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| Hilversum, The Netherlands, 27th - 30th November 2018 | | |
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| Summary: | | |
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| Proposal: | | |
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DRAFT CEPT BRIEF ON AGENDA ITEM 1.12

1.12 to consider possible global or regional harmonized frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems (ITS) under existing mobile-service allocations, in accordance with Resolution 237 (WRC-15);

# ISSUE

Resolution 237 (WRC-15) resolves to invite WRC-19 to consider, based on the results of the ITU-R studies, possible global or regional harmonized frequency bands for the implementation of evolving ITS under existing mobile-service allocations.

# Preliminary CEPT position

CEPT is of the view that its existing regional harmonisation measures for ITS in the band 5 855-5 925 MHz are sufficient and no changes to the RR are required in response to WRC-19 Agenda item 1.12 except the suppression of Resolution 237 (WRC-15). CEPT is developing a revision of its existing harmonisation framework for ITS around 63-64 GHz.

CEPT is of the view that harmonisation measures for ITS at ITU-R level can be achieved through the course of ITU-R study group work by applicable ITU-R Recommendations (e.g. Recommendation ITU-R M.[ITS\_FRQ]).

CEPT is also of the view that harmonisation of ITS under Agenda item 1.12 is limited to the exchange of information to improve traffic management and to assist driving safety.

In addition, CEPT is of the view that Road tolling (also known as Electronic Toll Collection (ETC)) in 5 795‑5 815 MHz is not part of Agenda item 1.12.

# Background

Since 1995, research and development activities have been conducted in info-communication systems as core technologies of ITS. ITS applications have been globally deployed. Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications[[1]](#footnote-1) called “co-operative ITS” have been developed to achieve safe drive support systems.

Under Agenda item 1.12, ITS is limited to the exchange of information to improve traffic management and to assist driving safety.

## Existing Harmonisation in Europe

The requirements developed for ITS operations under the existing primary mobile allocation have already addressed the sharing and compatibility requirements of the other primary services, and consequently do not impose additional constraints on primary services having allocations in the considered frequency bands.

With Decision ECC/DEC/(08)01 and Recommendation ECC/REC/(08)01, CEPT has harmonised the use of the frequency band 5 855‑5 925 MHz by deciding 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;
* 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;
* the protection of existing services needs to be ensured in the ITS bands and in adjacent bands.

It is also considered that:

* ITS systems implement 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;
* the ETSI Technical Specification TS 102 792 V1.2.1 specifies requirements to ensure coexistence between ITS at 5.9 GHz and TTT within 5 795-5 815 MHz;
* 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;
* ITS operates within CEPT under the primary mobile service allocation on a non-exclusive basis and ITS devices cannot claim protection from existing systems (e.g. FSS Earth Stations) operating under other current primary services;

In ECC Decision (09)01, CEPT has also harmonised the use of the frequency band 63-64 GHz for ITS by deciding that maximum radiated power (e.i.r.p.) for ITS stations should be limited to 40 dBm e.i.r.p. It is noted that the regulatory framework for the frequency range 57-66 GHz is under review in CEPT, including the ITS designation in the 60 GHz range with the goal to identify solutions to improve the sharing situation with other systems. This revision could lead to an alignment of the ITS band with the channelling of the wideband data transmission systems.

## Description of ITS and applications

Communicating with moving vehicles is one of the typical use cases for radiocommunications and a variety of ITS applications greatly depend on functionality of radiocommunication.

Radiocommunication technology is essential for ITS, especially for increasing traffic safety and traffic efficiency as well as for the support of automated driving system, etc.

Moving vehicles or other traffic participants are regularly crossing borders. Therefore, interoperability between the communication partners is necessary and high equipment rates of interoperable ITS systems is a condition to build up a communication network between the traffic participants to ensure improvement of traffic safety using radio communication.

Cooperative ITS communication (C-ITS) has to be based on standardized and interoperable wireless ad-hoc communication systems. The interoperability has to be guaranteed at least inside the different regions. In Europe, cross-border interoperability for various applications is achieved through standardisation in ETSI of radio equipment and communication protocols. This interoperability requirement does not imply the use of exactly the same system in all regions.

## deployment situation

In some CEPT countries, ITS applications are in deployment phase, e.g. in Germany there is deployment of traffic light and road works warning ongoing. In France, car manufacturers under the aegis of the Ministry of Transport are participating in a pre-deployment project of C-ITS (Cooperative Intelligent Transport Systems) using ITS-G5 technology involving 3000 vehicles over 2000 km road[[2]](#footnote-2).

The European Union has established the C-Roads Platform. The aim is to make the European roads safer for citizens, traffic more efficient and reducing harmful emissions from transport. This will also benefit European economy as a whole as it needs a safe, reliable and efficient transport system. It is the intention to develop harmonised specifications, taking the EU-C-ITS platform recommendations into account linking all C-ITS deployments[[3]](#footnote-3).

As core technologies, ITS is considered important in resolving road traffic problems such as congestion and accidents.

The study of sharing ITS spectrum to be used for V2V and V2I, with Radio Local Area Network (RLAN), has taken place under Agenda item 1.16. It has been concluded that there are difficulties in achieving co-existence between RLAN and ITS in the band 5 855-5 925 MHz.

C-ITS spectrum in the USA is designated in the range of 5 850-5 925 MHz similar to Europe, foreseeing the range of 5 855-5 925 MHz.

In the USA, one car manufacturer has deployed vehicles equipped with ITS in the beginning of 2017[[4]](#footnote-4). In Europe, two car manufacturers are planning to deploy vehicle equipped with ITS in 2018[[5]](#footnote-5) and 2019[[6]](#footnote-6).

## RelAtion with other WRC-19 Agenda items

WRC-19 Agenda item 9.1 issue 9.1.8 covers narrowband and broadband machine-type communication infrastructures, where a new ITU-R Report M 2441-0 on IMT verticals is under development within WP5D. The draft ITU-R Report includes ITS applications via LTE-based V2X feature as ad-hoc communication. This belongs to Agenda item 1.12 only. The part of the operation scenario via an operator network is in the scope of Agenda item 9.1 Issue 9.1.8.

# List of relevant documents

ITU-Documentation (Recommendations, Reports, others):

* Recommendation ITU-R M.1453-2 “Intelligent transport systems - dedicated short range communications at 5.8 GHz”
* Report ITU-R M.2228 “Advanced intelligent transport systems (ITS) radiocommunications”
* ITU Handbook on Land Mobile (including wireless access) volume 4: Intelligent transport systems, 2006
* Recommendation ITU-R M. [ITS\_FRQ] - Harmonization of frequency bands for Intelligent Transport Systems in the mobile service; (agreed for PSAA at Nov 18 SG5)
* Revision of Recommendation ITU-R M.1890-0 - Operational radiocommunication objectives and requirements for advanced intelligent transport systems; (agreed for PSAA at Nov 18 SG5)
* Report ITU-R M.2245 - Intelligent transport systems (ITS) usage in ITU Member States;
* Report ITU-R M.2444 - Examples of Arrangements for Intelligent Transport Systems deployments under the mobile service;
* Draft CPM Text for WRC-19 Section 1/1.12
* WP 5A Chairman’s Report in Document 5A/976 (Nov 2018):

Annex 22: Preliminary Draft revision of Recommendation ITU-R M.2084-0 - Radio interface standards of vehicle-to-vehicle and vehicle-to-infrastructure communications for Intelligent Transport System applications;

* WP 5A Chairman’s Report in Document 5A/469: [Annex 37](https://www.itu.int/md/dologin_md.asp?lang=en&id=R15-WP5A-C-0469!N37!MSW-E) : Proposed outline for revision of land mobile Handbook - Vol. 4 - Intelligent transport systems

1. These references will have to be updated after each of the WP5A meetings.

CEPT and/or ECC Documentation (Decisions, Recommendations, Reports)

* ECC/DEC/(08)01 “ECC Decision of 14 March 2008 on the harmonised use of the 5875-5925 MHz frequency band for intelligent transport systems (ITS)
* ECC/REC//(08)01 “ECC Recommendation on the band 5 855-5 875 MHz for intelligent transport systems (ITS)”
* ECC/DEC/(09)01) “ECC Decision on the harmonised use of the 63-64 GHz frequency band for intelligent transport systems (ITS)”
* ECC Report 101 “Compatibility studies in the band 5 855–5 925 MHz between intelligent transport systems (ITS) and other systems”
* ECC Report 109 “Aggregate impact from ITS, BBDR and BFWA in the 5 725-5 925 MHz band on the other services/systems”
* ECC Report 113 “Compatibility studies around 63 GHz between intelligent transport systems (ITS) and other system”
* ECC Report 114 “Compatibility studies between multiple gigabit wireless systems in frequency range 57-66 GHz and other services and systems (except ITS in 63-64 GHz)”
* ECC Report 228 “Compatibility studies between ITS in the band 5 855-5 925 MHz and other systems in adjacent bands”
* ECC Report 244 “Compatibility studies related to RLANs in the 5 725-5 925 MHz band”
* ECC Report 250 “Compatibility studies between TTT/DSRC in the band 5 805-5 815 MHz and other systems”
* CEPT Report 57 “Report A from CEPT to the European Commission in response to the Mandate “To study and identify harmonised compatibility and sharing conditions for wireless access systems including radio local area networks in the bands 5 350-5 470 MHz and 5 725-5 925 MHz ('WAS/RLAN extension bands') for the provision of wireless broadband services”

EU Documentation (Directives, Decisions, Recommendations, other), if applicable

* EC Decision 2008/671/EC “Commission Decision of 5 August 2008 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)”
* Radio Spectrum Committee working document “Mandate to CEPT to study and identify harmonised compatibility and sharing conditions for wireless access systems including radio local area networks in the bands 5 350-5 470 MHz and 5 725-5 925 MHz ('WAS/RLAN extension bands') for the provision of wireless broadband services”
* Directive 2010/40/EU of the European Parliament and of the Council“ on the framework for the deployment of intelligent transport systems in the field of road transport and for interfaces with other modes of transport”
* Commission Implementing Decision 2013/752/EU amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2005/928/EC

ETSI Documentation

* EN 302 571 “Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5855 MHz to 5925 MHz frequency band”
* EN 302 686 “Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 63 GHz to 64 GHz frequency band”
* Draft ETSI TR 103 583 “System Reference document (SRdoc); Technical characteristics of multiple gigabit wireless systems (MGWS) in radio spectrum between 57GHz and 71GHz” SRdoc - TC BRAN- MGWS in 60 GHz
* ETSI TR 103 319 V1.1.1 “Mitigation techniques to enable sharing between RLANs and Road Tolling and Intelligent Transport Systems in the 5 725 MHz to 5 925 MHz band”.
* [ETSI TS 102 792 V1.2.1 (2015-06)](http://www.etsi.org/deliver/etsi_ts/102700_102799/102792/01.02.01_60/ts_102792v010201p.pdf) “Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range”

# Actions to be taken

# Relevant information from outside CEPT (examples of these are below)

## European Union (date of proposal)

## Regional telecommunication organisations

APT (March 2018)

Preliminary views

APT Members support studies under Resolution 237 (WRC-15) toward possible harmonization of frequency bands in existing mobile-service allocations for the implementation of evolving Intelligent Transport Systems (ITS).

APT Members are also of the view that:

Evolving ITS should not be restricted to, nor exclude, any particular evolving ITS technology including LTE based V2X and its evolution technologies.

The use of frequency bands by ITS should not impose additional constraints on other primary services to which these frequency bands are already allocated and should take appropriate account of the potential interference from other primary Services, including FSS earth station uplinks.

Other views

Some APT Members support to consider the frequency band 5 850-5 925MHz or part of this frequency range as global or regional harmonized frequency band for ITS.

Some APT Members are of the view that frequency bands with existing mobile service allocations that are already in use by ITS on a regional (or sub-regional) basis, could also be used by the new generation of co-operative ITS.

Some APT Members support the Method of no changes to the Radio Regulations under this agenda item and satisfy this agenda item through ITU-R Recommendation and/or Report.

Some other APT Members support the Method of adding one new WRC-19 Resolution under this agenda item for global or regional harmonized frequency bands of evolving Intelligent Transport Systems.

ATU (September 2018)

The APM19-3 agreed to (preliminary):

* Support
  + Method C which entails a new WRC Resolution to encourage administrations to use globally and regionally harmonized frequency bands for ITS applications by referring to the most recent version of Recommendation ITU-R M.[ITS\_FRQ.
  + Suppress Resolution 237 (WRC-15).
* Reason: This method provides a regulatory framework for worldwide or regional harmonization for ITS applications through a new WRC Resolution and the most recent version of Recommendation ITU-R M.[ITS\_FRQ].

Arab Group (April 2018)

* Follow-up studies for this agenda item, and request administrations to consider the possibility of identifying appropriate frequency bands for these systems within the current allocations of the mobile service.
* Work on developing a vision for the use of intelligent transport systems (ITS) in Arab administrations and study the spectrum needs of these systems.
* Conduct a questionnaire for Arab administrations about the candidate bands to be used for ITS from the bands contained in draft Recommendation ITU-R.M. [ITS\_FRQ]

CITEL (July 2018)

Inter-American Proposal

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| BRA, CAN, COL, ECU, GTM, MEX, PAN, USA | NOC IAP/1.12/1  Radio Regulations Volumes 1, 2 and 4  Reason: It is unnecessary to identify spectrum specifically for Intelligent Transport Systems. Regional and global harmonization can be satisfied by developing applicable ITU-R Reports and Recommendations. Therefore, no change to the Radio Regulations or regulatory action is required under this agenda item.  SUP DIAP/1.12/2  RESOLUTION 237 (WRC-15)  Intelligent Transport Systems applications |

RCC (October 2018)

The RCC Administrations consider that there is no need to modify RR within this Agenda Item (Method A).

The RCC Administrations support harmonization of frequency bands for evolving Intelligent Transport Systems (ITS) at global and regional levels within existing mobile service allocations through the development of ITU-R Recommendations and Reports.

The RCC Administrations are of the view that harmonizing the use of frequency bands for evolving ITS shall not impose additional constraints on services to which these frequency bands are allocated. .

## International organisations

IATA (date of proposal)

ICAO (date of proposal)

IMO (date of proposal)

SFCG (August 2018)

SFCG supports no change to the Article 5 of Radio Regulations under this agenda item. ITS may continue to operate in existing allocations for mobile service. Harmonization can be achieved through ITU-R Recommendations or Reports encouraging administrations to use globally or regionally harmonized bands.

WMO and EUMETNET (June 2018)

Since no specific frequency bands have been currently proposed for study, WMO does not have a specific concern on this agenda item. Consideration of frequency bands used for meteorological operations would increase WMO concerns.

## Regional organisations

ESA (date of proposal)

Eurocontrol (November 2018)

EACP Position 1.12:

To ensure, on the basis of agreed ITU-R studies, that any regulatory actions within existing mobile-service bands do not impact existing aeronautical systems operating in accordance with the Radio Regulations.

Ensure that any reference to “existing mobile-service bands” applies only to existing frequency bands where the land mobile service is allowed (i.e., does not apply to bands that are allocated for example only to the aeronautical mobile service).

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

CRAF (March 2017)

CRAF supports the protection of existing RAS frequency allocations. Depending on the vicinity of the selected frequency bands to RAS allocations, CRAF requests no changes to the RR unless acceptable sharing and compatibility criteria are developed to ensure the protection of RAS from the future ITS operations.

IARU (April 2017)

The 5 GHz band is challenged by WRC-19 both by AI 1.12 and 1.16.

The frequency band 5 650 to 5 850 MHz (5 650 to 5925 in Region 2) is allocated to the amateur service on a secondary basis.

The frequency band 5 830 to 5 850 MHz is allocated to the amateur satellite service (space-to-Earth) on a secondary basis, and in the frequency band 5 650 to 5 670 MHz, the amateur-satellite service (Earth-to-space) may operate subject to not causing harmful interference to other services operating in accordance with the Table.

The frequency band 5 760 to 5 765 MHz is used for amateur weak-signal communication activity including terrestrial and Earth-Moon-Earth communications and propagation beacons.

There is a growing interest among radio amateurs in experimentation, investigation of propagation phenomena, point-to-point communication and space communication in this band.

The IARU requests that existing and future amateur use in this band is protected with special attention to the bands 5 760 to 5 765 and 5 830 to 5 850 MHz.

NATO (November 2018)

NATO Military Assessment

The frequency band 5850-5925 MHz is not a NATO harmonised frequency band. It is however used by some NATO nations for dedicated military applications in the fixed, fixed satellite, radiolocation, and mobile services in support of NATO military operations. While current regulation for ITS and WAS/RLAN type applications in 5850-5925 MHz is without prejudice to military systems used in this frequency band, it is essential, from a military perspective, that any evolution of the regulation allows the continuation of the operation for military systems in-band and ensure the protection of the NATO harmonised band for radiolocation applications below 5850 MHz.

NATO Position

NATO supports no change to the ITU Radio Regulations.

1. Vehicle-to-infrastructure refers to communication between vehicles and dedicated Road Side Units (RSU) infrastructure; such like V2X equipped traffic lights, traffic signs, road construction trailors or RSU at road intersections. [↑](#footnote-ref-1)
2. [www.scoop.developpement-durable.gouv.fr/en](http://www.scoop.developpement-durable.gouv.fr/en) [↑](#footnote-ref-2)
3. [www.c-roads.eu](http://www.c-roads.eu) [↑](#footnote-ref-3)
4. <http://media.cadillac.com/media/us/en/cadillac/news.detail.html/content/Pages/news/us/en/2017/mar/0309-v2v.html> [↑](#footnote-ref-4)
5. <https://www.automotiveworld.com/news-releases/renault-works-scoop-prepare-infrastructure-tomorrows-autonomous-connected-cars/> [↑](#footnote-ref-5)
6. <https://www.volkswagenag.com/en/news/2018/02/volkswagen_group_rapid_road_safety.html> [↑](#footnote-ref-6)