

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
System Reference Document;
Short Range Devices (SRD);
Radar sensors for non-automotive surveillance applications
in the 76 GHz to 77 GHz frequency range**

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document includes necessary information to support the co-operation under the MoU between ETSI and the Electronic Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations (CEPT).

Executive summary iTeh Standards

The present document describes the radar based surveillance applications in the 76 GHz to 77 GHz which in most cases are safety related. It provides a proposal for the planned applications and defines operational modes for fixed and vehicular installations and for applications in public and private locations and areas.

A high number of accidents in the public transportation area (trains and trams) or with construction/off road vehicles needs an increase in the safety in these areas. Information on accidents is described in annex A.

Furthermore, surveillance of critical infrastructure and key resources is essential to every nation's security, public health and public safety, economic vitality and way of life. Damage of vital national structures caused by terrorist attacks, criminal activities or by natural/man-made disasters could produce significant losses in terms of human casualties, economic values as well as damage to public morale and confidence. Due to this and to the increased international subversive and political activities during the last decade, new demands for an enhanced security level regarding protection of critical infrastructure and key resources have been raised in many nations.

However, an enhanced security level also means an increased amount of resources in the form of security personnel. To handle this, the security system in general is proposed to have the quality to enable a higher degree of automation. The sensors in such a system can therefore have the ability to analyze and evaluate the threat on a pre-status, e.g. for a radar sensor this might put higher requirements on range and velocity resolution in order to achieve sufficient data for that kind of estimation. More detailed information can be read in annexes A and B.

The 76 GHz radar technology as realized in EN 301 091 [i.1] is also suitable for applications in rail, highway construction, agriculture, leisure vehicles, unmanned vehicles, ground transportation, and security monitoring systems such as intruder alert, traffic control and many others.

The automotive radars provide safety features and have reached a high penetration. The penetration will further increase significantly with the introduction of radars not only in higher class but also in medium type cars.

It has to be considered that some of the surveillance systems respectively their installations have the potential for interfering with the automotive radars. In order not to impair the operation of the existing automotive vehicle radars operating in the same frequency range, the operational modes and application scenarios are addressed in the present document and have to be carefully defined in the scope of a future Harmonized Standard.

Introduction

ETSI has created a number of Harmonized Standards under the R&TTE Directive for automotive radar systems for different applications e.g. for the frequency bands of 24 GHz, 5,8 GHz, 63 GHz, 76 GHz and 79 GHz.

The 76 GHz RTTT Standard EN 301 091 [i.1] defines the technical characteristics and test methods for radar equipment operating in the 76 GHz to 77 GHz was among the first ones and published in published in June 1998. Its scope limits the application to automotive radar equipment.

The 76 GHz to 77 GHz automotive range radar technology is very versatile and can be used also for safety relevant application e.g. non-road applications which is the subject for the present document.

The main benefits of using the 76 GHz to 77 GHz frequency band are lower weight, measurement results (e.g. range resolution) and reduced size for new equipment. Better velocity resolution will be achieved because of the very short wavelength and high range resolution in connection with a simplified technical design when using e.g. FMCW modulation. This motivates to use the frequency band for many types of applications for short range radar systems.

The new planned applications for short range radar for surveillance radars operating in the 76 GHz to 77 GHz band needs to be evaluated with regard to their compatibility to the present 76 GHz to 77 GHz vehicle radars operating on the roads in many countries world-wide.

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