



European Radiocommunications Committee (ERC)
within the European Conference of Postal and Telecommunications Administrations (CEPT)

ERC Recommendation (01)01

BORDER COORDINATION OF UMTS/IMT-2000 SYSTEMS

Recommendation adopted by the Working Group "Frequency Management" (FM)

"The European Conference of Postal and Telecommunications Administrations,

considering

- a) that the Radio Regulations (RR S5.388) identify the band 1885 - 2025 and 2110 - 2200 MHz for IMT-2000,
- b) that ERC/DEC/(97)07 and ERC/DEC/(00)01 designate the bands 1900 - 1980 MHz, 2100 - 2025 MHz and 2110 - 2170 MHz for terrestrial UMTS,
- c) that ERC/DEC/(99)25 harmonises spectrum usage for UMTS,
- d) that these frequency bands are allocated to the Mobile Service and the Fixed Service on a co-primary basis and also to the space research service in 2110 - 2120 MHz,
- e) that in the implementation of UMTS/IMT-2000 it is necessary to take account of national policies for the use of the frequency bands in question,
- f) that national frequency and code planning for the UMTS/IMT-2000 is carried out by the operators and approved by the Administrations or carried out by these Administrations in cooperation with the operators,
- g) that frequency and code planning in border areas will be based on coordination between Administrations in cooperation with their operators.
- h) that in many CEPT member countries multiple operators for UMTS/IMT-2000 are expected,
- j) that coordination is necessary between countries operating the UMTS/IMT-2000 systems,
- k) that coordination is necessary between countries operating IMT-2000 systems and countries operating other services in accordance with the Radio Regulations,
- l) that where practicable, soft-handover between operators may provide an option to facilitate coordinated provision of service in border areas and to enhance efficiency of spectrum usage

recommends

- 1) that co-ordination between UMTS/IMT-2000 systems in border areas shall be based on bilateral or multilateral agreements between Administrations.
- 2) that coordination between UMTS/IMT-2000 systems should be based on the principles and the field strength levels provided in Annex 1 and the code groups provided in Annex 4.
- 3) that if the levels in Annex 1 are exceeded coordination is required and the procedure detailed in Annex 5 should be used.
- 4) that interference field strength predictions should be made using one of the propagation models defined in Annex 2
- 5) that, where practicable, preferential use of frequencies may be agreed between the Administrations in line with the method outlined in Annex 3
- 6) that frequency coordination between IMT-2000 and other services in neighbouring countries should be based on bilateral / multilateral agreements.
- 7) that bilateral / multilateral agreements should define coordination methods which encompass all IMT-2000 radio interfaces present on each side of the border.
- 8) that Administrations should encourage and facilitate the establishment of arrangements between operators of different countries with the aim to enhance the efficient use of the spectrum and the coverage in the border areas.
- 9) that coordination in coastal areas is based on prediction of field strength levels at the coastline of the neighbouring country. Other principles for co-ordination in coastal areas may be agreed between the Administrations concerned.
- 10) that Administrations may diverge from the technical parameters and procedures described in this Recommendation subject to bilateral / multilateral agreements.
- 11) that this Recommendation should be reviewed within 2 years of its adoption in the light of practical experience of its application and of the operation of UMTS / IMT2000 systems.”

Note:

Please check the ERO web site (www.ero.dk) under “Documentation / Implementation” for the up to date position on the implementation of this and other ERC Decisions.

Annex 1

PRINCIPLES AND FIELD STRENGTH LEVELS

Coordination in border areas is based on the following concept:

1. Preferential code groups or preferential code group blocks shall be agreed between Administrations concerned (see Annex 4 for guidance), where centre frequencies are aligned.
2. Frequencies in the band 2110-2170 MHz for systems using preferential codes, or where centre frequencies are not aligned, or not using a CDMA IMT-2000 radio interface, may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of **45 dB μ V/m/5MHz** at a height of 3 m above ground at and beyond the border line between two countries¹. Administrations may agree by bilateral and/or multilateral coordination agreement a reference line at some distance beyond the border.
3. In the bands 1900-1980 MHz and 2010-2025 MHz TDD systems using preferential codes, or where centre frequencies are not aligned, may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of **36 dB μ V/m/5MHz**² at a height of 3 m above ground at and beyond the border line between two countries¹. Administrations may agree by bilateral and/or multilateral coordination agreement a reference line at some distance beyond the border.
4. Frequencies used at the border for systems using non preferential codes and with centre frequencies aligned may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of **21 dB μ V/m/5MHz**² at a height of 3 m above ground at and beyond the border line between two countries¹.

Note: In bilateral and / or multilateral coordination agreements levels up to 15-20dB higher might typically be agreed between the Administrations concerned.

¹ Depending on the propagation model, the area beyond the border, which is relevant, may be agreed by the concerned Administrations.

² The value will be reconsidered when the recommendation is reviewed within 2 years of its original adoption.

Annex 2

PROPAGATION MODEL

Site specific model

Where appropriate detailed terrain data is available, the propagation model for interference field strength prediction is ITU-R Rec. P.452-8³. For the relevant transmitting terminal, predictions of path loss would be made at x km steps along radials of y km at z degree intervals. The values for those receiver locations within the neighbouring country would be used to construct a histogram of path loss exceeding the given threshold and if 10% of predicted values exceed the threshold the station shall be required to be coordinated.

Values of x, y and z to be agreed between the Administrations concerned.

Site General model⁴

If it is not desirable to utilise detailed terrain height data for the propagation modelling in the border area, the basic model to be used to trigger co-ordination between administrations and to decide, if co-ordination is necessary, is a modified (2GHz) version of Rec 370, as realised in the HCM tool of the Vienna agreement.

The field strength shall be predicted with the relevant UHF-curves (10% of time, 50% of locations), where the correction factor for the receiving antenna from 10 m to 3 m is -10 dB. The following formula describes the conversion of the result for higher frequencies:

$$F_{2\text{GHz}} = F_0 - (F_0 - F_{\text{UHF}}) \cdot S_{(\text{UHF} \dots 2\text{GHz})}, \text{ whereby } S_{(\text{UHF} \dots 2\text{GHz})} = 3 \cdot 10^{-4} \cdot 2000\text{MHz} / \text{MHz} + 0,814$$

are:

$F_{2\text{GHz}}$ = field strength with 2 GHz

F_0 = free space field strength

F_{UHF} = predicted field strength for the middle UHF range

$S_{(\text{UHF} \dots 2\text{GHz})}$ = slope factor for higher frequencies

Administrations and/or operators concerned may agree to deviate from the aforementioned model by mutual consent.

³ A new site specific propagation model has been proposed in ITU-R WP3K in July 2000 but this is not complete at the time of the adoption of this ERC Recommendation. It is intended that this new model would be incorporated into this ERC Recommendation if and when this new model becomes available as an official ITU-R Recommendation.

⁴ The inclusion of ITU-R Recommendation P.370 scaled to 2GHz in this ERC Recommendation is strictly an interim measure prior to completion of the new Recommendation ITU-R [TG3/2] on "Method for point-to-area predictions for the broadcasting, land mobile and maritime mobile services in the frequency range 30 to 3000MHz" expected in November 2000. It is agreed that when the new ITU-R Recommendation is available this ERC Recommendation should be revised to incorporate the 2GHz land and sea path propagation curves derived from the data set for the 2 GHz frequency range of this new ITU-R Recommendation for 50% of locations, 10% time, 3m receiver height and transmitter heights of 10, 20, 30 and 37.5m.

Annex 3

PREFERENTIAL USE OF FREQUENCIES

For some cross-border situations, in addition to code coordination, it may be possible to agree on a frequency coordination based on preferential frequencies, while ensuring a fair treatment of different operators within a country. This could be implemented in the case when FDD is used in following manner (also illustrated in Figure 1):-

A3.1 Preferential frequencies (or preferential frequency bands) and neutral frequencies (or neutral frequency bands) shall be agreed between Administrations concerned.

A3.2 Preferential frequencies may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of **65 dB μ V/m/5 MHz** at a height of 3m above ground at and beyond the border line between two countries.

A3.3 Neutral frequencies may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of **45 dB μ V/m/5MHz** at a height of 3m above ground at and beyond the border line between two countries.

A3.4 Non-preferential frequencies may be used without coordination with a neighbouring country if the predicted mean field strength of each carrier produced by the base station does not exceed a value of **45 dB μ V/m/5MHz** at a height of 3m above ground at and beyond the border line between two countries.

Systems operating on non-preferential frequencies must accept interference from services in the neighbouring country using preferential frequencies.

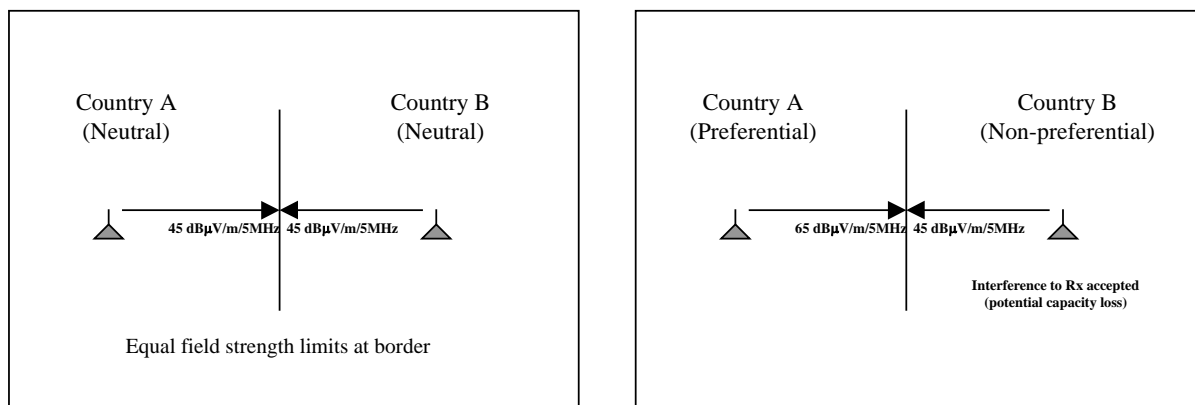


Figure 1: Illustration of neutral and preferential frequency scenarios)

Annex 4
Code groups

Annex to be developed

Annex 5

EXCHANGE OF INFORMATION

When requesting coordination the relevant characteristics of the base station shall be forwarded using the coordination form indicated in [Recommendation T/R 25-08 E](#), while adding the code group number and the antenna tilt. Administrations may diverge from the use of this form by common agreement but at least the following characteristics should be forwarded to the Administration affected:

- a) frequency in MHz
- b) name of transmitter station
- c) country of location of transmitter station
- d) geographical coordinates
- e) effective antenna height
- f) antenna polarisation
- g) antenna azimuth
- h) directivity in antenna systems
- i) effective radiated power
- j) expected coverage zone
- k) date of entry into service.
- l) code group number used
- m) antenna tilt

The Administration affected shall evaluate the request for coordination and shall within 30 days notify the result of the evaluation to the Administration requesting coordination.

If in the course of the coordination procedure the Administration affected requires additional information, it may request such information.

If no reply is received by the Administration requesting coordination within 30 days it may send a reminder to the Administration affected. An Administration not having responded within 30 days following communication of the reminder shall be deemed to have given its consent and the code co-ordination may be put into use with the characteristics given in the request for coordination.

The periods mentioned above may be extended by common consent.