

AUTOMOTIVE SHORT RANGE RADAR OPERATIONS AROUND 24 GHZ

The document gives a summary on activities related to the planned implementation of automotive Short-Range Radar (SRR) equipment in Europe.

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1 INTRODUCTION

The Automotive manufacturers organised in the SARA group have started activities to achieve licenses for Short Range Radar equipment to be implemented on future cars. The target frequency range for this application is 22.625-25.625 GHz, which includes the 23.6-24 GHz band used by EUMETSAT and its international partner organisations for very important operational meteorological measurements from microwave passive sensors flown on meteorological satellites. This band is a unique natural resource allowing to correct critical measurements of vertical temperature profiles in the 50 - 60 GHz band from water vapour attenuation. In recognition of the importance of this band for passive sensor measurements, the band is protected in the ITU Radio Regulations by Foot Note 5.340 stating “No emissions allowed in this band”.

2 STUDY RESULTS

Several studies have been conducted by SARA and the Earth Exploration Satellite Service (EESS) community. Furthermore there was intensive work done by the technical working group of the CEPT SE 24 to find out whether shared operations between SRR and passive sensors operating in the band 23.6-24 GHz would be feasible. EUMETSAT and its partner organisations ESA, EUMETNET, the World Meteorological Organisation (WMO) and the European Center for Medium Range Weather Forecast (ECMWF) have contributed to the work of this group and delivered detailed calculations in a study report.

The results indicated that sharing with a fully deployed SRR system is not feasible and that the interference potential would be in the order of 10 dB. This would invalidate passive measurements from satellites and would lead to major problems in numerical weather forecasts. It was also concluded that the tolerable interference level would be exceeded at a maximum market penetration of 10% of cars equipped with SRR.

3 DISCUSSIONS IN CEPT

The relevant working groups of the CEPT have taken note of the study results and have concluded that the band around 24 GHz cannot be used for SRR as a long-term solution.

It was recommended to investigate the use of the frequency band around 77 GHz for SRR applications. This band is allocated to the Radiolocation Service and would be suitable for the planned application.

Immediate implementation of SRR in the band around 77 GHz was refused by the automotive industry organised in SARA. It was stated that there are technical difficulties and much higher equipment costs compared to equipment operating around 24 GHz. A possible solution was discussed including interim implementation of SRR in a band around 24 GHz and implementation of SRR around 77 GHz as the final solution at a later date.

Discussions took place on whether the interim implementation would ensure the necessary protection to passive services as well as other existing services in the band. Diverging information was submitted by contributors of technical studies on the development of market penetration as well as the technical feasibility for SRR operations at 77 GHz.

While SARA claims that the transfer to the final system would only be feasible in the year 2014, studies of the Earth Exploration Satellite Service (EESS) community show that the date for transfer would have to be much earlier, i.e. in the year 2008.

From a different, more business-orientated perspective, it would of course be extremely difficult from a regulatory standpoint to cap the market penetration at a level below the 10% limit over highly developed countries, and, in addition, one cannot exclude that SRR becomes a recommended security equipment in such countries. The risk is therefore high that there are no means to control the development of the market of SRR operating around 24 GHz in certain parts of the world, including Europe, and in turn, the negative impact on meteorological applications world-wide. This point has been raised by EUMETSAT to European regulatory authorities (see paragraph 5 below).

4 ACTIVITIES BY SARA

The SARA group has performed a new study concerning the expected market penetration of SRR. The experience of market penetration of ABS and Air Bag were taken into account.

Concerning ABS it took 12 years, in the Air-bag case 13 years until 10% market penetration was reached. Estimates related to SRR resulted in a market penetration figure of 5% in 2014 based on a nominal scenario. The figure of 9.2 % was achieved in a worst case scenario.

In response to the problems identified in CEPT concerning the control of implementation, SARA plans to propose a "Memorandum of Understanding" which commits car manufacturers to work towards a final implementation of SRR at 77 GHz and limits

implementation of 24 GHz SRR to a maximum of 10% per fleet. The MoU shall also include the fixed end date, which terminates implementation of 24 GHz SRR.

The draft MoU will be presented to the Short Range Maintenance Group of the European Radio Office (ERO) with the request to forward the information to CEPT working groups.

The major problem with such a MoU is to define who would be the signing partners and which legal relevance such a document could have.

5 ACTIVITIES OF EARTH EXPLORATION COMMUNITY

Members of the various agencies operating sensors in the band 23.6 – 24 GHz, i.e. ESA, EUMETNET, ECMWF and EUMETSAT are participating in CEPT meetings related to the planned SRR implementation and participate in ITU working parties defining the Ultra Wide Band technology used for SRR in terms of the Radio Regulations.

The study on the compatibility of SRR operations around 24 GHz with sensors on-board EESS satellites has been produced with the inputs of those organisations.

The Directors of the EESS organisations have sent letters to the European Commission to stress concerns on the planned SRR implementation.

In his reply to the EUMETSAT letter the responsible EU Commissar has stressed that the requirements of the EESS community will be taken into account in any regulation concerning the SRR implementation. He stressed that an “explicit and credible commitment” on the issue of a temporary SRR implementation around 24 GHz needs to be developed within the CEPT framework.

6 CONCLUSION

The position of CEPT administrations is so far not in favour of SRR implementation in the band around 24 GHz. The recent meeting of the Frequency management group of the CEPT has agreed on a frame for future SRR implementation around 77 GHz but has not yet agreed on the proposed temporary implementation at 24 GHz. It has requested the SRD/MG to propose a legal framework for such an interim solution and to clarify responsibilities.

Several members have proposed to work towards a 77 GHz implementation without a temporary 24 GHz implementation.

Due to intense pressure from industry this topic will be brought back to the agendas of future CEPT working group meetings.

CGMS member agencies are invited to continue all activities to protect the sensor operations around 24 GHz.