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Bundesamt für Kommunikation
Sektion Netze und Dienste
Zukunftsstrasse 44, 2501 Biel

Öffentliche Konsultation betreffend die Ausschreibung und Vergabe von neuen Mobilfunkfrequenzen in der Schweiz - Ericssons Antwort

Fragebogen

Angaben zur eingebenden Partei

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☐ Betreiber eines landesweiten öffentlichen Mobilfunknetzes der Schweiz
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☐ Betreiber eines drahtlosen privaten Netzes in der Schweiz
☐ Netzbetreiber eines landesweiten leitungsgebundenen Netzes in der Schweiz
☐ Betreiber eines Mobilfunknetzes im Ausland
x Telekommunikationsnetzausrüster
☐ Telekommunikationsdiensteanbieter (Service-Provider)
☐ Anbieter von Inhalten (Content-Provider)
☐ Konsumentenorganisation
☐ Interessenverband
☐ Behörde
☐ Beratungsunternehmen
☐ Andere, welche?

Bitte kennzeichnen Sie nachfolgend alle Aussagen, bei denen Sie ein schutzwürdiges Geheimhaltungsinteresse geltend machen.

4.2 Allgemeine Fragen

1. Wie schätzen Sie die (u. a. zeitliche) Entwicklung der Mobilfunktechnologie (LTE-Evolution, 5G usw.) ein?

Mobile Communications are evolving in line with the traffic and device growth forecasts (see https://www.ericsson.com/en/mobility-report).

We are convinced that we evolve towards a networked society in which everything which can benefit from a connection will have one. 5G is the foundation for realizing the full potential of the Networked Society.

The first generation mobile network (1G) was all about voice. 2G was about voice + texting. 3G was about voice + texting + data. 4G was everything in 3G but faster. 5G will be something totally different. Like the transitions to 2G and 3G, the move to 5G will add a new element: the industrial internet. And like the transition to 4G, it will be much higher performance than the previous generation. The network capabilities are also evolving with new features / functionalities to improve the efficiency (in data throughputs/spectrum efficiency, power consumption) and increase the end-use capabilities for both consumers and industries.

5G is much more than high performance. With 5G, we'll see e.g. more secure transactions and virtual networks on-demand -- based on network slicing. All this will create opportunities for new use cases that we haven't yet dreamed of, new markets, and radically new business models.

From a spectrum point of view, there is a clear need for a continued roadmap to release additional high, mid and low band spectrum to improve capacity and coverage. All existing frequency bands in use in mobile today are still required in the long term.

2. Wie schätzen Sie deren Auswirkungen auf Anwendungen, Dienste, Endgeräte, Konvergenz Festnetz / Mobilfunk (FMC) usw. ein?

As the networks evolve, we are increasingly seeing convergence as being a key driver. This has started in the Voice Core of the fixed and mobile networks, and is now reaching into the access. Continued investment into Copper evolution is now questioned versus using Wireless technologies for the last mile access.

Wireless is being considered both for Rural connectivity to homes from the Macro network as well as Urban/Suburban Ultrafast connectivity from street level Radios.

With speeds that are faster than fiber, 5G can be used for fixed wireless broadband for the "last mile" connection to the home.

Greater capacity will allow more devices on the network, and lower energy requirements will enable larger battery life (10X what we see today) – both are critical for the growth of IoT.

With more and more video being generated and consumed on mobile devices, with mobile devices increasingly utilising Fixed Wi-Fi connectivity, and with less linear TV being consumed, the borders between the Fixed and Mobile services are getting blurred.

3. Wie schätzen Sie die langfristige Marktentwicklung bzgl. Teilnehmer / Volumen / Anwendungen (wie z.B. Internet of Things) ein?

We can observe the following trends:

Subscriptions: Worldwide, mobile subscriptions are growing at around 4% year-on-year, reaching 7.6 billion in Q1 2017. Mobile broadband subscriptions are growing by around 25% year-on-year. Subscriptions associated with smartphones have now surpassed those for basic phones (55% are now for smartphones).

Traffic: In the Western Europe region, we estimated a global data traffic in 2016 of 1.2 Exabyte/month. This figure should multiply by 8 till 2022.

Applications: Mobile video traffic is forecasted to grow by around 50% annually through 2022 (75% of all mobile data traffic). Social networking is expected to grow by 38% annually over the next 6 years.

Other application categories (audio, software download, web browsing, file sharing) have annual growth rates ranging from 19 to 34%. Additionally, the use of embedded video in social media and webpages continues to grow, fueled by larger device screens, higher resolution and new platforms supporting live streaming.

IoT: around 29 billion connected devices are forecasted by 2022, of which around 18 billion will be related to IoT. Connected IoT devices (this forecast includes connected cars, machines, meters, sensors, point-of-sales terminals, consumer electronics and wearables). Between 2016 and 2022, IoT devices are expected to increase at a CAGR of 21%, driven by new use cases. Out of these, 1.5 billion IoT devices would be with cellular connections by 2022.

5G: In 2022, 15 percent of the world's population will be covered by 5G, and there will be more than half a billion 5G subscriptions.

LTE: Globally, LTE will be the dominant access technology from 2018, with 5 billion LTE subscriptions anticipated by 2022

(Source: Ericsson Mobility Report June 2017**)**

4. Wie beurteilen Sie die Auswirkungen der geltenden Grenzwerte der NISV auf den Ausbau der Mobilfunknetze und die Nutzung der neu verfügbaren Frequenzen?

Switzerland today has field strength limits for mobile base station sites which are 1/10th of the limits defined by ICNIRP and common across Europe. This puts Switzerland at a disadvantage to other countries, and thus increases communication costs to the end users as more sites are required in order to meet the same traffic demand per km2.

With the continued evolution of networks trending towards the addition of new frequency bands, or the introduction of Massive MIMO antenna techniques (or TX diversity), the extra stringent requirements in the Switzerland market will stop existing sites from having more equipment deployed.

Ericsson would like to support BAKOM in the current discussions about reevaluation of the current regulation limits (in terms of measurement and/or total output power), taking into account both future needs of mobile communications and the historic situation in other countries across the EU where higher limits have been in operation for many years.

4.3 Fragen zu den Konzessionen und den Auflagen

5. Wie lange soll die Konzession gültig sein? (bitte Begründung angeben)

Ericsson believes that for frequencies up to 3.8GHz, licences should be awarded for a minimum of 20 years. This will create an environment that favours long term investment and security of potential returns.

6. Welche Auflagen (pro Frequenzband) sollten in den Konzessionen gemacht werden (z.B. Versorgungsauflagen, drahtlose Kameras, terrestrische Rundfunk-Verbreitung)? Oder sind keine notwendig?

The obligations that should be considered (if any) should not be generic, they should take into account the RF characteristics of the frequency band in question and the needs of Switzerland and her citizens.

Many countries consider coverage obligations (e.g. geographical, population, road/rail, indoor and outdoor) in their low (sub 1GHz) licence awards, and they have been proven to have merit to overcome the lack of investment in uneconomical regions. Naturally, any coverage obligation needs to

be factored into the spectrum valuations of forthcoming auctions, as will reduce the value to the operators due to increased cost obligations.

Whilst a mobile network can be used for many different service types, e.g. Wireless Residential Broadband, Mobile Broadband, Voice, Broadcast Media, Massive IoT, Public Safety, etc,, it does not make sense to place obligations on the licences for these services if the licences themselves are being awarded in a technology and service neutral manner.

7. Sollten Frequenzressourcen für regionale Netze reserviert werden? Wenn ja, wie viele, in welchem Frequenzband und für welche Anwendung?

The suitability for frequencies to be awarded on a regional/local basis, as opposed to a National basis, should be based upon the RF properties of the band.

As we move up in the frequency bands (e.g. into the mmWave bands), networks will increasingly become Noise Limited, and thus the ability to award frequencies to multiple parties based upon region or locality will increase. For lower frequency bands however (which are typically of significant value both commercially and strategically for the country) they will be Interference Limited, and thus the award of the frequencies to multiple parties will result in an inefficient utilisation of scarce low frequency spectrum.

For spectrum below 3.4GHz, Ericsson would recommend only National awards be considered. For spectrum between 3.4-3.8GHz, if possible this should be awarded on a National basis. For spectrum releases above this level alternative authorisation regimes can be considered, e.g. regional/local awards or shared access mechanisms.

In any eventuality that some spectrum is reserved for regional networks, it is highly recommended that this is minimised and the majority of the spectrum is awarded on a National basis.

4.4 Fragen zum Vergabeverfahren

8. Halten Sie den Zeitpunkt des Vergabeverfahrens – voraussichtlich Ende 2018 – für geeignet?

End 2018 is a date compatible with the desire to prepare for 5G deployment in both the 700MHz and 3.4-3.8GHz ranges.

9. Sehen Sie die Frequenzen in den verschiedenen Bändern als potenzielle Substitute und/oder Komplemente?

The frequencies in discussion in this consultation are considered to be Complements to existing mobile frequency allocations.

10. Mit welcher Art des Vergabeverfahrens (Auktion, Kriterienwettbewerb, direkte Zuteilung) sollten die Frequenzbänder vergeben werden? Sollten alle Frequenzbänder mit derselben Art des Verfahrens vergeben werden?

(no answer)

11. Soll die maximal erwerbbare Frequenzbandbreite pro Auktionsteilnehmer begrenzt werden? Wenn ja, weshalb und auf wie viel?

With regards to limits on total spectrum holdings per participant, Ericsson has no comment.

With regards to limits on spectrum holdings per band which can be obtained, Ericsson strongly recommends that no limit is set which would stop a participant securing 2*10MHz of 700MHz, or up to 100MHz of 3.4-3.8GHz.

4.5 Fragen zu den Frequenzen

700 MHz

12. Wie beurteilen Sie die Attraktivität dieses Frequenzbandes? (bitte Begründung angeben)

700MHz is seen to be a pioneer 5G band, and is in discussion in many countries as being the "Mission Critical Coverage" band for transforming Industries.

13. Wie beurteilen Sie die Attraktivität der SDL-Blöcke in diesem Frequenzband? Sollten diese Blöcke ebenfalls vergeben werden? (bitte Begründung angeben)

The 700MHz center gap (proposed here as 20MHz of SDL) should be awarded at the same time as the 700MHz 2*30MHz FDD spectrum.

However, Ericsson strongly recommends that a harmonised approach to this spectrum is achieved via BAKOM and the associated administrations of Switzerland's neighbouring countries, e.g. BNetzA and ARCEP.

Currently, the Switzerland proposal is aligned to the UK proposal from OFCOM, but not aligned to its neighbours. There is value in all Administrations to align to ensure maximum effectiveness in an ecosystem of devices and infrastructure, as well as ensure coordination across international borders.

14. Welche Aspekte sollten bei der Vergabe dieses Frequenzbandes beachtet werden?

700MHz is a key coverage band which needs to be coordinated with Switerland's neighbours. With some countries still utilising this spectrum for Digital Terrestrial TV (DTT), it is important for Switzerland to align and temporary restrictions on locations or power levels with the switch over plans of its Neighbours.

15. Wie gross ist Ihr Interesse an Bandbreite in diesem Frequenzband? Gibt es aus Ihrer Sicht einen Mindestbedarf unterhalb dessen die Nutzung u. U. ineffizient wäre? Wenn ja, wie gross ist dieser Frequenzumfang?

Ericsson is not expecting to acquire frequencies in this band

1400 MHz

16. Wie beurteilen Sie die Attraktivität dieses Frequenzbandes? Sollten diese Blöcke ebenfalls vergeben werden? (bitte Begründung angeben)

1452-1492MHz has already been awarded in Germany and in the UK, and deployments have begun.

The characteristics of this spectrum allow it to be combined with the 800MHz band, thus benefitting from a significant increase in capacity whilst retaining the coverage of the 800MHz band, makes this an attractive band for most operators.

The device eco-system for this band, whilst not mature, is expected to increase significantly as more countries consult on awarding this frequency band.

17. Welche Aspekte sollten bei der Vergabe dieses Frequenzbandes beachtet werden?

This is a SDL band and therefore need to be combined with an existing deployment. No coverage obligations should be specified for this band.

18. Wie gross ist Ihr Interesse an Bandbreite in diesem Frequenzband? Gibt es aus Ihrer Sicht einen Mindestbedarf unterhalb dessen die Nutzung u. U. ineffizient wäre? Wenn ja, wie gross ist dieser Frequenzumfang?

Ericsson is not expecting to acquire frequencies in this band.
Ericsson would recommend ensuring that any participant has the option to acquire at least 20MHz of spectrum if wanted.

3400–3800 MHz

19. Wie beurteilen Sie die Attraktivität dieses Frequenzbandes? Sollten diese Blöcke ebenfalls vergeben werden? (bitte Begründung angeben)

The 3.4-3.8GHz band is identified as the 5G Pioneer band for the EU, and administrations across the EU are currently looking at how to make part (or all) of this frequency available for 5G (either re-awarded, or on a trial basis) by end 2018.

The amount of spectrum available, combined with the RF properties (this is considered a low 5G band, compared to the mmWave frequencies often discussed with 5G) make this a 5G band of much interest.

20. Bevorzugen Sie im Bereich 3400–3600 MHz die Nutzung mit TDD oder FDD?

This spectrum should be awarded ONLY in a TDD arrangement in order to have a harmonised approach across Europe.

21. Welche Aspekte sollten bei der Vergabe dieses Frequenzbandes beachtet werden?

In a 5G world, there is an aspiration that a mobile operator should be able to obtain up to 100MHz of contiguous spectrum in 3.4-3.8GHz.

3.4-3.8 GHz band should be licenced on a National non-exclusive basis, allowing the licence holders to sublease to industries subject to commercial arrangements.

If only awarding part of this spectrum band at this time, BAKOM may consider regulations around Spectrum Trading which could allow licence holders to swap holdings at a future date (if they so desire), so as to combine holdings in the 3.4-3.6GHz with those in the 3.6-3.8GHz into one contiguous award.

This frequency is expected to be used for 5G-NR with carrier sizes greater than 20MHz, and utilising antenna techniques such as Massive Mimo beamforming active antenna systems. It should be noted that there is ongoing work in CEPT/3GPP around the proposed regulations for such a technology

operation. It is highly recommended that BAKOM align with the eventual outcome of this study and the resulting EU conclusions. If considering an award of this band before the conclusion of this study, it is recommended that BAKOM includes a mechanism to adopt any potential new regulations at the earliest possible date.

22. Wie gross ist Ihr Interesse an Bandbreite in diesem Frequenzband? Gibt es aus Ihrer Sicht einen Mindestbedarf unterhalb dessen die Nutzung u. U. ineffizient wäre? Wenn ja, wie gross ist dieser Frequenzumfang?

Ericsson is not expecting to acquire frequencies in this band.

4.6 Weitere Kommentare

Regarding the open point on usage of 3.4-3.6GHz spectrum for PMSE (Programme Making and Special Events), we observed in other countries a shift from PMSE to LTE Commercial networks. We could imagine also in Switzerland a scenario in which the telecom operator could become an operator for temporary events, and would propose an event slice for broadcaster (based on network slicing)