

## Appendix A

### RF Test Data for BLE(Conducted Measurement)

Product Name: LoRa+BLE module

Trade Mark: RAK

Test Model: RAK4600(H)

FCC ID: 2AF6B- RAK4600H

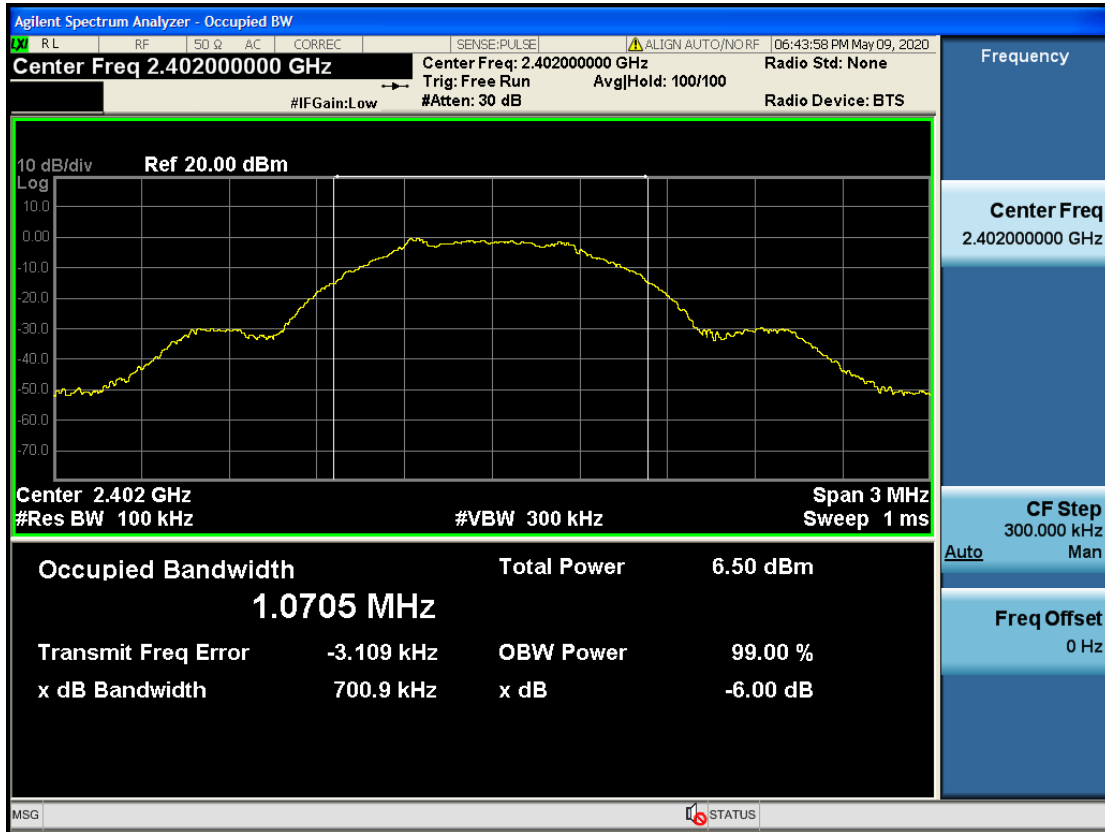
### Environmental Conditions

Temperature:	22.8° C
Relative Humidity:	60%
ATM Pressure:	100.0 kPa
Test Engineer:	Anna Hu
Supervised by:	Hugo Chen
NOTE	N/A

#### A.1. 6dB Bandwidth

Test Mode	Test Channel	Ant	EBW[MHz]	Limit	Verdict
BLE(1Mbps)	2402	Ant1	0.701	0.5	PASS
BLE(1Mbps)	2440	Ant1	0.756	0.5	PASS
BLE(1Mbps)	2480	Ant1	0.705	0.5	PASS
BLE(2Mbps)	2402	Ant1	1.258	0.5	PASS
BLE(2Mbps)	2440	Ant1	1.296	0.5	PASS
BLE(2Mbps)	2480	Ant1	1.372	0.5	PASS

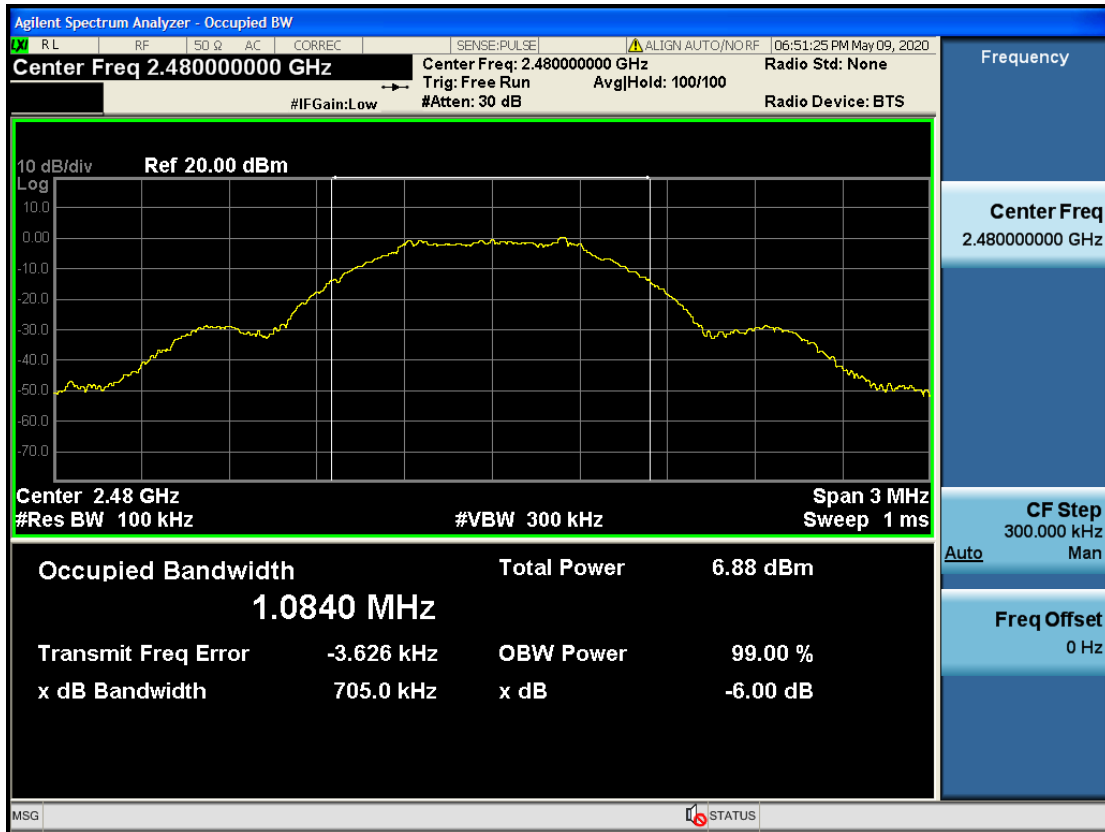
6dB Bandwidth\_BLE(1Mbps)\_2402\_Ant1



6dB Bandwidth\_BLE(1Mbps)\_2440\_Ant1



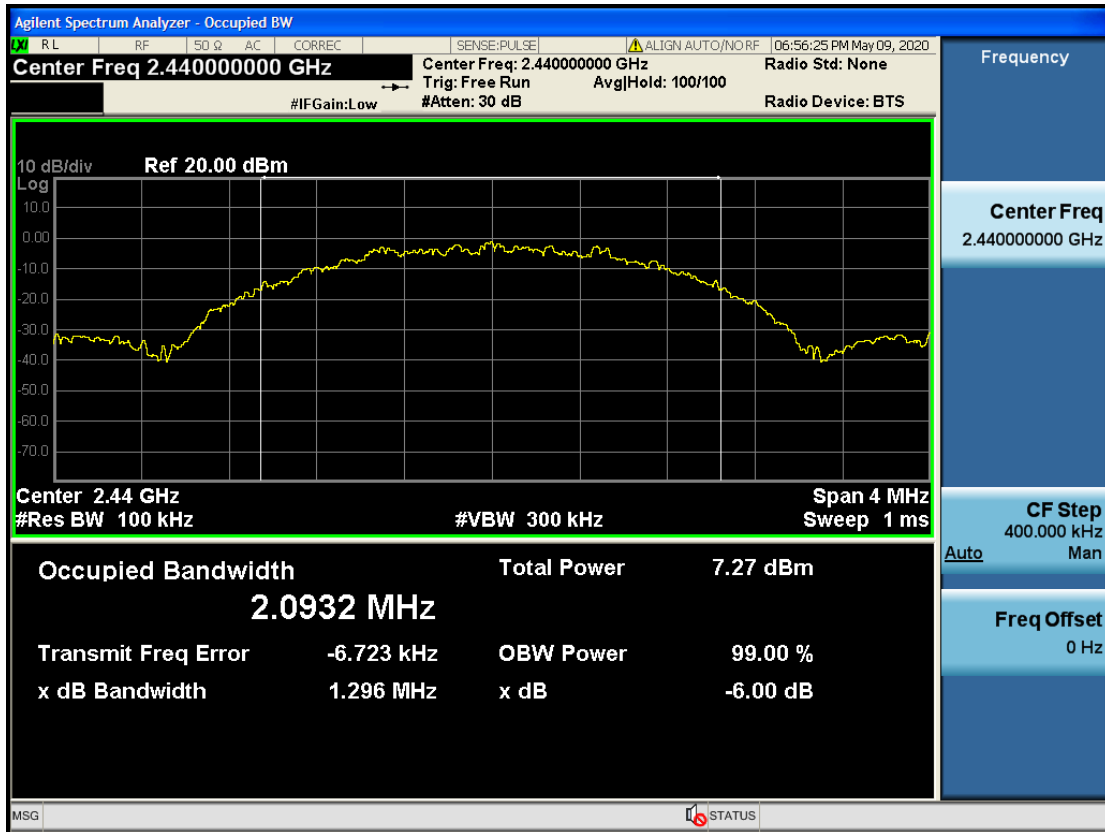
6dB Bandwidth\_BLE(1Mbps)\_2480\_Ant1



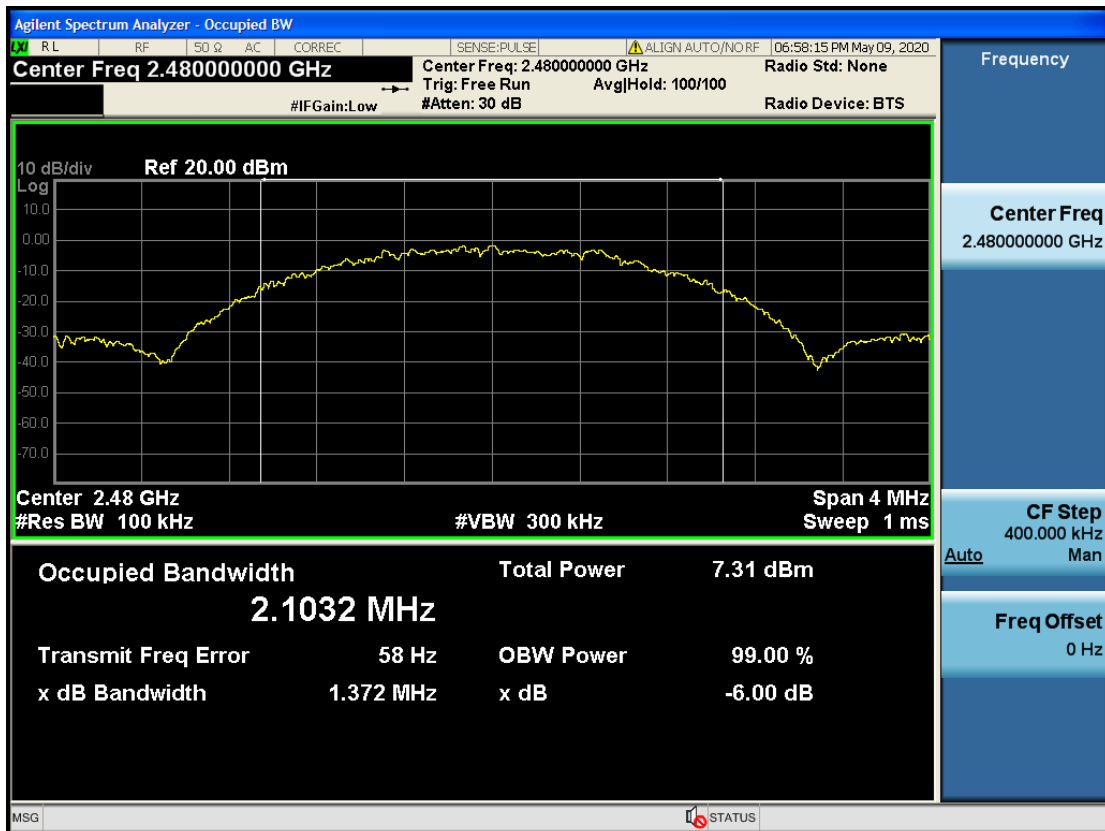
6dB Bandwidth\_BLE(2Mbps)\_2402\_Ant1



6dB Bandwidth\_BLE(2Mbps)\_2440\_Ant1



6dB Bandwidth\_BLE(2Mbps)\_2480\_Ant1



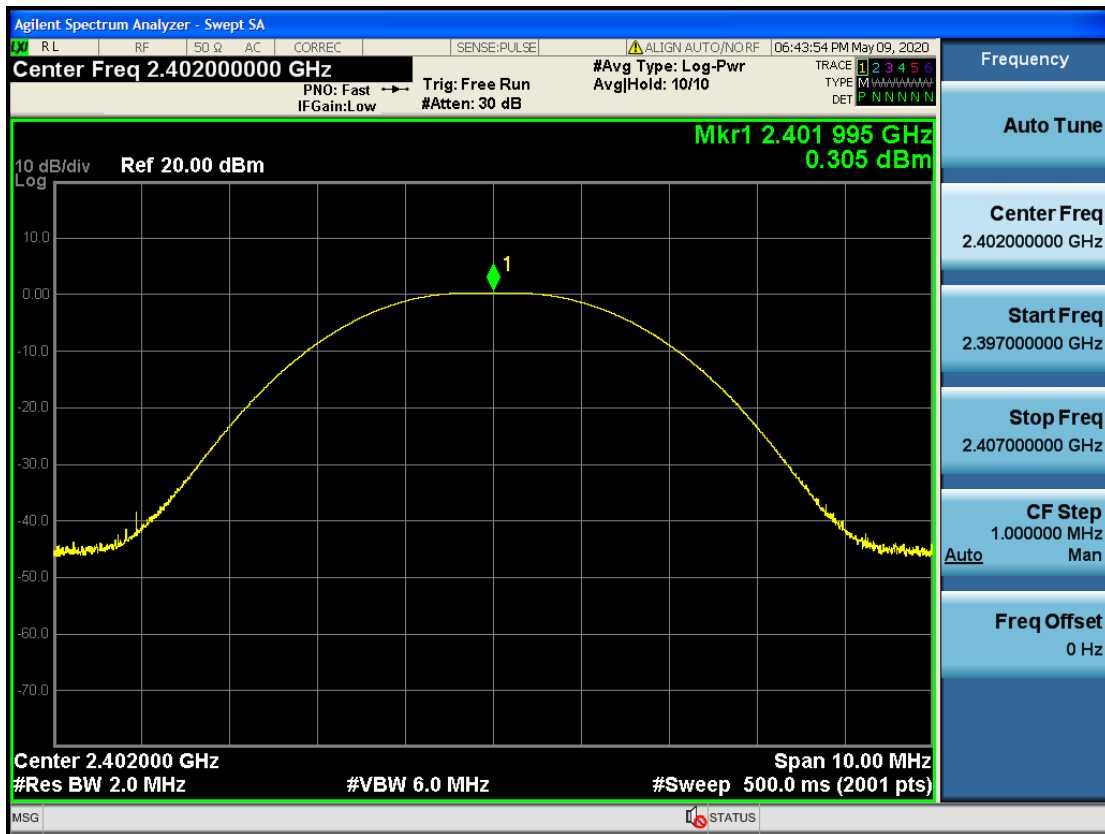
**A.2. Occupied Bandwidth**

Test Mode	Test Channel	Ant	OBW[MHz]	Limit[MHz]	Verdict
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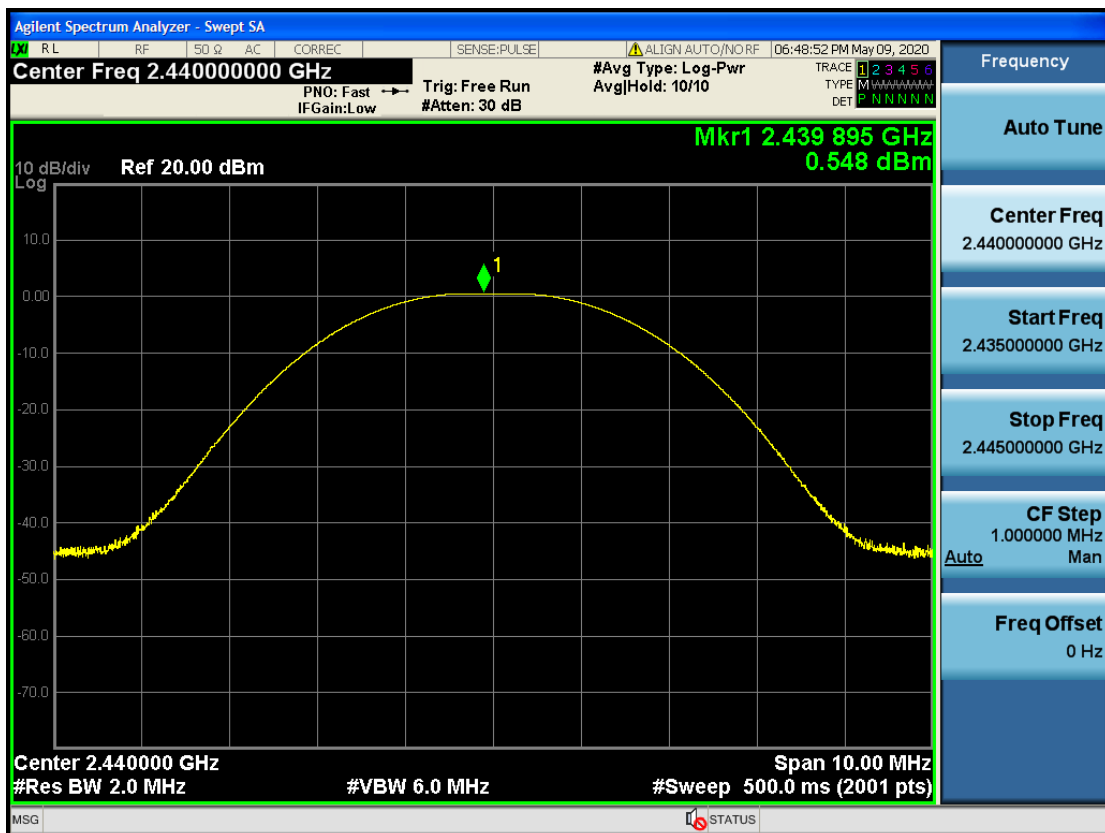
**A.3. Maximum peak conducted output power**

Test Mode	Test	Ant	Power[dBm]	Limit[dBm]	Verdict
BLE	2402	Ant1	0.305	30	PASS
BLE	2440	Ant1	0.548	30	PASS
BLE	2480	Ant1	0.786	30	PASS
BLE	2402	Ant1	0.409	30	PASS
BLE	2440	Ant1	0.620	30	PASS
BLE	2480	Ant1	0.844	30	PASS

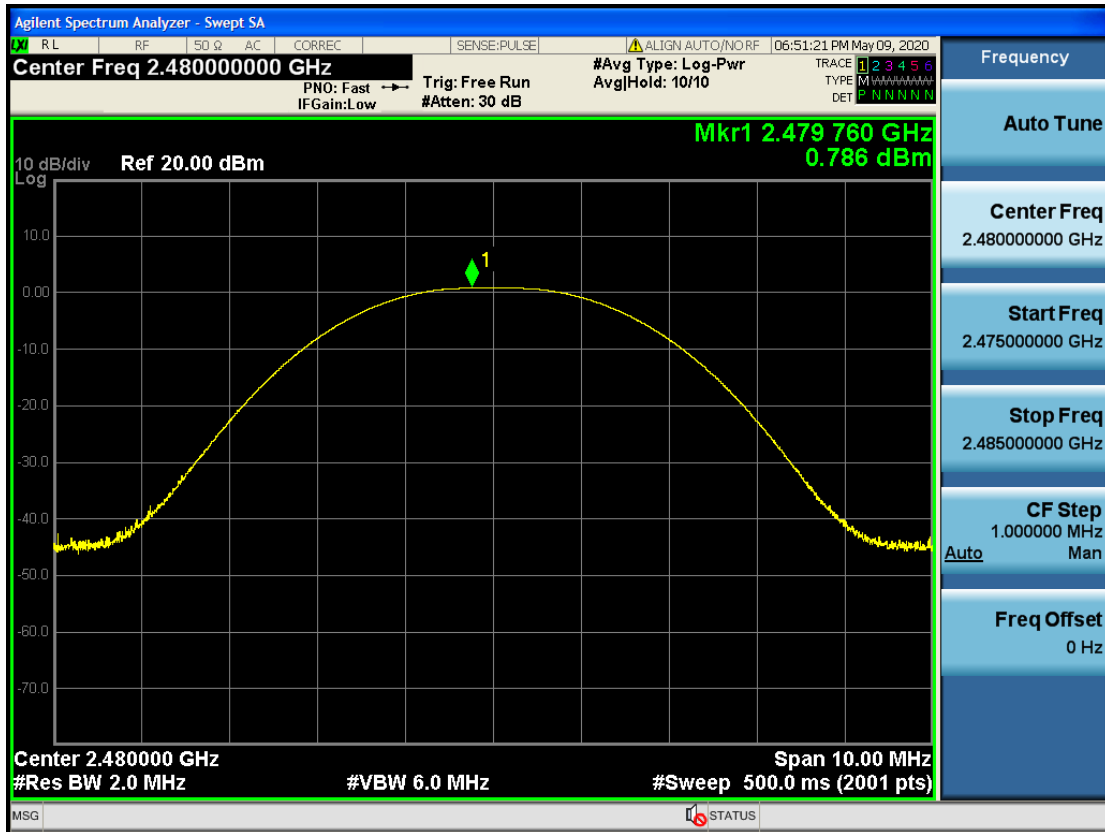
Maximum peak conducted output power\_BLE(1Mbps)\_2402\_Ant1



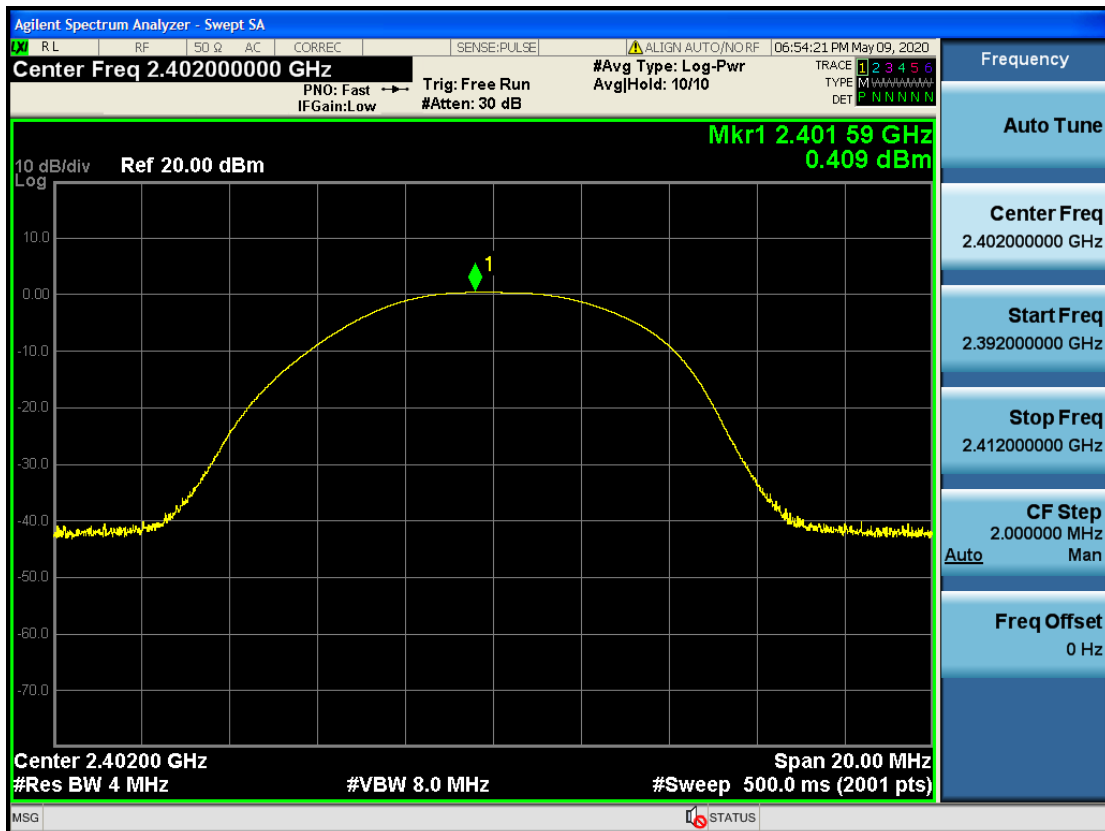
Maximum peak conducted output power\_BLE(1Mbps)\_2440\_Ant1



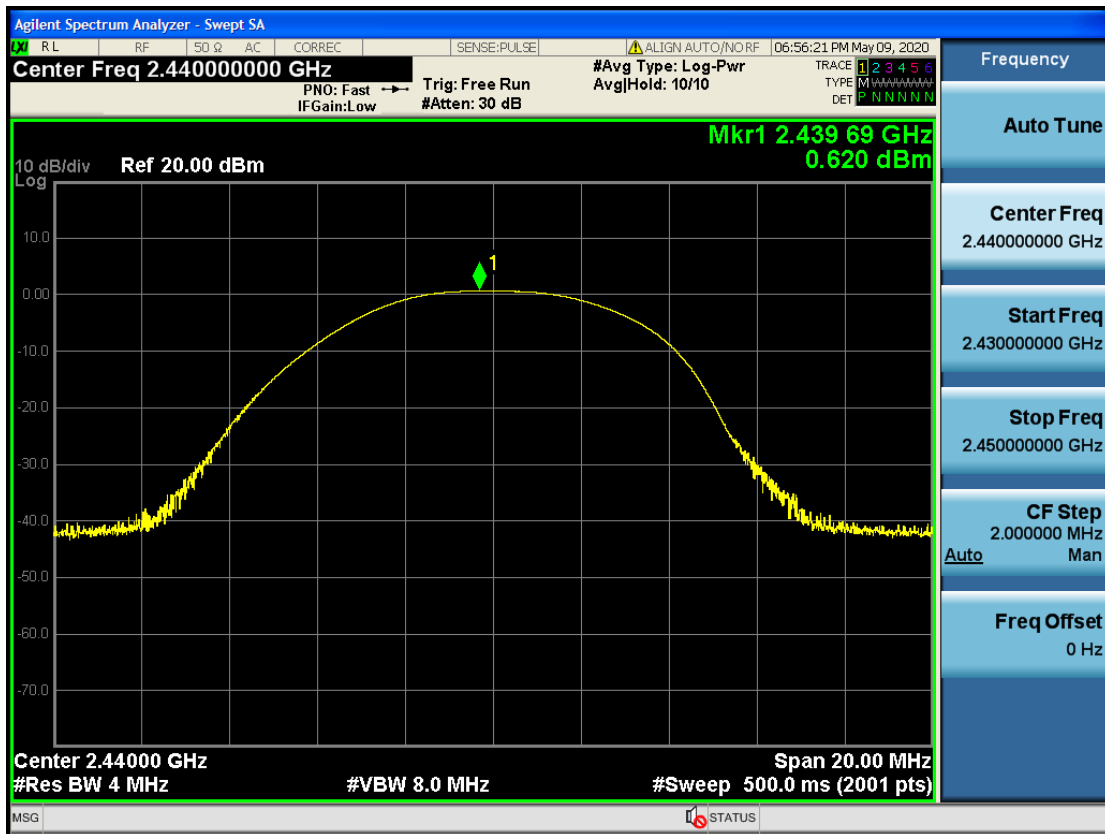
Maximum peak conducted output power\_BLE(1Mbps)\_2480\_Ant1



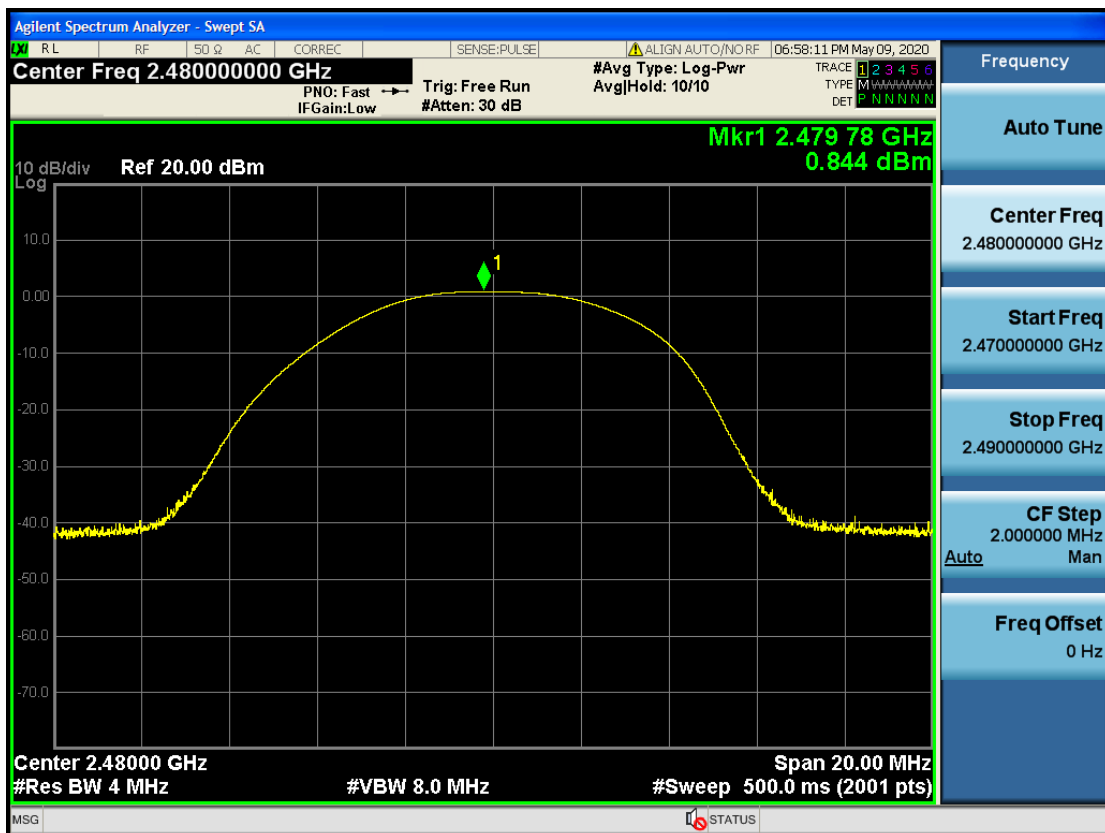
Maximum peak conducted output power\_BLE\_2402(2Mbps)\_Ant1



Maximum peak conducted output power\_BLE(2Mbps)\_2440\_Ant1



Maximum peak conducted output power\_BLE(2Mbps)\_2480\_Ant1

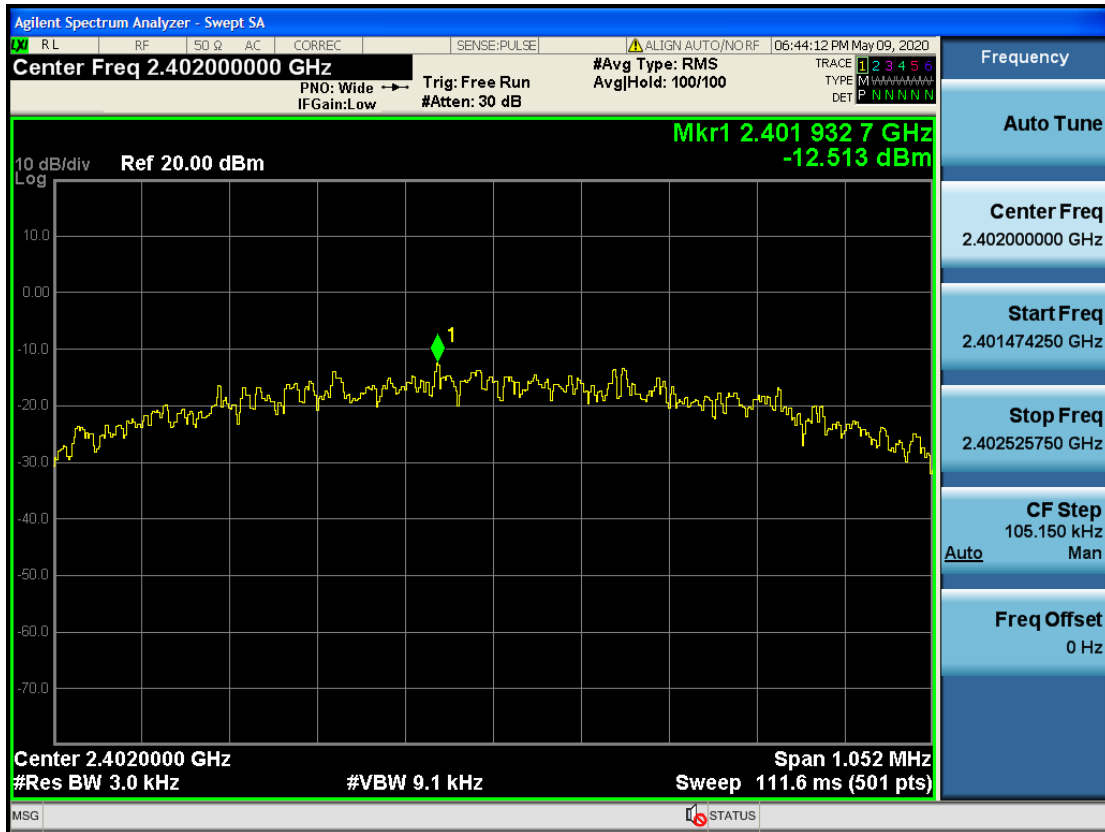




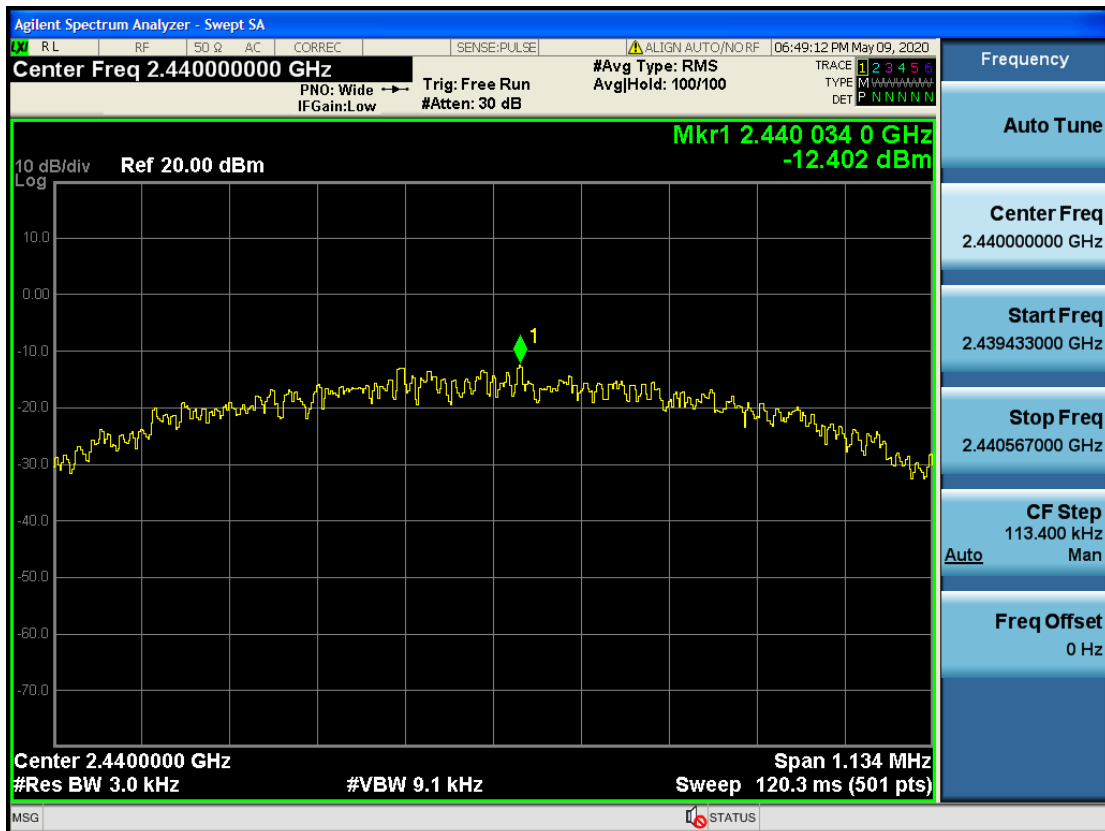
**A.4. Maximum Peak power spectral density**

Test Mode	Test	Ant	PSD[dBm/3KHz]	Limit[dBm/3KHz]	Verdict
BLE(1Mbps)	2402	Ant1	-12.513	8.00	PASS
BLE(1Mbps)	2440	Ant1	-12.402	8.00	PASS
BLE(1Mbps)	2480	Ant1	-13.04	8.00	PASS
BLE(2Mbps)	2402	Ant1	-16.012	8.00	PASS
BLE(2Mbps)	2440	Ant1	-15.709	8.00	PASS
BLE(2Mbps)	2480	Ant1	-14.847	8.00	PASS

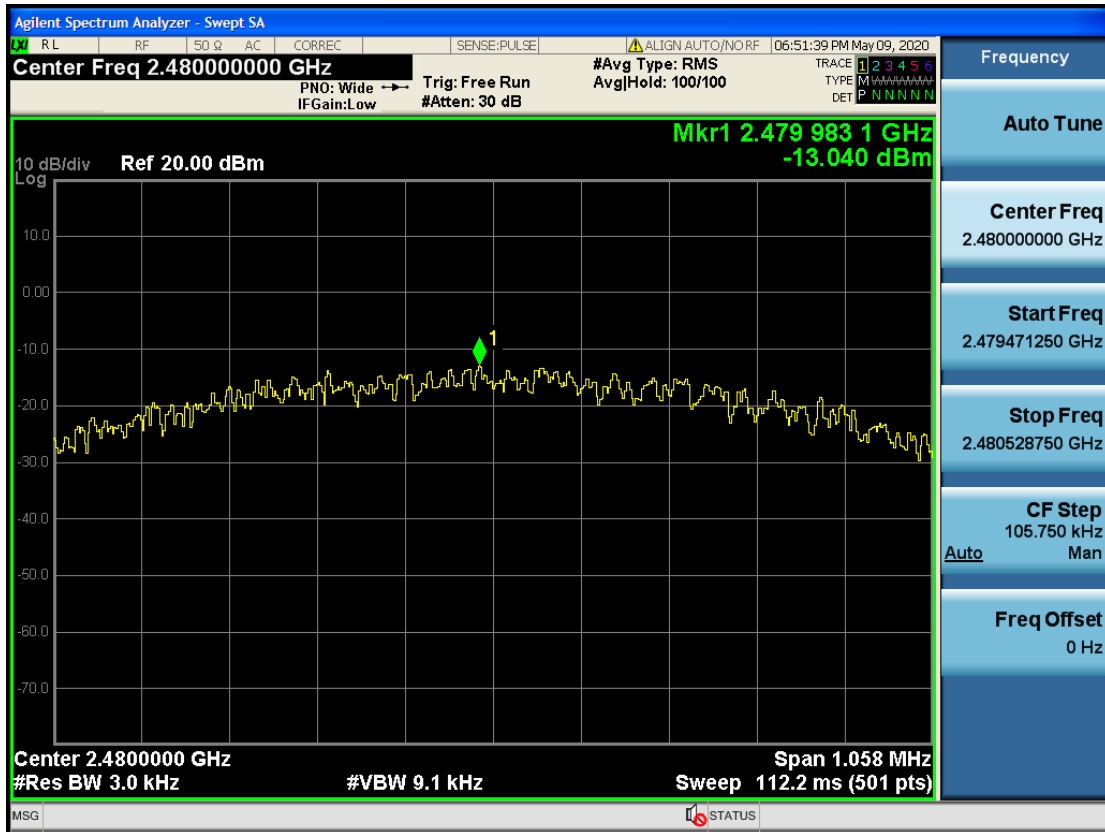
Maximum Peak power spectral density\_BLE(1Mbps)\_2402\_Ant1



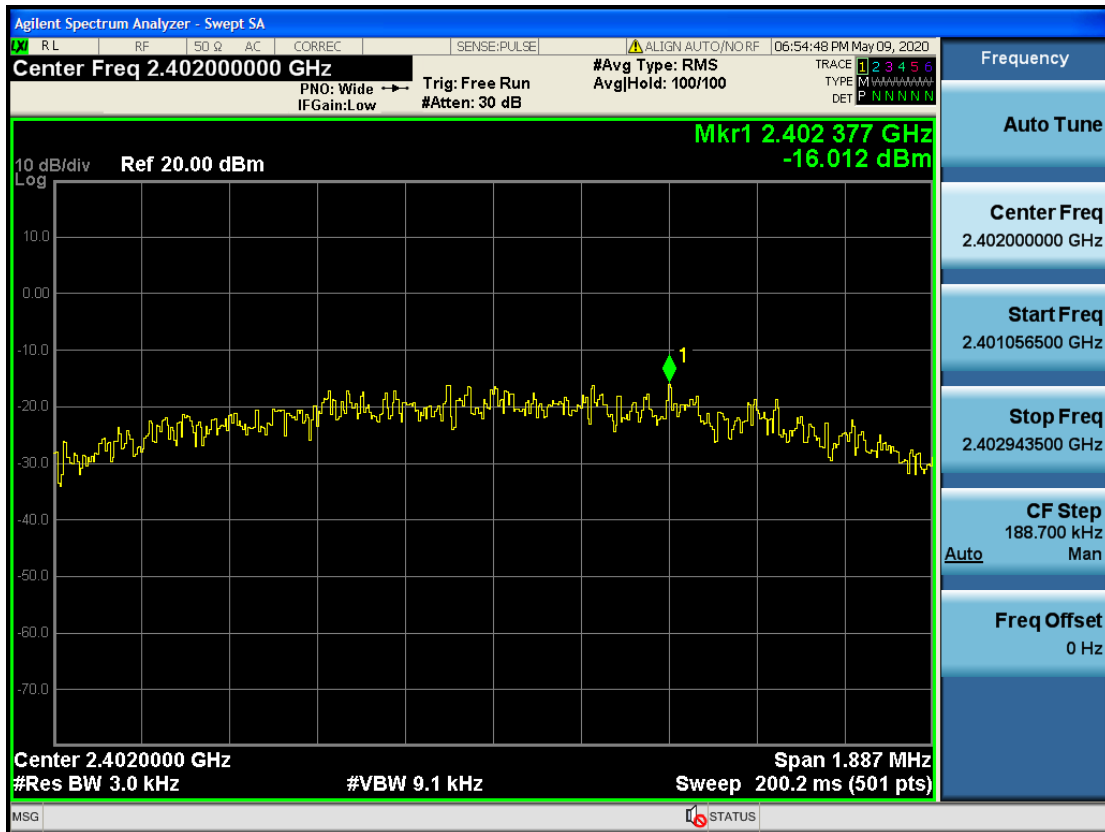
Maximum Peak power spectral density\_BLE(1Mbps)\_2440\_Ant1



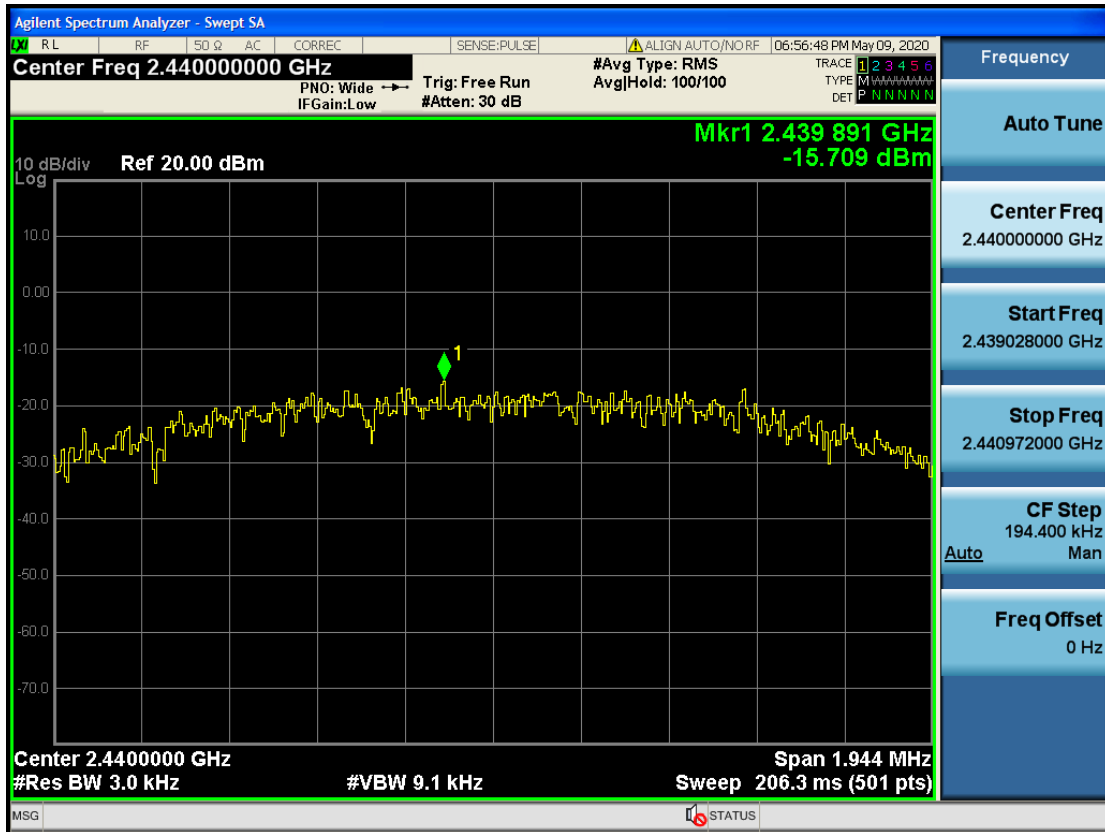
Maximum Peak power spectral density\_BLE(1Mbps)\_2480\_Ant1



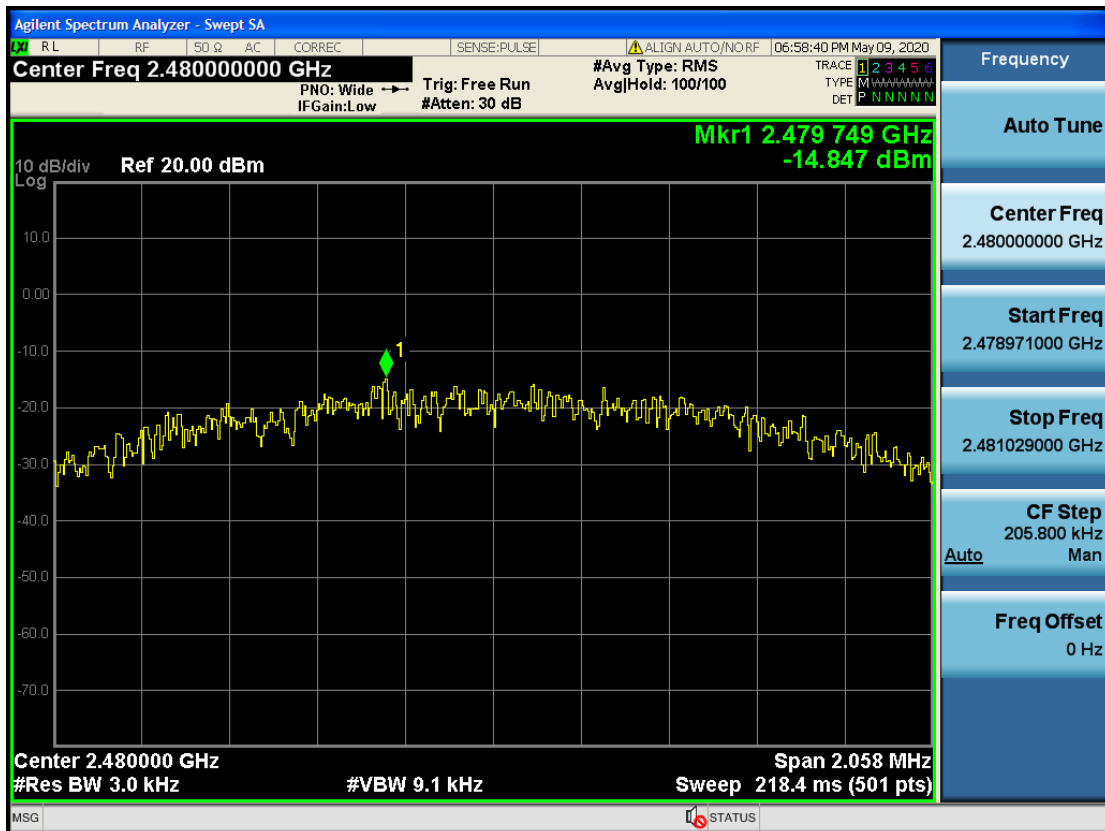
Maximum Peak power spectral density\_BLE(2Mbps)\_2402\_Ant1



Maximum Peak power spectral density\_BLE(2Mbps)\_2440\_Ant1



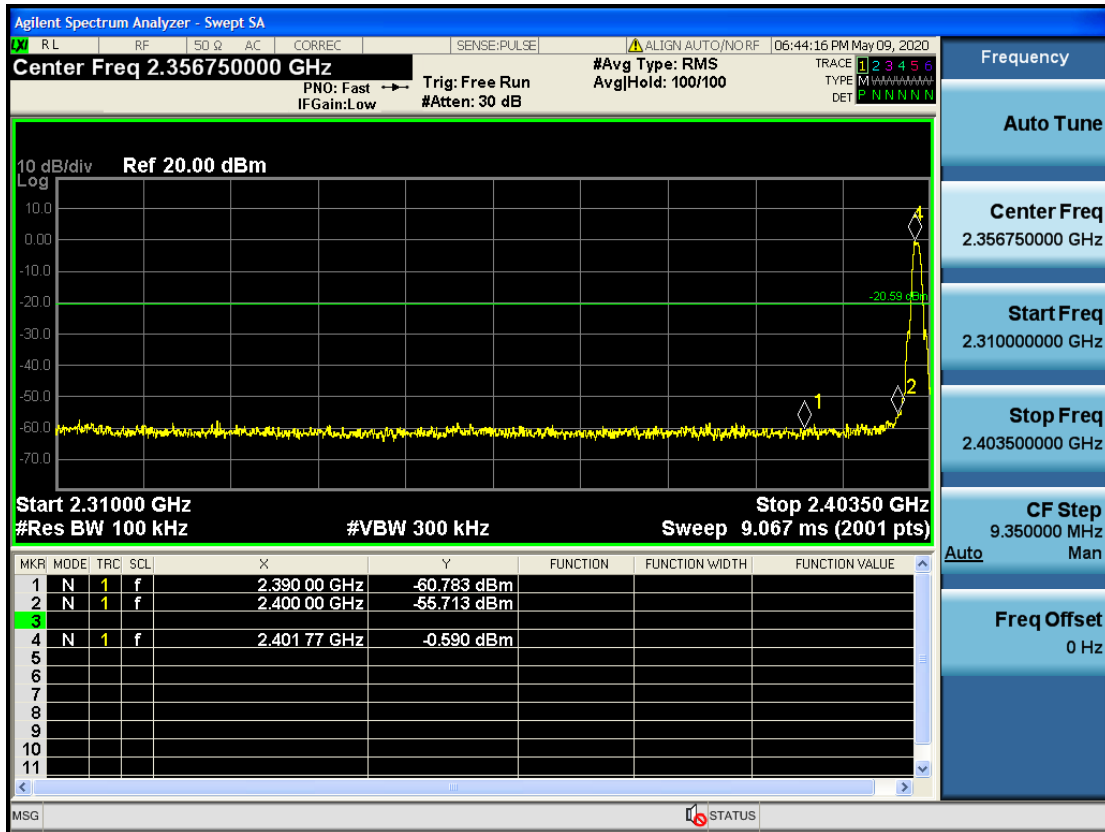
Maximum Peak power spectral density\_BLE(2Mbps)\_2480\_Ant1



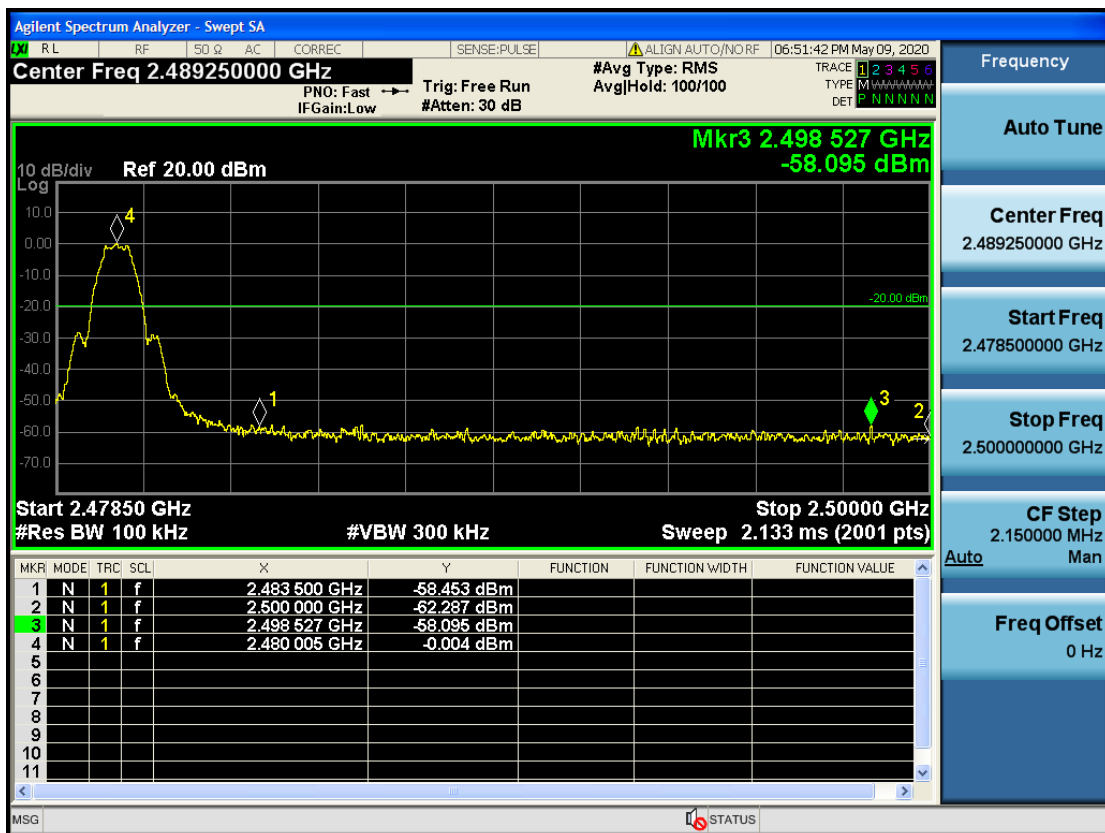
**A.5. Band-edge for RF Conducted Emissions**

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
BLE(1Mbps)	2402	2400	-0.59	-55.71	-20.59	Pass
BLE(1Mbps)	2480	2498.527	-0.004	-58.095	-20.004	Pass
BLE(2Mbps)	2402	2400	-0.423	-34.16	-20.423	Pass
BLE(2Mbps)	2480	2483.5	-2.158	-56.85	-22.158	Pass

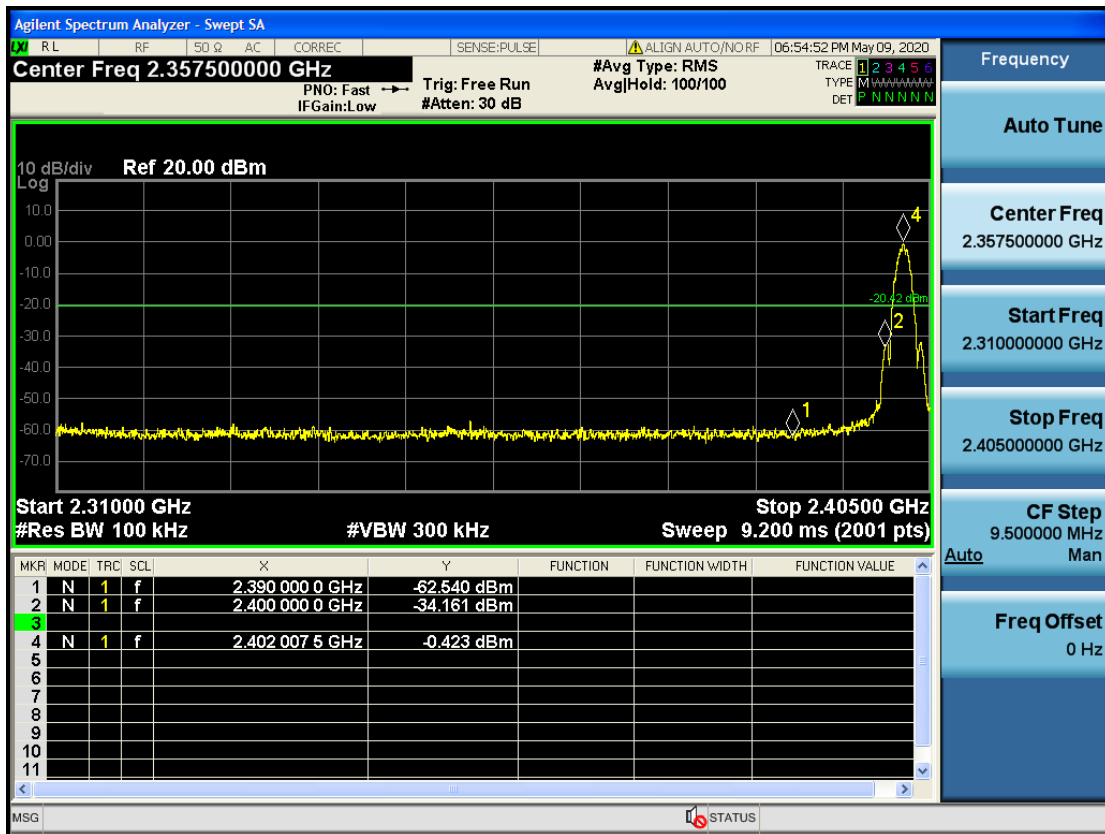
Band-edge for RF Conducted Emissions\_BLE(1Mbps)\_2402\_Ant1



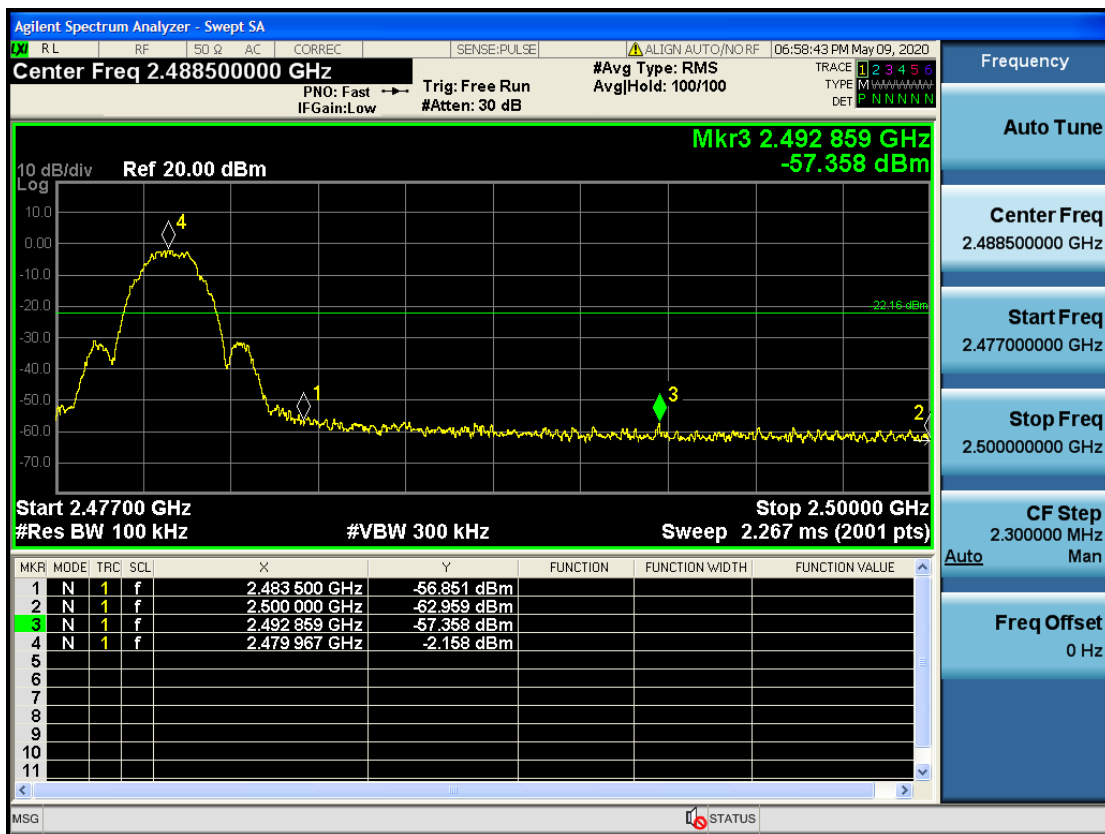
Band-edge for RF Conducted Emissions\_BLE(1Mbps)\_2480\_Ant1



Band-edge for RF Conducted Emissions\_BLE(2Mbps)\_2402\_Ant1



Band-edge for RF Conducted Emissions\_BLE(2Mbps)\_2480\_Ant1



### A.6. RF Conducted Spurious Emissions

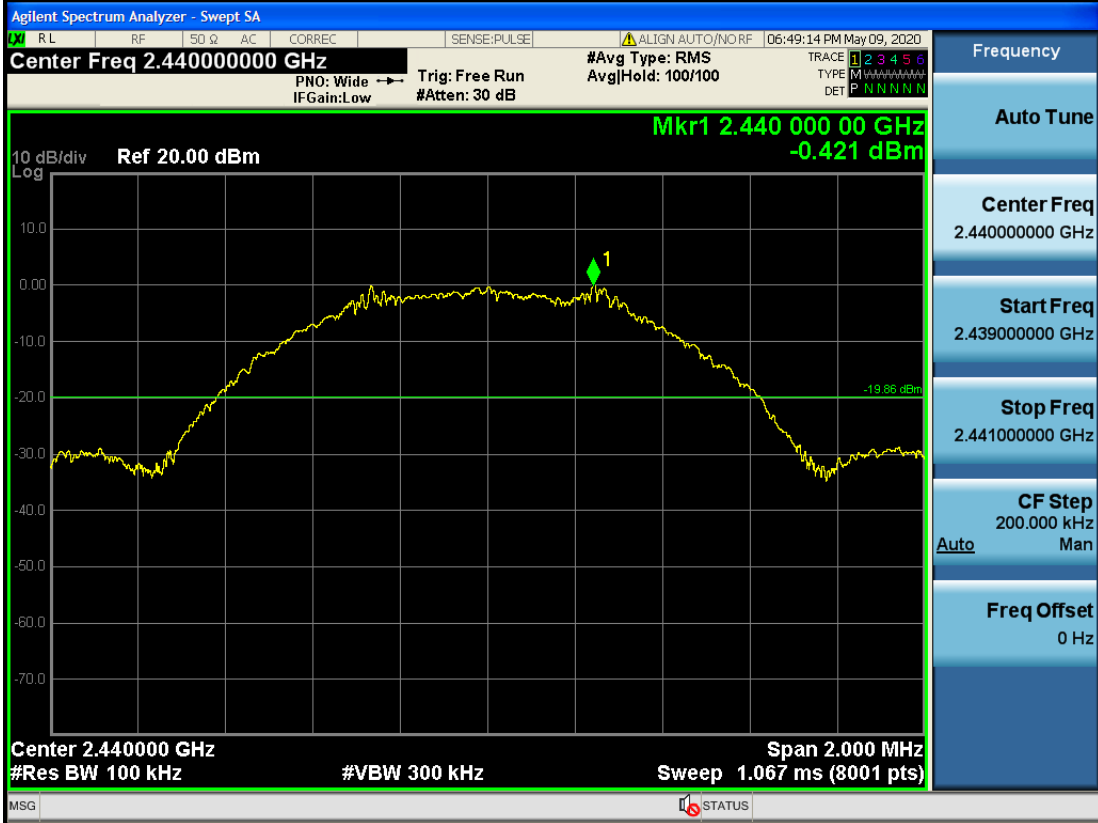
RF Conducted Spurious Emissions\_BLE(1Mbps)\_2402\_Ant1



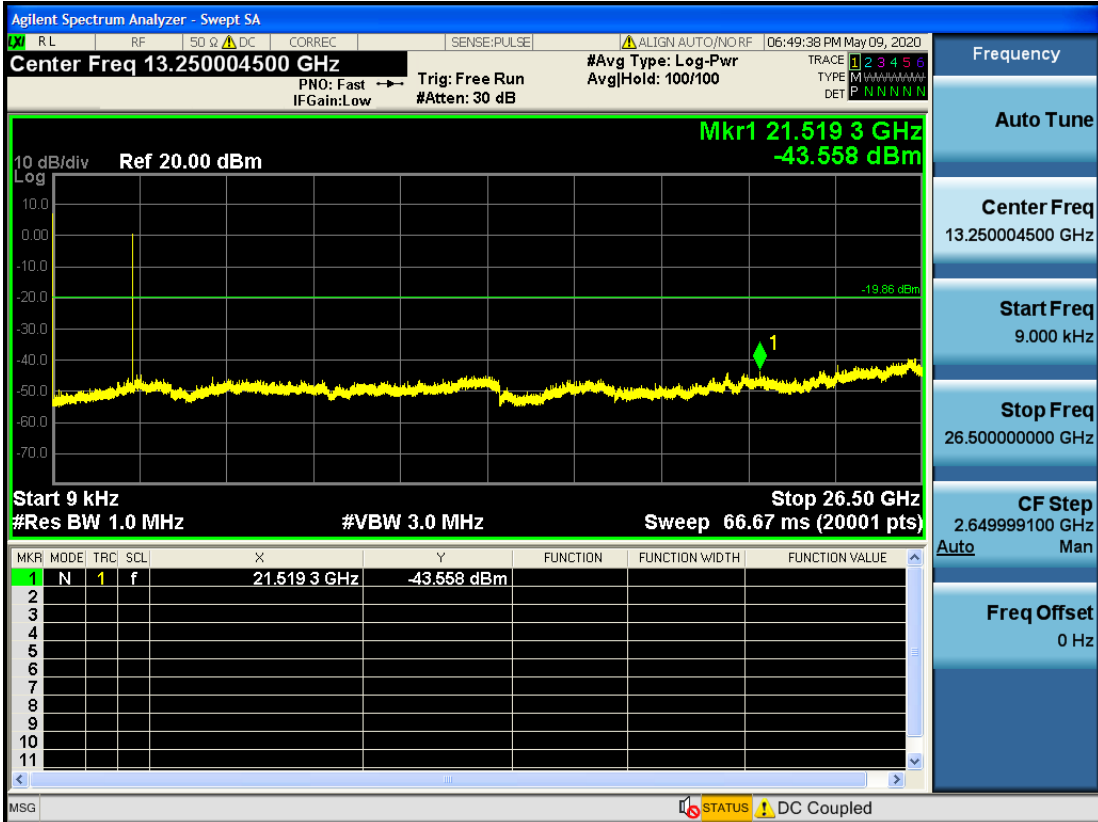


RF Conducted Spurious Emissions\_BLE(1Mbps)\_2440\_Ant1

Pref

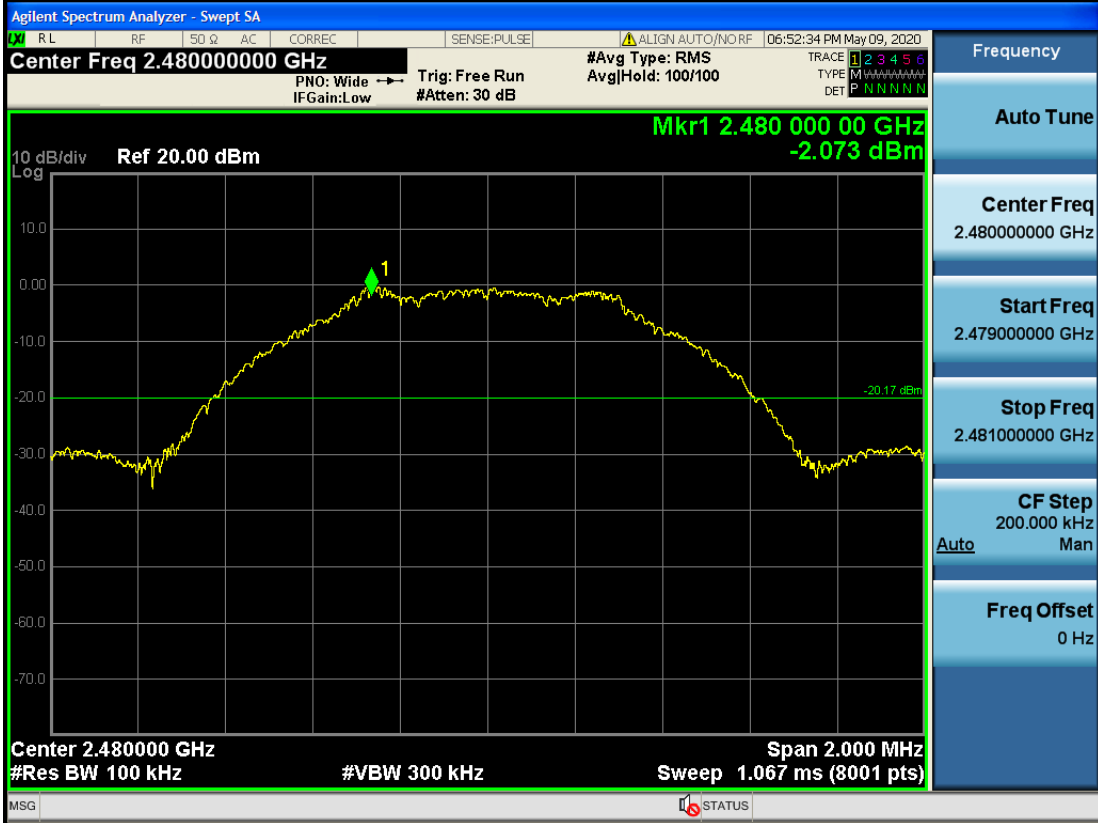


Puw

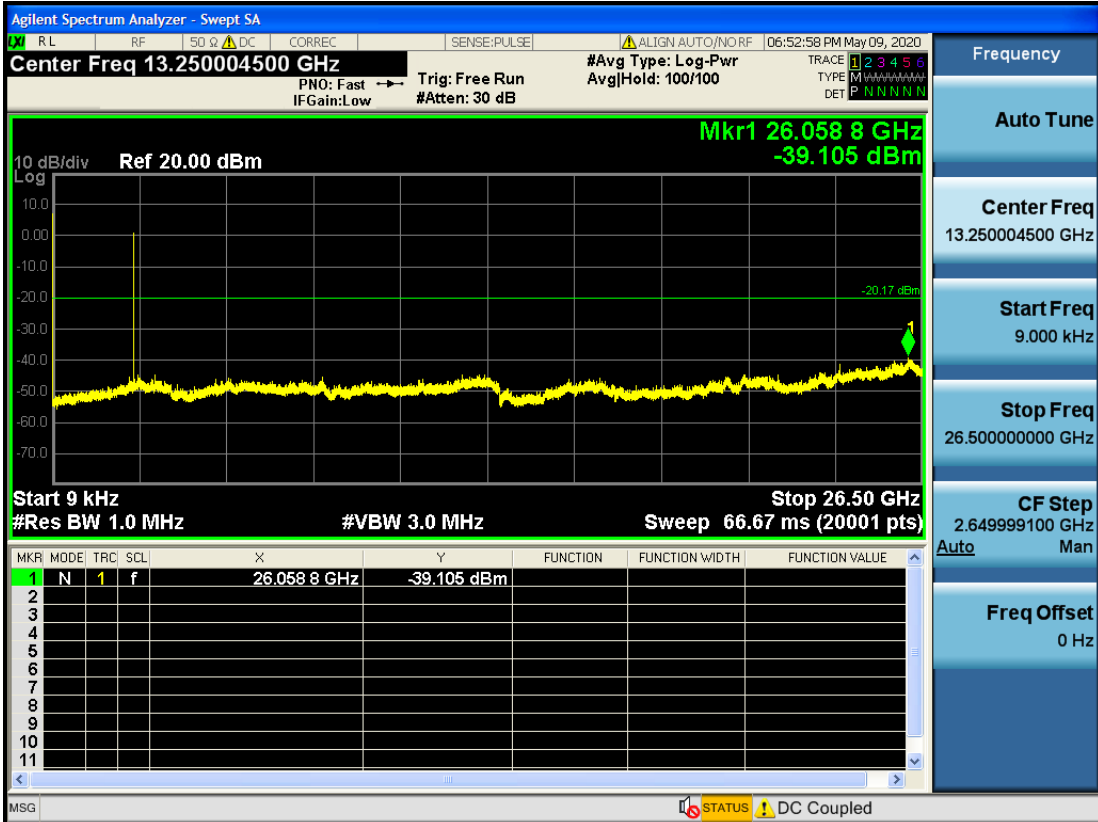


RF Conducted Spurious Emissions\_BLE(1Mbps)\_2480\_Ant1

Pref



Puw

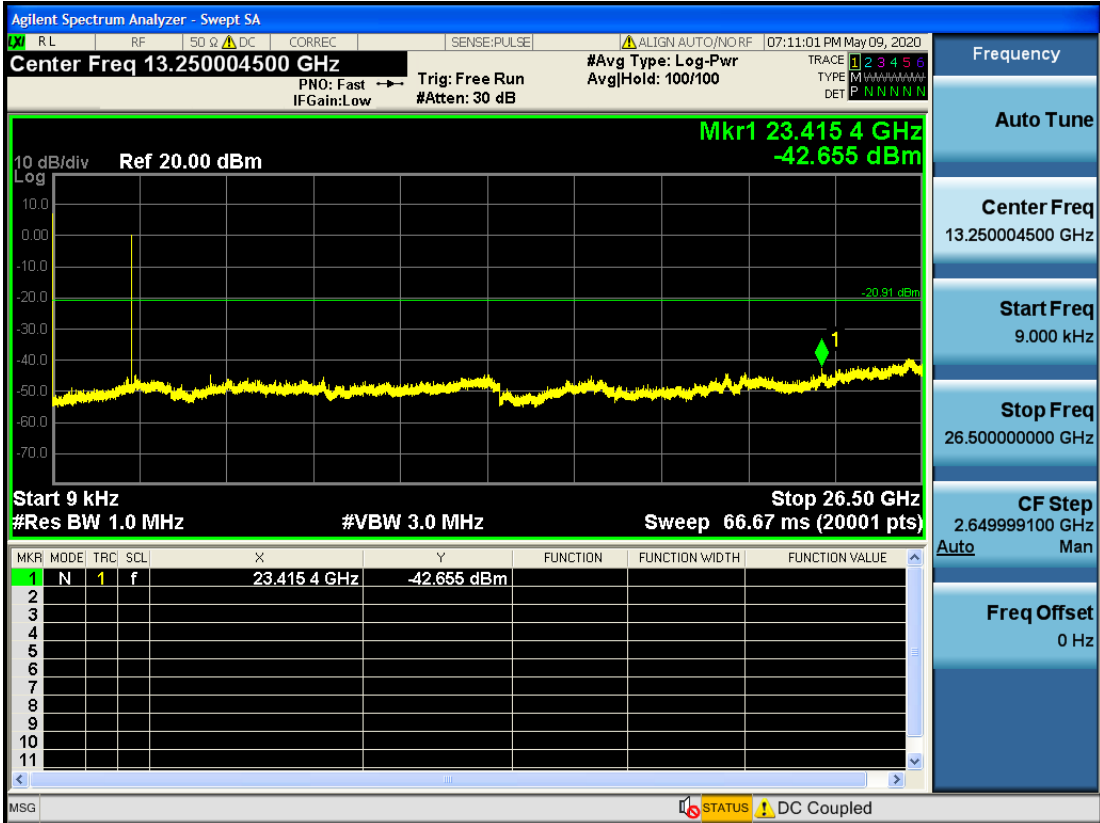


RF Conducted Spurious Emissions\_BLE(2Mbps)\_2402\_Ant1

Pref



Puw

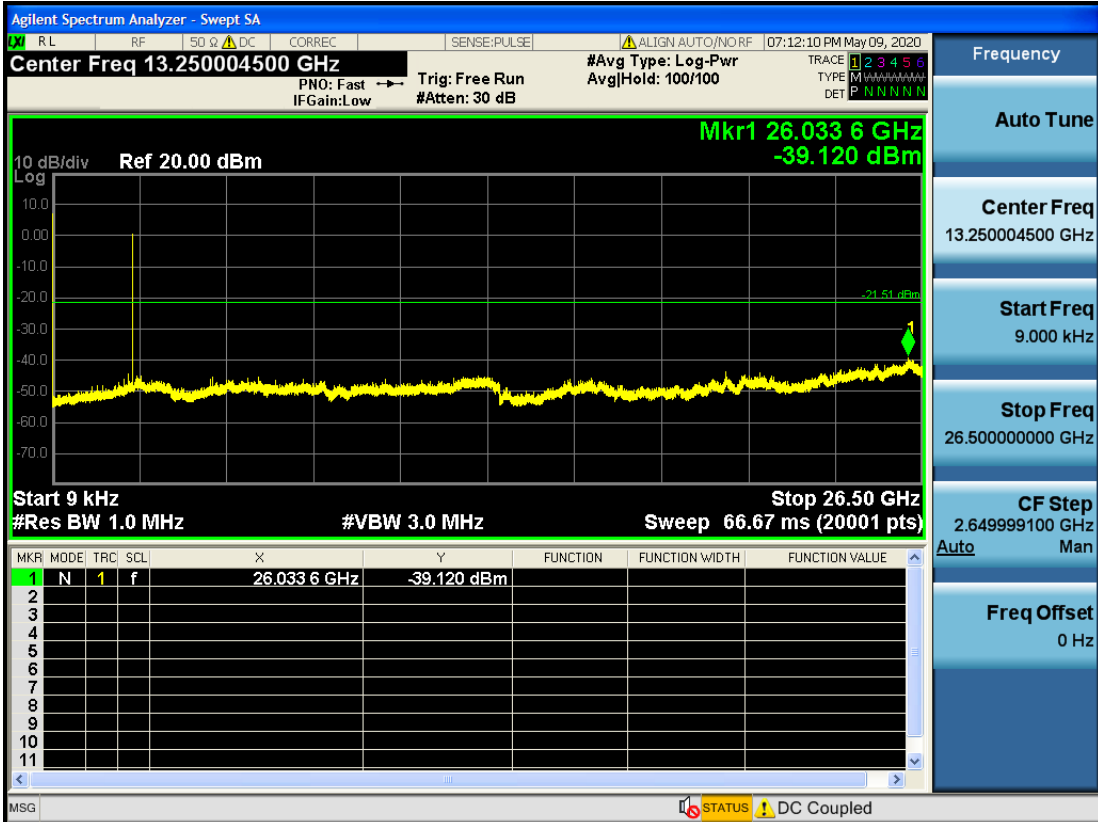


RF Conducted Spurious Emissions\_BLE(2Mbps)\_2440\_Ant1

Pref



Puw

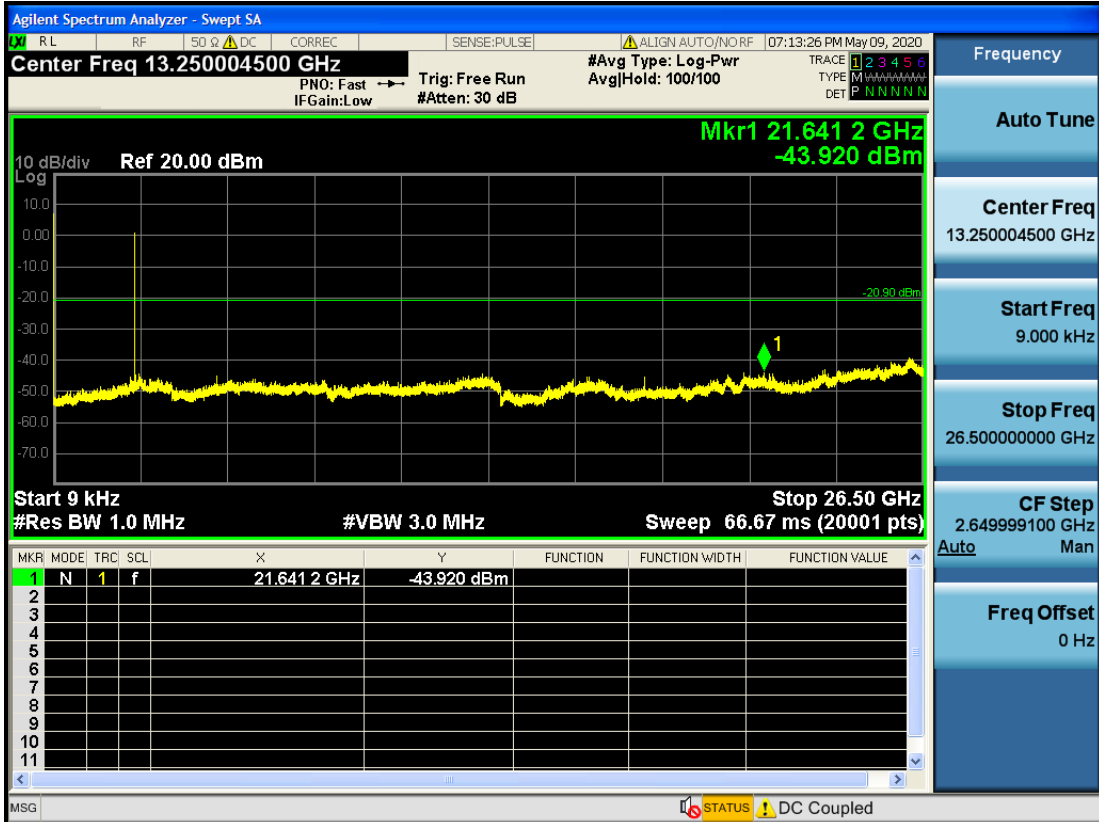


RF Conducted Spurious Emissions\_BLE(2Mbps)\_2480\_Ant1

Pref



Puw

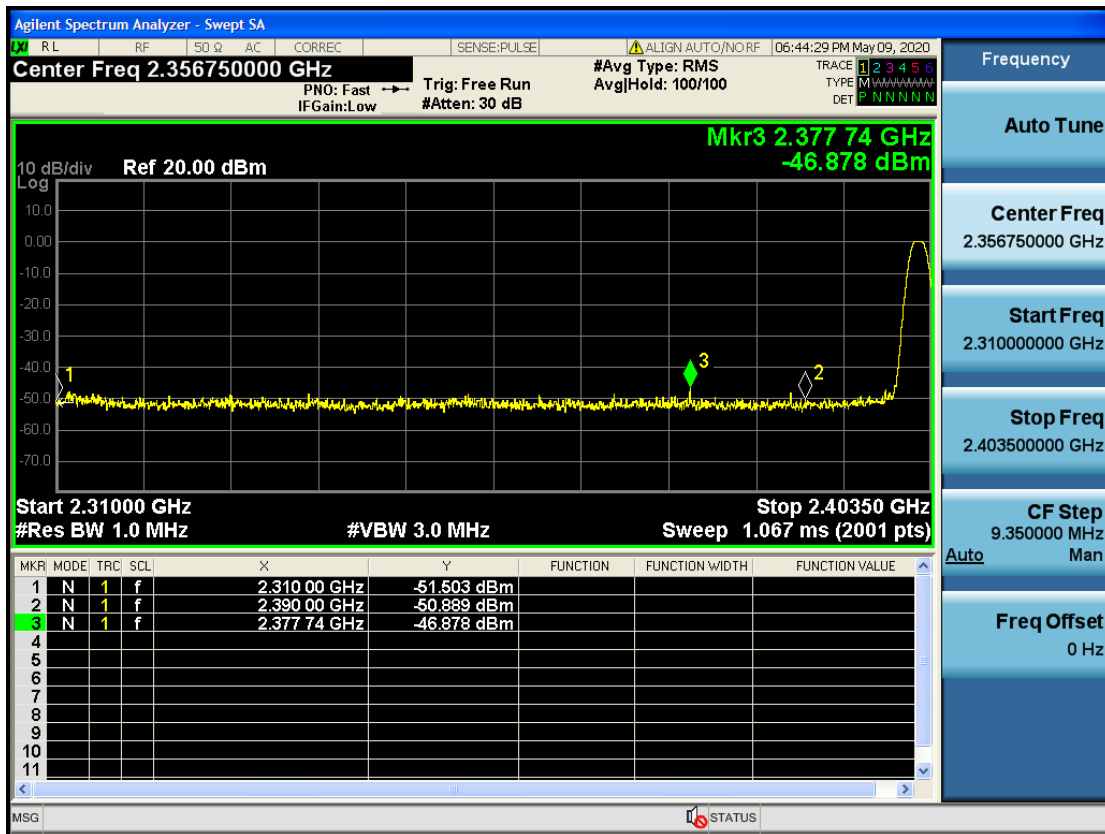


**A.7. Restrict-band band-edge measurements**

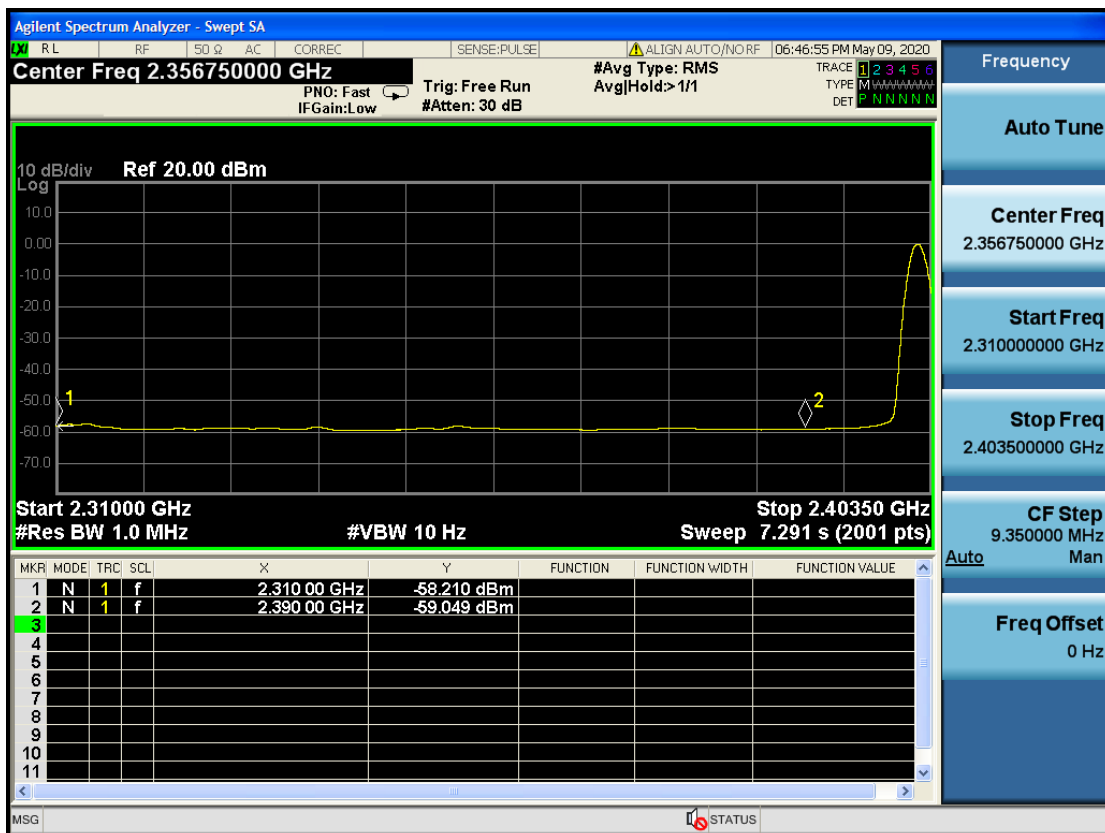
Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
BLE(1Mbps)	2402	2377.741	3.00	0.00	-46.878	51.322	74	Pass
BLE(1Mbps)	2480	2483.5	3.00	0.00	-49.626	48.574	74	Pass
BLE(2Mbps)	2402	2310	3.00	0.00	-50.58	47.62	74	Pass
BLE(2Mbps)	2480	2483.5	3.00	0.00	-44.843	53.357	74	Pass

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
BLE(1Mbps)	2402	2377.741	3.00	0.00	-58.21	39.99	54	Pass
BLE(1Mbps)	2480	2483.5	3.00	0.00	-54.722	43.478	54	Pass
BLE(2Mbps)	2402	2310	3.00	0.00	-58.212	39.988	54	Pass
BLE(2Mbps)	2480	2483.5	3.00	0.00	-47.996	50.204	54	Pass

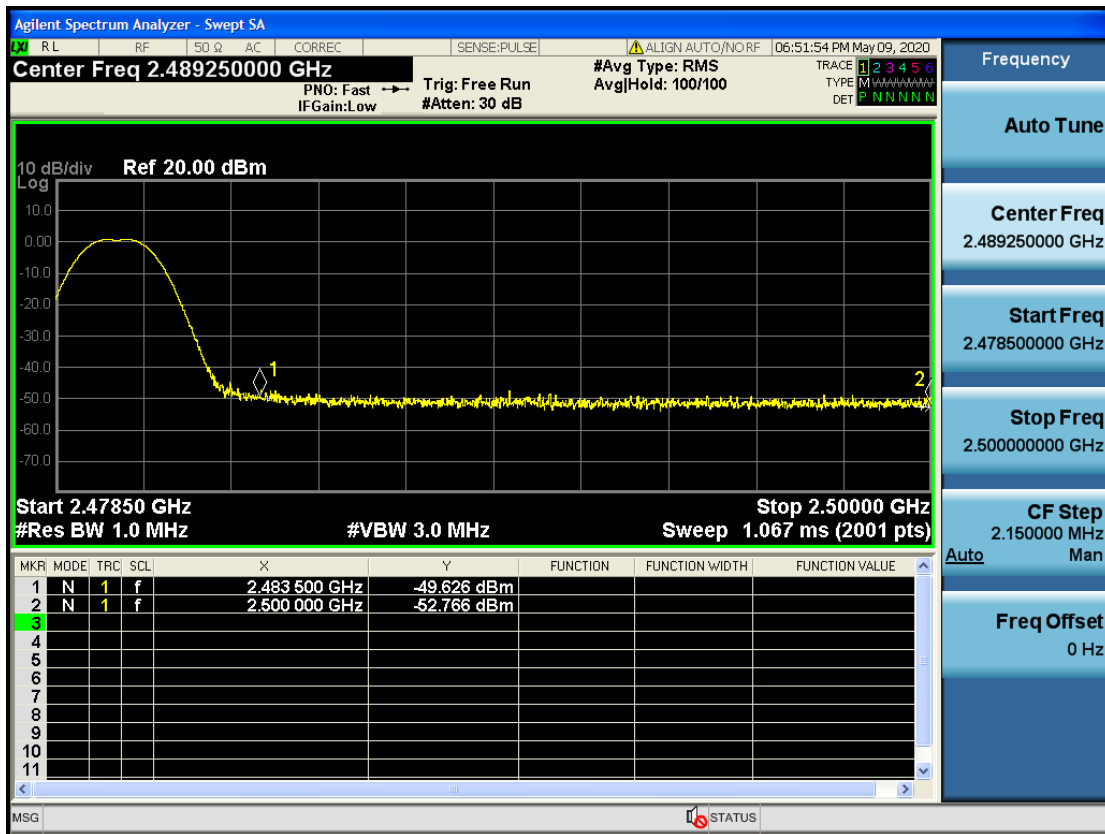
Restrict-band band-edge measurements\_BLE(1Mbps)\_2402\_Ant1\_PEAK



Restrict-band band-edge measurements\_BLE(1Mbps)\_2402\_Ant1\_AV



Restrict-band band-edge measurements\_BLE(1Mbps)\_2480\_Ant1\_PEAK

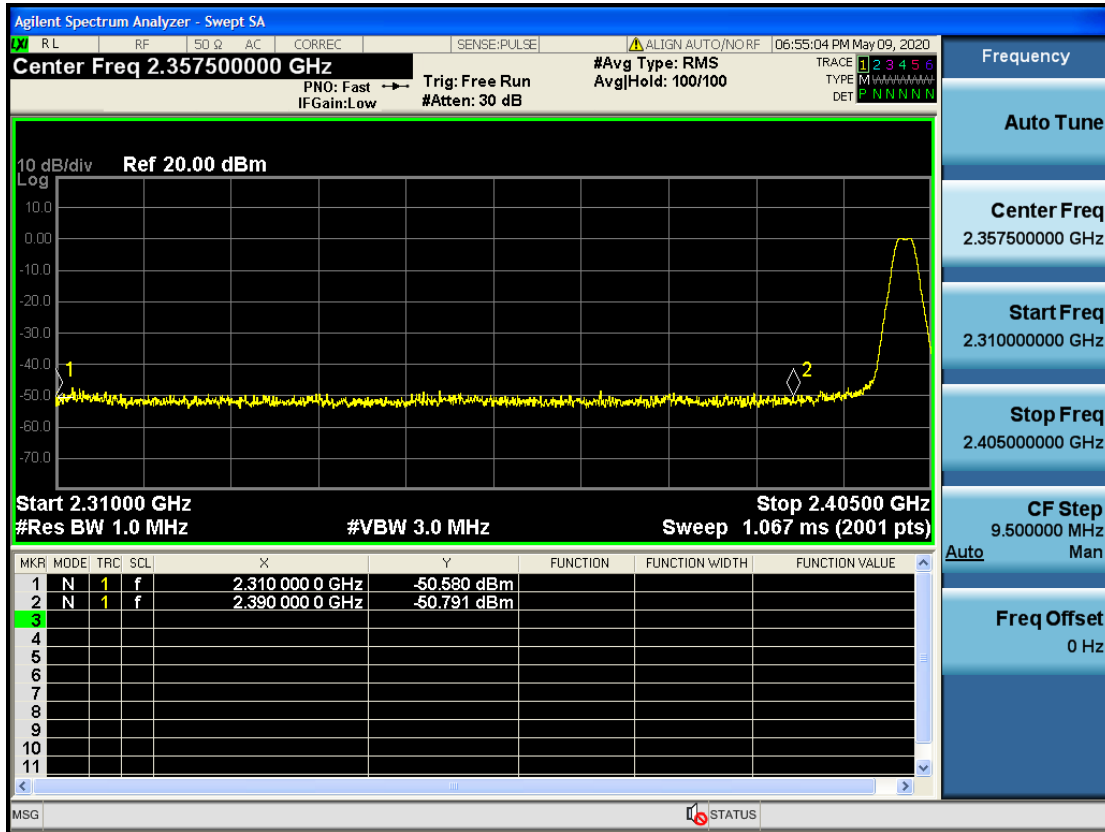


Restrict-band band-edge measurements\_BLE(1Mbps)\_2480\_Ant1\_AV

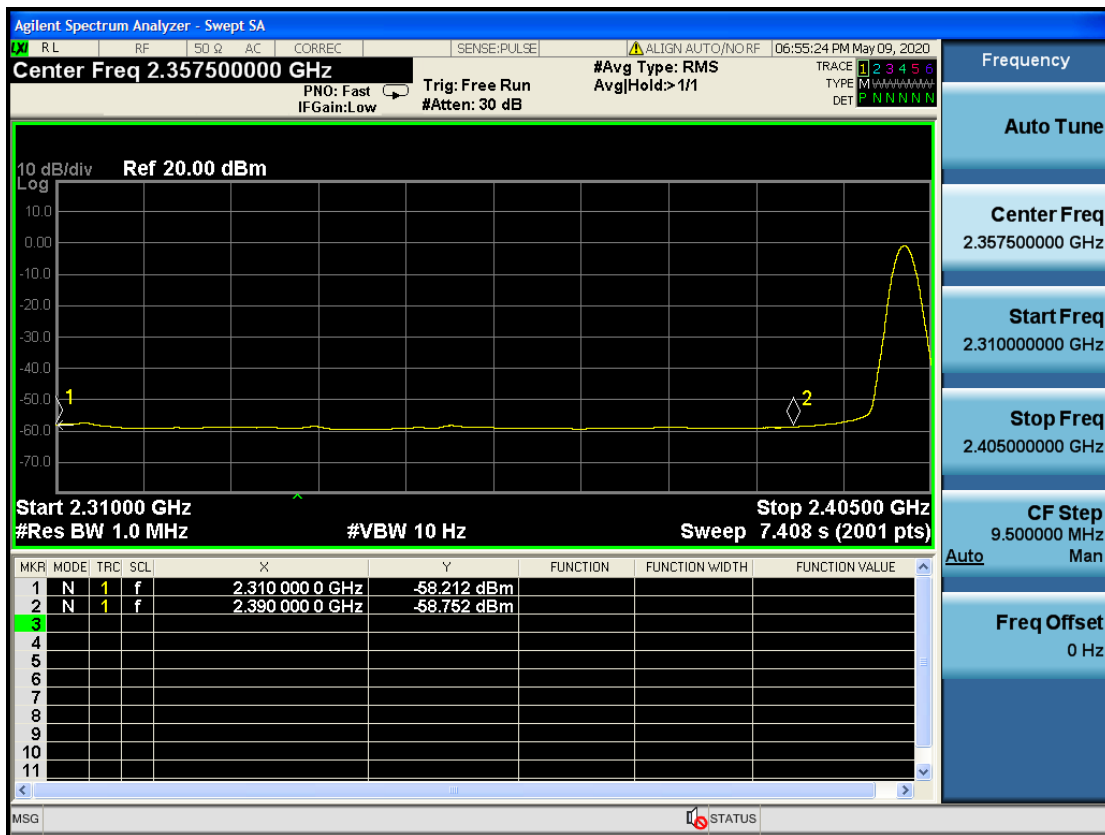




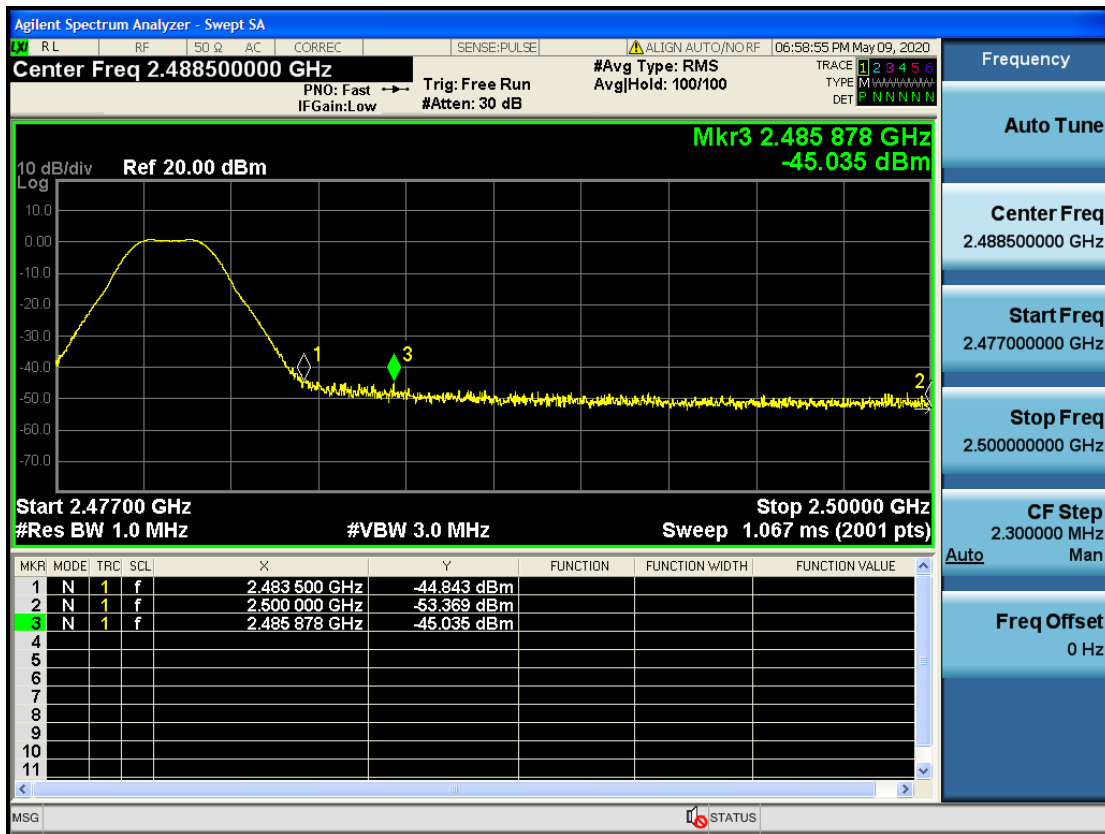
Restrict-band band-edge measurements\_BLE(2Mbps)\_2402\_Ant1\_PEAK



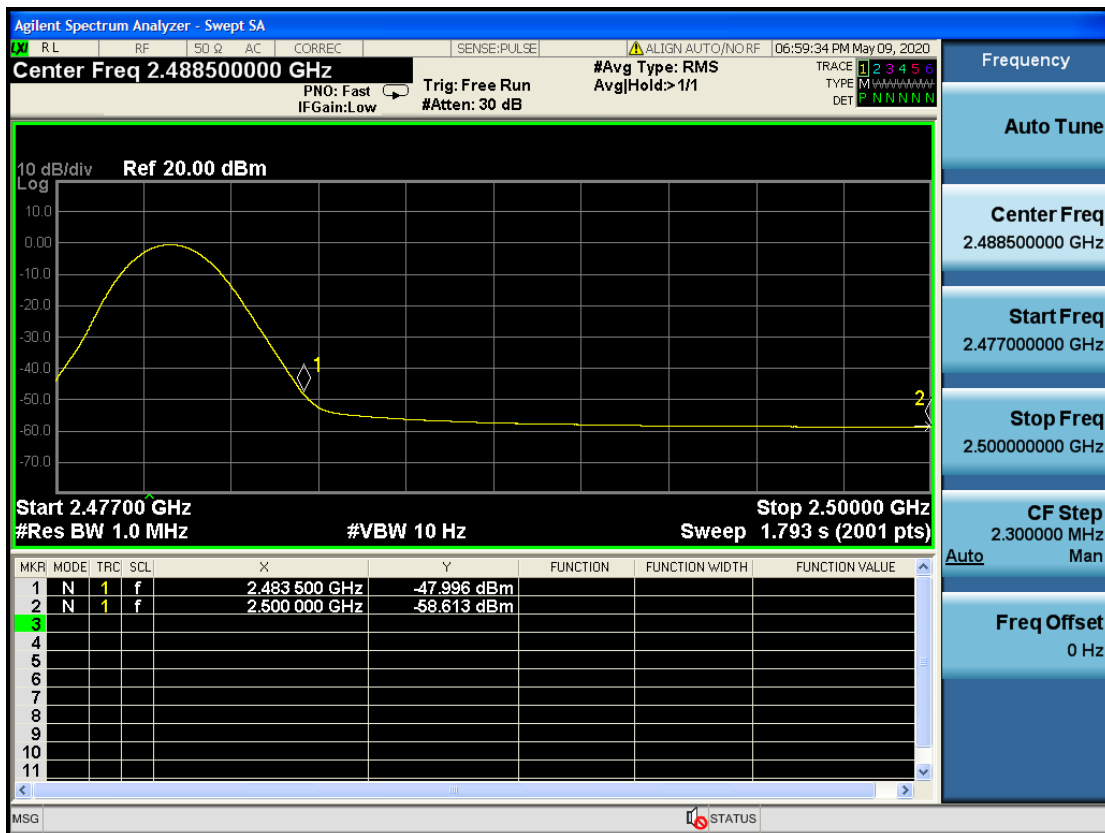
Restrict-band band-edge measurements\_BLE(2Mbps)\_2402\_Ant1\_AV



Restrict-band band-edge measurements\_BLE(2Mbps)\_2480\_Ant1\_PEAK



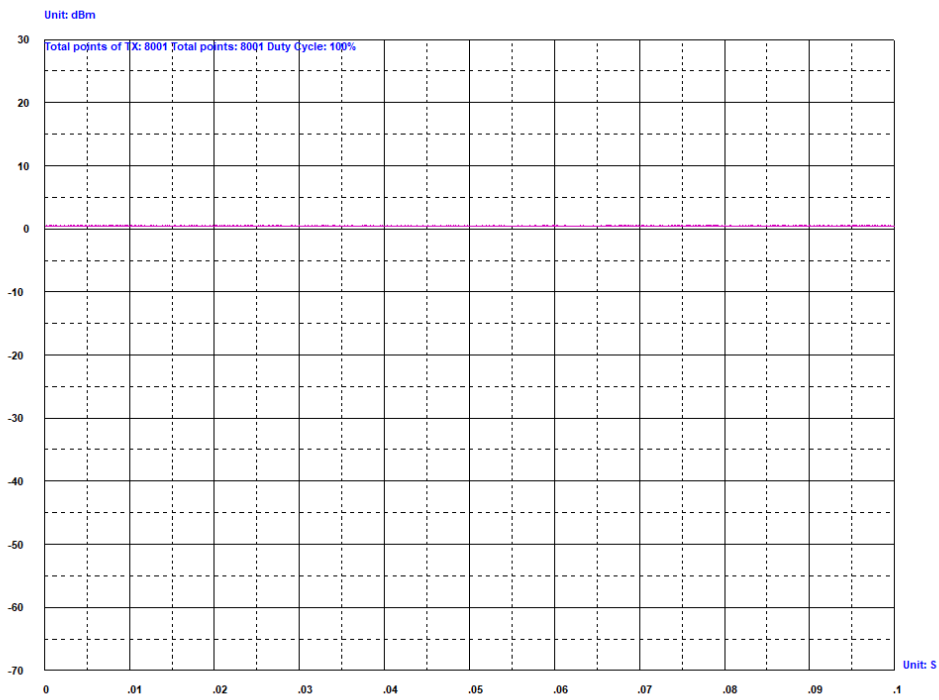
Restrict-band band-edge measurements\_BLE(2Mbps)\_2480\_Ant1\_AV



**A.8. Duty Cycle**

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BLE(1Mbps)	2440	Ant1	100.00	PASS
BLE(2Mbps)	2440	Ant1	100.00	PASS

Duty Cycle\_BLE(1Mbps)\_2440\_Ant1



Duty Cycle\_BLE(2Mbps)\_2440\_Ant1

