

APPENDIX 2

Consultation
on the 700/1500/2100 MHz
Award Procedure

Measures Safeguarding
Competition

NON BINDING TRANSLATION

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1 Introduction

Section 2 of this appendix describes current competition in the markets for mobile services and private customer broadband products, and in particular the role of MVNOs and the existing mandatory wholesale offer arising from the H3A/Orange merger.

In section 3, prime consideration is given to potential competition challenges when choosing measures to ensure competition. The regulatory authority has identified three potential competition challenges with relevance for the present award procedure:

- Fewer than three actual competitors on the mobile telecommunications market
- Excessively asymmetric spectrum assignment
- Competition deficit on the retail markets, considering the mandatory wholesale offer arising from the H3A merger and the demand-side power of MVNOs

The risk of the competition challenge materialising in the auction is analysed in a second step. The regulatory authority bases its assessment of spectrum assignment on the usual criteria relating to economic competition:

- Is one company (unilaterally) or are several companies jointly (through coordinated action) capable of limiting competition through a strategic purchase of spectrum in the auction?
- Do (unilateral or coordinated) incentives exist for the company or companies to pursue such a strategic purchase? Do the expected gains exceed the costs?
- Would such a strategic spectrum purchase have a negative impact on effective competition in the retail market?

A potential competition deficit in the retail markets exists, considering the mandatory wholesale offer arising from the H3A merger as well as the demand-side power of MVNOs. This challenge is investigated as follows: first, retail competition is analysed in the segments of mobile services and private customer broadband products. The respective risks of tacit collusion are then discussed. Finally, the demand-side power of MVNOs and the incentives and expected behaviour of MNOs on the wholesale market following the expiry of the current mandatory wholesale offer by H3A are discussed.

2 Market analysis

The provision of mobile telecommunications services necessarily involves the usage of spectrum. The amount of spectrum is limited and the use of spectrum offers considerable economies of scale. Providing mobile services nationwide in Austria also requires a corresponding number of broadcasting locations. It takes years to conclude licensing and construction projects for a corresponding number of locations. As a result of these high barriers to entry and expansion, it is particularly important for the spectrum award procedure to ensure that the use of this spectrum creates effective competition, thereby generating the greatest possible macroeconomic benefit. This task, referred to as ‘market shaping’, will also be an integral part of the EECC and forms part of the remit of the independent regulatory authorities.

As things currently stand, the awarding of bands in the 700, 1500 and 2100 MHz range constitutes the last opportunity before 2030 to acquire spectrum that is optimally or at least moderately suited for providing complete mobile service coverage in Austria. Accordingly, it is especially important that this award also safeguards the creation of effective competition within this time frame.

The following section presents and analyses the current state of competition in retail mobile services and private customer broadband products.

2.1 Retail mobile services

Conventional mobile services comprise national and international calls, SMS/MMS, data services and international roaming services.

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Figure 1: Market share of retail mobile services (by sales)

Source: Communications Survey Ordinance (KEV); ‘All others’: estimate based on LycaMobile SIM cards and values per HoT SIM card

Figure 1 presents quarterly revenues since 2014. Market leader is A1TA with approx. 35–45%; H3A and TMA each have 25–30% market share. MVNOs generate <5% of

total revenue. Significant brands here include HoT with <5% and MassResponse (MR, with the Spusu brand in particular) with <5%. MR has shown the strongest relative growth recently.

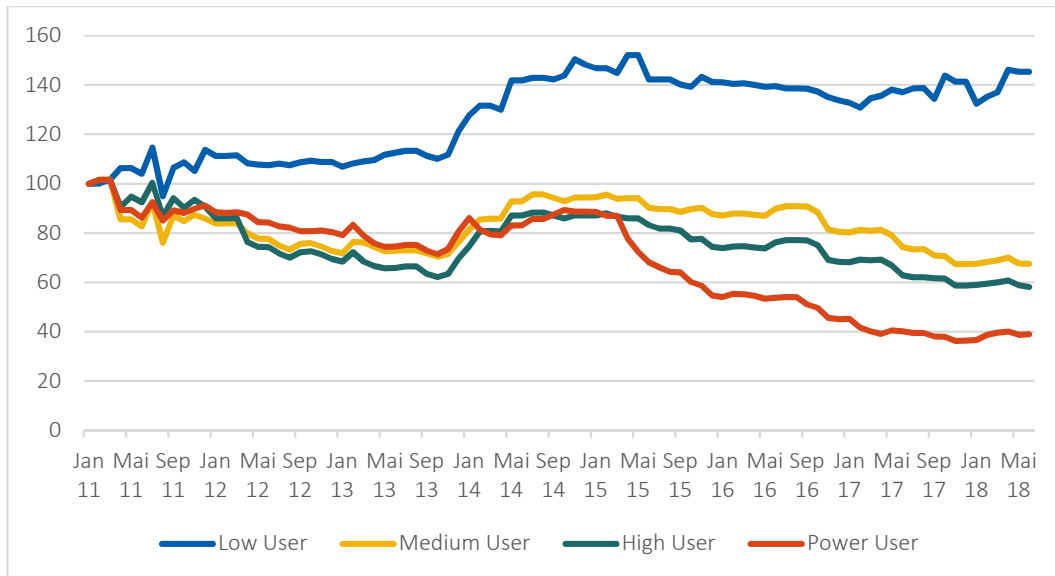


Figure 2: Mobile Services Price Index

To calculate the index, the average monthly prices for four different user categories are derived from the subscription information published each month by the Austrian Chamber of Labour. Three of the user categories refer to 'smartphone users' who make use of both voice service and text messaging as well as data services. Users in the fourth category ('low users') exclusively use voice and text messaging services. For each category, the index is based on the five cheapest rates per brand.

Figure 2 draws on several calculated price indices to illustrate pricing in mobile services since 2011. Prices for mobile services rose significantly from autumn 2013 to the end of 2014. MVNOs have ensured stronger competition since 2015. Prices for medium, high and power users (i.e. smartphone users) have fallen since this time.

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Figure 3: ARPU per SIM card and month

Source: Communications Survey Ordinance (KEV); 'All others': estimate based on LycaMobile SIM cards and values per HoT SIM card

Figure 3 presents the ARPU (Average Revenue per User) per SIM card and month. While the ARPU/SIM card is around EUR 10–20/month for the MNOs, this figure is EUR 0–10/month for the MVNOs. This is also attributable to the fact that MVNOs do not offer unlimited data access to any significant degree¹ and tend to focus instead on offering SIM-only tariff plans.

2.1.1 Significance of mandatory MVNO access

To understand the role of the MVNOs since 2013, the commitment underpinning MVNO access is crucially important. The basis for MVNO market entry was a commitment made by H3A to facilitate the approval of the Hutchison/Orange merger.² This commitment envisages access for up to 16 MVNOs to up to 30% of the capacity of the H3A network and enables access for ‘full’ MVNOs.³ The MVNO must organise interconnection with other network operators and is therefore free to directly buy additional roaming services as it sees fit. The setup fee for MVNO access is capped at EUR 200,000. The price for one gigabyte of data was initially approx. EUR 1–2, but is also subject to an indexation that is to be agreed individually. H3A is required to offer a contract with a term of up to 10 years. As an alternative, currently with guaranteed availability, the reference offer from H3A (and the corresponding prices) improved negotiating power vis-à-vis other MNOs.

The largest MVNO at the moment is HoT, or actually their enabler Ventocom GmbH. The host MNO (providing access) is TMA: HoT/Ventocom are merely ‘light’ MVNOs, i.e. the SIM cards are owned by TMA and TMA provides both the core network as well as interconnection services. The second-largest MVNO is Mass Response (MR) with its Spusu brand. MR uses the MVNO reference offer from H3A. MR is a full MVNO, i.e. it operates its own core network, owns its SIM cards directly and is directly responsible for national/international interconnectivity and purchasing additional roaming services.

MVNOs face several kinds of competitive challenges: some extant and some that will grow more severe in the future.

Firstly, ‘roam like at home’ legislation effectively prohibits MVNOs from charging extra fees for roaming.⁴ At the same time, unlike MNOs, who are able to offer roaming in Austria as a return service, MVNOs have no similar leverage in negotiations when purchasing roaming services on the wholesale market. Often, demand from MVNOs is so low in the country in question that MNOs offering roaming services see no economic benefit in concluding a contract with an MVNO. As a result, MVNOs must frequently pay the regulated roaming wholesale prices of (currently) EUR 6/GB (2022: EUR 2.5/GB), putting them at a competitive disadvantage compared to MNOs.⁵

¹ See the detailed discussion on private broadband products in section 2.2.

² COMP/M.6497 – HUTCHISON 3G AUSTRIA. / ORANGE AUSTRIA

³ A full MVNO has a proprietary core network and SIM cards.

⁴ For the legal base, refer to <https://www.rtr.at/de/tk/RoamingRechtGrundlagen>.

⁵ See also REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the implementation of Regulation (EU) 531/2012 of the European Parliament and of the Council of

Secondly, the reference offer requires MVNOs to pay the MNOs more than they themselves receive for termination, since the termination fees they receive were lowered in November 2013 by the Telekom-Control-Kommission (TKK), while the costs at the wholesale level have remained the same.

Thirdly, the rising demand for data and the falling prices per data volume are also working to reduce MVNO competitiveness. In general, unlimited data packages in which another GB of data costs nothing cannot be replicated by MVNOs working with a wholesale offer in which costs are charged per GB.

Fourthly—and decisively in terms of the longer-term future—H3A is no longer legally obliged to provide a reference offer after 2022 and after the expiry of the respective contract. This will weaken MVNO negotiating power still further.

2.2 Private customer broadband products

Alongside conventional mobile services, mobile telecommunications and the key input of frequency usage rights on which they depend play a significant role in Austria for home internet access.

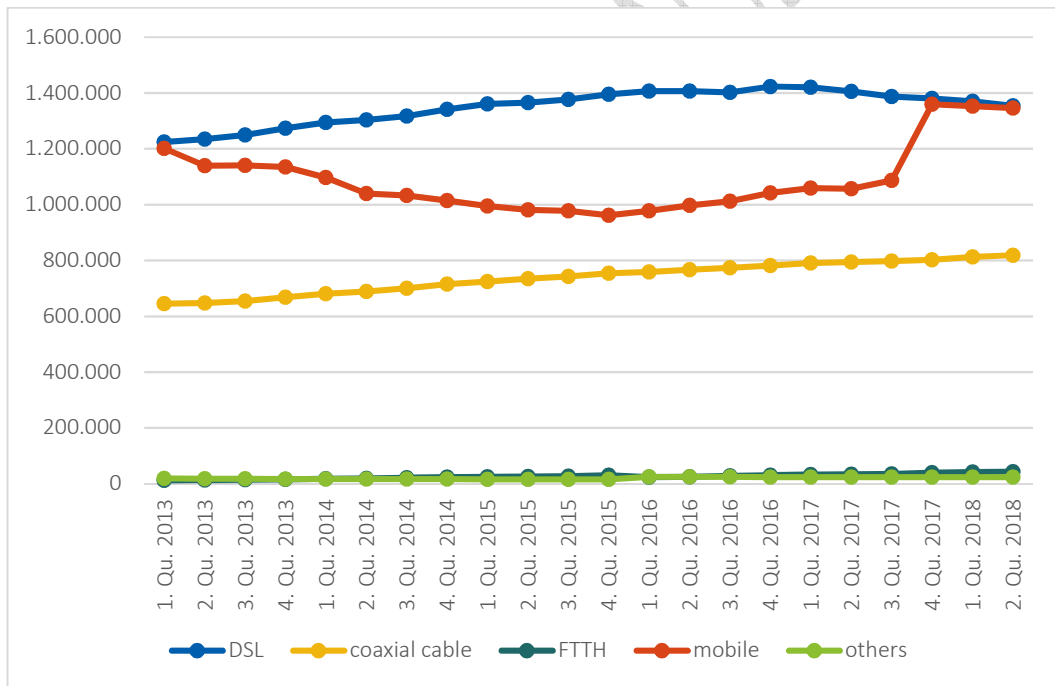


Figure 4: Retail broadband connections (private customers) by infrastructure

Source: KEV; fixed broadband connections incl. mobile data subscriptions with a fixed monthly fee, Q4/2017 break in time series for mobile due to survey changes

Figure 4 gives an overview of private customer broadband connections by infrastructure. In terms of wired internet access, just under 1.4 million private customers connect via the A1TA DSL network (both directly and via wholesale sourcing from other companies). Connections via regionally available coaxial cable

13 June 2012 on roaming on public mobile communications networks within the Union, as amended by Regulation (EU) 2015/2120 and Regulation (EU) 2017/920; COM(2018) 822 final

networks have risen steadily for several years and now account for over 0.8 million connections.

FTTH and other access types have played a minor role to date and this is unlikely to change in the near future. Mobile plans that offer unlimited data transfers at a fixed price—and which are likely to offer an especially good substitute for fixed-line internet access⁶—are not surveyed as separate items by RTR but form part of mobile connection survey data. Informal data provided by operators suggests around one million such connections are offered, with H3A the clear leader for this type of access. The mobile connections shown above cover all fixed-fee data subscriptions and therefore represent an approximation only. It is nonetheless certain that mobile broadband access constitutes a real competitor to wired broadband connections.⁷

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Figure 5: Market share of broadband connections (private customers in Q2/2018)

Source: KEV; fixed broadband connections incl. mobile data subscriptions with a fixed monthly fee (cubes with unlimited data but also dongles with limited data)

Figure 5 presents market share for broadband connections (private customers). A1 has a market share of 45–55%, while TMA (incl. UPC, which it acquired in 2018) has 20–30% and H3A (incl. Tele2, which it acquired in 2017) has 10–20%. All other providers have a nationwide market share of around 2% each and, taken together, do not exceed 10%. While regional cable network operators only operate regional cable networks, they can use this capacity to exert competitive pressure on the three major operators in their respective regions.

⁶ Even if the SIM cards associated with such products are suitable for both mobile and stationary use.

⁷ See Decision M 1.5/15-115 of 24 July 2017, available (in German) at https://www.rtr.at/de/tk/M_1_5_15 and decision M 1.6/15-117 of 24 July 2017, available (in German) at https://www.rtr.at/de/tk/M1_6_15

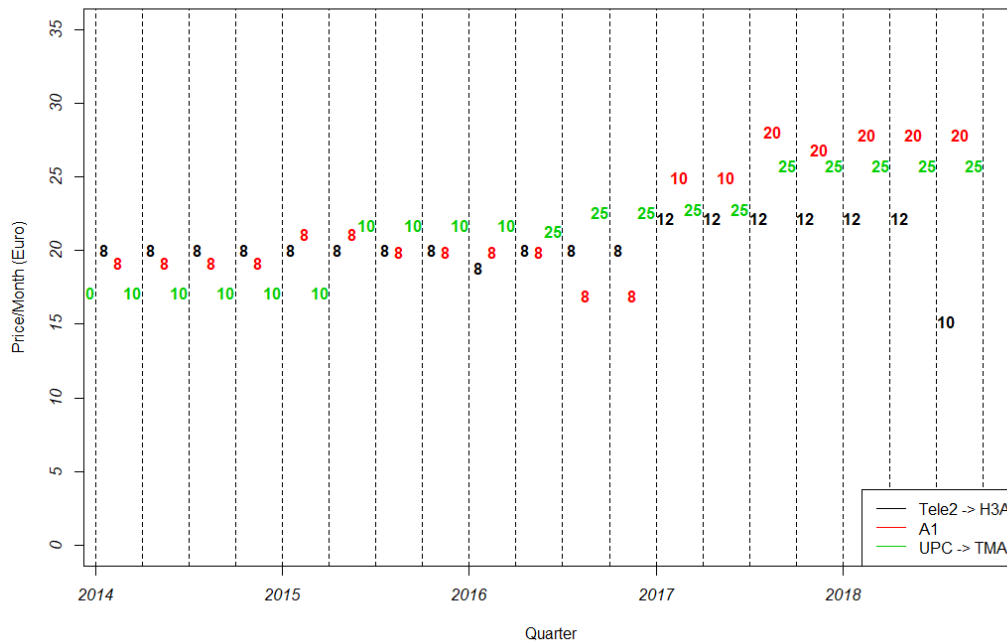


Figure 6: Fixed broadband—lowest flat rates by quarter (bandwidth in chart in Mbps)

Source: RTR survey

Figure 6 shows the changes in the lowest-priced wired broadband products offered by the three major nationwide operators. Prices for the cheapest entry-level plans from leading providers A1 and UPC have risen significantly from 2014 to Q3 2018. While such plans cost less than EUR 20 in 2014, they are now priced at EUR 25 or more. This equates to a price rise of over 25% in four years. These entry-level plans are those for which there is the greatest demand. While the bandwidths offered have increased significantly during the period in question, this does not alter the fact that customers must now spend far more on entry-level products than they did four years ago. As a nationwide provider, A1 offers less bandwidth on average for the same price than UPC, who is only regionally active. UPC was recently acquired by TMA.⁸

The price of the cheapest product offered by Tele2 rose by a much smaller margin during the same period, although Tele2 had fewer than 100,000 connections. This suggests Tele2 did not exert significant competitive pressure. Tele2 was acquired by H3A in 2017. As part of its brand repositioning strategy, H3A offered a low-cost, low-bandwidth (10 Mbit/s) entry-level plan in the third quarter of 2018.⁹

⁸ M.8808 T-MOBILE AUSTRIA / UPC AUSTRIA

⁹ However, it is doubtful whether this product will be offered over the long term in any significant volume via the fixed network. With no proprietary infrastructure, H3A use the wholesale services provided by A1TA, in particular virtual unbundling. At a retail price of about EUR 14 (incl. VAT), H3A achieves only a narrow contribution margin.

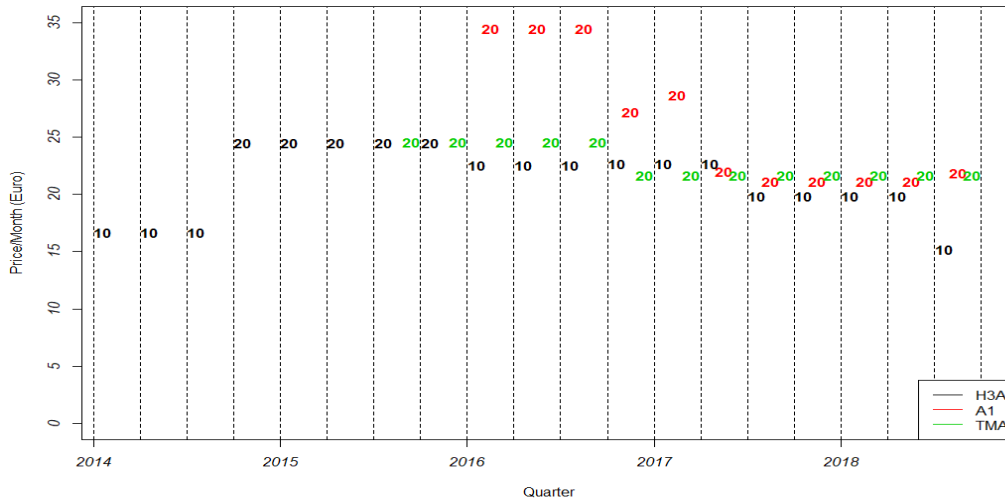


Figure 7: Mobile broadband—lowest flat rates by quarter (bandwidth in chart in Mbps)

Source: RTR survey

Figure 7 presents changes in the lowest-priced mobile unlimited data plans by price/month and connection speed per quarter. While H3A was a pioneer here, all providers have offered mobile unlimited data plans as fixed-line product substitutes since mid-2016.

2.2.1 Significance of mandatory MVNO access

Approval of the Hutchison/Orange merger was conditional on a commitment to provide a data subscription offer for MVNOs.¹⁰ Accordingly, an MVNO can select a tariff plan from H3A and is entitled to a retail-minus wholesale price with a discount of 25% on the net end customer price. MVNOs have not availed themselves of this H3A offer to any significant degree. In terms of mobile unlimited data plans or plans with large volumes of included data, MVNOs have no significant presence in the retail market. This fact can in all likelihood be attributed to the wholesale pricing structure or the level of wholesale pricing.

¹⁰ M.6497, Annex 1, Appendix A, Par. 9

3 Potential competition challenges

Mobile services play a decisive role in telecommunications within Austria. In awarding spectrum, the regulatory authority must work to safeguard competition both in the infrastructure market and the end customer market. Accordingly, the regulatory authority is performing a proactive competition analysis on two levels:

1. Distribution of frequency usage rights
2. Retail markets, taking into account the H3A merger wholesale offer and demand-side power on the part of MVNOs

3.1 Potential competition challenge: distribution of frequency usage rights

Current MNO spectrum assignments as well as spectrum to be awarded in the near future are presented in Table 1.

Table 1: Spectrum (MHz) held by MNOs and pending awards as of 1 January 2020 (bold)

MHz	Band									Total
	700	800	900	1500	1800	2100	2600	2600	3600	
A1		2x20	2x15		2x35	2x20	2x25	25		255
TMA		2x10	2x15		2x20	2x15	2x20			160
H3A			2x5		2x20	2x25	2x25	25		175
Total	2x30	2x30	2x35	80	2x75	2x60	2x70	50	390	1120

Note: The 2100 MHz band will be re-awarded as of 1 January 2021. Pending awards are shown in **bold type**.

Source: RTR

The spectrum award process for the 3410 to 3800 MHz range is ongoing. The competition analysis can take the results of this auction into account only after the auction has been completed.

3.1.1 Significance of individual bands for competition

The three MNOs currently offer their services simultaneously via several technologies. Some services are not offered by all network operators. With 2G, voice and texts form the bulk of services, while narrowband data transmission is also offered via EDGE. 3G focuses primarily on voice and broadband. 3G broadband services up to 42 Mbit/s are offered both for mobile use and at fixed locations. 4G is used primarily for broadband (on-the-go and at fixed locations); Voice over LTE (VoLTE) has only recently been added by all network operators. Some MNOs also offer dedicated narrowband IoT.

One potential scenario for the future is the development of 5G services that differentiate themselves by accommodating quality requirements such as ultra-reliable low-latency communications (URLLC) or massive machine-type communications (mMTC). In the future, technological developments could enable MNOs to provide multiple wireless networks simultaneously, with these networks being to an extent independent of one another. Each of these wireless networks could feature individualised service parameters (such as bandwidth, redundancy

etc.) and, being tailored in this way to the respective customer segment, could form or facilitate what would in effect be a private subnet. Both the 5G candidate bands (700 MHz, 3400-3800 MHz, 26 GHz) and (in the medium term) the other technology-neutral frequencies are suitable for this purpose. Network operators expect to see all bands used for 5G in the medium to long term.

While supply and demand for future services cannot yet be estimated accurately, an appropriate supply of spectrum and mobile network locations will form a key requirement for all such services. MNOs have typically proven to be flexible enough to transition from offering outdated services with a dwindling customer base to offering new services that enjoy growing demand. In many cases, the wireless access network is able to offer new or different services simply by means of software upgrades: this ensures a high degree of transition flexibility.

3.1.1.1 700–900 MHz spectrum

In the 700–900 MHz range (sub-1 GHz), a total of 2x95 MHz will be available following the award. Of the frequencies available for mobile services, the propagation characteristics of this spectrum make it optimally suited to achieving wide area coverage and ‘deep indoor’ coverage, i.e. coverage that extends to deep within buildings. Corresponding usage of this spectrum for narrowband services (voice services, NB-IoT), broadband services at fixed and mobile locations, and 5G services is expected to continue in the future. Use of the 700–900 MHz bands could also be supplemented with other bands (such as 1500 MHz in the downlink). When coupled with 1500 MHz in the downlink, the superior propagation characteristics of 700–900 MHz could compensate for the lower uplink transmission power and therefore expand the radius of individual cells. At the same time, the 700 MHz band is unlikely to allow the highest capacities: this is because the amount of this spectrum is limited and massive MIMO antennae are unlikely to be used for this band as a result of size requirements. In future, very high capacities will therefore probably not be created by this band alone but by other bands or in conjunction with other bands.

3.1.1.2 1500 MHz

In the 1500 MHz band, the effectively usable amount of spectrum remains unclear. In all likelihood, only 80 MHz will be usable without major restrictions. Use will probably be confined to deployment as an SDL (supplementary downlink), i.e. as an extension to the downlink to achieve a corresponding increase in bandwidth. This development depends in particular on decisions made by the standardisation bodies, and on the provisioning of suitable network and end customer equipment by key manufacturers. As of this writing, suitable equipment is not directly available for the entire frequency range, nor is there any certainty about the point in time when this will be available. Some MNOs have stated that the use of 1500 MHz spectrum would necessarily require sub-1 GHz spectrum for the uplink or that such a combined usage would at least offer major synergy effects.

3.1.1.3 1800–2100 MHz

In the 1800–2100 MHz range, a total of 2x135 MHz is available—somewhat more than for sub-1 GHz. These bands are therefore suited to slightly higher capacities. At the same time, this spectrum is only moderately suited to providing wide area coverage and deep indoor coverage. In very sparsely populated areas and in well-insulated or multi-storey buildings, coverage is more difficult than with sub-1 GHz spectrum. In the medium term, 5G services could also be offered in these bands.

The original 3G rollout used the 2100 MHz band. As a result of existing network/end customer equipment, operation of 3G both now and (in all probability) in future will be restricted to the 2100 and 900 MHz bands. This creates a certain degree of dependency on these two bands for the further operation of a 3G network. Switching between these bands—that is, from 2100 MHz to 900 MHz—would potentially require corresponding capital investment in equipment for the respective mobile network locations. Some network operators have already completed some of these investments, however. A major relocation of data traffic to LTE networks can also be identified, which is likely to continue until the expiry of the period of use at the end of 2020.

3.1.1.4 2600–3800 MHz

The bands in the 2600–3800 MHz range with 2x70 MHz FDD spectrum and 50+390 MHz TDD exhibit only limited suitability for wide area coverage and deep indoor coverage. Conversely, however, the higher frequency and its associated shorter wavelength and reduced size requirements for antennae simplify the deployment of massive MIMO technology. Massive MIMO is intended to be used for the targeted formation of beams, aiming in particular to extend network reach at the edge of the cell and enable spatial multiplexing of these bands. Following the upcoming award of the 3.4–3.8 GHz spectrum in early 2019, one medium-term expectation—at least in heavily populated areas—is the availability of mobile network-based broadband products with peak data rates significantly exceeding 300 Mbit/s. Capacity gains here are created above all by the use of up to 100 MHz (instead of the previous 2x20 MHz) and spatial multiplexing. This technology will be readily usable at fixed locations in particular. It is therefore expected that this band will enable very high levels of additional capacity in heavily populated areas.

3.1.2 Potential competition challenge: fewer than three effective competitors

The Austrian market currently has three active mobile network operators. This means that infrastructure-based competition is limited to these providers. Consequently, the regulatory authority believes that maintaining (at least) three effective competitors on the market is a key goal for competition.

3.1.2.1 Minimum spectrum portfolio in the 700-2100 MHz bands (excluding 1500 MHz)

The upcoming award affects spectrum that is ideally or moderately suited to achieving wide area coverage and deep indoor coverage.¹¹ The regulatory authority considers one criterion for effective competition to be a situation where at least three network operators have a minimum spectrum portfolio in the key bands affected by the award.

In the opinion of the regulatory authority, at least three MNOs should have 2x20 MHz of spectrum of at least moderate suitability for wide area coverage and deep indoor coverage for existing broadband products via LTE. This enables bandwidths of up to 300 Mbit/s in the respective sector. In addition, at least three MNOs should also have 2x15 MHz for other mobile telecommunications services. This should enable MNOs to at least operate certain basic services such as voice telephony (2G and/or 3G) and broadband over 3G. Over the next few years, spectrum could also be used for 5G services with appropriate quality requirements, once less spectrum is required for the simultaneous deployment of legacy technologies. Alongside these 2x35 MHz with at least moderate suitability, at least three MNOs should also have a minimum amount of spectrum—2x5 MHz—that is ideally suited to wide area coverage and deep indoor coverage. This basic requirement would be enough to offer voice telephony and broadband services with low bandwidth across Austria with a high level of wide area coverage and optimum levels of deep indoor coverage.

The regulatory authority does not currently think it necessary to assign more than 2x5 MHz in the sub-1 GHz range for at least three MNOs. This affects H3A in particular, which has only 2x5 MHz in the 900 MHz band. H3A has not as yet rolled out an Austria-wide network for its 2x5 MHz in the 900 MHz band. Currently, H3A uses national roaming with TMA to offer narrowband 2G services (voice, text, EDGE) via the TMA network and thereby to increase its own area coverage. While a nationwide rollout in Austria with 2x5 MHz can offer only a relatively small value add, this rollout could nonetheless be completed to ensure H3A can offer a certain level of basic voice telephony and narrowband services (e.g. 'broadband' services but with low bandwidth) independently of the actual competitor infrastructure in place.

Currently, H3A primarily uses higher-frequency spectrum (1800 and 2100 MHz) to provide extensive, nationwide coverage with corresponding 3G and 4G broadband services, and also has a commitment to cover at least 90% of the population. For many coverage areas, spectrum in the 1800/2100 MHz range is a substitute.

A certain degree of asymmetry between individual MNOs in terms of frequency assignments ensures stronger differentiation among wireless networks. This can also be a positive driver for competition. Based on the network coverage directly reported by H3A¹², H3A can also be expected to be able, even without sub-1 GHz

¹¹ The 3.4–3.8 GHz band, currently being awarded, is only little suited for providing corresponding coverage.

¹² <https://www.drei.at/de/info/netzabdeckung/>

spectrum, to offer high bandwidths¹³ in areas where this would be necessary due to competition. In recent years, H3A has been able to improve its market share slightly (see Figure 1). This confirms its effective ability to compete.

To answer the question of whether more spectrum should be included from the sub-1 GHz range in the minimum spectrum portfolio—and so implicitly reserved for H3A in the 700 MHz band—the previous behaviour of market participants during the last award auction for a sub-1 GHz band should be considered. In the 2013 multiband auction, H3A had the option of acquiring additional sub-1 GHz spectrum. However, H3A was not prepared to pay a high enough amount for more spectrum in the 900 MHz band. Yet H3A could have acquired another block for a moderate investment. Moreover, H3A also sold spectrum in the 900 MHz range to A1 as part of its acquisition of Orange.

Above the sub-1 GHz range, however, the target situation is for at least three MNOs to have the required 2x40 MHz in the 700, 800, 900, 1800 and 2100 MHz bands. The award process should therefore ensure this target is met. In actual fact, only H3A does not have this minimum spectrum portfolio. H3A has in any case 2x5 MHz in the 900 MHz band and 2x20 MHz in 1800 MHz. If H3A is the only bidder in the auction alongside A1 and TMA, the award rules should ensure that H3A can acquire at least 2x15 MHz in the 700 and 2100 MHz bands. The reason is that, as a result of the re-awarding process, H3A's licence for 2x25 MHz in the 2100 MHz band is expiring. Based on the assumption that no other MNO enters the market, it should be ensured that H3A's future spectrum portfolio does not drop below 2x15 MHz (in total, across the 700 and 2100 MHz bands).

As to the question of whether another participant—i.e. a new entrant—acquires spectrum, causing a situation where fewer than three MNOs have a minimum spectrum portfolio, this can be answered as follows. The acquisition of spectrum by a new entrant is always to be welcomed, since this would in all probability be a driver for competition. The new entrant must be prepared to pay a higher price than H3A for the minimum spectrum portfolio in order to force H3A under the 2x40 MHz limit. It should also be noted, however, that H3A is already prepared to pay a high price compared with a new entrant on account of its existing equipment and network and overall business activities. Considering this intrinsic value to H3A, it is therefore unlikely that a new entrant will demonstrate a higher valuation. Regarding a potential strategic value, the following applies: a new entrant can benefit only minimally by isolating H3A from spectrum, since this entrant is still in competition with A1, TMA and H3A (who is at best only weakened). A new entrant therefore seems very unlikely to achieve any noteworthy ROI from this kind of strategic spectrum acquisition. Accordingly, the regulatory authority estimates there to be only a low overall risk of H3A being unable to acquire the minimum spectrum portfolio as a result of a new entrant's actions. On this view, this scenario does not require any specific measures designed to safeguard competition in the context of protecting the minimum spectrum portfolio against a new entrant.

¹³ A maximum of about 150 Mbps is indicated for 4G/LTE and up to 42 Mbps for 3G. Such peak data rates require the use of more than 2x5 MHz, so that H3A urgently needs to use spectrum in the 1800 MHz or 2100 MHz range.

The implementation details for the minimum spectrum portfolio are to be determined based on the actual auction format.

3.1.3 Potential competition challenge: excessively asymmetric spectrum assignment

Alongside the loss of effective competitiveness on the part of one of the three MNOs—thereby leaving just two MNOs as de facto competitors—a second potential challenge to competition must also be addressed in the context of frequency distribution. Namely: an MNO could acquire significantly more spectrum than their competitors and therefore be exposed to an inadequate level of competitive pressure in certain segments or one of the MNOs could fall below 25% of total capacity.

If a case of excessively asymmetric spectrum assignment arises, this severely restricts the other network operators in their frequency assignment and therefore in their capabilities to exert effective competitive pressure. Considering the current frequency assignment, A1 is the least exposed to this risk and, conversely, best-placed to impose restrictions on other MNOs. TMA is in a position to impose minor restrictions on the others, as a result of A1's frequency assignment of 2x70 MHz in the bands of 800, 900 and 1800 MHz. For H3A, the exercising of unilateral market power as a result of strategic spectrum acquisition is in all probability unlikely, especially if spectrum caps of two thirds in each band were to be imposed, for example (in accordance with the preference of two MNOs).

3.1.3.1 Total capacity: distribution currently unclear due to ongoing award procedure

In this award procedure, 260 MHz or 23% of the spectrum available in 2021 is to be awarded. The ongoing award procedure for the 3.4–3.8 GHz band will decide the distribution of the 390 MHz from this band. Without knowledge of the outcome of this ongoing award procedure—over a third of the total spectrum available for mobile telecommunications—any analysis of the distribution of the frequency usage rights will be incomplete. In the last award, the regulatory authority had considered a minimum assignment of 25% per MNO to avoid excessive asymmetry in the event of only three MNOs being active in the market.¹⁴ Accordingly, the authority reserves the right to address further insights based on overall distribution and the need for at least three effective competitors in specifying measures designed to safeguard competition following the 3.4–3.8 GHz award.

3.1.4 General observations on potential competition challenges

Competition challenges occur as a result of strategic spectrum acquisition that isolates spectrum from competitors or at least increases its cost, thus imposing restrictions on competitors. Strategic spectrum acquisition must therefore be assessed using three criteria. Firstly, it must be possible in principle to actually isolate

¹⁴ See (in German) https://www.rtr.at/de/inf/Konsult5GAuktion2018/Anhang_Wettbewerbssichernde_Maßnahmen.pdf

spectrum. Secondly, there must be an incentive to isolate—and therefore an opportunity to make good on this investment. Thirdly, this must have a more than negligible negative impact on competition.

3.1.4.1 Capability of isolating spectrum or increasing its costs

Given the three MNOs in the market, the capability of fully isolating spectrum is essentially limited by the fact that all three MNOs have already acquired spectrum and are able to enjoy unrestricted use of a large portion of that spectrum—both now and in future. As such, isolation is therefore possible only in individual bands and/or by in some way working to limit the volume of frequency usage rights. Importantly, current planning does not envisage before 2030 any further awarding of spectrum with at least moderate suitability for wide area coverage and deep indoor coverage. Accordingly, until then, preventing the acquisition of additional spectrum in these bands is especially significant.

Were one or more MNOs to be thus isolated, they would also have the option of compensating for the lack of spectrum by increasing capital investments in other areas. Examples of such activities include investing in additional locations and technology upgrades or—for some products—the supplementary use of wired broadband. Ultimately, there is no 1:1 relationship between the usage rights for spectrum and the quality and quantity of the mobile services offered.

Existing assignments mean that the capability of isolating spectrum correspondingly arises as a result of individual services requiring a high amount of spectrum (i.e. more than 2x20 MHz) or—for spectrum that is ideally suited to wide area coverage and deep indoor coverage—a moderate volume (i.e. at least 2x10 MHz). In particular, isolation can lead to a situation where one or more MNOs are then unable to offer multiple instances of such services in parallel. This is relevant: 2G, 3G and 4G services are offered in parallel even now, and 5G will be added in future.

Potential for isolation also exists vis-à-vis new market entry (as an MNO or in another segment).

3.1.4.2 Opportunity to recoup the costs of isolation

Strategic spectrum acquisition is attractive only if accompanied by the opportunity to recoup the costs incurred by exercising market power. A distinction should be made here between a unilateral incentive (and thus unilateral market power) and an oligopolistic incentive (and thus collective market power).

A unilateral incentive is created when a company can use strategic spectrum acquisition to secure unilateral market power, and thereby act in the market to a certain degree independently of competitors and customers, and so recoup the costs of this strategic acquisition. This requires spectrum distribution among other MNOs to be sufficiently asymmetric.

A collective incentive is created by the following conditions. In order for several companies to establish or amplify their collective market power in retail markets by

strategic spectrum acquisition, both the strategic spectrum acquisition itself and activities in the retail markets must be (at least tacitly) coordinated. This requires focal points for collusion (i.e. actual coordinated behaviour such as certain kinds of prices or volume/product/band allocations) both in the context of the auction and in terms of market behaviour—where spectrum is an essential input resource for competitors. Furthermore, it must be possible to closely and reliably observe the behaviour of other participants in this cartel in both the auction and subsequent competition, as well as to punish as effectively as possible those deviating from the coordinated strategy—i.e. by minimising one’s own losses and ensuring penalties are targeted. The coordination that is necessary here means collective strategic frequency buying is essentially more difficult than unilateral action on the part of one company. Whether or not band-specific focal points exist that would further such coordination can be assessed on a per-band basis. A collective incentive exists in particular if one of the three MNOs holds insufficient spectrum (i.e. does not hold the minimum spectrum portfolio) or holds insufficient overall capacity in general.

A new entrant could theoretically reduce the market power of all three MNOs. Conversely, the thwarting of such a new entrant could be associated with a corresponding recouping of the costs incurred.

3.1.4.3 Impact on effective competition

Since only three MNOs with their own access network are currently active in the mobile telecommunications market, and assuming no market entry by a new MNO, it is likely that restricting the competitiveness of one MNO (or that MNO’s competitors) would negatively impact effective competition in the wholesale and retail markets.

3.1.5 Potential competition challenges in the specific bands

Excessively asymmetric spectrum assignment and a lack of three effective competitors with a minimum spectrum portfolio following the end of the upcoming auction are the two most important potential challenges to competition. To investigate these two potential competition challenges, this section looks at the capabilities for isolation, the opportunities for recouping costs and the impact on effective competition, focusing on specific bands where appropriate.

3.1.5.1 Sub-1 GHz bands

The most asymmetric assignment in the sub-1 GHz range would occur if A1 were to acquire 2x30 MHz in this range. With 2x65 MHz spectrum ideally suited to wide area coverage and deep indoor coverage, A1 would have a superior assignment. Only TMA, with 2x25 MHz, could exert a certain degree of competitive pressure in segments requiring the sub-1 GHz spectrum. If the spectrum cap of a maximum of 2/3 in each band, as proposed by two MNOs, is applied, A1 will still be able to buy 2x20 MHz and would then have 2x55 MHz, while this scenario would see TMA holding a maximum of 2x35 MHz or, alternatively, H3A holding a maximum of 2x15 MHz. Conversely, TMA could expand its current spectrum assignment of 2x30 MHz to 2x55 MHz. Essentially, A1 and TMA both have an opportunity to isolate other network operators from spectrum and to obtain a correspondingly unequal spectrum assignment from the auction.

This kind of asymmetric distribution and the market power it bestows could offer the MNO in question suitable opportunities for recouping costs. Demand for best-in-class coverage and deep indoor coverage with very high capacity could be met by just one network operator with the right product portfolio. It should also be noted that A1 is the only MNO having a wired network capable of serving rural areas with low demand and a correspondingly low contribution margin for mobile network expansion. While it is true that A1's competitive pricing options are limited in wired broadband to a certain degree by its commitment to the wholesale offer,¹⁵ A1 can on the other hand profit from a lack of mobile service coverage by redirecting this demand towards wired broadband products. This would potentially cause an increase in the number of wired broadband connections. Even ignoring the wired broadband option, it is nonetheless true that both A1 and (if weakened) TMA could, in the event of suitably asymmetric spectrum assignments, exert market power for services that require a correspondingly high amount of spectrum ideally suited to providing wide area coverage and deep indoor coverage. The risk of a corresponding opportunity to recoup losses cannot therefore be excluded without further analysis.

The regulatory authority is unable to guarantee that coverage in areas requiring ideally suited spectrum will be free from the exertion of market power in all circumstances. This lack of competition could lead directly to price discrimination, i.e. the dominant MNO's products could be excessively expensive compared to those of its competitors. Localised price differentiation could occur. Alternatively, the network operator could simply invest less capital, offer an inadequate level of coverage and therefore fail to fully exploit its spectrum in these areas. This therefore creates a risk of a negative impact on competition.

Accordingly, the risk of an asymmetric spectrum assignment with a correspondingly negative impact on competition cannot therefore be satisfactorily excluded. The regulatory authority is therefore considering implementing measures to safeguard competition and prevent any network operator from achieving significant dominance in the sub-1 GHz range. Accordingly, the regulatory authority is considering taking steps to prevent any network operator acquiring over 50% of the sub-1 GHz spectrum by applying a cap of 2x45 MHz across the 700, 800 and 900 MHz bands. As a result, A1 should be able to acquire no more than 2x10 MHz and TMA no more than 2x20 MHz. A1 faces more stringent restrictions than others. This is justified in particular by A1's already generous spectrum holdings: with 2x35 MHz, A1 has over 50% of the assignments in the sub-1 GHz bands already awarded and is the only network operator able to deploy a 2x20 MHz layer within a single sub-1 GHz band (at 800 MHz).

Looking at the issue of a collective incentive, where two MNOs prevent a third from acquiring a minimum amount of spectrum, the following can be said. In the 700 MHz band, the MNOs contest that a minimum of 2x10 MHz is needed in order to facilitate the efficient rollout of a new mobile telecommunications network. H3A in particular may need to invest here in new equipment and new, larger antennae. H3A's existing

¹⁵ See Decision M 1.5/15-115 of 24 July 2017, available (in German) at https://www.rtr.at/de/tk/M_1_5_15, and decision M 1.6/15-117 of 24 July 2017, available (in German) at https://www.rtr.at/de/tk/M1_6_15 as well as related details in section 3.2.2

towers may also need to be modified in terms of structural design and infrastructure, since mobile network locations are primarily oriented on the 1800/2100 MHz bands.

Even with caps in place to prevent asymmetric frequency distribution in the sub-1 GHz range (see above), a scenario where TMA acquires 2x20 MHz and A1 acquires 2x10 MHz in this band, with H3A going empty-handed, cannot be excluded. If these acquisitions were driven by an intention to isolate other MNOs, such a result would require TMA to bear the isolation costs for 2x20 MHz whereas A1 would incur isolation costs only for 2x10 MHz. If it is true that sub-1 GHz spectrum is crucially important to future competition, however, H3A will also see it as having a high intrinsic value and will be prepared to pay a price to match. Accordingly, MNOs participating in this kind of collective strategy would incur asymmetric costs. As the market participant currently holding the smallest market share, TMA would need to pay more yet would probably have less of an opportunity to recoup these costs as a result of this market share and the lack of wired broadband in rural regions, which by their nature require spectrum that is ideally suited to wide area coverage and deep indoor coverage. The regulatory authority therefore considers the risk of a collective isolation strategy with a 50% sub-1 GHz cap to be negligible. Accordingly, the authority does not intend to implement a specific measure to safeguard competition.

To sum up: given the measures as proposed, the regulatory authority does not currently believe that the risk of a third competitor being isolated from sub-1 GHz spectrum, with a corresponding impact on effective competition, is sufficiently high enough to warrant the adoption of measures to safeguard spectrum for a third MNO in this range.

3.1.5.2 1500 MHz

The regulatory authority is not aware of any detailed concerns relating to strategic spectrum acquisition in this band. Two network operators are supportive of a rule whereby a single network operator would be permitted to acquire no more than two thirds of any band—and hence of this band in particular.

Both in general and for this specific band, the regulatory authority does not see a challenge to competition arising if one network operator should acquire all of the spectrum in this band or if one or more operators acquire no spectrum. According to the latest assessments made, spectrum in this specific band has no particular competitive significance. Any restriction of opportunities to acquire spectrum for reasons of safeguarding competition should therefore be considered only if it applies across multiple bands.

More than one MNO specifies sub-1 GHz spectrum as being a precondition for using 1500 MHz in SDL mode. If H3A fails to acquire any 700 MHz spectrum, this complementarity with the sub-1 GHz range could mean that H3A—lacking an adequate volume of sub-1 GHz spectrum for combination—would have no interest in the 1500 MHz band. In this case, TMA and A1 should be able to acquire the entire band.

3.1.5.3 2100 MHz band

Like the 1800 MHz band, the 2100 MHz band is moderately suited to providing both wide area coverage and deep indoor coverage. As a result of the availability of terminal equipment and other equipment, it is also one of the only bands (the other being 900 MHz) that can be used to offer 3G services. Two network operators expressed a preference for a 2x40 MHz cap in this band, while another operator preferred caps that would effectively reserve 2x15 MHz of spectrum for three operators. Operators also expressed a number of concerns about awarding this band.

The first of these was that the band is a necessary precondition for 3G services. To this the regulatory authority would reply as follows. Trends show that 3G is becoming a legacy technology, i.e. 3G usage is declining and data traffic is moving to the LTE network.¹⁶ It may be assumed that the trend towards 5G will further reduce the usage of 3G services. TMA and A1 have rolled out a 3G network in the 900 MHz band,¹⁷ and the vast majority of terminal equipment can use 3G via the 900 MHz band. If appropriate prerequisites are met, infrastructure sharing agreements are one option for offering legacy technology products as a joint undertaking.

A second concern is that the period of time between the spectrum award and the expiry of usage rights on 31 Dec 2020 may be too short to allow for the corresponding changeover. In any case, TMA and A1 also offer 900 MHz-based 3G services, as mentioned above. Accordingly, the regulatory authority assumes that these two MNOs will be able to switch directly to the 900 MHz band for 3G services. As a result, the period of less than one year between the award and the expiry of the usage rights should not be a major problem.

A third concern is that all network operators use the band currently and have compatible equipment in the access network for this band, but could lose this band as a result of the award procedure. Two MNOs propose a spectrum reservation of 2x15 MHz for each MNO. While the regulatory authority generally appreciates that the loss of a minimum amount of spectrum in the 2100 MHz band results in a certain devaluation of existing, band-specific network equipment—such as amplifiers— the expiry of licences is itself a foreseeable event for network operators. Furthermore, one may assume that the individual operators already using this band will be prepared to pay a high price for the corresponding spectrum, since the mobile network locations and equipment are oriented on the band already in use. In other words: spectrum that is already in use is very likely to have a high intrinsic value. Any strategic value for isolating spectrum must therefore be higher for a bidder to have an incentive to acquire an appropriately large share of the band.

For any new entrant, however, a strategic acquisition of spectrum is in all probability unlikely: apart from the spectrum itself, that entrant would need to invest in

¹⁶ By way of example, refer to the declining number of 3G measurements reported in the RTR Internet Monitor, Number 2/2018, p. 47. 2G represents another alternative for voice services, while LTE is available for broadband. One operator has stated, for example, that less than 10% of all terminal devices exclusively support broadband via 3G but not 4G.

¹⁷ Refer to www.netztest.at

compatible locations and a corresponding network—also to be able to meet any coverage obligations. The new entrant would therefore have to bear additional costs. This is therefore another reason¹⁸ why it is unlikely that new entrants would opt to make a strategic payment of this size, faced with little chance of recouping their costs.

Existing MNOs would merely be able to impose a restriction of effective competitiveness on H3A and therefore potentially reduce the number of effective competitors to fewer than three— not least because A1 and TMA possess adequate spectrum in other ranges. An isolation of spectrum combined with cost recouping must therefore be assessed only if it targets H3A. Turning to H3A, one should also note that the 2100 MHz band is a key part of the H3A network. The network at its locations was oriented on this band during setup. An alternative layer is likely to require spending on frequency-specific equipment, the setting up of which would also require a prolonged ramp-up period. Loss of this spectrum could lead to severe bottlenecks at H3A, since the switching of 3G (and other) services to the 2x5 MHz in the 900 MHz band would involve both delays and capacity problems. Crucially, H3A also has the lowest level of current capacity in terms of spectrum that is ideally or moderately suited to achieving wide area coverage and deep indoor coverage.

Accordingly, the regulatory authority believes there is a risk that other operators stand to gain a strategic advantage if H3A no longer holds a minimum amount of spectrum. At the same time, the regulatory authority intends to address this via the minimum spectrum portfolio. This will ensure that at least three network operators possess at least 2x40 MHz of spectrum in the bands 700–900, 1800 and 2100 MHz. As a result, and assuming no new entrant materialises, H3A should be able to acquire a total of at least 2x15 MHz in this and the 700 MHz band.

Overall, the regulatory authority does not see a challenge to competition that would justify a reciprocal reservation of spectrum in this band for all existing operators. Importantly, the reservation of spectrum for a 20-year period is not an appropriate method for addressing any temporary difficulties of transition.

At the same time, no operator has expressed a preference for caps aimed at enabling the acquisition of more than 2x40 MHz.¹⁹ Given these caps, the regulatory authority does not see a band-specific potential competition challenge from asymmetric frequency distribution.

3.1.5.4 700–2100 MHz range overall

Spectrum in the overall 700 to 2100 MHz range—including the 1500 MHz band—exhibits suitability for wide area coverage and deep indoor coverage that ranges from ideal to moderate. For the foreseeable future (until 2030), spectrum in these bands is probably the only spectrum available for supplying large parts of the population with relevant mobile services. The extent of usage rights is a key factor

¹⁸ See the discussion on a new entrant’s potential for recouping costs in section 3.1.2.1

¹⁹ In the place of specific caps, one operator requested a 2x15 MHz spectrum floor. If this request is applied to all three operators, setting caps of more than 2x40 MHz for one operator has to be ruled out in any case.

that decides an MNO's capacity in terms of mobile services. In general, these bands offer an overall capability for spectrum isolation, combined with opportunities to recoup costs and to exert a corresponding impact on effective competition.

To guard against asymmetric spectrum assignment, the regulatory authority envisages applying a spectrum cap of 43% in these bands. Such a cap prevents an operator from acquiring more than 230 MHz of the 540 MHz offered in the bands 700, 800, 900, 1500, 1800 and 2100 MHz.

To prevent a situation where fewer than three MNOs are capable of engaging in effective competition, the regulatory authority envisages enforcing a minimum spectrum portfolio of at least 2x40 MHz in these bands (excluding 1500 MHz).

3.1.6 Conclusions: potential competition challenges related to distribution of frequency usage rights

A distribution of frequency usage rights that is not compatible with effective competition between the MNOs is to be prevented by the upcoming frequency award procedure. The regulatory authority therefore intends to apply at least the following measures to safeguard competition during this frequency award.

Firstly, a minimum of three network operators should have 2x40 MHz in the 700, 800, 900, 1800 and 2100 MHz bands. Based on existing assignments, this means that A1 and TMA may jointly purchase a maximum of 2x75 MHz of the available 2x90 MHz in the 700 and 2100 MHz bands.

Secondly, no operator should have more than 50%—and may therefore have a maximum of 2x45 MHz—in the bands ideally suited to wide area coverage and deep indoor coverage. This means that A1 is limited to acquiring 2x10 MHz and TMA to acquiring 2x20 MHz in the 700 MHz band.

Thirdly, no operator should hold more than 43% or a maximum of 230 MHz or 2x115 MHz in the 700, 800, 900, 1500, 1800 and 2100 MHz bands (a total of 2x230 + 80 MHz). Based on existing assignments, A1 could acquire a maximum of 2x45 MHz or 90 MHz, while TMA could acquire a maximum of 2x70 MHz or 140 MHz.

In line with the proposals put forward by two network operators, the regulatory authority is also considering the possibility of introducing band-specific caps at two thirds of the respective band.

Changes or supplementary measures to safeguard competition could also arise from the overall distribution of mobile network spectrum and potential asymmetries—and thus depend on the outcome of the 3.4–3.8 GHz award.

Specific implementation of these measures to safeguard competition will depend on the respective auction format.

3.2 Potential competition challenge: Competition deficit on the retail markets, taking into account the H3A merger wholesale offer and the demand-side power of MVNOs

3.2.1 Retail mobile services

Competition for consumers in the retail market for mobile services is currently significantly strengthened by H3A's commitment to providing a wholesale offer for MVNOs. This commitment on the part of H3A will expire in 2024. Until 2022, every MVNO has the option of extending their wholesale offer until no later than 2024,

at which point the wholesale offer then ends. The key question here is whether the MVNOs can then continue to source the wholesale offers they need to continue exerting a corresponding level of competitive pressure in the retail market.

Whether or not an MNO grants an MVNO access—and the price at which it is granted—depends on the following criteria. Firstly, the additional profit, namely earnings less the costs incurred, is a significant aspect. Secondly, the profit obtainable without granting an MVNO access of this kind is also a key factor. This in turn depends on the actions of other MNOs—whether or not they continue to grant MVNO access and perhaps the conditions on which they grant this access—as well as the behaviour of all retail market providers.

3.2.1.1 Collusion risk in the retail mobile service market

Assuming a lack of corresponding²⁰ MVNO access at competitive prices and three competitors of similar size, one key question here is whether a situation of 'tacit collusion' can develop in the retail market. The following section explains the background to this tacit collusion and derives appropriate criteria to test for its presence.

Note: principles underlying tacit collusion²¹

A 'collusive equilibrium' is established if the individual market participants forego higher profit (π^D) in the short term, which could be achieved through deviating from the collusion, and instead devote their energies to collusive behaviour, thereby earning a collusive profit (π^C). An individual company will behave exactly in this way if the valuation of the long-term collusive profit, based on the discount factor δ and expressed as $\pi^C/(1 - \delta)$, is higher than the valuation of the profit that could be derived from acting non-collusively and of a resultant, one-off higher profit (π^D) as well as the valuation of the profit potentially achieved later in all other rounds if all market participants were to behave competitively (π^N).

²⁰ Even in the presence of a monopoly, MVNOs still have their place as long as they are able to sell through particularly advantageous channels—such as a discount supermarket chain—or cater to isolated customer segments—such as the ethnic group segment, to which MVNOs offer foreign calling rights in one and the same package. This needs to be distinguished from a type of MVNO access that actually increases the intensity of competition in the retail mass market and provides an MVNO as a company with corresponding freedom to compete.

²¹ See, by way of example, chapter 14 in Peitz/Belleflamme (2015): Industrial Organization. Market and Strategies.

$$\frac{\pi^C}{1-\delta} \geq \pi^D + \frac{\delta}{1-\delta} \pi^N$$

This results in the key preconditions, described below.

For practical purposes, the first task is to ascertain what behaviours essentially constitute tacit collusion. This may involve coordinating pricing, certain aspects of pricing, certain market shares, certain product characteristics, the splitting up of bands in the course of an auction—or other parameters. This behaviour may be uniform, such as with the setting of a price, for example. Or it may be highly varied, with the deliberate aim of restricting mutual competition: such as when a variety of products are offered that do not compete directly with others and some products that would directly compete are not offered.

Secondly, the likelihood of collusive behaviour depends on the achievable profit—i.e. achievable by each and every participant. On the one hand, this depends on the coordinated activities and the competitive alternatives open to each provider. On the other, the profit achievable through collusion also depends on whether outsiders—i.e. providers not participating in the collusion, new market entrants or end customers—can exert competitive pressure in the form of demand-side power.

Thirdly, there is the question of whether the behaviour of individual participants in the tacit collusion can be monitored rapidly and precisely enough—and also ultimately sanctioned. Logically, if a participant in the collusion deviates from the agreement and earns a higher profit but the other participants are unable to observe or respond to this event, there would be no incentive for the individual participant to maintain the collusion and forego this chance of a higher profit.

In mobile telecommunications, an outsider can only be one of the three MNOs with an existing spectrum assignment or an MVNO with corresponding wholesale prices. And whether MVNOs receive corresponding wholesale access is precisely the question that is being asked.

3.2.1.1.1 Higher profits through tacit collusion where no MVNO has access?

Consequently, there needs to be an investigation of the pattern of behaviour that establishes itself in the market if no MVNO has access to corresponding prices. In this scenario, where MVNOs have no corresponding wholesale access, the question is whether all three MNOs are incentivised to participate in such collusive behaviour. If an individual company is able to achieve a higher level of profit in the long-term by competing directly—such as by acquiring higher levels of market share while improving or at least not significantly worsening its margins—then participation in collusion is unlikely. Currently, all three MNOs have similar market share and relatively similar cost structures. Overall demand is also relatively constant in the retail mass market. The sudden expansion of market share by one MNO and the acceptance of this expansion by the other MNOs (if demand is relatively constant, this would mean the other MNOs lose customers to the first MNO) would be unexpected. Accordingly, it is probable that all three MNOs could coordinate their behaviour to establish a scenario of tacit collusion. The internal stability of such a collusion is the concomitant risk created.

The question of whether external restrictions would prevent a tacit collusion can be answered as follows. In this scenario, there are only three MNOs and no MVNOs with wholesale access to corresponding prices. Assuming that all three MNOs participate in the tacit collusion, there is no outsider capable of expanding and therefore exerting competitive pressure. A new entrant would have to have the corresponding mobile spectrum. Yet this spectrum is currently assigned solely to the three MNOs. The retail market for mobile services is a mass market: as such, it is very unlikely that individual end customers could exert demand-side power in any shape or form. If no MVNO can exert a corresponding level of demand-side power on the wholesale market, then a high level of profit from collusion is probably achievable for the MNOs and this precondition for tacit collusion is in this case fulfilled.

As to the question of transparency for mobile services, it can be assumed that competitive behaviour in the retail market is directly and precisely observable. The price/product combinations are typically clear-cut and publicly accessible. A non-conformist company is also normally directly identifiable as such.

The question of sustainability, i.e. the long-term prospects of tacit collusion, can be answered as follows. Depending on the behaviour agreed, the targeted sanctioning of a non-conformist company is possible in this market. As one such sanction, price/product combinations could be launched on the market that are intended to compete—perhaps exclusively—with the products of the non-conformist. Of especial importance here is also the fact that, beyond this market, interactions and contractual agreements exist between the three MNOs across many other levels and markets, which could enable the swift and targeted imposition of sanctions.²²

Accordingly, the general preconditions for the tacit coordination of key competitive parameters are probably fulfilled—always assuming that MVNOs are unable to prevent such a collusion by providing competitive offers.

3.2.1.1.2 Changes in competition situation in 2013–2015 (without MVNOs)

This assessment tallies with observations made during the period 2013 to 2015, following the Hutchison/Orange merger in 2012. During this time, the market was effectively split between just three MNOs: the new MVNOs who had successfully negotiated wholesale sourcing on the basis or terms of the H3A offer were yet to enter the market or only minimally active. The increase in prices estimated by RTR²³ for new customers (as opposed to existing customers) during 2013 and 2014 was around 50–90% for the average smartphone user and 22–31% for the average conventional phone user (i.e. no use of mobile data services). The average price increase calculated by the Federal Competition Authority (*Bundeszweitsbewerbsbehörde*, BWB)²⁴ for existing customers (as opposed to new

²² Interactions exist, among other things in private customer and business customer markets, in wholesale markets, in other countries, in the case of wholesale cooperation (passive and in some cases active infrastructure, locations etc.) and when cooperating for lobbying purposes.

²³ RTR (2016): Ex-post analysis of the merger between H3G Austria and Orange Austria. Available at https://www.rtr.at/en/inf/Analysis_merger_H3G_Orange.

²⁴ BWB (2016). The Austrian Market for Mobile Telecommunication Services to Private Customers. An Ex-post Evaluation of the Mergers H3G/Orange and TA/ Yesss! Sectoral Inquiry BWB/AW-393, Final Report, Vienna. Available at

customers) was in the range 14–20%. Price increases were around 20–30% in the prepaid segment and 13–17% in postpaid. Competition increased only as a result of MVNO market entry in 2015. A corresponding effect is observable from 2016 in particular.²⁵ In the absence of any effective MVNO access, the MNOs therefore found it was possible to increase prices together above a level at which these would be competitive (see also Figure 2).

3.2.1.2 Demand-side power of MVNOs

Accordingly, a corresponding level of demand-side power on the part of MVNOs is a decisive factor. One key form of buyer power is created if an MVNO can credibly threaten to switch to another host MNO. The wording of the MVNO contract will make this switch more or less difficult.

A ‘light’ MVNO—such as VentoCom GmbH²⁶ and its subsidiary HoT GmbH, as defined by the terms of the agreement with TMA—uses the SIM card of the host MNO and would thus need to migrate its customers to new SIM cards. This is associated with substantial costs, a correspondingly high time investment and very likely a loss of customers—who would be faced with replacing their SIM card. The biggest MVNO by a wide margin in Austria is therefore only a light MVNO and, as such, has no immediate option to migrate its existing customers with their existing SIM cards to another MNO host. This increases the dependency of a light MVNO on its host MNO while weakening its buyer power.

A full MVNO—such as MassResponse (MR), for example—can continue to use its own SIM cards following a change to another host MNO. Interconnection with the new host MNO can be technically challenging, however, and is also associated with certain costs and the relevant migration period. Essentially, however, switching to a new host MNO is much easier for a full MVNO—which means the full MVNO can exert buyer power more easily.

The MNO’s negotiating power also depends on the revenue or profit losses that the MNO would incur by the loss of the MVNO as its wholesale customer. If this revenue or (ultimately) profit loss is moderate—and this is not just currently the case but also likely to be true in several years’ time for all full MVNOs—an MNO could credibly make the case that the loss of its MVNO customer is no threat at all. The bigger the MVNO and the larger its customer base, the more severe would be the host MNO’s losses in terms of customers and profit.

Overall, the regulatory authority believes that, without MNO commitment to a wholesale offer, there is a high risk of MVNOs being unable to wield effective demand-side power.

https://www.bwb.gv.at/news/news_2016/detail/news/bwb_und_rtr_praesentieren_endberichte_der_telekom_branchenuntersuchung/

²⁵ BEREC Report on Post-Merger Market Developments – Price Effects of Mobile Mergers in Austria, Ireland and Germany. BoR (18) 119. Available at https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8168-berec-report-on-post-merger-market-devel_0.pdf

²⁶ It should be noted here that Ventocom reached with their host MNO an independent agreement not directly based on the mandatory wholesale offer by H3A. At the same time it needs to be assumed that the mandatory wholesale offer by H3A resulted in a stronger negotiating position for Ventocom.

3.2.1.3 Competition in the wholesale market for MVNO access

Alongside this issue of moving to a new host MNO, there is also the question of whether competition in the wholesale market is adequate.

The first point to address is the individual incentive that a respective MNO has to enable access for an MVNO at prices such that this MVNO can promote competition in the retail market. In the absence of MVNOs with access at relevant wholesale prices, a price increase in the retail market would be likely (as was indeed the case during the 2013–2015 period, see section 3.2.1.1). H3A's wholesale offer originates in a commitment that H3A entered into directly, with the aim of securing approval for their merger with Orange. In this context, the MVNO access is therefore not voluntary.

The access granted to VentoCom as a light MVNO is substantially more restricted in terms of switching between MNOs.

In recent years, no MVNO has been able to negotiate a wholesale deal beyond the reference offer that would enable the MVNOs to offer any significant additional products (such as unlimited data transfer packages or zero-rated products). Even HoT, as the largest MVNO, does not offer any extensive data packages—although they are offered by MNOs. There have been no successful new entries by MVNOs that have significantly stimulated competition in the last two years. This is also probably a result of the necessary wholesale price indexing that would have to have been negotiated with MNOs. Indeed, this has already caused a perceptible downturn in competitiveness for both established MVNOs and new entrant MVNOs.

Overall, and in the absence of a specific commitment to do so, it appears unlikely that any MNO would offer an MVNO a wholesale agreement with a term and conditions so favourable as to allow the MVNO to exert effective competitive long-term pressure in the retail market and adequately prevent a situation of tacit collusion.

At the same time, the wholesale offer to MVNOs in general is unlikely to be abruptly terminated. Instead, it is likely that the existing MVNOs will continue to use inexpensive sales channels (e.g. Hofer) or that certain discrete customer segments (e.g. ethnic group or discount segments) will be served by MVNOs in cases where a specialised MVNO is better-placed to do so. This is to be distinguished from an MVNO access that exerts effective competitive pressure on the mass market by its intrinsic pricing freedom. Pending issues here include the question of whether timely access will be granted to new technologies, what indexation will be offered beyond the merger-based wholesale offer and other elements of a wholesale access that are necessary to exert effective competitive power in the future.

In addition, there is also the question of tacit collusion on the wholesale market, where MNOs act as suppliers and MVNOs act as buyers. Typically, there is little transparency in this market concerning the prices agreed. A lack of monitoring therefore makes any coordination of wholesale prices more difficult. At the same time, an individual MVNO can be monitored via the retail market to determine the network they use, the technologies they source from the respective host MNO and the prices the MVNO can offer on the market. Tacit collusion concerning these

observable parameters—namely granting access to the network, to specific technologies and (indirectly) to a possible range of end customer prices—is therefore certainly possible. Options for imposing sanctions must also exist, although these do not necessarily have to be part of the wholesale market but can (as shown above) be enforced in any of the other areas where MNOs interact.

Following its analysis of provider competition in the wholesale market, the regulatory authority therefore also sees a risk that, following the expiry of the merger-based wholesale offer, MVNOS will lack the buyer power needed to exert effective competitive pressure in the retail market. An increase in prices—relative to a scenario where a wholesale offer continues to safeguard competition—is therefore not unlikely, for the reasons stated.

Accordingly, the regulatory authority is considering safeguards in the award process to ensure an appropriate wholesale offer is continued beyond 2022/2024.

3.2.1.4 Consideration of mandatory MVNO access after expiry of the current obligation

In adopting a measure safeguarding competition, the challenges facing MVNOs, as stated in the market analysis given in section 2.1, must also be considered. Importantly, the rising demand for data and a tendency towards zero-rated offers for smartphone owners or packages enabling unlimited data consumption at no extra cost could severely limit the ability of MVNOs to compete effectively.

The regulatory authority is therefore considering making MNOs commit to a future-proof wholesale offer. Also being considered is the option of making MNOs commit to an unlimited tariff plan as a wholesale tariff that can be offered as a smartphone plan—i.e. in combination with minutes, texts and roaming. This would be a change compared to the existing commitment to a wholesale offer.²⁷

In terms of details, the regulatory authority is considering modelling the mobile wholesale offer on the existing commitment to a wholesale offer as set out in the merger document M.6497 – HUTCHISON 3G AUSTRIA/ORANGE AUSTRIA, annex 1. Key changes would be required in the following areas. Firstly, the wholesale prices and amounts must be adjusted accordingly, using appropriate indices. Secondly, the regulatory authority is considering lowering the maximum amount in the wholesale offer from 30% to 10–20% of capacity, or using some other limit. Thirdly, steps should be taken to ensure that MVNOs can obtain a corresponding wholesale offer in order to be able to offer smartphone subscriptions that are unlimited (in terms of data volume). Fourthly, the wholesale offer must also be appropriately future-proofed in terms of its application to new technologies, products and qualities.

3.2.2 Retail market for private customer broadband products

The retail market for private customer broadband products comprises access via DSL, cable and fibre, as well as mobile broadband products. Mobile broadband products

²⁷ M.6497 – HUTCHISON 3G AUSTRIA / ORANGE AUSTRIA, ANNEX 1: REFERENCE OFFER, APPENDIX A: CHARGES, Par. 19; available at: <https://www.drei.at/media/common/pdf/info/wholesale/mvno-reference-offer.pdf>

exert significant competitive pressure on fixed broadband connections. This is shown by several indicators, as follows. In many cases, mobile broadband is used without end customers utilising a wired connection. A trend of people moving between wired and mobile broadband can also be observed: customers are largely satisfied with their mobile access and do not plan a switch to wired broadband or the acquisition of supplementary wired access. The prices and product characteristics of mobile and wired broadband are comparable. Key applications such as video or music streaming are used as prevalently in households with only mobile broadband as they are in households with only wired broadband. Typically, broadband is not offered as a package with TV.²⁸ Around 1/3 of the data volume is consumed via mobile broadband—most of which are fixed-line replacement products.²⁹ Mobile broadband tends to be cheaper at lower bandwidths in particular.³⁰

Typically, MNOs advertise unlimited data plans—which exert the strongest competitive pressure in the retail market for private customer broadband products—as replacements for fixed-line products (A1: “Simply plug in anywhere and get online”; TMA: “HomeNet Box”; H3A: “Internet plans for at home”). These plans are not combined with inclusive minutes or texts and roaming is not included. As a rule, however, mobile broadband use is not further restricted: the customer is free to use the SIM card in a smartphone or could use the terminal device itself in several locations (e.g. in a second home or weekend home).³¹

3.2.2.1 Role of virtual unbundling

In the wholesale market for private customer broadband products, a commitment to provide a wholesale offer is already in place.³² The virtual unbundling wholesale product, which A1, pursuant to two decisions issued by TTK in 2017, is required to offer at local (to the main distribution frame) and regional (to the nine State capitals) handover points, lets alternative providers offer fixed-line access products to consumers (such as fixed voice telephony connections, fixed or hybrid broadband connections, and packages of these products or other data services such as leased lines or Ethernet services).

The regional handover and fee structure (fees free of margin squeeze even for small volumes) mean that the barriers to market entry can be considered to be low. Currently, these barriers are being further lowered by A1’s voluntary offer of a central network handover with only one handover point for all of Austria, plus an option with a modem. A1 is not required to do so, however.

Despite the relatively low barriers to market entry, no new, Austria-wide market entry is to be expected in the mass market (private customer segment) in the foreseeable future. The reasoning behind this forecast is as follows.

²⁸ Decision M 1.5/15-115 of 24 July 2017, item 2.2.2.1 (available in German at https://www.rtr.at/de/tk/M_1_5_15/Bescheid_M_1.5_15.pdf)

²⁹ See RTR INTERNET MONITOR No. 3/2018, p. 8; available (in German) at https://www.rtr.at/de/inf/internet-monitor-32018/RTR_Internet_Monitor_Ausgabe3_2018.pdf

³⁰ See RTR INTERNET MONITOR No. 3/2018, p. 36

³¹ The technology would, however, generally allow use to be limited to specified cells.

³² Due to their waning significance, other wholesale products are not described here.

As with physical unbundling (although this has been in decline for several years), virtual unbundling is used primarily by two companies: TMA and H3A. TMA uses virtual unbundling for hybrid products and—following its acquisition of UPC in summer 2018—for fixed broadband connections outside the area served by its own cable network infrastructure. After acquiring Tele2 in 2017, H3A uses virtual unbundling to offer fixed broadband connections. Over 80% of demand for unbundling products is met by these two companies.

All other companies use virtual unbundling only to a limited extent. Such companies are either regional (e.g. Russmedia or Innsbrucker Kommunalbetriebe) or active only in the business segment (e.g. Colt). The regional focus of these companies or their orientation on the business customer segment makes it unlikely that they will expand unbundling use significantly outside these areas. While these companies could have entered the nationwide private customer segment, they have not chosen to do so. The same reasoning also applies to companies who have not previously been active as providers of wired broadband connections, such as MVNOs.

Any (effective) nationwide entry into the private customer segment would ultimately be associated with high fixed costs, especially for marketing and sales. When compared to MVNO wholesale services, for example, virtual unbundling is also relatively complex for smaller-sized companies (i.e. excluding MNOs): this also presents an additional barrier for small businesses or companies who have not been active in the fixed-line or DSL segments to date.

Compounding these problems is the fact of stagnating—and to an extent declining—sales in fixed-line broadband. This makes it harder to achieve the economies of scale necessary to underpin successful market entry.

As a final point, the margin between A1's wholesale and retail prices, as specified in the relevant decisions, is not so large that existing offers from A1 can be undercut to any significant degree.³³ No significant change is to be expected here in the foreseeable future, either, since the decision specifies only the margin itself but does not place a cap on the wholesale fees charged for virtual unbundling.

Virtual unbundling is therefore of material importance in maintaining the current level of competition in broadband connections: it gives providers such as H3A and TMA the chance to offer nationwide products in the private customer and business customer segments while facilitating relevant business opportunities for smaller regional and specialist providers. A new, nationwide market entry is not expected in the foreseeable future, however, for the reasons stated above.

Lastly, it should be emphasised that current pricing regulations mean virtual unbundling offers no 'safe haven' against price increases on the part of A1, should A1 opt to exert market power to do so in the future (as A1 is able to increase wholesale prices to match higher retail prices).

One can therefore sum up by saying that, following the H3A/Tele2 and TMA/UPC mergers, the MNOs now possess the most extensive wired infrastructure and are the

³³ This was actually intended, to maintain incentives for A1 to invest in network expansion.

biggest demand-side parties in terms of regulated wholesale products. Major nationwide competitive pressure from broadband connections of other parties is not to be expected.

3.2.2.2 Collusion risk with private customer broadband products

For private customer broadband, there is essentially a state of three-way competition between the MNOs with their fixed and mobile private customer broadband products. All three MNOs offer unlimited data transfer packages in mobile and/or in combination with their wired broadband services.

Apart from the three MNOs, there are several regional cable network operators, such as Kabelplus, LIWEST and Salzburg AG. Although most of these operators are important local providers, they have no plans or intention to expand outside their current region with their own infrastructure. Furthermore, even if consumer broadband prices were to rise sharply, these operators would not exert competitive pressure capable of preventing the three MNOs exercising market power.

While it is true that a certain degree of external competitive pressure stems from virtual unbundling and the regional cable network operators, the latter face severe barriers to expansion. Not only do few companies besides MNOs make use of virtual unbundling but these providers also confine their activities to specific regions or the business customer segment. To date, regional cable network operators have made no effort towards exerting effective competitive pressure outside their regions.

Overall, the regulatory authority is unable to identify any level of external competitive pressure capable of effectively limiting the potential benefits accruable by tacit collusion between the three MNOs (incl. their wired infrastructure). Neither an adequate level of buyer power nor relevant expansion by existing infrastructure operators or purchasers of virtual unbundling is to be expected.

Accordingly, three issues remain to be investigated here: firstly, whether the three MNOs are able to find potential common ground for organising tacit collusion; secondly, whether all three MNOs stand to gain more from such collusion than from competition (so that all three MNOs have an abiding interest in such collusion); and thirdly, whether the behaviour of other collusion participants can be observed and sanctioned in a timely manner.

As regards transparency and sustainability, readers are referred to the arguments concerning the mobile services market (section 3.2.1.1), namely: one may assume that competitive behaviour in the retail market is directly and precisely observable. The price/product combinations are typically clear-cut and publicly accessible. A non-conformist company is also normally directly identifiable as such. Depending on the behaviour agreed, the targeted sanctioning of a non-conformist company is possible in this market. As one such sanction, price/product combinations could be launched on the market that are intended to compete—perhaps exclusively—with the products of the non-conformist. Of especial importance here is also the fact that, beyond this market, interactions and contractual agreements exist between the three MNOs across many other levels and markets, which could enable the swift and targeted imposition of sanctions.

Key differences vis-à-vis the mobile services market are to be found in existing infrastructure and market share (for the latter, see Figure 5). A1 has a nationwide wired network at its disposal, namely a copper wire pair network over the last mile that is also connected to a fibre-optic network with varying degrees of proximity to end customers. In Vienna, Graz and other regions, TMA/UPC has a coaxial cable network that is similarly connected to a fibre-optic network. In regions where TMA/UPC has no infrastructure of its own over the last mile, the wholesale offer from A1 is utilised to offer wired broadband. H3A is the largest provider of private customer broadband products over the mobile telecommunications network and offers wired broadband only via A1's wholesale offer.

Potential tacit collusion in this market is unlikely to be associated with symmetric market share, as a result of differing wholesale capacities and costs. This kind of situation is unlikely to be accepted into the long term by the two integrated providers with existing wired infrastructure who therefore incur minimal costs for a connection. In the regions where an MNO can utilise wired infrastructure with correspondingly higher capacity, this MNO's market share is likely to be higher. As a result, A1 currently has the largest market share, followed by TMA/UPC and H3A.

Capital spending on new technologies, whether in mobile services or wired broadband, represents a long-term strategic decision—especially when these levels of investment are particularly high—and this is an area where tacit collusion is a formidable challenge. The motivation of each operator to design price/product combinations will vary depending on the capacities that result from such investments. If segments experience radical upheaval, with marginal costs or capacities changing drastically as a result of spending on new technologies, a concomitant degree of disruption to any tacit collusion is therefore almost certain.

Focal points for coordinating behaviour in the private customer broadband market could therefore involve interdependent pricing, the maintenance of historical (i.e. non-symmetric) market share, the dividing-up of various segments, as well as tactics of postponing spending on certain smaller-scale measures designed to increase capacity. Nor do these points of focus need to be uniform for all three MNOs: coordination between the wired providers may be handled differently to coordination with the provider based primarily on mobile services.

Overall, the regulatory authority sees a very real risk of tacit collusion in the private customer broadband product segment. Only three providers compete nationwide and their total market share exceeds 90%. Adequate competitive pressure from other providers is not to be expected. The coordination of activities between the two wired providers may be handled differently to coordination with the primarily mobile-based provider. Behaviour in the retail market is highly transparent. The three MNOs interact on many other levels and therefore have a wide range of options for sanctioning nonconformist behaviour.

3.2.2.3 Competition in the wholesale market for MVNO access

Regarding competition in the wholesale market for MVNO access, readers are referred to section 3.2.1.3. As of this writing, MVNOs do not purchase unlimited

wholesale products to any appreciable degree—not even on the basis of the relevant wholesale offer commitment from H3A.

3.2.2.4 Consideration of a mandatory flat-rate wholesale product

Overall, the regulatory authority believes that there is also a risk of tacit collusion in the private customer broadband product segment. The regulatory authority is therefore considering securing a mobile wholesale offer for fixed-line replacement products with unlimited data access as part of the award.

However, safeguards might then need to be imposed to prevent MVNOs engaging in excessive use of the network operated by the respective MNO. Not least because MVNOs could overload the MNO's network without adequately taking into account effects on the overall quality of the network.

4 Options for measures safeguarding competition

Based on this analysis, the regulatory authority is considering measures to safeguard competition in terms of spectrum assignments as follows.

- Firstly, a minimum of three network operators should have 2x40 MHz in the 700, 800, 900, 1800 and 2100 MHz bands. Based on existing assignments, this means that A1 and TMA may jointly purchase a maximum of 2x75 MHz of the available 2x90 MHz in the 700 and 2100 MHz bands.
- Secondly, no operator should have more than 50%—and may therefore have a maximum of 2x45 MHz—in the bands ideally suited to wide area coverage and deep indoor coverage. This means that A1 would be limited to 2x10 MHz and TMA to 2x20 MHz in the 700 MHz band.
- Thirdly, no operator should hold more than 43% or a maximum of 230 MHz or 2x115 MHz in the 700, 800, 900, 1500, 1800 and 2100 MHz bands (a total of 2x230 + 80 MHz). Based on existing assignments, A1 could acquire a maximum of 2x45 MHz or 90 MHz, while TMA could acquire a maximum of 2x70 MHz or 140 MHz.
- In line with the proposals put forward by two network operators, the regulatory authority is also considering the possibility of introducing band-specific caps at two thirds of the respective band.

Changes or supplementary measures to safeguard competition (particularly in relation to the distribution over all bands) could also arise from the overall distribution of mobile network spectrum—and thus depend on the outcome of the 3.4–3.8 GHz award. Specific implementation of these measures to safeguard competition will depend on the respective auction format.

A potential competition deficit in the retail markets exists, considering the mandatory wholesale offer arising from the H3A merger as well as the demand-side power of MVNOs. Here the regulatory authority sees a risk of insufficient competitive pressure from MVNOs and tacit collusion among the three MNOs. The regulatory authority is therefore considering making MNOs commit to a wholesale offer.