



EN300 328 RF TEST REPORT

Applicant	:	Harman International Industries, Inc.
Address of Applicant	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Portable Bluetooth Speaker
Model No.	:	BOOMBOX 4C
Test Standard(s)	:	EN 300 328 V2.2.2 (2019-07)
Report No.	:	DDT-RE24112111-1E03
Issue Date	:	2025/05/07
Issued 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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Test Standard Used:
EN 300 328 V2.2.2 (2019-07)

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-RE24112111-1E03		
Date of Receipt:	2025/03/05	Date of Test:	2025/03/05 - 2025/04/25

Created: Bobo Chen	Reviewed: Ella Gong	Approved: Damon Hu
		
2025/04/25	2025/05/07	2025/05/07

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

Version	Revision Content	Issue Date	Approved
---	Initial issue	2025/05/07	

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	RF output power	4.3.1.2 or 4.3.2.2	Apply all equipment	Pass
2	Power Spectral Density	4.3.2.3	Only for equipment using wide band modulations other than FHSS	N/A
3	Duty Cycle, Tx-Sequence, Tx-gap	4.3.1.3 or 4.3.2.4	Only for non-adaptive equipment	N/A
4	Accumulated Transmit time, Frequency Occupation & Hopping Sequence	4.3.1.4	Only for FHSS equipment	Pass
5	Hopping Frequency Separation	4.3.1.5	Only for FHSS	Pass
6	Medium Utilisation	4.3.1.6 or 4.3.2.5	Only for non-adaptive equipment	N/A
7	Adaptive	4.3.1.7 or 4.3.2.6	Only for adaptive equipment	Pass
8	Occupied Channel Bandwidth	4.3.1.8 or 4.3.2.7	Apply all equipment	Pass
9	Transmitter unwanted emissions in the OOB domain	4.3.1.9 or 4.3.2.8	Apply all equipment	Pass
10	Transmitter unwanted emissions in the spurious domain	4.3.1.10 or 4.3.2.9	Apply all equipment	Pass
11	Receiver spurious emissions	4.3.1.11 or 4.3.2.10	Apply all equipment	Pass
12	Receiver Blocking	4.3.1.12 or 4.3.2.11	Apply all equipment	Pass
13	Geo-location capability	4.3.1.13 or 4.3.2.12	Only for equipment with geo-location capability	N/A
Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.				

2. General Test Information

2.1. Description of EUT

EUT Name	: Portable Bluetooth Speaker
Model Number	: BOOMBOX 4C
EUT Function Description	: Please reference user manual of this device
Power Supply	: Input: AC 100-240V ~ 50/60Hz, 150W Internal battery: Rechargeable Li-ion Battery Pack 99.02 Wh (equivalent to 21.6 V / 4584 mAh)
Hardware Version	: 2.0.1
Software Version	: V250430
Antenna Type	: FPC
Max Antenna Gain(dBi)	: 2.48

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

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	/	

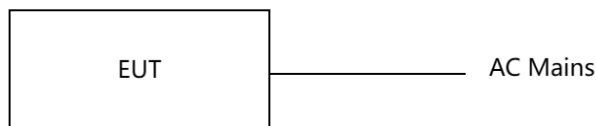
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's 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
AC cable	Harman	N/A	Length: 2.0 m

2.3. Block diagram of EUT configuration for test



2.4. Decision of final test mode

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

Test software: FCC_Tool_V3.0.exe

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

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

Tested mode, Tx Power Setting, Channel, and Frequency			
Tested mode	Setting Tx Power	Channel	Frequency (MHz)
GFSK hopping on Tx mode	9	CH0 to CH78	2402 to 2480
$\pi/4$ -DQPSK hopping on Tx mode	9	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	9	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	9	CH0	2402
	9	CH39	2441
	9	CH78	2480
$\pi/4$ -DQPSK hopping off Tx mode	9	CH0	2402
	9	CH39	2441
	9	CH78	2480
8DPSK hopping off Tx mode	9	CH0	2402
	9	CH39	2441
	9	CH78	2480
Rx mode	/	CH0	2402
	/	CH39	2441
	/	CH78	2480
Note: According exploratory test, EUT will have maximum output power in those data rate, worst-case data rates were: GFSK mode: DH5, $\pi/4$ -DQPSK mode: 2DH5, 8DPSK mode: 3DH5			

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

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

/	Normal Conditions	Extreme Conditions
Temperature range	15 °C to 35 °C	0 °C to +45 °C
Humidity range	20% to 75%	N/A
Pressure range	86-106 kPa	N/A
Power supply	NV: AC 230V/50Hz	N/A

Note 1: The Extreme temperature range and extreme voltages are declared by the manufacturer.

Note 2: NTNV: Normal Temperature Normal Voltage, LTNV: Low Temperature Normal Voltage, HTNV: High Temperature Normal Voltage.

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-20240, G-20118

2.8. Measurement uncertainty

Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz)
	4.40 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)

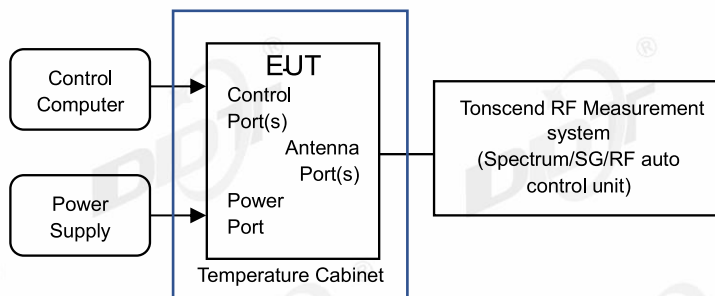
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑RF Connected Test (RF Measurement System 3#)				
SIGNAL ANALYZER	R&S	FSV40	101407	2025/07/08
Wideband Radio Communication Tester	R&S	CMW500	117491	2026/03/28
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2025/07/08
MXG Vector Signal Generator	Agilent	N5182A	MY48180912	2026/03/28
RF Control Unit	Tonscend	JS0806-2	20C8060230	2026/03/28
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2026/03/28
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A
☑RF Connected Test (RF Measurement System 4#)				
Signal &Spectrum Analyzer	R&S	FSV3044	101173	2026/03/28
Wideband Radio Communication Tester	R&S	CMW500	168801	2026/03/28
MXG Vector Signal Generator	Agilent	N5182A	MY48180737	2026/03/28
PSG Vector Signal Generator	Agilent	E8267D	US49060192	2025/08/25
RF Control Unit	Tonsend	JS0806-2	2118060485	2026/03/28
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2026/03/28
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A

4. RF Output Power

4.1. Block diagram of test setup



4.2. Limits

The maximum RF output power for adaptive Frequency Hopping equipment shall be equal to or less than 20 dBm.

The maximum RF output power for this equipment shall be equal to or less than the value declared by the manufacturer. This declared value shall be equal to or less than 20 dBm.

This limit shall apply for any combination of power level and intended antenna assembly.

4.3. Test procedure

- (1) The test according to EN 300 328 V2.2.2 Clause 5.4.2.2.1.
- (2) Connect EUT's antenna output to power sensor by RF cable, the path loss was compensated to the results.
- (3) For FHSS equipment, the measurements shall be performed during normal operation (hopping) and the equipment is assumed to have no blacklisted frequencies (operating on all hopping frequencies).
- (4) For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) is captured.
- (5) The measurements for RF output power shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.

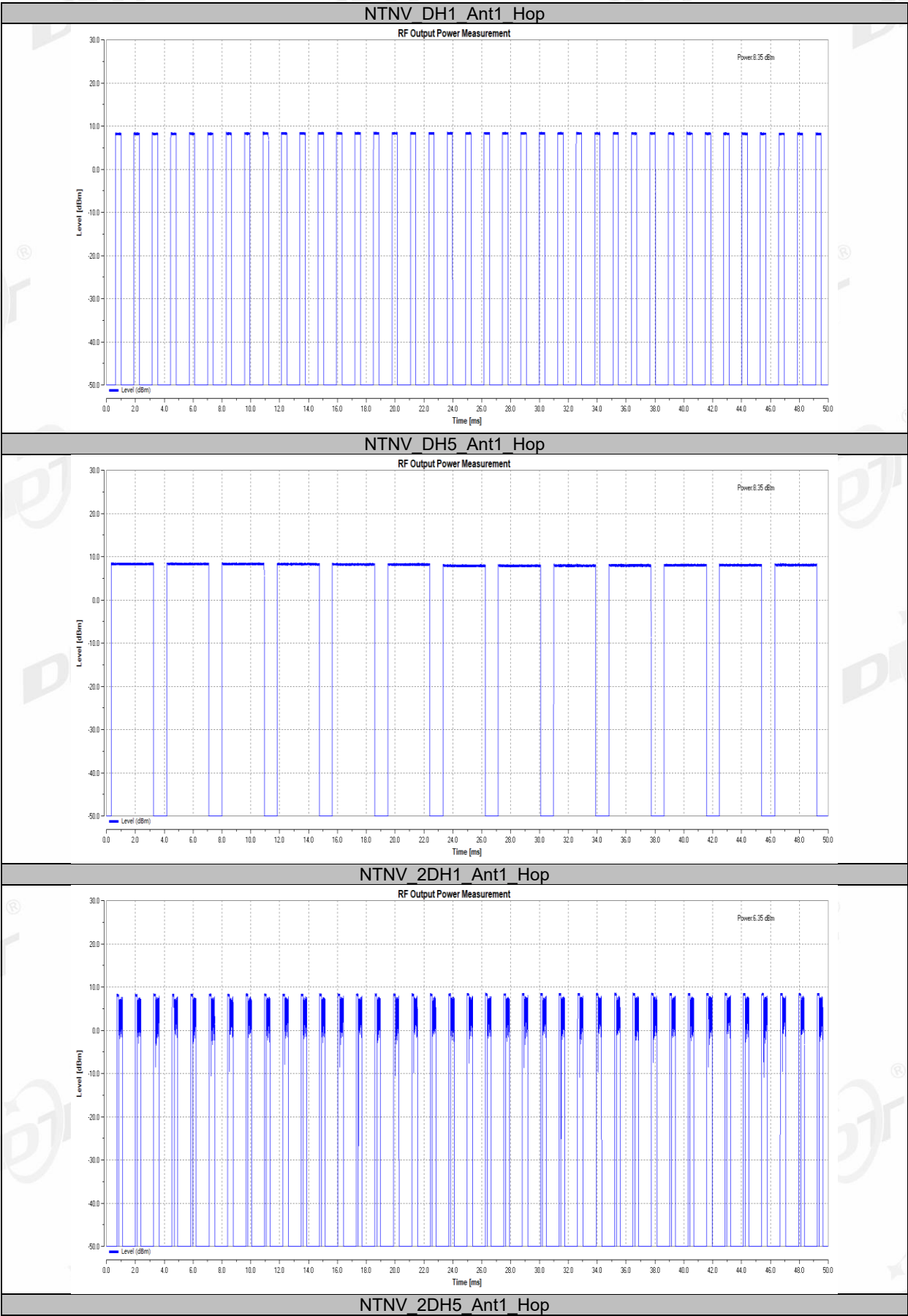
4.4. Test result

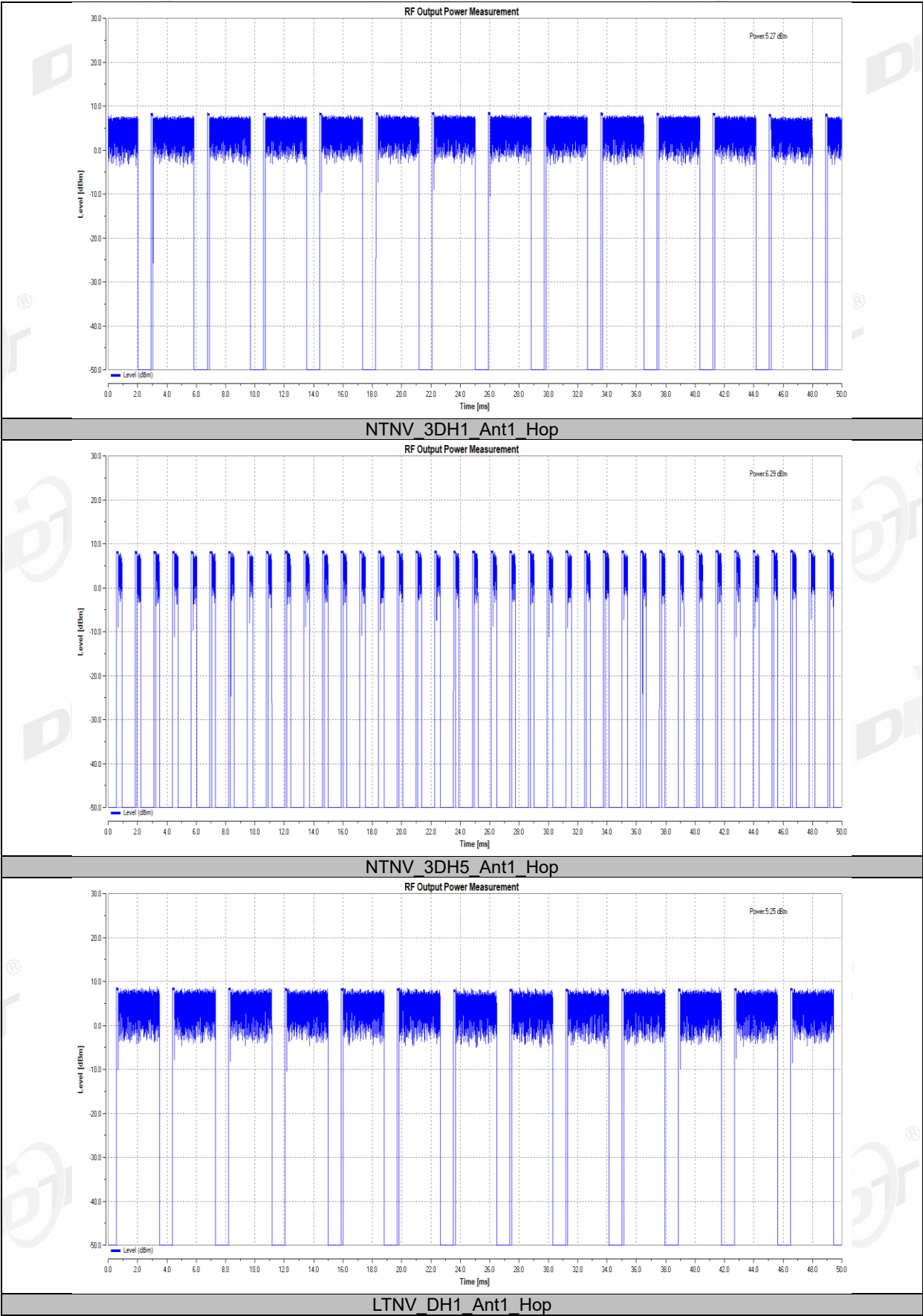
Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	25.9℃,45.6%RH	Test Date:	2025.04.17
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

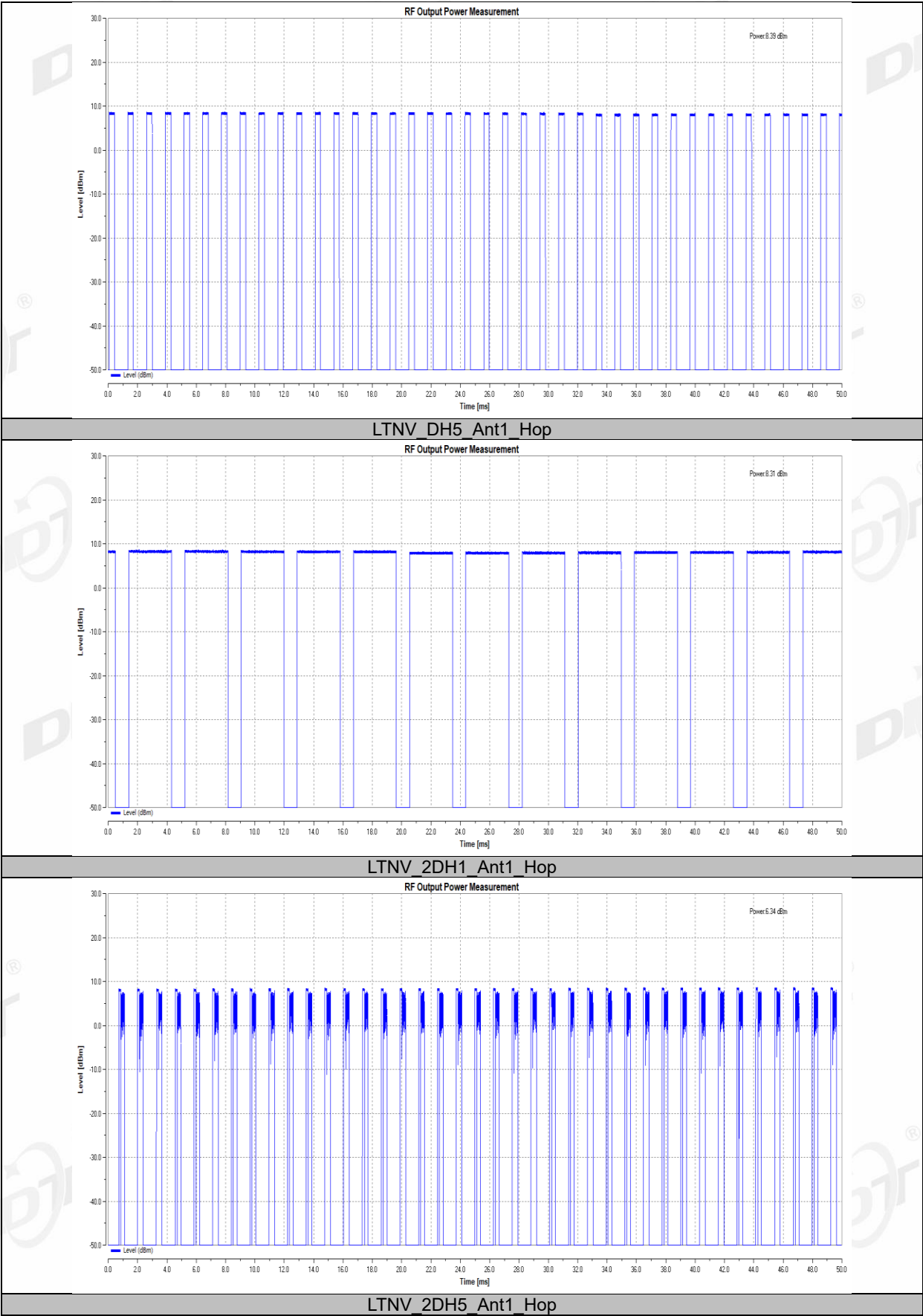
Test Condition	Test Mode	Antenna	Frequency[MHz]	Burst Power [dBm]	EIRP[dBm]	Limit[dBm]	Verdict
NTNV	DH1	Ant1	Hop	8.35	10.83	20	PASS
	DH5	Ant1	Hop	8.35	10.83	20	PASS
	2DH1	Ant1	Hop	6.35	8.83	20	PASS
	2DH5	Ant1	Hop	5.27	7.75	20	PASS
	3DH1	Ant1	Hop	6.29	8.77	20	PASS
	3DH5	Ant1	Hop	5.25	7.73	20	PASS
LTNV	DH1	Ant1	Hop	8.39	10.87	20	PASS
	DH5	Ant1	Hop	8.31	10.79	20	PASS
	2DH1	Ant1	Hop	6.34	8.82	20	PASS
	2DH5	Ant1	Hop	5.27	7.75	20	PASS
	3DH1	Ant1	Hop	6.34	8.82	20	PASS
	3DH5	Ant1	Hop	5.25	7.73	20	PASS
HTNV	DH1	Ant1	Hop	8.34	10.82	20	PASS
	DH5	Ant1	Hop	8.33	10.81	20	PASS
	2DH1	Ant1	Hop	6.30	8.78	20	PASS
	2DH5	Ant1	Hop	5.26	7.74	20	PASS
	3DH1	Ant1	Hop	6.33	8.81	20	PASS
	3DH5	Ant1	Hop	5.26	7.74	20	PASS

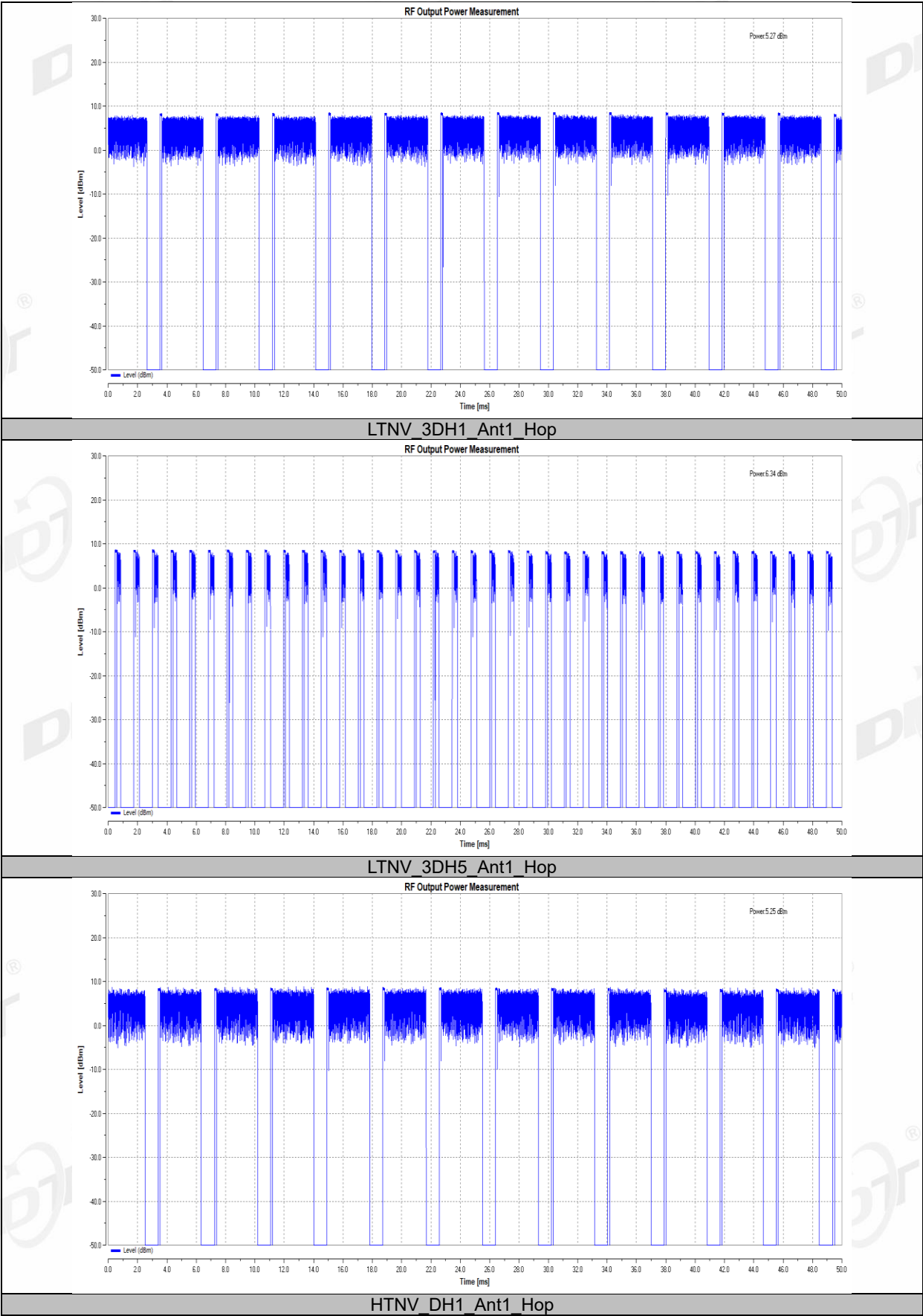
Note: EIRP = Measured Highest Pburst Values + Antenna Gain

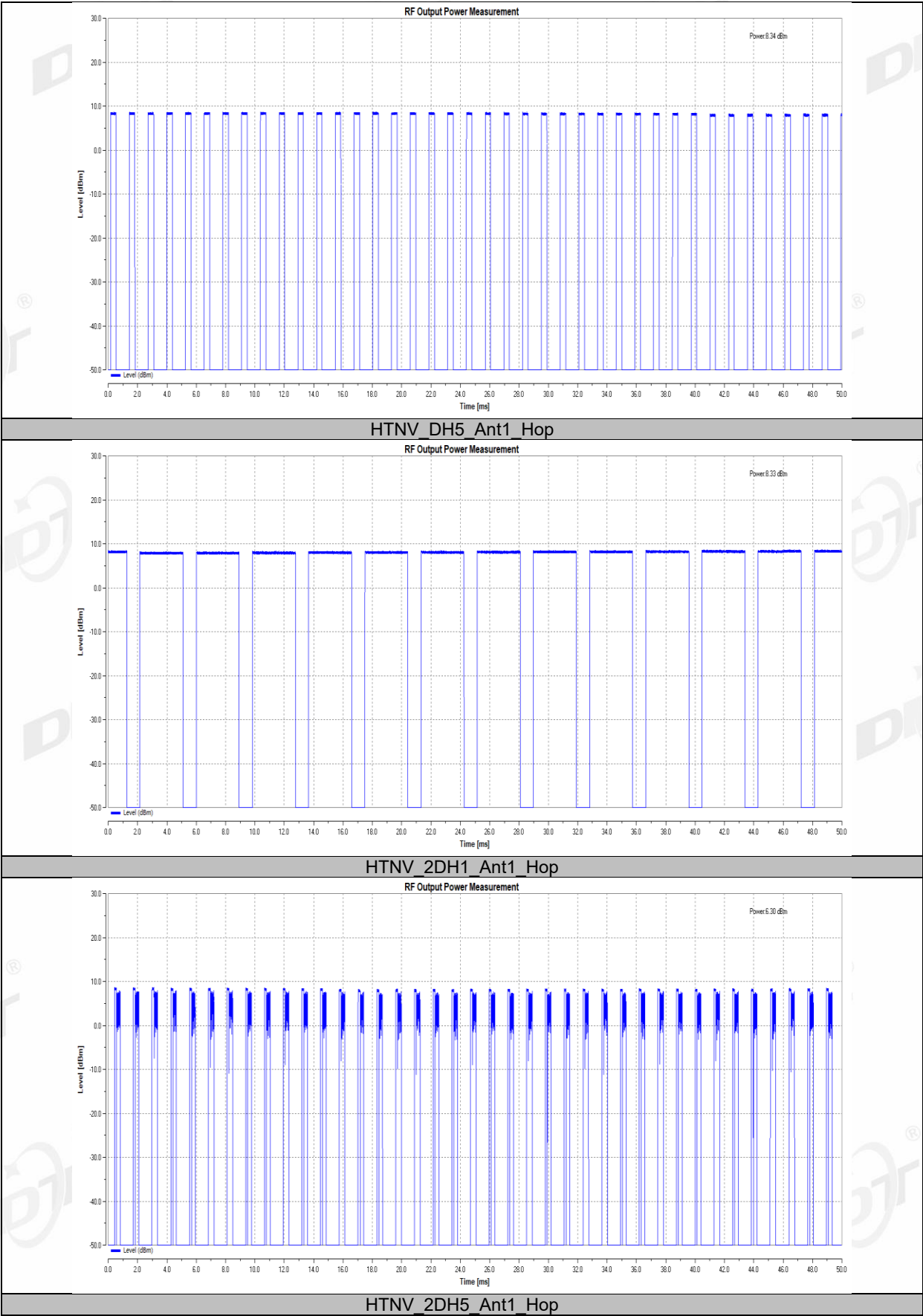
4.5. Test graphs

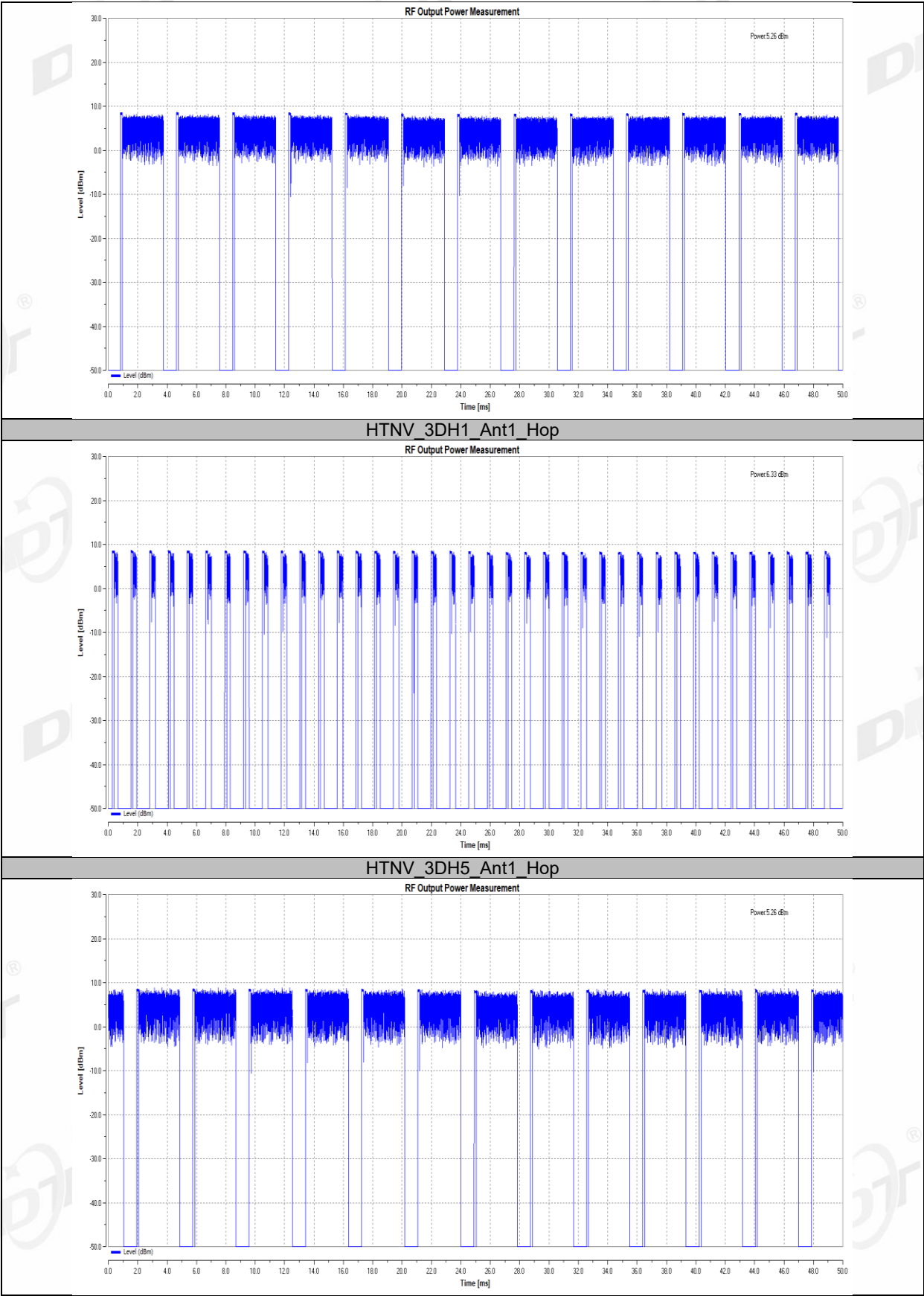






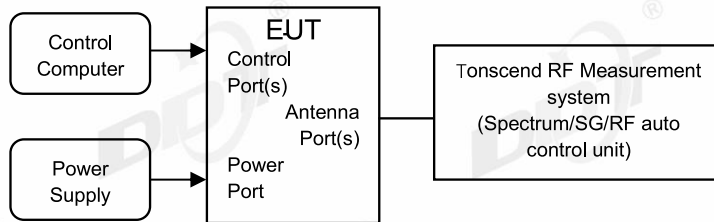






5. Occupied Channel Bandwidth

5.1. Block diagram of test setup



5.2. Limits

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band 2400 MHz to 2483.5 MHz for this device.

5.3. Test procedure

- (1) The test according to EN 300 328 V2.2.2 Clause 5.4.7.2.1.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) For FHSS equipment having overlapping channels, special software might be required to force the UUT to hop or transmit on a single Hopping Frequency. The measurement shall be performed only on the lowest and the highest frequency within the stated frequency range.
- (4) The frequencies on which the tests were performed shall be recorded.
- (5) Set the spectrum analyzer as follows:

Centre Frequency:	The centre frequency of the channel under test
Frequency Span:	2 × Nominal Channel Bandwidth
RBW:	~ 1 % of the span without going below 1 %
VBW:	3 × RBW
Detector Mode:	RMS
Sweep time:	1s
Trace Mode:	Max Hold

When the trace has completed, use the 99% bandwidth function of the spectrum analyzer to measure the occupied channel bandwidth of the EUT.

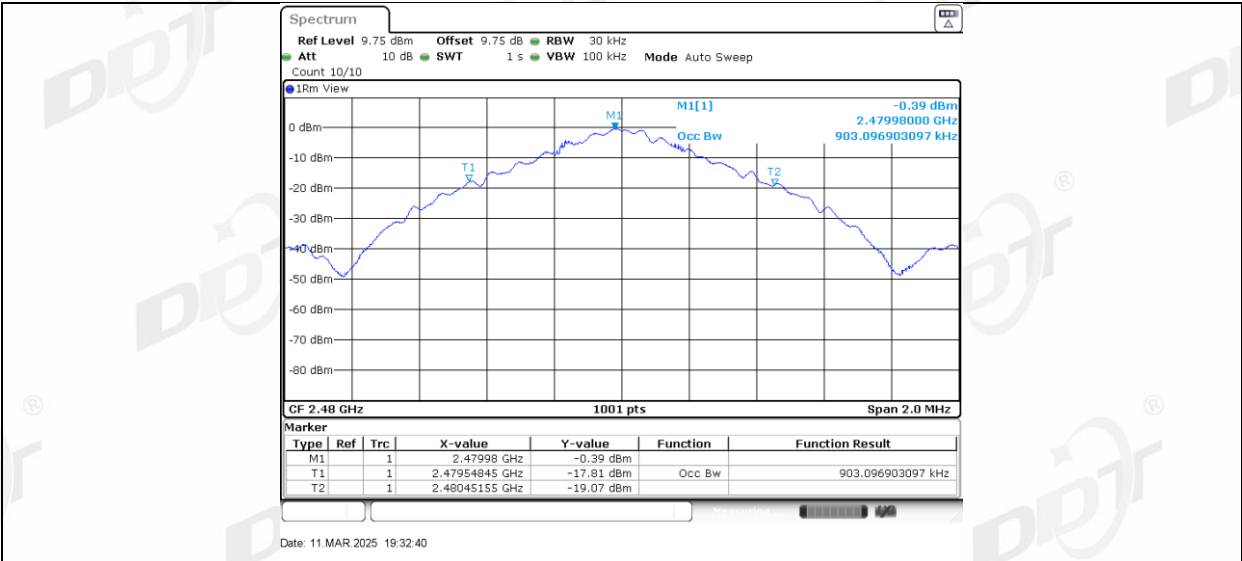
5.4. Test result

Test Engineer:	Gen Liu	Test Site:	RF Measurement System 3#
Ambient Condition:	24.8℃,52.4%RH	Test Date:	2025.03.11
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

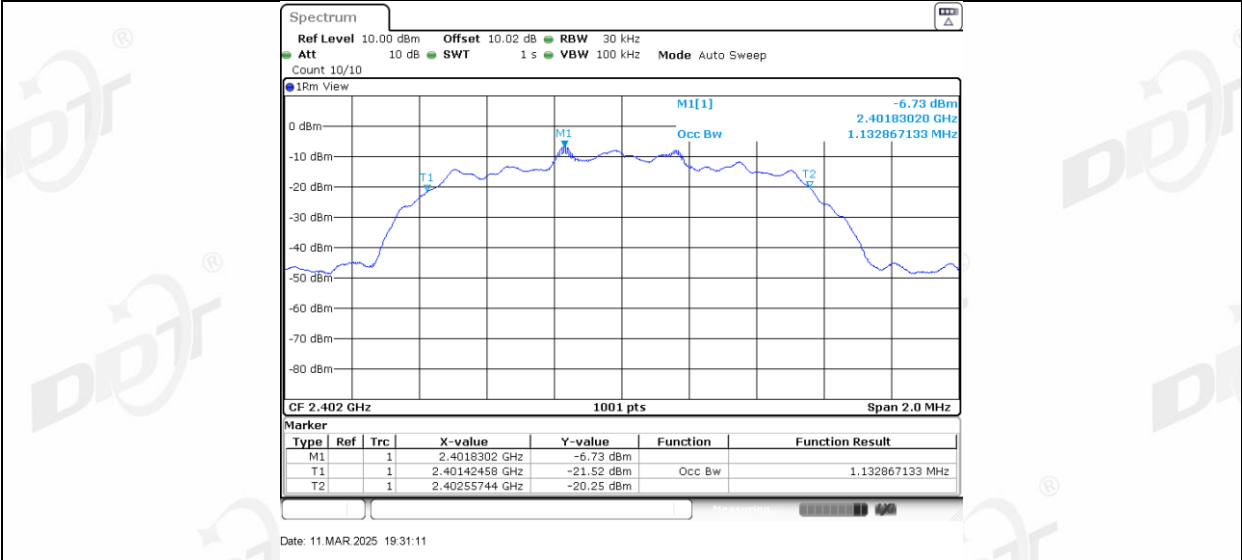
Test Mode	Antenna	Channel	OCB[MHz]	FL[MHz]	FH[MHz]	Limit [MHz]	Verdict
DH1	Ant1	2402	0.853	2401.5764	2402.4296	2400 to 2483.5	PASS
		2480	0.849	2479.5784	2480.4276	2400 to 2483.5	PASS
DH5	Ant1	2402	0.903	2401.5485	2402.4515	2400 to 2483.5	PASS
		2480	0.903	2479.5485	2480.4515	2400 to 2483.5	PASS
2DH1	Ant1	2402	1.133	2401.4246	2402.5574	2400 to 2483.5	PASS
		2480	1.133	2479.4246	2480.5574	2400 to 2483.5	PASS
2DH5	Ant1	2402	1.177	2401.4066	2402.5834	2400 to 2483.5	PASS
		2480	1.177	2479.4066	2480.5834	2400 to 2483.5	PASS
3DH1	Ant1	2402	1.139	2401.4346	2402.5734	2400 to 2483.5	PASS
		2480	1.141	2479.4326	2480.5734	2400 to 2483.5	PASS
3DH5	Ant1	2402	1.187	2401.4066	2402.5934	2400 to 2483.5	PASS
		2480	1.189	2479.4046	2480.5934	2400 to 2483.5	PASS

5.5. Test graphs

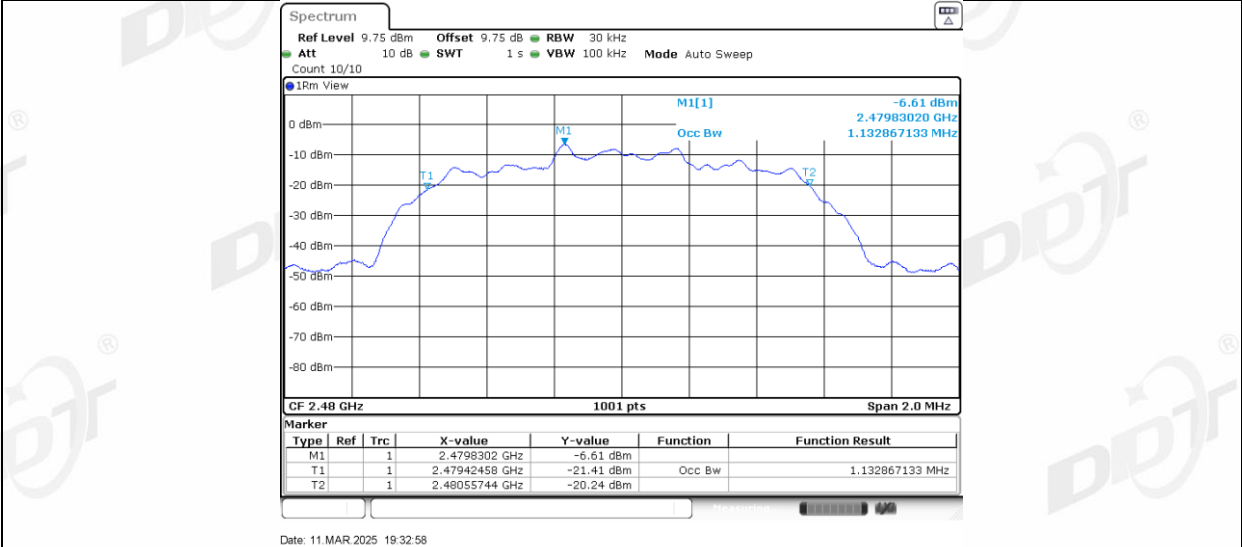




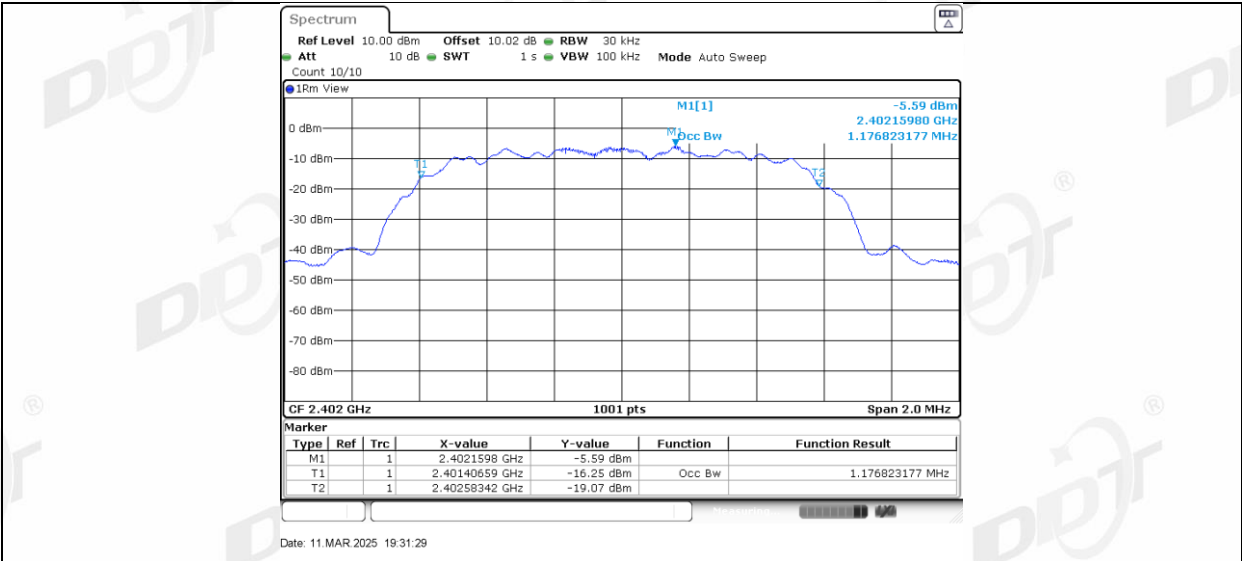
2DH1_Ant1_2402



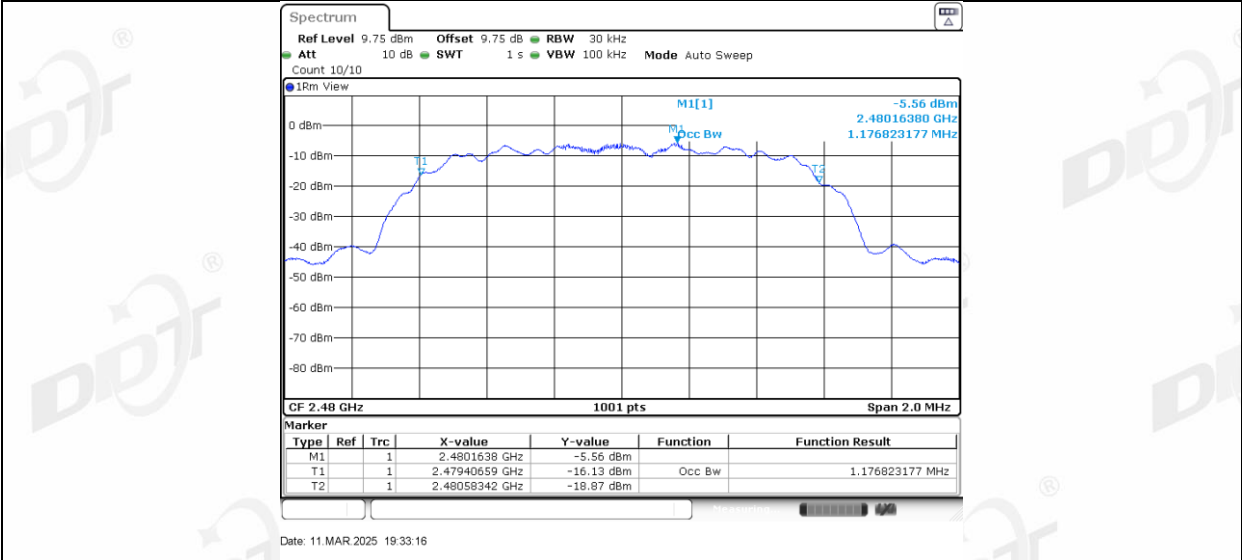
2DH1_Ant1_2480



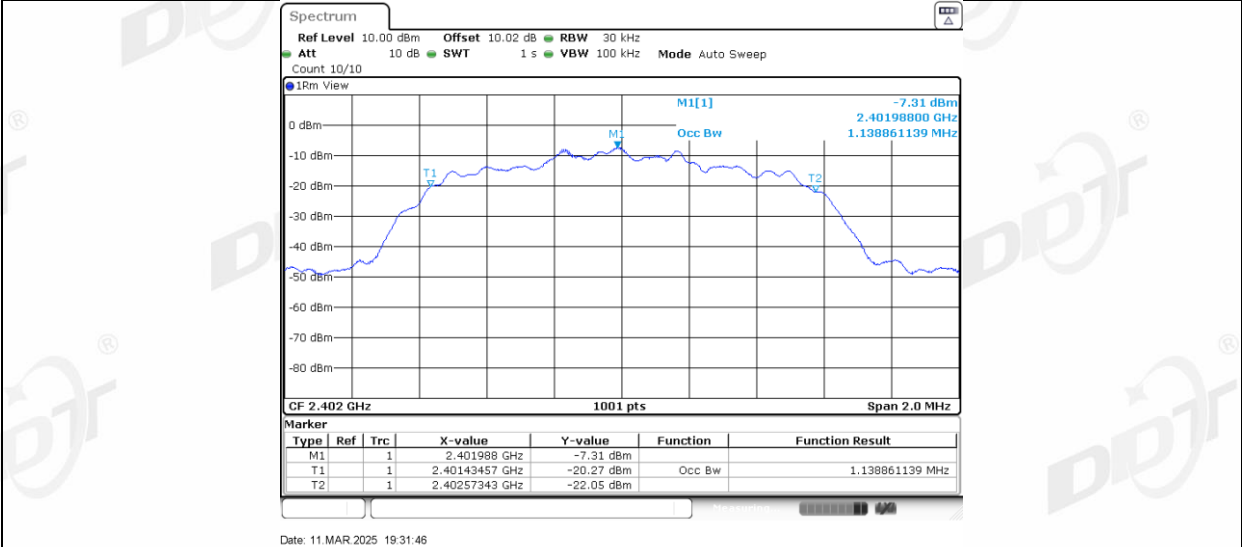
2DH5_Ant1_2402



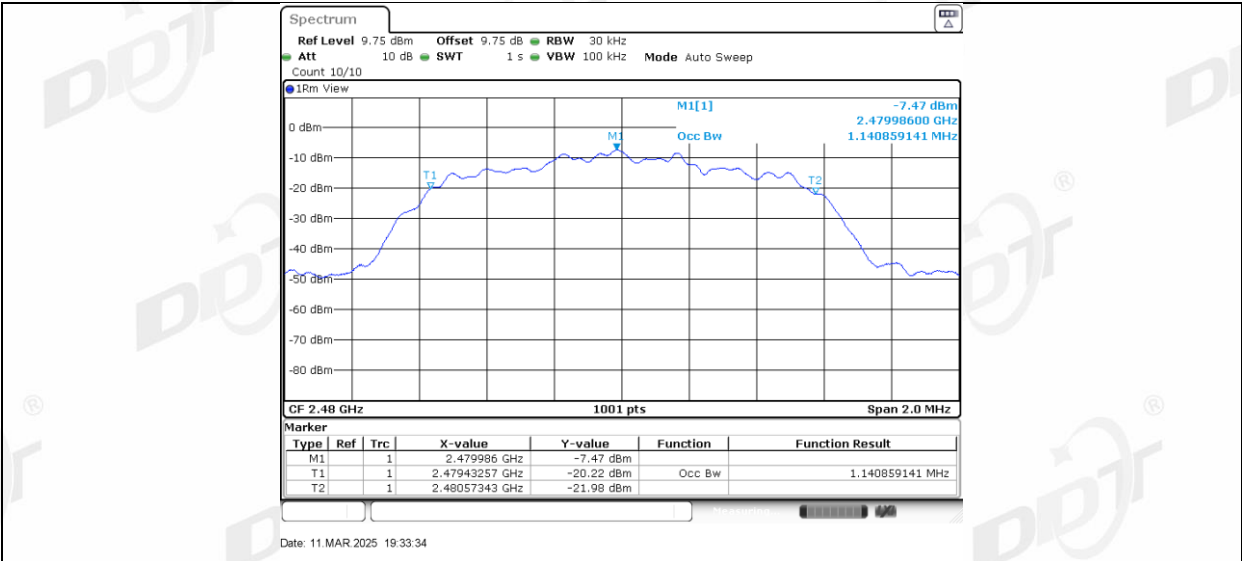
2DH5_Ant1_2480



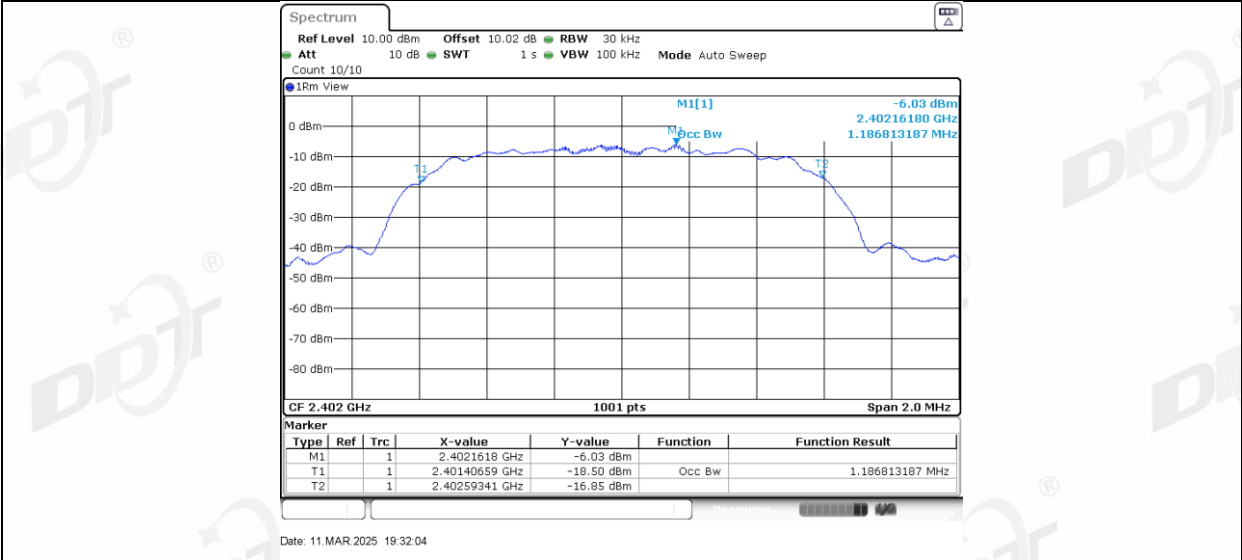
3DH1_Ant1_2402



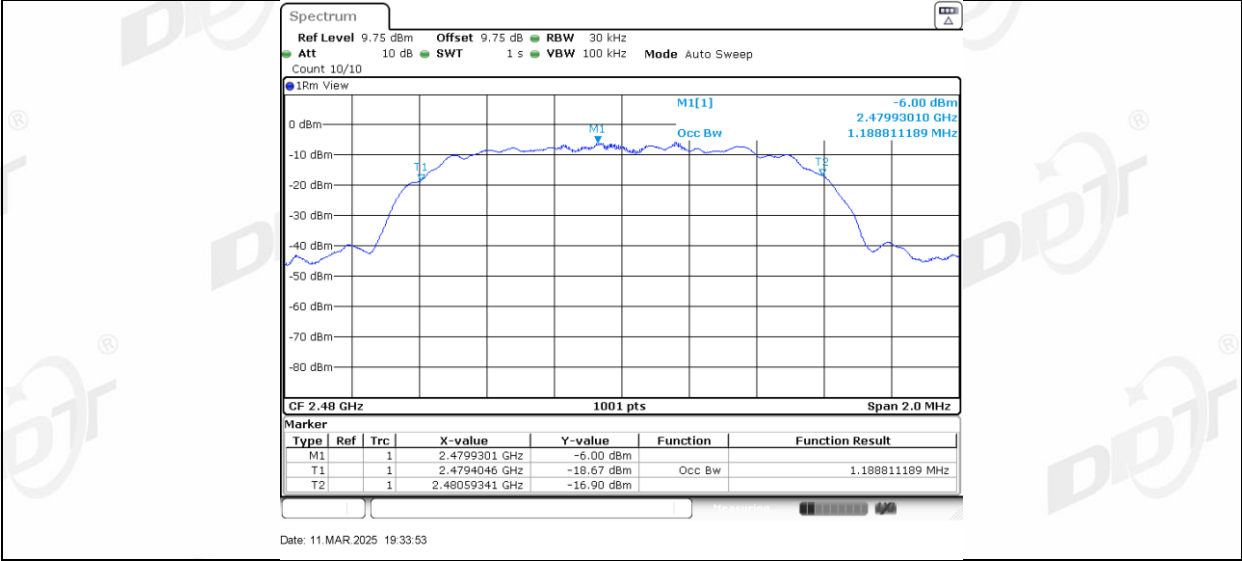
3DH1_Ant1_2480



3DH5_Ant1_2402

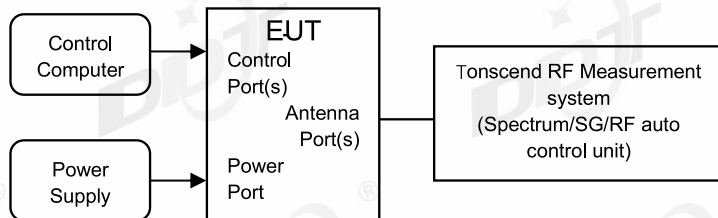


3DH5_Ant1_2480



6. Accumulated Transmit Time, Frequency Occupation & Hopping Sequence

6.1. Block diagram of test setup



6.2. Limits

The Dwell Time is the time that a particular hopping frequency would be occupied by the transmitter during a single hop. The equipment itself is not required to transmit on this hopping frequency during the Dwell Time.

For this Adaptive frequency hopping systems, the maximum accumulated dwell time on any hopping frequency shall be 400 ms within any period of 400 ms multiplied by the minimum number of hopping frequencies (79) that have to be used.

The Minimum Frequency Occupation Time shall be equal to one dwell time within a period not exceeding four times the product of the dwell time per hop and the number of hopping frequencies in use.

6.3. Test procedure

- (1) The test according to EN 300 328 V2.2.2 Clause 5.4.4.2.1.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) JS Tonscend test software is used to control the spectrum analyzer to use the following settings:

Accumulated Transmit Time settings:

Centre Frequency:	Equal to the hopping frequency being investigated
Frequency Span:	0 Hz
RBW:	~ 50 % of the Occupied Channel Bandwidth
VBW:	≥ RBW
Detector Mode:	RMS
Sweep time:	Equal to the applicable observation period
Trace Mode	Clear/Write

Frequency Occupation settings:

Centre Frequency:	Equal to the hopping frequency being investigated
Frequency Span:	0 Hz
RBW:	~ 50 % of the Occupied Channel Bandwidth
VBW:	≥ RBW
Detector Mode:	RMS
Sweep time:	4 × dwell time × Actual number of hopping frequencies in use
Trace Mode:	Clear/Write

Hopping Sequence settings:

Start Frequency:	2 400 MHz
Stop Frequency:	2 483,5 MHz
RBW:	~ 50 % of the Occupied Channel Bandwidth
VBW:	≥ RBW
Detector Mode:	Peak
Sweep time:	1 s
Number of sweep points:	~ 400 / Occupied Channel Bandwidth (MHz); the number of sweep points may need to be further increased in case of overlapping channels
Trace Mode:	Max Hold

6.4. Test result

Test Engineer:	Gen Liu	Test Site:	RF Measurement System 3#
Ambient Condition:	24.8℃,52.4%RH	Test Date:	2025.03.11
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

Accumulated Transmit Time

Test Mode	Antenna	Channel	Result [ms]	Limit [ms]	Verdict
DH5	Ant1	Hop_2402	323.363	400	PASS
		Hop_2480	295.977	400	PASS
2DH5	Ant1	Hop_2402	306.510	400	PASS
		Hop_2480	307.564	400	PASS
3DH5	Ant1	Hop_2402	294.924	400	PASS
		Hop_2480	291.764	400	PASS

Frequency Occupation

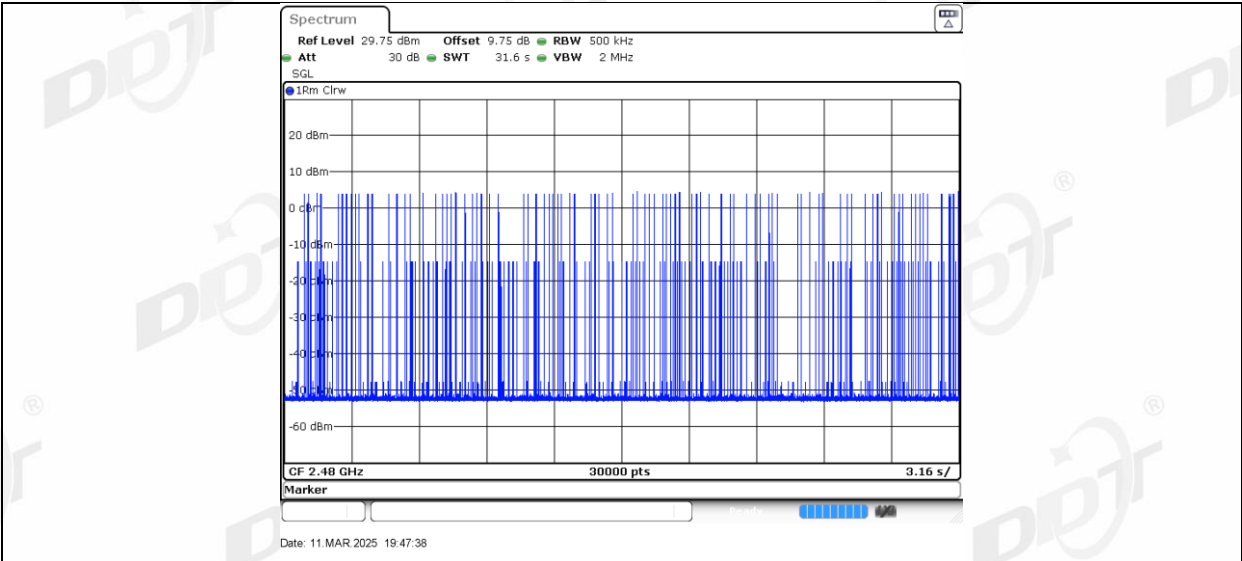
Test Mode	Antenna	Channel	Result [Num.]	Limit [Num.]	Verdict
DH5	Ant1	Hop_2402	3	1	PASS
		Hop_2480	3	1	PASS
2DH5	Ant1	Hop_2402	3	1	PASS
		Hop_2480	2	1	PASS
3DH5	Ant1	Hop_2402	1	1	PASS
		Hop_2480	1	1	PASS

Hopping Sequence

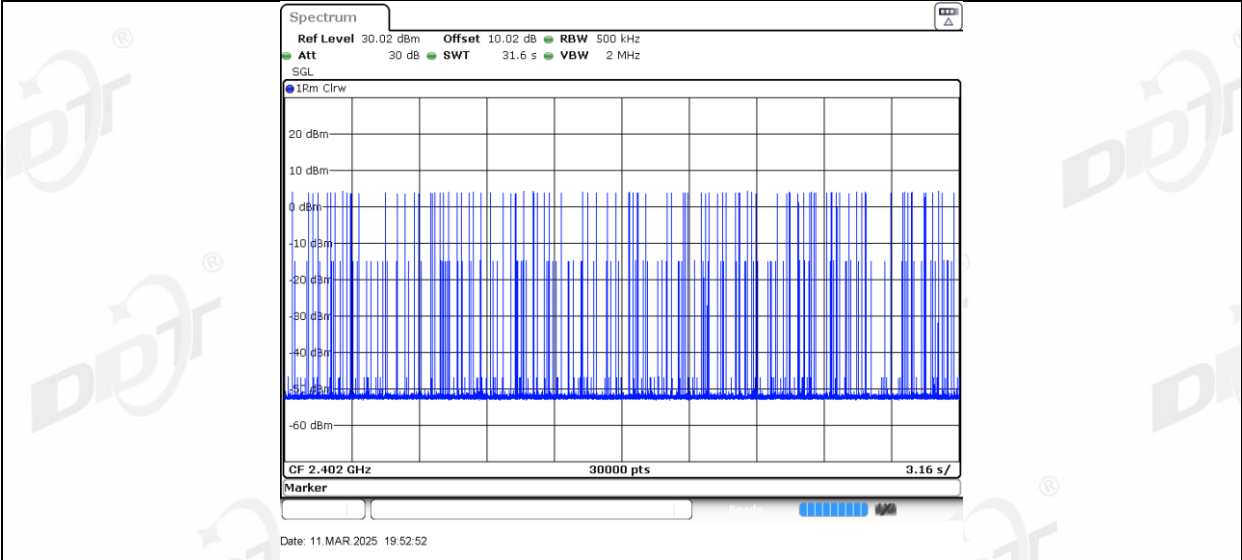
Test Mode	Antenna	Channel	Hop. [Num.]	Limit [Num.]	Band Use [%]	Limit [%]	Verdict
DH5	Ant1	Hop_2402	79	15	95.60	70	PASS
		Hop_2480	79	15	95.70	70	PASS
2DH5	Ant1	Hop_2402	79	15	96.20	70	PASS
		Hop_2480	79	15	96.20	70	PASS
3DH5	Ant1	Hop_2402	79	15	96.20	70	PASS
		Hop_2480	79	15	96.20	70	PASS

6.5. Test graphs

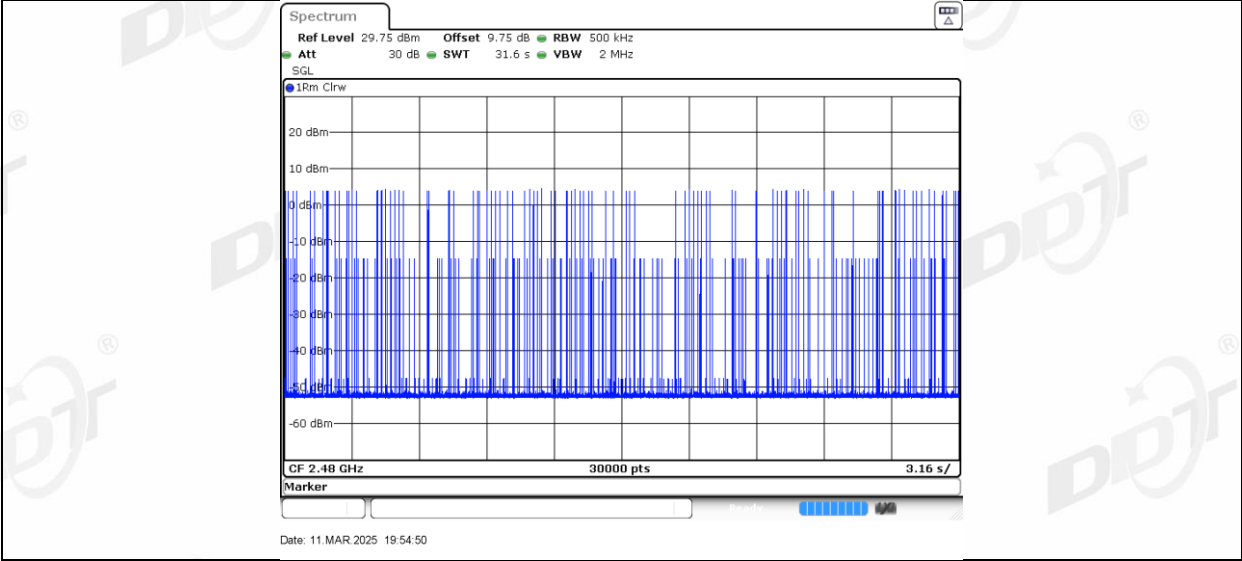


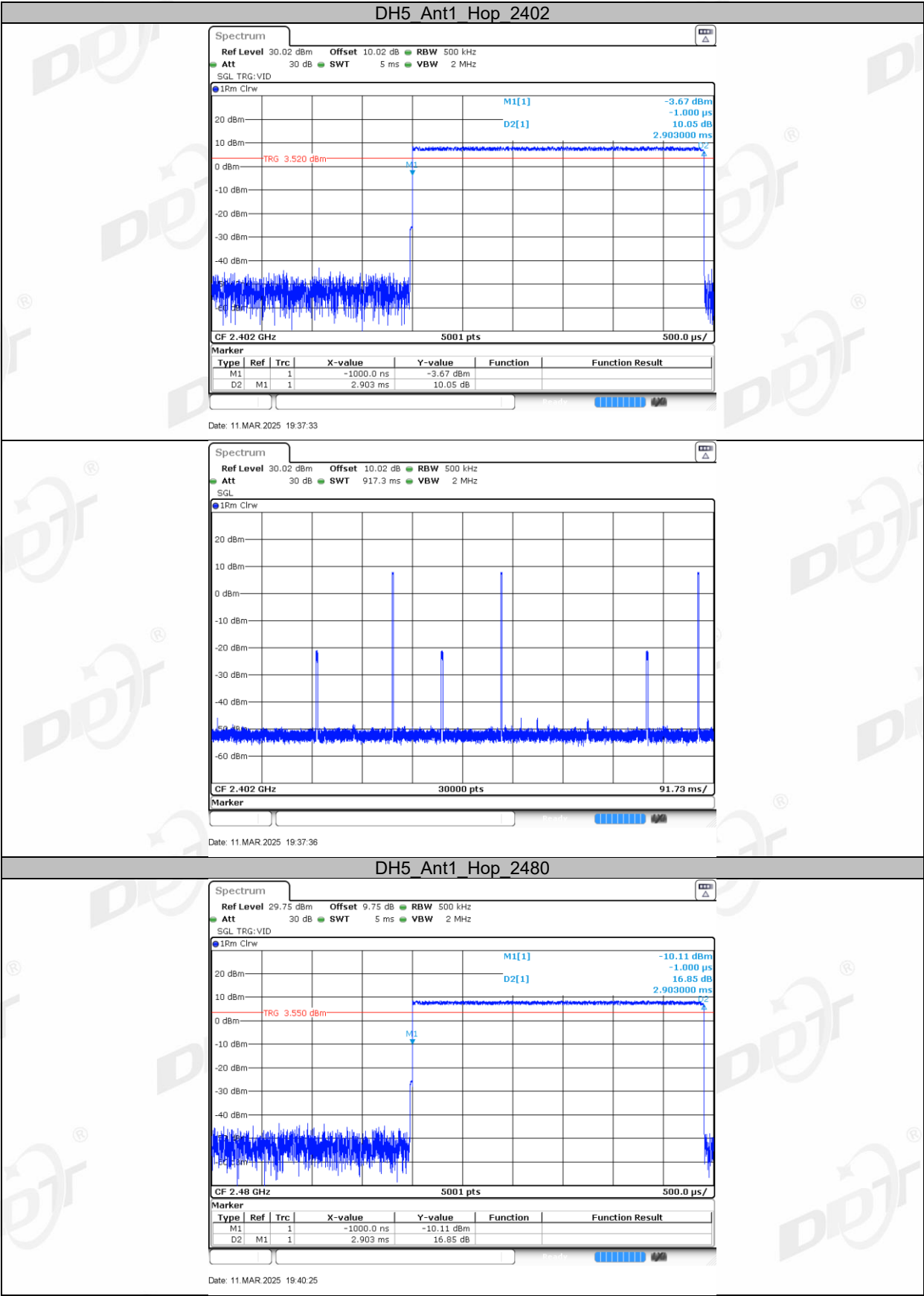


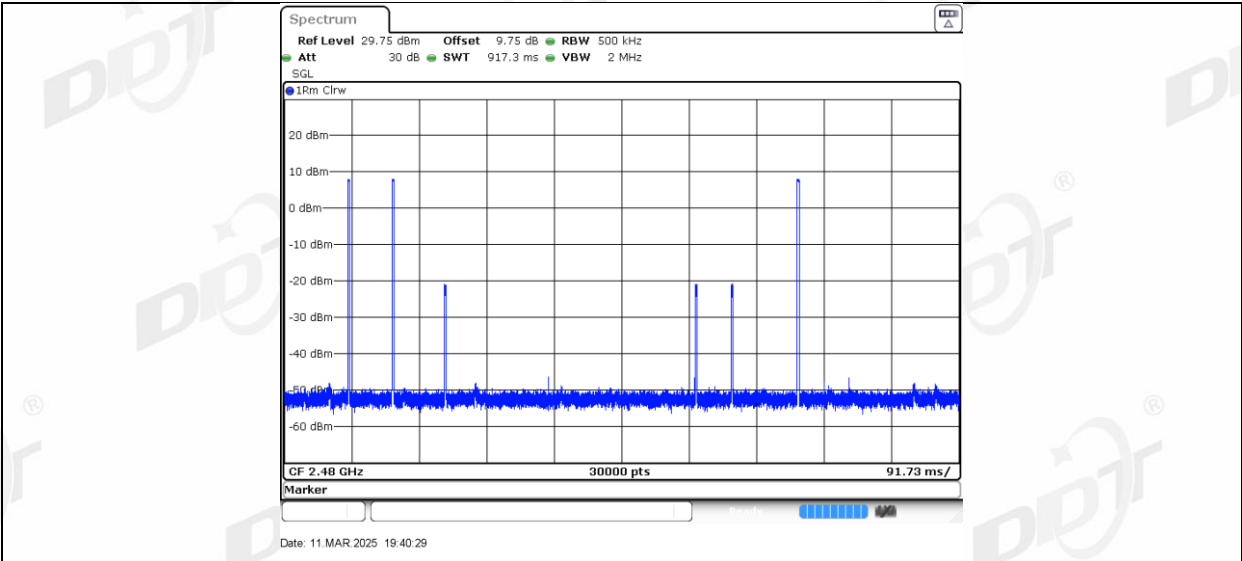
3DH5_Ant1_Hop_2402



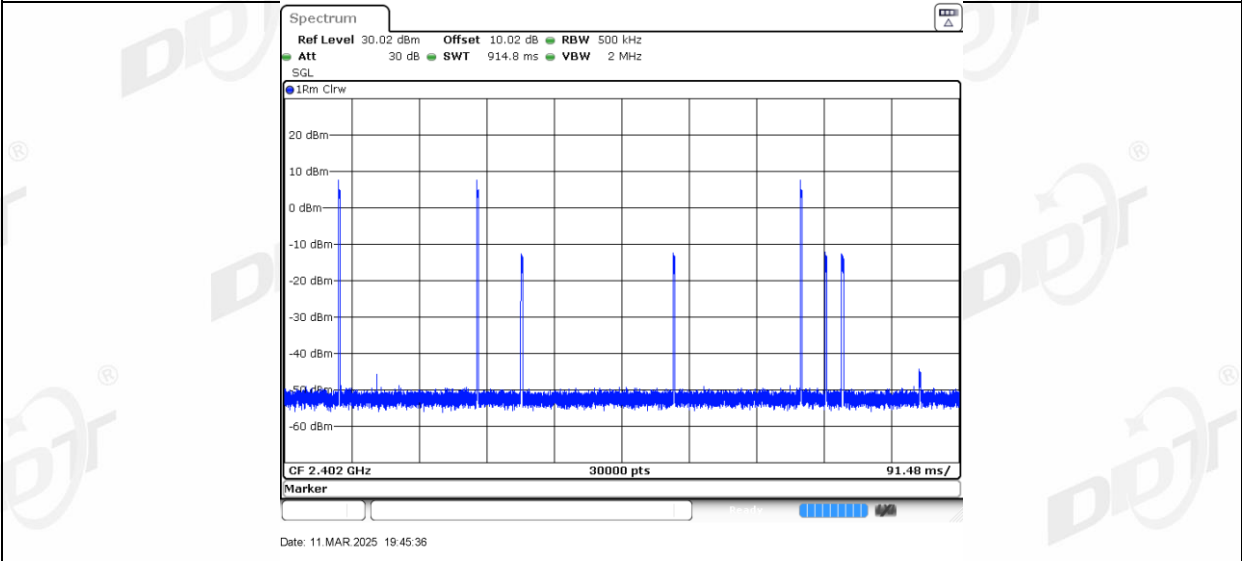
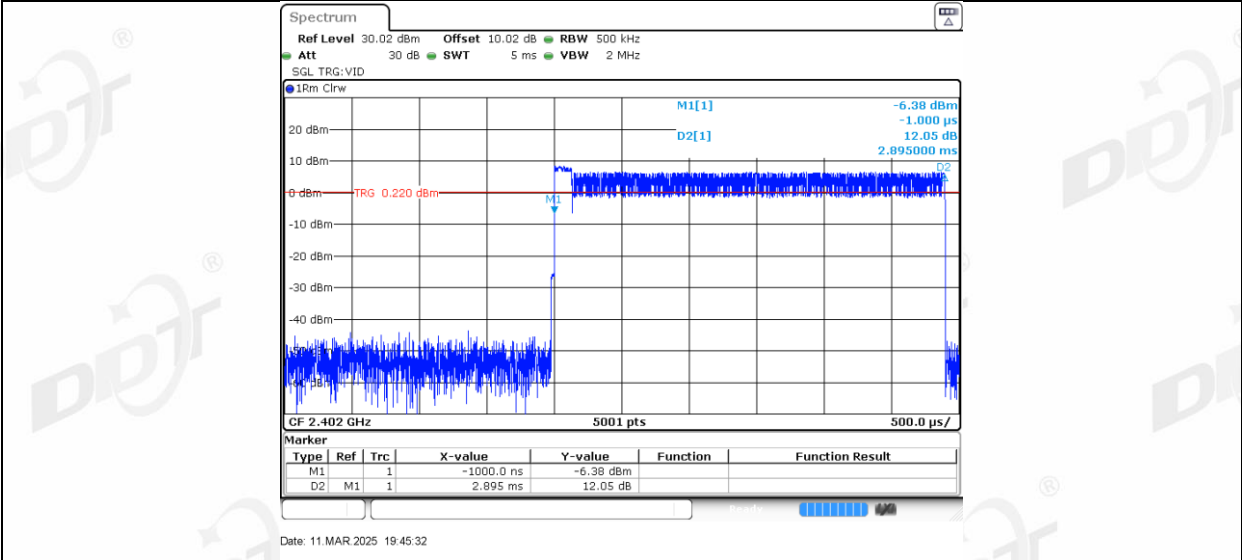
3DH5_Ant1_Hop_2480



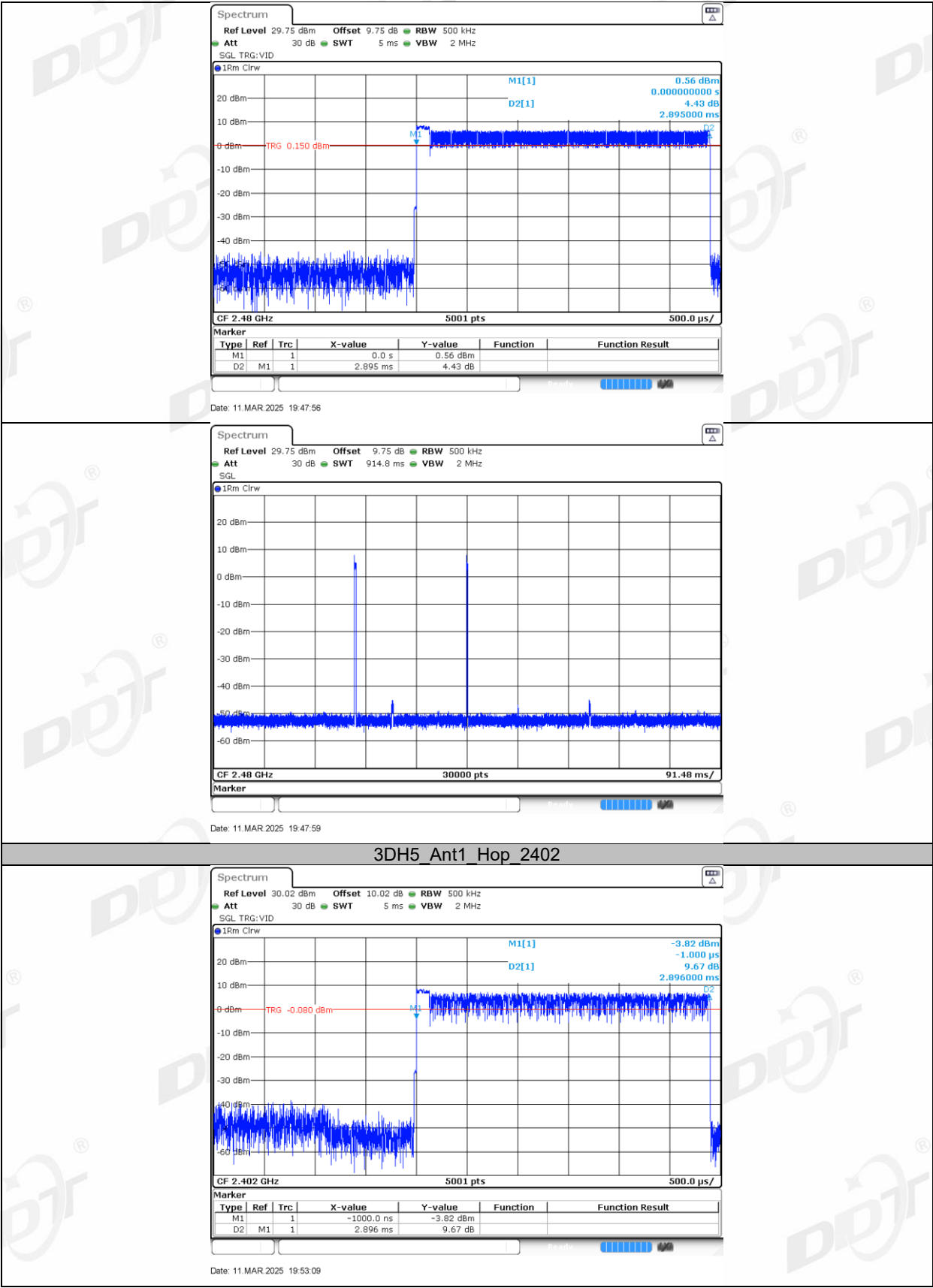


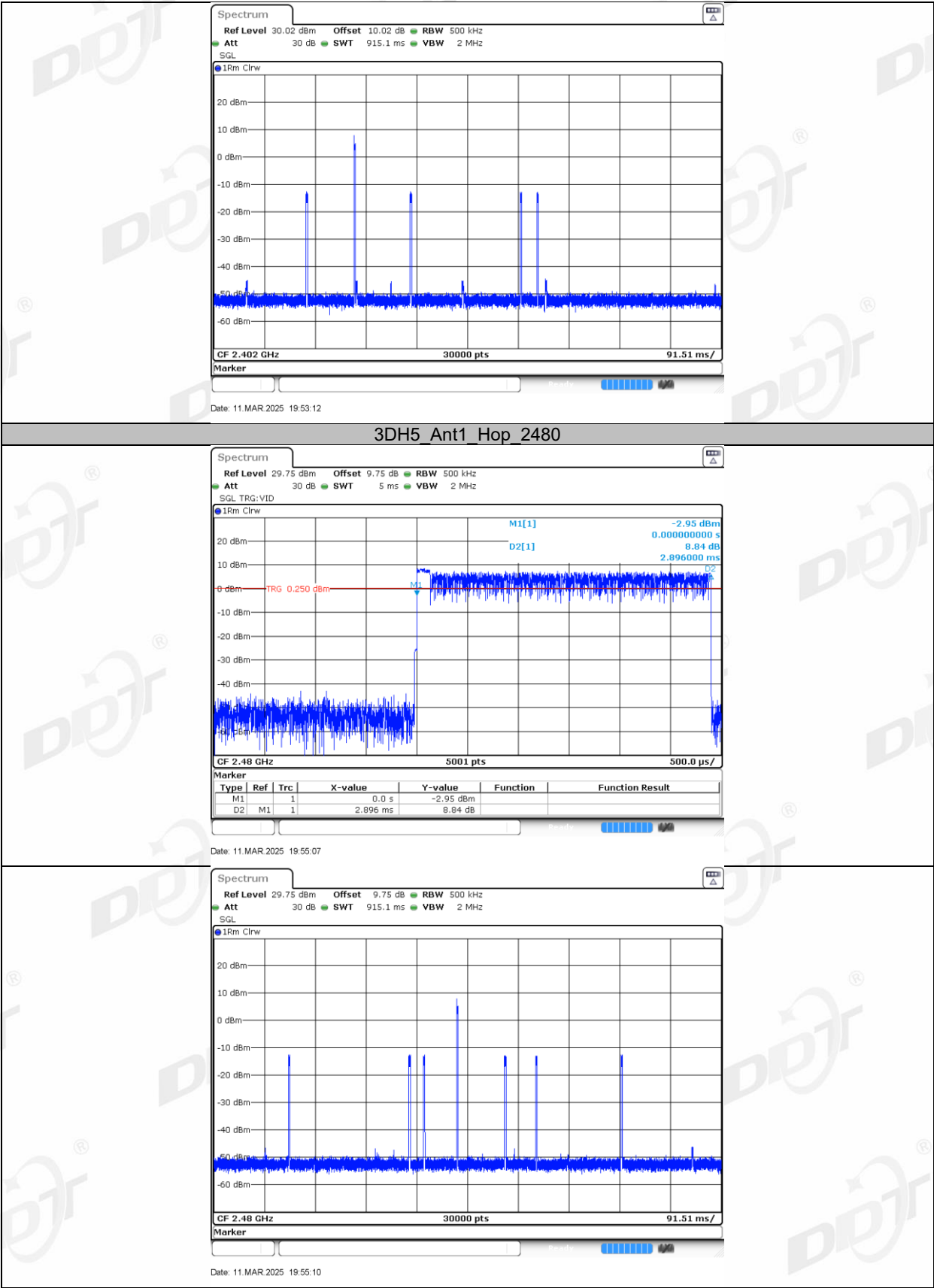


2DH5_Ant1_Hop_2402

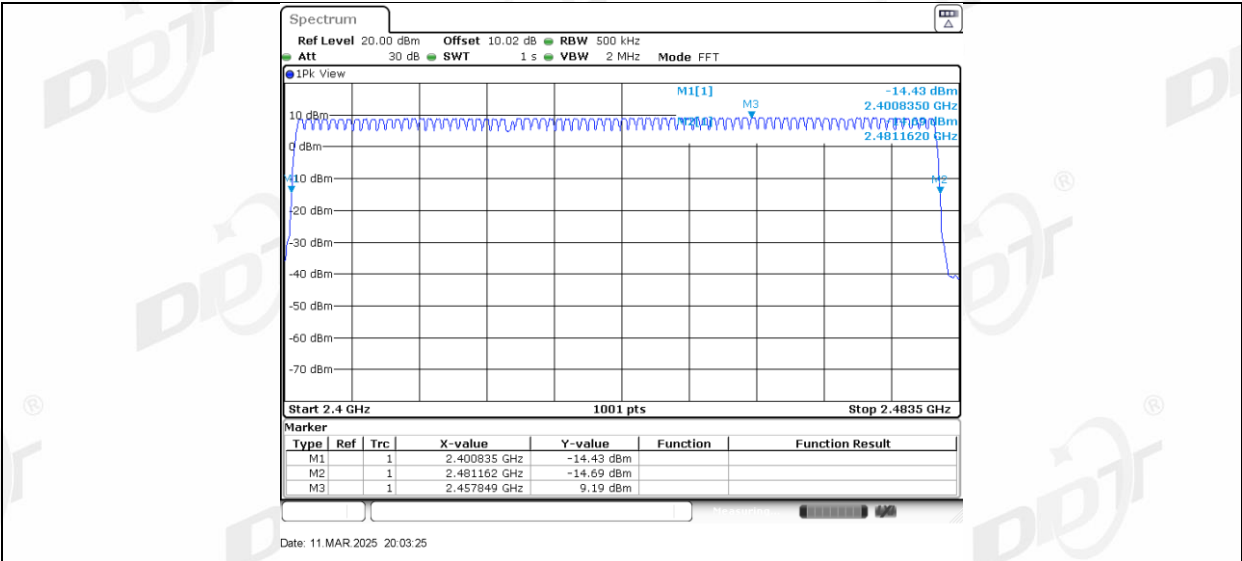


2DH5_Ant1_Hop_2480

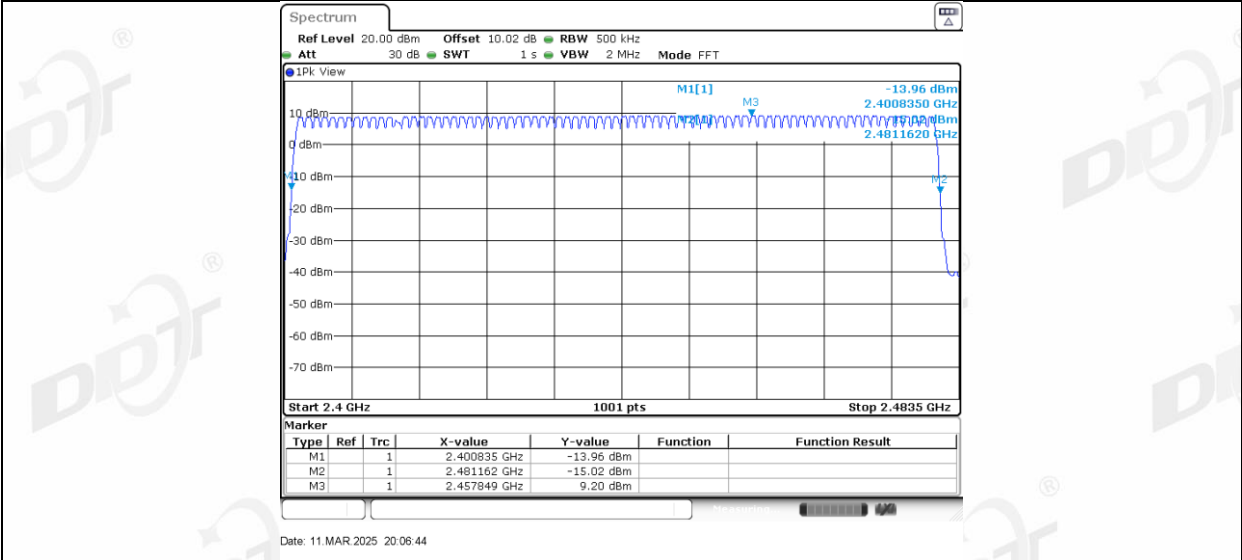




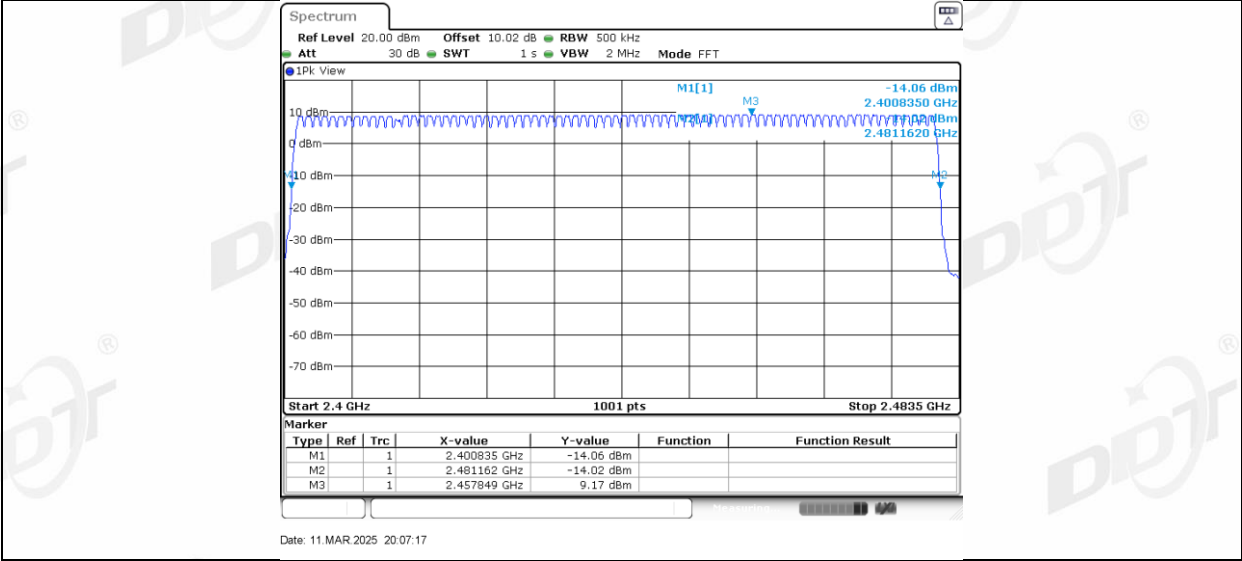




3DH5_Ant1_Hop_2402

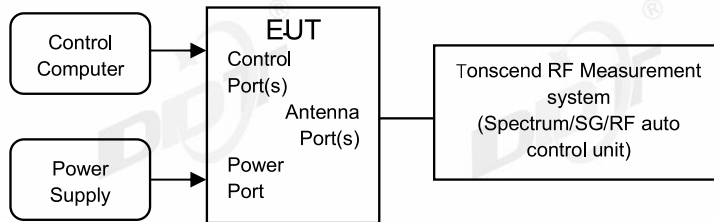


3DH5_Ant1_Hop_2480



7. Hopping Frequency Separation

7.1. Block diagram of test setup



7.2. Limits

- (1) For adaptive frequency hopping systems the minimum hopping frequency separation shall be 100 kHz.
- (2) For equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for non-adaptive Frequency Hopping equipment operating in a mode where the RF Output power is less than 10 dBm e.i.r.p. only the minimum Hopping Frequency Separation of 100 kHz applies.

7.3. Test procedure

- (1) The test according to EN 300 328 V2.2.2 Clause 5.4.5.2.1.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (3) Configure EUT work in normal hopping mode.
- (4) Set the spectrum analyzer as follows:

Centre Frequency:	Centre of the two adjacent hopping frequencies
Frequency Span:	Sufficient to see the complete power envelope of both hopping frequencies
RBW:	1 % of the Span
VBW:	3 × RBW
Detector Mode:	Max Peak
Sweep time:	Auto
Trace Mode:	Max Hold

When the trace has completed, Use the marker-delta function to determine the Hopping Frequency Separation between the peaks of the two adjacent hopping frequencies.

7.4. Test result

Test Engineer:	Gen Liu	Test Site:	RF Measurement System 3#
Ambient Condition:	24.8℃,52.4%RH	Test Date:	2025.03.11
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

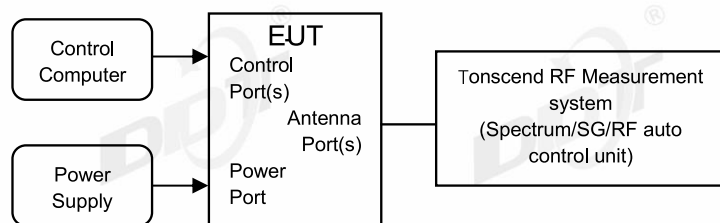
Test Mode	Antenna	Channel	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	1.003	0.100	PASS
2DH5	Ant1	Hop	1.006	0.100	PASS
3DH5	Ant1	Hop	1.006	0.100	PASS

7.5. Test graphs



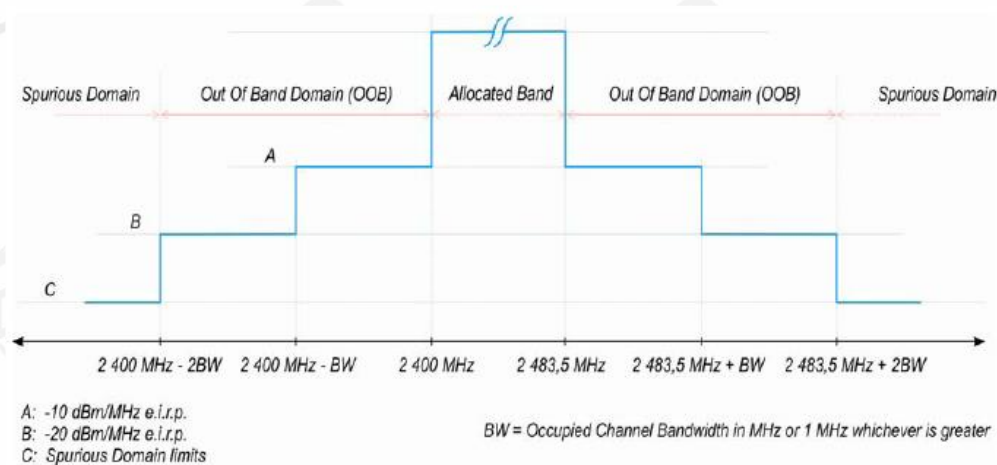
8. Transmitter Unwanted Emissions in The Out-of-band Domain

8.1. Block diagram of test setup



8.2. Limits

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask below:



8.3. Test procedure

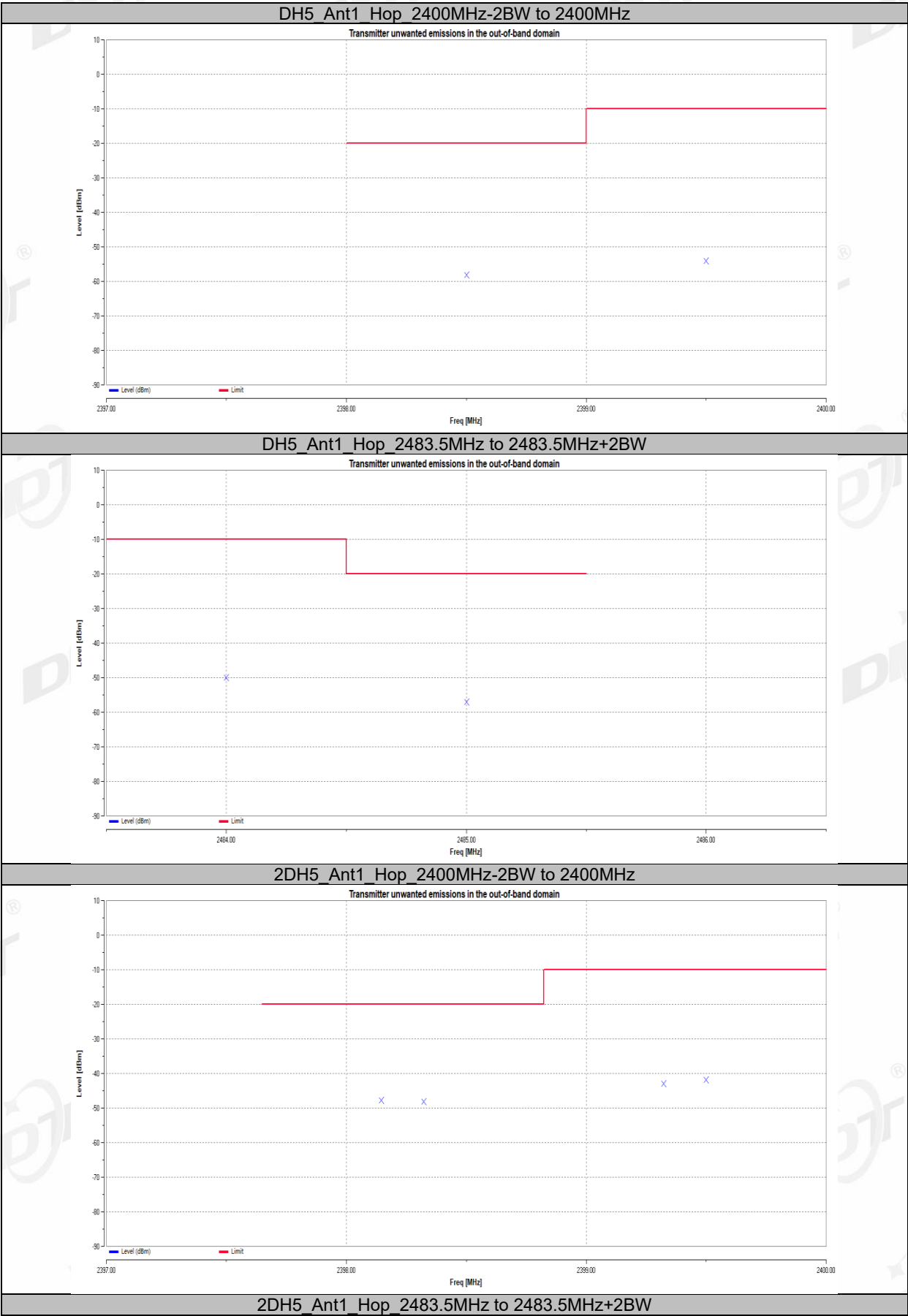
- (1) The test according to EN 300 328 V2.2.2 Clause 5.4.8.2.1.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Configure EUT work in normal hopping mode.

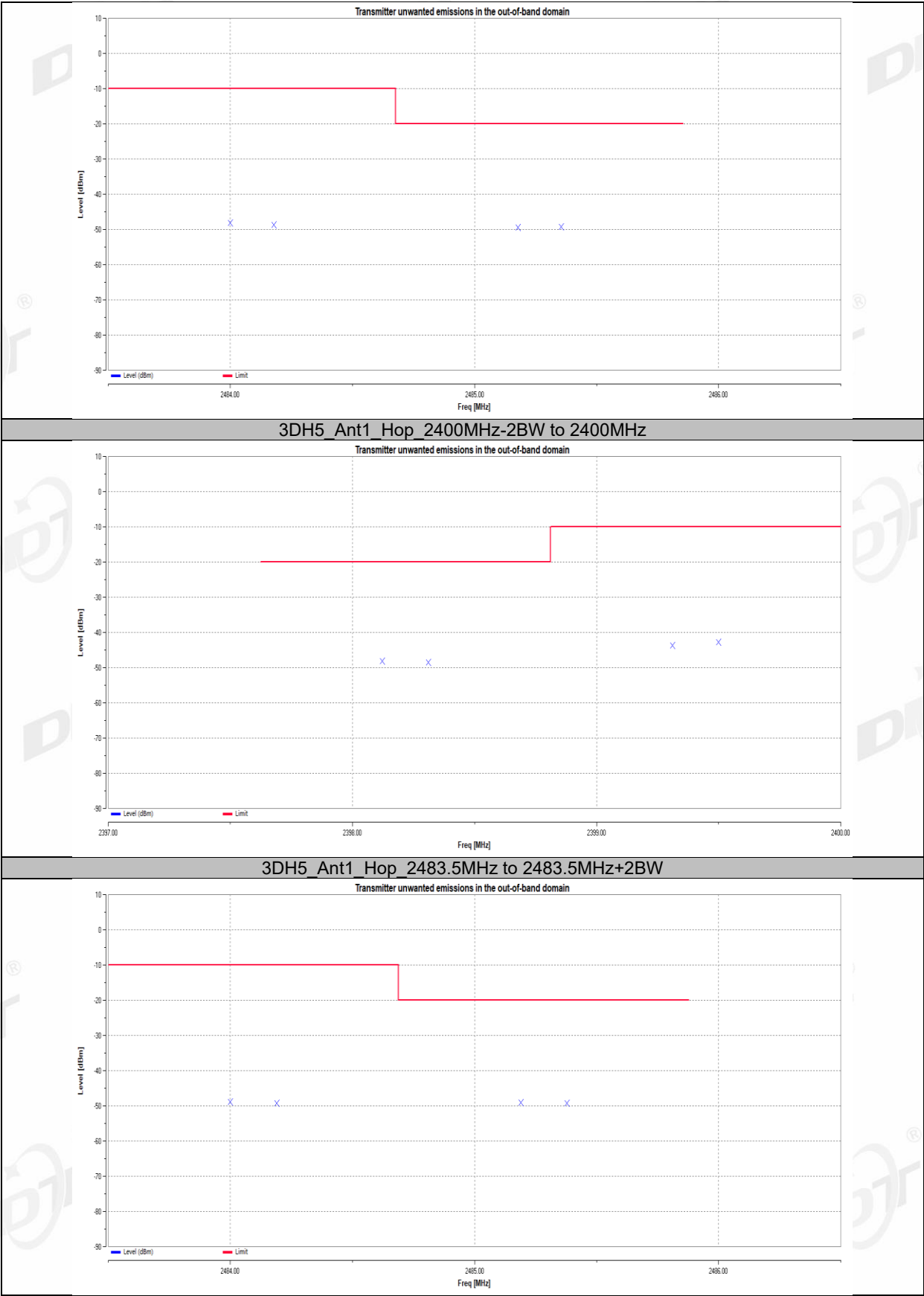
8.4. Test result

Test Engineer:	Gen Liu	Test Site:	RF Measurement System 3#
Ambient Condition:	24.8℃,52.4%RH	Test Date:	2025.03.11
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

Test Mode	Antenna	Channel	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
DH5	Ant1	Hop	2398.5	-58.11	-20.00	PASS
			2399.5	-54.10	-10.00	PASS
			2484	-50.01	-10.00	PASS
			2485	-56.95	-20.00	PASS
2DH5	Ant1	Hop	2398.146	-47.86	-20.00	PASS
			2398.323	-48.23	-20.00	PASS
			2399.323	-43.05	-10.00	PASS
			2399.5	-41.83	-10.00	PASS
			2484	-48.16	-10.00	PASS
			2484.177	-48.63	-10.00	PASS
			2485.177	-49.52	-20.00	PASS
			2485.354	-49.24	-20.00	PASS
3DH5	Ant1	Hop	2398.122	-48.14	-20.00	PASS
			2398.311	-48.55	-20.00	PASS
			2399.311	-43.71	-10.00	PASS
			2399.5	-42.74	-10.00	PASS
			2484	-48.84	-10.00	PASS
			2484.189	-49.26	-10.00	PASS
			2485.189	-49.00	-20.00	PASS
			2485.378	-49.20	-20.00	PASS

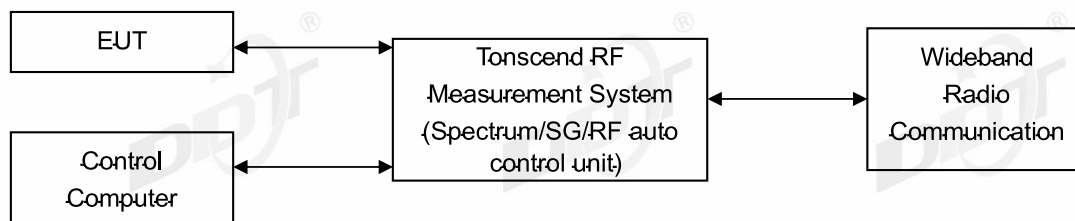
8.5. Test graphs





9. Receiver Blocking

9.1. Block diagram of test setup



9.2. Limits

This EUT belongs to:

☒ Receiver category 1

The following equipment shall be categorized as receiver category 1 equipment:

- Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p.

NOTE: Non-adaptive equipment is categorized as receiver category 2 or receiver category 3.

☐ Receiver category 2

The following equipment shall be categorized as receiver category 2 equipment:

- non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % (irrespective of the maximum RF output power); or
- equipment (adaptive or non-adaptive) with a maximum RF output power greater than 0 dBm e.i.r.p. and less than or equal to 10 dBm e.i.r.p.

☐ Receiver category 3

The following equipment shall be categorized as receiver category 3 equipment:

- non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % (irrespective of the maximum RF output power); or
- equipment (adaptive or non-adaptive) with a maximum RF output power of 0 dBm e.i.r.p.

Table 6: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × log ₁₀ (OCBW)) or -68 dBm whichever is less (see note 2)	2380 2504	-34	CW
(-139 dBm + 10 × log ₁₀ (OCBW)) or -74 dBm whichever is less (see note 3)	2300 2330 2360 2524 2584 2674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 20$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

Table 7: Receiver Blocking parameters receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB})$ or $(-74 \text{ dBm} + 10 \text{ dB})$ whichever is less (see note 2)	2380 2504 2300 2584	-34	CW

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to $P_{\min} + 30 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

Table 8: Receiver Blocking parameters receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB})$ or $(-74 \text{ dBm} + 20 \text{ dB})$ whichever is less (see note 2)	2380 2504 2300 2584	-34	CW

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to $P_{\min} + 30 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

Performance Criteria:

The minimum performance criterion shall be a PER less than or equal to 10 %.

9.3. Test procedure

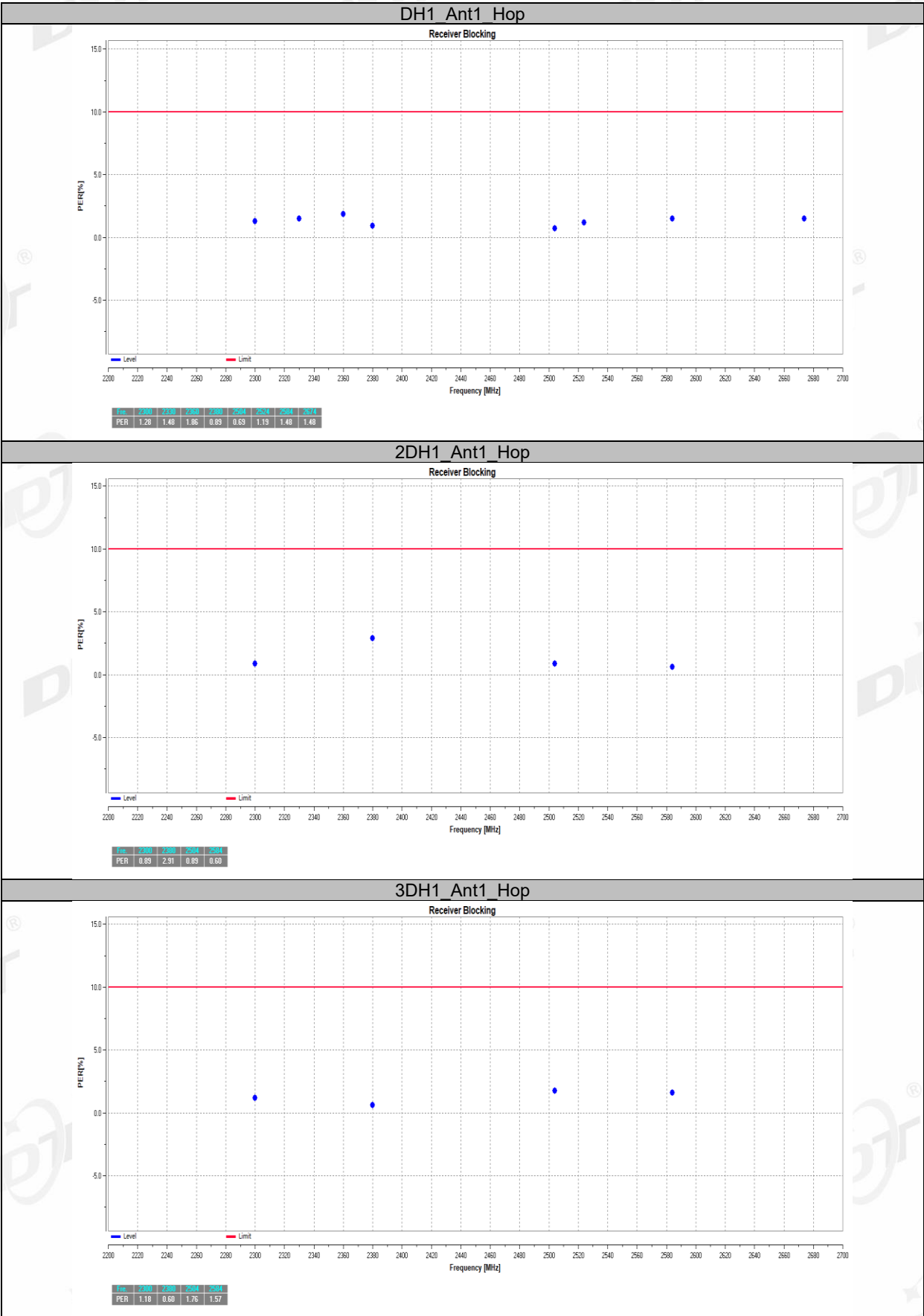
Refer to EN 300 328 V2.2.2 clause 5.4.11.2.1

9.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	25.9℃,45.6%RH	Test Date:	2025.03.26
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

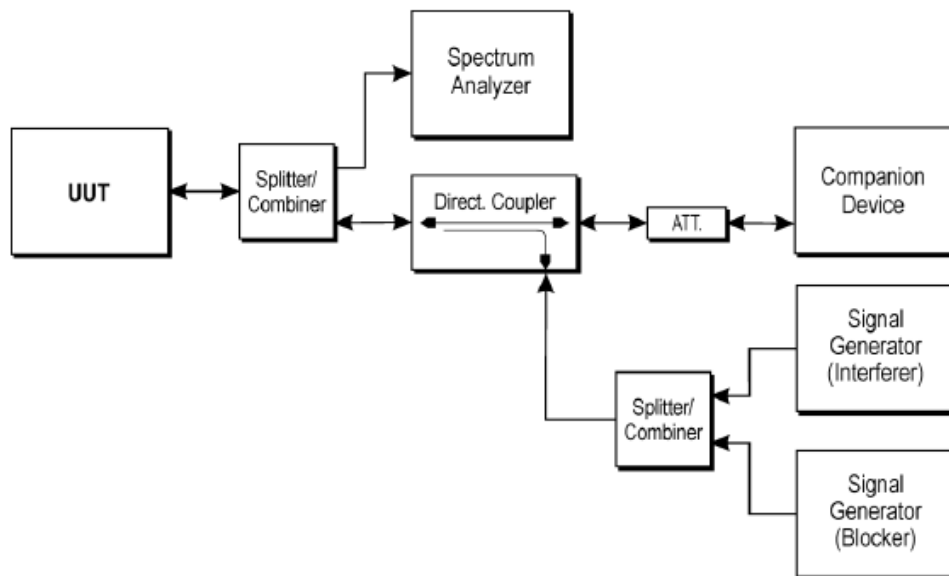
Test Mode	Antenna	Channel	Pmin [dBm]	Wanted signal [dBm]	Freq. [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
DH1	Ant1	Hop	---	-77.2	2300	-31.52	1.28	≤10	PASS
			---	-77.2	2330	-31.52	1.48	≤10	PASS
			---	-77.2	2360	-31.52	1.86	≤10	PASS
			---	-71.2	2380	-31.52	0.89	≤10	PASS
			---	-71.2	2504	-31.52	0.69	≤10	PASS
			---	-77.2	2524	-31.52	1.19	≤10	PASS
			---	-77.2	2584	-31.52	1.48	≤10	PASS
			---	-77.2	2674	-31.52	1.48	≤10	PASS
2DH1	Ant1	Hop	---	-65.96	2300	-31.52	0.89	≤10	PASS
			---	-65.96	2380	-31.52	2.91	≤10	PASS
			---	-65.96	2504	-31.52	0.89	≤10	PASS
			---	-65.96	2584	-31.52	0.60	≤10	PASS
3DH1	Ant1	Hop	---	-65.94	2300	-31.52	1.18	≤10	PASS
			---	-65.94	2380	-31.52	0.60	≤10	PASS
			---	-65.94	2504	-31.52	1.76	≤10	PASS
			---	-65.94	2584	-31.52	1.57	≤10	PASS

9.5. Test graphs



10. Adaptivity

10.1. Block diagram of test setup



10.2. Requirement

Adaptive Frequency Hopping equipment using non-LBT based DAA, shall comply with the following minimum set of requirements:

- (1) During normal operation, the equipment shall evaluate the presence of a signal for each of its hopping frequencies. If it is determined that a signal is present with a level above the detection threshold defined in step 5 the hopping frequency shall be marked as 'unavailable'.
- (2) The hopping frequency shall remain unavailable for a minimum time equal to 1 second or 5 times the actual number of hopping frequencies in the current (adapted) channel map used by the equipment, multiplied with the Channel Occupancy Time whichever is greater. There shall be no transmissions during this period on this hopping frequency. After this, the hopping frequency may be considered again as an 'available' frequency.
- (3) The total time during which an equipment has transmissions on a given hopping frequency without re-evaluating the availability of that hopping frequency is defined as the Channel Occupancy Time.

The Channel Occupancy Time for a given hopping frequency shall be less than 40 ms. For equipment using a dwell time > 40 ms that wants to have other transmissions during the same hop (dwell time) an Idle Period (no transmissions) of minimum 5 % of the Channel Occupancy Period with a minimum of 100 μ s shall be implemented. After the Idle Period has expired, the procedure as in step 1 needs to be repeated before having new transmissions on this hopping frequency during the same dwell time.

For non-LBT based frequency hopping equipment with a dwell time < 40 ms, the maximum Channel Occupancy Time may be non-contiguous, i.e. spread over a number of hopping sequences (equal to 40 ms divided by the dwell time [ms]).

- (4) 'Unavailable' channels may be removed from or may remain in the hopping sequence, but in any case:
 - apart from the Short Control Signalling Transmissions referred to in clause 4.3.1.7.4 of ETSI 300 328 V2.2.2, there shall be no transmissions on 'unavailable' channels;
 - a minimum of N hopping frequencies as defined in clause 4.3.1.4.3.2 (ETSI 300 328 V2.2.2)

shall always be maintained.

- (5) The detection threshold shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the detection threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels below 20 dBm e.i.r.p., the detection threshold level may be relaxed to:

$$TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out})$$

The equipment shall comply with the requirements defined in step 1 to step 4 of the present clause in the presence of an unwanted CW signal as defined as below table.

Wanted signal mean power from companion device (dBm)	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
-30 (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 2)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1.		
NOTE 2: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density in front of the UUT antenna (see example below).		

10.3. Test procedure

The analyser shall be set as follows:

- RBW: use next available RBW setting below the measured Occupied Channel Bandwidth
- Filter type: Channel Filter
- VBW: ≥ RBW
- Detector Mode: RMS
- Centre Frequency: Equal to the hopping frequency to be tested
- Span: 0 Hz
- Sweep time: > Channel Occupancy Time of the UUT. If the Channel Occupancy Time is non-contiguous (non-LBT based equipment), the sweep time shall be sufficient to cover the period over which the Channel Occupancy Time is spread out
- Trace Mode: Clear/Write
- Trigger Mode: Video

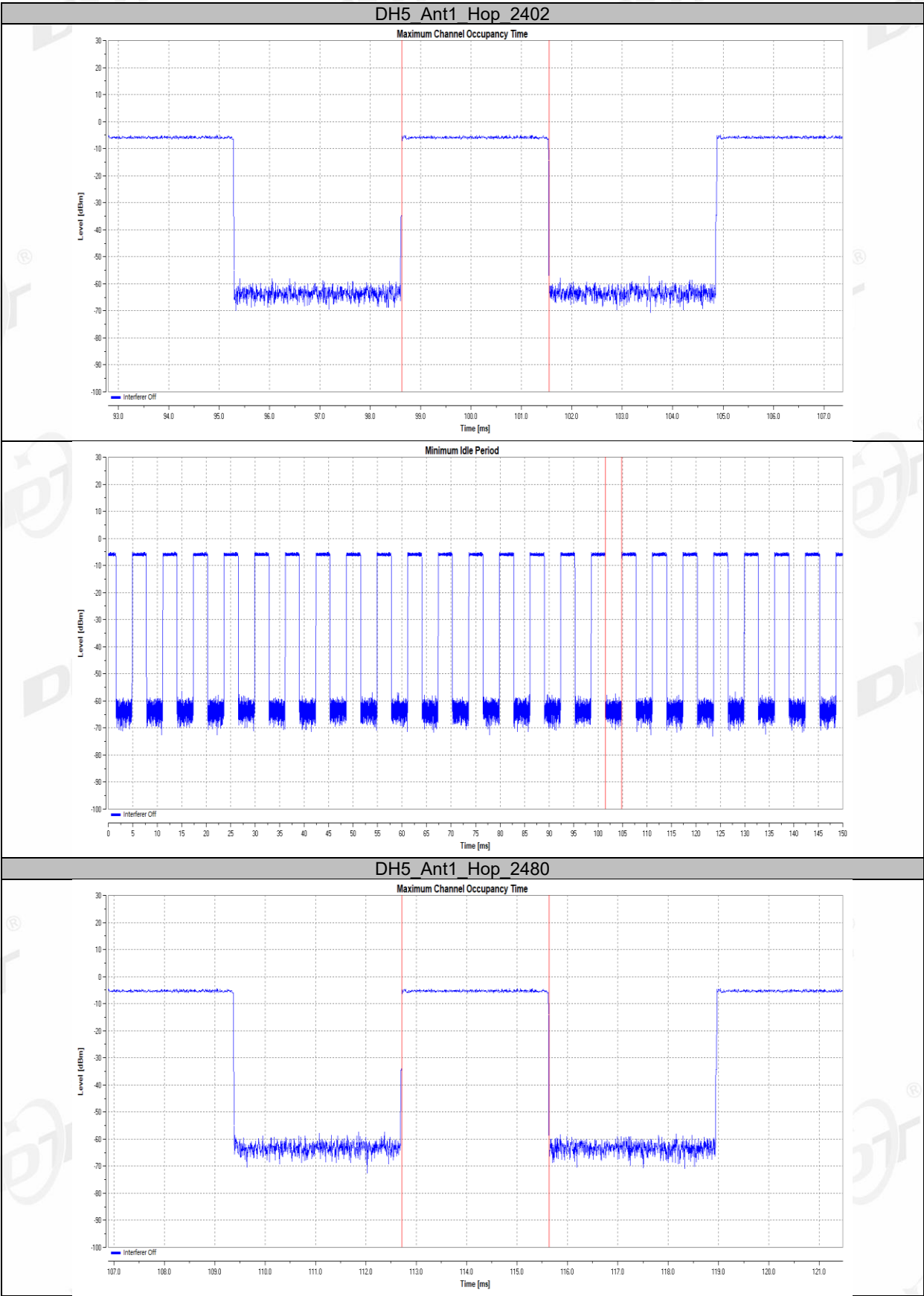
10.4. Test result

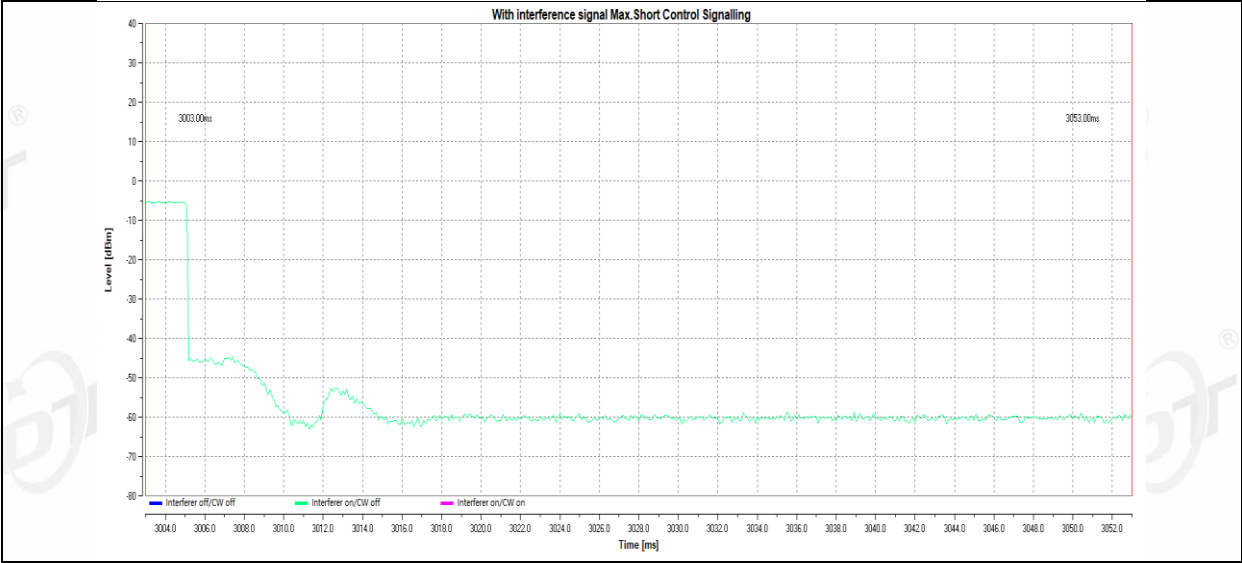
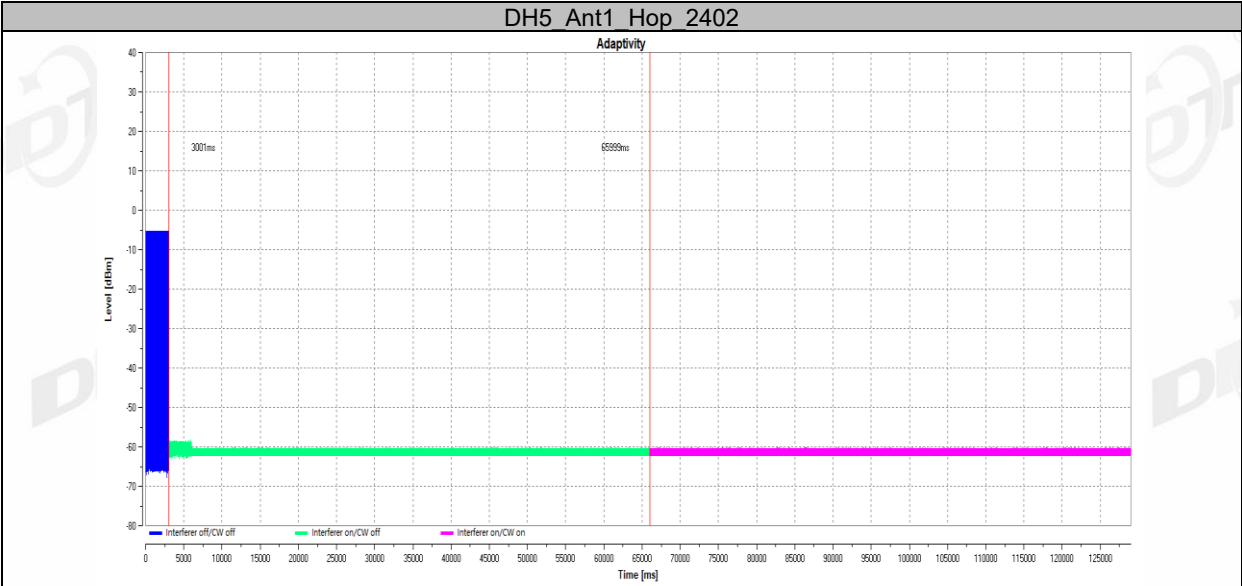
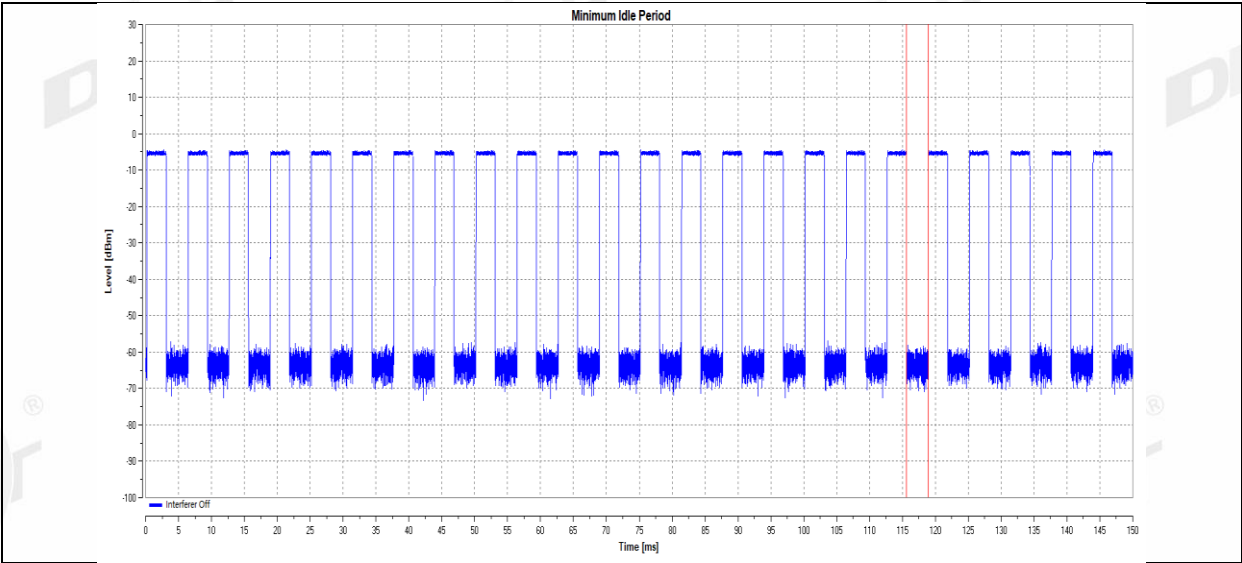
Test Engineer:	Zoe	Test Site:	RF Measurement System 4#
Ambient Condition:	25.9℃,45.6%RH	Test Date:	2025.03.26
Test Power Supply:	AC 230V/50Hz	Sample Number:	S24112111-032

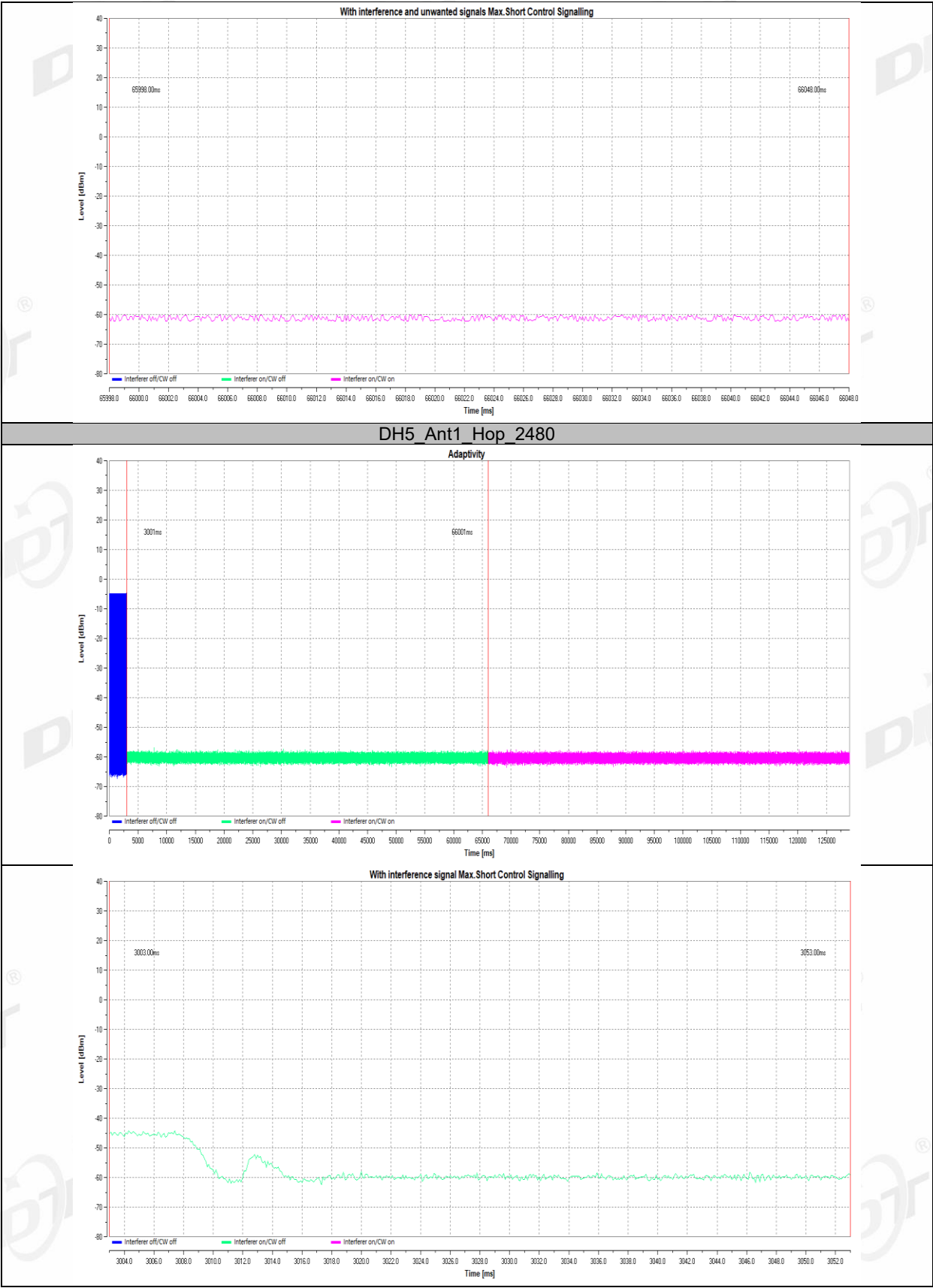
Test Mode	Antenna	Channel	Max.COT [ms]	Limit[ms]	Min.Idel Time[ms]	Limit[ms]	Verdict
DH5	Ant1	Hop_2402	2.915	40	3.335	0.146	PASS
		Hop_2480	2.915	40	3.335	0.146	PASS

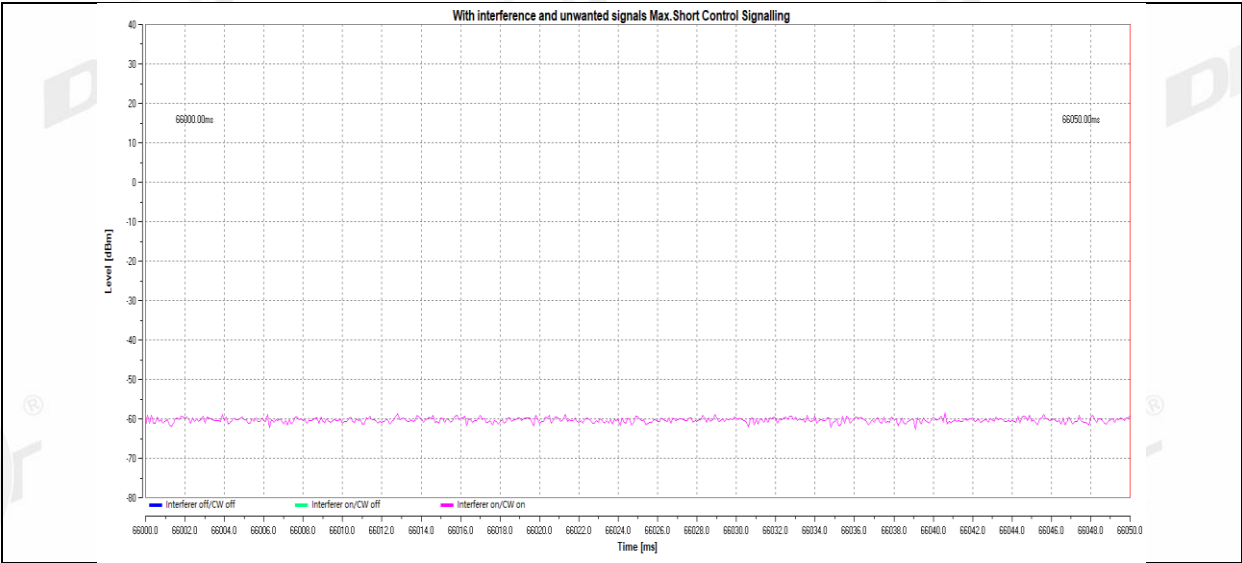
Test Mode	Antenna	Channel	Add Signal Type	Add Signal Time[ms]	Add Signal Level[dbm]	Max. Short Time [%]	Limit [%]	Verdict
DH5	Ant1	Hop_2402	AWGN	3001	-58.56	4.40	10	PASS
			CW	65999	-32.52	0.00	10	PASS
		Hop_2480	AWGN	3001	-58.56	0.00	10	PASS
			CW	66001	-32.52	0.00	10	PASS

10.5. Test graphs







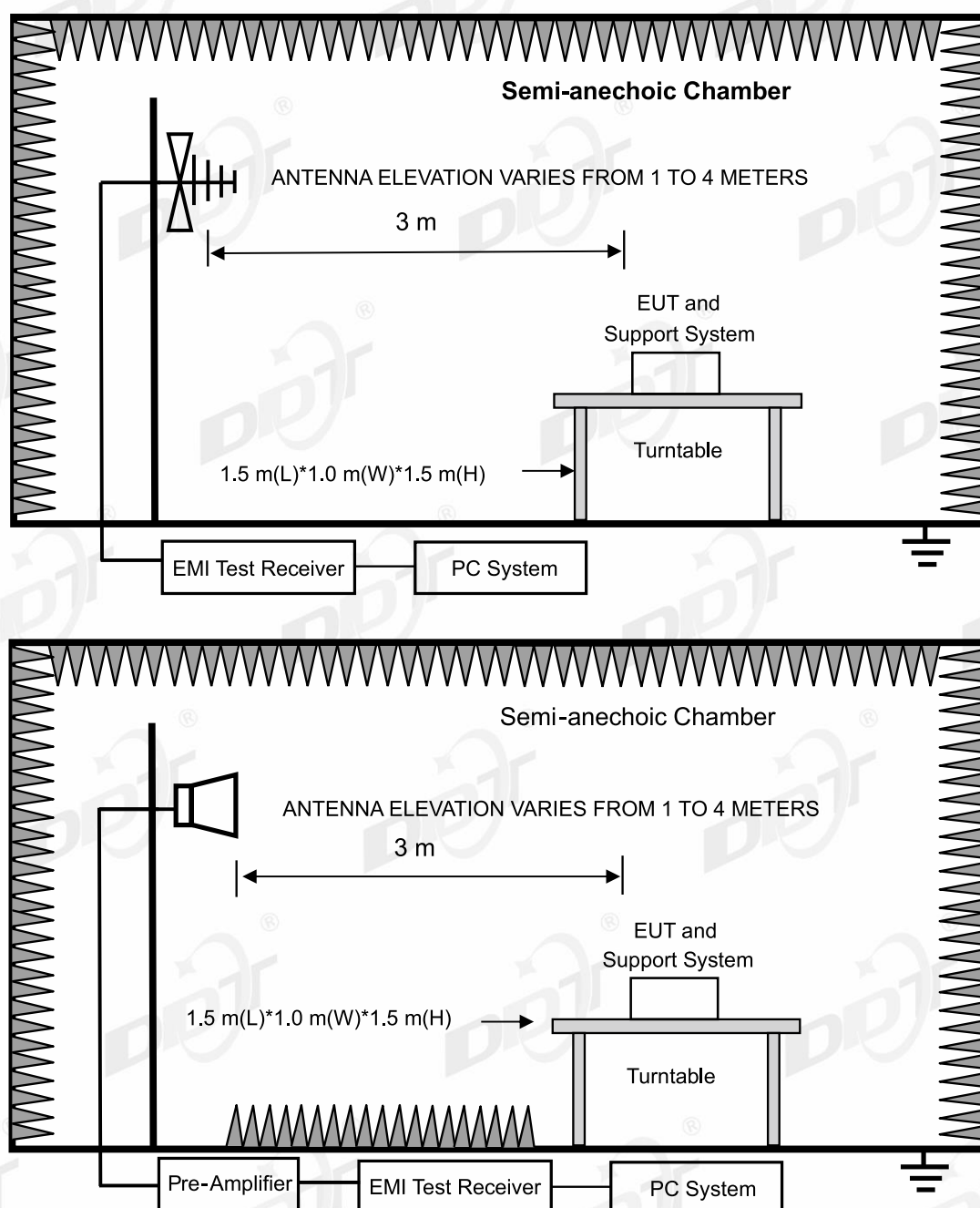


11. Transmitter unwanted emissions in the spurious domain

11.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2026/03/28
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/
Hochgewinn-Hornantenne	SCHWARZBEC K	BBHA 9120 D	DDT-ZC02129	2025/09/18
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2027/04/01
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2026/03/28
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2026/03/28
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2026/03/28
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2025/08/25
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2026/03/28
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2026/03/28
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2026/03/28
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2026/03/28
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2026/03/28
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2026/03/28
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2025/07/11
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2026/03/28
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/

11.2. Block diagram of test setup



11.3. Limits

Frequency Range	Maximum power, e.r.p (≤ 1 GHz); e.i.r.p (>1 GHz)	Bandwidth
30MHz to 47MHz	-36 dBm	100kHz
47MHz to 74MHz	-54 dBm	100kHz
74MHz to 87.5MHz	-36 dBm	100kHz
87.5MHz to 118MHz	-54 dBm	100kHz
118MHz to 174MHz	-36 dBm	100kHz
174MHz to 230MHz	-54 dBm	100kHz
230MHz to 470MHz	-36 dBm	100kHz
470 MHz to 694 MHz	-54 dBm	100kHz
694 MHz to 1 GHz	-36 dBm	100kHz

1GHz to 12.75GHz	-30 dBm	1MHz
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11.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

11.5. Test procedure

(1) EUT was placed on a non-metallic table, 1.5m above the ground plane inside a semi-anechoic chamber.

(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
30MHz-1GHz	Trilog Broadband Antenna
1GHz-12.75GHz	Double Ridged Horn Antenna

(3) Set EUT work in fixed channel transmitting mode.

(4) All the emissions from 30MHz to 12.75GHz at 3m distance was measured and recorded with receive antenna in both vertical and horizontal and varied from 1 m to 4 m. in height above the reference ground plane, and rotating the turntable obtain the maximum signal strength., the test spectrum analyser was set as below

Frequency band	RBW	VBW	Detector mode
30MHz-1GHz	100kHz	300kHz	Peak
1GHz-12.75GHz	1MHz	3MHz	Peak

Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

(5) A correction values from a verified site calibration was used to calculate the spurious emissions of EUT.

(6) All the emissions are measured with PK detector. Scan with GFSK, $\pi/4$ -DQPSK, 8DPSK, the worst case was recorded in this report.

11.6. Test result

PASS. (See below detailed test result)

11.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

TX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

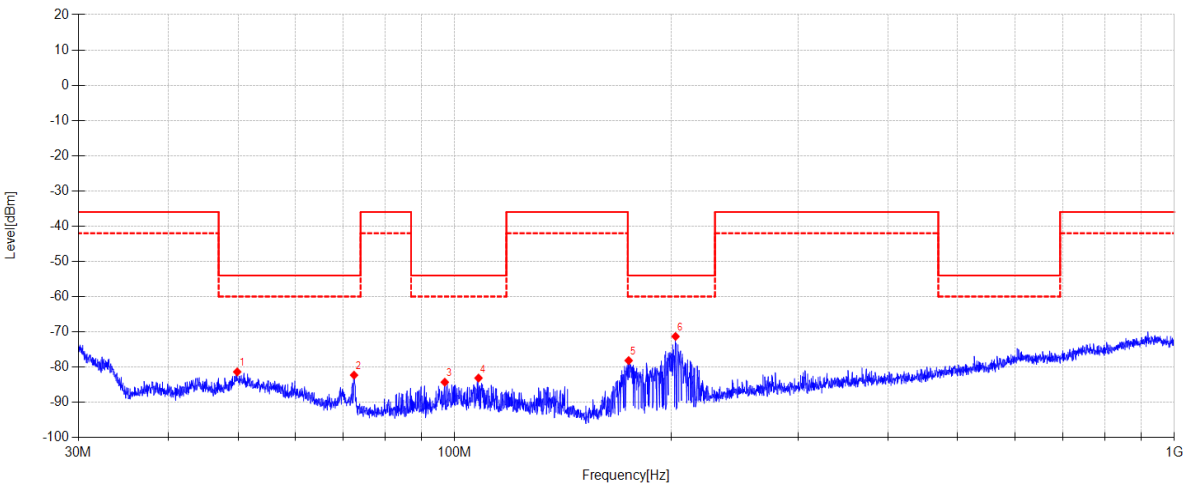
File Path:

d:\ts\2024 report data\Q24112111-1E\CE Below 1G BT\5

Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	49.876	28.68	-110.03	-81.35	-54.00	27.35	PK	Horizontal	ERP
2	72.477	35.21	-117.48	-82.27	-54.00	28.27	PK	Horizontal	ERP
3	96.888	31.33	-115.60	-84.27	-54.00	30.27	PK	Horizontal	ERP
4	107.936	32.48	-115.58	-83.10	-54.00	29.10	PK	Horizontal	ERP
5	174.485	38.61	-116.75	-78.14	-54.00	24.14	PK	Horizontal	ERP
6	202.733	43.72	-115.02	-71.30	-54.00	17.30	PK	Horizontal	ERP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

TX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

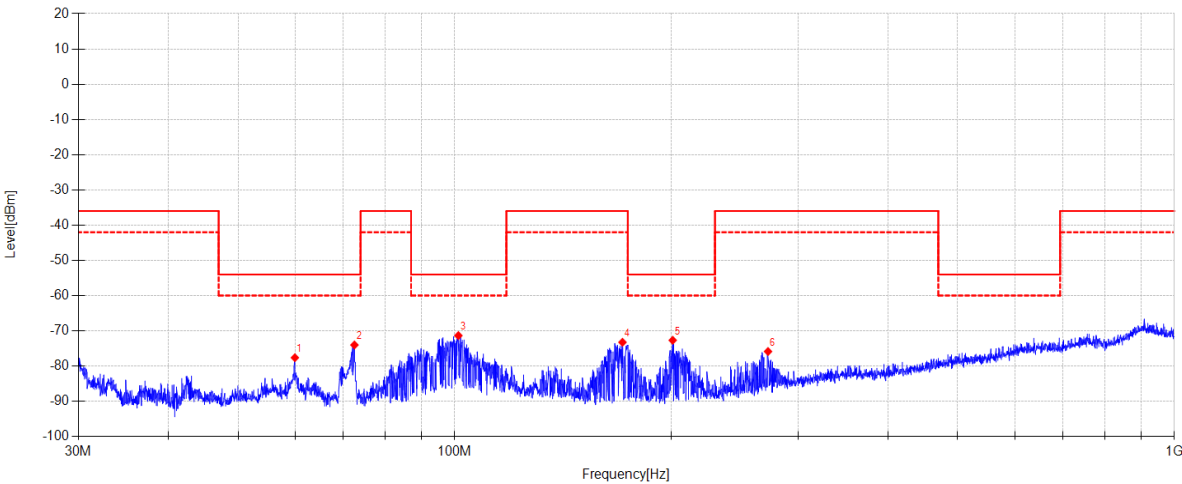
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	59.977	37.13	-114.74	-77.61	-54.00	23.61	PK	Vertical	ERP
2	72.579	43.42	-117.42	-74.00	-54.00	20.00	PK	Vertical	ERP
3	101.193	38.85	-110.18	-71.33	-54.00	17.33	PK	Vertical	ERP
4	171.093	40.36	-113.60	-73.24	-36.00	37.24	PK	Vertical	ERP
5	200.893	40.85	-113.52	-72.67	-54.00	18.67	PK	Vertical	ERP
6	272.540	35.02	-110.87	-75.85	-36.00	39.85	PK	Vertical	ERP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

TX 3DH5 2480MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

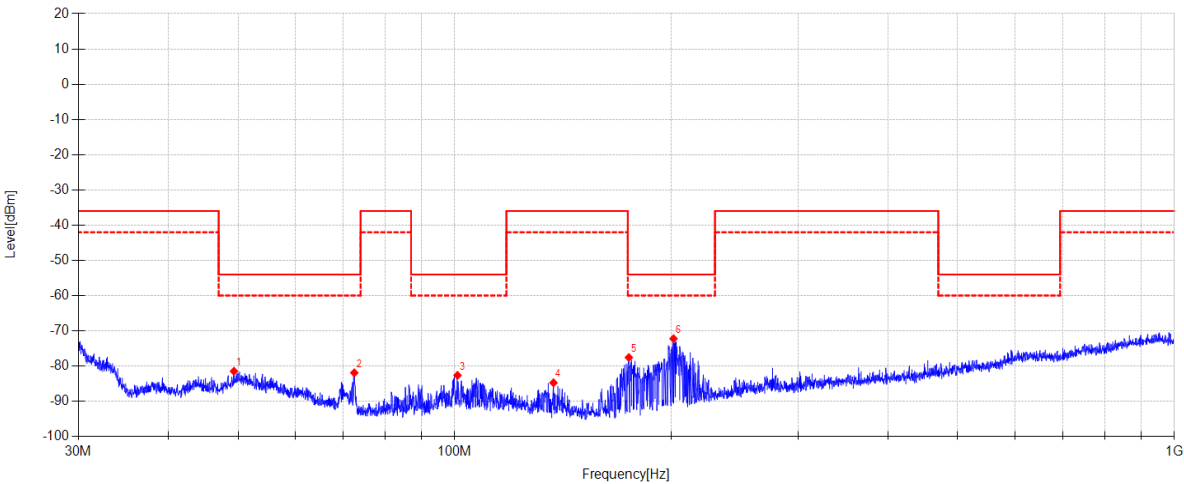
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	49.355	28.65	-110.10	-81.45	-54.00	27.45	PK	Horizontal	ERP
2	72.528	35.58	-117.48	-81.90	-54.00	27.90	PK	Horizontal	ERP
3	100.909	32.51	-115.13	-82.62	-54.00	28.62	PK	Horizontal	ERP
4	137.186	32.71	-117.44	-84.73	-36.00	48.73	PK	Horizontal	ERP
5	174.607	39.20	-116.75	-77.55	-54.00	23.55	PK	Horizontal	ERP
6	201.458	42.88	-115.10	-72.22	-54.00	18.22	PK	Horizontal	ERP

Note:

1. Level = Reading + Factor.

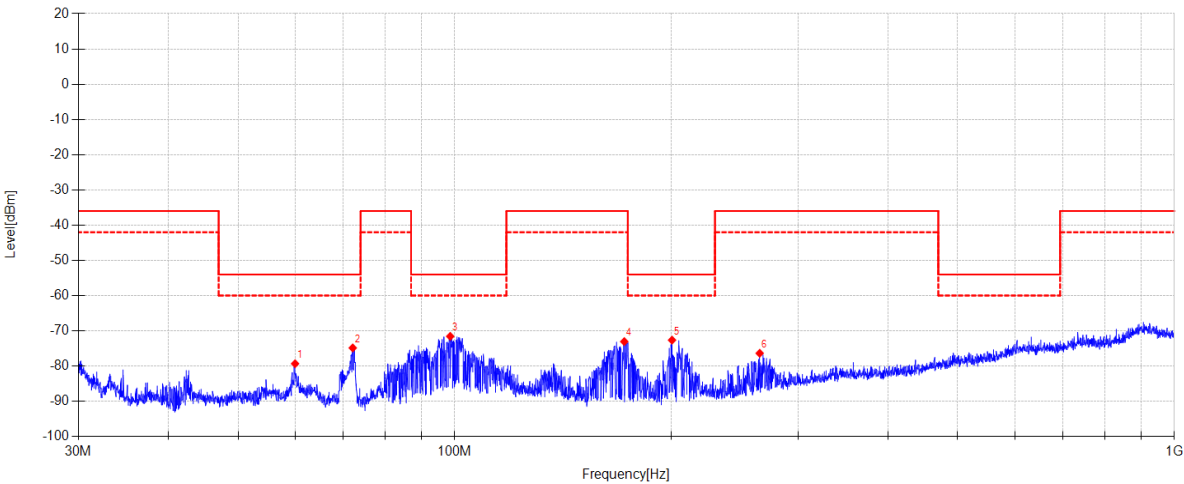
2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-03-12 Tested By: Lin Guoyaun
EUT: Portable Bluetooth Speaker Model Number: BOOMBOX 4C
Test Mode: TX 3DH5 2480MHz Mode Power Supply: AC 230V/50Hz
Condition: Temp:21.3°C;Humi:47.4% Test Site: DDT 3# Chamber
File Path: d:\ts\2024 report data\Q24112111-1E\CE Below 1G BT\8
Memo: Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	60.019	35.44	-114.75	-79.31	-54.00	25.31	PK	Vertical	ERP
2	72.173	42.64	-117.47	-74.83	-54.00	20.83	PK	Vertical	ERP
3	98.601	38.81	-110.36	-71.55	-54.00	17.55	PK	Vertical	ERP
4	172.055	40.56	-113.59	-73.03	-36.00	37.03	PK	Vertical	ERP
5	200.471	40.91	-113.53	-72.62	-54.00	18.62	PK	Vertical	ERP
6	265.374	34.96	-111.31	-76.35	-36.00	40.35	PK	Vertical	ERP

Note:
1. Level = Reading + Factor.
2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.
3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

TX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

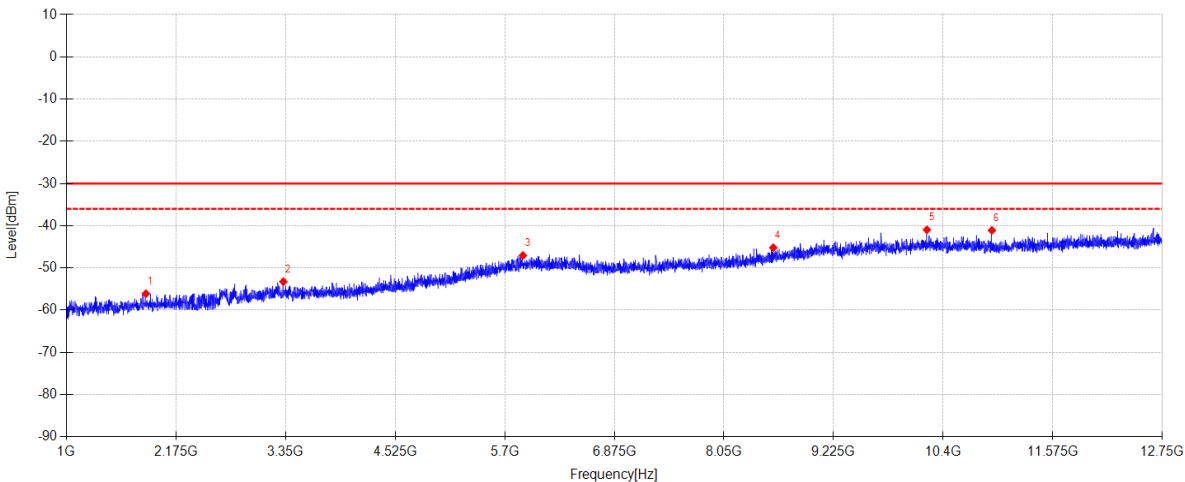
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	1853.050	47.48	-103.57	-56.09	-30.00	26.09	PK	Horizontal	EIRP
2	3326.500	48.33	-101.58	-53.25	-30.00	23.25	PK	Horizontal	EIRP
3	5893.875	46.94	-94.00	-47.06	-30.00	17.06	PK	Horizontal	EIRP
4	8578.750	45.58	-90.79	-45.21	-30.00	15.21	PK	Horizontal	EIRP
5	10226.100	47.06	-88.02	-40.96	-30.00	10.96	PK	Horizontal	EIRP
6	10922.875	46.98	-88.08	-41.10	-30.00	11.10	PK	Horizontal	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

TX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

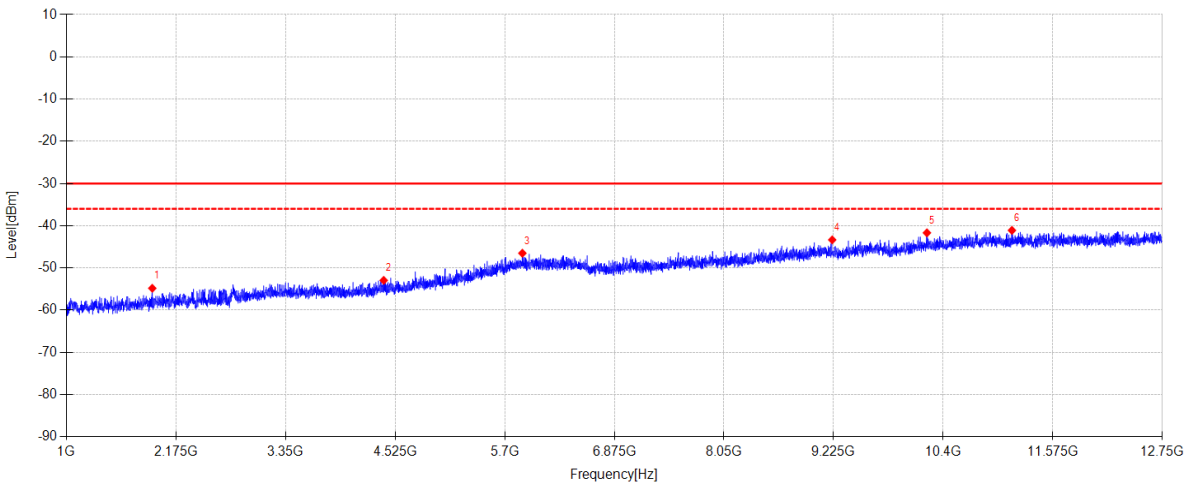
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	1921.200	48.43	-103.25	-54.82	-30.00	24.82	PK	Vertical	EIRP
2	4402.800	46.73	-99.67	-52.94	-30.00	22.94	PK	Vertical	EIRP
3	5889.175	47.52	-94.04	-46.52	-30.00	16.52	PK	Vertical	EIRP
4	9210.900	46.10	-89.45	-43.35	-30.00	13.35	PK	Vertical	EIRP
5	10226.100	46.42	-88.10	-41.68	-30.00	11.68	PK	Vertical	EIRP
6	11137.900	45.71	-86.81	-41.10	-30.00	11.10	PK	Vertical	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

TX 3DH5 2480MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

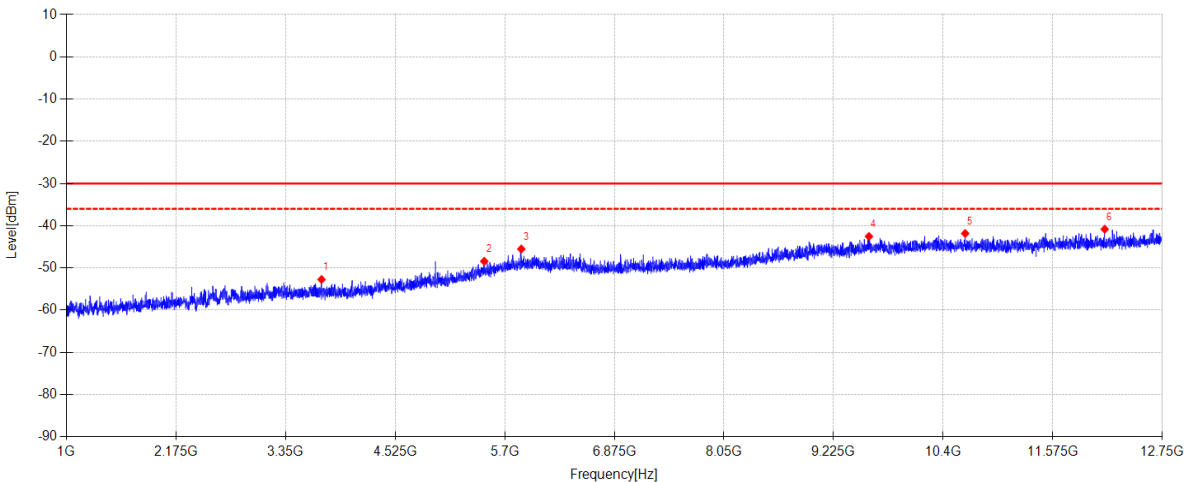
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	3735.400	48.25	-100.98	-52.73	-30.00	22.73	PK	Horizontal	EIRP
2	5480.275	47.31	-95.73	-48.42	-30.00	18.42	PK	Horizontal	EIRP
3	5877.425	48.54	-94.06	-45.52	-30.00	15.52	PK	Horizontal	EIRP
4	9604.525	45.99	-88.53	-42.54	-30.00	12.54	PK	Horizontal	EIRP
5	10636.175	46.21	-88.05	-41.84	-30.00	11.84	PK	Horizontal	EIRP
6	12131.950	47.07	-87.89	-40.82	-30.00	10.82	PK	Horizontal	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-03-12 Tested By: Lin Guoyaun

EUT: Portable Bluetooth Speaker Model Number: BOOMBOX 4C

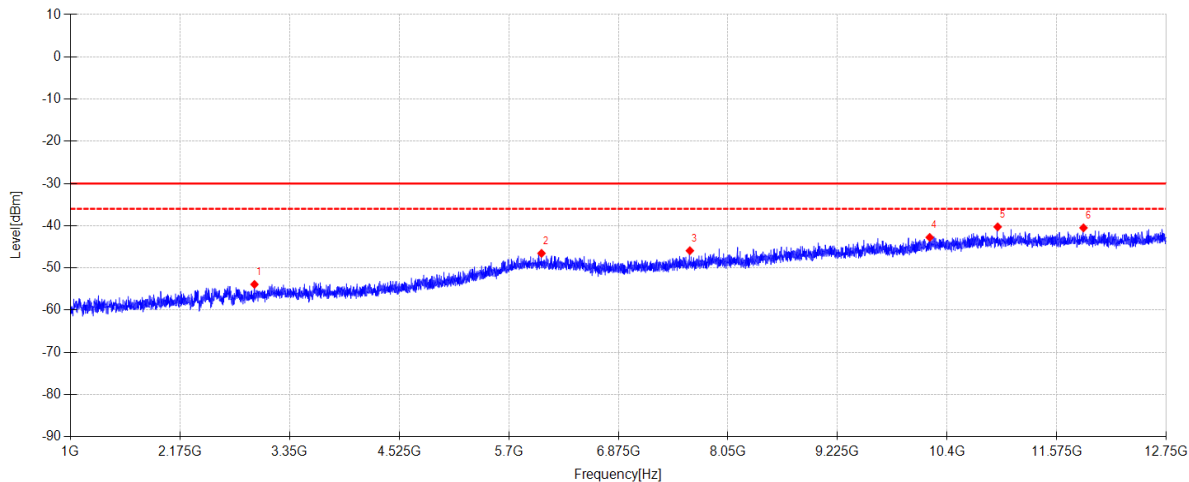
Test Mode: TX 3DH5 2480MHz Mode Power Supply: AC 230V/50Hz

Condition: Temp:21.3°C;Humi:47.4% Test Site: DDT 3# Chamber

File Path: d:\ts\2024 report data\Q24112111-1E\CE Above 1G BT4

Memo: Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	2974.000	48.13	-102.03	-53.90	-30.00	23.90	PK	Vertical	EIRP
2	6051.325	47.06	-93.60	-46.54	-30.00	16.54	PK	Vertical	EIRP
3	7642.275	47.41	-93.33	-45.92	-30.00	15.92	PK	Vertical	EIRP
4	10213.175	45.35	-88.12	-42.77	-30.00	12.77	PK	Vertical	EIRP
5	10941.675	46.55	-86.82	-40.27	-30.00	10.27	PK	Vertical	EIRP
6	11861.700	46.75	-87.26	-40.51	-30.00	10.51	PK	Vertical	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

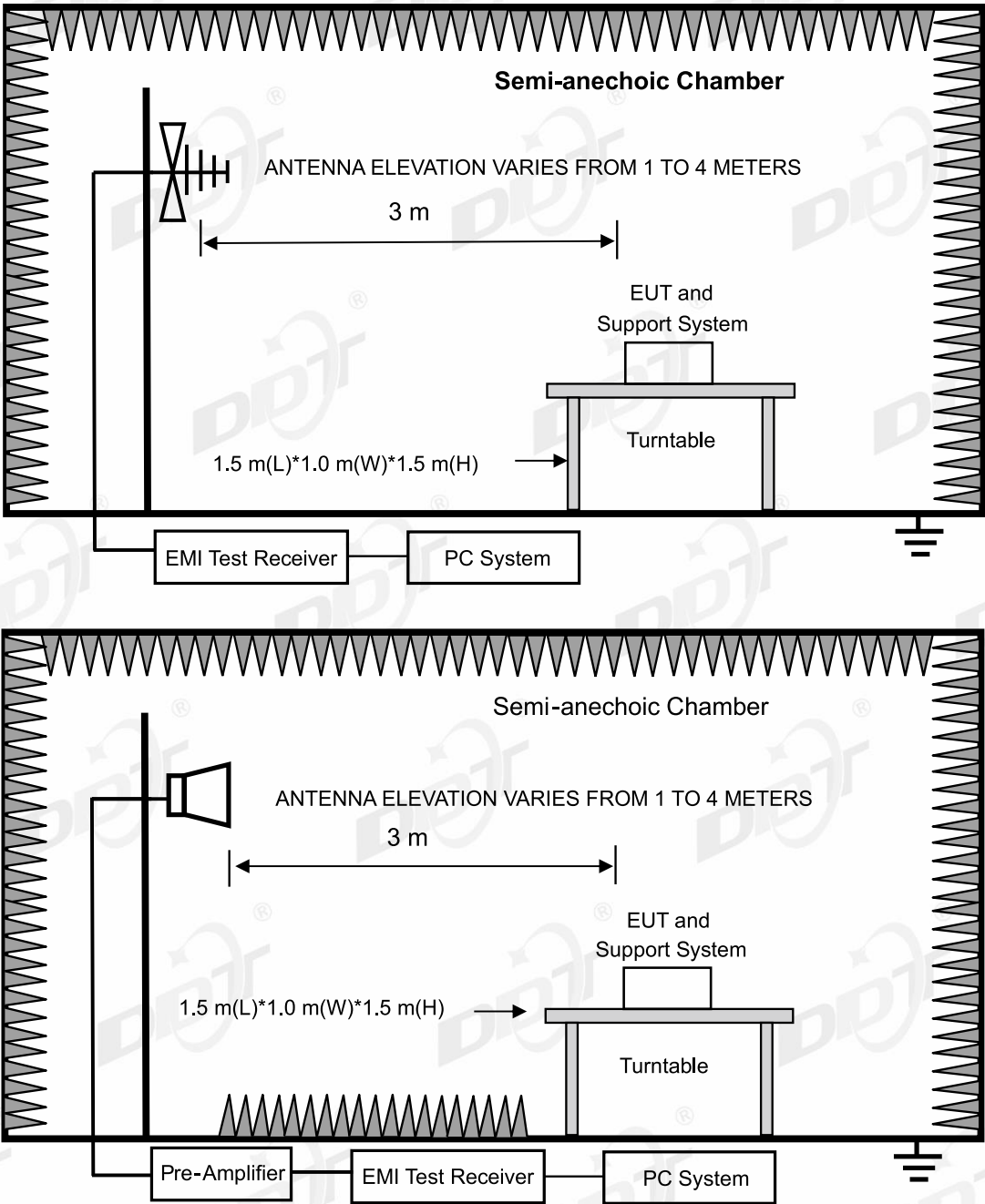
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

12. Receiver spurious emissions

12.1. Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal Due To
High pass filter	Micro-Tronics	HPM50108	DDT-ZC00560	2026/03/28
Micro-Tronics filters	REBES	BRM50716	DDT-ZC03240	/
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC02050	2025/07/11
EMI TEST RECEIVER	R&S	ESU26	DDT-ZC01909	2026/03/28
Pre-amplifier	COM-POWER	PAM-118A	DDT-ZC01293	2025/08/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	DDT-ZC00506	2027/04/01
High pass filter	Micro-Tronics	HPM50102	DDT-ZC00561	2026/03/28
PSA Series Spectrum Analyzer	Agilent	E4447A	DDT-ZC00517	2026/03/28
High Pass filter	Xi'an Xingbo	XBLBQ-GTA67	DDT-ZC02179	2026/03/28
RF cable	Zhongke Junchuang	JCT26S-NJ-NJ-1.5M	DDT-ZC02762	2026/03/28
RF cable	Yuhu Technology	ZT26S-SMAJ-SMAJ-1M	DDT-ZC02037	2026/03/28
RF Cable	N/A	W24.02 HL-562	DDT-ZC04022	2026/03/28
Hochgewinn-Hornantenne	SCHWARZBEC K	BBHA 9120 D	DDT-ZC02129	2025/09/18
Micro-Tronics filters	REBES	BRM50702	DDT-ZC03242	/
RF Cable	N/A	W13.02 AP1-X2	DDT-ZC04023	2026/03/28
RF cable	Yuhu Technology	JCTB810-NJ-NJ-9M	DDT-ZC02538	2026/03/28
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
Pre-amplifier	COM-POWER	PAM-840A	DDT-ZC01693	2026/03/28

12.2. Block diagram of test setup



12.3. Limits

The spurious emissions of the receiver shall not exceed the values given in below table.

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

12.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

12.5. Test procedure

Refer to EN 300 328 V2.2.2 Clause 5.4.10.2

12.6. Test result

PASS. (See below detailed test result)

12.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

RX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

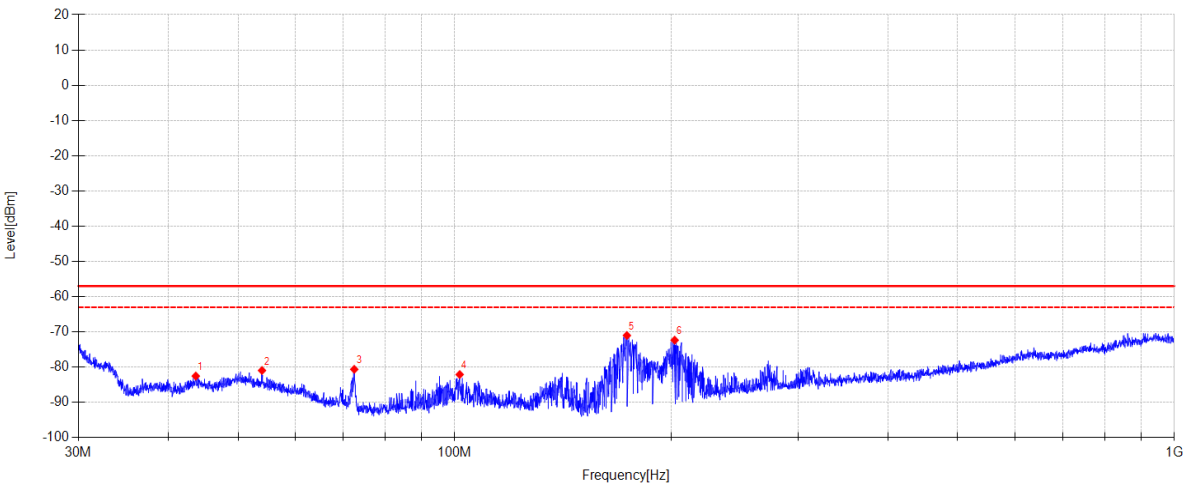
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	43.686	28.28	-110.82	-82.54	-57.00	25.54	PK	Horizontal	ERP
2	53.989	30.04	-111.00	-80.96	-57.00	23.96	PK	Horizontal	ERP
3	72.528	36.85	-117.48	-80.63	-57.00	23.63	PK	Horizontal	ERP
4	101.620	33.07	-115.17	-82.10	-57.00	25.10	PK	Horizontal	ERP
5	173.509	45.79	-116.81	-71.02	-57.00	14.02	PK	Horizontal	ERP
6	202.165	42.70	-115.05	-72.35	-57.00	15.35	PK	Horizontal	ERP

Note:

1. Level = Reading + Factor.
2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.
3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-03-12 Tested By: Lin Guoyaun

EUT: Portable Bluetooth Speaker Model Number: BOOMBOX 4C

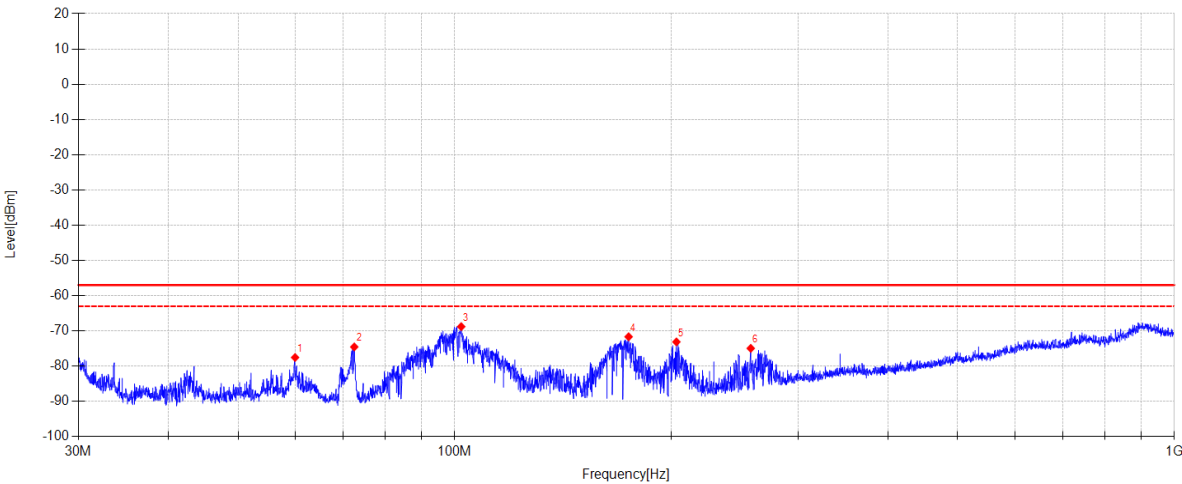
Test Mode: RX 3DH5 2402MHz Mode Power Supply: AC 230V/50Hz

Condition: Temp:21.3°C;Humi:47.4% Test Site: DDT 3# Chamber

File Path: d:\ts\2024 report data\Q24112111-1E\CE Below 1G BT\2

Memo: Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	60.019	37.20	-114.75	-77.55	-57.00	20.55	PK	Vertical	ERP
2	72.528	42.86	-117.42	-74.56	-57.00	17.56	PK	Vertical	ERP
3	102.120	41.45	-110.25	-68.80	-57.00	11.80	PK	Vertical	ERP
4	174.485	41.92	-113.59	-71.67	-57.00	14.67	PK	Vertical	ERP
5	203.302	40.33	-113.45	-73.12	-57.00	16.12	PK	Vertical	ERP
6	257.853	36.82	-111.78	-74.96	-57.00	17.96	PK	Vertical	ERP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

RX 3DH5 2480MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

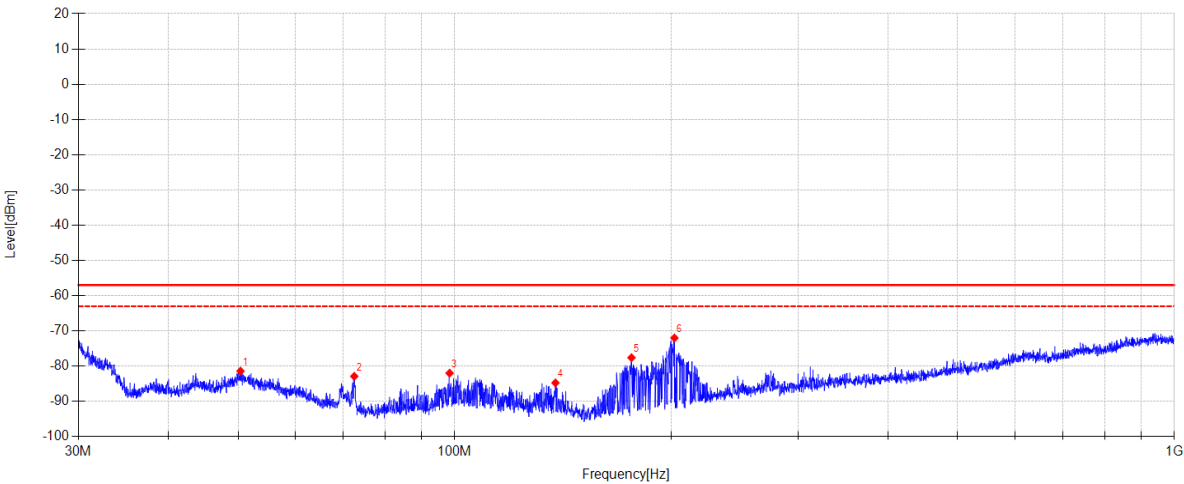
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	50.404	28.71	-110.12	-81.41	-57.00	24.41	PK	Horizontal	ERP
2	72.528	34.58	-117.48	-82.90	-57.00	25.90	PK	Horizontal	ERP
3	98.394	33.35	-115.34	-81.99	-57.00	24.99	PK	Horizontal	ERP
4	138.054	32.74	-117.49	-84.75	-57.00	27.75	PK	Horizontal	ERP
5	176.083	39.06	-116.66	-77.60	-57.00	20.60	PK	Horizontal	ERP
6	202.023	43.05	-115.06	-72.01	-57.00	15.01	PK	Horizontal	ERP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

RX 3DH5 2480MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

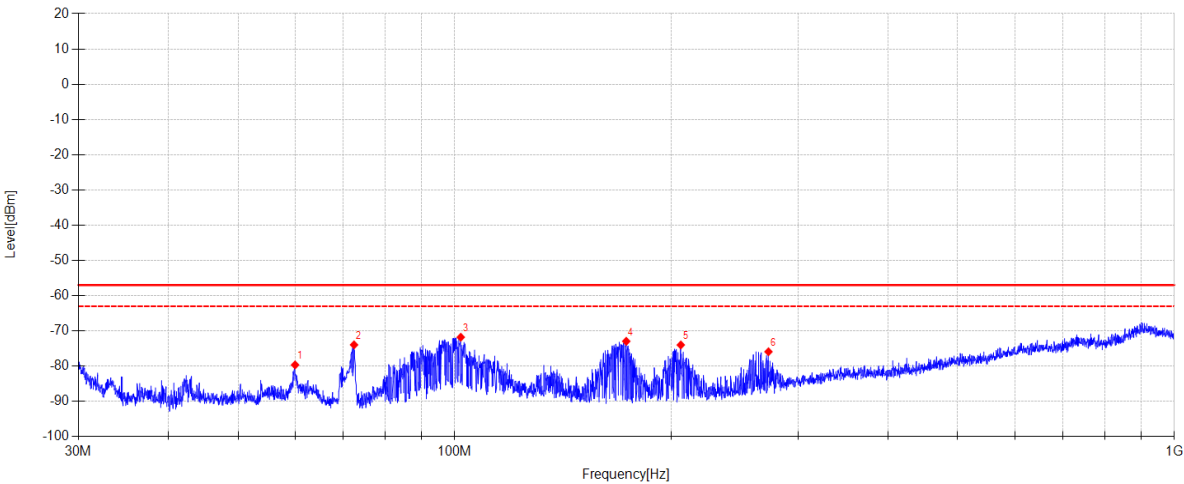
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	60.019	35.09	-114.75	-79.66	-57.00	22.66	PK	Vertical	ERP
2	72.477	43.47	-117.43	-73.96	-57.00	16.96	PK	Vertical	ERP
3	101.976	38.44	-110.24	-71.80	-57.00	14.80	PK	Vertical	ERP
4	173.144	40.65	-113.60	-72.95	-57.00	15.95	PK	Vertical	ERP
5	206.173	39.39	-113.38	-73.99	-57.00	16.99	PK	Vertical	ERP
6	272.922	34.93	-110.84	-75.91	-57.00	18.91	PK	Vertical	ERP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

RX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

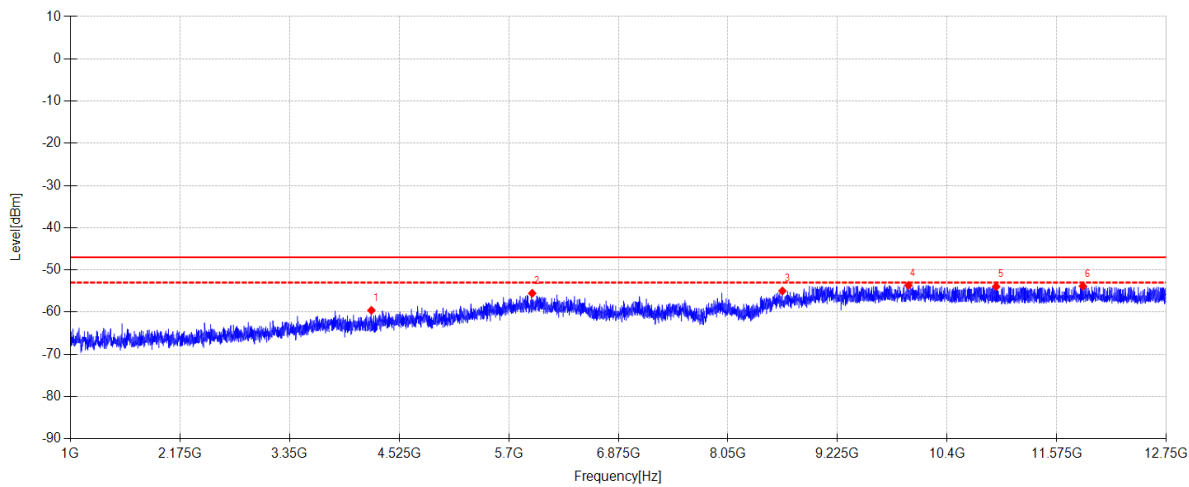
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	4227.725	40.88	-100.46	-59.58	-47.00	12.58	PK	Horizontal	EIRP
2	5951.450	38.57	-94.10	-55.53	-47.00	8.53	PK	Horizontal	EIRP
3	8633.975	35.95	-90.93	-54.98	-47.00	7.98	PK	Horizontal	EIRP
4	9985.225	34.94	-88.59	-53.65	-47.00	6.65	PK	Horizontal	EIRP
5	10925.225	34.85	-88.80	-53.95	-47.00	6.95	PK	Horizontal	EIRP
6	11854.650	34.85	-88.68	-53.83	-47.00	6.83	PK	Horizontal	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

RX 3DH5 2402MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

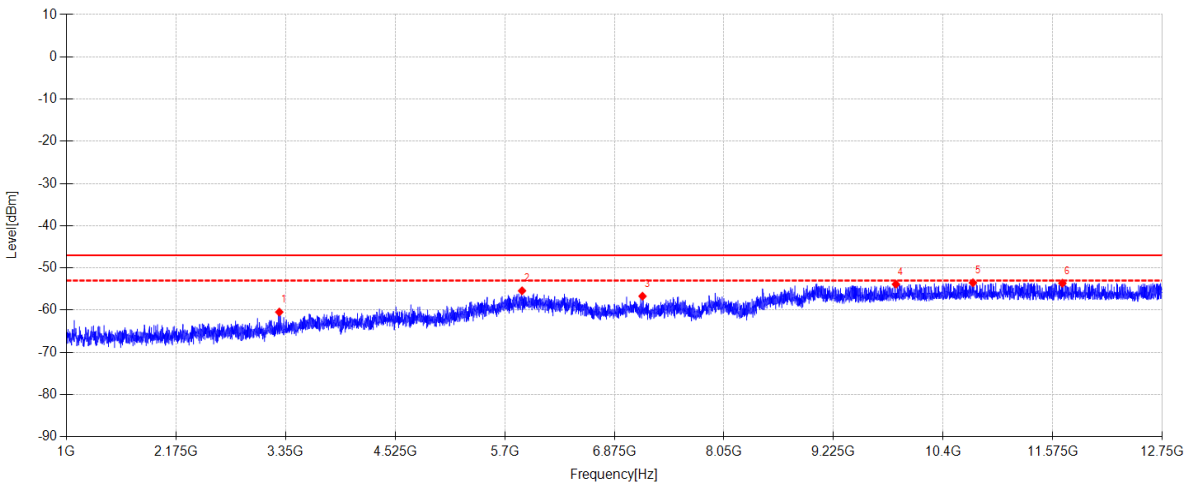
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	3283.025	42.25	-102.70	-60.45	-47.00	13.45	PK	Vertical	EIRP
2	5885.650	39.01	-94.42	-55.41	-47.00	8.41	PK	Vertical	EIRP
3	7176.975	38.42	-95.12	-56.70	-47.00	9.70	PK	Vertical	EIRP
4	9893.575	35.31	-89.17	-53.86	-47.00	6.86	PK	Vertical	EIRP
5	10719.600	34.40	-87.92	-53.52	-47.00	6.52	PK	Vertical	EIRP
6	11678.400	34.30	-87.92	-53.62	-47.00	6.62	PK	Vertical	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2025-03-12

Tested By:

Lin Guoyaun

EUT:

Portable Bluetooth Speaker

Model Number:

BOOMBOX 4C

Test Mode:

RX 3DH5 2480MHz Mode

Power Supply:

AC 230V/50Hz

Condition:

Temp:21.3°C;Humi:47.4%

Test Site:

DDT 3# Chamber

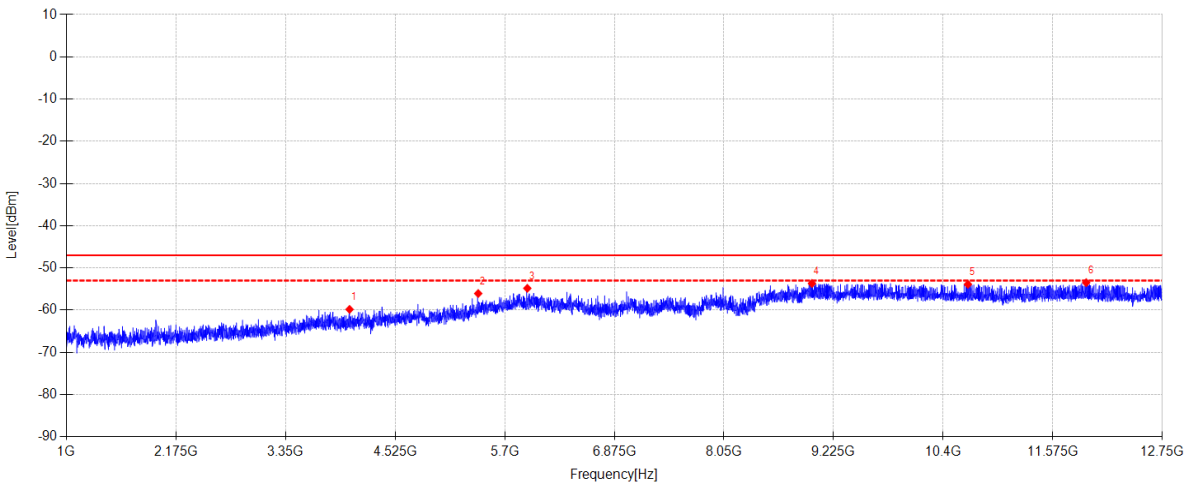
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Memo:

Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	4036.200	41.20	-101.02	-59.82	-47.00	12.82	PK	Horizontal	EIRP
2	5415.650	40.36	-96.42	-56.06	-47.00	9.06	PK	Horizontal	EIRP
3	5942.050	39.31	-94.14	-54.83	-47.00	7.83	PK	Horizontal	EIRP
4	8993.525	36.00	-89.68	-53.68	-47.00	6.68	PK	Horizontal	EIRP
5	10665.550	34.87	-88.75	-53.88	-47.00	6.88	PK	Horizontal	EIRP
6	11933.375	35.18	-88.67	-53.49	-47.00	6.49	PK	Horizontal	EIRP

Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2025-03-12 Tested By: Lin Guoyaun

EUT: Portable Bluetooth Speaker Model Number: BOOMBOX 4C

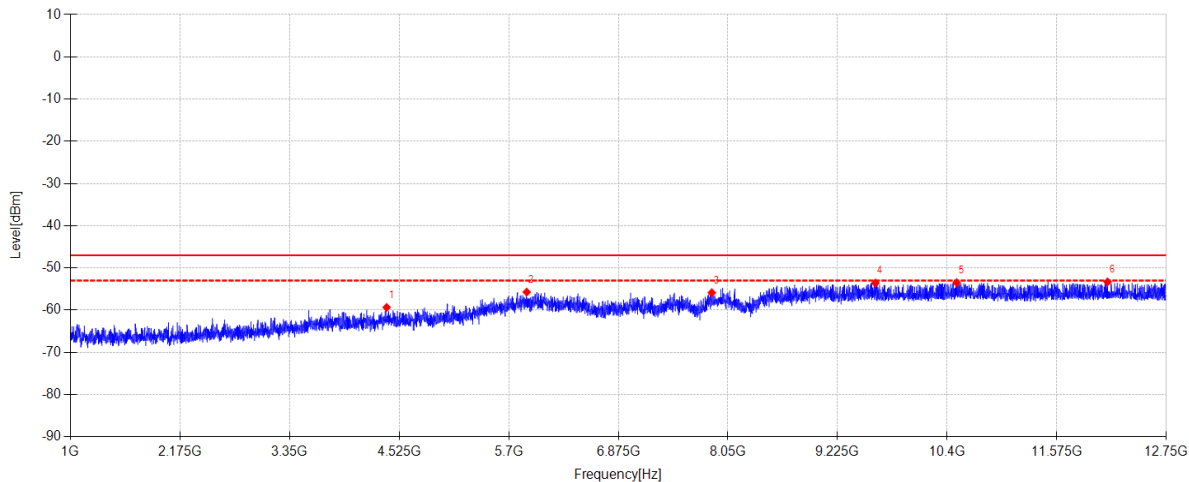
Test Mode: RX 3DH5 2480MHz Mode Power Supply: AC 230V/50Hz

Condition: Temp:21.3°C;Humi:47.4% Test Site: DDT 3# Chamber

File Path: d:\ts\2024 report data\Q24112111-1E\CE Above 1G BT\8

Memo: Sample Number: S24112111-015

Test Graph



Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBm]	Limit [dBm]	Margin [dB]	Detector	Polarity	Type
1	4391.050	40.85	-100.20	-59.35	-47.00	12.35	PK	Vertical	EIRP
2	5892.700	38.66	-94.38	-55.72	-47.00	8.72	PK	Vertical	EIRP
3	7877.275	37.20	-93.06	-55.86	-47.00	8.86	PK	Vertical	EIRP
4	9631.550	35.85	-89.42	-53.57	-47.00	6.57	PK	Vertical	EIRP
5	10502.225	34.79	-88.27	-53.48	-47.00	6.48	PK	Vertical	EIRP
6	12120.200	34.88	-88.18	-53.30	-47.00	6.30	PK	Vertical	EIRP

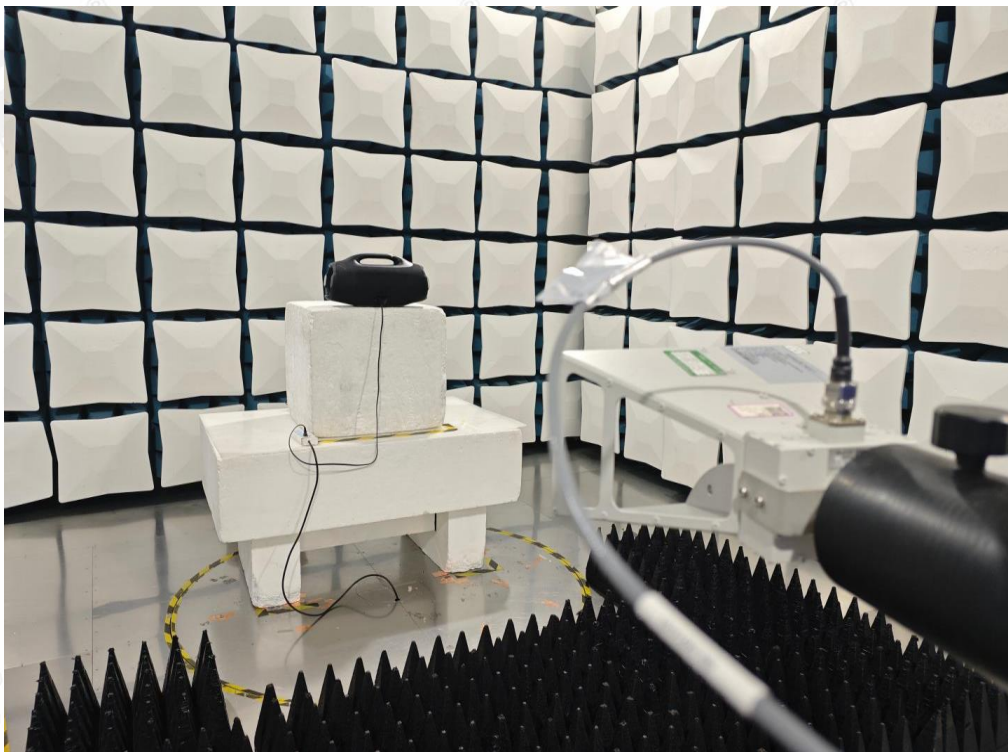
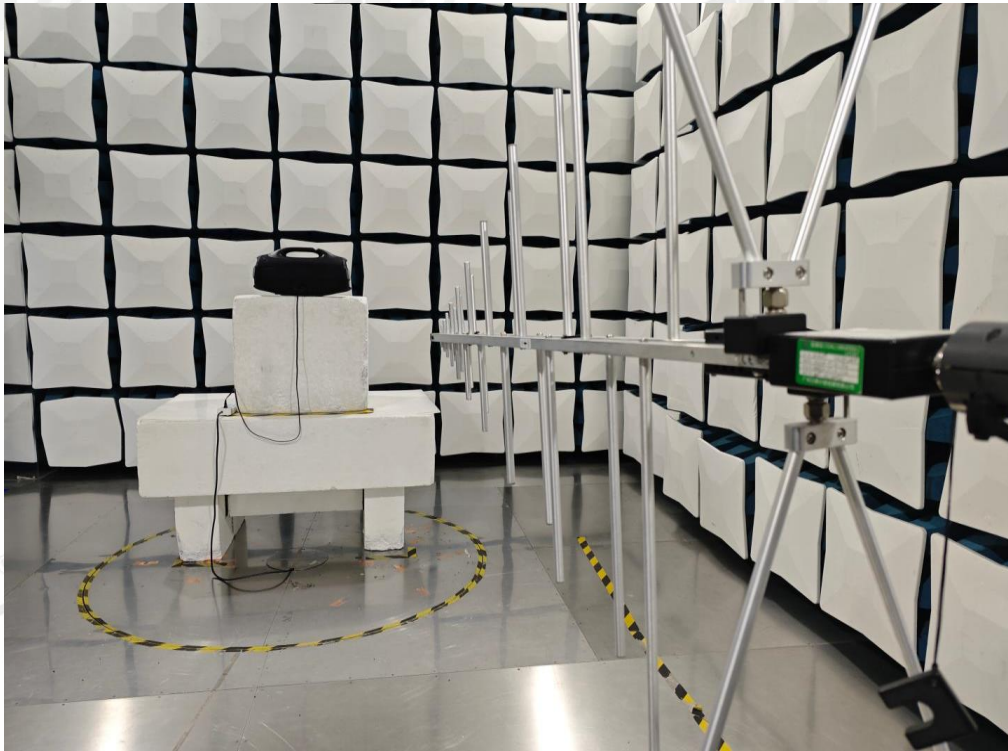
Note:

1. Level = Reading + Factor.

2. Factor = Antenna Factor + Cable Loss + Filter Factor - Preamp Gain + Site Loss Factor - 107.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

13. Test Setup Photograph





14. Photos of the EUT

Please refer to DDT-Q24112111-2E appendix I

-----End Report-----