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| **Radiocommunication Study Groups** |  |
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| Annex 6 to Working Party 5A Chairman’s Report |
| PRELIMINARY DRAFT CPM TEXT FOR WRC-19 AGENDA ITEM 1.11 |
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(**WP 5A** / **WP 4A**, **WP 4B**, **WP 4C**, **WP 5B**, **WP 5C**, **WP 5D**, **WP 7C**, **WP 7B**, **WP 7D**,
(WP 3K), (WP 6A))

*Editor’s note: Administrations are encouraged to contribute with respect to this document for the WP 5A meeting of May 2018.*

*1.11 to take necessary actions, as appropriate, to facilitate global or regional harmonized frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations, in accordance with Resolution* **236 *(WRC-15)****;*

Resolution **236 (WRC‑15)** – *Railway radiocommunication systems between train and trackside*

# 1/1.11/1 Executive summary

Resolution **236 (WRC-15)** invites the WRC-19, based on the results of ITU-R studies, to take necessary actions, as appropriate, to facilitate global or regional harmonized frequency bands, to the extent possible, for the implementation of railway radiocommunication systems between train and trackside, within existing mobile-service allocations.

*Editorial note: texts on summarization of the results of the studies and brief description of the method(s) identified that may satisfy the agenda item need to be added.*

# 1/1.11/2 Background

The evolving radiocommunication technologies facilitate the railway transportation, which contributes to global economic and social development, especially for developing countries. As one of the core infrastructures, railway radiocommunication systems between train and trackside (RSTT) are vital to provide improved railway traffic control, passenger safety and improved security for train operations.

[With the development of international railway transportation, cross-border railway transportation are of increasing great importance. At present, RSTT vary in different countries, which lead to high operation costs for cross-border railway transportation. International standards and harmonized spectrum would facilitate improved interoperability of RSTT, reducing the railway infrastructure investment and providing for economies of scale.]

# 1/1.11/3 Summary and analysis of the results of ITU-R studies

As the responsible group, ITU-R Working Party5A studied generic architecture, main application, current technologies, generic operating scenarios of RSTT and developed a Report ITU-R M.[RSTT.DESCRIPTION]. ITU-R Working Party 5A prepared a questionnaire ([5/LCCE/60](http://www.itu.int/md/R00-SG05-CIR-0060/en)) to Administrations of Member States, gathering information on the usage of RSTT. Responses from 37 Administrations and one ITU regional organization were received. WP 5A studied detailed characteristics, implementations of current and planned RSTT (based on responses to the questionnaire) and the spectrum needs of RSTT, and developed another Report ITU-R M.[RSTT.USAGE]. Working Party 5A also developed a Recommendation ITU-R M. [RSTT.FRQ]. These study results provide useful elements to facilitate global or regional harmonized frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations.

[Some frequency bands are reported to have been harmonized already among somecountries within Region 1.]

## 1/1.11/3/3.1 Summary and analysis on spectrum needs of RSTT

One case study on spectrum needs of RSTT in Report ITU-R M.[RSTT.USAGE] uses methodologies in ITU-R Documentation, including Recommendation ITU-R M.1768-1. This case study shows that the spectrum needs of RSTT in a typical scenario are XX MHz to YY MHz, in meeting the future spectrum needs of RSTT (mainly for train radio application).

## 1/1.11/3/3.2 Summary and analysis on technical and operational characteristics and implementation of RSTT

Report ITU-R M. [RSTT.DESCRIPTION] addresses the architecture, applications, technologies and operational scenarios of RSTT. Four categories of RSTT applications were identified, which are:

− Train Radio (for voice dispatching, signalling and traffic management with the aim to safe train operation),

− Train Position Information (gathering train positioning information relevant to train operations),

− Train Remote (data communication between locomotive and ground to control the engine), and

− Train Surveillance (capture and transmission of video of the public and trackside areas etc.).

Report ITU-R M. [RSTT.DESCRIPTION] contains five generic operating scenarios of RSTT (Railway line, Railway station, Shunting yard, Maintenance base and Railway hub).

Report ITU-R M. [RSTT.USAGE] addresses the technical and operational characteristics and the spectrum usage of current and planned RSTT as well as the studies on spectrum needs of RSTT.

## 1/1.11/3/3.3 Summary and analysis on spectrum usage of RSTT

Based on the input provided in the development of Report ITU-R M. [RSTT.USAGE], it is recognized that spectrum currently used for RSTT varies among Administrations. Analysis of the available data led to the following general conclusions regarding spectrum used by the responding administrations for the four main categories of RSTT:

– radiocommunication systems for Train Radio and Train Remote are mostly deployed in the frequency bands below 1 GHz by the responding administrations. ([parts of the frequency bands 100-200MHz, 330-475MHz and 718-950MHz are intensively used]).

– radiocommunication systems for Train Positioning Information applications mainly use frequency bands: below 1MHz for Axle Counter, 4MHz(uplink) and 27MHz(downlink) for Balise and millimetric bands for Radar.

– radiocommunication systems for Train Surveillance applications are currently realized by different technical approaches, including IEEE 802.11n, CCTV, MVT, etc., using frequency bands above 5GHz.

Radiocommunication systems for Train Radio and Train Remote applications are all within existing mobile service allocations.

However some radiocommunication systems for the application of Train Positioning and Train Surveillance are not within the existing mobile service allocations. For instance, some are within radiolocation service.

# 1/1.11/4 Methods to satisfy the agenda item

## 1/1.11/4.1 Method A: NOC to Vol.1, 2 of RR and suppress Resolution 236 (WRC‑15)

Reasons: Recommendation ITU-R M. [RSTT\_FRQ] is sufficient to provide harmonized frequency bands for RSTT and there is no reason to reference this Recommendation in the RR.

## 1/1.11/4.2 Method B: Propose a new Resolution XYZ (WRC-19) and consequently suppress the Resolution 236 (WRC-15)

Reasons: To facilitate global or regional harmonized frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations.

[

– RSTT is a core infrastructure for railway transportation which needs significant investments. A stable regulatory environment, especially the frequency bands planned for RSTT is vital for railway industry.

– Providing global/regional harmonized frequency bands through a WRC Resolution could provide a more stable regulatory environment and a stronger guidance to Administrations when making their national frequency planning for RSTT.

– This method could well satisfy agenda item 1.11, with NOC to the Radio Regulations Vol.1, 2 and 4, and NO additional constraints imposed on other services to which these frequency bands are already allocated.]

*Editor’s note: above three bulletins will be improved and be elements of the reason for Method B at the next WP5A meeting. The reason for Method B needs to be precise.*

# 1/1.11/5 Regulatory and procedural considerations

## 1/1.11.5.1 For Method A:

SUP

RESOLUTION 236 (WRC-15)

Railway radiocommunication systems between train and trackside

## 1/1.11/5.2 For Method B:

ADD

RESOLUTION xYZ (WRC-19)

[Railway radiocommunication systems between train and trackside (RSTT)]

The World Radiocommunication Conference ([place], 2019),

considering

*a)* that railway transportation contributes to global economic and social development, especially for developing countries;

*b)* that the term “Railway radiocommunication systems between train and trackside (RSTT)” refers to radiocommunication systems providing improved railway traffic control, passenger safety and improved security for train operations;

*c)* that new technologies for future RSTT applications are being developed;

*d)* that many administrations wish to facilitate RSTT interoperability for both national and cross-border operations, for effectively using spectrum resources and minimizing the risk of interference;

*e)* that international/regional standards and harmonized spectrum facilitate deployment of RSTT usage of commercial off-the-shelf equipment and provide for economies-of-scale in railway transportation;

*f)* that the evolving safety related applications of railway transportation may require more spectrum,

recognizing

*a)* Report ITU-R M. [RSTT.DESCRIPTION] provides the generic architecture, main applications, current technologies and generic operating scenarios of RSTT;

*b)* Report ITU-R M. [RSTT.USAGE] provides detailed characteristics of RSTT and also provides spectrum usage of current and planned RSTT by some administrations;

*c)* that RSTT is composed of categories of applications and systems, which operate in various frequency bands under varying restrictions/limitations mostly under mobile service allocations;

*d)* that the categories of applications of RSTT are Train Radio, Train Position Information, Train Remote and Train Surveillance. Among those, radiocommunication systems for Train Radio and Train Remote are within the existing mobile service allocations;

*e)* that radiocommunication systems for Train Radio and Train Remote are deployed in the frequency bands below 1 GHz by [most/some] countries;

*f)* that national spectrum planning for RSTT may need to have regard for cooperation and bilateral/multilateral consultation with other concerned administrations and railway organizations, in order to facilitate greater levels of spectrum harmonization;

*g)* that the amount of spectrum needed for RSTT differs significantly between countries, and that certain amounts of spectrum are already in use in various countries for RSTT applications,

noting

*a)* that among various technologies, two global standardized technologies namely GSM-R and TETRA are currently widely used for RSTT Train Radio application;

*b)* that some international organizations such as 3GPP, UIC etc. are developing specifications for technologies and new functions to evolve RSTT;

*c)* that some administrations in Region 1 have already implemented several harmonized frequency bands for some application of RSTT;

*d)* that applications requiring large coverage areas and providing good signal availability would generally be accommodated in lower frequency bands,

resolves

1 to encourage administrations to use harmonized frequency bands for RSTT to the maximum extent possible, taking into account the national and regional requirements and also having regard to any needed consultation and cooperation with other concerned countries;

2 to encourage administrations to consider the following global harmonized frequency bands, or parts thereof, for their RSTT: [138-174MHz, 335-475MHz, 873-889MHz/918-934MHz];

3 to encourage administrations to consider the following regional harmonized frequency bands for their railway radiocommunication systems between train and trackside:

*a)* in Region 1: [XXXXX];

*b)* in Region 2: [XXXXX];

*c)* in Region 3: [XXXXX],

*[Editor’s note: Frequency bands 137-174 MHz, 335-510 MHz, 43.5-45.5 GHz, 92-94 GHz, 94.1‑100 GHz, and 102-109.5 GHz for Region 3 for the harmonization for RSTT is proposed by Japan (*[*5A/386*](http://www.itu.int/md/R15-WP5A-C-0386/en)*), however it was not getting consensus during the WP 5A meeting of November, 2017.]*

4 that administrations encourage railway agencies and organizations to utilize relevant ITU‑R Publications in implementing channeling arrangements, technologies and systems supporting RSTT,

invites ITU-R

1 to continue to study and develop ITU-R Publications concerning the spectrum needs, technical and operational characteristics and implementation, as necessary, to meet the needs of RSTT, taking into account the capabilities, evolution and any resulting transition requirements of the existing systems, particularly those of many developing countries, for national and international operations; of RSTT;

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 participate actively in the study by submitting contributions to ITU-R,

instructs the Secretary-General

to bring this Resolution to the attention of International Union of Railways (UIC) and other relevant international and regional organizations.

SUP

RESOLUTION 236 (WRC-15)