

Appendix A

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

Product Name: Artemis v1

Trade Mark: Spark Fun

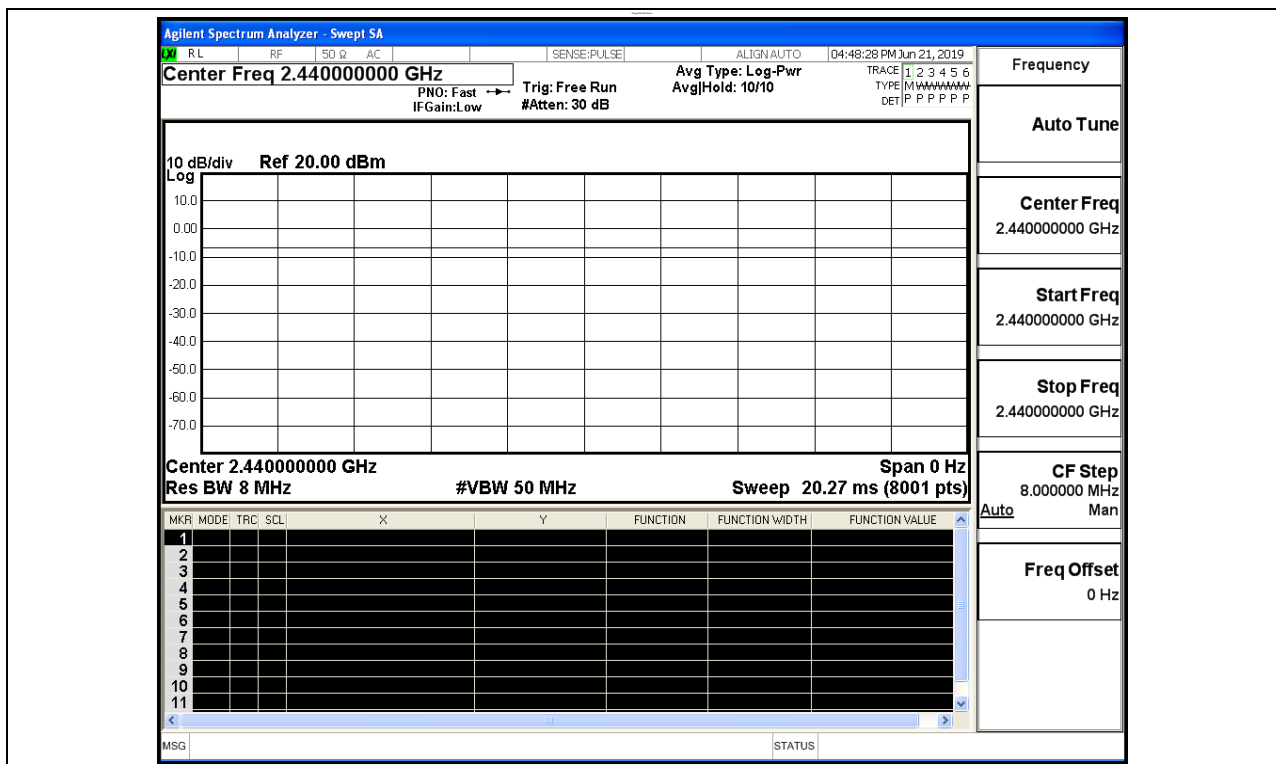
Test Model: Artemis v1

Environmental Conditions

Temperature:	24.5 ° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Tom.Liu

A.1 Duty Cycle

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

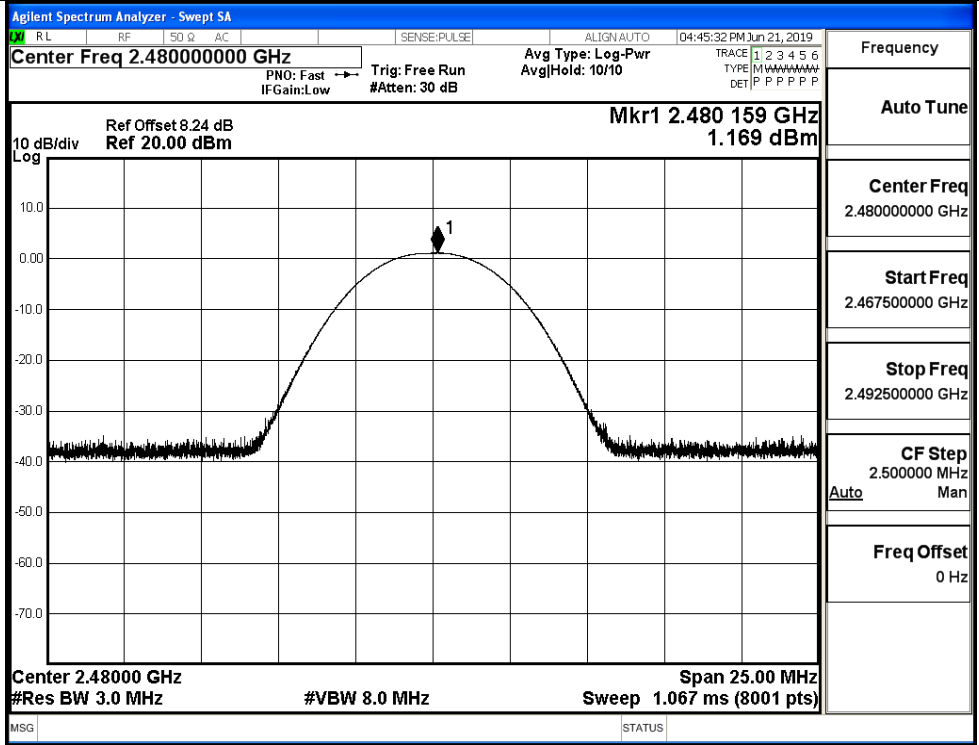


A.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	-0.584	30	PASS
BT LE	MCH	1.537	30	PASS
BT LE	HCH	1.169	30	PASS

Test Graphs	
LCH	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Agilent Spectrum Analyzer - Swept SA</p> <p style="margin: 0;">Center Freq 2.40200000 GHz Avg Type: Log-Pwr Mkr1 2.402 138 GHz PNO: Fast Trig: Free Run AvgHold: 10/10 -0.584 dBm IFGain:Low #Atten: 30 dB</p> <p style="margin: 0;">Ref Offset 8.24 dB Ref 20.00 dBm</p> <p style="margin: 0;">Center 2.40200 GHz Span 25.00 MHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> </div>
MCH	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Agilent Spectrum Analyzer - Swept SA</p> <p style="margin: 0;">Center Freq 2.44000000 GHz Avg Type: Log-Pwr Mkr1 2.440 059 GHz PNO: Fast Trig: Free Run AvgHold: 10/10 1.537 dBm IFGain:Low #Atten: 30 dB</p> <p style="margin: 0;">Ref Offset 8.24 dB Ref 20.00 dBm</p> <p style="margin: 0;">Center 2.44000 GHz Span 25.00 MHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> </div>

HCH



A.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-15.696	8	PASS
BT LE	MCH	-13.593	8	PASS
BT LE	HCH	-13.669	8	PASS

Test Graphs

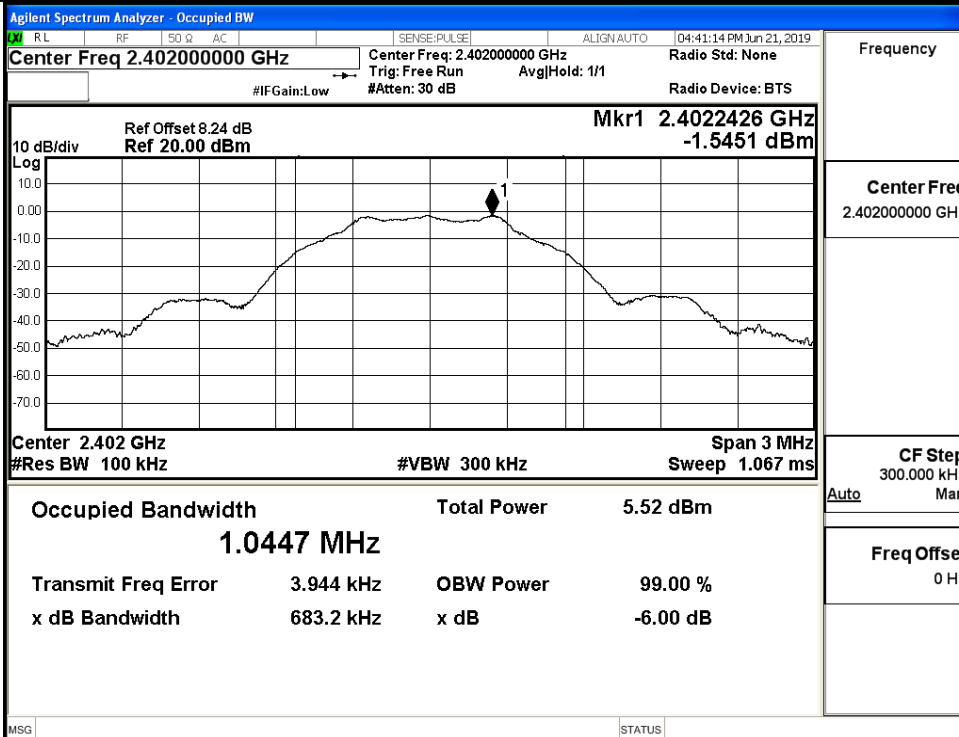
LCH	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.40200000 GHz</p> <p>Mkr1 2.401 974 5 GHz -15.696 dBm</p> <p>Ref Offset 8.24 dB Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 2.4020000 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 1.500 MHz Sweep 158.2 ms (1001 pts)</p>	<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.40200000 GHz</p> <p>Start Freq 2.401250000 GHz</p> <p>Stop Freq 2.402750000 GHz</p> <p>CF Step 150.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
MCH	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.44000000 GHz</p> <p>Mkr1 2.439 974 5 GHz -13.593 dBm</p> <p>Ref Offset 8.24 dB Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 2.4400000 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 1.500 MHz Sweep 158.2 ms (1001 pts)</p>	<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.440000000 GHz</p> <p>Start Freq 2.439250000 GHz</p> <p>Stop Freq 2.440750000 GHz</p> <p>CF Step 150.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>

A.4 6dB Bandwidth

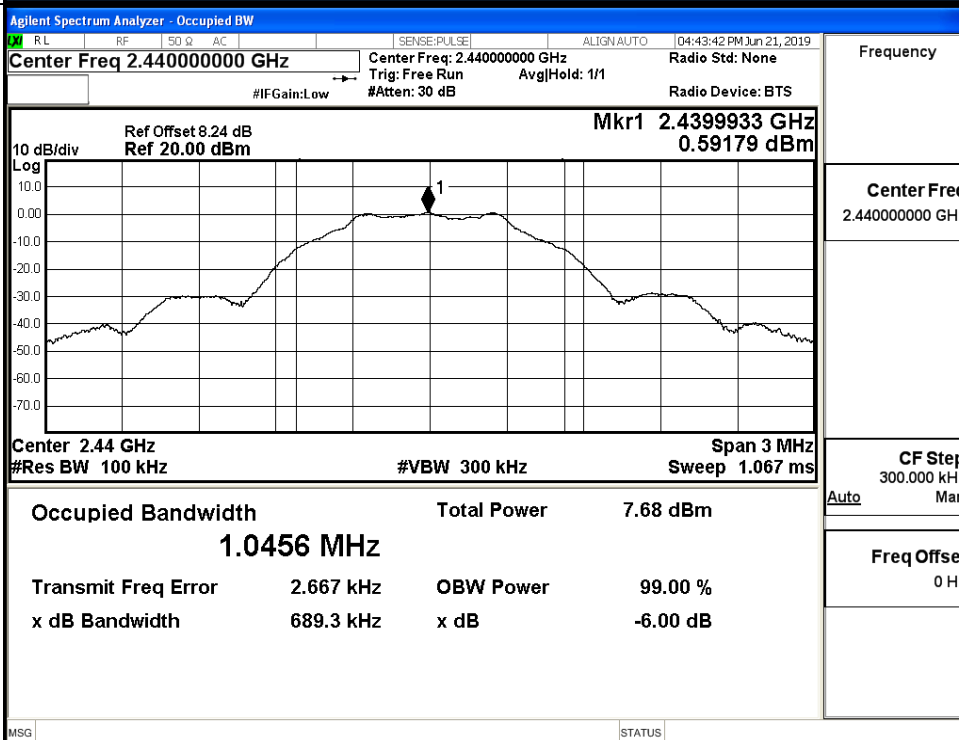
Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6832	≥0.5	PASS
BT LE	MCH	0.6893	≥0.5	PASS
BT LE	HCH	0.6916	≥0.5	PASS

Test Graphs

LCH



MCH



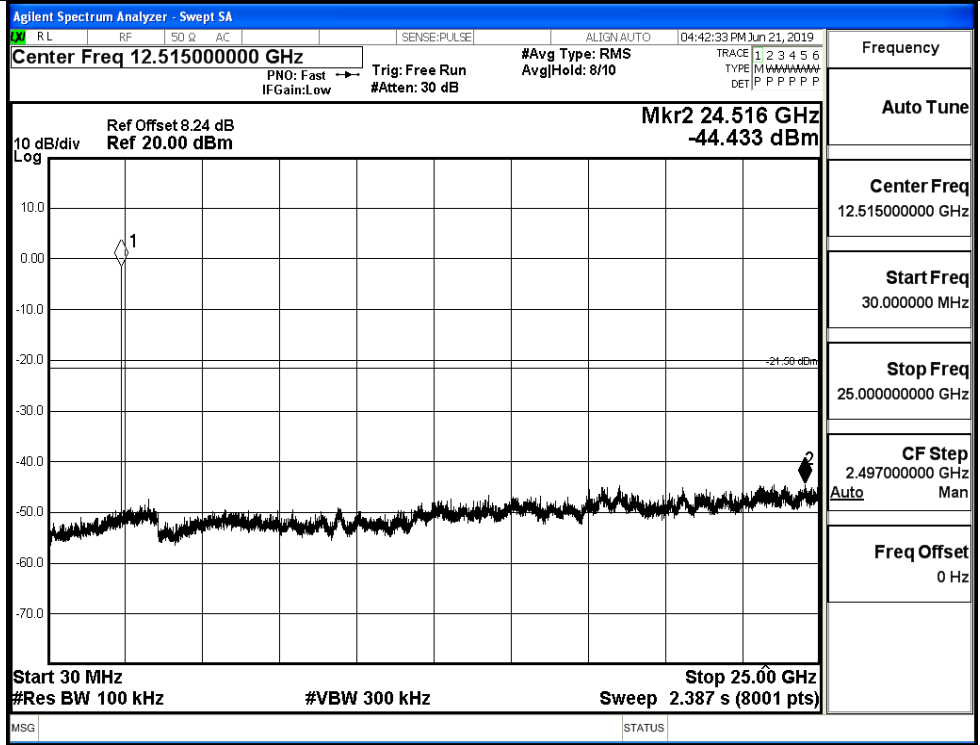
A.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0351	≥0.5	PASS
BT LE	MCH	1.0332	≥0.5	PASS
BT LE	HCH	1.0319	≥0.5	PASS

Test Graphs

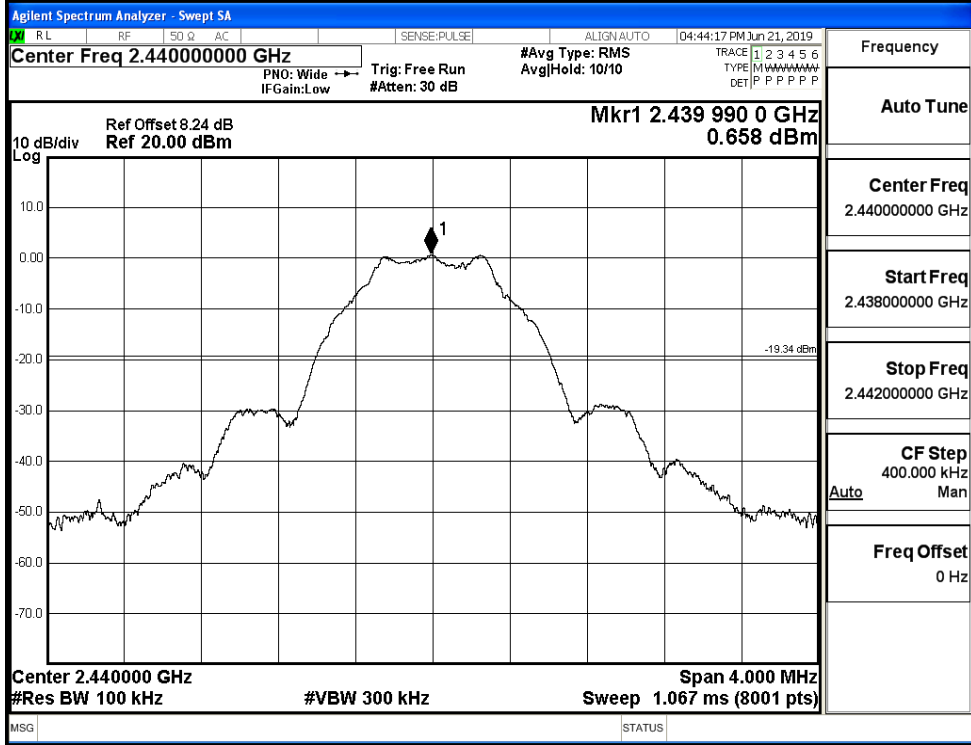
LCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz</p> <p>Center Freq: 2.40200000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB</p> <p>Ref Offset 8.24 dB Ref 20.00 dBm</p> <p>Center 2.402 GHz #Res BW 30 kHz</p> <p>Span 4 MHz Sweep 4.267 ms</p> <p>Occupied Bandwidth 1.0351 MHz</p> <p>Total Power 5.51 dBm</p> <p>Transmit Freq Error 7.904 kHz x dB Bandwidth 660.8 kHz</p> <p>OBW Power 99.00 % x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 400.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
	<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>Ref Offset 8.24 dB Ref 20.00 dBm</p> <p>Center 2.44 GHz #Res BW 30 kHz</p> <p>Span 4 MHz Sweep 4.267 ms</p> <p>Occupied Bandwidth 1.0332 MHz</p> <p>Total Power 7.69 dBm</p> <p>Transmit Freq Error 7.565 kHz x dB Bandwidth 659.3 kHz</p> <p>OBW Power 99.00 % x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.44000000 GHz</p> <p>CF Step 400.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>

Puw/BT LE/LCH

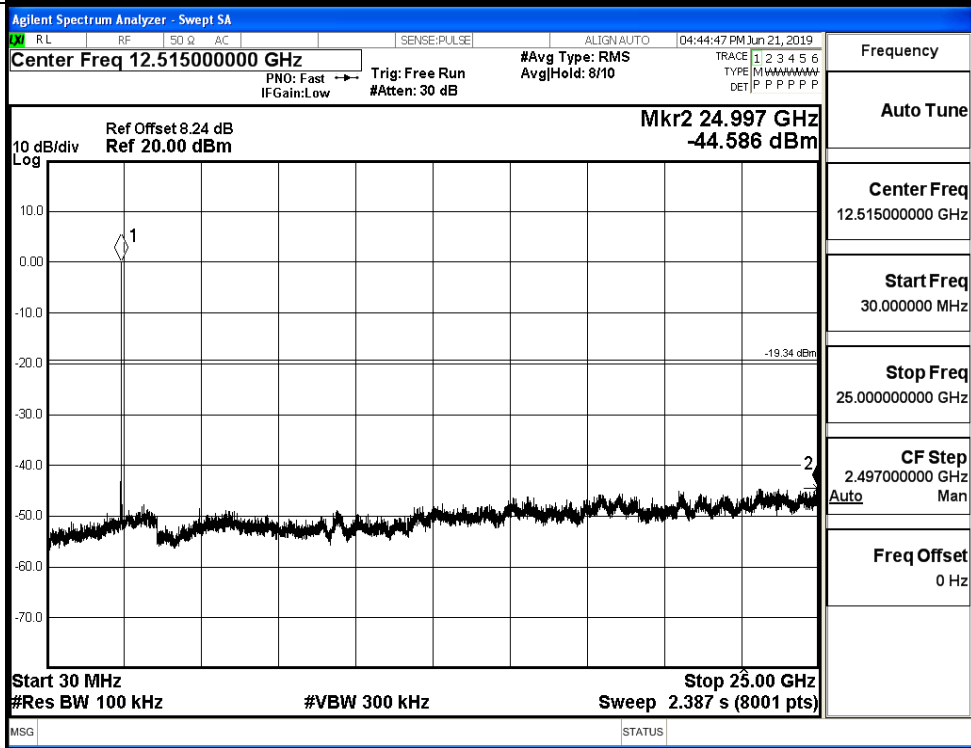


BT LE_MCH_Graphs

Pref/BT LE/MCH

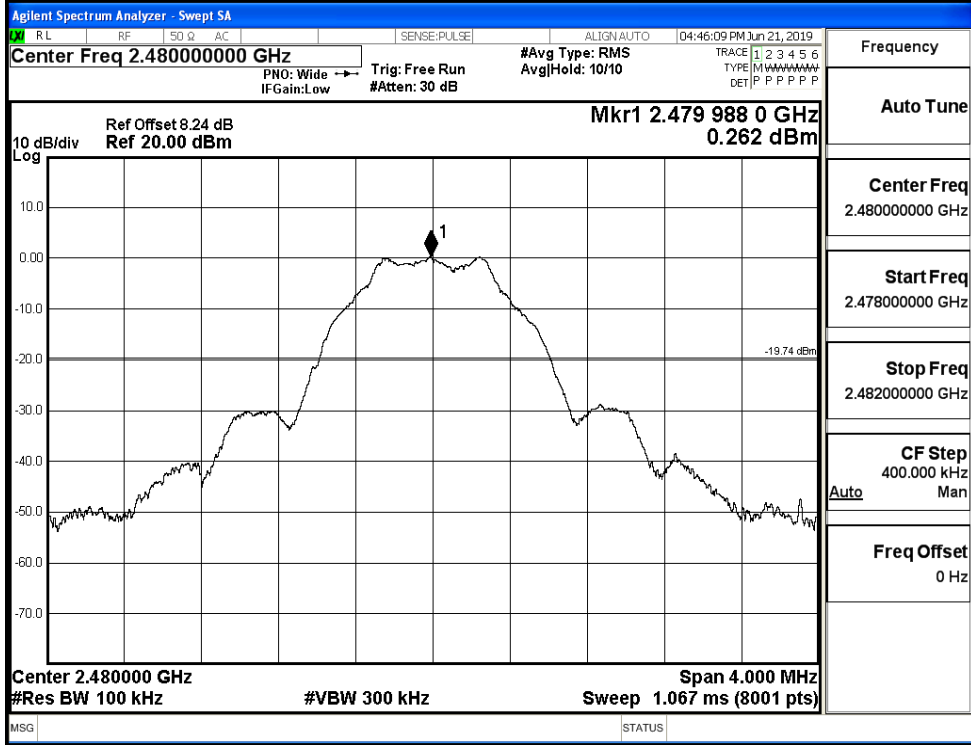


Puw/BT LE/MCH

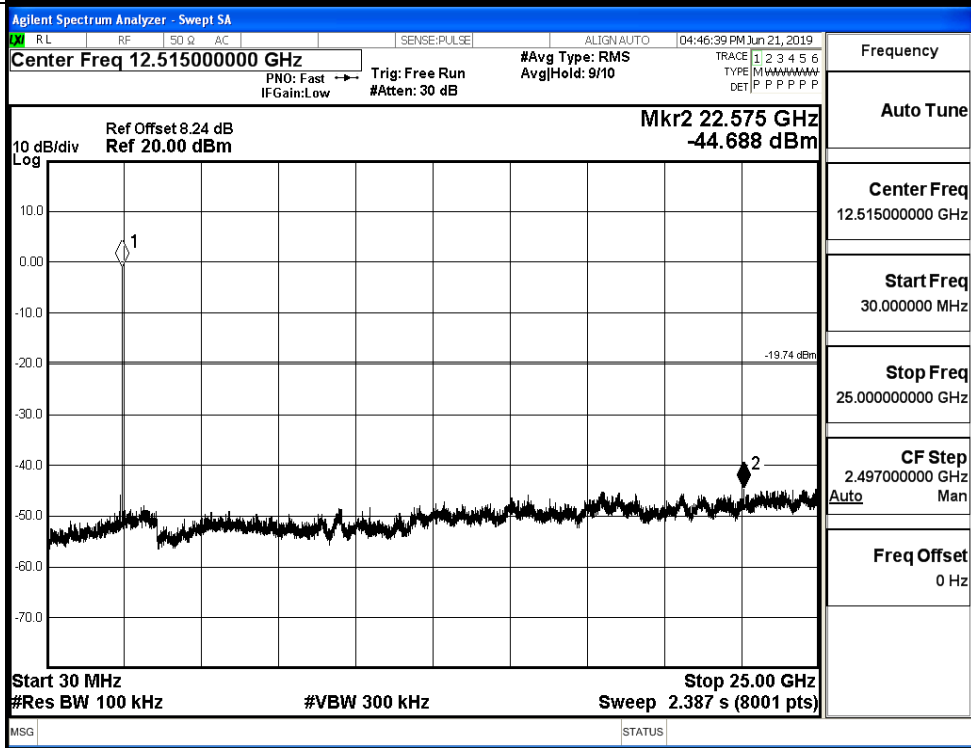


BT LE_HCH_Graphs

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	-1.224	-49.909	-21.22	PASS
BT LE	HCH	0.495	-49.705	-19.51	PASS

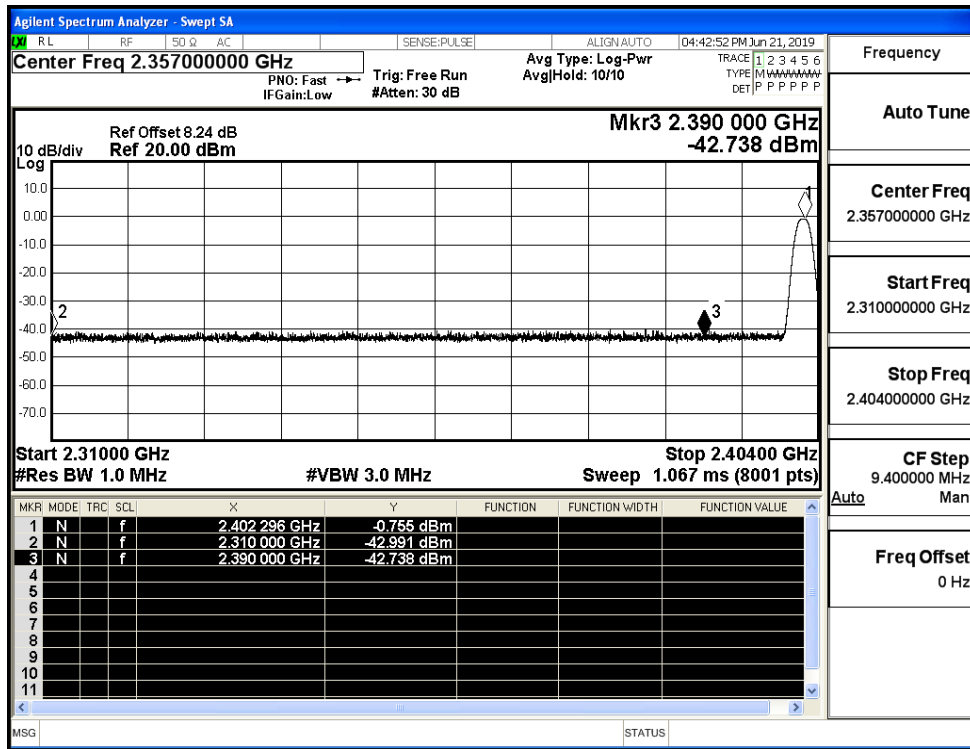
Test Graphs

LCH	<table border="1"> <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>2.401 991 GHz</td> <td>-1.224 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>-51.573 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>-53.936 dBm</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>N</td> <td>f</td> <td></td> <td>2.316 298 GHz</td> <td>-49.909 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		2.401 991 GHz	-1.224 dBm				2	N	f		2.400 000 GHz	-51.573 dBm				3	N	f		2.390 000 GHz	-53.936 dBm				4	N	f		2.316 298 GHz	-49.909 dBm				<table border="1"> <tr><td>Frequency</td></tr> <tr><td>Auto Tune</td></tr> <tr><td>Center Freq 2.35700000 GHz</td></tr> <tr><td>Start Freq 2.31000000 GHz</td></tr> <tr><td>Stop Freq 2.40400000 GHz</td></tr> <tr><td>CF Step 9.400000 MHz</td></tr> <tr><td>Auto Man</td></tr> <tr><td>Freq Offset 0 Hz</td></tr> </table>	Frequency	Auto Tune	Center Freq 2.35700000 GHz	Start Freq 2.31000000 GHz	Stop Freq 2.40400000 GHz	CF Step 9.400000 MHz	Auto Man	Freq Offset 0 Hz
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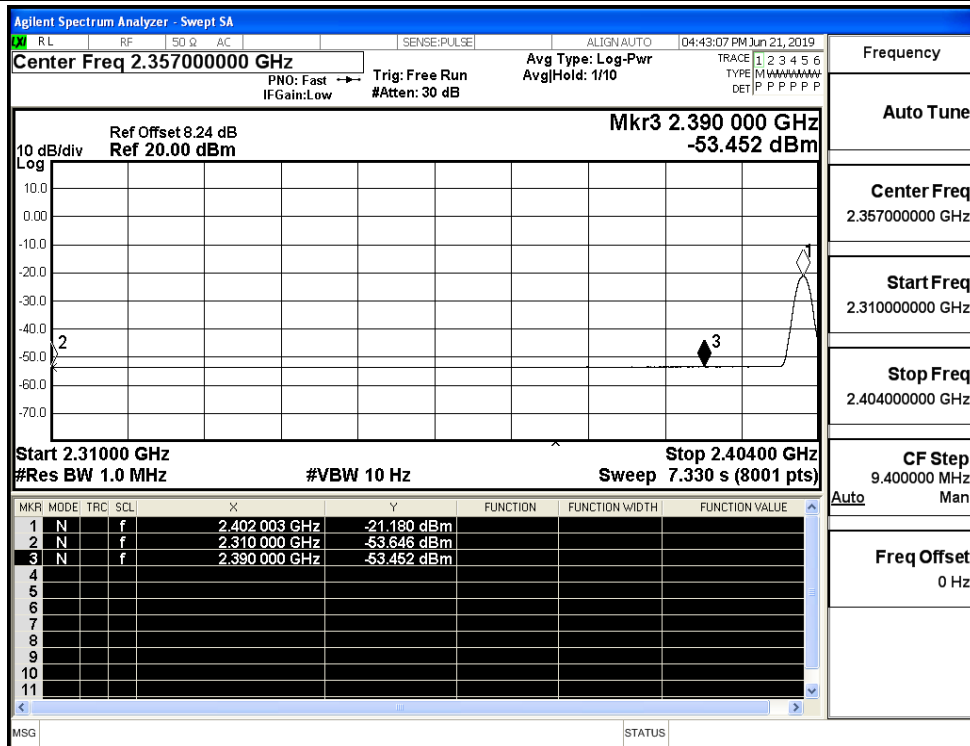
A.8 Restrict-band band-edge measurements

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	-42.99	2.0	0	52.27	PEAK	74	PASS
		Ant1	2310.0	-53.65	2.0	0	41.61	AV	54	PASS
		Ant1	2390.0	-42.74	2.0	0	52.52	PEAK	74	PASS
		Ant1	2390.0	-53.45	2.0	0	41.81	AV	54	PASS
	2480	Ant1	2483.5	-42.58	2.0	0	52.68	PEAK	74	PASS
		Ant1	2483.5	-53.15	2.0	0	42.11	AV	54	PASS
		Ant1	2500.0	-43.54	2.0	0	51.72	PEAK	74	PASS
		Ant1	2500.0	-53.06	2.0	0	42.20	AV	54	PASS

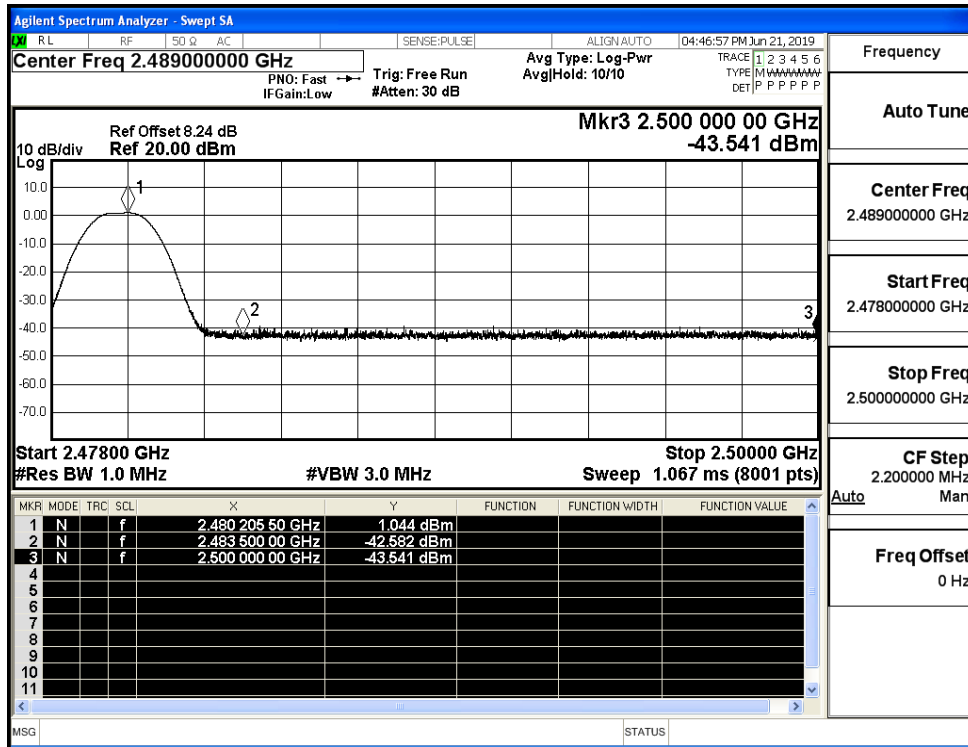
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

