UNION INTERNATIONALE DES CHEMINS DE FER
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Future Railway Mobile Communication System Spectrum Work Group	**Document No. erig3802**
Title:	**UIC response to RSPG public consultation on the Spectrum Aspects of Intelligent Transport Systems and the Internet-of-things (IoT) including M2M**
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References	
1	RSPG16-044 [Draft] Opinion for public consultation on Spectrum Aspects of Intelligent Transport Systems
2	RSPG16-045 [Draft] Opinion for public consultation on A Spectrum Roadmap for IoT Draft Opinion on the Spectrum Aspects of the Internet-of-things (IoT) including M2M
3	ETSI TR 103 333 V1.1.1_0.0.7 (2016-12) [Final Draft] GSM-R networks evolution
4	ETSI RT(16)062023 Railway vision on Next Generation Radio for Rail spectrum needs. This document represents the joint position of ETSI Technical Committee Railways Telecommunications, European Union Agency for Railway and Union Internationale des Chemins de Fer.

1. Introduction

This document is the response from the UIC FRMCS SWG to the RSPG's public consultation on the Draft Opinion on the Spectrum Aspects of the Internet-of-things (IoT) including M2M [Ref1], and the public consultation on the Draft RSPG Opinion on Spectrum Aspects of Intelligent Transport Systems [Ref2].

2. Response to Draft Opinion on Spectrum Aspects of Intelligent Transport Systems

2.1 UIC recommends to reflect the following comments in the updated version of the RSPG opinion.

Nr	Reference	Comment
1	Page 2, first paragraph: "Next-generation railway communications system (to replace GSM-R)"	The next generation railway communications system is referred to as "Future Railway Mobile Communication System (FRMCS)" within the UIC and ETS-TC RT. We propose to use or include this term in the RSPG opinion document on ITS since it is also used in the SRDoc [Ref3]
2	Page 3, bullet 1: The European spectrum arrangement for the railway communications system (GSM-R) should remain in place for the foreseeable future as this provides Member States with a harmonised allocation of 2x4 MHz (876-880/921-925 MHz) for GSM-R and its potential successor.	We fully agree that the current 2x4MHz (876-880/921-925 MHz) for GSM-R and FRMCS needs to remain in place for the foreseeable future. As mentioned in the SRDoc [Ref3] a substantial investment in GSM-R has already taken place and additional investments are planned for the near future: • GSM-R coverage on 162.000 line km is planned, of which 114.000 km are operational (2015) • Planned number of voice cabradios: 64.000, of which 48.000 are operational (2015) • Planned number of on-board ETCS data only radios: approx. 7.000, of which 2.400 are operational (2015) We suggest to add the following text to the RSPG opinion: The harmonization of this spectrum allocation is essential to support interoperability of trains across the EU, as mandated in CCS TSI 2016/919/EU.
3	Page 3, bullet 2: RSPG notes that the current railway communication system (GSM-R) will need to be replaced in due course and that the railways community considers that access to more spectrum may facilitate the transition from one system to another, depending on the options for new systems. The railway community is raising	As stated in the SRDoc [ref3] the GSM-R Industry has indicated that support of GSM-R products and services are guaranteed until 2030. Independently of the selected radio technology and spectrum, the replacement of all GSM-R on-board equipment by other radio equipment (supporting GSM-R and/or other technologies and spectrum) on a European scale is expected to take at least 10 years. According to a Position paper issued by the ETSI Technical Committee Railways Telecommunications, European

	this now, as the transition will be a long a complex process.	Union Agency for Railway and Union Internationale des Chemins de Fer [ref4], the deployment of new radio equipment (on-board and trackside) should be possible by the end of 2022 in order to leave sufficient time for the migration from GSM-R to any new radio system. This means that the relevant specifications have to be included in the EU legal framework around that date. Consequently, activities in the context of Proof-of-Concept are planned in the period between 2019 and 2021 and preparation of the production of on-board equipment and network equipment should be ready around 2022. Therefore, it is necessary that the future spectrum to be used by railways is identified by 2020 and that formal allocation and assignment is possible between 2020 and 2022 for trials, and for operational deployment as of start of 2023. We suggest to include in the RSPG opinion the following text: The coexistence of legacy GSM-R networks and FRMCS is needed during the transition period, until all trains in the EU are equipped with FRMCS receivers.
4	Page 3, bullet 3: RSPG notes that there is a wide range of options for the future of railway communications, but that the suitability of these options varies across Member States. These options include but are not limited to a. using the GSM-R band and the extension (E-GSM-R) band (or a part thereof) during the transition or permanently b. using commercial networks c. using other bands d. sharing networks with other users (e.g. PPDR in 700 MHz or 400 MHz)	From a spectrum perspective, we have envisaged several options for FRMCS in our Position paper [ref4], and in the SRDoc [Ref3]. An essential aspect to take into consideration when identifying the preferred FRMCS spectrum is the value of the installed base of GSM-R radio sites. Currently, around 18.000 radio sites have been put into operation, representing an investment of approximately 3.1 Billion Euro, with more sites still being added due to the ongoing network roll-outs and expansions of the existing networks in several EU countries. Re-use of essentially all of these sites is possible when using the GSM-R and/or E-GSM-R frequency band for FRMCS. In that case, also the costs for modifications to rolling stock and tunnel installations would be limited. The total economic benefit would be in the order of 3.9 Billion Euro. The additional spectrum needed for the migration from GSM-R to FRMCS, and subsequently for supporting the necessary traffic handling capacity, needs to be harmonized to allow interoperability of trains across the EU. We recognize the current discussions on allowing SRD

		usage in the E-GSM-R band. Although SRDs should operate on a non-interference, non-protected basis, it is our view that the proliferation of SRDs will be uncontrollable, and the density of SRDs may become very high. This would likely create significant interference on FRMCS systems, and therefore from railways perspective is not tolerable. This subject will need further investigation. We suggest to include the following text in the RSP opinion: RSPG notes the railway's preference for re-using the existing harmonized GSM-R band and the E-GSM-R band, based on both technical and economic benefits.
5	Page 4, bullet 4: Rail operators are invited to consider the options for the future of railways communications, including those outlined above, with the relevant administrations.	We gladly accept this invitation and recognize the importance of considering the different spectrum options with the relevant (national) administrations. Based on our Position paper [ref4] and SR-Doc [Ref3] these discussions have been initiated. However, we suggest to add the following text to the RSPG opinion: In addition, there is a need to ensure interoperability at EU level (single European railway area), which has to be taken into account by the member states. Furthermore, instead of "rail operators" the opinion should refer to "Railways", as both infrastructure managers and railway undertakings are concerned.
7	Page 3, bullet 6: RSPG notes that the spectrum demand for future rail systems remains uncertain, and will depend on the traffic to be accommodated and on national situations (i.e. only train/track signaling and voice, or train/track video communications, rail network density, cross border corridors).	As a basis for the spectrum demand included in the SRDoc [Ref3] an extensive traffic model has been prepared for FRMCS based on the identified current and future user requirements. This model differentiates between railway critical services, performance services, and business services. The spectrum demand identified in the SRDoc is only based on the needs for the railway critical services. To enable migration from GSM-R to FRMCS, in addition to the current 2x4MHz for continued GSM-R usage, an additional 2x3MHz is needed in an FDD arrangement. The most desired solution for that spectrum is the 2x3MHz of the E-GSM-R band as indicated under bullet 3. In addition to the railway critical services, additional performance and business services will create significantly more traffic, thus requiring other solutions such as usage of other frequency bands, sharing with other users or possibly usage of public networks. This is subject to further study. One of the conclusions we made from the current traffic

		and spectrum model is that the mentioned train/track video communications do require a substantial amount of traffic and spectrum, and can only be handled by FRMCS if the additional spectrum for migration is permanently assigned to Railways. It is suggested to Replace Bullet 6 by the following: • RSPG notes that the spectrum demand for future rail systems differentiates between railway critical services, performance services, and business services. The spectrum demand identified as performance services, and business services will depend on the traffic to be accommodated, and on national situations. For critical services, the spectrum demand is defined in the SRDoc [Ref3].

3. Response to the Spectrum Aspects of the Internet-of-things including M2M

Nr	Reference	Comment
1	Page 6, a: Opportunities to relax technical conditions for IoT in the band 862-868 MHz and to make available portions of the bands 870-876 MHz and 915-921 MHz In June 2016, the ECC approved for publication CEPT Report 59 in response to the European Commission permanent mandate on the "annual update of the technical annex of the Commission Decision on the technical harmonisation of radio spectrum for use by short range devices". An Addendum to this Report, which will be ready for public consultation in November 2016, will address the possibilities for a harmonization approach for the bands 870-876 MHz and 915-921 MHz also taking into account new opportunities in the band 862-868 MHz.	For your information, UIC has submitted comments to the Addendum to Report 59 to ECC. The UIC's concerns towards the use of SRD/RFID in the upper 3MHz of the 870-876 MHz and 915-921 MHz bands (E-GSM-R) is: • SRD/RFID implementations with higher Duty Cycle (e.g. 10%) and higher transmitting power (e.g. 2 or4 Watt) in adjacent bands to GSM-R and ER-GSM shall be thoroughly investigated and tested to prevent interference. Due to the possible large number of devices, high concentrations of SRD/RFID devices can lead to interference problems in GSM-R networks. This should be identified for further investigations. These considerations need to be extended to FRMCS, the successor of GSM-R. Our main concerns on the options proposed for FRMCS in the Addendum to report 59 are: • The proposed frequency ranges 875.1-876 MHz and 920.1-921 MHz (2x0.9 MHz) that should not be recommended for European harmonization for SRD/RFID but for FRMCS is much too small. Current railway studies [ref3] have identified that, during the migration period, an extra 2 x 3 MHz will be needed for FRMCS on top of the 2x4 MHz GSM-R band to

		allow a seamless operational transition. • The alternative suggested possibility for countries that cannot manage GSM-R migration within 2x5 MHz may be to use part of the commercial 900 MHz band for a limited time period. We see this not as an option since usage of the commercial 900 MHz band, temporary or permanently, may not be an option in all EU countries due to current license agreements. • The suggested geographical sharing of RFID and SRD in the current GSM-R band. We see this only as a partial option since geographical sharing with GSM-R is nearly impossible because there is no control over where mobile SRD's are used. For geographical sharing with networked SRD's (fixed installation) thorough coexistence studies must be conducted, to determine under which conditions geographical sharing is possible.
2	Page 6, a: <u>Opportunities to relax technical conditions for IoT in the band 862-868 MHz and to make available portions of the bands 870-876 MHz and 915-921 MHz</u> Taking into account the free circulation and use of equipment within the Union for a number of Member States the protection needs of primary use of the spectrum still preclude the implementation of SRD in accordance with ERC/REC 70-03. These include the primary mobile services (government services and e.g. E-GSM-R) as well as governmental (military) usages which have to be protected. The draft Addendum has therefore made proposals that are intended to foster greater implementation by offering more focused regulatory solutions in the bands 870-876 MHz and 915-921 MHz, while giving administrations flexibility with regard to the precise implementation.	This RSPG text should make clear that the Addendum to Report 59 is still in consultation, and should therefore not reflect it as an opinion from RSPG.