

Appendix B

RF Test Data for BT 4.2(BT LE) (Conducted Measurement)

Product Name: HEADSET

Trade Mark: microlab

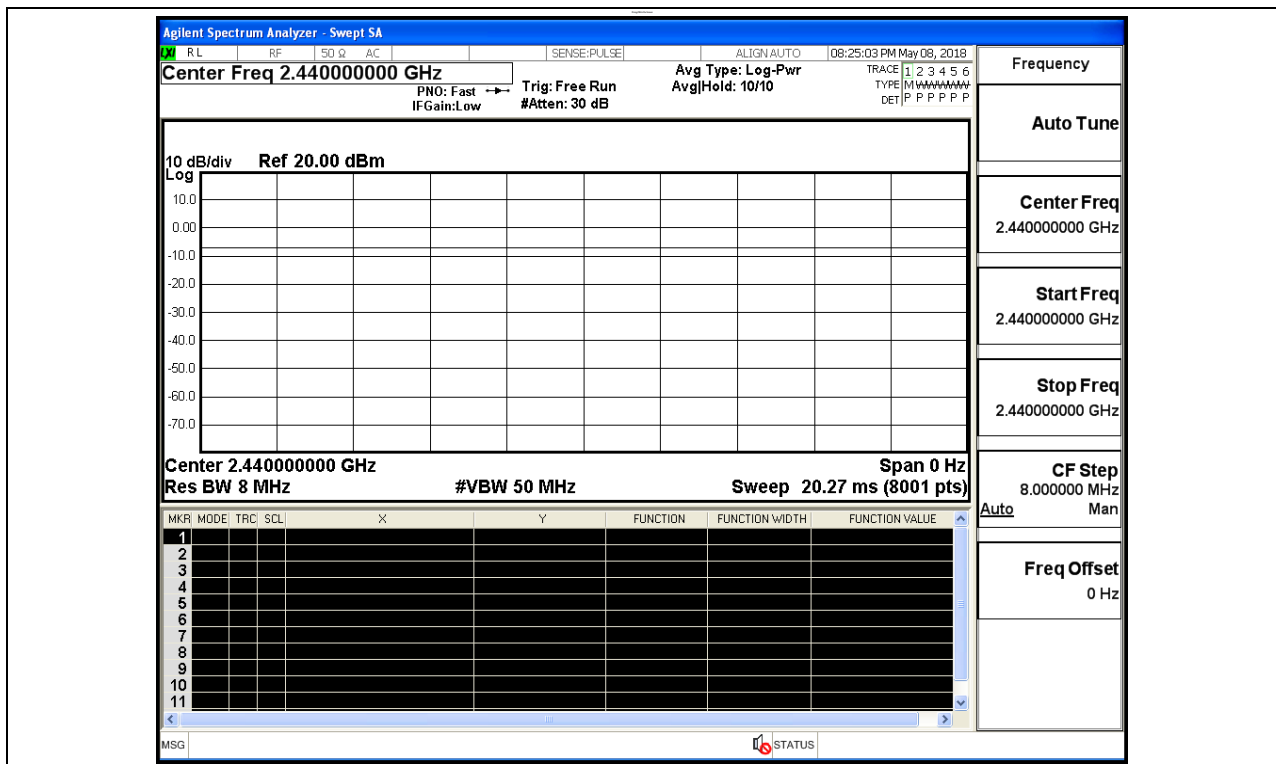
Test Model: Necklace 200

Environmental Conditions

Temperature:	24.6 ° C
Relative Humidity:	53.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.xu
Supervised by:	Jayden.Zhuo

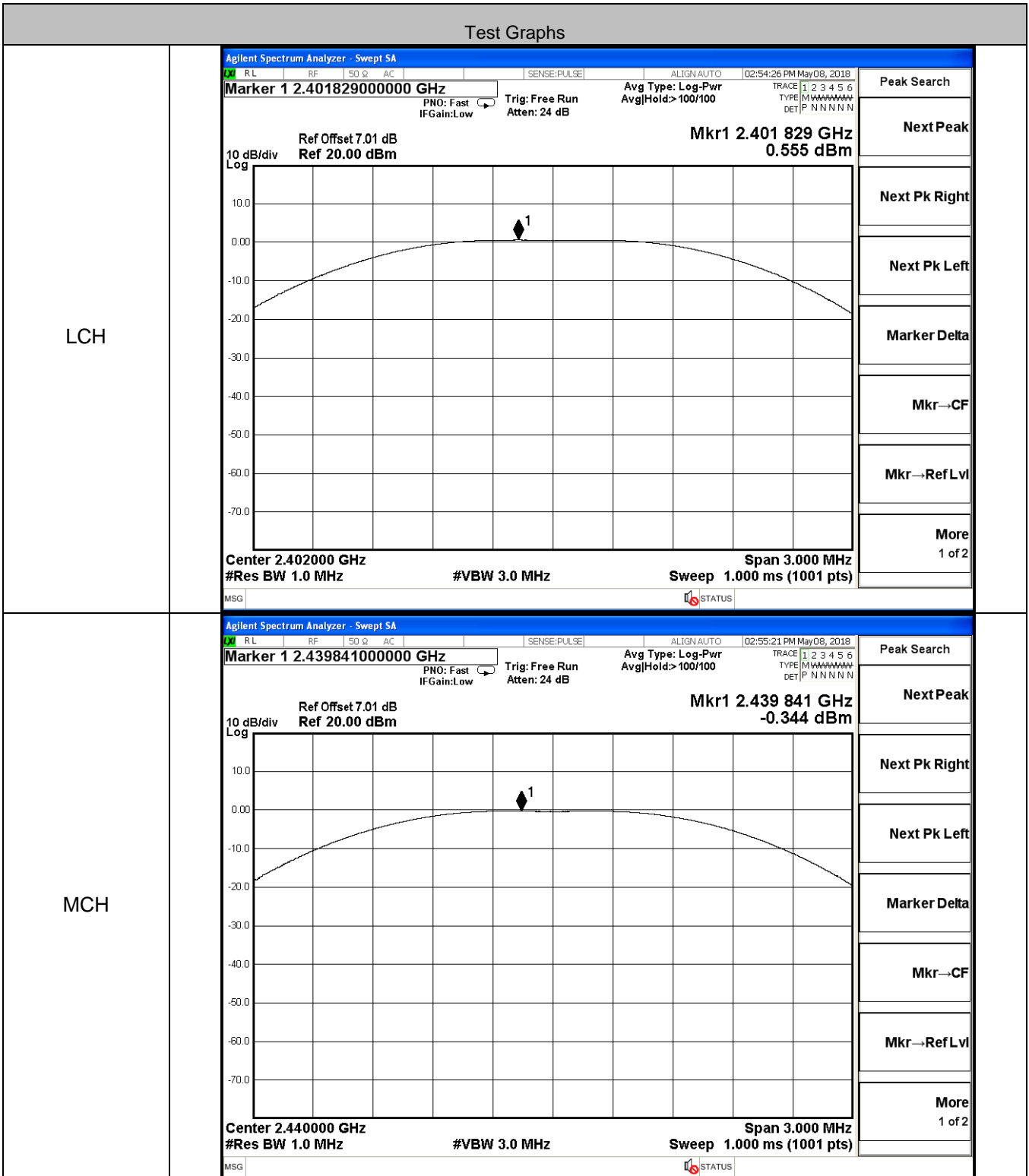
B.1 Duty Cycle

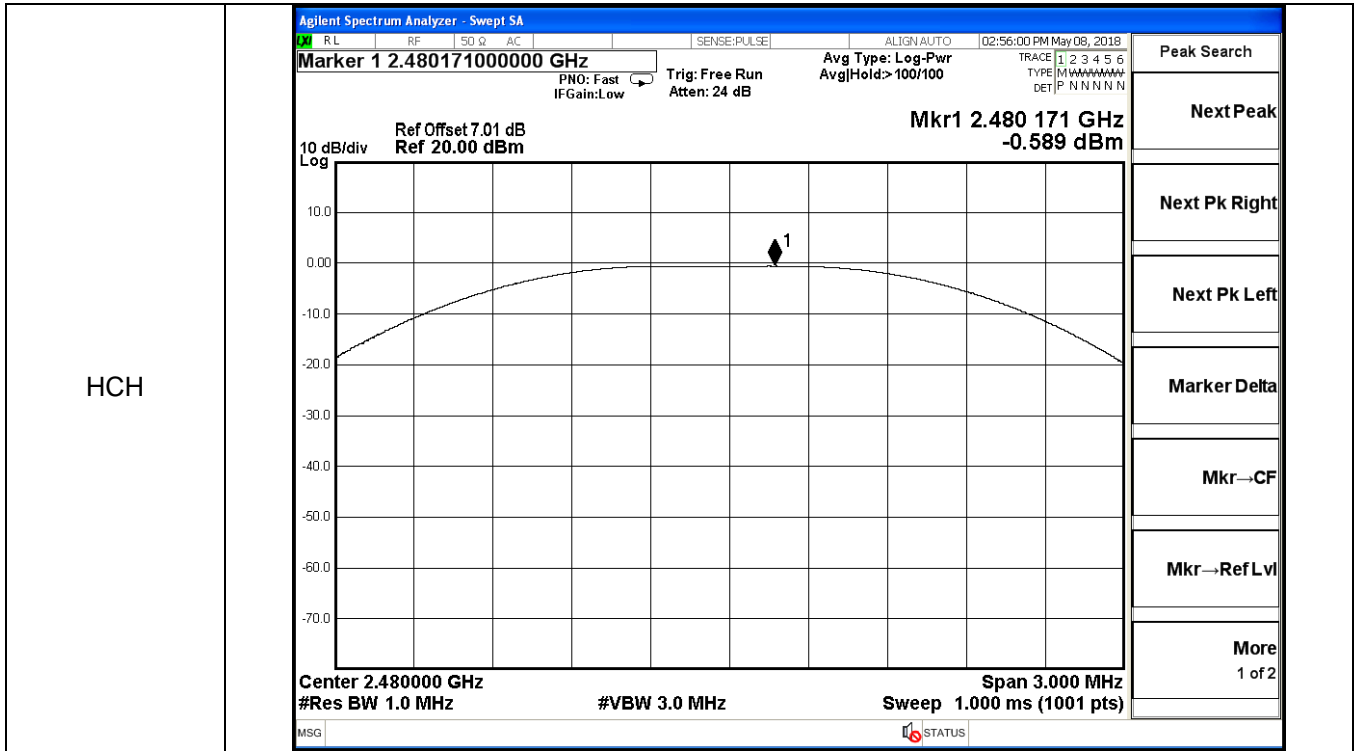
Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BT LE	2440	Ant1	100	PASS



B.2 Maximum Conducted Peak Output Power

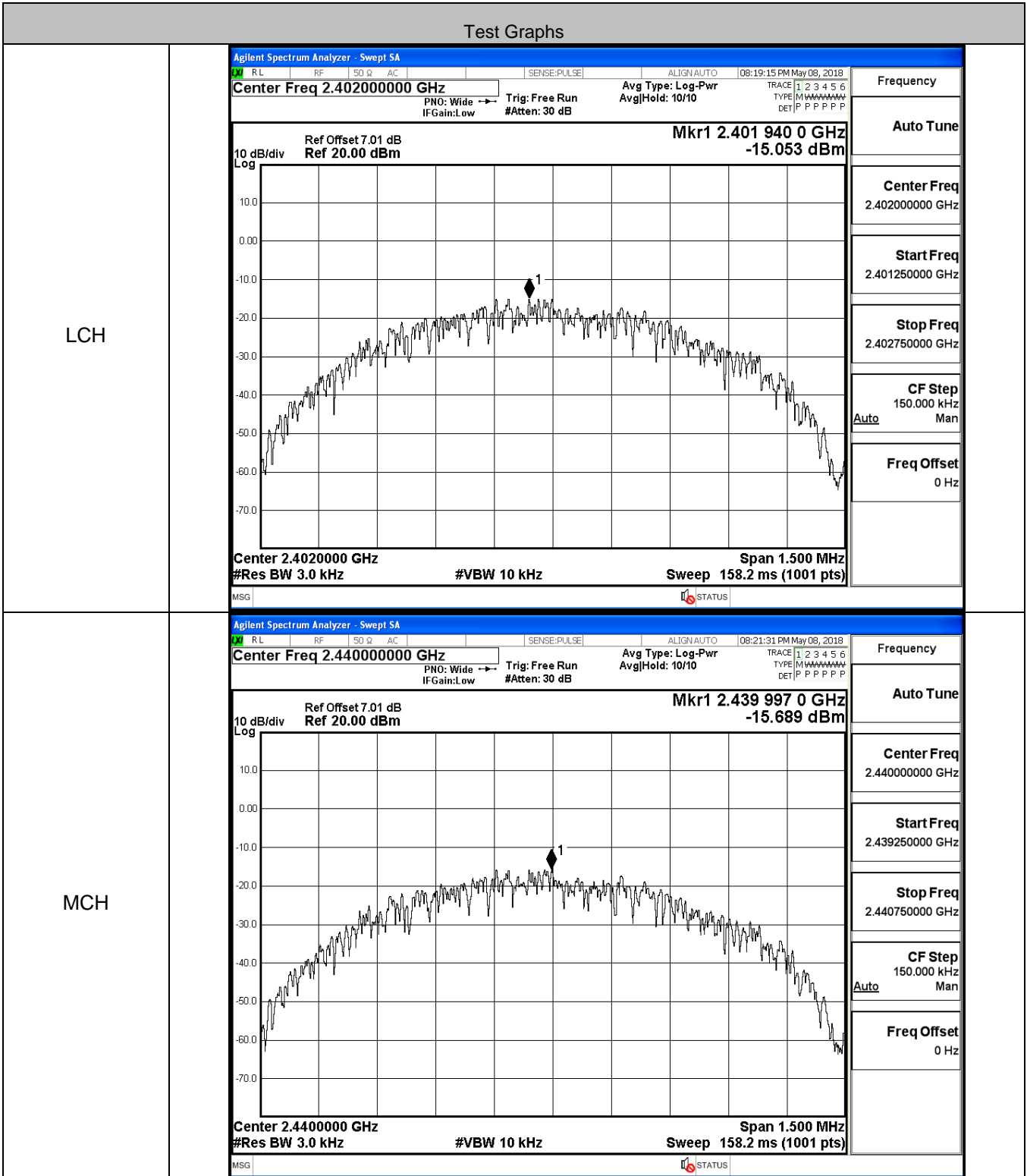
Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.555	30	PASS
BT LE	MCH	-0.344	30	PASS
BT LE	HCH	-0.589	30	PASS



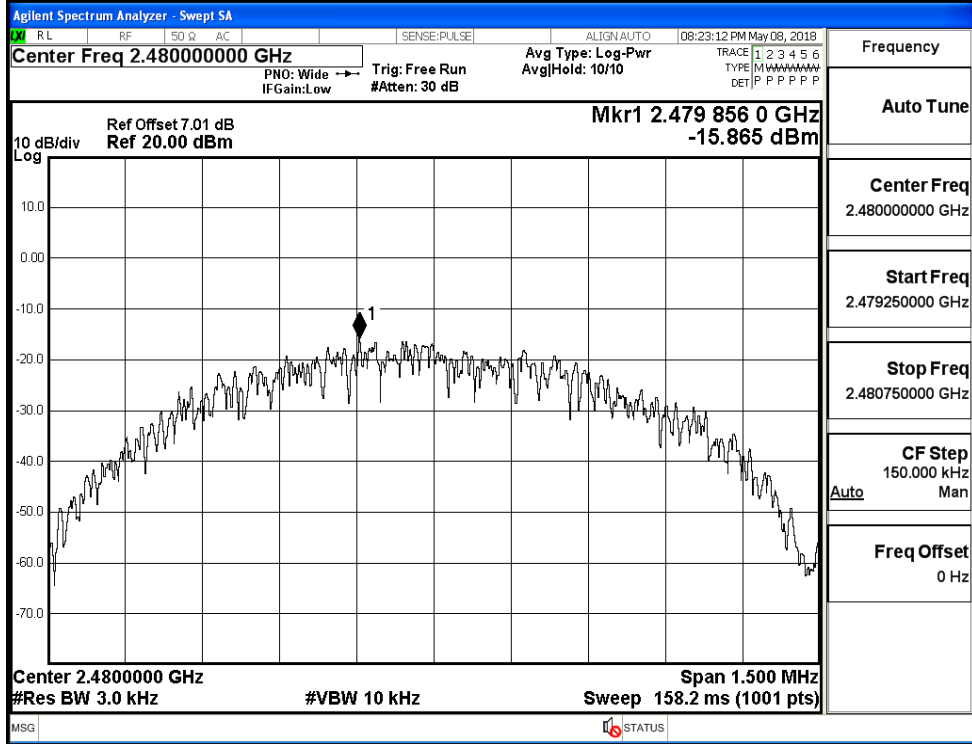


B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-15.053	8	PASS
BT LE	MCH	-15.689	8	PASS
BT LE	HCH	-15.865	8	PASS

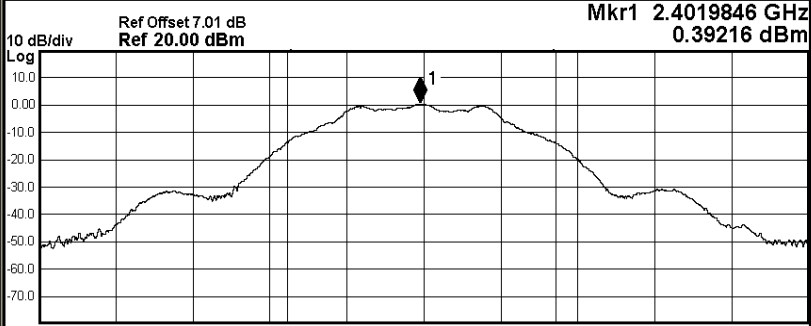
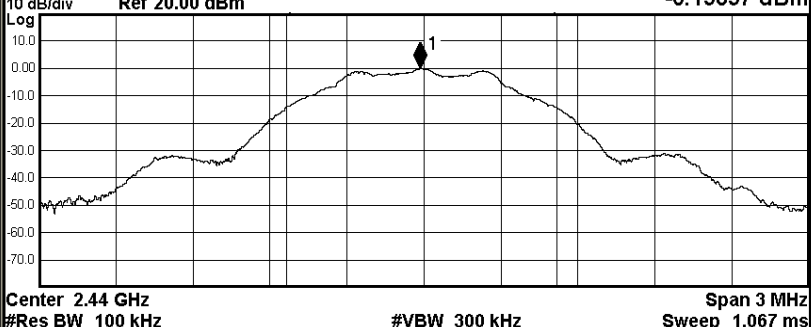


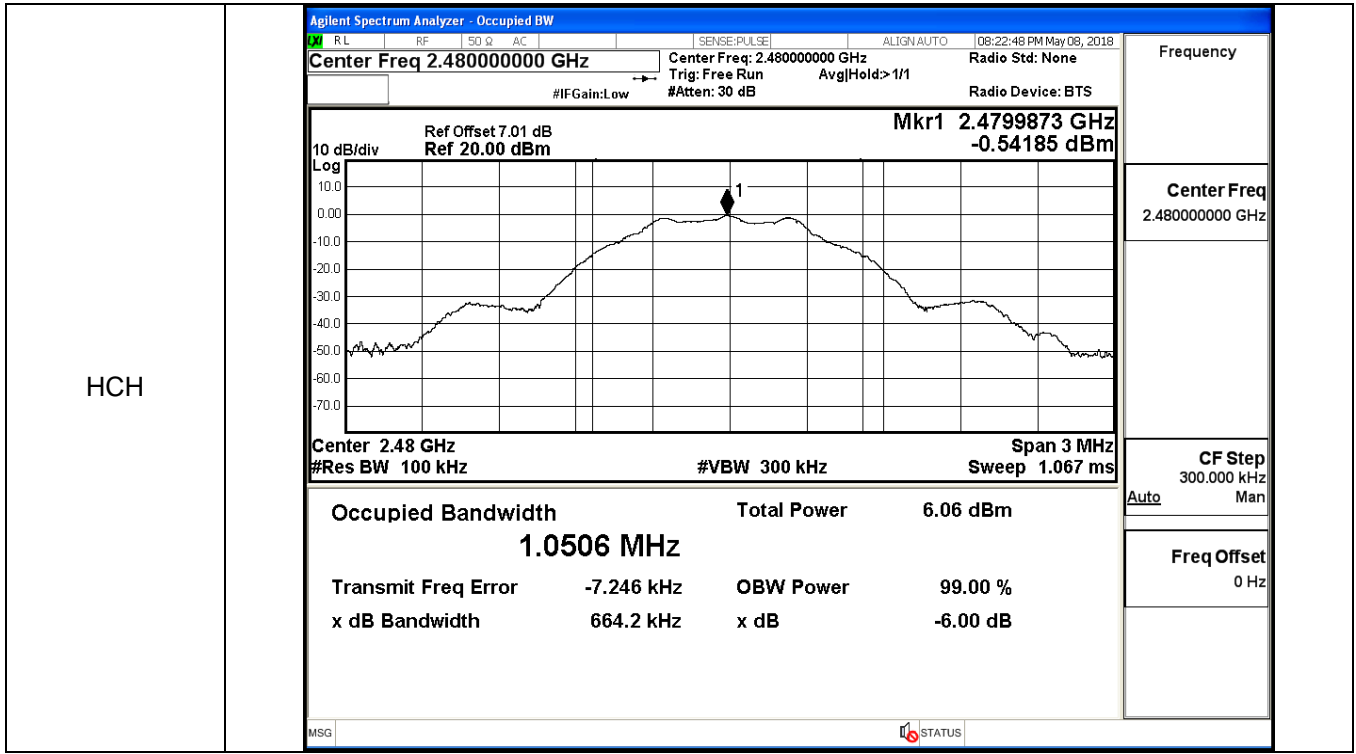
HCH



B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6498	≥0.5	PASS
BT LE	MCH	0.6531	≥0.5	PASS
BT LE	HCH	0.6642	≥0.5	PASS

Test Graphs													
LCH	<div style="border: 1px solid black; padding: 5px;"> <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:PULSE ALIGN:AUTO 08:18:52 PM May 08, 2018</p> <p style="font-size: small; margin: 0;">Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p style="font-size: x-small; margin: 0;">#IFGain:Low Trig: Free Run AvgHold: >1/1 Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <p style="font-size: x-small; margin: 0;">Ref Offset 7.01 dB Mkr1 2.4019846 GHz</p> <p style="font-size: x-small; margin: 0;">Ref 20.00 dBm 0.39216 dBm</p>  <p style="font-size: x-small; margin: 0;">Center 2.402 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>Occupied Bandwidth</td> <td>Total Power</td> <td>6.95 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>-8.681 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>649.8 kHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div> </div>	Occupied Bandwidth	Total Power	6.95 dBm	1.0471 MHz			Transmit Freq Error	-8.681 kHz	OBW Power 99.00 %	x dB Bandwidth	649.8 kHz	x dB -6.00 dB
Occupied Bandwidth	Total Power	6.95 dBm											
1.0471 MHz													
Transmit Freq Error	-8.681 kHz	OBW Power 99.00 %											
x dB Bandwidth	649.8 kHz	x dB -6.00 dB											
MCH	<div style="border: 1px solid black; padding: 5px;"> <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:PULSE ALIGN:AUTO 08:21:07 PM May 08, 2018</p> <p style="font-size: small; margin: 0;">Center Freq 2.440000000 GHz Center Freq: 2.440000000 GHz Radio Std: None</p> <p style="font-size: x-small; margin: 0;">#IFGain:Low Trig: Free Run AvgHold: 1/1 Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <p style="font-size: x-small; margin: 0;">Ref Offset 7.01 dB Mkr1 2.4399858 GHz</p> <p style="font-size: x-small; margin: 0;">Ref 20.00 dBm -0.19397 dBm</p>  <p style="font-size: x-small; margin: 0;">Center 2.44 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>Occupied Bandwidth</td> <td>Total Power</td> <td>6.39 dBm</td> </tr> <tr> <td style="text-align: center;">1.0520 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>-7.203 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>653.1 kHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div> </div>	Occupied Bandwidth	Total Power	6.39 dBm	1.0520 MHz			Transmit Freq Error	-7.203 kHz	OBW Power 99.00 %	x dB Bandwidth	653.1 kHz	x dB -6.00 dB
Occupied Bandwidth	Total Power	6.39 dBm											
1.0520 MHz													
Transmit Freq Error	-7.203 kHz	OBW Power 99.00 %											
x dB Bandwidth	653.1 kHz	x dB -6.00 dB											

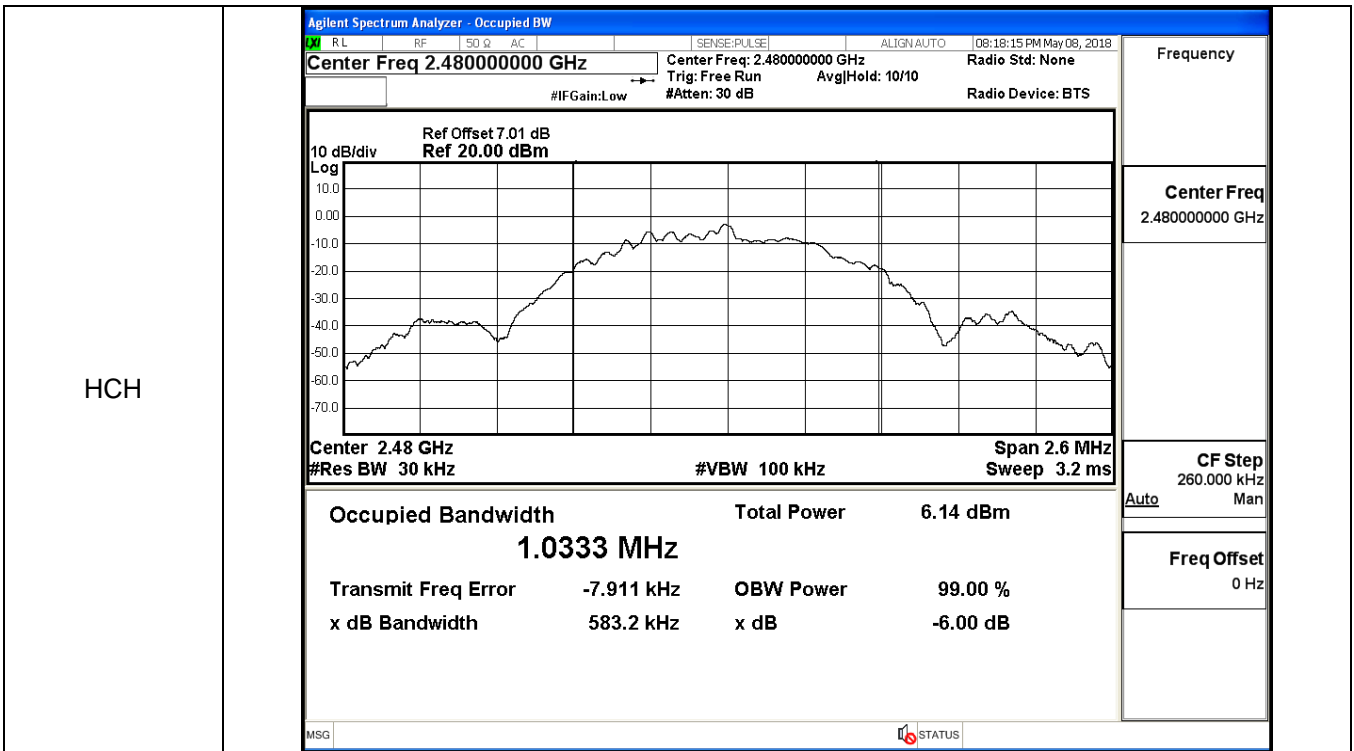


B.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0357	≥0.5	PASS
BT LE	MCH	1.0350	≥0.5	PASS
BT LE	HCH	1.0333	≥0.5	PASS

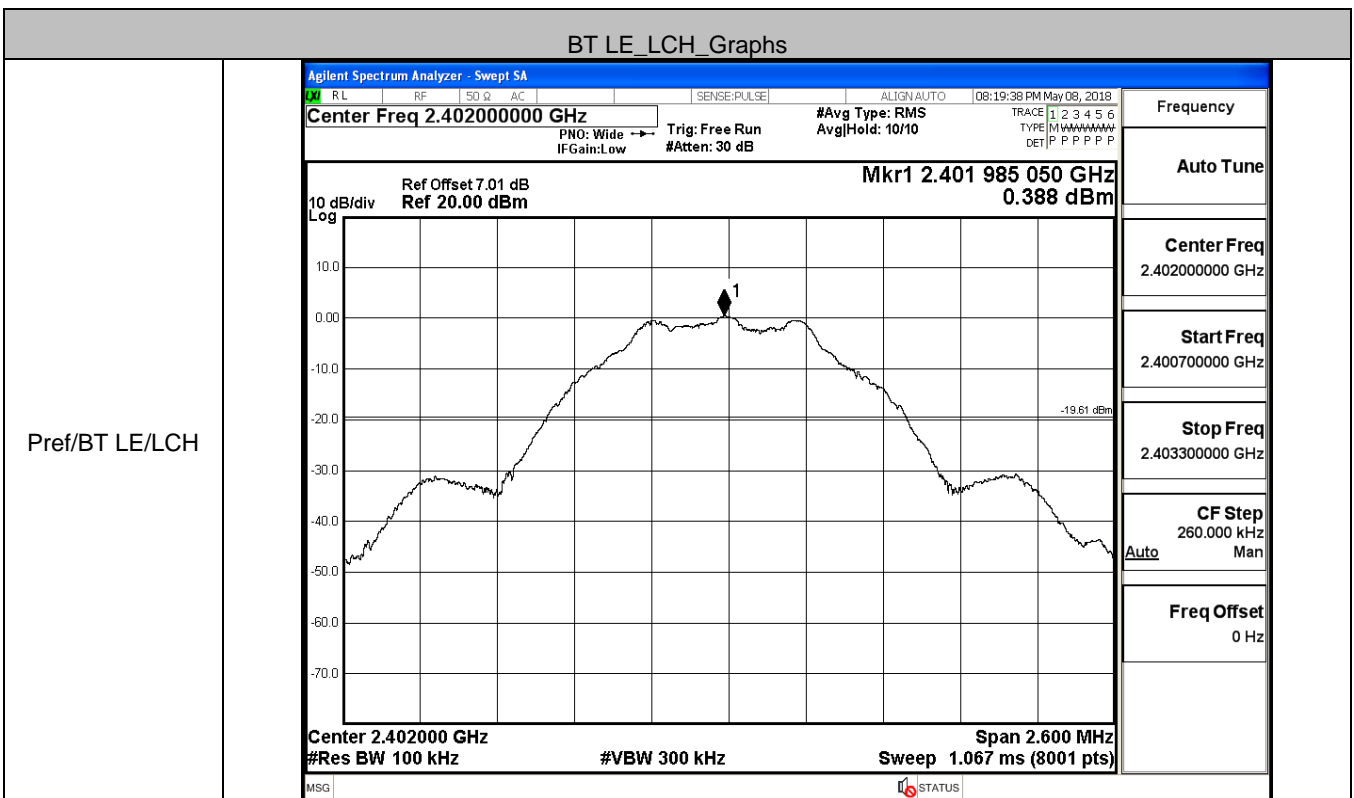
Test Graphs

LCH		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz</p> <p>Center Freq: 2.402000000 GHz</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset 7.01 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div</p> <p>Log</p> <p>Center 2.402 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 2.6 MHz</p> <p>Sweep 3.2 ms</p> <p>Occupied Bandwidth 1.0357 MHz</p> <p>Total Power 7.04 dBm</p> <p>Transmit Freq Error -7.280 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 579.9 kHz</p> <p>x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 260.000 kHz</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: 2.440000000 GHz</p> <p>Radio Std: None</p> <p>Radio Device: BTS</p> <p>Ref Offset 7.01 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div</p> <p>Log</p> <p>Center 2.44 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 2.6 MHz</p> <p>Sweep 3.2 ms</p> <p>Occupied Bandwidth 1.0350 MHz</p> <p>Total Power 6.51 dBm</p> <p>Transmit Freq Error -6.328 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 589.0 kHz</p> <p>x dB -6.00 dB</p>

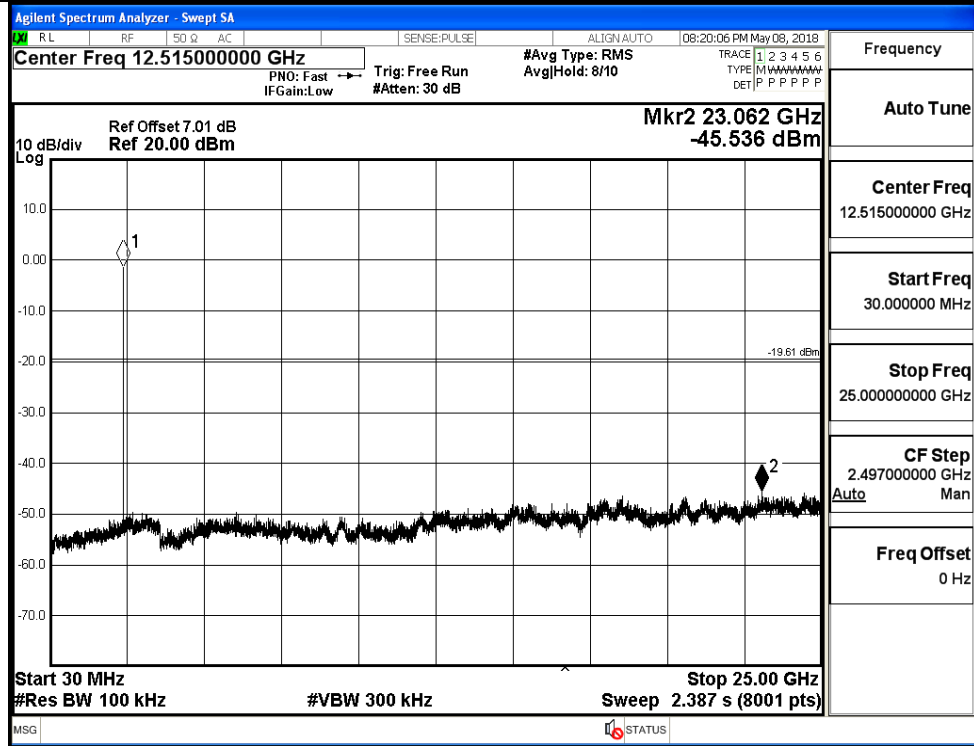


B.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.388	-45.536	-19.612	PASS
BT LE	MCH	-0.212	-45.136	-20.212	PASS
BT LE	HCH	-0.533	-45.633	-20.533	PASS

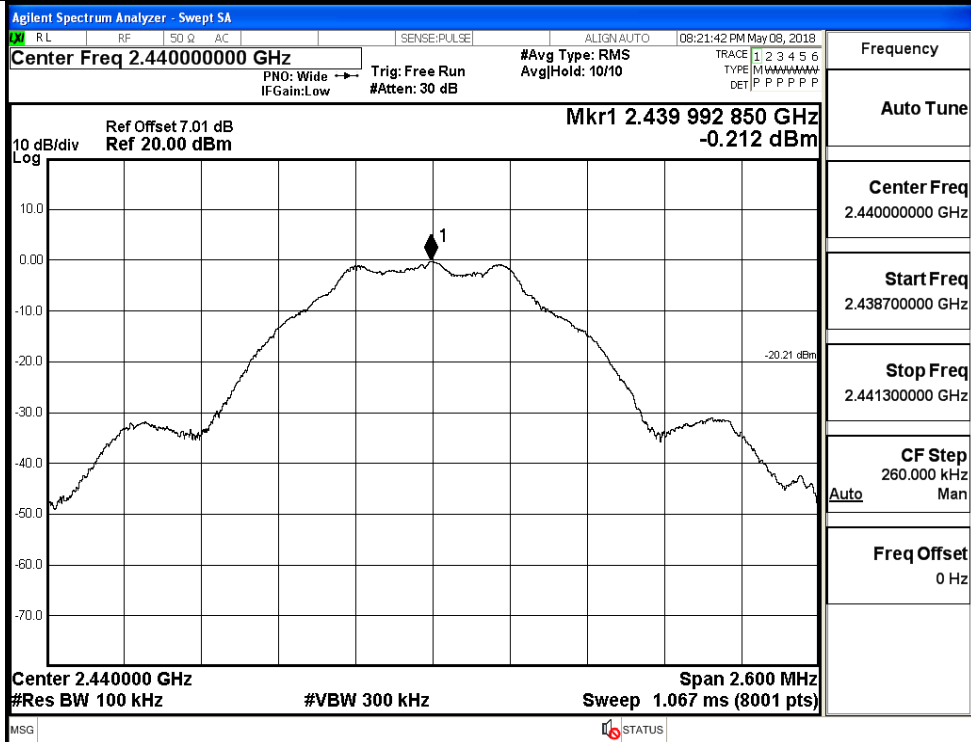


Puw/BT LE/LCH

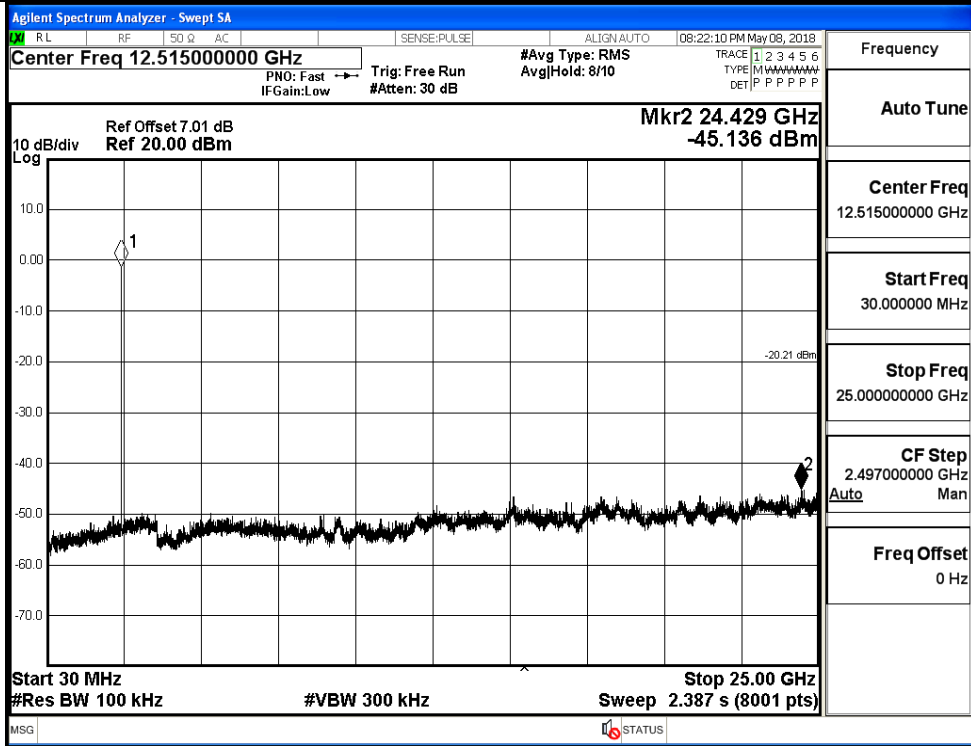


BT LE MCH Graphs

Pref/BT LE/MCH

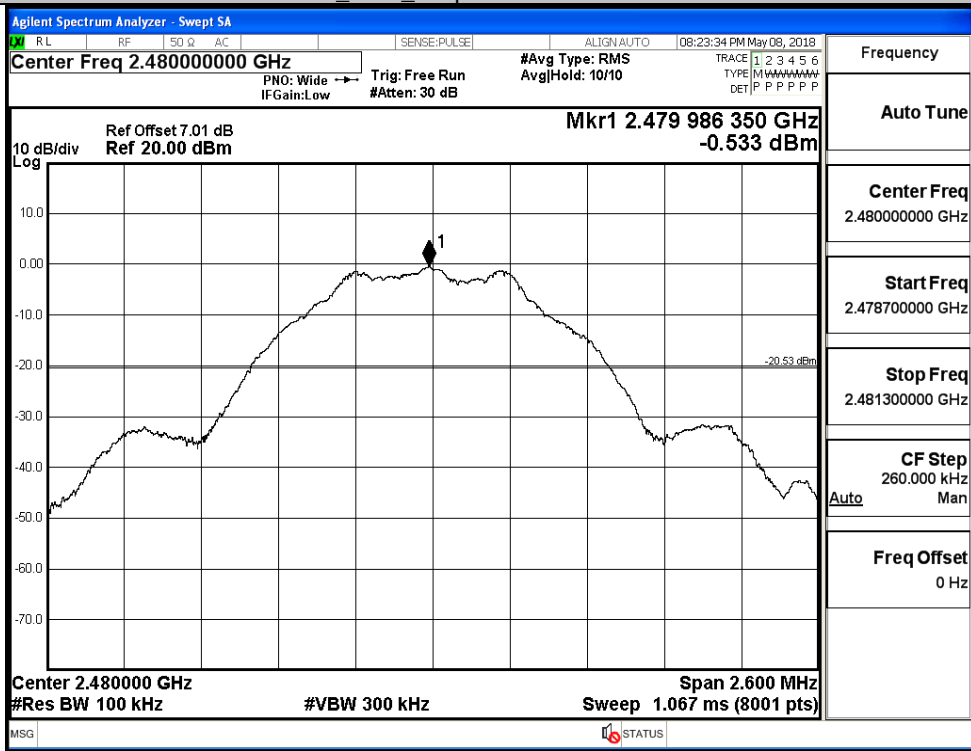


Puw/BT LE/MCH

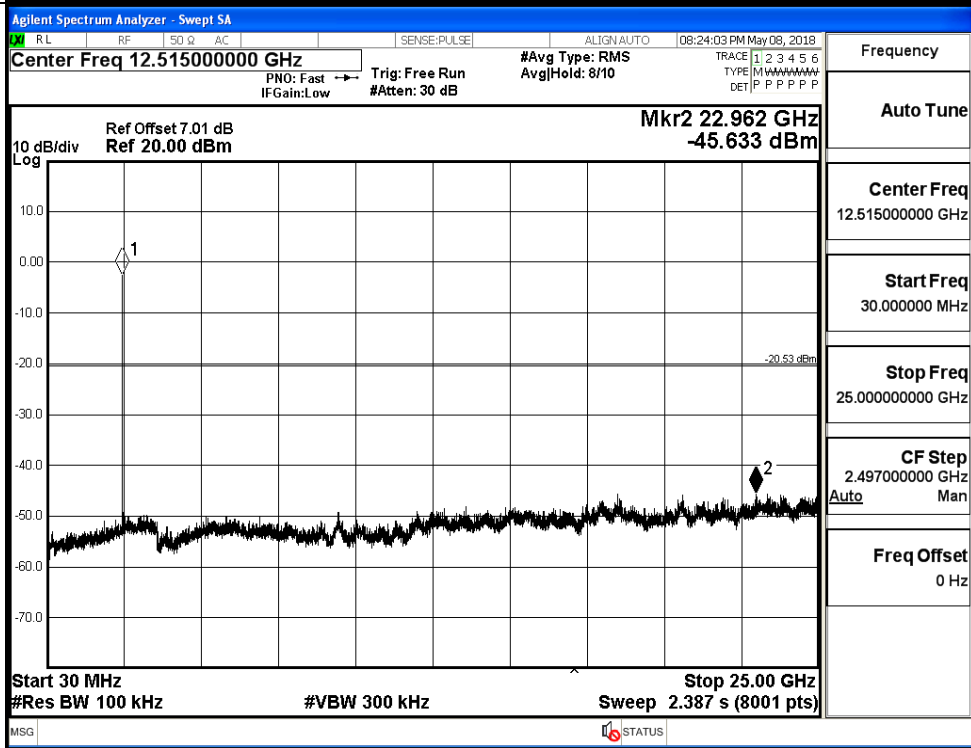


BT LE HCH Graphs

Pref/BT LE/HCH



Puw/BT LE/HCH



B.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.489	-51.346	-19.51	PASS
BT LE	HCH	-0.315	-42.982	-20.32	PASS

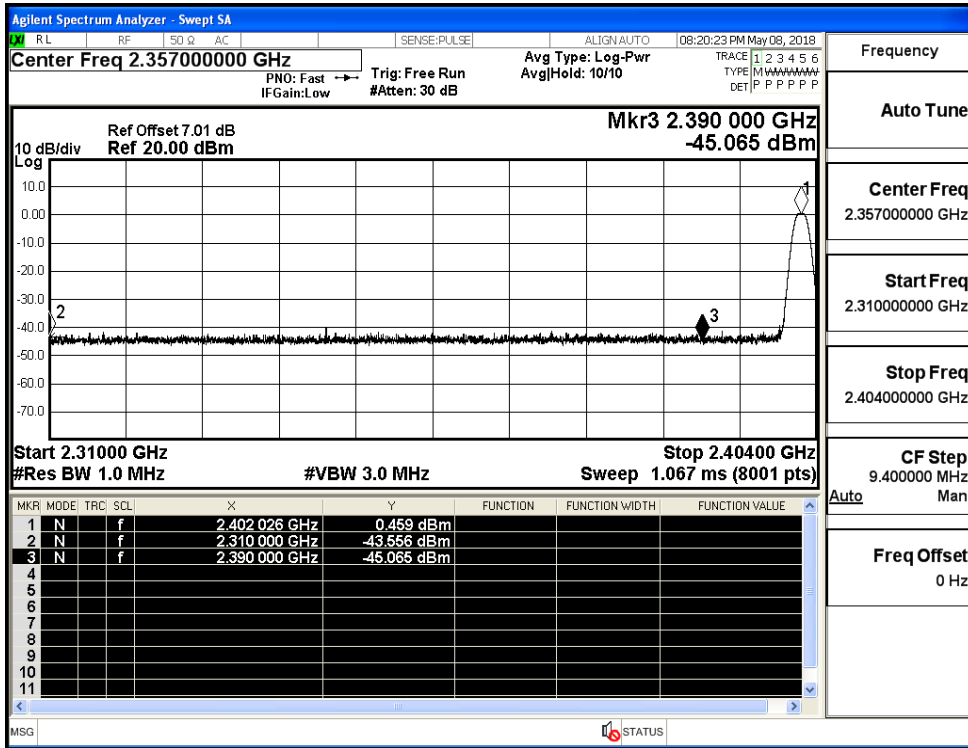
Test Graphs

LCH	<table border="1" style="width: 100%; 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>2.401991 GHz</td><td>0.489 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.400000 GHz</td><td>-43.196 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.390000 GHz</td><td>-52.021 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.357364 GHz</td><td>-51.346 dBm</td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.401991 GHz	0.489 dBm				2	N	f		2.400000 GHz	-43.196 dBm				3	N	f		2.390000 GHz	-52.021 dBm				4	N	f		2.357364 GHz	-51.346 dBm				5									6									7									8									9									10									11									<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.357000000 GHz</p> <p>Start Freq 2.310000000 GHz</p> <p>Stop Freq 2.404000000 GHz</p> <p>CF Step 9.400000 MHz</p> <p>Freq Offset 0 Hz</p>
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																																																																																						
1	N	f		2.401991 GHz	0.489 dBm																																																																																																									
2	N	f		2.400000 GHz	-43.196 dBm																																																																																																									
3	N	f		2.390000 GHz	-52.021 dBm																																																																																																									
4	N	f		2.357364 GHz	-51.346 dBm																																																																																																									
5																																																																																																														
6																																																																																																														
7																																																																																																														
8																																																																																																														
9																																																																																																														
10																																																																																																														
11																																																																																																														
HCH	<table border="1" style="width: 100%; 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>2.47999925 GHz</td><td>-0.315 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.48350000 GHz</td><td>-53.640 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.50000000 GHz</td><td>-52.934 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.48499050 GHz</td><td>-42.982 dBm</td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.47999925 GHz	-0.315 dBm				2	N	f		2.48350000 GHz	-53.640 dBm				3	N	f		2.50000000 GHz	-52.934 dBm				4	N	f		2.48499050 GHz	-42.982 dBm				5									6									7									8									9									10									11									<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.489000000 GHz</p> <p>Start Freq 2.478000000 GHz</p> <p>Stop Freq 2.500000000 GHz</p> <p>CF Step 2.200000 MHz</p> <p>Freq Offset 0 Hz</p>
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																																																																																						
1	N	f		2.47999925 GHz	-0.315 dBm																																																																																																									
2	N	f		2.48350000 GHz	-53.640 dBm																																																																																																									
3	N	f		2.50000000 GHz	-52.934 dBm																																																																																																									
4	N	f		2.48499050 GHz	-42.982 dBm																																																																																																									
5																																																																																																														
6																																																																																																														
7																																																																																																														
8																																																																																																														
9																																																																																																														
10																																																																																																														
11																																																																																																														

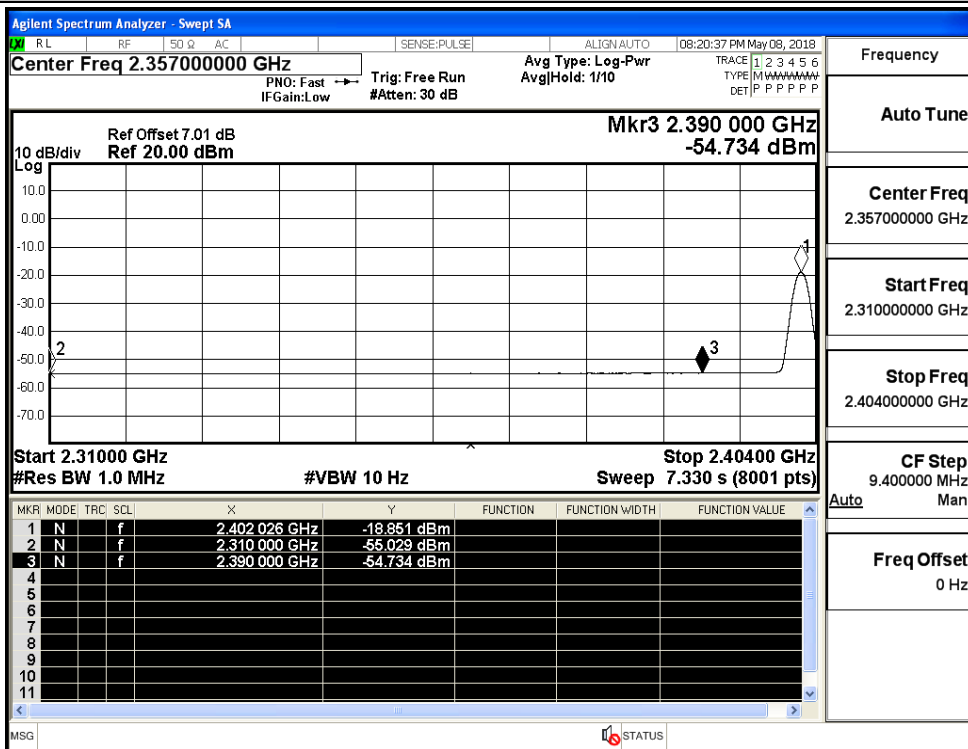
B.8 Restrict-band band-edge measurements

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	-43.56	2.5	0	54.20	PEAK	74	PASS
		Ant1	2310.0	-55.03	2.5	0	42.73	AV	54	PASS
		Ant1	2390.0	-45.07	2.5	0	52.69	PEAK	74	PASS
		Ant1	2390.0	-54.73	2.5	0	43.03	AV	54	PASS
	2480	Ant1	2483.5	-43.91	2.5	0	53.85	PEAK	74	PASS
		Ant1	2483.5	-54.41	2.5	0	43.35	AV	54	PASS
		Ant1	2500.0	-44.39	2.5	0	53.37	PEAK	74	PASS
		Ant1	2500.0	-54.37	2.5	0	43.39	AV	54	PASS

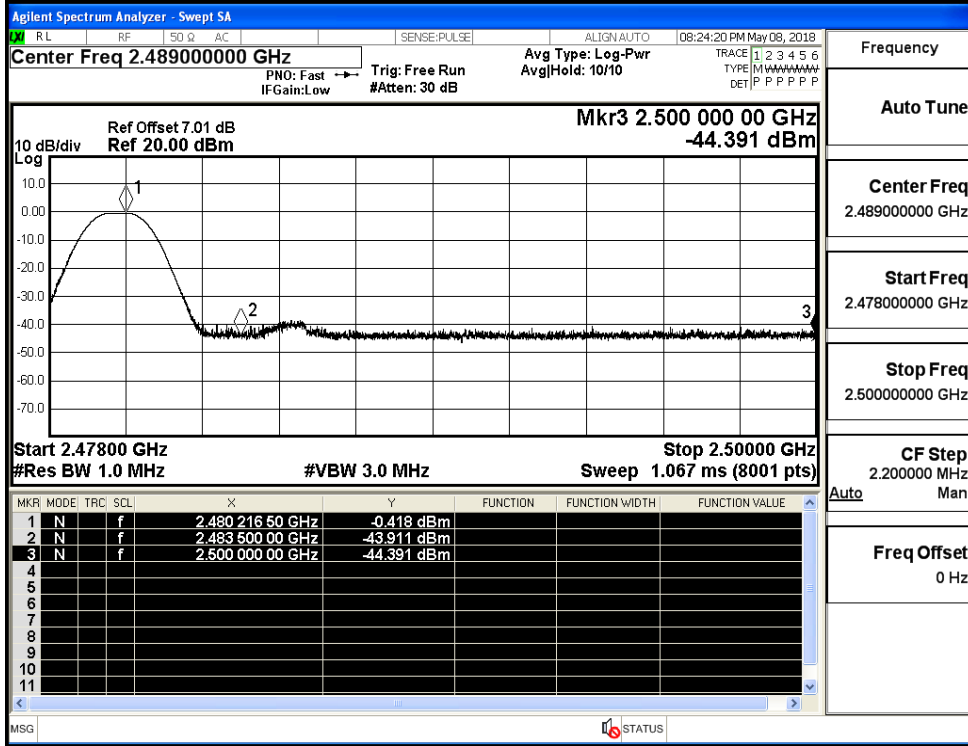
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

