



19 December 2023

Public consultation

regarding

**the allocation of mobile radio frequencies
available from 2029 for the provision of
telecommunication services in Switzerland**



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1 Introduction

The Federal Communications Commission (ComCom) has instructed the Federal Office of Communications (OFCOM) to begin preparatory work on the allocation of frequencies available from 2029 for the provision of telecommunication services for third parties.

As a first step, OFCOM is conducting a public consultation in which it invites all interested parties to give feedback on the allocation of mobile radio frequencies which will be available from 2029 for the provision of telecommunication services in Switzerland. The consultation runs until 26 February 2024. The aim is to collect a list of the needs of interested parties regarding the use of mobile frequencies in order to establish whether sufficient frequencies will be available from 1 January 2029. This relates to current frequency usage rights allocated to mobile telecommunication licence holders in 2012, which expire at the end of 2028, and to additional frequencies that may be available for mobile telecommunication in the future.

The volume of data transmitted via mobile devices is constantly increasing. The reasons for this are the high market penetration of smartphones, increasing data use (primarily driven by video services) and the increase in devices and objects that are wirelessly connected to the internet. As a result of these developments, additional frequencies for mobile telecommunication systems (IMT¹) are likely to be required. Interest in these frequencies has also increased owing to the wide availability of systems and devices. In addition to the mobile telecommunication licence holders who provide networks based on these frequencies, other potential users, such as transport companies and the emergency services, may also be interested in frequency usage rights.

If the present consultation shows that there may not be enough frequencies available to provide telecommunication services, ComCom generally issues a public call for tenders.²

¹ International Mobile Telecommunications (IMT), family of mobile radio systems: UMTS (3G), LTE (4G), New Radio (5G), WiMax (IEEE 802.16)

² Art. 22a TCA

2 Background

2.1 Overview of frequency spectrum of mobile telecommunication licence holders

The three mobile telecommunication licence holders Salt Mobile AG, Sunrise GmbH and Swisscom AG were able to acquire a broad range of frequency usage rights for the provision of public mobile telecommunication services in the award procedures carried out in 2012 and 2019. The duration of the mobile telecommunication licences was set at 15 years in both 2012 and 2019 and will expire on 31 December 2028 and 17 April 2034 respectively.

The licence holders are currently allocated 1020 MHz in the following frequency bands:

| Frequency band | Salt | Sunrise | Swisscom |
|-----------------------|------|---------|----------|
| 700 MHz FDD | 20 | 10 | 30 |
| 700 MHz SDL | 0 | 10 | 0 |
| 800 MHz FDD | 20 | 20 | 20 |
| 900 MHz FDD | 10 | 30 | 30 |
| 1400 MHz SDL | 10 | 15 | 50 |
| 1800 MHz FDD | 50 | 40 | 60 |
| 2.1 GHz FDD | 40 | 20 | 60 |
| 2.6 GHz FDD | 40 | 50 | 40 |
| 2.6 GHz TDD | 0 | 0 | 45 |
| 3.5 - 3.8 GHz TDD | 80 | 100 | 120 |
| Σ Auction 2012 | 160 | 160 | 255 |
| Σ Auction 2019 | 110 | 135 | 200 |
| Σ currently allocated | 270 | 295 | 455 |

Legend:

Green background: Frequencies allocated in the 2012 auction, valid until 31 December 2028

Blue background: Frequencies allocated in the 2019 auction, valid until 17 April 2034

Σ: Total

Figure 1: Bandwidths in MHz currently allocated to mobile telecommunication licence holders

2.2 Frequency usage rights expiring at the end of 2028

The following frequency usage rights will expire on 31 December 2028:

- 2 x 265 MHz for FDD³ use, distributed across the five frequency bands 800, 900, 1800, 2100 and 2600 MHz;
- 1 x 45 MHz for TDD⁴ use in the 2600 MHz frequency band.

The following chart shows a breakdown of the frequency usage rights of the respective mobile communication licence holders expiring at the end of 2028:

³ FDD: Frequency division duplex

⁴ TDD: Time division duplex

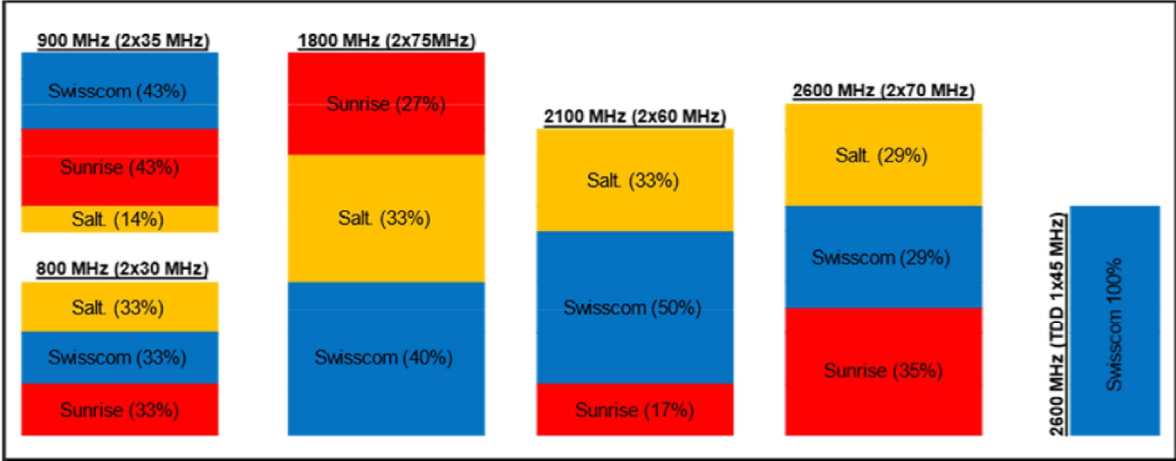


Figure 2: Shares of operators Salt, Sunrise and Swisscom in the frequency usage rights due to expire in 2028

2.3 Technology neutrality of mobile telecommunication licences

The frequency usage rights allow the free choice of mobile communication technology subject to the harmonised standards.⁵ This means that mobile telecommunication licence holders have the freedom to use the technologies that best meet their individual needs, e.g. 2G, 3G, 4G, 5G, 6G (technology neutrality). This encourages the efficient use of the spectrum and also emphasises the importance to the national economy of an advanced mobile communication infrastructure.

Technology neutrality makes it easier for licence holders to switch technologies in the existing mobile networks during the term of the mobile telecommunication licences. The replacement of 2G operations during the period of the current mobile telecommunication licences is practically complete and 3G is currently being replaced. Innovative approaches such as network slicing or non-terrestrial networks (NTN) are leading to the replacement of older technologies. With network slicing, virtual mobile networks can be operated within a physical network. NTN allows coverage to be improved in more remote areas. However, the use of NTNs in Europe is currently not possible due to a lack of international and national radio regulations.

3 Possible new frequency ranges for mobile telecommunication

3.1 Introduction

New developments and digitalisation mean that additional frequencies are likely to be required for mobile telecommunications (IMT⁶). New frequency ranges may therefore become available in Switzerland in the next few years.

Any allocation of frequencies for mobile telecommunications in the national frequency allocation plan (NFAP)⁷ does not necessarily mean that these frequencies will be available to licence holders or service providers. OFCOM manages the frequency spectrum and must ensure equal access to it.⁸ It

⁵ ETSI EN 301 908; IMT cellular networks; Harmonised standard for access to radio spectrum;

⁶ International Mobile Telecommunications (IMT), family of mobile radio systems: UMTS (3G), LTE (4G), New Radio (5G), WiMax (IEEE 802.16)

⁷ In the NFAP, frequency ranges for mobile telecommunications are labelled MOBILE and MFCN/IMT.

⁸ Art. 25 TCA.

may segment the frequency allocations in the mobile telecommunication sector according to need and make them available for use by interested parties.

It is therefore not yet clear whether any new frequency ranges for mobile communications in Switzerland can be made available in the next allocation. Nonetheless, the interested parties are already being asked in this consultation what their frequency needs are.

3.2 Frequencies in the 6GHz range

At the World Radiocommunication Conference (WRC-23), it was decided to allocate the 6 GHz band (6425 - 7125 MHz) to mobile radio (IMT) and RLAN⁹ in addition to the existing radio services. There is no corresponding allocation in the USA, India and China. The technical and regulatory conditions are now being worked out at European level. It should be noted that this frequency range in Switzerland is currently assigned to radio relay links and partly to satellite communication, and has already been partially allocated. The joint use of this frequency range will mean that restrictions (e.g. in geographical terms, restriction to conurbations, indoor use) will be necessary in the event of any future use for mobile communications.

3.3 Frequencies in the millimetre wave range 26GHz and 40GHz

The 24.25–27.50GHz and 40.5–43.5GHz frequency ranges are referred to in telecommunications as the 26GHz band and 40GHz band respectively and are generally categorised as millimetre waves. Both frequency bands are already harmonised at European level. However, before these frequencies can be made available in Switzerland, the necessary conditions must first be created at national level (e.g. changes to the NFAP, RIR, NIRO and associated guidelines). These frequency ranges in Switzerland are currently allocated and partially assigned to radio relay links, satellite communication and other telecom services.

⁹ Radio Local Area Network

Questionnaire

Publication information

The statements submitted will be published on OFCOM's website. OFCOM endeavours to publish documents barrier-free in accordance with the Disability Discrimination Act (DDA; SR 151.3). Please therefore submit your statements both as a Word file and PDF.

Should your statements contain confidential information, please also submit a version without this information. The content covered must be clearly described and reasons given as to why the information is confidential. Confidentiality interests must be kept to a minimum. The non-confidential version will be published on the website.

Administrative information

Please answer the questions below and give reasons for your answers.

Please send the completed questionnaire until **26 February 2024** to the following address (electronic version):

Email: tp-nd@bakom.admin.ch

Federal Office of Communications
Networks and Services Section
Zukunftsstrasse 44
2501 Biel/Bienne

Respondent's details

Name of the company/organisation/authority: Sunrise GmbH

Contact person (first name and surname): [REDACTED]

Street: Thurgauerstrasse 101b

Postcode, city: 8152 Glattpark (Opfikon)

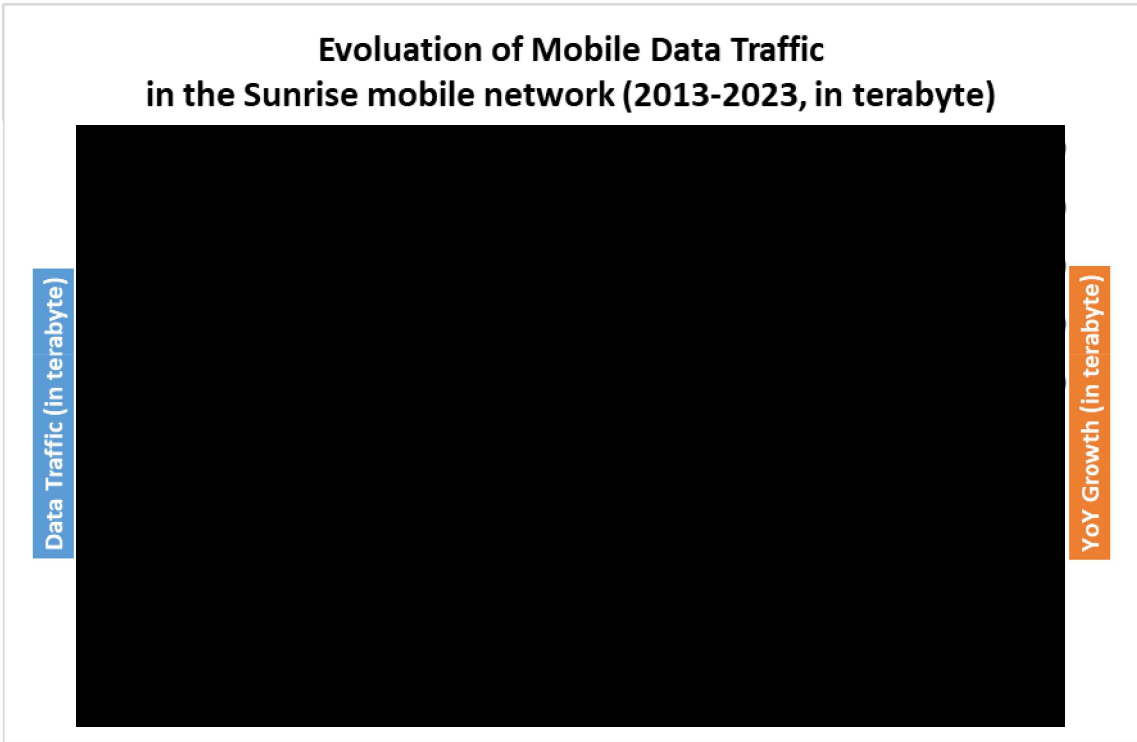
Tel.: [REDACTED]

Email: [REDACTED]

General questions

- 1. How do you think the market will develop long term (mobile technology / applications / end devices / mobile traffic volume etc.)?

A look at the historical development of mobile data traffic on the Sunrise mobile network shows that data traffic grew by a factor of 88 between 2013 and 2023. The traffic rose from [REDACTED] in 2013 to [REDACTED] terabytes in 2023.



There is currently no reason to assume that this growth will level off in the future. On the contrary, we assume that the volume will continue to rise: An increasing number of applications on existing and new devices will continue to drive up the use of mobile communications and data traffic.

The advent of the iPhone in 2006 had been the decisive moment in the history of mobile communications as this was the beginning of the area of the smart phone which until today is the dominating device and apart from a size increase and the introduction of high-resolution screens still has essentially the same form factor. The smart phone made the access to the internet from everywhere possible and the emergence of 4G and 5G thereafter paired the

usability with unparalleled speed. Since then, a whole ecosystem of Apps (applications on the Smart Phone) has emerged serving a variety of use cases:

- Social media has made it possible for people to share their experiences and feelings with others.
- Messaging and Communication apps such as WhatsApp, Telegram and other have pushed away classical SMS messaging and voice telephony and brought people and communities closer to each other.
- Mobile Banking, e-Wallet and other financial applications have been key enablers of the cash less society and made financial transactions possible from everywhere.
- A plethora of thousands of applications ranging from healthcare, scientific, reading, gaming and many others have enriched the life of thousands of people,
- more and more complemented by apps in augmented and virtual reality.
- Wearables - such as Sport Watches or the Apple Watch connectable with smartphone or having a SIM card - have appeared in large numbers.

Besides the development of the app world on the smartphone, there is also an emerging trend for devices with different shapes and sizes:

- The Apple Vision Pro and the advent of similar devices mark the beginning of a new area.
- Devices enabling holographic communication are no longer a far-fetched dream. Nevertheless, the dominating form factor of the future is still partly unknown and therefore open.
- Telemedicine and remote control will be increasingly important.
- Drones and vehicles being steered over 5G will be omnipresent.
- Mobile Edge Computing and Passive IoT are complementing the list of use cases.
- In any case, the services over these new devices and applications will put the highest requirements on bandwidth, capacity, and latency.

We are also seeing a growing interest in campus networks:

- However, we do not consider the reservation of dedicated spectrum for campus networks efficient.
- With network slicing, the mobile operators' 5G technology offers a clearly better solution.

We can also expect additional applications to emerge in the next generation of 6G.

2. The issue of integrating non-terrestrial (satellite-based) networks into mobile networks (direct connection between terminal device and satellite) will be addressed at the next World Radiocommunication Conference in 2027. How do you envisage developments and the possible integration of such networks, and what effect will they have.

The approval of normative activities on non-terrestrial networks (NTN) in Release 17 has generated growing interest. It is supported by a wide range of vendors (terminal, chipset, network), as well as service providers from both the mobile and space industries. To avoid any interference issues with terrestrial networks, it is important that the NTN are compliant with 3GPP standards from Release 17 and utilize spectrums assigned to satellite services (e.g. n255, n256, n510, n511, n512).

The use of NTN supplements coverage and capacity where no terrestrial mobile network is available (e.g. in mountainous regions). However, we believe that such networks remain niche applications for the time being. Whether the technology will one day leave its market depends largely on international standards (World Radiocommunication Conference 2027), regulatory frameworks and technological developments (interference with terrestrial networks).

Technically and economically, LEO can improve coverage for difficult-to-serve situations including white and remote areas. Integrating these technologies and spectrum into the managed IMT ecosystem will ensure they are fully available seamlessly to Swiss consumers and not just used by niche services.

3. How do you envisage the use of certain mobile radio frequency bands¹⁰ in airspace (e.g. for drones) going forward, and what will its impact be?

With 5G SA and slicing, mobile network operators can offer a service with guaranteed performance, improved connectivity, fast data transmission and more reliable communication for drone operations. Allocating dedicated frequency bands for drone communication and control is not efficient and should be avoided.

4. What is your view on the use of Fixed Wireless Access (FWA)¹¹ and which frequencies do you consider to be fundamentally appropriate? And which one are particularly well suited?

FWA is used where high-bandwidth Internet access is not possible or practical with wired infrastructure. In the implementation of the federal government's gigabit strategy, FWA is likely to be the most attractive access method in certain areas.

Fixed Wireless Access (FWA) has different bandwidth and capacity requirements than traditional cellular services. In principle, the 3.6 GHz band as well as the upper 6 GHz band are well suited for FWA. These guarantee broad coverage with sufficient penetration and good capacities.

Questions about the planned frequency allocation procedure in 2027

5. What type of allocation procedure (auction, criteria-based allocation, direct allocation) should be used to allocate the frequency bands? Should all frequency bands be allocated using the same type of procedure?

- a. Sunrise proposes to renew from 2027 all the frequency-band license holdings allocated in the 2012 auction (direct reallocation).

Sunrise continues to argue for an equal allocation of spectrum. However, the costs of retrospectively readjusting and reshuffling the 2012 allocations by far exceed any benefits to Swiss consumers, to ComCom or to any mobile operator.

The mobile operators' networks are optimised according to the current frequency distribution. Substantive changes in those allocation would force time-consuming and expensive re-engineering to reach the same level of optimisation and would lead to substantial degradation for Swiss consumers over the transition period. The mobile operators would consume resources that are better allocated to keeping up with continuing growth in consumer traffic.

¹⁰ See ECC Decision (22)07 (cept.org)

¹¹ Wireless broadband coverage of households via the stationary use of outdoor antennas on buildings, from which signals are brought into the buildings via cable

Today, a wide range of high-quality services are offered at affordable prices (based on [Art.1 para.1 FMG](#) and shown in [BAKOM: The Swiss telecommunications market - an international comparison, status 2022](#), page 4). The market is as competitive as can be expected, given the highly asymmetric spectrum holdings, EMF constraints and demands of Swiss consumers.

Several countries have renewed licences rather than re-awarded them including Czech Republic, Bulgaria, Finland, France, Italy, Spain, Poland, UK, and USA. However, the detailed approach taken in each country has varied considerably.

Some countries have chosen fixed term with administrative renewal: Czech Republic renews licences for a one-time fee (based on a process of expert valuation). Italy has used market-value fees for renewal (for example Vodafone's extension of 2.1 GHz for eight years in 2021 for a one-time fee). US licence renewals do not entail a fee but are subject to spectrum usage and network build requirements.

In a small number of jurisdictions, for example France and Portugal, the regulator has awarded mobile spectrum with an indefinite licence term and no direct fee. Instead, the licensee is subject to obligations, such as coverage or other investment commitments, as part of its licence.

The UK currently charges ALFs for three mobile spectrum bands (900 MHz and 1800 MHz since 2018; and 2100 MHz since 2022). See [OFCOM: Review of Ofcom's market-based approach to mobile spectrum management, 11 January 2024](#).

- b. Sunrise considers the probability of a new market participant to be very low to in-existent with current adequate and accepted coverage obligations.

There are several factors that make the Swiss market even less attractive for the entrance of a fourth player. Therefore, there is no need to reallocate the 2012-allocated spectrum to accommodate a new entrant:

- NIS thresholds make network construction in Switzerland complex and expensive.
- The NIS budget for existing installations has been exhausted, making additional site sharing virtually impossible.
- In addition, new locations for masts are very difficult to find.
- The Swiss market is relatively mature – market shares change slowly as each player responds to competitive moves from rivals.
- And finally, the Swiss mobile communications market is already highly competitive and price competition is fierce.
- A new market player would therefore have challenges coming up with a viable investor-story, with license costs and investments for the acquisition of sites, the development of the network and customer acquisition.

Hyperscalers (such as Google, Amazon, Microsoft, IBM Cloud or Oracle) will play an important role in hosting network software functions such as network as a service. The Swiss legislation includes significant network coverage obligations that result in a high entry barrier for new players. Therefore, it is unlikely that hyperscalers will credibly invest in a fourth network infrastructure based on own spectrum in Switzerland. If a hyperscaler were to enter a mobile market directly, we would expect it to do so as an MVNO (i.e. in summer 2023, Amazon entered the US market in collaboration with T-Mobile). Additionally, spectrum holders must not be discriminated against each other and specifically also not against new entrants by operator specific regulatory relaxations.

- c. Sunrise proposes this direct reallocation is confirmed by Year End 2025

The new licenses directly reallocating existing frequencies would apply from 2027. Confirming this during 2025 would remove uncertainty. It would prevent delay in further investing in network infrastructure using the 2012 frequency allocations. This means continuity in planning, expanding capacity, procurements, optimisations.

Clear and timely renewal decisions are crucial to mobile network development. They give mobile operators the certainty needed to make large long-term investments in mobile network infrastructure and services. A decision not to automatically renew a licence should only be made in exceptional circumstances, where the benefits from reassigning spectrum would exceed the costs ([GSMA: Best Practice in Mobile Spectrum Licensing, February 2022](#)).

- d. Sunrise proposes an equal allocation of all new spectrum.

When allocating new frequencies (6 GHz / 26 GHz / 40 GHz), we propose an even distribution among the licensed mobile network operators. This is supported by results in academia such as [Jon M. Peha \(SSRN\): Cellular Economies of Scale and Why Disparities in Spectrum Holdings Are Detrimental, 2017](#), [Patrick Rey, David J. Salant \(SSRN\): Auctions for Essential Inputs, 2017](#) and [David J. Salant, Daniel Ershov \(SSRN\): Auctions and Mobile Market Competition: Evidence from European 4G Auctions, 2022](#). At the very least, a cap should be set for each operator, roughly corresponding to one third of the available spectrum in each band.

- e. An auction brings no benefits, but risks causing damages

As mentioned above, any reallocation of frequencies results in costs and consequences far exceeding the potential benefits to Swiss Consumers. An auction is unlikely to achieve any significant re-distribution of the 2012 frequency allocation.

If there is an auction that would re-balance holdings among MNOs strict caps should be applied to each main band. Currently Swisscom has over 42% of spectrum in each main band and 45% overall. Should there be an auction, caps should be applied by band and overall, of 40% and 35%. Even then, only small reallocations are likely to occur, and there does not seem to be much benefit in running an auction other than to raise money.

Over hundreds of auctions, an emergent behaviour is that asymmetry leads to stronger players emerging stronger and weaker players weaker. Prices also tend to spiral until the surplus value approaches zero for the weakest MNO.

Auctions of 900 MHz spectrum always demonstrate this, as there is a prime number of blocks available, seven, hence it is impossible to have an equal outcome. Prices spiral upwards. The outcome is that the strongest MNO wins more frequency. All players have lower "surplus value", which can limit their ability to invest as much in network infrastructure. This is just as true where a cap in an auction means that one player can achieve an asymmetric outcome, as was the case in the 700 MHz band in the 2019 Swiss Auction.

Putting a cap criterion into an auction is an attempt to direct the allocation. It is an indication of the outcome that a regulator's policy might want. However, it is ever as strong determinate of that wished-for outcome as direct allocation.

- f. Should ComCom nevertheless decide to hold an auction, a tried and tested SMRA would have to be chosen.

As outlined above, we consider the auctioning of licences to be the least appropriate allocation option. Should COMCOM nevertheless choose an auction, we would prefer the simpler and less complicated auction procedure of 2019 compared to the complex and risky allocation procedure of 2012. Reserve prices should not be higher than at the last auction in 2019.

SMRA is probably best with all blocks auctioned at one time. Clock auctions are similar, but assignment stage presents exposure problems for bidders – unless no real differences between blocks within a band. If technically not much difference between blocks, then clock auction is good for the band.

As far as overall allocation, a solution creating more equal access, could be overall floors such as 60 MHz in FDD of 700/800/900 and 80 MHz in 1800/2100 (or 120 MHz if add in 2600 MHz).

Under no circumstances should the auction design give the incumbent an undue advantage over the other market participants.

6. **If an award procedure is organised, do you intend to participate?**

Yes.

7. **An initial award procedure is planned for 2027 and a second one will probably be held in 2032. What is your position on the intended procedure?**

The 6 GHz spectrum should be allocated together with the allocation of the outgoing spectrum (700 MHz, 1400 MHz, 3.4-3.8 GHz).

The use of mm waves is likely to lead to increased public debate. We therefore consider it important that the new bands in the mm spectrum are allocated separately and not together with already licensed spectrum.

Questions about mobile radio licences available from 2029 and conditions

8. **How long should the new mobile radio licences be valid for?**

The technology cycles in mobile communications are around 10 years (maturity phase). Licenses should cover at least two cycles and therefore be valid for 20-25 years. A license duration of at least 20 years corresponds to the licensing practice of recent years in Western Europe (according to [Analysys Mason](#)) and is also recommended by [GSMA](#). A long license term offers the security that mobile network operators need to expand and modernize their networks.

The allocation price for the license should be payable at the beginning of the license duration in 2029 as a lump sum, as an annuity over the full license duration or a combination thereof. No payment shall be due before 2029.

9. **What is your opinion about conditions of use such as service coverage, cybersecurity, safety communication? Should the current conditions be supplemented with further conditions and if so, which ones?**

According to [GSMA](#), licence conditions, other than those relating to co-existence, should be kept to a minimum or removed entirely. Sunrise is of the opinion that a license may include service and performance-related conditions in a frequency- and technology-neutral way.

Treating mobile licensees differently from other providers of connectivity or services leads to discrimination. Further conditions (relating to cyber security or security of communications, for example) must therefore be regulated in the relevant laws or ordinances. In mobile communications, the best-effort principle applies for technical reasons.

Detailed questions about available frequencies

800MHz (Band 20)

10. **How great do you think your demand for frequencies in this bandwidth will be from 2029?**

Description of strategic relevance for Sunrise.

This band is [redacted] showing good penetration rates with reliable and wide-area coverage, especially in rural areas. [redacted]

11. **If you were already allocated frequencies in this bandwidth in the 2012 allocation procedure, would you like to continue using them to the same extent? What effect would it have if you were no longer allocated the same frequencies or received fewer in this bandwidth?**

Description of strategic relevance for Sunrise.

As described above, [redacted]

12. **In your opinion, is there a minimum requirement and if so, how great is it?**

Sunrise requires a minimum of [redacted]

13. **What else should be taken into account when allocating this frequency band?**

If spectrum is allocated through auction, a mechanism is needed to set caps of 35% to 40% (2x35 MHz) in the lower bands in the next two auctions. This is the only way to ensure fair and efficient market conditions.

Up to a certain point, each MNO wants more, so it is likely that the sum over all MNO's will exceed supply. This is not an indication for an auction. What is important to an MNO is the total spectrum package. Too little in one band can be compensated to some extent with frequencies in another band.

900MHz (Band 8)

14. **How great do you think your demand for frequencies in this bandwidth will be from 2029?**

Assessments of strategic relevance for Sunrise.

[redacted]

15. **If you were already allocated frequencies in this bandwidth in the 2012 allocation procedure, would you like to continue using them to the same extent? What effect**

would it have if you were no longer allocated the same frequencies or received fewer in this bandwidth?

Description of strategic relevance for Sunrise.

[Redacted]

16. In your opinion, is there a minimum requirement and if so, how great is it?

Sunrise requires a minimum of [Redacted]

17. What else should be taken into account when allocating this frequency band?

Description of strategic relevance for Sunrise.

[Redacted]

If spectrum is allocated through auction, a mechanism is needed to set caps of 35% to 40% (2x35 MHz) in the lower bands in the next two auctions. This is the only way to ensure fair and efficient market conditions.

Up to a certain point, each MNO wants more, so it is likely that the sum over all MNO's will exceed supply. This is not an indication for an auction. What is important to an MNO is the total spectrum package. Too little in one band can be compensated to some extent with frequencies in another band.

1800MHz (Band 3)

18. How great do you think your demand for frequencies in this bandwidth will be from 2029?

Assessments of strategic relevance for Sunrise.

[Redacted]

19. If you were already allocated frequencies in this bandwidth in the 2012 allocation procedure, would you like to continue using them to the same extent? What effect would it have if you were no longer allocated the same frequencies or received fewer in this bandwidth?

Description of strategic relevance for Sunrise.

[Redacted]

20. In your opinion, is there a minimum requirement and if so, how great is it?

Sunrise requires a minimum of [Redacted]

21. What else should be taken into account when allocating this frequency band?

Assessments of strategic relevance for Sunrise.

[Redacted]

Up to a certain point, each MNO wants more, so it is likely that the sum over all MNO's will exceed supply. This is not an indication for an auction. What is important to an MNO is the total spectrum package. Too little in one band can be compensated to some extent with frequencies in another band.

2100MHz (Band 1)

22. How great do you think your demand for frequencies in this bandwidth will be from 2029?

Assessments of strategic relevance for Sunrise.

[Redacted]

23. If you were already allocated frequencies in this bandwidth in the 2012 allocation procedure, would you like to continue using them to the same extent? What effect would it have if you were no longer allocated the same frequencies or received fewer in this bandwidth?

Description of strategic relevance for Sunrise.

[Redacted]

24. In your opinion, is there a minimum requirement and if so, how great is it?

Sunrise requires a minimum of [Redacted]

25. What else should be taken into account when allocating this frequency band?

Description of strategic relevance for Sunrise.

[Redacted]

Up to a certain point, each MNO wants more, so it is likely that the sum over all MNO's will exceed supply. This is not an indication for an auction. What is important to an MNO is the total spectrum package. Too little in one band can be compensated to some extent with frequencies in another band.

2600MHz (Band 7)

26. How great do you think your demand for frequencies in this bandwidth will be from 2029?

Assessments of strategic relevance for Sunrise.

[Redacted]

27. If you were already allocated frequencies in this bandwidth in the 2012 allocation procedure, would you like to continue using them to the same extent? What effect would it have if you were no longer allocated the same frequencies or received fewer in this bandwidth?

Description of strategic relevance for Sunrise.

[Redacted]

28. In your opinion, is there a minimum requirement and if so, how great is it?

Sunrise requires a minimum of [Redacted]

29. What else should be taken into account when allocating this frequency band?

Description of strategic relevance for Sunrise.

[Redacted]

Up to a certain point, each MNO wants more, so it is likely that the sum over all MNO's will exceed supply. This is not an indication for an auction. What is important to an MNO is the total spectrum package. Too little in one band can be compensated to some extent with frequencies in another band.

2600MHz TDD (Band 38)

30. How great do you think your demand for frequencies in this bandwidth will be from 2029?

Assessments of strategic relevance for Sunrise.

[Redacted]

31. If you were already allocated frequencies in this bandwidth in the 2012 allocation procedure, would you like to continue using them to the same extent? What effect would it have if you were no longer allocated the same frequencies or received fewer in this bandwidth?

Spectrum not deployed in Sunrise Network. Sunrise has no spectrum holdings in this band yet.

32. In your opinion, is there a minimum requirement and if so, how great is it?

Sunrise requires a minimum of [Redacted]

33. What else should be taken into account when allocating this frequency band?

This spectrum is currently unevenly distributed, and an even allocation should be fostered as the allocation method chosen. It's not fair that one operator has all spectrum in this band.

Up to a certain point, each MNO wants more, so it is likely that the sum over all MNO's will exceed supply. This is not an indication for an auction. What is important to an MNO is the total spectrum package. Too little in one band can be compensated to some extent with frequencies in another band.

Detailed questions on possible new frequency bands

It is not yet known to what extent these frequency bands will be available in Switzerland in the future.

6GHz (Band 104)

34. How do you rate the attractiveness and the economic and social benefits of this frequency band?

The possibility for efficient deployments in this band will enable affordable mobile communications for citizens. Cost-benefit analyses of different allocation models have shown that, allocating the upper 6 GHz to licensed mobile networks will deliver greatest economic benefits (see [GSMA: The socioeconomic benefits of the 6 GHz band, June 2022](#)). Furthermore, licensing the band would result in significant savings in carbon emissions. Studies have shown that with the upper 6 GHz it is possible to reduce the carbon emissions by at least 2.9 times compared to the alternative of extreme IMT network densification.

35. Are you interested in usage rights in this frequency range? If so, what are your requirements?

Assessments of strategic relevance for Sunrise.

Upper 6 GHz band (6425-7125 MHz) is considered as a key band for delivering 5G-Advanced and 6G services. As there is 700 MHz of this spectrum available, this band is very attractive midterm.

36. For which application and coverage scenarios are these frequencies suitable?

These frequencies are the only suitable left for the 5G macro-capacity layer

37. Do network equipment and terminal devices that can be used in this frequency range already exist? If not, when can they be expected?

Prototypes for network equipment already exist and are expected to be available from 2025, according to the GSMA. Terminal devices are also expected to be available from 2025. We have conducted several tests already in our Joint Innovation Hub and reached 11 Gbps in downlink and 1 Gbps in uplink using 400 MHz with test licences. We will continue testing in the course of 2024/25 as midterm we see this to be an important band.

38. What other aspects need to be considered in this frequency band?

This spectrum should be allocated by Direct Distribution equally amongst the Swiss MNOs. This will ensure strong competition to the benefit of all Swiss Consumers. Strong competition will ensure the fastest roll-out of affordable services and development of the additional applications and services that will evolve in parallel with the deployment of this band.

If the frequencies are allocated by auction, a mechanism resulting in caps of 35% to 40% to ensure future competition. The blocks need to be as contiguous as possible.

Assessments of strategic relevance for Sunrise.

[Redacted]

[Redacted]

26GHz (Band 258)

39. How do you rate the attractiveness and the economic and social benefits of this frequency band?

Assessments of strategic relevance for Sunrise.

[Redacted]

40. Are you interested in usage rights in this frequency range? If so, what are your requirements?

Assessments of strategic relevance for Sunrise.

[Redacted]

41. For which application and coverage scenarios are these frequencies suitable?

Assessments of strategic relevance for Sunrise.

[Redacted]

42. Do network equipment and terminal devices that can be used in this frequency range already exist? If not, when can they be expected?

Yes, network equipment and terminal devices do exist.

43. What other aspects need to be considered in this frequency band?

This spectrum should be allocated by Direct Distribution equally amongst the Swiss MNOs. This will ensure strong competition to the benefit of all Swiss Consumers. Strong competition will ensure the fastest roll-out of affordable services and development of the additional applications and services that will evolve in parallel with the deployment of this band.

If the frequencies are allocated by auction, a mechanism resulting in caps of 35% to 40% to ensure future competition. The blocks need to be as contiguous as possible.

Assessments of strategic relevance for Sunrise.

[Redacted]

40GHz (Band 259)

44. How do you rate the attractiveness and the economic and social benefits of this frequency band?

Assessments of strategic relevance for Sunrise.

[Redacted]

45. Are you interested in usage rights in this frequency range? If so, what are your requirements?

Assessments of strategic relevance for Sunrise.

[Redacted]

46. For which application and coverage scenarios are these frequencies suitable?

Assessments of strategic relevance for Sunrise.

[Redacted]

47. Do network equipment and terminal devices that can be used in this frequency range already exist? If not, when can they be expected?

As far as we know, there are only prototypes of network equipment and terminal devices available at this point, as this band is not deployed yet in large scale if at all. Ecosystem is not mature yet.

48. What other aspects need to be considered in this frequency band?

This spectrum should be allocated by Direct Distribution equally amongst the Swiss MNOs. This will ensure strong competition to the benefit of all Swiss Consumers. Strong competition will ensure the fastest roll-out of affordable services and development of the additional applications and services that will evolve in parallel with the deployment of this band.

If the frequencies are allocated by auction, a mechanism resulting in caps of 35% to 40% to ensure future competition. The blocks need to be as contiguous as possible.

It is not yet possible to reliably assess specific business cases in this frequency band and their economic viability. Nevertheless, this band will be of great economic importance in the future. In view of the current uncertainties, an even distribution of frequencies among the three MNOs

is advisable. Accordingly, payment of the allocation price should not already be owed when the license is awarded.

Further remarks

49. Do you have other remarks, suggestions, etc.?

- a. All spectrum allocated should not be fragmented

It should be noted in principle: The allocation of dedicated frequency bands for specific applications or geographical regions is not efficient and should be avoided whenever possible. The most efficient approach from an economic point of view is to allocate spectrum resources to mobile network providers.

- b. There should be no delay in distributing spectrum that has been allocated internationally

All Swiss MNOs should have immediate access to all spectrum set aside for mobile telecommunication, and as soon as agreed by the World Radiocommunication Conference (WRC). This implements WRC's intent for spectrum supply to stay ahead of demand. None of the spectrum set aside exclusively for mobile telecommunication should be left idle. As BAKOM is an integral and important participant in WRC, there is no reason for duplicating its work through a second round of allocating this same spectrum. Several European countries have already licensed mm-wave bands. Switzerland must catch up.

- c. NIS restrictions should be relaxed

Description of strategic relevance for Sunrise.

[Redacted text block]

Before the next allocation of already licensed and, above all, new frequencies, the legal and procedural framework conditions for the construction and modernization of mobile networks must be clarified. In particular, rapid and simpler construction permission procedures are needed, the Ordinance on Protection against Non-Ionizing Radiation (NISV) must be adapted with regard to the new frequencies (e.g. definition of the relevant thresholds) and more realistic and practicable enforcement aids for the NISV and measurement methods for the new mobile radio frequencies are also required. If these framework conditions are not clarified, the use of the new frequencies from 2029 could lead to an unpleasant situation similar to that of 2019, when key elements for the enforcement of the NISV were missing, which led to permit blockades and moratoriums in municipalities and cantons. The result was and is a significant delay in the modernization of mobile networks.

Switzerland has the strictest thresholds for non-ionizing radiation (NIR) in Europe, which are far below the international recommendations. The NIR budgets of most of our sites have already been exhausted. [Redacted text]

[Redacted text block]

Description of Sunrise network load situation.

[REDACTED]

[REDACTED]

This means that already licensed frequencies, as well as new frequencies, cannot be switched on at all. This not only severely restricts the development of our mobile network, it is also very cost-intensive. Switzerland should bring its limits in line with international standards according to the recommendations of WHO or ICNIRP. Such a relaxation would also enable more sites to be shared, hence reducing the number of new sites.

- d. Each MNO must be allowed to pool or share surplus spectrum

This ensures the most efficient use of spectrum on a dynamic basis. Sharing spectrum is especially important as a way of compensation for past unequal allocation of legacy spectrum or technical evolution. This is rapidly gaining ground as a valuable tool of best-practice for spectrum allocation. Software-defined networks and radios enable dynamic switching. Market-making tools enable underutilized spectrum to be dynamically shifted to where it creates most economic value.

- e. Fostering network investments

The economic growth of a country depends on digitalization. Mobile communication is still a powerful driver of digitalization. Thus, MNOs should not be forced into reducing their network investments because of excessively high costs for frequency allocation.

- f. Immediate clarity on allocation of all legacy spectrum

Early clarity ensures MNO can optimise their network plans and reform spectrum if needed, ensuring more efficient and economical use of resources.