

Appendix B

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

Product Name: DONGLE

Trade Mark: N/A

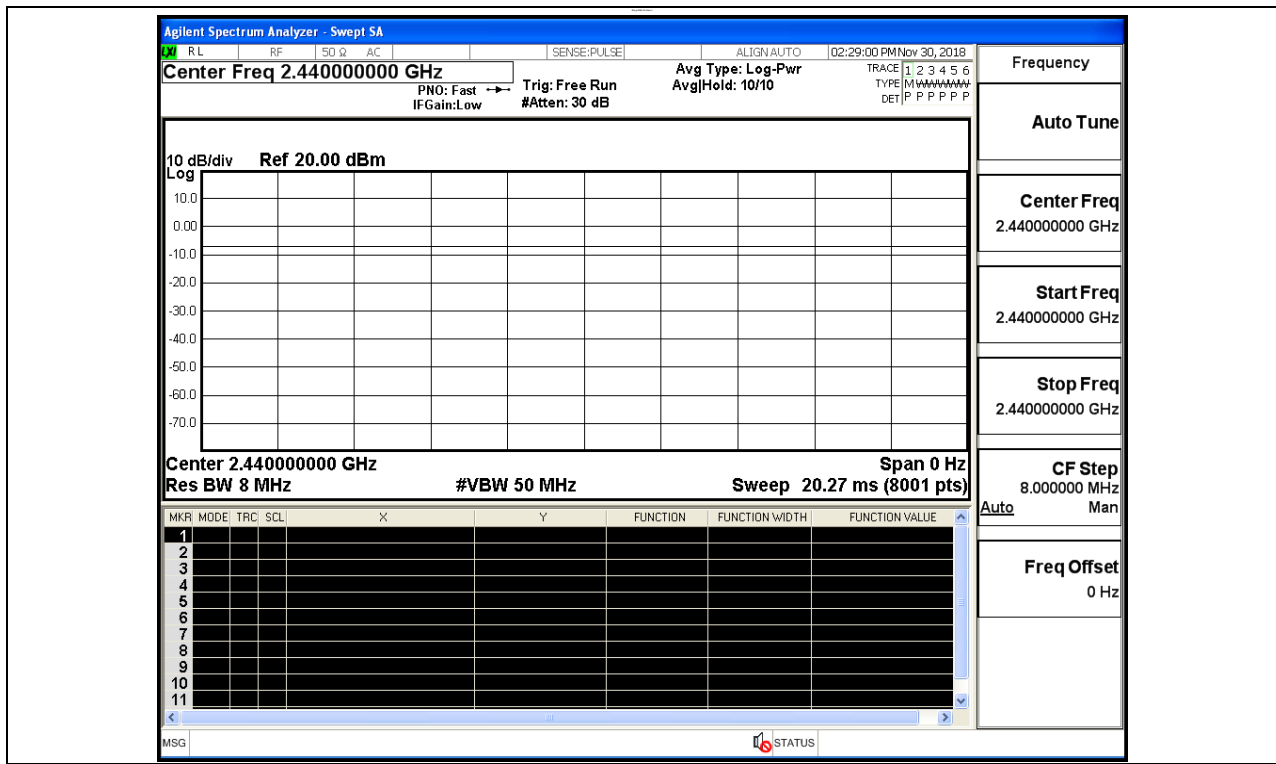
Test Model: BW0810-SP3E-R

Environmental Conditions

Temperature:	24.5 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	WANGCHUANG
Supervised by:	Jayden.Zhuo

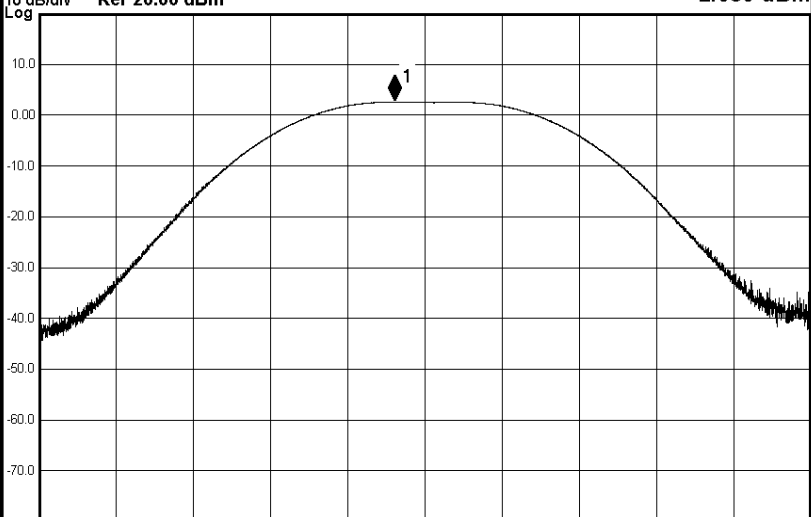
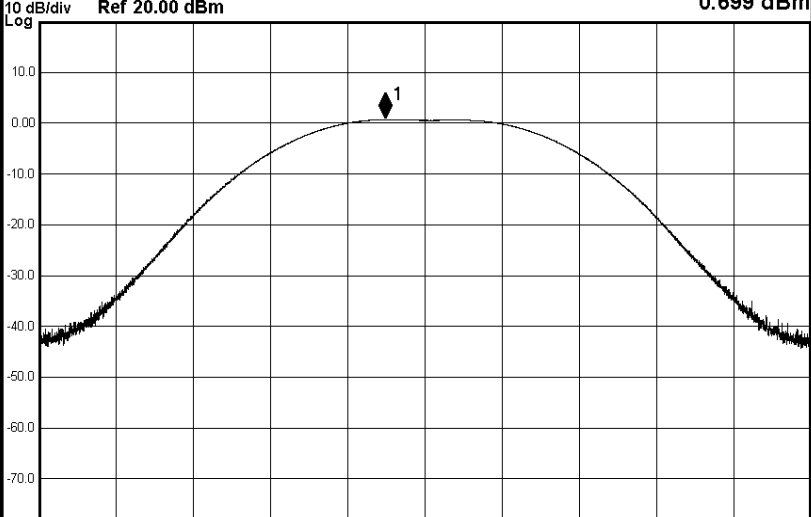
B.1 Duty Cycle

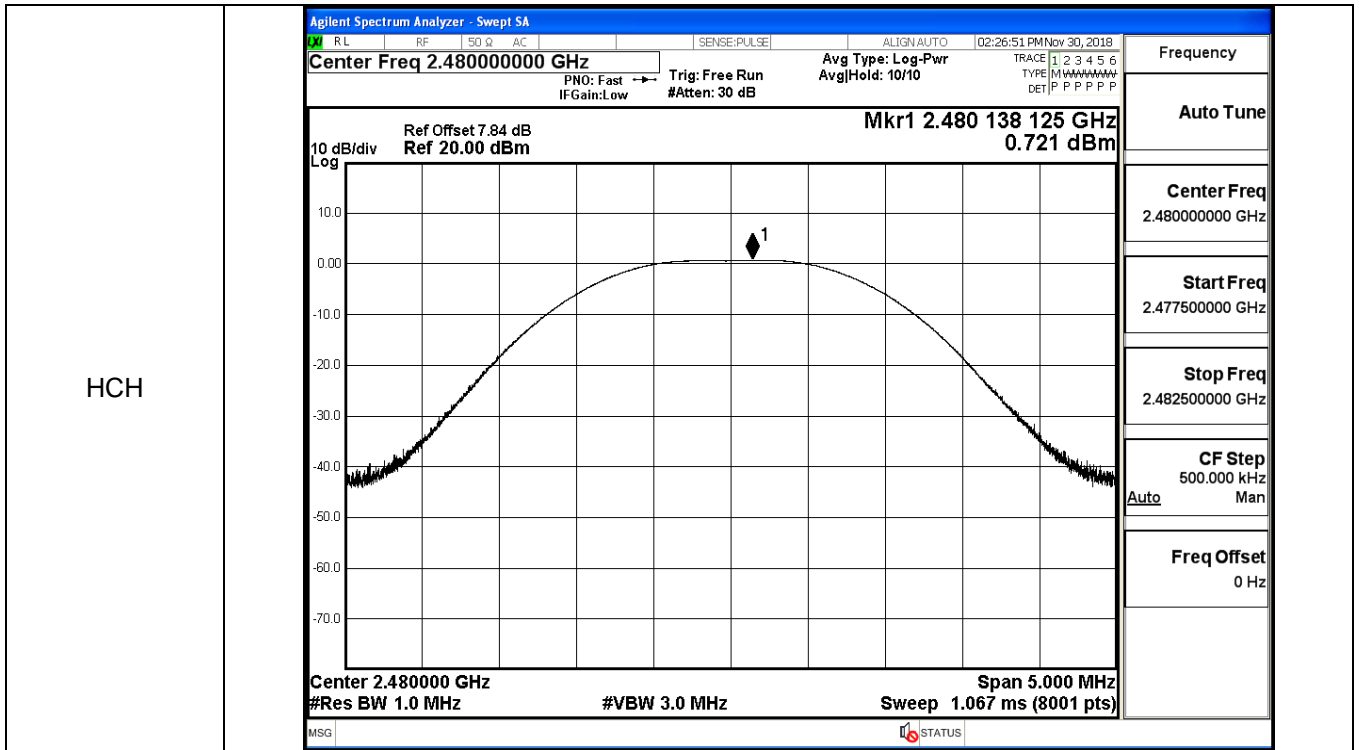
Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BT LE	2440	Ant1	100	PASS



B.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	2.585	30	PASS
BT LE	MCH	0.699	30	PASS
BT LE	HCH	0.721	30	PASS

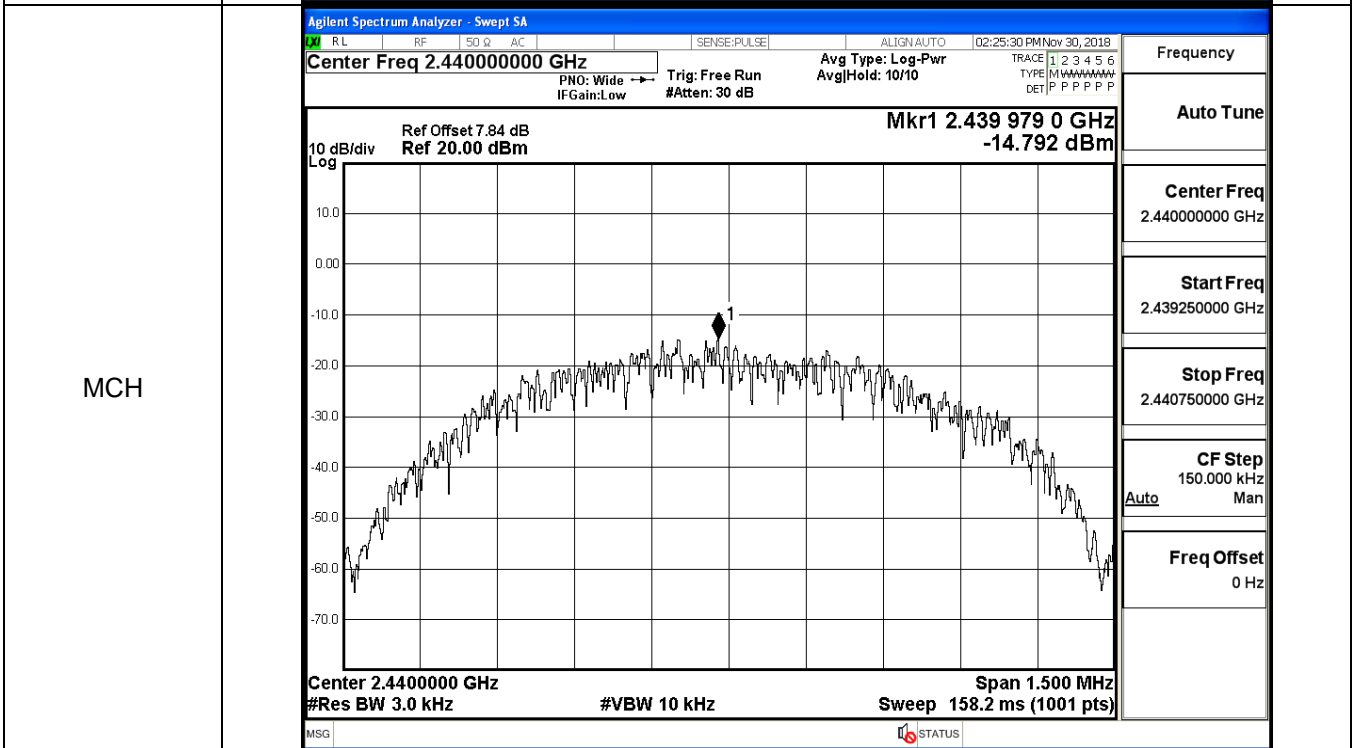
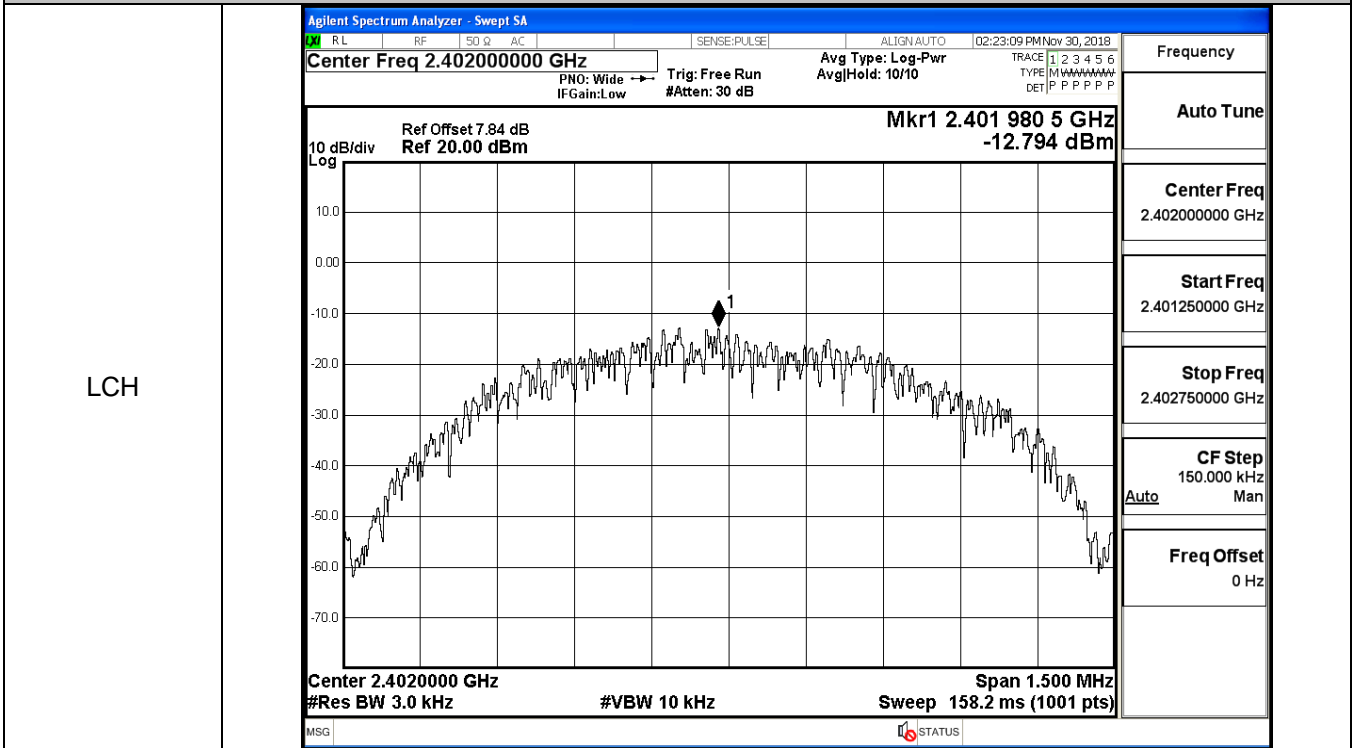
Test Graphs																	
LCH	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: small; margin: 0;">Agilent Spectrum Analyzer - Swept SA</p> <p style="font-size: x-small; margin: 0;">RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 02:22:56 PM Nov 30, 2018</p> <p style="font-size: small; margin: 0;">Center Freq 2.40200000 GHz Avg Type: Log-Pwr TRACE 1 2 3 4 5 6</p> <p style="font-size: x-small; margin: 0;">PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB AvgHold: 10/10 TYPE M W M M M M M M M M</p> <p style="font-size: x-small; margin: 0;">Mkr1 2.401 806 250 GHz 2.585 dBm</p>  <p style="font-size: x-small; margin: 0;">Ref Offset 7.84 dB Ref 20.00 dBm</p> <p style="font-size: x-small; margin: 0;">10 dB/div Log</p> <p style="font-size: x-small; margin: 0;">Center 2.402000 GHz Span 5.000 MHz</p> <p style="font-size: x-small; margin: 0;">#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 1.067 ms (8001 pts)</p> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td>Frequency</td><td></td></tr> <tr><td>Auto Tune</td><td></td></tr> <tr><td>Center Freq</td><td>2.402000000 GHz</td></tr> <tr><td>Start Freq</td><td>2.399500000 GHz</td></tr> <tr><td>Stop Freq</td><td>2.404500000 GHz</td></tr> <tr><td>CF Step</td><td>500.000 kHz</td></tr> <tr><td>Auto</td><td>Man</td></tr> <tr><td>Freq Offset</td><td>0 Hz</td></tr> </table>	Frequency		Auto Tune		Center Freq	2.402000000 GHz	Start Freq	2.399500000 GHz	Stop Freq	2.404500000 GHz	CF Step	500.000 kHz	Auto	Man	Freq Offset	0 Hz
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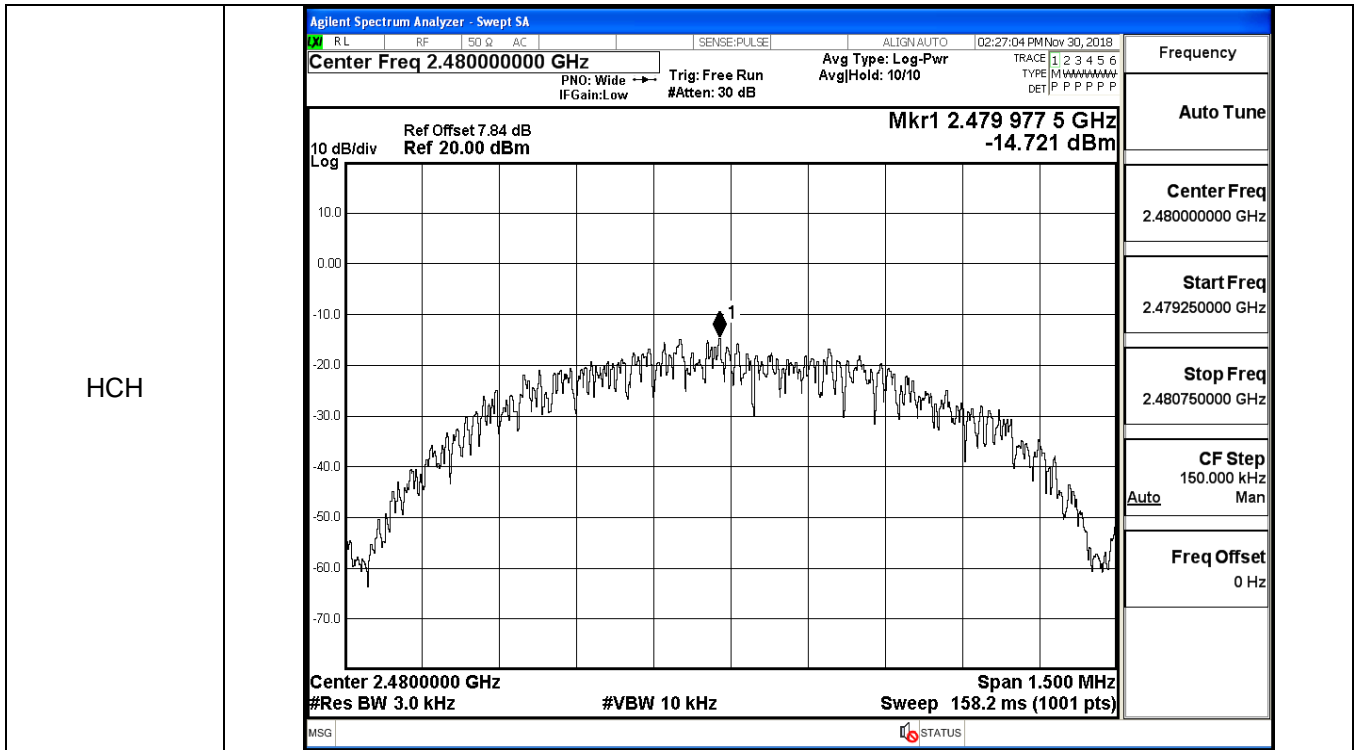


B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-12.794	8	PASS
BT LE	MCH	-14.792	8	PASS
BT LE	HCH	-14.721	8	PASS

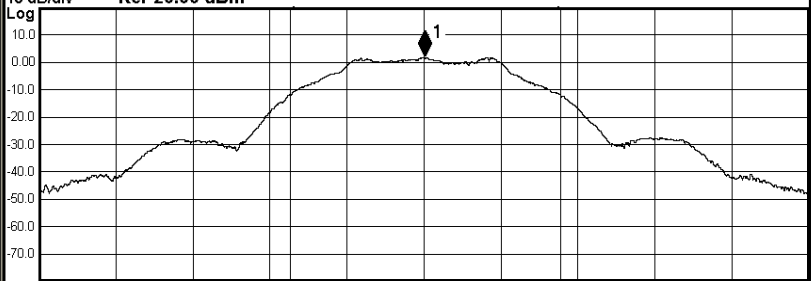

Test Graphs

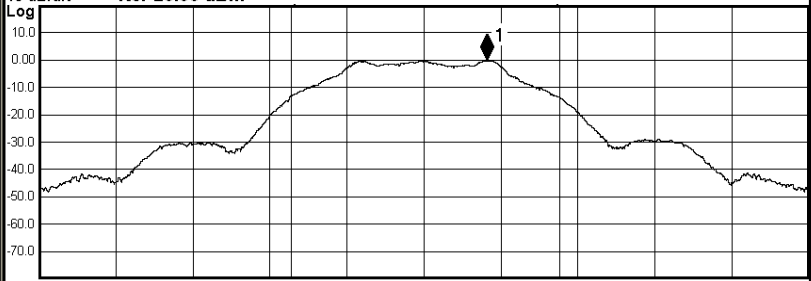




B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.7002	≥0.5	PASS
BT LE	MCH	0.7109	≥0.5	PASS
BT LE	HCH	0.7094	≥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 02:22:44 PM Nov 30, 2018</p> <p style="margin: 0;">Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p style="margin: 0;">Trig: Free Run AvgHold: 1/1</p> <p style="margin: 0;">#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <p style="font-size: x-small; margin: 0;">10 dB/div Ref Offset 7.84 dB Mkr1 2.4020019 GHz</p> <p style="font-size: x-small; margin: 0;">Log Ref 20.00 dBm 1.7202 dBm</p>  </div> <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 style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">8.84 dBm</td> </tr> <tr> <td style="text-align: center;">1.0483 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>6.342 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>700.2 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> </div>	Occupied Bandwidth	Total Power	8.84 dBm	1.0483 MHz			Transmit Freq Error	6.342 kHz	OBW Power	x dB Bandwidth	700.2 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 02:25:06 PM Nov 30, 2018</p> <p style="margin: 0;">Center Freq 2.440000000 GHz Center Freq: 2.440000000 GHz Radio Std: None</p> <p style="margin: 0;">Trig: Free Run AvgHold: >1/1</p> <p style="margin: 0;">#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <p style="font-size: x-small; margin: 0;">10 dB/div Ref Offset 7.84 dB Mkr1 2.4399966 GHz</p> <p style="font-size: x-small; margin: 0;">Log Ref 20.00 dBm -0.22516 dBm</p>  </div> <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 style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">6.95 dBm</td> </tr> <tr> <td style="text-align: center;">1.0504 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>3.328 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>710.9 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> </div>	Occupied Bandwidth	Total Power	6.95 dBm	1.0504 MHz			Transmit Freq Error	3.328 kHz	OBW Power	x dB Bandwidth	710.9 kHz	x dB			99.00 %			-6.00 dB
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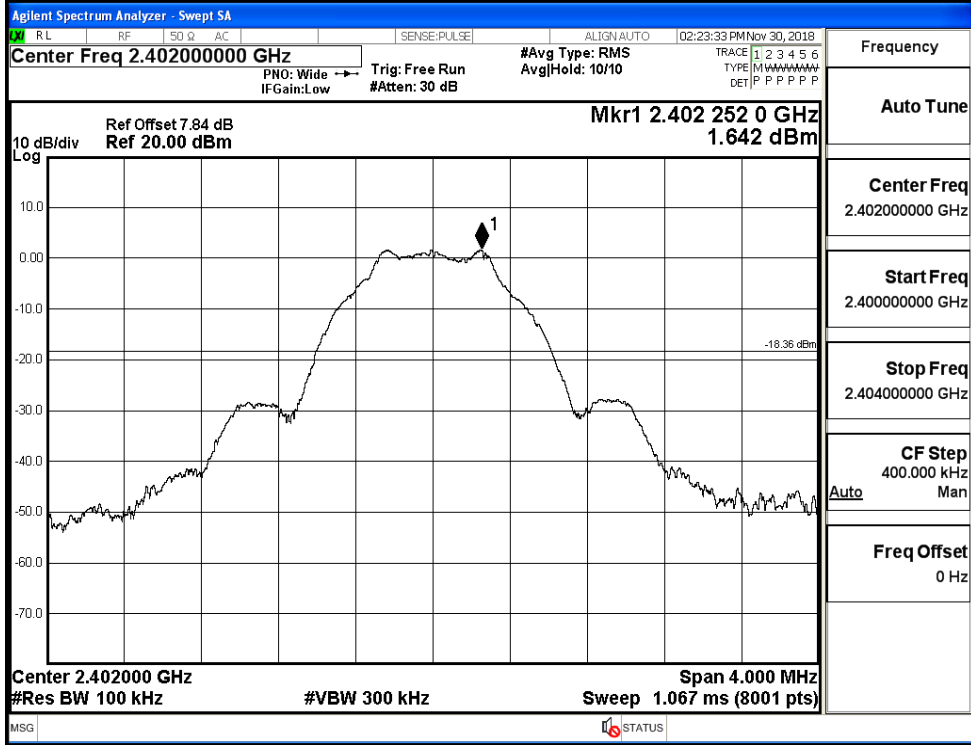
HCH	Agilent Spectrum Analyzer - Occupied BW	RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 02:26:40 PM Nov 30, 2018	Frequency																	
	Center Freq 2.480000000 GHz	Center Freq: 2.480000000 GHz Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB	Radio Std: None Radio Device: BTS																	
	<div style="display: flex; justify-content: space-between;"> 10 dB/div Ref Offset 7.84 dB Mkr1 2.4802441 GHz </div> <div style="display: flex; justify-content: space-between;"> Log Ref 20.00 dBm -0.20002 dBm </div> 	Center Freq 2.480000000 GHz																		
	Center 2.48 GHz	#Res BW 100 kHz	#VBW 300 kHz	Span 3 MHz Sweep 1.067 ms																
	<table style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">6.95 dBm</td> </tr> <tr> <td style="text-align: center;">1.0434 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>6.425 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>709.4 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>	Occupied Bandwidth	Total Power	6.95 dBm	1.0434 MHz			Transmit Freq Error	6.425 kHz	OBW Power	x dB Bandwidth	709.4 kHz	x dB			99.00 %			-6.00 dB	CF Step 300.000 kHz Auto Man
Occupied Bandwidth	Total Power	6.95 dBm																		
1.0434 MHz																				
Transmit Freq Error	6.425 kHz	OBW Power																		
x dB Bandwidth	709.4 kHz	x dB																		
		99.00 %																		
		-6.00 dB																		
MSG	STATUS																			

B.5 RF Conducted Spurious Emissions

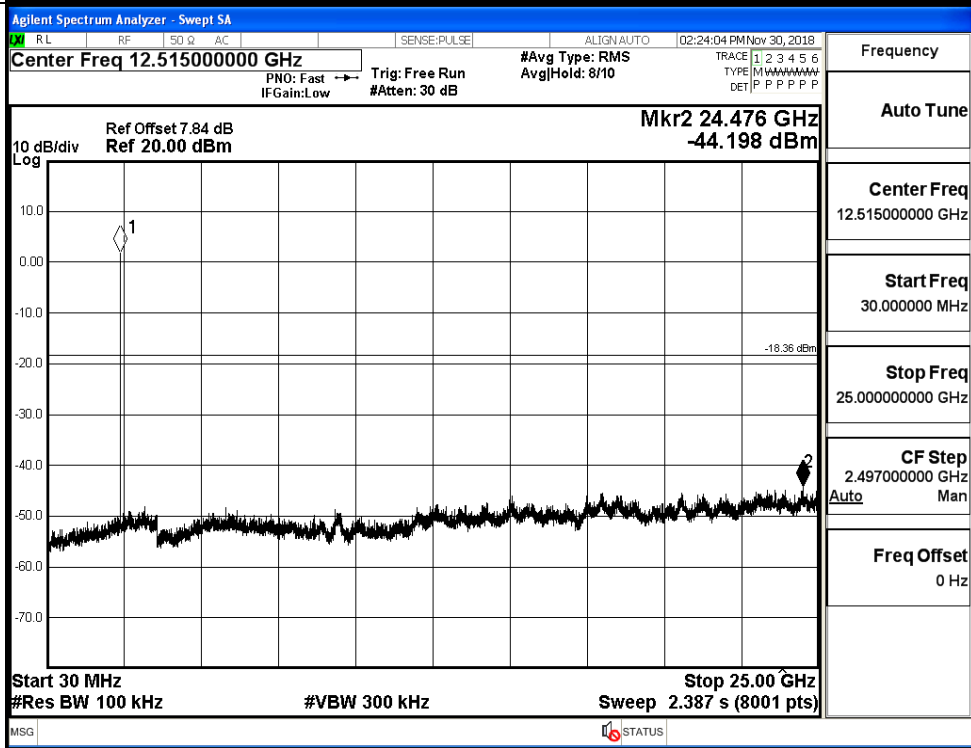
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	1.642	-44.198	-18.358	PASS
BT LE	MCH	-0.253	-44.255	-20.253	PASS
BT LE	HCH	-0.225	-43.579	-20.225	PASS

BT LE_LCH_Graphs

Pref/BT LE/LCH

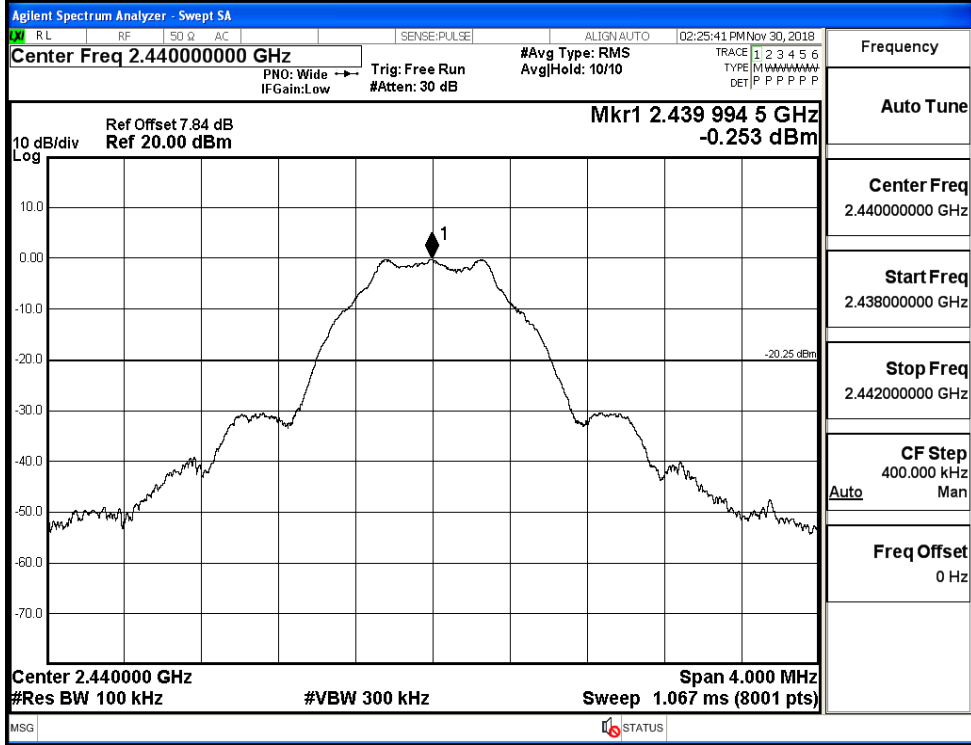


Puw/BT LE/LCH

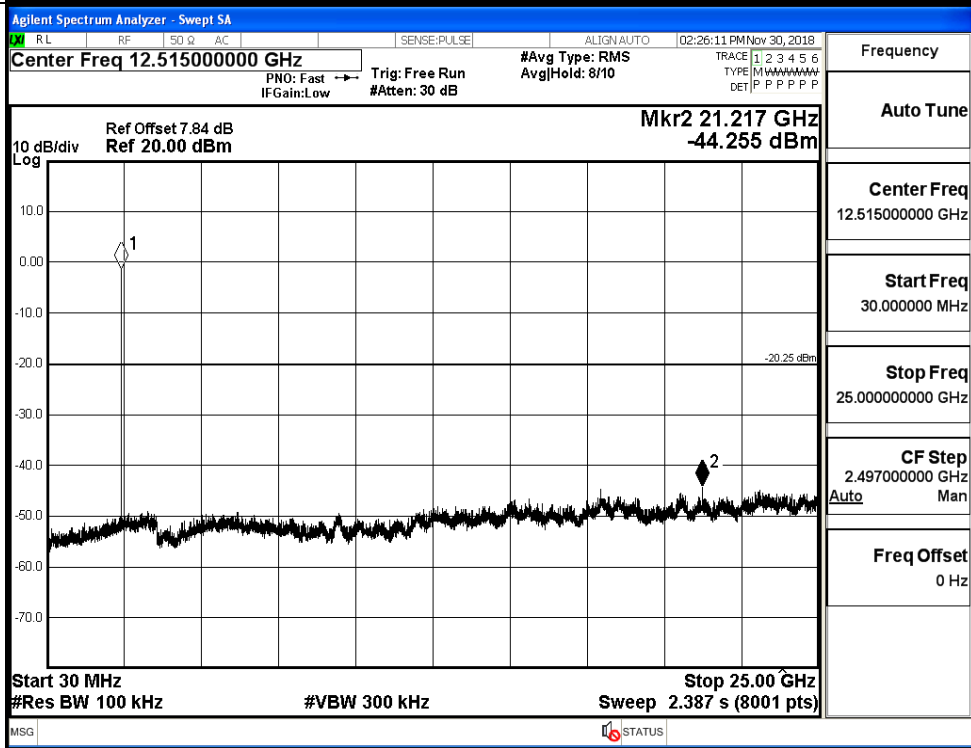


BT LE_MCH_Graphs

Pref/BT LE/MCH

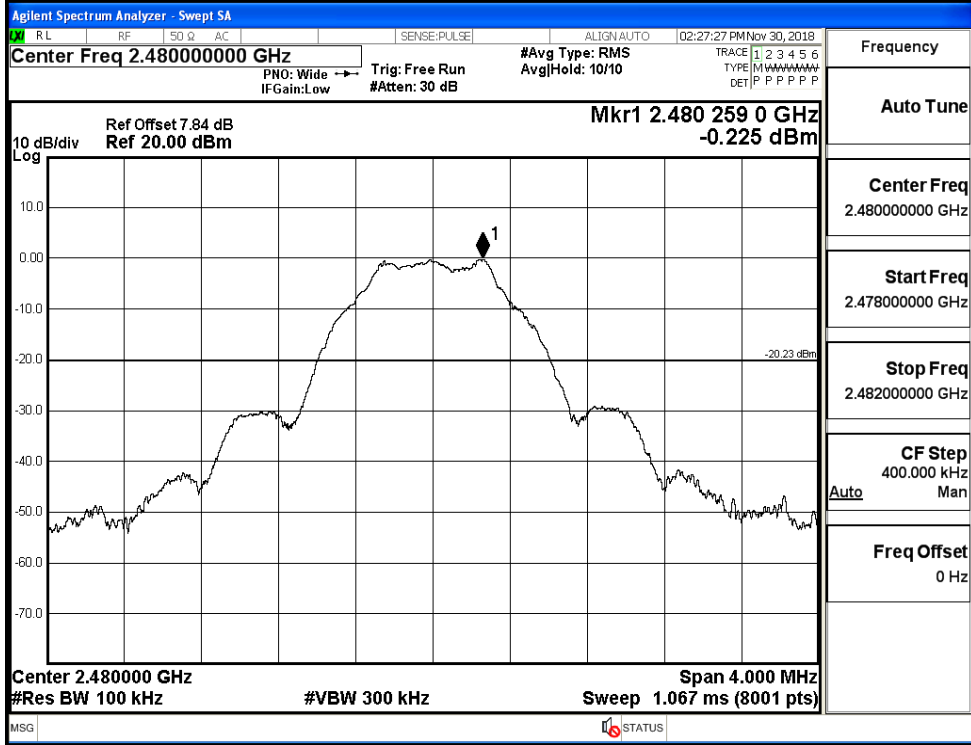


Puw/BT LE/MCH

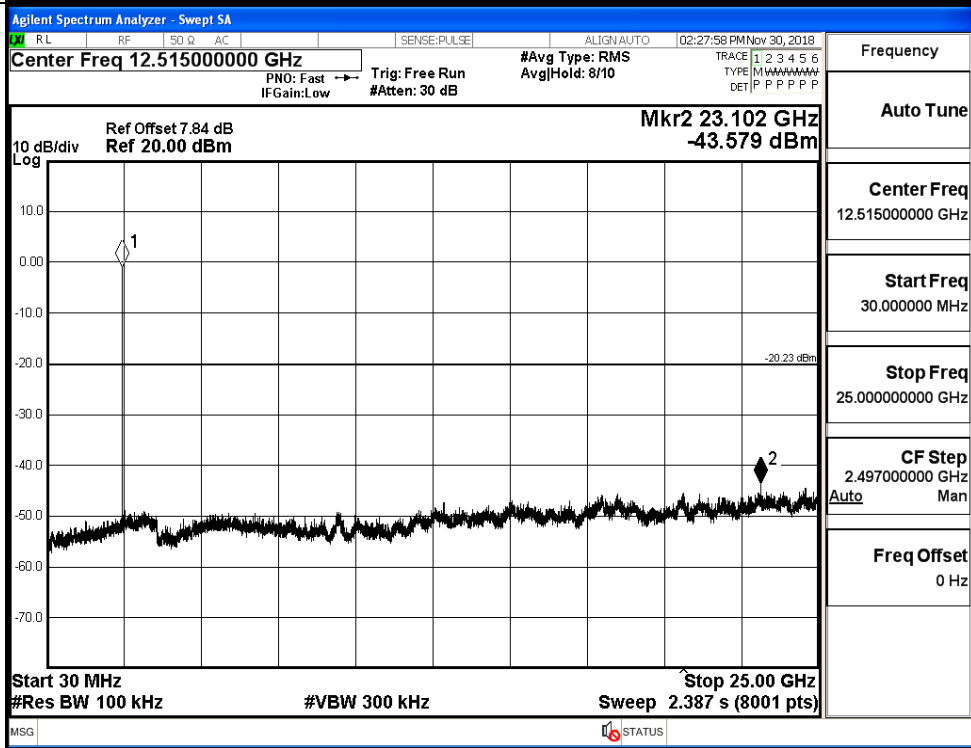


BT LE_HCH_Graphs

Pref/BT LE/HCH



Puw/BT LE/HCH



B.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	1.815	-49.993	-18.19	PASS
BT LE	HCH	0.054	-49.345	-19.95	PASS

Test Graphs

LCH

Agilent Spectrum Analyzer - Swept SA
 Center Freq 2.35700000 GHz
 Mkr4 2.387 597 GHz -49.993 dBm
 Start 2.31000 GHz Stop 2.40400 GHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 9.067 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.401 756 GHz	1.815 dBm			
2	N	f		2.400 000 GHz	-52.125 dBm			
3	N	f		2.390 000 GHz	-52.923 dBm			
4	N	f		2.387 597 GHz	-49.993 dBm			

Frequency

Auto Tune

Center Freq
2.35700000 GHz

Start Freq
2.31000000 GHz

Stop Freq
2.40400000 GHz

CF Step
9.400000 MHz

Freq Offset
0 Hz

HCH

Agilent Spectrum Analyzer - Swept SA
 Center Freq 2.48900000 GHz
 Mkr4 2.486 956 75 GHz -49.345 dBm
 Start 2.47800 GHz Stop 2.50000 GHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 2.133 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.480 246 75 GHz	0.054 dBm			
2	N	f		2.483 500 00 GHz	-52.212 dBm			
3	N	f		2.500 000 00 GHz	-53.483 dBm			
4	N	f		2.486 956 75 GHz	-49.345 dBm			

Frequency

Auto Tune

Center Freq
2.48900000 GHz

Start Freq
2.47800000 GHz

Stop Freq
2.50000000 GHz

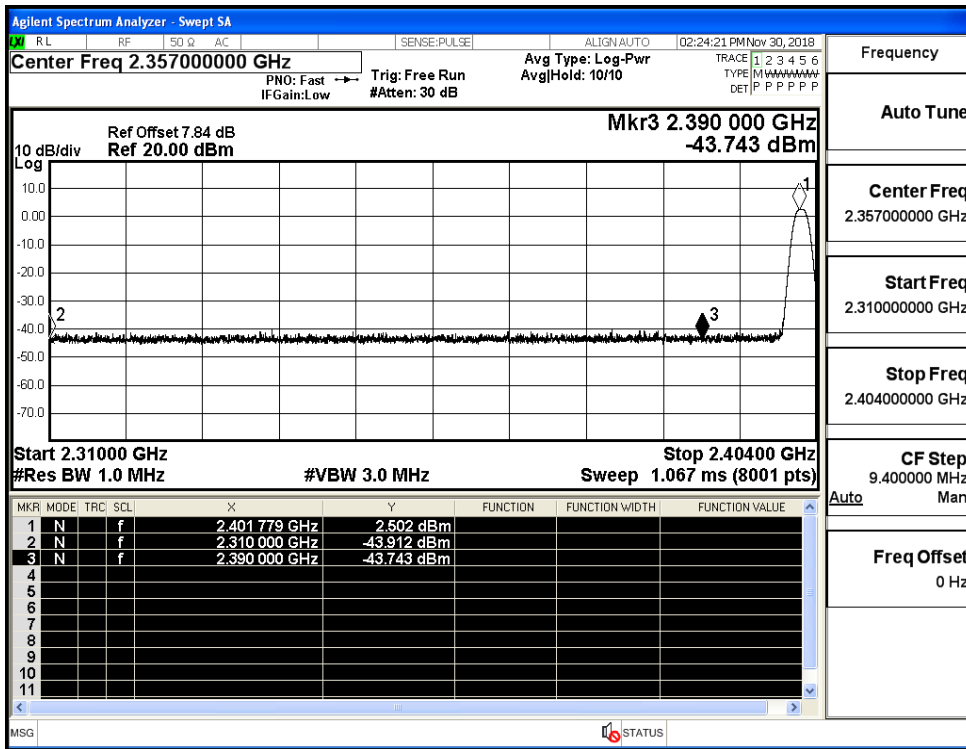
CF Step
2.200000 MHz

Freq Offset
0 Hz

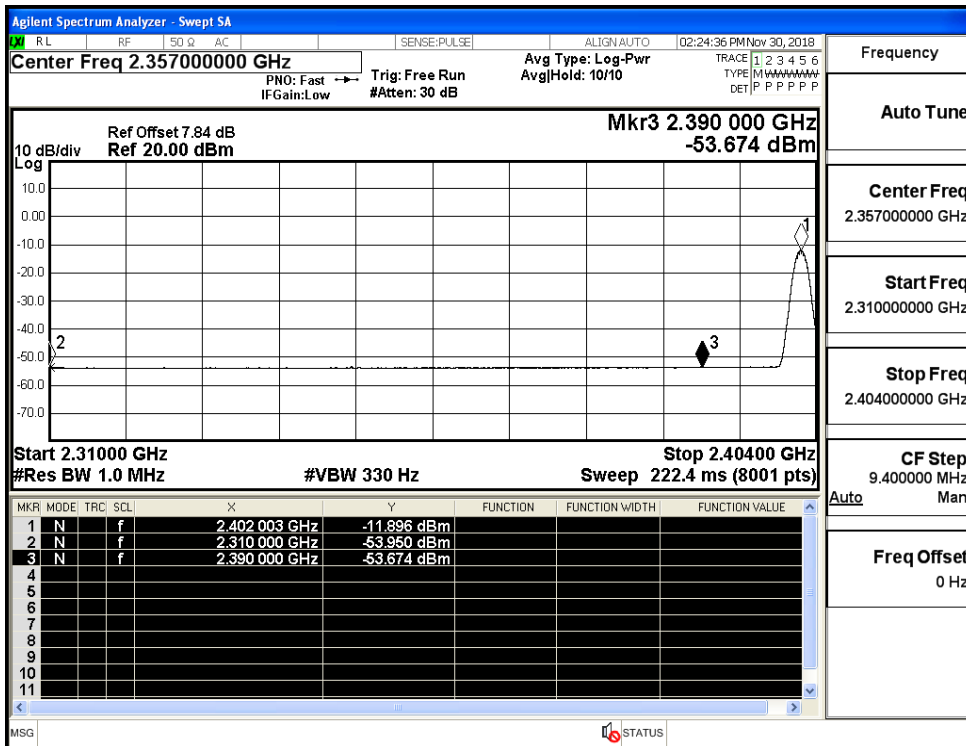
B.7 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
BT LE	2402	Ant1	2310.0	-43.91	2.0	0	53.35	PEAK	74	PASS
		Ant1	2310.0	-53.95	2.0	0	43.31	AV	54	PASS
		Ant1	2390.0	-43.74	2.0	0	53.51	PEAK	74	PASS
		Ant1	2390.0	-53.67	2.0	0	43.58	AV	54	PASS
	2480	Ant1	2483.5	-41.22	2.0	0	56.04	PEAK	74	PASS
		Ant1	2483.5	-52.85	2.0	0	44.41	AV	54	PASS
		Ant1	2500.0	-43.84	2.0	0	53.42	PEAK	74	PASS
		Ant1	2500.0	-53.20	2.0	0	44.06	AV	54	PASS

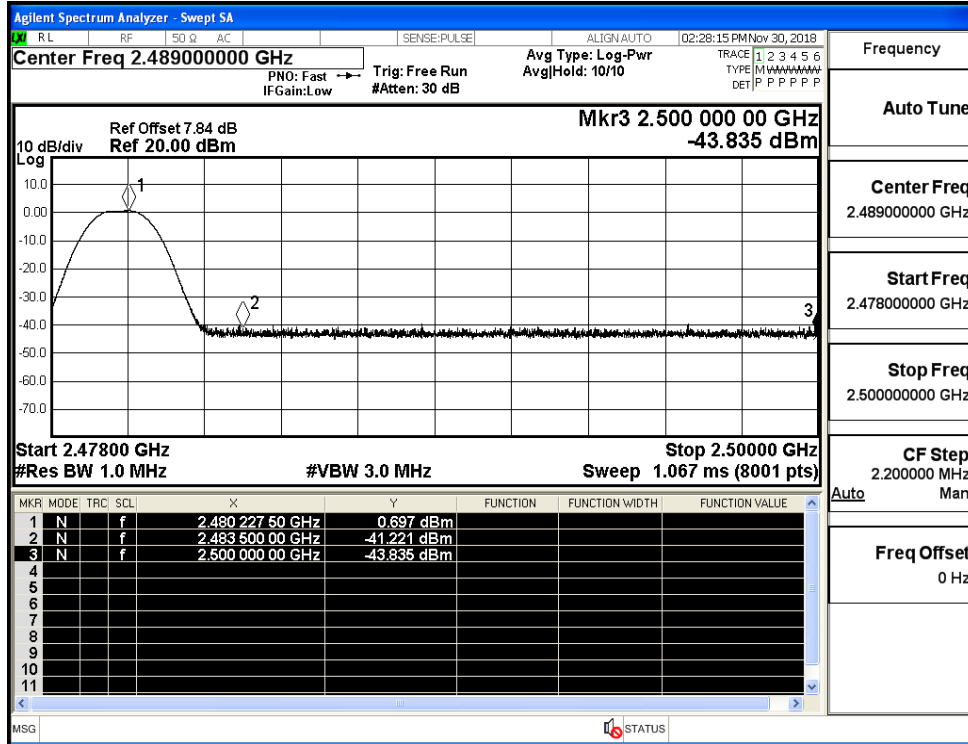
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

