



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268

fax: (480) 926-3598

<http://www.ComplianceTesting.com>

info@ComplianceTesting.com

Test Report

Prepared for: Icom Incorporated

Model: MR1010-R11

Description: Marine Radar

Serial Number: 00000120

FCC ID: AFJ271410

To

FCC Part 1.1310

Date of Issue: July 5, 2018

On the behalf of the applicant:

**Icom Incorporated
1-1-32 Kamiminami Hirano-ku
Osaka 547-0003
Japan**

Attention of:

**Atsushi Tomiyama, General Manager of QA Department
Ph: +81 6 6793 8424
E-Mail: world_support@icom.co.jp**

**Prepared By
Compliance Testing, LLC
1724 S. Nevada Way
Mesa, AZ 85204
(480) 926-3100 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p1840018**

**Greg Corbin
Project Test Engineer**

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	June 26, 2018	Greg Corbin	Original Document
2.0	July 3, 2018	Greg Corbin	Changed portable to mobile device on page 4 Revised calculations for antenna gain of 27 dBi.

ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

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

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

EUT Description

Model: MR1010-RII

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.

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

Test Data

Test Frequency, MHz	9419
Power, Conducted, mW (P)	1291.2
Antenna Gain Isotropic	27 dBi
Antenna Gain Numeric (G)	501.18
Antenna Type	Slotted Waveguide Array
Distance (R)	20 cm

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

Power Density (S) = 128.7 mw/cm ²
Limit = (from above table) = 1.0 mw/cm ²

The power density at 128.7 mw/cm² is over the 1.0 mw/cm² 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 ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Frequency, MHz	9419
Power, Conducted, mW (P)	1291.2
Antenna Gain Isotropic	27 dBi
Antenna Gain Numeric (G)	501.18
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)
227	1291.2	501.18	1.0

The minimum safe distance is 227 cm with a 27 dBi gain antenna.

END OF TEST REPORT