

## 12. Hopping Channel Separation

### 12.1 Block Diagram Of Test Setup



### 12.2 Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.

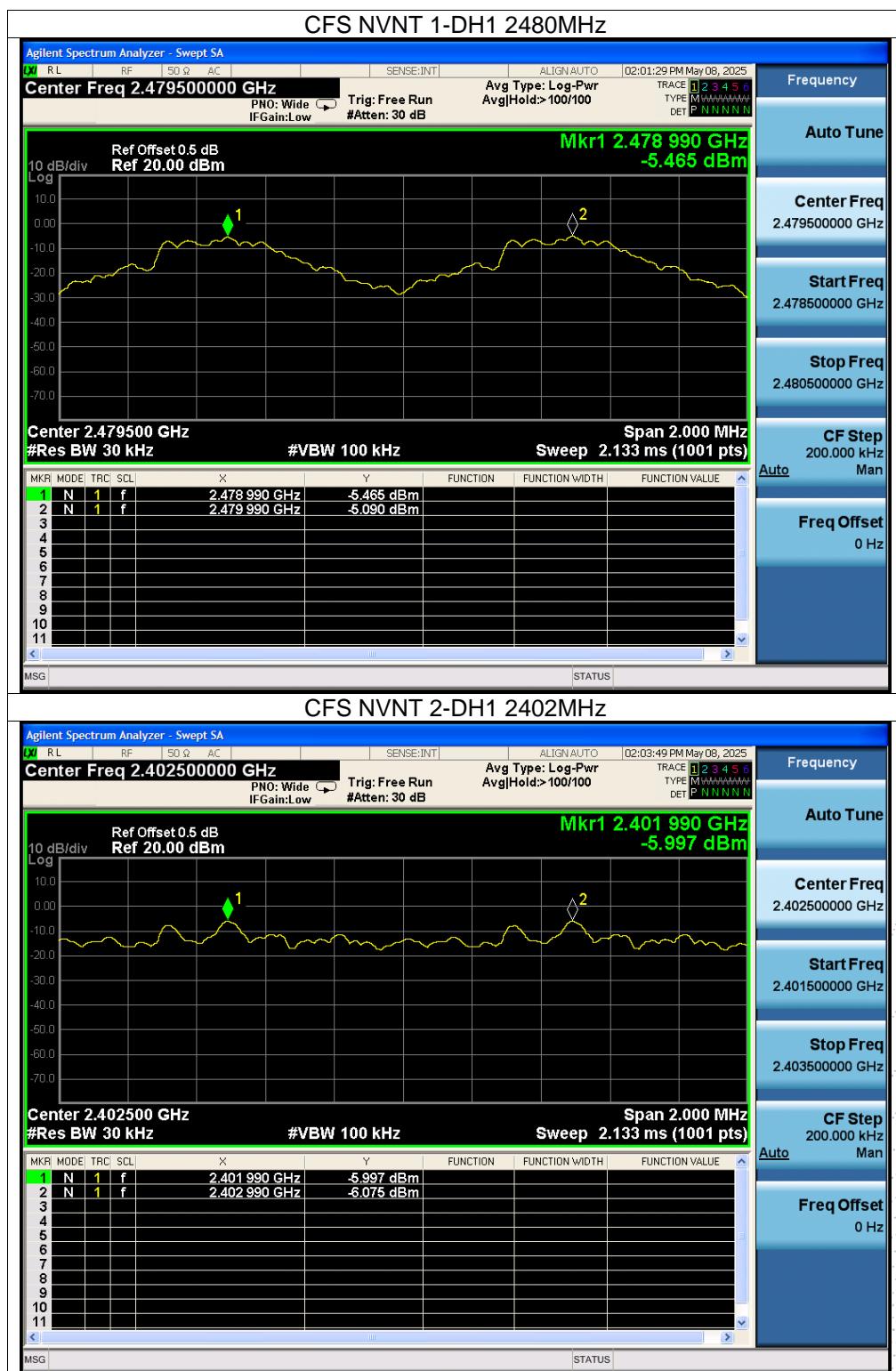
### 12.3 Test procedure

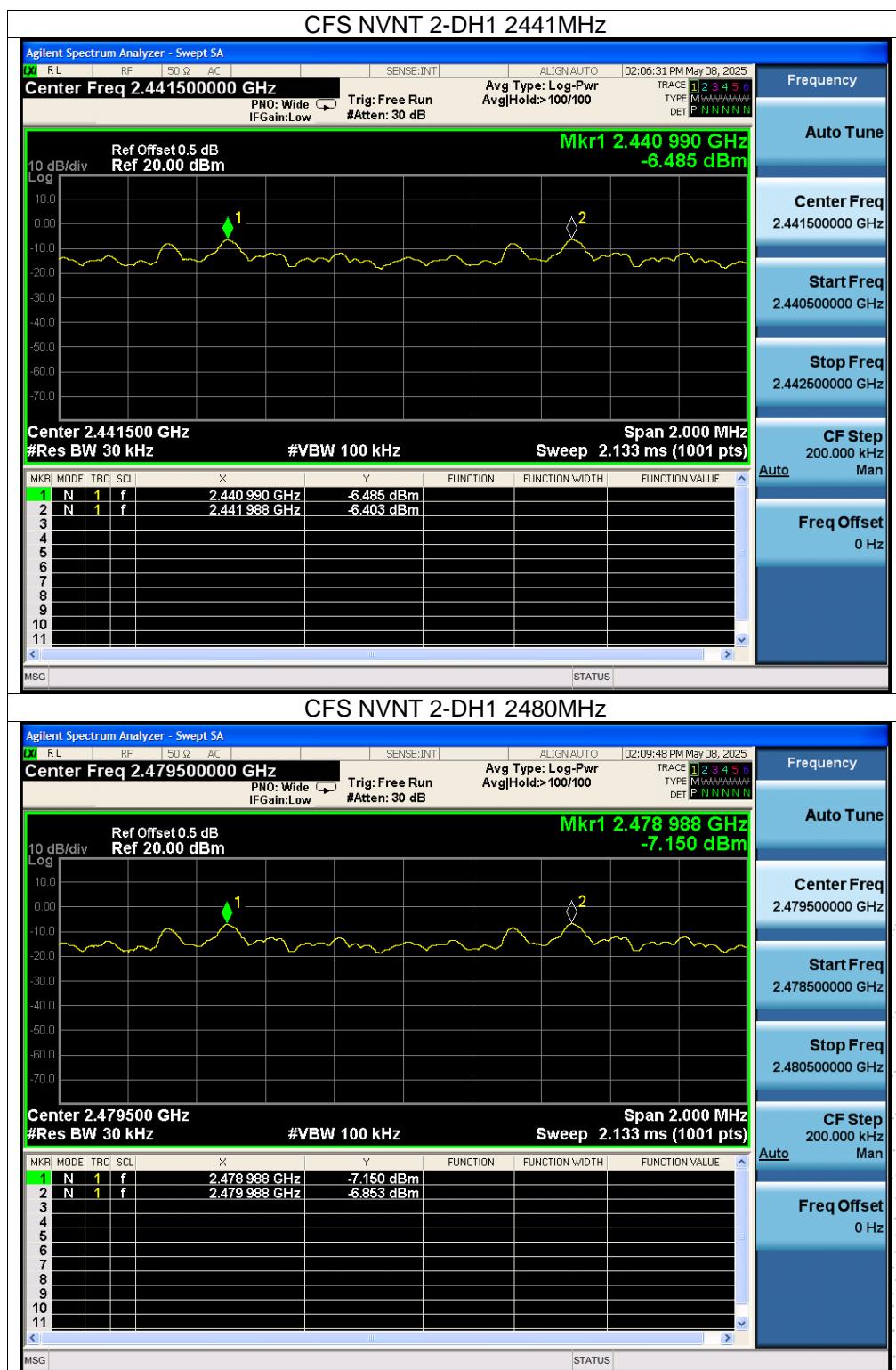
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 30 kHz. VBW = 100 kHz, Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

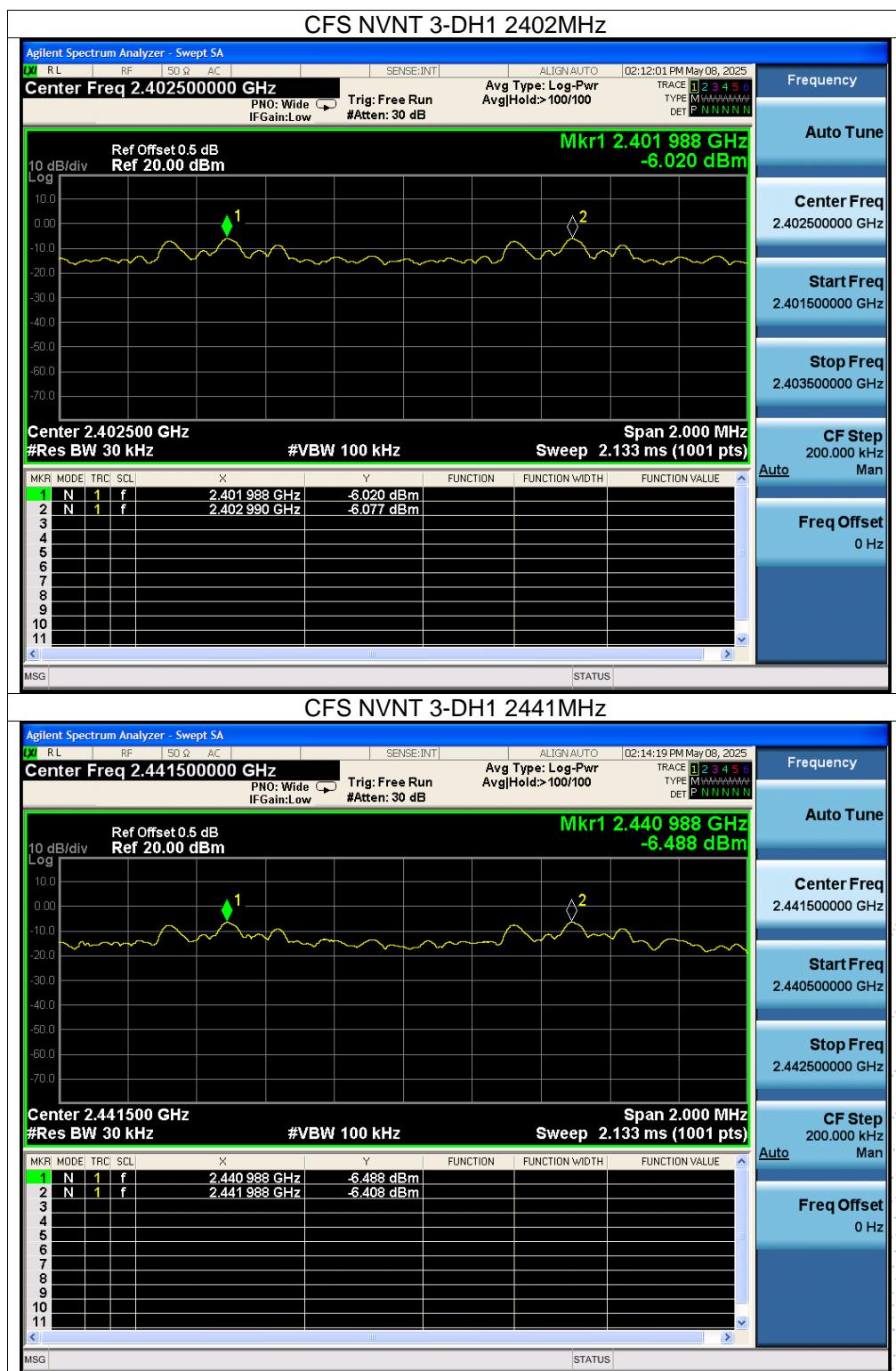
### 12.4 Test Result

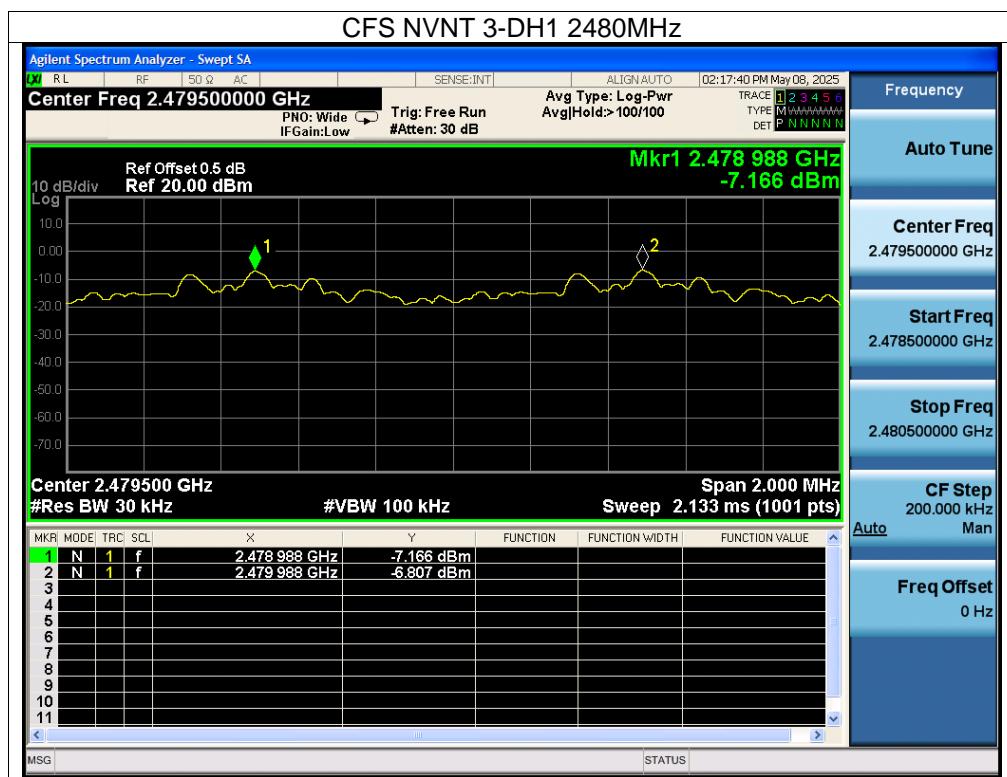
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2401.988	2402.99	1.002	0.584	Pass
NVNT	1-DH1	2440.99	2441.99	1	0.611	Pass
NVNT	1-DH1	2478.99	2479.99	1	0.585	Pass
NVNT	2-DH1	2401.99	2402.99	1	0.852	Pass
NVNT	2-DH1	2440.99	2441.988	0.998	0.84	Pass
NVNT	2-DH1	2478.988	2479.988	1	0.83	Pass
NVNT	3-DH1	2401.988	2402.99	1.002	0.836	Pass
NVNT	3-DH1	2440.988	2441.988	1	0.814	Pass
NVNT	3-DH1	2478.988	2479.988	1	0.811	Pass











### 13. Number Of Hopping Frequency

#### 13.1 Block Diagram Of Test Setup



#### 13.2 Limit

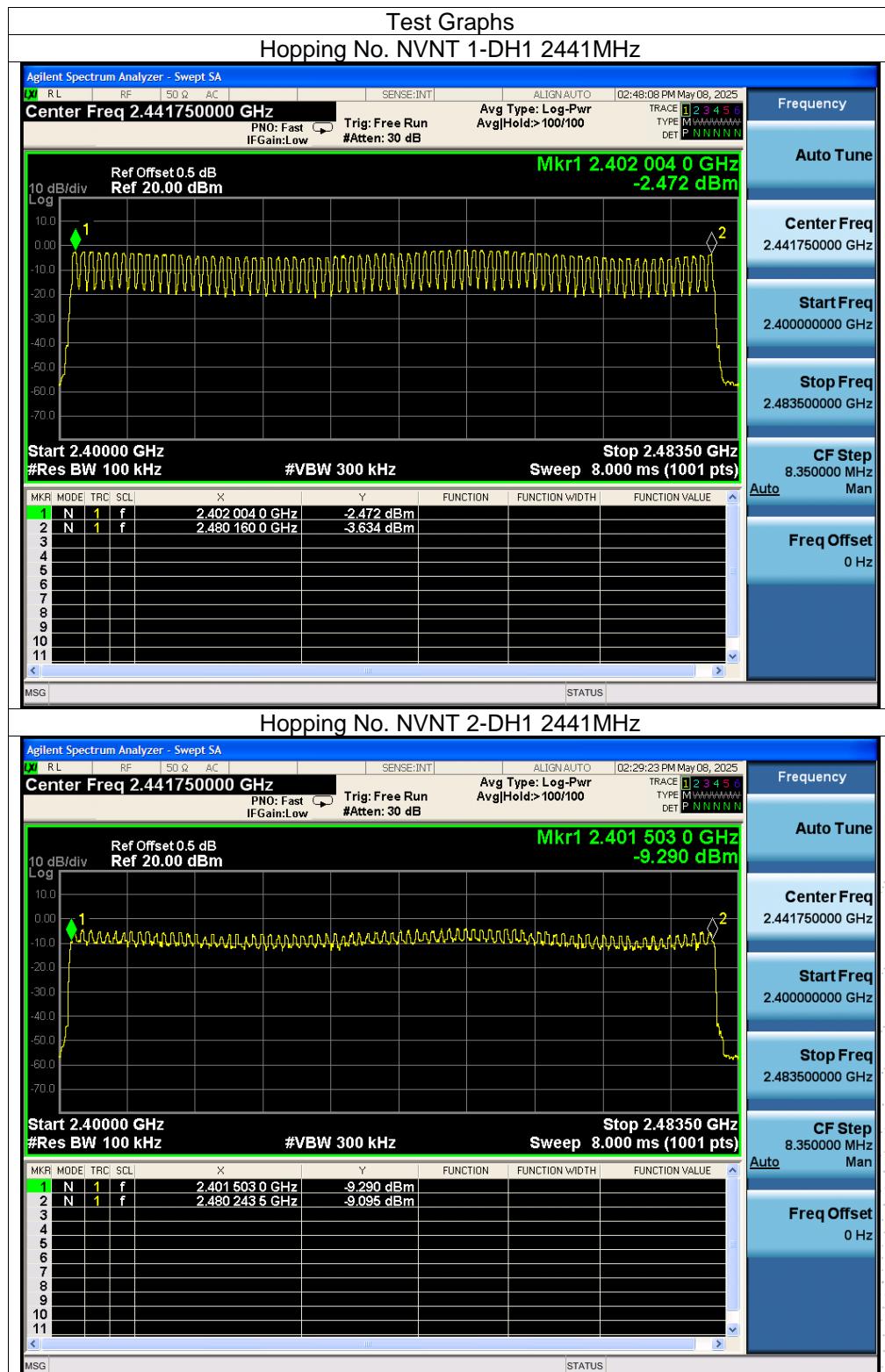
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

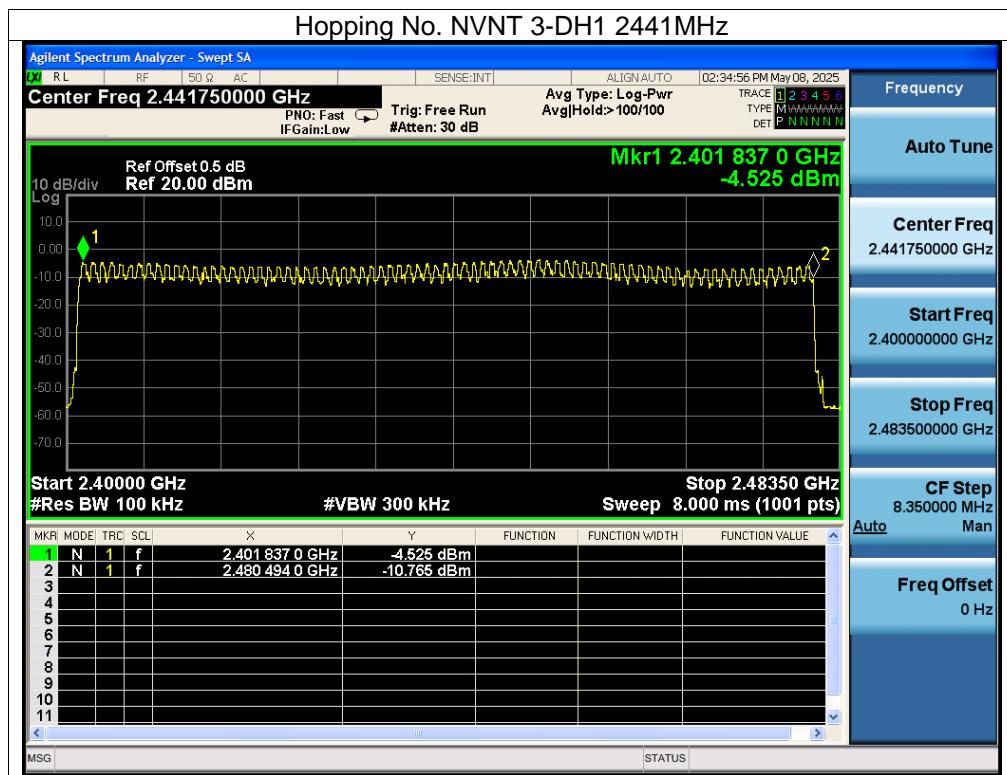
#### 13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100 kHz. VBW = 300 kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

#### 13.4 Test Result

Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass





## 14. Dwell Time

### 14.1 Block Diagram Of Test Setup



### 14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

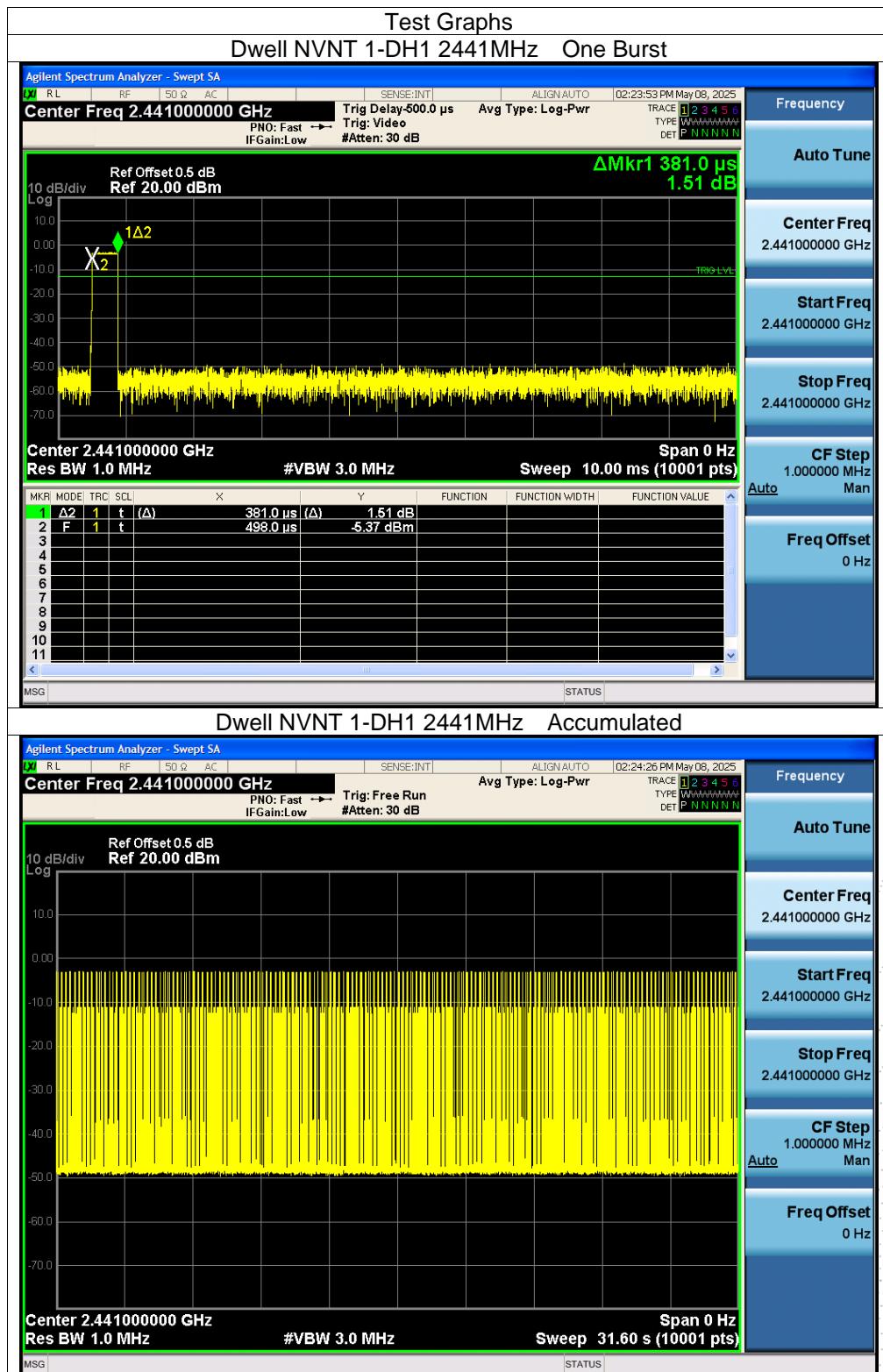
### 14.3 Test procedure

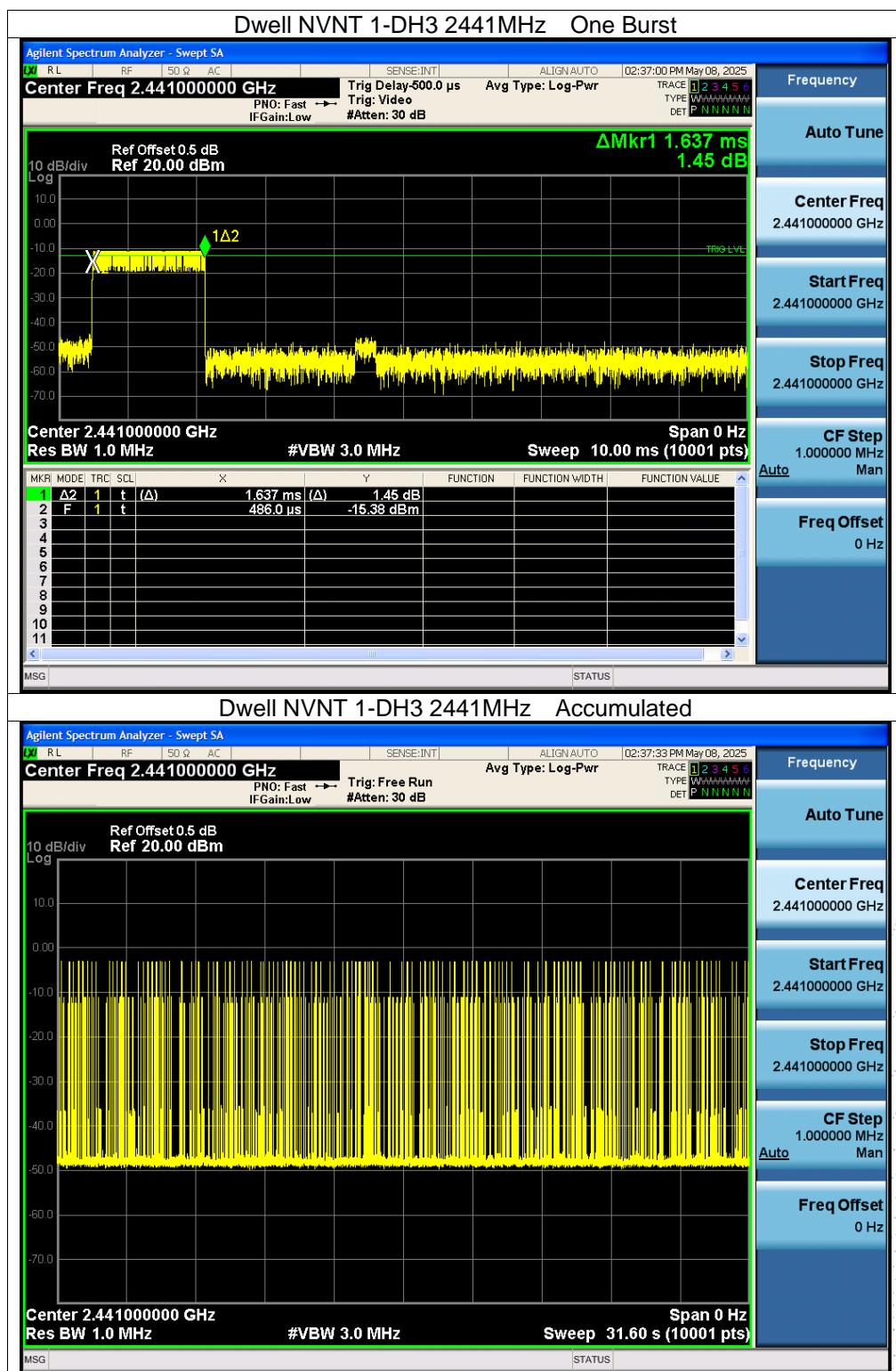
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0. Centred on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz. Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

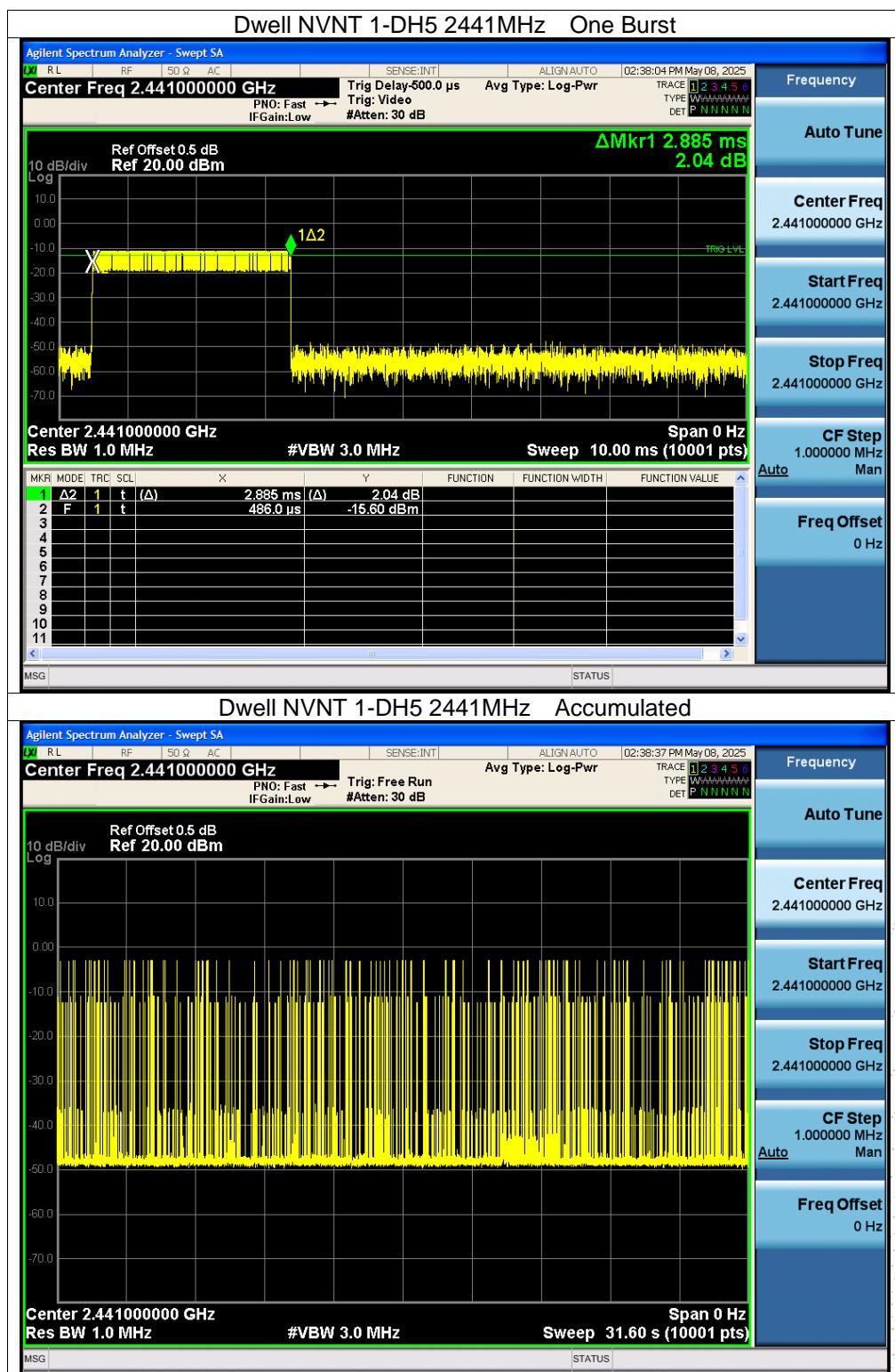
### 14.4 Test Result

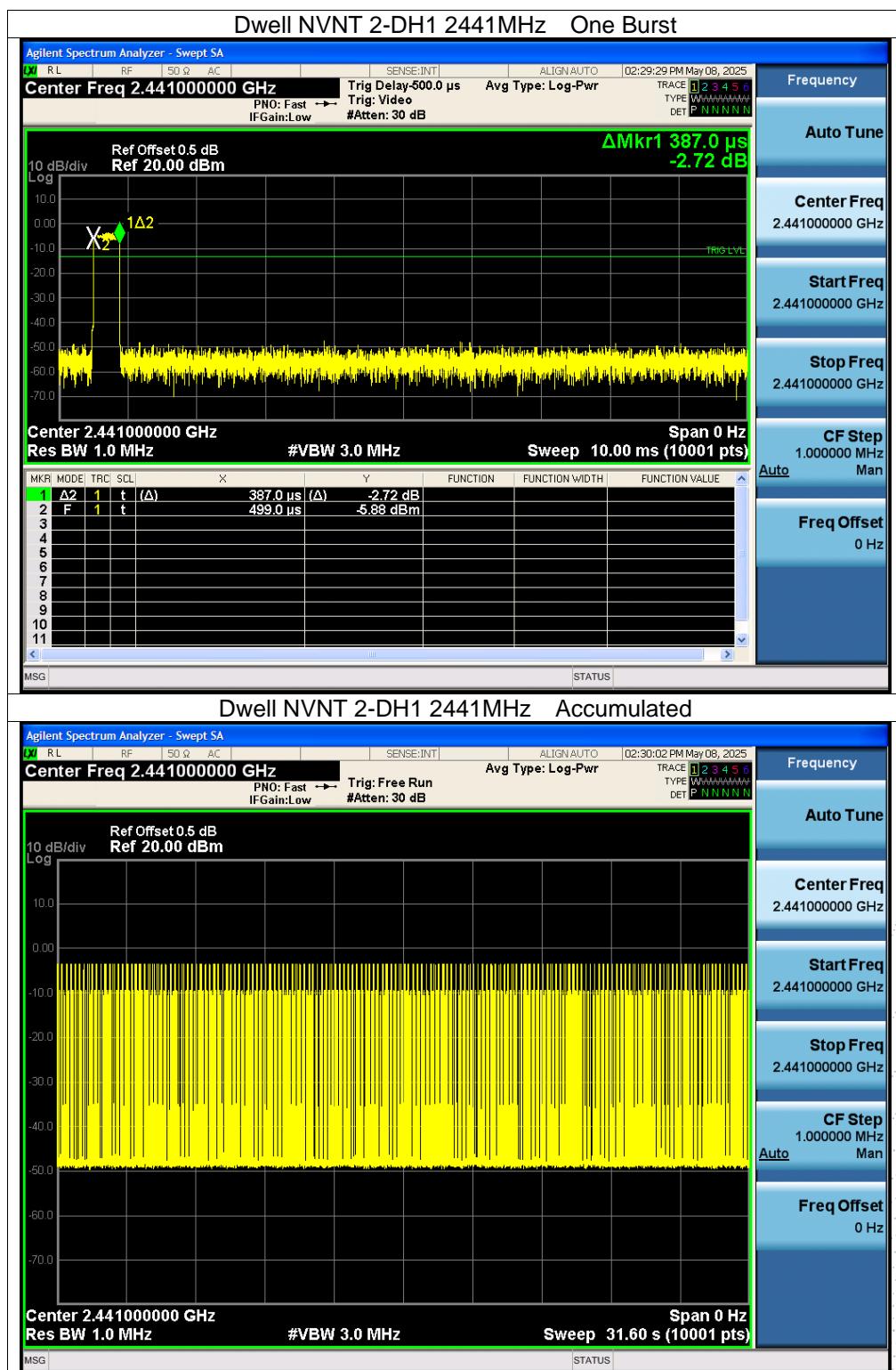
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.381	119.634	314	31600	400	Pass
NVNT	1-DH3	2441	1.637	258.646	158	31600	400	Pass
NVNT	1-DH5	2441	2.885	343.315	119	31600	400	Pass
NVNT	2-DH1	2441	0.387	121.905	315	31600	400	Pass
NVNT	2-DH3	2441	1.639	242.572	148	31600	400	Pass
NVNT	2-DH5	2441	2.887	314.683	109	31600	400	Pass
NVNT	3-DH1	2441	0.387	121.905	315	31600	400	Pass
NVNT	3-DH3	2441	1.638	270.27	165	31600	400	Pass
NVNT	3-DH5	2441	2.889	303.345	105	31600	400	Pass

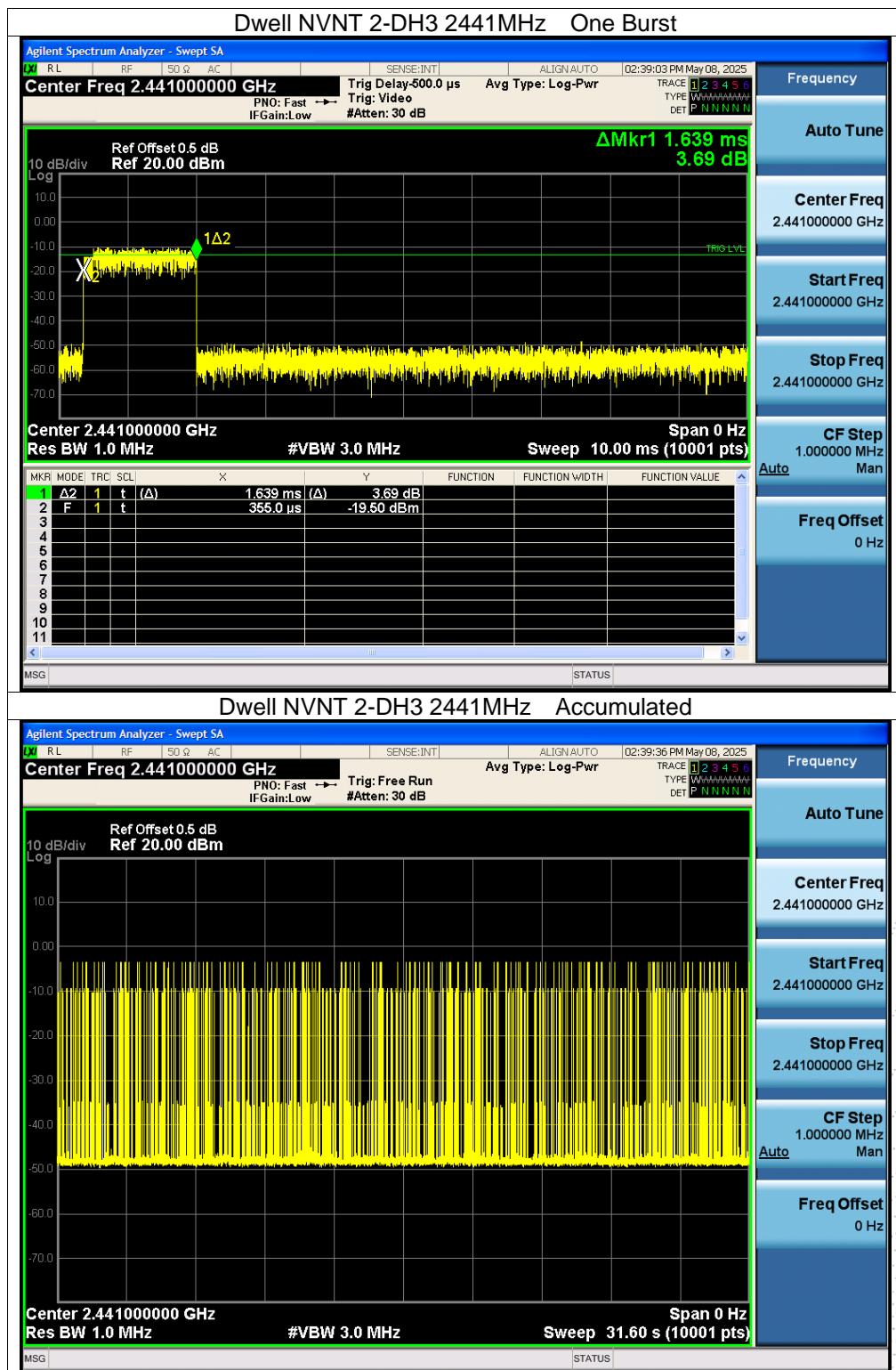
Note: Total Dwell Time (ms) = Pulse Time (ms)\*Burst Count

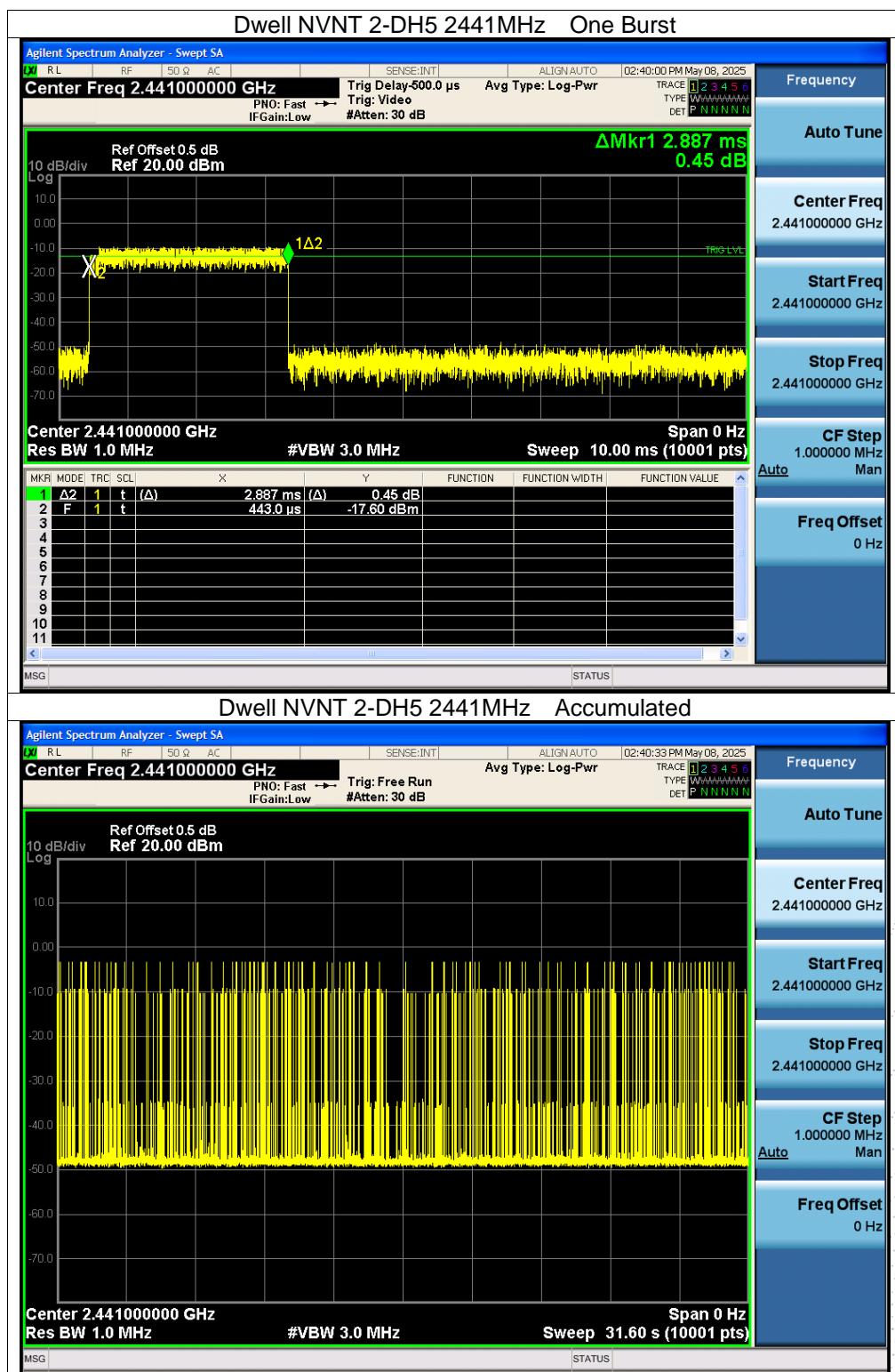


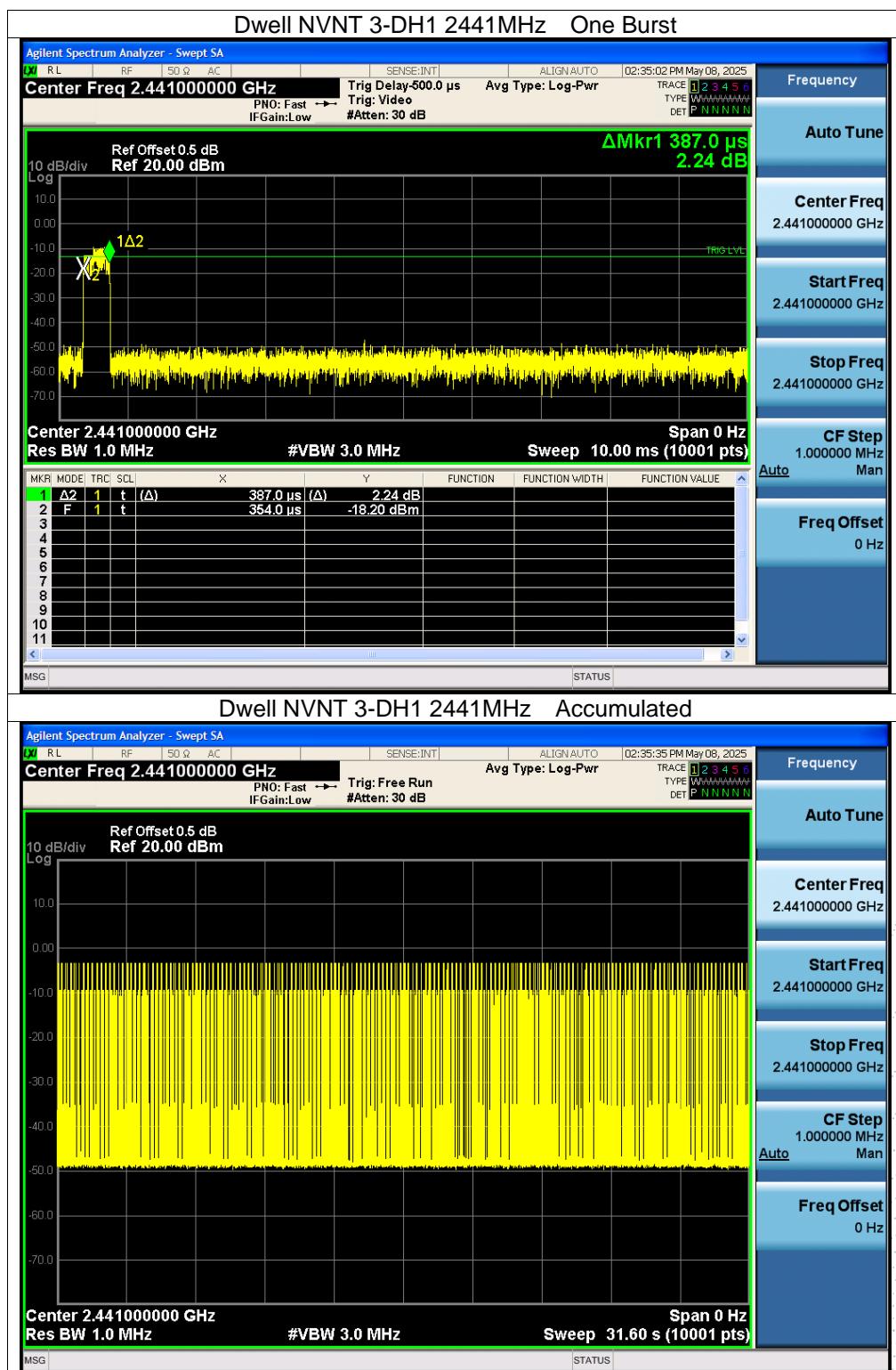


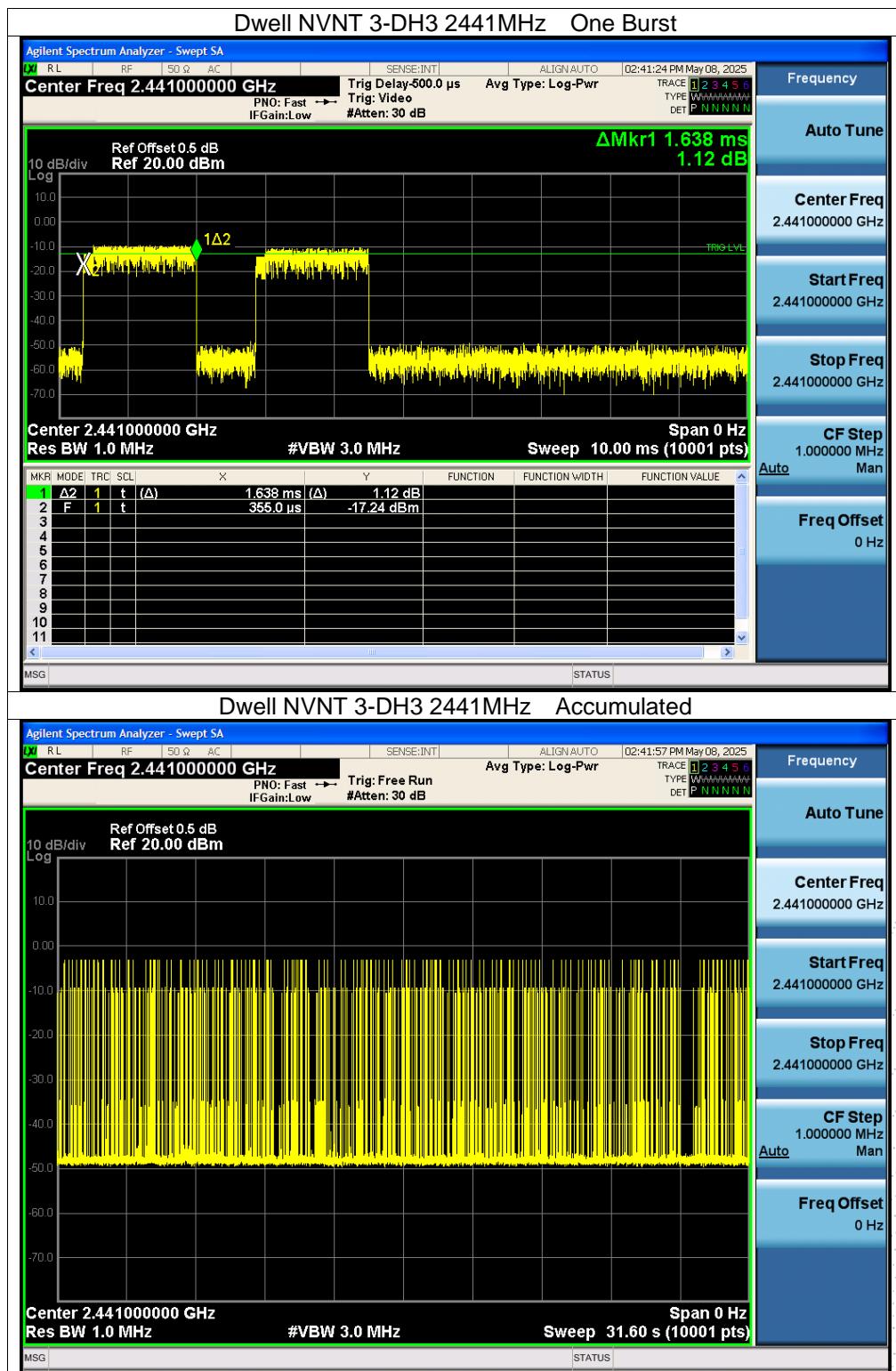


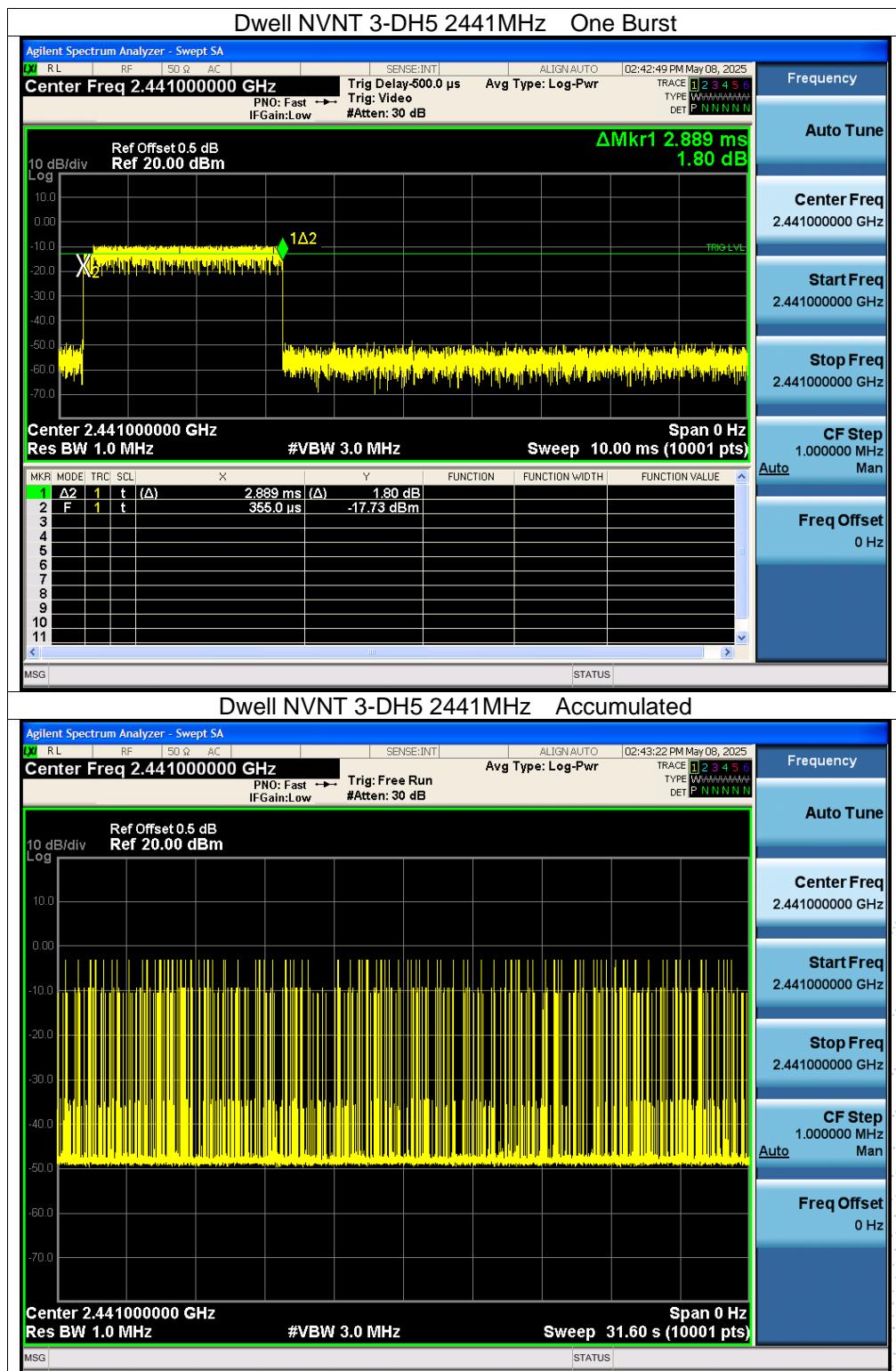












## 15. Antenna Requirement

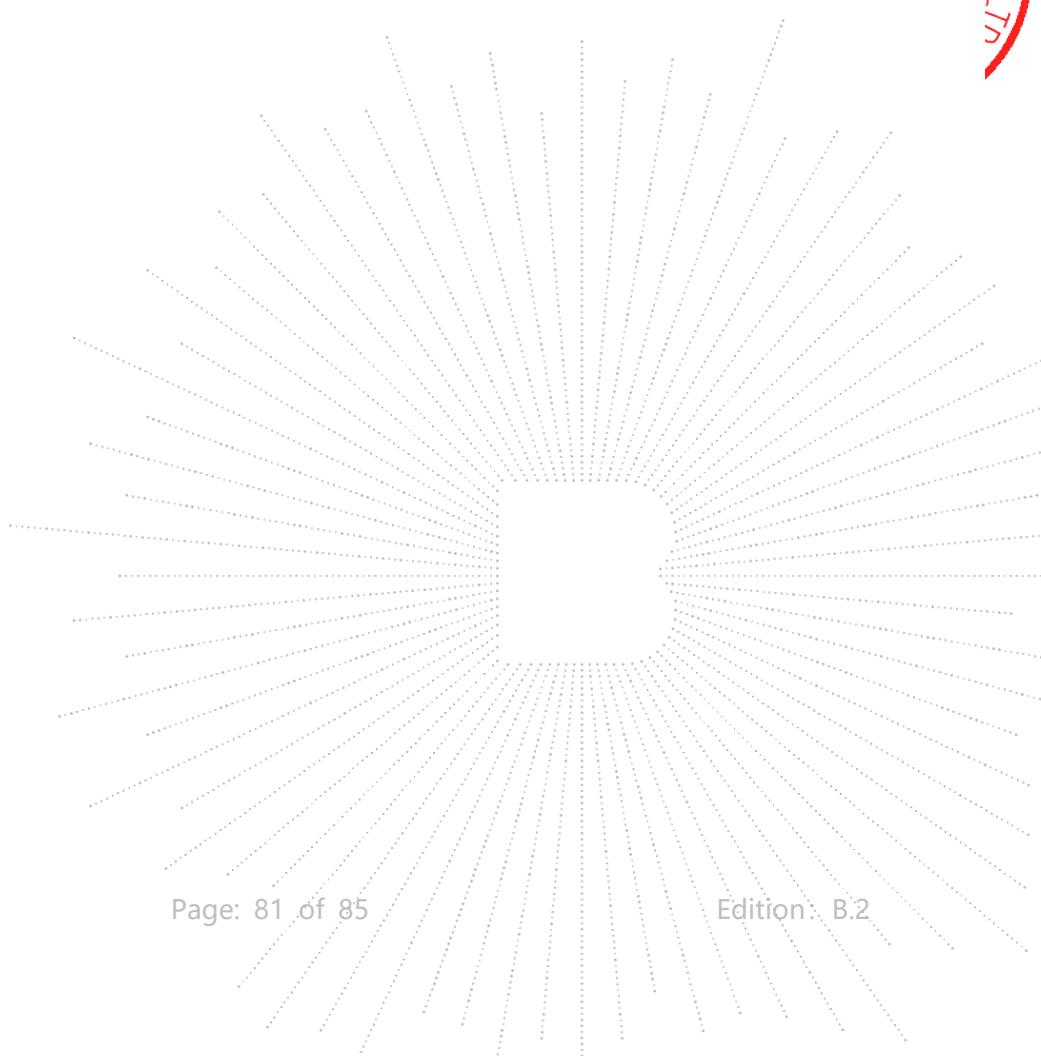
### 15.1 Limit

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.

### 15.2 Test Result

The EUT antenna is Internal antenna, fulfill the requirement of this section.

2017/02/22



## 16. EUT Photographs

**EUT Photo 1**



**EUT Photo 2**



NOTE: Appendix-Photographs Of EUT Constructional Details.

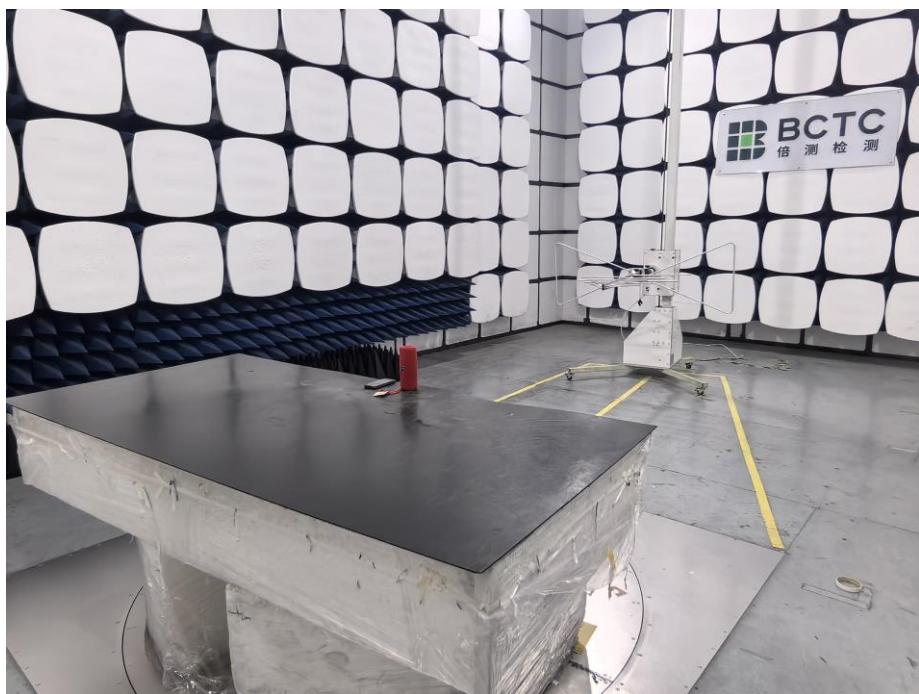


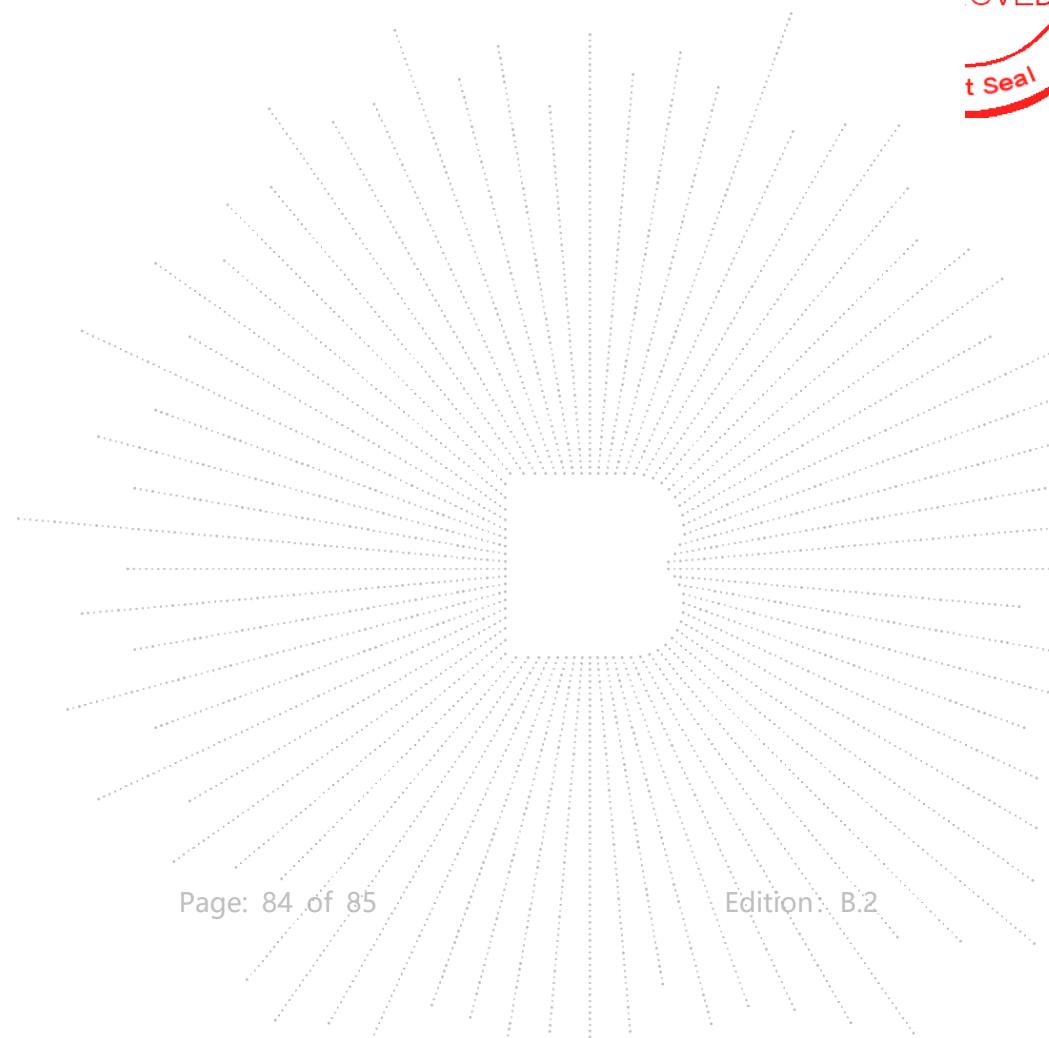
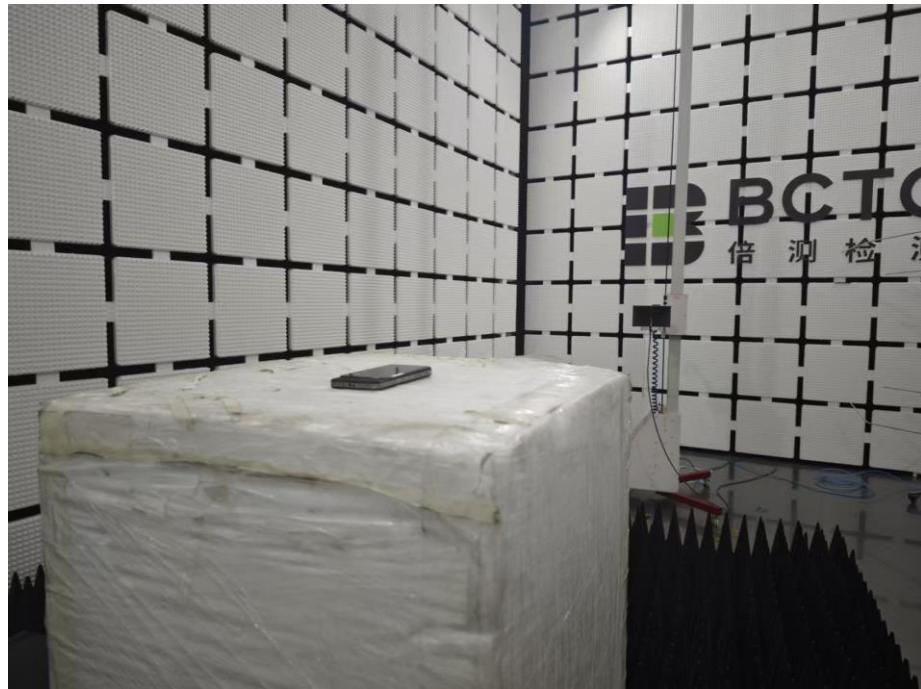
## 17. EUT Test Setup Photographs

### 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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