

**Fego Precision Industrial Co., Ltd.**

# TEST REPORT

**Model:**

EEC118A0, EEC118B0, EEC118B1

**REPORT NUMBER**

240600020THC-001

**ISSUE DATE**

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# Radio Spectrum TEST REPORT

|                               |                                                                                                                                               |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>             | Fego Precision Industrial Co., Ltd.<br>No 947 Lin-Sen Rd. Wu Fong Shiang, Taichung Hsien, Taiwan                                              |
| <b>Product:</b>               | Remote control transmitter                                                                                                                    |
| <b>Model No.:</b>             | EEC118A0, EEC118B0, EEC118B1                                                                                                                  |
| <b>FCC ID:</b>                | M8C-EEC118RF433                                                                                                                               |
| <b>Test Method/ Standard:</b> | 47 CFR FCC Part 15.231                                                                                                                        |
| <b>Test By:</b>               | Intertek Testing Services Taiwan Ltd.,<br>Hsinchu Laboratory<br>No. 17, Ln. 246, Niupu S. Rd., Xiangshan Dist,<br>Hsinchu City 300075, Taiwan |



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### Revision History

| Report No.       | Issue Date    | Revision Summary |
|------------------|---------------|------------------|
| 240600020THC-001 | Jul. 15, 2024 | Original report  |

## Table of Contents

|                                                                     |    |
|---------------------------------------------------------------------|----|
| 1. General Information .....                                        | 5  |
| 1.1 Identification of the EUT .....                                 | 5  |
| 1.2 Additional information about the EUT .....                      | 5  |
| 1.3 Antenna description .....                                       | 5  |
| 1.4 Operation mode .....                                            | 6  |
| 1.5 Peripherals equipment .....                                     | 6  |
| 2. Radiated emission test FCC 15.231 (b) .....                      | 7  |
| 2.1.1 Radiated emission from 9kHz to 30MHz uses Loop Antenna: ..... | 7  |
| 2.1.2 Radiated emission below 1GHz using Bilog Antenna .....        | 8  |
| 2.1.3 Radiated emission above 1GHz using Horn Antenna .....         | 8  |
| 3. Measured bandwidth FCC 15.231(C) .....                           | 14 |
| 4. Timing requirement of operated transmitter .....                 | 15 |
| 5. Conducted emission FCC 15.207 .....                              | 16 |
| Appendix A: Test equipment list .....                               | 17 |
| Appendix B: Measurement Uncertainty .....                           | 18 |

## Summary of Test Data

| Test Requirement                           | Applicable Rule   | Result |
|--------------------------------------------|-------------------|--------|
| Radiated Emission test                     | 15.231(b), 15.209 | Pass   |
| Measured bandwidth                         | 15.231(c)         | Pass   |
| Timing requirement of operated transmitter | 15.231(b)         | Pass   |
| Conducted Emission test                    | 15.207            | N/A    |
| Antenna Requirement                        | 15.203            | Pass   |

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.

Other Testing: the specification, standard and not taking into account the measurement uncertainty.

## 1. General Information

### 1.1 Identification of the EUT

|                               |                            |
|-------------------------------|----------------------------|
| <b>Product:</b>               | Remote control transmitter |
| <b>Model No.:</b>             | EEC118B1                   |
| <b>Operating Frequency:</b>   | 433.92MHz                  |
| <b>Rated Power:</b>           | DC 3V                      |
| <b>Power Cord:</b>            | N/A                        |
| <b>Sample receiving date:</b> | 2024/06/04                 |
| <b>Sample condition:</b>      | Workable                   |
| <b>Test Date(s):</b>          | 2024/06/19 ~ 2024/06/21    |

### 1.2 Additional information about the EUT

The customer confirmed EEC118A0, EEC118B0 are series models to EEC118B1 (EUT), the different is in enclosure.

### 1.3 Antenna description

Antenna Type : Printed Antenna  
Connector Type : Fixed

## 1.4 Operation mode

The EUT was supplied with DC 3V from battery.

The EUT will transmit continuously when power on.

The signal is maximized through rotation and placement in the three orthogonal axes.



**X axis**

**Y axis**

**Z axis**

After verifying three axes, we found the maximum electromagnetic field was occurred at X axis. The final test data was executed under this configuration.

| Frequency (MHz) | Signal on time (ms) | Signal on & off time (ms) | Duty Cycle | Duty Cycle factor |
|-----------------|---------------------|---------------------------|------------|-------------------|
| 433.92          | 32.64               | 100.00                    | 0.326      | 9.72              |

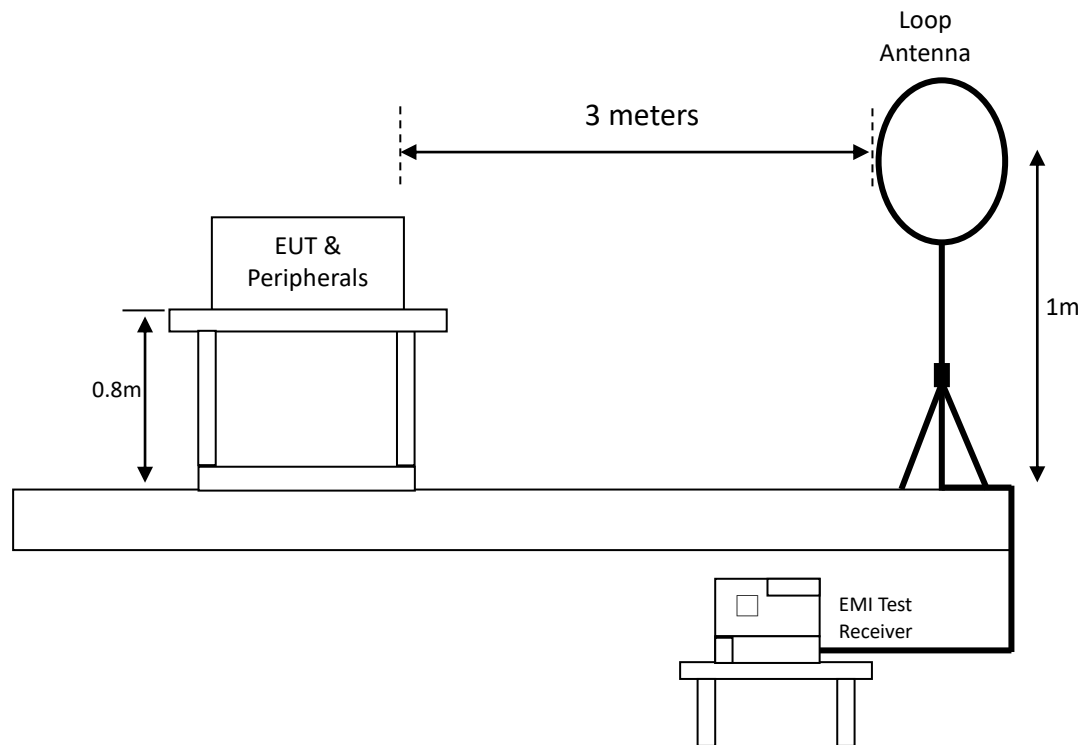
## 1.5 Peripherals equipment

| Peripherals | Brand | Model No. | Serial No. | Data cable |
|-------------|-------|-----------|------------|------------|
| Battery × 2 | GP    | 24G R03   | N/A        | N/A        |

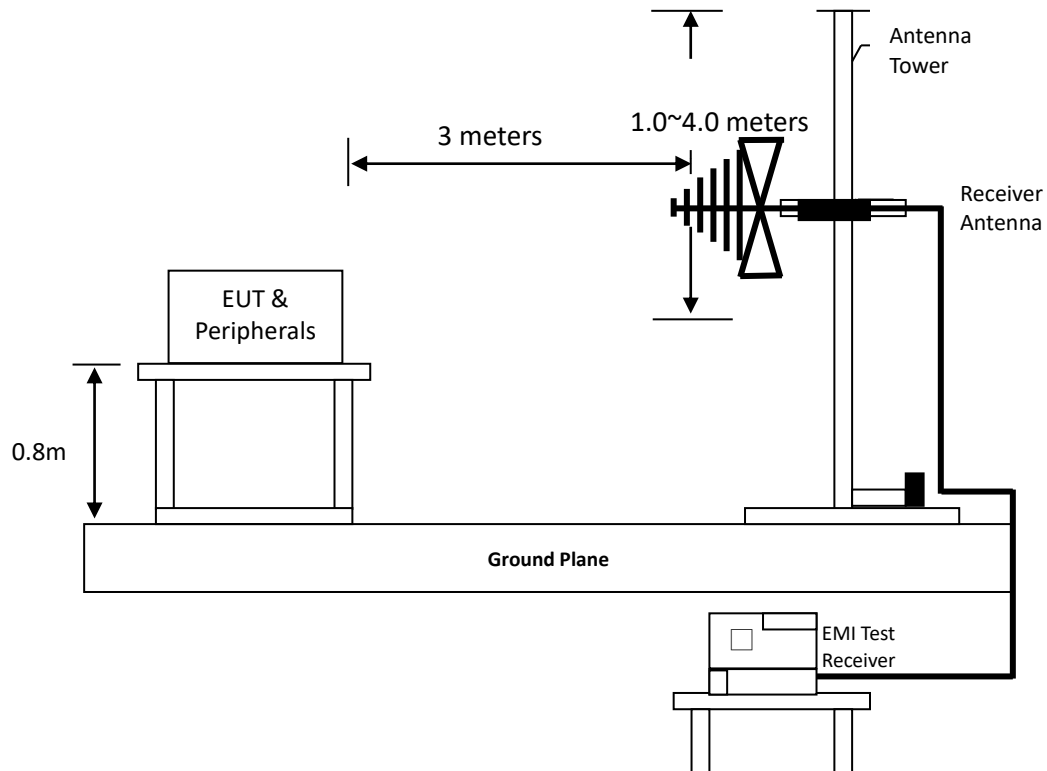
## 2. Radiated emission test FCC 15.231 (b)

### 2.1 Test setup & procedure

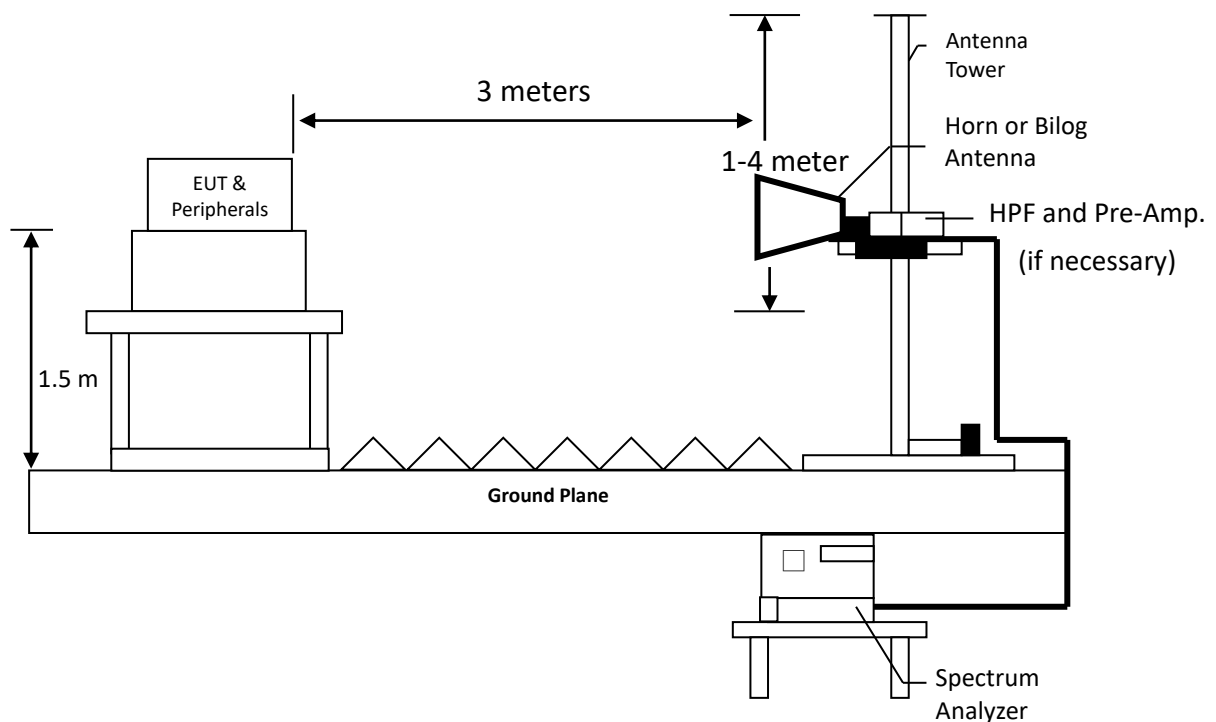
#### 2.1.1 Radiated emission from 9kHz to 30MHz uses Loop Antenna:



### 2.1.2 Radiated emission below 1GHz using Bilog Antenna



### 2.1.3 Radiated emission above 1GHz using Horn Antenna



## 2.2 Radiated emission limit

### 2.2.1 Fundamental and harmonics emission limits

| Frequency<br>(MHz) | Field Strength of Fundamental |              | Field Strength of Harmonics |              |
|--------------------|-------------------------------|--------------|-----------------------------|--------------|
|                    | (uV/m@3 m)                    | (dBuV/m@3 m) | (uV/m@3 m)                  | (dBuV/m@3 m) |
| 433.92             | 11002.71                      | 80.83        | 1100.27                     | 60.83        |

### 2.2.2 General radiated emission limit

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

| Frequency<br>MHz | 15.209 Limits<br>(dBμV/m@3m) |
|------------------|------------------------------|
| 30-88            | 40                           |
| 88-216           | 43.5                         |
| 216-960          | 46                           |
| Above 960        | 54                           |

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

## 2.3 Radiated emission test data FCC 15.231

### 2.3.1 Measurement results: Fundamental emission

Temperature: 27 °C  
Relative Humidity: 82 %  
Test date: 2024/06/19

| Frequency<br>(MHz) | Spectrum<br>Analyzer<br>Detector | Antenna<br>Polarization | Correction<br>Factor<br>(dB/m) | Reading<br>(dBμV) | Corrected<br>Reading<br>(dBμV/m) | Limit<br>@ 3 m<br>(dBμV/m) | Margin<br>(dB) |
|--------------------|----------------------------------|-------------------------|--------------------------------|-------------------|----------------------------------|----------------------------|----------------|
| 433.92             | PK                               | H                       | 25.43                          | 58.52             | 83.95                            | 100.83                     | -16.88         |
| 433.92             | AV                               | H                       | -                              | -                 | 74.23                            | 80.83                      | -6.60          |
| 433.92             | PK                               | V                       | 25.43                          | 51.44             | 76.87                            | 100.83                     | -23.96         |
| 433.92             | AV                               | V                       | -                              | -                 | 67.15                            | 80.83                      | -13.68         |

Remark: 1. Correction Factor = Antenna Factor + Cable Loss

2. AV Corrected Reading = PK Corrected Reading +Duty cycle correction factor (-9.72)

## TEST REPORT

### 2.3.2 Measurement results: frequencies equal to or less than 1 GHz

Temperature: 27 °C  
Relative Humidity: 79 %  
Test date: 2024/06/21

#### 9kHz – 30MHz

| Antenna Polarization | Frequency (MHz) | Detector | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|----------------------|-----------------|----------|--------------------------|----------------|----------------------------|----------------------|-------------|
| Perpendicular        | 0.519           | PK       | 17.92                    | 23.80          | 41.72                      | 73.30                | -31.58      |
| Perpendicular        | 1.329           | PK       | 17.97                    | 16.83          | 34.80                      | 65.13                | -30.33      |
| Perpendicular        | 2.078           | PK       | 17.91                    | 16.99          | 34.90                      | 69.54                | -34.64      |
| Perpendicular        | 6.307           | PK       | 19.89                    | 11.02          | 30.91                      | 69.54                | -38.63      |
| Perpendicular        | 9.756           | PK       | 19.91                    | 8.87           | 28.78                      | 69.54                | -40.76      |
| Perpendicular        | 12.245          | PK       | 20.27                    | 8.63           | 28.90                      | 69.54                | -40.64      |

Remark: Corr. Factor = Antenna Factor + Cable Loss

| Antenna Polarization | Frequency (MHz) | Detector | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|----------------------|-----------------|----------|--------------------------|----------------|----------------------------|----------------------|-------------|
| Parallel             | 0.519           | PK       | 17.92                    | 23.28          | 41.20                      | 73.30                | -32.10      |
| Parallel             | 0.879           | PK       | 18.08                    | 15.87          | 33.95                      | 68.72                | -34.77      |
| Parallel             | 1.449           | PK       | 17.96                    | 16.76          | 34.72                      | 64.38                | -29.66      |
| Parallel             | 1.988           | PK       | 17.90                    | 16.78          | 34.68                      | 69.54                | -34.86      |
| Parallel             | 5.917           | PK       | 19.80                    | 10.44          | 30.24                      | 69.54                | -39.30      |
| Parallel             | 11.855          | PK       | 20.30                    | 9.42           | 29.72                      | 69.54                | -39.82      |

Remark: Corr. Factor = Antenna Factor + Cable Loss

| Antenna Polarization | Frequency (MHz) | Detector | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|----------------------|-----------------|----------|--------------------------|----------------|----------------------------|----------------------|-------------|
| Ground-parallel      | 0.519           | PK       | 17.92                    | 23.53          | 41.45                      | 73.30                | -31.85      |
| Ground-parallel      | 1.449           | PK       | 17.96                    | 18.52          | 36.48                      | 64.38                | -27.90      |
| Ground-parallel      | 2.048           | PK       | 17.90                    | 15.91          | 33.81                      | 69.54                | -35.73      |
| Ground-parallel      | 6.277           | PK       | 19.89                    | 9.34           | 29.23                      | 69.54                | -40.31      |
| Ground-parallel      | 10.986          | PK       | 20.20                    | 9.46           | 29.66                      | 69.54                | -39.88      |
| Ground-parallel      | 16.984          | PK       | 20.79                    | 8.76           | 29.55                      | 69.54                | -39.99      |

Remark: Corr. Factor = Antenna Factor + Cable Loss

## TEST REPORT

Temperature: 27 °C  
Relative Humidity: 82 %  
Test date: 2024/06/19

### 30MHz – 1GHz

| Antenna Polarization | Frequency (MHz) | Spectrum Analyzer Detector | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|----------------------|-----------------|----------------------------|--------------------------|----------------|----------------------------|----------------------|-------------|
| Horizontal           | 217.21          | PK                         | 17.93                    | 18.39          | 36.32                      | 80.83                | -44.51      |
| Horizontal           | 325.85          | PK                         | 22.33                    | 11.95          | 34.28                      | 46.00                | -11.72      |
| Horizontal           | 393.75          | PK                         | 24.11                    | 8.67           | 32.78                      | 80.83                | -48.05      |
| Horizontal           | 419.94          | PK                         | 24.72                    | 18.10          | 42.82                      | 80.83                | -38.01      |
| Horizontal           | 447.10          | PK                         | 25.71                    | 16.85          | 42.56                      | 80.83                | -38.27      |
| Horizontal           | 867.84          | PK                         | 32.76                    | 13.07          | 45.83                      | 80.83                | -35.00      |

Remark: Corr. Factor = Antenna Factor + Cable Loss

| Antenna Polarization | Frequency (MHz) | Spectrum Analyzer Detector | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|----------------------|-----------------|----------------------------|--------------------------|----------------|----------------------------|----------------------|-------------|
| Vertical             | 67.83           | PK                         | 19.03                    | 9.43           | 28.46                      | 80.83                | -52.37      |
| Vertical             | 419.94          | PK                         | 24.72                    | 8.40           | 33.12                      | 80.83                | -47.71      |
| Vertical             | 447.10          | PK                         | 25.71                    | 9.70           | 35.41                      | 80.83                | -45.42      |
| Vertical             | 648.86          | PK                         | 29.62                    | 3.08           | 32.70                      | 80.83                | -48.13      |
| Vertical             | 795.33          | PK                         | 32.00                    | 3.93           | 35.93                      | 80.83                | -44.90      |
| Vertical             | 867.84          | PK                         | 32.76                    | 8.40           | 41.16                      | 80.83                | -39.67      |

Remark: Corr. Factor = Antenna Factor + Cable Loss

### 2.3.3 Measurement results: frequency above 1GHz

Temperature: 27 °C  
Relative Humidity: 79 %  
Test date: 2024/06/21

| Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|-----------------|----------------------------|-----------------|--------------------------|----------------|----------------------------|----------------------|-------------|
| 1301.76         | PK                         | H               | 30.64                    | 23.99          | 54.63                      | 74.00                | -19.37      |
| 1301.76         | AV                         | H               | ---                      | ---            | 44.91                      | 54.00                | -9.09       |
| 1410.24         | PK                         | H               | 31.36                    | 16.63          | 47.99                      | 74.00                | -26.01      |
| 1518.72         | PK                         | H               | 31.13                    | 23.40          | 54.53                      | 74.00                | -19.47      |
| 1518.72         | AV                         | H               | ---                      | ---            | 44.81                      | 54.00                | -9.19       |
| 1627.2          | PK                         | H               | 30.34                    | 26.20          | 56.54                      | 80.83                | -24.29      |
| 1735.68         | PK                         | H               | 30.71                    | 38.73          | 69.44                      | 80.83                | -11.39      |
| 1735.68         | AV                         | H               | ---                      | ---            | 59.72                      | 60.83                | -1.11       |
| 2169.6          | PK                         | H               | 34.41                    | 22.00          | 56.41                      | 80.83                | -24.42      |
| 2603.52         | PK                         | H               | 34.67                    | 16.25          | 50.92                      | 80.83                | -29.91      |
| 1301.76         | PK                         | V               | 30.64                    | 16.69          | 47.33                      | 74.00                | -26.67      |
| 1627.2          | PK                         | V               | 30.34                    | 21.98          | 52.32                      | 80.83                | -28.51      |
| 1735.68         | PK                         | V               | 30.71                    | 32.90          | 63.61                      | 80.83                | -17.22      |
| 1735.68         | AV                         | V               | ---                      | ---            | 53.89                      | 60.83                | -6.94       |

Remark: 1. Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre\_Amplifier Gain  
2. AV Corrected Reading = PK Corrected Reading +Duty cycle correction factor (-9.72)

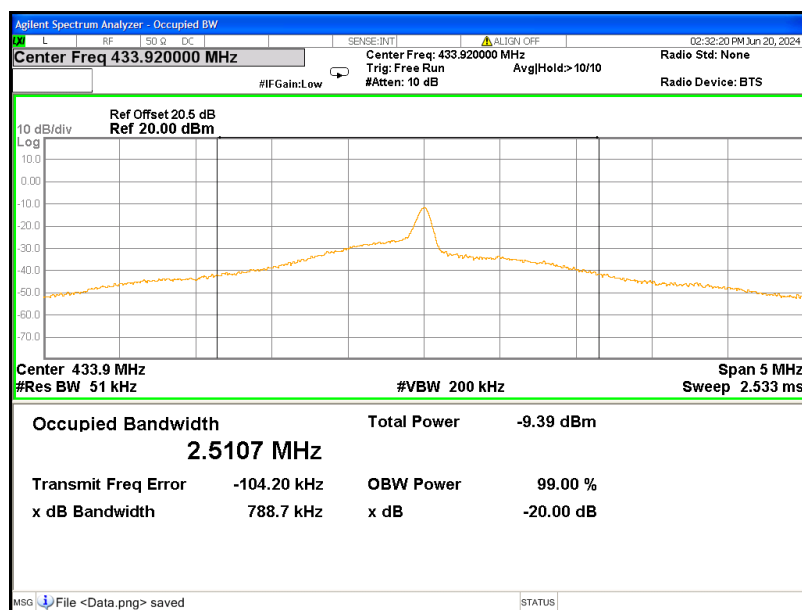
### 3. Measured bandwidth FCC 15.231(C)

Temperature: 25 °C  
 Relative Humidity: 73 %  
 Test date: 2024/06/20

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

| Frequency (MHz) | 20dB Occupied Bandwidth (MHz) | Limit (MHz) | Result |
|-----------------|-------------------------------|-------------|--------|
| 433.92          | 0.789                         | 1.085       | Pass   |

### 20dB Occupied Bandwidth



#### 4. Timing requirement of operated transmitter

Temperature: 25 °C  
 Relative Humidity: 73 %  
 Test date: 2024/06/20

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

| Frequency (MHz) | Transmission Time (s) | Limit (s) | Result |
|-----------------|-----------------------|-----------|--------|
| 433.92          | 0.343                 | < 5       | Pass   |

#### Transmitter Pulse Duration



## **5. Conducted emission FCC 15.207**

Since the EUT is not connected to AC source, therefore, the test can be waived.

### Appendix A: Test equipment list

| Test Equipment/<br>Test site         | Brand       | Model No.     | Serial No. | Calibration<br>Date | Next<br>Calibration<br>Date |
|--------------------------------------|-------------|---------------|------------|---------------------|-----------------------------|
| EMI Test Receiver                    | KEYSIGHT    | N9038B        | MY63060107 | 2024/03/06          | 2025/03/05                  |
| Spectrum analyzer                    | KEYSIGHT    | N9020B        | MY63450146 | 2024/03/05          | 2025/03/04                  |
| Signal Analyzer                      | Agilent     | N9030A        | MY51380492 | 2023/07/17          | 2024/07/16                  |
| Signal Analyzer                      | R&S         | FSV40         | 101532     | 2023/08/03          | 2024/08/02                  |
| Active Loop<br>Antenna               | SCHWARZBECK | FMZB1519      | 1519-067   | 2024/01/16          | 2025/01/15                  |
| Broadband<br>Antenna                 | SCHWARZBECK | VULB 9168     | 9168-172   | 2024/01/02          | 2025/01/01                  |
| Horn Antenna                         | SCHWARZBECK | BBHA 9120 D   | 9120D-456  | 2023/12/27          | 2024/12/26                  |
| Cable                                | SUHNER      | SUCOFLEX 104  | 295105/4   | 2024/03/02          | 2025/03/02                  |
| Cable                                | SUHNER      | SUCOFLEX 104P | CB0005     | 2024/06/14          | 2025/06/13                  |
| Power Meter                          | Anritsu     | ML2495A       | 0844001    | 2024/01/08          | 2025/01/07                  |
| Power Sensor                         | Anritsu     | MA2491A       | 031543     | 2024/01/08          | 2025/01/07                  |
| 20dB Attenuator                      | PE          | PE7001-20     | N/A        | 2024/05/23          | 2025/05/23                  |
| 966-2_3m<br>Semi-Anechoic<br>Chamber | 966_2       | CEM-966_2     | N/A        | 2023/08/01          | 2024/07/31                  |
| Test software                        | Audix       | e3            | V9         | NCR                 | NCR                         |

Note: No Calibration Required (NCR).

## Appendix B: Measurement Uncertainty

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

| Item                                                                                                        | Uncertainty |
|-------------------------------------------------------------------------------------------------------------|-------------|
| Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m                        | 2.73 dB     |
| Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m   | 3.91 dB     |
| Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m | 3.49 dB     |
| Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m   | 3.71 dB     |
| Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m | 3.71 dB     |
| Conducted Measurement                                                                                       | 0.69 dB     |
| AC Conducted Emission                                                                                       | 1.31 dB     |