# RF EXPOSURE REPORT

**Product:** IoT Wireless Device

**Model Name:** TMX08

**FCC ID:** 2ATV9TMX08

**Applicant:** ThingsMatrix Inc.

**Address:** 9442 North Capital of Texas Hwy,Plaza One, Suite 500,Austin, TX 78759

**Manufacturer:** ThingsMatrix Inc.

**Address:** 9442 North Capital of Texas Hwy,Plaza One, Suite 500,Austin, TX 78759

**Prepared by:** BV 7Layers Communications Technology (Shenzhen) Co. Ltd

**Lab Location:** No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China

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**E-MAIL:** customerservice.dg@cn.bureauveritas.com

**Report No.:** SA190701W004

**Received Date:** Jul. 14, 2019

**Test Date:** Jul. 15, 2019 ~ Jul. 16, 2019

**Issued Date:** Jul. 25, 2019

This report should not be used by the client to claim product certification, approval, or endorsement by A2LA or any government agencies.

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| SA190701W004 | Original release | Jul. 25, 2019 |

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# 1 CERTIFICATION

| | |
|---:|:---|
| **PRODUCT:** | IoT Wireless Device |
| **BRAND NAME:** | ThingsMatrix |
| **MODEL NAME:** | TMX08 |
| **APPLICANT:** | ThingsMatrix Inc. |
| **TESTED:** | Jul. 15, 2019 ~ Jul. 16, 2019 |
| **TEST SAMPLE:** | Identical Prototype |
| **STANDARDS:** | **FCC Part 2 (Section 2.1091)** |
| | **FCC OET Bulletin 65, Supplement C (01-01)** |
| | **KDB 447498 D01 General RF Exposure Guidance v06** |
| | IEEE C95.1 |

The above equipment has been tested by **BV 7Layers Communications Technology (Shenzhen) Co. Ltd** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY :** _____ , **DATE:** ___Jul. 25, 2019___

(Alex Chen/ Engineer)

**APPROVED BY :** _____ , **DATE:** ___Jul. 25, 2019___

(Luke Lu / Manager)

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## 2  GENERAL INFORMATION

### 2.1  GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| **PRODUCT** | IoT Wireless Device | |
| **MODEL NAME** | TMX08 | |
| **NOMINAL VOLTAGE** | 12Vdc (from adapter) | |
| **OPERATING TEMPERATURE RANGE** | -20 ~ 75℃ | |
| **MODULATION TYPE** | **LTE** | QPSK, 16QAM |
| **OPERATING FREQUENCY** | **LTE** | 1850.7MHz ~ 1909.3MHz   (FOR LTE Band2)<br>1710.7MHz ~ 1754.3MHz   (FOR LTE Band4)<br>824.7MHz ~ 848.3MHz   (FOR LTE Band5)<br>699.7MHz ~ 715.3MHz   (FOR LTE Band12)<br>779.5MHz ~ 784.5MHz   (FOR LTE Band13)<br>814.7MHz ~ 848.3MHz   (FOR LTE Band26) |
| **ANTENNA GAIN** | **LTE Band 2** | Fixed External Antenna with 2.5dBi gain |
| | **LTE Band 4** | Fixed External Antenna with 2.0dBi gain |
| | **LTE Band 5** | Fixed External Antenna with 2.0dBi gain |
| | **LTE Band 12** | Fixed External Antenna with 0 dBi gain |
| | **LTE Band 13** | Fixed External Antenna with -2.0dBi gain |
| | **LTE Band 26** | Fixed External Antenna with 1.4dBi gain |
| **HW VERSION** | BJ51AV01 | |
| **SW VERSION** | BJ51V01 | |
| **I/O PORTS** | Refer to user's manual | |
| **CABLE SUPPLIED** | N/A | |

**NOTE**:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

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**List of Accessories:**

| ACCESSORIES | MODEL | SPECIFICATION |
|---|---|---|
| Power supply adapter | TDX-1201000 | I/P:100~240VAC O/P:12VDC/1A |
| Battery | Li-ion Polymer Battery | DC 3.7V, 3000mAh, 11.1Wh |
| Sensor 1 | Ultrasonic&Temperature sensor | - |
| Sensor 2 | Ultrasonic sensor | - |
| Current draw sensor | Current draw sensor | - |
| Cellular Antenna | Cellular Antenna | - |
| GPS Antenna | GPS Antenna | - |

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## 3    RF EXPOSURE

### 3.1    LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| FREQUENCY RANGE (MHz) | ELECTRIC FIELD STRENGTH (V/m) | MAGNETIC FIELD STRENGTH (A/m) | POWER DENSITY (mW/cm$^2$) | AVERAGE TIME (minutes) |
|---|---|---|---|---|
| LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE | | | | |
| 300-1500 | … | … | F/1500 | 30 |
| 1500-100,000 | … | … | 1.0 | 30 |

F = Frequency in MHz

### 3.2    MPE CALCULATION FORMULA

Pd = (Pout*G) / (4*pi*r2)

where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

### 3.3    CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

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## 3.4 CONDUCTED POWER

**TUNE-UP POWER TABLE**

| Band | Frequency (MHz) | Operating Mode | Tune-Up Power And Tolerance (dBm) |
|---|---|---|---|
| LTE 2 | 1850~1910 | QPSK | 24.0 |
| LTE 4 | 1710~1755 | QPSK | 23.0 |
| LTE 5 | 824~849 | QPSK | 24.0 |
| LTE 12 | 699~716 | QPSK | 24.0 |
| LTE 13 | 777~787 | QPSK | 24.0 |
| LTE 26 | 814~849 | QPSK | 24.0 |

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## CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

### LTE

| Band | Frequency (MHz) | Operating Mode | Antenna Gain (dBi) | Tune-up Power (dBm) | E.I.R.P Power (mW) | Power Density (mW/cm^2) | limit (mW/cm^2) | PASS / FAIL |
|---|---|---|---|---|---|---|---|---|
| Band2 | 1850~1910 | QPSK | 2.50 | 24.00 | 446.684 | 0.089 | 1.00 | PASS |
| Band4 | 1710~1755 | QPSK | 2.00 | 23.00 | 316.228 | 0.063 | 1.00 | PASS |
| Band5 | 824~849 | QPSK | 2.00 | 24.00 | 398.107 | 0.079 | 0.55 | PASS |
| Band12 | 699~716 | QPSK | 0.00 | 24.00 | 251.189 | 0.050 | 0.47 | PASS |
| Band13 | 777~787 | QPSK | -2.00 | 24.00 | 158.489 | 0.032 | 0.52 | PASS |
| Band26 | 814~849 | QPSK | 1.40 | 24.00 | 346.737 | 0.069 | 0.54 | PASS |

--END--

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