



EUROPE

ERICSSON MOBILITY REPORT APPENDIX

MARKET OVERVIEW

Europe has mixed levels of maturity in its ICT (Information and Communications Technology) industry, from very advanced markets like Sweden, through to those in Eastern Europe that are still developing. However, these differences are getting smaller. Europe has the highest mobile penetration in the world – most countries reached above 100 percent 2 to 3 years ago, and some even earlier. It is difficult to make general assumptions about penetration based on geography or income levels. Emerging markets such as Russia or Kazakhstan now have amongst the highest mobile penetration levels in Europe.

Multi-SIM and multiple devices

Penetration rates are significantly affected by Multi-SIM ownership, as European consumers have an average of 1.2–1.3 mobile subscriptions each. There are different reasons for multi-SIM behavior in Western and Eastern Europe. One of the reasons for Eastern Europe's high penetration levels is the high number of inactive SIM cards. However the share of such subscriptions is decreasing every year. Another reason is that people in the region often buy additional SIM cards to economize, while in Western Europe they do so in order to have a mobile connection for more than one device.

For example, in Poland 30 percent of users have more than one SIM, and a quarter of these want to take advantage of cheaper calls. In the UK, 37 percent of multi-SIM users do so to connect another device.¹ This trend in Western Europe is supported by recent operator strategies to optimize tariffs by launching services such as special shared data plans for those with multiple devices. Such services are also being aimed at families as they will enable multiple users on one account. This simplifies the management of subscriptions and helps control costs across family members. For operators, this may help to reduce churn.

Multi-device behavior has become more common in Eastern Europe too, and has initially appeared in big cities. Ericsson research shows that a third of internet users in Moscow use three different devices – smartphones, tablets and laptops – to access the internet, depending on the situation. Not all of these internet-capable devices are directly connected to cellular networks. In Russia as a whole, 19 percent of respondents with more than one SIM card stated that their additional cards were for multiple devices. This highlights a closing gap in maturity levels between Western and Eastern Europe that is especially pronounced between cities in the two regions.

Mobile broadband and smartphone development

Mobile broadband is a key driver for market growth. As smartphones, other 3G/4G-enabled devices and data packages become more affordable, the range of mobile data applications grows. Consumer behavior in Eastern Europe is now shifting from voice-centric to data and app-centric. In Western Europe, we can already see mass demand for apps and services that significantly change everyday life.

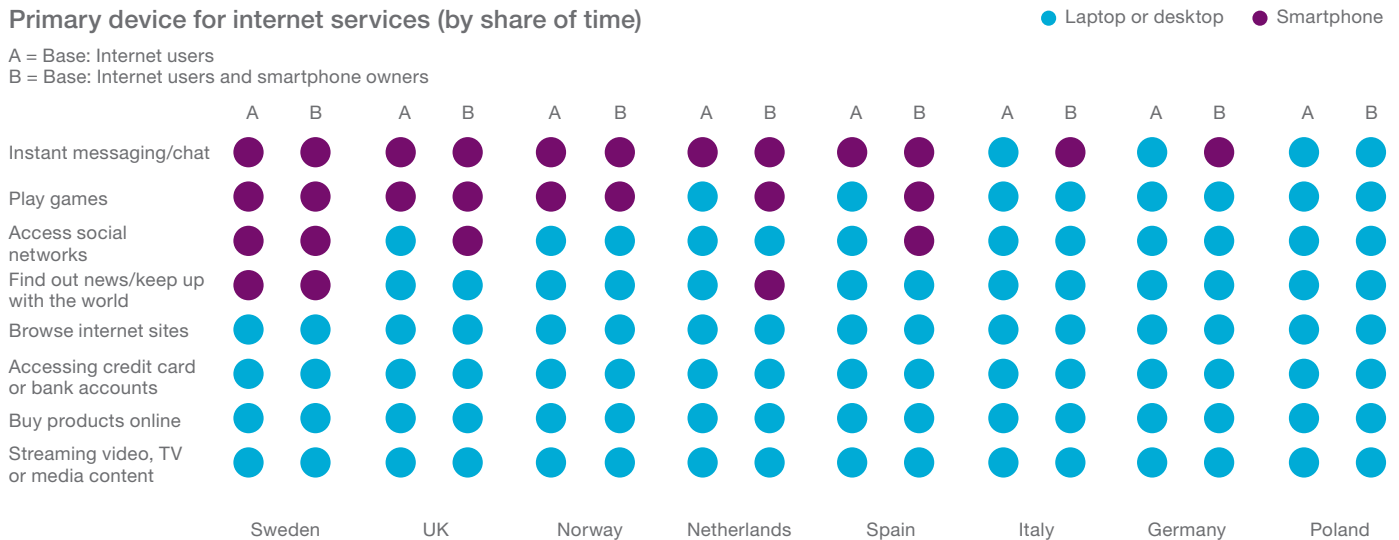
The continued growth in smartphone penetration has brought with it a correlated shift in user behavior. For example, in countries with greater smartphone adoption, there are significant changes in the way consumers access internet services. This is especially true in Norway, Sweden, the UK and the Netherlands. Smartphones are now commonplace in these countries, with the device's penetration levels among internet users now above or well above 60 percent. This means that it could potentially be the primary device for accessing any internet services. Instant messaging and games are the two apps for which the smartphone is becoming the device of choice. This is followed by social networks and news services, as shown in the graph on the opposite page. This is a common development for mature markets that are evolving from a PC-centric position. However, in many developing markets around the world, the smartphone is the primary device for all internet services – leapfrogging the PC stage.

¹ Source: Ericsson ConsumerLab (2013)

Primary device for internet services (by share of time)

A = Base: Internet users

B = Base: Internet users and smartphone owners



Source: Ericsson ConsumerLab (2013)

Base: Internet users aged 16-60

The chart above shows that the smartphone is already the primary device for some services in markets with a high mobile penetration, as illustrated in column A (all internet users aged 16-60). This trend is more pronounced if we just analyze smartphone users. This is shown in column B (a subset of the internet users in column A that also own a smartphone) and is illustrated by the increase in the number of services for which the smartphone is the primary device, and the number of countries where it now appears as the primary device.

This change in behavior is driven by the fact that smartphones enable users to always be connected and have instant access to services. This type of usage fits with the flow of everyday life and satisfies the consumer need to be up-to-date and connected. The trend for constant connection is expected to continue across Europe as smartphone penetration increases. This is further reflected by the fact that 50 percent of people who are looking to buy a new smartphone state that one of the most important factors for getting the device is to be able to use it anytime and anywhere. In addition to this, a further 35 percent state that keeping in touch with friends via a number of different applications is most important to them.²

The further development of more applications and cloud technologies will support this change, seeing the smartphone become the primary device for more internet services. It is not the primary device for video today, but it plays a significant role in this area. For example, Ericsson consumer research into active TV and internet users shows that 62 percent of Germans use a tablet, laptop or a smartphone to watch TV or video on a weekly basis, and 27 percent use any of those mobile devices to watch TV or video outside of the home on the same basis. This type of usage is typical in Western Europe, and even more pronounced in Sweden, where viewing outside of the home jumps to 42 percent. In France, one in four state that they watch video on a smartphone on a weekly basis, with their viewing time exceeding three hours. This trend for viewing video content on a smartphone is becoming commonplace across Western Europe. In Italy and Spain, smartphone owners who watch video on their device state that they view more than four hours of content on a weekly basis.²

² Ericsson ConsumerLab (2013)

MOBILE SUBSCRIPTIONS

In 2013, the total number of mobile subscriptions in Europe was around 1.1 billion, and this is expected to increase by another 20 million by the end of 2014. Furthermore, mobile subscriptions in the region are forecast to grow with a CAGR of 2 percent between 2013 and 2019, reaching around 1.3 billion.

LTE subscriptions

In Europe, every country has WCDMA/HSPA networks and more than half have launched LTE. Western Europe has the largest number of LTE subscriptions, whereas Eastern Europe lags behind due to spectrum being awarded later.

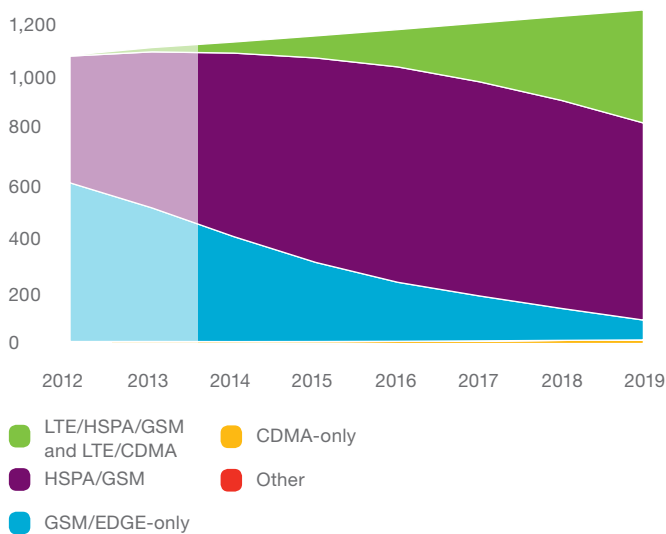
Sweden and Norway launched LTE in 2009, becoming the first in the world to do so. The number of LTE subscriptions in Europe at the end of 2013 reached around 16 million, equivalent to just over 1 percent of all subscriptions. However, this is expected to grow by

almost three times by the end of 2014. The number of LTE subscriptions will reach around 425 million by the end of 2019, which will equate to around 30 percent of all mobile subscriptions. In Western Europe LTE will reach 50 percent penetration, and in Central and Eastern Europe it will reach 20 percent penetration by 2019.

Smartphone subscriptions

Europe's smartphone penetration is already amongst the highest in the world. The number of subscriptions for this device was around 400 million in 2013, accounting for around 40 percent of all subscriptions. The number of smartphone subscriptions in Europe is expected to grow by around 20 percent during 2014 to 475 million and will represent almost half of all mobile subscriptions. The CAGR will be around 12 percent between 2013 and 2019, and the number of smartphone subscriptions will reach around 765 million – surpassing the total population number.

Mobile subscriptions, Europe (million)

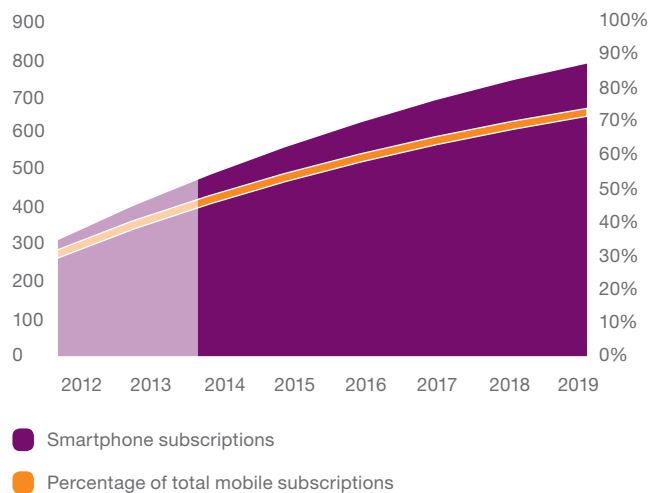


Mobile subscriptions do not include M2M subscriptions

30%

of mobile subscriptions will be LTE by the end of 2019

Smartphone subscriptions and penetration, Europe (million and percent)



MOBILE TRAFFIC

Mobile traffic in Europe will exceed 4 ExaBytes per month by the end of 2019 – around 8 times more than 2013. Mobile voice traffic will slightly increase in the coming years, but will have a lower impact on total mobile traffic volumes. Mobile data traffic is continuing to grow steadily, and increased around 65 percent in 2013 compared to 2012. It is expected to rise by a CAGR of around 40 percent between 2013 and 2019, due to the availability of affordable data-centric mobile devices and attractive data plans creating significant increases in usage per subscription. The rapid uptake of these devices, including both smartphones and tablets is fueling consumer demand for a better user experience.

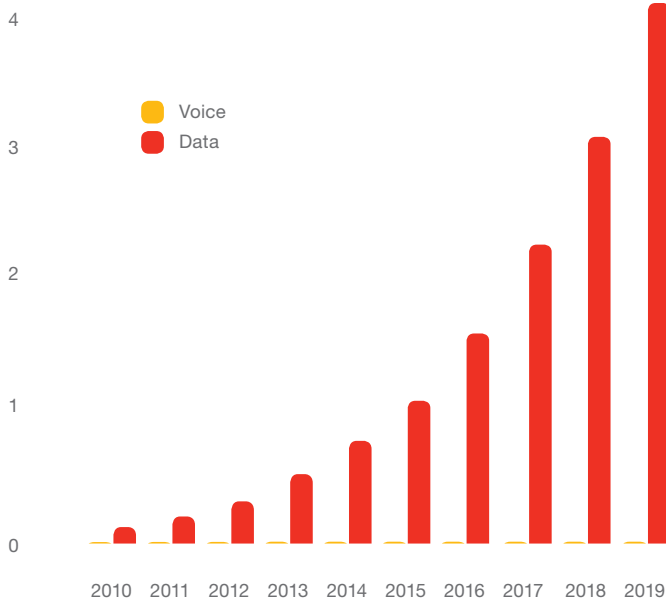
Smartphone data traffic will grow about 7-fold between the end of 2013 and the end of 2019.

The amount of data used on each active smartphone subscription will substantially increase from an average of 0.8 GB per month in 2013, to a forecast average of around 2.8 GB per month in 2019.

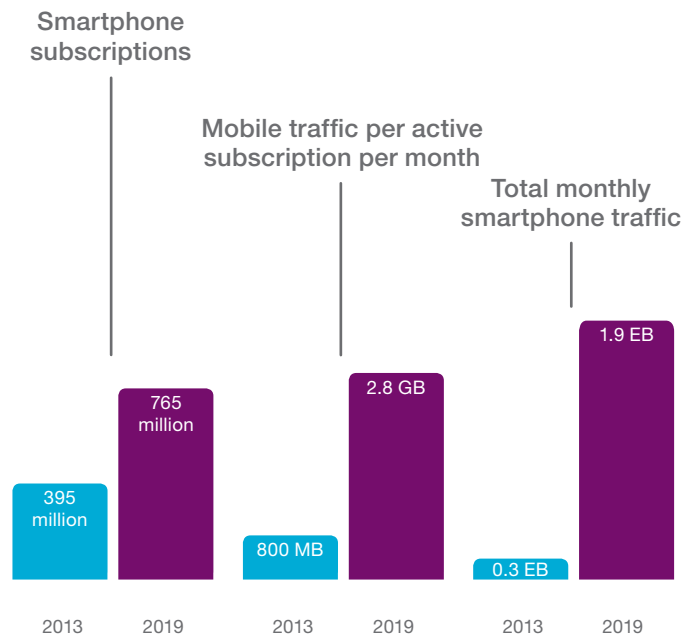
One of the key drivers of increased mobile data usage among consumers is the growth of video consumption on mobile devices, both at home and on the go.

The improved speed and capacity of HSPA networks is an important factor supporting this trend. The deployment of LTE across Europe will further enhance the user experience.

Mobile traffic, Europe (monthly ExaBytes)



ExaBytes = 10¹⁸ bytes.



Active subscriptions here refer to the number of used devices, i.e. not including multiple-SIMs or inactive devices.

7X

growth in smartphone traffic between 2013 and 2019

POPULATION AND APP COVERAGE

Population coverage

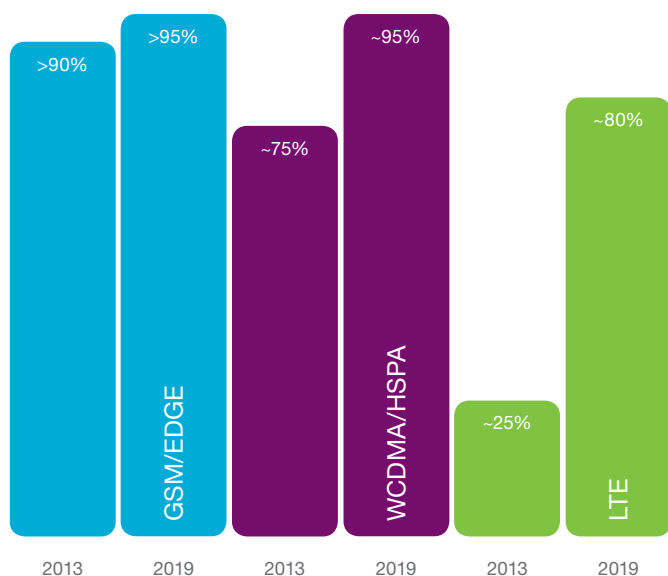
Europe was one of the earliest adopters of wireless technologies. During the early 1990s, GSM was rolled out across the region. 10 years later, commercial WCDMA networks were being deployed. These early rollouts are reflected in the high population coverage of over 90 percent for GSM/EDGE, and around 75 percent for WCDMA/HSPA that we see today. GSM/EDGE is estimated to increase to over 95 percent by 2019. It is forecast that WCDMA/HSPA coverage will reach around 90 percent of the population by 2019.

Operators are now deploying 4G/LTE coverage and capacity to meet the growing demand for mobile internet services. Sweden, Norway, Germany, France and the

UK are at the forefront of introducing LTE in Europe, and projects for its roll out in the remaining countries are currently ongoing. LTE deployments and the rapid uptake of LTE-enabled devices are contributing to significant improvements in user downlink throughput.

It was estimated that by the end of 2013, LTE covered around 25 percent of Europe. It is forecast that it will cover around 80 percent by 2019. Hence, Europe will have around 15 percentage points higher population coverage compared to the worldwide average in 2019. European networks can easily be upgraded to handle LTE, given that a high proportion of them have been modernized and can support multi-standard technologies.³

Population coverage, Europe



App coverage

There are millions of apps available to download from application stores and marketplaces, and this number is constantly increasing. It is challenging to deliver sufficient performance for each app everywhere, all the time – or even to know what they all require.

In response to this challenge, a new approach to network performance – app coverage – has been proposed by Ericsson.

Apps that involve streaming media depend on downlink throughput rates. Streaming apps tend to use mechanisms to ensure consistent network performance. However, if downlink throughput is not high enough then time-to-content increases, meaning that users need to wait longer before the video is launched. The risk of media freezing during the streaming process also gets higher.

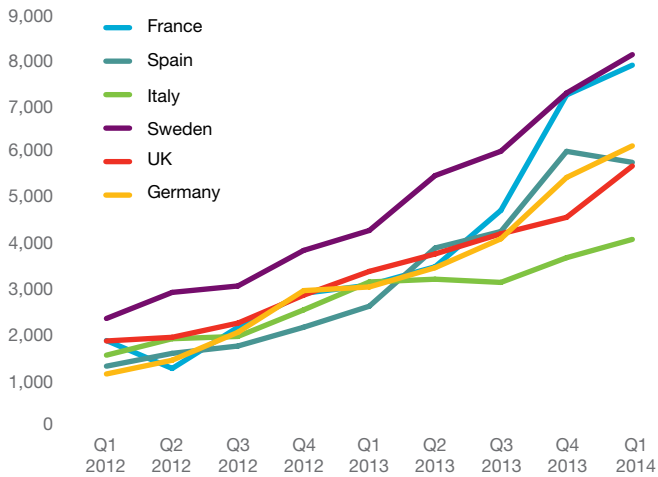
App coverage

The coverage area for any given app is relative to the level of network performance needed for it to function. App coverage describes the area within which there is a high probability of experiencing sufficient network performance to run a given application, e.g. video streaming or web browsing. Its

usefulness comes from the fact that smart devices and apps continually evolve to encompass newer capabilities, and therefore require more network resources to provide a good user experience. App coverage is an integrated view of mobile broadband, network coverage, capacity and quality.

³ Population coverage is the proportion of the population in an area that has sufficient signal to connect to a mobile network. It should be noted that the ability to utilize the technology is subject to other factors as well, such as access to devices and subscriptions.

Median (50% probability) downlink throughput (Kbps)



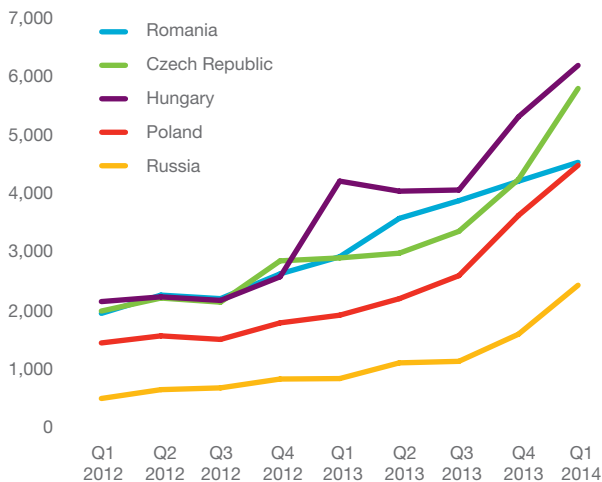
Source: Ericsson analysis of data from Speedtest.net provided by Ookla (2014)

Network performance measurements from Speedtest.net have been analyzed by Ericsson to calculate median and cell edge downlink data throughput rates. A user has a 50 percent probability of getting the median rate or higher, and a 90 percent probability of getting the cell-edge rate or higher throughout the network coverage area.

In Western Europe, median values have grown over the last two years. Sweden stands out amongst the download speed measurements with a peak rate of over 8 Mbps in Q1 2014. This can be explained by high capacity HSPA networks and early deployment of LTE coverage. France has shown steady growth in the last few quarters due to the deployment of LTE and a strong marketing push.

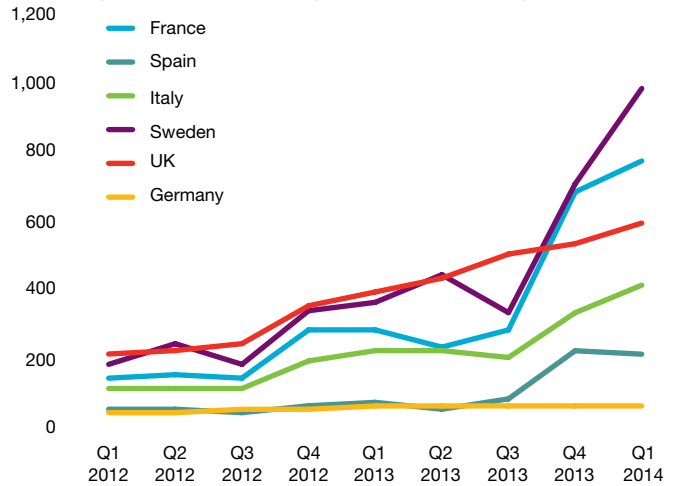
The 90 percent downlink probability measurement is a proxy for cell-edge performance. It has been improving in Western Europe as well. Sweden, France and the UK have progressed the quickest, with France making notable improvements in Q4 2013. Despite this, none of the countries studied could adequately support 720 Kbps – the downlink speed associated with standard-quality video streaming.

Median (50% probability) downlink throughput (Kbps)



Source: Ericsson analysis of data from Speedtest.net provided by Ookla (2014)

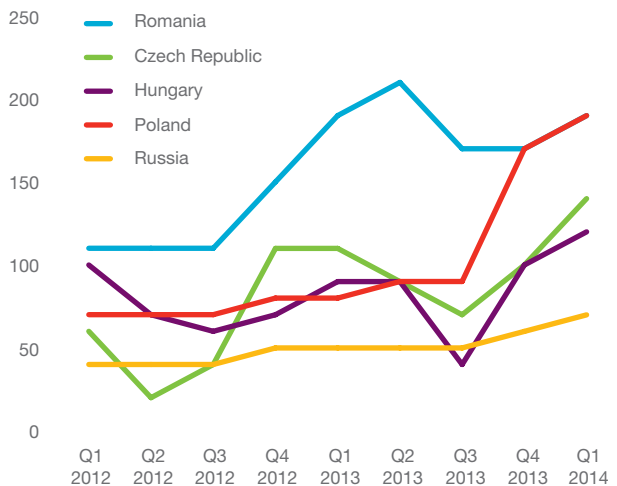
Cell edge (90% probability) downlink throughput (Kbps)



In Eastern Europe median downlink speeds have more than doubled in the last two years. Hungary has the fastest speeds, while Poland is catching up. Russia is also improving and in 2013 it saw a fourth commercial WCDMA/HSPA network launched, whilst LTE covers more than one-third of its population. As smartphone penetration is lower in Eastern Europe compared to Western Europe, good median performance is also the result of relatively less network load. Eastern Europe figures for cell-edge performance do not show sensitive improvements compared to improvements in median values.

The number of subscriptions in Europe is growing, with LTE representing an increasing share. Data traffic growth in the region is impressive and is mainly driven by new video habits. As user behavior switches to an always-connected paradigm, so their expectations increase. In order to meet these needs networks have to become more powerful and flexible in order to provide the right coverage and quality for each device in every place at any time. In this way it will be possible to use ICT to foster smart innovations that benefit people, businesses and society.

Cell edge (90% probability) downlink throughput (Kbps)



Ericsson is the driving force behind the Networked Society – a world leader in communications technology and services. Our long-term relationships with every major telecom operator in the world allow people, businesses and societies to fulfill their potential and create a more sustainable future.

Our services, software and infrastructure – especially in mobility, broadband and the cloud – are enabling the telecom industry and other sectors to do better business, increase efficiency, improve the user experience and capture new opportunities.

With more than 110,000 professionals and customers in 180 countries, we combine global scale with technology and services leadership. We support networks that connect more than 2.5 billion subscribers. Forty percent of the world's mobile traffic is carried over Ericsson networks. And our investments in research and development ensure that our solutions – and our customers – stay in front.

Founded in 1876, Ericsson has its headquarters in Stockholm, Sweden. Net sales in 2013 were SEK 227.4 billion (USD 34.9 billion). Ericsson is listed on NASDAQ OMX stock exchange in Stockholm and the NASDAQ in New York.

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