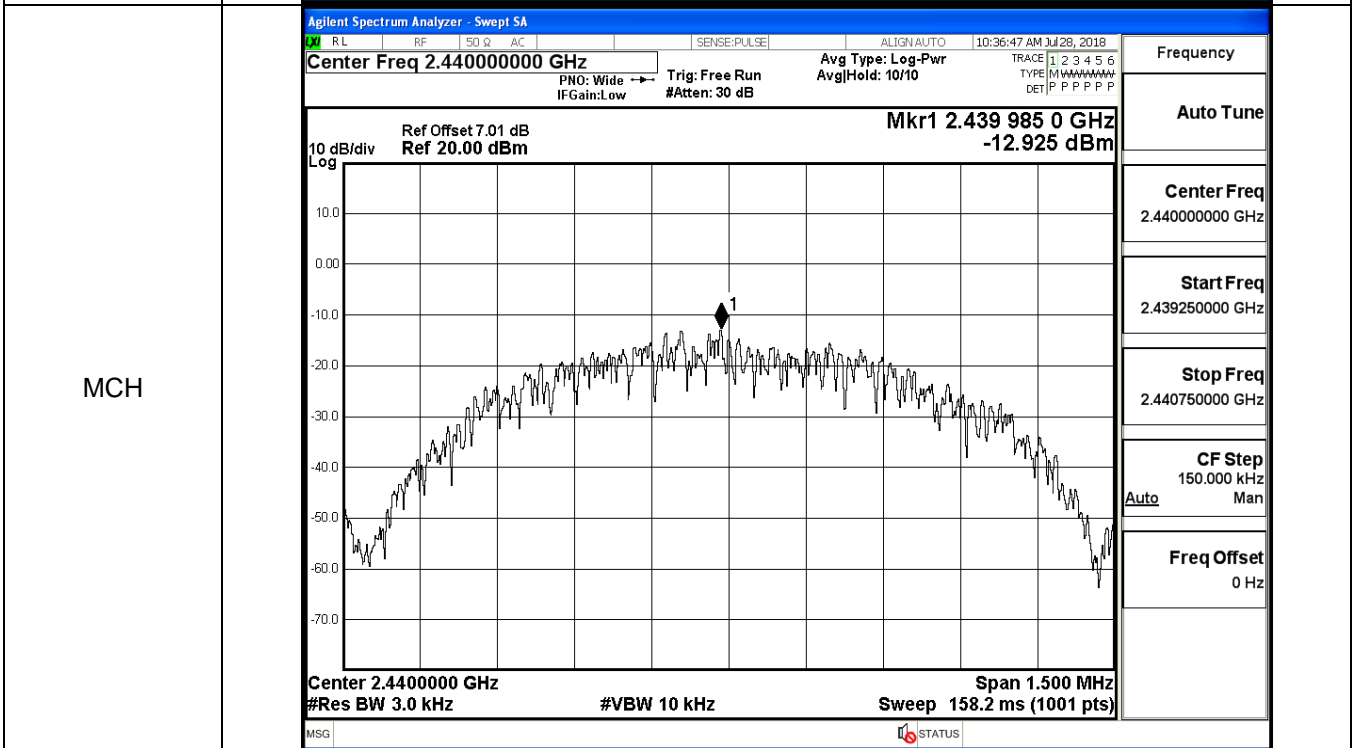
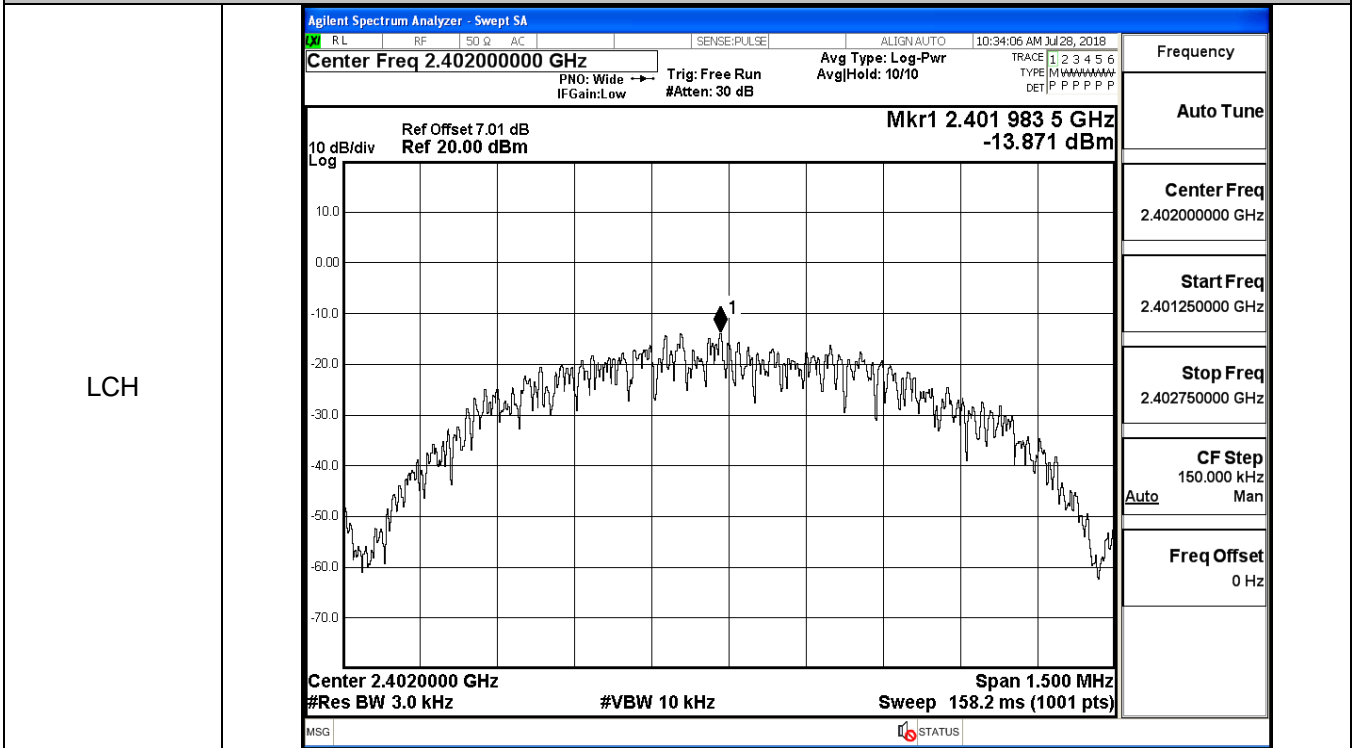
HCH



A.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-13.871	8	PASS
BT LE	MCH	-12.925	8	PASS
BT LE	HCH	-12.775	8	PASS

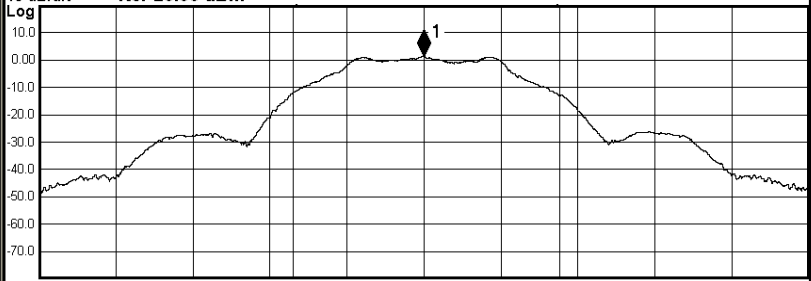
Test Graphs



A.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.7030	≥0.5	PASS
BT LE	MCH	0.6936	≥0.5	PASS
BT LE	HCH	0.6940	≥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 10:33:34 AM Jul 28, 2018</p> <p style="margin: 0;">Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p style="font-size: x-small; margin: 0;">Trig: Free Run AvgHold: 1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> <p style="font-size: small;">10 dB/div Ref Offset 7.01 dB Mkr1 2.402 GHz</p> <p style="font-size: x-small;">Log Ref 20.00 dBm 0.34636 dBm</p> <p style="font-size: x-small;">Center 2.402 GHz Span 3 MHz</p> <p style="font-size: x-small;">#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table border="0" style="width: 100%; font-size: small;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>7.43 dBm</td> </tr> <tr> <td style="text-align: center;">1.0471 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>8.927 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>703.0 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> </div> <div style="width: 35%; font-size: x-small;"> <p>Frequency</p> <hr/> <p>Center Freq 2.402000000 GHz</p> <hr/> <p>CF Step 300.000 kHz</p> <p>Auto Man</p> <hr/> <p>Freq Offset 0 Hz</p> </div> </div> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	7.43 dBm	1.0471 MHz			Transmit Freq Error	8.927 kHz	OBW Power	x dB Bandwidth	703.0 kHz	x dB			99.00 %			-6.00 dB
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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 10:36:14 AM Jul 28, 2018</p> <p style="margin: 0;">Center Freq 2.440000000 GHz Center Freq: 2.440000000 GHz Radio Std: None</p> <p style="font-size: x-small; margin: 0;">Trig: Free Run AvgHold: 1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> <p style="font-size: small;">10 dB/div Ref Offset 7.01 dB Mkr1 2.4400008 GHz</p> <p style="font-size: x-small;">Log Ref 20.00 dBm 1.2228 dBm</p> <p style="font-size: x-small;">Center 2.44 GHz Span 3 MHz</p> <p style="font-size: x-small;">#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table border="0" style="width: 100%; font-size: small;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>8.29 dBm</td> </tr> <tr> <td style="text-align: center;">1.0458 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>8.116 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>693.6 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> </div> <div style="width: 35%; font-size: x-small;"> <p>Frequency</p> <hr/> <p>Center Freq 2.440000000 GHz</p> <hr/> <p>CF Step 300.000 kHz</p> <p>Auto Man</p> <hr/> <p>Freq Offset 0 Hz</p> </div> </div> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	8.29 dBm	1.0458 MHz			Transmit Freq Error	8.116 kHz	OBW Power	x dB Bandwidth	693.6 kHz	x dB			99.00 %			-6.00 dB
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HCH	Agilent Spectrum Analyzer - Occupied BW	
	RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 10:38:05 AM Jul 28, 2018	Center Freq: 2.480000000 GHz Radio Std: None
	Center Freq 2.480000000 GHz Trig: Free Run AvgHold>1/1	#IFGain:Low #Atten: 30 dB Radio Device: BTS
	10 dB/div Ref Offset 7.01 dB Mkr1 2.48 GHz	Log Ref 20.00 dBm 1.2677 dBm
		
Center 2.48 GHz Span 3 MHz	#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms	
Occupied Bandwidth 1.0366 MHz		
Total Power 8.34 dBm		
Transmit Freq Error 9.415 kHz	OBW Power 99.00 %	
x dB Bandwidth 694.0 kHz	x dB -6.00 dB	
MSG	STATUS	

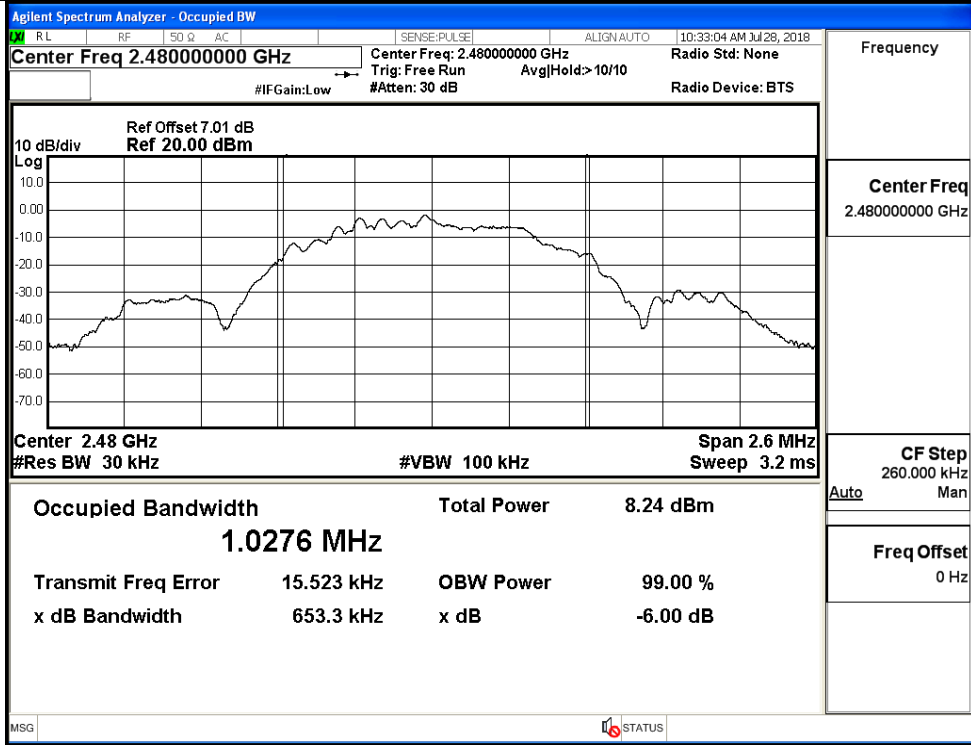
A.5 99% Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0318	No Limit	PASS
BT LE	MCH	1.0324	No Limit	PASS
BT LE	HCH	1.0276	No Limit	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 AvgHold: >10/10 Radio Device: BTS</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</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 1.0318 MHz</p> <p>Total Power 7.37 dBm</p> <p>Transmit Freq Error 15.302 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 652.1 kHz</p> <p>x dB -6.00 dB</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 AvgHold: 10/10 Radio Device: BTS</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</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 1.0324 MHz</p> <p>Total Power 8.20 dBm</p> <p>Transmit Freq Error 14.403 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 651.3 kHz</p> <p>x dB -6.00 dB</p> <p>MSG STATUS</p>

HCH

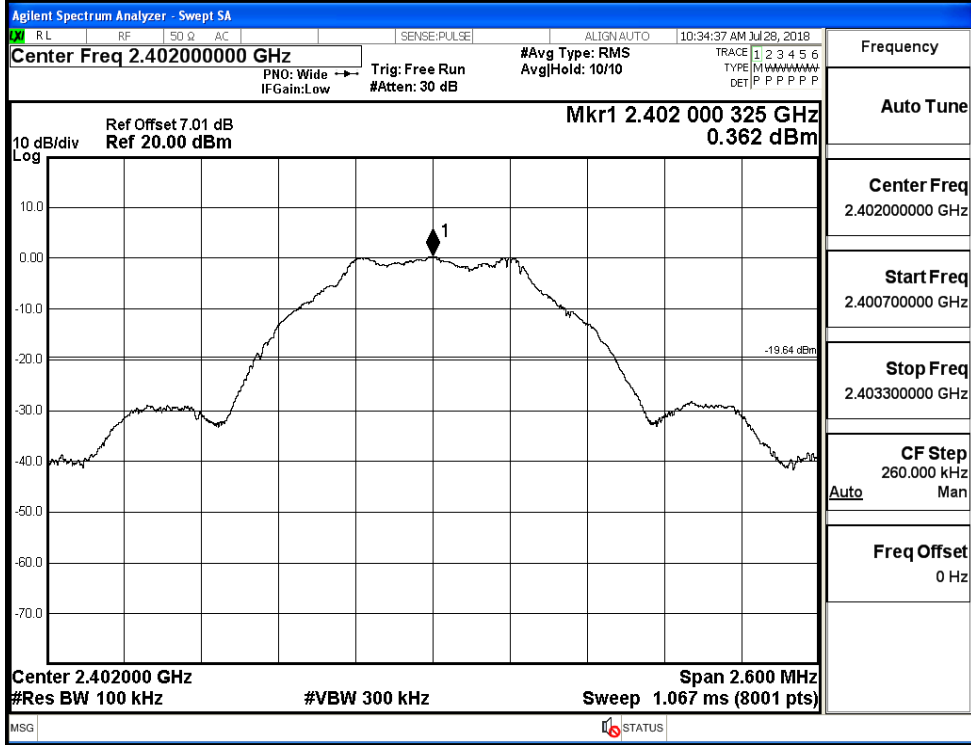


A.6 RF Conducted Spurious Emissions

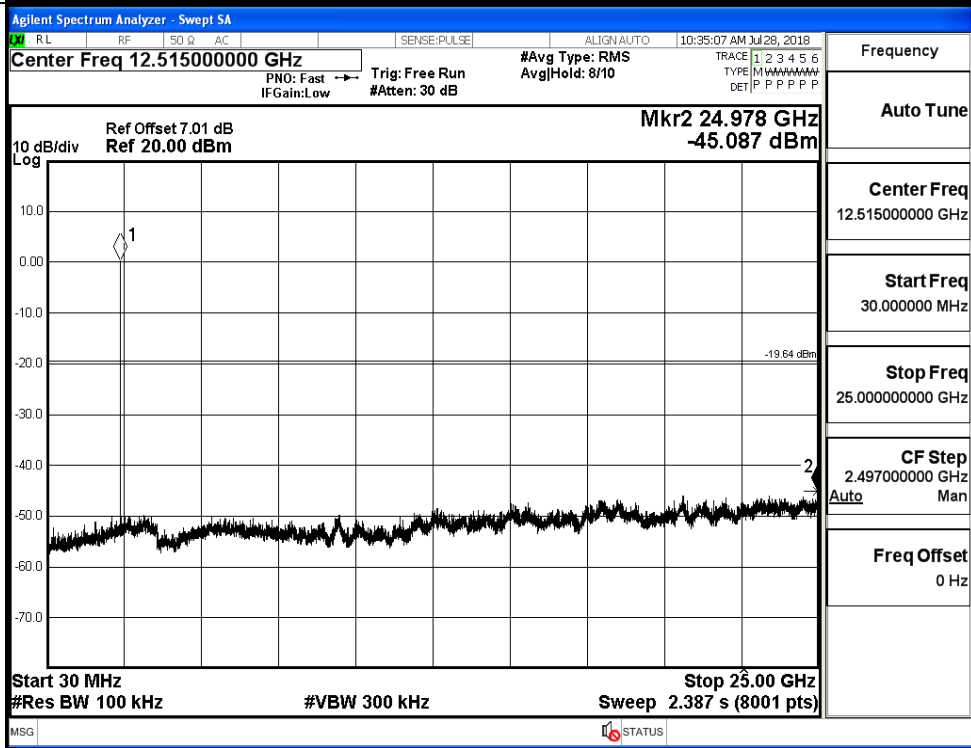
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.362	-45.087	-19.638	PASS
BT LE	MCH	1.212	-45.331	-18.788	PASS
BT LE	HCH	1.299	-45.604	-18.701	PASS

BT LE_LCH_Graphs

Pref/BT LE/LCH

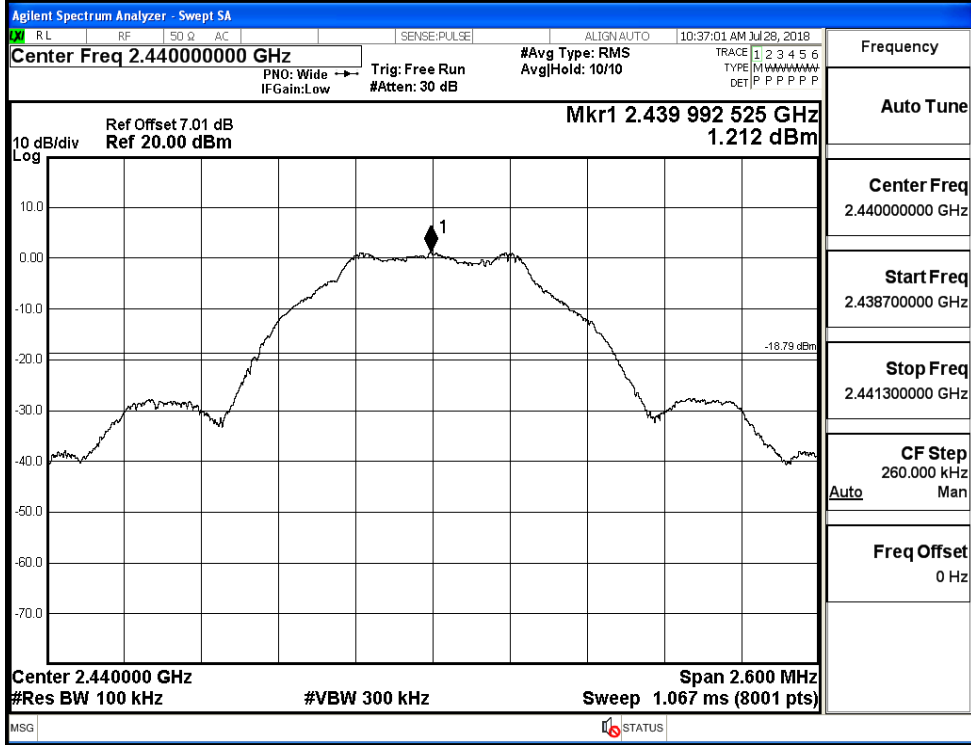


Puw/BT LE/LCH

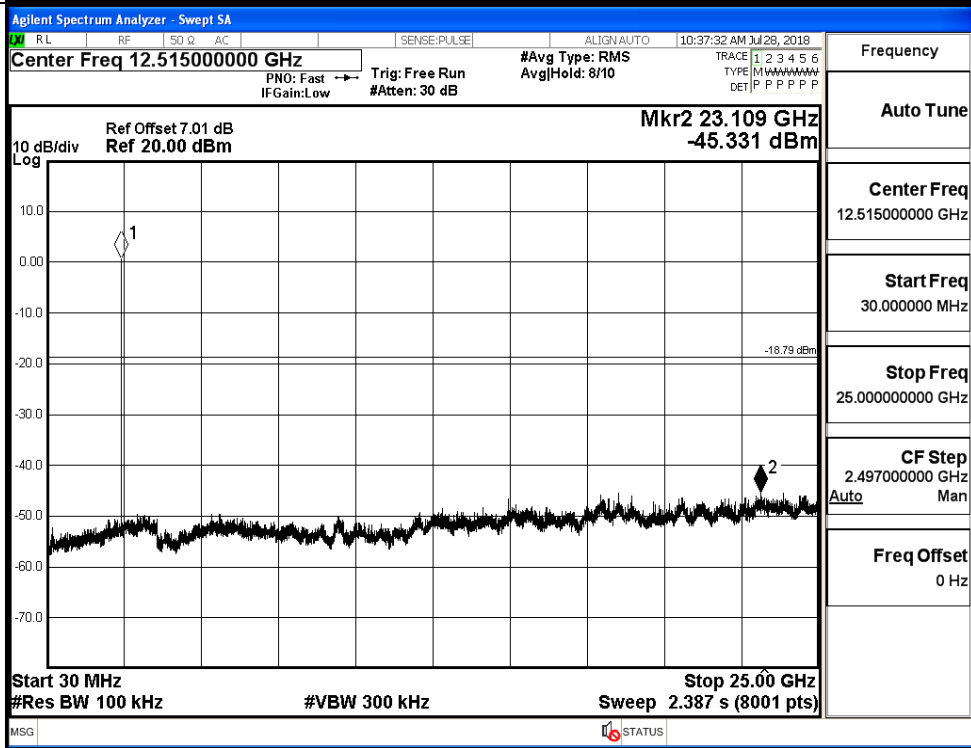


BT LE_MCH_Graphs

Pref/BT LE/MCH

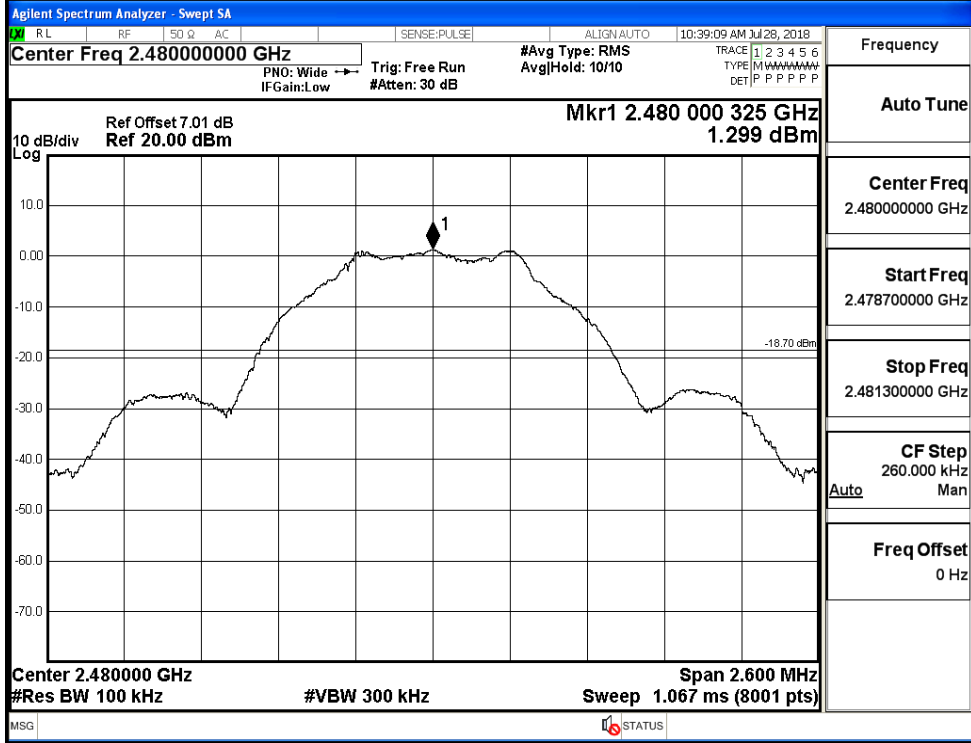


Puw/BT LE/MCH

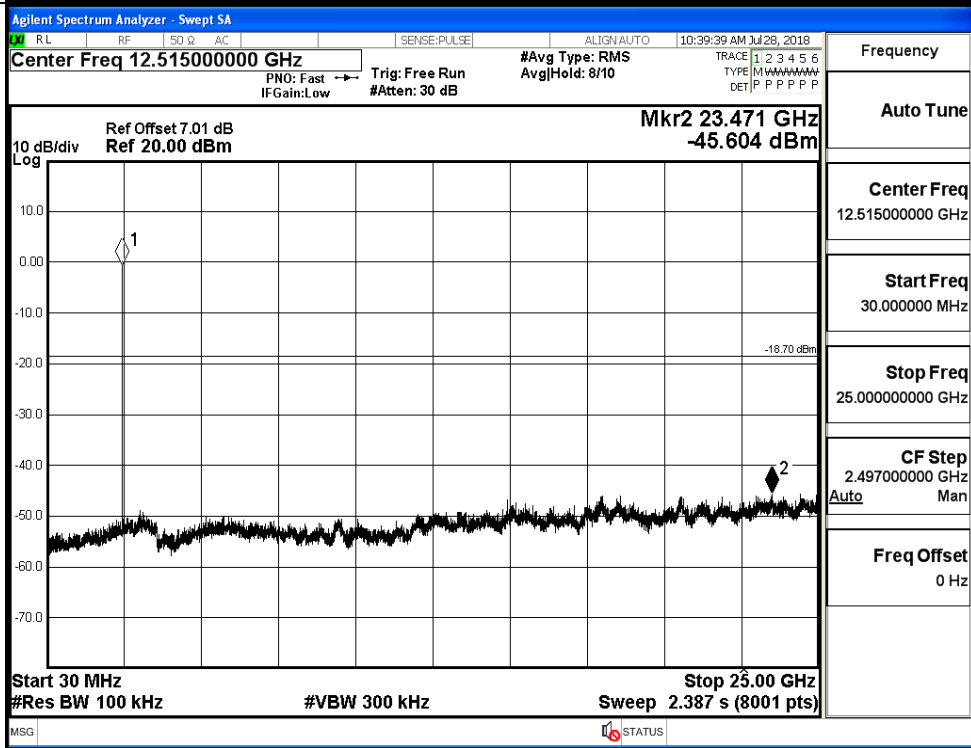


BT LE_HCH_Graphs

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	0.500	-51.182	-19.5	PASS
BT LE	HCH	1.377	-50.498	-18.62	PASS

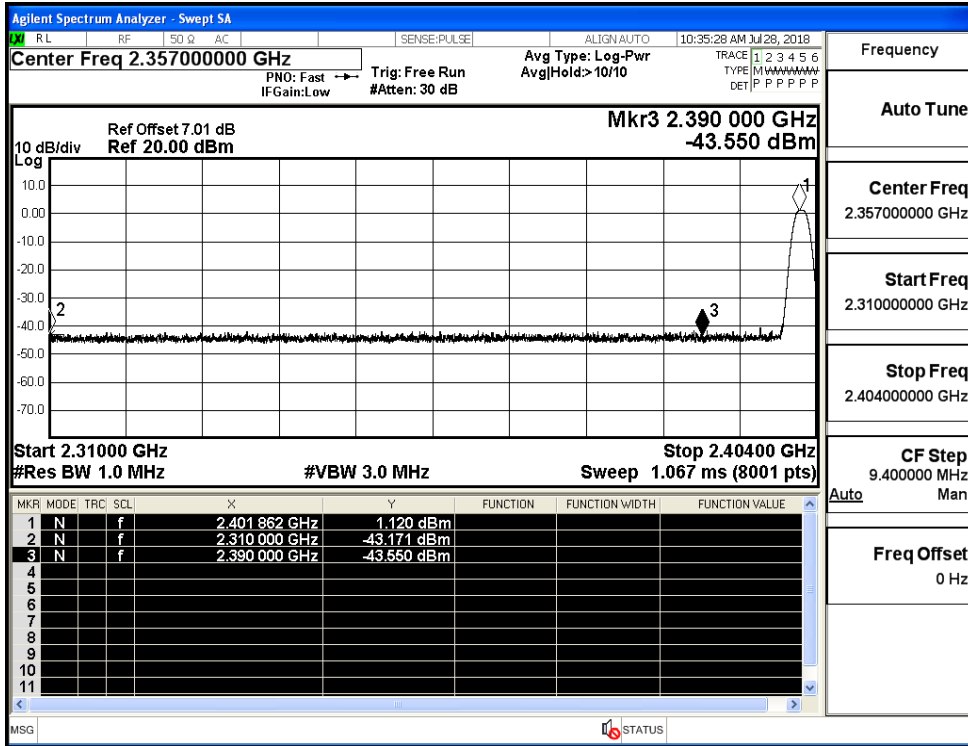
Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.35700000 GHz Max Spurious Level -51.182 dBm Mkr4 2.326 685 GHz Start 2.31000 GHz Stop 2.40400 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 9.067 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>2.402 249 GHz</td><td>0.500 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 GHz</td><td>-54.492 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 GHz</td><td>-55.279 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.326 685 GHz</td><td>-51.182 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		2.402 249 GHz	0.500 dBm				2	N	f		2.400 000 GHz	-54.492 dBm				3	N	f		2.390 000 GHz	-55.279 dBm				4	N	f		2.326 685 GHz	-51.182 dBm				Frequency Auto Tune Center Freq 2.35700000 GHz Start Freq 2.310000000 GHz Stop Freq 2.404000000 GHz CF Step 9.400000 MHz Freq Offset 0 Hz
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3	N	f		2.390 000 GHz	-55.279 dBm																																										
4	N	f		2.326 685 GHz	-51.182 dBm																																										
HCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.48900000 GHz Max Spurious Level -50.498 dBm Mkr4 2.492 789 50 GHz Start 2.47800 GHz Stop 2.50000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.133 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>2.479 993 75 GHz</td><td>1.377 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>-54.162 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>-54.357 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.492 789 50 GHz</td><td>-50.498 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		2.479 993 75 GHz	1.377 dBm				2	N	f		2.483 500 00 GHz	-54.162 dBm				3	N	f		2.500 000 00 GHz	-54.357 dBm				4	N	f		2.492 789 50 GHz	-50.498 dBm				Frequency Auto Tune Center Freq 2.48900000 GHz Start Freq 2.478000000 GHz Stop Freq 2.500000000 GHz CF Step 2.200000 MHz Freq Offset 0 Hz
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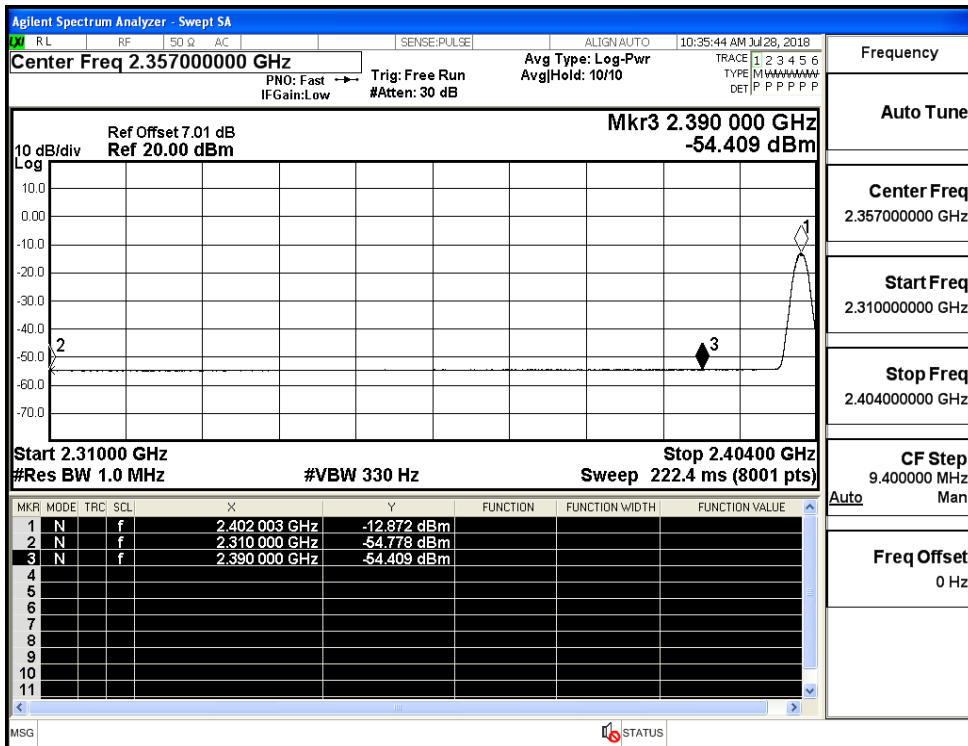
A.8 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
BT LE	2402	Ant1	2310.0	-43.17	2.0	0	54.09	PEAK	74	PASS
		Ant1	2310.0	-54.78	2.0	0	42.48	AV	54	PASS
		Ant1	2390.0	-43.55	2.0	0	53.71	PEAK	74	PASS
		Ant1	2390.0	-54.41	2.0	0	42.85	AV	54	PASS
	2480	Ant1	2483.5	-44.81	2.0	0	52.45	PEAK	74	PASS
		Ant1	2483.5	-54.15	2.0	0	43.11	AV	54	PASS
		Ant1	2500.0	-44.50	2.0	0	52.76	PEAK	74	PASS
		Ant1	2500.0	-54.03	2.0	0	43.23	AV	54	PASS

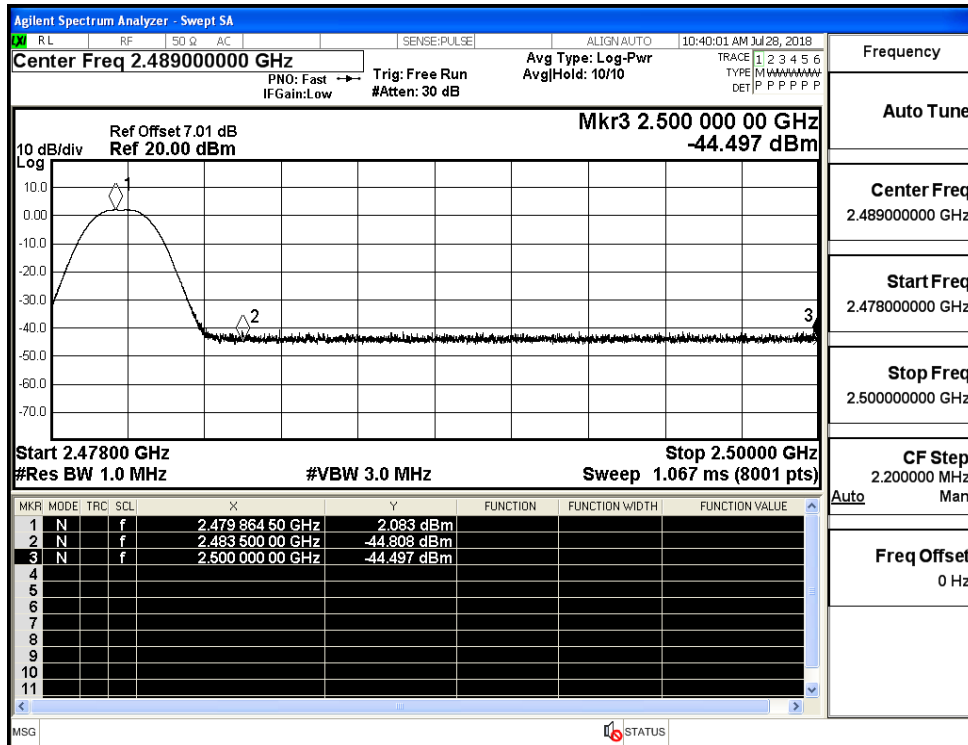
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

