

Principles and scenarios for the provision of the 800 MHz, 1.8 GHz and 2.6 GHz spectrum

Improving broadband coverage in Germany is closely linked to making suitable spectrum available for rolling out high-performance mobile networks.

The spectrum usage rights in the bands at 800 MHz and 2.6 GHz and some of the usage rights in the band at 1.8 GHz will be expiring at the end of 2025. It is therefore necessary to find out as soon as possible how best to provide the freed-up spectrum for use from 2026.

The Bundesnetzagentur's focus is on improving broadband coverage, particularly in rural areas. Out of the three bands, the spectrum at 800 MHz is especially suitable for delivering broadband to rural areas because of its propagation characteristics. This paper therefore focuses on the 800 MHz spectrum. The remaining spectrum for which the usage rights expire at the end of 2025 is, however, also to be made available again at the same time.

Last summer the Bundesnetzagentur published a "Spectrum compass" for market consultation with a view to encouraging and structuring debate at an early stage.

The Bundesnetzagentur has evaluated the responses received and is now consulting on its principles and scenarios for the provision of the spectrum with the aim of exploring the next possible steps. All interested stakeholders are invited to comment on this paper.

Responses are to be submitted in German

by **23 August 2021**

in writing to the postal address below

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Kennwort: Szenarienpapier 2021
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and

electronically in Microsoft Word (or Microsoft Word-compatible) or PDF format (copying and printing must be enabled) to the email address below

referat212@bnetza.de.

It is intended to publish the original responses on the Bundesnetzagentur website. Respondents are therefore asked to give their consent to publication when they submit their comments. If comments contain business and trade secrets, respondents are asked to submit an additional version for publication in which the business and trade secrets have been blacked out, together with a list justifying the blacked-out parts.

I. Current situation

The Bundesnetzagentur aims to decide on how to make the spectrum available again about two to three years before the usage rights expire. Its objective is to give the market legal and planning certainty for the further roll-out of high-speed telecommunications networks. Suitable spectrum is a fundamental resource for high-speed mobile networks. The pandemic has highlighted the very importance of high-speed broadband networks across the country, including in rural areas. Broadband networks are essential for mobile working, home schooling and e-health.

The spectrum below 1 GHz in particular plays a fundamental role in providing coverage to rural communities. The 800 MHz spectrum therefore also plays a part in delivering broadband, especially in rural areas. In view of user and consumer interests, making spectrum with expiring usage rights available again must not result in disruption to services or even a deterioration in coverage. The Bundesnetzagentur's objective is, rather, to improve coverage especially for communities in rural areas. Particular account must be taken of this objective when re-providing the spectrum.

At the same time, making freed-up spectrum available must promote sustainable competition for the benefit of consumers. This will make it possible to drive forward developments in the mobile communications market, with 5G applications also in mind.

The questions of which option for awarding the spectrum should be considered and whether an award decision is necessary especially depend on the scarcity or non-scarcity of the spectrum concerned. If the available spectrum is scarce, it is necessary to look at which award option is suitable with the regulatory objectives in mind. It is important to make sure that the new network operator and potential new entrants have equal access to spectrum resources as well.

The Federal Government's Mobile Communications Strategy drew attention to the following in connection with the provision of spectrum¹:

"[...] Ahead of this, consideration is to be given as to whether, and if so how, the rules governing spectrum award can be adapted in such a way that mobile communications coverage in rural areas is the crucial benchmark in the award and the latter is not based primarily on highest financial bids.

This will also include the options of extending spectrum use rights from the 700, 800 and 900 MHz ranges, which will expire in 2025 respectively 2033. It should also be taken into account that in the years ahead, a discussion will start on how other frequencies below 1 GHz can be used permanently. [...]"

¹ Available at https://www.bmvi.de/SharedDocs/DE/Anlage/DG/Digitales/mobile-communications-strategy-lang.pdf?__blob=publicationFile

Furthermore, the Bundesrat drew up a resolution concerning the design of award proceedings:²

"The Bundesrat requests the Federal Government, in cooperation with the federal states, to conduct a fundamental, open-minded review of the current practice of awarding spectrum by auction. Accompanied by neutral expertise, it should include an assessment of alternative award models with a view to finding a market-oriented and pro-competitive solution that will lead to a noticeable improvement in mobile coverage."

Finally, the provision of spectrum must also be legally sound. Award proceedings and assignments are designed on the basis of the national and European regulatory frameworks. In this context, it will also be necessary to take account of the amendments made to the Telecommunications Act to implement Directive (EU) 2018/1972 establishing the European Electronic Communications Code (EECC).

Against this background, the Bundesnetzagentur published its "Spectrum compass 2020" for consultation on its website and in its official gazette on 19 August 2020, inviting comments from all interested stakeholders. The paper presented initial considerations on the future availability of spectrum for mobile communications. This enabled interested stakeholders to take part in the discussion at an early stage.

Some consultation respondents said that the market entry of the new operator would worsen the scarcity situation, especially for valuable rural area spectrum. It was therefore necessary to choose an adequately large framework for award. It was said that extending current usage rights was a suitable way of making spectrum in different bands available at the same time, while also defragmenting the bands. It was said that provision of the UHF band 470-694 MHz for mobile services should also be taken into consideration.

It was said that future coverage obligations needed to take account of a wide range of factors, including mobile communications summits, state funding programmes, the activities of the mobile communications infrastructure company (MIG) and network operators' own targets. The objective must be a targeted roll-out suited to meet the needs of consumers.

It was said that national roaming did not contribute to improving mobile coverage. National roaming obligations were therefore neither appropriate nor legally possible.

However, there was also a call for preference and the assignment of rural area spectrum. It was said that regional and national roaming obligations should be imposed. Extensions of spectrum usage rights were not permissible.

With regard to service-based competition, it was said that requirements to the benefit of service providers were neither necessary nor proportionate. However, it was also said that only hard obligations could secure the position of service providers.

With respect to the UHF band, it was said that the 470-694 MHz band should not be touched. Terrestrial broadcasting in the UHF band had proven to be crisis-resilient, most recently in the current pandemic.

² See Bundesrat printed paper 445/19 of 11 October 2019.

Creating equal living conditions in urban and rural areas was also emphasised. In this context, there was a call for instruments, such as a "negative auction", to enable coverage for areas that were not financially lucrative. It was also said that there was a need to focus more in future on transport routes and their particular characteristics. Closer monitoring of mobile coverage with effective sanctions should be introduced. State funding measures had proven difficult to integrate into award proceedings and should be left out in future.

The Bundeskartellamt recommended shaping future regulatory measures above all towards securing infrastructure-based competition. It said that well-functioning competition created the most effective incentives for continuous network roll-out in line with requirements. In terms of competition, awarding spectrum in an auction was preferable to tendering. Extending spectrum usage rights was viewed critically in light of potential discrimination.

The responses – as far as they do not contain any business or trade secrets – have been published on the Bundesnetzagentur website at www.Bundesnetzagentur.de/mobilesbreitband.

II. Principles for the provision of the 800 MHz, 1.8 GHz and 2.6 GHz spectrum

- **Better mobile broadband quality** Expanding existing country-wide network infrastructures and rolling out new networks are essential for the spread of digital technology in urban and rural areas. Delivering high-performance broadband to communities across the country on the basis of existing digital infrastructures is to be improved.
- **Better coverage** High-performance broadband coverage is a must in areas where people live and work. It is essential for education and employment and so for prosperity and economic growth. High-performance broadband – in existing white spots as well – creates equal living conditions in urban and rural areas.
- **Uninterrupted coverage along transport routes** Uninterrupted broadband coverage along transport routes is to be driven further forward. Continuous and uninterrupted access to broadband mobile services is to be guaranteed for all end-users. The coverage already achieved for white and grey spots through cooperation is to be improved further.
- **Strengthening competition** Both infrastructure-based and service-based competition is to be promoted. Existing network infrastructures are to be reinforced and expanded. At the same time, new entrants are to be given the chance to roll out new networks and offer mobile services. In addition, service providers and MVNOs (mobile virtual network operators) are to be able to make a substantial contribution to competition.
- **Equal access** The Bundesnetzagentur will factor in equal access to spectrum below 1 GHz for the new operator when choosing the proceedings. At the same time, the Bundesnetzagentur believes that permanent roaming can also be an option for

gaining access to a country-wide network. This does not imply a right to rural area spectrum nor a right to permanent roaming.

- **Roaming as an engine for more competition** Infrastructure-based competition is to be strengthened to the greatest possible extent. Roaming can help to fill in gaps in mobile coverage in areas where rolling out several parallel network infrastructures would be disproportionately expensive. This can promote service-based competition. The Bundesnetzagentur is generally open to a model where one mobile operator ensures coverage in rural areas through national roaming.
- **Efficient spectrum use and competition** If a mobile operator has rural area spectrum, the spectrum must be used efficiently to provide coverage to communities in rural areas. The competitive implications of one-sided permanent national roaming are to be examined.

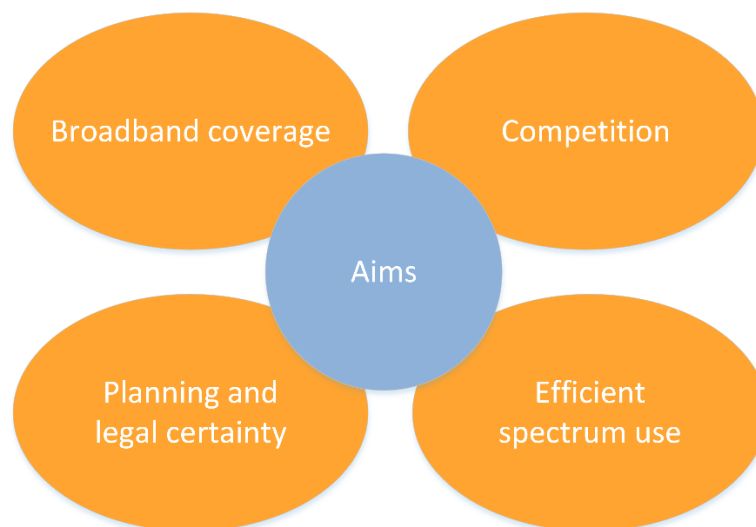


Figure: Objectives for the provision of the 800 MHz, 1.8 GHz and 2.6 GHz spectrum

Numerous changes to the telecommunications legislation that were made to implement the EECC affect the area of spectrum management. One key change is that an auction is no longer the default option when spectrum is scarce. It is still necessary, however, to choose the most suitable option for making the spectrum available. The objectives of improving broadband coverage, promoting sustainable competition and ensuring efficient and interference-free spectrum use will still be decisive when the Bundesnetzagentur chooses which option is suitable. Uninterrupted mobile broadband coverage on the basis of suitable spectrum is of considerable importance for implementing the regulatory objectives when making spectrum available.

III. Scenarios

In light of the principles set out above, both the current situation and market players' future positioning play a fundamental role in choosing a suitable procedure for making spectrum available. It is important to remember that it will be possible to provide more rural area spectrum – and possibly spectrum in the UHF band – in 2033.

At present three companies operate nationwide mobile networks in Germany. Broadband coverage in rural areas is achieved in particular by using 800 MHz spectrum. Each of the established operators has 2 x 10 MHz of spectrum, which has proven to be a suitable bandwidth compared with other European countries as well. The network operators are now cooperating to achieve cost-effective mobile coverage across the country. For instance, they cooperate along transport routes by offering each other coverage. Overall the Bundesnetzagentur welcomes cooperation where rolling out networks would not be economically viable. The Bundesnetzagentur follows this cooperation with interest while keeping an eye on the effects on competition. Cooperation can help not only to realise potential economic savings but also to protect nature and the climate by avoiding additional antenna sites.

The new number of four assignment holders opens up the potential to promote competition in Germany for the benefit of consumers. However, the market players also compete with each other with respect to the spectrum resources required for network roll-out. It is likely to be in the interest of the latest entrant to be able to offer customers nationwide mobile coverage for it to compete successfully in the market. The Bundesnetzagentur believes that rural area spectrum or roaming can play an important part in the economically viable roll-out/operation of networks across the country, that is in sparsely populated areas as well.

The Bundesnetzagentur takes the view that the scarcity situation – and, related to that, the choice of process and how it will be shaped – is significantly influenced by how the market players position themselves and how they would like to cooperate with each other. The Bundesnetzagentur will also take account of the implications for competition. The Bundesnetzagentur's objective is to strengthen competition in infrastructure and services, create the right incentives for investment in nationwide network roll-out and minimise spectrum prices with the aim of further network roll-out and for the benefit of all consumers.

The Bundesnetzagentur would like to draw attention here to the fact that rural area spectrum will be accompanied by relevant roll-out and coverage obligations, especially with regard to rural areas. However, if all the market players want to access rural area spectrum, this could increase the price of the spectrum for them all. The Bundesnetzagentur is explicitly open to permanent (long-term and viable) roaming. If a market player wants to buy rural area spectrum and also wants to have roaming arrangements for nationwide coverage, the price paid for the spectrum could play a part in the roaming conditions.

The choice of scenario for the upcoming spectrum award and how the process will be shaped depend not least on current and future market developments in terms of the network operators' roll-out strategies and the models of cooperation between the market players.

The following scenarios differ in particular with respect to the provision of the 800 MHz spectrum:

- Scenario 1 – auction
- Scenario 2 – extension of spectrum usage rights at 800 MHz
- Scenario 3 – operator model at 800 MHz
- Scenario 4 – combination of elements from an extension of spectrum usage rights and an auction
- Scenario 5 – tendering

However, the remaining spectrum for which the usage rights expire at the end of 2025 is also to be made available at the same time. The choice of scenario largely depends on the scarcity of spectrum in these bands as well.

SCENARIO 1: AUCTION

- All the spectrum for which the usage rights expire at the end of 2025 would be provided in an auction process.
- The option of combining the process with a negative auction could be a suitable way of improving coverage.

The main advantages are as follows:

- The spectrum would be awarded in an open, transparent and non-discriminatory process about two to three years before the current usage rights expire.
- An auction is a competitive process that gives all companies – especially the new network operator, but also potential new entrants – equal access to the limited spectrum resources.
- An auction makes it possible to allocate spectrum transparently and gives competitors the right scope to react in an open bidding process (market discovery process).
- An auction is a legally sound, tried-and-tested process that is familiar to market players and therefore creates a high level of investment, legal and planning certainty for all players.
- An auction makes it possible, in light of the comparatively small amount of rural area spectrum available, to take regulatory measures securing the regulatory objectives, if necessary, and to prevent strategically anti-competitive behaviour (for example spectrum cap, spectrum reserve, roaming obligation).

However, the following must also be taken into account:

- Only a limited amount of rural area spectrum will be available (2 x 30 MHz). This in itself could increase bidding competition.
- The Bundesnetzagentur is generally open to a model where one mobile operator permanently ensures coverage in rural areas only through national roaming or other cooperation arrangements. If a mobile operator has rural area spectrum, the competitive implications of one-sided permanent roaming must be examined.

Improving broadband coverage:

- The aim is to improve current broadband coverage. This means that the coverage obligations must not be lower than the existing ones, irrespective of future market

developments. Instead, coverage, including coverage quality, across the country – and especially for communities in white and grey spots – is to be driven forward. Coverage obligations to achieve better mobile coverage – especially for rural areas – can be imposed in an auction process.

- The Bundesnetzagentur also believes that combining the process with a negative auction could be a suitable way of achieving coverage as quickly as possible for areas with no or little coverage. Part of the auction proceeds could then be used for additional coverage commitments. This option should also be considered in context with other ways of promoting broadband coverage.

SCENARIO 2: EXTENSION OF SPECTRUM USAGE RIGHTS AT 800 MHz

➤ The usage rights for spectrum at 800 MHz would be extended upon application.

The main advantages are as follows:

- Extending usage rights is the usual procedure as set out in section 55(9) sentence 3 of the German Telecommunications Act (TKG) when spectrum is not scarce. This statutory provision states that a spectrum assignment granted for a limited period is to be extended when the requirements for assignment continue to be met.
- It is possible to extend an assignment even though spectrum is scarce in justified exceptional cases. The Bundesnetzagentur is generally open to a model where one mobile operator ensures coverage in rural areas on a long-term/permanent basis through national roaming arrangements.

However, the following must also be taken into account:

- Extending the spectrum usage rights would freeze the status quo of the three existing networks and would not give a new network operator equal access to rural area spectrum. Additional measures should therefore be considered.
- Extending usage rights when spectrum is scarce involves legal risks and therefore conflicts with legal, planning and investment certainty.

Improving broadband coverage:

- The aim is to improve current broadband coverage. This means that the coverage obligations must not be lower than the existing ones, irrespective of future market developments. Instead, coverage, including coverage quality, across the country – and especially for communities in white and grey spots – is to be driven forward. The principle of proportionality must be taken into account.

SCENARIO 3: OPERATOR MODEL AT 800 MHz

➤ One operator/consortium would be awarded all the 800 MHz spectrum nationwide in a tendering process, subject to the condition that the operator/consortium provides capacity in rural areas to competitors – for example through roaming arrangements – upon request.

The main advantages are as follows:

- Basic nationwide coverage with a high bandwidth (2 x 30 MHz) would be possible.

- It would be possible for both existing network operators and new entrants to gain access to the nationwide coverage.
- There would be no duplication of infrastructure in rural areas, which would be in the interests of both economic network roll-out and nature and climate protection.
- The operator model is a spectrum-efficient solution because all the spectrum in the band would be used everywhere by one operator/consortium. Users in rural areas, in particular, would benefit from basic coverage using the whole bandwidth.

However, the following must also be taken into account:

- It is questionable whether this would give new entrants equal access to spectrum because setting up a nationwide network is likely to involve a significant amount of time and costs.

Improving broadband coverage:

- It would be possible to impose coverage obligations for basic nationwide coverage and take account of voluntary commitments in the tendering process. This would include an obligation to provide basic nationwide coverage in areas where people live and work as well as along transport routes.

SCENARIO 4: COMBINATION OF ELEMENTS FROM AN EXTENSION OF SPECTRUM USAGE RIGHTS AND AN AUCTION

- The current 800 MHz spectrum assignment holders would each be awarded a spectrum reserve of 5 MHz.
- The remaining spectrum from the 800 MHz band amounting to 2 x 15 MHz would be auctioned.

The main advantages are as follows:

- Extending usage rights is the usual procedure as set out in section 55(9) sentence 3 TKG when spectrum is not scarce. This statutory provision states that a spectrum assignment granted for a limited period is to be extended when the requirements for assignment continue to be met. It is possible to extend an assignment even though spectrum is scarce in justified exceptional cases.
- The network operators already have rural area spectrum in other bands as well. However, reserving 2 x 5 MHz in the 800 MHz band for the current network operators could help to maintain current coverage.
- The remaining spectrum (2 x 15 MHz paired) would be awarded in an open, transparent and non-discriminatory process about two to three years before the current usage rights expire.
- Awarding some of the spectrum usage rights in an auction would make it possible to allocate spectrum transparently and give competitors the right scope to react in an open bidding process.

However, the following must also be taken into account:

- The legislation does not include grandfathering arrangements for existing network operators.

- A possible argument against a spectrum reserve is that the existing network operators have other rural area spectrum in the 700 MHz and 900 MHz bands.
- Releasing only 2 x 15 MHz (paired) could cause a regulation-induced scarcity. It would also be more difficult for a new entrant to compete successfully with the established network operators.

Improving broadband coverage:

- The aim is to improve current broadband coverage. This means that the coverage obligations must not be lower than the existing ones, irrespective of future market developments. Instead, coverage, including coverage quality, across the country – and especially for communities in white and grey spots – is to be driven forward. A spectrum reserve can be accompanied by an obligation to provide coverage.
- The Bundesnetzagentur believes that combining the process with a negative auction could be a suitable way of achieving coverage as quickly as possible for areas with no or little coverage. Part of the auction proceeds could then be used for additional coverage commitments. This option should also be considered in context with other ways of promoting broadband coverage.

SCENARIO 5: TENDERING

- All the available spectrum would be awarded in a tendering process.
- The 800 MHz spectrum could be awarded in the tendering process in three lots (of 2 x 10 MHz each).

The main advantages are as follows:

- The spectrum would be awarded in an open and non-discriminatory process about two to three years before the current usage rights expire.
- A tendering process is open and generally gives all companies equal access to the limited spectrum resources.

However, the following must also be taken into account:

- It is questionable whether this would give a new network operator and new entrants equal access to spectrum.

Improving broadband coverage:

- The aim is to improve current broadband coverage. This means that the coverage obligations must not be lower than the existing ones, irrespective of future market developments. Instead, coverage, including coverage quality, across the country – and especially for communities in white and grey spots – is to be driven forward. It would be possible to impose coverage obligations and evaluate voluntary commitments in a tendering process.