

## Test Report

Prepared for: Icom Incorporated

Model: MR-1010RII

Description: Marine Radar

Serial Number: 00000205

FCC ID: AFJ271420

To

FCC Part 1.1310

Date of Issue: December 8, 2020

On the behalf of the applicant:

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Project Test Engineer

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### Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	December 8,2020	Greg Corbin	Original Document

## ANAB

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The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

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**Non-accredited tests contained in this report:**

**N/A**

### **EUT Description**

**Model:** MR1010-R11

**Description:** Marine Radar

**Serial Number:** 00000120

### **Additional Information:**

The EUT is a 4kW Radome Scanner Marine Radar operating at 9.4 GHz.

The radar operates from 10.2 – 42 volts DC.

There is a 10 inch color TFT display that is used to control the radar and display the radar images.

The RF output going to the antenna port is WR90 waveguide.

Antenna gain = 25 dBi

Due to the wide bandwidth (10 – 27 MHz, dependent on PW and PRR) of the radar signal, the channel power was measured using the channel power tool on the spectrum analyzer.

The channel power was measured for 3 combinations of PW and PRR and the combination with the highest output was used to calculate the RF exposure.

## MPE Evaluation

This is a mobile device used in Uncontrolled Exposure environment.

**Limits Uncontrolled Exposure  
47 CFR 1.1310  
Table 1, (B)**

0.3-1.234 MHz:	Limit [mW/cm <sup>2</sup> ] = 100
1.34-30 MHz:	Limit [mW/cm <sup>2</sup> ] = (180/f <sup>2</sup> )
30-300 MHz:	Limit [mW/cm <sup>2</sup> ] = 0.2
300-1500 MHz:	Limit [mW/cm <sup>2</sup> ] = f/1500
1500-100,000 MHz	Limit [mW/cm <sup>2</sup> ] = 1.0

## Test Data

Test Frequency, MHz	9415
Power, Conducted, mW (P)	3605.8
Antenna Gain Isotropic	25 dBi
Antenna Gain Numeric (G)	316.23
Antenna Type	Slotted Waveguide Array
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$
Power Density (S) mw/cm <sup>2</sup>
226.85 mw/cm <sup>2</sup>

Power Density (S) = 226.85 mw/cm <sup>2</sup>
Limit = (from above table) = 1.0 mw/cm <sup>2</sup>

The power density at 226.85 mw/cm<sup>2</sup> is over the 1.0 mw/cm<sup>2</sup> limit so the minimum safe distance was calculated.

**Minimum Safe Distance Evaluation**

This is a mobile device used in Uncontrolled Exposure environment.

**Limits Uncontrolled Exposure  
47 CFR 1.1310  
Table 1, (B)**

0.3-1.234 MHz:	Limit [mW/cm <sup>2</sup> ] = 100
1.34-30 MHz:	Limit [mW/cm <sup>2</sup> ] = (180/f <sup>2</sup> )
30-300 MHz:	Limit [mW/cm <sup>2</sup> ] = 0.2
300-1500 MHz:	Limit [mW/cm <sup>2</sup> ] = f/1500
1500-100,000 MHz	Limit [mW/cm <sup>2</sup> ] = 1.0

**Test Data**

Test Frequency, MHz	9415
Power, Conducted, mW (P)	3605.8
Antenna Gain Isotropic	25 dBi
Antenna Gain Numeric (G)	316.23
Antenna Type	Slotted Waveguide Array
Limit (L)	20 cm

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
301.3	3605.8	316.23	1.0

**The minimum safe distance is 301.3 cm with a 25 dBi gain antenna.**

END OF TEST REPORT