



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8) Date : 12 Mar 2019

Application No. : LW039613(0)

Applicant : Yacht Sentinel Ltd
Unit 216, Yacht Sentinel 222 Kensal Road,
London, UK.
W10 5BN

Sample Description : One(1) item of submitted sample stated to be:

| Sample Description | Model No. |
|-------------------------------|-----------|
| High water sensor transmitter | HW001 |

Radio Frequency : 916MHz

Rating : 2 x 1.5V AAA size batteries

No. of submitted sample : One (1) set (s)

Sample registration No. : RY047476-001(7)

Date Received : 19 Feb 2019.

Test Period : 20 Feb 2019 to 12 Mar 2019

Test Requested : FCC 47CFR Part 15 Certification

Test Method : 47 CFR Part 15 (10-1-17 Edition)
ANSI C63.10 – 2013
ANSI C63.4 – 2014

Test Result : See attached sheet(s) from page 2 to 15.

Conclusion : The submitted sample was found to comply with requirement of FCC 47 CFR Part 15 Subpart C, section 15.249.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lip-ping, Andrew
Manager
Electrical Division

Page 1 of 15

FCC ID: 2AR6YHW001

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CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

Table of Contents

| | | |
|-----|---|----|
| 1 | General Information | 3 |
| 1.1 | General Description | 3 |
| 1.2 | Location of the test site | 4 |
| 1.3 | List of measuring equipment..... | 5 |
| 1.4 | Supporting Equipment | 5 |
| 1.5 | Measurement Uncertainty | 6 |
| 1.6 | Test Summary | 6 |
| 2 | Description of the radiated emission test | 7 |
| 2.1 | Test Procedure | 7 |
| 2.2 | Test Setup | 8 |
| 2.3 | Test Result | 10 |
| 3 | Description of the Line-conducted Test | 12 |
| 3.1 | Test Procedure | 12 |
| 3.2 | Test Result | 12 |
| 3.3 | Test Setup | 12 |
| 4 | Supplementary document..... | 13 |
| 4.1 | Bandwidth | 13 |
| 5 | Appendices | 14 |

FCC ID: 2AR6YHW001

Page 2 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

1 General Information

1.1 General Description

This transmitter connects to the base unit for difference detection on water flooding.

The device is powered by two 1.5V AAA battery and has a 916MHz transmitter for communication with boat system.

The 916MHz transmitter uses RF IC, SI1084 with external clock, 26MHz to generate a FSK modulation signal for communication by an integral coil antenna, 0.0dBi.

Page 3 of 15

FCC ID: 2AR6YHW001



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2014. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2014. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
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FCC Accreditation Lab (Designation Number: HK0004)

FCC ID: 2AR6YHW001

Page 4 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

1.3 List of measuring equipment

| Equipment | Manufacturer | Model No. | Serial No. | Calibration Due Date | Calibration Period |
|-------------------------|-----------------|--------------|--------------|----------------------|--------------------|
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | 100001 | 21 Mar 2019 | 1 Year |
| Spectrum Analyzer | Rohde & Schwarz | FSV40 | 100964 | 11 Sep 2019 | 1 Year |
| Loop Antenna | EMCO | 6502 | 00056620 | 29 Oct 2020 | 2 Years |
| Biconical Antenna | Rohde & Schwarz | HK116 | 837414/004 | 09 Oct 2020 | 2 Years |
| Log Periodic Antenna | Teseq | UPA6109 | 43666 | 27 Jul 2020 | 2 Years |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 9120D-531 | 21 Dec 2019 | 2 Years |
| Broadband Pre-Amplifier | Schwarzbeck | BBV 9718 | 9718-119 | 21 Dec 2019 | 2 Years |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA917 0442 | 01 Aug 2020 | 2 Years |
| Broadband Pre-Amplifier | Schwarzbeck | BBV 9719 | 9719-010 | 01 Aug 2020 | 2 Years |
| Coaxial Cable | Schaffner | RG 213/U | N/A | 17 May 2019 | 1 Year |
| Coaxial Cable | Suhner | RG 214/U | N/A | 17 May 2019 | 1 Year |
| Coaxial Cable | Suhner | Sucoflex_104 | N/A | 22 Jan 2020 | 1 Year |

1.4 Supporting Equipment

NIL

FCC ID: 2AR6YHW001

Page 5 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

1.5 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

Radiated emissions

| Frequency | Uncertainty (U_{lab}) |
|------------------------------|---------------------------|
| 30MHz ~ 200MHz (Horizontal) | 4.59dB |
| 30MHz ~ 200MHz (Vertical) | 4.49dB |
| 200MHz ~1000MHz (Horizontal) | 4.94dB |
| 200MHz ~1000MHz (Vertical) | 4.97dB |
| 1GHz ~ 6GHz | 4.52dB |
| 6GHz ~ 18GHz | 4.58dB |

1.6 Test Summary

| TEST ITEM | FCC REFERENCE | RESULT |
|-----------------------------------|---------------|--------|
| Fundamental and harmonic emission | 15.249(a) | Comply |
| Out-band emission | 15.249(d) | Comply |
| Peak Limit | 15.249(e) | Comply |
| Bandwidth | 15.215(c) | Comply |

FCC ID: 2AR6YHW001

Page 6 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

A non-conductive turntable with dimensions of 1.5m x 0.4m x 0.8m (L x W x H) placed above the reference ground plane. The equipment under test (EUT) was placed at 0.8m height for below 1GHz measurement and 1.5m height for above 1GHz measurement. The test distance is 3m between EUT and receiving antenna. A broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated. Additional absorbing material will be placed between the EUT and receiving antenna for above 1GHz measurement.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

FCC ID: 2AR6YHW001

Page 7 of 15



CMA Testing and Certification Laboratories

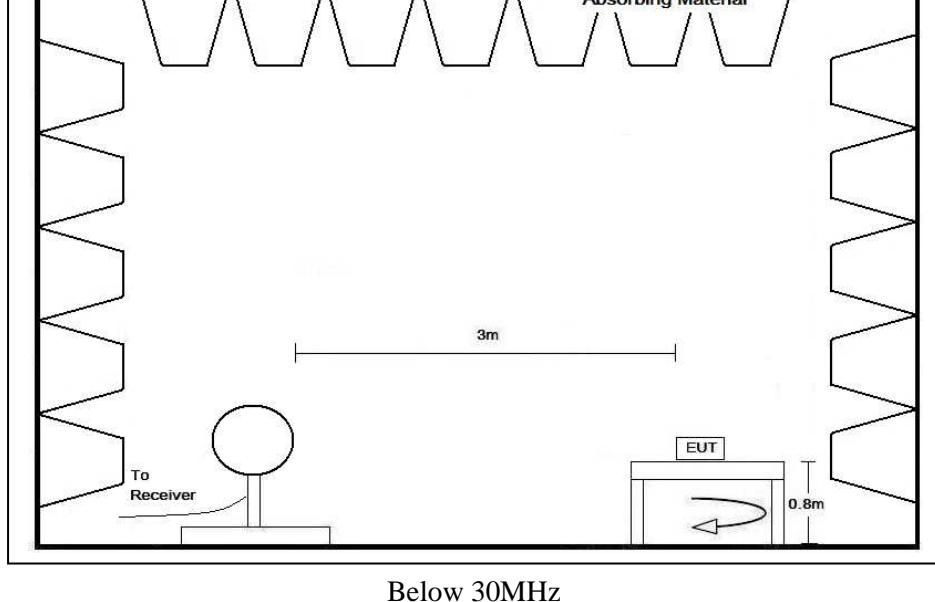
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TEST REPORT

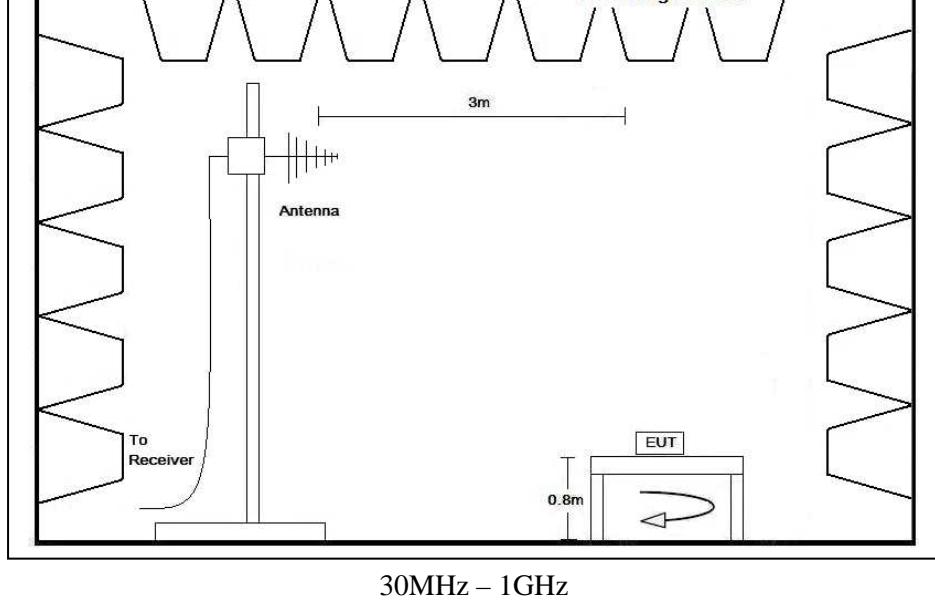
Report No. : AY0012763(8)

Date : 12 Mar 2019

2.2 Test Setup



Below 30MHz



30MHz - 1GHz

FCC ID: 2AR6YHW001

Page 8 of 15



CMA Testing and Certification Laboratories

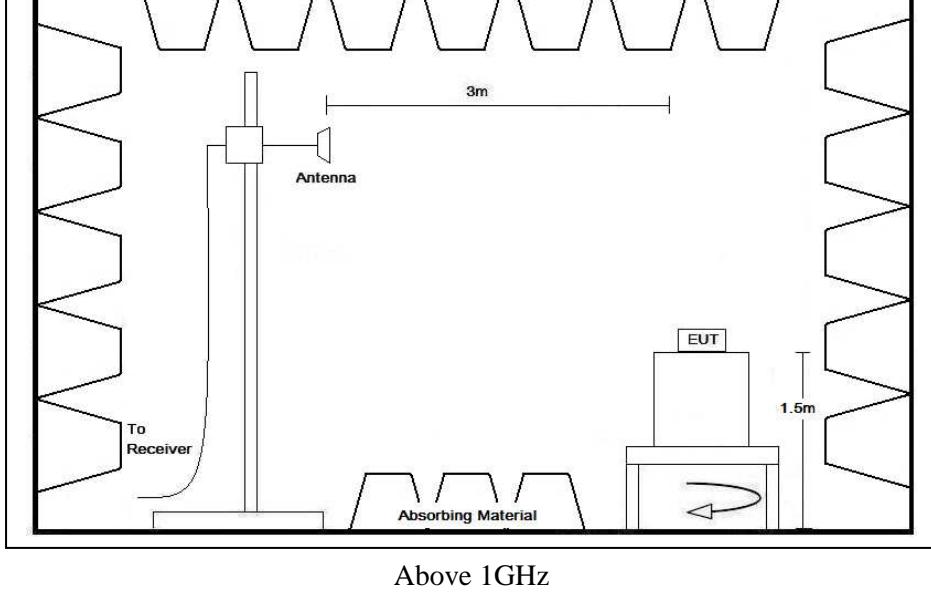
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TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

2.2 Test Setup



Above 1GHz

FCC ID: 2AR6YHW001

Page 9 of 15

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廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

2.3 Test Result

Peak Detector data was measured unless otherwise stated.

The radiated emissions are measured from 9kHz to 9GHz (the tenth harmonics)

The worst case configuration is shown on the worst case configuration of test setup photo.

The frequencies from fundamental up to tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next pages.

The EUT has been tested in Transmission mode.

It was found that the EUT meet the FCC requirement.

FCC ID: 2AR6YHW001

Page 10 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

| Parameter | Recorded value |
|----------------------|----------------|
| Ambient temperature: | 27.2 ° C |
| Relative humidity: | 58.1 % |

| Polarization | Frequency (MHz) | Reading at 3m (dB μ V) | Antenna Factor and Cable Loss (dB/m) | Field Strength at 3m (dB μ V/m) | Limit at 3m (dB μ V/m) | Margin (dB) | Detector Type |
|--------------|-----------------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|-------------|---------------|
| H | 915.909 | 50.0 | 28.7 | 78.7 | 94.0 | -15.3 | Peak |
| V | 915.975 | 49.9 | 28.7 | 78.6 | 94.0 | -15.4 | Peak |
| H | 1831.803 | 55.0 | -7.6 | 47.4 | 54.0 | -6.6 | Peak |
| V | 1831.963 | 56.0 | -7.6 | 48.4 | 54.0 | -5.6 | Peak |
| H | 2747.801 | 43.1 | -4.7 | 38.4 | 54.0 | -15.6 | Peak |
| V | 2747.824 | 47.5 | -4.7 | 42.8 | 54.0 | -11.2 | Peak |
| V | 3663.938 | 42.5 | -2.3 | 40.2 | 54.0 | -13.8 | Peak |
| V | 5495.669 | 40.8 | 3.2 | 44.0 | 54.0 | -10.0 | Peak |
| V | 6411.824 | 48.5 | 5.0 | 53.5 | 54.0 | -0.5 | Peak |
| V | 7327.334 | 38.3 | 9.6 | 47.9 | 54.0 | -6.1 | Peak |
| V | 8243.737 | 35.9 | 12.1 | 48.0 | 54.0 | -6.0 | Peak |

Remark: 1) If the peak values of emission are below the average limit, so no average measurement is performed and compare with average limit.

FCC ID: 2AR6YHW001

Page 11 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

3 Description of the Line-conducted Test

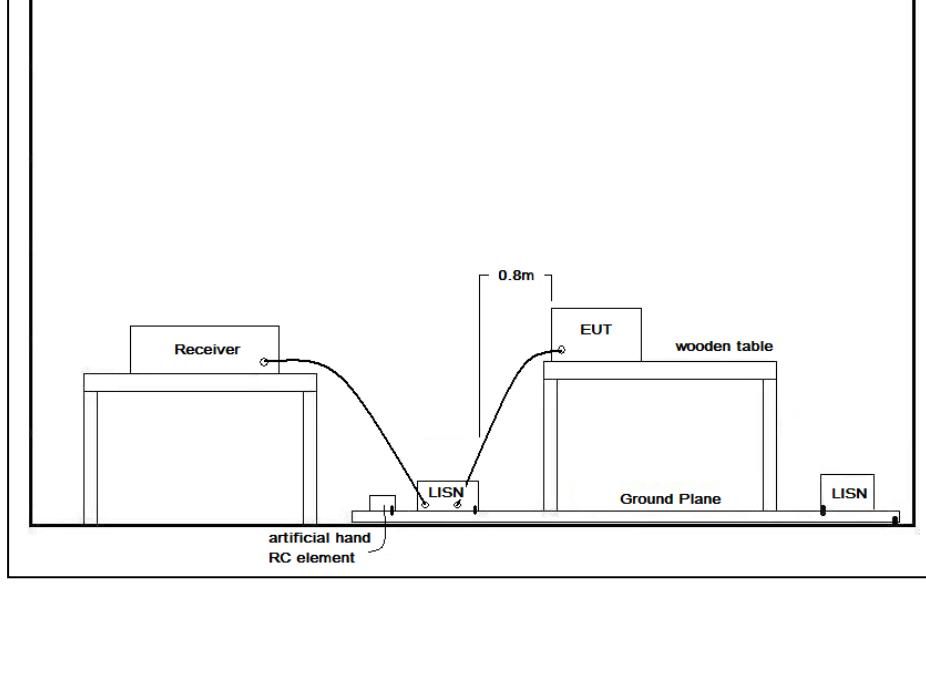
3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

Not applicable

3.3 Test Setup



FCC ID: 2AR6YHW001

Page 12 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

4 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

| Document | Filename |
|-------------------------|--------------------------------|
| ID Label/Location | Label Artwork and Location.pdf |
| Block Diagram | Block Diagram.pdf |
| Schematic Diagram | Schematic.pdf |
| Users Manual | User Manual.pdf |
| Operational Description | Operation Description.pdf |

4.1 Bandwidth

Appendices A1 show the fundamental emission is confined in the specified band. 20dB bandwidth is 123.38kHz which fall in the band of 902 – 928MHz. It also shows that the EUT met the requirement of FCC Part 15.215(c).

FCC ID: 2AR6YHW001

Page 13 of 15



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No.

: AY0012763(8)

Date : 12 Mar 2019

5 Appendices

A1. 20dB Bandwidth Plot

1 page(s)

FCC ID: 2AR6YHW001

Page 14 of 15



CMA Testing and Certification Laboratories

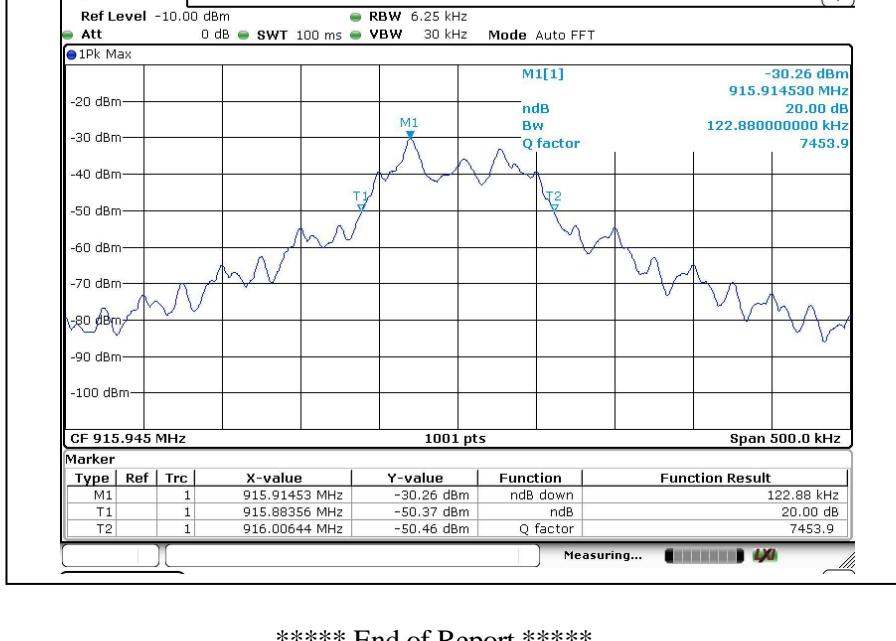
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TEST REPORT

Report No. : AY0012763(8)

Date : 12 Mar 2019

A1. 20dB Bandwidth Plot



***** End of Report *****

FCC ID: 2AR6YHW001

Page 15 of 15

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