



# Test Report - FCC PART 1.1310 / MPE

## Prepared For: Qual-Tron, Inc.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 10/13/2023

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.



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

## 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 FCC Limits for Maximum Permissible Exposure (MPE).....	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:** Qual-Tron, Inc.  
**Address:** 9409 E. 55th Place South  
Tulsa OK, 74145-8157, US

## 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

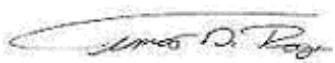
FCC test firm # 578780  
FCC Designation # US1070  
FCC site registration is under A2LA certificate # 0955.01  
ISED Canada test site registration # 2056A  
EU Notified Body # 1177  
For all designations see A2LA scope # 0955.01



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: 4/1/2021 – 4/28/2021

Signature: 

Sr. EMC Engineer  
EMC-003838-NE  
The logo for iMARIE ENGINEER features the word "iMARIE" in a stylized, italicized font with a registered trademark symbol, and "ENGINEER" in a smaller, all-caps font below it. A circular graphic with a grid pattern is positioned to the left of the text.

Name & Title: Tim Royer, EMC Engineer

Date of Signature 10/13/2023



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

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

The test sample was received: 4/1/2021

#### 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:	OGE-QSM
Brief Description	QSM Multi-Channel Data Modem
Type of Modular	Single Modular Transmitter
Model(s) #	QSM
Firmware version	51
Software version	.77
Serial Number	526 or 527

Technical Characteristics	
Technology	Data Transmitter
Frequency Range	138 – 158.3 MHz
RF O/P Power (Max.)	29.24 dBm
Modulation	F1D
Bandwidth & Emission Class	7.34 kHz & F1D
Number of Channels	3100
Duty Cycle	100%
Antenna Connector	UFL
Voltage Rating (AC or Batt.)	9 V DC

Antenna Characteristics		
Frequency Range	Mode / BW	Antenna Gain
n/a	n/a	2 dBi

- 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



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

## 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  $\text{mW/cm}^2$

EIRP = Equivalent Isotropic Radiated Power, in mW

D = Separation distance in cm

Power density is converted from units of  $\text{mW/cm}^2$  to units of  $\text{W/m}^2$  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  $\text{mW/cm}^2$

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

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

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: 20 cm

MPE									
Frequency Band	Evaluation Distance (cm)	Max Power + Tolerance (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	EIRP (W)	Power Density	Limit for Uncontrolled Exposure	Limit for Controlled Exposure	Distance Required to meet Uncontrolled Exposure Limit (cm)
138-158.3 MHz	20	33.33	2.00	100%	2.15	0.428 mW/cm <sup>2</sup>	0.2 mW/cm <sup>2</sup>	1 mW/cm <sup>2</sup>	29.27

RESULT: Pass at DISTANCE 29.27 cm



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_1549-21_FCC PT 1.1310/ MPE_	1	Initial release	4/27/2022
	2	Updated Page 8	10/13/2023



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

---