Annual Report 2015

Swiss Federal Communications Commission (ComCom)

Swiss Federal Communications Commission (ComCom)
Marktgasse 9
CH - 3003 Berne

Phone: +41 (0)58 463 52 90
Fax: +41 (0)58 463 52 91
Websites: www.comcom.admin.ch
www.comcom-ch.mobi

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Foreword by the President

Forewords set out to prepare people for reading a document.

As a rule they are not great works of literature.

This foreword does not attempt to buck the trend; it is intended to briefly state what interested readers can expect when browsing this annual report: primarily, it provides a detailed overview of the Swiss telecoms market.

It indicates trends and developments in the market. For example, market shares in some cases again shifted towards Swisscom and data traffic is increasing significantly in comparison with voice telephony. Network operators' investment in infrastructure remains satisfyingly high. In 2015, for example, some CHF 2 billion were invested in developing the fixed-network and mobile infrastructures. This means that LTE (4G) coverage throughout Switzerland is now in excess of 94% for all three mobile operators, putting Switzerland globally in a top position. In the case of mobile telephony, soon the adaption of the next generation of technologies, 4.5G and 5G, are expected. This report also shows that postpaid subscription models are becoming more popular, to the detriment of prepaid cards. This is also an indication of how products in the mobile market – and customer behaviour – have changed. Here prices have fallen between 7% and 32% – with high users benefiting more from lower prices.

However, the report also shows that fibre is coming ever closer to the home, that copper is slowly disappearing, or the lengths used are only very short. The last miles are becoming the last metres. The TV cable networks are stimulating this development, as the report shows; they are invigorating infrastructure competition with DOCSIS technology, thereby ensuring the necessary incentives for investment.

An annual report must not account for everything, but it should explain what the Commission has done and how it has defined its priorities. The report also looks forward to activity in the current year – it is clear that everything is changing: interconnection tariffs must now be calculated on a fibre basis, a new Telecommunications Act is under discussion and this year the Commission will take the first steps towards a new frequency allocation and a new universal service tender.

Like ComCom’s tasks, this annual report is also diverse and varied.

I hope you will enjoy reading it.

Marc Furrer, President

March 2016

I. Overview of the telecommunications market

For many years, in the first part of the annual report ComCom has presented data providing an overview of the evolution of the telecommunications market in Switzerland.

In order to produce its aggregations of statistical data, ComCom relies primarily on the figures published by the main telecommunications service providers. In certain cases, it makes use of publications by the OECD, the EU, specialist organisations or research institutes (Gartner, IDC, Analysys Mason, etc.). Finally, it relies on the data provided by OFCOM, which also originates from data obtained from the telecommunications service providers in Switzerland or from OFCOM's analyses.

We note that, in accordance with the legislation, OFCOM is responsible for drawing up annual official telecommunications statistics. However, the collection and processing of the data received from telecommunications service providers does not allow an analysis to be provided in the same year.

The figures taken from the official statistics below are therefore estimates or provisional figures, which unless otherwise specified do not date from the current year. For further information, we advise you to refer to the OFCOM website.

1. Development of mobile networks

Salt's decision in spring 2015 to cease communicating information about its results prevents us from describing the evolution of the operator's customer base during the reporting year. Similarly, we can no longer provide a comparative analysis of the number of customers per operator or an outline of the distribution of market shares between operators at the end of 2015.

Publication of Salt’s 2015 annual results is expected in early April and it is not certain that the operator will make public any figures on its customer numbers. At the time of writing, we have no data for Salt for the end of 2015.

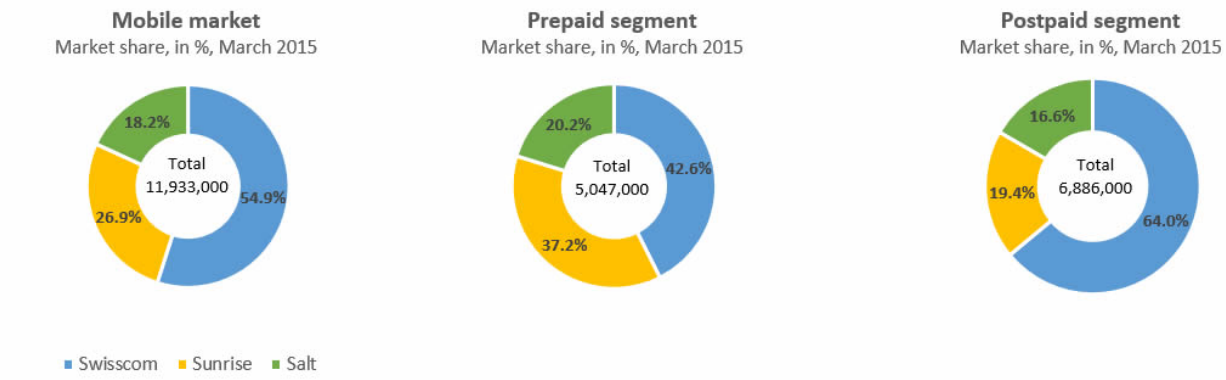
The latest data which we have concerning all providers for 2015 indicates the number of customers and the distribution of market shares at the end of the first quarter of 2015.

These figures are based on the so-called 12 month rule, which involves taking into account all prepaid customers whose SIM card was active and used to make at least one incoming or outgoing call on the network during the previous twelve months.

At the end of March 2015, Swisscom had 6,568,000 customers, Sunrise had 3,211,000 and Salt had 2,167,000.

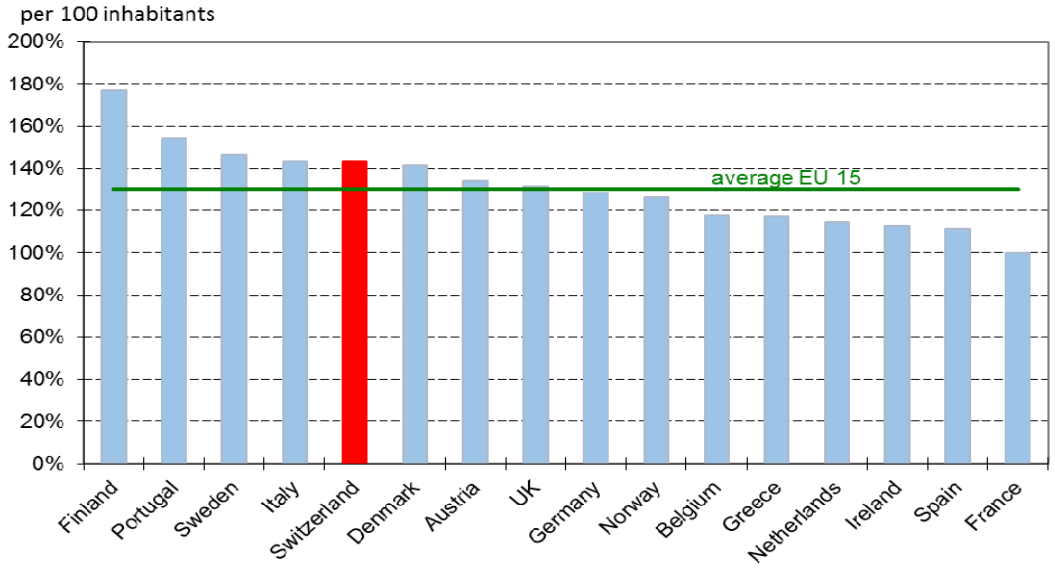
Swisscom therefore had a 54.9% market share, Sunrise 26.9% and Salt 18.2%, giving a total of 11,946,000 subscriptions (cf. fig. 1).

Fig.1 Market shares of mobile operators in Switzerland at the end of March 2015
Sources: operators



With almost 12 million subscriptions for a total population of 8.3 million inhabitants, the mobile telephony penetration rate in Switzerland is approximately 143%, (cf. fig. 2).

Fig. 2 Penetration of mobile telephony in Europe and Switzerland, September 2015
Sources: Analysys Mason, Telecom Market Matrix, January 2016, ComCom



In an increasingly mature mobile market, as in the previous year, there was a substantial migration to products with a contract (postpaid) to the detriment of prepaid products.

Over 2015 as a whole, Swisscom gained 85,000 new customers; its customer base increased from 6,540,000 at the end of 2014 to 6,625,000 at the end of 2015, or an increase of 1.3% over the period. The loss of 39,000 customers with a prepaid card was largely offset by the gain of 124,000 customers with a contract. In this market segment, Swisscom recorded growth of the order of 2.8%.

Sunrise on the other hand lost a total of approximately 169,000 mobile customers in 2015. Although the operator gained 80,000 postpaid customers, it has suffered a substantial loss of -249,000 prepaid customers over the same period. At the end of 2015, Sunrise had 3,063,000 mobile customers, down 5.2% over one year.

It should also be noted that upc cablecom, which entered the mobile market in spring 2014, enjoyed significant growth in 2015 and had 32,900 customers at the end of 2015. All the cable operators combined had almost 44,000 mobile customers at the end of 2015 and in the long term might also constitute a serious competitor in this market.

Figures are not published for the other MVNO providers and resellers.

The growth in mobile data traffic

For several years now, the global mobile telephony landscape has been characterised by the extremely rapid adoption of smartphones. Even though this trend seems to have slowed down somewhat in 2015, with an annual growth of approximately 10% (compared to +26% between 2013 and 2014), nonetheless 1.43 billion smartphones were sold worldwide in 2015, according to the International Data Corporation (IDC).

In its latest Mobility Report published in November 2015, Ericsson indicated that in the third quarter of 2015, there were 7.4 billion mobile subscribers worldwide, i.e. as many as the world's population. In the same period, there were already 3.4 billion active smartphones in the world, a proportion which is expected to double by 2021.

In Switzerland too, the proportion of smartphones continues to increase. More than three quarters of the Swiss population (78% according to Comparis), i.e. 4.9 million people, have a smartphone. For Swisscom, for example, the proportion of customers with a contract using a smartphone increased to 76% at the end of 2015, and the proportion of smartphones sold to this same category of customers reached 97% in the same period.

According to the JAMES study published by the Zurich University of Applied Sciences at the end of October 2014, the proportion of smartphones within the population of young people aged from 12 to 19 was already as high as 97% in 2014 (compared to 79% in 2012 and only 50% in 2010).

But the widespread use of these intelligent telephones also involves major changes in user behaviours – with increasing use of data exchanges, in particular videos. We are therefore witnessing enormous growth in data traffic on the mobile networks.

At a global level, again according to Ericsson, data consumption on the mobile networks continues to forge ahead. The volume of data exchanged worldwide could increase tenfold by 2021. The report reveals a significant increase in the consumption of videos on mobile devices, which could entail a sixfold increase in the volume of data on smartphones in Western Europe and North America by 2021. In 2015, video consumption already represented 50% of the volume of mobile data and could reach almost 70% in 2021, growing 55% a year worldwide between 2015 and 2021.

The growth in mobile data traffic in Switzerland was consequently substantial in 2015. In particular, it effectively doubled on the Swisscom mobile network (+97%).

In fact, the demand for mobile broadband services is also enjoying very strong growth in Switzerland. According to the OECD, the number of broadband contracts on mobile networks increased by 53% between June 2014 and June 2015 in Switzerland and reached 8.5 million units in mid-2015. The penetration rate of mobile broadband in Switzerland was 103% at that time (compared to 69.3% in June 2014); this was above the average for the OECD countries (85.4%).

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

In 2013 Swisscom announced that it intended to invest CHF 1.5 billion in the expansion of its mobile telephone network by 2017. Having already invested CHF 271 million in 2013 and CHF 235 million in 2014, its investments in mobile telephony infrastructure amounted to CHF 210 million in 2015. For its part, Sunrise also reduced the level of its investments in 2015, though after investing over CHF 1 billion in the roll-out of its own network infrastructures over the last three years. In 2015, Sunrise invested CHF 276 million, including CHF 174 million in improvement to its mobile network infrastructure. Under the five-year investment programme started in 2010, Salt (formerly Orange) invested over CHF 700 million in the modernisation and expansion of its mobile communications network. In 2014, Salt invested CHF 158 million in improvements to its LTE network.

Once again, the independent test published at the beginning of December 2015 by the German magazine Connect, which produces a comparative classification of mobile networks in Germany, Austria and Switzerland, confirmed the very good quality of all the mobile networks in Switzerland. Although Swisscom was top of this classification for the seventh consecutive year, the three Swiss mobile operators received a very good mark for the second time running. They were classified among the five best networks in all three countries - Swisscom on top, with Sunrise and Salt just behind the operators Drei and A1 Telekom Austria which are active in Austria. Primarily of note is the fact that the results obtained by the operators in Switzerland are improving - or at least stable for Salt, and also that the difference between them (in terms of quality of the networks) is negligible. Swiss customers therefore have a choice between several high-quality networks for both voice and data transfer.

According to this same study by the Connect magazine, Swiss users also benefit from the excellent quality of mobile communications in trains. The situation has greatly improved for telephony, whereas in relation to data transfer it remained stable compared to the year 2014. The study shows that 90% of users already benefit from connections of at least 3 Mbit/s, which enables them to telephone and surf the internet comfortably when travelling by train.

An improvement in mobile communications for travellers over the entire rail network is stated to be a priority for Swiss Railways SBB.

This is why SBB, in collaboration with mobile operators, working together in the InTrainCom consortium, has equipped all 1083 coaches and 51 combined units on its main line routes with repeaters for reception of mobile services in trains. The SBB and the mobile telephony operators also want to equip the approximately 1700 coaches on regional routes with signal amplifiers by the end of 2020. The mobile communications operators are still improving the service by installing new antennas along the tracks.

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

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

New dialling code 075

Given the increase in the number of mobile subscribers, which approached 12 million in Switzerland in 2015, it appeared essential to increase the number of available numbers. OFCOM therefore decided to make available the 075 dialling code for this type of service. These new numbers have been assigned since the end of October 2013 and can be requested by all mobile communication providers. Initially Swisscom used this new code for business customers

with data contracts. As announced at the time, Swisscom extended the allocation of the 075 code to some of its new prepaid customers in July 2015. The 075 code will also be offered to the operator's postpaid customers during 2016.

Extension of LTE networks

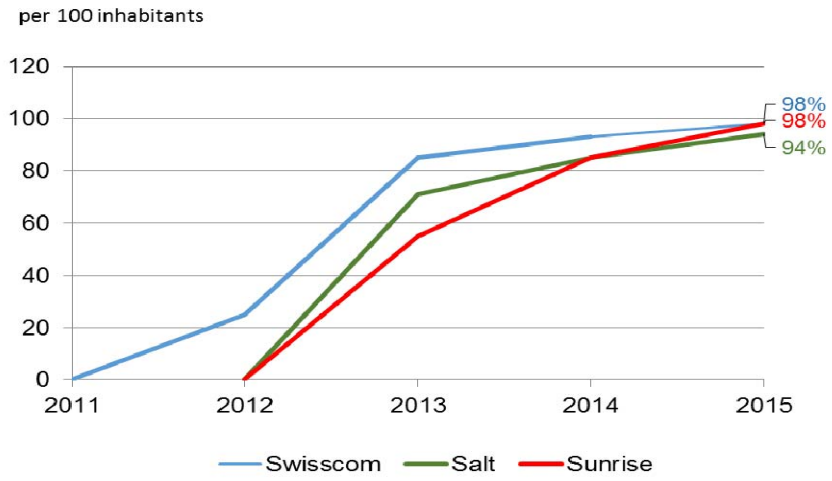
LTE (Long Term Evolution, 4G) networks, a major evolution of the previous generations of mobile telephony networks UMTS, HSDPA and HSDPA+ (3G), give access to very high speeds on the mobile networks and substantially improves the experience and user-friendliness of internet access. This new generation of 4G/LTE networks makes it possible for users to access the mobile internet at theoretical speeds of up to 150 Mbit/s.

Swisscom launched its LTE network in late November 2012. Sunrise and Salt launched theirs in the spring of 2013.

The modernisation of the mobile networks in Switzerland continued in 2015 and coverage of the Swiss population by these new modern networks is progressing very quickly. At the end of 2015, coverage of these latest generation networks reached 98% of the population for Swisscom and Sunrise, whereas Salt's 4G network had population coverage of 94% (cf. fig. 3).

In addition, the use of these new-generation networks is also on the increase, with 73% of Swisscom's mobile data traffic being carried on the LTE network at the end of 2015.

Fig. 3 LTE coverage in Switzerland, December 2015
Sources: operators



Elsewhere in the world, the roll-out continues at a rapid pace. According to ABI Research, there were 1.37 billion 4G LTE contracts worldwide at the end of 2015, i.e. more than double the number reached at the end of 2014 (650 million). This figure is expected to reach 3.5 billion by 2020.

According to GSMA, the mobile operators' investments in improving the quality and coverage of their 4G networks means that today contract users in Europe are already benefitting from download speeds well above the global average. And 60% of mobile connections will be made on LTE networks by 2020 in Europe, compared to 20% currently.

Again according to GSMA, the migration to 4G networks is being encouraged by the expansion of population coverage and the massive take-up of smartphones, as well as by the growing demand for consumption of streaming music and video services by users.

Innovations on LTE networks

From the point of view of technological development, the market for mobile communications has been characterised by several remarkable advances during 2015, making it possible to cope with this continual increase in the volumes of data carried on the mobile networks.

Sunrise proceeded with the installation of antennas serving small areas, termed microcells, in certain large cities, through a partnership with Swiss Fibre Net (SFN). This joint venture, bringing together local and regional electricity companies, provides accesses to optical fibre networks for the telecommunications companies. Several hundred 4G antenna sites were equipped with these microcells, in Bern, Geneva, St Gallen, Lucerne, Winterthur, Lausanne and Basle. Thanks to the optical fibre connections to which they are linked, these microcells make it possible to increase the capacities of LTE mobile networks on an ad hoc basis, in particular in urban areas and at the busiest sites.

Swisscom, for its part, also opted for an innovative solution with the installation of mobile telephony antennas and microcells in the cable ducts of its fixed network, i.e. in basements, in the large conurbations where demand for network capacity is highest. Swisscom carried out tests in Bern in the first quarter of 2015. Swisscom envisages a large-scale roll-out from 2016 if further extended tests in Basle, Lausanne and Zurich prove to be positive.

Roll-out of LTE-Advanced networks

In Switzerland, operators have continued to roll out LTE-Advanced (LTE-A) technology on their networks, enabling speeds to increase up to 450 Mbit/s.

After testing LTE-A within the framework of a pilot project from the third quarter of 2014, in June 2015 Sunrise announced the launch on its network based on the LTE-A standard in the large conurbations. Thanks to a partnership with Huawei, Sunrise is the first operator in Europe to introduce LTE-Advanced inter-site carrier aggregation. This new technological development supports download speeds of up to 225 Mbit/s on mobile networks by enabling the user to connect simultaneously to two separate antennas.

In mid-December 2014 Salt announced the launch of LTE-A on its network in the city of Bern, with the aim of gradually covering other large cities during 2015.

Swisscom, for its part, had rolled out its LTE-A network in several cities (Bern, Bienne, Lausanne, Zurich, Geneva, Lucerne, Lugano and Basle) at the end of 2014. And at the end of 2015, there were already 28 cities whose population could benefit from transmission speeds of up to 300 Mbit/s.

As announced in mid-August 2015, Swisscom is also carrying out another innovative project unique in Europe within the framework of a partnership with Ericsson and Qualcomm Technologies, which consists of combining the two standards LTE FDD (Frequency Division Duplex) and TDD (Time-Division Duplex) and in this way aggregating 3 carrier frequencies. By so doing, this technique makes it possible on the one hand to increase speeds up to 335 Mbit/s and on the other hand also enables a larger number of customers to simultaneously use the

same mobile telephony cell. This innovation should be available in Switzerland for its customers in the areas of heaviest use from summer 2016, whilst the first compatible smartphones, i.e. those able to use several frequency bands simultaneously, should be available on the market by then.

Launch of VoLTE

Swisscom was the first operator to launch VoLTE (Voice over LTE) in Switzerland, under the name Advanced Calling, in June 2015. This technology makes it possible to carry telephone calls on the LTE network and not only on the 3G or 2G networks. Until now, to make or receive a telephone call, the device connected automatically to the 2G or 3G network, because the 4G/LTE network is exclusively a data network.

From now on, customers who have a compatible telephone - but this applies to more and more models currently on the market - can benefit from calls of better quality on the LTE networks. The call is also set up more quickly, and users continue to benefit from a high surfing speed, even when they are making a telephone call.

VoLTE is also of benefit to the operator, since the telephone conversations transmitted as data packets require less network capacity. In addition, the 2G and 3G frequencies used to date to transmit calls can be reallocated to data, in particular since 2012 when frequencies were allocated to operators on a “technologically neutral” basis.

According to Swisscom, more than 500,000 customers were already using VoLTE to make calls at the end of 2015.

Neither Salt nor Sunrise yet offer this technology for the time being, but it could be introduced during 2016.

Introduction of WiFi calling

In 2015, the operators Salt and Swisscom also introduced WiFi calling, which makes it possible to make calls or send SMS messages via the WiFi network. Network coverage inside buildings can be improved in this way in the event of a lack of a mobile network or poor reception quality.

For use in Switzerland, WiFi calling differs from solutions such as WhatsApp, Facetime audio or Viber, with the advantage of not needing the installation of an application, nor being able to communicate only with correspondents who have the same application. On the other hand, in the case of calls made to fixed or mobile numbers, calls are not free, and calls are billed according to the customer's contract.

But here again, the user must have a compatible device of the latest generation in order to be able to benefit from this service and obviously must be connected to a WiFi network.

Salt introduced WiFi calling at the end of July 2015 for all of its customers, including those with a prepayment card. Salt is also the first Swiss operator to also offer WiFi calling abroad. Calls are billed as if the customer were in Switzerland, at the national tariff for calls to Switzerland, and at the international tariff for calls outside Switzerland, in accordance with the conditions of their contract, or they are deducted from their prepay card.

Swisscom, for its part, announced the launch of this solution at the end of August 2015, with a progressive roll-out for its private customers. At the end of 2015, not all customers were able to benefit from it and implementation is continuing in the first half of 2016. Unlike Salt, Swisscom's

product is not available to all customers, but only for certain types of contract: NATEL infinity and infinity plus or NATEL entry.

Finally, it should be noted that emergency calls cannot be made via the WiFi network; the telephone then switches automatically to the mobile network.

Number of mobile payment products increasing

After having undergone many false starts, mobile payment seems to have finally taken off. This system offers users simpler purchases, by enabling payment with their smartphone. It also allows purchases for small amounts, often without requiring a PIN code, by simply swiping the telephone near a payment terminal.

According to the Gartner institute, mobile payment is slowly winning the trust of consumers in North America, Japan and in some countries of Western Europe, to such an extent that half of them were expected to make payments with their smartphone or a wearable mobile accessory by 2018.

Announced in Switzerland since 2012, the mobile electronic wallet has had to develop quickly because of the implementation of an NFC (Near Field Communication) chip in mobile devices and the massive upsurge in smartphone use.

Mobile payment has enormous potential and represents a considerable gamble for a large number of players in various sectors who are seeking to develop their own solution, mobile applications, cardless payment functions, etc. Also, the development of electronic payment is still taking place in a disjointed fashion, with all players seeking to outsmart their competitors and position themselves in a nascent market.

In Switzerland, it has been possible to pay with a smartphone since 2013 in Valora kiosks, McDonald's, or at Manor and Jumbo, which had both launched a mobile payment application based on barcodes scanned at the till. In 2015, the two largest retail brands followed suit. In summer 2015, Migros launched its own smartphone payment application, developed in collaboration with the Migros Bank and available in all stores, this time using a QR code which merely has to be scanned. Since mid-2015 Coop has been using the Twint mobile payment system, based on Bluetooth technology which functions as a prepayment system. Developed by Postfinance, and supported by several other Swiss banks, this solution will also be available at Swiss Post and Swiss Railways SBB. At the beginning of 2016, Migros in turn announced its wish to integrate the Twint mobile payment system into its application by 2017.

In relation to the telephone operators, Swisscom, which had announced the launch of its Tapit payment solution jointly with Salt and Sunrise in summer 2014, will finally abandon this by summer 2016. The application did not find a market; it was handicapped in particular by the absence of NFC technology on many iPhones. Although associated with the initial project, Sunrise and Salt never offered the solution to their customers. Swisscom will adopt the Paymit mobile payment solution, launched by Six, UBS and the Cantonal Bank of Zurich in spring 2015.

The giants of the Web and data processing such as Google, Apple and Samsung must be taken into account; they might very soon introduce their own mobile payment service in Europe and Switzerland, if the success which they finally seem to be having in this area in the United States were to be confirmed.

Price of mobile communications

In 2015, Swiss consumers again benefitted from substantial reductions in the prices of mobile communication services, according to an OFCOM study. Although this price drop varies according to the products and market segments (contracts or prepaid cards), all types of users benefitted in 2015. Based on the three main service providers in Switzerland, the prices of the cheapest products fell by 13.5% for a low user, 21.5% for a medium user and 26.4% for a high user (cf. fig. 4).

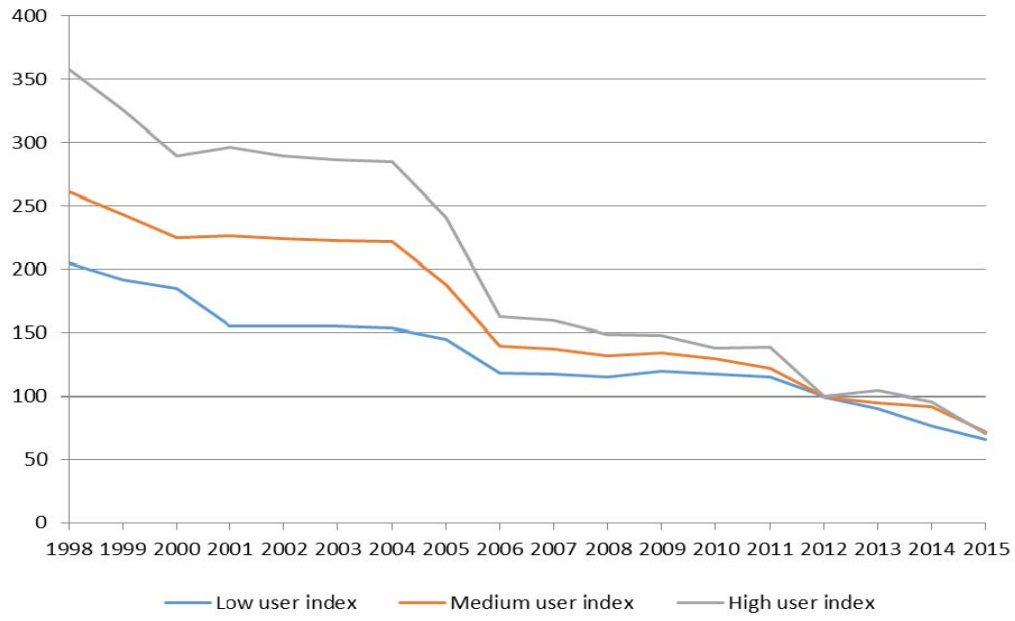
However, this evolution of prices must be qualified according to market segments.

According to the study on the retail prices of mobile communication services published by OFCOM on its website for the year 2015, it was clear that the reduction in prices was markedly larger for users with a prepaid card than for users with a contract. In the contract market, prices dropped by 7.6% for low users and by 9.1% for medium and high users. In the prepaid card market, prices fell by 24.9% for a low user, 32.0% for a medium user and 31.1% for a high user.

We also note that the trend which had long prevailed, whereby prepaid products are more advantageous for low or medium users – with contracts being more suitable for high users, has changed. Since 2011, contracts have consistently been more advantageous for medium users, whilst prepaid cards are still more suitable for the needs of low users.

According to OFCOM, this trend is explained in particular by the strategy of the main operators, who are making contracts more attractive than prepaid cards, leaving the prepaid card market to resellers of mobile services.

Fig. 4 Evolution of end prices for mobile telephony in Switzerland 1998 – 2015
(cost indices by user profile, 100 = 2012)
Source: OFCOM

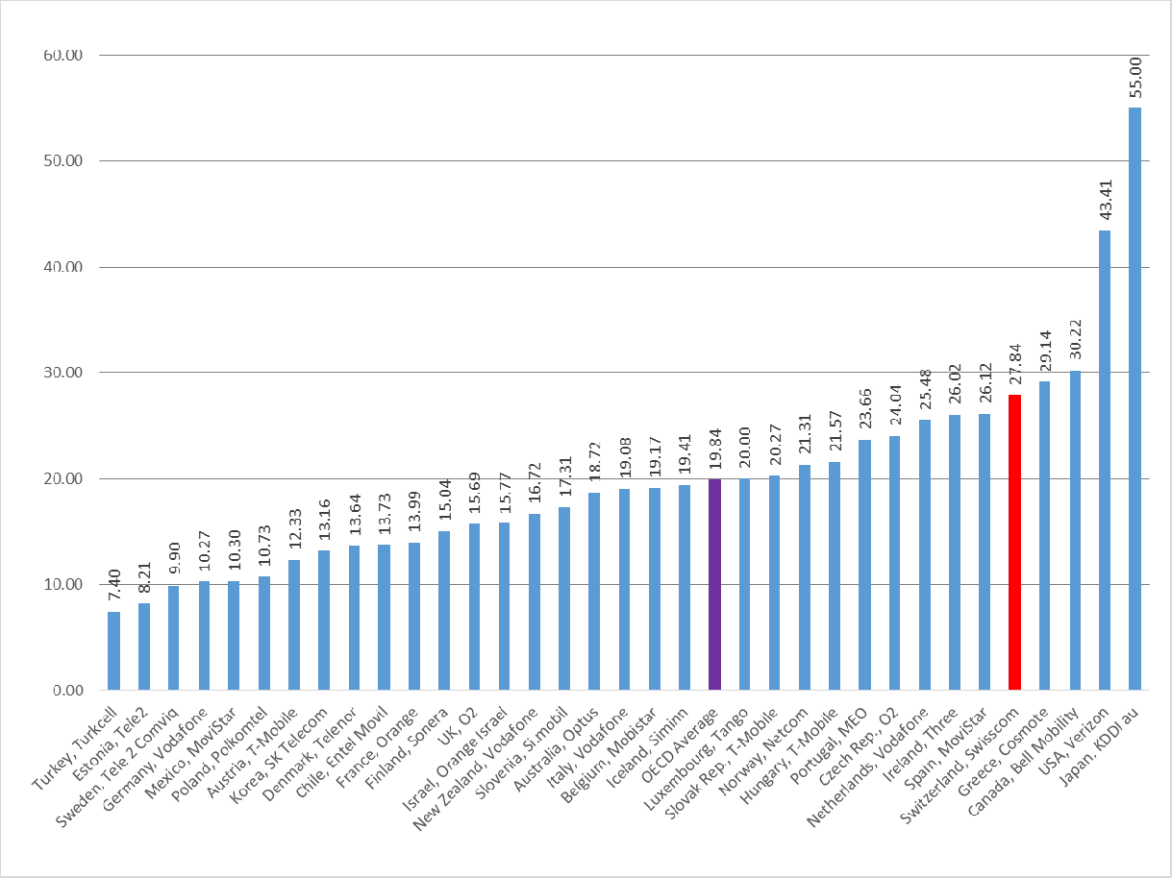


Despite the general price reduction, compared with the other OECD countries, mobile telephony prices in Switzerland remain some of the highest.

The Teligen price baskets published by Strategy Analytics, and based on the OECD's methodology which takes into account the cheapest products marketed by the largest operators in each country, confirm this. For a basket including voice telephony on mobile only (100 calls), despite a fall of €4 compared to the same period in 2014, a medium user in Switzerland in mid-2015 still paid €12 more than the average price in the OECD countries (€28 compared to €16). Although the bill of a high user (basket including 900 calls) in Switzerland also fell between 2014 and 2015, from €42 to €36, a Swiss user still pays €9 more than the average for the OECD countries, where the costs for this type of basket fell from €35 to €27.

For a basket including voice and data, a medium user in Switzerland (100 calls and 500 MB of data) pays €8 more than the average for the OECD countries (€28 compared to €20; cf. fig. 5) despite large price falls of about €14 in one year. The price which high users pay (900 calls and 2 Gb of data) remained stable between 2014 and 2015 in Switzerland whereas the remainder of the OECD countries experienced a very substantial drop in prices (- €11) over the same period. The gap even widened between 2014 and 2015, with a Swiss consumer paying almost €19 more than the average for the OECD countries (€50 compared to €31).

Fig. 5 OECD mobile basket voice + data, 100 calls + 500 MB
(euros incl. VAT), cheapest product per country, August 2015
Source: Results from Teligen Price Benchmarking System. Copyright Strategy Analytics, UK



2. Evolution of fixed networks

The number of telephone connections on fixed networks has been falling constantly for 10 years (-29% between 2005 and 2014). The reason for this is the continuous growth of mobile telephony, especially since the advent of the smartphone. The fall in the number of traditional

fixed telephony subscribers has accelerated, from an average of 1 to 2% per annum in the early 2000s to 5% per annum since 2009.

Likewise, the substitution of calls on fixed networks by those made on mobile networks seems to be intensifying, with fixed telephony traffic reducing very greatly in 2014. Thus in 2014 the total number of calls made on the fixed network fell by almost 40% and the total duration of calls made from the fixed network fell by 25%.

At the same time there has been considerable growth in voice telephony over VoIP on the fixed network. According to the official telecommunications statistics for 2014 published by OFCOM, the number of customers accessing telephony services on fixed networks from a VoIP access provided by the telecommunications service provider (DSL, cable, etc.) increased by 16.6% in 2014, totalling 913,336 connections at the end of the year.

However, the fixed networks will not disappear, quite the reverse.

The progressive migration to IP telephony, plus the growth of the cable operators in this sector and the increase in the number of fibre optic connections indicate the importance which the fixed network still has in Switzerland. In addition, the new forms of telecommunication (such as WiFi calling launched in Switzerland in 2015) or the growth in digital TV via DSL lines, also mitigate in favour of complementarity between the fixed and mobile networks.

In addition to the three mobile communication networks, Switzerland therefore has several “backbone” networks and quality access networks. Swisscom's access network (2,629,000 active connections at the end of 2015) covers the whole of the territory. The cable television networks are also well established and offer subscriber connections, although with the exception of upc cablecom, most of these networks offer broadband and telephony services on a fairly localised basis.

The distribution of fixed network market shares has changed little in recent years. Swisscom lost some 149,000 customers between 2014 and 2015, leaving its market share high; over 62% at the end of 2014, according to OFCOM's official telecommunications statistics for 2014. Sunrise is also losing customers, and its market share continues to fall: it had little more than 9% of subscribers at the end of 2014 and ceased to be Swisscom's main competitor in this market segment three years ago.

For their part, the cable operators are continuing to make progress in fixed telephony. They had 718,000 fixed telephony customers at the end of 2015, up by almost 8% (+52,700) compared to the previous year. At the end of 2015, upc cablecom, the leading provider of cable telephone services, had 505,000 telephone subscribers. Its market share was 12% at the end of 2014. The numerous other providers have marginal shares of the market.

It should be noted that billing for the subscriber connection by alternative operators to their customers, instead of Swisscom, continues to fall considerably, down from 61,135 connections at the end of 2014 to 47,430 at the end of 2015, i.e. a drop of 22.4%. This fall - like the fall in the number of automatic carrier preselections (-55,000 during 2015; see p. 33) - is explained by the increase in customer migration to the cable operators and the gains made by bundled offerings offers including VoIP telephony.

Phase out of analogue telephony

As announced in spring 2014, Swisscom intends to phase out analogue telephony and ISDN by 2017. The migration from traditional fixed telephony to IP technology (Internet Protocol) corresponds to a fundamental trend at the global level. With the generalisation of internet

products or bundled offerings (digital TV, telephony and the internet), operators are moving all services onto the same IP network. Virtually all data (music, images, videos and voice communication) is already being carried by the current IP network. As a general rule, telephony over IP offers higher voice quality and is proving to be less expensive for users.

Except for ISDN telephones and telephones with pulse dialling (featuring a rotary dial), the majority of existing devices will continue to be functional after the migration. There remain a number of cases where users will have to check the compatibility of their equipment, such as fax machines, some alarm systems and communication systems inside lifts, for example. In addition, there are already products guaranteeing coverage in the event of a power failure; finally, as is currently already the case, users can use a mobile device or a call diversion service on mobile telephones.

In the proposed revision of the TSO, in consultation at the end of 2015, and about which a Federal Council Decision is expected by summer 2016, a transitional period is envisaged until the end of 2020, so that customers can continue to use their analogue and digital (ISDN) terminals and gradually replace their equipment.

Price of fixed communications

Fixed telephony prices in Switzerland increased slightly in 2015, as they did over the preceding two years, but in a different way depending on the user profile. According to an OFCOM study of retail prices for fixed telephony services in 2015, the index for the cheapest offerings increased slightly, by 3.8% for a medium user in Switzerland. Prices also increased slightly by approximately 3.2% for low users in 2015. On the other hand, the increase was 22.7% for high users in 2015; OFCOM explains this in its study by the discontinuation of certain products by operators. However, it should be noted that, apart from some unbundled products which benefit low and medium users, the most appropriate 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, however, the prices of fixed telephony in Switzerland remain higher than in the other 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 almost €20 more per month than the average for the OECD countries (almost €60 compared to €40).

Broadband on the fixed network

First of all we should define what we understand by broadband on the fixed network, given that there is no agreed definition of what this term covers.

Broadband is a term which defines a high-speed internet access. However, rapid technological progress means that the concept of broadband is constantly evolving. Also, the definition of high speed itself varies considerably from country to country.

Thus the terms broadband and high speed are used as synonyms in our report. They generally indicate, in a generic form, an internet access with speeds greater than or equal to 1 Mbit/s.

When a distinction is necessary between high speed, very high speed and ultra-high speed, we base ourselves on the definition provided by the Federal Council in 2014 in its report on the trends in the Swiss telecommunications market (note 5, page 10). Thus, “In terms of definitions, in this report we define as “high speed” bandwidths of at least 1 Mbit/s (download), “very high

speed" bandwidths of at least 30 Mbit/s and “ultra-high speed" band-widths of at least 100 Mbit/s”.

Finally, we would point out that we continue to speak of DSL providers and DSL technology, as opposed to cable operators or CATV operators, even though some of these providers are already offering their customers optical fibre connections.

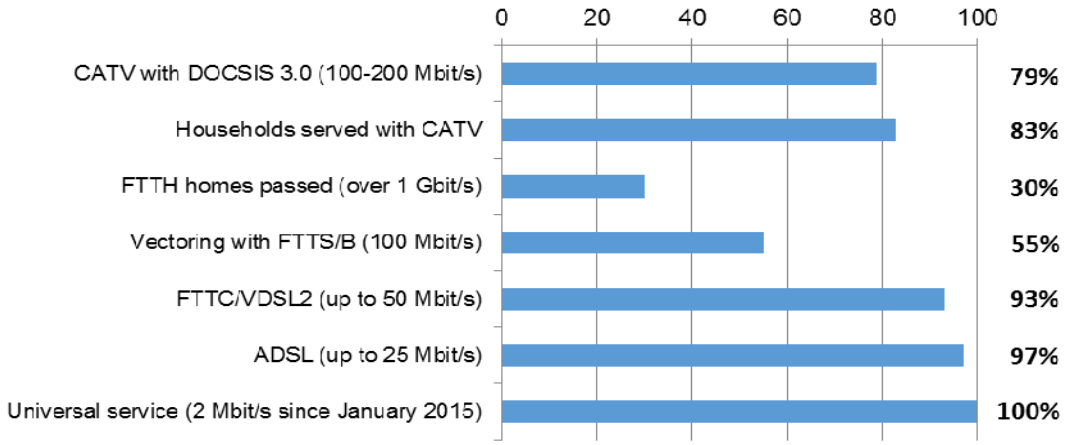
Moreover, with regard to the cable operators who have introduced fibre connections on their networks, including some as far as the subscriber, we are still, in most cases, dealing with fibre networks with a coaxial termination (HFC - Hybrid Fibre Coaxial - networks).

Every year, the operators are making considerable investment in network infrastructure.

Swisscom, for example, invested CHF 1.8 billion in Switzerland in the course of 2015, of which more than half, i.e. more than CHF 900 million, has been invested in improving the fixed network infrastructure and extending its fibre optic network. upc cablecom, for its part, stated that each year it is investing over CHF 200 million in its hybrid fibre optic cable network.

Switzerland therefore has very high-performance high-speed telecommunications infrastructures (cf. fig. 6). Competition on infrastructures and services offers a wide choice to consumers and also benefits the economy.

Fig. 6 Broadband access in Switzerland
% of Swiss households, 2015
Sources: Swisscom, Suissedigital, ComCom estimate



In its report entitled Measuring the Information Society 2015, the International Telecommunication Union (UIT) draws up a ranking of 167 countries according to the information and communication technologies (ICT) development index IDI. This IDI index (ICT Development Index), which measures access to ICT, use of these technologies and skills in this area, is broadly acknowledged by governments, United Nations organisations and the private sector. The results show that between 2010 and 2015 the index rose in all countries. South Korea was ranked first, followed by Denmark and Iceland. Switzerland came 7th, up five places. Of the top ten countries in the table, eight are European.

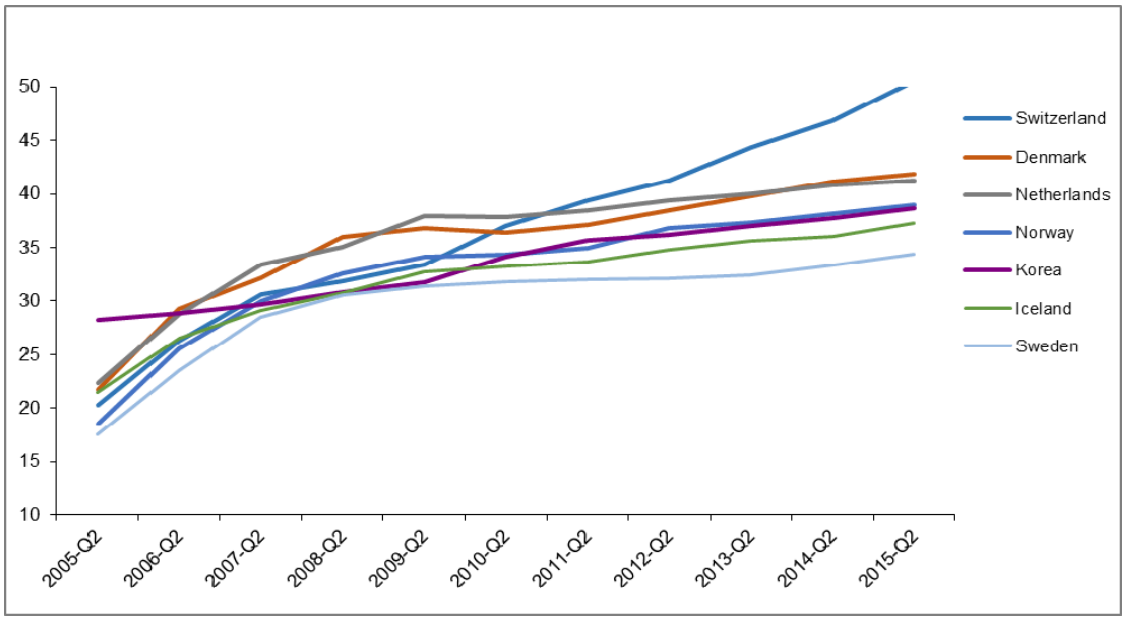
The ITU notes that all these countries have a high gross national income (GNI), which illustrates the correlation between high IDI values and per capita GNI. But above all it notes that these

countries have competitive, liberalised markets which encourage innovation, as well as a population with a relatively high income and the necessary skills to use these ICT effectively. According to the ITU, these countries also benefit from considerable international internet bandwidth. Consequently, the high levels of internet use in these countries are explained by the high levels of internet connectivity in homes and by the ready availability of broadband services, which are financially accessible.

For several years, therefore, Switzerland has been in the lead in terms of high-speed access. As one of the world leaders in terms of penetration of broadband connections, Switzerland is experiencing strong annual growth, of the order of +8%, considerably higher than the average for the OECD countries (+3.5%) between 2014 and 2015.

With 50.5% of the population enjoying broadband internet access in mid-2015, Switzerland has improved its position at the top of the ranking of the OECD countries (cf. fig. 7), now clearly outstripping Denmark (41.9%) and the Netherlands (41.2%). Over the same period, the average for the OECD countries was 28.8%.

Fig. 7 Broadband penetration rate (per 100 inhabitants), top OECD countries, June 2015
Source: OECD



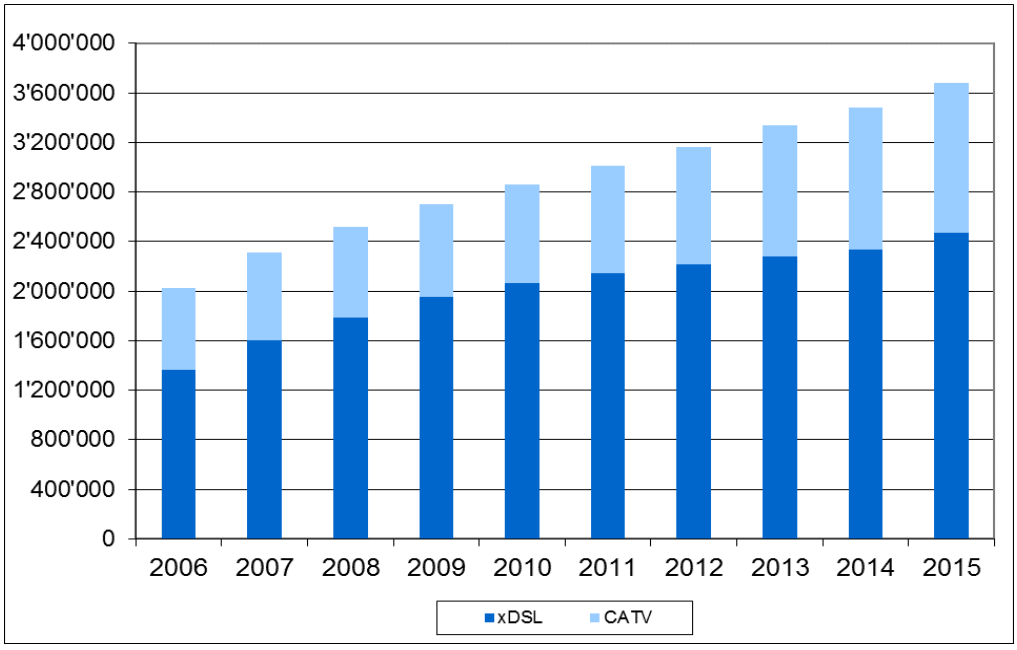
Not only does Switzerland have good broadband access penetration, but Swiss surfers are also benefitting from ever higher speeds. In an international comparison, Switzerland is therefore always among the best connected countries in the world. According to a study published in December 2015 by Akamai Technologies (The State of Internet, 3rd Quarter 2015), in autumn 2015 some 93% of Swiss internet users had an internet connection faster than 4 Mbit/s, the same proportion as the same period in 2014; the worldwide average was 65%. These are primarily connections at higher speeds, which have seen continued progress during the last few months. Switzerland is fourth in this world ranking, with average speeds of the order of 16.2 Mbit/s, up 12% on the same period in 2014, whilst the average speed worldwide is 5.1 Mbit/s. Moreover, 61% of broadband connections in Switzerland are at least 10 Mbit/s (compared to 54% in 2014). Switzerland is thus ranked second worldwide behind South Korea, but first in Europe. Thirty-six percent of Swiss surfers even have a broadband connection of at least 15

Mbit/s (up 22%), whilst 13% of Swiss surfers already enjoy speeds of 25 Mbit/s, up 38% in one year.

According to another study on retail prices of broadband services published by OFCOM, the increase in speeds was accompanied by a very large reduction in prices in 2015. Thus the costs incurred by a medium user for broadband services fell by 17.6% between 2014 and 2015. For high users, this reduction was 6.4%, and for low users it was 14.1%. According to OFCOM, the combination of increased speeds and reduced prices led to a reduction in the Mbit/s price index for all types of users; it fell by 36.9% compared to the previous year for medium users.

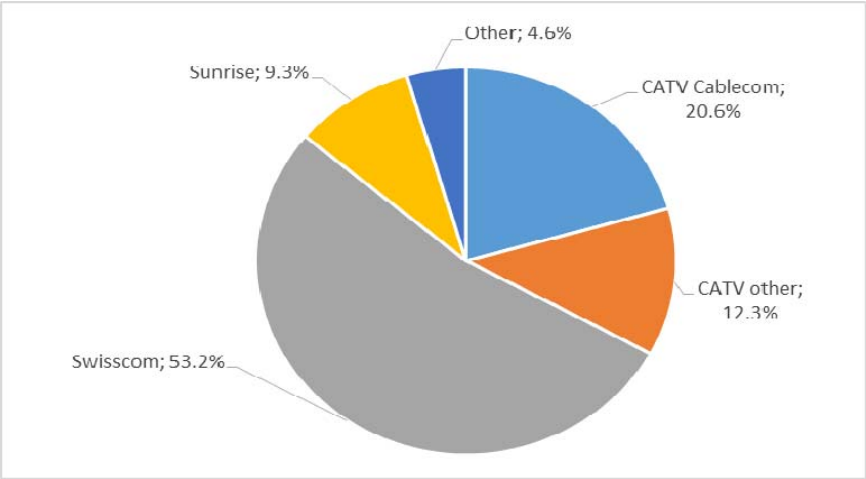
DSL providers are still way in front of cable providers for internet access: at the end of 2015, 67% of surfers had opted for an offering from a DSL provider (2,469,000 connections) and 33% opted for an offering from a cable operator (1,214,500 connections) (cf. fig. 8).

Fig. 8 Broadband connections in Switzerland: xDSL vs. CATV 2006-2015
Sources: Swisscom, Suissedigital



Considering the entirety of high-speed internet service providers (CATV and DSL), the distribution of market shares still favours Swisscom (cf. fig. 9). With a market share of 53.2% at the end of 2015, Swisscom is far ahead of its main competitors.

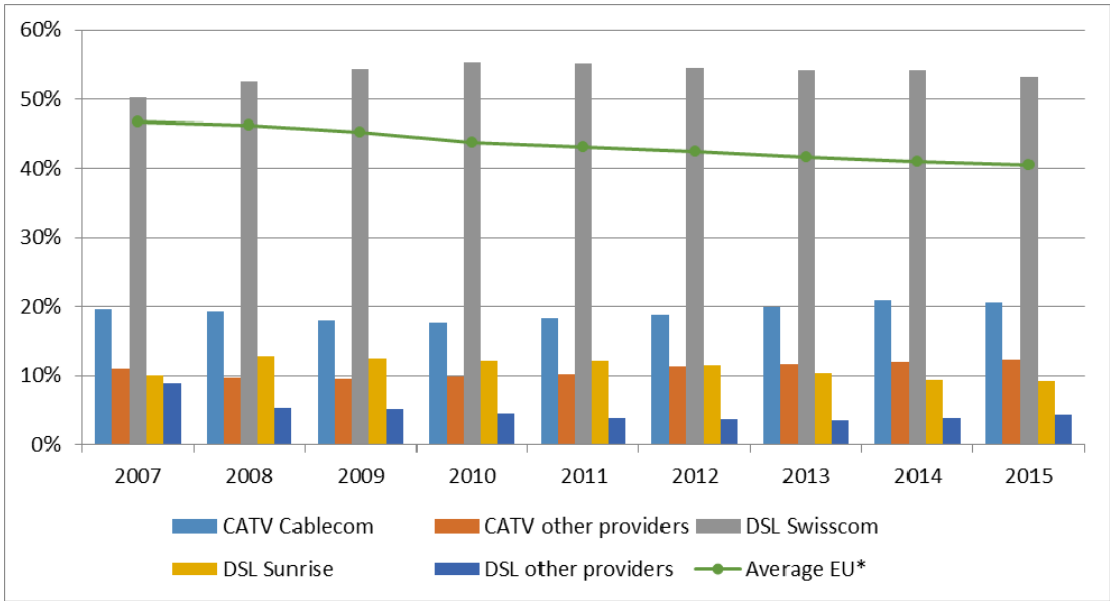
Fig. 9: Market shares of broadband connections in Switzerland, end of 2015
Sources: operators



At the end of 2015, the share of all the alternative DSL providers was 13.9%, of which 9.3% was held by Sunrise. For the cable operators, upc cablecom's market share was 20.6% and that of the other CATV providers was 12.3%.

By way of comparison, the average market share of the historic operators in the European Union is constantly falling and was approximately 40% in July 2015 (cf. fig. 10).

Fig. 10 Market shares of broadband connections in Switzerland and in the EU, 2006-2015
* market shares of the historic operator
Sources: operators, European Commission



The figures for broadband connections include Swisscom's FTTH/B users, as well as those benefitting from Swisscom's hybrid fibre/copper technologies (FTTC and FTTS). At the end of September 2015, Swisscom had almost 173,000 fibre subscribers. Sunrise also has fibre subscribers, though no details about them are available. According to Analysys Mason, on the same date there were approximately 68,000 additional fibre subscribers; these are customers of the other alternative providers using the historical operator's network or the infrastructure of the utility companies in towns and cities.

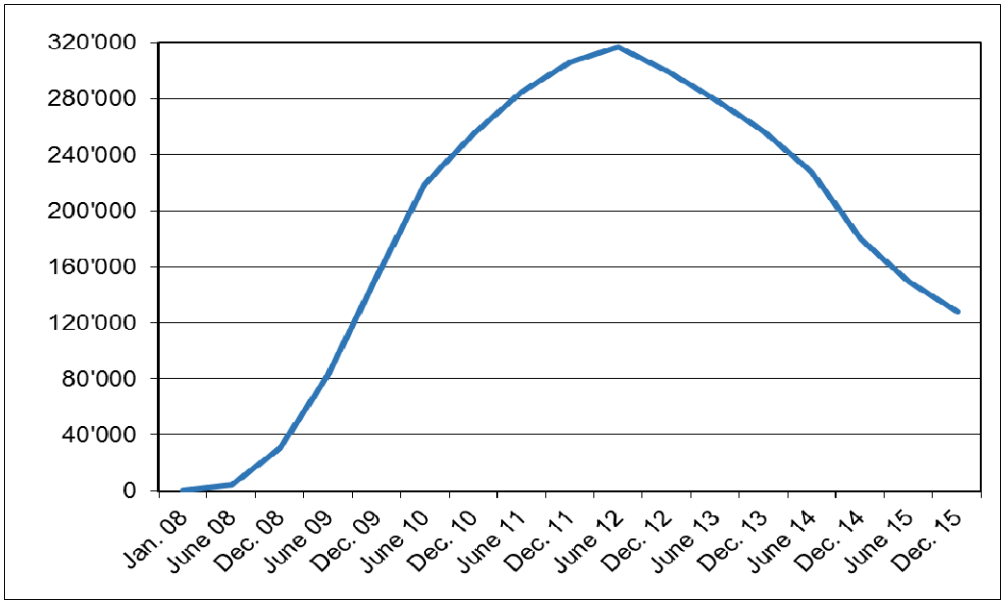
Fibre subscriber connections had therefore reached over 6% of all high-speed lines by the end of 2015.

Indeed, unbundling saw a very large drop for the third consecutive year. The number of unbundled lines, which totalled approximately 180,000 units at the end of 2014, amounted to only 128,000 at the end of 2015 (cf. fig. 11). Fully unbundled lines (Full Access) only accounted for 5.3% of all DSL lines and hardly 3.5% of all broadband lines.

This is explained on the one hand by the products from cable network operators and the increasing use of fibre optic connections which are further strengthening competition at the infrastructure level. On the other hand, the growing interest of customers in bundled offerings, combining telephony, the internet and digital TV, is a negative factor bundled offerings are incompatible with unbundling technology.

ADSL technology is not capable of offering a high-quality digital TV product, especially in HD quality, via the telephone network. It is not possible in Switzerland to use VDSL technology on an unbundled line; only ADSL technology is available. In order to be able to offer television to their customers, the alternative providers are therefore forced to request Swisscom's commercial resale offering for VDSL, which is not regulated in Switzerland.

Fig. 11 Evolution of the number of unbundled lines in Switzerland, December 2015
Unbundled subscriber lines (TAL)
Sources: Swisscom



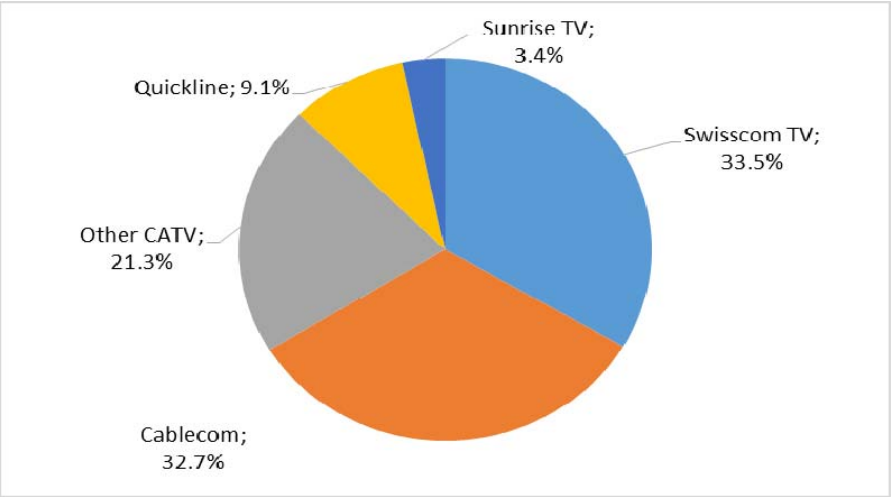
Digital TV in Switzerland

The number of digital television subscribers on the fixed network continued to increase at very constant rates during 2015. The DSL providers are entering into very serious competition with the cable operators in this market segment. The cable operators as a whole, with 2.5 million digital television customers, still have a 63% share of the market. But considering the providers individually, Swisscom has overtaken upc cablecom to take first place, some 10 years after its entry into this market. Swisscom gained 166,000 customers corresponding to growth of over 14% between 2014 and 2015. The historical operator has 1,331,000 subscribers to its digital TV offering and has seen market share grow to 33.5%. Sunrise, the last to enter this market in

2012, gained 27,000 customers over the same period, i.e. a growth rate of over 25%. Sunrise's market share grew to 3.4% (cf. fig. 12).

The results of the cable operators are more diverse. Overall, they lost some 130,000 customers in 2015, registering a drop of almost 5%. upc cablecom, which lost almost 85,000 customers for its digital TV product, was down more than 6% over the year and saw its market share fall to 32.7% at the end of 2015. With 362 300 customers, the Quickline grouping of cable operators, which constitutes the second largest CATV provider in Switzerland after upc cablecom, lost 6,400 customers in 2015, down 1.7%, and its market share fell to 9.1%.

Fig. 12 Market shares for digital television in Switzerland, end of 2015
excl. satellite/terrestrial
Sources: operators



We also note the good performance of the TV services from Internet Teleboy, Wilmaa and Zattoo in Switzerland. Despite a slight drop in audiences (-2.6%) compared to 2014, Zattoo is the platform with the largest number of users, with an average of almost 865,000 individual customers each month, with an average of over 8 million visits according to the data from Net-Metrix-Audit for the year 2015. Teleboy and Wilmaa, for which the average number of monthly users was down 12% and 14% respectively, can still rely on a substantial number of regular users. Teleboy has approximately 540,000 individual monthly customers, who make approximately 3.2 million visits each month, and Wilmaa has 300,000 monthly customers with 2.4 million visits.

In addition, Swisscom's internet television, Swisscom TV Air, although slightly down in terms of the number of customers (-4.8% compared to 2014), has on average 720,000 individual customers each month, with over 6 million visits.

All of these services are also available on mobile devices using a dedicated application.

For its part, Netflix, the world leader in subscription video on demand (SVOD), whose arrival in Switzerland in autumn 2014 stimulated Swisscom and upc cablecom to launch their own SVOD platforms, does not communicate individual figures for each country. From the publication of its 2015 results (in January 2016), we note that the American giant, with 75 million users worldwide, still makes approximately two thirds of its revenue from its SVOD activities in the United States. Its international growth, however, is remarkable, with an increase in turnover of 46% in 2015; it says it hopes to establish itself in more than 200 countries by 2017. With more than 42 billion hours of programming viewed worldwide in 2015, we also note that the streaming

service monopolises a large proportion of network capacity, since it represents 37% of internet traffic on American soil, whereas YouTube accounts for less than 20%.

Development of ultra-broadband networks

As already indicated, in terms of broadband provision on the fixed network, Switzerland is holding since some years a leading position in international comparisons. In relation to the development of ultra-broadband (100 Mbit/s and higher), though Switzerland is not yet a world leader, considerable sums continue to be invested in the expansion of the network.

On the one hand, an important driver for this is infrastructure competition. On the other hand it is important for all network operators to invest pro-actively in a future-proof network against a background of rapidly growing data traffic, in order to be able to continue to meet customers' needs in the future. According to Swisscom, data traffic on the fixed network is currently doubling approximately every 16 months.

The development path is clear: on both the telecoms and CATV networks, optical fibre, which has been used to construct backbone networks for some time now, is being brought ever closer to end customers. The last section to end customers, which still consists of conventional copper or coaxial cable, is consequently getting shorter and shorter – or the entire subscriber line is being replaced in a single step.

In the case of “Fibre to the Street” (FTTS) and “Fibre to the Building” (FTTB), the copper or coaxial cables are only 50-200 metres long. In conjunction with snowballing technologies such as vectoring and, from 2016 onwards, “G.fast” in the case of the telecoms networks or DOCSIS 3.0 and now DOCSIS 3.1 in the case of the CATV networks, customers can be offered ultra-high speed broadband at 100 Mbit/s and higher via hybrid connections.

In the case of “Fibre to the Home” (FTTH), a fibre connection extends right up to a main socket in the home, enabling service offerings with bandwidths of 1 Gbit/s.

For several years now, within the framework of co-operation between Swisscom and local utility companies in more than 20 cities and regions of Switzerland, FTTH networks have been constructed, as a rule on the basis of the multi-fibre model which was agreed at ComCom's FTTH Round Table between 2008 and 2012 (cf. ComCom’s 2012 Annual Report). In a few cases there was co-operation between CATV operators and Swisscom. In over 30 locations, Swisscom or individual political municipalities are going it alone to invest in a fibre network. Fibre rollout is taking place not only in the large conurbations but also in many rural areas (for example in the Upper Valais, in the Lower Engadine or in municipalities such as Schönholzerswilen).

In the development of its ultra-high speed broadband network, Swisscom is opting for a mix of technologies; with FTTS/FTTB and vectoring, bandwidths up to 100 Mbit/s and from 2016, with G.fast, up to 500 Mbit/s can be achieved. At the end of 2015 Swisscom announced that it was able to supply 2 million households with ultra-broadband using the various fibre connections and vectoring. By the end of 2015, Swisscom, alone or in co-operation with utility companies, had provided approximately 1 million households with fibre to the home (FTTH, the number of “homes passed” is therefore approximately 30%). By the end of 2020, 85% of households and businesses are expected to have access to ultra-broadband of at least 100 Mbit/s. In addition, Swisscom plans to push ahead with expansion in order that “every Swiss municipality is provided with almost 100% ultra-fast broadband coverage in the long term” (Swisscom’s 2015 Annual Report, pp. 4-5).

Compared with other countries, broadband provision is excellent as the CATV operators have invested heavily over recent years in fibre expansion and in DOCSIS 3.0. Some 80% of Swiss

households have a cable connection and 95% of these could access an ultra-broadband product. In 2015, Quickline became the first CATV company to begin installing the new DOCSIS 3.1 standard for faster data transmission (at up to 1 Gbit/s).

Since 2013 there has been an additional player in the market, Swiss Fibre Net (SFN). SFN is a joint venture by a number of utility companies, which connects up the local fibre network nation-wide and offers service providers uniform FTTH products on a common platform. This network consortium currently comprises twelve co-operating partners and covers almost 800,000 households in various locations in Switzerland.

In addition, various providers who do not have their own access network (among others Init7, 1tv, iWay.ch, GGA Maur, Sunrise and VTX) offer their services via the fibre network of utility companies.

3. Outlook

Our modern societies are faced with profound upheavals. New technologies have invaded our daily life and the world is becoming ever more closely connected.

So much so that it has become customary to speak of a fourth industrial revolution to define the digital transformation of the economy which goes well beyond the telecommunications sector.

Thus cities, cars, houses, as well as health, energy and finance are becoming “smart”. Benefitting from connected industry, which is also evolving in an ever more globalised environment, new forms of production and distribution are emerging and many new goods and services are enabling consumers' new needs and habits to be accommodated.

Hailed for several years as a panacea, connected objects and the internet of things are increasingly on display at the major fairs devoted to technological innovation.

For many ICT experts, the internet of things is one of the areas, which will see strong growth over the next decade. According to Cisco, there will be 50 billion connected objects by 2020. And according to the ITU, “within five years all sectors are expected to have launched initiatives relating to the internet of things by creating new economic models”.

A number of companies which are keen to increase their effectiveness have addressed the digital transformation of their activities. This digital transition, which began several years ago, particularly with the generalisation of corporate internet sites, e-commerce and the production and consumption of media and dematerialised cultural goods (music, films and books), is involving more and more areas of activity.

Businesses are also having to adapt to the phenomenon of 'uberisation' of society, from the name of the American Uber corporation of cars with a driver, which puts drivers and customers into direct contact via a mobile application. Benefitting from the increase in access speeds and the massive take-up of smartphones, and thanks to the development of online platforms and applications, this disruptive demand economy model is witnessing the arrival of many new players. These are part of the trend towards the dematerialisation of more and more services; they are based on a strong innovative spirit and, by circumventing the historic physical intermediaries, are closer to the aspirations of users and can offer a better service at a better price.

This new economic model is affecting more and more areas of activity and, according to the company Deloitte, will be worth 100 billion dollars worldwide within three years.

The variety and the enormous quantity of connected devices will therefore generate a considerable increase in the volume of data. None of this would be possible, of course, without extremely high-performance fixed and mobile network infrastructures. The growing need for bandwidth will also require new network architectures and additional frequencies on the mobile networks, for example.

Also the regulation of the telecommunications market has to be adapted to these new trends, which are accompanied by a host of new issues, given in particular the appearance of new players and new economic models; they also involve the security and protection of user data and private life.

In order to take these major changes into account, the European Commission has initiated a complete review of its telecoms legal framework and the Swiss Federal Council is proposing a revision of the Telecommunications Act in two stages. In December 2015, it launched the public consultation process for the first stage of the revision.

In the first stage, the Federal Council wants to tackle a number of urgent points which it had already outlined in the 2014 telecommunications report: among other things, for example, it wants to improve consumer protection, to enable the sharing of passive infrastructures and of telecom installations inside buildings, to liberalise use of the radio spectrum and to introduce a duty to provide information concerning network management. In terms of access regulation, the current *ex-post* regime is to be retained in principle and regulation is to be restricted to the copper network. Now, however, *ex-officio* regulation and a more differentiated set of measures are being proposed.

ComCom very much welcomes the fact that the Telecommunications Act is to be updated, particularly given the fact that the law was last revised a decade ago, when social networks were still in their infancy and when neither smartphones nor ultra-high speed broadband existed. ComCom supports the changes to the TCA proposed by the Federal Council. However, in view of the rapid changes in the market which can be expected to continue in the future, in ComCom's opinion the creation of a framework legislation or a new statutory architecture should be examined. In this way, better consideration could be given to convergence and reactions to new developments could be faster.

ComCom activities in 2016

In relation to ComCom's core mission as a licensing and regulatory authority, nothing will change in 2016: in the interests of the economy and consumers, ComCom must 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 2016, ComCom will be focussing on the following activities:

- **The universal service**: As soon as the Federal Council has decided, within the framework of the ordinance revision in progress since 2015, which services will be included in the universal service from 2018 onwards, ComCom will prepare for the award of the universal service licence by mid-2017.
- **Mobile radio frequencies:** On the occasion of the World Radio Conference (WRC), which was held in Geneva in November 2015, additional frequency resources were

identified at a global level for mobile broadband communications. The main focus was on the frequencies in the 700 MHz band (694 to 790 MHz), the so-called L-band (1427 to 1518 MHz) and the C-band (3.4 to 3.6 GHz). After the WRC, the Federal Council will regulate the national utilisation of the frequency spectrum in the national frequency allocation plan (NFAP). On this basis, ComCom will be able to decide how it wants to proceed with the award of the new frequencies which will become available for mobile radio. Naturally, the needs of the market will also be assessed in this context.

- **Access procedures:** After contentious points were clarified by the judgement of the Federal Administrative Court on 18 January 2016 (cf. below) the various outstanding access procedures will continue to be actioned by OFCOM as the instructing authority.
- **Revision of the Telecommunications Act (TCA):** In December 2015, the Federal Council launched the public consultation procedure concerning the revision of the TCA. ComCom will reflect on the proposed changes to the law in 2016.
- **International affairs:** Together with OFCOM, ComCom is following the regulatory practice in the other European countries. To this end it participates as an observer in meetings of BEREC and is actively involved in the Independent European Regulators Group (IRG).

II. 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 the universal service licence (Art. 14 TCA),
- fixing access conditions and prices when providers cannot reach 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),
- it also takes 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 2015, the Commission consisted of the following members:

- **Marc Furrer, President,** Lawyer and notary
- **Monica Duca Widmer, Deputy-President**, Dr. dipl. chem. Ing. ETH, Ticino entrepreneur
- **Andreas Bühlmann**, Dr. rer. pol., Head of the Finance Office, Canton of Solothurn
- **Adrienne Corboud Fumagalli,** Dr. rer. pol., Vice President for Innovation and Technology Transfer, Swiss Federal Institute of Technology, Lausanne (EPFL)
- **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)
- **Dr Stephan Netzle,** Doctor of Law, LL.M. Lawyer.

On 25 November 2015, the Federal Council proceeded with the renewal of the extraparliamentary bodies for the period from 2016 to 2019. On that occasion, the members of ComCom were all re-elected.

The Federal Council also re-elected Marc Furrer as President of the Commission and Monica Duca Widmer as Deputy President. Because of the 12-year limit of the allowable legal mandate, the president, Marc Furrer, will leave the Commission at the end of 2016. Likewise, the vice-

president, Monica Duca Widmer, as well as professor Reiner Eichenberger, will sit on the Commission until the end of 2017.

The list of the members of the extraparliamentary bodies for the period from 2016 to 2019 is available at: https://www.admin.ch/gov/fr/accueil/droit-federal/commissions-extraparlementaires.html (for ComCom, see page 196).

As a general rule, the Commission meets almost once a month. The members also devote much time to the preparation of the meetings and to circulating comments. In 2015, the Commission also met for an internal two-day training seminar, relating to developments and trends in telecommunications and information technologies.

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 webmaster (80%) and an administrative assistant (70%).

In 2015, Maya Stampfli took well deserved early retirement after 10 years with the ComCom secretariat. The Commission and the secretariat warmly thank Mrs Stampfli for her long and invaluable collaboration. In spring 2015, the Commission engaged Jacqueline Fischer Pulfer to succeed her.

For further 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

III. Activities of the Commission

The following sections provide an overview of ComCom's activities in 2015.

1. Access procedures

In order to promote competition in the telecommunications market, the Telecommunications Act (Art. 11 TCA) stipulates that market-dominant companies (such as, for example, the former monopolist Swisscom) must provide smaller providers with access to their existing infrastructure. 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 infrastructure access are definitively enumerated in the Act - in contrast, for instance, with the access regime in the EU. ComCom, as the regulatory authority, can thus specify the conditions and prices for infrastructure access, but only precisely within these areas.

Furthermore, in the Swiss telecommunications legislation, the primacy of negotiation applies; this means that smaller providers must first negotiate with the market-dominant provider concerning the conditions for infrastructure access. Only if these negotiations do not result in an agreement can an application be made to ComCom for setting of access conditions and prices. This procedure is known as *ex-post* regulation.

Specifically, the TCA specifies the following six forms of access (Art. 11), which must be offered at cost-based prices if a market-dominant situation exists:

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.

In Switzerland, regulation in the access network is limited to the conventional copper technology. Fibre and cable networks are not subject to any access obligation or regulation.

At the beginning of 2015 a total of 6 access procedures were pending with ComCom. In three cases ComCom was able to take a definitive decision in the course of the year; one of these was contested in the Federal Administrative Court. In addition, at the end of 2015 an appeal was pending with the Federal Administrative Court against a ComCom decision of 18 December 2013; on 18 January 2016 the Court reached a judgement on this matter (cf. also www.bvger.ch).

1.1. Interconnection and other forms of access

Two access procedures are currently in progress in which the prices for various forms of access have to be calculated over several years. In addition, because of the above-mentioned judgement of the Federal Administrative Court, a procedure relating to 2012 and 2013 access prices will have to be taken up once again in 2016.

On 1 July 2014 a number of new rules concerning calculation of the price for regulated forms of access entered into force in the Telecommunications Services Ordinance (TSO; cf. explanations in the 2014 annual report). Accordingly, in 2015 the first, labour-intensive implementation of the new provisions of the ordinance was in the foreground in the access procedures in progress. Within this framework, Swisscom as the market-dominant provider, has the chance to provide evidence of its actual costs on the new basis. The model for providing evidence of costs is a highly complex system, by means of which the costs of a nation-wide modern telecoms network are calculated.

Another innovation in the price calculation is the change in the network technology, which is used for the calculation of regulated access prices: fibre technology is now used as the “modern” reference technology, which is used as the basis for calculating the costs of a telecoms network. The technical term for this reference technology is “Modern Equivalent Asset” (MEA).

Fibre as a Modern Equivalent Asset

In the calculation of regulated interconnection and access prices, the customary switching and copper technology have until now been used as the established MEA. Today, a company constructing a new telecoms network would, however, 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 the summer of 2012, however, it came to the conclusion that a change in the MEA by 1.1.2013 was an overambitious target. The reason for this was a revision of the ordinance being undertaken at that time, in which the Federal Council wished to make changes in the price calculation method in the telecommunications services ordinance. In summer 2012, however, it was already apparent that the new provisions of the ordinance would enter into force in the course of 2013 at the earliest.

Since ComCom feared that a change in the MEA in 2013 might in this constellation lead to unforeseeable large price movements, it wanted to wait for the Federal Council's revision of the Telecommunications Services Ordinance. In order to ensure security in the market concerning planning and legislation, ComCom decided in July 2012 to defer the switch to fibre technology until 2014.

Consequently, ComCom's decision at the end of 2013 on access prices for the years 2012 and 2013 was still based on copper technology. Sunrise submitted an appeal to the Federal Administrative Court about the deferral of the MEA change to 2014 and other aspects of the procedure. In its judgement of 18 January 2016, the Court in part upheld Sunrise's appeal.

Though the Court maintained that substantial price movements could well have resulted from a change in the MEA and that this might have seriously jeopardised the willingness of market players to invest, the Court found that this circumstance, however, was not a sufficient reason for a deferral of the MEA change. According to the Court, ComCom had had an adequate legal basis for the MEA change and should also have been able to define transitional measures (cf. Federal Administrative Court judgement A-549/2014 of 18.1.2016). In the opinion of the Court, ComCom did not therefore have to wait for the results of the TSO revision and could have, indeed should have, completed the MEA change by 2013 – as previously announced.

Therefore not only must the access prices from 2014 be calculated on the basis of fibre technology, but also those for the year 2013. On the basis of the Court's decision, ComCom will take up the corresponding procedure again and will recalculate access prices from 2012 onward.

1.2. Use of cable ducts

Within the framework of two procedures which are similar in terms of content, ComCom had to decide on the question of whether a provision in the contract concerning access to cable ducts is permissible.

Specifically, it concerned the obligation to remove cables laid in ducts, on termination of the agreement, within one year and at one's own expense – or, if decommissioning is impossible for certain reasons – paying early lump-sum compensation for decommissioning and disposal.

In its decision, ComCom came to the conclusion that the contractual decommissioning obligation after a cancellation or some other termination of an individual agreement infringes the ban on discrimination and must therefore be annulled in accordance with the applicant's request (the legally binding decision of 8.12.2016 was published on the ComCom website: www.comcom.admin.ch/themen).

For the future, contracting parties are naturally free, in the context of the primacy of negotiation, to seek an appropriate alternative settlement for decommissioned cables which is in conformity with the Telecommunications Act.

1.3. Interconnect 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 could use the previous data connections free of charge. Collateral security demanded by Swisscom was rejected by ComCom. Swisscom's appeal against this decision by ComCom was rejected on 13 November 2013 by the Federal Administrative Court; the judgement was published on the internet (www.bvger.ch).

After the exchange of correspondence in 2014 regarding clarification of the issue of market dominance, an extensive market survey was carried out by OFCOM and the Competition Commission (COMCO) was consulted. Since COMCO initiated a preliminary investigation on this matter in the spring of 2015 (cf. COMCO’s 2015 annual report), the procedure which was pending with ComCom was suspended.

2. Licences

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

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

2.1. The universal service

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 basic 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). It is the task of the Federal Council to periodically adapt the scope of the universal service to social and economic needs and to the state of technology. The services forming part of the universal service are defined more precisely by the Federal Council in the Telecommunications Services Ordinance (Art. 15 and 16 TSO). In addition, the Federal Council sets some upper price limits for these services (Art. 22 TSO) and determines the criteria for measuring the quality of the universal service (Art. 21 TSO).

The universal service currently includes voice telephony, fax and the fixed network connection (including an entry in the public telephone service directory) and broadband internet access. Furthermore, an adequate provision of telephone boxes and access to emergency services must be guaranteed. A transcription service and switching services are available to facilitate communication for the hearing and visually impaired.

Since 2008, in addition to the normal telephone connection, the universal service has also included a broadband internet connection. The minimum transmission speed of this broadband connection is currently 2000 kbit/s on the download and 200 kbit/s on the upload. The Federal Council has set the upper price limit for this internet connection at CHF 55 per month (excl. VAT). A standard telephone connection in the universal service costs CHF 23.45 (excl. VAT).

The universal service licence

ComCom is responsible for the tender procedure and award of the universal service licence; OFCOM conducts the award procedure on behalf of ComCom.

The current universal service licence was awarded in 2008 and will run until the end of 2017. Since the liberalisation of the telecoms market in 1998, Swisscom has been providing the universal service. In 2015, Swisscom continued to provide the universal service everywhere and in the prescribed quality, as the assessment of the quality of the universal service performed by OFCOM indicated.

The provision of the population with a universal service including a high-quality and affordable basic offering of telecom services is therefore being ensured throughout Switzerland.

Public telephones

In an international comparison, Switzerland has a good provision of public telephones ("publifons"). However, these telephone boxes are generally being used less and less with time, as both the resident population and travellers have mobile telephones and can therefore make telephone calls nearly everywhere in Switzerland.

When the universal service licence was awarded in 2007, the minimum number of public telephones for each municipality was specified (taking the historical context into account). Consideration was given to the number of inhabitants and the size of the municipality.

However, municipalities can also opt to forgo public telephones. In the case of many very rarely used public telephones, over the last few years the competent municipalities, together with Swisscom, have come to the conclusion that they would like to forgo certain public telephones.

If the municipality concerned and Swisscom agree on the withdrawal of a telephone box, an application for decommissioning can be submitted to ComCom. In 2015 - on the basis of municipalities' waiver statements - ComCom approved the withdrawal of a total of 156 public telephone boxes; in 2015 substantially fewer public telephones were abolished than in 2014 (202). At the end of 2015, there were still 2949 public telephones which are part of the universal service. Approximately 40 per cent of the municipalities in Switzerland have now opted to do without the provision of public telephones. In addition, outside the universal service, Swisscom provides approximately 1000 additional public telephones in commercially profitable locations.

The removal of little used public telephone for reasons of cost is not limited to Switzerland: in Germany and Italy, the number of telephone boxes is also falling substantially and in France most telephone boxes are expected to disappear by 2017, since Orange is no longer obliged to maintain them.

Adaptation of the scope of the universal service

With regard to the award of the next universal service licence, which will enter into force at the beginning of 2018, the Federal Council has given consideration to the future scope of the universal service. In autumn 2015 a public consultation was conducted on the Federal Council's proposals.

On the basis of changed general conditions, several adjustments to the scope of the universal service are being proposed in the revision of the telecom services ordinance which is currently in progress: for example, in future a broadband connection is expected to replace the conventional telephone connection. In this context, the Federal Council also envisages a transitional period for the migration to IP telephony announced by Swisscom (cf. p. 14). It should be possible to continue to use today's analogue and ISDN telephones until the end of 2020.

The draft ordinance also envisages increasing the bandwidth of the internet access in the universal service to 3000/300 kbit/s. The Federal Council could also decide to remove several services from the universal service (e.g. fax and public telephones). To this end, the Federal Council plans to expand somewhat the services for people with disabilities.

The comments received during the public consultation on this revision of the Telecommunications Services Ordinance were also published on the OFCOM website (www.bakom.ch). The Federal Council is expected to adopt the revision of the ordinance by mid-2016.

Award of the new universal service licence

As soon as the ordinance is adopted, ComCom will prepare for the award of the new universal service licence. The licence must be awarded by mid-2017.

The award of the licence will – as laid down in the Telecommunications Act (Art. 14 TCA) – take place on the basis of a tender procedure and a competition based on criteria. If no candidature is received under the tender procedure, ComCom may enlist one or more providers to assure the universal service.

2.2. GSM technology

At the beginning of the liberalisation of the telecommunications market in 1998, ComCom awarded three GSM licences to DiAx, Orange (now Salt) and Swisscom. As the result of a merger with DiAx, Sunrise became a GSM licensee in 2000.

In the tempestuous initial phase of telecoms competition, mobile telephony was still based exclusively on GSM technology, with the main services being telephony and SMS. Later came technological evolutions of GSM – GPRS and EDGE – which permitted slightly higher data transmission rates and which gradually held out the hope of a mobile internet. Currently practically 100% of the population and approximately 90% of the land area are still covered by GSM and EDGE.

Here too, though, times are changing. On the one hand the three GSM licences expired at the end of 2013 and on the other hand GSM technology itself is now gradually becoming the "discontinued model". For example, last October Swisscom expressed the intention to switch off GSM technology at the end of 2020. With the end of the 2nd generation of mobile radio, additional frequencies can be used for the future mobile radio technologies.

2.3. UMTS licences

Four UMTS licences were auctioned in 2000. The unused UMTS licence held by the 3G Mobile company was revoked in 2006. The remaining three licences run until the end of 2016.

The three operators Salt, Sunrise and Swisscom are complying with their licences. According to information provided by the operators, population coverage for UMTS is up to 99%. Especially in rural areas where access to LTE is still limited, the further development of the updated development of UMTS (HSPA+) enables mobile broadband coverage.

All the frequencies of the UMTS licences were purchased at auction in 2012 by Salt, Sunrise and Swisscom. Once the UMTS licences expire, these frequencies will become part of the mobile radio licences awarded in 2012. UMTS population coverage will not change; UMTS technology will continue to operate alongside GSM and LTE.

2.4. Technology-neutral mobile radio licences

In February 2012, all mobile radio frequencies currently available in Switzerland were awarded anew. Frequencies in the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz were auctioned. In June 2012, the new licences, with a term extending to 2028, were awarded. This gives mobile operators long-term planning security. All three mobile operators – Salt, Sunrise and Swisscom – acquired a much larger, future-proof frequency entitlement in the auction. This ensures that the operators have sufficient spectrum to meet the rapidly growing demand for mobile broadband services, even in the long term.

Thanks to the technology-neutral assignment of the frequencies, the operators themselves can decide which technologies they wish to use in which frequency bands. Thus all three providers operate different technologies alongside each other (GSM, UMTS and LTE). Since the auction in 2012, all three mobile operators have invested heavily in the 4th generation of mobile radio, LTE. With a high LTE coverage of 94-98% of the population, Switzerland is one of the leading European countries. In order to be able to meet customers' demand for high quality, the Swiss mobile operators are often early adopters of new technologies compared with other countries.

Reallocations of frequencies (refarming)

In the auction in 2012, some mobile radio frequencies were assigned to a different operator. In summer 2014, this led to refarming work in the 900 MHz and 1800 MHz frequency bands; this was carried out according to plan and without incident.

With the expiration of the UMTS licences, the frequencies in the 2100 MHz band will become part of the new technology-neutral mobile radio licence. Within the framework of this transition,

some frequencies will be switched. The three operators are planning this work in close cooperation with OFCOM. The refarming is planned for the summer of 2016, when data traffic is comparatively low on the mobile networks because of the holidays.

Salt: A new ownership structure and a new name

After almost exactly three years in the ownership of the private equity company Apax Partners, the licensee Orange Network SA was taken over at the beginning of 2015 by the French entrepreneur Xavier Niel, who owns the French telecom company Iliad (Free).

Such a takeover requires a transfer of the licence, which must be approved by ComCom. When ComCom does this, it verifies whether the statutory licensing requirements (technical capabilities and compliance with the relevant legislation) will be complied with under the new ownership and that competition in the telecoms market will not be substantially impaired (in accordance with Art. 23 TCA).

In February 2015 ComCom approved the application for the economic transfer of the Orange mobile radio licences to Xavier Niel. The terms of the licence are expected to be fulfilled under the new ownership and competition in mobile telephony is not expected to be adversely affected either.

On 23 April 2015 Orange then announced that the new brand name would be Salt.

Sunrise: IPO in 2015

The private equity company CVC Capital Partners (CVC) took over Sunrise Communications AG in 2010. At the beginning of 2015 was decided that Sunrise would go public. Sunrise announced its initial public offering (IPO) on 14 January 2015 and shares in Sunrise (SRCG) have been traded since 6 February 2015 on the SIX Swiss Exchange. Despite the IPO, CVC retained control over the licensee. According to Sunrise this was the largest new listing on the stock exchange in Switzerland since 2006.

3. Free choice of provider

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

In mobile telephony, consumers have a choice between three network operators and various providers which have concluded commercial partnerships with operators.

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, the roll-out of fibre by the urban utilities offers an additional choice to consumers via this third network infrastructure.

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.

Carrier preselection initially made a large contribution to stimulating competition, reaching 1.37 million connections in 2002, corresponding to one third of all connections. This number has since fallen continuously. Thus the number of preselections fell to 175,306 units in December 2015, down 23.9% over one year (-55,047 units). At that time, preselection involved less than

7% of connections. The net reduction in the number of connections with automatic preselection is attributable to the fact that customers are increasingly opting for cable networks or bundled products including VoIP telephony.

Consumer protection

In order to better protect consumers from an unwanted change of provider, in 2007 ComCom strengthened the practical steps for automatic preselection (Annex 2 of the ComCom Ordinance). Preselection orders placed by telephone must, for example, be registered and verified by a recognised third-party organisation (Third Party Verification). When registering, customers must in no case be influenced and must give their explicit consent to the oral conclusion of the contract. The entire sales conversation preceding the actual preselection application must also be recorded. In case of dispute, the customer can request this recording.

Consumer protection was again strengthened by the Federal Council's decision of October 2015 against abuse in relation to telephone canvassing. From 1 January 2016, the right of cancellation, which was previously restricted to door-to-door sales, will also apply to contracts concluded by telephone. Furthermore, the cooling-off period granted to the consumer was extended from seven to fourteen days, except for transactions under CHF 100. However, the extension of this right does not apply to the conclusion of an insurance contract or negotiations which consumers have expressly requested, nor to other contracts concluded remotely, notably transactions concluded on the internet.

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, in 2015 there was a considerable increase in the number of ported numbers compared to the previous year (+23%).

Teldas also specifies that number portability now relates primarily to the mobile sector, after the fixed network saw strong growth since 2004, and in particular in 2009 in the context of unbundling.

Thus almost 310,000 numbers were transferred on the mobile network during 2015 (compared to 230,000 in 2014, up 35%), which corresponds to approximately 2.5% of total mobile users. As in 2014, there was also a considerable increase (+35% compared to 2014) in ported numbers in the contract segment.

On the fixed network, the number is transferred only when the customer switches the connection operator, choosing the cable network, a VoIP service provider or another operator within the unbundling framework. Some 130,000 numbers were transferred to another operator in 2015, which represents approximately 4% 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 take their telephone number with them to other dialling code areas, as long as their service provider offers this possibility.

Speeding up the number porting process

In order to strengthen consumer rights and stimulate competition between telecommunications service providers, ComCom decided to shorten the time required for number porting. From 1 November 2015, fixed and mobile telephone numbers can be ported more quickly in the event of a change of provider.

The previous provider will be obliged to confirm to the new provider a request for portability for mobile telephone numbers within one working day at the latest, instead of 5 working days as was the case. Thus the new provider will more quickly have a guarantee that customers wishing to change provider can port their old number.

With all other telephone numbers - such as, for example, fixed telephone numbers or the added value service numbers, the confirmation must reach the new provider within two working days at the latest, insofar as the steps to be taken by the former provider are more numerous than for the transfer of a mobile telephone number.

Although the reduction in the time to confirm this request speeds up number portability, it is necessary to take into account the fact that a number transfer and a change of provider also involve other administrative processes and techniques which will result in some additional delay.

In addition, the original provider is henceforth obliged to comply with a request for portability even in case of disputes with the customer, for example with regard to the contract or the services provided.

IV. 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 Post 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 Regulatory Authorities” (RegInfra) administrative unit. The General Secretariat of DETEC 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 its activity is therefore not compromised as a result.

Very close practical cooperation exists with OFCOM, which prepares most of ComCom's business and produces briefs for legal proceedings. If one wishes to represent the revenue and expenditure of the telecoms regulator as a whole, the costs and revenues of OFCOM must also be included. In 2015, OFCOM's expenditure in the context of its different activities for ComCom, at CHF 3.03 million, were approximately CHF 167,000 lower than in the previous year. Revenue amounted to CHF 216,240.

The expenditure of the Commission and its administrative secretariat were practically the same in 2015 as in the previous year. In 2015 they amounted to some CHF 1.4 million (more detailed information is published in the Confederation's estimates and state accounts (cf. www.efv.admin.ch).

For the use of radio licences which are awarded by ComCom, the network operators pay either radio licence fees which are due annually or one-off amounts, in accordance with the respective auction results.

In 2015 the Confederation received CHF 1.2 million in annual radio licence fees. Since the last auction in 2012 featured an option for staggered payment, in 2015 an additional CHF 139 million of extraordinary revenue flowed into the federal treasury (the second payment tranche).

Abbreviations

ADSL = Asymmetric Digital Subscriber Line
BEREC = Body of European Regulators for Electronic Communications
FAC = Federal Administrative Court
CATV = Cable Television
COMCO = Federal Competition Commission
ComCom = Federal Communications Commission
DETEC = Federal Department of the Environment, Transport, Energy and Communications
DSL = Digital Subscriber Line
EDGE = Enhanced Data rates for GSM Evolution (GSM technology)
FDD = Frequency Division Duplex (2 radio channels are used to establish a connection)
FTTB = Fibre to the Building
FTTC = Fibre to the Cabinet
FTTH = Fibre to the Home
FTTS = Fibre to the Street
GPRS = General Packet Radio Services (GSM technology)
GSM = Global System for Mobile Communications (Standard for 2G mobile radio networks)
HDTV = High-Definition Television
HFC = Hybrid Fiber Coaxial
HSDPA = High Speed Downlink Packet Access (UMTS technology)
IC = Interconnection
ICT = Information and Communications Technology
IP = Internet Protocol
IPTV = Internet Protocol Television
ISDN = Integrated Services Digital Network
ISP = Internet Service Provider
LRIC = Long Run Incremental Costs (Model for calculating interconnection prices)
LTE = Long Term Evolution (Mobile radio standard for 3.9G and 4G systems)
LTE-A = LTE-Advanced (Standard for 4G mobile radio networks)
NFC = Near Field Communication
NGA = Next Generation Access Network
MEA = Modern Equivalent Asset
OFCOM = Swiss Federal Office of Communications
PSTN = Public Switched Telephone Network (conventional telephone network)
SMS = Short Message System
SVOD = Subscription Video on Demand
TCA = Telecommunications Act (CC 784.10)
TDD = Time Division Duplex (bidirectional communication on a single radio channel)
TSO = Telecommunications Services Ordinance (CC 784.101.1)
UMTS = Universal Mobile Telecommunications System (Standard for 3G mobile radio networks)
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