

## 10. Bandwidth Test

### 10.1 Block Diagram Of Test Setup



### 10.2 Limit

FCC Part15 (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

### 10.3 Test Procedure

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 10.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

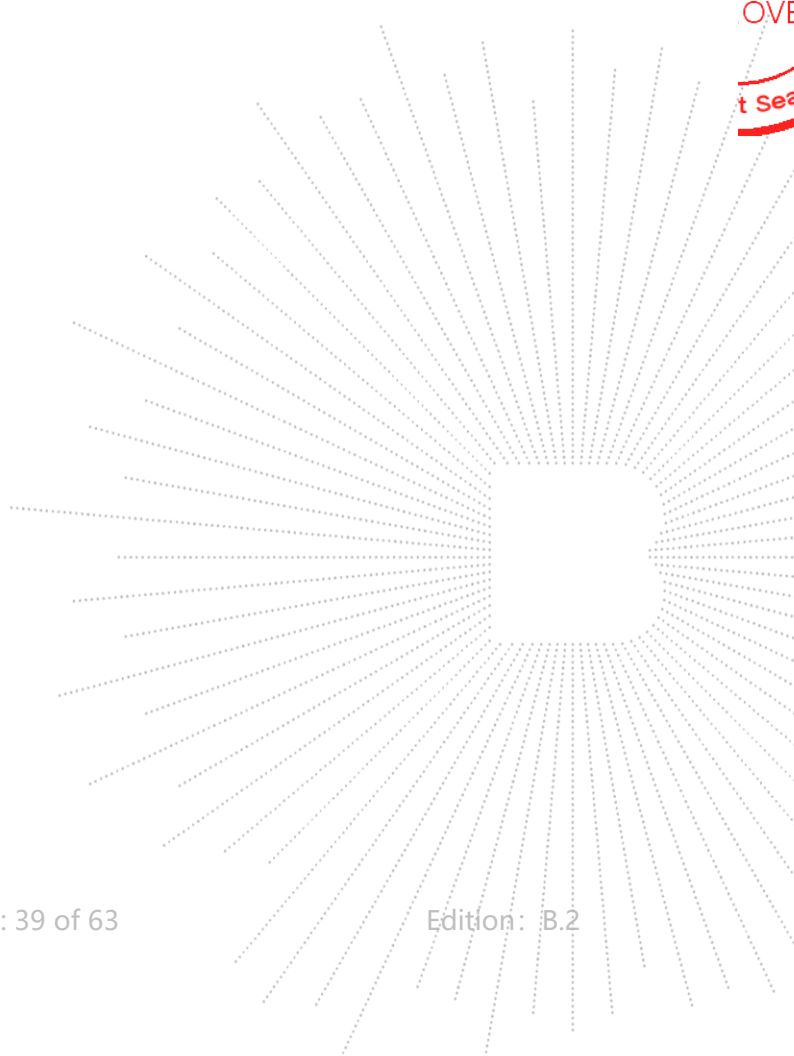
Note: Power Spectral Density(dBm)=Reading+Cable Loss

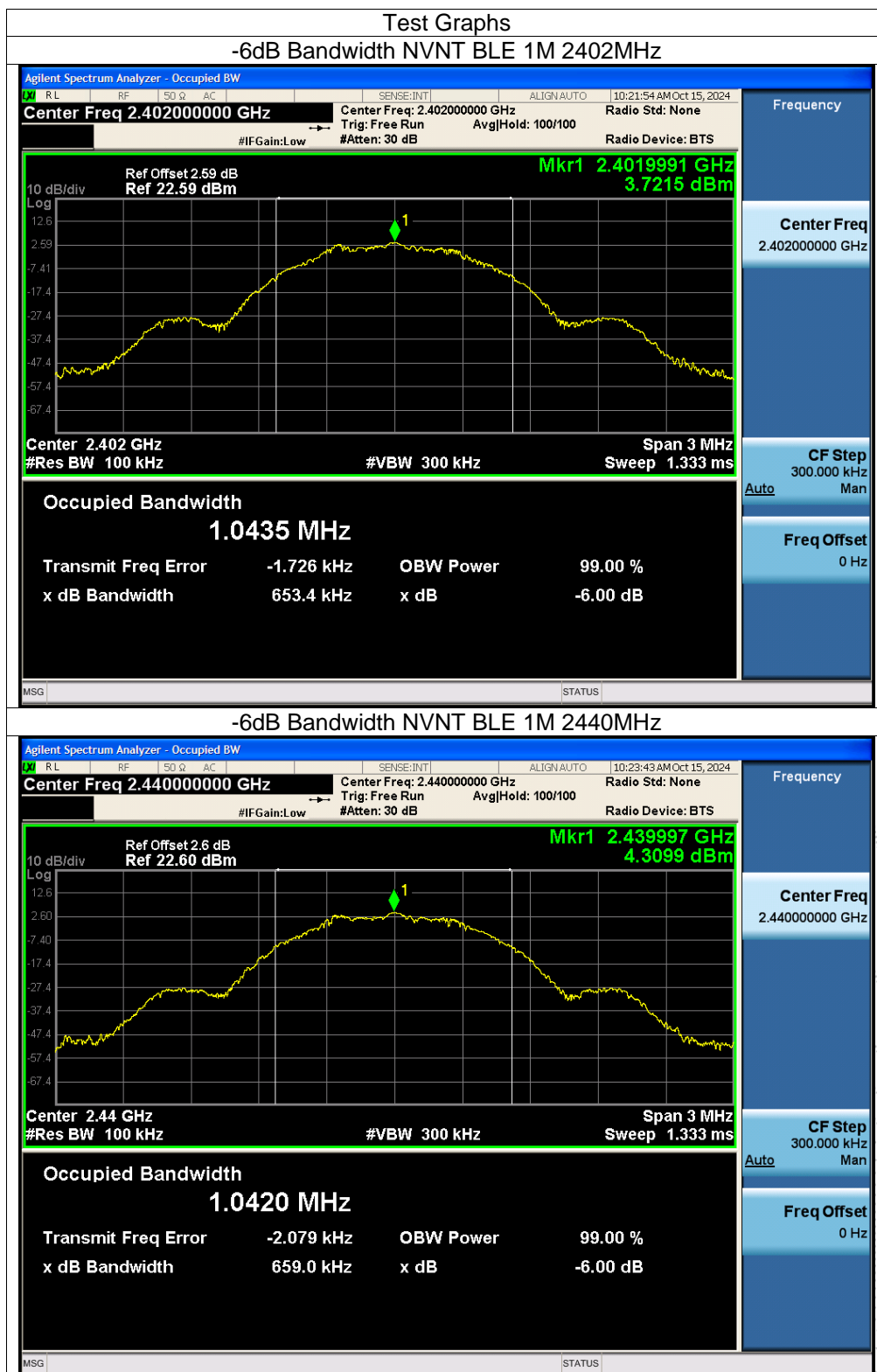
## 10.5 Test Result

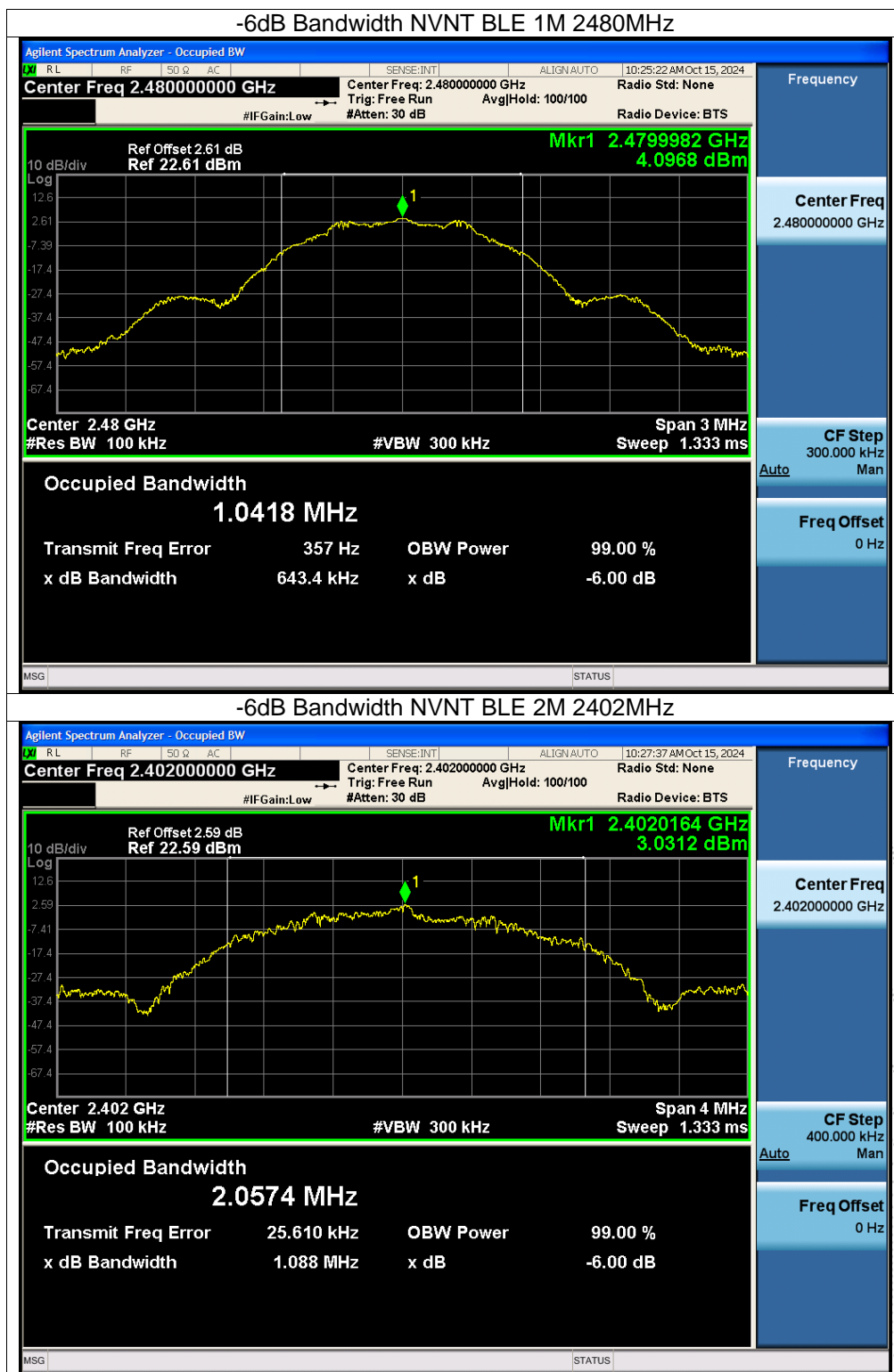
Temperature:	26°C	Relative Humidity:	54%
Test Mode:	GFSK	Test Voltage:	AC 120V/60Hz

Condition	Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	0.653	0.5	Pass
NVNT	BLE 1M	2440	0.659	0.5	Pass
NVNT	BLE 1M	2480	0.643	0.5	Pass
NVNT	BLE 2M	2402	1.088	0.5	Pass
NVNT	BLE 2M	2440	1.111	0.5	Pass
NVNT	BLE 2M	2480	0.936	0.5	Pass

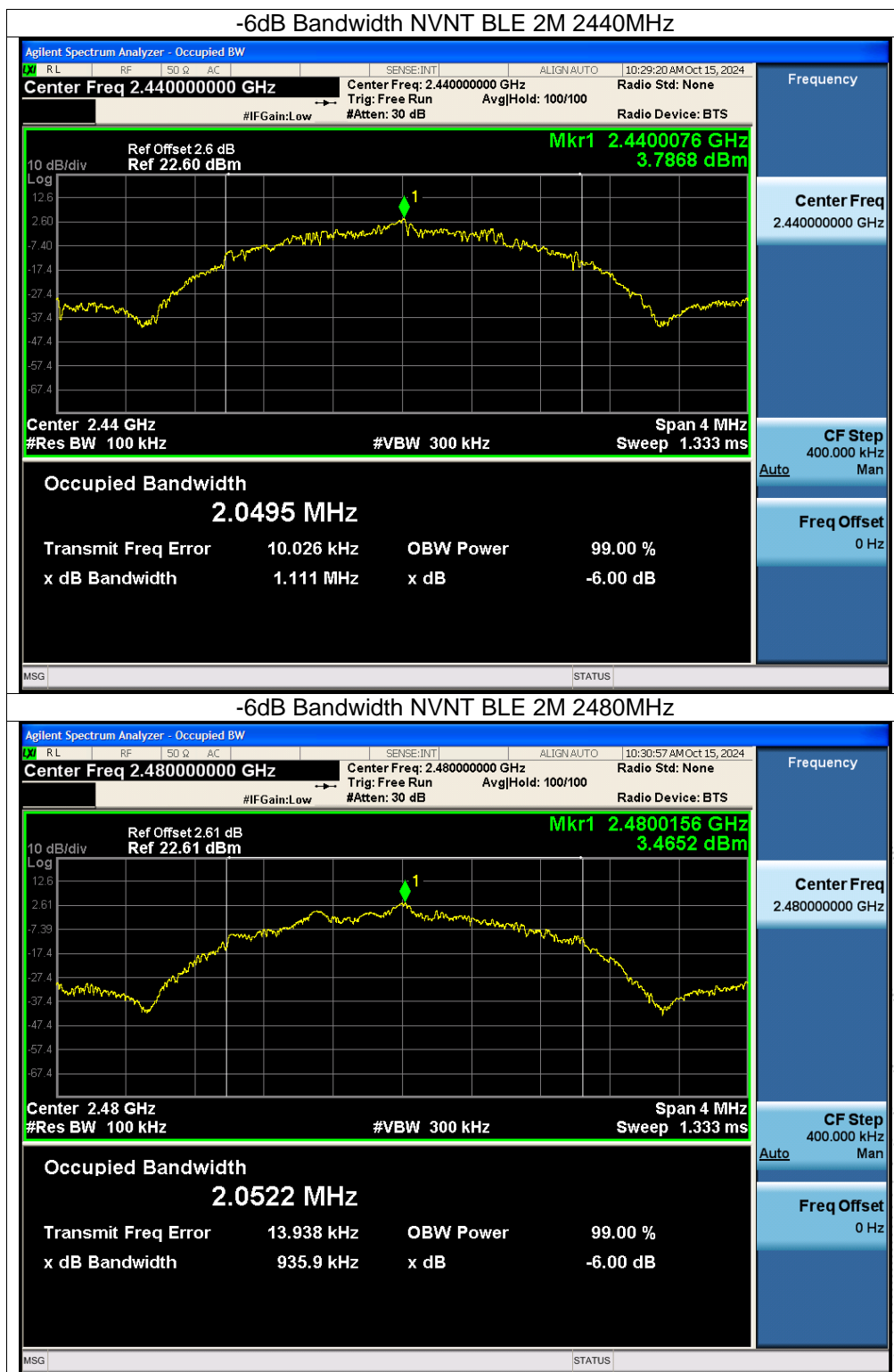
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## 11. Peak Output Power Test

### 11.1 Block Diagram Of Test Setup



### 11.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

### 11.3 Test Procedure

- a. The EUT was directly connected to the Power meter

### 11.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

### 11.5 Test Result

Temperature:	26°C	Relative Humidity:	54%
Test Mode:	GFSK	Test Voltage:	AC 120V/60Hz

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	3.4	30	Pass
NVNT	BLE 1M	2440	4.5	30	Pass
NVNT	BLE 1M	2480	4.28	30	Pass
NVNT	BLE 2M	2402	3.42	30	Pass
NVNT	BLE 2M	2440	4.08	30	Pass
NVNT	BLE 2M	2480	3.84	30	Pass



## 12. 100 KHz Bandwidth Of Frequency Band Edge

### 12.1 Block Diagram Of Test Setup



### 12.2 Limit

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

### 12.3 Test Procedure

Using the following spectrum analyzer setting:

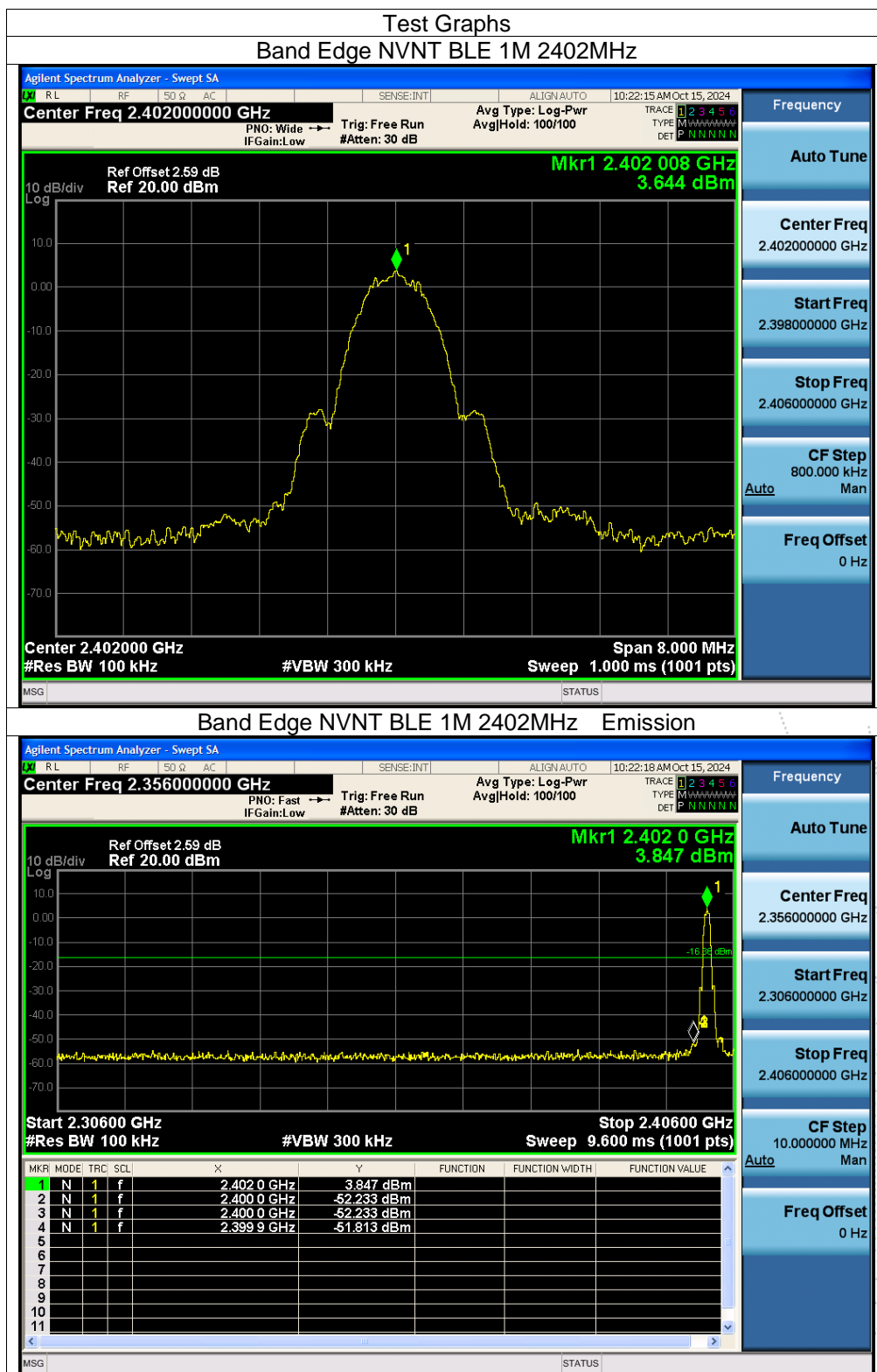
- a) Set the RBW = 100KHz.
- b) Set the VBW = 300KHz.
- c) Sweep time = auto couple.
- d) Detector function = peak.
- e) Trace mode = max hold.
- f) Allow trace to fully stabilize.

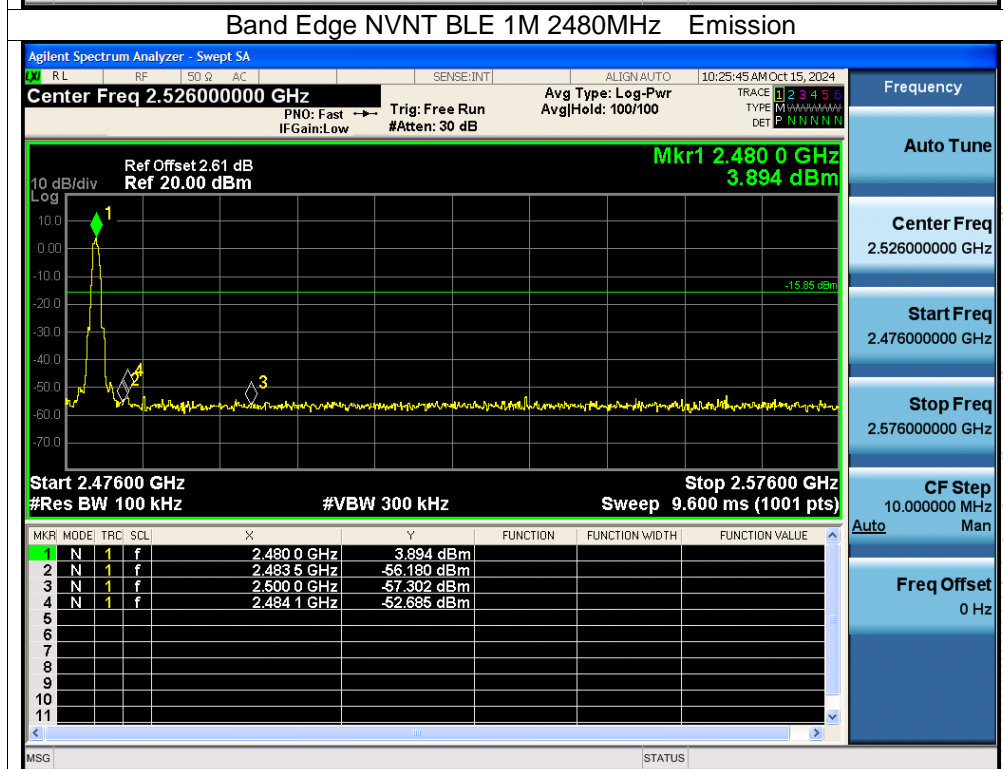
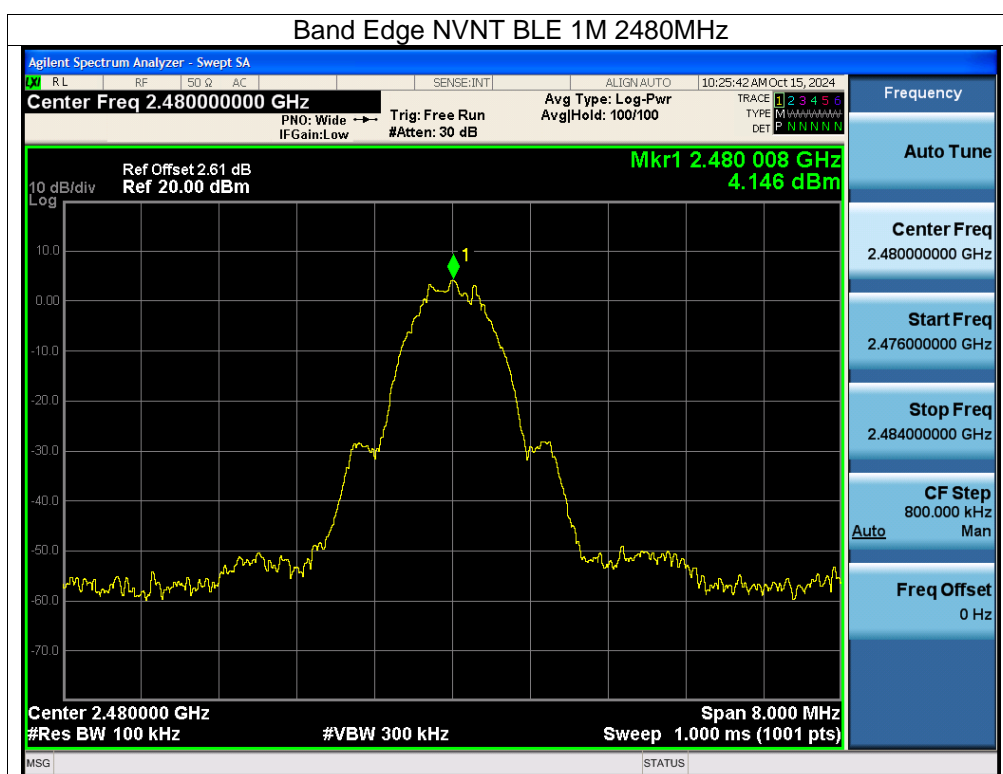
### 12.4 EUT Operating Conditions

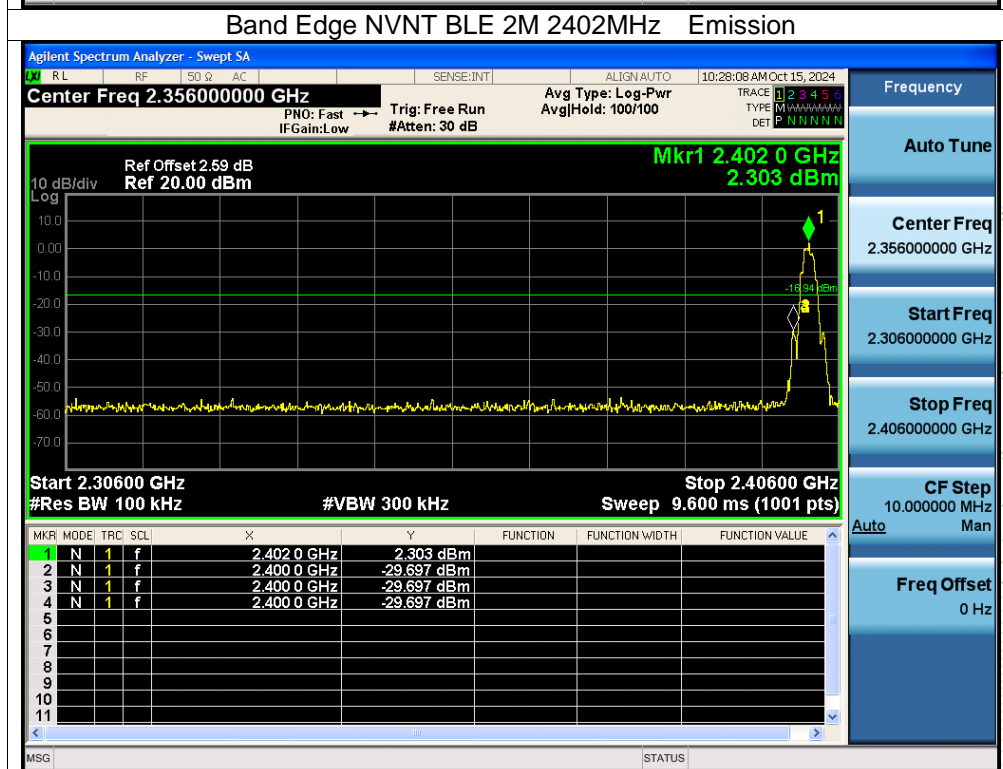
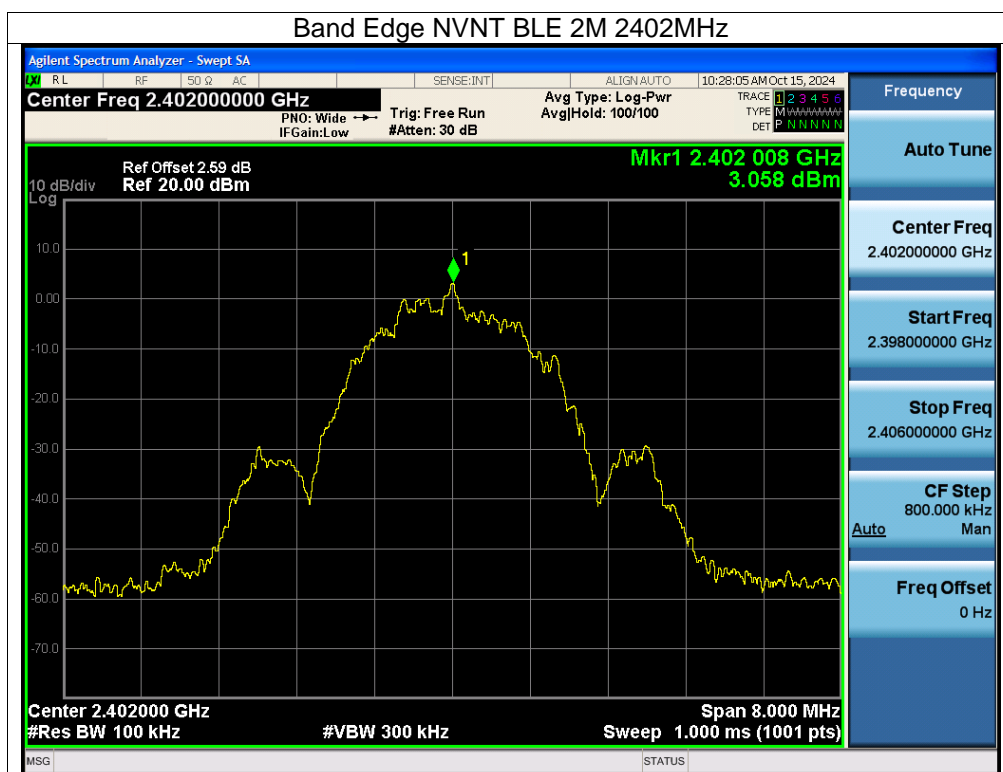
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

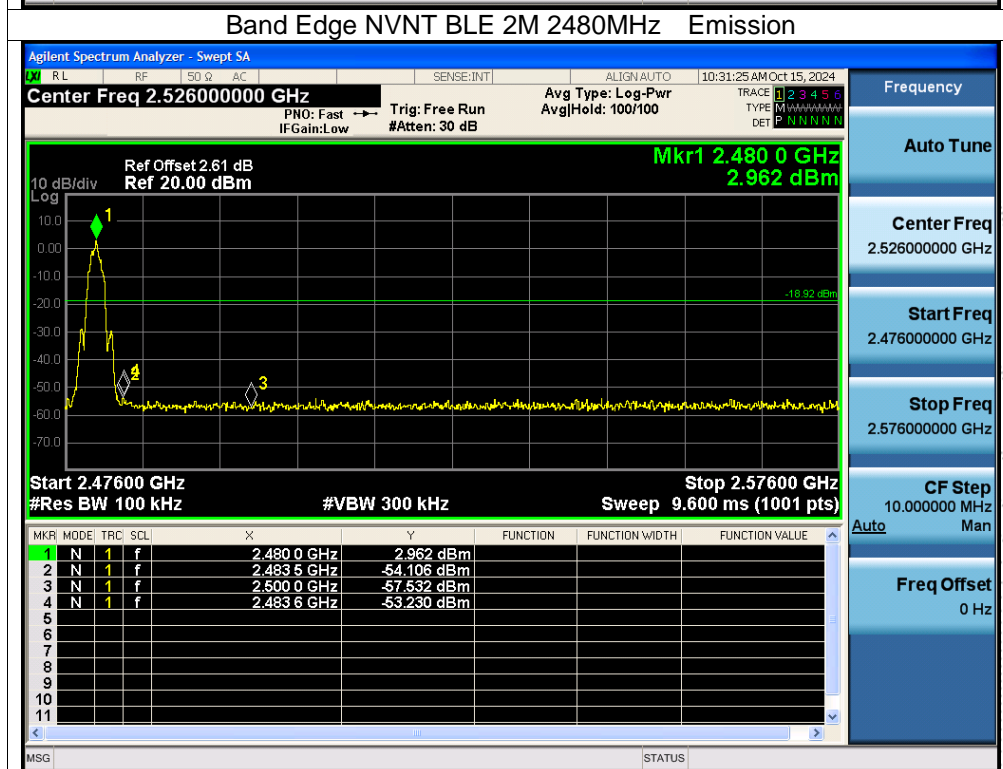
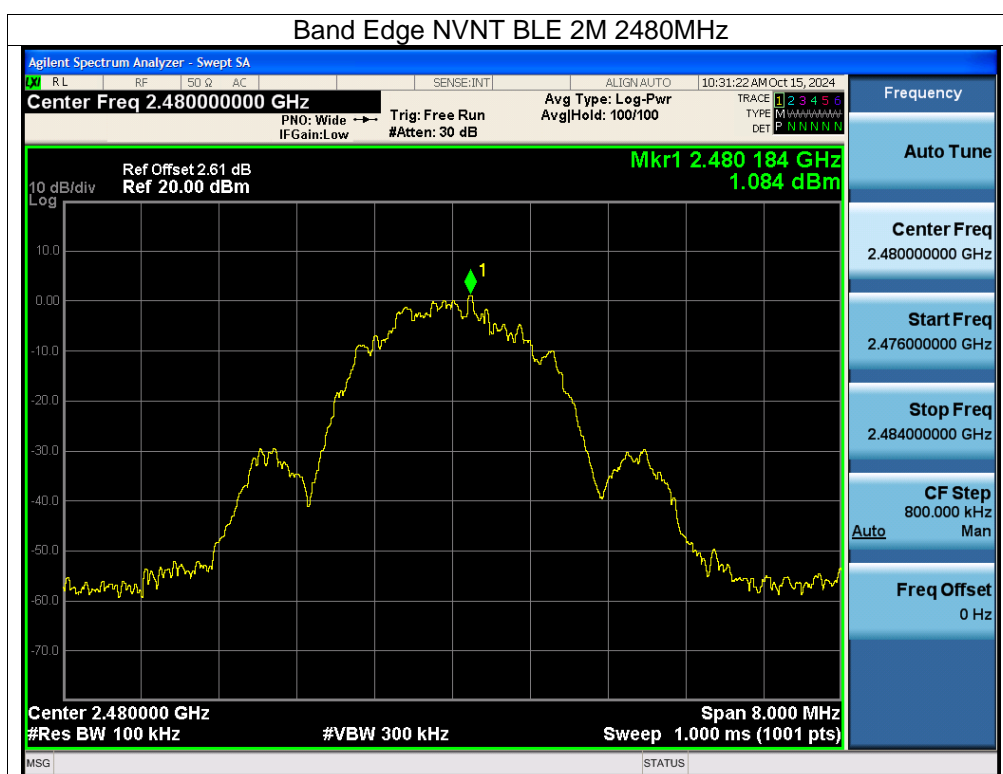
Note: Power Spectral Density(dBm)=Reading+Cable Loss

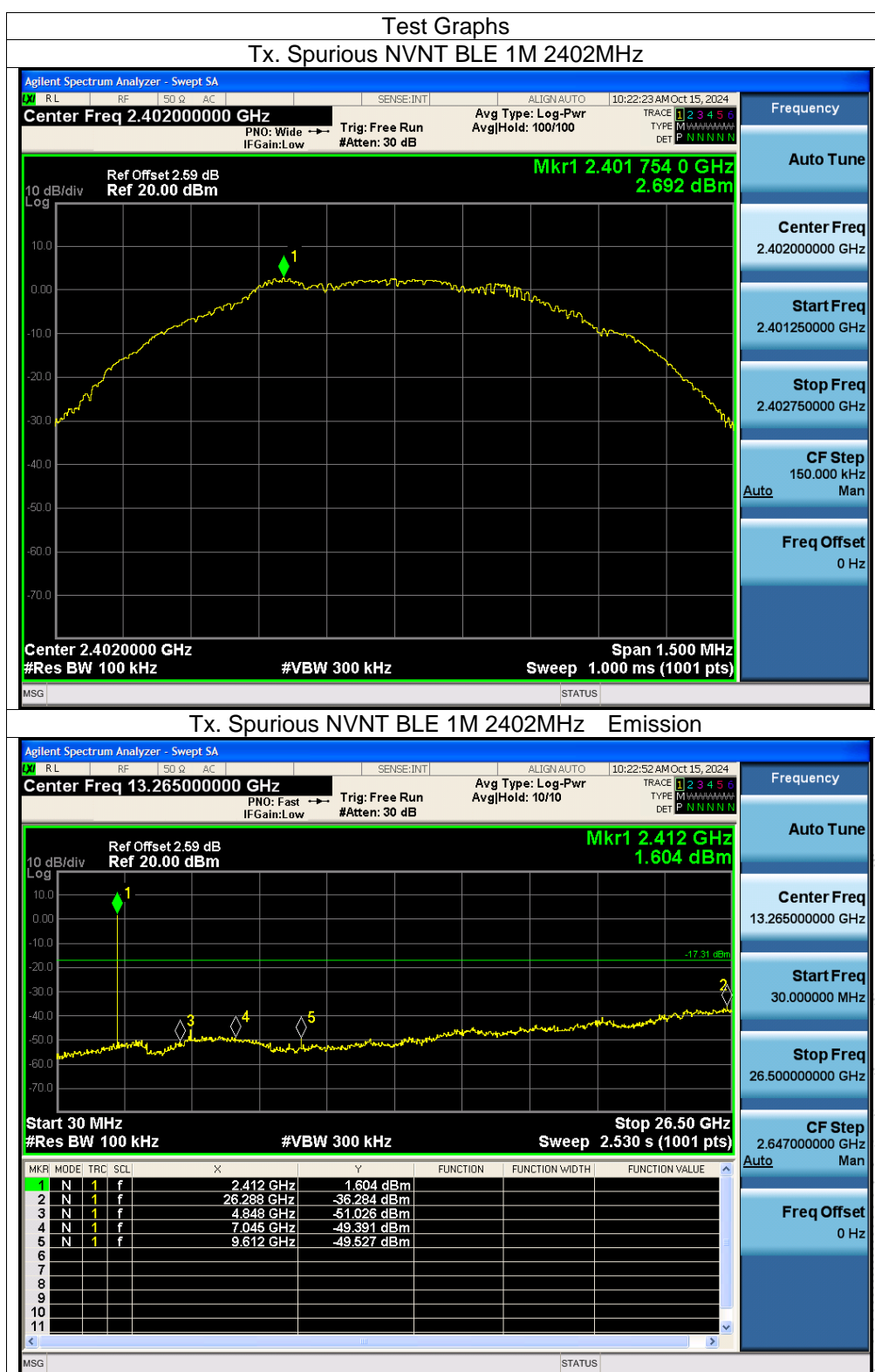
## 12.5 Test Result



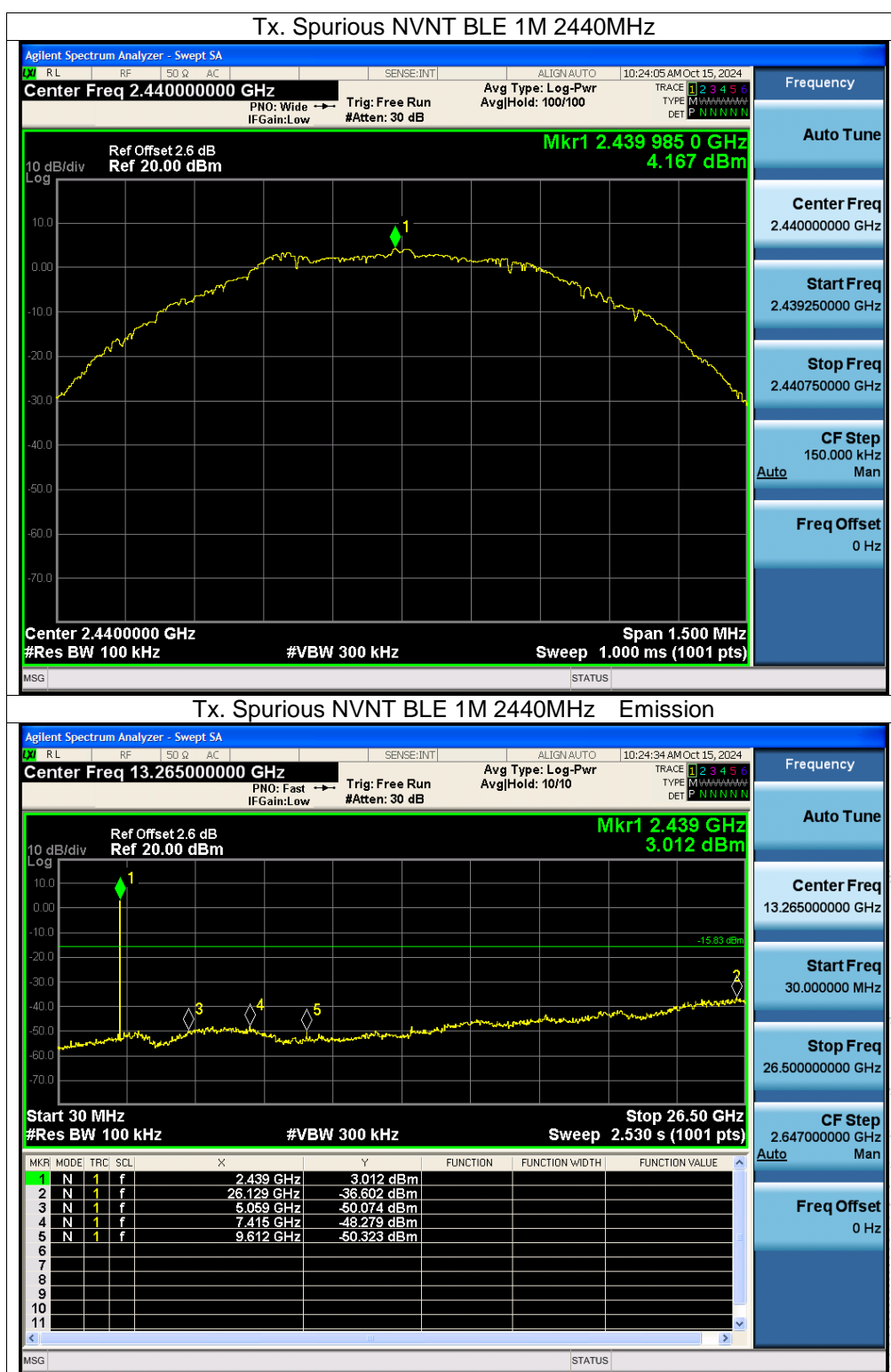






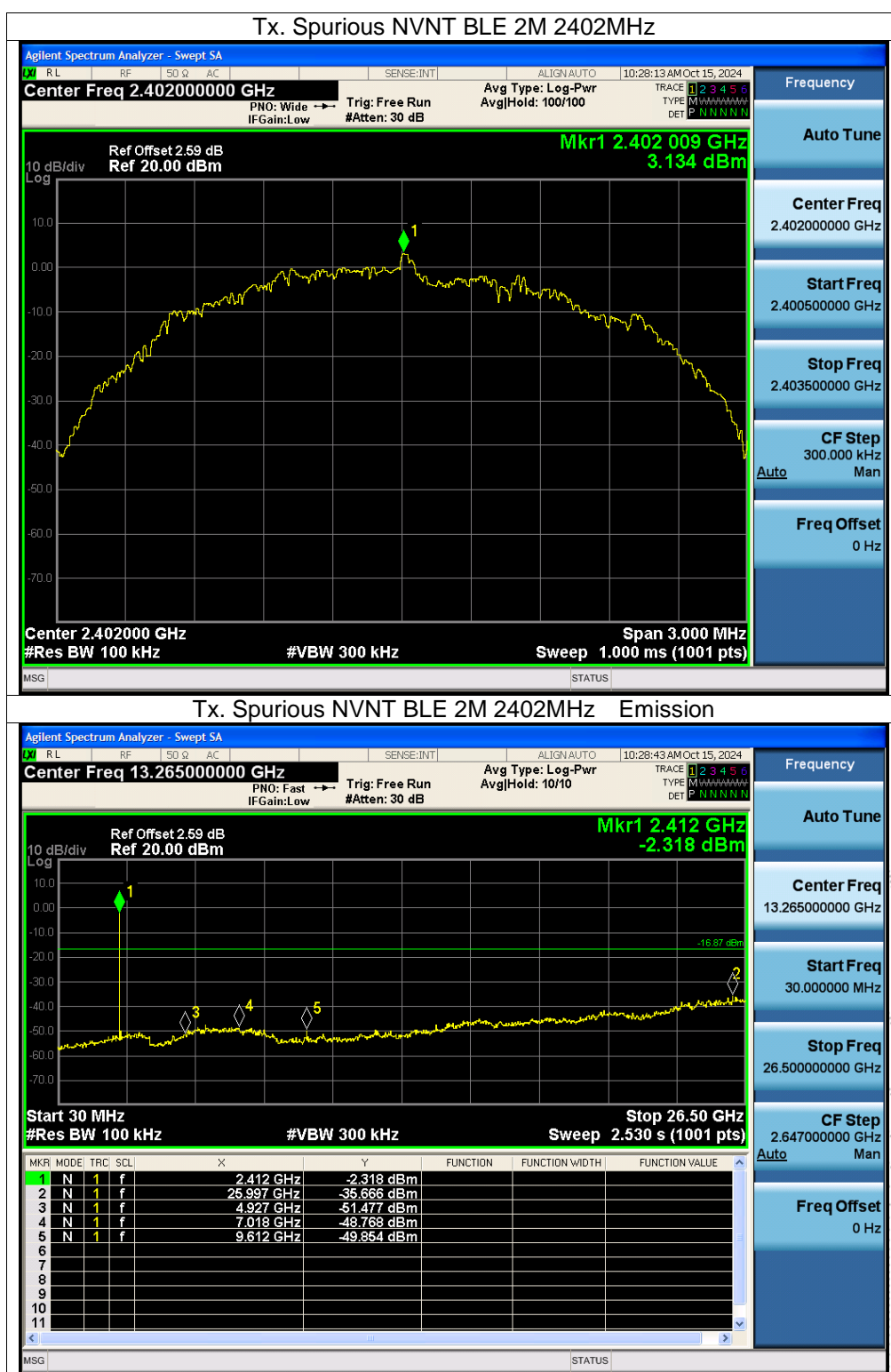


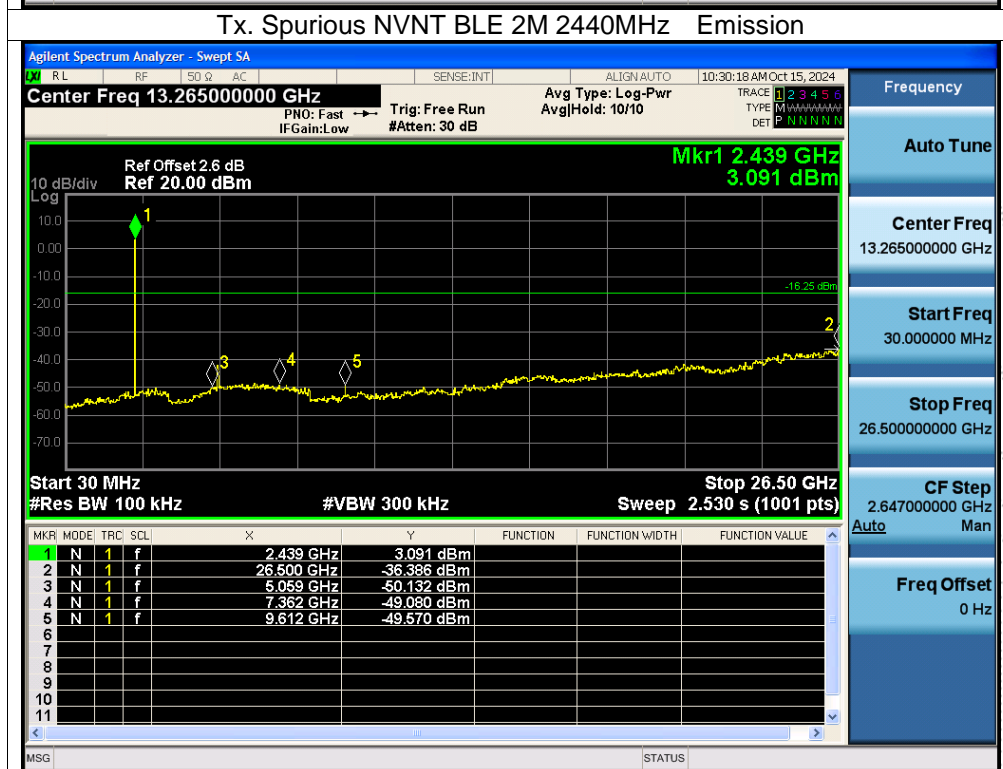
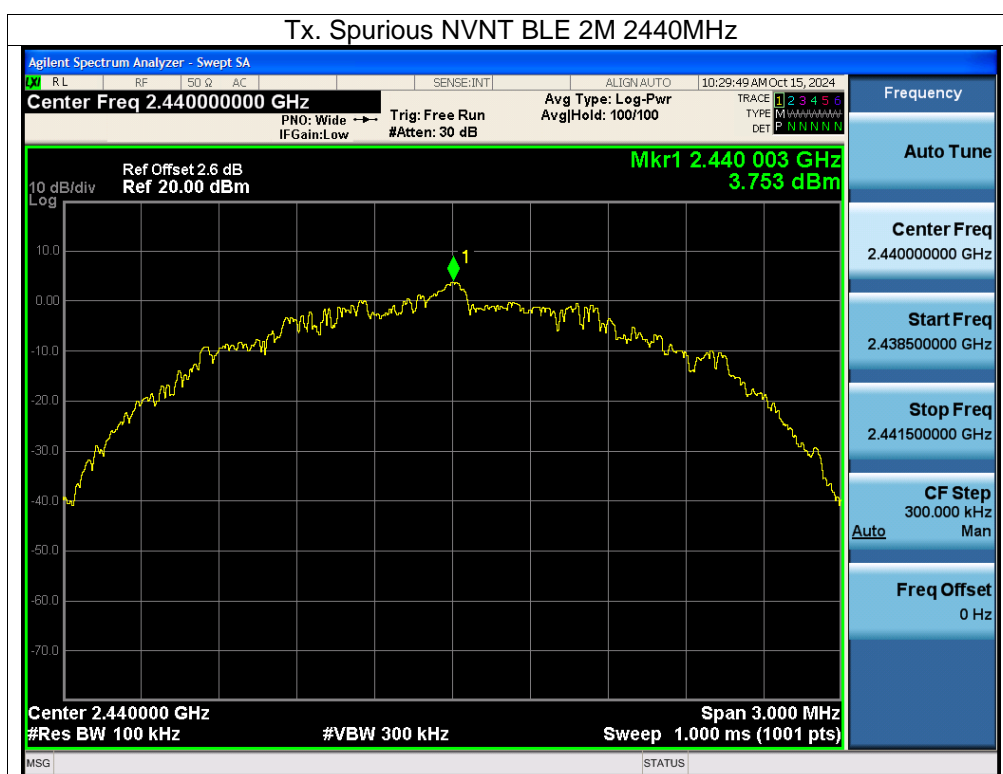


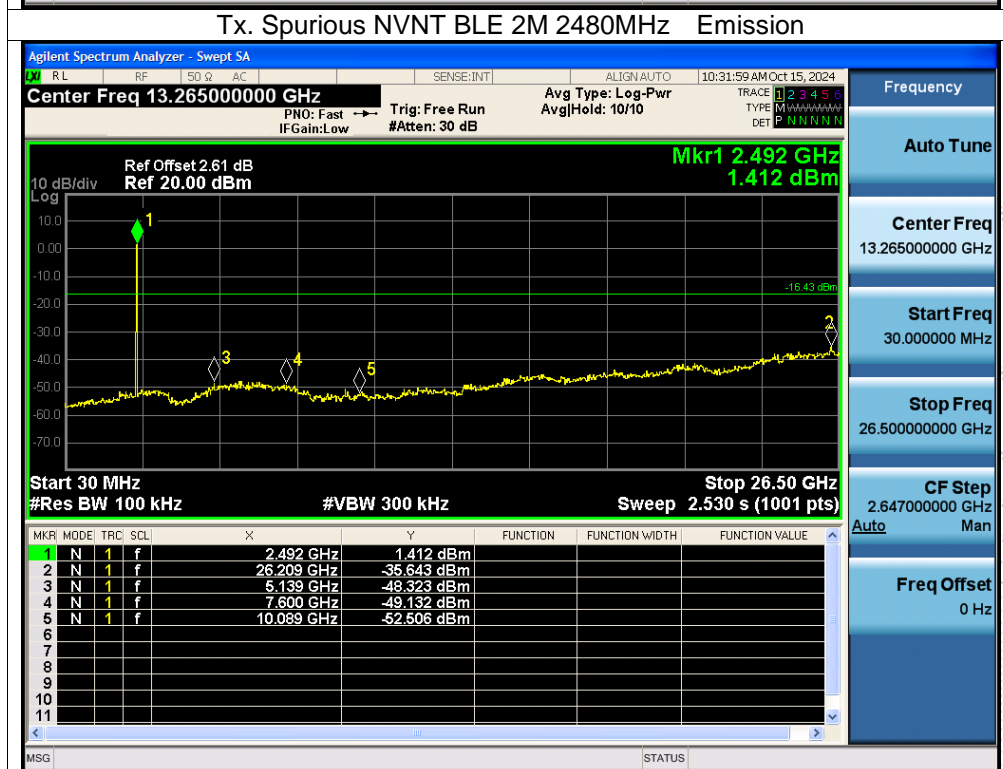
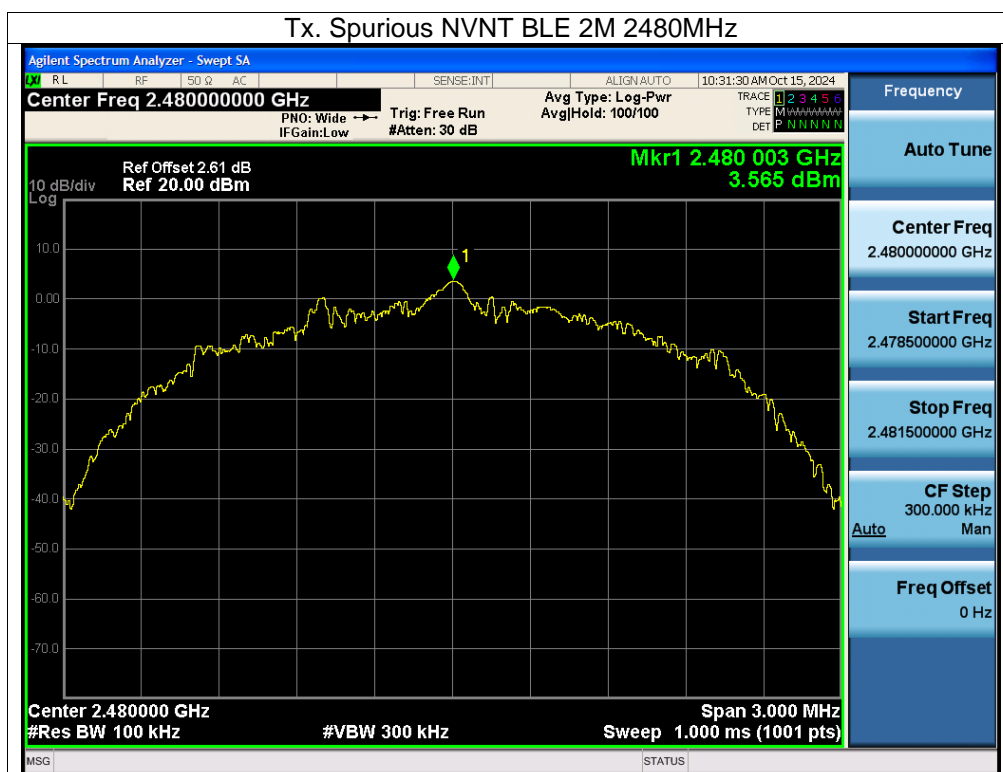












### 13. Duty Cycle Of Test Signal

#### 13.1 Standard Requirement

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

#### 13.2 Formula

Duty Cycle =  $T_{on} / (T_{on} + T_{off})$

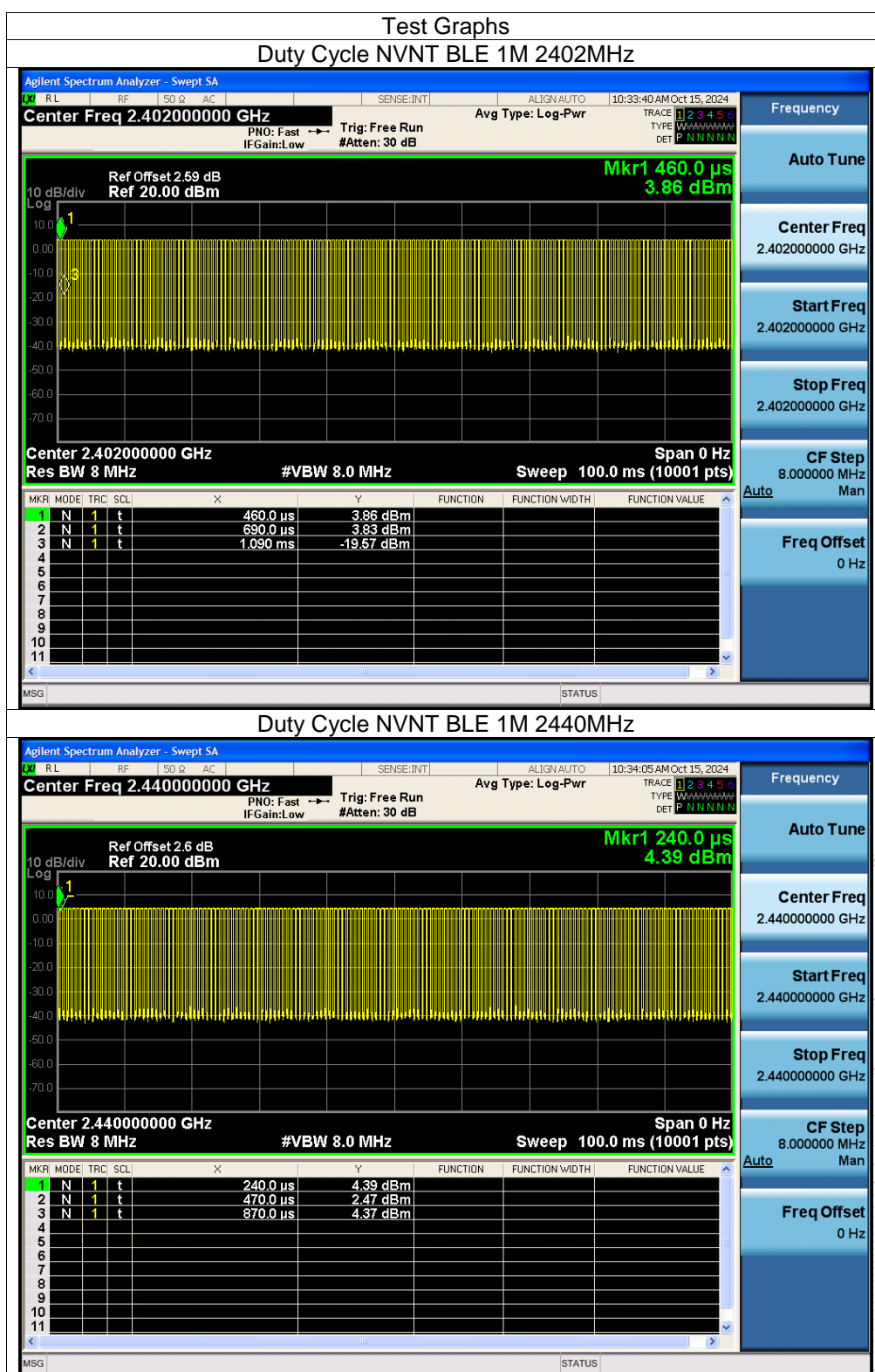
#### 13.3 Measurement Procedure

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

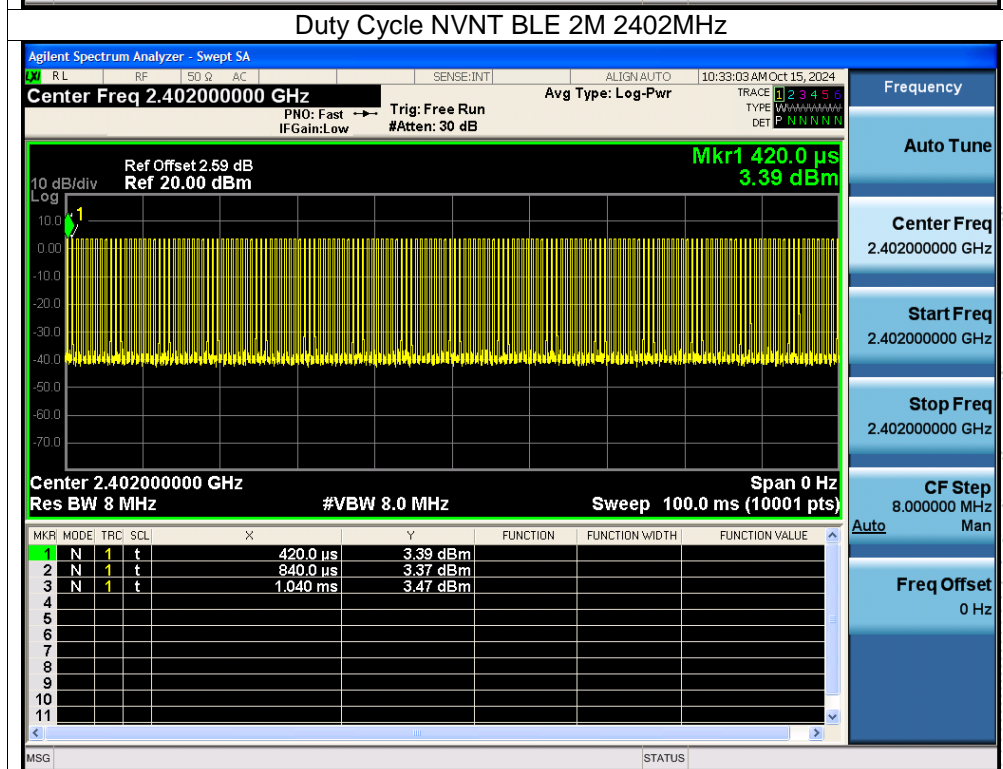
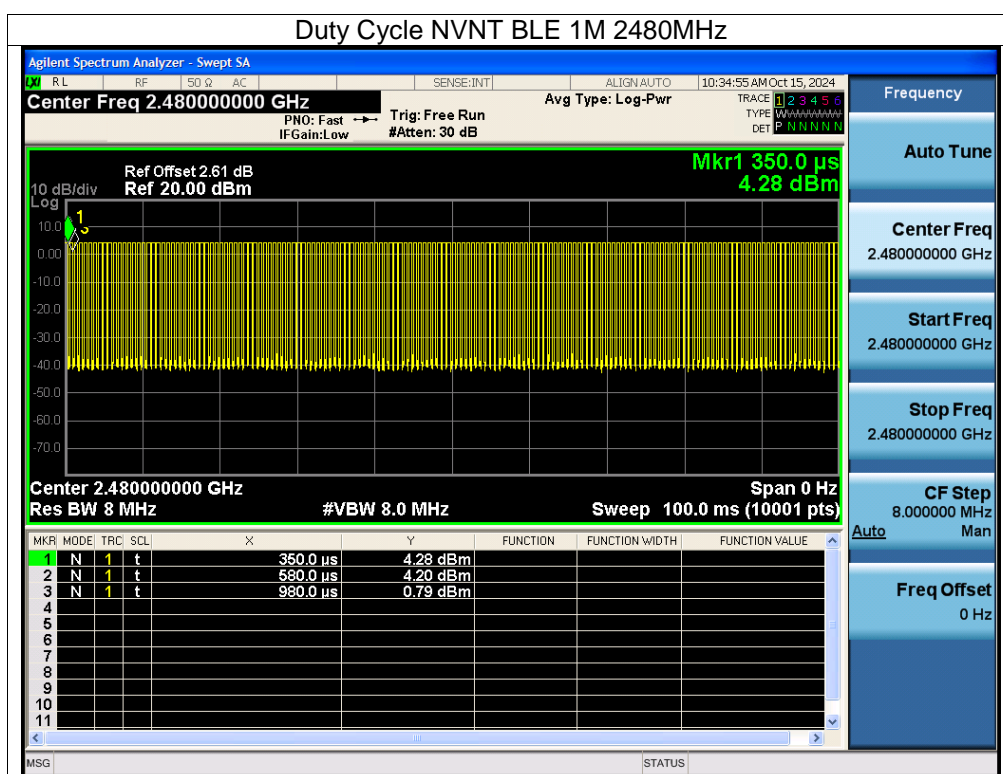
#### 13.4 Test Result

Duty Cycle

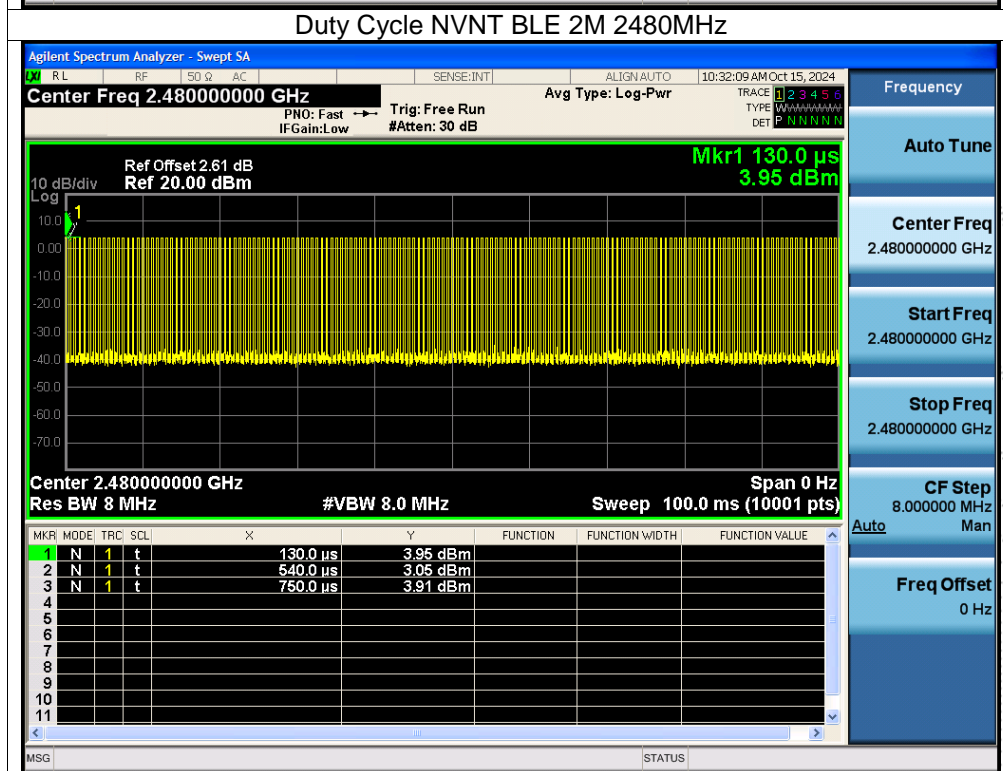
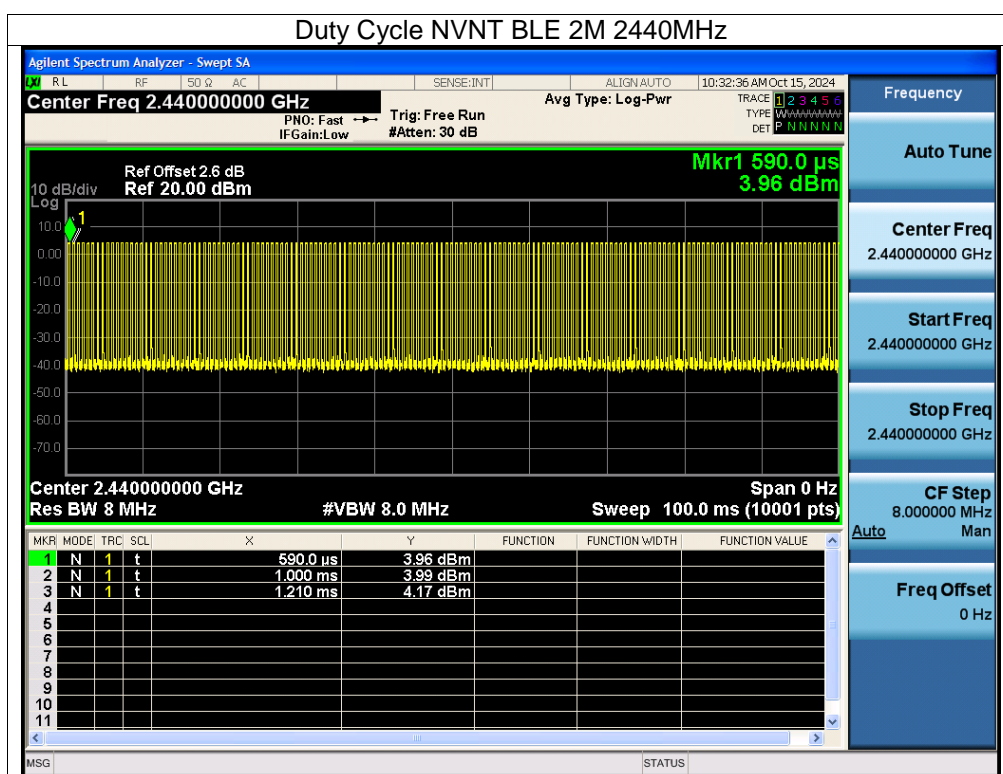
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	63.49	1.97	2.5
NVNT	BLE 1M	2440	63.49	1.97	2.5
NVNT	BLE 1M	2480	63.49	1.97	2.5
NVNT	BLE 2M	2402	32.26	4.91	5
NVNT	BLE 2M	2440	33.87	4.7	4.76
NVNT	BLE 2M	2480	33.87	4.7	4.76











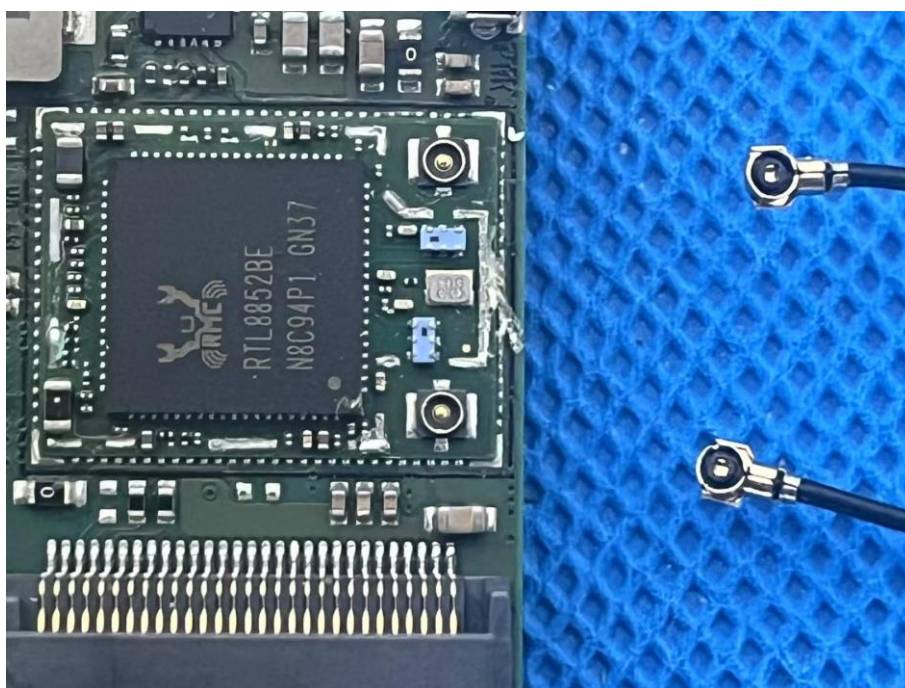
## 14. Antenna Requirement

### 14.1 Limit

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.

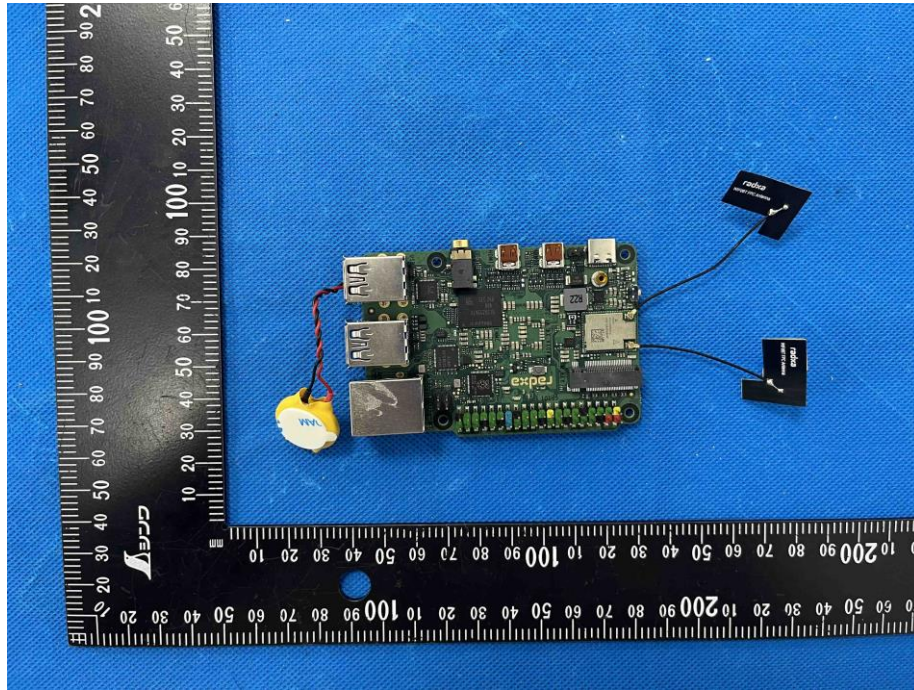
### 14.2 Test Result

The EUT antenna is FPC antenna, antenna connector type is IPEX generation connector. It is a non-standard connector, fulfill the requirement of this section.



## 15. EUT Photographs

EUT Photo 1



NOTE: Appendix-Photographs Of EUT Constructional Details.

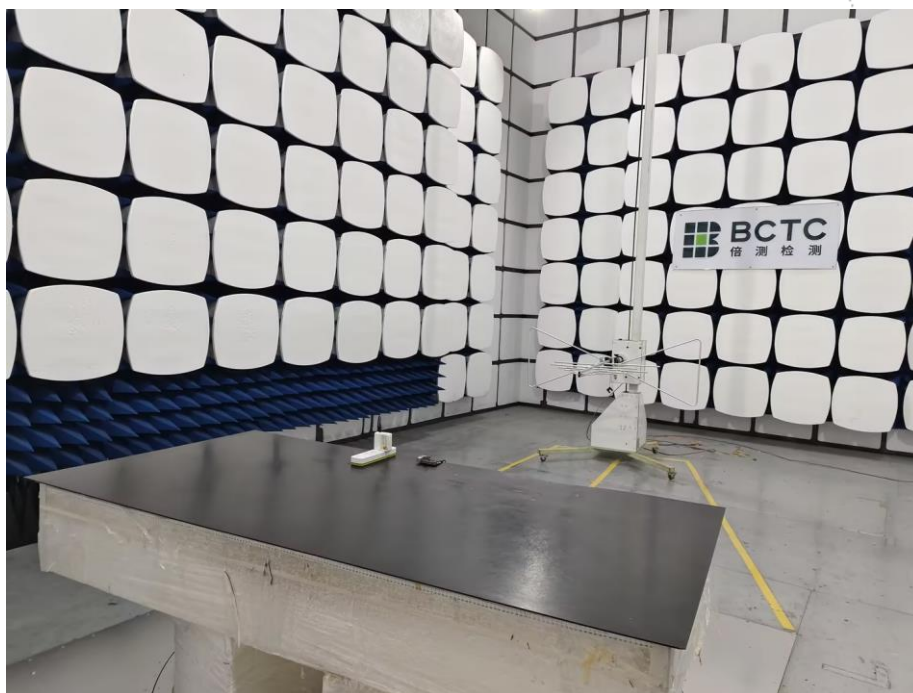


## 16. EUT Test Setup Photographs

### Conducted Emissions Photo



### Radiated Measurement Photos





## STATEMENT

1. The equipment lists are traceable to the national reference standards.
2. The test report can not be partially copied unless prior written approval is issued from our lab.
3. The test report is invalid without the "special seal for inspection and testing".
4. The test report is invalid without the signature of the approver.
5. The test process and test result is only related to the Unit Under Test.
6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.
7. The quality system of our laboratory is in accordance with ISO/IEC17025.
8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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