



Maritime and Coastguard Agency

## MIN 367 (M+F)

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# Research Project 617: Potential Impact of Out of Band Emissions from the 2.6GHz Auction on S-Band Maritime Radar

Notice to all Shipowners, Masters etc

*This MIN expires 30 November 2010*

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### Summary

With the development of new communication systems in the 2.5-2.69GHz frequency, the MCA became concerned about possible interference to Maritime S-Band Radar between 2.6 and 3.1GHz. This MIN outlines the finding of the MCA commissioned research to establish what affects the changes to the 2.5-2.69GHz band would have on the Maritime S-Band Radar. The research concluded that interference to S-Band Radar from out-of-bands emissions was inevitable and the possibility of establishing protection areas for marine radar should be considered.

### 1. Introduction/ Background

- 1.1 Due to the development of new communications systems in the 2.5 to 2.69 GHz band, there is the possibility of degradation in target detection capability of maritime S-band radars in the 2.9 to 3.1 GHz band. This is because of the radar receiver's sensitivity to emissions in the 2.5 to 2.69 GHz band. There may also be relevance to devices operating in the 3.4 to 3.6 GHz band (for this band, only fixed wireless access services in the 3.48 to 3.5 GHz have been considered for estimating separation distances).
- 1.2 Testing was performed on magnetron S-band maritime radar in a laboratory. Targets were generated using a radar target generator and the interference using signal generators. The test used the conducted method of injecting the radar target signals and interference into the radar antenna report.
- 1.3 Two interference mechanisms were investigated, the communications system channel power saturating amplifiers in the radar receiver chain and out-of-band emissions levels to help identify the dominant interference mechanism in each case.
- 1.4 The measured magnetron radar sensitivity data and estimated solid-state radar sensitivity have been used to estimate required protection distances. For mobile ship radar, the two main scenarios considered were mainbeam-to-mainbeam interference and mainbeam-to-sidelobe interference where an antenna coupling loss of 20 dB has been used. In both cases, all of the propagation is considered to be over sea. For VTS radar, mainbeam-to-sidelobe was considered as the main practical scenario.

1.5 Discussions were held with radar manufacturers, both magnetron and the new solid state designs to extrapolate the experimental results on to existing radar designs. The manufactures indicated that the sensitivity of other mobile magnetron radars were likely to be similar. These results may also be indicative of Vessel Traffic Services (VTS) port radars as they are similar in design.

## 2. Conclusions and Recommendations

2.1 In order to be properly protected from potential interference from out-of-band emissions, protection distances of less than 1km up to 70km are required (assuming flat terrain). It is therefore conclusive that interference is going to be inevitable as these particular scenarios are unrealistic.

2.2 Further research is required in order to fully determine all possible interference from out-of-bound emissions, particularly from frequencies located outside the upper band.

## 3. Project Output

3.1 A full report and executive summary can be downloaded from the MCA website:

[http://www.mcga.gov.uk/c4mca/2009-0258\\_final\\_-\\_mca-2.pdf](http://www.mcga.gov.uk/c4mca/2009-0258_final_-_mca-2.pdf)

## More Information

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