



## RADIO TEST REPORT

|                         |   |                                                                                                                                                                                                                                                      |
|-------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant               | : | Harman International Industries, Inc.                                                                                                                                                                                                                |
| Address of Applicant    | : | 8500 Balboa Boulevard, Northridge, CA 91329,<br>UNITED STATES                                                                                                                                                                                        |
| Manufacturer            | : | Harman International Industries, Inc.                                                                                                                                                                                                                |
| Address of Manufacturer | : | 8500 Balboa Boulevard, Northridge, CA 91329,<br>UNITED STATES                                                                                                                                                                                        |
| Equipment under Test    | : | GAMING WIRELESS HEADSET                                                                                                                                                                                                                              |
| Model No.               | : | QUANTUM 850X                                                                                                                                                                                                                                         |
| Trademark               | : | JBL                                                                                                                                                                                                                                                  |
| FCC ID                  | : | APIJBLQ850X                                                                                                                                                                                                                                          |
| IC                      | : | 6132A-JBLQ850X                                                                                                                                                                                                                                       |
| Test Standard(s)        | : | FCC Rules and Regulations Part 15 Subpart C,<br>ANSI C63.10-2020+Cor.1-2023,<br>RSS-247 Issue 4 July 24, 2025,<br>RSS-Gen Issue 5, Apr. 2018, Amendment 2<br>(February 2021),<br>ANSI C63.10-2020+Cor.1-2023+C63.10a-<br>2024+Errata to C63.10a-2024 |
| Report No.              | : | DDT-RE26032509-3E01                                                                                                                                                                                                                                  |
| Issue Date              | : | 2026/06/11                                                                                                                                                                                                                                           |
| Issue By                | : | Guangdong Dongdian Testing Service Co., Ltd.<br>Unit 2, Building 1, No. 17, Zongbu 2nd Road,<br>Songshan Lake Park, Dongguan, Guangdong, China,<br>523808                                                                                            |

# REPORT

## Table of Contents

|      |                                                  |    |
|------|--------------------------------------------------|----|
| 1.   | Summary of Test Results .....                    | 7  |
| 2.   | General Test Information.....                    | 8  |
| 2.1. | Description of EUT .....                         | 8  |
| 2.2. | Accessories of EUT .....                         | 9  |
| 2.3. | Block diagram of EUT configuration for test..... | 9  |
| 2.4. | Decision of final test mode .....                | 9  |
| 2.5. | Deviations of test standard .....                | 10 |
| 2.6. | Test environment conditions .....                | 10 |
| 2.7. | Test laboratory .....                            | 10 |
| 2.8. | Measurement uncertainty .....                    | 11 |
| 3.   | Equipment Used During Conductive Test .....      | 12 |
| 4.   | 20 dB Bandwidth .....                            | 13 |
| 4.1. | Block diagram of test setup .....                | 13 |
| 4.2. | Limits .....                                     | 13 |
| 4.3. | Test procedure .....                             | 13 |
| 4.4. | Test result.....                                 | 14 |
| 4.5. | Test graphs .....                                | 15 |
| 5.   | 99% Bandwidth .....                              | 18 |
| 5.1. | Block diagram of test setup .....                | 18 |
| 5.2. | Limits .....                                     | 18 |
| 5.3. | Test procedure .....                             | 18 |
| 5.4. | Test result.....                                 | 19 |
| 5.5. | Test graphs .....                                | 20 |
| 6.   | Maximum Peak Output Power.....                   | 23 |
| 6.1. | Block diagram of test setup .....                | 23 |
| 6.2. | Limits .....                                     | 23 |
| 6.3. | Test procedure .....                             | 23 |
| 6.4. | Test result.....                                 | 24 |
| 6.5. | Test graphs .....                                | 25 |
| 7.   | Carrier Frequency Separation .....               | 28 |
| 7.1. | Block diagram of test setup .....                | 28 |
| 7.2. | Limits .....                                     | 28 |
| 7.3. | Test procedure .....                             | 28 |
| 7.4. | Test result.....                                 | 29 |
| 7.5. | Test graphs .....                                | 30 |
| 8.   | Dwell Time.....                                  | 31 |

|       |                                               |    |
|-------|-----------------------------------------------|----|
| 8.1.  | Block diagram of test setup .....             | 31 |
| 8.2.  | Limits .....                                  | 31 |
| 8.3.  | Test procedure .....                          | 31 |
| 8.4.  | Test result.....                              | 32 |
| 8.5.  | Test graphs .....                             | 33 |
| 9.    | Number of Hopping Channel.....                | 39 |
| 9.1.  | Block diagram of test setup .....             | 39 |
| 9.2.  | Limits .....                                  | 39 |
| 9.3.  | Test procedure .....                          | 39 |
| 9.4.  | Test result.....                              | 40 |
| 9.5.  | Test graphs .....                             | 41 |
| 10.   | Band Edge Compliance (Conducted Method) ..... | 42 |
| 10.1. | Block diagram of test setup .....             | 42 |
| 10.2. | Limit.....                                    | 42 |
| 10.3. | Test procedure .....                          | 42 |
| 10.4. | Test result.....                              | 43 |
| 10.5. | Test graphs .....                             | 44 |
| 11.   | RF Conducted Spurious Emissions.....          | 48 |
| 11.1. | Block diagram of test setup .....             | 48 |
| 11.2. | Limits .....                                  | 48 |
| 11.3. | Test procedure .....                          | 48 |
| 11.4. | Test result.....                              | 48 |
| 11.5. | Test graphs .....                             | 50 |
| 12.   | Duty cycle.....                               | 59 |
| 12.1. | Block diagram of test setup .....             | 59 |
| 12.2. | Limit.....                                    | 59 |
| 12.3. | Test procedure .....                          | 59 |
| 12.4. | Test result.....                              | 60 |
| 12.5. | Test graphs .....                             | 61 |
| 13.   | Antenna Requirements.....                     | 64 |
| 13.1. | Limit.....                                    | 64 |
| 13.2. | Result .....                                  | 64 |
| 14.   | Radiated Emission .....                       | 65 |
| 14.1. | Test equipment.....                           | 65 |
| 14.2. | Block diagram of test setup .....             | 66 |
| 14.3. | Limits .....                                  | 67 |
| 14.4. | Assistant equipment used for test .....       | 69 |
| 14.5. | Test procedure .....                          | 69 |

|       |                                         |    |
|-------|-----------------------------------------|----|
| 14.6. | Test result.....                        | 70 |
| 14.7. | Test data .....                         | 71 |
| 15.   | Band Edge Compliance.....               | 79 |
| 15.1. | Test equipment.....                     | 79 |
| 15.2. | Block diagram of test setup .....       | 79 |
| 15.3. | Limits .....                            | 80 |
| 15.4. | Assistant equipment used for test ..... | 80 |
| 15.5. | Test procedure .....                    | 80 |
| 15.6. | Test result.....                        | 80 |
| 15.7. | Test data .....                         | 81 |
| 16.   | Power Line Conducted Emissions.....     | 93 |
| 16.1. | Test equipment.....                     | 93 |
| 16.2. | Block diagram of test setup .....       | 93 |
| 16.3. | Limits .....                            | 93 |
| 16.4. | Assistant equipment used for test ..... | 93 |
| 16.5. | Test procedure .....                    | 94 |
| 16.6. | Test result.....                        | 94 |
| 16.7. | Test data .....                         | 95 |
| 17.   | Test Setup Photograph .....             | 97 |
| 18.   | Photos of the EUT .....                 | 99 |

Test Report Declare

|                         |   |                                                            |
|-------------------------|---|------------------------------------------------------------|
| Applicant               | : | Harman International Industries, Inc.                      |
| Address of Applicant    | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |
| Equipment under Test    | : | GAMING WIRELESS HEADSET                                    |
| Model No.               | : | QUANTUM 850X                                               |
| Manufacturer            | : | Harman International Industries, Inc.                      |
| Address of Manufacturer | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |

Test Standard Used:  
FCC Rules and Regulations Part 15 Subpart C,  
ANSI C63.10-2020+Cor.1-2023,  
RSS-247 Issue 4 July 24, 2025,  
RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021),  
ANSI C63.10-2020+Cor.1-2023+C63.10a-2024+Errata to C63.10a-2024

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-RE26032509-3E01 |               |                         |
| Date of Receipt: | 2026/05/17          | Date of Test: | 2026/05/17 - 2026/06/02 |

|                                                                                     |                                                                                     |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Created: Chen Ziqin                                                                 | Reviewed: Bobo Chen                                                                 | Approved: Ella Gong                                                                   |
|  |  |  |
| 2026/05/28                                                                          | 2026/06/11                                                                          | 2026/06/11                                                                            |

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  |
|---------|------------------|------------|-----------|
| V0      | Initial issue    | 2026/06/11 | Ella Gong |
|         |                  |            |           |

## 1. Summary of Test Results

| No. | Test Parameter                  | Clause No.                                                                                                                                         | Condition | Result |
|-----|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|
| 1   | Maximum Peak Output Power       | 47 CFR Part 15 15.247(b)(1),<br>RSS-247 clause 6.2.3.2(a)                                                                                          | /         | Pass   |
| 2   | 20 dB Bandwidth                 | 47 CFR Part 15 15.247(a)(1),<br>RSS-247 clause 6.2.3.1(a)                                                                                          | /         | Pass   |
| 3   | 99% Bandwidth                   | RSS-Gen clause 6.7                                                                                                                                 | /         | Pass   |
| 4   | Carrier Frequency Separation    | 47 CFR Part 15 15.247(a)(1),<br>RSS-247 clause 6.2.3.1(a)                                                                                          | /         | Pass   |
| 5   | Number of Hopping Channel       | 47 CFR Part 15<br>15.247(a)(1)(iii),<br>RSS-247 clause 6.2.3.1(b)                                                                                  | /         | Pass   |
| 6   | Dwell Time                      | 47 CFR Part 15<br>15.247(a)(1)(iii),<br>RSS-247 clause 6.2.3.1(b)                                                                                  | /         | Pass   |
| 7   | RF Conducted Spurious Emissions | 47 CFR Part 15 15.247(d),<br>RSS-247 clause 6.6                                                                                                    | /         | Pass   |
| 8   | Radiated Emission               | 47 CFR Part 15 15.205,<br>47 CFR Part 15 15.209,<br>47 CFR Part 15 15.247(d),<br>RSS-247 clause 6.6,<br>RSS-Gen clause 8.9,<br>RSS-Gen clause 8.10 | /         | Pass   |
| 9   | Band Edge Compliance            | 47 CFR Part 15 15.205,<br>47 CFR Part 15 15.209,<br>47 CFR Part 15 15.247(d),<br>RSS-247 clause 6.6,<br>RSS-Gen clause 8.9,<br>RSS-Gen clause 8.10 | /         | Pass   |
| 10  | Antenna Requirement             | 47 CFR Part 15 15.203,<br>RSS-Gen clause 6.8                                                                                                       | /         | Pass   |
| 11  | Power Line Conducted Emissions  | 47 CFR Part 15 15.207(a),<br>RSS-Gen clause 8.8                                                                                                    | /         | 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                   | : GAMING WIRELESS HEADSET                                                                   |
| Model Number               | : QUANTUM 850X                                                                              |
| Difference of model number | : /                                                                                         |
| EUT Function Description   | : Please reference user manual of this device                                               |
| Power Supply               | : For headset: DC 5V from external USB cable<br>DC 3.7V/700mAh Lithium-ion built-in battery |
| Antenna Type               | : FPC Antenna                                                                               |
| Max Antenna Gain(dBi)      | : -0.2                                                                                      |

|                     |                               |
|---------------------|-------------------------------|
| 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 | /  |      |

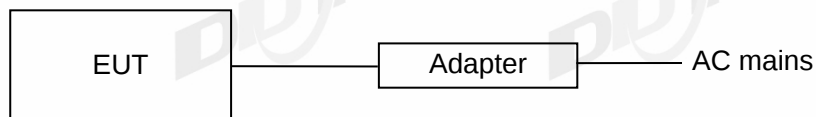
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's 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 |
|-------------|--------------|--------------|-------------|
| /           | /            | /            | /           |

## 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: Airoha.Tool.Kit.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, Tx Power Setting, Channel, and Frequency |                  |             |                 |
|-------------------------------------------------------|------------------|-------------|-----------------|
| Tested mode                                           | Tx Power Setting | Channel     | Frequency (MHz) |
| GFSK hopping on Tx mode                               | 62               | CH0 to CH78 | 2402 to 2480    |
| $\pi/4$ -DQPSK hopping on Tx mode                     | 62               | CH0 to CH78 | 2402 to 2480    |
| 8DPSK hopping on Tx mode                              | 62               | CH0 to CH78 | 2402 to 2480    |
| GFSK hopping off Tx mode                              | 62               | CH0         | 2402            |
|                                                       | 62               | CH39        | 2441            |
|                                                       | 62               | CH78        | 2480            |
| $\pi/4$ -DQPSK hopping off Tx mode                    | 62               | CH0         | 2402            |

|                                                                                                                                                                                  |    |      |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|------|
| 8DPSK hopping off Tx mode                                                                                                                                                        | 62 | CH39 | 2441 |
|                                                                                                                                                                                  | 62 | CH78 | 2480 |
|                                                                                                                                                                                  | 62 | CH0  | 2402 |
|                                                                                                                                                                                  | 62 | CH39 | 2441 |
|                                                                                                                                                                                  | 62 | 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:

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

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

## 2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: [ddt@dgddt.com](mailto:ddt@dgddt.com).

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20240, G-20118

## 2.8. Measurement uncertainty

| Test Item                                                                                                                                     | Uncertainty                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Bandwidth                                                                                                                                     | 1.9%                                              |
| Peak Output Power (Conducted) (Spectrum analyzer)                                                                                             | 0.98 dB                                           |
| Peak Output Power (Conducted) (Power Sensor)                                                                                                  | 1.18 dB                                           |
| Power Spectral Density (Base EIRP)                                                                                                            | 1.51 dB                                           |
| Power Spectral Density (Spectrum analyzer)                                                                                                    | 0.98 dB                                           |
| Frequencies Stability                                                                                                                         | 1.9 kHz                                           |
| Conducted spurious emissions                                                                                                                  | 1.21 dB ( $9\text{ kHz} \leq f < 7\text{ GHz}$ ); |
|                                                                                                                                               | 3.31 dB ( $7\text{ GHz} \leq f < 40\text{ GHz}$ ) |
| Uncertainty for radio frequency (RBW < 20 kHz)                                                                                                | $5.5 \times 10^{-8}$                              |
| Time                                                                                                                                          | 0.11%                                             |
| Temperature                                                                                                                                   | 0.3 °C                                            |
| Humidity                                                                                                                                      | 2 %                                               |
| Uncertainty for Radiation Emission test<br>(9 kHz – 30 MHz)                                                                                   | 3.44 dB                                           |
| Uncertainty for Radiation Emission test<br>(30 MHz - 1 GHz)                                                                                   | 4.28 dB (Antenna Polarize: V)                     |
|                                                                                                                                               | 4.14 dB (Antenna Polarize: H)                     |
| Uncertainty for Radiation Emission test<br>(1 GHz - 40 GHz)                                                                                   | 4.22 dB (1 - 6 GHz)                               |
|                                                                                                                                               | 4.52 dB (6 GHz - 18 GHz)                          |
|                                                                                                                                               | 4.58 dB (18 GHz - 40 GHz)                         |
| Uncertainty for Power line conduction emission test                                                                                           | 3.32dB (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   |
|----------------------------------------------------------------------------------|--------------|-------------|---------------|------------|
| <input checked="" type="checkbox"/> RF Connected Test (RF Measurement System 3#) |              |             |               |            |
| SIGNAL ANALYZER                                                                  | R&S          | FSV40       | 101407        | 2026/07/06 |
| Wideband Radio Communication Tester                                              | R&S          | CMW500      | 120259        | 2026/07/06 |
| EXG Analog Signal Generator                                                      | KEYSIGHT     | N5173B      | MY62153058    | 2026/07/06 |
| MXG Vector Signal Generator                                                      | Agilent      | N5182A      | MY48180912    | 2027/02/27 |
| RF Control Unit                                                                  | Tonscend     | JS0806-2    | 20C8060230    | 2027/03/17 |
| TEMP&HUMI Programmable Chamber                                                   | ZHIXIANG     | ZXGDJS-150L | ZX170110-A    | 2027/02/27 |
| Test Software                                                                    | Tonscend     | JS1120-3    | V3.6.21       | 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 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:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

| Test Mode | Antenna | Frequency [MHz] | 20dB EBW[MHz] |
|-----------|---------|-----------------|---------------|
| DH5       | Ant1    | 2402            | 0.96          |
|           |         | 2441            | 0.96          |
|           |         | 2480            | 0.96          |
| 2DH5      | Ant1    | 2402            | 1.25          |
|           |         | 2441            | 1.26          |
|           |         | 2480            | 1.26          |
| 3DH5      | Ant1    | 2402            | 1.29          |
|           |         | 2441            | 1.29          |
|           |         | 2480            | 1.29          |

4.5. Test graphs







## 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 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:

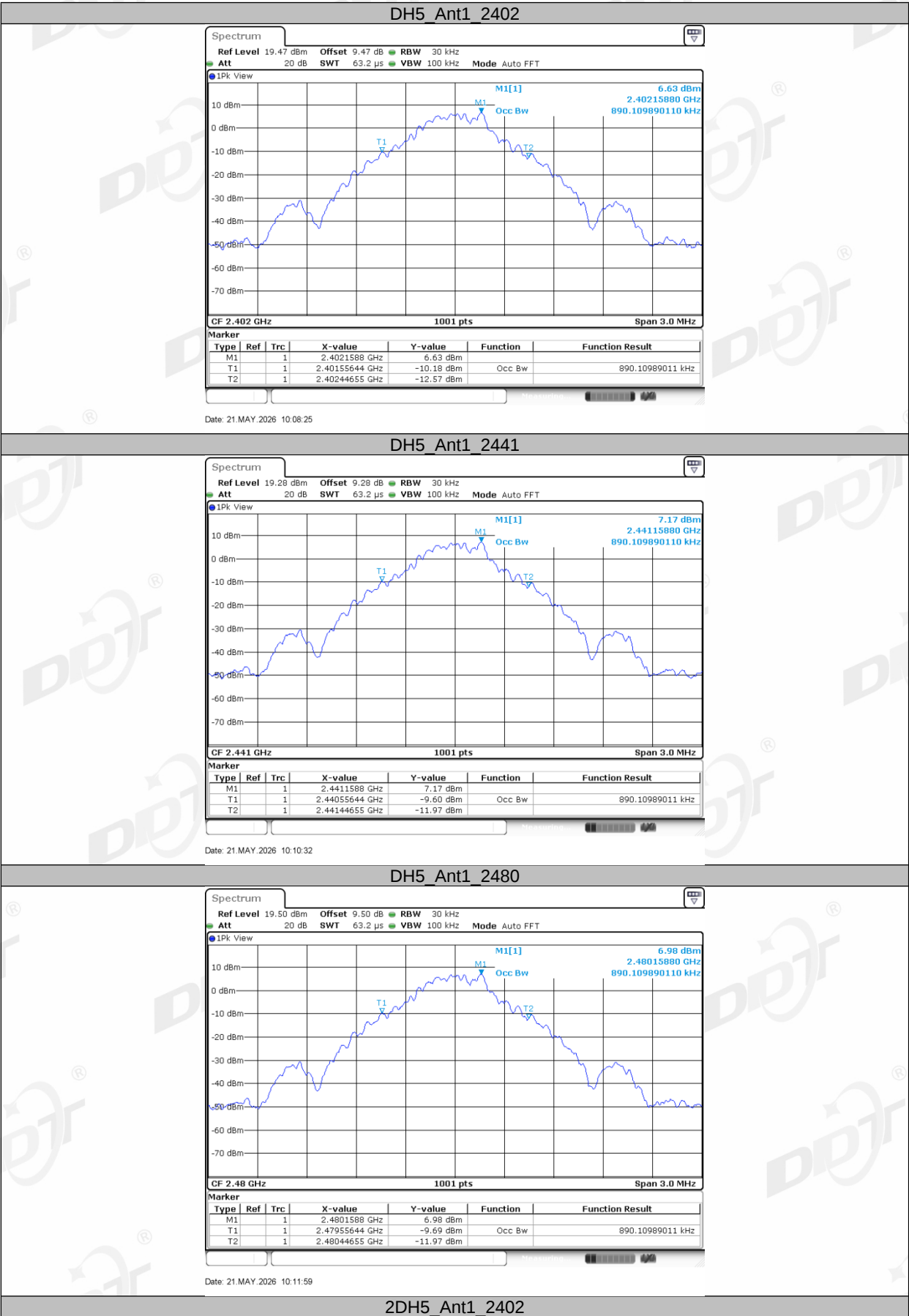
|                |                                         |
|----------------|-----------------------------------------|
| RBW:           | 1% to 5% of the OBW                     |
| VBW:           | approximately three times RBW           |
| Span:          | between 1.5 times and 5.0 times the OBW |
| Detector Mode: | Peak                                    |
| Sweep time:    | Auto                                    |
| Trace mode:    | Max hold                                |
- (5) Measure and record the results in the report.

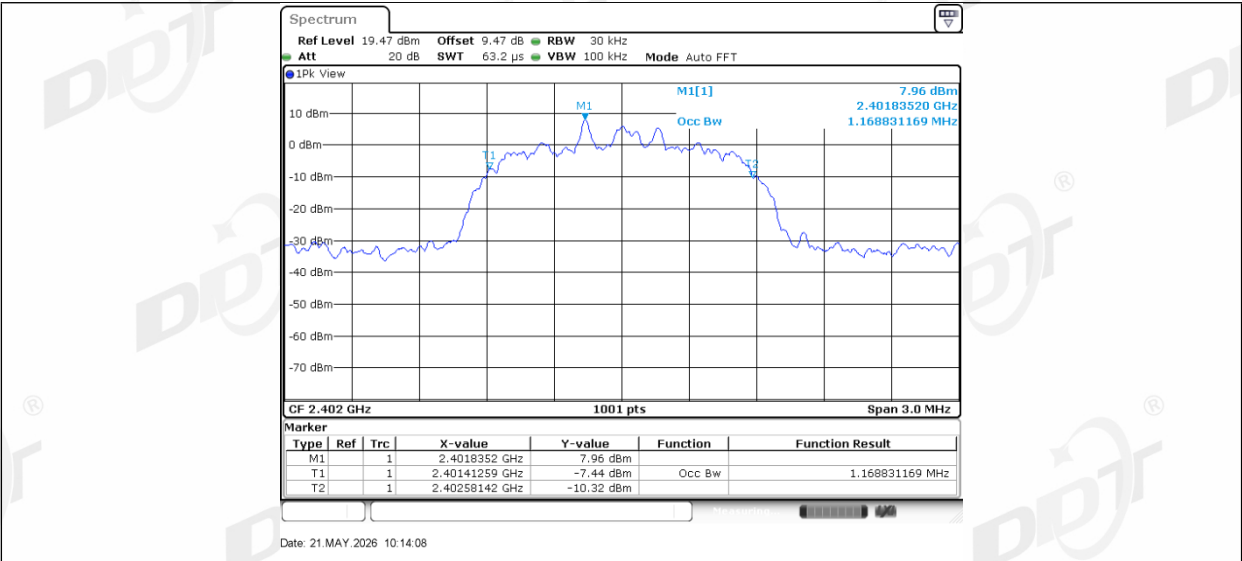
5.4. Test result

|                    |               |                |                          |
|--------------------|---------------|----------------|--------------------------|
| Test Engineer:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

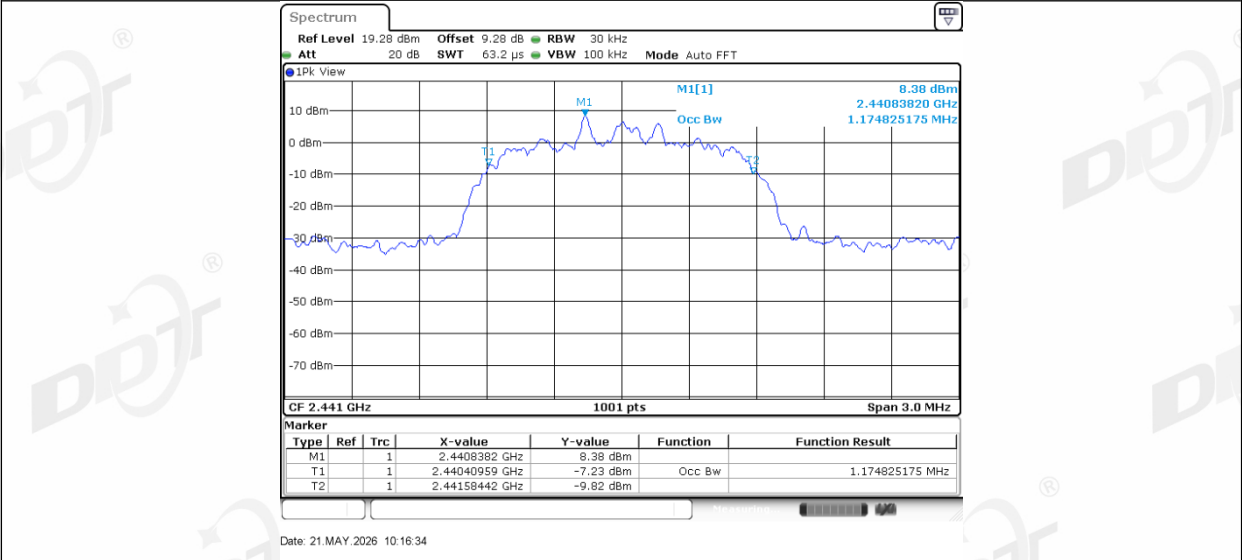
| Test Mode | Antenna | Frequency [MHz] | OCB [MHz] | FL[MHz]   | FH[MHz]   |
|-----------|---------|-----------------|-----------|-----------|-----------|
| DH5       | Ant1    | 2402            | 0.89011   | 2401.5564 | 2402.4466 |
|           |         | 2441            | 0.89011   | 2440.5564 | 2441.4466 |
|           |         | 2480            | 0.89011   | 2479.5564 | 2480.4466 |
| 2DH5      | Ant1    | 2402            | 1.1688    | 2401.4126 | 2402.5814 |
|           |         | 2441            | 1.1748    | 2440.4096 | 2441.5844 |
|           |         | 2480            | 1.1718    | 2479.4126 | 2480.5844 |
| 3DH5      | Ant1    | 2402            | 1.1748    | 2401.4126 | 2402.5874 |
|           |         | 2441            | 1.1748    | 2440.4126 | 2441.5874 |
|           |         | 2480            | 1.1748    | 2479.4126 | 2480.5874 |

5.5. Test graphs

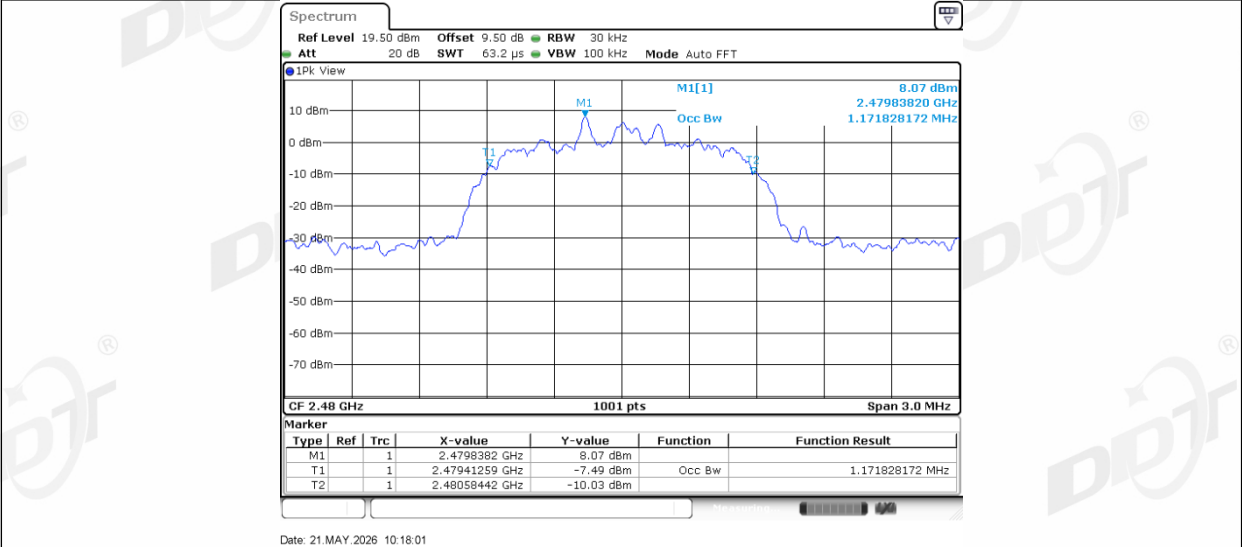




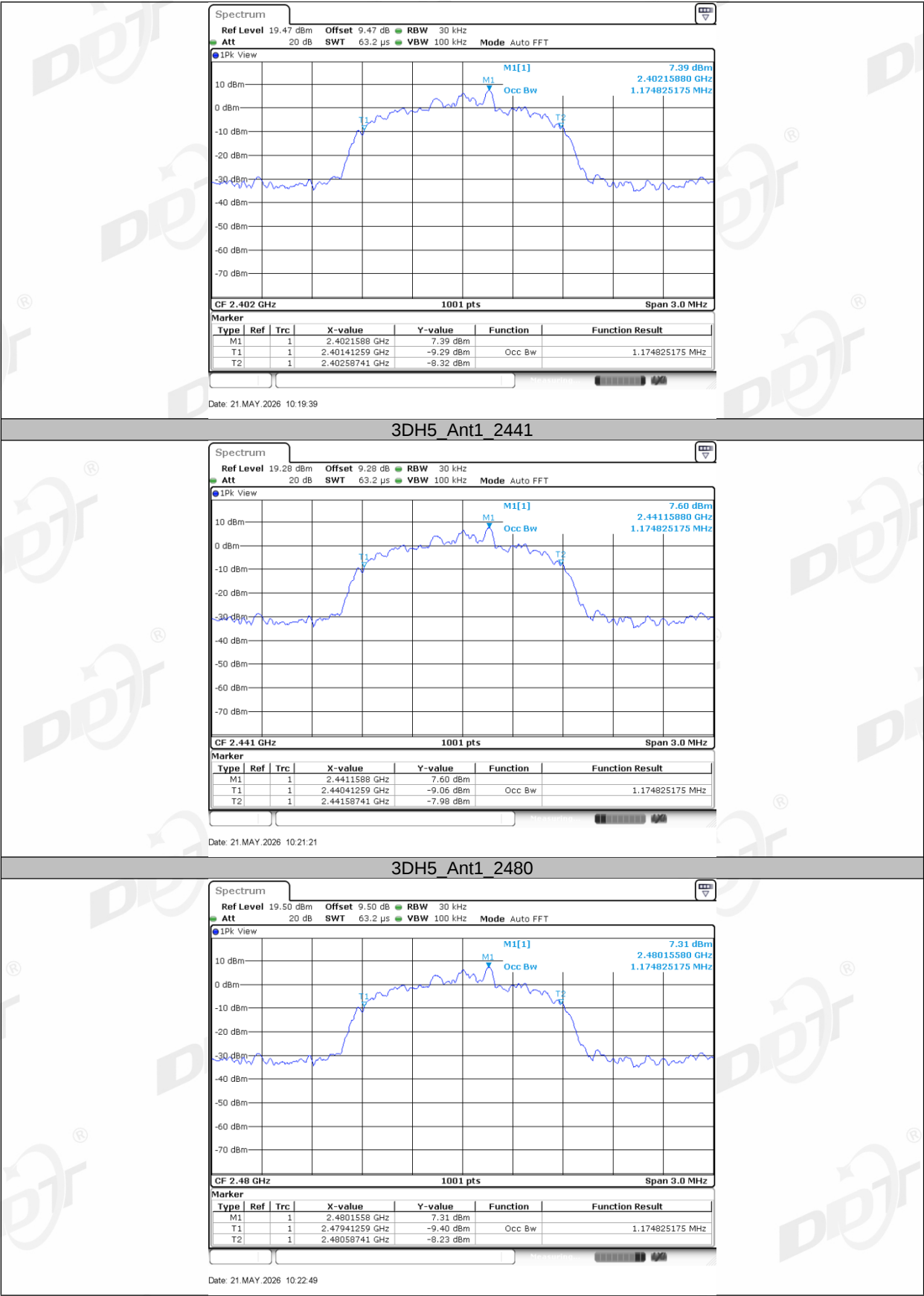
2DH5\_Ant1\_2441



2DH5\_Ant1\_2480

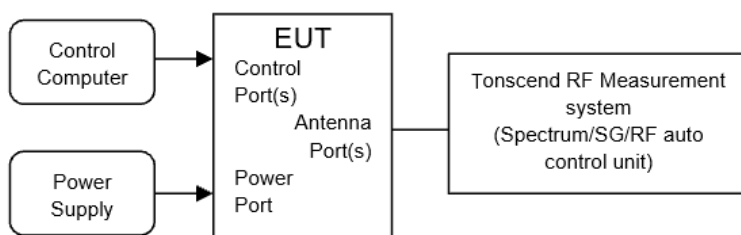


3DH5\_Ant1\_2402



## 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 clause 7.8.5.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

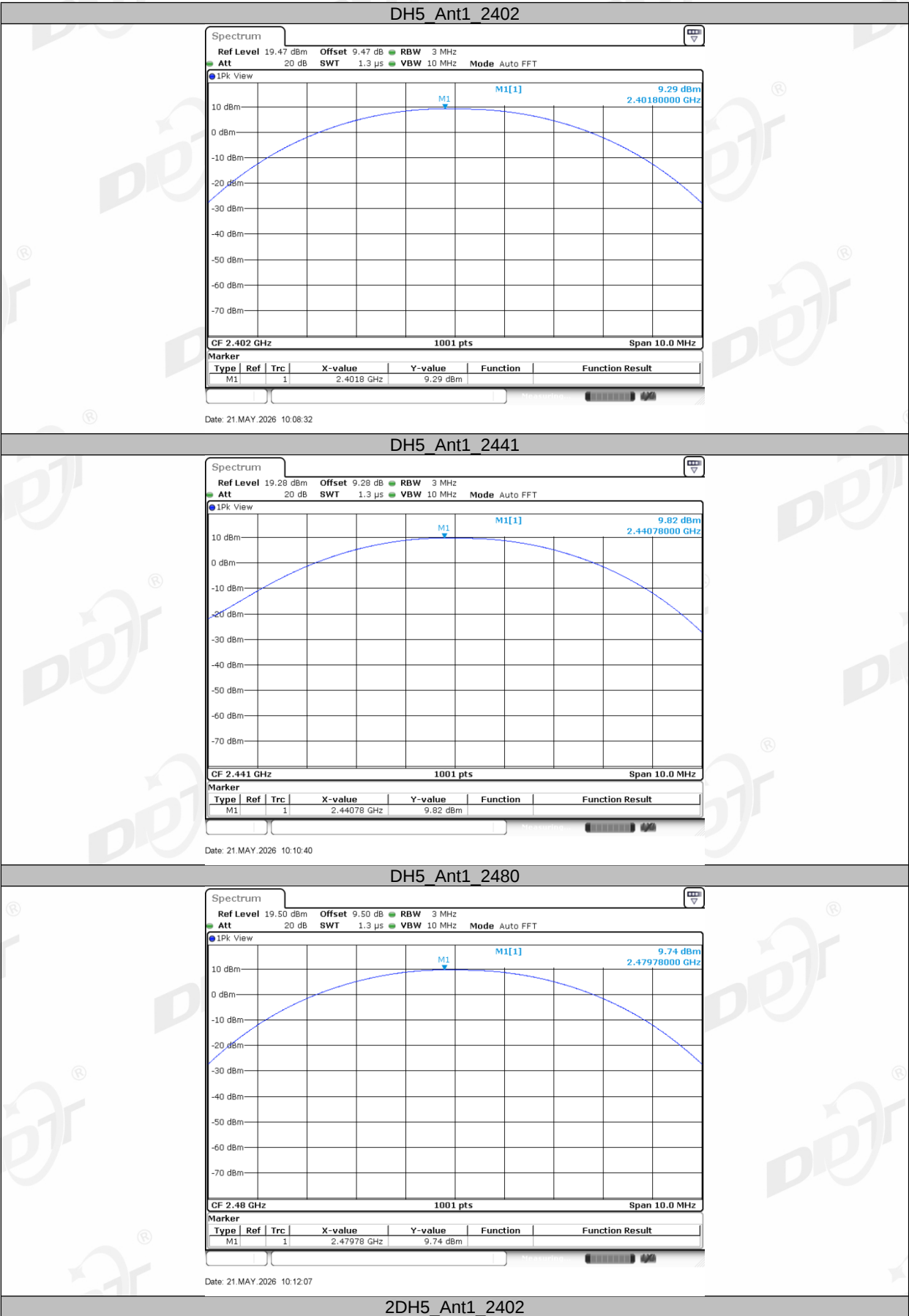
|                |                                                                              |
|----------------|------------------------------------------------------------------------------|
| RBW:           | > 20 dB bandwidth of the emission being measured.                            |
| VBW: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

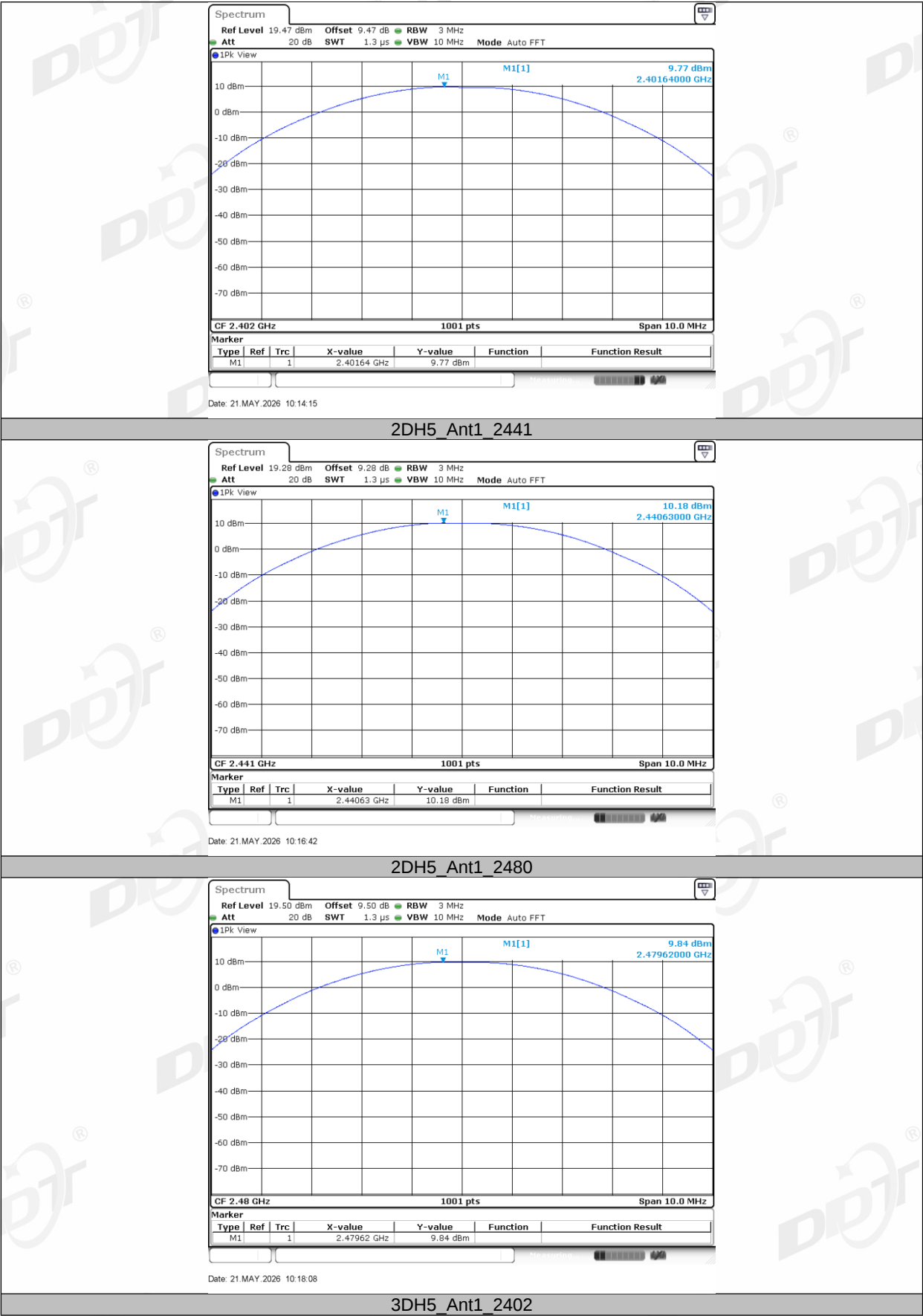
6.4. Test result

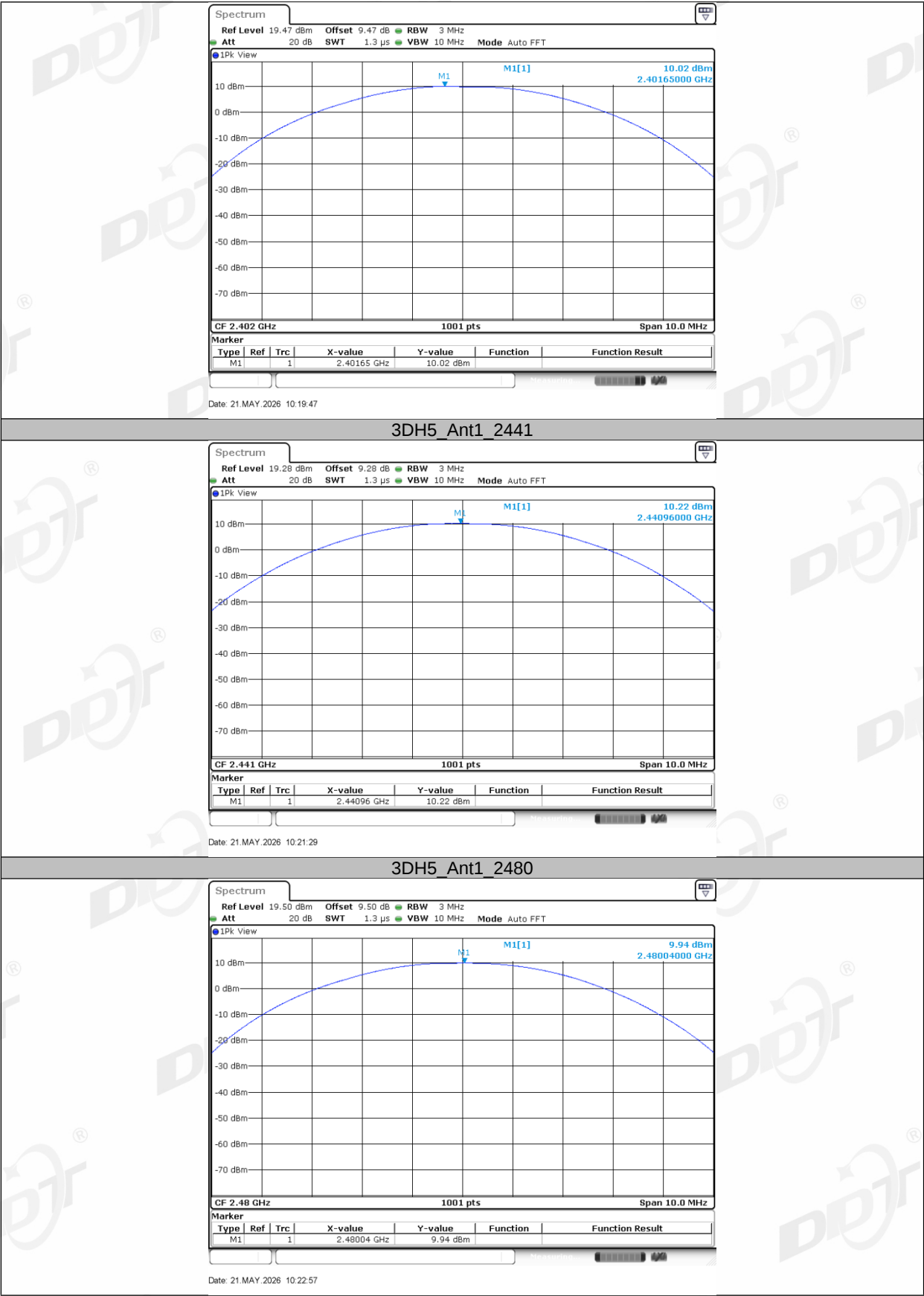
|                    |               |                |                          |
|--------------------|---------------|----------------|--------------------------|
| Test Engineer:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

| Test Mode | Antenna | Frequency [MHz] | Conducted Peak Power[dBm] | Conducted Limit[dBm] | EIRP[dBm] | EIRP Limit[dBm] | Verdict |
|-----------|---------|-----------------|---------------------------|----------------------|-----------|-----------------|---------|
| DH5       | Ant1    | 2402            | 9.29                      | ≤20.97               | 9.09      | ≤30             | PASS    |
|           |         | 2441            | 9.82                      | ≤20.97               | 9.62      | ≤30             | PASS    |
|           |         | 2480            | 9.74                      | ≤20.97               | 9.54      | ≤30             | PASS    |
| 2DH5      | Ant1    | 2402            | 9.77                      | ≤20.97               | 9.57      | ≤30             | PASS    |
|           |         | 2441            | 10.18                     | ≤20.97               | 9.98      | ≤30             | PASS    |
|           |         | 2480            | 9.84                      | ≤20.97               | 9.64      | ≤30             | PASS    |
| 3DH5      | Ant1    | 2402            | 10.02                     | ≤20.97               | 9.82      | ≤30             | PASS    |
|           |         | 2441            | 10.22                     | ≤20.97               | 10.02     | ≤30             | PASS    |
|           |         | 2480            | 9.94                      | ≤20.97               | 9.74      | ≤30             | PASS    |

6.5. Test graphs

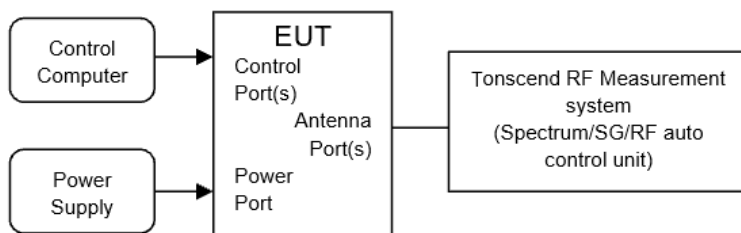






## 7. Carrier Frequency Separation

### 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 clause 7.8.2.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

|                |                                                            |
|----------------|------------------------------------------------------------|
| RBW:           | approximately 30% of the channel spacing                   |
| VBW:           | $VBW \geq RBW$ .                                           |
| Span:          | Wide enough to capture the peaks of two adjacent channels. |
| Detector Mode: | Peak                                                       |
| Sweep time:    | Auto                                                       |
| Trace mode:    | Max hold                                                   |
- (5) Use the marker-delta function to determine the separation between the peaks of the adjacent channels and record the results in the report.

7.4. Test result

|                    |               |                |                          |
|--------------------|---------------|----------------|--------------------------|
| Test Engineer:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

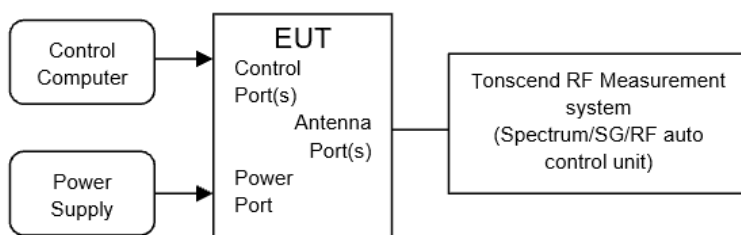
| Test Mode | Antenna | Frequency [MHz] | Result [MHz] | Limit [MHz] | Verdict |
|-----------|---------|-----------------|--------------|-------------|---------|
| DH5       | Ant1    | Hop             | 1            | ≥0.960      | PASS    |
| 2DH5      | Ant1    | Hop             | 1.003        | ≥0.840      | PASS    |
| 3DH5      | Ant1    | Hop             | 1.003        | ≥0.860      | PASS    |

7.5. Test graphs



## 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 clause 7.8.4.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for the maximum peak output power measurement:
 

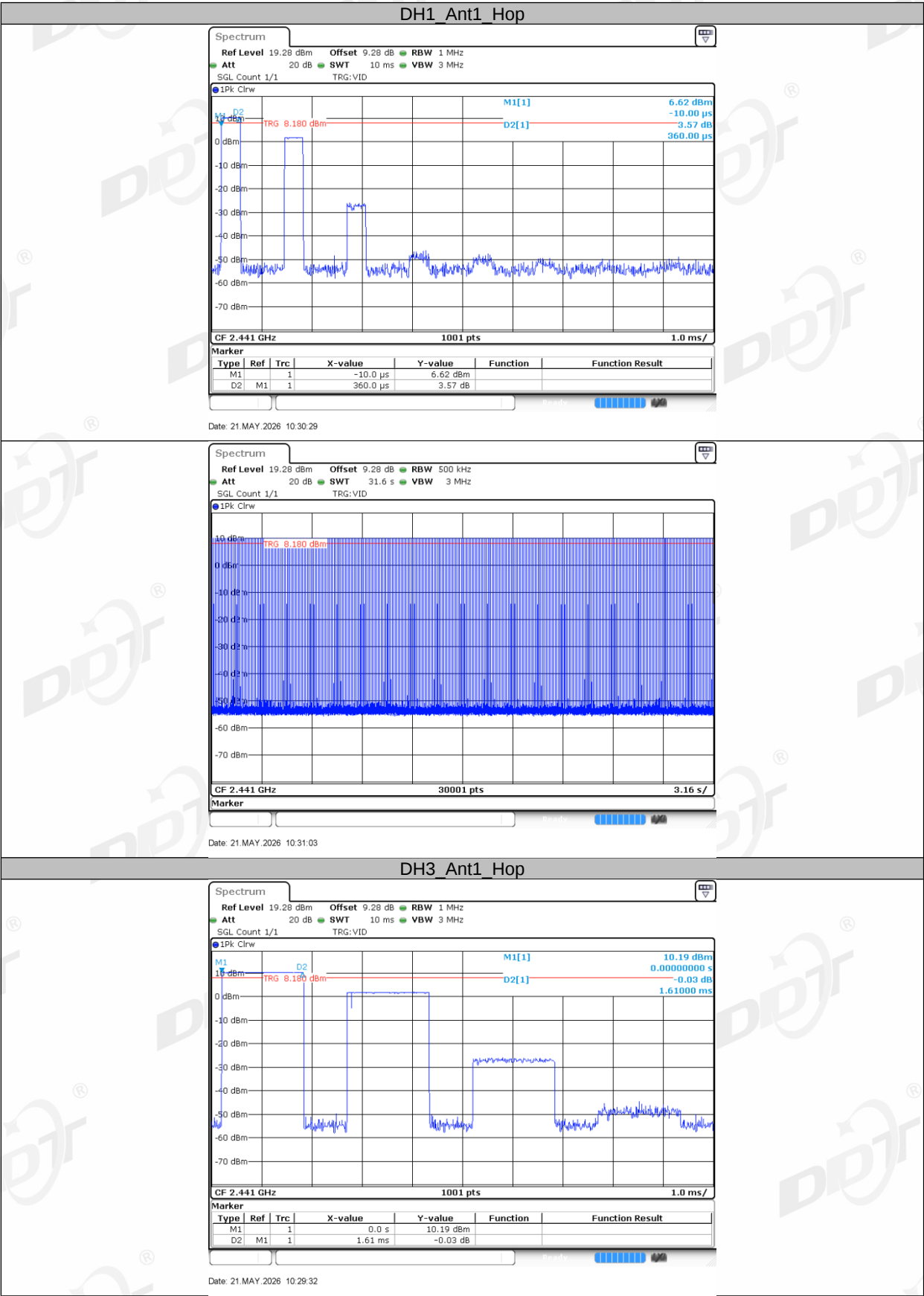
|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| RBW:           | ≤ channel spacing and where possible RBW should be set $\gg 1 / T$ |
| VBW:           | $VBW \geq RBW$ .                                                   |
| Span:          | Zero span, centered on a hopping channel.                          |
| Detector Mode: | Peak                                                               |
| Sweep time:    | Auto                                                               |
| Trace mode:    | Clear Write.                                                       |
- (5) The test period:  $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$
- (6) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = total hops \* pulse's on time.
- (7) Measure and record the results in the report.

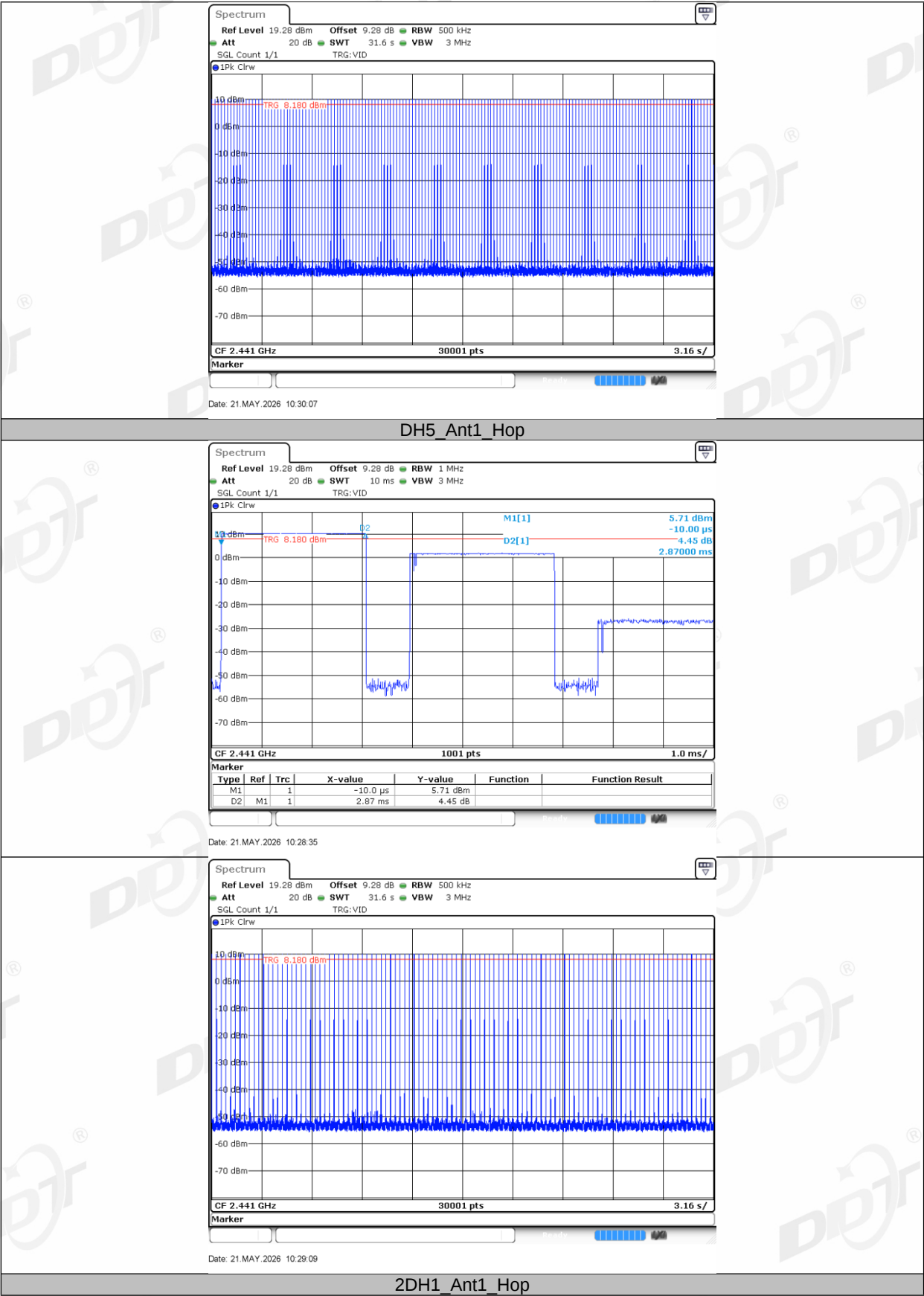
8.4. Test result

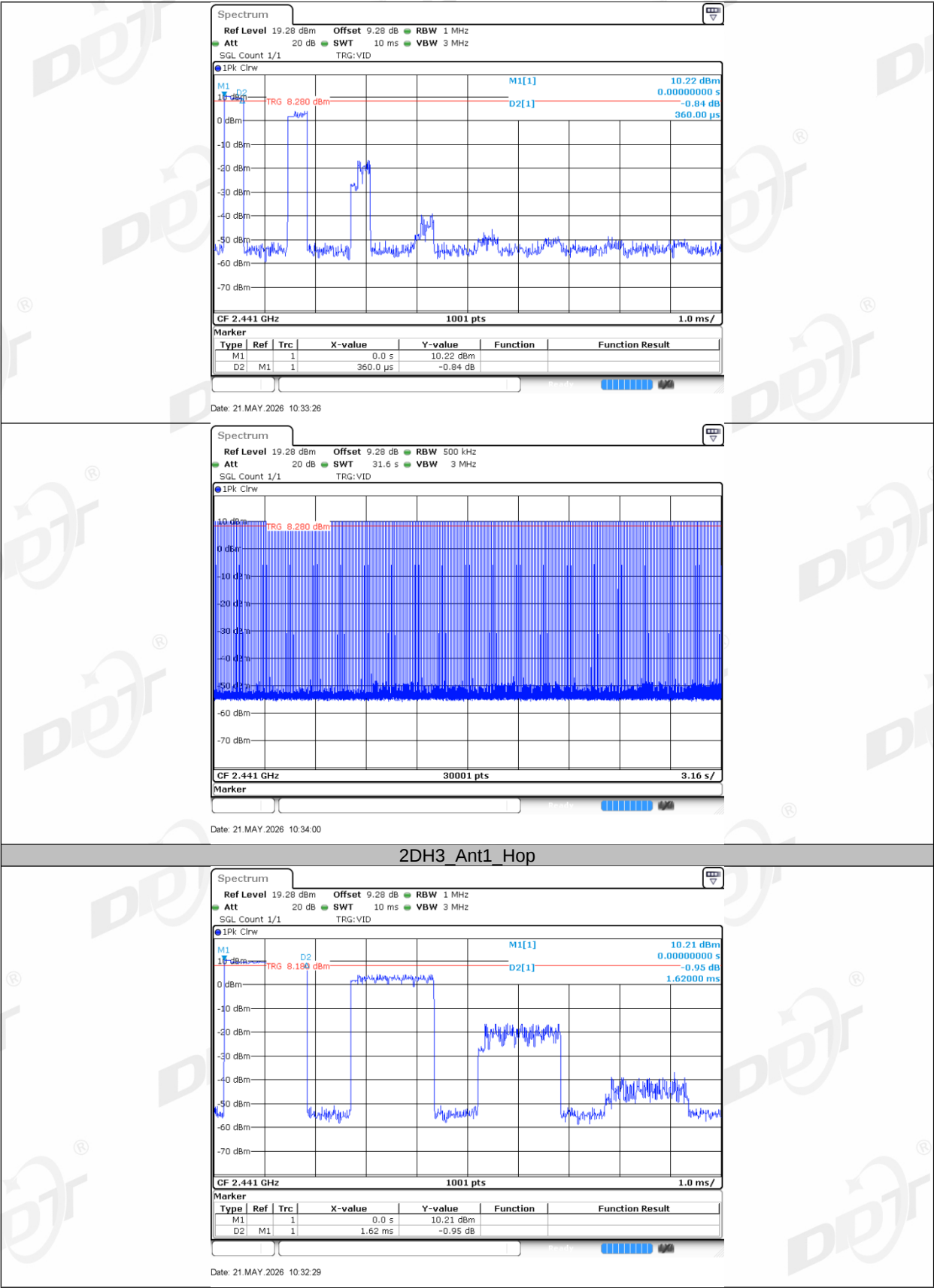
|                    |               |                |                          |
|--------------------|---------------|----------------|--------------------------|
| Test Engineer:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

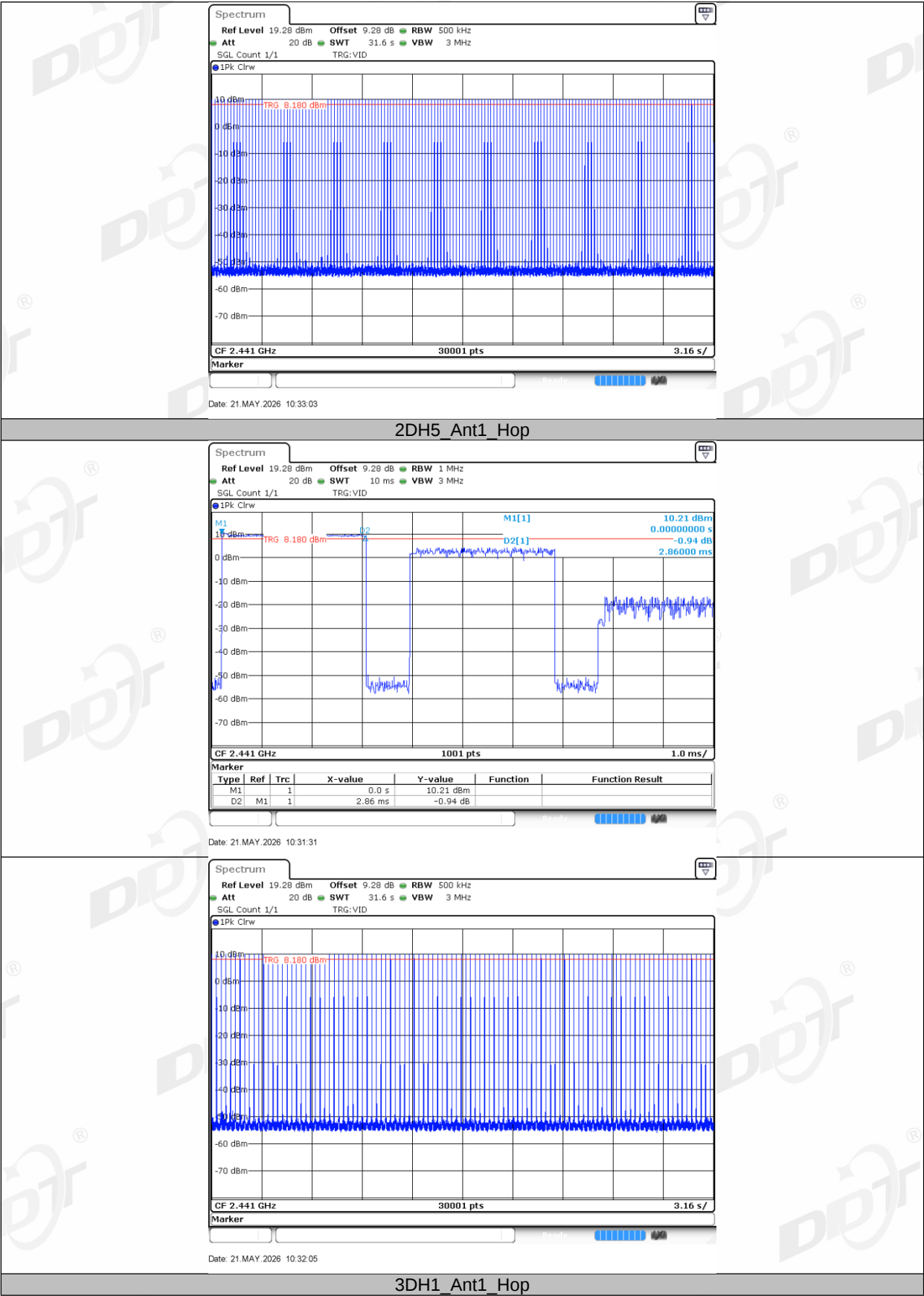
| Test Mode | Antenna | Frequency [MHz] | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|-----------|---------|-----------------|-----------------|-----------------|-----------|----------|---------|
| DH1       | Ant1    | Hop             | 0.360           | 320             | 0.115     | ≤0.4     | PASS    |
| DH3       | Ant1    | Hop             | 1.610           | 160             | 0.258     | ≤0.4     | PASS    |
| DH5       | Ant1    | Hop             | 2.870           | 107             | 0.307     | ≤0.4     | PASS    |
| 2DH1      | Ant1    | Hop             | 0.360           | 320             | 0.115     | ≤0.4     | PASS    |
| 2DH3      | Ant1    | Hop             | 1.620           | 160             | 0.259     | ≤0.4     | PASS    |
| 2DH5      | Ant1    | Hop             | 2.860           | 107             | 0.306     | ≤0.4     | PASS    |
| 3DH1      | Ant1    | Hop             | 0.360           | 320             | 0.115     | ≤0.4     | PASS    |
| 3DH3      | Ant1    | Hop             | 1.610           | 160             | 0.258     | ≤0.4     | PASS    |
| 3DH5      | Ant1    | Hop             | 2.870           | 107             | 0.307     | ≤0.4     | PASS    |

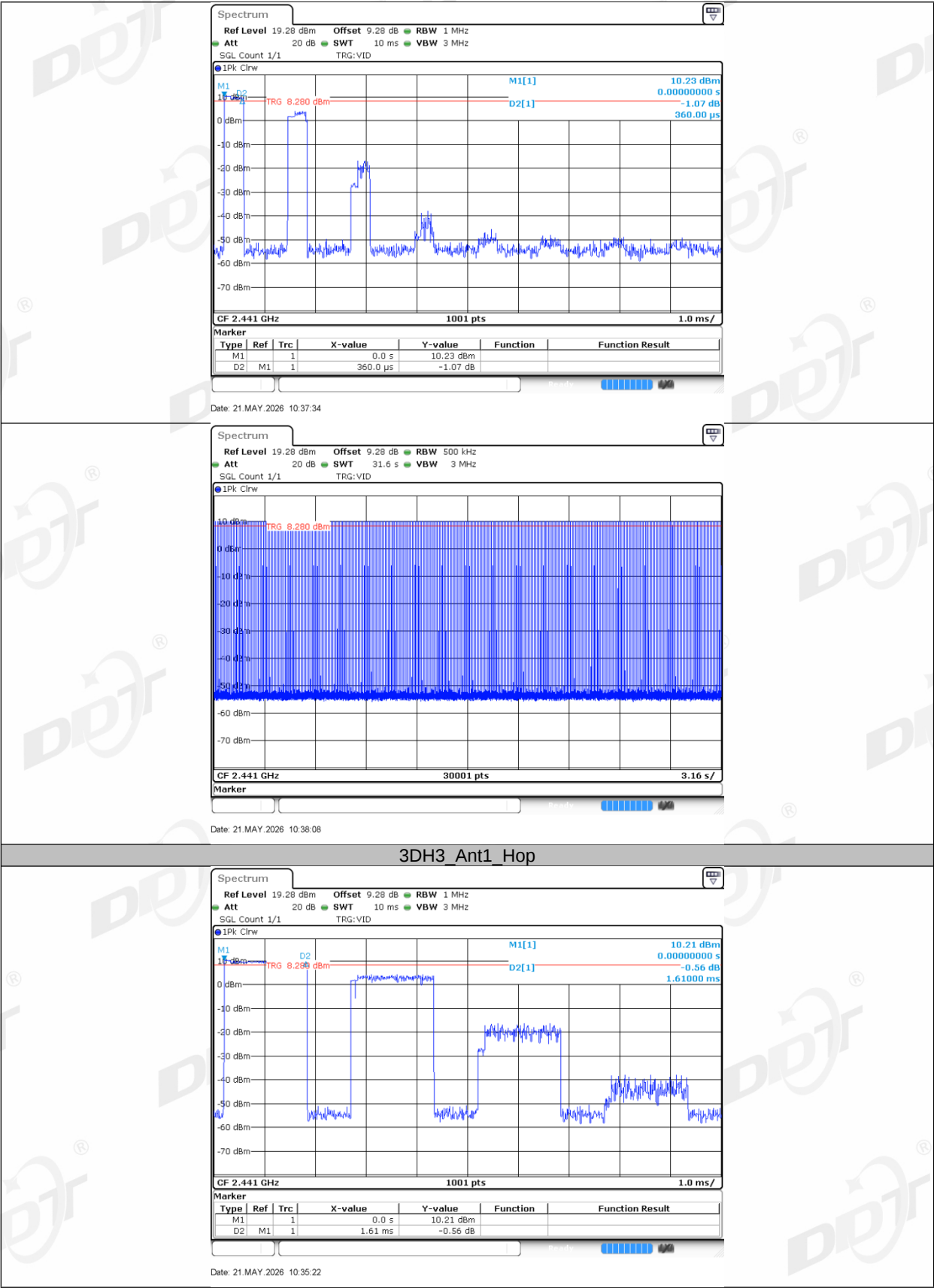
8.5. Test graphs

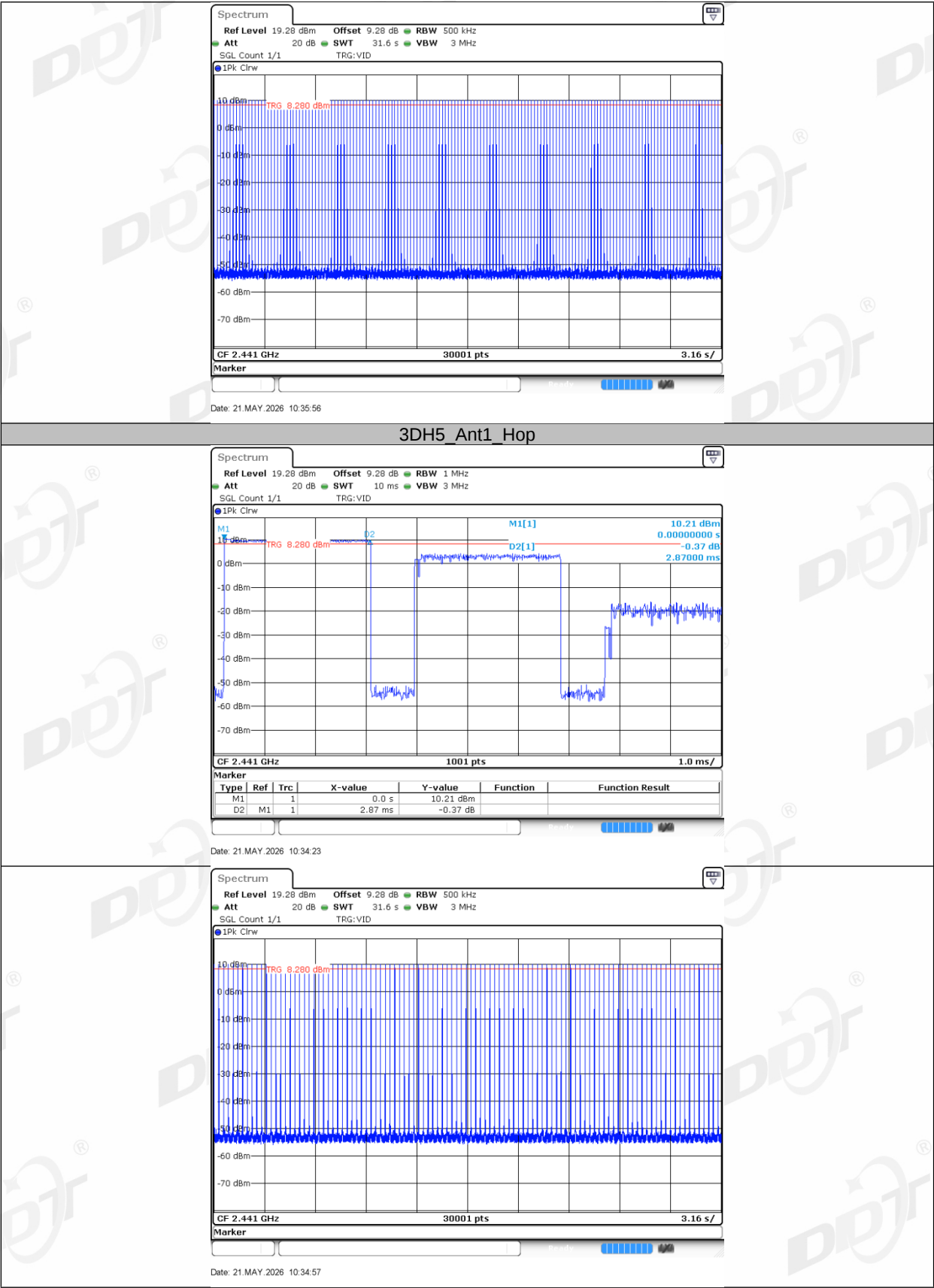






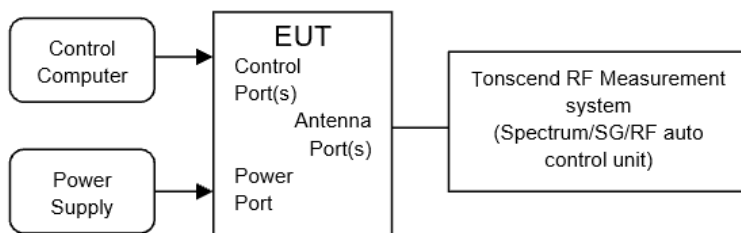






## 9. Number of Hopping Channel

### 9.1. Block diagram of test setup



### 9.2. Limits

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

### 9.3. Test procedure

- (1) The test according to ANSI C63.10 clause 7.8.3.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
- (4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

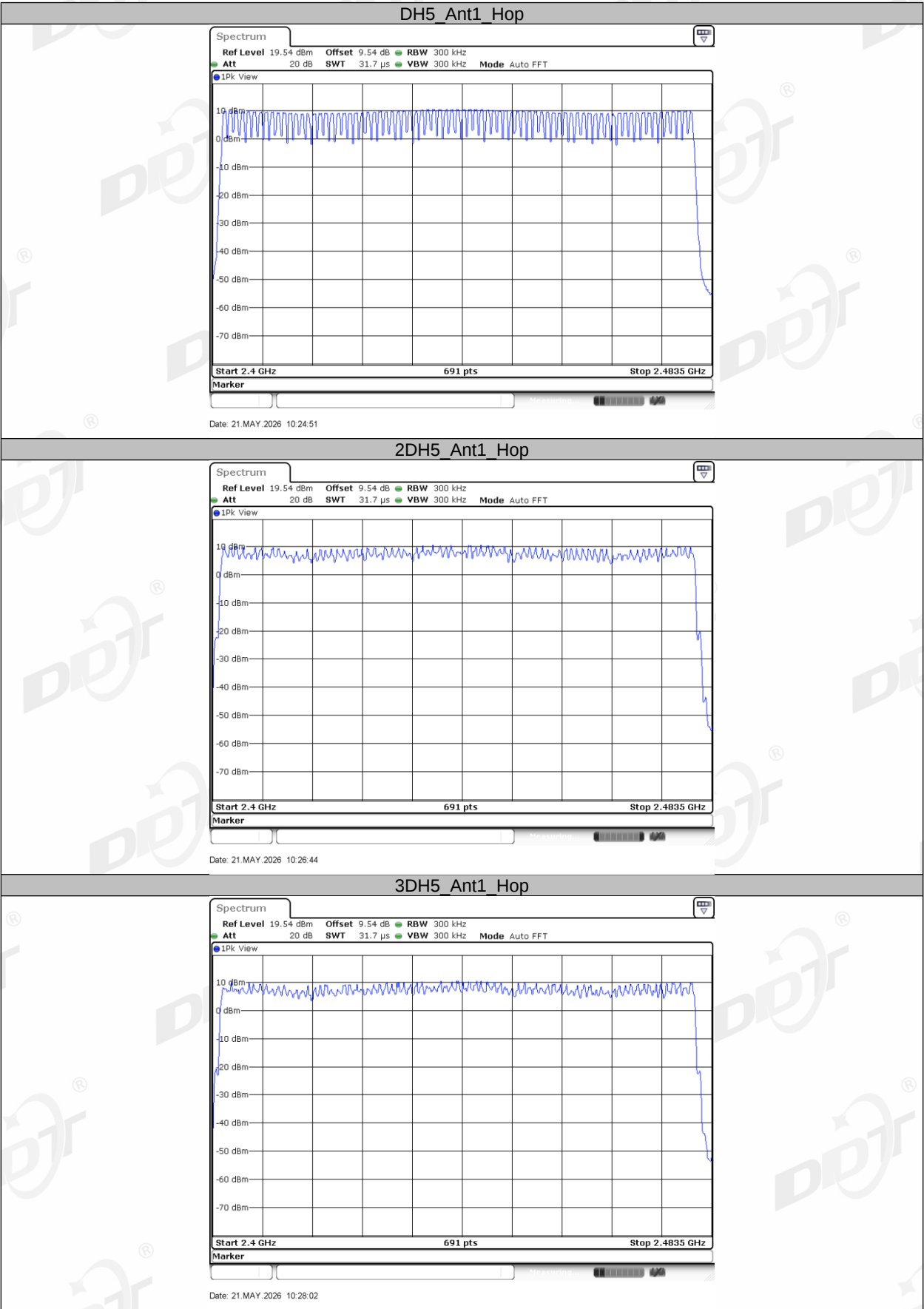
|                |                                                                                           |
|----------------|-------------------------------------------------------------------------------------------|
| RBW:           | RBW to less than 30% of the channel spacing or the 20 dB bandwidth,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

9.4. Test result

|                    |               |                |                          |
|--------------------|---------------|----------------|--------------------------|
| Test Engineer:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

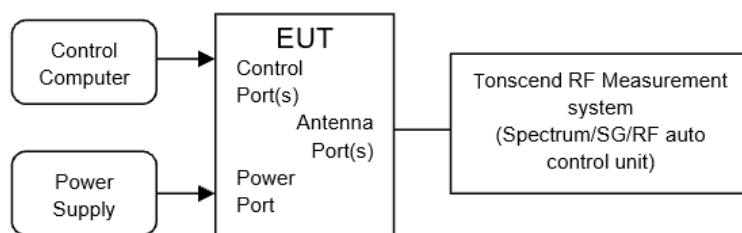
| Test Mode | Antenna | Frequency [MHz] | Result [Num] | Limit [Num] | Verdict |
|-----------|---------|-----------------|--------------|-------------|---------|
| DH5       | Ant1    | Hop             | 79           | ≥15         | PASS    |
| 2DH5      | Ant1    | Hop             | 79           | ≥15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

9.5. Test graphs



## 10. Band Edge Compliance (Conducted Method)

### 10.1. Block diagram of test setup



### 10.2. Limit

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

### 10.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

|                |                                          |
|----------------|------------------------------------------|
| RBW:           | 100 kHz                                  |
| VBW:           | 300 kHz                                  |
| Span           | Encompass frequency range to be measured |
| Detector Mode: | Peak                                     |
| Sweep time:    | Auto                                     |
| Trace mode     | Max hold                                 |
- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
- (4) Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

10.4. Test result

|                    |               |                |                          |
|--------------------|---------------|----------------|--------------------------|
| Test Engineer:     | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition: | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test Power Supply: | Battery       | Sample Number: |                          |

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

10.5. Test graphs



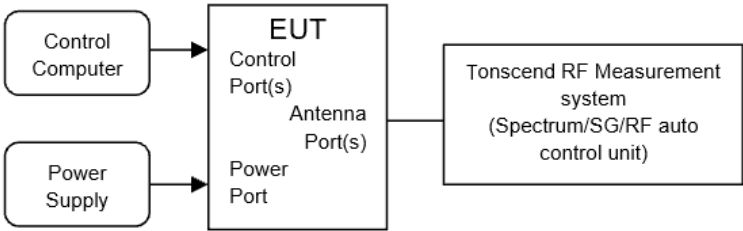






11. RF Conducted Spurious Emissions

11.1. Block diagram of test setup



11.2. Limits

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

11.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:
  - Center frequency                      Test frequency
  - RBW:                                      100 kHz
  - VBW:                                      300 kHz
  - Span                                      Wide enough to capture the peak level of the in-band emission
  - Detector Mode:                      Peak
  - Sweep time:                              Auto
  - Trace mode                              Max hold
- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
- (4) Set the spectrum analyzer as follows:
  - RBW:                                      100 kHz
  - VBW:                                      300 kHz
  - Span                                      Encompass frequency range to be measured
  - Number of measurement points                      ≥Span/RBW
  - Detector Mode:                      Peak
  - Sweep time:                              Auto
  - Trace mode                              Max hold

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

11.4. Test result

|                                                              |               |                |                          |
|--------------------------------------------------------------|---------------|----------------|--------------------------|
| Test Engineer:                                               | Zeng Zhongyao | Test Site:     | RF Measurement System 3# |
| Ambient Condition:                                           | 25.4℃,60.7%RH | Test Date:     | 2026.05.21               |
| Test                      Power                      Battery |               | Sample Number: |                          |

|         |  |  |  |
|---------|--|--|--|
| Supply: |  |  |  |
|---------|--|--|--|

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

11.5. Test graphs

