

WT 10-160

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Federal Communications Commission
Office of the Secretary

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Wireless Telecommunications Bureau
Federal Communications Commission
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Attn: Ruth Milkman

21 June 2010

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Dear Madam,

On behalf of our client, Aquamate Products Ltd¹, I hereby request a waiver of FCC rules to allow approval of a dual band Radar Target Enhancer (RTE) for use on board ships in United States waters under CFR 47 part 80.375(d).

In correspondence with Tim Maguire, of this division, ITU-R M.1176² and MSC.164(78)³ were recommended as the documents to prove compliance for such devices. This request for waiver specifically refers to the requirements of ITU-R M.1176.

Background

An RTE is intended for use on small vessels to increase their visibility to radar. The use of a Radar Reflector or RTE on vessels under 150tons is required by SOLAS chapter V⁴, where practicable. IMO issued a performance standard for these devices in MSC.164(78). This performance standard requires operation at both S and X band, as does ISO 8728-2⁵, whereas M.1176 allows operation in one or both bands.

On the 9th December 2009, Ocean Signal Ltd⁶, on behalf of Aquamate, applied for FCC approval of an X-band Radar Target Enhancer (RTE) for use on board vessels under CFR 47 part 80.375(d). The RTE operates in the band 9.3 to 9.5GHz and conforms to the X-band requirements of international

¹ Aquamate Products Ltd, PO Box 6032, Dunmow, Essex, CM6 3AS, United Kingdom. FRN Number:0019383975.

² ITU-R M.1176 (1995): "Technical parameters of radar target enhancers".

³ Resolution MSC.164(78) adopted 17 May 2004, "Revised performance standards for Radar Reflectors".

⁴ Solas Chapter V Regulation 19.2.1.7 states that a ship shall have "if less than 150 tons and if practicable, a radar reflector, or other means, to enable detection by ships navigation radar as both 9 and 3GHz."

⁵ ISD8729-2 (May 2009): "Ships and marine technology - Marine radar reflectors - Part 2: Active type".

⁶ Ocean Signal Ltd, FRN Number 0019285519, previously known as Coverise Ltd

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standard MSC164(78) and ISO8729-2. At the request of the FCC OET examiner, a separate test report was provided, in accordance to the requirements of M.1176. The grant was subsequently issued on the 21st January 2010 under FCC identifier XZMACTIVE-X.

Aquamate Products Ltd. has developed a second generation RTE which operates on both S-band (2.9 to 3.1GHz) and X-band (9.3 to 9.5GHz). In comparing the requirements of M.1176 and MSC.164(78) a major discrepancy has been highlighted.

In M.1176, the gain of the device is given as a minimum of 50dB for both S and X-band. In MSC.164(78), the minimum radar cross section of the RTE is given as 0.5m² at S-band and 7.5m² at X-band. Radar cross section is proportional to both gain and the wavelength squared. If a gain of 50dB is used at S-band the corresponding radar cross section will be over 79m². (See Technical Justification at the end of this letter.)

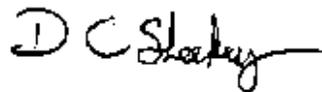
Request

Considering the above argument, the following issues will result if the 50dB gain specified in ITU-R M.1176 is met at S-band.

Excess gain will mean that vessels fitted with an RTE will paint the S-band radar screen at significantly larger distances than needed by IMO MSC.192(79), because the RCS presented is much larger than required. A second issue is that it will make design of a dual band radar target enhancer much more difficult to ensure that the induced stability meets the requirements of ISO8729-2, without increasing size and/or weight considerably. Larger size will reduce the practicability of fitting an RTE to smaller vessels, as required by SOLAS.

Ocean Signal Ltd therefore request that the FCC consider a waiver to the requirements of ITU-R M.1176 to either to reduce the gain requirement to greater than 28dB at S-band, or to allow the use of ISO8729-2 as the test standard for a dual band active radar target enhancer.

Yours faithfully,



David Sheekey
Product and Approvals Manager
Ocean Signal Ltd,
on behalf of John Simpson, Aquamate Products Limited.

Annex: Technical Justification

MSC.164(78) establishes a minimum requirement for radar cross section (RCS) of 7.5m^2 at X-band and a much lower limit of 0.5m^2 at S-band.

The equation for RCS is:-

$$RCS = \frac{G \times \lambda^2}{4 \times \pi} \quad (1)$$

Where G is the numerical gain of the RTE

λ is the wavelength

ITU-R M.1176 specifies an overall gain of 50dB or ($G = 100000$)

At X-band (9.3 to 9.5GHz), $\lambda = 0.0313\text{m}$

$$\therefore RCS = \frac{100000 \times 0.0313^2}{4 \times \pi} = 7.8\text{m}^2$$

At S band (2.9 – 3.1GHz) $\lambda = 0.1\text{m}$

Applying the same gain at S-band gives

$$RCS = \frac{100000 \times 0.1^2}{4 \times \pi} = 79.5\text{m}^2$$

It can be seen that using the gain in ITU-R M.1176 yields a considerably larger radar cross section than required by IMO. It seems that this situation was overlooked by the drafting team back in 1995.

Taking the IMO requirement for 0.5m^2 at S-band and rearranging equation 1 gives

$$G = \frac{4 \times \pi \times 0.5}{0.1^2}$$

$$\therefore G = 628 = 27.9\text{dB}$$