

Appendix B

RF Test Data for BT V5.0 (Conducted Measurement)

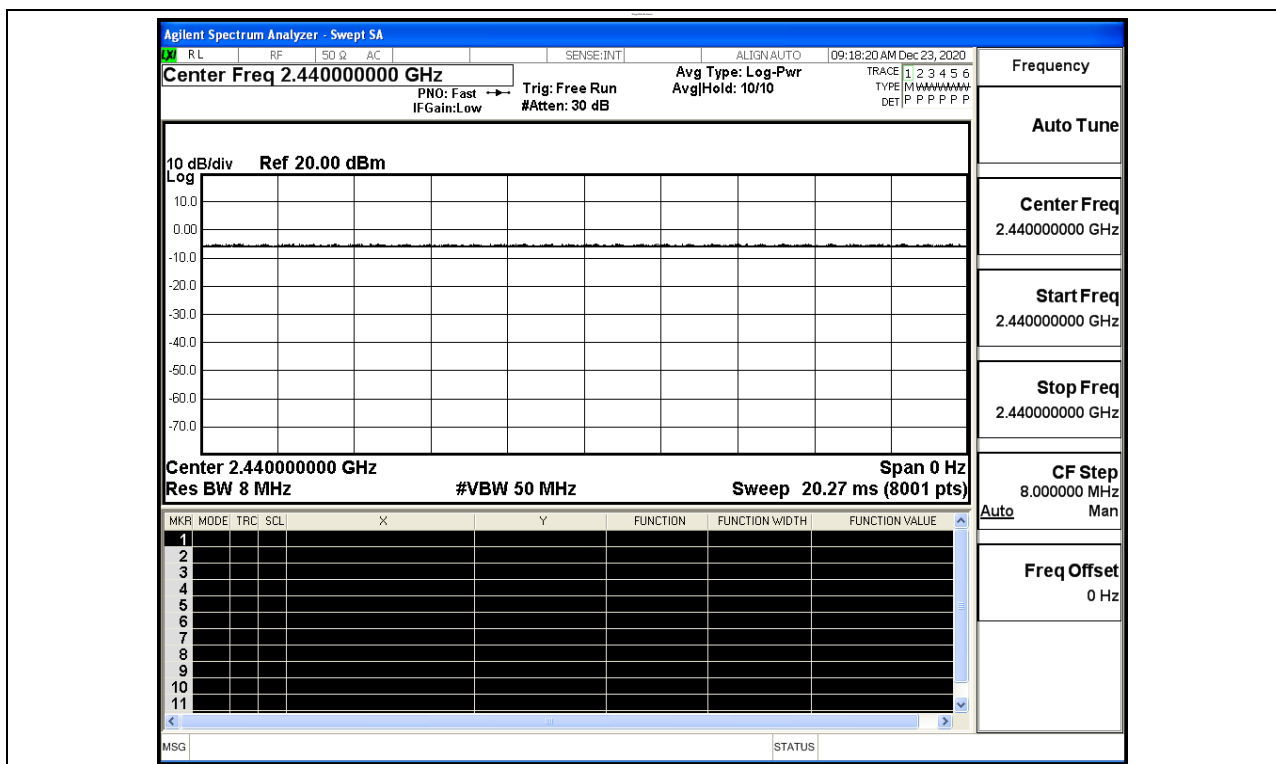
Product Name: Atmosic BLE module
Trade Mark: N/A
Test Model: GTI-ATM2022-1M

Environmental Conditions

Temperature:	23.5 ° C
Relative Humidity:	53.6%
ATM Pressure:	101.0 kPa
Test Engineer:	Ken He
Supervised by:	Li Huan

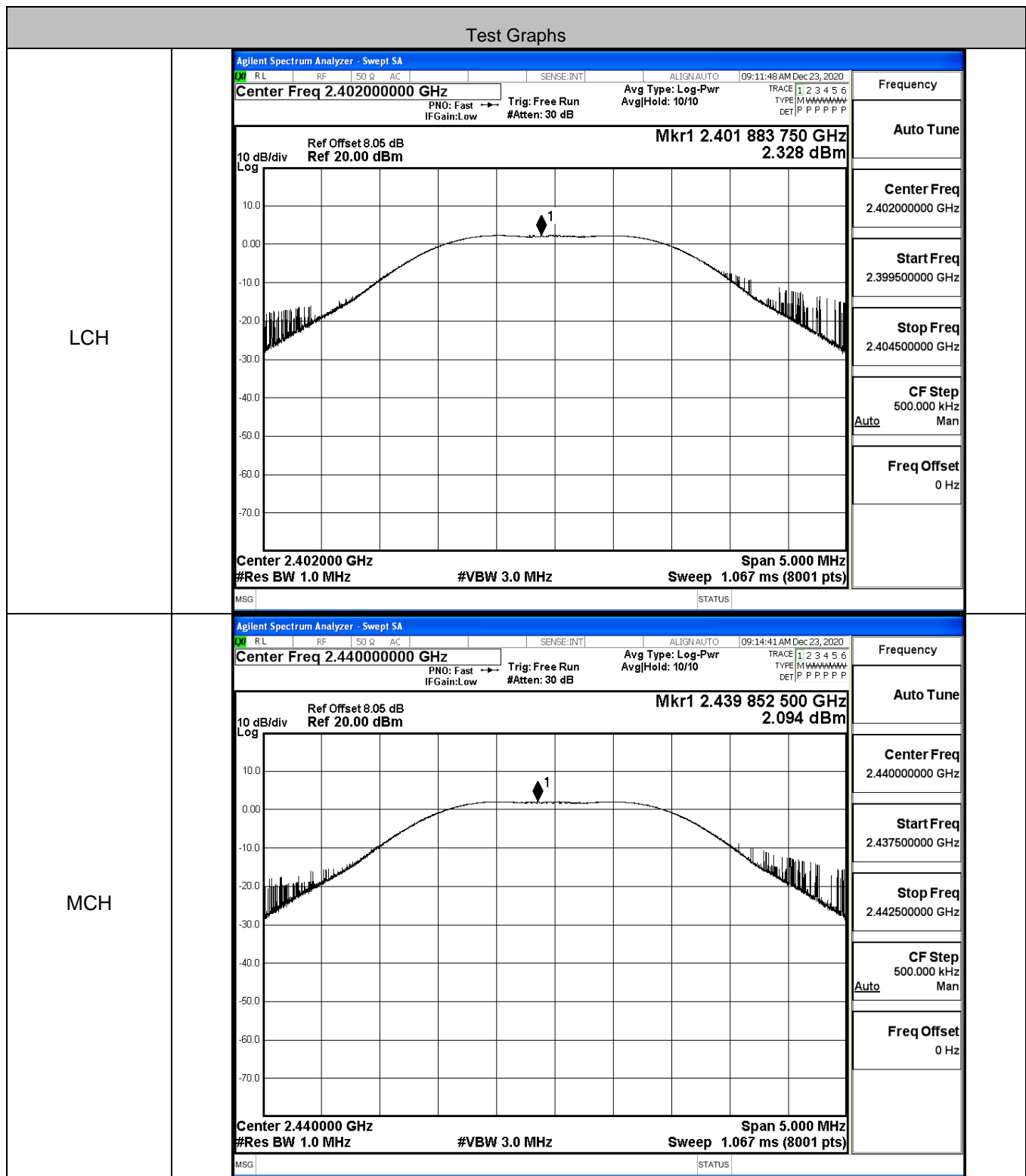
B.1 Duty Cycle

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BT 2LE	2440	Ant1	100	PASS

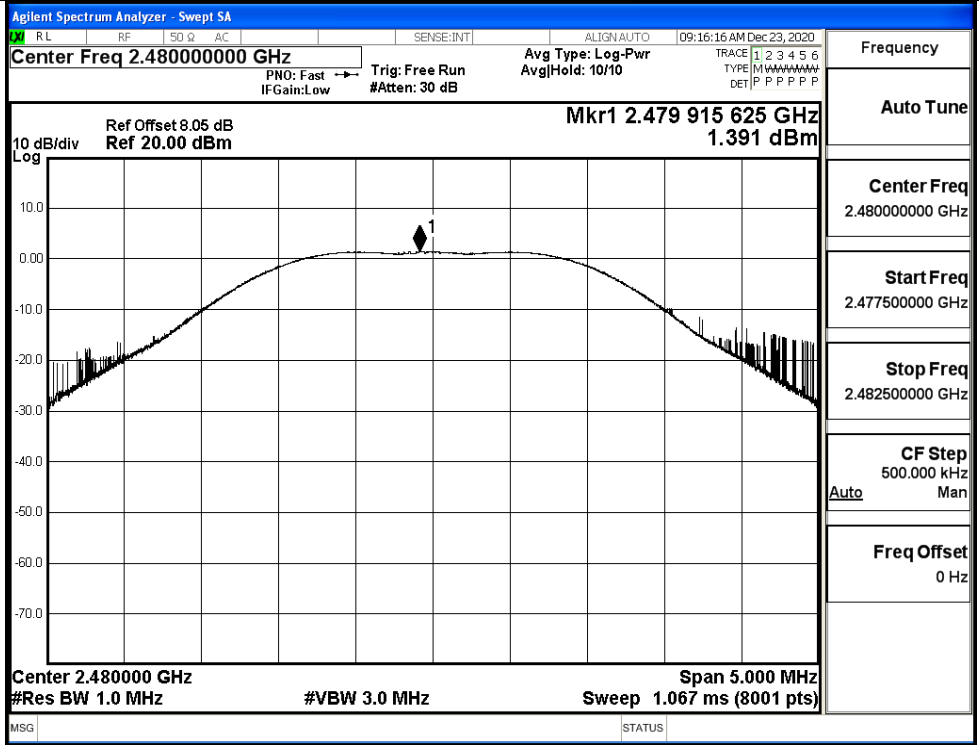


B.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT 2LE	LCH	2.328	30	PASS
BT 2LE	MCH	2.094	30	PASS
BT 2LE	HCH	1.391	30	PASS

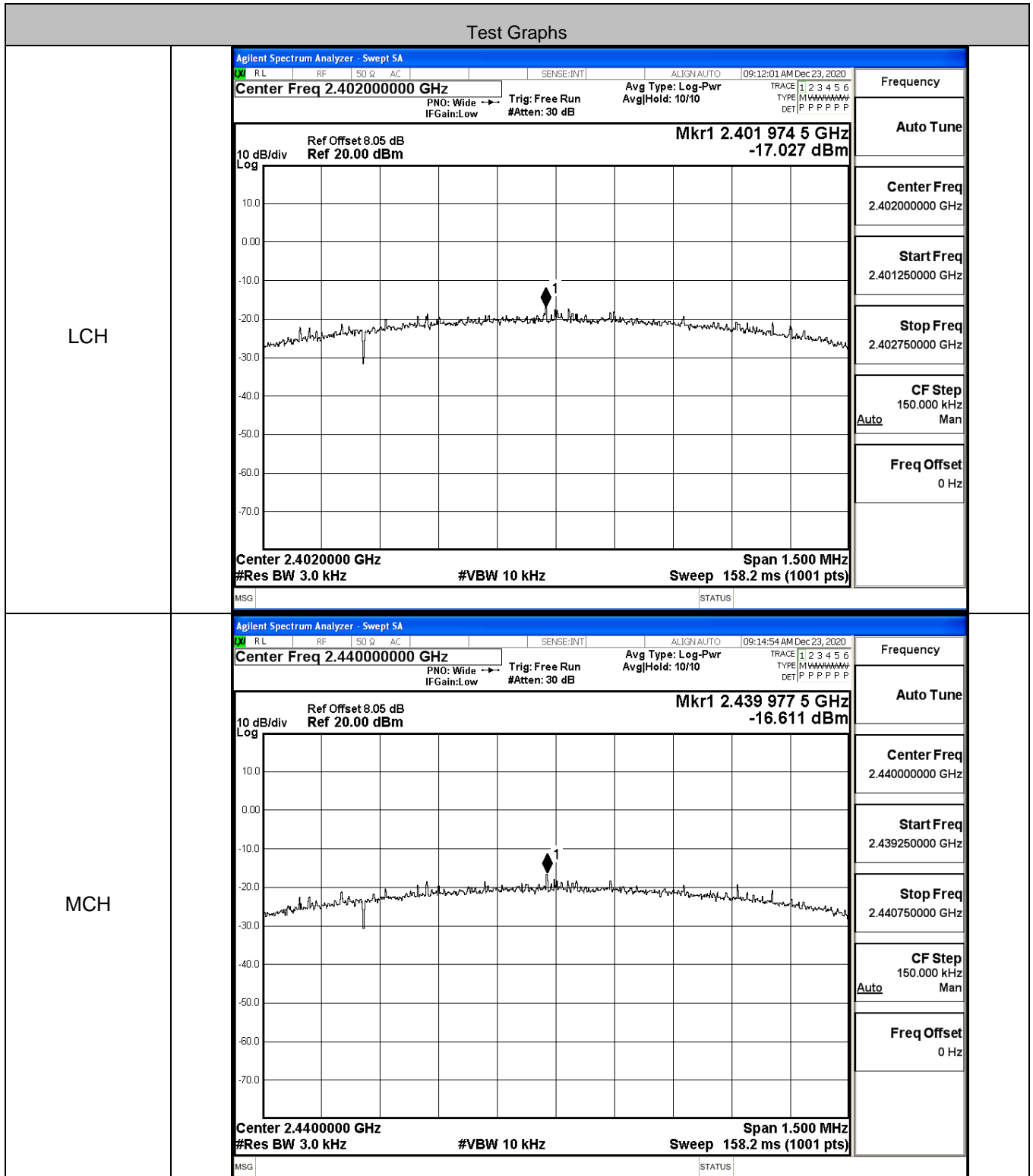


HCH

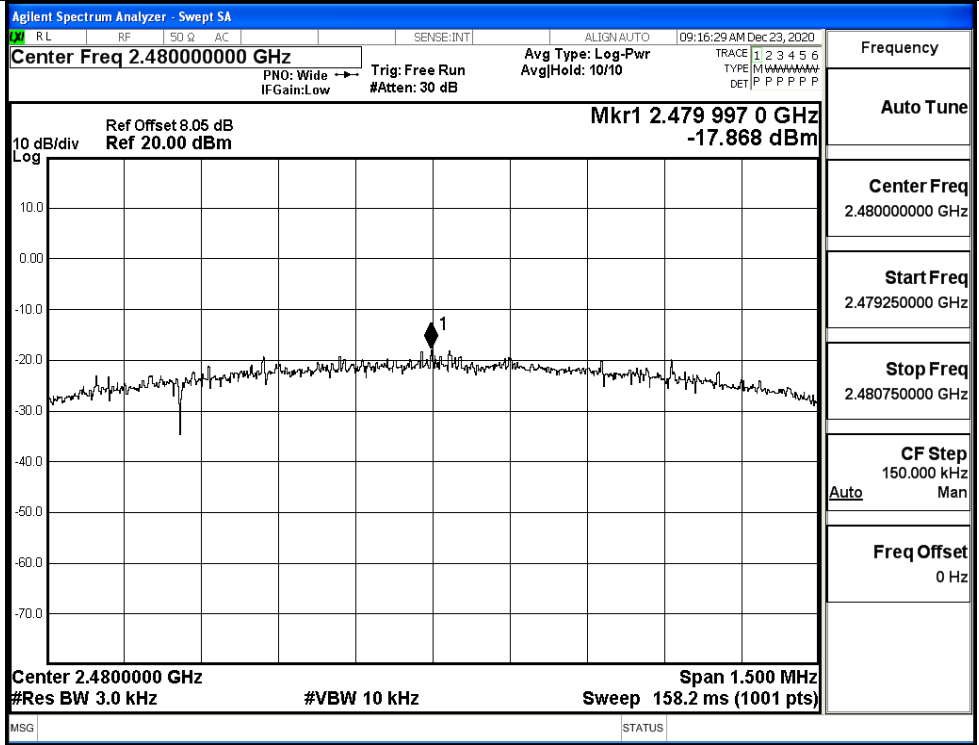


B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT 2LE	LCH	-17.027	8	PASS
BT 2LE	MCH	-16.611	8	PASS
BT 2LE	HCH	-17.868	8	PASS

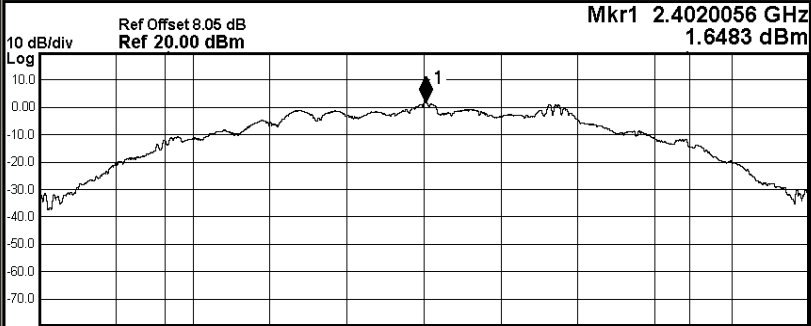
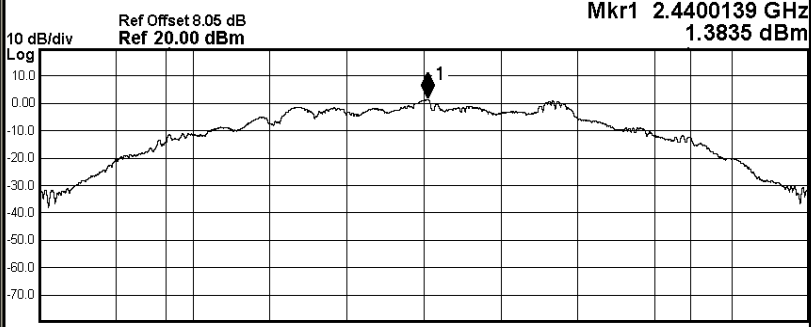


HCH

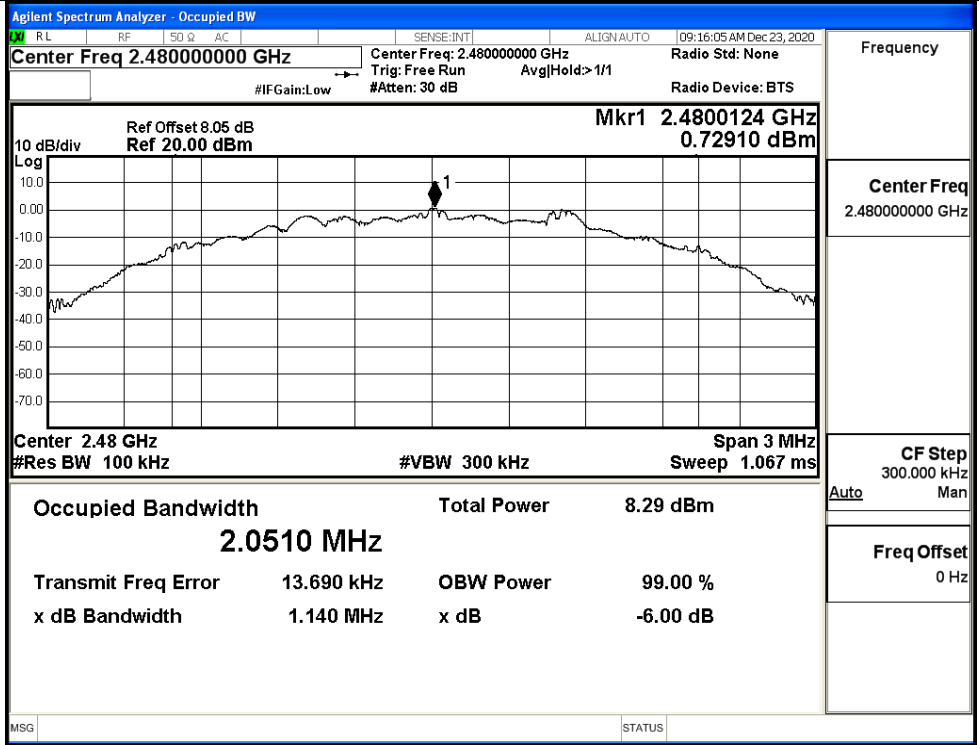


B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT 2LE	LCH	1.142	≥0.5	PASS
BT 2LE	MCH	1.136	≥0.5	PASS
BT 2LE	HCH	1.140	≥0.5	PASS

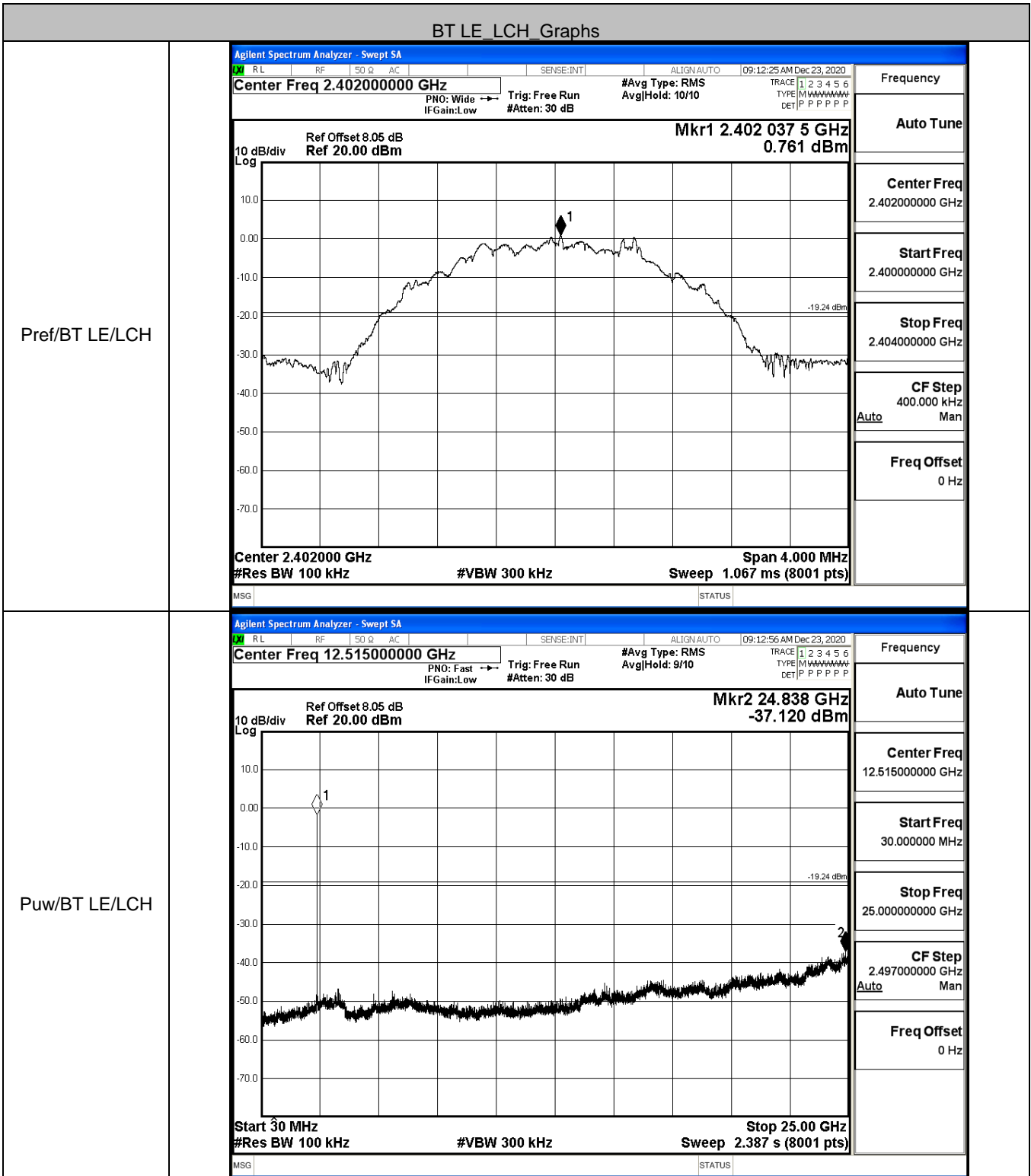
Test Graphs																									
LCH	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: small; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: x-small; margin: 0;">RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 09:11:37 AM Dec 23, 2020</p> <p style="font-size: 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;">Trig: Free Run AvgHold: >1/1</p> <p style="font-size: x-small; margin: 0;">#IFGain: Low #Atten: 30 dB Radio Device: BTS</p>  <p style="font-size: 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 border="0" style="width: 100%; font-size: small;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>9.25 dBm</td> </tr> <tr> <td style="text-align: center;">2.0444 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>12.949 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>1.142 MHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p style="font-size: x-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 09:14:30 AM Dec 23, 2020</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;">Trig: Free Run AvgHold: 1/1</p> <p style="font-size: x-small; margin: 0;">#IFGain: Low #Atten: 30 dB Radio Device: BTS</p>  <p style="font-size: 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 border="0" style="width: 100%; font-size: small;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>8.99 dBm</td> </tr> <tr> <td style="text-align: center;">2.0405 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>16.952 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>1.136 MHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	9.25 dBm	2.0444 MHz			Transmit Freq Error	12.949 kHz	OBW Power 99.00 %	x dB Bandwidth	1.142 MHz	x dB -6.00 dB	Occupied Bandwidth	Total Power	8.99 dBm	2.0405 MHz			Transmit Freq Error	16.952 kHz	OBW Power 99.00 %	x dB Bandwidth	1.136 MHz	x dB -6.00 dB
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HCH



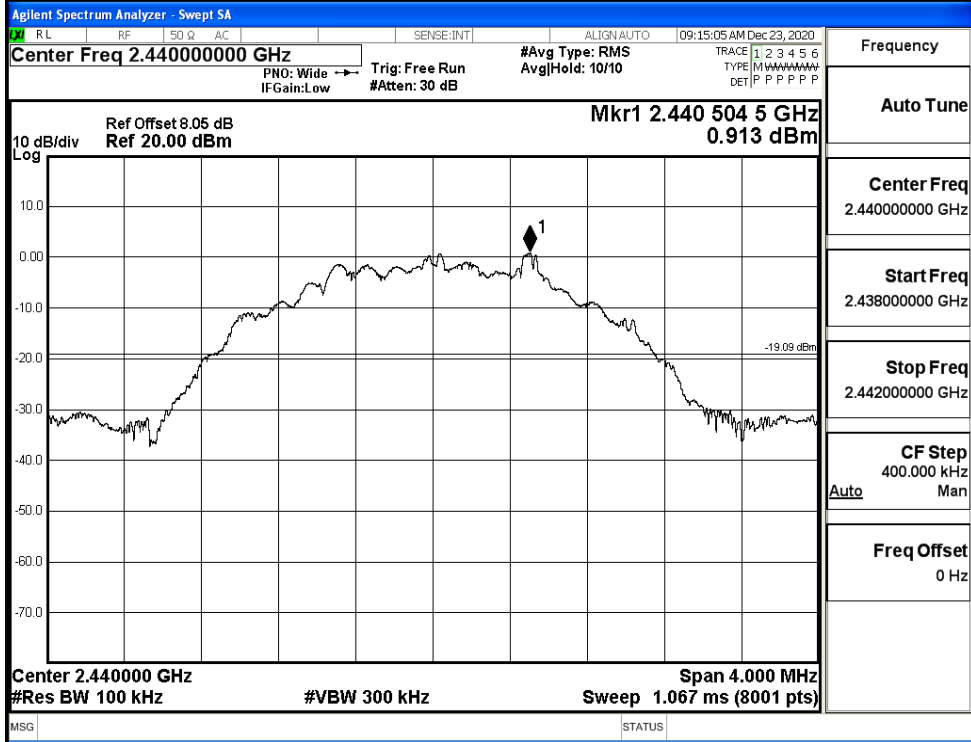
B.5 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT 2LE	LCH	0.761	-37.120	-19.239	PASS
BT 2LE	MCH	0.913	-36.639	-19.087	PASS
BT 2LE	HCH	0.752	-37.205	-19.248	PASS

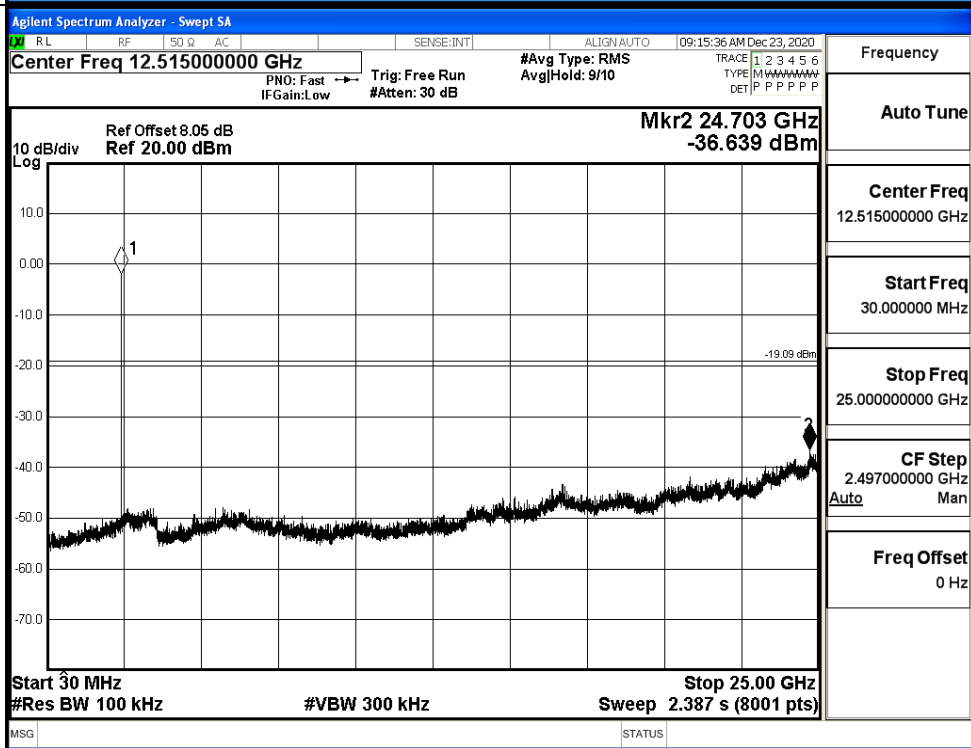


BT LE_MCH_Graphs

Pref/BT LE/MCH

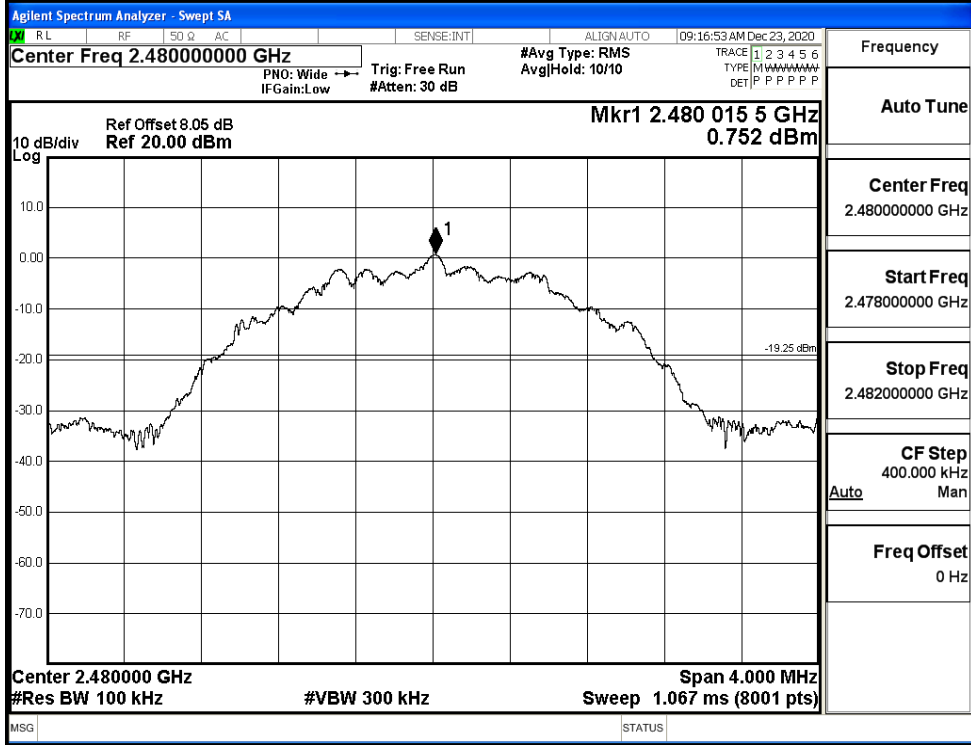


Puw/BT LE/MCH

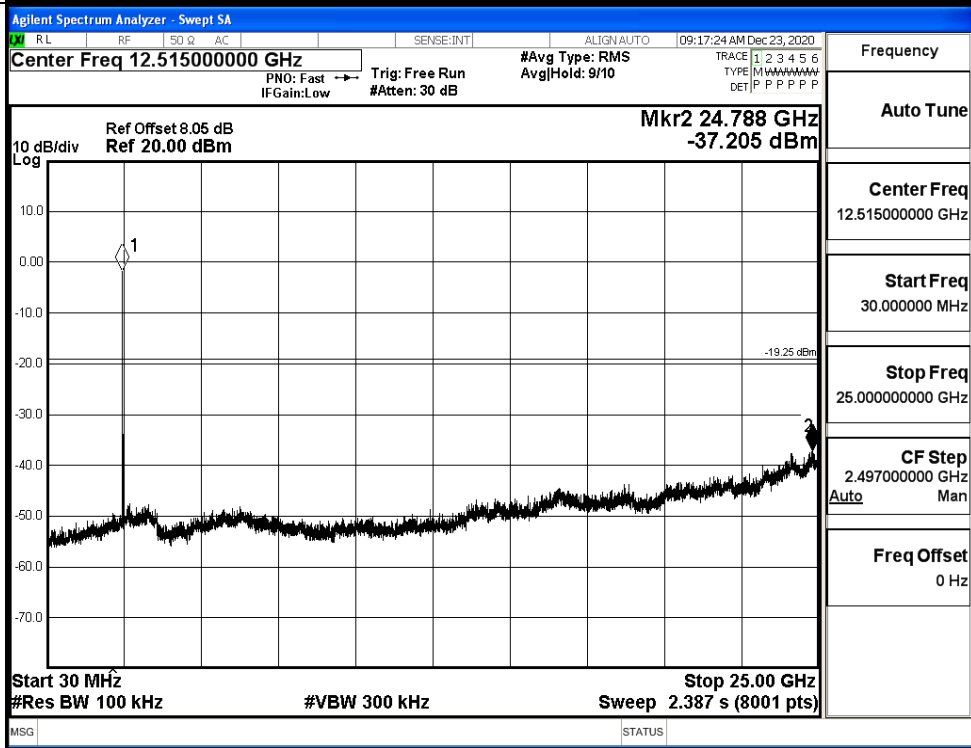


BT LE_HCH_Graphs

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 2LE	LCH	0.021	-48.497	-19.98	PASS
BT 2LE	HCH	0.913	-39.292	-19.09	PASS

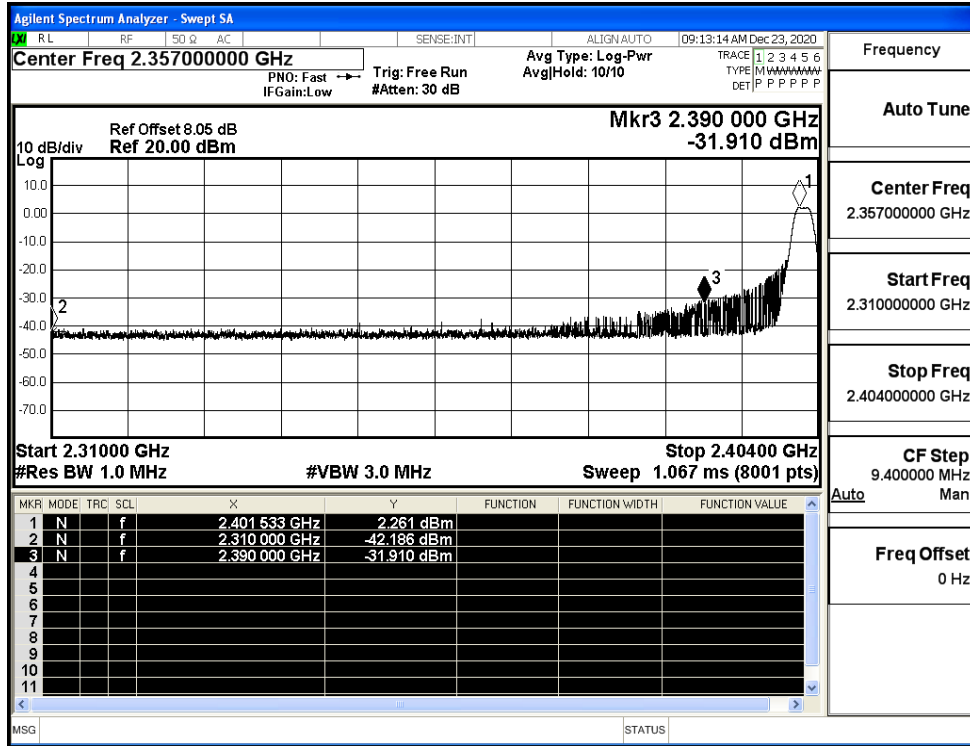
Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.35700000 GHz #Ave Type: RMS AvgHold: 10/10 Mkr4 2.387 750 GHz -48.497 dBm 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>2.402 179 GHz</td><td>0.021 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>-32.139 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>-53.078 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.387 750 GHz</td><td>-48.497 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		2.402 179 GHz	0.021 dBm				2	N	f		2.400 000 GHz	-32.139 dBm				3	N	f		2.390 000 GHz	-53.078 dBm				4	N	f		2.387 750 GHz	-48.497 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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HCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.48900000 GHz #Ave Type: RMS AvgHold: 10/10 Mkr4 2.483 519 25 GHz -39.292 dBm 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>2.480 010 25 GHz</td><td>0.913 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>-40.794 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>-51.321 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.483 519 25 GHz</td><td>-39.292 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		2.480 010 25 GHz	0.913 dBm				2	N	f		2.483 500 00 GHz	-40.794 dBm				3	N	f		2.500 000 00 GHz	-51.321 dBm				4	N	f		2.483 519 25 GHz	-39.292 dBm				Frequency Auto Tune Center Freq 2.489000000 GHz Start Freq 2.478000000 GHz Stop Freq 2.500000000 GHz CF Step 2.200000 MHz Freq Offset 0 Hz
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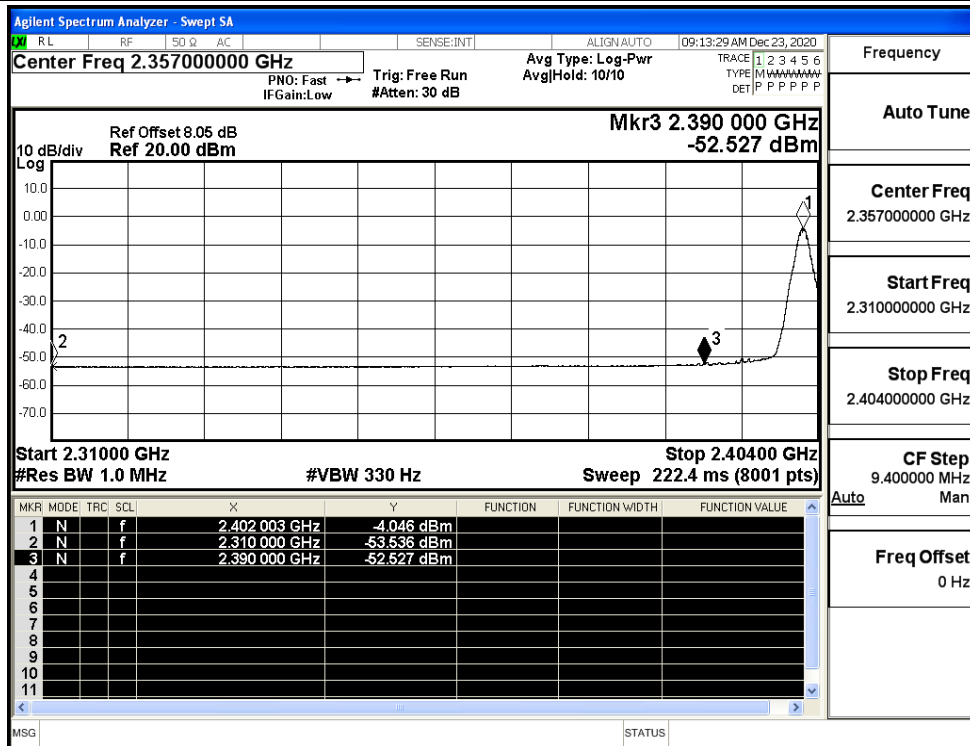
B.7 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
BT 2LE	2402	Ant1	2310.0	-42.19	2.0	0	55.04	PEAK	74	PASS
		Ant1	2310.0	-53.54	2.0	0	43.69	AV	54	PASS
		Ant1	2390.0	-31.91	2.0	0	65.32	PEAK	74	PASS
		Ant1	2390.0	-52.53	2.0	0	44.7	AV	54	PASS
	2480	Ant1	2483.5	-21.56	2.0	0	75.67	PEAK	74	PASS
		Ant1	2483.5	-49.46	2.0	0	47.77	AV	54	PASS
		Ant1	2500.0	-42.68	2.0	0	54.55	PEAK	74	PASS
		Ant1	2500.0	-52.40	2.0	0	44.83	AV	54	PASS

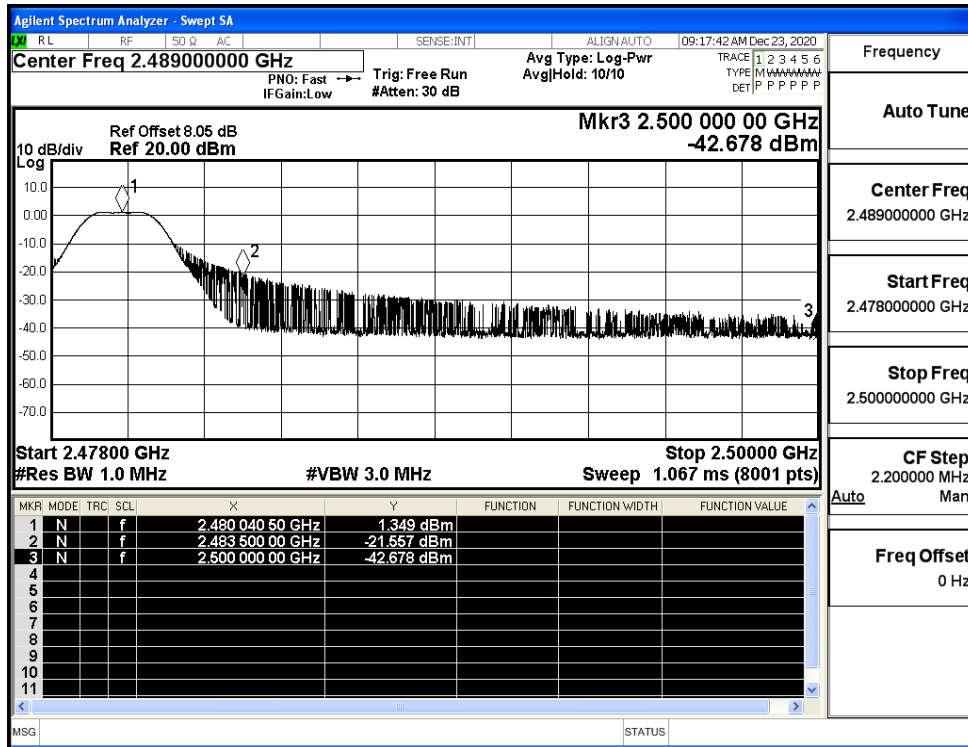
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

