



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: Leica Geosystems

Model: UHP

Description: Mining equipment locator using GPS and reporter using WiFi and 3G

Serial Number: 700158

To

FCC Part 15B
Class A

And

IC ICES-003 Issue 6 (January 2016)

Date of Issue: September 15, 2016

On the behalf of the applicant:

Leica Geosystems
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Attention of:

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Alex Macon
Project Test Engineer

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All results contained herein relate only to the sample tested.

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	8/31/16	Alex Macon	Original Document

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The applicant has been cautioned as to the following

FCC

15.21 – Information to user

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) – Special Accessories

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in the part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in §2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Industry Canada

Products subject to Industry Canada ICES-003 must be labeled in English and/or French (based on the intended market and any other applicable provincial or federal regulations) as follows:

CAN ICES-3 (A)/NMB-3(A)

ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

Test and Measurement Data

Subpart 2.1033(b)

All tests and measurement data shown were performed in accordance with FCC Rule Parts: 15.107, 15.109 (Unintentional Radiators).

All tests and measurement data shown are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003.

Name of Test	FCC Section	ICES-003
A/C Powerline Conducted Emissions	15.107	Section 6
Radiated Emissions	15.109	Section 6

Standard Engineering Practices

Unless otherwise indicated, the procedures contained in ANSI C63.4-2009 were observed during testing.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurement.

Standard Test Conditions and Engineering Practices

Unless otherwise indicated in the specific measurement results, the ambient temperature was maintained within the range of 10° to 40°C (50° to 104°F) and the relative humidity levels were in the range of 10% to 90%.

Environmental Conditions	
Temperature (°C)	Humidity (%)
23.8	31.4

EUT Description

Model: UHP

Part Number: 828045

Serial Number: 700158

Description: Mining equipment locator using GPS and reporter using WiFi and 3G

Firmware: N/A

Software: N/A

Additional Information:

The EUT was placed in an active mode using the manufacturer's software and instructions.

The primary casing of the unit is aluminum

EUT Operation during Tests

The EUT was placed in a test mode using the manufacturer supplied HTML



Accessories:

Qty	Description	Manufacturer	Model	S/N
2	Wifi antenna	Mobile Mark	0D6-2400M0D2-BLK-SP-335	N/A
2	GPS antenna	Antcom Corp	G5Ant-53AT1	N/A

Cables:

Qty	Description	Length (M)	Shielding Y/N	Shielded Hood Y/N	Termination
4	Antenna cable	>3m	Y	Y	N/A
1	Power Cable	>3m	Y	Y	N/A
4	Multi pin IO cable	>3m	Y	Y	N/A
1	Display cable	>3m	Y	Y	N/A
1	Ethernet cable	>3m	Y	Y	N/A

Modifications: None

Test Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.107	A/C Powerline Conducted Emissions	N/A	
15.109	Radiated Emissions	Pass	

15.109 Radiated Emissions

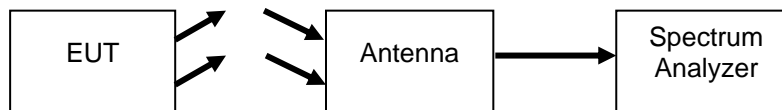
Engineer: Alex Macon

Test Date: 8/1/16

Test Procedure

The EUT was tested in a semi-anechoic chamber with the turntable set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360 degrees with the antennas in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the signal levels were maximized. All emissions from 30 MHz to 1 GHz were examined.

Test Setup



Settings

RBW = 120 KHz

VBW = 300 KHz

Detector – Quasi Peak

Sample Calculations

Corrected Value = Measured Value + Correction factor

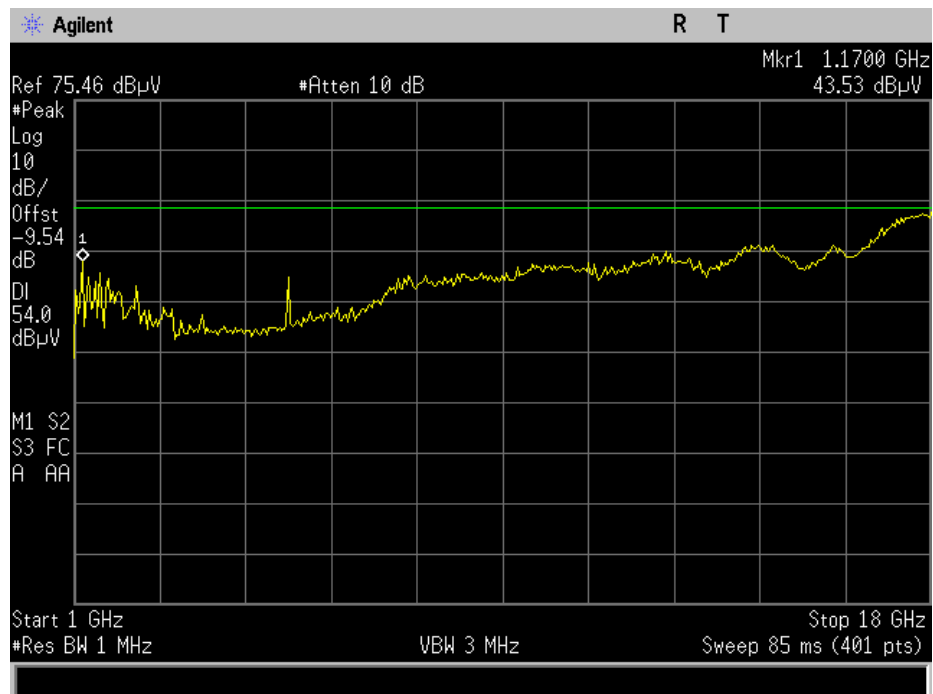
Correction factor = ACF + Cable loss

Radiated Emissions

Emission Frequency (MHz)	Measured Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Antenna Polarity (V/H)	Turntable Position (deg)	Detector (QP,PK,Avg)
34.6399	34.388	49.5	-15.11	100	V	357	QP
47.812	38.283	49.5	-11.22	111	V	0	QP
48.463	36.352	49.5	-13.15	110	V	196	QP
51.069	36.425	49.5	-13.08	113	V	39	QP
51.813	36.082	49.5	-13.42	111	V	45	QP
644.356	49.93	56.9	-6.97	100	V	343	QP

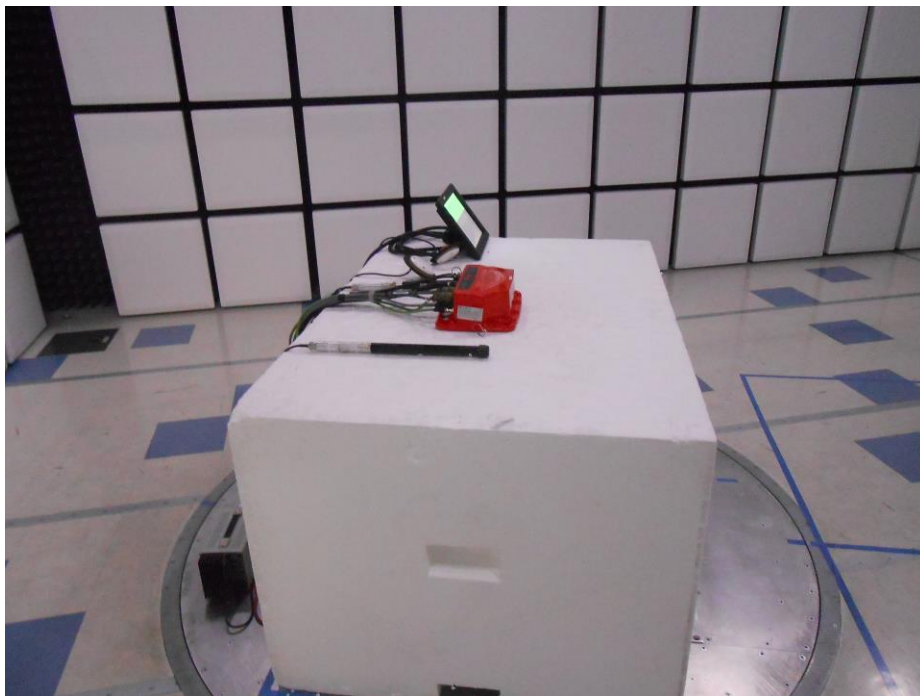
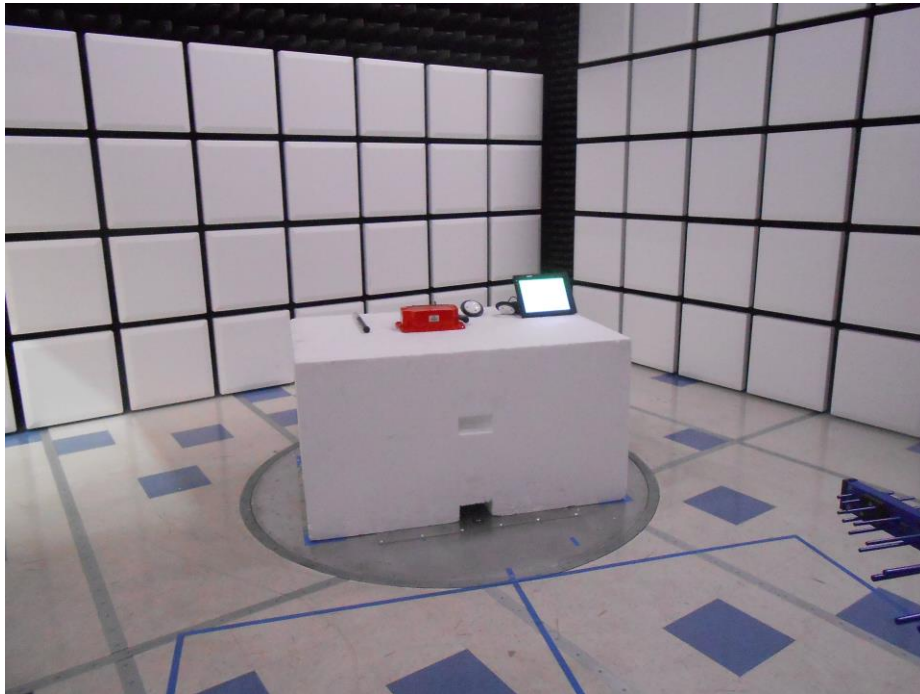


1 – 18 GHz



Emissions were investigated up to 25 GHz but only noise floor was observed

Radiated Emissions Test Setup Photos



Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	ARA	DRG-118/A	i00271	6/16/16	6/16/18
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	5/26/16	5/26/17
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	10/19/15	10/19/17
EMI Analyzer	Agilent	E7405A	i00379	2/11/16	2/11/17
*3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	7/27/14	7/27/16
Preamplifier for 1-18GHz horn antenna	Miteq	AFS44 00101 400 23-10P-44	i00509	N/A	N/A

*Note: Equipment is under a 30 day calibration extension per Lab Manager

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT