



## Test Report - FCC PART 1.1310 / MPE

### Applicant: TransRail Innovation Inc.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 6/8/2022

This test report shall not be reproduced except in full without the written and signed permission of Timco Engineering Inc. (IIA). This test report relates only to the items tested as identified and is not valid for any subsequent changes or modifications made to the equipment under test.



## Table of Contents

---

1.	CUSTOMER INFORMATION.....	3
2.	LOCATION OF TESTING .....	3
2.1	TEST LABORATORY .....	3
2.2	TESTING WAS PERFORMED, REVIEWED BY .....	4
3.	TEST SAMPLE(S) (EUT/DUT) .....	5
3.1	DESCRIPTION OF THE EUT.....	5
4.	TEST METHODS & APPLICABLE REGULATORY LIMITS.....	6
4.1	TEST METHODS/STANDARDS/GUIDANCE: .....	6
4.1.1	<i>FCC Limits for Maximum Permissible Exposure (MPE)</i> .....	6
4.2	EQUATIONS.....	7
5.	RF EXPOSURE RESULTS .....	8
6.	HISTORY OF TEST REPORT CHANGES .....	9



Timco Engineering, Inc., an IIA Company  
849 NW State Road 45, Newberry, Florida 32669  
(352) 472-5500 / [testing@timcoengr.com](mailto:testing@timcoengr.com)

## 1. Customer Information

Applicant: TransRail Innovation Inc.  
Address: Suite 100, 999 8th Street SW  
Calgary Alberta, T2R 1J5, Canada

## 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



Timco Engineering, Inc., an IIA Company  
849 NW State Road 45, Newberry, Florida 32669  
(352) 472-5500 / [testing@timcoengr.com](mailto:testing@timcoengr.com)

## 2.2 Testing was performed, reviewed by

Dates of Testing: 4/14/2022 – 4/18/2022

Signature:

Sr. EMC Engineer  
EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature

6/8/2022

Signature:

Name & Title:

Kristoffer Costa, EMC Technician

Date of Signature

6/8/2022



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

The test sample was received: 4/14/2022

#### 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:	2A554-001
Brief Description	Multi-Sensor Monitoring Device
Model(s) #	TIM-21-002, TIM-21-001
Firmware version	1.3
Software version	TerraTerm
Serial Number	N/A

Technical Characteristics	
Technology	Bluetooth
Frequency Range	2402-2480 MHz
RF O/P Power (Max.)	0.008W
Duty Cycle	100%
Antenna Connector	N/A
Voltage Rating (AC or Batt.)	7.2 VDC

Antenna Characteristics			
Frequency Range (MHz)	Mode / BW	Ant Gain 1	Ant Gain 2
2402-2480 MHz	n/a	0 dBi	n/a

- Note: Information such as antenna gain, firmware/software numbers are provided by manufacturer and cannot be validated by the test lab.



#### 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 <sup>2</sup> )	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 <sup>2</sup> )	<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 <sup>2</sup> )	<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

$$E(V/m) = \text{SQRT} ( 30 * P * G ) / d$$

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

$$S = \text{EIRP} / ( 4 * \text{Pi} * D^2 )$$

Where:

S = Power density, in mW/cm<sup>2</sup>

EIRP = Equivalent Isotropic Radiated Power, in mW

D = Separation distance in cm

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

### DISTANCE

$$D = \text{SQRT} ( \text{EIRP} / ( 4 * \text{Pi} * S ) )$$

Where:

D = Separation distance in cm

EIRP = Equivalent Isotropic Radiated Power, in mW

S = Power density in mW/cm<sup>2</sup>

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

$$\text{Source-based time-average EIRP} = ( \text{DC} / 100 ) * \text{EIRP}$$

Where:

DC = Duty Cycle in % as applicable.

EIRP = Equivalent Isotropic radiated Power, in mW



Timco Engineering, Inc., an IIA Company  
849 NW State Road 45, Newberry, Florida 32669  
(352) 472-5500 / [testing@timcoengr.com](mailto:testing@timcoengr.com)

## 5. RF Exposure Results

Separation Distance: 5 mm

### *MPE*

Frequency Band	Separation Distance (mm)	Max Power + Tolerance (dBm)	Max Power + Tolerance (mW)	SAR Exclusion Value	Limit for 1-g SAR	Limit for 10-g SAR (Extremities)	SAR Exclusion
2402-2480 MHz	5	9.27	8.45	2.66	3.0	7.5	SAR EXEMPT





Timco Engineering, Inc., an IIA Company  
849 NW State Road 45, Newberry, Florida 32669  
(352) 472-5500 / [testing@timcoengr.com](mailto:testing@timcoengr.com)

## 6. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_1799-22_FCC PT 1.1310/ MPE_	1	Initial release	4/20/2022



Timco Engineering, Inc., an IIA Company  
849 NW State Road 45, Newberry, Florida 32669  
(352) 472-5500 / [testing@timcoengr.com](mailto:testing@timcoengr.com)

---

END OF TEST REPORT

---