



FCC CERTIFICATION TEST REPORT

Applicant	:	Kingstate Electronics(Dongguan)Co., Ltd
Address of Applicant	:	No 11 Chong Tian Avenue, Shi Pai Town, Dong Guan City, Guang Dong Province, China.
Manufacturer	:	Kingstate Electronics(Dongguan)Co., Ltd
Address of Manufacturer	:	No 11 Chong Tian Avenue, Shi Pai Town, Dong Guan City, Guang Dong Province, China.
Equipment under Test	:	HEADPHONES
Model No.	:	YH-L500A
FCC ID	:	2AKMBYH-L500A
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013
Report No.	:	DDT-RE24052920-1E01
Issue Date	:	2024/08/13
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	11
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.	Maximum Peak Output Power.....	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.	Carrier Frequency Separation	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.	Dwell Time	26
7.1.	Block diagram of test setup	26
7.2.	Limits.....	26
7.3.	Test procedure.....	26
7.4.	Test result	27
7.5.	Test graphs	28
8.	Number of Hopping Channel	34

8.1.	Block diagram of test setup	34
8.2.	Limits.....	34
8.3.	Test procedure.....	34
8.4.	Test result	35
8.5.	Test graphs.....	36
9.	Band Edge Compliance (Conducted Method).....	37
9.1.	Block diagram of test setup	37
9.2.	Limit.....	37
9.3.	Test procedure.....	37
9.4.	Test result	38
9.5.	Test graphs.....	39
10.	RF Conducted Spurious Emissions.....	43
10.1.	Block diagram of test setup	43
10.2.	Limits.....	43
10.3.	Test procedure.....	43
10.4.	Test result	44
10.5.	Test graphs.....	45
11.	Duty cycle	54
11.1.	Block diagram of test setup	54
11.2.	Limit.....	54
11.3.	Test procedure.....	54
11.4.	Test result	55
11.5.	Test graphs.....	56
12.	Antenna Requirements	59
12.1.	Limit.....	59
12.2.	Result.....	59
13.	Radiated Emission.....	60
13.1.	Test equipment	60
13.2.	Block diagram of test setup	61
13.3.	Limits.....	62
13.4.	Assistant equipment used for test	63
13.5.	Test procedure.....	63
13.6.	Test result	65
13.7.	Test data	66
14.	Band Edge Compliance	74
14.1.	Test equipment	74
14.2.	Block diagram of test setup	75
14.3.	Limits.....	75

14.4.	Assistant equipment used for test	75
14.5.	Test procedure.....	75
14.6.	Test result	75
14.7.	Test data	76
15.	Power Line Conducted Emissions.....	88
15.1.	Test equipment.....	88
15.2.	Block diagram of test setup	88
15.3.	Limits.....	88
15.4.	Assistant equipment used for test	88
15.5.	Test procedure.....	89
15.6.	Test result	89
15.7.	Test data	90
16.	Test Setup Photograph.....	92
17.	Photos of the EUT	94

Test Report Declare

Applicant	:	Kingstate Electronics(Dongguan)Co., Ltd
Address of Applicant	:	No 11 Chong Tian Avenue, Shi Pai Town, Dong Guan City, Guang Dong Province, China.
Equipment under Test	:	HEADPHONES
Model No.	:	YH-L500A
Manufacturer	:	Kingstate Electronics(Dongguan)Co., Ltd
Address of Manufacturer	:	No 11 Chong Tian Avenue, Shi Pai Town, Dong Guan City, Guang Dong Province, China.

Test Standard Used:
FCC Rules and Regulations Part 15 Subpart C,
ANSI C63.10:2013

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-RE24052920-1E01		
Date of Receipt:	2024/07/09	Date of Test:	2024/07/09~2024/08/13

Prepared By:

Bobo Chen

Bobo Chen/Engineer

Approved By:



Damon Hu

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	2024/08/13	

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)	/	Pass

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	: HEADPHONES
Model Number	: YH-L500A
EUT Function Description	: Please reference user manual of this device
Power Supply	: DC 5V/0.5A by USB port powered or DC 3.7V built-in lithium battery
Maximum Work Frequency	: 2480MHz

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

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

Antenna information	
Antenna Type	: PCB
Max Antenna Gain(dBi)	: 2.72

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		

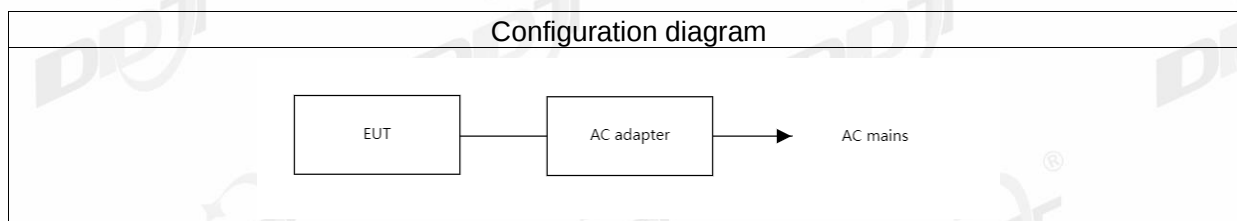
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's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

“☑” means to be chosen or applicable; “☐” means don't to be chosen or not applicable; This note applies to entire report.

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
USB cable	N/A	N/A	length: 0.30m, unshielded
Aux in cable	N/A	N/A	length: 3.00m, unshielded

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: BlueTest3_3.3.18.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	Default	CH0 to CH78	2402 to 2480
$\pi/4$ -DQPSK hopping on Tx mode	Default	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	Default	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	Default	CH0	2402
	Default	CH39	2441
	Default	CH78	2480
$\pi/4$ -DQPSK hopping off Tx mode	Default	CH0	2402
	Default	CH39	2441
	Default	CH78	2480
8DPSK hopping off Tx mode	Default	CH0	2402
	Default	CH39	2441
	Default	CH78	2480
Worst-case data rates were: GFSK mode: DH5, $\pi/4$ -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°C to +35 °C
Humidity range:	20% to 75%
Pressure range:	86 kPa to 106 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 ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
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)

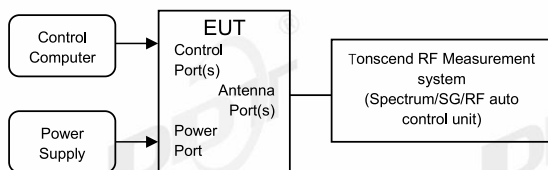
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑RF Connected Test (RF Measurement System 3#)				
SIGNAL ANALYZER	R&S	FSV40	101407	2025/07/08
Wideband Radio Communication Tester	R&S	CMW500	117491	2025/03/31
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2025/07/08
MXG Vector Signal Generator	Agilent	N5182A	MY48180912	2025/03/31
RF Control Unit	Tonscend	JS0806-2	20C8060230	2025/03/31
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2025/04/22
Test Software	Tonscend	JS1120-3	Ver.3.2.22	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 C63.10-2013 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:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

Test Mode	Antenna	Frequency [MHz]	20dB EBW[MHz]
DH5	Ant1	2402	0.96
		2441	0.96
		2480	0.96
2DH5	Ant1	2402	1.34
		2441	1.34
		2480	1.34
3DH5	Ant1	2402	1.31
		2441	1.31
		2480	1.31

4.5.Test graphs

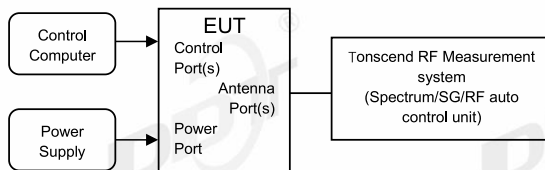






5. Maximum Peak Output Power

5.1. Block diagram of test setup



5.2. 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.

5.3. Test procedure

- (1) The test according to ANSI C63.10-2013 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:	$VBW \geq RBW$.
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.

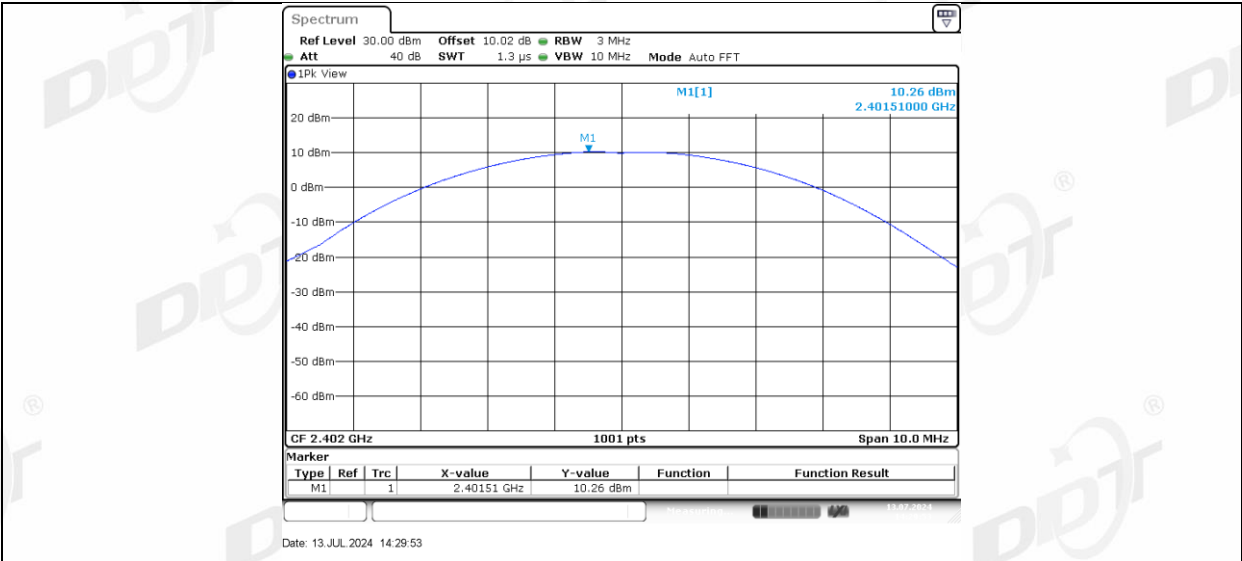
5.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

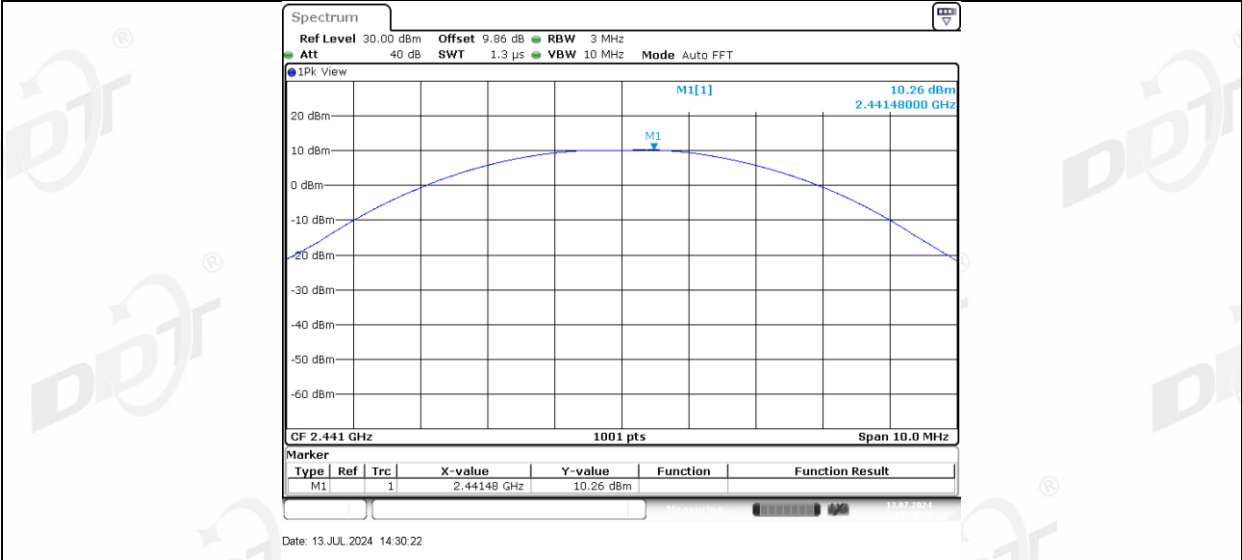
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
DH5	Ant1	2402	10.20	≤20.97	12.92	≤30	PASS
		2441	10.16	≤20.97	12.88	≤30	PASS
		2480	10.12	≤20.97	12.84	≤30	PASS
2DH5	Ant1	2402	10.26	≤20.97	12.98	≤30	PASS
		2441	10.26	≤20.97	12.98	≤30	PASS
		2480	10.42	≤20.97	13.14	≤30	PASS
3DH5	Ant1	2402	10.54	≤20.97	13.26	≤30	PASS
		2441	10.71	≤20.97	13.43	≤30	PASS
		2480	10.82	≤20.97	13.54	≤30	PASS

5.5.Test graphs

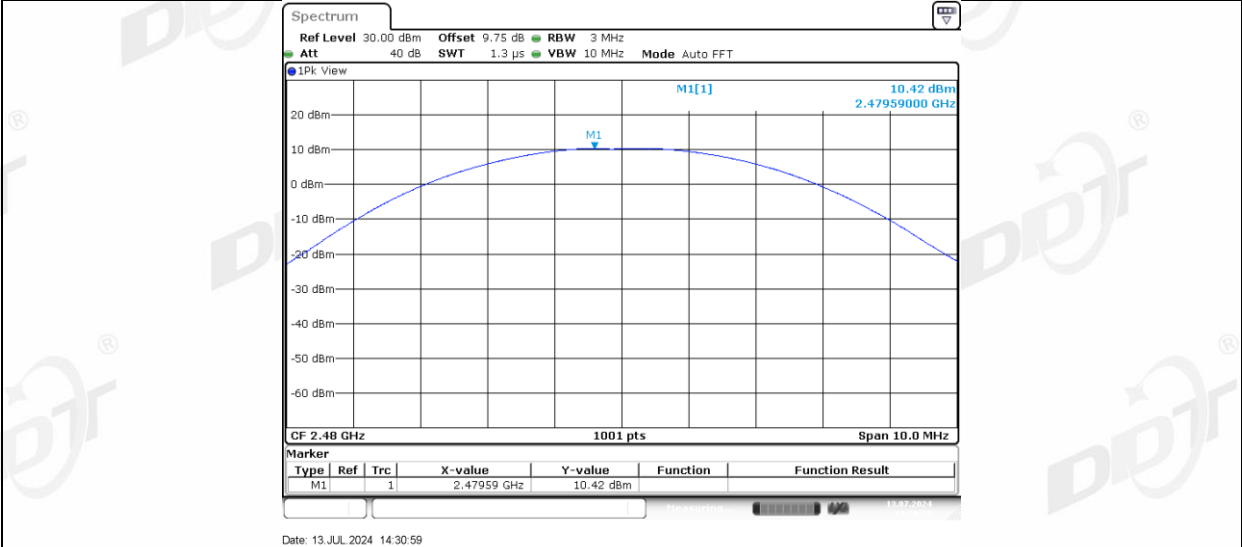




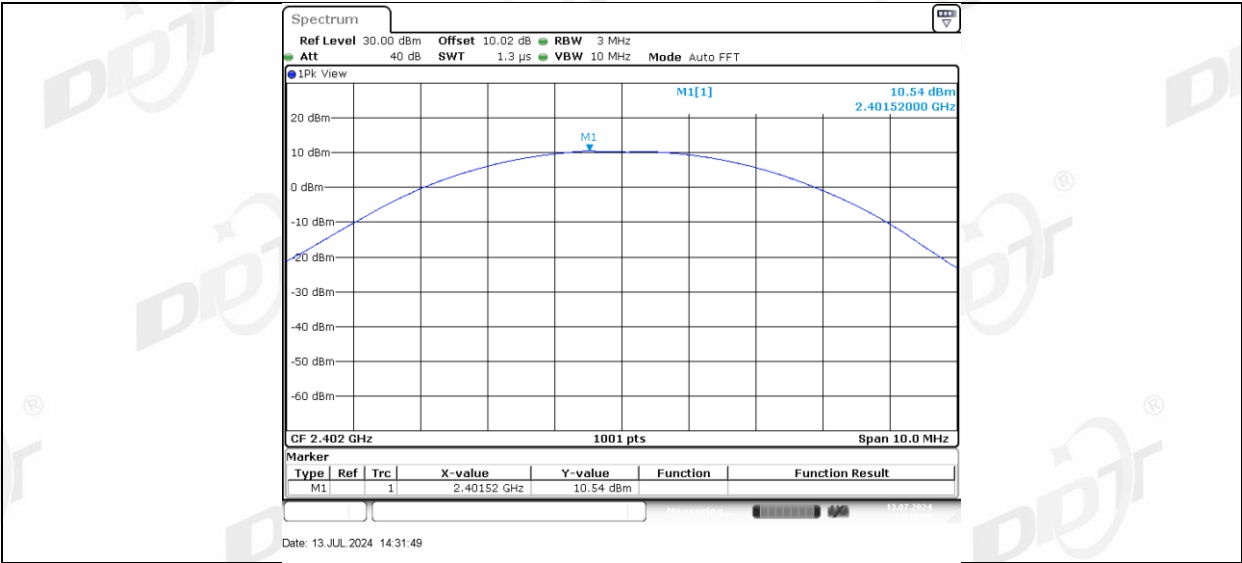
2DH5_Ant1_2441



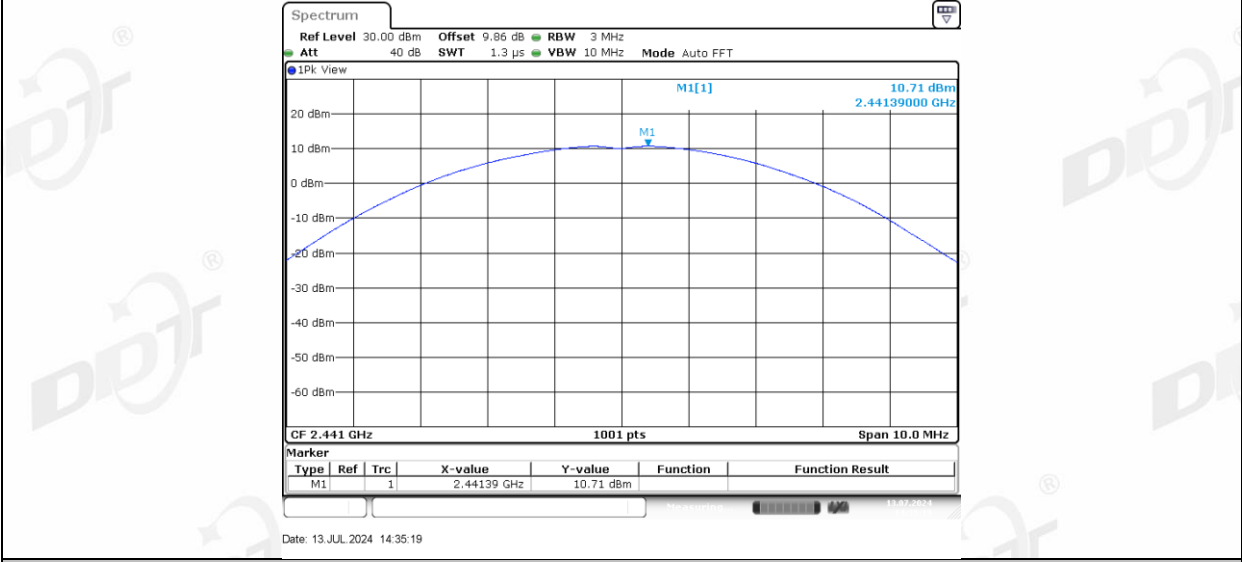
2DH5_Ant1_2480



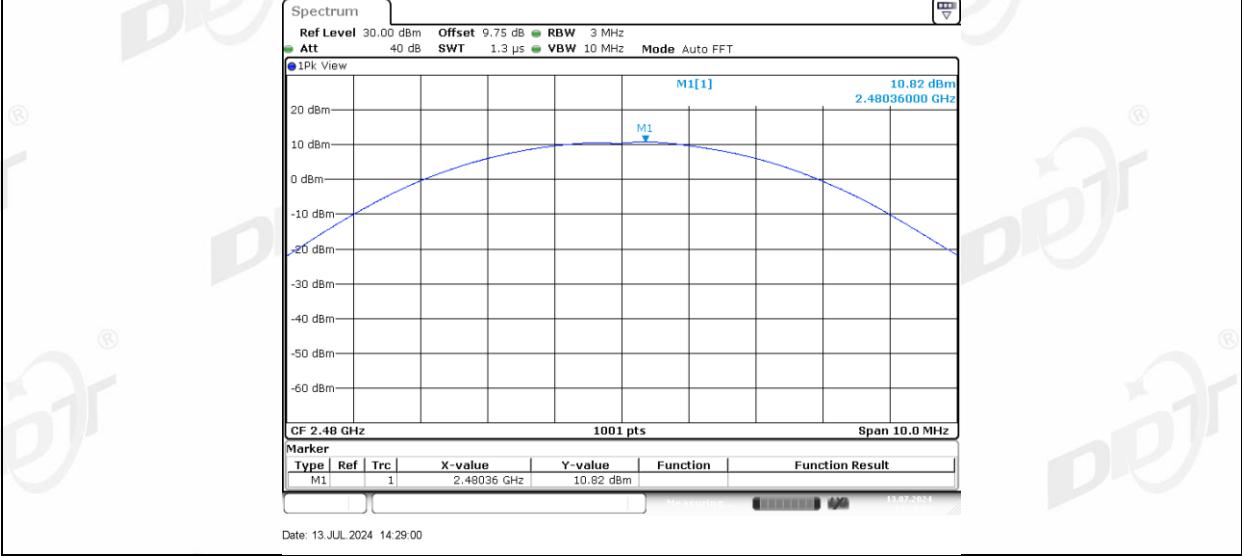
3DH5_Ant1_2402



3DH5_Ant1_2441

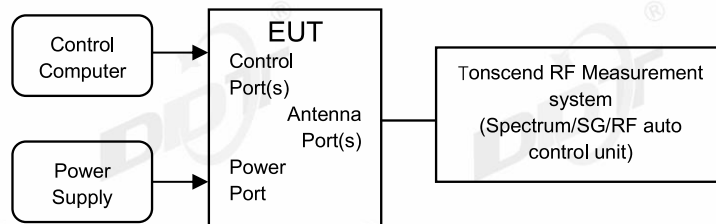


3DH5_Ant1_2480



6. Carrier Frequency Separation

6.1. Block diagram of test setup



6.2. 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.

6.3. Test procedure

- (1) The test according to ANSI C63.10-2013 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 $\geq$ 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.

6.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

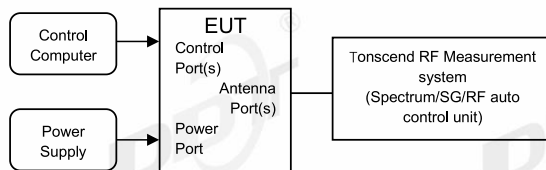
Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	1.003	≥0.960	PASS
2DH5	Ant1	Hop	1.000	≥0.893	PASS
3DH5	Ant1	Hop	1.000	≥0.873	PASS

6.5.Test graphs



7. Dwell Time

7.1. Block diagram of test setup



7.2. 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.

7.3. Test procedure

- (1) The test according to ANSI C63.10-2013 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:

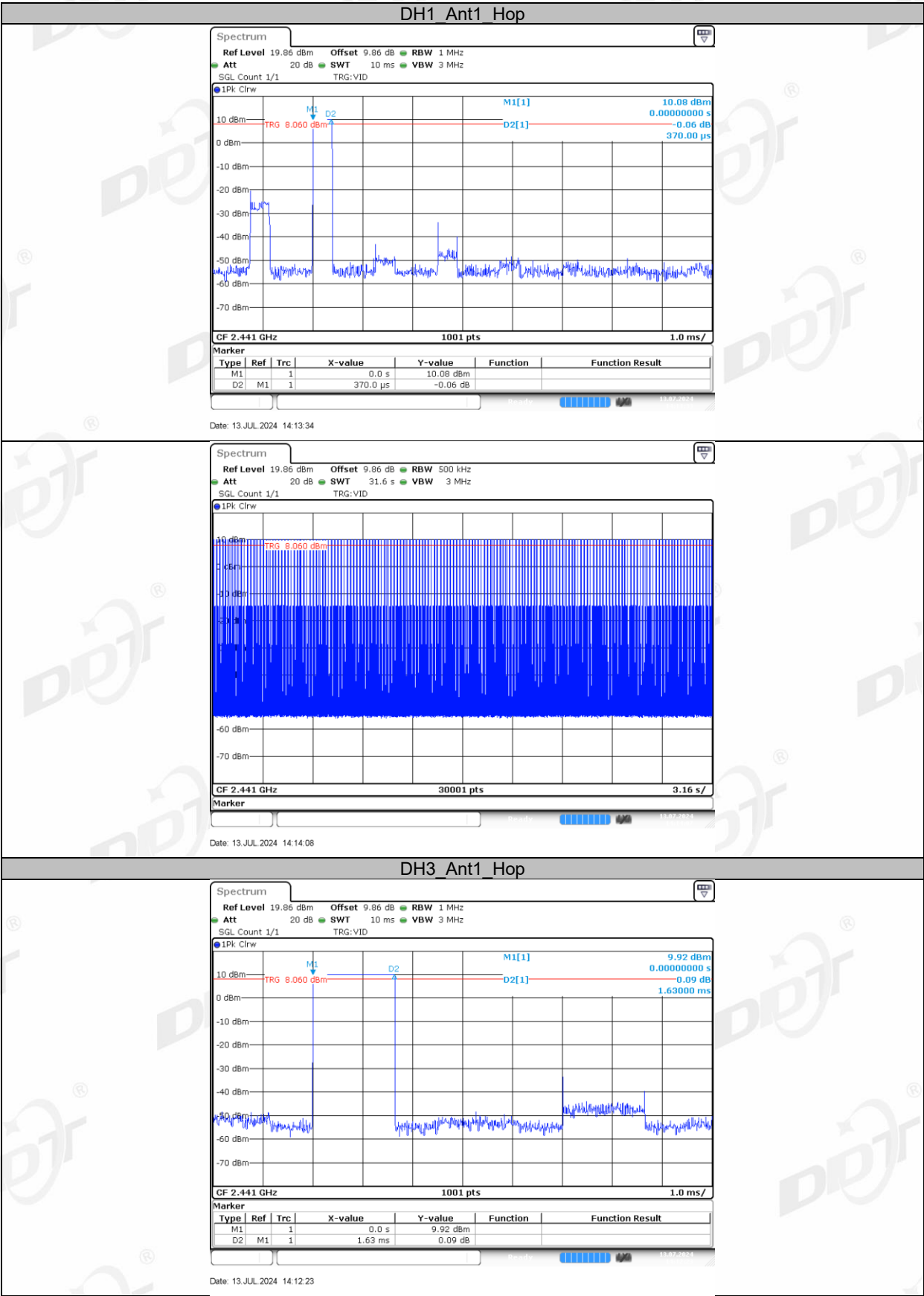
RBW:	$\leq$ channel spacing and where possible RBW should be set $\gg 1 / T$
VBW:	$VBW \geq RBW$.
Span:	Zero span, centered on a hopping channel.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Clear Write.
- (5) The test period: $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$
- (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.

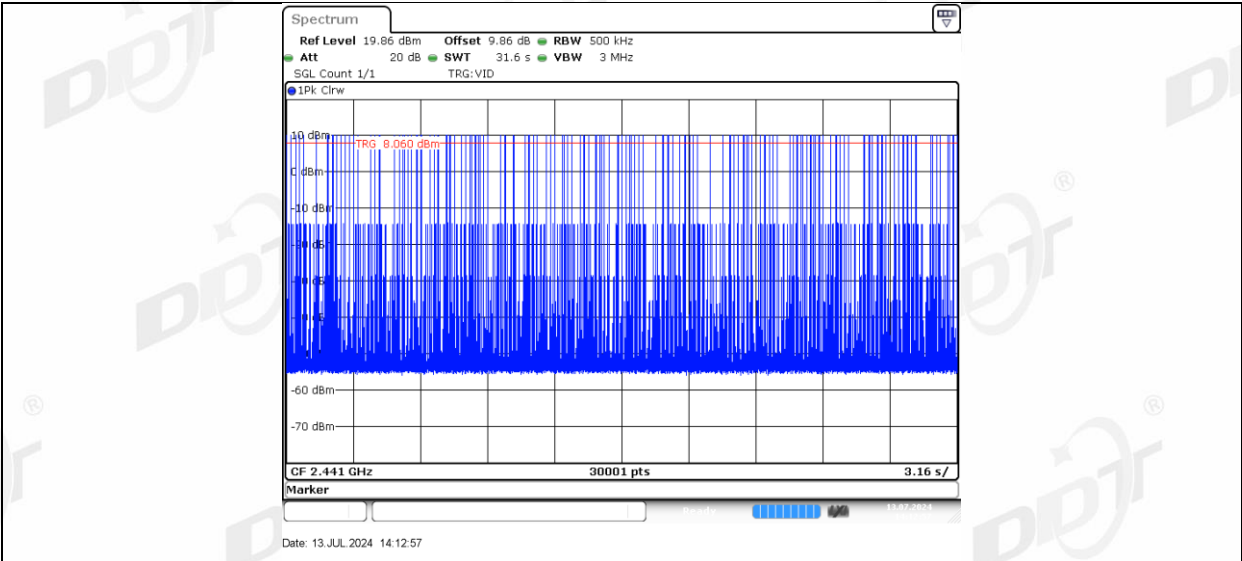
7.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

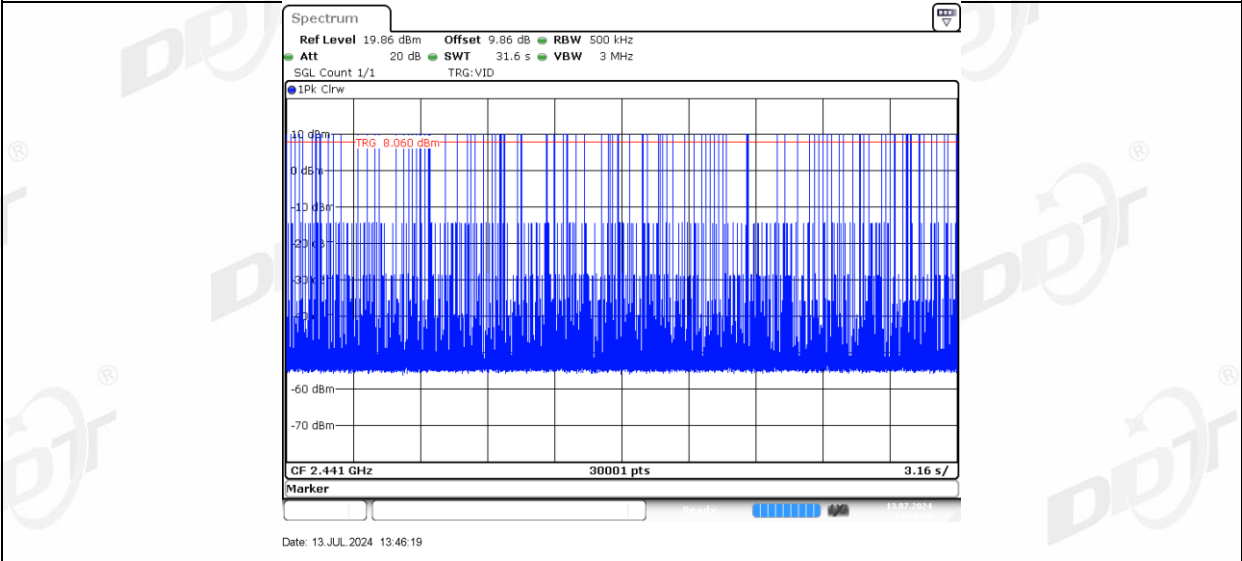
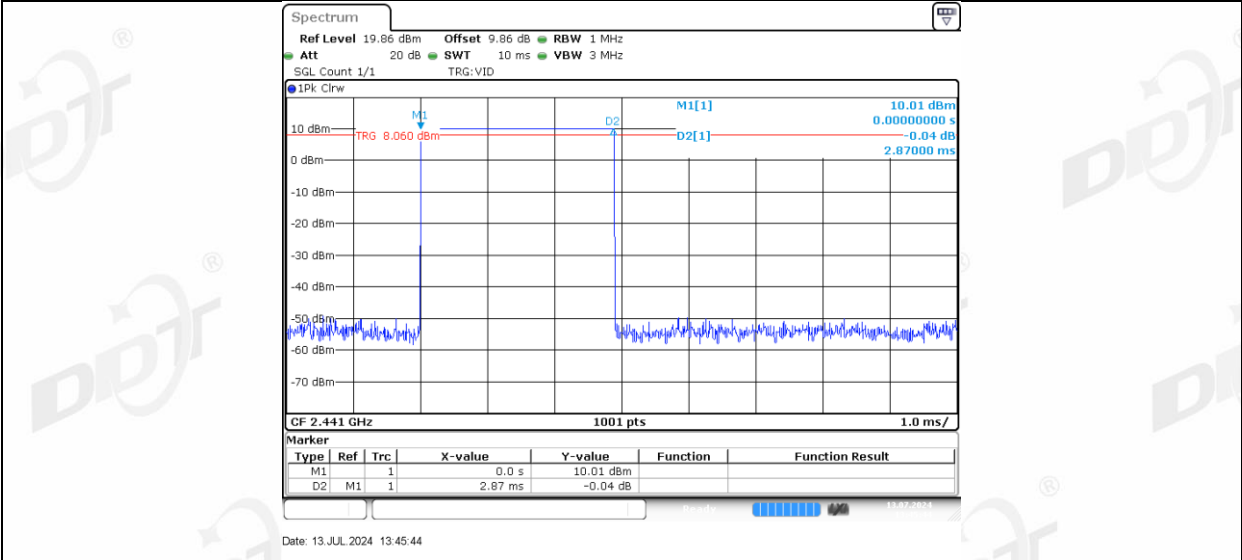
Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.370	318	0.118	≤0.4	PASS
DH3	Ant1	Hop	1.630	157	0.256	≤0.4	PASS
DH5	Ant1	Hop	2.870	114	0.327	≤0.4	PASS
2DH1	Ant1	Hop	0.370	317	0.117	≤0.4	PASS
2DH3	Ant1	Hop	1.620	159	0.258	≤0.4	PASS
2DH5	Ant1	Hop	2.870	107	0.307	≤0.4	PASS
3DH1	Ant1	Hop	0.370	318	0.118	≤0.4	PASS
3DH3	Ant1	Hop	1.620	163	0.264	≤0.4	PASS
3DH5	Ant1	Hop	2.880	94	0.271	≤0.4	PASS

7.5.Test graphs

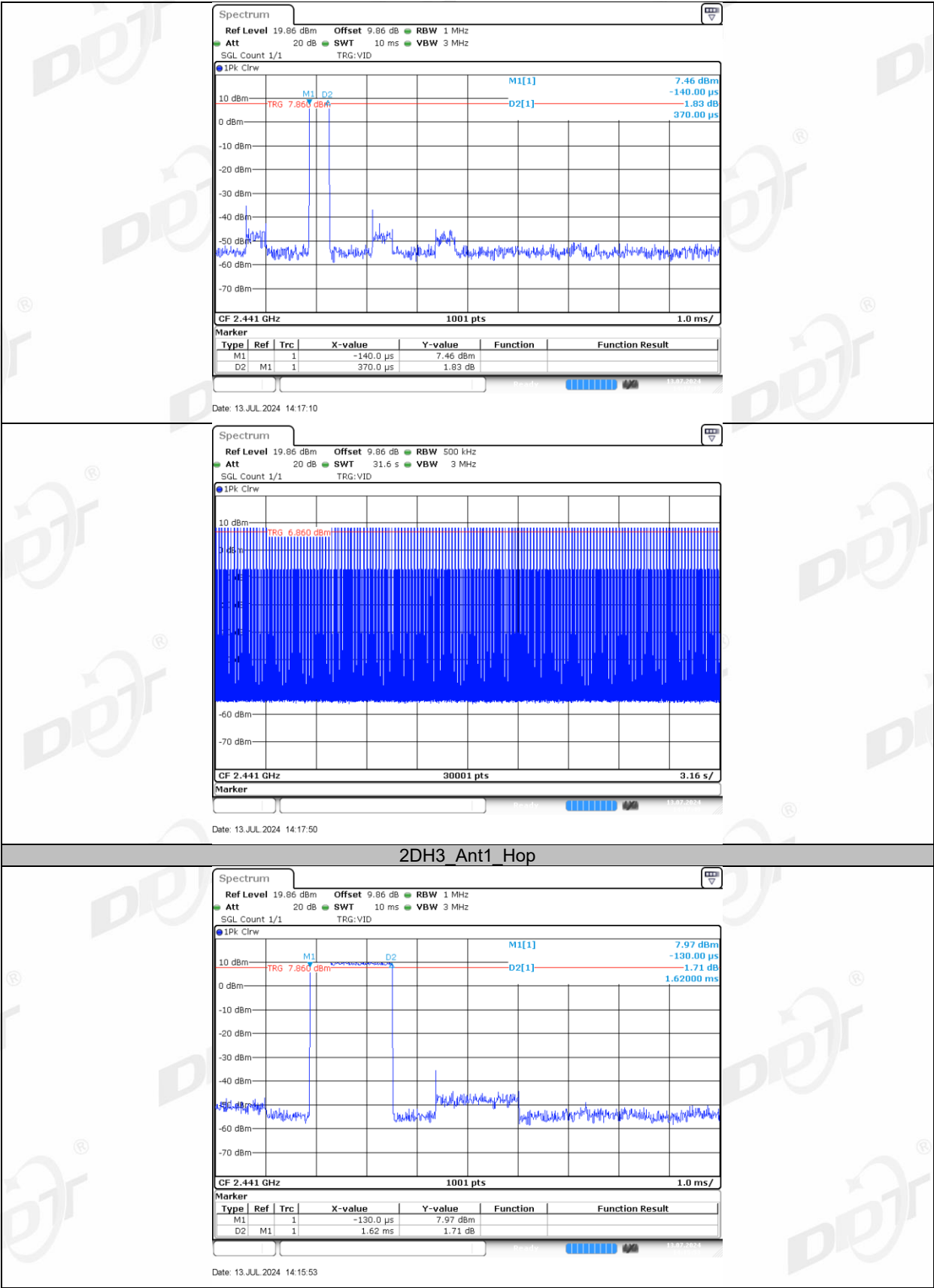


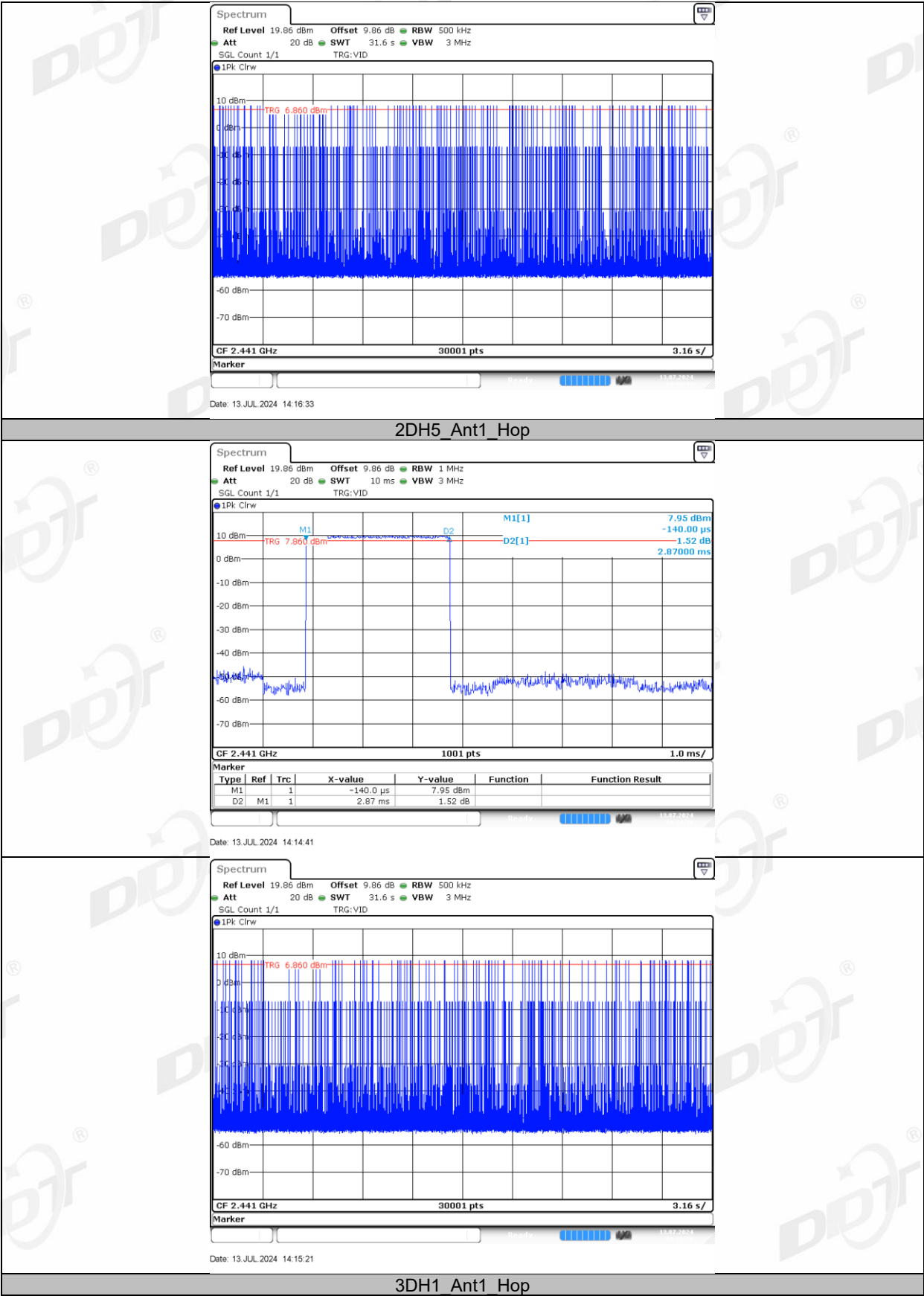


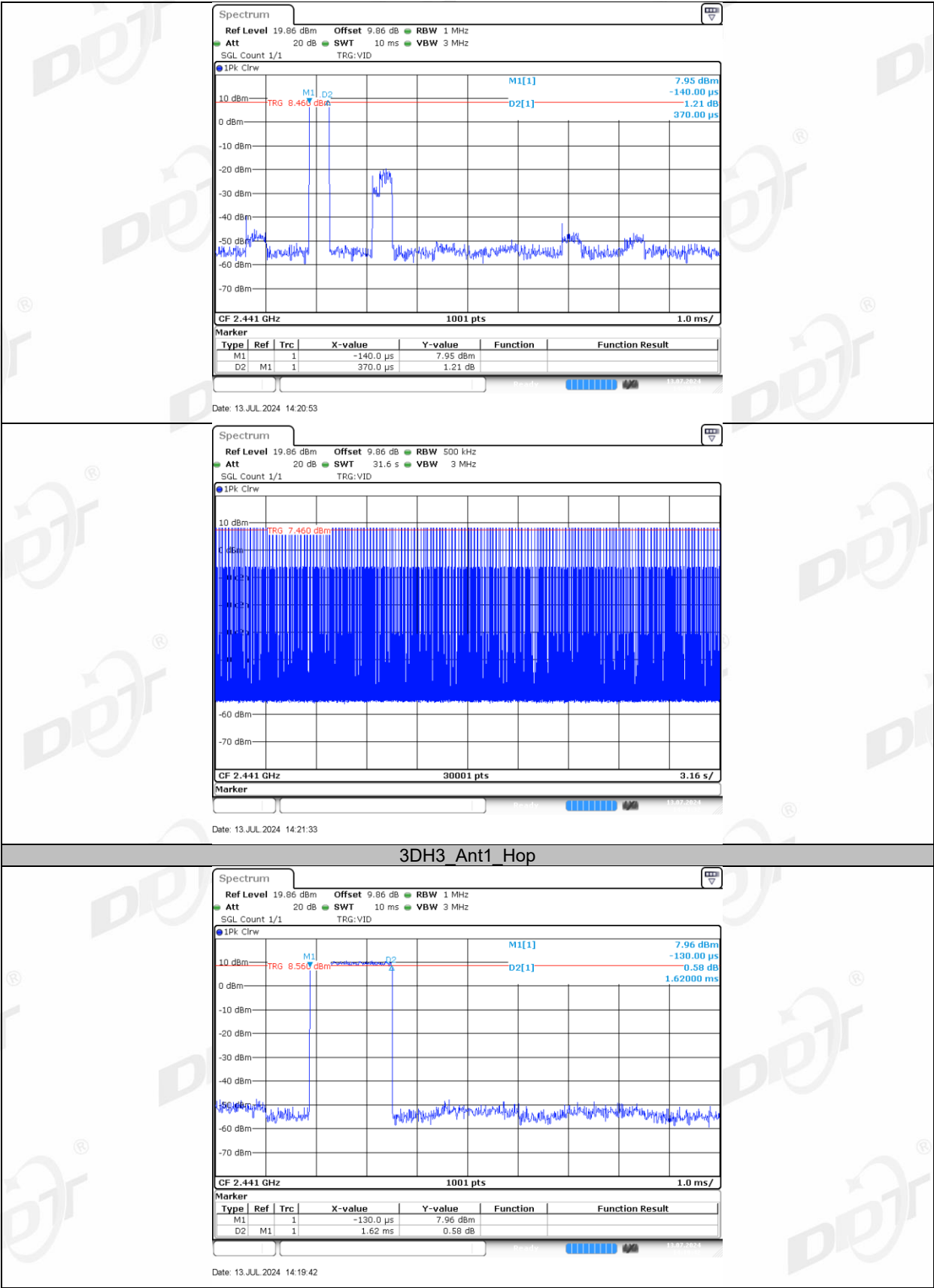
DH5_Ant1_Hop

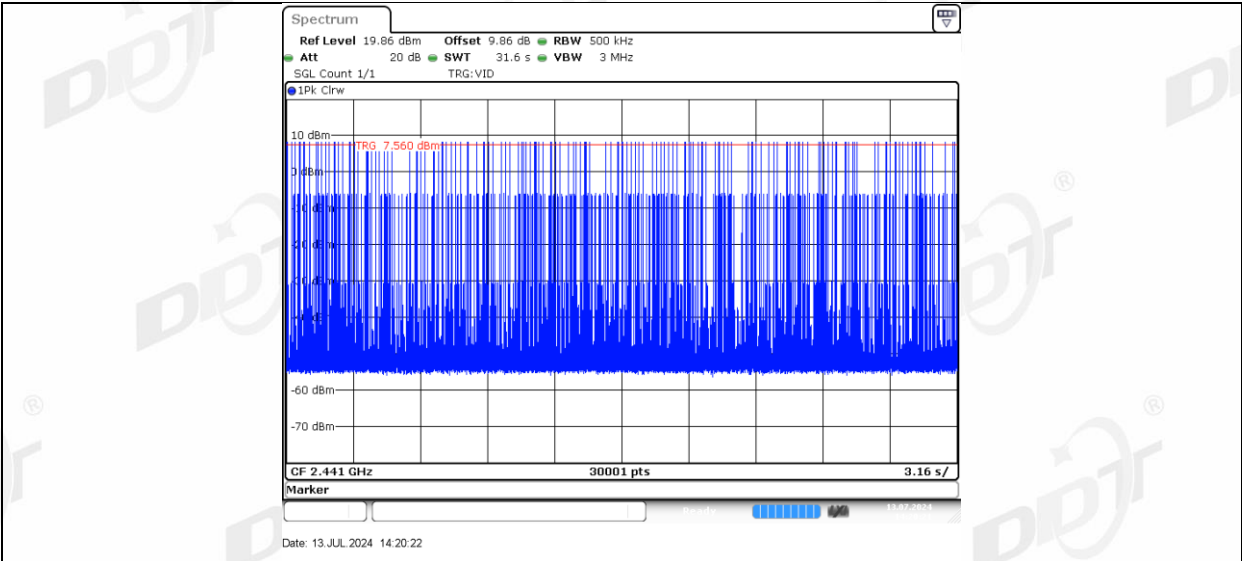


2DH1_Ant1_Hop

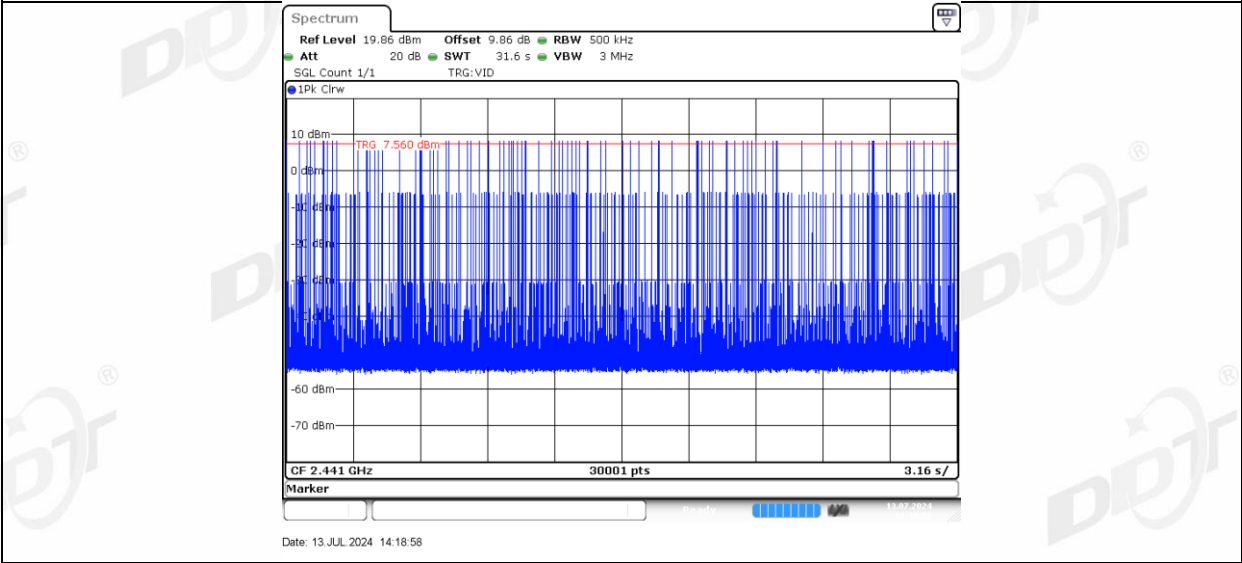
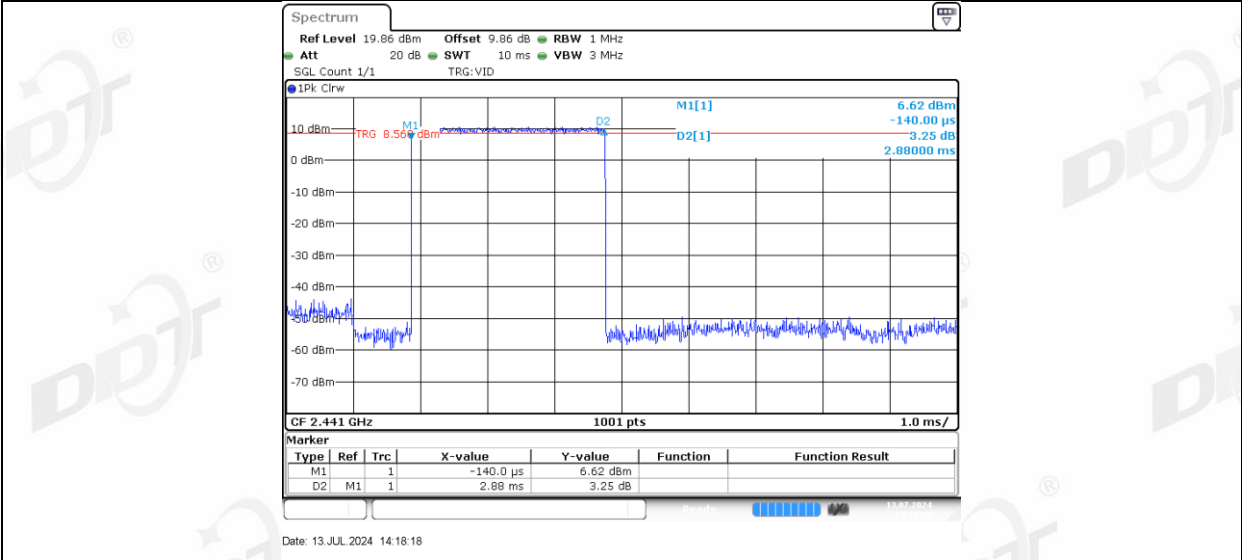






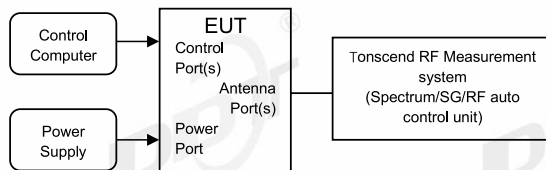


3DH5_Ant1_Hop



8. Number of Hopping Channel

8.1. Block diagram of test setup



8.2. Limits

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

8.3. Test procedure

- (1) The test according to ANSI C63.10-2013 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:

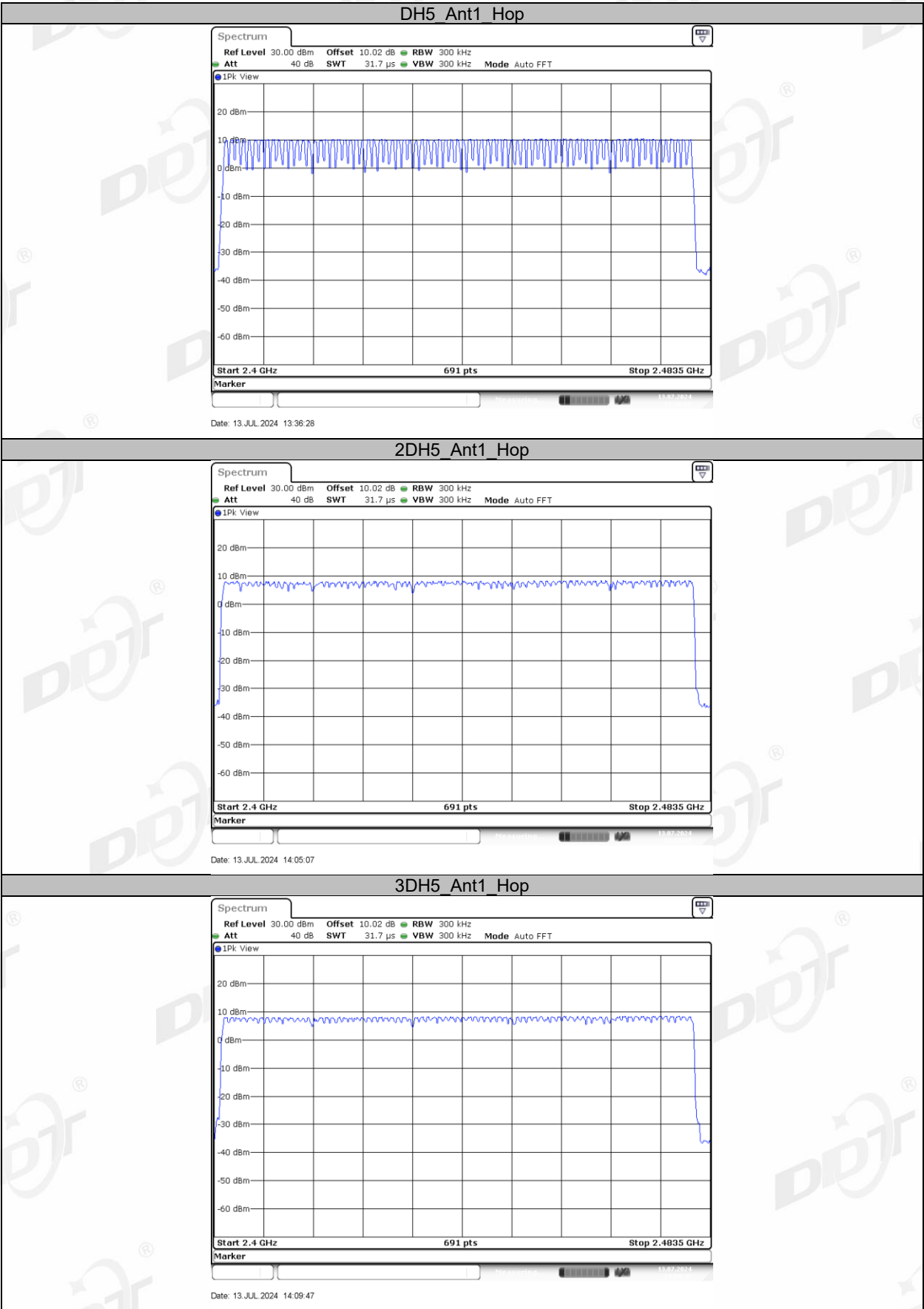
RBW:	RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW:	$VBW \geq RBW$.
Span:	The frequency band of operation
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold
- (5) Measure the hopping number and record the results in the report.
- (6) Measure and record the results in the report.

8.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

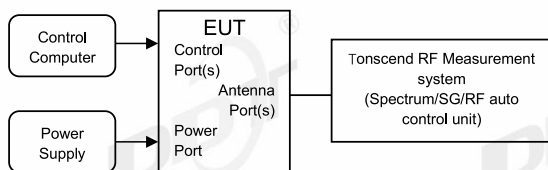
Test Mode	Antenna	Frequency [MHz]	Result [Num]	Limit [Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

8.5.Test graphs



9. Band Edge Compliance (Conducted Method)

9.1. Block diagram of test setup



9.2. Limit

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

9.3. 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.

9.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

Mode	Freq. (MHz)	Verdict
GFSK	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass
π /4-DQPSK	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass
8DPSK	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass

9.5.Test graphs



DH5_Ant1_Low_Hop_2402

Spectrum

Ref Level 20.00 dBm Offset 9.94 dB RBW 100 kHz Att 30 dB SWT 113.8 μ s VBW 300 kHz Mode Auto FFT

1Pk View

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

M1[1]

M2[1]

M3

M4

9.35 dBm

2.4050102 GHz

-50.51 dBm

2.400000 GHz

-10 dBm

D1 -10.650 dBm

Start 2.31 GHz

691 pts

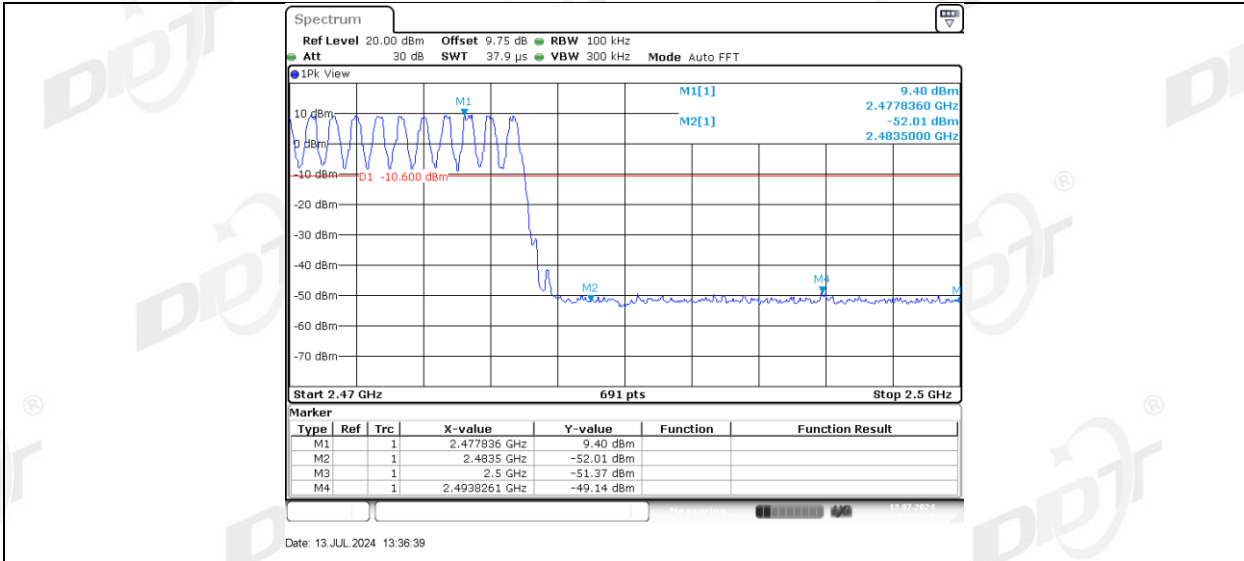
Stop 2.41 GHz

Marker

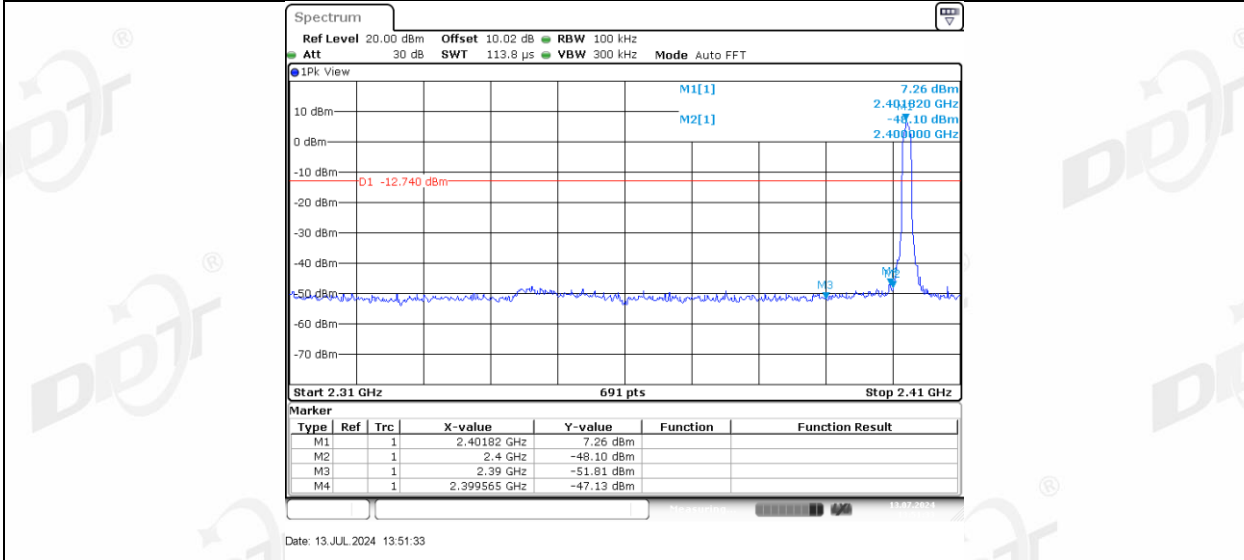
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1		2.40501 GHz	9.35 dBm		
M2	1		2.4 GHz	-50.51 dBm		
M3	1		2.39 GHz	-51.48 dBm		
M4	1		2.35087 GHz	-47.81 dBm		

Date: 13.JUL 2024 13:35:54

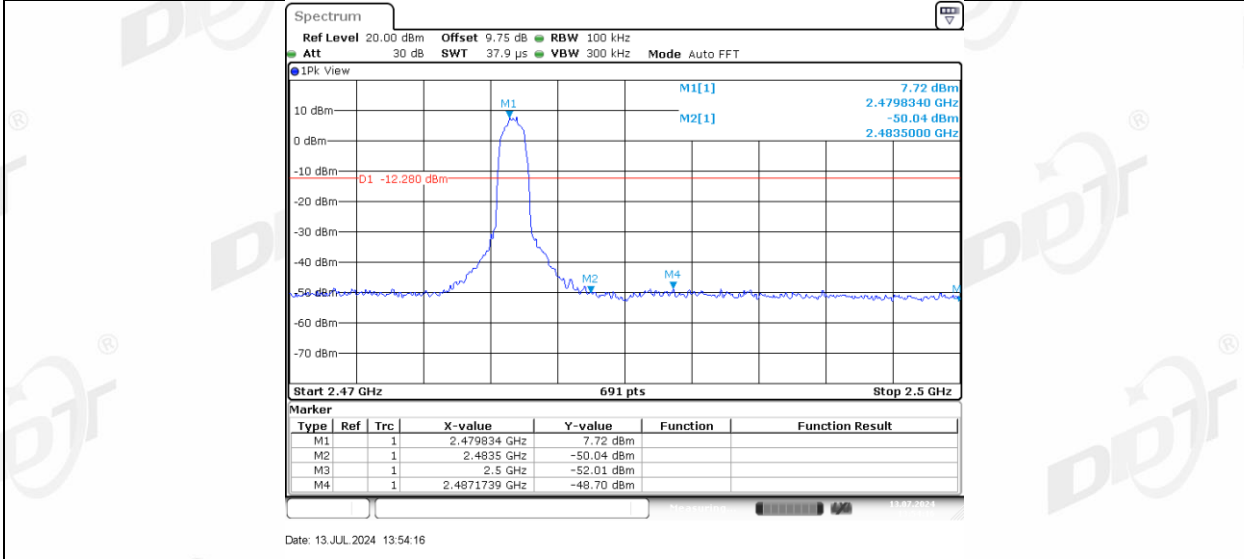
DH5_Ant1_High_Hop_2480



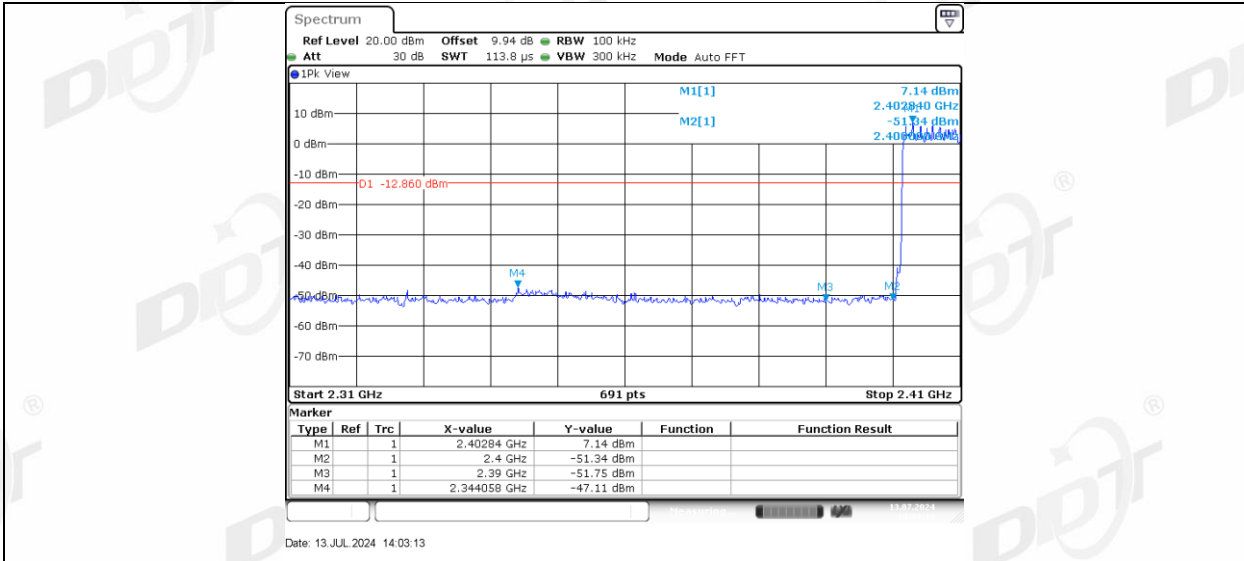
2DH5_Ant1_Low_2402



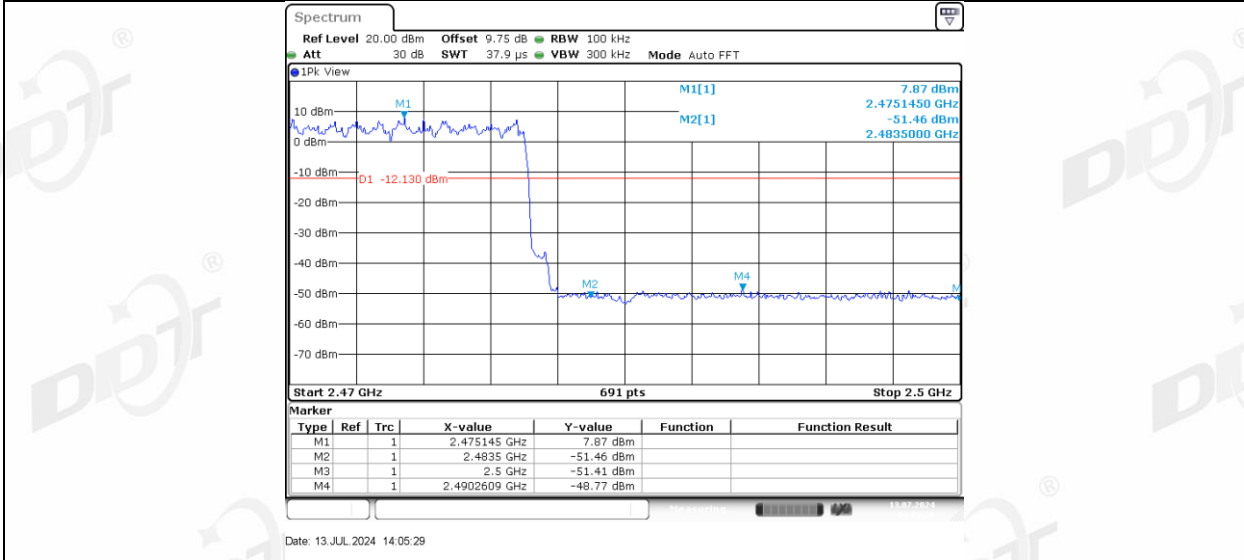
2DH5_Ant1_High_2480



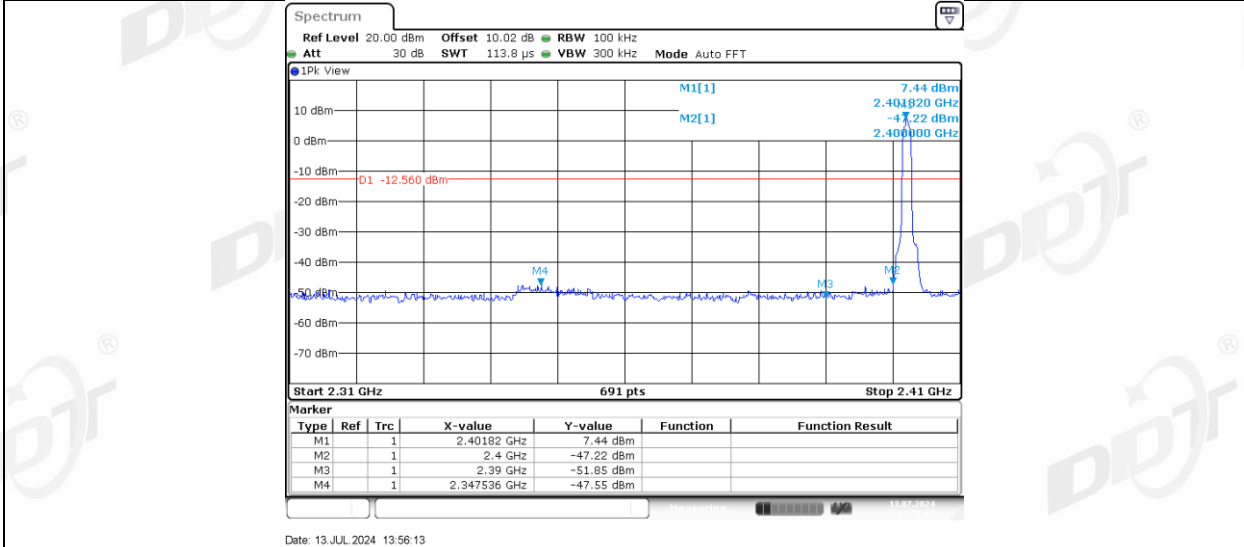
2DH5_Ant1_Low_Hop_2402



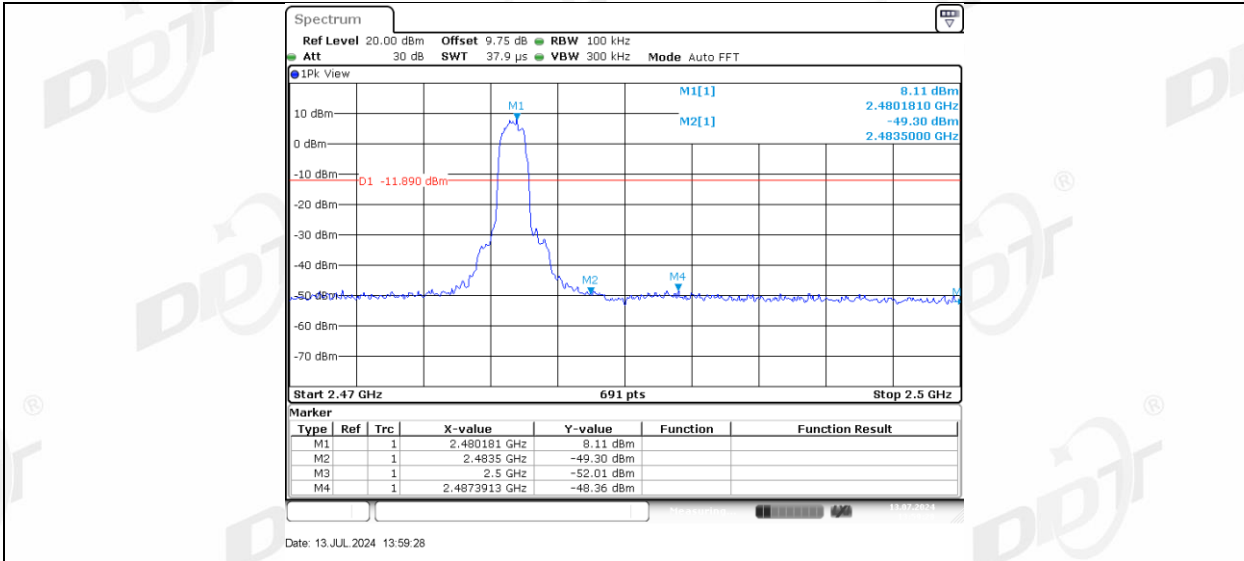
2DH5_Ant1_High_Hop_2480



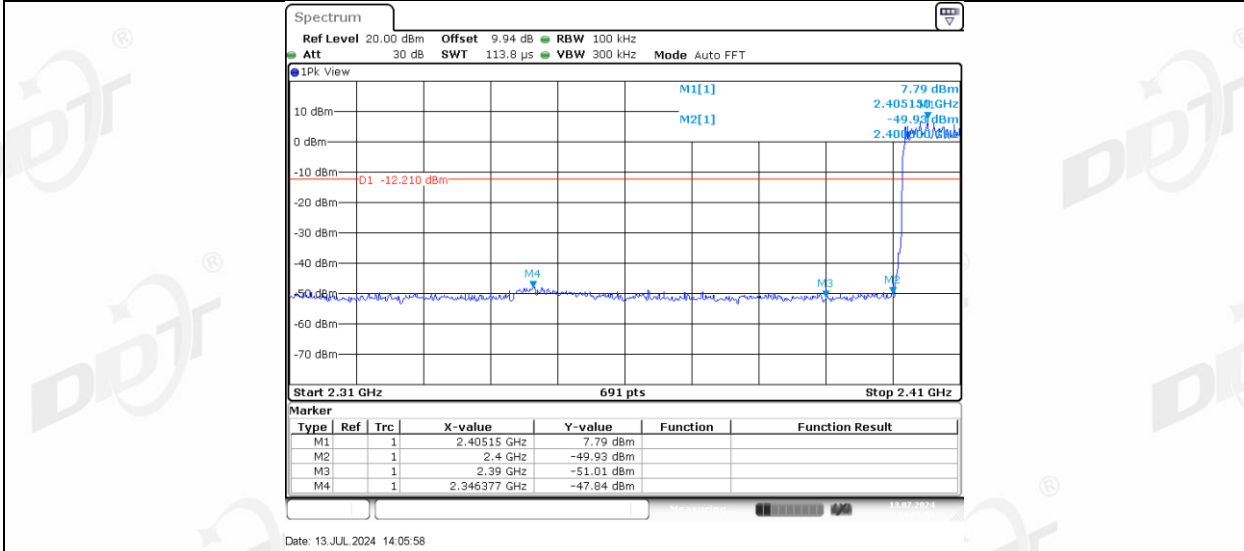
3DH5_Ant1_Low_2402



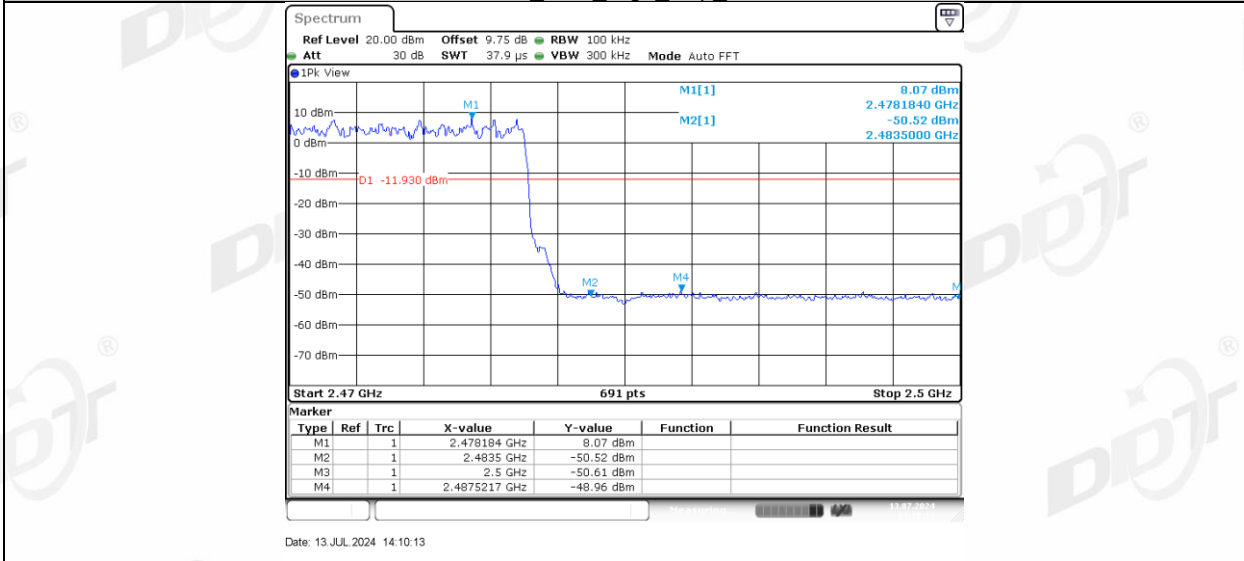
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402

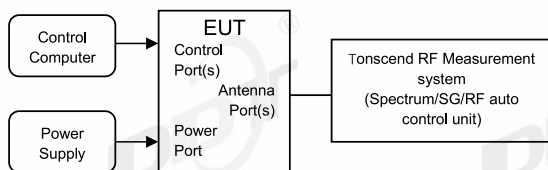


3DH5_Ant1_High_Hop_2480



10. RF Conducted Spurious Emissions

10.1. Block diagram of test setup



10.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

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:

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	$\geq \text{Span/RBW}$
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

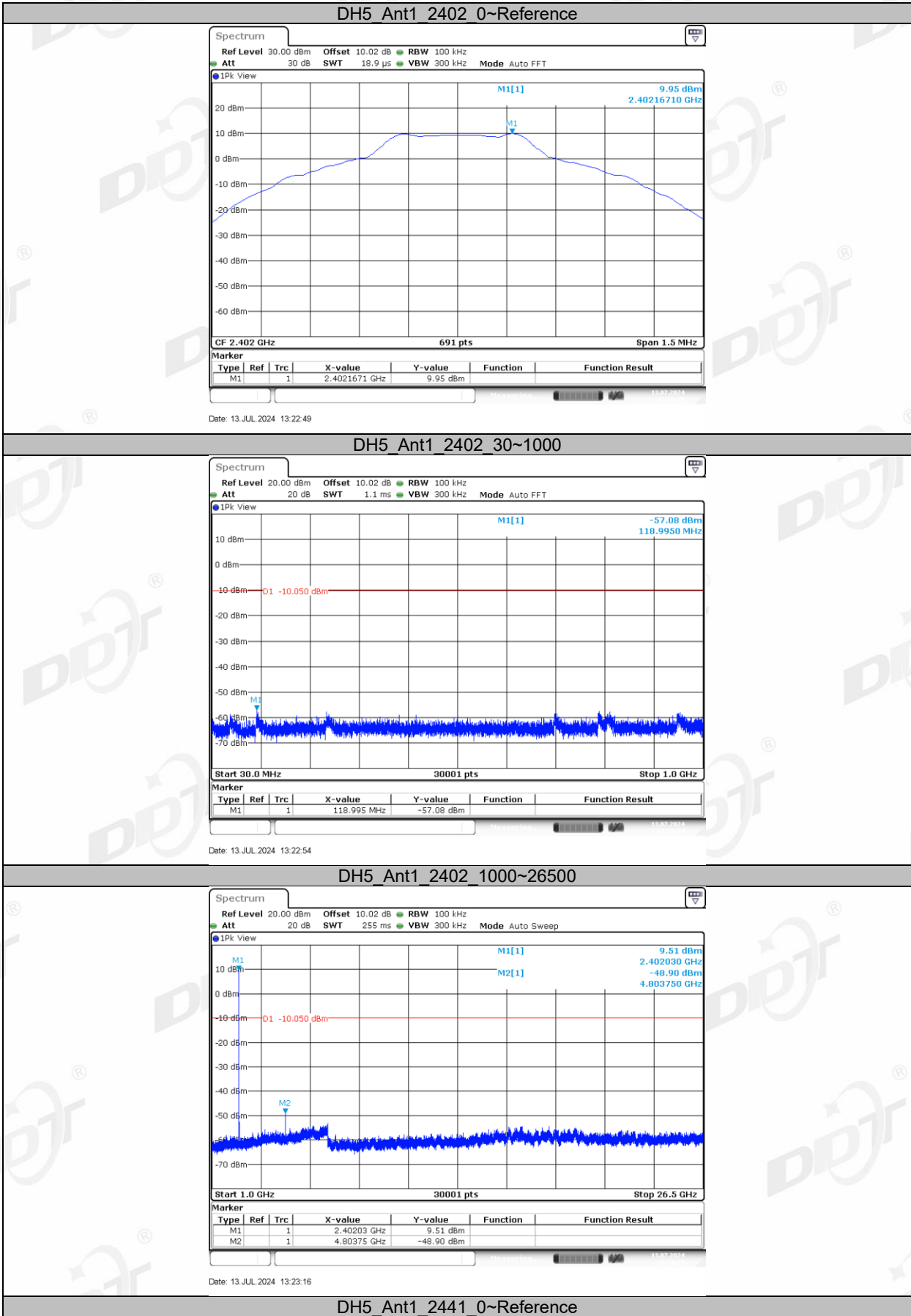
Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

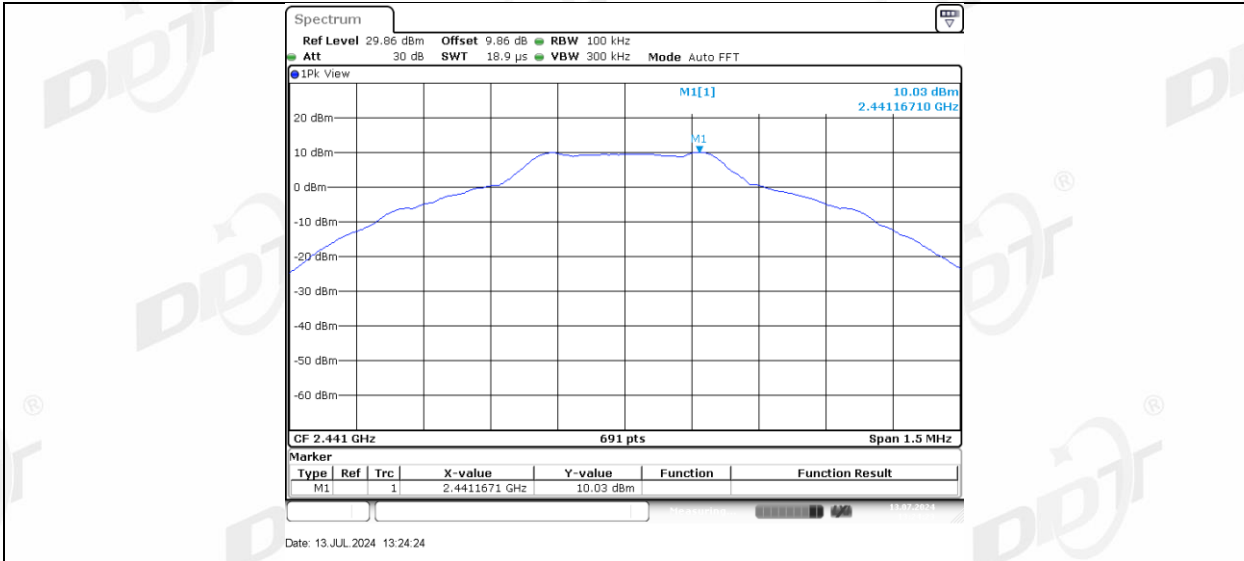
10.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,39.1%RH	Test Date:	2024.07.13
Test Power Supply:	Battery	Sample Number:	S24052920-017

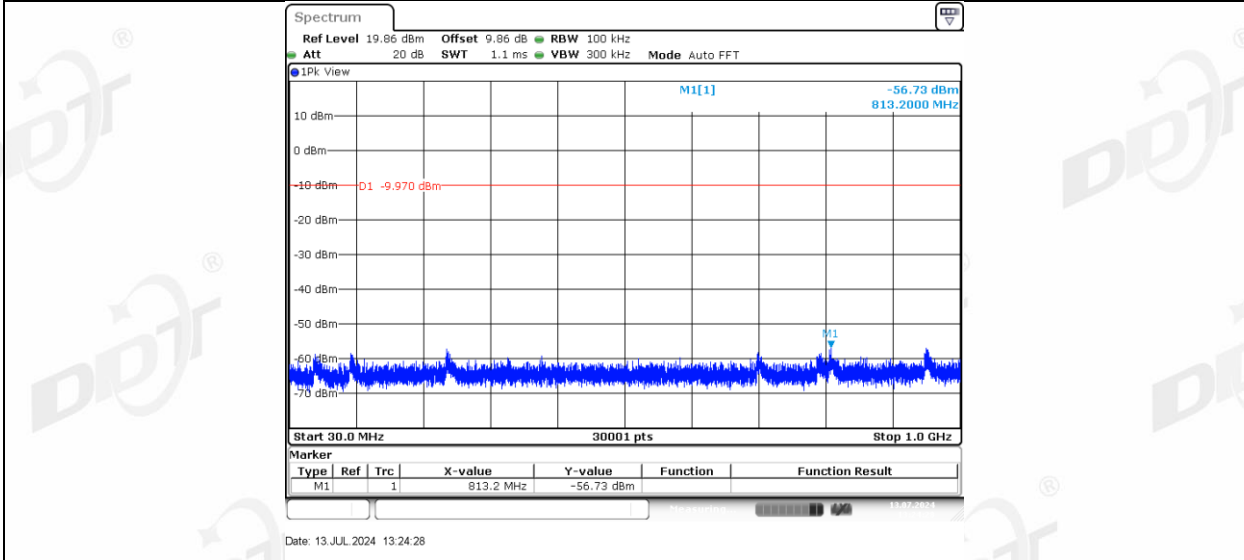
Mode	Freq. (MHz)	Verdict
GFSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass
$\pi/4$ -DQPSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass
8DPSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass

10.5. Test graphs

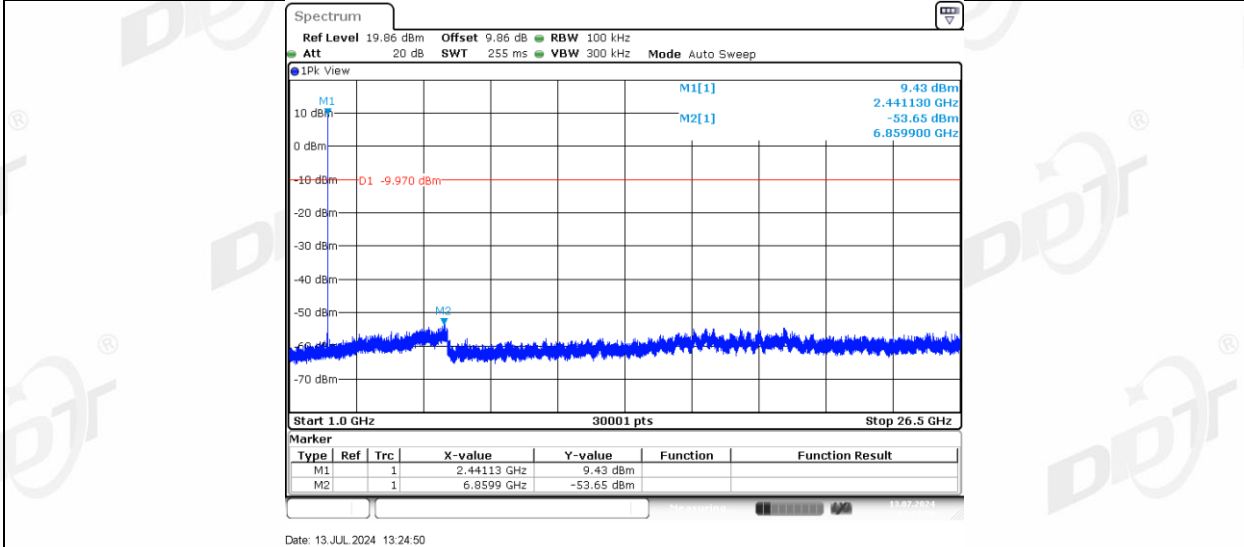




DH5_Ant1_2441_30~1000



DH5_Ant1_2441_1000~26500



DH5_Ant1_2480_0~Reference