

Appendix B

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

Product Name: GNSS RECEIVER

Trade Mark: SOUTH, KOLIDA, SANDING, RUIDE, TIANYU

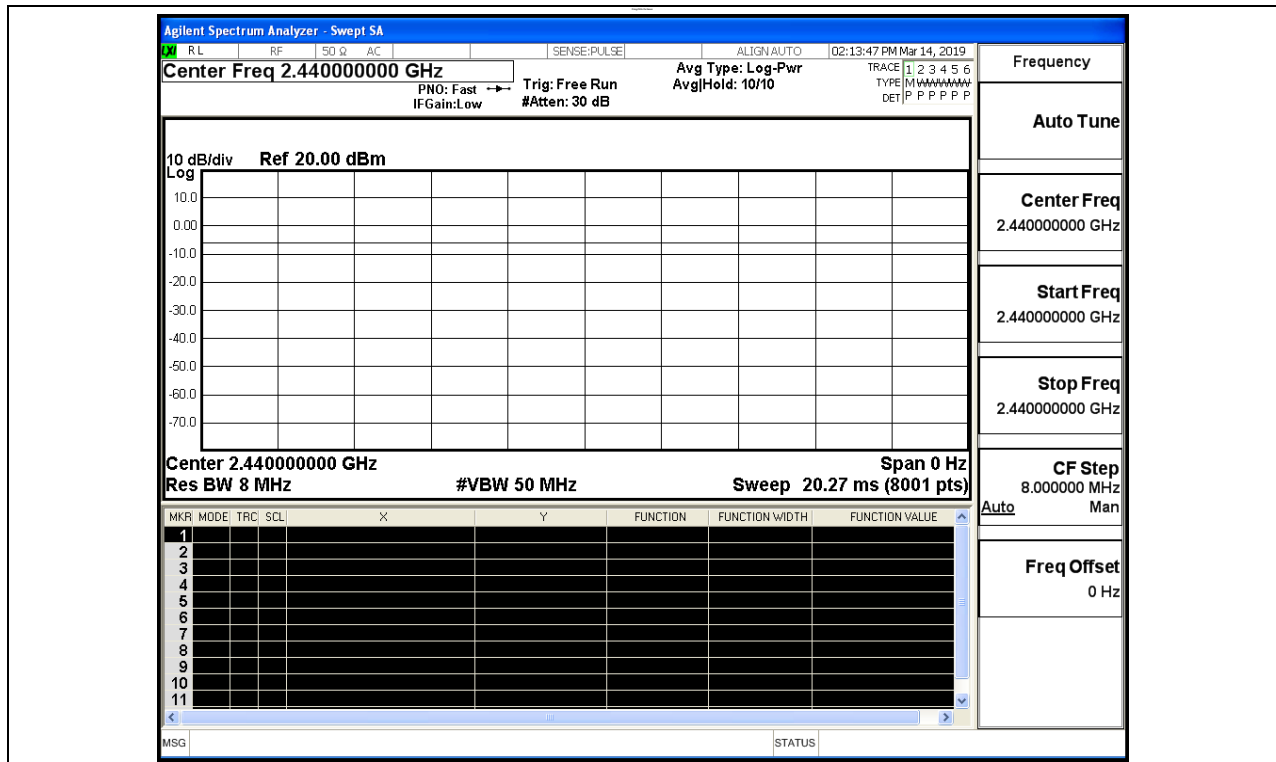
Test Model: K5

Environmental Conditions

Temperature:	24.5 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Tom.Liu

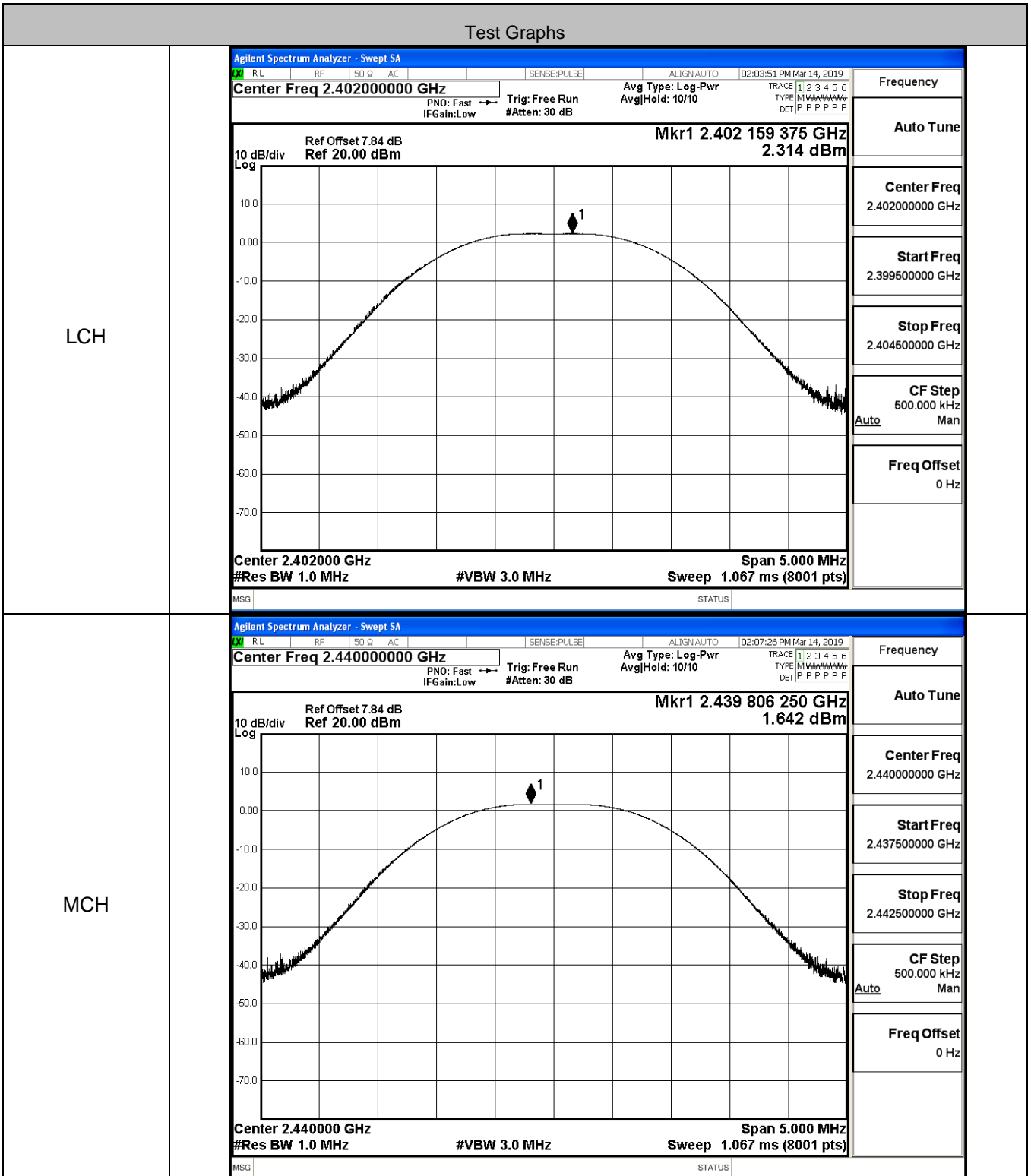
B.1 Duty Cycle

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

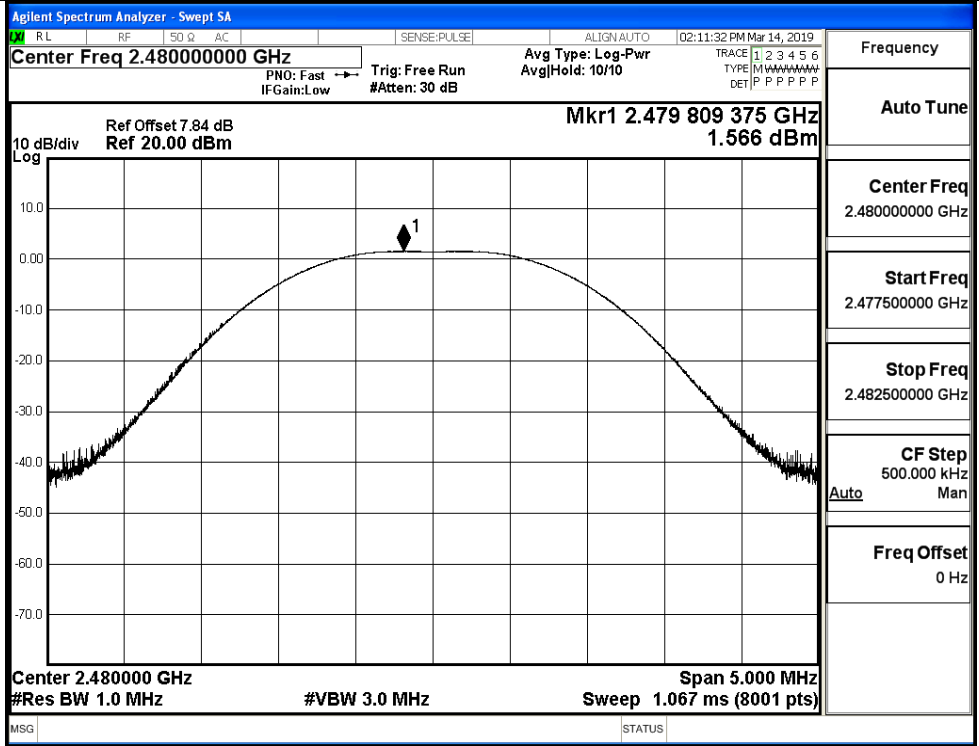


B.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	2.314	30	PASS
BT LE	MCH	1.642	30	PASS
BT LE	HCH	1.566	30	PASS

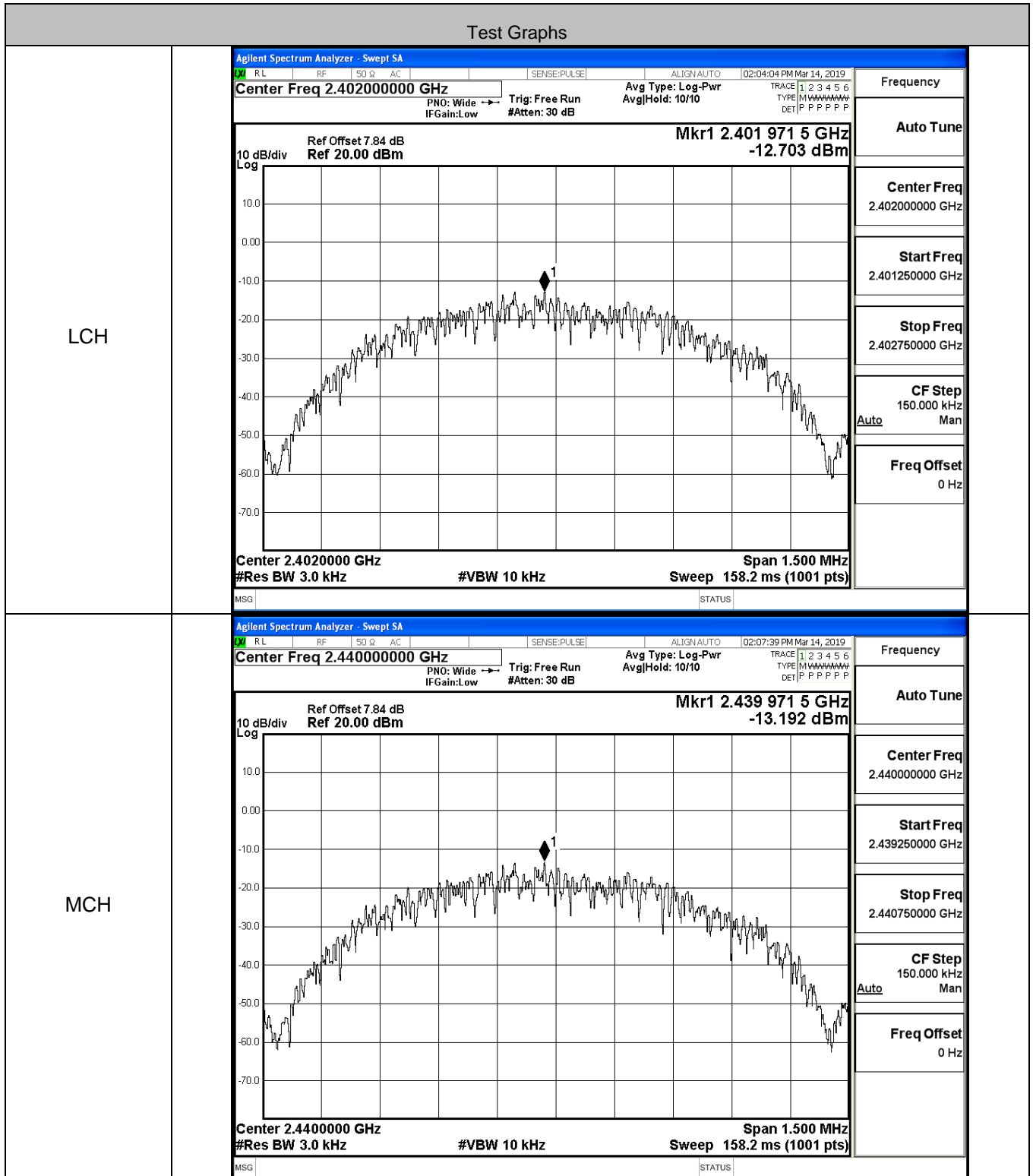


HCH

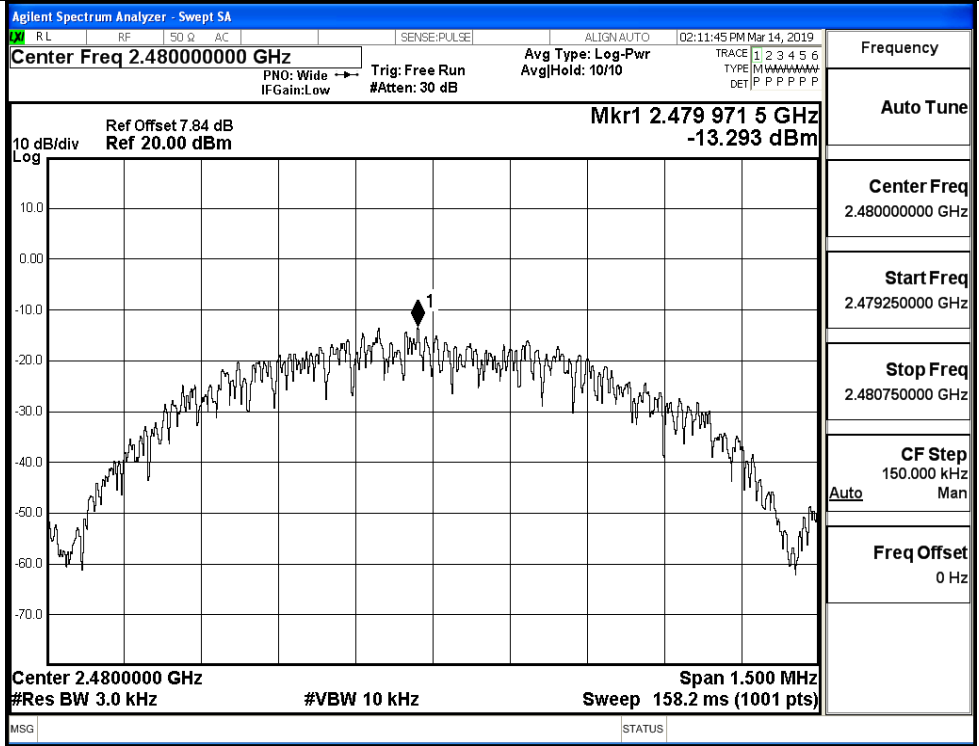


B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-12.703	8	PASS
BT LE	MCH	-13.192	8	PASS
BT LE	HCH	-13.293	8	PASS



HCH



B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6838	≥0.5	PASS
BT LE	MCH	0.6878	≥0.5	PASS
BT LE	HCH	0.6879	≥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 02:03:40 PM Mar 14, 2019</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="display: flex; justify-content: space-between;"> <div style="font-size: x-small;"> 10 dB/div Log Ref Offset 7.84 dB Ref 20.00 dBm </div> <div style="text-align: right;"> Mkr1 2.4019835 GHz 1.4749 dBm </div> </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-top: 5px;"> <div>Center 2.402 GHz #Res BW 100 kHz</div> <div>#VBW 300 kHz</div> <div>Span 3 MHz Sweep 1.067 ms</div> </div> <table style="width: 100%; font-size: x-small; margin-top: 5px;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td colspan="2">8.56 dBm</td> </tr> <tr> <td colspan="4" style="text-align: center;">1.0443 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-1.833 kHz</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>683.8 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	8.56 dBm		1.0443 MHz				Transmit Freq Error	-1.833 kHz	OBW Power	99.00 %	x dB Bandwidth	683.8 kHz	x dB	-6.00 dB
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1.0443 MHz																	
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x dB Bandwidth	683.8 kHz	x dB	-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:PULSE ALIGN:AUTO 02:07:15 PM Mar 14, 2019</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="display: flex; justify-content: space-between;"> <div style="font-size: x-small;"> 10 dB/div Log Ref Offset 7.84 dB Ref 20.00 dBm </div> <div style="text-align: right;"> Mkr1 2.4399888 GHz 0.90733 dBm </div> </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-top: 5px;"> <div>Center 2.44 GHz #Res BW 100 kHz</div> <div>#VBW 300 kHz</div> <div>Span 3 MHz Sweep 1.067 ms</div> </div> <table style="width: 100%; font-size: x-small; margin-top: 5px;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td colspan="2">7.94 dBm</td> </tr> <tr> <td colspan="4" style="text-align: center;">1.0419 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-3.563 kHz</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>687.8 kHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	7.94 dBm		1.0419 MHz				Transmit Freq Error	-3.563 kHz	OBW Power	99.00 %	x dB Bandwidth	687.8 kHz	x dB	-6.00 dB
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1.0419 MHz																	
Transmit Freq Error	-3.563 kHz	OBW Power	99.00 %														
x dB Bandwidth	687.8 kHz	x dB	-6.00 dB														

HCH

Agilent Spectrum Analyzer - Occupied BW

RL	RF	50 Ω	AC	SENSE:PULSE	ALIGN:AUTO	02:11:21 PM Mar 14, 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	Ref Offset 7.84 dB	Mkr1 2.4799895 GHz
Log	Ref 20.00 dBm	0.78798 dBm

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

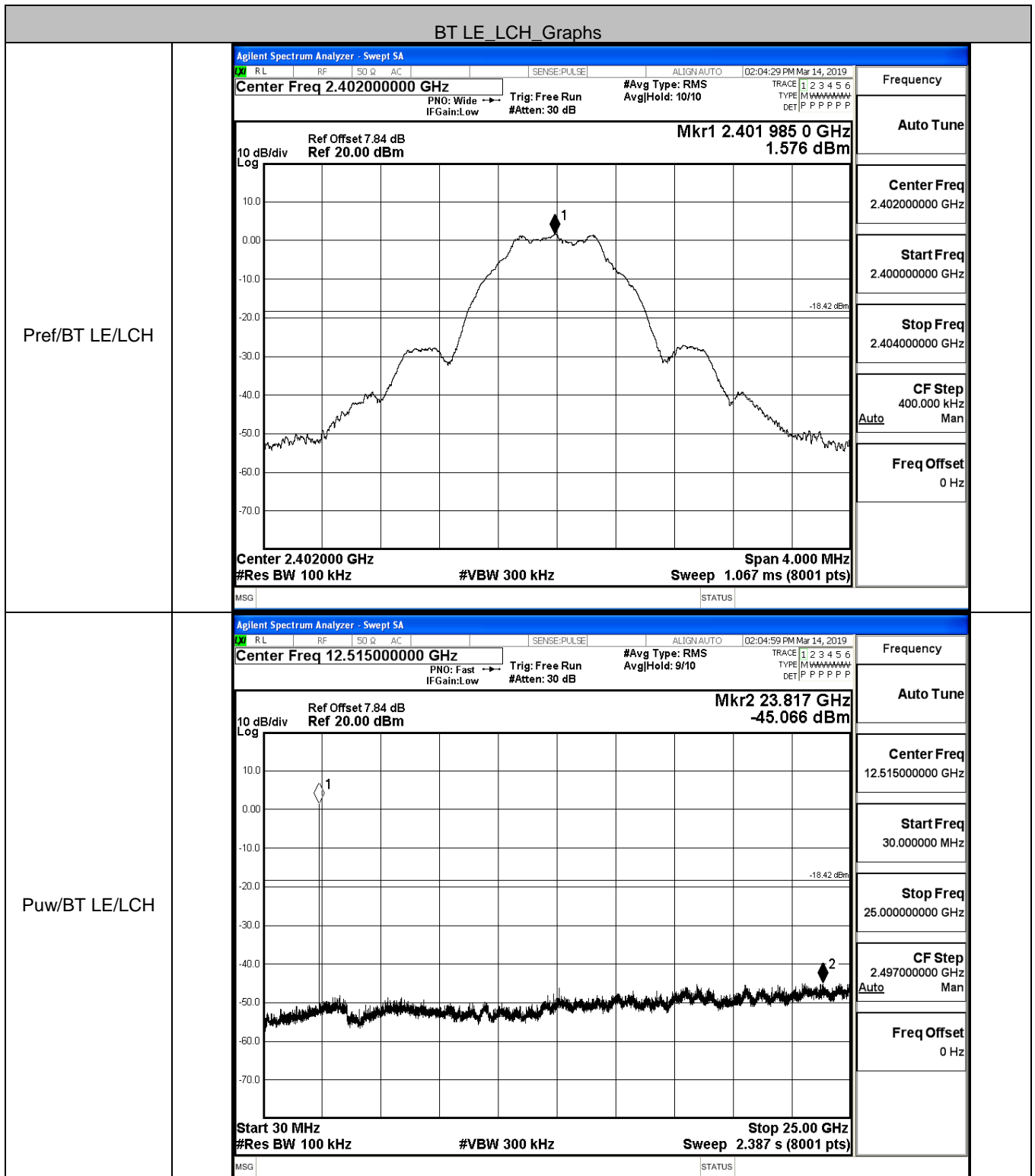
Occupied Bandwidth	Total Power	7.86 dBm
1.0390 MHz		
Transmit Freq Error	-2.976 kHz	OBW Power
x dB Bandwidth	687.9 kHz	99.00 %
	x dB	-6.00 dB

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

MSG
STATUS

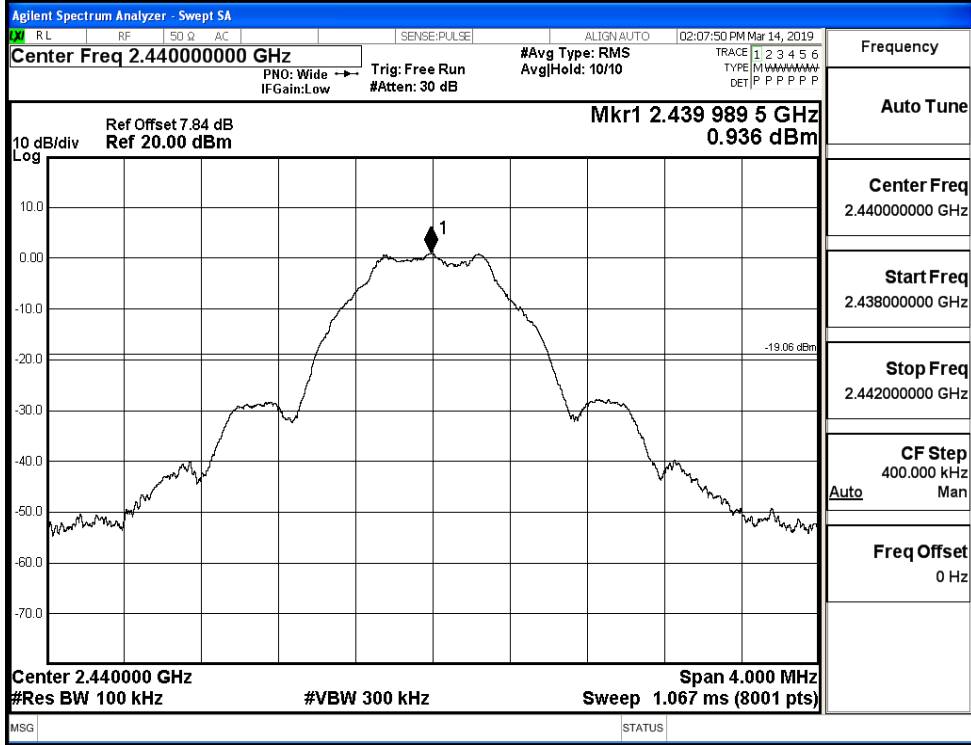
B.5 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	1.576	-45.066	-18.424	PASS
BT LE	MCH	0.936	-43.964	-19.064	PASS
BT LE	HCH	0.69	-43.934	-19.310	PASS

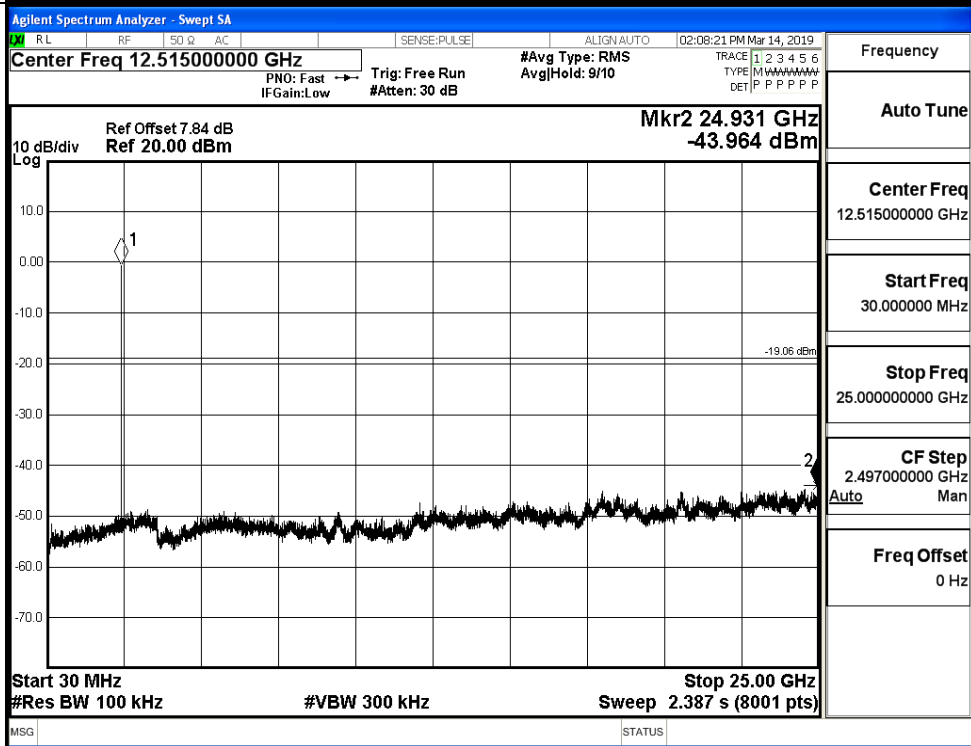


BT LE_MCH_Graphs

Pref/BT LE/MCH

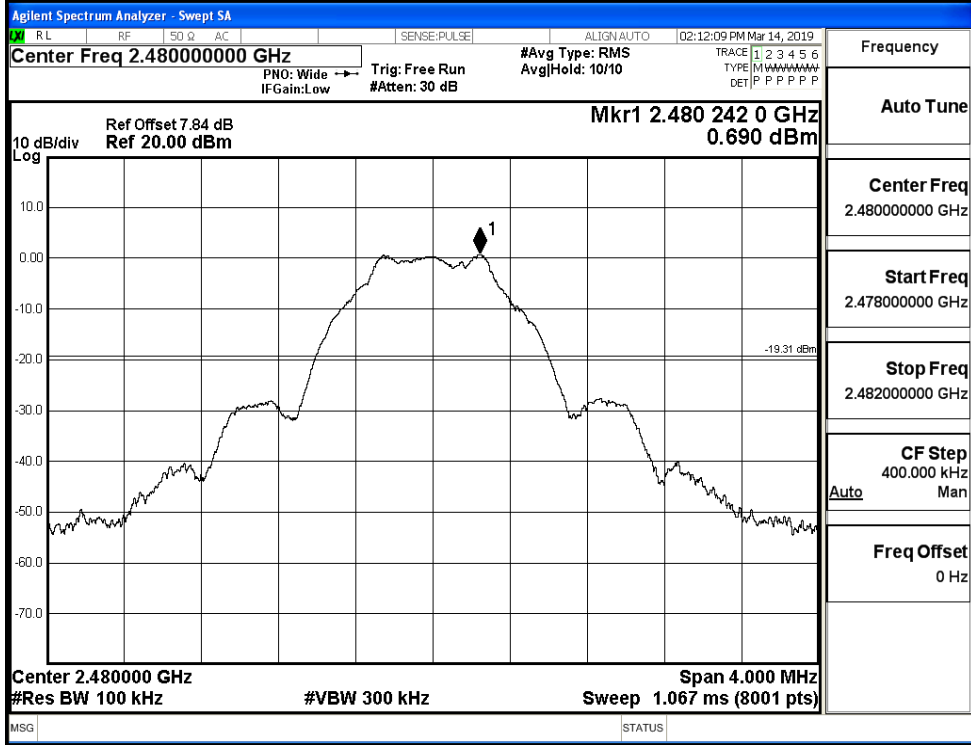


Puw/BT LE/MCH

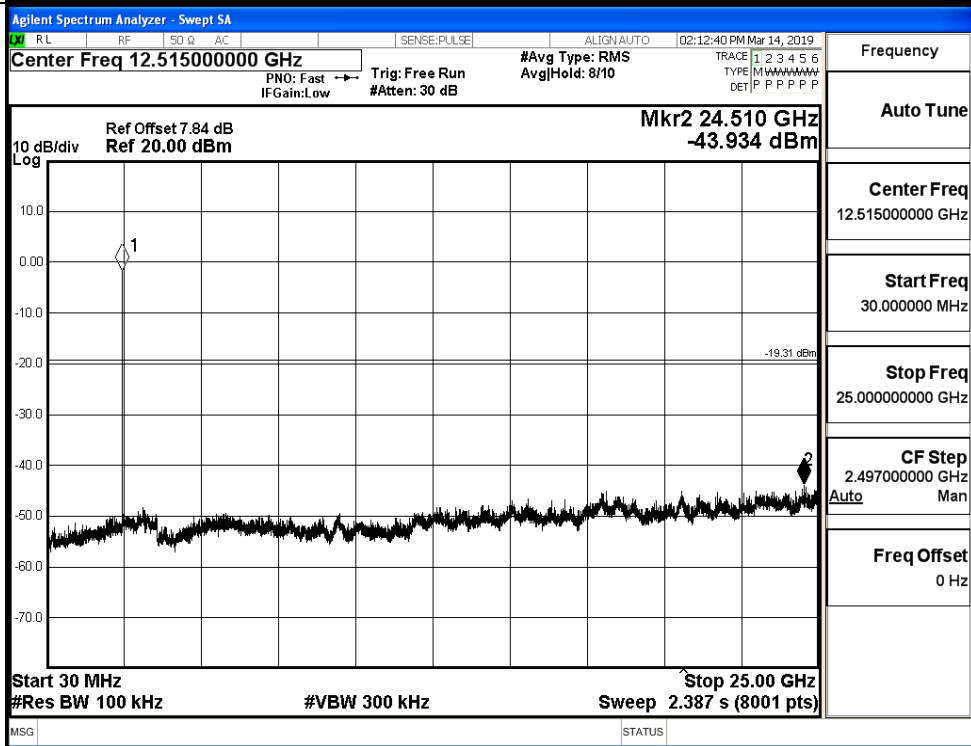


BT LE_HCH_Graphs

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 LE	LCH	1.725	-50.282	-18.28	PASS
BT LE	HCH	0.904	-50.199	-19.1	PASS

Test Graphs

LCH

Agilent Spectrum Analyzer - Swept SA
 Center Freq 2.35700000 GHz
 Ref Offset 7.84 dB, Ref 20.00 dBm
 Mkr4 2.363 122 GHz, -50.282 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	2.402 003 GHz	1.725 dBm			
2	N		f	2.400 000 GHz	-52.173 dBm			
3	N		f	2.390 000 GHz	-54.188 dBm			
4	N		f	2.363 122 GHz	-50.282 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

HCH

Agilent Spectrum Analyzer - Swept SA
 Center Freq 2.489000000 GHz
 Ref Offset 7.84 dB, Ref 20.00 dBm
 Mkr4 2.479 760 25 GHz, -50.199 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	2.479 760 00 GHz	0.904 dBm			
2	N		f	2.483 500 00 GHz	-54.337 dBm			
3	N		f	2.500 000 00 GHz	-53.632 dBm			
4	N		f	2.497 918 25 GHz	-50.199 dBm			

Frequency

Auto Tune

Center Freq
2.489000000 GHz

Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

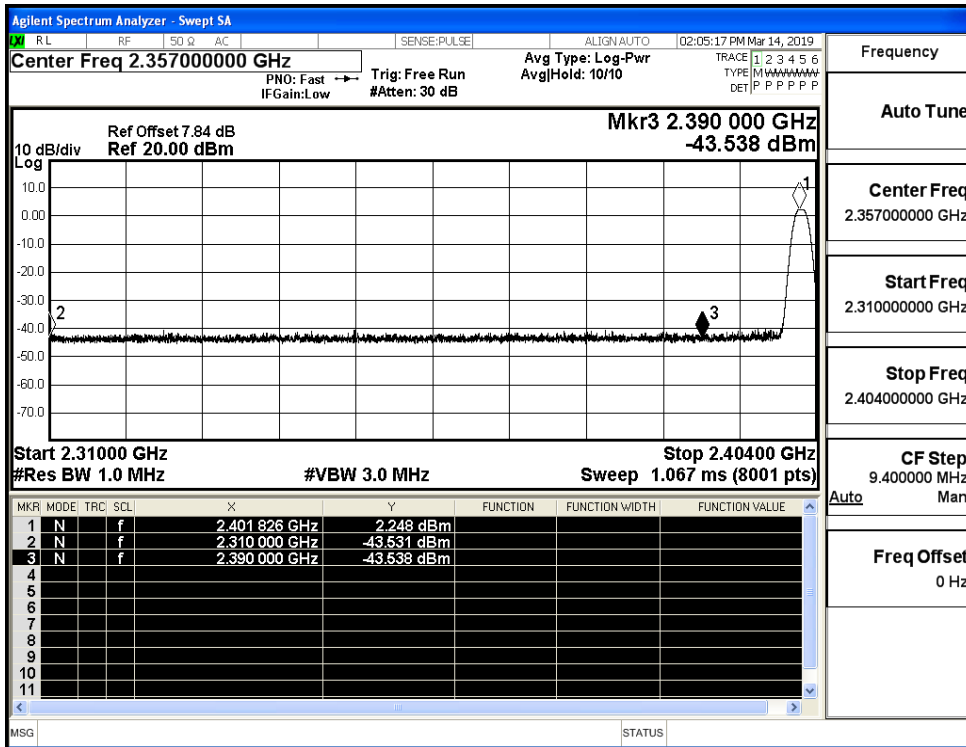
CF Step
2.200000 MHz

Freq Offset
0 Hz

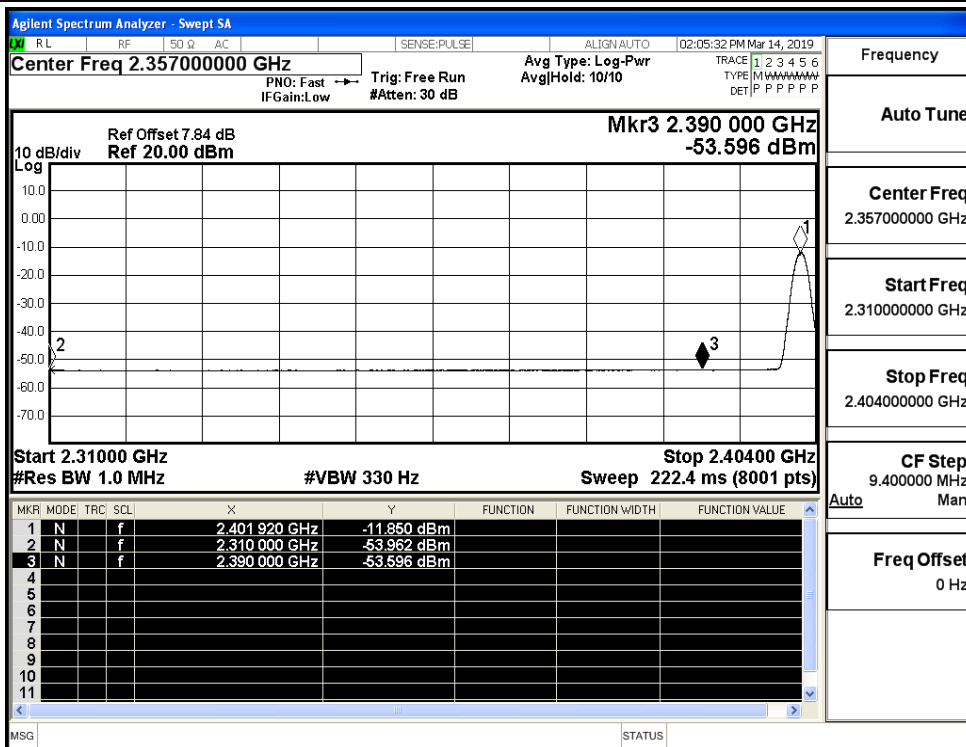
B.7 Restrict-band band-edge measurements

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	-43.53	2.0	0	53.73	PEAK	74	PASS
		Ant1	2310.0	-53.96	2.0	0	43.30	AV	54	PASS
		Ant1	2390.0	-43.54	2.0	0	53.72	PEAK	74	PASS
		Ant1	2390.0	-53.60	2.0	0	43.66	AV	54	PASS
	2480	Ant1	2483.5	-40.17	2.0	0	57.09	PEAK	74	PASS
		Ant1	2483.5	-53.25	2.0	0	44.00	AV	54	PASS
		Ant1	2500.0	-41.90	2.0	0	55.36	PEAK	74	PASS
		Ant1	2500.0	-53.26	2.0	0	43.99	AV	54	PASS

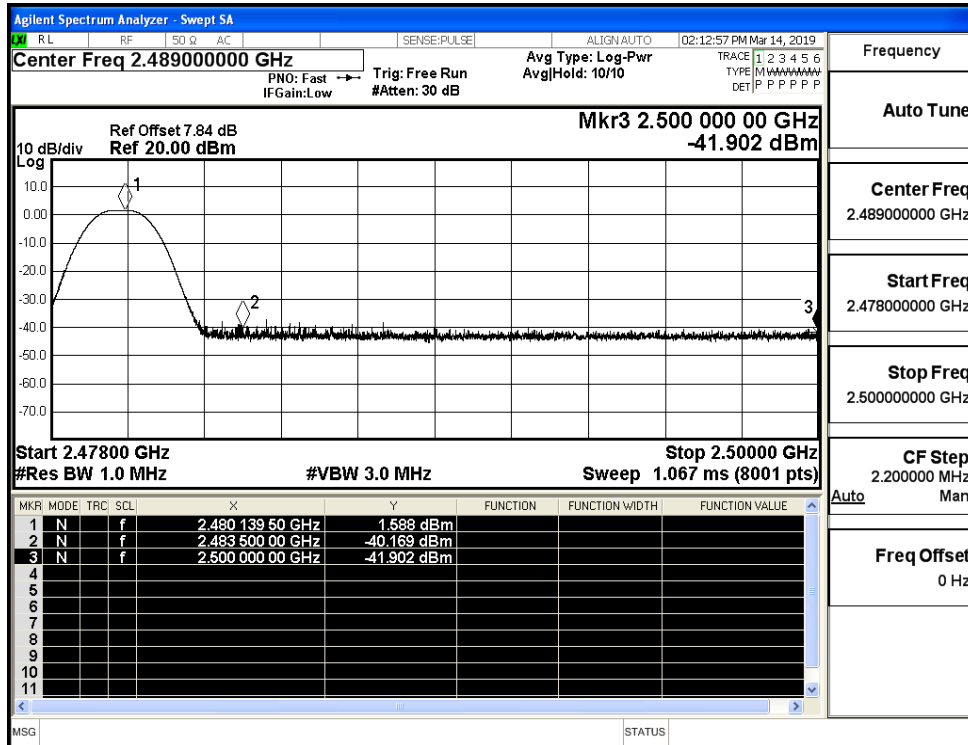
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



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

