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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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COMMERCIAL-IN-CONFIDENCE

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**DATED**

31 July 2014

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**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)<br>Akari-1 (Type 1 AtoN)<br>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)<br>ICES-003 (2012)                                                                                                                           |
| Incoming Release Date          | Application Form<br>10 June 2014                                                                                                                                        |
| Disposal Reference Number Date | Held Pending Disposal<br>Not Applicable<br>Not Applicable                                                                                                               |
| Order Number Date              | POR004675<br>02 June 2014                                                                                                                                               |
| 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.**



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## 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.<br>ADDRESS : 2-176-1, Toyoshima-Minami, Ikeda City, Osaka, 563-0035 Japan<br>NAME FOR CONTACT PURPOSES : Shuzo Kawashita<br>TELEPHONE NO: ...+81-72-761-1313<br>FAX NO: N/A<br>E-MAIL: s-kawashita@zenilite.co.jp |  |  |  |

| EQUIPMENT INFORMATION                                                                          |                                                 |                                         |                               |
|------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------|-------------------------------|
| Model name/number                                                                              | Akari-1s /Akari-1 /Akari-3s /Akari-3            | Identification/Part number              | AtoN: <b>-080200.03.03.xx</b> |
| Hardware Version                                                                               | v1                                              | Software Version:                       |                               |
| Sensor:- <b>80400.02.04.xx</b>                                                                 |                                                 |                                         |                               |
| Manufacturer                                                                                   | Zenilite Buoy Co Ltd.                           | Country of Origin                       | Hungary                       |
| FCC ID                                                                                         | <b>2AB5X-4180026.</b>                           | Industry Canada ID                      | N/A.                          |
| Technical description (a brief description of the intended use and operation)                  |                                                 |                                         |                               |
| AIS AtoN, Maritime Navigation                                                                  |                                                 |                                         |                               |
| <u>Supply Voltage:</u>                                                                         |                                                 |                                         |                               |
| [   ]                                                                                          | AC mains                                        | State AC voltage ..... V                | and AC frequency ..... Hz     |
| [ x ]                                                                                          | DC (external)                                   | State DC voltage 12/24 V                | and DC current 2.5 peak       |
| [   ]                                                                                          | DC (internal)                                   | State DC voltage ..... V                | and Battery type .....        |
| <u>Frequency characteristics:</u>                                                              |                                                 |                                         |                               |
| Transmitter Frequency range                                                                    | 156.025. MHz to 162.025. MHz                    | Channel spacing ..... 25kHz             | (if channelized)              |
| Receiver Frequency range (if different)                                                        | ..... MHz to ..... MHz                          | Channel spacing .....                   | (if channelized)              |
| 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 power                                                                      | ...12.5..... W                                  | Minimum transmitter power (if variable) | ..... W                       |
| [   ]                                                                                          | Continuous transmission                         |                                         |                               |
| [   ]                                                                                          | 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>                                                                |                                                 |                                         |                               |
| [ X ]                                                                                          | Antenna connector                               | State impedance .....50... ohm          |                               |
| [   ]                                                                                          | Temporary antenna connector                     | State impedance ..... ohm               |                               |
| [   ]                                                                                          | Integral antenna Type .....                     | State gain ..... dBi                    |                               |
| [ X ]                                                                                          | External Antenna Type Quarter wave vertical.... | State gain .....3..... dBi              |                               |
| <u>Modulation characteristics:</u>                                                             |                                                 |                                         |                               |
| [   ]                                                                                          | Amplitude                                       | [ x ]                                   | Other                         |
| [   ]                                                                                          | Frequency                                       | Details: ...GMSK.....                   |                               |
| [   ]                                                                                          | Phase                                           | (GMSK, QSPK etc)                        |                               |
| Can the transmitter operate un-modulated?                                                      |                                                 | Y/N (In test mode only)                 |                               |
| ITU Class of emission: 16K0GXW                                                                 |                                                 |                                         |                               |
| <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, consisting of a large, stylized 'S' followed by a horizontal line.

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



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## **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.

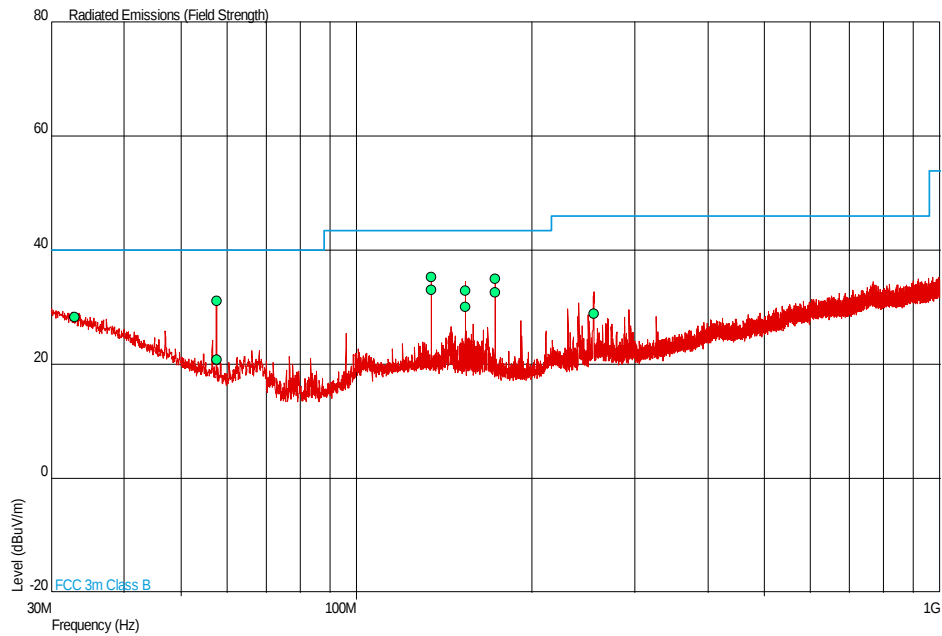
#### **2.1.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 20.0°C |
| Relative Humidity   | 47.0%  |



## 2.1.7 Test Results

### 30 MHz to 1 GHz

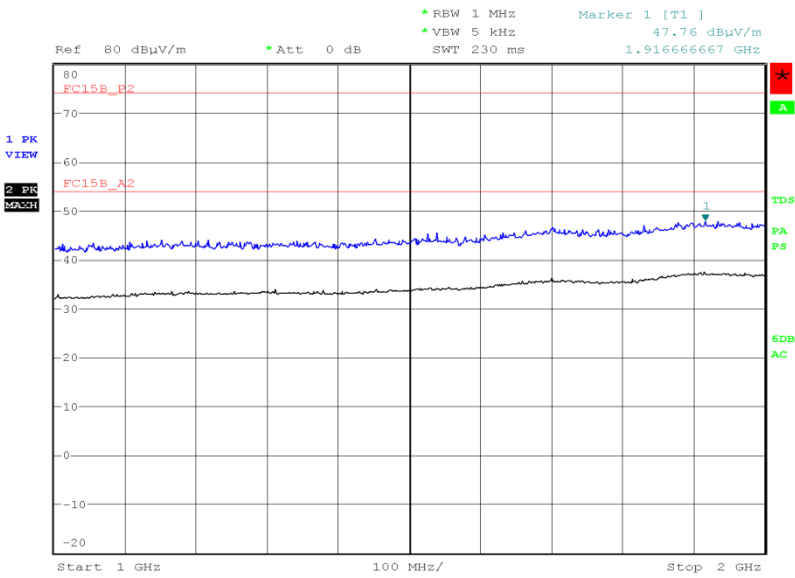


| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 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**



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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 |
|-----------------------------------------|-----------------|-------------------|--------|-----------------------------|-----------------|
| <b>Section 2.1 - Radiated Emissions</b> |                 |                   |        |                             |                 |
| 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: $\pm 5.1$ dB<br>1GHz to 40GHz: $\pm 6.3$ 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  
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