



FCC/IC - TEST REPORT

Report Number : 709502403251-00B Date of Issue: Sep. 24, 2024

Model : Cra EW

Product Type : Cradle

Applicant : SHINING 3D Tech Co., Ltd.

Address : No.1398 Xiangbin Road, Wenyan, Xiaoshan, Hangzhou,  
Zhejiang, China

Manufacturer : SHINING 3D Tech Co., Ltd.

Address : No.1398 Xiangbin Road, Wenyan, Xiaoshan, Hangzhou,  
Zhejiang, China

Test Result : ☒ Positive ☐ Negative

Total pages including  
Appendices : 43



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## 2. Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|-------|-----------------------|---------------|
| 1     | First Issue           | 09/24/2024    |

## 3. Details about the Test Laboratory

### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch  
No.16 Lane, 1951 Du Hui Road,  
Shanghai 201108,  
P.R. China

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FCC Registration No.: 820234

FCC Designation Number: CN1183

ISED CAB identifier CN0101

IC Registration No.: 31668



## 4. Description of the Equipment Under Test

### 4.1 EUT Description

Product: Cradle

Model no.: Cra EW

Hardware Version Cra EW  
Identification No. (HVIN)

Product Marketing Name (PMN) Cra EW

FCC ID: 2AMG4-CRAEW

IC: 24652-CRAEW

Options and accessories: NA

Rating: DC 5V, 3A

RF Transmission Frequency: For WPT:  
111-205KHz

For 5G Wi-Fi:  
5180~5240 MHz (U-NII-1)  
5745~5825 MHz (U-NII-3)

No. of Operated Channel: For 5G Wi-Fi:

| Band (GHz)        | Operating Channel Number | Channel center frequencies for 20MHz bandwidth (MHz) |
|-------------------|--------------------------|------------------------------------------------------|
| 5.15GHz~5.25GHz   | 36                       | 5180                                                 |
|                   | 40                       | 5200                                                 |
|                   | 44                       | 5220                                                 |
|                   | 48                       | 5240                                                 |
| 5.725GHz~5.825GHz | 149                      | 5745                                                 |
|                   | 153                      | 5765                                                 |
|                   | 157                      | 5785                                                 |
|                   | 161                      | 5805                                                 |
|                   | 165                      | 5825                                                 |



| Band (GHz)        | Operating Channel Number | Channel center frequencies for 40MHz bandwidth (MHz) |
|-------------------|--------------------------|------------------------------------------------------|
| 5.15GHz~5.25GHz   | 38                       | 5190                                                 |
|                   | 46                       | 5230                                                 |
| 5.725GHz~5.825GHz | 151                      | 5755                                                 |
|                   | 159                      | 5795                                                 |

| Band (GHz)        | Operating Channel Number | Channel center frequencies for 80MHz bandwidth (MHz) |
|-------------------|--------------------------|------------------------------------------------------|
| 5.15GHz~5.25GHz   | 42                       | 5210                                                 |
| 5.725GHz~5.825GHz | 155                      | 5775                                                 |

Modulation: For WPT:  
ASK

For 5G Wi-Fi:  
Orthogonal Frequency Division Multiplexing (OFDM) for 802.11a/n/ac/ax

Hardware Version: 3

Software Version: /

Data speed: 5G Wi-Fi:  
SISO: 11a 6 ~ 54Mbps,  
11n HT20 6.5 ~ 72.2Mbps, 11n HT 40 13.5 ~ 150Mbps,  
11ac VHT20 6.5 ~ 86.7Mbps, 11ac VHT40 13.5 ~ 200Mbps,  
11ac VHT80 29.3 ~ 433.3Mbps  
11ax HE20 7.313 ~ 143.382Mbps, 11ax HE40 14.625 ~ 286.765Mbps,  
11ax HE80 30.625 ~ 600.490Mbps  
MIMO: 11a 6 ~ 54Mbps,  
11n HT20 13 ~ 144.4Mbps, 11n HT 40 27 ~ 300Mbps,  
11ac VHT20 13 ~ 173.3Mbps, 11ac VHT40 27 ~ 400Mbps,  
11ac VHT80 58.5 ~ 866.7Mbps  
11ax HE20 14.625 ~ 286.765Mbps, 11ax HE40 29.250 ~ 573.529Mbps,  
11ax HE80 61.250 ~ 1200.980Mbps

Antenna Type: For WPT:  
Coil antenna

For 5G Wi-Fi:  
Capacitor Antenna

Antenna Gain: For 5G Wi-Fi:  
Antenna1: 4.26 dBi, Antenna2: 3.09 dBi

Directional gain: For 5GHz Wi-Fi output power & power spectral density: 6.71 dBi  
Directional gain =  $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$  dBi  
G1 = 4.26 dBi, G2 = 3.09 dBi, NANT = 2



So Directional gain =

$$10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi} = 10 \log[(10^{3.09/20} + 10^{3.09/20})^2 / 2] \text{ dBi} = 6.71 \text{ dBi}$$

The Equipment supports MIMO and does not support beamforming and CDD modulation, and all antennas have the different gain,

According to KDB662911 D01 chapter F d) (i) :

$$\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi}$$

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.],

Description of the EUT:

The Equipment Under Test (EUT) is a Cradle with Wi-Fi Module and Wireless Power Transmission function. The EUT support Wireless Power Transmission function operated at 111-205KHz and Wi-Fi operated at 5GHz.

Test sample no.: SHA-809685-1

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain, or any information supplied.

## 4.2 Peripheral devices during the testing:

- |                              |                                        |
|------------------------------|----------------------------------------|
| ■ - <u>Intraoral Scanner</u> | Type : <u>Aoralscan Elite Wireless</u> |
| ■ - <u>Notebook</u>          | Type : <u>Crossnair 15 R6E B12UEZ</u>  |



## 5. Summary of Test Standards

| Test Standards                            |                                                                        |
|-------------------------------------------|------------------------------------------------------------------------|
| RSS-216 Issue 2<br>January 2016           | Wireless Power Transfer Devices                                        |
| RSS-Gen Issue 5 March<br>2019 Amendment 1 | General Requirements for Compliance of Radio Apparatus                 |
| ICES-001 Issue 5<br>July 2020             | Industrial, Scientific and Medical (ISM) Radio Frequency Generators    |
| CFR 47 Part 15 Subpart C                  | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

## 6. Summary of Test Results

| Technical Requirements                                               |                                                                    |             |
|----------------------------------------------------------------------|--------------------------------------------------------------------|-------------|
| <b>RSS-216</b><br><b>ICES-001</b><br><b>CFR 47 Part 15 Subpart C</b> |                                                                    |             |
| Test Condition                                                       |                                                                    | Test Result |
| RSS-216 §6.2.2.1<br>ICES-001 §3.3.3<br>CFR 47 §15.207                | Conducted emission AC power port                                   | Pass        |
| RSS-216 §6.2.2.2<br>ICES-001 §3.3.4<br>CFR 47 §15.209                | Radiated Emissions                                                 | Pass        |
| RSS-GEN §6.7, §8.10<br>CFR 47 §15.215                                | 20dB Bandwidth & Restricted frequency bands and occupied bandwidth | Pass        |
| CFR 47 §15.203                                                       | Antenna requirement                                                | See note 2  |

Note 1: Because the highest frequency of the internal sources of the EUT is less than 108MHz, so the measurement only is made up to 1GHz.

Note 2: The EUT uses a coil antenna. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.



## 7. General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2AMG4-CRAEW, IC: 24652-CRAEW, complies with Section 15.207, 15.209, 15.205 of the FCC Part 15, Subpart C rules.

This report is only for WPT, for the 5GHz Wi-Fi test report please refer to 709502403251-00C.

### SUMMARY:

All tests according to the regulations cited on page 7 were

■ - Performed

□ - Not Performed

The Equipment under Test

■ - Fulfills the general approval requirements.

□ - Does not fulfill the general approval requirements.

Sample Received Date: April 29, 2024

Testing Start Date: May 9, 2024

Testing End Date: September 12, 2024

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch -

Reviewed by:

Prepared by:

Tested by:



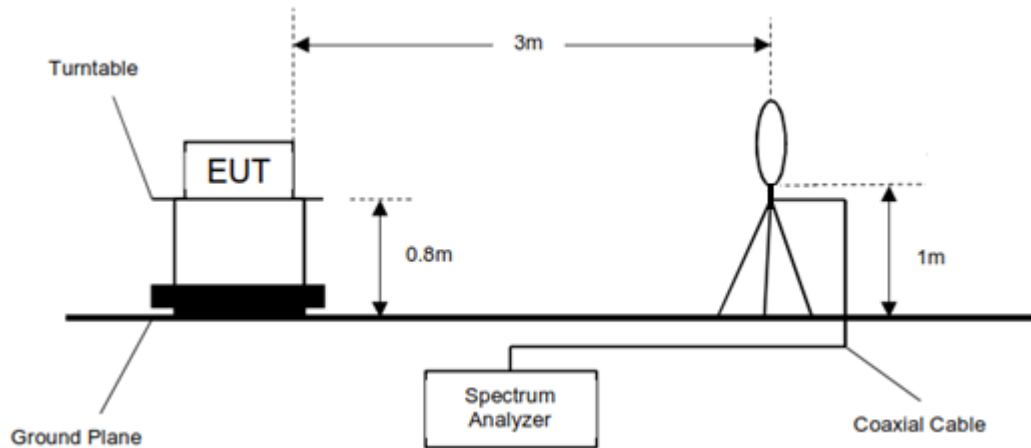
Hui TONG  
Review Engineer

Wenqiang LU  
Project Engineer

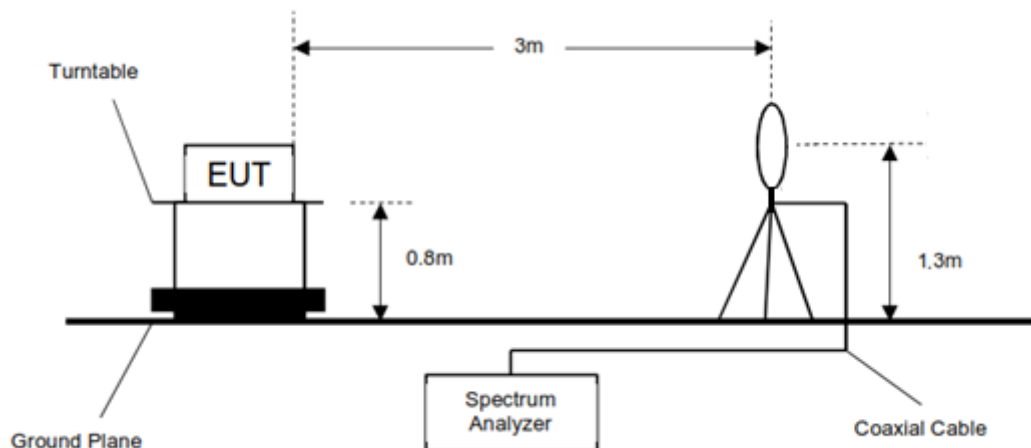
Chengjie GUO  
Test Engineer

## 8. Test Setups

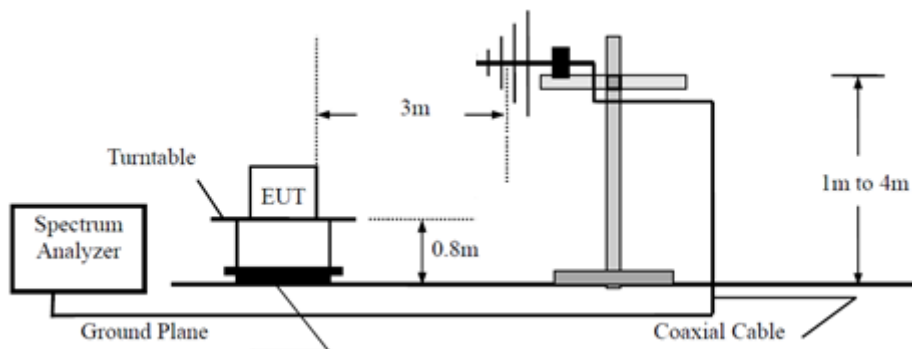
Below 30MHz for FCC



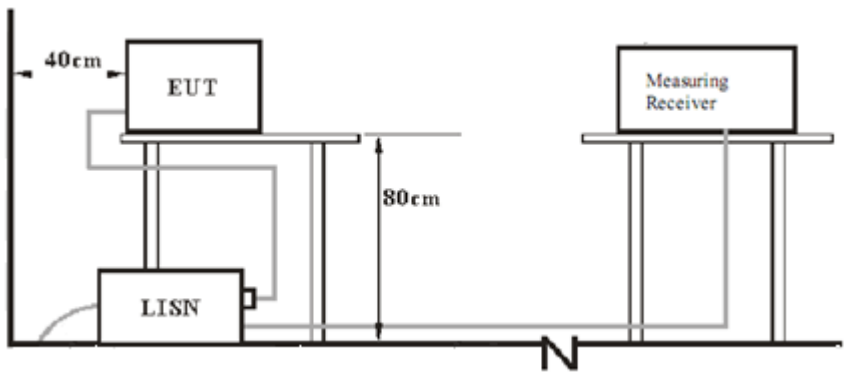
Below 30MHz for ICES-001



30MHz-1GHz



AC Power Line Conducted Emission test setups



## 9. Technical Requirement

### 9.1 Conducted Emission Test

#### Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.).
3. Maximum disturbance procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

#### Limit

According to CFR 47 §15.207, conducted emissions limit as below:

| Frequency of emission (MHz) | Conducted limit (dBμV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-peak             | Average   |
| 0.15-0.5                    | 66 to 56*              | 56 to 46* |
| 0.5-5                       | 56                     | 46        |
| 5-30                        | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

According to RSS-216 §6.2.2.1 and ICES-001 §3.3.3 conducted emissions limit as below:

| Frequency range (MHz)                                                                                                                                     | Appliances rated 120 V, without an earth connection<br>Quasi-peak (dBμV) | Appliances rated 120 V, without an earth connection<br>Average (dBμV) | All other appliances<br>Quasi-peak (dBμV) | All other appliances<br>Average (dBμV) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------|----------------------------------------|
| 0.009 – 0.05                                                                                                                                              | 122                                                                      | —                                                                     | 110                                       | —                                      |
| 0.05 – 0.15                                                                                                                                               | 102 to 92 *                                                              | —                                                                     | 90 to 80 *                                | —                                      |
| 0.15 – 0.5                                                                                                                                                | 72 to 62 *                                                               | 62 to 52 *                                                            | 66 to 56 *                                | 56 to 46 *                             |
| 0.5 – 5                                                                                                                                                   | 56                                                                       | 46                                                                    | 56                                        | 46                                     |
| 5 – 30                                                                                                                                                    | 60                                                                       | 50                                                                    | 60                                        | 50                                     |
| <b>Note:</b> The more stringent limit applies at transition frequencies.<br>* The limit level in dBμV decreases linearly with the logarithm of frequency. |                                                                          |                                                                       |                                           |                                        |

**Test Result:**

# 150k-30MHz Conducted Emission Test

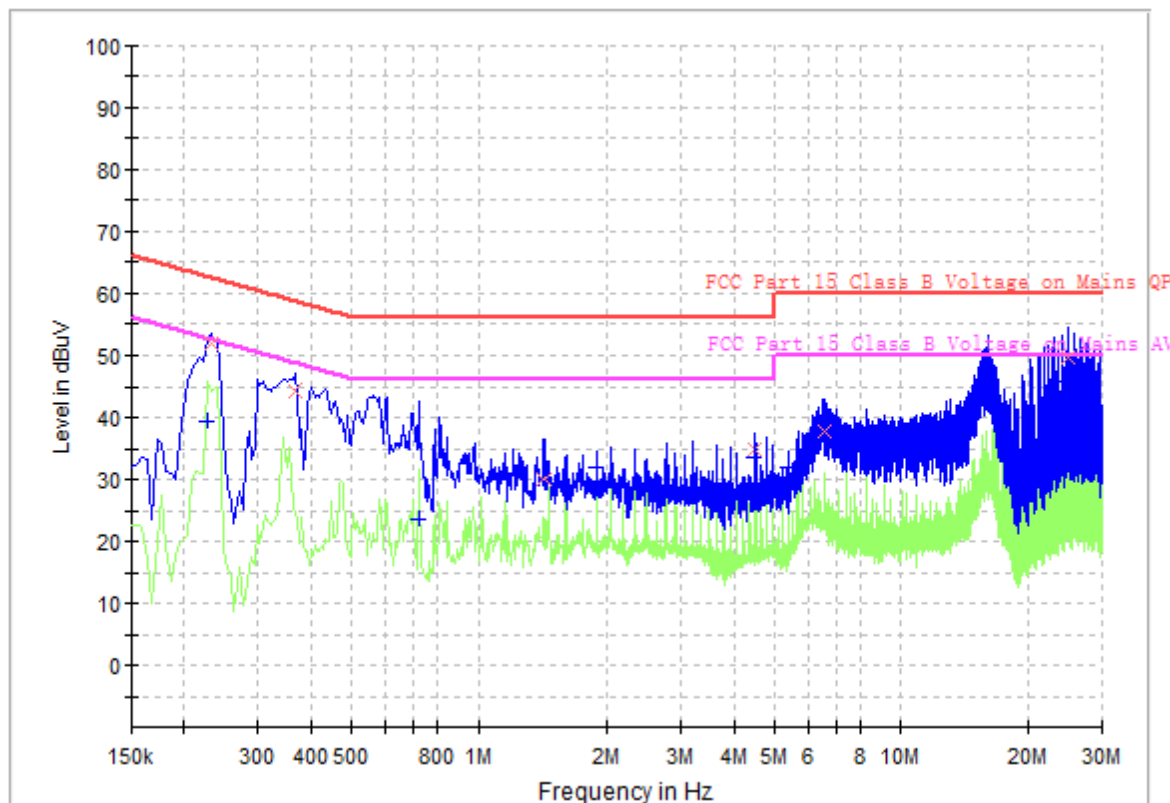
**EUT Information**

|             |                                                                   |
|-------------|-------------------------------------------------------------------|
| EUT Name:   | Cradle                                                            |
| Model       | Cra EW                                                            |
| Client:     | SHINING 3D Tech Co., Ltd.                                         |
| Op Cond     | Power on, output: 5V/0.8A, AC 120V/60Hz, T21.1, H41.1%, P103.4kPa |
| Operator:   | Chengjie GUO                                                      |
| Standard    | FCC 15.207                                                        |
| Comment:    | Phase L                                                           |
| Sample No.: | SHA-809685-1                                                      |

**Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]**

|                 |                          |
|-----------------|--------------------------|
| Hardware Setup: | Voltage with 2-Line-LISN |
| Receiver:       | [ESR 3]                  |
| Level Unit:     | dBuV                     |

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamplifier |
|------------------|-----------|-----------|--------|------------|--------------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB         |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB         |





## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.226500        | ---              | 39.60           | 52.58        | 12.98       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.231000        | 51.93            | ---             | 62.41        | 10.48       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.366000        | 44.36            | ---             | 58.59        | 14.23       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.721500        | ---              | 23.78           | 46.00        | 22.22       | 1000.0          | 9.000           | L1   | 19.5       |
| 1.419000        | 30.27            | ---             | 56.00        | 25.73       | 1000.0          | 9.000           | L1   | 19.5       |
| 1.891500        | ---              | 31.94           | 46.00        | 14.06       | 1000.0          | 9.000           | L1   | 19.5       |
| 4.506000        | 34.84            | ---             | 56.00        | 21.16       | 1000.0          | 9.000           | L1   | 19.6       |
| 4.506000        | ---              | 33.59           | 46.00        | 12.41       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.379000        | ---              | 31.93           | 50.00        | 18.07       | 1000.0          | 9.000           | L1   | 19.6       |
| 6.544500        | 38.01            | ---             | 60.00        | 21.99       | 1000.0          | 9.000           | L1   | 19.7       |
| 24.859500       | ---              | 45.79           | 50.00        | 4.21        | 1000.0          | 9.000           | L1   | 20.9       |
| 24.859500       | 49.66            | ---             | 60.00        | 10.34       | 1000.0          | 9.000           | L1   | 20.9       |

# 150k-30MHz Conducted Emission Test

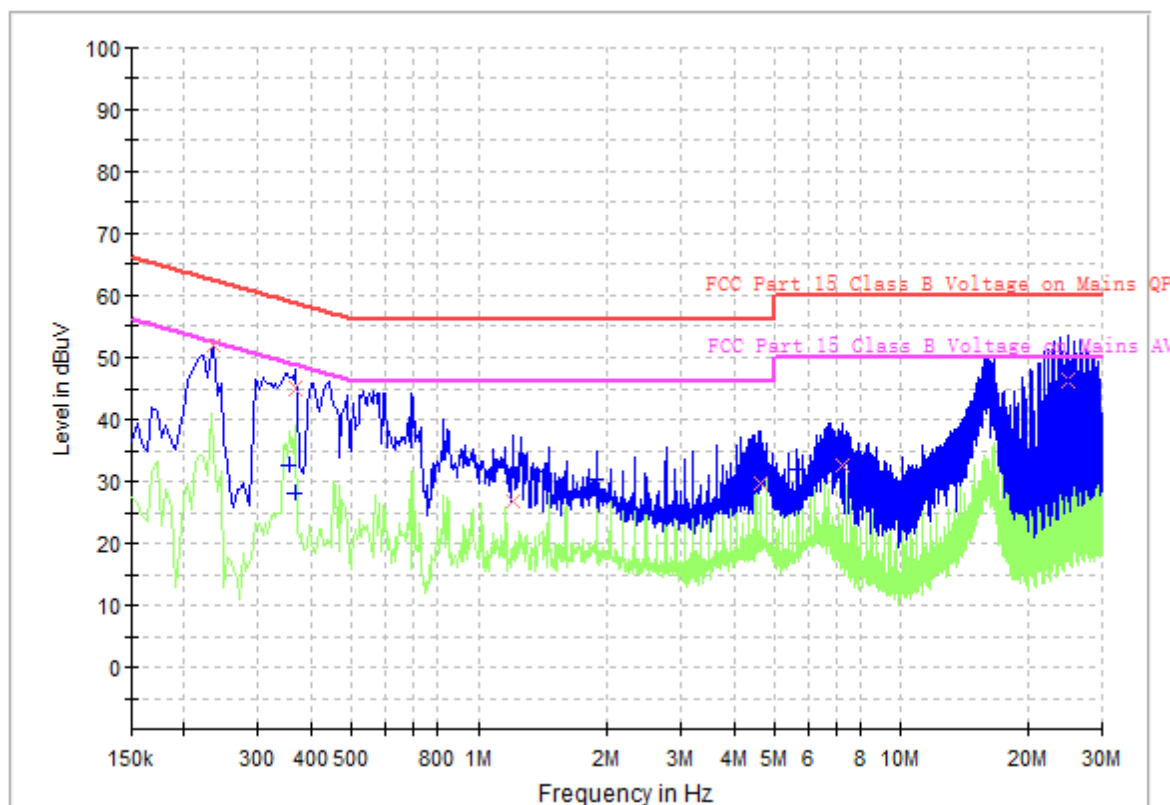
## EUT Information

EUT Name: Cradle  
Model: Cra EW  
Client: SHINING 3D Tech Co., Ltd.  
Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T21.1, H41.1%, P3.4kPa  
Operator: Chengjie GUO  
Standard: FCC Part 15.207  
Comment: Phase N  
Sample No.: SHA-809685-1

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN  
Receiver: [ESR 3]  
Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamplifier |
|------------------|-----------|-----------|--------|------------|--------------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB         |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB         |





## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.235500        | 51.95            | ---             | 62.25        | 10.30       | 1000.0          | 9.000           | N    | 19.4       |
| 0.357000        | ---              | 32.61           | 48.80        | 16.19       | 1000.0          | 9.000           | N    | 19.5       |
| 0.366000        | ---              | 28.10           | 48.59        | 20.49       | 1000.0          | 9.000           | N    | 19.5       |
| 0.366000        | 44.98            | ---             | 58.59        | 13.61       | 1000.0          | 9.000           | N    | 19.5       |
| 1.207500        | 26.98            | ---             | 56.00        | 29.02       | 1000.0          | 9.000           | N    | 19.5       |
| 1.887000        | ---              | 30.37           | 46.00        | 15.63       | 1000.0          | 9.000           | N    | 19.5       |
| 4.506000        | ---              | 34.36           | 46.00        | 11.64       | 1000.0          | 9.000           | N    | 19.6       |
| 4.636500        | 29.67            | ---             | 56.00        | 26.33       | 1000.0          | 9.000           | N    | 19.6       |
| 5.667000        | ---              | 31.98           | 50.00        | 18.02       | 1000.0          | 9.000           | N    | 19.6       |
| 7.215000        | 32.61            | ---             | 60.00        | 27.39       | 1000.0          | 9.000           | N    | 19.6       |
| 24.850500       | ---              | 44.88           | 50.00        | 5.12        | 1000.0          | 9.000           | N    | 20.6       |
| 24.850500       | 46.41            | ---             | 60.00        | 13.59       | 1000.0          | 9.000           | N    | 20.6       |

# 150k-30MHz Conducted Emission Test

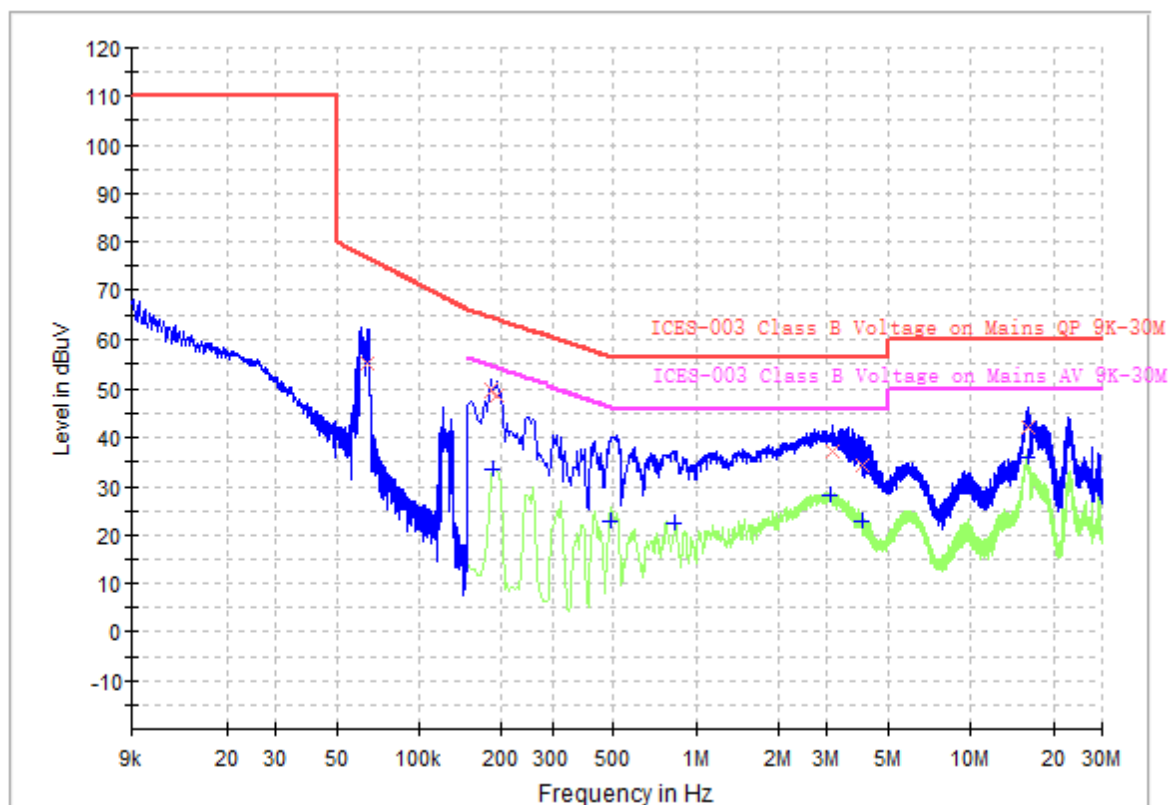
## EUT Information

|             |                                                                   |
|-------------|-------------------------------------------------------------------|
| EUT Name:   | Cradle                                                            |
| Model       | Cra EW                                                            |
| Client:     | SHINING 3D Tech Co., Ltd.                                         |
| Op Cond     | Power on, output: 5V/0.8A, AC 120V/60Hz, T21.1, H41.1%, P103.4kPa |
| Operator:   | Chengjie GUO                                                      |
| Standard    | ICES-003                                                          |
| Comment:    | Phase L                                                           |
| Sample No.: | SHA-809685-1                                                      |

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

|                 |                          |
|-----------------|--------------------------|
| Hardware Setup: | Voltage with 2-Line-LISN |
| Receiver:       | [ESR 3]                  |
| Level Unit:     | dBuV                     |

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamplifier |
|------------------|-----------|-----------|--------|------------|--------------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB         |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB         |





## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.065300        | 55.12            | ---             | 76.60        | 21.48       | 1000.0          | 0.200           | L1   | 19.5       |
| 0.181500        | 49.59            | ---             | 64.42        | 14.83       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.186000        | ---              | 33.48           | 54.21        | 20.73       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.190500        | 48.59            | ---             | 64.01        | 15.42       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.487500        | ---              | 22.75           | 46.21        | 23.46       | 1000.0          | 9.000           | L1   | 19.4       |
| 0.838500        | ---              | 22.41           | 46.00        | 23.59       | 1000.0          | 9.000           | L1   | 19.5       |
| 3.093000        | ---              | 28.14           | 46.00        | 17.86       | 1000.0          | 9.000           | L1   | 19.5       |
| 3.160500        | 37.24            | ---             | 56.00        | 18.76       | 1000.0          | 9.000           | L1   | 19.5       |
| 4.006500        | ---              | 22.99           | 46.00        | 23.01       | 1000.0          | 9.000           | L1   | 19.6       |
| 4.024500        | 34.31            | ---             | 56.00        | 21.69       | 1000.0          | 9.000           | L1   | 19.6       |
| 16.057500       | 42.00            | ---             | 60.00        | 18.00       | 1000.0          | 9.000           | L1   | 20.1       |
| 16.165500       | ---              | 35.82           | 50.00        | 14.18       | 1000.0          | 9.000           | L1   | 20.1       |

# 150k-30MHz Conducted Emission Test

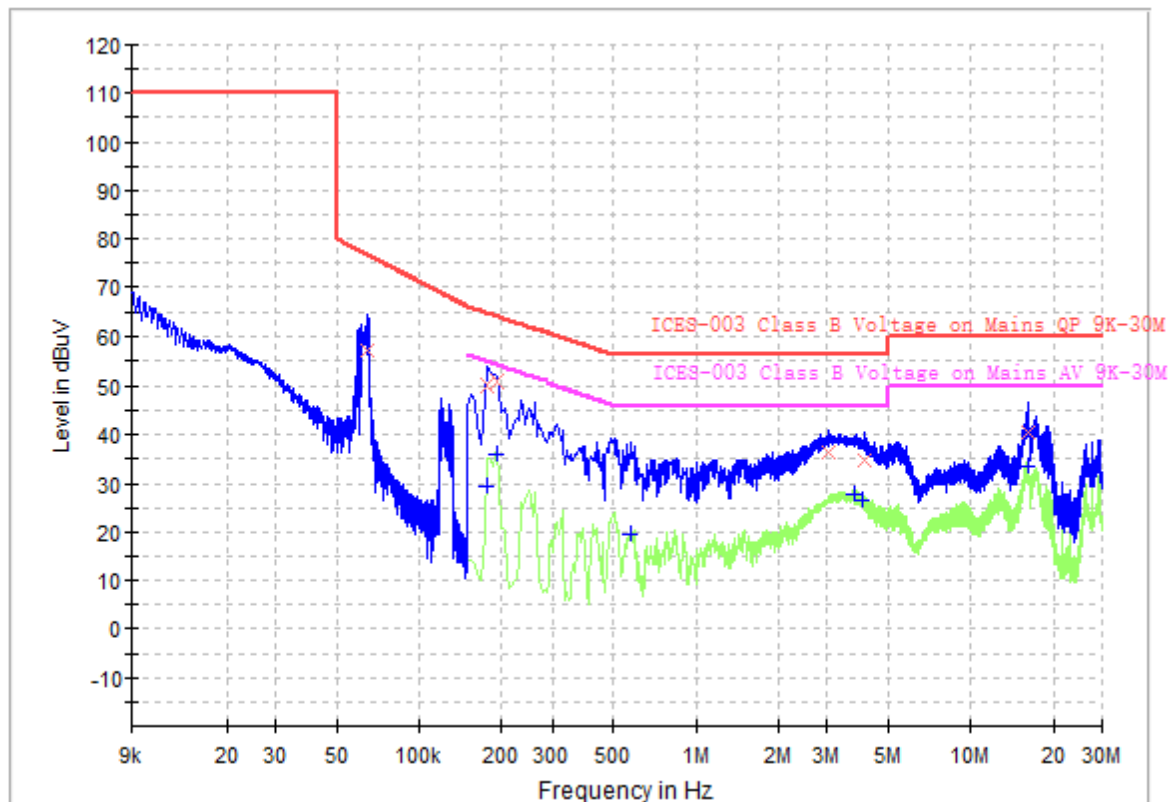
## EUT Information

|             |                                                                 |
|-------------|-----------------------------------------------------------------|
| EUT Name:   | Cradle                                                          |
| Model       | Cra EW                                                          |
| Client:     | SHINING 3D Tech Co., Ltd.                                       |
| Op Cond     | Power on, output: 5V/0.8A, AC 120V/60Hz, T21.1, H41.1%, P3.4kPa |
| Operator:   | Chengjie GUO                                                    |
| Standard    | ICES-003                                                        |
| Comment:    | Phase N                                                         |
| Sample No.: | SHA-809685-1                                                    |

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

|                 |                          |
|-----------------|--------------------------|
| Hardware Setup: | Voltage with 2-Line-LISN |
| Receiver:       | [ESR 3]                  |
| Level Unit:     | dBuV                     |

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamplifier |
|------------------|-----------|-----------|--------|------------|--------------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB         |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB         |





## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.065200        | 56.96            | ---             | 76.62        | 19.66       | 1000.0          | 0.200           | N    | 19.5       |
| 0.177000        | ---              | 29.32           | 54.63        | 25.31       | 1000.0          | 9.000           | N    | 19.4       |
| 0.177000        | 49.87            | ---             | 64.63        | 14.76       | 1000.0          | 9.000           | N    | 19.4       |
| 0.190500        | ---              | 35.80           | 54.01        | 18.21       | 1000.0          | 9.000           | N    | 19.4       |
| 0.190500        | 50.71            | ---             | 64.01        | 13.30       | 1000.0          | 9.000           | N    | 19.4       |
| 0.577500        | ---              | 19.54           | 46.00        | 26.46       | 1000.0          | 9.000           | N    | 19.5       |
| 3.030000        | 36.39            | ---             | 56.00        | 19.61       | 1000.0          | 9.000           | N    | 19.5       |
| 3.750000        | ---              | 27.64           | 46.00        | 18.36       | 1000.0          | 9.000           | N    | 19.6       |
| 4.002000        | ---              | 26.55           | 46.00        | 19.45       | 1000.0          | 9.000           | N    | 19.6       |
| 4.105500        | 34.95            | ---             | 56.00        | 21.05       | 1000.0          | 9.000           | N    | 19.6       |
| 16.080000       | ---              | 33.49           | 50.00        | 16.51       | 1000.0          | 9.000           | N    | 20.0       |
| 16.147500       | 40.38            | ---             | 60.00        | 19.62       | 1000.0          | 9.000           | N    | 20.0       |

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)



## 9.2 Radiated Emission Test for 9KHz-30MHz

### Test Method

1: Field strength measurements are made in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna as specified in ANSI C63.4 clause 4.5.2, positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The lowest height of the loop shall be 1 m above the ground. This method is applicable for radiated radio-noise measurements from all units, cables, power cords, and interconnect cabling or wiring.

2: For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

### Limits

According to CFR 47 §15.209, radiated emissions limit as below:

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |

| Frequency             | Limit at 3m (dBuV/m) |
|-----------------------|----------------------|
| 0.009 MHz – 0.490 MHz | 128.5 to 93.8        |
| 0.490 MHz – 1.705 MHz | 73.8 to 63           |
| 1.705 MHz – 30 MHz    | 69.5                 |

According to RSS-216 §6.2.2.2 and ICES-001 §3.3.4.1, radiated emissions limit as below

| Frequency range (MHz)                                                           | Quasi-peak, at 3 m distance (dBμA/m) |
|---------------------------------------------------------------------------------|--------------------------------------|
| 0.009 – 0.07                                                                    | 69                                   |
| 0.07 – 0.15                                                                     | 69 to 39 *                           |
| 0.15 – 30                                                                       | 39 to 7 *                            |
| * The limit level in dBμA/m decreases linearly with the logarithm of frequency. |                                      |

## Test Result

# 0.009-30MHz Radiated Emission

## EUT Information

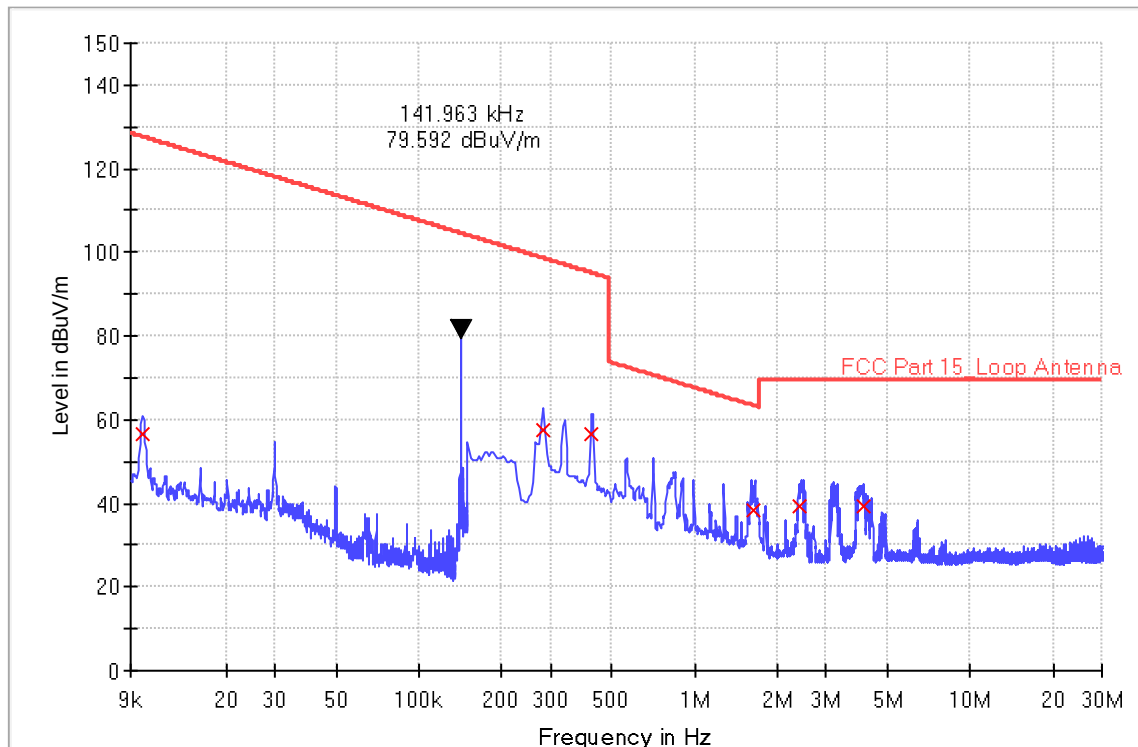
EUT Name: Cradle  
Model: Cra EW  
Client: SHINING 3D Tech Co., Ltd.  
Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
Operator: Chengjie GUO  
Test Spec: FCC Part 15.209  
Comment: X  
Sample No: SHA-809685-1

## Sweep Setup: RE\_Loop E\_pre [EMI radiated]

Hardware Setup: RE\_Loop Antenna V  
Receiver: [ESR 3]  
Level Unit: dBuV/m

| Subrange         | Step Size | Detectors | Bandwidth | Sweep Time | Preamplifier |
|------------------|-----------|-----------|-----------|------------|--------------|
| 9 kHz - 150 kHz  | 70.5 Hz   | PK+       | 200 Hz    | 0.01 s     | 0 dB         |
| 150 kHz - 30 MHz | 3.731 kHz | PK+       | 9 kHz     | 0.01 s     | 0 dB         |

RE\_Loop E\_pre





## Limit and Margin

| Frequency<br>(MHz) | QuasiPeak<br>(dBuV/m) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) | Corr.<br>(dB) | Margin<br>- QPK<br>(dB) | Limit -<br>QPK<br>(dBuV/m) |
|--------------------|-----------------------|--------------------|--------------------|----------------|-----|------------------|---------------|-------------------------|----------------------------|
| 0.009880           | 56.5                  | 1000.0             | 0.200              | 100.0          | X   | 6.0              | 19.6          | 71.179                  | 127.709                    |
| 0.282000           | 57.5                  | 1000.0             | 9.000              | 100.0          | X   | 84.0             | 18.8          | 41.059                  | 98.599                     |
| 0.422000           | 56.8                  | 1000.0             | 9.000              | 100.0          | X   | 25.0             | 18.7          | 38.338                  | 95.098                     |
| 1.634000           | 38.4                  | 1000.0             | 9.000              | 100.0          | X   | 132.0            | 18.9          | 24.919                  | 63.339                     |
| 2.398000           | 39.5                  | 1000.0             | 9.000              | 100.0          | X   | 112.0            | 19.1          | 30.072                  | 69.542                     |
| 4.070000           | 39.3                  | 1000.0             | 9.000              | 100.0          | X   | 231.0            | 19.1          | 30.262                  | 69.542                     |

## 0.009-30MHz Radiated Emission

### EUT Information

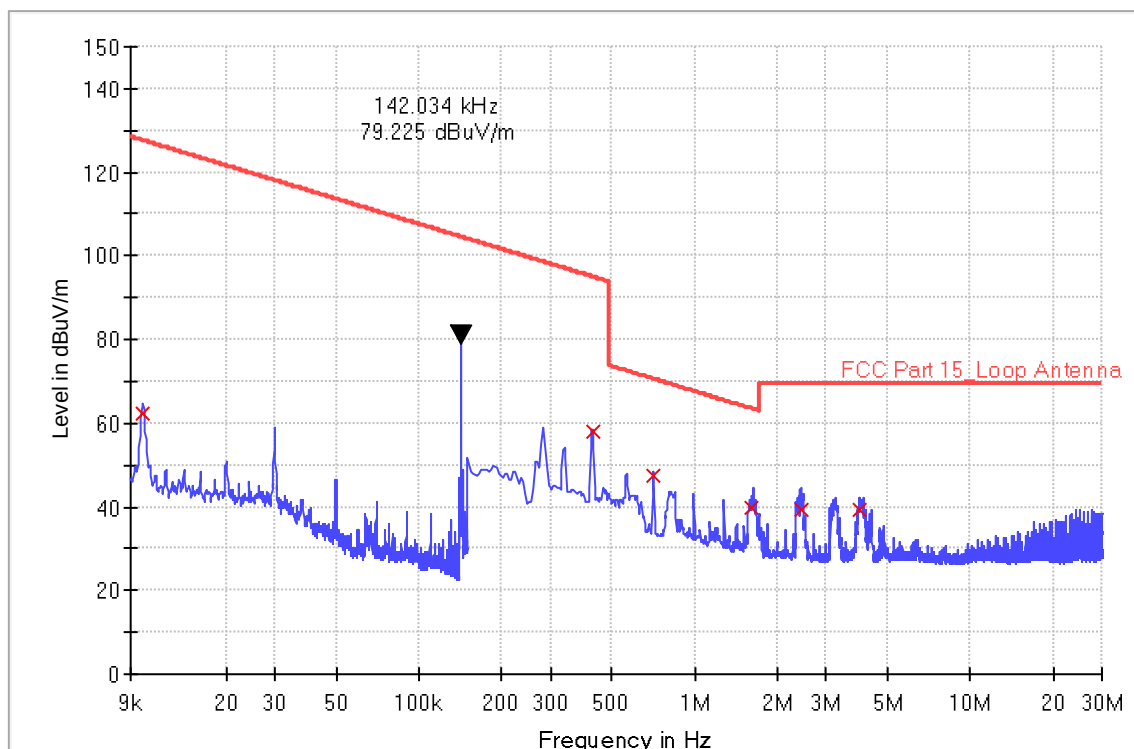
EUT Name: Cradle  
 Model: Cra EW  
 Client: SHINING 3D Tech Co., Ltd.  
 Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
 Operator: Chengjie GUO  
 Test Spec: FCC Part 15.209  
 Comment: Y  
 Sample No: SHA-809685-1

### Sweep Setup: RE\_Loop E\_pre [EMI radiated]

Hardware Setup: RE\_Loop Antenna V  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

| Subrange         | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-----------|-----------|-----------|------------|--------|
| 9 kHz - 150 kHz  | 70.5 Hz   | PK+       | 200 Hz    | 0.01 s     | 0 dB   |
| 150 kHz - 30 MHz | 3.731 kHz | PK+       | 9 kHz     | 0.01 s     | 0 dB   |

RE\_Loop E\_pre





## Limit and Margin

| Frequency<br>(MHz) | QuasiPeak<br>(dBuV/m) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) | Corr.<br>(dB/m) | Margin<br>- QPK<br>(dB) | Limit -<br>QPK<br>(dBuV/m) |
|--------------------|-----------------------|--------------------|--------------------|----------------|-----|------------------|-----------------|-------------------------|----------------------------|
| 0.009960           | 62.4                  | 1000.0             | 0.200              | 100.0          | Y   | 61.0             | 19.6            | 65.289                  | 127.639                    |
| 0.426000           | 57.9                  | 1000.0             | 9.000              | 100.0          | Y   | 124.0            | 18.7            | 37.126                  | 95.016                     |
| 0.706000           | 47.3                  | 1000.0             | 9.000              | 100.0          | Y   | 115.0            | 18.8            | 23.378                  | 70.628                     |
| 1.618000           | 40.0                  | 1000.0             | 9.000              | 100.0          | Y   | 153.0            | 18.9            | 23.455                  | 63.425                     |
| 2.422000           | 39.4                  | 1000.0             | 9.000              | 100.0          | Y   | 123.0            | 19.1            | 30.192                  | 69.542                     |
| 3.958000           | 39.1                  | 1000.0             | 9.000              | 100.0          | Y   | 124.0            | 19.1            | 30.472                  | 69.542                     |

## 0.009-30MHz Radiated Emission

### EUT Information

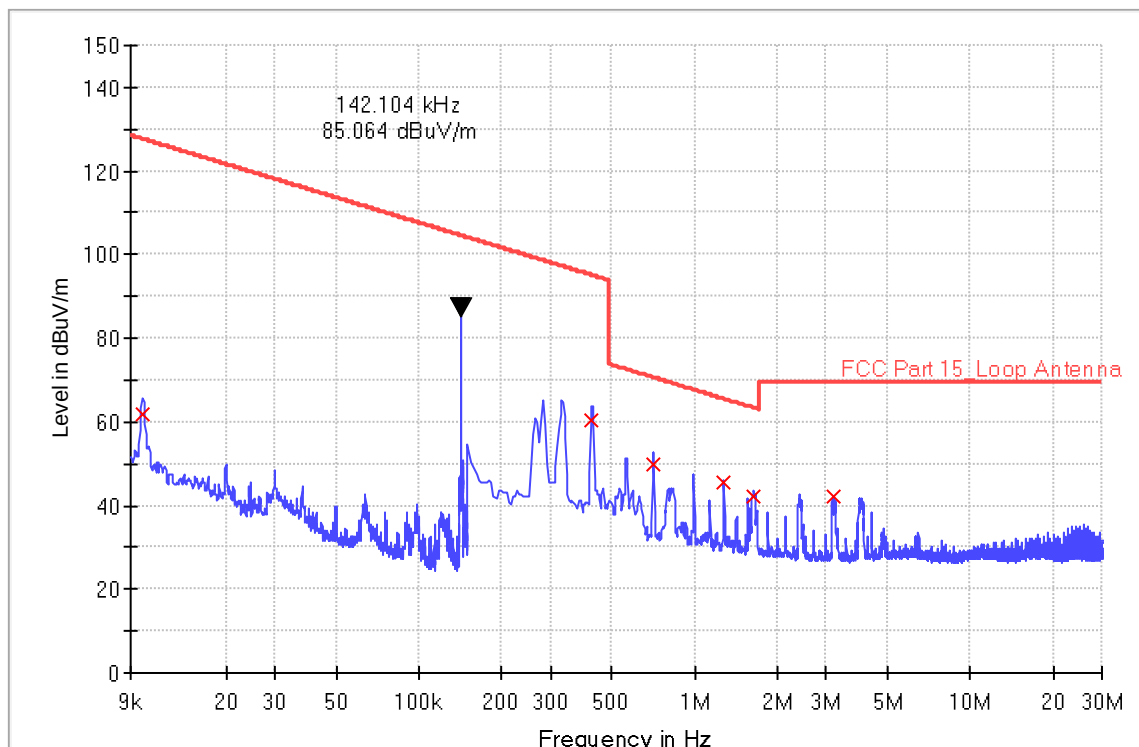
EUT Name: Cradle  
Model: Cra EW  
Client: SHINING 3D Tech Co., Ltd.  
Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
Operator: Chengjie GUO  
Test Spec: FCC Part 15.209  
Comment: Z  
Sample No: SHA-809685-1

### Sweep Setup: RE\_Loop E\_pre [EMI radiated]

Hardware Setup: RE\_Loop Antenna V  
Receiver: [ESR 3]  
Level Unit: dBuV/m

| Subrange         | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-----------|-----------|-----------|------------|--------|
| 9 kHz - 150 kHz  | 70.5 Hz   | PK+       | 200 Hz    | 0.01 s     | 0 dB   |
| 150 kHz - 30 MHz | 3.731 kHz | PK+       | 9 kHz     | 0.01 s     | 0 dB   |

RE\_Loop E\_pre





## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 0.009880        | 61.9               | 1000.0          | 0.200           | 100.0       | Z   | 123.0         | 19.6         | 65.849            | 127.709              |
| 0.422000        | 60.5               | 1000.0          | 9.000           | 100.0       | Z   | 221.0         | 18.7         | 34.568            | 95.098               |
| 0.706000        | 49.7               | 1000.0          | 9.000           | 100.0       | Z   | 175.0         | 18.8         | 20.888            | 70.628               |
| 1.278000        | 45.3               | 1000.0          | 9.000           | 100.0       | Z   | 154.0         | 18.9         | 20.134            | 65.474               |
| 1.646000        | 42.1               | 1000.0          | 9.000           | 100.0       | Z   | 115.0         | 18.9         | 21.156            | 63.276               |
| 3.206000        | 42.0               | 1000.0          | 9.000           | 100.0       | Z   | 153.0         | 19.1         | 27.592            | 69.542               |

Remark:

$$E[\text{dB}(\mu\text{V/m})] = V[\text{dB}(\mu\text{V})] + L[\text{dB}] + AF^E[\text{dB}(\text{m}^{-1})]$$

Where

$E$  is the electrical field strength level

$AF^E$  is the "electric" antenna factor

$V$  is the voltage reading level measured by the receiver, the reading Level is recorded by software which is not shown in the sheet

$L$  is the cable loss

The worst-case data were reported, and no other spurious and harmonics emissions were reported greater than listed emission above table.



## 0.009-30MHz Radiated Emission

### EUT Information

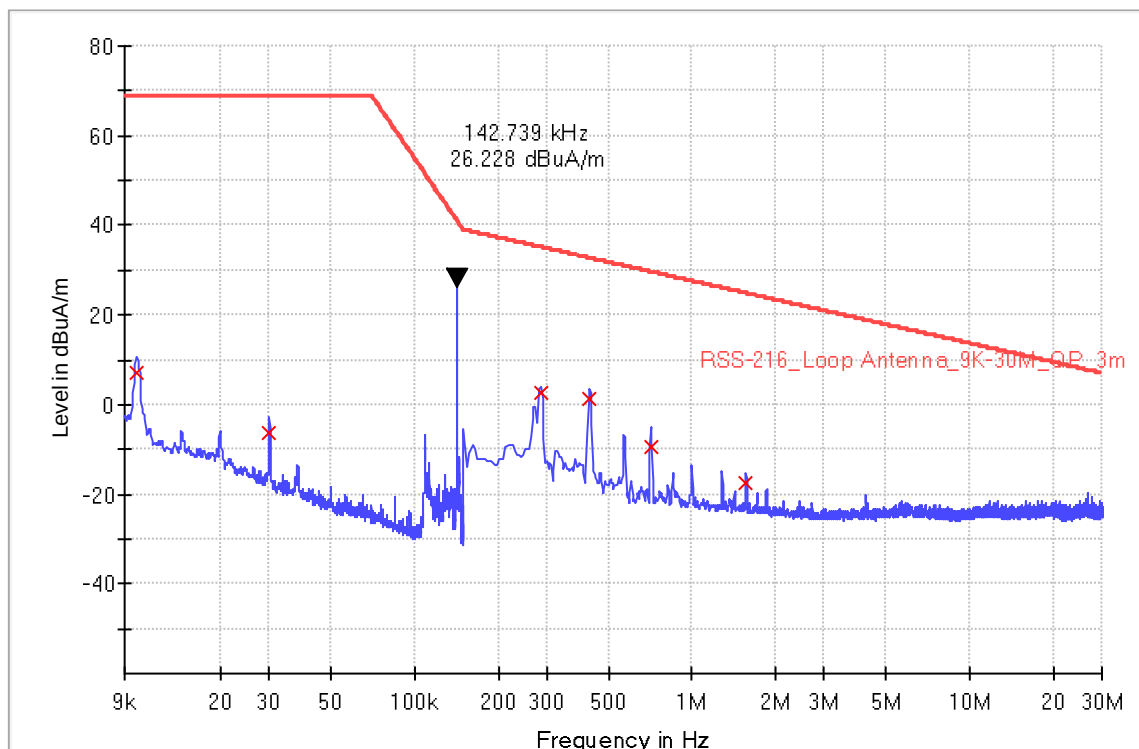
EUT Name: Cradle  
Model: Cra EW  
Client: SHINING 3D Tech Co., Ltd.  
Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
Operator: Chengjie GUO  
Test Spec: RSS-216  
Comment: coaxial  
Sample No: SHA-809685-1

### Sweep Setup: RE\_Loop E\_pre [EMI radiated]

Hardware Setup: RE\_Loop Antenna V  
Receiver: [ESR 3]  
Level Unit: dBuV/m

| Subrange         | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|------------------|-----------|-----------|-----------|------------|--------|
| 9 kHz - 150 kHz  | 70.5 Hz   | PK+       | 200 Hz    | 0.01 s     | 0 dB   |
| 150 kHz - 30 MHz | 3.731 kHz | PK+       | 9 kHz     | 0.01 s     | 0 dB   |

RE\_Loop H\_pre





## Limit and Margin

| Frequency<br>(MHz) | QuasiPeak<br>(dBuA/m) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) | Corr.<br>(dB/m) | Margin<br>- QPK<br>(dB) | Limit -<br>QPK<br>(dBuA/m) |
|--------------------|-----------------------|--------------------|--------------------|----------------|-----|------------------|-----------------|-------------------------|----------------------------|
| 0.009960           | 7.2                   | 1000.0             | 0.200              | 100.0          | H   | 161.0            | -32.0           | 61.8                    | 69.0                       |
| 0.029960           | -6.1                  | 1000.0             | 0.200              | 100.0          | H   | 123.0            | -32.6           | 75.1                    | 69.0                       |
| 0.286000           | 2.4                   | 1000.0             | 9.000              | 100.0          | H   | 84.0             | -32.8           | 32.7                    | 35.1                       |
| 0.426000           | 1.3                   | 1000.0             | 9.000              | 100.0          | H   | 46.0             | -32.8           | 31.4                    | 32.7                       |
| 0.710000           | -9.5                  | 1000.0             | 9.000              | 100.0          | H   | 1.0              | -32.7           | 39.1                    | 29.6                       |
| 1.566000           | -17.4                 | 1000.0             | 9.000              | 100.0          | H   | 152.0            | -32.6           | 42.2                    | 24.8                       |

## 0.009-30MHz Radiated Emission

### EUT Information

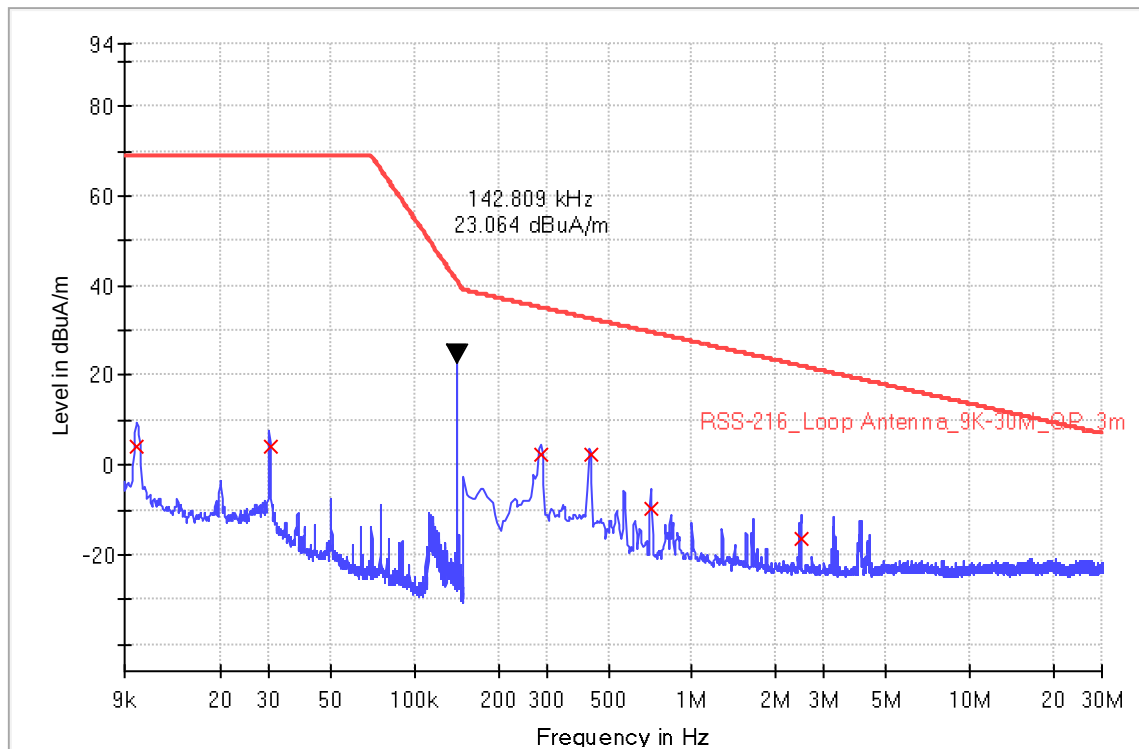
EUT Name: Cradle  
 Model: Cra EW  
 Client: SHINING 3D Tech Co., Ltd.  
 Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
 Operator: Chengjie GUO  
 Test Spec: ICES-001  
 Comment: coplanar  
 Sample No: SHA-809685-1

### Sweep Setup: RE\_Loop E\_pre [EMI radiated]

Hardware Setup: RE\_Loop Antenna V  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

| Subrange         | Step Size | Detectors | Bandwidth | Sweep Time | Preamplifier |
|------------------|-----------|-----------|-----------|------------|--------------|
| 9 kHz - 150 kHz  | 70.5 Hz   | PK+       | 200 Hz    | 0.01 s     | 0 dB         |
| 150 kHz - 30 MHz | 3.731 kHz | PK+       | 9 kHz     | 0.01 s     | 0 dB         |

RE\_Loop H\_pre





## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuA/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBuA/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|--------------|-------------------|----------------------|
| 0.009880        | 4.0                | 1000.0          | 0.200           | 100.0       | H   | 213.0         | -31.9        | 65.0              | 69.0                 |
| 0.030040        | 4.2                | 1000.0          | 0.200           | 100.0       | H   | 153.0         | -32.6        | 64.8              | 69.0                 |
| 0.286000        | 2.4                | 1000.0          | 9.000           | 100.0       | H   | 234.0         | -32.8        | 32.7              | 35.1                 |
| 0.430000        | 2.2                | 1000.0          | 9.000           | 100.0       | H   | 214.0         | -32.8        | 30.5              | 32.6                 |
| 0.710000        | -9.8               | 1000.0          | 9.000           | 100.0       | H   | 113.0         | -32.7        | 39.4              | 29.6                 |
| 2.466000        | -16.6              | 1000.0          | 9.000           | 100.0       | H   | 123.0         | -32.4        | 38.7              | 22.1                 |

Remark:

$$E[\text{dB}(\mu\text{A/m})] = V[\text{dB}(\mu\text{A})] + L[\text{dB}] + AF^E[\text{dB}(\text{m}^{-1})]$$

Where

$E$  is the electrical field strength level

$AF^E$  is the "electric" antenna factor

$V$  is the voltage reading level measured by the receiver, the reading Level is recorded by software which is not shown in the sheet

$L$  is the cable loss

The worst-case data were reported, and no other spurious and harmonics emissions were reported greater than listed emission above table.



### 9.3 Radiated Emission Test for 30MHz-1GHz

#### Test Method

- 1: The EUT was placed on a turn table which is 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.4:  
 Span = wide enough to capture the peak level of the in-band emission and all spurious  
 RBW = 100 KHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak,  
 Trace = max hold.

#### Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

#### Limits

According to CFR 47 §15.209, radiated emissions limit as below:

| Test Limits     |              |             |
|-----------------|--------------|-------------|
| Frequency (MHz) | Distance (m) | QP (dBμV/m) |
| 30 - 88         | 3            | 40          |
| 88 - 216        | 3            | 43.5        |
| 216 - 960       | 3            | 46          |
| Above 960       | 3            | 54          |

According to RSS-216 §6.2.2.2 and ICES-001, radiated emissions limit as below

| Test Limits     |              |             |
|-----------------|--------------|-------------|
| Frequency (MHz) | Distance (m) | QP (dBμV/m) |
| 30 – 230        | 3            | 40          |
| 230 – 1000      | 3            | 47          |



Test Result

30-1000MHz Radiated Emission

EUT Information

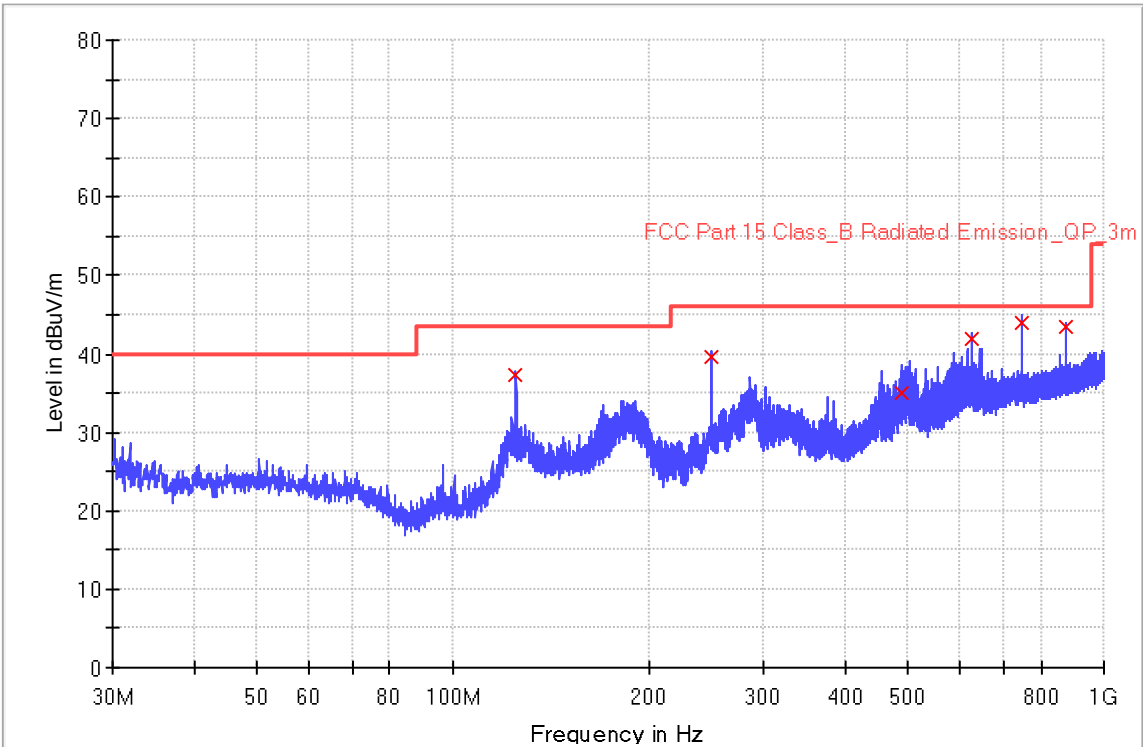
EUT Name: Cradle  
Model: Cra EW  
Client: SHINING 3D Tech Co., Ltd.  
Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
Operator: Chengjie GUO  
Test Spec: FCC Part 15.209  
Comment: Horizontal  
Sample No: SHA-809685-1

Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
Receiver: [ESR 3]  
Level Unit: dBuV/m

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|------------|-------------------|----------------------|
| 125.000000      | 37.4               | 1000.0          | 120.000         | 125.0       | H   | 123.0         | 18.5       | 6.1               | 43.5                 |
| 250.000000      | 39.7               | 1000.0          | 120.000         | 214.0       | H   | 124.0         | 19.9       | 6.3               | 46.0                 |
| 489.360000      | 35.1               | 1000.0          | 120.000         | 124.0       | H   | 212.0         | 26.4       | 11.0              | 46.0                 |
| 625.000000      | 41.9               | 1000.0          | 120.000         | 231.0       | H   | 153.0         | 29.2       | 4.1               | 46.0                 |
| 750.040000      | 43.9               | 1000.0          | 120.000         | 221.0       | H   | 124.0         | 31.7       | 2.1               | 46.0                 |
| 875.000000      | 43.4               | 1000.0          | 120.000         | 125.0       | H   | 126.0         | 32.8       | 2.6               | 46.0                 |



## 30-1000MHz Radiated Emission

### EUT Information

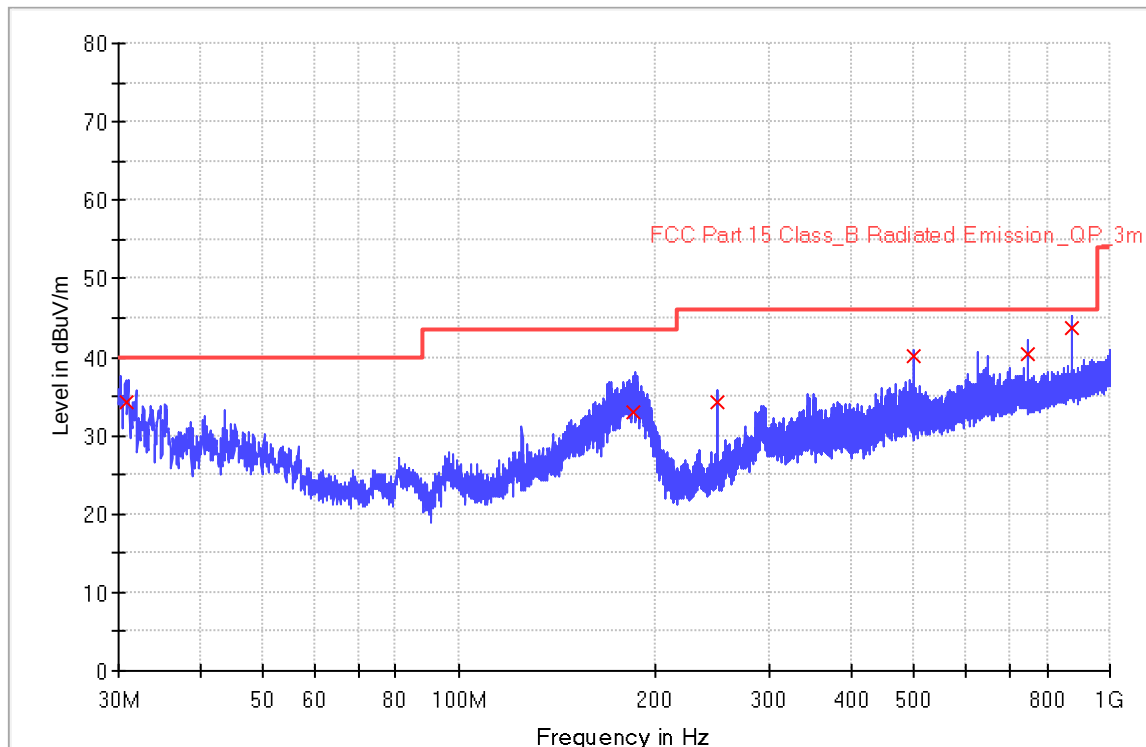
EUT Name: Cradle  
 Model: Cra EW  
 Client: SHINING 3D Tech Co., Ltd.  
 Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%,  
 Operator: Chengjie GUO  
 Test Spec: FCC Part 15.209  
 Comment: Vertical  
 Sample No: SHA-809685-1

### Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|------------|-------------------|----------------------|
| 30.840000       | 34.1               | 1000.0          | 120.000         | 164.0       | V   | 242.0         | 19.3       | 5.9               | 40.0                 |
| 184.760000      | 32.9               | 1000.0          | 120.000         | 116.0       | V   | 112.0         | 18.9       | 10.6              | 43.5                 |
| 250.000000      | 34.3               | 1000.0          | 120.000         | 175.0       | V   | 164.0         | 19.9       | 11.7              | 46.0                 |
| 500.000000      | 40.0               | 1000.0          | 120.000         | 132.0       | V   | 143.0         | 26.6       | 6.0               | 46.0                 |
| 750.000000      | 40.5               | 1000.0          | 120.000         | 164.0       | V   | 114.0         | 31.7       | 5.5               | 46.0                 |
| 875.080000      | 43.6               | 1000.0          | 120.000         | 177.0       | V   | 321.0         | 32.8       | 2.4               | 46.0                 |

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)



# 30-1000MHz Radiated Emission

## EUT Information

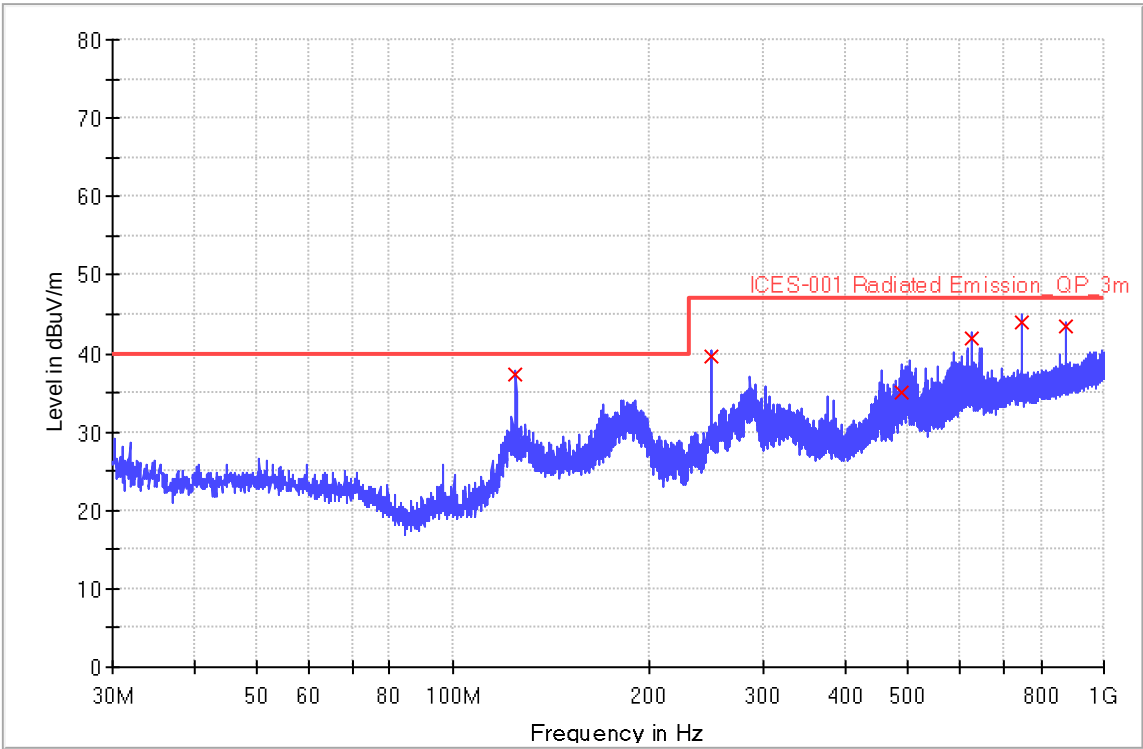
EUT Name: Cradle  
Model: Cra EW  
Client: SHINING 3D Tech Co., Ltd.  
Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%, P103.4kPa  
Operator: Chengjie GUO  
Test Spec: ICES-001  
Comment: Horizontal  
Sample No: SHA-809685-1

## Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
Receiver: [ESR 3]  
Level Unit: dBuV/m

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





## Limit and Margin

| Frequency<br>(MHz) | QuasiPeak<br>(dBuV/m) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) | Corr.<br>(dB) | Margin -<br>QPK<br>(dB) | Limit - QPK<br>(dBuV/m) |
|--------------------|-----------------------|--------------------|--------------------|----------------|-----|------------------|---------------|-------------------------|-------------------------|
| 125.000000         | 37.4                  | 1000.0             | 120.000            | 125.0          | H   | 123.0            | 18.5          | 2.6                     | 40.0                    |
| 250.000000         | 39.7                  | 1000.0             | 120.000            | 214.0          | H   | 124.0            | 19.9          | 7.3                     | 47.0                    |
| 489.360000         | 35.1                  | 1000.0             | 120.000            | 124.0          | H   | 212.0            | 26.4          | 12.0                    | 47.0                    |
| 625.000000         | 41.9                  | 1000.0             | 120.000            | 231.0          | H   | 153.0            | 29.2          | 5.1                     | 47.0                    |
| 750.040000         | 43.9                  | 1000.0             | 120.000            | 221.0          | H   | 124.0            | 31.7          | 3.1                     | 47.0                    |
| 875.000000         | 43.4                  | 1000.0             | 120.000            | 125.0          | H   | 126.0            | 32.8          | 3.6                     | 47.0                    |



## 30-1000MHz Radiated Emission

### EUT Information

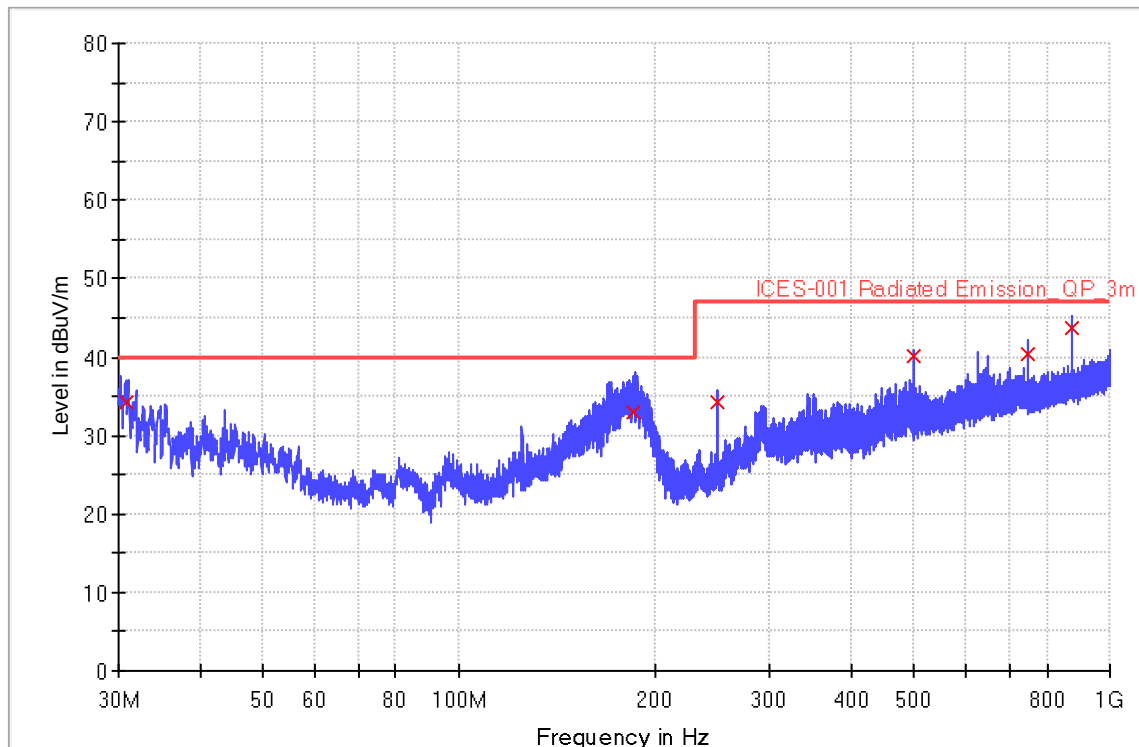
EUT Name: Cradle  
 Model: Cra EW  
 Client: SHINING 3D Tech Co., Ltd.  
 Op Cond: Power on, output: 5V/0.8A, AC 120V/60Hz, T20.2, 42.4%,  
 Operator: Chengjie GUO  
 Test Spec: ICES-001  
 Comment: Vertical  
 Sample No: SHA-809685-1

### Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|------------|-------------------|----------------------|
| 30.840000       | 34.1               | 1000.0          | 120.000         | 164.0       | V   | 242.0         | 19.3       | 5.9               | 40.0                 |
| 184.760000      | 32.9               | 1000.0          | 120.000         | 116.0       | V   | 112.0         | 18.9       | 7.1               | 40.0                 |
| 250.000000      | 34.3               | 1000.0          | 120.000         | 175.0       | V   | 164.0         | 19.9       | 12.7              | 47.0                 |
| 500.000000      | 40.0               | 1000.0          | 120.000         | 132.0       | V   | 143.0         | 26.6       | 7.0               | 47.0                 |
| 750.000000      | 40.5               | 1000.0          | 120.000         | 164.0       | V   | 114.0         | 31.7       | 6.5               | 47.0                 |
| 875.080000      | 43.6               | 1000.0          | 120.000         | 177.0       | V   | 321.0         | 32.8       | 3.4               | 47.0                 |

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)



## 9.4 20dB Bandwidth & Restricted frequency bands and occupied bandwidth

### Test Method

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. Use the following test receiver settings:  
Span = approximately 5 times the 20dB bandwidth.  
RBW = 1% to 5% of the 20dB bandwidth of the emission being measured, VBW ≥ RBW,  
Sweep = auto, Detector function = peak, Trace = max hold
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
4. Repeat above procedures until all frequencies measured were complete.

### Limit

According to CFR 47 §15.215, radiated emissions limit as below:

#### Limit [KHz]

No Limit

According to RSS-GEN §8.10, the transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table below

Table 7 – Restricted frequency bands\*

| MHz                 | MHz                   | GHz           |
|---------------------|-----------------------|---------------|
| 0.090 - 0.110       | 149.9 - 150.05        | 9.0 - 9.2     |
| 0.495 - 0.505       | 156.52475 - 156.52525 | 9.3 - 9.5     |
| 2.1735 - 2.1905     | 156.7 - 156.9         | 10.6 - 12.7   |
| 3.020 - 3.026       | 162.0125 - 167.17     | 13.25 - 13.4  |
| 4.125 - 4.128       | 167.72 - 173.2        | 14.47 - 14.5  |
| 4.17725 - 4.17775   | 240 - 285             | 15.35 - 16.2  |
| 4.20725 - 4.20775   | 322 - 335.4           | 17.7 - 21.4   |
| 5.677 - 5.683       | 399.9 - 410           | 22.01 - 23.12 |
| 6.215 - 6.218       | 608 - 614             | 23.6 - 24.0   |
| 6.26775 - 6.26825   | 960 - 1427            | 31.2 - 31.8   |
| 6.31175 - 6.31225   | 1435 - 1626.5         | 36.43 - 36.5  |
| 8.291 - 8.294       | 1645.5 - 1646.5       | Above 38.6    |
| 8.362 - 8.366       | 1660 - 1710           |               |
| 8.37625 - 8.38675   | 1718.8 - 1722.2       |               |
| 8.41425 - 8.41475   | 2200 - 2300           |               |
| 12.29 - 12.293      | 2310 - 2390           |               |
| 12.51975 - 12.52025 | 2483.5 - 2500         |               |
| 12.57675 - 12.57725 | 2655 - 2900           |               |
| 13.36 - 13.41       | 3260 - 3267           |               |
| 16.42 - 16.423      | 3332 - 3339           |               |
| 16.69475 - 16.69525 | 3345.8 - 3358         |               |
| 16.80425 - 16.80475 | 3500 - 4400           |               |
| 25.5 - 25.67        | 4500 - 5150           |               |
| 37.5 - 38.25        | 5350 - 5460           |               |
| 73 - 74.6           | 7250 - 7750           |               |
| 74.8 - 75.2         | 8025 - 8500           |               |
| 108 - 138           | --                    |               |

\* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

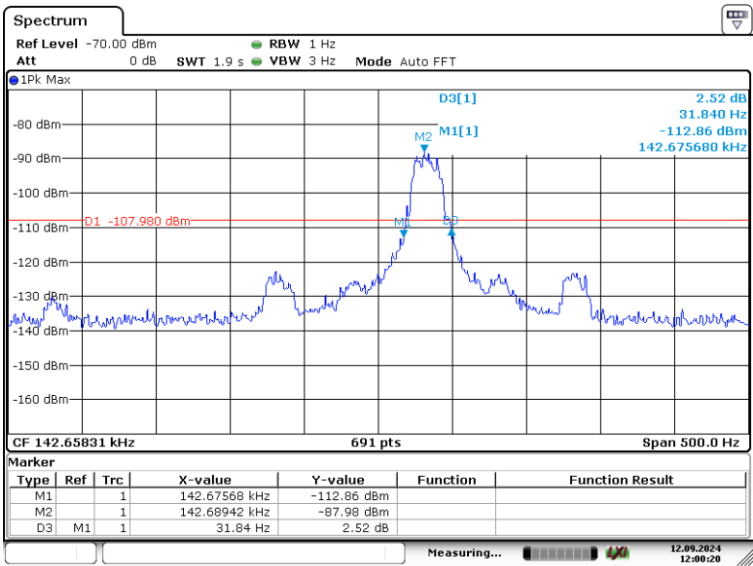


Test result

| Frequency<br>KHz | 20dB<br>bandwidth<br>Hz | 99%<br>bandwidth<br>Hz | Result               |                      | Result |
|------------------|-------------------------|------------------------|----------------------|----------------------|--------|
|                  |                         |                        | F <sub>L</sub> (KHz) | F <sub>H</sub> (KHz) |        |
| 142              | 31.840                  | 29.67                  | 141.730              | 141.760              | Pass   |

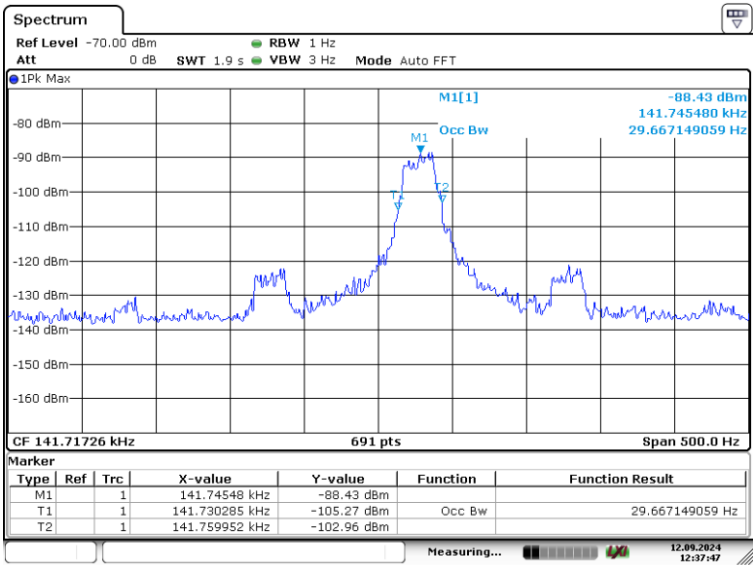
The fundamental frequency is outside the restricted bands of RSS-GEN §8.10.

20dB bandwidth



Date: 12 SEP. 2024 12:00:20

99% bandwidth



Date: 12 SEP. 2024 12:37:47



## 10. Test Equipment List

|                                  | DESCRIPTION                         | MANUFACTURER    | MODEL NO. | SERIAL NO. | CAL. DATE | CAL. DUE DATE |
|----------------------------------|-------------------------------------|-----------------|-----------|------------|-----------|---------------|
| RE                               | EMI Test Receiver                   | Rohde & Schwarz | ESR3      | 101906     | 2023-8-1  | 2024-7-31     |
|                                  | Signal Analyzer                     | Rohde & Schwarz | FSV40     | 101091     | 2023-8-1  | 2024-7-31     |
|                                  | Trilog Super Broadband Test Antenna | Schwarzbeck     | VULB 9168 | 961        | 2021-9-23 | 2024-9-22     |
|                                  | Loop antenna                        | Rohde & Schwarz | HFH2-Z2   | 100443     | 2023-6-15 | 2024-6-14     |
|                                  | 3m Semi-anechoic chamber            | TDK             | 9X6X6     | ----       | 2024-5-8  | 2027-5-7      |
| CE                               | EMI Test Receiver                   | Rohde & Schwarz | ESR3      | 101907     | 2023-8-1  | 2024-7-31     |
|                                  | LISN                                | Rohde & Schwarz | ENV216    | 101924     | 2023-8-1  | 2024-7-31     |
| Measurement Software Information |                                     |                 |           |            |           |               |
| Test Item                        | Software                            | Manufacturer    | Version   |            |           |               |
| RE                               | EMC 32                              | Rohde & Schwarz | 10.50.40  |            |           |               |
| CE                               | EMC 32                              | Rohde & Schwarz | V9.15.03  |            |           |               |



11. Measurement System Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| Items                                    | Extended Uncertainty                                                                                       |
|------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Conducted Disturbance at Mains Terminals | 150kHz to 30MHz, LISN, 3.16dB                                                                              |
| Radiated Disturbance                     | 30MHz to 1GHz, 5.03dB (Horizontal)<br>5.12dB (Vertical)<br>1GHz to 18GHz, 5.49dB<br>18GHz to 40GHz, 5.63dB |

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.

-----End of Test Report-----  
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