



Test Report - FCC PART 1.1310 / MPE

Prepared For: Alphasatron Marine USA, Inc.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature

(YYYY-MM-DD): 2021-04-30

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Timco Engineering, Inc., an IIA Company
849 NW State Road 45, Newberry, Florida 32669
(352) 472-5500 / testing@timcoengr.com

1. Customer Information

Applicant: Alphontron Marine USA, Inc.
Address: 1205 Butler Road
League City, TX 77573

2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780

FCC Designation # US1070

FCC site registration is under A2LA certificate # 0955.01

ISED Canada test site registration # 2056A

EU Notified Body # 1177

For all designations see A2LA scope # 0955.01



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2.2 Testing was performed, reviewed by

Dates of Testing: April 15 - 29, 2021

Signature:

A handwritten signature in black ink, appearing to read "Tim Royer", is written over a horizontal line.

Sr. EMC Engineer
EMC-003838-NE



Name & Title: Tim Royer, EMC Engineer

Date of Signature

(YYYY-MM-DD): 2021-04-30



3. Test Sample(s) (EUT/DUT)

The test sample was received: April 22, 2021

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	2ADJKNKE387
Brief Description	River Radar
Type of Modular	n/a
Model(s) #	NKE-387
Trade name	n/a
Firmware version	n/a
Software version	n/a
Serial Number	n/a

Technical Characteristics	
Technology	Radar
Frequency Range	9200 - 9500 MHz
RF O/P Power (Max.)	5.5 kW
Modulation	Pulse w/ no modulated information
Bandwidth & Emission Class	66M3PON
Number of Channels	n/a
Duty Cycle	0.12%
Antenna Connector	Proprietary (fitted with WR-90 adapter for testing)
Voltage Rating (AC or Batt.)	DC 24 V

Antenna Characteristics		
Antenna Name	Frequency Range	Dimensions
Swing Circle 1880 mm	9.0 – 9.5 GHz	6'
Swing Circle 2240 mm	9.0 – 9.5 GHz	7'
Swing Circle 2810 mm	9.0 – 9.5 GHz	9'



4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

The following guidance FCC KDB 447498 D01 General RF Exposure Guidance v06 was used for RF exposure evaluation as per FCC Part 1.1310 and FCC Part 2.1091 and part 2.1093. Full test results are available in this report.

4.1.1 FCC Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging Time (minutes)
A Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
B Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30



4.2 Equations

POWER DENSITY

$$E(V/m) = \text{SQRT} (30 * P * G) / d$$

$$Pd(W/m^2) = E^2 / 377$$

$$S = \text{EIRP} / (4 * \text{Pi} * D^2)$$

Where:

S = Power density, in mW/cm²

EIRP = Equivalent Isotropic Radiated Power, in mW

D = Separation distance in cm

Power density is converted from units of mW/cm² to units of W/m² by multiplying by 10.

DISTANCE

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

Where:

D = Separation distance in cm

EIRP = Equivalent Isotropic Radiated Power, in mW

S = Power density in mW/cm²

SOURCE-BASED DUTY CYCLE (When applicable (for example, multi-slot mobile phone applications) A duty cycle factor may be applied.)

$$\text{Source-based time-average EIRP} = (\text{DC} / 100) * \text{EIRP}$$

Where:

DC = Duty Cycle in % as applicable.

EIRP = Equivalent Isotropic radiated Power, in mW



5. RF Exposure Results

Type	Horizontal Beam Width(deg.)	Vertical Beam Width(deg.)	Antenna Gain (dBi)	Maximum dimension of antenna D(m)	①R _{nf} Near-field (m)	②R _{ff} Far-field Beginning Distance (m)	Aperture Efficiency η	③S _{nf} Power density of Near-field (mW/cm ²)	④R _t The distance of till S _{LMT} by using Near-field (cm)	⑤R _f The distance of till S _{LMT} by using Far-field (cm)
NAX-16R-6	1.2	28.9	29.1	1.7760	24.730	59.352	0.6	0.427	211.3	308.4
NAX-16R-7	1.0	28.7	29.5	2.1296	35.558	85.339	0.6	0.297	211.3	322.9
NAX-16R-9	0.81	28.3	30.9	2.7060	57.411	137.786	0.6	0.184	211.3	379.4

Type	Length	FCC Limit (cm)
NAX-16R-6	6ft	308.4
NAX-16R-7	7ft	322.9
NAX-16R-9	9ft	379.4



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6. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_1573-21_FCC_MPE_1	1	Initial release	April 30, 2021
	2	Page 8 Updated	July 6, 2021



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END OF TEST REPORT
