|  |  |
| --- | --- |
| **Radiocommunication Study Groups** |  |
|  |  |
|  |  |
| Source: Document 5A/TEMP/378 | **Annex 8 to Document 5A/976-E** |
| **16 November 2018** |
| **English only** |
| Annex 8 to Working Party 5A Chairman’s Report | |
| WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R M.[RSTT\_FRQ] | |
| Harmonization of frequency bands for railway radiocommunication systems between train and trackside  *Editor’s note: The meeting agreed to discuss this document in the next WP 5A meeting and then to consider elevating it to DNR.* | |

(Question ITU-R 37-6/5)

(…)

**Scope**

This Recommendation provides guidance to facilitate harmonization of frequency bands for existing and future railway radiocommunication systems between train and tracksides (RSTT) on global or regional basis. This recommendation also provides examples of [countries’] frequency arrangements. The relevant frequency arrangements are addressed in the Annexes to this Recommendation.

Keywords

[Railway Radiocommunication Systems, Frequency bands, Harmonization, [Frequency arrangement], Train, Trackside, RSTT]

Abbreviations

RSTT Railway Radiocommunication Systems between Train and Trackside

Related ITU Recommendations and Reports

1 Report ITU-R [M.2418](https://www.itu.int/pub/R-REP-M.2418) “Description of Railway Radiocommunication Systems between Train and Trackside”

2 [Report ITU-R M.](https://www.itu.int/pub/R-REP-M/en)[RSTT.USAGE] “Current and future usage of railway radiocommunication systems between train and trackside (RSTT)”

3 [Recommendation ITU-R SM.1896](https://www.itu.int/rec/R-REC-SM.1896/en) “Frequency ranges for global or regional harmonization of short-range devices”

The ITU Radiocommunication Assembly,

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 many administrations wish to facilitate RSTT interoperability, for both national and cross-border operations;

*d)* that the deployment of RSTT requires significant infrastructure investment;

*e)* that the main categories of applications of RSTT are Train Radio, Train Positioning Information, Train Remote and Train Surveillance;

*f)* that some national and international railway organizations and standards bodies have begun investigating and developing specifications for new technologies for railway radiocommunication systems;

*g)*  that international standards and harmonized spectrum facilitate deployment of RSTT based on readily available cost-effective technologies that would help to provide economies-of-scale for the railway industry;

[*h)* that spectrum harmonization of Train Radio application of RSTT may have the top priority; because Train Radio provides for train dispatching, train control and other important railway services which is used to ensure the safety for train operations and passenger, and require high reliability and high quality of services;]

*i)* that implementation of future RSTT needs to take account of the development of railway industry;

*j)* that the evolving safety related applications of railway transportation may require more spectrum;

*k)* that there is a need to integrate different technologies in order to facilitate various functions, for instance dispatching commands, operating control and data transmission, into railway train and trackside systems to also meet the needs of a high-speed railway environment;

*l)* that continuing development of new technologies may be able to serve, support or supplement RSTT;

[*m)* that cooperation and bilateral and multilateral consultation with other concerned administrations and railway organisations will facilitate greater levels of spectrum harmonization;]

[*n)* that, in the context of this Recommendation, the term “harmonized frequency range” means a range of frequencies harmonized globally or regionally over which relevant radio equipment is envisaged to be capable of operating in specific frequency bands/conditions; however, the actual use may be limited according to national and regional conditions and requirements];

*o)* that the frequency bands [harmonized] by this Recommendation are allocated to a variety of services in accordance with the relevant provisions of the Radio Regulations, especially to the mobile service on primary basis,

recognizing

*a)* that Report ITU-R M.2418 provides the architecture, applications, technologies and operational scenarios of Railway Radiocommunication Systems between Train and Trackside (RSTT) for all types of trains (e.g. high-speed trains, passenger trains, freight trains, and metro trains);

*b)* thatReport 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 Recommendation ITU-R SM.1896 contains frequency ranges to be used as recommended ranges for short-range devices (SRDs) applications requiring operation on a global or regional harmonized basis,

noting

*a)* that spectrum planning for RSTT is performed at the national level, taking into account the need for interoperability and benefits of neighbouring administrations using harmonized frequency bands;

*b)* that increased use of railway transportation contributes to the goal of reducing carbon emissions;

*c)* the needs of countries, particularly the developing countries, for cost-efficient communication equipment;

[*d)* that flexibility must be afforded to administrations to determine:

– how much spectrum to make available at a national level for RSTT from the ranges in the recommends part of this Recommendation in order to meet their particular national requirements;

– the need and timing of availability as well as the conditions of usage of the bands used for RSTT, including those covered in this Recommendation, in meeting specific regional or national situations; and

– whether existing RSTT systems using other bands will continue in operation and require ongoing support;]

*e)* that RSTT as a whole consists of subcategories of systems and applications, which operate in various frequency bands;

*f)* that railway systems have already been operating in many countries for many years using various frequency bands, as indicated in Annex 2, and that these frequency bands may continue in operation in the future,

recommends

1 that administrations consider using the frequency [ranges/bands] (or parts thereof) listed in Annex 1, for achieving harmonization of frequency [ranges/bands] for RSTT,

*Editor’s note: The next WP 5A will consider whether to refer to another document dealing with the frequency arrangement of RSTT.*

2that administrations implementing the frequency [ranges/bands] [in the Annex1] should make all necessary efforts to ensure compatibility between RSTT and stations of other services in neighbouring countries;

[3that the growing and evolving of the railway transportation systems may require administrations to follow the development of applicable standards.]

*Editor’s note: The Recommend 3 might be good to move up to the considering part.*

ANNEX 1

Table 1

[Possible] frequency bands for [Global / Regional] spectrum harmonization for RSTT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Region 1** | **Region 2** | **Region 3** | **[Global]** |
| Train Radio | For ATU[[1]](#footnote-1):  Simplex:  138-140 MHz, 150.5-153MHz; 417-418 MHz; 443-444 MHz  Duplex:  141-143 MHz/146-148 MHz;  153-154 MHz/158-159 MHz;  387-390/397-399.99 MHz;  415-417/425-427 MHz; 876-880 MHz /921-925 MHz  452.5-457.475MHz/462.5-467.475MHz; 876-880 MHz / 921-925 MHz | [TBD] | [TBD] | [TBD] |
| For ASMG: [TBD] |
| For CEPT:  876-880 MHz;  921-925 MHz; |
| For RCC: [TBD] |
| Train Positioning | For ATU: | [TBD] | [TBD] | [TBD] |
| For ASMG: |
| For CEPT:  0.984 – 7.484 MHz  7,3 – 23.0 MHz  27.09-27.10 MHz |
| For RCC: [TBD] |
| Train Remote | [TBD] | [TBD] | [TBD] | [TBD] |
| Train Surveillance | [TBD] | [TBD] | [TBD] | [TBD] |

Table 1*bis*

[Possible] frequency bands for [Global / Regional] spectrum harmonization for RSTT

*Editor’s Note: The 2019 meeting of WP 5A will continue to discuss the Table 1Bis, while taking account of the feedbacks from the regional groups.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Application | Frequency bands | Global/Regional | Region 1 | Region 2 | Region 3 |
| Train Radio | 150 MHz band | [Global basis] | [[148-149.9 MHz, 150.05-174 MHz] or [138-174MHz]  or [160-174MHz]  or  Simplex: 138-140 MHz, 150.5-153MHz; 417-418 MHz; 443-444 MHz  Duplex: 141-143 MHz/146-148 MHz; 153-154 MHz/158-159 MHz; 387-390/397-399.99 MHz; 415-417/425-427 MHz; 876-880 MHz /921-925 MHz; 452.5-457.475MHz/462.5-467.475MHz; 876-880 MHz / 921-925 MHz] | | |
| Regional basis | 146-174 MHz  or 151.7-156.1MHz  or  138-140 MHz, 150.5-153MHz; 141-143 MHz/146-148 MHz;  153-154 MHz/158-159 MHz; |  | 150.05-174 MHz |
| 400 MHz band | [Global basis] | [335.4-399.9 MHz, 406.1-430 MHz,440-470 MHz]  or [335.4-470MHz] | | |
| Regional basis | 340-399.9 MHz  406.1-430 MHz 440-470 MHz  Or  417-418 MHz; 443-444 MHz; 387-390/397-399.99 MHz;  415-417/425-427 MHz; 452.5-457.475MHz/462.5-467.475MHz |  | 340-399.9 MHz  406.1-430 MHz 440-470 MHz |
| 700 MHz band | [Global basis] |  | | |
| Regional basis |  |  | 718-728 MHz 773-783 MHz  or 703-803MHz |
| 900 MHz band | [Global basis] | [873-915 MHz, 918-960 MHz or 873-960MHz] | | |
| Regional basis | 873-880 MHz  918-925 MHz  876-880 MHz /921-925 MHz  876-880 MHz / 921-925 MHz |  | 880-915MHz  925-960MHz  or  885-890 MHz  930-935 MH |
| 1 700 MHz band | [Global basis] | [1775-1880MHz] | | |
| Regional basis | 1785-1805 MHz  1880-1900 MHz |  | 1770-1805 MHz  1865-1900 MHz |
| 40 GHz band | [Global basis] | [43.5-45.5GHz] | | |
| Regional basis |  |  | 43.5-45.5 GHz |
| 100 GHz band | [Global basis] | [92-109.5GHz] | | |
| Regional basis |  |  | 92-109.5 GHz |
| Train Positioning | […] | […] | … | … | … |
| Train Remote | […] | […] | 440-470 MHz | […] | 440-470 MHz |
| Train Surveillance | […] | […] | […] | […] | […] |

*Editor’s note: The meeting needs to consider whether to keep the Global Basis rows in the Table 1bis.*

ANNEX 2

Information on country specific frequency bands used for Railway Radiocommunications Systems for Train and Trackside

This annex lists the frequency bands used for railway radiocommunications systems for train and trackside in the countries shown, and expected to continue to be used to support railway operations in the future. These bands may or may not accord with the recommended harmonized frequency ranges listed in Annex 1.

Section 1: Other frequency bands used to support railway systems in Region 1

Section 2: Other frequency bands used to support railway systems in Region 2

Section 3: Other frequency bands used to support railway systems in Region 3

Australia

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency band | Main railway application | Signal characteristics | Other comments |
| 70-88 MHz | Train radio, shunting, maintenance | 6.25/12.5 kHz FM channels | Mainly voice and low-rate FSK data |
| 148-174 MHz | Train radio, shunting, maintenance | 6.25/12.5 kHz FM channels | Mainly voice and low-rate FSK data |
| 403-420 MHz | Train radio, shunting, maintenance | 6.25/12.5 kHz FM channels | Mainly voice and low-rate FSK data |
| 450-520 MHz | Train radio, shunting, maintenance | 6.25/12.5 kHz FM channels | Mainly voice and low-rate FSK data |
| 703-803 MHz | Train radio, train monitoring, location tracking, MB signalling | 3GPP LTE Rel.14 | Voice and broadband data |
| 803-960 MHz | Train radio, shunting, maintenance | Digital trunked systems | Voice and medium-rate data |
| 1 710-1 880 MHz | Train radio, train monitoring, location tracking, passenger intercom | 3GPP LTE Rel.14 | Voice and broadband data |

1. This was provided by 21 African countries through Document [5A/612](https://www.itu.int/md/R15-WP5A-C-0612/en). [↑](#footnote-ref-1)