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Report On

FCC and Industry Canada Testing of the
Zeni Lite Buoy Co,Ltd.
Akari-3s (Type 3 AtoN With sensor)
In accordance with FCC CFR 47 Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: 2AB5X-4180026
IC: Not supplied

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July 2014



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PREPARED FOR

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Ikeda City
Osaka
563-0035
Japan

MANUFACTURER

Natalie Bennett
Senior Administrator, Technical Solutions

APPROVED BY

Matthew Russell
Authorised Signatory

DATED

31 July 2014

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 CFR 47 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



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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Zeni Lite Buoy Co,Ltd.
Akari-3s (Type 3 AtoN With sensor)
In accordance with FCC CFR 47 Part 15B and ICES-003



1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the Zeni Lite Buoy Co,Ltd. Akari-3s (Type 3 AtoN With sensor) to the requirements of FCC CFR 47 Part 15B and ICES-003.

Objective	To perform FCC and 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	Zeni Lite Buoy Co,Ltd.
Model Number(s)	Akari-3s (Type 3 AtoN With sensor)
Manufacturer Declared Variants	Akari-1s (Type 1 AtoN With sensor) Akari-1 (Type 1 AtoN) Akari-3 (Type 3 AtoN)
Serial Number(s)	Test Sample: 002
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2013) ICES-003 (2012)
Incoming Release Date	Application Form 10 June 2014
Disposal Reference Number	Held Pending Disposal
Date	Not Applicable
Order Number	Not Applicable
Date	
Start of Test	30 June 2014
Finish of Test	30 June 2014
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2003)

This report has been up issued to Issue 2 and should be read in place of Issue 1. This report has been up issued to change the model numbers of the products as requested by the customer.



1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	FCC	IC			
Idle					
2.1	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4 (2003)



1.3 APPLICATION FORM

APPLICATION FORM FOR TESTING TO FCC/INDUSTRY CANADA REQUIREMENTS

APPLICANT'S DETAILS			
COMPANY NAME : Zeni Lite Buoy Co,Ltd. ADDRESS :2-176-1, Toyoshima-Minami, Ikeda City, Osaka, 563-0035 Japan NAME FOR CONTACT PURPOSES : Shuzo Kawashita TELEPHONE NO: ...+81-72-761-1313 FAX NO: N/A E-MAIL: s-kawashita@zenilite.co.jp			
EQUIPMENT INFORMATION			
Model name/number	Akari-1s /Akari-1 /Akari-3s /Akari-3		
Hardware Version	v1		
Sensor:-	80400.02.04.xx		
Manufacturer	Zenilite Buoy Co Ltd.	Country of Origin	Hungary
FCC ID	2AB5X-4180026.	Industry Canada ID	N/A.
Technical description (a brief description of the intended use and operation) AIS AtoN, Maritime Navigation			
<u>Supply Voltage:</u> [<input checked="" type="checkbox"/>] AC mains State AC voltage V and AC frequency Hz [<input type="checkbox"/>] DC (external) State DC voltage 12/24 V and DC current 2.5 peak [<input type="checkbox"/>] DC (internal) State DC voltage V and Battery type			
<u>Frequency characteristics:</u> Transmitter Frequency range 156.025. MHz to 162.025. MHz Channel spacing25kHz (if channelized) Receiver Frequency range MHz to MHz Channel spacing (if different)			
Designated test frequencies: Bottom: ...156.025 MHz Middle:159.025... MHz Top:162.025 MHz Intermediate Frequencies : 19.655 and 29.255 MHz Highest Internally Generated Frequency : 191.28 MHz			
<u>Power characteristics:</u> Maximum transmitter power12.5..... W Minimum transmitter power W (if variable) [<input type="checkbox"/>] Continuous transmission [<input type="checkbox"/>] Intermittent transmission State duty cycle<1% If intermittent, can transmitter be set to continuous transmit test mode? Y/N (Low power only)			
<u>Antenna characteristics:</u> [<input checked="" type="checkbox"/>] Antenna connector State impedance50... ohm [<input type="checkbox"/>] Temporary antenna connector State impedance ohm [<input type="checkbox"/>] Integral antenna Type State gain dBi [<input checked="" type="checkbox"/>] External Antenna Type Quarter wave vertical.... State gain dBi			
<u>Modulation characteristics:</u> [<input type="checkbox"/>] Amplitude [<input checked="" type="checkbox"/>] Other [<input type="checkbox"/>] Frequency Details: ...GMSK..... [<input type="checkbox"/>] Phase (GMSK, QSPK etc) Can the transmitter operate un-modulated? Y/N (In test mode only)			
<u>Battery/Power Supply</u> Model name/number N/A..... Identification/Part number Manufacturer Country of Origin			
<u>Ancillaries (if applicable)</u> Model name/number N/A..... Identification/Part number Manufacturer Country of Origin			
<u>Extreme conditions:</u> Maximum temperature +70°C Minimum temperature -25 °C Maximum supply voltage 31.2 V Minimum supply voltage 9.6V			



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I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

A handwritten signature in black ink, appearing to read "Richard McMahon".

Signature :

Name : Richard McMahon Engineer
Position held : Certification Engineer
Date : 31/07/14



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Zeni Lite Buoy Co,Ltd. Akari-3s (Type 3 AtoN With sensor). 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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In accordance with FCC CFR 47 Part 15B and ICES-003



2.1 RADIATED EMISSIONS

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

Akari S/N: Test Sample: 002 - Modification State 0

2.1.3 Date of Test

30 June 2014

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

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane.

The horizontal reference ground plane encompasses a turntable which is used to adjust the azimuth of the EUT. An antenna positioner is used to elevate the measuring antenna above the horizontal reference ground plane whereby the antenna elevation is adjustable between 1 m and 4 m.

Exploratory radiated emissions measurements were made by azimuth emissions searches over a range of 0° and 360°. These exploratory radiated emissions measurements were made using a peak detector over a frequency range of 30 MHz to 2 GHz, with the measuring antenna in both vertical and horizontal polarizations.

At least six of the greatest peak emissions, frequency positions were selected from the exploratory radiated emissions measurements for further evaluation as final measuring points.

To ascertain the azimuth and measuring antenna polarization that yields the highest peak emission level, each final measurement frequency was investigated by continuous azimuth emissions searching with the measuring antenna in both vertical and horizontal polarizations. For each final measurement frequency, the respective peak emission azimuth and measuring antenna polarization was used during a measuring antenna elevation search from 1 m to 4 m. Each final measurement frequency was then measured with the EUT azimuth, measuring antenna height and polarization that yielded the greatest peak emission level.

Final measurement points over the frequency range of 30 MHz to 1 GHz were measured using a quasi-peak detector. Final measurement points over the frequency range of 1 GHz and 2 GHz were measured using peak and average methods. Peak measurements were made using a peak detector with 1 MHz resolution and video bandwidths. Average measurements were made using a resolution bandwidth of 1 MHz and a video bandwidth of 5 kHz.



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All final measurements were assessed against the Class B emission limits in Clause 15.109 of FCC CFR 47 FCC Part 15B.

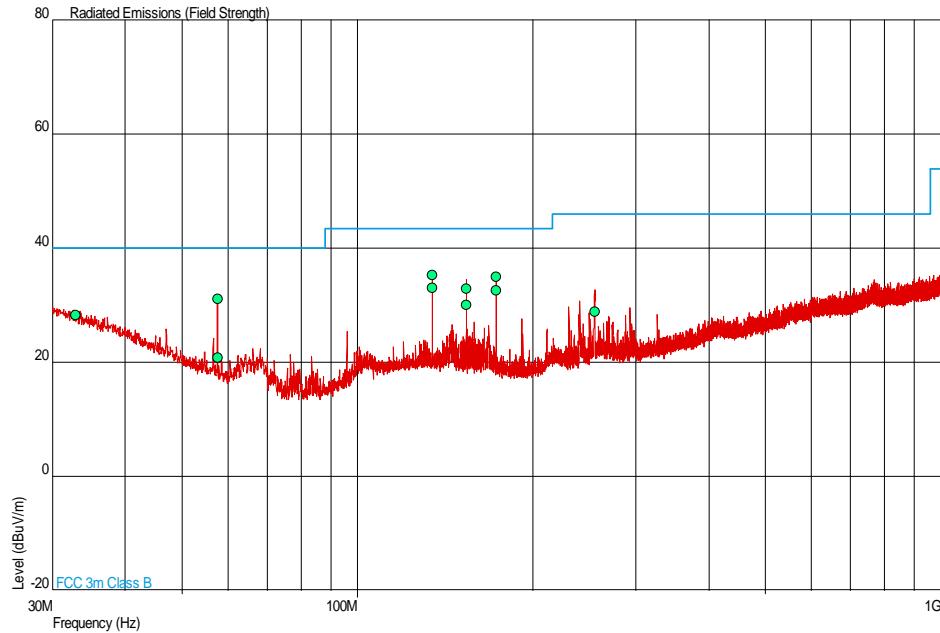
2.1.6 Environmental Conditions

Ambient Temperature 20.0°C
Relative Humidity 47.0%



2.1.7 Test Results

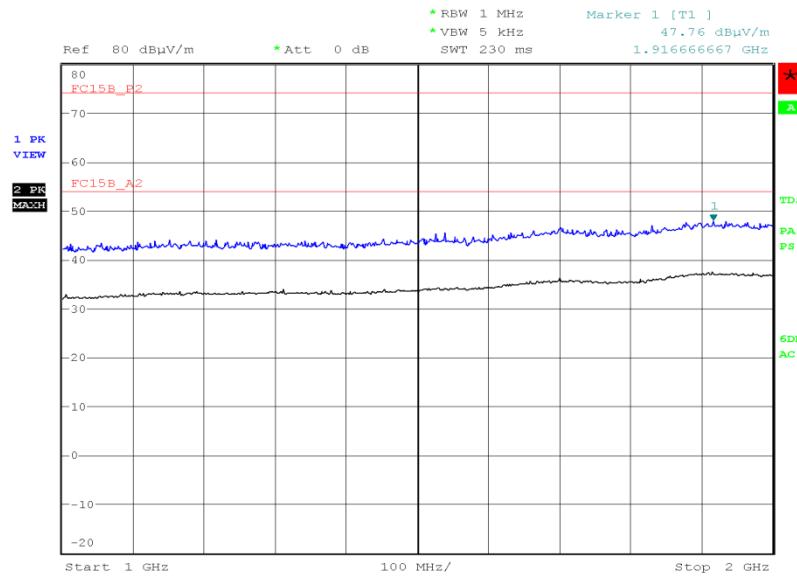
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
32.909	28.3	26.0	40.0	100	-11.7	-74.0	355	1.00	Vertical
57.600	31.1	35.9	40.0	100	-8.9	-64.1	43	1.00	Vertical
57.604	20.9	11.1	40.0	100	-19.1	-88.9	318	3.99	Horizontal
134.406	33.0	44.7	43.5	150	-10.5	-105.3	89	1.00	Vertical
134.407	35.3	58.2	43.5	150	-8.2	-91.8	72	3.42	Horizontal
153.588	33.0	44.7	43.5	150	-10.5	-105.3	360	1.00	Vertical
153.596	30.0	31.6	43.5	150	-13.5	-118.4	107	1.57	Horizontal
172.783	32.7	43.2	43.5	150	-10.8	-106.8	19	2.71	Horizontal
172.798	35.0	56.2	43.5	150	-8.5	-93.8	225	1.00	Vertical
255.045	28.8	27.5	46.0	200	-17.2	-172.5	312	1.00	Vertical



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1 GHz to 2 GHz

Date: 30.JUN.2014 21:24:40

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



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SECTION 3

TEST EQUIPMENT USED



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					
Termination 50ohm/50W	Bird	8085	389	12	20-Jun-2015
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU

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	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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).

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