



REPORT No. : SZ18080066S01

RF EXPOSURE EVALUATION REPORT

APPLICANT : MiMOMax Wireless Limited
PRODUCT NAME : 800MHz Tornado Transceiver
MODEL NAME : MWL-TORNADO-*E A/B/C*
BRAND NAME : MiMOMax Wireless
FCC ID : XMK-MMXTRNB005
RECEIPT DATE : 2018-08-16
ISSUE DATE : 2020-03-03



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MORLAB

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Change History		
Version	Date	Reason for change
1.0	2020-03-03	First edition



1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	MiMOMax Wireless Limited
Applicant Address:	540 Wairakei Road, Christchurch, 8053 New Zealand
Manufacturer:	MiMOMax Wireless Limited
Manufacturer Address:	540 Wairakei Road, Christchurch, 8053 New Zealand

1.2 Equipment Under Test (EUT) Description

Product Name:	800MHz Tornado Transceiver
Serial No:	UUT 1:23001213 UUT2:23001212
Hardware Version:	IP001
Software Version:	R04.03.04
Operating Frequency Range:	806.0~824.0MHz; 851.0~869.0MHz
Channel Bandwidth:	12.5kHz; 25kHz
Modulation Type:	QPSK,16QAM,64QAM,256QAM
Operating Voltage:	10.5-60Vdc(Isolated)
Antenna Type:	Omni Antenna; External Panel antenna
Emission Designator:	12.5kHz:10K5W1W 25.0kHz:21K2W1W



2. Standards

The objective of the report is to perform testing according to 47 CFR Part 1.1310 for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 1.1310	Radio frequency exposure limits
2	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.



3. RF Exposure Evaluation

3.1.1. Requirement

Devices that operate under CFR47 Part 90 are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and limit for power density for general population/uncontrolled exposure is $f/1500 \text{ mW/cm}^2$. The output power range by Manufacturer statement is 24dBm.

(B) Limits for General Population/Uncontrolled Exposure				
Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

Note: f=frequency in MHz; *=Plane-wave equivalent power density

Prediction of MPE limit at given distance, equations from OET Bulletin 65, Edition 97 - 01:

$S = (P * G) / (4 * \pi * R^2)$ (where PG = EIRP) Where:

S = power density

P= power input to antenna

G= numeric gain of the antenna

R= distance to the center of radiation of the antenna

**3.2.2 Result for RF safety distance**

Antenna Type	Gain(dBi)	Max Gain(numeric)	Safe Distance(cm)
Omni	5.0	3.2	10.9
	8.0	6.3	15.3
External Panel	10.0	10.0	19.3
	12.0	15.8	24.3
	16.0	39.8	38.5

A sample for 16dBi calculation for the safe distance would be:

$$d = \sqrt{(P * G) / 4 * \pi * S}$$

$$d = \sqrt{251 * 39.8 / (4 * 3.14 * 0.537)}$$

$$d = 38.5\text{cm}$$

Result: Complies if the safe distances defined above are applied.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
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2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

3. Accreditation Certificate

Accredited Testing Laboratory:	The FCC designation number is CN1192. Test firm registration number is 226174. (Shenzhen Morlab Communications Technology Co., Ltd.)
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