



Electronic Communications Committee (ECC)  
within the Conference of Postal and Telecommunications Administrations (CEPT)

## ECC RECOMMENDATION (08)02

### FREQUENCY PLANNING AND FREQUENCY COORDINATION FOR THE GSM 900 (including E-GSM) /UMTS 900, GSM 1800/UMTS 1800 LAND MOBILE SYSTEMS<sup>1</sup> (Except direct mode operation (DMO) channels)

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

"The European Conference of Postal and Telecommunications Administrations,

*considering*

- a) That the ECC/REC/(05)08 addresses "Frequency planning and frequency coordination for the GSM 900, GSM 1800, E-GSM and GSM-R land mobile systems" and the ERC/REC/(01)01 addresses "Border coordination of UMTS";
- b) that the Radio Regulations identify the frequency bands 880-915 MHz/925-960 MHz (RR 5.317A) and 1710-1785 MHz/1805-1880 MHz (RR 5.384A) for terrestrial IMT;
- c) that ERC/DEC/(94)01, ERC/DEC/(97)02 and ERC/DEC/(95)03 designate the bands 880-915 MHz, 925-960 MHz and 1710-1785 MHz/1805-1880 MHz for GSM systems;
- d) that ECC/DEC/(06)13 designates the bands 880-915 MHz, 925-960 MHz, 1710-1785 MHz and 1805-1880 MHz for terrestrial IMT-2000/UMTS systems;
- e) that in the implementation of the GSM and/or IMT-2000/UMTS systems it is necessary to take account of national policies for the use of the frequency bands in question;
- f) that frequency (GSM and IMT-2000/UMTS) and code (only for IMT-2000/UMTS) planning in border areas will be based on coordination between national administrations in cooperation with their operators;
- g) that coordination is necessary between countries operating the GSM and IMT-2000/UMTS systems in the same frequency band;
- h) that many agreements for GSM border coordination have been signed between administrations and administrations continue the operation and development of GSM networks;
- i) that GSM and IMT-2000/UMTS systems use frequency arrangements with different channel bandwidths;
- j) that the coordination procedure depends on a great number of parameters (technical, operational or topographical);
- k) that where practicable and only for IMT-2000/UMTS systems soft-handover between neighbouring networks may provide an option to facilitate coordination in border areas and to enhance efficiency of spectrum usage;

---

<sup>1</sup> Although this Recommendation makes reference to IMT-2000/UMTS and GSM, only the coordination of UMTS/UMTS and UMTS/GSM systems are addressed in the current version of this Recommendation.

- l) that administrations may diverge from the technical parameters, propagation models and procedures described in this Recommendation subject to bilateral / multilateral agreements;
- m) that in the case of operator arrangements approved by national administrations it is possible to deviate from this Recommendation;
- n) that in many CEPT member countries there are multiple operators for the GSM and IMT-2000/UMTS systems;
- o) that a frequency coordination procedure is necessary both between countries operating the GSM and IMT-2000/UMTS systems and between those countries and countries operating other systems in accordance with the Radio Regulations;
- p) That existing bi-/multilateral agreements for GSM systems have to be updated in order to include IMT-2000/UMTS systems;
- q) that this Recommendation does not consider TDD systems.

*recommends*

***in general:***

1. that, if the levels in Annex 1 or in Annex 2 are exceeded, coordination is required and the procedure detailed in Annex 5 should be used;
2. that interference field strength predictions should be made using the appropriate propagation models defined in Annex 3 for IMT-2000/UMTS systems and in ECC/REC/(05)08 for GSM systems;
3. 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;
4. that frequency coordination between IMT-2000/UMTS systems and other systems in neighbouring countries should be based on bilateral / multilateral agreements;
5. 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;

***regarding GSM systems at the border:***

6. that frequency co-ordination between GSM systems should be based on ECC/REC/(05)08;

***regarding GSM and IMT-2000/UMTS (FDD) systems at the border:***

7. that frequency co-ordination between the GSM and IMT-2000/UMTS systems in border areas should be based on the concept of :
  - field strength levels for IMT-2000/UMTS (FDD) systems to protect the GSM systems;
  - field strength levels for GSM systems based on the ECC/REC/(05)08;
8. that coordination between GSM systems and IMT-2000/UMTS (FDD) systems should be based on the principles provided in Annex 2;
9. that frequency coordination between GSM and IMT-2000/UMTS in neighbouring countries should be based on preferential and non-preferential frequency blocks of 200 kHz for GSM systems. The ECC/REC/(05)08 should be applied for GSM systems;
10. that frequency co-ordination between GSM and IMT-2000/UMTS, in neighbouring countries may also be based on preferential and non-preferential frequency blocks of 5 MHz;

11. that bi/multi-lateral agreements between administrations may define common frequency blocks of 5 MHz to facilitate the introduction of the IMT-2000/UMTS systems;

*regarding IMT-2000/UMTS (FDD) systems at the border:*

12. that coordination between neighbouring IMT-2000/UMTS (FDD) systems should be based on the principles and the field strength levels provided in Annex 1 and the code groups provided in Annex 4.”

*Note:*

*Please check the Office web site (<http://www.ero.dk>) for the up to date position on the implementation of this and other ECC Recommendations*

## Annex 1

### PRINCIPLES AND COORDINATION FIELD STRENGTH LEVELS FOR THE BORDER COORDINATION BETWEEN:

#### IMT-2000/UMTS (FDD) SYSTEMS IN THE FREQUENCY BANDS 880-915 MHz /925-960 MHz and 1710-1785 MHz /1805-1880 MHz

#### Code coordination:

1. Frequencies in the bands 925-960 MHz and 1805-1880 MHz for systems **using preferential codes**, or where **centre frequencies are not aligned** may be used without coordination with a neighbouring country if the mean field strength of each carrier produced by the base station does not exceed a value of:
  - **IMT-2000/UMTS900 (FDD) => 59 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at the borderline between two countries **and** a value of **31 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at a distance of 6 km inside the neighbouring country, in the frequency band 925-960 MHz.
  - **IMT-2000/UMTS1800 (FDD) => 65 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at the borderline between two countries **and** a value of **37 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at a distance of 6 km inside the neighbouring country, in the frequency band 1805-1880 MHz.
2. Frequencies in the bands of 925-960 MHz and 1805-1880 MHz for systems using **non preferential codes** and **with centre frequencies aligned** may be used without coordination with a neighbouring country if the mean field strength of each carrier produced by the base station does not exceed a value of:
  - **IMT-2000/UMTS900 (FDD) => 31 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at the border line between two countries in the frequency band 925-960 MHz.
  - **IMT-2000/UMTS1800 (FDD) => 37 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at the border line between two countries in the frequency band 1805-1880 MHz.

	Preferential Code <sup>2</sup>	Alignment of centre frequency <sup>3</sup>	dB $\mu$ V/m @ km 900 MHz	dB $\mu$ V/m @ km 1800 MHz
	Y	Y/N	59@0 & 31@6	65@0 & 37@6
	Y/N	N	59@0 & 31@6	65@0 & 37@6
	N	Y	31@0	37@0

**Table A1.1: Summary of field strength levels for the coordination between  
IMT-2000/UMTS systems at 900 MHz and 1800 MHz**

Administrations may agree in bi or multilateral agreements on preferential frequency blocks of 5 MHz. In this case, the trigger values for the coordination between **IMT-2000/UMTS** systems at 900 MHz and 1800 MHz are increased by 10 dB for administrations which are using the preferential frequency blocks. IMT-2000/UMTS systems operating on non-preferential frequencies in the border area must accept interference from services in the neighbouring country using preferential frequencies.

Note for **IMT-2000/UMTS** 900/1800 systems: Administrations have the flexibility to use different values e.g. when re-using existing GSM sites.

<sup>2</sup> For Preferential Codes: *Y* – “preferential”, *N* – “non-preferential”

<sup>3</sup> For Alignment of centre frequencies: *Y* – “aligned”, *N* – “not aligned”

## Annex 2

### PRINCIPLES AND COORDINATION FIELD STRENGTH LEVELS FOR THE BORDER COORDINATION BETWEEN: IMT-2000/UMTS (FDD) AND GSM SYSTEMS IN THE FREQUENCY BANDS 880-915 MHz / 925-960 MHz and 1710-1785 MHz /1805-1880 MHz

When introducing IMT-2000/UMTS systems in border areas an operator must consider the protection of GSM systems in the neighbouring countries and the bi-or multilateral agreements. Two cases are proposed:

#### 1. Bi- or multilateral agreements for coordination between GSM systems are still valid

##### 1.1 Coordination field strength levels and conditions for IMT-2000/UMTS (FDD) base stations for the protection of GSM systems in neighbouring countries

For the protection of GSM systems, frequencies in the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz may be used by **IMT-2000/UMTS (FDD)** systems without coordination with a neighbouring country, if the mean field strength of each carrier produced by the IMT-2000/UMTS base station does not exceed the following levels:

- **IMT-2000/UMTS900 => 33 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at the borderline in the frequency band 925-960 MHz.
- **IMT-2000/UMTS1800 => 39 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at the borderline in the frequency band 1805-1880 MHz.

The GSM systems can continue to operate according to ECC Recommendation (05)08 and the existing agreements.

#### 2. Bi- or multilateral agreements for coordination between GSM systems are modified or replaced by bi- or multilateral agreements for coordination between GSM - IMT-2000/UMTS

##### 2.1 Coordination field strength levels and conditions for IMT-2000/UMTS (FDD) base stations according to agreements with preferential frequency blocks (5 MHz)

For some cross-border situations, it may be possible to agree on a frequency coordination based on preferential frequency blocks, while ensuring a fair treatment of different operators within a country. This could be implemented in the case when FDD is used in the following manner.

2.1.1 Preferential and non preferential frequency blocks (5 MHz) should be agreed between administrations concerned.

2.1.2 If the preferential frequency band is one block equal or larger than 5 MHz (contiguous blocks of 25 or more preferential GSM channels), IMT-2000/UMTS (FDD) carriers introduced in this preferential frequencies block may be used without coordination with a neighbouring country if the mean field strength of each carrier produced by the IMT-2000/UMTS base station does not exceed the following levels:

- **IMT-2000/UMTS900 (FDD) => 69 dB $\mu$ V/m/5 MHz** at a height of 3m above ground at the border line between two countries and in the frequency band 925-960 MHz and **41<sup>4</sup> dB $\mu$ V/m/5 MHz** at a height of 3m above ground at a distance of 6 km inside the neighbouring country.
- **IMT-2000/UMTS1800 (FDD) => 75 dB $\mu$ V/m/5 MHz** at a height of 3m above ground at the border line between two countries and in the frequency band 1805-1880 MHz and **47<sup>4</sup> dB $\mu$ V/m/5 MHz** at a height of 3m above ground at a distance of 6 km inside the neighbouring country.

---

<sup>4</sup> Administration have the possibility of coordinating with other values.

2.1.3 Non-preferential frequencies may be used without coordination with a neighbouring country if the mean field strength of each carrier produced by the base station does not exceed a value of:

- **IMT-2000/UMTS900 (FDD)** => **59 dB $\mu$ V/m/5MHz** at a height of 3m above ground at the border line between two countries and **31 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at a distance of 6 km inside the neighbouring country and in the frequency band 925-960 MHz.
- **IMT-2000/UMTS1800 (FDD)** => **65 dB $\mu$ V/m/5MHz** at a height of 3m above ground at the border line between two countries and **37 dB $\mu$ V/m/5MHz** at a height of 3 m above ground at a distance of 6 km inside the neighbouring country and in the frequency band 1805-1880 MHz.

The GSM systems operating in the neighbouring countries can continue to operate according to ECC/REC/(05)08.

## **2.2 Coordination field strength levels and conditions for GSM and IMT-2000/UMTS base stations according to agreements without preferential frequency blocks of 5 MHz**

In many cases sharing of preferential frequency blocks of at least 5 MHz between administrations is not possible. Also under these conditions coverage of the areas at the border for GSM and IMT-2000/UMTS can be made possible, e.g. if UMTS operator uses the frequency blocks of 5MHz on non-preferential frequency basis within spectrum previously allocated for the use of GSM. For this bi- or multilateral agreements should be concluded where it is recommended that no coordination is necessary if the mean field strength of each carrier produced by the base station does not exceed the following levels:

- **IMT-2000/UMTS900 (FDD)** => **59 dB $\mu$ V/m/5 MHz** at a height of 3m above ground at the border line between two countries and in the Frequency band 925-960 MHz and **31 dB $\mu$ V/m/5 MHz** at a height of 3m above ground at a distance of 6 km inside the neighbouring country.

**GSM900** => The GSM networks can continue to operate by default according to the provisions laid down in the previous relevant bi- or multilateral agreements based on ECC Recommendation (05)08 or according to new provisions agreed between administrations

- **IMT-2000/UMTS1800 (FDD)** => **65 dB $\mu$ V/m/5 MHz** at a height of 3m above ground at and beyond the border line between two countries and in the Frequency band 1805-1880 MHz and **37 dB $\mu$ V/m/5 MHz** at a height of 3m above ground at a distance of 6 km inside the neighbouring country.

**GSM1800** => The GSM networks can continue to operate by default according to the provisions laid down in the previous relevant bi- or multilateral agreements based on ECC/REC/(05)08 or according to new provisions agreed between administrations.

Frequency band 900MHz / 1800MHz	UMTS dB $\mu$ V/m/5MHz @ km	GSM dB $\mu$ V/m/200kHz @ km
<b>GSM agreement is still valid</b>		
900MHz	33@0	Rec. (05)08
1800MHz	39@0	Rec. (05)08
<b>GSM – UMTS agreement with 5 MHz preferential frequency blocks is valid</b>		
900MHz	69@0 & 41@6	Rec. (05)08
1800MHz	75@0 & 47@6	Rec. (05)08
<b>GSM – UMTS agreement with 5MHz no preferential frequency blocks is valid</b>		
900MHz	59@0 & 31@6	Rec. (05)08
1800MHz	65@0 & 37@6	Rec. (05)08
<b>GSM – UMTS agreement without 5MHz preferential frequency blocks is valid</b>		
900MHz	59@0 & 31@6	Rec. (05)08
1800MHz	65@0 & 37@6	Rec. (05)08

**Table A2.1: Summary of field strength levels for the use of GSM and  
IMT-2000/UMTS (FDD) at 900 MHz and 1800 MHz**

Note for IMT-2000/UMTS FDD systems: Administrations have the flexibility to use different values e.g. when reusing existing GSM sites.

### **Annex 3**

## **PROPAGATION MODEL**

### **Path specific model**

Where appropriate detailed terrain data is available, the propagation model for interference field strength prediction is the latest version of ITU-R Rec. P.452. 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 – and if 10% of predicted values exceed the threshold the station shall be required to be coordinated.

Values for x, y and z to be agreed between the administrations concerned.

### **Site General model**

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 ITU-R Rec. P.1546, “Method for point to area predictions for terrestrial services in the frequency range 30 to 3000 MHz”. This model is to be employed for 50% locations, 10% time and using a receiver height of 3m.

For specific reception areas where terrain roughness adjustments for improved accuracy of field strength prediction are needed, administrations may use correction factors according to terrain irregularity and/or an averaged value of the TCA parameter in order to describe the roughness of the area on and around the coordination line.

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



**Annex 4**

**PREFERENTIAL CODES FOR IMT-2000/UMTS (UTRA FDD)**

The code groups defined for the FDD modes have no particular correlation properties and no particular organisation of the repartition is required.

Administrations should agree on a repartition of these code groups on an equitable basis.

In any case, apart from in the border areas, each country could use all code groups.

In border areas, the codes will be divided into 6 "code sets" containing each one sixth of the available code groups. Each country is allocated three code sets (half of the codes) in a bilateral case, and two code sets (one third of the codes) 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 codes with its neighbouring countries, with the following conventions of writing:

	Preferential code
	non-preferential code

For the FDD mode; 3GPP TS 25.213 defines 64 « scrambling code groups » in §5.2.3, numbered {0..63}, hereafter called « code groups ».

	Set A	Set B	Set C	Set D	Set E	Set F
<b>Country 1</b>	0..10	11..20	21..31	32..42	43..52	53..63
Border 1-2						
Zone 1-2-3						
Border 1-3						
Zone 1-2-4						
Border 1-4						
Zone 1-3-4						

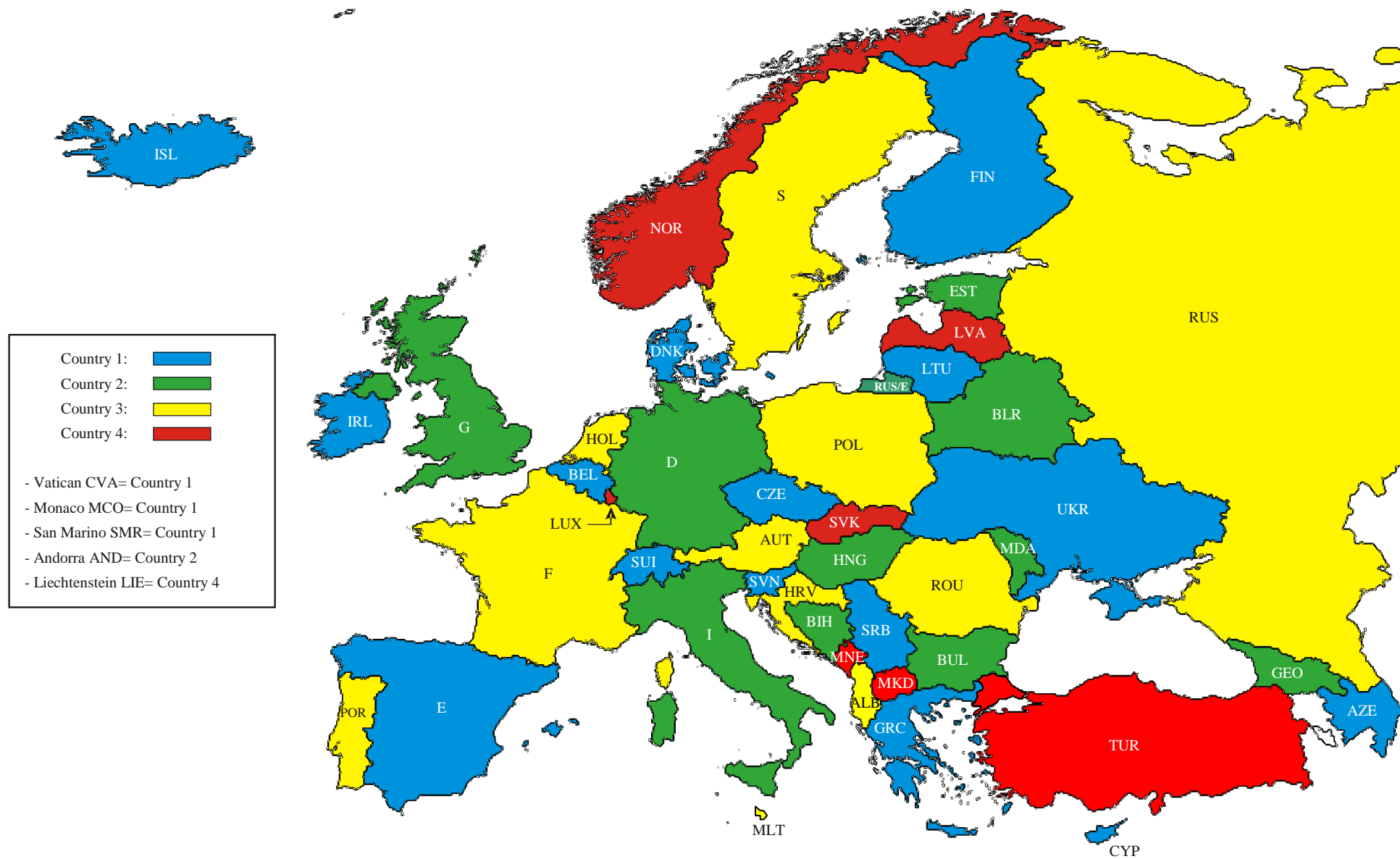
	Set A	Set B	Set C	Set D	Set E	Set F
<b>Country 2</b>	0..10	11..20	21..31	32..42	43..52	53..63
Border 2-1						
Zone 2-3-1						
Border 2-3						
Zone 2-1-4						
Border 2-4						
Zone 2-3-4						

	Set A	Set B	Set C	Set D	Set E	Set F
<b>Country 3</b>	0..10	11..20	21..31	32..42	43..52	53..63
Border 3-2						
Zone 3-1-2						
Border 3-1						
Zone 3-1-4						
Border 3-4						
Zone 3-2-4						

	Set A	Set B	Set C	Set D	Set E	Set F
<b>Country 4</b>	0..10	11..20	21..31	32..42	43..52	53..63
Border 4-1						
Zone 4-1-2						
Border 4-2						
Zone 4-2-3						
Border 4-3						
Zone 4-3-1						

### Notes

1. All codes are available in areas away from the border where the field strengths into the neighbouring country are below the relevant trigger levels.
2. For the other IMT-2000 CDMA radio interfaces (IMT-MC, or cdma2000), preferential code allocation schemes are still to be developed.
3. A two countries code sharing should be applied or used by base stations that exceed the relevant trigger level (Annex 1) of only one neighbouring country. A three countries code sharing should be applied or used by base stations that exceed the relevant trigger level (Annex 1) of two neighbouring countries.
4. 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.



## Annex 5

### EXCHANGE OF INFORMATION

When requesting coordination the relevant characteristics of the base station and the code group number should be forwarded to the Administration affected. All of the following characteristics should be included:

- a) carrier frequency (MHz)
- b) name of transmitter station
- c) country of location of transmitter station
- d) geographical coordinates (W/E, N; WGS84)
- e) effective antenna height (m)
- f) antenna polarisation
- g) antenna azimuth (deg)
- h) directivity in antenna systems or antenna gain (dBi)
- i) effective radiated power (dBW)
- j) expected coverage zone
- k) date of entry into service (month, year).
- l) code group number used only for UMTS/IMT2000
- m) antenna tilt (deg / Electric and mechanic tilt)
- n) antenna pattern or envelop.

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 an Administration may request additional 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.