

TECHNICAL ARRANGEMENT

**BETWEEN
THE NATIONAL FREQUENCY MANAGEMENT AUTHORITIES OF
AUSTRIA, CROATIA, HUNGARY, ROMANIA, SERBIA,
THE SLOVAK REPUBLIC AND SLOVENIA**

ON BORDER COORDINATION OF BROADBAND SYSTEMS (UMTS, LTE AND WiMAX) IN THE 900 MHz BAND

880 – 915/925 – 960 MHz

Budapest, 28th May 2014

1. Introduction

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 Post and Electronic Communications Agency [HAKOM] (Croatia), the Federal Ministry for Transport, Innovation and Technology [BMVIT] (Austria), the National Media and Infocommunications Authority [NMHH] (Hungary), the National Authority for Management and Regulation in Communications [ANCOM] (Romania), Agency for Communication Networks and Services of the Republic of Slovenia [AKOS] (Slovenia), the Republic Agency for Electronic Communications of Republic of Serbia [RATEL] (Serbia) and Regulatory Authority for Electronic Communications and Postal Services of the Slovak Republic [RU] (Slovak Republic) (hereinafter called Signatory Authorities) **concluded this Technical Arrangement concerning the frequency usage in border areas for UMTS, LTE and WiMAX networks** (hereinafter called "*Broadband Arrangement*") in the bands 880 – 915/925 – 960 MHz (900 MHz band).

In the above mentioned frequency bands and in border areas – except some parts of them – the frequency usage has been regulated for GSM technology in special bi- or multilateral agreements, arrangements or protocols. At the same time, it is vital that introduction of new broadband technologies such as UMTS, LTE and WiMAX (hereafter referred to as "broadband systems") in these bands is ensured due to increasing mobile internet demand both in terms of data rate and coverage.

In line with ECC Decision ECC/DEC/(06)13, it is also important to protect and sustain GSM technology in the 900 MHz band in the future. Although, there are not any European-wide plans for refarming the 900 MHz band or for unified/harmonized introduction of UMTS, LTE or WiMAX technology in the 900 MHz band, there are different national initiatives. So, it is expected that placing UMTS, LTE or WiMAX channels within the 900 MHz band will be various, depending on, among other things, the frequency blocks mobile operators have.

Concerning the broadband technology of UMTS, the Signatory Authorities above already concluded the "*Technical Arrangement on border coordination of IMT/UMTS systems in GSM bands*" signed in Budapest, 28th October 2010, and now have unanimously expressed their wish to withdraw from it indicating that all the three broadband technologies (UMTS, LTE and WiMAX) should be regulated in a single technical arrangement.

The relevant provisions of the bi- or multilateral agreements, arrangements or protocols dealing with frequency coordination in general (e.g. "HCM Agreement") shall be applied unless otherwise laid down in this Technical Arrangement.

The aim of this Technical Arrangement is to lay down the principles, the technical provisions and administrative procedure necessary to put broadband stations into use in border areas where GSM usage is already possible and widespread in the 900 MHz band in border areas.

The Signatory Authorities have agreed on the following regulation in border areas.

2. Principles of coordination

2.1 Technologies

Due to the fact that the frequency coordination situation of GSM vs. GSM has already been regulated, the following coordination situations are regulated in this Technical Arrangement:

- GSM system vs. broadband systems
- broadband systems vs. broadband systems

With regard to these relationships between the narrow band GSM and the broadband systems and between broadband systems, the applied principles are the following:

- a) GSM base stations that are in operation or that will later be put into operation can continue to operate according to the provisions laid down in the relevant bi- or multilateral agreements, arrangements or protocols, with the protection of GSM systems having priority over broadband systems,
- b) protection between broadband systems is treated in a system/technology neutral way,
- c) if a new broadband system different from UMTS, LTE or WiMAX systems is intended to be introduced, the approval of the Signatory Authorities concerned shall be obtained before the introduction of a new broadband system,
- d) a new broadband system may only be treated as UMTS, LTE or WiMAX systems after having been granted the approval of Signatory Authorities concerned.

2.2 Radio wave propagation

2.2.1 Calculation for planning and effectuation

For field strength calculations, depending on the path, the methods described in the HCM Agreement shall be applied.

2.2.2 Detailed calculations

The aim of more detailed field strength calculations is to minimise the probability of harmful interference using detailed data. More detailed calculations (e.g. radial or area calculation) may be performed between operators within "Operator Arrangement" (see section 4 and 6.b) or, in the case of reported harmful interference, instead of the calculations given in section 5 if there is an agreement on it between operators.

There are three interference field strength prediction methods described in the relevant ECC/REC/(08)02 (Edition 27 April 2012):

- site general model with line calculations (hereinafter called "site general method"),
- path specific model with radial calculations from base stations (more sophisticated, hereinafter called "radial calculations"),
- area calculations with a path specific model (the most sophisticated, hereinafter called "area calculations").

Using a site general method (like "HCM" Agreement") for the assessment of interference can only ensure a certain protection against harmful interference.

In the case of harmful interference operators are expected to apply area calculations based on commonly agreed wave propagation models, trigger values and methods 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.

3. General technical provisions for broadband systems

The frequency bands 880–915/925–960 MHz may only be used for duplex operation.

Base stations shall transmit in the bands 925–960 MHz (downlink band), and mobile stations shall transmit in the bands 880–915 MHz (uplink band).

Channel centre frequencies may be selected wherever permitted under relevant standards. Nevertheless, a channel must be placed near the edges of the 900 MHz frequency band in a way that the channel pertaining to the channel centre frequency with the nominal channel spacing falls entirely within 880–915/925–960 MHz.

If the band 880-880.1/925-925.1 MHz is used, the regulation in relation to "GSM protected case" (see section 4.1) shall be applied unless otherwise regulated within a so-called "Operator Arrangement" between the operators concerned of the affected public mobile and GSM-R networks.

4. Regulation of broadband systems in border areas

The frequency coordination situations depending upon technologies applied and negotiations between Signatory Authorities concerned are:

- GSM protected case,
- technology neutral case.

If it is required by operators that provisions such as trigger values, parameters etc. under sections 4.1 and 4.3 may be exceeded or changed, they may conclude an arrangement between operators (hereinafter called "**Operator Arrangement**") (see also Section 6.b) that, in general, should be based on ECC/REC/(08)02 issued on 27th April 2012.

4.1 GSM protected case

This is the case where it is not necessary to examine which technology (GSM or broadband system) is used in the affected country.

Frequencies of a broadband base station may be used if the mean field strength of each carrier produced by this base station does not exceed the 33 dB μ V/m/5 MHz (trigger value) at a height of 3 m above ground at the border line between two affected countries.

The above trigger value shall be modified according to channel bandwidth (see section 4.3).

4.2 Technology neutral case

This is the case where operators wish to deviate from the GSM protected case i.e. from the relevant provisions laid down in sections 4.1 and 4.3 (see also section 6.b). In this case an "Operator Arrangement" may be concluded in the following way.

4.2.1 Procedure

- a) The operators of affected countries may draw up a draft "Operator Arrangement". The draft "Operator Arrangement" should be based on section 4.2.2.
- b) The draft "Operator Arrangement" shall be sent to the respective Signatory Authorities for approval.
- c) The draft "Operator Arrangement" will only enter into force if it has been approved by all the Signatory Authorities concerned.
- d) If there is no agreement achieved, technical provisions under section 4.1 of this Technical Arrangement shall be applied.

4.2.2 Provisions

An "Operator Arrangement" for the common deployment of systems using the GSM or broadband technologies should be based on ECC/REC/(08)02 and ECC/REC/(05)08.

4.3 Modification of trigger value

Field strength value or trigger given in section 4.1 refers to a reference frequency block of 5 MHz and to a single channel. Therefore, the field strength trigger shall be modified according to the value of the bandwidth correction factor. The modified field strength trigger shall be applied to each individual base station.

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 trigger given in section 4.1:

$$10 * \log (Cs/5 \text{ MHz}) \quad (\text{dB})$$

where

$$\text{"Cs" nominal channel spacing} \quad (\text{MHz}).$$

5. Harmful interference reported to the Signatory Authorities

If harmful interference occurs and is reported to the Signatory Authorities, in order to check the interference, the following models shall be used for field strength line calculations (border line), depending on radio wave propagation paths.

- a) The free space attenuation should be applied for distances less than or equal to 2 km, and for distances larger than 2 km if there is no terrain obstacle within the 1st Fresnel zone. The calculations shall be carried out between a base station and the receiver points of the borderline in the direction of the interfered area. The reference antenna height of receiver points is 3m above ground.
- b) "HCM" Agreement" based on a site general method should be applied for distances larger than 2 km. This model is to be employed for 10% of the time and at 50% of the locations.

As a first step it is necessary to adjust the parameters of base stations, according to the calculation methods detailed above.

In the case where harmful interference is still experienced, it is necessary to examine whether the measured field strength exceeds the trigger values defined in section 4. If so, the radiation parameters of the interfering station shall be adjusted until trigger values are met or mutually accepted solutions shall be reached by all the Signatory Authorities concerned.

6. Administrative procedure

- a) Notifications of base stations are not required in general. However, in the case of harmful interference, the data necessary to evaluate and treat harmful interference shall be exchanged between Signatory Authorities concerned.

Each Signatory Authority has to inform the Signatory Authorities concerned about

- the date of starting the operation of any broadband system,
- the name of the operator,
- the centre frequency of the channel and

- the nominal channel spacing.
- b) Operators concerned may agree to deviate from the principles, the technical provisions and administrative procedure etc. given in this Technical Arrangement by mutual consent in an "**Operator Arrangement**", but Administrations concerned shall give their consent.

7. Review

This Technical Arrangement can be revised in light of administrative, regulatory or technical developments, especially in order to comply with relevant amendments of the bi- or multilateral agreements dealing with frequency coordination in general (e.g. the "HCM Agreement") or CEPT ERC/ECC decisions, recommendations and reports at the proposal of any Signatory Authority with the agreement of all other Signatory Authorities.

8. Withdrawal

8.1 Withdrawal from this Technical 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.

Frequency assignments made within the framework of this Technical Arrangement prior to the date of entry into force of the withdrawal shall remain valid and be protected according to their status.

8.2 Withdrawal from the Technical Arrangement on UMTS usage in GSM bands

In order to have a single technical arrangement regulating the frequency usage of all the three broadband technologies (UMTS, LTE and WiMAX) in border areas, the Signatory Authorities of this "*Broadband Arrangement*" have decided

- to withdraw from the "*Technical Arrangement on border coordination of IMT/UMTS systems in GSM bands*" signed in Budapest, 28th October 2010 (hereinafter called "*UMTS Arrangement*"),
- that frequency coordination regulation on UMTS systems in border areas be included in the new "*Broadband Arrangement*".

The right to withdraw from the "*UMTS Arrangement*" is given in section 8 of it. Although the Signatory Authorities of the "*UMTS Arrangement*" may only withdraw from it with six months notice in advance in accordance with the "*UMTS Arrangement*", the common Signatory Authorities of both "*UMTS and Broadband Arrangement*" unanimously

resign this right, and cancel "UMTS Arrangement" between them when "Broadband Arrangement" takes effect.

9. Language of the Technical Arrangement

The original text of this Technical Arrangement exists in English in seven originals.

10. Date of entry into force of the Technical Arrangement

This Technical Arrangement will enter into force on 28th May 2014.
The Serbian Administration shall confirm the Arrangement by correspondence.

Done at Budapest, 28th May 2014.

For Austria
BMVIT



(Josef HOTTER)

For Croatia
HAKOM



(Ivančica SAKAL)

For Hungary
NMHH



(Péter VÁRI)

For Romania
ANCOM



(Bogdan Cristian IANA)

For Serbia
RATEL
subject to confirmation



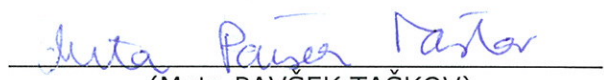
(Zoran BRANKOVIĆ)

For the Slovak Republic
RU



(Milan MIZERA)

For Slovenia
AKOS



(Meta PAVŠEK TAŠKOV)