CEPT Report 001

Report from CEPT to the European Commission

under Mandate 4

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

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Electronic Communications Committee (ECC)
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Final Report from CEPT

4th Mandate on IMT-2000

"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"

1 EXECUTIVE SUMMARY

The EC issued Mandate 4[1] to the CEPT on 9 March 2001 to develop and 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. This final report from CEPT was approved at the 4th meeting of CEPT ECC in November 2002. The report sets out the CEPT proposals relating to the amount of additional spectrum, the frequency bands to accommodate the additional spectrum needed, the timetable to make available this additional spectrum, and an analysis of the global roaming implications of the proposals. As required by the Mandate this report confirms a 'reference date' of January 2008 from which additional spectrum for IMT-2000 should become available on a harmonised basis..

1.1 Amount of additional spectrum needed

In preparation for WRC-2000 CEPT developed a European Common Proposal, which stated that the requirement for additional IMT-2000 terrestrial spectrum was 160 MHz, with the primary CEPT candidate band for additional spectrum for IMT-2000 being the 2500-2690MHz band[2]. The original calculations were conducted by the UMTS Forum[3] and were subsequently refined by CEPT and ITU-R TG 8/1, leading to the value of 160MHz. CEPT re-confirms this requirement for additional IMT-2000 terrestrial spectrum, which was agreed at WRC-2000[4]. CEPT is currently investigating the most appropriate frequency arrangements for the implementation of this additional spectrum.

The CPM report for WRC-2000 concluded that the requirement for additional global MSS spectrum were 2x8MHz by 2005 and 2x30MHz by 2010, in those geographical areas where the traffic is the highest[5]. In line with this, CEPT made a proposal to WRC-2000 for 2 x 8 MHz of additional L-band MSS spectrum to satisfy the MSS requirements for the year 2005. However, WRC-2000 did not make any additional MSS allocations, but adopted Resolutions 226 and 227, to study the appropriateness of making allocations to MSS at WRC-2003. WRC-2000 also adopted another new Resolution[6] with regards to the satellite component of IMT-2000 at frequencies in the 1-3GHz band. CEPT re-confirms its support for the decisions of WRC-2000, and will review the spectrum requirement in the light of market developments.

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[1] EC: 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 the WRC-2000 for IMT-2000 systems, March 2001.
[2] ERO Report: Introduction of 3rd generation mobile communications in Europe: Examination of spectrum issues related to UMTS, March 2000.
[3] UMTS Forum Report Number 6.
[4] ITU Press Release: Thumbs up for IMT-2000, 30 May 2000.
[5] Text from ECP on WRC-2000 Agenda item 1.6, May 2000.
[6] Resolves 1 and 2 of Resolution 225.

1.2 Frequency bands to accommodate the additional spectrum needs

WRC-2000 identified additional spectrum for IMT-2000 in the 2500-2690 MHz frequency band, in accordance with Resolution 223 and Resolution 225 (WRC-2000).

CEPT re-confirms that the preferred band to accommodate the additional terrestrial IMT-2000 spectrum requirement is the 2500-2690MHz band. This band is expected to become available in most CEPT countries between 2005 and 2010. In Europe, the 900MHz and 1800MHz bands have been already assigned to, and will continue to be commercially used by, 2G systems (GSM), in many countries, up to and beyond the date by which additional spectrum is expected to be needed. Studies are under way within CEPT to investigate the frequency arrangements for the 2500-2690MHz band and a decision defining the complete frequency arrangement will be adopted by 2004. This will require a choice on:

- whether this band is best used as a standalone band or as downlink only or whether FDD (uplink and downlink) and/or TDD technology should be used;
- whether the bands 2500 -2520/2670-2690 MHz should be used for the terrestrial and/or satellite component of IMT-2000.

This choice should take into account the experience of the mobile multimedia market gained so far as well as the mobile satellite market.

1.3 Time table to make available the additional spectrum

According to the results of an inventory conducted by the ERO most countries in Europe will be able to make the band 2500-2690MHz available for use by IMT-2000 by 2008. This is about five (5) years after the expected introduction of IMT-2000 services in countries which will first implement IMT-2000.

After considerable debate, ECC PT1 was able to establish a 'reference date' by which additional spectrum should become available. The reference date set in the ECC Decision is 1 January 2008. In cases where additional spectrum is needed before 2008, solutions on a national basis are possible.

1.4 Analysis of the global roaming implications of the proposals

The intentions of Region 2 and Region 3 in relation to the allocation of additional spectrum for IMT-2000 services is still unclear. For this reason it is necessary for CEPT to have as flexible an approach as possible in relation to the channelling arrangements to ensure global roaming. CEPT is also working within ITU-R to make its preferences known to Regions 2 and 3.

Furthermore it should be noted that any solution requiring the combination of the GSM900 or GSM1800 bands with the 2500-2690MHz band would pose severe difficulties for CEPT due to the different dates of availability of those bands and would jeopardise global roaming.

There are currently no mobile channelling arrangements in the 2500-2690MHz band so there is a good possibility to harmonise and achieve global roaming in this band in the longer term.

There are several cases that may influence the possibilities for global roaming in the 1710-2170MHz band depending on how the options in Europe are combined with options being proposed from other regions of the world. Some of the possibilities for global roaming may create an unbalanced situation regarding part of this band, and competition implications may therefore also need to be considered.

1.5 Frequency Arrangements for the Band 2500 – 2690MHz

Having designated the band 2500-2690MHz as the additional band for Europe, PT1 is considering options for its use. By the year 2004 some commercial experience with IMT-2000 and other mobile multimedia services will be gained (including the level of asymmetry of the traffic). This experience will facilitate the appropriate decisions on the possible detailed arrangements for the 2500-2690 MHz band by the year 2004 in line with the *decides 4* of the draft CEPT Decision on the 2500 MHz band. In addition, sharing and adjacent band

compatibility studies between satellite and terrestrial IMT-2000 components in the bands 2500-2520/2670-2690 MHz are on-going within the ITU-R JCG 8F-8D.

Consequently CEPT has decided to fix detailed channelling arrangements by the end of 2004. This approach provides the necessary flexibility to allow decisions at an appropriate time on the specific arrangements.

1.6 Conclusions and Proposals

It is proposed to make available the band 2500-2690 MHz as additional spectrum for IMT 2000. This should be done by means of an ECC Decision, which should be finalised by November 2002. The additional spectrum should be made available by 1 January 2008. Concerning the use of the bands 2500-2520 MHz and 2670-2690 MHz it is too early to state whether or not these bands should be made available for use by the IMT-2000 satellite component and/or terrestrial component, therefore CEPT decided that a decision on detailed frequency arrangements should be taken by the end of 2004.

Although WRC-2000 has identified IMT-2000 spectrum in other bands (e.g. spectrum in the band 1770-1785/1805-1880 MHz), there is no proposal to designate any other additional spectrum for IMT-2000, due to the high degree of current, long-term utilisation in the other investigated bands in most CEPT countries.

2 INTRODUCTION

This is the final report from the European Conference of Postal and Telecommunications Administrations (CEPT) to the European Commission (EC) under Mandate 4[7].

Mandate 4 (see Annex 2) requested CEPT to undertake preliminary investigations and to adopt a first set of the harmonising measures necessary to make available throughout the Community *additional* frequency spectrum for the provision of terrestrial and satellite IMT-2000 services.

The Mandate was issued to the CEPT on 9 March 2001. The first deliverable under the Mandate, an interim report, was approved at the 2nd meeting of the Electronic Communications Committee (ECC) in March 2002 and this final report was approved at the 4th meeting (November 2002) of the ECC.

The report was developed by the ECC project team ECC/PT1 on IMT-2000 and Systems Beyond during the period March 2001 to September 2002. Participants in ECC/PT1 included representatives of CEPT administrations, telecom manufacturers, operators and representatives from the EC (Counsellor) and the European Radiocommunications Office (ERO).

As required by the Mandate this final report validates, in so much as is possible at the time of production of the report and bearing in mind the development of markets for IMT-2000 and other mobile multimedia services, the proposals of the interim report from CEPT and confirms a 'reference date' from which additional spectrum for IMT-2000 should become available on a harmonised basis. Specifically, the report sets out in Section 5 the CEPT positions and proposals for:

- The amount of additional spectrum needed (terrestrial and satellite component);
- The frequency bands to accommodate the *additional* spectrum needs (including an inventory of current usage of the proposed bands and an assessment of scenarios to relocate/free/share these bands);
- The time table to make available the *additional* spectrum;
- An analysis of the global roaming implications of the proposals considering the envisaged choices for additional bands in other regions/countries.

[7] EC 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 the WRC-2000 for IMT-2000 systems, March 2001.

3 THE OUTCOME OF WRC-2000

The mobile telecommunications market was expected to reach one billion mobile subscribers world-wide by 2002-2003[8]. This forecast has already been exceeded. To meet this growing demand the World Radiocommunications Conference of 2000 (WRC-2000) identified additional spectrum for IMT-2000 for the provision of mobile services. The bands identified were 2500-2690MHz, 1710-1885MHz and 806-960MHz. The identification of the latter band for IMT-2000 is limited to those parts of the band which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems.

Within Europe, the 2500-2690MHz band is being used for a wide range of different services, parts of the band 1710-1885MHz are currently used for GSM1800 and part of the 806-960MHz band is used for E-GSM and GSM900. These bands are in addition to the spectrum identified by WARC-92[9] for IMT-2000 (1885-2025MHz and 2110-2200MHz). In addition, the frequency 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 were identified in Resolution 225 for use by administrations wishing to implement the satellite component of IMT-2000.

4 THE RESULTS OF WORLD TELECOMMUNICATIONS DEVELOPMENT CONFERENCE RELATED TO IMT-2000

The recent ITU World Telecommunications Development Conference (ITU WTDC)[10] approved two texts relating to IMT-2000:

i. **Resolution 43** (WTDC-02): Assistance for implementing IMT-2000 and;
ii. **Question 18/2**: Strategy for migration from 2G mobile networks into IMT-2000 and beyond

Of relevance to the Mandate, Resolution 43 instructs the Director of the ITU Telecommunication Development Bureau (BDT) to encourage and assist countries to implement IMT-2000 systems in the frequency bands identified in the ITU Radio Regulations, using the relevant ITU Recommendation for harmonized frequency band implementation and to provide direct assistance to countries in using the relevant frequency band plans, the radio technologies and the standards recommended by ITU in order to meet their national requirements for the implementation of IMT-2000 in the short, medium and long term.

5 STATUS OF UMTS/IMT-2000 SPECTRUM DEVELOPMENTS OUTSIDE EUROPE:

5.1 Work being done within ITU-R

The ITU-R established Working Party 8F under Study Group 8[11] with responsibility for the overall radio system aspects of IMT-2000 and Systems Beyond. WP8F has the prime responsibility within ITU-R Study Group 8 for issues related to the terrestrial component of IMT-2000 and Systems Beyond and works closely with Working Party 8D on issues related to the satellite component of IMT-2000. The ITU has also established a Joint Correspondence Group between WP 8D and WP 8F (JCG 8D-8F) in order to facilitate studies on sharing and adjacent band compatibility between satellite and terrestrial components of IMT 2000 in the 2.5 GHz band.

WP8F has established 6 working groups to address the main areas of concern:

i. WG Circulation addresses issues that may facilitate the ability of IMT-2000 to achieve global deployment including, access, circulation and common emission requirements;
ii. WG Developing IMT acts as a focal point for the consideration of issues relevant to the needs of developing countries and ensures that the work on IMT-2000 adequately reflects these needs;

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[8] UMTS Forum Report No.9: The UMTS Third Generation Market - Structuring the Service Revenues Opportunities, September 2000
[9] WARC-92 – World Administrative Radio Conference, Málaga – Torremolinos, 1992.
[10] ITU WTDC-02, Istanbul, 18 – 27 March 2002.
[11] The scope of ITU-R SG8 covers ‘Systems and networks for the mobile, radiodetermination and amateur services, including related satellite services’.

iii. WG Radio Technology is responsible for the maintenance and update of IMT-2000 RSPC terrestrial component in conjunction with external organisations;
iv. WG Satellite Co-ordination functions as the focal point for satellite aspects and acts as the point of interface for draft liaison statements to WP 8D on satellite issues;
v. WG Spectrum is responsible for spectrum matters relating to IMT-2000 and systems beyond IMT-2000, considering spectrum implementation issues and any necessary sharing;
vi. WG Vision will provide the roadmap for the future in relation to the time perspectives for IMT-2000 and systems beyond IMT-2000.

European contributions to ITU-R WP8F are being developed by ECC/PT1 and members of ECC/PT1 have been very active in ITU-R WP8F promoting European positions as agreed within the ECC project team. Contributions from ECC/PT1 to ITU-R WP8F are often in the form of multi-country contributions.

Currently key issues include:

- developing the preferred frequency arrangements for the additional frequency bands identified by WRC-2000 for IMT-2000 that would best aid global harmonisation;
- sharing as well as compatibility studies on the ability of the terrestrial component of IMT-2000 to operate without interference from other services in adjacent bands and;
- how best to ensure the global circulation of IMT-2000 terminals in all ITU Regions.

5.2 Work being done within ITU-T

The ITU-T has also established a Special Study Group (SSG) on IMT-2000 and Systems Beyond. This Special Study group is responsible for studies relating to the network aspects of IMT-2000 and systems beyond, including, wireless internet, convergence of mobile and fixed networks, mobility management, mobile multimedia functions, internetworking, interoperability and enhancements of existing ITU-T Recommendations on IMT-2000.

The SSG has established 3 Working Parties (WP) to address the main areas of work:

- SSG/WP1 on service and interface requirements for IMT-2000 and beyond;
- SSG/WP2 on the application and interworking of IMT-2000 systems and;
- SSG/WP3 dealing with harmonization and convergence of IMT-2000 systems.

The Special Study Group collaborates with ITU-R Working Party 8F on the radio aspects of the terrestrial elements and with ITU-R Working Party 8D on the radio aspects of the satellite elements of IMT-2000 systems.

5.3 Spectrum Options within Region 2 (The Americas)

The Inter-American Telecommunication Commission (CITEL)[12] has issued a draft recommendation[13] outlining their proposals for frequency arrangements in the 1710-2170MHz band, i.e., 1710-1755MHz paired with 1805-1850 MHz (95MHz duplex spacing) and 1755-1805MHz paired with 2110-2160MHz (355MHz duplex spacing).

Of relevance to this report, the recommendation requests that CITEL Member States adhere to the following principles when identifying spectrum for IMT-2000:

a) Maximise harmonisation of the IMT-2000 identified bands with existing 2G and 3G band plan pairings for implementation of IMT-2000 services;

b) Maximize the use of the entire 1710-1850 MHz band;

c) Maximise harmonization with the global 2110-2170 MHz Base Transmit Band.

[12] CITEL: Inter-American Telecommunication Commission formed under the auspices of the Organization of American States. CITEL resides in Washington, DC, USA and has 35 Member States and over 200 Associate Members. It has been entrusted by the Heads of State at the Summits of the Americas with specific mandates to intensify its activities in key areas, including IMT-2000 (www.citel.oas.org).
[13] Draft Recommendation PCC.III/REC.YY (XX-02) ”Frequency Arrangements for IMT-2000 in the bands 806 to 960 MHz, 1710 to 2025 MHz and 2110 to 2200 MHz.”.

The Recommendation also gives the following Spectrum Band Pairing Options

i. Mobile transmit band 1 920-1 980 MHz, paired with the global base transmit band 2 110-2 170 MHz, with a 190 MHz duplex separation - some countries may wish to implement part of the band;

ii. Mobile transmit band 1 710-1 785 MHz, paired with a base transmit band 1 805-1 880 MHz, consistent with a duplex separation of 95 MHz (aligned with GSM1800 bandplan). For countries having implemented option 3, the upper edge for the mobile transmit band is 1 755 MHz and for the base transmit band is 1 850 MHz;

iii. Mobile transmit band 1 850-1 910 MHz, paired with a base transmit band 1 930-1 990 MHz, consistent with a duplex separation of 80 MHz (aligned with PCS1900 bandplan);

iv. Mobile transmit band 1 755-1 805 MHz, paired with the global base transmit band 2 110-2 160 MHz, with a 355 MHz duplex separation;

v. Mobile transmit band 1 710-1 770 MHz, paired with the global base transmit band 2 110-2 170 MHz, consistent with a duplex separation of 400 MHz;

vi. Mobile transmit band starting at 824 MHz paired with a base transmit band starting at 869 MHz, consistent with a duplex separation of 45 MHz.

It is encouraging to note the consensus around the reservation of the band 2110 – 2170 MHz to be used as downlink for IMT-2000 systems in all these countries. A common downlink in the region can support straightforward equipment solutions to introduce IMT-2000 systems even in countries where the core band 1920 – 1980 MHz is not fully available, but preferably a portion of the band 1710-1850 MHz as uplink.

Some Latin American countries are planning reallocation of the band 2150 – 2162 MHz, currently used for the multi-channel multi-point distribution system (MMDS), in order to make the 60 MHz available in the band 2110 – 2170 MHz for IMT-2000 use.

The United States has conducted studies on the availability of bands for 3G services. On March 30th 2001 the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA) published their final reports on their spectrum studies on the potential for accommodating Third Generation services in the bands 1710-1850MHz and 2500-2690MHz. Both reports listed three possible spectrum options, which are given in Table 1 below.

FCC	NTIA
1710-1755 MHz paired with 2110-2150/2160-2165 MHz	1710-1755 MHz paired with 1805–1850MHz
1710-1755 MHz paired with 1755-1850 MHz	1710-1790 MHz paired with 2110–2150 / 2160–2165 MHz
2110-2150 / 2160-2165 MHz paired with 2500-2690 MHz	1710-1755 MHz paired with Spectrum above 2100 MHz

Table 1. Spectrum pairing options considered in the FCC and NTIA final reports.

As well as these bands addressed in the reports there are other spectrum bands that are being considered in the context of spectrum for advanced wireless services in the US, they are:

- 698-746 MHz (currently used for Broadcasting);
- 747-762 MHz (currently used for Broadcasting);
- 777-792 MHz (currently used for Broadcasting);
- 806-960 MHz (currently used for SMR and Cellular);
- 1850-1990 MHz (currently used for PCS);
- 2110-2150 MHz and 2160-2165 MHz.

Parts of the US wireless industry have argued that a substantial part (most) of the 1710 MHz to 1850 MHz band would be needed for commercial use to fulfil the projected spectrum needs for IMT-2000. The potential for this band to provide harmonised use with that of other regions has also been promoted.

According to plans developed after the WRC-2000 the FCC, in conjunction with NTIA, would identify spectrum by July 2001 with a view to auctioning licences for 3G services by September 2002. However, this auction has been delayed by at least 2 years by the NTIA and FCC, with support of the US industry, to allow time for the development of the best possible solution.[14]

In a Memorandum Opinion and Order and Further Notice of Proposed Rulemaking issued in August 2001 the FCC added new spectrum bands for consideration in their proceeding on "advanced wireless services": 1910-1930 MHz (currently Unlicensed PCS), 2150-2160 MHz (currently licensed to MDS), 1990-2025 MHz and 2165-2200 MHz (currently allocated and partially licensed to MSS) and 2390-2400 MHz (currently used by the Amateur Service and asynchronous Part 15 data services) [15].

In another proceeding the FCC in September 2001 issued a First Report and Order and Memorandum Opinion and Order concerning the 2500-2690 MHz band[16]. In the Order the FCC decided not to relocate current ITFS and MMDS services from the band. A mobile allocation was however added to the band "thereby making it

[14] FCC: Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, August 2001. FCC 01-224

[15] FCC: Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, August 2001. FCC 01-224

[16] FCC: First Report and Order and Memorandum Opinion and Order, September 2001. FCC 01-256

potentially available for advanced mobile and fixed terrestrial wireless services, including 3G". Thus incumbent licensees can implement 3G in the band within the constraints of their current licenses. These constraints may be changed at a later time. The band will however not be opened to other potential operators via auction.

In a further related proceeding the FCC in August 2001 issued a Notice of Proposed Rule-Making exploring the feasibility of adding a terrestrial mobile allocation to both 2GHz MSS bands (i.e. 1990-2025 and 2165-2200 MHz) and other MSS bands (L-bands and 1.6/2.4 GHz)[17]. Some MSS licensees have requested permission to introduce an "ancillary terrestrial component" to their planned MSS systems. The FCC is through this NPRM exploring if some sort of regulatory flexibility could be introduced to accommodate this request.

Commerce Secretary Evans and FCC Chairman Powell agreed to establish a task force to succeed where previous efforts had failed; and further agreed that a final decision on allocation of spectrum for 3G should be extended to ensure that any decision on additional spectrum for 3G be the best one possible. As a result of this agreement, the Secretary directed the NTIA to work with the FCC in coordination with the Executive Branch agencies to develop a plan to assess spectrum for 3G. A plan[18] was developed to assess the 1710- 1770 MHz and 2110-2170 MHz bands because they appeared to hold the greatest potential for possible use by 3G without significantly conflicting with Federal government operations. The 1710-1770 MHz band is currently used by the Federal government while the 2110-2170 MHz band is currently used by the private sector. It was envisioned that the 2110-2170 MHz band could be use for the base station part of 3G and the 1710-1770 MHz band for the hand-held units. It was then determined that NTIA would assess the 1710-1770 MHz band and the FCC would assess the 2110-2170 MHz band. Further information regarding the results of the viability assessment and the steps necessary to clear the identified spectrum is described below.

1710-1755 MHz Band: The 1710-1755 MHz band can be used for the accommodation of advanced mobile wireless services, assuming certain actions are accomplished including clearing federal systems not later than December, 2008. A reimbursement fund would be made available by the private sector entity receiving this spectrum to cover relocating or modifying costs of Federal Government radiocommunications systems required to vacate or modify their operations in the 1710-1755 MHz band after the auction has taken place. The NTIA would direct the relocation of federal non-military systems from the 1710-1755 MHz band to other federal bands and the Department of Defense (DOD) would relocate its conventional fixed microwave systems from the 1710-1755 MHz band to other bands within two years after reimbursement, but no later than December 2008, depending on the complexity of the relocated systems.

1755-1770 MHz Band: The 1755-1770 MHz band is not viable for use by 3G for three reasons. First, the impact to or constraints on DOD mobile radiocommunication system operations would be significant and unacceptable in light of DOD's extensive and critical operations in this band. Second, the sharing between 3G and DOD terrestrial systems in this band would not be possible in light of the large geographical separation distances required. Third, the DOD satellite ground control stations would interfere with 3G base stations at large geographical distances. In addition, it was determined that no suitable alternate federal and/or commercial spectrum could be identified for satisfactory relocation of DOD systems. A leap forward in technology may permit extensive sharing in all bands below 3 GHz in the future. Until that time, however, use of the 1755-1770 MHz band for advanced wireless applications is not considered viable.

2110-2170 MHz Band - According to FCC's 3G working group
http://www.ntia.doc.gov/ntiahome/threeg/va7222002/3Gva072202web.htm -
_ftn5#_ftn5http://www.ntia.doc.gov/ntiahome/threeg/va7222002/3Gva072202web.htm -
_ftn5#_ftn5http://www.ntia.doc.gov/ntiahome/threeg/va7222002/3Gva072202web.htm -
_ftn5#_ftn5http://www.ntia.doc.gov/ntiahome/threeg/va7222002/3Gva072202web.htm - _ftn5#_ftn5,
45 MHz in the 2110-2170 MHz band appears to be feasible for 3G use. It is anticipated that the FCC will initiate a rulemaking for allocation and service rules that will make 45 MHz available for advanced wireless services.

[17] FCC: Notice of Proposed Rule-Making, August 2001. FCC 01-225
[18] National Telecommunications and Information Administration (NTIA) - An Assessment of the Viability of Accommodating Advanced Mobile Wireless (3G) Systems in the 1710-1770 MHz and 2110-2170 MHz Bands - July 22, 2002.

5.4 Spectrum Options in Region 3 (Asia Pacific)

Throughout ITU Region 3 different frequency plans have been used to implement 2G systems. Some countries in Region 3 are in a position to implement IMT-2000 systems in the 2GHz 'core band'. As of October 2001, Japan, Republic of Korea, New Zealand, Singapore and Hong Kong have each allocated 3 or 4 IMT-2000 licenses in the 2GHz core band.

Australia has adopted a building block approach, and resulted in 3 national and 3 additional "metropolitan" licenses having been allocated in the core band.

NTT DoCoMo commenced trial service in May 2001 and commercial service in October 2001. Japan thus became the first country in the world to provide an IMT-2000 service. J-Phone has announced W-CDMA test services by 2nd quarter 2002 in the Tokyo metropolitan area and to commence commercial services nationwide in December 2002.

The Chinese government has issued formal rules to remove the services currently operating in the core band. For example, some existing microwave systems and some FWA networks in this band will be removed. These signs indicate that China is considering use of the 2 GHz core band in line with Europe, but there is no formal planned time scale and scheme for 3G licensing announced as of yet.

The Asia Pacific Telecommunity (APT), as a result of the work of its IMT-2000 Task Force, launched the APT IMT-2000 Forum in June 2001. Its objective is to provide a forum for a co-ordinated, harmonised and focused approach to implement IMT-2000 and facilitate IMT-2000 service expansion in the Asia Pacific region. A Letter of Understanding with the UMTS Forum is being proposed with the aim of exchanging and sharing of information between the two bodies. This group will provide a forum for exchange of ideas and for implementation of time frames for the region. It will also consider the business aspects of IMT-2000 implementation including IPR, global circulation of terminals and resource sharing.

The APT IMT-2000 Forum has established 3 working groups, these are:

- Regulatory Working Group dealing with the regulatory issues around IMT-2000;
- Operational Working Group;
- Business Facilitation Working Group.

6 STATUS OF UMTS/IMT-2000 SPECTRUM DEVELOPMENTS IN EUROPE

The World Administrative Radio Conference in 1992 (WARC-92) identified, in footnote 5.388, the frequency bands 1 885-2 025MHz and 2 110-2 200MHz for IMT-2000 services, including 1 980-2 010MHz (uplink) and 2 170-2 200MHz (downlink) for the satellite component. This position is reflected in Resolution 212, drafted at WARC-92 and amended at WRC-95 and WRC-97. Following on from those activities, CEPT/ERC issued three Decisions on the designation of these bands for UMTS services and a Recommendation on how to deal with border co-ordination of UMTS/IMT-2000 systems. A summary of the relevant ECC Decisions, Recommendations and Reports is given in Annex 2.

Further developments at WRC-95 led to the allocation in Region 2 of the frequency bands 2 010-2 025MHz (uplink) and 2 160-2 170MHz (downlink), from within the IMT-2000 range, for the Mobile-Satellite Services (MSS).

On 14 December 1998, the European Parliament and the Council adopted a Decision on the co-ordinated introduction of a third-generation mobile and wireless communications system (UMTS) in the Community. The decision states that "Member States shall take all actions necessary in order to allow, in accordance with Article 10 of Directive 97/13/EC, the co-ordinated and progressive introduction of the UMTS services on their territory by 1 January 2002 at the latest and in particular shall establish an authorisation system for UMTS no later than 1 January 2000". The Decision also states that "the Commission shall, in accordance with the procedure laid down in Article 16 of Directive 97/13/EC, give CEPT/ERC and CEPT/ECTRA mandates inter alia to harmonise frequency use. Those mandates shall define the tasks to be performed."

Pursuant to their 'UMTS Decision', the European Commission has issued a series of mandates 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 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.

Within CEPT, ECC Project Team 1 has responsibility for all issues concerning UMTS/IMT-2000 and systems beyond with regard to spectrum, sharing and compatibility and regulatory matters and has been tasked to compile the response to the current Mandate 4 (see Section 1 above). It has responsibility for developing and updating ECC Decisions and Recommendations on issues relating to IMT-2000.

Within many CEPT countries licences have already been issued to operate services in the IMT-2000 'core band' of 1900-1980MHz, 2010-2025MHz and 2110-2170MHz. A survey was undertaken by ERO in CEPT countries of the current usage of the 'core band'. The result of the questionnaire, detailed in Annex 4, shows that:

- most of the countries that have issued licenses have completely utilised all frequencies in the bands 1900-1980 and 2110-2170 MHz;
- other services will be removed from these bands by 2002 regardless of whether licenses have been issued or not;
- some countries have licensed one 5 MHz TDD block (Austria, Germany and Italy) in the band 2010-2025 MHz (see Annex 4).

The current utilisation and more detailed information on the status of licensing and the other uses of the 'core band' are given in Annex 4. .

Launch of services in the 'core band' was originally expected in early 2002. However, this is now expected to be more gradual, with UMTS networks being launched commercially towards the end of 2002 and throughout 2003. It will then take some time for UMTS network operators to build up subscribers and gain operational experience. As a consequence, at September 2002, there is only limited experience of UMTS network deployment and market developments with which to inform the final proposals from CEPT.

To date no services for the IMT-2000 satellite component have been launched in Europe in the bands identified at WARC-92. However, there are plans to launch services within the WARC-92 bands, the 1.5-1.6 GHz as well as the 2.5 GHz bands.

6.1 Amount of additional spectrum needed (terrestrial and satellite)

In preparation for WRC-2000, CEPT developed a proposal which stated that the requirement for additional IMT-2000 terrestrial spectrum was 160 MHz, with the primary CEPT candidate band for additional spectrum for IMT-2000 being the 2500-2690MHz band[19]. The original calculations were conducted by the UMTS Forum[20] and were subsequently refined by CEPT and ITU-R TG 8/1, leading to the value of 160MHz. CEPT re-confirms this requirement for additional IMT-2000 terrestrial spectrum, which was agreed at WRC-2000 and is currently investigating the most appropriate frequency arrangements for the implementation of this additional spectrum.

The CPM report for WRC-2000 concluded that the requirement for additional global MSS spectrum was 2x8MHz by 2005 and 2x30MHz by 2010, in those geographical areas where the traffic is the highest[21]. In line with this, CEPT made a proposal to WRC-2000 for 2 x 8 MHz of additional L-band MSS spectrum to satisfy the MSS requirements for the year 2005. However, WRC-2000 did not make any additional MSS allocations, but

[19] ERO Report: Introduction of 3rd generation mobile communications in Europe: Examination of spectrum issues related to UMTS, March 2000
[20] UMTS Forum Report Number 6
[21] Text from ECP on WRC-2000 Agenda item 1.6, June 2000

adopted Resolutions 226 and 227, to study the appropriateness of making allocations to MSS at WRC-2003. WRC-2000 also adopted another new Resolution[22] with regards to the satellite component of IMT-2000 at frequencies in the 1-3GHz band. CEPT re-confirms its support for the decisions of WRC-2000 and notes that a decision will be taken by the end of 2004 on the utilisation of the band 2500-2520 / 2670-2690 MHz, in the light of market developments, consistent with *resolves* 2 of ITU-R Resolution 225.

For IMT-2000 to be deployed successfully throughout Europe, manufacturers and operators have requested that they be given timely confidence and clarity on availability of spectrum to make the necessary investments in IMT-2000 system and services. In CEPT it was agreed that an ECC Decision, in line with Mandate 4, on the additional band 2 500 – 2 690 MHz would provide a clear message that the required frequency band would be made available on time and on a European-wide basis. This commitment would also give a signal to countries outside Europe that this band will be available and used for UMTS/IMT-2000 in CEPT countries.

6.1.1 Use of 2500-2520/2670-2690 MHz

There have been requests from some Administrations and from the satellite industry for the designation in Europe of the sub-bands 2500-2520 and 2670 – 2690 MHz which are also allocated to the MSS for the satellite component of UMTS/IMT-2000, whereas other Administrations and the mobile communications industry requested that these sub-bands should be included in the designation of the full band 2500-2690 MHz for the terrestrial component.

Phase Three of the Detailed Spectrum Investigation (DSI III) specifically addressed this issue and recommended "that the band 2500-2690 MHz should be optimised for IMT-2000 within the timeframe 2010 but that for particular high traffic areas the bands could be required from 2005. The bands 2500-2520 and 2670-2690 MHz should be included into the overall strategy for terrestrial networks in the longer term."

CEPT ECC commented on this conclusion that this point was "supported in principle, however the statement regarding the inclusion of 2×20 MHz of MSS allocations into the strategy for terrestrial developments should only be understood as the consideration of one possible scenario, of MSS developments proving to be unsuccessful, in addition to the other, hopeful scenario of successful MSS developments."

This is consistent with the European Common Proposal (ECP) on agenda item 1.6.1 of WRC-2000, which was retained by the Conference as resolves 2 of Resolution 225.

6..1.2 Scenarios for ECC Decisions

There are a number of possible scenarios for the bands 2500-2690 MHz to be decided by the end of 2004:

1. Designation of the whole band for terrestrial use:
   - would fulfil the terrestrial demand;
   - would eliminate the Mobile-Satellite Service (MSS) in this band.

2. Designation of the whole band to the terrestrial component of UMTS/IMT-2000 and the 2×20 MHz sub-bands to the satellite component of UMTS/IMT-2000:
   - would require sharing issues to be addressed;
   - Perhaps requires a postponement of the decision on frequency arrangements pending the outcome of sharing studies.

3. Designation of only 150 MHz for terrestrial and the 2×20 MHz for satellite components respectively of UMTS/IMT2000:
   - would not fully fulfil the terrestrial requirement;
   - would reduce the possible number of options for channel arrangements due to required guard bands between frequency blocks (e.g. FDD/TDD);
   - Meets the satellite industry requirement.

Other scenarios might also be considered, such as a compromise between scenario 1 and scenario 3 regarding the amount of bandwidth allocated to either component and possibly involving scenario 2 in part of the bands.

[22] Resolves 1 and 2 of Resolution 225.

6.1.3 Conclusion

As of September 2002, it is not possible to decide on the requirements of the terrestrial and the satellite proponents.

In order to provide a clear message that the required frequency band will be made available on time and on a European-wide basis, CEPT has developed an ECC Decision to make available the frequency band 2500 - 2690 MHz to UMTS/IMT-2000 applications without specifying whether the 2×20 MHz should be designated for terrestrial and/or satellite use but stating that a decision will be taken by the end of 2004.

6.2 Frequency bands to accommodate additional spectrum needs

6.2.1 Preferred band

CEPT re-confirms that the preferred band to accommodate the additional terrestrial IMT-2000 spectrum requirement is the 2500 – 2690 MHz band. This band is expected to become available in most CEPT countries by 2008, as shown in Annex 4, the inventory of current spectrum usage. In Europe, the 900MHz and 1800MHz bands have been already assigned to, and will continue to be commercially used by, 2G systems (GSM) in many countries beyond 2008, the date by which additional spectrum is expected to be needed, as explained in Section 5.5. Studies are under way within CEPT to investigate the frequency arrangements for the 2500-2690MHz band, as explained in Section 5.7. No decision has been made as yet whether this band is best used as a standalone band or as downlink only or whether FDD (uplink and downlink) and/or TDD technology should be used. These issues will not be fully resolved until some experience of the operation of IMT-2000 systems has been gained. In addition, sharing and adjacent band compatibility studies are on-going.

The bands 2500-2520MHz and 2670-2690MHz were also identified in Resolution 225 and allocated to the mobile-satellite service for those administrations wishing to implement the satellite component of IMT-2000 in this band. The Resolution also identified that, depending on market developments, it may be possible in the longer term for the bands 2500-2520MHz and 2670-2690MHz to be used by the terrestrial component of IMT-2000. In addition to the frequency bands indicated above, the frequency bands 1525-1544MHz, 1545-1559MHz, 1610-1626.5MHz, 1626.5-1645.5MHz, 1646.5-1660.5MHz and 2483.5-2500MHz were also identified in Resolution 225 for use by administrations wishing to implement the satellite component of IMT-2000, subject to the regulatory provisions related to the mobile-satellite service in those frequency bands.

6.2.2 Other Bands

As noted in Section 3, WRC-2000 identified additional spectrum for IMT-2000 for the provision of (terrestrial) mobile services in the 1710-1885MHz and 806-960MHz frequency bands as well as the 2500-2690MHz band. It should be noted that there are differences at national level in the availability of the bands identified by WRC-2000 for additional spectrum, as explained in Section 5.3, the inventory of current spectrum usage. CEPT is therefore currently investigating how best to use the GSM bands so that the transition from GSM900 and GSM1800 to IMT-2000 services is as smooth as possible, and leads to a degree of global harmonisation. The transition is complicated not only by the availability of spectrum but by the duration of current licences, which also differ from country to country within Europe. It is important that the transition from GSM systems to IMT-2000 is carefully planned so that the same BS and MS transmit frequency bands are used, enabling global harmonisation in parts of these bands (see also Section 5.4.2).

The band 1710–1885MHz is used in many parts of the world for GSM1800 services. As noted above, these services will continue to be offered in this band in many European countries for the foreseeable future. However, in the long term this band will be planned for IMT-2000 services in many countries as the GSM1800 services are phased out.

WRC-2000 also identified the band 806-960MHz as additional spectrum for IMT-2000 mobile services. All ITU Regions are currently using part of this band for 2nd generation mobile services. Countries in Region 2 anticipate that IMT-2000 services in Region 2 will first be introduced in the part of the band currently being used for 2nd generation systems.

Within the European allocation of 862-960MHz the bands that are not designated to GSM (i.e. 862-880MHz and 915-925MHz) are not available for future use by IMT-2000 services because there are existing long-term

plans in Europe to use these bands according to the outcome of DSI phase III. This includes applications such as Short Range Devices (SRDs), GSM for railways and military communications.

6.3 Inventory of Current Usage of Proposed Bands

A survey was undertaken in CEPT countries of the current usage of the bands identified by WRC–2000 for mobile services. The results of the survey, covering the frequency bands 2500-2690MHz, 1710-1785/1805-1880MHz and 880-915/925-960MHz, is shown in Annexes 4 and 5. A summary of the results of this survey is given below.

6.3.1 Utilisation of the band 2500–2690MHz in Europe

The band 2500-2690MHz is currently used by a number of different applications ranging from FWA and MMDS to military radiolocation and radio astronomy. In the majority of cases the existing services will be phased out so that the spectrum will be available by 2008.

Two tables have been included in Annex 4 that summarise the situation in the band 2520-2670MHz and the bands 2500-2520/2670-2690MHz.

6.3.2 Utilisation of the GSM bands

The result of the questionnaire clearly shows the extensive use of the GSM bands.

The primary GSM band (890-915/935-960 MHz) is almost exclusively used throughout CEPT member countries for GSM. The E-GSM band (880-890/925-935 MHz) is used for GSM in some countries (Austria, Belgium, Denmark. Finland, France, the Netherlands, Sweden, Switzerland and the United Kingdom) and others have plans to make it available for GSM within the next 5 years.

Six countries (Austria, Denmark, France, the Netherlands, Russia and the United Kingdom) have fully deployed the GSM1800 band for GSM. The band is utilised to at least 75% by licensed GSM operators in most countries in Europe. In these countries the remaining 25% of the spectrum is available or will become available for GSM within the next 5 years.

The current situation is summarised in Annex 6.

6.4 Assessment of scenarios to make available additional IMT-2000 frequency bands

The procedures to be applied to make available additional IMT2000 frequency bands are under the competence of national administrations. However, some general principles may be established by CEPT.

The procedures in question are designated by several terms such as migration and re-farming which needs to be defined more precisely on the basis of ITU terminology.

In the context of this report migration is a general term referring to the change from 2G to 3G services, in a particular band. Refarming is the process by which existing services or users are removed from a certain band in order to make it available for use for 3G services.

CEPT is currently studying refarming issues in general within Project Team 8 (PT8) of the ECC Radio Regulatory Working Group (WG-RR).

As a preliminary principle, it appears already clearly that two cases shall be differentiated, the refarming of the 2500-2690MHz band currently used by other services on one hand, and the migration from 2G to 3G within the existing 2G bands.

6.4.1 The Additional Band (2500 – 2690 MHz)

The date for availability of this band for UMTS/IMT-2000 differs among CEPT countries. Further information can be found in Annex 4.

Several scenarios can be envisaged. As mentioned above, in the majority of countries indications are that spectrum will be free by the reference date of 1 January 2008 and in a number of countries from 2006 (see Section 5.5.1).

In some other countries, however, current users may still be present after that reference date (e.g. France). In this case some measures need to be implemented in order to re-locate them to other bands, or use alternative technologies. These measures may be implemented when licences come to an end or before, in which case consideration of some form of financial or other compensation may be required.

A few countries (e.g. Ireland) currently have no plans to introduce IMT-2000 services in this band because it is and will be used extensively by other services. This may result in non-optimum implementation of IMT-2000 throughout Europe with services being delivered in the 2GHz, 2.5GHz bands and even in the GSM-1800 band. However, such solutions also depend on suitable equipment and terminals being available in a timely manner.

Therefore, the consensus view of CEPT is that the band should be made available on a harmonised basis throughout Europe by the agreed reference date.

6.4.2 Other Bands

It is likely that Administrations will wish to consider the longer-term use of the 900MHz and 1800MHz bands alongside any proposals for further release of spectrum at 2500-2690MHz. Re-farming can be considered as part of the broader issue of expansion/growth of the 3G market, keeping in mind the long-term utilisation of GSM as described in Section 5.2.2.

Many situations need to be assessed and considered in this context. Some of these are:

i. 2G licences expire on different dates in different countries (see Section 5.5.2 and Annex 6). There can therefore be problems for a harmonised migration;
ii. Not all of the 2G operators have obtained 3G licences, and not all 3G operators obtained 2G licences (new entrants);
iii. In each country, the spectrum distribution, by operator, in the 2G bands (900MHz and 1800 MHz) varies (see Section 5.5.2). Some operators have 900MHz spectrum only, some have 1800MHz spectrum only, and some have both. Changes in one of the bands might lead to rearrangements in other bands (e.g. 900MHz);
iv. Can spectrum under 2G licence be used for 3G services before the expiry date of the 2G licence? In that case a re-conversion fee may be considered, in accordance with competition principles;
v. When 2G licences are due for renewal, will the 3G licences be a continuation of the 2G licence in the same band (again, re-conversion fees may apply), or does there have to be a new licence attribution procedure?;
vi. Differences in timing of implementation of 3G and differing uses of the band may cause difficulties in border co-ordination.

Administrations might want to pursue objectives of effective and sustainable competition between operators in the same country or at the European level in the provision of mobile telecommunications services, and to make spectrum available in the most efficient manner. Decisions on refarming and the relative priority given to refarming and migration within the other bands will need to take account of, amongst other things:

i. the level of demand;
ii. the views of the existing 2G and 3G operators;
iii. the Government's telecommunications policy at the time; and the requirements of international and European legislation;
iv. the consequence of border co-ordination.

Once principles are established, it will be possible to consider scenarios, taking into account the different possibilities.

Administrations might hold a public consultation in line with the mechanisms described in the Radio Spectrum Decision[23] before deciding on how and when refarming might be implemented.

[23] Decision No 676/2002/EC of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision).

6.5 Timetable to make available additional spectrum

6.5.1 Preferred band

According to the results of an inventory conducted by the ERO most countries in Europe will be able to make the band 2500-2690MHz available for use by IMT-2000 by 2008. This is about five (5) years after the expected introduction of IMT-2000 services in countries which will first implement IMT-2000.

After considerable debate, ECC PT1 was able to establish a 'reference date' by which additional spectrum should become available. The reference date set in the ECC Decision is 1 January 2008. In cases where additional spectrum is needed before 2008, solutions on a national basis are possible.

In order to meet the reference date it will be necessary for administrations to plan the availability of this additional band beforehand. This will be a substantial task for those administrations that currently have a considerable amount of existing users in the band 2500-2690 MHz. Therefore these administrations require a timely decision on the European level, designating the band 2500-2690 MHz for IMT-2000. The same is true for industry players, which will be affected due to existing use or other interests in this band. An ECC Decision on this topic has been developed by ECC PT1. This is in line with the Mandate 4 which requires an ECC Decision to be in place by March 2003.

6.5.2 Other Bands

In the band 1710 – 1785/1805 - 1880 MHz the spectrum inventory has shown that the availability of these bands diverges substantially throughout Europe. Countries such as Finland and Ireland could make 2 x 30 MHz of spectrum available for IMT-2000 without refarming, whenever the market requires. Others such as Austria, Denmark, France, the Netherlands, Spain and the UK have licensed or will license the entire GSM 1800 band and therefore may be able to introduce IMT-2000 only in the longer term. However regulatory authorities in the renewal process for 2G licences could be requested to permit 2G operators to move from GSM 1800 to IMT-2000 technologies.

Consequently, there is a potential danger of deviating developments and time scales within the band 1710 - 1785/1805 - 1880 MHz. Therefore this band has not been considered for designation for IMT-2000 at this stage. In addition, in the case that 3G technologies are introduced in to this band it will be necessary to study technical compatibility and competitive implications first (see also Section 5.4.2).

According to the results of the inventory the band 880-915/925-960 MHz is extensively used for GSM in all European countries. Therefore this band will only be available for refarming in the long-term.

6.6 Analysis of global roaming implications of the initial proposals considering envisaged choices for additional bands in other regions

The intentions of many countries in Region 2 and Region 3 in relation to the allocation of additional spectrum for IMT-2000 services are still unclear. For this reason it is necessary for CEPT to have as flexible an approach as possible in relation to the channelling arrangements to ensure global roaming. CEPT is also working within ITU-R to make its preferences known to Regions 2 and 3. This should enable the identification of bands (or parts of bands) which would best facilitate global roaming in the near and short term.

6.6.1 2500–2690MHz

There are currently no mobile channelling arrangements in this band so there is a good possibility to harmonise and achieve global roaming in the longer term. It should be noted that CEPT has decided to fix the detailed channelling arrangements by the end of 2004.

6.6.2 1710–2170MHz

There are several cases that may influence the possibilities for global roaming depending on how the preferred options of Europe are combined with options being proposed from other regions of the world. Some of the

possibilities for global roaming may create an unbalanced situation regarding part of this band, and competition implications may therefore also need to be considered.
If for example the draft recommendation from CITEL[24] is combined with the GSM1800 channelling arrangement used in CEPT then global roaming will be possible with a harmonised frequency plan in the upper portion of the GSM1800 band. In the case where some terminals will be implemented with only this part of the GSM1800 frequency band, this would create an unbalanced situation where the upper portion of the GSM1800 band would be more valuable and operators that only have spectrum in the lower portion of the GSM1800 band would be deprived of global roaming possibilities. Furthermore, this combination may result in pressure to re-farm the GSM1800 band in Europe, because of the global roaming capabilities.

6.6.3 880–960MHz

Due to the existing differences in the channelling arrangements around the world and the long-term utilisation to provide GSM services, it is unlikely that there will be any globally harmonised channelling arrangements in this band.

6.7 Frequency Arrangements for the Band 2500 – 2690MHz

Having designated the band 2500-2690MHz as the additional band for Europe, PT1 is considering options for its use. By year 2004 some commercial experience with IMT-2000 and other mobile multimedia services will be gained (including the level of asymmetry of the traffic). This experience will facilitate the appropriate decisions on the possible detailed arrangements for the 2500-2690 MHz band by the year 2004 in line with the *decides 4* of the draft CEPT Decision on the 2500 MHz band. In addition, sharing and adjacent band compatibility studies between satellite and terrestrial IMT-2000 components in the bands 2500-2520/2670-2690 MHz are on-going within the ITU-R JCG 8F-8D. Sharing and compatibility studies with other services are also ongoing. Consequently CEPT has decided to fix detailed channelling arrangements by the end of 2004. This approach provides the necessary flexibility to allow decisions at an appropriate time on the specific arrangements..

Moreover the 4th Mandate did not require a definition of these detailed frequency arrangements at this stage. Therefore, this issue is not dealt with in detail, but for information the current frequency arrangements under consideration within CEPT can be found in Annex 6.

6.8 ECC Decision

In line with the Mandate, ECC/PT1 has developed a draft Decision on the designation of additional frequency bands to be used for IMT-2000 as from a 'reference date'. The text of the draft Decision is in Annex 7 with the key *decides* listed below:

"*decides*

1. to designate the frequency band 2500 – 2690 MHz to UMTS/IMT-2000 systems;

2. that the frequency band 2500 – 2690 MHz should be made available for use by UMTS/IMT-2000 systems by 1 January 2008, subject to market demand and national licensing schemes;

3. to designate the frequency band 2520 – 2670 MHz for the use by terrestrial UMTS/IMT-2000 systems and;

4. that the detailed spectrum arrangements for the 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 by the end of 2004;

5. that this Decision shall enter into force on [x November] 2002 and;

6. that CEPT Member administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the ERO when the Decision is nationally implemented."

[24] Mobile transmit band starting at 1755 MHz, paired with the global base transmit band starting at 2110 MHz, with a 355 MHz duplex separation (Draft Recommendation PCC.III/REC.xx (XVIII-01) "Spectrum Arrangements for 3G")

7 CONCLUSIONS AND PROPOSALS

This report is part of the second set of deliverables from CEPT to the EC under Mandate 4. This report validates the initial CEPT proposals on additional spectrum needs, time scales and global roaming implications at a particular point in time, i.e. September 2002. It is important to recognise that it is a snapshot of a rapidly changing environment with uncertainties over the exact timing and nature of market developments.

In particular in Section 4 the report sets out the proposals for:
Amount of additional spectrum needed (terrestrial and satellite component);
Frequency bands to accommodate *additional* spectrum needs (including Inventory of current usage of proposed bands and assessment of scenarios to relocate/free/share these bands);
Time table to make available *additional* spectrum;
Analysis of the global roaming implications of the proposals considering envisaged choices for additional bands in other regions/countries.

After substantial debate and detailed consideration, ECC/PT1, which is responsible for preparation of the mandate deliverables, has reached a conclusion on the "reference date" proposed by the Commission. Following consideration of the input made during the public consultation, the proposed 'reference date ' was confirmed as 1 January 2008.

It is proposed to make available the band 2500-2690 MHz as additional spectrum for IMT 2000. This should be done by means of an ECC Decision, which should be finalised by November 2002. The additional spectrum should be made available by 1 January 2008. Concerning the use of the bands 2500-2520 MHz and 2670-2690 MHz it is too early to state whether or not these bands should be made available for use by the IMT-2000 satellite component and/or terrestrial component, therefore CEPT decided that a decision on detailed frequency arrangements should be taken by the end of 2004.

Although WRC-2000 has identified IMT-2000 spectrum in other bands (e.g. spectrum in the band 1770-1785/1805-1880 MHz), there is no proposal to designate any other additional spectrum for IMT-2000 due to the high degree of current, long-term utilisation in the other investigated bands in most CEPT countries.

List of Annexes

Annex 1 **Glossary of Terms**

Annex 2 **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 the WRC-2000 for IMT-2000 systems**

Annex 3 **Summary of ERC Decisions, Recommendations and Reports**

Annex 4 **Usage of the UMTS Core Bands in Europe**

Annex 5 **Frequency Utilisation of the Frequency Band 2500-2690MHz**

Annex 6 **Frequency Utilisation of the GSM900 and GSM1800MHz Bands**

Annex 7 **Draft ECC Decision**

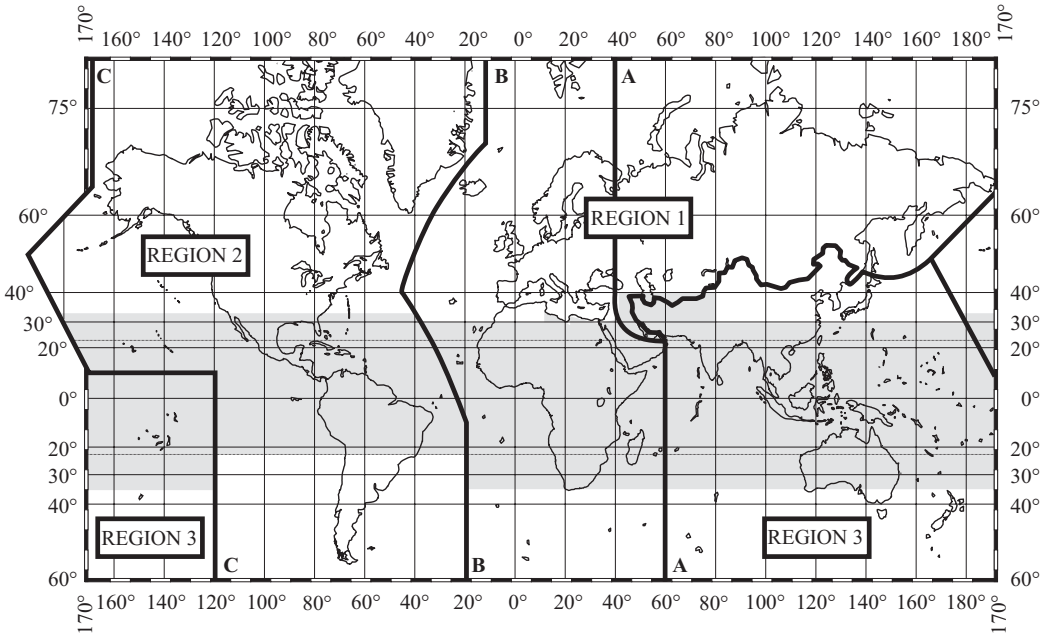
Annex 8 **Current Status of Frequency Arrangement Discussions**

ANNEX 1

Glossary of Terms

APT	The Asia Pacific Telecommunity
BS	Base Station as defined in a cellular network
CEPT	European Conference of Postal and Telecommunications Administrations
CEPT countries	Albania, Andorra, Austria, Azerbaijan, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, The Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, The Former Yugoslav Republic of Macedonia, Turkey, Ukraine, United Kingdom, Vatican City
CEPT ECC	Electronic Communications Committee of the CEPT
CEPT ECTRA	European Committee for Telecommunications Regulatory Affairs (Merged with the ERC to form the ECC).
CEPT ERC	European Radiocommunication Committee of the CEPT (The forerunner of the CEPT ECC.)
CPM	ITU Conference Preparatory Meeting
CITEL	The Inter-American Telecommunication Commission
DOD	United States Department of Defense
DSI III	Phase Three of the Detailed Spectrum Investigation
EC	European Commission.
ECC WG RR	ECC Radio Regulatory Working Group
ECC PT1	Project Team 1 of the ECC
E-GSM	Extended GSM
E-GSM band	880-890 MHz paired with 925-935 MHz
ERO	European Radiocommunications Office
FCC	Federal Communications Commission
FDD	Frequency Division Duplex
FWA	Fixed Wireless Access
GSM	Global System for Mobile Communications
GSM1800 band	1710 – 1785 MHz paired with 1805 - 1880 MHz

GSM900 band	890-915 MHz paired with 935-960 MHz
IMT-2000	International Mobile Telecommunications - 2000
ITFS	Instructional Television Fixed Service
ITU	International Telecommunications Union
ITU – BDT	ITU Telecommunication Development Bureau (ITU-D)
ITU WTDC	ITU World Telecommunications Development Conference
ITU-R	Radiocommunications Sector of the ITU
ITU-R TG 8/1	ITU-R Task Group 8/1
ITU-R WP 8D	ITU-R Working Party 8D
ITU-R WP 8F	ITU-R Working Party 8F, established under Study Group 8 with responsibility for the overall radio system aspects of IMT-2000 and Systems Beyond.
ITU-T	Telecommunications Standardization Sector of the ITU
L-band	The frequency band 390 – 1550 MHz
MMDS	Multi-channel multi-point distribution system
MS	Mobile Station as defined in a cellular network
MSS	Mobile-Satellite Service
NPRM	Notice of Proposed Rule-Making
NTIA	National Telecommunications and Information Administration
SRDs	Short Range Devices
SSG	Special Study Group
TDD	Time Division Duplex
UMTS	Universal Mobile Telecommunications System
WARC-92	World Administrative Radio Conference, Málaga, 1992.
WRC-2000	World Radiocommunications Conference, Geneva, 2000
WRC-95	World Radiocommunication Conference, Geneva, 1995.
WRC-97	World Radiocommunication Conference, Geneva, 1997.
ITU Regions	For the allocation of frequencies the world has been divided into three regions as indicated on the map below



The shaded part represents the Tropical Zones as defined in Nos. **5.16** to **5.20** and **5.21**.

5-01

Figure 1. ITU Regions

Source: ITU Radio Regulations

ANNEX 2

Brussels, 9 March 2001

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 the WRC-2000 for IMT-2000 systems

Mandate 4

Purpose
To mandate CEPT to develop and 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.

Justification
The Decision 128/1999/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 adopted on 14 December 1998 ('UMTS Decision') requires that compatible UMTS networks and services be provided in frequency bands to be harmonised by CEPT to ensure interoperability of services as well as roaming capabilities at Community-wide level, on the basis of internal market principles and in accordance with commercial demand.
Pursuant to Article 5.1 of the 'UMTS Decision', the Commission shall give CEPT mandates *inter alia* to harmonise frequency use. Those mandates shall define the tasks to be performed and lay down a timetable.
Pursuant to Annex II of the 'UMTS Decision', the Commission can also issue mandates to CEPT on further spectrum allocation, including *additional* spectrum beyond that originally identified by WARC-92.
The present mandate calls upon CEPT to undertake preliminary investigations and to adopt a first set of the harmonising measures necessary to make available throughout the Community *additional* frequency spectrum for the provision of terrestrial and satellite IMT-2000 services. This is required as a follow up of the WRC-2000 resolutions, which have identified *additional* spectrum for the terrestrial and the satellite component of IMT-2000 systems.

Background
The WARC-92 identified a total of 230 MHz frequency spectrum for IMT-2000 in the bands 1885-2025MHz and 2110-2200MHz. It should be noted that from the spectrum identified by WARC-92, a 'core bandwidth' of 155MHz (i.e.1900–1980MHz, 2010–2025MHz and 2110-2170MHz) was designated for terrestrial UMTS services by the ECC Decision ERC/DEC(97)07 of 30 June 1997. On the other hand, the spectrum identified by WARC-92 for satellite services was not formally designated in the ECC Decision ERC/DEC(97)07, but only 'accommodated' within the bands 1980-2010MHz and 2170-2200 MHz since market demand for satellite UMTS services was not visible at the time.
Pursuant to the 'UMTS Decision', the Commission issued a series of mandates to CEPT. In response to mandate 1[25], the ECC subsequently adopted the Decision ERC/DEC(00)01 on 28 March 2000 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 and other terrestrial systems included in the IMT-2000 family, in order to enable a competitive market for third generation mobile services. The full 'core bandwidth' should be made available by 1 January 2002, subject to market demand and national licensing schemes.
A further mandate 2[26] resulted in the ECC 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[27] for the development of a 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 being drafted and adopted by CEPT. The *additional* band preferred by CEPT, i.e. the 2500-2690MHz band (see ECP Part 1A2), was subsequently accepted by WRC-2000 as one of the *additional* frequency bands identified for IMT-2000 systems.

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25 Document LC/10/99/final, 26 March 1999
26 Document LC/11/99/final, 26 March 1999
27 Document LC/15/99/final, 26 July 1999

WRC-2000 identified three possible bands for IMT-2000 services, in addition to the 230 MHz bandwidth identified by WARC-92 for IMT-2000 services, leaving it to ITU members to decide when and to what extent to allocate spectrum for IMT-2000 systems out of these identified bands.

Table: Bands identified by ITU for IMT-2000 services (WARC-92 and WRC-2000)

900 MHz band	806[28]-960 MHz[29]
1.8 GHz band	1710-1885 MHz[30]
2.0 GHz band	1885-2025 MHz and 2110-2200 MHz[31]
2.5 GHz band	2500-2690 MHz[32]

Further to the WRC-2000 resolutions, work is now being undertaken within ITU (notably within ITU-R WP 8F) to define recommendations for the usage of these *additional* bands. In this context and in order to maintain a co-ordinated approach, it is necessary for the Community to formalise the identification of its specific needs for *additional* spectrum for the provision of 3G services. (Similar decision processes will take place as well in all major regions/countries.)

The objective of the present mandate is start the process which will lead to sufficient spectrum being made available in due time, in a co-ordinated manner and based on market demand. Ultimately, this decision process will determine how much spectrum will be needed, at what point in time, which bands are to be used and how these bands will be organised to accommodate 3G services.

However, many important aspects of the future usage of the *additional* spectrum are unknown today, such as:

- IMT-2000 services are not expected to be launched in the Community on a major commercial basis before 2002. The evolution of the market for IMT-2000 services and therefore the spectrum needs are uncertain.
- Technology developments may significantly influence the spectral usage efficiency, which can be achieved, as well as the cost of multi-band and/or variable duplex gap terminals.
- The evolution of traffic characteristics (e.g. traffic asymmetry, capacity demand for the up and/or downlinks) is unpredictable.

Since IMT-2000 is a system of global reach, the planning of spectrum in the different regions/countries is potentially related to each other, while the benefits or costs of a globally co-ordinated approach have not yet been sufficiently analysed.

Despite these uncertainties, taking into account the long and complicated procedures which need to be undertaken until new spectrum becomes effectively available[33] it is necessary to launch the decision process on *additional* spectrum well in advance and before all elements impacting on the future spectrum needs can be fully assessed. In these circumstances, the present mandate proposes a staged approach. This process will necessarily be an iterative one, requiring regular checks against defined milestones and regular assessment as to whether the original market assumptions are still valid.

The scope of the present mandate covers in greater detail the general objective already formulated in mandate 3, i.e. the development of a 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. Mandate 4, therefore, replaces mandate 3 as far as further deliverables from CEPT are concerned.

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[28] For Region 1, the band 806-862 MHz was not identified for IMT-2000 services

[29] EU Member States have licensed GSM900 services in the band 880-915MHz paired with 925-960MHz according to ERC/DEC/(94)01 and ERC/DEC/(97)02.

[30] EU Member States have licensed GSM1800 services in the band 1710-1785MHz paired with 1805-1880MHz according to ERC/DEC/(95)03.

[31] The bands 1900–1980MHz, 2010–2025MHz and 2110-2170MHz were designated for terrestrial UMTS services in the ERC Decision ERC/DEC(97)07 of 30 June 1997. EU Member States have already licensed (or will license soon) terrestrial 3G services in the bands 1900-1980MHz and 2110-2170MHz.

[32] This band was the CEPT preferred *additional* spectrum band (see ECP Part 1A2). Note that WRC-2000 has earmarked the sub bands 2500-2520 MHz and 2570-2590 MHz for satellite services. However, these sub bands may also be used by terrestrial services, in accordance with market demand.

[33] From the WARC-92 initial identification in 1992 until IMT-2000 spectrum becomes effectively available in 2002, ten years of spectrum management efforts were necessary. CEPT took its first decision in 1997, with a perspective to make IMT-2000 spectrum effectively available 5 years later.

Due to the above mentioned uncertainties, it is of paramount importance that first results of deployed IMT-2000 networks are available and be taken into account before detailed decisions on the frequency arrangements for the additional bands are taken.
The present mandate also outlines a schedule for the preliminary investigations and initial decision required before final measures are established at a later stage to make available *additional* spectrum and to define the related spectrum scheme. For these latter decisions, it is expected that separate mandates[34] will be issued in due course.

Order and Schedule
By this order (Mandate 4), the CEPT is mandated to undertake all necessary steps to assess the need for *additional* bands under different usage scenarios and based on detailed studies reflecting the views of all parties concerned.
The work to be done by CEPT, in response to this mandate, should take into account the prospective development of the 3G market and should consider both the terrestrial and the satellite component of IMT-2000. Due consideration should be given to the specific European situation. Although solutions should be sought by CEPT to achieve global harmonisation (notably within ITU-R WP 8F), these solutions must, having regard to current usage of the bands concerned, meet European requirements, including, in particular, promoting competition and ensuring flexibility in time scales adapted to market needs.
At this moment, and for the purpose of planning the decision process ahead, it is suggested that a 'reference date' as from which additional spectrum should become available be set as 1 January 2007. However, this 'reference date' should be re-assessed and, if necessary, revised according to market needs, before the adoption of a CEPT Decision by 31 March 2003.
The following deliverables are requested through this mandate:

[34] Mandates to CEPT are covered by the UMTS Decision 128/1999/EC, which is in force until January 2003. The Commission has proposed a Decision of the European Parliament and of the Council on a regulatory framework for radio spectrum policy in the European Community COM (2000) 407 which foresees a mandate procedure similar to that of the UMTS Decision and should provide the legal basis for further mandates.

Delivery date	Deliverable	Subject
30 November 2001	Report from CEPT	Initial proposals for: amount of additional spectrum needed (terrestrial and satellite component). frequency bands to accommodate additional spectrum needs (incl. Inventory of current usage of proposed bands and assessment of scenarios to relocate/free/share these bands). time table to make available additional spectrum. analysis of the global roaming implications of the initial proposals considering envisaged choices for additional bands in other regions/countries.
30 November 2002	CEPT Report Draft Decision by CEPT for adoption by 31 March 2003	Validation of initial proposals, including the confirmation of the 'reference date'. Designation of additional frequency bands to be used for IMT-2000 systems as from a 'reference date'.
31 March 2003	adoption of CEPT Decision	

Upon delivery of a CEPT Decision by 31 March 2003, subsequent mandates for further harmonisation of the *additional* IMT-2000 frequency bands and for the development of a common spectrum scheme may be issued by the Commission.
The result of this mandate can be made applicable in the European Community pursuant to Article 5.3 of the 'UMTS Decision'.
In the Decision to be adopted as mandated hereby, the CEPT shall, where relevant, take the utmost account of Community law applicable. This includes in particular the 'UMTS Decision' and the Directive 97/13/EC of the European Parliament and of the Council of 10 April 1997 on a common framework for general authorisations and individual licenses in the field of telecommunications service, as well as relevant proposed legislation currently under co-decision procedure[35].

[35] Proposal for a Decision of the European Parliament and of the Council on a regulatory framework for radio spectrum policy in the European Community ('Spectrum Decision') COM(2000)407.
Proposal for a Directive of the European Parliament and of the Council on the authorisation of electronic communications networks and services ('Authorisation Directive') COM(2000)386.
Proposal for a Directive of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services ('Framework Directive') COM(2000)393.

ANNEX 3

Summary of Relevant ECC Decisions, Recommendations and Reports

ECC Text	Title	Purpose	Implementation
CEPT/ERC/DEC(99)25. Oslo 1999	ERC Decision of 29 November 1999 on the harmonised utilisation of spectrum for terrestrial Universal Mobile Telecommunications Systems (UMTS) operating within the bands 1900-1980 MHz, 2010-2025 MHz and 2110-2170 MHz.	Designates the bands 1900-1980 MHz, 2010-2025 MHz and 2110-2170 MHz. For use by UMTS	Decision has been implemented by 14 countries, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Netherlands, Norway, Portugal, Switzerland, UK
CEPT/ERC/DEC(97)07 The Hague 1997.	ERC Decision of 30 June 197 in the frequency bands for the introduction of the Universal Mobile Telecommunications System (UMTS).	Designates that at least 2 X 40 MHz of the band 1900-1980 MHz and 2110-2170 MHz be made available for terrestrial UMTS by January 2002.	Decision has been implemented by 20 countries, Austria, Croatia, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Portugal, Slovenia, Switzerland, Turkey, UK
CEPT/ERC/DEC(00)01 Nicosia 2000	Extending ERC/DEC(97)07 on the frequency bands for the introduction of terrestrial Universal Mobile telecommunications System (UMTS).	Designates the entire 155 MHz of the band 1900-1980 MHz, 2010-2025 MHz and 2110-2170 MHz for the terrestrial component of UMTS.	Decision has been implemented by 9 countries, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Switzerland
CEPT/ERC/REC 01-01 2001	Border co-ordination of UMTS/IMT-2000 systems.	Provides principles and methods for use in co-ordination between UMTS/IMT-2000 systems in border areas.	Recommendation has been implemented by 4 countries: Netherlands, Norway, Finland, Turkey
ERC Report 060 Biel/Bienne 1998.	Global circulation of IMT-2000 terminals.		
ERC Report 064 Menton 1999	Frequency Sharing between UMTS and existing fixed services.	Report addresses co-frequency sharing between UMTS and existing fixed services in some European countries in bands identified in ERC Decision ERC/DEC(97)07	
ERC Report 065. Menton 1999, revised Helsinki 1999.]	Adjacent band compatibility between UMTS and other services in the 2 GHz band	Parameters for adjacent band compatibility between UMTS and DECT, mobile-satellite services, space services and the fixed service.	

ANNEX 4

Usage of the UMTS Core Bands in Europe

Section 1: Utilisation of the UMTS Core Bands in Europe

N.B.: For each country the first row indicates the spectrum occupied by UMTS. The second row indicates the spectrum occupied by other applications.

Table A4.1: Utilisation of the UMTS Core Bands in Europe

Country	**TDD** **1900-1920 MHz (20)**	**FDD** **1920-1980/ 2110-2170 MHz (2x60)**	**TDD** **2010-2025 MHz (15)**	**Expiry**
Austria*	20 0	2 x 60 0	5 0	UMTS: Dec. 2020 -
Belgium	15 0	2 x 60 few links	0 0	UMTS: 2021 Other: 2002
Croatia	0 0	0 0	0 0	- -
Czech Republic*	20 0	2 x 60 0	15 0	UMTS: 2021 -
Finland*	20 15	2 x 60 55	0 0	UMTS: 2019 Other: 2002
France*	20 0	2x60 0	2x5 0	Until 2004, only 2x40 MHz can be used by operators. 2 operators have been granted licences for a 20 year period ending in 2021
Germany*	20 0	2 x 60 0	1 x 5 0	UMTS: Dec. 2020 -
Hungary	0 few links	0 few links	0 few links	- Other: 2003
Iceland	0 20	0 2 x 60	0 15	- Other: available when market requires
Ireland*	0 0	0 0	0 0	UMTS: 2022 -
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*	0 0	0 0	0 0	- -
Luxembourg	0 0	0 0	0 0	- -
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	2 x 5 0	UMTS: Dec 2016 -
Norway	20 0	2 x 60 0	0 0	UMTS: Dec 2012 -
Portugal	20	2 x 60 one link	0 one link	UMTS: Jan 2016 Other: Jan 2003
Spain*	20	2 x 60	0	UMTS: 2021 (2031)

Country	TDD 1900-1920 MHz (20)	FDD 1920-1980/ 2110-2170 MHz (2x60)	TDD 2010-2025 MHz (15)	Expiry
	20	2 x 60	15	Other: end 2002
Sweden*	20 20	2 x 60 2 x 60	0 15	UMTS: 2015 Other: : until used by UMTS
Switzerland*	20 0	2 x 60 0	0 0	UMTS: 2016 Other: -
United Kingdom*	20 0	2 x 60 0	0 2 links	UMTS: Dec. 2021 Other: 2006

Section 2: Plans for UMTS

Austria*

Operator	License expiry (or duration)	Frequencies
3G Mobile	December 2020	1920-3-1930,1/2110,3-2120,1 MHz
Hutchison	December 2020	1930,1-1939,9/2120,1-2129,9 MHz 1915,1 – 1920,1 MHz
Mannesmann (now EKOM 3G Mobilfunk GmbH)	December 2020	1939,9-1949,7/2129,9-2139,7 MHz
Connect	2020	1949,7-1959,7/2139,7-2149,7 MHz
Mobilkom	2020	1959,7-1969,7/2149,7/2159,7 MHz 1900,1 – 1910,1 MHz
max.mobil (now T-Mobile Austria GmbH)	2020	1969,7-1979,7/2159,7-2169,7 MHz 1910,1-1915,1 MHz 2019,9-2024,7 MHz

Belgium

Operator	License expiry (or duration)	Frequencies
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
No information concerning award of UMTS available

Czech Republic*

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

* Information updated in September 2002

		1900,1-1905,1 MHz

Finland*

Operator	License expiry (or duration)	Frequencies
Finnish 3G Ltd, 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 1914,9–1919,9 MHz
Oy Radiolinja Ab	18.3.1999-18.3.2019 1.9.1999-1.9.2019 (in Åland)	1935,3–1950,1/2125,3–2140,1 MHz 1909,9-1914,9 MHz
Telia Mobile Ab branch in Finland, 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 1904,9–1909,9 MHz
Sonera Corporation	18.3.1999-18.3.2019 1.9.1999-1.9.2019 (in Åland)	1964,9–1979,7/2154,9–2169,7 MHz 1899,9–1904,9 MHz

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

France*

UMTS licenses have been granted to two operators (SFR and Orange) in August 2001 for a duration of 20 years. A second call for tender has been launched in 2002. One candidate has answered to this call for tender.

Germany*

Operator	License expiry (or duration)	Frequencies
Vodafone D2 GmbH	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	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	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	Expiration date: 31 December 2020	FDD Uplink 1950,0-1959,9 / FDD Downlink 2140,0-2149,9 TDD 1905,1-1910,1
O2 (Germany) GmbH & Co OHG	Expiration date: 31 December 2020	FDD Uplink 1959,9-1969,8 / FDD Downlink 2149,9-2159,8
T-Mobile Deutschland GmbH	Expiration date: 31 December 2020	FDD Uplink 1969,8-1979,7 / FDD Downlink 2159,8-2169,7 TDD 1910,1-1915,1

Hungary

The auction or tender for UMTS licences is expected in 2002, and the frequencies will be available in 2003.

Iceland

No Licences awarded yet. Timescales have not been set.

Ireland*

Operator	License expiry (or duration)	Frequencies
Hutchinson Wampoa	20 years	1920 – 1935 / 2110 – 2125
O2	20 years	1965 – 1980 / 2155 – 2170 ; 1910 - 1915
Vodafone	20 years	1935 – 1965/ 2125 - 2155

Italy*

Operator	License expiry (or duration)	Frequencies
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
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
Tele2	31 December 2016	Frequency assignement is on the way. It is envisaged to devide 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 assignement is on the way. It is envisaged to devide 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 in the middle of 2003. Four licenses are expected to be issued.

Luxembourg
UMTS licensing is expected in January 2002.

Malta*
No licences awarded yet.

Netherlands

Operator	License expiry (or duration)	Frequencies
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

Operator	License expiry (or duration)	Frequencies
NetCom GSM	31.12.2012	FDD 1920,3-1935,3/2110,3-2125,3 TDD 1915-1920
Broadband Mobile	31.12.2012	FDD 1935,3-1950,1/2125,3-2140,1 TDD 1910-1915
Telenor	31.12.2012	FDD 1950,1-1964,9/2140,1-2154,9 TDD 1905-1910
Tele2 Norge	31.12.2012	FDD 1964,9-1979,7/2154,9-2169,7 TDD 1900-1905

Portugal

Operator	License expiry (or duration)	Frequencies
Vodafone	2016.01.01	FDD: 1920,5-1935,3/ 2110,5-2125,3 MHz TDD: 1915,1-1920,1 MHz
TMN	2016.01.01	FDD: 1964,9-1979,7/2154,9-2169,7 MHz TDD: 1910,1-1915,1 MHz
ONI WAY	2016.01.01	FDD: 1950,1-1964,9/2140,1-2154,9 MHz TDD: 1905,1-1910,1 MHz
Optimus	2016.01.01	FDD: 1935,3-1950,1/2125,3-2140,1 MHz TDD: 1900,1-1905,1 MHz

Spain*

Operator	License expiry (or duration)	Frequencies
VODAFONE	20 + 10 years	1950.1-1964.9 / 2140.1-2154.9 MHz 1905.1-1910.1 MHz
AMENA	20 + 10 years	1935.3-1950.1 / 2125.3-2140.1 MHz 1900.1-1905.1 MHz
TELEFONICA	20 + 10 years	1964.9-1979.7 / 2154.9-2169.7 MHz 1910.1 – 1919.1 MHz
XFERA	20 + 10 years	1920.5-1935.3 / 2110.5-2125.3 MHz 1915.1-1920.1 MHz

Sweden*

Operator	License expiry (or duration)	Frequencies
Vodafone	5 year (will be prolonged until Dec 2015	FDD = 2x15 MHz TDD= 5 MHz
Hi3G	5 year (will be prolonged until Dec 2015	FDD = 2x15 MHz TDD= 5 MHz
Orange, Sweden	5 year (will be prolonged until Dec 2015	FDD = 2x15 MHz TDD= 5 MHz
Tele 2	5 year (will be prolonged until Dec 2015	FDD = 2x15 MHz TDD= 5 MHz

Switzerland*

Operator	License expiry (or duration)	Frequencies
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

* Information updated in September 2002

United Kingdom*

Operator	License expiry (or duration)	Frequencies
Hutchison 3G UK Limited	31 December 2021	1920.0 - 1934.9 MHz 2110.3 - 2124.9 MHz 1914.9 - 1920.0 MHz
Vodafone Limited	31 December 2021	1944.9 - 1959.7 MHz 2134.9 - 2149.7 MHz
BT 3G Limited	31 December 2021	1934.9 - 1944.9 MHz 2124.9 - 2134.9 MHz 1909.9 - 1914.9 MHz
T-Mobile (UK) Limited	31 December 2021	1959.7 - 1969.7 MHz 2149.7 - 2159.7 MHz 1899.9 - 1904.9 MHz
Orange Personal Communications services Limited	31 December 2021	1969.7 - 1979.7 MHz 2159.7 - 2169.7 MHz 1904.9 - 1909.9 MHz

Section 3: Plans for applications other than UMTS

N.B.: The highlighted countries did not respond to the questionnaire in May 2001

Country	Frequency range 1900 - 1980 MHz *Use other than UMTS*	License duration, Trends, When will band be available?
Austria*	none	-
Belgium	none	-
Croatia	none	-
Cyprus	none	-
Czech Republic*	none	-
Denmark*	Free	
Estonia	Fixed Service 10 links (35 dBW)	
Finland*	Fixed Service 1905.5-1975.5 223 links 2*8 Mbit/s	Fixed Service will be removed based on the network construction plan received from the UMTS/IMT-2000 licence holders within 7 months time period.
France*	Military fixed service ITU 283-5, 14 MHz channels	Progressive refarming from 2001 to 2004
Germany*	none	-
Greece	About 75 fixed links	-
Hungary	29 links (ITU-R F 283-4)	Different expiry dates; latest end of 2003
Iceland	Fixed Service 23 links (ITU-R F 283)	Available when market requires
Ireland*	none	-
Italy*	none	-
Latvia*	None	Available
Liechtenstein*	none	-
Lithuania*	none	-
Luxembourg	none	-
Malta*	ENG/OB	Removal planned by end 2003.
Netherlands	none	-
Norway	none	-
Poland	Fixed Service 1900-1980 Military / 1900-1960 Civil 22 analogue links	
Portugal	one link	The band will be free on 1 Jan. 2003
Slovak Republic	ENG 1900-2000 2 links (28 MHz 30dBm) Military Fixed Mobile	?
Spain*	Fixed Service (around 43 High Capacity links)	To be phased out by end of 2002
Sweden	Military use	The entire band will be made available for UMTS/IMT-2000 in accordance with the operators roll out plan.
Switzerland*	none	-
Turkey	Rural Telephone 50 links (34 Mbit/s)	?
United Kingdom*		

Country	Frequency range 2010-2025 MHz *Use other than UMTS*	License duration, Trends, When will band be available?
Austria*	none	-
Belgium	none	-
Croatia	none	-
Cyprus	none	-
Czech Republic*	none	-
Denmark*	Free	-
Estonia	Free	-
Finland*	Fixed Service 2024.5-2094.5 223 links 2*8 Mbit/s	Fixed Service will be removed based on the network construction plan received from the UMTS/IMT-2000 licence holders within 7 months time period.
France*	Military fixed service ITU 283-5, 14 MHz channels	Progressive refarming from 2001 to 2004
Germany*	none	-
Greece	About 5 fixed links	?
Hungary	11 fixed links (ITU-R F 283-4)	Same as 1900-1980 MHz
Iceland	Fixed Service 4 links (ITU-R F 283)	Available when market requires
Ireland*	none	-
Italy*	none	-
Latvia*	None	Available
Liechtenstein*	none	-
Lithuania*	none	-
Luxembourg	none	-
Malta*	ENG/OB	Removal planned by end 2003.
Netherlands	none	-
Norway	none	-
Poland	Fixed Service 2015-2025 Civil 1 analogue link 1985-2015 Military (Altimeter)	?
Portugal	one link	The band will be free on 1 Jan. 2003
Slovak Republic	ENG 2016.5 1 link (28 MHz 30dBm) Military Fixed/Mobile	?
Spain*	Fixed Service (around 20 High Capacity links)	To be phased out by end of 2002
Sweden*	Military use	Reserved for SPA-applications of UMTS/IMT2000 and will be made available subject to market demand.
Switzerland*	none	-
Turkey	Rural Telephone 7 links (34 Mbit/s)	?
United Kingdom*	2 transhorizon links.	expected to remain for 5 years.

Country	Frequency range 2110-2170 MHz *Use other than UMTS*	License duration, Trends, When will band be available?
Austria*	none	-
Belgium	Military fixed network (59 links)	Intention is to remove links by Jan 2002
Croatia	none	-
Cyprus	Fixed service - 2130 MHz	?
Czech Republic*	none	-
Denmark	Free	
Estonia	Free	
Finland*	Free	
France*	Fixed service (PSTN) 2250 links	Progressive reframing from 2001 to 2004
Germany*	none	-
Greece	About 10 fixed links	?
Hungary	none	-
Iceland	Fixed Service 44 links (ITU-R F 283)	Available when market requires
Ireland*	none	-
Italy*	none	-
Latvia*	None	Available
Liechtenstein*	none	-
Lithuania*	none	-
Luxembourg	none	-
Malta*	ENG/OB	Removal planned by end 2003.
Netherlands	none	?
Norway	none	-
Poland	2120-2170 Military Radiolocation	?
Portugal	one link	The band will be free on 1 Jan. 2003
Slovak Republic	MVDS 2100-2300 MHz Military Fixed	?
Spain*	Fixed Service (around 37 High Capacity links)	To be phased out by end of 2002
Sweden*	Military use 100 links 3.5/7 MHz channels	The entire band will be made available for UMTS/IMT-2000 after 1 Jan 2002 in accordance with the operators roll out plan.
Sweden*	Military use	The entire band will be made available for UMTS/IMT-2000 in accordance with the operators roll out plan.
Turkey	Rural Telephone 1 link (34 Mbit/s)	?
United Kingdom*	none	-

*Information updated September 2002

ANNEX 5

Frequency Utilisation of the Frequency Band 2500-2690MHz

The highlighted countries did not respond to the questionnaire in May 2001.

Table A5.1: Use of the band 2520-2670MHz

Country	Current Use of 2520 – 2670 MHz (status mid 1999)	License duration, Trends, When will band be available?
Austria*	Fixed service (75 links, national raster)	Existing use is planned to be terminated by end 2002.
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	?
Croatia	Fixed service (46 links) Mobile Cameras (CEPT 75-03)	1 licence up to Jan. 2005
Czech Rep.*	Military radiolocation Temporary ENG/OB on shared basis with military	Military radiolocation to be phased out by 2008.
Denmark*	ENG/OB (Cordless cameras)	UMTS candidate
Estonia	Fixed service (reserved)	According to DSI Phase III
Finland*	Fixed service	Decrease by 50% by 2004[36]
France*	Military fixed	Military until about 2010, but could be subject to review if necessary. Some fixed links to be maintained longer than 2010 in rural areas
Germany*	Digital P-P FS applications (6 links); FWA P-MP FS applications (285 service areas) 2655-2670 MHz: RA (continuum measurements);	P-P FS to be phased out by 31.12.2007; FWA to be phased out by 31.12.2007.
Hungary	Aeronautical radionavigation and radiolocation Radioastronomy, Earth exploration and space research	Licences for aeronautical radionavigation and radiolocation are valid until 31 December 2008
Iceland	Fixed service (3 links) and MMDS	To be decided
Ireland*	Fixed service (MMDS)	Licensed until 2015
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
Latvia*	Fixed service (MMDS)	Could be available after 2008.
Liechtenstein*	Fixed service + ENG/OB	UMTS candidate
Lithuania*	Fixed service (MMDS)	The band can be made available by 1 Jan 2008, subject to market demand.
Luxembourg	Partly military	No plans
Macedonia	2520-2593/2593-2670 MHz: rural P-MP 2558-2593/2632-2670 MHz: governmental use	UMTS candidate
Malta*	Partly military.	No plans.
Netherlands	2520-2670 MHz: Fixed Wireless Access (FWA)	FWA license until 2008
Norway	2520-2670 MHz; some rural mobile and fixed links	Licenses expire in 2005. Geographical sharing

[36] UMTS/IMT-2000 can be implemented already in 2004-2005, if needed.

	2579-2593 MHz: governmental use	with UMTS is envisaged.
Poland	2520-2530 / 2560-2595 / 2640-2655 MHz: Fixed service (24 links and 4 operators) 2600-2670 MHz: Aeronautical Radionavigation, 2520-2560 MHz: Radiolocation	 Radionavigation until 2005 Radiolocation until 2005
Portugal	ENG/OB	Likely to be available from 1 Jan. 2005
Slovenia	Fixed service, ITU 283 (70 links)	Increase in fixed service
Spain*	Military fixed and tactical links Fixed service P-P (around 40 links)	Maintain military use Expect to be phased out by end of 2006
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.
Switzerland*	Fixed service + ENG/OB	UMTS candidate
UK*	ENG/OB 1 transhorizon link	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.

Table A5.2: Use of the bands 2500-2520 / 2670-2690 MHz

Country	**Current Use of 2500-2520 / 2670-2690 MHz (status May 2001)**	**License duration, Trends, When will band be available?**
Austria*	Same as 2520-2670 MHz	Existing use is planned to be terminated by end 2002.
Belgium	2573-2593 MHz: Mobile cameras (13)	Mobile cameras until 2010
Croatia	2670-2690 MHz: 1 fixed link	Until 27.01.2005.
Czech Rep.*	2500-2520 MHz: none 2670-2690 MHz: military radiolocation	 Until 2008
Denmark*	ENG/OB (Cordless cameras)	UMTS candidate
Estonia	Fixed service (reserved)	According to DSI Phase III
Finland*	Fixed service	Decrease by 50% by 2004. UMTS / IMT-2000 can be implemented already in 2004-2005, if needed
France*	2500-2520: Radiolocation and ENG/OB	Military until about 2010, but could be subject to review if necessary.
Germany*	2500-2520 MHz: 4 P-P fixed links 2655-2700 MHz: Radio astronomy	P-P to be phased out by 31.12.2007 Radio astronomy will stay
Hungary	Aeronautical radionavigation and radiolocation; Radio astronomy, earth exploration and space research	Radionavigation and radiolocation licences are valid till 31 December 2008.
Iceland	Fixed service (3 links)	To be decided
Ireland*	Fixed service (MMDS)	Available for satellite component of IMT-2000 by 1 January 2005
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
Latvia*	Fixed service (MMDS)	Could be available after 2008.
Liechtenstein*	Fixed service	Can be refarmed in 2003
Lithuania*	Fixed service (MMDS)	The band can be made available by 1 Jan 2008,

*Information updated September 2002

		subject to market demand.
Luxembourg	None	available
Malta*	Fixed service.	No plans.
Netherlands	Fixed Wireless Access	FWA license until 2008
Norway	rural wireless access 2579-2593 MHz: governmental use	License until 2008
Poland	2520-2530 / 2560-2595 / 2640-2655 MHz: Fixed service (24 links and 4 operators) 2600-2670 MHz: Aeronautical Radionavigation, 2520-2560 MHz: Radiolocation	 Radionavigation until 2005 Radiolocation until 2005
Portugal	ENG/OB (4 links)	Likely to be available from Jan 2005
Slovenia	Fixed service, ITU 283 (70 links)	Increase in fixed service
Spain*	2500-2520 MHz: 5 P-P fixed links and military 2670-2690 MHz: 6 P-P fixed links and military	Military links will be maintained Fixed links will be removed end 2006
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.
Switzerland*	Fixed service	Can be refarmed in 2003
UK*	ENG/OB	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.

ANNEX 6

Frequency Utilisation of the GSM900 and GSM1800 Bands

Section 1: Summary of responses

N.B.: For each country the first row indicates the spectrum occupied by GSM. The second row indicates the spectrum occupied by other applications.

Table A6.1: Countries that responded to the questionnaire in May 2001

Country	E-GSM 880-890/ 925-935 MHz (2x10)	GSM-900 890-915/ 935-960 MHz (2x25)	GSM-1800 1710-1785/ 1805-1880 MHz (2x75)	Expiry
Austria*	0 0	2 x 24 2 x 1	2 x 71.4 0	GSM: Dec. 2015 to Dec. 2019 Other: 2005
Belgium	2 x 5 2 x 5	2 x 24 2 x 1	2 x 52 0	GSM: Nov. 2010 to July 2013 Other: partly by 2008
Croatia	0 10	2 x 23 0	0 0	GSM: 2008 Other: end 2001
Czech Republic*	0 2 x 8	2 x 22.6 2 x 1.2	2 x 46 0	GSM: July 96 to Mar. 2016 Other: 2003 - 2007
Denmark*	2 x 8.0 2 x 2.0	2 x 24 2 x 1	2 x 75	GSM: Mar. 2002 to Jan. 2011
Finland*	2 x 5.4 0	2 x 23.6 0	2 x 42.2 0	GSM: Nov. 2017
France*	2x10 0	2 x 25 0	2 x 75 0	GSM: Mar. 2006 to Dec. 2009 Other: ?
Germany*	0 2x10	2 x 24.8 0	2 x 55.2 0	GSM: Dec. 2009 to Dec. 2016 Other: Dec 2002
Hungary	0 2 x 2.3	2 x 23.8 2 x 5.6	2 x 44.8 0	GSM: Nov. 2009 to July 2014 Other: 2003 - 2005
Iceland	0 0	2 x 19.2 2 x 1	2 x 50.4 0	GSM: 2007 – 2010 Other: ?
Ireland*	0 0	2 x 19.2 0	2 x 43.2 0	GSM: 2011 – 2015
Italy*	0 2 x 10	2 x 21.6 2 x 2.8	2 x 50 2 x 20	GSM: Feb. 2010 to Aug. 2014 Other: E-GSM band by 2005
Latvia*	0 0	2x25 0	2x50 0	2006 -
Liechtenstein	2 x 8 2 x 2	2 x 8.4 0	2 x 12.2 0	GSM: 2009 Other: 2002-2005
Lithuania*	0 0	2 x 22.8 2 x 1.0	2 x 22.6 0	GSM: not limited Other: Jan 2008
Luxembourg	0 2 x 10	2 x 23.2 0	2 x 19.6 0	GSM: 2008 Other: immediately
Macedonia	0 0	2 x 12.5 MHz 0	0 0	GSM: no limit Other: -
Netherlands	2 x 10 0	2 x 23.8 2 x 1	2 x 72 0	GSM: Mar. 2010 to Feb. 2013 Other : ?
Norway	0 ?	2 x 19.2 10	2 x 20 ?	GSM: Nov. 2005 to Mar. 2010 Other: ?
Portugal	0 0	2 x 23.8 2 x 1	2 x 18 0	GSM: Oct. 2006 to Nov. 2012 Other: Jan 2008

*Information updated September 2002

Spain*	0 2 x 7.9	2 x 24 2 x 0.6	2 x 40.2 0	GSM: Feb. 2015 to July 2028 Other: Dec. 2006
Sweden*	2 x 5 limited use	2 x 23.2 0	2 x 40,8 3.4 + 14.5	GSM: see Section 2 Section 1 Other: ? (Radio astronomy and military use)
Switzerland*	2 x 6.6 2 x 2	2 x 24.2 0	2 x 750	GSM: May 2008 Other: 2005
United Kingdom*	9 2 x 1	2 x 24.4 0	2 x 71.6 0	GSM: Renewable annually Other: Dec. 2003

Table A6.2: Countries that have not responded to the questionnaire in May 2001

Country	**E-GSM** **880-890/ 925-935 MHz (2x10)**	**GSM-900** **890-915/ 935-960 MHz (2x25)**	**GSM-1800** **1710-1785/ 1805-1880 MHz (2x75)**	**Expiry**
Albania	0	2 x 12.4	0	GSM: Aug. 2014
Andorra	0	2 x 25	0	GSM: Unlimited
Bulgaria	0	2 x 9.2	2 x 2.4	GSM: Aug. 2009 to Jan. 2016
Cyprus	0 ?	2 x 16.8 2 x 7.6	2 x 24.8 ?	GSM: Unlimited Other: Unlimited
Estonia	0	2 x 22.8	2 x 28.8	GSM: 2010
Greece	0	2 x 20	2 x 25	GSM: Sep. 2012 to Mar. 2023
Malta*	0 0	2 x 16.8 0	0 2 x 25	September 2010. September 2010.
Poland	0 ?	2 x 21.0 2 x 4	2 x 27.8 ?	GSM: Feb. 2011 to Sep. 2014 Other: Jan 2004
Romania	0	2 x 25	2 x 7	GSM: 2006 to 2009
Russia	0	2 x 25	2 x 75	?
Slovakia	0	2 x 18	2 x 15.6	GSM: Aug. 2011
Slovenia	0	2 x 24.4	3 x 30	GSM: Apr. 2013 to Jan. 2016
Turkey	0	2 x 20	2 x 14.8	GSM: Apr. 2023 to Jan. 2026
Ukraine	0	2 x 16.4	2 x 6.4	

Section 2: Detailed responses

Frequency Utilisation
Of the GSM bands

E-GSM:	**880-890 / 925-935 MHz**	**(2 x 10 MHz)**
GSM-900:	**890-915 / 935-960 MHz**	**(2 x 25 MHz)**
GSM-1800:	**1710-1785 / 1805-1880 MHz**	**(2 x 75 MHz)**

*Information updated September 2002

Section 2.1: Countries that replied to the questionnaire in May 2001

Austria*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
6 474 000	2 x 0 MHz *)	2 x 24 MHz	2 x 71.4 MHz	78 %

Operator	Service start	License expiry	Frequencies	
T-Mobile Austria GmbH	OCT 96	DEC 2015	906.2-913.8 / 951.2-958.8. MHz (2x 7.8 MHz) 1710.2-1712.0/1805.2-1807,0 MHz (2 x 2.0 MHz) 1740.0-1741.0/1835.0-1836.0 MHz (2x 1.2 MHz) 1742.8-1743.8/1837.8-1838.8 MHz (2x 1.2 MHz) 1748.0-1750.2/1843.0-1845.2 MHz (2x 2.4 MHz) 1756.8-1757.8/1851.8-1852.8 MHz (2x 1.2 MHz)	2,008,000
Mobilkom Austria	DEC 92	DEC 2015	898.2-905.8 / 943.2-950.8 MHz (2 x 7.8 MHz) 1712.4-1722.4/1807.4-1817.4 MHz (2 x 10.2 MHz) 1731.6-1733.8/1826.6-1828.8 MHz (2x 2.4 MHz) 1741.4-1742.4/1836.4-1837.4 MHz (2x 1.2 MHz) 1755.4-1756.4/1850.4-1851.4 MHz (2x 1.2 MHz)	2,842.000
Connect Austria	SEP 98	DEC 2017	1734.2-1739.6/1829.2-1834.6 MHz (2 x 5.6 MHz) 1758.2-1781.4/1853.2-1876.4 MHz (2x 23.4 MHz)	1,350,000
Telering Telekom	JUN 00	DEC 2019	1725.0-1731.2 /1820.0-1826.2 MHz (2x 6.4 MHz) 1744.2-1747.6 /1839.2-1842.6 MHz (2x 3.6 MHz) 1750.6-1755.0/1845.6-1850.0 MHz (2x 4.6 MHz)	274.000
Average			**2 x 20.5 MHz per operator**	

Notes:
*) EGSM: 2 x 9.8 MHz will be auctioned off end of 2002
Source of market data: Mobile Communications Aug. 2002

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
914-915/959-960	Cordless telephon (SLT 1)	The band will be available for GSM as from 2005.

Belgium

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
5 600 000	2 x 5 MHz	2 x 24.0 MHz	2 x 52.0 MHz	55.0 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Proximus	JAN 94	Licence given on 2/7/96 for 15 yrs: 2/7/2011	890-896/935-941 MHz and 902-908/947-953 MHz and 1710-1725/1805-1820 MHz (2 x 27 MHz)	3 200 000
Mobistar	AUG 96	Licence given on 27/11/95 for 15 yrs: 27/11/2010	896-902/941-947 MHz and 908-914/953-959 MHz 1725-1740/1820-1835MHz (2 x 27 MHz)	1 800 000
KPN/ORANGE	APR 99	Licence given on 2/7/98 for 15 yrs: 2/7/2013	1763-1785 / 1858-1880 MHz and 883-885/928-930 MHz * and 887-990/932-935 MHz * (2 x 27 MHz)	600000

Average			**2 x 27 MHz per operator**	
Analogue			none	

* The E-GSM bands are not yet operational

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
880-883 / 925-928 MHz	Military Tactical and Transportable Radio Relays	
885-887 / 930-932 MHz	CT1+	Band will be available in 2008
914-915 / 959-960 MHz	CT1	Decrease

Croatia

GSM Subscribers	**Total E-GSM**	**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
915 000	0	2 x 23.0 MHz	0	19.0 %

Operator	**Service start**	**License expiry**	**Frequencies**	**No. of Sub scribers**
CROATIAN TELEKOM CRONET	OCT 95	2008	896.0-908.0 / 941.0-953.0 MHz (2 x 12.0 MHz)	445 000
VIPNET	JUL 99	2008	890.0-896.0 / 935.0-941.0 MHz and 908.2-914.2 / 953.2-959.2 MHz (2x 12.0 MHz)	470 000
Average			**2 x 12.0 MHz**	
Analogue			None	

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
880-890 MHz	Military use	End 2001

Czech Republic*

GSM Subscribers	**Total E-GSM**	**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
7 787 930	0	2 x 21.8 MHz	2 x 45.6 MHz	75.6%

Operator	**Service start**	**License expiry**	**Frequencies**	**No. of Sub scribers**
EuroTel	JUL 96	20 years	897.2-899.8 / 942.2-944.8 MHz and 902.2-904.0 / 947.2-949.0 MHz and 906.2-909.2 / 951.2-954.2 MHz and 911.8-912.8 / 956.8-957.8 MHz and 1711.4-1717.2/1806.4-1812.2 MHz and 1717.4-1721.8/1812.4-1816.8 MHz and 1724.0-1727.2/1819.0-1822.2 MHz	3 566 857

*Information updated September 2002

Radio Mobil	SEPT 96	20 years	894.4-897.0 / 939.4-942.0 MHz and 900.0-902.0 / 945.0-947.0 MHz and 904.2-906.0 / 949.2-951.0 MHz and 909.4-911.6 / 954.4-956.6 MHz 1722.0-1723.6/1817.0-1818.6 MHz and 1730.4-1736.4/1825.4-1831.4 MHz and 1752.8-1762.6/1847.8-1857.6 MHz	3 149 714
Cesky mobil	MAR 2000	20 years	890.2-894.0/935.2-939.0 MHz and 1763.0-1776.8/1858.0-1871.8 MHz	1 071 359
Average			**2 x 22.4 MHz**	
Analogue			none	

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
880,0-884,0 / 925,0-929,0 MHz 958,8 – 960 MHz	Request for military tactical rr Military: aeronautical radionaviga-tion	 By 2007
885–887 / 930–932 MHz 914–915 / 959–960 MHz	CT1 + CT1	By the end 2005 By the end 2005
884,0 – 888,0 MHz	WLL	By the end 2003

Denmark*

GSM Subscribers	**Total E-GSM**	**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
3935797	2 x 8.6 MHz	2 x 22.4 MHz	2 x 74.8 MHz	73.7 %

Operator	**Service start**	**License expiry**	**Frequencies**	**No. of Sub scribers**
Sonofon	MAR 92	GSM900: MAR2002 GSM1800 JUN2007/ DEC2010	905.0-913.8 / 950.0-958.8 MHz and 1710.2-1729.4 /1805.2-1824.4 MHz (2x28.4 MHz)	940600
TDC	MAR 92	GSM900: MAR2002 GSM1800 JUN2007/ DEC2010	896.0-904.8 / 941.0-949.8 MHz and 1729.6-1746.0/1824.6-1841.0 MHz 1775.0-1784.8/1870.0-1879.8 MHz (2 x 35.6 MHz)	1596935
Telia	MAR 98	GSM900 JAN2011 GSM1800 JUN2007	880.2-880,8/925.2-925.8 MHz 886.4-889.8/931.4-934.8 MHz 890.0-890.8/935.0-935.8 MHz[1] 892.8-893.4/937.8-938.4 MHz[2] 893.6-894.6/938.6-939.6 MHz 1746.2-1760.4 / 1841.2–1855.4 MHz (2x21.8 MHz)	291311
Orange	MAR 98	GSM900: JAN2011 GSM1800 JUN 2007	881.0-881.6/926.0-926.6 MHz 882.8-886.2/927.8-931.2 MHz 891.0-891.8/936.0-936.8 MHz 892.0-892.6/937.0-937.6 MHz 894.8-895.8/939.8-940.8 MHz 1760.6-1774.8 / 1855.6–1869.8 MHz (2x21.8 MHz)	608107
Average			**2 x 17 MHz**	
Analogue:			None	

[1] Frequencies will be available by 31. October 2002
[2] Frequencies will be available by 1. March 2002

Finland*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
4 286 250	2 x 5.4 MHz	2 x 23.6 MHz	2 x 50,4 MHz	ca. 83.0 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Oy Radiolinja Ab	for GSM: JAN 92	NOV 2017[2]	1745.4-1754.4 / 1840.4-1849.4 MHz (2 x 9.2 MHz) Areas listed[37]: 904.0 - 913.8 / 949.0 - 958.8 MHz (2 x 10 MHz) Rest of the country (except Åland): 905.4 - 913.8 / 950.4 - 958.8 MHz (2 x 8.6 MHz)	1 356 204
Sonera Corporation	for GSM: JUL 92	NOV 2017[2]	1710.2-1721.2 / 1805.2-1816.2 MHz (2 x 11,2 MHz) Areas listed[1]: 890.2 - 903.6 / 935.2 - 948.6 MHz (2 x 13.6 MHz) Rest of the country: 890.2 - 901.6 / 935.2 - 946.6 MHz (2 x 11.6 MHz)	2 450 000
Ålands Mobiltelefon AB	JUN 93	DEC 2017[2]	Åland: 905.8 - 913.8 / 950.8 - 958.8 MHz (2 x 8.2 MHz)	6 500
Telia Mobile Ab branch in FIN	MAR 98	NOV 2017[2]	1768.4-1781.8 / 1863,4.0-1876.8 MHz (2 x 13.6 MHz)	239 000
Finnish 2 G Ltd	start: JAN 01	DEC 2019[2]	Whole country except Åland: 1735.8-1744.8 / 1830.8-1839.8 MHz (2 x 9.2 MHz) 880.2 - 885.4 / 925.2 - 930.4 MHz (2 x 5.4 MHz) Whole country except areas listed[1] and Åland: 902.0 - 905.0 / 947.0 - 950.0 MHz (2 x 3.2 MHz)	200 000
Elisa Communications	JUL 00	NOV 2017[2]	1724.0-1731.0 / 1819.0-1826.0 MHz (2 x 7.2 MHz)	
Average			**2 x 13.2 MHz**	
Analogue			none (service stopped 31.12.2000)	

[37] Helsinki area, Turku + 16 km, Tampere + 23 km and Oulu + 30 km.
[2] Operating licence.

*Information updated September 2002

France*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
37 807 400	2*10 MHz	2 x 24.8 MHz	2 x 75 MHz	62,7%

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Bouygues Telecom	MAY 96	8 DEC 2009	GSM 900: 900,1-904,9 MHz and duplex (2*4,8 MHz) except in very densely populated areas. E-GSM: 880,1-889,9 MHz and duplex (2*9,8 MHz) progressively allocated in all the metropolitan territory from 2002 to 2005 (except 880,1-885,1 MHz and duplex (2*5 MHz) in military campsites). GSM 1800, from 2003: 1758,3-1784,9 MHz and duplex (2*26,6 MHz) in very densely populated areas, 1759,9-1784,9 MHz and duplex (2*25 MHz) in military campsites and 1763,3-1784,9 MHz and duplex (2*21,6 MHz) in the remaining metropolitan territory.	6 195 700
SFR	APR 93	25 MAR 2006	GSM 900: 902,5-914,9 MHz and duplex (2*12,4 MHz) in very densely populated areas and 904,9-914,9 MHz and duplex (2*10 MHz) in the remaining metropolitan territory. GSM 1800, from 2003: 1710,1-1712,9 MHz and duplex (2*2,8 MHz) and 1737,1-1758,1 MHz and duplex (2*21 MHz).	12 987 100
Orange France (ex France Telecom Mobiles)	JUL 92	25 MAR 2006	GSM 900: 890,1-902,5 MHz and duplex (2*12,4 MHz) in very densely populated areas and 890,1-900,1 MHz and duplex (2*10 MHz) in the remaining metropolitan territory. GSM 1800, from 2003: 1713,1-1736,9 MHz and duplex (2*23,8 MHz)	18 624 600
Average			**2 x 36,2 MHz per operator in very densely populated areas**	
Analogue			None	

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
890-915x935-960 MHz	None	15 years licenses, ending 2006 (Orange France&SFR) or 2009 (BYT). No plan for transition yet.

880-890x925-935 MHz	Tactical radio relays	This frequency ressource will be given to BYT from 2002 to 2005 except for some military areas in the framework of the existing licenses. No plan for transition yet
1710-1785x1805-1880 MHz	None	15 years licenses, ending 2006Orange France&SFR) or 2009 (BYT). No plan for transition yet.

GERMANY*

GSM Subscribers	**Total E-GSM**		**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
55 928 000	0		2 x 24.8 MHz	2 x 55.2 MHz	68 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
T- Mobile Deutschland GmbH	JUL 92	DEC 09	892.5-899.9 / 937.5-944.9 MHz and 906.1-910.5 / 951.1-955.5 MHz and 914.3-914.9 / 959.3-959.9 MHz and 1725.1-1730.1 / 1820.1-1825.1 MHz (2x17.4 MHz)		23 200 000
Vodafone D2 GmbH	JUL 92	DEC 09	890.1-892.5 / 935.1-937.5 MHz and 899.9-906.1 / 944.9-951.1 MHz and 910.5-914.3 / 955.5-959.3 MHz and 1752.7-1758.1 /1847.7-1853.1 MHz (2x17.4 MHz)		21 350 000
E-Plus Mobilfunk GmbH & Co KG	MAY 94	DEC 12	1758.1-1780.5 / 1853.1-1875.5 MHz (2x22.4 MHz)		7 092 000
O2 (Germany) GmbH & Co OHG	MAR 98	DEC 16	1730.1-1752.5 / 1825.1-1847.5 MHz (2x22.4 MHz)		34 08600 000
Average			**2 x 20 MHz**		
Analogue			none		

About 50 % of the GSM Subscribers own GSM terminals with prepaid-cards. The EGSM bands are currently not available due to other usage by CT1+ (until December 2002) and military services. The remaining parts of the 1800 MHz bands, which have not been licensed so far, are used for military services.

Hungary

GSM Subscribers	**Total E-GSM**		**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
3 000 000	0		2 x 23.8 MHz	2 x 44.8 MHz	30.0 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Pannon GSM	MAR 94 NOV 00	NOV 09 JUL 14	898.0-906.0 / 943.0-951.0 MHz and 1758.1-1773.1/1853.1-1868.1 MHz (2 x 23 MHz)		1 200 000
Westel 900	MAR 94 NOV 00	NOV 09 JUL 14	906.0-914.0 / 951.0-959.0 MHz and 1743.1-1758.1 /1838.1-1853.1 MHz (2 x 23 MHz)		1 600 000
Vodafone	DEC 99	JUL 14	890.1-897.9 / 935.1-942.9 MHz 1710.2-1725.0/1805.2-1820.0 MHz (2x 22.6 MHz)		200 000
Average			**2 x 22.9 MHz**		
Analogue			455.16-457.38/465.16-467.38 MHz		80 000

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
880 - 882 MHz/ 925 - 935 MHz	Aeronautical radionavigation	Bands will be available after 2003-2005.

*Information updated September 2002

890 - 895.3 MHz/ 935 - 940.3 MHz	Analog FWA systems	Further 2*1 MHz bands will be available for GSM after 31 december 2001 and 31 December 2002. The whole 890.1 - 897.9/935.1 - 942.9 MHz bands will be available after 4 November 2003.
914.7—915 MHz/ 959.7—960 MHz	CT1 applications in big towns	After 31 December 2007
914.7—915 MHz/ 959.7—960 MHz	CT1 applications in rural areas	After 31 December 2007

Iceland

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
185 603	0	2 x 19.2 MHz	2 x 50.4 MHz	65.6 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Iceland Telecom	AUG 94	2008	901.9-913.9 / 946.9-958.9 MHz and 1710.1-1712.1 / 1805.1-1807.1 MHz and 1716.1-1718.1/1811.1-1813.1 MHz (2 x 16.0 MHz)	130 603
Tal Ltd	MAY 98	2007	890.1-897.3 / 935.1-942.3 MHz and 1724.1-1740.1/1820.1-1835.1 MHz (2 x 23.2 MHz)	55 000
Islandssimi GSM	?	2010	1770.1-1785.1/1865.1-1880.1 MHz (2 x 15.0 MHz)	0
Lina net	?	2010	1740.1-1745.1 / 1835.1-1840.1 MHz (2 x 5.0 MHz)	0
Hallo frjals fjarskipti	?	2010	1747.5-1755.1 / 1840.5-1850.1 MHz (2 x 7.6 MHz)	0
IMC a Islandi	?	2010	1766.3-1769.1 /1861.3-1864.1 MHz (2 x 2.8 MHz)	0
Average			**2 x 11.6 MHz**	
Analogue			None	

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
914-915/959-969 MHz	CT1	To be decided

Ireland*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
2 970 000	0	2 x 19.2 MHz	2 x 43.2 MHz	77%

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
O2	MAR 97	2011	907.5-915.0 / 952.5-960.0 MHz (2 x 7.5 MHz) 1750.9-1765.3 / 1845.9-1860.3 MHz (2x14.4 MHz)	39%
Vodafone	JUL 93	2011	900.0-907.5 / 945.0-952.5 MHz (2 x 7.5 MHz) 1736.3-1750.7 / 1831.3-1845.7 MHz (2x14.4 MHz)	57%
Meteor	FEB 01	2015	892.7-897.5/937.7-942.5 MHz (2 x 4.8 MHz) 1765.5-1779.9/1860.5-1874.9MHz (2 x 14.4 MHz)	4%
Average			**2 x 20.8 MHz**	
Analogue			None	

Italy*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
36 400 000	0	2 x 21.6 MHz	2 x 50.0 MHz	63.2 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers

Blu	MAY/00	AUG/2014	National wide excluding 4 areas 1740.1-1749.9/1835.1-1844.9 MHz In 4 areas 1770.1-1779.9/1865.1-1874.9 MHz Temporarily until 31.12.2002 - National wide 1735.1-1739.9/1830.1-1834.9 MHz Weighted average: 2x15 MHz	900 000
Omnitel Pronto Italia	DEC 95	FEB/2010	National wide 905.5-913.7 / 950.5-958.7 MHz 1780.1-1784.9 / 1875.1-1879.9 MHz In 16 large cities 903.5-905.5 / 948.5-950.5 MHz Temporarily until 31.12.2002 National wide excluding 4 areas 1775.1-1779.9 / 1870.1-1874.9 MHz in 4 areas 1745.1-1749.9/1840.1-1844.9 MHz Weighted average: 2x18.8 MHz	14 500 000
TIM	OCT 95	FEB/2010	National wide 892.1-900.3 / 937.1-945.3 MHz 1755.1-1759.9 / 1850.1-1854.9 MHz In 16 large cities 900.3-903.3 / 945.3-948.3 MHz Temporarily until 31.12.2002 - National wide 1750.1-1754.9/1845.1-1849.9 MHz Weighted average: 2x19 MHz	17 000 000
Wind Telecomunica-zioni	MAR 99	JUN/2013	National wide 1760.1-1769.9 / 1855.1-1864.9 MHz National wide excluding 16 large cities 900.5-905.3 / 945.5-950.3 MHz Temporararily until 31.12.2002 In 12 large cities 1770.1-1774.9/1865.1-1869.9 MHz In 4 large cities 1740.1-1744.9/1835.1-1839.9 MHz Weighted average: 2x15 MHz	4 000 000
Average			**2 x 17.0 MHz**	
Analogue: TIM (Tacs-900)	APR 90	*)	Nation-wide: 880.0-891.8 / 925.0-936.8 MHz (2 x 11.8 MHz)	2.800 000

*) According to the National Table of Frequency Allocations (NTFA) the TACS system will be phased out at latest in 2005. The band will then be allocated to GSM.

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
914 -915 958 - 960	CT1	CT1 to expire according CEPT decisions; band to be allocated to GSM
1710 - 1735 1805 - 1840	Reserved to the Ministry of Defence	20 MHz out of this band could be allocated to GSM

Latvia*

*Information updated September 2002

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
775 000	0	2x25MHz	2x50MHz	92% of territory; 95% of population; 32% of population are subscribers;

Operator	Service Start	License expiry	Frequencies	Subscribers
LMT	Jan 1995	2006	890-903/935-950MHz (2x13); 1710-1735/1805-1830MHz (2x25);	440 000
Lele2	Apr 1997	2006	903-913/948-958MHz (2x10); 1735-1760/1830-1855MHz (2x25);	335 000
Average			2x36.5MHz	

Liechtenstein*

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
~15'500	0		2 x 8.4 MHz	2 x 12.2 MHz	~47 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
mobilkom liechtenstein AG	APR 00	DEC 09	1747.7-1750.1 / 1842.7-1845.1 MHz and 1753.5-1755.1 / 1848.5-1850.1 MHz (2x4.0 MHz)		---
Tele2 AG	APR 00	DEC 09	897.5-899.9 / 942.5-944.9 MHz and 909.9-911.7 / 954.9-956.7 MHz (2x4.2 MHz)		---
Telekom FL AG	APR 00	DEC 09	892.5-896.7 / 937.5-941.7 MHz and 1739.3-1740.1 / 1834.3-1835.1 MHz and 1750.3-1753.5 / 1845.3-1848.5 MHz (2x8.2 MHz)		---
VIAG Europlatform AG	APR 00	DEC 09	1717.7-1719.1 / 1812.7-1814.1 MHz and 1731.3-1733.9 / 1826.3-1828.9 MHz (2x4.0 MHz)		---
Average			**2 x 5.1 (2x5.3) MHz**		
Analogue			none		

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
885 – 887 MHz	CT1+	Until end 2005 (Then: Additional spectrum for GSM)
930 – 932 MHz	CT1+	Until end 2005 (Then: Additional spectrum for GSM)

Luxembourg

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
303 274	0		2 x 23.2 MHz	2 x 19.6 MHz	68.0 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
PTT (LUXGSM)	JUN 93	JUN 08	890.2-894.6 / 935.2-939.6 MHz and 900.0-907.2 / 945.0-952.2 MHz and 1775-1784.8 / 1870-1879.8 MHz (2 x 21.4 MHz)		180 072
TANGO	MAY 98	MAY 08	895.2-899.6 / 940.2-944.6 MHz and 907.6-914.8 / 952.6-959.8 MHz and 1760.2-1770 / 1855.2-1865 MHz (2 x 21.4 MHz)		123 202

Average			**2 x 21.4 MHz**	
Analogue			None	

In LUXGSM, GSM900 and GSM1800 together form a fully integrated network, where the whole traffic is carried on. The TANGO network is a dual-band network, where 7% of the total traffic is taken bis 1800 MHz channels.

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
880-890/925-935 MHz	Domestic CT1+ in use Planned for E-GSM	No licenses have been issued. Band is available

Macedonia

GSM Subscribers	**Total E-GSM**	**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
150.000	0	2 x 12.5 MHz	0	7,5 %

Operator	**Service start**	**License expires**	**Frequencies**	**No. Of Subscriber**
Mobimak	OCT 96	Not limited[1)]	890.0-902,5 / 935,0-947,5 MHz (2 X 12,5 MHz)	150.000
Average			**2 x 12.5 MHz**	
Analogue	-	-	None	-

A second Macedonian GSM operator is planned for the second half of 2001 in the GSM bands 900 and 1800 MHz. The E-GSM bands are not yet operational.

1) Should be registered every 5 years

Netherlands

GSM Subscribers	**Total E-GSM**	**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
10 730 000	2 x 10.0 MHz	2 x 23.8 MHz	2 x 72.0 MHz	69.7 %

Operator	**Service start**	**License expiry**	**Frequencies**	**No. of Sub scribers**
Libertel	SEPT 95	MAR 2010 FEB 2013	894.1-903.1 / 939.1-948.1 MHz and 911.5-913.9 / 956.5-958.9 MHz and 1710.1-1712.7 / 1805.1-1807.7 MHz and 1775.1-1777.7 / 1870.1-1872.7 MHz (2x16.6 MHz)	3 180 000
KPNTelecom	JUL 94	MAR 2010 FEB 2013	890.1-894.1/935.1-939.1 MHz and 903.1-911.5/948.1-956.5 MHz and 1712.7-1715.1/1807.7-1810.1 MHz and 1720.1-1722.7/1815.1-1817.7 MHz and 1725.1-1730.1/1820.1-1825.1 MHz and 1735.1-1737.7/1830.1-1832.7 MHz and 1770.1-1775.1/1865.1-1870.1 MHz (2 x 30 MHz)	4 800 000
Dutchtone	JAN 99	FEB 2013	880.1-880.9/925.1-925.9 MHz and 882.3-886.5/927.3-931.5 MHz and 1740.1-1755.1/1835.1-1850.1 MHz (2x20 MHz)	1 000 000
Telfort	OCT 98	FEB 2013	880.9-882.3/925.9-927.3 MHz and 886.5-890.1/931.5-935.1 MHz and 1755.1-1770.1/1850.1-1865.1 MHz and 1717.7-1720.1/1812.7-1815.1 MHz (2x 22.4 MHz)	900 000

*Information updated September 2002

Ben	FEB 99	FEB 2013	1715.1-1717.7/1810.1-1812.7 MHz and 1730.1-1732.7/1825.1-1827.7 MHz and 1722.7-1725.1/1817.7-1820.1 MHz and 1732.7-1735.1/1827.7-1830.1 MHz and 1737.7-1740.1/1832.7-1835.1 MHz and 1777.7-1782.1/1872.7-1877.1 MHz (2x16.8 MHz)	850 000
Average			**2 x 21MHz**	
Analogue:			None	

The bands 914-915 MHz and 959-960 MHz are not used for cellular mobile due to the CT1 application.

Norway

GSM Subscribers	**Total E-GSM**		**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
2 637 500	0		2 x 19.2 MHz	2 x 20 MHz	61.1 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
NetCom	DEC 92 MAR 98	NOV 05 MAR 10	904.3-913.9 / 949.3-958.9 MHz (2 x 9.6 MHz) 1754.5-1764.5/1849.5-1859.5 (2 x 10 MHz)		800 000
Telenor Mobil	DEC 92 MAR 98	NOV 05 MAR 10	894.5-904.1 / 939.5-949.1 MHz (2 x 9.6 MHz) 1771.3-1781.3/1866.3-1876.3 (2 x 10 MHz)		2 070 000
Average			**2 x 19.6 MHz**		
Analogue: Telenor Mobil	DEC 86 JAN 81	JUL 2001 NOV 2003	890-894.5 / 935-939.5 MHz (2 x 4.5 MHz) 453-457.5/463-467.5 MHz (2 x 4.5 MHz)		216 000

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
930.5 MHz ± 4.0MHz	EISCAT radar	Current licence expires 31.12.2002, but will be extended. Limited GSM use around EISCAT sites.
914-915 MHz	CT1	

Portugal

GSM Subscribers	**Total E-GSM**		**Total GSM-900**	**Total GSM-1800**	**GSM Penetration**
5 768 353	0		2 x 23.8 MHz	2 x 18.0 MHz	57.7%
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
TMN	OCT 92	MAR 2007	905.9-913.9 / 950.9-958.9 MHz (2 x 8 MHz) 1763.5-1766.7/1858.5-1861.7 MHz and 1770.1-1772.9/1865.1-1867.9 MHz (2 x 6 MHz)		3905520
Telecel	OCT 92	OCT 2006	890.1-898.1 / 935.1-943.1 MHz (2 x 8 MHz) 1759.9-1763.1 / 1854.9-1858.1 MHz 1772.9-1775.7 / 1867.9-1870.7 (2 x 6 MHz)		2534788
Optimus	AUG 98	NOV 2012	898.1-905.9 / 943.1-950.9 MHz (2 x 7.8 MHz) 1775.7-1781.7 / 1870.7-1876.7 MHz (2 x 6 MHz)		1537499
Average			**2 x 13.9**		
Analogue			None		

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
880 – 915 MHz	CT1-Cordless telephones from 914-915 MHz	To be phased out by 2008.01.01

925 – 960 MHz	CT1-Cordless telephones from 959-960MHz	To be phased out by 2008.01.01
1710 – 1785 MHz	------	
1805 – 1880 MHz	------	

Spain*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
24 210 000	0	2 x 24 MHz	2 x 60 MHz	60.5 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Airtel Movil	OCT 95 JUL 98	FEB.25 JUL 28	902.9-914.9 / 947.9-959.9 MHz (2x12) 1744.7-1764.7 / 1839.7-1859.7 MHz (2x13.4 MHz)	6 900 000
Telefonica Moviles	JUL 95 JUL 98	FEB 15 JUL 28	890.1-897.9 / 935.1-942.91 MHz and 898.5-902.7·/·943.5-947.7·MHz (2x12 MHz) 1724.5-1744.5/1819.5-1839.5 MHz (2x13.4 MHz)	13 580 000
Amena	APR 99	JUL-28	1764.9-1784.9/1859.9-1879.9 MHz (2 x 13.4 MHz)	3 730 000
Average			**2 x 21.4MHz**	
Analogue: Telefonica Moviles	APR 90	DEC-06	874.1-887.9/919.1-932.9 MHz 897.9-898.5/942.9-943.5 MHz (2 x 14.4 MHz)	350 000

Sweden*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
7 157 000	2x5 MHz	2 x 23,2 MHz	2 x 40,8 MHz	80 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Telia	NOV 92	07-12-31 11-12-31	936.9-944.1 / 891.9-899.1 MHz and 1817.1-1835.1 / 1722.1-1740.1 MHz (2x25.2 MHz)	3 295 000
Tele2	SEP 92	07-12-31 11-12-31	944.3-951.5 / 899.3-906.5 MHz and 1835.1-1846.5 / 1740.1-1751.5 MHz (2x18.6 MHz)	2 532 000
Vodafone	SEP 92 (Europolitan)	07-12-31 11-12-31	951.7-958.9 / 906.7-913.9 MHz and 1849.5-1860.9 / 1754.5-1765.9 MHz (2x18.6 MHz)	1 109 000
SweFour		17-06-31	880-885 / 925-935 MHz and 890-891,6 / 935-936,6 MHz (2 x 6,6 MHz)	0
Average			**2 x 17.25 MHz**	
Analogue Telia	DEC 82	07-12-31	453-457,5 / 463-467,5 MHz (2x4,5 MHz)**NMT-450**	144 0000

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
880-890/925-935 MHz	Research	Geographical restrictions to protect EISCAT receiver.
1718.8-1722,2 MHz	Radio astronomy and Military	No changes foreseen.

*Information updated September 2002

1805-1819.5 MHz	use	
1765.9-1785MHz/ 1860.9-1880 MHz	Test system, manufacturers, R&D.	Decision to be taken when ITU-R/WP8F has concluded on the use of extension bands for IMT-2000.

Switzerland*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
5'476'000	2 x 6.6 MHz	2 x 24.2 MHz	2 x 48.8 MHz	75 %

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Swisscom Mobile	MAR 93	31 MAY 2008	890.1-902.3 / 935.1-947.3 MHz 907.5-908.9 / 952.5-953.9 MHz 1739.3-1746.5 / 1834.3-1841.5 MHz 1748.9-1753.9 / 1843.9-1848.9 MHz (2x25.8 MHz)	3'465'000
TDC Switzerland	DEC 98	31 MAY 2008	882.5-884.5 / 927.5-929.5 MHz 887.5-889.9 / 932.5-934.9 MHz 902.5-907.3 / 947.5-952.3 MHz 909.1-914.9 / 954.1-959.9 MHz 1735.1-1739.1 / 1830.1-1834.1 MHz 1746.7-1748.7 / 1841.7-1843.7 MHz 1754.1-1759.9 / 1849.1-1854.9 MHz (2x26.8 MHz)	1'010'000
ORANGE Communications	JUN 99	31 MAY 2008	880.1-882.3 / 925.1-927.3 MHz and 1710.1-1734.9 / 1805.1-1829.9 MHz (2x27.0 MHz)	956'000
Ohters	**?**	31 MAY 2008	-	**45'000**
Average			**2 x 26.5 MHz**	

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
885 – 887 MHz	CT1+	Until end 2005 (Then: Additional spectrum for GSM)
930 – 932 MHz	CT1+	Until end 2005 (Then: Additional spectrum for GSM)

United Kingdom*

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
46,811,19	2*8.8 MHz	2*24.4	2 x 71.6 MHz	79.57%

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
02(UK) Limited	JAN 94	No expiry date	884.5-887.9 / 929.5-932.9 MHz 889.1-890.1 / 934.1-935.1 MHz 894.7-902.1 / 939.7 - 947.1 MHz 910.1-914.9 / 955.1-959.9 MHz 1710.1-1715.9/1805.1-1810.9 MHz (2x22.4 MHz)	11,171,000
T-Mobile (UK) Limited	SEP 93	No expiry date	1721.7-1751.7/1816.7-1846.7 MHz (2 x 30 MHz)	11,000,000
Orange Personal Communication Services Ltd	APR 94	No expiry date	1751.7-1781.7/1846.7-1876.7 MHz (2 x 30 MHz)	12,802,000

Vodafone Limited	JUL 92	No expiry date	880.1-884.5 / 925.1-929.5 MHz 890.1-894.7 / 935.1-939.7 MHz 902.3-909.9 / 947.3-954.9 MHz 1715.9-1721.7/1810.9-1816.7 MHz (2x22.4 MHz)	11,838,190
Average			**2 x 26.2MHz**	
Analogue:			Sevices ceased	

Frequency Band	**Other existing use in the GSM bands**	**License duration, Trends, When will band be available?**
888 – 889 MHz	Low Power Devices	31 December 2003

Section 2.2: Countries that did not reply to the questionnaire in May 2001

The information is taken from the ERO Information Document on GSM (Jan 2001)

Albania

GSM Subscriber	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
30.000	0		2 x 12.4 MHz	0	1 %
Operator	**Service start**	**License expires**	**Frequencies**		**No. of Subscriber**
Albanian Mobile Communications (AMC)	MAY 96	19 AUG 2014	890.0-902,4/935,0-947,4 MHz (2 X 12,4 MHz)		30.000
Analogue	-	-	None		-

A second Albanian GSM operator is planned and will be given the frequency sub-bands 907-915 / 952-960 MHz (2 x 8 MHz). The rest of the GSM shall be reserve. The E-GSM bands are not yet operational.

Andorra

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
26 000	0		2 x 25.0 MHz	0	40.0 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Subscribers**
STA (Mobiland)	1993	unlimited	890.0 – 915.0 / 935.0-960.0 MHz (2 x 25.0 MHz)		26 000
Average			**2 x 25.0 MHz**		
Analogue:			none		

The Andorran government is planning to grant a 1800 MHz license to STA.

Bulgaria

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
570 000	0		2 x 9.2 MHz	2 x 2.4 MHz	7.1 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Subscribers**
MobilTel	SEPT 95	AUG 2009	890.2-894.8 / 935.2-939.8 (2 x 4.6 MHz)		570 000
OTE	JAN 2001	JAN 2016	895.4-900.0 / 940.4-945.0 MHz (2 x 4.6 MHz) 1730.6-1733 / 1825.6-1828.0 MHz (2 x 2.4 MHz)		0
Average			**2 x 5.8 MHz per operator**		
Analogue			None		

Cyprus

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
186520	0		2 x 16.8 MHz	2 x 24.8 MHz	27.44 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Subscribers**
CYTA-PTT	APR 95	No limit	943.0-959.8 / 898.0-914.8 MHz (2 x 16.8 MHz) 1710.2-1735.0/1805.2-1830.0 MHz (2 x 24.8 MHz)		186 520
Analogue: CYTA-PTT	DEC 88	No limit	890.2-897.8 / 935.2-942.8 MHz (2 x 7.6 MHz)		1 242

Estonia

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
545 040	0		2 x 22.8 MHz	2 x 28,8 MHz	38,9 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. Of Sub scribers**
EMT	JAN 95	2010	898.2-905.8 / 943.2-950.8 MHz (2 x 7.6 MHz) 1775.3-1784.9/1870.3-1879.9 MHz (2 x 9.6 MHz)		327 000
Radiolinja Estonia	JAN 95	2010	906.2-913.8 / 951.2-958.8 MHz (2 x 7.6 MHz) 1760.1-1769.7/1855.1-1864.7 MHz (2 x 9.6 MHz)		118 040
Ritabell	APR 97	2010	890.2-897.8 / 935.2-942.8 MHz (2 x 7.6 MHz) Reserved DCS – 1800 (2* 9,6 MHz)		100 000
Average			**2 x 17,2MHz**		
Analogue			None		

Greece

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
5932000	0		2 x 20 MHz	2 x 25 MHz	57 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Panafon SA	JUL 93	SEP 2012	905-915 / 950-960 MHz (2 x 10 MHz)		2 226 000
TeleSTET	JUL 93	SEP 2012	890-900 / 935-945 MHz (2 x 10 MHz)		1 645 000
Cosmote	MAR 98	MAR 2023	1760-1785 / 1855-1880 MHz (2 x 25 MHz)		2 061 000
Average			**2 x 15 MHz**		
Analogue			none		

Lithuania*

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
1 292 000	0		2 x 22.8 MHz	2 x 21.6 MHz	37,1 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Bite GSM	DEC 95[1)] JAN 99[2)]	Not limited[3)]	899.3-904.1 / 944.3-949.1 MHz and 910.7-913.9 / 955.7-958.9 MHz and 1728.9-1736.1 / 1823.9-1831.1 MHz (2x15.2 MHz)		
Omnitel	MAR 95[1)] JAN 99[2)]	Not limited[3)]	895.7-898.1 / 940.7-943.1 MHz and 905.1-910.7 / 950.1-955.7 MHz and 1744.1-1751.3/1839.1-1846.3 MHz (2x15.2 MHz)		
TELE 2	MAR 01[1)] JUN 00[2)]	Not limited[3)]	890.1-895.7/935.1-940.7 MHz and 898.1-899.3/943.1-944.3 MHz and 1758.9-1766.1 / 1853.9-1861.1 MHz (2x14 MHz)		
Average			**2 x 14.8 MHz**		
Analogue:			None		

1) GSM 900
2) GSM 1800
3) Should be reregistered every 10 years

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
914–915 / 959–960 MHz	CT1 Cordless telephones	Should be phased out by the end of 2008

*Information updated September 2002

Malta*

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
239,416	0		2 x 16.8 MHz	2 x 25 MHz	60.7 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Vodafone Malta Limited	SEP 97	SEP 2010	896.2 – 913 / 941.2 – 958 MHz (2 x 16.8 MHz)		144,859
Mob*Isle* Communications plc.	DEC 2000	SEP 2010	1710 – 1735 / 1805 – 1830 MHz (2 x 25 MHz)		94,557
Average			**2 x 20.9 MHz**		
Analogue:			none		

Poland

GSM Subscr.	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
6 795 300	0		2 x 21.0 MHz	2 x 27.8	17.5 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Polkomtel (Plus)	23.02.96 GSM 900 13.09.99 GSM 1800	23.02.2011 13.09.2014	890.0-892.8 / 935.0-937.8 MHz and 897.2-903.4 / 942.2-948.4 MHz and 1757.6-1759.8/1852.6-1854.8 MHz and 1777.8-1784.8/1872.8-1879.8 MHz (2x 18.2 MHz)		2 460 000
Polska Telefonia Cyfrowa (ERA)	23.02.96 GSM 900 11.08.99 GSM 900	23.02.2011 11.08.2014	892.8-897.2 / 937.8-942.2 MHz and 903.4-908.0 / 948.4-953.0 MHz and 1755.0-1757.2/1850.0-1852.2 MHz and 1770.2-1777.2/1865.2-1872.2 MHz (2x 18.2 MHz)		2 950 000
CENTERTEL (IDEA)	5.07.99 GSM 900 21.08.97 GSM1800	5.07.2014 21.08.2014	908.0-911.0 / 953.0-956.0 MHz and 1760.4-1769.8 / 1855.4-1864.8 MHz (2x12.4 MHz)		1 385 300
Average			**2 x 16.3 MHz**		

The bands 911-915/ 956-960 MHz (2 x 4 MHz) have been reserved for CENTERTEL. The band 956-958 MHz will be made available by 1 July 2001 and the rest of the upper band by 1 January 2004.

Romania

GSM900/1800 Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
2 430 000	0		2 x 25 MHz	2 x 7 MHz	10.7 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
MobiFon	MAR 97	2006	890.0-902.4/935.0-947.4 MHz (2 x 12.4 MHz)		1 172 000
Mobil Rom	JUN 97	2006	902.6-915.0/947.6-960.0 MHz (2 x 12.4 MHz)		1 222 000
Cosmorom	APR 00	2009	2 x 6.8 MHz in the GSM 1800 band		36 000
Average			**2 x 10.4 MHz**		
Analogue			none		

Russia*

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
12500000	2 x 1.6 MHz		2 x 25 MHz	2 x 75 MHz	8.5 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of subscribes**
Mobile TeleSystems	1994	2007	GSM 900: From 2 x 4.8 up to 2 x 11,4 MHz per operator (non-consecutive channels shared with ARNS) depending on EMC conditions and market demand within licensing area GSM 1800: From 2 x 8 up to 2 x 20.0 MHz per operator (non-consecutive channels shared with FS) depending on local EMC conditions and market demand within licensing area		4 685 000
VympelCom	1997	2007	GSM 900: From 2 x 4.8 up to 2 x 10,0 MHz per operator (non-consecutive channels shared with ARNS) depending on EMC conditions and market demand within licensing area GSM 1800: From 2 x 8 up to 2 x 20.0 MHz per operator (non-consecutive channels shared with FS) depending on local EMC conditions and market demand within licensing area		3 630 000
MegaFon	1997	2011	GSM 900: From 2 x 3.0 up to 2 x 12,0 MHz per operator (non-consecutive channels shared with ARNS) depending on EMC conditions and market demand within licensing area GSM 1800: From 2 x 8 up to 2 x 20.0 MHz per operator (non-consecutive channels shared with FS) depending on local EMC conditions and market demand within licensing area		1 880 000
Regional operators	duration 10 years from licence issue		GSM 900: From 2 x 4.0 up to 2 x 10,0 MHz per operator (non-consecutive channels shared with ARNS) depending on EMC conditions and market demand within licensing area GSM 1800: From 2 x 8 up to 2 x 18 MHz per operator (non-consecutive channels shared with FS) depending on local EMC conditions and market demand within licensing area		2 305 000
Average			**GSM900 - 2 x 7.6 MHz** **GSM1800 – 2 x 9 MHz**		
Analogue:			none		

Frequency Band	Other existing use in the GSM bands	License duration, Trends, When will band be available?
880-890/925-935	Aeronautical Radio Navigation Service	till the end of lifetime, regional reassignment in order to release GSM channels
890-915/935-960	Aeronautical Radio Navigation Service	till the end of lifetime, regional reassignment in order to release GSM

*Information updated September 2002

		channels
1710-1785/1805-1880	Fixed Service	till the end of lifetime, no new assignments

Slovakia

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
1 293 734	0		2 x 18 MHz	2 x 15.6 MHz	24.3 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Eurotel GSM	FEB 97 DEC 99	AUG 2011	899-908 / 944-953 MHz (2 x 9 MHz) 1726.6-1733.8/1821.6-1828.8 MHz and 1747.2-1747.8/1842.2-1842.8 MHz (2 x 7.8 MHz)		493 030
Globtel	JAN 97 DEC 99	AUG 2011	890-899/ 935-944 MHz (2 x 9 MHz) 1717.4-1723.4/1812.4-1818.4 MHz and 1748.0-1749.8/1843.0-1844.8 MHz (2 x 7.8 MHz)		800 704
Average			**2 x 16.8 MHz**		
Analogue			None		

Slovenia

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
1 155 236	0		2 x 24.4 MHz	3 x 30 MHz	57.8 %
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Mobitel	OCT 96	APR13	902.6-914.8 / 947.6-959.8 MHz (2 x 12.2 MHz)		1 003 236
Simobil	APR 99	OCT13	890.0-902.4 / 935.0-947.4 MHz (2 x 12.2 MHz)		152 000
Average			**2 x 12.2 MHz**		
Western Wireless		JAN16	1710.1-1725.1/1805.1-1820.1 MHz (2 x 15 MHz)		
Mobitel		JAN16	1740.1-1755.1/1835.1-1850.1 MHz (2 x 15 MHz)		
Simobil		JAN16	1725.1-1740.1/1820.1-1835.1 MHz (2 x 15 MHz)		
Average			**2 x 15 MHz**		
Analogue	Mobitel	JUL91	411.675-415.850/421.675-425.850 MHz (2x4.175 MHz)		41.212

Turkey

GSM Subscribers	Total E-GSM		Total GSM-900	Total GSM-1800	GSM Penetration
13 925 000	0		2 x 20 MHz	2 x 14.8	22.9%
Operator	**Service start**	**License expiry**	**Frequencies**		**No. of Sub scribers**
Telsim	MAR 94	27 APR 2023	894-896 / 939-941 MHz and 898-906 / 943-951 MHz (2 x 10 MHz)		4 730 000
Turkcell	FEB 94	27 APR 2023	892-894 / 937-939 MHz and 906-914 / 951-959 MHz (2 x 10 MHz)		9 195 000
IS-TIM	Within a few months	20 OCT 2025	1710.2-1725.0/1805.2-1820.0 MHz (2 x 14.8 MHz)		0
AY – CELL	Within a few months	11 JAN 2026	Not allocated yet		0
Average			**2 x 8.7 MHz**		
Analogue:			none		

Ukraine

GSM Subscribers	Total E-GSM	Total GSM-900	Total GSM-1800	GSM Penetration
210 000	0	2 x 16.4 MHz	2 x 6.4 MHz	0.5%

Operator	Service start	License expiry	Frequencies	No. of Sub scribers
Golden Telecom	MAR 97		(2 x 6.4 MHz)	26 000
Ukranian Mobile Communication	SEPT 97		(2 x 5.6 MHz)	116 000
Kyivstar	DEC 97		(2 x 5.4 MHz)	54 000
Ukranian Radio Systems (WellComm)	OCT 98		(2 x 5.4 MHz)	14 000
Average			**2 x 5.7 MHz**	
Digital AMPS: Dig Cellular Com	OCT 96		(2 x 3.75 MHz)	36 000

*Information updated September 2002

ANNEX 7

ELECTRONIC COMMUNICATIONS COMMITTEE

ECC Decision of 15 November 2002 on the designation of frequency band 2500 – 2690 MHz for UMTS/IMT-2000

(ECC/DEC/(02)06)

EXPLANATORY MEMORANDUM

1. INTRODUCTION

There is a general understanding of the need of IMT-2000 services and corresponding spectrum requirements within Europe/CEPT to satisfy the society development with increasing needs of high bit rates for mobile services covering capacity needs, particularly for dense traffic areas.

There is also a growing interest in the evolution and development of UMTS/IMT-2000 services in addition to the ones launched during year 2002 within Europe. UMTS is part of IMT-2000, which is developed within the ITU on a world wide level. The radio interfaces of the IMT-2000 are specified in ITU Recommendation ITU-R M.1457, "Detailed Specifications of the Radio Interfaces of IMT-2000".

The first ERC Decision on UMTS, ERC Dec (97)07, was adopted by the ERC in 1997. Since then a large amount of activity has been ongoing within Europe involving manufacturers, operators and regulators. The ERC Dec (97)07 has then been extended with ERC Dec(00)01. Within the ITU Radiocommunications Sector the development of IMT-2000 and systems beyond is one of the main issues being discussed. UMTS/IMT-2000 is considered in many groups such as ECC (PT1 former TG 1), the UMTS Forum, ITU-R (WP 8F, former TG 8/1) and the 3rd Generation Partnership Projects (3GPPs).

The rapid progression of mobile issues and the results of WRC-2000 call for further ECC Decisions that will take into account these developments and which enables CEPT to implement the necessary regulatory regime for the designation of all the bands identified for UMTS/IMT-2000.

As a follow up to the WRC-2000 Resolutions 223 and 225, which have identified additional spectrum for the terrestrial and the satellite components of IMT-2000 systems, the European Commission issued, on 9 March 2001, a Mandate 4[38] calling upon CEPT to undertake preliminary investigations and to adopt a first set of harmonising measures necessary to ensure the availability in the Community of harmonised additional frequency bands for the provision of IMT-2000 services.

2. BACKGROUND

The CEPT has recognised the importance of UMTS/IMT-2000 for the whole community and the work and responsibilities of ERC TG1 was therefore transferred into ERC PT1, now ECC PT1.

The first IMT-2000 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 Decision (99)07.

Pursuant to their 'UMTS Decision', the European Commission has issued a series of mandates 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 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.

Mandate 4 has triggered a decision process intended to guarantee that sufficient additional spectrum for third generation mobile and wireless communication systems will be made available in the

[38] 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.

European Union in due time, in a co-ordinated manner and based on market demand. The Commission proposed that CEPT should follow a staged approach for the deliverables requested by Mandate 4, ultimately leading to the adoption, by 31 March 2003, of an **ECC Decision** designating the additional frequency bands to be used for IMT-2000 systems and defining a 'reference date' by which the additional spectrum should become available. The outcome of the preliminary investigations undertaken by CEPT and the validation of its findings should be described in a **Report** from CEPT to be delivered to the Commission by 30 November 2002. This Report from CEPT should provide a validation of the initial proposals developed by CEPT and the basis for the decisions subsequently enshrined in a formal **ECC Decision**.

The CPM report to WRC-2000 concluded on total spectrum requirements for the terrestrial element of IMT-2000 for the three Regions, which were based on the sum of the spectrum identified for IMT-2000 in RR **5.388**, the spectrum identified in the three Regions for existing second generation systems and an 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 estimated to be 160 MHz in all three Regions by 2010. Europe fully supported these conclusions. Also during 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. The standardisation work for UMTS/IMT-2000 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 technical specifications are written by the 3GPPs and transformed into standards by the regional standardisation organisations, including ETSI.

In May 1996 European regulators, operators and manufacturers established the UMTS Forum. The UMTS Forum has a group dealing with spectrum issues, Spectrum Aspects Group. The most important view of the Spectrum Aspects Group developed in preparation for the WRC-2000 was that the required spectrum for UMTS/IMT-2000 at year 2005 and year 2010 should be identified at WRC-2000 in as few bands as possible to facilitate the global roaming. Through its input to ERC TG1, the UMTS Forum has also contributed to the evaluation of additional spectrum requirements for UMTS/IMT-2000.

3. REQUIREMENT FOR AN ECC DECISION

The allocation or designation of a frequency band for its use by a service or system under specified conditions in CEPT member countries is laid down by law, regulation or administrative action. The ECC recognises that for UMTS/IMT-2000 to be deployed successfully throughout Europe, manufacturers and operators must be given the confidence to make the necessary investments in this extension of these radiocommunication systems and services. Therefore ECC believes that it is necessary to designate from the outset of all bands identified at WRC-2000 an adequate amount of spectrum. This was to provide an additional band to the already adopted bands in accordance with the ERC Decision(00)01, creating the environment for multiple commercial operators to offer additional bandwidth with the possibility to expand the service when the market demands so require. This will enable the multiple operator environment while giving all operators the possibility to offer additional capacity, particularly for dense traffic areas and new services. The users will benefit from the full range of services that UMTS/IMT-2000 make possible, with a reduced risk of bandwidth congestion. A commitment by CEPT member countries to implement an ECC Decision for the additional frequency band will provide a clear indication that the required frequency bands for further and future service demands will be made available on time and on a European-wide basis.

There is now an urgent need for an ECC Decision identifying the additional UMTS/IMT-2000 band at 2.5 GHz for terrestrial services in accordance with WRC-2000 outcome as complement to the existing ERC DEC (00)01. The ECC Decision on the additional band for UMTS/IMT-2000 should be embedded in a flexible approach that will allow room to adapt to specific national situations and needs while giving firm guidelines to administrations, operators, and manufacturers.

The detailed spectrum arrangements for the band 2500-2690 MHz will be decided by the end of year 2004.

ECC DECISION
15 November 2002

on the designation of frequency band 2500 - 2690 MHz for UMTS/IMT-2000

(ECC/DEC/(02)06)

"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);

c) that the ERC Decision (97) 07 designates the frequency bands 1900 - 1980 MHz, 2010 - 2025 MHz and 2110 - 2170 MHz to terrestrial UMTS applications;

d) that the ERC Decision (97) 07 indicates that the satellite component of UMTS can be accommodated in the bands 1980 – 2010 MHz and 2170 – 2200 MHz;

e) that CEPT has extended ERC Decision (97)07 with ERC Decision (00)01 to fully exploit the whole 155 MHz available in Europe for terrestrial UMTS;

f) that before the WRC-2000 ITU-R estimated the frequency requirements for terrestrial mobile spectrum in ITU Region 1 to be 555 MHz by the year 2010. This is to be fulfilled in Europe through the frequency bands designated to be used for second generation mobile services, the frequency bands designated in ERC/DEC/(97)07 and from within the band 2500 – 2690 MHz;

g) that the main CEPT IMT-2000 proposal to WRC-2000 was the identification of the frequency band 2500 – 2690 MHz for IMT-2000 expansion;

h) that the CEPT priority for WRC-2000 was the identification of additional spectrum for the terrestrial component of IMT-2000;

i) that WRC-2000 identified additional frequency bands for IMT-2000 in RR 5.384A of the Radio Regulations together with Resolutions 223 and 225;

j) that there is a need to facilitate UMTS interoperability throughout Europe;

k) that the bands 880 - 915 MHz, 925 - 960 MHz, 1710 - 1785 MHz and 1805 - 1880 MHz are currently used for GSM (2^{nd} generation terrestrial mobile system) in most CEPT member countries and are expected to be used by UMTS/IMT-2000 (3^{nd} generation terrestrial mobile system) only in the longer term after the additional spectrum at 2.5 GHz has been utilised;

l) that the band 2500 - 2690 MHz is currently used for the fixed and/or mobile service in most CEPT member countries;

m) that there will be differences in the demand for UMTS/IMT-2000 spectrum across Europe which could lead to an offset in timescales concerning the introduction of the additional band 2500 – 2690 MHz for UMTS/IMT-2000;

n) that it is the view of CEPT that ITU-R should recommend globally harmonised frequency arrangements for all of the additional IMT-2000 terrestrial bands, with a view to publishing channel arrangements in one or more ITU-R Recommendation(s);

o) that further information is necessary prior to the development of ECC Decision on frequency arrangements in the band 2500-2690 MHz considering the traffic asymmetry and other market requirements;

p) that the European Common Table of Frequency Allocations and Utilisation (ERC Report No 25, revised January 2002) is indicating the bands 2500 – 2520 MHz and 2670 – 2690 MHz to be used for the extension of UMTS/IMT-2000 terrestrial and satellite component;

q) that there are planned separate ECC Decisions covering detail planning of the band 2500 - 2690 MHz and related transitional arrangements;

r) that there is planned a separate ECC Report covering adjacent band compatibility for the band 2500 – 2690 MHz.

recognising

a) that to facilitate global roaming it is important to have harmonised spectrum, licensing and circulation arrangements for the use of IMT-2000 terminals;

b) the Mandate No.4 from the EC, which requests CEPT to develop and adopt the measures necessary to ensure the availability in the Community of harmonised frequency bands, within the additional spectrum bands identified by WRC2000 for the provision of terrestrial and satellite UMTS/IMT-2000 services;

c) that flexibility should be afforded to administrations to determine, at a national level, the availability of the 2500 – 2690 MHz band for UMTS/IMT-2000 in order to meet their specific deployment of existing systems, market demand and other national considerations;

decides

7. to designate the frequency band 2500 – 2690 MHz to UMTS/IMT-2000 systems;

8. that the frequency band 2500 – 2690 MHz should be made available for use by UMTS/IMT-2000 systems by 1 January 2008, subject to market demand and national licensing schemes;

9. to designate the frequency band 2520 – 2670 MHz for the use by terrestrial UMTS/IMT-2000 systems and;

10. that the detailed spectrum arrangements for the 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 by the end of 2004;

11. that this Decision shall enter into force on 15 November 2002 and;

12. that CEPT Member Administrations shall communicate the national measures implementing this Decision to the ECC Chairman and the ERO when the Decision is nationally implemented.

Note:

Please check the CEPT web site (http//:www.CEPT.org) under “Documentation / Implementation” for the up to date position on the implementation of this and other ECC Decisions.

Current Status of Frequency Arrangement Discussions

2500-2690MHz Band

This section describes how a generic principle can be used to generate specific frequency arrangements.

The band 2500-2690 MHz is divided into three parts, as shown in Figure 1.

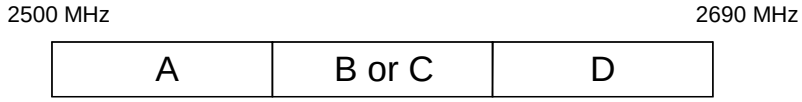


Figure 1: Three sub-bands A, B or C and D in the 2500-2690 MHz band.

With these three parts, the following scenarios could be implemented:

	A	B or C	D
Scenario 1	FDD Uplink operation paired with sub-band D	TDD operation	FDD Downlink operation paired with sub-band A
Scenario 2	FDD Uplink operation paired with sub-band D	FDD Downlink operation paired with a band outside 2500 – 2690 MHz	FDD Downlink operation paired with sub-band A

Table 1: Scenarios in the frequency sub-bands A, B or C and D shown in Fig. 1.

In case the extension band 2500-2690 MHz will be used only as a capacity extension to other IMT-2000 bands (e.g. the WARC-92 bands), without FDD Uplink operation, to provide additional capability for asymmetric traffic, the band can be divided only into two sub-bands, as shown in Figure 2.

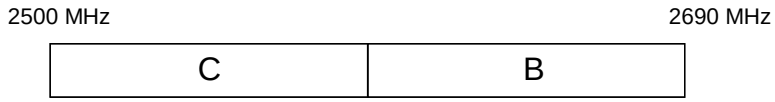


Figure 2: Two sub-bands B and C in the 2500-2690 MHz band

Now, the following scenario 3 may also be applied:

	C	B
Scenario 3	FDD Downlink operation paired with a band outside 2500 – 2690 MHz	TDD operation

Table 2: Scenario in the frequency sub-bands B and C shown in Figure 2

The case where the whole extension band 2500 – 2690 MHz is only used for FDD Downlink operation or TDD operation is shown in Figure 3.

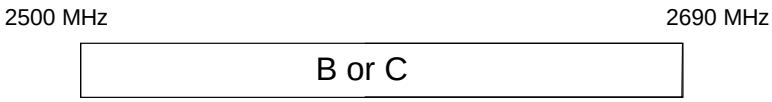


Figure 4: One sub-band in the 2500-2690 MHz band

Now, the following scenarios 4 and 5 may also be applied:

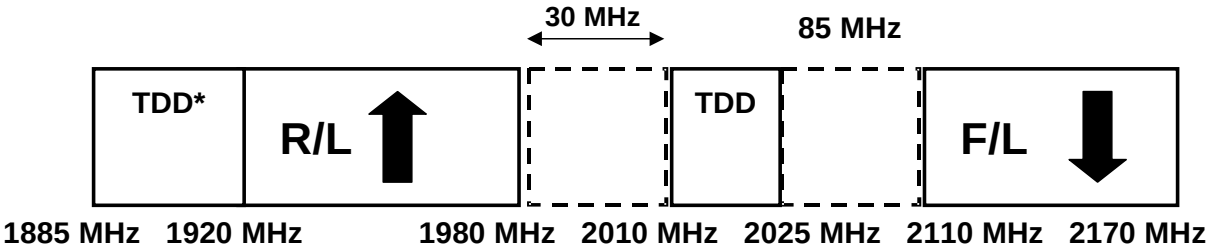
	B or C
Scenario 4	TDD operation
Scenario 5	FDD Downlink operation paired with a band outside 2500 – 2690 MHz

Table 4: Scenarios in the frequency sub-band B or C shown in Figure 4

1710-2170MHz Band

WARC-92 band frequency arrangement

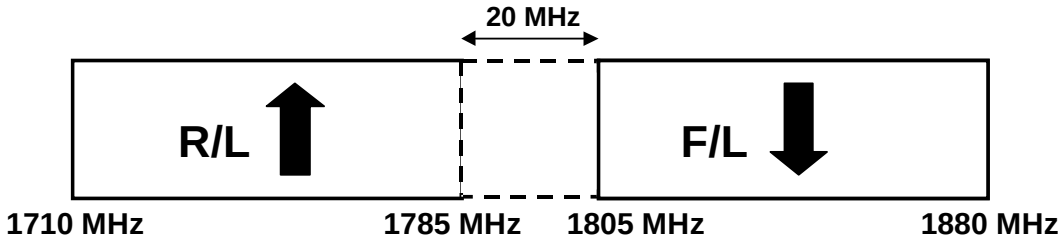
The WARC-92 band frequency channelling, as shown below, has already been implemented for first IMT-2000 deployment in many countries:



**The band 1880-1900 MHz is used for DECT*

Pairing of the band 1710-1785 MHz with 1805-1880 MHz

This frequency channelling will facilitate the migration of 2G systems operating in accordance with this frequency plan since it is implemented for GSM1800 in Europe and in many other countries.



880-960MHz Band

Pairing of the band 880-915 MHz with 925-960 MHz

This frequency channelling will facilitate the migration of 2G systems operating in accordance with this frequency plan since it is implemented for GSM900 in Europe and in many other countries.