

## Appendix A

### RF Test Data for BT V5.0(BLE) (Conducted Measurement)

Product Name: Bluetooth GPIO Detector

Trade Mark: Phillips Connect Technologies

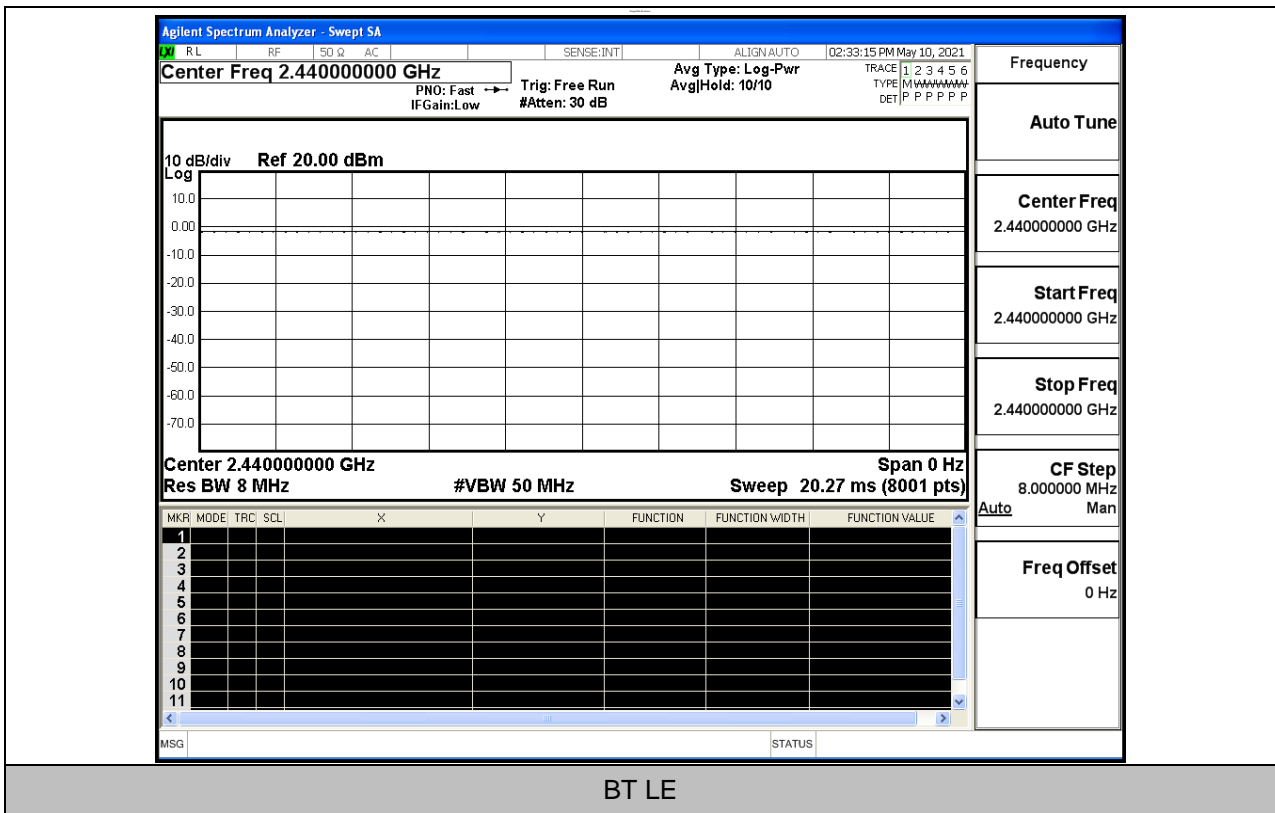
Test Model: LampCheck

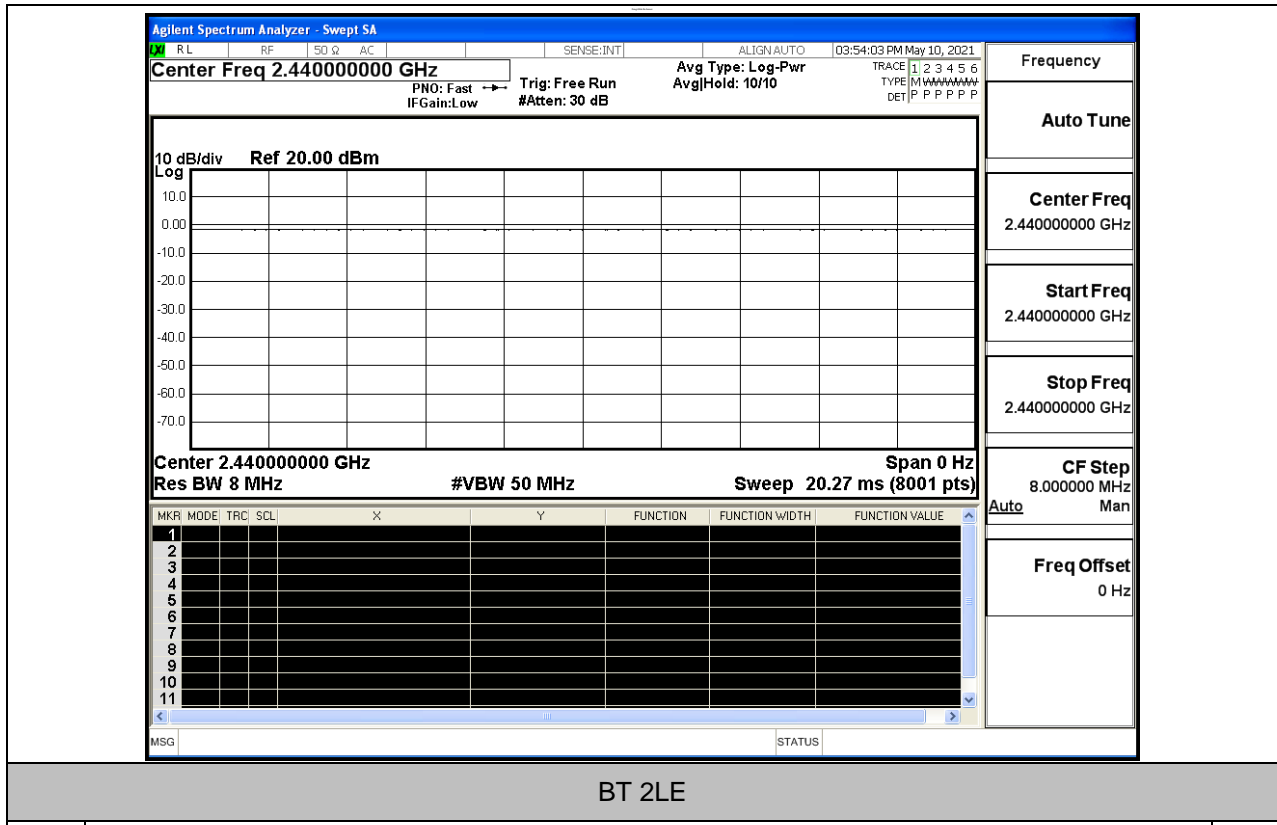
#### Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan

#### A.1 Duty Cycle

Test Mode	Test Channel	Duty Cycle[%]	Verdict
BT LE	2440	100	PASS
BT 2LE	2440	100	PASS



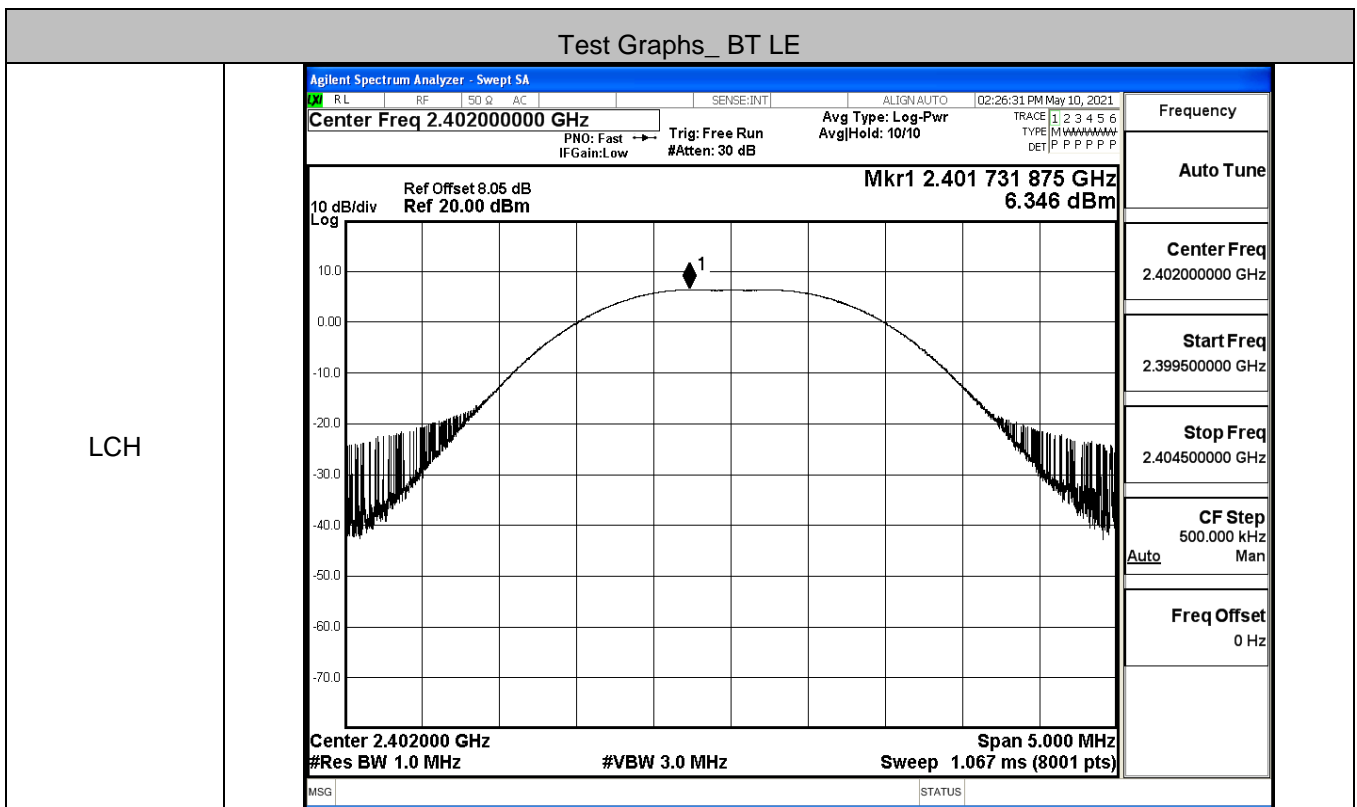


**A.2 Maximum Conducted Peak Output Power and e.i.r.p.**

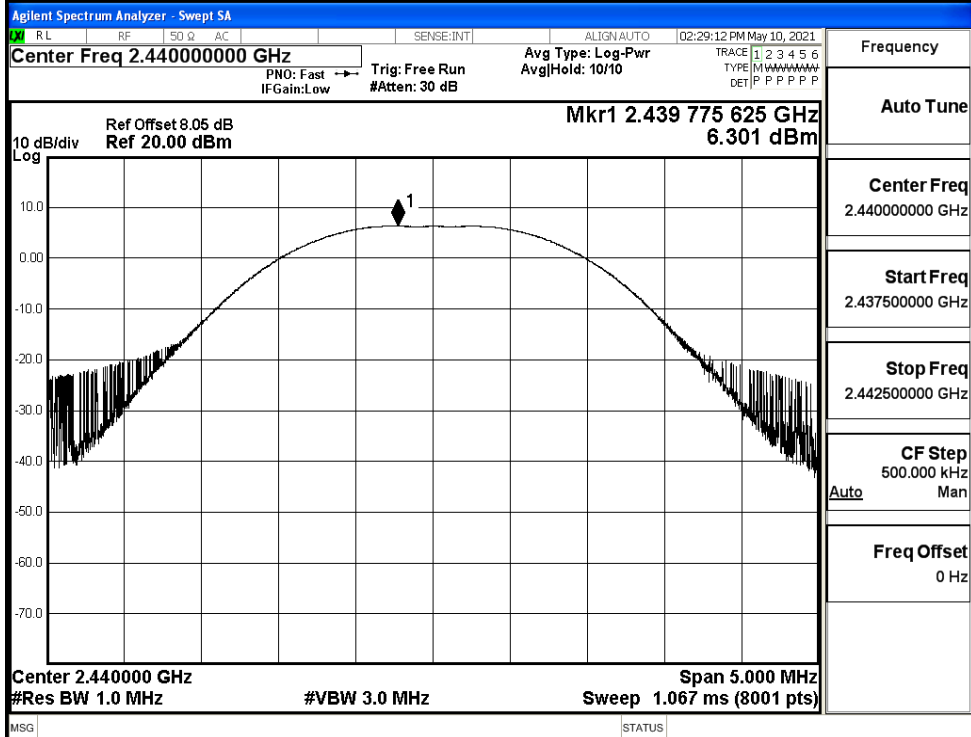
Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	6.346	30	PASS
BT LE	MCH	6.301	30	PASS
BT LE	HCH	5.873	30	PASS
BT 2LE	LCH	6.411	30	PASS
BT 2LE	MCH	6.344	30	PASS
BT 2LE	HCH	5.89	30	PASS

Mode	Channel	Conduct Peak Power[dBm]	Gain [dBi]	e.i.r.p. [dBm]	Limit [dBm]	Verdict
BT LE	LCH	6.346	1.82	8.17	36	PASS
BT LE	MCH	6.301	1.82	8.12	36	PASS
BT LE	HCH	5.873	1.82	7.69	36	PASS
BT 2LE	LCH	6.411	1.82	8.23	36	PASS
BT 2LE	MCH	6.344	1.82	8.16	36	PASS
BT 2LE	HCH	5.89	1.82	7.71	36	PASS

Test Graphs\_ BT LE

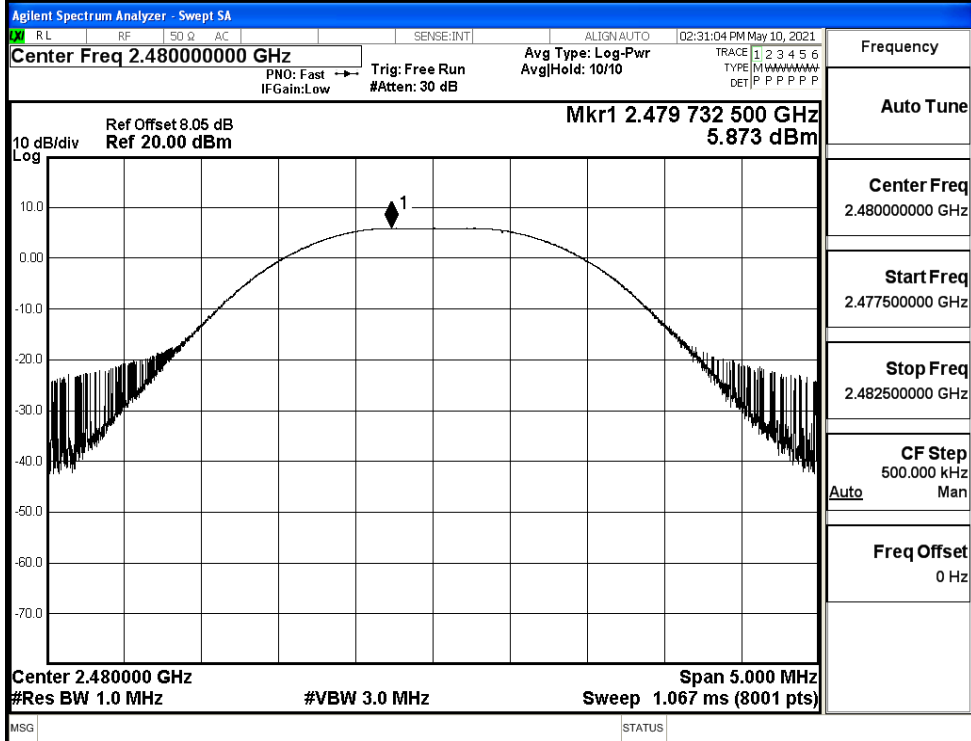


MCH



Frequency	
Auto Tune	
Center Freq	2.44000000 GHz
Start Freq	2.437500000 GHz
Stop Freq	2.442500000 GHz
CF Step	500.000 kHz
Auto	Man
Freq Offset	0 Hz

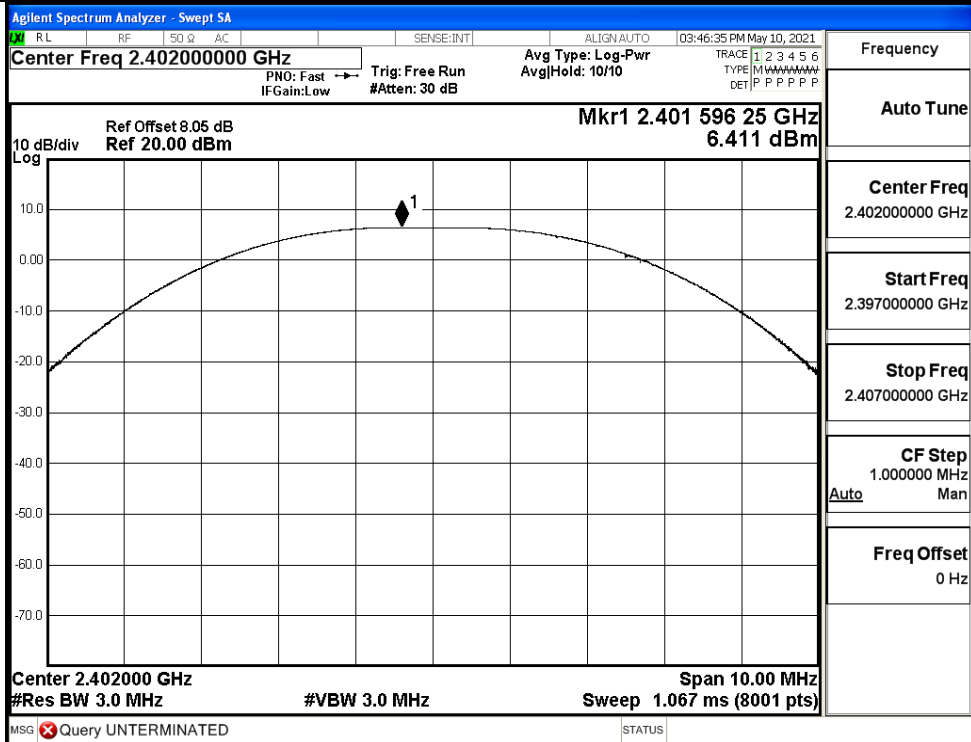
HCH



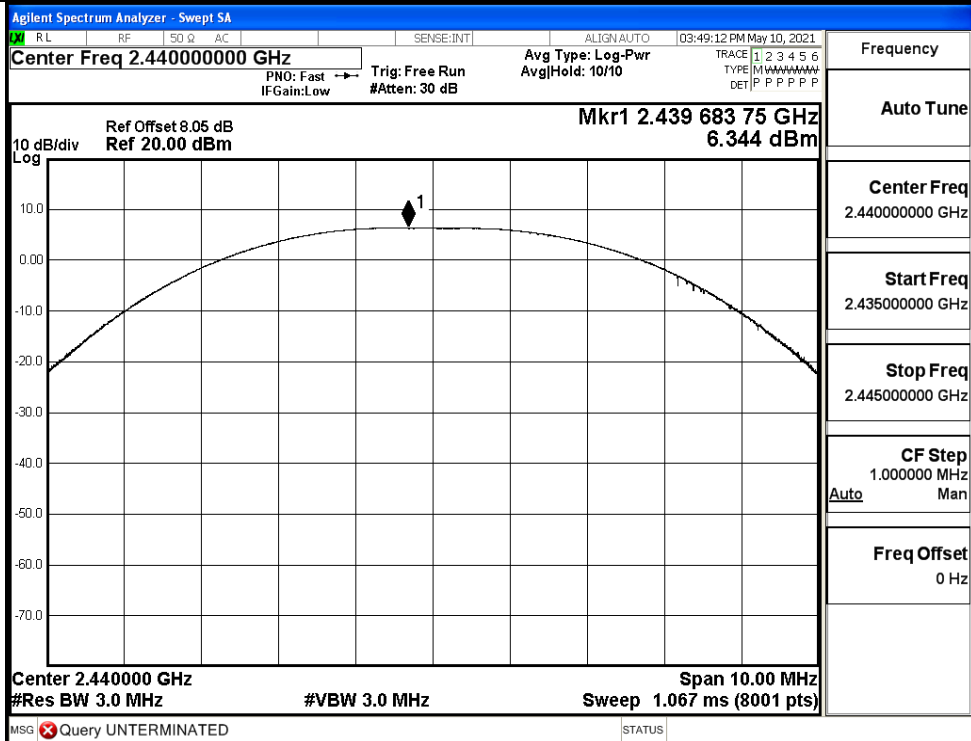
Frequency	
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.477500000 GHz
Stop Freq	2.482500000 GHz
CF Step	500.000 kHz
Auto	Man
Freq Offset	0 Hz

Test Graphs\_ BT 2LE

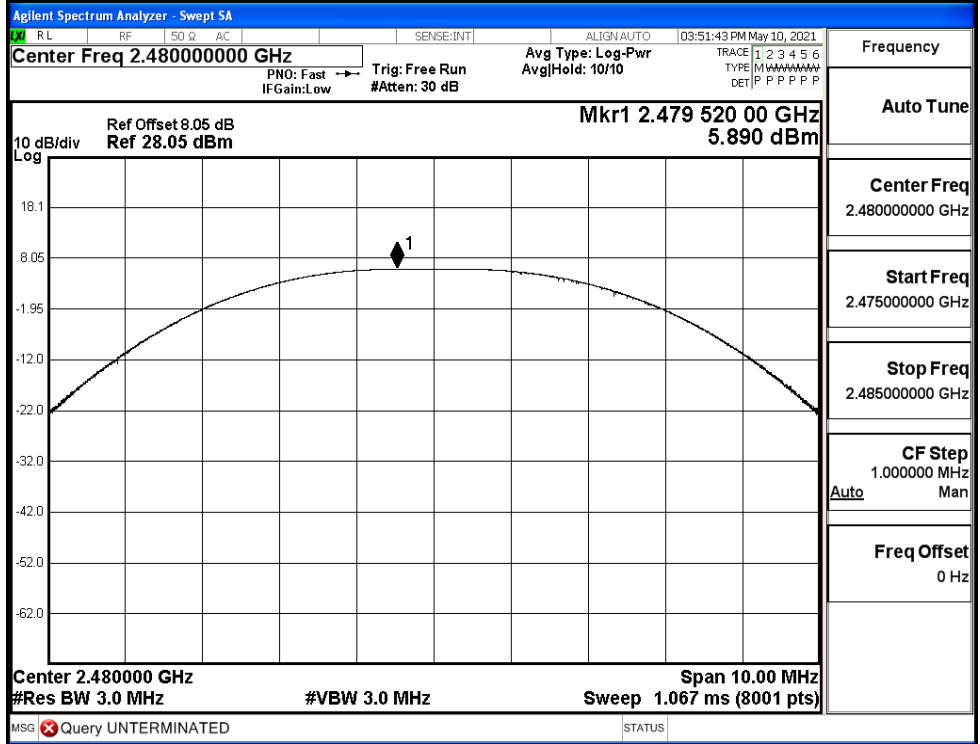
LCH



MCH

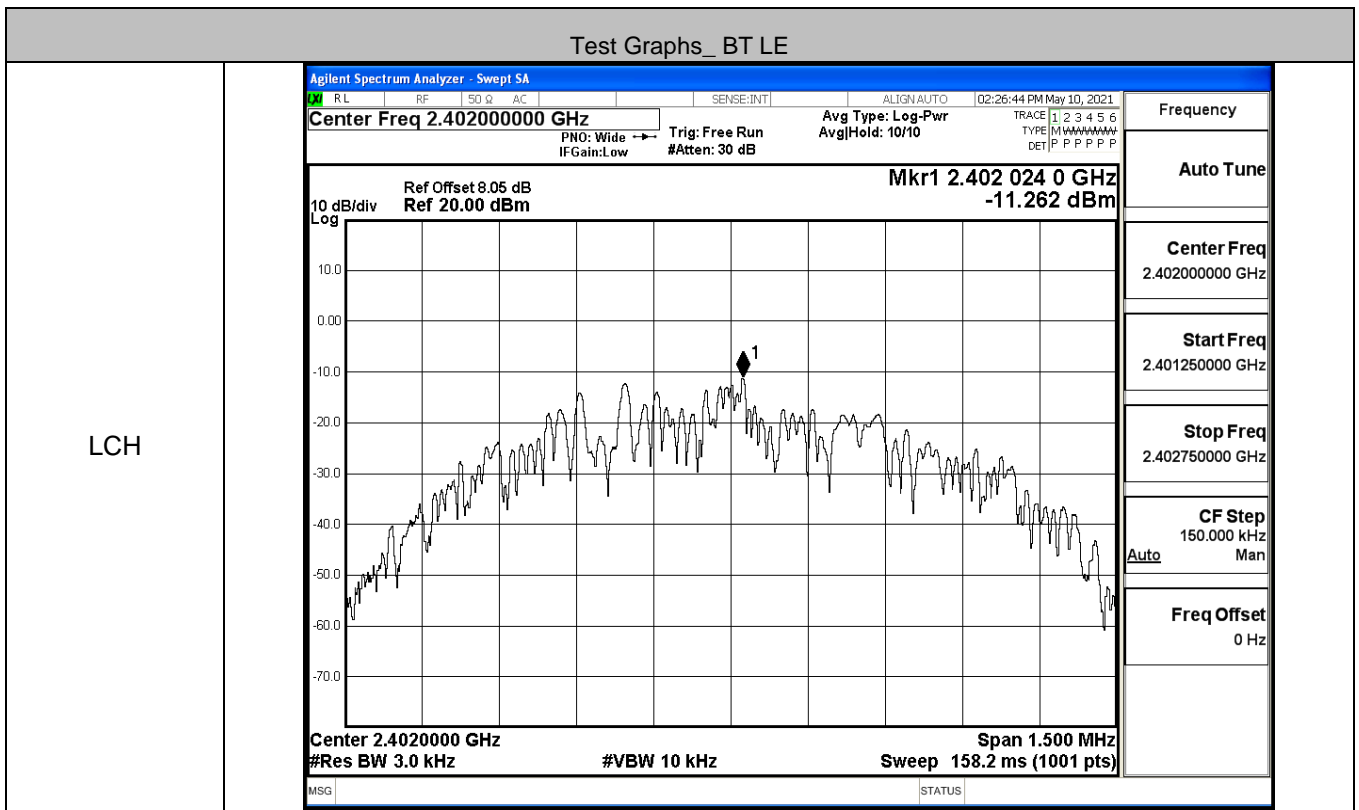


HCH

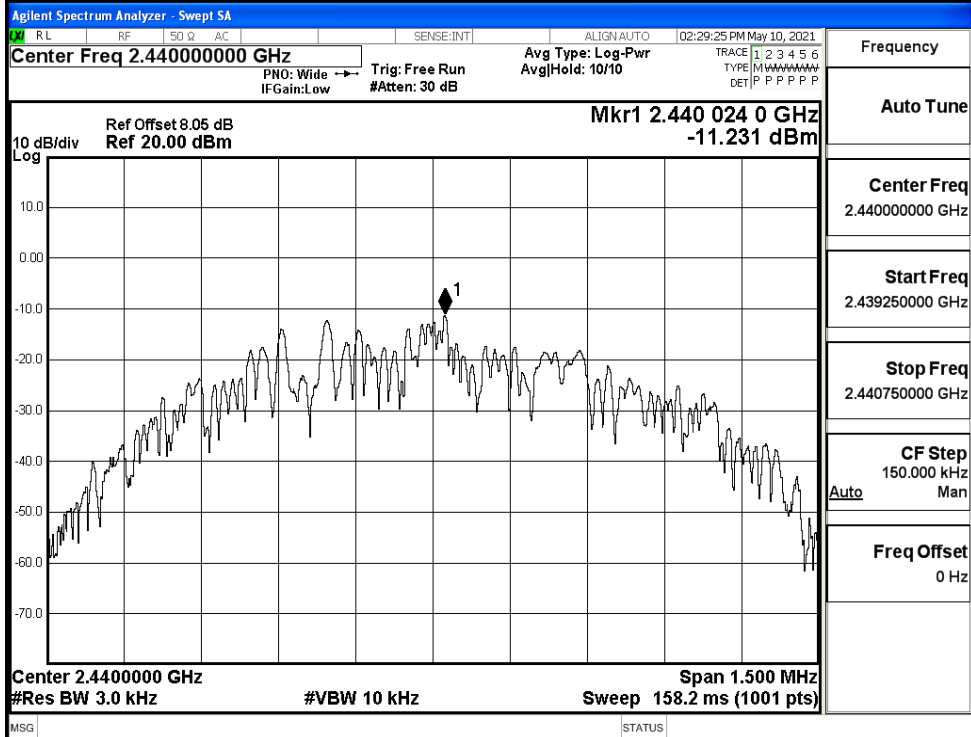


### A.3 Maximum Power Spectral Density

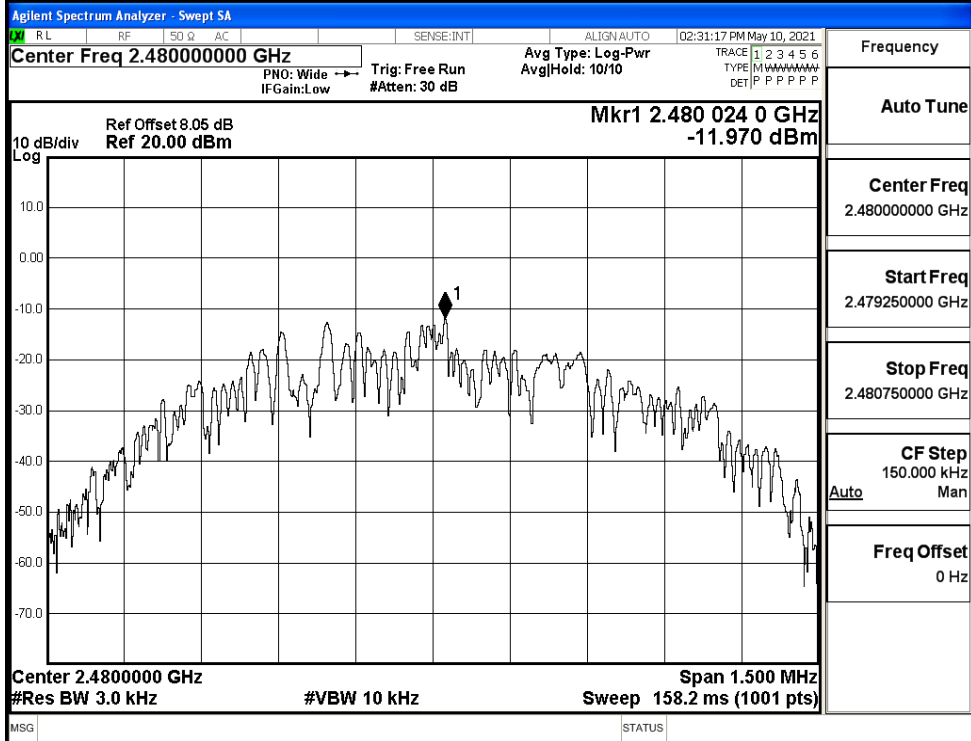
Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-11.262	8	PASS
BT LE	MCH	-11.231	8	PASS
BT LE	HCH	-11.970	8	PASS
BT 2LE	LCH	-13.348	8	PASS
BT 2LE	MCH	-13.547	8	PASS
BT 2LE	HCH	-14.042	8	PASS



MCH



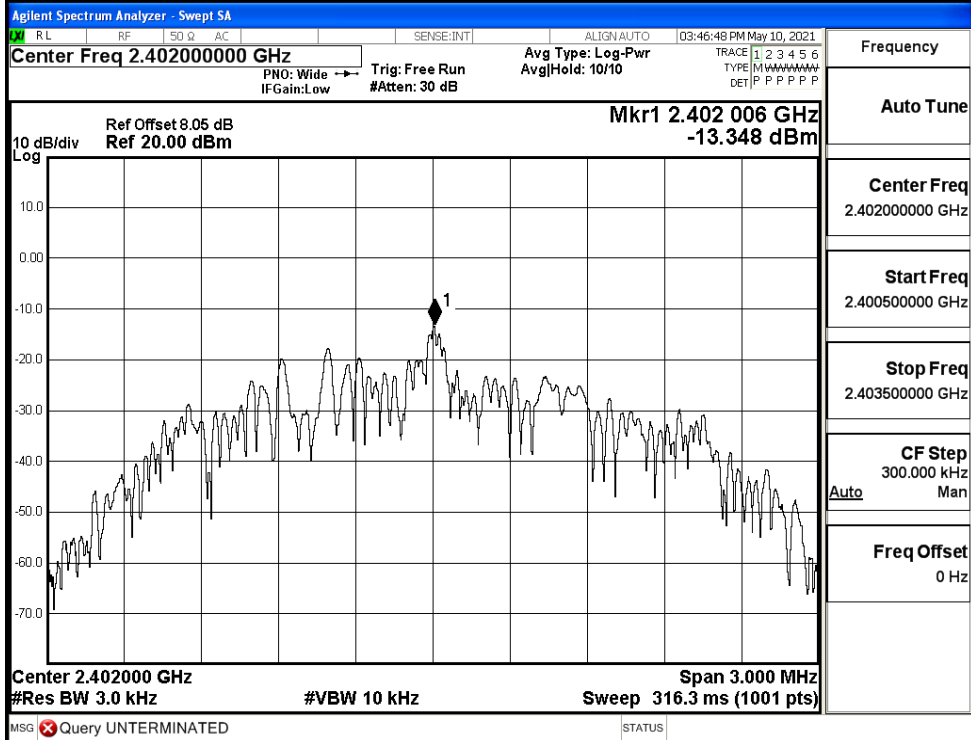
HCH





Test Graphs\_ BT 2LE

LCH



Frequency

Auto Tune

Center Freq 2.402000000 GHz

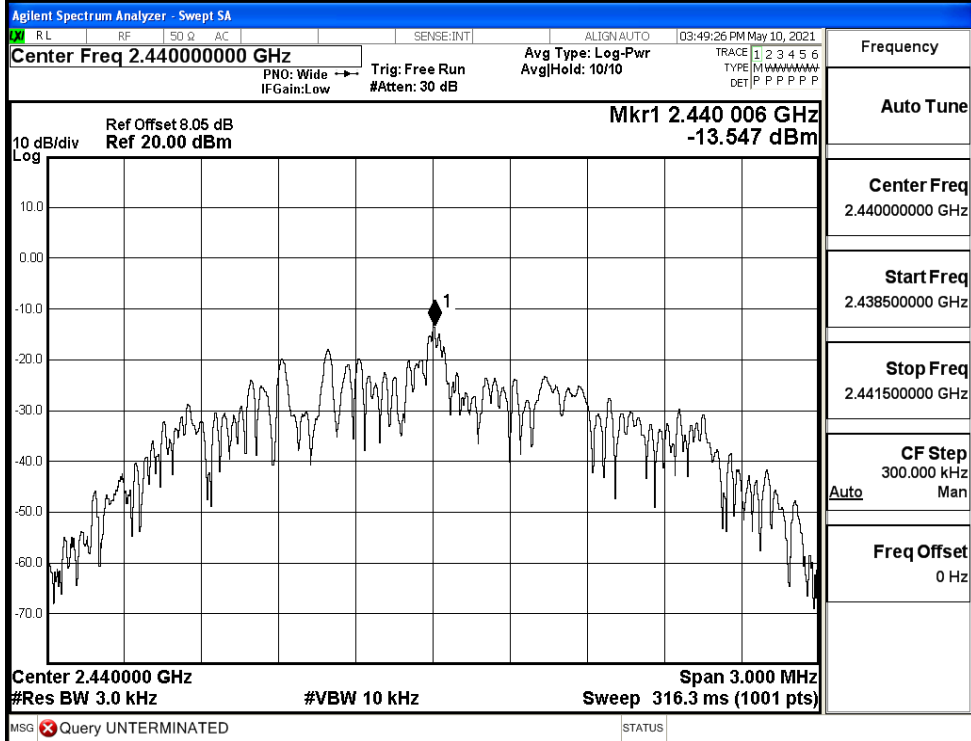
Start Freq 2.400500000 GHz

Stop Freq 2.403500000 GHz

CF Step 300.000 kHz Auto Man

Freq Offset 0 Hz

MCH



Frequency

Auto Tune

Center Freq 2.440000000 GHz

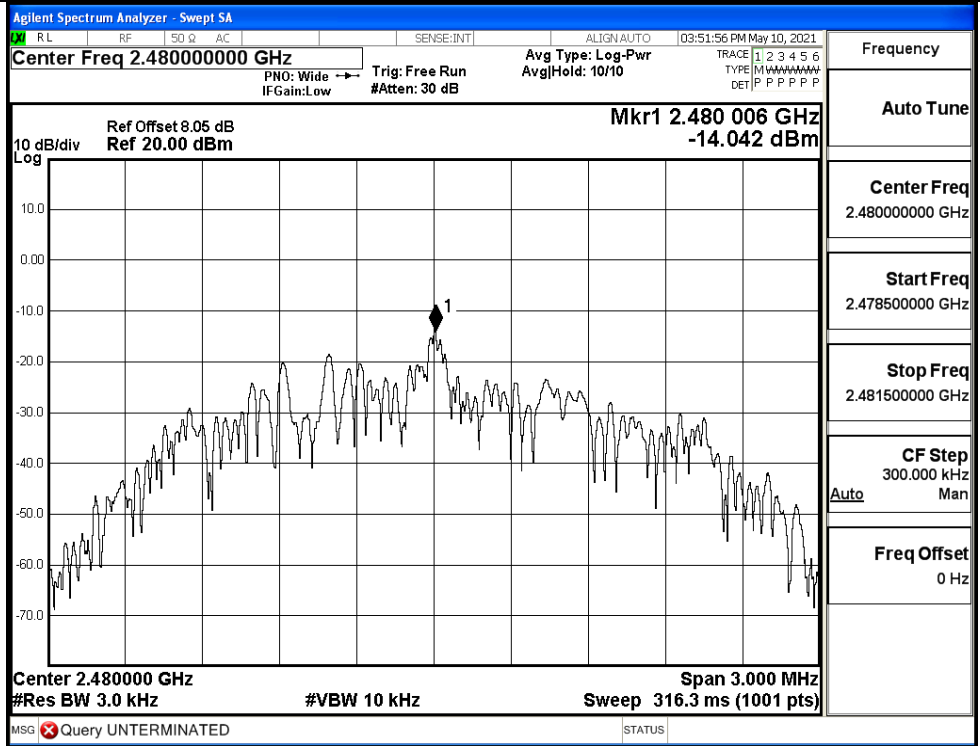
Start Freq 2.438500000 GHz

Stop Freq 2.441500000 GHz

CF Step 300.000 kHz Auto Man

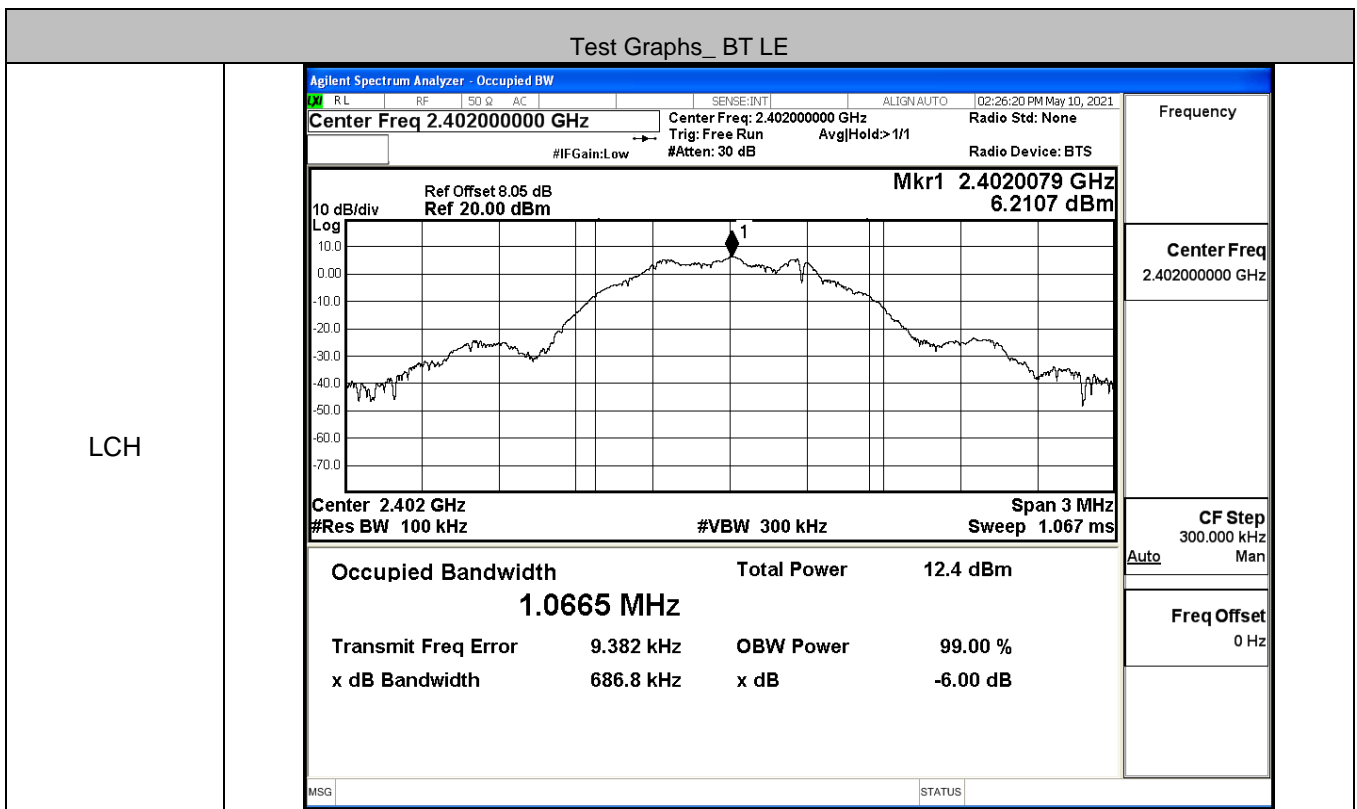
Freq Offset 0 Hz

HCH

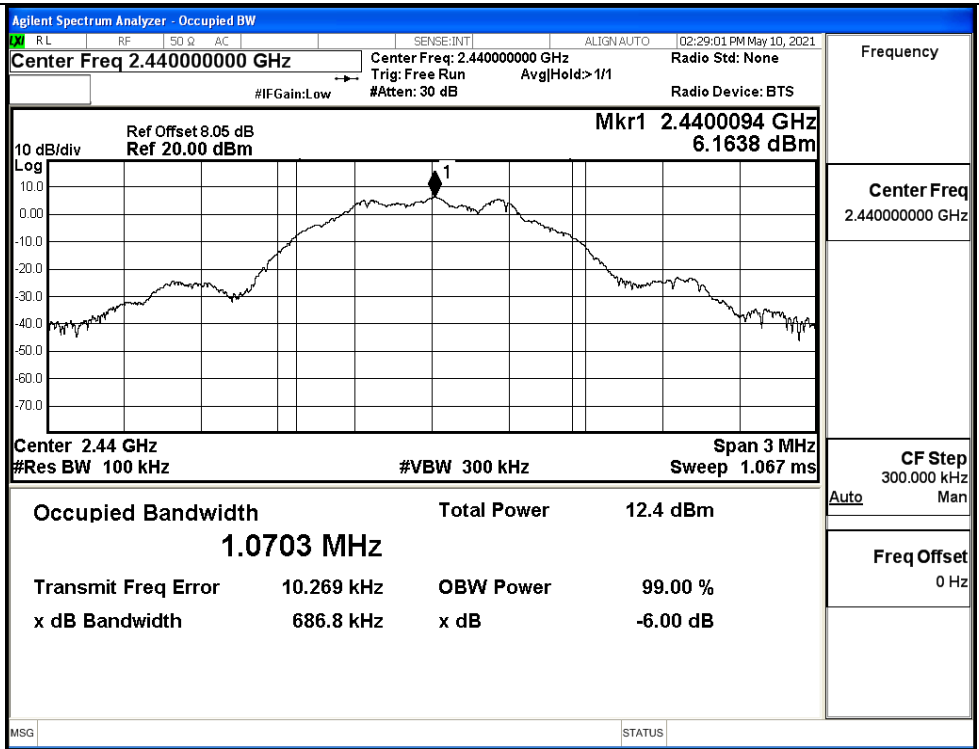


**A.4 6dB Bandwidth**

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6868	≥0.5	PASS
BT LE	MCH	0.6868	≥0.5	PASS
BT LE	HCH	0.6849	≥0.5	PASS
BT 2LE	LCH	1.185	≥0.5	PASS
BT 2LE	MCH	1.169	≥0.5	PASS
BT 2LE	HCH	1.179	≥0.5	PASS



MCH



Frequency

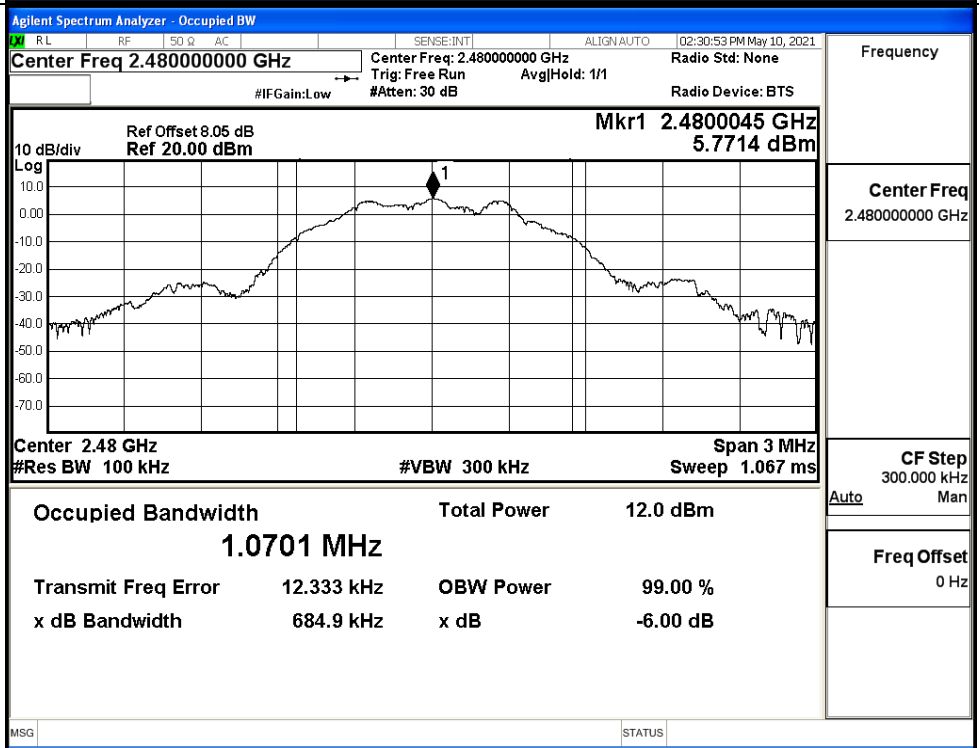
Center Freq  
2.44000000 GHz

CF Step  
300.000 kHz

Auto Man

Freq Offset  
0 Hz

HCH



Frequency

Center Freq  
2.48000000 GHz

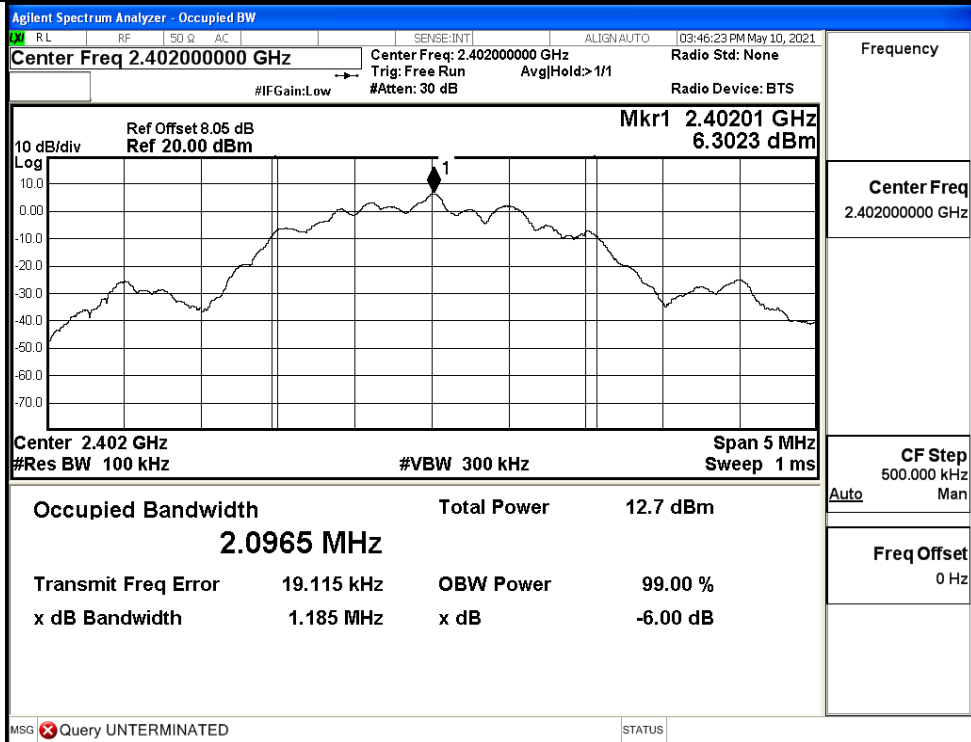
CF Step  
300.000 kHz

Auto Man

Freq Offset  
0 Hz

Test Graphs\_ BT 2LE

LCH



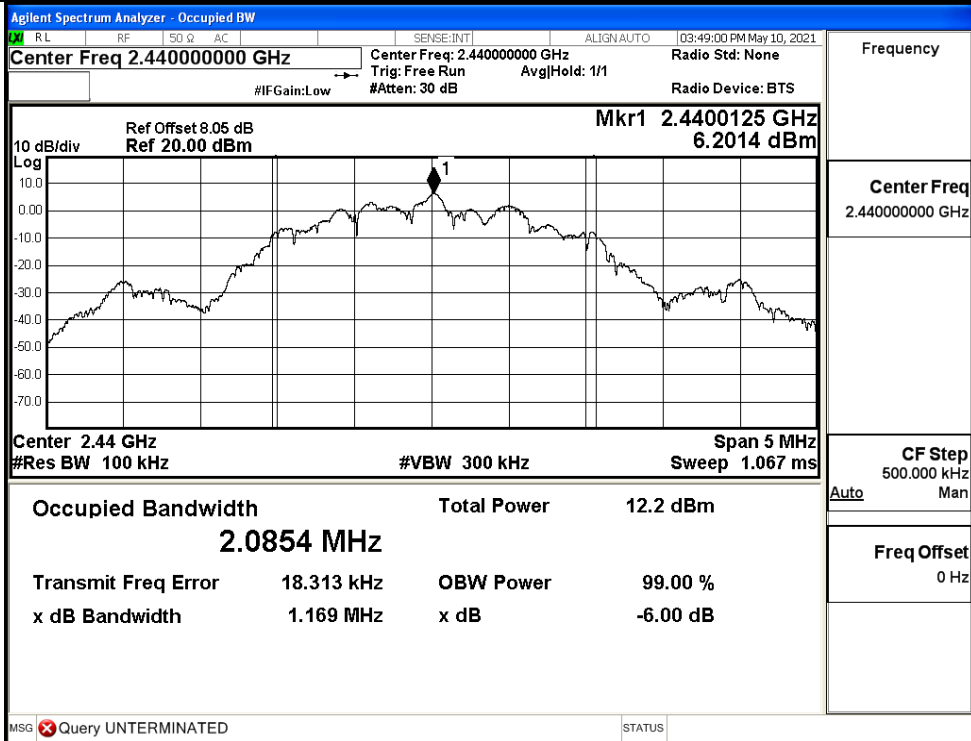
Frequency

Center Freq  
2.40200000 GHz

CF Step  
500.000 kHz  
Auto Man

Freq Offset  
0 Hz

MCH



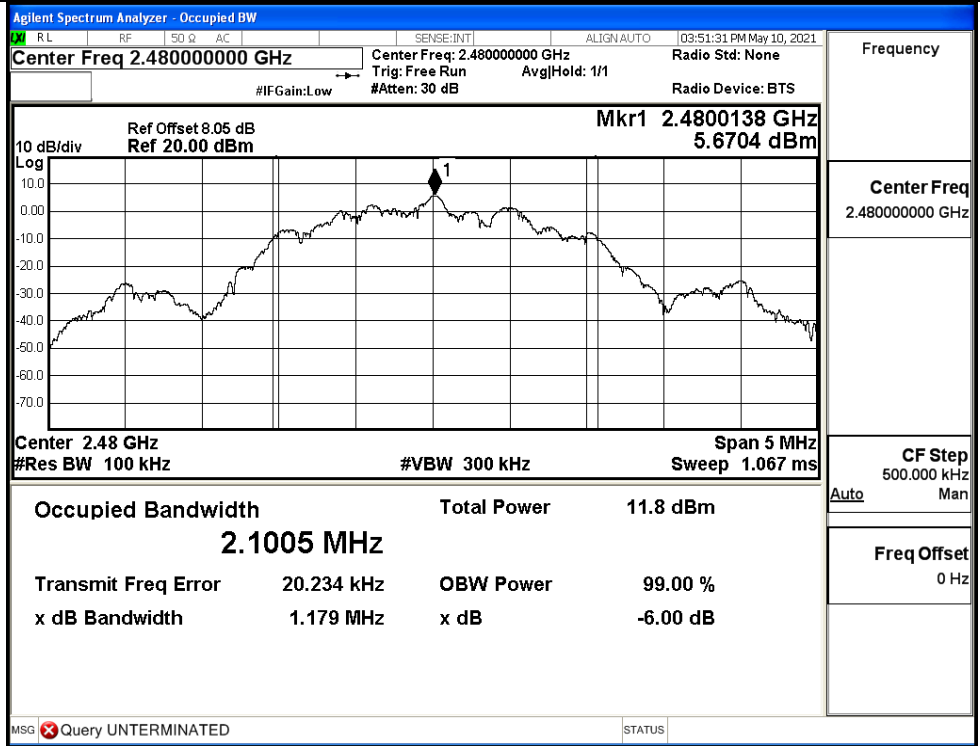
Frequency

Center Freq  
2.44000000 GHz

CF Step  
500.000 kHz  
Auto Man

Freq Offset  
0 Hz

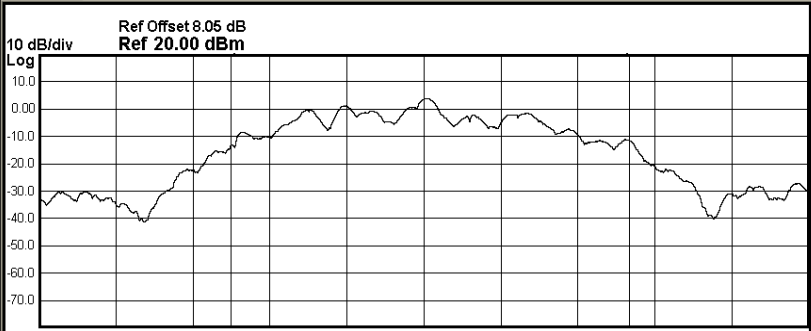
HCH



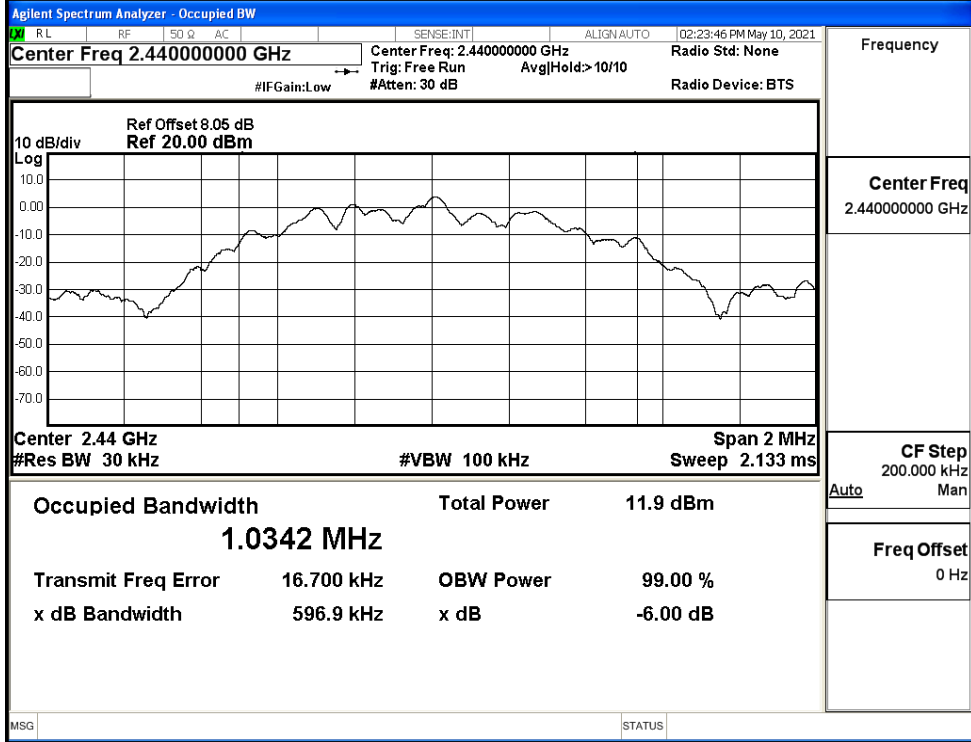
### A.5 Occupied Bandwidth

Mode	Channel	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	1.0315	≥0.5	PASS
BT LE	MCH	1.0342	≥0.5	PASS
BT LE	HCH	1.0370	≥0.5	PASS
BT 2LE	LCH	2.0499	≥0.5	PASS
BT 2LE	MCH	2.0519	≥0.5	PASS
BT 2LE	HCH	2.0541	≥0.5	PASS

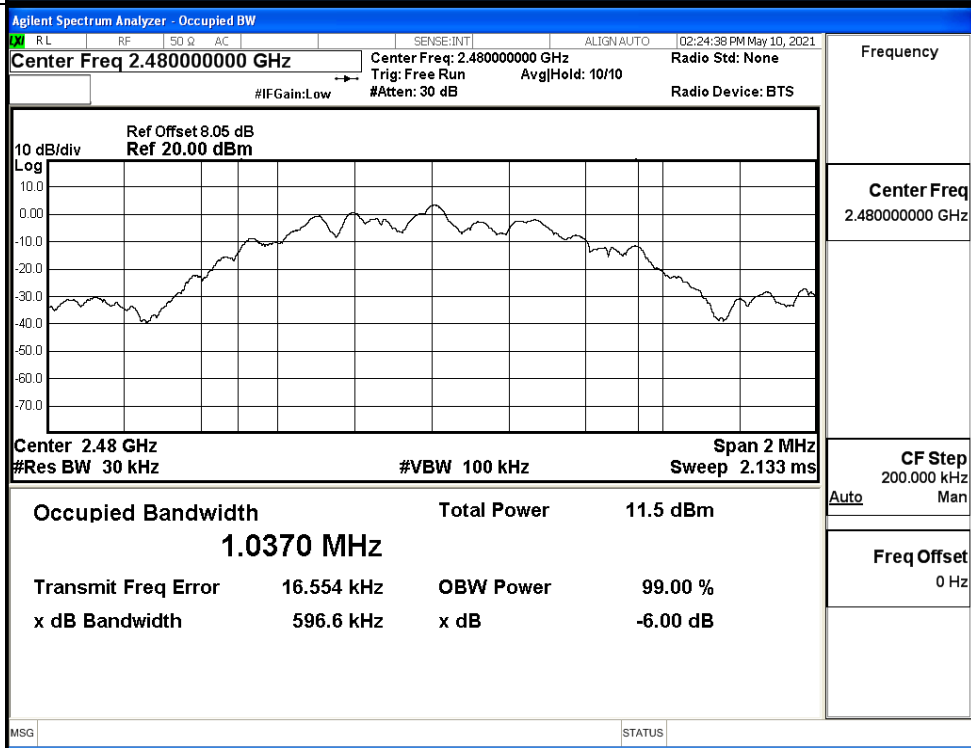
Test Graphs\_ BT LE

LCH	Agilent Spectrum Analyzer - Occupied BW	RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 02:23:09 PM May 10, 2021	Frequency
	Center Freq 2.402000000 GHz #IFGain:Low #Atten: 30 dB Radio Device: BTS	Center Freq: 2.402000000 GHz Trig: Free Run AvgHold: 10/10 Radio Std: None	Center Freq 2.402000000 GHz
	Ref Offset 8.05 dB Ref 20.00 dBm	 <p style="font-size: 8px;">10 dB/div Log -70.0 to 10.0</p>	CF Step 200.000 kHz Auto Man
	Center 2.402 GHz #Res BW 30 kHz Occupied Bandwidth <b>1.0315 MHz</b> Total Power 12.0 dBm Transmit Freq Error 16.431 kHz x dB Bandwidth 598.5 kHz	Span 2 MHz Sweep 2.133 ms OBW Power 99.00 % x dB -6.00 dB	Freq Offset 0 Hz
MSG STATUS			

MCH



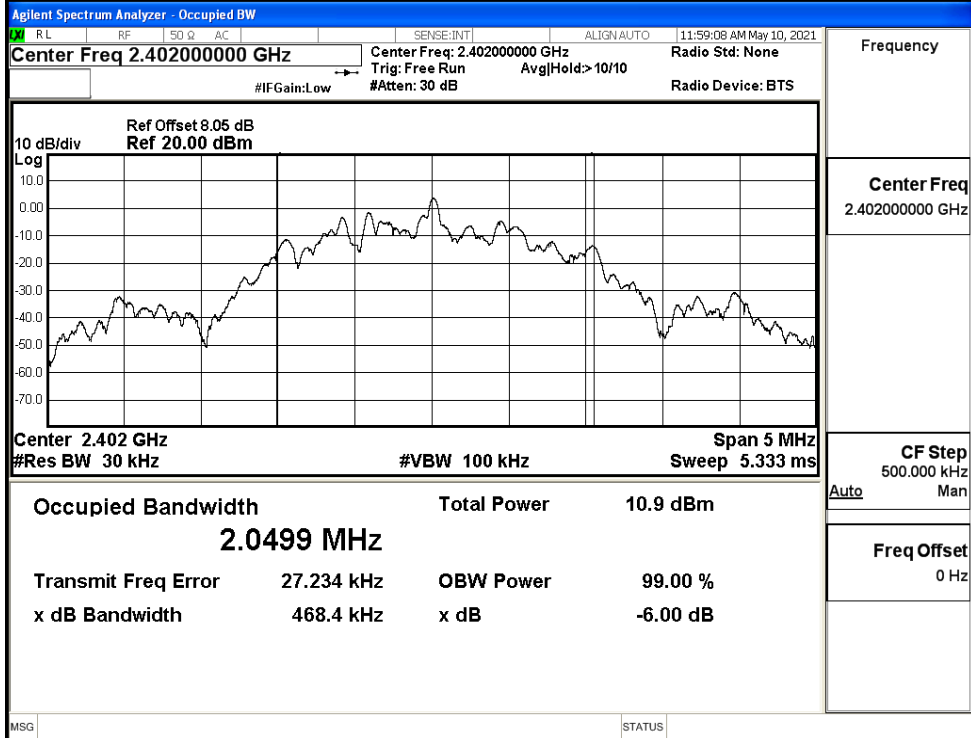
HCH





Test Graphs\_ BT 2LE

LCH



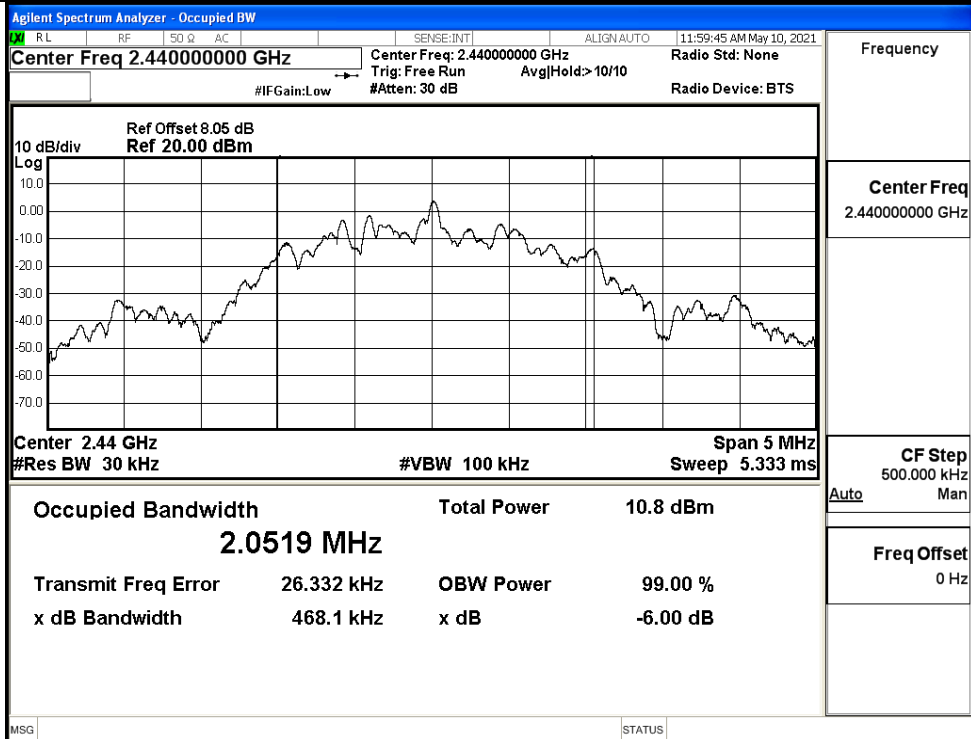
Frequency

Center Freq  
2.402000000 GHz

CF Step  
500.000 kHz  
Man

Freq Offset  
0 Hz

MCH



Frequency

Center Freq  
2.440000000 GHz

CF Step  
500.000 kHz  
Man

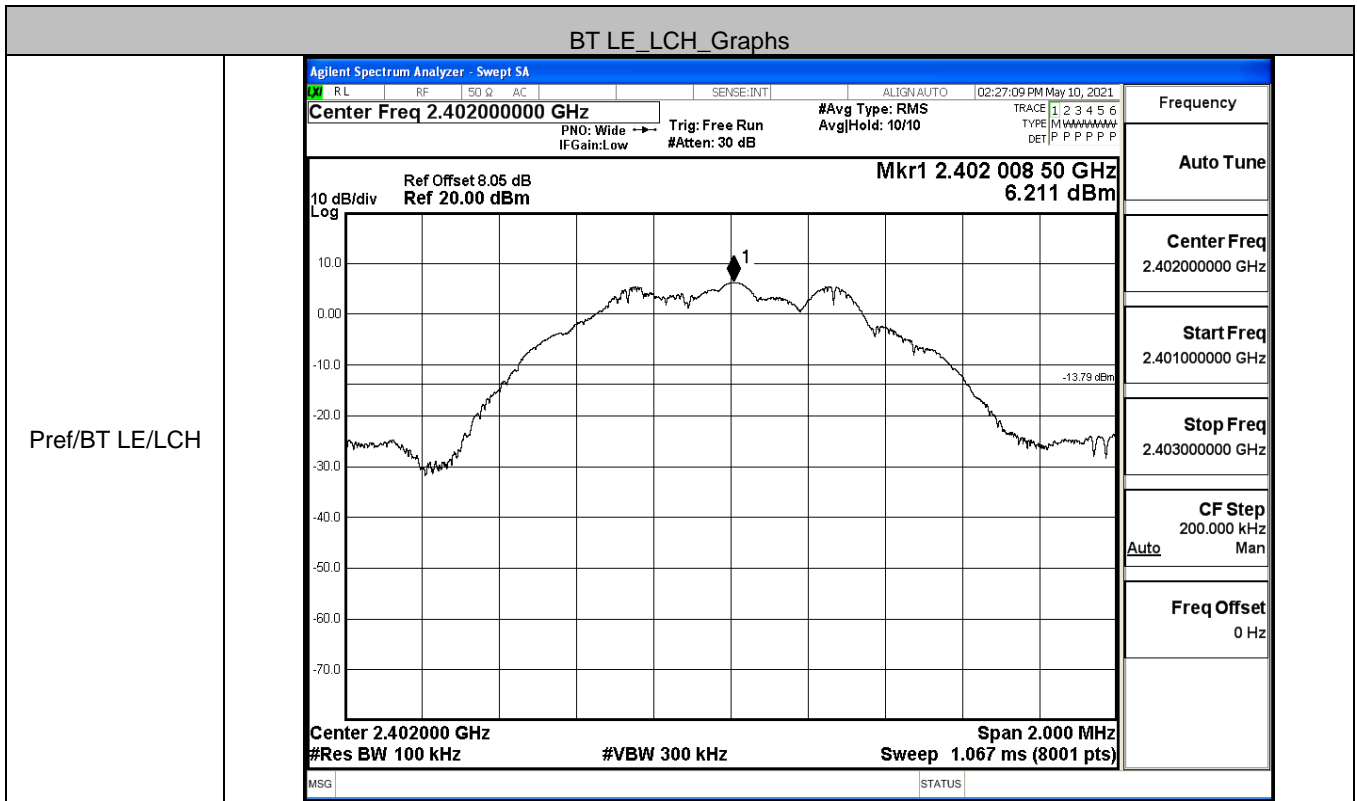
Freq Offset  
0 Hz

HCH

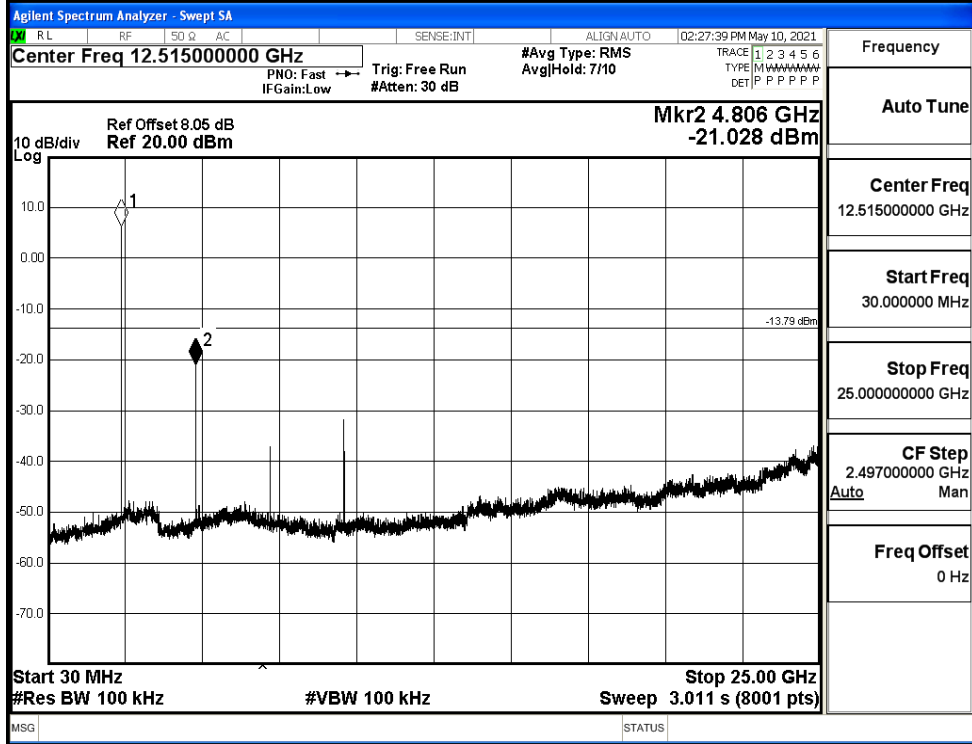


### A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	6.211	-21.028	-13.789	PASS
BT LE	MCH	6.15	-24.607	-13.850	PASS
BT LE	HCH	5.731	-21.591	-14.269	PASS
BT 2LE	LCH	6.233	-22.329	-13.767	PASS
BT 2LE	MCH	6.162	-18.139	-13.838	PASS
BT 2LE	HCH	5.726	-20.120	-14.274	PASS

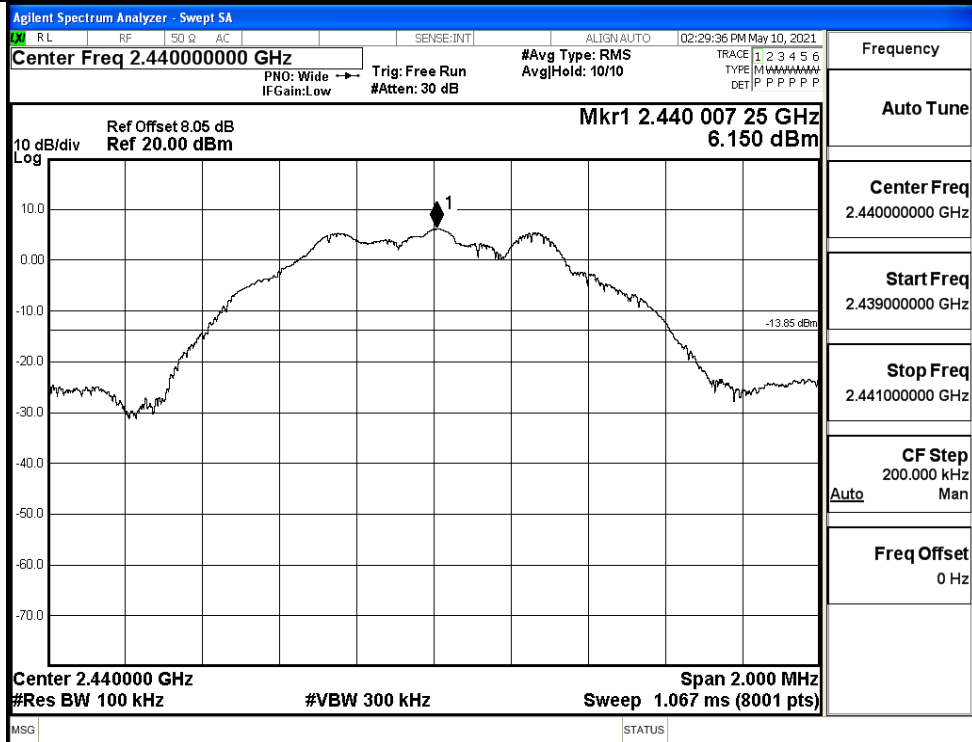


Puw/BT LE/LCH

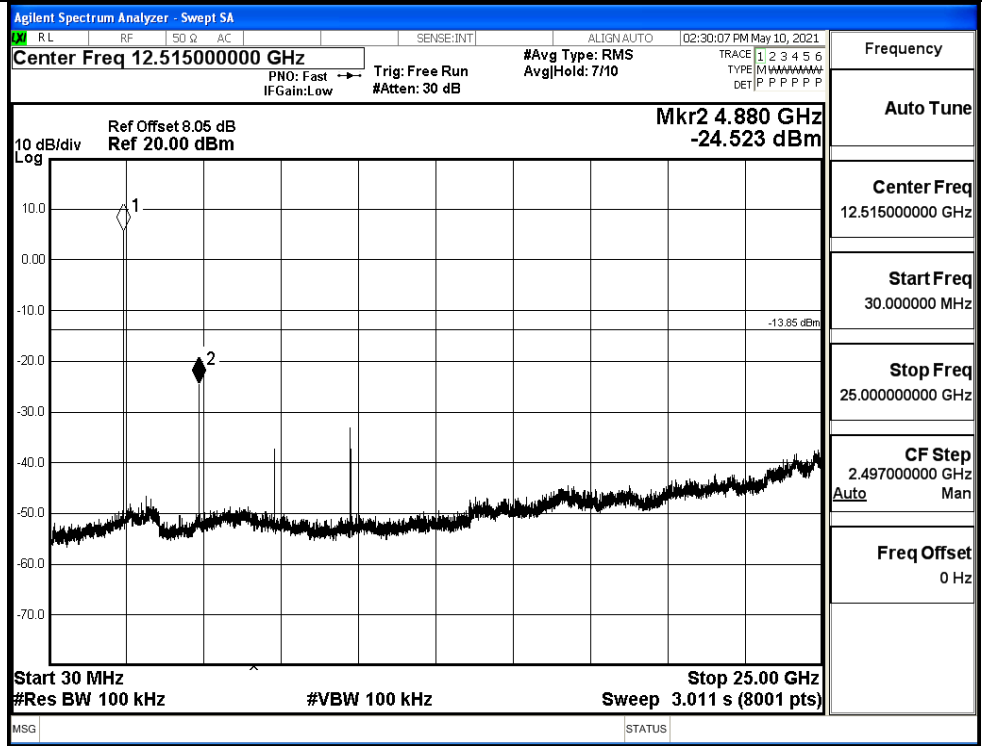


BT LE\_MCH\_Graphs

Pref/BT LE/MCH

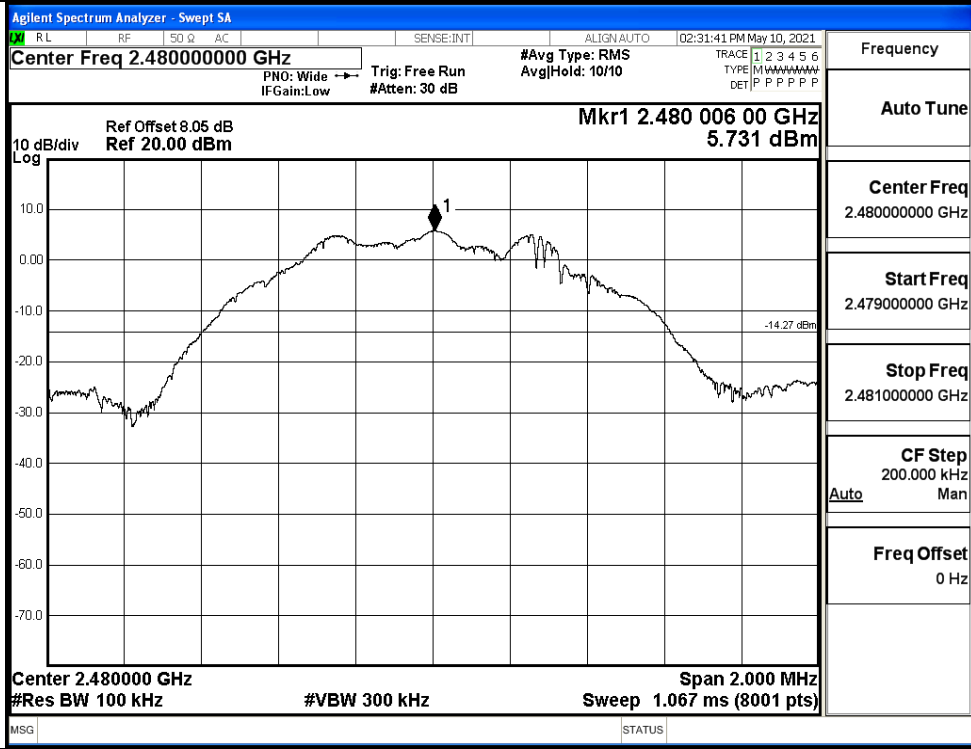


Puw/BT LE/MCH

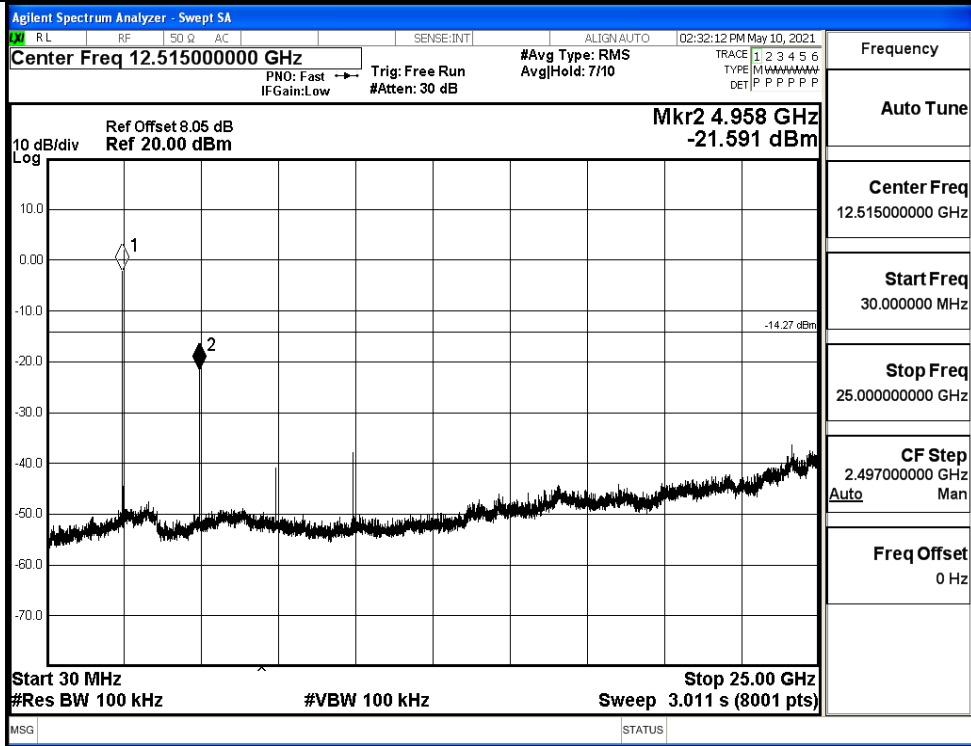


BT LE\_HCH\_Graphs

Pref/BT LE/HCH

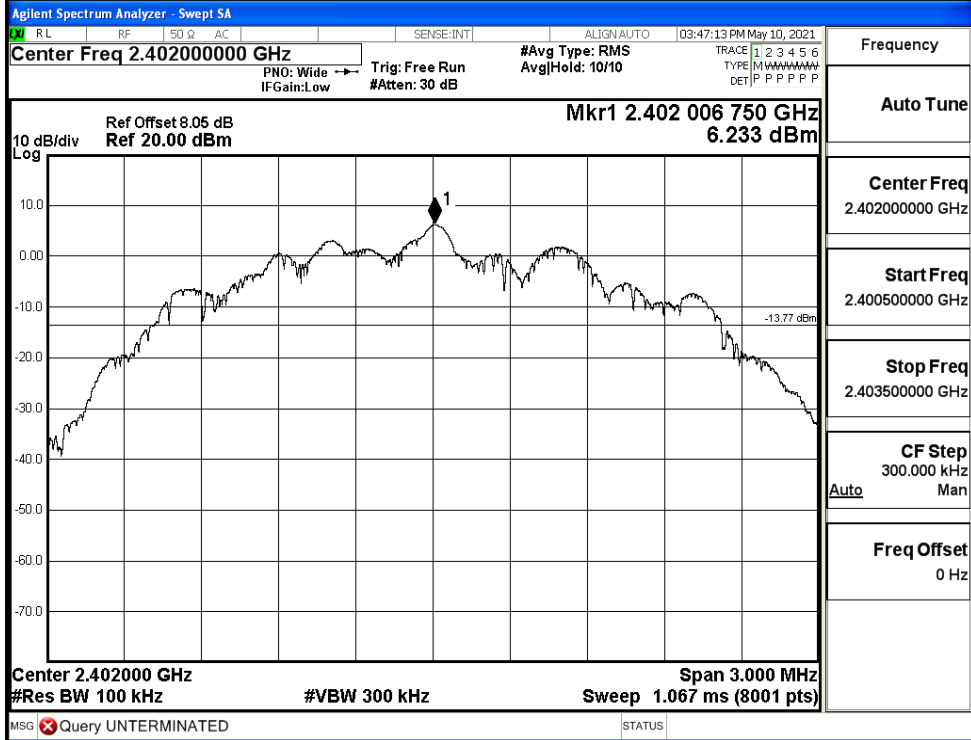


Puw/BT LE/HCH

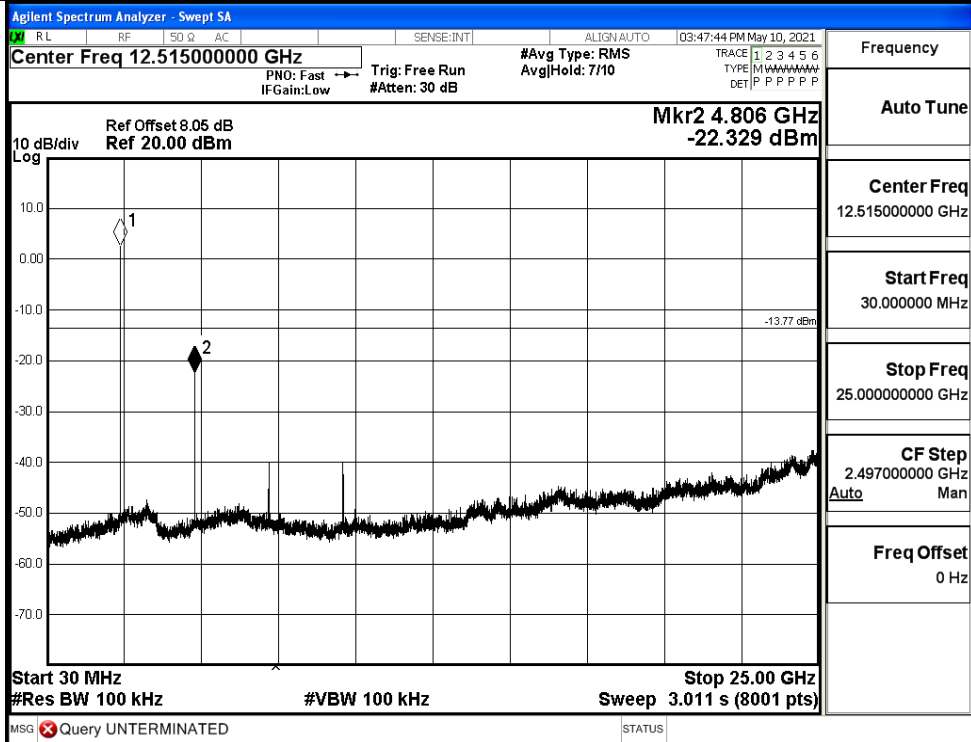


BT 2LE\_LCH\_Graphs

Pref/BT 2LE/LCH

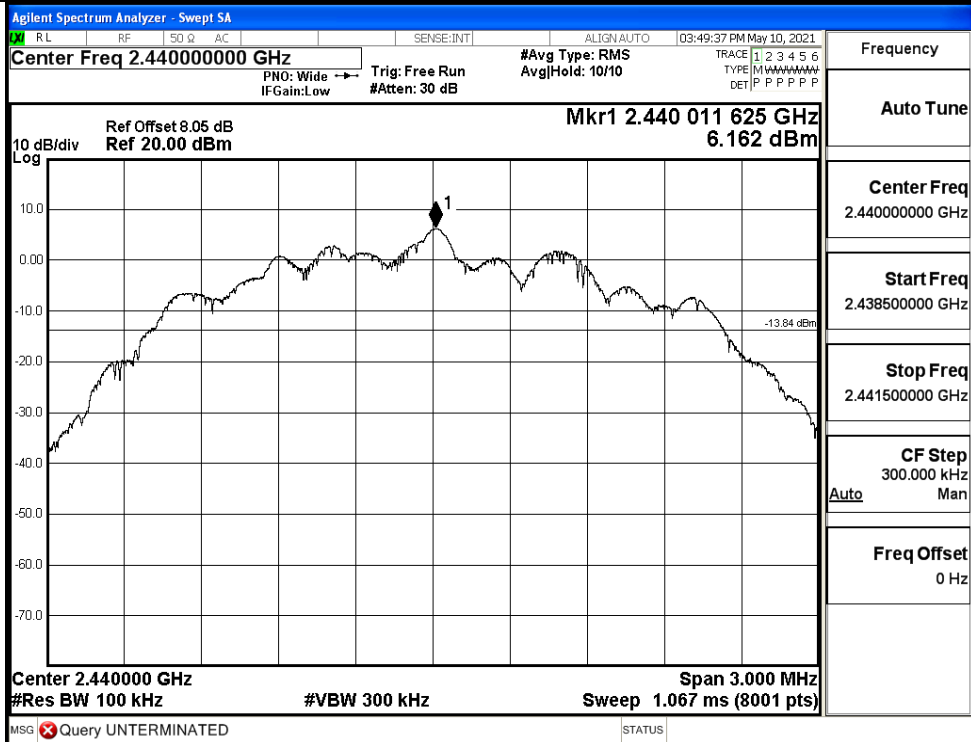


Puw/BT 2LE/LCH



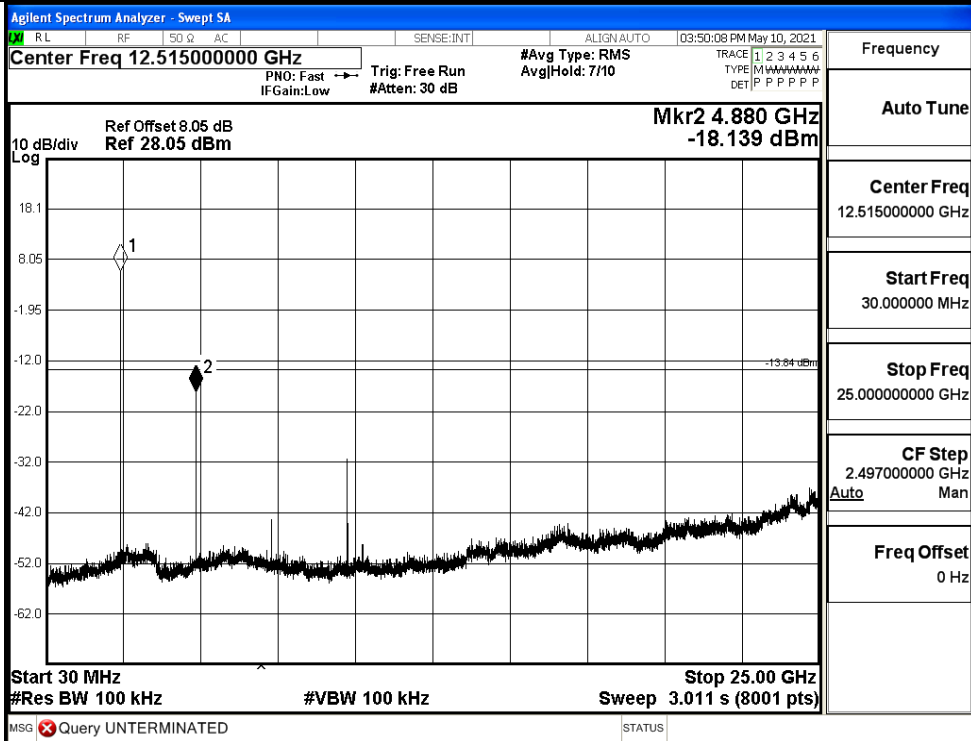
BT 2LE\_MCH\_Graphs

Pref/BT  
2LE/MCH



Frequency
Auto Tune
Center Freq 2.44000000 GHz
Start Freq 2.438500000 GHz
Stop Freq 2.441500000 GHz
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz

Puw/BT  
2LE/MCH

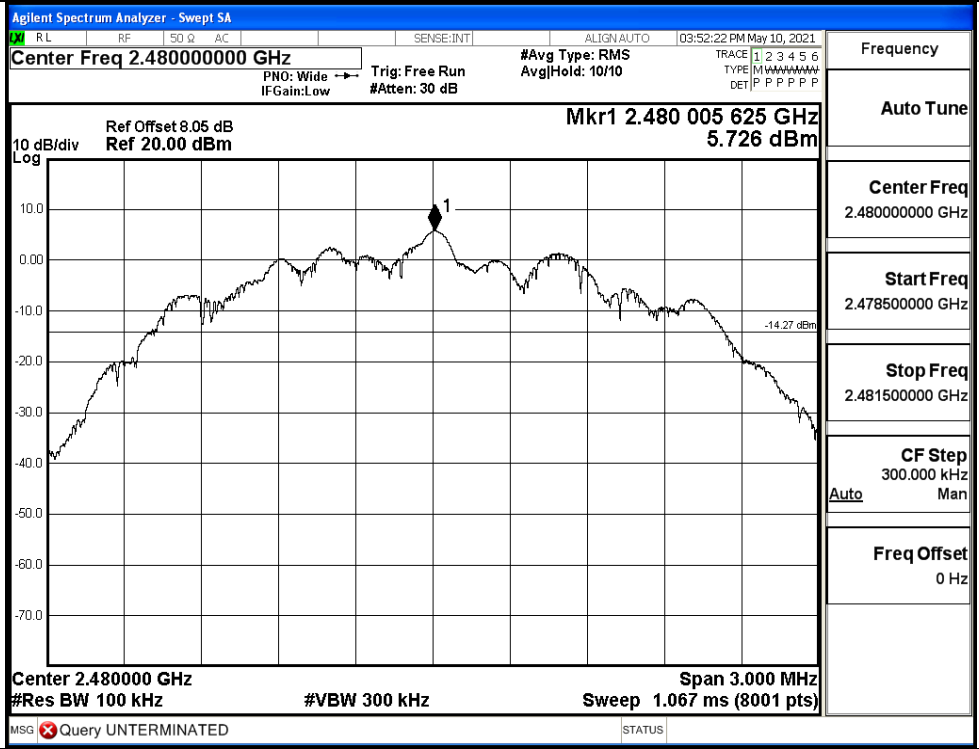


Frequency
Auto Tune
Center Freq 12.51500000 GHz
Start Freq 30.000000 MHz
Stop Freq 25.00000000 GHz
CF Step 2.497000000 GHz Auto Man
Freq Offset 0 Hz

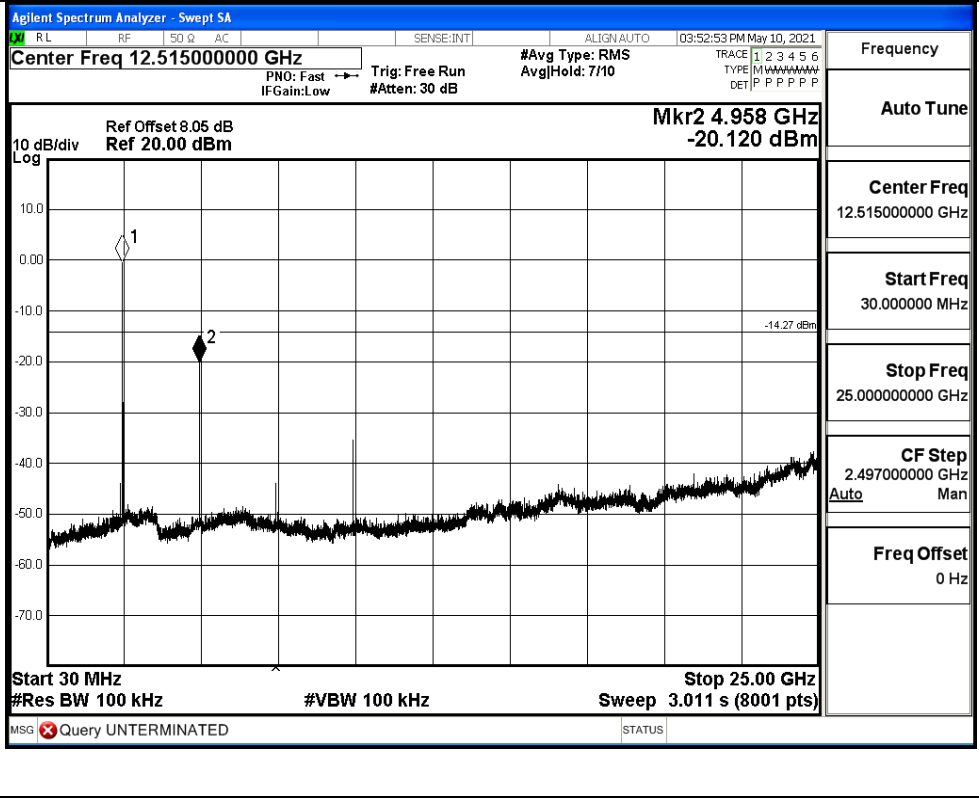


BT 2LE\_HCH\_Graphs

Pref/BT 2LE/HCH

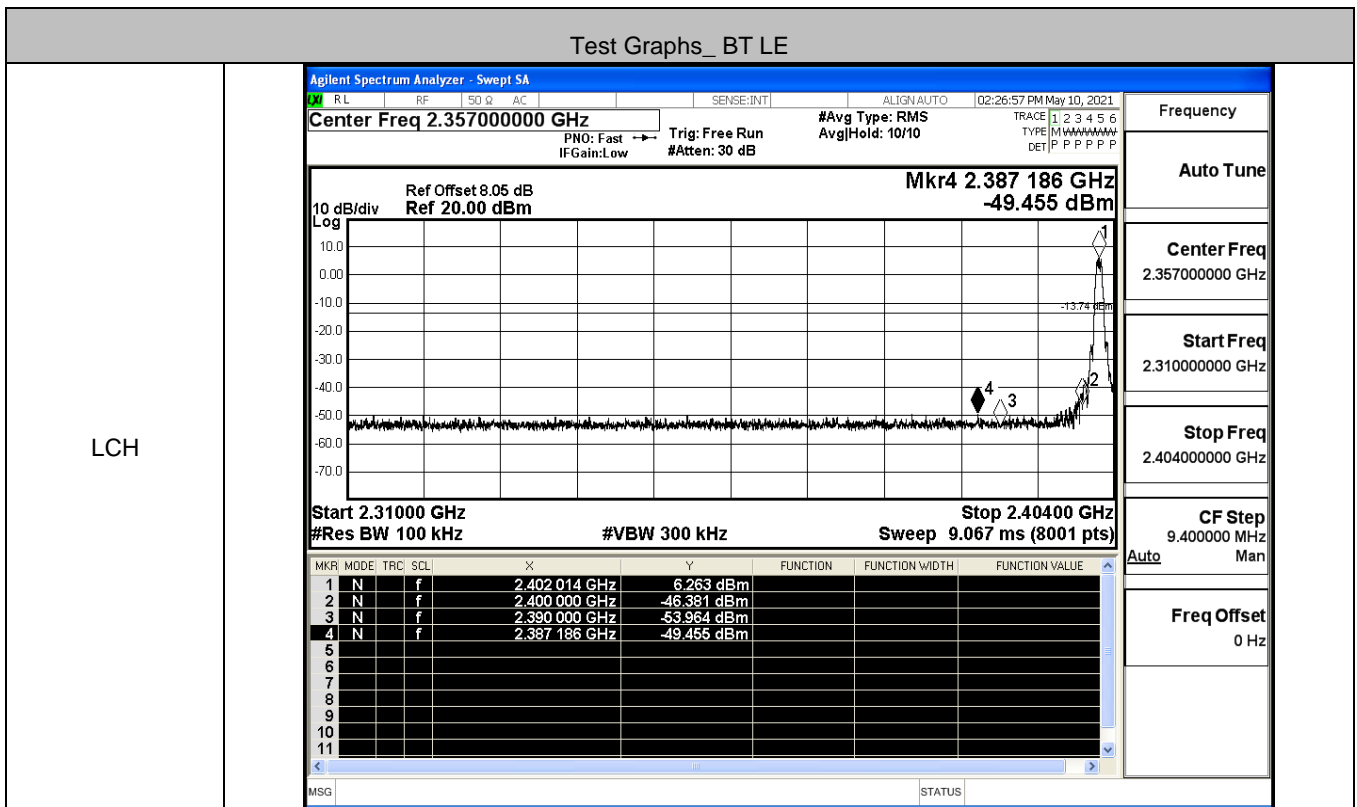


Puw/BT 2LE/HCH

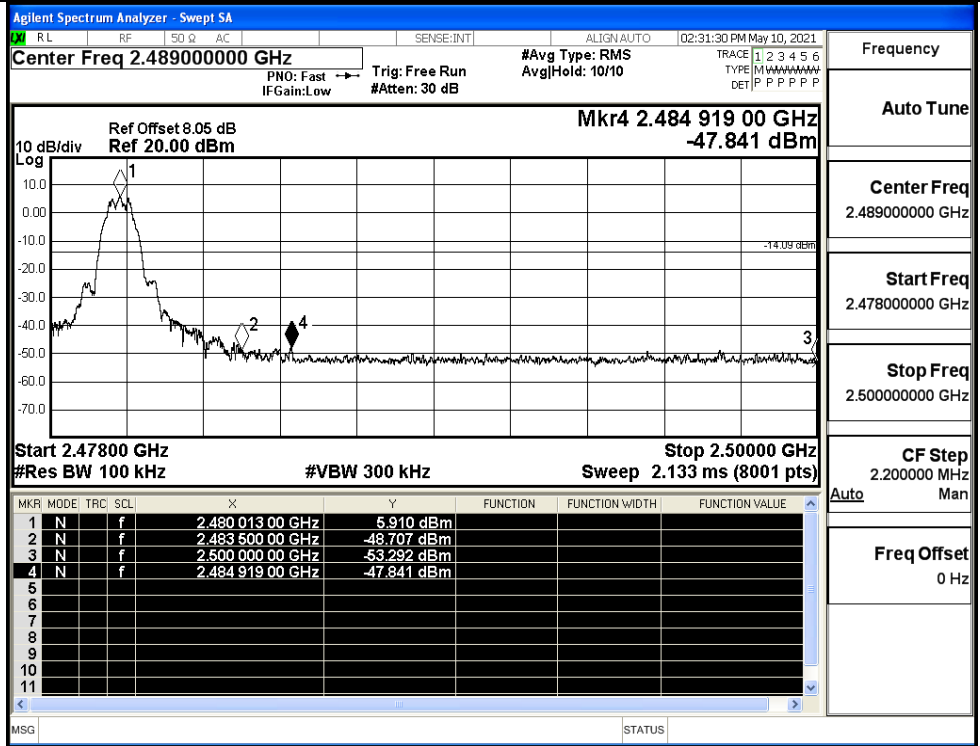


### A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	6.263	-49.455	-13.74	PASS
BT LE	HCH	5.910	-47.841	-14.09	PASS
BT 2LE	LCH	6.242	-49.851	-13.76	PASS
BT 2LE	HCH	5.882	-47.466	-14.12	PASS

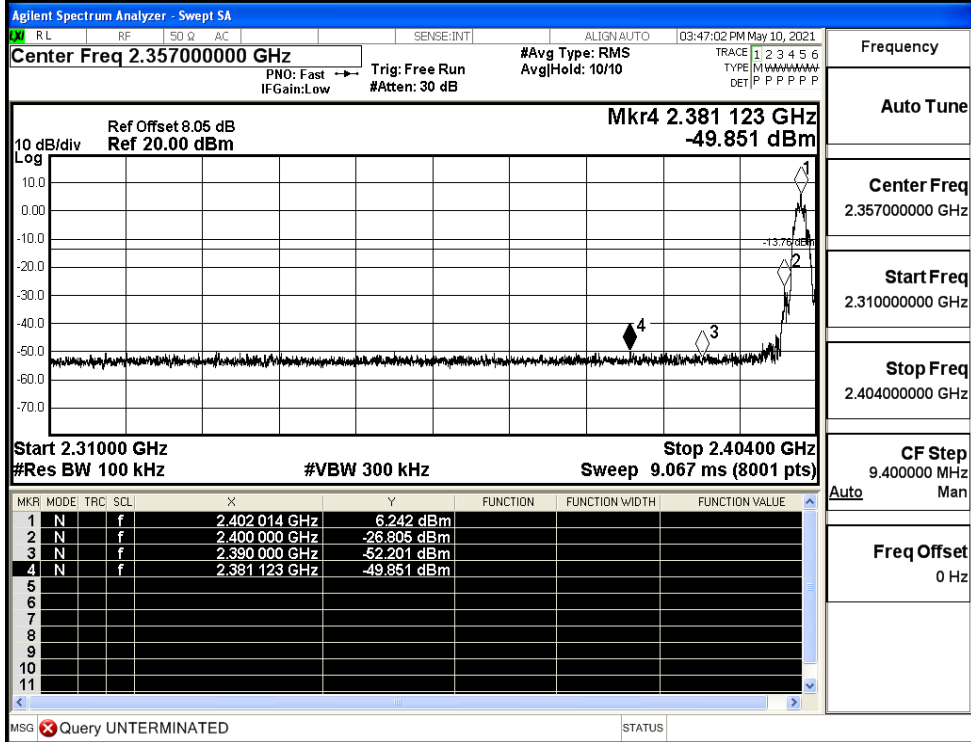


HCH

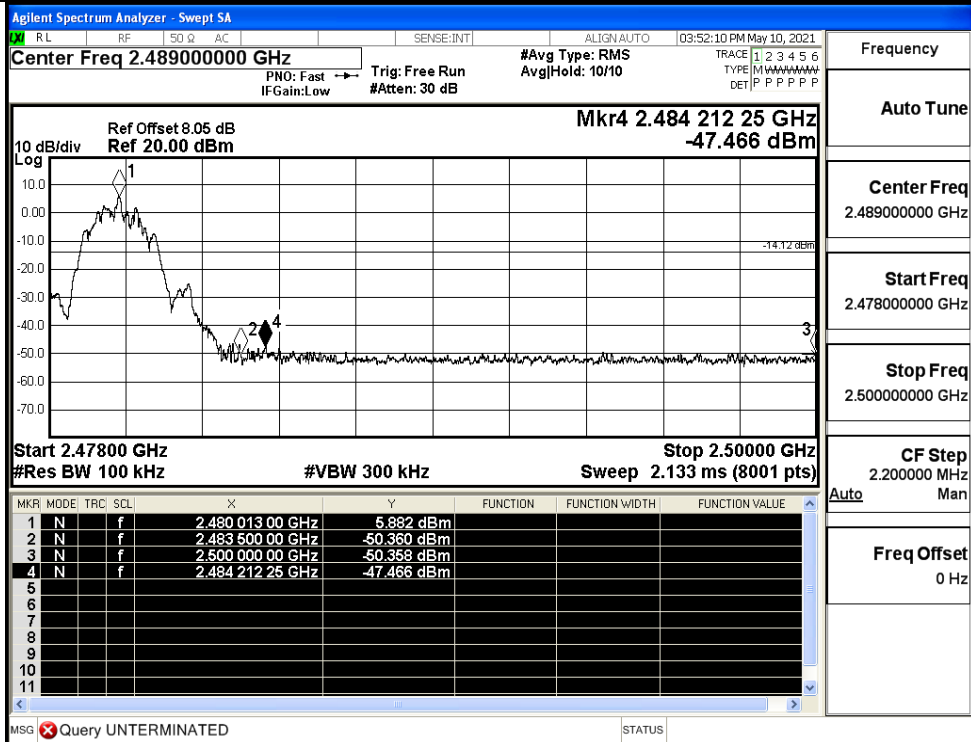


Test Graphs\_ BT 2LE

LCH



HCH

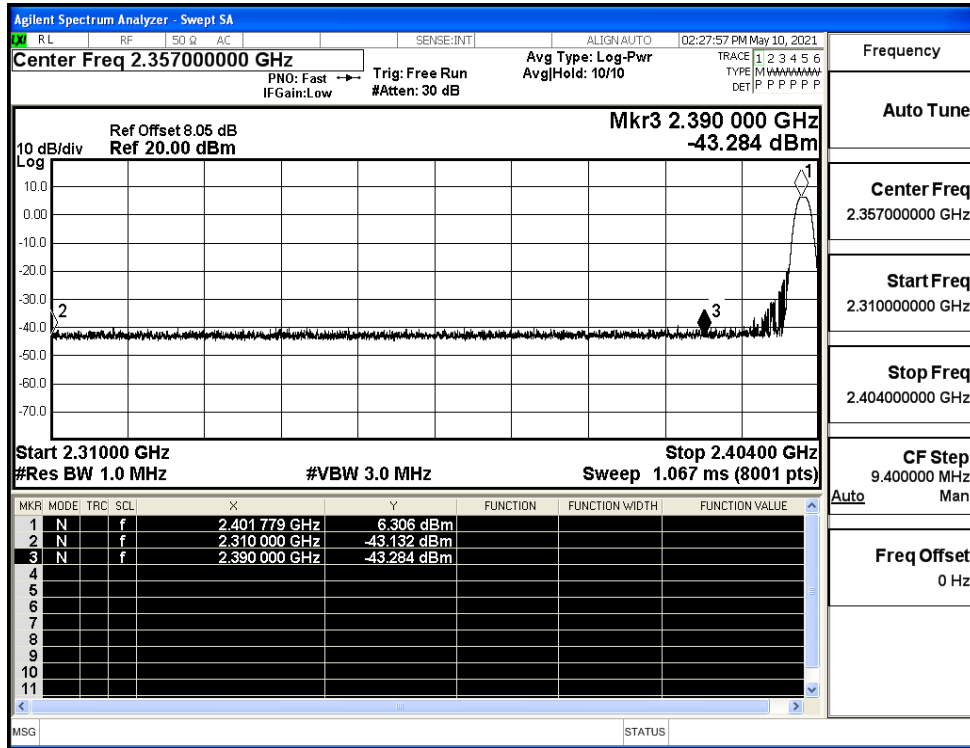


### A.8 Restrict-band band-edge measurements

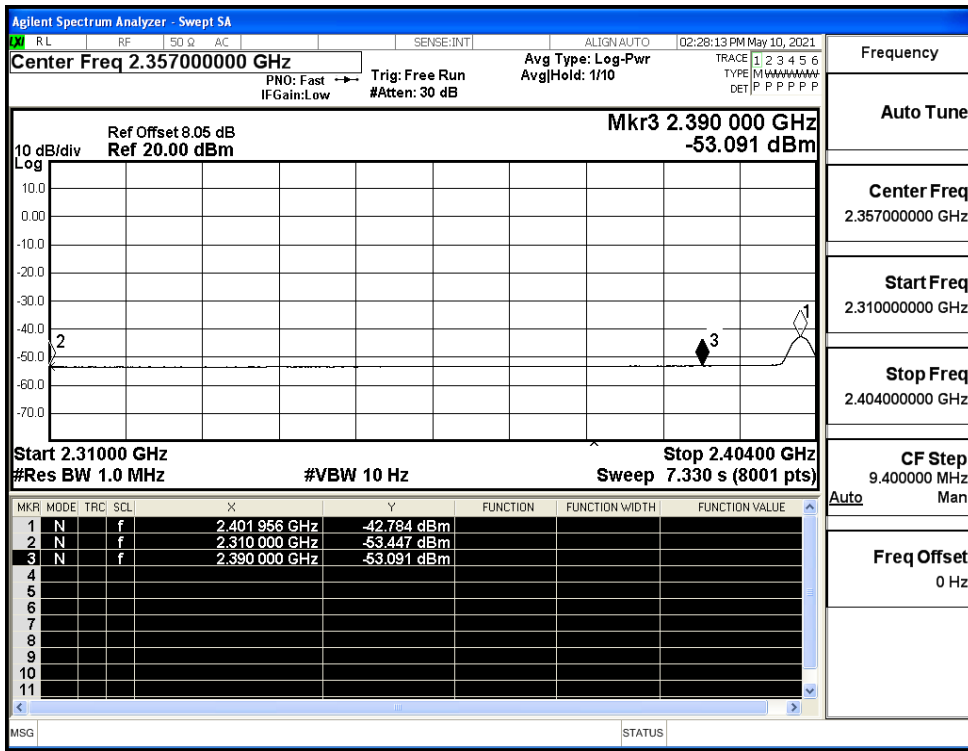
Test Mode	Test Channel	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
BT LE	2402	2310.0	-43.13	2.0	0	54.10	PEAK	74	PASS
		2310.0	-53.45	2.0	0	43.78	AV	54	PASS
		2390.0	-43.28	2.0	0	53.95	PEAK	74	PASS
		2390.0	-53.09	2.0	0	44.14	AV	54	PASS
	2480	2483.5	-31.80	2.0	0	65.43	PEAK	74	PASS
		2483.5	-52.49	2.0	0	44.74	AV	54	PASS
		2500.0	-41.68	2.0	0	55.55	PEAK	74	PASS
		2500.0	-52.47	2.0	0	44.76	AV	54	PASS

Test Mode	Test Channel	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
BT 2LE	2402	2310.0	-42.56	2.0	0	54.67	PEAK	74	PASS
		2310.0	-53.60	2.0	0	43.63	AV	54	PASS
		2390.0	-43.27	2.0	0	53.96	PEAK	74	PASS
		2390.0	-53.20	2.0	0	44.03	AV	54	PASS
	2480	2483.5	-34.49	2.0	0	62.74	PEAK	74	PASS
		2483.5	-52.42	2.0	0	44.81	AV	54	PASS
		2500.0	-42.32	2.0	0	54.91	PEAK	74	PASS
		2500.0	-52.60	2.0	0	44.63	AV	54	PASS

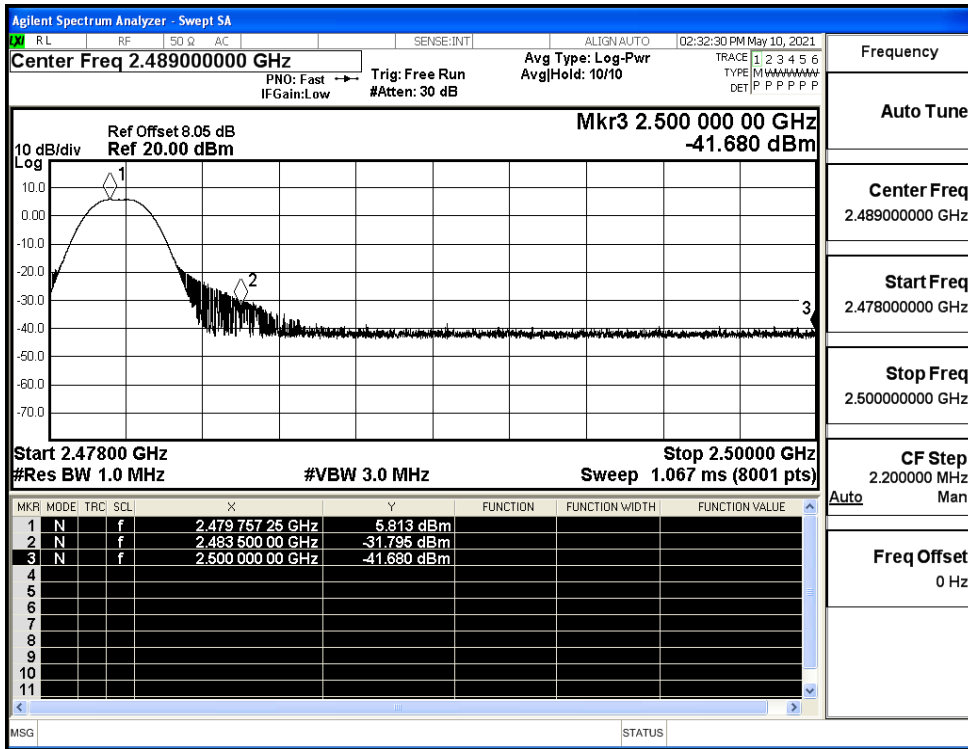
Restrict-band band-edge measurements\_BT LE\_2402\_Ant1\_PEAK



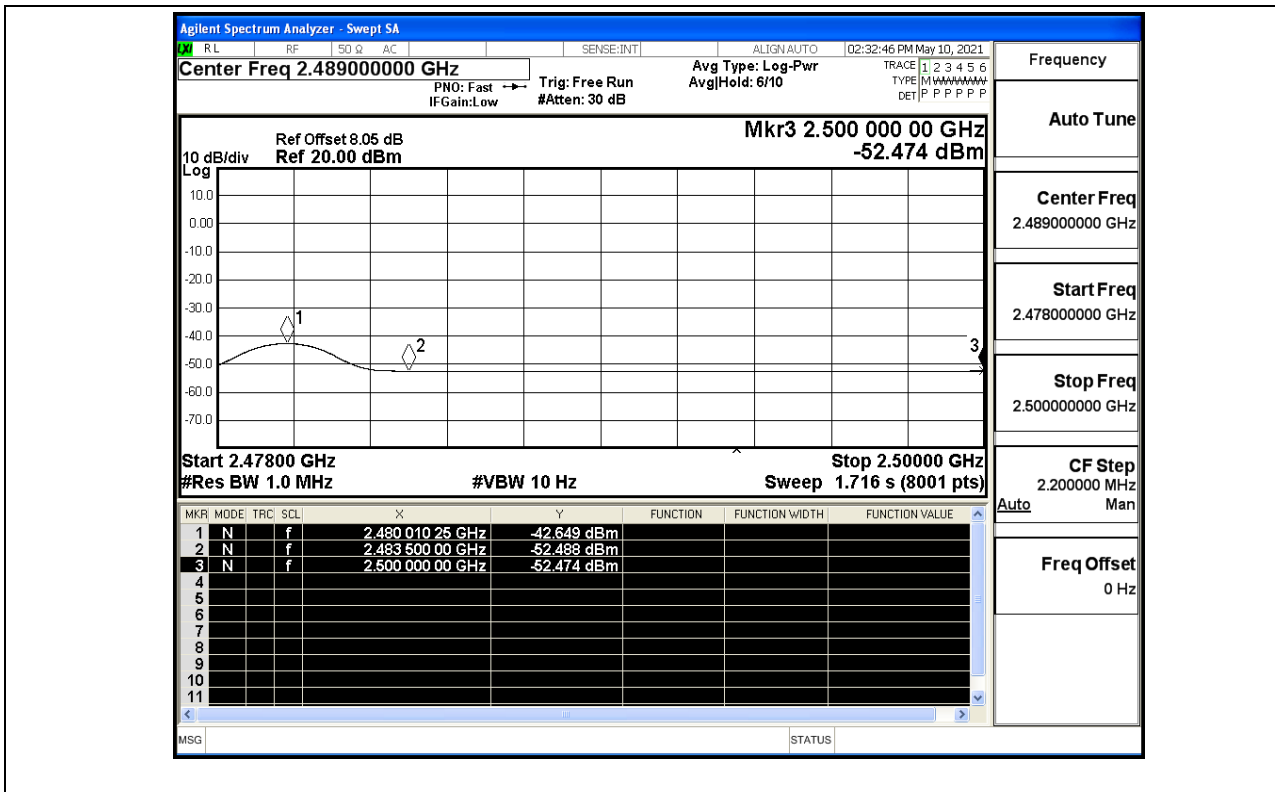
Restrict-band band-edge measurements\_BT LE\_2402\_Ant1\_AV



Restrict-band band-edge measurements\_BT LE\_2480\_Ant1\_PEAK

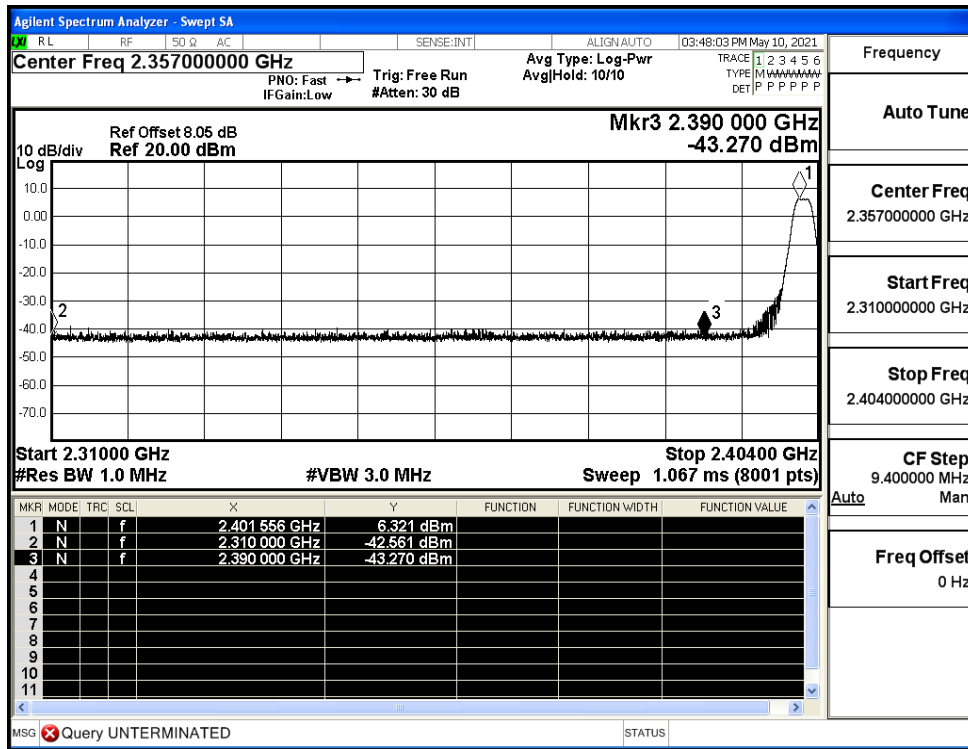


Restrict-band band-edge measurements\_BT LE\_2480\_Ant1\_AV

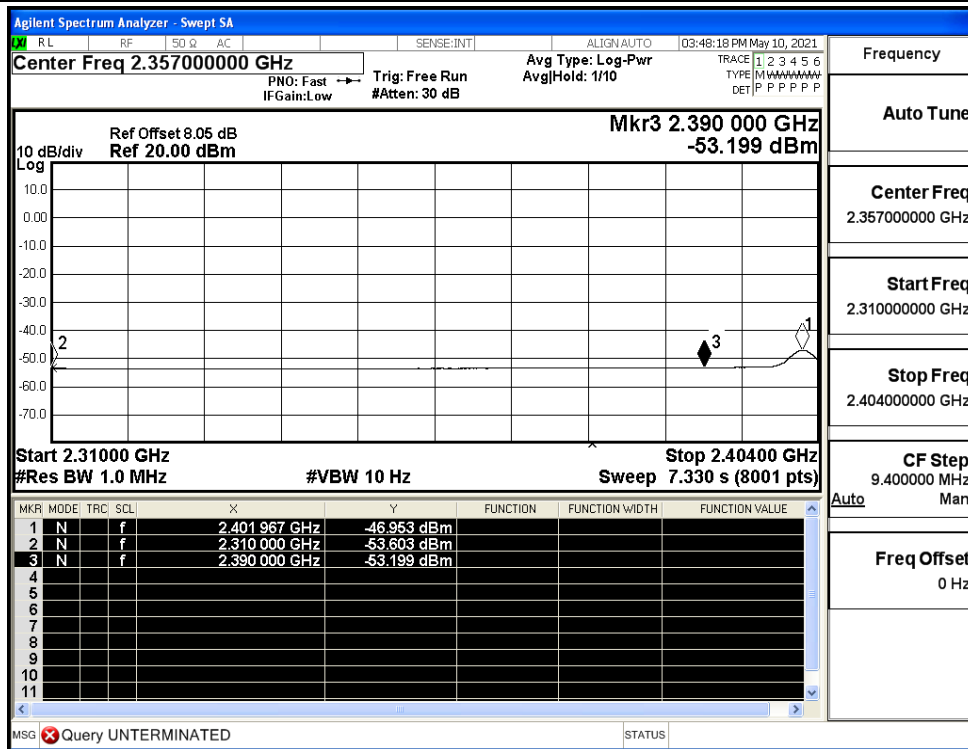


Restrict-band band-edge measurements\_BT 2LE\_2402\_Ant1\_PEAK

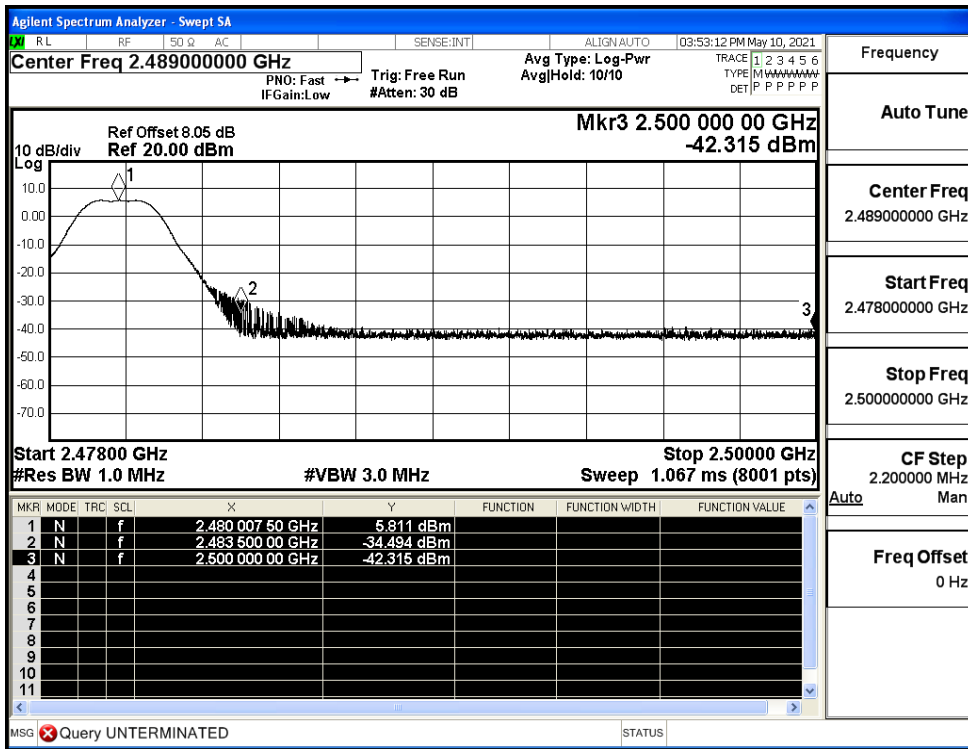




Restrict-band band-edge measurements\_BT 2LE\_2402\_Ant1\_AV



Restrict-band band-edge measurements\_BT 2LE\_2480\_Ant1\_PEAK



Restrict-band band-edge measurements\_BT 2LE\_2480\_Ant1\_AV

