



Test Report No.: SA190701W004



# 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

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**Report No.:** SA190701W004

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

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

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

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Test Report No.: SA190701W004

## TABLE OF CONTENTS

RF EXPOSURE REPORT.....	1
RELEASE CONTROL RECORD .....	3
1 <b>CERTIFICATION</b> .....	4
2 <b>GENERAL INFORMATION</b> .....	5
2.1 GENERAL DESCRIPTION OF EUT .....	5
3 <b>RF EXPOSURE</b> .....	7
3.1 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) .....	7
3.2 MPE CALCULATION FORMULA .....	7
3.3 CLASSIFICATION .....	7
3.4 CONDUCTED POWER .....	8
CALCULATION RESULT OF MAXIMUM CONDUCTED POWER .....	9



**BUREAU**  
**VERITAS**

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## RELEASE CONTROL RECORD

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



# 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 :** Alex , **DATE:** Jul. 25, 2019  
(Alex Chen/ Engineer)

**APPROVED BY :** Luke Lu , **DATE:** Jul. 25, 2019  
(Luke Lu / Manager)



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

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



**List of Accessories:**

<b>ACCESSORIES</b>	<b>MODEL</b>	<b>SPECIFICATION</b>
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	-

### 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 <sup>2</sup> )	AVERAGE TIME (minutes)
<b>LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b>				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

#### 3.2 MPE CALCULATION FORMULA

$$Pd = (Pout * G) / (4 * pi * r^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

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**.



### 3.4 CONDUCTED POWER

#### TUNE-UP POWER TABLE

Band	Frequency (MHz)	Operating Mode	Tune-Up Power And Tolerance (dBm)
LTE 2	1880	QPSK	24.0
LTE 4	1732.5	QPSK	23.0
LTE 5	836.5	QPSK	24.0
LTE 12	707.5	QPSK	24.0
LTE 13	782	QPSK	24.0
LTE 26	831.5	QPSK	24.0





### 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 <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	PASS / FAIL
Band2	1880	QPSK	2.50	24.00	446.684	0.089	1.00	PASS
Band4	1745	QPSK	2.00	23.00	316.228	0.063	1.00	PASS
Band5	836.5	QPSK	2.00	24.00	398.107	0.079	0.56	PASS
Band12	711	QPSK	0.00	24.00	251.189	0.050	0.47	PASS
Band13	782	QPSK	-2.00	24.00	158.489	0.032	0.52	PASS
Band26	831.5	QPSK	1.40	24.00	346.737	0.069	0.55	PASS

--END--