Project 17731-15

Triax Technologies SIM-G

Wireless Certification Report

Prepared for:

Justin Morgenthau Triax Technologies 66 Fort Point Street Norwalk, CT 06855

By

Professional Testing (EMI), Inc. 1601 North A.W. Grimes Blvd., Suite B Round Rock, Texas 78665

23 Sep 2016

Reviewed by

Larry Finn Chief Technical Officer Written by

Eric Lifsey EMC Engineer

Revision History

| Revision Number | Description | Date |
|--------------------|-------------------------------------|-------------|
| 00 | Draft for review. | 14 Sep 2016 |
| 01 | Final; revised per internal review. | 23 Sep 2016 |
| 02 | Revised. | 18 May 2017 |
| | | |

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| | | | | | | | | |

None.

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NOTICE: (1) This Report must not be used to claim product endorsement, by NVLAP, NIST, the FCC or any other Agency. This report also does not warrant certification by NVLSIM-Gor NIST. (2) This report shall not be reproduced except in full, without the written approval of Professional Testing (EMI), Inc. (3) The significance of this report is dependent on the representative character of the test sample submitted for evaluation and the results apply only in reference to the sample tested. The manufacturer must continuously implement the changes shown herein to attain and maintain the required degree of compliance.



Compliance Certificate

| Applicant | Device & Test Identification | |
|--|------------------------------|------------|
| Triax Technologies (Justin Morgenthau) | FCC ID: | 2AGHISIM-G |
| 66 Fort Point Street | Industry Canada ID: | 21358-SIMG |
| Norwalk, CT 06855 | Model(s): | SIM-G |
| Certificate Date: 23 Sep 2016 | Laboratory Project ID: | 17731-15 |

The device named above was tested utilizing the following documents and found to be in compliance with the required criteria:

| Requirement | Reference | Detail | |
|----------------------|--|--|--|
| FCC 47 CFR Part 15 C | 15.247 | Operation within the bands 902-928 MHz, <u>2400-2483.5 MHz</u> , and 5725-5850 MHz. | |
| FCC 47 CFR Part 15 C | 15.209 | Radiated emission limits; general requirements. | |
| FCC 47 CFR Part 15 C | 15.205 | Restricted Bands of Operation | |
| KDB 558074 D01 | DR01 | DTS Measurement Guidance v03r02 | |
| KDB 412172 | D01 | Guidelines for Determining the ERP and EIRP of an RF Transmitting System | |
| OET Bulletin 65* | Edition 97-01, and Supplement C, Ed. 01-01 | Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields | |
| RSS-247 | Issue 2 | Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence- Exempt Local Area Network (LE-LAN) Devices | |
| RSS-Gen | Issue 4 | General Requirements and Information for the Certification of Radio Apparatus | |
| RSS-102 | Issue 4 | Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) | |

^{*}MPE is reported separately from this document. **Corresponding RSS references are listed in the body of the report.

I, Eric Lifsey, for Professional Testing (EMI), Inc., being familiar with the above requirements and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.



This report has been reviewed and accepted by the Applicant. The undersigned is responsible for ensuring that this device will continue to comply with the requirements listed above.

| Representative of Applicant | _ |
|-----------------------------|-------|

1.0 Introduction

1.1 Scope

This report describes the extent to which the equipment under test (EUT) conformed to the intentional radiator requirements of the United States and Canada.

Professional Testing (EMI), Inc., (PTI) follows the guidelines of National Institute of Standards and Technology (NIST) for all uncertainty calculations, estimates, and expressions thereof for electromagnetic compatibility testing.

1.2 EUT Description

| Table 1.2.1: Equipment Under Test | | | | |
|---|------|---------------------------|--|--|
| Manufacturer / Model Serial # Description | | | | |
| Triax Technologies SIM-G | none | 915 MHz FHSS transceiver. | | |

| Table 1.2.2: Support Equipment | | | | |
|---|--|------|--|--|
| Manufacturer / Model Serial # Description | | | | |
| none | | none | | |

The EUT part of a wireless network for collecting data on a proprietary sensor network.

The EUT measures approximately 65 mm x 27 mm x 10 mm not including the integral antenna whip. It is powered by a rechargeable battery. There are no I/O or RF connectors. The EUT is recharged by any USB source.

1.3 EUT Operation

The EUT was exercised in a manner consistent with normal operations.

1.4 Modifications to Equipment

No modifications were made to the EUT during the performance of the test program. For testing purposes, the EUT had wires added to allow external input of power, and the firmware was modified to operate on the desired channels with modulation to facilitate testing.

1.5 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas. The site is registered with the FCC under Section 2.948 and Industry Canada per RSS-GEN, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas 78758, while the main office is located at 1601 North A.W. Grimes Boulevard, Suite B, Round Rock, Texas, 78665.

1.6 Radiated Measurements

Radiated levels are determined as follows:

Raw Measured Level + Antenna Factor + Cable Losses - Amplifier Gain = Corrected Level

Conducted RF levels, if applicable, are determined as follows:

Conducted mains levels are determined as follows:

Raw Measured Level + LISN Factor + Cable/Filter/Limiter Losses = Corrected Level

Additionally, measurement distance extrapolation factors are applied and documented where used.

1.7 Applicable Documents and Clauses

| Table 1.7.1: Applicable Documents | | | | |
|-----------------------------------|--|--|--|--|
| Document | Title | | | |
| 47 CFR | Part 15 – Radio Frequency Devices | | | |
| 47 CFK | Subpart C -Intentional Radiators | | | |
| RSS-247 Issue 2 | Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence- | | | |
| K33-247 ISSUE 2 | Exempt Local Area Network (LE-LAN) Devices | | | |
| RSS-Gen Issue 4 | ue 4 General Requirements and Information for the Certification of Radio Apparatus | | | |
| ANCI C62 10 2012 | American National Standard of Procedures for Compliance Testing of Unlicensed | | | |
| ANSI C63.10 2013 | Wireless Devices | | | |

| Table 1.7.2: Applicable Clauses | | | | | | |
|---------------------------------|--------------------------------------|----------------------------------|--|--|--|--|
| Parameter | FCC Part 15 Rule Paragraphs | IC RSS References | | | | |
| Transmitter Characteristics | 15.247 | RSS-247 5.2 (DTS) & 5.4, RSS-Gen | | | | |
| Bandwidth | 15.247(a)(1), 2.1049, KDB 558074 D01 | RSS-Gen 4.6 | | | | |
| Spurious Emission | 15.247, 15.209, 15.205 | RSS-247 5.5, RSS-GEN 4.9, 4.10 | | | | |
| Band Edge | 15.247, 15.205 | RSS-247 5.5, RSS-Gen 4.9 | | | | |
| Antenna Requirement | 15.203 | RSS-Gen 8.3 | | | | |

2.0 Fundamental Power

2.1 Test Procedure

Peak power is measured using radiated means with modulation. The transmitter hopping sequence is disabled to operate on a single channel for the measurement.

2.2 Test Criteria

| 47 CFR (USA) // IC (Canada) | | | | | | |
|--------------------------------|--|-------------|--|--|--|--|
| Section Reference | Parameter | Date | | | | |
| 15.247(a)(3) // RSS-247 5.2 | Fundamental Power Conducted Limits 1 W Limit Restated as Field: 125.23 dBμV/m @ 3 m 114.78 dBμV/m @ 10 m | 23 Aug 2016 | | | | |

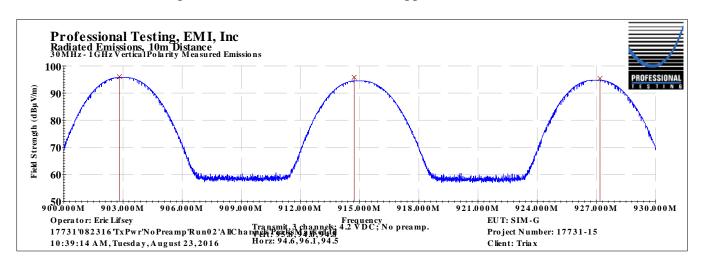
2.3 Test Results, Peak Power

The EUT was measured for radiated power in three orthogonal orientations.

| Table 2.3.1 Power, Peak, Radiated; Orientation: Flat, Vertical Polarization (worse-case) | | | | | |
|--|---|---|--|--|--|
| Frequency MHz | Measured Peak Power dBμV/m @ 10 m Vertical Polarity | Maximum Measured Peak Power Restated as EIRP in dBm | Maximum Measured Peak Power Restated as EIRP in mW | | |
| 903 | 96.1 | 11.3 | 13.6 | | |
| 915 | 95.8 | 11.0 | 12.7 | | |
| 927 | 95.4 | 10.6 | 11.6 | | |

Measured in 3 MHz RBW, 3 MHz VBW.

The EUT satisfied the requirements. Plotted measurements appear below.



2.4 Test Results, Duty Cycle

Measurement is based on intervals not to exceed 100 msec. Maximum transmitter on time is divided by the lesser of 100 msec or the actual measured minimum transmitter interval time. The result is

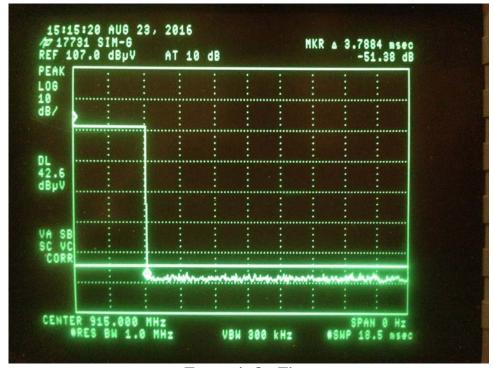
converted to dB and applied as needed to peak measurements of transmitter artifacts to determine average power. This is not a pass/fail measurement.

| Table 2.5.1 Du | Table 2.5.1 Duty Cycle Results and Average Duty Cycle Factor Result | | | | | | | | | |
|-------------------------------|---|--|----------------|---|--|--|--|--|--|--|
| Measured On Time (msec) | Measured Time Interval (msec) | Duty Cycle Factor Calculation | Result (dB) | Duty Cycle Factor Allowed (dB) | | | | | | |
| 3.79 | 305.4 | = 20 * Log ₁₀ (3.79 msec / 305.4 msec) | -38.1 | -20.0 | | | | | | |

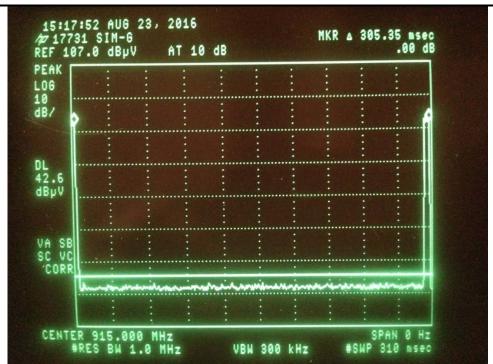
The allowed duty cycle factor is applied to peak measured harmonic signals to find average levels.

| Table 2.5.2 Sou | Table 2.5.2 Source Averaging Factor (for exposure) | | | | | | | | | |
|-------------------------------|--|--|----------------|---|--|--|--|--|--|--|
| Measured On Time (msec) | Measured Time Interval (msec) | Duty Cycle Factor Calculation | Result (dB) | Duty Cycle Factor Allowed (dB) | | | | | | |
| 3.79 | 305.4 | = 10 * Log ₁₀ (3.79 msec / 305.4 msec) | -19.1 | -19.1 | | | | | | |

Plotted results appear below.



Transmit On Time



Transmit Period

3.0 Power Spectral Density

3.1 Test Procedure

A spectrum analyzer is either connected directly to the EUT or used by radiated means to measure the fundamental emission. It is adjusted to measure the power spectral density in the specified resolution bandwidth.

3.2 Test Criteria

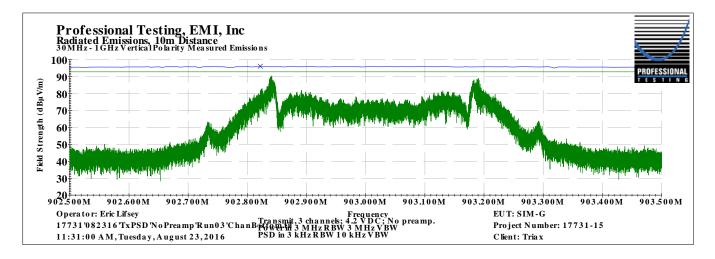
| 47 CFR (USA) // IC (Canada) | | |
|-----------------------------|---|-------------|
| Section Reference Parameter | | Date |
| 15.247(e) // RSS-247, 5.2 | Power Spectral Density, Conducted Limit: 8 dBm / 3 kHz Restated as field strength limit: 103.23 dBμV/m at 3 m, 92.8 dBμV/m at 10 m | 23 Aug 2016 |

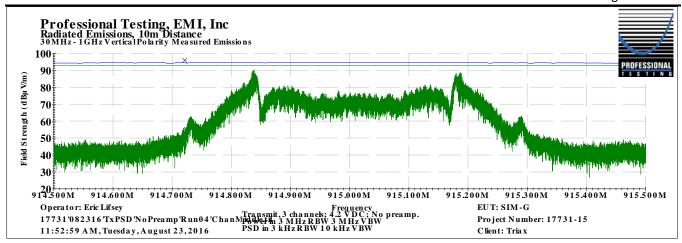
3.3 Test Results

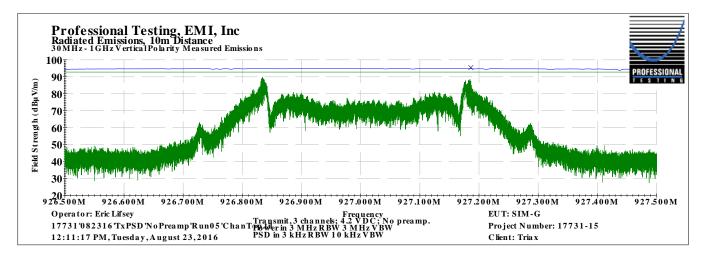
| Table 3.3.1 Power Spectral Density, Radiated, at 10 m (Worse case: flat and vertical polarity.) | | | | | | | | | |
|---|---|---|--|--|--|--|--|--|--|
| Frequency MHz | Measured Peak Power dBμV/m @ 10 m Vertical Polarity | Maximum Measured Peak Power Restated as EIRP in dBm | | | | | | | |
| 903 | 90.3 | 5.5 | | | | | | | |
| 915 | 90.2 | 5.4 | | | | | | | |
| 927 | 89.8 | 5.0 | | | | | | | |

Measured in 3 kHz RBW, 10 kHz VBW.

Plotted results included below.







4.0 Occupied Bandwidth

4.1 Test Procedure

Bandwidth is measured by radiated means. A recording of the results is included.

4.2 Test Criteria

| 47 CFR (USA) // IC (Canada) | | | | | | | | |
|--|------------------------|-------------|--|--|--|--|--|--|
| Section Reference | Parameter | Date(s) | | | | | | |
| 14.247(a)(2), 2.1049, KDB 558074 D01 // RSS-Gen 4.6 | Bandwidth, 6 dB, 20 dB | 25 Jul 2016 | | | | | | |

4.3 Test Results

The bandwidth measurement is used to verify DTS characteristics and/or for general reporting for agency application.

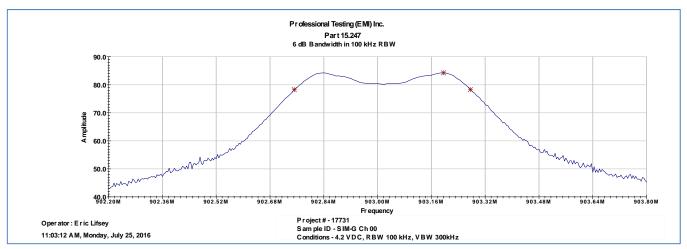
The EUT was found to be in compliance with applicable requirements.

| Table 5.3.1 Band | Table 5.3.1 Bandwidth 6 dB, Minimum 500 kHz in 100 kHz RBW | | | | | | | | | | |
|---|--|-------------|------------|--|--|--|--|--|--|--|--|
| Low Channel Mid Channel High Channel Reported | | | | | | | | | | | |
| Measured BW | Measured BW | Measured BW | Minimum BW | | | | | | | | |
| (kHz) | (kHz) | (kHz) | (kHz) | | | | | | | | |
| 524 | 528 | 528 | 524 | | | | | | | | |

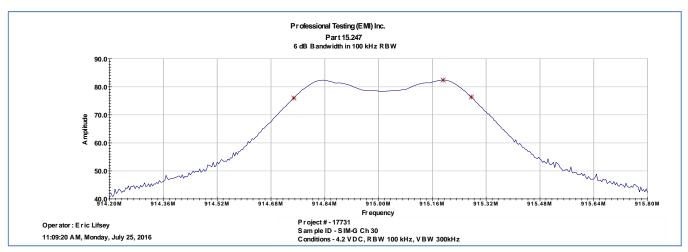
| Table 5.3.2 Band | Table 5.3.2 Bandwidth 20 dB, Measure and Report | | | | | | | | | | |
|---|---|-------------|------------|--|--|--|--|--|--|--|--|
| Low Channel Mid Channel High Channel Reported | | | | | | | | | | | |
| Measured BW | Measured BW | Measured BW | Maximum BW | | | | | | | | |
| (kHz) | (kHz) | (kHz) | (kHz) | | | | | | | | |
| 480 | 472 | 472 | 480 | | | | | | | | |

Plotted measurements appear on the following pages.

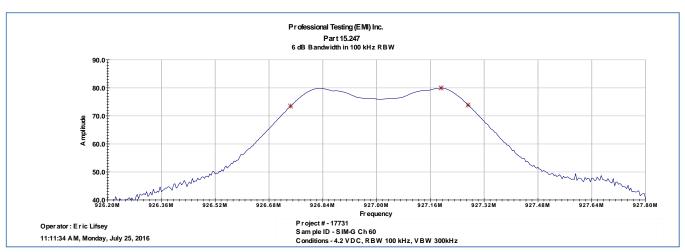
4.3.1 Bandwidth Plots, 6 dB



6 dB, Low Channel

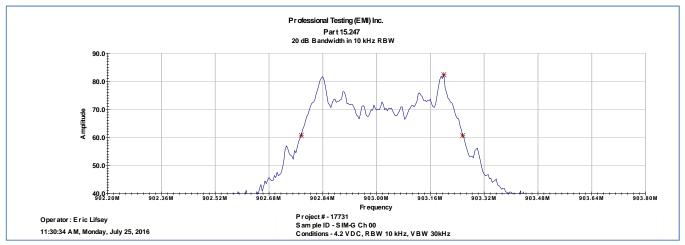


6 dB, Middle Channel

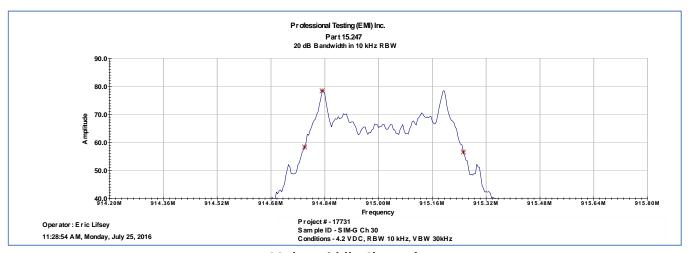


6 dB, High Channel

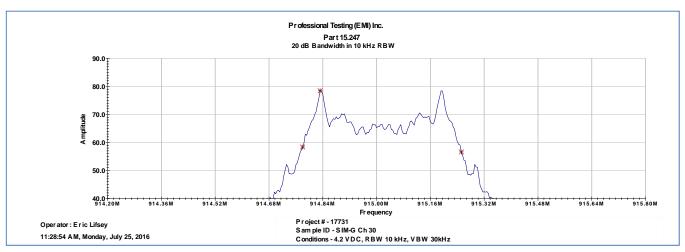
4.3.2 Bandwidth Plots, 20 dB



20 dB, Low Channel



20 dB, Middle Channel



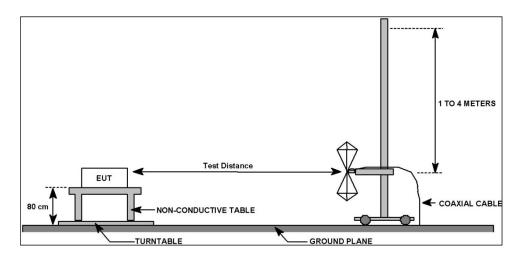
20 dB, High Channel

5.0 Radiated Spurious Emissions, Receive Mode

5.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The EUT was centered on a rotating turntable. Measurements below 1 GHz were taken at a test distance of 10 meters from the measurement antenna. Above 1 GHz the measurement distance was 3 meters.

Spurious emissions below 1 GHz were measured with quasi-peak detection with a resolution bandwidth of 120 kHz. Above 1 GHz peak measurements were taken and average measured where appropriate and 1 MHz resolution bandwidth. A diagram showing the test setup appears below.



5.2 Test Criteria

| 47 CFR (USA) // IC (Canada) | | | | | | | |
|--|---|------------|--|--|--|--|--|
| Section Reference | Parameter | Date(s) | | | | | |
| 15.247, 15.209 // RSS-247 5.5, RSS-Gen 4.9 & 4.10 | Field Strength of Radiated Spurious/Harmonic Emissions Receive Mode | 5 Apr 2016 | | | | | |

5.3 Test Results

The EUT was tuned to the middle channel and placed in receive mode.

The EUT satisfied the criteria. Recorded data is presented below.

| | | | Profes | sional Te | sting, El | MI, Inc. | | | |
|--|--|---|--|--|--|--|--|--|--------------------------|
| est Metho | od: | ANSI C63. Devices | 10–2013: Ameri | can National Sta | andard of Proc | edures for Co | mpliance Test | ing of Unlicer | ised Wireless |
| n accorda | nce with: | Emissions | 5.109 - Code of Limits | Federal Regulat | ions Part 47, S | Subpart B - Un | intentional Ra | adiators, Radi | ated |
| ection: | | 15.109 | | | l | | | | |
| est Date(s | 5): | 4/5/201 | | | EUT Serial | | None | | |
| Customer: | | | chnologies | | EUT Part #: | | SIM-G, Acce | ess Point | |
| Project Nu | | | 5, 17733-15 | | Test Techn | | Eric Lifsey | | |
| Purchase C | | NA C. A | anna Daint | | Supervisor | | Lisa Arndt | | |
| quip. Und | | | ccess Point | | Witness' N | ame: | None | | |
| | | | Emissions Test | t Results Data | 1 | | Pa | | of 1 |
| EUT L | ine Voltage | : 4 | .2, 5.0 VDC | | EUT Pov | ver Frequen | cy: (| N/A | |
| Antenna | a Orientation | on: | Vertic | al | Frequ | ency Range: | | 30MHz to | 1GHz |
| | EUT N | Mode of C | peration: | 1 | | | Receiving | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees | _ | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test Results |
| 30.2978 | 10 | 46 | 1.47 | Quasi-peak | 24.1 | 12.651 | 29.5 | -16.8 | Pass |
| 38.908 | 10 | 324 | 3.03 | Quasi-peak | 24 | 7.243 | 29.5 | -22.3 | Pass |
| 416.708 | 10 | 202 | 3.81 | Quasi-peak | 22.3 | 15.926 | 35.6 | -19.7 | Pass |
| 643.354 | 10 | 3 | 4.12 | Quasi-peak | 22 | 20.581 | 35.6 | -15.0 | Pass |
| 892.314 | 10 | 227 | 1.68 | Quasi-peak | 21.4 | 26.28 | 35.6 | -9.3 | Pass |
| 949.202 | 10 | 165 | 2.03 | Quasi-peak | 21 | 26.199 | 35.6 | -9.4 | Pass |
| Radiated | sional Testing, Emissions, 10m D GHz Vertical Polarity | istance | ns | | | ∇ Corre— Peak I— Corre | -peak Limit Level cted Quasi-peak Read Limit Level cted Peak Value cd Low-PRF QP Readi | | DEOLEGISMA |
| 50 | | | | | | | V erifica tio n Limit | | PROFESSIONAL TESTING X X |
| (W/A nd Bb) | | | | | | | × | _ _ x _ | - |
| Field Strength (dB Vm 200 - 20 | × | | | | | | | and the same of th | |
| 10 T | Marina III | <u> </u> | - Julio | lara e e e e e e e e e e e e e e e e e e | THE SHEET STREET | Harriston bord blicant blic | | | |
| | A CALIFORNIA VARIANTA | وربيه المالية | Marie Carles Control of the Party of the Par | | No. of the Control of | | | | |
| 0 30M | 1 | | 100M | | - | | | 1 | 1G |
| Operator: | Eric Lifsey | | | | luency | E | UT: SIM-G, A ccess Po | int | |
| | 733'RE'Run01'RX'S | numio no til | | ceive, Receive 2 VDC, 5.0 VDC | | D | roject Number: 17731 | 17733 | |

| Table 6.3.2 | 2: Radiate | d Spuriou | s Emission | s, Receive N | Mode, Beld | ow 1 (| GHz, | Horizor | ntal I | Polarity | |
|--|---|---|-------------------------------|------------------------------------|--|-----------------------|--|--|-----------|----------------|-------------------------------|
| | | | Profes | sional Te | sting, EN | MI, I | nc. | | | | |
| Test Metho | d: | ANSI C63.10 Devices | –2013: Ameri | can National Sta | andard of Proc | edures | for Co | mpliance ' | Testin | g of Unlicer | sed Wireless |
| In accordan | ce with: | FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits | | | | | | | | ated | |
| Section: | | 15.109 | | | 1 | | | | | | |
| Test Date(s |): | 4/5/2016 | | | EUT Serial | | | None | _ | | |
| Customer: | • | Triax Tech | | | EUT Part #: | | | SIM-G, | | s Point | |
| Project Nur | | 17731-15, | 17733-15 | | Test Techn | | | Eric Lifs | | | |
| Purchase O | | NA S A | ass Daint | | Supervisor | | | Lisa Arn | ιατ | | |
| Equip. Und | er rest: | SIM-G, Acc | ess Point | | Witness' N | ame: | | None | | | |
| | F | Radiated Er | nissions Test | t Results Data | a Sheet | | | | Page | : 1 | of 1 |
| EUT Li | ne Voltage: | 4.2 | , 5.0 VDC | | EUT Pow | ver Fre | quen | су: | 0 | N/A | |
| Antenna | Orientatio | n: | Horizor | ntal | Frequ | ency R | lange: | | 3 | OMHz to | 1GHz |
| | EUT N | lode of Op | eration: | | | | | Receivi | ng | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corre Lev (dBµ\ | vel | Limit Le | | Margin (dB) | Test Results |
| 32.6942 | 10 | 327 | 3.97 | Quasi-peak | 23.9 | 12.4 | 419 | 29.5 | | -17.1 | Pass |
| 80.8125 | 10 | 284 | 1.29 | Quasi-peak | 23.3 | 4.3 | 37 | 29.5 | | -25.1 | Pass |
| 620.515 | 10 | 13 | 1.61 | Quasi-peak | 22 | 19.89 | | 35.6 | | -15.7 | Pass |
| 747.454 | 10 | 269 | 3.57 | Quasi-peak | 21.7 | 22.444 | | 35.6 | | -13.2 | Pass |
| 899.912 | 10 | 249 | 1.85 | Quasi-peak | 21.3 | 26.5 | 594 | 35.6 | | -9.0 | Pass |
| 931.088 | 10 | 5 | 3.5 | Quasi-peak | 21.1 | 26.1 | 111 | 35.6 | | -9.5 | Pass |
| Radiated | cional Testing, Emissions, 10m Di GHz Horizontal Polar | stance | ns | | | | ✓ Correct— Peak I— Correct✓ Verifie | -peak Limit Levo cted Quasi-peak Limit Level cted Peak Value ed Low-PRF QP Verification Lim | k Reading | | PROFESSIONAL TESTING *× |
| Field Strength (d B µV/m) × 30 × 4 | | | × | | | | | | | × | T Y |
| 10 | Andrew Market Comment of the Market | Market Mark Mark Line Control | Y Y | | and the state of t | | Harmer of the state of the stat | detroit, and other | | V V | |
| | Eric Lifsey 733 'R E'Run01 'RX 'S _I .M, Tuesday, April05 | ,2016 | Power: 4.2 | ceiv e, Receiv e 2 VDC, 5.0 VDC | quency | | Pı C | UT: SIM-G, Acc roject Number: lient: Triax Tech | 17731,17 | 7733 | 16 |
| | | ≤ 10 | iHz Horizont | tal Antenna P | Polarity Mea | sured | Emiss | sions | | | |

| Table 6.3.3 | 3: Radiate | d Spuriou | s Emission | s, Receive l | Mode, Abo | ve 1 GHz, | Vertical P | olarity | |
|--------------------------------|--|--|--|--|--|--|---|----------------|-------------------------|
| | | | Profess | sional Te | sting, El | VII, Inc. | | | |
| Test Metho | d: | ANSI C63.10 Devices | –2013: Americ | can National St | andard of Proc | edures for Co | mpliance Test | ing of Unlice | nsed Wireless |
| In accordan | ice with: | FCC Part 15. Emissions Li | | Federal Regula | tions Part 47, | Subpart B - Ur | intentional R | adiators, Rad | iated |
| Section: | | 15.109 | | | | | | | |
| Test Date(s |): | 4/5/2016 | | | EUT Serial | #: | None | | |
| Customer: | | Triax Tech | | | EUT Part #: | | SIM-G, Acc | ess Point | |
| Project Nur | | 17731-15, | 17733-15 | | Test Techn | ician: | Eric Lifsey | | |
| Purchase O | rder #: | NA | | | Supervisor | | Lisa Arndt | | |
| Equip. Und | er Test: | SIM-G, Acc | ess Point | | Witness' N | ame: | None | | |
| | F | Radiated Er | nissions Test | Results Dat | a Sheet | | Pa | ge: 1 | of 1 |
| EUT Li | ne Voltage: | : 4.2 | , 5.0 VDC | | EUT Pow | ver Frequen | cy: (| N/A | |
| Antenna | Orientatio | n: | Vertic | al | Frequ | ency Range: | | Above 1 | GHz |
| | EUT N | /lode of Op | eration: | | | | Receiving | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test Results |
| 1045.47 | 3 | 225 | 1 | Average | 35 | 23.36 | 54.0 | -30.6 | Pass |
| 1469.52 | 3 | 280 | 1 | Average | 35.9 | 24.532 | 54.0 | -29.4 | Pass |
| 1946.32 | 3 | 296 | 1 | Average | 40.3 | 31.27 | 54.0 | -22.7 | Pass |
| 3864.83 | 3 | 332 | 1 | Average | 33.8 | 28.028 | 54.0 | -25.9 | Pass |
| 4671.35 | 3 | 211 | 1 | Average | 33.1 | 28.936 | 54.0 | -25.0 | Pass |
| 4814.04 | 3 | 65 | 1 | Average | 33.4 | 29.395 | 54.0 | -24.6 | Pass |
| Radiated | cional Testing, Emissions, 3m Dis ertical Polarity Measu | tance | | | | ∇ Corre— Peak | ge Limit Level cted A verage Reading Limit Level cted Peak Reading | | PROFESSIONAL TESTING |
| 70 | of held help of a Manager day a ship his second | nelising de la | and the self-self-self-self-self-self-self-self- | The state of the s | از المادر المراجع و محادد و المادر و ا | | e de juliera e la cale. | Y | Y Y |

Mode: Receive, Receive Power: 4.2 VDC, 5.0 VDC

Frequency

Operator: Eric Lifsey

17731+17733 'RE'Run01 'RX 'Spurio us.til

01:02:10 PM, Tuesday, April 05, 2016

EUT: SIM-G, Access Point

Client: Triax Technologies

Project Number: 17731,17733

| rabie 6.5. | 4. Naulate | u Spuri | | ons, Receive M | · | | | 110112011 | tai i oi | arity | | |
|--|--|--|---------------------|--|---|------------------------|----------|---|--|--------------|---------------------|--------|
| | | | Profe | essional Te | sting, El | VII, It | nc. | | | | | |
| Test Metho | od: | ANSI C63 Devices | 3.10–2013: Am | erican National Sta | andard of Proc | edures | for Coi | mpliance Te | esting of | Unlice | nsed Wir | reless |
| In accorda | nce with: | FCC Part Emission | | of Federal Regulat | ions Part 47, | Subpart | B - Un | intentional | Radiato | rs, Rad | iated | |
| Section: | | 15.109 | | | | | | | | | | |
| Test Date(s | s): | 4/5/201 | 16 | | EUT Serial | #: | | None | | | | |
| Customer: | | | echnologies | | EUT Part #: | | | SIM-G, A | ccess P | oint | | |
| Project Nu | | | L5, 17733-15 | | Test Techn | ician: | | Eric Lifse | | | | |
| Purchase C | Order #: | NA | | | Supervisor | | | Lisa Arnd | t | | | |
| Equip. Und | ler Test: | SIM-G, | Access Point | | Witness' N | ame: | | None | | | | |
| | F | Radiated | Emissions 1 | est Results Data | a Sheet | | | F | Page: | 1 | of | 1 |
| EUT L | ine Voltage | | 4.2, 5.0 VI | OC . | EUT Pov | ver Fre | quen | су: | 0 | N/A | | |
| Antenn | a Orientatio | n: | Hori | zontal | Frequ | ency R | ange: | | Ab | ove 1 | GHz | |
| | EUT N | /lode of | Operation: | | | | | Receivin | g g | | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degree | - | Detector | Recorded Amplitude (dBµV) | Correc Lev (dBµV | el | Limit Leve | | argin dB) | Test Re | esults |
| 1497.48 | 3 | 352 | 1 | Average | 35.5 | 24.2 | 235 | 54.0 | -2 | 9.7 | Pas | SS |
| 2031.69 | 3 | 175 | 1 | Average | 35.3 | 26.6 | 33 | 54.0 | -2 | 7.3 | Pas | SS |
| 2978.64 | 3 | 208 | 1 | Average | 34.4 | 27.9 | 23 | 54.0 | -2 | 6.0 | Pas | ss |
| 3712.41 | 3 | 272 | 1 | Average | 34.4 | 28.3 | 46 | 54.0 | -2 | 25.6 | Pas | SS |
| 4253.29 | 3 | 217 | 1 | Average | 33.7 | 28.8 | 895 | 54.0 | -2 | 5.1 | Pas | SS |
| 4821.29 | 3 | 268 | 1 | Average | 33.5 | 29.5 | 02 | 54.0 | -2 | 4.5 | Pas | SS |
| Radiated | sional Testing, Emissions, 3m Dis Horizontal Polarity Me | tance | 118 | | | | ∨ Correc | ge Limit Level cted Average Read .imit Level cted Peak Reading | | | PROFESSI T E S T | |
| Field Strength (d BhVm) 40 40 40 40 40 40 40 40 40 40 40 40 40 | ndell settle ers byreders sets and | dan de de la | ni Jean de Balanda, | we are the state of the state o | المراجعة ا | and the section | | and a second distribution of | Total in the second of the sec | Y | | |
| 20 G | Esia Lifean | | <u>Y</u> | Free | quency | | | UT. CIM C A | a Do in 4 | | 5 G | |
| | Eric Lifsey '733'RE'Run01'RX'S _I PM, Tuesday, April05 | | | le: R eceiv e, R eceiv e er: 4.2 VDC,5.0 VDC | | | Pr | UT: SIM-G, Access roject Number: 17 lient: Triax Techno | 731,17733 | | | |

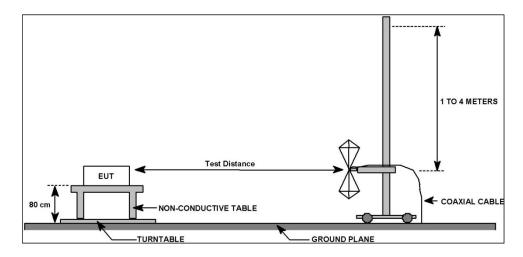
> 1GHz Horizontal Antenna Polarity Measured Emissions

6.0 Radiated Spurious Emissions, Transmit Mode

6.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The EUT was centered on a rotating turntable. Measurements below 1 GHz were taken at a test distance of 10 meters from the measurement antenna. Above 1 GHz the measurement distance was 3 meters.

Spurious emissions below 1 GHz were measured with quasi-peak detection with a resolution bandwidth of 120 kHz. Above 1 GHz peak measurements were taken and average measured where appropriate using 1 MHz resolution bandwidth. A diagram showing the test setup appears below.



6.2 Test Criteria

| 47 CFR (USA) // IC (Canada) | | |
|--|--|-------------|
| Section Reference | Parameter | Date(s) |
| 15.247, 15.209 // RSS-247 5.5, RSS-Gen 4.9 & 4.10 | Field Strength of Radiated Spurious/Harmonic Emissions Transmit Mode | 14 Apr 2016 |

6.3 Test Results

Modulation was enabled for this test and the transmitter was placed into continuous transmit mode.

The duty cycle averaging factor applies -20.0 dB to the peaks recorded for the harmonics. Therefore if the peak limit is satisfied, the average limit is also satisfied.

All measurements used peak detection.

Table 7.3.1: TX Mode, Low Channel, Below 1 GHz, Vertical Polarity

| | | | Profes | sional Te | sting, El | MI, Inc. | | | | | | |
|--------------------------------|--|-------------------------------|-------------------------------|--|--|---|--|---------------------|----------------|--|--------|--|
| Test Metho | d: | ANSI C63.10 Devices | –2013: Ameri | can National Sta | andard of Proc | edures for Co | mpliance ⁻ | Testing of | Unlice | nsed Wir | eless | |
| In accordan | nce with: | FCC Part 15. Limits | 209 - Code of | Federal Regulat | ions Part 47, S | Subpart C - Int | tentional R | tadiators, | Radiate | ed Emiss | ions | |
| Section: | | 15.209 | | | 1 | | | | | | | |
| Test Date(s | s): | 4/14/2016 | | | EUT Serial | | Channe SIM-G | 1 2, 32, 6 | 4 | | | |
| Customer: | | Triax Tech | nologies | | EUT Part #: | | | | | | | |
| Project Nur | | 17731-15 | | | Test Technician: Eric Lifsey Supervisor: Lisa Arndt | | | | | | | |
| Purchase O | | NA | | | Supervisor | at | | | | | | |
| Equip. Und | er rest: | SIM-G | | | Witness' N | ame: | None | | | | | |
| | F | Radiated En | nissions Tes | t Results Data | Sheet | | | Page: | 1 | of | 1 | |
| EUT Li | ne Voltage: | : 4 | .2 VDC | | EUT Power Frequency: 0 N/A | | | | | | | |
| Antenna | Orientatio | n: | Vertic | al | Frequency Range: 30MHz to 1GHz | | | | | | | |
| | EUT N | /lode of Op | | | Trai | nsmit; Ch | nannel: | | | | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Lev | | argin dB) | Test Ro | esults | |
| 31.248 | 10 | 321 | 1.33 | Quasi-peak | 24.3 | 12.791 | 29.5 | -1 | 6.7 | Pas | SS | |
| 68.9699 | 10 | 64 | 1.67 | Quasi-peak | 33.1 | 12.949 | 29.5 | -1 | 6.6 | Pas | ss | |
| 746.783 | 10 | 248 | 2.26 | Quasi-peak | 32.1 | 32.773 | 35.6 | -: | 2.8 | Pas | SS | |
| 876.781 | 10 | 71 | 3.86 | Quasi-peak | 26.8 | 30.856 | 35.6 | | 4.7 | Pas | SS | |
| 928.841 | 10 | 251 | 1.74 | Quasi-peak | 34.6 | 39.581 | 80.0 | -4 | 10.4 | Pas | SS | |
| 954.812 | 10 | 29 | 1.55 | Quasi-peak | 26.8 | 32.029 | 35.6 | : | 3.6 | Pas | SS | |
| Radiated | sional Testing, Emissions, 10m Di GHz Vertical Polarity | istance | | | Quasi-peak Limit ♥ Corrected Quasi- ₱ Peak Limit Level Corrected Peak V ♥ Verified Low-PRI X LPRF Verification ■ Restricted Band M | peak Reading alue F QP Reading n Limit | | PROFESSI T E S T | IONAL I N G | - - - - - - - - - - - - - - | | |
| 80 M (4B L Vm) | Married State State of State o | × | 100M | Manadada, bashing ang pagkalaka di Sarah | luency | | | | X | ×××× | | |
| | Eric Lifsey Run01 'TX 'Spurious'L PM, Thursday, April 1 | | Mode: Tra Power: 4.2 | nsmit,Low Channel | r - 150 | P | UT: SIM-G roject Number: 1 lient: Triax Tech | | | | | |

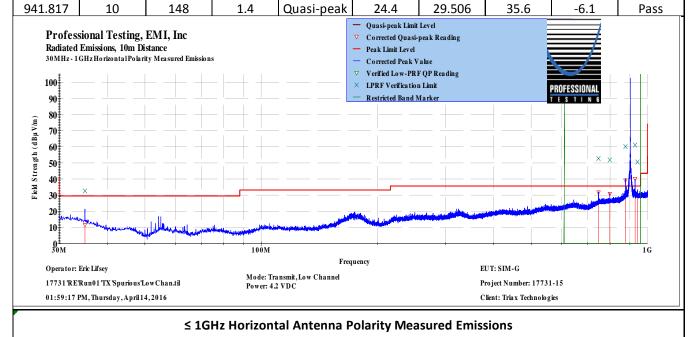
≤ 1GHz Vertical Antenna Polarity Measured Emissions

Table 7.3.2: TX Mode, Low Channel, Below 1 GHz, Horizontal Polarity

| Professional Testing, EMI, Inc. | | | | | | | | | | | | |
|---------------------------------|--|----------------------------------|---|--|--|--|--|--|--|--|--|--|
| Test Method: | ANSI C63.10–2013: American Nat Devices | tional Standard of Procedures fo | r Compliance Testing of Unlicensed Wireless | | | | | | | | | |
| In accordance with: | FCC Part 15.209 - Code of Federa Limits | Regulations Part 47, Subpart C | - Intentional Radiators, Radiated Emissions | | | | | | | | | |
| Section: | 15.209 | | | | | | | | | | | |
| Test Date(s): | 4/14/2016 | EUT Serial #: | Channel 2, 32, 64 | | | | | | | | | |
| Customer: | Triax Technologies | EUT Part #: | SIM-G | | | | | | | | | |
| Project Number: | 17731-15 | Test Technician: | Eric Lifsey | | | | | | | | | |
| Purchase Order #: | NA | Supervisor: | Lisa Arndt | | | | | | | | | |
| Equip. Under Test: | SIM-G | Witness' Name: | None | | | | | | | | | |

| Naulat | eu cillissio | iis Test Results Date | a Sileet | Page. | 1 (| ו וכ |
|----------------------|--------------|-----------------------|----------------------|-------|-----------|------|
| EUT Line Voltage: | 4.2 | VDC | EUT Power Frequency: | 0 | N/A | |
| Antenna Orientation: | H | lorizontal | Frequency Range: | 30N | 1Hz to 1G | Hz |

EUT Mode of Operation: Transmit; Channel: EUT Test Recorded Corrected Frequency **Antenna** Limit Level **Detector** Margin Measured Direction Amplitude Distance Height Level **Test Results Function** $(dB\mu V/m)$ (dB) (MHz) (Meters) (Degrees) (Meters) (dB_µV) (dBµV/m) 34.9863 10 9 1.54 Quasi-peak 23.1 11.589 29.5 -17.9 Pass 746.795 10 125 1.38 Quasi-peak 31 31.672 35.6 -3.9 Pass 798.842 10 155 1.18 Quasi-peak 29.2 30.793 35.6 -4.8 Pass 876.836 10 150 1.1 Quasi-peak 35 39.069 80.0 -40.9 **Pass** 928.854 80.0 -39.9 10 143 1.05 Quasi-peak 35.1 40.071 Pass



| Table 7.3.3 | 3: TX Mod | e, Low Cha | annel, Abo | ve 1 GHz, \ | /ertical Po | larity | | | | |
|--------------------------------|--|-------------------------------|-------------------------------|----------------------|---------------------------------|--------------------------------|---|----------------|--------------------|----------------|
| | | | Profess | sional Te | sting, EN | VII, Inc. | | | | |
| Test Metho | d: | ANSI C63.10- Devices | -2013: Amerio | an National St | andard of Proc | edures for Co | ompliance Test | ing of Unlice | nsed Wi | reless |
| In accordan | ice with: | FCC Part 15.2 Limits | :09 - Code of F | ederal Regula | tions Part 47, S | Subpart C - In | tentional Radi | ators, Radiate | ed Emiss | sions |
| Section: | | 15.209 | | | | | | | | |
| Test Date(s |): | 4/14/2016 | | | EUT Serial | #: | Channel 2, | 32, 64 | | |
| Customer: | | Triax Techn | ologies | | EUT Part #: | | SIM-G | | | |
| Project Nur | | 17731-15 | | | Test Techni | | Eric Lifsey | | | |
| Purchase O | | NA | | | Supervisor: | | Lisa Arndt | | | |
| Equip. Und | er Test: | SIM-G | | | Witness' N | ame: | None | | | |
| | F | Radiated Em | issions Test | Results Dat | a Sheet | | Pa | ge: 1 | of | 1 |
| EUT Li | ne Voltage: | : 4. | .2 VDC | | EUT Pow | N/A | | | | |
| Antenna | Orientatio | n: | Vertic | al | Freque | Above 1 | GHz | | | |
| | EUT N | Node of Ope | eration: | | Transmit; Channel: | | | | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test R | esults |
| 3611.26 | 3 | 61 | 1 | Peak | 66.1 | 60.063 | 74.0 | -13.9 | Pa | SS |
| 5416.73 | 3 | 50 | 1 | Peak | 55.5 | 53.051 | 74.0 | -20.9 | Pa | SS |
| Radiated | sional Testing, Emissions, 3m Dis ertical Polarity Measu | tance | | | | ▽ Cori | rage Limit Level rected Average Reading Limit Level rected Peak Reading | | PROFESS T E S T | SIONAL IN 6 |
| 20 (BμV/m) | | | _ | | | | * | | | |

> 1GHz Vertical Antenna Polarity Measured Emissions

Mode: Transmit, Low Channel Power: 4.2 VDC EUT: SIM-G

Project Number: 17731-15

Client: Triax Technologies

20±

Operator: Eric Lifsey

17731 RE'Run01 TX Spurious'Low Chan.til
02:22:16 PM, Thursday, April 14, 2016

| 4: TX Mod | e, Low Ch | annel, Abo | ve 1 GHz, I | Horizontal | Polarity | | | | | | |
|------------------------|--|---|---|--|--|---|---|---|---|---|--|
| | | Profess | sional Te | sting, El | VII, Inc. | | | | | | |
| od: | ANSI C63.10 Devices | –2013: Americ | can National Sta | andard of Proc | edures for Co | mpliance Test | ing of Un | licen | sed Wi | reless | |
| nce with: | FCC Part 15.2 Limits | 209 - Code of I | Federal Regulat | tions Part 47, S | Subpart C - Int | entional Radi | ators, Rac | diate | d Emis | sions | |
| | 15.209 | | | | | | | | | | |
| s): | 4/14/2016 | | | EUT Serial | #: | | 32, 64 | | | | |
| | | nologies | | EUT Part #: | | | | | | | |
| | _ | | | Test Techn | ician: | | | | | | |
| Order #: | NA | | | <u> </u> | | Lisa Arndt | | | | | |
| der Test: | SIM-G | | | Witness' N | ame: | None | | | | | |
| F | Radiated Em | nissions Test | t Results Data | a Sheet | | Pa | ge: | 1 | of | 1 | |
| ine Voltage: | : 4 | .2 VDC | | EUT Pow | ver Frequen | cy: (|) N | I/A | | | |
| a Orientatio | n: | Horizor | ntal | Frequency Range: Abov | | | | | iHz | | |
| EUT Mode of Operation: | | | | | Transmit; Channel: | | | | | | |
| EUT N | Node of Ope | eration: | | | Trar | nsmit; Chan | nel: | | | | |
| Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Tran Corrected Level (dBµV/m) | Limit Level (dBμV/m) | nel: Margi (dB) | | Test R | esults | |
| Test Distance | EUT Direction | Antenna Height | | Amplitude | Corrected Level | Limit Level | Margi | | Test R Pa | | |
| Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Function | Amplitude (dBμV) | Corrected Level (dBμV/m) | Limit Level (dBμV/m) | Margi (dB) | 8 | | SS | |
| | od: nce with: s): mber: Order #: der Test: Fine Voltage: | ANSI C63.10 Devices nce with: FCC Part 15.2 Limits 15.209 s): 4/14/2016 Triax Techi mber: 17731-15 Order #: NA der Test: SIM-G Radiated Em | ANSI C63.10–2013: Americ Devices nce with: FCC Part 15.209 - Code of Limits 15.209 s): 4/14/2016 Triax Technologies mber: 17731-15 Order #: NA der Test: SIM-G Radiated Emissions Test Line Voltage: 4.2 VDC | Professional Te ANSI C63.10–2013: American National State Devices FCC Part 15.209 - Code of Federal Regular Limits 15.209 s): 4/14/2016 Triax Technologies mber: 17731-15 Order #: NA der Test: SIM-G Radiated Emissions Test Results Data Line Voltage: 4.2 VDC | Professional Testing, Effords of Professional Testing, Effords of Professional Standard of Profe | Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Int Limits 15.209 s): | Professional Testing, EMI, Inc. ANSI C63.10–2013: American National Standard of Procedures for Compliance Test Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radi Limits 15.209 s): 4/14/2016 EUT Serial #: Channel 2, Triax Technologies EUT Part #: SIM-G mber: 17731-15 Test Technician: Eric Lifsey Drder #: NA Supervisor: Lisa Arndt der Test: SIM-G Witness' Name: None Radiated Emissions Test Results Data Sheet Pa | Professional Testing, EMI, Inc. ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of UnDevices nce with: FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiations 15.209 s): 4/14/2016 EUT Serial #: Channel 2, 32, 64 Triax Technologies EUT Part #: SIM-G mber: 17731-15 Test Technician: Eric Lifsey Order #: NA Supervisor: Lisa Arndt der Test: SIM-G Witness' Name: None Radiated Emissions Test Results Data Sheet Page: Line Voltage: 4.2 VDC EUT Power Frequency: 0 N | Professional Testing, EMI, Inc. ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of Unlicen Devices nce with: FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiate Limits 15.209 s): 4/14/2016 EUT Serial #: Channel 2, 32, 64 Triax Technologies EUT Part #: SIM-G mber: 17731-15 Test Technician: Eric Lifsey Order #: NA Supervisor: Lisa Arndt der Test: SIM-G Witness' Name: None Radiated Emissions Test Results Data Sheet Page: 1 Line Voltage: 4.2 VDC EUT Power Frequency: 0 N/A | Professional Testing, EMI, Inc. ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of Unlicensed Windows Devices TCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions 15.209 s): 4/14/2016 | |

Mode: Transmit, Low Channel Power: 4.2 VDC EUT: SIM-G

Project Number: 17731-15

Client: Tria x Technologies

Operator: Eric Lifsey

17731'RERun01'TX'S purious'LowChan.til

02:22:16 PM, Thursday, April 14, 2016

| i abie 7.3. | 5: TX Mod | le, Middle | Channel, I | Below 1 GH | z, Vertical | Polarity | | | |
|--------------------------------|---|-------------------------------|-------------------------------|----------------------|--|--|--------------|------------------------------|---------------|
| | | | Profes | sional Te | sting, El | MI, Inc. | | | |
| Test Metho | od: | ANSI C63.10 Devices | –2013: Ameri | can National Sta | andard of Proc | edures for Co | mpliance Te | esting of Unlice | ensed Wireles |
| In accorda | nce with: | FCC Part 15. Limits | 209 - Code of | Federal Regulat | ions Part 47, S | Subpart C - Int | tentional Ra | diators, Radia | ted Emissions |
| Section: | | 15.209 | | | | | | | |
| Test Date(| s): | 4/14/2016 | | | EUT Serial | #: | Channel 2 | 2, 32, 64 | |
| Customer: | | Triax Tech | nologies | | EUT Part #: | : | SIM-G | | |
| Project Nu | | 17731-15 | | | Test Techn | | Eric Lifsey | | |
| Purchase C | | NA | | | Supervisor | | Lisa Arnd | t | |
| Equip. Und | ler Test: | SIM-G | | | Witness' N | ame: | None | | |
| | F | Radiated En | nissions Test | t Results Data | Sheet | | Р | age: 1 | of 1 |
| EUT L | ine Voltage | : 4 | .2 VDC | | EUT Pow | ver Frequen | cy: | 0 N/A | 1 |
| Antenn | a Orientatio | on: | Vertic | al | Frequ | ency Range: | | 30MHz to | 1GHz |
| | EUT N | /lode of Op | eration: | | | Transm | it; Channe | el: Middle | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Leve | | Test Result |
| 758.797 | 10 | 242 | 1.93 | Quasi-peak | 34.3 | 35.274 | 35.6 | -0.3 | Pass |
| 888.813 | 10 | 74 | 4.06 | Quasi-peak | 28 | 32.775 | 35.6 | -2.8 | Pass |
| 940.781 | 10 | 249 | 1.88 | Quasi-peak | 34 | 39.083 | 80.0 | -40.9 | Pass |
| Radiated | ssional Testing, I Emissions, 10m D I GHz Vertical Polarity | istance | | | ─ Quasi-peak Limit ▽ Corrected Quasi- ─ Peak Limit Level ─ Corrected Peak V ▽ Verified Low-PR × LPRF Verificatio ─ Restricted Band ! | i-peak Reading Value IF QP Reading on Limit | | PROFESSIONAL TESTING X | X |
| 10 0 30M | white comments are the second of the second | Approximately and the second | 100M | Free | quency | | EUT: SIM-G | | 1G |

| | .5. IX IVIU | ie, ivilaale | Channel, I | Below 1 GH | z, Horizon | tal Polarity | <u> </u> | | | | |
|---|---|--|-------------------------------|------------------------|--|---|----------------|---------------|-------------------------|----------|--------|
| | | | Profes | sional Te | sting, El | MI, Inc. | | | | | |
| Test Meth | od: | ANSI C63.10 Devices | –2013: Ameri | can National Sta | andard of Proc | edures for Co | mpliand | ce Testing | g of Unlice | nsed Wi | eless |
| In accorda | nce with: | FCC Part 15. Limits | 209 - Code of | Federal Regulat | ions Part 47, | Subpart C - Int | ention | al Radiato | ors, Radiate | ed Emiss | ions |
| Section: | | 15.209 | | | | | | | | | |
| Test Date(| (s): | 4/14/2016 | | | EUT Serial | #: | Chanı | nel 2, 32 | 2, 64 | | |
| Customer: | | Triax Tech | nologies | | EUT Part #: | | SIM-G | | | | |
| Project Nu | | 17731-15 | | | Test Techn | | Eric Li | | | | |
| Purchase (| | NA | | | Supervisor | | Lisa A | | | | |
| Equip. Un | der Test: | SIM-G | | | Witness' N | ame: | None | | | | |
| | | Radiated En | nissions Tes | t Results Data | Sheet | | | Page | : 1 | of | 1 |
| EUT | Line Voltage | : 4 | I.2 VDC | | EUT Pov | ver Frequen | су: | 0 | N/A | | |
| Antenn | a Orientati | on: | Horizoi | ntal | Frequ | ency Range: | | 3 | 0MHz to | 1GHz | |
| | EUT I | Mode of Op | eration: | | | Transm | it; Cha | nnel: N | 1iddle | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit (dBµ\ | | Margin (dB) | Test R | esults |
| 758.808 | 10 | 128 | 1.17 | Quasi-peak | 34.7 | 35.665 | 80 | .0 | -44.3 | Pa | SS |
| 888.784 | 10 | 158 | 1.11 | Quasi-peak | 34.1 | 38.858 | 80 | .0 | -41.1 | Pa | SS |
| 940.792 | 10 | 139 | 3.89 | Quasi-peak | 25.4 | 30.461 | 35 | .6 | -5.1 | Pa | SS |
| Radiate: 30 MHz- 100 | SSIONAL TESTING d Emissions, 10m I 1GHzHorizontalPola | Distance | ns | | ─ Quasi-peak Limit ▽ Corrected Quasi- ─ Peak Limit Level ─ Corrected Peak V ▼ Verified Low-PR X LPRF Verificatio Restricted Band 1 | -peak Reading Value F QP Reading n Limit | | PRO | JFESSIONAL S 1 I N 6 | - X | |
| 20 10 10 30 M | :: Eric Lifsey | And the second s | 100M | Free | quency | F | EUT: SIM-G | | | 16 | |
| 20 10 10 10 10 10 10 10 10 10 10 10 10 10 | :: Eric Lifsey E'Run 0 2 'TX Spurious | | | ansmit, Middle Channel | quency | F | Project Num | ber: 17731-15 | | 16 | |

| | | | | | | | | | | 0 | |
|--------------------------------|--|-------------------------------|-------------------------------|----------------------|---------------------------------|--|---|------------|----------------|---------|--------|
| Table 7.3. | 6: TX Mod | e, Middle | Channel, A | Above 1 GH | z, Vertical | Polarity | | | | | |
| | | | Profess | sional Te | sting, El | VII, Inc. | | | | | |
| Test Metho | d: | ANSI C63.10- Devices | -2013: Americ | can National Sta | andard of Proc | edures for Co | mplian | ce Testi | ing of Unlicer | nsed Wi | reless |
| In accordar | ice with: | FCC Part 15.2 Limits | :09 - Code of I | Federal Regulat | tions Part 47, | Subpart C - Int | ention | al Radia | ators, Radiate | d Emis | sions |
| Section: | | 15.209 | | | | | | | | | |
| Test Date(s | s): | 4/14/2016 | | | EUT Serial | #: | | | 32, 64 | | |
| Customer: | | Triax Techn | ologies | | EUT Part #: | | SIM-G | <u> </u> | | | |
| Project Nur | nber: | 17731-15 | | | Test Techn | ician: | Eric Li | • | | | |
| Purchase O | rder #: | NA | | | Supervisor | | Lisa A | rndt | | | |
| Equip. Und | er Test: | SIM-G | | | Witness' N | ame: | None | | | | |
| | F | Radiated Em | issions Test | : Results Data | a Sheet | | | Pag | ge: 1 | of | 1 |
| EUT Li | ne Voltage | : 4. | .2 VDC | | EUT Pow | ver Frequen | су: | O | N/A | | |
| Antenna | orientation | n: | Vertic | al | Frequ | ency Range: | | | Above 1 | GHz | |
| | EUT N | Node of Ope | eration: | | Transmit; Channel: Middle | | | | | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit (dBµ\ | | Margin (dB) | Test R | esults |
| 2744.56 | 3 | 97 | 1 | Peak | 58.3 | 50.424 | 74 | .0 | -23.5 | Pa | SS |
| 6358.65 | 3 | 56 | 1 | Peak | 39.4 | 39.934 | 74 | .0 | -34.0 | Pa | SS |
| Radiated | sional Testing, Emissions, 3m Dis ertical Polarity Meass | tance | | | | ∇ Corre— Peak | ge Limit Level Limit Level ected Peak R | ge Reading | | PROFES | |
| 30 | And the state of t | and the second of the second | | | | | | - ∀ | | | |

 $\begin{array}{l} \textbf{Mode: Transmit, Middle Channel} \\ \textbf{Power: 4.2 VDC} \end{array}$

EUT: SIM-G

Project Number: 17731-15

Client: Tria x Technologies

Operator: Eric Lifsey

17731 'RE'Run02 'TX 'Spurious' Middle Chan.til

 $03\!:\!31\!:\!32\,PM, Thursday, April 14, 2016$

| Table 7.3. | 7: TX Mod | e, Middle | Channel, A | Above 1 GH | z, Horizon | tal Polarity | / | | | |
|--|--|-------------------------------|--|----------------------|---------------------------------|--------------------------------|--|----------------|-------------------------|--|
| | | | Profess | sional Te | sting, EN | VII, Inc. | | | | |
| Test Metho | od: | ANSI C63.10- Devices | -2013: Amerio | an National Sta | andard of Proc | edures for Co | mpliance Test | ing of Unlicer | sed Wireless | |
| In accordar | nce with: | FCC Part 15.2 Limits | 09 - Code of F | ederal Regulat | ions Part 47, S | Subpart C - Int | entional Radi | ators, Radiate | d Emissions | |
| Section: | | 15.209 | | | | | | | | |
| Test Date(s | s): | 4/14/2016 | | | EUT Serial | | Channel 2, | 32, 64 | | |
| Customer: | | Triax Techn | ologies | | EUT Part #: | | SIM-G | | | |
| Project Nur | | 17731-15 | | | Test Techni | | Eric Lifsey | | | |
| Purchase O | rder #: | NA | | | Supervisor: | | Lisa Arndt | | | |
| Equip. Und | er Test: | SIM-G | | | Witness' N | ame: | None | | | |
| | F | Radiated Em | issions Test | Results Data | a Sheet | | Pa | ge: 1 | of 1 | |
| EUT Li | ine Voltage: | : 4. | 2 VDC | | EUT Pow | ver Frequen | cy: (| N/A | | |
| Antenna | orientatio | n: | Horizon | ital | Frequ | 3Hz | | | | |
| | EUT N | lode of Ope | ration: | | Transmit; Channel: Middle | | | | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBμV/m) | Margin (dB) | Test Results | |
| 2744.53 | 3 | 199 | 1 | Peak | 57 | 49.115 | 74.0 | -24.8 | Pass | |
| 3659.39 | 3 | 33 | 1 | Peak | 63.9 | 57.84 | 74.0 | -16.1 | Pass | |
| Radiated 1-18GHzE 90 | sional Testing, Emissions, 3m Dis Iorizontal Polarity Mo | tance | | | | ▽ Corre — Peak l | ge Limit Level cted Average Reading Limit Level cted Peak Reading | | PROFESSIONAL TESTING | |
| 300 (m/M) 300 (m | had a second | gedicus demission | personal in a light section of the s | V | W | | | Water Street | | |

Mode: Transmit, Middle Channel Power: 4.2 VDC EUT: SIM-G

Project Number: 17731-15

Client: Tria x Technologies

Operator: Eric Lifsey

17731 'RE'Run02 'TX 'Spurious' MiddleChan.til
03:31:32 PM, Thursday, April 14, 2016

| Table 7.3. | 8: TX Mod | e, High | <u>ո Ch</u> | annel, Bel | ow 1 GHz, \ | Vertical Po | larity | | | | | |
|--|---|--------------------|-------------|-------------------------------|----------------------|--|---|----------------|------------------------------|-------------------------|----------|--------|
| | | | | Profes | sional Te | sting, El | VII, Inc. | | | | | |
| Test Metho | od: | ANSI C6 Devices | | -2013: Ameri | can National Sta | andard of Proc | edures for Co | mpliand | ce Testin | g of Unlice | nsed Wii | reless |
| In accordar | nce with: | FCC Part | t 15.2 | :09 - Code of | Federal Regulat | ions Part 47, | Subpart C - Int | tention | al Radiat | ors, Radiate | ed Emiss | ions |
| Section: | | 15.209 | | | | | | | | | | |
| Test Date(s | s): | 4/14/2 | 016 | | | EUT Serial | #: | Chanı | nel 2, 3 | 2, 64 | | |
| Customer: | | Triax T | echn | ologies | | EUT Part #: | | SIM-G | ì | | | |
| Project Nui | nber: | 17731- | 15 | | | Test Techn | ician: | Eric Li | | | | |
| Purchase C | rder #: | NA | | | | Supervisor | | Lisa A | | | | |
| Equip. Und | er Test: | SIM-G | | | | Witness' N | ame: | None | | | | |
| | F | Radiate | d Em | issions Test | t Results Data | a Sheet | | | Page | e: 1 | of | 1 |
| EUT L | ne Voltage: | : | 4. | .2 VDC | | EUT Pow | ver Frequen | су: | 0 | N/A | | |
| Antenna | Orientatio | n: | | Vertic | al | Frequ | ency Range: | : | 3 | 30MHz to | 1GHz | |
| EUT Mode of Operation: | | | | | | | Transmit; Channel: Hig | | | | | |
| Frequency Measured (MHz) | equency Test EUT leasured Distance Direction | | | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit (dBµ\ | | Margin (dB) | Test Ro | esults |
| 758.568 | 10 | 249 |) | 2.35 | Quasi-peak | 33.2 | 34.172 | 35 | .6 | -1.4 | Pa | SS |
| 771.6 | 10 | 250 |) | 2.16 | Quasi-peak | 35.8 | 36.798 | 80 | .0 | -43.2 | Pas | SS |
| 901.586 | 10 | 73 | | 4.08 | Quasi-peak | 25.7 | 30.93 | 35 | .6 | -4.7 | Pa | SS |
| 953.572 | 10 | 37 | | 4.07 | Quasi-peak | 32.1 | 37.36 | 80 | .0 | -42.6 | Pas | SS |
| Radiated 30MHz-1 100 90 80 80 80 80 80 | sional Testing, Emissions, 10m Di GHz Vertical Polarity | istance | | | | ─ Quasi-peak Limit ▽ Corrected Quasi- ─ Peak Limit Level ─ Corrected Peak V ▽ Verified Low-PR X LPRF Verificatio ─ Restricted Band 1 | -peak Reading Value F QP Reading n Limit | | PR | OFESSIONAL S Y I N 8 | | |
| 20 40 10 10 10 10 10 10 10 10 10 10 10 10 10 | Eric Lifsey Run03 TX Spurious T | U | , disting | 100M Mode: Tr Power: 4. | ansmit, High Channel | quency | I | | ber: 17731-1 Technologies | | 16 | ; |

Table 7.3.9: TX Mode, High Channel, Below 1 GHz, Horizontal Polarity

| | | | | Profes | sional Te | sting, EN | VII, Inc. | | | | | |
|---|--|-------------------|-------------------------------|----------------------|---|---|--|--------------------------------|----------------|------------------------|----------|--------|
| Test Metho | od: | ANSI C6 | | -2013: Ameri | can National Sta | andard of Proc | edures for Co | mpliance | e Testin | g of Unlice | nsed Wi | reless |
| In accordar | nce with: | FCC Par Limits | t 15.2 | 09 - Code of | Federal Regulat | ions Part 47, S | Subpart C - Int | entiona | l Radiato | ors, Radiate | ed Emiss | ions |
| Section: | | 15.209 | | | | | | | | | | |
| Test Date(s | s): | 4/14/2 | | | | EUT Serial | el 2, 32 | 2, 64 | | | | |
| Customer: | _ | _ | | ologies | | EUT Part #: | | SIM-G | | | | |
| Project Nur | | 17731- | -15 | | | Test Techni | | Eric Lif | | | | |
| Purchase O | | NA | | | | Supervisor: | | Lisa Aı | rndt | | | |
| Equip. Und | er Test: | SIM-G | | | | Witness' N | ame: | None | | | | |
| | i | Radiate | d Em | issions Test | Results Data | Sheet | | | Page | : 1 | of | 1 |
| EUT Li | ine Voltage | : | 4. | 2 VDC | | EUT Pow | er Frequen | су: | 0 | N/A | | |
| Antenna | o Orientatio | n: | | Horizor | ntal | Frequ | ency Range: | | 3 | 0MHz to | 1GHz | |
| | EUT N | /lode of | f Ope | eration: | | | Transr | nit; Ch | annel: | High | | |
| Frequency Measured (MHz) | equency Test EUT easured Distance Direction | | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit L (dBμV | | Margin (dB) | Test R | esult | |
| 758.643 | 10 | 130 |) | 1.07 | Quasi-peak | 33 | 33.919 | 35. | 6 | -1.7 | Pa | SS |
| 771.616 | 10 | 141 | L | 1.27 | Quasi-peak | 34.1 | 35.173 | 35. | 6 | -0.4 | | SS |
| 901.579 | 10 | 155 | 5 | 1.08 | Quasi-peak | 33.3 | 38.548 | 80.0 -41.5 | | | Pa | SS |
| 953.554 | 10 | 141 | l | 1.13 | Quasi-peak | 31.4 | 36.633 | 80. | 0 | -43.4 | Pa | SS |
| Radiated | sional Testing, Emissions, 10m D GHzHorizontal Polar | istance | | s _ | | Quasi-peak Limit ∇ Corrected Quasi- Peak Limit Level Corrected Peak V Verified Low-PR X LPRF Verification Restricted Band N | peak Reading Talue F QP Reading n Limit | | | FESSIONAL S T I N 6 | - | |
| Field Strength (d.B.) 10 30 30 30 30 30 30 | and market and a second | Wall Albertally | | 100M | Marchael Institute of the Administration of | | | | | × | × × × | ; |
| | Eric Lifsey | | | Made Tr | Free ansmit, High Channel | quency | | EUT: SIM-G | | | | |
| Operator: | | | | | anomitaligh Channel | | _ | | | | | |
| 17731 RE | Run03'TX'Spurious'l PM, Thursday, April 1 | | | Power: 4.2 | 2 VDC | | | roject Numb Client: Triax T | | i | | |

| 11. TV N/a | | | | | | | | | | |
|------------------------|--|--|--|--|---|--|---|--|--|--|
| 11: I X IAIO | de, High C | hannel, Al | oove 1 GHz | , Vertical P | olarity | | | | | |
| | | Profess | sional Te | sting, El | VII, Inc. | | | | | |
| od: | ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wirele | | | | | | ireless | | | |
| nce with: | FCC Part 15.2 Limits | CC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emiss imits | | | | | | sions | | |
| | 15.209 | | | | | | | | | |
| s): | 4/14/2016 | | | EUT Serial | #: | Chan | nel 2, 3 | 32, 64 | | |
| | Triax Techn | ologies | | EUT Part #: | | SIM-G | ì | | | |
| mber: | 17731-15 | | | Test Techn | ician: | Eric Li | ifsey | | | |
| Order #: | NA | | | Supervisor | | Lisa A | rndt | | | |
| der Test: | SIM-G | | | Witness' N | ame: | None | | | | |
| F | Radiated Em | issions Test | Results Dat | a Sheet | | | Pag | ge: 1 | of | 1 |
| ine Voltage | : 4. | .2 VDC | | EUT Pow | ver Frequen | су: | 0 | N/A | ı | |
| a Orientatio | n: | Vertic | al | Frequency Range: Above 1GHz | | | | | | |
| EUT N | lode of Ope | eration: | | Transmit; Channel: High | | | | | | |
| Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | - | | Margin (dB) | Test F | Results |
| 3 | 41 | 1 | Peak | 63.7 | 56.011 | 74 | .0 | -17.9 | Pa | ass |
| 3 | 83 | 1 | Peak | 55.5 | 49.429 | 74 | .0 | -24.5 | Pa | ass |
| d Emissions, 3m Dis | tance | | | | ▽ Corre — Peak | ected Avera | ge Reading | | PROFES | SSIONAL T I N 6 |
| | Line Voltage na Orientatio EUT N Test Distance (Meters) 3 3 ssional Testing, d Emissions, 3m Dis | Ince with: FCC Part 15.2 Limits 15.209 [s]: 4/14/2016 : Triax Techn Imber: 17731-15 Order #: NA der Test: SIM-G Radiated Em Line Voltage: A Distance (Meters) Recompany | ANSI C63.10–2013: Americ Devices FCC Part 15.209 - Code of Limits 15.209 [s]: 4/14/2016 : Triax Technologies Imber: 17731-15 Order #: NA der Test: SIM-G Radiated Emissions Test Line Voltage: 4.2 VDC na Orientation: Vertice EUT Mode of Operation: Function Height (Meters) 3 41 1 3 83 1 Ssional Testing, EMI, Inc d Emissions, 3m Distance | ANSI C63.10–2013: American National State Devices FCC Part 15.209 - Code of Federal Regular Limits 15.209 (s): 4/14/2016 : Triax Technologies Limber: 17731-15 Order #: NA der Test: SIM-G Radiated Emissions Test Results Dat Line Voltage: 4.2 VDC Test SIM-G EUT Mode of Operation: Function Height (Degrees) (Meters) Antenna Direction Height (Meters) Gerea Simulation: Peak Antenna Detector Function (Meters) Peak Ssional Testing, EMI, Inc d Emissions, 3m Distance EMI, Inc d Emissions, 3m Distance | ANSI C63.10–2013: American National Standard of Proceed Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Stimits 15.209 (s): 4/14/2016 EUT Serial EUT Part #: Triax Technologies EUT Part #: Test Technologies Imber: 17731-15 Test Technologies Supervisor: Adder Test: SIM-G Witness' Note Test: SIM-G Witness' Note Test: SIM-G Witness' Note Test Results Data Sheet Line Voltage: 4.2 VDC EUT Power and Orientation: Vertical Frequency Function (Meters) (Degrees) (Meters) Test EUT Antenna Detector Function (Meters) (Degrees) (Meters) 3 41 1 Peak 63.7 3 83 1 Peak 55.5 Ssional Testing, EMI, Ince d Emissions, 3m Distance | ANSI C63.10–2013: American National Standard of Procedures for Copevices ANSI C63.10–2013: American National Standard of Procedures for Copevices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Integration of Procedures for Copevices Indicate Procedures for Copevices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Integration of Procedures for Copevices EUT Serial #: EUT Part #: Indicate Procedures for Copevices for | ANSI C63.10–2013: American National Standard of Procedures for Compliance Devices ANSI C63.10–2013: American National Standard of Procedures for Compliance Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Limits 15.209 (s): 4/14/2016 | ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radia Limits 15.209 [s]: 4/14/2016 | ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of Unlice Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiat Limits 15.209 [s]: 4/14/2016 | ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of Unlicensed W Devices FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Results Data Sheet Radiated Emissions Test Results Data Sheet Function (Degrees) FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Test Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part 47, Subpart C - Intentional Radiators, Radiated Emissions Part |

Mode: Transmit, High Channel Power: 4.2 VDC

EUT: SIM-G

Project Number: 17731-15

Client: Tria x Technologies

Operator: Eric Lifsey

 $17731\,{}^{\circ}\!RE'\!Run03\,{}^{\circ}\!TX\,{}^{\circ}\!Spurious'\!HighChan.til$ 04:49:25 PM, Thursday, April 14, 2016

| T-1-1- 7.0 | 10 TV 04 - | -l- 11'-l- 0 | | 4 611 | | . I. D I' I | | | | 8.00 | |
|--------------------------------|--|-------------------------------|--|----------------------|---------------------------------|--|---------------------------|------------|--|---------|-----------------|
| Table 7.3. | 12: TX Mo | de, High C | | oove 1 GHz | | · · · · · · · · · · · · · · · · · · · | | | | | |
| | | | Protess | sional Te | sting, El | VII, Inc. | | | | | |
| Test Metho | d: | ANSI C63.10- Devices | ANSI C63.10–2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices | | | | | | | | |
| In accordan | ice with: | FCC Part 15.2 Limits | CC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions imits | | | | | | | sions | |
| Section: | | 15.209 | | | | | | | | | |
| Test Date(s |): | 4/14/2016 | | | EUT Serial | #: | Chan | nel 2, | 32, 64 | | |
| Customer: | | Triax Techn | ologies | | EUT Part #: | | SIM-G | ì | | | |
| Project Nur | nber: | 17731-15 | | | Test Techn | ician: | Eric Li | fsey | | | |
| Purchase O | rder #: | NA | | | Supervisor | | Lisa A | rndt | | | |
| Equip. Und | er Test: | SIM-G | | | Witness' N | ame: | None | | | | |
| | F | Radiated Em | issions Test | : Results Dat | a Sheet | | | Pag | ge: 1 | of | 1 |
| EUT Li | ne Voltage: | : 4. | .2 VDC | | EUT Pow | ver Frequen | су: | C | N/A | | |
| Antenna | Orientatio | n: | Horizor | ntal | Frequ | ency Range | : | | Above 1 | GHz | |
| | EUT N | lode of Ope | eration: | | | Transr | nit; Ch | anne | l: High | | |
| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit (dBµ\ | | Margin (dB) | Test R | esults |
| 2782.86 | 3 | 147 | 1 | Peak | 60.5 | 52.808 | 74 | .0 | -21.1 | Pa | ISS |
| 3710.21 | 3 | 161 | 1 | Peak | 59.5 | 53.46 | 74 | .0 | -20.5 | Pa | ISS |
| 5565.75 | 3 | 269 | 1 | Peak | 57.7 | 55.504 | 74 | .0 | -18.5 | Pa | ISS |
| Radiated 1-18GHzH 90 | sional Testing, Emissions, 3m Dis lorizontal Polarity Mo | tance | | | | ∇ Corre— Peak | ge Limit Leveteted Averag | ge Reading | | PROFES: | SIONAL I N 6 |
| Field Strength (d B µ Vm) | illa la serie de l | on and the state of models. | A STATE OF THE STA | | | | | | A CONTRACTOR OF THE PARTY OF TH | | |

> 1GHz Horizontal Antenna Polarity Measured Emissions

Mode: Transmit, High Channel Power: 4.2 VDC

Frequency

EUT: SIM-G

Project Number: 17731-15

Client: Tria x Technologies

Operator: Eric Lifsey

17731'RE'Run03'TX'Spurious'HighChan.til

04:49:25 PM, Thursday, April 14, 2016

7.0 Antenna Construction Requirements

The design was investigated for meeting the antenna construction requirements of the applicable rules.

7.1 Procedure

A direct examination of the antenna construction is performed and compared to rule criteria that prevent wireless device antennas from being modified by end users in ways that would void their authorization to use the device.

7.2 Criteria

| 47 CFR (USA) // IC (Canada) | | |
|-----------------------------|----------------------|-------------|
| Section Reference | Parameter | Date(s) |
| 15.203 // RSS-Gen 8.3 | Antenna Construction | 14 Sep 2016 |

7.3 Results

| Table 8.3.1 Antenna Construction Details | | |
|---|----------------------|--|
| Antenna Manufacturer and Model | Specifications | |
| Manufacturer: Beldon (raw material, wire); T | riax (in final form) | |
| Part Number: Triax 9976 010100 | | |
| Construction: | | |
| 915MHz, 1/4wave wire, 3.5", 26ga, Solid, Blad | ck | |

- Antenna is a wire antenna.
- The antenna is integral to the device.
- The device uses a molded enclosure.
- There is no external connector.

The antenna design above satisfies the requirements of the rules.

8.0 Equipment

8.1 Radiated Emissions 30 MHz to 10 GHz

| | | Profess | sional Testing, EMI, Inc. | | |
|------------|----------------------|--|--|----------------------|-------------------------|
| est Metho | d: | C63.10–2013: Ame ensed Wireless Dev | rican National Standard of Procedure | es for Compliance 1 | Testing of |
| n accordan | | Part 15.209 - Code o | of Federal Regulations Part 47, Subpa | rt C - Intentional R | adiators, |
| ection: | 15.20 | | | | |
| est Date(s |): 4/14/ | ['] 2016 | EUT Serial #: | Channel 2, 32, 64 | |
| ustomer: | Triax | Technologies | EUT Part #: | SIM-G | |
| roject Nun | nber: 17731 | l-15 | Test Technician: | Eric Lifsey | |
| urchase O | | | Supervisor: | Lisa Arndt | |
| quip. Und | er Test: SIM-G | ì | Witness' Name: | None | |
| | | Radiate | d Emissions Test Equipment List | | |
| Til | le! Software Version | on: 4.2.A, | May 23, 2010, 08:38:52 AM | | |
| | Test Profile: | | Rad Emissions_ClassA - LowPRF_072 Rad Emissions_ClassB - LowPRF_072 | | |
| Asset # | Manufacturer | Model | Equipment Nomenclature | Serial Number | Calibration Due Date |
| 1509A | Braden | N/A | TDK 10M Chamber, NSA < 1 GHz | DAC-012915-005 | 2/5/2017 |
| 1890 | HP | 8447F | Preamp/Amp, 9kHz-1300MHz, 28/25dB | 3313A05298 | 2/1/2018 |
| 1937 | Agilent | E4440A | Spectrum Analyzer, 3 Hz - 26.5 GHz, Opt. AYZ | MY44808298 | 12/15/2016 |
| 1926 | ETS-Lindgren | 3142D | Antenna, Biconilog, 26 MHz - 6 GHz | 135454 | 1/25/2017 |
| C027D | none | RG214 | Cable Coax, N-N, 25m | none | 10/1/2016 |
| 1327 | EMCO | 1050 | Controller, Antenna Mast | none | N/A |
| 0942 | EMCO | 11968D | Turntable, 4ft. | 9510-1835 | N/A |
| 1969 | HP | 11713A | Attenuator/Switch Driver | 3748A04113 | N/A |
| | | | | | |
| 1509B | Braden | N/A | TDK 10M Chamber, VSWR > 1 GHz | DAC-012915-005 | 3/14/2017 |
| 2004 | Miteq | AFS44-00101800- 2S-10P-44 | Amplifier, 40dB, .1-18GHz | 0 | 1/11/2018 |
| C030 | none | none | Cable Coax, N-N, 30m | none | 10/1/2016 |
| 1325 | EMCO | 1050 | Controller, Antenna Mast | 9003-1461 | N/A |
| | 1 | 1 | Antenna, Double Ridged Guide | 110313 | 2/25/2017 |

Applies also to power spectral density and receive spurious equipment list.

8.2 Bandwidth and Duty Cycle

| Asset # | Manufacturer | Model # | Description | Calibration Due |
|---------|--------------|---------|-------------------------|--------------------|
| 2216 | НР | 8593E | Spectrum Analyzer | 19 Jul 2017 |
| None | B&K | 1710 | Adjustable Power Supply | CIU |
| 0472 | Tektronix | THS730A | DMM / Scope | 7 Dec 2016 |

9.0 Measurement Bandwidths

| Radiated Emissions Spectrum Analyzer Bandwidth and Measurement Time - Peak Scan | | | | | | | | | |
|---|------------------------------|-------------------------|--------------------------|----------------------------|--|--|--|--|--|
| Frequency Band Start (MHz) | Frequency Band Stop (MHz) | 6 dB Bandwidth (kHz) | Number of Ranges Used | Measurement Time per Range | | | | | |
| 0.009 | 0.15 | 0.3 | 2 | Multiple Sweeps | | | | | |
| 0.15 | 30 | 9 | 6 | Multiple Sweeps | | | | | |
| 30 | 1000 | 120 | 2 | Multiple 800 mS Sweeps | | | | | |
| 1000 | 6000 | 1000 | 2 | Multiple Sweeps | | | | | |
| 6000 | 18000 | 1000 | 2 | Multiple Sweeps | | | | | |
| 18000 | 26500 | 1000 | 2 | Multiple Sweeps | | | | | |

*Notes:

^{1.} The settings above are specifically calculated for the E4440A series of spectrum analyzers, which have 8,000 data points per range.

^{2.} The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz.

^{3.} The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.

^{4.} The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1000 MHz.

^{5.} The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz.

Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty

All uncertainty calculations, estimates and expressions thereof shall be in accordance with NIST policy. Since PTI operates in accordance with NIST (NVLAP) Handbook 150-11: 2007, all instrumentation having an effect on the accuracy or validity of tests shall be periodically calibrated or verified traceable to national standards by a competent calibration laboratory. The certificates of calibration or verification on this instrumentation shall include estimates of uncertainty as required by NIST Handbook 150-11.

1. Rationale and Summary of Expanded Uncertainty.

Each piece of instrumentation at PTI that is used in making measurements for determining conformance to a standard (or limit), shall be assessed to evaluate its contribution to the overall uncertainty of the measurement in which it is used. The assessment of each item will be based on either a type A evaluation or a type B evaluation. Most of the evaluations will be type B, since they will be based on the manufacturer's statements or specifications of the calibration tolerances, or uncertainty will be stated along with a brief rationale for the type of evaluation and the resulting stated uncertainties.

The individual uncertainties included in the combined standard uncertainty for a specific test result will depend on the configuration in which the item of instrumentation is used. The combination will always be based on the law of propagation of uncertainty. Any systematic effects will be accommodated by including their uncertainties, in the calculation of the combined standard uncertainty; except that if the direction and amount of the systematic effect cannot be determined and separated from its uncertainty, the whole effect will be treated as uncertainty and combined along with the other elements of the test setup.

Type A evaluations of standard uncertainty will usually be based on calculating the standard deviation of the mean of a series of independent observations, but may be based on a least-squares curve fit or the analysis of variance for unusual situations. Type B evaluations of standard uncertainty will usually be based on manufacturer's specifications, data provided in calibration reports, and experience. The type of probability distribution used (normal, rectangular, a priori, or u-shaped) will be stated for each Type B evaluation.

In the evaluation of the uncertainty of each type of measurement, the uncertainty caused by the operator will be estimated. One notable operator contribution to measurement uncertainty is the manipulation of cables to maximize the measured values of radiated emissions. The operator contribution to measurement uncertainty is evaluated by having several operators independently repeat the same test. This results in a Type A evaluation of operator-contributed measurement uncertainty.

A summary of the expanded uncertainties of PTI measurements is shown as Table 1. These are the worst-case uncertainties considering all operative influence factors.

Table 1: Summary of Measurement Uncertainties for Site 45

| Type of Measurement | Frequency Range | Meas. Dist. | Expanded Uncertainty U, dB (k=2) |
|-----------------------------|-------------------|-------------|--|
| Mains Conducted Emissions | 150 kHz to 30 MHz | N/A | 2.9 |
| Telecom Conducted Emissions | 150 kHz to 30 MHz | N/A | 2.8 |
| Radiated Emissions | 30 to 1,000 MHz | 10 m | 4.8 |
| Radiated Emissions | 1 to 18 GHz | 3 m | 5.7 |

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