CFS NVNT 1-DH1 2480MHz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.478 826 GHz	-5.251 dBm			
2	N	1	f	2.479 826 GHz	-5.208 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

CFS NVNT 2-DH1 2402MHz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.401 828 GHz	-6.633 dBm			
2	N	1	f	2.402 828 GHz	-6.665 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

CFS NVNT 2-DH1 2441MHz

Agilent Spectrum Analyzer - Swept SA

R L | RF | 50 Ω | AC | SENSE:INT | ALIGN AUTO | 09:22:25 PM Jun 29, 2023

Center Freq 2.441500000 GHz

PNO: Wide **Trig: Free Run** #Avg Type: RMS TRACE 1 2 3 4 5 6
IFGain:Low #Atten: 30 dB Avg|Hold:>100/100 TYPE M W W W W W
DET P N N N N N

Ref Offset 2.36 dB **Mkr1 2.440 826 GHz**
10 dB/div **Ref 20.00 dBm** **-5.799 dBm**
Log

10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.441500 GHz **Span 2.000 MHz**
#Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.440 826 GHz	-5.799 dBm			
2	N	1	f	2.441 826 GHz	-5.772 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG | STATUS

CFS NVNT 2-DH1 2480MHz

Agilent Spectrum Analyzer - Swept SA

R L | RF | 50 Ω | AC | SENSE:INT | ALIGN AUTO | 09:23:56 PM Jun 29, 2023

Center Freq 2.479500000 GHz

PNO: Wide **Trig: Free Run** #Avg Type: RMS TRACE 1 2 3 4 5 6
IFGain:Low #Atten: 30 dB Avg|Hold:>100/100 TYPE M W W W W W
DET P N N N N N

Ref Offset 2.4 dB **Mkr1 2.478 826 GHz**
10 dB/div **Ref 20.00 dBm** **-5.313 dBm**
Log

10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.479500 GHz **Span 2.000 MHz**
#Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.478 826 GHz	-5.313 dBm			
2	N	1	f	2.479 828 GHz	-5.289 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG | STATUS

CFS NVNT 3-DH1 2402MHz

CFS NVNT 3-DH1 2441MHz

CFS NVNT 3-DH1 2480MHz

Agilent Spectrum Analyzer - Swept SA

R L   RF   50 Ω   AC   SENSE:INT   ALIGN AUTO   09:28:59 PM Jun 29, 2023

Center Freq 2.479500000 GHz

PNO: Wide   Trig: Free Run   #Avg Type: RMS
IFGain:Low   #Atten: 30 dB   Avg|Hold:>100/100

TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P N N N N N

Ref Offset 2.4 dB
Ref 20.00 dBm
10 dB/div
Log

Mkr1 2.478 824 GHz
-5.412 dBm

10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.479500 GHz   Span 2.000 MHz
#Res BW 30 kHz   #VBW 100 kHz   Sweep 2.133 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.478 824 GHz	-5.412 dBm			
2	N	1	f	2.479 826 GHz	-5.352 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG   STATUS

13. Number Of Hopping Frequency

13.1 Block Diagram Of Test Setup
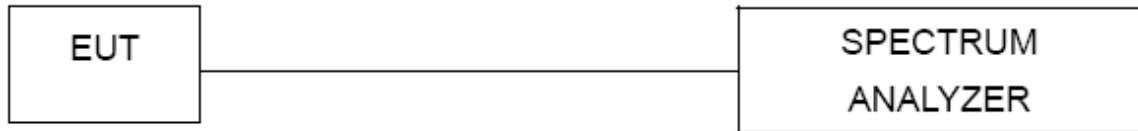
13.2 Limit

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 = 100kHz. VBW = 300kHz. 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

Test Graphs
Hopping No. NVNT 1-DH1 2441MHz

Hopping No. NVNT 2-DH1 2441MHz

Hopping No. NVNT 3-DH1 2441MHz

Agilent Spectrum Analyzer - Swept SA

R L   RF   50 Ω   AC   SENSE:INT   ALIGN AUTO   09:39:11 PM Jun 29, 2023

Center Freq 2.441750000 GHz

PNO: Fast   Trig: Free Run   #Avg Type: RMS   TRACE 1 2 3 4 5 6
IFGain:Low   #Atten: 30 dB   Avg|Hold:>100/100   TYPE M W W W W W
   DET P N N N N N

Ref Offset 2.36 dB
Ref 20.00 dBm   Mkr1 2.401 670 0 GHz
10 dB/div   -8.793 dBm
Log

Start 2.40000 GHz   Stop 2.48350 GHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 8.000 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.401 670 0 GHz	-8.793 dBm			
2	N	1	f	2.480 327 0 GHz	-8.581 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG   STATUS

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

DH5 Packet permit maximum 1600 / 79 / 6   hops per second in each channel
(5 time slots RX, 1 time slot TX).
DH3 Packet permit maximum 1600 / 79 / 4   hops per second in each channel
(3 time slots RX, 1 time slot TX).
DH1 Packet permit maximum 1600 / 79 /2   hops per second in each channel
(1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5:1600/79/6*0.4*79*(MkrDelta)/1000
DH3:1600/79/4*0.4*79*(MkrDelta)/1000
DH1:1600/79/2*0.4*79*(MkrDelta)/1000
Remark: Mkr Delta is once pulse time.

Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (s)	Limit (s)	Verdict
NVNT	1-DH1	2441	0.375	0.120	0.4	Pass
NVNT	1-DH3	2441	1.631	0.261	0.4	Pass
NVNT	1-DH5	2441	2.88	0.307	0.4	Pass
NVNT	2-DH1	2441	0.385	0.123	0.4	Pass
NVNT	2-DH3	2441	1.636	0.262	0.4	Pass
NVNT	2-DH5	2441	2.884	0.308	0.4	Pass
NVNT	3-DH1	2441	0.386	0.124	0.4	Pass
NVNT	3-DH3	2441	1.636	0.262	0.4	Pass
NVNT	3-DH5	2441	2.887	0.308	0.4	Pass

Test Graphs
Dwell NVNT 1-DH1 2441MHz   One Burst

Dwell NVNT 1-DH3 2441MHz   One Burst

Dwell NVNT 1-DH5 2441MHz   One Burst

Dwell NVNT 2-DH1 2441MHz   One Burst

Dwell NVNT 2-DH3 2441MHz   One Burst

Dwell NVNT 2-DH5 2441MHz　One Burst

Dwell NVNT 3-DH1 2441MHz　One Burst

Dwell NVNT 3-DH3 2441MHz   One Burst

Dwell NVNT 3-DH5 2441MHz   One Burst
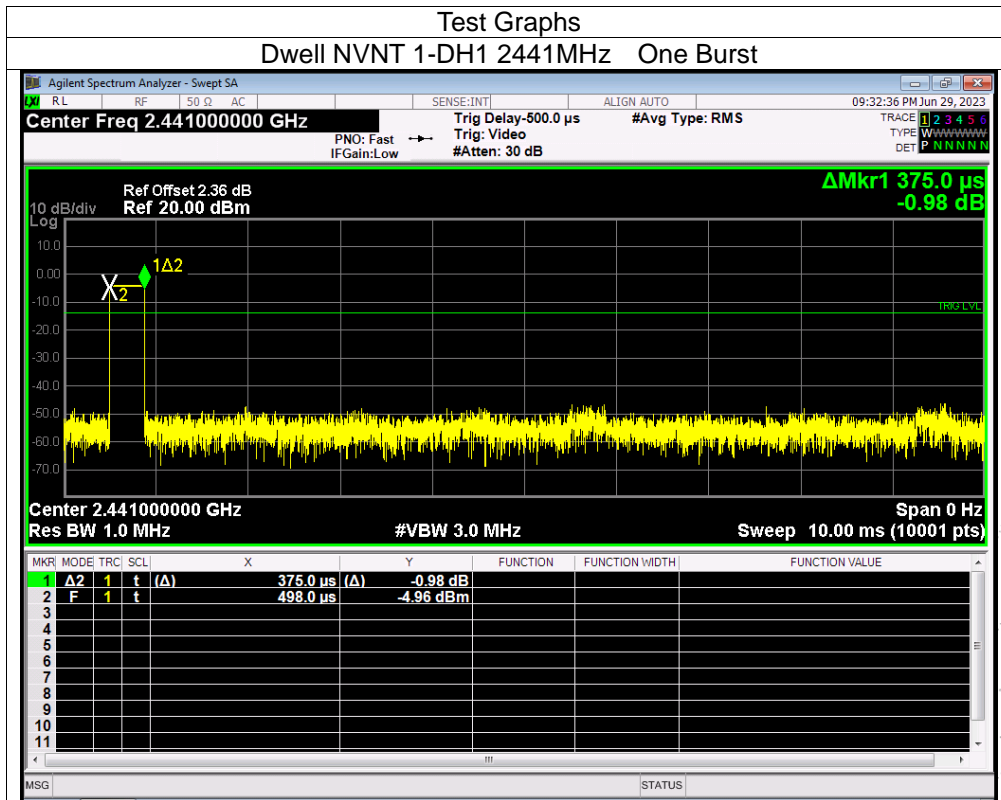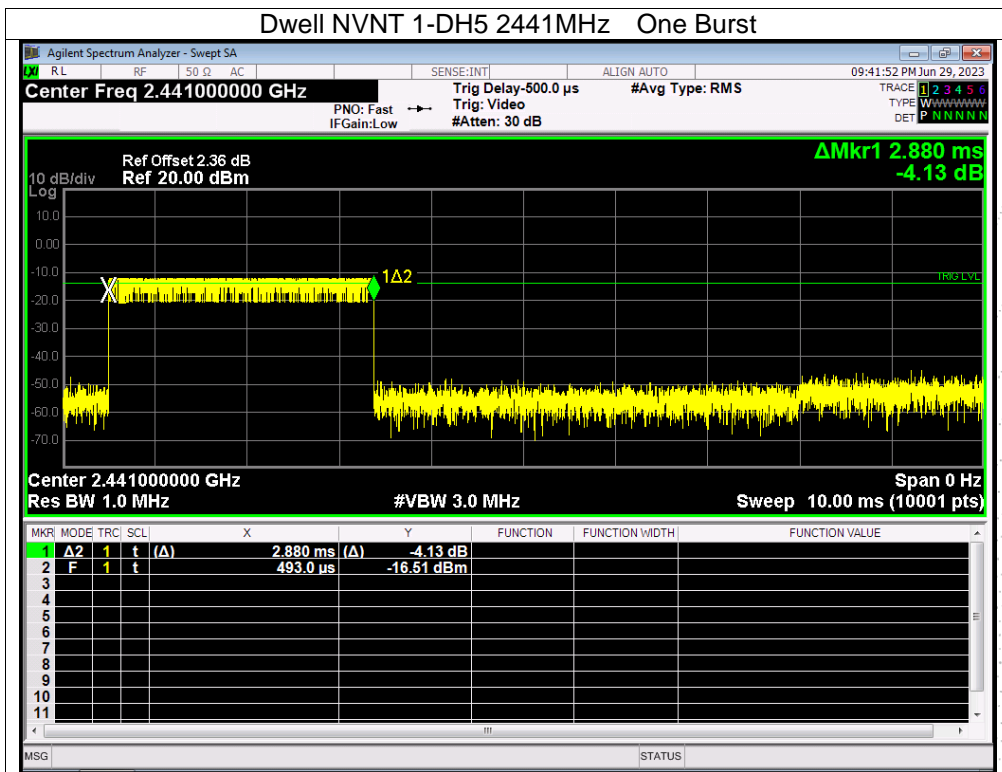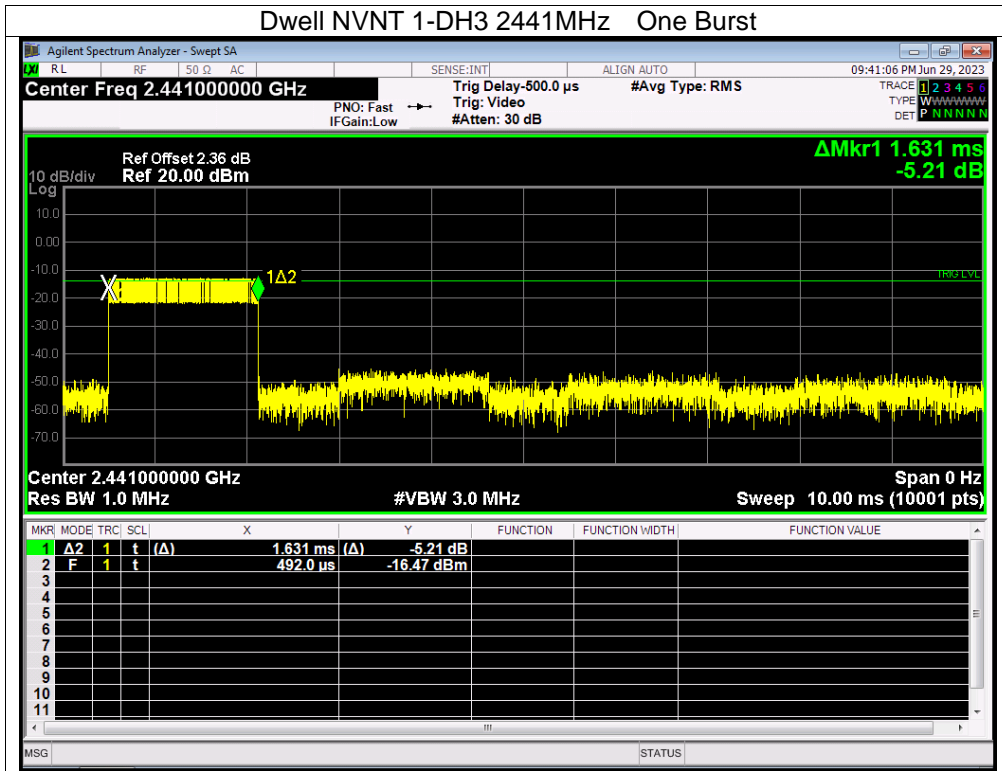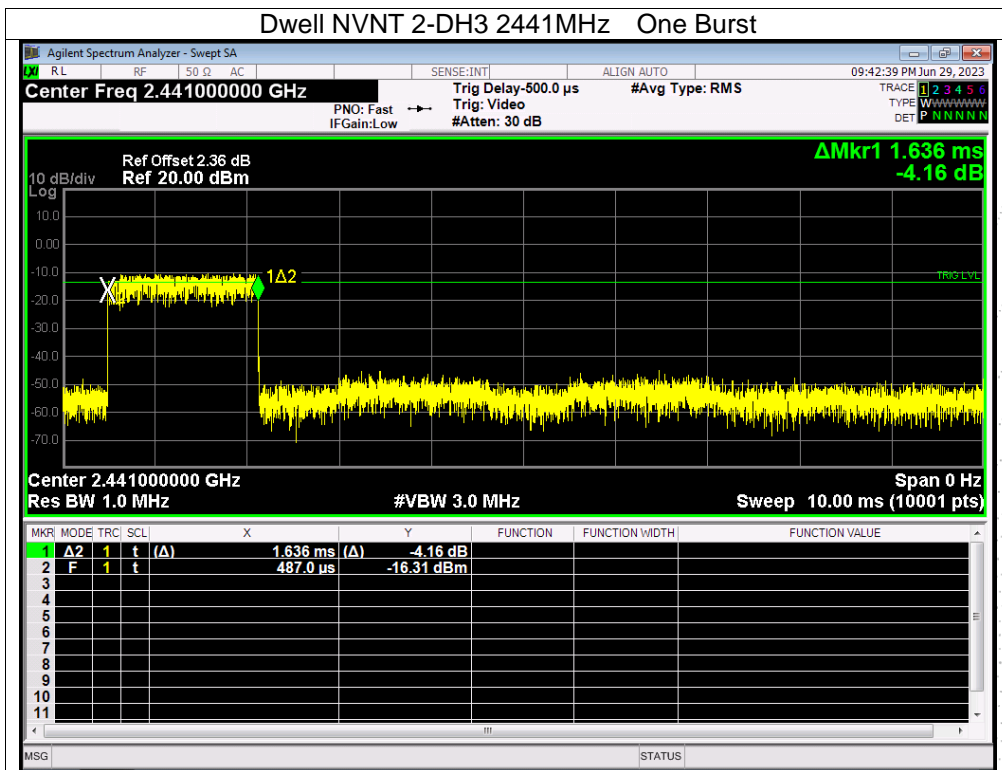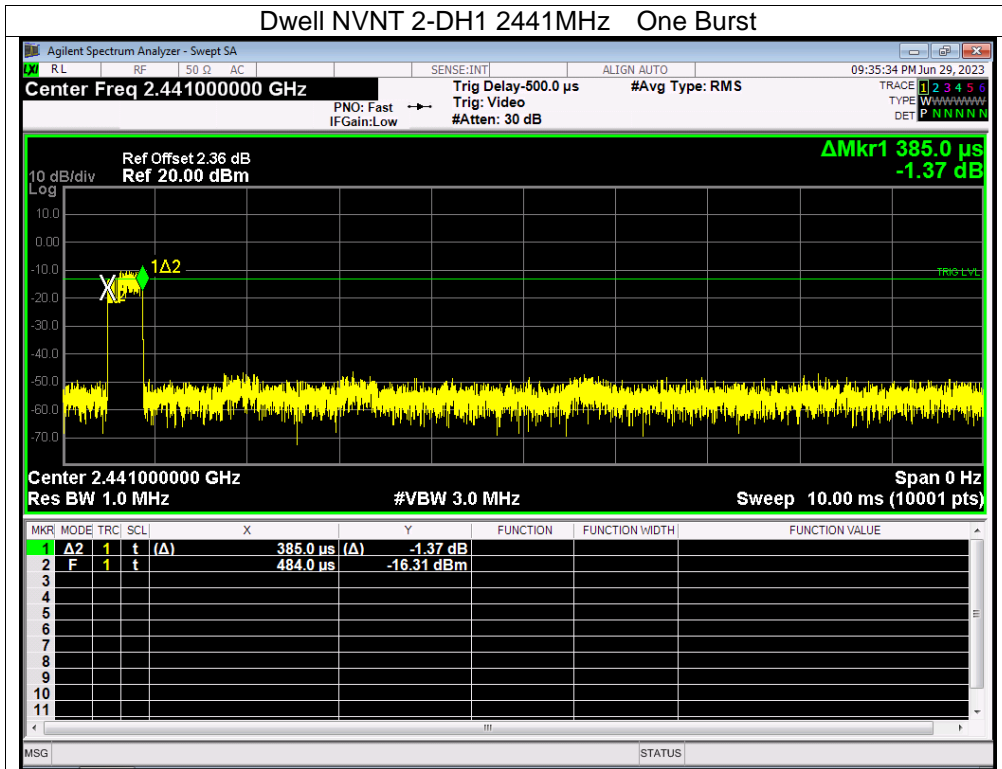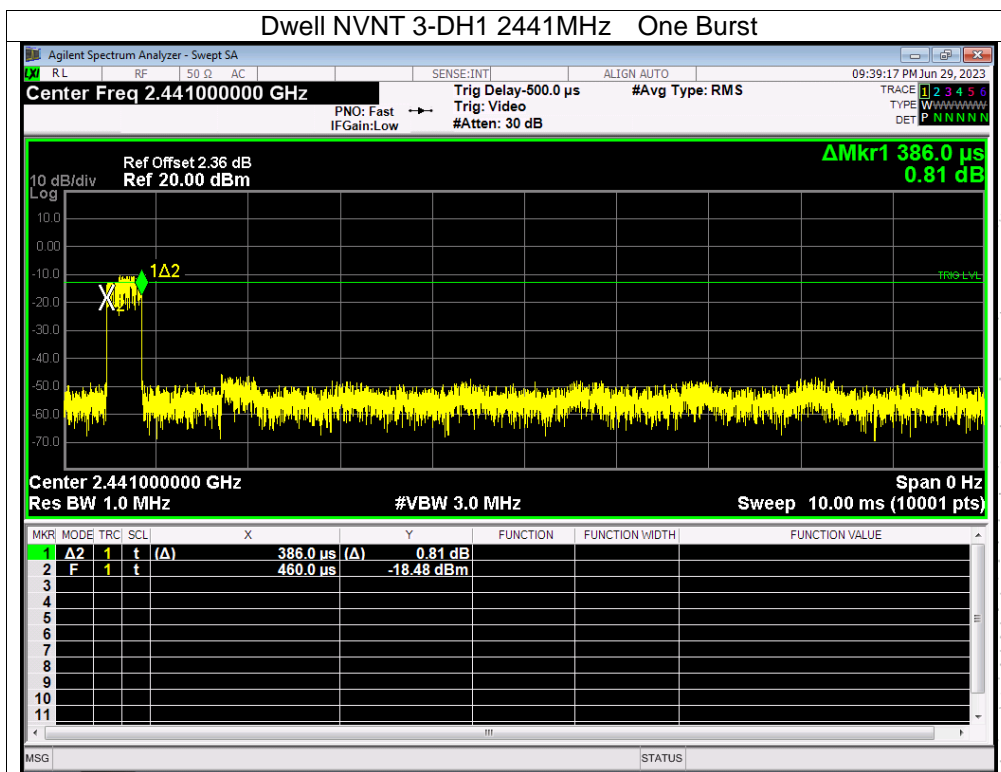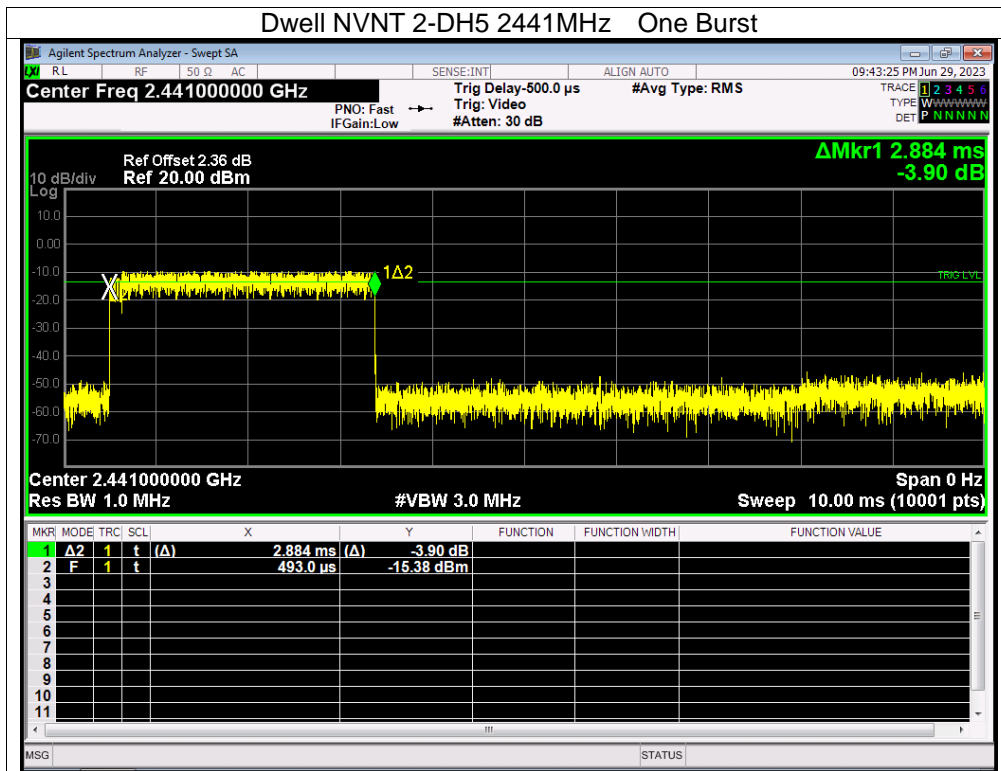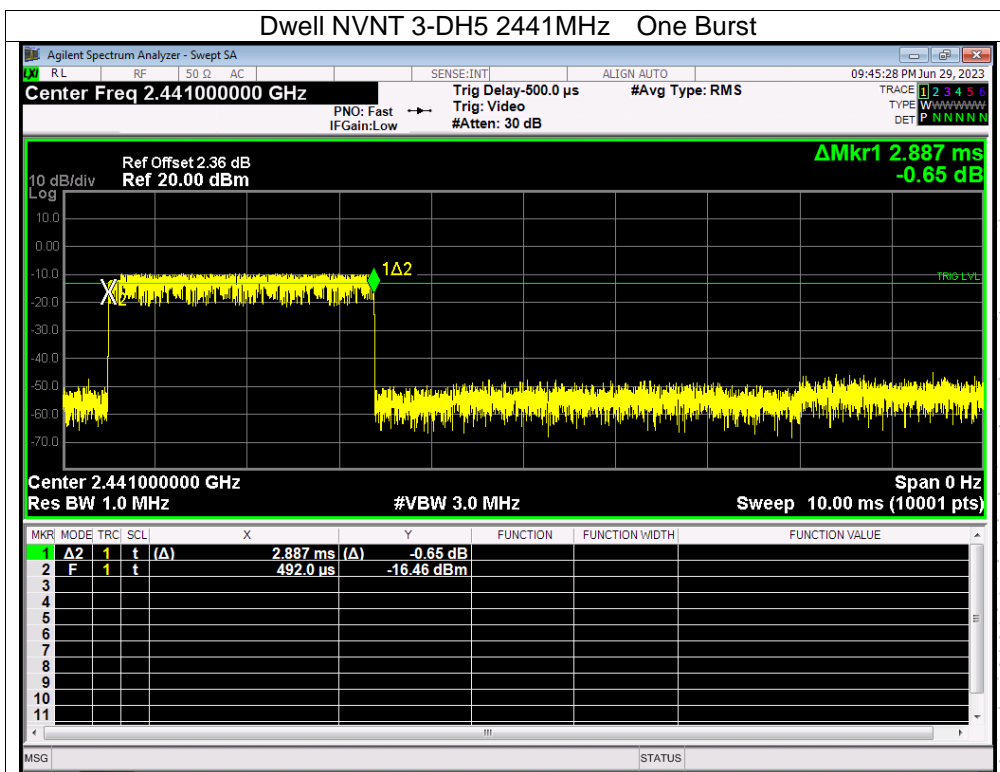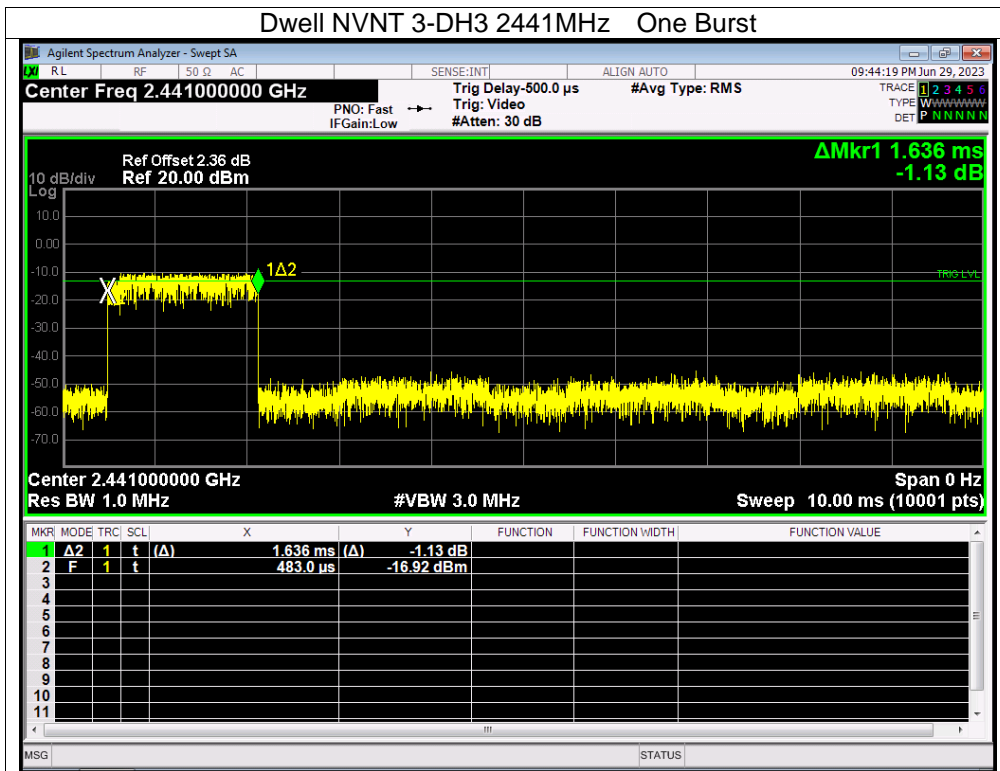
15.   Antenna Requirement

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 PCB antenna, fulfill the requirement of this section.
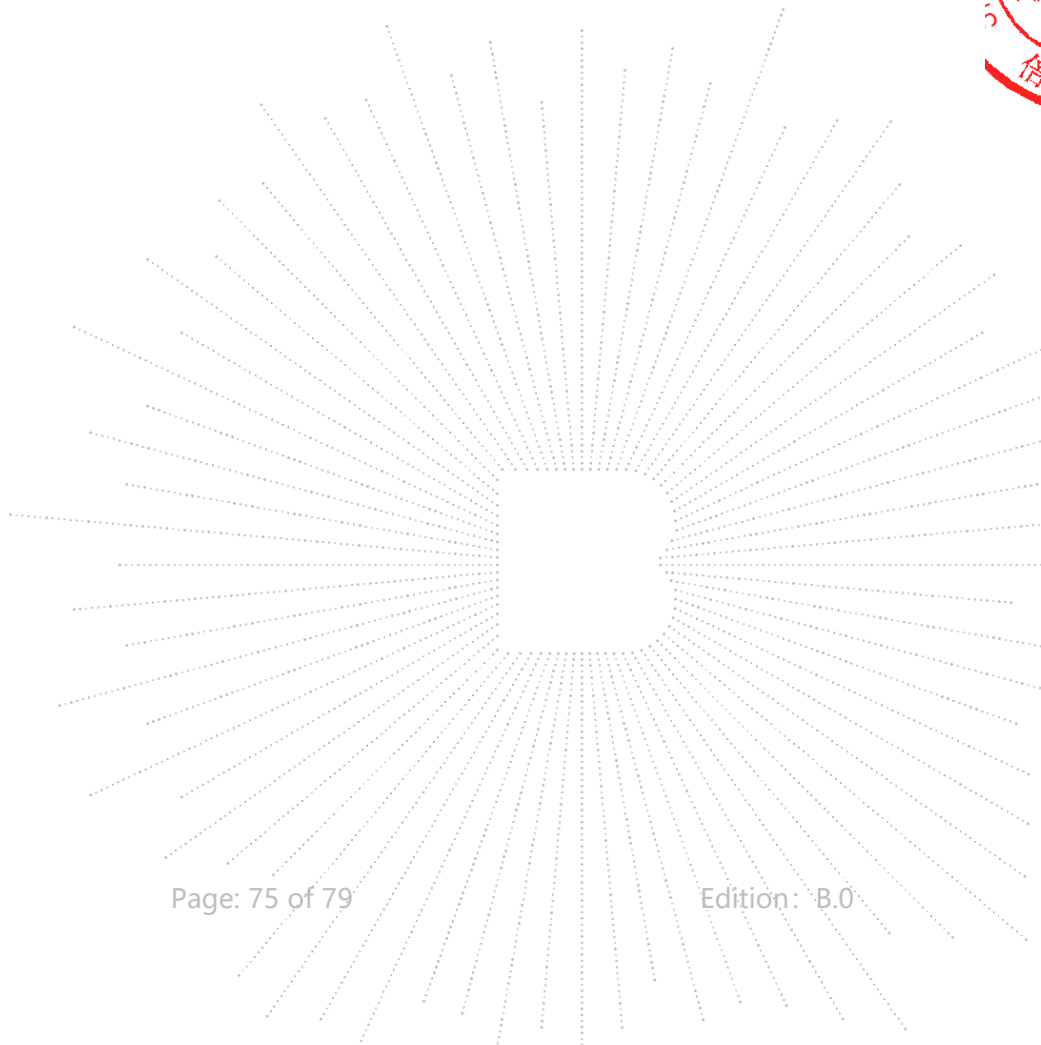
16. EUT Photographs

EUT Photo 1
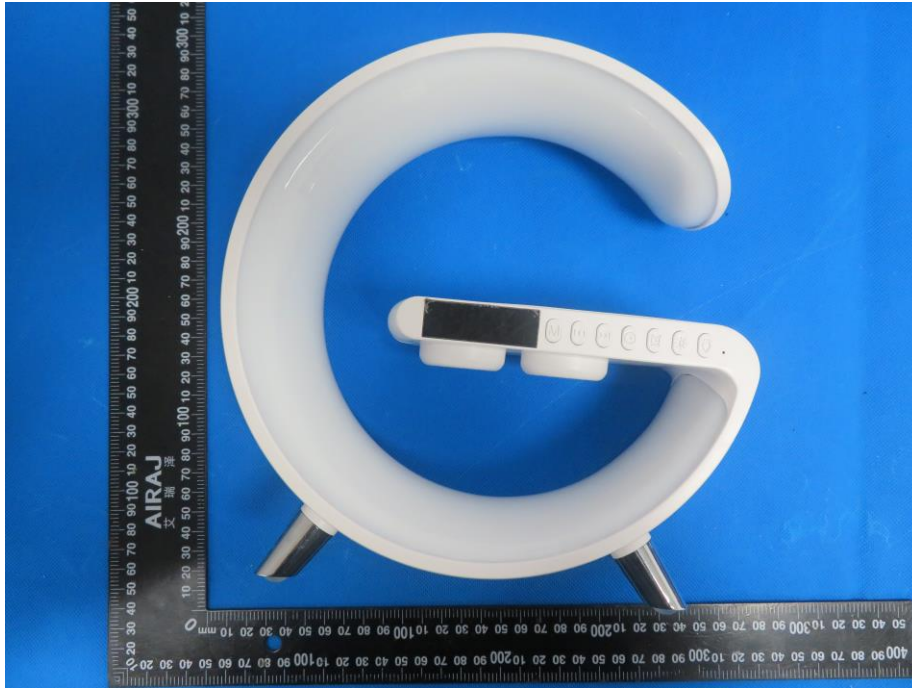
EUT Photo 2

17. EUT Test Setup Photographs

Conducted Measurement Photo

Radiated Measurement Photos
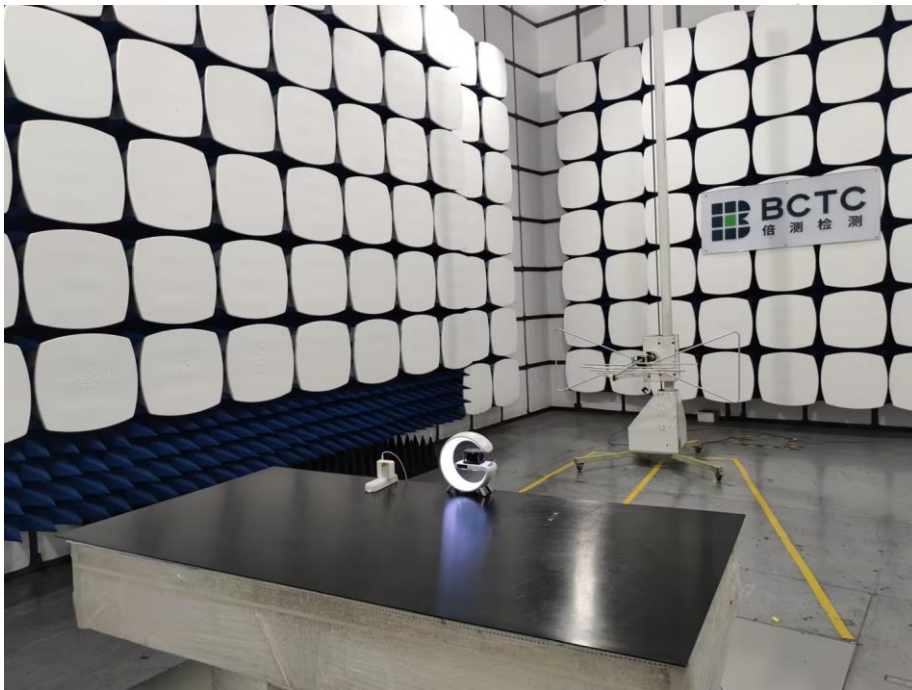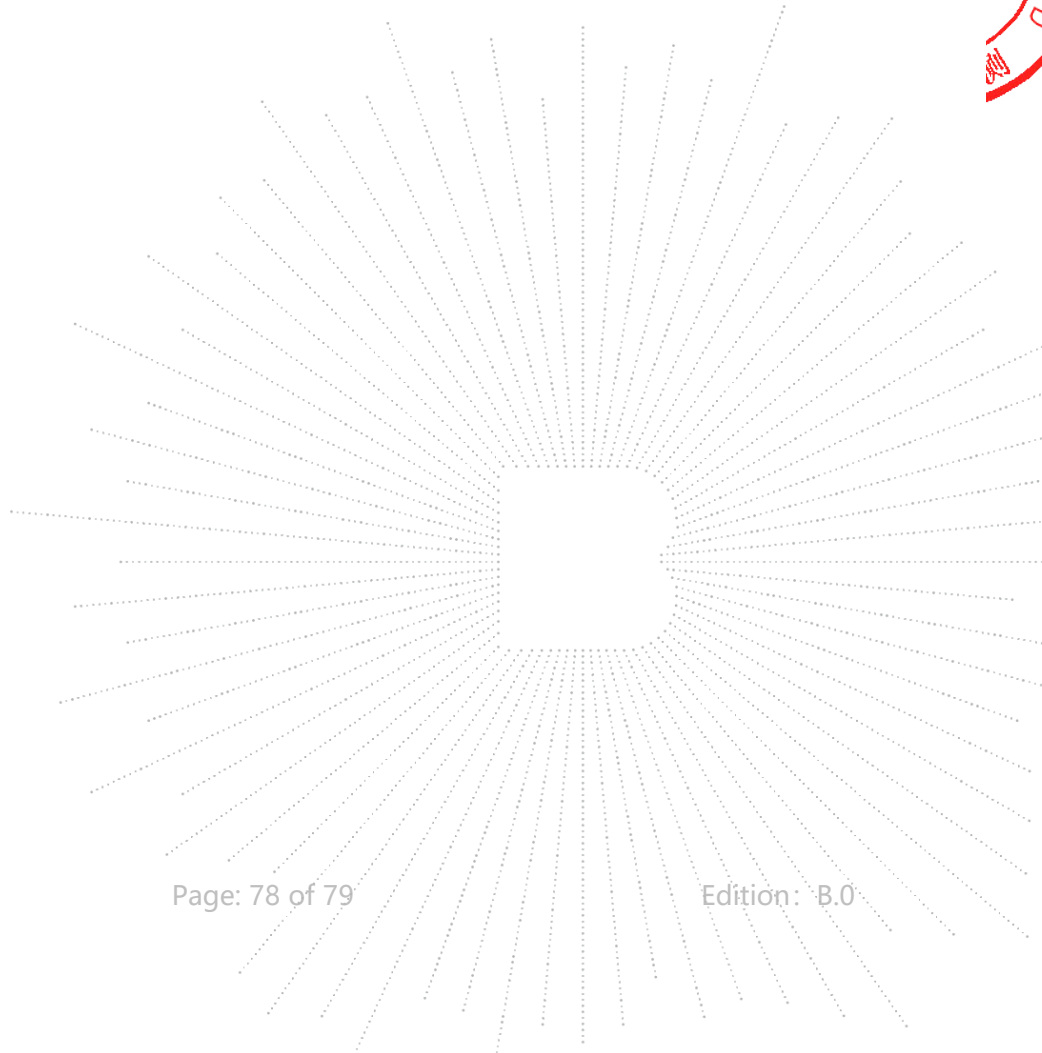
STATEMENT

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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E-Mail：bctc@bctc-lab.com.cn

※※※※※ **END** ※※※※※