TECHNICAL ARRANGEMENT

BETWEEN THE NATIONAL FREQUENCY MANAGEMENT AUTHORITIES OF

AUSTRIA, CROATIA, HUNGARY, and SLOVENIA

ON BORDER COORDINATION

FOR TERRESTRIAL SYSTEMS CAPABLE OF PROVIDING ELECTRONIC COMMUNICATIONS SERVICES

IN THE FREQUENCY BAND 2500-2690 MHz

Budapest, 15th February 2018

1 INTRODUCTION

The aim of this Technical Arrangement is to lay down the principles, the technical provisions and administrative procedure necessary to regulate the deployment of terrestrial systems capable of providing electronic communications services in the band 2500 – 2690 MHz in border areas.

In the framework of article 6 of ITU Radio Regulations, of bi- or multilateral agreements, arrangements or protocols dealing with frequency coordination in general (e.g. the "HCM Agreement"), the Croatian Regulatory Authority for Network Industries (Croatia), the Federal Ministry for Transport, Innovation and Technology (Austria), the National Media and Infocommunications Authority (Hungary) and the Post and Electronic Communications Agency of the Republic of Slovenia (Slovenia) concluded this Technical Arrangement concerning the usage of the frequencies for terrestrial systems capable of providing electronic communications services in the band 2500 – 2690 MHz in border areas.

The Signatory Authorities have agreed on the following coordination procedures and rules detailed in the sections below in border areas.

2 PRINCIPLES OF FREQUENCY PLANNING AND FREQUENCY USAGE IN BORDER AREAS

2.1 Relevant regulations

From regulatory point of view, the following deliverables play an important role in the regulation of border coordination in the band 2500 – 2690 MHz:

- COMMISSION DECISION (2008/477/EC) of 13 June 2008 on

  the harmonisation of the 2500 – 2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community *(notified under document number C(2008) 2625)*;

- ECC Decision (ECC/DEC/(05)05) amended 03 July 2015 on

  Harmonised utilisation of spectrum for Mobile/Fixed Communications Networks (MFCN) operating within the band 2500 – 2690 MHz;

- ECC RECOMMENDATION (ECC/REC/(11)05) amended on 3 February 2017 on

  Cross-border Coordination for Mobile/Fixed Communications Networks (MFCN) in the frequency band 2500 - 2690 MHz.

2.2 Regulated bands

Within this Technical Arrangement, the band 2500 – 2690 MHz has been regulated concerning the FDD and TDD/Supplemental Downlink utilisation except the FDD usage in the sub-band 2570 – 2620 MHz (see section 3).

If FDD operation is required in the band 2570 – 2620 MHz, a separate bi- or multilateral Technical Arrangement between administrations concerned or an Operator Arrangement (see also section 3.2) between operators concerned should be concluded.

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2.3 FDD vs. TDD and TDD vs. SDL issues

TDD systems are allowed to operate in a paired band where FDD systems can be used. The consequence of this FDD vs. TDD or mixed scenario is that harmful interference can occur in some cases. The cases that particularly should be dealt with, because of the high probability of interference, are where a TDD system operates in the downlink or uplink band of a paired band used by an FDD system in a neighbouring country.

If the TDD usage in the downlink or uplink band of a paired band is not regulated properly, it places FDD systems at a disadvantage, making the deployment and coverage of FDD systems impossible in border areas. In addition, harmful interference and service degradation are expected in FDD systems. Therefore, it is necessary to redress the balance by regulating this mixed scenario so that harmful interference between FDD and TDD systems can be avoided, spectrum efficiency can be improved in border areas, and a certain balance of access to the spectrum between the FDD and TDD systems can be achieved.

SDL can be introduced in an unpaired band where TDD can be primarily operated; therefore, the SDL vs. TDD scenario needs to be also regulated in order to avoid harmful interference.

Taking into account the above-mentioned aspects of interference and the good balance between FDD and TDD access and between TDD and SDL access to the spectrum, it is necessary to limit the interference signal coming from a TDD network operating in the downlink or uplink band of the paired band and the interference signal coming from SDL systems operating in the unpaired band.

2.4 Access to the spectrum in general

One of the most important aims of this Technical Arrangement is to give simple procedure and rules so that networks in border areas may be deployed in a fast and effective way ensuring proper access to the spectrum. From this point of view, the coordination principle applied in this Technical Arrangement is that each country concerned has the same access to the spectrum, i.e. they may use all the frequencies in the band 2500 – 2690 MHz with the repartition of PCI (physical-layer cell-identity) codes on an equitable basis.

To apply the principle outlined above, the same interference field strength level is allowed for a home network and its opposite network in the neighbouring country, ensuring a more or less equitable access to the spectrum for the operators in the neighbouring countries.

Nevertheless, this kind of frequency usage in the border area is rather delicate and only viable if the field strength triggers given in this Technical Arrangement are kept and calculated using accurate radio wave propagation methods. In order to achieve better control of interference, radio parameters of the systems may need to be coordinated at an operator level according to the so-called "Operator Arrangement" (see section 6).

As a consequence of the above, traditional frequency coordination

(coordination and notification of stations) would disturb this delicate balance in the border area. Therefore, traditional frequency coordination will not be performed in this Technical Arrangement.

It is also important that the information about bringing the frequency bands into use by operators is available for the interested Administrations and this information can be seen in EFIS (www.efis.dk).

2.5 Radio wave propagation

Achieving equitable access to the spectrum rather depends upon the radio wave propagation method applied to calculate the field strength since that method serves as a tool for enforcing the rules of this Technical Arrangement.

2.5.1 Calculation for planning and effectuation

For the field strength calculations the method of the HCM Agreement shall be applied. Time probability for electronic communications services is 10%.

2.5.2 Calculations in the case of reported interference

As for interference field strength prediction, the following three methods have been recommended in the relevant frequency coordination Recommendation ECC/REC/(11)05:

- site general model with line calculations (hereinafter called "site general method");
- path specific model with radial calculations from base stations (hereinafter called "radial calculations");
- area calculations with a path specific model (hereinafter called "area calculations").

Using a site general method (like "HCM" Agreement") for the assessment of interference cannot ensure proper protection against harmful interference for several cases and results in less efficiency in frequency usage in border areas.

Radial calculations can only give better result than site general methods if steps along paths are small enough and the number of radial directions is high enough. Still, there may be some cases causing harmful interference.

Area calculations, especially alongside using clutter data, can eliminate the mistakes of both site general methods and radial calculations and, in addition, important geographic areas can also be protected. Therefore, area calculations are preferable in the case where it is necessary to evaluate interference in detail. Thus, operators are expected to apply area calculations based on commonly agreed wave propagation model, trigger values and method used for evaluation of interference to protect their networks or a special part of the border area and to enhance spectrum efficiency in border areas.

2.6 Interference calculation

In this Technical Arrangement, special single entry interference calculation is prescribed as given in sections 4.1, 4.2, 4.3, 4.4, 4.5 and their sub-sections so that calculations can be performed by the HCM Agreement.

2.7 Coordination procedure

In general, neither coordination nor notification of stations is required except in cases of harmful interference (see section 5).

2.8 Diversion from this Technical Arrangement

Operators may diverge from the principles, provisions and procedure given in this Technical Arrangement subject to the so-called "Operator Arrangement" (see section 6) except the cases given in section 3.1 -3.3 (band usage) and in section 3.4 (technology and radio service).

3 GENERAL TECHNICAL PROVISIONS

In this section the general technical provisions are given while section 4 details the additional technical provisions for the values of interference field strength that shall be kept in border areas.

If band usage other than given in section 3.1-3.3 is required and/or other technology and radio service given in section 3.4 is introduced, the Signatory Authorities concerned shall enter into negotiation and reach an agreement for properly modifying this Technical Arrangement before putting any station into operation.

3.1 Channelling arrangement

The frequency band 2500 MHz – 2690 MHz is divided into three sub-bands. All the sub-bands below may be used as an unpaired band or as a part of a paired band (see also sections 3.2 and 3.3):

"a"	2500 – 2570 MHz	uplink band of the paired band of ***"a"*** and ***"c"***
"b"	2570 – 2620 MHz	unpaired band
"c"	2620 – 2690 MHz	downlink band of the paired band of ***"a"*** and ***"c"***

The assigned blocks shall be in multiple of 5.0 MHz with the first lower block edge starting at the frequency of 2500 MHz.

3.2 FDD systems

The sub-bands ***"a"*** and ***"c"*** as paired ones (paired band) may be used for FDD systems. The duplex spacing for FDD operation shall be 120 MHz with terminal station transmission in the uplink band and base station transmission in the downlink band.

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The sub-band ***"b"*** may not be used for FDD operation with regulations laid down in this Technical Arrangement (see section 2.2).

3.3 TDD and SDL systems

a) TDD systems

All the sub-bands ***"a"***, ***"b"*** and ***"c"*** may be used for TDD systems.

b) SDL systems

The sub-band ***"b"*** may be used for SDL systems.

3.4 Technology and radio service

All rules laid down in this Technical Arrangement refer to LTE technology and land mobile/fixed radio service. Parameters of mobile and base stations such as power shall comply with the requirements given in COMMISSION DECISION (2008/477/EC) of 13 June 2008.

3.5 PCI codes and border areas

Due to the fact that only the LTE technology is applied for land mobile/fixed service in the band 2500 – 2690 MHz it is required to share the preferential physical-layer cell identities (PCI) according to ECC Recommendation ECC/REC/(11)05. The allocation of PCI codes in different border areas (or border zones) is given in Annex 1 to this Technical Arrangement.

All the regulation laid down in this Technical Arrangement refers only to the following border areas:

Austrian-Hungarian (AUT-HNG) border area

Austrian-Hungarian-Slovenian (AUT-HNG-SVN) border area

Austrian-Slovenian (AUT-SVN) border area

Hungarian-Slovenian (HNG-SVN) border area

Croatian-Hungarian-Slovenian (HRV-HNG-SVN) border area

Croatian-Slovenian (HRV-SVN) border area

Croatian-Hungarian (HRV-HNG) border area

4 TECHNICAL PROVISIONS RELATED TO FIELD STRENGTH TRIGGERS

4.1 Basic rules

Field strength values or triggers given in section 4.2, 4.3, 4.4, 4.5 and 4.6

and in their sub-sections refer to a reference frequency block of 5 MHz wide. The field strength triggers shall be modified according to the value of the bandwidth and the aggregated power correction factor given below. The modified field strength triggers shall be applied to each individual base station.

a) Bandwidth correction factor

If the nominal channel spacing of a system is not equal to 5 MHz, the value of the bandwidth correction factor according to the following equation shall be added to the field strength triggers given in section 4.2 to 4.4:

10 * log (Cs/5 MHz) (dB)

where

"Cs" nominal channel spacing (MHz).

b) Aggregated power correction factor

If there is more than one transmission in a respective reference frequency block, the field strength triggers shall be decreased by the value of the aggregated power correction factor according to the following equation in each antenna sector.

10 * log n (dB)

where

"n" the number of the transmitters or transmissions in the respective antenna sectors.

If a transmission with nominal channel spacing falls into a respective reference frequency block (even if partly), it shall be included in the value of "n".

When counting the value of "n" within a cell, all transmitters within a sector shall be taken into account.

In the case of mobile stations the aggregated power correction factor does not need to be applied.

4.2 Field strength triggers in the case where an FDD system is used in the paired band *"a"* and *"c"*

The following field strength triggers shall be applied for base stations in the pair band of **"a"** and **"c"** given in section 3.1 and 3.2:

a) Base stations of FDD systems with centre frequencies not aligned on both sides of the borderline using all PCI codes or with centre frequencies aligned using preferential PCI codes given in Annex 1 may be operated if the mean field strength produced by the cell (all transmitters within the sector) does not exceed the value of 65 dBμV/m/5MHz at a height of 3 m above ground at the borderline between countries and does not exceed a value of 49 dBμV/m/5MHz at a height of 3 m above ground at a distance of 6 km (6 km line) inside the neighbouring country.

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b) Base stations of FDD systems with centre frequencies aligned on both sides of the borderline using non-preferential PCI codes given in Annex 1 may be operated if the mean field strength produced by the cell (all transmitters within the sector) does not exceed the value of 49 dBμV/m/5 MHz at a height of 3 m above ground at the borderline between countries.

4.3 Field strength triggers in the case where TDD systems are used in the unpaired band *"b"* on both sides of the borderline

4.3.1 Non-synchronised TDD networks in the unpaired band *"b"*

Base stations of non-synchronised TDD systems using all PCI codes given in Annex 1 may be operated if the mean field strength produced by the cell (all transmitters within the sector) does not exceed the value of 30 dBμV/m/5 MHz at a height of 3 m above ground at the borderline.

4.3.2 Synchronised TDD networks in the unpaired band *"b"*

a) Base stations of synchronised TDD systems with centre frequencies not aligned on both sides of the borderline using all PCI codes or with centre frequencies aligned using preferential PCI codes given in Annex 1 may be operated if the mean field strength produced by the cell (all transmitters within the sector)ngth does not exceed the value of 65 dBμV/m/5MHz at a height of 3 m above ground at the borderline, and does not exceed the value of 49 dBμV/m/5MHz at a line of 6 km beyond the border at a height of 3 m above ground.

b) Base stations of synchronised TDD systems with centre frequencies aligned on both sides of the borderline using non-preferential PCI codes given in Annex 1 may be operated if the mean field strength produced by the cell (all transmitters within the sector) does not exceed the value of 49 dBμV/m/5MHz at a height of 3 m above ground at the borderline.

4.4 Field strength triggers in the case where TDD systems operate in the paired bands *"a"* or *"c"*

a) Base stations of TDD systems either in the uplink band "a" or in the downlink band "c" of the paired band, using all PCI codes given in Annex 1 may only be operated if the mean field strength produced by the cell (all transmitters within the sector) does not exceed the value of 10.5 dBμV/m/5MHz at a height of 3 m above ground at the borderline.

b) A mobile station of a TDD system, either in the uplink band "a" or in the downlink band "c" of the paired band, may only be operated if the mean field strength does not exceed the value of 10.5 dBμV/m/5MHz at a height of 3 m above ground at the borderline.

c) Higher field strength levels may only be applied if Operator Arrangements have been concluded.

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4.5 Field strength triggers in the case where the unpaired band "*b*" is used for Supplemental Downlink

a) In the case where no information is given on the frequency usage of a neighbouring country in the unpaired band "b", base stations of an SDL system using all PCI codes given in Annex 1 may be operated if the mean field strength produced by the cell (all transmitters within the sector) does not exceed the value of 10.5 dBμV/m/5 MHz at a height of 3 m above ground at the borderline.

b) In the case where the unpaired band "b" or part of it is used for Supplemental Downlink on both sides of the borderline, the same cases with the same field strength triggers should be used as in section 4.2. Other field strength triggers may also be used on the basis of Operator Arrangements.

4.6 Overview Table of field strength triggers to be applied

The trigger values of field strength, the usable PCI codes and the relevant sections (if possible) in brackets of this Arrangement given under "NO INFORMATION" part of the following Overview Table shall be used until otherwise concluded in Operator Arrangements.

Under OTHER CASES part of the Overview Table there is information on how the different network scenarios should be treated across both sides of the borderline. If more than one rule should refer to a cross-border scenario, the strictest one should be applied. The regulation of the cases in the OTHER CASES part of the Overview Table shall be based on Operator Arrangements and accordingly, trigger values other than in the Overview Table may also be applied.

NO INFORMATION on neighbouring country's network		
	Paired band	**Unpaired band**
System	Home network	Home network
FDD	Preferential PCI codes **A** (--) NON-Preferential PCI codes **B** (--)	FDD may not be used (2.2 and 3.2)
TDD	All PCI codes **C** (4.4)	All PCI codes **D** (--)
Supplement. Downlink	--	All PCI codes **C**(4.5.a)

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<table>
<tr><th colspan="6">OTHER CASES</th></tr>
<tr><td></td><td>Home network</td><td>Neighbour's network</td><td></td><td>Home network</td><td>Neighbour's network</td></tr>
<tr><td></td><td>FDD</td><td>FDD</td><td></td><td>TDD</td><td>TDD</td></tr>
<tr><td>centre frequencies aligned</td><td colspan="2">Preferential PCI codes
<u>A</u>
(4.2.a)
NON-Preferential PCI codes
<u>B</u>
(4.2.b)</td><td>Synchronised

NON-synchronised
(4.3.1)</td><td colspan="2">Preferential PCI codes
<u>A</u>
(4.3.2a)
NON-Preferential PCI codes
<u>B</u>
(4.3.2b)

ALL PCI codes
<u>D</u></td></tr>
<tr><td>centre frequencies NOT aligned</td><td colspan="2">All PCI codes
<u>A</u>
(4.2.a)</td><td>Synchronised

NON-synchronised</td><td colspan="2">All PCI codes
<u>A</u>

ALL PCI codes
<u>D</u>
(4.3.1)</td></tr>
<tr><td>--</td><td>FDD</td><td>TDD</td><td>--</td><td>SDL</td><td>SDL</td></tr>
<tr><td>--</td><td>Preferential PCI codes
<u>A</u>
(4.2.a)

NON-Preferential PCI codes
<u>B</u>
(4.2.b)</td><td>ALL PCI codes
<u>C</u>
(4.4)</td><td>--</td><td colspan="2"><u>Centre frequencies aligned</u>
Preferential PCI codes
<u>A</u>
(4.5.b and 4.2.a)
NON-Preferential PCI codes
<u>B</u>
(4.5.b and 4.2.b)

<u>Centre frequencies NOT aligned</u>
All PCI codes
<u>A</u>
(4.5.b and 4.2.a)</td></tr>
<tr><td></td><td></td><td></td><td></td><td>TDD</td><td>SDL</td></tr>
<tr><td></td><td></td><td></td><td></td><td>All PCI codes
<u>D</u>
(--)</td><td>All PCI codes
<u>C</u>
(4.5.a)</td></tr>
<tr><td>Sets of trigger values</td><td colspan="5"><u>A</u>
65 dBµV/m/5 MHz@0 km and 49 dBµV/m/5 MHz@6 km at a height of 3 m above ground
<u>B</u>
49 dBµV/m/5 MHz@0 km at a height of 3 m above ground
<u>C</u>
10.5 dBµV/m/5 MHz@0 km at a height of 3 m above ground
<u>D</u>
30 dBµV/m/5 MHz@0 km at a height of 3 m</td></tr>
</table>

If there is no any network in operation in a neighbouring country in a certain band, the "NO INFORMATION" part of the Overview Table shall be used.

5 PROCEDURE IN THE CASE OF HARMFUL INTERFERENCE

In the case of harmful interference the data necessary to evaluate and

treat the harmful interference shall be exchanged between Signatory Authorities concerned.

When checking the trigger values, for line and point-to-point calculations, taking into account the different type of radio wave propagation paths, the methods of HCM Agreement shall be used. Time probability in all calculations is 10 %, except free space propagation.

5.1 Harmful interference between FDD systems in the paired band *"a"* and *"c"*

Concerning interference calculations a two-step procedure is described below and, based upon interference calculations, operators shall adjust the characteristics of base stations.

As the first step, in the case of harmful interference, the characteristics of base stations shall be adjusted based upon interference calculations laid down in section 5.1.1. If the first step does not result in harmful interference-free operation, the second step shall be taken.

As the second step, in the case of harmful interference, the characteristics of base stations shall be adjusted based upon interference calculations laid down in section 5.1.2. If the second step does not result in harmful interference-free operation, the third step, i.e. measurements shall be carried out (section 5.1.3).

5.1.1 Step 1: Line calculations

If harmful interference occurs, field strength line calculations shall be carried out between the base station causing harmful interference and the points of the borderline / 6 km line and the characteristics of the base station shall be adjusted in such a way that the trigger values in section 4.2.a) and 4.2.b) are kept.

5.1.2 Step 2: Area calculations

Operators are required to apply area calculations based on commonly agreed border area (the area behind the borderline, i.e. the exact area for which calculations should be carried out), wave propagation models, field strength trigger values, interference evaluation method and so on when harmful interference is still experienced after Step 1, according to section "Area calculations" of Annex 3.3 to ECC Recommendation ECC/REC/(11)05 before measuring the interference field strength.

Area calculations including their elements detailed in the previous paragraph shall at this time be agreed by the Operators concerned.

5.1.3 Step 3: Interference measurements

If harmful interference is still experienced despite the adjustment detailed in Step 1 and Step 2, measurements shall be carried out according to internationally/mutually agreed procedures.

5.2 Harmful interference between TDD systems in the unpaired band "b"

5.2.1 Between synchronised TDD networks

If harmful interference occurs between synchronised TDD networks, the procedure given for FDD in section 5.1, 5.1.1, 5.1.2 and 5.1.3 shall be adapted to this case using the trigger values given in section 4.3.2.a) and 4.3.2.b).

5.2.2 Between non-synchronised TDD networks

a) Step 1

If harmful interference occurs between non-synchronised TDD networks, field strength line calculations shall be carried out for the borderline and the characteristics of the base station shall be adjusted in such a way that the trigger value given in section 4.3.1 is kept.

b) Step 2

If Step 1 does not result in harmful interference-free operation, operators are required to perform area calculations, according to section 5.1.2, using the trigger value given in section 4.3.1.

c) Step 3

If Step 2 does not result in harmful interference-free operation, interference measurements shall be carried out according to internationally/mutually agreed procedures.

5.3 Harmful interference between SDL systems in the unpaired band "b"

If harmful interference occurs between SDL networks, the procedure and field strength triggers given for FDD in section 5.1, 5.1.1, 5.1.2 and 5.1.3 shall be applied.

5.4 Harmful interference between TDD and FDD systems in the paired band *"a"* and *"c"*

a) FDD interference to TDD

Stations of a TDD system shall accept interference from an FDD system if the latter keeps the trigger values given in section 4.2.a) and 4.2.b).

If an FDD system causes harmful interference to a TDD system, the provisions given in sections 5.1, 5.1.1, 5.1.2 and 5.1.3 shall be applied.

b) TDD interference to FDD

If harmful interference caused by a TDD station occurs, field strength line calculation shall be carried out for the borderline and the characteristics of the TDD station shall be adjusted in such a way that the trigger values given in sections 4.4.a) and 4.4.b) are kept.

In addition, protection of an FDD base station receiver may be claimed if a reference transmitter, located at the site and the height of the FDD receiver concerned, generates a field strength which does not exceed the value 49 dBμV/m/5 MHz at a height of 3 m above ground level, at a distance of 6 km from the borderline in the territory of the neighbouring country. The ERP of the reference transmitter is 10 dBW and shall be increased by the antenna gain of the FDD receiver in the actual direction.

c) Measurements

If steps given in sections 5.4.a) and 5.4.b) do not result harmful in interference-free operation, interference measurements shall be carried out according to internationally/mutually agreed procedures.

5.5 Harmful interference in the case where TDD systems operate in the paired bands *"a"* or *"c"* on both sides of the borderline

In this case section 5.2 and its sub-sections shall be applied.

5.6 Harmful interference in the case where a TDD system and an SDL operate on the opposite sides of the borderline in the unpaired band *"b"*

a) TDD interference to SDL

Stations of an SDL system shall accept interference from a TDD system and the TDD system shall keep the trigger values given in section 4.3.1.

In the case of harmful interference provisions given in section 5.2.2 shall be applied.

b) SDL interference to TDD

If harmful interference caused by an SDL base station occurs, field strength line calculation shall be carried out for the borderline and the characteristics of the SDL base station shall be adjusted in such a way that the trigger value given in section 4.5.a) is kept.

In addition, protection of a TDD base station receiver may be claimed if a reference transmitter, located at the site and the height of the TDD receiver concerned, generates a field strength which does not exceed the value 30 dBμV/m/5 MHz at a height of 3 m above ground level, at a distance of 6 km from the TDD base station if the distance between the base station and the borderline is greater than 6 km. If this distance is less than 6 km, the calculation shall be carried out on the borderline. The ERP of the reference transmitter is 2 dBW and shall be increased by the antenna gain of the TDD receiver in the actual direction. This rule shall be applied to TDD base stations with distance less than 12 km to the borderline.

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c) Measurements

If steps given in sections 5.6.a) and 5.6.b) do not result in interference-free operation, interference measurements shall be carried out according to internationally/mutually agreed procedures.

6 OPERATOR ARRANGEMENTS

To further improve the coexistence of terrestrial systems capable of providing electronic communications services, and to enhance the efficient use of spectrum and coverage in border areas, operators may diverge from the regulation given in this Technical Arrangement (see section 2.8) by concluding so-called additional "Operator Arrangements".

The "Operator Arrangements" (type 1) shall be in line with the *"Agreement between administrations concerning the approval of arrangements between operators of radiocommunications network"* for the administrations that have signed such an agreement.

If there are no such Agreements concluded or these Agreements are not valid between administrations concerned for this 2600 MHz Technical Arrangement, operators may negotiate Operator Arrangements (type 2) which concern only the common part of those frequency bands in respect of which they have been granted licences, without affecting the rights of non-involved third parties.

Both types of "Operator Arrangements" are subject to prior approval of their respective administration and should be based on the relevant deliverables listed in section 2.1 and their subsequently revised versions.

7 STATUS OF THE EXISTING ARRANGEMENTS

The *"Technical Arrangement between the national frequency management authorities of Austria, Croatia, [The Czech Republic], Hungary, the Slovak Republic and Slovenia on border coordination for terrestrial systems capable of providing electronic communications services in the frequency band 2500–2690 MHz (Vienna, 12th October 2011)"* is repealed for Austria, Croatia, Hungary and Slovenia at the date of entry into force of this Technical Arrangement.

8 REVISION OF THE TECHNICAL ARRANGEMENT

With the consent of the other Signatory Authorities, this Technical Arrangement may be reviewed or modified at the request of one or more Signatory Authorities where such modifications become necessary in the light of administrative, regulatory or technical developments, or if practical experience or the operation of terrestrial systems capable of providing electronic communications services require.

9 WITHDRAWAL FROM THE ARRANGEMENT

Any Authority may withdraw from this Technical Arrangement by the end of a calendar month by giving notice of its intention at least six months in advance. A declaration to that effect shall be addressed to all other Signatory Authorities.

10 LANGUAGE OF THE ARRANGEMENT

This Technical Arrangement has been concluded in English in six originals. A copy is submitted to the Managing Administration of the HCM Agreement.

11 DATE OF ENTRY INTO FORCE

This Technical Arrangement enters into force on the date of its signature.

Done at Budapest, 15th February 2018

For Austria

Franz ZIEGELWANGER

For Croatia

Ivančica SAKAL

For Hungary

Emília UELAY

For Slovenia

Meta PAVŠEK-TAŠKOV

Annex 1

PREFERENTIAL PHYSICAL-LAYER CELL IDENTITIES (PCI) FOR IMT-2000/LTE

PCI co-ordination is only needed when channel centre frequencies are aligned independent of the channel bandwidth.

3GPP TS 36.211 defines 168 "unique physical-layer cell-identity groups" in §6.11, numbered 0...167, hereafter called "PCI groups". Within each PCI group there are three separate PCIs giving 504 PCIs in total.

Administrations should agree on a repartition of these 504 PCI on an equitable basis when channel centre frequencies are aligned as shown in the Table below. It has to be noted that dividing the PCI groups or PCI's is equivalent.

As shown in the table below, the PCI's should be divided into 6 sub-sets containing each one sixth of the available PCI's. Each country is allocated three sets (half of the PCI's) in a bilateral case, and two sets (one third of the PCI's) in a trilateral case.

Four types of countries are defined in a way such that no country will use the same code set as any one of its neighbours. The following lists describe the distribution of European countries:

Type country 1: BEL, CVA, CYP, CZE, DNK, E, FIN, GRC, IRL, ISL, LTU, MCO, SMR, SUI, SVN, UKR, AZE, SRB.

Type country 2: AND, BIH, BLR, BUL, D, EST, G, HNG, I, MDA, RUS (Exclave), GEO
Type country 3: ALB, AUT, F, HOL, HRV, POL, POR, ROU, RUS, S, MLT
Type country 4: LIE, LUX, LVA, MKD, MNE, NOR, SVK, TUR.

For each type of country, the following tables and figure describe the sharing of the PCI's with its neighbouring countries, with the following conventions of writing:

	Preferential PCI
	non-preferential PCI

The 504 physical-layer cell-identities should be divided into the following 6 sub-sets when the carrier frequencies are aligned in border areas:

PCI	Set A	Set B	Set C	Set D	Set E	Set F
Country 1	0..83	84..167	168..251	252..335	336..419	420..503
Border 1-2						
Zone 1-2-3						
Border 1-3						
Zone 1-2-4						
Border 1-4						
Zone 1-3-4						

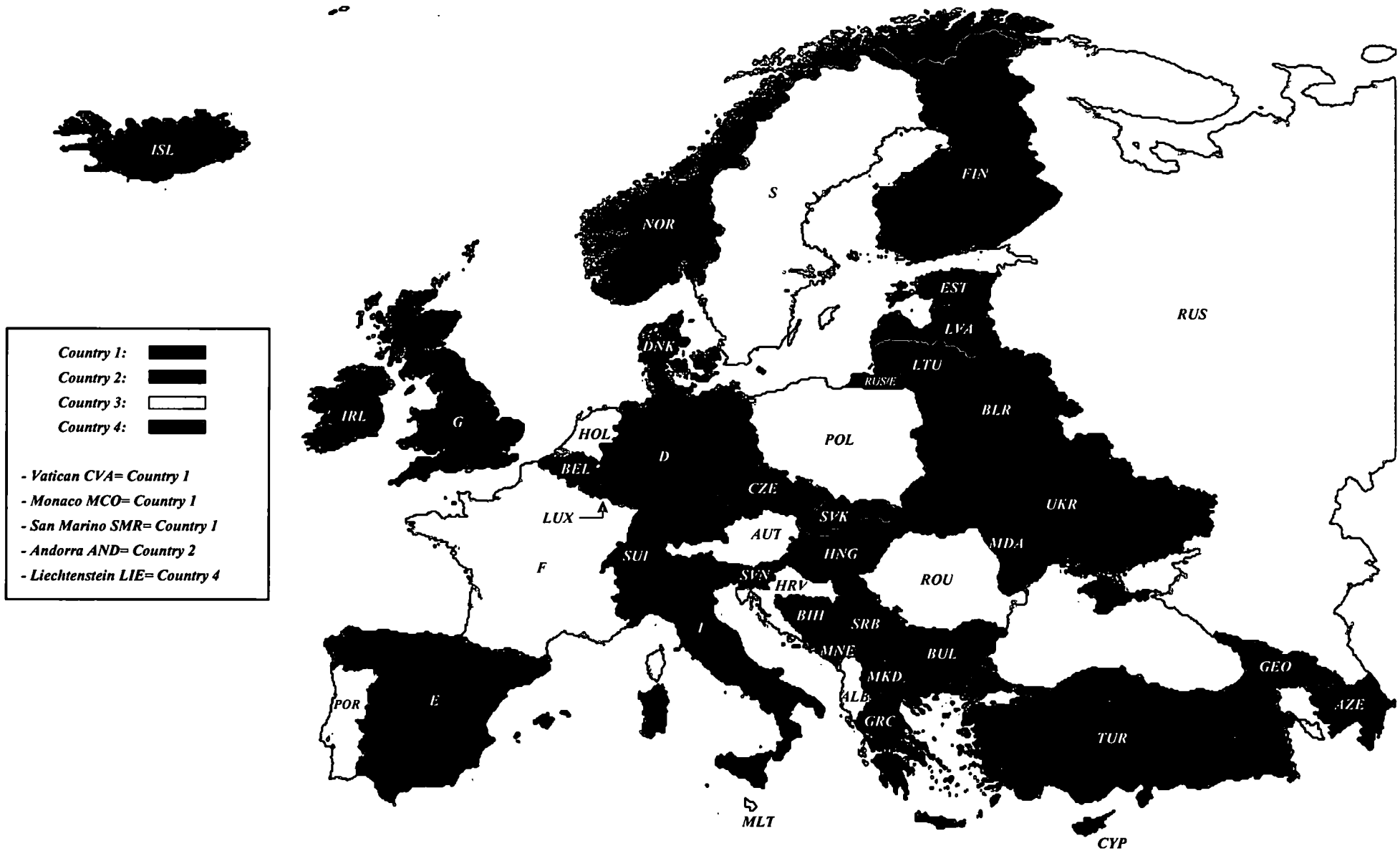
PCI	Set A	Set B	Set C	Set D	Set E	Set F
Country 2	0..83	84..167	168..251	252..335	336..419	420..503
Border 2-1						
Zone 2-3-1						
Border 2-3						
Zone 2-1-4						
Border 2-4						
Zone 2-3-4						

PCI	Set A	Set B	Set C	Set D	Set E	Set F
Country 3	0..83	84..167	168..251	252..335	336..419	420..503
Border 3-2						
Zone 3-1-2						
Border 3-1						
Zone 3-1-4						
Border 3-4						
Zone 3-2-4						

PCI	Set A	Set B	Set C	Set D	Set E	Set F
Country 4	0..83	84..167	168..251	252..335	336..419	420..503
Border 4-1						
Zone 4-1-2						
Border 4-2						
Zone 4-2-3						
Border 4-3						
Zone 4-3-1						

Notes

In certain specific cases (e.g. AUT/HRV) where the distance between two countries of the same type number is very small (< few 10s km), it may be necessary to address the situation in bi/multilateral coordination agreements as necessary, and may include further subdivision of the allocated codes in certain areas.


ISL
NOR
S
FIN
EST
LVA
RUS
DNK
LTU
RUS/E
IRL
G
HOL
BEL
D
POL
BLR
CZE
LUX
SVK
UKR
AUT
HNG
MDA
SUI
F
SVN
HRV
ROU
BIH
SRB
I
MNE
BUL
GEO
MKD
ALB
AZE
POR
E
GRC
TUR
MLT
CYP
Country 1:
Country 2:
Country 3:
Country 4:
- Vatican CVA= Country 1
- Monaco MCO= Country 1
- San Marino SMR= Country 1
- Andorra AND= Country 2
- Liechtenstein LIE= Country 4

Annex2

The versions of the deliverables mentioned in section 2.1 are not attached to this Arrangement owing to their volume. Nevertheless, these versions are attached to the covering letter or email on this Technical Arrangement so that Signatory Authorities avoid confusion as to which version of a particular deliverable shall be used due to revisions made by e.g. CEPT after signing this Arrangement.

CEPT