

Appendix A

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

Product Name: Battery Operated LTE Cellular GPS Tracker

Trade Mark: Phillips Connect Technologies

Test Model: 77-6811

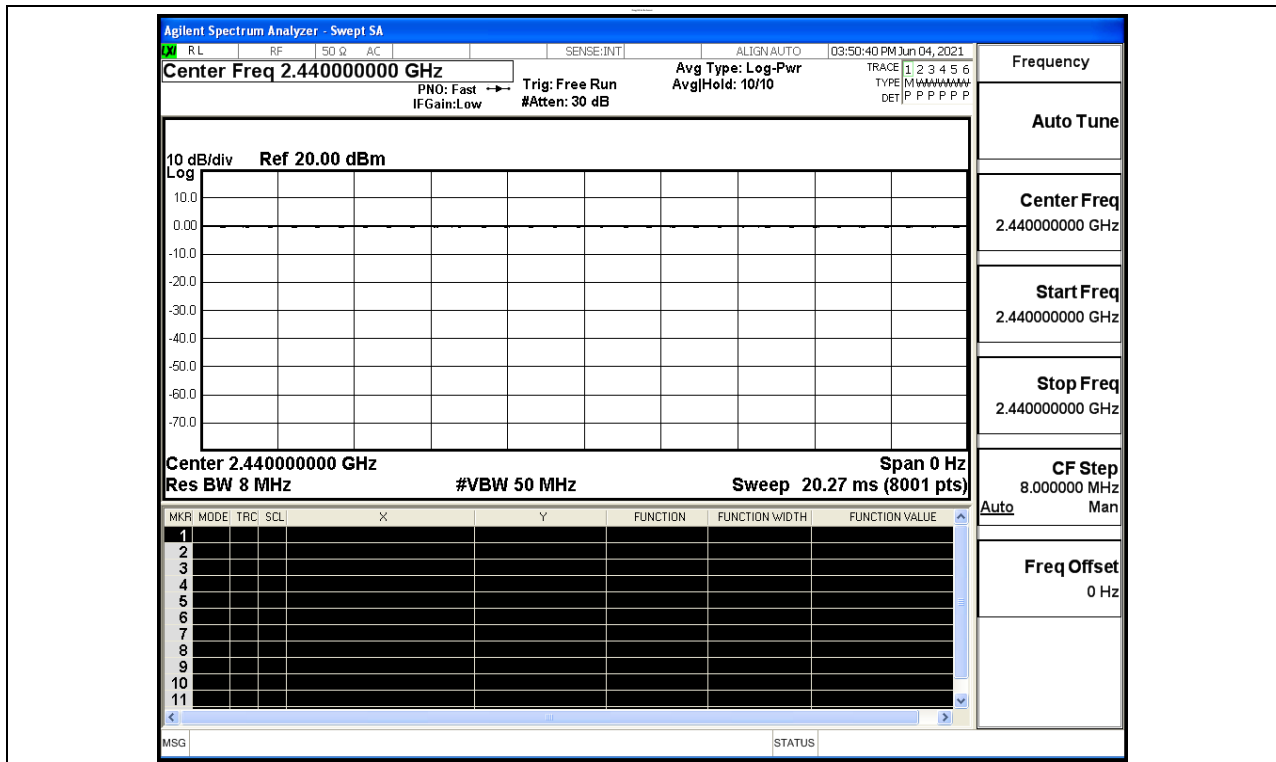
HVIN: 77-6811, Smart-7-LA, Smart-7 Lid, 77-6800 A, SBR-4LA, 77-MB-ARLA,
Sabre LA, 77-MB-02, 77-6900

Environmental Conditions

Temperature:	21.6 ° C
Relative Humidity:	52.7%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

A.1 Duty Cycle

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

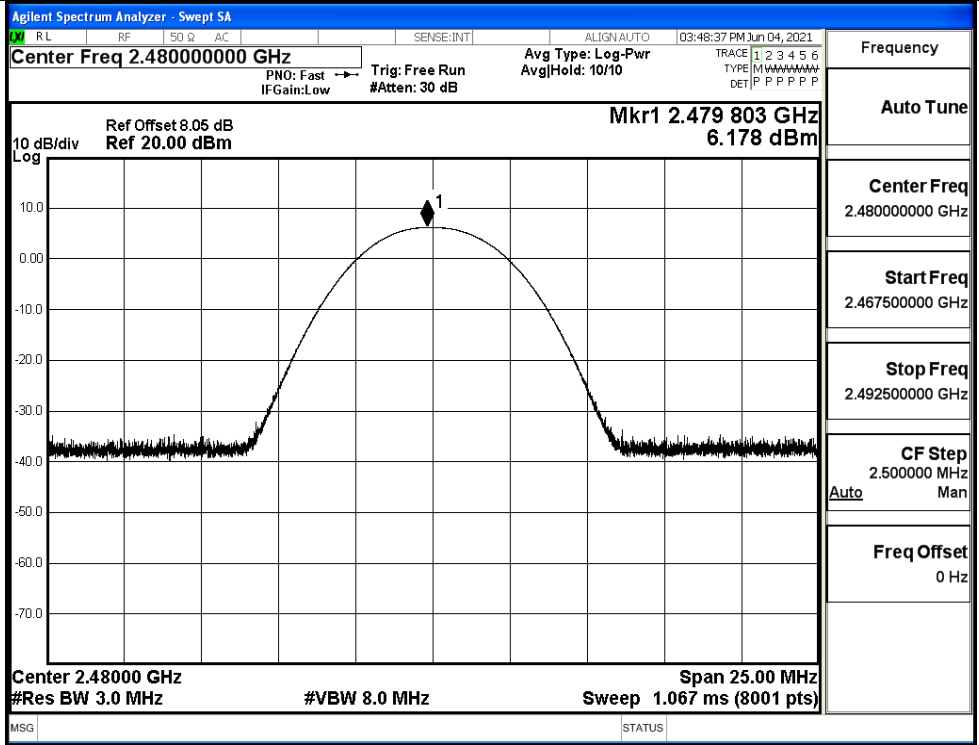


A.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	6.358	30	PASS
BT LE	MCH	7.701	30	PASS
BT LE	HCH	6.178	30	PASS

Test Graphs	
LCH	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.40200000 GHz</p> <p>Mkr1 2.402 063 GHz 6.358 dBm</p> <p>Center 2.40200 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p>
MCH	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.44000000 GHz</p> <p>Mkr1 2.440 116 GHz 7.701 dBm</p> <p>Center 2.44000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p>

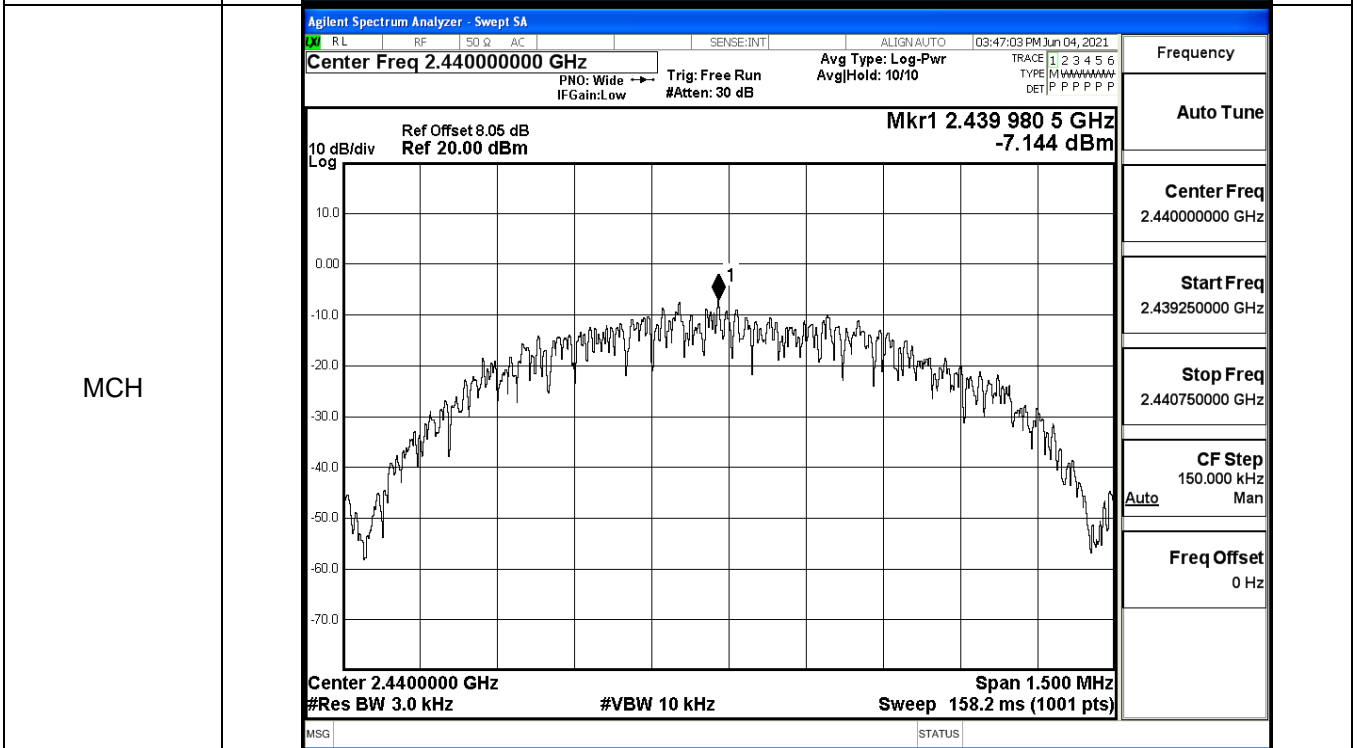
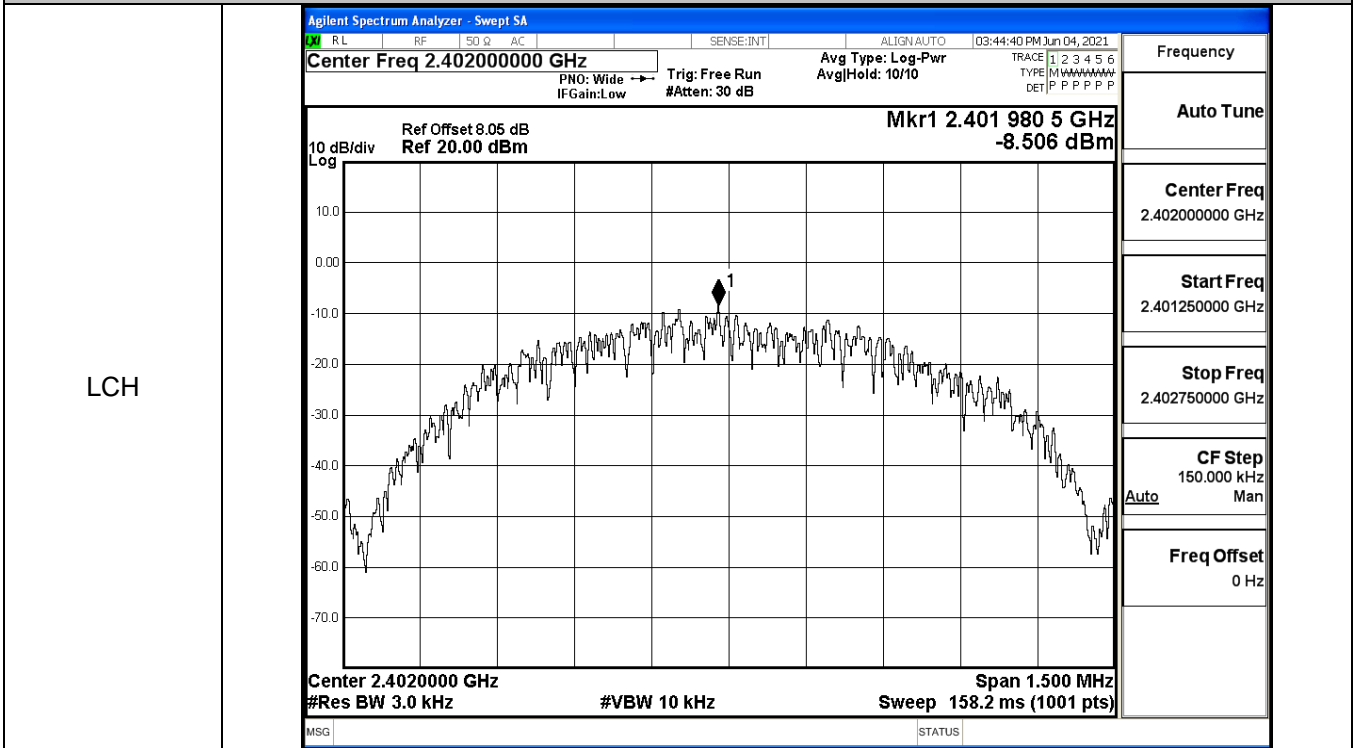
HCH



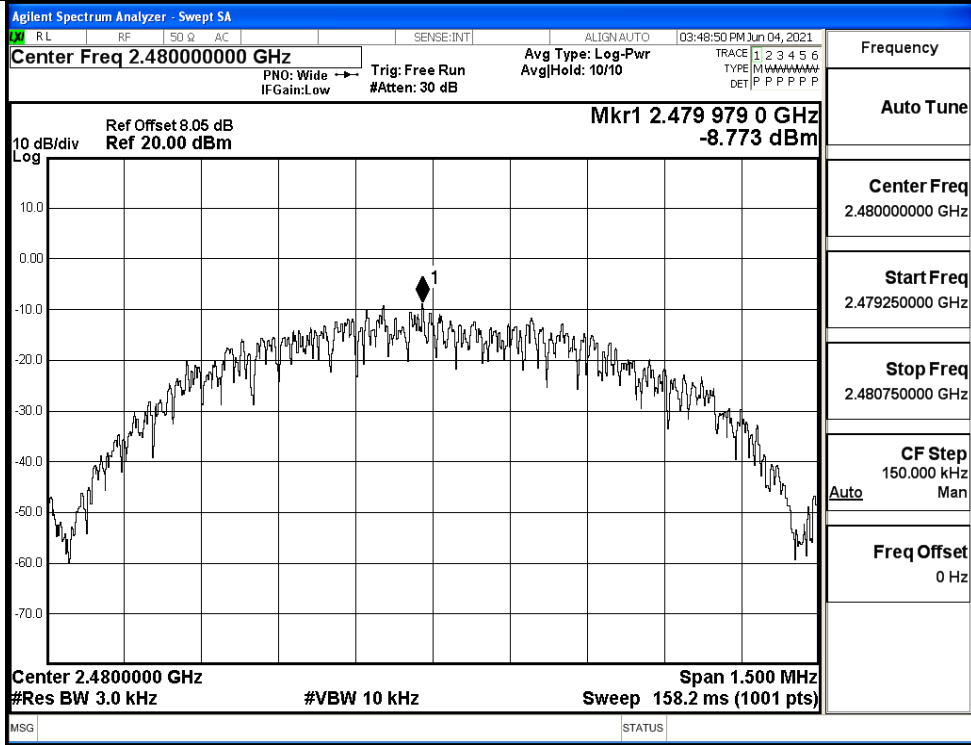
A.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-8.506	8	PASS
BT LE	MCH	-7.144	8	PASS
BT LE	HCH	-8.773	8	PASS

Test Graphs



HCH



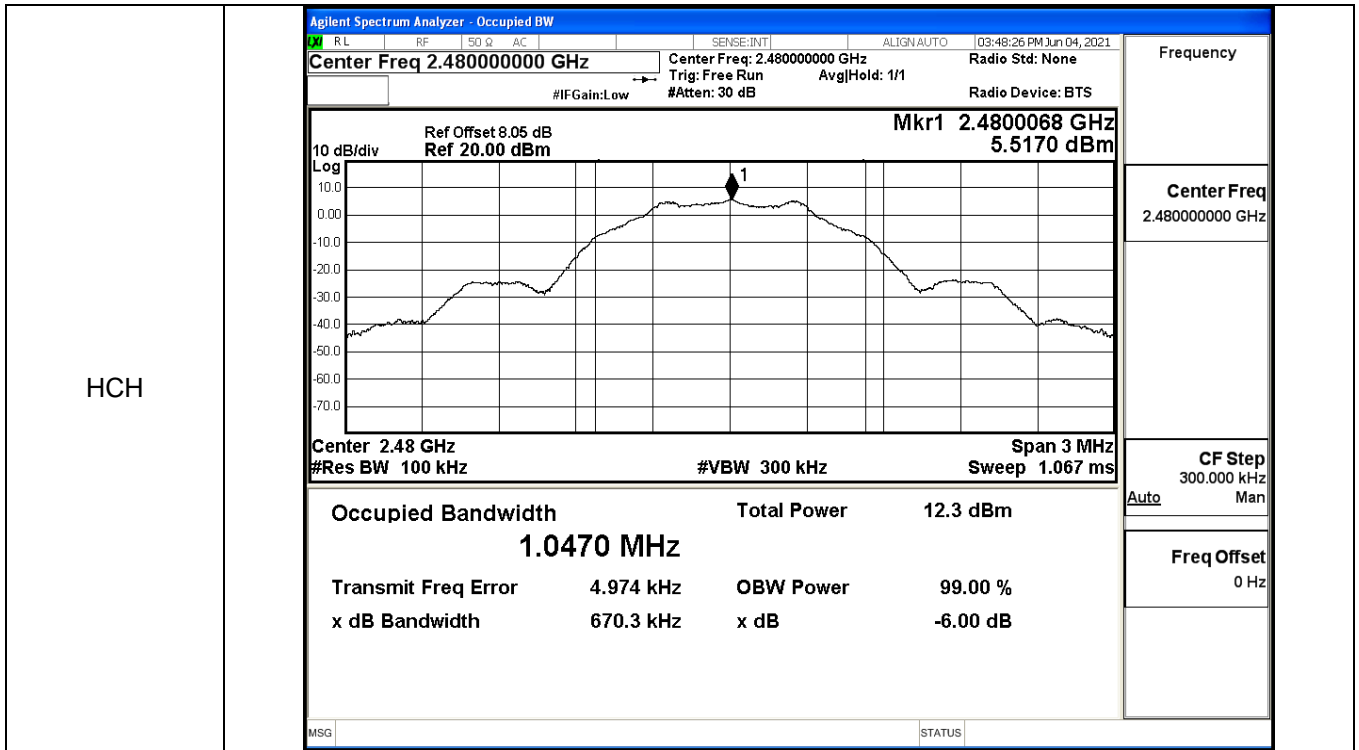
A.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6731	≥0.5	PASS
BT LE	MCH	0.6741	≥0.5	PASS
BT LE	HCH	0.6703	≥0.5	PASS

Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz Center Freq: 2.40200000 GHz Radio Std: None Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <p>Ref Offset 8.05 dB Mkr1 2.4020068 GHz Ref 20.00 dBm 5.6646 dBm</p> <p>10 dB/div Log</p> <p>Center 2.402 GHz Span 3 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <p>Occupied Bandwidth 1.0501 MHz Total Power 12.5 dBm</p> <p>Transmit Freq Error 7.018 kHz OBW Power 99.00 % x dB Bandwidth 673.1 kHz x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 300.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
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MCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.44000000 GHz Center Freq: 2.44000000 GHz Radio Std: None Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <p>Ref Offset 8.05 dB Mkr1 2.4399985 GHz Ref 20.00 dBm 7.0222 dBm</p> <p>10 dB/div Log</p> <p>Center 2.44 GHz Span 3 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <p>Occupied Bandwidth 1.0475 MHz Total Power 13.8 dBm</p> <p>Transmit Freq Error 5.472 kHz OBW Power 99.00 % x dB Bandwidth 674.1 kHz x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.44000000 GHz</p> <p>CF Step 300.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
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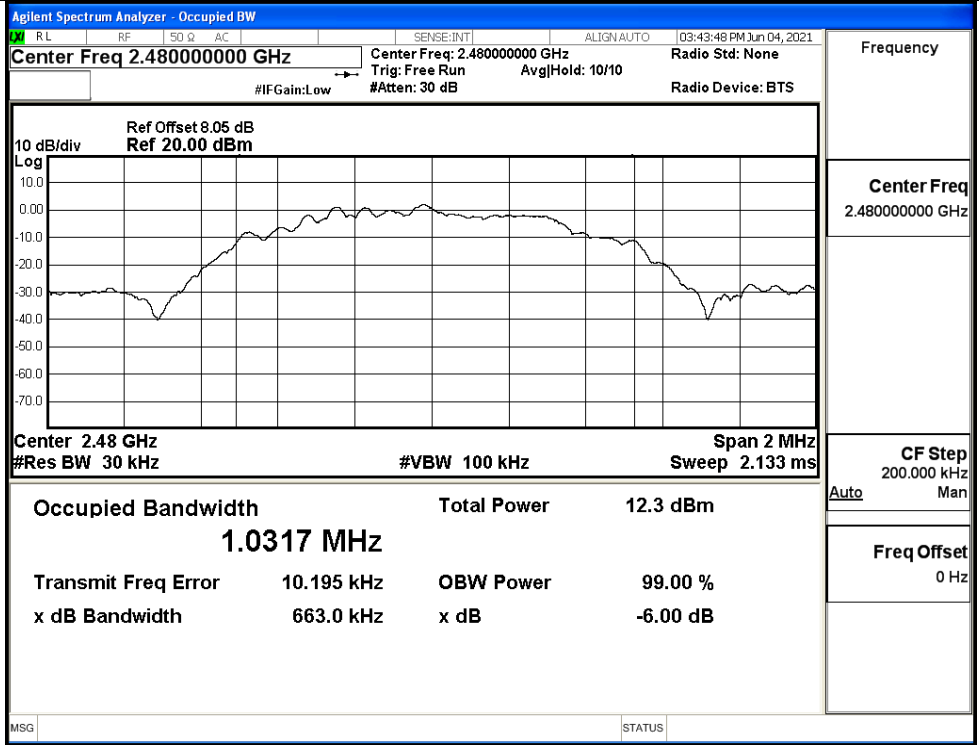
A.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0317	≥0.5	PASS
BT LE	MCH	1.0318	≥0.5	PASS
BT LE	HCH	1.0317	≥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</p> <p>Ref Offset 8.05 dB</p> <p>Ref 20.00 dBm</p> <p>Occupied Bandwidth 1.0317 MHz</p> <p>Total Power 12.5 dBm</p> <p>Transmit Freq Error 12.005 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 663.1 kHz</p> <p>x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 200.000 kHz</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</p> <p>Ref Offset 8.05 dB</p> <p>Ref 20.00 dBm</p> <p>Occupied Bandwidth 1.0318 MHz</p> <p>Total Power 13.9 dBm</p> <p>Transmit Freq Error 10.854 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 664.3 kHz</p> <p>x dB -6.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.44000000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>

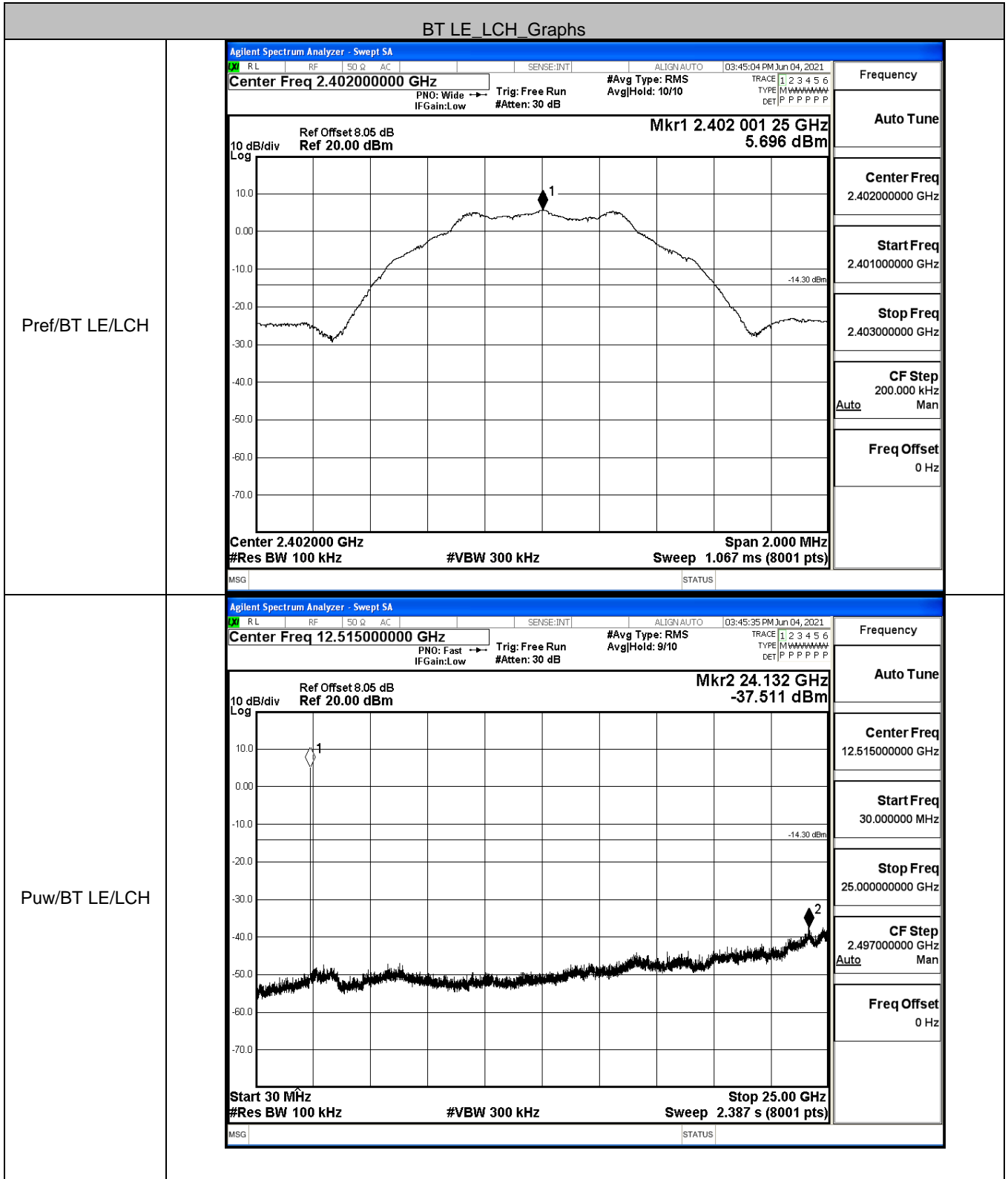
HCH



A.6 RF Conducted Spurious Emissions

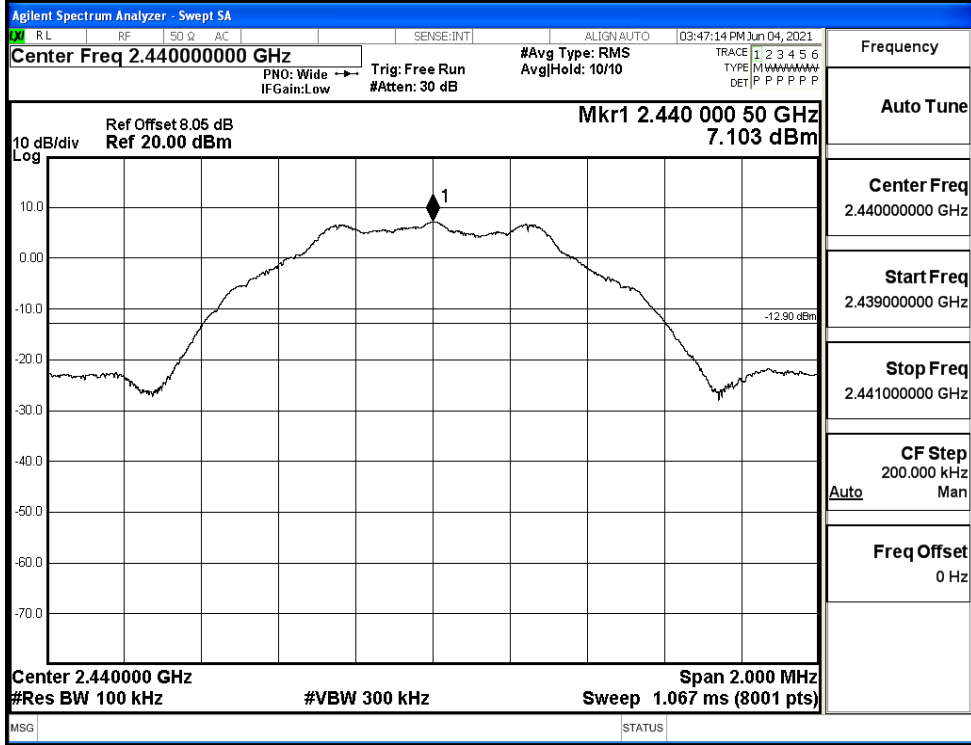
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	5.696	-37.511	-14.304	PASS
BT LE	MCH	7.103	-37.514	-12.897	PASS
BT LE	HCH	5.477	-37.371	-14.523	PASS

BT LE_LCH_Graphs

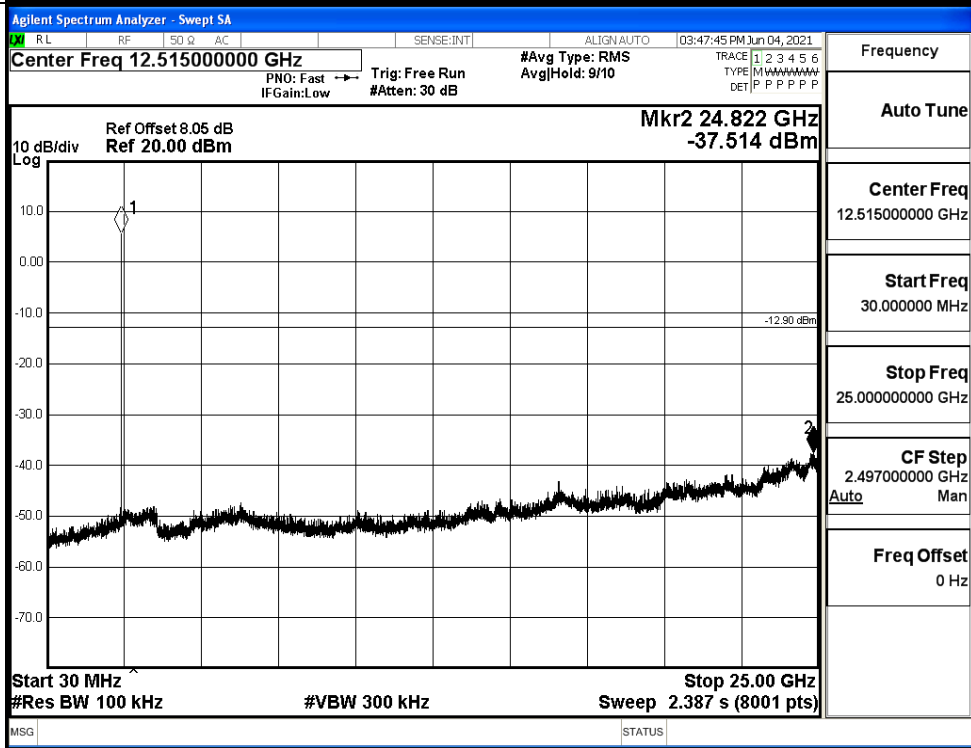


BT LE_MCH_Graphs

Pref/BT LE/MCH

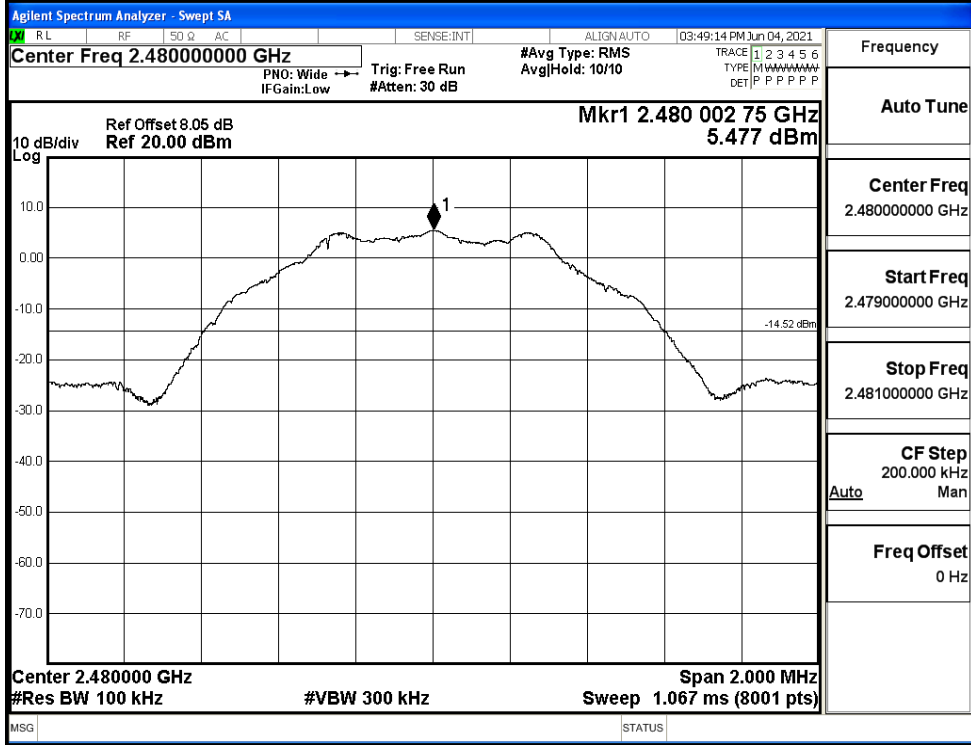


Puw/BT LE/MCH

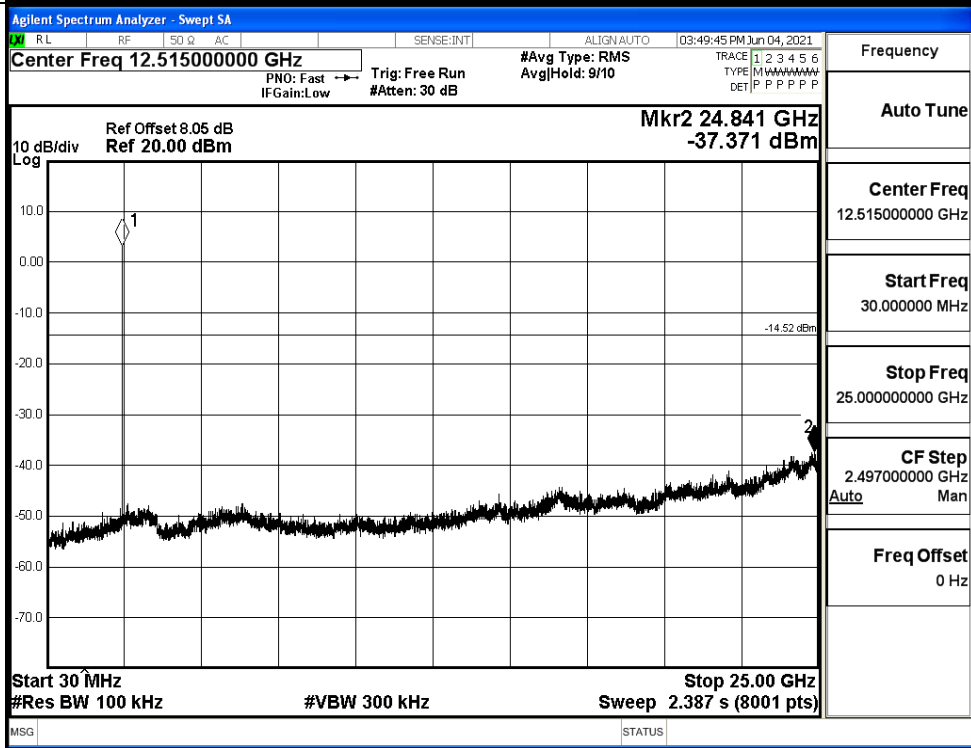


BT LE_HCH_Graphs

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	5.786	-50.283	-14.21	PASS
BT LE	HCH	5.656	-48.366	-14.34	PASS

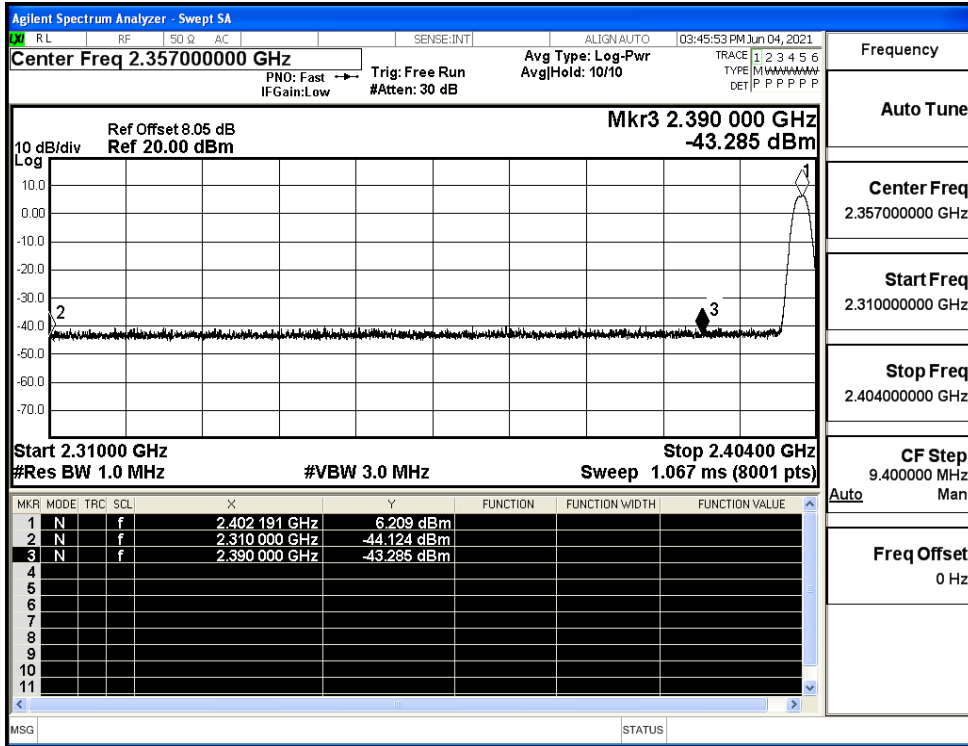
Test Graphs

LCH	<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>2.402 003 GHz</td><td>5.786 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>-50.118 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>-54.181 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.376 576 GHz</td><td>-50.283 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		2.402 003 GHz	5.786 dBm				2	N	f		2.400 000 GHz	-50.118 dBm				3	N	f		2.390 000 GHz	-54.181 dBm				4	N	f		2.376 576 GHz	-50.283 dBm				5									6									7									8									9									10									11									<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.35700000 GHz</p> <p>Start Freq 2.31000000 GHz</p> <p>Stop Freq 2.40400000 GHz</p> <p>CF Step 9.400000 MHz</p> <p>Freq Offset 0 Hz</p>
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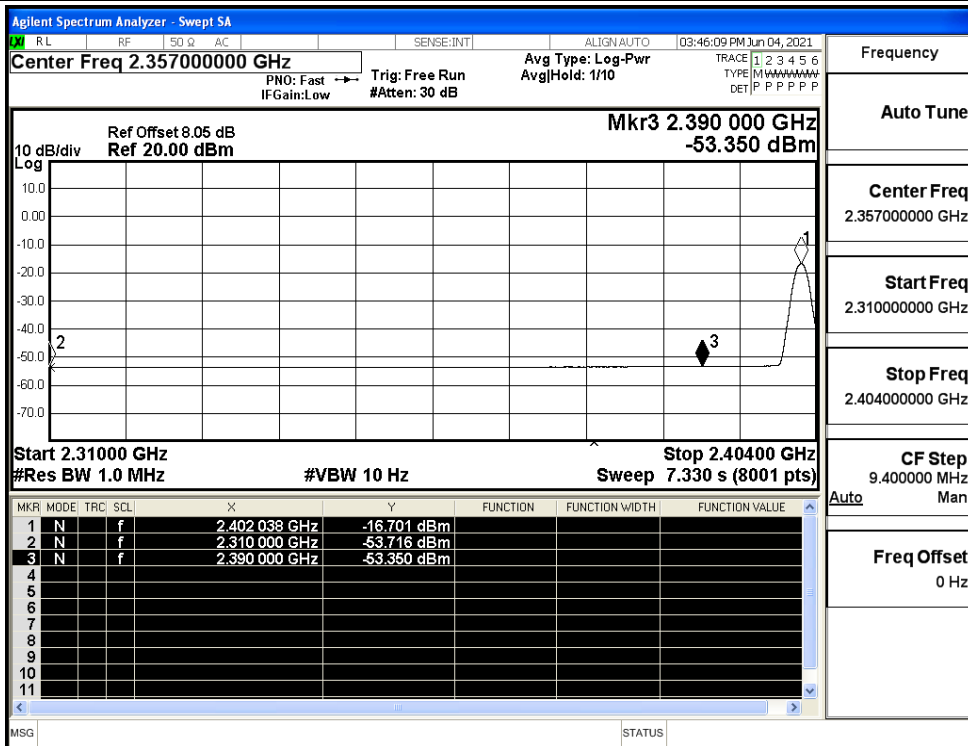
A.8 Restrict-band band-edge measurements

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	-44.12	2.0	0	51.13	PEAK	74	PASS
		Ant1	2310.0	-53.72	2.0	0	41.54	AV	54	PASS
		Ant1	2390.0	-43.29	2.0	0	51.97	PEAK	74	PASS
		Ant1	2390.0	-53.35	2.0	0	41.91	AV	54	PASS
	2480	Ant1	2483.5	-42.72	2.0	0	52.53	PEAK	74	PASS
		Ant1	2483.5	-52.72	2.0	0	42.54	AV	54	PASS
		Ant1	2500.0	-43.08	2.0	0	52.18	PEAK	74	PASS
		Ant1	2500.0	-52.70	2.0	0	42.56	AV	54	PASS

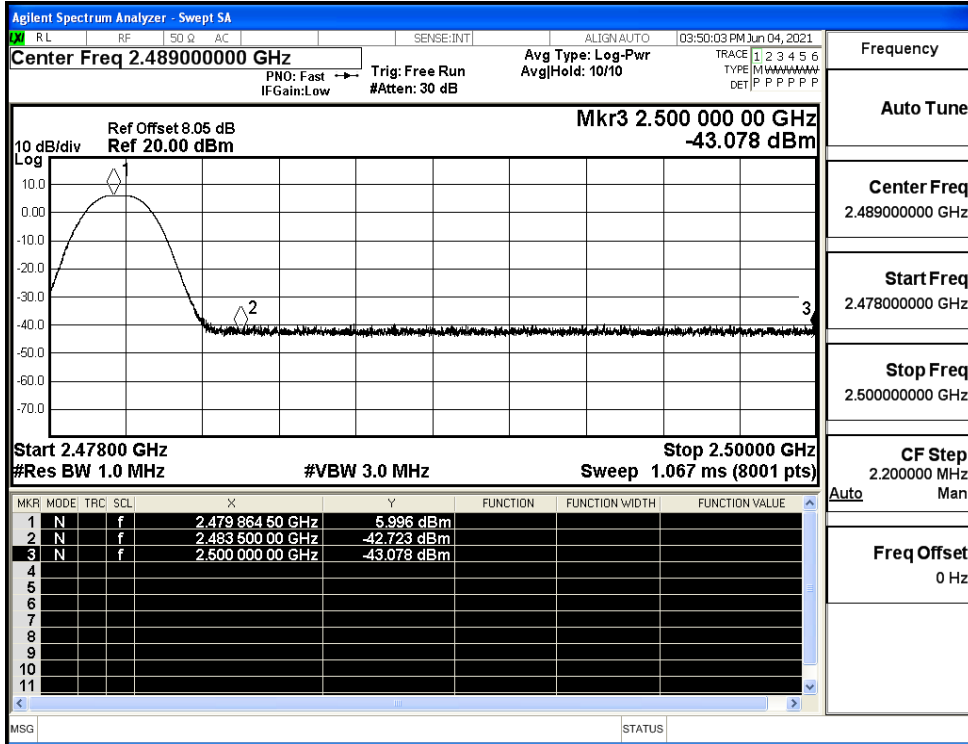
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

