Timco Test Report # TR_3851-20_FCC_MPE_1
Revision: 1
Issue Date: October 28, 2020
Final Test Date: October 15, 2020

TIMCO ENGINEERING, Inc.

An IIA Company

Test Report - FCC PART 1.1310 / MPE
Prepared For: TowerIQ Inc.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager
Date of Signature (YYYY-MM-DD): 2020-10-29

Table of Contents

1. Customer Information

Applicant:	TowerIQ Inc.
Address:	13723 Riverport Drive c/o Potter Electric Signal Company Saint Louis MO 63043
Contact:	Mr. Connor Crowley
Telephone:	347-200-8058
Email address:	connorc@pottersignal.com

2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780
FCC Designation # US1070
FCC site registration is under A2LA certificate # 0955.01
ISED Canada test site registration # 2056A
EU Notified Body # 1177
For all designations see A2LA scope # 0955.01

2.2 Testing was performed, reviewed by

Dates of Testing: October 15, 2020

Signature: 

Name & Title: Franklin Rose, EMC Specialist
Date of Signature
(YYYY-MM-DD): 2020-10-29

Signature: 

Sr. EMC Engineer
EMC-003838-NE

Name & Title: Tim Royer, EMC Engineer
Date of Signature
(YYYY-MM-DD): 2020-10-29

3. Test Sample(s) (EUT/DUT)

The test sample was received: October 15, 2020

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	2AXVJ4500402
Brief Description	TowerlinQ Gateway
Type of Modular	n/a
Model(s) #	4500402
Trade name	n/a
Firmware version	ver. 1.0
Hardware version	TQ-03-1-MB-FCC
Software version	ver. 1.0 (web-configurator SW)
Serial Number	2e:0:35:0:11:51:36:34:34:34:33:34

Technical Characteristics	
Technology	Signal Booster
Frequency Range	470-512 MHz
RF O/P Power (Max.)	20 dBm (100 mW)
Modulation	FM
Bandwidth & Emission Class	16K0F3E
Number of Channels	2
Duty Cycle	100%
Antenna Type	n/a
Antenna Gain (for each ant.)	0 dBi
Antenna Connector	N
Voltage Rating (AC or Batt.)	24 V DC (Note 1)

Antenna Characteristics		
Frequency Range	Mode / BW	Antenna Gain
n/a	n/a	0 dBi

4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

The following guidance FCC KDB 447498 D01 General RF Exposure Guidance v06 was used for RF exposure evaluation as per FCC Part 1.1310 and FCC Part 2.1091 and part 2.1093. Full test results are available in this report.

4.1.1 FCC Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging Time (minutes)
A Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
B Limits for General Population/Uncontrolled Exposure				
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

4.2 Equations

POWER DENSITY

E(V/m) = SQRT (30 * P * G) / d

Pd(W/m^2) = E^2 / 377

S = EIRP / (4 * Pi * D^2v)

Where:

S = Power density, in mW/cm^2
EIRP = Equivalent Isotropic Radiated Power, in mW
D = Separation distance in cm

Power density is converted from units of mW/cm^2 to units of W/m^2 by multiplying by 10.

DISTANCE

D = SQRT (EIRP / (4 * Pi * S))

Where:

D = Separation distance in cm
EIRP = Equivalent Isotropic Radiated Power, in mW
S = Power density in mW/cm^2

SOURCE-BASED DUTY CYCLE (When applicable (for example, multi-slot mobile phone applications) A duty cycle factor may be applied.)

Source-based time-average EIRP = (DC / 100) * EIRP

Where:

DC = Duty Cycle in % as applicable.
EIRP = Equivalent Isotropic radiated Power, in mW

5. RF Exposure Results

Transmitter Type: Single RF chain, Fixed Mount, Non – MIMO, Non-collocated TX

Separation Distance: 20 cm (minimum)

Frequency band	Mode	Separation Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	EIRP (mW)	Power Density (mW/cm^2)	LIMIT (mW/cm^2)
470 – 512 MHz	n/a	20	20.0	0.0	100	100	0.02	0.313

RESULT: Passes Limit at Distance: 5.04 cm, reverting to 20 cm minimum allowed separation distance for EUT.

6. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_3851-20_FCC_MPE_1	1	Initial release	October 29, 2020
TR_3851-20_FCC_MPE_2	2	Updated Address on Page 3	December 8, 2020

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END OF TEST REPORT