
Exposure Assessment

easyAtoN (Aids-to-Navigation)

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General

The information contained in this report is intended to show verification of the RF Exposure Assessment of the Weatherdock easyAtoN (AIS transmitter) to the requirements of the applied test specifications.

General Public Exposure levels:

Antenna Gain	Peak Output Power (W)	Calculated RF Exposure at = 20 cm	General Public Exposure Limit	Application
1	5	0.0006 mW/cm ² 0.006 W/m ²	0.20 mW/cm ²	FCC 47 CFR § 1.1310
			2.00 W/m ²	ICNIRP
			2.00 W/m ²	Canada's RF Safety Code 6
			2.00 W/m ²	ARPANSA

The calculations have shown that they meet the General Public Exposure Levels described in the FCC 47 CFR § 1.1310 Guidelines limits at 20 cm, the point of investigation, which is the minimum separation distance when the device is operating.

1 Product Information

1.1 Attestation

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 MHz) - General public. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s)

1.2 Technical Description

The Equipment under test was a Weatherdock easyAtoN (AIS-AtoN). A full technical description can be found in the manufacturer's documentation.

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 MHz) - General public. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s).

All reported calculations were carried out on the relevant information supplied or measured of a sample as found in Test-Reports:

- TUV-SUD: No. 70464-22758-01 (Edition 1) (Radio tests)

The RF power at 161.975 and 162.025 MHz measured in this test report is 37 dBm = 5 W.
The duty cycle of the emission is given by a AIS messages á 52 ms every 180 seconds:

$$\text{Duty Cycle} = (1 \times 0.052 \text{ s}) / 180 \text{ s} = 0.00029$$

The average power is:

$$P_{\text{av}} = P \cdot \text{Duty Cycle} = 5 \text{ W} \cdot 0.00029 = 1.5 \text{ mW}$$

The operation position of the easyAtoN is at distances of > 20 cm considering the location of the transmitter at an buoy (see user manual) with an VHF marine band antenna, taking into account, that the connected VHF Marine Band antenna has got a typical gain of $G = 3 \text{ dBi} = 2$:

The calculated RF Exposure at 20 cm :

1.1.2 MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

E = Electric field (V/m)

G = EUT Antenna numeric gain (numeric)
The formula can be changed to

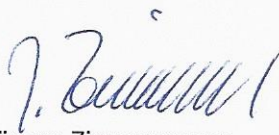
$$P_d = \frac{30 \times P \times G}{377 \times d^2}$$

$$\text{Power Density: } P_d \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

P = RF output power (W)

d = Separation distance between radiator and human body (m)

$$P_d = \frac{30 \cdot 1.5 \text{ mW} \cdot 2}{377 \cdot 20^2 \text{ cm}^2} = 0.0006 \text{ mW/cm}^2 = 0.006 \text{ W/m}^2$$


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