FCC CERTIFICATION TEST REPORT

Applicant	:	ASA Electronics Shenzhen Limited
Address of Applicant	:	Room 503,5/F., Unit A, Skyworth Building, Gaoxin Avenue.1.S., Nanshan District, Shen Zhen, 518057, China
Manufacturer	:	ASA Electronics, LLC.
Address of Manufacturer	:	2602 Marina Drive, Elkhart, IN 46514 USA
Equipment under Test	:	AM/FM/BT Radio
Model No.	:	XMH50, RMXMH50
FCC ID	:	2AHU2XMH50
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2020
Report No.	:	DDT-RE24120318-2E01
Issue Date	:	2025/01/06
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

Table of Contents

1. Summary of Test Results 7
2. General Test Information 8
2.1. Description of EUT 8
2.2. Accessories of EUT 9
2.3. Block diagram of EUT configuration for test 9
2.4. Decision of final test mode 9
2.5. Deviations of test standard 10
2.6. Test environment conditions 10
2.7. Test laboratory 10
2.8. Measurement uncertainty 11
3. Equipment Used During Conductive Test 12
4. 20 dB Bandwidth 13
4.1. Block diagram of test setup 13
4.2. Limits 13
4.3. Test procedure 13
4.4. Test result 14
4.5. Test graphs 15
5. 99% Bandwidth 18
5.1. Block diagram of test setup 18
5.2. Limits 18
5.3. Test procedure 18
5.4. Test result 19
5.5. Test graphs 20
6. Maximum Peak Output Power 23
6.1. Block diagram of test setup 23
6.2. Limits 23
6.3. Test procedure 23
6.4. Test result 24
6.5. Test graphs 25
7. Carrier Frequency Separation 28
7.1. Block diagram of test setup 28
7.2. Limits 28
7.3. Test procedure 28
7.4. Test result 29
7.5. Test graphs 30
8. Dwell Time 31

8.1. Block diagram of test setup 31
8.2. Limits 31
8.3. Test procedure 31
8.4. Test result 32
8.5. Test graphs 33
9. Number of Hopping Channel 39
9.1. Block diagram of test setup 39
9.2. Limits 39
9.3. Test procedure 39
9.4. Test result 40
9.5. Test graphs 41
10. Band Edge Compliance (Conducted Method) 42
10.1. Block diagram of test setup 42
10.2. Limit 42
10.3. Test procedure 42
10.4. Test result 43
10.5. Test graphs 44
11. RF Conducted Spurious Emissions 48
11.1. Block diagram of test setup 48
11.2. Limits 48
11.3. Test procedure 48
11.4. Test result 49
11.5. Test graphs 50
12. Duty cycle 59
12.1. Block diagram of test setup 59
12.2. Limit 59
12.3. Test procedure 59
12.4. Test result 60
12.5. Test graphs 61
13. Antenna Requirements 64
13.1. Limit 64
13.2. Result 64
14. Radiated Emission 65
14.1. Test equipment 65
14.2. Block diagram of test setup 66
14.3. Limits 67
14.4. Assistant equipment used for test 68
14.5. Test procedure 68

14.6. Test result 70
14.7. Test data 71
15. Band Edge Compliance 79
15.1. Test equipment 79
15.2. Block diagram of test setup 80
15.3. Limits 80
15.4. Assistant equipment used for test 80
15.5. Test procedure 80
15.6. Test result 80
15.7. Test data 81
16. Power Line Conducted Emissions 87
16.1. Test equipment 87
16.2. Block diagram of test setup 87
16.3. Limits 87
16.4. Assistant equipment used for test 87
16.5. Test procedure 88
16.6. Test result 88
17. Test Setup Photograph 89
18. Photos of the EUT 91

Test Report Declare

Applicant	:	ASA Electronics Shenzhen Limited
Address of Applicant	:	Room 503,5/F., Unit A, Skyworth Building, Gaoxin Avenue.1.S., Nanshan District, Shen Zhen, 518057, China
Equipment under Test	:	AM/FM/BT Radio
Model No.	:	XMH50, RMXMH50
Manufacturer	:	ASA Electronics, LLC.
Address of Manufacturer	:	2602 Marina Drive, Elkhart, IN 46514 USA

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C,

ANSI C63.10:2020

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Report No.:	DDT-RE24120318-2E01		
Date of Receipt:	2024/12/06	**Date of Test:**	2024/12/06 - 2025/01/05

Prepared By: **Approved By:**

Jacky Huang

Jacky Huang/Engineer **Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2025/01/06	

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	Maximum Peak Output Power	FCC Part 15: 15.247(b)(1)	/	Pass
2	20 dB Bandwidth	FCC Part 15: 15.247(a)(1)	/	Pass
3	Carrier Frequency Separation	FCC Part 15: 15.247(a)(1)	/	Pass
4	Number of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii)	/	Pass
5	Dwell Time	FCC Part 15: 15.247(a)(1)(iii)	/	Pass
6	RF Conducted Spurious Emissions	FCC Part 15: 15.247(d)	/	Pass
7	Radiated Emission	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	/	Pass
8	Band Edge Compliance	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	/	Pass
9	Antenna Requirement	FCC Part 15: 15.203	/	Pass
10	Power Line Conducted Emissions	FCC Part 15: 15.207(a)	/	N/A
Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.				

2. General Test Information

2.1. Description of EUT

EUT Name	:	AM/FM/BT Radio
Model Number	:	XMH50, RMXMH50
Difference of model number	:	Above models are identical in schematic and structure, only the name is different for all the models, therefore the test performed on the model XMH50.
EUT Function Description	:	Please reference user manual of this device
Power Supply	:	DC 12V
Antenna Type	:	PCB antenna
Max Antenna Gain (dBi)	:	-0.62

Note: This EUT support Bluetooth BR/EDR, this report only for Bluetooth BR/EDR.

Radio Specification	:	Bluetooth BR/EDR
Operation Frequency	:	2402 MHz-2480 MHz
Modulation	:	GFSK, π/4-DQPSK, 8DPSK

Channel information					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476

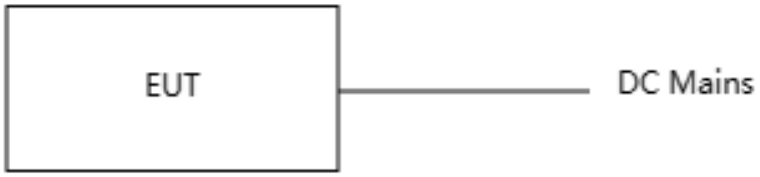
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
/	/	/	/

2.3. Block diagram of EUT configuration for test



2.4. Decision of final test mode

According pre-test, the worst test modes were reported as below:

Test software: MV Frequency Tools V 0.3.2.exe

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

The pathloss of external cable: 0.5 dB (According to the manufacturer's claims)

Tested mode, channel, information			
Mode	Setting Tx Power	Channel	Frequency (MHz)
GFSK hopping on Tx mode	-8	CH0 to CH78	2402 to 2480
π/4-DQPSK hopping on Tx mode	-8	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	-8	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	-8	CH0	2402
	-8	CH39	2441
	-8	CH78	2480
π/4-DQPSK hopping off Tx mode	-8	CH0	2402
	-8	CH39	2441
	-8	CH78	2480
8DPSK hopping off Tx mode	-8	CH0	2402
	-8	CH39	2441
	-8	CH78	2480
Worst-case data rates were: GFSK mode: DH5, π/4-DQPSK mode: 2DH5, 8DPSK mode: 3DH5			

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	+15℃ to +35 ℃
Humidity range:	20% to 75%
Pressure range:	86 kPa to106 kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808.

Tel.: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.8. Measurement uncertainty

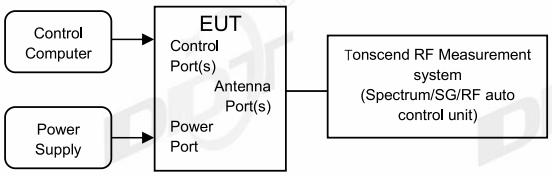
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Frequencies Stability	6.7 x 10^{-8} (Antenna couple method)
	5.5 x 10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.40 dB (3.6 GHz ≤ f < 8 GHz)
	1.66 dB (8 GHz ≤ f < 26.5 GHz)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 ℃
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz)
	4.40 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date	Cal. Interval
☒RF Connected Test (RF Measurement System 4#)					
Signal &Spectrum Analyzer	R&S	FSV3044	101173	2025/03/31	1 Year
Wideband Radio Communication Tester	R&S	CMW500	168801	2025/03/31	1 Year
MXG Vector Signal Generator	Agilent	N5182A	MY48180737	2025/03/31	1 Year
PSG Vector Signal Generator	Agilent	E8267D	US49060192	2025/08/25	1 Year
RF Control Unit	Tonsend	JS0806-2	21I8060485	2025/03/31	1 Year
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2025/04/22	1 Year
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A	N/A

4. 20 dB Bandwidth

4.1. Block diagram of test setup



4.2. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.3. Test procedure

(1) The test according to ANSI C63.10-2020 clause 6.9.2.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously

(4) Use the following spectrum analyzer settings for the 20 dB bandwidth measurement:

RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 2 times and 5 times the OBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold

(5) Measure and record the results in the report.

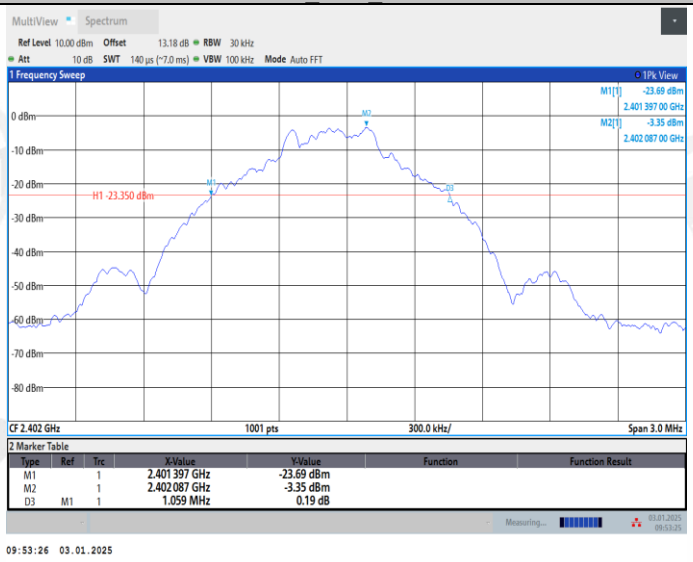
4.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

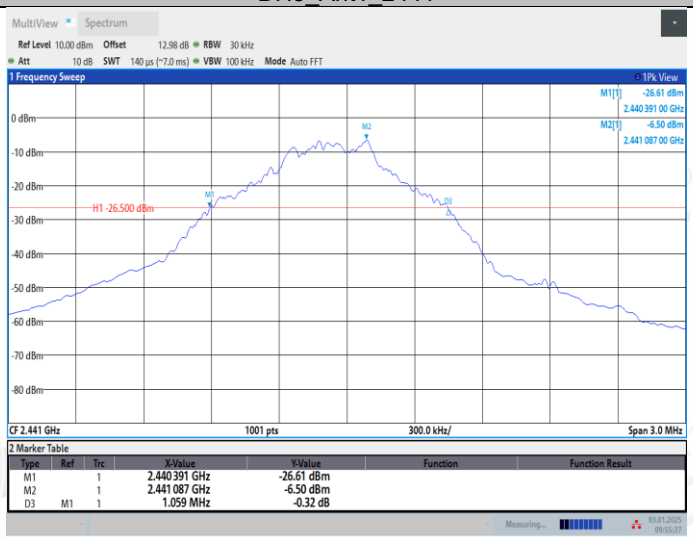
Test Mode	Antenna	Frequency [MHz]	20dB EBW [MHz]
DH5	Ant1	2402	1.06
		2441	1.06
		2480	1.06
2DH5	Ant1	2402	1.31
		2441	1.32
		2480	1.32
3DH5	Ant1	2402	1.32
		2441	1.30
		2480	1.30

4.5. Test graphs

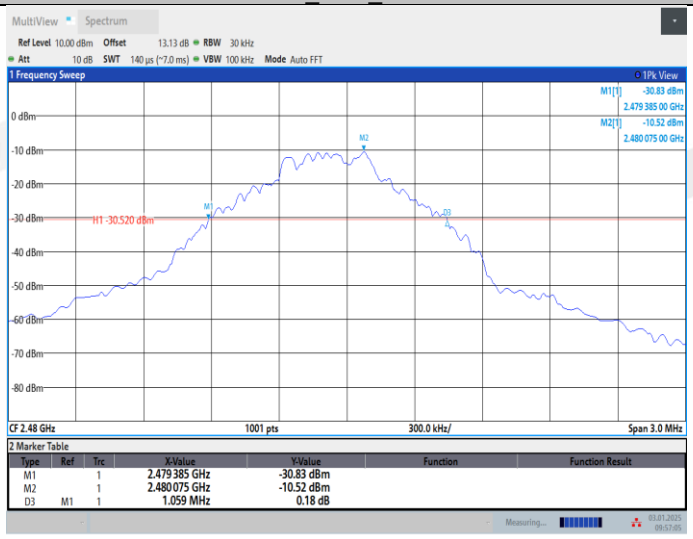
DH5_Ant1_2402



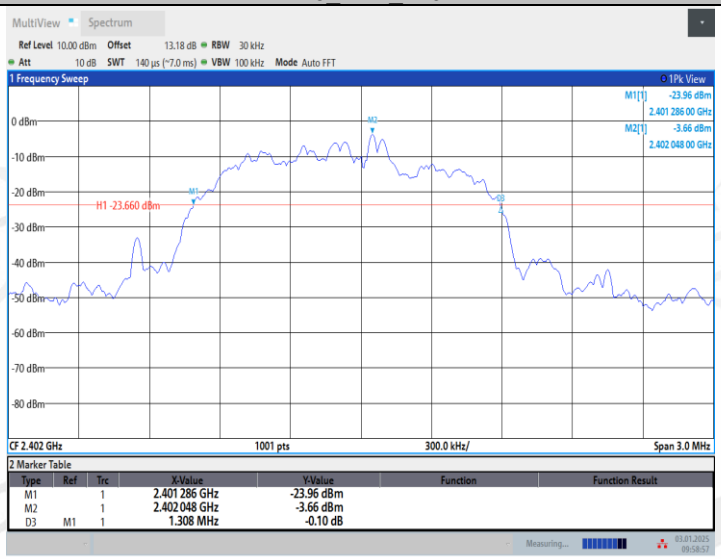
DH5_Ant1_2441



DH5_Ant1_2480

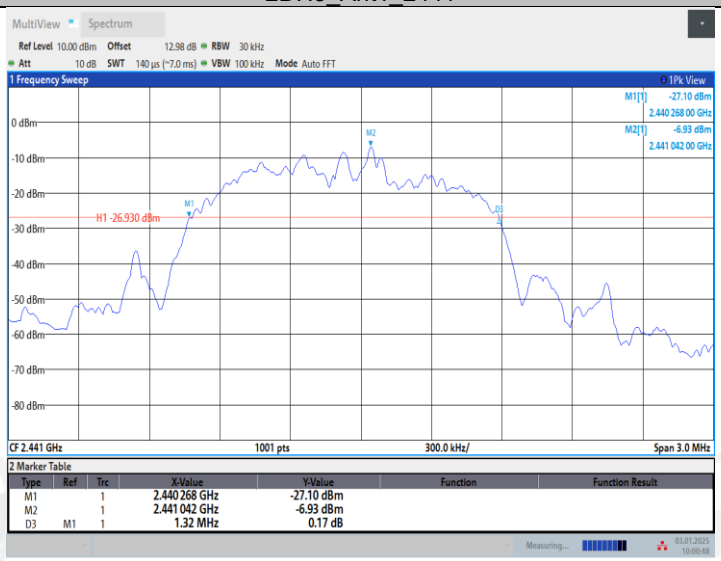


2DH5_Ant1_2402



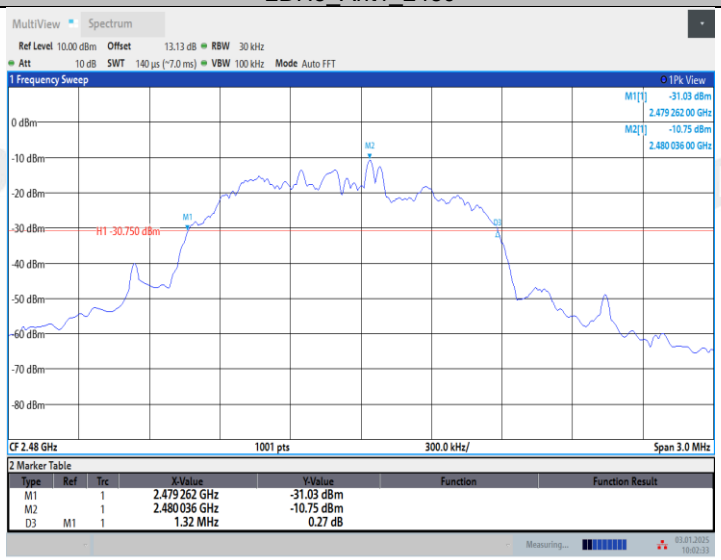
09:58:57 03.01.2025

2DH5_Ant1_2441



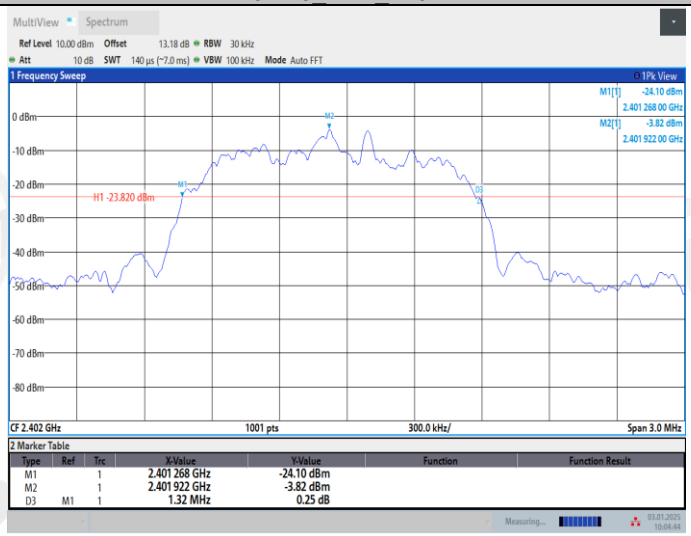
10:00:48 03.01.2025

2DH5_Ant1_2480



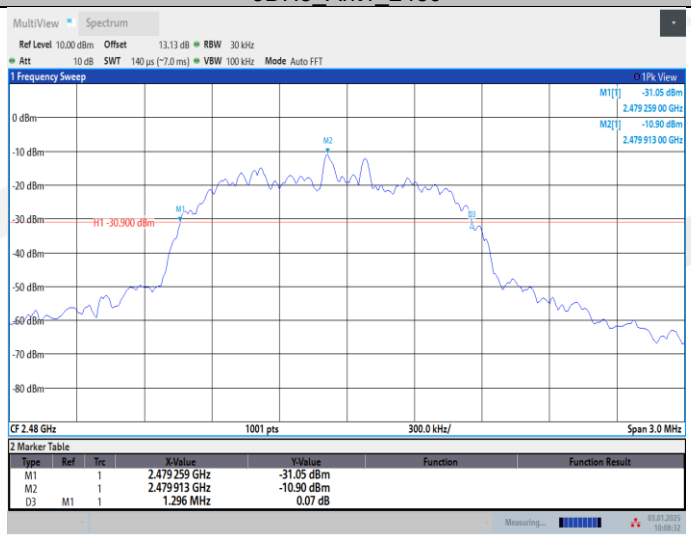
10:02:33 03.01.2025

3DH5_Ant1_2402



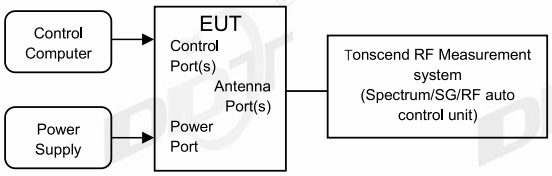
3DH5_Ant1_2441

3DH5_Ant1_2480



5. 99% Bandwidth

5.1. Block diagram of test setup



5.2. Limits

Just for Report.

5.3. Test procedure

(1) The test according to ANSI C63.10-2020 clause 6.9.3.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously

(4) Use the following spectrum analyzer settings for the 99% bandwidth measurement:

RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 1.5 times and 5.0 times the OBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold

(5) Measure and record the results in the report.

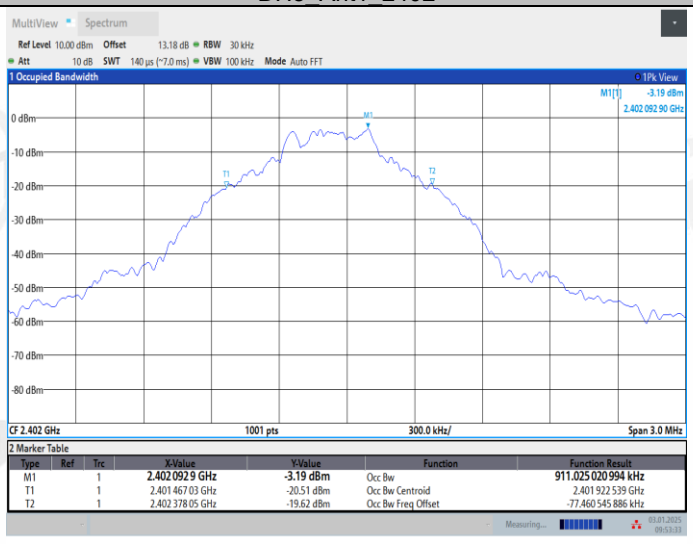
5.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

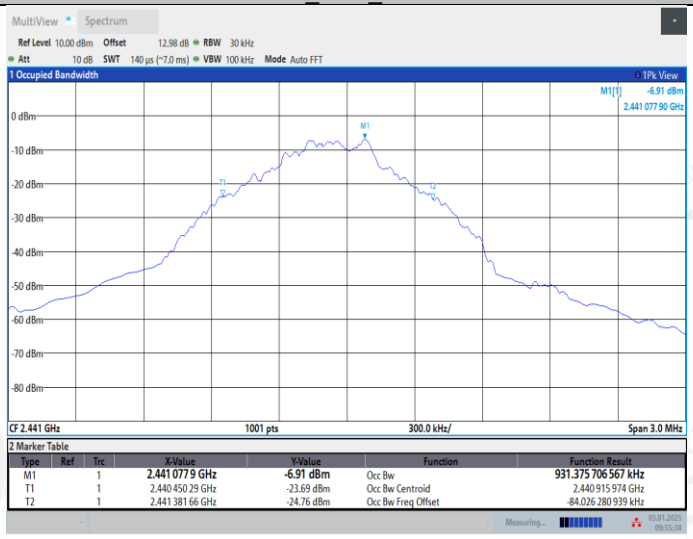
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]
DH5	Ant1	2402	0.911	2401.4670	2402.3781
		2441	0.931	2440.4503	2441.3817
		2480	0.917	2479.4528	2480.3695
2DH5	Ant1	2402	1.211	2401.3312	2402.5419
		2441	1.195	2440.3335	2441.5288
		2480	1.204	2479.3255	2480.5292
3DH5	Ant1	2402	1.193	2401.3395	2402.5329
		2441	1.187	2440.3341	2441.5209
		2480	1.221	2479.3110	2480.5325

5.5. Test graphs

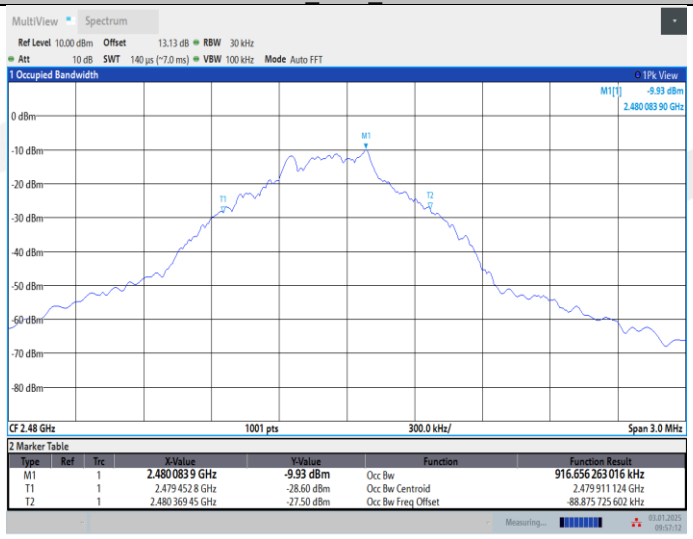
DH5_Ant1_2402



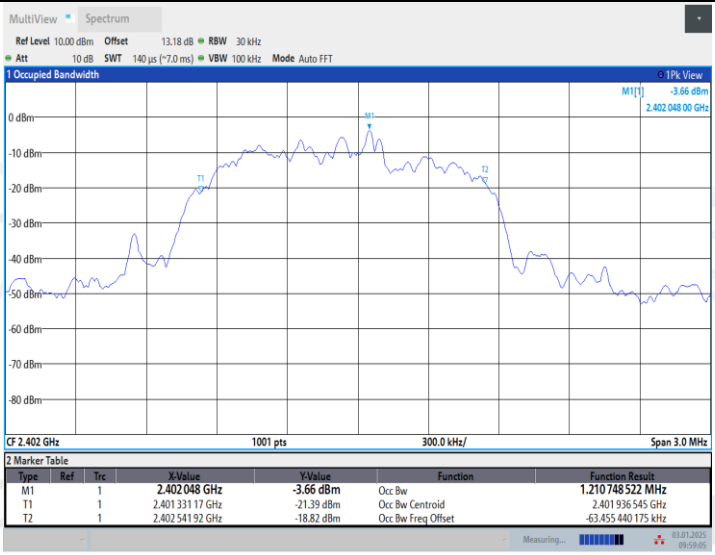
DH5_Ant1_2441



DH5_Ant1_2480

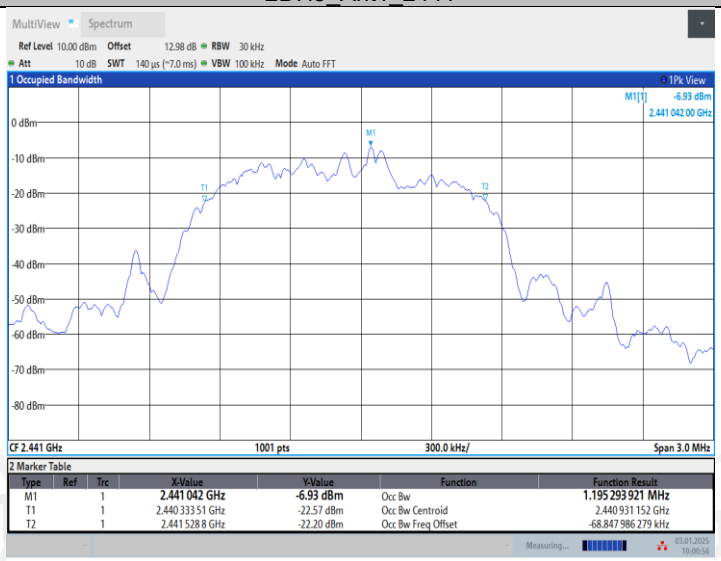


2DH5_Ant1_2402



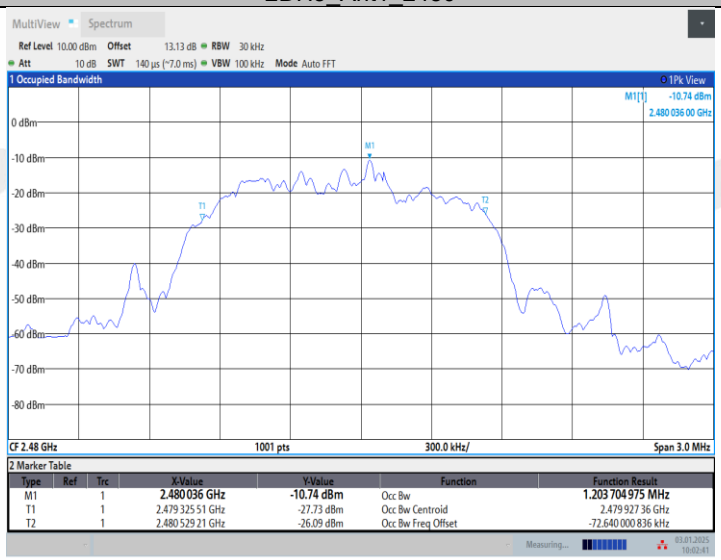
09:59:05 03.01.2025

2DH5_Ant1_2441



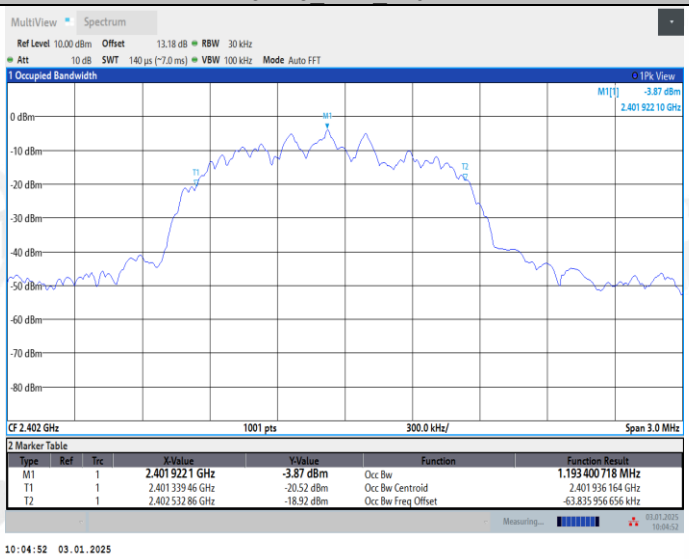
10:00:56 03.01.2025

2DH5_Ant1_2480

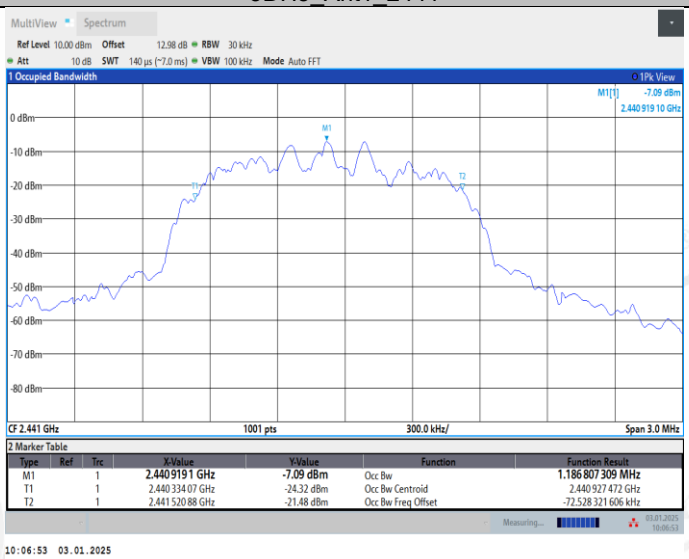


10:02:41 03.01.2025

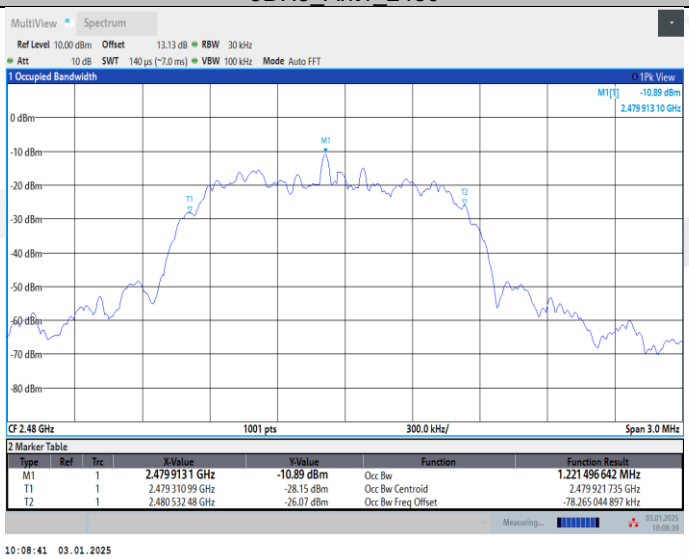
3DH5_Ant1_2402



3DH5_Ant1_2441

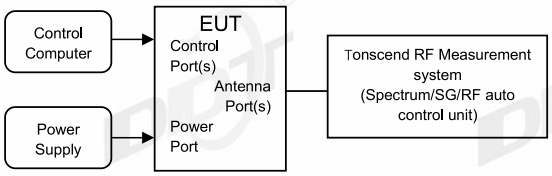


3DH5_Ant1_2480



6. Maximum Peak Output Power

6.1. Block diagram of test setup



6.2. Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W.

6.3. Test procedure

(1) The test according to ANSI C63.10-2020 clause 7.8.5.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.

(4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	> 20 dB bandwidth of the emission being measured.
VBW:	VBW ≥ RBW.
Span:	Approximately five times the 20 dB bandwidth, centered on a hopping channel.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold

(5) Use the marker-to-peak function to set the marker to the peak of the emission and record the results in the report.

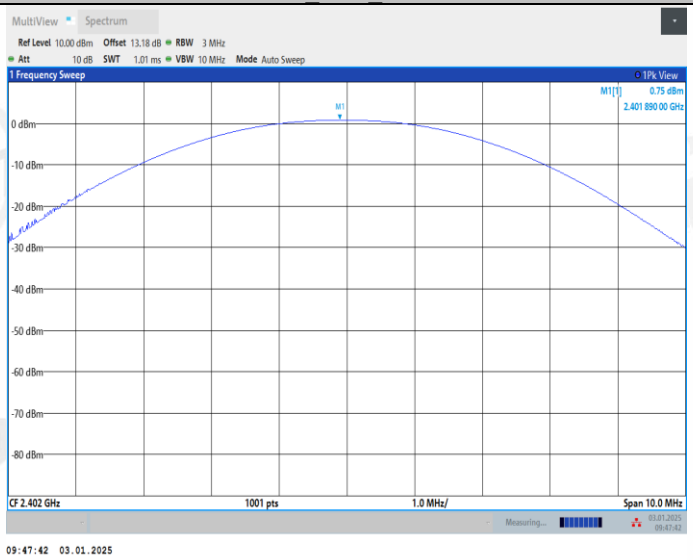
6.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

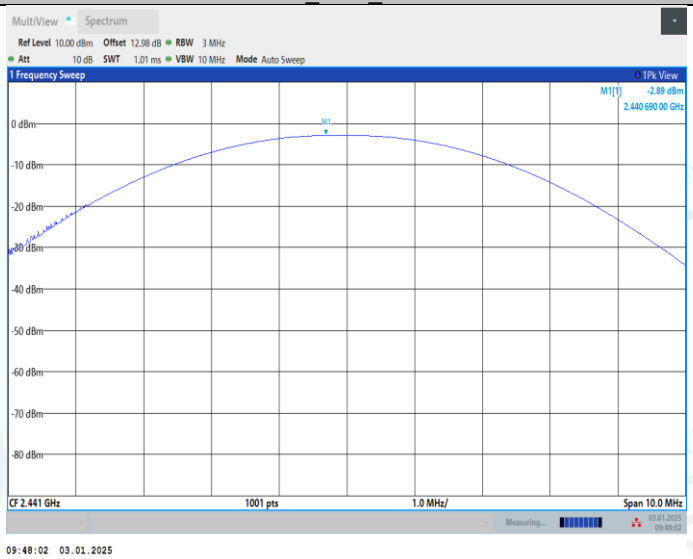
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Conducted Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
DH5	Ant1	2402	0.75	≤20.97	0.13	≤30	PASS
		2441	-2.89	≤20.97	-3.51	≤30	PASS
		2480	-6.77	≤20.97	-7.39	≤30	PASS
2DH5	Ant1	2402	0.56	≤20.97	-0.06	≤30	PASS
		2441	-2.98	≤20.97	-3.60	≤30	PASS
		2480	-6.80	≤20.97	-7.42	≤30	PASS
3DH5	Ant1	2402	0.48	≤20.97	-0.14	≤30	PASS
		2441	-3.05	≤20.97	-3.67	≤30	PASS
		2480	-6.84	≤20.97	-7.46	≤30	PASS

6.5. Test graphs

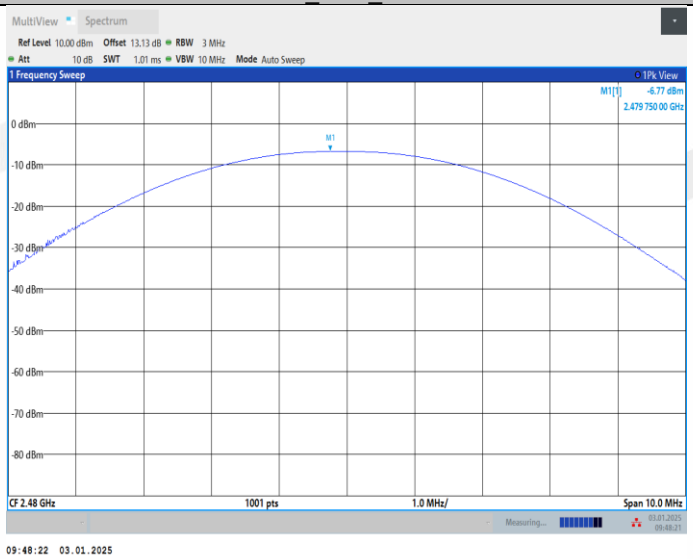
DH5_Ant1_2402



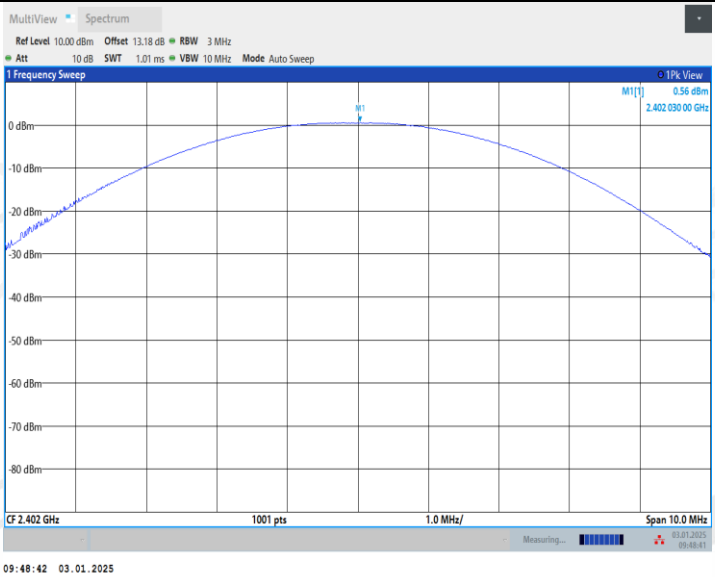
DH5_Ant1_2441



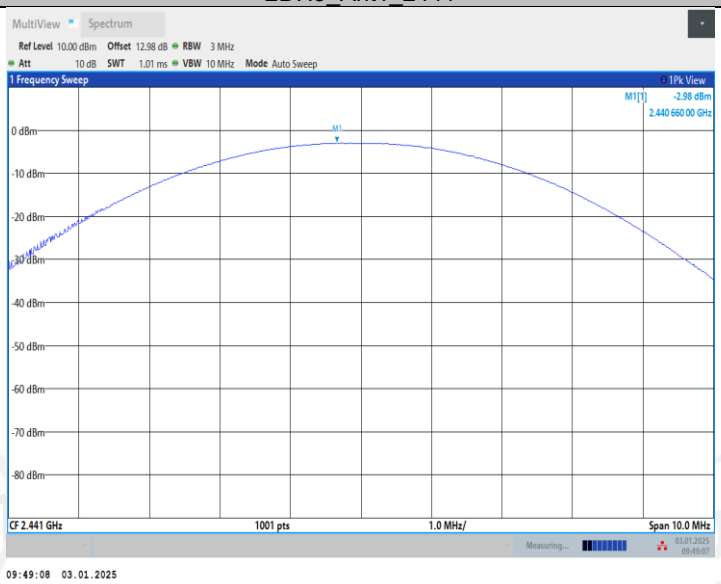
DH5_Ant1_2480



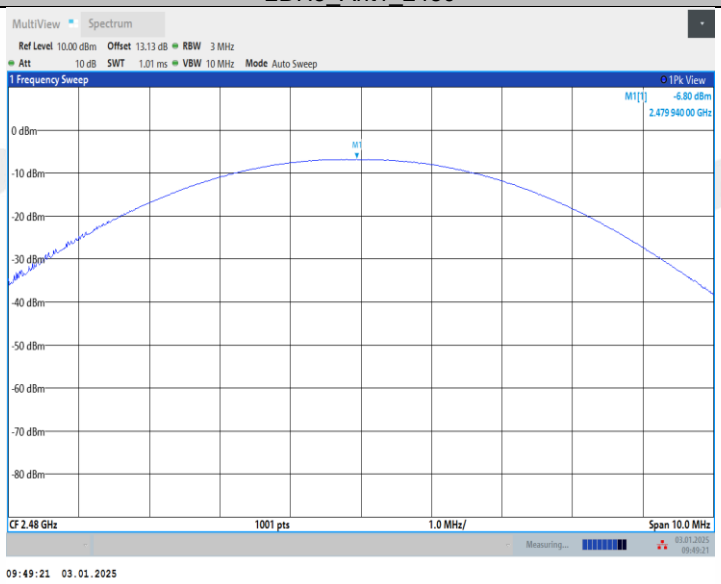
2DH5_Ant1_2402



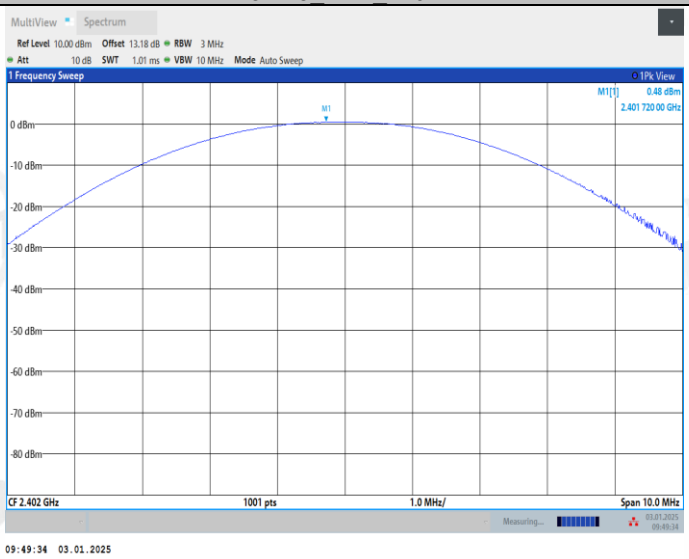
2DH5_Ant1_2441



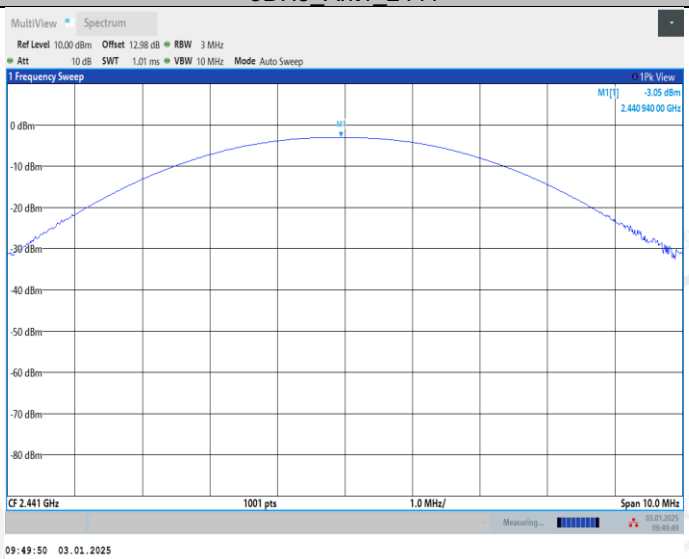
2DH5_Ant1_2480



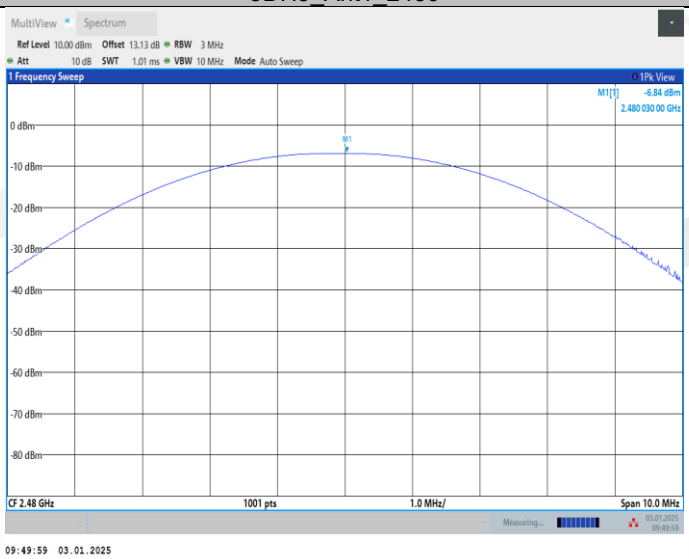
3DH5_Ant1_2402



3DH5_Ant1_2441

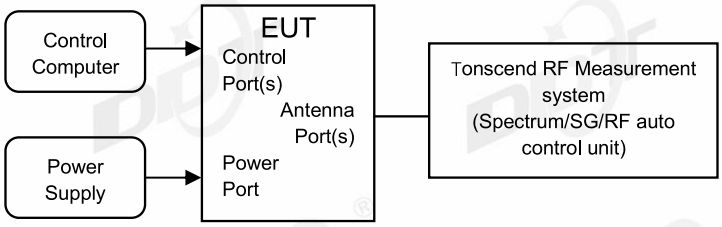


3DH5_Ant1_2480



7. Carrier Frequency Separation

7.1. Block diagram of test setup



7.2. Limits

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 125 mW.

7.3. Test procedure

(1) The test according to ANSI C63.10-2020 clause 7.8.2.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.

(4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	approximately 30% of the channel spacing
VBW:	VBW ≥ RBW.
Span:	Wide enough to capture the peaks of two adjacent channels.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold

(5) Use the marker-delta function to determine the separation between the peaks of the adjacent channels and record the results in the report.

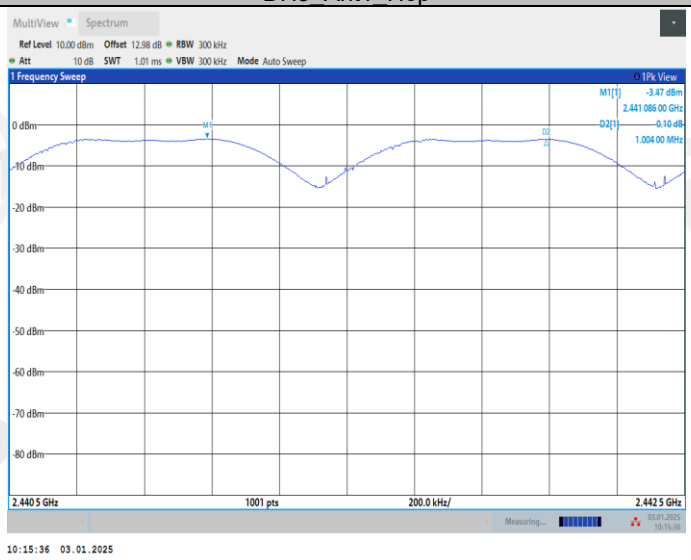
7.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

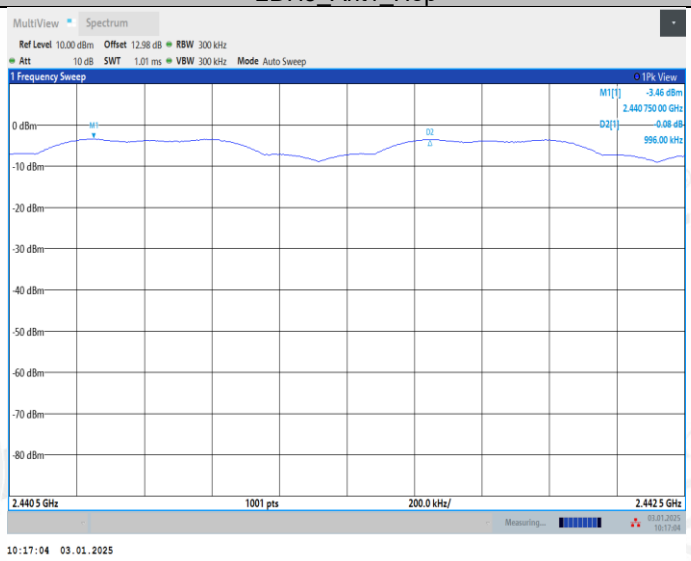
Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	1.004	≥0.707	PASS
2DH5	Ant1	Hop	0.996	≥0.880	PASS
3DH5	Ant1	Hop	1.008	≥0.880	PASS

7.5. Test graphs

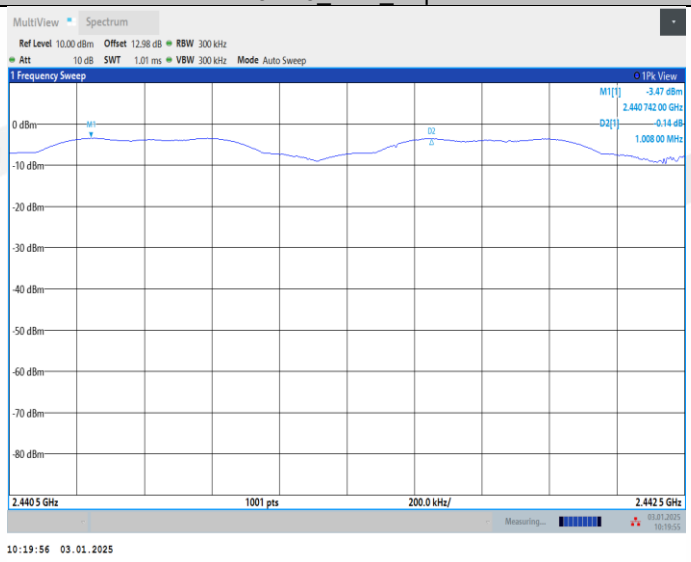
DH5_Ant1_Hop



2DH5_Ant1_Hop

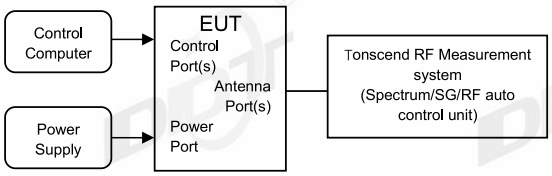


3DH5_Ant1_Hop



8. Dwell Time

8.1. Block diagram of test setup



8.2. Limits

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.

8.3. Test procedure

(1) The test according to ANSI C63.10-2020 clause 7.8.4.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.

(4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	≤ channel spacing and where possible RBW should be set >>1 / T
VBW:	VBW ≥ RBW.
Span:	Zero span, centered on a hopping channel.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Clear Write.

(5) The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

(6) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = total hops *pulse's on time.

(7) Measure and record the results in the report.

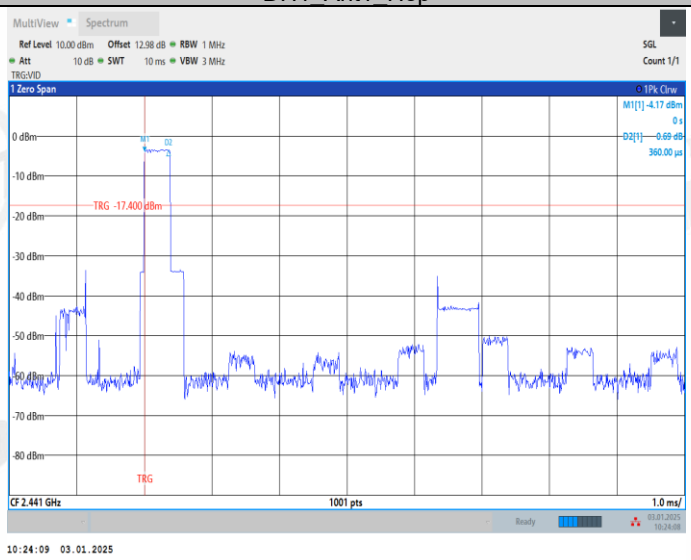
8.4. Test result

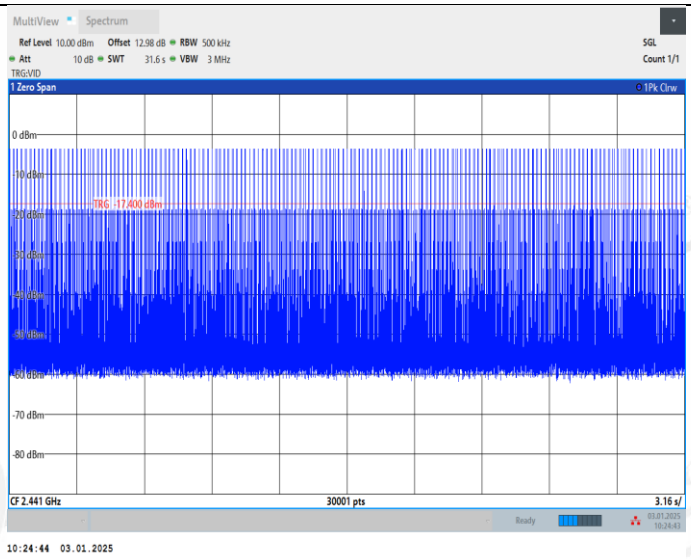
Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

Test Mode	Antenna	Frequency [MHz]	Burst Width [ms]	Total Hops [Num]	Result [s]	Limit [s]	Verdict
DH1	Ant1	Hop	0.360	312	0.112	≤0.4	PASS
DH3	Ant1	Hop	1.630	177	0.289	≤0.4	PASS
DH5	Ant1	Hop	2.870	107	0.307	≤0.4	PASS
2DH1	Ant1	Hop	0.370	311	0.115	≤0.4	PASS
2DH3	Ant1	Hop	1.620	177	0.287	≤0.4	PASS
2DH5	Ant1	Hop	2.870	108	0.31	≤0.4	PASS
3DH1	Ant1	Hop	0.370	311	0.115	≤0.4	PASS
3DH3	Ant1	Hop	1.620	175	0.284	≤0.4	PASS
3DH5	Ant1	Hop	2.870	107	0.307	≤0.4	PASS

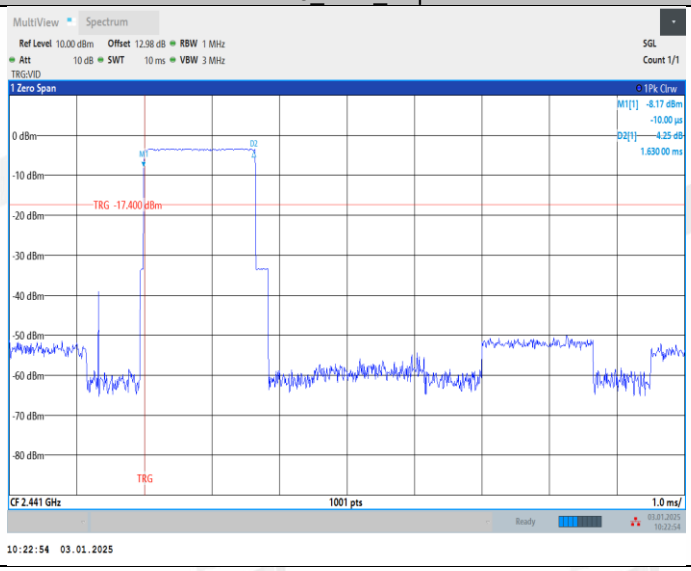
8.5. Test graphs

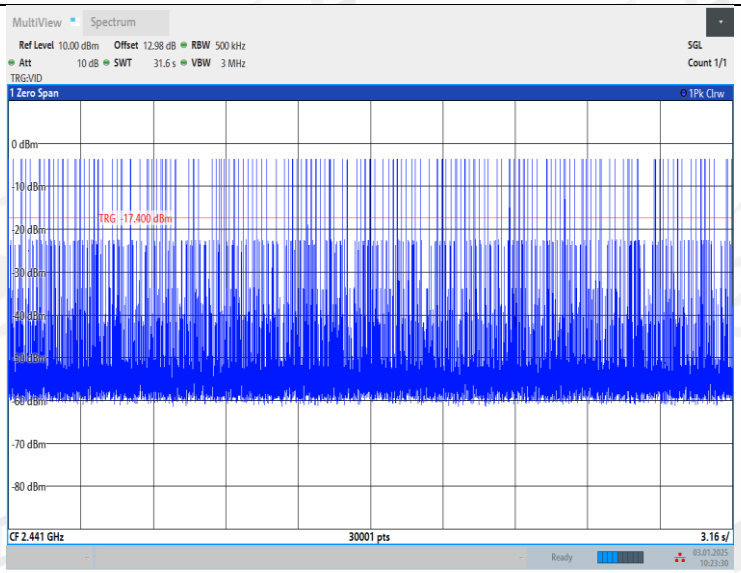
DH1_Ant1_Hop





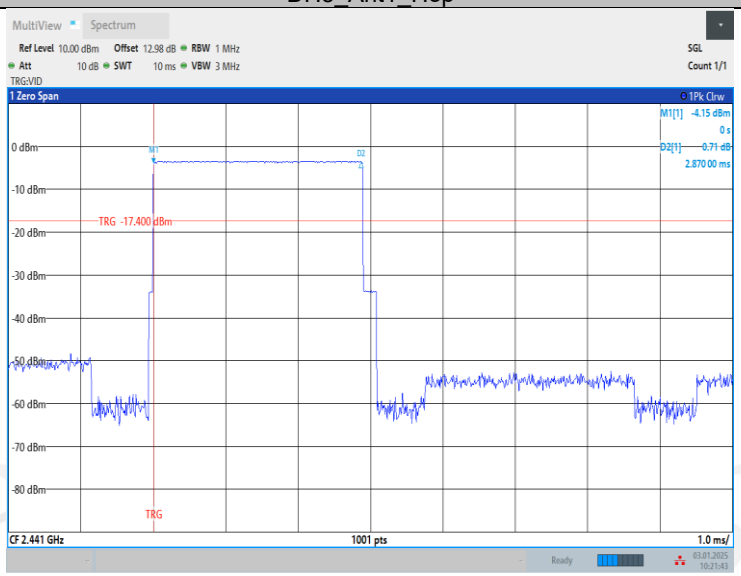
DH3_Ant1_Hop



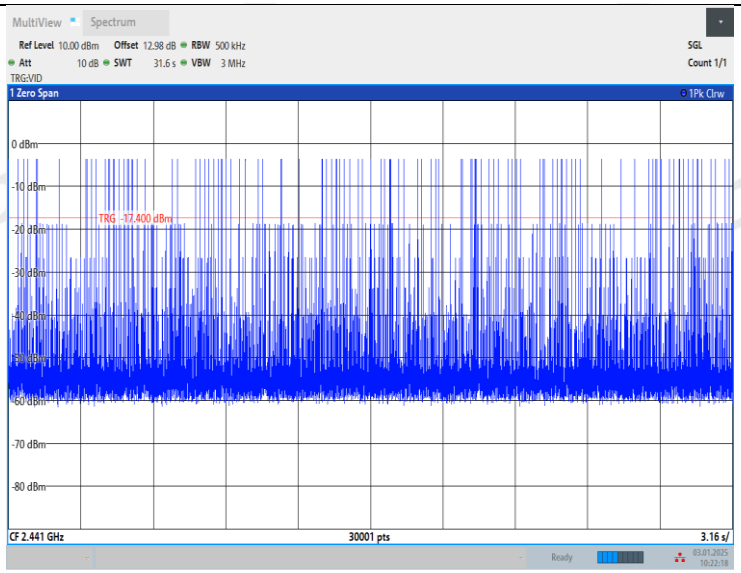


10:23:30 03.01.2025

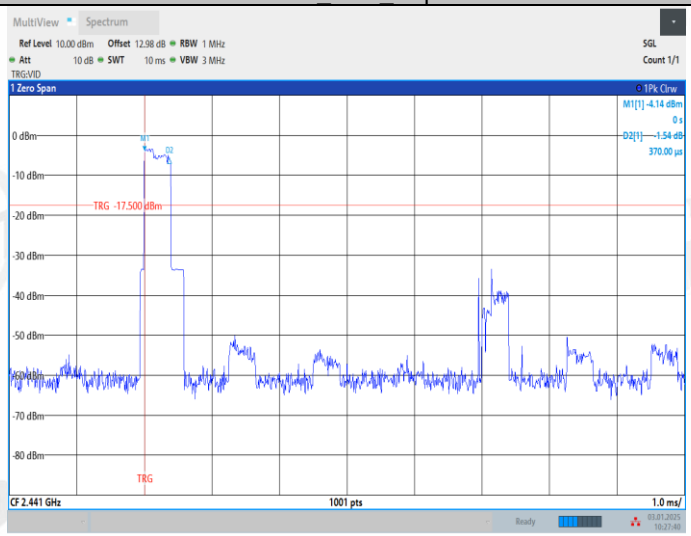
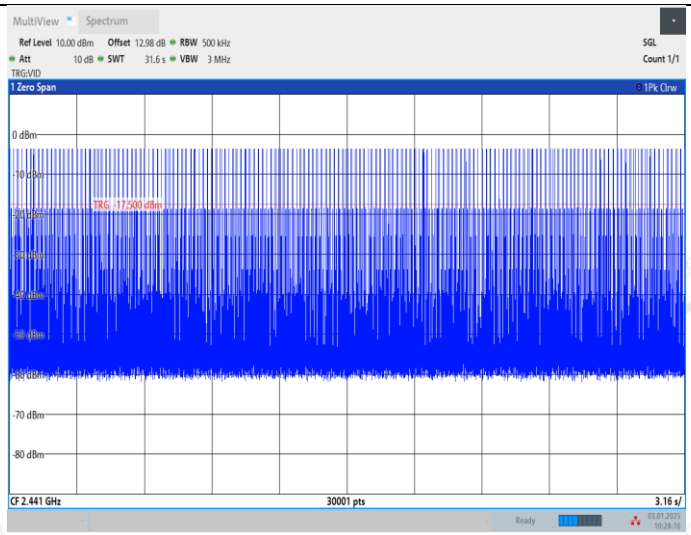
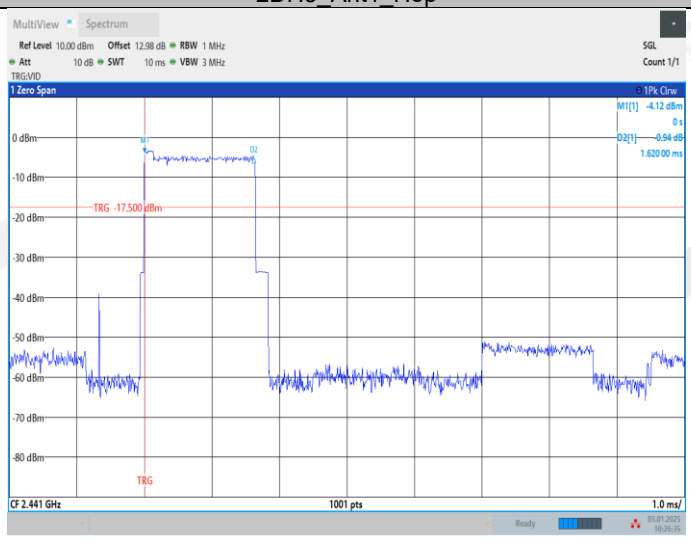
DH5_Ant1_Hop

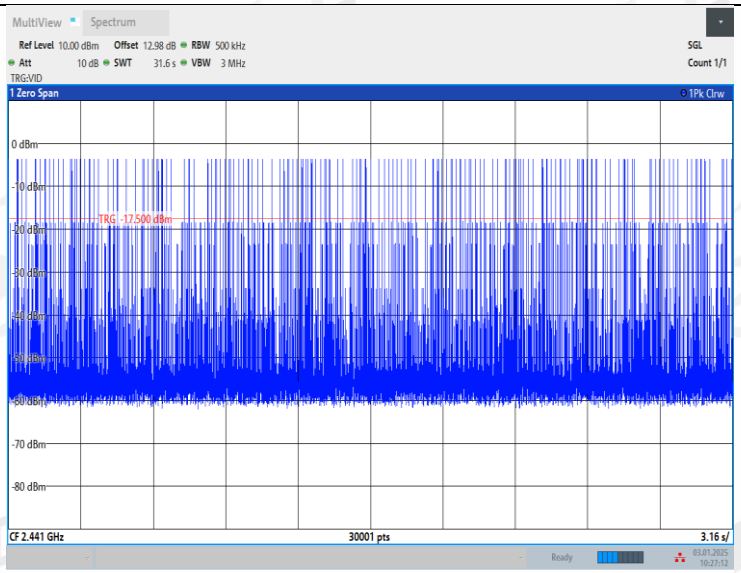


10:21:43 03.01.2025



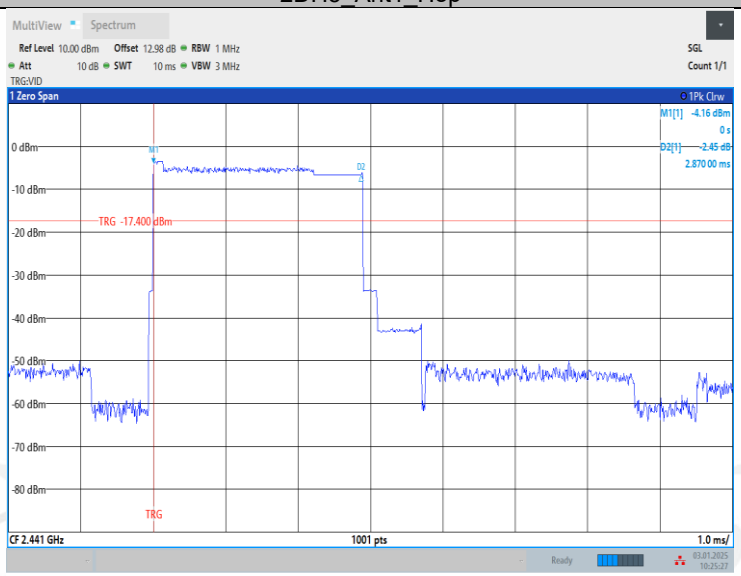
10:22:19 03.01.2025

2DH1_Ant1_Hop


2DH3_Ant1_Hop


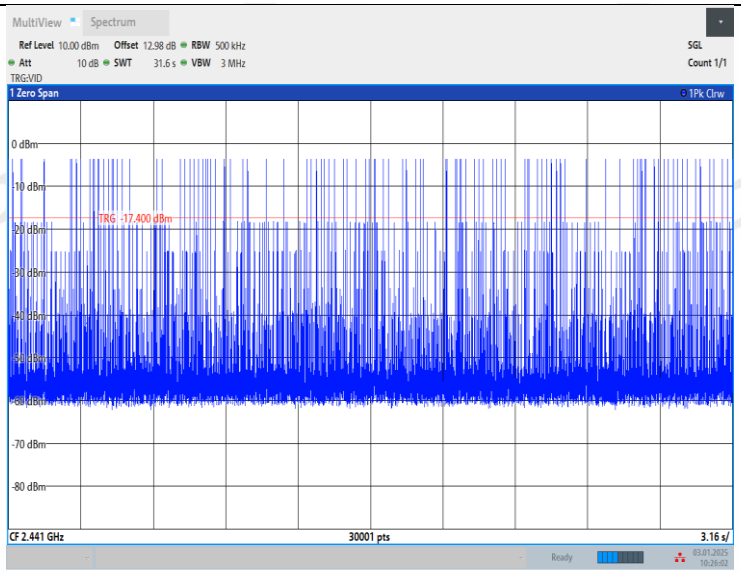


10:27:12 03.01.2025

2DH5_Ant1_Hop

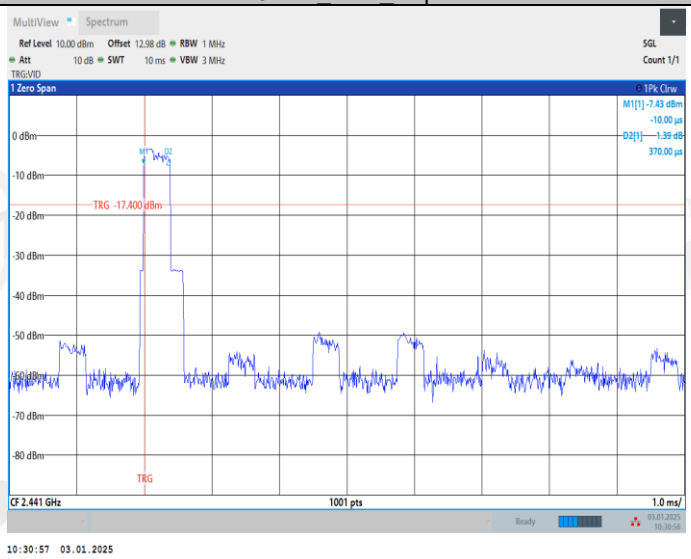


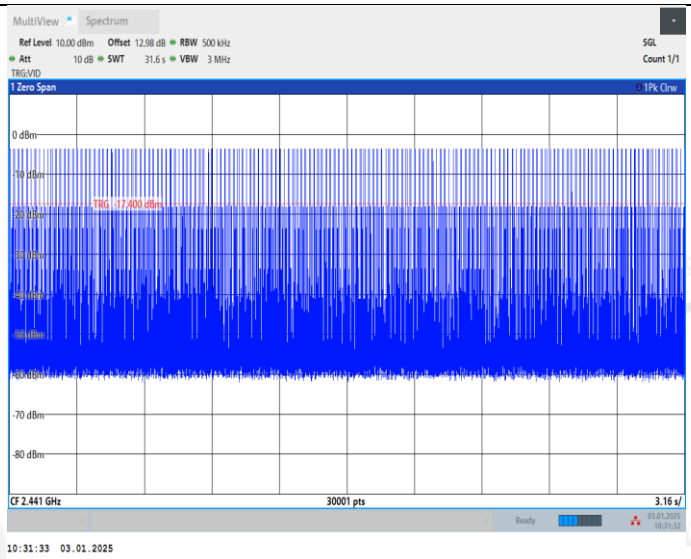
10:25:27 03.01.2025



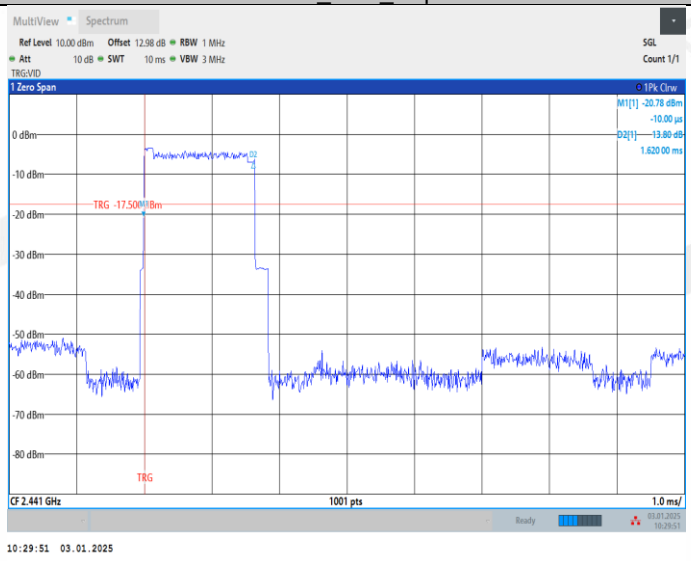
10:26:03 03.01.2025

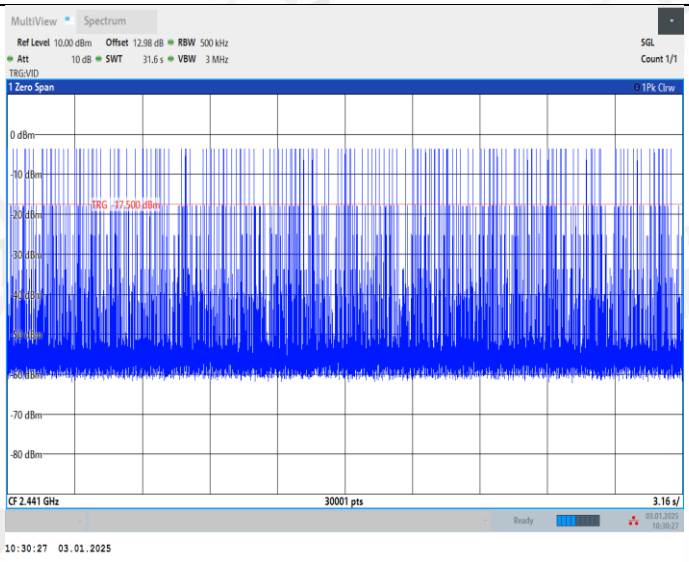
3DH1_Ant1_Hop



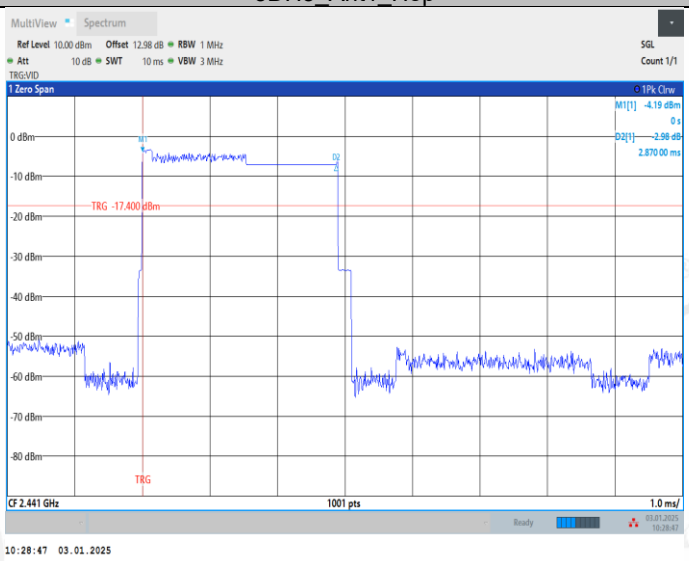


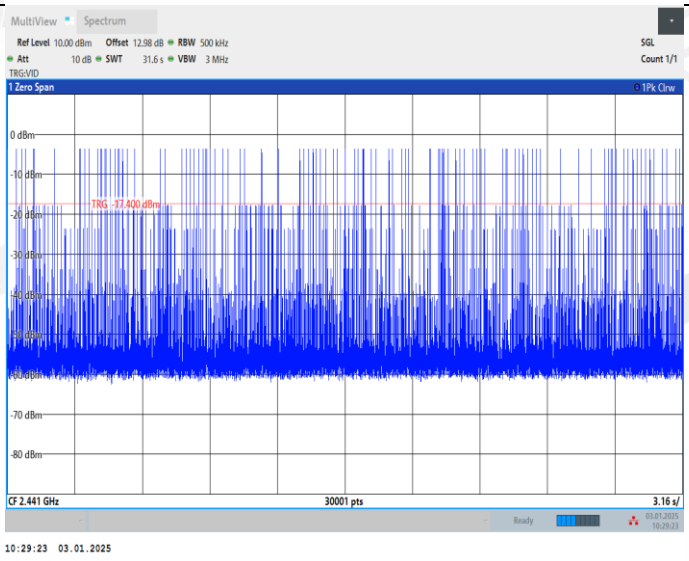
3DH3_Ant1_Hop





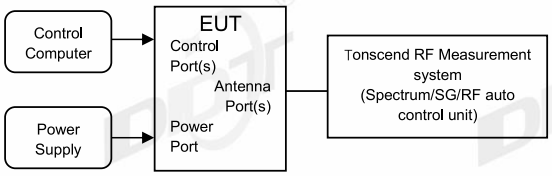
3DH5_Ant1_Hop





9. Number of Hopping Channel

9.1. Block diagram of test setup



9.2. Limits

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

9.3. Test procedure

(1) The test according to ANSI C63.10-2020 clause 7.8.3.

(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.

(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.

(4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW:	VBW ≥ RBW.
Span:	The frequency band of operation
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold

(5) Measure the hopping number and record the results in the report.

(6) Measure and record the results in the report.

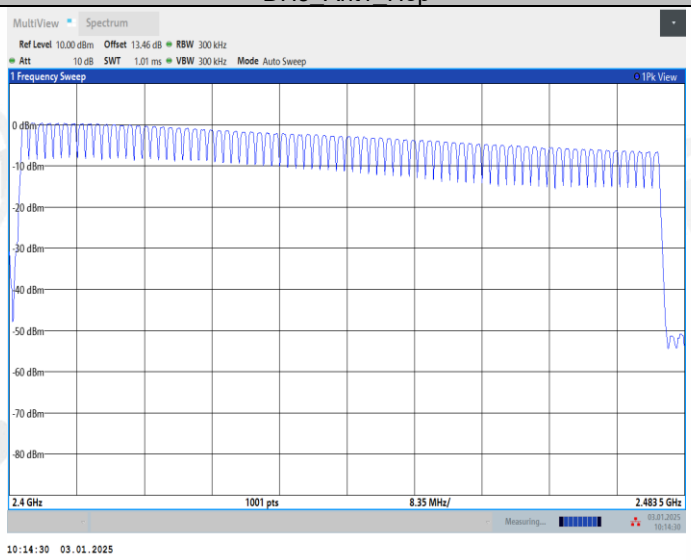
9.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

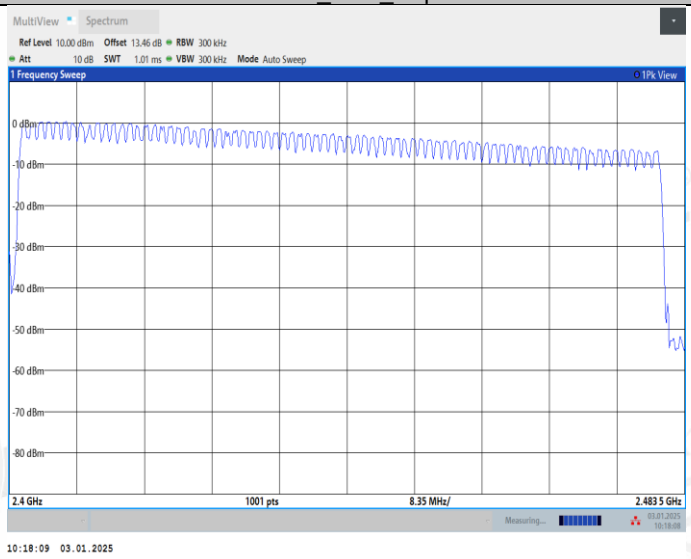
Test Mode	Antenna	Frequency [MHz]	Result [Num]	Limit [Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

9.5. Test graphs

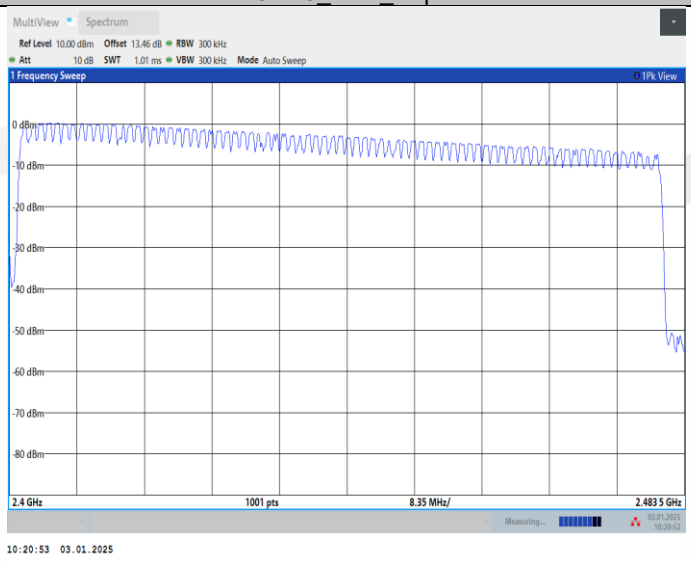
DH5_Ant1_Hop



2DH5_Ant1_Hop

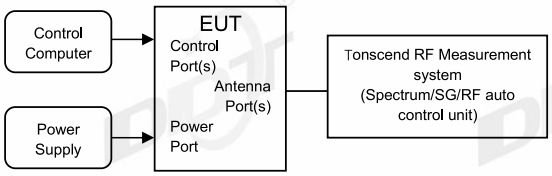


3DH5_Ant1_Hop



10. Band Edge Compliance (Conducted Method)

10.1. Block diagram of test setup



10.2. Limit

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

10.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

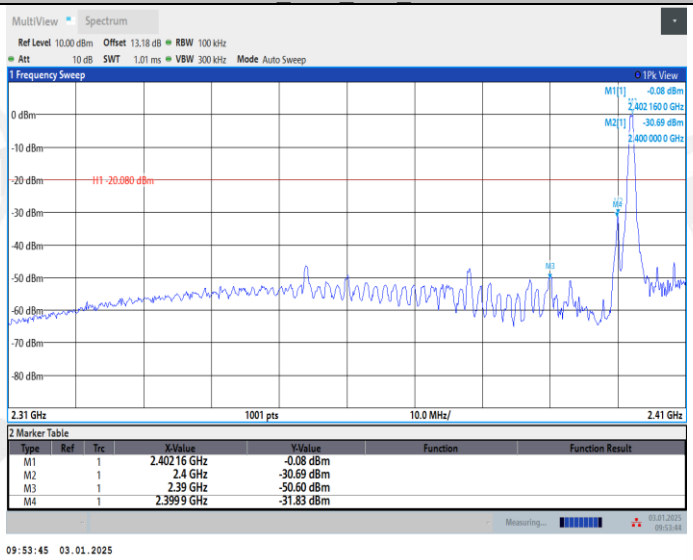
10.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

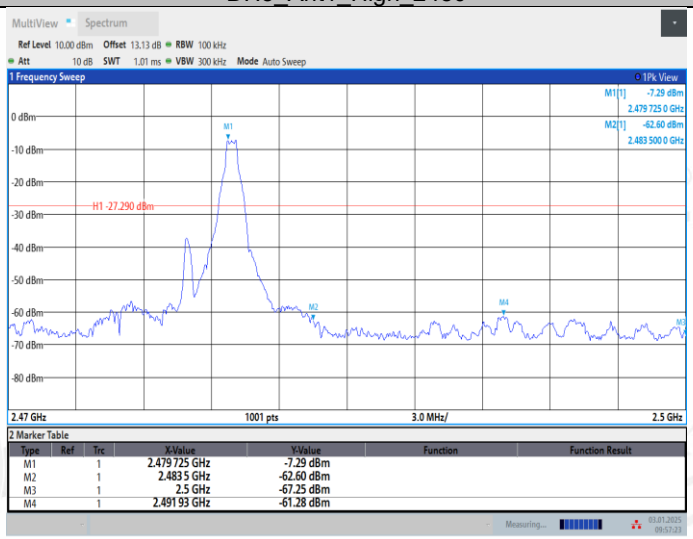
Mode	Freq. (MHz)	Verdict
DH5	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass
2DH5	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass
3DH5	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass

10.5. Test graphs

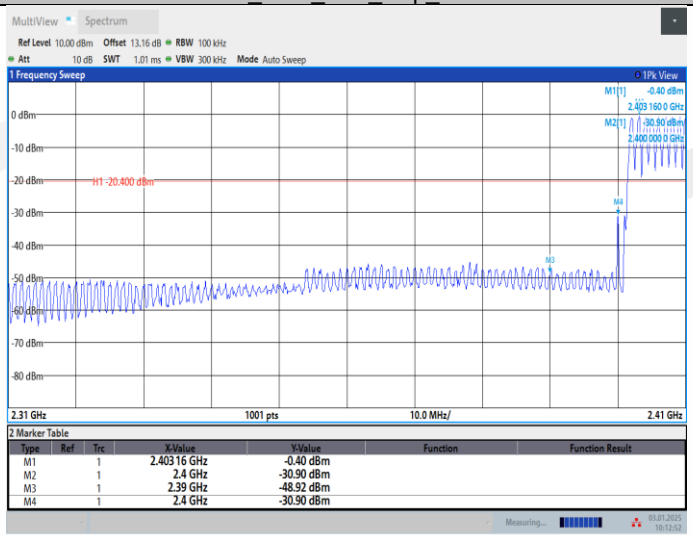
DH5_Ant1_Low_2402



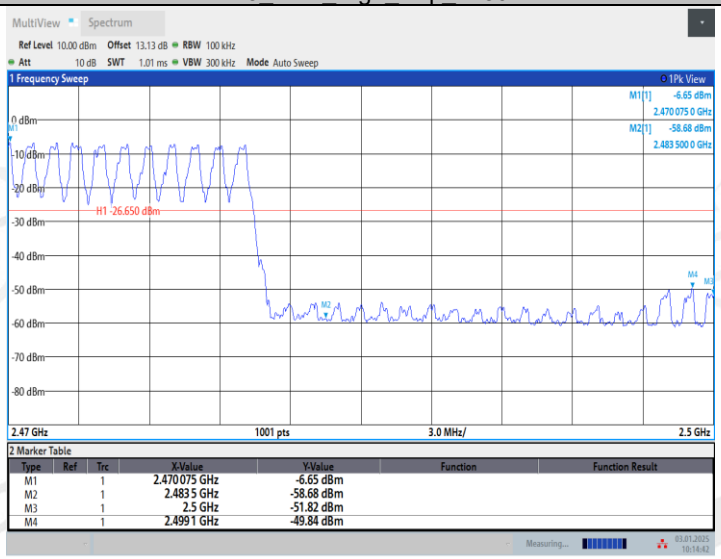
DH5_Ant1_High_2480



DH5_Ant1_Low_Hop_2402

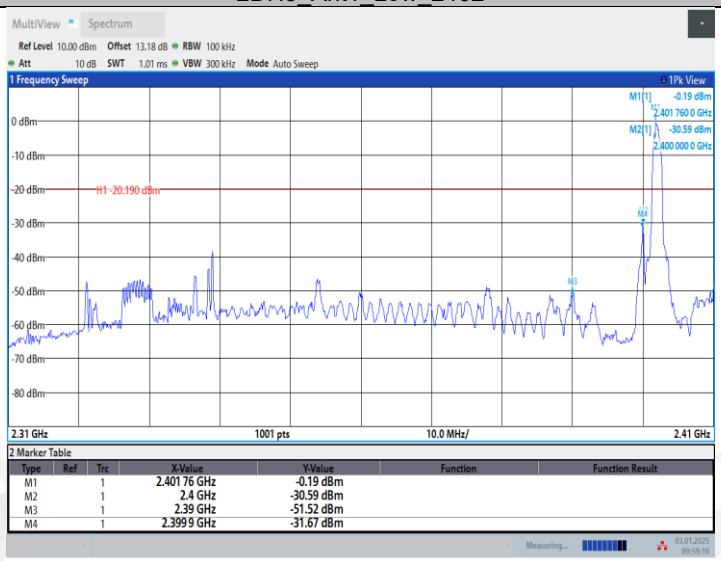


DH5_Ant1_High_Hop_2480



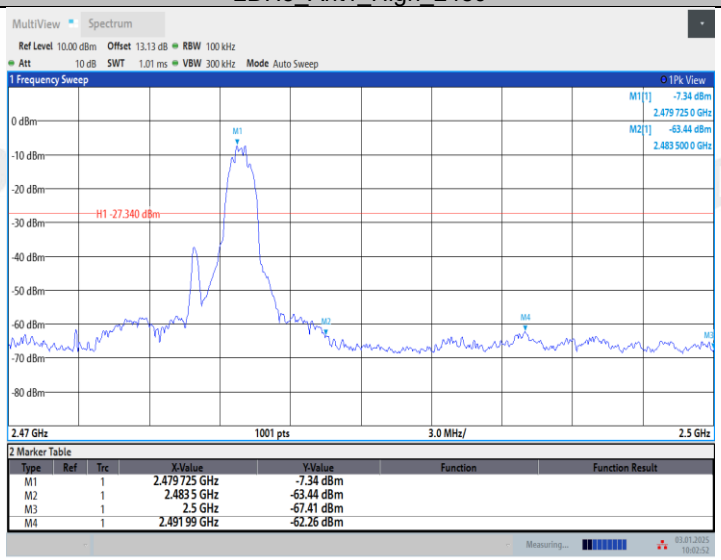
10:14:43 03.01.2025

2DH5_Ant1_Low_2402



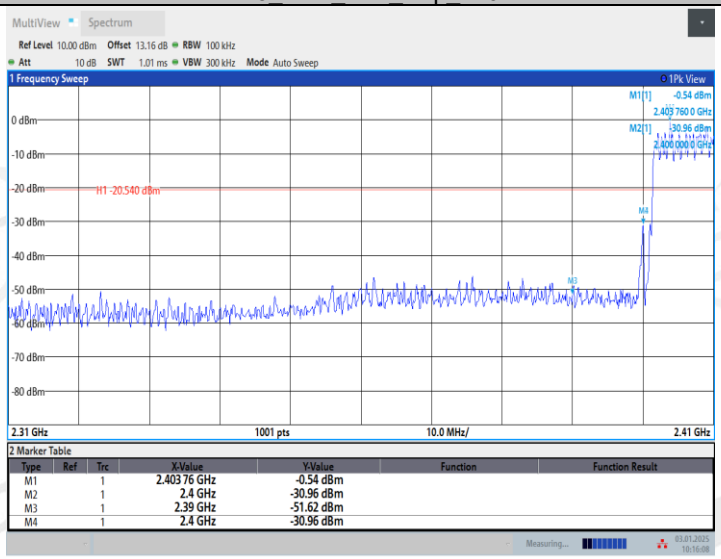
09:59:16 03.01.2025

2DH5_Ant1_High_2480



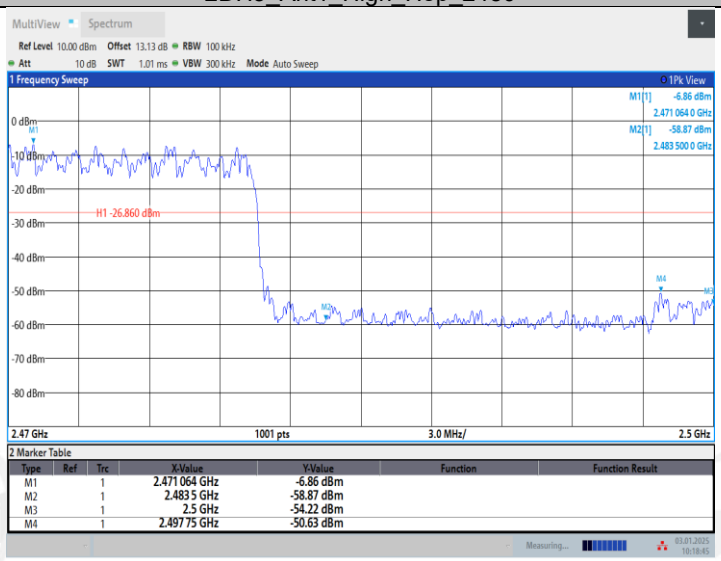
10:02:52 03.01.2025

2DH5_Ant1_Low_Hop_2402



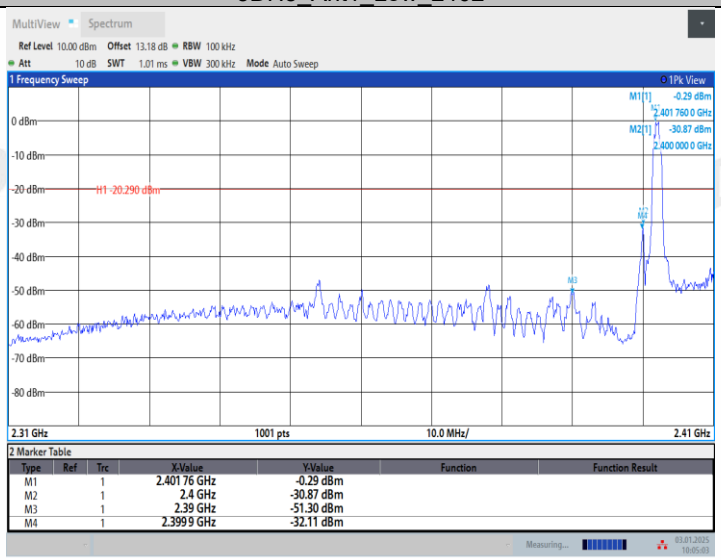
10:16:09 03.01.2025

2DH5_Ant1_High_Hop_2480



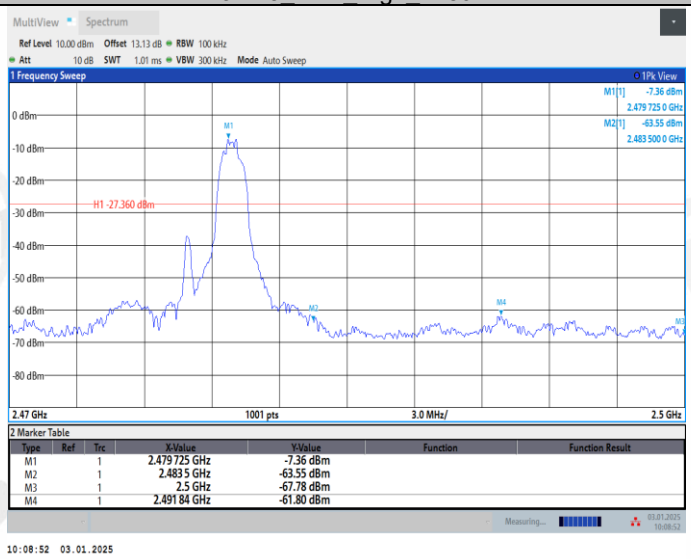
10:18:45 03.01.2025

3DH5_Ant1_Low_2402

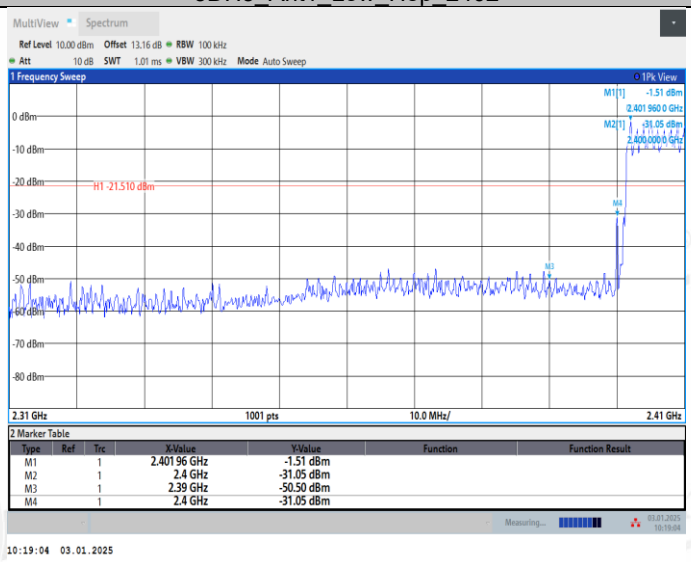


10:05:03 03.01.2025

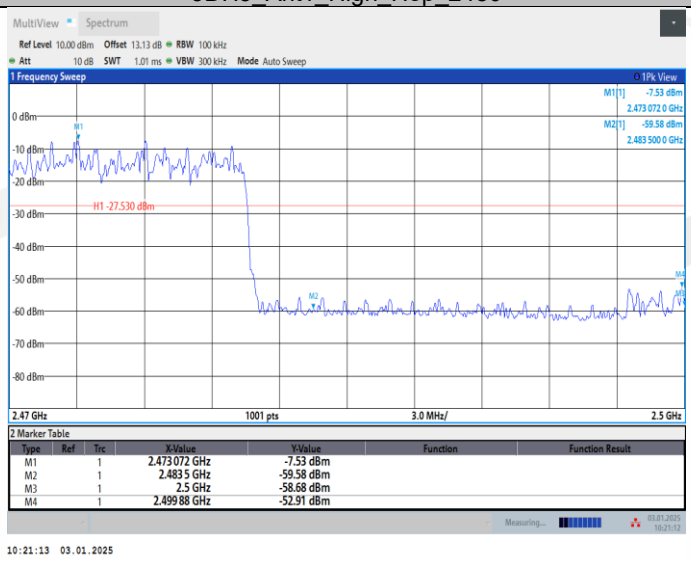
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



11. RF Conducted Spurious Emissions

11.1. Block diagram of test setup

Same as 10.1

11.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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.

11.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	Test frequency
RBW:	100 kHz
VBW:	300 kHz
Span	Wide enough to capture the peak level of the in-band emission
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	≥Span/RBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

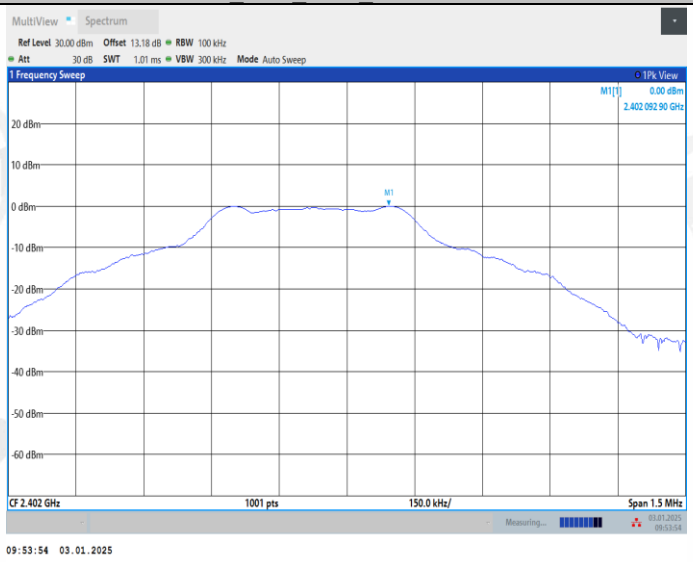
11.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	23.6℃, 48.3%RH	Test Date:	2025.01.03
Test Power Supply:	DC 12V	Sample Number:	S24120318-006

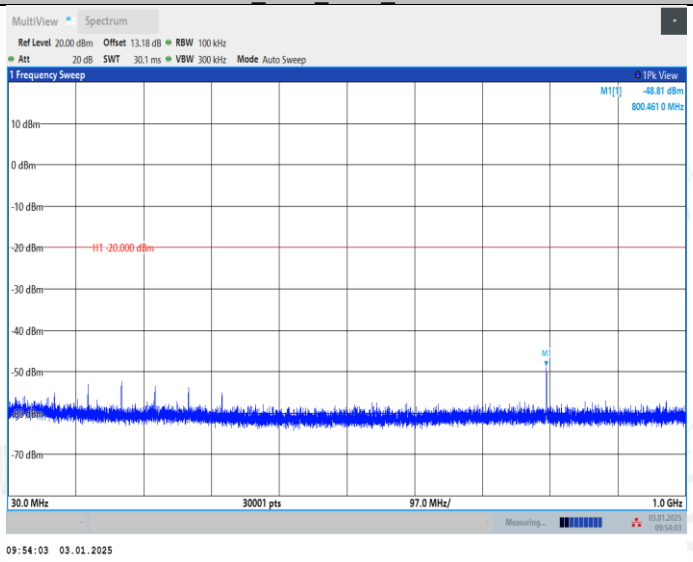
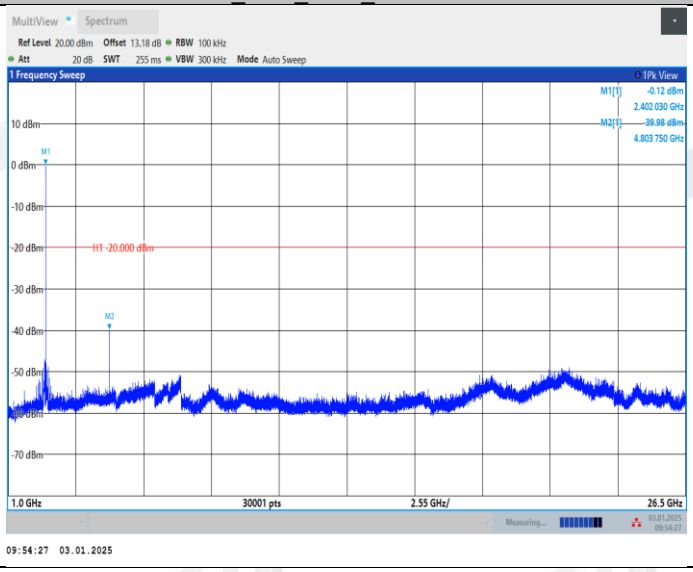
Mode	Freq. (MHz)	Verdict
DH5	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass
2DH5	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass
8DPSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass

11.5. Test graphs

DH5_Ant1_2402_0~Reference



DH5_Ant1_2402_30~1000



DH5_Ant1_2402_1000~26500