



## FCC CERTIFICATION TEST REPORT

<b>Applicant</b>	:	ASA Electronics Shenzhen Limited
<b>Address of Applicant</b>	:	Room 503, 5/F., Unit A, Skyworth Building, Gaoxin Avenue.1.S., Nanshan District, Shen Zhen
<b>Manufacturer</b>	:	ASA Electronics, LLC.
<b>Address of Manufacturer</b>	:	2602 Marina Drive, Elkhart, IN 46514 USA
<b>Equipment under Test</b>	:	Bluetooth Wall Plate
<b>Model No.</b>	:	BTWP2, RMBTWP2
<b>FCC ID</b>	:	2AHU2BTWP2
<b>Test Standard(s)</b>	:	FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013
<b>Report No.</b>	:	DDT-RE23120624-2E01
<b>Issue Date</b>	:	2024/01/17
<b>Issue By</b>	:	Guangdong Dongdian Testing Service Co., Ltd.
<b>Address of Laboratory</b>	:	Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

# REPORT

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## Test Report Declare

<b>Applicant</b>	:	ASA Electronics Shenzhen Limited
<b>Address of Applicant</b>	:	Room 503, 5/F., Unit A, Skyworth Building, Gaoxin Avenue.1.S., Nanshan District, Shen Zhen
<b>Equipment under Test</b>	:	Bluetooth Wall Plate
<b>Model No.</b>	:	BTWP2, RMBTWP2
<b>Manufacturer</b>	:	ASA Electronics, LLC.
<b>Address of Manufacturer</b>	:	2602 Marina Drive, Elkhart, IN 46514 USA

### Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C

### Test Procedure Used:

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.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above standards.**

<b>Report No.:</b>	DDT-RE23120624-2E01		
<b>Date of Receipt:</b>	2023/12/10	<b>Date of Test:</b>	2023/12/10-2024/01/17

**Prepared By:**

**Approved By:**

*Johnson Huang*

*Damon Hu*

**Johnson 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	2024/01/17	

## 1. Summary of Test Results

Description of Test Item	Standard	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1)	Pass
20 dB Bandwidth	FCC Part 15: 15.247(a)(1)	Pass
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1)	Pass
Number of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii)	Pass
Dwell Time	FCC Part 15: 15.247(a)(1)(iii)	Pass
RF Conducted Spurious Emissions	FCC Part 15: 15.247(d)	Pass
Radiated Emission	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	Pass
Band Edge Compliance	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d)	Pass
Power Line Conducted Emissions	FCC Part 15: 15.207(a)	NA
Antenna Requirement	FCC Part 15: 15.203	Pass

## 2. General Test Information

### 2.1. Description of EUT

EUT Name	: Bluetooth Wall Plate
Model Number	: BTWP2, RMBTWP2
Difference of model number	: Above models are identical in schematic, appearance and structure, only the Model Number is different for all the models, therefore the test performed on the model BTWP2.
EUT Function Description	: Please reference user manual of this device
Power Supply	: DC12V
Radio Specification	: Bluetooth (BR/EDR)
Operation Frequency	: Bluetooth (BR/EDR): 2402 MHz-2480 MHz
Modulation	: Bluetooth BR/EDR: GFSK, $\pi/4$ -DQPSK, 8DPSK

Note 1: “☒” means to be chosen or applicable; “☐” means don’t to be chosen or not applicable; This note applies to entire report.

Note 2: This report only for Bluetooth BR/EDR.

Note 3: Antenna information:

Bluetooth Antenna information	
Antenna Type	: PCB
Antenna Gain(dBi)	: -0.62

Note 4: Channel information:

Bluetooth BR/EDR 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 5: 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.

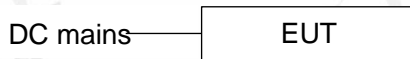
## 2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
N/A	N/A	N/A	N/A	N/A

## 2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
NoteBook	Dell	i7-1255U MX550	N/A	038C0A5A-F922-40B9-A219-8D44E9D1
HIGH RESOLUTION DC POWER SUPPLY	HYELEC	HY3005B	N/A	640995

## 2.4. Block diagram of EUT configuration for test



Test software: FrequencyTool\_0.3.2

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	2	CH0 to CH78	2402 to 2480
$\pi/4$ -DQPSK hopping on Tx mode	2	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	2	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	2	CH0	2402
	2	CH39	2441
	2	CH78	2480
$\pi/4$ -DQPSK hopping off Tx mode	2	CH0	2402
	2	CH39	2441
	2	CH78	2480
8DPSK hopping off Tx mode	2	CH0	2402
	2	CH39	2441
	2	CH78	2480
Worst-case data rates were: GFSK mode: DH5			

## 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](mailto: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 <sup>-8</sup> (Antenna couple method)
	5.5 x 10 <sup>-8</sup> (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)	3x10 <sup>-8</sup>
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)

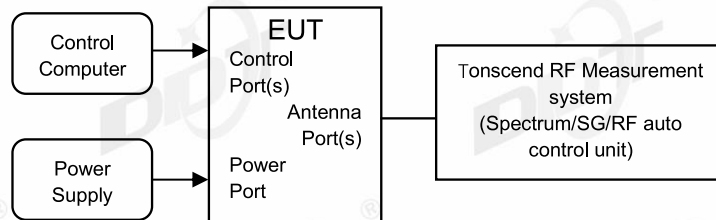
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 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	2024/07/11
Wideband Radio Communication Tester	R&S	CMW500	117491	2024/04/26
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2024/07/11
MXG Vector Signal Generator	Agilent	N5182A	MY48180912	2024/04/22
RF Control Unit	Tonscend	JS0806-2	20C8060230	2024/04/26
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2024/05/14
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:
 

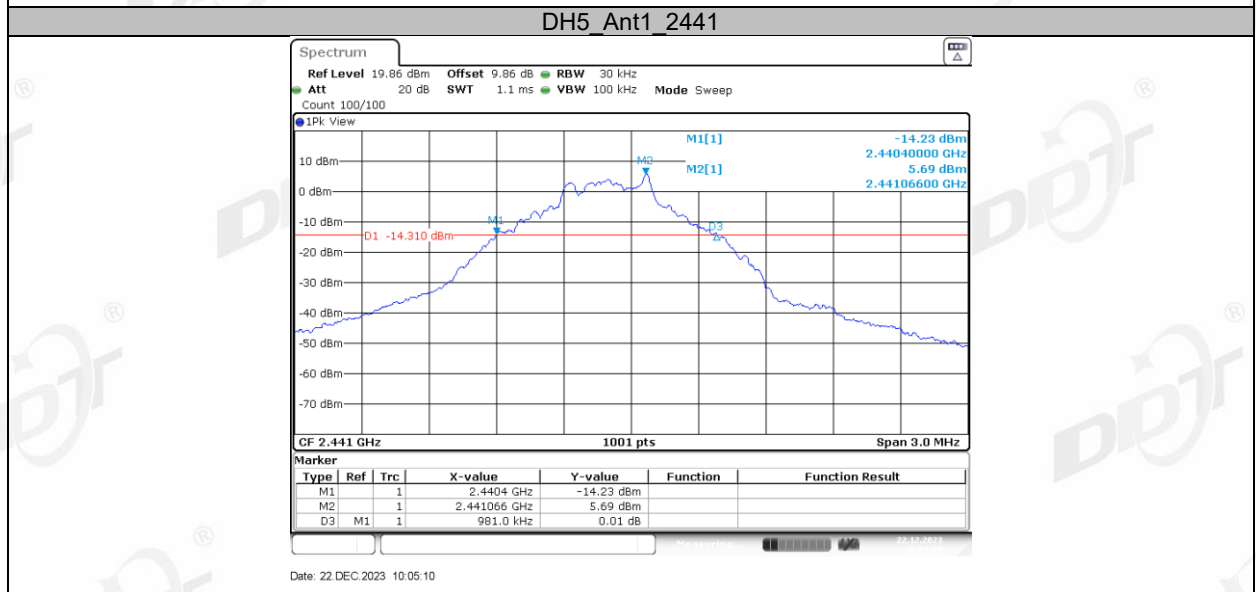
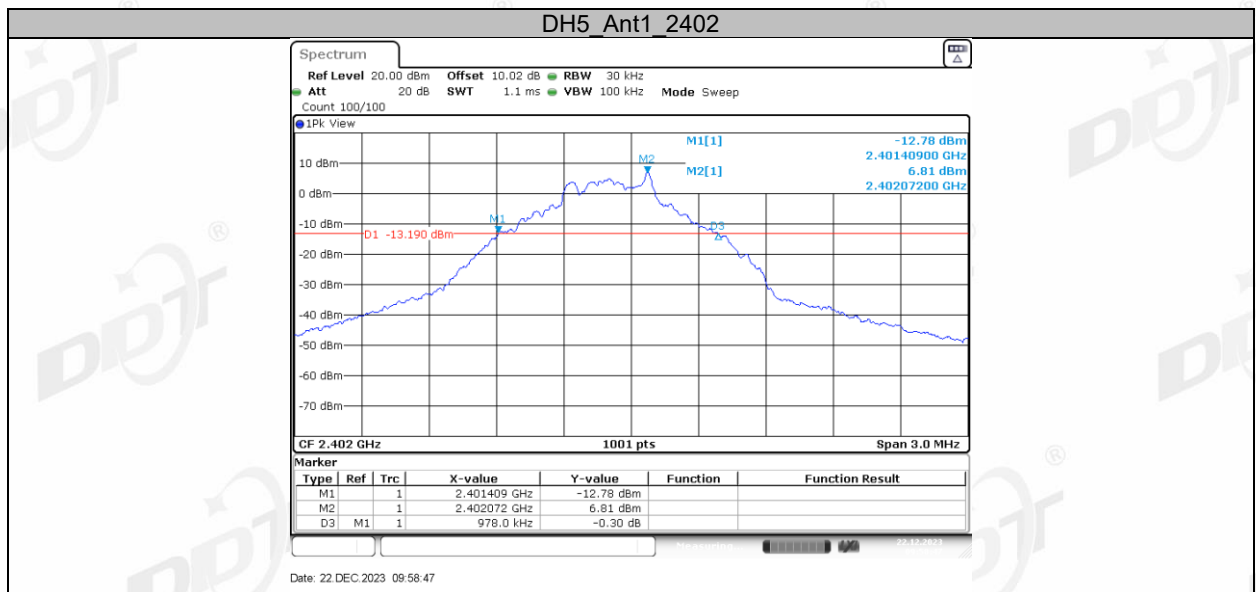
RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 2 times and 5 times the OBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold
- (5) Measure and record the results in the report.

4.4. Test result

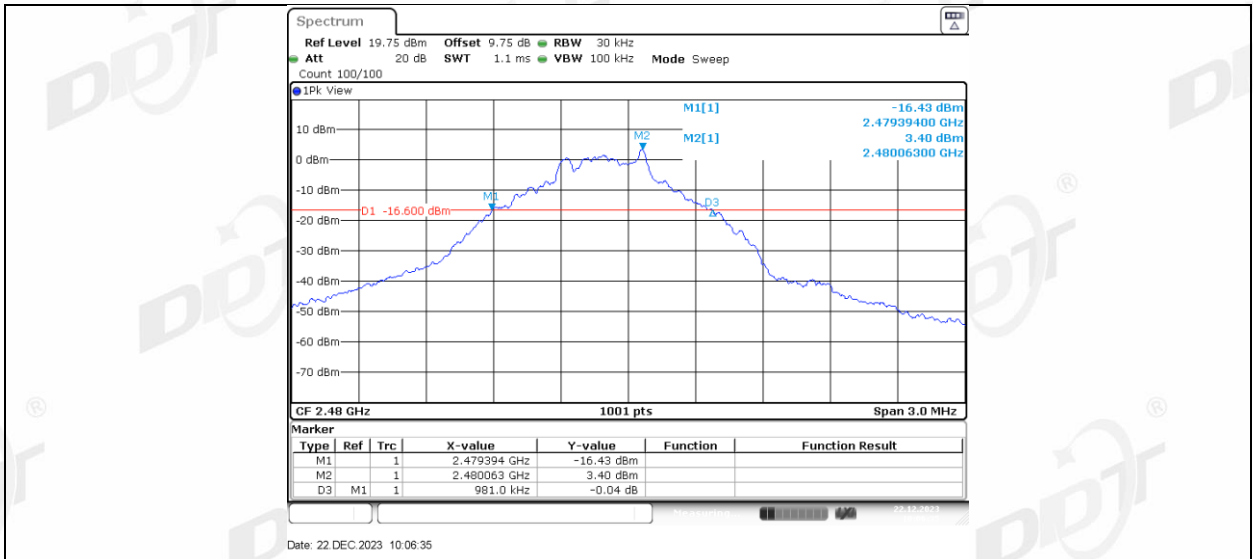
Test Site:	RF Measurement System 3#	Test Date:	2023.12.22
Ambient Condition:	17.4 °C,27.5 %RH	Test Engineer:	Zhongyao
Equipment under Test:	Bluetooth Wall Plate	Model No.:	BTWP2
Sample Number	S23120624-03	Test Power Supply:	DC 12V

Test Mode	Antenna	Frequency [MHz]	20dB EBW[MHz]
DH5	Ant1	2402	0.98
		2441	0.98
		2480	0.98
2DH5	Ant1	2402	1.30
		2441	1.31
		2480	1.31
3DH5	Ant1	2402	1.30
		2441	1.30
		2480	1.30

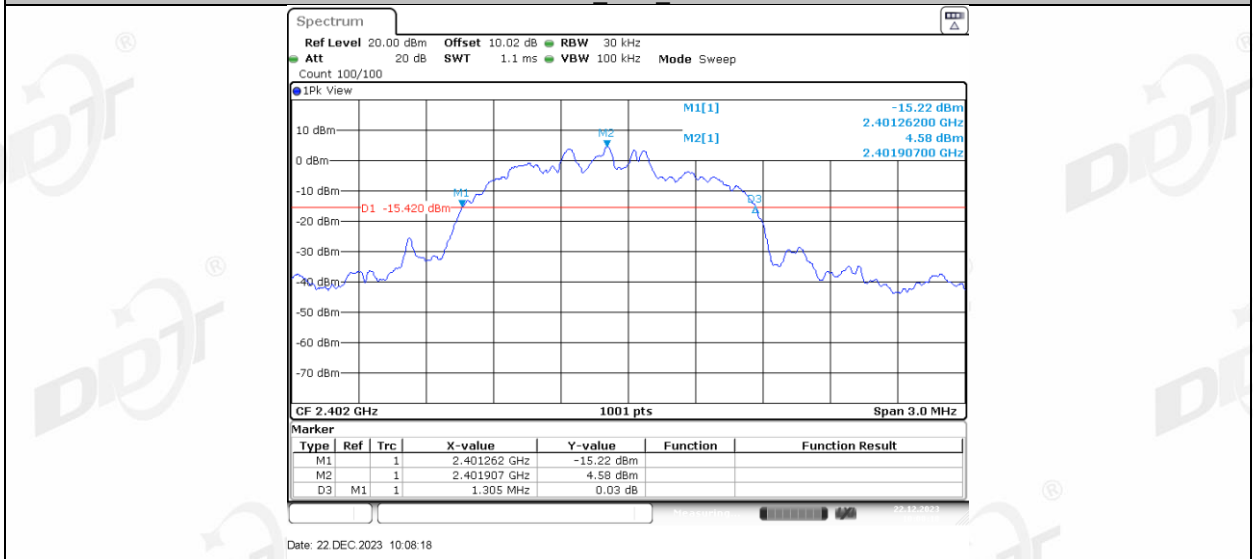
4.5. Test graphs



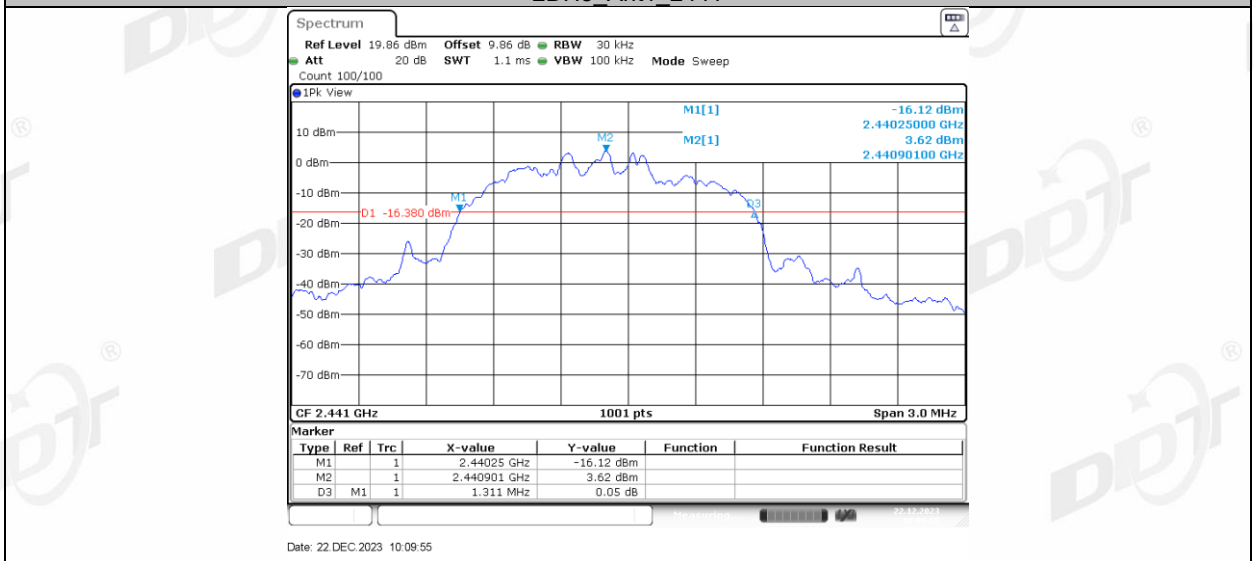
DH5 Ant1 2480



2DH5\_Ant1\_2402

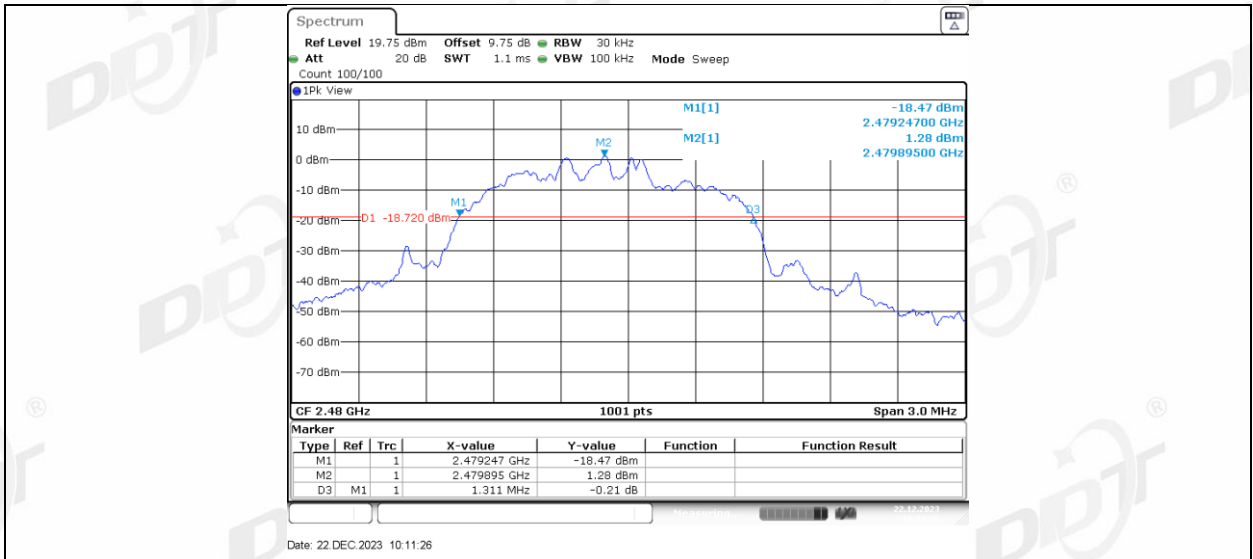


2DH5\_Ant1\_2441

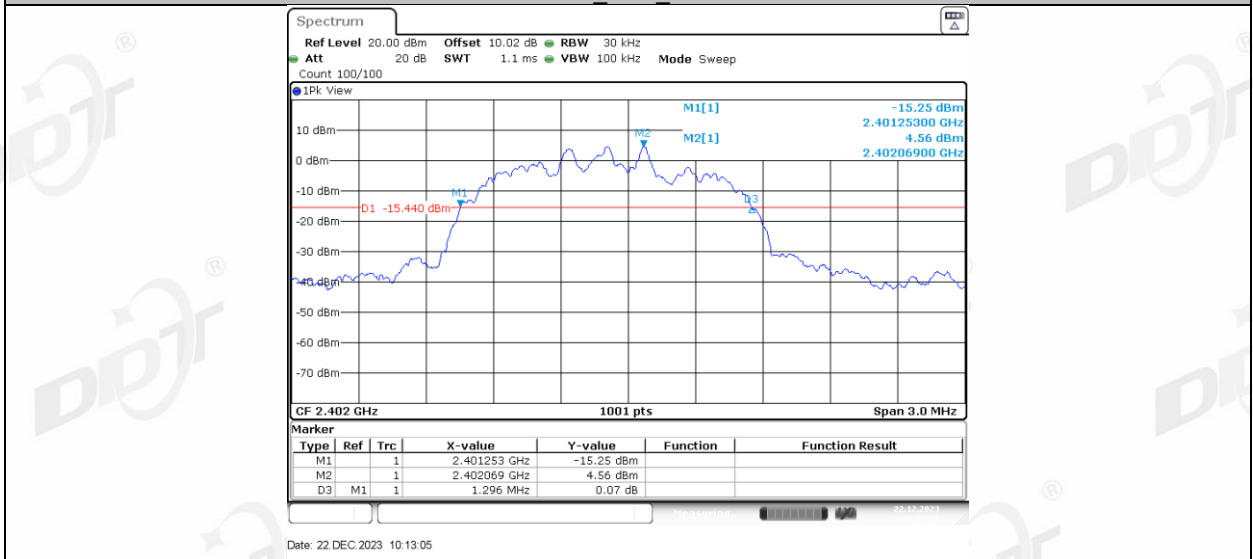


2DH5\_Ant1\_2480

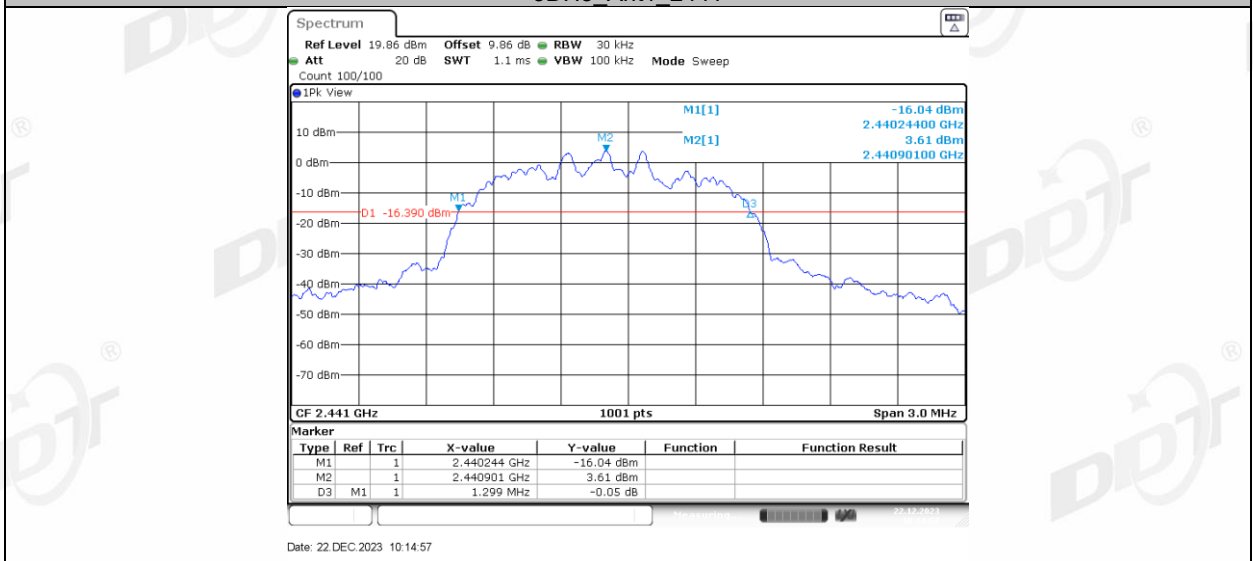




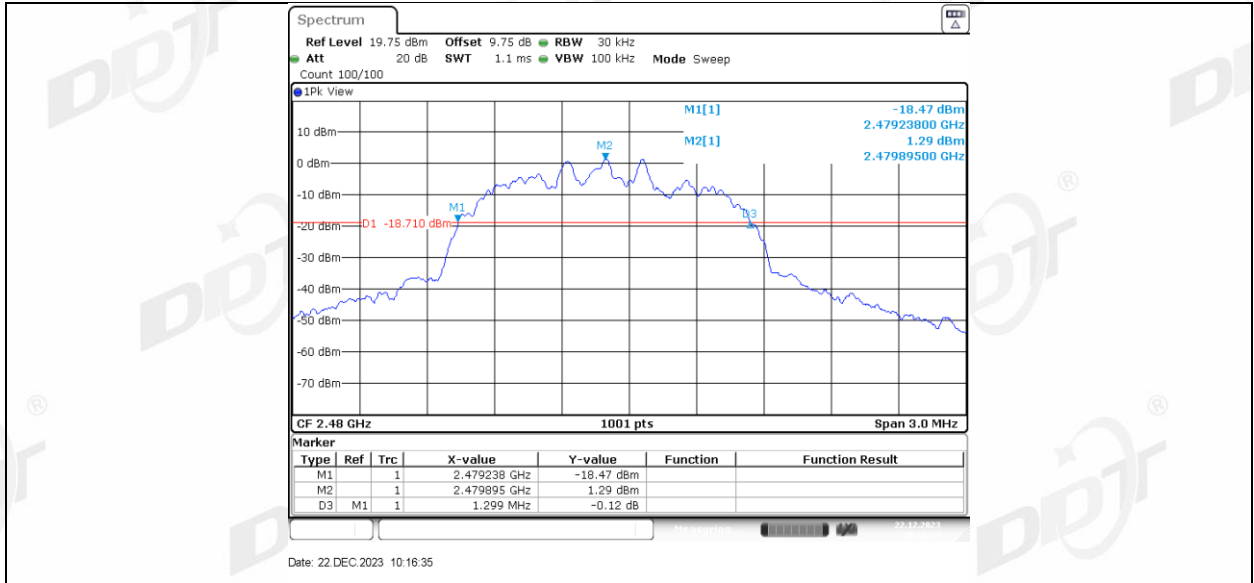
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441

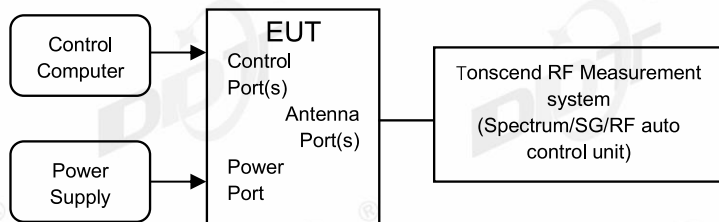


3DH5\_Ant1\_2480



## 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:
 

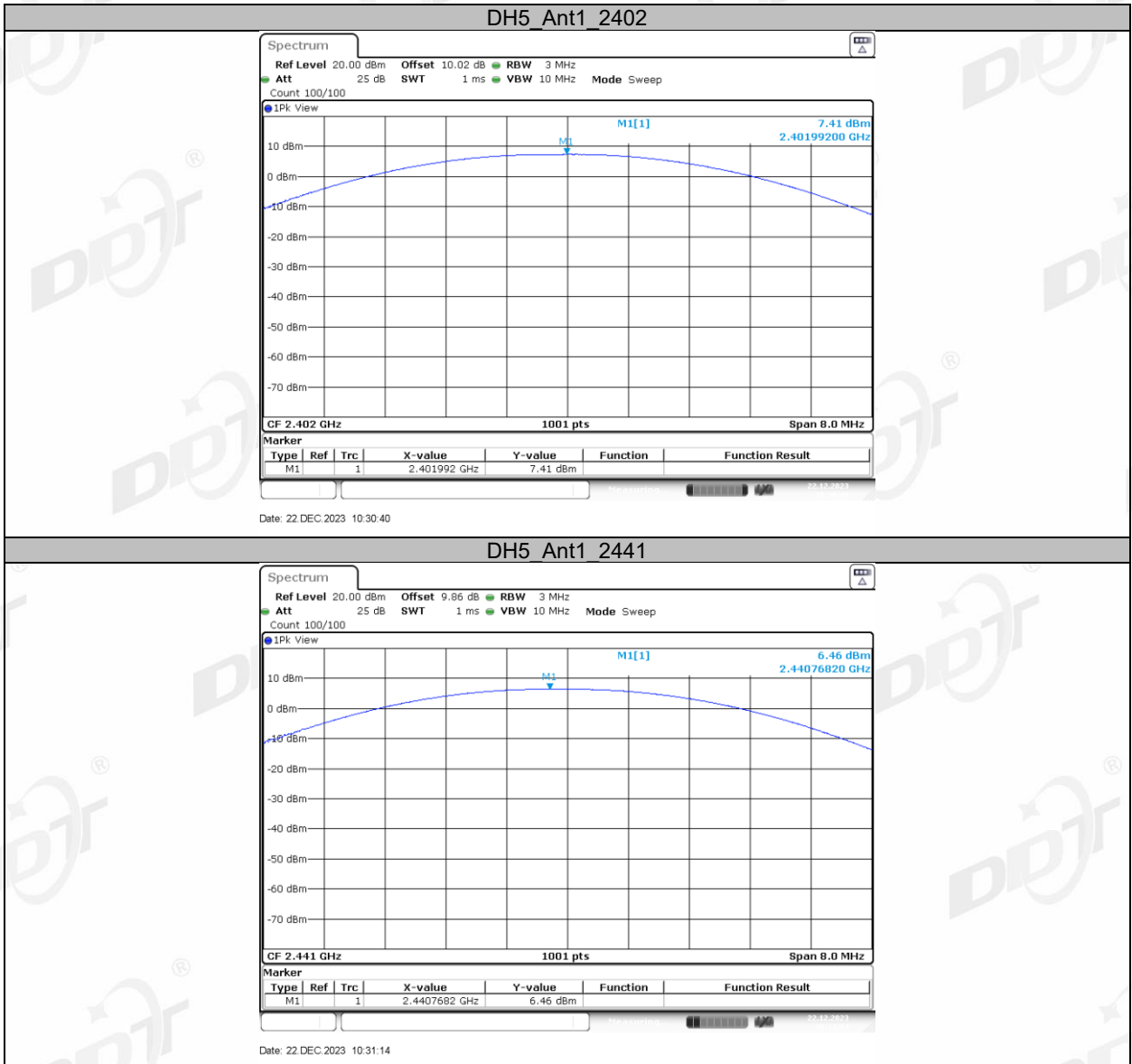
RBW:	> 20 dB bandwidth of the emission being measured.
VBW:	$VBW \geq RBW$ .
Span:	Approximately five times the 20 dB bandwidth, centered on a hopping channel.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold
- (5) Use the marker-to-peak function to set the marker to the peak of the emission and record the results in the report.

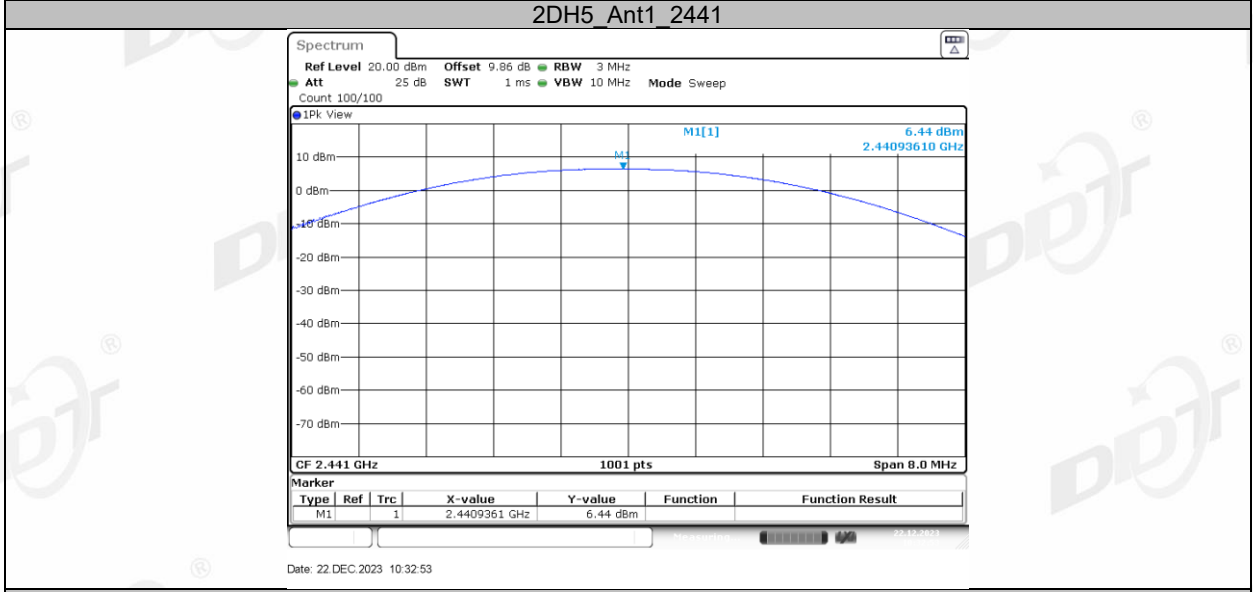
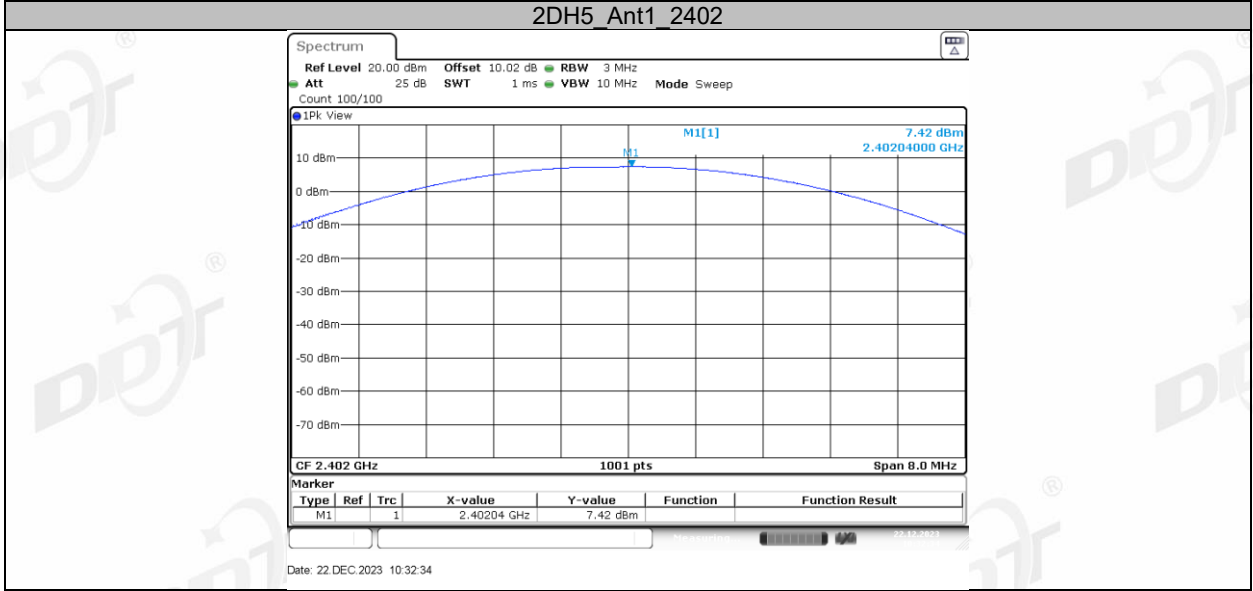
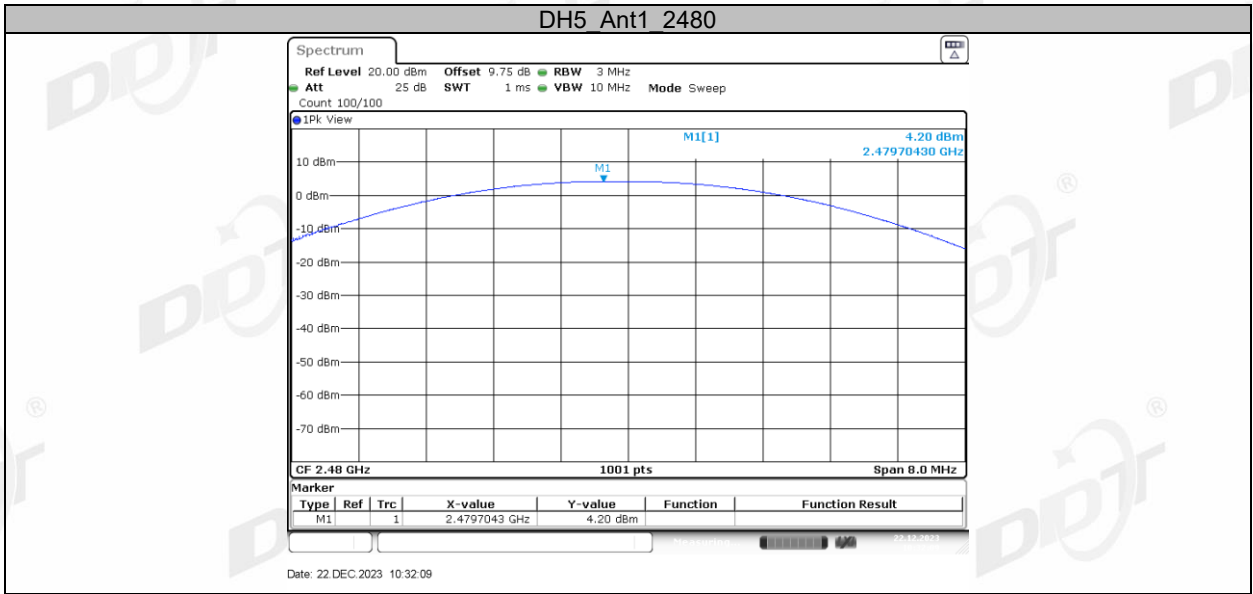
### 5.4. Test Result

Test Site:	RF Measurement System 3#	Test Date:	2023.12.22
Ambient Condition:	17.4 °C,27.5 %RH	Test Engineer:	Zhongyao
Equipment under Test:	Bluetooth Wall Plate	Model No.:	BTWP2
Sample Number	S23120624-03	Test Power Supply:	DC 12V

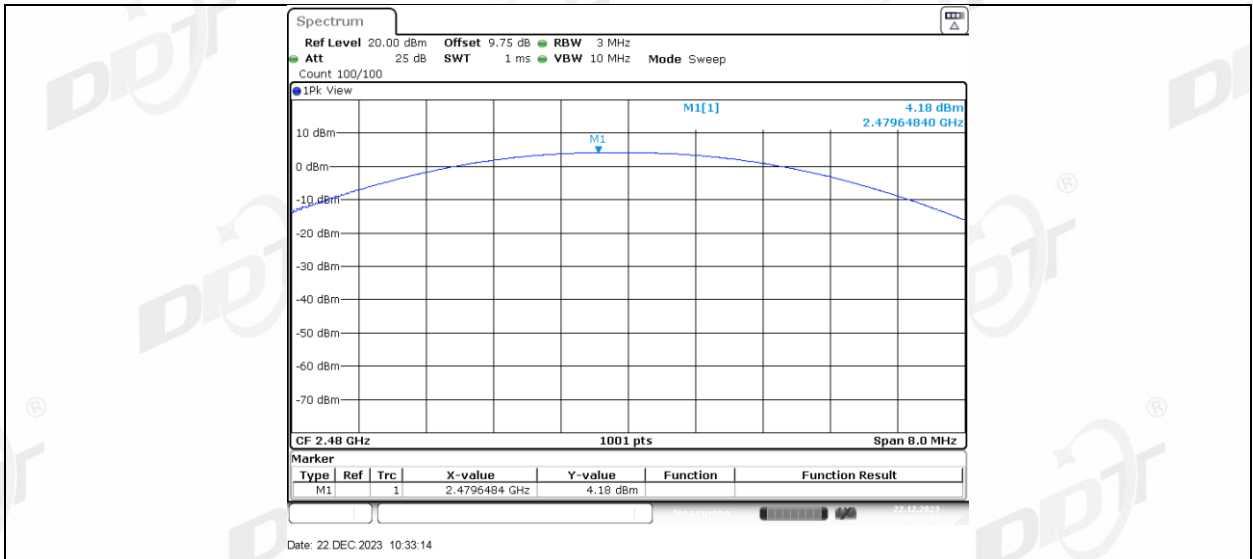
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
DH5	Ant1	2402	7.41	≤20.97	6.79	≤36	PASS
		2441	6.46	≤20.97	5.84	≤36	PASS
		2480	4.20	≤20.97	3.58	≤36	PASS
2DH5	Ant1	2402	7.42	≤20.97	6.80	≤36	PASS
		2441	6.44	≤20.97	5.82	≤36	PASS
		2480	4.18	≤20.97	3.56	≤36	PASS
3DH5	Ant1	2402	7.42	≤20.97	6.80	≤36	PASS
		2441	6.46	≤20.97	5.84	≤36	PASS
		2480	4.16	≤20.97	3.54	≤36	PASS

### 5.5. Test graphs

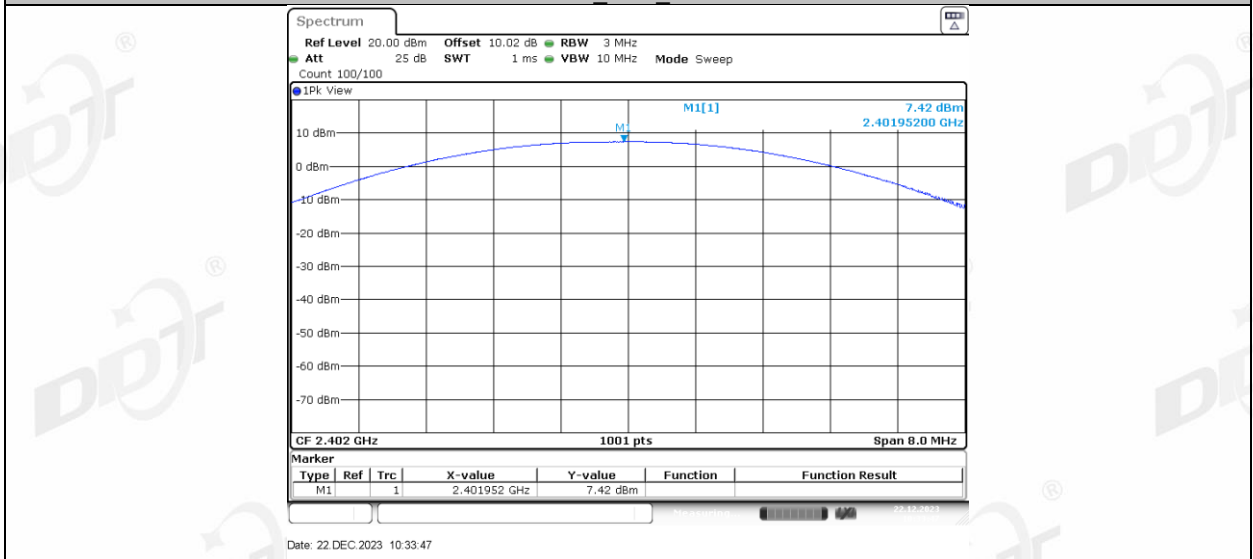




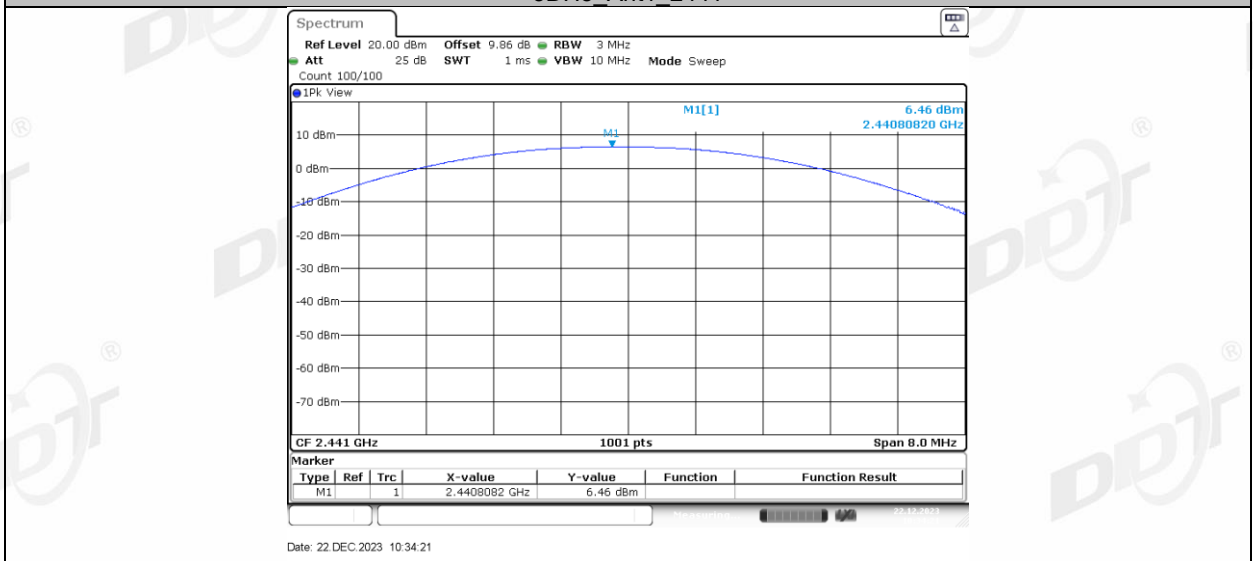
### 2DH5 Ant1 2480



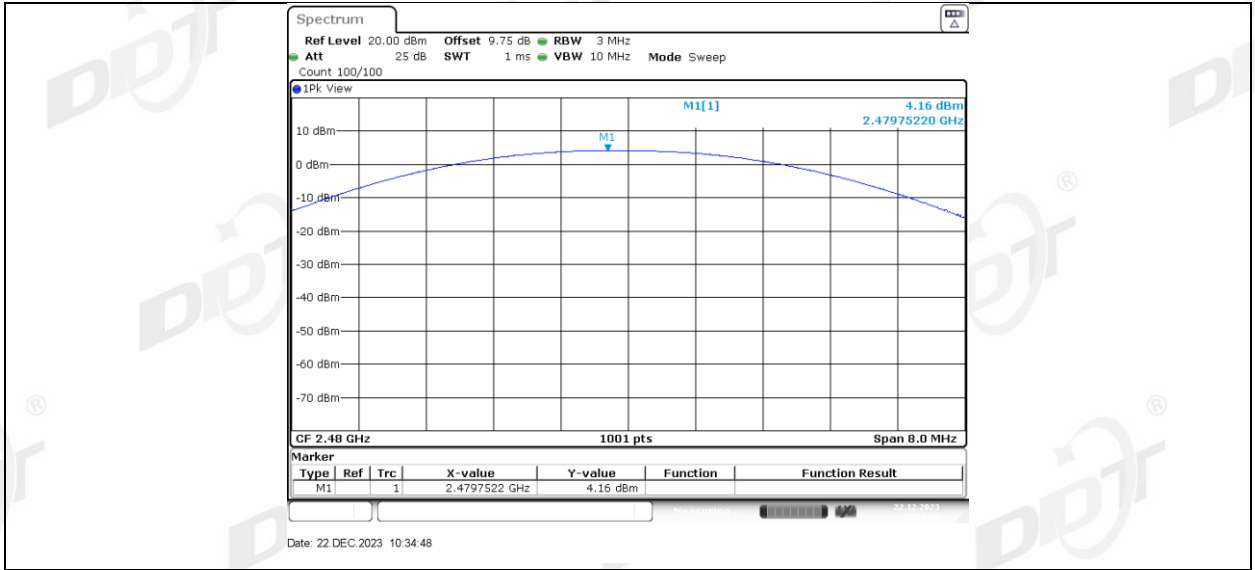
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441

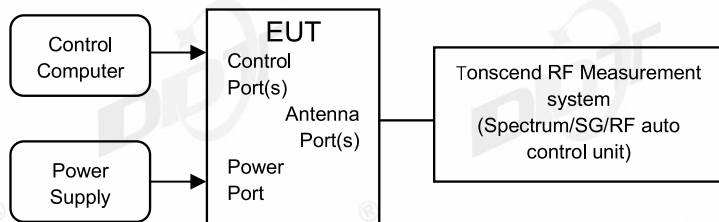


3DH5\_Ant1\_2480



## 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.

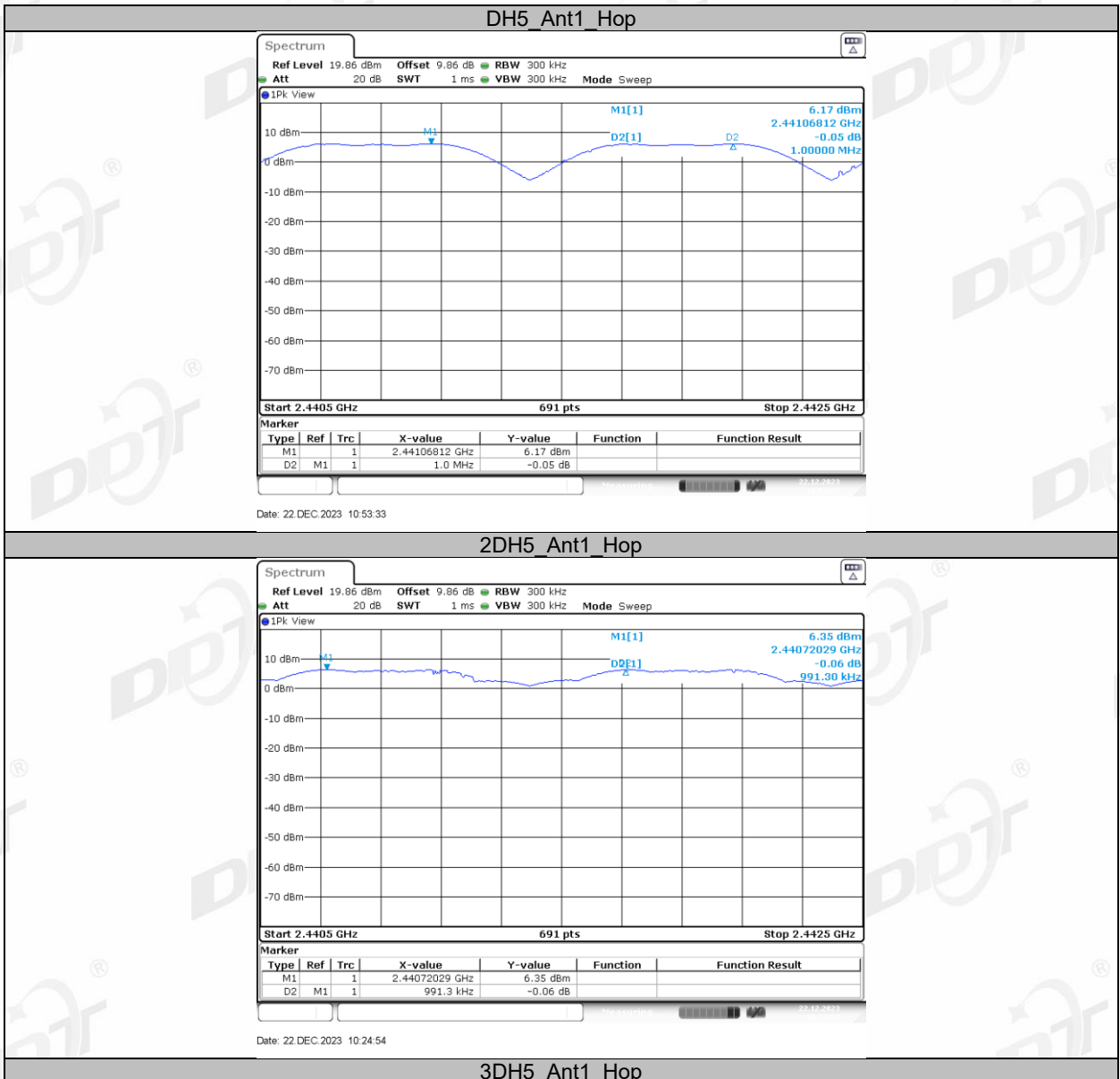


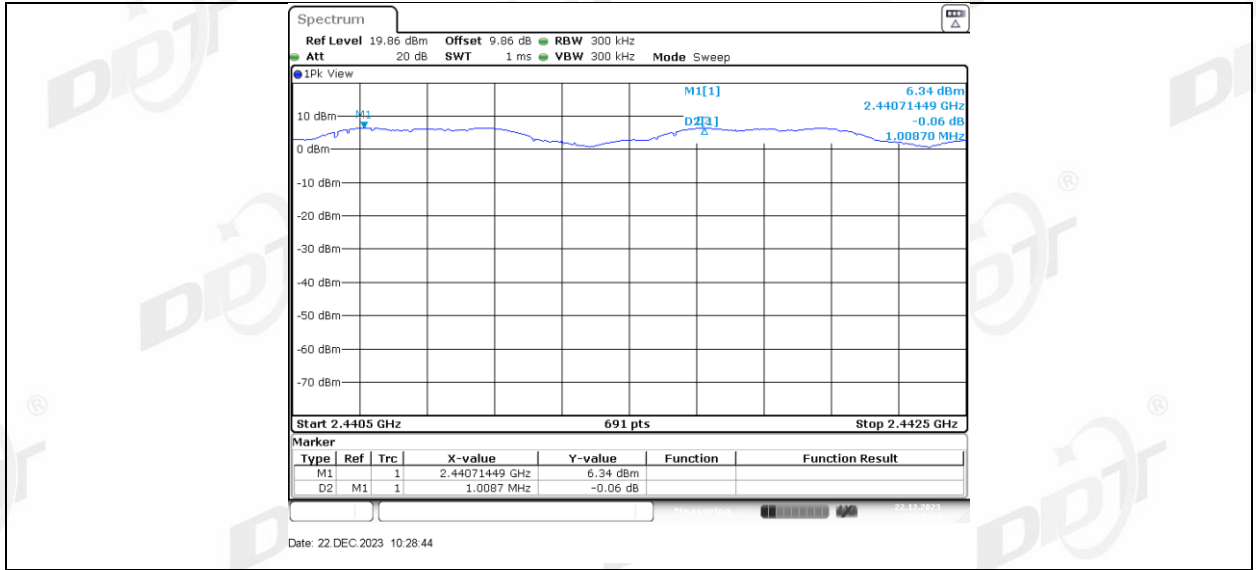
### 6.4. Test result

Test Site:	RF Measurement System 3#	Test Date:	2023.12.22
Ambient Condition:	17.4 °C,27.5 %RH	Test Engineer:	Zhongyao
Equipment under Test:	Bluetooth Wall Plate	Model No.:	BTWP2
Sample Number	S23120624-03	Test Power Supply:	DC 12V

Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	1	≥0.980	PASS
2DH5	Ant1	Hop	0.991	≥0.873	PASS
3DH5	Ant1	Hop	1.009	≥0.867	PASS

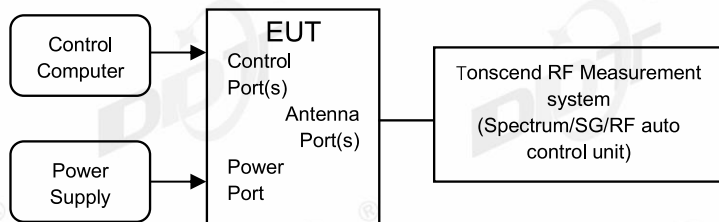
### 6.5. Test graphs





## 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:	≤ 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.

Measure and record the results in the report.

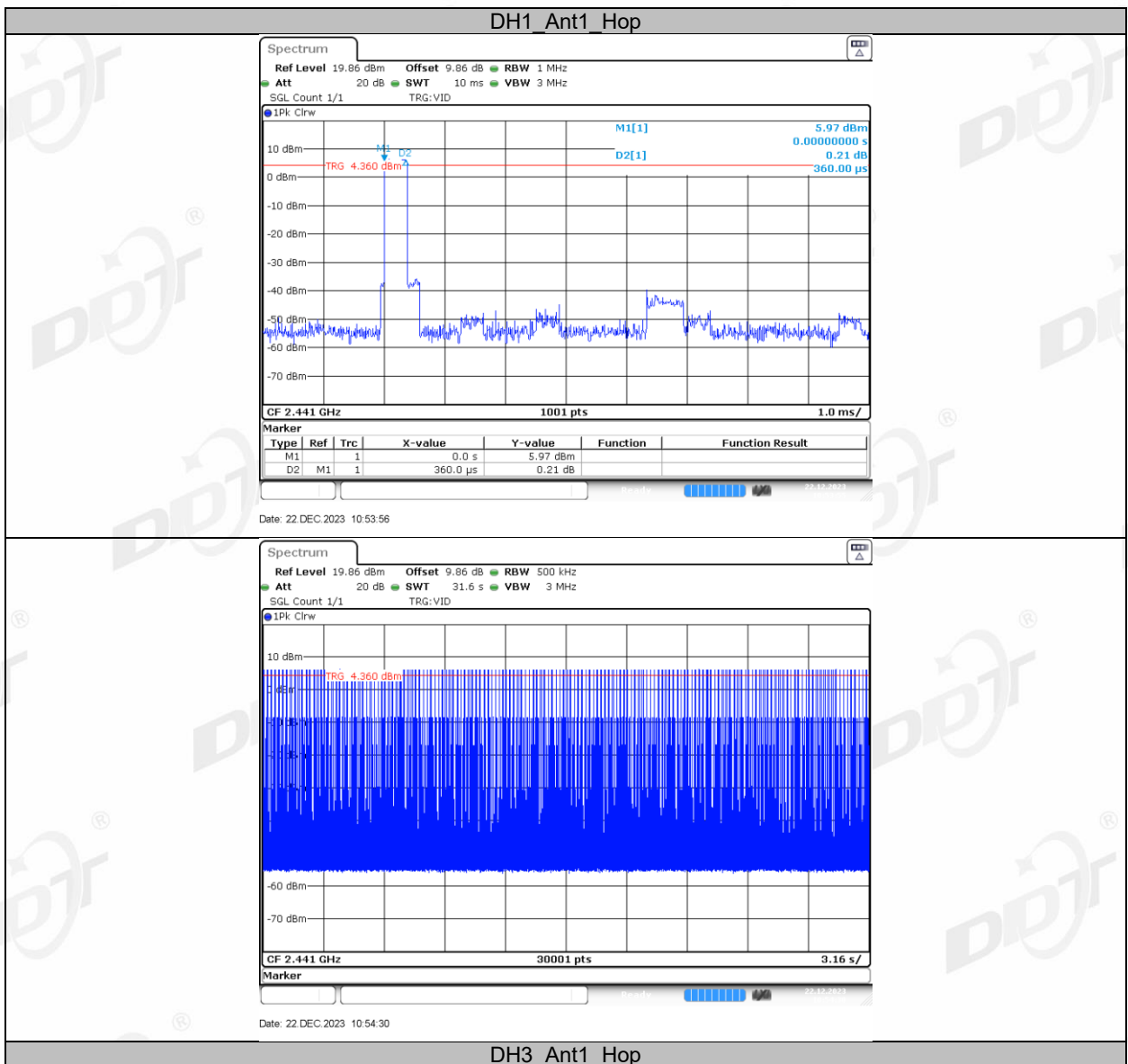
- (5) The test period:  $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$
- (6) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula  $\text{Dwell time} = \text{total hops} \times \text{pulse's on time}$ .

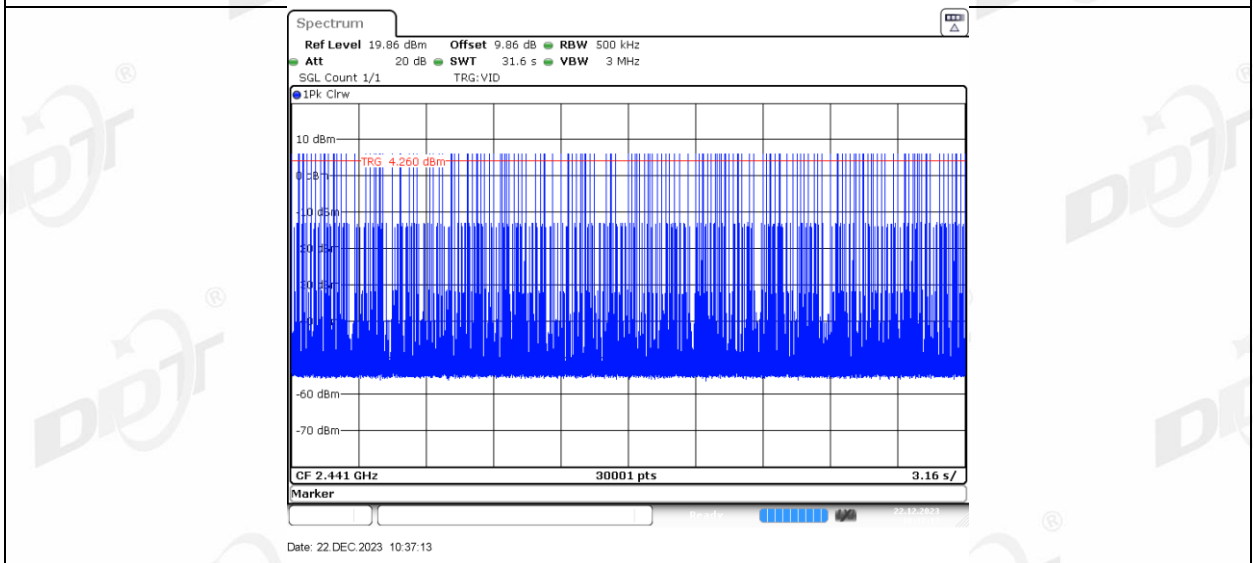
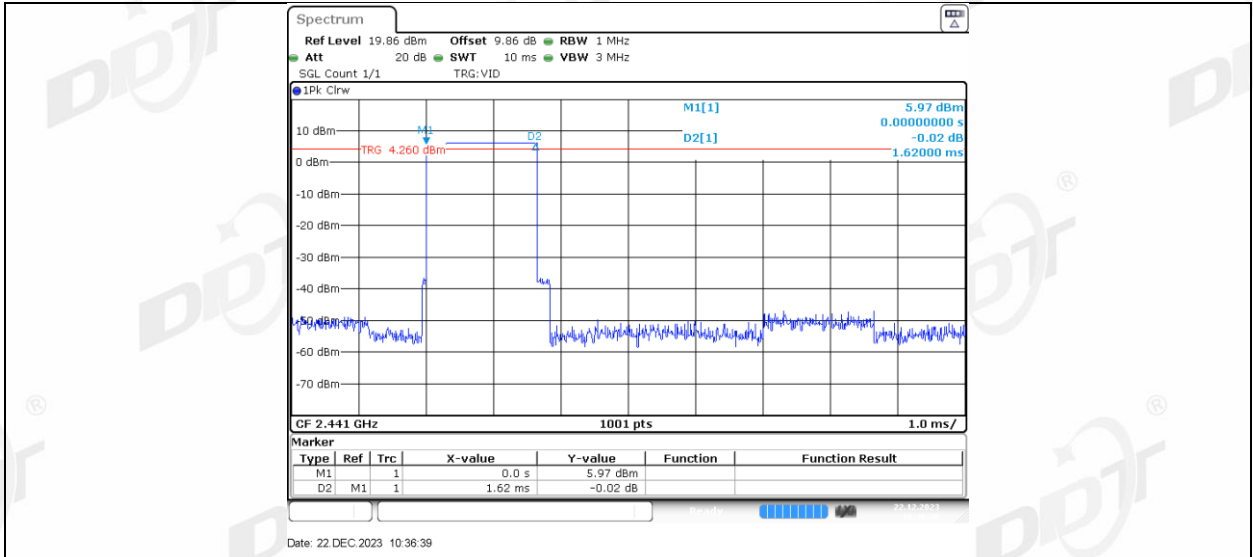
### 7.4. Test result

Test Site:	RF Measurement System 3#	Test Date:	2023.12.22
Ambient Condition:	17.4 °C,27.5 %RH	Test Engineer:	Zhongyao
Equipment under Test:	Bluetooth Wall Plate	Model No.:	BTWP2
Sample Number	S23120624-03	Test Power Supply:	DC 12V

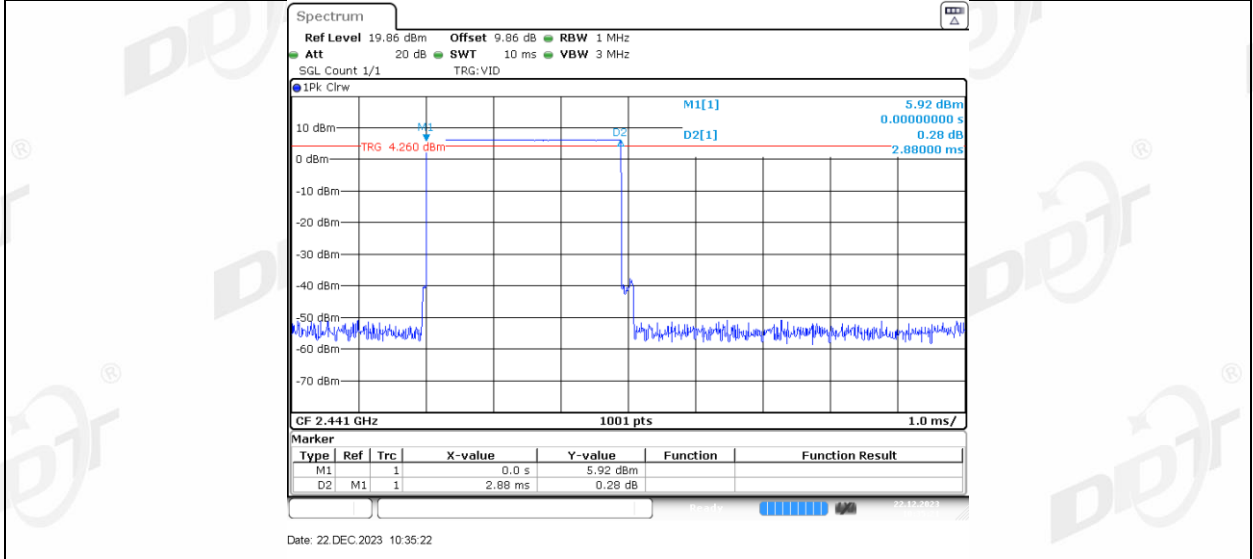
Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.360	311	0.112	≤0.4	PASS
DH3	Ant1	Hop	1.620	172	0.279	≤0.4	PASS
DH5	Ant1	Hop	2.880	107	0.308	≤0.4	PASS
2DH1	Ant1	Hop	0.370	312	0.115	≤0.4	PASS
2DH3	Ant1	Hop	1.620	172	0.279	≤0.4	PASS
2DH5	Ant1	Hop	2.870	107	0.307	≤0.4	PASS
3DH1	Ant1	Hop	0.370	311	0.115	≤0.4	PASS
3DH3	Ant1	Hop	1.620	172	0.279	≤0.4	PASS
3DH5	Ant1	Hop	2.870	107	0.307	≤0.4	PASS

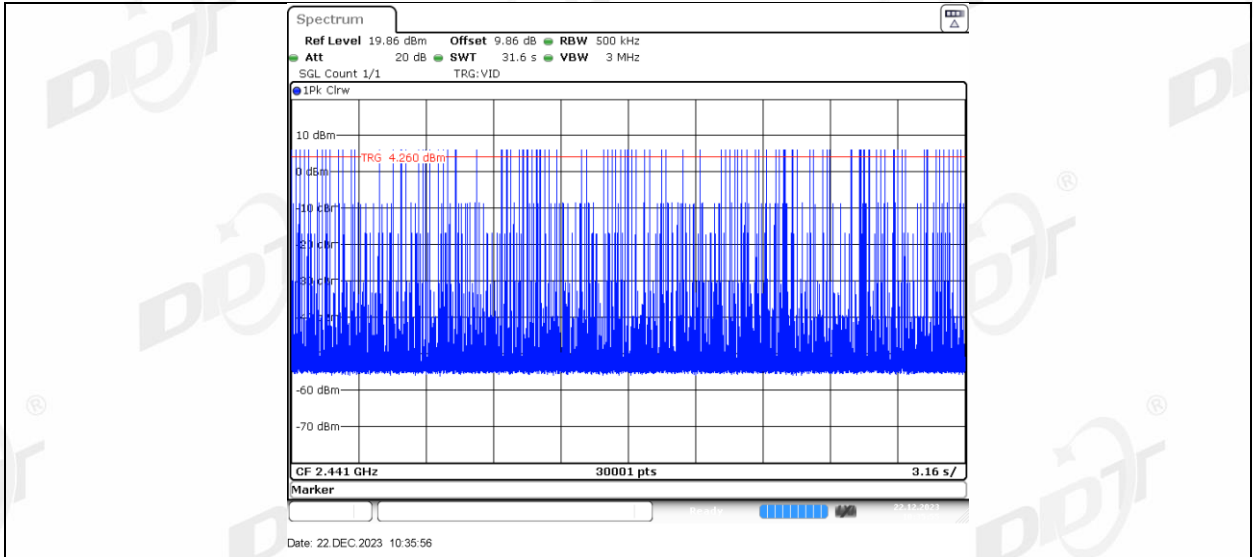
### 7.5. Test graphs



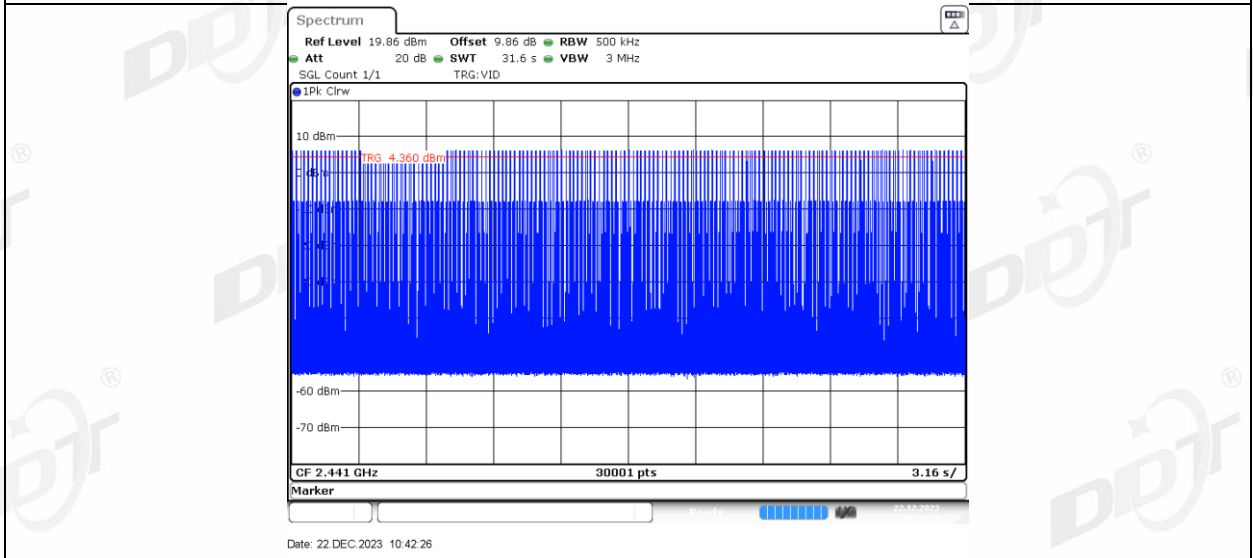
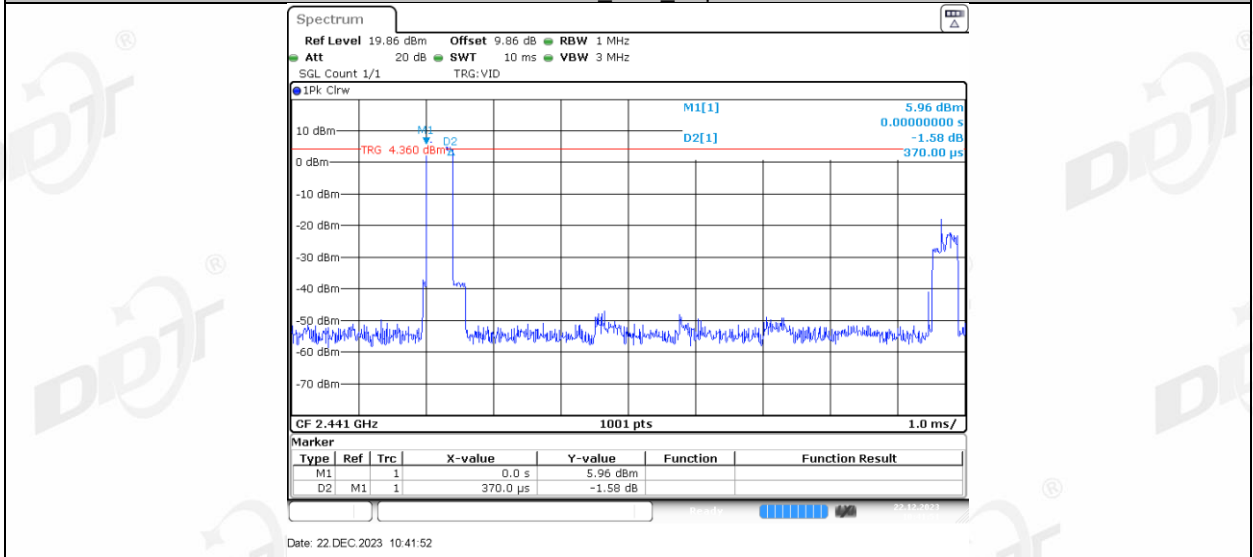


DH5\_Ant1\_Hop

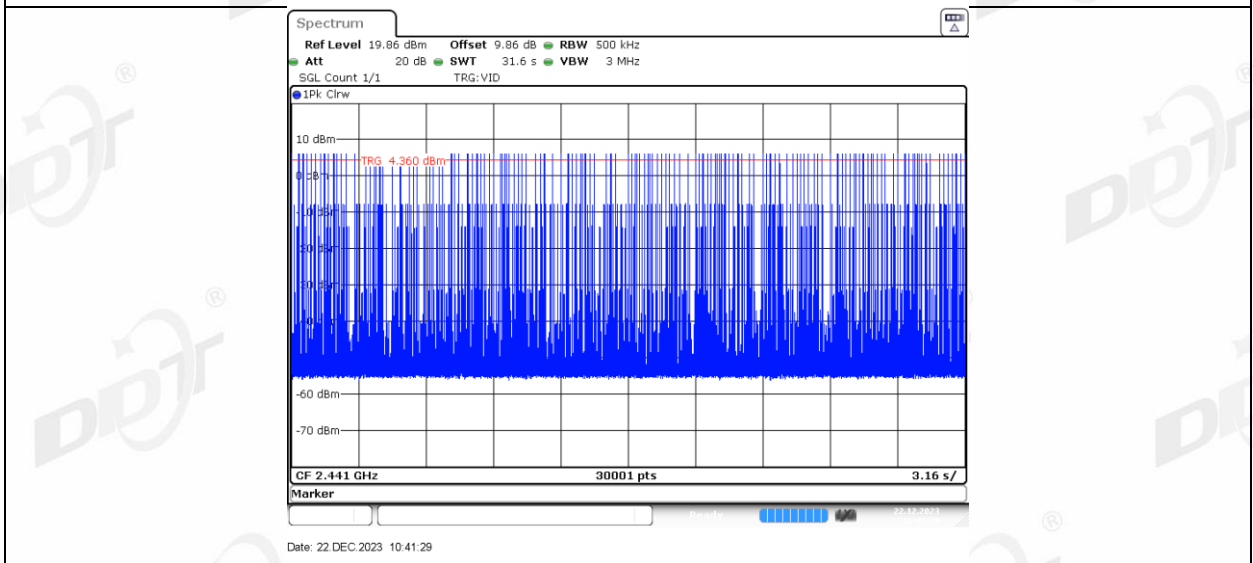
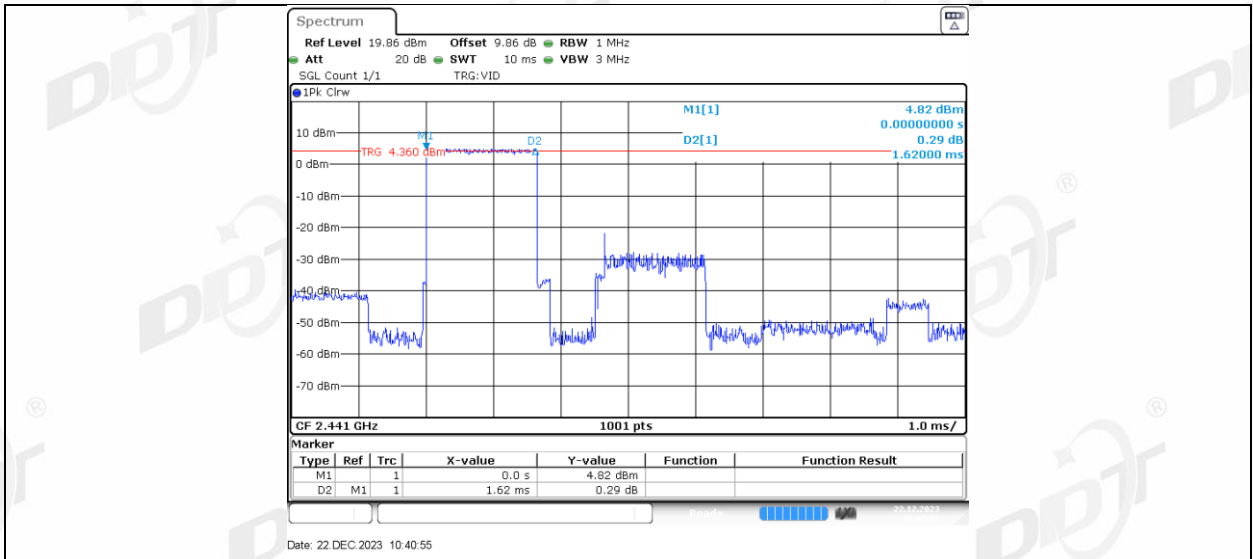




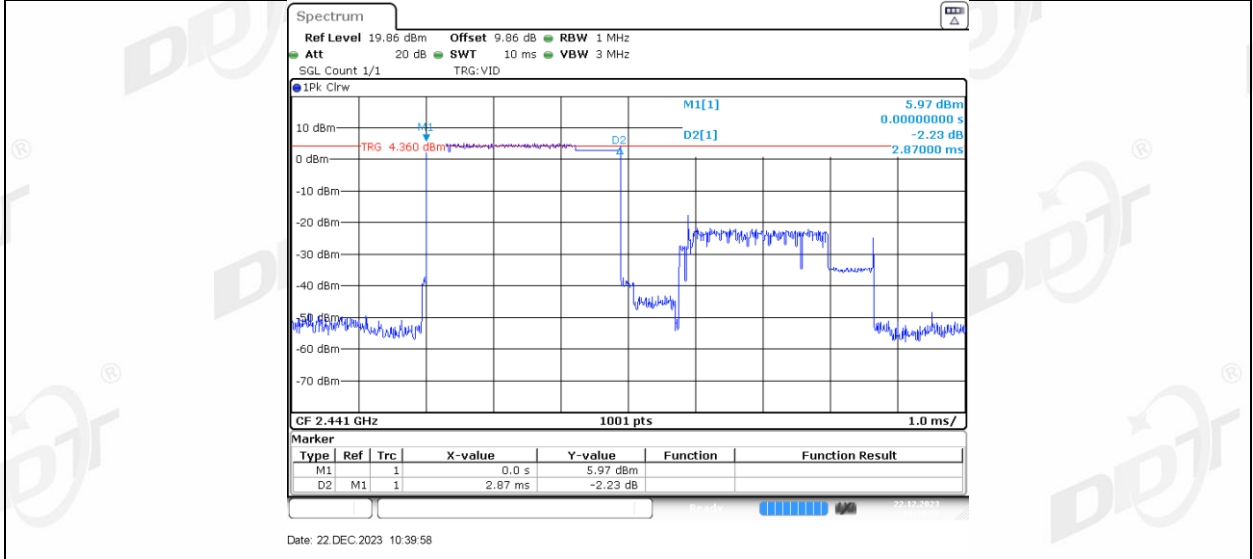
2DH1\_Ant1\_Hop



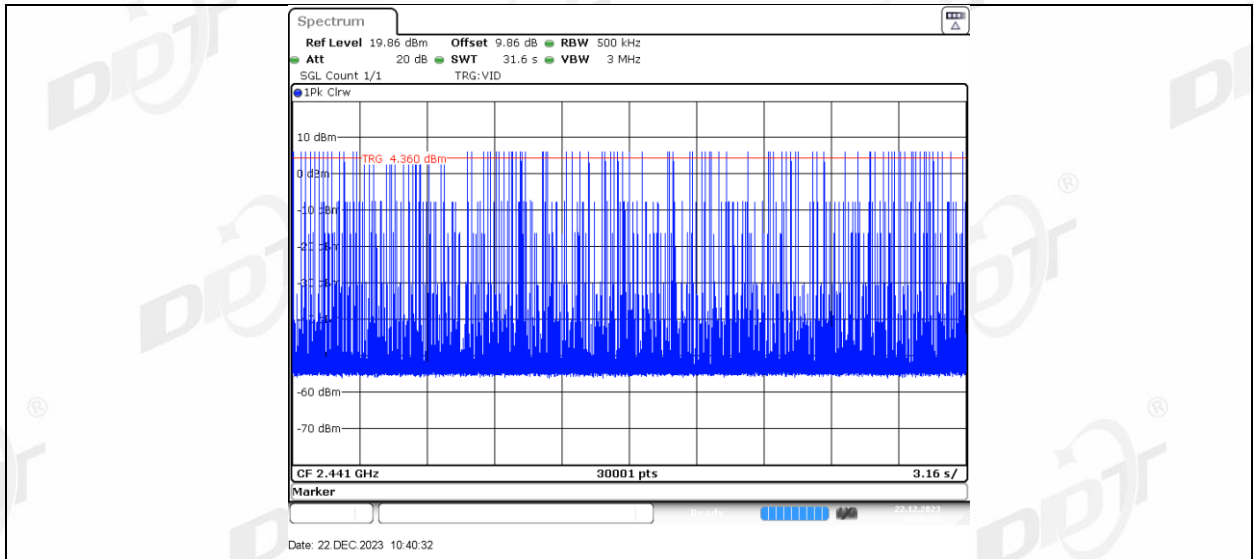
2DH3\_Ant1\_Hop



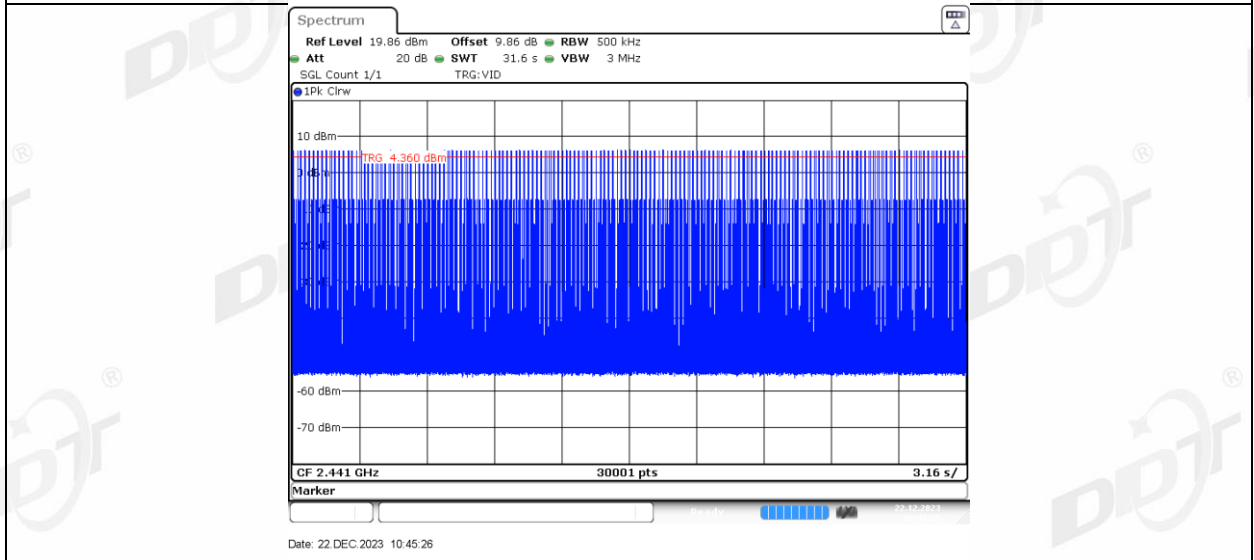
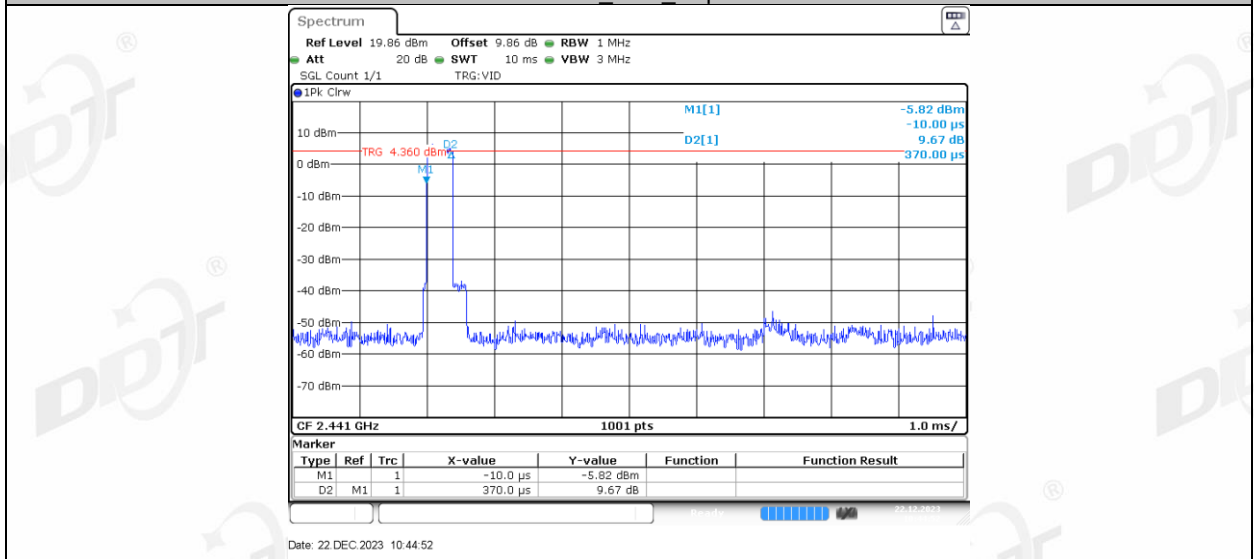
2DH5\_Ant1\_Hop





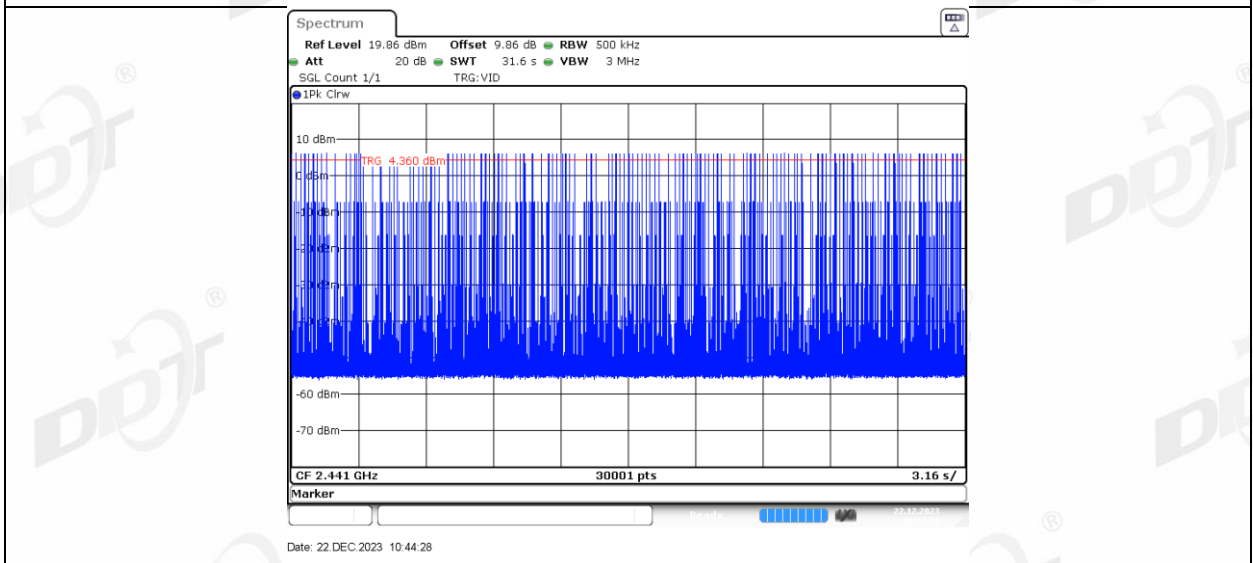
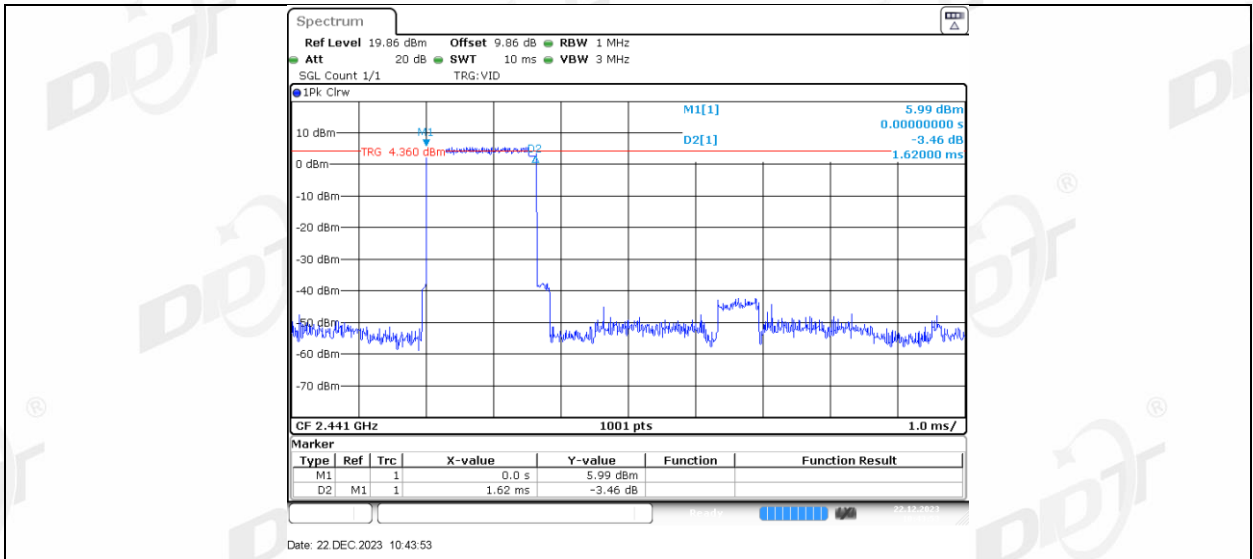


3DH1\_Ant1\_Hop

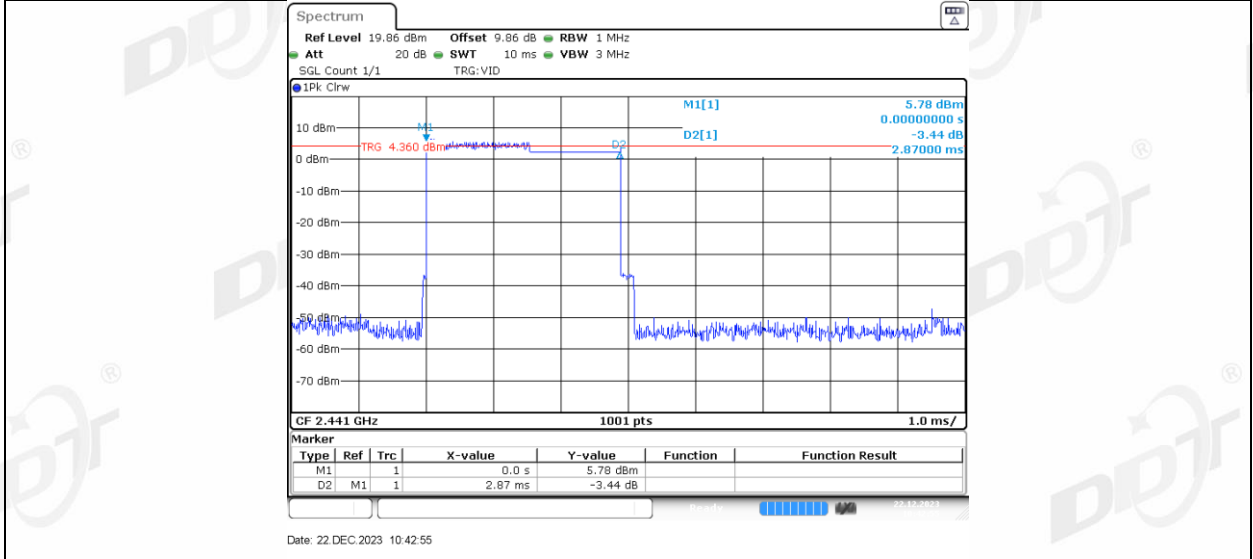


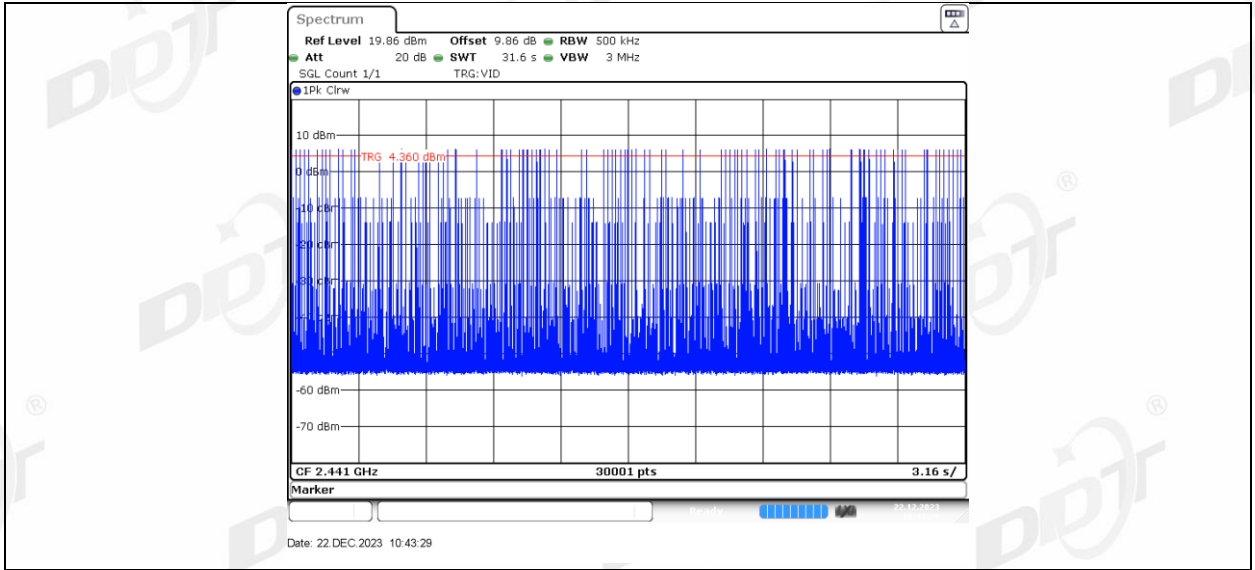
3DH3\_Ant1\_Hop





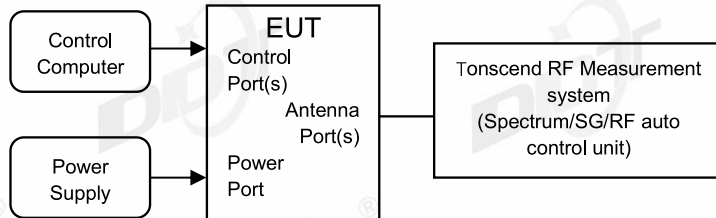
3DH5\_Ant1\_Hop





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

### 8.4. Test result

Test Site:	RF Measurement System 3#	Test Date:	2023.12.22
Ambient Condition:	17.4 °C,27.5 %RH	Test Engineer:	Zhongyao
Equipment under Test:	Bluetooth Wall Plate	Model No.:	BTWP2
Sample Number	S23120624-03	Test Power Supply:	DC 12V

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



