|  |  |
| --- | --- |
| **Radiocommunication Study Groups** |  |
|  |  |
|  |  |
| Source: Document 5A/TEMP/418(Rev.1) | **Annex 4 toDocument 5A/1065-E** |
| **10 May 2019** |
| **English only** |
| Annex 4 to Working Party 5A Chairman’s Report |
| WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R M.[RSTT\_FRQ] |
| Spectrum Harmonization for Railway Radiocommunication Systems between Train and Trackside (RSTT) |

(Question ITU-R 37-6/5)

Scope

This Recommendation recommends the use of frequency ranges 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 information on countries’ specific frequency bands used for RSTT. The relevant frequency bands are addressed in the Annexes to this Recommendation.]

Keywords

Railway Radiocommunication Systems between Train and Trackside (RSTT), Train, Trackside, frequency ranges, frequency bands, harmonization

Abbreviations and Glossary

APT Asia-Pacific Telecommunity

ASMG Arab Spectrum Management Group

ATU African Telecommunications Union

CEPT European Conference of Postal and Telecommunications Administrations

MB Mobile Broadband

RCC Regional Commonwealth in the field of Communications

RSTT Railway Radiocommunication Systems between Train and Trackside

Harmonized frequency range: In the context of this Recommendation, 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.

Railway radiocommunication systems between train and trackside: Radiocommunication systems providing improved railway traffic control, passenger safety and improved security for train operations

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.2442](http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2442-2019-MSW-E.docx) – *Current and future usage of railway radiocommunication systems between train and trackside*

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 main categories of applications of RSTT are Train Radio, Train Positioning Information, Train Remote and Train Surveillance;

*c)* that many administrations wish to facilitate RSTT interoperability, in particular for cross-border operations, effective use of spectrum resources and for minimizing the risk of interference;

*d)* that information and radiocommunication technologies in railway radiocommunication systems between train and trackside provide improved railway traffic control, passenger safety and improved security for train operations, and benefit from using frequency bands allocated to mobile service on primary basis;

*e)* that the deployment of RSTT requires significant infrastructure investment and would benefit from a stable radio spectrum regulatory environment;

*f)*  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;

*g)* that in general, spectrum harmonization of Train Radio application of RSTT may have priority over other RSTT applications, because Train Radio application requires high reliability and quality of services for the safety for train operations;

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

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

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

*k)* that there may be 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,

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)* that Report ITU‑R M.2442 provides technical and operational characteristics and the spectrum usage of current and future Railway radiocommunication Systems between Train and Trackside (RSTT);

*c)* that Recommendation ITU-R SM.1896 contains Frequency ranges for global or regional harmonization of short-range devices,

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 cooperation among all involved parties (administrations and railway organisations), will facilitate spectrum harmonization for RSTT;

*c)* that the growth and evolution of the railway transportation systems may require administrations to follow the development of applicable standards to ensure coexistence with other applications operated in the same band and/or in the adjacent bands;

*d)* that some railway systems have been operating in many countries for many years using various frequency bands not necessarily listed in Annex 1, and that these frequency bands as indicated in Annex 2 will continue to be used for RSTT in the future and require ongoing support;

*e)* that the provisions of RR Nos. **1.59** and **4.10** do not apply for railway radiocommunication systems,

recommends

*Editor’s notes: 2 options were proposed for Recommends part.*

*Option 1: To have 2 separated* recommends *items*

1 that administrations should consider using the frequency bands, or parts thereof, that are allocated to the mobile service on primary basis within the harmonized frequency ranges listed in Table 1 of Annex 1;

2that administrations should take into account the frequency bands, or parts thereof, that are allocated to the mobile service on primary basis within the frequency ranges listed in Table 2 of the Annex 1 when considering other possible spectrum harmonization for RSTT;

3that administrations should make all necessary efforts to ensure cross border coexistence between RSTT and other systems operating in the mobile service as well as between RSTT and stations of other services.

*Option 2: To merger above 2 separated* recommends *items*

1that administrations should consider using frequency bands for RSTT, within mobile service on primary basis, within the frequency ranges (or parts thereof), listed in Annex 1, in achieving regional or global spectrum harmonization for RSTT;

2that administrations should make all necessary efforts to ensure cross border coexistence between RSTT and other systems operating in the mobile service as well as between RSTT and stations of other services.

ANNEX 1

Editor’s notes: 2 options were proposed for Annex 1. To merger above 2 separated tables into 1 table (Table 1bis)

*Option 1: to have 2 separated tables Option 2*

Table 1

Harmonised frequency ranges for RSTT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Region 1** | **Region 2** | **Region 3** | **Global** |
| Train Radio | 876-880 MHz / 921-925 MHz | See Note 2 | See Note 1 | See Note 1 |
| Train Positioning | See Note 1 | See Note 2 | See Note 1 | See Note 1 |
| Train Remote | See Note 1 | See Note 2 | See Note 1 | See Note 1 |
| Train Surveillance | See Note 1 | See Note 2 | See Note 1 | See Note 1 |
| Note 1: No Frequency ranges for this RSTT application are harmonized at this time.Note 2: Region 2 does not have any harmonized frequency bands identified for RSTT at this time. |

[Editor’s note: CEPT is of the view that regional and global harmonisation can only be achieved if there is overlapping spectrum in the related harmonisation measures of the regional groups or their sub-regional entities.]

[Editor’s note: Another methodology for achieving global or regional spectrum harmonisation for RSTT was proposed in the Document 5A/976 Annex 12 and this methodology will be discussed in the next WP 5A meeting as well.]

Table 2

Frequency ranges under consideration for a possible regional/global spectrum harmonization for RSTT proposed from within regional groups

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Region 1 | Region 2 | Region 3 | Global |
| Train Radio | ATU: 138-170 MHz,406.1-430 MHz,440-470 MHz;873-876 MHz/ 918‑921 MHz |  | 138-174 MHz, 335.4‑470 MHz, 703‑748 MHz, 758‑803 MHz, 873‑915 MHz, 918‑960 MHz, 1 770‑1 880 MHz, 43.5-45.5 GHz and 92‑109.5 GHz | APT:138-174 MHz, 335.4-470 MHz, 873-915 MHz, and 918‑960 MHz |
| ASMG: TBD |
| CEPT[[1]](#footnote-1) |
| RCC[[2]](#footnote-2): 138-174 MHz;406.2-430 MHz / 440‑470 MHz; |
| Train Positioning | CEPT:0.984-7.484 MHz27.09-27.10 MHz |  |  |  |
| Train Remote | RCC2: 138-174 MHz;406.2-430 MHz /440‑470 MHz;876-880 MHz / 921‑925 MHz |  |  |  |
| Train Surveillance |  |  |  |  |

*Option 2: to merger above 2 separated tables into 1 table (Table 1bis)*

Table 1*bis*

Frequency Ranges for Harmonization for RSTT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Region 1** | **Region 2** | **Region 3** | **Global** |
|  | **Frequency ranges considered for harmonization by Regional group** | **Harmonized Frequency ranges for Region 1** | **Frequency ranges considered for harmonization by Regional group** | **Frequency ranges considered for harmonization by Regional group** | **Frequency ranges considered for harmonization by Regional group** |
| Train Radio | ATU: 138-170 MHz, 406.1-430 MHz, 440-470 MHz;873-880 MHz / 918‑925 MHz | 876-880 MHz / 921-925 MHz | See Note 2 | 138-174 MHz, 335.4-470 MHz, 703-748 MHz, 758-803 MHz, 873-915 MHz, 918‑960 MHz, 1 770-1 880 MHz, 43.5-45.5 GHz and 92-109.5 GHz | APT: 138-174 MHz, 335.4-470 MHz, 873-915 MHz, and 918‑960 MHz |
| ASMG: 876-880 MHz/921-925 MHz |
| For CEPT[[3]](#footnote-3):876-880 MHz / 921-925 MHz |
| RCC[[4]](#footnote-4): 138–174 MHz;406.2–430 MHz /440–470 MHz; 876-880 MHz / 921-925 MHz |
| Train Positioning | CEPT:0.984 - 7.484 MHz27.09 - 27.10 MHz | See Note 1 | See Note 2 | See Note 1 | See Note 1 |
| Train Remote | RCC4: 138–174 MHz; 406.2–430 MHz /440–470 MHz; 876-880 MHz / 921-925 MHz | See Note 1 | See Note 2 | See Note 1 | See Note 1 |
| Train Surveillance | See Note 1 | See Note 1 | See Note 2 | See Note 1 | See Note 1 |
| Note 1: No Frequency ranges for this RSTT application are harmonized at this time.Note 2: Region 2 does not have any harmonized frequency bands identified for RSTT at this time. |

ANNEX 2

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

*Editor’s note: Pending WRC-19 outcomes, WP 5A will consider whether or not to establish a new study item for ITU-R Report on frequency arrangement of RSTT and will consider moving this Annex 2 from this Recommendation to a new or existing ITU-R Report. Noting d) in this Recommendation will also be amended accordingly.*

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 signaling | 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. CEPT is currently undertaking studies on spectrum needs and an identification of suitable bands for European-wide harmonisation for RSTT. To this regard, CEPT was mandated by the European Commission to study the paired frequency bands 874.4-880 MHz/919.4-925 MHz and the unpaired frequency band 1 900-1 920 MHz. Further spectrum bands, for example the band 2 290-2 400 MHz on a tuning range basis, may also be studied. [↑](#footnote-ref-1)
2. It is frequency tuning band and will be limited to use by these systems according to national and regional constraints, conditions and requirements. [↑](#footnote-ref-2)
3. CEPT is currently undertaking studies on spectrum needs and an identification of suitable bands for European-wide harmonisation for RSTT. To this regard, CEPT was mandated by the European Commission to study the paired frequency bands 874.4-880 MHz/
919.4-925 MHz and the unpaired frequency band 1 900-1 920 MHz. Further spectrum bands, for example the band 2 290-2 400 MHz on a tuning range basis, may also be studied. [↑](#footnote-ref-3)
4. It is frequency tuning band and will be limited to use by these systems according to national and regional constraints, conditions and requirements. [↑](#footnote-ref-4)