

6. CONDUCTED SPURIOUS & BAND EDGE EMISSION

6.1 LIMIT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

6.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

6.3 TEST SETUP



The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminals is 50 Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

6.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

6.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

7. POWER SPECTRAL DENSITY TEST

7.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	≤ 8 dBm (RBW ≥ 3 KHz)	2400-2483.5	PASS

7.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: $100 \text{ kHz} \geq \text{RBW} \geq 3 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

7.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.



8. BANDWIDTH TEST

8.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

8.2 TEST PROCEDURE

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

8.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.



9. PEAK OUTPUT POWER TEST

9.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5	PASS

9.2 TEST PROCEDURE

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

RBW $\geq$ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq$ [3 $\times$ RBW].
- Set span $\geq$ [3 $\times$ RBW].
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

9.3 TEST SETUP



9.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

9.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.



10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

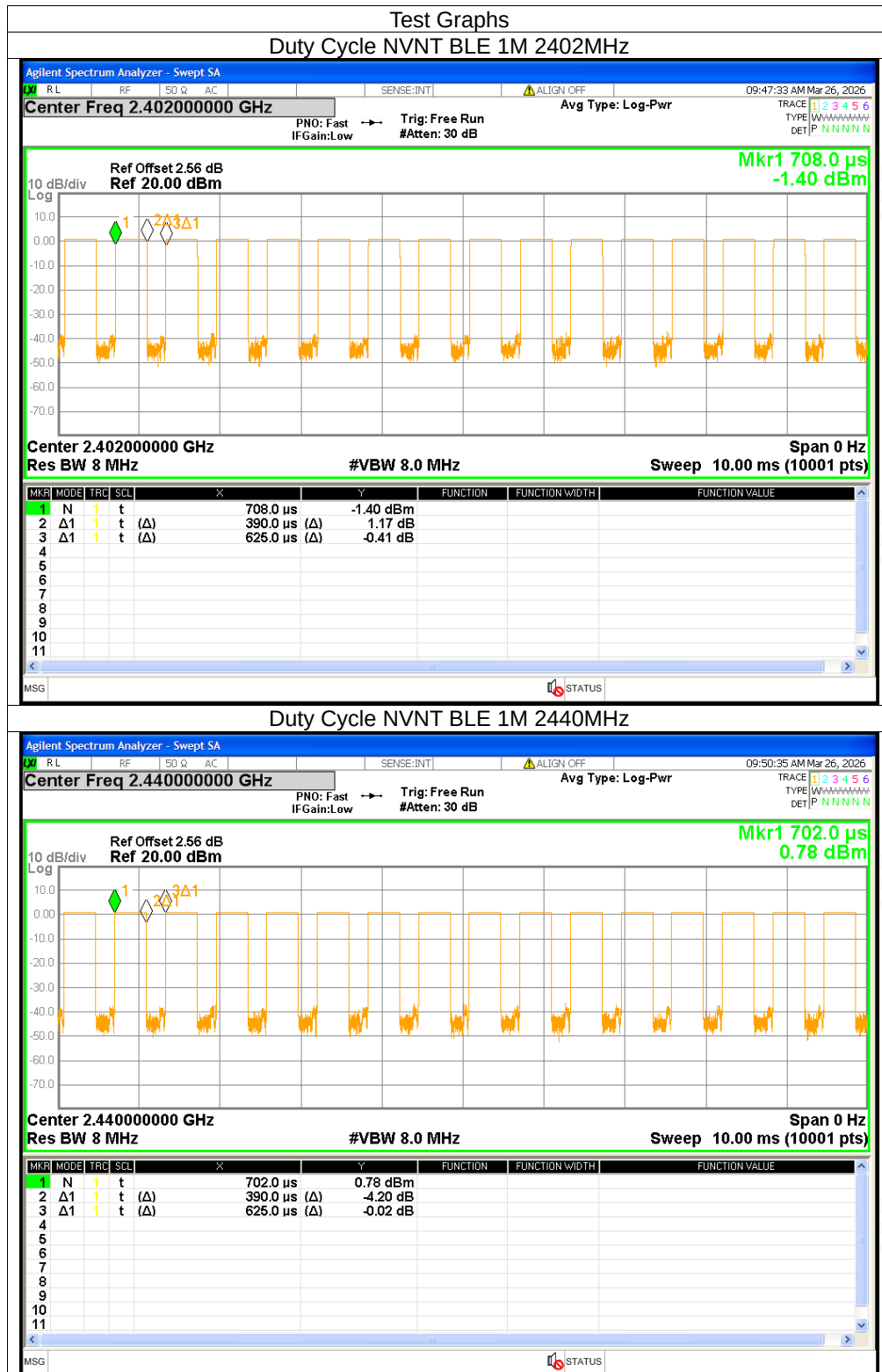
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

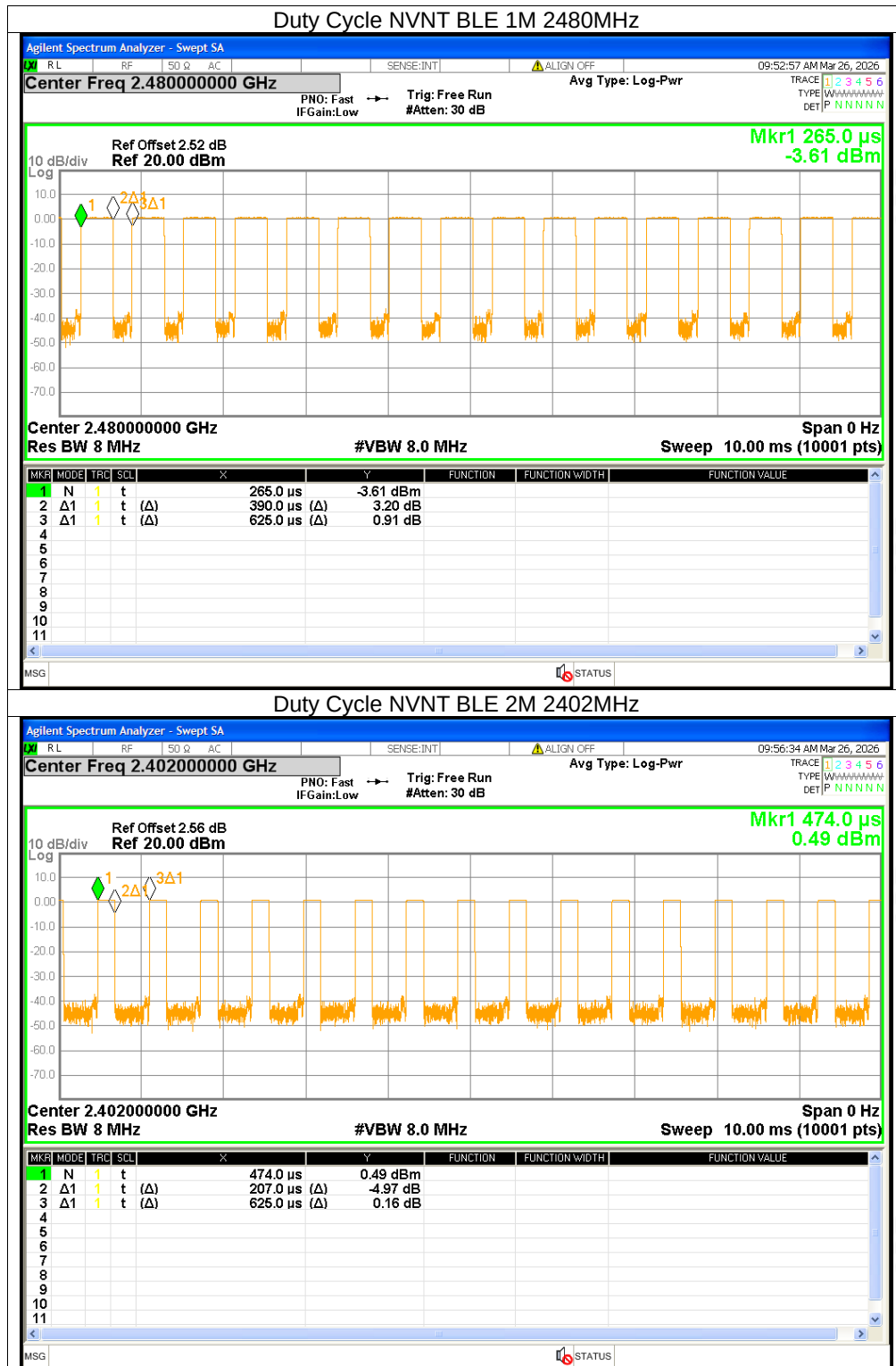
10.2 EUT ANTENNA

The EUT antenna is Ceramic Antenna. It comply with the standard requirement.

**APPENDIX 1-TEST DATA****Duty Cycle**

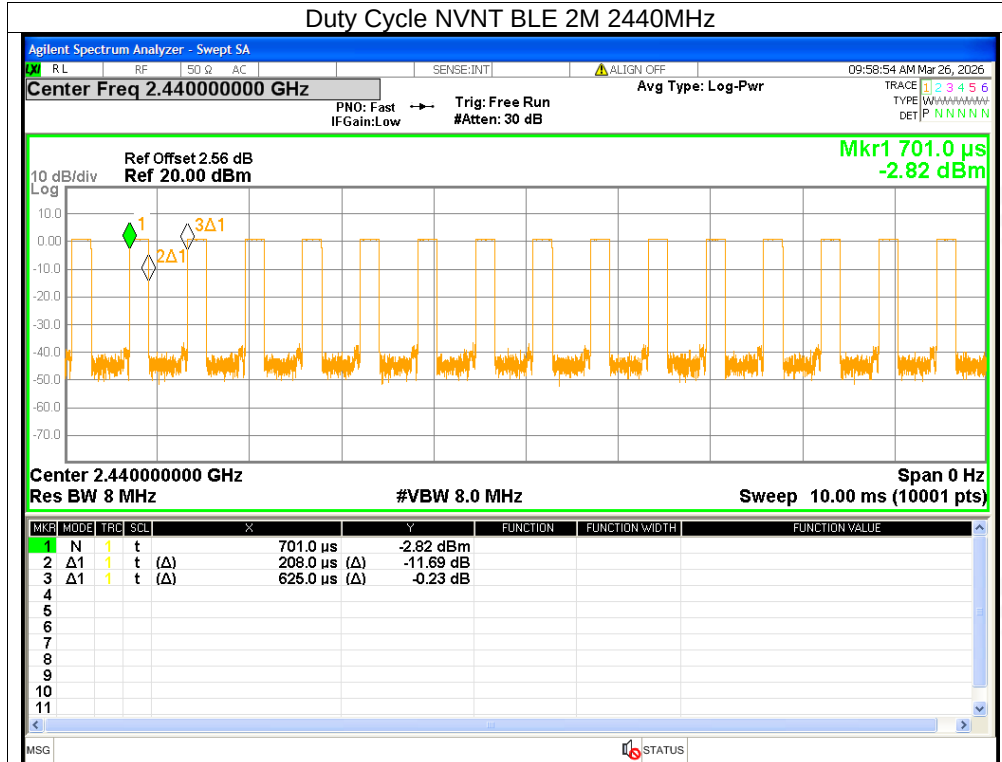
Condition	Mode	Frequency (MHz)	On Time (ms)	Period (ms)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	0.39	0.625	62.4	2.05	2.56
NVNT	BLE 1M	2440	0.39	0.625	62.4	2.05	2.56
NVNT	BLE 1M	2480	0.39	0.625	62.4	2.05	2.56
NVNT	BLE 2M	2402	0.207	0.625	33.12	4.8	4.83
NVNT	BLE 2M	2440	0.208	0.625	33.28	4.78	4.81
NVNT	BLE 2M	2480	0.207	0.625	33.12	4.8	4.83



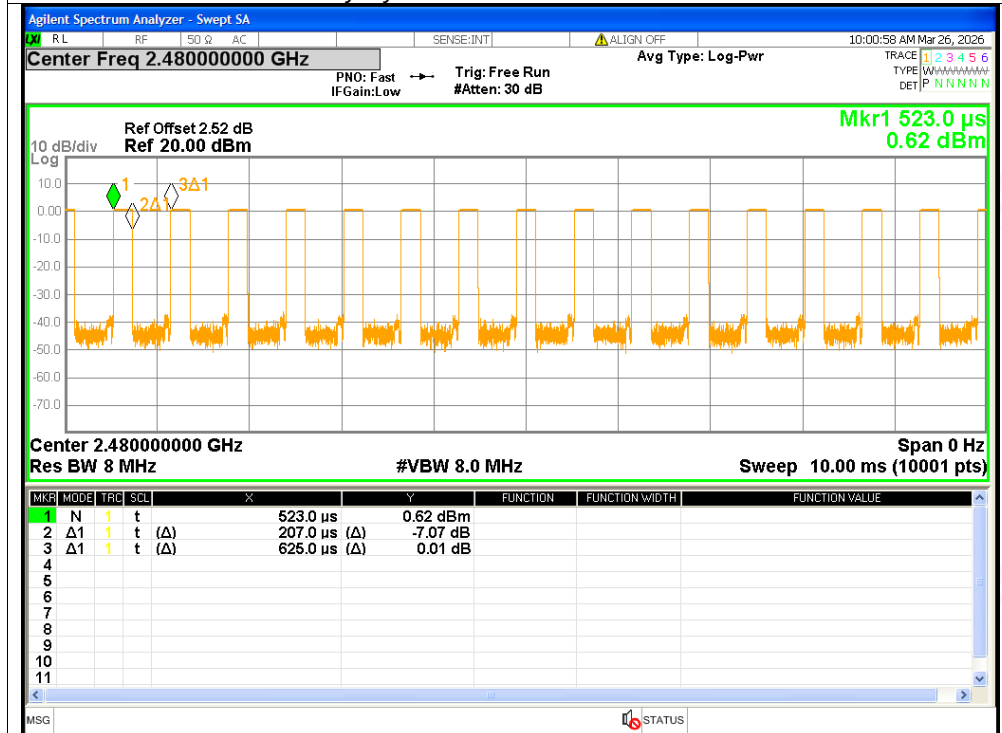




Duty Cycle NVNT BLE 2M 2440MHz



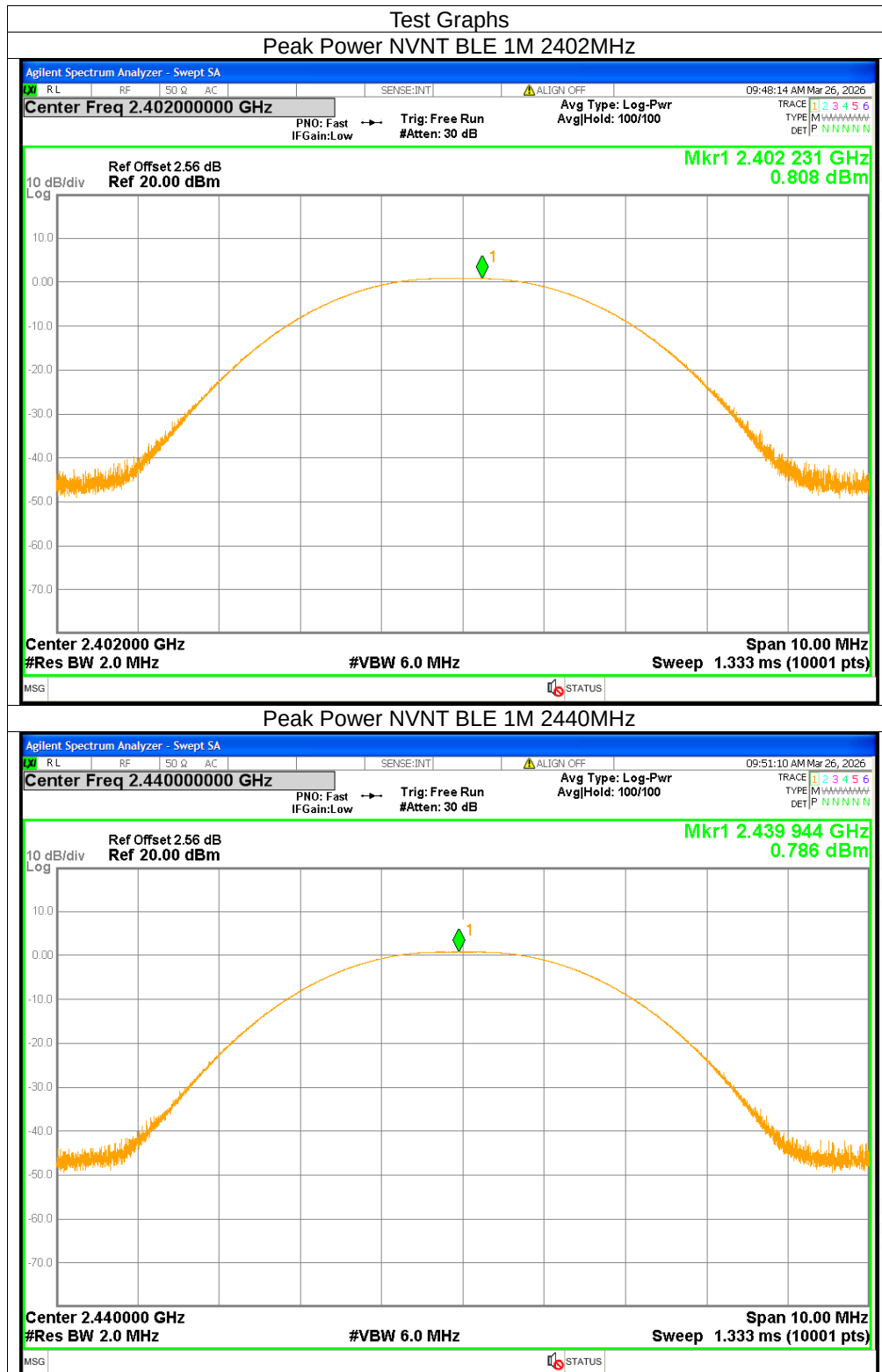
Duty Cycle NVNT BLE 2M 2480MHz

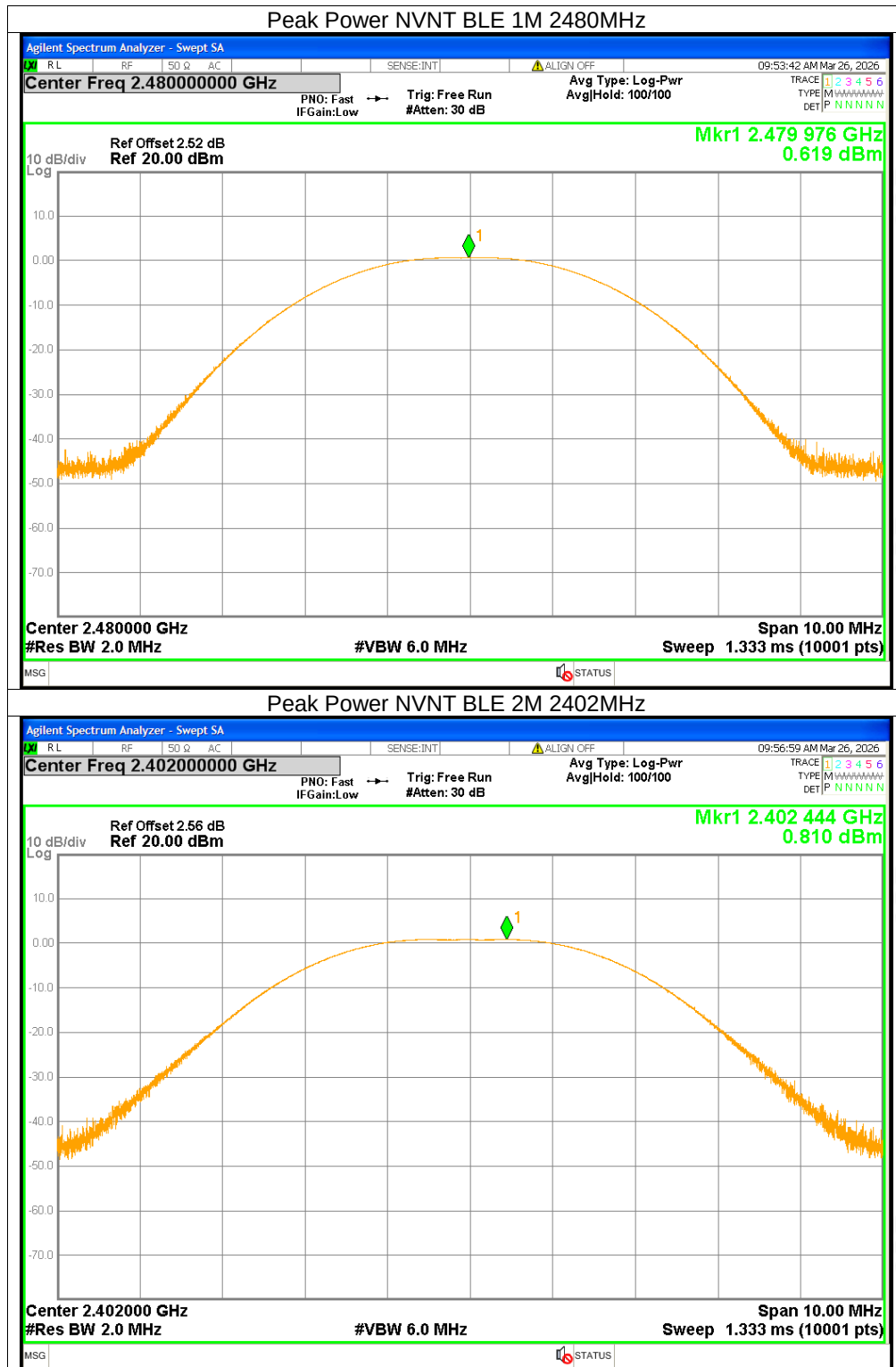


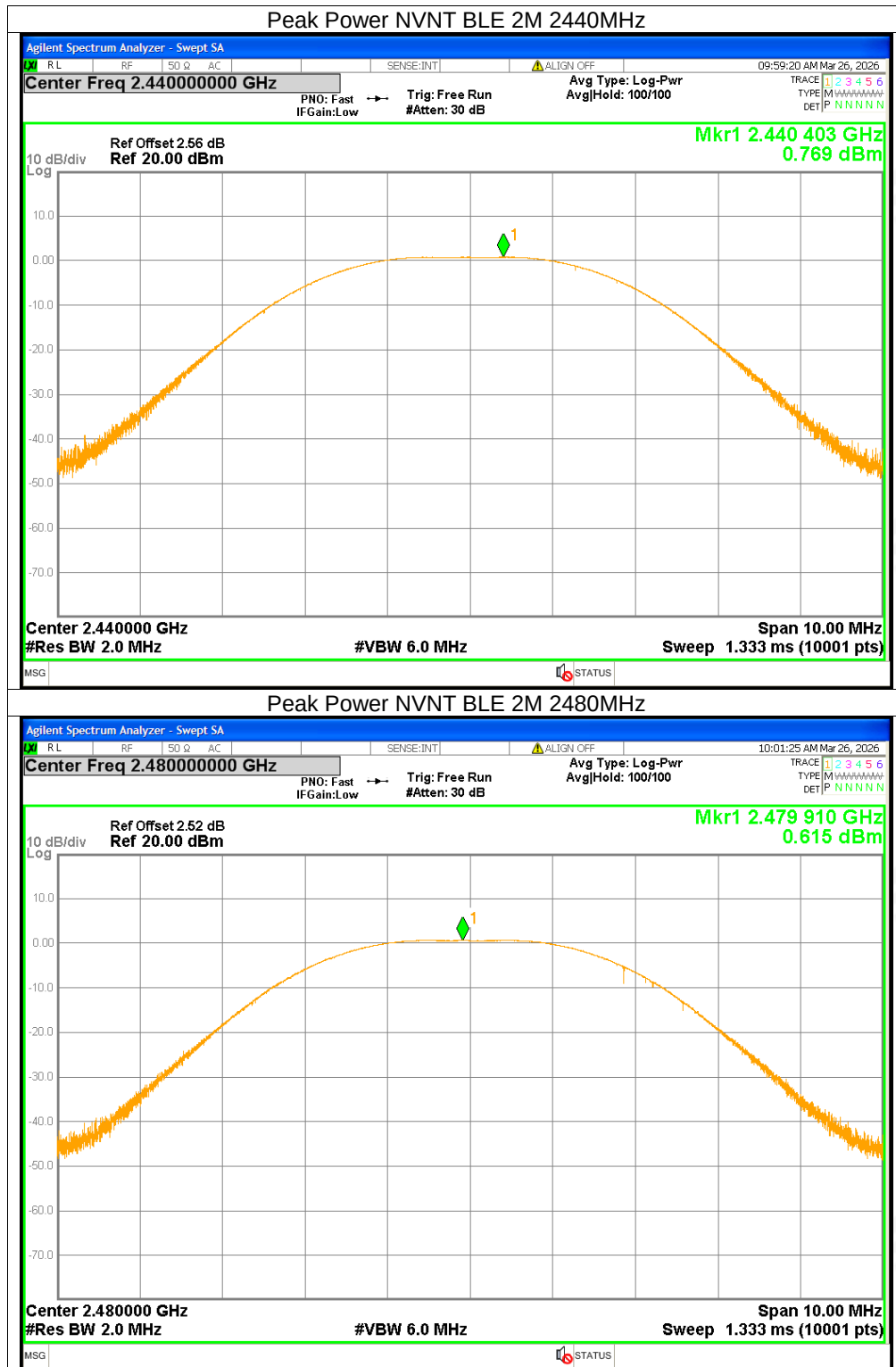


Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	0.81	<=30	Pass
NVNT	BLE 1M	2440	0.79	<=30	Pass
NVNT	BLE 1M	2480	0.62	<=30	Pass
NVNT	BLE 2M	2402	0.81	<=30	Pass
NVNT	BLE 2M	2440	0.77	<=30	Pass
NVNT	BLE 2M	2480	0.62	<=30	Pass



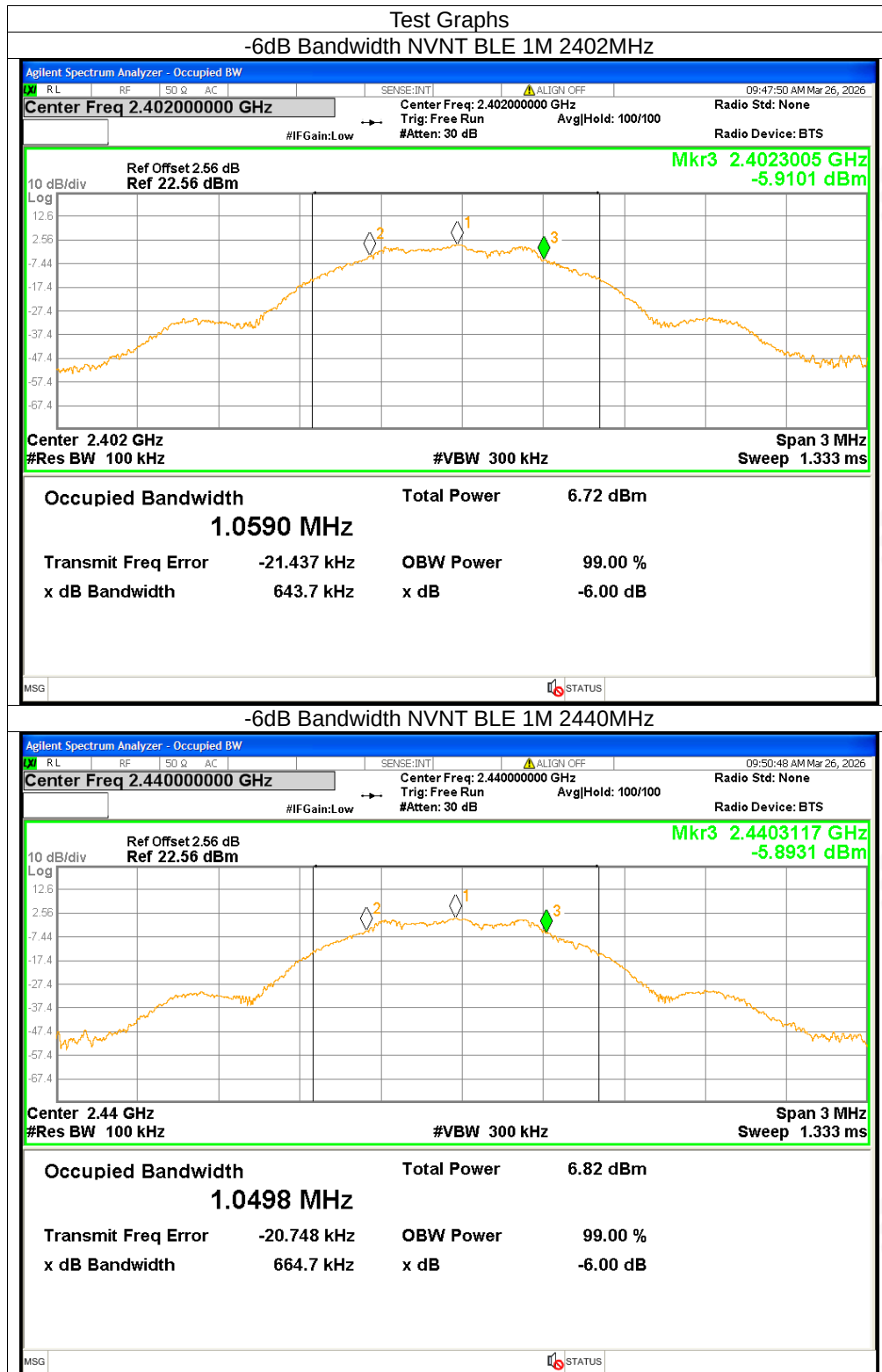


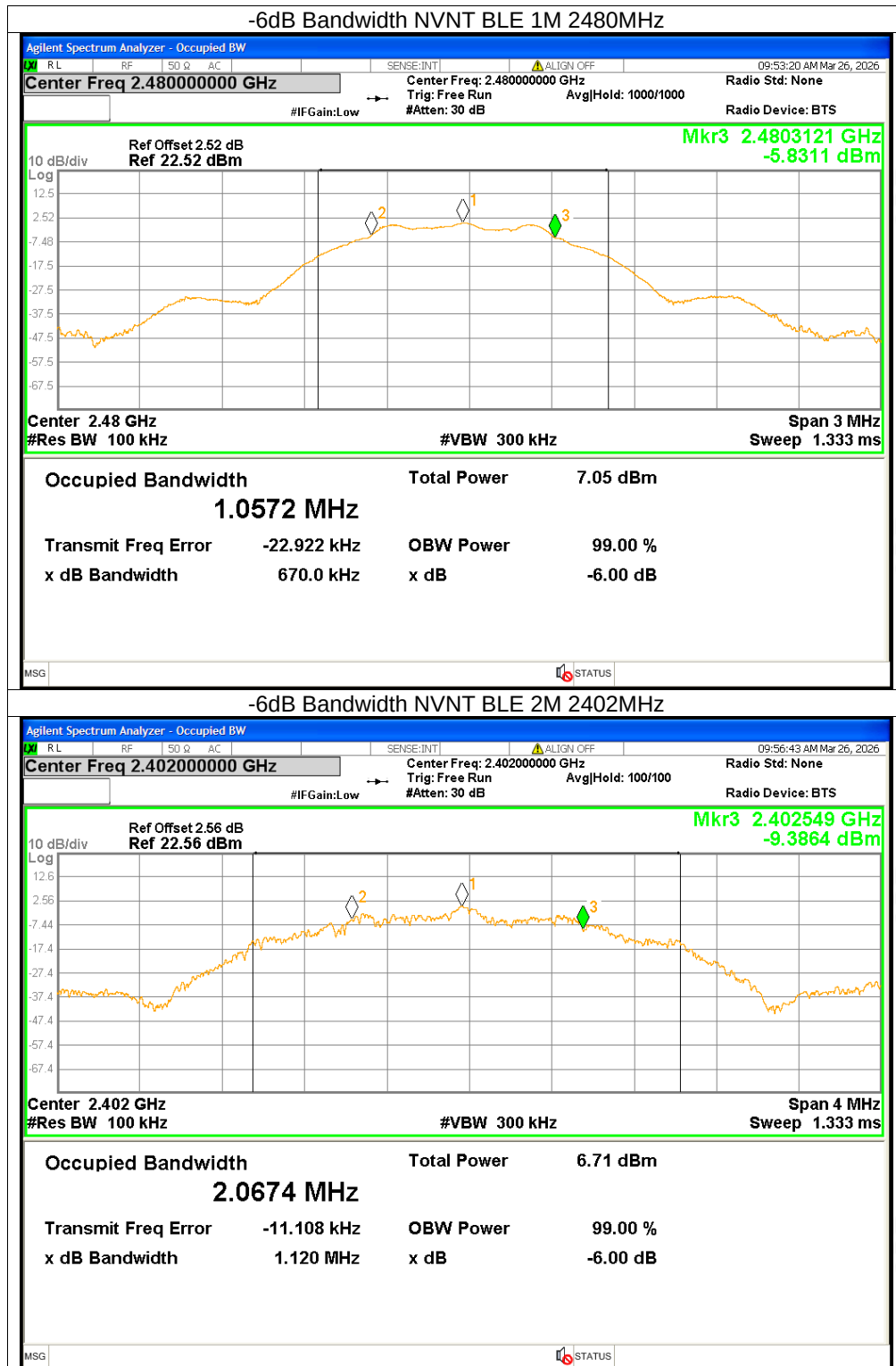


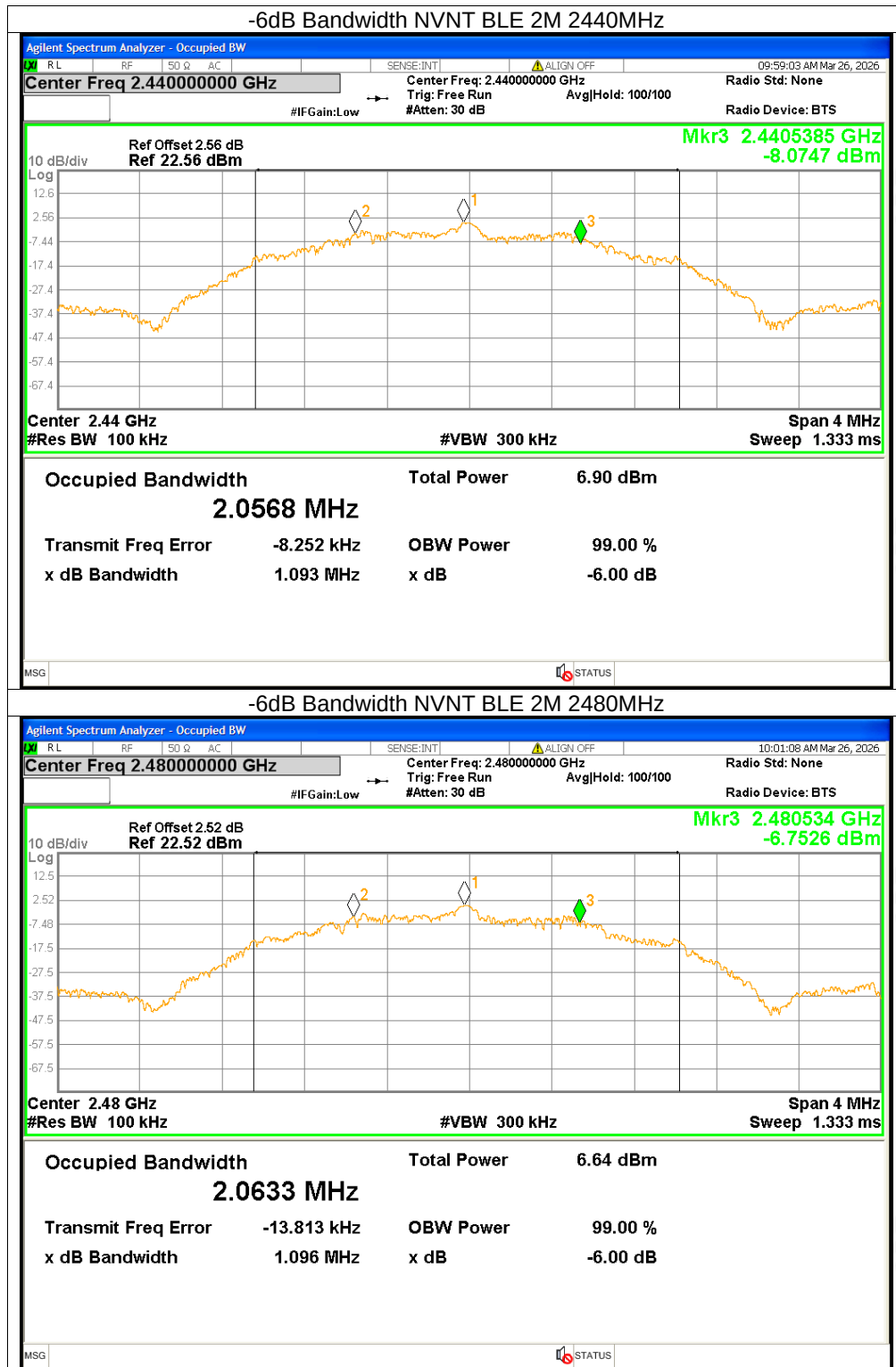


-6dB Bandwidth

Condition	Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	0.6437	≥ 0.5	Pass
NVNT	BLE 1M	2440	0.6647	≥ 0.5	Pass
NVNT	BLE 1M	2480	0.67	≥ 0.5	Pass
NVNT	BLE 2M	2402	1.12	≥ 0.5	Pass
NVNT	BLE 2M	2440	1.093	≥ 0.5	Pass
NVNT	BLE 2M	2480	1.096	≥ 0.5	Pass



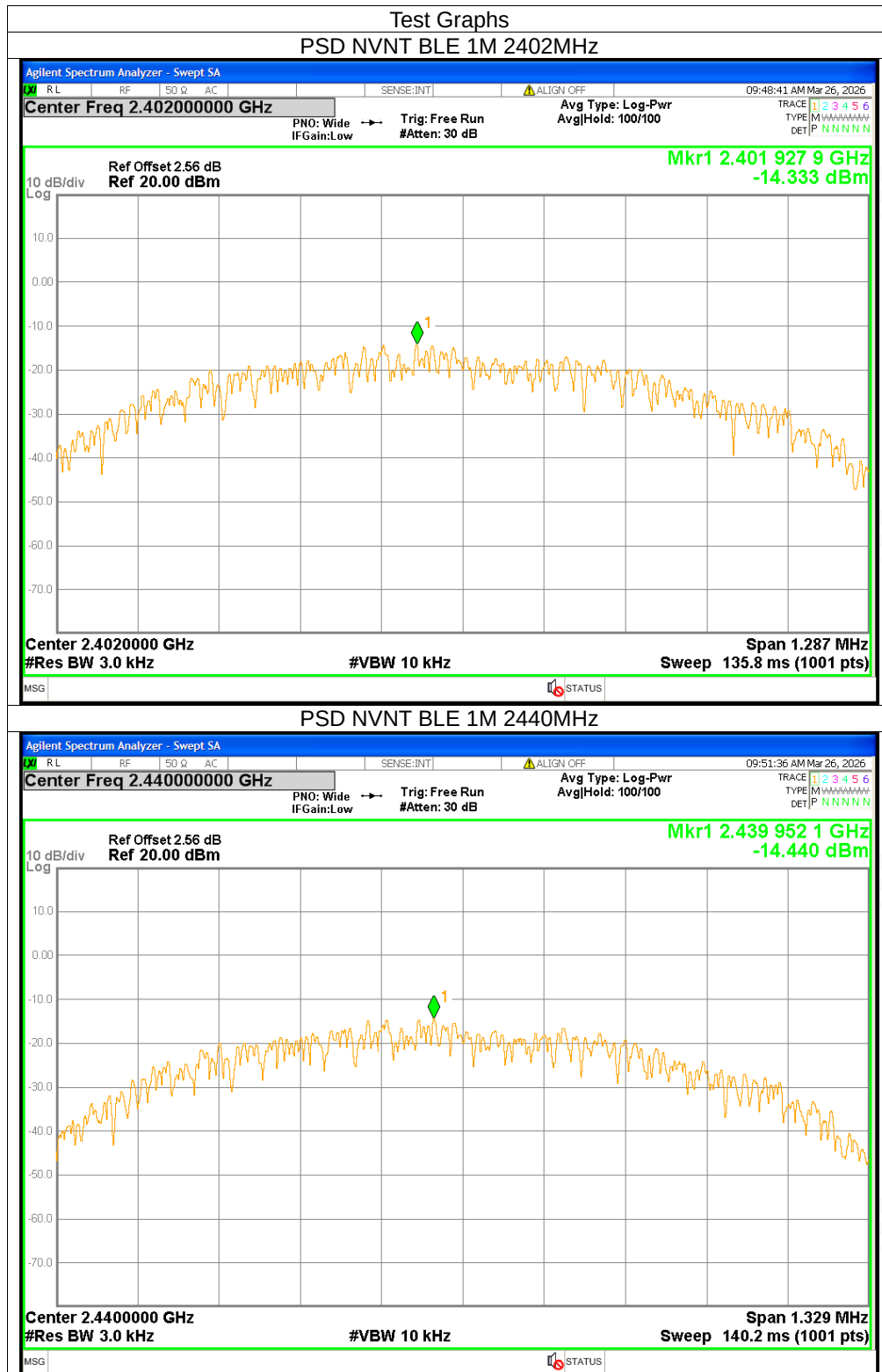


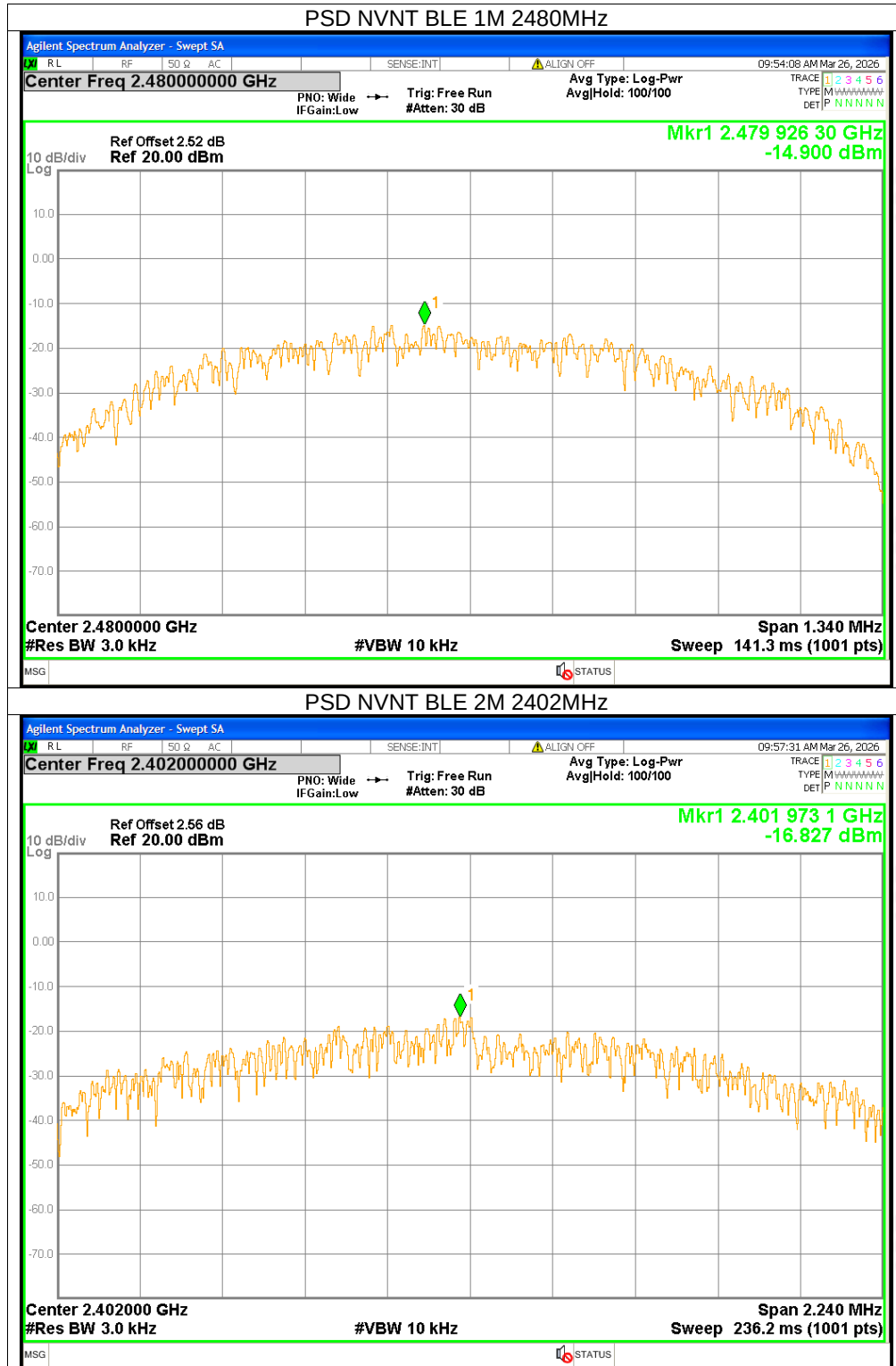


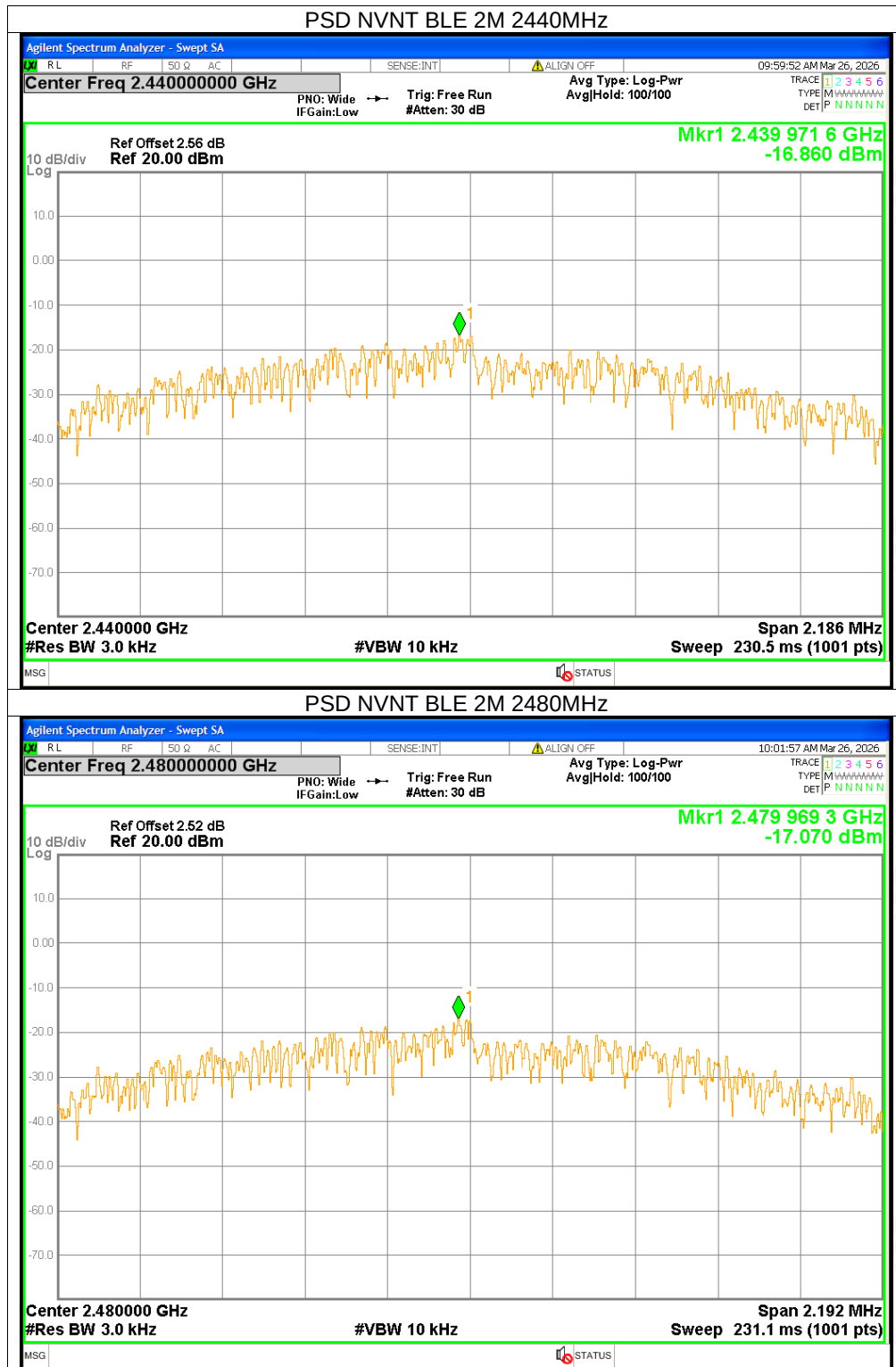


Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	-14.33	≤ -8	Pass
NVNT	BLE 1M	2440	-14.44	≤ -8	Pass
NVNT	BLE 1M	2480	-14.9	≤ -8	Pass
NVNT	BLE 2M	2402	-16.83	≤ -8	Pass
NVNT	BLE 2M	2440	-16.86	≤ -8	Pass
NVNT	BLE 2M	2480	-17.07	≤ -8	Pass



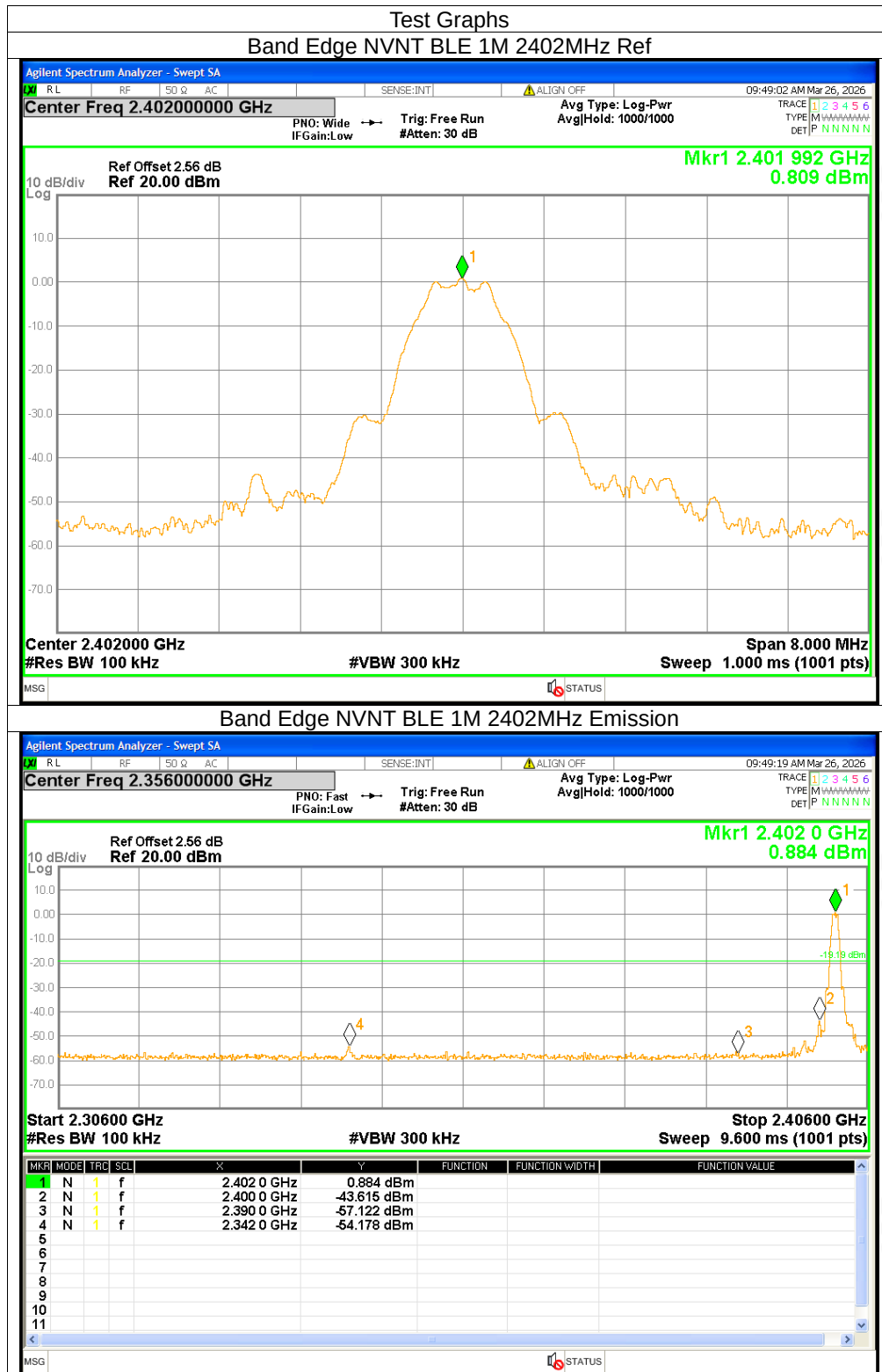


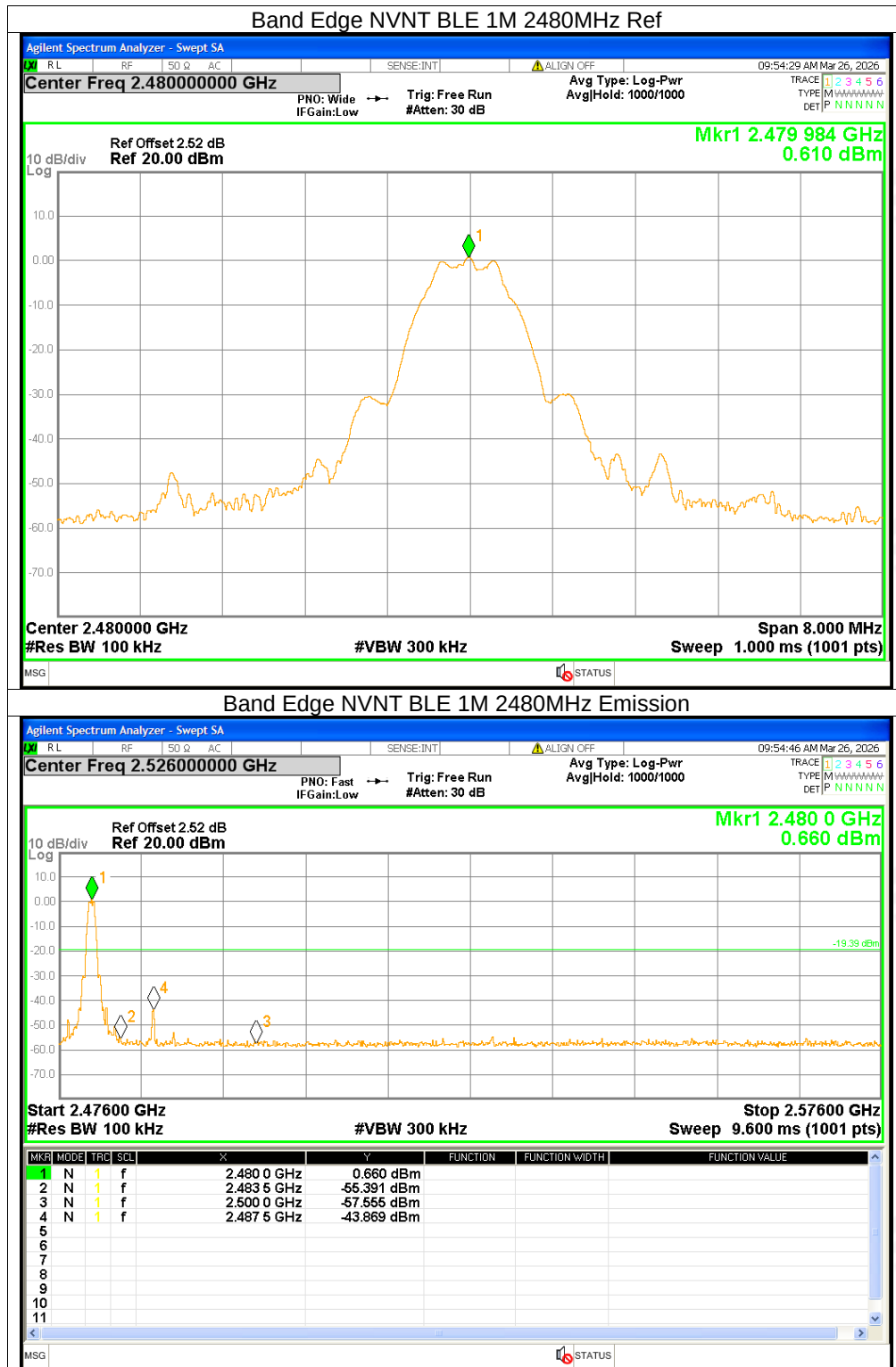


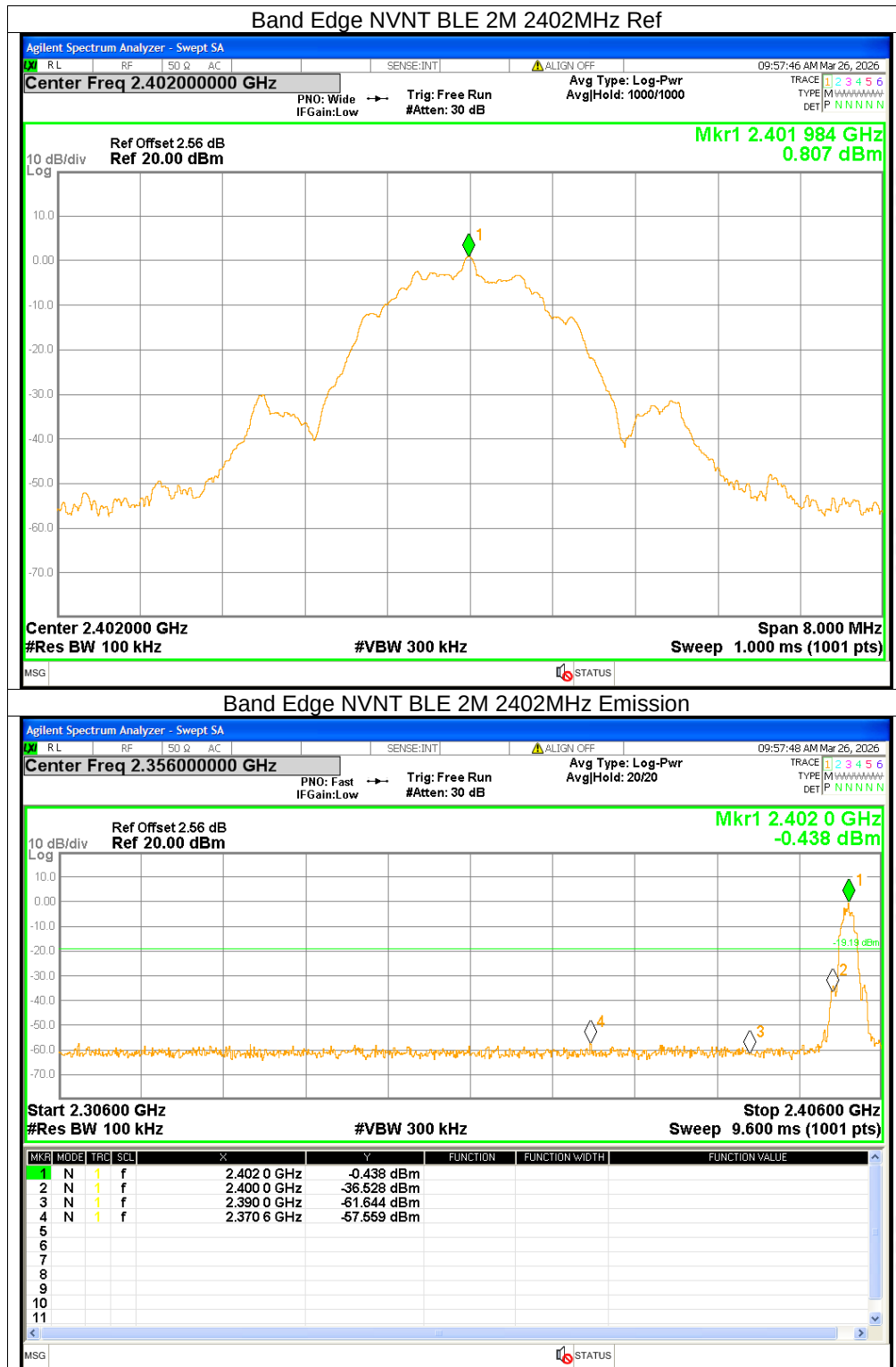


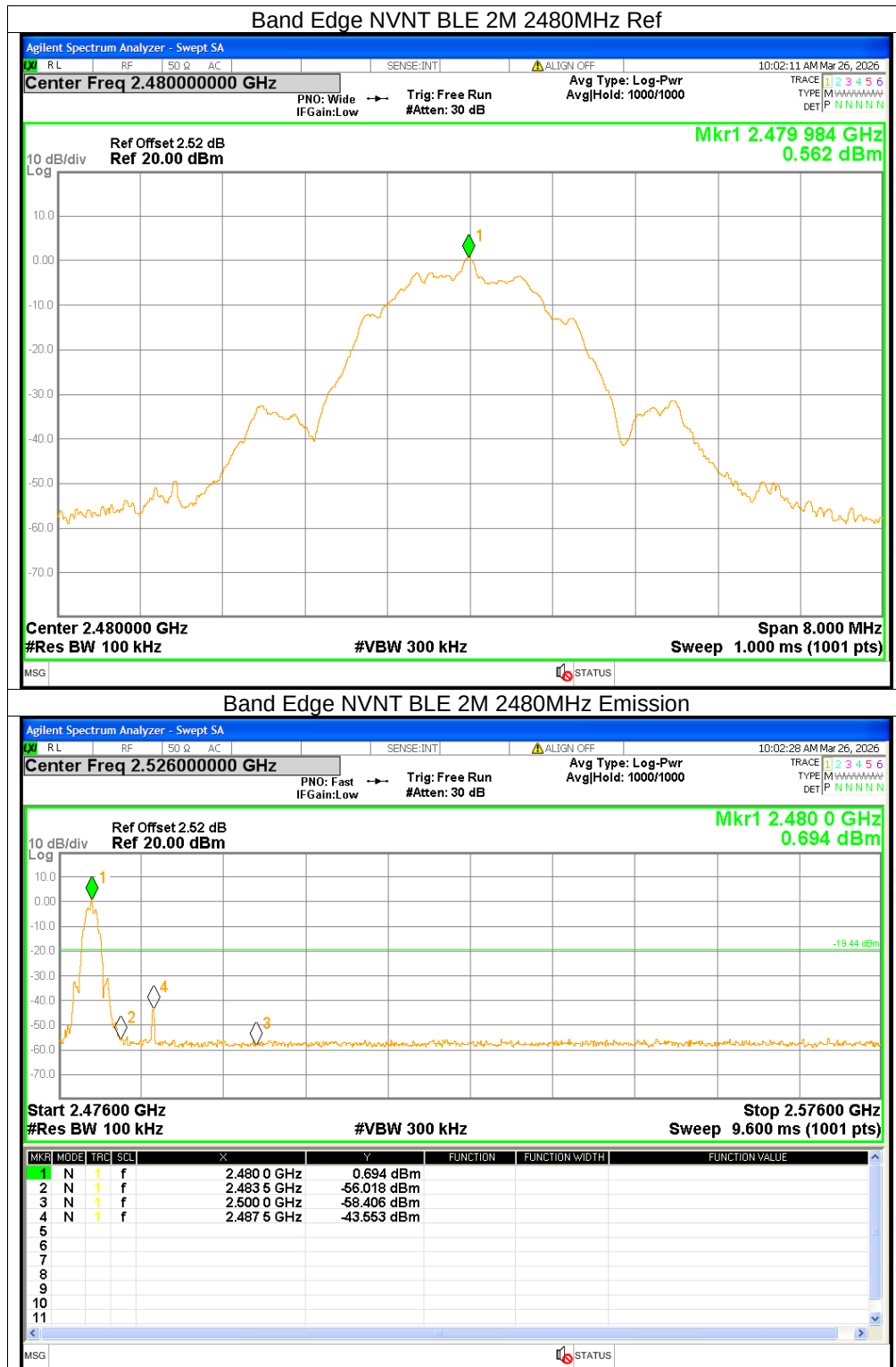
Band Edge

Condition	Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	-54.98	≤ -20	Pass
NVNT	BLE 1M	2480	-44.47	≤ -20	Pass
NVNT	BLE 2M	2402	-58.36	≤ -20	Pass
NVNT	BLE 2M	2480	-44.11	≤ -20	Pass





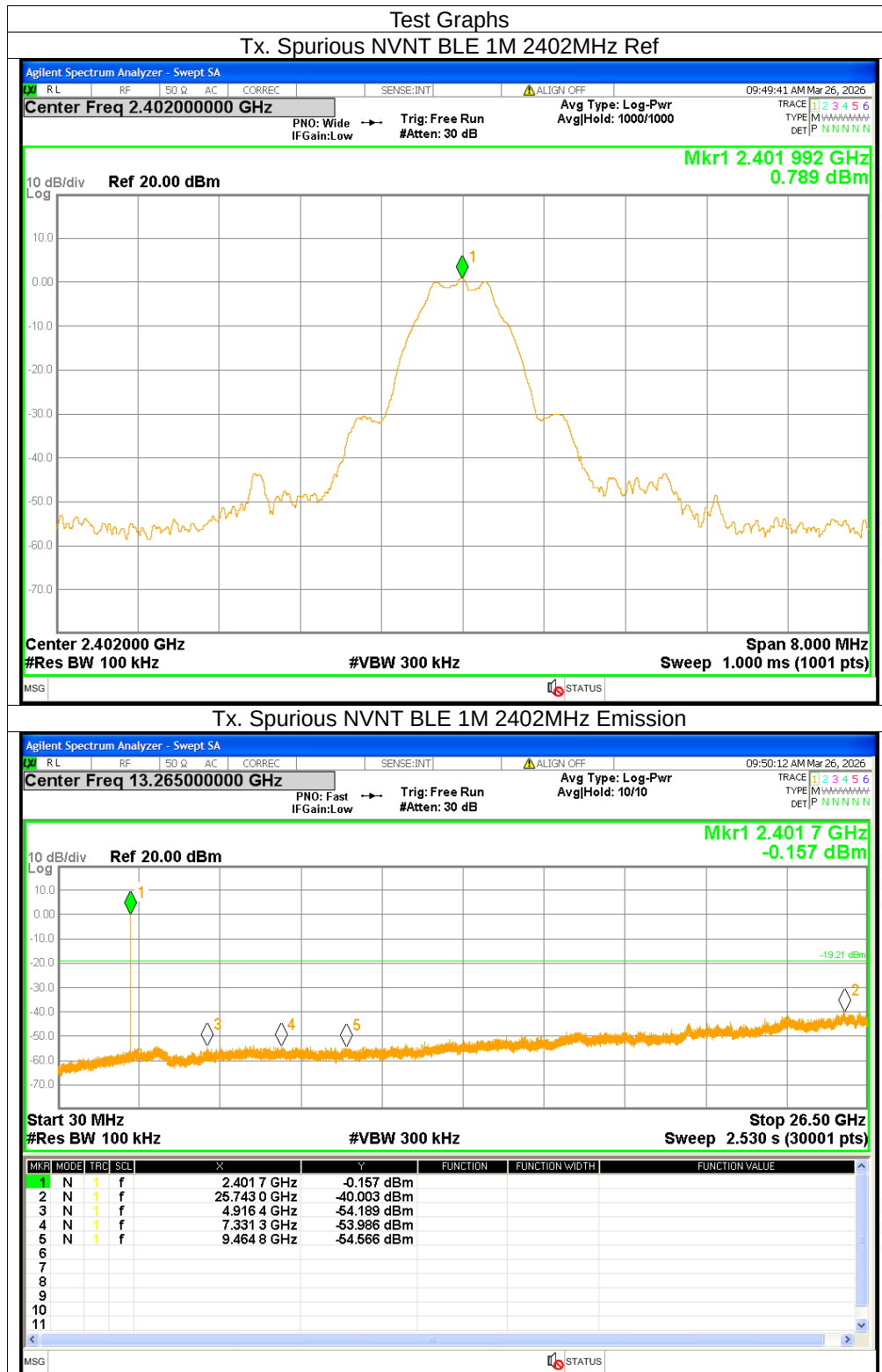


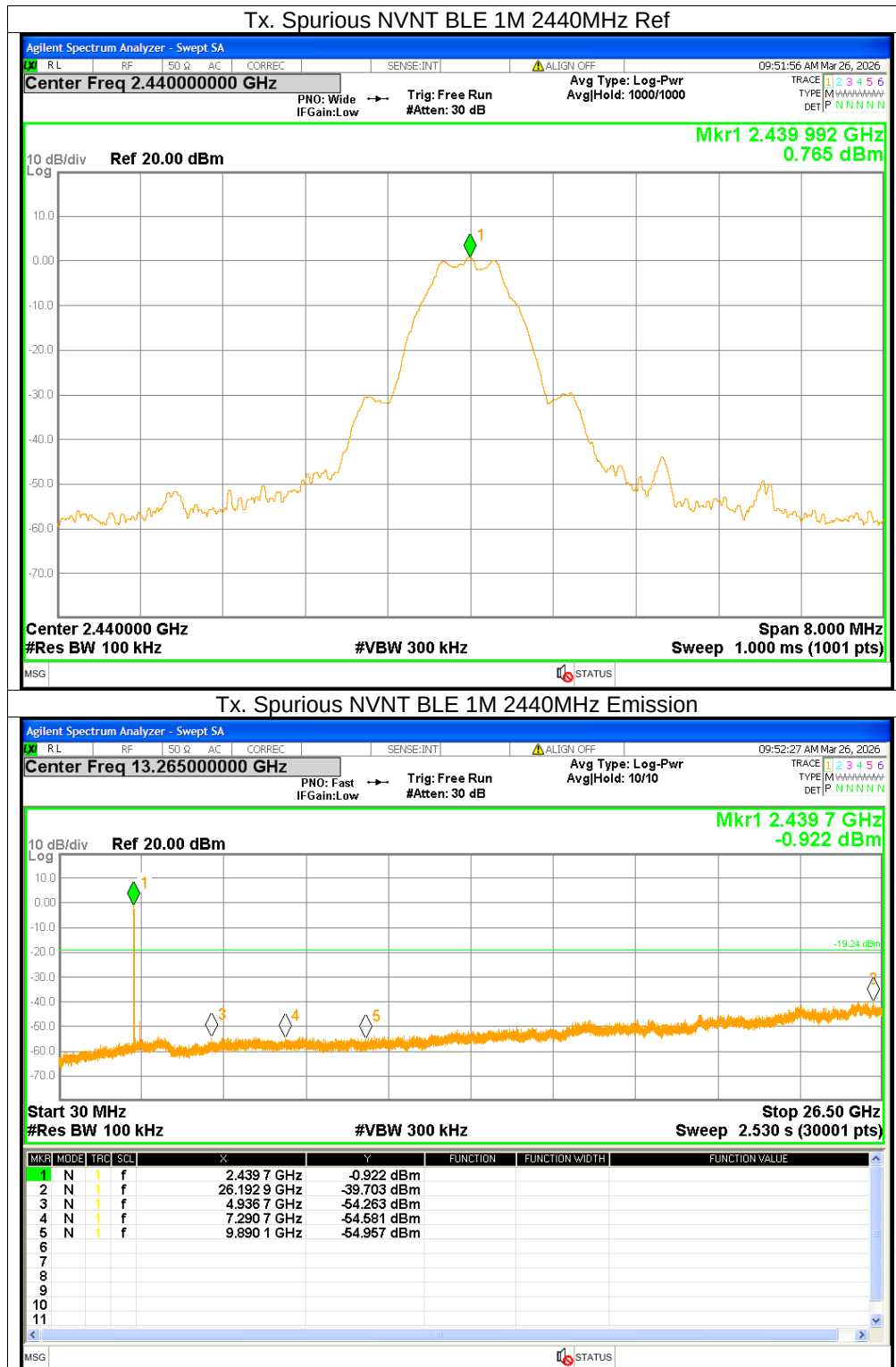


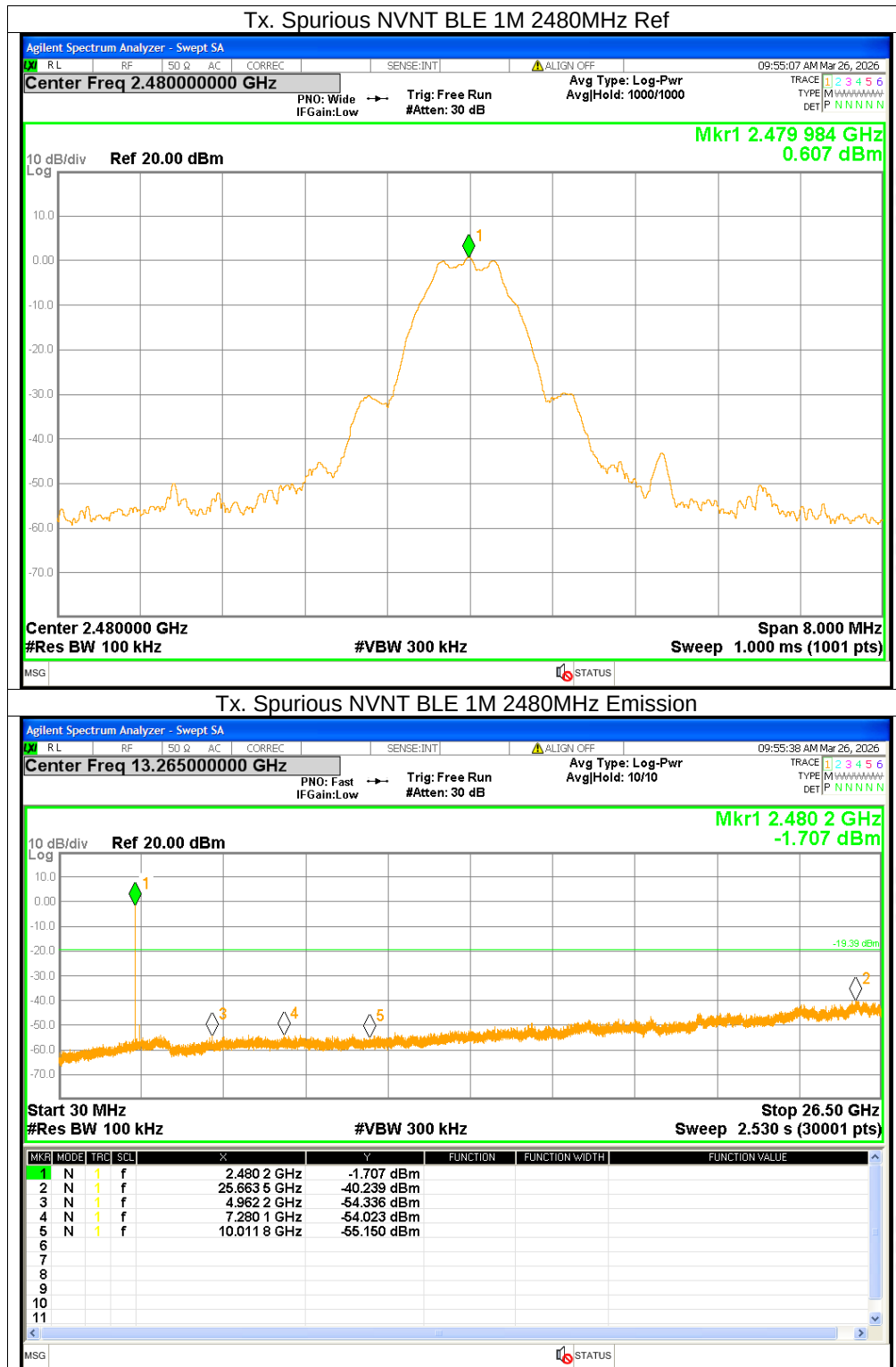


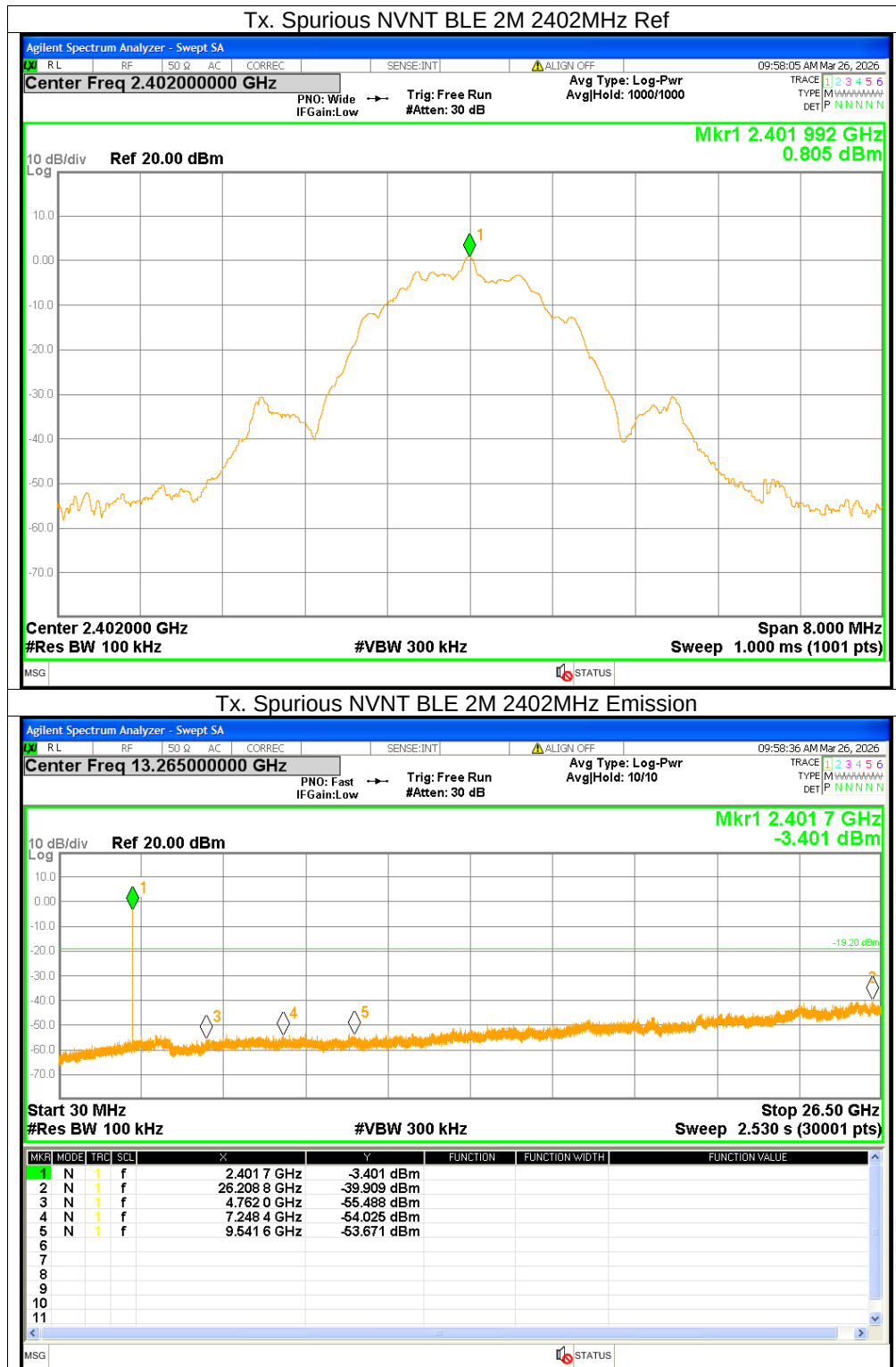
Conducted RF Spurious Emission

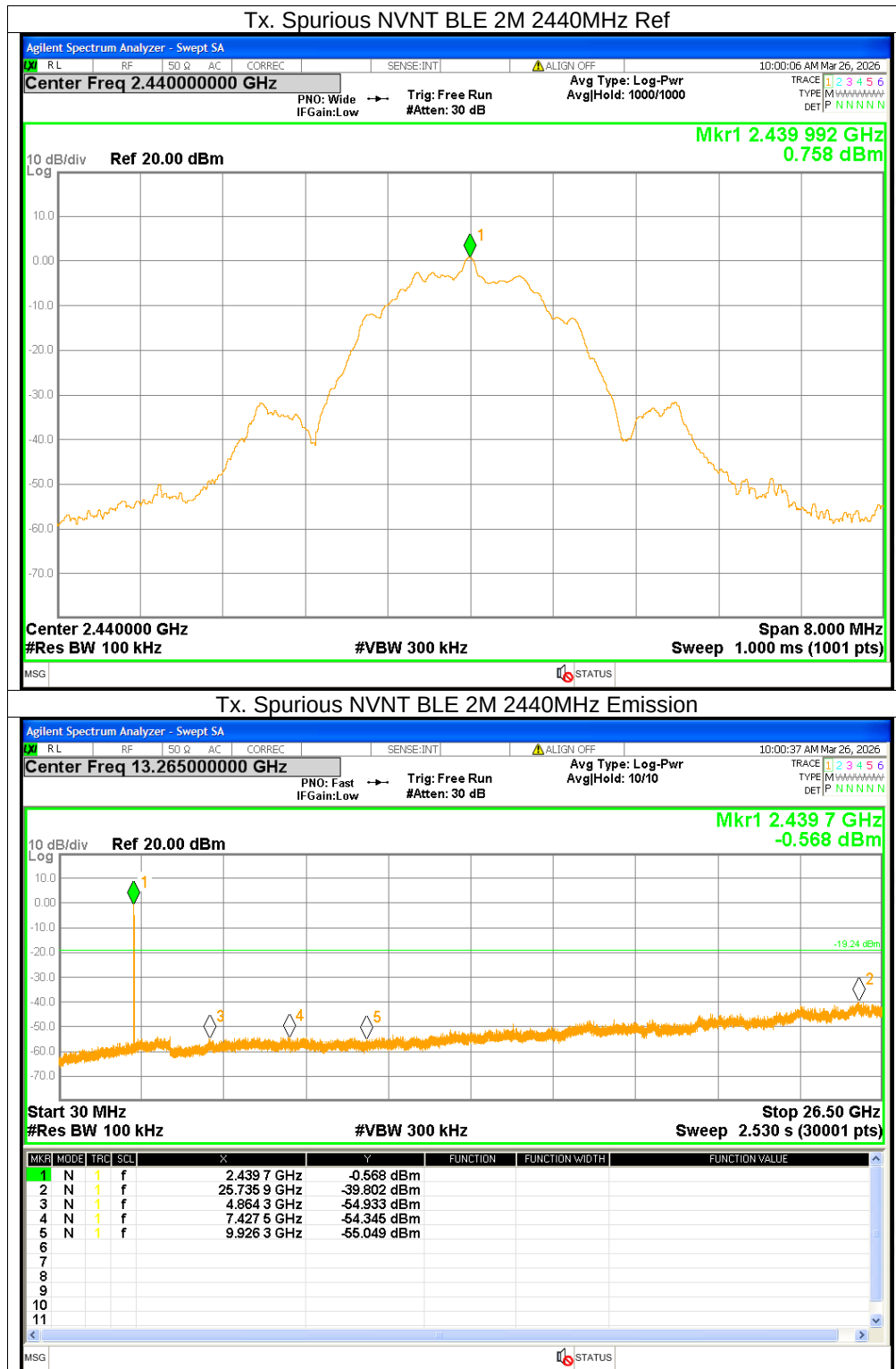
Condition	Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	-40.79	<=-20	Pass
NVNT	BLE 1M	2440	-40.47	<=-20	Pass
NVNT	BLE 1M	2480	-40.84	<=-20	Pass
NVNT	BLE 2M	2402	-40.71	<=-20	Pass
NVNT	BLE 2M	2440	-40.56	<=-20	Pass
NVNT	BLE 2M	2480	-41.28	<=-20	Pass

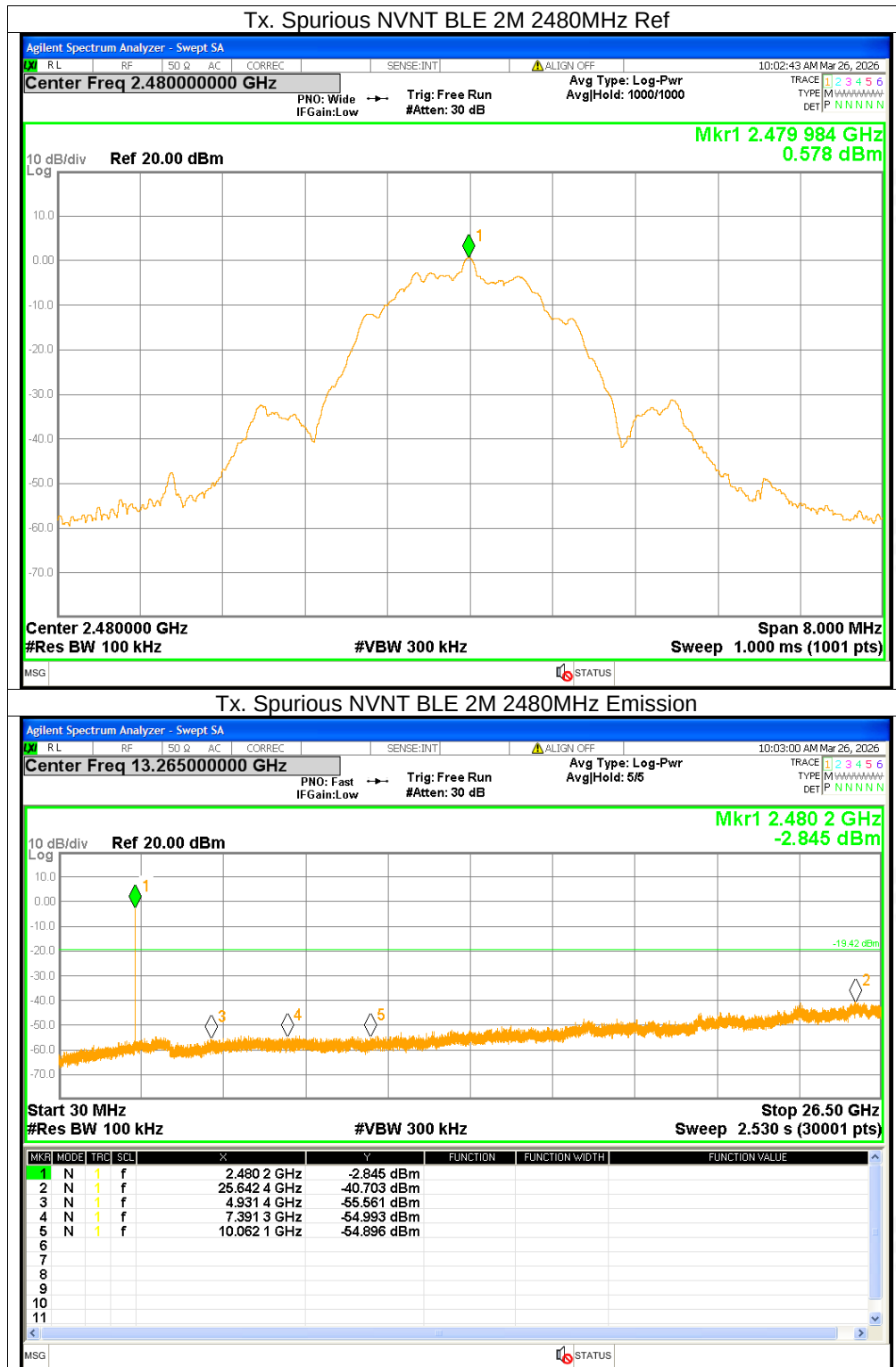














APPENDIX 2- EUT TEST PHOTO

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

*****END OF THE REPORT*****