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Spectrum and Regulatory Issues for ITS in the 5.9 GHz Band in Europe

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SIXTH FRAMEWORK PROGRAMME

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Spectrum and Regulatory Issues for ITS in the 5.9 GHz Band in Europe

1 Introduction

Intelligent Transport Systems (ITS) are under development in Europe and world wide.

In Europe, safety related ITS supports the European Union eSafety initiative with the goals to reduce road fatalities and improve the efficiency of road traffic.

European industry in ETSI has presented requirements for European wide harmonisation of spectrum to CEPT and European telecommunication administrations for deployment of ITS within the 5.9 GHz band. Harmonisation is needed in order to enable free movement and seamless border crossing of ITS all over Europe.

ITS for road safety has a strong political importance in Europe and the European Commission has requested technical information about the spectrum requirements and compatibility issues with the aim to issue a European Commission (EC) Decision providing mandatory implementation and availability of spectrum for safety critical ITS applications within EU member states (27 European countries, and in practise the vast majority of European countries).

2 Frequency requirements and technical justification.

The frequency band 5875-5925 MHz has been identified for the deployment of safety related ITS applications and the frequency band 5855-5875 MHz for non-safety related ITS applications in Europe.

The safety related spectrum requires low latency communication and therefore needs a predictable sharing situation and protection against interference from other services. The non-safety applications can be operated on a non-protected/non-interference basis.

The CEPT has studied the background for the spectrum requirements based on realistic traffic scenarios and confirmed that between 30-50 MHz would be needed for safety related ITS applications in the 5.9 GHz band.

3 Compatibility studies

Extensive compatibility studies performed within the CEPT conclude that within the frequency band 5875-5905 MHz, ITS applications will not suffer from excessive interference resulting from other services/systems and ITS in this band is compatible with all other services providing that the unwanted emission levels are

less than -55 dBm/MHz below 5850 MHz in order to protect the Radiolocation Services;

less than -65 dBm/MHz below 5815 MHz in order to protect the RTTT applications;

less than -65 dBm/MHz above 5925 MHz in order to protect the Fixed Service.

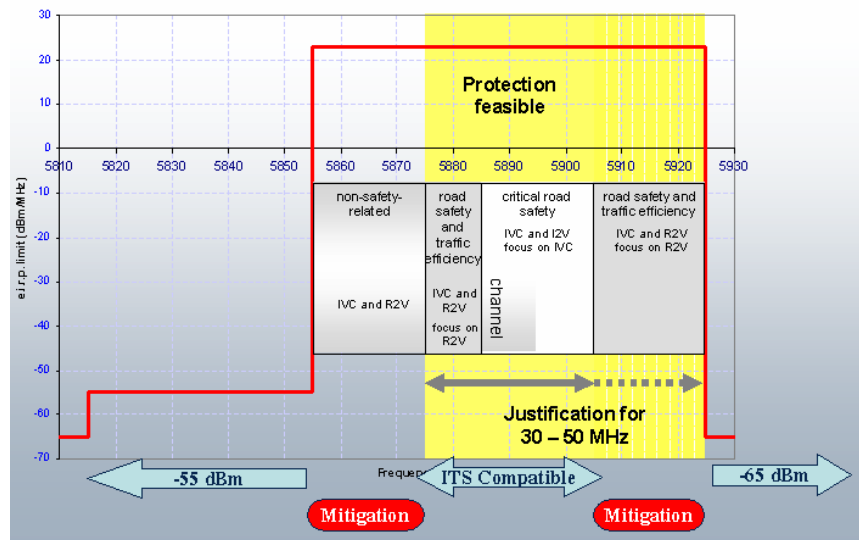


Figure 1: ITS Frequency Band Overview

With this conclusion ITS can achieve a predictable sharing situation and protection against interference from possible new systems and applications of the Fixed and Mobile Service within the band 5875-5905 MHz. ITS can, however, not claim protection from FSS earth stations but the usage of those stations is very limited.

The use of the frequency band 5905-5925 MHz for ITS may suffer interference from the Fixed Service above 5925 MHz and will be subject to the same restrictions regarding unwanted emissions as for the band 5875-5905 MHz.

The frequency band 5855-5875 MHz intended for non-safety applications is also subject to the same restrictions as for the band 5875-5905 MHz, but in line with the requirements without protection. Figure 1 provides a graphical overview of the frequency situation.

4 Regulation provided by the CEPT

ECC Decisions are used within CEPT in the decision making process on matters of significant harmonisation. The implementation of ECC Decisions is formally on a voluntary basis where administrations commit themselves to the implementation and update the national regulation accordingly. ECC Recommendations guides administrations to a certain use of spectrum and are less binding without commitment.

For ITS an ECC Decision has been developed and adopted by the WG FM for public consultation (see [CEPT020] for more details on the frequency band and regulations).

The Decision harmonises the band 5875-5925 MHz for ITS road safety applications in a two step approach where the sub-band 5875-5905 MHz is designated to ITS on a European basis immediately and the sub-band 5905-5925 MHz considered for future extension within the CEPT review process.

It is agreed that both in-vehicle and roadside units will be subject to free circulation and use all over CEPT. On-board units will be exempted from individual licensing and even if authorisation of roadside units is technically not necessary it may be considered by administrations to ensure that different ITS operators can coexist.

An ECC Recommendation suggests that CEPT administrations make the frequency sub-band 5855-5875 MHz available for non-safety ITS applications on a non-protected/non-interference basis.

Both the ECC Decision and the ECC Recommendation were approved for public consultation by the WG FM end of September 2007. During the public consultation three administrations provided comments for both documents:

1. Spain supported the frequency designation without change request.
2. Germany provided some editorial changes to improve the documents and to align the decisions on EC and CEPT level.
3. Austria wanted to exclude the protection of ITS from Fixed Services (FS) operating in the same frequency band, because Austria had licensed the ITS spectrum without time limitation to the broadcaster ORF for Electronic News Gathering (ENG) applications, e.g. during sport events. Usually the spectrum is used for ENG only 14 days per year and with limitation to certain regions. But it is expected, that ENG profoundly interfere with ITS.

The SRD/MG considered these comments in their meeting from 15-17 January. The changes proposed by Germany were included with some modifications. But the Austrian request regarding exemption of protection of ITS from FS in the band 5975-5905 MHz was rejected with the argument, that the Austrian frequency usage is not harmonized on a European level and is therefore an issue, which

has to be solved on national basis. The revised ECC Decision and ECC Recommendation were forwarded to WG FM for approval.

In the meantime the Austrian administration invited representatives from the C2C-CC and the ORF to evaluate possible solutions for the conflict of spectrum usage in the range from 5875 - 5905 MHz in Austria. Both spectrum users explained their applications and requirements on the spectrum availability. It was explained that ITS requires the whole 30 MHz of bandwidth and cannot accept any interference from ENG. But it will take some time until ITS is fully deployed. Finally it was agreed, that the administration will provide the ORF an alternative spectrum and the frequency band from 5875 - 5905 MHz will not be used any more by the ORF after a period of 3 - 5 years. In the meantime it is expected that the spectrum is used by ITS mainly for operational tests or field trials whereas the spectrum usage will be coordinated with the ORF.

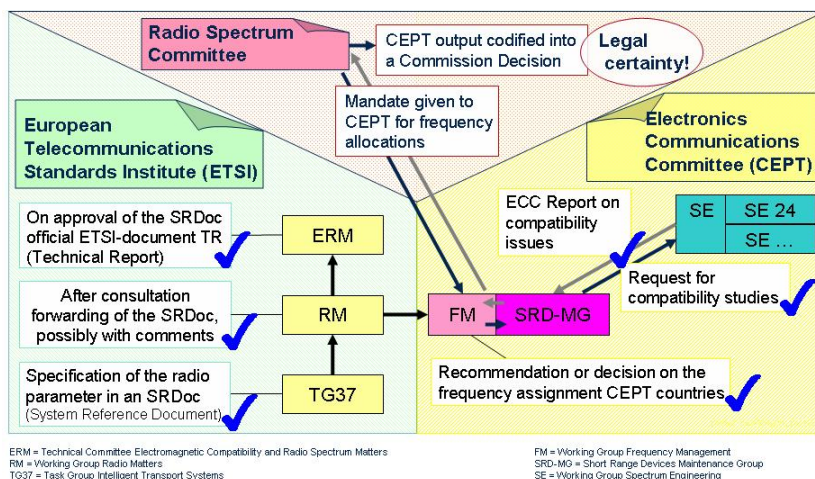


Figure 2: Progress in the process for implementation and availability of spectrum for safety critical ITS applications

With regard to the agreement reached for spectrum availability in Austria the Austrian administration agreed on the ECC documents as approved by the SRD/MG. In the WG FM meeting from 11-15 February a final revision of the documents was made regarding the maximum transmission power by replacing the absolute value of 33 dBm to a channel bandwidth dependent value of 23 dBm/MHz. This last change provides a higher flexibility if during the system development it turns out, that a higher channel bandwidth than the originally specified 10 MHz is more appropriate. WG FM finally adopted the ECC Recommendation for publication and the ECC Decision on ITS for approval for publication by the ECC in the meeting from 10-14 March. It is expected that after that all CEPT administrations including other countries outside the European Union like the Russian Federation will implement the ECC Decision and the ECC Recommendation. Figure 2 illustrates the steps that have been taken in the process for implementation and availability of spectrum for safety critical ITS applications.

5 Regulation provided by the European Commission

Based on a report from CEPT the European Commission is expected to issue an EC Decision on spectrum and regulatory issues for safety related ITS in the 5.9 GHz band. The implementation of such a decision will be mandatory for EU member states and will ensure legally harmonised spectrum for ITS in Europe.

The CEPT Report to the Commission includes background explanation for the spectrum requirement, spectrum justification, details of the compatibility studies and the level of protection to be afforded to ITS in the 5.9 GHz band.

The CEPT has also developed an Impact Assessment with cost benefit analyses on ITS concluding that the benefits of ITS in terms of improving road safety will exceed the opportunity costs of allocating spectrum for ITS on a fully protected basis as soon as the ITS generates a road safety improvement in excess of 1%. The report also concludes that ITS is based on the principle of free movement and seamless border crossing all over Europe which supports a strong requirement for European harmonised spectrum.

The CEPT Report recommends European harmonisation of spectrum for ITS including the two step approach with an immediate frequency designation of 30 MHz and another 20 MHz at a later stage.

A first draft of an EC Decision on ITS considers a frequency assignment of 30 MHz referencing to the ECC Decision, i.e. the same technical parameters and conditions are defined. During the consultation of this first draft in the meeting of the Radio Spectrum Committee (RSC) of the EC from 12-13 December 2008 the Austrian administration raised their concern, because they have licensed the spectrum from 5875 - 5905 MHz to the ORF for the ENG applications as explained before in the context with the Austrian comments on the ECC Decision. With respect to the agreement between the Austrian administration, the ORF and the C2C-CC Austria will request a derogation of the EC Decision for a period of 3-5 years.

It is envisaged to adapt the first draft of the EC Decision based on the feedback in the RSC and from EU member states in the next RSC meeting from 2-3 April 2008. The final version of the EC Decision could be adopted by the mid 2008 so that spectrum provisions could enter into force by end 2008.

Relevant meetings and expected measures towards the availability of spectrum:

- 10-12 March 2008, ECC:
Adoption of the voluntary ECC Decision.
- 2-3 April 2008, RSC:
Final adaptation of the first draft of the mandatory EC Decision considering the comments from member states.
- Mid 2008:
Final adoption of the EC Decision.
- End 2008:
Implementation of the CEPT decision in EU the member states and some other CEPT countries

References

[CEPT020] CEPT Report 020
Report from CEPT to EC in response to Mandate on
“the harmonised radio spectrum use for safety critical applications of
Intelligent Transport Systems (ITS) in the European Union”
Report approved on 21 December 2007 by the:
Electronic Communications Committee (ECC)
within the European Conference of Postal and Telecommunications
Administrations (CEPT)

Annex 1 Acronyms

CEPT	Conférence Européenne des Administrations des Postes et des Télécommunications
C2C-CC	Car2Car Communication Consortium
DG INFSO	Directorate General Information Society and Media (EC)
EC	European Commission
ECC	Electronic Communications Committee
ENG	Electronic News Gathering
ETSI	European Telecommunications Standards Institute
FS	Fixed Service
FSS	Fixed Satellite Service (Earth-to-Space)
ITS	Intelligent Transport Systems
ORF	Oesterreichischer Rundfunk (Austrian Broadcasting Service)
RSC	Radio Spectrum Committee
RTTT	Road Traffic and Transport Telematics
SRD	Short Range Device
SRD/MG	Short Range Device Maintenance Group
TG	Technical Group (ETSI)
WG FM	Working Group Frequency Management (CEPT-ECC)
WG SE	Working Group Spectrum Engineering (CEPT-ECC)