

**COMMISSION IMPLEMENTING DECISION (EU) 2018/1538****of 11 October 2018****on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands***(notified under document C(2018) 6535)***(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision) <sup>(1)</sup>, and in particular Article 4(3) and (4) thereof,

Whereas:

- (1) Short-range devices (SRDs) are typically mass-market and/or portable products which can easily be taken and used across borders. Differences in spectrum access conditions may prevent their free movement, increase their production costs and create risks of harmful interference with other radio applications and services due to unauthorised use. Commission Decision 2006/771/EC <sup>(2)</sup> harmonises the technical conditions for use of spectrum for a wide variety of short-range devices.
- (2) Decision No 243/2012/EU of the European Parliament and of the Council <sup>(3)</sup> requires Member States in cooperation with the Commission to foster, where appropriate, the collective use of spectrum as well as shared use of spectrum in order to improve efficiency and flexibility, and to seek to ensure spectrum availability for the 'Internet of Things' (IoT) including for radio-frequency identification (RFID). The technical conditions for using the 863-870 MHz frequency range for IoT including for RFID are covered by Decision 2006/771/EC, which sets the general harmonised technical conditions for using a wide variety of short-range devices which, as a result, are subject to no more than a general authorisation under national law. However, the sharing environment in the 874-876 MHz and 915-921 MHz bands deviates from this approach to spectrum for short-range devices and therefore calls for a specific regulatory regime.
- (3) On the basis of the permanent mandate issued in July 2006 to the European Conference of Postal and Telecommunications Administrations (CEPT) under Article 4(2) of Decision No 676/2002/EC to update the Annex to Decision 2006/771/EC to technological and market developments in the area of short-range devices, the Commission specifically asked the CEPT in July 2014, in its guidance letter for the corresponding sixth update cycle (RSCOM 13-78rev2), to examine the possibility of introducing short-range devices in the 870-876 MHz and 915-921 MHz bands while allowing national administrations some flexibility and protecting existing use of spectrum for public order and public security purposes and defence (such as unmanned aeronautical and ground vehicles, remote control and telemetry, tactical radio relays, tactical communication systems and data links) and railways.
- (4) In response, on 6 March 2017 the CEPT submitted an Addendum (RSCOM17-07) to its 17 July 2016 Report 59, which provides conclusions regarding the possibility of technically harmonised use of the 870-876 MHz and 915-921 MHz bands in order to enable the introduction of technically advanced RFID solutions as well as new short-range devices enabling new types of machine-to-machine and IoT applications. These machine-to-machine and IoT applications are based on networked short-range devices under the control of network access points which, as fixed network access points in a data network, act as a connection point for the other short-range devices in such a network to service platforms outside of that network by transferring data collected from terminal nodes under their control. These possibilities for harmonisation also take into account new opportunities in the 863-868 MHz band already harmonised for short-range devices.

<sup>(1)</sup> OJ L 108, 24.4.2002, p. 1.

<sup>(2)</sup> Commission Decision 2006/771/EC of 9 November 2006 on harmonisation of the radio spectrum for use by short-range devices (OJ L 312, 11.11.2006, p. 66).

<sup>(3)</sup> Decision No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multiannual radio spectrum policy programme (OJ L 81, 21.3.2012, p. 7).

- (5) RFID devices using spectrum in the lower 900 MHz range are available almost everywhere in the world. Ensuring their full availability also in the Union would create new global usage opportunities, which would benefit Union companies. In the same way, networked short-range devices, which enable a broad range of IoT applications including low-cost IoT, could benefit from this global harmonisation potential and could also make applications such as global asset tracking possible or help innovative Union smart home device developers to increase their market reach. These new devices therefore represent an important, fast-growing sector with high innovation potential. The Union should benefit from the almost global availability of such devices and corresponding applications and from the resulting important economies of scale and lower costs by ensuring the harmonisation of technical spectrum usage conditions within the 874-876 MHz and 915-921 MHz bands in all Member States.
- (6) Harmonised technical usage conditions establish a predictable sharing environment by specifying within a frequency band for a given category of short-range devices transmit power, field strength or power density limits, as well as some additional parameters and usage restrictions, based on underlying compatibility studies. Such conditions should be able to prevent harmful interference, foster the reliable and efficient use of frequency bands and allow flexibility for a variety of applications. As a result, they should make it possible for most short-range devices in most Member States to be operated on a non-exclusive and shared basis, subject to a general authorisation regime under national law, similar to short-range devices harmonised under Decision 2006/771/EC. This is without prejudice to Article 5 of Directive 2002/20/EC of the European Parliament and of the Council <sup>(1)</sup> and Article 9(3) and (4) of Directive 2002/21/EC of the European Parliament and of the Council <sup>(2)</sup>, as well as in line with Article 7 of Directive 2014/53/EU of the European Parliament and of the Council <sup>(3)</sup> regarding the possibility to impose additional requirements for shared non-exclusive use of these bands for certain reasons, where harmonised technical conditions or general authorisation conditions are not sufficient to ensure appropriate quality of service.
- (7) While the 873-876 and 918-921 MHz bands are not harmonised for GSM-R usage by Union law or by a European Communications Committee (ECC) decision, they may be used for this purpose on a national basis subject to national decision in line with Radio Regulations of the International Telecommunication Union (ITU Radio Regulations). Hence, where harmonised technical conditions under general authorisations would not be sufficient to protect such a use of 873-876 MHz and 918-921 MHz bands for a national extension of GSM for Railways (E-GSM-R), concerned Member States should be able to subject the use of short-range devices to individual non-exclusive authorisations or to specific installation or operation requirements, geographical restrictions or specific mitigation techniques without impacting the harmonised technical conditions for access to spectrum for short-range devices within the bands. Such restrictions, where needed in a particular Member State, could in particular ensure that coordination takes place in order to enable geographic sharing between E-GSM-R on the one hand and RFID devices and networked short-range devices on the other hand.
- (8) Moreover, in accordance with Article 1(4) of Decision No 676/2002/EC, as Member States retain the right to organise and use their radio spectrum for public order and public security purposes and defence, they should remain free to protect the existing and future use of these bands and of adjacent bands for military and other public security and public order purposes while pursuing the aim of making available the minimum harmonised core bands for networked short-range devices according to the technical conditions defined in this Decision.
- (9) In 2012, the European railway community started the Future Rail Mobile Communications System (FRMCS) project to prepare for the introduction of a successor to GSM-R. Since this project was not advanced enough at the time of preparation of the Addendum (RSCOM17-07) to CEPT Report 59, the Addendum does not take account of such a future system. The 59th Radio Spectrum Committee meeting on 15-16 March 2017 acknowledged this and invited the Commission to work on a solution which takes account of possible future FRMCS needs. To that purpose, on 19 June 2017, the Commission organised a stakeholder workshop on 'Efficient use of spectrum in the bands 870-876 and 915-921 MHz by internet of Things (IoT) and railways'.

<sup>(1)</sup> Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorization of electronic communications networks and services (Authorisation Directive) (OJ L 108, 24.4.2002, p. 21).

<sup>(2)</sup> Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive) (OJ L 108, 24.4.2002, p. 33).

<sup>(3)</sup> Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (OJ L 153, 22.5.2014, p. 62).

- (10) During the workshop, stakeholders who were present (rail, RFID and IoT communities) made a strong request to harmonise the future use of the 870-876 and 915-921 MHz bands. Based on further input from them and additional input from CEPT (RSCOM18-14) following the workshop, and taking into account the opinion of the Radio Spectrum Committee the 874,4-876 and 919,4-921 MHz sub-bands should be reserved for potential future railway use. Furthermore, appropriate spectrum should be made available for RFID and IoT, in order to enable their main benefits and achieve a harmonised approach across the Union. For this reason, it is necessary to deviate from the Addendum to CEPT Report 59. However, this deviation, while it adjusts location and size of the frequency bands, remains within the limits of the technical conditions as proposed by CEPT.
- (11) The reservation of the 874,4-876 and 919,4-921 MHz bands for FRMCS is subject to further study and may require a review of this Decision regarding these bands in the future.
- (12) Although this Decision allows greater flexibility in implementation compared to Decision 2006/771/EC and although protecting existing use of the bands for public order and public security purposes and defence and railways may lead to restrictions or even partial or total non-availability of spectrum in some Member States, it should prevent any further fragmentation in the bands and enable the use of IoT services, including RFID, in a harmonised minimum core bands across the Union.
- (13) In line with Article 5 and 10 of Decision 676/2002/EC and as required by Commission Decision 2007/344/EC <sup>(1)</sup> on harmonised availability of information regarding spectrum use within the Community, Member States should report on the implementation of this Decision to the Commission..
- (14) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

#### *Article 1*

This Decision harmonises the frequency bands and the related technical conditions for the availability and efficient use of spectrum for short-range devices within the 874-876 MHz and 915-921 MHz frequency bands.

#### *Article 2*

For the purposes of this Decision, the following definitions shall apply:

1. 'short-range devices' means radio transmitters which provide either unidirectional or bidirectional communication and which transmit over a short distance at low power;
2. 'networked short-range device' means a short-range device in a data network, which potentially also covers wider areas; networked short-range devices are under the control of network access points;
3. 'network access point' means a fixed terrestrial networked short-range device in a data network that acts as a connection point for the other short-range devices in the data network to service platforms located outside of the data network;
4. 'data network' means several networked short-range devices including the network access point as network components and the wireless connections between them;
5. 'non-interference and non-protected basis' means that no harmful interference may be caused to any radio communications service and that no claim may be made for protection of these devices against harmful interference originating from radio communications services in the same band;
6. 'category of short-range devices' means a group of short-range or networked short-range devices that use spectrum with similar technical spectrum access mechanisms or based on common usage scenarios;

<sup>(1)</sup> Commission Decision 2007/344/EC of 16 May 2007 on harmonised availability of information regarding spectrum use within the Community (OJ L 129, 17.5.2007, p. 67).

*Article 3*

1. Member States shall designate and make available, on a non-exclusive, non-interference and non-protected basis the frequency bands for the types of short-range devices and networked short-range devices, subject to the harmonised technical conditions and by the implementation deadlines set out in the Annex.
2. Member States may take appropriate measures to protect existing use in the 874-876 MHz and 915-921 MHz spectrum to the extent necessary and where no alternative protective solution may be found through coordination of the various types of uses in those bands. This may include the imposition of additional technical, geographic or operational requirements for the use of the band while complying with the harmonised technical conditions for spectrum access set out in the Annex.
3. Member States may allow the use of the frequency bands covered by the Annex under less restrictive conditions or for short-range devices which are not part of the harmonised category. This holds as long as it does not prevent or reduce the possibility for short-range devices of the harmonised category to rely on the appropriate set of harmonised technical conditions allowing the shared use of a specific part of the spectrum on a non-exclusive basis and for different purposes by short-range devices of the same category.
4. Member States shall refrain from introducing new uses in the 874,4-876 MHz and 919,4-921 MHz sub-bands until such time as harmonised conditions for their use are adopted under Decision No 676/2002/EC.

*Article 4*

Member States shall monitor the use of the 874-876 MHz and 915-921 MHz frequency bands, including the potential use of the 874,4-876 MHz and 919,4-921 MHz sub-bands for the future railway mobile communications system (FRMCS), and report their findings to the Commission upon request or at their own initiative in order to allow regular and timely review of the Decision.

*Article 5*

This Decision is addressed to the Member States.

Done at Brussels, 11 October 2018.

*For the Commission*  
Mariya GABRIEL  
*Member of the Commission*

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### Frequency bands with corresponding harmonised technical conditions and implementation deadlines for short-range devices

The table below specifies different combinations of frequency band and category of short-range devices (as defined in Article 2(6)), and the harmonised technical conditions for spectrum access and implementation deadlines applicable thereto.

General technical conditions which apply to all bands and short-range devices which fall in the scope of the present Decision:

- Member States must allow the usage of spectrum up to the **transmit power, field strength or power density** given in this table. In accordance with Article 3(3), they may impose less restrictive conditions, i.e. allow the use of spectrum with higher transmit power, field strength or power density, provided that this does not reduce or compromise the appropriate coexistence between short-range devices in bands harmonised by this Decision;
- Member States may only impose the **'additional parameters** (channelling and/or channel access and occupation rules)' identified in the table, and shall not add other parameters or spectrum access and mitigation requirements. Less restrictive conditions within the meaning of Article 3(3), mean that Member States may completely omit the 'additional parameters (channelling and/or channel access and occupation rules)' in a given cell or allow higher values, provided that the appropriate sharing environment in the harmonised band is not compromised.
- Member States may only impose the **'other usage restrictions'** identified in the table and shall not add additional usage restrictions unless the conditions mentioned in Article 3(2) apply. As less restrictive conditions may be introduced within the meaning of Article 3(3), Member States may omit one or all of these restrictions, provided that the appropriate sharing environment in the harmonised band is not compromised.

Terms used:

**'Duty cycle'** is defined as the ratio, expressed as a percentage, of  $\Sigma(\text{Ton})/(\text{Tobs})$  where Ton is the 'on' time of a single transmitter device and Tobs is the observation period. Ton is measured in an observation frequency band (Fobs). Unless otherwise specified in this technical annex, Tobs is a continuous one hour period and Fobs is the applicable frequency band in this technical annex. Less restrictive conditions within the meaning of Article 3(3), mean that Member States may allow a higher value for 'duty cycle'.

Band no	Frequency band	Category of short-range devices	Transmit power limit/field strength limit/power density limit	Additional parameters (channelling and/or channel access and occupation rules)	Other usage restrictions	Implementation deadline
1	874-874,4 MHz <sup>(8)</sup>	Non-specific short-range devices <sup>(1)</sup>	500 mW e.r.p. Adaptive Power Control (APC) required, alternatively other mitigation techniques which achieve at least an equivalent level of spectrum compatibility	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the <i>Official Journal of the European Union</i> under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.  Bandwidth: $\leq 200$ kHz Duty cycle: $\leq 10$ % for network access points <sup>(4)</sup> Duty cycle: 2,5 % otherwise	This set of usage conditions is only available for data networks  All devices within the data network shall be under the control of network access points <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup> <sup>(7)</sup>	1 February 2019

Band no	Frequency band	Category of short-range devices	Transmit power limit/field strength limit/power density limit	Additional parameters (channelling and/or channel access and occupation rules)	Other usage restrictions	Implementation deadline
2	917,4-919,4 MHz <sup>(9)</sup>	Wideband data transmission devices <sup>(3)</sup>	25 mW e.r.p	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the <i>Official Journal of the European Union</i> under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.  Bandwidth: ≤ 1 MHz Duty cycle: ≤ 10 % for network access points <sup>(4)</sup> Duty cycle: ≤ 2,8 % otherwise	This set of usage conditions is only available for wideband short-range devices in data networks  All devices within the data network shall be under the control of network access points <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup>	1 February 2019
3	916,1-918,9 MHz <sup>(10)</sup>	Radio Frequency Identification (RFID) devices <sup>(2)</sup>	Interrogator transmissions at 4 W e.r.p. only permitted at the centre frequencies 916,3 MHz, 917,5 MHz, 918,7 MHz	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the <i>Official Journal of the European Union</i> under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.  Bandwidth: ≤ 400 kHz	<sup>(5)</sup> <sup>(6)</sup> <sup>(7)</sup>	1 February 2019
4	917,3-918,9 MHz	Non-specific short-range devices <sup>(1)</sup>	500 mW e.r.p.  Transmissions only permitted within the frequency ranges 917,3-917,7 MHz, 918,5-918,9 MHz  Adaptive Power Control (APC) required, alternatively other mitigation techniques which achieve at least an equivalent level of spectrum compatibility	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the <i>Official Journal of the European Union</i> under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.  Bandwidth: ≤ 200 kHz Duty cycle: ≤ 10 % for network access points <sup>(4)</sup> Duty cycle: ≤ 2,5 % otherwise	This set of usage conditions is only available for data networks  All devices within the data network shall be under the control of network access points <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup> <sup>(7)</sup>	1 February 2019

Band no	Frequency band	Category of short-range devices	Transmit power limit/field strength limit/power density limit	Additional parameters (channelling and/or channel access and occupation rules)	Other usage restrictions	Implementation deadline
5	917,4-919,4 MHz <sup>(9)</sup>	Non-specific short-range devices <sup>(1)</sup>	25 mW e.r.p.	Techniques to access spectrum and mitigate interference that provide an appropriate level of performance to comply with the essential requirements of Directive 2014/53/EU shall be used. If relevant techniques are described in harmonised standards or parts thereof the references of which have been published in the <i>Official Journal of the European Union</i> under Directive 2014/53/EU, performance at least equivalent to these techniques shall be ensured.  Bandwidth: ≤ 600 kHz  Duty cycle: ≤ 1 %	This set of usage conditions is only available for short-range device in data networks  All devices within the data network shall be under the control of network access points <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup>	1 February 2019

- <sup>(1)</sup> The non-specific short-range device category covers all kinds of radio devices, regardless of the application or the purpose, which fulfil the technical conditions as specified for a given frequency band. Typical uses include telemetry, telecommand, alarms, data transmissions in general and other applications.
- <sup>(2)</sup> The radio frequency identification (RFID) device category covers tag/interrogator based radio communications systems, consisting of radio devices (tags) attached to animate or inanimate items and of transmitter/receiver units (interrogators) which activate the tags and receive data back. Typical uses include the tracking and identification of items, such as for electronic article surveillance (EAS), and collecting and transmitting data relating to the items to which tags are attached, which may be either battery-less, battery assisted or battery powered. The responses from a tag are validated by its interrogator and passed to its host system.
- <sup>(3)</sup> The wideband data transmission device category covers radio devices that use wideband modulation techniques to access the spectrum. Typical uses include wireless access systems such as radio local area networks (WAS/RLANs) or wideband short-range devices in data networks.
- <sup>(4)</sup> A network access point in a data network is a fixed terrestrial short-range device that acts as a connection point for the other short-range devices in the data network to service platforms located outside of that data network. The term data network refers to several short-range devices, including the network access point, as network components and to the wireless connections between them.'
- <sup>(5)</sup> According to Article 3(1) the frequency bands shall be designated and made available on a non-exclusive and shared basis. The harmonised technical conditions should make it possible for most short-range devices in most Member States to be operated subject to a general authorisation regime under national law. This is without prejudice to Article 5 of Directive 2002/20/EC, Article 9(3) and (4) of Directive 2002/21/EC, Article 7 of Directive 2014/53/EU and Article 3(2), Member States may limit usage of this entry such that installation and operation are performed only by professional users and may consider individual authorisation, e.g. to administer geographical sharing and/or the application of mitigation techniques to ensure protection of radio services.
- <sup>(6)</sup> In Member States where parts or all of this frequency range are used for public order and public security purposes and defence and coordination is not possible, Member States may decide not to implement this entry partially or entirely, in accordance with Article 1(4) of Decision 676/2002/EC and Article 3(2) of this Decision.
- <sup>(7)</sup> National rules, such as local coordination, may also be needed in order to avoid interference to radio services operating in the adjacent bands, for example due to intermodulation or blocking.
- <sup>(8)</sup> This frequency range 874-874,4 MHz is the harmonised minimum core band.
- <sup>(9)</sup> This frequency range 917,4-919,4 MHz is the harmonised minimum core band.
- <sup>(10)</sup> RFID tags respond at a very low power level (– 10 dBm e.r.p.) in a frequency band around the RFID interrogator channels and must comply with the essential requirements of Directive 2014/53/EU.