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Content

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01 Introduction

In accordance with the 5G strategy of the federal government, the plan is to allocate frequencies in the range 3,700 to 3,800 MHz locally and regionally in particular for 5G, irrespective of the applications of network operators. The background is the conviction that there is a large number of applications with various performance requirements and only a few that need the theoretical peak 5G performance. On the other hand, there is a large interest in flexibility, provider independence, and control over the infrastructure and the associated security aspects. The report from BITKOM that so far only 6 % of companies have involved themselves with the use of 5G frequencies is surprising.

The Federal Network Agency is currently discussing the provision of regional and local networks to allow applicants frequency allocations for their respective business models and to offer large bandwidths for regional 5G applications.

For the frequencies to be made available to the market in accordance with demand as far as possible, a distinction is made between indoor and outdoor networks. The networks listed here are set up for the following frequency ranges, according to the areas of application:

- Regional networks: 3700 – 3780 MHz (Indoor/ Outdoor)
- Local networks: 3780 – 3800 MHz (Indoor/ Outdoor)

Regional networks extend over a specified area, whereas local networks are restricted to a company site or campus networks. To prevent disruptions to neighboring frequency use, the frequencies should be used according to a suggestion from the Federal Network Agency in such a way that a value of
41 dBµV/m and 5-MHz-block is not exceeded on the outside of buildings at a height of 10 m.

By providing these networks, the Federal Network Agency is facilitating networks in the context of Industry 4.0 for applications such as real-time control and management, connection of robots, predictive maintenance, and automated production, all of which help to consolidate Germany's leading position in the key 5G market. [BNetzA2]

In August 2018 the Federal Network Agency developed a first draft of the application process and received feedback from interest groups (regional authorities) and stakeholders in order to develop the basic framework conditions for the future application process [BNetzA1]. This document summarizes the opinions and most important aspects of that feedback.

Opinions and Challenges 02

Fundamentally, the provision of regional/local frequencies is being welcomed. But in relation to the allocation guidelines for regional network there is a range of different positions.

Local spectrum

Industry is unhappy that the intended local frequency spectrum is too narrow. From the perspective of industry, the bandwidth should be more than 100 MHz in order to deliver applications in the Industry 4.0 or IoT context.

According to ZVEI, Bitkom and BASF, the division into local indoor and outdoor networks is also problematic, as communication without media discontinuities is not possible if, for example, a driverless transport system or vehicle goes out of the factory hall and out onto the site. [ZVEI, Bitkom, BASF]

"The requirements and circumstances of German industry are various and heterogeneous. There is a fundamental distinction between discrete production (primarily in factory buildings) and the process industry (largely outside factories). Production facilities in the process industry and logistics centers are sites covering large areas, so many use cases of Industry 4.0 take place outdoors." [ZVEI]

In addition, security zones are required to prevent disruptions in the transition between campus network and public network.

Regional spectrum

In the view of Bitkom, the spatial scope of regional network allocation is not clear. The term "region" is neither (adequately) defined nor restricted [Bitkom].

Deutsche Telekom, Vodafone, Telefónica and Bitkom fear significant market distortions in this connection. Specifically, owners of regional frequencies could cover such a large area with 5G that they could be in competition with existing cell phone network providers.

As a result of the extended spatial utilization of the regional spectrum, competitors that do not have to participate in the auction process for 5G frequencies could become established. At the same time, owners of national allocations in Germany would not be allowed access to the 3.7 – 3.8 GHz spectrum. [Deutsche Telekom, Vodafone, Telefónica, Bitkom]

"Business models for regional use should not be allowed to compete directly with the services of the owners of national frequency allocations for wireless network access." [Telekom]

Temporary shared use

The Federal Network Agency envisages temporary, shared use of the 3.7 – 3.8 GHz spectrum, provided that it is not being used by a regional or local allocation holders. [BNetzA2]
Specifically this means:

- owners of national allocations in the range 3,400 – 3,700 MHz having shared use of the unused spectrum
- of 3,700 – 3,800 MHz
- Owners of regional allocations in the range 3,700 – 3780 MHz having shared use of the unused spectrum
- of 3,780 – 3,800 MHz
- Owners of local allocations in the range 3,780 – 3,800 MHz having shared use of the unused spectrum
- of 3,700 – 3,780 MHz

According to the Bayerische Rundfunk, this will allow short-term frequency allocations for events such as music festivals, elections or sporting occasions, for example, which also require their own media production network for reporting which can be set up and operated on site. [BR]

Others have a rather critical view of shared use.

In view of the need for planning security for local and regional frequency owners, it is necessary for applications for shared use of free capacities to be made in good time. This gives preferred users the opportunity to communicate their own plans for the frequency ranges concerned before shared ownership comes about. [Audi]

Deutsche Telekom stresses that owners of national allocations must be in a position to access their resources at any time. Temporary shared use can also lead to coordination problems such as planning and development delays, as it is necessary to wait for the company with shared use to withdraw. Shared use is neither necessary nor sensible from the perspective of capacity. The planning uncertainties and coordination efforts would also be disproportionate to the potential benefits. [Telekom]

Furthermore it must be ensured that these frequencies are not hoarded by a national mobile network operator (MNO), says Telefónica. It would be conceivable in this connection to restrict permission to apply in such a way that each national MNO together with the spectrum available to it nationally has a maximum limit. [Telefónica]

Possible Solution (Telekom) 03

Only the 3.4 – 3.8 GHz range is available for use of 5G New Radio (5G NR) on public wireless networks. On the other hand, the range 3.8 – 4.2 GHz is intended for the fixed satellite service (in the direction space-earth). As a result of the limited number of applications, this spectrum is ideal for the application of a model for joint use of Licensed Shared Access (LSA) and, because of similar characteristics in the range 3.7 – 3.8 GHz, proves to be ideal for planned applications in the Industry 4.0 environment.

Advantages of positioning of local and regional networks in the 3.8 – 4.2 GHz spectrum:

- Increases the efficiency of the use of frequencies in this band
- Makes a significantly larger spectrum (400 instead of 100 MHz) available for applications in the area of Industry 4.0 and for private and independent networks
- Allows maximum quality and capacity for 5G wireless networks in Germany
- Creates additional opportunities for realization of industrial applications as a service by telecommunications companies
- Facilitates the development of a global harmonized solution for Industry 4.0 applications, rather than an insular German solution
- Allows the identification of an additional band for 5G applications with global scaling effects

This is a classic win-win situation in which both network operators and the using industry can ultimately occupy a better market position on the international stage. [Telekom]

04 Conclusion and Outlook

From these opinions, there is a clear perception of a fundamental need for local and regional frequencies on the part of the various stakeholder groups. Industry, in particular, supports this approach with a view to topics such as data protection, independence and the presumed slow pace of network development. The BITKOM study demonstrates, however, that the potential of local and regional frequencies has not yet been recognized across the board of potential users, including industry. An indicator of this is that the opinions cover only part of the possible user industries. It therefore seems both sensible and necessary to further pursue the requirements of the various branches of industry when it comes to local and regional networks and, among other things, to identify other use cases that apply across the board.

In addition, the network operators fear distortions of competition as a result of the obligatory development of the necessary network infrastructure in conjunction with the sell-off of the frequencies, in which the owners of local and regional frequencies will not take part.

The discussions about local and regional frequencies should be regularly extended to include new opinions, such as the suspension of the distinction between indoor and outdoor, and current developments.

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