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2017 Activity Report

of the Federal Communications Commission (ComCom)

Federal Communications Commission (ComCom)

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Editorial

The brave new world of 5G

Autonomous vehicles, factories without workers, kitchens which order the ingredients for dinner automatically, machines which can teach themselves the required skills without human assistance, waste bins which report to the control centre when they need to be emptied, diagnostic devices which constantly transmit patients' medical data to their doctors – the imagination knows no limits when it comes to possible applications of the new information technologies. Modern fixed and mobile data communication technologies play a key role in this development. Faster and more robust communications networks will ensure that the required data reaches its destination without delay and that linked devices can communicate with each other.

In this context, the fifth generation of mobile radio, 5G, is at the forefront. It presupposes that network operators have additional mobile radio frequencies at their disposal. ComCom is charged with awarding these frequencies and plans to conduct the corresponding auction before the end of 2018. In an international comparison, this means that Switzerland will be one of the leading countries in which 5G networks can be rolled out. For ComCom, this award is not about maximising revenue from the sale, but instead focuses on being able to provide network operators with sound foundations which will enable them to offer top-quality 5G digital services at affordable prices and as rapidly as possible.

The euphoria around 5G was recently dampened because the Council of States, for the second time, refused to increase the limits for non-ionising radiation from mobile radio antennas and to bring them more in line with those of neighbouring countries. This could have a substantial effect on the architecture of the network and drive up the costs of network development. Since it will not be possible to fit powerful transmitters to existing antennas, many additional antennas will have to be constructed in order to be able to realise the potential of 5G technology. The complex and lengthy approval procedures will also complicate the situation. Innovative technical solutions and more closely targeted measurement methods will help to make more efficient use of the limits on radiation and power. However, this does not mean that the laws of physics can be ignored.

Also, the development of mobile communications networks always presupposes the development of the data-line networks. 5G technology in particular, in which the signals are transmitted over a shorter distance, is dependent on high-capacity optical fibre links to the antenna sites. In this area too it can be stated that Switzerland is playing a leading role internationally.

In relation to the roll-out of fibre to households, however, ComCom notes that development has not been on the scale that had been envisaged by market participants around the legendary Round Table in 2009. Switzerland is below the average in terms of the take-up and use of optical fibre technology by private households. Whereas earlier there was talk of a national FTTH (Fibre To The Home) roll-out, with multiple optical fibres being laid simultaneously and made available to competitors in order to avoid the parallel construction of new networks; today, over the last mile, copper lines are increasingly being equipped with alternative technologies to provide households with higher bandwidths. However, it remains an open question whether this solution can meet consumers' needs in the long term and whether it actually excludes competitors from access to households.

The multi-fibre solution proposed by the Round Table would eliminate these concerns. In any event, to prevent the emergence of new monopolies over the last mile, ComCom supports the "technology-neutral regulation" proposed in the revision of the new Telecommunications Act (TCA). ComCom's regulatory authority is currently limited to the so-called "twisted metallic pair", i.e. to conventional copper lines. Optical fibre cables have to date been excluded from regulation. This solution is no longer appropriate. Technology-neutral regulatory competency should, moreover, be laid down directly in the legislation and not dealt with by way of ordinances.

The ongoing revision of the TCA confronts legislators with another fascinating point of discussion: the issue of regulation of network neutrality. Should the internet be made available equally to all users and therefore be "neutral", or should individual providers be able to buy preferential transmission of their products and services? In the event of bottlenecks in data traffic, the latter would lead to a slowing-down or blocking of alternative offerings. On this point, the draft legislation envisages a transparency obligation imposed on network operators. Will certain offerings actually be favoured or disadvantaged by means of "throttling" or "blocking"? A mere transparency obligation, as is currently proposed, is in ComCom's view inadequate; instead the principle of network neutrality should be laid down in the Act. In addition, it should at least be possible for consumers to switch their provider immediately in the event of violation of the principle.

We are at the beginning of 2018, which will be an exciting year for telecommunications in Switzerland. With the award of the frequencies envisaged for 5G, the discussion around the revision of the TCA, in particular the issues of technology neutrality and network neutrality, as well as current and expected access procedures, ComCom will seek to continue to contribute to ensuring that both residents and businesses in Switzerland can benefit from technical excellence in the area of telecommunications.

Stephan Netzle, President

March 2018

I. Overview of the telecommunications market

This first chapter presents data giving a brief overview of the evolution of the telecommunications market in Switzerland. For more details on the latest trends in the fixed and mobile markets in Switzerland, please consult the ComCom website, under the "Telecommunication" tab, heading "Facts and figures"[1].

1. Development of mobile networks

In a mature mobile communications market, the number of mobile customers in Switzerland remained stable in 2017, at 11,419,000 units.

At the end of 2017, Swisscom had 6,637,000 mobile customers in Switzerland, up very slightly by 0.4% in one year, with in particular the acquisition of 90,000 customers with a contract (postpaid), and the loss of 65,000 prepaid customers. Sunrise, for its part, which had 2,876,000 mobile customers at the end of the year, registered a reduction of about 1.4%, despite a considerable increase in postpaid customers (+109,000 units), which did not offset the loss of customers for prepaid offerings (-149,000 units). Salt, for its part, registered growth in its customer numbers, both in the contract segment (+1.7%) accounting for 1,223,000 customers, and in the prepaid card segment, which grew to 683,000 units (+2%), giving a total of 1,906,000 customers. At the end of 2017, Swisscom held approximately 58% of market share, with Sunrise at 25% and Salt at 17%.

It should be noted that cable operators had 150,000 mobile customers in the same period, including more than three quarters (115,000 customers) with UPC, and might in the long term constitute a serious competitor in this market. At the present time, the market share of the CATV operators is just above 1%.

With approximately 11.4 million subscriptions for a total population of 8.48 million inhabitants, the penetration rate of mobile telephony in Switzerland was almost 135% at the end of 2017. This rate is slightly higher than the average for the countries of Europe, which was approximately 130% for the same period.

Growth in mobile data traffic

The widespread use of smartphones has led to major changes in the behaviour of users, who are tending more and more to exchange data, in particular videos, generating strong growth in data traffic on the mobile networks.

The growth in mobile data traffic in Switzerland was consequently substantial in 2017, as with preceding years. On Swisscom's mobile network, for example, the volume of data transmitted increased by 55% compared to 2016.

At the global level, the volume of data exchanged on mobile networks increased by 65% in one year, between September 2016 and September 2017, mainly because of the increase in the number of data contracts and the increase in the volumes of data included in these contracts. According to Ericsson, video consumption already represented 55% of the volume of mobile data in 2017 and could reach almost 75% in 2023, growing almost 50% every year world-wide between 2017 and 2023.

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[1] The list of sources at the end of the report includes all the sources used

Investment

Telecommunications service providers are therefore investing considerable sums in their network infrastructures, in particular to be able to cope with the substantial growth in data traffic on the mobile network.

In 2013 Swisscom announced that it wanted to invest CHF 1.5 billion in the expansion of its mobile telephone network by 2017. Having already invested CHF 210 million in 2015 and CHF 231 million in 2016, its investments in mobile telephony infrastructure amounted to CHF 269 million in 2017, up 16%. For its part, Sunrise increased the level of its investments in 2017, after already investing more than CHF 1 billion in the roll-out of its own network infrastructures between 2012 and 2015. In 2017, Sunrise invested more than CHF 200 million in improvements to its fixed and mobile network infrastructure. Finally, Salt invested CHF 382 million in its mobile network infrastructure in 2017. This operator therefore also increased the level of its new investment with a view in particular to improving the coverage and speeds of its network.

Coverage of the networks

In Switzerland, mobile communications coverage is almost total. The GSM (2G) networks serve almost 100% of the population and cover about 90% of the territory. It is therefore possible to make calls from almost anywhere, even in the remotest areas.

As for UMTS/HSPA (3G) services, which enable mobile internet access, these cover up to 99% of the Swiss population, depending on the operator in question.

At the end of 2017, the coverage of the LTE/4G networks was 98% of the population for Salt and exceeded 99% for Swisscom and Sunrise.

Elsewhere in the world, the roll-out continues at a rapid pace. According to GSA (the Global Mobile Suppliers Association), there were 2.54 billion LTE/4G contracts world-wide in the autumn of 2017, i.e. almost 840 million more than a year before. This number is expected to increase significantly over the next few years to approach the 5 billion mark by 2022, corresponding to more than 50% of all mobile contracts.

Price of mobile communications

After several consecutive years of reductions, the prices of mobile communications rose slightly in 2017, for the majority of user types. Based on the three main service providers in Switzerland, the prices of the cheapest products increased by 6.1% for a medium user and 2.9% for a high user, whilst they remained stable for a low user.

According to OFCOM's Statistical Observatory, only low users with prepaid cards benefited from a price drop during 2017. In the contract market, prices increased by 1.8% for a low user, 11.2% for medium users and 4.6% for high users. In the prepaid card market, prices fell by 5.8% for a low user, whilst they increased by 1.1% for a medium user and 5.6% for a high user.

Compared with the other OECD countries, the prices of mobile communications in Switzerland are still among the most expensive.

2. Development of fixed networks

In addition to the three mobile communications networks, Switzerland has several "backbone" networks and high-quality access networks. Swisscom's access network (2,047,000 fixed telephone connections at the end of 2017) covers the whole of the territory. The cable television networks are also well established and offer subscriber connections, although with the exception

of UPC most of these networks offer broadband and telephony services on a fairly localised basis. Approximately 82% of households in Switzerland have a connection to a CATV network.

The distribution of fixed network market shares has changed little in recent years. Swisscom's market share, close to 60% at the end of 2016, remains high. The historic operator is far ahead of its two main competitors, UPC and Sunrise, which have market shares of 13.1% and 10.3% respectively. The numerous other providers have marginal shares of the market.

Because of the continuous development of mobile telephony, further boosted by the advent of the smartphone in 2007, the fall in the number of telephone connections on fixed networks in Switzerland continues. In fact, there has been a continuous reduction between 2006 and 2016 of some 38% in the number of subscribers to traditional fixed telephony.

The total number of calls made on the fixed network fell by a factor of 2.5 between 2006 and 2016 (1.8 billion compared to almost 5.5 billion calls), and the total duration of calls made from the fixed network fell by 50% over the same period (9 billion compared to 17 billion minutes).

At the same time there has been considerable growth in voice telephony using VoIP on the fixed network. For more than 10 years, telephony services using VoIP technology have been offered by alternative telecommunications service providers and the cable operators. According to OFCOM, the number of customers accessing telephony services on the fixed networks via a VoIP access has almost quadrupled over the last ten years, totalling 1,062,607 connections at the end of 2016.

But fixed networks are not set to disappear, quite the contrary.

The progressive migration to IP telephony, as well as the growth of the cable operators in this sector and the increase in the number of fibre connections, highlight the importance which the fixed network still has in Switzerland and make a case for complementarity between the fixed and mobile networks.

Migration from analogue telephony to IP

In spring 2014 Swisscom announced that by the end of 2017 it wants to switch off analogue telephony, which is over a hundred years old, as well as ISDN telephony, which dates from the 1980's, and convert all connections to digital IP telephony (telephony via Internet Protocol). 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 transmitted over IP-based networks. With IP telephony, power is not provided to devices via the subscriber line and this therefore offers various advantages, such as lower costs and better speech quality.

At the end of 2016 Swisscom had migrated two thirds of connections. One year later, 90% of Swisscom's telephone customers already benefited from the new technology. Now, in 2018, the first regions are to be gradually switched over completely to IP.

In some cases users have to check whether their equipment is IP-compatible, for example in the case of home automation applications, some alarm systems or emergency telephones in lifts. For these types of equipment, however, IP-based products are already available on the market. Products which ensure operation even in the event of a power failure are also now available. As is already the case, users can also use call diversion to a mobile telephone.

Swisscom connections used with fixed-network telephony fell by 320,000 in 2017 whereas the CATV companies gained 55,000 telephone customers (of which UPC gained 26,000) and Sunrise 24,000 in the fixed network. In this context, Swisscom stated in its 2017 business report that more and more customers would go without their fixed-network telephone connection. A proportion of consumers have evidently also opted for a broadband connection or for IP-based products from Swisscom's competitors.

Price of fixed communications

After falling appreciably in 2016, fixed telephony prices in Switzerland increased very slightly in 2017. According to OFCOM's Statistical Observatory, the index for the cheapest products increased by 1.3% for low users, 1.8% for medium users and 1.1% for high users in 2017.

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, fixed telephony prices in Switzerland are still higher than the average for the OECD countries. According to the Teligen price baskets published by Strategy Analytics, for an average basket including 140 calls (national and international calls), a medium user in Switzerland pays the equivalent of 35 euros per month (compared to 24.50 euros for the average for the OECD countries).

3. Broadband 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 rate

With almost 46% of the population having broadband access as of the end of June 2017, Switzerland is consolidating its position at the top of the ranking of OECD countries and is still well ahead of Denmark (42.9%) and the Netherlands (42.2%). Over the same period, the average for the OECD countries was 30.6% and the figure for the EU countries was 33.7% (July 2017).

However, in terms of fibre connections to the home (FTTH) Switzerland is not a leading country in the world; though approximately 30% of Swiss households could access an FTTH connection, according to an IDATE study for the year 2017, however, only approximately 8% of households use such connections.

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. According Akamai Technologies, in 2017 some 95% of Swiss internet users had an internet connection faster than 4 Mbit/s; the worldwide average was 82%. Switzerland is fifth in this world ranking, with average speeds of the order of 21.7 Mbit/s, up 16% on the same period in 2016, whilst the average speed world-wide is 7.2 Mbit/s. Furthermore, 75% of broadband connections in Switzerland are at least equivalent to 10 Mbit/s (+10% over one year). Fifty-six percent of Swiss surfers even have a broadband connection of at least 15 Mbit/s (up 26%), whilst 26% of Swiss surfers already enjoy speeds of 25 Mbit/s, up 45% in one year.

Prices

According to OFCOM's Statistical Observatory, this increase in speeds was accompanied by a reduction in prices in 2017 for two user profiles. The costs incurred by a medium user for broadband services fell by 21.8% between 2016 and 2017; the figure for a high user was 11.8%.

The increase in prices for low users (+15.2%) is due to the marketing of new products with appreciably higher speeds. OFCOM also notes that all the operators currently offer products with downlink speeds of at least 100 Mbit/s; some even offer speeds as high as 1 Gbit/s.

Structure of the market

DSL/FTTx telecommunications service providers are still way in front of cable TV providers for internet access: at the end of 2017, just over 69% of surfers had opted for an offering from a telecoms operator (2,806,000 connections) and almost 31% for an offering from a cable operator (1,245,500 connections).

Considering high-speed internet service providers (CATV, DSL and FTTx) as a whole, Swisscom is still far ahead of its main competitors, with a market share of 49.7% at the end of 2017.

The share of all the alternative telecommunications providers was 19.5% at the end of 2017, 10.4% of which was accounted for by Sunrise. As far as the cable operators are concerned, UPC's market share was 18.5% and that of the other CATV providers was 12.2%.

By way of comparison, the average market share of the historic operators in the European Union is constantly falling and was approximately 40% in 2017.

Unbundling

Unbundling of the local loop makes it possible for alternative operators to provide their own telecommunications services to their customers by leasing the copper line from Swisscom and operating it to the end customer.

When it was introduced, unbundling considerably stimulated competition on the DSL access market, which enjoyed exceptional growth in Switzerland during the initial years.

In fact, unbundling has registered a continuous reduction overall for several years. The number of unbundled lines, which totalled approximately 300,000 units at the end of 2012, had fallen to only 107,000 at the end of 2017. Fully unbundled lines (Full Access) now represents less than 3% of all broadband lines in Switzerland.

This is explained on the one hand by the products from the cable network operators and the increasing use of fibre connections which are further strengthening competition at the level of infrastructures. Furthermore, consumers' growing interest in bundled offerings, combining telephony, internet access and digital TV, is a negative factor for unbundling technology, which is not appropriate for bundled offers.

Digital TV in Switzerland

The cable operators are continuing to lose customers in their core segment, with a loss of more than 62,000 TV customers in 2017 – down 2.5%. The market share of all the cable operators, at almost 2.4 million customers for digital television, dropped below 60% for the first time. UPC, which lost almost 52,000 customers for its digital TV product, down by almost 4%, saw its market share fall to 29.6% at the end of 2017.

Over the same period, the number of digital television subscribers on the fixed telephony network continued to increase during 2017, and the DSL providers are now seriously competing with the cable operators in this market segment. Considering the providers individually, Swisscom consolidated its top position, which it won from UPC in 2015. Swisscom in fact gained 49,000 customers in 2017 and hence reported growth of almost 3.5% between 2016 and 2017. The historical operator has 1,467,000 subscribers to its digital TV offering and has seen its

market share grow to 36.2%. Sunrise, the last to enter this market (in 2012), gained 51,000 customers over the same period, i.e. a growth rate of over 31%, and has seen its market share increase to 5.3%.

Development of ultra-broadband networks

The above figures for broadband connections include Swisscom's FTTH/B users as well as those benefiting from Swisscom's hybrid fibre/copper technologies (FTTC and FTTS). In autumn 2017, Swisscom had almost 290,000 fibre customers, according to Analysys Mason. Sunrise also has fibre customers, but no details are available. According to Analysys Mason, at the same time there were approximately another 250,000 fibre users; these are customers of the other alternative providers which use the historic operator's network or the infrastructure of the local utility providers.

Fibre customer connections therefore represented 13.6% of all high-speed lines in Switzerland in the autumn of 2017, a slightly higher figure than the penetration rate for fibre connections in the European Union countries (13%).

As already indicated, 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 ultra-broadband development (100 Mbit/s and over), Switzerland is not yet a world leader, but considerable sums continue to be invested in development of the network.

The drivers of these investments are the rapidly growing 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 investing in optical fibre, it is also mostly about making their locations more attractive.

The technological development path is clear: on both the telecoms networks and on the CATV networks, optical fibre, which has for some time been used on the backbone networks, is being brought ever closer to end customers. Either the conventional copper or co-axial cable is being replaced entirely by optical fibre (FTTH) or the fibres are brought as far as the cabinet in the locality (FTTC), to the manhole in the street (FTTS) or into 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 more than 20 cities and regions. The co-operating partners jointly constructed a local FTTH network and then each has at least one fibre to every household. In cooperation with local utility providers, Swisscom has provided approximately 1.33 million homes and businesses with FTTH.

In other locations, individual political municipalities are going it alone in terms of FTTH investment. However, fibre expansion is taking place not only in the large conurbations but also in many rural areas (for example in the Upper Valais or in the Lower Engadine).

Swisscom too is currently investing independently in modernisation of the fixed network in many locations. For some years, however it has generally 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 renewal of this final section as far as the customer. This was made possible following development of complementary technologies such as "vectoring" and "G.fast" some years ago; they enable high bandwidths of 100 to 500 Mbit/s even 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 (cf. "Unbundling" and the "Virtual Unbundling Local Access" access method). For this reason ComCom is also in favour of technology-neutral regulation.

By the end of 2017 Swisscom had provided some 3.1 million connections with this technology mix, corresponding to a substantial increase of 24%. Swisscom's investment in fibre development amounted to CHF 469 million in 2017. Swisscom also stated that it intends to provide approximately 90% of all households and businesses with at least 80 Mbit/s and approximately 75% of connections with 200 Mbit/s or more by the end of 2021.

Broadband provision in Switzerland has developed satisfactorily thanks to the infrastructure competition between Swisscom and the CATV operators, also because the latter have made major investments in fibre expansion and in DOCSIS 3.0 over co-axial cables. Approximately 82% of Swiss households have a cable network connection and for 95% of them an ultra-broadband product is available. Since 2016 Quickline has begun to invest in DOCSIS 3.1 which makes even faster data communication possible (up to 1 Gbit/s).

In the case of the CATV companies, a gradual market consolidation can be observed: in 2017, UPC again acquired several local CATV networks, as in previous years.

Since 2013 there has also been an additional player in the market, Swiss Fibre Net (SFN). SFN is a joint venture consisting of various utility providers which have constructed local fibre networks. SFN offers those service providers who do not have their own fibre network uniform FTTH products for resale throughout Switzerland on a common platform. In 2017, several new network partners joined up, as in previous years. The network association now comprises 16 partner companies which together cover almost 900,000 households with FTTH in all parts of the country.

In addition, various providers without their own access network connection are offering their services via the fibre networks of the utility providers (among others: Init7, 1tv, iWay.ch, GGA Maur, Sunrise and VTX).

On 20 March 2018 Salt announced with a fanfare that it would be entering the fixed-network arena. Via SFN's fibre connections, Salt is launching a low-price triple-play product with data transfer rates of up to 10 Gbit/s.

II. Prospects for 2018

Nothing will change in 2018 as far as ComCom's basic mission as a licensing and regulatory authority is concerned: in the interests of the economy and the population, 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 2018, ComCom will be focussing on the following activities:

1. **The 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.

2. **Mobile radio frequencies:** The next World Radio Conference (WRC) will take place in 2019 and the question of which other frequencies will be reserved in future for mobile communication at the global and European level will again be discussed. OFCOM will represent the interests of Switzerland at WRC 2019. ComCom will continue to closely monitor this development and the introduction of 5G.

3. **Access procedures:** The various pending access procedures will continue to be processed in 2018 by OFCOM as the instructing authority and the first decisions on the basis of the new calculation principles will be made by ComCom. An issue for ComCom is the speeding up of access procedures within the framework of the statutory possibilities.

4. **Revision of the Telecommunications Act (TCA):** The Federal Council published its dispatch on a partial revision of the TCA in autumn 2017 and forwarded it to Parliament for decision. Parliament has specified that the TCA revision will first be dealt with in the National Council. The Commission for Transport and Telecommunications (CTT-N) held a consultation in November 2017 and in February 2018 decided on the timetable for the bill. The CTT-N wants to start detailed discussion in July 2018. ComCom will closely monitor the discussions in Parliament.
   ComCom welcomes updating of the Telecommunications Act, given that the Act was last revised a decade ago, when there were no smartphones or apps and when mobile broadband communication and social media (such as Facebook, Twitter, etc.) were still in their infancy. In the interest of consumers, ComCom is eager to ensure that technology-neutral regulation of network access is possible in the event of a failure of the market. This is the only way to guarantee that competition is effective throughout Switzerland and that consumers can choose from multiple providers (TSPs). The revision of the legislation also includes proposals to prevent discrimination by internet service providers: this goal is to be achieved by obliging TSPs to provide information. It will then be up to consumers to draw their own conclusions and change their TSP. This proposal does not go far enough for ComCom. In its opinion, the goal of network neutrality should be explicitly stated in law. The problem of high roaming costs will also be addressed in the bill. In view of the "roam like at home" principle introduced in the EU, there is an acute need for action on this point.

5. **International affairs:** Together with OFCOM, ComCom monitors regulatory practice in the other European states as well as the proposals of the European Commission for a review of its legal framework for telecoms. To this end it participates as an observer at meetings of BEREC and maintains regular contact with the telecoms regulatory

authorities in Europe (among other things within the framework of the Independent European Regulators' Group IRG).

III. Commission and Secretariat

1. Commission

ComCom is an independent extraparliamentary commission with decision-making powers, in charge of awarding licences and of regulation of the telecommunications market.

In accordance with the TCA, its main tasks are:

- the award of radiocommunication licences for the use of the frequency spectrum (Art. 24a TCA),

- the award of universal service licences (Art. 14 TCA),

- laying down access conditions and prices when providers cannot reach an agreement (Art. 11 and 11a TCA),

- approval of the national numbering plans (Art. 28 TCA),

- regulation of the methods of application of number portability and carrier selection (Art. 28 TCA),

- decisions on the necessary measures and sanctions in the event of violations of the applicable legislation within the framework of a licence granted by ComCom (Art. 58 TCA).

The Commission consists of seven members, all independent specialists, appointed by the Federal Council.

In 2017, the Commission consisted of the following members:

- **Stephan Netzle,** President, Doctor of Law, LL.M., lawyer.

- **Monica Duca Widmer,** Deputy President, Dr. dipl. chem. Ing. ETH, Ticino entrepreneur

- **Andreas Bühlmann**, Doctor of Political Science, Head of the Finance Office of the Canton of Solothurn

- **Adrienne Corboud Fumagalli**, Dr. rer. pol., President of the Board of Directors and CEO of Deeption SA,

- **Reiner Eichenberger**, Doctor of Economics, Professor of Economics at the University of Fribourg

- **Jean-Pierre Hubaux**, Electrical engineer, Professor at the Swiss Federal Institute of Technology, Lausanne (EPFL)

- **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.

At the end of the legal term of their mandate, the Deputy President, Monica Duca Widmer, and Reiner Eichenberger, left the Commission at the end of 2017. ComCom thanks them very sincerely for their great commitment and their invaluable contributions to the work of the Commission.

At its meeting on 1 December 2017, the Federal Council appointed two new members: Flavia Verzasconi, Lawyer and Notary, current President of the Administrative Court of the Canton of Ticino, and Christian Martin, ETS Electrical Engineer and Director General of Cisco Switzerland, to complete the Commission from January 2018 onwards.

The Federal Council also appointed Adrienne Corboud Fumagalli, a member of the Commission since 2012, as Deputy President of the Commission.

In 2017, the Commission sat almost once a month and its members took part in an internal seminar and in conferences. The members also devote much time to preparation of the meetings and to circulating comments.

2. Secretariat

The Commission is assisted by a Secretariat which is responsible for coordinating Commission business, fulfilling communication tasks and public relations. The Secretariat also coordinates the activities of the Commission with OFCOM, which prepares case files and generally implements ComCom decisions.

This Secretariat consists of a secretary general (90%), a scientific collaborator and website administrator (80%) and an administrative assistant (70%).

For any information, please contact the **colleagues in the Secretariat:**

- Peter Bär, secretary of the Commission,

- Pierre Zinck, scientific collaborator and webmaster

- Jacqueline Fischer Pulfer, administrative assistant

It should also be noted that the ComCom Secretariat moved at the beginning of 2018 into a building which it shares with other regulatory authorities, namely the Federal Electricity Commission (ElCom), the Independent Complaints Authority for Radio and Television (ICA) and the Railways Arbitration Commission (RACO). From now on, the ComCom Secretariat offices are located at Christoffelgasse 5 in Bern.

IV. Activities of the Commission

The following sections give an overview of ComCom's activities in 2017.

1. Access procedures

Introduction

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, Swisscom, the former monopolist in certain areas) must provide the other providers with various forms of access to the existing infrastructure or services. If a market-dominant situation exists, this access to certain equipment and services must be enabled in a non-discriminatory and transparent manner and at cost-based prices.

The areas in which a market-dominant provider must grant access to the infrastructure are definitively enumerated in the Act – in contrast, for instance, with the technology-neutral access regime in the EU. Specifically, the TCA 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 with the market-dominant provider on the conditions of access to the infrastructure. Only if these negotiations do not result in an agreement can an application be made to ComCom for a definition of access conditions and prices. This procedure is known as *ex-post* regulation.

In all other respects, access in the access network is currently 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 2017 a total of three access procedures were pending. Two procedures concerned remuneration for interconnection and other forms of access in accordance with Art. 11 TCA; the third procedure concerned free peering.

At the end of 2017 a further procedure was still pending with the Federal Administrative Court (FAC) in the form of an appeal. The appeal is directed against ComCom's decision of 8 December 2015 concerning transit services in the framework of interconnection.

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

Fibre as a Modern Equivalent Asset (MEA)

In the calculation of regulated interconnection and access prices, customary switching technology and copper technology have until now been used as an established technology (MEA – Modern Equivalent Asset). However, when a company is constructing a new telecoms network today, it would use fibre technology. In ComCom's opinion, therefore, a change in this reference technology was appropriate.

Originally, ComCom had planned the introduction of fibre as an MEA from 2013 onwards. In summer 2012, however, it had come to the conclusion that an MEA change by 1.1.2013 was too ambitious (for further details cf. the 2016 Annual Report) and ComCom decided to defer the switch to fibre technology to 2014. In the context of an appeal against the ComCom decision on 2012 and 2013 access prices, Sunrise had also contested this deferment and the Federal Administrative Court agreed with Sunrise on this point.

Thus not only do access prices from 2014 onward have to be calculated on the basis of fibre technology (MEA), but also those for the year 2013. On the basis of the Court's decision, ComCom took up the procedure again and agreed with the procedure concerning prices for 2014 and subsequent years.

Access prices from 2013

At the end of 2017 two access procedures were pending in which the prices for different forms of access (interconnection, unbundling, leased lines, access to cable ducts) are to be calculated for the years from 2013 onwards.

Particular significance is attached to these procedures, because for the first time new regulations, which the Federal Council had laid down in 2014 in the TSO, concerning the price calculation method (cf. Federal Council media release dated 14.03.2014), are being applied; this is also a central reason for the prolonged timescale of the procedures.

As explained above, fibre technology now applies as the network technology which would be used today to construct a new telecoms network (MEA).

The current procedures will be subject to application of the following new provisions:

-   **Unbundling of the copper subscriber line:** Since a fibre network is 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 line. The Federal Council laid down the procedure in this context in Art. 58 TSO.

-   **Cable ducts:** In the future, price calculations for the 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 interconnection and leased lines, the TSO envisages a graduated transition to the fibre network as an MEA over three years.

In 2017 OFCOM pressed on with the preparation of the procedures; one procedure at least proved to be very time-consuming owing to the complexity of the subject matter and the details of the inputs (some unsolicited). The procedure is very important for all concerned, because ComCom will use it to establish a new practice for the coming years. After the consultation of the price surveillance authority, an decision is expected in 2018.

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 former contractual relationship between the parties: for the duration of the access procedure, Init7 can use the existing data connections free of charge. Collateral security as demanded by Swisscom was rejected by ComCom. Swisscom's appeal against this decision by ComCom was rejected by the Federal Administrative Court on 13 November 2013; (A- 3939/2013; available at www.bvger.ch in French, German and Italian).

After the exchange of correspondence in 2014 regarding clarification of the question of market dominance, a market survey was carried out by OFCOM and the Competition Commission (COMCO) was consulted. Since COMCO initiated a preliminary clarification 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 in its original form might well have had a substantial adverse effect on effective competition. As a result, however, it was stated that the parties had voluntarily cooperated in the context of the preliminary clarification and that they had already modified their agreements during the pre-clarification phase, so intervention by COMCO was rendered unnecessary (see. 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 critical. In its report of 18 December 2014 COMCO 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 to the effect that the market for IP interconnection with the respondent was in principle a competitive market, the prognosis in the principal matter was negative and ComCom therefore also lifted the precautionary measure issued in June 2013. This decision has the force of law.

1.3. New access application: "Virtual Unbundled Local Access" (VULA)

A new application for regulated access to "virtually 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 a competitive offering could often not be provided with physical unbundling of the local loop because of unilateral conditions (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 too slow) could be used on the unbundled loop and the alternative provider would be forced to order a BBCS with higher bandwidth from Swisscom. As a result of the use of vectoring by the network operator, unbundling allegedly becomes greatly restricted and the investment which has been made becomes worthless.

Also in this procedure, OFCOM proceeded to the exchange of correspondence

2. Licences

In accordance with the Telecommunications Act (TCA), ComCom grants radiocommunication 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 on radio licences which are awarded by OFCOM can be found on the www.bakom.ch website.

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

2.1. Universal service licence

The universal service comprises 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.

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 fully met by Swisscom in 2017 – as in previous years.

New configuration of the universal service

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

Since 1 January 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 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 will in future no longer form part of the universal service (e.g. a fax connection, telephone boxes in every municipality, bars on outgoing calls). Providers are still free to continue to offer these services under market conditions.

Telephone boxes no longer part of the universal service

At the end of 2016, there were still 2844 public telephones ('Publifon') in Switzerland which were part of the universal service. Outside of the universal service, Swisscom has to date operated a substantial number of additional public telephones in commercially attractive locations (e.g. at rail stations or airports).

Because of the mobile boom, however, between 2004 and 2016 the use of public telephones fell by 95% overall, according to Swisscom. Most public telephones were therefore used only very rarely.

During 2017, ComCom – on the basis of a request from Swisscom and waivers by the municipalities – gave for the last time its consent to telephone boxes being abolished in 25 municipalities. At the end of 2017 there were 2818 public telephones in the universal service.

Since public telephone boxes no longer form part of the universal service (see above), there is no obligation to provide them from January 2018. Consequently from 2018 it will be up to Swisscom to decide which sites it will continue to operate.

The disappearance of telephone boxes is an international trend: in Switzerland's neighbouring countries too, many public telephones are being removed and in France most of them were removed last year, as Orange is no longer obliged to maintain them.

2017 universal service licence has been awarded

The universal service which had been in force since 2008 had a term of 10 years. Therefore ComCom began work on a new award of the licence in 2016 and conducted a survey among providers in the Swiss market who were in principle competent to provide the universal service. It became apparent that only Swisscom had an interest in providing the universal service for telecommunication services.

ComCom therefore decided to forego a time-consuming tender procedure and to appoint Swisscom to provide the universal service. Swisscom agreed to do so.

In May 2017 ComCom therefore awarded the new universal service licence to Swisscom (Schweiz) AG. The licence entered into force on 1.1.2018 and runs until 31.12.2022. The universal service, with affordable telecommunication services available to all households in Switzerland, will therefore continue to be provided by Swisscom for the next five years.

The telecommunications legislation in principle provides for the creation of a fund which can be used to meet any uncovered costs of the universal service (Art. 19 TCA and Art. 13 – 14 plus Art. 24 – 26 TSO).

However, since in the last 20 years Swisscom has refrained from claiming uncovered costs related to the universal service, this fund has not been created to date.

However, if the universal service were to be further extended on the basis of policy decisions, the universal service licensee could demand remuneration for the uncovered costs. It would then have to open its books and provide evidence of the actual costs.

In this context, it is worth mentioning a new development: with the decision of the Council of States on 5 March 2018, Parliament adopted a motion from national councillor Martin Candinas, demanding an increase in the internet speed in the universal service to 10 Mbit/s.

2.2. Mobile radio licences

There are currently a total of 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.).

Technology-neutral mobile radio licences

In February 2012, all mobile radio frequencies available at that time in Switzerland were awarded anew. The frequencies in the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz bands were auctioned for a total of approximately CHF 1 billion. In June 2012, the new licences, with a term extending to 2028, were awarded. This gave mobile operators long-term planning and investment security.

All three mobile operators – Salt, Sunrise and Swisscom – acquired a much larger, future-proof frequency entitlement in this auction.

Since the auction in 2012, all three mobile radio operators have invested massively in LTE technology (Long Term Evolution). LTE is also termed the fourth generation (4G) of mobile radio technology which enables mobile data communication at up to 150 Mbit/s. LTE handles the strong growth in data traffic and also enables voice telephony with VoLTE.

The mobile radio networks of Salt, Sunrise and Swisscom all provide very high LTE coverage of 98 percent or more of the population. This means that Switzerland has three very high-performance mobile radio networks which are among the best in Europe, as demonstrated 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. Currently LTE Advanced (or 4G+) has already been introduced on all Swiss networks; this in turn permits substantially higher speeds (in some cases in excess of 300 Mbit/s).

GSM technology (2G) has been in use in Switzerland since the liberalisation of the telecommunications market in 1998. Currently 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.

The three GSM licences awarded at the beginning of the liberalisation process in 1998 expired at the end of 2013 and GSM is also gradually becoming the "discontinued model": Sunrise, for example, announced that it wanted to remove the outdated 2G technology from the network as early as the end of 2018. Salt and Swisscom want to follow in 2020. The frequencies currently used by GSM can subsequently be used by other technologies.

The UMTS licences auctioned in 2000 have also expired (at the end of 2016). UMTS technology (3G), however, continues to be used throughout Switzerland for voice telephony and data communication (HSPA+). According to information provided by the operators, population coverage for UMTS is approximately 99%.

2.3. Award of new mobile radio frequencies

Within the framework of the preparation for the award of frequencies, OFCOM carried out a public consultation in June and July 2017 on behalf of ComCom. This showed that there is great interest in the new frequencies.

Results of the public consultation

Among other things, the comments stressed the importance of a sufficiently rapid award of frequencies. In this way it would be possible to ensure that in relation to 5G, Switzerland does not fall behind the European level. The mobile radio providers and other participants were concerned about the restrictions imposed by the Ordinance on Non-Ionising Radiation (ONIR). These would make the introduction of 5G more difficult at existing sites in densely populated areas. 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. Finally, organisations active in the safety and rescue sector demanded that requirements relating to reliability and availability be laid down so that the mobile radio infrastructure could be used for deployments of all kinds.

The 57 comments come from mobile radio operators, industry federations and interest groups, environmental protection bodies, network constructors, federal authorities, emergency and

rescue services, and other interested parties. The comments and a summary of the results were published on the OFCOM website (www.bakom.ch).

National Frequency Allocation Plan and the Ordinance on Fees amended by the Federal Council

On 8 November 2017 the Federal Council took two decisions which opened up the way to the award of new mobile radio frequencies by ComCom: in the National Frequency Allocation Plan (NFAP) for the year 2018 it released more frequencies for use in mobile radio networks. In the Ordinance on Fees, it reduced the licensing fees for mobile radio frequencies in the range above 3 GHz to a level which is customary internationally.

Only with this decision did it become clear which frequencies ComCom can put out to tender in 2018: these are extensive and attractive frequencies in the 700 MHz, 1400 MHz and 3500 to 3800 MHz bands (cf. table below); in addition there is a block with 2600 MHz frequencies for which no buyer was found in the last award procedure in 2012. It will be possible to use all these frequencies country-wide from 2019 onwards.

Table of the mobile radio frequencies to be awarded

Frequency band	Frequency spectrum	Availability
700 MHz	2 x 30 MHz FDD 1 x 15 MHz SDL, i.e. usable only for downstream and complementary with other frequencies	from 2019
1400 MHz	1 x 90 MHz SDL, i.e. usable only for downstream and complementary with other frequencies	from 2019
3500–3600 MHz and 3600–3800 MHz	1 x 300 MHz TDD	from 2019
2600 MHz remaining frequencies	2 x 5 MHz FDD	already available

Note on non-ionising radiation: Although the frequencies mentioned above will be newly used in the mobile networks in Switzerland, these frequencies have already been used for mobile communication, therefore many years of experience concerning non-ionising radiation has been acquired throughout the world. For example, the 700 MHz frequencies are used on the mobile radio networks in the USA and are used worldwide for digital terrestrial television (DVB-T). 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 3.5-3.8 GHz range are used worldwide for wireless broadband connections (BWA and WiMAX) and also with wireless cameras and at sporting events. In addition, the 2.4 GHz and 5 GHz frequency ranges, which are used everywhere in countless private WLANs, are located above or below 3.5 GHz and are thus comparable in terms of the radiation effect. In addition, the 3.5-3.8 GHz frequencies, because of their low range, can only be used in small mobile radio cells with low transmitting powers.

In the first half of 2018 ComCom plans to put the newly available frequencies out to tender and to award them by auction. ComCom began to draw up the terms and conditions for the award as early as 2017. In March 2018 interested mobile radio operators had an opportunity to express their views on the draft tender documents. After the tender procedure is opened, the companies must apply to participate in the auction. Once bidders have been admitted, they will then receive bidder training and take part in a trial auction. Auctioning of the frequencies is planned for the second half of 2018.

The frequencies to be allocated could be used on the one hand to eliminate capacity bottlenecks in today's 4G mobile radio networks. On the other hand, these are also important frequencies for the 5G mobile radio technology of the future.

5G promises some extensive innovations: very high data transfer rates (up to 10 Gbit/s), low latencies (1 ms) and high reliability, low energy consumption, very many simultaneous data connections and extensive networking among devices.

5G does not only allow much more data traffic be handled, it also opens up many new possibilities: examples include time-critical applications (such as autonomous vehicles or remote control of robots), the Internet of Things (IoT) and many new applications e.g. in the areas of healthcare, smart cities and the smart home.

Meanwhile all Swiss mobile radio operators have begun to carry out the first 5G trials together with partner companies. The first 5G networks are expected to be constructed from 2019 onwards and to be commercially viable from 2020. The time at which the first terminal devices will be available in fairly large quantities, and in use, is still unclear.

The timely introduction of 5G is of great importance for digitisation and innovation in Switzerland. In order to ensure that the frequencies can be used optimally, it was proposed in a motion of the Council of States' Transport and Telecommunications Committee (TTC-S) to moderately relax the very strict limit values for non-ionising mobile radio radiation (NIR). This adjustment of the NIR limit values was rejected by the Council of States on 5 March 2018.

2.4. Sale of passive infrastructure by Sunrise

In May 2017 Sunrise announced that it would be selling its subsidiary Swiss Towers AG, which owns 2,239 Sunrise antenna masts, to a consortium for CHF 500 million. The consortium consists of Cellnex Telecom S.A., Swiss Life Asset Managers AG and Deutsche Telekom Capital Partners. According to Sunrise, this sale was intended to reduce debts and speed up investments.

This transaction concerned only passive network infrastructure, i.e. predominantly steel and concrete structures. The active infrastructure of the mobile radio network, however, remained with Sunrise – and for this reason ComCom did not classify the sale as one requiring approval.

In return, Sunrise has entered into a long-term agreement with the consortium to ensure that Sunrise can continue to use the antenna masts. Moreover, according to Sunrise a programme for the construction of large new antennas and small cells has been agreed.

2.5. New DAB frequency block for French-speaking Switzerland

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

In 2016 OFCOM carried out a consultation on additional further frequencies for DAB+ in Switzerland. In French-speaking Switzerland several companies expressed interest in an additional DAB+ coverage. DETEC therefore decided to award the new frequency block for French-speaking Switzerland within the framework of a public tender procedure. ComCom is the authority responsible for awarding the radiocommunication licence. In German-speaking and Italian-speaking Switzerland, there was only one interested party (SwissMediaCast AG), so the frequencies there were allocated directly by OFCOM.

In December 2017 DETEC therefore entrusted ComCom with the implementation of the corresponding procedure. ComCom will manage the putting out to tender of a frequency block for DAB+ in French-speaking Switzerland in the spring of 2018. The legislation provides for an award on the basis of a competition based on criteria; according to DETEC, decisive additional criteria will include for example strengthening media diversity, the size of the coverage area and reception quality.

3. Carrier selection

Free choice of provider is an important instrument introduced at the time of market liberalisation in order to ensure competition. Consumers must be able to choose their provider freely, without any constraints.

In relation to mobile telephony, consumers have a choice between three network operators and various providers which have entered into commercial partnerships with operators. In addition, changing one's mobile operator became simpler since the operators relaxed certain contract cancellation conditions and scrapped the automatic renewal of contracts.

On the fixed network, in addition to Swisscom's traditional telephone connection, several telephony service providers and some cable operators offer a high-speed internet connection as well as telephony services. Finally, in some areas the roll-out of fibre by the local utility providers offers, via this third network infrastructure, an additional choice to consumers.

In order to make it as easy as possible to switch providers on the fixed network, manual selection of the provider for each call (carrier selection call-by-call) and automatic preselection (carrier pre-selection) were introduced in 1999.

Although carrier preselection initially made a significant contribution to stimulating competition, reaching 1.37 million connections in 2002, amounting to one third of all connections, this number has fallen continuously since then. The number of preselections consequently fell very greatly in 2017, by about 77% (72,891 units), amounting to only 21,162 units at the end of the year. At that time, preselection applied to only 4% of connections. The net decline in the number of connections with carrier preselection is mainly due to the migration from analogue telephony to IP telephony by Swisscom and the fact that customers are increasingly opting for cable networks or bundled products which include VoIP telephony.

4. Number portability

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

According to the Teldas company, which operates the central database on portability in Switzerland, the total number of ported numbers in 2017 was fairly similar to the previous year (+3%).

Teldas also stated that number portability now relates mainly to the mobile sector, after the number of ported numbers experienced strong growth on the fixed network since 2004, and in particular in 2009 in the context of unbundling.

Thus almost 370,000 numbers were ported on the mobile network during 2017 (+0.3%) corresponding to approximately 3% of all mobile users. The portability of mobile numbers relates above all to the contract segment, which, moreover, registered a slight increase (+5% compared to 2016).

On the fixed network, a number is ported only when the customer switches the connection operator, choosing the cable network, a VoIP service provider or another operator within the context of unbundling. Some 215,000 numbers were ported to another operator in 2017, up 10% over one year, which represents approximately 8% of fixed subscriber connections.

Since 2002, fixed telephony operators have been able to offer geographical portability of numbers throughout Switzerland: if customers move house, they can therefore also take their telephone number with them to other dialling code areas, as long as their service provider offers this option.

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 Services Commission (PostCom), the Railways Arbitration Commission (RACO) and the Independent Complaints Authority for Radio and Television (ICA), in 2012 ComCom 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 substantive cooperation exists with OFCOM, which prepares most of ComCom's business and produces briefs for legal proceedings. In any general overview of the revenue and expenditure of the telecoms regulator, OFCOM's costs and revenues must also be included. OFCOM's most important activities for ComCom in 2017 were, for instance, briefings for the access procedures, the development of regulatory foundations, preparation of the award of mobile radio frequencies and the universal service licence. OFCOM's costs within the framework of these activities for ComCom amounted to CHF 3.11 million in 2017 (some CHF 60,000 less than in the previous year). OFCOM received CHF 327,470 in administrative fees. The Confederation received approximately CHF 75,585 in radio licence fees in 2017.

The expenditure of the Commission and its administrative Secretariat was just under of CHF 1.064 million in 2017. Consequently, outgoings in 2017 were some CHF 200,000 or 15 percent lower than 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

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

Sources

- Akamai, The State of Internet, First Quarter 2017 (https://www.akamai.com/us/en/about/our-thinking/state-of-the-internet-report/global-state-of-the-internet-connectivity-reports.jsp)

- Analysys Mason, Telecoms Market Matrix: Western Europe 3Q 2017, January 2018

- Ericsson Mobility Report, November 2017 (https://www.ericsson.com/en/mobility-report)

- European Commission, Digital Scoreboard 2017, Broadband indicators July 2017 (https://ec.europa.eu/digital-single-market/en/news/broadband-data-files-digital-scoreboard-2017)

- Gartner Press Release : Gartner Says Worldwide Sales of Smartphones Recorded First Ever Decline During the Fourth Quarter of 2017 (https://www.gartner.com/newsroom/id/3859963)

- GSA (Global mobile Suppliers Association) – LTE Subscriptions to 3Q 2017 (https://gsacom.com/)

- GSMA The Mobile Economy. Europe 2017 (https://www.gsma.com/mobileeconomy/europe/)

- IDATE Digiworld for FTTH Council, Market Panorama, February 2018 (http://www.ftthcouncil.eu/documents/IDATE_European_FTTH_B_panorama%20_at_Sept_2017_VF.pdf)

- IDC Press Release : Smartphones Hit Pivotal Stage as Worldwide Shipment Volumes Decline 0.5% in 2017, But Return to Growth is Expected, According to IDC (https://www.idc.com/getdoc.jsp?containerId=prUS43591418)

- Liberty Global Reports Q4 and Full-Year 2017 Results (http://www.libertyglobal.com/pdf/press-release/Liberty-Global-Q4-2017-Press-Release.pdf)

- Federal Office of Communication, Statistical observatory (https://www.bakom.admin.ch/bakom/en/homepage/telecommunication/facts-and-figures/statistical-observatory.html)

- Federal Statistical Office, Permanent and non-permanent resident population by category of citizenship, sex and canton, at the end of the third quarter 2017 (only in French, German and Italian) (https://www.bfs.admin.ch/bfs/fr/home/statistiques/population.html)

- OECD Broadband Portal (http://www.oecd.org/internet/broadband/broadband-statistics/)

- Strategy Analytics (Teligen Price Benchmarking System, Copyright Strategy Analytics, UK)

- Suissedigital Press release, 7th february 2018 (in French and German) (https://www.suissedigital.ch/fr/suissedigital/medias/detail/suissedigital-les-reseaux-cables-gagnent-62-000-abonnes/)

- Sunrise Annual report 2017 (https://www.sunrise.ch/content/dam/sunrise/corporate/documents/ir-reports-presentations/2017/Sunrise_Annual_Report_2017.pdf)

- Swisscom Report on the progress of unbundling and interconnection 2017 (in German) (https://www.swisscom.ch/dam/swisscom/de/ws/documents/D_Entbuendelung/bericht_zum_fortschrittderentbuendelungundinterkonnektion12-2017.pdf)

- Swisscom Annual report 2017 (https://www.swisscom.ch/en/about/investors/financial-calendar/annual-results-2017.html)

- Teldas, Number Portability 2017 (https://www.teldas.ch/)

- UPC Press release, 15th february 2018: Annual results 2017. UPC posts growth in number of subscriptions (https://www.upc.ch/en/about-us/media-centre/media-releases/details.351_13819_wojvj0.html/)