



CEPT Report 002

Report from CEPT to the European Commission on the
5th Mandate on IMT-2000/UMTS

**HARMONISATION OF THE FREQUENCY USAGE
WITHIN THE ADDITIONAL FREQUENCY BAND OF 2500-2690 MHZ
TO BE MADE AVAILABLE FOR IMT-2000/UMTS SYSTEMS IN
EUROPE**

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



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Harmonisation of the frequency usage within the additional frequency band of 2500-2690 MHz to be made available for IMT-2000/UMTS systems in Europe

1. Executive summary

This Report has been developed by CEPT in response to Mandate 5 from the EC (see Attachment 1) and provides the background information that has been used to develop the channelling arrangement in the 2500-2690 MHz IMT-2000/UMTS frequency band.

Firstly, an overview is given of the frequency bands available for IMT-2000/UMTS usage, and then the current use of those bands in Europe is reviewed in detail. That is followed by an introduction to the potential impact of space services on IMT-2000/UMTS usage by terrestrial systems in the 2500-2690 MHz band. The use of the 2605-2655 MHz band by IMT-2000 systems in CEPT countries was safeguarded at the World Radiocommunication Conference 2003 (WRC-03), but CEPT action in response to WRC-07 decisions on agenda item 1.9 will be essential to ensure the appropriate protection to IMT-2000 from other space services in the whole band. Information on the use of the IMT-2000/UMTS terrestrial and satellite bands has led to the choice of terrestrial mobile usage in the frequency bands 2500-2520 MHz and 2670-2690 MHz.

A number of relevant compatibility and sharing studies have been summarized and the issue of guard bands has been examined in Chapter 5. ECC Report 45¹ on 2.6 GHz band sharing and compatibility provides guidance and recommendations on the applicability of adjacent band operation of the various applications in the 2500-2690 MHz band. For the case of terrestrial mobile stations, protection of radio astronomy stations can be ensured by definition of exclusion zones, where transmission is prohibited. Adjacent channel operation between co-located Multipoint Microwave Distribution Service (MMDS) and terrestrial UMTS services requires a minimum frequency separation of 15 MHz for macro and micro cell deployment of UMTS. It has been concluded that the guard bands between IMT-2000/UMTS FDD and TDD blocks in the 2500-2690 MHz band should be decided on a national basis, because these decisions will be influenced by national considerations. CEPT may conduct further technical studies to assist administrations in defining the size of these guard bands.

Technology neutrality has been extensively discussed within CEPT. Chapter 6 summarizes the CEPT position regarding this issue in the IMT 2000/UMTS frequency bands. CEPT has concluded that the scope of the ECC Decision on harmonised utilisation of spectrum for IMT-2000/UMTS systems operating within the band 2500-2690 MHz should be limited to IMT-2000. The licensing conditions will continue to be the responsibility of national administrations, who will need to take into consideration the EU regulatory framework.

Finally, channelling arrangements have been considered. CEPT has concluded that 2500-2570 MHz paired with 2620-2690 MHz should be designated for FDD deployment, with frequency blocks in multiples of 5 MHz. CEPT has also concluded that the band 2570-2620 MHz could be used for either TDD or FDD downlink (external), to be decided on a national basis, and should accommodate any necessary guard bands. Duplex pairings with frequency bands external to the 2500-2690 MHz band have not been considered.

¹ ECC Report 45 Sharing and adjacent band compatibility between UMTS/IMT-2000 in the band 2500 – 2690 MHz and other services.



Attachments 2 and 3 give more detailed information on the MS/MSS usage in IMT-2000/UMTS frequency bands and the present use and availability of these bands in Europe. The draft ECC Decision (Attachment 4) provides the frequency arrangements for harmonised utilisation of spectrum for IMT-2000/UMTS systems operating within the band 2500-2690 MHz.

2. Introduction

This is the final report developed by the European Conference of Postal and Telecommunications Administrations (CEPT) in response to the European Commission (EC) under Mandate 5².

Mandate 5 requested CEPT to develop and adopt the measures necessary to ensure a harmonised and efficient use of the frequency band 2500-2690 MHz for IMT-2000/UMTS.

As required by Mandate 5 this report provides the background information that has been used to develop the detailed channelling arrangements for the band 2500-2690 MHz, taking into account the following issues:

- Availability of the bands 2500-2520 / 2670-2690 MHz for use by the IMT-2000 satellite component and/or terrestrial component;
- Impact of BSS sound at 2605-2655 MHz (and possibly other space services in the band 2500-2690 MHz) on IMT-2000/UMTS services;
- The impact of technological advances such as variable duplex spacing or other developments that may facilitate flexible channelling arrangements as well as technology neutrality, noting that these technologies must be commercially available by 2008;
- The desirability to take utmost account of making regulation technologically neutral; and
- Efficient and harmonised use of spectrum.

In March 2001 the European Commission issued Mandate 4³ to CEPT to undertake all necessary steps to assess the need for additional frequency bands under different scenarios and based on detailed studies reflecting the views of all parties concerned. In response to Mandate 4 CEPT issued a Report and ECC Decision (02)06⁴ whose key points are:

- Designation of the whole 2500-2690 MHz band for UMTS/IMT-2000 systems.
- To make the whole band 2500-2690 MHz available for use by UMTS/IMT-2000 systems by 1 January 2008, subject to market demand and national licensing schemes.

² EC Mandate to CEPT to harmonise frequency usage within the additional frequency band of 2500 – 2690 MHz to be made available for IMT-2000/UMTS systems in Europe (Mandate 5).

³ EC Mandate 4 to CEPT on Frequency Usage to Facilitate a Co-ordinated Implementation in the Community of Third Generation Mobile and Wireless Communication Systems Operating in Additional Frequency Bands as Identified by the WRC-2000 for IMT-2000 Systems.

⁴ ECC Decision (02)06 on the designation of the frequency band 2500 – 2690 MHz for UMTS/IMT-2000 systems.



- Designation of the frequency band 2520-2670 MHz for use by terrestrial UMTS/IMT-2000 systems.
- The detailed channelling arrangements for the whole band 2500-2690 MHz as well as the utilisation of the bands 2500-2520 MHz / 2670-2690 MHz shall be decided in an additional ECC Decision to be adopted by the end of 2004.

The Licensing Committee adopted the deliverables through a written procedure which opened on 5 December 2002 and ended on 19 December 2002.

3. Availability of frequency bands for IMT 2000/UMTS

This Chapter provides an overview of the frequency bands available for IMT-2000/UMTS usage, and the current use of those bands in Europe. Also, an introduction to the potential impact of space services on IMT-2000/UMTS usage by terrestrial systems in the 2500-2690 MHz band is provided.

3.1. Frequency bands identified for IMT-2000 usage

The World Administrative Radio Conference (WARC-92) identified the “core band” spectrum for IMT-2000 in 1992. The bands identified were 1885-2025 MHz and 2110-2200 MHz. Those bands included 2 x 30 MHz of MSS spectrum (1980-2010 MHz / 2170-2200 MHz). The World Radiocommunication Conference of 2000 (WRC-2000) identified additional spectrum for IMT-2000 for the provision of mobile services. The bands identified were 2500-2690 MHz, 1710-1885 MHz and 806-960 MHz. The identification of the latter band for IMT-2000 is limited in Region 1 to those parts of the band that are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems (862-960 MHz). Furthermore, WRC-2000 identified the bands 1525-1544 MHz, 1545-1559 MHz, 1610-1626.5 MHz, 1626.5-1645.5 MHz, 1646.5-1660.5 MHz, 2483.5-2500 MHz, 2500-2520 MHz and 2670-2690 MHz for the satellite component of IMT-2000.

3.2. Current usage in Europe of bands identified for IMT-2000/UMTS

The current usage of the core bands as identified by WARC-92 in most CEPT countries is detailed in Attachment 2.

In Europe, the band 2500-2690 MHz is currently being used for various different services including fixed links, military and MMDS. Most CEPT countries will be able to make the band available for IMT-2000/UMTS services by January 2008 subject to market demand.

Parts of the band 1710-1885 MHz are currently used for GSM1800 and parts of the 862-960 MHz band are used for E-GSM (880-890 MHz / 915-925 MHz) and GSM900 (890-915 MHz / 925-960 MHz). According to the existing work plan, CEPT is planning to develop band plans for UMTS in the bands currently used by GSM. 3GPP has been requested to start the development of technical specifications for UMTS for those bands.



3.3. *The impact of Broadcasting Satellite Service (sound) at 2605-2655 MHz (BSS (sound)) and other space services in the band 2500-2690 MHz on IMT-2000/UMTS services*

The additional allocation to the BSS (sound) under RR No. 5.418 and No. 5.417 concerns in both cases a limited number of countries in Region 3, namely: Japan, Korea (Rep. of), India, Pakistan and Thailand in the band 2630-2655 MHz, and Korea (Rep. of) and Japan in the band 2605-2630 MHz. The WRC-03 decision relating to frequency sharing between the BSS (sound) and terrestrial services (former A.I. 1.34) achieved the safeguard of the use of the 2605-2655 MHz band by IMT-2000 systems, by modifying the former technical and regulatory regime applicable to the BSS (sound), and providing new provisions including BSS (sound) transmission pfd limits on Earth, except in a limited area around the national territory borders of the BSS (sound) service area listed in footnotes No. 5.418 and No. 5.417 (see also Resolution 539, Rev.WRC-03). The pfd limit levels were calculated taking into account IMT-2000/UMTS mobile and base stations as potential victim receivers. Therefore these limits cover both directions of transmission. No CEPT country is contained partly or as a whole in the area around the BSS (sound) territory and service area borders where the pfd limits no longer apply, except a part of the Russian Federation close to Japan. However, specific restrictions concerning BSS (sound) potential emissions over this part of the Russian Federation are included in the WRC-03 decisions in RR No. 5.418, which take care of their needs. Although this may not impact directly on the use of the band 2605-2655 MHz in CEPT countries, it may be noted that the implementation of BSS (sound) over one territory, as is the case in Japan and Korea, is exclusive to co-frequency co-coverage IMT-2000/UMTS deployment.

The technical and regulatory studies undertaken in the context of WRC-03 agenda item 1.34 raised the issue that the technical and regulatory regime currently applicable to the other space services allocated in parts of the band 2500-2690 MHz may not provide sufficient safeguard to the current and planned use of the band 2500-2690 MHz by terrestrial systems including IMT-2000. WRC-07 agenda item 1.9: “*to review the technical, operational and regulatory provisions applicable to the use of the band 2 500-2 690 MHz by space services in order to facilitate sharing with current and future terrestrial services without placing undue constraint on the services to which the band is allocated;*” was proposed in this context. It should be noted that some of the space services allocated in parts of the band 2500-2690 MHz are subject to pfd limits whose current level is less stringent than the levels decided in the context of WRC-03 agenda item 1.34. CEPT action in response to WRC-07 decisions on agenda item 1.9 will be therefore essential to ensure the appropriate protection to IMT-2000 in this band.

4. Subscriber figures and estimates of traffic/growth

The current utilisation of all relevant MS and MSS bands has been investigated. The findings of recent studies were that at the end of 2002 there existed approximately 643,000 MSS subscribers and 1,130 million terrestrial cellular subscribers worldwide. Regarding the assessment of the number of subscribers for either the satellite or terrestrial services, the studies also gave an indication of the extent to which each band was in use (if at all). Further details of the number of subscribers in each of the bands are summarised in the table shown in Attachment 3.



In summary, information on the use of the IMT-2000/UMTS terrestrial and satellite bands has led to the choice of terrestrial mobile usage in the frequency bands 2500-2520 MHz and 2670-2690 MHz.

4.1. Terrestrial

From the results of the studies in Attachment 3, it can be seen that the 2G terrestrial Mobile Services (MS) bands had 1,130 million subscribers at the end of 2002. 119 new licenses for IMT-2000 had been issued world-wide for the 2 GHz frequency bands by the end of 2002. The number of WCDMA subscribers exceeded 10 million during September 2004, and has been growing at a rate of around 1 million a month. This is expected to accelerate by the end of 2004, as a number of large networks enter full commercial service and the number of WCDMA terminals increases. It is predicted to reach around 17 million by the end of 2004.

4.2. Satellite

In studies conducted in the run-up to WRC-2000, the spectrum requirements for MSS in 2010 were agreed at 2 x 145 MHz in the 1-3 GHz range, for MSS subscriber figures estimated to exceed several million subscribers. In the development of this report CEPT could not reach agreement on the most appropriate methodology to be used for MSS spectrum demand forecasts to provide an updated estimate of the required spectrum for MSS services. The methodology used in the ASMS-TF report, considered during CEPT investigations, is an evolution of the methodology used in ITU-R Recommendation M.1391 and takes into account, among other things, the evolution of traffic characteristics of MSS services.

However, the revised market expectation of MSS, including the satellite component of IMT-2000, presented in the ASMS-TF report indicates a significant reduction in both subscriber figures and traffic volume when compared with the 1999 forecast market figures taken as the basis for spectrum requirements in ITU-R Report M.2023. The conclusion was that the spectrum requirements of MSS until year 2010 can be accommodated in the existing MSS bands.

5. Compatibility and sharing studies

ECC Report 45¹ on 2.6 GHz band sharing and compatibility provides guidance and recommendations on the applicability of adjacent band operation of the various applications in the 2500-2690 MHz band. This is one important element required for the development of detailed channelling arrangements for IMT-2000/UMTS in the 2500-2690 MHz band. The results of the studies carried out in developing ECC Report 45 are summarised below. The results include the required guard bands.

Sharing and compatibility issues between terrestrial and satellite IMT-2000, radio astronomy and MMDS have been studied. With a few exceptions, all the results presented in the Report were obtained using agreed baseline assumptions for FDD and TDD UTRA systems. In summary:

- The protection of radio astronomy stations from terrestrial mobile stations can be ensured by definition of exclusion zones, where transmission is prohibited.
- For the protection of radio astronomy stations from base stations co-ordination zones would be required.



- Adjacent channel operation between co-located MMDS and terrestrial IMT-2000/UMTS services requires a minimum frequency separation of 15 MHz for macro and micro cell deployment of IMT-2000/UMTS.
- Guard bands between IMT-2000/UMTS FDD and TDD blocks in the 2500-2690 MHz band should be decided on a national basis, because these decisions will be influenced by national considerations. CEPT may conduct further technical studies to assist administrations in defining the size of these guard bands.

5.1. Radio Astronomy

The following table provides the co-ordination criteria between radio astronomy stations and IMT-2000/UMTS base and mobile stations:

Station type	Required isolation (MCL value in dB)
DS-CDMA FDD, BS (P=43dBm) ⁵	190
DS-CDMA FDD, MS (P=24dBm) ⁵	174

Table 1: Required isolation between IMT-2000 system components and radio astronomy stations

For the case of terrestrial mobile stations, protection of radio astronomy stations can be ensured by definition of exclusion zones, where transmission is prohibited. For base stations co-ordination zones would be required as follows:

- For terrestrial IMT-2000/UMTS-BSS the Minimum Coupling Loss (MCL) figures mentioned above could be used by administrations to calculate the relevant co-ordination zone. Each planned base station within this zone will need to be location / frequency co-ordinated with the radio astronomy stations.
- For the terrestrial mobile stations an exclusion zone will be accomplished as a consequence of coordinating the base stations, noting that mobiles implement “receive before transmit”. These exclusion zones have to be defined depending on the local geographical situation.
- The size of the co-ordination and exclusion zones will be site-specific. The studies so far indicate typical co-ordination distances for base stations in the range 60-100 km. For a single terrestrial mobile transmitting at maximum power the exclusion zone is between 30-50 km.
- Taking into account the location of the relevant RA sites, an assumption is that the required co-ordination or exclusion zone is expected to be entirely within a national boundary.

Base station filtering may provide an additional means of achieving the required isolation (for example, a case specific study for the Jodrell Bank radio astronomy site in the UK showed that under specific environment propagation conditions around the radio astronomy site, an additional 20 dB base station Tx filtering leads to a reduction of about 20 km in the calculated co-ordination distance around that radio astronomy station).

⁵ The maximum Out of Band (OOB) emissions were obtained with maximum BS/MS transmit power, it can be noted that typical BS/MS transmitter power are below this value.



5.2. *MMDS*

Studies have shown that for adjacent channel operation between co-located MMDS and terrestrial IMT-2000/UMTS services a minimum frequency separation of 15 MHz will be necessary for macro and micro cell deployment of IMT-2000/UMTS. For pico cell deployment no guard band is necessary. Due to the high front to back ratio of MMDS receive antennas it may be possible to reduce the interference into MMDS receivers for adjacent channel sharing by ensuring that they are pointing away from the IMT-2000/UMTS service areas.

5.3. *Guard Bands*

Guard bands between TDD and FDD are likely to be required in order to achieve adequate protection from interference and to avoid an undue increase in the complexity and cost of terminals and base stations. The size of the guard band will depend on:

- the overall deployment (e.g. types of cells, antenna);
- the specified performance of the FDD and TDD equipment;
- any mitigation techniques which could be employed through the improved performance of base stations; and
- the level of coordination possible between TDD and FDD networks.

ITU-R Report M.2030 addresses the coexistence between IMT-2000 TDD and FDD terrestrial radio interface technologies around 2600 MHz operating in adjacent bands and in the same geographic area. This study was based on the minimum requirements for UTRA TDD as defined in 3GPP specifications. It concluded that, without any mitigation, this guard band could be greater than 10 MHz. However, since this study was completed, 3GPP has defined higher levels of performance for the scenarios of operation in the same geographic area and co-located base stations, which have already been implemented in commercial TDD products. 3GPP has not yet defined specifications for the 2.6 GHz band, but it is envisaged that the performance requirements in these specifications could be similar. Further ITU-R studies⁶ have shown that these higher levels of performance and other mitigation techniques could reduce this guard band substantially to an acceptable frequency offset, but the practical feasibility and the disadvantages of some of these mitigation techniques may be highly dependent on deployment scenarios and technical characteristics of the IMT-2000 parameters (TDD, FDD, type of cells in the deployment, mitigation techniques). CEPT envisages that the specifications that will be developed for the 2.6 GHz band, together with mitigation techniques that are feasible to implement, will allow the deployment of TDD between the uplink and downlink bands with guard bands of a reasonable size. It has been concluded that the guard bands should be decided on a national basis, because these decisions will be influenced by national considerations. CEPT may conduct further technical studies to assist administrations in defining the size of these guard bands.

⁶ These studies are documented in report ITU-R M.2030 “Coexistence between IMT-2000 time division duplex and frequency division duplex terrestrial radio interface technologies around 2 600 MHz operating in adjacent bands and in the same geographical area”.



6. Regulatory developments

6.1. *Technology neutrality and harmonisation of standards*

Mandate 5 requires CEPT to develop detailed channelling arrangements for the band 2500-2690 MHz, taking into account the desirability to make regulation technologically neutral. “Technology neutrality” has been extensively discussed within CEPT and, in the context of this document, is used as a synonym for “standards neutrality”. It is understood as the freedom to choose any radio standard restricted only by basic requirements of, for example, the maximum available bandwidth, adjacent channel interference, maximum transmit power, etc.

The opposite concept to technology neutrality (standards neutrality) is the harmonisation of standards. This alternative definition means the preference for a certain radio standard to be used by various operators, providing equal types of services in a certain spectrum band.

The definition of a set of preferred radio standards in a family concept (for examples, the IMT-2000 family of standards) is an attempt to combine the concept of technology neutrality (standards neutrality) with the concept of harmonisation of standards.

6.2. *IMT-2000/UMTS core bands (WARC-92 bands)*

In Decision ERC(99)25, some technology neutrality is achieved by the definition of TDD / FDD blocks and a channelling raster “compatible” with various IMT-2000 radio interfaces. On the other hand, guard bands and other technical parameters included in the channelling arrangement have been derived from a technical analysis based on technologically specific assumptions (the UTRA air interfaces). This did not prevent a further update of the Decision to add additional guard bands and technical parameters to take into account other IMT-2000 air interfaces in the future, and an ECC Recommendation⁷ on low chip rate UTRA TDD was subsequently adopted.

6.3. *2500-2690 MHz IMT-2000/UMTS extension band*

Channel arrangements for the band 2500-2690 MHz must be compatible between all components considered. Therefore, to derive values for FDD carrier frequencies or spacing between FDD and TDD carriers assumptions relating to the transmitter characteristics (for example, the Adjacent Channel Leakage Ratio) and the receiver performance (such as Adjacent Channel Selectivity) have been made.

The solution proposed in the new ECC Decision is to define the frequency edge of each block and to specify that, for UTRA FDD, the frequency edge is defined with 2.5 MHz offset from the centre frequency. For other systems in the IMT-2000 family, including UTRA TDD, the frequency offset will have to be defined on a case-by-case basis. This solution means that the ECC Decision applies to any IMT-2000 technology, while providing a default solution applicable to UTRA FDD systems and avoiding some solutions which would not be technically compatible.

⁷ ECC/REC(02)10 Harmonised utilisation of spectrum for 1.28Mcps UTRA TDD option in connection with ERC/DEC/(99)25.



The UK and some industry representatives in ECC PT1 have proposed an alternative approach to technology neutrality and how this should be accounted for in the ECC Decision. The UK has proposed that CEPT adopt an approach which would permit the use of technologies which have emission levels outside of the nominal wireless carrier channel edge so long as these fall below a certain level (the assumption is that it would be based on the emission mask of the UMTS system). This approach would allow an operator to deploy systems of larger or smaller than 5 MHz channel bandwidth. However, systems with larger bandwidth or different modulation may have undue difficulties to fit the mask and some systems (for example, those with narrow bandwidth) may cause blocking interference to adjacent channel at a much higher level.

The UK further proposes that the ECC Decision should explicitly provide the possibility for administrations to allow other technologies to be deployed in the band, in addition to some or all of those existing IMT-2000 family members included in Recommendation ITU-R M.1457, which may be specified and standardized for the 2500-2690 MHz band in the future.

Other administrations and some industry representatives objected, stating that the ECC Decision should only deal with IMT-2000 systems and that the issue raised by UK should be considered in the framework of national licensing schemes. These administrations emphasized that the range of technologies identified within the ITU-R harmonization process is sufficient to satisfy a technology neutrality requirement, while maintaining the benefits of global harmonisation and economies of scale.

Consequently, the scope of the ECC Decision has been limited to IMT-2000. The licensing conditions will continue to be the responsibility of national administrations, who will need to take into consideration the EU regulatory framework.

7. Technological Consideration in developing the band plan

7.1. Technological developments

- **Developments in the IMT-2000 family**

Apart from the need for channel arrangements for the band 2500-2690 MHz to be compatible between all components of the IMT-2000 family (discussed in Chapter 6), there is no additional relationship between the developments in ITU of the IMT-2000 family and the channelling arrangements in the 2.6 GHz band. Further developments of the IMT-2000 family concept is considered to be more relevant to the WRC-07 agenda item 1.4 preparations and have not been investigated further.

- **Variable duplex spacing**

Variable duplex spacing is a very promising technology. However, the preference for having internal paired FDD in the 2.6 GHz band is justified by the fact that potential uncertainty on this technology should not prevent or delay the development and deployment of equipment in this frequency band.



- **Flexibility**

Flexibility is always welcomed when it does not create uncertainty and impede the development of systems. In the frequency arrangement developed by CEPT, a balance has been made between the need to foster the development of paired FDD, through the selection of 2 x 70 MHz as the most appropriate size of internal paired spectrum blocks, and the flexibility which has been left for the near future in the use of the 50 MHz centre gap.

7.2. Traffic Asymmetry

Until there is significantly more experience of real operating 3G networks, it is premature to envisage the detailed traffic characteristics of services that will be offered. In general, it is expected that services will exhibit some asymmetry where the downlink carries more traffic than the uplink.

Studies have suggested that there may be a requirement in the order of between 2:1 and 3:1 (in the downlink direction) for overall traffic asymmetry in the future delivery of 3G services. For example, the UMTS Forum⁸ has been studying different types of traffic that might flow across UMTS networks, and how the characteristics of that traffic, especially its asymmetry, might result in an overall asymmetry of delivered traffic. The report concludes that the aggregate offered 3G traffic on a country level may be asymmetric towards the downlink with a DL/UL asymmetry of up to 2.3. However, higher or lower asymmetry could be expected at a cell level. Additionally, actual traffic asymmetry in the order of 2 – 3 was observed on GPRS and WLAN networks. While the actual and offered traffic asymmetry cannot be directly compared at this point, the indications are that future asymmetry at a country level will be less than previously anticipated. However, even if it is agreed that there will be an overall asymmetric traffic requirement, it does not necessarily follow that there must be an asymmetric assignment of spectrum to network operators. A number of techniques, such as High-Speed Downlink Packet Access (HSDPA), will be available to allow operators to deliver asymmetric traffic efficiently in symmetric spectrum.

7.3. FDD

7.3.1. FDD Internal

CEPT has concluded that internal pairing of FDD frequencies is necessary and 2 x 70 MHz of paired bands should be made available for the implementation of FDD internally paired spectrum arrangements. This will ensure the availability of FDD equipment at a reasonable cost, since internal pairing does not rely on untested technology. Also, asymmetry in the traffic does not automatically require asymmetric spectrum pairing.

Some CEPT countries which use this band for MMDS services may not be able to implement IMT-2000 services in the whole band.

⁸ UMTS Forum Report #33.



7.3.2. Duplex Direction

Globally aligned bands have made an important contribution to the success of mobile communications. CEPT has given serious consideration to the possibility of alignment of the band plans in Europe with other parts of the world, and especially on the duplex direction with regard to Japan. The national allocations in the 2.6 GHz range to MSS and BSS in Japan place serious constraints on the possible deployment of IMT-2000. Alignment with Japan could only be achieved by reversing the duplex direction in Europe, possibly with asymmetric FDD spectrum. It is recognised that this would have disadvantages to Europe.

In the conventional duplex direction for FDD terrestrial mobile systems, the mobile terminal transmits at the lower frequencies and the base station at the higher frequencies. This is because the system performance is generally constrained by the uplink link budget due to the limited transmit power of terminals. For the 2.6 GHz band, a reversal of the duplex direction would change the uplink link budget by about 1 dB, which would result in a coverage reduction of around 10%.

CEPT has therefore concluded that the duplex direction should be conventional, i.e. the downlink should be at the top of the band.

7.3.3. Duplex Gap

CEPT considers the technically required minimum duplex gap between FDD internal uplink and internal downlink in the 2.6 GHz band to be 30 MHz, as has been concluded in 3GPP Feasibility Study TR 25.889. However, a duplex gap larger than 30 MHz can facilitate the design of duplex filters with lower insertion loss. In addition, a duplex gap of 50 MHz would provide for development of TDD or additional FDD (external) downlink capacity within this duplex gap.

CEPT has decided on a band plan which gives a duplex gap of 50 MHz for TDD or FDD downlink (external) usage.

7.3.4. FDD Downlink only

The draft ECC Decision designates the band 2570-2620 MHz to either IMT-2000/UMTS TDD or FDD downlink (external). A downlink only channel within the 2.6 GHz band would be used in conjunction with an uplink channel in a different frequency band (external). This uplink channel might be located within an unpaired band. Alternatively, a downlink only channel could be used in conjunction with the uplink of a paired channel within a different frequency band. This would support traffic that has a substantial bias towards the downlink.

CEPT has not addressed the question of what bands might be used for these uplink channels.

7.4. TDD

In order to allow for flexibility in the deployment of IMT-2000 technologies, some countries wished to include TDD in the 2.6 GHz band. A mixed FDD and TDD deployment might have an impact on the cost and complexity of the terminals supporting FDD downlink (external). Therefore, the draft Decision envisages that an Administration would not make assignments within the centre gap to both TDD and FDD downlink (external). The draft ECC Decision



designates the band 2570-2620 MHz to either IMT-2000/UMTS TDD or FDD downlink (external).

8. Decisions taken within CEPT in response to Mandate 5

8.1. Decision on terrestrial / MSS usage

There was considerable discussion within CEPT on the possible designation of the 2500-2520 and 2670-2690 MHz bands for the use by MSS or satellite IMT-2000. CEPT agreed on a solution that would support both terrestrial and satellite components of IMT-2000. It was decided that this 2 x 20 MHz would be required by terrestrial IMT-2000/UMTS and that the requirements of MSS or satellite IMT-2000 can be met by the MSS allocations in:

- 1518-1525 MHz / 1668-1675 MHz,
- 1525-1559 MHz / 1626.5-1660.5 MHz,
- 1610-1626.5 MHz / 2483.5-2500 MHz,
- 1980-2010 MHz / 2170-2200 MHz.

With that decision, detailed spectrum arrangements for terrestrial IMT-2000/UMTS for the whole of the 2500-2690 MHz band could be developed.

In order to support the MSS and satellite component of IMT-2000, CEPT will make available the whole set of other MSS bands (the 1.5 / 1.6 GHz band, including the additional 2x7 MHz allocated at WRC-03, the 1.6 / 2.4 GHz band and the 2 GHz band) for their development and in order to support new MSS services. Consequently, CEPT administrations will support regulatory and standardization action to facilitate such development in these bands.

8.2. Main decisions on the 2500-2690 MHz band

In line with the Mandate, ECC PT1 has developed a draft ECC Decision on the detailed spectrum arrangements in the 2.6 GHz band. The full text of the Decision is contained in Attachment 4 with the main decisions listed below:

1. that the frequency band 2500-2690 MHz is designated for terrestrial IMT-2000/UMTS systems;
2. that Administrations shall make provisions to allow for the harmonised utilisation of spectrum in the frequency band 2500-2690 MHz for terrestrial IMT-2000/UMTS, as identified in Annex 1 to this Decision;
3. that the frequency band in decides 1 is available for terrestrial IMT-2000/UMTS systems as from 1 January 2008, subject to market demand and national licensing schemes;
4. that the date for implementation of this Decision shall be 18 March 2005;
5. that CEPT Member Administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the Office when the Decision is nationally implemented.



9. Conclusions

In the preparation of the final CEPT Report on Mandate No. 5, and to answer the questions raised under the Mandate, CEPT has studied the following issues:

- **Usage**
The survey on the current and planned use of GSM and IMT-2000/UMTS frequency bands (including the 2.6 GHz band) was updated. To date (November 2004), 31 Administrations have responded to the ERO questionnaire on the use of GSM and IMT-2000/UMTS frequency bands.
- **Satellite vs terrestrial usage**
On the designation of the 2500-2520 and 2670-2690 MHz bands for the use by MSS or satellite IMT-2000, CEPT agreed on a solution that would support both terrestrial and satellite components of IMT-2000. It was decided that this 2 x 20 MHz would be required by terrestrial IMT-2000/UMTS, and that the satellite requirements of MSS or satellite IMT-2000 can be met by the MSS allocations in the bands 1518-1525 MHz / 1668-1675 MHz, 1525-1559 MHz / 1626.5-1660.5 MHz, 1610-1626.5 MHz / 2483.5-2500 MHz and 1980-2010 MHz / 2170-2200 MHz. Consequently, CEPT administrations will support regulatory and standardization actions to facilitate such development in these bands.
- **Space services**
The impact of BSS (sound) at 2605-2655 MHz and other space services in the band 2500-2690 MHz on IMT-2000/UMTS services has been investigated. As a result, it was concluded that CEPT has to develop similar regulations under WRC-07 agenda item 1.9 for the whole band, as were developed under WRC-03 agenda item 1.34 for parts of the band.
- **Sharing and compatibility**
A report (ECC Report 45) on 2.6 GHz band sharing and adjacent band compatibility between UMTS/IMT-2000 in the band 2500-2690 MHz and other services, (Granada, February 2004), was developed and is available on the ERO website.
- **Technological advances**
On the investigation of technological advances such as variable duplex spacing or other developments that may facilitate flexible channelling arrangements, it has been noted that these technologies may not be fully commercially available by 2008. Therefore, the detailed channelling arrangements, as agreed by CEPT, are not based on these anticipated technological advances.
- **Technology neutrality**
Technology neutrality has been extensively discussed within CEPT. CEPT has concluded that the scope of this ECC Decision on harmonised utilisation of spectrum for IMT-2000/UMTS systems operating within the band 2500-2690 MHz, should be limited to IMT-2000. The licensing conditions will continue to be the responsibility of national administrations, who will need to take into consideration the EU regulatory framework.



- **Detailed channelling arrangements**

Finally, CEPT has concluded that 2500-2570 MHz (uplink) paired with 2620-2690 MHz (downlink) should be designated for FDD deployment, with frequency blocks in multiples of 5 MHz. CEPT has also concluded that the band 2570-2620 MHz could be used for either TDD or FDD downlink (external) services, to be decided on a national basis, and should accommodate any necessary guard bands. Duplex pairing with frequency bands external to the 2500-2690 MHz band have not been considered.

10. Glossary

<i>2G</i>	Second Generation Mobile
<i>3G</i>	Third Generation Mobile
<i>3GPP</i>	Third Generation Partnership Project
<i>AI</i>	WRC Agenda Item
<i>ASMS-TF</i>	Task Force on Advanced Satellite Mobile Systems
<i>BS</i>	Base Station
<i>BSS</i>	Broadcasting Satellite Service
<i>CDMA-2000</i>	Code Division Multiple Access 2000
<i>CEPT</i>	European Conference of Postal and Telecommunications Administrations
<i>DL</i>	Downlink
<i>DS-CDMA</i>	Direct Spread Code Division Multiple Access
<i>EC</i>	European Commission
<i>ECC</i>	Electronic Communications Committee (of CEPT)
<i>E-GSM</i>	Extended GSM 900 Band
<i>ERC</i>	European Radiocommunications Committee
<i>ERO</i>	European Radiocommunications Office
<i>FDD</i>	Frequency Division Duplex
<i>GPRS</i>	General Packet Radio Service
<i>GSM</i>	Global System for Mobile Communication
<i>HSDPA</i>	High Speed Downlink Packet Access
<i>ITU-R</i>	International Telecommunications Union – Radiocommunication Sector
<i>MCL</i>	Minimum Coupling Loss
<i>MMDS</i>	Multipoint Microwave Distribution Service
<i>MS</i>	Mobile Service
<i>MSS</i>	Mobile Satellite Service
<i>OOB</i>	Out of Band
<i>PDC</i>	Personal Digital Cellular
<i>pdf</i>	Power Flux Density
<i>RA</i>	Radio Astronomy
<i>RR</i>	Radio Regulations (used in the text to refer to relevant articles of the Radio Regulations)



<i>TDD</i>	Time Division Duplex
<i>Tx</i>	Transmitter
<i>UL</i>	Uplink
<i>UMTS</i>	Universal Mobile Telecommunication Service
<i>UTRA</i>	Universal Terrestrial Radio Access
<i>WARC</i>	World Administrative Radio Conference
<i>WCDMA</i>	Wideband Code Division Multiple Access
<i>WLAN</i>	Wireless Local Area Network
<i>WP8F</i>	ITU-R Working Party 8F
<i>WRC</i>	World Radiocommunication Conference



Attachment 1: 5th Mandate to CEPT on IMT-2000/UMTS



EUROPEAN COMMISSION
Directorate-General Information Society

Communications Services
Implementation/Committees

Brussels, 10 June 2003

RSCOM03-14

FOR INTERNAL USE ONLY

RADIO SPECTRUM COMMITTEE

Subject: 5th Mandate to CEPT on IMT-2000/UMTS

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1. Title

Mandate to CEPT to harmonise the frequency usage within the additional frequency band of 2500-2690 MHz to be made available for IMT-2000/UMTS systems in Europe (Mandate 5)

2. PURPOSE

To mandate CEPT to develop and adopt the measures necessary to ensure a harmonised and efficient use of the frequency band 2500-2690 MHz for IMT-2000/UMTS.

3. JUSTIFICATION

Pursuant to Article 4 of the Radio Spectrum Decision⁹, the Commission may issue mandates to the CEPT for the development of technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum; such mandates shall set the task to be performed and the timetable therefor.

In Europe the frequency band 2500-2690 MHz is foreseen as additional spectrum for IMT-2000/UMTS. In order to ensure harmonised conditions and efficient use of the above-mentioned spectrum, it is necessary to investigate and decide on detailed spectrum usage parameters as well as whether or not and to which extent the satellite component of IMT-2000 could use parts of this additional spectrum.

4. BACKGROUND

Pursuant to the UMTS Decision¹⁰, and after consulting the Member States at the Licensing Committee, the Commission issued on 9 March 2001 a fourth Mandate to CEPT to harmonise frequency usage in order to facilitate a co-ordinated implementation in the Community of third generation mobile and wireless communication systems operating in additional frequency bands as identified by WRC-2000 for IMT-2000 systems.

Mandate 4 asked CEPT to undertake all necessary steps to assess the need for additional frequency bands under different usage scenarios and based on detailed studies reflecting the views of all parties concerned. The work to be done by CEPT took into account the prospective development of the 3G market and considered both the terrestrial and the satellite component of IMT-2000 systems.

CEPT delivered a Report and an ECC Decision in line with the scope and tasks given under Mandate 4. The key points included in the adopted ECC Decision, ECC/DEC/(02)06, are:

- Designation of the **whole** band 2500-2690MHz to IMT-2000/UMTS systems.

⁹ Decision 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community, OJ L 108 of 24.4.2002, p.1.

¹⁰ Decision 128/199/EC of the European Parliament and of the Council on the co-ordinated introduction of a third generation mobile and wireless communications system (UMTS) in the Community of 14 December 1998.



- Making the **whole** band 2500-2690MHz available for use by IMT-2000/UMTS systems by **1 January 2008**, subject to market demand and national licensing schemes.
- Designation of the frequency band **2520–2670MHz** for use by **terrestrial** IMT-2000/UMTS systems.
- Detailed **channelling arrangements** for the whole band 2500–2690MHz as well as the **utilisation** of the bands 2500–2520MHz / 2670–2690MHz **shall** be decided in an additional ECC Decision to be adopted **by the end of 2004**.

Following the delivery of the report and the ECC Decision by CEPT the Licensing Committee adopted the deliverables through a written procedure which was opened on 5 December 2002 and ended on 19 December 2002. Licensing Committee members unanimously agreed on the following statement: *"The Committee welcomes the results of the work done by the CEPT pursuant to Mandate 4 and accepts the ECC Decision ECC/DEC/(02)06 of 15 November 2002 on the designation of the frequency band 2500-2690 MHz for UMTS/IMT-2000. The Committee invites the EU Member States to commit to the implementation of such ECC Decision in due time."*

5. ORDER AND SCHEDULE

Considering that the band 2500-2690 MHz is to be made available by 1 January 2008 and that the ECC Decision that was agreed under the 4th Mandate to CEPT foresees a second ECC Decision dealing with the channelling arrangements for the band 2500-2690 MHz by the end of 2004;

CEPT is mandated to develop channelling arrangements for the band 2500-2690 MHz taking into account and commenting on at least the following issues;

- Availability of the bands 2500-2520 / 2670-2690 MHz for the use by the IMT-2000 satellite component and/or terrestrial component;
- The impact of BSS sound at 2605-2655 MHz (and possibly other services in the band 2500-2690 MHz) on IMT-2000/UMTS services;
- The impact of technological advances such as variable duplex spacing or other developments that may facilitate flexible channelling arrangements as well as technology neutrality, noting that these technologies must be commercially available by 2008;
- The desirability to take utmost account of making regulation technologically neutral, and
- Efficient and harmonised use of spectrum.

These issues are to be addressed in a CEPT Report which would be the basis for a following ECC Decision concerning channelling arrangements.

The deliverables of this Mandate are an interim and final report, as well as an ECC Decision on IMT-2000/UMTS channelling arrangements with the following delivery dates.



- **July 2004:** Submission of an interim report to the RSC giving initial proposals or strategies, commenting on the progress of the work and highlighting any problems with the timing of the mandate on the basis of which the Commission with the support of the RSC might have to reassess the timing of the outstanding deliverables.
- **November 2004:** Submission of the final CEPT report to the RSC and adoption of the ECC Decision for public consultation;
- **March 2005:** Final approval of the ECC Decision by the ECC.

The result of this mandate can be made applicable in the European Community pursuant to Article 4 of the Radio Spectrum Decision.

In implementing this mandate, the CEPT shall, where relevant, take the utmost account of Community law applicable.

* * *



Attachment 2: Availability of IMT-2000/UMTS spectrum in Europe

Section 1: Utilisation of the IMT-2000/UMTS Core Bands in Europe

NOTE: For each country the first row indicates the spectrum occupied by IMT-2000/UMTS. The second row indicates the spectrum occupied by other applications.

Country	TDD 1900-1920 MHz (20)	FDD 1920-1980/ 2110-2170 MHz (2x60)	TDD 2010-2025 MHz (15)	Expiry	Update
Austria	20	2 x 60	5	UMTS: Dec. 2020	March 2004
Belgium	15 0	2 x 60 few links	0 0	UMTS: 2021 Other: 2002	March 2004
Croatia	0	0	0		March 2004
Cyprus	UMTS	UMTS	UMTS		March 2004
Czech Republic	20 0	2 x 60 0	15 0	UMTS: 2021 -	March 2004
Denmark	1900-1920 MHz	1920-1980/ 2110-2170 MHz	2010-2025 MHz	Oct 2021	March 2004
Estonia	15 0	2 x 45 0	0 0		September 2004
Finland	20	2 x 60	0	UMTS: 2019	March 2004
France	20 0	2x60 0	15 0	3 UMTS licence holders: Orange France and SFR (licence granted in August 2001) and Bouygues Telecom (licence granted in December 2002). Licence duration: 20 years.	June 2004
Germany	20 0	2 x 60 0	1 x 5 0	UMTS: 31 December 2020	March 2004
Hungary	0 Fixed and mobile applications	0 Fixed and mobile applications	0 Fixed and mobile applications	- 31 December 2004	March 2004
Iceland	8 FX links	12 FX links 1920-1980 31 FX links 2110-2170	4 FX links	Available when market requires	March 2004
Ireland	20 0	2 x 60 0	15 0	UMTS: 2022 -	March 2004
Italy	20 0	2 x 60 0	1 x 5 0	UMTS: Dec 2016 -	
Latvia	10 -	2x40 -	- -	UMTS Dec.2017 -	
Liechtenstein	20 0	2 x 60 0	15 0	UMTS: 2016 -	
Lithuania	20 0	2 x 60 0	5 0	- -	Septmber 2004



Country	TDD 1900-1920 MHz (20)	FDD 1920-1980/ 2110-2170 MHz (2x60)	TDD 2010-2025 MHz (15)	Expiry	Update
Luxembourg	UMTS Other services	20 0	5 0	0 0	March 2004
The former Yugoslav Republic of Macedonia	0 0	0 0	0 0	UMTS: ? -	
Malta	0 few links	0 few links	0 0	- 2003	
Netherlands	20 0	2 x 60 0	5 0	UMTS: Dec 2016 -	September 2004
Norway	20 0	2 x 60 0	0 0	UMTS: Dec 2012 -	
Poland	1900.0-1920.1 0	1920.1-1980.01 / 2110- 2170 0	10 0	UMTS: 2023 Other: 2006	March 2004
Portugal	15	2 x 60	0	UMTS: Jan 2016	March 2004
Slovak Republic					March 2004
Spain	20 Residual Applications of fixed	2 x 60 Residual Applications of fixed links and Spatial Investigation	Residual Applications of fixed	UMTS: 2020 (2030)	March 2004
Sweden	20 0	2x60 0	0 0	2015 Other: until used by UMTS	March 2004
Switzerland	20 0	2 x 60 0	0 0	UMTS: 2016 Other: -	March 2004
Turkey *UMTS spectrum planning is being continued **Licence duration is indefinite	* Will**	* Fixed link	* Fixed link	End of 2004	March 2004
United Kingdom	20 0	2 x 60 0	0 2 links	UMTS: Dec. 2021 Other: 2006	March 2004



Section 2: Plans for IMT-2000/UMTS operators

Austria, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
3G Mobile Telecommunications GmbH	November 2000	December 2020	1920-3-1930,1/2110,3-2120,1 MHz	
Hutchison 3G Austria GmbH	November 2000	December 2020	1930,1-1939,9/2120,1-2129,9 MHz 1915,1 – 1920,1 MHz	22,000
EKOM 3G Mobilfunk GmbH	November 2000	December 2020	1939,9-1949,7/2129,9-2139,7 MHz	- *)
One GmbH	November 2000	December 2020	1949,7-1959,7/2139,7-2149,7 MHz	- *)
Mobilkom Austria Aktiengesellschaft & Co KG	November 2000	December 2020	1959,7-1969,7/2149,7/2159,7 MHz 1900,1 – 1910,1 MHz	1,500
T-Mobile Austria GmbH	November 2000	December 2020	1969,7-1979,7/2159,7-2169,7 MHz 1910,1-1915,1 MHz 2019,9-2024,7 MHz	- *)

*) commercial service since Dec. 2003

Source of market data: Mobile Communications Jan. 2004

Belgium, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Belgacom Mobile		20 years	1920.0-1935.3 / 2110.3-2125.3 MHz 1914.9-1920.0 MHz	
KPN Mobile 3G Belgium		20 years	1935.3-1950.1 / 2125.3-2140.1 MHz 1899.9-1904.9 MHz	
Mobistar		20 years	1964.9-1979.7 / 2154.9-2169.7 MHz 1909.9-1914.9 MHz	

Croatia

The tender process is open until 27 September 2004. Three licences are expected to be awarded in October 2004.

Cyprus, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
CYTA	*	27/2/24	1920-1935 MHz /2110-2125 MHz Paired 1900-1905 MHz Unpaired	-
SCANCOM	*	1/12/23	1935-1950 MHz /2125-2140 MHz Paired 1905-1910 MHz Unpaired	-

NOTE: No UMTS services offered yet



Czech Republic, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Radio Mobil	14. 12. 2001	14. 12. 2021	1959,9-1979,7/2149,9-2169,7 MHz 1910,1-1915,1 MHz	0
EuroTel	14. 12. 2001	14. 12. 2021	1920,3-1940,1/2110,3-2130,1 MHz 1900,1-1905,1 MHz	0

Denmark, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
TDC	Oct2001	Oct2021	1935-1950/2125-2140 MHz + 1900-1905 MHz	0
Orange	Oct2001	Oct2021	1965-1980/2155-2170 MHz + 1910-1915 MHz	0
3	Oct2001	Oct2021	1920-1935/2110-2155 MHz + 1915-1920 MHz	3000
Telia	Oct2001	Oct2021	1950-1965/2140-2155 MHz + 1905-1910 MHz	0

Estonia, updated September 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Radiolinja Eesti	July 2003	July 2013	1900,2-1905,0 MHz 1964,9-1979,7/2154,9-2169,7 MHz	0
Estonian Mobile Telephone	July 2003	July 2013	1905,2-1910,0 MHz 1950,1-1964,9/2140,1-2154,9 MHz	0
TELE 2	August 2003	August 2013	1910,2-1915,0 MHz 1935,3-1950,1/2125,3-2140,1 MHz	0

Finland, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Suomen 3G Oy, Ålands Mobiltelefon Ab		18.3.1999-18.3.2019, 1.9.1999-1.9.2019 (in Åland)	1920,3-1935,3/2110,3-2125,3 MHz 1915,0-1919,8 MHz	
Radiolinja Origo Oy		18.3.1999-18.3.2019 1.9.1999-1.9.2019 (in Åland)	1935,3-1950,1/2125,3-2140,1 MHz 1910,0-1914,8 MHz	
Oy Pearl 3g Ab, Song Networks Ltd		18.3.1999-18.3.2019, 1.9.1999-1.9.2019 (in Åland)	1950,1-1964,9/2140,1-2154,9 MHz 1905,0-1909,8 MHz	
Sonera Mobile Networks Oy		18.3.1999-18.3.2019 1.9.1999-1.9.2019 (in Åland)	1964,9-1979,7/2154,9-2169,7 MHz 1900,0-1904,8 MHz	

NOTE: There are three different types of licences in Finland i.e. whole country (Radiolinja Origo Oy and Sonera Mobile Networks Oy), whole country except the province of Åland (Suomen 3G Oy and Oy Pearl 3g Ab) and the province of Åland (Ålands Mobiltelefon and Song Networks).



France, June 2004

Operator	License start	License duration	Frequencies	Comments
Orange France	August 2001	20 years	FDD: 1964.9-1979.7 / 2154.9-2169.7 MHz TDD: 1910.1-1915.1 MHz & 1964.9-1978.9 MHz	Commercial services launched in 2004. By 31 December 2004, Orange France must provide 3G services in at least 12 of the largest urban areas. By 31 December 2005, Orange France will be required to cover 58% of the population.
SFR	August 2001	20 years	FDD: 1920.5-1935.3 / 2110.5-2125.3 MHz TDD: 1915.1-1920.1 MHz & 1920.5-1935.3 MHz	Commercial services launched in 2004. By 31 December 2004, SFR must provide 3G services in at least 12 of the largest urban areas. By 31 December 2005, SFR will be required to cover 58% of the population.
Bouygues Telecom	December 2002	20 years	FDD: 1935.3-1950.1 / 2125.3-2140.1 MHz TDD: 1900.1-1905.1 MHz & 1935.3-1950.1 MHz	The rollout obligations for Bouygues Telecom will be examined at a later date. The due date for the first rollout milestone is December 12, 2004 in accordance with the licence conditions

Germany, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Vodafone D2 GmbH	August 2000	Expiration date: 31 December 2020	FDD Uplink 1920.3-1930.2 / FDD Downlink 2110.3-2120.2 TDD 1915.1-1920.1	
Quam - Group 3 G UMTS GmbH	August 2000	Expiration date: 31 December 2020	FDD Uplink 1930.2-1940.1 / FDD Downlink 2120.2-2130.1 TDD 1900.1-1905.1	
E-Plus Mobilfunk GmbH & Co KG	August 2000	Expiration date: 31 December 2020	FDD Uplink 1940.1-1950.0 / FDD Downlink 2130.1-2140.0 TDD 2019.7-2024.7	
Mobilcom Multimedia GmbH	August 2000 - License was given back to RegTP on 24 December 2003		FDD Uplink 1950.0-1959.9 / FDD Downlink 2140.0-2149.9 TDD 1905.1-1910.1	
O2 (Germany) GmbH & Co OHG	August 2000	Expiration date: 31 December 2020	FDD Uplink 1959.9-1969.8 / FDD Downlink 2149.9-2159.8	
T-Mobile Deutschland GmbH	August 2000	Expiration date: 31 December 2020	FDD Uplink 1969.8-1979.7 / FDD Downlink 2159.8-2169.7 TDD 1910.1-1915.1	

Hungary, updated September 2004

The tender process has been made for UMTS licences. Four licences are expected to be issued by the end of 2004.

Iceland, updated March 2004

No UMTS licences awarded yet. Timescales have not been set.



Ireland, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Hutchinson	25 July 02	20 years	1920 – 1935 / 2110 – 2125	Not Avail
O2	2 Oct 02	20 years	1965 – 1980 / 2155 – 2170 ; 1910 – 1915	Not Avail
Vodafone	16 Oct 02	20 years	1950 – 1965/ 2140 – 2155; 1905 – 1910	Not Avail

Italy

Operator	License expiry (or duration)	Frequencies	Comments
IPSE 2000	31 dec. 2016	1920 – 1935 / 2110 – 2125 ; 1915 – 1920 MHz	
Telecom Italia Mobile	31 dec. 2016	1935 – 1945 / 2125 – 2135 ; 1910 – 1915 MHz	
WIND Telecomunicazioni	31 dec. 2016	1945 – 1955 / 2135 – 2145 ; 2020 – 2025 MHz	
H3G	31 dec. 2016	1955 – 1970 / 2145 – 2160 ; 1900 – 1905 MHz	
Omnitel Pronto Italia	31 dec. 2016	1970 – 1980 / 2160 – 2170 ; 1905 – 1910 MHz	

Latvia

Operator	License expiry (or duration)	Frequencies	Comments
LMT	Dec. 2017	FDD 1920-1940/2110-2130 TDD 1900-1905	
TELE2	Dec. 2017	FDD 1940-1960/2130-2150 TDD 1910-1915	

Liechtenstein

Operator	License expiry (or duration)	Frequencies	Comments
Tele2	31 December 2016	Frequency assignment is on the way. It is envisaged to divide the spectrum into 4 equal packages (2x14.8 MHz FDD and 5 MHz TDD). For the time being 1 package is thought to be assigned to each operator.	
VIAG Europlatform	31 December 2016	Frequency assignment is on the way. It is envisaged to divide the spectrum into 4 equal packages (2x14.8 MHz FDD and 5 MHz TDD). For the time being 1 package is thought to be assigned to each operator.	

Lithuania

UMTS licensing is expected at the end of 2004. Four licenses are expected to be issued.

Luxembourg, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Entreprise des P&T	2002	15	1920.3-1935.3 / 2110.3-2125.3 MHz & 1899.9-1904.9 MHz	only test subscribers
Tango S.A.	2002	15	1950.1-1964.9 / 2140.1-2154.9 MHz & 1909.9-1914.9 MHz	only test subscribers
Luxcommunications S.A.	2003	15	1935.3-1950.1 / 2125.3-2140.1 MHz & 1904.9-1909.9 MHz	0
Orange Communications Luxembourg S.A.	2002	15	1964.9-1979.7 / 2154.9-2169.7 MHz & 1914.9-1920.3 MHz	0



Malta

No licences awarded yet.

Netherlands, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Vodafone (Libertel)		31-12-2016	FDD Uplink 1920,0-1934,9 / FDD Downlink 2110,3-2124,9 TDD 1914,9-1920,0	
KPN Mobile		31-12-2016	FDD Uplink 1934,9-1949,7 / FDD Downlink 2124,9-2139,7 TDD 1909,9-1914,9	
Dutchtone Multimidea		31-12-2016	FDD Uplink 1949,7-1959,7 / FDD Downlink 2139,7-2149,7 TDD 1904,9-1909,9	
Telfort Holding		31-12-2016	FDD Uplink 1959,7-1969,7 / FDD Downlink 2149,7-2159,7 TDD 1899,9-1904,9	
3G Blue		31-12-2016	FDD Uplink 1969,7-1979,7 / FDD Downlink 2159,7-2169,7 TDD 2019,7-2024,7	

Norway, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
NetCom GSM AS	Jan 01	Dec 12	FDD: 1920,3 - 1935,3 / 2110,3 - 2125,3 TDD: 1915 - 1920	
Telenor Mobil AS	Jan 01	Dec 12	FDD: 1950,1-1964,9/2140,1-2154,9 TDD: 1905-1910	
Hi3G Access Norway AS	Nov 03	Sep 15	FDD: 1935,3-1950,1/2125,3-2140,1 TDD: 1910-1915	
Not assigned			FDD: 1964,9-1979,7/2154,9-2169,7 TDD: 1900-1905	
Not assigned			FDD: 2010-2025	

Poland, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
PTK Centertel	20.12.2000	01.01.2023	1915,1-1920,1 1920,5-1935,3 / 2110,5-2125,3	
POLKOMTEL	20.12.2000	01.01.2023	1905,1-1910,1 1950,1-1964,9 / 2140,1-2154,9	
PTC	20.12.2000	01.01.2023	1910,1-1915,1 1935,3-1950,1 / 2125,3-2140,1	



Portugal, updated 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Vodafone	2001.01.11	2016.01.01	FDD: 1920,3-1940,1/ 2110,3-2130,1 MHz TDD: 1915,1-1920,1 MHz	-
TMN	2001.01.11	2016.01.01	FDD: 1959,9-1979,7/2149,9-2169,7 MHz TDD: 1910,1-1915,1 MHz	-
Optimus	2001.01.11	2016.01.01	FDD: 1940,1-1959,9/2130,13-2149,7 MHz TDD: 1900,1-1905,1 MHz	-

Slovak Republic, updated 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
EUROTEL	28.06.2002	20 years	1940 – 1960/2130 – 2150/1905 - 1910	
ORANGE	28.06.2002	20 years	1920 – 1940/2110 – 2130/1900 - 1905	

Spain, updated 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
VODAFONE	10/03/2000	20 + 10 years	1950.1-1964.9 / 2140.1-2154.9 MHz 1905.1-1910.1 MHz	PRECOMERCIAL SERVICE
AMENA	10/03/2000	20 + 10 years	1935.3-1950.1 / 2125.3-2140.1 MHz 1900.1-1905.1 MHz	- NO SERVICE
TELEFONICA	10/03/2000	20 + 10 years	1964.9-1979.7 / 2154.9-2169.7 MHz 1910.1 – 1915.1 MHz	PRECOMERCIAL SERVICE
XFERA	10/03/2000	20 + 10 years	1920.5-1935.3 / 2110.5-2125.3 MHz 1915.1-1920.1 MHz	- NO SERVICE

Sweden, updated March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Vodafone	2004-02-23	5 year (will be prolonged until Dec 2015)	FDD = 2x15 MHz 2110-2125 / 1920-1935 MHz TDD= 5 MHz 1915-1920 MHz	0
Hi3G, 3	2003-05-03	5 year (will be prolonged until Dec 2015)	FDD = 2x15 MHz 2125-2140 / 1935-1950 MHz TDD= 5 MHz 1910-1915 MHz	X
Orange	Tbd	5 year (will be prolonged until Dec 2015)	FDD = 2x15 MHz 2140-2155 / 1950-1965 MHz TDD= 5 MHz 1905-1910 MHz	0
Svenska UMTS Nät	2004-03-10	5 year (will be prolonged until Dec 2015)	FDD = 2x15 MHz 2170-2155 / 1965-1980 MHz TDD= 5 MHz 1900-1905 MHz	0



Switzerland, updated 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Swisscom Mobile		15 years	FDD: 1920.5 - 1935.3 MHz / 2110.5 - 2125.3 MHz TDD: 1915.5 - 1920.5 MHz	
TDC Switzerland		15 years	FDD: 1935.3 - 1950.1 MHz / 2125.3 - 2140.1 MHz TDD: 1910.5 - 1915.5 MHz	
Orange		15 years	FDD: 1950.1 - 1964.9 MHz / 2140.1 - 2154.9 MHz TDD: 1905.5 - 1910.5 MHz	
3G Mobile		15 years	FDD: 1964.9 - 1979.7 MHz / 2154.9 - 2169.7 MHz TDD: 1900.5 - 1905.5 MHz	

Turkey, updated September 2004

In Turkey, Telecommunications Authority established a “National UMTS Coordination Board” consisting of telecom players in 2002 for conducting necessary activities regarding UMTS licenses. However, since the Authority evaluated that granting UMTS licenses in near future was not feasible, the activities of the mentioned Board were ceased in 2003. The Authority has not yet determined timing of introduction, number of licenses, awarding methods and other relevant issues concerning the UMTS licenses.”

United Kingdom, March 2004

Operator	License start	License expiry (or duration)	Frequencies	Comments
Hutchison 3G UK Limited	27 April 2000	31 December 2021	1920.0 - 1934.9 MHz 2110.3 - 2124.9 MHz 1914.9 - 1920.0 MHz	230,000 (estimate)
Vodafone Limited	27 April 2000	31 December 2021	1944.9 - 1959.7 MHz 2134.9 - 2149.7 MHz	
O2 (UK) Limited	27 April 2000	31 December 2021	1934.9 - 1944.9 MHz 2124.9 - 2134.9 MHz 1909.9 - 1914.9 MHz	
T-Mobile (UK) Limited	27 April 2000	31 December 2021	1959.7 - 1969.7 MHz 2149.7 - 2159.7 MHz 1899.9 - 1904.9 MHz	
Orange Personal Communications services Limited	27 April 2000	31 December 2021	1969.7 - 1979.7 MHz 2159.7 - 2169.7 MHz 1904.9 - 1909.9 MHz	



Section 3: Frequency Utilisation of the Frequency Band 2500-2690 MHz

Use of 2520 – 2670 MHz

Country	Current Use of 2520 – 2670 MHz (status November 2004)	License duration, Trends, When will band be available?	Updated
Austria	Fixed service (75 links, national raster)	Existing use is planned to be terminated by end 2002.	March 2004
Belgium	Fixed links in accordance with Rec. ITU-R F.283-5 (194 links in the band 2483.5-2690 MHz) Uplink ENG/OB liaisons with helicopters in 2573-2593 MHz	?	March 2004
Croatia	Fixed service ENG/OB (Cordless Cameras)	Presently not used. Until implementation of UMTS/IMT-2000	March 2004
Cyprus	<ol style="list-style-type: none"> 1. Government use (defence systems) (only in 2520-2655 MHz) 2. Fixed links 3. Radioastronomy applications (only in 2655-2670 MHz) 4. SAP/SAB 5. Terrestrial UMTS/IMT-2000 	No licenses so far. The band is already available.	March 2004
Czech Rep.	Military radiolocation Temporary ENG/OB on shared basis with military	Military radiolocation to be phased out by 2008.	March 2004
Denmark	ENG/OB (Cordless cameras)	UMTS candidate	March 2004
Estonia	Fixed, Mobile	01.01.2008	September 2004
Finland	Fixed service	Fixed service still in few locations. Band will be available according to ECC/DEC/(02)06.	March 2004
France	Military applications	Military until about 2010, but could be subject to review if necessary. Some military fixed links to be maintained longer than 2010 in rural areas.	September 2004
Germany	FWA P-MP FS applications (283 service areas) 2655-2670 MHz: RA (continuum measurements);	FWA to be phased out by 31.12.2007.	February 2004
Hungary	Fixed and mobile, except aeronautical mobile, radiolocation and aeronautical radionavigation applications for governmental use	Assignment of fixed and mobile (except aeronautical mobile) applications until 31 December 2007. Radiolocation and aeronautical radionavigation applications can be in operation until 31 December 2008 Intended for UMTS/IMT-2000 application	March 2004
Iceland	3 FX links and MMDS	To be decided	March 2004
Ireland	Fixed service (MMDS)	Licensed until 2015	March 2004



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Country	Current Use of 2520 – 2670 MHz (status November 2004)	License duration, Trends, When will band be available?	Updated
Italy	2520-2655 MHz: Military radio relay 2655-2670 MHz: FS, EESS, Radio astronomy, Space Research	There are some difficulties to make available the frequency band. A time schedule for UMTS will be defined in the near future	May 2001
Latvia	Fixed service (MMDS)	Could be available after 2008.	May 2001
Liechtenstein	Fixed service + ENG/OB	UMTS candidate	May 2001
Lithuania	Fixed service (MMDS)	The band can be made available between 1 Jan 2009 and 1 Jan 2012, subject to market demand.	September 2004
Luxembourg	Partly military	No plans	March 2004
The former Yugoslav Republic of Macedonia	2520-2593/2593-2670 MHz: rural P-MP 2558-2593/2632-2670 MHz: governmental use	UMTS candidate	May 2001
Malta	Partly military.	No plans.	May 2001
Netherlands	2520-2670 MHz: Fixed Wireless Access (FWA)	FWA license until 2008	March 2004
Norway	2520-2670 MHz; some rural mobile and fixed links 2579-2593 MHz: governmental use	Licenses expire in 2005. Geographical sharing with UMTS is envisaged.	May 2001
Poland	2520-2530 / 2560-2595 / 2640-2655 MHz: Fixed service (24 links and 4 operators) 2600-2670 MHz: Aeronautical Radionavigation, 2520-2560 MHz: Radiolocation	Accessible band – no demand from UMTS operators. Currently the band is used by the fixed radio service till the end of 2006. Radionavigation until 2005 Radiolocation until 2005	March 2004
Portugal	ENG/OB	Likely to be available from 1 Jan. 2006	March 2004
Slovak Republic	MMDS	Licences valid until end 2007	March 2004
Slovenia	Fixed service, ITU 283 (70 links)	Increase in fixed service	
Spain	Military fixed and tactical links Fixed service P-P civil (around 40 links)	Fixed links will be removed end 2007	March 2004
Sweden	Fixed service	Current licenses for fixed service expire 31 DEC 2005. The band can be made available by 1 Jan 2007 for IMT-2000, subject to market demand.	March 2004
Switzerland	Fixed service ENG/OB UMTS	Until end 2004 Until 2008 (planned) Candidate	March 2004
Turkey	2520-2670 MHz	This band is available now.	March 2004
UK	ENG/OB 1 transhorizon link	Links will be phased out so that the spectrum will be available for UMTS/IMT-2000 by 1 January 2008. Likely to be available between 2005 and 2010 subject to outcome of consultation, studies on sharing or relocation options for existing users, and market developments.	arch 2004 May 2001



Use of the bands 2500-2520 / 2670-2690 MHz

Country	Current Use of 2500-2520 / 2670-2690 MHz (status November 2004)	License duration, Trends, When will band be available?	Updated
Austria	Same as 2520-2670 MHz	presently not used; reserved for UMTS extension.	March 2004
Belgium	2573-2593 MHz: Mobile cameras (13)	Mobile cameras until 2010	March 2004
Croatia	Fixed service	Presently not used. Reserved for UMTS extension	March 2004
Cyprus	<ol style="list-style-type: none"> 1. Mobile Satellite applications 2. Radioastronomy applications (only in 2670-2690 MHz) 3. UMTS/IMT-2000 	No licenses so far. The band is already available.	March 2004
Czech Rep.	2500-2520 MHz: none 2670-2690 MHz: military radiolocation	Until 2008	March 2004
Denmark	No use	UMTS candidate	March 2004
Estonia	Fixed, Mobile	01.01.2008	September 2004
Finland	Fixed service	Fixed service still in few locations. Band will be available according to ECC/DEC/(02)06.	March 2004
France	Military applications	Military until about 2010, but could be subject to review if necessary. Some military fixed links to be maintained longer than 2010 in rural areas.	September 2004
Germany	2500-2520 MHz: 3 P-P fixed links 2655-2700 MHz: Radio astronomy	P-P to be phased out by 31.12.2007 Radio astronomy will stay	February 2004
Hungary	Radiolocation and aeronautical radionavigation applications for governmental use	Radiolocation and aeronautical radionavigation applications can be in operation until 31 December 2008 Intended for UMTS/IMT-2000 application	March 2004
Iceland	2 FX links and MMDS	To be decided	March 2004
Ireland	Fixed service (MMDS)	Available for IMT-2000 by 1 January 2005	March 2004
Italy	2500-2520 MHz: FS, MS exp a.m., MSS (s-E) 2670-2690 MHz: FS, MS exp a.m., MSS (E-s), EESS (passive), Space research, Radioastronomy	Available for MSS in 2005	May 2001
Latvia	Fixed service (MMDS)	Could be available after 2008.	May 2001
Liechtenstein	Fixed service	Can be refarmed in 2003	May 2001
Lithuania	Fixed service (MMDS)	The band can be made available between 1 Jan 2009 and 1 Jan 2012, subject to market demand.	September 2004
Luxembourg	None	available	March 2004
Malta	Fixed service.	No plans.	May 2001
Netherlands	Fixed and Mobile (ENG/OB)	licenses until 2008	March 2004
Norway	rural wireless access 2579-2593 MHz: governmental use	License until 2008	May 2001



CEPT Report 002
12 November 2004

Country	Current Use of 2500-2520 / 2670-2690 MHz (status November 2004)	License duration, Trends, When will band be available?	Updated
Poland	2520-2530 / 2560-2595 / 2640-2655 MHz: Fixed service (24 links and 4 operators) 2600-2670 MHz: Aeronautical Radionavigation, 2520-2560 MHz: Radiolocation	Accessible band – no demand from UMTS operators. Currently the band is used by the fixed radio service till the end of 2006. Radionavigation until 2005 Radiolocation until 2005	March 2004
Portugal	ENG/OB (4 links)	Likely to be available from Jan 2006	March 2004
Slovak Republic	MMDS	Licences valid until end 2004	March 2004
Slovenia	Fixed service, ITU 283 (70 links)	Increase in fixed service	
Spain	2500-2520 MHz: P-P fixed links civil and military 2670-2690 MHz: P-P fixed links civil and military	Fixed links will be removed end 2007	March 2004
Sweden	Fixed service	Current licenses for fixed service expire 31 DEC 2005. The band can be made available by 1 Jan 2007 for IMT-2000, subject to market demand.	March 2004
Switzerland	Fixed service ENG/OB UMTS	Until end 2004 Until 2008 (planned) Candidate	March 2004
Turkey	2500-2520/2670-2690 MHz	These bands are available now.	March 2004
UK	ENG/OB	Links will be phased out so that the spectrum will be available for UMTS/IMT-2000 by 1 January 2008. Likely to be available between 2005 and 2010 subject to outcome of consultation, studies on sharing or relocation options for existing users, and market developments.	March 2004



Attachment 3: Global mobile subscribers for terrestrial and satellite services

The global mobile subscriber figures for terrestrial and satellite services, up to the end of 2002, have been surveyed by the UMTS Forum.

IMT-2000 Band (MHz)		Band	System	Subscribers millions end of 2002	Services	Operators end of 2002	Future Plans ¹¹
806 - 960	MS	810 - 826	PDC	GSM (aggregate): 787.5 CDMA (aggregate): 142.7 PDC (aggregate): 60.1	Voice, data up to 384 kbps	467	
		824 - 849/ 869 - 894	AMPS TDMA CDMA				
		880 - 915/ 925 - 960	GSM 900				
		901 - 941	GSM				
		940 - 956	PDC ¹²				
1710 - 1885	MS	1710 - 1785/ 1805 - 1880	GSM 1800	TDMA (aggregate): 109.2 AMPS + other analogue: 30.0 TOTAL: 1129.5			
1885 - 1980	MS	1850 - 1990	GSM 1900 TDMA CDMA				
1900-1920/ 2 010 - 2 025	MS (UMTS TDD)					103	
1920-1980/ 2110 - 2170	MS (UMTS FDD)		3G/ IMT2000 ¹³	W-CDMA: 0.153 ¹⁴		119 ¹⁵	
1525 - 1544/ 1626.5 - 1645.5	MSS (GSO)			0.468 ¹⁶	Voice, data up to 144 kbps	10	Data rates up to 432 kbit/sec
1545 - 1559 / 1646.5 - 1660.5	MSS (GSO)						
1610 - 1626.5 / 2483.5 - 2500	MSS (N-GSO)			0.147	Voice, data up to 9.6 kbps	2	
1980 - 2010 / 2170 - 2200	MSS (satellite UMTS, N-GSO)						New ICO 2x3.5MHz, Plans in USA/FCC, S-DMB concept (1 st generation)
2500 - 2520/ 2670 - 2690	MS and MSS (UMTS)			0.028 ¹⁷		2	Terrestrial UMTS, S-DMB concept (2 nd gen.)
2520-2670	MS (UMTS)						Terrestrial UMTS

Source: UMTS Forum

¹¹ In the frequency bands where there are yet no subscribers, the future plans are indicated.

¹² PDC also uses 1429 - 1441 MHz / 1477 - 1489 MHz.

¹³ CDMA-2000 subscriber figures included in CDMA figures above.

¹⁴ 1 million in August 2003.

¹⁵ UMTS to mobilize the data world, <http://www.3gamericas.org>.

¹⁶ Does not include Volna and Solidaridad subscriber figures.

¹⁷ The Japanese NSTAR a, b, c satellites had a total of 28,000 subscribers in March 2002. No information on INSAT subscribers was available.



**Attachment 4: ECC Decision on harmonised utilisation of
spectrum for IMT-2000/UMTS systems operating within the band
2500 - 2690 MHz**

ELECTRONIC COMMUNICATIONS COMMITTEE

ECC Decision
of 18 March 2005
on harmonised utilisation of spectrum for
IMT-2000/UMTS systems operating within the band
2500 - 2690 MHz

(ECC/DEC/(05)05)



EXPLANATORY MEMORANDUM

1 INTRODUCTION

On 9 March 2001, the European Commission issued a Mandate 4¹⁸ calling upon CEPT to undertake preliminary investigations and to adopt the measures necessary to ensure the availability in the community of harmonised frequency bands, within the additional spectrum bands identified by WRC-2000 for the provision of terrestrial and satellite IMT-2000 services. In response to this mandate the ECC adopted Decision (02)06, which decided:

- to designate the 2500 to 2690 MHz band to IMT-2000/UMTS systems;
- that the 2500 to 2690 MHz band should be made available for use by IMT-2000/UMTS systems by 1 January 2008, subject to market demand and national licensing schemes;
- to designate the 2520 to 2670 MHz band for use by terrestrial IMT-2000/UMTS systems; and
- that the detailed spectrum arrangements for the 2500 to 2690 MHz band, as well as the utilisation of the bands 2500 to 2520 MHz / 2670 to 2690 MHz, should be decided in an additional ECC Decision by the end of 2004.

Following CEPT's response to Mandate 4, the European Commission issued Mandate 5¹⁹ in August 2003. This mandate requires CEPT to develop and adopt the measures necessary to ensure a harmonised and efficient use of the frequency band 2500-2690 MHz for IMT-2000/UMTS. Specifically CEPT is mandated to develop channelling arrangements for the band 2500-2690 MHz taking into account and commenting on at least the following issues;

- Availability of the bands 2500-2520 / 2670-2690 MHz for the use by the IMT-2000 satellite component and/or terrestrial component;
- The impact of BSS sound at 2605-2655 MHz (and possibly other services in the band 2500-2690 MHz) on IMT-2000/UMTS services;
- The impact of technological advances such as variable duplex spacing or other developments that may facilitate flexible channelling arrangements as well as technology neutrality, noting that these technologies must be commercially available by 2008;
- The desirability to take utmost account of making regulation technologically neutral, and
- Efficient and harmonised use of spectrum

2 BACKGROUND

The CEPT has recognised the importance of the European-wide harmonised availability of IMT-2000/UMTS services to the citizens of Europe.

The first IMT-2000/UMTS systems have been introduced within Europe utilising the frequency bands identified for IMT-2000 at the WARC-92 in RR 5.388 and in accordance with the ERC Decisions (97)07, (99)25 and (00)01 and ERC Recommendation 02-10.

In 1998, the European Community adopted a Decision, to facilitate the rapid and coordinated introduction of compatible UMTS networks and services, DEC No 128/1999/EC, the 'UMTS Decision'. This Decision defined UMTS and described the characteristics which UMTS is to be capable of supporting. It instructed the Commission to give Mandates to CEPT to harmonise frequency use, and to take measures, where appropriate in cooperation with ETSI, to promote a common and open standard for the provision of compatible UMTS services throughout Europe.

The European Commission has issued a series of Mandates on IMT-2000/UMTS to CEPT. In response to Mandate 1, the ERC subsequently adopted the Decision ERC/DEC(00)01 making available by 1 January 2002 at the latest, in accordance with commercial demand and subject to national licensing schemes, the full 'core bandwidth' (155 MHz) for terrestrial UMTS. A further Mandate 2 resulted in the ERC Decision ERC/DEC(99)25 of 29 November 1999 which contains the spectrum plan for the usage of the 'core band' and provides a common approach to be followed by CEPT administrations when licensing IMT-2000/UMTS services to operate in the 'core band'. In July 1999, the Commission issued a Mandate 3 for the development of a

¹⁸ Mandate to CEPT to harmonise frequency usage in order to facilitate a co-ordinated implementation in the Community of third generation mobile and wireless communication systems operating in additional frequency bands as identified by WRC-2000 for IMT-2000 systems, 9 March 2001.

¹⁹ Mandate to CEPT to harmonise the frequency usage within the additional frequency band of 2500-2690 MHz to be made available for IMT-2000/UMTS systems in Europe (Mandate 5), August 2003.



common plan to identify, with a view to make available between the years 2005 and 2010, *additional* frequency spectrum for the provision of terrestrial 3G mobile and wireless services in the Community. This resulted in a European Common Proposal (ECP) for 160 MHz of additional spectrum for the terrestrial component of IMT-2000/UMTS.

Report ITU-R M.2023 concluded on total spectrum requirements for the terrestrial element of IMT-2000 for the three ITU Regions, which were based on the sum of:

- the spectrum identified for IMT-2000 in RR 5.388,
- the spectrum available in the three Regions for existing second generation systems, and
- the additional spectrum requirement to meet the forecasted traffic volume in geographic areas where the traffic was expected to be the highest.

This additional spectrum was forecasted to be a minimum of 160 MHz in all three Regions by 2010, in those geographic areas where the traffic was expected to be the highest. Europe fully supported these conclusions. These conclusions were included in the CPM report to WRC-2000. At WRC-2000, European Common Proposals were successful on identification of additional spectrum for the terrestrial and satellite components of IMT-2000, including the main candidate band 2500-2690 MHz, see RR 5.384A (WRC-2000) and Resolution 223 (WRC-2000).

Mandate 4 resulted in ECC Decision (02)06 which specified a first set of measures necessary to ensure the availability of harmonised additional frequency bands for the provision of IMT-2000/UMTS services in the Community. Considering that the band 2500 – 2690 MHz is to be made available by 1 January 2008, Decision (02)06 foresaw a second ECC Decision by End of 2004 dealing with the spectrum arrangements for the band 2500 – 2690 MHz..

EC Mandate 5 asks CEPT to develop these spectrum arrangements to ensure a harmonised and efficient use of the frequency band 2500 – 2690 for IMT-2000/UMTS. The Commission proposed that CEPT should follow a gradual approach for the deliverables requested by Mandate 5 aiming for the approval of an ECC Decision on spectrum arrangements and on the use of the 2*20 MHz at the band edges of 2.6 GHz by March 2005. The outcome of the investigations undertaken by CEPT should be described in a Report to be delivered to the Commission by November 2004 and should be the basis for the ECC Decision.

The standardisation work for IMT-2000/UMTS started in ETSI (European Telecommunications Standards Institute) in 1991. ETSI has defined the system concept and reference model and the standard for UMTS Release 99 was finalised by the end of 1999. The responsibility for developing the technical specifications was transferred to 3GPP and these transposed into standards by the Organisational Partners of 3GPP, including ETSI.

3 REQUIREMENT FOR AN ECC DECISION

The ECC recognises that a harmonised implementation of IMT-2000/UMTS in the band 2500 – 2690 MHz will be of greatest benefit to operators, manufacturers and end users and will promote the continued development of IMT-2000/UMTS services across Europe.

The ECC recognises that for 3rd Generation services to continue to be developed successfully and in accordance with the global IMT-2000 definition, manufacturers and operators must be given the confidence to make the necessary investment. The ECC believes that the continued development of 3rd Generation services will be facilitated by harmonised use of IMT-2000/UMTS spectrum across the CEPT, and a commitment by CEPT member countries to implement this Decision will provide a clear indication that additional paired and unpaired frequency bands, necessary for the future successful development of 3rd Generation services of will be made available in a timely manner, subject to market demand, and on a Europe-wide basis.

The ECC recognises that harmonised use of the frequency band 2500 – 2690 MHz must ensure that spectrum is available for IMT-2000/UMTS systems while allowing administrations to respond to market demand.



**ECC Decision
of 18 November 2004**

**on the harmonised utilisation of spectrum
for IMT-2000/UMTS operating within the band 2500 - 2690 MHz**

(ECC/DEC/(05)05)

The European Conference of Postal and Telecommunications Administrations,

considering:

- a) that the ITU has identified at WARC-92 the frequency bands 1885 - 2025 MHz and 2110 - 2200 MHz for the International Mobile Telecommunications (IMT-2000);
- b) that CEPT has adopted the ERC Decision (97)07 on the frequency bands for the introduction of the Universal Mobile Telecommunications System (UMTS) that designates the frequency bands 1900 - 1980 MHz, 2010 - 2025 MHz and 2110 - 2170 MHz to terrestrial UMTS applications and indicates that the satellite component of UMTS can be accommodated in the bands 1980 – 2010 MHz and 2170 – 2200 MHz;
- c) that ERC Decision (00)01 indicated that the entirety of the 155 MHz shall be made available for terrestrial UMTS and other terrestrial systems included in the IMT-2000 family;
- d) that WRC-2000 identified additional frequency bands for IMT-2000 in RR 5.384A of the Radio Regulations applying to the Mobile Service together with Resolutions 223 and 225 and in RR 5.317A together with Resolution 224;
- e) that there is a need to facilitate IMT-2000/UMTS interoperability throughout Europe;
- f) that the bands 880 - 915 MHz, 925 - 960 MHz, 1710 - 1785 MHz and 1805 - 1880 MHz are currently used for GSM (2nd generation terrestrial mobile system) in most CEPT member countries and are expected to be used by terrestrial IMT-2000/UMTS in the longer term;
- g) that the band 2500 - 2690 MHz is currently used for the fixed and/or mobile service in most CEPT member countries;
- h) that there will be differences in the demand for IMT-2000/UMTS spectrum and there are different licensing schemes across Europe which could lead to an offset in timescales concerning the introduction of the additional band 2500 – 2690 MHz for IMT-2000/UMTS;
- i) that CEPT supports the development by ITU-R of globally harmonised frequency arrangements for the bands identified for IMT-2000;
- j) that ECC Report 45 addresses sharing and adjacent band compatibility studies between IMT-2000/UMTS in the band 2500 – 2690 MHz and other services;
- k) that co-ordination may be required on a national basis to protect the Radioastronomy Service (see RR 4.6, RR 5.30, RR 5.149, RR 5.340)
- l) that ECC Decision (02)06 designated the entire frequency band 2500 – 2690 MHz to IMT-2000/UMTS systems and the sub-band 2520 – 2670 MHz for use by terrestrial IMT-2000/UMTS systems;
- m) that ECC Decision (02)06 decided that detailed spectrum arrangements for the frequency band 2500 – 2690 MHz as well as the utilisation of the sub-bands 2500 – 2520 MHz and 2670 – 2690 MHz shall be decided in an additional ECC Decision by the end of 2004;



- n) that according to ECC Decision (02)06 the frequency band 2500 – 2690 MHz should be made available for use by IMT-2000/UMTS systems by 1 January 2008, subject to market demand and national licensing schemes;
- o) that to facilitate global roaming it is important to have harmonised spectrum, licensing and circulation arrangements for the use of IMT-2000 terminals;
- p) that measures are necessary to ensure a harmonised and efficient use of the frequency band 2500-2690 MHz for IMT-2000/UMTS;
- q) that flexibility should be afforded to administrations to determine, at a national level, the availability of the 2500 – 2690 MHz band for IMT-2000/UMTS in order to meet their specific deployment of existing systems (e.g. fixed service, MMDS, ENG-OB), based on market demand and other national considerations;
- r) that the MSS including the satellite component of IMT-2000 will need the following bands for their development and in order to support new innovative MSS services:
- 1518 – 1525 MHz / 1670 – 1675 MHz
- as well as existing pairings at:
- 1525 – 1559 MHz / 1626.5 - 1660.5 MHz;
 - 1610 - 1626.5 MHz / 2483.5 – 2500 MHz;
 - 1980 – 2010 MHz / 2170 - 2200 MHz;

DRAFT



DECIDES

1. that the frequency band 2500 – 2690 MHz is designated for terrestrial IMT-2000/UMTS systems;
2. that Administrations shall make provisions to allow for the harmonised utilisation of spectrum in the frequency band 2500 – 2690 MHz for terrestrial IMT-2000/UMTS, as identified in **Annex 1** to this Decision;
3. that the frequency band in decides 1 is available for terrestrial IMT-2000/UMTS systems as from 1 January 2008, subject to market demand and national licensing schemes;
4. that the date for implementation of this Decision shall be 18 March 2005;
5. that CEPT Member Administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the Office when the Decision is nationally implemented.

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 Decisions.



ANNEX 1:

HARMONISED SPECTRUM SCHEME FOR IMT-2000/UMTS IN THE BAND 2500 - 2690 MHz

1. The frequency band 2500 – 2570 MHz is paired with 2620 – 2690 MHz for FDD operation with the mobile transmit within the lower band and base transmit within the upper band;
2. Administrations may assign the frequency band 2570 – 2620 MHz either for TDD or for FDD downlink (external). Any guard bands required to ensure adjacent band compatibility at 2570 MHz and 2620 MHz boundaries will be decided on a national basis and taken within the band 2570 – 2620 MHz;
3. Assigned blocks shall be in multiple of 5.0 MHz;
4. The upper and lower frequency edges of FDD uplink and downlink blocks are specified in Annex 2;
5. For 5 MHz UTRA FDD, the block edge frequency is defined with an offset of 2.5 MHz from the nearest carrier centre frequency;
6. For other IMT-2000 radio interface, the block edge is to be defined on a case by case basis depending on receiver and transmitter characteristics of the radio interface in adjacent channels.

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ANNEX 2:

ALTERNATIVE 1: IMT-2000/UMTS CHANNELLING ARRANGEMENTS BLOCKS IN THE BAND 2500 - 2690 MHz

2500 MHz	2505 MHz	2510 MHz	2515 MHz	2520 MHz	2525 MHz	2530 MHz	2535 MHz	2540 MHz	2545 MHz	2550 MHz	2555 MHz	2560 MHz	2565 MHz	2570 MHz	2575 MHz	2580 MHz	2585 MHz	2590 MHz	2595 MHz	2600 MHz	2605 MHz	2610 MHz	2615 MHz	2620 MHz	2625 MHz	2630 MHz	2635 MHz	2640 MHz	2645 MHz	2650 MHz	2655 MHz	2660 MHz	2665 MHz	2670 MHz	2675 MHz	2680 MHz	2685 MHz	2690 MHz
UL 01	UL 02	UL 03	UL 04	UL 05	UL 06	UL 07	UL 08	UL 09	UL 10	UL 11	UL 12	UL 13	UL 14	TDD*										DL 01	DL 02	DL 03	DL 04	DL 05	DL 06	DL 07	DL 08	DL 09	DL 10	DL 11	DL 12	DL 13	DL 14	
FDD Uplink Blocks														FDD Downlink Blocks																								

*Any guard bands required to ensure adjacent band compatibility at 2570 MHz and 2620 MHz boundaries will be decided on a national basis and taken within the band 2570 – 2620 MHz.

ALTERNATIVE 2: IMT-2000/UMTS CHANNELLING ARRANGEMENTS BLOCKS IN THE BAND 2500 - 2690 MHz

2500 MHz	2505 MHz	2510 MHz	2515 MHz	2520 MHz	2525 MHz	2530 MHz	2535 MHz	2540 MHz	2545 MHz	2550 MHz	2555 MHz	2560 MHz	2565 MHz	2570 MHz	2575 MHz	2580 MHz	2585 MHz	2590 MHz	2595 MHz	2600 MHz	2605 MHz	2610 MHz	2615 MHz	2620 MHz	2625 MHz	2630 MHz	2635 MHz	2640 MHz	2645 MHz	2650 MHz	2655 MHz	2660 MHz	2665 MHz	2670 MHz	2675 MHz	2680 MHz	2685 MHz	2690 MHz
UL 01	UL 02	UL 03	UL 04	UL 05	UL 06	UL 07	UL 08	UL 09	UL 10	UL 11	UL 12	UL 13	UL 14	FDD Downlink (External)*										DL 01	DL 02	DL 03	DL 04	DL 05	DL 06	DL 07	DL 08	DL 09	DL 10	DL 11	DL 12	DL 13	DL 14	
FDD Uplink Blocks														FDD Downlink Blocks																								

*Any guard bands required to ensure adjacent band compatibility at 2570 MHz and 2620 MHz boundaries will be decided on a national basis and taken within the band 2570 – 2620 MHz.