|  |  |
| --- | --- |
| ETSI_logo_Office_Colour_Small | ToR STF CC (TC RT JTFIR) |
| Version: 2.2 |
| Author: Anne-Sophie Chazel – Date: 21 Sept 2017  |
| Last updated by: Youssouf Sakho– Date: 25 April-2018 |
| page 1 of 14 |

Terms of Reference - Specialist Task Force

STF CC (TC RT JTFIR)

Urban Rail systems: Allowing CBTC application in the EC harmonised safety-related ITS band – pre-standardization studies -

Summary information

|  |  |
| --- | --- |
| Approval status | Approved by remote consensus by TC ITS and TC RT To be presented for approval by Board#117 (date 20 April 2018) |
| Funding | **Maximum budget: 136 600 ETSI FWP**Manpower cost: 135 000€ Travel cost: 1 600€  |
| Time scale | June 2018 to December 2018 |
| Work Items  | DTR/RT-JTFIR-2 (TR 103 580): Extension of the 5.9GHz band for safety related ITS |
| Board priority  | [ETSI STF funding criteria](https://portal.etsi.org/STF/STFs/Funding.aspx)* Emerging domains for ETSI
 |

Part I – Reason for proposing the STF

# Rationale

CEPT/ECC has requested ETSI to support CEPT/ECC to provide the Commission with the necessary information to consider the amendment of Commission Decision 2008/671/EC, of 5 August 2008 [5], on the harmonised use of radio spectrum in the 5 875-5 905 MHz frequency band for safety-related applications of Intelligent Transport Systems (ITS) [7].

In particular, the purpose of the EC ITS mandate to CEPT [6] is to study the possibility of:

* Extending the upper edge of the EC harmonised safety-related ITS band (5 875-5 905 MHz) by 20 MHz up to 5 925 MHz.
* In addition to road transport, allowing other means of transport such as Urban Rail (using Communication Based Train Control, (CBTC)) in the EC harmonised safety-related ITS band.

In the scope of the STF:

* ITS (Intelligent Transport Systems) covers Urban Rail ITS and road ITS.
* Urban Rail ITS covers CBTC (Communications Based Train Control).
* Road ITS covers cooperative ITS applications based on ITS-G5 and LTE-V2X technologies.

In the ongoing discussion between ETSI TC RT and TC ITS on the shared use of the frequency spectrum between 5905 MHz to 5925 MHz for Urban Rail systems based on the ETSI SRdoc TR 103 111 V1.1.1 [1] using the set of CBTC requirements defined in IEEE 1474.1 [2] and IEC 62290-2, several sharing options have been proposed and initially evaluated in ETSI TR 103 442 V1.2.1 [3]. Based on the feedback from ETSI to CEPT, WGFM has invited ETSI to provide a detailed and agreed technical standard allowing practical implementation of both Urban Rail and ITS applications in the 5875-5925 MHz band [8].

ETSI TR 103 442 V1.2.1 has proposed several possible ways to share the spectrum, either based on advertisement of mitigation areas, and application of mitigation techniques in these areas, or based on the usage by CBTC of the ITS harmonized access protocol layer.

In order to guarantee the availability of the required expertise, TC RT and TC ITS have proposed to create this STF with the goal of bringing detailed technical arguments to choose the best solution based on:

* + the fulfilment of the communication needs for each application,
	+ the spectrum efficiency,
	+ the technical neutrality of the solution, allowing further evolutions to benefit from technical progress in one domain without being blocked by market constraints of the other domain.

As such, it ensures that the technical work to be conducted in this STF will follow the principles mentioned in the mandate [6], which are technology neutrality and efficient spectrum use as regulatory principle together with uncompromised safety and the introduction in the longer-term of 5G for the further development of CCAM (Cooperative, Connected and Automated Mobility) -

# Objective

The proposed STF will:

* evaluate the real mutual impact of both kinds of application (Road ITS and Urban Rail ITS) sharing the same spectrum, based on real propagation conditions and access protocols
* detail the solution based on warning and mitigation techniques, identified as “Detect and Mitigate solution”.
* check the feasibility of the solution based on a harmonized access protocol layer to meet Urban Rail ITS and road ITS requirements and identifying the corresponding updates and extension of the ITS standards identified as “Harmonized Protocol solution”
* evaluate the need for an update of the harmonized standard HEN 302 571
* the results will be addressed in the TR 103 580.

The frequency spectrum to be addressed is 5875 to 5925 MHz.

The aim is to specify the best solution to be applied in the ITS band (5875-5925 MHz) and meet Urban Rail ITS and road ITS applications requirements in terms of one-way delay, packet failure rate and throughput. CBTC systems need to keep independence between CBTC train control applications and the communication systems used.

# Relation with ETSI strategy and priorities

In the MoU between ETSI and ECC it has been defined that ETSI has the charter to develop harmonised standards in support of the spectrum policy of the ECC and the EC. This is depicted in Figure 1Figure 1. The proposed STF fully supports these interactions and mandates by developing a technical solution for coexistence and equal access to spectrum.



Figure 1: MoU between ETSI and ECC

The proposed STF supports the ETSI Long term strategy by:

* creating high quality standards for global use and with low time-to-market.
* engaging in other industry sectors besides telecoms, (cross-sector ICT)
* environment and sustainable future

The proposed STF will support the mandate to CEPT on ITS [6] by providing technical proposals for an Urban Rail system as part of the overall ITS framework guaranteeing the efficient use of spectrum in the 5.9 GHz band as requested.

# Context of the proposal

## ETSI Members support

|  |  |  |
| --- | --- | --- |
| **ETSI Member** | **Supporting delegate** | **Motivation** |
| Siemens | Anne-Sophie Chazel, Andrew Price | Siemens does not share the view of the German administration that Urban Rail ITS needs to be interoperable with Road ITS in one traffic environment. Quite the contrary, Urban Rail using CBTC operates on its own segregated infrastructure with strict block separation between trains. However, this is all the more reason to examine carefully all the conditions required to ensure co-existence and equal access to the spectrum for all ITS users. |
| RATP | Caroline Paulet | Study the coexistence between Urban Rail ITS and Road ITS and identify solutions ensuring the security and the performance of both systems, in respect to the existing Urban Rail system, without imposing any specific technology which would have a strong impact on the market.This STF will help JTFIR to achieve these studies in an appropriate time. |
| STIB | Frederic Jans-Cooremans | The upcoming of the ITS deployment needs to find quickly a spectrum sharing method with the existing Urban Rail systems.Delivering a short term solution and a midterm most integrated standard is smart. |
| Alstom | Etienne Fayt, Pierre Cotelle | The study of these two identified solutions has the objective to ensure the performance of both ITS and Urban Rail applications, to respect the existing Urban Rail installed based, through a technology neutral approach |
| BMWi / BNetzA | Stefan Hiensch | The German administration support this work, due to the fact that Urban Rail applications shall be part of the ITS regulatory framework with the need to be interoperable with other ITS applications in one traffic environment. Therefor an STF is needed, to investigate the possibilities, to update the ITS standards in such a way that they are able to support the system characteristics of Urban Rail applications. Furthermore, to provide information if such a change is needed to enable Urban Rail applications by using the ITS standards family. |
| FBConsulting Sarl | Dr. Friedbert Berens. | Main interest from FBConsulting will be the possible reusability of the STF results for the development of standards in TC ITS and to support the further development of a new generation of Train Control systems for Urban Rail applications |
| Kapsch TrafficCom AB | Hans Johansson | Extending ITS including Urban Rail is the most efficient way sharing the frequency spectrum. Even if some work has been initiated, the progress so far is low, a STF will help to achieve this in a reasonable time frame. |
| BMVit, Austria | Wolfgang Krammer | •             To get a TS and later on a harmonized standard just in time, to meet the conditions for coexistence of road- and rail-ITS in a shared band.•             To reach the adequate protection- and mitigation-techniques for both applications.•             To fulfil the ITS-mandate (M-453) and the following CEPT-mandate to study this coexistence. |
| Deutsche Bahn AG | Dirk Schattschneider | To investigate the usability of the technology for a broad range of possible application in the Urban Rail environment and beyond. |
| QUALCOMM | Lu Zhao | Investigating technical solutions with a twofold goal: to ensure the efficient spectrum sharing of safety-related ITS and Urban Rail systems by using advanced technologies and to pave the way for a common technological evolution path for road ITS application and Urban Rail, e.g. by the introduction of 5G in the longer term. |

## Market impact

An harmonised frequency usage throughout Europe would insure continued safe operation of CBTC systems.

There are currently more than 150 metro lines in operation in Europe (see [www.urbanrail.net/eu/euromet.htm](http://www.urbanrail.net/eu/euromet.htm)).

About 70 projects have been already recorded on operators' side for operational CBTC service:

* 18 until 2015
* 12 between 2016 and 2020
* additionally around 40 beyond 2020

Based on these 70 projects and an assumption of 30 km and 50 trains per project, each of them would involve 250 radios in full traffic conditions. This leads to a total of 17 500 transmitters either fixed and/or mobile at the end of the current planned deployment.

The market for unattended urban rail operations as of 2013 was 32 cities, 674 km track length, 48 lines and with 700 stations. It has increased by more than 25% over the last 15 years.

With the increasing intensification of urban areas, it is expected to grow to nearly 2 000 km of track lines in 2025.



*Figure 2: Urban Rail in Europe (source:* [*www.urbanrail.net/eu/euromet.htm*](http://www.urbanrail.net/eu/euromet.htm)*)*

The possibility for road-ITS to use the highest sub-band will allow new road-ITS applications.



*Figure 3: Estimation of ITS station penetration rate; optimistic view; based on figures from simTD.*

## Tasks for which the STF support is necessary

The need to recourse to an STF is required to meet the time schedule. There is a lack of continuously available resources in JTFIR in particular regarding ITS expertise. Especially, for the review of the results the agreement of the two groups will be essential for the success of the developed solution.

## Related voluntary activities in the TBs

TC ITS and TC RT will closely follow the activities of the STF via the JTFIR. Members of TC ITS and TC RT and other ETSI TCs (TC ERM) will review the proposals from the STF. It is planned that the results and outcomes of the STF can be used as the basis for the development and update of the relevant specifications in TC ITS.

In detail, the voluntary activities within the TBs will consist of:

* synchronisation of the STF work with other TB work
* support with the approval process of the documents
* review and approval of the developed technical report itself

## Previous funded activities in the same domain

None

## Consequences if not agreed

If the STF is not accepted, given the amount of work to be done in such a short time frame, it is very likely that ETSI will not be able to find a solution to be proposed as feedback to the CEPT WGFM request from January 2017 ([ERM(17)0610088](https://docbox.etsi.org/ERM/ERM/05-CONTRIBUTIONS/2017//ERM%2817%29061088_LSin_from_WGFM_on_a_request_to_further_investigate_common_Ur.zip)) and the new CEPT mandate [6] requests.

Part II - Execution of the work

# Technical Bodies and other stakeholders

## Reference TB

The STF will be managed by the TC RT JTFIR with the involvement of both TC RT members and TC ITS members. Roles of involved TBs are detailed in 7.

ETSI TC ITS, main contact: Niels Peter Skov Andersen

ETSI TC RT, main contact: Robert Sarfati

## Other interested ETSI Technical Bodies/WGs

ETSI TC ERM

ETSI ERM TG37

A formal exchange between the STF and TC ERM has to undergo the official process via TC RT

Roles of involved TBs are detailed in 7.

## Other stakeholders

A formal exchange between the STF and any CEPT entity has to undergo the official process via TC ERM.

Roles of involved TBs are detailed in 7.

# Base documents and deliverables

## Base documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title** | **Current Status** | **Expected date for stable document** |
| ETSI TR 103 111 V1.1.1 [1] | Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference Document; Spectrum requirements for Urban Rail Systems in the 5,9 GHz range  | published |  |
| ETSI TR 103 442 V1.2.1 [3] | Railways Telecommunications (RT); Shared use of spectrum between Communication Based Train Control (CBTC) and ITS applications | published |  |
| IEEE Std. 1474.1 – 2004 [2] | IEEE Standard for Communications- Based Train Control (CBTC) Performance and Functional Requirements | published |  |
| ETSI EN 302 571 V2.1.1 [4] | Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5855 MHz to 5925 MHz frequency band; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU | published |  |
| Various ETSI TC ITS specifications and standards |  | published |  |

## Deliverable

|  |  |  |
| --- | --- | --- |
| **Deliv.** | **Work Item code****Standard number** | **Working title****Scope** |
| D1 | DTR/RT-JTFIR-2TR 103 580 | Working title: Extension of the 5.9GHz band for safety related Intelligent Transport Systems (ITS) - Scope: to specify the solution to be applied in the ITS band (5875-5925 MHz) to meet Urban Rail ITS and road ITS applications requirements.  |

## Deliverable schedule:

DTR/RT\_JTFIR-2

* Creation of WI: 15-Oct- 2017
* Start of work 11-June- 2018
* Early draft 13-July-2018
* Stable draft 31-Aug-2018
* Final draft for approval 30 –Sept -2018
* WG approval 15-Nov-2018
* TB approval 30-Nov-2018
* Publication 31-Dec-2018

# Work plan, time scale and resources

## Organization of the work

The STF should consist of up to 5 to 6 experts with experience in the domain of Urban Rail CBTC systems, mitigation techniques and the different ETSI ITS protocol layers. At least one of the experts should have a good overview of the procedures in the regulatory domain in CEPT and the EC and the STF procedures in ETSI.

The STF will identify solutions, which ideally do not significantly contribute to added cost/complexity of any given ITS technology nor hinder evolution and/or advances of such technology and in addition take the constraints of CBTC into account.

The STF will have one single phase and the Technical Report will be published in December 2018.

It is very important to finalize the report by December 2018 since EC Decision2008/671/EC [5] revision will take into account the outcome of ETSI TR 103 580. This report is essential since the lack of solutions would endanger future operations of CBTC and might impact the road ITS development.

The STF work will take place under TC RT JTFIR (Joint Task Force ITS RT) and the results will be reported on a regular basis to TC ITS, TC RT and TC ERM.

Information to relevant CEPT (WGSE, WGFM) activities will be provided through TC ERM.

## Task description

Task 0 – Overall management of the STF

Objectives

The STF leader will:

* plan the work of the STF members, ensuring that the timescales of the STF deliverable are met
* organise STF meetings to discuss the drafts, recording any major issues and resolutions of the STF, identifying and progressing the actions of STF members
* report to the TC RT JTFIR on the work of the STF
* represent, or arrange for other STF members to represent the STF at other external meetings as appropriate (e.g. ECC)
* produce the STF reports

Input

* N/A

Output

* Progress Report 1
* Progress Report 2
* STF Final Report

Interactions

* ETSI TC RT JTFIR

Resources required

* 10 000 EUR

Task 1 – Requirements and Specification evaluation

In Task 1 the Urban Rail and ITS requirements operating in the band 5 875 MHz to 5 925 MHz will be reviewed and formulated in a referenceable format where appropriate.

Objectives

* Summarize the relevant Urban Rail CBTC requirements
* Evaluate the available set of specifications in ETSI TC ITS relevant for the Urban Rail application

Input

* Collecting input from all supporting/relevant ETSI groups especially from TC RT and TC ITS

Output

* Definition of minimum necessary requirements for an Urban Rail system as part of ETSI ITS
* Evaluation summary of the existing ITS specifications in ETSI TC ITS
* Detailed analyses of the improvements required in support of the Urban Rail communication applications

Interactions

* ETSI TC RT JTFIR

Resources required

* 14 000 EUR

Task 2 –Evaluation of mutual impact

Task 2 will evaluate the mutual impact of both kinds of application sharing the same spectrum, based on real propagation conditions (including fading impact, antenna used, etc.), access layer protocol effects and based on traffic models of both kind of messages (Road ITS and Urban Rail ITS).

Objectives

* Evaluate the size of the area where ITS road devices and CBTC devices are possibly impact each other
* Evaluate the probability of message collision, depending on the different possibilities of detection and collision mitigation,
* Evaluate the operational impacts (emergency brake, traffic disruption …)

Input

* Propagation models, detection capacity, traffic models, access layer protocols

*Output*

* Definition of a method to dimension the areas requiring mitigation –reducing them as much as possible
* Evaluation of size of this area for typical configuration

Interactions

* ETSI TC RT JTFIR

Resources required

* 27 000 EUR

Task 3 – Evaluation of the “Detect and Mitigate” solution based on advertisement and mitigation techniques

Task 3 based on “Detect and Mitigate” techniques, will define the content of the “CBTC warning beacons” and the mitigation techniques allowing access to the band for both Road ITS and Urban Rail ITS.

Objectives:

* Definition of the content of the “CBTC warning ITS beacons” message, including information on the area where the mitigation is required
* Definitions of the rules to deploy the beacons (to ensure they are taken into account in the mitigation area, they should be received in a wider area than the mitigation area)
* Definition of the mitigation techniques to be applied, given access to both ITS road application and CBTC, and evaluation of the impact on ITS road application in the mitigation area
* Evaluation of the need for evolution of the harmonized standard HEN 302 571 V2.1.1 [4]

Input

* Outcome Task 1-2

Output

* Detailed Description of the proposed solution

Interactions

* ETSI TC RT JTFIR

Resources required

* 36 000 EUR

**Task 4 – Feasibility and evaluation of a “Harmonized protocol” solution based on use of harmonized access layer**

**Task 4 will examine the feasibility of a “Harmonized Protocol” solution based on a harmonized access protocol layer, meeting the Urban Rail applications requirements in term of one-way delay, packet failure rate and throughput. This task will identify the necessary updates and extension of the ITS standards needed and take into account the CBTC constraints.**

Objectives

* Define which ITS standards should be applied, and how they could be adapted to support CBTC
* Check if it can fulfil the communication requirements of CBTC applications
* Evaluation of the need for evolution of the harmonized standard HEN 302 571

Input

* Outcome Task 1 - 2

Output

Detailed Description of the proposed solution

Interactions

* With ETSI *TC RT JTFIR*

Resources required

* 36 000 EUR

Task 5 – Update and finalization of the TR

Objectives

* Analyse and compare the proposed solutions
* Finalize the deliverable

Input

* Outcome Task 3 and 4

Output

* final version of the TR

Interactions

* With ETSI TC RT JTFIR

Resources required

* 12 000 EUR

## Milestones

**Milestone 1 – Status TC ITS and TC RT, after Task 1 and 2**

* Early draft version of TR 103 580 including the requirements section \*
* Presentation to TC RT JTFIR in July
* Progress report 1 approved by TC RT and TC ITS

**Milestone 2 – ETSI TR stable draft**

* Stable draft version of TR 103 580 provided to TC RT JTFIR (August 2018)
* Stable draft final version of TR 103 580 provided to TC ITS and TC RT (September 2018), for information to ERM and CEPT WG FM
* Progress report 2 approved by TC RT and TC ITS

**Milestone 3 – STF close**

* Final draft report to be approved for publication (October 2018)
* TR published by ETSI (December 2018)
* STF Final Report approved by TC ITS and TC RT

## Task summary

Table 1: Task and Milestone summary

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Task / Milestone / Deliverable** | **Target date** | **EUR** |
| M0 | Start of work | June 2018 |  |
| T0 | Overall management of the STF | From June 2018 to December 2018 | 10 000 |
| T1 | Requirements and Specification evaluation | from June 2018-to July 2018 | 14 000 |
| T2 | Evaluation of mutual impact | from June 2018 –to July 2018 | 27 000 |
| M1 | ETSI TR early draft available.Progress Report#1 approved by TC RT and TC ITS by Remote Consensus (RC) | 13 July 2018 |  |
| T3 | Evaluation of the “Detect and Mitigate” solution based on advertisement and mitigation techniques | from July 2018 –to Nov 2018 | 36 000 |
| T4 | Feasibility and evaluation of a “Harmonized protocol” solution based on use of harmonized access layer | from July 2018 –to Nov 2018 | 36 000 |
| M2 | ETSI TR stable draft available.Progress Report#2 approved by TC RT and TC ITS by RC | 31 Aug 2018 |  |
| T5 | Update and finalization of the TR | from Oct 2018 –to Dec 2018 | 12 000 |
| M3 | TR published & STF final report approved by TC RT and TC ITS by RC | Dec 2018 |  |
| **Total** | **135 000** |

Table 2: Task and Milestone Graphics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Task Milest.** | **Description** | **J** | **J** | **A** | **S** | **O** | **N** | **D** |
| T0 | STF management |  |  |  |  |  |  |  |
| T1 | Requirements and status |  |  |  |  |  |  |  |
| T2 | Impact analysis |  |  |  |  |  |  |  |
| M1 | Early draft of TR |  |  |  |  |  |  |  |
| T3 | Detect and mitigate |  |  |  |  |  |  |  |
| T4 | Evaluation of Urban Rail as part of ITS |  |  |  |  |  |  |  |
| M2 | Stable draft of TR |  |  |  |  |  |  |  |
| T5 | Update and finalization of TR |  |  |  |  |  |  |  |
| M3 | TR published, STF closed |  |  |  |  |  |  |  |

## Working methods and travel cost

Task 0:

* Overall project management
* STF-Expert - preparation meeting 1 day @ ETSI

Task 1:

* 2 STF-Expert-Meeting / 2 days F2F @ ETSI
* 4 STF-Expert-Meetings remotely / G2M between / 2 hrs each

Task 2:

* 2 STF-Expert-Meetings / 2 days F2F @ ETSI
* 4 STF-Expert-Meetings remotely / G2M between / 2 hrs each

Task 3:

* 2 STF-Expert-Meetings / 2 days F2F @ ETSI
* 4 STF-Expert-Meetings remotely / G2M between / 2 hrs each

Task 4:

* 2 STF-Expert-Meetings / 2 days F2F @ ETSI
* 4 STF-Expert-Meetings remotely / G2M between / 2 hrs each

Task 5:

* 2 STF-Expert-Meetings / 2 days F2F @ ETSI
* 4 STF-Expert-Meetings remotely / G2M between / 2 hrs each

# Expertise required

## Team structure

5 -6 participants to ensure the following mix of competences:

* Urban Rail CBTC functionality and requirements expertise
* Urban Rail operational expertise
* Urban Rail communication protocol expertise
* Expert in ETSI procedures and STF operations
* ETSI ITS Access layer expertise
* ETSI ITS Network and Transport layer expertise
* ETSI ITS Facilities layer expertise
* ETSI ITS Congestion control expertise
* Project management experience

The STF leader will have to possess project management experience, report-writing skills, experience of consensus building, presentation skills as well as experience of working in an international environment.

Part III: Financial conditions

# Maximum budget

## Manpower cost

## Manpower cost

|  |  |
| --- | --- |
| Task 0 | 10 000 |
| Task 1  | 14 000 |
| Task 2  | 27 000 |
| Task 3  | 36 000 |
| Task 4  | 36 000 |
| Task 5 | 12 000 |
| **Total**  | **135 000** |

## Travel cost

|  |  |
| --- | --- |
| **Expected travels** | **Cost estimate** |
| 1 TC RT JTFIR for interim reporting | **800** |
| 1 TC RT JTFIR for final presentation  | 800 |
| **Total cost** | **1600** |

Part IV: STF performance evaluation criteria

# Key Performance Indicators

Contribution from STF experts to ETSI work

* Contributions presented to TB/WG meetings of TC ITS and TC RT (number, type, comments received)
* Presentations in workshops, conferences, stakeholder meetings, e.g. ITS World Congress or ITS Europe Congress, ETSI ITS work shop
* Contributions/presentations to other ETSI TBs, e.g. TC ERM
* Contributions received from other ETSI TBs

Liaison with other stakeholders

* Stakeholder participation in the project (category, business area)
* Liaison to identify requirements and raise awareness on ETSI deliverables

Quality of deliverables

* Approval of deliverables according to schedule presented in the ToR and the corresponding WI schedules
* Respect of time scale, with reference to start/end dates in the approved ToR
* Quality review by TB
* Quality review by ETSI Secretariat

# Document history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.1 | 21-09-2017 | Anne-Sophie Chazel | Initial draft  |  |
| 0.2 | 18-10-2017 | Anne-Sophie Chazel | Updated after RT comments and some comments from Friedbert Berens on version 0.1 |  |
| 0.3 | 02-11 2017 | Friedbert Berens | Udated with newest version of ITS proposal |  |
| 0.4 | 22-11-2017 | Anne-Sophie Chazel | Proposal after comments received | To be discussed during RTJTFIR(17)004 |
| 0.5 | 24-11-2017 |  | Modifications by A.L, ASC and LZ |  |
| 0.6 | 27-11-2017 | Anne-Sophie Chazel | Final version after G2M |  |
| 2.0 | 09-03-2018 | ETSI Secretariat |  | Update before OCG/Board Panel review |
| 2.1 | 10-04-2018 |  | Correction to answer board comment |  |
| 2.2 | 25-04-2018 | Youssouf Sakho | Board Approved | Revisions before CL Publication |

# Reference

[5] EC Decision2008/671/EC, “Commission Decision 2008/671/EC of 5 August 2008 on the Harmonised Use of Radio Spectrum in the 5875 - 5905 MHz Frequency Band for Safety-related Applications of Intelligent Transport Systems (ITS),” 2008.

[6] Mandate to CEPT to study the extension of the Intelligent Transport Systems (ITS) safety-related band at 5.9GHz RSCOM17-26 rev.3 (Final)

[7] LS from CEPT/ECC, Cooperation with ETSI regarding the EC Mandate to CEPT to study the extension of the 5.9 GHz band for safety-related Intelligent Transport Systems (ITS), ECC#46

[8] LS from CEPT/ECC WGFM, Request to further investigate common Urban Rail and ITS spectrum sharing solutions, Doc. FM(17)067 Annex 36.