



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

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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

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



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2.2 Testing was performed, reviewed by

Dates of Testing: 4/1/2021 – 4/28/2021

Signature:

A handwritten signature in black ink, appearing to read "Tim Royer", is written over a horizontal line.

Sr. EMC Engineer
EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature

10/13/2023



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 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

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

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

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

Where:

S = Power density, in mW/cm²

EIRP = Equivalent Isotropic Radiated Power, in mW

D = Separation distance in cm

Power density is converted from units of mW/cm² to units of W/m² 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/cm²

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



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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 ²	0.2 mW/cm ²	1 mW/cm ²	29.27

RESULT: Pass at DISTANCE 29.27 cm



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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



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END OF TEST REPORT
