FCC & ISED CANADA CERTIFICATION

TEST REPORT

for the

FREDERICK ENERGY PRODUCTS, LLC

FCC ID: QUI-FS-ICOS
IC ID: 11625A-FSICOS

WLL REPORT# 17182-01 REV 1

Prepared for:

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Testing Certificate AT-1448

FCC & ISED Canada Certification

Test Report

for the

Frederick Energy Products, LLC

Check-Out Station (1370755)

FCC ID: QUI-FS-ICOS
ISED ID: 11625A-FSICOS

August 24, 2021

WLL Report# 17182-01 Rev 1

Prepared by:

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Reviewed by:

Steven D. Koster
President

Abstract

This report has been prepared on behalf of Frederick Energy Products, LLC to support the attached Application for Equipment Authorization. The test report and application are submitted for a Transmitter under Part §15.209 (10/2014) of the FCC Rules and Regulations and Industry Canada RSS-Gen issue 5 (3/2019). This Certification Test Report documents the test configuration and test results for the Frederick Energy Products, LLC Check-Out Station (1370755).

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 4840 Winchester Boulevard, Frederick, MD 21703. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD.

Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory. (ISED Canada number 3035A).

The Frederick Energy Products, LLC Check-Out Station (1370755) complies with the limits for a transmitter under FCC Part §15.209 and ISED Canada RSS GEN Issue 5.

Revision History	Description of Change	Date
Rev 0	Initial Release	August 24, 2021
Rev 1	ACB Comments # ATCB027654	September 9, 2021

Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Compliance Statement

The Frederick Energy Products, LLC Check-Out Station (1370755) complies with the limits for an intentional radiator under FCC Part §15.209 and ISED Canada RSS Gen, Issue 5.

1.2 Test Scope

Tests for radiated and conducted emissions were performed. All measurements were performed in accordance with ANSI C63.4 and ANSI C63.10. The measurement equipment conforms to ANSI C63.4 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

FCC Rule Part	ISED Canada	Specific Description	Result
§15.207	RSS Gen	AC Voltage Conducted Emissions	Pass
§15.209	RSS Gen	Fundamental, Radiated Emissions	Pass
§15.209	RSS Gen	Harmonics/Spurious Emissions	Pass
§15.209	RSS Gen	Receiver Spurious Emissions	Pass
§15.109	ICES-003	Digital Apparatus, Radiated Emissions	Pass
§2.1049	RES Gen	Occupied Bandwidth	Pass

1.3 Contract Information

Customer:	Frederick Energy Products, LLC
Purchase Order Number:	9198
Quotation Number:	72709

1.4 Test and Support Personnel

Washington Laboratories, LTD	Ryan Mascaro and Thuan Ta
Customer Representative	Andrew Nichols

1.5 Testing Algorithm

The Check-Out Station (1370755) was tested while powered with its 120 VAC power source. A PAD was used to support the EUT during all testing. The transmitter was verified before and after each test. When detectable, the worst case emissions are provided throughout this report.

1.6 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Frederick, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED Canada OATS number for Washington Laboratories, Ltd. is 3035A. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

1.7 Test Dates

The EUT was tested during the following dates: 6/25/2021 & 8/12/2021.

2 Equipment Under Test

2.1 EUT Identification & Description

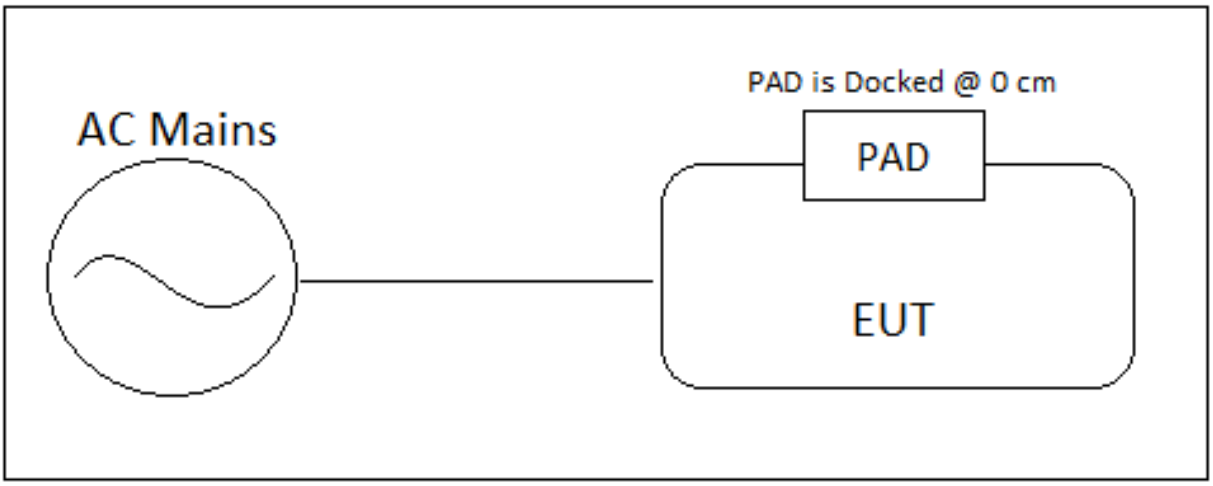
Table 1: EUT – Device Summary

Manufacturer:	Frederick Energy Products, LLC
FCC ID:	QUI-FS-ICOS
ISED ID:	11625A-FSICOS
EUT Name:	Check-Out Station (1370755)
HVIN:	1370755
FCC Rule Parts:	§15.209
ISED Rule Parts:	RSS-Gen Issue 5
FCC Emission Designator	1K0NON
IC Emission Designator	1K0NON
99% Occupied Bandwidth:	986 Hz
TX Frequency:	73 kHz
RX Frequency:	916.5 MHz
Keying:	Automatic
TX Modulation:	CW
Number of Channels:	1
Power Output Level	Fixed
Antenna Type:	Wire Wrapped Ferrite
Interface Cables:	Power Cable
Software/Firmware:	Normal Mode (no special settings)
Power Source & Voltage:	12 VDC via 120 VAC adapter

The Frederick Energy Products, LLC., Check-Out Station (1370755) is primarily for used with the DDAC-PAD, or the Raymond iWarehouse PAD. The simple design and operation uses a 73 kHz Magnetic Field transmitter to verify the functionality of a Personal Alarm Device (PAD). The PAD is seated into the EUT receptacle, with the audible and visual PAD alarm facing down into the EUT housing. If the PAD is working correctly, the EUT will provide indicators LED after several seconds. The EUT has a 916.5 MHz Receive Module (RX Only). When the EUT is supplied with a final 12 – 15 VDC, via a 120 VAC wall-power supply, the TX and RX are automatically enabled.

* note: for testing purposes, the EUT was confirmed to be transmitting at all times via two methods. (1) the test laboratory was able to trigger the alarm mode of a PAD, when seated into the EUT dock, and (2) when a near-field probe was placed at 1cm from the 73 kHz antenna, a small fundamental signal was detected (see Figure 2).

Figure 1: Test Configuration



2.2 Test Configuration

The EUT was tested in a power on, steady state with the 73 kHz Transmitter and the 916.5 MHz Receiver set to enabled. When DC power is supplied through the EUT's 120 VAC Power Supply, both the TX and RX automatically begin to function normally. The EUT was testing while actively triggering a support PAD. The PAD is placed in EUT docking station, as a means to establish the RF connectivity. The Check-Out Station (1370755) was configured as denoted via the following tables.

Table 2: System Configuration List

Name / Description	Part Number	FCC ID	Serial Number	Revision
Check-Out Station (1370755)	N/A	QUI-FS-ICOS	N/A	A
AC/DC Power Supply	ETSA120330U	N/A	N/A	N/A

Table 3: Support Equipment

Item	Model/Part Number	Serial Number
iWAREHOUSE (PAD)	QUI-FS-PAD	N/A

Table 4: Cable Configuration

Port Identification	Connector Type	Cable Length	Shielded (Y/N)	Termination Point
1	IEC – 3 Prong	< 3m	N	AC Mains – EUT

2.3 Measurements

2.3.1 References

ANSI C63.2 (Jan-2016) Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 (Jan 2014) American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

ANSI C63.10 (Jun 2013) American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

2.4 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a{}^2} + \frac{b^2}{div_b{}^2} + \frac{c^2}{div_c{}^2} + ...}$$

Where uc = standard uncertainty
a, b, c,.. = individual uncertainty elements
Diva, b, c = the individual uncertainty element divisor based on the probability distribution
Divisor = 1.732 for rectangular distribution
Divisor = 2 for normal distribution
Divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where:
U = expanded uncertainty
k = coverage factor
k ≤ 2 for 95% coverage (ANSI/NCSL Z540-2 Annex G)
uc = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 5 below.

Table 5: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR32, CISPR14, FCC Part 15	± 2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR32, CISPR14, FCC Part 15	± 4.55 dB

3 Test Equipment

Table 6 shows a list of the test equipment used for measurements along with the calibration information.

Table 6: Test Equipment List

Test Name:	**Conducted Emissions Voltage**	**Test Date:**	**06/25/2021**
Asset #	Manufacturer/Model	Description	Cal. Due
00823	AGILENT N9010A	EXA SPECTRUM ANALYZER	5/27/2022
00125	SOLAR 8028-50-TS-24-BNC	LISN	9/10/2021
00126	SOLAR 8028-50-TS-24-BNC	LISN	9/10/2021
00330	WLL CE CABLE	BNC-BNC RF COAXIAL CABLE	5/12/2022
00895	HP 11947A	TRANSIENT LIMITER	2/18/2022

Test Name:	**Radiated Emissions**	**Test Date:**	**06/25/2021**
Asset #	Manufacturer/Model	Description	Cal. Due
00823	AGILENT N9010A	EXA SPECTRUM ANALYZER	5/27/2022
00644	SUNOLS CIENCES CORP.	BICONALOG ANTENNA	11/9/2022
00425	ARA DRG-118/A	ANTENNA DRG 1-18GHZ	8/18/2022
00955	JUNKOSHA USA	18M HF COAXIAL, SMA/N	5/10/2022
00522	HP 8449B	PRE-AMPLIFIER 1-26.5GHZ	6/4/2022
00559	HP 8447D	AMPLIFIER	6/3/2022
00865	STORM 874-0101-036	HIGH FREQUENCY CABLE	6/17/2022

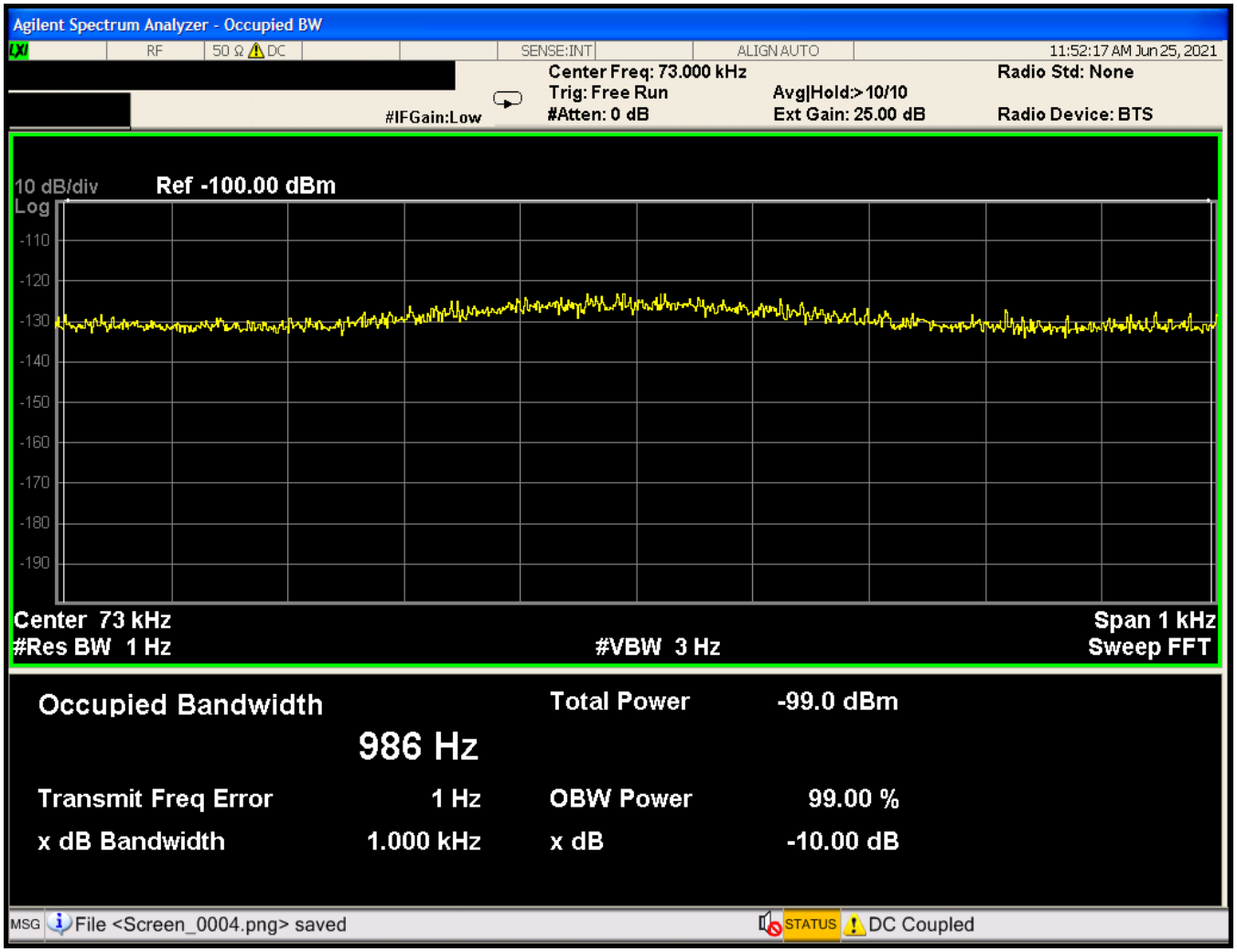
Test Name:	**73 kHz Radiated Emissions**	**Test Date:**	**8/12//2021**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
00942	AGILENT, MXA-N9020A	SPECTRUM ANALYZER	10/30/2021
00031	EMCO, 6502	ANTENNA ACTIVE LOOP	7/21/2023
00857	WLL, RG-223	50FT COAXIAL CABLE	Cal. Before Use

4 Test Results

4.1 Occupied Bandwidth: FCC §15.209 & §2.1049

The Occupied Bandwidth measurement was performed by disassembling the EUT's outer housing to gain access to the 73 kHz coil antennas. The measurement was only successfully made when a near-field RF probe was placed 1cm from the radiating source. The fundamental transmitter is only detectable from a measurement distance of less than 2cm.

Figure 2: Transmitter Occupied Bandwidth



4.2 Transmitter Radiated Emissions: FCC §15.209 & RSS Gen

Radiated emissions from the EUT must comply with the field strength limits as specified in FCC Part §15.209 and RSS Gen. The limits for the radiated emissions are as shown in the following table.

Table 7: Radiated Spurious Emissions Limits

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (meters)
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

4.2.1 Test Procedure

The EUT does not have a detectable radiated fundamental when evaluated at any distance greater than 1cm – 2 cm. As such, the measurements made for this section of the report, are all ambient conditions that have been made at the noise floor. Nevertheless, the EUT was placed on motorized turntable on a 10-meter Open Area Test Site. The EUT rotated through every azimuth by rotating the turntable. For frequencies between 10 kHz and 30 MHz, a loop antenna was mounted to a tripod at a height of 1m. The loop antenna was rotated about its vertical and horizontal axes, to determine the highest ambient conditions.

The limit at 300m measurement distance has been corrected to 10m.

With the EUT on the test site, and the transmitter and receiver enabled, the unit was examined in three orthogonal planes, as a means to detect the worst-case conditions/emissions.

Please see Table 8 through Table 10 for the final test data for below 30 MHz; all ambient measurements.

Resolution bandwidths (worst-case) used for radiated emissions, as a function of frequency:

9 kHz – 150 kHz: RBW = 300 Hz
150 kHz – 30 MHz: RBW = 10 kHz
30 MHz – 1 GHz: RBW = 120 kHz
Above 1 GHz: RBW = 1 MHz

For this test section, the following conditions apply:

The EUT was evaluated from 73 kHz to 30 MHz, which includes the 10th harmonic of the fundamental.

Field strength values below 30 MHz have been corrected for measurements at 10m.

For field strength measurements below 159 kHz, the rules allow for a measurement distance of 10m, when the original limit is defined at 300m. In this case, a distance correction of 40 dB/decade may be applied to the measured field strength. This distance correction is derived from: 40LOG(300/10) = 59.1

Table 8: Fundamental, Radiated Emissions for FCC (All Ambient)

Frequency (kHz)	Antenna Polarity	EUT Polarity	SA Level (dBuV)	Antenna Factor (dB)	Distance Corr. (dB)	Corr. Level (dBuV/m)	Corr. F/S (uV/m)	Limit (uV/m)	Limit (dBuV/m)	Margin (dB)	Detector
73.0	X	X	71.90	11.0	59.1	23.8	15.52	330	50.3	-26.5	Peak
73.0	X	X	62.00	11.0	59.1	13.9	4.96	33	30.3	-16.4	AVG
73.0	Y	X	77.90	11.0	59.1	29.8	30.96	330	50.3	-20.5	Peak
73.0	Y	X	68.00	11.0	59.1	19.9	9.90	33	30.3	-10.4	AVG
73.0	Z	X	77.10	11.0	59.1	29.0	28.23	330	50.3	-21.3	Peak
73.0	Z	X	67.20	11.0	59.1	19.1	9.03	33	30.3	-11.2	AVG

Note: Because the fundamental was not detectable at 10 meters, the average and peak detectors were used for measurements instead of a DCCF.

Table 9: Fundamental, Radiated Emissions for ISED Canada (All Ambient)

Frequency (kHz)	Antenna Polarity	EUT Polarity	SA Level (dBuV)	Antenna Factor (dB)	Distance Corr. (dB)	H-Field Corr.	Corr. Level (dBuA/m)	Limit (uA/m)	Limit (dBuA/m)	Margin (dB)	Detector
73.0	X	X	71.90	11.0	59.1	51.5	-27.7	0.87	-1.2	-26.5	Peak
73.0	X	X	62.00	11.0	59.1	51.5	-37.6	0.087	-21.2	-16.4	AVG
73.0	X	Y	77.90	11.0	59.1	51.5	-21.7	0.87	-1.2	-20.5	Peak
73.0	X	Y	68.00	11.0	59.1	51.5	-31.6	0.087	-21.2	-10.4	AVG
73.0	X	Z	77.10	11.0	59.1	51.5	-22.5	0.87	-1.2	-21.3	Peak
73.0	X	Z	67.20	11.0	59.1	51.5	-32.4	0.087	-21.2	-11.2	AVG

The RSS-Gen field strength limit for the 73 kHz transmitter is .087 uA/m at 300m.

E-Field to H-field conversion is 0LOG(120pi) = 20LOG(377) = 51.5 dBΩ

Table 10: Harmonics, Radiated Emissions – All Ambient

Frequency (kHz)	Antenna Polarity	EUT Polarity	SA Level (dBuV)	Antenna Factor (dB)	Corr. Level (dBuV/m)	Corr. F/S (uV/m)	Limit (uV/m)	Limit (dBuV/m)	Margin (dB)	Detector
146.0	Y	X	71.20	10.5	-6.9	0.452	160	44.3	-51.2	Peak
146.0	Y	X	61.30	10.5	-16.8	0.145	16	24.3	-41.1	AVG
219.0	Y	X	55.90	10.5	6.4	2.089	110	40.8	-34.4	Peak
219.0	Y	X	46.00	10.5	-3.5	0.668	11	20.8	-24.3	AVG
292.0	Y	X	49.20	10.5	-0.3	0.966	80	38.3	-38.6	Peak
292.0	Y	X	39.30	10.5	-10.2	0.309	8	18.3	-28.5	AVG
365.0	Y	X	47.70	10.5	-1.8	0.813	70	36.9	-38.7	Peak
365.0	Y	X	37.80	10.5	-11.7	0.260	7	16.4	-28.1	AVG
438.0	Y	X	45.00	10.5	-4.5	0.596	50	34.8	-39.3	Peak
438.0	Y	X	35.10	10.5	-14.4	0.191	5	14.8	-29.2	AVG
511.0	Y	X	46.10	10.5	18.1	8.036	470	53.4	-35.3	Peak
511.0	Y	X	39.20	10.5	11.2	3.631	47	33.4	-22.2	AVG

4.3 Non-Transmitter Radiated Emissions: FCC §15.109, RSS Gen, and ICES-003

FCC Compliance Limits		
Frequency Range	Limit (distance)	
	Class A (10 meter)	Class B (3 meter)
30-88 MHz	90 µV/m	100 µV/m
88-216 MHz	150 µV/m	150 µV/m
216-960 MHz	210 µV/m	200 µV/m
>960MHz	300 µV/m	500 µV/m

4.3.1 Test Procedure

The requirements of FCC Part 15 and ICES-003 call for the EUT to be placed on an 80 cm high 1 X 1.5 meters non-conductive motorized turntable for radiated testing at an open field test site.

The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Bi-conical and log periodic broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The output of the antenna was connected to the input of the spectrum analyzer and the emissions in the frequency range of 30 MHz to 6 GHz were measured. The peripherals were placed on the table in accordance with ANSI C63.4. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The detector function was set to quasi-peak for measurements below 1 GHz. The measurement bandwidth of the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. For measurements above 1 GHz, both the peak and average levels are recorded, using a measurement bandwidth of 1 MHz with a video bandwidth setting of 10 Hz for the average measurement.

4.3.2 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are included into the antenna factor (AF) column of the table and in the cable factor (CF) column of the table. The AF (in dB/m) and the CF (in dB) is algebraically added to the raw Spectrum Analyzer Voltage in dBµV to obtain the Radiated Electric Field in dBµV/m. This logarithm amplitude is converted to a linear amplitude, then compared to the FCC limit.

Example:

Spectrum Analyzer Voltage:	VdBµV (SA)
Antenna Correction Factor:	AFdB/m
Cable Correction Factor:	CFdB
Pre-Amplifier Gain (if applicable):	GdB
Electric Field:	EdBµV/m = V dBµV (SA) + AFdB/m + CFdB - GdB
To convert to linear units of measure:	Inv Log (EdBµV/m/20)

4.3.3 Test Data

The EUT complies with the Radiated Emissions requirements for a Digital Device.

All radiated measurements were taken at distance of 3m, because the EUT is a Class B device.

There are some emissions that are solely a product of digital processing and internal crystal oscillators.

As such, the Class A limits have been applied for these signals.

The frequencies/emissions denoted in Table 8, are not related to the transmitter.

The Class A, 10m limit, has been interpolated to 3m via the following formulas:

- dBuV/m = 20 * LOG (uV/m)
- 3m Limit [dBuV/m] = 20 * LOG (10/3) + 10m Limit [dBuV/m]
- uV/m = 10 ^ (dBuV/m ÷ 20)

NF indicates that the measurement was taken at the noise floor.

Spur indicates that there was an emission present.

No emissions were detected in the frequency range above 1 GHz.

As such, the Class B limits were applied to these ambient measurements.

Table 11: Radiated Emission Test Data, 30 – 1000 MHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector	Comments
39.50	V	90.0	1.6	46.4	-9.7	68.1	300.0	-12.9	QP	Spur
41.13	V	0.0	1.4	55.1	-11.0	161.6	300.0	-5.4	QP	Spur
42.20	V	0.0	1.4	54.7	-11.7	140.3	300.0	-6.6	QP	Spur
45.16	V	10.0	1.3	60.7	-13.7	223.5	300.0	-2.6	QP	Spur
52.22	V	0.0	1.5	59.9	-16.9	141.7	300.0	-6.5	QP	Spur
58.45	V	270.0	1.3	43.0	-17.0	19.9	300.0	-23.6	QP	Spur
180.10	V	0.0	1.6	31.9	-12.5	9.3	500.0	-34.6	QP	AMB
240.10	V	0.0	1.6	29.6	-12.0	7.6	700.0	-39.3	QP	AMB
848.65	V	90.0	1.2	29.3	-0.5	27.5	700.0	-28.1	QP	AMB
39.53	H	0.0	1.3	46.7	-9.8	70.5	300.0	-12.6	QP	Spur
39.98	H	270.0	1.3	29.4	-10.2	9.2	300.0	-30.3	QP	Spur
45.16	H	280.0	1.2	44.9	-13.7	36.4	300.0	-18.3	QP	Spur
45.71	H	280.0	1.2	43.5	-14.1	29.6	300.0	-20.1	QP	Spur
47.66	H	270.0	1.3	49.3	-15.2	50.8	300.0	-15.4	QP	Spur
55.39	H	90.0	1.4	33.4	-17.1	6.5	300.0	-33.3	QP	Spur
473.00	H	180.0	1.6	32.0	-5.3	21.6	700.0	-30.2	QP	AMB
614.10	H	180.0	1.4	27.0	-3.5	15.0	700.0	-33.4	QP	AMB
992.60	H	180.0	1.1	27.1	1.7	27.6	1000.0	-31.2	QP	AMB

* Note: The data represented in Table 11 is also representative of the Receiver Emissions. When the EUT is powered on, the Transmitter and Receiver are enabled, both in a continuous mode. As such, this device meets the requirements of RSS-Gen, Section 7.

Table 12: Radiated Emission Test Data, 1 – 6 GHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector	Comments
1000.00	V	0.0	1.2	50.3	-11.5	86.6	5000	-35.2	Peak	AMB
1000.00	V	0.0	1.2	27.0	-11.5	5.9	500	-38.5	AVG	AMB
1833.00	V	180.0	1.2	49.0	-12.0	70.4	5000	-37.0	Peak	AMB
1833.00	V	180.0	1.2	34.0	-12.0	12.5	500	-32.0	AVG	AMB
2100.00	V	0.0	1.2	49.5	-10.3	91.1	5000	-34.8	Peak	AMB
2100.00	V	0.0	1.2	34.3	-10.3	15.8	500	-30.0	AVG	AMB
2749.50	V	0.0	1.2	48.2	-10.2	79.7	5000	-36.0	Peak	AMB
2749.50	V	0.0	1.2	34.0	-10.2	15.5	500	-30.2	AVG	AMB
3666.00	V	180.0	1.3	47.1	-9.8	73.6	5000	-36.6	Peak	AMB
3666.00	V	180.0	1.3	32.5	-9.8	13.7	500	-31.2	AVG	AMB
1000.00	H	270.0	1.4	49.9	-11.5	82.7	5000	-35.6	Peak	AMB
1000.00	H	270.0	1.4	28.3	-11.5	6.9	500	-37.2	AVG	AMB
1833.00	H	90.0	1.3	48.9	-12.0	69.6	5000	-37.1	Peak	AMB
1833.00	H	90.0	1.3	35.1	-12.0	14.2	500	-30.9	AVG	AMB
2100.00	H	90.0	1.2	49.6	-10.3	92.2	5000	-34.7	Peak	AMB
2100.00	H	90.0	1.2	36.1	-10.3	19.5	500	-28.2	AVG	AMB
2749.50	H	0.0	1.2	47.0	-10.2	69.4	5000	-37.2	Peak	AMB
2749.50	H	0.0	1.2	31.0	-10.2	11.0	500	-33.2	AVG	AMB
3666.00	H	0.0	1.2	48.0	-9.8	81.6	5000	-35.7	Peak	AMB
3666.00	H	0.0	1.2	35.0	-9.8	18.3	500	-28.7	AVG	AMB

* Note: The data represented in Table 12 is also representative of the Receiver Emissions. When the EUT is powered on, the Transmitter and Receiver are enabled, both in a continuous mode. As such, this device meets the requirements of RSS-Gen, Section 7.

4.4 Conducted Emissions (AC Power Line) FCC §15.207 & RSS Gen

Compliance Limits				
Frequency Range	Class A Digital Device		Class B Digital Device	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5 MHz	79 dBµV	66 dBµV	66 to 56 dBµV	56 to 46 dBµV
0.5 to 5 MHz	79 dBµV	66 dBµV	56 dBµV	46 dBµV
0.5-30 MHz	73 dBµV	60 dBµV	60 dBµV	50 dBµV

4.4.1 Test Procedure

The requirements of FCC Part 15 and ICES-003 call for the EUT to be placed on an 80cm-high 1 X 1.5-meter non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω/50 µH Line Impedance Stabilization Network bonded to a 3 X 2-meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power was supplied to the peripherals through a second LISN. The peripherals were placed on the table in accordance with ANSI C63.4. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak, peak, or average as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth. For average measurements, the post-detector filter was set to 10 Hz.

These emissions must meet the limits specified in §15.107 for quasi-peak and average measurements.

Environmental Conditions During Conducted Emissions Testing

Ambient Temperature:	19 °C
Relative Humidity:	58 %

4.4.2 Conducted Data Reduction and Reporting

The comparison between the Conducted emissions level and the FCC limit is calculated as shown in the following example:

Spectrum Analyzer Voltage: VdBµV(raw)

LISN Correction Factor: LISN dB

Cable Correction Factor: CF dB

Voltage: VdBµV = V dBµV (raw) + LISN dB + CF dB

4.4.3 Test Data

The EUT complies with the Class B Conducted Emissions requirements.

The EUT was set to a TX enabled mode, during this test.

The EUT also activated the alarm of a PAD, during this test.

Table 13: AC Power Conducted Emissions Test Data

NEUTRAL										
Frequency (MHz)	**Level QP (dBµV)**	**Level AVG (dBµV)**	**Cable Loss (dB)**	**LISN Corr (dB)**	**Level QP Corr (dBµV)**	**Level Corr Avg (dBµV)**	**Limit QP (dBµV)**	**Limit AVG (dBµV)**	**Margin QP (dB)**	**Margin AVG (dB)**
0.383	39.8	15.0	10.2	0.9	50.9	26.1	58.2	48.2	-7.3	-22.1
0.574	23.0	15.0	10.2	0.8	34.0	26.0	56.0	46.0	-22.0	-20.0
0.602	29.4	21.1	10.3	0.8	40.4	32.1	56.0	46.0	-15.6	-13.9
0.837	17.0	10.0	10.3	0.7	28.0	21.0	56.0	46.0	-28.0	-25.0
1.524	14.0	7.0	10.2	0.8	25.0	18.0	56.0	46.0	-31.0	-28.0
1.873	15.6	9.0	10.2	0.8	26.5	19.9	56.0	46.0	-29.5	-26.1
26.284	27.6	25.8	11.7	3.3	42.7	40.8	60.0	50.0	-17.3	-9.2

PHASE / L1										
Frequency (MHz)	**Level QP (dBµV)**	**Level AVG (dBµV)**	**Cable Loss (dB)**	**LISN Corr (dB)**	**Level QP Corr (dBµV)**	**Level Corr Avg (dBµV)**	**Limit QP (dBµV)**	**Limit AVG (dBµV)**	**Margin QP (dB)**	**Margin AVG (dB)**
0.289	42.3	16.0	10.2	1.0	53.5	27.2	60.6	50.6	-7.1	-23.4
0.604	28.0	20.0	10.3	0.9	39.2	31.2	56.0	46.0	-16.8	-14.8
1.292	28.0	20.0	10.2	0.9	39.2	31.2	56.0	46.0	-16.8	-14.8
1.419	15.7	8.0	10.2	0.9	26.9	19.2	56.0	46.0	-29.1	-26.8
1.615	18.0	7.0	10.2	1.0	29.1	18.1	56.0	46.0	-26.9	-27.9
27.914	27.4	24.4	11.9	4.4	43.7	40.7	60.0	50.0	-16.3	-9.3