TEST REPORT

Report No. : AY0012767(1) 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.
Motion detection sensor transmitter	M001
Temperature sensor transmitter	T001
Door sensor transmitter	D001
Shore power transmitter	SPU001

Radio Frequency : 916MHz
Rating : 2 x 1.5V AAA size batteries (each model)
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 16.

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

Remark : The models: M001, T001, D001 and SPU001 are same electrical and mechanical aspect except the detector. M001 is selected as represented model for testing.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____ Page 1 of 16

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

FCC ID: 2AR6YSEN001

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1 General Information

1.1 General Description

These are 916MHz transmitter with difference sensor for boat. These transmitters connect to the base unit for difference detection on door, temperature, voltage supply and intruder.

The devices are powered by two 1.5V AAA battery. The devices have 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.

Four models are same on electrical and mechanical aspect except difference switch.

Product Description	**Detector sensor**
Motion detection sensor transmitter	Infrared sensor
Temperature sensor transmitter	Temperature sensor
Shore power transmitter	Voltage detection
Door sensor transmitter	Magnetic switch

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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,
Hong Kong.

FCC Accreditation Lab (Designation Number: HK0004)

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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	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100964	11 Sep 2019	1Year
Loop Antenna	EMCO	6502	00056620	29 Oct 2020	2Years
Biconical Antenna	Rohde & Schwarz	HK116	837414/004	09 Oct 2020	2Years
Log Periodic Antenna	Teseq	UPA6109	43666	27 Jul 2020	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	21 Dec 2019	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2019	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	01 Aug 2020	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	01 Aug 2020	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	17 May 2019	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	17 May 2019	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	22 Jan 2020	1Year

1.4 Supporting Equipment

NIL

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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

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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.

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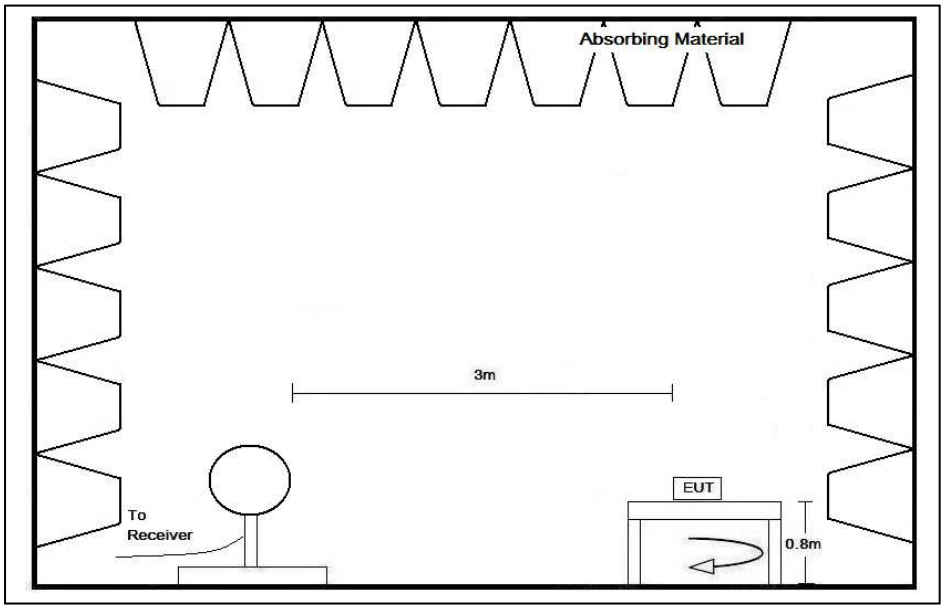
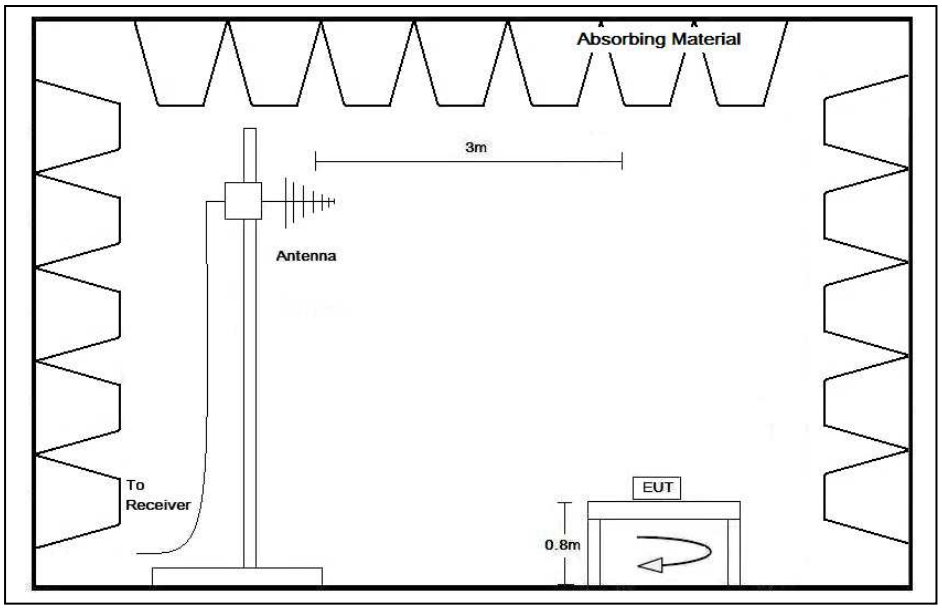
2.2 Test Setup



Below 30MHz



30MHz – 1GHz

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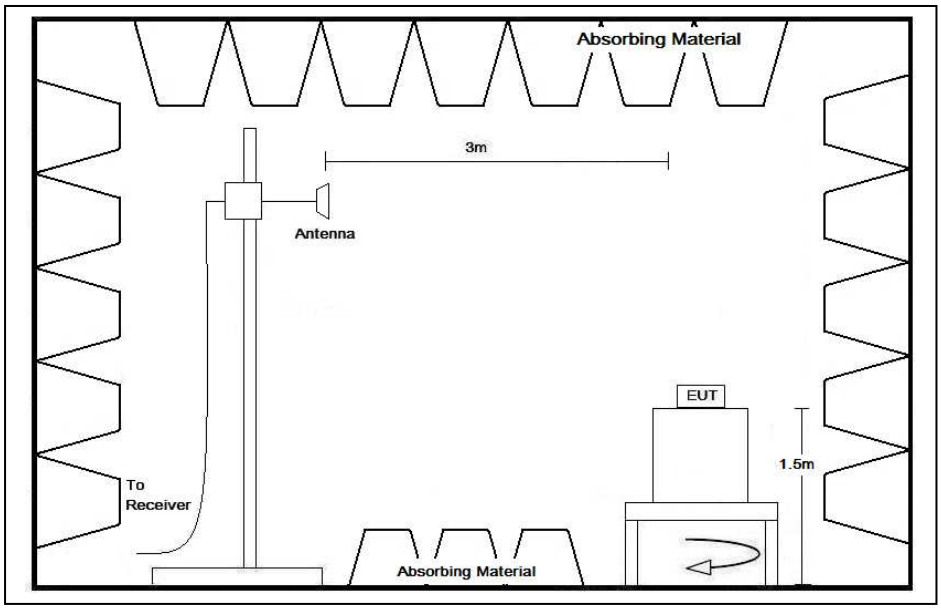
2.2 Test Setup



Above 1GHz

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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.

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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 (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Detector Type
H	915.914	50.5	28.7	79.2	94.0	-14.8	Peak
V	915.975	50.2	28.7	78.9	94.0	-15.1	Peak
H	1831.932	49.1	-7.6	41.5	54.0	-12.5	Peak
V	1831.767	54.3	-7.6	46.7	54.0	-7.3	Peak
H	2747.795	47.1	-4.7	42.4	54.0	-11.6	Peak
V	2747.614	45.9	-4.7	41.2	54.0	-12.8	Peak
V	3663.597	44.3	-2.3	42.0	54.0	-12.0	Peak
H	4579.737	42.0	0.9	42.9	54.0	-11.1	Peak
H	5495.296	44.2	3.2	47.4	54.0	-6.6	Peak
V	5495.745	41.4	3.2	44.6	54.0	-9.4	Peak
H	6411.406	50.3	5.0	55.3	74.0	-18.7	Peak
H	6411.565	26.6	5.0	31.6	54.0	-22.4	Average
V	6411.301	47.9	5.0	52.9	54.0	-1.1	Peak
H	7327.309	45.7	9.6	55.3	74.0	-18.7	Peak
H	7327.546	24.2	9.6	33.8	54.0	-20.2	Average
V	7327.732	43.3	9.6	52.9	54.0	-1.1	Peak
H	8243.277	45.8	12.1	57.9	74.0	-16.1	Peak
H	8243.491	22.0	12.1	34.1	54.0	-19.9	Average
V	8243.287	40.8	12.1	52.9	54.0	-1.1	Peak
H	9159.127	44.5	11.9	56.4	74.0	-17.6	Peak

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H	9159.412	22.9	11.9	34.8	54.0	-19.2	Average
V	9159.764	43.8	11.9	55.7	74.0	-18.3	Peak
V	9159.229	22.9	11.9	34.8	54.0	-19.2	Average

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

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3 Description of the Line-conducted Test

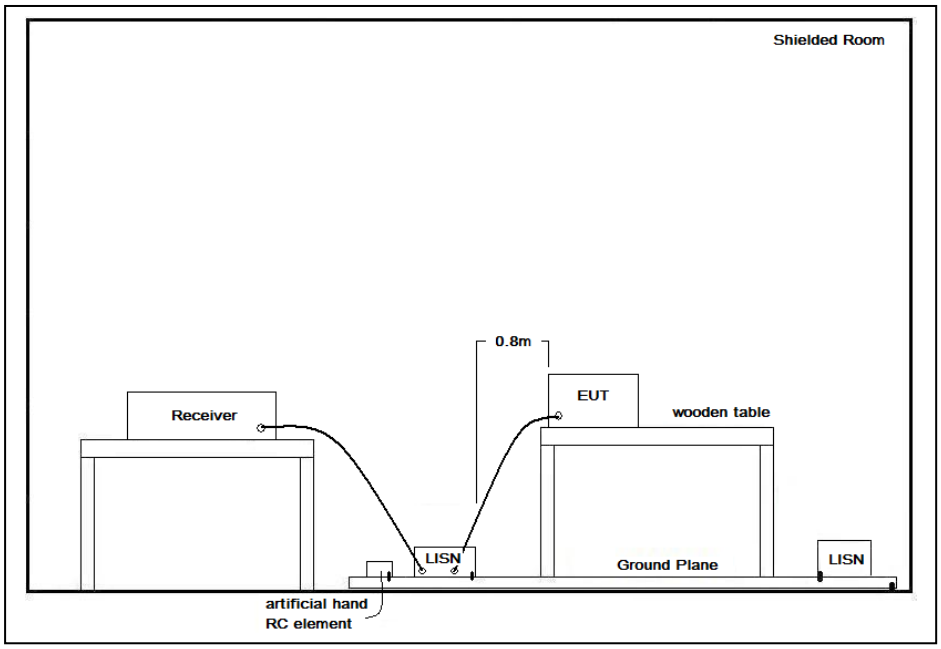
3.1 Test Procedure

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



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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 122.88kHz which fall in the band of 902 – 928MHz. It also shows that the EUT met the requirement of FCC Part 15.215(c).

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5 Appendices

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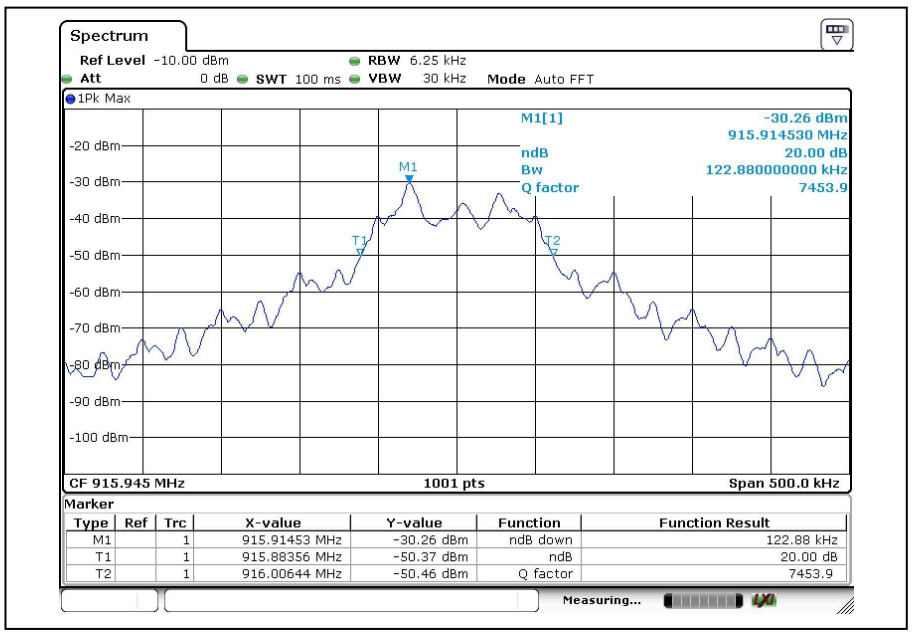
A1. 20dB Bandwidth Plot



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

FCC ID: 2AR6YSEN001

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