

# Test Report # 3512 B

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**Equipment Under Test:** ITQ-MODULE

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**Requirement(s):** FCC Part 1.1307, 2.1093

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**Test Date(s):** October 15, 2021

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**Prepared for:**  
Gauthier Biomedical  
Attn: Paul Seifert  
2221 Washington St  
Grafton, WI 53024

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**Report Issued by:** Adam Alger, Laboratory Manager

Signature: *Adam Alger*

Date: 1/20/2022

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**Report Reviewed by:** Zach Wilson, EMC Engineer

Signature: *Zach Wilson*

Date: 1/20/2022

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**Report Constructed by:** Adam Alger, Laboratory Manager

Signature: *Adam Alger*

Date: 11/11/2021

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## Laird Connectivity Test Services in Review

The Laird Connectivity LLC laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



### A2LA – American Association for Laboratory Accreditation

*Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope*

*A2LA Certificate Number: 1255.01*

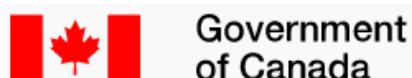
*Scope of accreditation includes all test methods listed herein unless otherwise noted*



### Federal Communications Commission (FCC) – USA

*Accredited Test Firm Registration Number: 953492*

*Recognition of two 3 meter Semi-Anechoic Chambers*



### Innovation, Science and Economic Development Canada

*Accredited U.S. Identification Number: US0218*

*Recognition of two 3 meter Semi-Anechoic Chambers*

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## 1 TEST REPORT SUMMARY

On **October 15, 2021** the Equipment Under Test (EUT), **ITQ-MODULE**, as provided by **Gauthier Biomedical** was evaluated to the following requirements:

Requirement	Description	Specification	Method	Result
FCC Part 1.1307, 2.1093	RF Exposure and equipment authorization requirements	Reported	FCC KDB 447498	Compliant

### Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

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## 2 CLIENT INFORMATION

Company Name	Gauthier Biomedical
Contact Person	Paul Seifert
Address	2221 Washington St Grafton, WI 53024

### 2.1 Equipment Under Test (EUT) Information

*The following information has been supplied by the client*

Product Name	ITQ-MODULE
Model Number	ITQ-MODULE
Serial Number	N/A
FCC ID	2A3CW001

### 2.2 Product Description

2.4 GHz Bluetooth Low Energy Module

### 2.3 Modifications Incorporated for Compliance

Not applicable to RF Exposure

### 2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

### 2.5 Additional Information

Applicant Gauthier Biomedical has filed for a change of ID and a class 2 permissive change to modify RF Exposure conditions from mobile classification conditions to portable.

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### 3 REFERENCES

Publication	Edition	Date
eCFR	-	2021
KDB 447498 D01	06	2015
ANSI C63.10	-	2013

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## 4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of  $k = 2$ .

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty $\pm$
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	$1 \times 10^{-7}$	$0.55 \times 10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

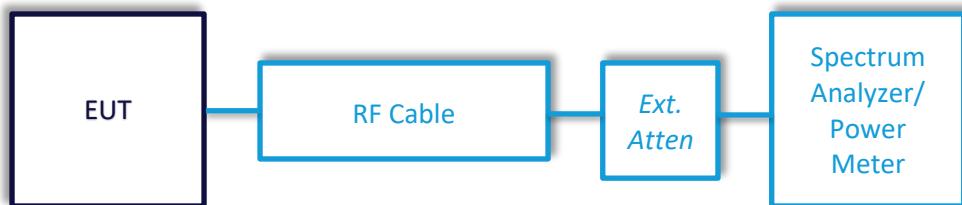
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## 5 TEST DATA

### 5.1 Antenna Port Conducted Emissions

<b>Description of Measurement</b>	<p>The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter.</p> <p>The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.</p>
<b>Example Calculations</b>	<p>Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm)</p> <p>Margin (dB) = Limit (dBm) – Corrected Reading (dBm)</p>

#### Block Diagram



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### 5.1.1 Antenna Port Conducted Emissions

<b>Operator</b>	Anthony Smith	<b>QA</b>	Zach Wilson
<b>Temperature</b>	20.1°C	<b>R.H. %</b>	51.4%
<b>Test Date</b>	10/15/2021	<b>Location</b>	Conducted RF Bench
<b>Requirement</b>	FCC 15.247	<b>Method</b>	ANSI C63.10

#### Test Parameters

<b>Frequency</b>	2402 MHz, 2440 MHz, 2480 MHz	<b>Setup</b>	Conducted
<b>RBW</b>	1 MHz	<b>VBW</b>	3 MHz
<b>Detector(s)</b>	Peak detector	<b>Trace</b>	Max Hold
<b>Example Calculations</b>	Output Power (mW) = $10^{(P/10)}$ *where P = power in dBm		

#### Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960143	Cable	Gore	EKD01D01048.0	5546519	2/3/2021	2/3/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration

#### EUT Parameters

<b>Input Power</b>	5VDC	<b>Method</b>	Conducted
<b>Channels</b>	0, 39, 79	<b>Misc.</b>	Modulated
<b>Data Rates</b>	125k, 500k, 1Mbps, 2Mbps	<b>Mode</b>	BLE Transmit

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**Data Table**

Data Rate	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mw)
125k	2402	5.6	3.6
125k	2440	5.5	3.5
125k	2480	5.1	3.2
500k	2402	5.6	3.6
500k	2440	5.5	3.5
500k	2480	5.2	3.3
1Mbps	2402	6.1	4.1
1Mbps	2440	6.0	4.0
1Mbps	2480	5.8	3.8
2Mbps	2402	6.3	4.3
2Mbps	2440	6.2	4.2
2Mbps	2480	6.0	4.0

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## 5.2 FCC RF Exposure Evaluation

Rated output power at 2.402 GHz + 1 dB Tune Up Tolerance:  $7.3 \text{ dBm} = 5.4 \text{ mW} = 5 \text{ mW}$

For 100 MHz to 6 GHz and test separation distances  $\leq 50 \text{ mm}$ , the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR, where } f(\text{GHz}) \text{ is the RF channel transmit frequency in GHz}$

$$[5/ 5] * [\sqrt{2.402}] = 1.5 < 3.0$$

At the minimum separation distance of 5 mm the numeric threshold of 1.5 is less than 3.0 therefore SAR test is not required.

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## 6 REVISION HISTORY

Version	Date	Notes	Person
V0	11/11/2021	Initial Draft	Adam Alger
V1	11/23/2021	Final	Adam Alger
V2	1/20/2022	Update	Adam Alger

**END OF REPORT**

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