FCC CERTIFICATION TEST REPORT

Applicant	:	PEAG, LLC dba JLab Audio
Address of Applicant	:	5927 LANDAU CT, Carlsbad, CA 92008, United States
Manufacturer	:	Shenzhen Yinuo Digital Technology Co., Ltd
Address of Manufacturer	:	ROOM 201, Plant No 34, Zhangyi Residential Quarter, Junzibu Community Guanlan Street Longhua District Shenzhen, Guangdong CN 518110
Equipment under Test	:	Wireless Hearing Aid
Model No.	:	JLH1, JLH2
FCC ID	:	2AHYV-HEAR
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013
Report No.	:	DDT-RE23122824-2E01
Issue Date	:	2024/04/09
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

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Test Report Declare

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Address of Manufacturer	:	ROOM 201, Plant No 34, Zhangyi Residential Quarter, Junzibu Community Guanlan Street Longhua District Shenzhen, Guangdong CN 518110

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-RE23122824-2E01		
Date of Receipt:	2024/03/15	**Date of Test:**	2024/03/15~2024/04/09

Prepared By:	**Approved By:**
Ziqin Chen	Damon Hu
Ziqin Chen/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	2024/04/09	

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	99% Bandwidth	ANSI C63.10:2013	/	Pass
4	Carrier Frequency Separation	FCC Part 15: 15.247(a)(1)	/	Pass
5	Number of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii)	/	Pass
6	Dwell Time	FCC Part 15: 15.247(a)(1)(iii)	/	Pass
7	RF Conducted Spurious Emissions	FCC Part 15: 15.247(d	/	Pass
8	Radiated Emission	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d)	/	Pass
9	Band Edge Compliance	FCC Part 15: 15.205, FCC Part 15: 15.209, FCC Part 15: 15.247(d)	/	Pass
10	Power Line Conducted Emissions	FCC Part 15: 15.207(a)	/	Pass
11	Antenna Requirement	FCC Part 15: 15.203	/	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	:	Wireless Hearing Aid
Model Number	:	JLH1, JLH2
Difference of model number	:	Above models are identical in schematic and structure, only the model number are different, therefore the test performed on the model JLH1
EUT Function Description	:	Please reference user manual of this device
Power Supply	:	DC 5V by an external adapter or DC 3.7V built-in lithium battery

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

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

Antenna information		
Antenna Type	:	FPC
Max Antenna Gain(dBi)	:	-1.71

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
/	/	/	/

2.3. Block diagram of EUT configuration for test

Configuration diagram

2.4. Decision of final test mode

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

Test software: AWRDLABV2.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	0x08	CH0 to CH78	2402 to 2480
π/4-DQPSK hopping on Tx mode	0x08	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	0x08	CH0 to CH78	2402 to 2480
	0x08	CH0	2402

GFSK hopping off Tx mode	0x08	CH39	2441
	0x08	CH78	2480
p/4-DQPSK hopping off Tx mode	0x08	CH0	2402
	0x08	CH39	2441
	0x08	CH78	2480
8DPSK hopping off Tx mode	0x08	CH0	2402
	0x08	CH39	2441
	0x08	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

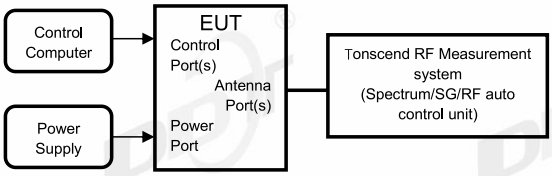
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Frequencies 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
☒RF Connected Test (RF Measurement System 4#)				
Signal &Spectrum Analyzer	R&S	FSV3044	101173	2024/04/22
Wideband Radio Communication Tester	R&S	CMW500	168801	2024/04/26
MXG Vector Signal Generator	Agilent	N5182A	MY48180737	2024/04/26
PSG Vector Signal Generator	Agilent	E8267D	US49060192	2024/09/05
RF Control Unit	Tonsend	JS0806-2	21I8060485	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.

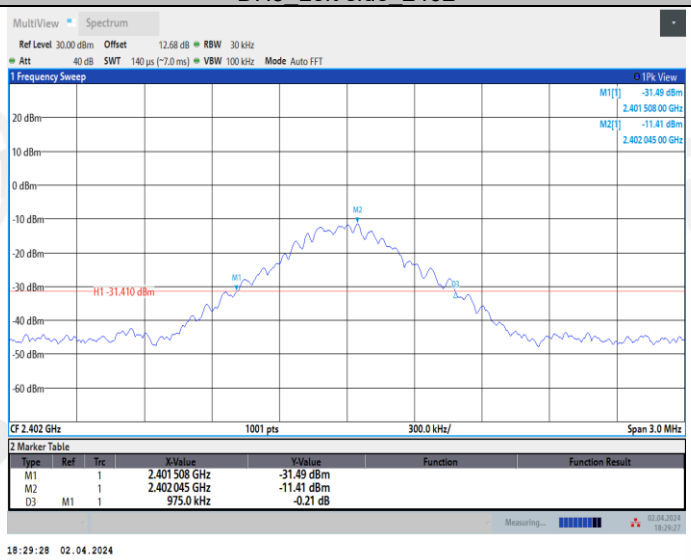
4.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 4#
Ambient Condition:	25℃,49.8%RH	Test Date:	2024.03.14-2024.04.03
Test Power Supply:	Battery	Sample Number:	S23122824-01

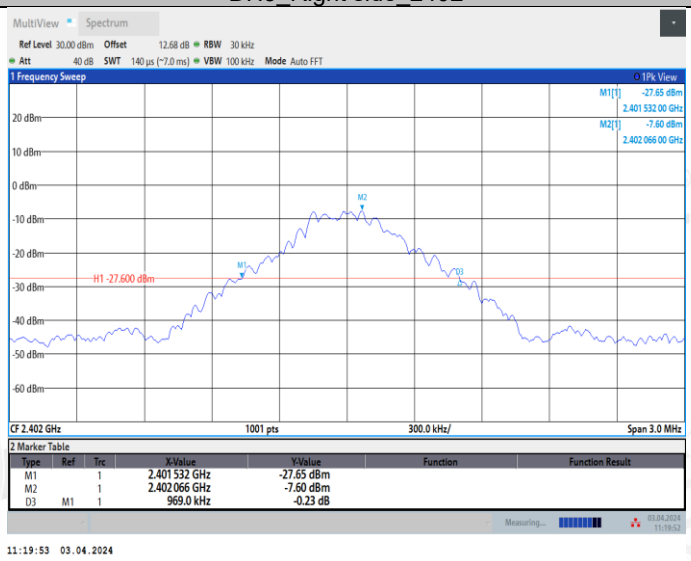
Test Mode	Antenna	Frequency [MHz]	20dB EBW[MHz]
DH5	Left side	2402	0.98
	Right side	2402	0.97
	Left side	2441	1.03
	Right side	2441	0.93
	Left side	2480	1.03
	Right side	2480	0.93
2DH5	Left side	2402	1.34
	Right side	2402	1.34
	Left side	2441	1.34
	Right side	2441	1.29
	Left side	2480	1.34
	Right side	2480	1.27
3DH5	Left side	2402	1.32
	Right side	2402	1.29
	Left side	2441	1.33
	Right side	2441	1.34
	Left side	2480	1.32
	Right side	2480	1.26

4.5. Test graphs

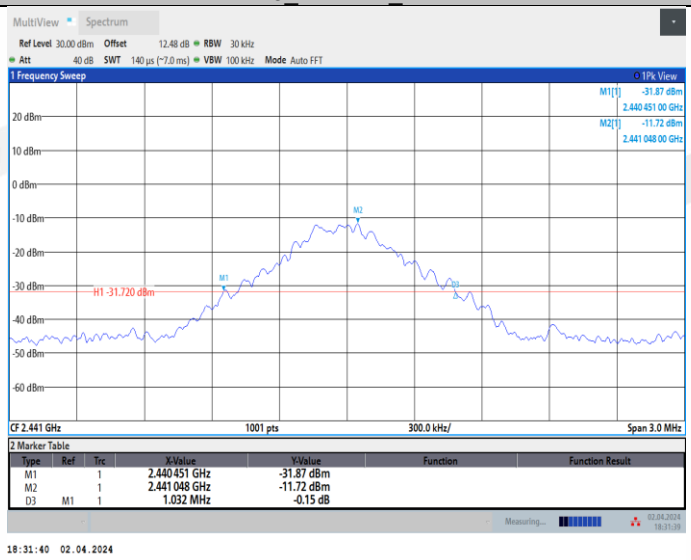
DH5_Left side_2402



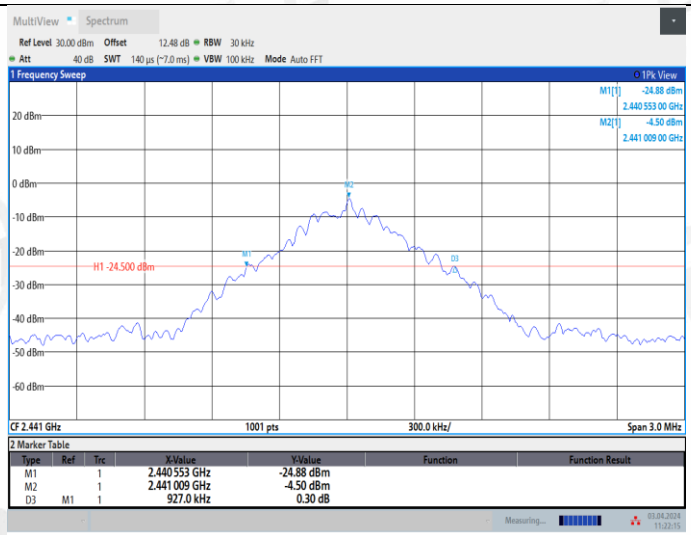
DH5_Right side_2402



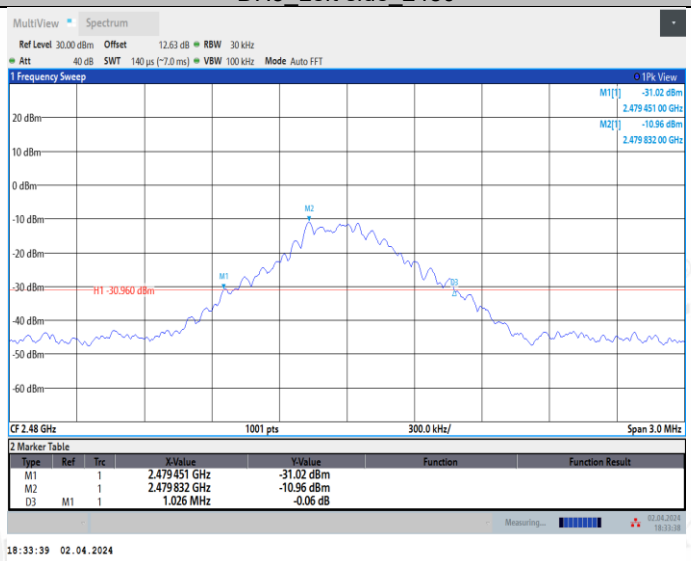
DH5_Left side_2441



DH5_Right side_2441



DH5_Left side_2480



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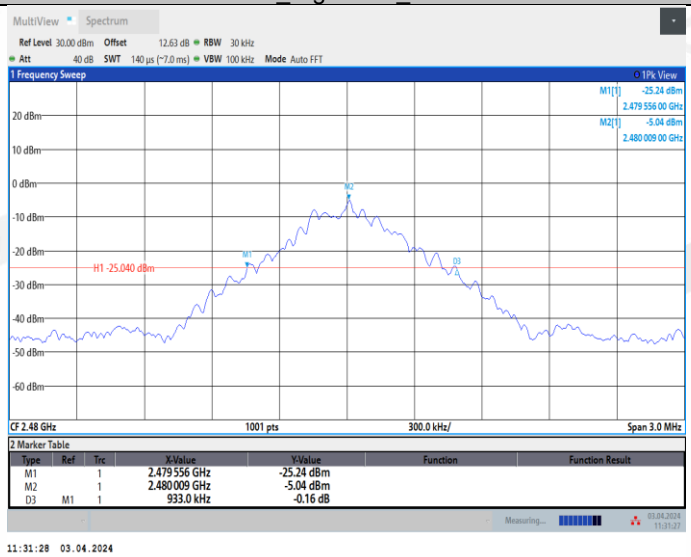
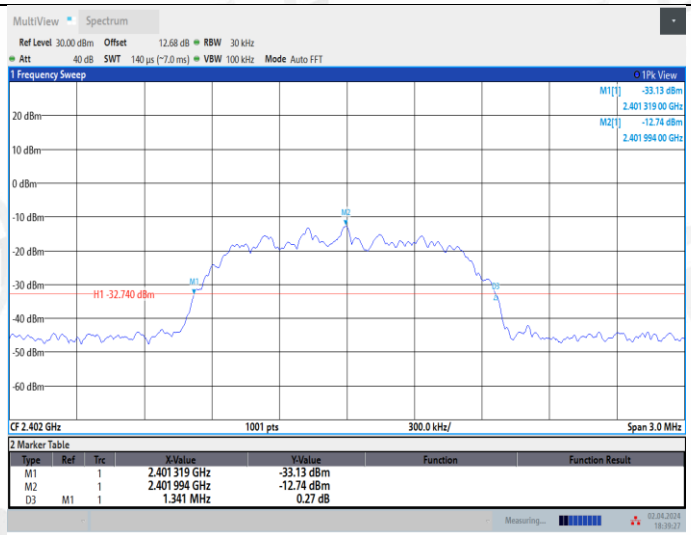


2DH5_Left side_2402



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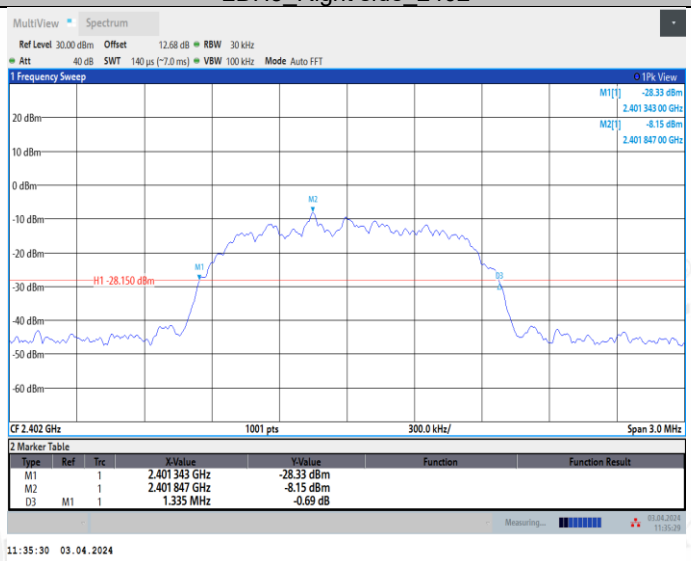
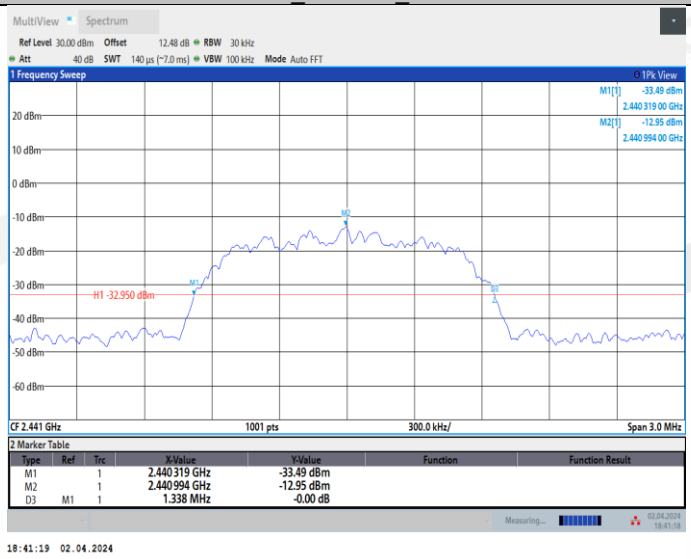
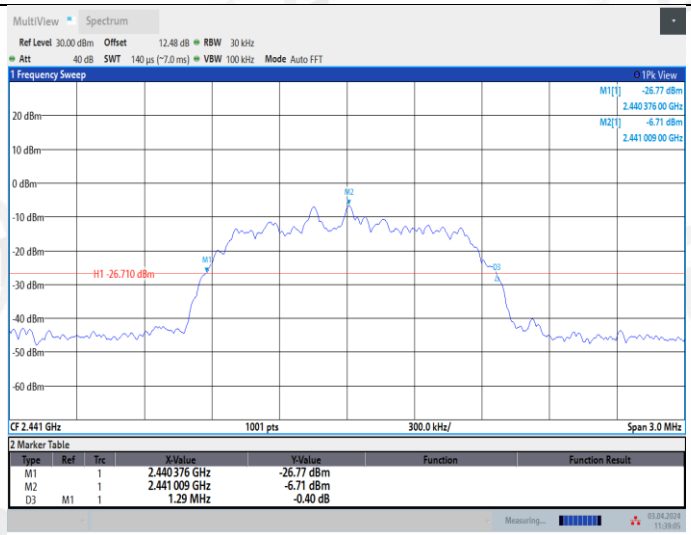


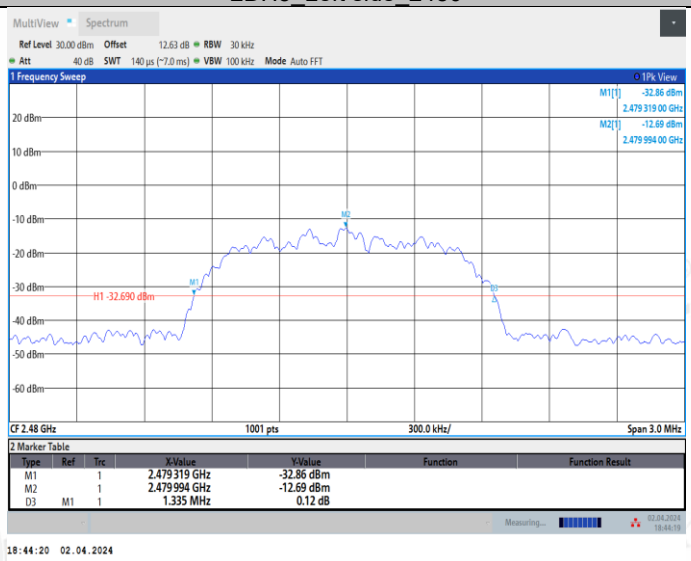
2DH5_Left side_2441



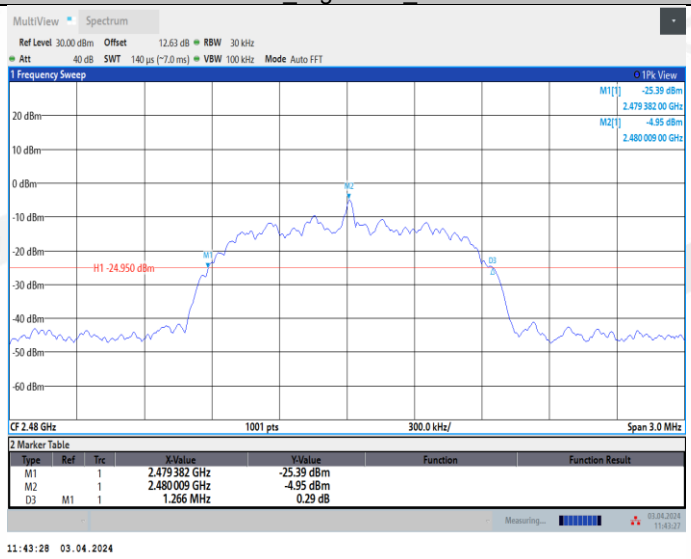
2DH5_Right side_2441



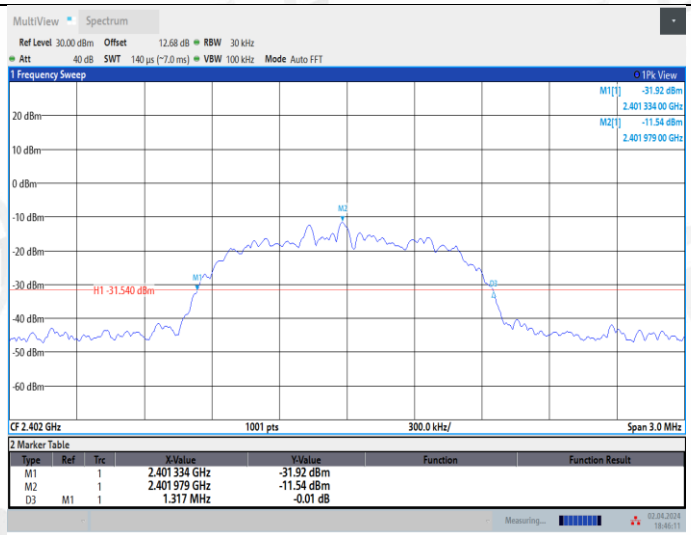
2DH5_Left side_2480



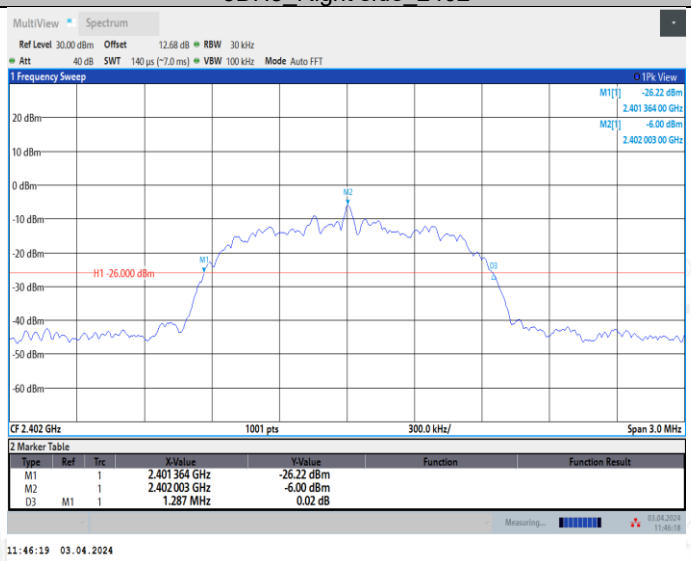
2DH5_Right side_2480



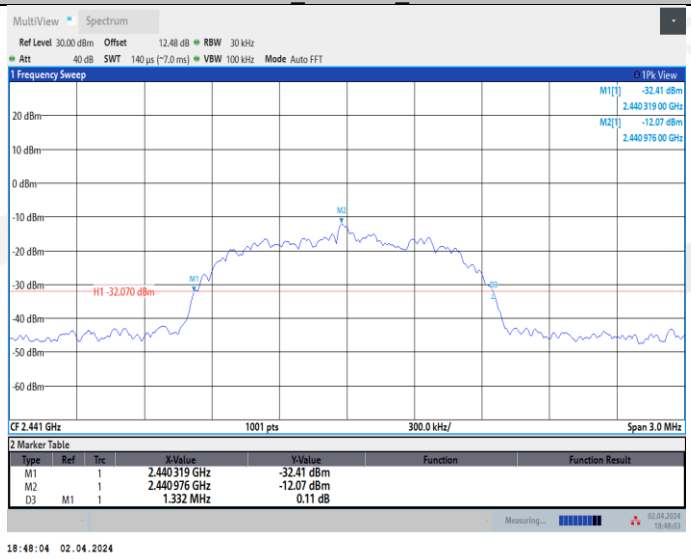
3DH5_Left side_2402



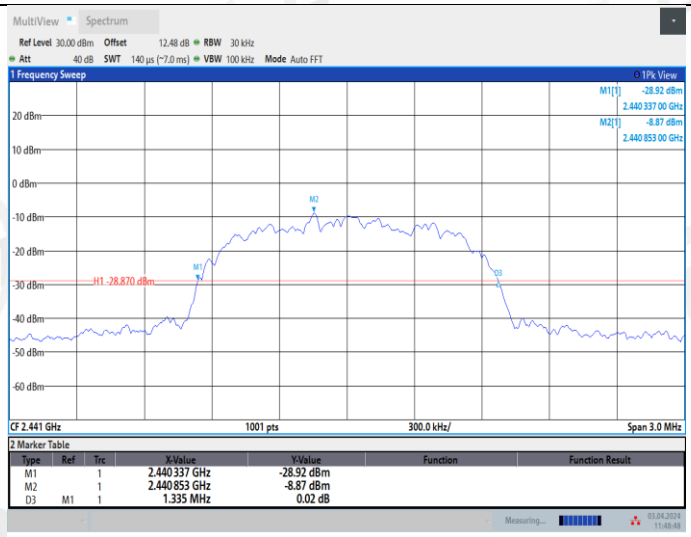
3DH5_Right side_2402



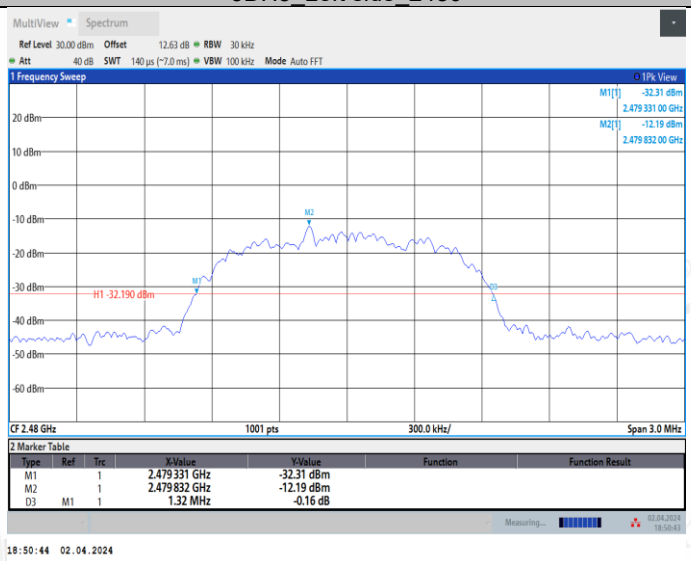
3DH5_Left side_2441



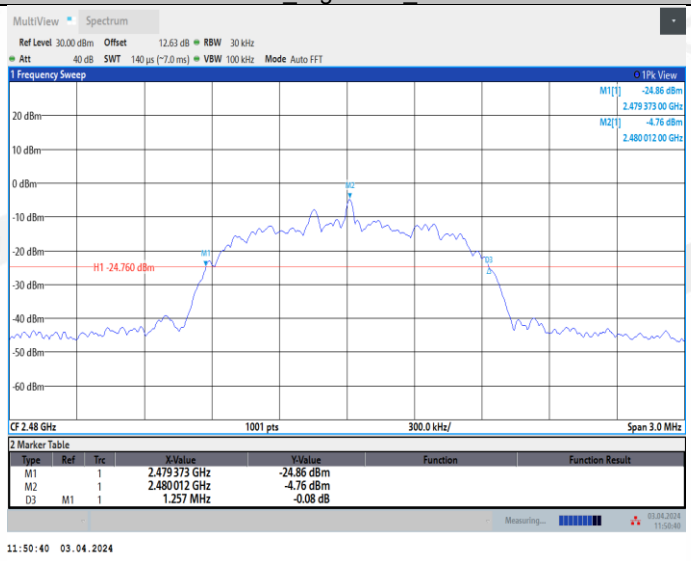
3DH5_Right side_2441



3DH5_Left side_2480

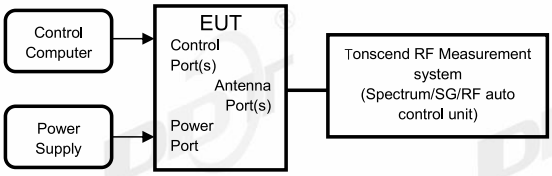


3DH5_Right side_2480



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.

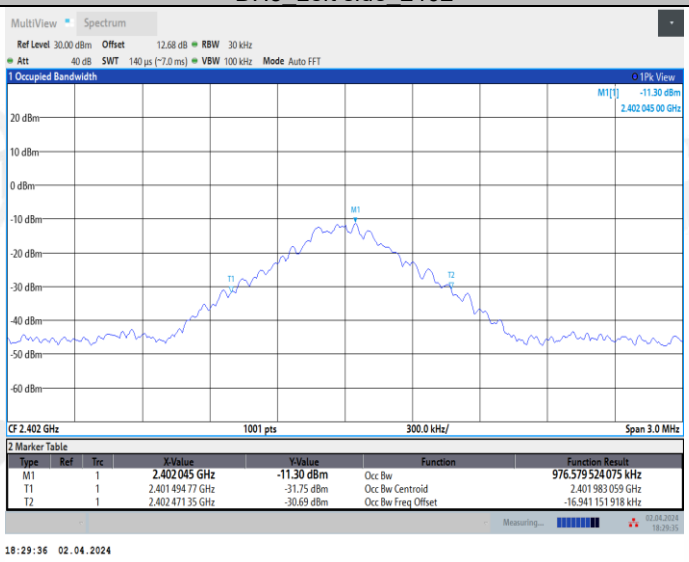
5.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 4#
Ambient Condition:	25℃,49.8%RH	Test Date:	2024.03.14-2024.04.03
Test Power Supply:	Battery	Sample Number:	S23122824-01

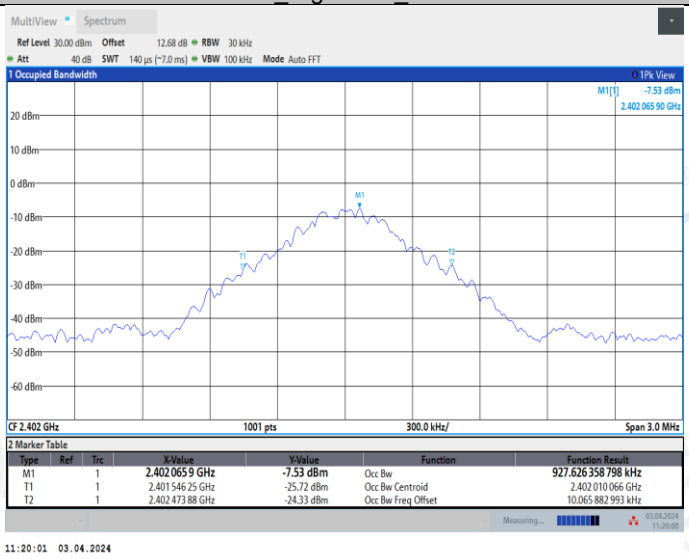
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
DH5	Left side	2402	0.977	2401.4948	2402.4713
	Right side	2402	0.928	2401.5463	2402.4739
	Left side	2441	0.962	2440.5058	2441.4674
	Right side	2441	0.934	2440.5420	2441.4763
	Left side	2480	0.963	2479.5014	2480.4645
	Right side	2480	0.935	2479.5451	2480.4798
2DH5	Left side	2402	1.215	2401.3816	2402.5970
	Right side	2402	1.2	2401.4116	2402.6118
	Left side	2441	1.216	2440.3820	2441.5975
	Right side	2441	1.192	2440.4135	2441.6055
	Left side	2480	1.208	2479.3851	2480.5930
	Right side	2480	1.196	2479.4126	2480.6085
3DH5	Left side	2402	1.22	2401.3721	2402.5918
	Right side	2402	1.194	2401.4113	2402.6058
	Left side	2441	1.212	2440.3785	2441.5902
	Right side	2441	1.215	2440.3989	2441.6143
	Left side	2480	1.219	2479.3744	2480.5932
	Right side	2480	1.205	2479.4050	2480.6097

5.5. Test graphs

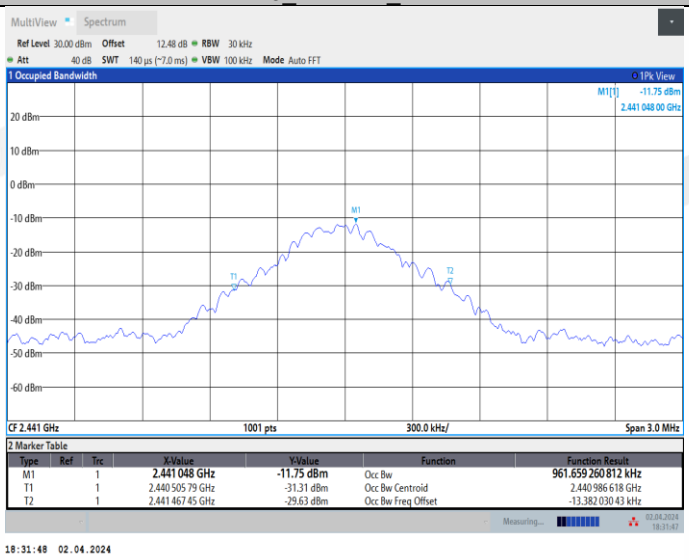
DH5_Left side_2402



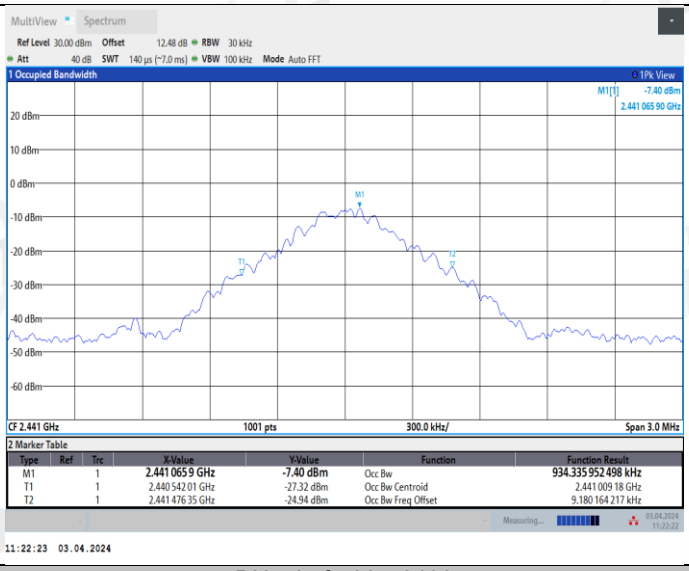
DH5_Right side_2402



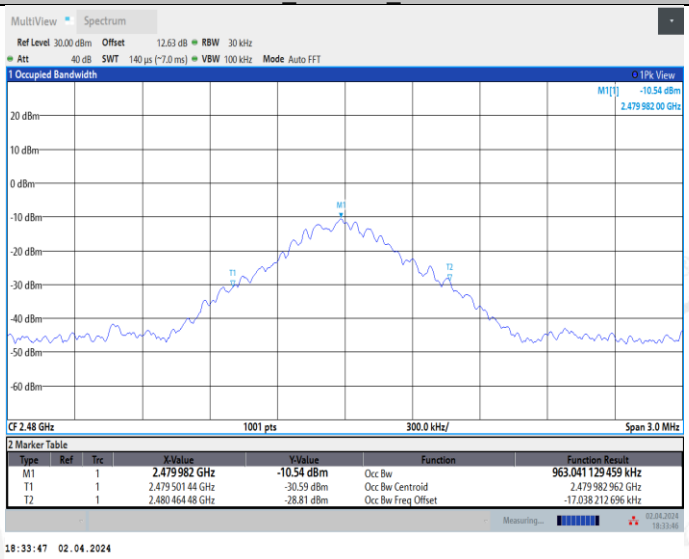
DH5_Left side_2441



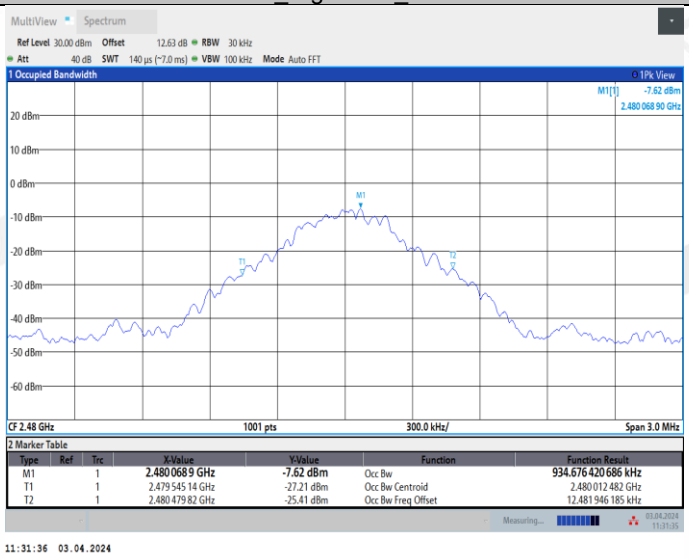
DH5_Right side_2441



DH5_Left side_2480



DH5_Right side_2480



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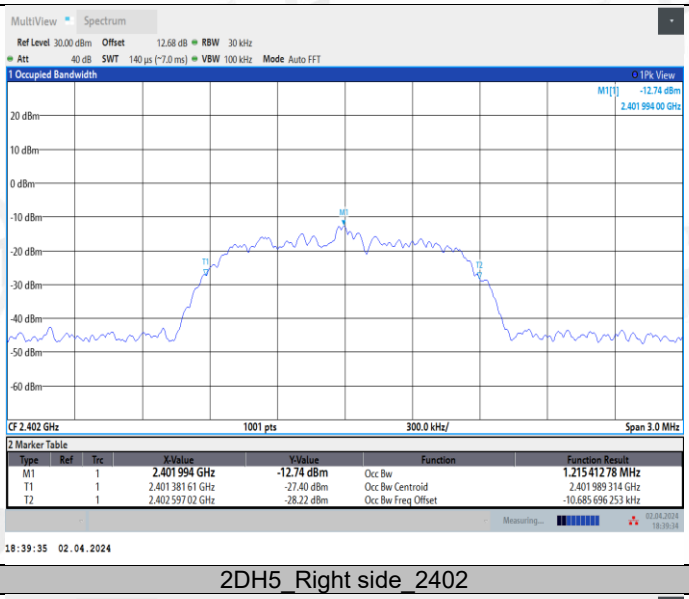
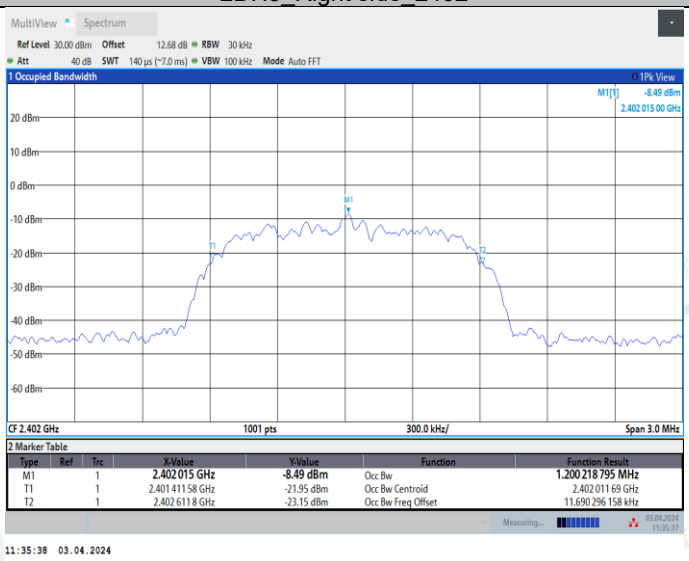
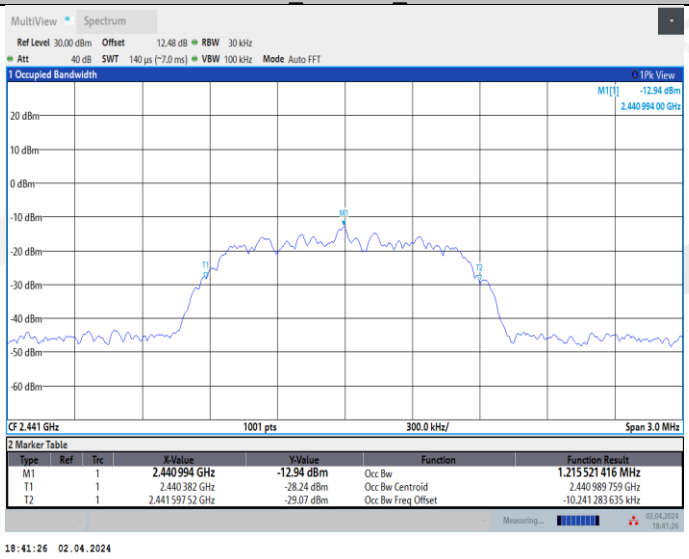


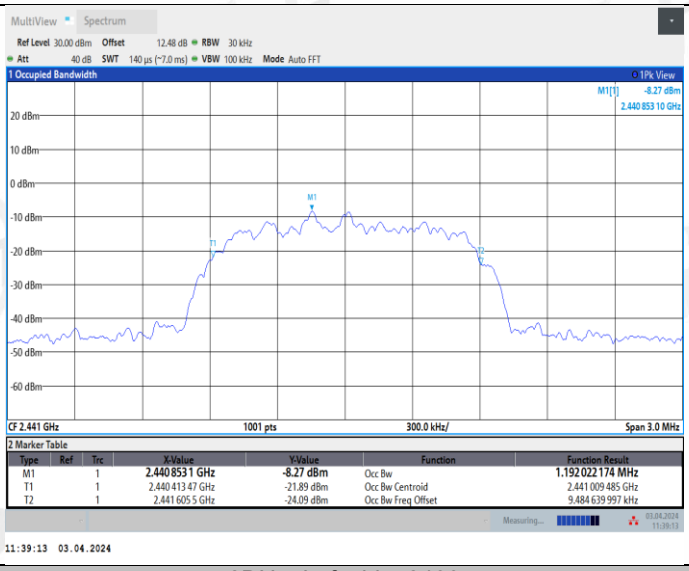
2DH5_Right side_2402



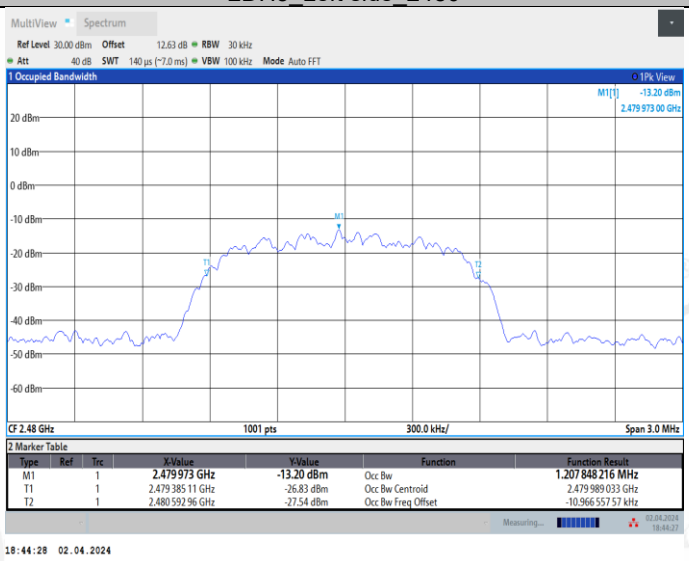
2DH5_Left side_2441



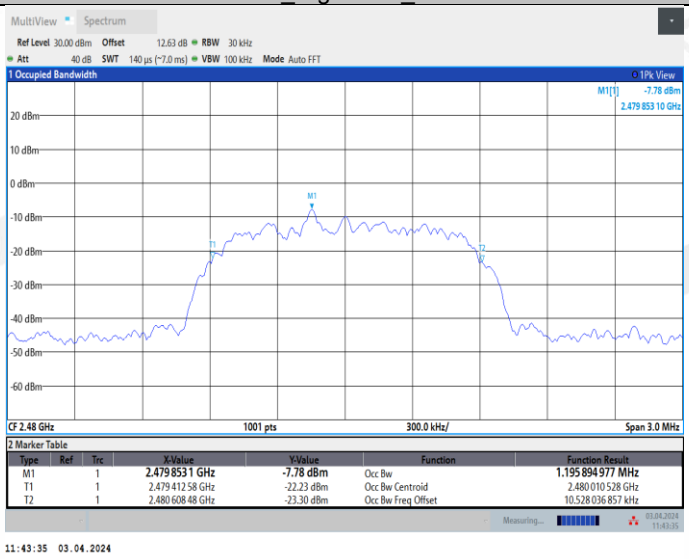
2DH5_Right side_2441



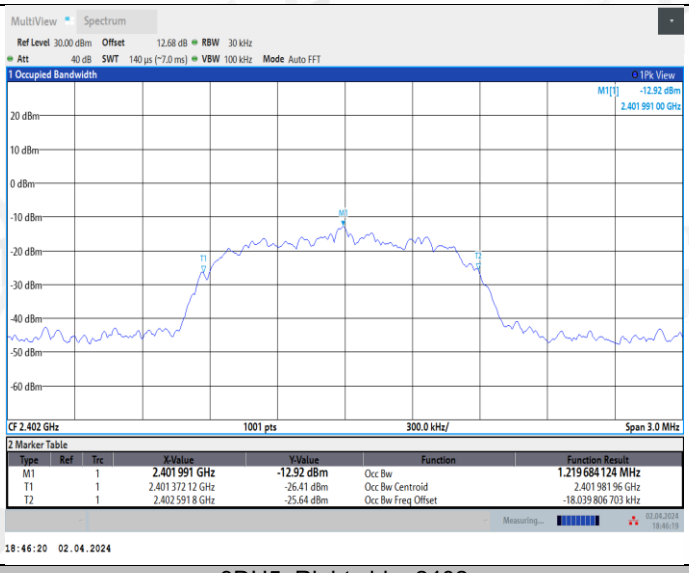
2DH5_Left side_2480



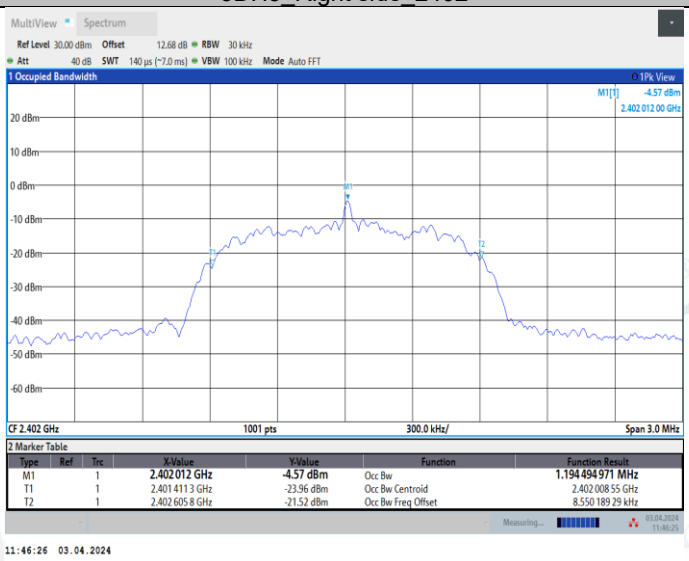
2DH5_Right side_2480



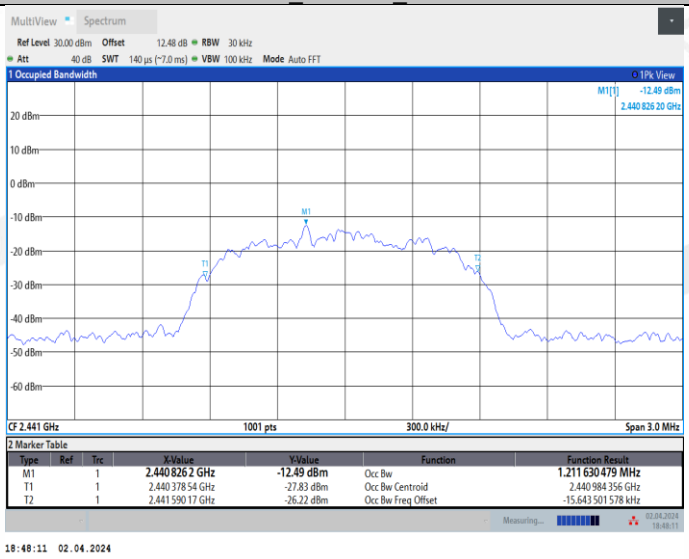
3DH5_Left side_2402



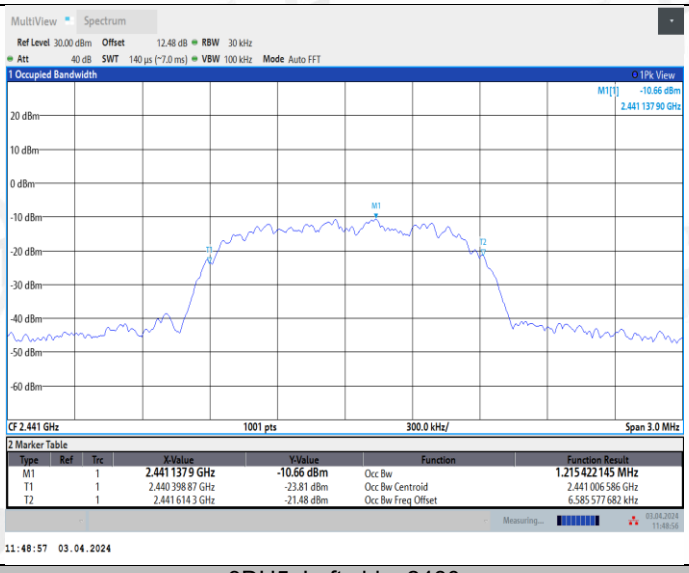
3DH5_Right side_2402



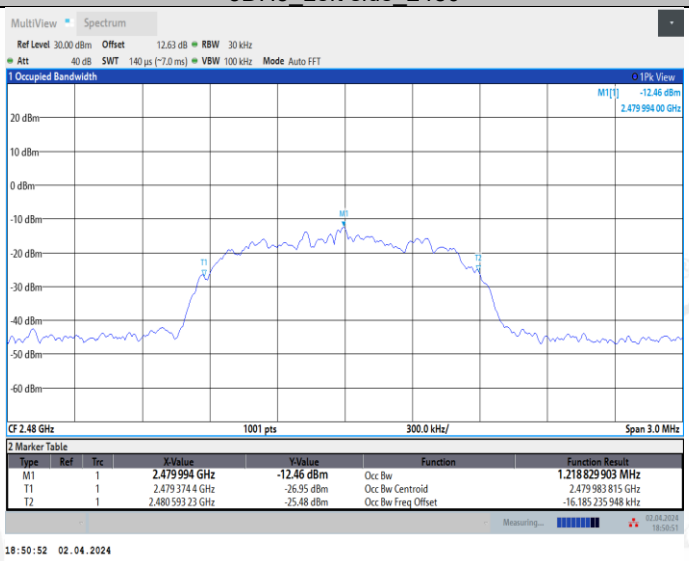
3DH5_Left side_2441



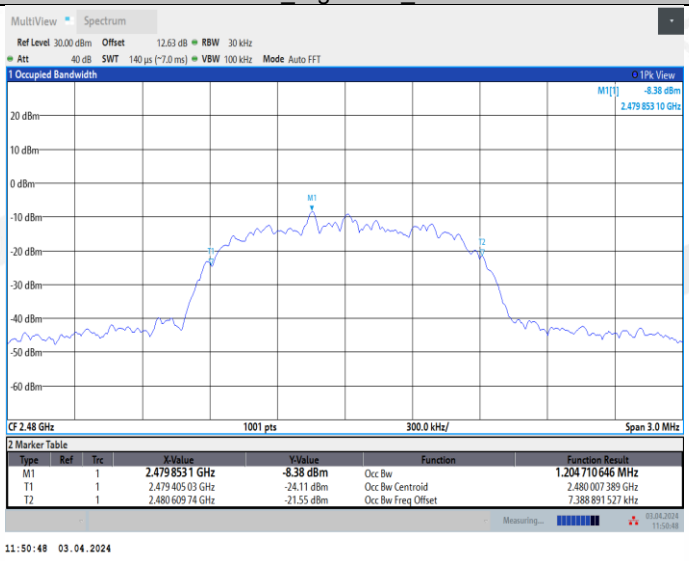
3DH5_Right side_2441



3DH5_Left side_2480

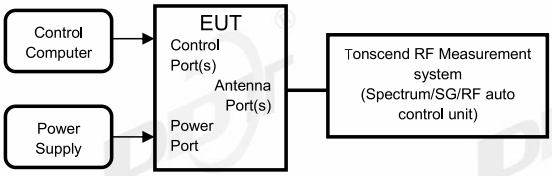


3DH5_Right side_2480



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 ≥ 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.

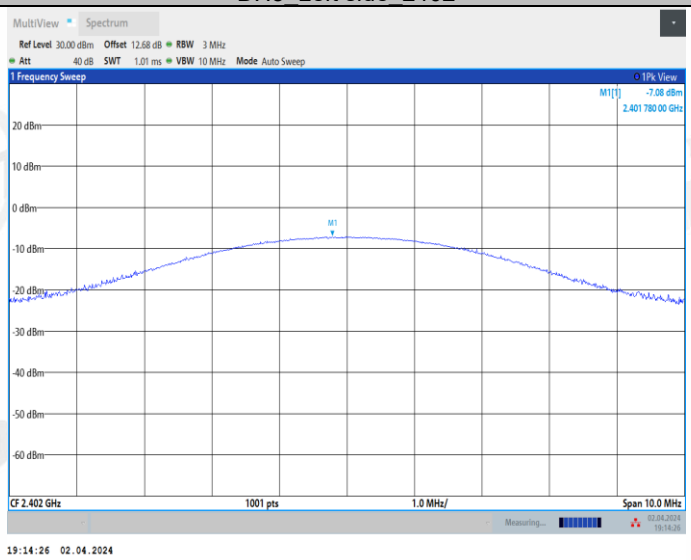
6.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 4#
Ambient Condition:	25℃,49.8%RH	Test Date:	2024.03.14-2024.04.03
Test Power Supply:	Battery	Sample Number:	S23122824-01

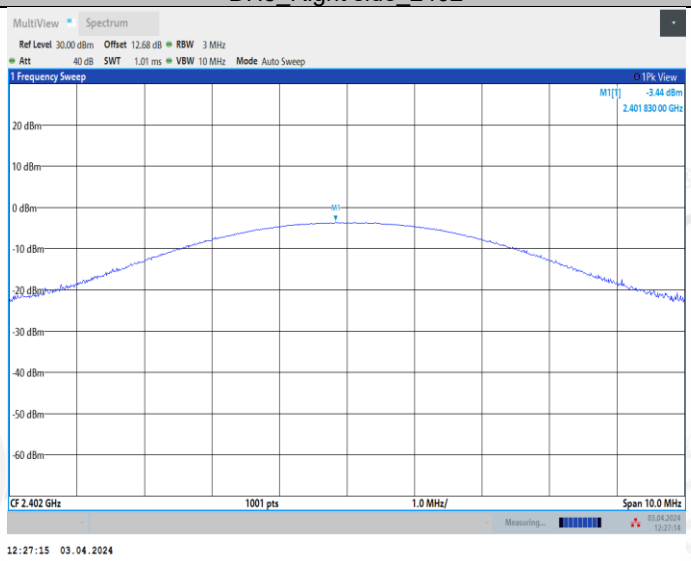
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
DH5	Left side	2402	-7.08	≤20.97	-8.79	≤30	PASS
	Right side	2402	-3.44	≤20.97	-5.15	≤30	PASS
	Left side	2441	-7.17	≤20.97	-8.88	≤30	PASS
	Right side	2441	-3.44	≤20.97	-5.15	≤30	PASS
	Left side	2480	-6.79	≤20.97	-8.5	≤30	PASS
	Right side	2480	-3.80	≤20.97	-5.51	≤30	PASS
2DH5	Left side	2402	-5.16	≤20.97	-6.87	≤30	PASS
	Right side	2402	-1.46	≤20.97	-3.17	≤30	PASS
	Left side	2441	-5.39	≤20.97	-7.10	≤30	PASS
	Right side	2441	-1.49	≤20.97	-3.20	≤30	PASS
	Left side	2480	-4.78	≤20.97	-6.49	≤30	PASS
	Right side	2480	-1.75	≤20.97	-3.46	≤30	PASS
3DH5	Left side	2402	-4.80	≤20.97	-6.51	≤30	PASS
	Right side	2402	-1.09	≤20.97	-2.80	≤30	PASS
	Left side	2441	-4.90	≤20.97	-6.61	≤30	PASS
	Right side	2441	-0.94	≤20.97	-2.65	≤30	PASS
	Left side	2480	-4.50	≤20.97	-6.21	≤30	PASS
	Right side	2480	-1.24	≤20.97	-2.95	≤30	PASS

6.5. Test graphs

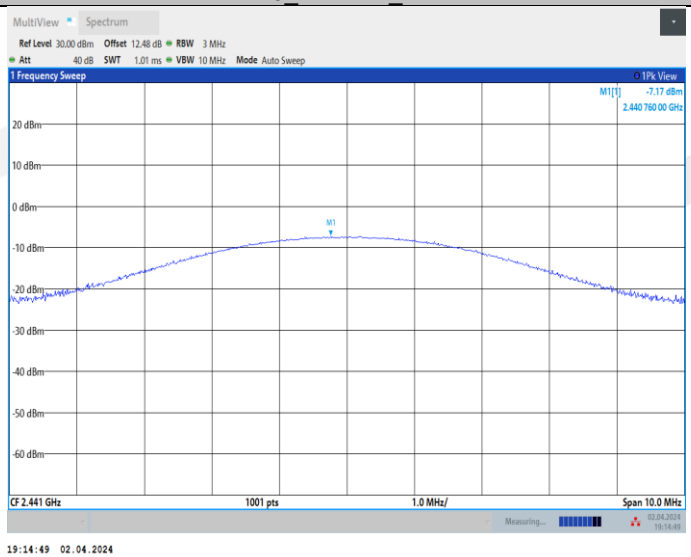
DH5_Left side_2402



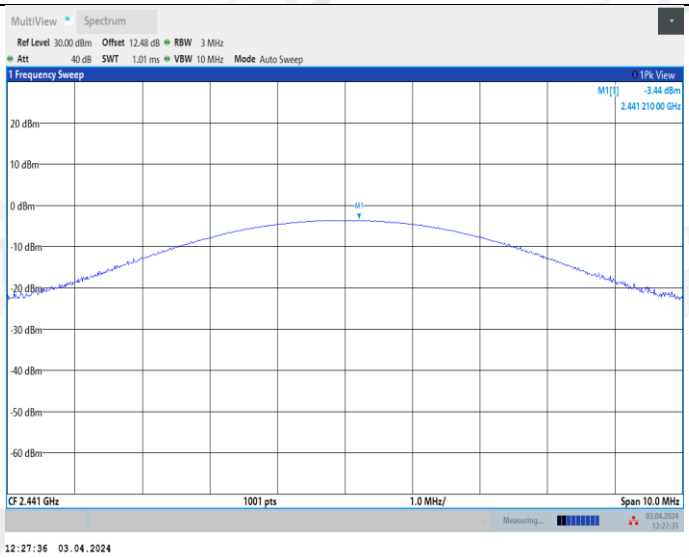
DH5_Right side_2402



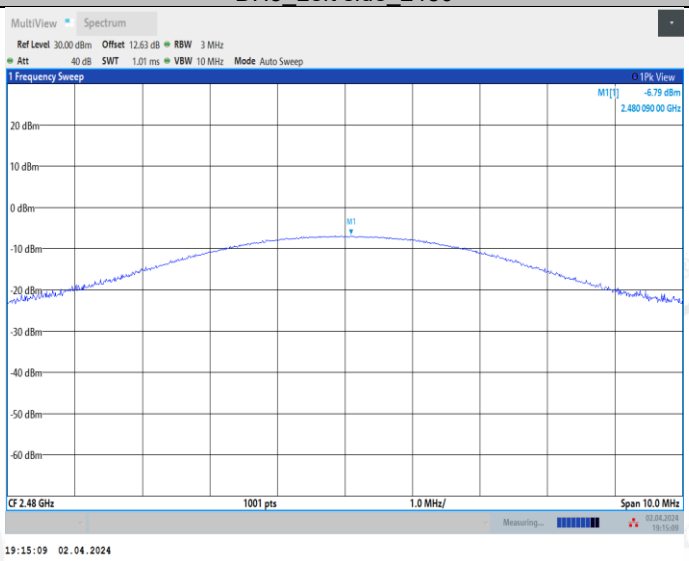
DH5_Left side_2441



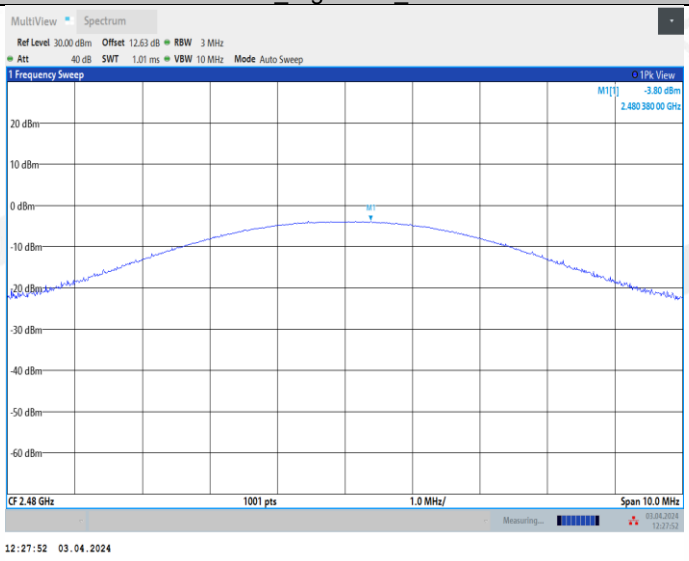
DH5_Right side_2441



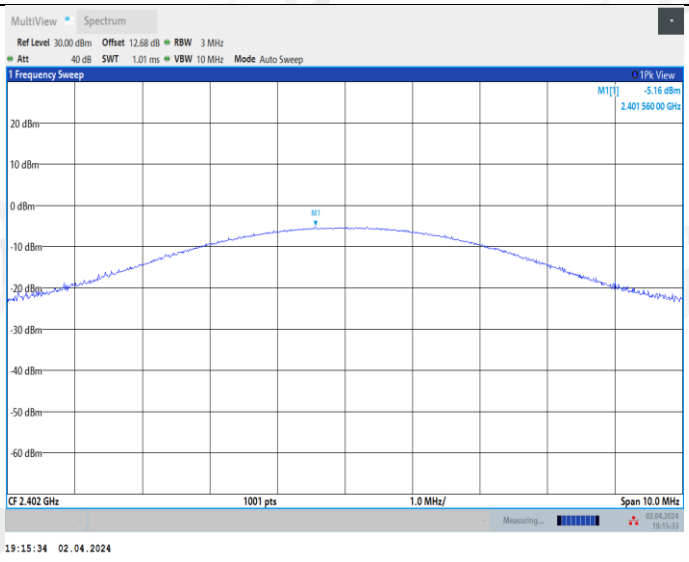
DH5_Left side_2480



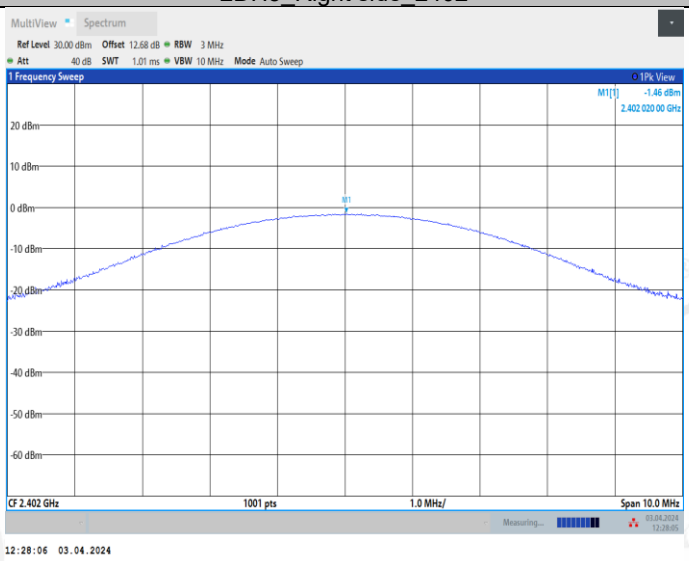
DH5_Right side_2480



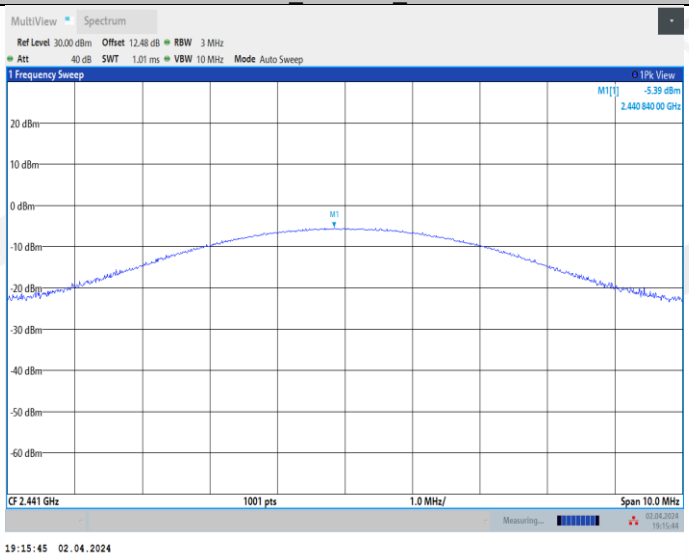
2DH5_Left side_2402



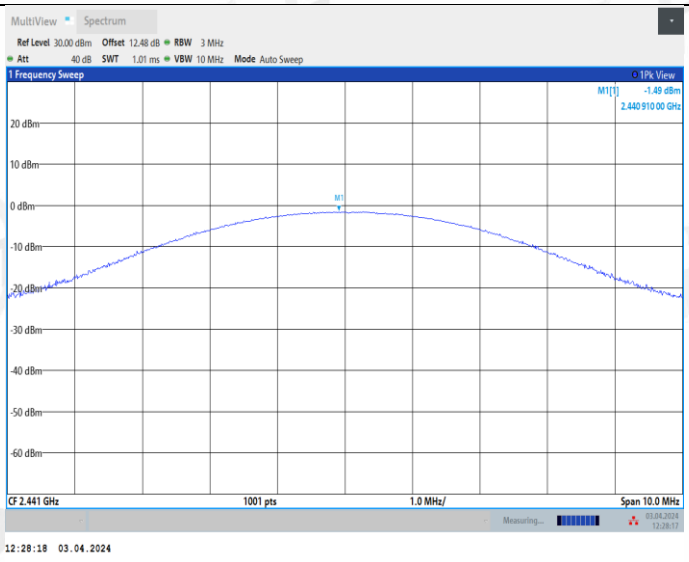
2DH5_Right side_2402



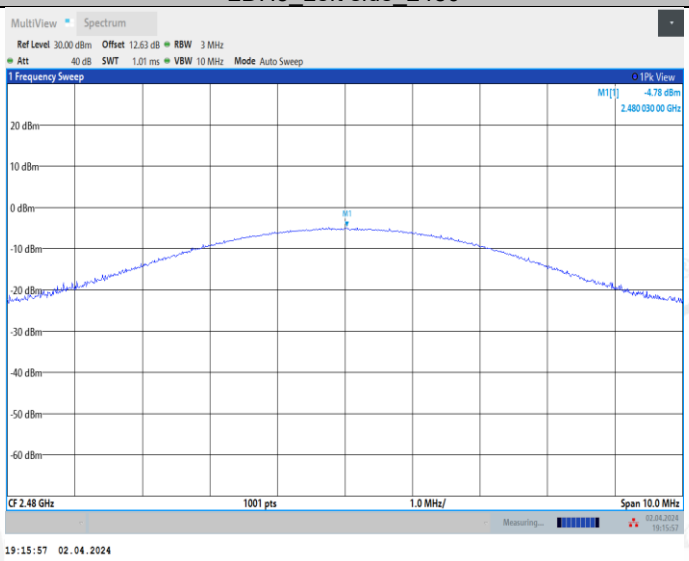
2DH5_Left side_2441



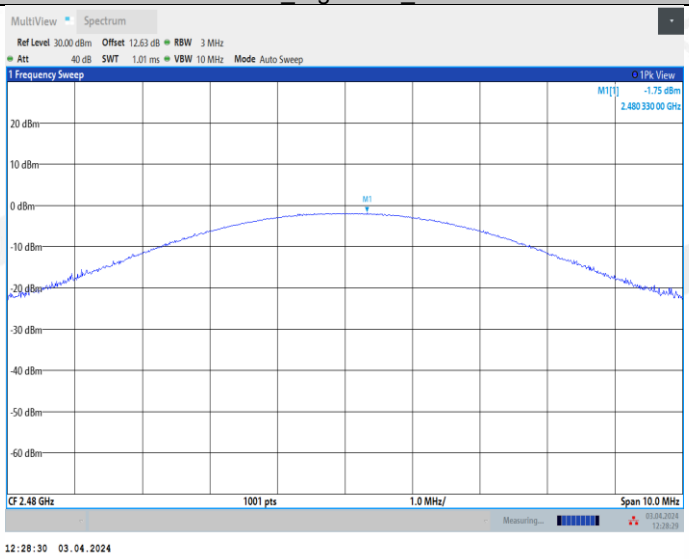
2DH5_Right side_2441



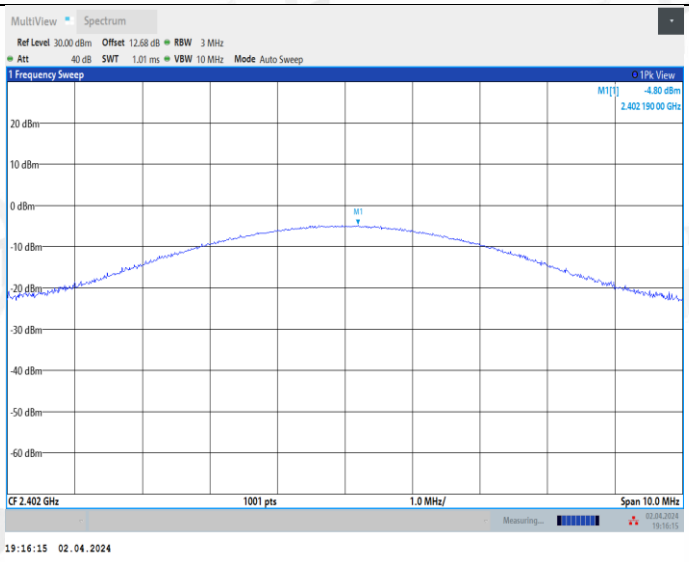
2DH5_Left side_2480



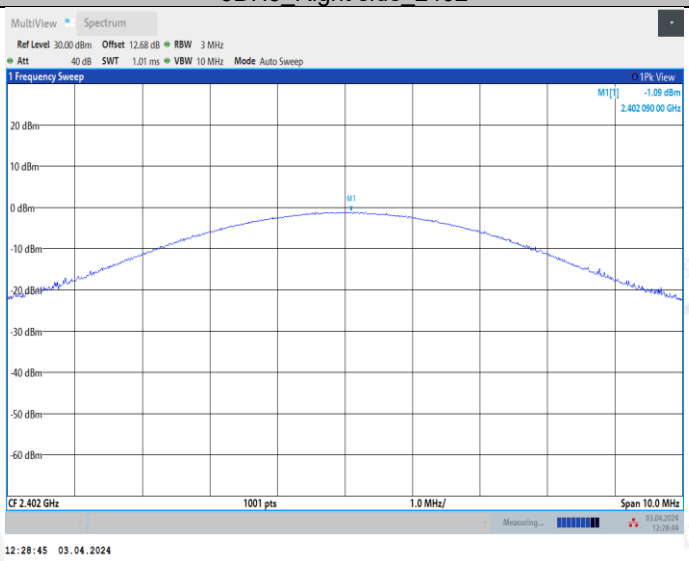
2DH5_Right side_2480



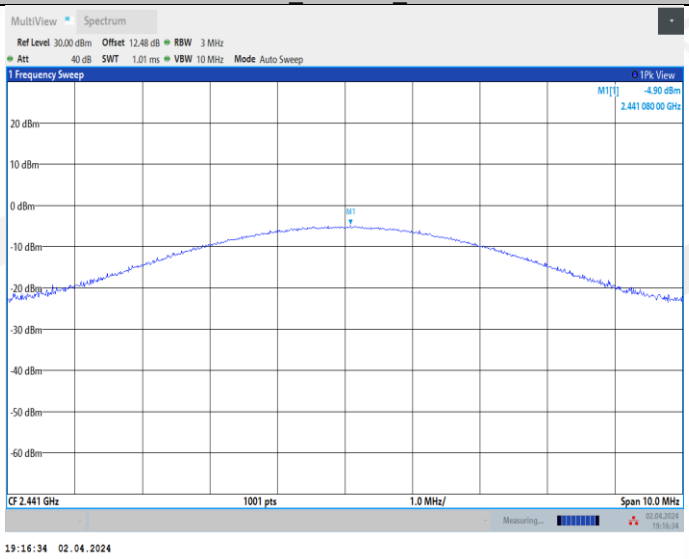
3DH5_Left side_2402



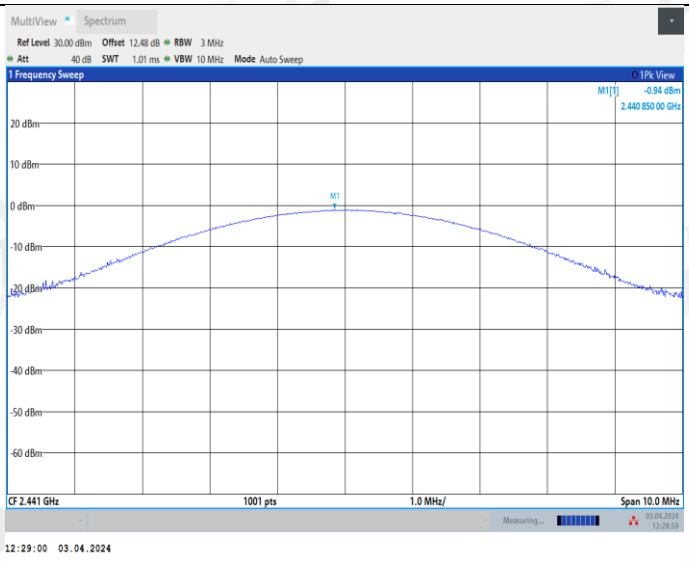
3DH5_Right side_2402



3DH5_Left side_2441



3DH5_Right side_2441



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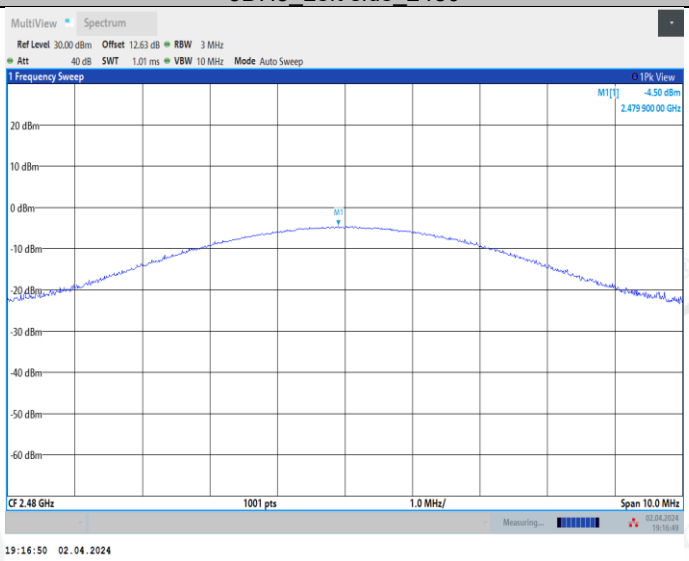
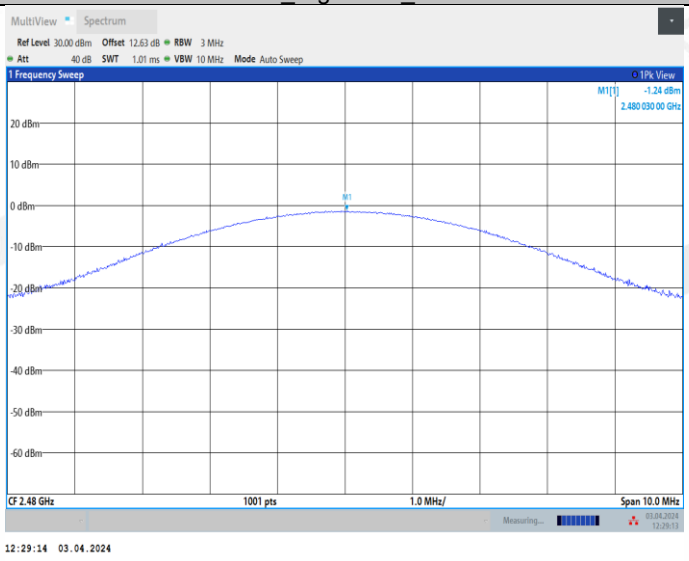
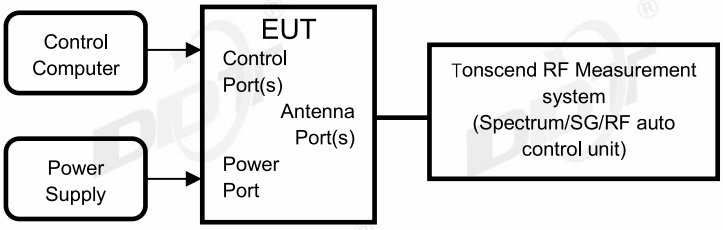


3DH5_Right side_2480



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 C63.10-2013 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 ≥ 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.

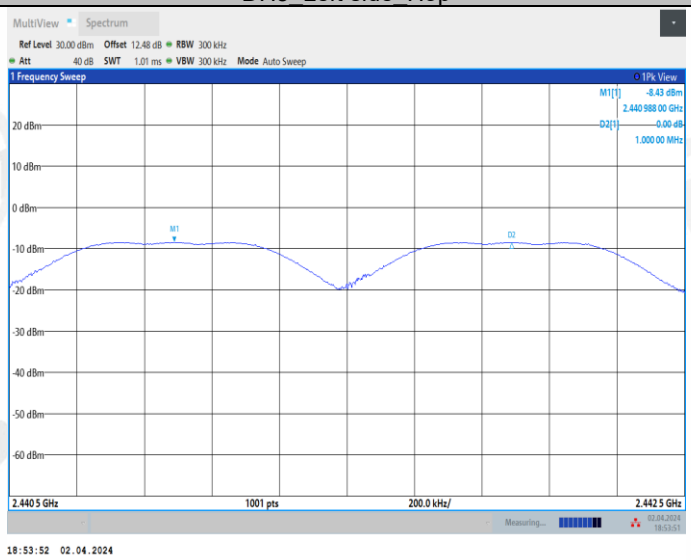
7.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 4#
Ambient Condition:	25℃,49.8%RH	Test Date:	2024.03.14-2024.04.03
Test Power Supply:	Battery	Sample Number:	S23122824-01

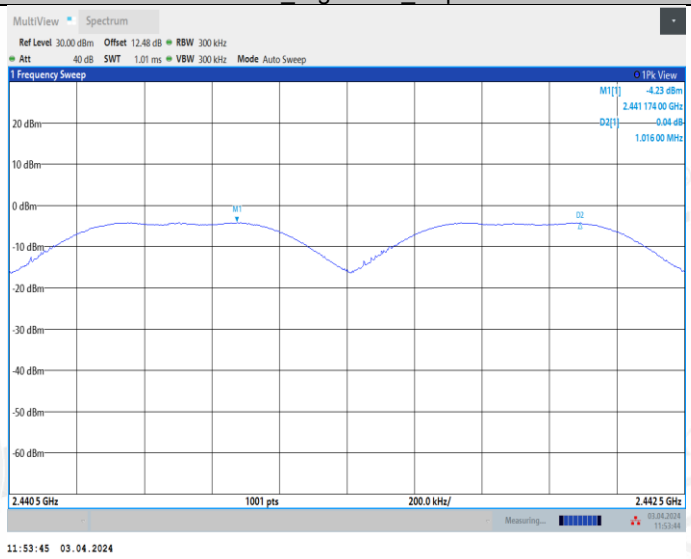
Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Left side	Hop	1	≥0.980	PASS
	Right side	Hop	1.016	≥0.687	PASS
2DH5	Left side	Hop	1.154	≥0.907	PASS
	Right side	Hop	1.178	≥0.893	PASS
3DH5	Left side	Hop	1.04	≥0.887	PASS
	Right side	Hop	0.988	≥0.887	PASS

7.5. Test graphs

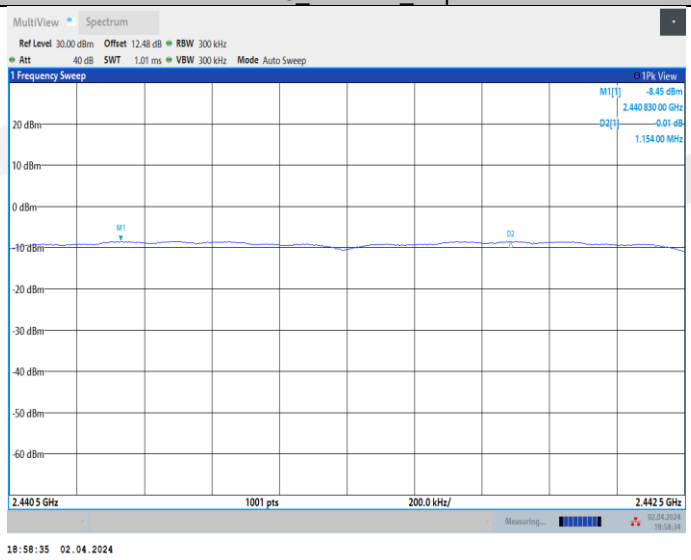
DH5_Left side_Hop



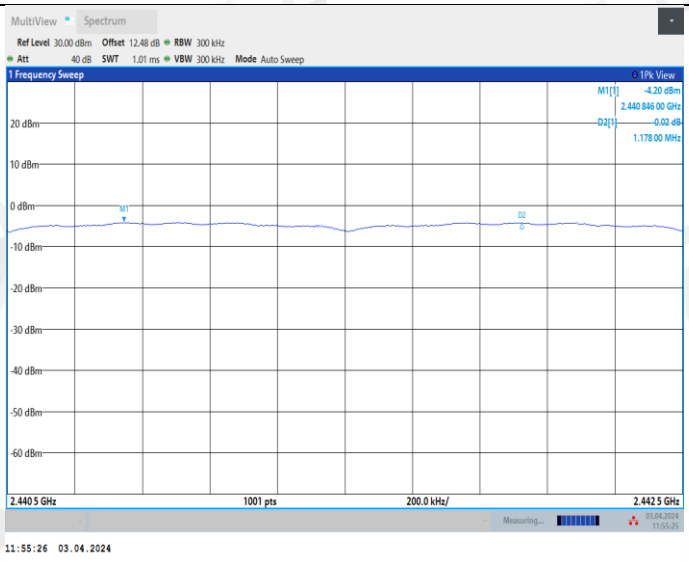
DH5_Right side_Hop



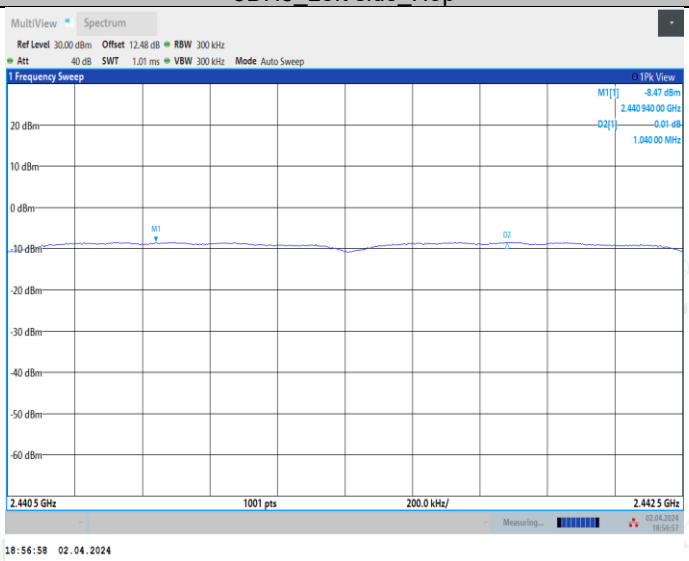
2DH5_Left side_Hop



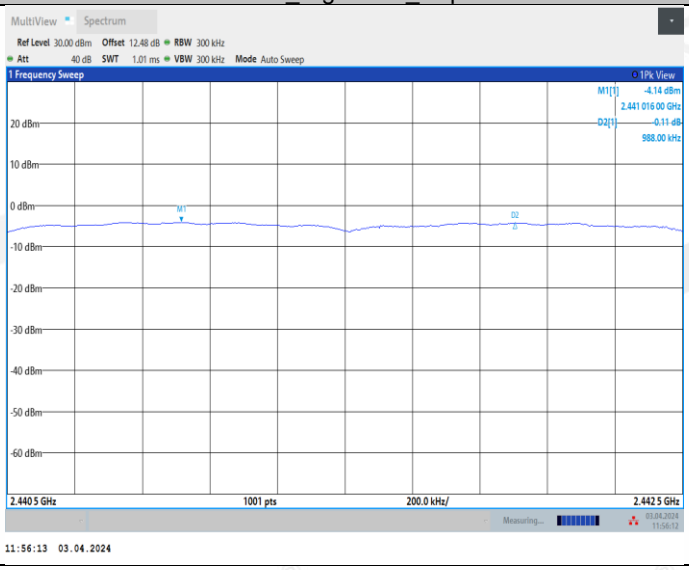
2DH5_Right side_Hop



3DH5_Left side_Hop

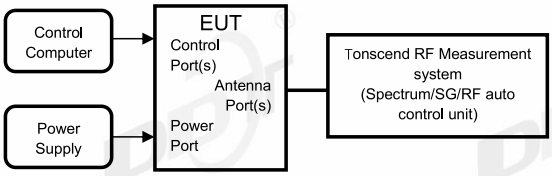


3DH5_Right side_Hop



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 C63.10-2013 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 >>1 / T
VBW:	VBW ≥ RBW.
Span:	Zero span, centered on a hopping channel.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Clear Write.

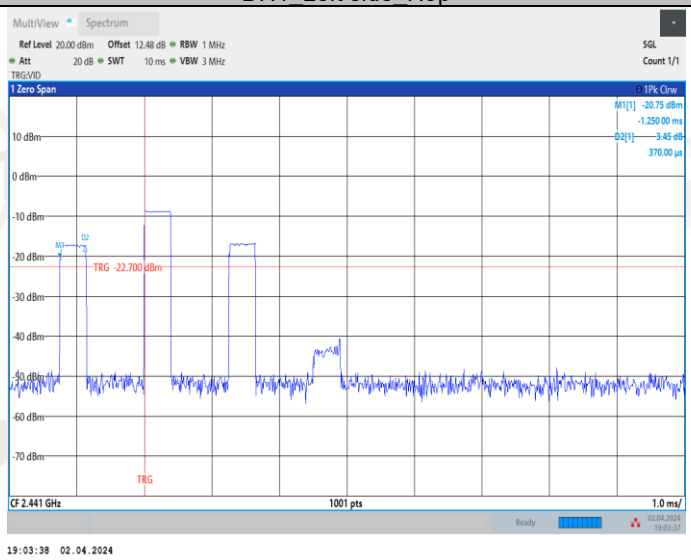
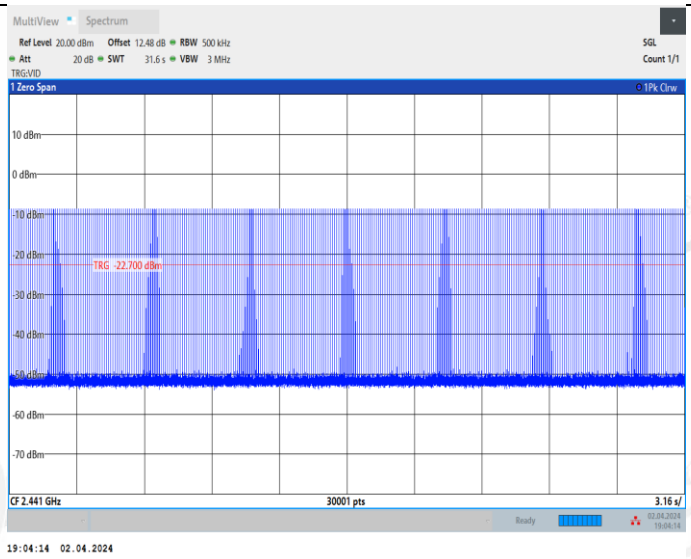
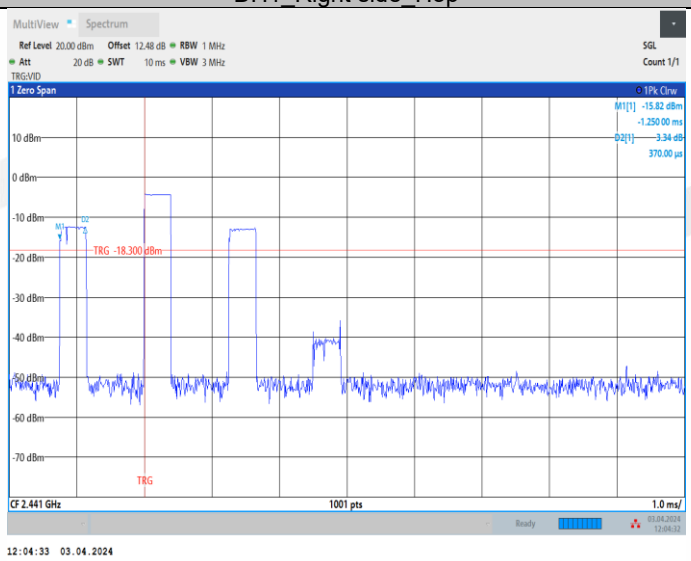
(5) The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s
(6) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = total hops *pulse's on time.
(7) Measure and record the results in the report.

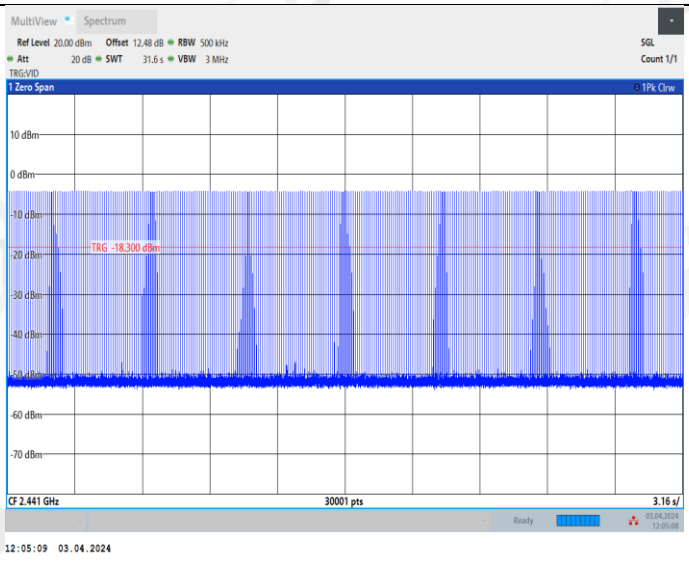
8.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 4#
Ambient Condition:	25℃,49.8%RH	Test Date:	2024.03.14-2024.04.03
Test Power Supply:	Battery	Sample Number:	S23122824-01

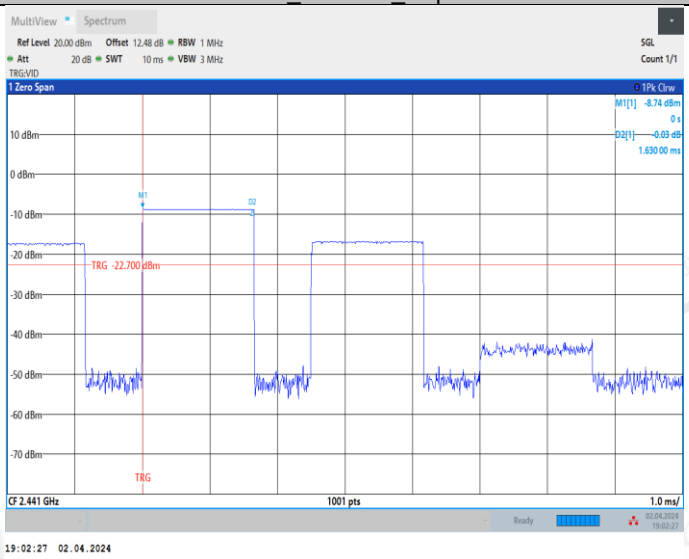
Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Left side	Hop	0.370	320	0.118	≤0.4	PASS
	Right side	Hop	0.370	320	0.118	≤0.4	PASS
DH3	Left side	Hop	1.630	160	0.261	≤0.4	PASS
	Right side	Hop	1.630	160	0.261	≤0.4	PASS
DH5	Left side	Hop	2.890	107	0.309	≤0.4	PASS
	Right side	Hop	2.890	107	0.309	≤0.4	PASS
2DH1	Left side	Hop	0.380	320	0.122	≤0.4	PASS
	Right side	Hop	0.390	320	0.125	≤0.4	PASS
2DH3	Left side	Hop	1.640	160	0.262	≤0.4	PASS
	Right side	Hop	1.640	160	0.262	≤0.4	PASS
2DH5	Left side	Hop	2.890	107	0.309	≤0.4	PASS
	Right side	Hop	2.890	107	0.309	≤0.4	PASS
3DH1	Left side	Hop	0.380	320	0.122	≤0.4	PASS
	Right side	Hop	0.380	320	0.122	≤0.4	PASS
3DH3	Left side	Hop	1.630	160	0.261	≤0.4	PASS
	Right side	Hop	1.640	160	0.262	≤0.4	PASS
3DH5	Left side	Hop	2.880	107	0.308	≤0.4	PASS
	Right side	Hop	2.890	107	0.309	≤0.4	PASS

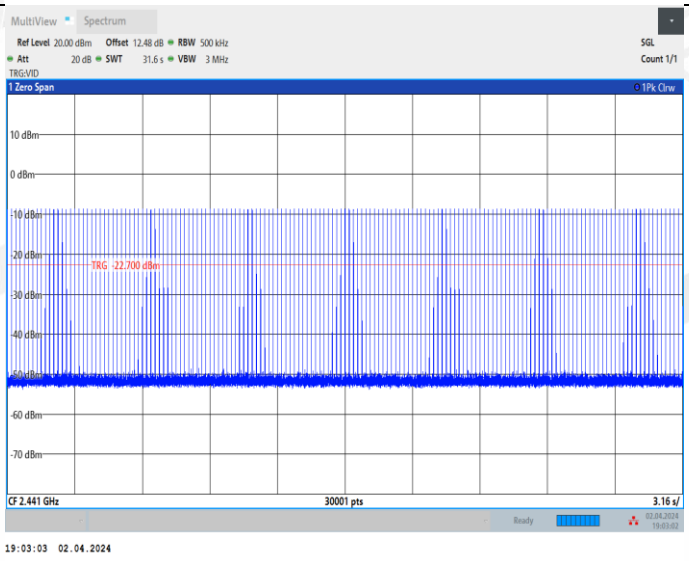
8.5. Test graphs

DH1_Left side_Hop


DH1_Right side_Hop


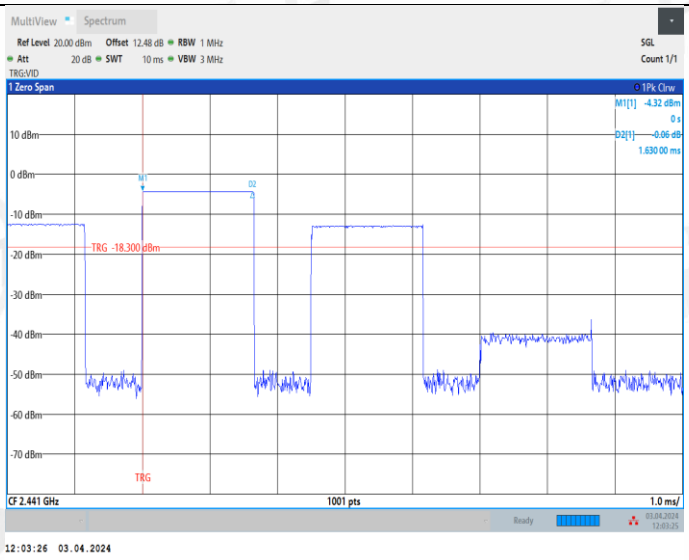


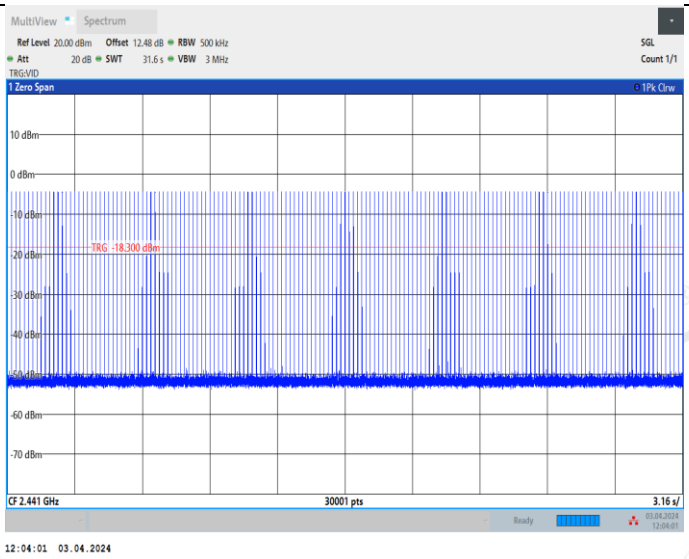
DH3_Left side_Hop



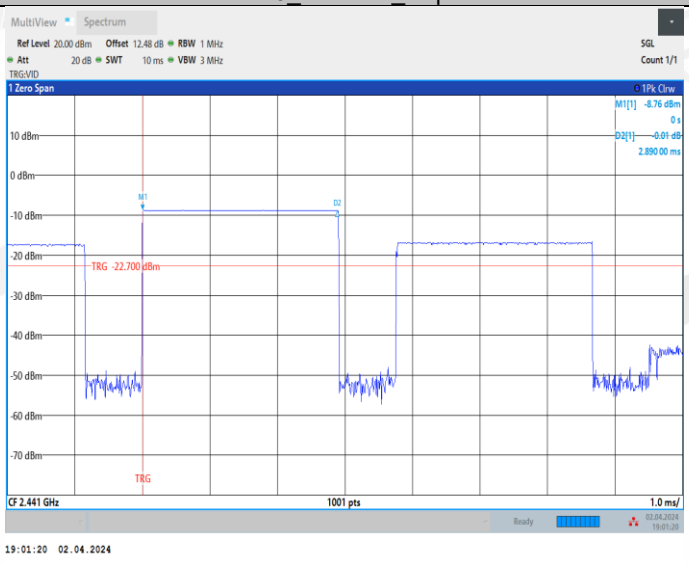


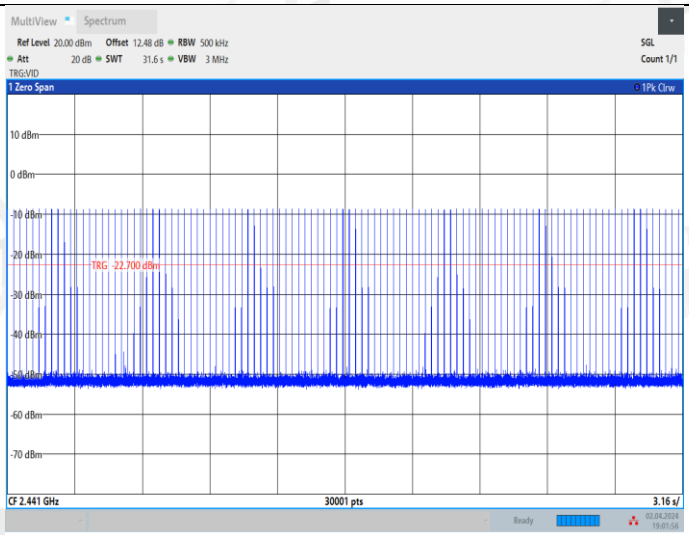
DH3_Right side_Hop



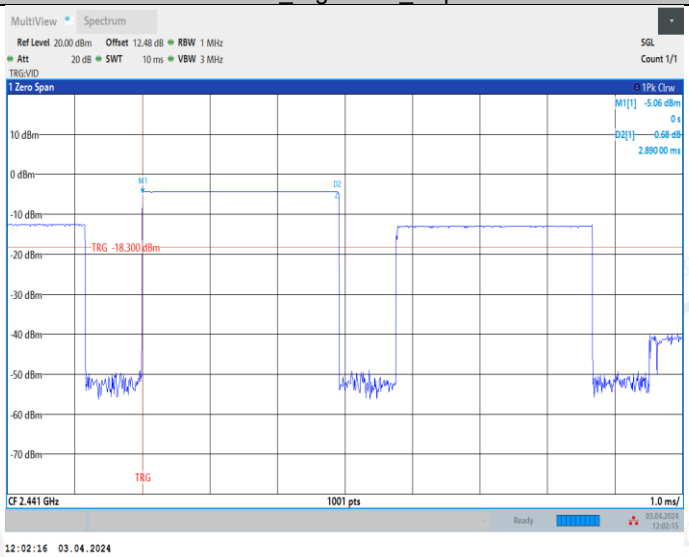


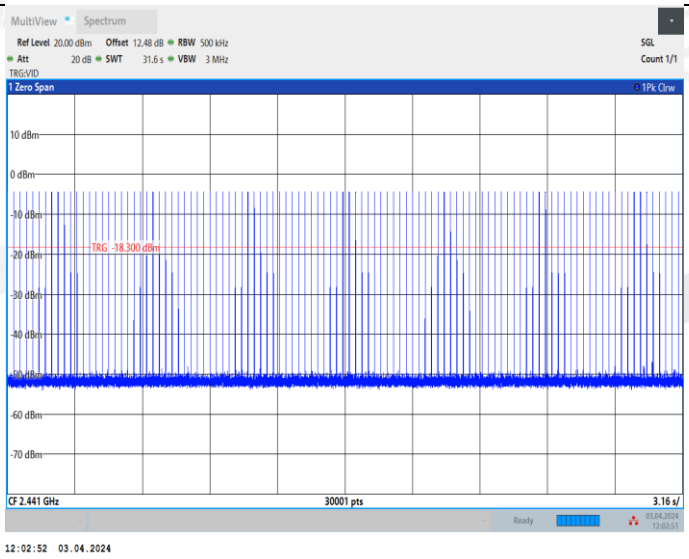
DH5_Left side_Hop



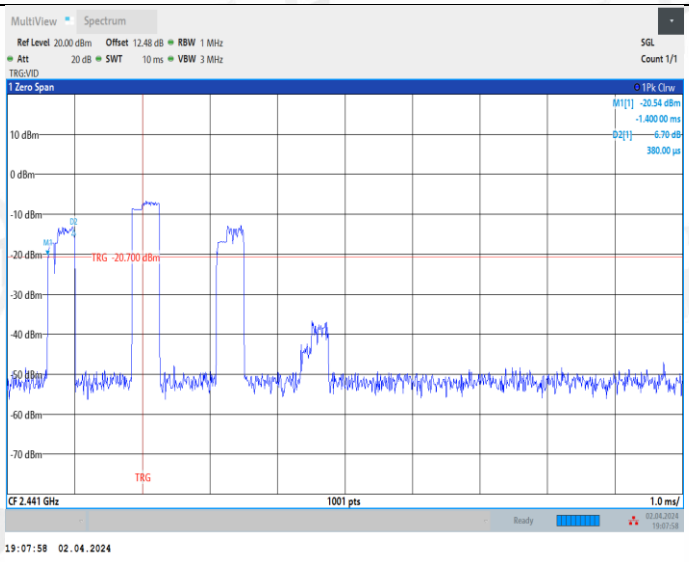


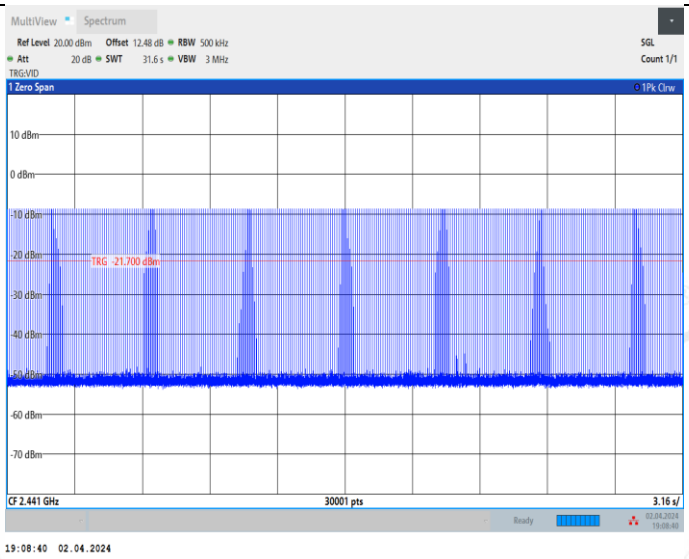
DH5_Right side_Hop



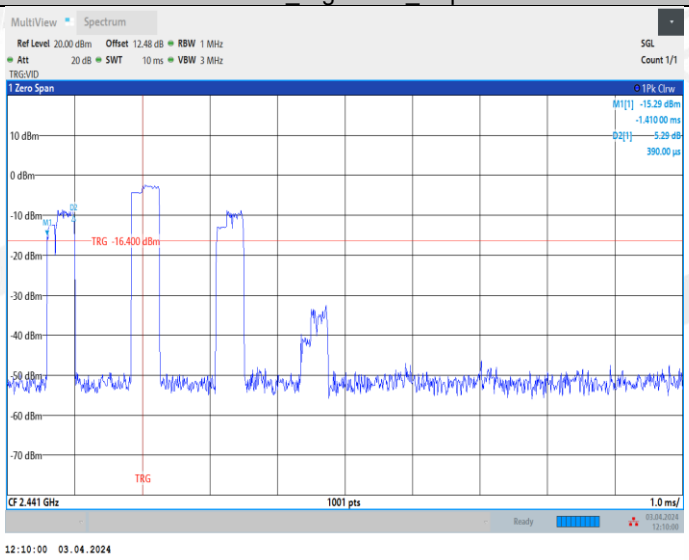


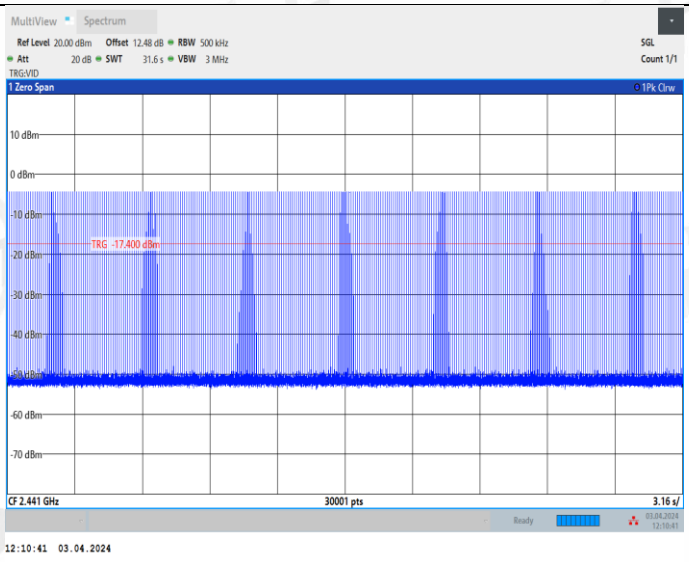
2DH1_Left side_Hop



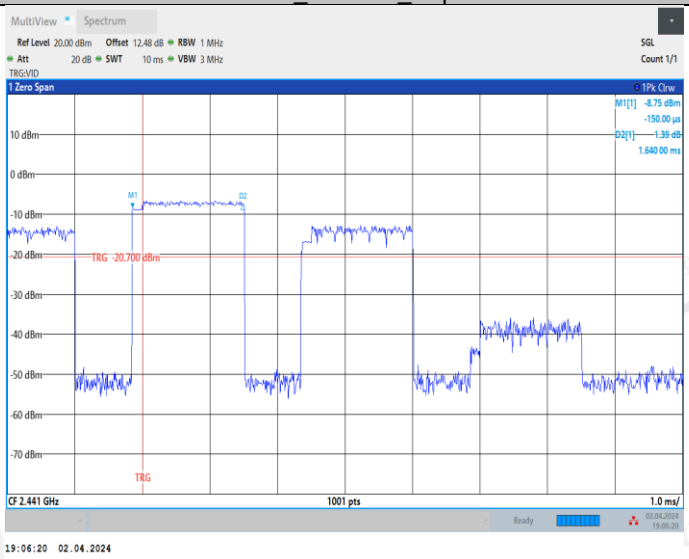


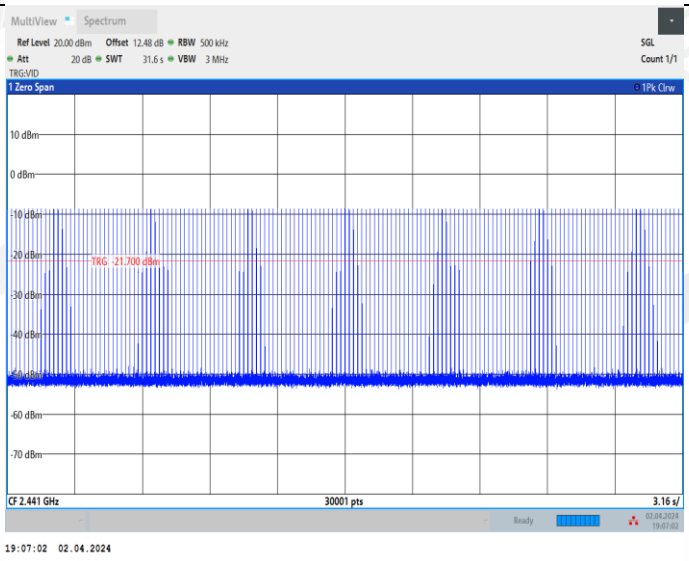
2DH1_Right side_Hop



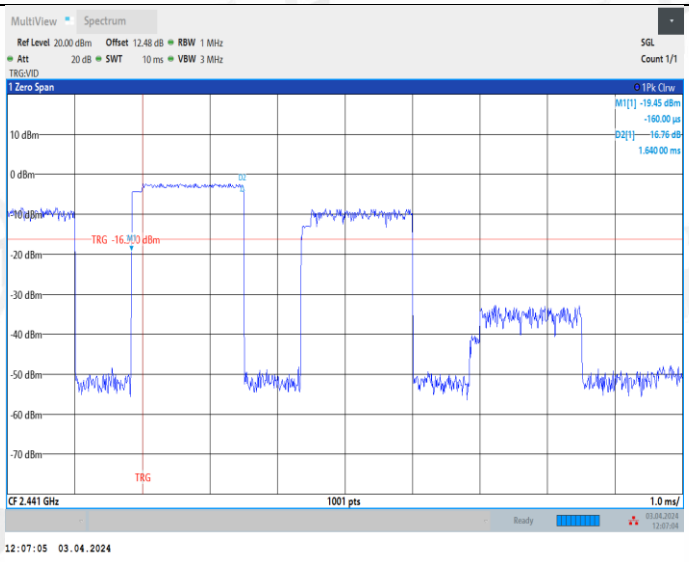


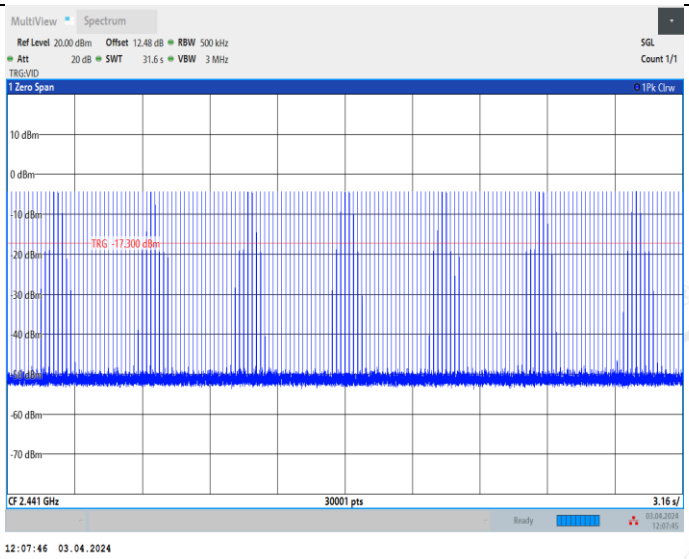
2DH3_Left side_Hop



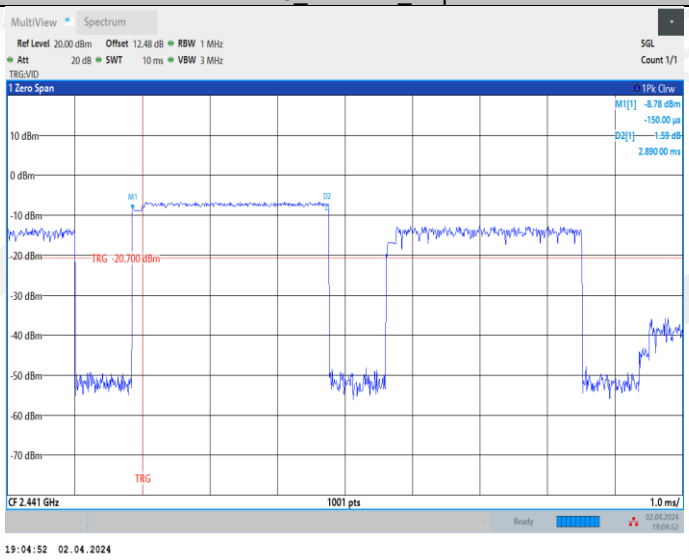


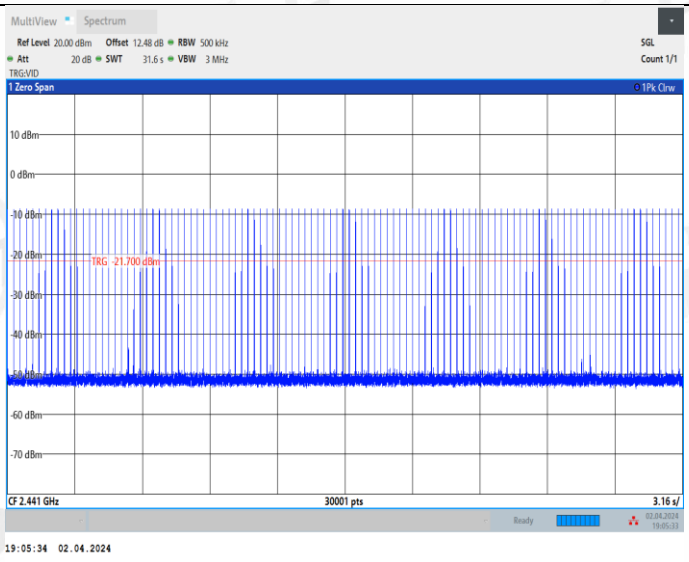
2DH3_Right side_Hop



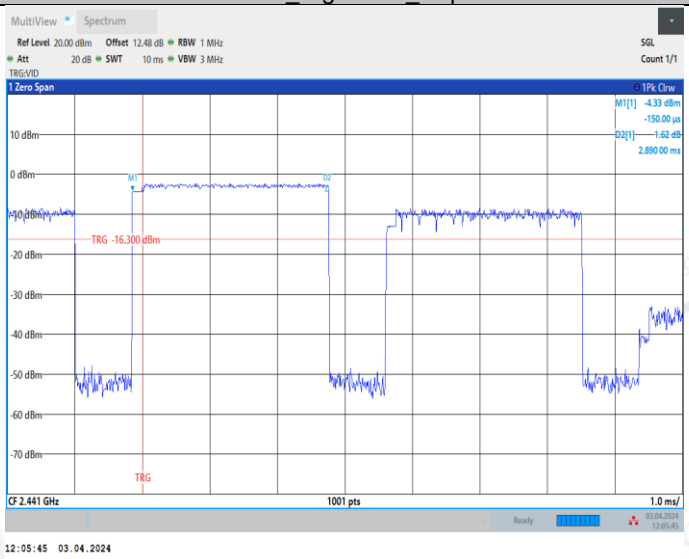


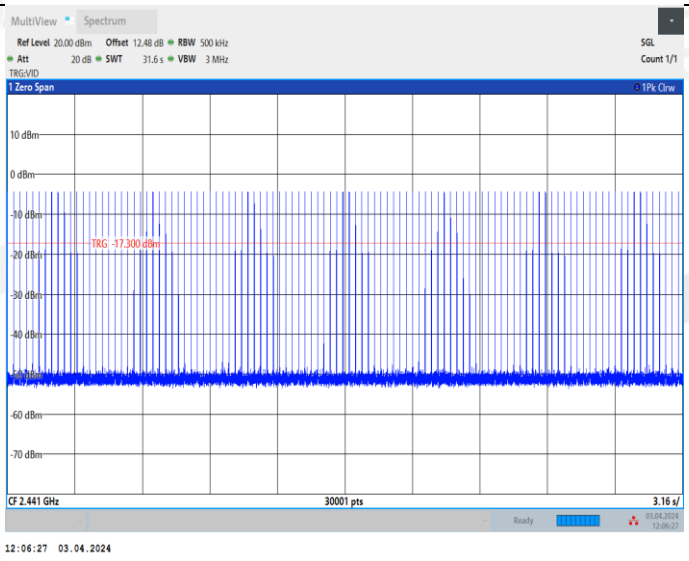
2DH5_Left side_Hop





2DH5_Right side_Hop





3DH1_Left side_Hop