2018 Activity Report

of the Federal Communications Commission (ComCom)

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Contents

Editorial

5G becomes a reality

The fantastic notions about how the new mobile telephone technology might change all our lives have now been followed by concrete steps. For the telecoms industry and legislators it is now a matter of continuing to build on the technical and legal foundations so that the new services can be provided in accordance with the demand. Initially, 5G means the possibility of being able to disseminate enormous amounts of data quickly and without delay. This results in completely new areas of application; their usefulness and sustainability will in the final analysis be determined by the market. Which areas will the new technical possibilities be able to exploit most quickly: the handling and control of industrial manufacturing processes, medical interventions by specialists who are no longer in the same room as the patient, the automatic control of transport systems or ultimately, once again, the demand for videos and online games?

With the successful allocation of additional mobile radio frequencies, ComCom has met an important requirement for the introduction of the new 5G technology standard in Switzerland. The auction in January 2019 was preceded by a thorough consultation procedure which lasted over a year; it was above all the interested providers of mobile telephony services and equipment companies which participated and submitted proposals. The auction's goal was not to maximise revenue from the sale; rather, ComCom’s goal was to make frequencies available to providers in good time in order to promote the expansion of the network. This was successful: Switzerland is one of the first countries in Europe in which the 5G standard can be introduced. This also has the advantage that Swiss businesses, as “first movers”, can make an important contribution to the development of the new technology.

From ComCom's viewpoint, two factors were critical for the success of the award procedure: on the one hand the Commission had decided on a comparatively simple and transparent auction design which offered few incentives for strategic bidding but which instead led to operators being able to acquire the spectrum they needed for their projects at a predictable price. On the other hand, politics did not formulate expectations for the mobile operators which, as has happened in other countries, would have turned out to be unrealistic on closer examination or which could have been met only at a disproportionate cost. The pragmatic Swiss procedure also earned recognition from abroad.

However, this leading position must be defended. In this context, politics can make an important contribution: the expansion of the 5G network is dependent on additional antennas. The building and expansion of antennas is subject to construction permit procedures which experience has shown can take a very long time. ComCom is convinced that these procedures can be significantly simplified and shortened to a few months' duration without disproportionately restricting citizens' rights. It will apply itself to achieving this objective as far as it is able to do so.

Also, the amount of data already being carried on today's network is growing rapidly. The new 5G technology, which interconnects not only people but also things, is further accelerating the growth in the volumes of data. Even today, most existing antenna sites in Switzerland are working at full capacity. If it is desired to continue to satisfy the demand for larger volumes of data and faster transmission, antennas must be able to work more efficiently. Innovative solutions (e.g. beam forming antennas) are taking technical developments and increased demand into account. ComCom supports an examination of the measurement methods and of the current limit values for non-ionising radiation, which are lower than in other countries. To this end DETEC has convened a working group with experts from all relevant specialist areas which is expected to submit proposals to the Federal Council by the middle of this year. ComCom is also represented in this working group.

In the last year parliament has been engaged with the revision of the Telecommunications Act. It has approved most of the Federal Council's proposals and has adapted the legal basis to reflect technical developments and the rapidly rising demand for telecommunications services. In this connection, ComCom had also supported the demand for technology-neutral regulation in order to promote the nationwide provision of households with fibre-optic connections. In order to avoid duplicating networks in the fixed network sector, Swisscom should make it possible for its competitors to share its infrastructures. If the parties cannot agree on the conditions of joint use, ComCom, as the regulator, would decide. Currently regulation by ComCom continues to be limited to copper connections. Extending regulation to the current fibre technology was rejected by parliament against the Federal Council’s proposal, which was also supported by ComCom. However, ComCom is ready to assist participants in the market to find amicable solutions, as it did 10 years ago at the start of the construction of fibre networks.

Today, Switzerland is in a leading position in terms of the ongoing development of communications networks. It is primarily the proactive and innovative enterprises in the telecommunications industry we have to thank for this; they are the beneficiaries of a liberal regulatory environment. However, such a lead will quickly be lost if we do not succeed in constantly adapting the basic legal framework to technical requirements and developments, taking all interests into account.

Stephan Netzle

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I. An overview of the telecoms market

In the first section of this report ComCom presents various data which gives an overview of the development of the telecommunications market in Switzerland. Further information on the latest developments in the Swiss fixed network and mobile telephony market is available on the ComCom website under the heading “Figures and Facts”[1].

1. Development of mobile networks

The number of mobile customers in Switzerland, which remained stable in 2017, fell in 2018 by 1.6% to just over 11,230,000 units.

At the end of 2018 Swisscom had 6,551,000 mobile customers; this is slightly fewer than in the previous year (-1.3%). An increase of 34,000 customers with contracts (postpaid products) was accompanied by a loss of 120,000 prepaid customers. Sunrise recorded a drop of approximately 2.7% and at the end of the year had 2,797,000 mobile customers. The considerable increase in the postpaid segment (+135,000 units) was not able to offset the declining number of customers in the prepaid segment (-214,000). Salt gained some 13,000 contract customers, but at the same time lost 36,000 in the prepaid segment. Overall, the number of Salt's mobile telephone customers fell in the year under review to 1,883,000 (-1.2%) by the end of 2018. At the end of 2018 Swisscom's market share was approximately 58% and that of Sunrise was 25%; the figure for Salt was 17%.

At the same point in time, the cable network operators had a total of 197,000 mobile customers. UPC (146,000) and Quickline (42,000) had approximately 95% of these customers. The current market share of the CATV operators is just over 1.5%.

With approximately 11.2 million connections for a total population of 8.53 million, mobile penetration in Switzerland at the end of 2018 was nearly 132%. This value is still slightly below the EU average, which was approximately 137% at the end of 2017.

Growth in mobile data traffic

According to the latest Ericsson Mobility Report of November 2018, in the third quarter of 2018 there were 7.9 billion mobile connections worldwide (up 3% on the previous year). Sixty percent of all mobile telephones are now smartphones. At the end of 2018, some 5 billion smartphones were in use worldwide. By 2024 the figure is expected to be 7.2 billion, even though the growth in sales of such smart devices slowed down somewhat in 2018.

The proliferation of smartphones has radically changed not only our ways of communicating but also our everyday lives. Users are online virtually round the clock and are consuming more and more data, especially in the form of videos. This is leading to an enormous increase in data traffic on the mobile networks.

Because of this development, data traffic on mobile networks increased in Switzerland in 2018 as with previous years. On Swisscom's network, for example, it increased by nearly 30% in comparison with 2017. According to Sunrise's own figures, it is seeing a doubling of data traffic every 16 months.

[1] All sources used are listed in the list of sources at the end of the report.

According to the Ericsson Mobility Report, updated in February 2019, data traffic on mobile networks worldwide increased by 88% between the end of 2017 and the end of 2018. This is the highest increase since mid-2013, when an increase of 89% was recorded. However, if one compares the actual volume of data, it is clear that the 2018 increase was 15 times greater than that observed in 2013. The reason for this is on the one hand the increasing number of data contracts associated with smartphones and on the other hand the increase in the volume of data included in these contracts, due mainly to the increasing transmission of video content. According to Ericsson, the share of video in 2018 already accounted for 60% of mobile data traffic and could rise to almost 74% by 2024. This would correspond to a worldwide increase of almost 35% per annum between 2018 and 2024.

Moreover, according to Ericsson, the number of broadband mobile contracts increased by approximately 15% in one year and reached 5.7 billion in September 2018. This figure includes approximately 3.3 billion LTE contracts. At the end of 2018 LTE was the most common mobile telephony technology.

Investment

In order to be able to cope with the enormous growth in mobile data traffic, telecommunications service providers are making substantial investments in their network infrastructure.

In 2013 Swisscom announced that up to 2017 it would invest a total of CHF 1.5 billion in the expansion of its mobile network. Following Swisscom’s investment in mobile infrastructure of CHF 231 million in 2016 and CHF 269 million in 2017, the corresponding amount for 2018 was approximately CHF 310 million, i.e. 14% more than in the previous year. Sunrise, however, significantly reduced its investment in 2018. After the company had spent more than CHF 200 million in 2017 to improve LTE coverage in particular, in 2018 it invested approximately CHF 157 million in the expansion of its fixed network and mobile telephony infrastructure. Finally, Salt, which according to its own figures had spent almost CHF 587 million in the last two years on expanding its mobile radio and fibre network infrastructure, also reduced its investment in 2018, to CHF 205 million (compared to CHF 382 million in 2017).

Network quality

As in previous years, at the beginning of February 2019 the German specialist periodical Connect published an independent test in which the mobile networks in Germany, Austria and Switzerland were compared with each other. The test confirmed the outstanding quality of all the Swiss mobile networks. Swisscom was once again in first place, just one point ahead of Sunrise, whilst Salt was ranked fifth, behind T-Mobile and A1 in Austria. Swisscom and Sunrise were also the only ones described as “outstanding”. Salt improved on the previous year in both voice and data traffic and was classified as "very good". Furthermore, all three mobile providers stand out from the competition for the high stability and quality of their networks.

According to the Connect study, mobile coverage in trains is also excellent and in particular considerably better than in Germany and Austria. The improvement in mobile provision for travellers across the entire rail network is a priority for SBB Swiss Railways.

The InTrainCom consortium, an alliance of mobile operators and SBB, has already equipped all long-distance trains with repeaters for reception of mobile signals. Equipping of the carriages of the regional transport fleet should be 75% complete by 2020 and 100% complete by 2024. Mobile operators are also improving network coverage by erecting new antennas along rail corridors.

Network coverage

Mobile coverage is almost total in Switzerland. The GSM (2G) networks serve almost 100% of the population and cover about 90% of the territory. Mobile calls can be made nearly everywhere – often even in very remote areas of the country.

In the case of UMTS/HSPA services (3G), which enable mobile internet access, population coverage in Switzerland is up to 99%, depending on the operator.

At the end of 2018 LTE (4G) coverage was already 98% of the population for Salt, more than 99% for Swisscom and almost 100% (99.9%) for Sunrise. In terms of LTE-A technology (4G+), all operators report high network coverage: for Salt the figure is already 55% of the population; for Sunrise it is 80% and for Swisscom even over 80%.

The new technology is also spreading rapidly throughout the world. According to the GSA (Global Mobile Suppliers Association) in summer 2018 there were 3.6 billion LTE/4G contracts worldwide, i.e. more than a billion more than the year before (+43%). The LTE/4G share of mobile contracts is 42%.

According to the GSMA (the GSM Association) LTE/4G will very soon become the dominant mobile radio technology. In 2019, 50% of all mobile calls are expected to be made using this standard; by 2025 this share could rise to almost 60%. At the same time 5G will also make its mark on everyday life. In numerous countries, including Switzerland, the first 5G-capable smartphones and commercial services are expected to come onto the market in the second half of 2019. The GSMA estimates that the number of 5G mobile contracts will grow to 1.4 billion by 2025 - 15% of all contracts. In some markets such as China and Europe, this share could reach 30% or even 50% in the USA.

Data transmission rates

Mobile users in Switzerland benefit from high transmission speeds.

Compared to other countries, Switzerland is one of the leaders, with average data transmission rates of 30 Mbit/s on the LTE/4G networks. This is the conclusion of the Report on the Digital Economy and Society Index (DESI) on the digitalisation of the economy and society published by the European Commission in May 2018. Switzerland is therefore ranked above the average of the European countries (26 Mbit/s). In Europe, average data rates vary from 20 to 42 Mbit/s, substantially higher than in the USA or in Russia (16 Mbit/s). From the latest State of Mobile Networks Report for Switzerland, updated in November 2018 and produced using the Open Signal network monitoring app, it is apparent that Swiss operators had made progress in only a few months: Swisscom achieves average transmission speeds of 40 Mbit/s as the first operator, closely followed by Sunrise and Salt with average data rates of 35 and 33 Mbit/s respectively.

The disparity between these values and the theoretical transmission speeds touted by operators shows that the networks are coming up against their capacity limits. The reasons for this are the increasing number of users and the ever larger volumes of data being transferred. Thanks to the acquisition of new frequencies at the beginning of 2019, operators should initially be able to increase the capacities of their LTE/4G networks and to offer their customers higher transmission speeds before expanding the 5G networks in a subsequent phase.

Price of mobile communications

After a slight increase in 2017, mobile prices returned to the falling trend for the majority of customer types in 2018. On average the prices of the cheapest products from the three largest Swiss service providers fell by 7.6% for high users, by 10.2% for medium users and by 9.0% for low users. The drop in prices differs depending on the market segment (contract or prepaid).

According to OFCOM statistics, in 2018 prepaid customers benefited from the largest reductions in prices. In this segment, prices for low users fell by 36.9%; for medium users the figure was 22.1% and for high users it was 11.3%. In the contract market segment, prices for medium users fell by 1.9% and by 1.8% for high users, whilst they increased for low users by 2.7%.

Compared with the other OECD countries, mobile telephony prices in Switzerland continue to be among the highest.

This is confirmed by the Teligen price baskets published by the market research firm Strategy Analytics, which are based on the OECD methodology and which take into account the most favourable products from the largest operators in each country. It records products and options from both the prepaid and contract segments. In the price basket for Switzerland, only the products from the three operators Salt, Sunrise and Swisscom are taken into account. For an average basket with voice and data calls, a medium user (100 calls and 500 MB of data) in Switzerland paid CHF 22 per month more than the OECD-wide average (CHF 40 compared to CHF 18). For high users (900 calls and 2 GB of data), the difference is less pronounced, but in Switzerland they still pay CHF 13 per month more than the average in the OECD countries (CHF 40 compared to CHF 27).

2. Development of fixed networks

In the fixed network sector, Switzerland has several backbone networks as well as high-quality access networks. Swisscom's access network is available nationwide. The well-developed cable television networks, in particular those of UPC and the Quickline group, also offer fixed network connections in extensive parts of the country. In addition, there are a large number of small cable network operators which offer broadband and telephone services in geographically limited areas. Approximately 82% of Swiss households have a CATV network connection.

Market shares in fixed network telephony have shifted somewhat in recent years: Swisscom's market share, which was for a long time in excess of 60%, fell to 56% at the end of 2017. However, the historic provider continues to be far ahead of its two main competitors UPC and Sunrise, which claimed 15.1% and 12.4% of the market respectively at the same point in time. The numerous other providers all have only modest shares of the market.

As a result of the continued boom in mobile telephony, the downtrend in the number of fixed-network telephone connections in Switzerland continues. Between 2017 and 2018 Swisscom alone lost 259,000 fixed-network telephone connections; this corresponds to a drop of 12.7%, to 1,788,000 active fixed network connections at the end of 2018.

However, the fixed networks will not disappear, on the contrary.

The gradual transition to IP telephony, but also the growth of the cable network operators in this sector or the increase in the number of fibre connections, show that the fixed network in Switzerland is still very significant and indicate that fixed-network and mobile telephony will complement each other in the future.

Voice telephony over the internet (VoIP) on the up and up

In parallel there is strong growth in voice telephony via Internet Protocol (VoIP) in the fixed network. Fixed-network telephone services using VoIP technology were being provided as long as ten years ago by alternative providers of telecommunication services and cable network operators. The gradual replacement of analogue by IP telephony (telephony via Internet Protocol) is a worldwide trend and additionally favours the progress of VoIP.

According to OFCOM, the number of customers who make telephone calls in the fixed network using a VoIP connection from a telecommunication services provider (DSL, cable, etc.), has seen an eightfold increase over the past ten years and passed the 3 million mark at the end of 2017 (3,032,593). In the last two years alone, this figure increased by approximately 75%.

In the market for VoIP solutions which has existed for a decade there are numerous experienced providers of different sizes. Some of these have specialised in consultancy and applications for business customers. In this market segment in particular, it is currently not merely a matter of converting conventional telephony to VoIP but covers the introduction of a platform for "Unified Communications & Collaboration" (UCC). As well as telephony, such new collaborative platforms enable other forms of cooperation within a business or with external partners, such as chats, video conferencing or file sharing.

Migration of analogue telephony to IP

In spring 2014 Swisscom announced that it would convert all fixed-network connections to digital IP telephony over the next few years and phase out the old analogue, as well as ISDN telephony dating from the 1980s. The gradual migration from traditional fixed-network telephony to IP technology is a global trend. Today practically all data (music, images, videos and voice communication) is conveyed digitally over IP-based networks. In the case of IP telephony, a power supply is no longer provided to devices via the subscriber line, so it offers various advantages, such as lower costs and better speech quality.

Apart from telephone equipment with dials, most telephones can continue to be used even after the migration.

By the end of 2017 Swisscom had already migrated approximately 90% of private customers to all-IP. In 2018 the focus was more on business customers. In addition, Swisscom began to switch the first regions of Switzerland completely to IP in order then to be able to progress with the decommissioning of the old infrastructure.

Price of fixed communications

As in 2017, prices for fixed-network telephony increased slightly in 2018. According to OFCOM statistics, the lowest-priced offers for low users increased in price between 2017 and 2018 by 2.3%, for medium users by 0.5% and for high users by 0.2%.

OFCOM also noted that the most advantageous products for the three user profiles are bundled products, often including internet access services, at an all-in price for unlimited telephony on all the networks in Switzerland.

In an international comparison the prices for fixed-network telephony in Switzerland are in the middle of the OECD ranking. According to the Teligen price baskets published by Strategy Analytics a medium user in Switzerland pays a little over CHF 44 per month for an average basket with 140 (national and international) calls (OECD average: approx. CHF 45).

3. Broadband market on the fixed network

Switzerland has very high-performance high-speed telecommunications infrastructures. The economy as a whole benefits from competition in infrastructures and services, which offers greater choice to consumers.

Penetration rates

At the end of June 2018, more than 47.5% of the Swiss population had a broadband internet connection. Switzerland therefore secured its top ranking in an OECD-wide comparison. It is clearly ahead of Denmark (43.4%), France (42.9%) and the Netherlands (42.9%). The average for the OECD countries is 30.7%; that of the EU countries is 34.7% (July 2018).

However, in terms of fibre connections to homes (FTTH) Switzerland is not currently a world leader; approximately 30% of Swiss households have an FTTH connection but according to an IDATE study for 2018 the uptake in Swiss households is only approximately 8%. According to IDATE, the penetration rate in the European Union in September 2018 was 13.9%.

Speeds

In an international comparison, Switzerland is still one of the best connected countries in the world. Not only does Switzerland have good broadband access penetration, Swiss surfers also benefit from ever higher speeds. In the Measurement Lab (M-Lab) performance measurements carried out between May 2017 and May 2018 in 200 countries and states, the results of which were published in August 2018 by Cable.co.uk, Switzerland, with an average transmission rate of 30 Mbit/s, was in 11th position. Singapore was in first place, with an average data transmission rate of 60 Mbit/s; followed by three Scandinavian countries with average rates between 40 and 46 Mbit/s. Worldwide, the average data transmission rate is approximately 9 Mbit/s. In comparison with the previous measurement period, the average data transmission rate in Switzerland increased by 3 Mbit/s.

Prices

According to OFCOM statistical data, the increase in data transmission rates in 2018 was accompanied by falling prices for two user profiles. The reduction in prices was less pronounced than in 2017. However, the prices of broadband services for medium users fell between 2017 and 2018 by 3.3% and for high users by 3.4%. The slight price rise for low users (+0.8%) is attributable to the fact that the cable operators increased their contract charges. OFCOM also notes that the average data transmission rate of the products examined for medium users is 44 Mbit/s and that currently all providers offer products with downstream transmission rates of at least 100 Mbit/s, some even offer transmission rates of up to 1 Gbit/s.

Market structure

In terms of internet access, the DSL/FTTx providers are still way ahead of the cable network operators. At the end of 2018, about 70% of users had connections from a telecoms operator (2,761,000 connections) and 30% had connections from a cable network operator (1,203,000 connections).

Looking at the entirety of the broadband providers (CATV, DSL and FTTx), it is apparent that Swisscom, with a market share of 51.3% at the end of 2018 is still far ahead of its closest competitors.

At the end of 2018, all the alternative telecoms providers combined had a market share of 18.4%. Sunrise's share of this was 11.5%. As far as the cable network operators are concerned, UPC has a market share of 17.7% and the other CATV operators combined have 12.7%.

For comparison: the average market share of the historic providers in the EU countries is constantly falling and was 39.7% in 2018.

Unbundling

Unbundling of local loops allows alternative providers to offer their customers their own telecommunication services by leasing the copper subscriber lines from Swisscom and operating them themselves as far as the end customers.

After its introduction in 2007, unbundling initially led to strong stimulation of the competition on the market for DSL connections. For several years now, the number of unbundled lines has been declining: in mid-2012 there were still approximately 315,000 whereas at the end of 2018 there were less than 90,000. Fully unbundled lines (Full Access) therefore now represent less than 3% of all broadband lines in Switzerland.

On the one hand this is due to the offerings from cable network operators and the increasing use of fibre connections, which is further intensifying infrastructure competition. On the other hand, the increasing interest of customers in bundled products for telephony, internet and digital television is working against unbundling technology, since the latter does not allow high data transmission rates.

Development of ultra-broadband networks

The above figures for broadband connections in Switzerland include Swisscom's customers who are supplied via an FTTH/B connection as well as via hybrid fibre and copper technologies (FTTC and FTTS), plus the customers of alternative providers who use the network of the historic provider or the public utilities infrastructure.

At the end of 2018, it is estimated that 930,000 or just over 20% of broadband users in Switzerland used a fibre connection. This figure is below the average fibre penetration rate in the OECD countries (25%), but is slightly above the figure for the European Union (16%). However, the switch to fibre contracts in Switzerland is progressing briskly: according to OECD data, their number grew between June 2017 and June 2018 by approximately 42%.

As already mentioned, in terms of broadband provision on the fixed network, Switzerland has for some years occupied a leading position compared with other countries. With regard to the development of ultra-broadband (100 Mbit/s and more), Switzerland is, however, not a world leader. Nonetheless, considerable sums are still being invested in network expansion.

The drivers of these investments are the rapidly growing volume of data traffic and, looking ahead, the necessity to invest in a future-proof network. Infrastructure competition also works as an incentive. For the municipalities and regions which are themselves investing in optical fibre, it is also mostly about making their locations more attractive as a location for businesses.

The technological development path is clear: in both the telecoms networks and the CATV networks optical fibre, which has for some time already been used on the backbone networks, is being brought ever closer to end customers. The conventional copper or co-axial cable is either

being replaced entirely by optical fibre (FTTH) or the fibres are being brought at least as far as the cabinet in the locality (FTTC), to the manhole in the street (FTTS) or to the basements of buildings (FTTB).

Over several years, within a framework of co-operation between Swisscom and local utility providers, FTTH networks have been constructed in numerous cities and regions. The cooperating partners jointly build a local FTTH network and then they each have at least one fibre to every household. In cooperation with local utility providers, Swisscom has provided approximately 1 million households with fibre (FTTH). In February 2019, for instance, the St. Gallen public utilities announced that after nearly 10 years of construction the comprehensive fibre network with 48,000 connections has been completed.

In other locations, individual political municipalities are going it alone with investment in FTTH. However, fibre expansion is taking place not only in the large conurbations but also in many rural areas (for example in canton Freiburg, in the Upper Valais or in the Lower Engadine). One new example is canton Grisons, which announced in the spring of 2018 that it wants to promote ultra-broadband (100 Mbit/s) development. The canton is aiming to become a "top spot" in order to be competitive with the major conurbations.

In addition to cooperation, Swisscom is also currently working alone on investments to modernise the fixed network in many locations. For some years, however, it has primarily been opting for a hybrid technology consisting of copper cable and optical fibre (FTTC, FTTS and FTTB). This means that copper cable continues to be used over the last 50 to 200 metres to the socket in the household. This avoids the high costs of replacing this final section as far as the customer. This is possible because the complementary technologies of "vectoring" and "G.fast" were developed some years ago; these enable high bandwidths of 100 to 500 Mbit/s over short copper cables. However, this technology mix and "vectoring" have an adverse effect on unbundling, which was introduced during the last revision of the TCA as an instrument to stimulate competition and which is continuing to lose significance (cf. "Unbundling" and the "Virtual Unbundling Local Access" access method).

By the end of 2018, Swisscom had provided approximately 4.2 million high-speed broadband connections of at least 50 Mbit/s. Swisscom's investments in fibre expansion amounted to CHF 490 million in 2018 (+4.5%). Swisscom had already announced some time ago that it wanted to provide approximately 90% of all households and businesses with at least 80 Mbit/s by the end of 2021. According to Swisscom, at the end of 2018 half of Swiss municipalities have high-speed broadband.

Broadband provision in Switzerland has developed satisfactorily thanks to the infrastructure competition between Swisscom and the numerous CATV operators, and also because the latter have constantly invested in fibre expansion and in DOCSIS 3.0 (and DOCSIS 3.1) on co-axial cables. Approximately 80% of Swiss households have a cable network connection and for 95% of them an ultra-broadband product can be acquired. A new technology - DOCSIS 3.1 – which started in 2016 enables even faster data transmission rates (1 Gbit/s and more).

Since 2013 there has been an additional player in the market: Swiss Fibre Net (SFN). SFN is a network consortium consisting of numerous utility providers which have constructed local fibre networks. SFN consists on the one hand of the following five shareholders: the utility providers of the cities of Bern, Lucerne and St. Gallen plus the network companies Danet (Upper Valais) and Didico (Meilen-Herrliberg). Thirteen partner networks also belong to the consortium.

SFN offers service providers who do not have their own access network (e.g. Init7, 1tv, iWay.ch, GGA Maur, Salt, Sunrise and VTX) the possibility of sourcing uniform FTTH products nationwide via a common platform for resale.

In 2018 Sunrise renewed cooperation with SFN and Salt has also entered into a partnership with SFN since it commenced fixed-network business in March 2018. Both have also announced, in return for long-term, non-retractable usage rights, to make up-front investments in the infrastructure of the SFN partners.

Digital television in Switzerland

With almost 2.24 million customers, the cable network operators continue to lay claim to the lion's share of the digital TV market in Switzerland. However, they continue to lose customers in their core business year on year. In 2018 their customer base contracted by more than 135,000 TV subscribers, a fall of 5.7%. In 2017 their market share fell below 60% for the first time – down to 55.9% at the end of 2018.

UPC lost more than 117,000 subscribers to its digital TV service (nearly 10% in one year), which reduced its market share to 27.1% by the end of 2018.

In the case of Quickline, a group of several cable network operators, the customer base in the reporting year also fell by some 8400 units or 2.4% and amounted to just under 349,000 TV customers at the end of 2018. Its market share fell to 8.7%.

In parallel, the number of digital TV customers in the fixed network also continued to rise in 2018. In this market segment the telecoms providers represent serious competition for the cable network operators.

Considering the providers individually, it is clear that Swisscom was able to consolidate the leading position it took over from UPC in 2015: it gained 52,000 customers in the year under review and registered growth of 3.5% compared to 2017. Today the historic provider has 1.52 million digital TV subscribers. Its market share increased to 38%.

Sunrise, which was the last to enter this market in 2012, recorded an increase in new customers in the same period of nearly 30,000 - up 14%. Its market share increased to 6.1%.

II. Prospects for 2019

ComCom's fundamental mission as the licensing and regulatory authority will not change in 2019; in the interests of the economy and consumers ComCom will guarantee consumers a good universal service, promote competition in the telecoms market and ensure efficient use of the frequency spectrum. ComCom is also committed to ensuring an investment-friendly environment and to promoting technological innovation in the telecommunications market.

In 2019, ComCom will be focussing on the following activities:

- **Universal service**: ComCom will monitor compliance with the universal service licence and together with OFCOM will ensure that the services forming part of the universal service are provided in accordance with the stipulations of the Federal Council. ComCom will also supervise the implementation of the motion of National Councillor M. Candinas which calls for a minimum internet access speed of 10 Mbit/s in the universal service.
- **Mobile radio frequencies:** The objective of the tender procedure launched in July 2018 for new mobile radio frequencies is the efficient auctioning of the frequencies in early 2019 and the subsequent rapid award of licences, so that the new 5G technology can be introduced quickly in Switzerland. At the World Radio Conference (WRC) which will take place in 2019, there is expected to be further discussion on which additional frequencies will be reserved for mobile communication in future at the global and European level. OFCOM will represent the interests of Switzerland at WRC 2019.
- **Access procedures:** At the beginning of 2019 ComCom will take the first decisions based on new calculation methods.
- **Revision of the Telecommunications Act (TCA):** In the course of 2018 both houses of parliament discussed the Federal Council's proposals on the partial revision of the TCA. This revision of the legislation was concluded in the 2019 spring session and the amendments at the level of the ordinances will now follow; ComCom will observe this implementation process. In ComCom's opinion it is unfortunate that parliament rejected the possibility of technology-neutral regulation of network access in the event of market dominance. Here the legislators merely specify that the Federal Council should submit an evaluation report on the evolution of the telecoms market every three years; this may also include measures on promoting competition. However, the TCA now includes a provision on network neutrality (new Art. 12e) and various improvements in consumer protection. ComCom's tasks change slightly in two areas: on the one hand as the result of the introduction of joint use of equipment inside buildings (new Art. 35b) and on the other hand concerning the transfer of radiocommunication licences and network cooperation (Art. 24d).
- **International relations:** Since the beginning of 2019, ComCom and OFCOM have unfortunately no longer been invited as observers to the meetings of the EU agency for European telecoms regulators (BEREC). ComCom and OFCOM therefore no longer have access to an important platform for the exchange of knowledge and experience at the European level. The reason for the exclusion of Switzerland is evidently the non-signature of the institutional framework agreement with the EU. ComCom continues to be a member of the Independent European Regulators Group (IRG) and in this way is attempting to maintain contacts with the telecoms regulatory authorities in Europe.

III. Commission and Secretariat

1. Commission

ComCom is an independent, extraparliamentary commission with decision-making powers and is responsible for licensing and market regulation in the telecommunications sector.

According to the Telecommunications Act the most important tasks of ComCom are:

- the award of licences for the use of the radio frequency spectrum (Art. 24a TCA),
- the award of the universal service licence (article 14 TCA),
- the definition of access prices and conditions if the providers cannot reach an agreement among themselves (Art. 11 and 11a TCA),
- the approval of the national numbering plans (Art. 28 TCA),
- the regulation of the modalities for number portability and the free choice of service provider (Art. 28 TCA),
- taking measures and imposing sanctions for violations of the applicable law within the framework of a licence awarded by ComCom (Art. 58 TCA).

The commission consists of seven independent experts, who are appointed by the Federal Council.

In 2018 the Commission consisted of the following members:

- **Stephan Netzle, President,** Doctor of Law, LL.M., lawyer
- **Adrienne Corboud Fumagalli, Deputy President,** Doctor in Economics and Social Sciences, chair of the board of directors and CEO of Deeption SA
- **Andreas Bühlmann**, Doctor of Political Science, Head of the Finance Office of the Canton of Solothurn
- **Jean Pierre Hubaux**, Electrical engineer, Professor at the Swiss Federal Institute of Technology, Lausanne (EPFL)
- **Christian Martin,** Electrical engineer HTL, general manager of Cisco Switzerland
- **Stephanie Teufel,** Professor of Management in Information and Communication Technologies and Director of the International Institute of Management in Technology (iimt) at the University of Freiburg
- **Flavia Verzasconi,** attorney and notary, president of the Administrative Court of canton Ticino

With regard to the resignation of Deputy President Monica Duca Widmer and Reiner Eichenberger at the end of 2017 due to the legal restriction on terms of office, the Federal Council, at its meeting of 1 December 2017, appointed two new members: Flavia Verzasconi, attorney and notary and president of the Administrative Court of canton Ticino, and Christian Martin, electrical engineer HTL and general manager of Cisco Switzerland GmbH, joined the Commission on 1 January 2018. At the same time the Federal Council appointed Adrienne

Corboud Fumagalli, who has been a member of the Commission since 2012, as the new Deputy President of the Commission.

In 2018 the Commission met almost every month. The members also spend much time in preparing the meetings and on circulating comments.

2. Secretariat

The Commission is assisted by a Secretariat, which is responsible for management and public relations. The Secretariat coordinates the Commission's activities with OFCOM, which prepares ComCom business and generally implements its decisions.

The Secretariat consists of a Commission secretary (90%), a scientific co-worker and webmaster (80%) and an administrative assistant (70%).

For any information, please contact the **members of the Secretariat**:

- Peter Bär, Commission secretary
- Pierre Zinck, scientific co-worker and webmaster
- Jacqueline Fischer Pulfer, administrative assistant

At the beginning of 2018 ComCom moved into its new premises at Christoffelgasse 5 in Bern. The same building accommodates other regulatory authorities – the Federal Electricity Commission (ElCom), the Independent Complaints Authority for Radio and Television (ICA) and the Railways Arbitration Commission (RACO).

IV. The Commission's activities

The following sections give an overview of ComCom's activities in 2018.

1. Access procedures

In order to promote competition in the telecoms market, the Telecommunications Act (in Art. 11 TCA) specifies that market-dominant companies (such as, for example, the former monopolist Swisscom in the case of certain markets or sub-sectors) must provide the other providers with access in various forms to its existing infrastructure or to services. If a market-dominant situation exists, this access to certain equipment and services must be enabled in a non-discriminatory manner and at cost-based prices.

The areas in which a market-dominant provider must grant access to infrastructure and services are definitively enumerated in the Act - in contrast, for instance, with the technology-neutral access regime in the EU. Specifically, the TCA currently enumerates the following six forms of access (Art. 11):

1. Full unbundling of the local loop
2. Fast bitstream access (for four years)
3. Charging for subscriber connections on the fixed network
4. Interconnection
5. Leased lines
6. Access to cable ducts, in so far as these have sufficient capacity.

Another feature of Swiss telecommunications legislation is the so-called primacy of negotiation. This means that alternative providers must first negotiate the conditions of access to the infrastructure with the market-dominant provider. Only if these negotiations do not result in an agreement can an application be made to ComCom for a definition of the access conditions and prices. This procedure is known as *ex-post* regulation.

In all other respects access in the access network is limited to conventional copper technology. In Switzerland, connections based on fibre or coaxial cable are currently not subject to any access obligation or to any regulation.

Pending procedures

At the end of 2018 a total of three access procedures were pending with ComCom. These procedures concern remuneration for interconnection and in some cases other forms of access in accordance with article 11 TCA.

At the end of 2018, two appeals against ComCom decisions were pending before the Federal Administrative Court (FAC). Here the FAC is the sole appeal body.

1.1. Interconnection and other forms of access according to Art. 11 TCA

Access prices from 2013

At the end of 2018 two access procedures were pending in which the prices for different forms of access such as interconnection, unbundling, leased lines and access to cable ducts are to be calculated.

These procedures are especially significant owing to various innovations in the calculation of prices.

A) Fibre as a Modern Equivalent Asset (MEA)

On the basis of a ruling by the FAC (A-549/2014 of 18.1.2016), on the one hand fibre technology applies from the beginning of 2013 as the reference technology for the calculation of cost-based prices (for more details see the 2016 Annual Report).

When defining regulated access prices, to date conventional transmission technology and copper technology have been applied as the established technology (MEA), in order to derive the costs of a new efficient telecom network using a model. Today a company which is constructing a new telecoms network would, however, use fibre technology. Therefore there was a switch in 2013 to fibre as a reference technology.

B) First application of new ordinance provisions

On the other hand, new provisions in ordinances are being applied for the first time in the current procedures (cf. Federal Council media release of 14 March 2014):

- **Unbundling of the copper local loop:** Since a modern network would be built using optical fibre and since it would be much more efficient than the old copper network, the value difference between old and new technology must be determined for the calculation of the regulated price of the unbundled copper local loop. The Federal Council laid down how to proceed in this context in Art. 58 TSO.
- **Cable ducts:** In the future, the price calculation for use of cable ducts will no longer be based on model costs, but on the actual costs for the long-term maintenance and development of cable ducts (Art. 54a TSO). ComCom will use the actual expenditure of the telecommunications service provider concerned for the price calculation.
- **Glide path for the transition to fibre technology:** In the case of a change in the MEA, the TSO provides for a price adjustment spread over three years for interconnection and leased lines.

The various innovations have led to numerous and very detailed comments by the parties involved. The preparation of the procedures has taken a very long time, since OFCOM had to thoroughly clarify and assess the many detailed requests from the two parties.

In December 2018 OFCOM submitted two partial decisions to ComCom. The decisions were adopted by ComCom in February 2019 (cf. media release of 12 February 2019).

1.2. Interconnection Peering

In 2013 the Init7 (Switzerland) company applied to ComCom to oblige Swisscom to grant it peering free of charge and this was also to be decreed as a precautionary measure.

The background to the procedure is the dissolution of the peering agreement between the two parties to the procedure and the change demanded by Swisscom from free to charged-for peering.

In June 2013 ComCom had decreed a precautionary measure which re-established the old contractual relationship between the parties: for the duration of the access procedure, Init7 can use the existing data connections free of charge. Swisscom's appeal against ComCom's decision was rejected by the Federal Administrative Court (FAC) on 13 November 2013 (A-3939/2013; available at www.bvger.ch in French, German and Italian).

After the initial exchange of correspondence in 2014, OFCOM conducted a market survey on the question of market dominance and the Competition Commission (COMCO) was consulted. Since COMCO initiated a preliminary investigation on this matter in the spring of 2015 (cf. COMCO 2015 Annual Report), the procedure which was pending with ComCom was suspended until May 2017.

In the final preliminary clarification report dated 12 December 2016, the COMCO Secretariat found that the transit agreement between the respondent and Deutsche Telekom could have been likely, in its original form, to have substantial adverse effects on effective competition. As a result, however, it was established that the parties had cooperated within the framework of the preliminary investigation and had voluntarily amended their agreements on the initiative of the COMCO Secretariat, so intervention by COMCO was no longer necessary (cf. RPW 2017-1, p. 73).

After the conclusion of the investigations by the COMCO Secretariat, OFCOM resumed the procedure.

In July 2017 Init7 submitted an application for extension of the precautionary measure. For a precautionary measure to be issued, various conditions must be met cumulatively (successful prognosis in the principal matter, urgency, a disadvantage which cannot be easily rectified, proportionality). On the basis of the COMCO report and the preliminary clarification by its Secretariat, in terms of a successful prognosis in the principal matter, the disputed question of market dominance was key. In its report of 18 December 2014 COMCO had stated that in principle alternative routes into the respondent's network existed which the respondent could control with IP interconnection.

Against the background of the findings by OFCOM and COMCO, the prognosis in the principal matter was negative and so ComCom therefore also lifted the precautionary measure issued in June 2013.

ComCom finally reached the conclusion that Swisscom was at no time dominant in the market for IP peering. The agreement which emerged during the procedure between DTAG and Swisscom could indeed have occasionally affected competition. Swisscom was, however, always sufficiently subject to disciplinary forces, so it could not act independently in the market for IP interconnection.

In July 2018 ComCom finally rejected the request from Init7. This decision by ComCom was appealed before the FAC.

1.3. “Virtual Unbundled Local Access” (VULA) access procedure

A new application for regulated access to "virtual unbundled local access" “(VULA) was submitted in February 2018.

VULA is an alternative to physical unbundling and resembles a bitstream offering. With VULA, a continuous broadband data connection can also be provided from the local exchange to the customer via a hybrid line (consisting of optical fibre and copper cable).

As a reason for this request, the applicant stated that competitive offerings could often not be provided with physical unbundling of the local loop because of unilateral conditions by Swisscom (restricted use of frequencies on copper cable, no free choice of technology). In particular, if the network operator itself uses vectoring with VDSL or G.fast, then only ADSL (which is slow) could be used on the unbundled loop and providers were forced to order a commercial BBCS with higher bandwidth from Swisscom. As a result of the use of vectoring by the network operator, unbundling also allegedly becomes greatly restricted and the investment which has been made becomes worthless.

Because of the absence of a legal basis, it was not possible for ComCom to introduce the requested virtual unbundling. ComCom therefore had to reject the request in June 2018, even though the introduction of VULA would have stimulated competition (cf. ComCom media release of 22 June 2018).

2. Licences

In accordance with the Telecommunications Act (TCA), ComCom grants radio licences and awards the universal service licence.

ComCom has permanently delegated to OFCOM the granting of those radio licences which are not the subject of a public tender procedure (e.g. licences for amateur radio operators or for private companies' radio) and which are wholly or primarily intended for the broadcasting of access-authorised radio and television programme services (Art. 1 ComCom Ordinance; CC 784.101.112). Information concerning radio licences which are awarded by OFCOM can be found on the www.bakom.admin.ch website.

The following overview deals only with those licences awarded by ComCom itself.

2.1. Universal service licence

The universal service includes a basic range of telecom services which must be offered throughout the country to all sections of the population in good quality and at an affordable price. These services are intended to enable participation by the population throughout Switzerland in social and economic life. The universal service also includes services which extend the possibilities of communication for persons with disabilities.

The scope of the universal service is defined in the Telecommunications Act (Art. 16 TCA). The Federal Council periodically adapts the universal service to social and economic needs and to the state of technology.

It is ComCom's task to award the universal service licence and to ensure compliance with it, together with OFCOM. The universal service licence awarded in May 2017 to Swisscom entered into force on 1 January 2018 and runs until 31 December 2022.

Which services form part of the universal service?

Regarding the award of the new universal service licence, which entered into force at the beginning of 2018, the Federal Council had one year previously already adjusted the scope of the universal service in the Telecommunications Services Ordinance (Art. 15 and 16 TSO). Once again, price ceilings were also set for individual services (Art. 22 TSO).

Since 1 January the 2018 the following services have been included in the universal service:

- a multi-functional broadband connection, which is based on the Internet Protocol (IP), replaces both the existing analogue connection and the ISDN connection. Until the end of 2021 Swisscom must provide, free of charge, an interface for analogue and ISDN equipment at the network termination point, so that sufficient time remains for changes to terminal equipment.
- In relation to internet access in the universal service, the Federal Council raised the minimum data rate to 3000 kbit/s on the downlink and 300 kbit/s on the uplink.
- Each household can now request a second directory listing entry free of charge.
- In addition, the services for the disabled have been extended:
  - For the hearing impaired, a round-the-clock transcription service, which also covers emergency calls, is provided as well as an SMS service. At certain times there is now also a sign-language service via videotelephony.
  - For the visually impaired and persons with reduced mobility there is a round-the-clock directory enquiries and operator service which ensures access to the directory data of customers of all providers, using the 1145 number

Some services for which there are affordable alternatives thanks to technological developments or which in the view of the Federal Council are no longer essential for the population's ability to communicate have ceased to be included in the universal service since 2018 (e.g. a fax connection, telephone kiosks in every municipality, bars on outgoing calls). Naturally, providers will be able to continue to offer these services under market conditions.

In order to ensure the universal service, the Federal Council has laid down quality criteria for the services forming part of the universal service (Art. 21 TSO). The universal service licensee has to report annually to OFCOM on how these criteria are met. These quality criteria were also fully met by Swisscom in 2018.

2.2. Mobile radio licences

There are currently three mobile radio licences in Switzerland with differing frequency spectrums. These licences are configured to be technology-neutral, so the licensees can decide for themselves which of their frequencies they wish to use with which mobile radio technology (GSM, UMTS, LTE, etc.).

Existing mobile radio licences

In February 2012, all mobile radio frequencies available at that time in Switzerland were awarded anew. All mobile radio frequencies in the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz bands at that time were sold at auction for approximately CHF 1 billion. In June 2012, the new licences, with a term extending to 2028, were awarded.

All three mobile radio operators - Salt, Sunrise and Swisscom - acquired a much larger frequency utilization within the framework of this auction which made the speedy introduction of 4G technology possible for them.

Thanks to the massive investment by all three mobile radio operators, it was possible to provide very good 4G coverage within a few years (for at least 98% of the population). This means that Switzerland has three high-capacity mobile radio networks which are among the best in Europe, as shown by various independent tests.

In order to be able to satisfy customers' demand for high quality, the Swiss mobile operators are often early adopters of new technologies compared with other countries. This trend is also confirmed by the introduction of LTE Advanced (or 4G+) and now once again by 5G.

The obsolescent GSM model

GSM technology (2G) has been in use in Switzerland since the liberalisation of the telecommunications market in 1998. At present, practically 100% of the population and approximately 90% of the territory are still covered by GSM and EDGE. GSM is used for voice telephony, SMS and minimal data communication.

Sunrise originally wanted to switch off the outdated GSM technology at the end of 2018; however, it reversed this decision. This might have been linked not only to customers' old mobile telephones but also to various industry applications.

To date, Salt and Swisscom have expressed an intention to let GSM be discontinued by the end of 2020. Discontinuing an old technology not only reduces costs, but also frees up frequencies which can be used with a modern, more efficient technology (such as 5G).

2.3. Tender procedure for new mobile radio licences 2018

In November 2017 the Federal Council had released various frequency bands for use with mobile radio (see table below). After several consultations of interested parties and the mobile radio operators, at the beginning of July 2018 ComCom launched the invitation to tender for the award of these mobile radio frequencies (further information on the early history of the award procedure can be found in ComCom's 2017 annual report and at www.bakom.admin.ch).

Consultations ahead of the tender procedure

The consultation conducted in summer 2017 showed that there was great interest in the new frequencies. The mobile operators and other participants pointed out that the strict limit values in the Ordinance on Non-Ionising Radiation (ONIR) could obstruct the introduction of the new 5G technology at existing sites. Environmental protection bodies were for their part of the opinion that the award of new mobile radio frequencies should not result in an increase in the exposure to non-ionising radiation.

In spring 2018 the interested companies were able to comment on a specific ComCom proposal concerning the award procedure (including the auction rules and a specimen licence). Several companies submitted numerous requests, some with completely different orientations. ComCom examined all proposals in detail. Before ComCom decided definitely on the tender procedure and the procedural rules, further consultations also took place with the network operators and various network equipment suppliers.

Frequencies put out to tender in 2018

Frequency band	Frequencies to be awarded	Number of blocks	Uses, term of licence
700 MHz	**Frequency division duplex FDD:** - A: 703–733 MHz / 758–788 MHz ⇨ 60 MHz **Supplemental downlink only:** - B: 738-753-MHz 15 MHz	6 blocks at 2x5 MHz 3 blocks at 5 MHz	Previously: digital terrestrial television (DVB-T) In future: 4G, 5G Term of use: 15 years from award of licence
1400 MHz	**Supplemental downlink only:** - C1: 1427–1452 MHz ⇨ 25 MHz - C2: 1452–1492 MHz ⇨ 40 MHz - C3 1492-1517 MHz ⇨ 25 MHz Total: 90 MHz	5 blocks at 5 MHz 8 blocks at 5 MHz 5 blocks at 5 MHz Total: 18 blocks at 5 MHz	Previously: digital broadcasting (DAB) In future: 4G, 5G Term: 15 years
2600 MHz	**Frequency division duplex FDD:** - D: 2565–2570 / 2685–2690 MHz ⇨ 10 MHz FDD	1 block at 2x5 MHz	Previously: 4G In future: 4G, 5G Term: until the end of 2028
3500-3800 MHz	**Time division duplex TDD:** - E: 3500–3800 MHz ⇨ 300 MHz	15 blocks at 20 MHz	Previously: broad-band wireless access (BWA), wireless cameras (PMSE), satellite services In future: 5G, satellite services Term: 15 years

Tender procedure launched in July 2018

On 6 July 2018 ComCom launched the tender procedure for the award of all newly available mobile radio frequencies by auction (cf. table above).

For the frequency award, ComCom chose a comparatively simple, two-stage auction format (a so-called “clock auction”). This auction format makes it possible for bidders to bid simultaneously for multiple blocks in all the frequency bands to be awarded.

The minimum prices for the frequency blocks were specified according to the statutory provisions in such a way that appropriate revenue from the auction was guaranteed. However, maximised auction revenue was not an objective of the award.

By means of bidding restrictions (“spectrum caps”), ComCom ensured that a bidder could not buy up the majority of the frequencies. All network operators therefore had a fair chance of acquiring broad spectrum which was appropriate for their needs. New entrants in the market could also take part in the award procedure under the same conditions.

All interested parties had the possibility of submitting questions concerning the procedure up to 27 July 2018. The answers were published online by OFCOM in anonymised form on 5 September 2018.

Four companies – Dense Air, Salt, Sunrise and Swisscom – submitted a candidature by 5 October 2018. This also included a mandatory application for a desired amount of spectrum and a bank guarantee. All the candidates fulfilled the conditions for participation and were then authorised to participate in the procedure. Since demand for frequency blocks exceeded supply, ComCom decided to hold the auction in January 2019.

In January 2019 each candidate was individually trained in using the auction software and a test auction was then held.

The auction lasted from 29 January to 7 February 2019. The 29 bidding rounds were managed via an electronic auction system provided by the English company DotEcon Ltd. A similar system had already been used successfully for a frequency award by ComCom in 2012 as well as in numerous other countries. The system is specially secured and enables a reliable bidding procedure via the internet.

All four candidates took part in the auction. The existing mobile radio operators were each able to acquire broad additional spectrum; the fourth candidate Dense Air came away empty-handed (cf. table below). The total revenue from the auction amounted to almost CHF 380 million which will pass into the Federal treasury.

Five 5 MHz frequency blocks in the 700 MHz, 1400 MHz and 2600 MHz bands remained unsold. These non-assigned frequencies remain with the Confederation and will be put out to tender at a later date.

Result of the mobile radio auction in January/February 2019

Frequency band	Dense Air Ltd.	Salt	Sunrise	Swisscom
700 MHz FDD	0	20 MHz	10 MHz	30 MHz
700 MHz SDL	0	0	10 MHz	0
1400 MHz SDL	0	10 MHz	15 MHz	50 MHz
2600 MHz TDD	0	0	0	0
3500 - 3800 GHz TDD	0	80 MHz	100 MHz	120 MHz
Adjudication price in CHF	**0**	**94,500,625**	**89,238,101**	**195,554,002**

Key:

FDD: Frequency division duplex => Two radio channels are needed for a connection

TDD: Time division duplex => Only one radio channel is needed for a connection

SDL: Supplemental downlink => Three radio channels are used for a connection

Information on non-ionising radiation

It will be possible to use the frequencies mentioned above in future in Switzerland for mobile radio, but for all these frequencies many years of experience concerning non-ionising radiation has been acquired throughout the world:

For example, the 700 MHz frequencies have been used for some time on the mobile radio networks in the USA, the Asia-Pacific region and for digital terrestrial television (DVB-T) throughout the world. The new 1400 MHz and 2600 MHz spectrum is located within the range of the frequencies currently used in the mobile radio networks. The frequencies in the 3500 - 3800 MHz range are used worldwide for broadband wireless access (BWA and WiMAX) and also with wireless cameras and at sports events. In addition, the 2400 MHz and 5000 MHz frequency ranges, which are used everywhere in countless private WLANs, are located above or below 3500 GHz and are thus comparable in terms of the radiation effect.

Efficient frequency allocation thanks to the auction

The auction achieved not only the objective of generating appropriate revenue in accordance with Art. 23 of the Ordinance on Frequency Management and Radiocommunication Licences (OFMRL), but also an efficient allocation of frequencies.

Thanks to the early award of spectrum and a term of use for the frequencies of 15 years the licensees now enjoy long-term planning security and can continue to invest in new technologies such as LTE-A and 5G.

Fifth-generation mobile radio (5G)

The network operators need the additional frequencies which have now been awarded for the introduction of 5G. The frequency award was therefore of key importance for the digitalisation of Switzerland and took place in conformity with the Federal Council's "Digital Switzerland" strategy. In addition to efficient mobile communication, 5G will in future make many new applications possible, such as the Internet of Things (IoT), medical applications (eHealth), image-processing applications (virtual reality, augmented reality) and autonomous vehicles. Switzerland is one of the first countries in Europe which has already awarded the 5G frequencies to network operators.

2.4. New DAB frequency block for French-speaking Switzerland

In October 2017, the Federal Council decided that from 2020 DAB+ (Digital Audio Broadcasting) will replace the analogue FM system as the main broadcasting technology for radio programme services. In co-operation with OFCOM, the radio industry itself is drawing up the timetable for the orderly transition from FM to DAB+. This should be completed by 2024 at the latest. The radio industry intends to announce the time for the definite switch-off of FM stations in 2019.

On 20 December 2017 the Federal Department of the Environment, Transport, Energy and Communications (DETEC) released an additional frequency block for DAB+ coverage in German-speaking, French-speaking and Italian-speaking Switzerland.

OFCOM had conducted a survey of interested parties beforehand. In French-speaking Switzerland several companies had expressed interest in additional DAB+ coverage. DETEC therefore decided to award the new frequency block for French-speaking Switzerland within the framework of a public tender procedure. In this case ComCom is responsible for the award of

the radiocommunication licence. In German-speaking Switzerland and in Ticino, respectively, there was only one interested party, so it was possible to make an award without a tender procedure.

Against this background, in December 2017 DETEC instructed ComCom to conduct an award of frequencies. ComCom prepared and launched the tender procedure for a DAB+ licence in French-speaking Switzerland in the spring of 2018.

This licence is being awarded on the basis on a competition based on specific criteria. The tender documents explained in detail the criteria on which applications would be judged. The most important selection criteria are the strengthening of media diversity, the extent of coverage of DAB+ in French-speaking Switzerland and the economic feasibility of the project (cf. tender documents on the ComCom website).

The interested companies had until the end of July 2018 to apply for the DAB+ licence for French-speaking Switzerland. The evaluation by OFCOM and ComCom of the wide-ranging submissions was still in progress at the end of 2018. ComCom will conclude the procedure in 2019.

3. Number portability

Since the year 2000 it has been possible to transfer one's telephone number when changing operator.

In 2018, according to the Teldas company, which operates the central porting database in Switzerland, many fewer numbers were ported than in the previous year (-9%).

In the fixed network in particular, the number of ported numbers fell greatly in 2018 (-43%). However, in the mobile radio networks, the number of ported numbers increased considerably (+10%).

Teldas also stated that number porting once again mainly concerned the mobile sector; it had increased greatly in the fixed network from 2004 onwards and in particular in 2009 in the context of unbundling.

In 2018 a little over 408,000 numbers were ported in the mobile sector. This corresponds to approximately 4% of all mobile radio connections. Number porting concerns both the contract segment (+9%) and the prepaid segment (+17%).

In the fixed network, number porting takes place only in the case of a switch between operators of their own connections (for example, a switch to a cable network operator, a VoIP provider or another provider in the course of unbundling). In 2018 approximately 124,000 numbers were ported to another operator – about half as many as in the previous year (-43%) – which corresponds to approximately 7% of fixed-network connections.

Since 2002, fixed network providers have been able to offer "geographic number portability" throughout Switzerland: When moving house, customers can therefore take their telephone number with them, even to a different area code zone, if their provider offers this.

V. Finances

Regulators from various infrastructure sectors are administratively attached to the Federal Department of the Environment, Transport, Energy and Communications (DETEC). Together with the Federal Electricity Commission (ElCom), the Postal Commission (PostCom), the Railways Arbitration Commission (RACO) and the Independent Complaints Authority for Radio and Television (ICA), ComCom in 2012 became part of the "Infrastructure Regulation Authorities" (RegInfra) administrative unit. DETEC's General Secretariat provides services to the RegInfra administrative unit in various administrative areas; in particular, ComCom is also supported in terms of budgeting and accounting. ComCom's independence in exercising its activities is therefore not impaired.

Very close practical cooperation exists with OFCOM, which prepares most of ComCom's business and produces briefs for legal proceedings. In any general picture of the revenue and expenditure of the telecoms regulator, OFCOM's costs and revenues must also be included.

In 2018, within the framework of activities for ComCom, OFCOM incurred total costs of CHF 3.75 million. A large proportion of these costs are attributable to the intensive preparation of the invitation to tender and the auction of new mobile radio frequencies. Other important activities of OFCOM for ComCom in 2018 also included briefings for access procedures, drawing up the basis for regulation, and supervision of the universal service licence.

On the revenue side, in 2018 OFCOM collected administration fees amounting to CHF 208,190 and radiocommunication licence fees amounting to CHF 79,244. In the case of ongoing legal proceedings and for the mobile radio tender procedure, the administration fees can be billed only when the matters are completed in law.

In 2018 the costs of the Commission and its administrative Secretariat amounted to CHF 1.018 million. Consequently, the 2018 outgoings are some CHF 200,000 lower than was envisaged in the preliminary estimate (more detailed information on RegInfra is published in the estimates and state accounts of the Confederation; cf.www.efv.admin.ch).

Abbreviations

5G = Fifth generation mobile radio
ADSL = Asymmetric Digital Subscriber Line
BBCS = Broadband Connectivity Service (commercial wholesale offers of Swisscom)
BEREC = Body of European Regulators for Electronic Communications
CATV = Cable television
COMCO = Competition Commission
ComCom = Federal Communications Commission
DETEC = Federal Department of the Environment, Transport, Energy and Communications
DOCSIS = Data Over Cable Service Interface Specification (technology for high bandwidths on co-ax cable)
DSL = Digital Subscriber Line
EDGE = Enhanced Data rates for GSM Evolution (GSM technology)
ESC = Energy supply companies
FAC = Federal Administrative Court
FDD = Frequency Division Duplex (two radio channels are needed for one connection)
FTTB = Fibre to the Building
FTTC = Fibre to the Cabinet
FTTH = Fibre to the Home
FTTS = Fibre to the Street
G.fast = Gigabit fast access to subscriber terminals (technology for bandwidths up to 500 Mbit/s on copper cable)
GPRS = General Packet Radio Services (GSM technology)
GSM = Global System for Mobile Communications (standard for second-generation mobile radio networks)
HDTV = High-definition television
HFC = Hybrid Fibre Coaxial
HSDPA = High Speed Downlink Packet Access (UMTS technology)
IC = Interconnection
ICT = Information and communication technologies
IP = Internet Protocol
IPTV = Internet Protocol Television
ISDN = Integrated Services Digital Network
ISP = Internet Service Provider
LRIC = Long Run Incremental Costs (model for calculation of interconnection prices)
LTE = Long Term Evolution (standard for fourth-generation mobile radio networks/3.9G standard)
LTE-A = LTE-Advanced (standard for fourth-generation mobile radio networks)
MEA = Modern Equivalent Asset
NFC = Near Field Communication
NGA = Next Generation Access Network
OFCOM = Federal Office of Communications
PSTN = Public Switched Telephone Network (traditional telephone network)
SMS = Short Message System

SVOD = Subscription Video on Demand
TCA = Telecommunications Act (CC 784.10)
TDD = Time Division Duplex (bidirectional communication on only one radio channel)
TSO = Telecommunications Services Ordinance (CC 784.101.1)
TSP = Telecommunication Services provider
UMTS = Universal Mobile Telecommunications System
VDSL = Very-high-bit-rate DSL
VoD = Video on Demand
VoIP = Voice over IP
VoLTE = Voice over LTE
Wi-Fi = Wireless Fidelity (wireless local networks)
WLAN = Wireless Local Area Network

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