Nemzeti Média- és Hírközlési Hatóság

Band introduction
The 1920-1980/2110-2170 MHz bands

7 November 2017

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1. Summary

Pursuant to the International Radio Regulations, the 1920-1980 MHz and 2110-2170 MHz paired frequency bands (hereinafter: 1920-1980/2110-2170 MHz band or 2100 MHz frequency band) can be used world-wide for the implementation of international mobile telecommunications (IMT[1]).

In the EU countries, this band was harmonised firstly for universal mobile telecommunications systems (hereinafter: UMTS[2]), then, keeping in mind the strategic challenges arising from the increasing spectrum requirements of wireless communications as well as the principle of technological neutrality, for the provision of wireless broadband electronic communications services that can be implemented with mobile and fixed communications networks (MFCNs[3]). Pursuant to Commission Implementing Decision 2012/688/EU, which sets out the rules of harmonised use, only Frequency Division Duplex (FDD) mode wireless terrestrial communications networks may be installed in this band.

In accordance with the Commission Implementing Decision, Hungary has implemented the EU regulation on the use of the 1920-1980/2110-2170 MHz band for MFCN purposes. The NMHH Decree 7/2015 (XI.13.) on the national frequency allocation and the rules of using frequency bands contains the technical and bandwidth usage-related provisions in coherence with the relevant EU provisions, enabling technology-neutral use of the band. With respect to UMTS/IMT-2000 systems we currently have coordination agreements regulating the use of frequencies in national border zones, and international coordination agreements are being negotiated regarding technology-neutral use, in compliance with the new regulations.

The so-called "UMTS band" was sold and used for UMTS/IMT-2000 purposes in most European countries in the early 2000s. In Hungary, this band was sold in 2004, and from the available 2x60 MHz spectrum three service providers obtained a 2x15 MHz spectrum each, while 2x15 MHz is still unused (“not allocated” band).

In line with international efforts, the provision and the licensing, as required, of the radio spectrum necessary for the further development of mobile broadband services is one of the key strategic goals of the NMHH for the period between 2016-2020. The sale of the 2100 MHz band, along with other potential bands available for sale, is expected to take place in 2019, although a precondition for this sale is a decision regarding the extension of the existing licenses being made. Concerning the 2100 MHz band, a decision is necessary on whether only the sub-band not covered by the current entitlement (1965-1980/2155-2170 MHz) or the entire 2100 MHz band (1920-1980/2110-2170 MHz) should be sold, given that the acquired entitlements to frequency use are valid until the end of 2019 and may be extended, on one occasion, by 7.5 years at the request of the licensees. Service providers must contact the Authority 18 months before expiry of their license to request an extension, and the Authority is obliged take the decision regarding the extension of the license by not later than 9 months prior to the date of expiry of the license period.

1 IMT: International Mobile Telecommunication

2 UMTS: Universal Mobile Telecommunications System: a third generation (3G) mobile telecommunications system, compliant with the ITU’s IMT-2000 specifications set for third generation telecommunication systems

3 Mobile/Fixed Communications Networks (With regards to the convergence of the fixed and mobile wireless communication services, the CEPT regulation introduced the umbrella term ‘MFCN’ (Mobile/Fixed Communication Networks). This also includes the IMT (International Mobile Telecommunication) systems used in ITU terminology.)

2. Introduction

The 2100 MHz has been designated in the European countries to implement networks based on the UMTS/IMT-2000 technology, according to the so-called UMTS Decision[4], the EU regulation accepted in 1999. The scope of this decision extended to the 1900-1980 MHz, 2010-2025 MHz and 2110-2170 MHz frequency bands, which included the FDD[5] use of the 1920-1980 MHz and 2110-2170 MHz bands (2 GHz paired frequency bands), and the TDD[6] use of the 1900-1920 MHz and 2010-2025 MHz bands (2 GHz unpaired frequency bands). The sale of the 2100 MHz band for UMTS purposes has been practically implemented in every country and it is considered the main band from the perspective of 3G services to present day.

Striving to ensure the possibility of technological development, the regulation of the band initially harmonised for UMTS at an European level, has been amended, keeping in mind the strategic challenges arising from the increasing spectrum requirements of wireless broadband communications as well as the principle of technological neutrality. Instead of the UMTS Decision, the Commission Implementing Decision 2012/688/EU[7] ensuring the technology-neutral use of the band came into effect, abolishing technological restrictions and harmonising the 1920-1980/2110-2170 MHz frequency band on a technology-neutral basis for mobile and fixed communications networks (MFCN) capable of providing wireless broadband communications services.

Commission Implementing Decision 2012/688/EU only applies to the paired 1920-1980/2110-2170 MHz frequency band, and only allows the introduction of Frequency Division Duplex (FDD) mode wireless terrestrial communications networks. In accordance with the new decision, the member states had to amend the existing regulation until 30 June 2014, and enable the application of technologies other than UMTS (e.g. LTE) in the 2100 MHz band.

In most countries, UMTS systems (3G) and their advanced versions operate at present in the 1920-1980/2110-2170 MHz frequency band, however, many service providers have recently opted to introduce the LTE[8] systems (4G) in this band, in response to consumer demand. On an international scale, the inspection of the band began for the introduction of 5G, therefore the increased use of 4G and 5G systems is expected in this band on the long run.

In accordance with the Commission Implementing Decision, Hungary has implemented the EU regulation on the use of the 1920-1980/2110-2170 MHz band for MFCN purposes. The NMHH Decree 7/2015 (XI.13.) on the national frequency allocation and the rules of using frequency bands contains the technical and bandwidth usage-related provisions enabling technology-neutral use of the band.

The so-called "UMTS band" was sold and used for UMTS/IMT-2000 purposes in most European countries in the early 2000s. In Hungary, this band was sold in 2004, and from the available 2x60 MHz spectrum 3 service providers obtained a 2x15 MHz spectrum each, while 2x15 MHz is still unused. The entitlements to frequency use acquired in 2004 will expire at the end of 2019, and the entitlements to frequency use may be extended by 7.5 years without the announcement of new tenders, upon request by the licensee, based on the Authority's decision.

4 Decision 128/1999/EC on the coordinated introduction of a third-generation mobile and wireless communications systems (UMTS) in the Community', published in the Official Journal of the European Community on 22 March 1999 (repealed)

5 FDD: Frequency Division Duplex

6 TDD: Time Division Duplex

7 Commission Implementing Decision 2012/688/EU of 5 November 2012 on the harmonisation of the frequency bands 1920–1980 MHz and 2110–2170 MHz for terrestrial systems capable of providing electronic communications services in the Union

8 LTE: Long Term Evolution

3. Current use

The 1920-1980/2110-2170 MHz frequency band was sold and used for UMTS purposes in most European countries in the early 2000s. The regulation of the band, originally harmonised at a European level for UMTS, has been amended, taking technology-neutrality into consideration; based on the new Commission Implementing Decision approved in 2012, 1920-1980/2110-2170 MHz frequency band may be used for mobile and fixed communications networks (MFCN) capable of providing wireless broadband communications services. The majority of the networks operating in the European countries are as yet 3G, but in response to market demand and increasing number of service providers choose to introduce 4G in this band as well (e.g. LTE networks already operating in the band in Estonia, the Netherlands, Poland, Romania, Slovenia and the United Kingdom).

In Hungary, the band was sold in 2004, the acquired entitlements to frequency use will remain valid until end 2019, which may be extended upon request by the service providers in question.

3.1. International regulation

According to the International Radio Regulations, the 2100 MHz band (and the various partial ranges of it) is globally harmonised for mobile broadband applications. The international organisations and groups responsible for frequency management (ITU[9], CEPT[10], European Commission, RSPG[11] and RSC[12]) have elaborated and accepted the detailed rules of the use of the band.

On a European level, establishment of regulation took place in two steps. In accordance with the EU regulations, the 1920-1980/2110-2170 MHz frequency band was first harmonised for UMTS, and the regulation of the band's use was amended in 2012, and by taking into account technology and service neutrality, the EU regulation allowed the provision of wireless broadband electronic communications services implemented by mobile and fixed communications networks based on alternative technologies (other than UMTS). Most European countries have made technology-neutral use possible for service providers.

3.1.1. ITU

The ITU's International Radio Regulations, in the Region 1 including the EU member states, allocates the 1920-1980/2110-2170 MHz frequency band to fixed and mobile services, with a shared primary nature. Within this, the 2110-2120 MHz sub-band is also allocated for space research (distant space, Earth-space direction) with a primary nature.

Annex 1. of NMHH Decree 7/2015 (XI.13.) on the national frequency allocation and the rules of using frequency bands (hereinafter: NFFF) contains international allocation according to the International Radio Regulations.

Annex 1 of the NFFF contains the international allocation according to the International Radio Regulations. The 1920-1980/2110-2170 MHz band may be used for IMT purposes in accordance with footnote 5.388:

9 ITU: International Telecommunication Union

10 CEPT: Conférence européenne des Administrations des postes et des télécommunications – European Conference of Postal and Telecommunications Administrations

11 RSPG: Radio Spectrum Policy Group

12 RSC: Radio Spectrum Committee

5.388 *The bands 1885–2025 MHz and 2110–2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT in accordance with Resolution* ***212 (Rev.WRC-07)***[13] *(See also Resolution* ***223. (Rev.WRC-07)*** [14]*). (*WRC-12[15]*)*

3.1.2. CEPT

According to the regulation valid for CEPT countries, the 1920-1980/2110-2170 MHz frequency band may be used for mobile and fixed communications networks (MFCN) capable of providing wireless broadband communications services, in accordance with Decision ECC/DEC/(06)01. The band can also be used to provide mobile communications services available aboard aircraft (MCA[16]) and ships (MCV[17]), in compliance with the provisions of regulations ECC/DEC/(06)07[18] and ECC/DEC/(08)08[19] respectively.

The following CEPT/ECC documents apply to the MFCN use of the 2100 MHz band:

- Decision ECC/DEC/(06)01[20] containing the harmonised technical conditions of the use of the 1920-1980/2110-2170 MHz band for MFCN purposes, the recommended channel arrangement and the limit values of emissions ensuring the coexistence of the various radio services;
- Recommendation ERC/REC/01-01[21] containing the coordination provisions corresponding to the MFCN systems operating in the 1920-1980 MHz and 2110-2170 MHz bands;
- CEPT Report 039:[22] a report compiled for the Commission, containing the results of the technical investigations in connection with the technology-neutral use of the 2100 MHz band for the FDD use of the 1920-1980 MHz and 2110-2170 MHz bands, and the TDD use of the 1900-1920 MHz and 2010-2025 MHz bands;
- ERC Report 065[23]: contains the co investigations of the MFCN operating in the 2100 MHz band and the other services operating in the adjacent bands.

3.1.3. EU

On a European level, establishment of regulation took place in two steps. The European Parliament and the Council accepted Decision No 128/1999/EC “on the coordinated introduction of a

13 RESOLUTION 212 (REV.WRC-15):Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

14 RESOLUTION 223 (REV.WRC-15): Additional frequency bands identified for International Mobile Telecommunications

15 World Radiocommunication Conference 2012

16 Mobile Communication on Aircraft (MCA)

17 Mobile Communication on Vessels (MCV)

18 The harmonised use of airborne GSM and LTE systems in the frequency bands 1710-1785 MHz and 1805-1880 MHz, and airborne UMTS systems in the frequency bands 1920-1980 MHz and 2110-2170 MHz (Approved 1 December 2006, Amended 18 November 2016, Updated 30 June 2017)

19 The harmonised use of GSM systems in the 900 MHz and 1800 MHz bands, UMTS systems in the 2 GHz band and LTE systems in the 1800 MHz and 2.6 GHz bands on board vessels (Approved 31 October 2008, Amended 04 March 2016, Updated 30 June 2017)

20 ECC Decision (06)01 - The harmonised utilisation of the bands 1920-1980 MHz and 2110-2170 MHz for mobile/fixed communications networks (MFCN) including terrestrial IMT systems (Approved 24 March 2006, Amended 02 November 2012)

21 ERC Recommendation 01-01: Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 1920-1980 MHz and 2110-2170 MHz (felülvizsgálva Dublin 2003, Helsinki 2007, Cluj-Napoca 2016)

22 CEPT Report 039: Report from CEPT to the European Commission in response to the mandate to develop least restrictive technical conditions for 2 GHz bands, Final Report on 25 June 2010

23 ERC Report 065: Adjacent band compatibility between UMTS and other 2 GHz services

third-generation mobile and wireless communications system (UMTS) in the Community" on 14 December 1998. This so-called "UMTS Decision" included the regulation of the FDD use of the 1920-1980 MHz and 2110-2170 MHz bands and the TDD use of the 1900-1920 MHz and 2010-2025 MHz bands. According to the decision, the member states were obliged, on the one hand, to take all possible measures to allow the coordinated and gradual introduction of UMTS services in their territories latest by 1 January 2002, and they had to implement a licensing system latest by 1 January 2000 for UMTS purposes.

Following this, the Commission, in coherence with its publication titled "Rapid access to spectrum for wireless electronic communications services through more flexibility" - which, among others, covers the 2100 MHz terrestrial frequency band - urged the more flexible use of the spectrum and strengthened the principle of technology and service neutrality in Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002[24] ("framework directive"). On 15 June 2009, it issued a mandate to CEPT to elaborate, within the framework of Wireless Access Policy for Electronic Communications Services (WAPECS[25]) the technical conditions with the least possible constraints for the 2 GHz bands as well.

CEPT Report 39 was prepared based on the mandate, which is based on the notion of block edge mask (BEM). The BEM thresholds may equally concern emissions within and out of the user frequency block and are valid regardless of the technology used by a particular user; accordingly, the harmful interference between the UMTS and the other networks can be managed by observing the technical parameters in question.

Therefore, based on the results of CEPT Report 39, the decision was made that the introduction of technical harmonisation conditions is only justified in case of paired bands. The approved Commission Implementing Decision 2012/688/EU specified for the member states to designate the 1920-1980 and 2110-2170 MHz paired frequency bands for systems capable of providing electronic communications services compliant with the parameters determined in the annex of the decision, latest by 30 June 2014, on a nonexclusive basis.

Conditions of MFCN use

According to the annex of Commission Implementing Decision 2012/688/EU, the 1920-1980 and 2110-2170 MHz bands designated for MFCN must be used in compliance with the following technical conditions:

- The duplex mode is FDD (Frequency Division Duplex). The duplex distance is 190 MHz, so that the end user station broadcasts in the bottom range (starting at 1920 MHz and ending at 1980 MHz) (uplink FDD band), and the base station broadcasts in the upper range (starting at 2110 MHz and ending at 2170 MHz) (downlink FDD band).
- The spectrum block edges may be the following:
    - The closest spectrum block edge to 1920 MHz is 1920.3 MHz or above (the member states may decide to decrease this frequency to 1920.0 MHz for the sake of coherence with the conditions of the existing licences);
    - The closest spectrum block edge to 1980 MHz is 1979.7 MHz or below (the member states may decide to increase this frequency to 1980.0 MHz for the sake of coherence with the conditions of the existing licences);

24 DIRECTIVE (EC) NO. 2002/21 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).

25 Wireless Access Policy for Electronic Communications Services (WAPECS)

- The closest spectrum block edge to 2110 MHz is 2110.3 MHz or above (the member states may decide to decrease this frequency to 2110.0 MHz for the sake of coherence with the conditions of the existing licences);
- The closest spectrum block edge to 2170 MHz is 2169.7 MHz or below (the member states may decide to increase this frequency to 2170.0 MHz for the sake of coherence with the conditions of the existing licences);

- The transmissions of the base stations and end user stations must comply with the BEM levels specified in the annex of the decision.

By approving Commission Implementing Decision 2012/688/EU of 5 November 2012 on the harmonisation of the frequency bands 1920-1980 MHz and 2110-2170 MHz for terrestrial systems capable of providing electronic communications services in the Union, the band is no longer only available for the application of the UMTS technology, but the application of alternative (other than UMTS) technologies has also become possible by taking the principle of technology and service neutrality into consideration.

Other harmonised use in the 1920-1980/2110-2170 MHz bands

Based on the EU regulation, the provision of MCA services available aboard aircraft and the MCV services for persons aboard ships has to be made possible in the band, based on the decisions below:

- Commission Implementing Decisions 2013/654/EU amending Commission Decision 2008/294/EC of 7 April 2008 on harmonised conditions of spectrum use for the operation of mobile communication services on aircraft (MCA services) in the Community, and Commission Implementing Decision (EU) 2016/2317 amending both;
- Commission Decision 2010/166/EU of 19 March 2010 on harmonised conditions of use of radio spectrum for mobile communication services on board vessels (MCV services) in the European Union, and Commission Implementing Decision (EU) 2017/191 amending it.

Both decisions have been implemented in the domestic regulation.

3.2. National regulation

In Hungary, according to the effective NFFF, in coherence with the International Radio Regulations, 1920-1980 MHz and 2110-2170 MHz paired frequency bands are primarily allocated for fixed and mobile services, based on footnote 5.388. Systems of space research may also operate in the 2110-2120 MHz sub-band, likewise with a primary nature.

The national regulation corresponding to the 1920-1980 MHz and 2110-2170 MHz bands is described in Annex 2 of the effective NFFF.

In accordance with the European harmonised use, according to Annex 2 of the NFFF, frequencies may be designated for FDD applications of terrestrial systems capable of providing electronic communications services in the 1920-1980 MHz/2110-2170 MHz bands, on a primary basis. On a tertiary basis, civilian MCS systems may operate in the 1920–1980/2110–2170 MHz band in the framework of mobile service, while both civilian and non-civilian SRD[26] radio determination applications may operate in the 1900-1980/2110-2170 MHz band.

Conditions of MFCN use

The band use conditions and frequency management requirements of the terrestrial systems capable of providing electronic communications services in the 1920–1980/2110–2170 MHz band can be found in Chapter 4.4 of Annex 3 of the NFFF.

26 Short Range Device (SRD)

The 2x60 MHz available in the 1920-1980/2110-2170 MHz frequency band is divided into 24 units of 5 MHz blocks, so that by applying a 190 MHz duplex distance, 12 units of 5 MHz blocks may be formed according to the table below:

Basic block No.	Block width	Lower band	Upper band
1	2x5 MHz	1920–1925 MHz	2110–2115 MHz
2	2x5 MHz	1925–1930 MHz	2115–2120 MHz
3	2x5 MHz	1930–1935 MHz	2120–2125 MHz
4	2x5 MHz	1935–1940 MHz	2125–2130 MHz
5	2x5 MHz	1940–1945 MHz	2130–2135 MHz
6	2x5 MHz	1945–1950 MHz	2135–2140 MHz
7	2x5 MHz	1950–1955 MHz	2140–2145 MHz
8	2x5 MHz	1955–1960 MHz	2145–2150 MHz
9	2x5 MHz	1960–1965 MHz	2150–2155 MHz
10	2x5 MHz	1965–1970 MHz	2155–2160 MHz
11	2x5 MHz	1970–1975 MHz	2160–2165 MHz
12	2x5 MHz	1975–1980 MHz	2165–2170 MHz

A basic block forms a user block if the basic block and all basic blocks in neighbouring frequencies have different licensees, or if it is a neighbouring basic block in at least two frequencies, if its licensee is the same. By consolidating the basic blocks of the band user blocks can be formed, whose magnitude and quantity is established in the announcement documentation of the tendering procedure.

The conditions of acquiring the right of frequency use and the provisions regarding band use are summarised in the following table:

Subject of condition	**Specification**
Purpose of use	electronic communications service provision (MFCN)
Method of frequency allocation	tendering procedure
Quantity of available frequency range	the quantity of the basic blocks that can be acquired by the participant of the tendering procedure and the size of the user blocks are determined in the announcement documentation
Term of the right of frequency use	a minimum of 9 and a maximum of 20 years, with the actual duration determined by the announcement documentation of the tendering procedure and the resolution concluding it, or a public contract.
Territorial extension of the entitlement to frequency use	National
Method of management	block allocation
Secondary trading	the entitlement to frequency use and right may be transferred or leased with any territorial or temporal restrictions, in part or in whole, i.e. without limitation to the smallest unit or quantity of the frequency band
	in case of transfer, the Authority is entitled to extend the deadline of starting electronic communications services by up to one year

The frequency management requirements for using the block for MFCN purposes is shown in the table below:

Requirement subject	Specification
Carrier frequency band of end user stations	1920–1980 MHz
Carrier frequency band of fixed stations	2110–2170 MHz
Duplex spacing	190 MHz
Access mode	FDD only
Nominal channel spacing	UMTS: 5 MHz
	LTE: 1,4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
Channel centre carrier frequencies	UMTS: every 200 kHz
	LTE: every 100 kHz

Regarding the services, no limiting provisions are in force, as technology and service neutrality must be ensured in the band. In the 1920-1980/2110-2170 MHz paired frequency band, electronic communications service may be acquired for mobile services and terrestrial systems capable of providing electronic communications services operating in the framework of fixed services (currently available: LTE, UMTS).

Taking technology-neutrality into consideration, the band may only be used in FDD mode, if the harmonised technical conditions set out in Decision 2012/688/EU are fulfilled.

It contains BEM in-block and out-of-block power limits specified for the base station. The in-block power limit corresponds to a block designated to an operator. Concerning FDD fixed blocks, the EIRP within the block may not exceed the value of 65 dBm/5 MHz. In case of certain applications, such as in rarely populated areas, even higher values are permissible, if this does not increase the risk of blocking end user stations significantly. The out-of-block power limits apply to sub-bands within the 1920-1980 MHz and 2110-2170 MHz frequency bands, or outside the block designated to the service provider in question.

The maximum mean in-block power of user blocks in FDD end user stations cannot exceed 24 dBm. For specific deployments, such as land-location end-user stations in rural areas, deviation from the given thresholds may be permitted provided that protection of other services, networks and applications are not compromised and cross-border obligations are fulfilled.

Conditions of use of other applications

The band use conditions and frequency management requirements of the MCA systems in the 1920-1980/2110-2170 MHz band can be found in point 5.9 of Annex 3 of the NFFF.

In coherence with the EU regulations, systems providing MCV services may also operate in the 1920-1980/2110-2170 MHz band. The MCV systems do not concern the territory of Hungary; they may only be used in international traffic, outside Hungary's borders. Annex 6 of the NFFF includes the obligations of the member states of the European Union in order to avoid harmful interference caused by the systems providing MCV services in the coastal seas to terrestrial mobile networks.

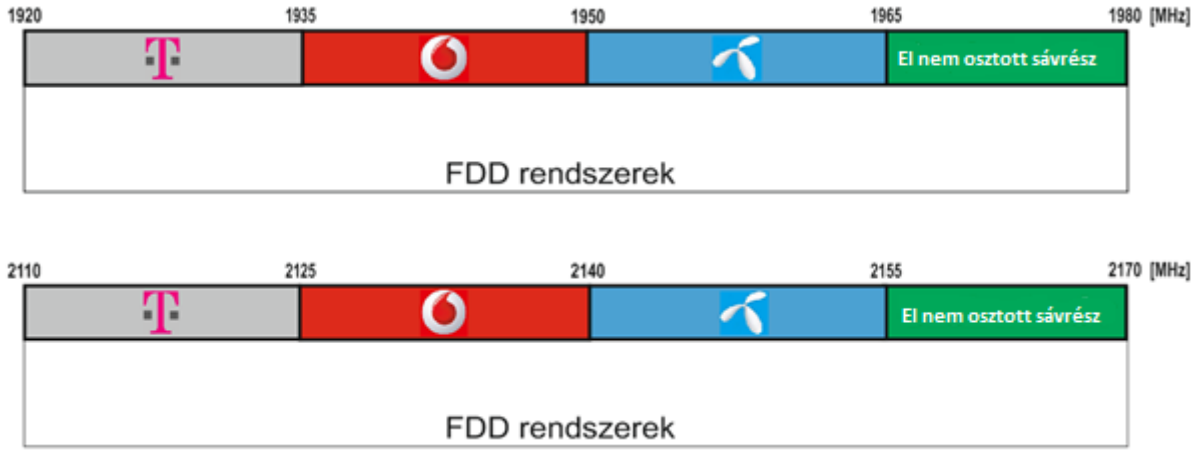
SRD radio determination applications may be operated in accordance with points 11.1 and 11.7.2 of the NFFF.

The MCA systems and SRD applications may operate on a tertiary basis, therefore their detailed regulation need not be examined from the aspect od sale.

3.3. Actual use

In the tendering procedure launched on 31 August 2004 for introducing the 3G technology (UMTS), each of the domestic mobile service providers (Magyar Telekom, Vodafone and Telenor) obtained entitlement for using a 2x15 MHz Frequency Division Duplex (FDD) spectrum from the 2x60 MHz available spectrum in the 2100 MHz band, according to the table below:

Operator	FDD frequency band	
	1920-1935 MHz	2110-2125 MHz
	1935-1950 MHz	2125-2140 MHz
	1950-1965 MHz	2140-2155 MHz
Unallocated sub-band of band	1965-1980 MHz	2155-2170 MHz



The duration of the entitlements to frequency use acquired in 2004 is 15 years, therefore they will expire at the end of 2019. The entitlements to frequency use may be extended by 7.5 years without the announcement of new tenders, upon request by the licensee, based on the Authority's decision.

If the licensee wishes to extend the duration of the licence, it is obliged to submit an application at the Authority 18 (eighteen) months before expiry of the licensee, requesting the said extension. The Authority is obliged take the decision regarding the extension of the license by not later than 9 (nine) months prior to the date of expiry of the license period.

Therefore, it can be seen from the above that the licensee may request an extension of the entitlement until mid-2018, taking into account the specified deadline, and the Authority is obliged to make a decision by not later than the beginning of 2019, deliberating the contents of the decision establishing entitlements to frequency use. The documentation recorded the following, as the aspects of the decision made on extending the duration of the entitlement:

i. that the quality of the service provided by the licensee until the day before submitting the application, the coverage achieved and the other parameters of service have met the requirements set out in the present documentation, the Announcement resolution and the corresponding legal regulations,

ii. the changes on the mobile telecommunications market after the decision on entitlement to frequency use becoming effective (including the technology applied) and the capability of the licensee to use these, and

iii. the international obligations of the Republic of Hungary and the Contracting Entity after the effective date of the decision on the entitlement to frequency use, and – if applicable – the capability of the licensee to adhere to these new obligations, and

iv. whether the licensee undertook payment of the new recommended fee in its recommendation.

4. Future use

By introducing Commission Implementing Decision 2012/688/EU of 5 November 2012 on the harmonisation of the frequency bands 1920-1980 MHz and 2110-2170 MHz for terrestrial systems capable of providing electronic communications services in the Union into the domestic jurisdiction, the band is no longer only available for the application of the UMTS technology, but the application of alternative (other than UMTS) technologies has also become possible by taking the principle of technology and service neutrality into consideration.

The technology-neutral use also ensures flexibility, as equipment of various channel spacing may be operated besides the channel division of 5 MHz according to the UMTS standard, e.g. bandwidths of 5, 10, 15 or even 20 MHz may be used in case of LTE applications. By applying the carrier aggregation technique, even greater bandwidths can be achieved. The carrier aggregation technique can be applied for the more advanced 3G and 4G systems, with respect to the bands determined in the standards.

UMTS systems and their advanced versions operate even at present in the 1920-1980/2110-2170 MHz frequency band in most countries, however, the use of LTE systems in this band has also gained momentum.

4.1. International regulation

4.1.1. ITU

Concerning the use of the 1920-1980 /2110-2170 MHz band, no changes took place in the Radio Regulations in comparison to the regulation in Annex 1 of the NFFF at the WRC-15. The amendment of the use of the band is not on the next WRC's (WRC-19) agenda either.

The ITU regulation concerning the band is found in chapter 3.1.1.

4.1.2. CEPT

Concerning the band, the CEPT documents containing the technical conditions of harmonised use are already available (See point 3.1.2.).

4.1.3. EU

The EU regulation for the MFCN use of the 1920-1980 /2110-2170 MHz band is contained in the Commission Implementing Decision EU/2012/688, which has been implemented in the domestic regulation. No new harmonisation process was initiated for the band, in order to review the corresponding harmonisation rules.

4.2. National regulatory plans

The EU regulation had to be implemented until 2014; Hungary had implemented it and laid down the detailed technical details of harmonised use in the NFFF. The users may continue operating their UMTS systems based on the current regulations, or may switch to LTE networks and the rules of usage will not change after sale of the band.

Only FDD systems may be put to operation in the band, therefore, is LTE will be introduced besides or instead of UMTS, the systems will be compatible if the BEM are observed.

Depending on the outcome of the sale, band rearrangement may be necessary to create contiguous user blocks. The necessity of band rearrangement may be decided on if it is found out

whether the service providers in question will choose to extent their entitlement to frequency use acquired earlier.

5. Frequency use and coordination beyond the borders

5.1. Current use

Similarly to Hungary, the band was also allocated in the neighbouring countries for UMTS or technology-neutral use. Based on the data available in the ECO Frequency Information System (hereinafter: EFIS[27]), designated by the European Commission as a common access point and operated by the European Communications Office (hereinafter: ECO), the use by the neighbouring countries is summarised in the following table.

	AUT	**HRV**	**ROU**	**SRB***	**SVK**	**SVN**	**UKR**
Application[28]	digital cell	UMTS	digital cell	UTRA	UMTS	technology-neutral	IMT-2000 CDMA UMTS/WCDMA
Expiry of entitlement	2020	2024	2020/2022	2016	2026	2021/2023	2020

*Only data from 2010 were available for SRB

In national border zones, only stations meeting prevailing relevant conditions set forth in international coordination documents may be permitted.

For the 1920-1980 and 2110-2170 MHz frequency bands, we have international coordination agreements regulating cross-border use of UMTS/IMT-2000 with every neighbouring country, with the exception of Serbia.

Considering that the band can be used in a technology-neutral mode based on the international regulation, the conclusion of an “MFCN agreement” is necessary with every neighbouring country, which ensures, regardless of the chosen technology, the border zone implementation of broadband mobile service applications.

The international coordination requirements for the introduction of the MFCN have been developed in the competent CEPT working groups; the international coordination rules corresponding to the band are contained in recommendation ECC/REC/(01)01. The reconciliation of the draft of the coordination agreement elaborated for MFCN based on the recommendation is underway, and may be signed in the near future by all neighbouring countries.

The agreement is based on the field strength limitations applicable in border zones and the use of preferred codes; accordingly, if the countries concerned adhere to the values specified in the agreement, the coordination of the individual stations is not necessary.

27 https://www.efis.dk/

28 Name of the application given in EFIS (only the applications significant from the aspect of band use are indicated).

6. Other potential sources of interference

By observing the technical parameters in the EU/688/2012 decision, the compatibility between the in-band MFCN networks and the other out-of-band applications. Based on the experience gained from the operation of the UMTS, we have no information of any interference problems that would require further investigation in the 2100 MHz band.

In case of interference problems emerging in the course of operation of networks operating in accordance with the specified requirements, the provisions of the Electronic Communications Act[29] must be followed.

29 Act C of 2003 on electronic communications

7. Frequency fees

For determining the fees to be paid after the use of the 2100 MHz frequency band, the rules and calculation methods determined in Section 20 titled “Fees to be paid for service type bands with block allocation, sold at an auction or a tender” and Annex 9 of the NMHH Decree 1/2011 (III. 31.) on frequency reservation and usage fees (hereinafter: the Fee Decree) are applicable.

Based on Section 20 of the Fee Decree, the licensed party, and the party covered by the scope of block allocation by legal regulation, acquiring right of frequency use in a designated frequency band without tendering procedure, shall only pay a band fee during the validity of the entitlement to frequency use on frequency bands used for services and covered by the scope of block allocation acquired in the context of a tender or auction, or re-sold thereafter.

Unless otherwise specified by the decision of the authorities or a public contract concluded before 1 January 2014, the band fee shall be defined as a product of the unit fee, the width of the frequency band sold and the applicable band multiplier. The fee is calculated by the following method:

- A uniform fee of HUF 7500/kHz per month shall apply to all frequency band sold and acquired.
- This fee shall be multiplied by the cumulative frequency in kHz of bands sold and acquired, and by the band multiplier.
- When defining the amount expressed in kHz of the bands sold and acquired, both parts of duplex bands shall be taken into account.
- A licensee shall be liable for paying the full monthly band fee for each month involved in its entitlement to or right of frequency use.

The following table contains the band multipliers in case of a nationwide entitlement to frequency use:

Frequency Range	Band Multiplier Value
For bands in use on 1 January 2014 in the 1710-2200 MHz frequency range	0.25
For bands not in use on 1 January 2014 in the 1710-2200 MHz frequency range	0.5

In order to support investments, the enterprise acquiring entitlement to frequency use in the 1920-1980/2110-2170 MHz frequency band in the tendering procedure launched after 1 March 2013 will be entitled to a 50% discount on the band fee, in accordance with the above, for a duration of 4 years following the date of acquisition. Among the frequency bands listed above, the discount for supporting investment is not granted for any frequency band in which the enterprise being awarded the entitlement to frequency use already has an entitlement to frequency use at the time of the tender announcement.

In case of frequency blocks acquired in the context of a tender or auction launched after 1 April 2011, the rate of the determined fee shall remain unchanged even if the location of the frequency block within the band changes as a result of band reallocation.

Related documents

[1] 2012/688/EU Commission Implementing Decision of 5 November 2012 on the harmonisation of the frequency bands 1 920-1 980 MHz and 2 110-2 170 MHz for terrestrial systems capable of providing electronic communications services in the Union;

[2] CEPT Report 39 Report from CEPT to the European Commission in response to the mandate to develop least restrictive technical conditions for 2 GHz bands, Final Report on 25 June 2010;

[3] ECC/DEC/(06)01: The harmonised utilisation of the bands 1920-1980 MHz and 2110-2170 MHz for mobile/fixed communications networks (MFCN) including terrestrial IMT systems (Approved 24 March 2006, Amended 02 November 2012);

[4] ERC Report 065: Adjacent band compatibility between UMTS and other 2 GHz services;

[5] ERC/REC 01-01: Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 1920-1980 MHz and 2110-2170 MHz (revised Dublin 2003, Helsinki 2007, Cluj-Napoca 2016);

[6] ECC/DEC/(06)07: The harmonised use of airborne GSM and LTE systems in the frequency bands 1710-1785 and 1805-1880 MHz, and airborne UMTS systems in the frequency bands 1920-1980 MHz and 2110-2170 MHz;

[7] ECC/DEC/(12)01: Exemption from individual licensing and free circulation and use of terrestrial and satellite mobile terminals operating under the control of networks;

[8] Recommendation ITU-R M.1036-5 (10/2015) Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR);

[9] AGREEMENTBETWEEN THE ADMINISTRATIONS OF AUSTRIA, CROATIA, HUNGARY AND SLOVENIA ON BORDER CO-ORDINATION OF UMTS/IMT-2000 SYSTEMS IN THE FREQUENCY BANDS 1900 – 1980 MHz, 2010 – 2025 MHz and 2110 – 2170 MHz (Vienna, 5th February 2002);

[10] AGREEMENTBETWEEN THE ADMINISTRATIONS OF HUNGARY, POLAND, THE SLOVAK REPUBLIC AND UKRAINE ON BORDER CO-ORDINATION OF UMTS/IMT-2000 SYSTEMS IN THE FREQUENCY BANDS 1900 – 1980 MHz, 2010 – 2025 MHz and 2110 – 2170 MHz (Bratislava, 5th September 2002);

[11] AGREEMENT between the Administrations of ROMANIA and HUNGARY ON BORDER CO-ORDINATION OF UMTS/IMT-2000 SYSTEMS IN THE FREQUENCY BANDS 1900 – 1980 MHz and 2110 – 2170 MHz (Budapest, 3rd September 2004);

[12] MSZ EN 301 908-1: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 1: Introduction and common requirements.

[13] MSZ EN 301 908-2: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE)

[14] MSZ EN 301 908-3: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS)

[15] MSZ EN 301 908-11: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 11: CDMA Direct Spread (UTRA FDD) Repeaters

[16] MSZ EN 301 908-1: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 1: Introduction and common requirements.

[17] MSZ EN 301 908-13: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)

[18] MSZ EN 301 908-14: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)

[19] MSZ EN 301 908-15: IMT cellular networks. Harmonised European standard covering the essential requirements of Article 3 Section (2) of the R&TTE Directive Part 15: Evolved Universal Terrestrial Radio Access (E-UTRA FDD) Repeaters;

[20] ETSI TS 36.104 v 14.3.0 (2017-04): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA);Base Station (BS) radio transmission and reception"(3GPP TS 36.104 version 14.3.0 Release 14);

[21] ETSI TS 36 101 V14.3.0 (2017-04) - LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 version 14.3.0 Release 14);

[22] Global mobile Suppliers Association, ‘Evolution to LTE report: 4G Market and Technology Update’, 28 July 2016;