Report On

FCC and Industry Canada Testing of the
MiX Telematics Magix Pico Base Station
In accordance with FCC 47 CFR Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: 2AFMS-PBS9
IC: 20545-PBS9

Document 75932793 Report 03 Issue 2 **January 2016**

Product Service

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PREPARED FOR

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Cape Town
South Africa

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APPROVED BY

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Authorised Signatory

DATED 19 January 2016

This report has been up-issued to Issue 2 to correct the manufacturer's name.

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 ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

UKAS TESTING 0141

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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
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1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the MiX Telematics Magix Pico Base Station to the requirements of FCC 47 CFR Part 15B and ICES-003.

Objective	To perform Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	MiX Telematics
Model Number(s)	Magix Pico Base Station
Serial Number(s)	0964TE000051
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B (2014) ICES-003 (2012)
Incoming Release Date	Declaration of Build Status 10 December 2015
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	P0084401 25 November 2015
Start of Test	8 December 2015
Finish of Test	8 December 2015
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2014)

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1.2 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	ICES-003			
Idle					
2.1	15.109	6.2	Radiated Emissions	Pass	

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1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	Magix Pico Base Station		
MANUFACTURER	MiX Telematics International (PTY) Ltd		
TYPE	Type 9		
PART NUMBER	440FT0964		
SERIAL NUMBER	094TE000052, 094TE000054		
HARDWARE VERSION	Build State V4 (PCB 440AWZ950-V2A – BOM 440PLZ950-V6B)		
SOFTWARE VERSION	V1-12		
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	902MHz to 928MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	902MHz to 928MHz		
COUNTRY OF ORIGIN	South Africa		
INTERMEDIATE FREQUENCIES	None		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	44K0F1D		
MODULATION TYPES: (i.e. GMSK, QPSK)	FSK		
HIGHEST INTERNALLY GENERATED FREQUENCY	928MHz		
OUTPUT POWER (W or dBm)	+20dBm		
FCC ID	2AFMS-PBS9		
INDUSTRY CANADA ID	20545-PBS9		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The Pico Base Station (PBS) is required as part of the Magix Asset Positioning System (MAPS) solution for the US market and has been designed to enable an FM OBC to act as a Base Station for the MAPS network providing two way communication with the GPS enabled Beame mobile devices.		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
VOLTAGE			
COUNTRY OF ORIGIN			
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
COUNTRY OF ORIGIN			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

Signature

Date: 10th December 2015

Declaration of Build Status Serial Number

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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a MiX Telematics Magix Pico Base Station. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 12 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

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SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
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2.1 RADIATED EMISSIONS

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
ICES-003, Clause 6.2

2.1.2 Equipment Under Test and Modification State

Magix Pico Base Station S/N: 0964TE000051 - Modification State 0

2.1.3 Date of Test

8 December 2015

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The test was performed in accordance with ANSI C63.4, Clause 8 and ICES-003, Clause 6.2.

Remarks

When frequencies greater than 18 GHz were measured the EUT was positioned 1 m above the horizontal reference ground plane.

All final measurements were assessed against the Class B emission limits in FCC 47 CFR Part 15, Clause 15.109 and ICES-003, Clause 6.2.

2.1.6 Environmental Conditions

Ambient Temperature	19.7°C
Relative Humidity	46.0%

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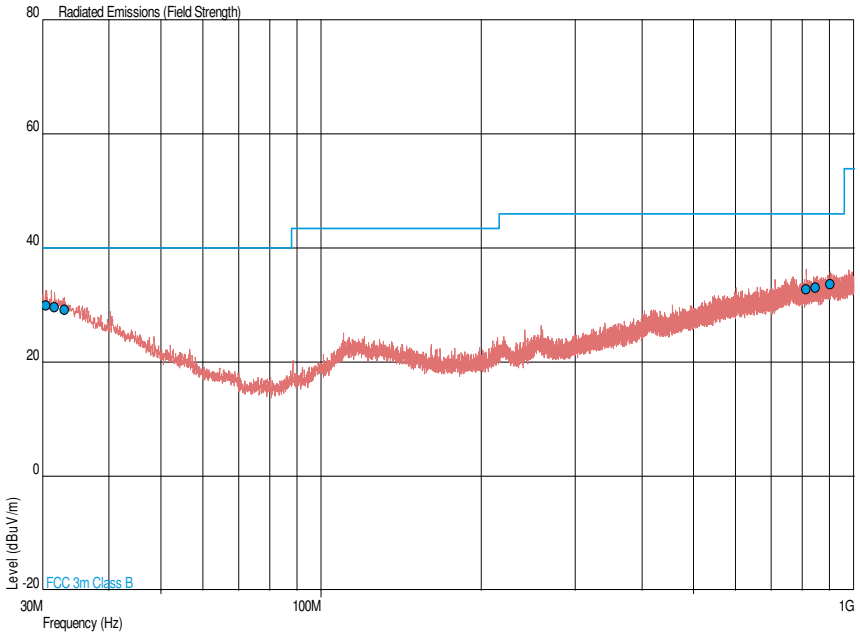
2.1.7 Test Results

Idle, 30 MHz to 1 GHz Results

Frequency (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Level (µV/m)	Quasi-Peak Margin (dµV/m)	Quasi-Peak Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.437	29.9	31.3	-10.1	-68.7	180	1.00	Horizontal
31.649	29.6	30.2	-10.4	-69.8	0	1.00	Horizontal
33.011	29.2	28.8	-10.8	-71.2	0	1.00	Horizontal
812.742	32.8	43.7	-13.2	-156.3	180	1.00	Vertical
848.195	33.1	45.2	-12.9	-154.8	0	1.00	Horizontal
902.661	33.6	47.9	-12.4	-152.1	0	1.00	Horizontal

Idle, 30 MHz to 1 GHz Plot

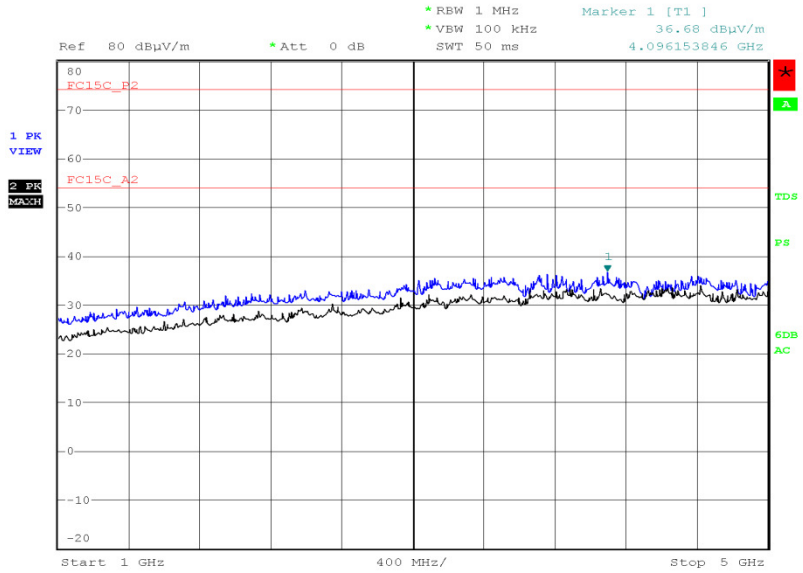


Idle, 1 GHz to 5 GHz Results

Frequency (MHz)	Average Level (dBµV/m)	Peak Level (dBµV/m)	Average Level (µV/m)	Peak Level (µV/m)	Angle (deg)	Height (m)	Polarisation
*							

*No emissions were detected within 10 dB of the limit.

Idle, 1 GHz to 5 GHz Plot



Date: 7.DEC.2015 21:43:33

FCC 47 CFR Part 15, Limit Clause 15.109

Class B

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

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ICES-003, Limit Clause 6.2

Class B

Frequency of Emission (MHz)	Quasi-Peak (dBµV/m)
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 to 1000	54.0

Frequency of Emission (MHz)	Field Strength (dBµV/m)	
	Linear Average Detector	Peak Detector
Above 1000	54.0	74.0

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SECTION 3

TEST EQUIPMENT USED

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3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
DC Power Supply	Hewlett Packard	6269B	742	-	TU
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Multimeter	Fluke	177	3833	12	16-Jun-2016
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	6-Oct-2016
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
0.5m SMA Cable (Rx)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	19-Feb-2016

TU – Traceability Unscheduled

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3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB

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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).