ECC Decision (08)01

The harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS)[1]

Approved 14 March 2008

Amended 3 July 2015

[1] Comparable technical specifications to those given in this ECC Decision are given in Commission Decision 2008/671/EC. EU Member States and, if so approved by the EEA Joint Committee, Iceland, Liechtenstein and Norway are obliged to implement the Commission Decisions.

EXPLANATORY MEMORANDUM

1 INTRODUCTION

This CEPT/ECC Decision addresses frequency designation within the band 5875-5925 MHz for the harmonised implementation of **I**ntelligent **T**ransport **S**ystems **(ITS)**. The frequency band is allocated to the Mobile Service, the Fixed service and the Fixed-Satellite Service (Earth-to-space) on a primary basis in ITU Region 1 and in accordance with the European Common Allocation Table (ECA).

The objective of frequency designation for road safety applications in the 5.9 GHz band is to support the European Union *e*Safety initiative with its goals to reduce the number of road fatalities and improving the efficiency of road traffic with Intelligent Vehicle Safety Systems. ITS road safety and traffic efficiency systems in Europe are being developed within the 6th Framework programme of the European Union. The intelligent car is a flagship initiative of the i2010 policy of the European Union.

ITS traffic safety and traffic efficiency communication includes Inter Vehicle Communication (IVC), Infrastructure to Vehicle (I2V) communication and portable ITS stations in highly dynamic ad hoc networks. A portable ITS station can be included in a mobile phone or as standalone devices for inclusion of pedestrians and cyclists into the overall traffic safety operations. All ITS stations can in principle support all features and facilities in ITS networks. The ITS station concept shows no role difference for the different ITS stations such as IVC, I2V or portable stations. In order to support the time critical traffic safety applications where fast information exchange is necessary to warn and support the driver without time delay, all ITS station types may be involved.

To support a quick development and deployment of ITS systems within a trans-European road network, it is essential that common frequency bands and associated harmonised equipment standards are available throughout Europe. A stable and permanent solution needs to be made available as soon as possible in order to support the European industry developments in this area.

In Europe, the frequency band 5875-5925 MHz has been identified for the development and deployment of road safety and traffic efficiency applications from a propagation as well as from a technology availability point of view. CEPT/ECC studies regarding the necessary spectrum requirements for road safety and traffic efficiency within the 5.9 GHz band based on accepted traffic scenarios with both IVC and I2V communication have confirmed that a realistic estimate of the needed bandwidth is between 30-50 MHz including 20 MHz of bandwidth for time critical road safety applications.

The CEPT/ECC compatibility studies addressed in ECC Report 101 conclude that between 5875 MHz and 5905 MHz ITS will not suffer from excessive interference resulting from other systems/services.

ECC Report 228 includes a review of the compatibility studies between ITS in the frequency band 5855-5925 MHz and other systems in adjacent bands and concluded that regarding unwanted emissions at the antenna, a level of -65dBm/MHz e.i.r.p. will be required in the band 5795-5815 MHz for truck installation and -60 dBm/MHz e.i.r.p for car installation respectively[2]. ECC Report 228 also lists a number of mitigation techniques and if so employed, an unwanted emission limit of -30dBm/MHz e.i.r.p. is sufficient for the protection of the FS above 5925 MHz.

Thus the compatibility studies have taken into account both sharing within the band 5875-5925 MHz required for ITS applications in Europe and services below 5875 MHz including the Radiolocation service below 5850 MHz as well as services above 5925 MHz including the Fixed Service.

The ECC Report 109 “on the aggregate impact from the proposed new systems (ITS, BBDR and BFWA) in the 5725-5925 MHz band on the other services/systems currently operating in this band” and ECC Report 110 “on compatibility studies between broad-band disaster relief (BBDR) and other systems” also relate to ITS.

[2] Equivalent mitigation techniques, as defined in the relevant harmonised European standard ETSI EN 302 571, may also be used.

The ECC Report 109 concludes that;

- The existing results of the different compatibility studies between each of the systems, Broadband fixed wireless access (BFWA), Broadband Disaster Relief (BBDR), ITS and existing services will not be significantly changed by their aggregate impact;

The ECC Report 110 concludes that;

- If the band 5875-5925 MHz is used for BBDR radio applications, protection distances between ITS and BBDR could exceed several kilometres in both directions in the rural case whereas it is limited to hundreds of metres in urban and suburban cases. Compatibility between BBDR and ITS may be improved by the use of appropriate mitigation techniques in that case.

It is essential for the implementation and deployment of ITS traffic safety and traffic efficiency applications in the CEPT countries and thus the possibility to meet the general European Union policies on road safety that a European harmonised solution on spectrum availability is adopted within the CEPT/ECC providing the necessary regulatory certainty for the ITS industry.

An ECC Decision making spectrum available for ITS within the band 5875-5925 MHz based on compatibility studies developed within the CEPT/ECC will also ensure that future Fixed and Mobile Service systems in this frequency band will have to prove their compatibility with ITS as well as with other existing services and applications in the band.

2 BACKGROUND

The frequency band 5875-5925 MHz has been identified by ETSI within the system reference document TR 102 492-1/2 as the most suitable frequency band for development and deployment of ITS providing road safety and traffic efficiency applications all over Europe.

The need for ITS data communication and a suitable frequency designation has been recognized for several years. These communication systems have been a topic in research for many years. Although many technical key challenges were solved in a number of research activities, IVC systems using ad hoc network technology have not been implemented in vehicles so far. The reason for this is the lack of appropriate frequency bands which grants effective protection for traffic safety applications and the lack of commercially cheap radio hardware. With the availability of the WLAN (IEEE 802.11) technology as a mass market product the technical and business requirements for ITS will be solved and the IEEE 802.11p for ITS equipment is now available.

It is realised that spectrum identified for cooperative ITS will require an allocation on a harmonised European basis in order to be operated in all Member States. It is also necessary to standardise communication protocols to ensure cross-border interoperability for the various applications envisaged as part of the European transport policies. Global harmonisation enhances economies of scale in equipment manufacture and would result in a wider cross-border mobility. In the USA 75 MHz of spectrum within the band 5850-5925 MHz has been allocated to Dedicated Short Range Communications (DSRC) providing ITS applications with specific channels for safety and with general access priority to safety applications in the whole band. In Japan 80 MHz (5770-5850 MHz) is dedicated for DSRC and intended for ITS applications including IVC and R2V communications. Other countries worldwide are considering the 5.9 GHz band for traffic safety applications which may provide further global harmonisation of the use of this particular frequency range for ITS.

Cooperative ITS systems based on the ETSI ITS standards will be deployed from 2015 onwards. Major car manufacturers recently signed a memorandum of understanding to signal their intentions to provide cooperative ITS systems from 2015 on.

The scope of the current EN 302 571 is covering On Board Equipment (OBE equipment fitted with integral or dedicated antenna(s), intended for use in vehicles, e.g. a road or a rail vehicle) and Road Side Equipment (RSE equipment fitted with an antenna socket, integral or dedicated antenna(s), normally used as a fixed station); e.g. a road or rail infrastructure.

3 REQUIREMENT FOR AN ECC DECISION

The allocation or designation of frequency bands for use by a service or system under specified conditions in CEPT administrations is laid down by law, regulation or administrative action. ECC Decisions are required to deal with radio spectrum related matters and the carriage and use of equipment throughout Europe. The harmonisation on a European basis supports the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. A commitment by CEPT administrations to implement an ECC Decision will provide a clear indication that the required frequency bands will be made available on time and on a European-wide basis.

ECC DECISION OF 14 MARCH 2008 ON THE HARMONISED USE OF THE 5875-5925 MHz FREQUENCY BAND FOR ECC/DEC/(08)01 AMENDED 3 JULY 2015

"The European Conference of Postal and Telecommunications Administrations,

considering

a) that there is an industry requirement for designation of frequency spectrum within the band 5875-5925 MHz for harmonised implementation and deployment of Intelligent Transport Systems (ITS);

b) that the deployment of ITS in Europe would support the European Union e-Safety initiative with the goals to reduce road fatalities and improve the efficiency of road traffic and the i2010 policy of the European Union;

c) that Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport was adopted;

d) that the frequency band 5875-5925 MHz is allocated to the Mobile Service, the Fixed Service and the Fixed-Satellite Service (Earth-to-space) on a primary basis in ITU Region 1 and in the European Common Allocation table;

e) that ITS applications providing communication to and from mobile units are considered as an application in the Mobile Service and that frequency spectrum should be designated to ITS as to any other mobile service application based on the agreed compatibility conditions;

f) that the CEPT/ECC studies regarding the spectrum requirements for road safety and traffic efficiency within the 5.9 GHz band based on accepted traffic scenarios with both Inter Vehicle Communication (IVC) and Infrastructure to Vehicle Communication (I2V) have confirmed that a realistic estimate of the needed bandwidth is between 30-50 MHz including 20 MHz of bandwidth for critical road safety applications;

g) that the ITS station concept and the ITS reference communications architecture is set out in EN 302 665, and there is no difference in the functions between a vehicle-based station, a fixed installed station or a portable ITS stations, i.e. all ITS stations can support all relevant features and facilities;

h) that ECC Report 101 on 'Compatibility studies in 5855-5925 MHz between ITS and other systems' provides the results of compatibility studies between the ITS and other services within the band 5875-5925 MHz as well as requirements to protect other services below 5850 MHz and above 5925 MHz;

i) that ITS devices cannot claim protection from FSS earth stations in the frequency band 5875-5925 MHz;

j) that ITS applications may be developed and deployed in Europe based on the conditions described in the ECC Report 101 and ECC Report 228 (which includes a review of the compatibility studies) with a frequency designation of 30 MHz for traffic safety applications in the band 5875-5905 MHz and with the band 5905-5925 MHz to be considered for future ITS extension;

k) that standardisation of radio equipment and communication protocols to ensure cross-border interoperability for various applications envisaged is ongoing within ETSI and other international standardisation organisations;

l) that ETSI has developed the harmonised European standard EN 302 571 for ITS equipment, road and rail (OBE and RSE), that also includes requirements which are going to ensure the protection of existing services in the 5855-5925 MHz bands and in adjacent bands;

m) that the Technical Specification TS 102 792 V1.2.1, which specifies requirements to ensure coexistence between ITS at 5.9 GHz and TTT within 5795-5815 MHz, was published by ETSI in June 2015;

n) that duty cycle restrictions and specified frequency re-use conditions (e.g. for periodic ITS messages and ITS channel congestion control considerations) are not only beneficial for the compatibility with other systems in the same or adjacent frequency bands but also for the efficient use of the spectrum by cooperative ITS;

o) that only one ITS transmitting device uses an ITS frequency channel at any one time using listen before talk, transmitter power reduction and duty cycle restriction. The average conveyed ITS message duration is assumed to be below 1 millisecond. The frequency re-use distance depends on the ITS transmitter power and typically varies between 15 metres to 1 000 metres;

p) that ITS critical safety applications are not seeking the status of safety service (RR 1.59);

q) that the frequency band 5855-5875 MHz has been made available for ITS (non-safety applications) by ECC/REC/(08)01;

r) that in EU/EFTA countries the radio equipment that is under the scope of this Decision shall comply with the R&TTE Directive. Conformity with the essential requirements of the R&TTE Directive may be demonstrated by compliance with the applicable harmonised European standard(s) or by using the other conformity assessment procedures set out in the R&TTE Directive.

DECIDES

1. that the purpose of this ECC Decision is to harmonise the use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS);
2. that for the purpose of this Decision, Intelligent Transport Systems (ITS) traffic safety applications mean those applications whose aim is to reduce the number of traffic fatalities or accidents using communications between ITS stations;
3. that CEPT administrations shall designate the frequency sub-band 5875-5905 MHz on a non-exclusive basis for ITS traffic safety applications;
4. that CEPT administrations shall consider within a future review of this Decision the designation of the frequency sub-band 5905-5925 MHz for an extension of ITS spectrum noting that protection of ITS cannot be ensured in this band;
5. that within CEPT, in the 5.9 GHz range, the spectrum for ITS services is split into channels with a bandwidth of 10 MHz each;
6. that the maximum spectral power density for ITS stations should be limited to 23 dBm/MHz e.i.r.p. but the total power shall not exceed 33 dBm e.i.r.p. with a Transmit Power Control (TPC) range of 30 dB;
7. that the protection of existing services needs to be ensured in the ITS bands and in adjacent bands;
8. that CEPT administrations shall permit free circulation and use of ITS equipment subject to the provisions of this Decision;
9. that CEPT administrations shall exempt ITS equipment falling under this Decision that complies with EN 302 571 from individual licensing;
10. that this ECC Decision enters into force on 3 July 2015;
11. that the preferred date for implementation of this ECC Decision shall be 3 January 2016;

12. that CEPT administrations shall communicate the national measures implementing this Decision to the ECC chairman and the Office when the Decision is nationally implemented."

Note:

Please check the Office documentation database http://www.ecodocdb.dk for the up to date position on the implementation of this and other ECC Decisions.