Report on the FCC and IC Testing of the Wireless Measurement Ltd, Mercury Ethernet Gateway. In accordance with FCC 47 CFR Part 15B and Industry Canada RSS-GEN

Product Service

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Prepared for: Wireless Measurement Ltd
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FCC ID: 2AKX6-E01
IC : 22384-E01

COMMERCIAL-IN-CONFIDENCE

Date: January 2018
Document Number: 75941209-01 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Steven White	19 January 2018	
Authorised Signatory	Kim Archer	19 January 2018	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	19 January 2018	

FCC Accreditation	Industry Canada Accreditation
90987 Octagon House, Fareham Test Laboratory	IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2016 and Industry Canada RSS-GEN: Issue 4, November 2014 for the tests detailed in section 1.3.

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Product Service

Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	19 January 2018

Table 1

1.2 Introduction

Applicant	Wireless Measurement Ltd
Manufacturer	Wireless Measurement Ltd
Model Number(s)	WSG-ETHI-G4-SMA
Serial Number(s)	39145
Hardware Version(s)	1.0
Software Version(s)	Not defined
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2016 Industry Canada RSS-GEN: Issue 4, November 2014
Order Number Date	171205 14-December-2017
Date of Receipt of EUT	19-December-2017
Start of Test	01-January-2018
Finish of Test	01-January-2018
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.4 (2014)

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15B	RSS-GEN			
Configuration and Mode: Idle Mode					
2.1	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4

Table 2

1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	MERCURY ETHERNET GATEWAY
Part Number	WSG-ETHI-G4-SMA
Hardware Version	1.0
Software Version	
FCC ID (if applicable)	2AKX6
Industry Canada ID (if applicable)	22384
Technical Description (Please provide a brief description of the intended use of the equipment)	2.4GHz to Ethernet transceiver

INTENTIONAL RADIATORS									
Technology	Frequency Band (MHz)	Conducted Declared Output Power (dBm)	Antenna Gain (dBi)	Supported Bandwidth (s) (MHz)	Modulation Scheme(s)	ITU Emission Designator	Test Channels (MHz)		
							Bottom	Middle	Top
802.15.4	2400	<8dBm	4.9	2	O-QPSK	2M00 GIDBN	2405	2440	2475

UN-INTENTIONAL RADIATOR	
Highest frequency generated or used in the device or on which the device operates or tunes	2475

Power Source			
AC	Single Phase	Three Phase	Nominal Voltage
External DC	Nominal Voltage	Maximum Current	
	5	<250mA	
Battery	Nominal Voltage	Battery Operating End Point Voltage	
Can EUT transmit whilst being charged?		Yes ☐ No ☐	

EXTREME CONDITIONS					
Maximum temperature	60	°C	Minimum temperature	-30	°C

Ancillaries
Please list all ancillaries which will be used with the device.
PULSE W1038 ANTENNA

ANTENNA CHARACTERISTICS					
☒	Antenna connector		State impedance	50	Ohm
☐	Temporary antenna connector		State impedance		Ohm
☐	Integral antenna	Type			
☒	External antenna	Type	PULSE W1038 1/4W		

I hereby declare that the information supplied is correct and complete.

Name: MIKE MILLEN
Position held: ENGINEER Date: 14 DEC 2017

1.5 Product Information

1.5.1 Technical Description

The device is an Ethernet Gateway, which facilitates the connection of wireless measurement sensors operating at 2.4GHz to the internet.

1.5.2 Configuration of EUT during testing

Rx/Idle Mode:

The device was powered from an external battery source (5VDC), with the transmitter configured in receive mode. The ethernet connector on the device was terminated into a laptop via a screened cable.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: 39145			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Rx/Idle Mode		
Radiated Emissions	Graeme Lawler	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Radiated Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
Industry Canada RSS-GEN, Clause 7.

2.1.2 Equipment Under Test and Modification State

Mercury Ethernet Gateway, S/N: 39145 - Modification State 0

2.1.3 Date of Test

01-January-2018

2.1.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 8.

2.1.5 Environmental Conditions

Ambient Temperature	12.7 °C
Relative Humidity	46.0 %

2.1.6 Test Results

Rx/Idle Mode

Highest frequency generated or used within the EUT: 2475 MHz
Upper frequency test limit: 13 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
31.841	19.0	39.1	-20.1	117	1.00	Horizontal
34.311	18.0	39.1	-21.1	212	1.50	Horizontal
59.987	22.7	39.1	-16.4	12	1.00	Vertical
170.186	27.4	43.5	-16.1	80	1.60	Horizontal
171.122	25.3	43.5	-18.2	158	1.00	Vertical
960.000	23.3	46.4	-23.1	306	3.39	Vertical

Table 5 - 30 MHz to 1 GHz

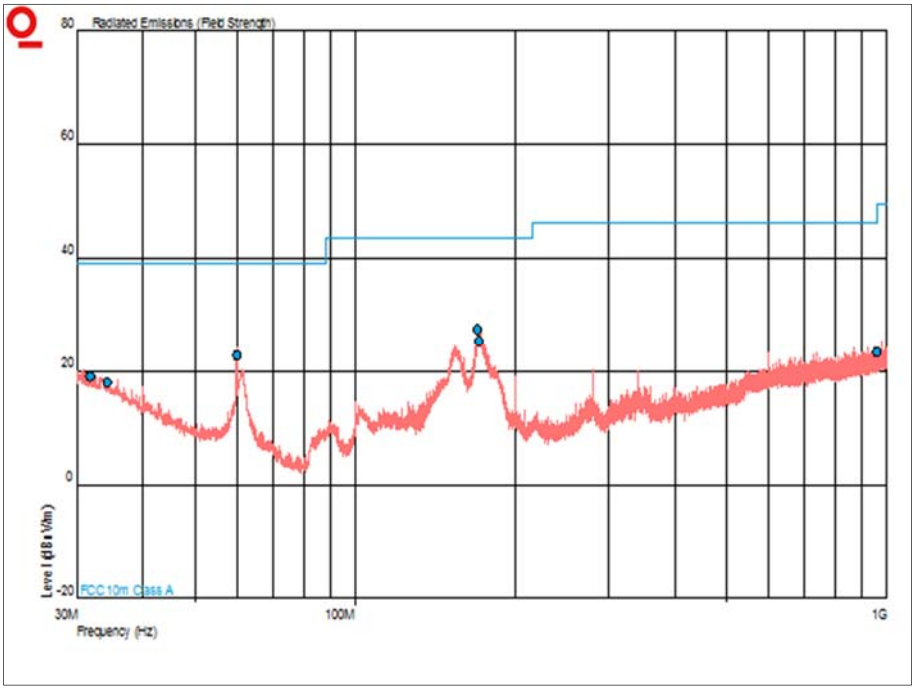

Figure 1 - 30 MHz to 1 GHz - Horizontal and Vertical

Frequency (GHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)	
	Peak	Average	Peak	Average	Peak	Average
*						

Table 6 - 1 GHz to 13 GHz

No emissions were detected within 10 dB of the limit.

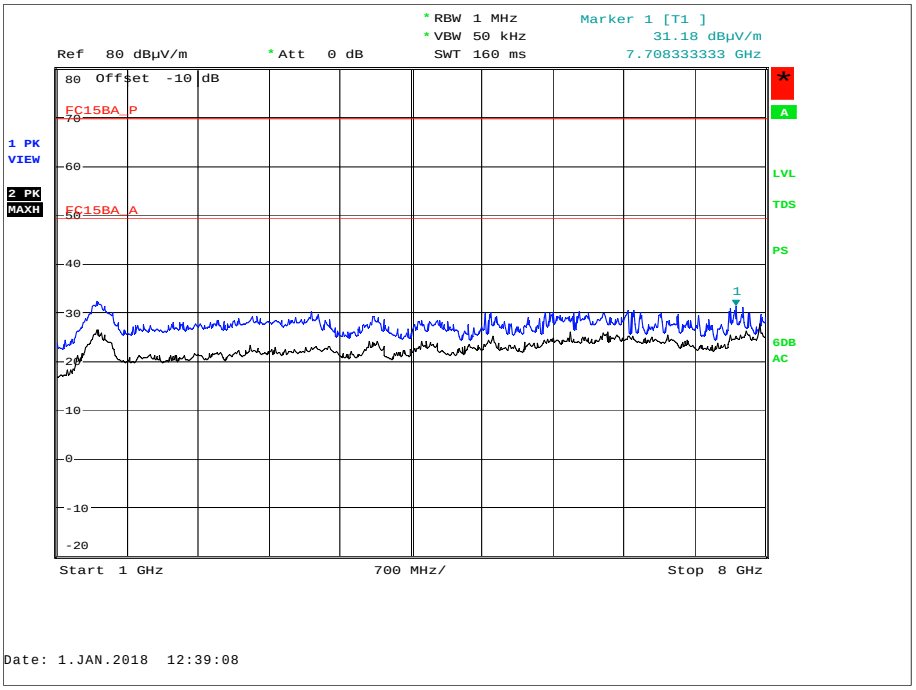

Figure 2 - 1 GHz to 8 GHz - Horizontal and Vertical

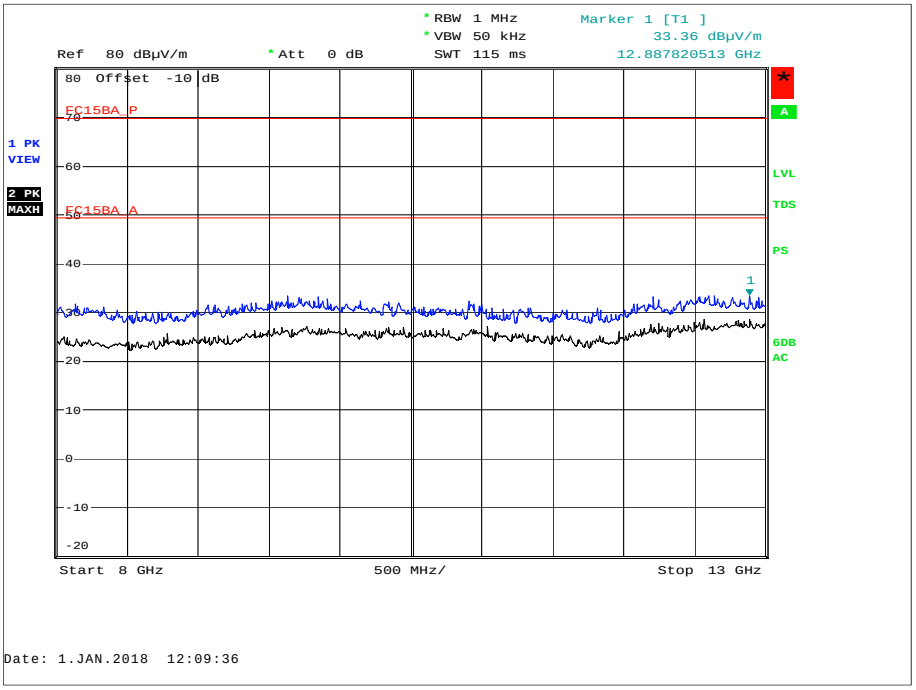

Figure 3 - 8 GHz to 13 GHz - Horizontal and Vertical

FCC 47 CFR Part 15, Limit Clause 15.109 and RSS-GEN, Limit Clause 7.1.2

Frequency of Emission (MHz)	Field Strength (µV/m)
30 to 88	100.0
88 to 216	150.0
216 to 960	200.0
Above 960	500.0

2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Pre-Amplifier	Phase One	PS04-0086	1533	12	31-Jul-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Jan-2018
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Comb Generator	Schaffner	RSG1000	3034	-	TU
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	18-Oct-2018
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	04-May-2018
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	22-May-2018
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	17-Feb-2018

Table 7

TU - Traceability Unscheduled

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Radiated Emissions	30 MHz to 1 GHz: ±5.2 dB 1 GHz to 40 GHz: ±6.3 dB

Table 8