



FCC - TEST REPORT

Report Number : **709502505392-00B** Date of Issue: August 13, 2025

Model : CE220818

Product Type : Wireless Headphones

Applicant : Balco Brands Pty Ltd

Address : C/ siemens Building Ground Floor 885 Mountain Hwy Bayswater Victoria, 3153 Australia

Production Facility : Shenzhen Qiateng Electronics Co., Ltd

Address : 1402, Chuangzhi Industrial Building, 1 Ying'ai Road, Dalang Street, Longhua District, Shenzhen, Guangdong Sheng, China

Test Result : **Positive Negative**

Total pages including Appendices : 83

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2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
709502505392-00B	First Issue	08/12/2025

3 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
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FCC Registration No.: 820234

FCC Designation Number: CN1183

ISED CAB identifier CN0101

IC Registration No.: 31668



4 Description of the Equipment Under Test

Product: Wireless Headphones
 Model no.: CE220818
 FCC ID: 2BNW2-CE220818
 Options and accessories: USB Cable, Audio cable
 Rating: USB input 5V DC,500mA; Internal rechargeable lithium battery:3.7V DC
 RF Transmission Frequency:
 No. of Operated Channel: 2402~2480MHz

Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	79	

Modulation: GFSK, $\pi/4$ -DQPSK, 8DPSK
 Antenna Type: Onboard PCB antenna
 Antenna Gain: 0.42dBi
 Hardware version: V1.0
 Software version: 1.3.8
 Description of the EUT: The Equipment Under Test (EUT) was a Wireless Headphones with classic Bluetooth function.
 Test sample no.: SHA-929061-2 (Radiated sample); SHA-929061-3 (Conducted sample)

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain or any information supplied



5 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2023 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.



6 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart		Pages	Test Site	Test Result		
Test Condition				Pass	Fail	N/A
§15.207	Conducted emission AC power port	10-15	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247 (b) (1)	Conducted peak output power	16-20	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)	20dB bandwidth Bandwidth	21-24	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)	Carrier frequency separation	25-26	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)(iii)	Number of hopping frequencies	27-28	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)(iii)	Dwell Time - Average Time of Occupancy	29-31	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(e)	Power spectral density	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(e)	Spurious RF conducted emissions	32-35	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	Band edge	36-48	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	49-79	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203	Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses a onboard PCB antenna, which gain is 0.42dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.



7 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2BNW2-CE220818, complies with Section 15.205, 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

- Performed

- **Not** Performed

The Equipment Under Test

- **Fulfills** the general approval requirements.

- **Does not** fulfill the general approval requirements.

Sample Received Date: June 20, 2025

Testing Start Date: June 24, 2025

Testing End Date: August 9, 2025

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:

Tested by:

Hui TONG



Hui TONG
Review Engineer

Jiaxi XU

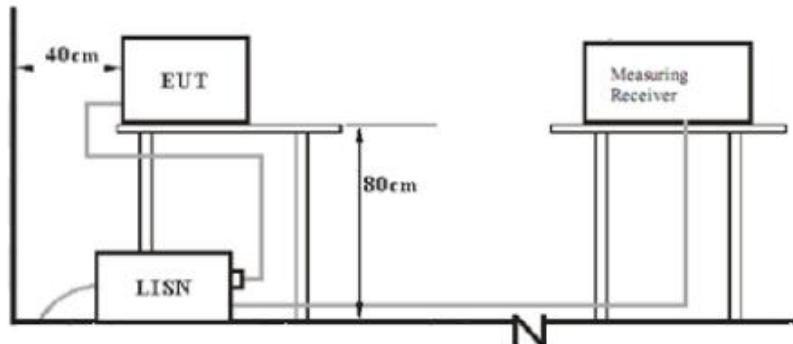
Jiaxi XU
Project Engineer

Doujun XU

Doujun XU
Test Engineer

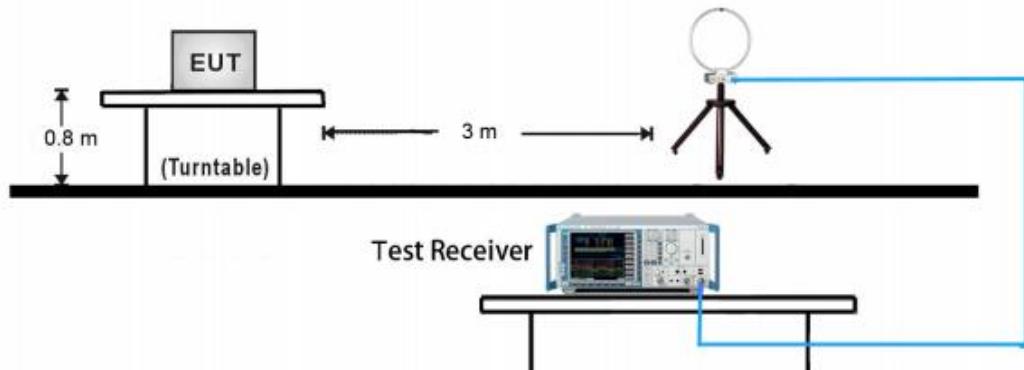
8 Test Setups

8.1 AC Power Line Conducted Emission test setups

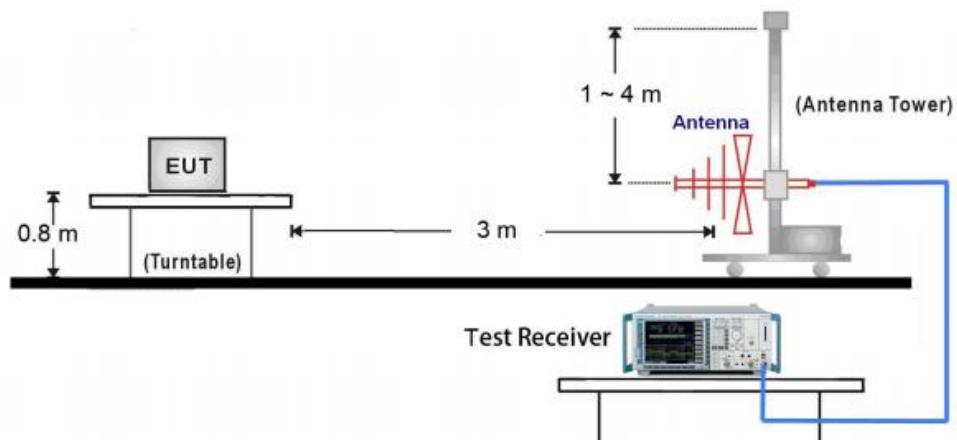


8.2 Radiated test setups

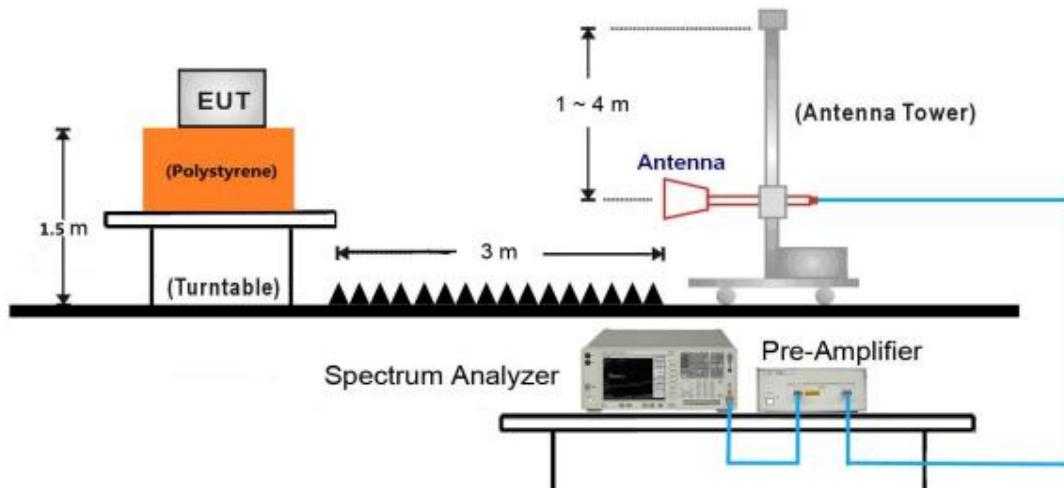
9kHz ~ 30MHz Test Setup:



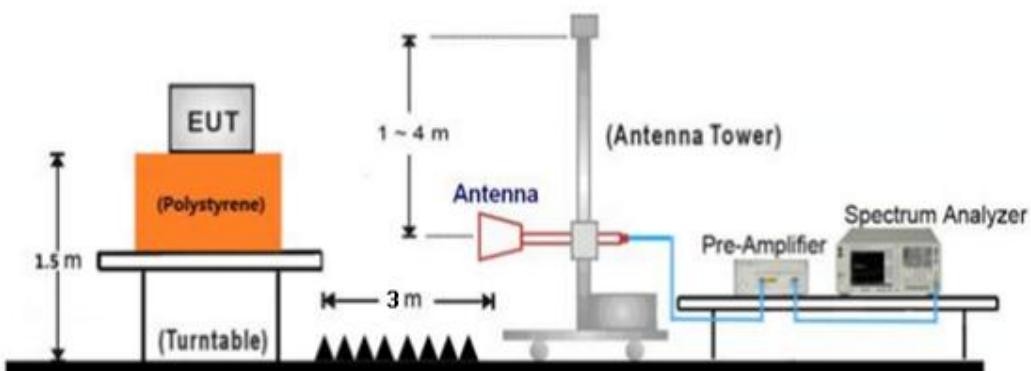
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



18GHz ~ 25GHz Test Setup:



8.3 Conducted RF test setups





9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	E470	PF-OU5TS7 17/09
Adaptor	--	TPA-67B050100VU01	--

Test software: FCC_assist_1.0.2.2, which used to control the EUT in continues transmitting mode.

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Mode	Tested Channel	Modulation	Index Value (Power level setting)
DH5	0	GFSK	10
	40	GFSK	10
	78	GFSK	10
2DH5	0	$\pi/4$ -DQPSK	10
	40	$\pi/4$ -DQPSK	10
	78	$\pi/4$ -DQPSK	10
3DH5	0	8DPSK	10
	40	8DPSK	10
	78	8DPSK	10

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power



10 Technical Requirement

10.1 Conducted Emission

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.



Conducted Emission

150k-30MHz Conducted Emission Test

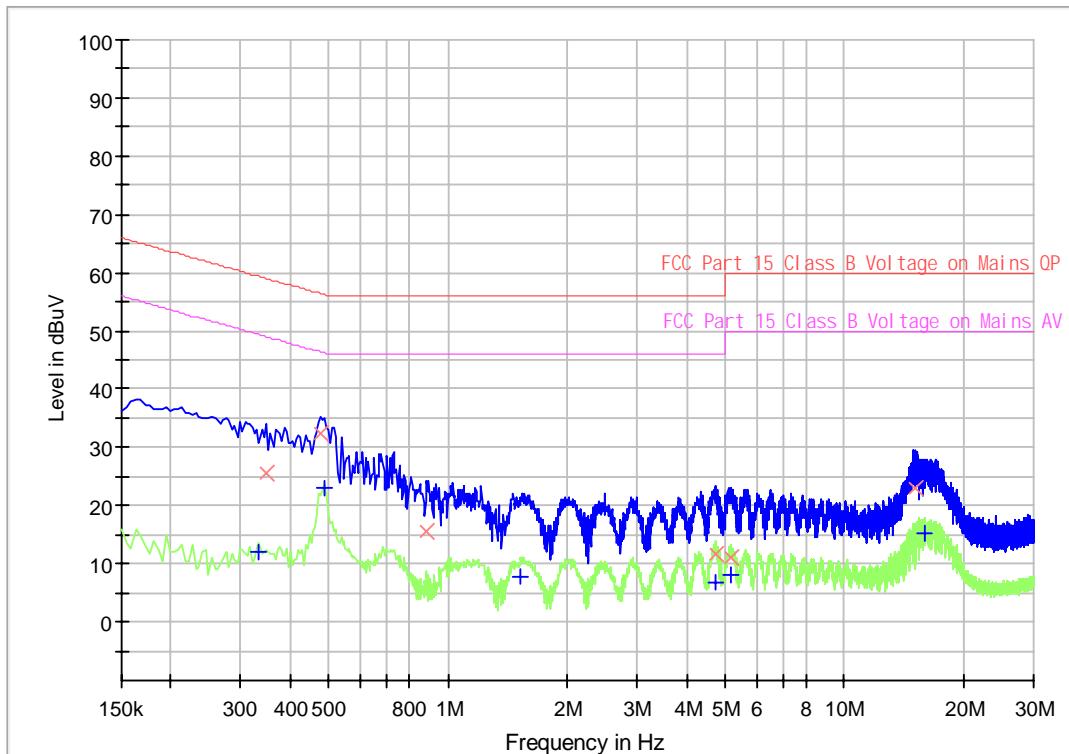
EUT Information

EUT Name: Wireless Headphones
 Model: CE220818
 Client: Balco Brands Pty Ltd
 Op Cond: Charging and TX_2402MHz at GFSK mode
 Operator: Doujun XU
 Test Spec: FCC 15.207 (a)
 Comment: Phase L
 Sample No: SHA-929061-2

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
 Receiver: [ESR 3]
 Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.02 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB





Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.334500	---	12.05	49.34	37.29	1000.0	9.000	L1	19.5
0.348000	25.75	---	59.01	33.26	1000.0	9.000	L1	19.5
0.478500	32.49	---	56.37	23.88	1000.0	9.000	L1	19.5
0.487500	---	23.13	46.21	23.08	1000.0	9.000	L1	19.5
0.883500	15.49	---	56.00	40.51	1000.0	9.000	L1	19.5
1.518000	---	7.92	46.00	38.08	1000.0	9.000	L1	19.5
4.717500	11.76	---	56.00	44.24	1000.0	9.000	L1	19.6
4.717500	---	6.67	46.00	39.33	1000.0	9.000	L1	19.6
5.154000	---	8.12	50.00	41.88	1000.0	9.000	L1	19.6
5.181000	11.18	---	60.00	48.82	1000.0	9.000	L1	19.6
15.153000	22.90	---	60.00	37.10	1000.0	9.000	L1	19.9
15.945000	---	15.33	50.00	34.67	1000.0	9.000	L1	20.0



150k-30MHz Conducted Emission Test

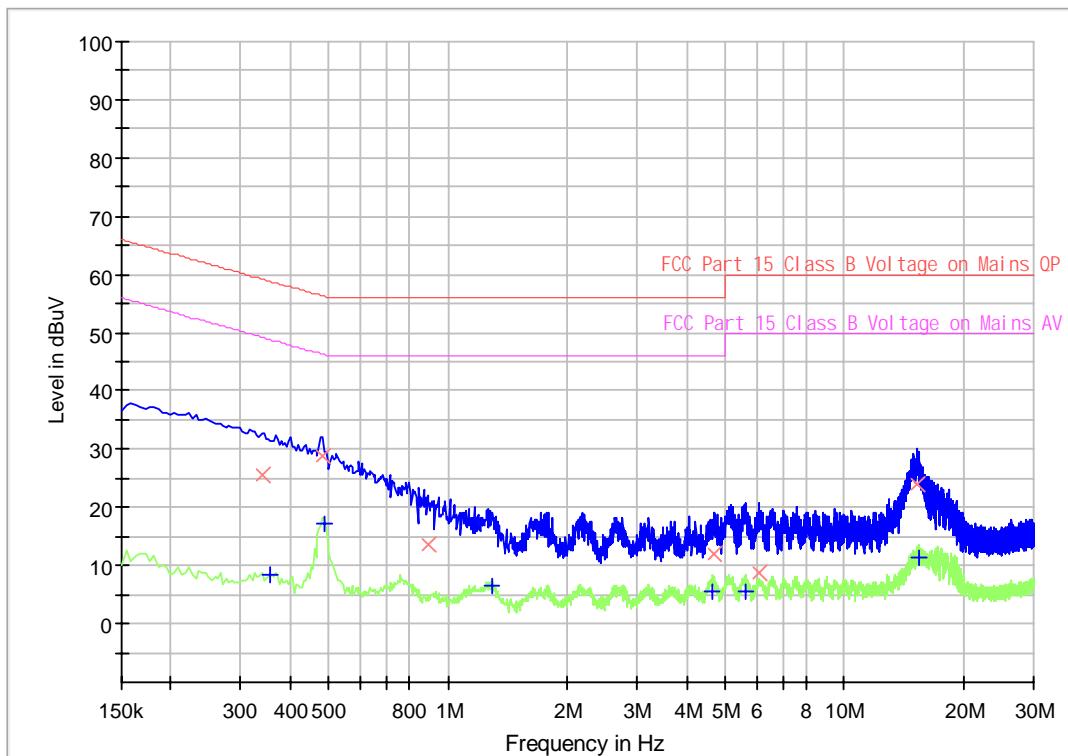
EUT Information

EUT Name: Wireless Headphones
 Model: CE220818
 Client: Balco Brands Pty Ltd
 Op Cond: Charging and TX_2402MHz at GFSK mode
 Operator: Doujun XU
 Test Spec: FCC 15.207 (a)
 Comment: Phase N
 Sample No: SHA-929061-2

Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN
 Receiver: [ESR 3]
 Level Unit: dBuV

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0.02 s	0 dB
150 kHz - 30 MHz	4.5 kHz	PK+; AVG	9 kHz	0.01 s	0 dB





Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.339000	25.54	---	59.23	33.69	1000.0	9.000	N	19.4
0.357000	---	8.29	48.80	40.51	1000.0	9.000	N	19.4
0.483000	28.91	---	56.29	27.38	1000.0	9.000	N	19.5
0.487500	---	17.29	46.21	28.92	1000.0	9.000	N	19.5
0.888000	13.73	---	56.00	42.27	1000.0	9.000	N	19.5
1.297500	---	6.59	46.00	39.41	1000.0	9.000	N	19.5
4.654500	---	5.38	46.00	40.62	1000.0	9.000	N	19.6
4.708500	11.85	---	56.00	44.15	1000.0	9.000	N	19.6
5.622000	---	5.51	50.00	44.49	1000.0	9.000	N	19.6
6.085500	8.91	---	60.00	51.09	1000.0	9.000	N	19.6
15.288000	23.81	---	60.00	36.19	1000.0	9.000	N	19.9
15.450000	---	11.29	50.00	38.71	1000.0	9.000	N	20.0

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)



10.2 Conducted Peak Output Power

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following test receiver settings:
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
RBW > the 20dB bandwidth of the emission being measured, $VBW \geq RBW$,
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power and record the results in the test report.
5. Repeat above procedures until all frequencies measured were complete.

Limits

According to §15.247 (b) (1), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30



Conducted Peak Output Power

Bluetooth Mode GFSK modulation Test Result

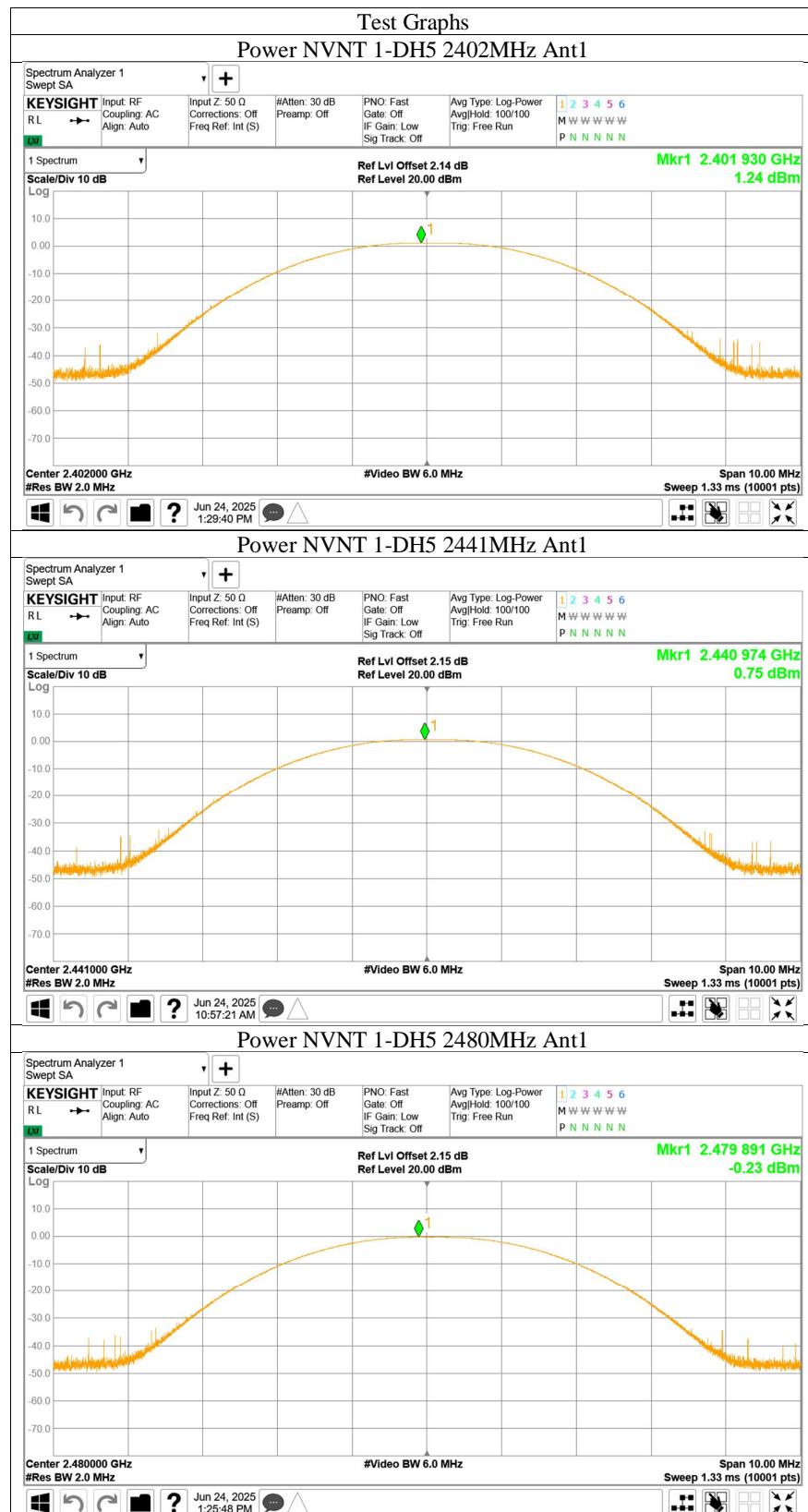
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	1.24	Pass
Middle channel 2441MHz	0.75	Pass
High channel 2480MHz	-0.23	Pass

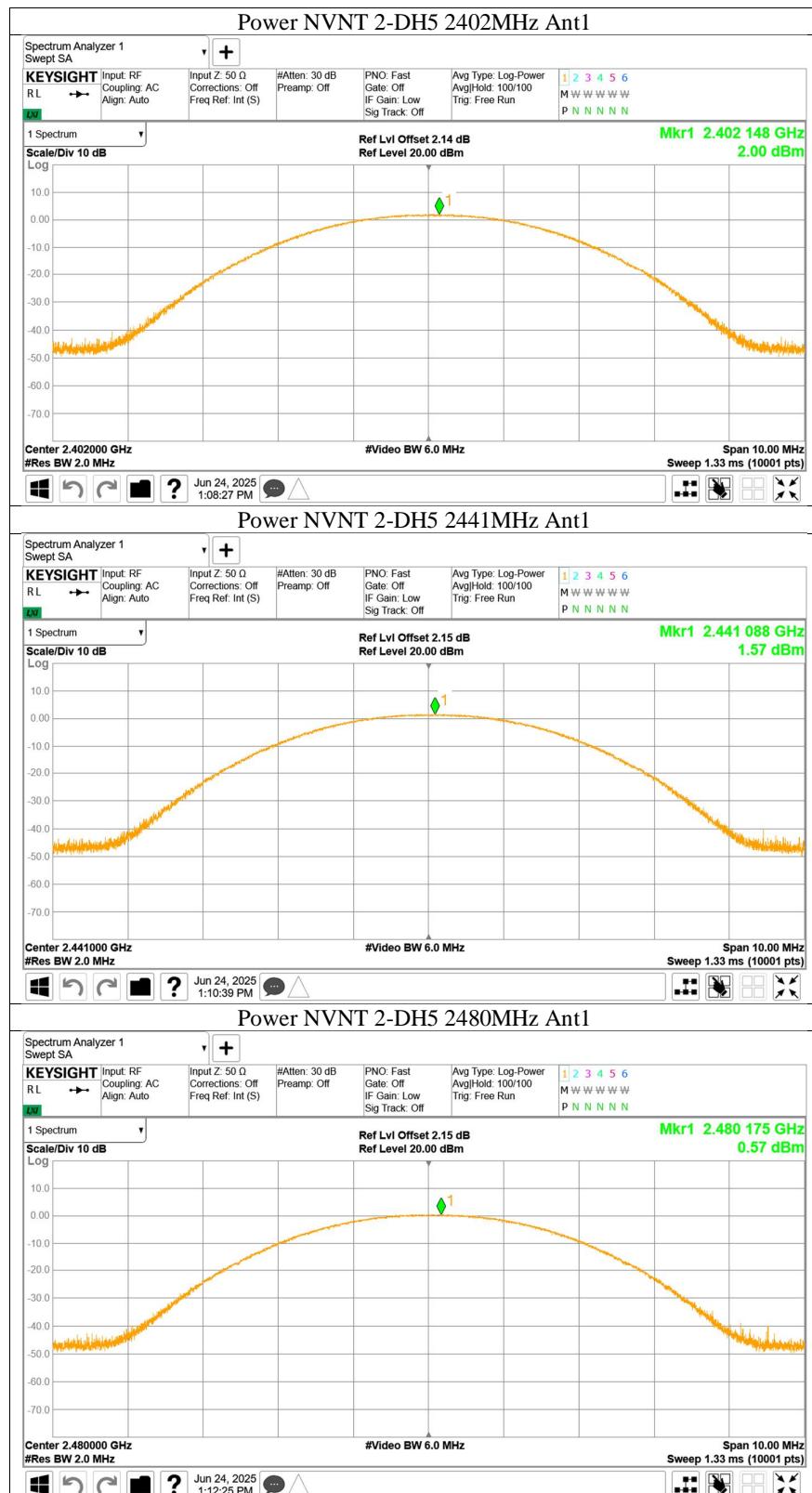
Bluetooth Mode π/4-DQPSK modulation Test Result

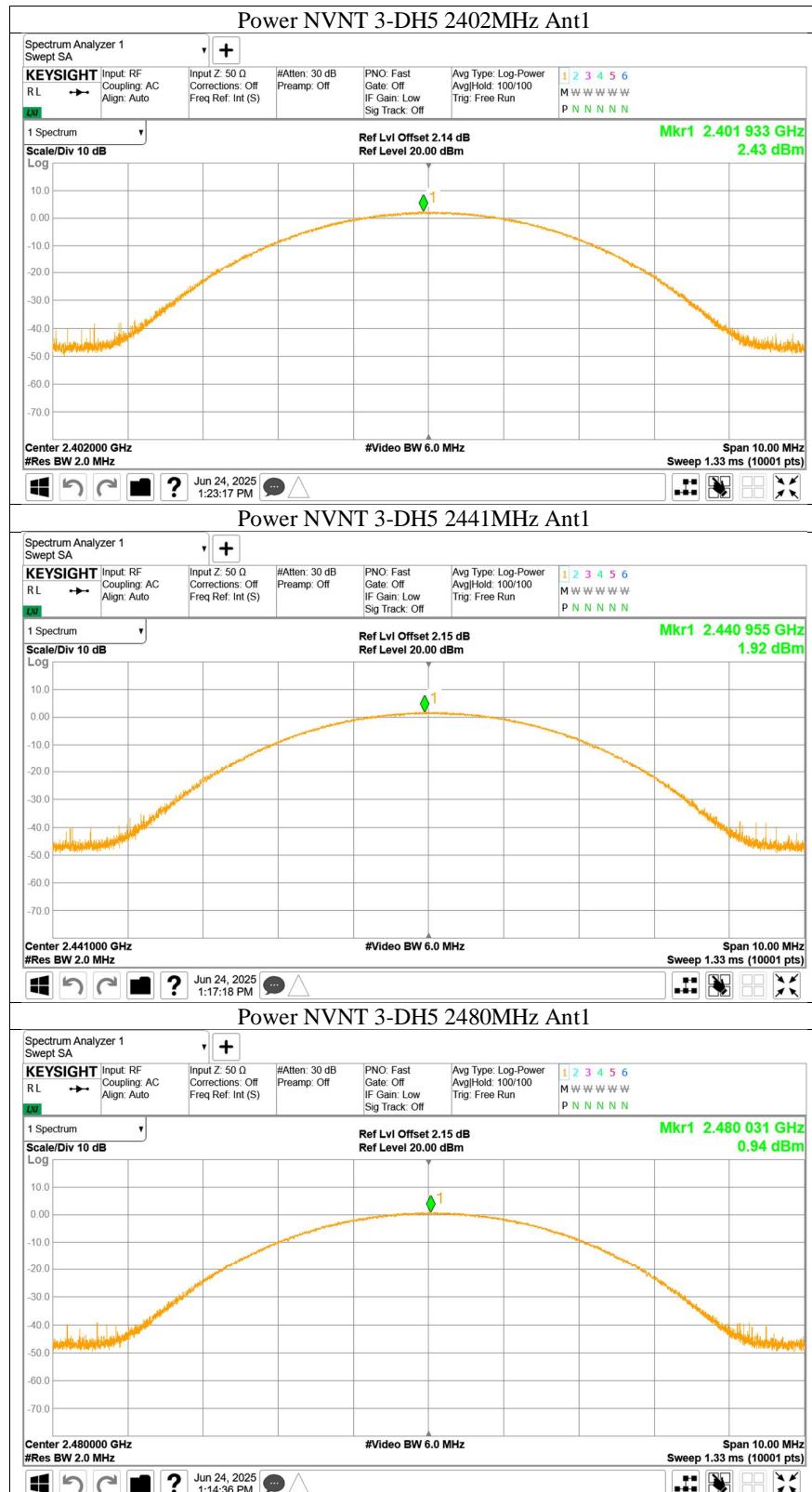
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	2.01	Pass
Middle channel 2441MHz	1.57	Pass
High channel 2480MHz	0.57	Pass

Bluetooth Mode 8DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	2.43	Pass
Middle channel 2441MHz	1.92	Pass
High channel 2480MHz	0.94	Pass









10.3 20 dB bandwidth

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW \geq 1% to 5% of the 20 dB bandwidth/99% OBW, VBW \geq 3RBW,
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB/99% OBW from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

Limit

Limit [kHz]

—
N/A

20 dB bandwidth

Bluetooth Mode GFSK Modulation test result

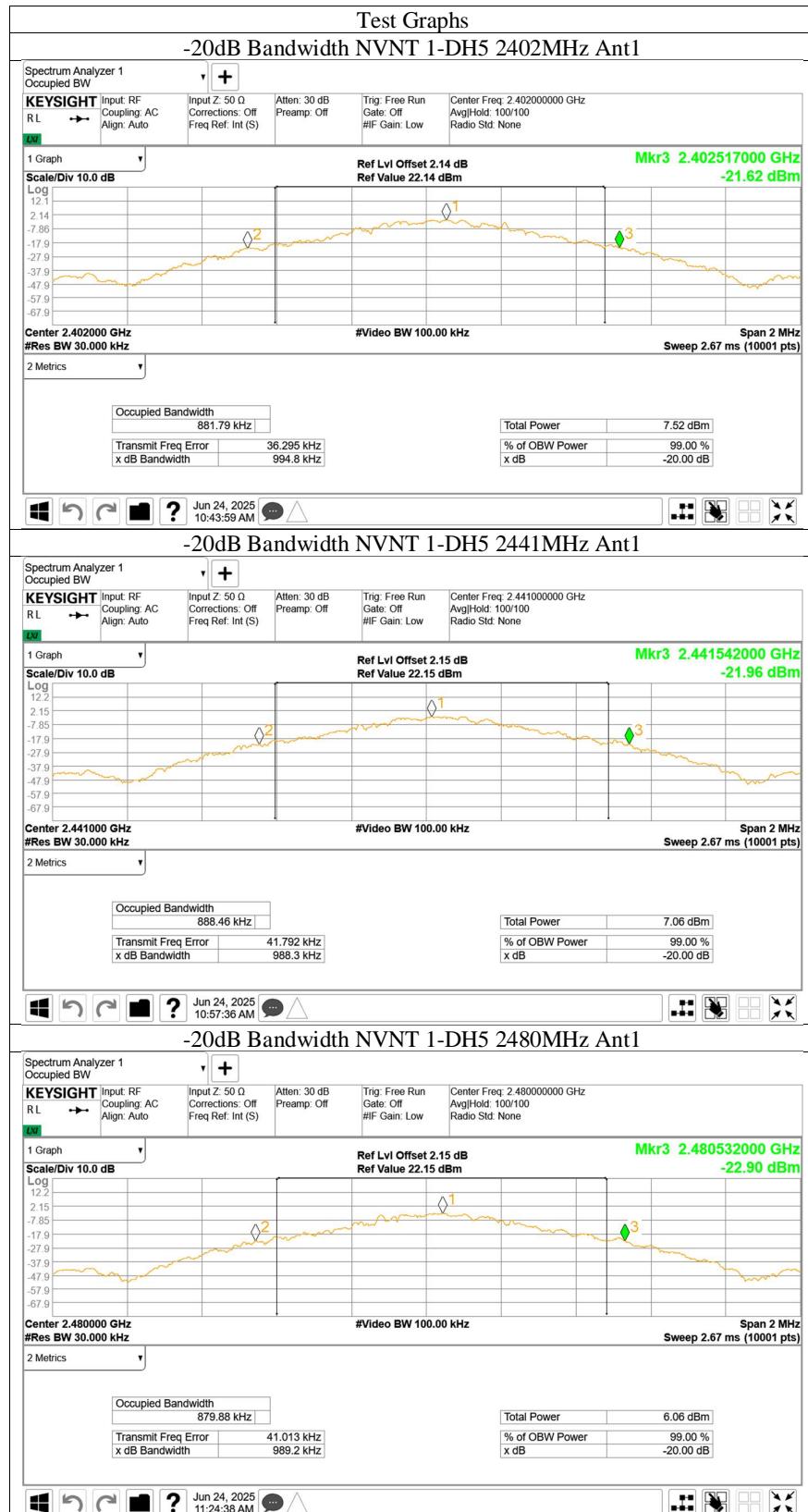
Frequency MHz	20 dB Bandwidth kHz	Limit kHz	Result
2402	0.995	--	Pass
2441	0.988	--	Pass
2480	0.989	--	Pass

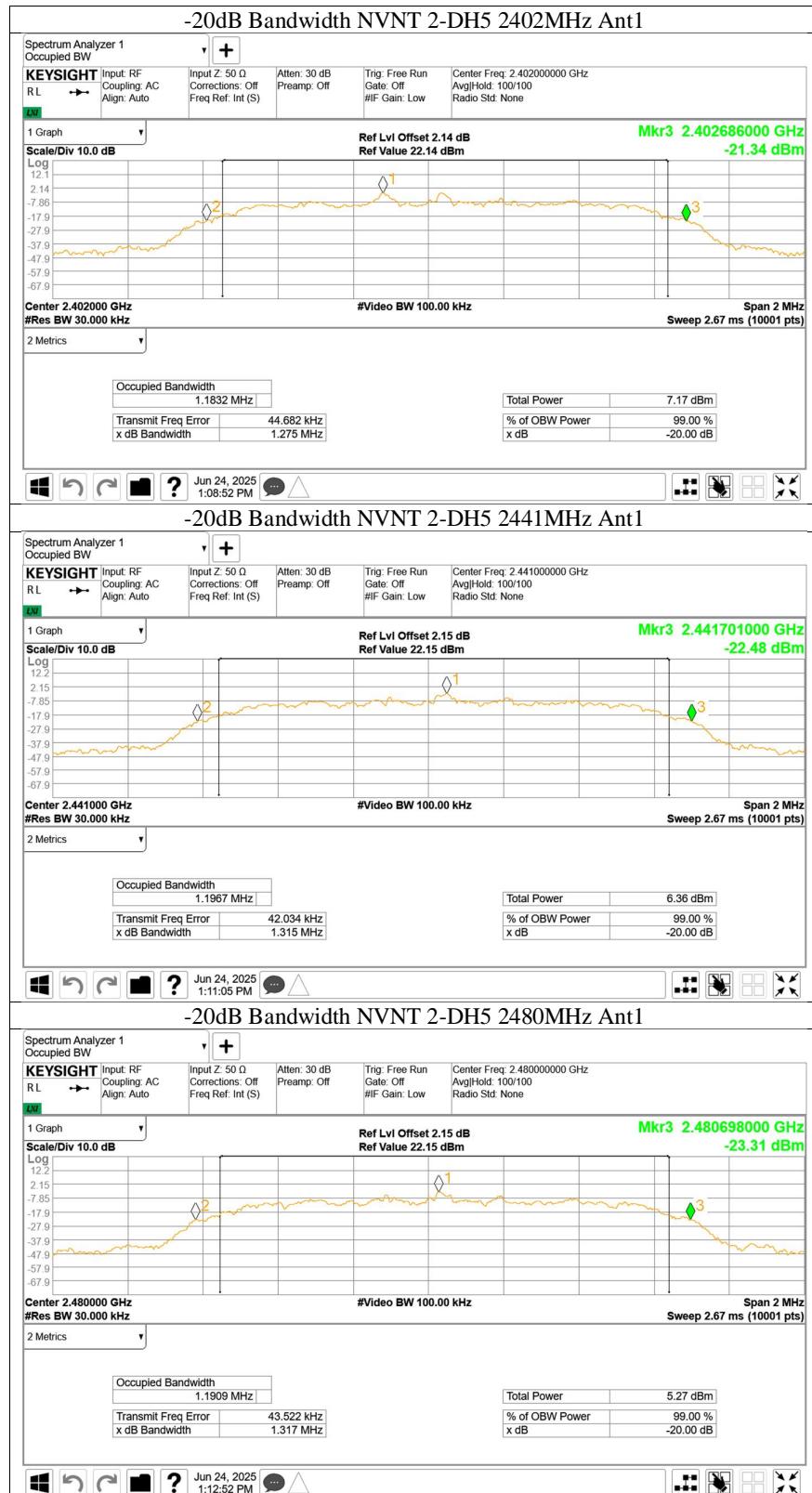
Bluetooth Mode $\pi/4$ -DQPSK Modulation test result

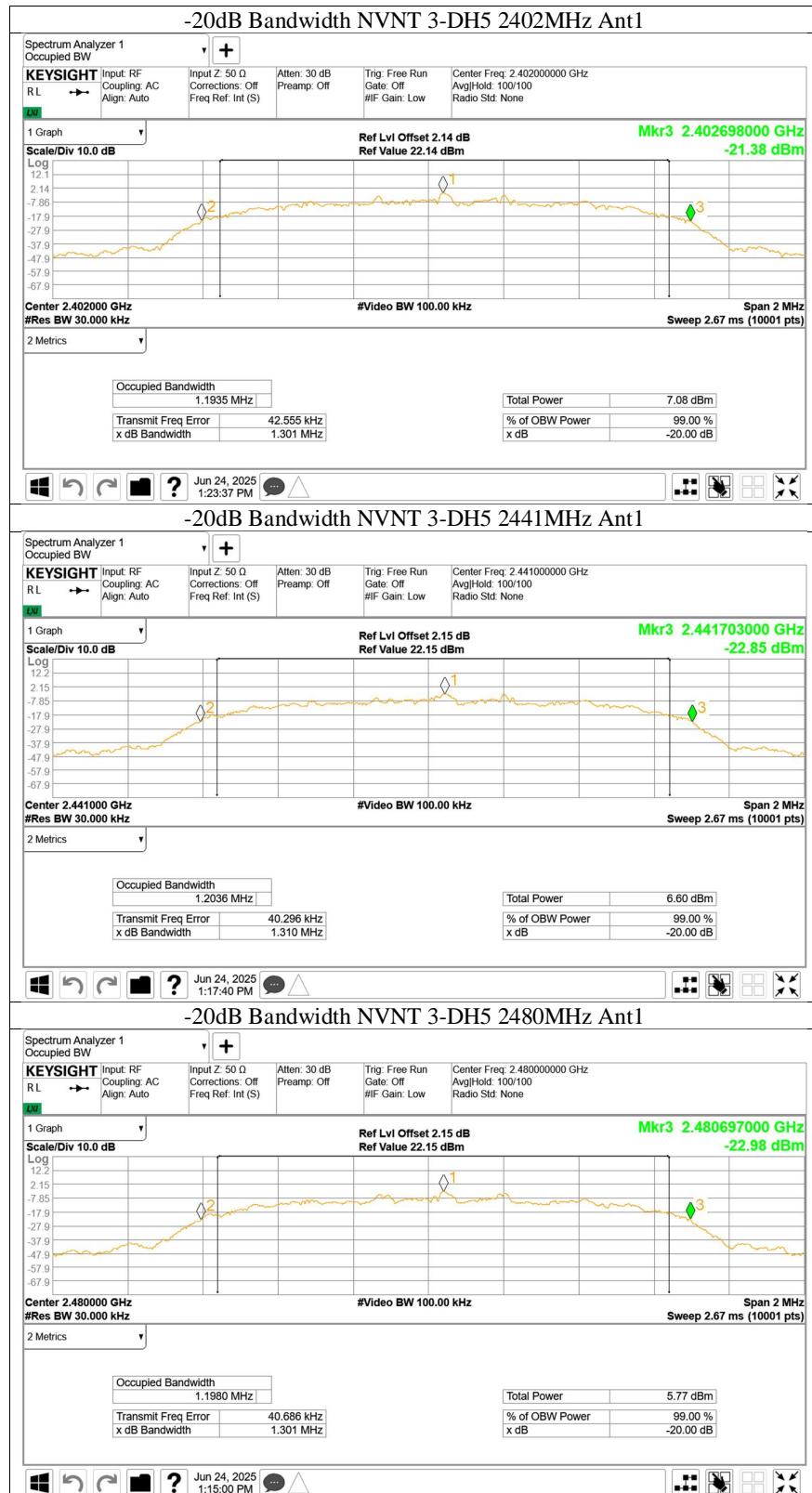
Frequency MHz	20 dB Bandwidth kHz	Limit kHz	Result
2402	1.275	--	Pass
2441	1.315	--	Pass
2480	1.317	--	Pass

Bluetooth Mode 8DPSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	Limit kHz	Result
2402	1.301	--	Pass
2441	1.31	--	Pass
2480	1.301	--	Pass









10.4 Carrier Frequency Separation

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels, RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. VBW \geq RBW, Sweep = auto, Detector function = peak.
4. By using the Max-Hold function record the separation of two adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function. Record the results.
6. Repeat above procedures until all frequencies measured were complete.

Limit

Limit kHz
$\geq 25\text{KHz}$ or 2/3 of the 20 dB bandwidth which is greater

Limit

Modulation	Frequency MHz	2/3 of 20 dB Bandwidth
		kHz
GFSK	2402	663
$\pi/4$ -DQPSK	2441	876
8DPSK	2441	873



Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here the worst case was used to show compliance.

Test result

Modulation	Frequency MHz	Carrier Frequency Separation kHz	Result
GFSK	2402	994	Pass
$\pi/4$ -DQPSK	2441	996	Pass
8DPSK	2441	1004	Pass





10.5 Number of hopping frequencies

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:
Span = the frequency band of operation, RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller, $VBW \geq RBW$, Sweep = auto, Detector function = peak, Trace=Max hold.
4. 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. Submit this plot(s).

Limit

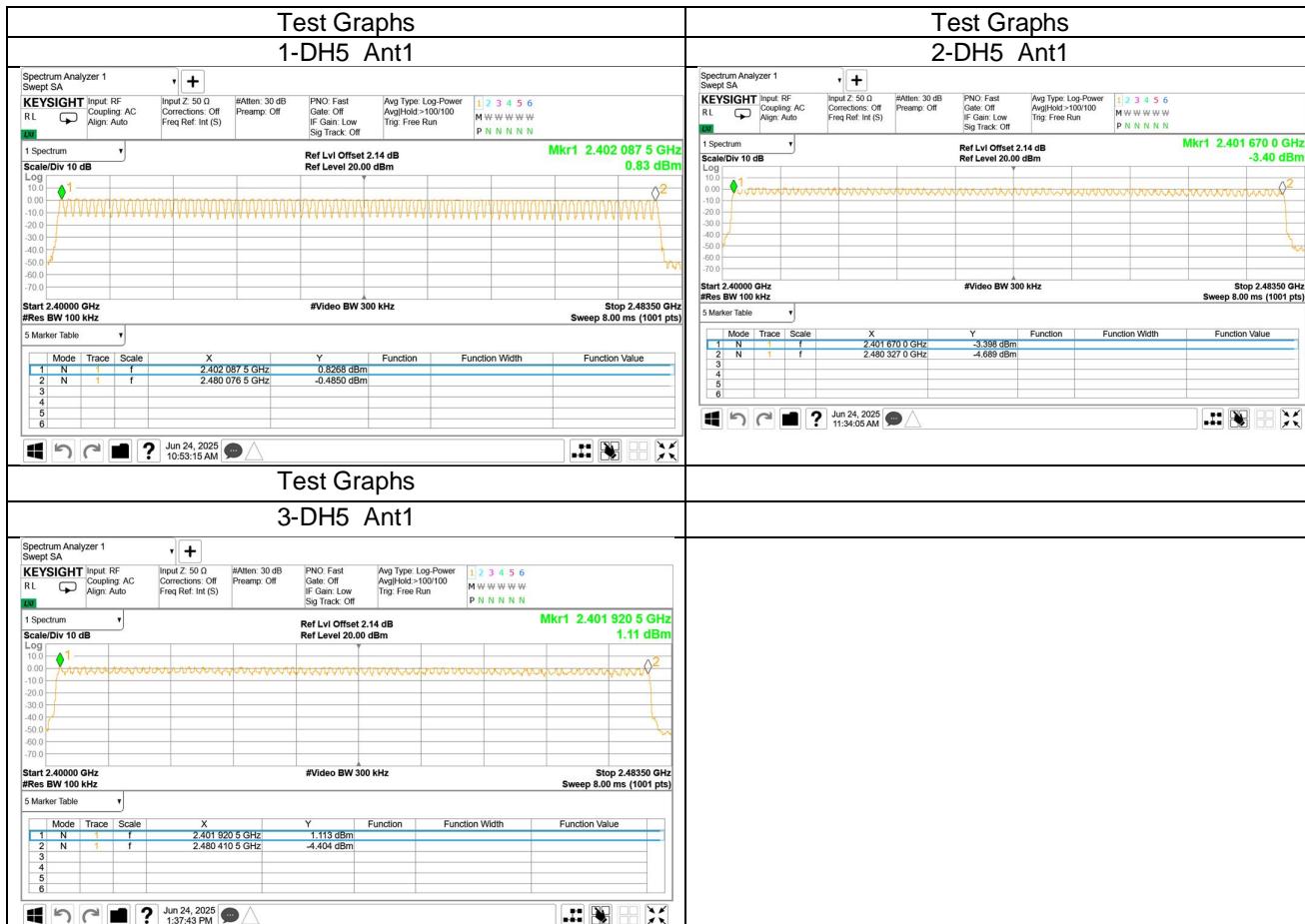
Limit number
≥ 15



Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

Number of hopping frequencies	Result
79	Pass





10.6 Dwell Time

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Span: Zero span, centered on a hopping channel.
4. RBW shall be \leq channel spacing and where possible RBW should be set $>> 1 / T$, where T is the expected dwell time per channel.
5. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
6. Detector function: Peak.
7. Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

Limit

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.



Dwell Time

Dwell time

The maximum dwell time shall be 0,4 s.

According to the Bluetooth Core Specification, the worse result was reported to show compliance.

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:

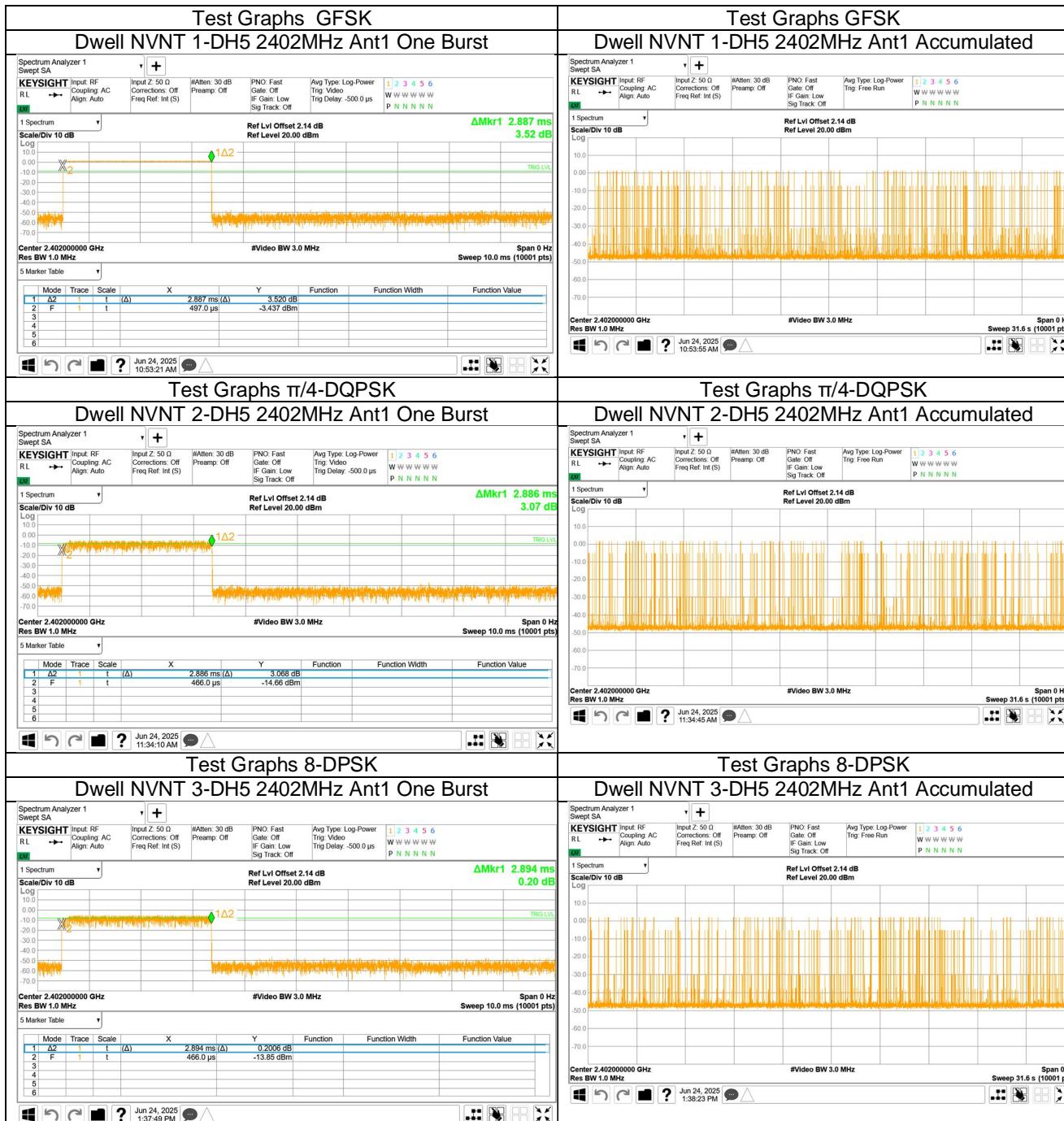
The duration for dwell time calculation: $0.4 \text{ [s]} * \text{hopping number} = 0.4 \text{ [s]} * 79 \text{ [ch]} = 31.6 \text{ [s*ch]}$;

The burst width, which is directly measured, refers to the duration on one channel hop.



Test Result

Modulation	Mode	Reading (ms)	Total Hops	Test Result (ms)	Limit (ms)	Result
GFSK	DH5	2.887	111	320.457	< 400	Pass
$\pi/4$ -DQPSK	2DH5	2.886	106	305.916	< 400	Pass
8-DPSK	3DH5	2.894	101	292.294	< 400	Pass





10.7 Spurious RF conducted emissions

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector, Sweep = auto, Span = wide enough to capture the peak level of the in-band emission and all spurious emissions, Trace = max hold. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency

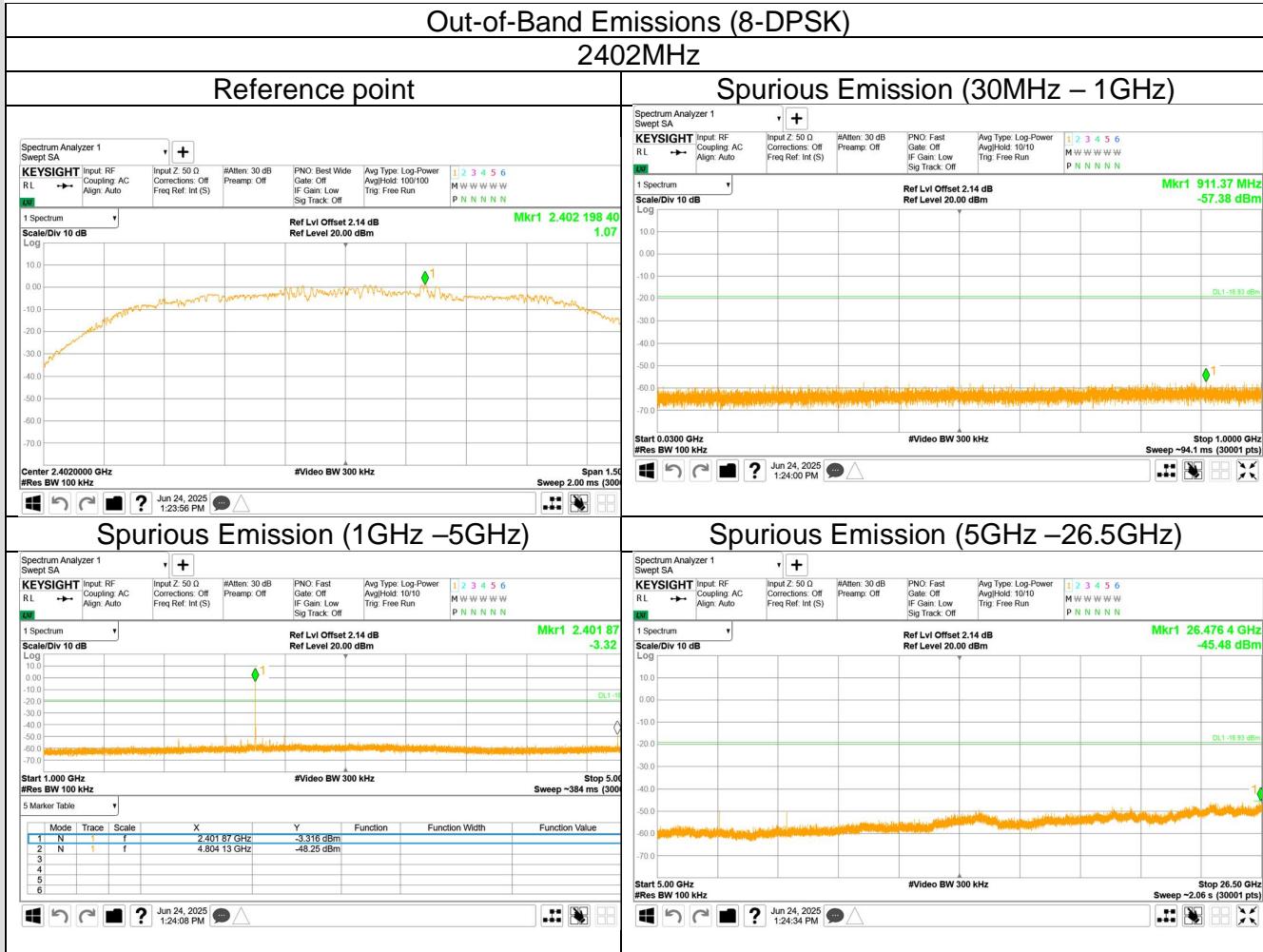
Limit

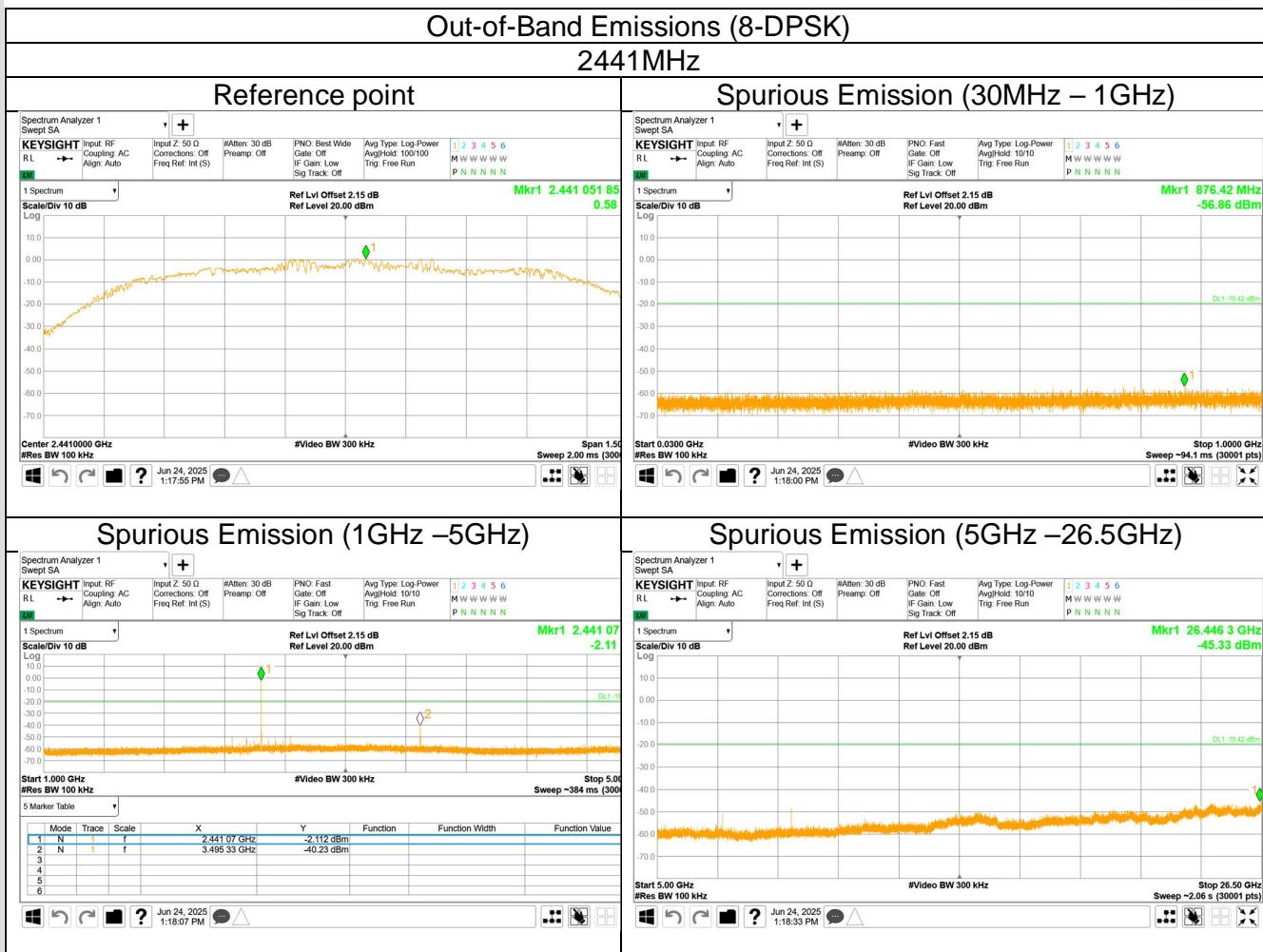
Frequency Range MHz	Limit (dBc)
30-25000	-20



Spurious RF conducted emissions

Only the worst case (which is subject to the maximum Peak Power, 8-DPSK mode) test result is listed in the report.





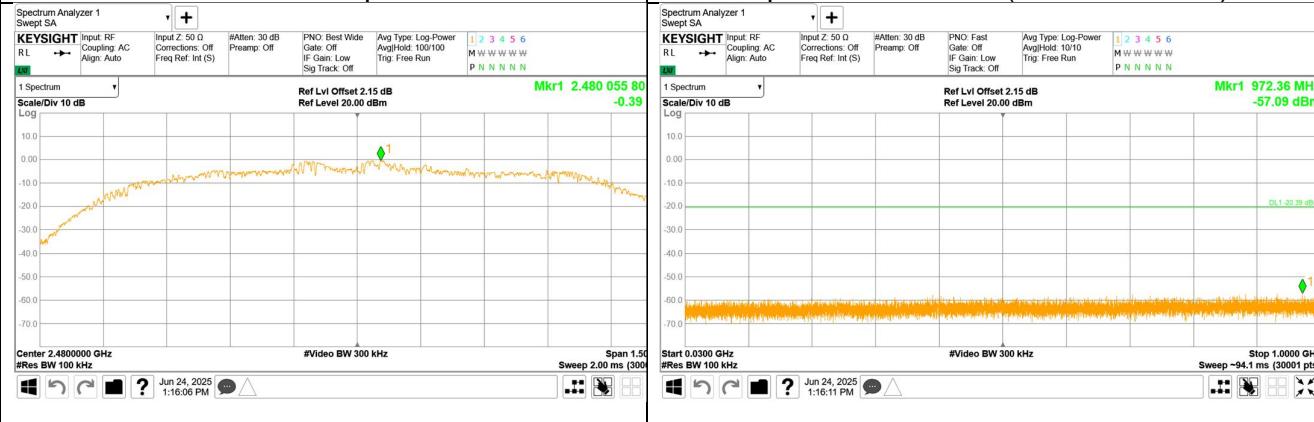


Out-of-Band Emissions (8-DPSK)

2480MHz

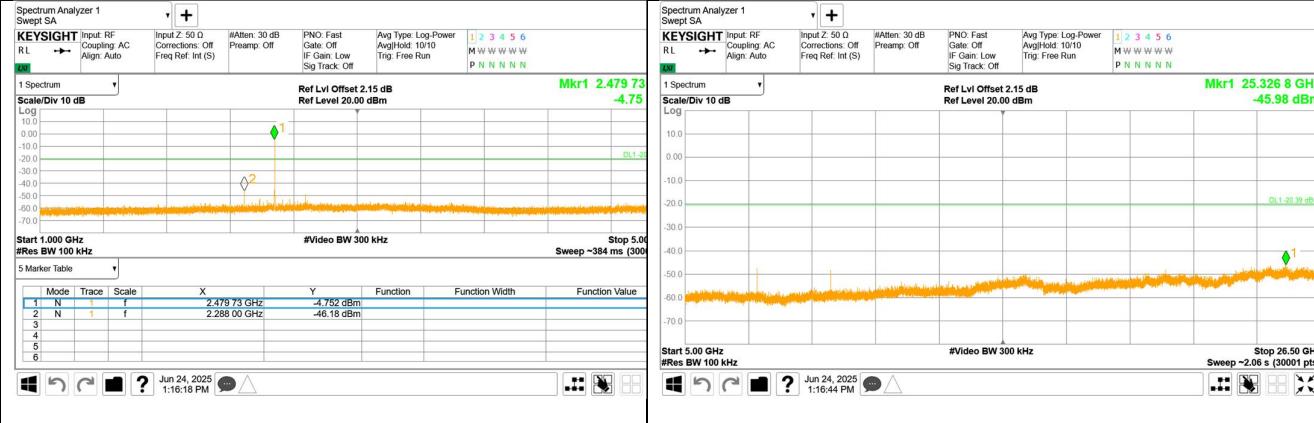
Reference point

Spurious Emission (30MHz – 1GHz)



Spurious Emission (1GHz – 5GHz)

Spurious Emission (5GHz – 26.5GHz)





10.8 Band edge testing

Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously. Set the EUT to the lowest frequency channel.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector, Trace: Max hold, Sweep time: Coupled, Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation. Allow the trace to stabilize.
4. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.
5. Set the EUT to the highest frequency channel and repeat step 2) to 4)
6. Enable the EUT hopping mode, repeat the test.

Limit:

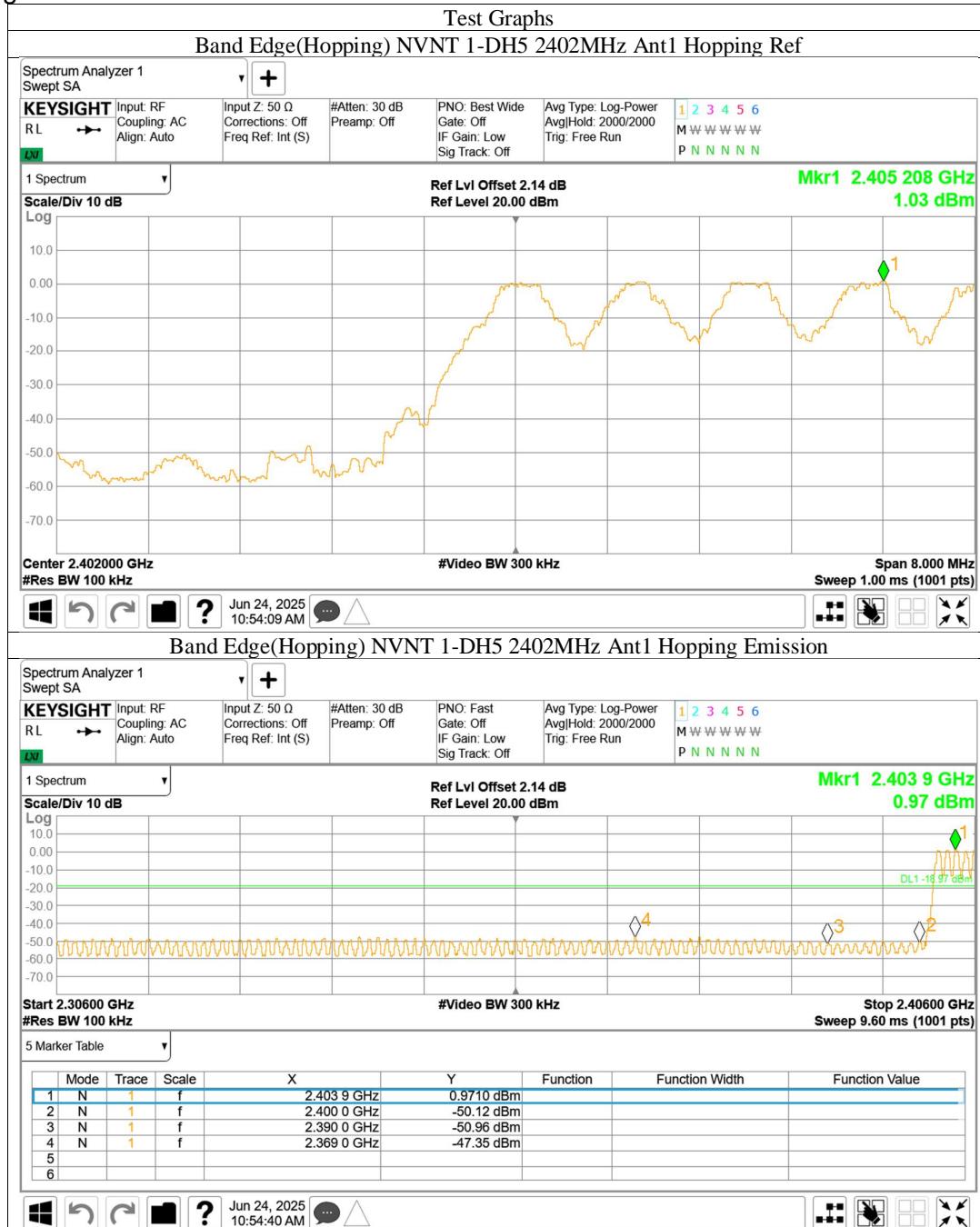
In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

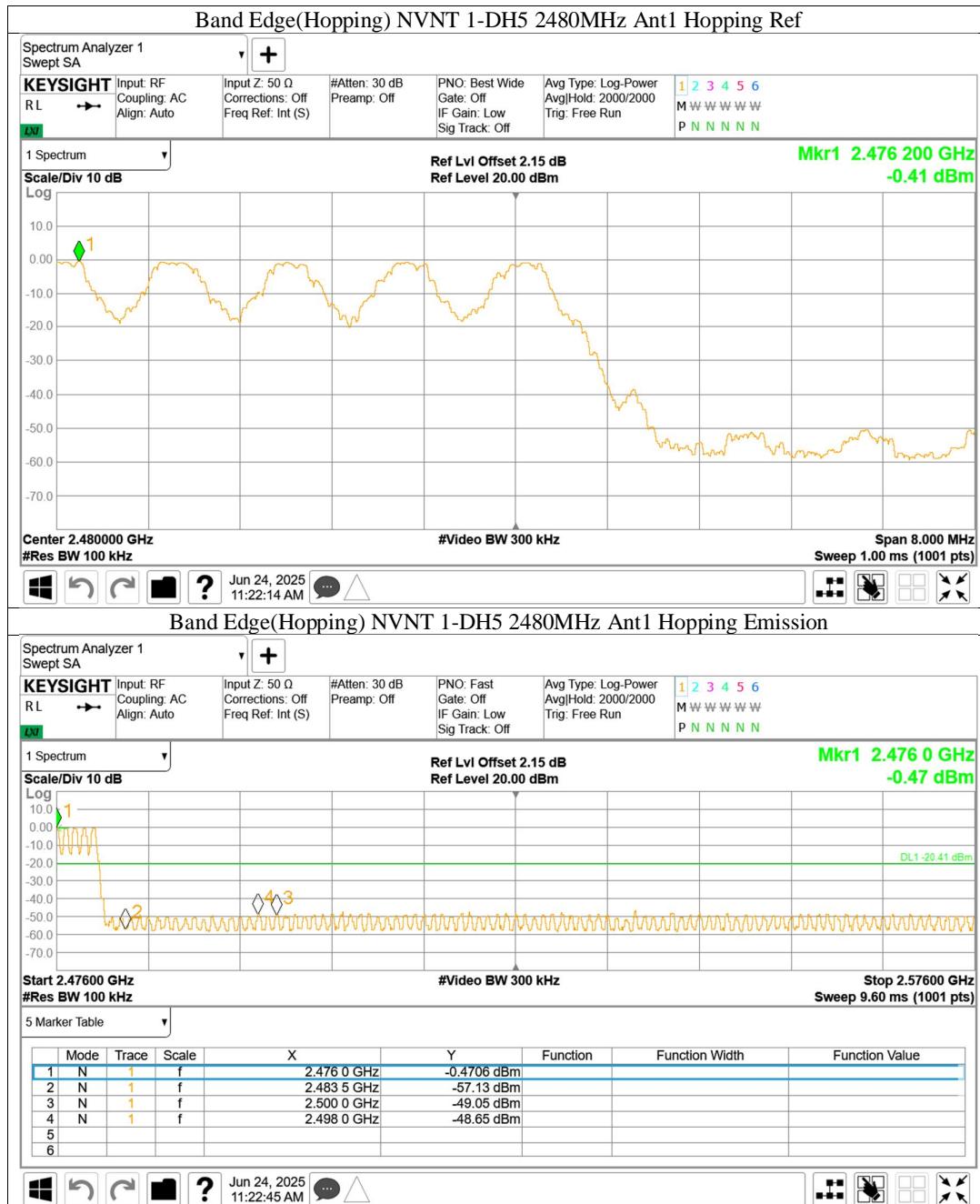


Band edge testing

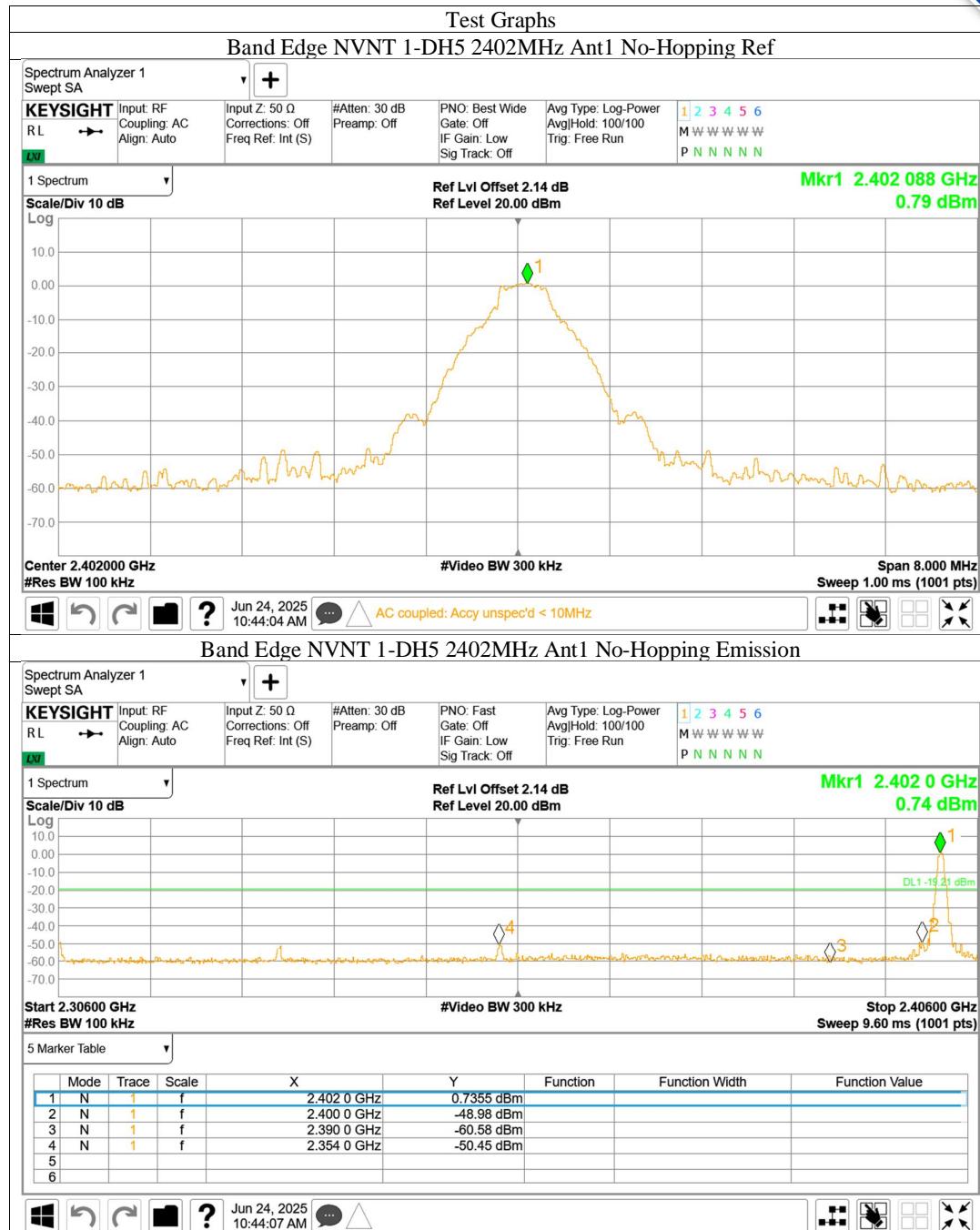
GFSK Modulation Test Result:

Hopping on mode:





Hopping off mode:



Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref

