



■ Report No.:DDT-RE23050825-2E01

■ Issued Date: Jun. 09, 2023

FCC CERTIFICATION TEST REPORT

FOR

Applicant	:	PEAG, LLC dba JLab Audio
Address	:	5927 Landau Ct. Carlsbad, CA 92008, USA
Equipment under Test	:	TWS Earphone
Model No.	:	JBuds Mini
Trade Mark	:	JLAB
FCC ID	:	2AHYV-JBMINI
Manufacturer	:	GuangDong Simpreal Intelligent Technology Co., Ltd
Address	:	Room 2408, JiaHong ZhenXing DaSha, DongGuan Avenue #13, DongCheng District, DongGuan City, GuangDong Province, P.R. China

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

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REPORT

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Test Report Declare

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Manufacturer	:	GuangDong Simpreal Intelligent Technology Co., Ltd
Address	:	Room 2408, JiaHong ZhenXing DaSha, DongGuan Avenue #13, DongCheng District, DongGuan City, GuangDong Province, P.R. China

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 Dongguan 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 Dongguan 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 FCC standards.

Report No.:	DDT-RE23050825-2E01		
Date of Receipt:	May 16, 2023	Date of Test:	May 16, 2023 ~ Jun. 09, 2023

Prepared By:**Johnny Wang/Engineer****Approved By:****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 Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Jun. 09, 2023	

1. Summary of Test Results

Description of Test Item	Standard	Verdict
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1)	Pass
20 dB Bandwidth and 99% 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)	Pass
Antenna Requirement	FCC Part 15: 15.203	Pass

2. General Test Information

2.1. Description of EUT

EUT Name	: TWS Earphone
Model Number	: JBuds Mini
EUT Function Description	: Please reference user manual of this device
Power Supply	: Charging case: DC 5V by an external adapter or a 3.8V built-in lithium battery. Wireless headphones: DC 3.85V built-in lithium battery.
Radio Specification	: Bluetooth V5.3
Operation Frequency	: 2402 MHz - 2480 MHz
Modulation	: GFSK, $\pi/4$ -DQPSK
Data Rate	: 1 Mbps, 2 Mbps
Antenna	: Left side: 1.26 dBi Right side: 0.24 dBi
Sample Number	: S23050825-03 for conductive, S23050825-04 for radiation

Note: EUT is the ab. of equipment under test.

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		

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
N/A	N/A	N/A	N/A	N/A

2.4. Block diagram of EUT configuration for test

Test software: FCC_assist_1.0.1.2.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	10	CH0 to CH78	2402 to 2480
$\pi/4$ -DQPSK hopping on Tx mode	10	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	10	CH0	2402
	10	CH39	2441
	10	CH78	2480
$\pi/4$ -DQPSK hopping off Tx mode	10	CH0	2402
	10	CH39	2441
	10	CH78	2480

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

Temperature range:	+15°C to +35 °C
Humidity range:	20% to 75%
Pressure range:	86 kPa to 106 kPa

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, 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 × 10 ⁻⁸ (Antenna couple method) 5.5 × 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 °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.	

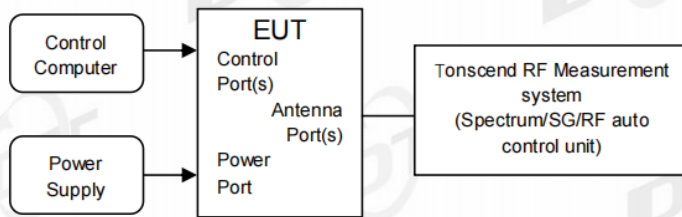
3. Equipment Used During Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑RF Connected Test (Tonscend RF Measurement System 3#)					
Signal & Spectrum analyzer	R&S	FSV40	101407	Jul. 21, 2022	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	Apr. 27, 2023	1 Year
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	Aug. 26, 2022	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180912	Apr. 23, 2023	1 Year
RF Control Unit	Tonscend	JS0806-2	20C8060230	Apr. 27, 2023	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	May 15, 2023	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.3.2.22	N/A	N/A
☑Radiation 3#chamber					
EMI Test Receiver	R&S	ESU26	100472	Apr. 23, 2023	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Apr. 23, 2023	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Sep. 29, 2022	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	01429	Jul. 22, 2022	1 Year
Double Ridged Horn Antenna	Schwarzbeck	BBHA9120 D	02468	Sep. 29, 2022	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	Apr. 26, 2023	1 Year
Pre-amplifier	COM-POWER	PAM-118A	18040084	Aug.17, 2022	1 Year
Pre-amplifier	COM-POWER	PAM-840A	461369	Apr. 27, 2023	1 Year
RE Cable	N/A	W23.02 CP1-X2 + W23.09 AP1-X8+ JCT26S-NJ-NJ-1.5M	4.5M+8M+1.5M	Apr. 21, 2023	1 Year
RF Cable	Yuhu Technology	JCTB810-NJ-NJ-9M+ ZT26S-SMAJ-SMAJ-1M	21123964	Apr. 23, 2023	1 Year
Micro-Tronics filters	REBES	BRM50702	G555	N/A	N/A
Micro-Tronics filters	REBES	BRM50716	G392	N/A	N/A
High Pass filter	XB	XBLBQ-GTA67	210820-2-3	N/A	N/A
Test software	Tonscend	JS32-RE	V 5.0.0.1	N/A	N/A
☑Power Line Conducted Emissions Test 1#					
Test Receiver	R&S	ESCI	100551	Aug. 26, 2022	1 Year
LISN 1	R&S	ENV216	101109	Aug. 26, 2022	1 Year
LISN 2	R&S	ESH2-Z5	100309	Aug. 26, 2022	1 Year

Pulse Limiter	R&S	ESH3-Z2	101242	Aug. 26, 2022	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Aug. 26, 2022	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
Test Receiver	R&S	ESCI	100551	Aug. 26, 2022	1 Year

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

Left side:

Test Mode	Antenna	Frequency [MHz]	20dB EBW[MHz]
DH5	Ant1	2402	1.02
		2441	1.02
		2480	1.02
2DH5	Ant1	2402	1.29
		2441	1.32
		2480	1.29

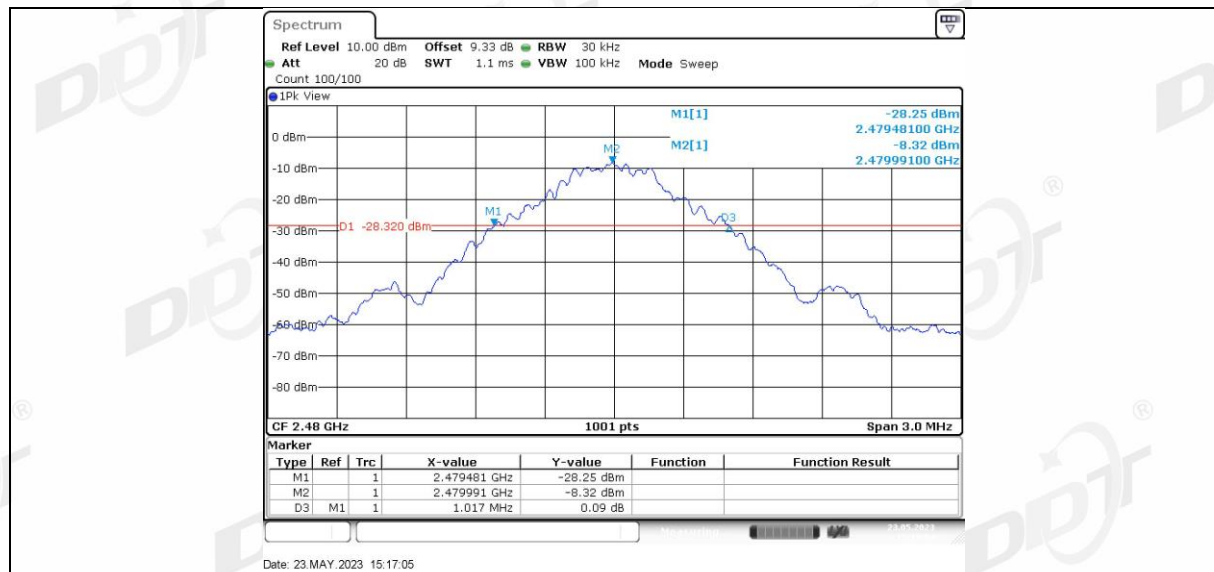
Right side:

Test Mode	Antenna	Frequency [MHz]	20dB EBW[MHz]
DH5	Ant1	2402	1.02
		2441	1.02
		2480	1.02
2DH5	Ant1	2402	1.29
		2441	1.29
		2480	1.31

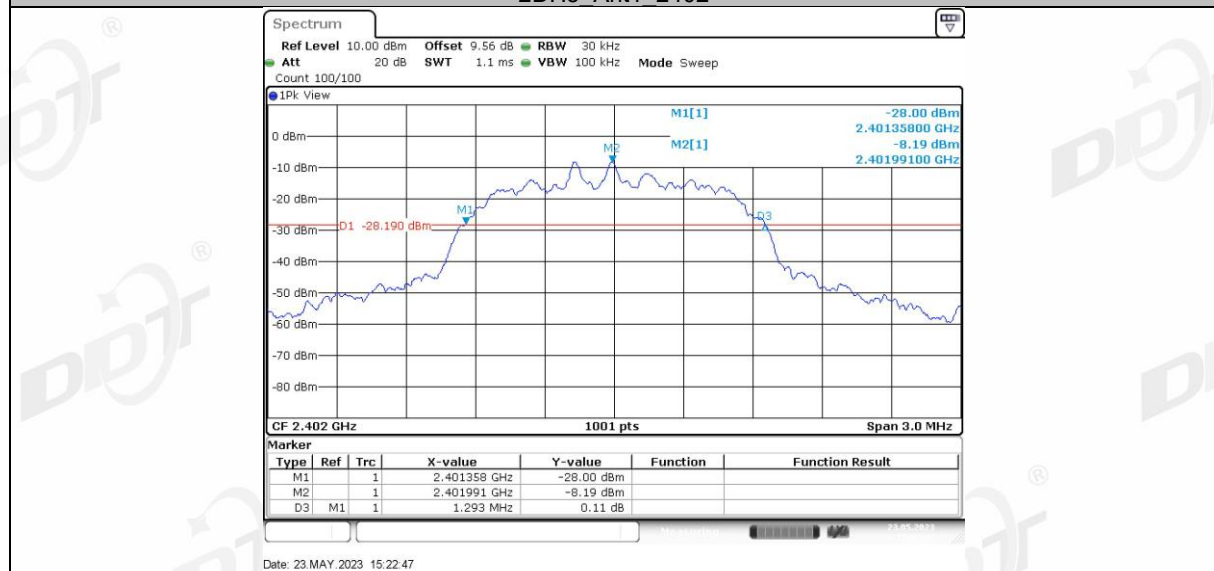
4.5. Test graphs

Left side:

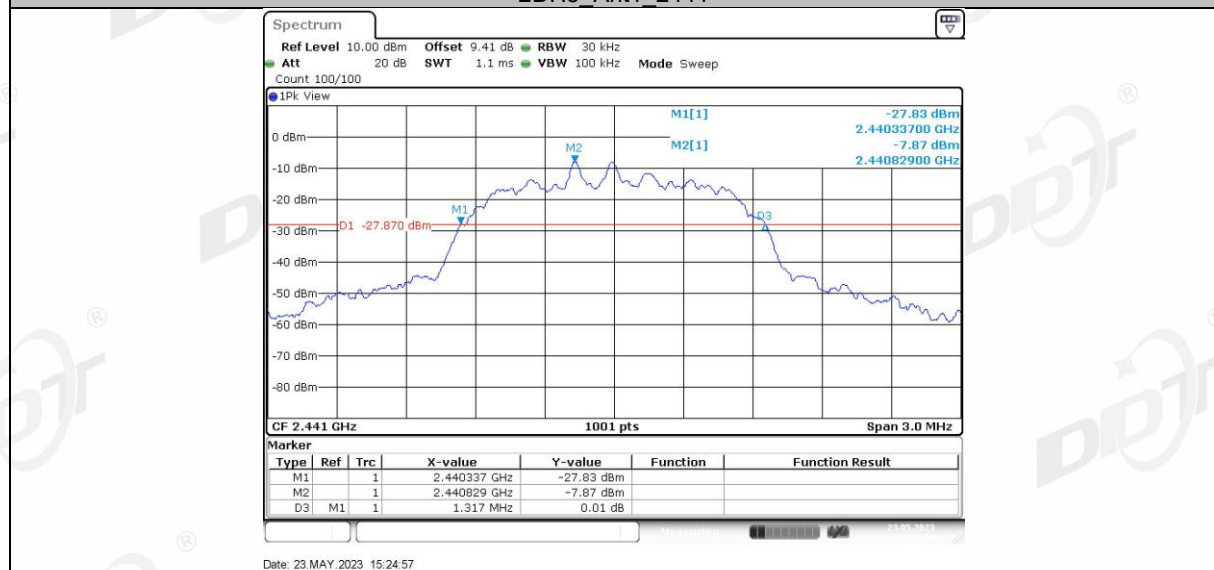




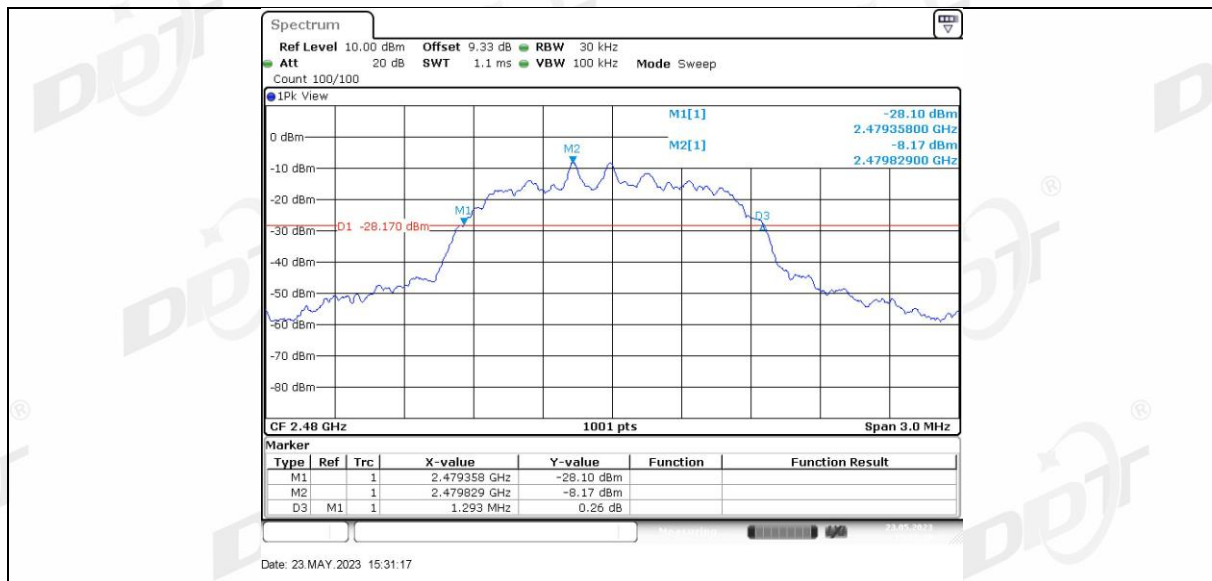
2DH5 Ant1_2402



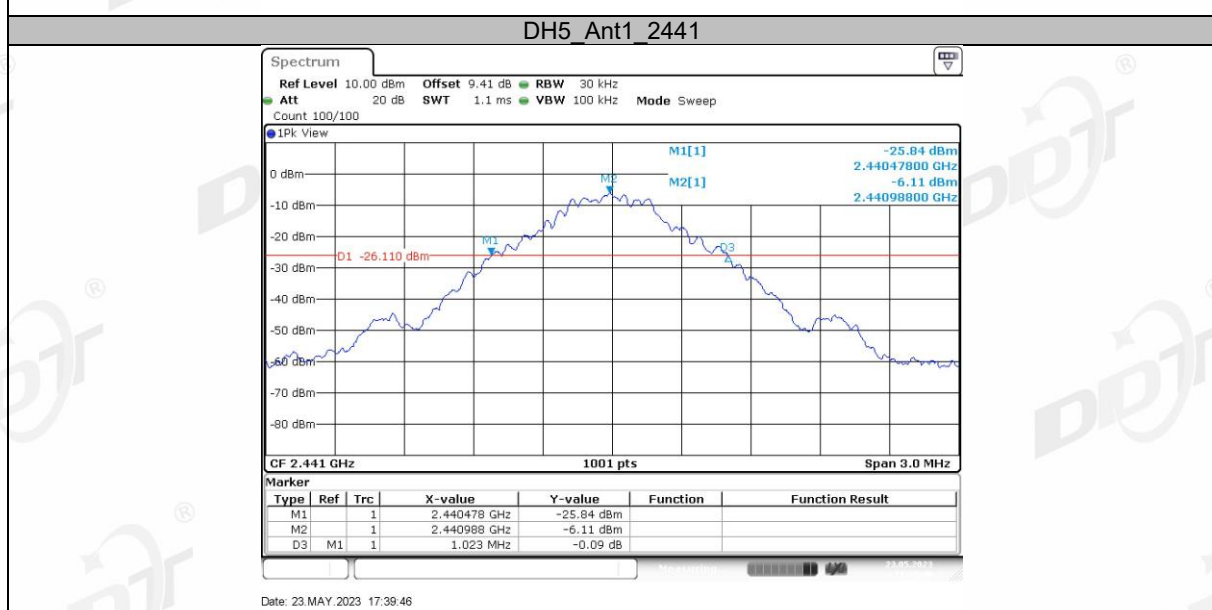
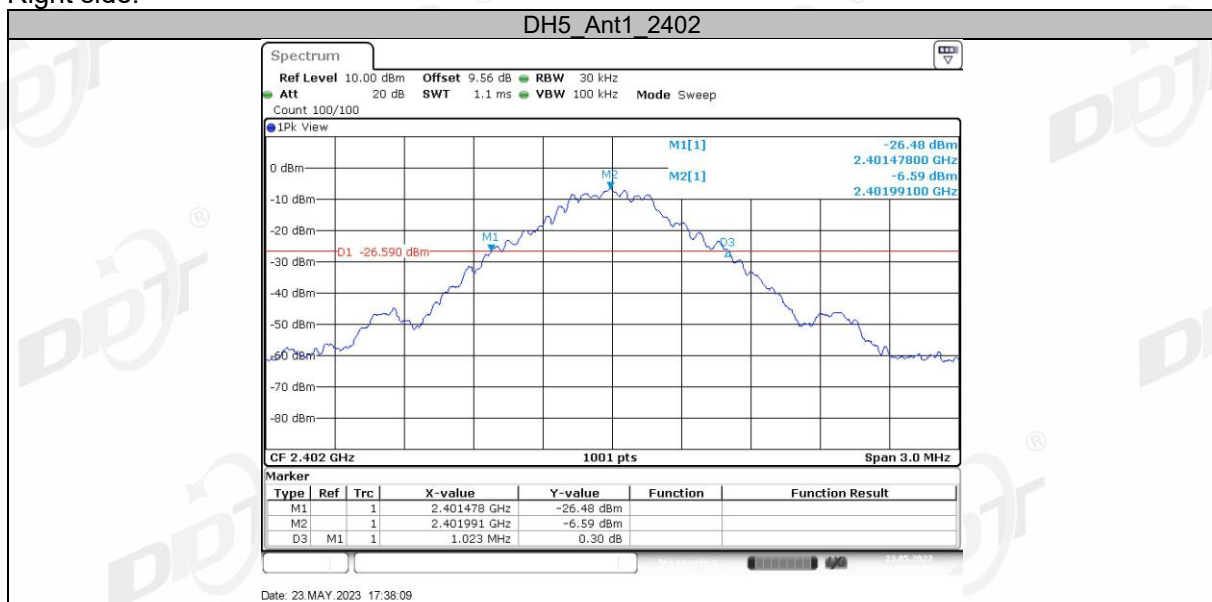
2DH5 Ant1_2441



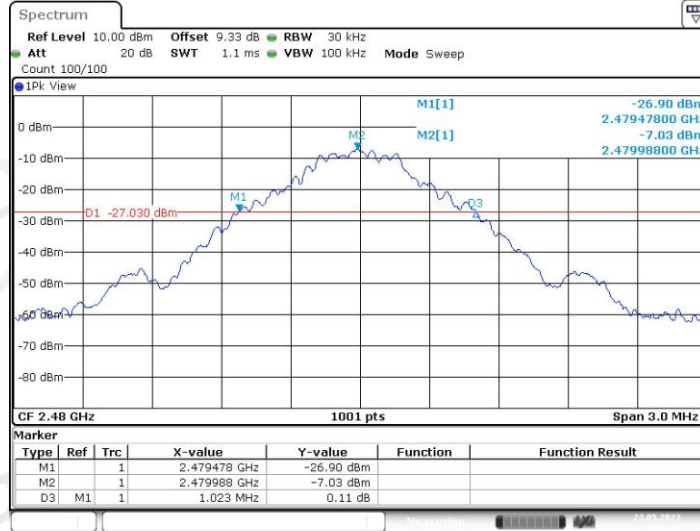
2DH5 Ant1_2480



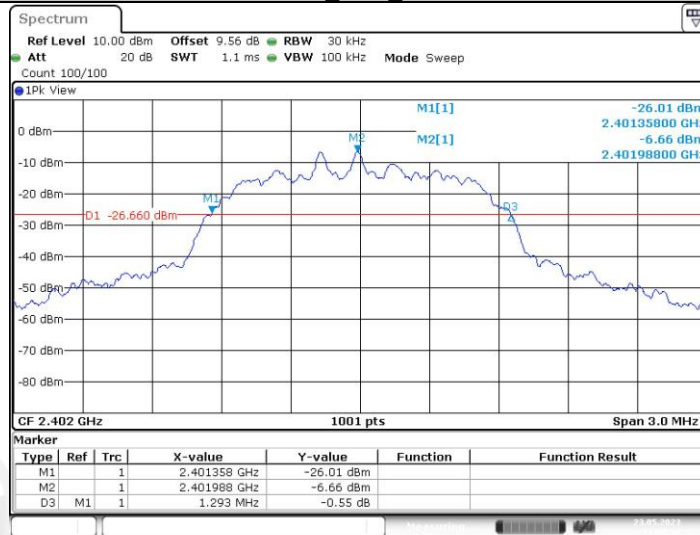
Right side:



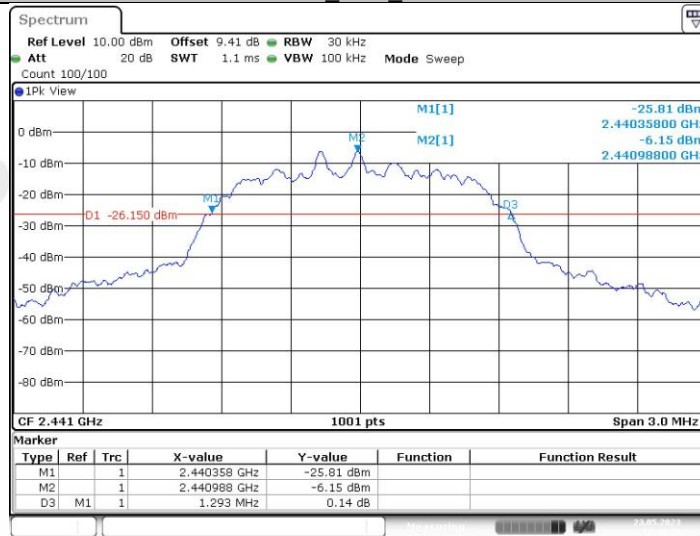
DH5_Ant1_2480



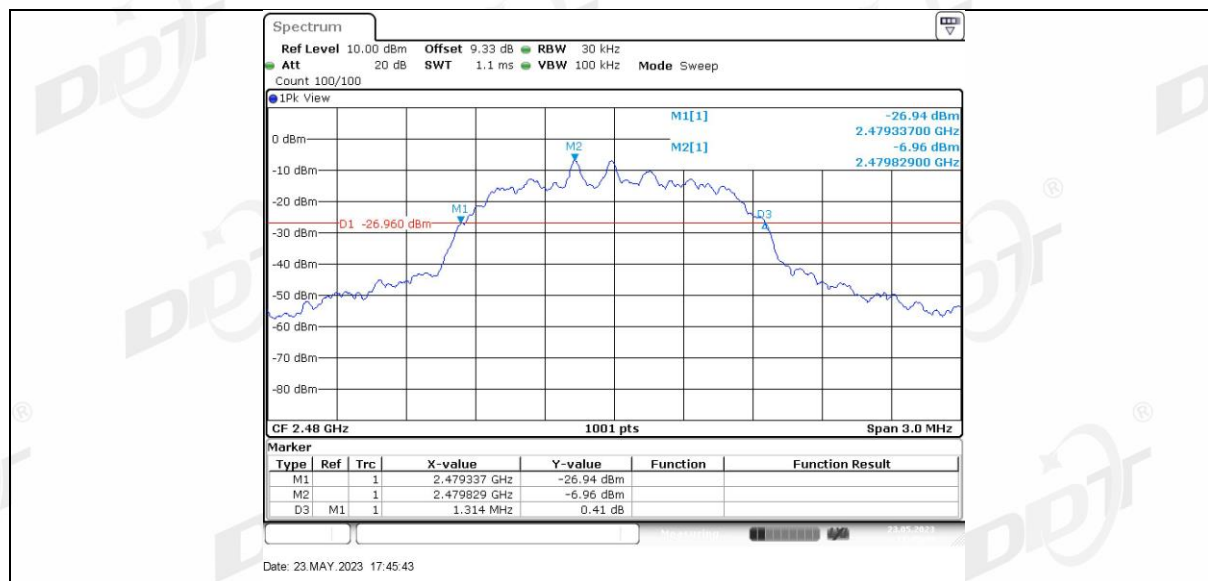
2DH5_Ant1_2402



2DH5_Ant1_2441

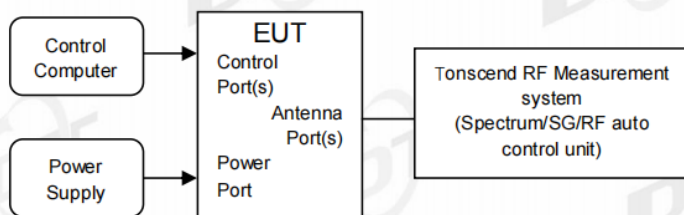


2DH5_Ant1_2480



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 C63.10-2013 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

Left side:

Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.905	2401.5415	2402.4466
		2441	0.905	2440.5385	2441.4436
		2480	0.902	2479.5415	2480.4436
2DH5	Ant1	2402	1.19	2401.4006	2402.5904
		2441	1.19	2440.3976	2441.5874
		2480	1.19	2479.3976	2480.5874

Right side:

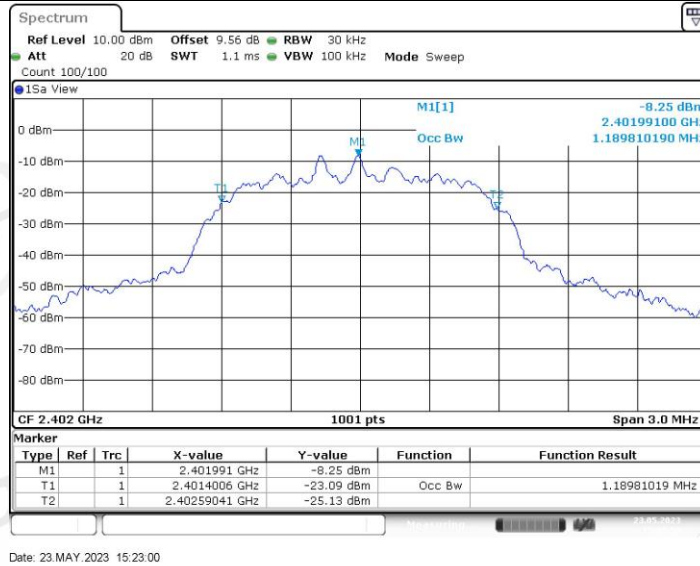
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.914	2401.5355	2402.4496
		2441	0.914	2440.5355	2441.4496
		2480	0.911	2479.5355	2480.4466
2DH5	Ant1	2402	1.196	2401.3946	2402.5904
		2441	1.196	2440.3946	2441.5904
		2480	1.19	2479.3976	2480.5874

5.5. Test Graphs

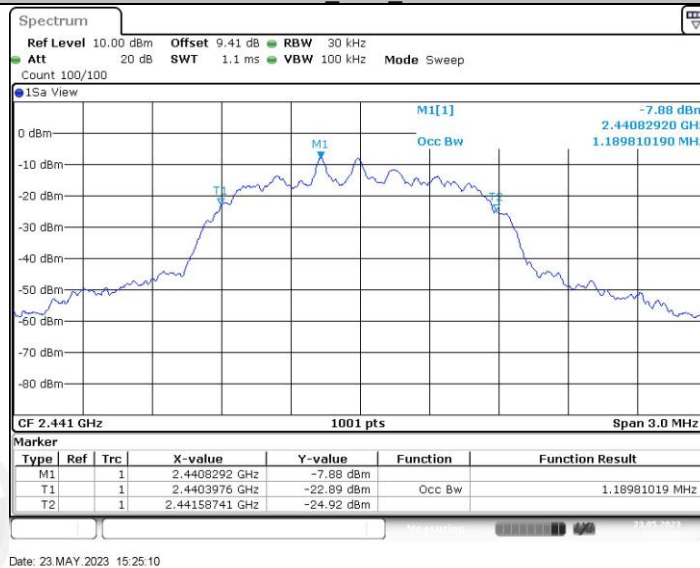
Left side:



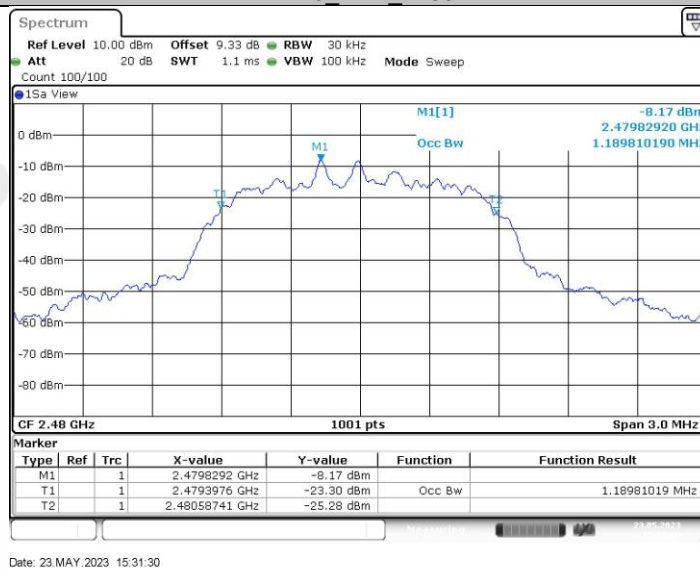
2DH5 Ant1 2402



2DH5 Ant1 2441



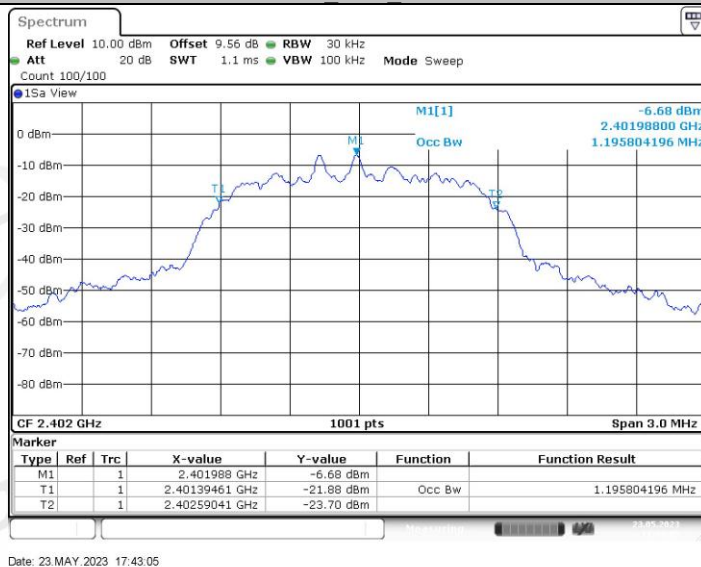
2DH5 Ant1 2480



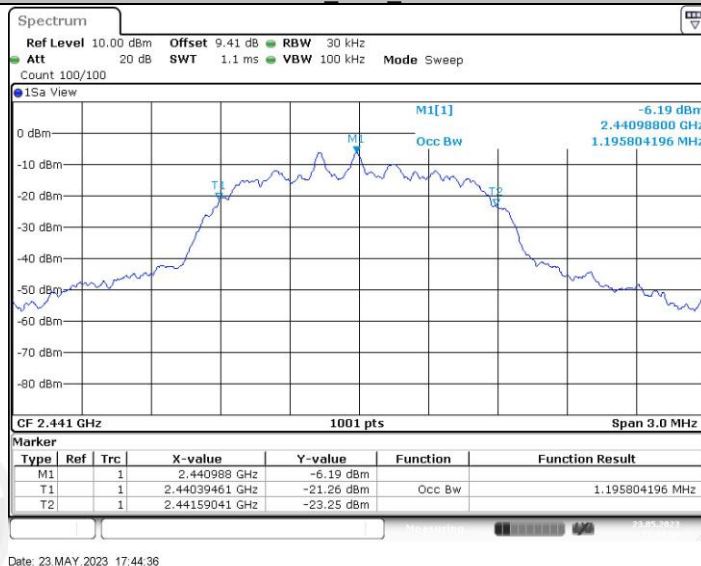
Right side:



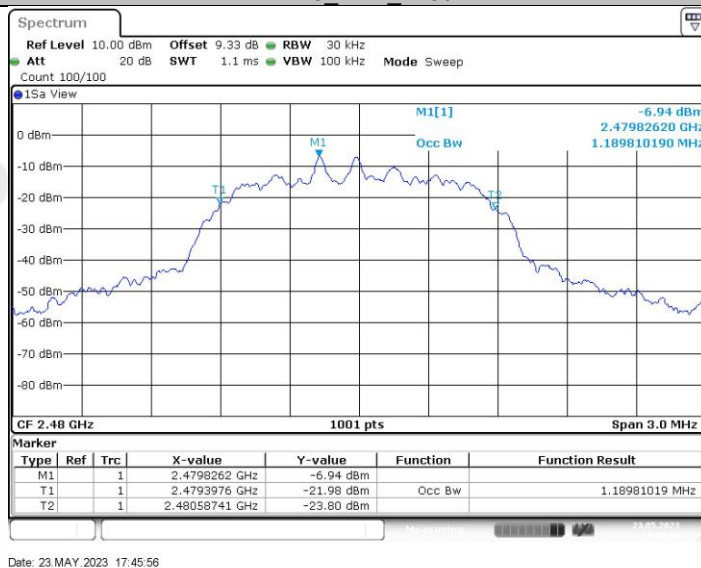
2DH5_Ant1_2402



2DH5_Ant1_2441

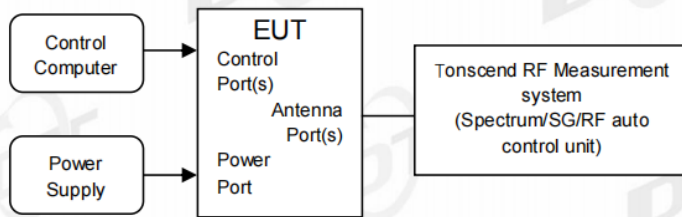


2DH5_Ant1_2480



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 C63.10-2013 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.

6.4. Test Result Peak

Left side:

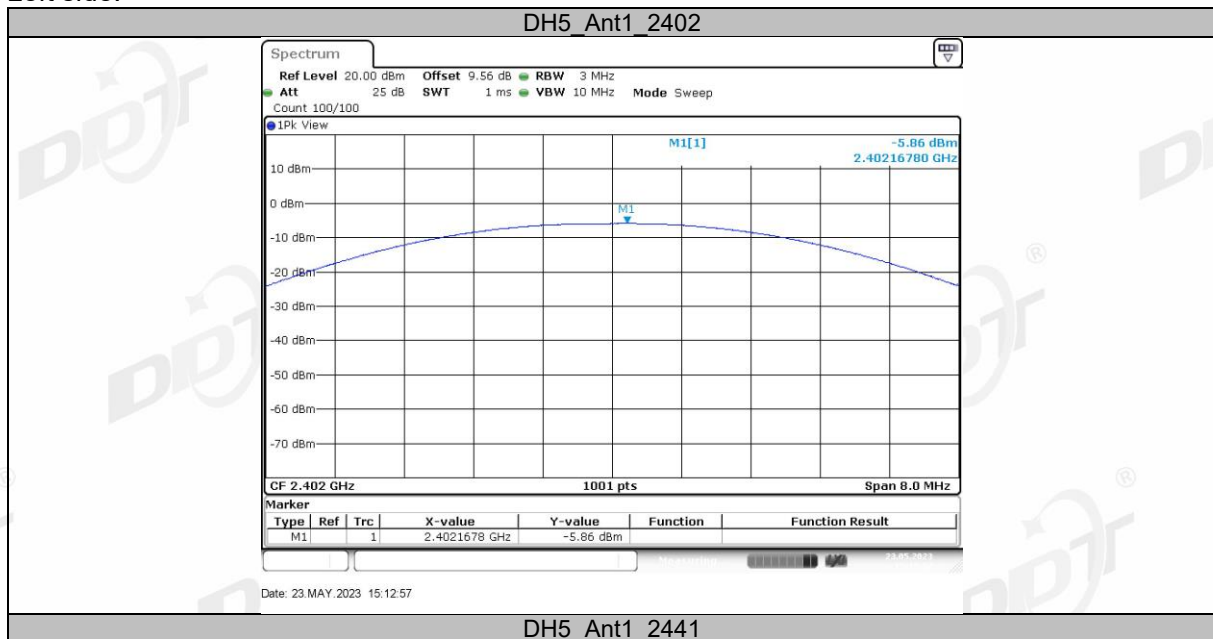
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
DH5	Ant1	2402	-5.86	≤20.97	-4.60	≤36	PASS
		2441	-5.55	≤20.97	-4.29	≤36	PASS
		2480	-5.74	≤20.97	-4.48	≤36	PASS
2DH5	Ant1	2402	-4.96	≤20.97	-3.70	≤36	PASS
		2441	-4.69	≤20.97	-3.43	≤36	PASS
		2480	-4.86	≤20.97	-3.60	≤36	PASS

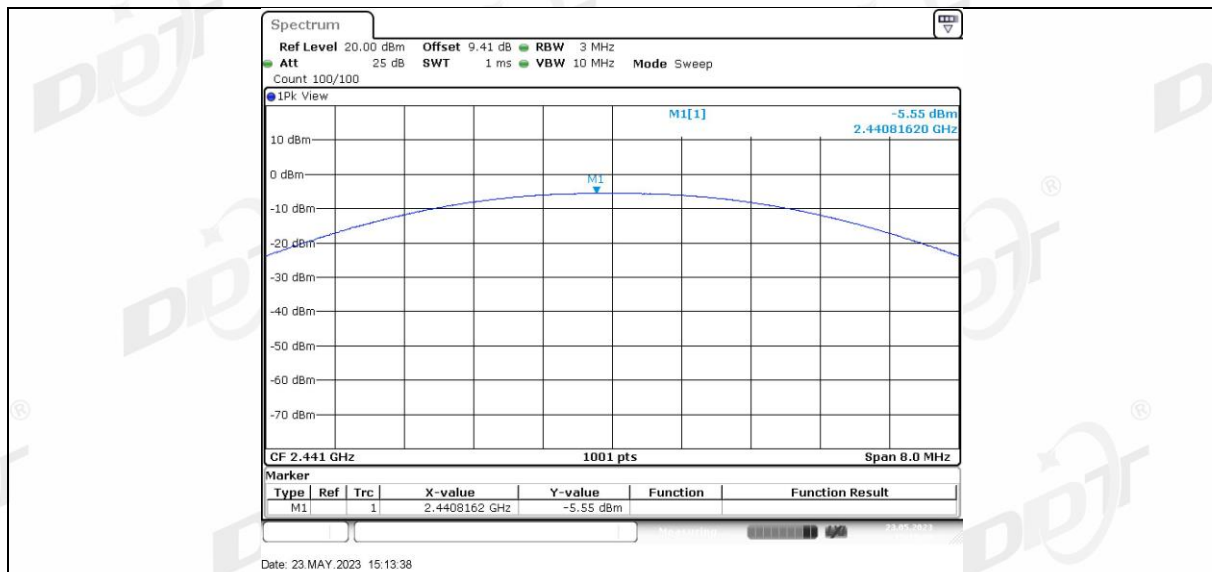
Right side:

Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
DH5	Ant1	2402	-4.44	≤20.97	-4.20	≤36	PASS
		2441	-3.86	≤20.97	-3.62	≤36	PASS
		2480	-4.54	≤20.97	-4.30	≤36	PASS
2DH5	Ant1	2402	-3.56	≤20.97	-3.32	≤36	PASS
		2441	-2.97	≤20.97	-2.73	≤36	PASS
		2480	-3.64	≤20.97	-3.40	≤36	PASS

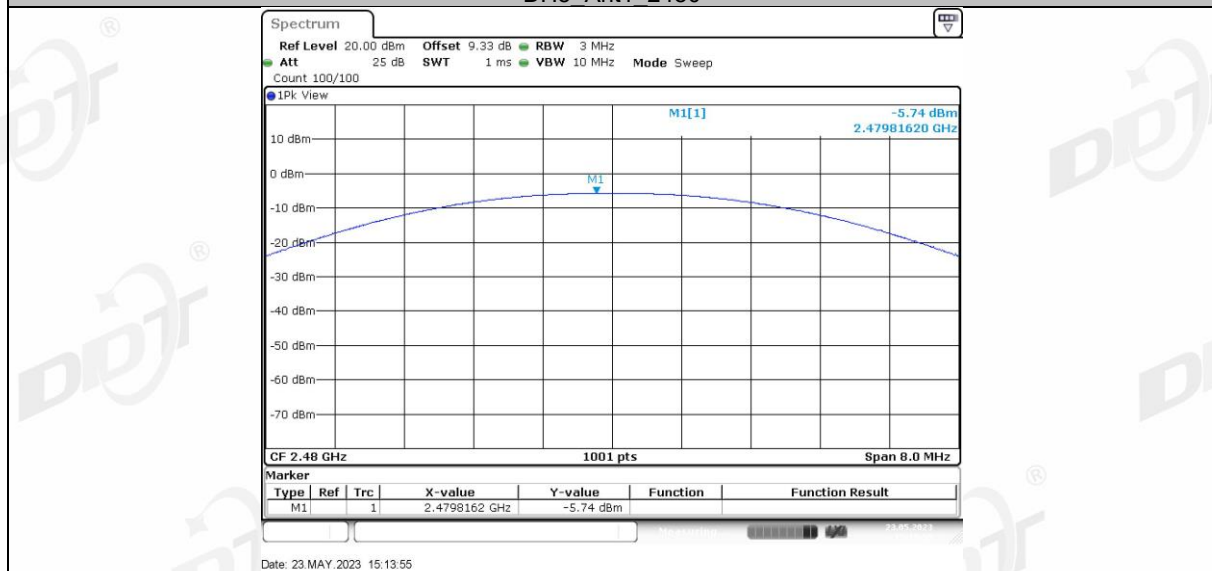
6.5. Test graphs

Left side:

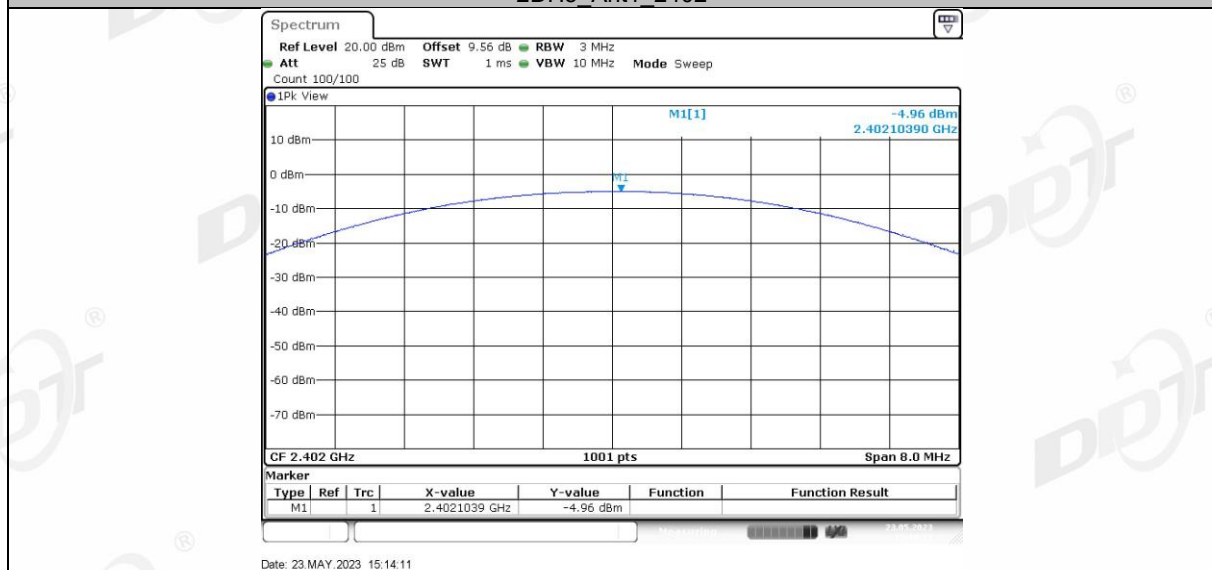




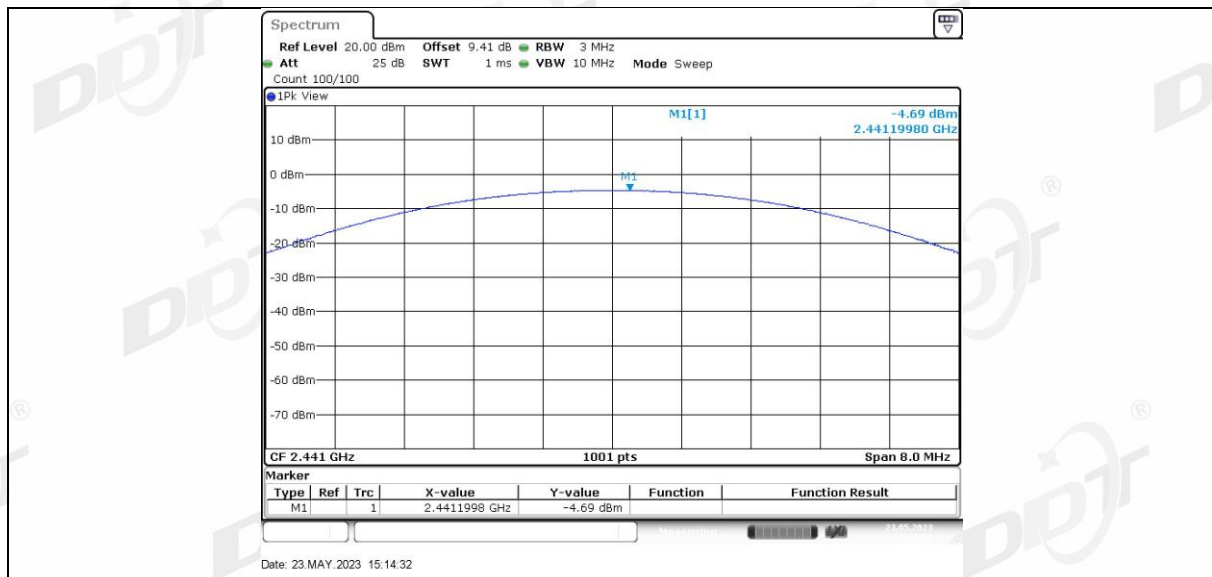
DH5 Ant1 2480



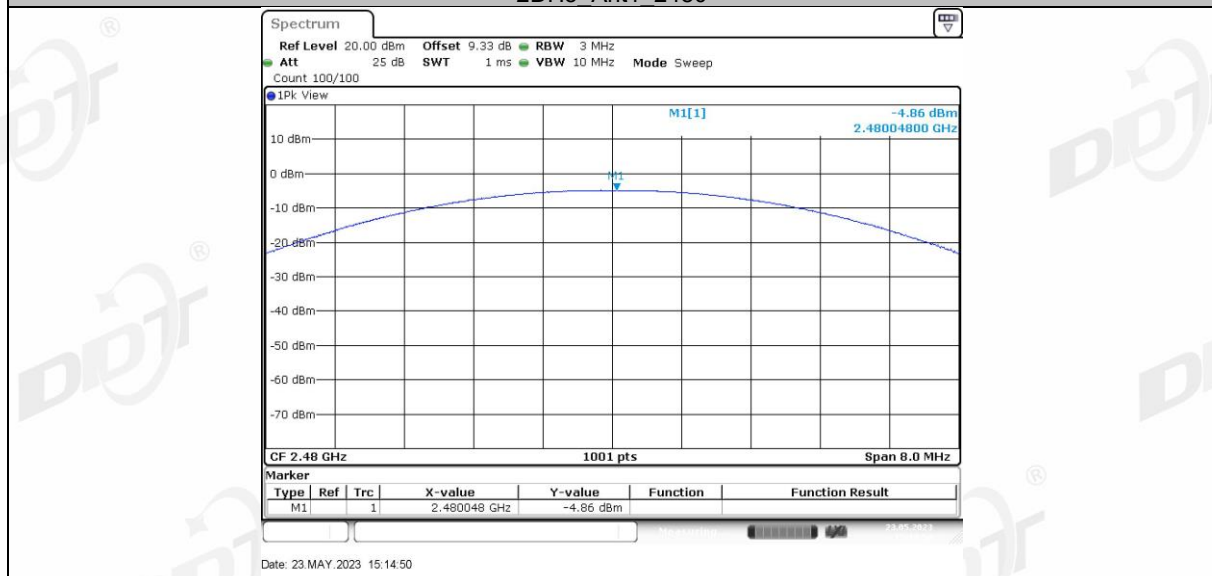
2DH5 Ant1_2402



2DH5 Ant1_2441

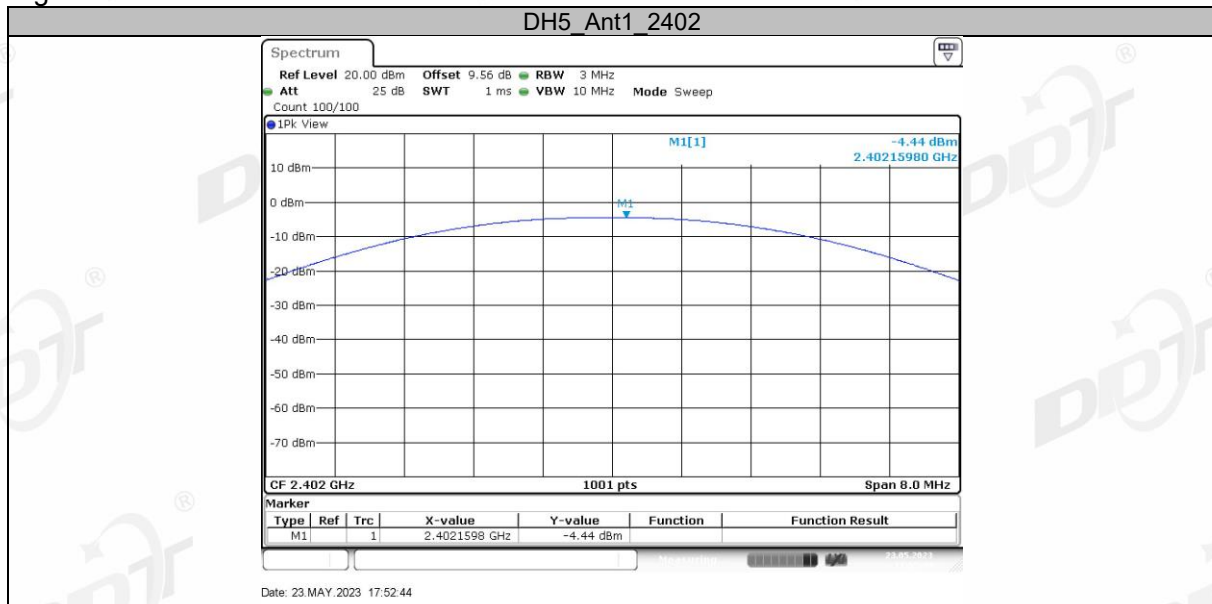


2DH5 Ant1 2480



Right side:

DH5_Ant1_2402

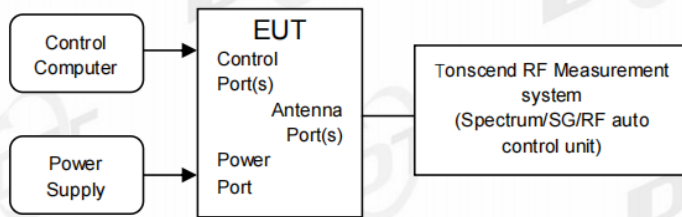






7. Carrier Frequency Separation

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 C63.10-2013 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.

7.4. Test result

Left side:

Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	1.003	≥ 0.680	PASS
2DH5	Ant1	Hop	1.000	≥ 0.880	PASS

Right side:

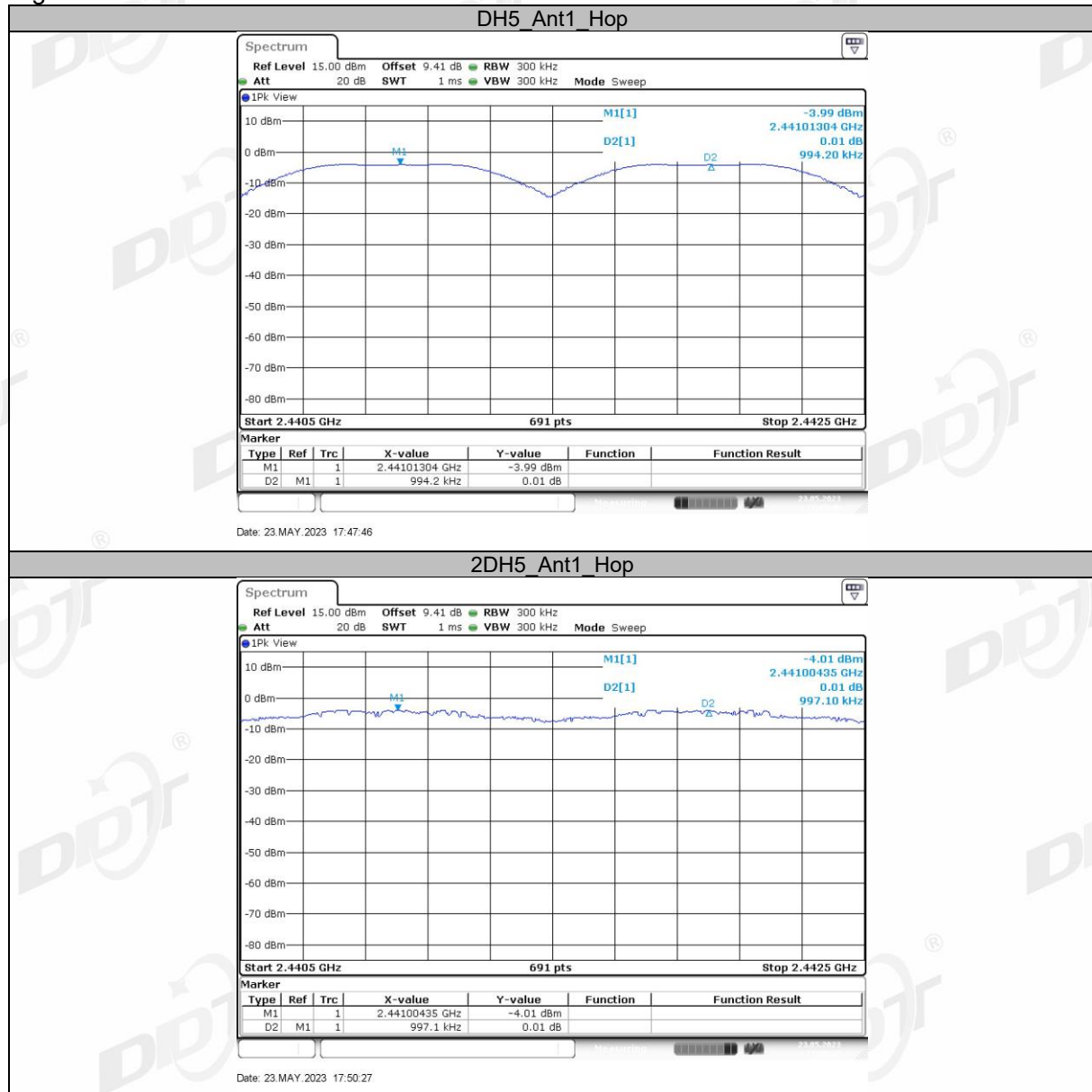
Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	0.994	≥ 0.680	PASS
2DH5	Ant1	Hop	0.997	≥ 0.873	PASS

7.5. Test graphs

Left side:

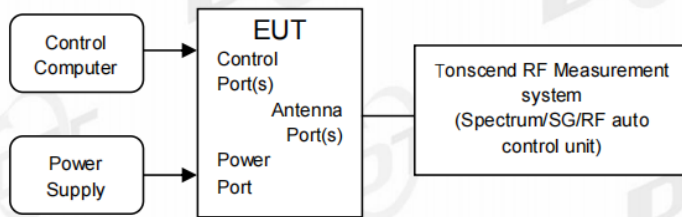


Right side:



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 C63.10-2013 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.

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 Dwell time = total hops * pulse's on time.

8.4. Test result

Left side:

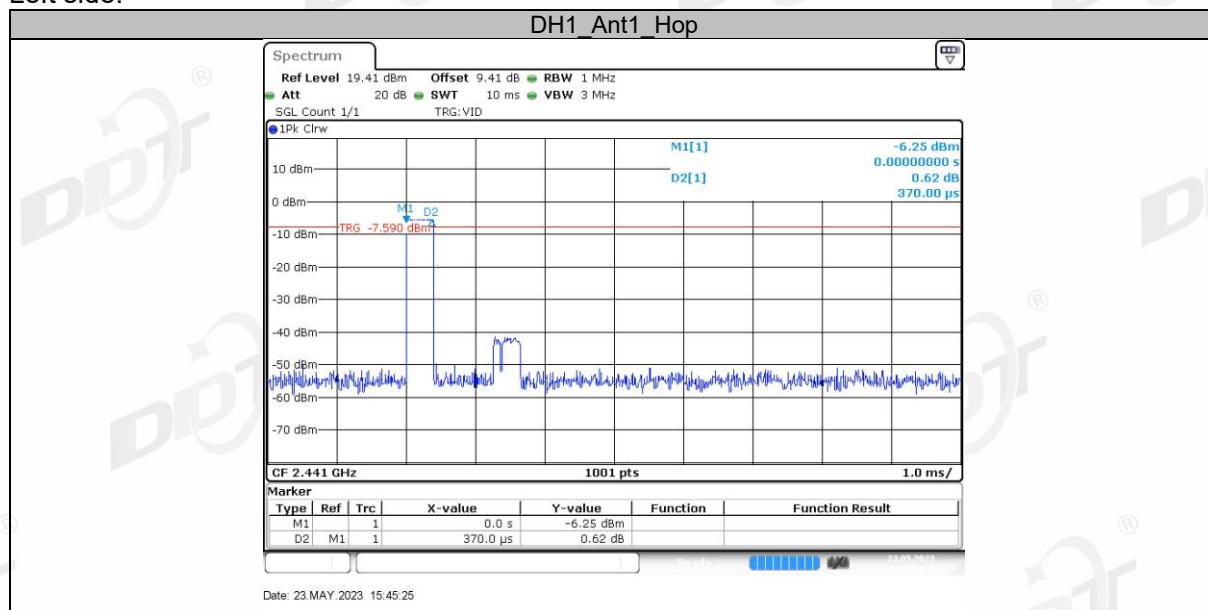
Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.37	319	0.118	≤0.4	PASS
DH3	Ant1	Hop	1.62	166	0.269	≤0.4	PASS
DH5	Ant1	Hop	2.87	109	0.313	≤0.4	PASS
2DH1	Ant1	Hop	0.37	319	0.118	≤0.4	PASS
2DH3	Ant1	Hop	1.62	161	0.261	≤0.4	PASS
2DH5	Ant1	Hop	2.88	112	0.323	≤0.4	PASS

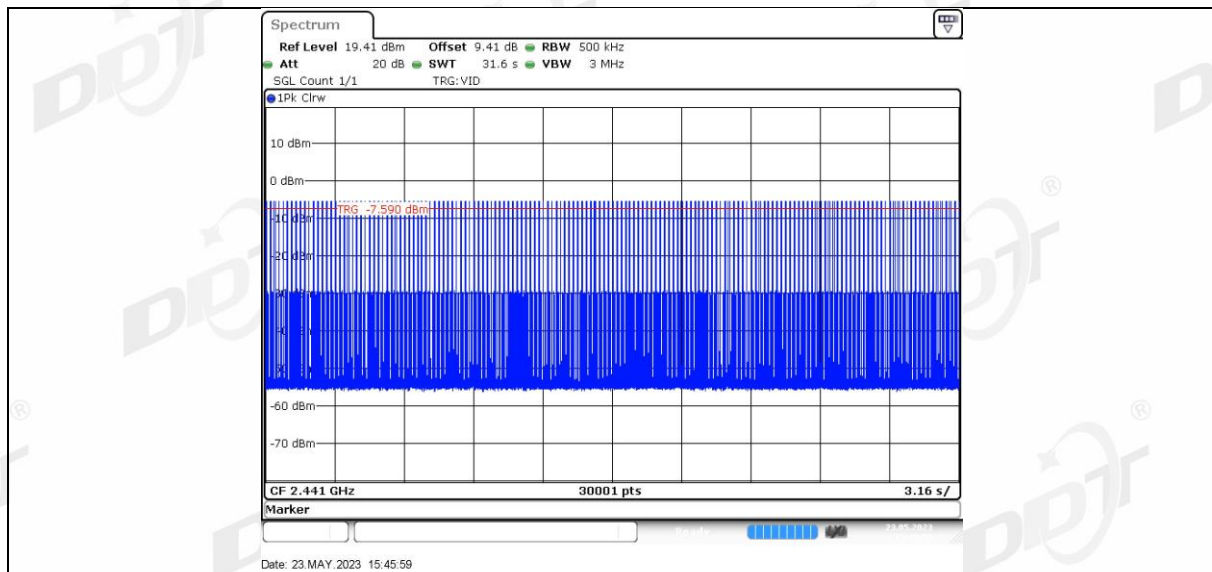
Right side:

Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.37	320	0.118	≤0.4	PASS
DH3	Ant1	Hop	1.62	162	0.262	≤0.4	PASS
DH5	Ant1	Hop	2.87	101	0.29	≤0.4	PASS
2DH1	Ant1	Hop	0.37	320	0.118	≤0.4	PASS
2DH3	Ant1	Hop	1.62	161	0.261	≤0.4	PASS
2DH5	Ant1	Hop	2.88	108	0.311	≤0.4	PASS

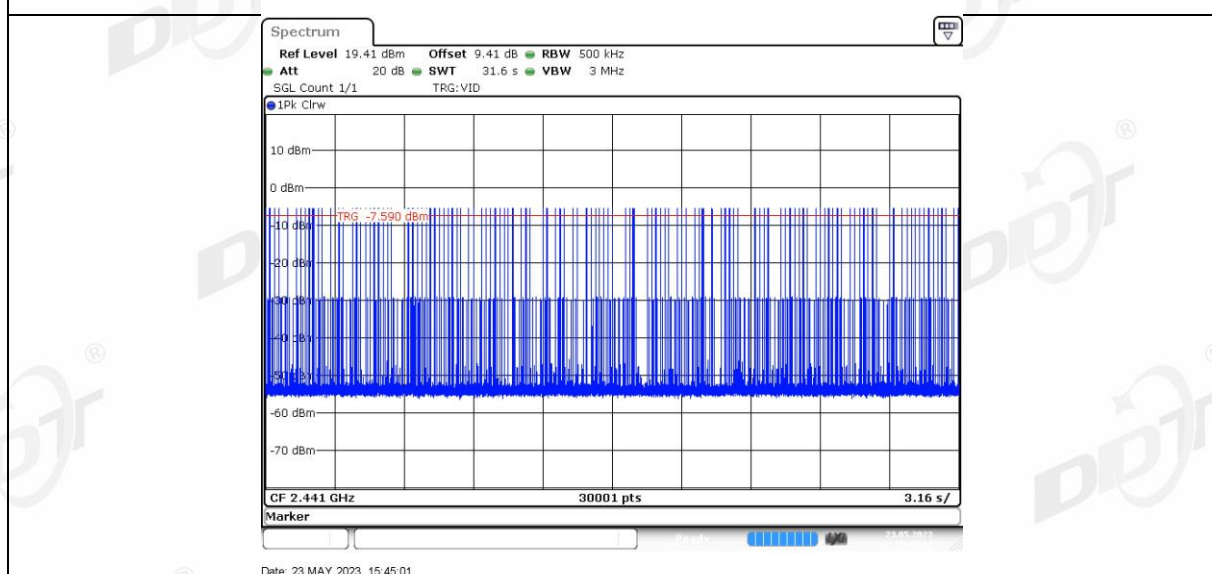
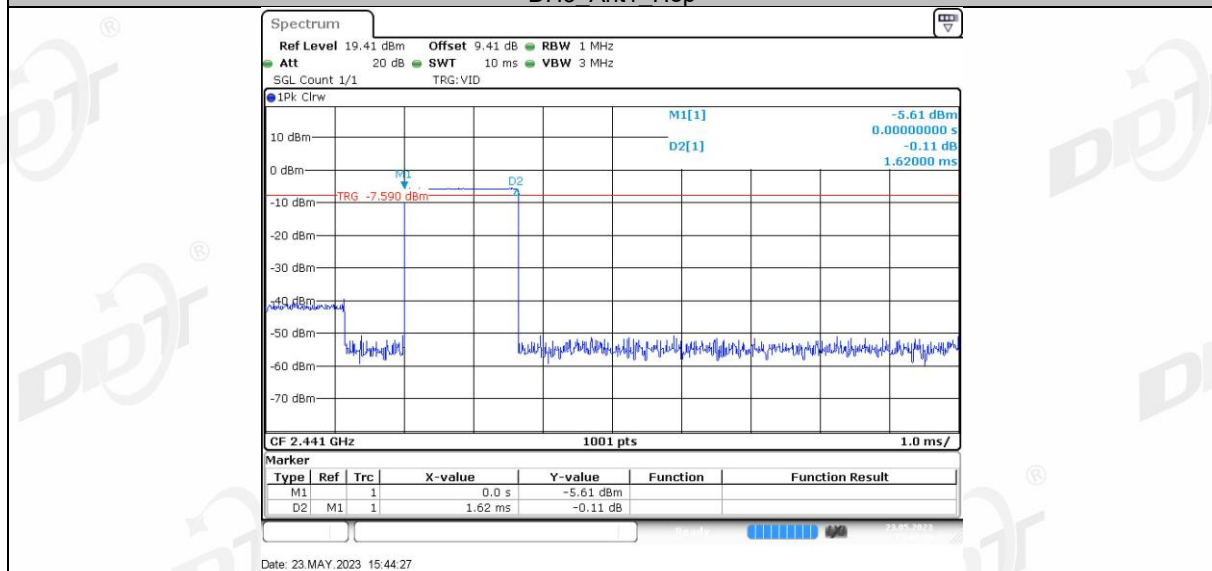
8.5. Test graphs

Left side:



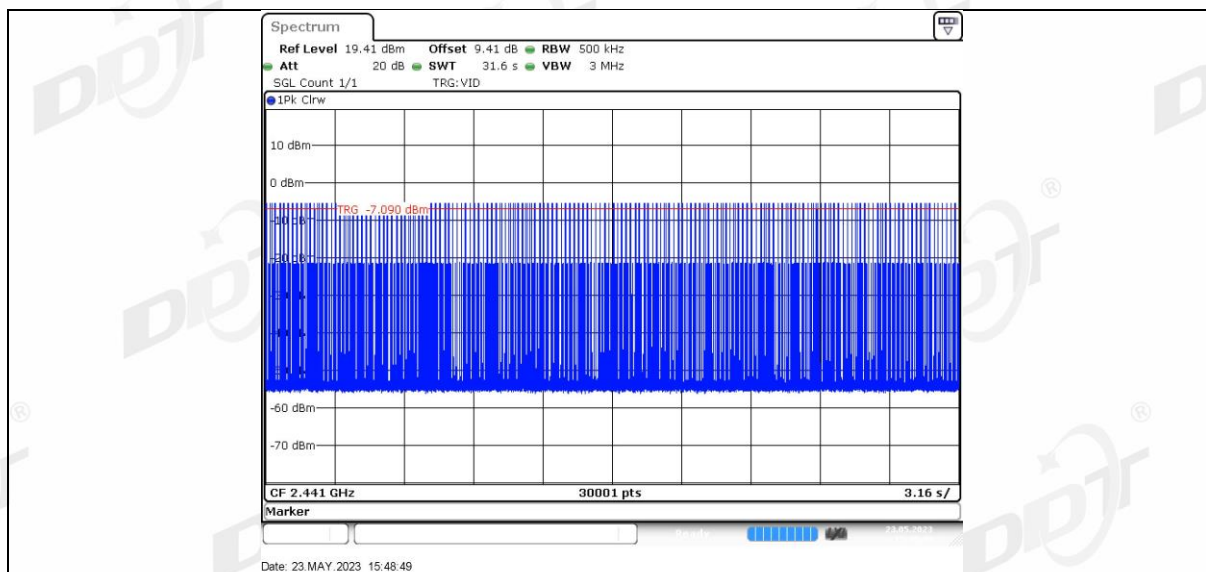


DH3_Ant1_Hop

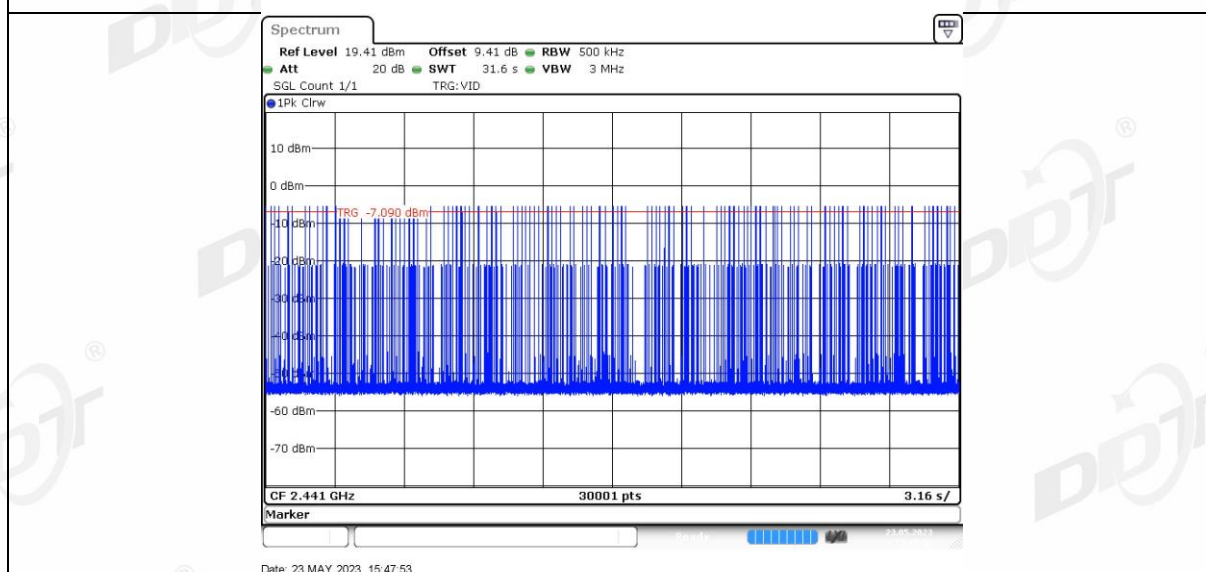
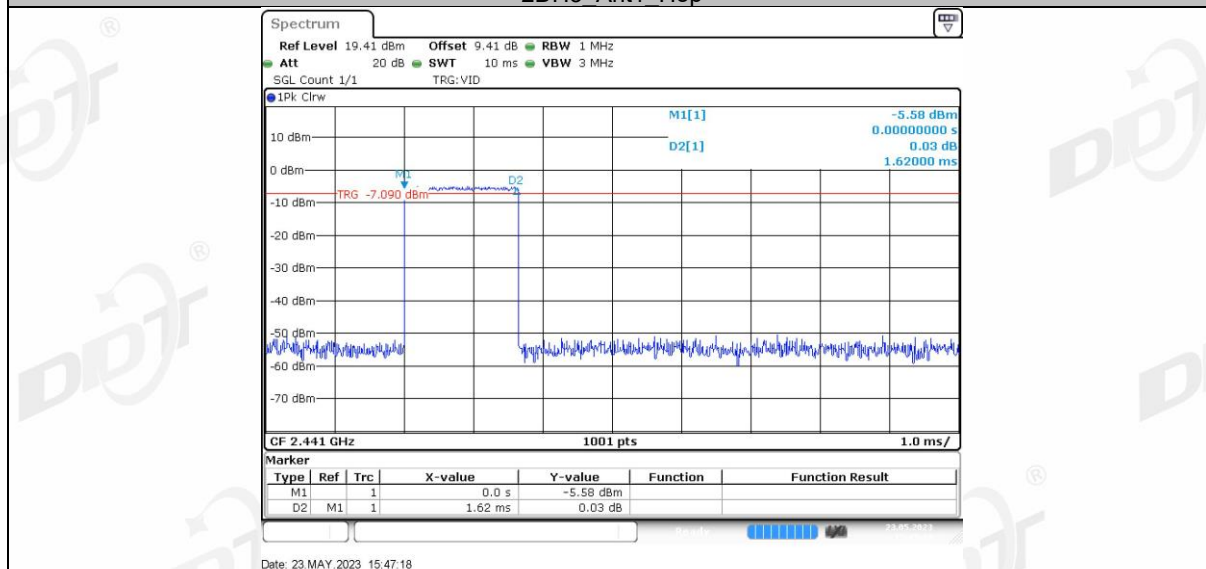


DH5_Ant1_Hop

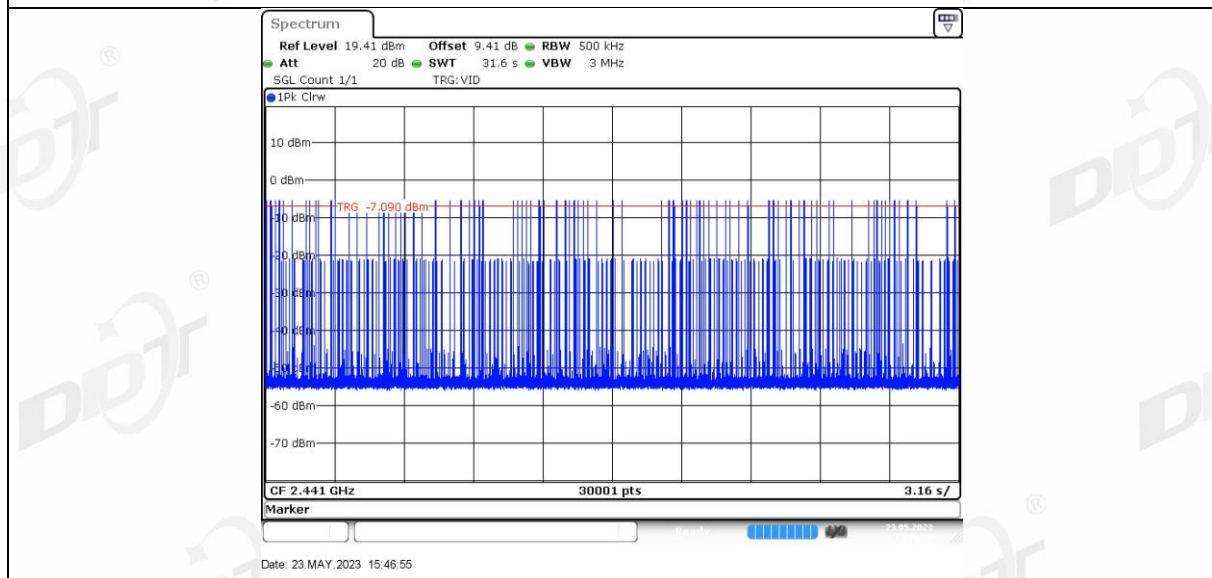
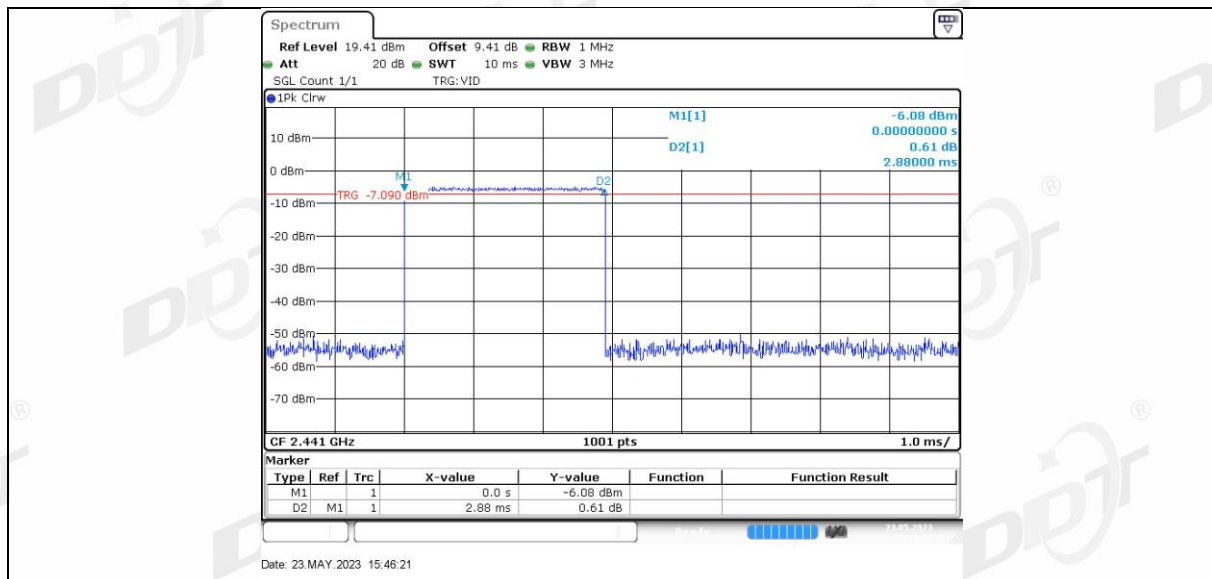




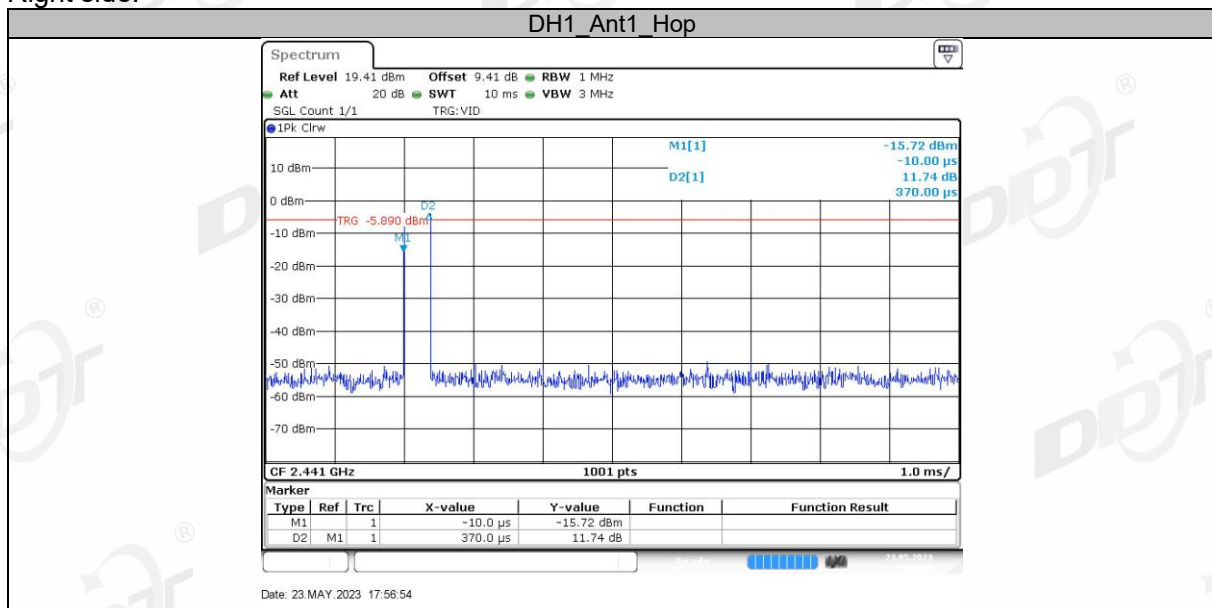
2DH3 Ant1 Hop

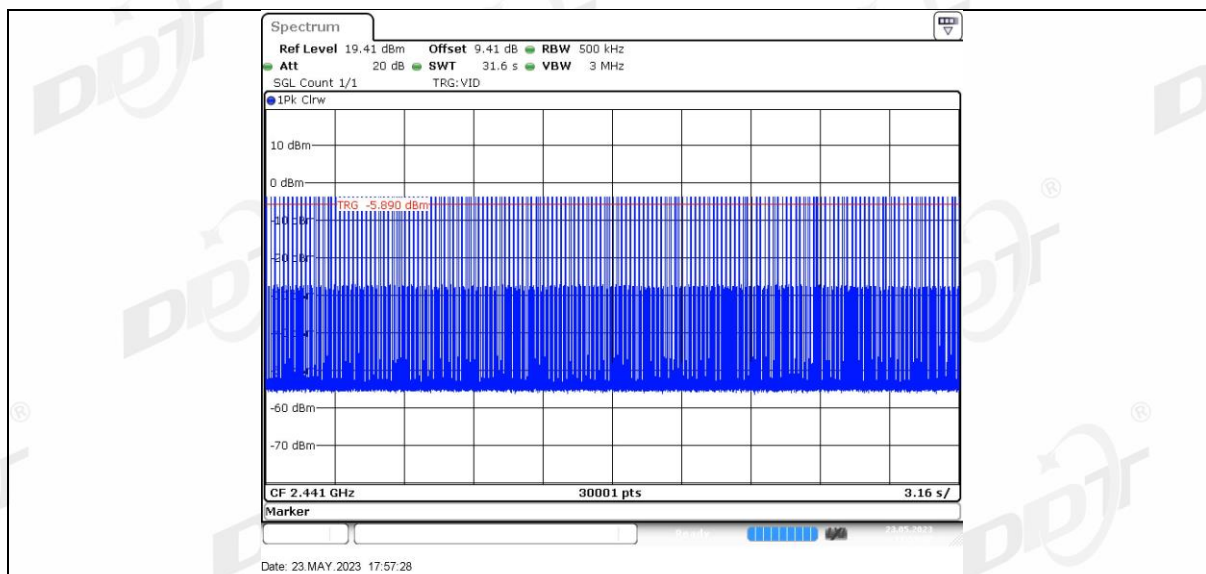


2DH5 Ant1 Hop

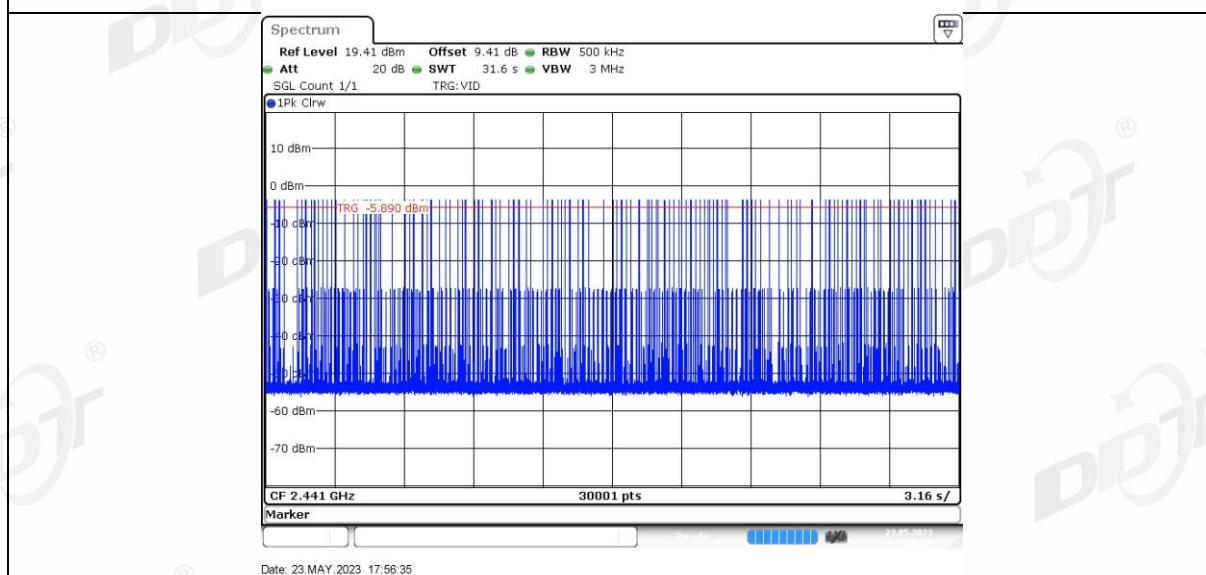
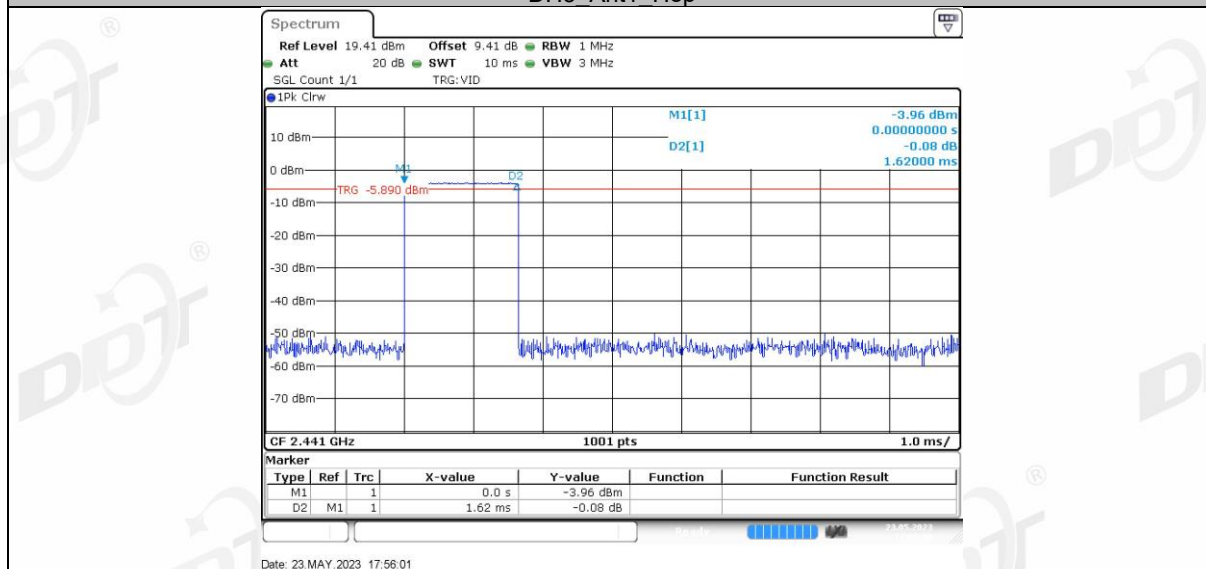


Right side:





DH3 Ant1 Hop



DH5 Ant1 Hop