TECHNICAL ARRANGEMENT

concerning the use of terrestrial systems capable of providing electronic communications services in the frequency band 3400-3800 MHz in border areas

between
the Communications Regulatory Authority of the Republic of Lithuania
and
the Office of Electronic Communications of the Republic of Poland

Warsaw, 24 April 2024

Preamble

According to the Article 6 of ITU Radio Regulations and in the framework of the "*HCM Agreement*"[1] the representatives of the Communications Regulatory Authority of the Republic of Lithuania and the Office of Electronic Communications of the Republic of Poland (hereinafter referred to as the Parties) have concluded this *Technical Arrangement concerning the use of terrestrial systems capable of providing electronic communications services in the frequency band 3400-3800 MHz* with the aim to avoid mutual interference and optimize the use of the above-stated frequency band in the border areas[2] on the mutually agreed basis (hereinafter referred to as the *Technical Arrangement*).

The frequency band 3400-3800 MHz is designated for terrestrial systems capable of providing electronic communications services according to Commission Decision (2008/411/EC) of 21 May 2008 on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community and Commission Implementing Decision (EU) 2019/235 of 24 January 2019 on amending Decision 2008/411/EC as regards an update of relevant technical conditions applicable to the 3400-3800 MHz frequency band.

This *Technical Arrangement* supersedes the "*TECHNICAL CRITERIA and PRINCIPLES concerning the use of the frequency band 3400-3800 MHz for terrestrial Mobile/Fixed Communications Networks (MFCN) in border areas between the Communications Regulatory Authority of the Republic of Lithuania and the Office of Electronic Communications of the Republic of Poland*" (Warsaw, 20 December 2018). Frequency assignments made on the basis of abovementioned document remain valid.

1. Principles

1.1. This *Technical Arrangement* is based on the concept of field strength levels for MFCN[3] base stations, distribution of preferential and non-preferential Physical Cell Identities (PCIs) for LTE and NR systems as described in ECC Recommendation (15)01 of 13 February 2015 (latest corrected on 8 March 2024) "*Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 694-790 MHz, 1452-1492 MHz, 3400-3600 MHz and 3600-3800 MHz*" (hereinafter referred to as ECC/REC/(15)01) and principle of the equal access to spectrum by both Parties.

1.2. The frequency arrangement for terrestrial MFCN systems presumes Time Division Duplex (TDD) mode is used in the frequency band 3400-3800 MHz. This *frequency arrangement conforms* to ECC Decision (11)06 of 9 December 2011 (latest amended 26 October 2018) "*Harmonised frequency arrangements and least restrictive technical conditions (LRTC) for mobile/fixed communications networks (MFCN) operating in the band 3400-3800 MHz*".

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[1] Agreement between the Administrations of Austria, Belgium, the Czech Republic, Germany, France, Hungary, the Netherlands, Croatia, Italy, Liechtenstein, Lithuania, Luxembourg, Poland, Romania, the Slovak Republic, Slovenia and Switzerland on the Coordination of frequencies between 29.7 MHz and 43.5 GHz for fixed service and land mobile service (HCM Agreement), Berlin, 8 September 2022 (date of entry into force: 1 January 2023).

[2] In the context of this Technical Arrangement the term "border" is understood as the international borderline between the countries of the Parties.

[3] MFCN - mobile/fixed communications networks which includes IMT and other communications networks in the mobile and fixed services" which would include fixed wireless access but not point-to-point links

1.3. The frame structures of MFCN TDD system and related parameters conform to the ECC Recommendation (20)03 "Frame structures to facilitate cross-border coordination of TDD MFCN in the frequency band 3400-3800 MHz" (approved 23 October 2020) (hereinafter referred to as ECC/REC/(20)03) and are given in Annex 1 and Annex 2 to this *Technical Arrangement*.

1.4. Synchronised operation is the operation with common phase clock reference (i.e. a reference clock with consistent time offsets relative to a common UTC-based time reference to ensure full alignment of transmissions) and compatible frame structures (to be used on both sides of the border to avoid simultaneous UL/DL transmissions). ECC Report 216 provides practical guidance for transmission of reference phase/time clock.

1.5. Unsynchronised operation is the operation with common phase clock reference and non-compatible frame structures or without common phase clock reference and compatible or non-compatible frame structures. This *Technical Arrangement* covers unsynchronised operation without preferential frequency blocks and operation based on ECC/REC/(20)03 frame structures with and without downlink symbol blanking (DSB) feature.

1.6. Field strength values in this *Technical Arrangement* are based on a receiving antenna height of 3 m above ground for 10 % of time and 50 % of locations.

1.7. This *Technical Arrangement* covers operation and coordination of base stations using AAS[4] and non-AAS[5]. Parties agree that coordination is not required for terminal stations in mobile and fixed services since that is covered by operation and coordination of base stations.

1.8. Field strength values in this *Technical Arrangement* are mean values for non-AAS base stations and median values for AAS base stations.

2. Use of frequencies and PCIs

2.1. Each Party may use the 3400-3800 MHz frequency band for base stations of synchronised MFCN TDD systems on both sides of the border without coordination with the other Party if the field strength of each cell produced by base station does not exceed the levels given in Annex 3 to this *Technical Arrangement*.

2.2. Each Party may use the 3400-3800 MHz frequency band for unsynchronised MFCN TDD systems on both sides of the border without coordination with the other Party if the field strength of each cell produced by base station does not exceed the levels given in Annex 4 to this *Technical Arrangement*.

2.3. Each Party shall use PCIs for LTE and NR systems according to the Annex 5 to this *Technical Arrangement*.

2.4. If frequency block size is other than 5 MHz, a correction factor, calculated by the formula 10 × lg (frequency block size / 5 MHz), dB, shall be added to the field strength values indicated in items 2.1 and 2.2.

[4] AAS – Active Antenna System (stations that use an antenna that consists of an array of active elements)

[5] Non-AAS – not Active Antenna System

2.5. For the field strength calculations the tool of the HCM Agreement shall be applied (using appropriate calculation mode). The Parties may apply other calculation tools using the latest version of Recommendation ITU-R P.1546 "Method for point-to-area predictions for terrestrial services in the frequency range 30 MHz to 4000 MHz" for 10 % of time and 50 % of locations. In case of any differences in results of calculations the official version of HCM Program shall be used as a reference.

3. Coordination procedure and harmful interference

3.1. If the field strength value of any carrier produced by the base station exceeds the levels indicated in items 2.1 and 2.2 the frequency assignment shall be coordinated with the other Party.

3.2. The period of coordination shall not exceed 45 days from the date of receiving the request and 20 days after the reminder. If no reply is received within 65 days the frequency assignment shall be considered as coordinated. The exchange of coordination information shall take place by e-mail or other electronic means.

3.3. Coordination requests shall be drawn up according to Annex 2 of the HCM Agreement in the electronic format for mobile service.

3.4. Reports on harmful interference shall be presented in accordance with Annex 7 of the HCM Agreement. The Parties shall take all possible measures in order to eliminate harmful interference in due time.

3.5. Complaints on harmful interference shall be based on the median value of measurements of field strength, performed at a receiving antenna height of 3 m above ground at least in two different points over a distance of at least 100 m along the border.

4. Arrangements between operators

4.1. Operators concerned may agree on preferential frequency distribution, network synchronisation, use of the DSB feature and to deviate from field strength levels in Section 2 by mutual consent concluding an arrangement between operators (hereinafter referred to as the AbO) with the written mutual consent of the Parties concerned.

4.2. AbO shall only be valid as long as all participating operators hold exclusive rights of use of the common part of the frequency bands.

4.3. Operators should inform relevant Parties on the cancellation of the AbO. After such cancellation, base stations brought into use under AbO shall operate in accordance with Section 2.

4.4. Operators shall take all possible measures in order to eliminate harmful interference originating from station brought into use under the AbO.

4.5. In case interference cannot be eliminated by mutual consent between Operators concerned provisions in accordance with Section 2 apply to base station causing interference. In case interference persist, the concerned base station should be switched off.

5. Revision and cancellation

5.1. This *Technical Arrangement* may be revised at any time on the initiative of any Party with the consent of the other Party.

5.2. This *Technical Arrangement* may be cancelled by a mutual decision of both Parties on terms and conditions adopted by the Parties or by a decision of one Party notifying the other Party on its intention at least six months before. This does not affect the operation of stations already brought into use or coordinated under this *Technical Arrangement*. After such cancellation, Parties will exchange the list of stations already brought into use or coordinated under this *Technical Arrangement*.

6. Entry into force

6.1. This *Technical Arrangement* shall come into force on the date of signing it by both Parties.

6.2. This *Technical Arrangement* has been drawn in English in two identical copies, one for the Republic of Lithuania and one for the Republic of Poland.

Warsaw, 24 April 2024

Chair of the Council of the Communications Regulatory Authority of the Republic of Lithuania	President of the Office of Electronic Communications of the Republic of Poland
.....	.....
Jūratė Šovienė	Jacek Oko

Annex 1

Frame structure and related parameters for NR system in the 3400-3800 MHz frequency band in the Republic of Lithuania

In the 3400-3700 MHz frequency band[6]:

Parameter	**Value**		
Downlink and Uplink (DL/UL) slot pattern	DDDSU DDDSU DDDSU DDDSU		
Frame duration	10 ms		
Slot duration	0.5 ms		
Slot pattern periodicity	2.5 ms		
Special slot "S" configuration (i.e., DL:GP:UL symbols)	Downlink (DL)	Guard period (GP)	Uplink (UL)
	10	2	2
SCS (sub-carrier spacing)	30 kHz		
Time base	Start of UTC second epoch +/- 1.5 µs		
D = Downlink slot; S = Special slot; U = Uplink slot UTC = Coordinated Universal Time (In accordance with Recommendation ITU-R TF.460)			

In the 3700-3800 MHz frequency band:

not defined.

[6] According to Annex 1 of ECC/REC/(20)03 (Table 1, Frame A)

Annex 2

Frame structure and related parameters for NR system in the 3400-3800 MHz frequency band in the Republic of Poland

until 31 January 2028[7]:

Parameter	**Value**		
Downlink and Uplink (DL/UL) slot pattern	DDDSUUDDDD DDDSUUDDDD		
Frame duration	10 ms		
Slot duration	0.5 ms		
Slot pattern periodicity	5 ms		
Special slot "S" configuration (i.e., DL:GP:UL symbols)	Downlink (DL)	Guard period (GP)	Uplink (UL)
	6	4	4
SCS (sub-carrier spacing)	30 kHz		
Time base	Start of UTC second epoch +/- 1.5 µs		
D = Downlink slot; S = Special slot; U = Uplink slot UTC = Coordinated Universal Time (In accordance with Recommendation ITU-R TF.460) In terms of DL/UL slot pattern DDDSUUDDDD half-frame is equivalent to the DDDDDDDSUU half-frame when a -2 ms or +3 ms time offset is applied. This means that operators may choose to implement two consecutive DDDDDDDSUU half-frames with proper time offset instead.			

from 1 February 2028[8]:

Parameter	**Value**		
Downlink and Uplink (DL/UL) slot pattern	DDDSU DDDSU DDDSU DDDSU		
Frame duration	10 ms		
Slot duration	0.5 ms		
Slot pattern periodicity	2.5 ms		
Special slot "S" configuration (i.e., DL:GP:UL symbols)	Downlink (DL)	Guard period (GP)	Uplink (UL)
	10	2	2
SCS (sub-carrier spacing)	30 kHz		
Time base	Start of UTC second epoch +/- 1.5 µs		
D = Downlink slot; S = Special slot; U = Uplink slot UTC = Coordinated Universal Time (In accordance with Recommendation ITU-R TF.460)			

[7] According to Annex 1 of ECC/REC/(20)03 (Table 1, Frame B)
[8] According to Annex 1 of ECC/REC/(20)03 (Table 1, Frame A)

Annex 3

Field strength levels for synchronised operation of MFCN TDD systems in the 3400-3800 MHz frequency band

	Synchronised operation		
	Field strength level, dBµV/m / 5 MHz[9]		
	Synchronisation signal[10] centre frequencies aligned		Synchronisation signal centre frequencies not aligned
	Preferential PCIs	Non-preferential PCIs	All PCIs
at the border	79	61	79
at the 6 km line	61	–	61
	For NR base station using AAS considering the subcarrier spacing of 30 kHz the value of 79 dBµV/m/(5 MHz) correspond to SSB field strength level[11] of 69 dBµV/m/(30 kHz) for single-beam antenna pattern and 76 dBµV/m/(30 kHz) for multi-beam antenna pattern For NR base station using AAS considering the subcarrier spacing of 30 kHz the value of 61 dBµV/m/(5 MHz) correspond to SSB field strength level of 51 dBµV/m/(30 kHz) for single-beam antenna pattern and 58 dBµV/m/(30 kHz) for multi-beam antenna pattern		

[9] In case the bandwidth of the signal is other than 5 MHz the field strength should be corrected in accordance with item 2.4 of this Technical Arrangement

[10] Synchronisation signal means Synchronisation Signal Block (SSB) for NR

[11] Derived for one resource element (one subcarrier during one OFDM symbol) in secondary synchronisation signal (SSS) for the subcarrier spacing (SCS) of 30 kHz

Annex 4

Field strength levels for unsynchronised operation of MFCN TDD systems based on ECC/REC/(20)03 frame structures with and without downlink symbol blanking (DSB) in the 3400-3800 MHz frequency band

<table>
<tr><td></td><td colspan="3">Unsynchronised operation based on ECC/REC/(20)03 frame structures</td></tr>
<tr><td></td><td colspan="3">Field strength level, dBµV/m / 5 MHz[12]</td></tr>
<tr><td></td><td colspan="3">DSB feature not activated</td></tr>
<tr><td>at the border</td><td colspan="3">32 (for all PCIs)</td></tr>
<tr><td></td><td colspan="3">For NR base station using AAS considering the subcarrier spacing of 30 kHz the value of 32 dBµV/m / 5 MHz correspond to SSB[13] field strength level[14] of 18 dBµV/m / 30 kHz for single-beam antenna pattern and 23 dBµV/m / 30 kHz for multi-beam antenna pattern</td></tr>
<tr><td rowspan="3"></td><td colspan="3">DSB feature activated</td></tr>
<tr><td colspan="2">Synchronisation signal[15] centre frequencies aligned</td><td>Synchronisation signal centre frequencies not aligned</td></tr>
<tr><td>Preferential PCIs</td><td>Non-preferential PCIs</td><td>All PCIs</td></tr>
<tr><td>at the border</td><td>79</td><td>61</td><td>79</td></tr>
<tr><td>at the 6 km line</td><td>61</td><td>–</td><td>61</td></tr>
<tr><td></td><td colspan="3">For NR base station using AAS considering the subcarrier spacing of 30 kHz the value of 79 dBµV/m / 5 MHz correspond to SSB field strength level of 69 dBµV/m / 30 kHz for single-beam antenna pattern and 76 dBµV/m / 30 kHz) for multi-beam antenna pattern
For NR base station using AAS considering the subcarrier spacing of 30 kHz the value of 61 dBµV/m/(5 MHz) correspond to SSB field strength level of 51 dBµV/m / 30 kHz for single-beam antenna pattern and 58 dBµV/m / 30 kHz for multi-beam antenna pattern</td></tr>
</table>

[12] If the bandwidth of the signal is other than 5 MHz the field strength should be corrected in accordance with item 2.4 of this Technical Arrangement.
[13] Synchronisation Signal Block for NR
[14] Derived for one resource element (one subcarrier during one OFDM symbol) in secondary synchronisation signal (SSS) for the subcarrier spacing (SCS) of 30 kHz
[15] Synchronisation signal means Synchronisation Signal Block (SSB) for NR

Field strength levels for unsynchronised operation of MFCN TDD systems with non-preferential frequency blocks in the 3400-3800 MHz frequency band

	Unsynchronised operation with non-preferential frequency blocks
	Field strength level, dBµV/m / 5 MHz[16]
at the border	32 (for all PCIs)
	For NR base station using AAS considering the subcarrier spacing of 30 kHz the value of 32 dBµV/m / 5 MHz correspond to SSB[17] field strength level[18] of 19 dBµV/m / 30 kHz for single-beam antenna pattern and 24 dBµV/m / 30 kHz for multi-beam antenna pattern

[16] If the bandwidth of the signal is other than 5 MHz the field strength should be corrected in accordance with item 2.4 of this Technical Arrangement.

[17] Synchronisation Signal Block for NR

[18] Derived for one resource element (one subcarrier during one OFDM symbol) in secondary synchronisation signal (SSS) for the subcarrier spacing (SCS) of 30 kHz

Annex 5

Distribution of preferential Physical-layer Cell Identities (PCIs) for LTE and NR systems

Set	A	B	C	D	E	F
PCIs for LTE	0..83	84..167	168..251	252..335	336..419	420..503
PCIs for NR	0..83 504..587	84..167 588..671	168..251 672..755	252..335 756..839	336..419 840..922	420..503 923..1007
Set preferential to[19]	LTU[20]	LTU	LTU	POL[21]	POL	POL

[19] preferential PCIs to one Party are non-preferential to the other Party.
[20] LTU – Republic of Lithuania
[21] POL – Republic of Poland

Annex 6 (informative)

TDD synchronisation framework

In the Republic of Lithuania:

1. Operators use GPS signal or ITU-T G.8275.1 standard for phase/time synchronisation.
2. Operators are not obliged to implement Downlink Symbol Blanking (DSB) feature.

In the Republic of Poland:

1. Operators are obliged to ensure synchronization of network operation in terms of frequency, phase and time through the use of a distributed synchronization scheme based on satellite systems, a centralized synchronization scheme based on the IEEE 1588v2 standard, or any other synchronization system ensuring accuracy not worse than +/- 1.5 µs.
2. Operators are not obliged to activate the feature Downlink Symbol Blanking (DSB) feature but all operators declared that they intend to use DSB if in the neighbouring country the different frame is used.

General:

1. When operating MFCN TDD networks on both sides of the border using the frame structures recommended in ECC Recommendation (20)03 (Frame A on one side and Frame B on the other side) with a common phase clock reference, it is highly recommended that Parties will encourage operators on both sides of the border to activate the DSB feature to make efficient use of the frequency resources in the border areas in order to avoid harmful interference.