

Appendix B

RF Test Data for BT V4.2(DSS/DTS) (Conducted Measurement)

Product Name: DP50-1

Trade Mark: ***OBSTAR***®, **OBPROG**

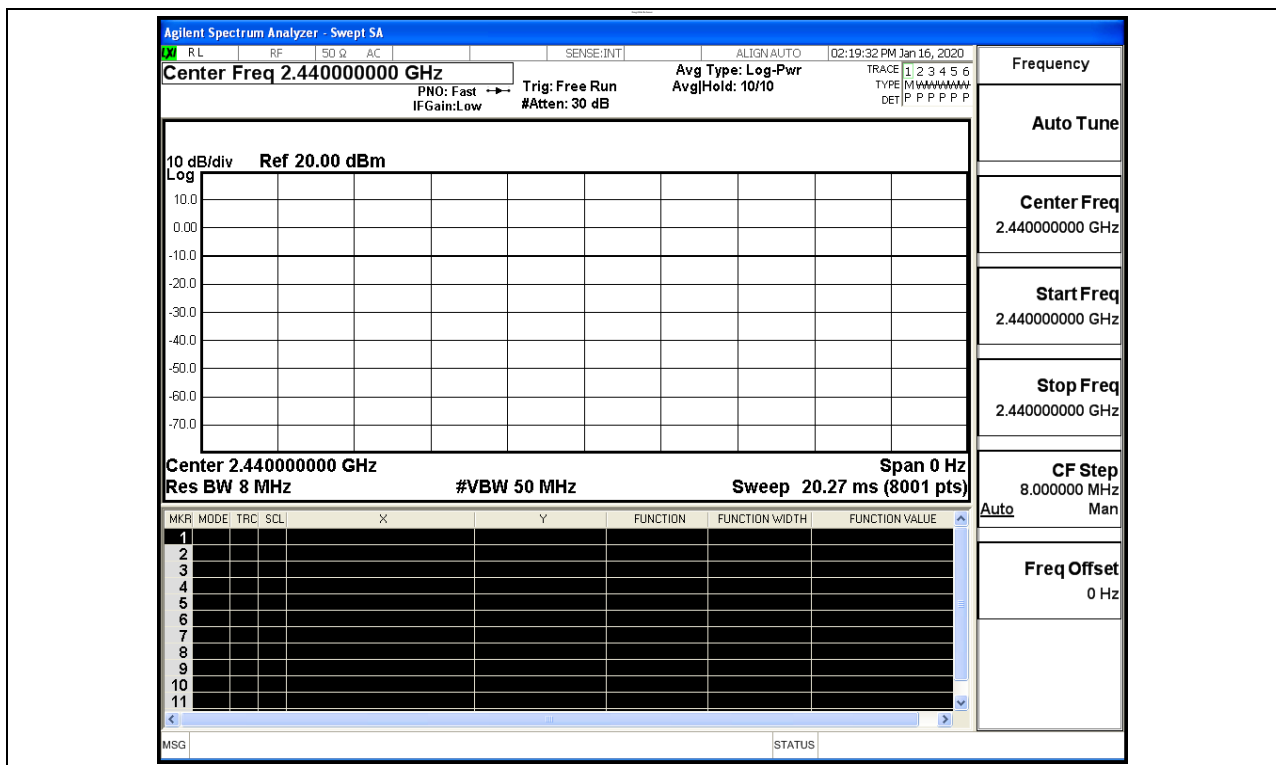
Test Model: DP50-1

Environmental Conditions

Temperature:	22.8°C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Li Huan
Supervised by:	Tom.Liu

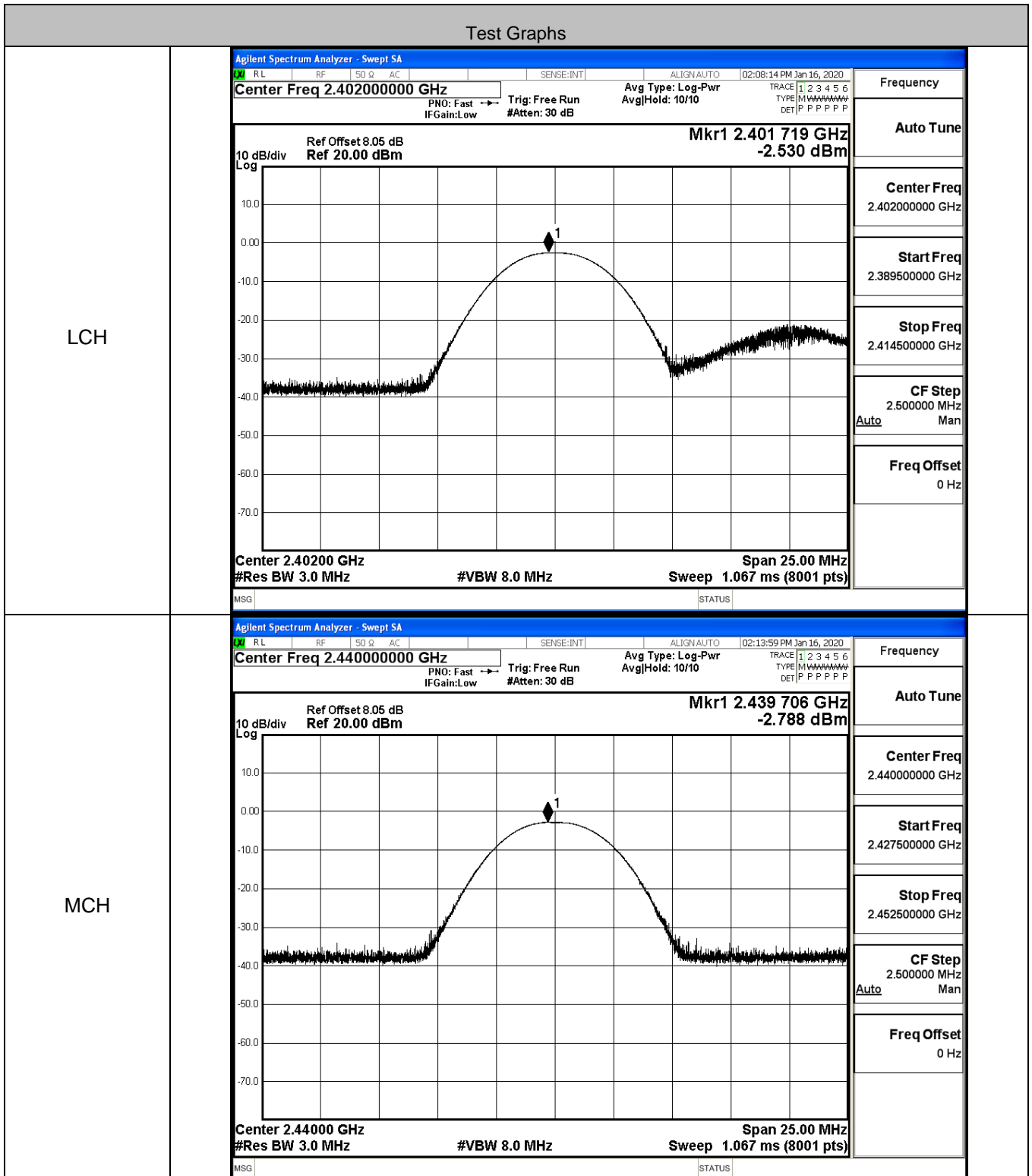
B.1 Duty Cycle

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

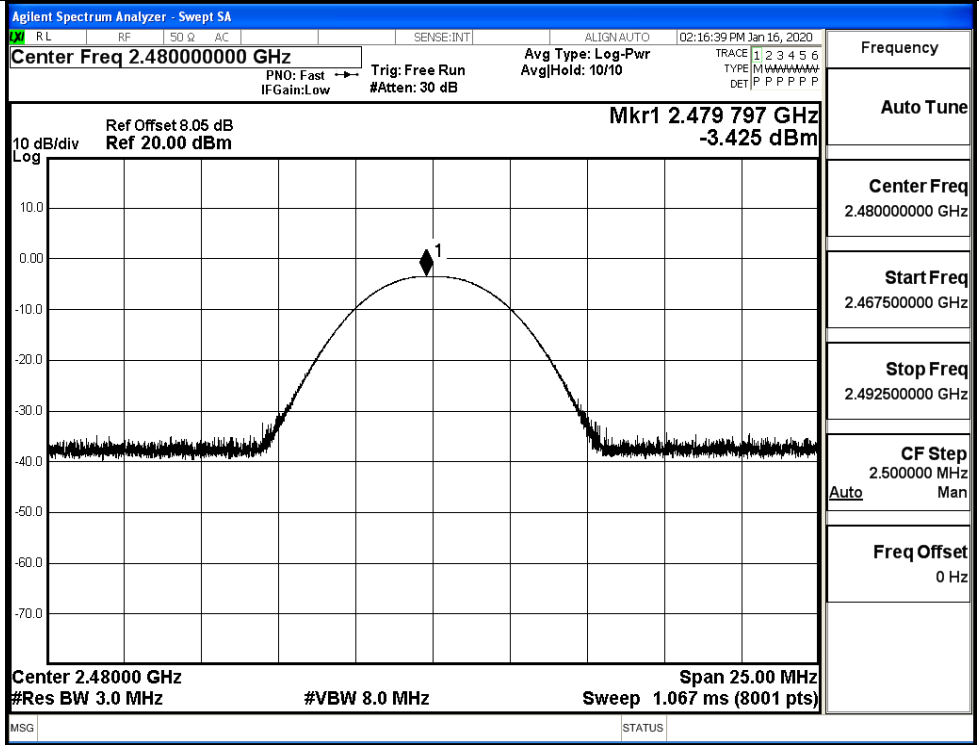


B.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	-2.530	30	PASS
BT LE	MCH	-2.788	30	PASS
BT LE	HCH	-3.425	30	PASS

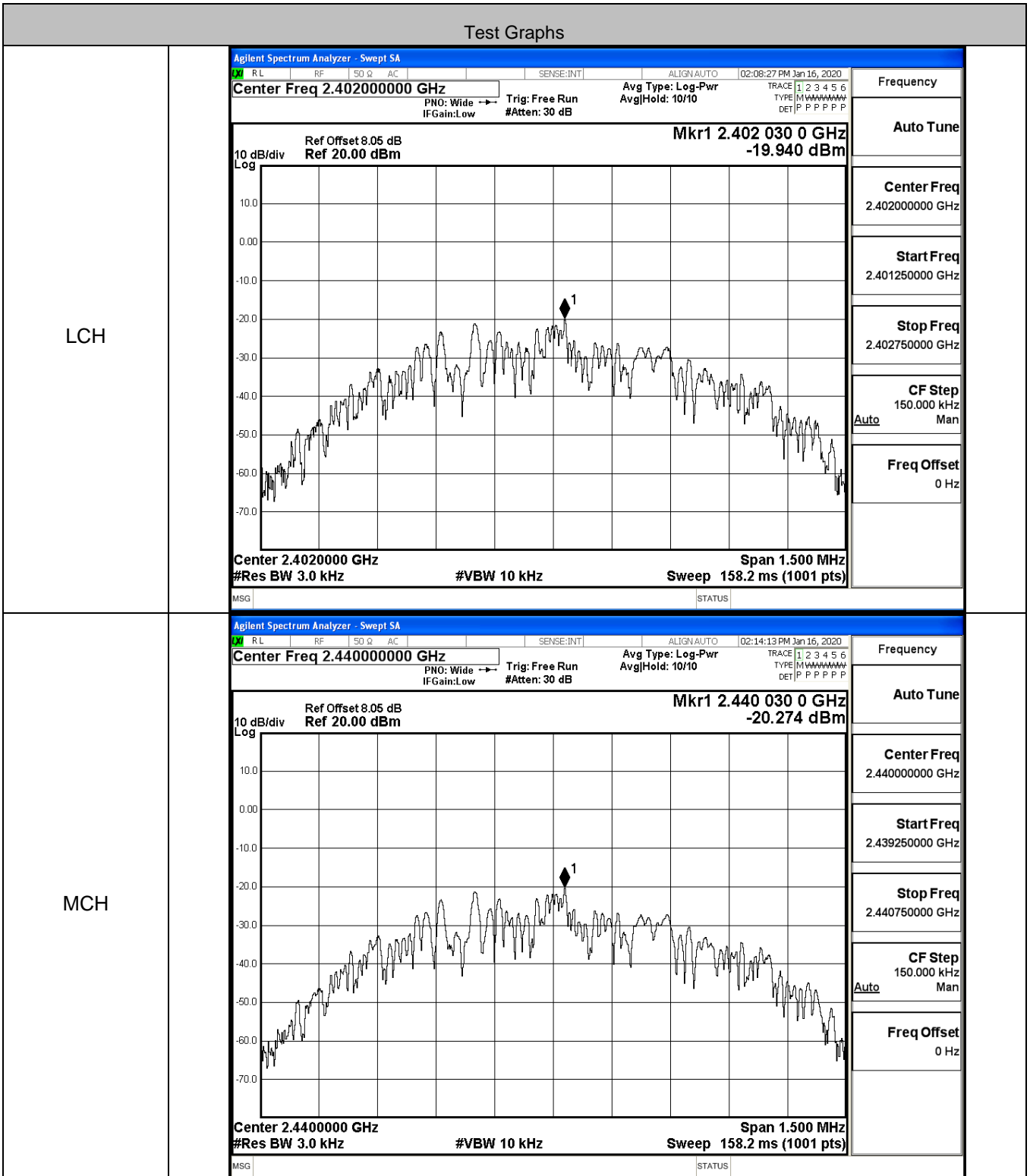


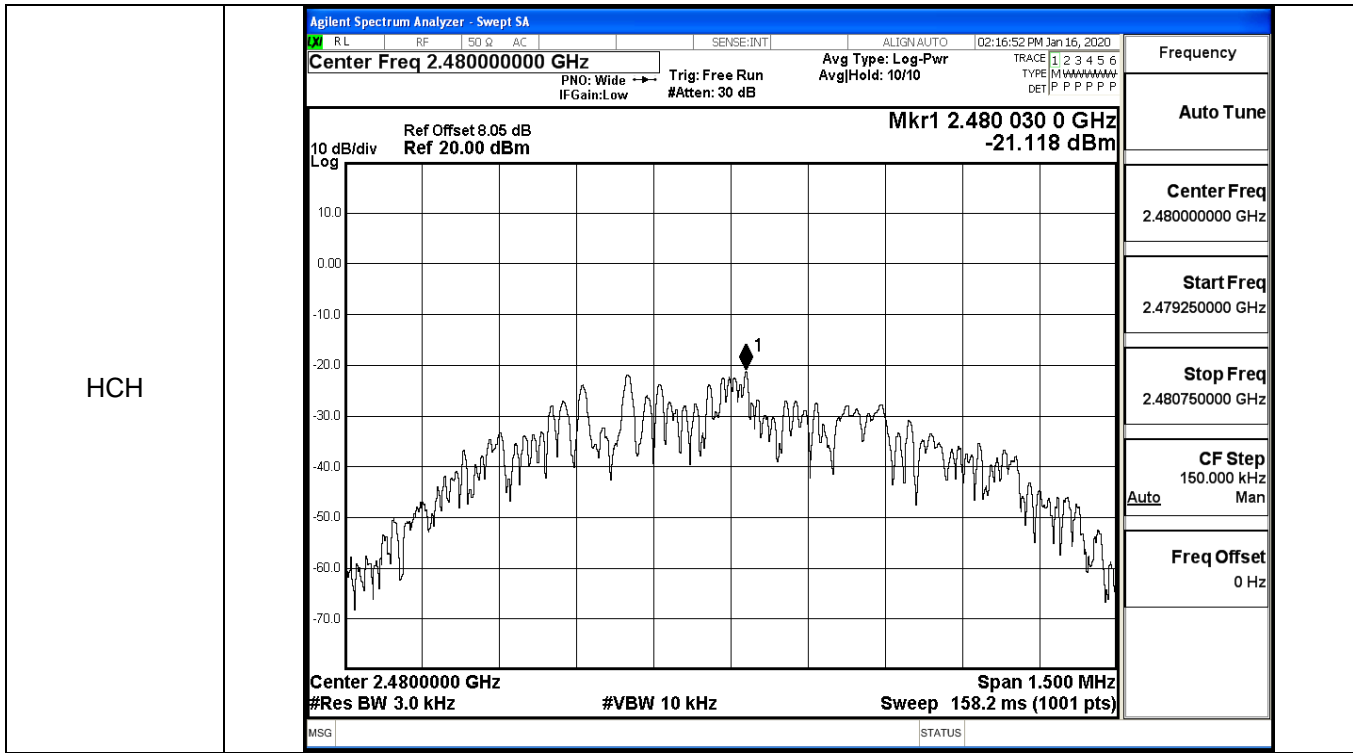
HCH



B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-19.940	8	PASS
BT LE	MCH	-20.274	8	PASS
BT LE	HCH	-21.118	8	PASS

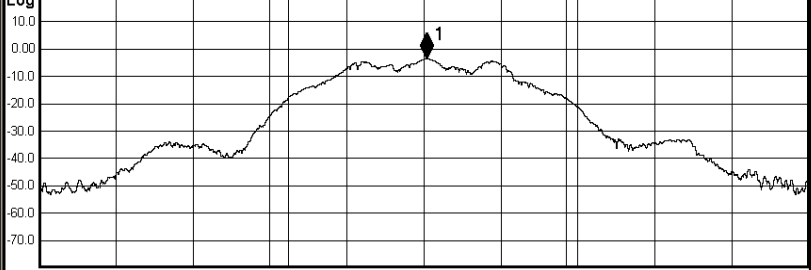




B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6894	≥0.5	PASS
BT LE	MCH	0.6850	≥0.5	PASS
BT LE	HCH	0.6856	≥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:INT ALIGN:AUTO 02:07:42 PM Jan 16, 2020</p> <p style="margin: 0;">Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px;"> <p style="text-align: right; margin: 0;">Mkr1 2.402018 GHz -2.7257 dBm</p> </div> <p style="margin: 0;">Center 2.402 GHz Span 3 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table style="width: 100%; font-size: small; border-collapse: collapse;"> <tr> <td style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">3.47 dBm</td> </tr> <tr> <td style="text-align: center;">1.0638 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>16.635 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>689.4 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> <p style="font-size: x-small; margin: 0;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	3.47 dBm	1.0638 MHz			Transmit Freq Error	16.635 kHz	OBW Power	x dB Bandwidth	689.4 kHz	x dB			99.00 %			-6.00 dB
Occupied Bandwidth	Total Power	3.47 dBm																	
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		-6.00 dB																	
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:INT ALIGN:AUTO 02:13:48 PM Jan 16, 2020</p> <p style="margin: 0;">Center Freq 2.440000000 GHz Center Freq: 2.440000000 GHz Radio Std: None Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px;"> <p style="text-align: right; margin: 0;">Mkr1 2.440015 GHz -2.9811 dBm</p> </div> <p style="margin: 0;">Center 2.44 GHz Span 3 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table style="width: 100%; font-size: small; border-collapse: collapse;"> <tr> <td style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">3.30 dBm</td> </tr> <tr> <td style="text-align: center;">1.0684 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>16.983 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>685.0 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	3.30 dBm	1.0684 MHz			Transmit Freq Error	16.983 kHz	OBW Power	x dB Bandwidth	685.0 kHz	x dB			99.00 %			-6.00 dB
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		-6.00 dB																	

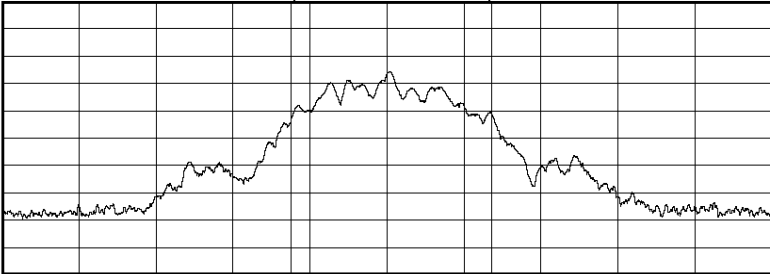
HCH	Agilent Spectrum Analyzer - Occupied BW	RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 02:16:28 PM Jan 16, 2020	Frequency																	
	Center Freq 2.480000000 GHz	Center Freq: 2.480000000 GHz Trig: Free Run AvgHold: 1/1 #IFGain:Low #Atten: 30 dB	Radio Std: None Radio Device: BTS																	
	10 dB/div Log	Ref Offset 8.05 dB Ref 20.00 dBm	Mkr1 2.4800128 GHz -3.5958 dBm																	
	 <p>The plot shows a signal spectrum with a peak at 2.4800128 GHz. The y-axis is labeled 'Log' and ranges from -70.0 to 10.0 dB/div. The x-axis represents frequency. A marker '1' is placed at the peak of the signal.</p>		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;"> <tr> <td style="width: 33%;">Occupied Bandwidth</td> <td style="width: 33%;">Total Power</td> <td style="width: 33%;">2.55 dBm</td> </tr> <tr> <td style="text-align: center; font-size: 1.2em;">1.0753 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>16.176 kHz</td> <td>OBW Power</td> </tr> <tr> <td>x dB Bandwidth</td> <td>685.6 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	2.55 dBm	1.0753 MHz			Transmit Freq Error	16.176 kHz	OBW Power	x dB Bandwidth	685.6 kHz	x dB			99.00 %			-6.00 dB	CF Step 300.000 kHz Auto Man
Occupied Bandwidth	Total Power	2.55 dBm																		
1.0753 MHz																				
Transmit Freq Error	16.176 kHz	OBW Power																		
x dB Bandwidth	685.6 kHz	x dB																		
		99.00 %																		
		-6.00 dB																		
MSG		STATUS	Freq Offset 0 Hz																	

B.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0331	≥0.5	PASS
BT LE	MCH	1.0373	≥0.5	PASS
BT LE	HCH	1.0407	≥0.5	PASS

Test Graphs

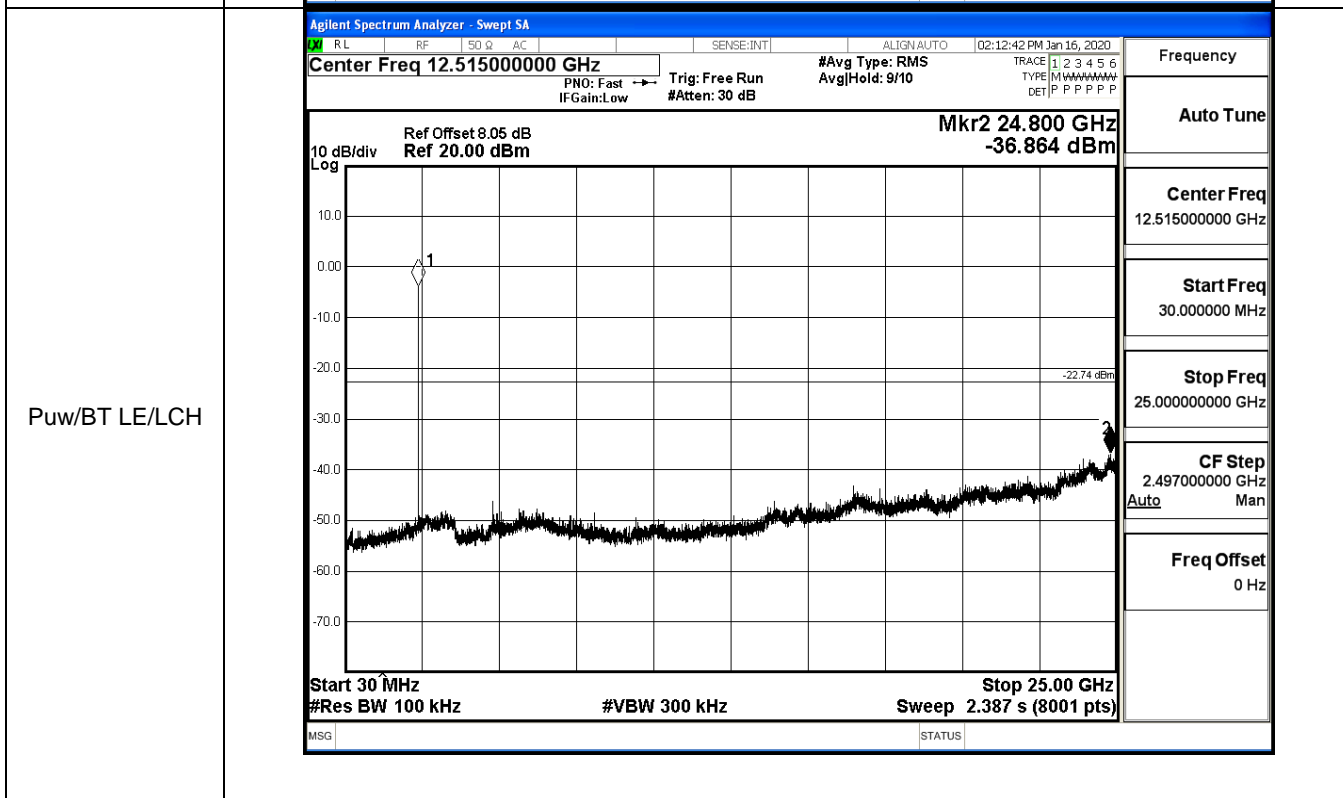
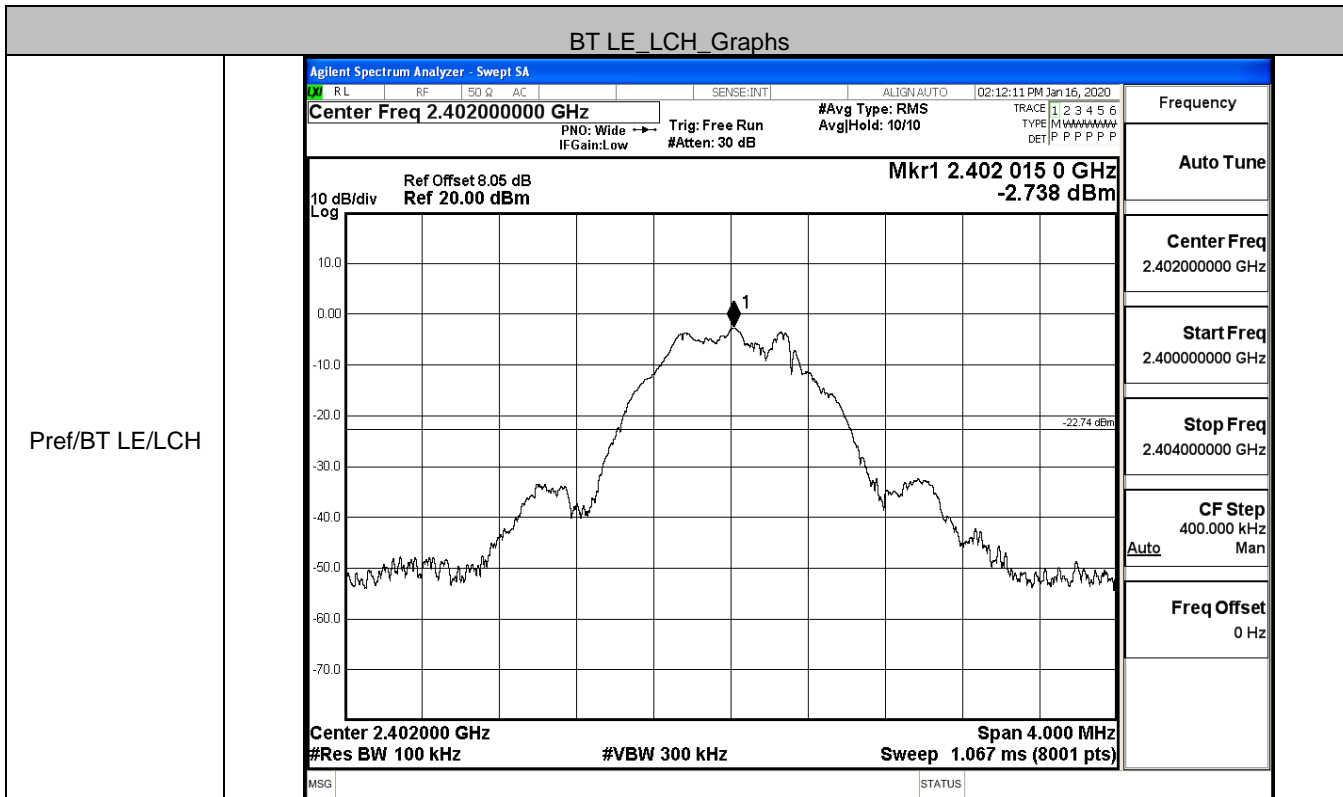
LCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p>Trig: Free Run Avg/Hold: 10/10</p> <p>#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>Center 2.402 GHz Span 4 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 4.267 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>3.08 dBm</td> </tr> <tr> <td colspan="3" style="text-align: center;">1.0331 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>23.325 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>595.3 kHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p>MSG STATUS</p>	Occupied Bandwidth	Total Power	3.08 dBm	1.0331 MHz			Transmit Freq Error	23.325 kHz	OBW Power 99.00 %	x dB Bandwidth	595.3 kHz	x dB -6.00 dB	<p>Frequency</p> <p>Center Freq 2.402000000 GHz</p> <p>CF Step 400.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
	Occupied Bandwidth	Total Power	3.08 dBm											
1.0331 MHz														
Transmit Freq Error	23.325 kHz	OBW Power 99.00 %												
x dB Bandwidth	595.3 kHz	x dB -6.00 dB												
MCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.44000000 GHz Center Freq: 2.440000000 GHz Radio Std: None</p> <p>Trig: Free Run Avg/Hold: 10/10</p> <p>#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>Center 2.44 GHz Span 4 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 4.267 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>2.73 dBm</td> </tr> <tr> <td colspan="3" style="text-align: center;">1.0373 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>22.810 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>591.2 kHz</td> <td>x dB -6.00 dB</td> </tr> </table> <p>MSG STATUS</p>	Occupied Bandwidth	Total Power	2.73 dBm	1.0373 MHz			Transmit Freq Error	22.810 kHz	OBW Power 99.00 %	x dB Bandwidth	591.2 kHz	x dB -6.00 dB	<p>Frequency</p> <p>Center Freq 2.440000000 GHz</p> <p>CF Step 400.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
	Occupied Bandwidth	Total Power	2.73 dBm											
1.0373 MHz														
Transmit Freq Error	22.810 kHz	OBW Power 99.00 %												
x dB Bandwidth	591.2 kHz	x dB -6.00 dB												

HCH	Agilent Spectrum Analyzer - Occupied BW	RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 02:07:02 PM Jan 16, 2020	
	Center Freq 2.480000000 GHz	Center Freq: 2.480000000 GHz Trig: Free Run AvgHold: 10/10	Radio Std: None
	#IFGain:Low	#Atten: 30 dB	Radio Device: BTS
	<div style="display: flex; justify-content: space-between;"> 10 dB/div Ref Offset 8.05 dB </div> <div style="display: flex; justify-content: space-between;"> Log Ref 20.00 dBm </div> 		
	Center 2.48 GHz #Res BW 30 kHz	#VBW 100 kHz	Span 4 MHz Sweep 4.267 ms
Occupied Bandwidth <div style="text-align: center; font-size: 1.2em; font-weight: bold;">1.0407 MHz</div>		Total Power <div style="text-align: center; font-weight: bold;">2.33 dBm</div>	
Transmit Freq Error	22.090 kHz	OBW Power	
x dB Bandwidth	600.7 kHz	x dB	
		99.00 %	
		-6.00 dB	
MSG	STATUS		

B.6 RF Conducted Spurious Emissions

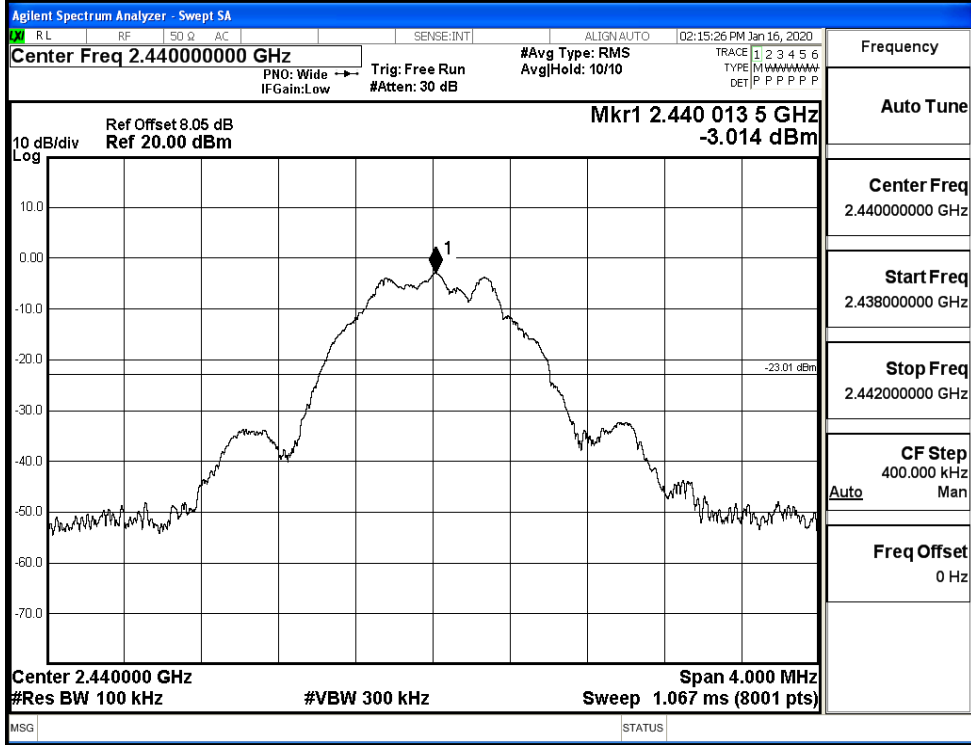
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	-2.738	-36.864	-22.738	PASS
BT LE	MCH	-3.014	-29.827	-23.014	PASS
BT LE	HCH	-2.242	-25.116	-22.242	PASS

BT LE_LCH_Graphs

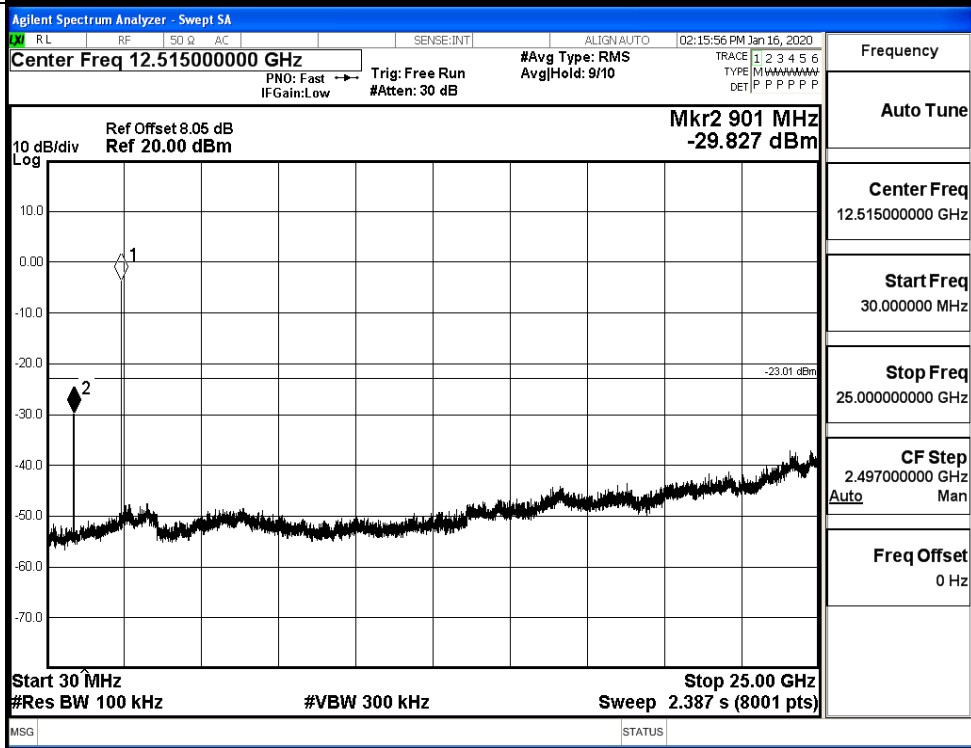


BT LE_MCH_Graphs

Pref/BT LE/MCH

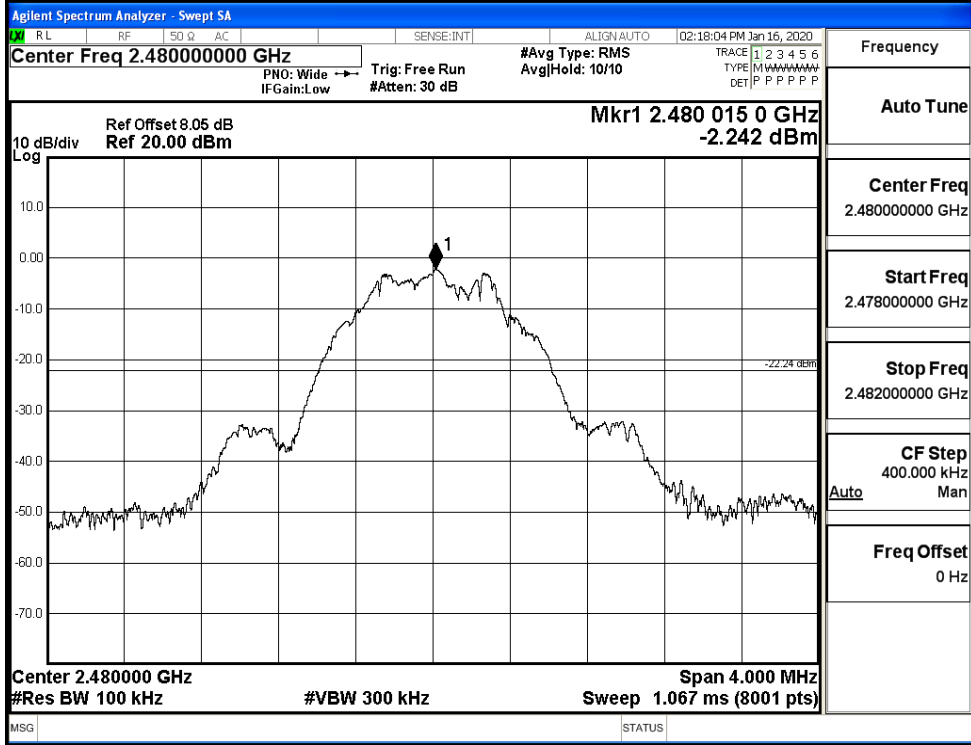


Puw/BT LE/MCH

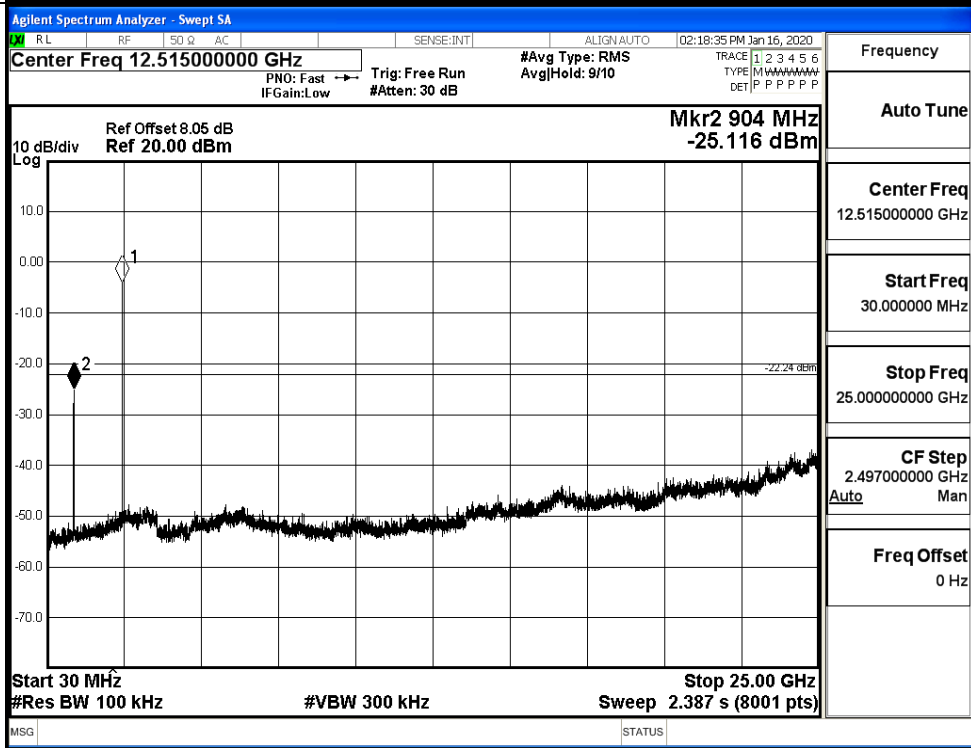


BT LE_HCH_Graphs

Pref/BT LE/HCH



Puw/BT LE/HCH



B.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	-2.694	-49.364	-22.69	PASS
BT LE	HCH	-3.535	-49.789	-23.54	PASS

Test Graphs

LCH

Agilent Spectrum Analyzer - Swept SA
 Center Freq 2.35700000 GHz
 Ref Offset 8.05 dB, Ref 20.00 dBm
 Mkr4 2.327 002 GHz, -49.364 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		2.402 014 GHz	-2.694 dBm			
2	N	f		2.400 000 GHz	-51.773 dBm			
3	N	f		2.390 000 GHz	-52.005 dBm			
4	N	f		2.327 002 GHz	-49.364 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
 Ref Offset 8.05 dB, Ref 20.00 dBm
 Mkr4 2.493 237 75 GHz, -49.789 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		2.480 018 50 GHz	-3.535 dBm			
2	N	f		2.483 500 00 GHz	-52.792 dBm			
3	N	f		2.500 000 00 GHz	-53.204 dBm			
4	N	f		2.493 237 75 GHz	-49.789 dBm			

Frequency

Auto Tune

Center Freq
2.48900000 GHz

Start Freq
2.47800000 GHz

Stop Freq
2.50000000 GHz

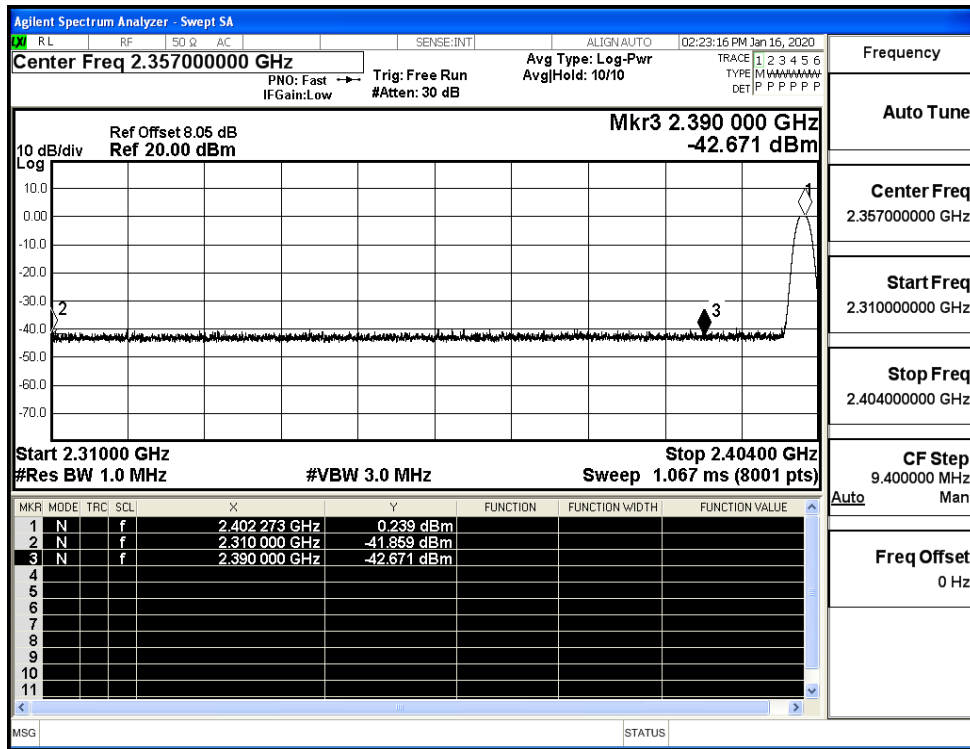
CF Step
2.200000 MHz

Freq Offset
0 Hz

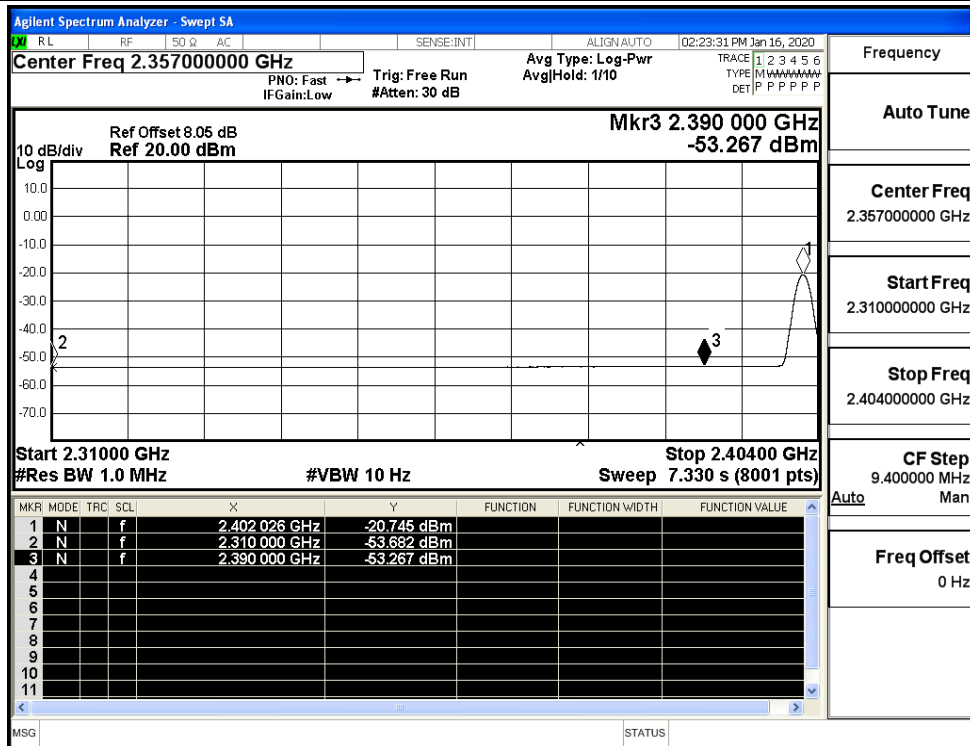
B.8 Restrict-band band-edge measurements

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	-41.86	3.0	0	56.37	PEAK	74	PASS
		Ant1	2310.0	-53.68	3.0	0	44.55	AV	54	PASS
		Ant1	2390.0	-42.67	3.0	0	55.56	PEAK	74	PASS
		Ant1	2390.0	-53.27	3.0	0	44.96	AV	54	PASS
	2480	Ant1	2483.5	-42.32	3.0	0	55.91	PEAK	74	PASS
		Ant1	2483.5	-52.70	3.0	0	45.53	AV	54	PASS
		Ant1	2500.0	-41.08	3.0	0	57.15	PEAK	74	PASS
		Ant1	2500.0	-52.69	3.0	0	45.54	AV	54	PASS

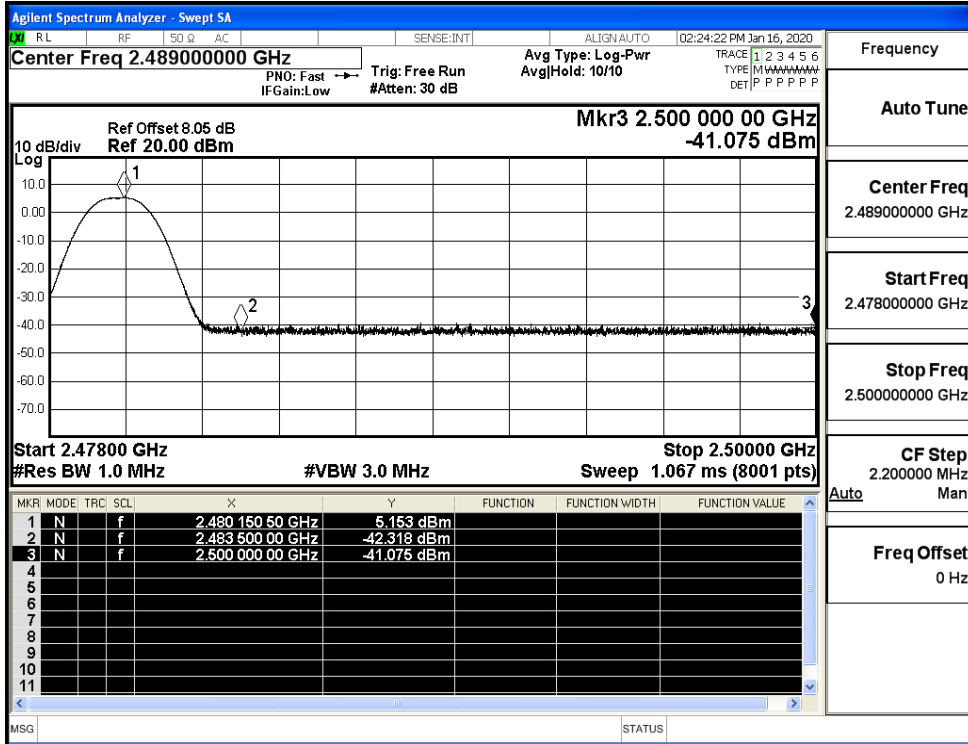
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

