

Appendix B

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

Product Name: MJ-80

Trade Mark: N/A

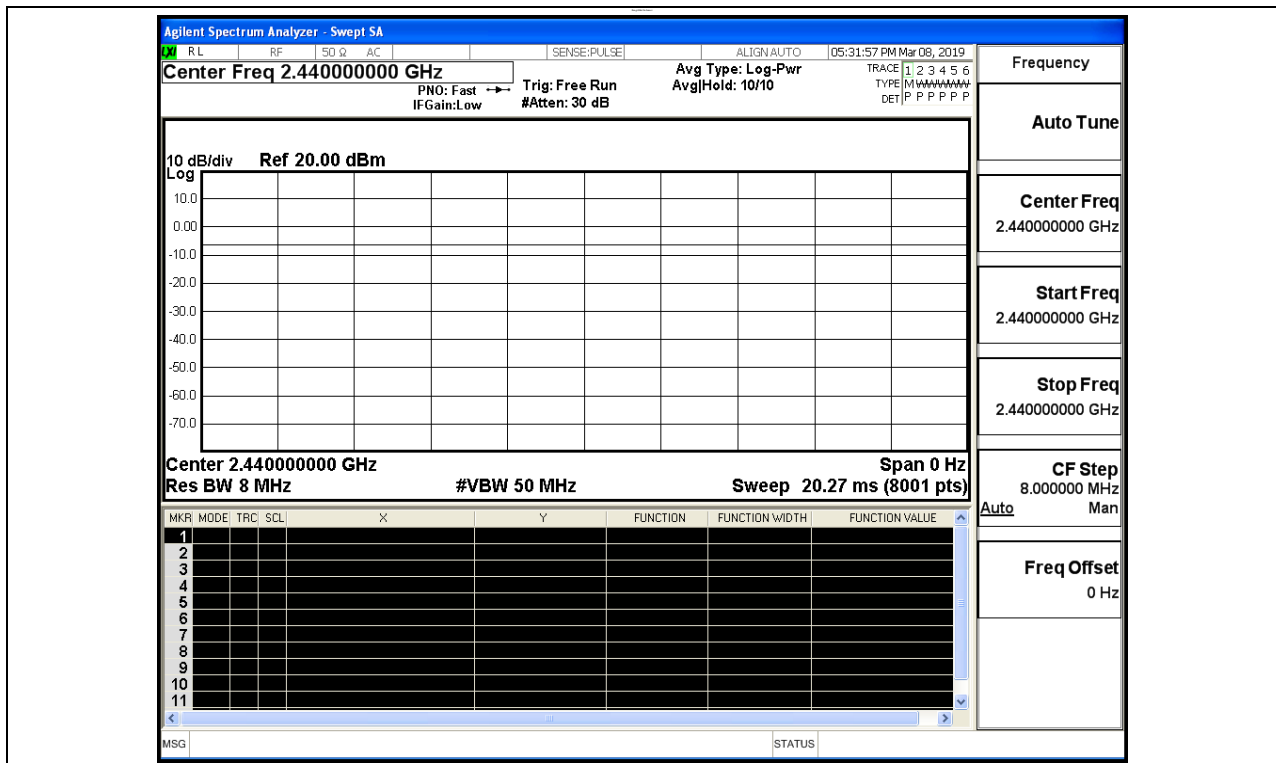
Test Model: MJ-80B

Environmental Conditions

Temperature:	21.8° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Tom Liu

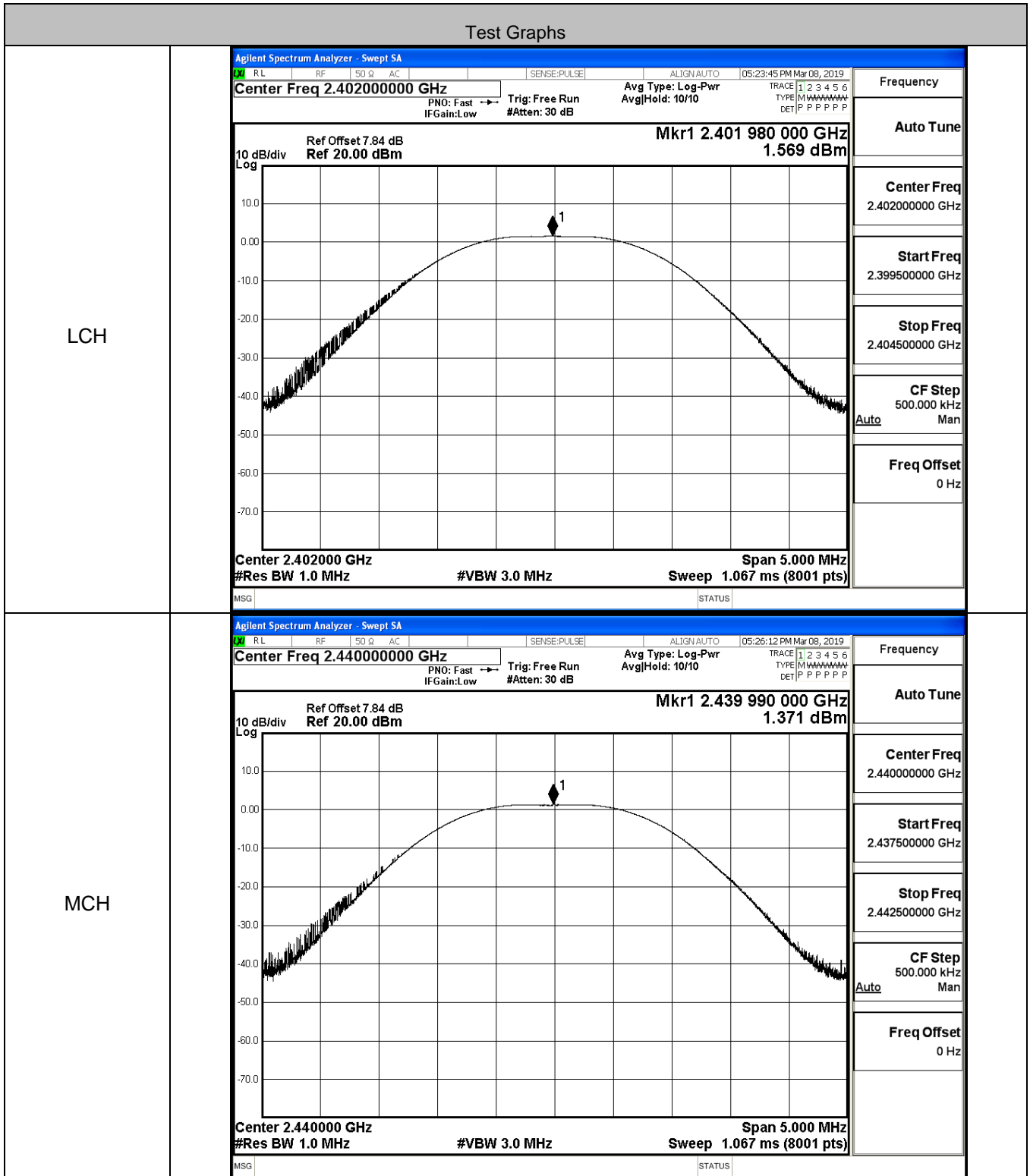
B.1 Duty Cycle

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

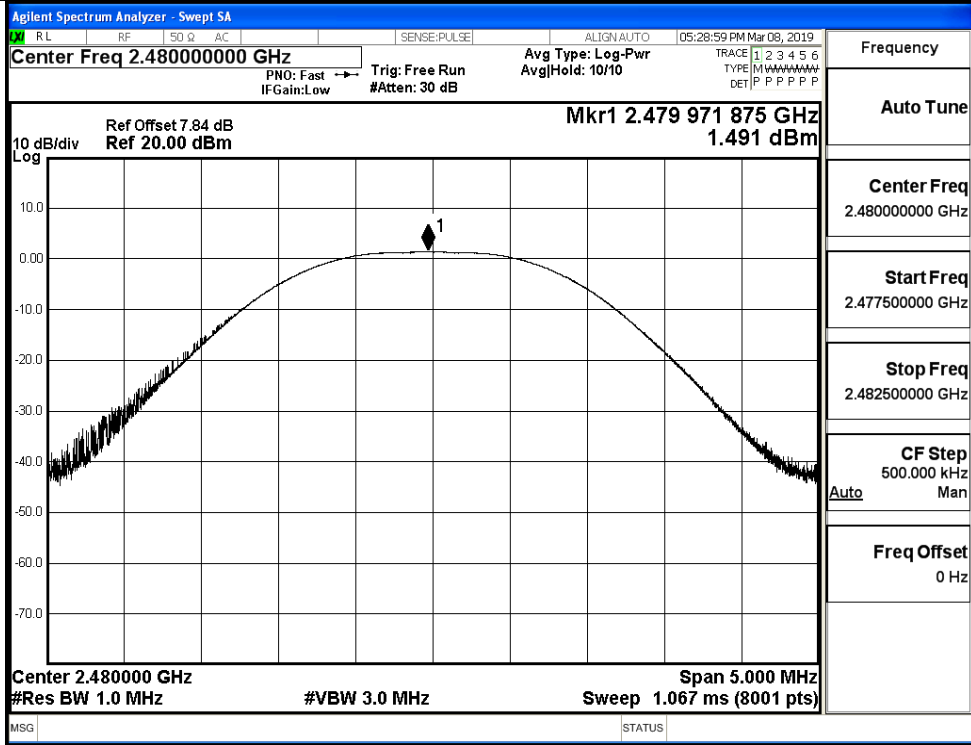


B.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	1.569	30	PASS
BT LE	MCH	1.371	30	PASS
BT LE	HCH	1.491	30	PASS



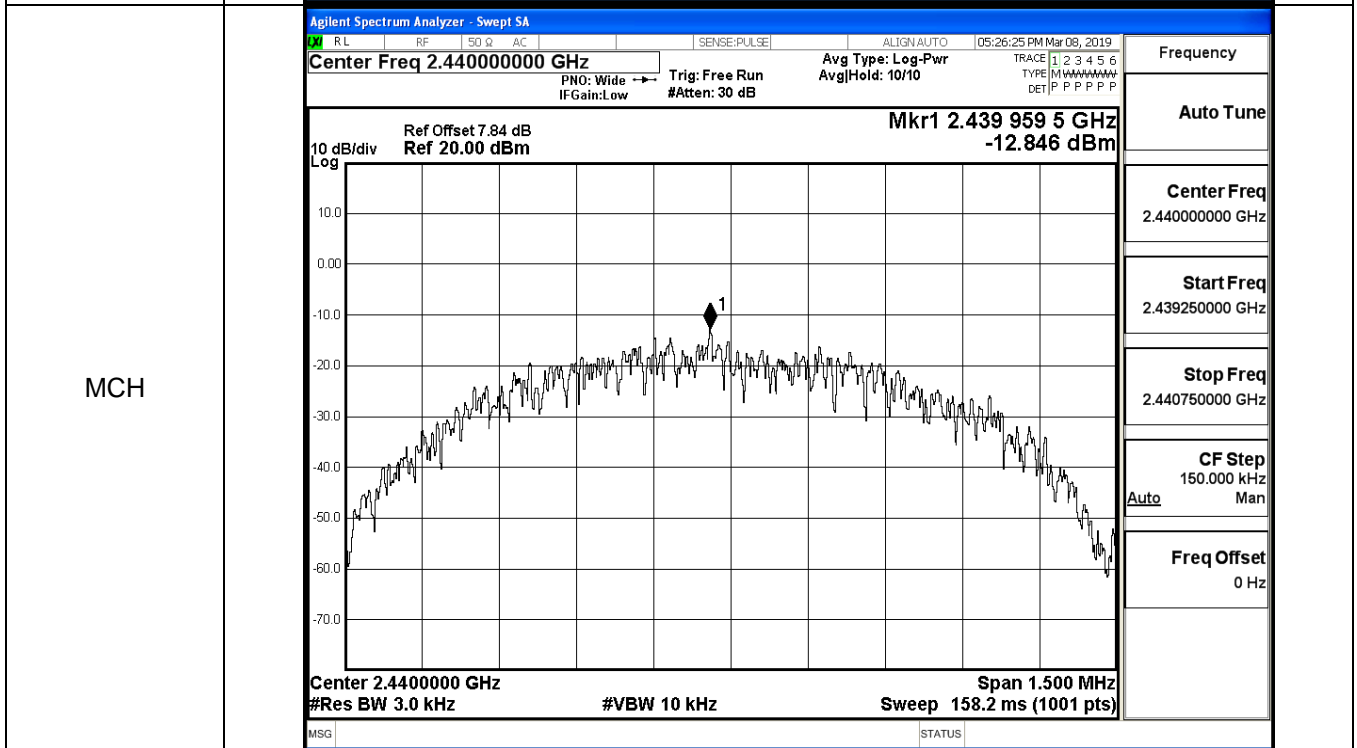
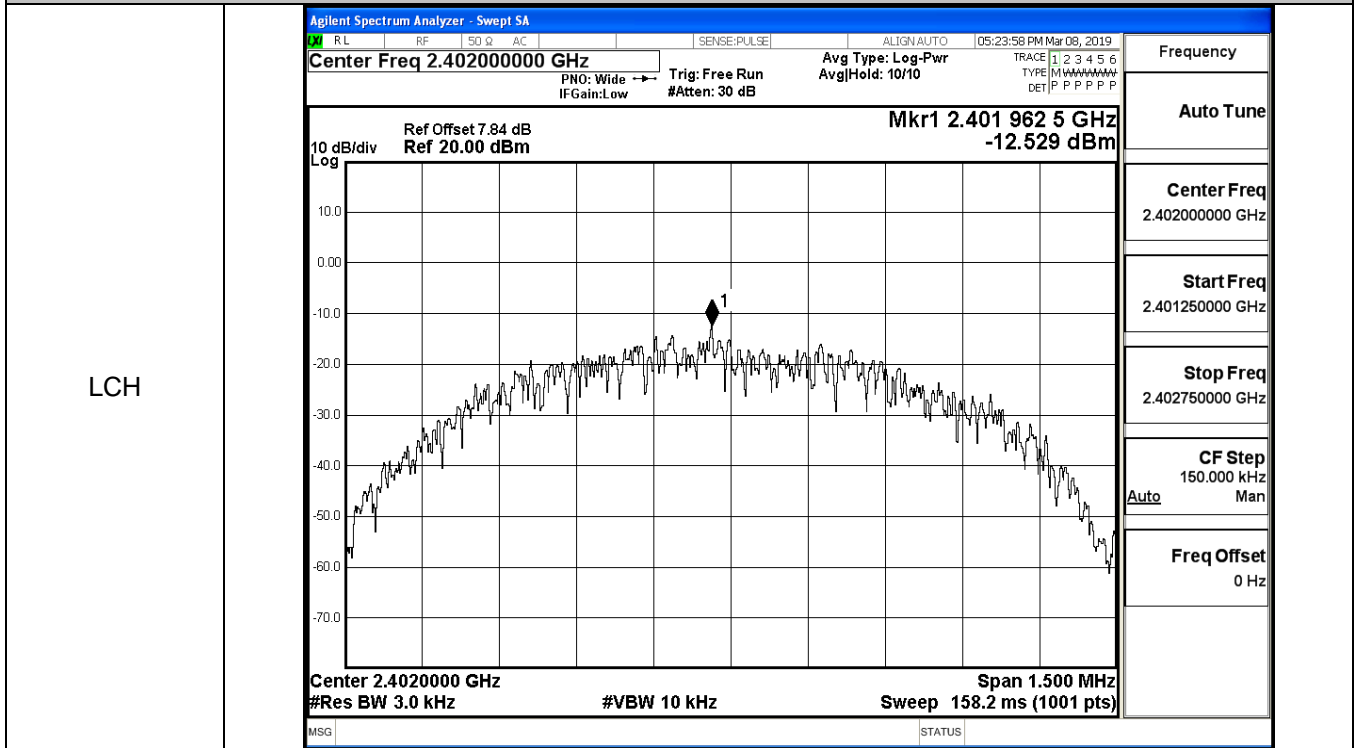
HCH



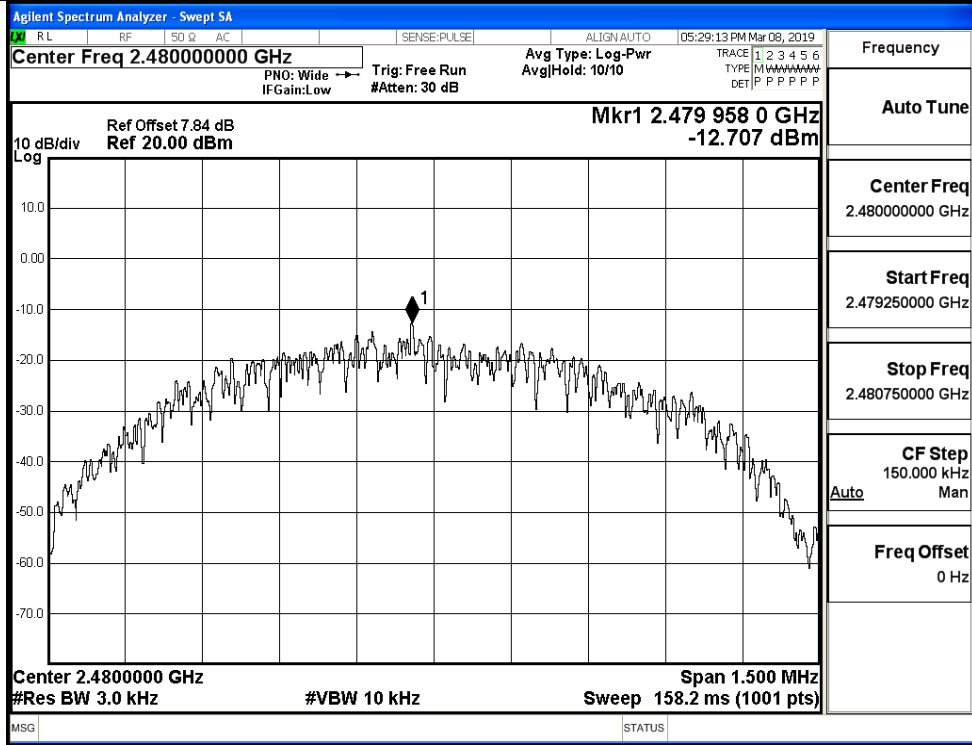
B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-12.529	8	PASS
BT LE	MCH	-12.846	8	PASS
BT LE	HCH	-12.707	8	PASS

Test Graphs

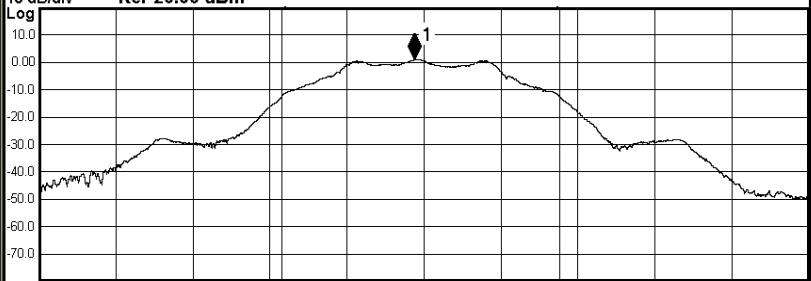
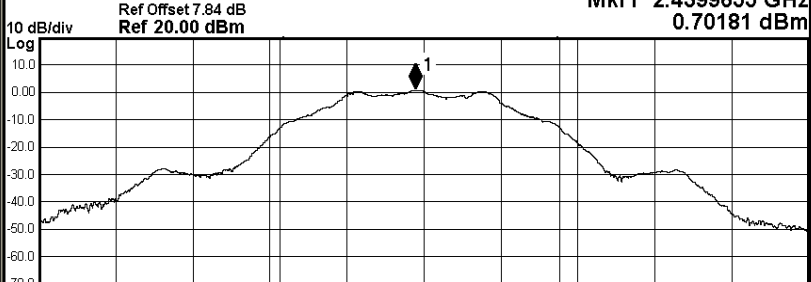


HCH



B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6873	≥0.5	PASS
BT LE	MCH	0.7086	≥0.5	PASS
BT LE	HCH	0.6970	≥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 05:23:33 PM Mar 08, 2019</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 2.4019633 GHz</p> <p style="font-size: x-small; margin: 0;">Log Ref 20.00 dBm 0.91428 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: 50%;">Occupied Bandwidth</td> <td style="width: 50%;">Total Power</td> <td style="width: 50%;">7.84 dBm</td> </tr> <tr> <td style="text-align: center;">1.0840 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	7.84 dBm	1.0840 MHz			Transmit Freq Error	OBW Power	99.00 %	x dB Bandwidth	x dB	-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 05:26:01 PM Mar 08, 2019</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 2.4399655 GHz</p> <p style="font-size: x-small; margin: 0;">Log Ref 20.00 dBm 0.70181 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: 50%;">Occupied Bandwidth</td> <td style="width: 50%;">Total Power</td> <td style="width: 50%;">7.64 dBm</td> </tr> <tr> <td style="text-align: center;">1.0842 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	7.64 dBm	1.0842 MHz			Transmit Freq Error	OBW Power	99.00 %	x dB Bandwidth	x dB	-6.00 dB
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1.0842 MHz													
Transmit Freq Error	OBW Power	99.00 %											
x dB Bandwidth	x dB	-6.00 dB											

HCH

Agilent Spectrum Analyzer - Occupied BW

RL	RF	50 Ω	AC	SENSE:PULSE	ALIGN:AUTO	05:28:48 PM Mar 08, 2019
Center Freq 2.480000000 GHz			Center Freq: 2.480000000 GHz		Radio Std: None	
			Trig: Free Run		AvgHold: 1/1	
#IFGain:Low			#Atten: 30 dB		Radio Device: BTS	

10 dB/div
Log

Mkr1 2.4799655 GHz
0.71112 dBm

Center 2.48 GHz	#VBW 300 kHz	Span 3 MHz
#Res BW 100 kHz		Sweep 1.067 ms

Occupied Bandwidth	Total Power	7.61 dBm
1.0839 MHz		
Transmit Freq Error	-17.550 kHz	OBW Power
x dB Bandwidth	697.0 kHz	x dB
		99.00 %
		-6.00 dB

Frequency	Center Freq
	2.480000000 GHz
	CF Step
	300.000 kHz
	Auto
	Man
	Freq Offset
	0 Hz

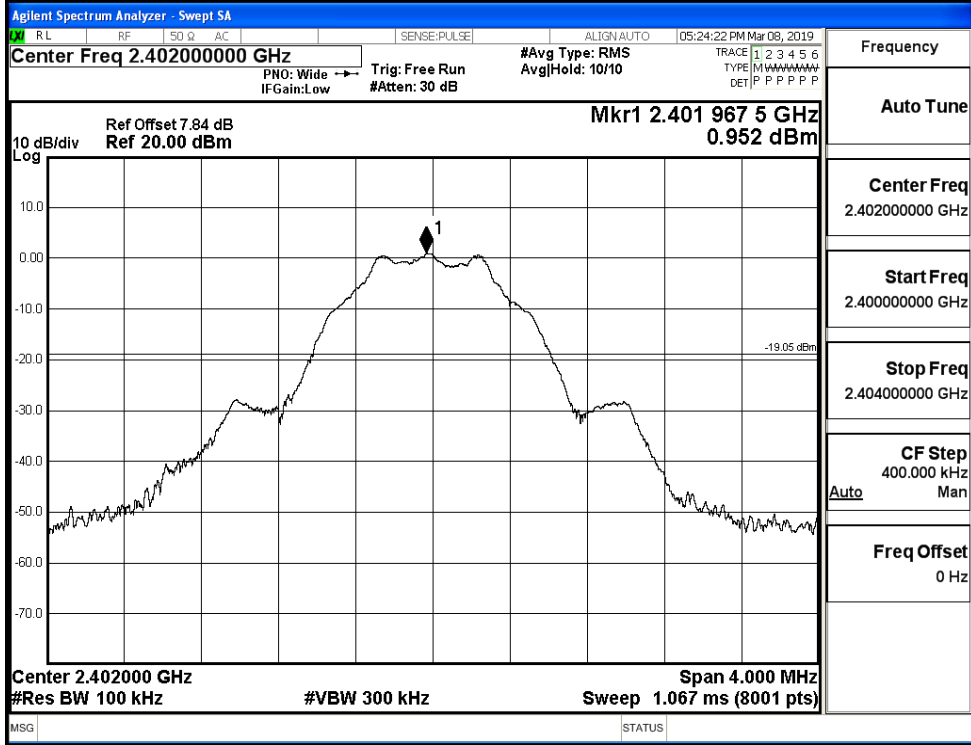
MSG
STATUS

B.5 RF Conducted Spurious Emissions

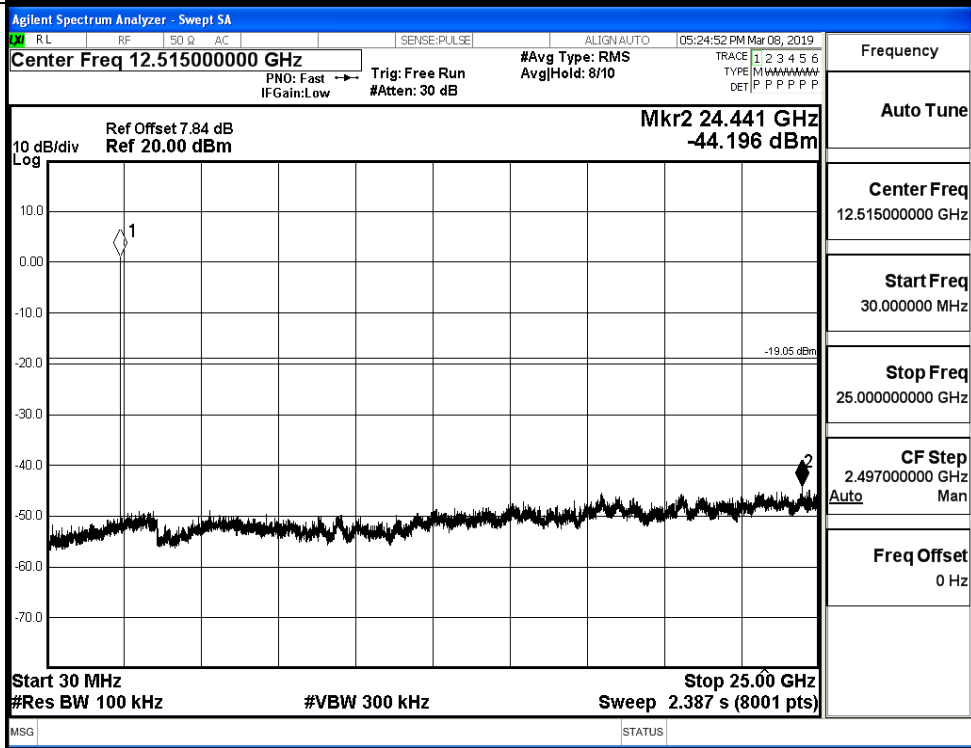
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	0.952	-44.196	-19.048	PASS
BT LE	MCH	0.75	-43.843	-19.250	PASS
BT LE	HCH	0.728	-43.710	-19.272	PASS

BT LE_LCH_Graphs

Pref/BT LE/LCH

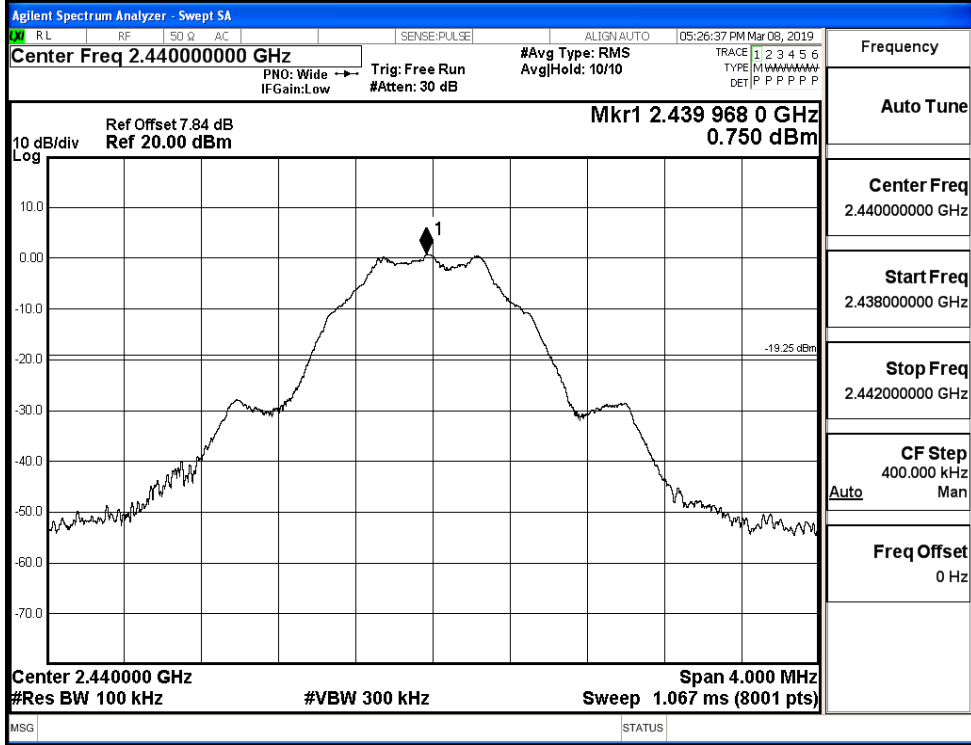


Puw/BT LE/LCH

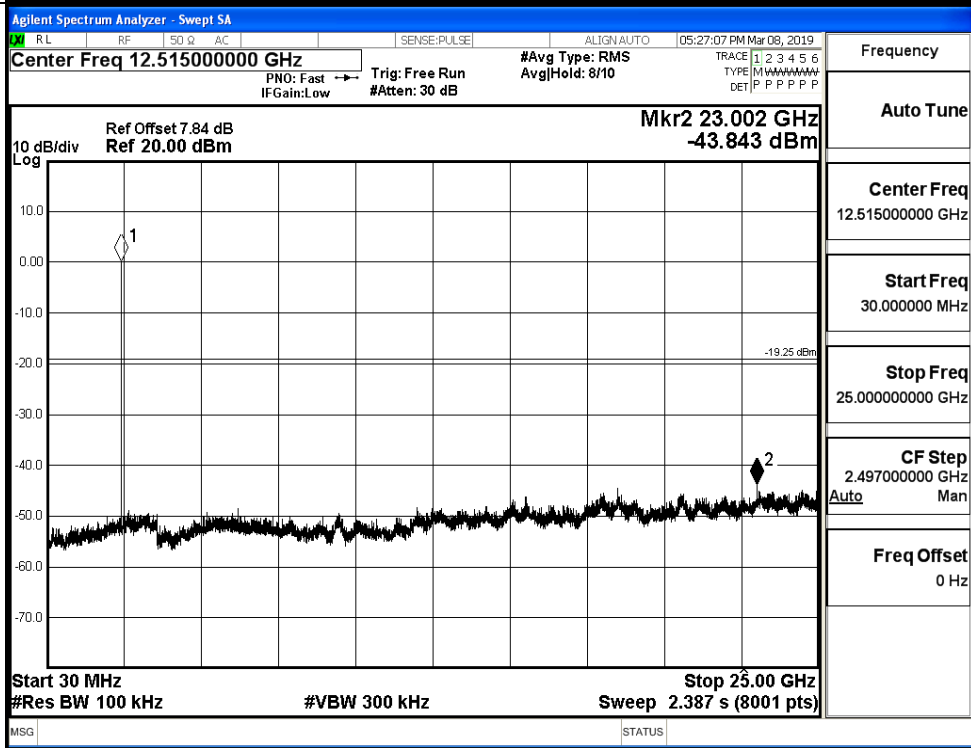


BT LE_MCH_Graphs

Pref/BT LE/MCH

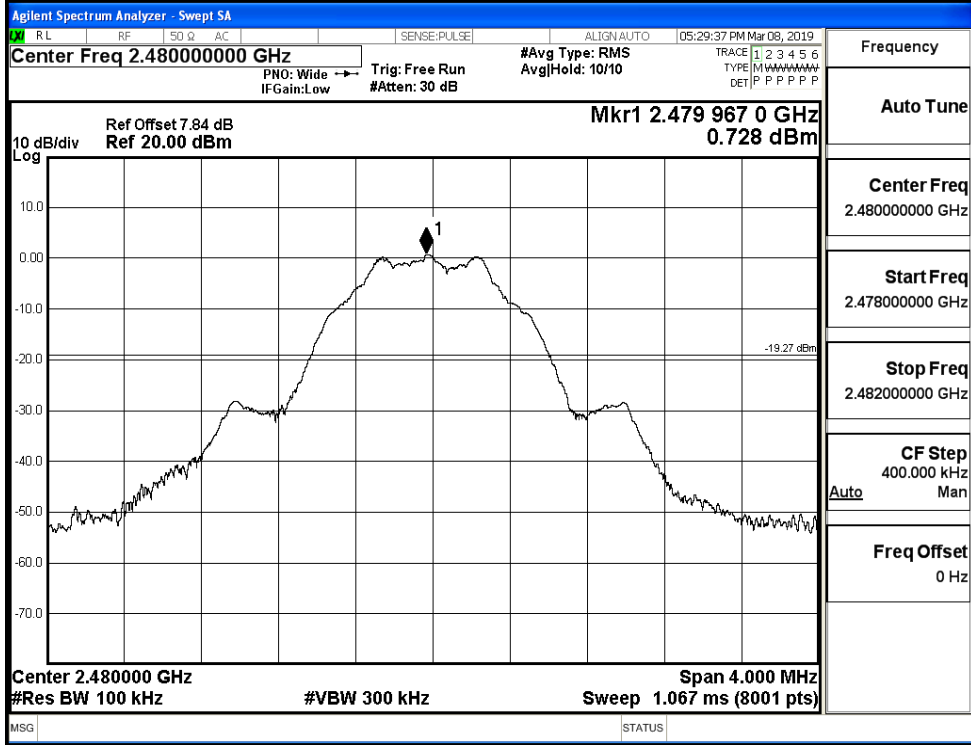


Puw/BT LE/MCH

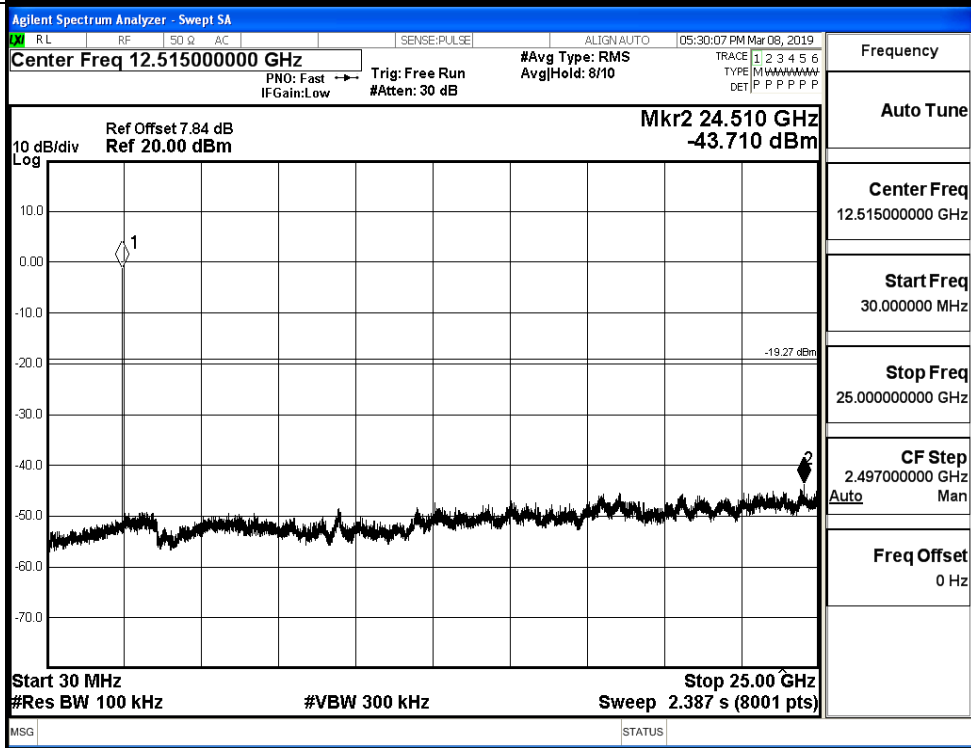


BT LE_HCH_Graphs

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	1.025	-50.355	-18.98	PASS
BT LE	HCH	0.863	-50.621	-19.14	PASS

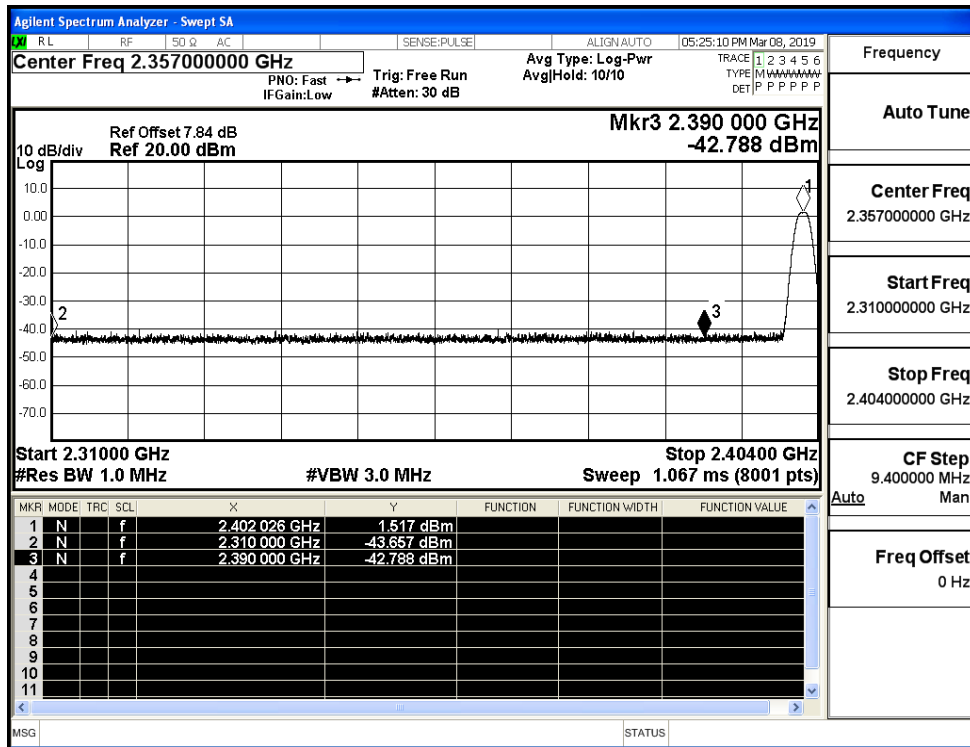
Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.35700000 GHz Ref Offset 7.84 dB, Ref 20.00 dBm Mkr4 2.346 460 GHz -50.355 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="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>2.401 979 GHz</td><td>1.025 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>-54.510 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>-54.043 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.346 460 GHz</td><td>-50.355 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		2.401 979 GHz	1.025 dBm				2	N	f		2.400 000 GHz	-54.510 dBm				3	N	f		2.390 000 GHz	-54.043 dBm				4	N	f		2.346 460 GHz	-50.355 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 Ref Offset 7.84 dB, Ref 20.00 dBm Mkr1 2.479 969 00 GHz -0.863 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="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>2.479 969 00 GHz</td><td>0.863 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>-53.244 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>-53.564 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.495 336 00 GHz</td><td>-50.621 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		2.479 969 00 GHz	0.863 dBm				2	N	f		2.483 500 00 GHz	-53.244 dBm				3	N	f		2.500 000 00 GHz	-53.564 dBm				4	N	f		2.495 336 00 GHz	-50.621 dBm				Frequency Auto Tune Center Freq 2.48900000 GHz Start Freq 2.478000000 GHz Stop Freq 2.500000000 GHz CF Step 2.200000 MHz Freq Offset 0 Hz
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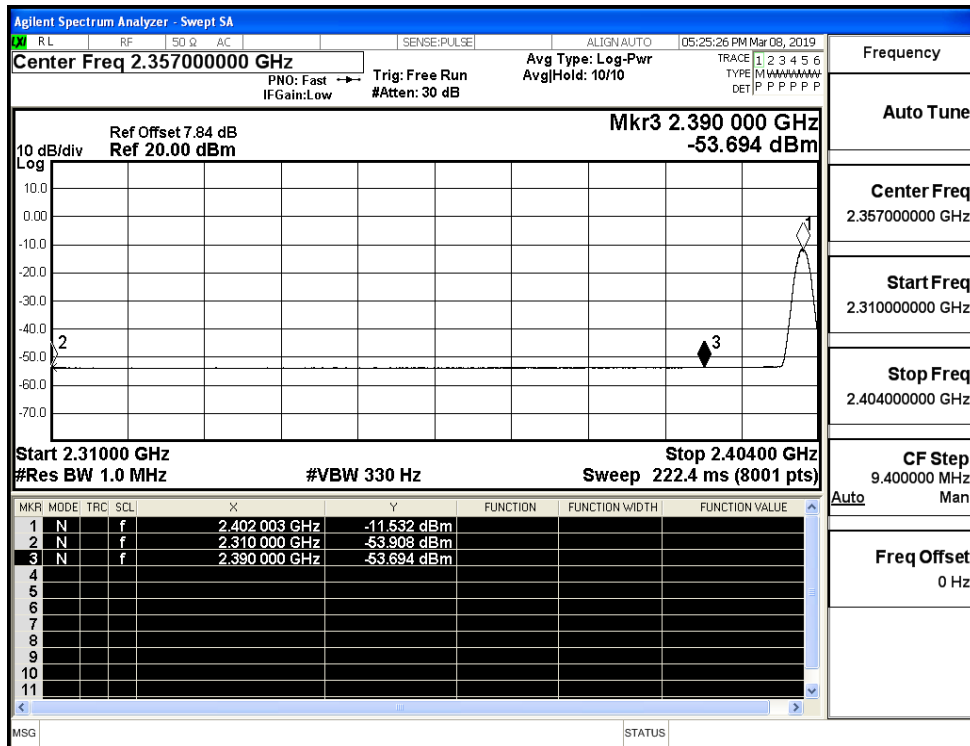
B.7 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
BT LE	2402	Ant1	2310.0	-43.66	2.0	0	53.60	PEAK	74	PASS
		Ant1	2310.0	-53.91	2.0	0	43.35	AV	54	PASS
		Ant1	2390.0	-42.79	2.0	0	54.47	PEAK	74	PASS
		Ant1	2390.0	-53.69	2.0	0	43.56	AV	54	PASS
	2480	Ant1	2483.5	-43.41	2.0	0	53.85	PEAK	74	PASS
		Ant1	2483.5	-53.20	2.0	0	44.06	AV	54	PASS
		Ant1	2500.0	-43.17	2.0	0	54.09	PEAK	74	PASS
		Ant1	2500.0	-53.32	2.0	0	43.94	AV	54	PASS

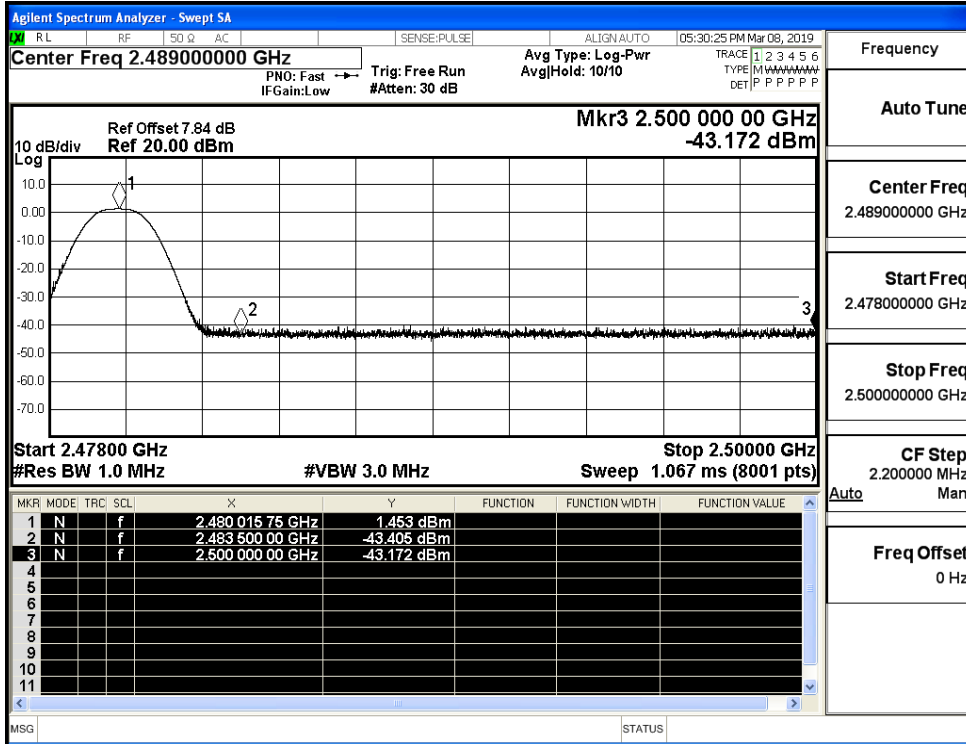
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

