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| **Radiocommunication Study Groups** |  |
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| Source: Document 5A/TEMP/261(Rev.1)Subject: WRC-19 agenda item 1.12 | **Annex 8 to Document 5A/650-E** |
| **17 November 2017** |
| **English only** |
| Annex 8 to Working Party 5A Chairman’s Report |
| preliminary DRAFT cpm text for wrc-19 agenda item 1.12 |
| 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)****;*

Resolution **237 (WRC‑15)** – *Intelligent Transport Systems applications*

# 1/1.12/1 Executive summary

*[Text of the executive summary, not more than half a page of text to describe briefly the purpose of the agenda item, summarize the results of the studies carried out and, most importantly, provide a brief description of the method(s) identified that may satisfy the agenda item]*

# 1/1.12/2 Background

*[Text of the background, not more than half a page of text to provide general information in a concise manner, in order to describe the rationale of the agenda items (or issue(s))]*

Since 1995, research and development activities have been conducted in info-communication systems as core technologies of ITS. ITS, including ETC (Electronic Toll Collection) have been globally deployed. Evolving ITS, including vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) communications, vehicle-to-network (V2N) and vehicle-to-pedestrian (V2P) have been regionally deployed to assist safe driving. Communicating with moving vehicles is one of the typical use cases for radiocommunication, and a variety of ITS applications greatly depend on functionality of radiocommunication. Radiocommunication technology is essential to the next generation of ITS applications, especially to assist safe driving and potentially supports automated driving, etc.

Evolving ITS also becomes important in resolving road traffic problems such as congestion and accidents. To resolve such road safety and efficiency related matters, the ITS systems with vehicle-to-everything communication (e.g. WAVE, ETSI ITS-G5, LTE based V2X) are studied in ITU-R.

Recognizing that harmonized spectrum and international standards would facilitate deployment of ITS radiocommunication, agenda item 1.12 was approved by WRC-15 to study the possible global or regional harmonized frequency bands for the implementation of evolving ITS under existing mobile-service allocations. The mobile service bands being used by the evolving ITS may also be utilized by other applications and services and some of the frequency bands are also being considered under other agenda items.

# 1/1.12/3 Summary and Analysis of the results of ITU-R studies

*[This section should contain a summary of the technical and operational studies performed within ITU-R, including a list of relevant ITU-R Recommendations. Depending on the agenda item, this section could be divided in two parts, one part dealing with the summary of technical and operational studies and the other part dealing with the analysis of the results of studies.
The results of the ITU-R studies should also be analyzed with respect to the possible methods of satisfying the agenda item, and presented in a concise manner.]*

## [1/1.12/3.1 Other studies]

*[Editor’s note: This entire section is in [ ]. Need to discuss whether or not this section is out of scope at next WP 5A meeting in May.]*

Sharing studies have been undertaken regarding use of ITS in the bands 5 725‑5 850 MHz (in Region 1) and 5 850‑5 925 MHz (globally), where FSS systems have been deployed. This regional result show that there is a potential for harmful interference from FSS earth stations to ITS receivers. Preliminary studies also concluded that the probability of interference from ITS devices to FSS space receivers would be negligible (although this conclusion should be revisited once the full characterization of ITS systems is completed; i.e.: when the report on ITS.USAGE would provide sufficient information on the technical characteristics of ITS systems)

[*Editor’s note: the following text should be improved at the next WP 5A meeting in May.*]

[In order to ensure the proper operation of ITS devices in the band 5 855‑5 925 MHz, within the mobile service, [administrations should ensure that] the ITS receivers are designed in such a way as to accommodate the potential interference created by FSS earth stations and other incumbent co‑primary services.]

## [1/1.12/3.1*bis* ITU-R studies]

International standardization activities for ITS have been conducted by ITU-R and ISO at the global level, by ETSI, CEN, ARIB and others at the regional level, and by IEEE, SAE and other organizations in the private sector. In ITU-R, several recommendations and reports have been published, as follows:

– Draft Revision of Recommendation [ITU-R M.1890](http://www.itu.int/rec/R-REC-M.1890/en)[-1], “Intelligent Transport Systems – Guidelines and Objectives”[, 2011].

– Recommendation [ITU-R M.1453-2](http://www.itu.int/rec/R-REC-M.1453/en), “Intelligent Transport Systems – Dedicated Short Range Communications at 5.8 GHz”[, 2005].

– Recommendation [ITU-R M.1452-2](http://www.itu.int/rec/R-REC-M.1452/en), “Millimetre wave radiocommunication systems for ITS applications”[, 2012].

– Report [ITU-R M.2228](http://www.itu.int/pub/R-REP-M.2228), “Advanced Intelligent Transport Systems (ITS) radiocommunications”[, 2012].

– Draft Revision of Recommendation [ITU-R M.2084](http://www.itu.int/rec/R-REC-M.2084/en)[-1], “Radio interface standards of vehicle-to-vehicle and vehicle-to-infrastructure communications for intelligent transport systems applications”[, 2015].

– [Working document towards a preliminary draft new] Report ITU-R M.[ITS USAGE] – “Intelligent transport systems (ITS) usage in ITU Member States”]

– [Working document towards a preliminary draft new~~]~~ Recommendation ITU-R M.[ITS.FRQ] – “Harmonization of frequency arrangements for Intelligent Transport Systems in the mobile service”]

# 1/1.12/4 Methods to satisfy the agenda item

*[This section should contain the brief description of the Method or Methods to satisfy the agenda item as per section 4 of Annex 2 to Resolution ITU-R 2-7]*

*[Editor's note: The text below needs to be further improved by administrations]*

There are [four] methods to satisfy the agenda item:

**Method A** – No change to the Radio Regulations. Suppress Resolution **237 (WRC-15)**

Reasons: ITS continues to operate within existing mobile service allocations. The required harmonization on frequencies for ITS pertaining to the exchange of information to improve traffic management and assisting safe driving can be achieved by developing applicable ITU‑R Recommendations and Reports.

**Method B** – Add a new Resolution **XXX (WRC-19).** Suppress Resolution **237 (WRC-15)**

Method B1

Establish a new Resolution XXX (WRC-19) to include technical and operational aspects of evolving ITS, the globally and regionally harmonized frequency bands/ranges for evolving ITS application should refer to Recommendation ITU-R [ITS\_FRQ].

**Reasons:**

[Harmonized spectrum and international standards would facilitate deployment of ITS radiocommunication under WRC Resolution which refers to the most recent version of Recommendation ITU-R M.[ITS\_FRQ].]

This method provides a stable regulatory environment and guidance of evolving ITS applications to administrations, and benefits worldwide economy scale of ITS industry development. Regarding the fast development of new ITS radiocommunication technologies, the recommendation in the resolution could easily adapt to possible modification of harmonized ITS frequency [bands/ranges] according to future ITU-R study.

Method B2

Establish a new Resolution **XXX (WRC-19)** to include technical and operational aspects of evolving ITS, this Resolution includes globally and regionally harmonized frequency bands/ranges for evolving ITS application

**Reasons:** This method provides a stable regulatory environment and guidance of evolving ITS applications to administrations, and benefits worldwide economy scale of ITS industry development.

**Method C – Add** footnotes to the relevant parts ofRadio Regulations which refer to most recent version of Recommendation ITU-R M.[ITS\_FRQ]. Suppress Resolution **237 (WRC-15)**

**Reasons:** Future vehicular radiocommunication technologies and ITS broadcast systems are emerging. Harmonized spectrum and international standards would facilitate deployment of ITS radiocommunication by a new footnote **5.C112** referring most recent version of Recommendation ITU-R M.[ITS\_FRQ].

**Method D – Add** footnotes to the relevant parts of Article 5 in the Radio Regulations[. Add a new WRC Resolution **[B112 ITS] (WRC-19)**]**.** Suppress Resolution **237 (WRC-15)**

**Reasons:** Harmonized spectrum and international standards would facilitate deployment of ITS radiocommunication shown by a footnote identifying use for ITS and, in addition, by a new WRC Resolution which refers to the most recent version of Recommendation ITU-R M.[ITS\_FRQ].

# 1/1.12/5 Regulatory and procedural considerations

*[Example(s) of regulatory text relating to the Method(s) to satisfy the agenda item]*

## 1/1.12/5.1 For Method A

**NOC** for the Radio Regulations

NOC

Radio Regulations Volumes 1 and 2

SUP

Resolution 237 (wrc-15)

Intelligent Transport Systems applications

## 1/1.12/5.2 For Method B

The regulatory approach under this Method is to add a new Resolution.

ADD

Resolution **XXX (WRC-19)**

An example text for such Resolution is provided in Annex 1.

SUP

Resolution 237 (wrc-15)

Intelligent Transport Systems applications

### 1/1.12/5.2.2 For Method C

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
(See No. 2.1)

MOD

|  |
| --- |
| 5 570-6 700 MHz |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 5 725-5 830FIXED-SATELLITE(Earth-to-space)RADIOLOCATIONAmateur | 5 725-5 830 RADIOLOCATION Amateur |
| 5.150 5.451 5.453 5.455 5.C122A |  5.150 5.453 5.455 5.C122A |
| 5 830-5 850FIXED-SATELLITE(Earth-to-space)RADIOLOCATIONAmateurAmateur-satellite (space-to-Earth) | 5 830-5 850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) |
| 5.150 5.451 5.453 5.455 5.C122A |  5.150 5.453 5.455 5.C122A |
| 5 850-5 925FIXEDFIXED-SATELLITE(Earth-to-space)MOBILE 5.C122B | 5 850-5 925FIXEDFIXED-SATELLITE(Earth-to-space)MOBILE 5.C122BAmateurRadiolocation | 5 850-5 925FIXEDFIXED-SATELLITE (Earth-to-space)MOBILE 5.C122BRadiolocation |
| 5.150　 | 5.150 | 5.150  |

ADD

*[Japan’s note: “The following foot notes are newly proposed]*

5.C112A Use of the frequency band [5 770-5 850 MHz] by stations the intelligent transport system applications in the mobile service that operate under **5.453** should be in accordance with the most recent version of Recommendation ITU-R M.[ITS\_FRQ]. (WRC-19)

5.C112B Use of the frequency band [5 855-5925 MHz] by stations the intelligent transport system applications in the mobile service should be in accordance with the most recent version of Recommendation ITU-R M.[ITS\_FRQ].    (WRC-19)

MOD

|  |
| --- |
| 55.78-66 GHz |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 5.C122C RADIOLOCATION 5.559 5.138 |

ADD

*[Japan’s note “The following footnote is newly proposed]*

5.C112C Use of the frequency band [63-64 GHz] by stations of the intelligent transport system applications in the mobile service should be in accordance with the most recent version of Recommendation ITU-R M.[ITS\_FRQ]. (WRC-19)

SUP

Resolution 237 (wrc-15)

Intelligent Transport Systems applications

## 1/1.12/5.3 For Method D

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
(See No. 2.1)

MOD

|  |
| --- |
| 5 570-6 700 MHz |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 5 725-5 830FIXED-SATELLITE(Earth-to-space)RADIOLOCATIONAmateur | 5 725-5 830 RADIOLOCATION Amateur |
| 5.150 5.451 5.453 5.455 5.D122A |  5.150 5.453 5.455 5.D122A |
| 5 830-5 850FIXED-SATELLITE(Earth-to-space)RADIOLOCATIONAmateurAmateur-satellite (space-to-Earth) | 5 830-5 850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) |
| 5.150 5.451 5.453 5.455 5.D122A |  5.150 5.453 5.455 5.D122A |
| 5 850-5 925FIXEDFIXED-SATELLITE(Earth-to-space)MOBILE 5.D122B | 5 850-5 925FIXEDFIXED-SATELLITE(Earth-to-space)MOBILE 5.D122BAmateurRadiolocation | 5 850-5 925FIXEDFIXED-SATELLITE (Earth-to-space)MOBILE 5.D122BRadiolocation |
| 5.150 | 5.150 | 5.150  |

ADD

*[Japan’s note “The following footnotes are newly proposed]*

5.D112A Use of the frequency band [5 770-5 850 MHz] by stations of the intelligent transport system applications in the mobile service that operate under **5.453** shall be in accordance with Resolution **XXX (WRC-19)**. (WRC-19)

5.D112B Use of the frequency band [5 855-5925 MHz] by stations of the intelligent transport system applications in the mobile service shall be in accordance with Resolution **XXX (WRC‑19)**.     (WRC-19)

MOD

|  |
| --- |
| 55.78-66 GHz |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 5.D122C RADIOLOCATION 5.559 5.138 |

ADD

*[Japan’s note “The following footnote is newly proposed]*

5.D112C Use of the frequency band [63-64 GHz] by stations of the intelligent transport system applications in the mobile service that operate in accordance with recognized international standards. Such use] shall be in accordance with Resolution **XXX (WRC-19)**. (WRC-19)

ADD

Resolution **XXX (WRC-19)**

An example text for such Resolution is provided in Annex 1

SUP

Resolution 237 (wrc-15)

Intelligent Transport Systems applications

ANNEX 1

RESOLUTION XXX (WRC-19)

Frequency [ranges/bands] for evolving Intelligent Transport Systems applications under mobile service allocations

The World Radiocommunication Conference ([place], 2019)

considering

*a)* that information and communication technologies are integrated in a vehicle system to provide evolving Intelligent Transport Systems (ITS) communication applications for the purpose of improving traffic management and assisting safe driving;

*b)* that there is a need for consideration of spectrum harmonization for evolving ITS applications, which are being used globally or regionally;

*c)* that there is a need to integrate various technologies, including radiocommunications, into land transportation systems;

*d)* that many new connected vehicles use intelligent technologies in the vehicles’ combined advanced traffic management, advanced traveller information, advanced public transportation management systems and/or advanced fleet management systems to improve traffic management;

*e)* that future vehicular radiocommunication technologies and ITS broadcast systems are emerging;

*f)* that some administrations have harmonized frequency bands for ITS radiocommunication applications,

recognizing

that harmonized spectrum and international standards would facilitate worldwide deployment of ITS radiocommunications and provide for economies of scale in bringing ITS equipment and services to the public,

noting

*a)* that the guidelines for radio interface requirements of ITS are described in Recommendation ITU-R M.1890;

*b)* that outlines of technologies and characteristics for dedicated short-range communications at 5.8 GHz are described in Recommendation ITU-R M.1453;

*c)* that studies and feasibility tests on advanced ITS radiocommunications have been actively conducted towards the realization of traffic safety and a reduction of environmental impact as described in Report ITU-R M.2228;

*d)* that radio interface standards of vehicle-to-vehicle and vehicle-to-infrastructure communications for ITS applications are described in Recommendation ITU-R M.2084;

*[Editor's note: Consider related reports, e.g. ITU-R M.[ITS\_USAGE]]*

*[Start Method B2]*

*e)* that Recommendation ITU-R M.[ITS\_FRQ] provides frequency [ranges/bands] for ITS systems,

*[End Method B2]*

emphasizing

*a)*  that the provisions of Nos. **1.59** and **4.10** do not apply to ITS applications under mobile service allocations,

resolves

*[Start Method B1]*

1 to encourage administrations to use global or regionally harmonized frequency [ranges/bands] for evolving Intelligent Transport Systems applications, which are listed in the most recent version of Recommendation ITU-R [ITS\_FRQ];

2 to encourage administrations to take into account the national and regional requirements and also have regard to any needed consultation and cooperation with other concerned countries;

*[End Method B1]*

*[Start Method B2]*

1 to encourage administrations to use the frequency [ranges/bands] [5 850-5 925 MHz], or part of this [range/band], for evolving Intelligent Transport Systems applications:

1*bis* to further encourage administrations to also consider parts of the following regionally harmonized frequency [ranges/bands] for evolving Intelligent Transport Systems applications:

– Region 1: Frequency [range/band] [xxxx-xxxx MHz];

– Region 2: […]

– Region 3: […];

2 to encourage administrations to, take into account the national and regional requirements and also having regard to any needed consultation and cooperation with other concerned countries;

*[End Method B2]*

*[Start Method D]*

1 to encourage administrations to use global or regionally harmonized frequency [ranges/bands] for evolving Intelligent Transport Systems applications, which are listed in the most recent version of Recommendation ITU-R [ITS\_FRQ];

*[End Method D]*

invites ITU-R

1 to continue study and make recommendations concerning technical and operational characteristics and implementation, as necessary, to meet future ITS requirements to support advanced vehicle communication scenarios, taking into account the capabilities, evolution and any resulting transition requirements of the existing systems for national and international operations;

2 to review and update the relevant ITU-R Recommendations and ITU-R Report, as appropriate,

invites Member States, Sector Members, Associates and Academia

to contribute actively to the ITU-R studies on this issue,

instructs the Secretary-General

to bring this Resolution to the attention of administrations and other relevant international and regional ITS organizations.