

**Public Consultation
on Essentials of
Awarding Licences for
Third Generation Mobile Systems**

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Introduction

On behalf of the Telekom-Control Commission, Telekom-Control GmbH is holding a consultation with regard to the planned award of licences for UMTS (Universal Mobile Telecommunications System).

UMTS is a new mobile communications system providing for significantly higher data rates than the current mobile systems. Contrary to GSM, data and multimedia services will become the focus of attention in UMTS. Service providers and content providers will therefore play a more significant role, in addition to infrastructure providers. UMTS can be considered a milestone in the convergence of IT, media and telecommunications.

To allow for the introduction of UMTS in Austria in the year 2002 several UMTS licences shall be awarded at the turn of 2000/2001. This consultation shall give providers of communications networks, service providers, content providers as well as the interested public the opportunity to comment on essential items concerning the award of UMTS licences and on the impact of UMTS on the telecommunications market.

The comments should be sent by 13 September 1999, if possible (also) in electronically readable format, to Telekom-Control GmbH, A-1060 Vienna, Mariahilferstraße 77-79, att. Ms. Birgit Göß (email: umts@tkc.at, phone: +43 1 58058-301, fax: +43 1 58058-9301).

Unless explicitly stated otherwise, the comments will be published on the home page of Telekom-Control GmbH. Parts of the comments which are not to be published shall be marked appropriately.

The consultation serves as an initial approach to the topic. The contents are non-binding and do not prejudice the decisions of the Telekom-Control Commission.

1 General information on UMTS

In this chapter general aspects of UMTS are discussed. Following a short introduction, standards and spectrum issues for UMTS are dealt with.

1.1 Introduction

UMTS (Universal Mobile Telecommunications System) is the European contribution to the global third generation mobile communications systems. First generation mobile systems are analogue systems like the so-called D-network in Austria. GSM (Global System for Mobile Communications) is the most successful representative of second generation mobile communications systems. With currently more than 160 million subscribers GSM which is based on a European standard is in use all over the world.

UMTS is expected to become a reality in 2002, combining functionalities of mobile, cordless and paging systems. UMTS will allow for packet-switching, and data rates exceeding those of the current mobile systems by far shall be offered. By this multimedia applications (integration of voice, video and data communications) can be realised.

UMTS is composed of a terrestrial system and a satellite system. The satellite system shall allow for mobile communications especially in areas where terrestrial coverage is not possible. The current activities at European and national levels mainly focus on the terrestrial part. In this document the terrestrial element of UMTS is discussed.

1.2 Standardisation

IMT-2000 (International Mobile Telecommunications 2000) is the global third generation mobile communications system. The ITU is responsible for standardising IMT-2000 which shall comprise various third generation mobile communications systems within the framework of a family concept. Roaming between the systems shall be possible in any case.

UMTS, the European contribution to IMT-2000, is standardised by 3GPP (3rd Generation Partnership Project). ETSI (European Telecommunications Standards Institute) is one of the members of 3GPP. In January 1998 ETSI took a decision regarding the radio interfaces for UMTS. The UTRA radio interface (UMTS Terrestrial Radio Access) comprises W-CDMA (Wideband Code Division Multiple Access) for operation in FDD (Frequency Division Duplex) mode and TD-CDMA (Time Division Code Division Multiple Access) for operation in TDD (Time Division Duplex) mode. The data rates for UMTS shall be at least 144 kbit/s in rural outdoor environment, 384 kbit/s in urban outdoor environments and 2048 kbit/s in indoor and low range outdoor environments.

The UMTS Forum, an association of operators, manufacturers, regulators and other organisations, deals with fundamental topics with regard to UMTS.

Views are invited on the following questions:

- 1.1 *To what extent should UMTS/IMT-2000 standardisation have progressed at the time of licence award?*
- 1.2 *To what extent must standardisation be completed in order to allow the commercial introduction of UMTS/IMT-2000?*
- 1.3 *To what extent is standardisation beyond UTRA required?*
- 1.4 *Should only the UMTS standard with the UTRA radio interface or also other IMT-2000 standards be licensed in Austria?*
- 1.5 *To what extent will UMTS/IMT-2000 systems be based on GSM?*

1.3 Frequency spectrum

For Europe the frequency bands for UMTS have been defined by CEPT/ERC in the Decision ERC/DEC/(97)07. For the terrestrial component of UMTS a total of 155 MHz is designated. The spectrum 1920 - 1980 MHz and 2110 - 2170 MHz, i.e. 2x60 MHz, is identified as paired spectrum and the spectrum 1900 – 1920 MHz and 2010 – 2025 MHz as unpaired spectrum. According to the CEPT/ERC Decision, which Austria has undertaken to implement, 2x40 MHz from the 1900 – 1980 MHz and 2110 – 2170 MHz bands shall be made available to UMTS from 1 January 2002. In line with the Ordinance on Frequency Utilisation, in Austria the entire spectrum of 155 MHz provided for terrestrial applications will be available for UMTS from 1 January 2002. The extent to which the utilisation of this frequency spectrum will be constrained because of different use of this range in neighbouring countries and the required co-ordination measures is currently under review. Apart from the award of frequency bands to licensed operators, there are considerations to use parts of the unpaired spectrum for unlicensed operation (e.g. for private LANs, etc.).

The UMTS Forum estimates that after 2005 additional spectrum for UMTS (extension bands) will be required [5,6]. In addition, refarming of frequency bands for second generation mobile communications systems for the operation of UMTS is envisaged.

Views are invited on the following questions:

- 1.6 *Which extension and refarming bands should be envisaged in order to meet future requirements?*
- 1.7 *How should, where appropriate licensed and unlicensed frequency bands be distributed?*

2 Awarding of UMTS licences

Several factors are decisive for the award of UMTS licences. On the one hand, the above mentioned frequency spectrum, on the other hand, however, the legislative framework and the licensing process are of critical importance. These factors shall now be addressed in greater detail.

2.1 Legislative framework

2.1.1 European legislation

According to art. 3 of the Decision 128/1999/EC of the European Parliament and of the Council of 14 December 1988 on the coordinated introduction of a third generation mobile and wireless communications system (UMTS) in the Community, the member states shall be obliged to take all necessary measures to enable, pursuant to art. 1 of the Directive 97/13/EEC, the gradual coordinated introduction of the UMTS services in their territories by 1 January 2002. By 1 January 2000 appropriate licensing procedures shall be established.

Pursuant to art. 3 subsec. 2 of the decision, the member states shall, on request, be granted an additional implementation period not exceeding 12 months, in addition to the periods stated in subsec. 1, to establish a licensing procedure and to introduce the UMTS services if this is justified because of unexpected technical problems occurring in the course of implementing the required adaptations of their frequency plans.

Pursuant to art. 3 subsec. 3 of the decision, the member states in preparing and using their licensing procedures shall be obliged in accordance with Community law to ensure that in the provision of UMTS

- frequency bands are utilised which have been harmonised by CEPT pursuant to the procedure specified in article 5;
- European UMTS standards developed or approved by ETSI, where available, are used, comprising a common, open and internationally competitive radio interface in particular. The member states shall ensure that the licences permit transnational roaming within the Community.

Art. 3 Subsec. 4 of the decision defines that the member states shall coordinate their actions so that compatible types of UMTS systems will be approved within the Community.

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 licences in the field of telecommunications services contains relevant provisions with regard to licensing procedures.

Art. 3 of the directive specifies that individual licences shall be granted only if the licensee is given access to scarce material and other resources or is subject to special obligations or enjoys special rights. Individual licences shall be granted by open, non-discriminatory and transparent procedures, which shall be the same for all applicants, unless there exists an objective reason for a different treatment.

The individual licences shall be granted on the basis of objective, non-discriminatory, detailed, transparent and proportionate selection criteria.

Art. 3 subsec. 2 of the directive specifies that licences may be provided only with the conditions listed in the Annex. With regard to the respective service, these conditions shall be objectively

justified, non-discriminatory, proportionate and transparent.

The Annex specifies, among other things, that conditions may be attached to individual licences only

- if they are justified and comply with the principle of proportionality,
- if they are in connection with the actual utilisation and the efficient administration of radio frequencies, or
- if they refer to a maximum duration, in particular, to ensure the efficient utilisation of radio frequencies.

2.1.2 National legislation

The European legislative requirements of the Directive 97/13/EC have been implemented in the *Telekommunikationsgesetz* (Telecommunications Act).

The Telecommunications Act also covers the licensing procedure stipulated in the Decision 128/1999/EC.

The award procedure for mobile services subject to licensing is laid down in art. 20f of the Telecommunications Act.

The Regulatory Authority shall award the licences for mobile services in line with the principles of an open, fair and non-discriminatory procedure. By virtue of office it shall invite public tenders for the intended award of a licence for mobile services if a licence application for the respective service has been submitted as well as if required. The invitation to tender for the licence may refer to specific services and specific service areas, after the matter has been referred to the Federal Minister of Science and Transport and he has agreed (art. 22 subsec. 2 of the Telecommunications Act).

The invitation to tender shall be published in the Official Gazette to the *Wiener Zeitung*. A period of at least two months shall be defined during which bids may be submitted.

Considerable changes of the conditions of the tender shall be permitted only if legal or international regulations that are binding on the Republic of Austria change. In addition, the Regulatory Authority shall be entitled to call off the tender for important reasons or to discontinue the process.

Pursuant to art. 21 subsec. 2 of the Telecommunications Act, the application for the award of a licence for mobile services shall state the single or recurring frequency utilisation fee which the applicant, if he is awarded the licence, is willing to pay for use of the frequencies designated for the provision of the telecommunications service.

Pursuant to art. 22 subsec. 6 of the Telecommunications Act, essential modifications of the applications after expiry of the tender period shall not be permitted. This shall not apply to the opportunity to be already provided in the tender that the frequency utilisation fee offered may be subsequently modified for a period to be specified in the tender. The frequency utilisation fee may be increased only.

The Regulatory Authority shall grant the licence to the applicant who complies with the pre-qualification requirements according to art. 15 subsec. 2 of the Telecommunications Act and ensures the most efficient use of the frequencies; this shall be determined according to art. 21 of the Telecommunications Act by the amount of the frequency utilisation fee offered (art. 22 subsec. 1 of the Telecommunications Act).

Pursuant to subsec. 7, the Regulatory Authority shall exclude bidders who do not fulfil the fundamental requirements for obtaining a licence pursuant to art. 15 subsec. 2 from the licensing process.

Therefore, in a first step the pre-qualification requirements according to art. 15 subsec 2 are

reviewed. If these requirements are not fulfilled, the applicant shall be excluded from the tender by means of notification.

From among the remaining applicants the bidder who guarantees the most efficient use of frequencies is then selected; this will be determined by the amount of the frequency utilisation fee offered (art. 22).

In the second step the licence holder is therefore determined by means of an auction.

2.2 Frequency spectrum per operator - number of licences

The UMTS Forum recommends per operator an initial minimum spectrum of 2x15 MHz in the paired band and additional 5 MHz in the unpaired band [4]. If the licence were awarded in line with this recommendation with a total of 155 MHz available for the terrestrial component of UMTS, licences might be granted to four operators. Parts of the remaining 15 MHz could be used for unlicensed operation (coordination of frequency bands for unlicensed operation within Europe is conducted by CEPT/ERC). In some European countries also alternatives are being discussed which provide for allocation of less amount of spectrum to existing GSM operators in order to allow a greater number of operators or new operators to enter the UMTS market.

Views are invited on the following questions:

- 2.1 Should licences be awarded for the entire Austrian territory or for regions?*
- 2.2 What do you consider the initial minimum requirements for paired and unpaired spectrum for an operator with and without a GSM licence?*
- 2.3 Should a larger frequency spectrum be available to operators without a GSM licence?*
- 2.4 How many UMTS operators with a reasonable amount of spectrum would be possible?*
- 2.5 Should all operators be allocated the same amounts of frequency spectrum?*
- 2.6 Should a fixed frequency spectrum be assigned to the individual licences prior to the licensing process or should it be possible that the potential operators define the spectrum in the course of the licensing process? Determination in the course of the licensing process might be done by auctions of small frequency packages. A minimum amount of frequencies per operator might be specified.*
- 2.7 How do you consider the spectrum requirements for individual operators and as a whole with regard to the time schedule?*
- 2.8 Should UMTS operators with licensed spectrum be able to use also the unlicensed bands?*

2.3 Basics on auctions

The following shall give a short overview of the most important auction types employed in the course of frequency allocation.

2.3.1 Sealed bid versus multiple round auctions

In a sealed bid auction the licence is awarded to the highest bidder after one round. Contrary to that, in a multiple round (or ascending) auction a licence is awarded after several rounds in which the bidders may increase their bids. The process ends if no new bid is made. Between rounds the bidders are informed of the current state (highest bid etc.) of the auction.

In allocating frequencies multiple round auctions are primarily used for a number of reasons. The main reason is to prevent the winner's curse, i.e. the risk of bidding beyond the actual value of an auction item. Thus, multiple round auctions bear less risk for the bidders.

2.3.2 Sequential auction versus simultaneous auction

If several items are put up for auction, the question is if the auction should be simultaneous or sequential. In a simultaneous auction all auction items are auctioned at the same time. During the auction bidders may switch from one auction item to the other, depending on their preferences, privileges¹ and, of course, on the current price.

With allocation of frequencies, simultaneous auctions have been used almost exclusively. This is mainly due to interdependencies existing between the auction items (licences, frequency packages, etc.) which may be either of substitutive or complementary nature. In complementary relationships synergy effects are derived for the bidder: the value of the item will increase if the complementary item is bought at auction as well. A good example of complementary relationships between auction items are frequency packages in adjacent regions. In substitutive relationships items are of the same value for a bidder, i.e. they can be substituted. The major disadvantage in a sequential auction is that when one of the items is auctioned, only limited information (e.g. on prices) is available on the outcome of future auctions, so that the values of the respective items have to be estimated by the bidders. Sequential auctions also limit the strategic flexibility of the bidders. If e.g. the price of an auction item increases excessively, alternative strategies (switch to substitutes) can be developed and implemented only to a very limited extent. Contrary to that, in a simultaneous auction all items are auctioned at the same time. The bidders have up-to-date information on the current prices and can switch between the items according to this information and develop alternative strategies with regard to efficiently aggregating a number of items. A simultaneous auction offers greater security and flexibility for the bidders. Moreover, in a simultaneous auction market prices are achieved - items of similar value (substitutes) obtain a similar price.

¹ Maximum number of auction items a bidder may buy at auction

2.3.3 Combinatorial bidding

While high synergy effects are created for bidders by the combination of items, individual bidding² may involve a risk for the bidders. If the individual bids are based on the synergy value³ and if only part of the combination sought can be obtained, the price will exceed the value. One way of accounting for this problem is to permit combinatorial or package bidding, i.e. to accept bids for combinations of auction items. If very high synergy effects exist, combinatorial bidding will create fairer chances for the bidders. Opposed to this advantage, however, is a greater complexity of the process leading to a higher degree of insecurity and higher costs of the process.

2.3.4 Multi-stage auctions

Another type of auction used for allocating frequencies is the so-called two-stage (multi-stage) auction. In a two-stage auction the licences (together with a basic set of frequencies, where appropriate) are put up for auction separately from the frequency spectrum.

Variations on this type are currently under discussion in some European countries in the course of UMTS licensing.

2.4 Options for UMTS

A decision on the concrete auction design can only be taken after a number of marginal conditions have been clarified, such as:

- the number of licences, in particular, however, the question, if it shall be determined by the auction itself;
- the frequency spectrum of the specific licences, in particular the question whether all licences shall comprise the same amount of spectrum or if the frequency spectrum shall be determined by the auction itself;
- appropriate preferred treatment of new entrants, i.e. operators who are new to enter the mobile market in the course of UMTS licensing, e.g. by means of a larger frequency spectrum.

In auctions for UMTS licences more than one auction item will be sold. For the reasons given above, this suggests that a simultaneous multiple round auction should be chosen.

Apart from this basic variant - depending on the above mentioned outline conditions - only options may be suggested from today's point of view. These options are based on the following matrix (Fig. 1), where four options are conceivable, depending on whether the number of licences and their spectrum packages are decided on by the regulator prior to the actual licensing process or determined by the auction according to the preferences of the specific bidders (market). If the frequency packages are determined via the market, smaller packages shall be auctioned. The total frequency package of a licence is the sum of frequency bands bought at auction by a bidder.

² i.e. for specific items

³ The value as represented by the auction items combined

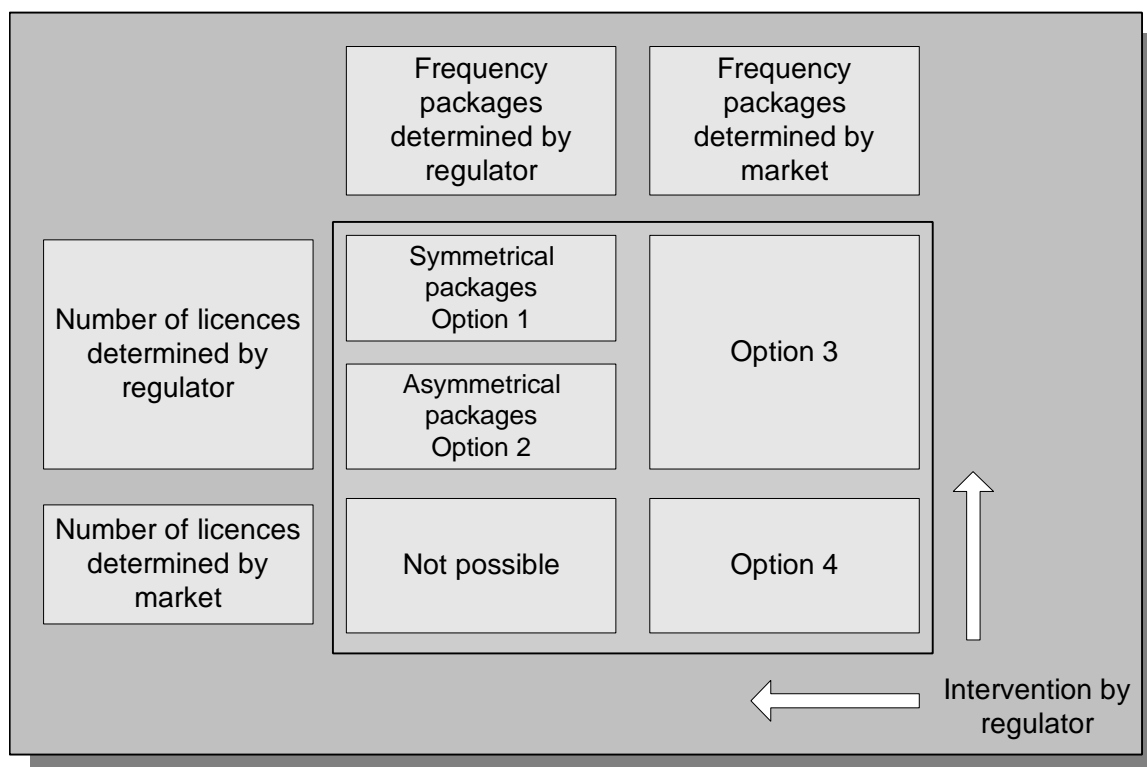


Fig. 1: Options for frequency packaging and auction types

- Option 1:** The number of licences and the spectrum packages are predetermined. Packaging is symmetrical. New entrants are not preferred. In this case a simultaneous multiple round auction would be the preferred type of auction.
- Option 2:** The number of licences and the spectrum packages are predetermined. Packaging is asymmetrical. New entrants may be preferred by obtaining a larger frequency spectrum. In this case a one- or two-stage simultaneous multiple round auction would be the preferred type of auction.
- Option 3:** The number of licences is predetermined. The spectrum packages are determined by the market (auction). Either a two-stage simultaneous multiple round auction or a simultaneous multiple round auction, with reduced combinatorial bidding where appropriate, are the preferred types of auction.
- Option 4:** The number of licences and the frequency packages are determined by the market (auction). A simultaneous multiple round auction, with reduced combinatorial bidding where appropriate, is the preferred type of auction.

Views are invited on the following questions:

- 2.9 *Please state your position on these comments and on the individual options.*
- 2.10 *Do you believe that other options exist in addition to the ones described?*
- 2.11 *Which of the options suggested would you prefer?*

2.5 Changing the law

The problems that arise are to the effect that a simultaneous award of licences on the basis of the provisions of the Telecommunications Act in connection with the applicable provisions of the Act on General Administrative Procedures would involve great legal risk.

The provisions of the Telecommunications Act are designed for awarding a licence for which several applicants exist. Such a procedure can be carried out on the basis of the current legal regulations. However, the simultaneous award of several licences to several applicants is not possible on the basis of the current legal situation (or only at great legal risk). This would mean that if the current legal situation persists, the UMTS licences would have to be auctioned sequentially.

A simultaneous award on the basis of the current legal provisions would also involve considerable procedural risks for potential bidders.

The economic disadvantages to be expected and the legal problems resulting from the anticipated different frequency utilisation fees should be taken into account in considering an amendment of the Telecommunications Act.

2.6 Licences

The existing GSM operators have the following licences:

- **Mobilkom Austria AG:** The licence will terminate on 31 December 2015. Presently, Mobilkom is entitled to use a frequency spectrum of 2x8 MHz from the GSM-900 frequency range and 2x5 MHz (limited to Vienna) from the GSM-1800 frequency range. The coverage target is 75%.
- **max.mobil:** The licence will also terminate on 31 December 2015. Presently, max.mobil is entitled to use a frequency spectrum of 2x8 MHz from the GSM-900 frequency range. According to art. 125 subsec. 3 of the Telecommunications Act, max. mobil can apply for additional frequencies in package of 5 MHz from the frequency range reserved for DCS-1800 if their subscriber capacity is demonstrably exhausted and they have taken all reasonable economic and technical measures in order to increase subscriber capacity. The coverage target is also 75%.

- **Connect:** The licence will terminate on 31 December 2017. Presently, the frequency spectrum assigned comprises 2x16.8 MHz from the GSM-1800 frequency range. When a subscriber volume of 300,000 and a coverage of 75% are reached, the spectrum will be extended to a total of 2x22.5 MHz.
- **tele.ring:** The licence will terminate on 31 December 2019. The frequency spectrum assigned comprises 2x14.8 MHz from the GSM-1800 frequency range. The coverage imposed is 98%, to be achieved within three and a half years after granting the licence.

Pursuant to art. 3 subsec. 2 of the Directive 97/13 EEC of the European Parliament and of the Council of 10 April 1997 on a common framework for general authorisations and individual licences in the field of telecommunications services, licences may be provided with the conditions listed in the Annex to this directive.

The UMTS licences, if bought at auction by the existing operators, will actually be an extension of their GSM licences. The licences shall be designed such that the provisions are compatible with those of the existing licences.

Therefore, the licences are likely to contain different provisions depending on whether an existing operator or a new entrant is awarded the licence.

Basically, the tender should be designed such that new operators, too, get a realistic opportunity to purchase a licence and to enter the market,

In order not to impede the introduction of new services, frequency spectrum is assigned for a limited period of time. Thus, licences for services requiring frequency spectrum are allocated only for a limited period of time.

Various conditions, e.g. coverage obligation during roll-out, compliance with quality criteria (e.g. dropped calls), may be attached to the licence. In defining such criteria it would be useful if the licence conditions of all licence holders be reviewed jointly.

Views are invited on the following questions:

- 2.12 *Which legal framework might enable or facilitate access of new entrants to the market?*
- 2.13 *For which period of time should UMTS licences be awarded?*
- 2.14 *Should obligations with regard to the number of subscribers and coverage during roll-out be contained in the licences?*
- 2.15 *For which (carrier) services should these obligations be imposed?*
- 2.16 *Shall UMTS operators be obliged to adhere to quality criteria in the licence documents?*
- 2.17 *If so, which criteria might be useful?*

2.7 Time schedule

Figure 2 gives an overview of the time schedule aimed at by the competent Austrian regulatory authorities, which provides for the award of the UMTS licences at the turn of 2000/ 2001.

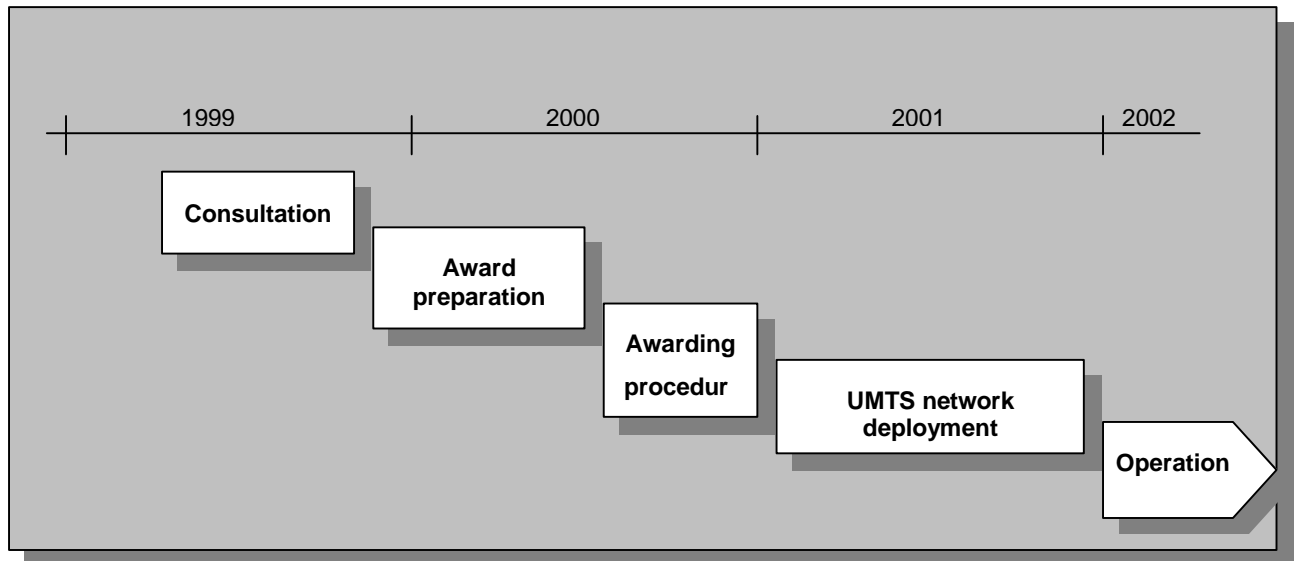


Fig. 2: Time schedule for the introduction of UMTS in Austria

The major milestones for the introduction of UMTS in Austria are listed in the following table.

Milestone	Time schedule
Consultation	
• Publishing of Consultation	2 nd quarter 1999
• Receipt of comments	3 rd quarter 1999
• Publishing of comments	4 th quarter 1999
Licensing process	
• Invitation to tender	3 rd quarter 2000
• Auction	4 th quarter 2000 1 st quarter 2001
• Award of licence	1 st quarter 2001
Start of network deployment	1 st quarter 2001
Commercial launch of UMTS	1 st quarter 2002

Table 1: Milestones of the introduction of UMTS

3 The UMTS market and its implications for competition

This chapter deals with the impact of UMTS on the telecommunications market and its regulation. On the basis of a new, more diversified value chain the impact on markets, convergence, interconnection etc. are examined and the implications for regulation are presented.

3.1 UMTS value chain

It is expected that within the framework of UMTS a new value chain (see Fig. 3) will emerge. Contrary to second generation mobile communications networks (see Fig. 3), service providers and content providers will play a more significant role. This is due to the fact [1,7] that, on the one hand, there is no dominant application for UMTS and the required variety of services will be possible only by a variety of service and content providers. On the other hand, the standardisation of UMTS is directed at broadband communications and thus multimedia communications [7]. The provision of multimedia applications is hardly possible without corresponding contents.

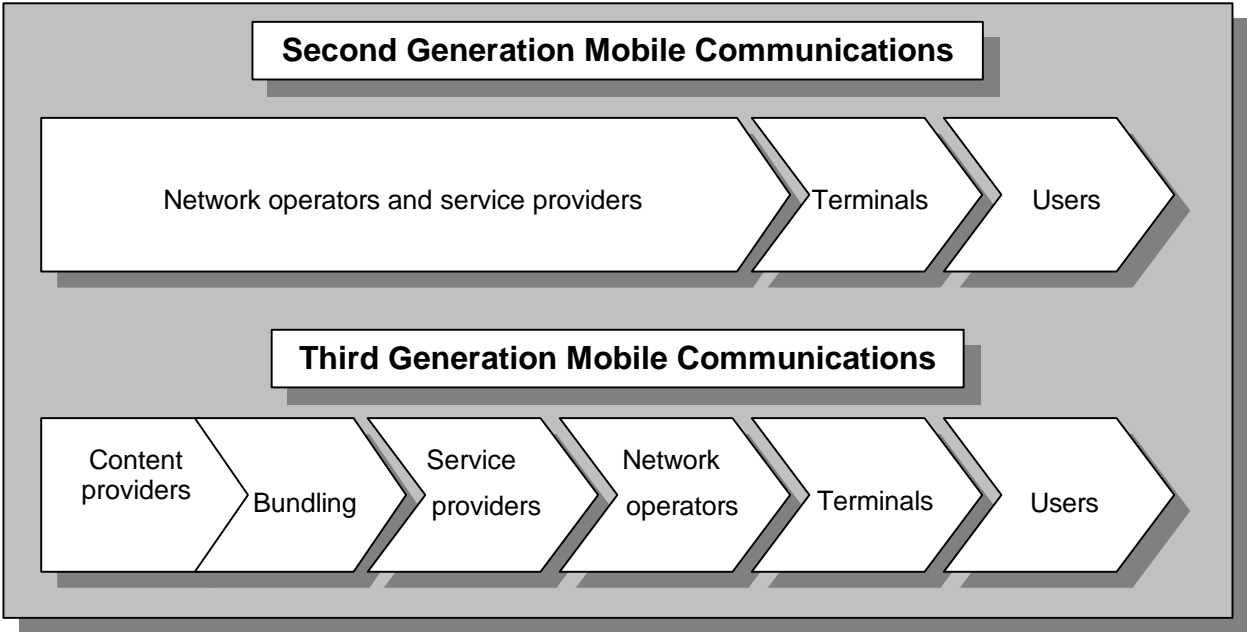


Fig. 3: Comparison of second and third generation mobile communications value chains

3.2 Market players and market roles in the UMTS market

On the basis of this more diversified value chain the most major market players relevant to regulation and their roles in the UMTS market shall be examined in greater detail.

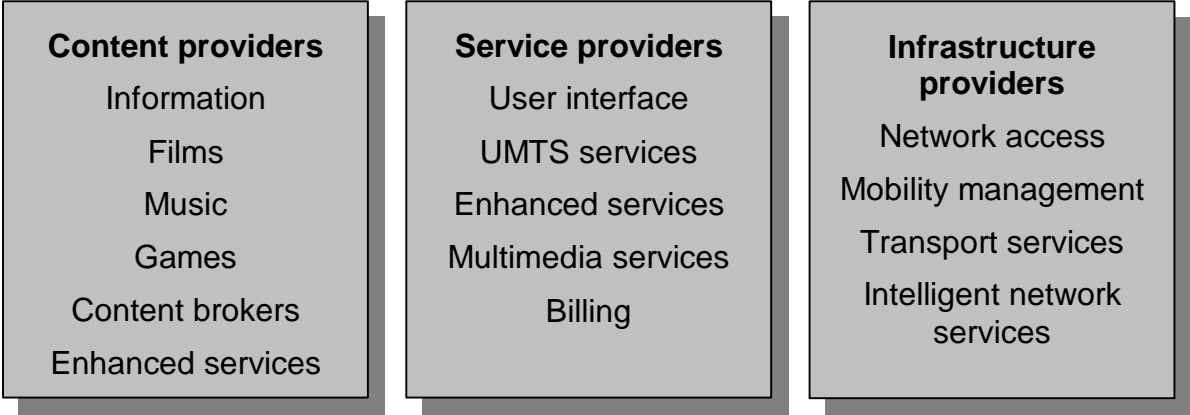


Fig. 4: Market players in the UMTS market

As can be seen in Fig. 4, the introduction of UMTS adds to creating a more diversified and greater value creation which in turn is accompanied by an increase in - more specialised - market players. For the sake of completeness it shall be mentioned in this context that, of course, there will be market players who will be active at several levels of the value chain (so-called vertically integrated providers). It can be assumed that both infrastructure providers and content providers will offer multimedia services and other UMTS services.

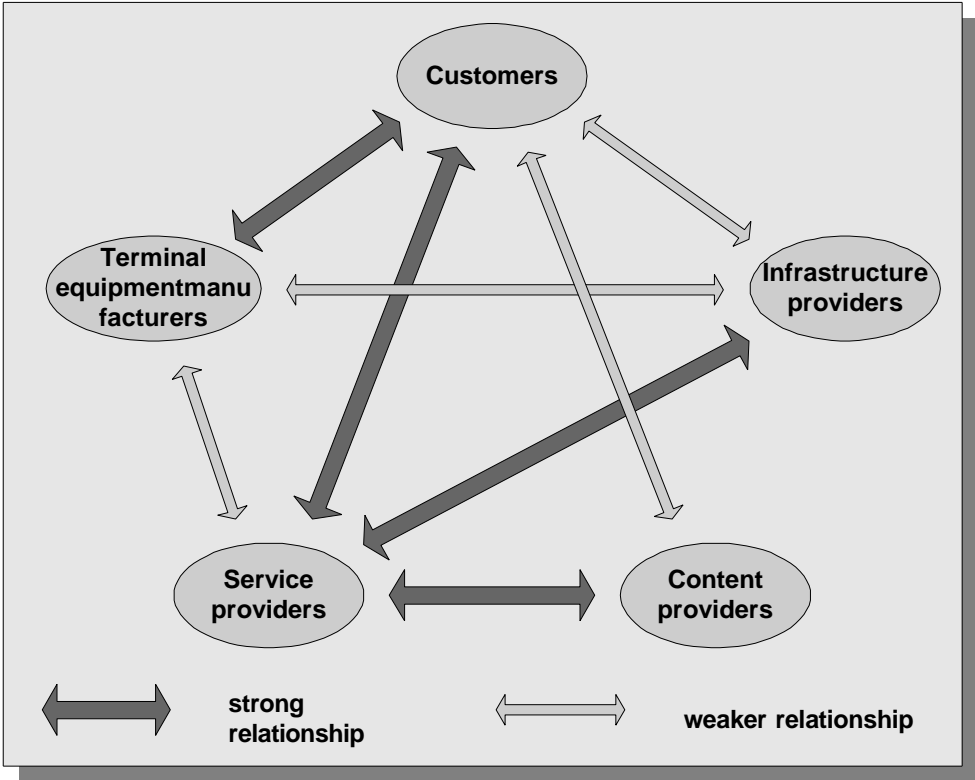


Fig. 5: Relationships between market players

The emphasis is also placed on the relationships (see Fig. 5) between the individual market players. In case of non-integrated enterprises these relationships represent markets.

Views are invited on the following questions:

- 3.1 *Do you agree with this view, in particular on the market relationships and roles?*
- 3.2 *Which functions do you believe are performed by the individual market players? Which function do you plan to perform?*
- 3.3 *Which horizontal and vertical integration options do you envisage?*

3.3 UMTS products and markets

Since the current regulation framework is strongly geared to companies with considerable market power, the definition and delimitation of the markets relevant to UMTS represent a central aspect for regulation. However, it is not possible at the moment to give a precise definition for a number of reasons:

- the market demand for mobile multimedia services and mobile information and communications services is largely unknown
- standardisation procedures and the evolution of technologies have not yet been completed (e.g. role of the Internet, etc.)
- the regulatory framework has not yet been defined.

As matters stand now, within UMTS there will be no dominant application, such as voice telephony in second generation mobile communications networks, but a huge number of mostly broadband communications and information services, for example:

- Electronic commerce, electronic banking
- Intranet/Internet access
- Interactive games
- Public information services
- Video on-demand
- Audio on-demand
- Videotelephony and videoconferencing
- Collaborative working applications

In any case, two aspects shall be taken into account in defining and delimiting the relevant markets within the scope of UMTS. On the one hand, the deeper value chain and the resulting separation of infrastructure and service levels is also reflected on the markets. On the other hand, overlappings with existing markets or newly developing markets both in the field of mobile communications (in particular, mobile data services emerging due to the introduction of

GSM Phase 2+) and the fixed network sector (multimedia and Internet) are to be considered.

Views are invited on the following questions:

- 3.4 *Which products and services will be offered within the scope of UMTS?*
- 3.5 *What is your opinion on delimitation and definition of the markets relevant within the scope of UMTS?*
- 3.6 *What is your opinion on overlappings with existing or newly developing markets, respectively?*
- 3.7 *How will the relationship between fixed network and mobile communications develop, in particular within the scope of multimedia communications?*

3.4 Role of the service providers

As already mentioned above, it is assumed that the service providers will play a central role. Apart from vertically integrated operators⁴ and mere reseller of UMTS network services, there will be a completely new class of service providers offering banking services, multimedia services, electronic commerce, etc. without having a separate telecommunications infrastructure. Dealing with this new group of service providers is a challenge to regulatory activities. A regulatory framework that ensures fair, non-discriminatory access of service providers without infrastructure to UMTS network services, is also regarded a key to success by the UMTS Forum [7]:

„It will be crucial for the success of mobile multimedia that service providers obtain cost effective access to mobile networks on fair and reasonable terms“.

Above all, this discussion shall be regarded in the light of vertically integrated network operators who, on the one hand, are competitors of service providers without infrastructure but, on the other hand, provide them with UMTS network services. For regulation, this gives rise to two central questions:

- Which relevance do service providers without infrastructure have and to what extent does this group of providers require fair, non-discriminatory and cost-oriented access to mobile networks?
- Is it possible to ensure fair, non-discriminatory network access only by means of regulatory measures?

Apart from that, the question has to be raised to what extent regulatory measures at the service provider level (e.g. universal service) are reasonable and necessary.

⁴ UMTS network operators who are also service providers.

Views are invited on the following questions:

- 3.8 *Which relevance do service providers without infrastructure have?*
- 3.9 *Are regulatory measures necessary to protect service providers? If so, which regulatory measures do you consider as reasonable? Should these measures affect all infrastructure providers or only companies with considerable market power?*
- 3.10 *Should there also be regulatory measures at the service provider level? How could this be justified? What does this mean for GSM network operators?*

3.5 New entrants

From today's point of view, for existing GSM operators the migration from GSM to UMTS will be evolutionary and the creation of equal opportunity and functioning competition between operators with GSM infrastructure and new entrants to the market will pose a challenge to regulators. As matters stand now, a number of means are available in order to offer new entrants a fair chance for market entry:

- Higher amount of frequency spectrum (see chapter 2)
- National roaming (see chapter 3.9)
- Infrastructure sharing (see chapter 3.8)
- Service providers (see chapter 3.4)

Views are invited on the following questions:

- 3.11 *Do you consider it realistic that new entrants will apply for licences?*
- 3.12 *Which measures should be taken to offer new entrants fair chances for an entry to the UMTS market?*

3.6 UMTS and convergence

In its “Green paper on convergence” the European Union defined convergence as [1]:

„...the ability of different network platforms to carry essentially similar kinds of services, or the coming together of consumer devices such as the telephone, television and personal computer”.

In addition, convergence shall be seen as a process leading to a step-by-step break-up of the traditionally separated sectors IT, telecommunications and media. UMTS may be considered a milestone in this process.

Apart from this broad convergence, the topic “convergence between fixed network and mobile network” (FMC) has become an increasingly important factor in telecommunications.

Views are invited on the following questions:

- 3.13 Is a regulatory environment which does not take into account the convergence of IT, media and telecom a barrier to the development of UMTS?*
- 3.14 How do you regard the impact of UMTS on convergence?*
- 3.15 How do you regard the implications of convergence between fixed and mobile networks on UMTS?*

3.7 Interconnection

Pricing for interconnection is a key factor for determining the structure and intensity of competition. Providers with considerable market power must be able to demonstrate that their interconnection fees are determined on the basis of objective criteria, comply with the principles of transparency and cost-orientation and are sufficiently broken down with regard to the network and service elements. The amount of the fees for interconnection traffic should be flexibly designed; however, a basis for calculation of the fees has to be defined yet. The present time-dependent calculation seems to be pointless with packet-switched services⁵. The amount of the fees should encourage productivity and an efficient, lasting market development. These principles apply to interconnection in the fixed network sector as well as to interconnection of fixed and mobile networks.

⁵ At present, access fees are calculated according to the technology used (circuit-switched transmission) on the basis of time-dependent tariffing regimes. It can be expected that in UMTS packet-switched services will become more important.

Views are invited on the following questions:

- 3.16 *How shall the framework for interconnection of the fixed network and the UMTS mobile network be designed? Are the existing regulations sufficient or what kind of changes are conceivable?*
- 3.17 *Which cost models shall be used in calculating the amount of the interconnection fees?*
- 3.18 *Which basis shall be used for calculating the fees?*
- 3.19 *What are the differences between existing GSM operators and future UMTS operators with regard to interconnection with the fixed network?*
- 3.20 *Which technical criteria are decisive for interconnection with the fixed network?*

3.8 Site Sharing

Liberalisation of the telecommunications market has already led to remarkable developments in the field of mobile voice telephony services. This is clearly demonstrated by the subscriber growth rates that are far beyond expectation. This development and the fact that in the meantime several operators have obtained a licence with nation-wide coverage obligation, however, have resulted in many new transmitter stations being erected. According to the second amendment of the Telecommunications Act the owners of an antenna must have to permit its shared use by holders of licences for the provision of a public telecommunications service if this is technically feasible, in particular with regard to frequencies. The owner shall perform, or have performed, the changes required for that reason, if the changes are minor and the joint user bears the costs. The right to site sharing also comprises the joint use of the infrastructure required for operation. The owner shall not exercise his power of disposal of the installation to the disadvantage of the joint user. An appropriate fee shall be paid for site sharing. Agreements on the amount of this fee shall be negotiated by the parties involved. If no agreement can be reached, the Telecom-Control Commission shall decide on the conditions of site sharing.

Views are invited on the following questions:

- 3.21 *Which parts of the infrastructure do you consider suitable for sharing (e.g. with existing GSM operators)?*
- 3.22 *Which amount of infrastructure sharing do you consider realistic?*
- 3.23 *Which savings in investment costs can be expected by infrastructure sharing?*
- 3.24 *Which time savings can be expected by infrastructure sharing in the course of network roll-out?*
- 3.25 *Which general problems do you expect in connection with infrastructure sharing?*
- 3.26 *Is the existing legal framework sufficient or is additional legislation required? If so, which?*

3.9 National Roaming

Without national roaming a customer of a mobile phone operator can access only the infrastructure of this particular operator. In areas where this operator has no radio network infrastructure, the customer cannot get access to services.

With national roaming, agreements between operators have been concluded which govern the mutual use of infrastructure. In areas where his operator's network is not rolled out, not accessible or congested, a customer can use the network of a different operator.

Thus, an operator without national coverage can offer his services throughout all of Austria by using the infrastructure of a different mobile operator in areas where his network is not rolled-out.

From a legal point of view, national roaming is, in principle, permitted. At present, however, there exists no obligation to provide for national roaming. Therefore, it is up to the mobile operators to conclude roaming agreements. The following combinations have to be distinguished:

- existing GSM operator/UMTS operator and vice versa
- UMTS operator/UMTS operator

Views are invited on the following questions:

- 3.27 *Shall existing GSM operators be obliged to conclude national roaming agreements with UMTS operators?*
- 3.28 *Shall future UMTS operators be obliged to conclude national roaming agreements with other UMTS operators as well as with existing GSM operators?*
- 3.29 *How should the conditions for national roaming for existing GSM operators as well as for UMTS operators be defined?*
- 3.30 *Which ratio between an operator's own coverage and coverage by national roaming do you consider useful for UMTS operators?*
- 3.31 *Which technical problems (e.g. transmission capacity, packet-switching) do you expect in connection with national roaming with existing GSM operators?*
- 3.32 *Do you expect that the service quality offered by an operator will be impaired by national roaming?*

3.10 Numbering

In Austria, each GSM operator has his own operator access code. With UMTS, it is considered not to assign different access codes to the individual operators. This might allow for number portability upon switching of networks.

Views are invited on the following questions:

3.33 *Which problems do you expect in connection with number portability in UMTS?*

Literature

- [1] European Commission: COM(97)623 *Green paper on the convergence of the telecommunications, media and information technology sectors, and the implications for regulation towards an information society approach.*
- [2] UMTS Forum: UMTS Forum Report No. 1; *A Regulatory Framework for UMTS*, June 1997.
- [3] UMTS Forum: UMTS Forum Report No. 4; *Licensing Conditions for UMTS*, Sept. 1998.
- [4] UMTS Forum: UMTS Forum Report No. 5; *Minimum Spectrum demand per public terrestrial UMTS operator in the initial phase* , Sept. 1998.
- [5] UMTS Forum: UMTS Forum Report No. 6; *UMTS/IMT-2000 Spectrum*, Dec. 1998.
- [6] UMTS Forum: UMTS Forum Report No. 7; *Candidate Extension Bands for UMTS/IMT-2000 Terrestrial Component*, March 1999.
- [7] UMTS Forum: UMTS Forum Report No. 8; *The Future Mobile Market*, March 1999.