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COMeSafety
Communication for eSafety

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Deliverable

D28 Standardisation Activities

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SIXTH FRAMEWORK PROGRAMME

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0.2	25.11.2009	New chapter on ETSI TC ITS WG5
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1.0	21.12.2009	Final version

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Executive Summary

The COMeSafety Specific Support Action has in its key objectives the creation of direct communication channels between the results produced by the European projects that are working on the design and development of cooperative systems for road safety and traffic efficiency based on vehicle to vehicle and on vehicle to infrastructure communication and the related standardisation bodies.

This role is conceived to enable solutions where the standardisation bodies will benefit from the availability of relevant project activities and outcomes and running projects will benefit from the possibility to directly communicate to the standardisation bodies the information related to the core technologies necessary for V2V and V2I communication.

This document is the planned update of the COMeSafety Deliverable D18.

1 Introduction

This deliverable is to be considered as an evolution of the previous deliverables dealing with ongoing standardisation activities.

It reports the status of running liaisons among COMeSafety and their related standardisation bodies.

A very crucial topic on which Europe joint its efforts is the realisation of a common European architecture for vehicle to vehicle and for vehicle to infrastructure communication, in this task COMeSafety is heavily involved in direct cooperation with the projects that are working on cooperative systems for road safety and traffic efficiency like SAFESPOT, CVIS, COOPERS. Additionally the availability of appropriate frequency spectrum with effective protection for safety related cooperative applications is of the highest importance. In USA a specific frequency band has been allocated by the Federal Communications Commission for vehicle to vehicle and for vehicle to infrastructure, while in Europe the design and development of communication based system and applications have been started without the allocation of a frequency band.

It is for these motivations that the COMeSafety Specific Support Action has the task to establish the link between the OEMs (members of the C2C-C Consortium), the other stakeholders, the European Commission, the eSafety Forum Working Group on Communications and the Standardisation bodies to promote the allocation of an appropriate frequency band, to support the running projects in their design of a common communication architecture and to bring to the standardisation bodies all the inputs from the running projects related to the communication system parameters, the distribution of data and priority management for messages for an

efficient use of the radio resources.

The aim of the actions towards the different standardisation bodies is therefore to facilitate and support the cooperation of the C2C-C consortium, the running European projects on cooperative systems for safety and mobility with the standardisation bodies.

Available project results have been consolidated and prepared for the standardization and implementation process. This way they can be directly translated into technical decisions and standardization proposals. By feeding those proposals to open standardization groups and other relevant public bodies, they can be exploited by all European stakeholders.

2 Standardisation process

When COMeSafety started in 2006, many European projects and activities were planned or already on their way dealing with different aspects of Car2X communication and cooperative systems. A European wide process was missing to consolidate the results and to support the projects to introduce these results into the European and world wide standardisation process.

Rudy Mietzner (Cirquent), Timo Kosch (BMW Research and Technology), and Dieter Seeberger (Daimler) proposed a new consolidation process as one of the main guiding principles of COMeSafety (see Figure 2.1 below). The basic idea was to collect the requirements of the projects under consideration. These requirements needed to be consolidated. The results of the consolidation would provide a basis for the European and world-wide standardisation and the frequency allocation process.

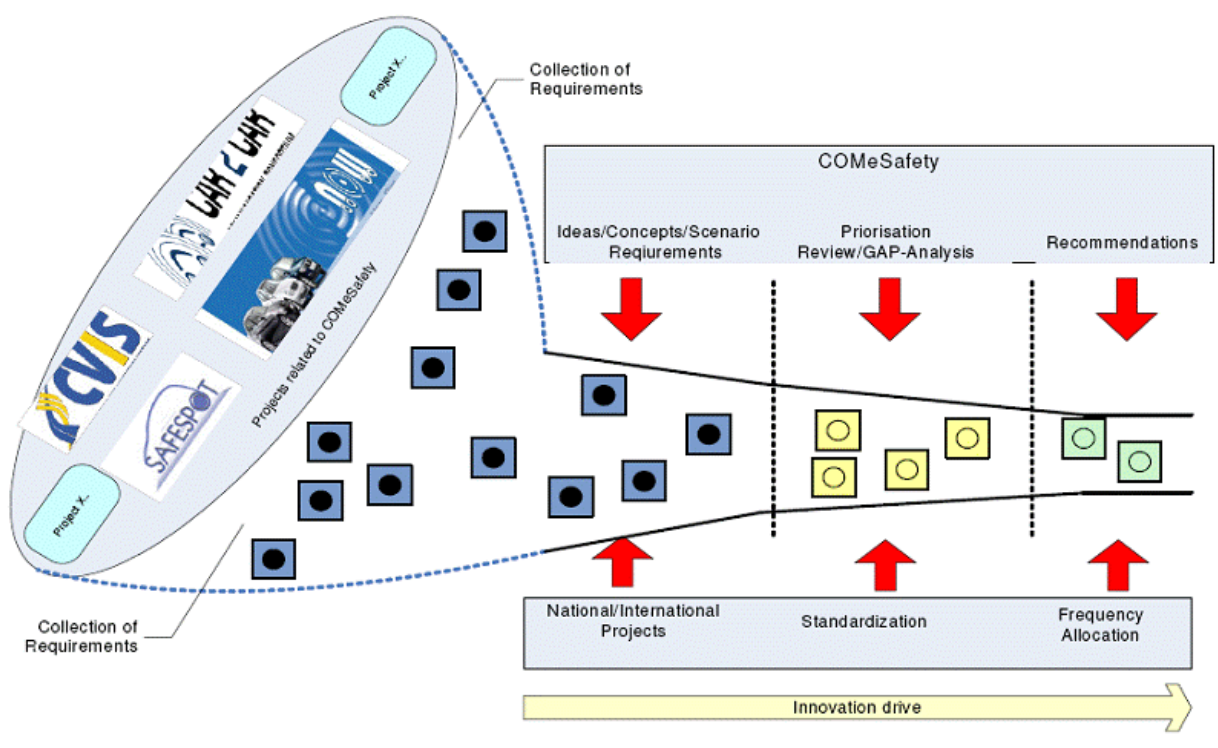


Figure 2.1: Aim of COMeSafety: New Consolidation Process

Now, 3 years later, the process is alive. COMeSafety has been chairing an architecture task force that is both collecting and consolidating the requirements and defining an architectural framework. The three currently running big integrated projects dealing with cooperative systems, CVIS, COOPERS and SAFESPOT are all actively participating in this work. Furthermore,

members of these projects are also active in the C2C Communication Consortium, which provides industry-wide platforms to harmonize the technical details and forward them to European standardisation in ETSI.

Figure 2.2 shows the connection between projects and standardisation. The process is a sequence of collaboration, consolidation and harmonisation into standardisation, which is fostered by the support of COMeSafety (see Figure 2.3).

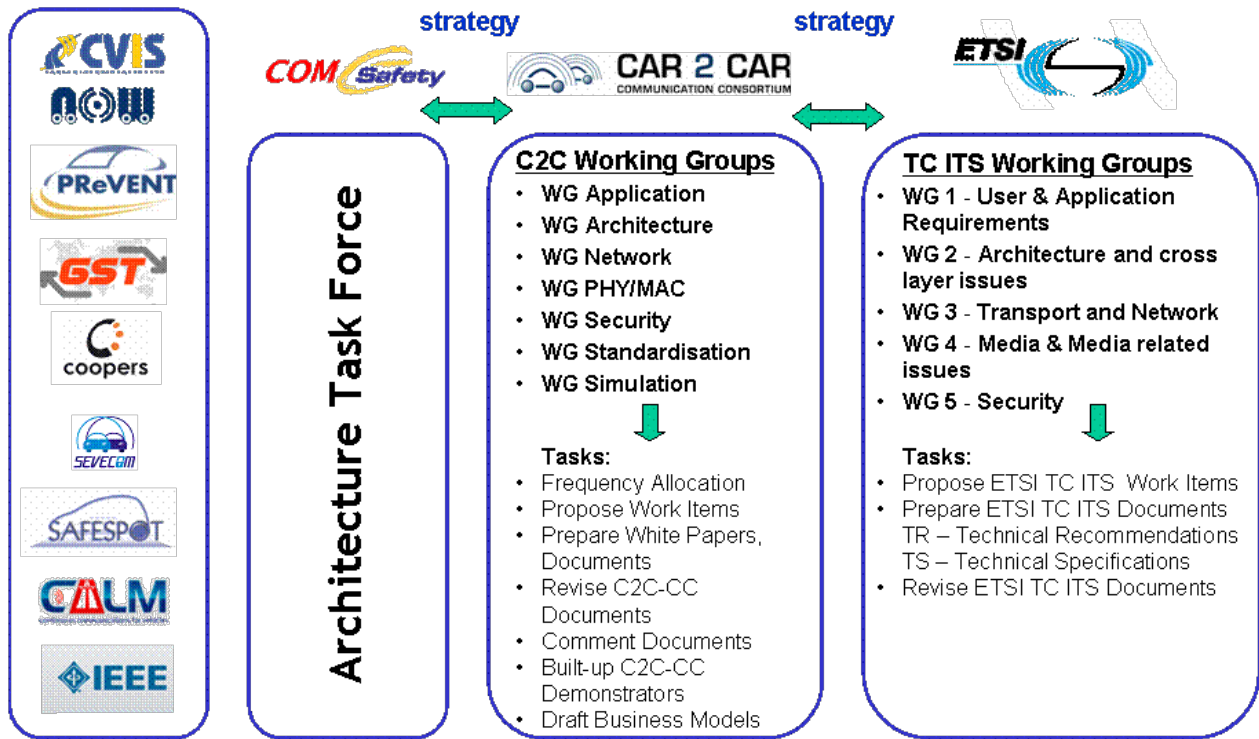


Figure 2.2: New Process: Actors and Tasks

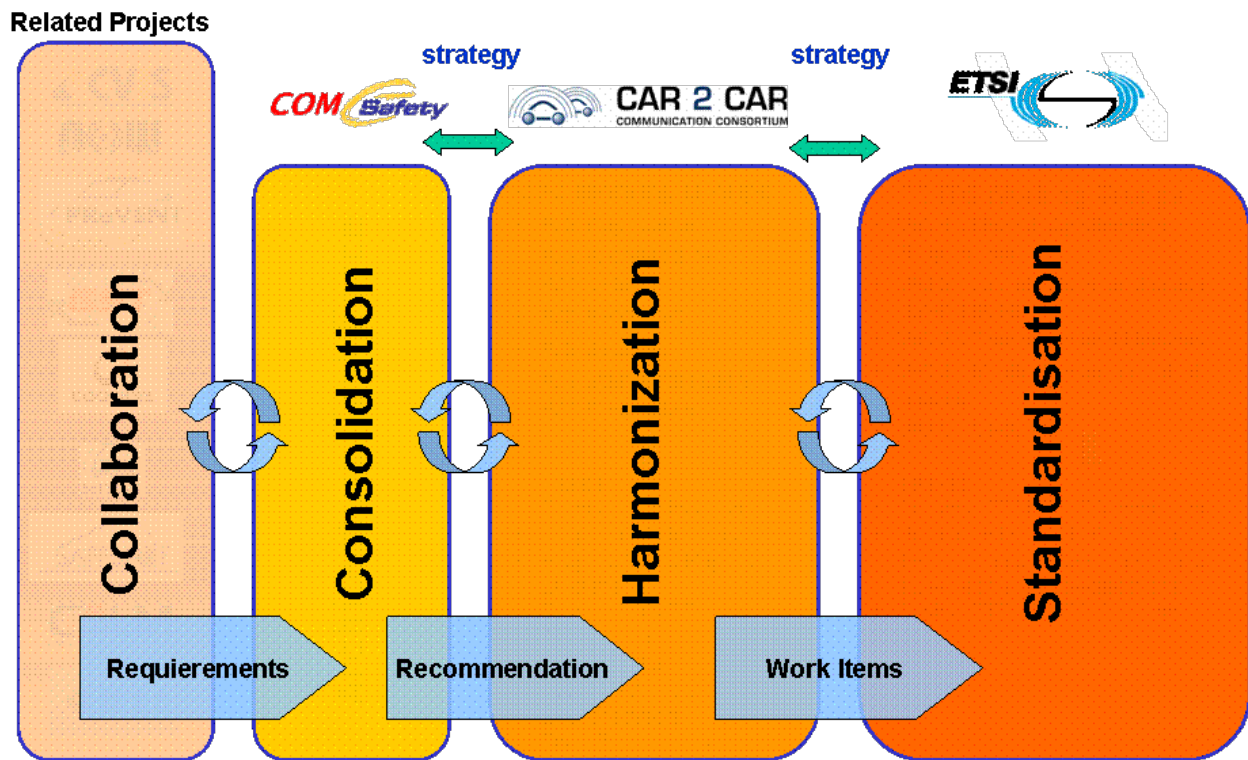


Figure 2.3: COMeSafety Process for Collaboration, Consolidatio, Harmonization and Standardisation

A key problem is finding the way of getting the best progress. For solving that problem a so called group of experts is established to coordinate all activities in a qualified way. Triggered by COMSafety activities the main tasks of the group of experts are amongst others

- the dialogue to the C2C Communication Consortium,
- the contact to the European and world wide standardisation bodies and
- the compensation of specifications and requirements between the involved European projects.

The group of experts can be seen as an information exchange and control centre between the involved European projects and standardisation bodies and the one side and the COMeSafety and C2C Communication Consortium on the other side. Figure 2.4 illustrates the role of the group of experts.

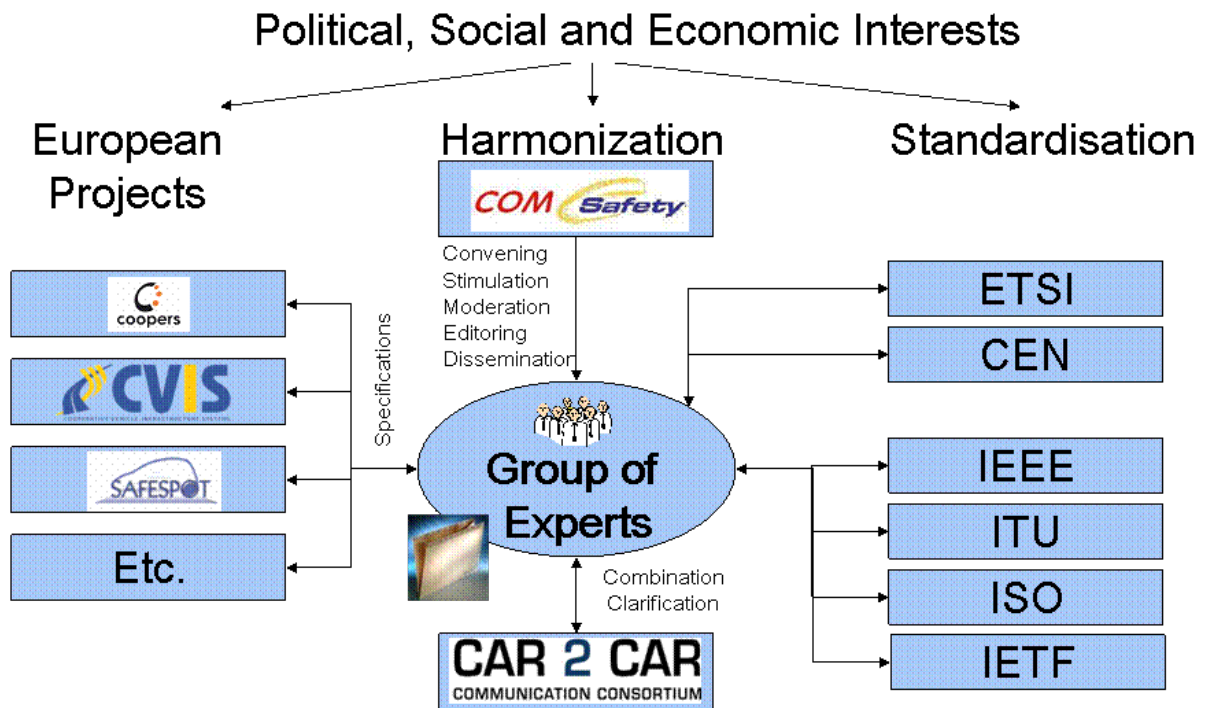


Figure 2.4: Role of the Group of Experts

COMeSafety itself has named so-called liaison managers for the 5 working groups in ETSI as well as for ISO CALM and IEEE 802.11p, 1609.2 and 1609.4. Figure 2.5 shows the assignment of the COMeSafety liaison managers. A guideline has been developed to define the work of the liaison managers.

ETSI ITS WG1:	RENAULT	IEEE 802.11p:	still in discussion
ETSI ITS WG2:	BMW Group Forschung und Technik	IEEE 1609.2:	BMW Group Forschung und Technik
ETSI ITS WG3:	DAIMLER	IEEE 1609.4:	DAIMLER
ETSI ITS WG4:			
ETSI ITS WG5:	Audi	ISO CALM:	CRF CENTRO RICERCA FIAT

Figure 2.5: Liaison Managers of COMeSafety

3 Liaisons to standardisation bodies

3.1 *Liaison Managers*

COMeSafety consolidated results and interests should contractually be submitted to the European and worldwide standardization bodies. Especially the European frequency allocation process should be actively supported by participating in ETSI and CEPT technical groups. Relevant ISO and IEEE work should also be supported. To this aim the COMeSafety Support Action has established a team of liaison managers that are becoming active in this third year of COMeSafety activities as relevant outcomes and main topics of discussions are now becoming available.

COMeSafety liaison managers today the follows:

- ETSI WG1: Gerard.Segarra@renault.com
- ETSI WG2: Markus.Strassberger@bmw.de
- ETSI WG3: Dieter.Seeberger@daimler.com
- ETSI WG4: [Andreas.Lübke@volkswagen.de](mailto:Andreas.Luebke@volkswagen.de)
- ETSI WG5: Ingrid.Paulus@audi.de
- IEEE 802.11p: Michele.Provera@crf.it
- IEEE 1609.2: Timo.Kosch@bmw.de
- ISO CALM: Danilo.Galgani@crf.it

3.2 *Overview of standardisation activities*

3.3 *ETSI ITS Working Groups*

ETSI collaborates with the European Conference of Postal and Telecommunications Administrations (CEPT) and the European Commission to secure the radio spectrum required for Intelligent Transport Systems.

Currently, there are currently the following projects related to automotive ITS:

- Dedicated Short-Range Communications (DSRC) provide communications between the vehicle and the roadside in

specific locations (for example toll plazas). Applications such as Electronic Fee Collection (EFC) will operate over DSRC.

- Wireless Communications Systems dedicated to Intelligent Transport Systems and Road Transport and Traffic Telematics will provide network connectivity to vehicles and interconnect them. Using radio bands requires adequate Harmonized Standards which are under development for the bands 5 GHz and 63 GHz.
- Continuous Air interface Long and Medium range (CALM) provides continuous communications between a vehicle and the roadside using a variety of communication media, including cellular, 5 GHz, 63 GHz and infra-red links. CALM will provide a range of applications, including vehicle safety and information, as well as entertainment for driver and passengers.

These technological projects form part of wider initiatives on matters such as road safety (for example the European Commission's eSafety initiative) and road tolling.

For more information see

www.etsi.org/WebSite/Technologies/IntelligentTransportSystems.aspx

3.3.1 ETSI ITS WG1

Terms of Reference of the Working Group

The WG1 terms of Reference were proposed to the Technical Committee and agreed.

The intention was not only develop application requirements but also standardize basic services supporting the applications, as:

- Co-operative Awareness basic service,
- Decentralized Environmental Notification basic service.

Another aim of WG1 was develop operational requirements and consider conformance testing and interoperability testing procedures.

Program of work and roadmap

The general program of work proposed to and agreed by the TC is here reported (roadmap in Figure 3.1).

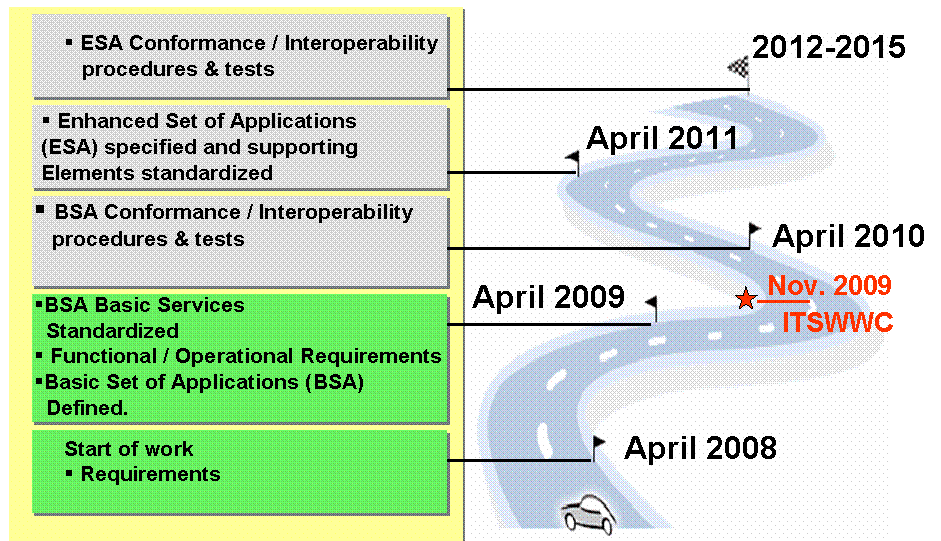


Figure 3.1: Proposed roadmap for ETSI WG1

Work Progression

The WG1 has been delivering its two first ETSI documents after the TC ITS meeting of the 23rd April 2009.

These two documents are:

- TR 102 638: Basic Set of Applications (BSA) definition,
- TR 102 698: C2C-CC Demonstrator 2008; Use cases and Technical Specifications.

Several Technical Specifications (TS) are now ready to be delivered to the TC ITS in the middle of January 2010.

They are:

- TS 102 637 part 1: BSA Functional Requirements,
- TS 102 637 part 2: Co-operative Awareness Message (CAM) Basic Service Specification.
- TS 102 637 part 3: Decentralized Environmental Notification Message (DENM) Basic Service Specification.
- TS 102 637 part 4: BSA Operational Requirements.

New work items

Nine New Work Items proposed by the WG1 have been approved by the TC ITS during its last meeting in October 2009 and subsequent ABC procedures.

They are:

- Facilities layer structure, functional requirements and specifications.
- Local Dynamic Map; scoping the local dynamic map standardization and developing the related Technical Specifications.
- TR 102 863: Local Dynamic Map (LDM); Rationale and guidance on standardization.
- TS 102 868 – Part 1: Conformance test specification for Co-operative Awareness Messages (CAM); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma.
- TS 102 868 – Part 2: Conformance test specification for Co-operative Awareness Messages (CAM); Part 2: Test Suite Structure and Test Purpose (TSS+TP).
- TS 102 868 – Part 3: Conformance test specification for Co-operative Awareness Messages (CAM); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information Testing (PIXIT).
- TS 102 869 – Part 1: Conformance test specification for Decentralized Environmental Notification Messages (DENM); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma.
- TS 102 869 – Part 2: Conformance test specification for Decentralized Environmental Notification Messages (DENM); Part 2: Test Suite Structure and Test Purpose (TSS+TP).
- TS 102 869 – Part 3: Conformance test specification for Decentralized Environmental Notification Messages (DENM); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information Testing (PIXIT).

Lan Lin from Hitachi is the rapporteur for WI related to the Facilities layer.

Miro Bogdanovic from Daimler is the rapporteur for WIs related to the Local Dynamic Map (LDM)

Arno Hinsberger from HTW Saarland is the rapporteur for WIs related to CAM & DENM Conformance testing.

Contribution to E.C Mandate STF

In the scope of the European Commission Mandate for ITS standardization (M453), in April 2009, the WG1 has been proposed to the TC ITS two STFs:

- One on LDM standardization scoping and standard development.
- One on CAM & DENM Conformance testing.

These two STFs have been accepted and have been regrouped with some others proposed by the WG2 and WG3 to form the following STFs:

- STF UU (TC ITS / WG1 – WG2) on “Local Dynamic Map standardization scoping and classification / management of applications”.
- STF UV (TC ITS / WG1 –WG3) on “Conformance test specification for CAM & DENM, GeoNetworking, Basic Transport Protocol and integration of IPv6 and GeoNetworking”.

Cross-Layers Issues

Several items being considered by the WG1 require some co-operation between several WGs of the TC ITS. Such co-operation will be facilitated by WGs common meetings, the first one being programmed the 28th and 29th January 2010 in ETSI Sophia Antipolis. The WG1 items to be considered are:

- Control and execution of the services announcement. Indeed, the control shall be achieved by the facilities layer which includes the “services management” function. But its execution can be achieved by the facilities layer, the transport & network layer or the MAC layer.
- DENM forwarding to reach the targeted relevant area. It is clear that the transport and network layer keep the responsibility of forwarding messages. However, only the facilities / application layers will have some knowledge about the evolution of forwarded events. So it could be wise to use this knowledge to optimize the number of forwarded messages so avoiding some channel congestion problems.
- Management of the Communication Resources according to some technical and economical criteria. Indeed, in the future it could be possible to use different communication profiles to support an ITS application. In such case, it will be necessary to develop some management policies taking into account various elements provided by several layers of an ITS station.

- Identifiers management. For the Services Announcement, the WG1 has proposed the following identifiers: - Services ID, - Communities ID, Communication Profiles ID. It has to be decided now which entity takes the responsibility of assigning IDs and managing them.

Liaisons

CEN TC 278 WG16 – ETSI TC ITS

Following the setting-up of the CEN TC 278 WG16 dedicated to road co-operative systems, ETSI and CEN have started a small task force to:

- Clearly identify the Minimum Set of Standards to be developed to respond to the European Commission Mandate M453 on ITS.
- Delimitate the respective CEN and ETSI responsibilities to achieve the development of this minimum set of standards.
- Provide a work plan including the decided STFs.

Every thing shall be available at the end of March 2010.

TISA – ETSI TC ITS

Following a presentation of the ETSI TC ITS WG1 activity plan to TISA at the end of 2008, TISA accepted to co-operate with ETSI for the use and development of TPEG.

C2C-CC WG Applications – ETSI TC ITS WG1

A strong liaison is now established between C2C-CC WG Application and the ETSI TC ITS WG1. This is achieved through the active participation in the two WGs of some members of both working groups.

PRE-DRIVE C2X – ETSI TC ITS WG1

PRE-DRIVE C2X has been actively contributing to the definition of the Basic Set of Applications (TR 102 638) and to the definition of the facilities layer structure.

CVIS – ETSI TC ITS WG1

CVIS has also contributed to the definition of the Basic Set of Applications.

Next Meetings

- 27th January 2010 in ETSI Sophia Antipolis
- 14th April 2010 in ETSI Sophia Antipolis.

3.3.2 ETSI ITS WG3

Terms of Reference of the Working Group

The ETSI TC ITS WG Transport and Network is developing ETSI deliverables for the data transport and network protocol layers and management of these layers.

In particular this includes:

- Development of a network architecture which covers existing and future wireless and wired technologies and various application services for any kind of ITS users, including vehicle drivers and passengers, railway users, pedestrians, bicyclists and other;
- Harmonization of the network architecture with the overall ITS system and protocol architecture;
- Development of novel networking protocols for ITS, such as ad hoc and multi-hop routing protocols, reliable transport protocols over multi-hop routing, and others;
- Integration of dedicated ITS network protocols and transport protocols with the Internet protocol suite and IP mobility extensions;
- Work out solutions for internetworking between access networks;
- Ensuring that the networking and data transport protocols and algorithms
 - Are efficient, scalable and reliable
 - Protect the user's privacy and ensure security

Program of work and roadmap

The WG's current work is defined by the Work Items, which are listed below together with some status information:

DTS/ITS-0030002 Intelligent Transport System (ITS); Vehicular Communications; Part1: Requirements for GeoNetworking and Data Transport Protocol

- The document will specify the requirements of network and transport layer protocols for ad hoc routing in vehicular environments based on wireless communication technology.
- A final draft TS 102 636-1 V1.1.1 is available and currently in the approval by correspondence process. The final approval for publication is planned for the next TC meeting in January 2010.

DTS/ITS-0030003 Intelligent Transport System (ITS); Vehicular Communications; Part2: Scenarios for GeoNetworking

- The document will specify the network scenarios for vehicle-to-vehicle and vehicle-to-infrastructure communication.
- The final draft TS 102 636-2 V1.1.1 is available as a consolidated list of scenarios. Currently the draft is in the WG's internal approval by correspondence process. The final approval for publication is planned for the next TC meeting in January 2010.

DTS/ITS-0030004 Intelligent Transport System (ITS); T Vehicular Communications; Part 3: Network architecture

- The deliverable will specify the network architecture for vehicle-to-vehicle and vehicle-to-infrastructure wireless communication.
- #The final draft TS 102 636-3 V1.1.1 is consolidated with the overall ITS communication architecture ETSI TS 102 665 V0.0.16. and currently in the WG's internal approval process. The TC approval for publication is planned for the next TC meeting in January 2010..

DTS/ITS-0030001 Intelligent Transport System (ITS); Vehicular Communications; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communication; Subpart 1: Media independent functionalities

- The deliverable will specify a network protocol for ad hoc routing in vehicular environments, including vehicle-to-vehicle and vehicle-to-infrastructure wireless communication. The protocol will support communication based on concepts for geographical addressing and forwarding (Geocast). It provides mechanisms for periodic messaging and multi-hop, robust, efficient, reliable, secure and anonymous communication.
- A first analysis of GeoNetworking functionalities and the splitting into media-dependent and media-independent functionalities is done. The standard will have the number TS 102 636-4-1, but so far a draft is not available. The planned WG approval of the final draft is postponed to end of April 2010.

DTS/ITS-0030007 Intelligent Transport System (ITS); Vehicular Communications; Geographical addressing and forwarding for point-to-point and point-to-multipoint communication; Subpart 2: Media dependent functionalities for 5GHz media (5.9 GHz)

- The deliverable will specify media-dependent functionalities for GeoNetworking as a network protocol for ad hoc routing in vehicular environments, including vehicle-to-vehicle and vehicle-to-infrastructure wireless communication. More specifically, the deliverable will specify the media-dependent functionalities for 5 GHz media (5,9 GHz).
- Analog to the related work item DTS/ITS-0030001 a first analysis of GeoNetworking functionalities and the splitting into media-dependent and media-independent functionalities is done. The standard will have the number TS 102 636-4-2, but so far a draft is not available. The planned WG approval of the final draft is postponed to end of April 2010.

DTS/ITS-0030006 Intelligent Transport System (ITS); Vehicular Communications; Part 5: Transport Protocols; Subpart 5: Basic Transport Protocol for GeoNetworking

- The deliverable will specify a transport layer protocol for wireless communication in ITS environments.
- No draft available yet. A stable draft for WG approval is expected in April 2010. The number of the standard will be TS 102 636-5-1.

DTS/ITS-0030005 Intelligent Transport System (ITS); Vehicular Communications; Integration of IPv6 and GeoNetworking

- The deliverable will specify mechanisms to support IPv6 over GeoNetworking.
- The number of this standard will be TS 102 636-6-1. A first draft is available and progress is ensured by drafting meetings organized out of the regular WG meetings. The WG approval is planned for April 2010.

DTS/ITS-0030008 Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 11: Interface between network and transport layers and facilities layer

2010-10-14

- The document will specify the Interface(s) between the ITS network&transport layer and the ITS facility layer including interface services and service primitives which are extendible in order to achieve general applicability. Related procedures and common parameters will be specified in consultation of TC ITS WG1 and WG2.
- The number of this standard will be TS 102 723-11. The outcome of this recently agreed work item should be provided for WG approval end of October 2010.

DTS/ITS-0030010 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT);

- Protocol conformance testing for GeoNetworking/ITS-G5 as defined in TS 102 636-5-1.
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030011 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma;

- Protocol conformance testing for the Basic Transport Protocol (BTP) as defined in TS 102 636-5-1.
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030012 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 2: Test Suite Structure and Test Purposes (TSS&TP);

- Protocol conformance testing for the Basic Transport Protocol (BTP) as defined in TS 102 636-5-1
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030013 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking ITS-G5; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT);

- Protocol conformance testing for GeoNetworking/ITS-G5 as defined in TS 102 636-5-1
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030014 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking ITS-G5; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma;

- Protocol conformance testing for GeoNetworking/ITS-G5 as defined in TS 102 636-4-1 and TS 102 636-4-2
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030015 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking ITS-G5; Part 2: Test Suite Structure and Test Purposes (TSS&TP);

- Protocol conformance testing for GeoNetworking/ITS-G5 as defined in TS 102 636-4-1 and TS 102 636-4-2
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030017 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over Geonetworking; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma;

- Protocol conformance testing for Transmission of IP packets over GeoNetworking as defined in TS 102 636-6-1.
- The WG approval of the result is scheduled to end of March 2011.

DTS/ITS-0030009 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over Geonetworking; Part 2: Test Suite Structure and Test Purposes (TSS&TP)

- Protocol conformance testing for transmission of IP over GeoNetworking as defined in TS 102 636-6-1.
- The result should be available for WG approval by end of March 2011.

DTS/ITS-0030016 Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over Geonetworking; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT);

- Protocol conformance testing for transmission of IP packets over GeoNetworking as defined in TS 102 636-6-1.
- The WG approval of the result is scheduled to end of March 2011.

It is expected that WG3 will work on following aspects at a later stage:

- GeoNetworking - Media dependent functionality 2.4GHz medium and 5GHz media (5.4GHz) and other media (for example IR and 63GHz)
- More advanced transport layer protocols (TS 102 636-5-2)
- IP mobility extensions for ITS (Mobile IPv6, NEMO, MONAMI6)
- Interoperation of IP version 4 and 6
- Network management

3.3.3 ETSI ITS WG4

The WG 4 covers the media and media related issues of the ITS standardization. The working group develops Physical and MAC layer standards for ITS. The WG emphasizes on the 5.9 GHz band, however it is not limited to it. All short range and cellular technologies suitable for ITS can be handled by the WG.

The standards currently under development are:

- ES 202 663 (Intelligent Transport Systems (ITS); European profile standard for the physical and medium access control layer of Intelligent Transport Systems operating in the 5 GHz frequency band)

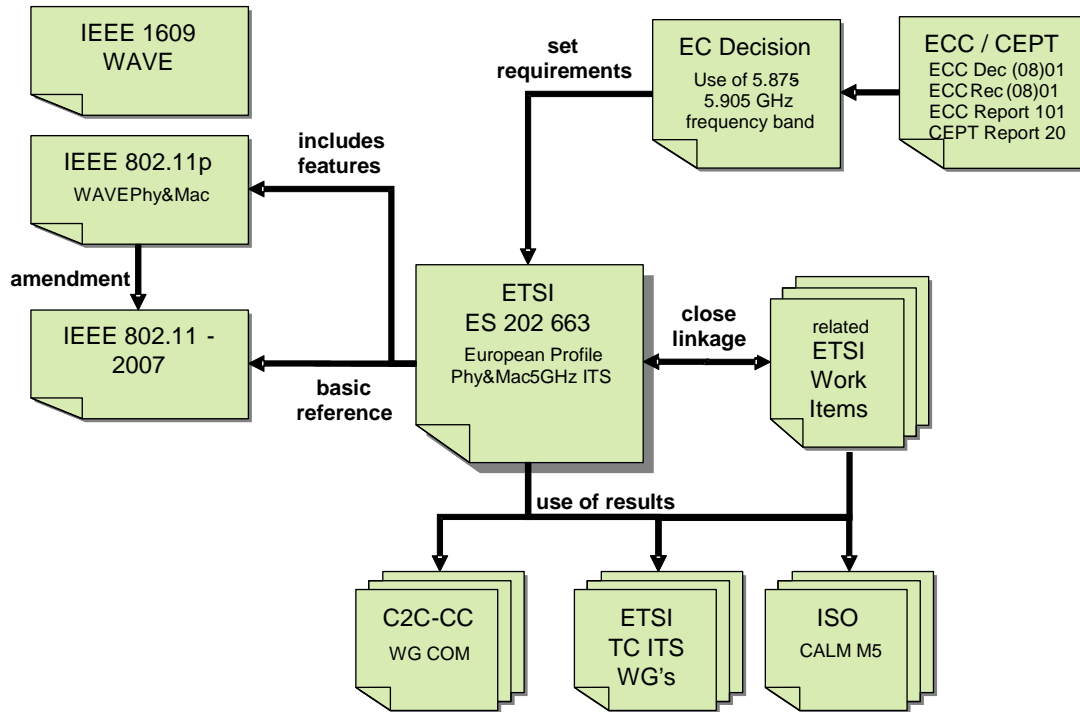


Figure 3.3.1: European profile standard, its relation to other standards and bodies

This European profile standard is the adaptation and enhancement of the IEEE 802.11p standard to the available frequency bands in Europe. It covers physical layer and MAC layer. Figure 3.3.1 depicts the relation between the European profile standard and other standards and bodies. Besides the frequency bands addressed by EC Decision, ECC Decision

and ECC Recommendation, the profile includes the RLAN band between 5.470 and 5.725 GHz for use with ITS.

Figure 3.3.2 indicates the channels as defined by the European profile standard. The allocated 50 MHz for ITS are subdivided into five channels, of which one is a control channel (CCH) and the four others are service channels (SCHs). Not included in the figure are other service channels located in the RLAN band. The red line in the figure indicates the maximum transmit power spectral density limits allowed within the frequency band.

Note that the control channel uses a different frequency band than in the US. The reason is the “guard-zone” concept pursued in the European profile standard: a guard zone is introduced between CCH and SCH1 to avoid interference. It is intended to use the guard zone channel adjacent to the CCH (SCH2) only for low-priority messages. Messages transmitted on SCH2 will not interfere with those transmitted on CCH or SCH1 because of a lower transmit power. In this concept, the two most heavily-used channels are CCH and SCH1.

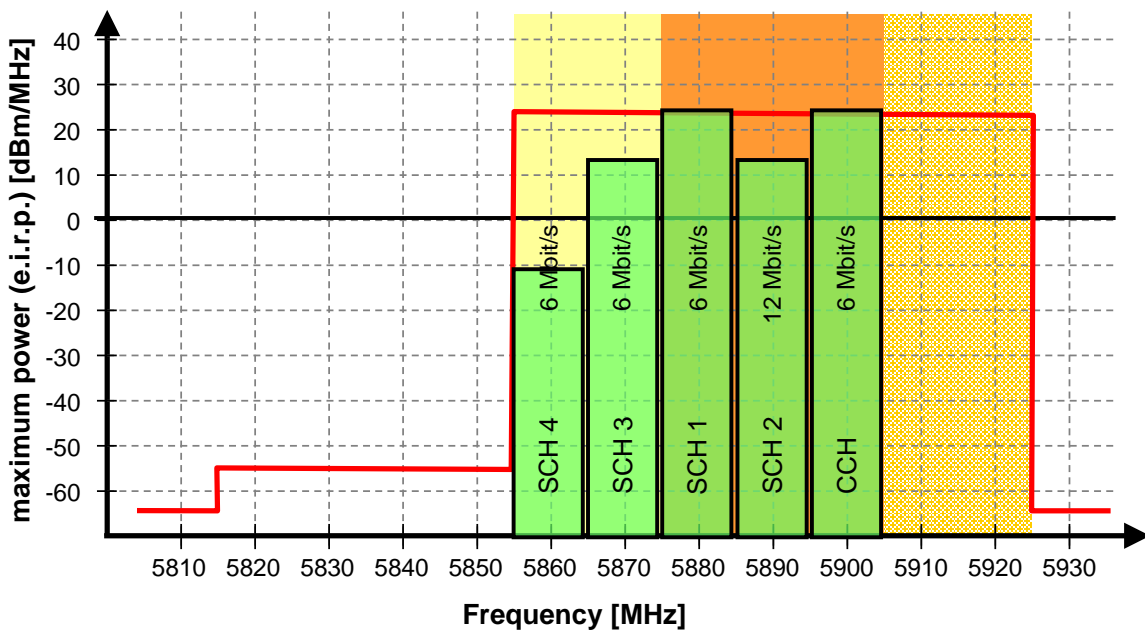


Figure 3.2.2: ITS G5 channels with respective maximum TX power spectral density limit; missing: SCH5 in RLAN band

According to the European profile standard, all ITS devices – except for those only providing non-safety applications – have to permanently listen on the control channel while they are not transmitting in the frequency band between 5.855 GHz and 5.905 GHz. Practically, this can be expected to result in a dual receiver concept, as no currently available receiver is capable of switching between channels without any delay. This is different to the current US concept

[IEEE P16094], where a single receiver switches between service channels and control channel according to fixed time slots.

ES 202 663 has been approved for membership voting by ETSI TC ITS in October 2009. The membership voting will end January 11th 2010.

Furthermore, the following specifications related to the allocated frequency band are under development in the working group:

- TS 102 687 (Transmitter Power Control Mechanism for Intelligent Transport Systems operating in the 5 GHz range):

This document provides the transmit power control specifications for operation in the 5 GHz range to meet the regulatory requirements, in particular the 30 dB TPC range, and as well to support congestion control and networking.

- TS (DTS/ITS-0040013) (Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range):

Dedicated Short Range Communication (DSRC) devices operating in the frequency band between 5795 MHz and 5815 MHz may suffer from interference caused by ITS devices at adjacent frequency bands. The developed TS will detail this issue and propose solutions to the problem.

- TS (DTS/ITS-0040016) (Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band):

This document describes the specifications for operation of ITS devices in the 5 GHz range to satisfy the harmonized usage of the designated spectrum by control and service channels including usage of channels for road-safety related ITS applications.

This includes also transmit and receive restrictions that are likely to have implications on Transmit Power Control (TPC) functionalities.

In addition co-channel and adjacent channel interference considerations are encompassed.

Several Specialist Task Forces (STFs) have started their work related to ETSI standards being developed for the allocated frequency band.

- STF “Techniques to ensure co-existence between Cooperative Intelligent Transport Systems (ITS) and Dedicated Short Range Communication (DSRC) used in the European Electronic Tolling Service (EETS)”

This STF performs work related to TS (DTS/ITS-0040013)

- STF “Investigations of 802.11p reliability problems beyond the scope of current ETSI TC ITS PHY layer standardization“

This STF investigates potential mobility issues with IEEE 802.11p-based ITS systems with a focus on modulation, coding, and channel estimation.

- STF „Performance and potential for standardization of STDMA medium access method for cooperative Intelligent Transport Systems“

It is currently intended that ITS devices will use CSMA/CA as channel access scheme, as defined in the IEEE 802.11 standard. This STF investigates self-organizing time division multiple access (STDMA) as an alternative MAC method.

3.3.4 ETSI ITS WG5

Terms of Reference of the Working Group

Topics addressed in the ETSI WG5 are:

- Threat, vulnerability and risk analysis
- Objectives and functional requirements for security
- Security architecture and security mechanisms and architecture instantiation concerning use of 5GHz technology

Applying the ETSI approach two key issues are considered:

- “Design for assurance” based on the considerations to allow for a Common Criteria evaluation of the resulting products and services
- Risk based selection of countermeasures suite using ETSI’s Threat Vulnerability and Risk Analysis (TVRA) approach

The use cases considered in the TVRA to date have been selected from the ETSI ITS Basic Set of Applications (ETSI TR 102 638).

Program of work and roadmap

The objectives of the WG5 are:

- Conducting studies leading to deliverables on Security;
- Assuring ITS solutions conform to regulatory requirements for privacy, data protection, lawful interception and data retention;
- Management and co-ordination of the development of security specifications for ITS communication and data;
- Investigation of security services and mechanisms required for providing ITS services over the Internet;
- Development of security analyses of candidate protocols and network elements to be used within the ITS framework to implement capabilities e.g., EMTel aspects, IPv6 migration, keying strategies and methods;
- Tracking ongoing worldwide security activities of interest to ITS (notably in ISO TC204)

Based on these objectives, a program of work and a roadmap have been developed but will be refined to address the ongoing developments in the wider ITS and telecommunications worlds.

Work Items

Work Items in ETSI are the holder for active work in ETSI standardization and have to be supported by at least 4 ETSI members. Current work Items within WG5 of ETSI are

Next meetings

- All the scheduled meetings of ETSI TC ITS and the related WGs are listed on the meetings calendar on the ETSI portal. (http://portal.etsi.org/Portal_Common/home.asp, select the technical body “ITS” and in the next step the “WG”. The next period of TC and WG meetings is planned for 18-22 January 2010 at ETSI in Sophia Antipolis.
- Agenda of the meetings will be available in due time on the ETSI portal. Non ETSI members can ask the TC or WG chairman respectively for an invitation to a meeting.

4 Results of current standardisation activities

As reported in the COMeSafety project web site, many projects are currently addressing the use of communication technologies for road safety and efficiency. For safety applications, 5,9 GHz communication based systems will play a crucial role and are foreseen to be the core of European cooperative road safety and efficiency systems.

This work on applications and technologies, protocols and security mechanisms, will fit into one overall architectural framework. This framework is currently built. A task force moderated by COMeSafety has been dedicated to consolidate it and foster its adoption. The major European projects working on related issues participated, especially the Integrated Projects COOPERS, CVIS, SAFESPOT and SeVeCOM, bringing in security and privacy solutions. To achieve wide acceptance and prepare standardisation, the task force is working in close contact with the Car2Car Communication Consortium and the relevant standardization bodies such as ETSI TC ITS, CEN, ISO TC 204, IEEE802.11p and IEEE1609.x. It is foreseen to standardise the framework through ETSI TC ITS.

COMeSafety took actively part in the European frequency allocation process for spectrum for communication between vehicles and between vehicles and roadside units.

In the first step the European industry in ETSI developed a System Reference Document (SRDoc) to describe the requirements and basic system parameters for European wide harmonisation of spectrum to the European Conference of Post and Telecommunications (CEPT). For safety and non-safety applications a bandwidth of 70 MHz was identified in the 5.9 GHz band. The same spectrum was already available in the US and other countries like Japan assigned spectrum already in the 5 GHz band for the same purpose. Considering the existing European spectrum allocations the frequency band 5.875-5.925 GHz was identified for the deployment of safety related applications and the frequency band 5.855-5.875 GHz for non-safety related applications. 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 as given in the ISM band. The proposed maximum transmission power for the whole frequency range is 33 dBm e.i.r.p. in a 10 MHz channel.

Within the CEPT extensive compatibility studies followed with the result, that within the 30 MHz of spectrum in the frequency band 5875-5905 MHz, ITS applications will not suffer from excessive interference resulting from other services/systems. However in that frequency range ITS cannot claim protection from FSS earth stations but the usage of those stations is very limited. In the remaining 20 MHz of spectrum in the range from 5.905-5.925 GHz ITS may suffer interference from the Fixed Service above 5925 MHz.

CEPT has also studied the required spectrum bandwidth for safety related ITS applications based on realistic traffic scenarios and confirmed that 30 to 50 MHz would be needed in the 5.9 GHz band.

Based on the results of the studies the CEPT developed the ECC Decision on the harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS) (ECC/DEC/(08)01) that designates the sub-band 5.875-5.905 GHz to ITS road safety applications on a European basis immediately and considers the sub-band 5905-5925 MHz for future extension. 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.

Additionally the ECC Recommendation on the use of the band 5855-5875 MHz for ITS (ECC/REC (08)01) suggests the CEPT administrations to make these 20 MHz of spectrum available for non-safety ITS applications on a non-protected/non-interference basis.

Frequency designation is subject to national legislation and ECC Decisions are on a voluntary basis, but administrations have to commit themselves to its implementation and consideration in the national regulation. ECC Recommendations guide administrations to a certain use of spectrum and are less binding without commitment.

While the implementation of CEPT regulations is voluntary for its 48 members, a frequency decision developed in the EU regulatory framework is binding for the 27 EU member states. Because ITS for road safety has a strong political importance in Europe the European Commission (EC) mandated the CEPT to provide technical information about the spectrum requirements and compatibility issues. Based on this information the Radio Spectrum Committee of the EC developed the Commission Decision on the harmonised use of radio spectrum in the 5875 - 5905 MHz frequency band for safety related applications of Intelligent Transport Systems (ITS). By this EC Decision EU member states are forced to designate the considered 30 MHz of spectrum not later than six months after entry into force of this decision and as soon as reasonably practicable following such designation, to make that frequency band available on a non-exclusive basis.

The CEPT and as well the EC limited the maximum transmission power of ITS in the whole band from 5.855 – 5.925 to 23 Bm/MHz e.i.r.p., but absolutely not more than 33 dBm e.i.r.p..

5 References

- Contact Points:
- CEN TC278: www.nen.nl/cen278
- ISO TC204: www.isotc204.com
- ETSI: www.etsi.org
- CALM: www.calm.hu
- ETF: www.ietf.org
- IEEE: www.ieee.org
- Chairman ISO TC204 Michael Noblett,
Michael.Noblett@SEICCS.com
- Chairman CEN TC278 Henk Stoelhorst,
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- Chairman ETSI TC ITS Sören Hess,
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Annex 1 Acronyms

API	Application Programming Interface
ASTM	American Society for Testing and Materials
BSA	Basic Set of Applications
C2C-CC	Car-to-Car Communication Consortium
CAL	Communication Adaptation Layer
CALM	Continuous Air interface for Long and Medium range
CEN	European Committee for Standardisation
CEPT	Conference of European Postal & Telecommunications
CI	Communication Interface
CIMAE	CI Management Adaptation Entity
CVIS	EU project: Cooperative Vehicle-Infrastructure Systems
COOPERS	EU project: Co-operative Systems for Intelligent Road Safety
DSRC	Dedicated Short Range Communication
EC	European Commission
ECC	Electronic Communications Committee
ERM	Electromagnetic compatibility and Radio spectrum Matters
ESA	Enhanced Set of Applications
ETSI	European Telecommunications Standards Institute
EU	European Union
FCC	Federal Communications Commission
FS	Fixed Service
FSS	Fixed Satellite Service (Earth-to-Space)
IEEE	Institute of Electrical and Electronics Engineers
IETF	International Engineering Task Force
IP	Internet Protocol
ISM Band	Industrial, Scientific and Medical Band
ISO	International Organisation for Standardisation
ITS	Intelligent Transport Systems
ITU	International Telecommunication Union
MAC	Medium Access Control
MAIL	Media Adapted Interface Layer

MEXT	Mobility Extensions for IPv6
MONAMI6	Mobile Nodes and Multiple Interfaces in IPv6
NEMO	Network Mobility Extension for Mobile IPv6
OSI	Open Systems Interconnection
RTTT	Road Transport and Traffic Telematics
SAFESPOT	EU project: Cooperative vehicles and road infrastructure for road safety
SAP	Service Access Point
SRDoc	System Reference Document
TC	Technical Committee
TG	Technical Group
TPC	Transmitter Power Control
V2I	Vehicle to Infrastructure
V2V	Vehicle to Vehicle
VII	Vehicle Infrastructure Integration
WAVE	Wireless Access in Vehicular Environments
WG	Working Group
WLAN	Wireless Local Area Network