Telekom-Control-Kommission

Position Paper on Infrastructure Sharing in Mobile Networks

NON-BINDING TRANSLATION

Vienna, April 4, 2011

Telekom-Control Commission Position Paper: Infrastructure Sharing in Mobile Networks

In 2002, the Telekom-Control-Kommission (TKK) published a position paper on the topic of "Infrastructure Sharing in 3rd-Generation Mobile Networks (UMTS/IMT-2000)“. Due to advances in technology as well as changes in the legal framework and competitive circumstances, it has now become necessary to revise and further develop the TKK's position from that time.

This paper is intended to inform mobile network operators about the TKK's position on the shared use of infrastructure in cooperation arrangements. Companies are subject to increasingly high competitive pressure on the retail mobile communications market and have to respond to that pressure with large investments in transmission technologies and innovative products. At the same time, it is becoming more and more difficult for mobile communications companies to establish new sites for transmission infrastructure.

Given the special status of mobile communications in the telecommunications sector as a whole, the assessment of how cooperation arrangements affect competition is an especially significant task. These activities also have to be viewed in light of the fact that competition in the telecommunications sector is becoming increasingly intermodal in nature, with competition spilling over from mobile services into the fixed-link segment. In this assessment, it is necessary to account for the economic characteristics of the mobile communications sector. First of all, it is necessary to consider the fact that frequencies are a scarce resource, which means that high entry barriers exist for new competitors on the market, not least because of the long validity period of frequency assignments. Second, the mobile communications market is a tight oligopoly, and the market participants' desire to *curb* competition has been articulated repeatedly. Over a longer period of time, there is a risk that competition may actually decrease; above all, this is to be regarded against the backdrop of the largely irreversible nature of infrastructure cooperation arrangements.

Despite all the competition problems which arise, the TKK also sees advantages in cooperation arrangements: The shared use of infrastructure allows cooperation partners to attain greater reach among the population at lower cost. In a competitive environment, these advantages ultimately benefit the customers as well. Cooperation arrangements also make it possible to reduce the expense involved in rolling out mobile broadband services in less densely populated areas. This is attractive to mobile network operators in cases where there is demand for the best network coverage possible, as in the case of mobile voice telephony.

The TKK's opinion as articulated in this paper applies equally to all mobile transmission technologies and to the frequency ranges used for those technologies.

Legal framework and responsibilities

As the result of an assessment always depends on the specific circumstances in each case, this position paper cannot prejudice the decisions of the TKK in individual cases. The statements made in this paper therefore only constitute guidelines for assessments by the TKK. In this context, it is important to note that cooperation arrangements in the mobile communications sector are to be assessed primarily by the general competition authorities on the basis of the regulations of general competition law in Austria, and that the decisions of those authorities cannot be anticipated on the basis of this position paper.

In any case, however, the Austrian Telecommunications Act (TKG) provides a number of relevant indications for situations where frequencies are transferred (e.g. spectrum sharing).

Art. 56 TKG 2003 stipulates that any transfers of frequencies assigned by the regulatory authority require prior approval by the regulatory authority. In its decision, the regulatory authority must in particular assess the technical effects of a transfer on competition in each individual case. In cases where a transfer is likely to have an adverse effect on competition even if incidental conditions are imposed, the regulatory authority is required to reject the transfer.

Art. 56 Par. 2 TKG 2003 governs cases where material changes are made in the ownership structure of companies which have been assigned frequencies. Such changes also require prior approval by the regulatory authority, and the criteria set forth in Par. 1 also apply to the regulatory authority's assessment.

In addition, the TKG 2003 also includes the following provision regarding cooperation arrangements and interactions between frequency assignment holders:

Under Art. 8 Par. 2 (Site Sharing), owners or other authorised users of an antenna mast or a high-voltage mast must permit joint use by public communications network operators, fire brigades, rescue services as well as police authorities if such use is technically feasible, in particular in terms of frequencies. This right of joint also includes use of the infrastructure necessary for operation.

Premises

In the course of the TKK's review (within the scope of its responsibilities) and in its contributions to assessments by the general competition authorities, the TKK's considerations focus in particular on the effects of cooperation arrangements on infrastructure competition. This form of competition only appears to be ensured in cases where all of the premises listed below are fulfilled. As a matter of course, these premises also apply to the forms of cooperation described further below.

- **No deterioration of structural conditions for competition**

  The cooperation arrangement must not bring about significant adverse effects on competition. In this context, the narrowest requirement is that the cooperation must not, under any circumstances, cause one or more companies to gain a position of significant market power on one or more communications markets. In addition, it is necessary to ensure that cooperation arrangements do not lead to a noticeable weakening of competition.

  In this context, the concept of joint significant market power is especially relevant. Mobile communications markets are tight oligopolies, and there is a greater risk of collusion on such markets.

  Collusion may be favoured or obstructed by structural factors. In the context of cooperation arrangements, the following key factors are relevant in this context:

  - Collusion is more likely in cases of high horizontal market transparency. The better informed companies are about the market strategies of their competitors and/or the more rapidly companies can obtain information about those strategies, the more likely a collusive market result becomes.
  - Collusion is also more likely in cases where structural or other connections exist between companies on the market.

- The more frequently companies interact with each other, the more likely collusion becomes.
- The smaller the asymmetries or differences (in costs, product differentiation and innovation) between companies are, the more likely collusion becomes.

From the TKK's perspective, cooperation arrangements are only permissible in cases where their result does not influence relevant collusion factors in such a way that the propensity to collude increases significantly on a communications market.

- **No crowding out or obstruction of non-participating mobile operators in competition**

  Cooperation between two or more companies must not obstruct or crowd out third parties in competition. This could be the case, for example, if two companies establish an especially powerful market position through a cooperation arrangement. In the TKK's assessment of this premise, the size or the expansion potential arising from the cooperation arrangement may be a significant factor for third parties.

- **No deterioration of access for service providers**

  Vertically integrated companies have an incentive to deny competitors access to wholesale markets (e.g. to the access and origination market) in order to foreclose downstream markets (e.g. retail markets) to potential competitors (e.g. service providers). Such strategies cannot succeed on a market with functioning competition, which is why service providers have repeatedly been able to conclude private-law wholesale agreements with mobile network operators.

  From the TKK's perspective, cooperation arrangements are only permissible in cases where they are not accompanied by a structural deterioration of access for service providers. For example, this might be the case where a wholesale agreement between a service provider and a mobile network operator is contingent upon the consent of other mobile operators involved in a cooperation arrangement or where such wholesale services are made impossible for third parties, thus effectively limiting the options of the service provider as well as the mobile operator.

- **Independence in the design of products and services with regard to quality, availability and pricing**

  Prices, innovations, quality, service charges, availability and commercialisation (e.g., bundled products) are key parameters of competition.

  From the TKK's perspective, a cooperation arrangement is only permissible in cases where each provider can decide autonomously on the deployment of those competitive instruments. This refers not only to pricing, but also to the design of products and services. In the mobile communications markets, for example, coverage levels play a key role in this context. Other differentiating characteristics include the quality of voice services, the bandwidth of data services, and quality of service. Cooperation arrangements which lead to broad harmonisation in the introduction of new services are to be viewed critically because they limit the potential for differentiation in competition. For example, the premise of independence is violated when an expansion of coverage or an improvement of service quality is only possible given coordination with one or more cooperation partners, or when a cooperation arrangement obstructs or even prevents autonomous activity.

On the other hand, the premise of independence appears to be fulfilled in cases where a cooperation arrangement is technically designed in such a way that the cooperation partners are able to differentiate themselves in competition on the access network. The TKK assumes that this will not be the case in mutual spectrum sharing.

A cooperation is only considered to comply with competition requirements in cases where technological developments are not slowed or hampered.

- **Demonstrable gains in productivity or efficiency**

  One prerequisite for the assessment of a cooperation arrangement is the verifiable existence of efficiency gains. It is not sufficient merely to claim that such gains will be realised. The resulting cost reductions must be demonstrable and transparent.

- **Geographical extent of cooperation**

  This premise addresses the regions of the country where companies can cooperate and the overall extent to which they can cooperate. The larger the region or population covered by a cooperation arrangement, the more critically it must be reviewed. From the TKK's perspective, the smaller the region or population covered, the more likely a cooperation arrangement is to be approved. In this context, passive sharing[1] is to be assessed differently from active sharing[2].

  Moreover, the regions in which companies cooperate are especially relevant in the case of active sharing. In rural areas with low population density and low traffic volumes, the efficiency gains outweigh those achieved in densely populated areas. If a cooperation arrangement serves to improve coverage in rural areas, this effect is generally considered a positive factor. Naturally, this only applies if more than a single infrastructure is then available in the region in question, as otherwise one could expect adverse effects on competition. In contrast, the TKK does not generally see a need for far-reaching cooperation arrangements in urban areas.

- **Exchange of information**

  From the TKK's perspective, the exchange of company information brings about the risk of coordinated behaviour and can subsequently have adverse effects on competition. In reviewing cooperation arrangements, the TKK will therefore pay careful attention to the information exchanged between the cooperation partners.

  In any case, cooperation agreements must not include provisions regarding cooperation or information exchanges in areas which are basically unnecessary for the cooperation arrangement (e.g. extensive data exchange with regard to expansion projects or the introduction of new services).

- **Enforceability**

  The operators involved are to ensure that the desired cooperation arrangement complies with the premises set forth above and that the TKK is able to review adherence to those premises. In this context, the burden of proof falls upon the cooperation partners, who are

---

[1] The TKK defines passive sharing as the joint use of passive equipment such as masts, antennas, power supply, air conditioning systems, etc.

[2] The TKK defines active sharing as the joint use of electronic components such as transmission or switching equipment (e.g. Node Bs, BTSs, etc.).

required to provide all documentation necessary for the TKK's review. The cooperation partners must also ensure that the TKK can conduct ongoing reviews of cooperation conditions.

Forms of cooperation

The assessment of cooperation arrangements primarily depends on their specific design. However, as it is not possible to anticipate and pre-assess various cooperation scenarios, the next section presents three basic technical forms of cooperation and the corresponding opinion of the TKK on each scenario.

Passive site sharing

In the conventional sense, passive site sharing refers to the joint use of transmitter masts by one or more mobile network operators. In this form of sharing, the following elements might be used jointly:

- Sites
- Foundations
- Masts or antenna mounting equipment
- Antennas
- Feeder cables to antennas
- Tower-mounted amplifiers
- Power supply
- Containers (air conditioners, etc.)

In addition, the infrastructure used to connect a site may be shared regardless of its technical realisation (e.g. optical fibre, microwave radio links). In this form of site sharing, switching equipment or Node Bs (RNCs) are not subject to joint use.

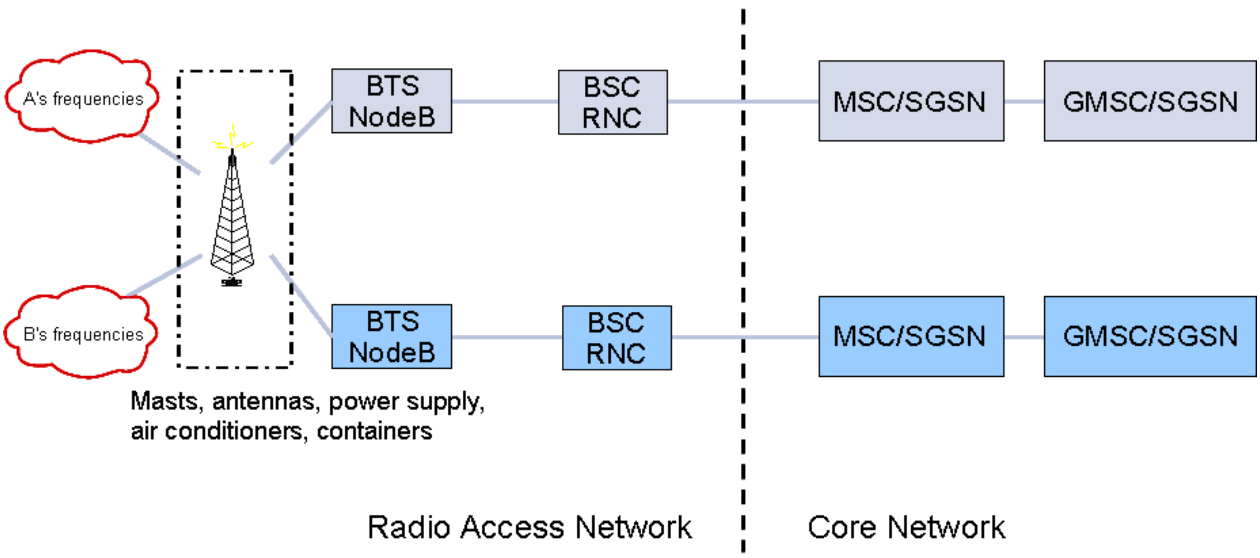

Figure 1: Passive site sharing

Under Art. 8 Par. 2 TKG 2003, owners or other authorised users of an antenna mast or a high-voltage mast are required to permit joint use by public communications network operators if this use is technically feasible, in particular in terms of frequencies. Technical changes required for this purpose are to be carried out or commissioned by the owner or authorised party mentioned above in cases where the changes are minor and the party wishing to share the facilities bears the costs of the changes. The right to share also includes sharing the infrastructure required for operation.

However, even in cases where passive site sharing is basically permissible under the legal provision cited above, these cooperation models must remain within the limits of general competition law. In terms of competition, this form of cooperation is considered problematic where the merging of sites leads to a harmonisation of the cooperation partners' network structures and/or other competitors' access to site sharing is subject to material limitations.

As for the geographical dimension, passive site sharing is generally not considered questionable from the TKK's perspective – given due adherence to the competitive premises discussed above – as long as two operators do not share more than 50% of their sites. Passive sharing can therefore be permitted across a larger geographical area in cases where it involves different cooperation partners. For example, this would be the case where Operator A shares 30% of its sites with Operator B and an additional 40% of its sites with Operator C.

The TKK defines a site as a transmission facility which has a transmission power of at least 1 W, which excludes e.g. Femto cells. For example, a transmitter mast with three sector antennas would qualify as a site. This also applies to transmission equipment mounted at several points (corners) of a building and operated by one network operator.

Under this definition, the technology used (or whether multiple technologies are used simultaneously) at a given site is irrelevant.

As active sharing also involves passive site sharing, the assessment of active sharing arrangements must also account for their passive elements.

Active sharing without spectrum sharing

The TKK defines active sharing as the joint use of electronic components such as transmission or switching equipment (e.g. Node Bs, BTSs, etc.). In the form described here, it is assumed that sufficient competitive differentiation is ensured between the cooperation partners. This requires that the partners are able to define the most essential competitive parameters independently and that each operator uses its own frequencies. In this context, the TKK considers the most essential competition parameters to be the technology used at each site, the available capacity, the range, the data rate, and service quality (e.g. latency time). This list of parameters is by no means exhaustive; other factors may have to be taken into account depending on the nature, scope and design of a given cooperation arrangement.

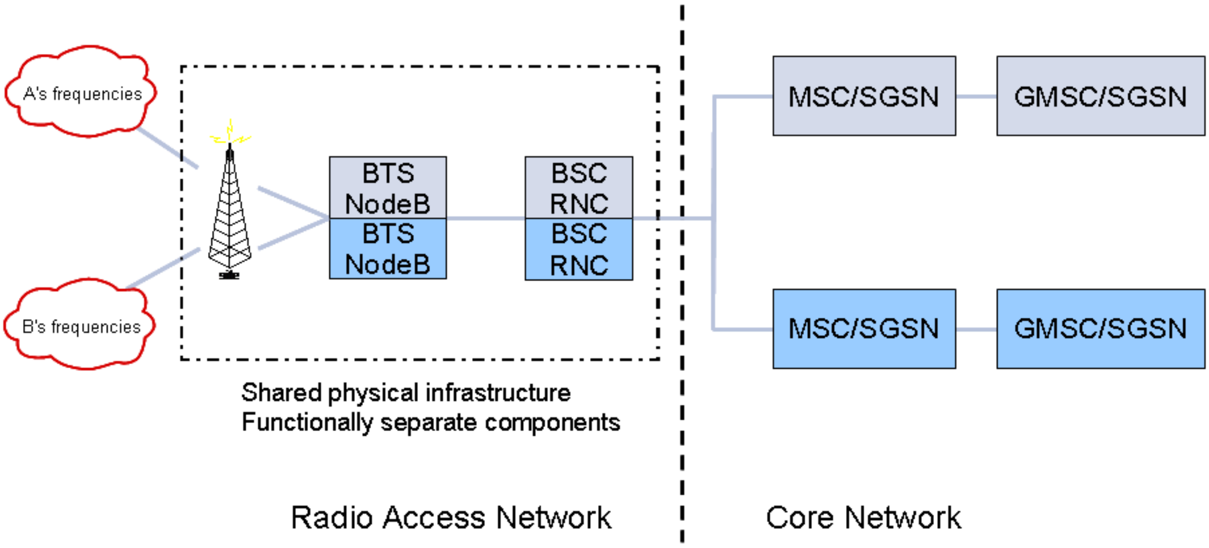

Figure 2: Active sharing without spectrum sharing

As for the geographical dimension, the TKK assumes that passive site sharing may not be considered questionable – given due adherence to the competitive premises discussed above – as long as each network operator involved independently operates at least 50% of its sites outside of (active sharing) cooperation arrangements and only uses its own frequencies in the arrangement.

An independently operated mobile network is defined as a network in which the essential network elements in the core network (switches, VLRs, HLRs) and the essential elements of the radio network (BSCs/RNCs, BTSs/Node Bs) are operated by the mobile network operator itself. That means that the mobile network operator has to have legal and actual control over these network elements. In this case, legal control is not to be equated with property; for example, the equipment may also be rented.

Active sharing combined with spectrum sharing

In this form of cooperation, companies share active network elements as well as each other's spectrum.

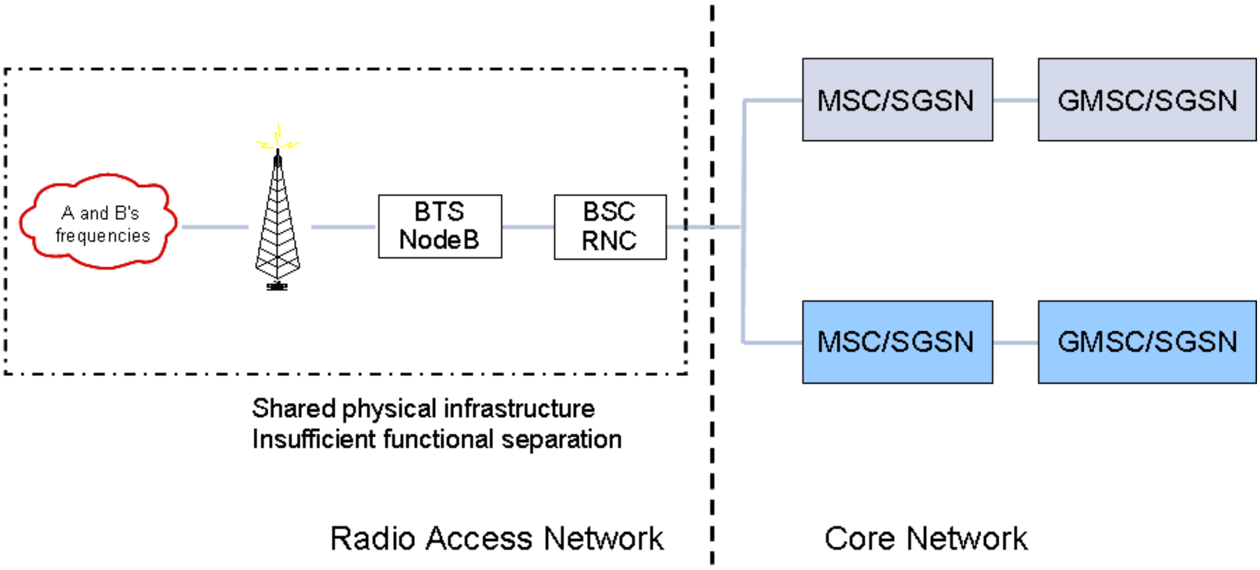

Figure 3: Active sharing with spectrum sharing

The TKK generally assumes that mutual spectrum sharing does not ensure sufficient competitive differentiation between the cooperation partners.

As a result, this form of cooperation can only be approved in exceptional cases in those areas where coverage is desirable, but not reasonable from a business standpoint for technical or economic reasons. Such areas include road tunnels and ski areas, to name two examples. This exception also includes large-scale events in which the need for coverage is only temporary.

Finally, adverse effects on competition do not appear to arise if the geographical extent of this form of cooperation is sufficiently small.

Connection between expansion obligations and cooperation arrangements

Each mobile network operator is obliged to fulfil the coverage requirements stipulated in the frequency assignment decision using the assigned frequencies. This means that a required coverage level of e.g. 50% of the population may also be attained with the help of cooperation arrangements as long as the assignment holder uses only its own frequencies to do so. As a result, national roaming and spectrum sharing arrangements cannot be used for the purpose of fulfilling coverage requirements.

National roaming

The TKK defines national roaming as the joint use of frequencies and infrastructure by Operator B at a site belonging to Operator A.

In the opinion of the TKK, national roaming cannot be equated with spectrum sharing scenarios. As only the infrastructure and frequencies of one network operator participating in the cooperation arrangement are used and thus the capacity at the site belonging to Operator A is limited, this model is subject to certain limits. It is also assumed that limitations of service will arise. The use of national roaming is to be considered only in thinly settled areas or as a temporary, transitional scenario. Moreover, in contrast to other possibilities, this form of cooperation can be reversed without incurring material expenses. Given increasing capacity requirements, the expansion of an operator's own network infrastructure would be necessary and justified.

Under certain circumstances, national roaming may even be required in regulatory obligations. In the case of voluntary agreements, the premises related to competition must be observed in any case.

Spectrum sharing

With regard to the question of whether frequency transfers (e.g. spectrum sharing) to other network operators are permissible, the TKK refers to the provisions of the TKG 2003. Where a cooperation arrangement involves spectrum sharing, the arrangement must be subjected to a separate assessment pursuant to Art. 56 TKG 2003.

In spectrum sharing, frequencies assigned to one network operator are also used by other operators in the same coverage area. Spectrum sharing may be unilateral or mutual.

Therefore, it is not permissible for Operator A to use frequencies assigned to Operator B in order to fulfil the coverage requirements associated with Operator A's frequencies.

On the other hand, Operator A may make excess capacity available to Operator B if Operator B fulfils its coverage mandate independently of that arrangement.

As a result, mutual spectrum sharing is only possible in those areas which go beyond the minimum required coverage level.

Concluding remarks

Again, it is important to point out that cooperation arrangements always have to be assessed on a case-by-case basis. All of the premises discussed in this paper have to be observed in a cooperation arrangement and will be taken into account in the TKK's assessment. The percentage values indicated above are not to be understood as rigid limits. Depending on the nature, form and design of the cooperation arrangement, higher (as well as lower) values may also apply in this context given the market position of the cooperation partners.