



## FCC CERTIFICATION TEST REPORT

|                                |   |                                                                                                                                                           |
|--------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>               | : | Guangdong Hiway Integrated Circuit Technology Co., Ltd.                                                                                                   |
| <b>Address of Applicant</b>    | : | No. 1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, People's republic of China                          |
| <b>Manufacturer</b>            | : | Guangdong Hiway Integrated Circuit Technology Co., Ltd.                                                                                                   |
| <b>Address of Manufacturer</b> | : | No. 1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, People's republic of China                          |
| <b>Equipment under Test</b>    | : | Hand LF Tool                                                                                                                                              |
| <b>Model No.</b>               | : | HW71012-SGY-330                                                                                                                                           |
| <b>FCC ID</b>                  | : | 2BLDF-HW71012                                                                                                                                             |
| <b>Test Standard(s)</b>        | : | FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013                                                                                             |
| <b>Report No.</b>              | : | DDT-RE24091103-2E01                                                                                                                                       |
| <b>Issue Date</b>              | : | 2024/11/02                                                                                                                                                |
| <b>Issue By</b>                | : | 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 .....                    | 5  |
| 2.   | General Test Information .....                   | 6  |
| 2.1. | Description of EUT .....                         | 6  |
| 2.2. | Accessories of EUT .....                         | 6  |
| 2.3. | Block diagram of EUT configuration for test..... | 6  |
| 2.4. | Decision of final test mode .....                | 6  |
| 2.5. | Deviations of test standard .....                | 7  |
| 2.6. | Test environment conditions.....                 | 7  |
| 2.7. | Test laboratory .....                            | 7  |
| 2.8. | Measurement uncertainty .....                    | 8  |
| 3    | 20 dB Bandwidth.....                             | 9  |
| 3.1. | Test equipment .....                             | 9  |
| 3.2. | Block diagram of test setup .....                | 9  |
| 3.3. | Limits.....                                      | 9  |
| 3.4. | Test procedure.....                              | 9  |
| 3.5. | Test result .....                                | 9  |
| 3.6. | Test data .....                                  | 10 |
| 4.   | Radiated Emission.....                           | 11 |
| 4.1. | Test equipment .....                             | 11 |
| 4.2. | Block diagram of test setup .....                | 12 |
| 4.3. | Limits.....                                      | 12 |
| 4.4. | Assistant equipment used for test .....          | 13 |
| 4.5. | Test procedure.....                              | 13 |
| 4.6. | Test result .....                                | 14 |
| 4.7. | Test data .....                                  | 15 |
| 5.   | Power Line Conducted Emissions.....              | 19 |
| 5.1. | Test equipment .....                             | 19 |
| 5.2. | Block diagram of test setup .....                | 19 |
| 5.3. | Limits.....                                      | 19 |
| 5.4. | Assistant equipment used for test .....          | 19 |
| 5.5. | Test procedure.....                              | 20 |
| 5.6. | Test result .....                                | 20 |
| 5.7. | Test data .....                                  | 21 |
| 6.   | Test Setup Photograph.....                       | 23 |
| 7.   | Photos of the EUT .....                          | 25 |

## Test Report Declare

|                                |   |                                                                                                                                  |
|--------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>               | : | Guangdong Hiway Integrated Circuit Technology Co., Ltd.                                                                          |
| <b>Address of Applicant</b>    | : | No. 1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, People's republic of China |
| <b>Equipment under Test</b>    | : | Hand LF Tool                                                                                                                     |
| <b>Model No.</b>               | : | HW71012-SGY-330                                                                                                                  |
| <b>Manufacturer</b>            | : | Guangdong Hiway Integrated Circuit Technology Co., Ltd.                                                                          |
| <b>Address of Manufacturer</b> | : | No. 1 Headquarters, Songshan Lake High Technology Industrial Park, Dongguan City, Guangdong Province, People's republic of China |

**Test Standard Used:**

FCC Rules and Regulations Part 15 Subpart C, ANSI C63.10:2013

**We Declare:**

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

|                         |                     |                      |                       |
|-------------------------|---------------------|----------------------|-----------------------|
| <b>Report No.:</b>      | DDT-RE24091103-2E01 |                      |                       |
| <b>Date of Receipt:</b> | 2024/09/29          | <b>Date of Test:</b> | 2024/09/29~2024/10/28 |

**Prepared By:****Jason Cao/Engineer****Approved By:****Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

| Rev. | Revisions     | Issue Date | Revised By |
|------|---------------|------------|------------|
| ---  | Initial issue | 2024/11/02 |            |
|      |               |            |            |

## 1. Summary of Test Results

| No. | Test Parameter                 | Clause No.                               | Condition | Result |
|-----|--------------------------------|------------------------------------------|-----------|--------|
| 1   | 20 dB Bandwidth                | FCC Part 15: 15.215                      | /         | Pass   |
| 2   | Radiated Emission              | FCC Part 15: 15.205, FCC Part 15: 15.209 | /         | Pass   |
| 3   | Power Line Conducted Emissions | FCC Part 15: 15.207(a)                   | /         | Pass   |
| 4   | Antenna Requirement            | FCC Part 15: 15.203                      | /         | Pass   |

Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.

## 2. General Test Information

### 2.1. Description of EUT

|                          |                                                                   |
|--------------------------|-------------------------------------------------------------------|
| EUT Name                 | : Hand LF Tool                                                    |
| Model Number             | : HW71012-SGY-330                                                 |
| EUT Function Description | : Please reference user manual of this device                     |
| Power Supply             | : DC 5V from external USB cable<br>3.7V built-in battery, 2600mAh |

|                     |           |
|---------------------|-----------|
| Modulation          | : ASK     |
| Operation frequency | : 125 kHz |

|                     |                               |
|---------------------|-------------------------------|
| Antenna information |                               |
| Antenna Type        | : Inductive loop coil antenna |

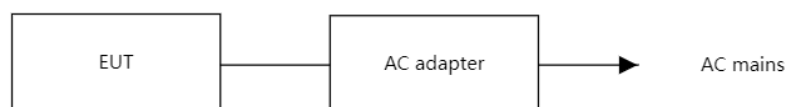
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's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

| Tested mode, channel, information |         |                 |
|-----------------------------------|---------|-----------------|
| Mode                              | Channel | Frequency (kHz) |
| TX mode                           | /       | 125             |

Note : New battery is used during all test

## 2.5. Deviations of test standard

No deviation.

## 2.6. Test environment conditions

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

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

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

## 2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

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

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

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

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

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

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

## 2.8. Measurement uncertainty

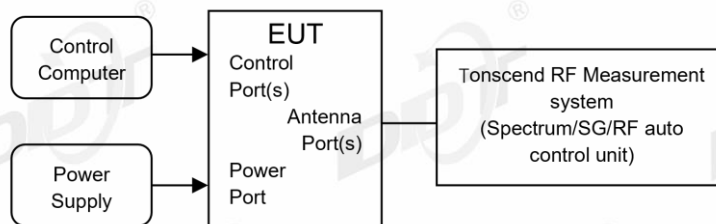
| Test Item                                                                                                                                     | Uncertainty                                                                                                                                               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

#### 3.1. Test equipment

| Equipment         | Manufacturer | Model No. | Serial No.  | Cal Due To |
|-------------------|--------------|-----------|-------------|------------|
| SPECTRUM ANALYZER | R&S          | FSU26     | DDT-ZC00236 | 2025/07/08 |

#### 3.2. Block diagram of test setup



#### 3.3. 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.

#### 3.4. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and 10 kHz VBW. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

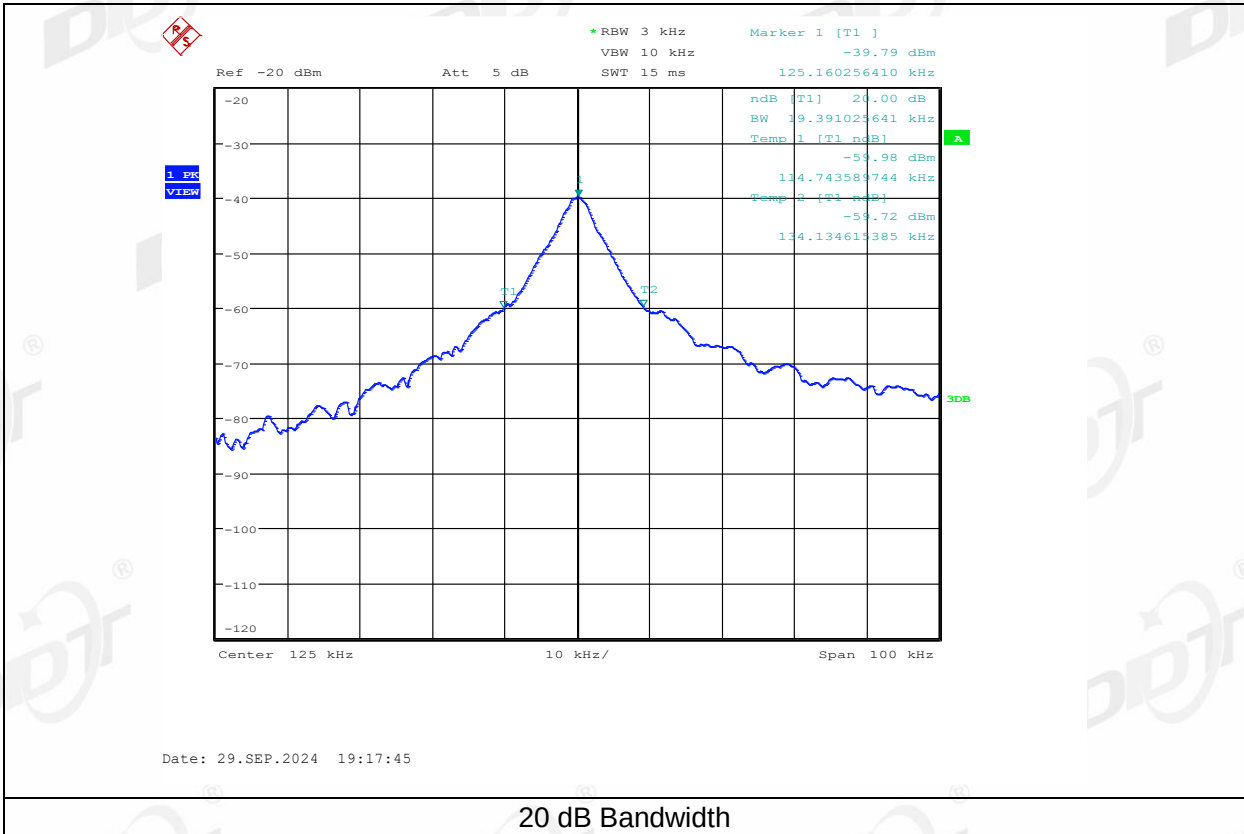
#### 3.5. Test result

|                              |                           |
|------------------------------|---------------------------|
| Test Site: 2#EMC Shield Room | Test Date: 2024/09/29     |
| Condition: 24.2°C, 38.3%     | Test Engineer: Zora Zhang |
| Memo: /                      |                           |

|                                     |                            |
|-------------------------------------|----------------------------|
| EUT Name: Hand LF Tool              | EUT Model: HW71012-SGY-330 |
| Sample No.: S24091103-010           | Test Mode: TX mode         |
| Power supply: 3.7V built-in battery | Memo: /                    |

| Freq. (kHz) | 20 dB bandwidth Result (kHz) | Conclusion |
|-------------|------------------------------|------------|
| 125         | 19.391                       | Pass       |

3.6. Test data

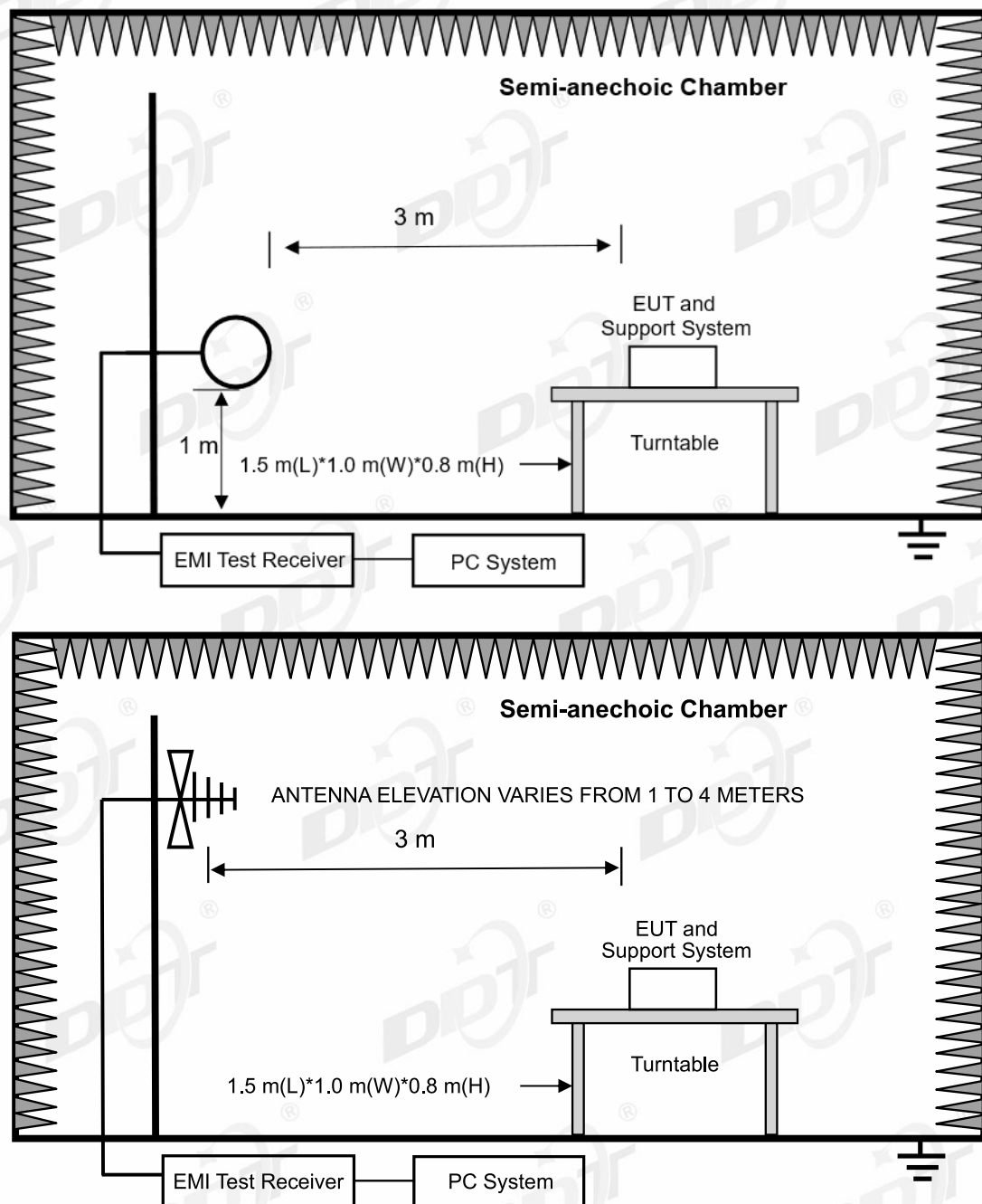


## 4. Radiated Emission

### 4.1. Test equipment

| Equipment                    | Manufacturer      | Model No.          | Serial No.  | Cal Due To |
|------------------------------|-------------------|--------------------|-------------|------------|
| PSA Series Spectrum Analyzer | Agilent           | E4447A             | DDT-ZC00517 | 2025/03/31 |
| Broad-Band Horn Antenna      | Schwarzbeck       | BBHA 9170          | DDT-ZC00506 | 2025/04/26 |
| RF Cable                     | N/A               | W13.02 AP1-X2      | DDT-ZC04023 | 2025/03/31 |
| Pre-amplifier                | COM-POWER         | PAM-118A           | DDT-ZC01293 | 2025/08/25 |
| RF cable                     | Yuhu Technology   | JCTB810-NJ-NJ-9M   | DDT-ZC02538 | 2025/03/31 |
| High pass filter             | Micro-Tronics     | HPM50102           | DDT-ZC00561 | 2025/04/22 |
| Pre-amplifier                | COM-POWER         | PAM-840A           | DDT-ZC01693 | 2025/03/31 |
| RF Cable                     | N/A               | W24.02 HL-562      | DDT-ZC04022 | 2025/03/31 |
| High pass filter             | Micro-Tronics     | HPM50108           | DDT-ZC00560 | 2025/04/22 |
| RF cable                     | Zhongke Junchuang | JCT26S-NJ-NJ-1.5M  | DDT-ZC02762 | 2025/03/31 |
| Micro-Tronics filters        | REBES             | BRM50702           | DDT-ZC03242 | /          |
| RF cable                     | Yuhu Technology   | ZT26S-SMAJ-SMAJ-1M | DDT-ZC02037 | 2025/03/31 |
| Hochgewinn-Hornantenne       | SCHWARZBEC K      | BBHA 9120 D        | DDT-ZC02129 | 2025/09/18 |
| EMI TEST RECEIVER            | R&S               | ESU26              | DDT-ZC01909 | 2025/03/31 |
| High Pass filter             | Xi'an Xingbo      | XBLBQ-GTA67        | DDT-ZC02179 | 2025/04/22 |
| Active Loop Antenna          | Schwarzbeck       | FMZB1519           | DDT-ZC00524 | 2025/09/11 |
| Micro-Tronics filters        | REBES             | BRM50716           | DDT-ZC03240 | /          |
| TRILOG Broadband Antenna     | Schwarzbeck       | VULB 9163          | DDT-ZC02050 | 2025/07/11 |

#### 4.2. Block diagram of test setup



#### 4.3. Limits

| FREQUENCY<br>(MHz) | DISTANCE<br>(Meters) | FIELD STRENGTHS LIMIT        |                                   |
|--------------------|----------------------|------------------------------|-----------------------------------|
|                    |                      | ( $\mu\text{V}/\text{m}$ )   | $\text{dB}(\mu\text{V})/\text{m}$ |
| 0.009 ~ 0.490      | 300                  | $2400/\text{F}(\text{kHz})$  | $67.6-20\log(\text{F})$           |
| 0.490 ~ 1.705      | 30                   | $24000/\text{F}(\text{kHz})$ | $87.6-20\log(\text{F})$           |
| 1.705 ~ 30.0       | 30                   | 30                           | 29.54                             |
| 30 ~ 88            | 3                    | 100                          | 40.0                              |
| 88 ~ 216           | 3                    | 150                          | 43.5                              |
| 216 ~ 960          | 3                    | 200                          | 46.0                              |
| 960 ~ 1000         | 3                    | 500                          | 54.0                              |

Note:

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30 MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dBuV/m}) = \text{Limit}_{300\text{m}}(\text{dBuV/m}) + 40\text{Log}(300\text{m}/3\text{m}) = \text{Limit}_{300\text{m}}(\text{dBuV/m}) + 80$$

$$\text{Limit}_{3\text{m}}(\text{dBuV/m}) = \text{Limit}_{30\text{m}}(\text{dBuV/m}) + 40\text{Log}(30\text{m}/3\text{m}) = \text{Limit}_{30\text{m}}(\text{dBuV/m}) + 40$$

#### 4.4. Assistant equipment used for test

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

#### 4.5. Test procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a fully-anechoic chamber for above 1G.

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

| Test frequency range | Test antenna used        | Test antenna distance |
|----------------------|--------------------------|-----------------------|
| 9 kHz - 30 MHz       | Active Loop antenna      | 3 m                   |
| 30 MHz - 1 GHz       | TRILOG Broadband Antenna | 3 m                   |

According ANSI C63.10:2013 clause 6.4.6 and 6.5.3, for measurements below 30 MHz, Antenna was located 3 m from EUT, the loop antenna was positioned in three antenna orientations (parallel, perpendicular, and round-parallel), for each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable, and the lowest height of the magnetic antenna shall be 1 m above the ground. For measurement above 30MHz, the TRILOG Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1 m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below final test was performed with frequency range from 9 kHz to 18 GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz, for emissions from 9 kHz - 90 kHz, 110 kHz - 490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW.

| Frequency band   | RBW     |
|------------------|---------|
| 9 kHz - 150 kHz  | 200 Hz  |
| 150 kHz - 30 MHz | 9 kHz   |
| 30 MHz - 1 GHz   | 120 kHz |

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; According ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure.

(8) For portable device, X axis, Y axis, Z axis are tested, and worse setup is reported.

#### 4.6. Test result

**PASS. (See below detailed test result)**

4.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-10-10

Tested By:

Zhong Nan

EUT:

Hand LF Tool

Model Number:

HW71012-SGY-330

Test Mode:

125K TX mode

Power Supply:

DC 3.7V

Condition:

Temp:24.5°C;Humi:47.4%

Test Site:

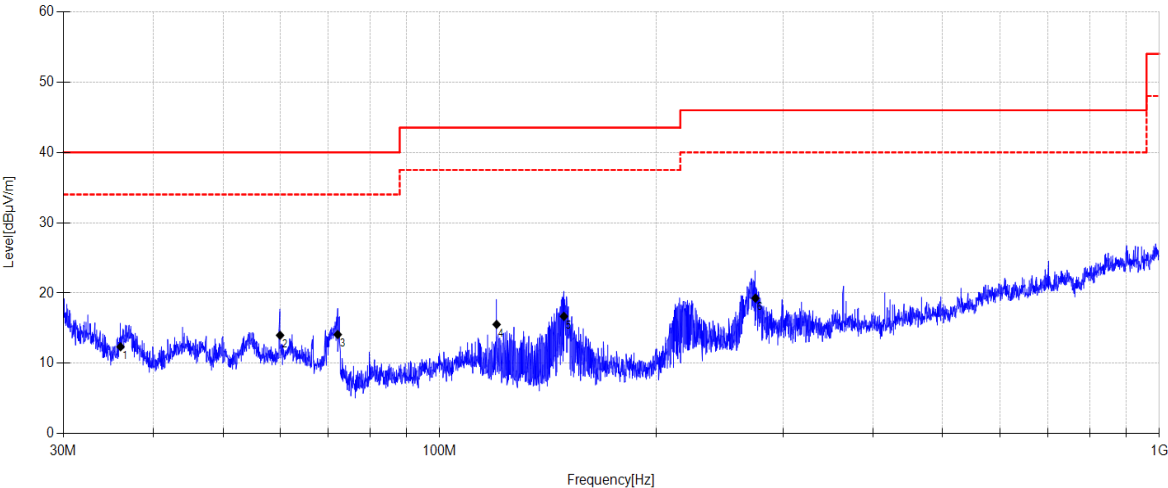
DDT 3# Chamber

File Path:

d:\ts\2024 report data\Q24091103-2E\FCC Below 1G\20241010-005149\_H

Memo:

Sample Number:S24091103-010



| Data List |             |                  |                     |                 |                 |                |             |          |            |
|-----------|-------------|------------------|---------------------|-----------------|-----------------|----------------|-------------|----------|------------|
| NO.       | Freq. [MHz] | Reading [dBμV/m] | Antenna Factor [dB] | Cable Loss [dB] | Result [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Detector | Polarity   |
| 1         | 36.025      | 27.76            | 11.90               | 3.80            | 12.36           | 40.00          | 27.64       | QP       | Horizontal |
| 2         | 60.019      | 28.35            | 12.79               | 3.96            | 14.00           | 40.00          | 26.00       | QP       | Horizontal |
| 3         | 72.173      | 31.63            | 9.53                | 4.04            | 14.10           | 40.00          | 25.90       | QP       | Horizontal |
| 4         | 119.991     | 32.33            | 10.00               | 4.33            | 15.54           | 43.50          | 27.96       | QP       | Horizontal |
| 5         | 148.810     | 34.64            | 8.72                | 4.48            | 16.69           | 43.50          | 26.81       | QP       | Horizontal |
| 6         | 274.650     | 33.02            | 12.50               | 5.10            | 19.27           | 46.00          | 26.73       | QP       | Horizontal |

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-10-10

Tested By:

Zhong Nan

EUT:

Hand LF Tool

Model Number:

HW71012-SGY-330

Test Mode:

125K TX mode

Power Supply:

DC 3.7V

Condition:

Temp:24.5°C;Humi:47.4%

Test Site:

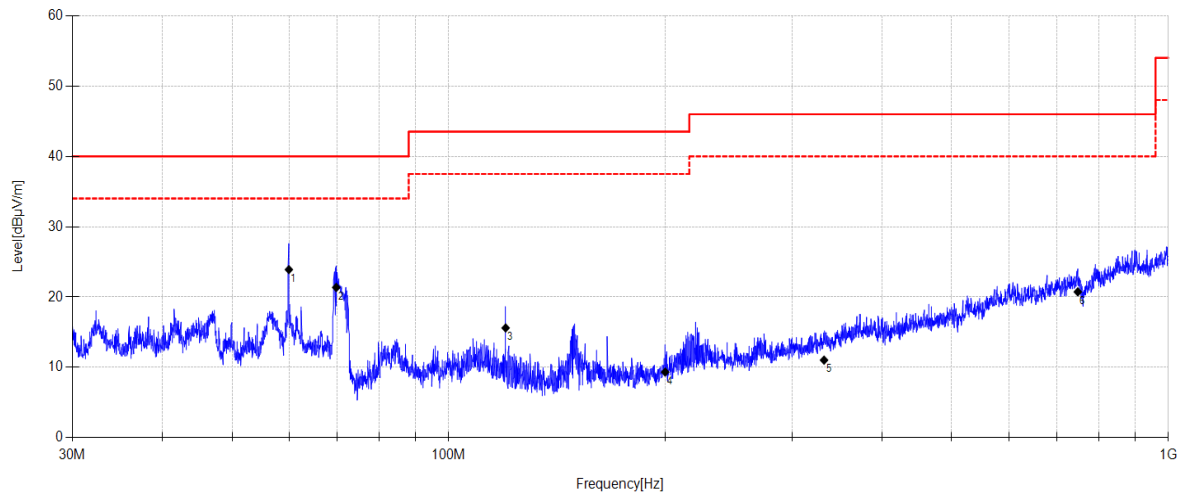
DDT 3# Chamber

File Path:

d:\ts\2024 report data\Q24091103-2E\FCC Below 1G\20241010-005234\_V

Memo:

Sample Number:S24091103-010



| Data List |             |                  |                     |                 |                 |                |             |          |          |
|-----------|-------------|------------------|---------------------|-----------------|-----------------|----------------|-------------|----------|----------|
| NO.       | Freq. [MHz] | Reading [dBμV/m] | Antenna Factor [dB] | Cable Loss [dB] | Result [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Detector | Polarity |
| 1         | 59.977      | 38.26            | 12.79               | 3.96            | 23.91           | 40.00          | 16.09       | QP       | Vertical |
| 2         | 69.784      | 38.5             | 9.95                | 4.02            | 21.37           | 40.00          | 18.63       | QP       | Vertical |
| 3         | 119.991     | 32.4             | 10.00               | 4.33            | 15.61           | 43.50          | 27.89       | QP       | Vertical |
| 4         | 199.910     | 25.03            | 10.75               | 4.76            | 9.34            | 43.50          | 34.16       | QP       | Vertical |
| 5         | 332.359     | 22.67            | 14.44               | 5.35            | 11.04           | 46.00          | 34.96       | QP       | Vertical |
| 6         | 748.575     | 25.12            | 20.07               | 6.82            | 20.74           | 46.00          | 25.26       | QP       | Vertical |

Note:

- Result Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
- Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-10-10

Tested By:

Zhong Nan

EUT:

Hand LF Tool

Model Number:

HW71012-SGY-330

Test Mode:

125K TX mode

Power Supply:

DC 3.7V

Condition:

Temp:24.5°C;Humi:47.4%

Test Site:

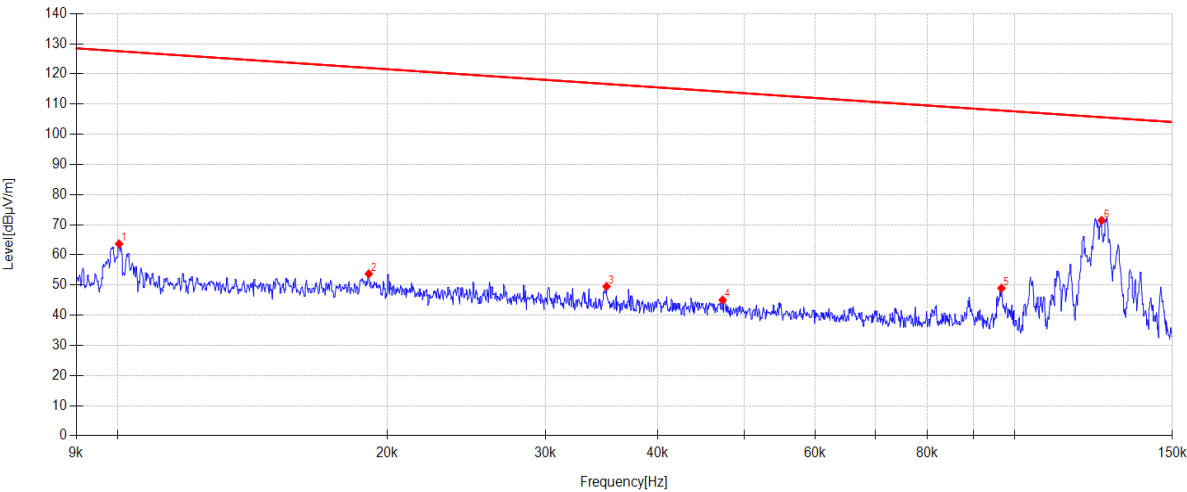
DDT 3# Chamber

File Path:

d:\ts\2024 report data\Q24091103-2E\FCC Below 1G\20241010-002116\_V

Memo:

Sample Number:S24091103-010



| Data List |             |                  |                     |                 |          |                |                |             |          |          |
|-----------|-------------|------------------|---------------------|-----------------|----------|----------------|----------------|-------------|----------|----------|
| NO.       | Freq. [MHz] | Reading [dBµV/m] | Antenna Factor [dB] | Cable loss [dB] | AMP [dB] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Detector | Polarity |
| 1         | 0.010       | 70.35            | 20.50               | 3.21            | -30.40   | 63.66          | 127.56         | 63.90       | PK       | X        |
| 2         | 0.019       | 60.46            | 20.50               | 3.22            | -30.46   | 53.72          | 121.99         | 68.27       | PK       | X        |
| 3         | 0.035       | 56.47            | 20.40               | 3.23            | -30.57   | 49.53          | 116.69         | 67.16       | PK       | X        |
| 4         | 0.047       | 52.02            | 20.40               | 3.24            | -30.65   | 45.01          | 114.10         | 69.09       | PK       | X        |
| 5         | 0.097       | 56.34            | 20.37               | 3.23            | -30.98   | 48.96          | 107.89         | 58.93       | PK       | X        |
| 6         | 0.125       | 78.99            | 20.22               | 3.22            | -31.00   | 71.43          | 105.65         | 34.22       | PK       | X        |

Note:

1. Level = Reading + Cable Loss + Antenna Factor + AMP

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: 9kHz-150kHz    RBW: 300Hz, VBW: 1 kHz, Sweep time: auto.  
150kHz-30MHz RBW: 10kHz, VBW: 30kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-10-10

Tested By:

Zhong Nan

EUT:

Hand LF Tool

Model Number:

HW71012-SGY-330

Test Mode:

125K TX mode

Power Supply:

DC 3.7V

Condition:

Temp:24.5°C;Humi:47.4%

Test Site:

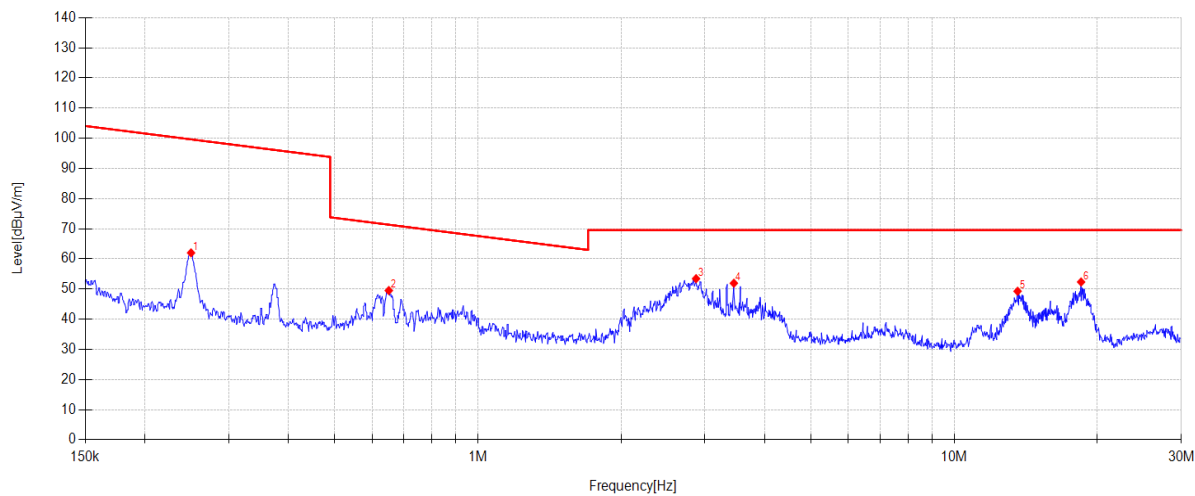
DDT 3# Chamber

File Path:

d:\ts\2024 report data\Q24091103-2E\FCC Below 1G\20241010-002319\_V

Memo:

Sample Number:S24091103-010



| Data List |             |                  |                     |                 |          |                |                |             |          |          |
|-----------|-------------|------------------|---------------------|-----------------|----------|----------------|----------------|-------------|----------|----------|
| NO.       | Freq. [MHz] | Reading [dBμV/m] | Antenna Factor [dB] | Cable loss [dB] | AMP [dB] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Detector | Polarity |
| 1         | 0.250       | 69.60            | 20.16               | 3.24            | -31.00   | 62.00          | 99.64          | 37.64       | PK       | X        |
| 2         | 0.650       | 56.91            | 20.33               | 3.26            | -31.00   | 49.50          | 71.34          | 21.84       | PK       | X        |
| 3         | 2.873       | 60.69            | 20.40               | 3.35            | -31.00   | 53.44          | 69.54          | 16.10       | PK       | X        |
| 4         | 3.448       | 59.14            | 20.42               | 3.37            | -31.00   | 51.93          | 69.54          | 17.61       | PK       | X        |
| 5         | 13.592      | 56.34            | 20.30               | 3.65            | -31.02   | 49.27          | 69.54          | 20.27       | PK       | X        |
| 6         | 18.479      | 59.53            | 20.17               | 3.68            | -31.04   | 52.34          | 69.54          | 17.20       | PK       | X        |

Note:

1. Level = Reading + Cable Loss + Antenna Factor + AMP

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

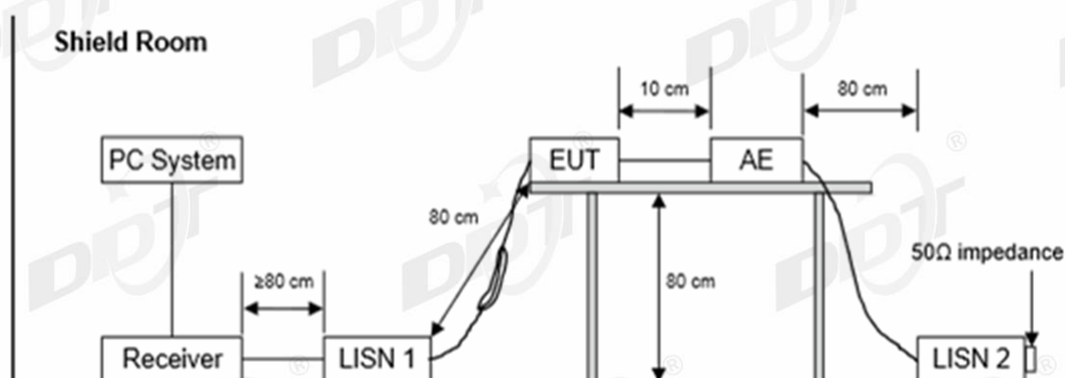
3. Test setup: 9kHz-150kHz    RBW: 300Hz, VBW: 1 kHz, Sweep time: auto.  
150kHz-30MHz RBW: 10kHz, VBW: 30kHz, Sweep time: auto.

## 5. Power Line Conducted Emissions

### 5.1. Test equipment

| Equipment                            | Manufacturer    | Model No.     | Serial No.  | Cal Due To |
|--------------------------------------|-----------------|---------------|-------------|------------|
| Δ-shaped artificial power network    | SCHWARZBECK     | PVDC 8301     | DDT-ZC03939 | 2025/03/31 |
| Two Line V-Network                   | R&S             | ENV216        | DDT-ZC02059 | 2025/07/08 |
| Three-phase artificial power network | SCHWARZBECK     | NSLK 8163     | DDT-ZC01572 | 2025/07/08 |
| Two Line V-Network                   | R&S             | ENV216        | DDT-ZC02056 | 2025/07/08 |
| Conducted Radiated Software          | Audix           | E3            | DDT-ZC00562 | /          |
| Pulse Limiter                        | SCHWARZBECK     | VTSD 9561     | DDT-ZC02128 | 2025/07/08 |
| RF Cable                             | Yuhu Technology | Z806-NJ-NJ-6M | DDT-ZC02004 | 2025/07/08 |
| EMI Test Receiver                    | R&S             | ESCI/E3       | DDT-ZC01297 | 2025/07/08 |

### 5.2. Block diagram of test setup



### 5.3. Limits

| Frequency         | Quasi-Peak Level<br>dB(μV) | Average Level<br>dB(μV) |
|-------------------|----------------------------|-------------------------|
| 150 kHz ~ 500 kHz | 66 ~ 56*                   | 56 ~ 46*                |
| 500 kHz ~ 5 MHz   | 56                         | 46                      |
| 5 MHz ~ 30 MHz    | 60                         | 50                      |

Note 1: \* Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

### 5.4. Assistant equipment used for test

| Assistant equipment | Manufacturer | Model number | Description | other |
|---------------------|--------------|--------------|-------------|-------|
| Adapter             | HUAWEI       | HW-120100C02 | /           | /     |

### 5.5. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

### 5.6. Test result

#### **PASS. (See below detailed test result)**

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: “----” means Peak detection; “----” means Average detection.

Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded the worst case.

5.7. Test data

TR-4-E-010 Conducted Emission Test Result

Test Site

: DDT 6# Shield Room

Test Date

: 2024-10-28

EUT

: Hand LF Tool

Power Supply

: AC 120V/60Hz

Condition

: Temp:21.8°C,Humi:51.9%

Memo

:

D:\2024 Report Date\Q24091103-2E\1028 CE.EM6

Tested By

: Guoyuan Lin

Model Number

: HW71012-SGY-330

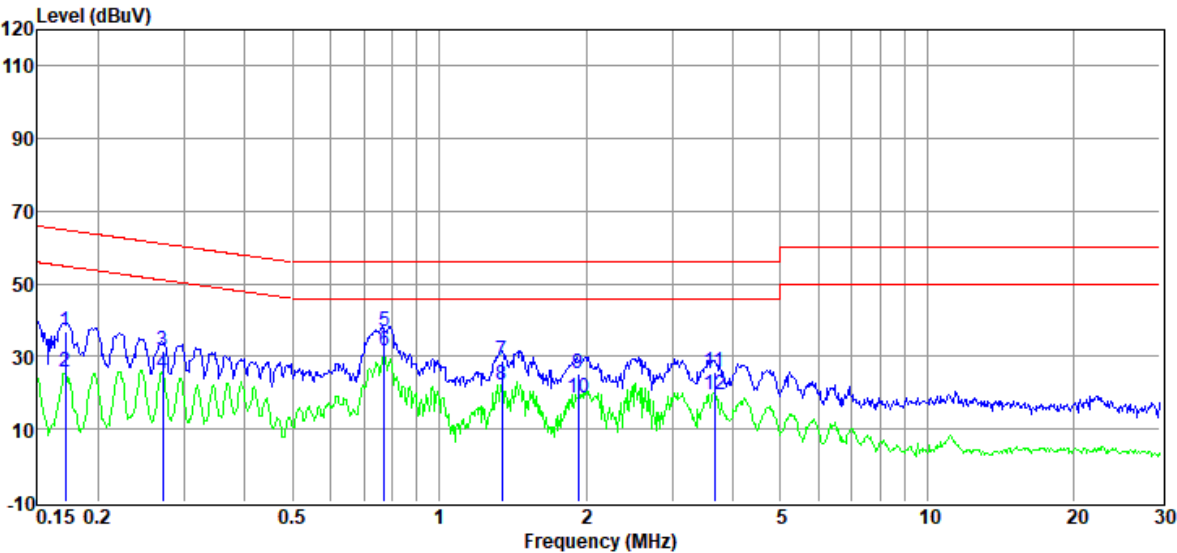
Test Mode

: 125 kHz TX mode

LISN

: 2024 ENV216 3#/LINE

Data: 2



| Item   | Freq. | Read Level | LISN Factor | Cable Loss | Pulse Limiter Factor | Result Level | Limit Line | Over Limit | Detector | Phase |
|--------|-------|------------|-------------|------------|----------------------|--------------|------------|------------|----------|-------|
| (Mark) | (MHz) | (dBμV)     | (dB)        | (dB)       | (dB)                 | (dBμV)       | (dBμV)     | (dB)       |          |       |
| 1      | 0.17  | 17.38      | 9.78        | 0.07       | 9.83                 | 37.06        | 64.90      | -27.84     | QP       | LINE  |
| 2      | 0.17  | 6.23       | 9.78        | 0.07       | 9.83                 | 25.91        | 54.90      | -28.99     | Average  | LINE  |
| 3      | 0.27  | 11.70      | 9.76        | 0.06       | 9.83                 | 31.35        | 61.07      | -29.72     | QP       | LINE  |
| 4      | 0.27  | 5.79       | 9.76        | 0.06       | 9.83                 | 25.44        | 51.07      | -25.63     | Average  | LINE  |
| 5      | 0.77  | 17.21      | 9.75        | 0.05       | 9.84                 | 36.85        | 56.00      | -19.15     | QP       | LINE  |
| 6      | 0.77  | 11.86      | 9.75        | 0.05       | 9.84                 | 31.50        | 46.00      | -14.50     | Average  | LINE  |
| 7      | 1.35  | 9.31       | 9.74        | 0.12       | 9.84                 | 29.01        | 56.00      | -26.99     | QP       | LINE  |
| 8      | 1.35  | 2.40       | 9.74        | 0.12       | 9.84                 | 22.10        | 46.00      | -23.90     | Average  | LINE  |
| 9      | 1.93  | 5.39       | 9.75        | 0.11       | 9.84                 | 25.09        | 56.00      | -30.91     | QP       | LINE  |
| 10     | 1.93  | -0.91      | 9.75        | 0.11       | 9.84                 | 18.79        | 46.00      | -27.21     | Average  | LINE  |
| 11     | 3.66  | 5.83       | 9.77        | 0.10       | 9.85                 | 25.55        | 56.00      | -30.45     | QP       | LINE  |
| 12     | 3.66  | -0.05      | 9.77        | 0.10       | 9.85                 | 19.67        | 46.00      | -26.33     | Average  | LINE  |

Note: 1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.  
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 6# Shield Room

Test Date : 2024-10-28

EUT : Hand LF Tool

Power Supply : AC 120V/60Hz

Condition : Temp:21.8°C,Humi:51.9%

Memo :

D:\2024 Report Date\Q24091103-2E\1028 CE.EM6

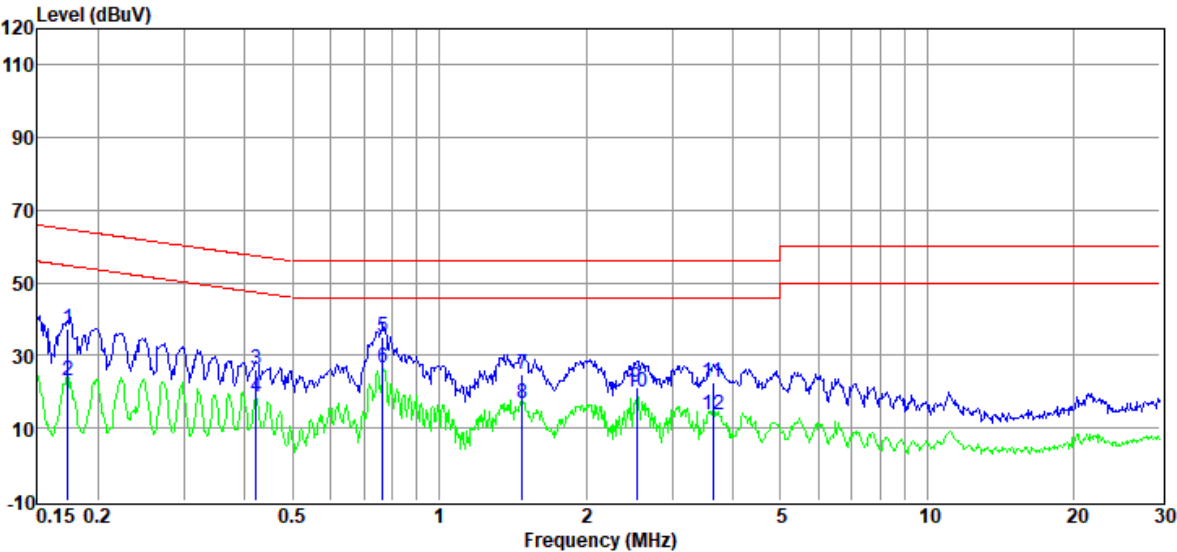
Tested By : Guoyuan Lin

Model Number : HW71012-SGY-330

Test Mode : 125 kHz TX mode

LISN : 2024 ENV216 3#/NEUTRAL

Data: 4



| Item<br>(Mark) | Freq.<br>(MHz) | Read Level<br>(dBμV) | LISN Factor<br>(dB) | Cable Loss<br>(dB) | Pulse Limiter Factor<br>(dB) | Result Level<br>(dBμV) | Limit Line<br>(dBμV) | Over Limit<br>(dB) | Detector | Phase   |
|----------------|----------------|----------------------|---------------------|--------------------|------------------------------|------------------------|----------------------|--------------------|----------|---------|
| 1              | 0.17           | 17.65                | 9.77                | 0.07               | 9.83                         | 37.32                  | 64.81                | -27.49             | QP       | NEUTRAL |
| 2              | 0.17           | 3.36                 | 9.77                | 0.07               | 9.83                         | 23.03                  | 54.81                | -31.78             | Average  | NEUTRAL |
| 3              | 0.42           | 6.42                 | 9.77                | 0.09               | 9.83                         | 26.11                  | 57.42                | -31.31             | QP       | NEUTRAL |
| 4              | 0.42           | -0.89                | 9.77                | 0.09               | 9.83                         | 18.80                  | 47.42                | -28.62             | Average  | NEUTRAL |
| 5              | 0.77           | 15.54                | 9.75                | 0.06               | 9.84                         | 35.19                  | 56.00                | -20.81             | QP       | NEUTRAL |
| 6              | 0.77           | 7.06                 | 9.75                | 0.06               | 9.84                         | 26.71                  | 46.00                | -19.29             | Average  | NEUTRAL |
| 7              | 1.48           | 5.28                 | 9.77                | 0.12               | 9.84                         | 25.01                  | 56.00                | -30.99             | QP       | NEUTRAL |
| 8              | 1.48           | -3.07                | 9.77                | 0.12               | 9.84                         | 16.66                  | 46.00                | -29.34             | Average  | NEUTRAL |
| 9              | 2.54           | 1.53                 | 9.77                | 0.11               | 9.84                         | 21.25                  | 56.00                | -34.75             | QP       | NEUTRAL |
| 10             | 2.54           | 0.01                 | 9.77                | 0.11               | 9.84                         | 19.73                  | 46.00                | -26.27             | Average  | NEUTRAL |
| 11             | 3.64           | 2.70                 | 9.78                | 0.10               | 9.85                         | 22.43                  | 56.00                | -33.57             | QP       | NEUTRAL |
| 12             | 3.64           | -6.21                | 9.78                | 0.10               | 9.85                         | 13.52                  | 46.00                | -32.48             | Average  | NEUTRAL |

Note: 1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.  
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

## 7. Photos of the EUT

Please refer to DDT-Q24091103-2E appendix I

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