

ANNUAL REPORT 2016



POST AND TELECOM
ADMINISTRATION
IN ICELAND

TABLE OF CONTENTS

Address by the Managing Director	3
Telecom affairs.....	3
Postal affairs.....	5
Closing words.....	5
The Electronic Communications Market	6
Monitoring status.....	6
PTA statistical reports.....	6
Nordic statistical report.....	6
Market analyses.....	7
Main tasks in the field of market analysis in 2016.....	7
Main tasks related to monitoring of obligations in 2016.....	8
Changes of regulatory framework in step with technical development.....	9
Internet of Things - new rules on numbers for connected devices	9
Net neutrality - open and efficient communications for all.....	9
Universal services in electronic communication, not without limitations.....	10
Electronic Communications Technology and Distribution	12
Electronic communications frequency spectrum - a limited resource.....	12
PTA frequency policy and frequency allocations for the year 2015-2018	12
Limited offer of FM frequencies for radio in the capital city area	13
Iceland optical connected - rapid spread of next generation fixed line networks.....	13
Quality of electronic communications connections on roads interactive web map	15
Security in Electronic Communications.....	16
Security of electronic communications infrastructure	16
Study of mobile network transmitters in the vicinity of Katla volcano	16
Surveillance of frequency spectrum - PTA interference monitoring.....	16
Nordic cooperation	17
Computer Security Incident Response Team CERT-IS.....	18
Postal Affairs	19
Tariff within monopoly	19
Changes in distribution	20
Reduction in delivery days in the countryside.....	20
Access points.....	20
Letter boxes.....	20
Consumer Issues	21
Price monitoring on the electronic communications market	21
Major change in pricing of roaming within the EEA.....	21
Rules of procedure on registering and dissemination of information in telephone directories.....	22
Post and Telecom Administration 2016	23
Registered Providers of Electronic Communications Networks and Service	24

ADDRESS BY THE MANAGING DIRECTOR



TELECOM AFFAIRS

Status of electronic communications in Iceland in an international context

This year the International Telecommunication Union (ITU) published its analysis of the status and development of the information society worldwide. In this report, states are listed by score and the results according to criteria used to measure the status and development of the information society. The main criteria are access, use and skills of users. Taking all of these into account, Iceland has the second highest score in this international total ranking, behind first placed South Korea.

The overall conclusions demonstrate steady development of the information society in all countries on the list, but there is however a great difference between states and world regions. Iceland's good position on the list shows that access to electronic communications and use of the Internet in this country are among the best in the world.

Competition generates an advantage for consumers

The rapid development of electronic communications and of the information society in this country are among other things, grounded on the opening of the electronic communications market to competition and to the regulatory framework that was introduced to support development of competition on the market. In this context one can among other things mention the entry of NOVA into the market in 2007. It was the opinion of a panel of judges from the media companies Fréttablaðið, Stöð 2 and Vísir that Björgólfur Thor's sale of NOVA to the American asset management company Pt Capital Advisors was the trade of the year in 2016. Björgólfur Thor's website www.btb.is, states that the entry of NOVA into the market was contributory to a significant drop in the price of mobile phone services which represented a gain for the people of the country, valued at more than ISK 60 billion over a period of 10 years. Whether this figure is correct or not, it is clear that Icelanders have profited significantly from competition on the electronic communications market. In the case of NOVA, competition has mainly been in the mobile phone section of the market, which represents just under one

third of the total market. Competition can be found in various sections of the electronic communications market, e.g. in fixed line telephony, in Internet service and in TV service. One could therefore argue that the total consumer gain from competition in electronic communications is significantly higher, even twice as much, which would mean more than ISK 100 billion over a 10-year period. This shows without a shadow of a doubt how important it is to support open markets with an effective regulatory framework and with surveillance which assures flourishing competition for the benefit of consumers.

The Electronic Communications Plan and the development of high-speed networks

The Electronic Communications Plan includes objectives for very good access to high-speed network services, both in networks provided at a fixed location and in mobile networks. The development of electronic communications infrastructure, rests mainly on parties to the market. Government supports the development of infrastructure where markets have failed to do so. The Telecommunications Fund has in recent years provided funds for the development of electronic communications infrastructure in less populated areas. The objective of the authorities is for the vast majority of citizens to enjoy good connections to the Internet and thus become active participants in the information society. It is expected that at the end of the decade, almost all households in the country will have a 100 Mb/s connection provided at a fixed location.

Distribution of high-speed mobile networks has spread rapidly in recent years. The objective of the authorities is that all citizens will have high-speed mobile networks in their homes and that distribution will cover 80% of Iceland's land mass and over 99% of fishing grounds to a distance of 40 miles from the shore. Parties to the market will mainly develop their mobile networks in such a manner that most of these objectives will be achieved in this decade. The main risk is that inhabitants in the countryside may not enjoy high-speed mobile network service and that part of the country's landmass will not be covered by the distribution. The authorities must examine measures that will ensure achievement of the objectives of the Electronic

Communications Plan. This can e.g. be achieved by imposing distribution requirements in frequency range licences, by supporting the development of well-connected electronic communications transmitters in remote areas, by supporting increased sharing of electronic communications infrastructure and in certain exceptional cases by funding the development of mobile phone network infrastructure on a community basis. In the light of the fact that mobile networks play an ever-increasing role as a public safety device, the situation may arise where the authorities act to increase operational security of mobile networks.

Increased frequency licences for mobile networks

During the year, the Administration began its preparations for the allocation of a major increase in frequency ranges for mobile networks. It is expected that accessible bandwidth in the frequency spectrum will more than double in the coming years with the allocation of various new frequency bands. This is done in the light of a huge increase in the use of data transfer in mobile networks which is predicted to continue. This increase in bandwidth should mean that it will not be problematic for mobile phone companies to offer general data transfer speed of 100 Mb/s or greater given good conditions.

Increased radio interference goes hand-in-hand with increased use of mobile networks and increased assignment of frequency licences. In this respect, 2016 was a record year. It is important that the Administration has an adequate operational basis to deal promptly and effectively with all damaging radio interference throughout the whole country.

Internet of Things

There is every indication that there will be a huge increase in the connection of various things and equipment to the Internet, either by wireless or cable – the Internet of Things. It is likely that the next generation of mobile networks, 5G, will be specifically designed for operation and management of all kinds of things and the services they relate to. The role of the authorities is to remove obstacles to this development and to protect the interests of the public, among other things in their dealings with parties to the market. To meet this development, the Administration has already amended rules governing telephone numbers; matters related to frequencies are being examined and there are plans to further increase surveillance of operational security of mobile networks and cyber security.

Operational security of electronic communication networks and PTA surveillance

The Administration has recently conducted field research on the operational security of electronic communications networks. In 2015, Mila hosting facilities were inspected at 6 locations. The Administration raised some issues regarding the state of affairs. Work was also done on an inspection of the security of mobile network transmitters in the Katla volcano evacuation zone in the light of imminent natural catastrophe in that area. The Administration has furthermore sent its plans to the Ministry of Foreign Affairs for stricter surveillance of physical security of the electronic communications network. The Administration considers it important to actively support optimum security as it is clear that electronic communications networks are the foundation of the current industrial revolution and foundations must be as secure as possible.

Electronic communications regulation framework in a process of change

Major changes are expected to the electronic communications regulatory framework.

This year the EU Commission published its ideas on development of the electronic communications regulatory framework. If these ideas are realised, they will lead to measures to support development of high-speed networks, to increased access to electronic communications services and to further strengthening of the regulatory framework for Internet of Things. Furthermore, a regulatory framework on net neutrality and security will soon be introduced, and a regulatory framework for economic development of electronic communications infrastructure.

Distribution of TV and radio

Electronic communications have mostly taken over as distribution systems for TV. The use of such technology, including Siminn TV and Vodafone PLAY in this country is well ahead of such use abroad. This brings certain challenges in market development and a distinct risk that in the long term this development could lead to oligopoly on the market as smaller parties find it difficult to emulate the product offer of the large companies. The situation could furthermore arise where access to specific material could be limited to a specific access network, which would mean that consumers would need to switch access network or to have more than one active connection to the household if they wish to have access to all material that interests them.

The time has come to review the arrangement for radio services on the FM frequency range, at least in the capital city area. A lack of suitable transmitter locations for FM transmitters has restricted possibilities for new radio stations and the Administration needs to limit access for parties to the market to the FM frequency spectrum by authorising only one frequency for each programme. Discussions must be launched on facilities for radio transmission equipment, on the organisation of the FM frequency spectrum and on the introduction of newer technology for high quality digital radio e.g. with DAB technology.

POSTAL AFFAIRS

Postal services have been compromised because of diminishing letter volume. The part of Íslandspóstur operations handling universal services public postal deliveries has been run at a loss. In an attempt to counteract this loss, it was decided to authorise simplification of mobile postal delivery in country areas such that delivery is every other working day, three days and two days a week alternately. Estimated savings of this economy measure amount to approximately ISK 200 million per annum. There seem to be some gains resulting from a substantial increase in Internet shopping by Icelanders and the resulting parcel post. But not everything is as it seems in this respect, as obligations according to international agreements mean that pricing of certain international postal deliveries, particularly from China, cause services to be run at a loss. These changes however, appear on the whole to mean that the operations of Íslandspóstur appear to be heading towards equilibrium after many lean years at the company. This situation should facilitate the adoption of the new postal laws where monopoly on delivery of 50 g letters will be removed.

CLOSING WORDS

It is likely that surveillance of electronic communications will change significantly in the coming years in the light of service offered through the Internet. The business model of the largest Internet operators such as Google, YouTube, Facebook and others is based on leveraging personal information provided by users, wittingly or unwittingly, when using the service in question. The user's "payment" for the service is in the form of providing information about himself. It is clear that these international companies have gathered an enormous amount of personal information about users. In many instances, this information

is analysed with highly sophisticated artificial intelligence technology which creates a user profile. This profile is then used as a basis for offering various kinds of service that an Internet user might want. Internet service, e.g. search is thus tailored to the needs of each individual. It is also possible to generate a profile on other characteristics of the individual, e.g. his political views. It is thought that such profiles were used recently to influence elections in neighbouring countries by sending tailored information to users, e.g. on Facebook. One can deliberate on how many of the people who received such messages were aware of the fact that after accepting terms of business of the large service providers, their political views were analysed in this manner. There are currently provisions in the Electronic Communications Act related to the protection of electronic communications traffic information, i.e. information on who calls whom, at what time, the length of the conversation, etc. This information is thus in some respects analogous to the information collected by the large Internet providers. This information shall be kept for 6 months for the purpose of investigations and then deleted. Processing of this information is also governed by strict rules, and electronic communications companies may only use the information for processing invoices. The Administration monitors compliance with these rules, e.g. with on-site inspections.

The above means that a certain imbalance has been created. Electronic communications traffic information is subject to strict surveillance within the country, while the collection and storage of personal information by international Internet providers - which in many instances is more over-reaching and more detailed than any of the electronic communications traffic information - is subject to almost no surveillance whatsoever up to this point in time. It could be that public opinion on protection of personal information has changed such that this collection by Internet service providers is considered normal. It is however clear that the debate on protection of electronic communications traffic information in this country indicates that the public considers it to be extremely significant. It is not unlikely that this imbalance will be brought before the legislature in the political arena sooner or later, either for relaxation of the rules on electronic communications traffic information or for tighter surveillance of the collection of personal information by international Internet service providers. Regardless of the above, there is every reason for the public today to consider how such information is provided.

Hrafnkell V. Gíslason

THE ELECTRONIC COMMUNICATIONS MARKET

MONITORING STATUS

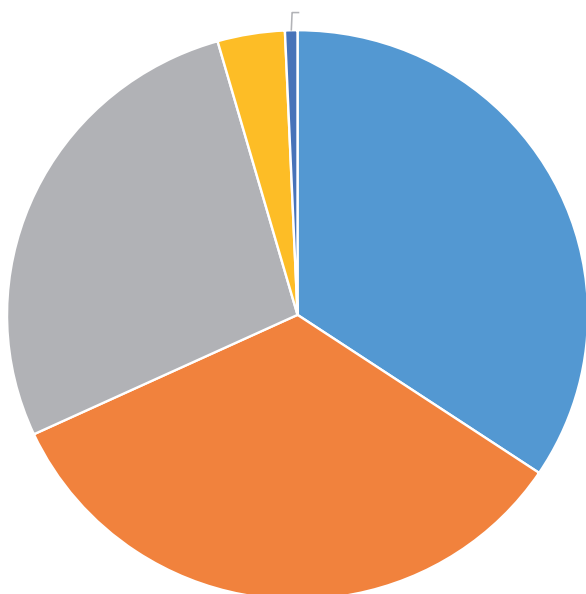
PTA statistical reports

Twice a year, the Post and Telecom Administration (PTA) gathers information from registered electronic communications companies in this country on various quantities in electronic communications operations and services. The Administration processes these numbers to provide statistical reports which show information on the main quantities and companies on the Icelandic electronic communications market. The reports are published twice a year, in the second quarter for the whole preceding year and in the fourth quarter for the status in the middle of the same year. The objective is to improve provision of information and to increase transparency on this market, where the PTA reports correspond to reports published by sister institutions in our neighbouring countries. See statistics on the Icelandic electronic communications market for the first half of 2016 on the PTA website.

A statistical report for the first half of 2016 shows, among other things, that there is active competition on the mobile network market and that division of the market between the three largest companies is more or less equal, where Nova has 34% market share, Siminn just under 34% and Vodafone has approximately 27.5%. On the market for Internet service, Siminn has a 49% share, Vodafone just over 28%, 365 has just under 12% and other parties have less. The position on the market for fixed line networks has remained fairly stable during the past years where Siminn is by far the largest with about 63% market share with Vodafone coming next with 23%.

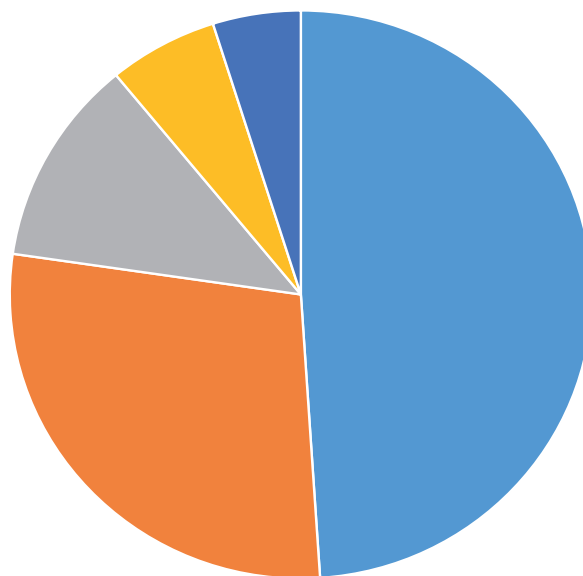
Mobile subscriptions

Market share by companies



Internet subscriptions

Market share by companies



Nordic statistical report

A statistical report is issued annually in cooperation with the PTA and its sister institutions in the Nordic countries and in the Baltics. The report gathers comparative data on the use of the main components of electronic communications service and on developments during the past years, in the eight countries.

On the whole, use of electronic communications is very similar in these countries and their citizens use comparable technology in a similar way. Despite this fact, one can nevertheless see different usage and development of specific features. The report can be accessed on the PTA website

MARKET ANALYSES

Market analyses of the electronic communications market constitute a large part of PTA operations. They are used to strengthen competition by analysing the position of parties to the market and by applying appropriate measures where competition is not considered adequate. The market analysis is the basis for decisions on whether to impose, maintain, change or lift specific regulatory obligations on electronic communications companies that have been designated as having significant market power.

Implementation of market analysis can be divided into 3 phases:

1. Define the relevant service markets and geographical markets
2. Analyse all markets, determine whether there is active competition on these markets and make a decision on whether one can find one or more companies with significant market power
3. Make a decision on whether obligations shall be imposed, amended or withdrawn on companies with SMP

The PTA makes analyses on the markets specified in the EFTA (ESA) Recommendations in accordance with the Electronic Communications Act and with Iceland's obligations pursuant to the EEA Agreement. Furthermore, the electronic communications legislation prescribes that the PTA define these markets in accordance with circumstances specific to Iceland. This means that one can allow for variations between the PTA market definition and the definition in the Recommendation. The PTA is furthermore authorised to study other electronic communications markets than those listed in the Recommendation. The ESA Recommendation currently in force was issued on 11 May 2016 and it lists fewer markets than in the prior ESA Recommendations on the same subject, which were published in 2004 and 2008. It was considered that in general not all markets in the 2008 Recommendation still fulfilled conditions that made them susceptible to the imposition of ex-ante obligations. The markets where there is an obligation to examine pursuant to the current ESA Recommendation from 2016 are the following wholesale markets:

- Market 1: Call termination on individual public telephone networks provided at a fixed location.
- Market 2: Voice call termination on individual mobile networks.
- Market 3: a) Local access provided at a fixed location.
b) Central access provided at a fixed location for mass-market products.
- Market 4: High quality access provided at a fixed location.

The PTA analysis on the following wholesale markets based on the ESA Recommendation from 2008 are still in force:

- Market 4: Network infrastructure access (including shared or fully unbundled access) at a fixed location. (PTA Decision no. 21/2014)
- Market 5: Broadband access (PTA Decision no. 21/2014)
- Market 6: Terminating segments of leased lines. (PTA Decision no. 8/2014)
- Market 7: Voice call termination on individual mobile networks. (PTA Decision no. 20/2015)

In addition to this, analysis of the following wholesale market based on the ESA Recommendation from 2014 is still in force: Trunk line segments of leased lines, which was previously Market 14. (PTA Decision no. 21/2015). In 2016, the Administration completed analysis of the retail market for access to the public telephone network and for the wholesale markets for origination and termination of telephone calls in public telephone networks provided at a fixed location in accordance with the Administration's yearly plan.

Furthermore, continuing emphasis will be placed on following up the obligations that have been imposed subsequent to market analysis and particularly on cost analysis of wholesale prices and review of reference offers.

It is planned to analyse the following markets in 2017 in accordance with the ESA Recommendation from 2016:

- Market 3: a) Wholesale local access provided at a fixed location
b) Wholesale central access provided at a fixed location for mass-market products (previously Market 5/2008).
- Market 4: High-quality access provided at a fixed location (previously Market 6/2008).

Main tasks in the field of market analysis in 2016

On 23 December 2016. The PTA published two Decisions subsequent to market analysis of markets for voice telephony on public telephone networks provided at a fixed location. On the one hand, there was Decision no. 22/2016 on the designation of companies with significant market power on the wholesale market for call termination on individual public telephone networks provided at a fixed location, Market 1/2016. On the other hand, there was Decision no. 23/2016 on market analysis of the retail

market for access to individual public telephone networks provided at a fixed location (Market 1/2008) and on the wholesale market for call origination in public telephone networks provided at a fixed location (Market 2/2008).

With the PTA Decision no. 22/2016 on 23 December 2016, Síminn, Vodafone, Nova, Hringdu, Símafélagið and Tismi BV were designated as companies with significant market power on the wholesale market for call termination in public telephone networks provided at a fixed location and obligations were imposed on these companies, including obligation for access, non-discrimination and price control. The PTA lifted the obligation on Síminn for publishing a reference offer and the obligation on Síminn and Vodafone for separation of accountancy.

With Decision no. 23/2016 obligations were lifted from Síminn on the wholesale market for call origination as the relevant market no longer fulfilled the criteria for designating a party with significant market power and for the imposition of obligations, as there were no longer significant market barriers to the relevant market. With the same Decision, obligations were also lifted from Síminn on the retail market for access to the public telephone network provided at a fixed location. The relevant market no longer fulfilled the criteria for designating a party with significant market power and for the imposition of obligations, as there were no longer significant market barriers to the relevant market. The Administration relieved Síminn of obligations on the relevant markets at the end of 2017 so that the companies with wholesale transactions with Síminn have an adequate glidepath to adapt to changed circumstances. In the autumn of 2016, national consultation was opened on the PTA draft analysis of the above specified markets. Market 1/2016 was analysed separately while Markets 1/2008 and 2/2008 were analysed together. Consultation on the draft analyses was open from the second week of October 2016 for a period of 4 weeks. Comments were received from the Competition Authority. On 22 November 2016, the draft decisions were sent for consultation to the EFTA Surveillance Authority (ESA) and to other electronic communications regulatory bodies in the EEA with reference to Article 7 of Act no. 69/2009 on the Post and Telecom Administration. These parties raised no objections to the draft decisions which meant that the PTA could make a formal decision in the matter in accordance with the draft decisions.

Main tasks related to monitoring of obligations in 2016

Price decisions

On 28 October 2016, the PTA published its Decision no. 17/2016 on wholesale tariff for origination of telephone calls in individual public telephone networks provided at a fixed location (Markets 2/2008 and 3/2008). It was pre-

scribed that the conclusion of benchmarking made by the Administration would be the basis for maximum prices for call origination and termination. Pursuant to the Decision, wholesale price for call origination in the Síminn public telephone network provided at a fixed location was a maximum of ISK 0.50/minute. Additionally, the wholesale price for call termination in public telephone networks provided at a fixed location would be ISK 0.14/minute and this price should apply as the maximum price for Síminn, Vodafone, Nova, Símafélagið and Hringdu. The new wholesale prices came into force from and including 1 January 2017. On 17 October 2016, the PTA published its Decision no. 14/2016 on wholesale tariff for call termination in individual mobile phone networks on the wholesale market. It was prescribed that the conclusion of benchmarking made by the Administration would be the basis for maximum termination rates of Síminn, Vodafone, Nova, IMC/Alterna and 365 media for the year 2017. According to the above specified benchmarking, the maximum charge should be reduced to ISK 1.23 per minute from and including 1 January 2017.

Cost analyses

The main tasks related to cost analysis in 2016 were as follows:

- Access to network infrastructure at a fixed location (Market 4), consultation opened on draft decision 22 January 2016 and additional consultation on 26 April 2016
- Terminating segments of leased lines (Market 6), consultation on draft decision opened on 25 May 2016
- Broadband access (Market 5), consultation on draft decision opened on 14 December 2016

Completion of the above specified cost analyses with a Decision is scheduled for the first half of 2017 subsequent to national consultation and consultation with ESA.

Reference offers

On 9 August 2016, the PTA published its Decision no. 9/2016 where the Administration endorsed the new Mila Reference Offer for wholesale access to the local loop. Among the main innovations was that the reference offer covered equally copper local loops and fibre-optic local loops whereas the reference offer previously in force only covered copper local loops, and in addition to this the reference offer contain provisions on service level agreements (SLA) and service level guarantees (SLG). In the Decision, the conditions of the reference offer being examined were those other than price-related conditions. The prices were dealt with in another case, i.e. in a cost analysis being processed by the PTA.

The new reference offer replaces the older Mila reference offer on the same subject which was in the main from the year 2009. The above specified Decision is based on the PTA Decision no. 21/2014, where Mila was designated as a company with significant market power on the wholesale market for access to local loops, and in addition to this the appropriate obligations were imposed on the company to endeavour to resolve the competition problems that were identified on the market. Among the obligations were a requirement that Mila should review its reference offer in line with changed market circumstances.

Other reference offers being prepared in the year 2016:

Work was being done on a new reference offer for Mila bitstream access during the year and among other things, consultations were initiated on 9 June 2016 and 7 December 2016.

Work was being done on a new reference offer for Mila leased line access during the year and among other things, consultations were initiated on 16 August 2016 and 23 November 2016.

Completion of the above specified cost analyses with a decision was scheduled for the first half of 2017 subsequent to national consultation with ESA.

CHANGES OF REGULATORY FRAMEWORK IN STEP WITH TECHNICAL DEVELOPMENT

Internet of Things - new rules on numbers for connected devices

Direct communications between machines (M2M) are increasing rapidly, among other things as a result of rapid technical development based on the next generation of electronic communications systems and on cost reduction in mobile phones and mobile networks. It is expected that the number of such devices in use throughout the world will be about 27 billion in the year 2024.

These communications can both be wireless or through systems provided at a fixed location. As examples of devices and machines based on M2M communications one could mention fax machines, warning systems, vending machines, all kinds of devices in industrial production and now e.g. autonomous vehicles are entering the market.

It is necessary to adapt the electronic communications regulatory framework to these changes and now the rules on structure, allocation and use of numbers, number series and addresses in the field of electronic communications are being changed to enable the allocation of numbers for M2M service.

On the official government gazette website, new Rules no. 1289/2016 were published on amendments to Rules no. 590/2015 on organisation, allocation and use of numbers, number series and addresses in the field of electronic communications. According to the new Rules, item 19 in Article 7 of the Rules is as follows:

"Numbers that begin with a 3 shall be 9 digits. Numbers that begin with 35 X XXX XXX shall be allocated for use for M2M for devices manufactured in this country or that are imported for use in this country. Numbers for such service shall in every instance connect to a SIM card. It is not authorised to use numbers that begin with 3 in value added service."

This new number series contains 10 million numbers. Experience must show in the coming years whether this number sequence will suffice to meet demand in this country for M2M numbers or whether further number series need to be defined in the 3X X XXX XXX sequence for such services.

The M2M service which has existed in this country up to this point in time has used traditional fixed line or mobile phone numbers and today about 24,000 numbers are used for such service. It is known that a number of parties are interested in increased M2M service in Iceland.

Net neutrality - open and efficient communications for all New rules on net neutrality in the EEA

On 30 April 2016, a new regulation came into force on net neutrality within the European Union, called the TSM Regulation no. 2015/2120.

The regulation has been adopted in the EEA Agreement and will come into force in this country when the Althingi has made appropriate amendments to the law.

The regulation on net neutrality enshrines in EU law the rule that the Internet should be open for all. The provisions of the regulation assure the end user the right to access to information, to disseminate information and material and to use and offer software and service of his own choosing.

All electronic communications on the electronic communications market shall be treated in an equal manner and all electronic communications shall be carried regardless of material, content, software, characteristics of use, service, equipment, source address or recipient address. The regulation is intended to ensure that the Internet continues to be a forum for free exchange of messages, innovation and commerce according to best effort, which means that best efforts are made to ensure that the electronic communications network can handle all data transfer.

On 1 August, the cooperation forum for European electronic communications regulatory agencies, BEREC (Body of European Regulators for Electronic Communications) presented detailed Guidelines to the regulatory agencies which standardise guidance on surveillance, compliance and official provision of information with respect to matters covered by the regulation on net neutrality and to resolution of individual cases.

The Guidelines will also be useful for parties to the market when structuring measures related to net neutrality in accordance with the obligations imposed by the rules on electronic communications companies in the EEA.

The PTA study of the status of net neutrality in Iceland

In the light of the new European regulation on net neutrality and the pending adoption of the regulation here in this country, the PTA considered it appropriate to make a study of the status and implementation of net neutrality in Iceland and make a comparison between electronic communications companies regarding implementation.

The main conclusions of the study were generally positive, though it is not appropriate to make definitive conclusions on the implementation of specific measures taken by electronic communications companies (traffic control). For example, it seems possible to draw the following conclusions:

- In general, traffic control is being used with the objective of influencing or limiting material or services on the Internet, e.g. by limiting speed or eliminating file-swapping services or other services on the Internet.
- Electronic communications traffic is not contingent on the endpoint devices being used. This applies both to networks provided at a fixed location and to mobile networks.
- When it is necessary to apply traffic control because of the nature of a subscription, e.g. for maximum data traffic, this is prescribed in the commercial agreement with the subscriber.
- Electronic communications companies appear to apply a narrow definition of zero rating download services. The interpretation of the concept will become clearer in the implementation of the rules on net neutrality and in the light of the Guidelines currently being elaborated by BEREC.
- Unclear division of responsibility between network operators and virtual network parties on implementation of traffic control and provision of information to PTA on this issue.

UNIVERSAL SERVICES IN ELECTRONIC COMMUNICATIONS, NOT WITHOUT LIMITATIONS

Universal services in telecommunications are specific parts of telecom services that should be available to all citizens at an affordable price regardless of their geographical location. Among universal services are connections to all legal residences in the country to the public core telecommunications network. Today it is Mila ehf. that bears the universal services obligation to provide such a connection.

Various matters arise that test legislation and rules governing universal services. One such case occurred last year when a submission was received by the PTA from a person living in Strandasýsla in the West Fjords, asking when the person could expect telephone and high-speed connection to which all citizens had a right. According to this person, there was no connection whatsoever to his farm and he stated that, as it seemed impossible to provide a fixed line connection and thus voice telephony, as prescribed by law, then he would accept an alternative, such as a connection by GSM (3G/4G). Such a solution would be a much less expensive way to fulfil the provisions of the Electronic Communications Act on universal services than by laying an underground cable.

After having reviewed the case, the PTA published its position on the submission by the inhabitant with its Decision no. 5/2016. In the Decision, it is stated that although the Electronic Communications Act implies the obligation to provide legal residences with a connection to the core network, the right to universal services is on the other hand, not without limitations. The cost of providing universal services is fixed to a specific maximum cost of ISK 650,000 which is the general reference for maximum cost of connection which are universal service provider must bear. The cost of laying a local loop to the farm in question would on the other hand be far in excess of that amount, i.e. approximately ISK 40 million. The PTA concluded that the cost was far in excess of the above specified maximum amount to be borne by the universal service provider pursuant to the universal service obligation in force. The excess burden of cost in this instance would thus accrue to the user in question. It was therefore the PTA conclusion that the universal service provider, Mila ehf., was in this instance not obliged to accede to the request for access to the public electronic communications network provided at a fixed location through an interconnection point and to bear the cost of this measure in excess of the above specified maximum burden.

With respect to the inhabitant's claim that another technical solution should be applied than the fixed line connection, such as through GSM connection, the PTA could accept that this could be significantly less expensive than laying a local loop to the farm as much less civil works were required to install a mobile transmitter than for laying a local loop over an approximately 40 km route. The Administration could however not consider such a technical solution in the legal environment that currently applied to universal services. According to the law as it is today, a wireless electronic communications service such as mobile phone service or high-speed network connection is not within the scope of universal service in the understanding of the electronic communications legislation, pursuant to Article 19 of the Act. It would not be possible to impose an obligation to provide mobile network service instead of a local loop connection to the public fixed line network. It should be noted that in proposals for a new European Union electronic communications regulatory framework, on which Icelandic legislation is based, it is stated that it should be possible to provide this universal service with wireless technology, and in addition to this, the member states of the EEA will be granted latitude to define the need for minimum data transfer speed to afford users a functional Internet connection, as it is worded. The PTA does not however consider it necessary to wait for this regulatory framework being enshrined in European law before implementing changes to this effect in this country.

ELECTRONIC COMMUNICATIONS TECHNOLOGY AND DISTRIBUTION

ELECTRONIC COMMUNICATIONS FREQUENCY SPECTRUM - A LIMITED RESOURCE

The frequency spectrum is by nature a limited resource. This applies regardless of whether one refers to FM frequencies for radio or to frequencies used for other wireless communications of various types.

A formal specification is decided of frequency spectrum available for various services worldwide at the ITU World Radiocommunication Conference. This applies to various kinds of telecommunications, such as radio, TV, mobile networks (2G, 3G, 4G, etc.), satellite communications, amateur communications, etc. Cooperation in this field has increased rapidly in recent years, in which Iceland has played an active role.

Within this framework, the states have certain latitude to organise use of frequencies in their own area.

Because of the limitation of the frequency spectrum, it is of vital importance that organisation and allocation of this resource are conducted in as efficient a manner as possible and the Post and Telecom Administration has the role of assuring this in Iceland.

Major development has continued in wireless communications, particularly with the development of fourth generation networks, 4G, though significant development

of 3G is still taking place as the technology it uses is still under development as is actually also the case with 4G technology. 3G electronic communications networks are rapidly approaching the distribution of 2G, while 4G is also developing in this direction though it has some distance to go yet. This development is necessary as there is prodigious growth in data transfer through mobile networks. Data volume has increased by a factor of 10 during the last 5 years and growth could easily double each year. The rapid increase in the number of tourists makes it necessary to provide data connections at most locations they visit.

Connected devices and Internet of Things (IoT) have been the subject of much discussion during the year and will be given even more attention in coming years, though it is still early days for Iceland in this respect. Preparations are however underway for the introduction of such service in this country and one need only mention the project Reykjavik Smart City as an example. One can also mention that new rules were introduced during the year on numbers for connected devices, which is specifically covered in the section here above. A key issue in this connection, which is also very relevant to the debate on net neutrality, is the quality of electronic communications connections. Data connections make other demands for quality than traditional voice telephony. Important factors are for example data transfer speed (upload and download), connection speed, network capacity and distribution. This discussion is still in its infancy in this country but will increase in scope in the near future.

PTA FREQUENCY POLICY AND FREQUENCY ALLOCATIONS FOR THE YEAR 2015-2018

The very substantial development of mobile networks with 3G and 4G technology, and the continued increase in data transfer in mobile networks calls for a supply of more frequency ranges for this service, as adequate frequency ranges are a prerequisite for serving this high volume of data traffic. Preparations for auction of a large number of frequency ranges have been underway and are nearing completion. Terms and conditions for the auction were submitted for public consultation and opinions have been submitted to the PTA. Uncertainty about 365 miðlar frequency licence on the 800 MHz frequency range has however delayed the actual implementation of the auction.

Frequency range	Allocation year	Start date of validity of frequency licence
700 MHz	2017	2017
900 MHz	2016	2017
2.1 GHz	2017	2017
2.6 GHz	2017	2017

After consultation with the stakeholders the PTA decided to reallocate frequencies on the 900 MHz frequency range to Siminn and Vodafone. The companies' frequency licences, each for 2x5 MHz which were valid until 13 February 2017, have thus been renewed.

The Administration considers it normal that the renewal match other frequency licences on the 900 MHz frequency range, so the renewal is until 13 February 2022.

It was furthermore decided that the entire 900 MHz frequency range should be technically neutral from and including 14 February 2017. All frequency ranges that have been allocated for mobile phone/mobile networks are thus now technically neutral, which means that they may be used for the technology available for this service, which today is 2G, 3G and/or 4G. In this way, electronic communications companies have latitude to decide the technology as usage changes.

During the year, the PTA rejected a request from Fjar-skipti hf. (Vodafone) for renewal of the company's 2600 MHz frequency range for MMDS TV transmissions (Digital Ísland) the end of 2018. The PTA however accepted the plan submitted by Vodafone to move customers for the TV service over to digital TV service on the UHF frequency range, but with the amendment that the transfer should be completed and transmissions discontinued on the 2600 MHz frequency range, no later than 30 June 2017.

The PTA conclusion is among other things based on the substantial and rapid development that has taken place on the Icelandic telecommunications market in recent years. The most significant factor here is the enormous growth in high-speed mobile network service with the advent of fourth-generation mobile network service. The 2600 MHz frequency range is among the frequency ranges that the PTA intends to allocate for mobile network service in the year 2017.

LIMITED OFFER OF FM FREQUENCIES FOR RADIO IN THE CAPITAL CITY AREA

Because of the range of FM transmissions, the limited number of suitable transmission locations in the capital city area and the risk of interference because of the proximity of transmitters to each other, there is a limited supply of FM frequencies on offer in the capital city area.

The FM frequency range is from 87.5 to 108.0 MHz. When allocating an FM channel/frequency, there is a minimum of 400–500 kHz between channels in the same area, e.g. 103.5 and 103.9 MHz. This is done to ensure a minimum of interference. It is necessary to have free FM frequencies available for temporary radio, such as radio related to specific events like school radio. One must furthermore look to the future and to the necessity for FM frequencies being available to ensure latitude for the entry of new parties to the market and for further development and innovation in radio service. A special project has been

defined within the Administration for 2017 where an analysis and study will be made of radio transmissions in the capital city area.

With this in mind, and because of the increase in the number of radio stations in the capital city area, the implementation of the allocation of frequencies at the PTA has for many years been such that only one frequency is allocated for each program in the same area and according to information gathered by the PTA this is generally the arrangement used in other countries. This was tested during the year where the PTA decided with its Decision no. 15/2016, to reject an application from the radio station Útvarp Saga for additional frequency for the company's programme. The company was however authorised to change its frequency and use a larger transmitter at a better location in order to gain a larger distribution area, if this were considered advantageous.

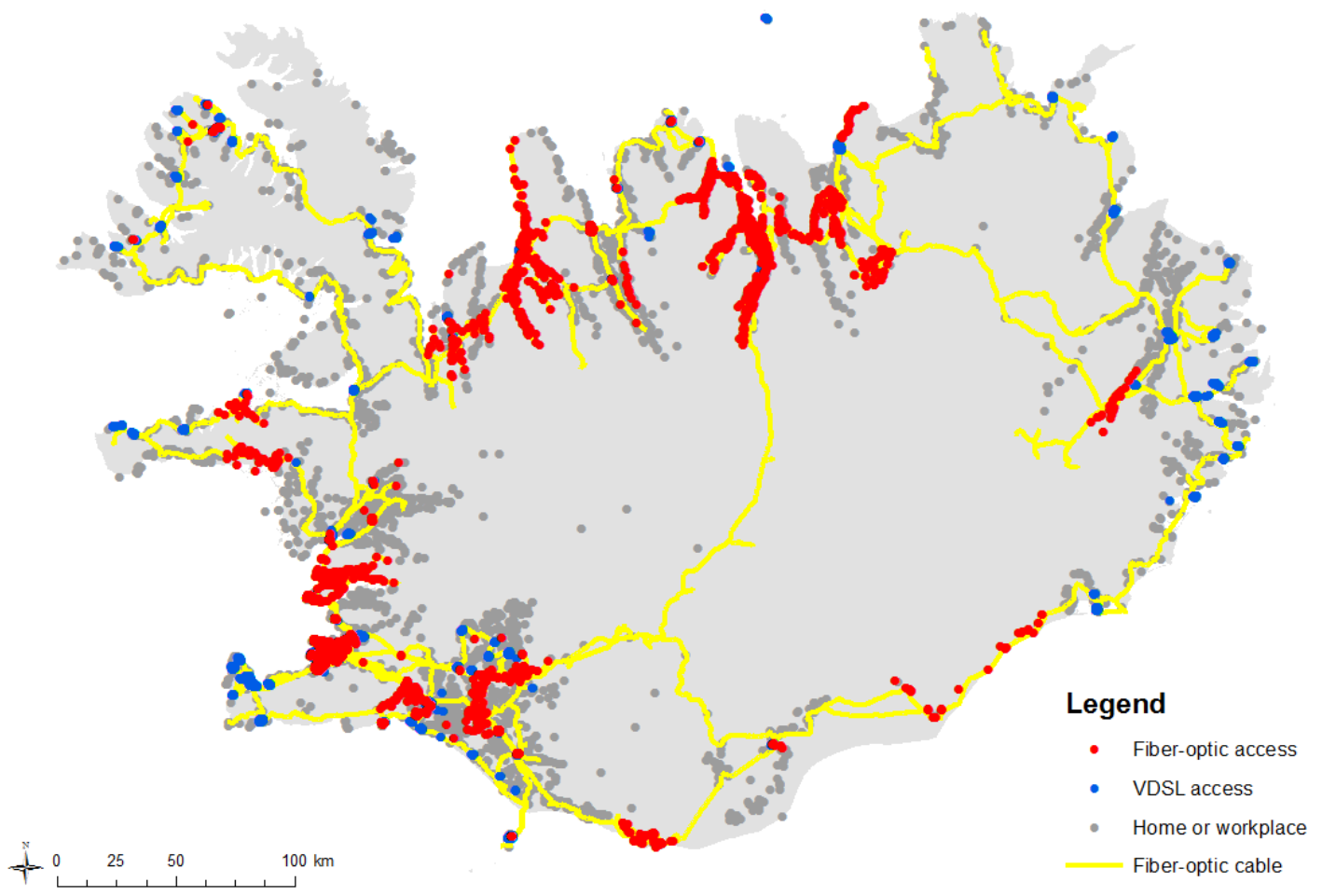
ICELAND OPTICAL CONNECTED – RAPID SPREAD OF NEXT GENERATION FIXED LINE NETWORKS

In this country as elsewhere, there is now rapid development in the building of the next generation of fixed line networks, i.e. fibre-optic and VDSL connections.

Instructions and support for introduction of fibre-optic in country areas

2016 was the second year of the government project initiative, Iceland Optical Connected, to roll out fibre-optic to homes and businesses in the countryside. The Telecommunications Fund manages the project and the Post and Telecom Administration has been responsible for various tasks that relate to government assistance for public authorities in preparing and implementing the fibre-optic rollout in individual areas. Public bodies such as municipalities that plan fibre-optic rollout in their areas can access information and guidance on the Administration's website, and since the project started, a considerable amount of experience has been gathered by the Telecommunication Fund and by the PTA on how to organise the process, how to register and process information for awarding grants by the Fund.

Next Generation Access (NGA)



In areas that are not marked with either fibre-optic or VDSL, the inhabitants do not have access to next generation access networks.

N.B. In the PTA annual report for 2015, information was not published for the Ásahreppur municipality (connections became active there at the turn of the year 2015/2016) and nor for Fljótdalshreppur municipality connections, about which the PTA had no information.

QUALITY OF ELECTRONIC COMMUNICATIONS CONNECTIONS ON ROADS - INTERACTIVE WEB MAP

During the period autumn 2015 until autumn 2016 measurements were made of electronic communications connections on most roads in the country's road system. The project was made at the request of the Telecommunications Fund and this made by the PTA staff who took measurements with appropriate devices on the roads in question.

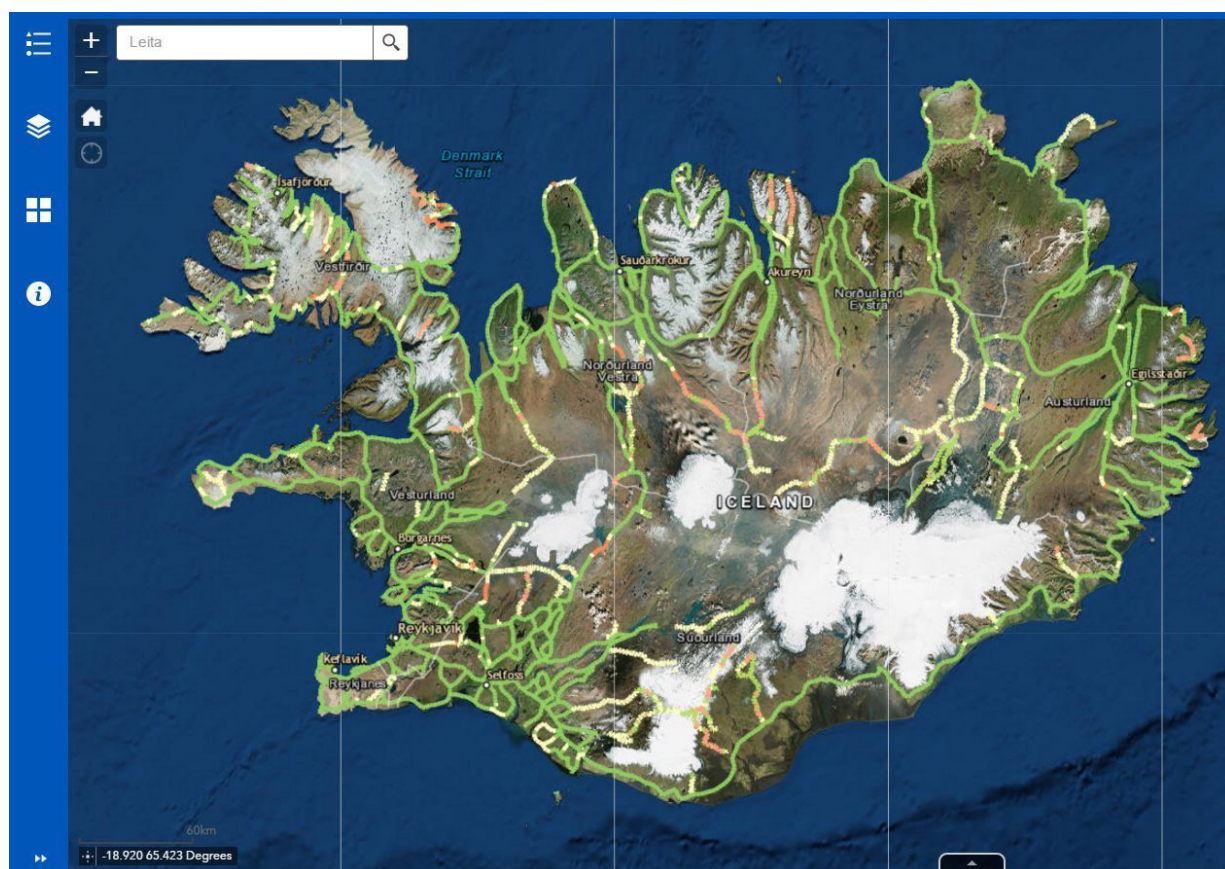
Systems	Good connection	Average connection	Poor connection
LTE (4G)	6.40%	21.40%	72.20%
UMTS (3G)	46.10%	32.30%	21.60%
GSM	88.10%	10.10%	1.80%

The main results of the measurements can be seen in the table on the left. The GSM mobile phone system is still the most important telecommunication system on the country's roads. It provides good coverage on about 91% of roads, UMTS (3G) gives good coverage on about 66% while (4G) is relatively new and has little distribution, about 8.5%. About 1.4% of roads in this study were measured with only poor GSM connectivity.

After the measurements were made, they were used to make an interactive web map for all electronic communications systems, GSM, 3G and 4G.

It is possible to zoom in precisely to individual places and see the locations of the measurement points and the status of the connectivity.

The interactive web map can be accessed on the PTA web at:
<https://www.pfs.is/fjarskipti/maelingar-a-fjarskiptasambandi-a-vegum/>



SECURITY IN ELECTRONIC COMMUNICATIONS

SECURITY OF ELECTRONIC COMMUNICATIONS INFRASTRUCTURE

Security of electronic communications infrastructure is an important task in PTA operations. Despite the fact that public electronic communications systems are not configured for security communications, the trend has nevertheless been such that they are in use today to call people out, e.g. in the health system, by the police, fire service and for messages for evacuation in the event of natural catastrophes. According to the PTA rules on functionality of public electronic communications systems, electronic communications companies are obliged to take appropriate measures to assure secure operation of their systems. Increased emphasis has recently been placed on PTA surveillance activities of security of electronic communications systems, particularly in the light of natural catastrophes which are always a threat to the inhabitants of Iceland.

Development of technology in recent years has brought new devices which connect to the country's electronic communications infrastructure, in addition to smart phones and computers. This development will continue at an even more rapid pace in the foreseeable future. This is the development of connected devices, i.e. devices that either talk directly to each other or to a computer. As an example, one can mention monitoring and sensor equipment of various kinds (weather measurements, seismic activity measurements etc.), sensors for lighting, security systems, telemonitoring of patients and many other examples. This development imposes even greater demands on operational security of electronic communications infrastructure and on the quality of the service, particularly for service in the health system.

Study of mobile network transmitters in the vicinity of Katla volcano

The PTA places great emphasis on security and integrity of electronic communication networks. In order to determine the status of these factors and to ensure security of the country's electronic communications networks, the Administration commenced a process which would make it possible for the Administration to have an overall view of the status of security and integrity of the networks. The PTA has therefore commenced work on collecting information on security aspects of mobile network transmitter locations, and has developed procedures for inspecting mobile network transmitters.

There is a dual objective. On the one hand to test and inspect the existing security measures in a defined area and on the other hand to standardise the documentation

of security measures in such a manner that the information can be useful for the relevant authorities, i.e. for the PTA and civil defence, for the purpose of coordinating measures to maintain electronic communications in the event of natural catastrophes or other events that could threaten integrity of networks.

In the work currently in progress and which will eventually cover the whole country, the PTA considered it appropriate to prioritise documentation and processing of security measures in such a manner that the study covered a district which could suffer from a natural catastrophe in the foreseeable future, i.e. the Katla evacuation zone. It is expected that the study of the Katla evacuation zone will be completed with the publication of a report in the first quarter of 2017.

Surveillance of frequency spectrum - PTA interference monitoring

The Post and Telecom Administration monitors interference in electronic communication systems in this country and intervenes where necessary.

Instances of such interference have increased very significantly in recent years and they can have serious consequences.

Number of interference events 2013 - 2016				
Year	2013	2014	2015	2016
Number of interference events	30	53	82	89

Wireless systems are the basis of communications in modern society. Not only are they used in communications between people but also and not least in various communication systems that control equipment, such as in air traffic control, monitoring, calling out (e.g. in the health system and in a natural catastrophe), and in manufacturing companies (industrial controls that use wireless). Interference events in such environments can cause a crisis or financial damage which means that it is necessary to react to them in a timely manner.

One known reason for electronic communications interference is the use of devices that do not carry a valid CE mark according to standards that apply in the EEA. Devices that do not carry such a mark are illegal in this country and in the summer of 2016 the Administration made an investigation of whether electronic communications devices on offer from merchants in this country fulfilled the obligations of the CE mark. The conclusion of the investigation was that most electronic communications devices that were examined in shops in this country carried valid

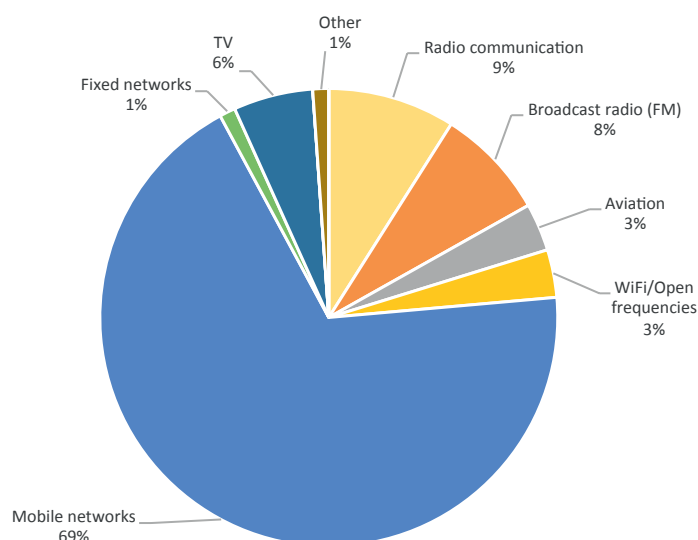
CE marks. This supported the suspicion that one of the reasons for the significant increase in interference events was precisely the importing by the public of devices through the Internet, many of which come from regions outside the EEA and which do not match the frequency configuration used in this country. Such devices could for example be DECT-telephones from the United States, mobile phone repeaters and other user devices which are not recognised for use in Europe. The customs authorities stop many such deliveries to the country every year and e.g. a judgement has been passed in court in a case of this nature where an individual was fined. Illegal electronic communications devices are however not the only reason for interference. There can be several other reasons for such events as can be seen in the list below.

Causes of interference in electronic communication systems

- Increased import of devices by the public through the Internet (often devices not CE - marked)
- Undesirable impact from adjacent mast or masts to another mast, e.g. blending from two masts to a third mast, antennae too close to each other, overflow of receive antenna etc.
- Malfunction in equipment, e.g. malfunction in transmitter or cables
- Incorrect or illegal use of frequencies, e.g. when knowledge of frequency bands is lacking, transmitter incorrectly configured etc.
- Increased load on frequency ranges in use, e.g. on high-speed frequency ranges (4G/LTE). This results from a huge increase in devices in use at any given time with the attendant huge increase in data volume through the frequency range.

The increase in interference events has been so great in recent years, that despite the increase in staff and equipment at PTA interference monitoring, the Administration cannot fully cover response to wireless interference and is obliged to prioritise notifications of interference on the basis of the importance of the systems being affected. Security systems such as for air traffic are e.g. always prioritised.

This lack of manpower and equipment makes it difficult for the Administration to respond to interference outside the capital city area, and major interference which affects a large number of parties is dealt with before interference where fewer users are affected. For example, interference in the countryside may have to wait for a considerable time if it is not in a priority category if staff are too busy to respond. A number of tasks of this nature were on hold last New Year both in the countryside and in the capital city area.



Interferences 2016

In the pie-chart above one can see how electronic communications interference in 2016 is divided by where it occurred. As one can see the vast majority of events were in mobile phone networks, 69%.

Nordic cooperation

The PTA participates in cooperation between Nordic electronic communications regulatory bodies where the cooperation aims mainly at physical security of electronic communications infrastructure and integrity of electronic communications networks. At the beginning of the year the PTA published, along with these partners, Guidelines or Recommendations for the purpose of strengthening security of information in electronic communications networks. The Recommendations concern Signalling System No. 7 or SS7 which electronic communications companies use between each other to set up and manage configuration of telephone calls and user data flow. Under certain circumstances and with a specific technology it is possible to abuse the system to track people on electronic communications networks, and even to eavesdrop on communications. The new Guidelines that were prepared in consultation with parties to the market provide information on how electronic communications companies can counteract these vulnerabilities in their networks.

Specialists at the Post and Telecom Administration believe that cooperation is a good thing and is conducive to supporting and strengthening defence against various threats in electronic communications networks, as experience and knowledge from a variety of countries is combined to strengthen security.

Computer Security Incident Response Team CERT-IS

The CERT-IS Computer Security Incident Response Team operates within the Post and Telecom Administration pursuant to the Electronic Communications Act and to Regulation no. 475 from 2013. The response team jurisdiction covers electronic communications companies that operate public electronic communications networks and/or provide access to the Internet and Internet services, but not to general public users. The role of the team is to prevent and mitigate the risk of cyber-attacks and other security events in its network jurisdiction and to impede and minimise damage from such sources to the community's critical information infrastructure. The team maintains the website www.cert.is.

In November, CERT-IS organised a network security exercise with the Icelandic parties the belong to the Team's service group. The object of the exercise was to strengthen coordination and cooperation between parties, to develop exchange of information and notifications and to adjust the contact list, procedures and response plans.

CERT-IS is a participant and contact party for the Icelandic authorities in national and international cooperation on response and defence on the field of network security and is the CERT National Point of Contact. The team is party to the Nordic cooperation group of CERT teams, known as the NCC group, and its staff regularly attend meetings and courses in the Nordic countries and elsewhere.

During the year the PTA, in cooperation with the Ministry of Home Affairs, has worked on elaborating a comprehensive policy for network security teams in Iceland. The objective of this work is to strengthen network and information security of important community infrastructure.

POSTAL AFFAIRS

TARIFF WITHIN MONOPOLY

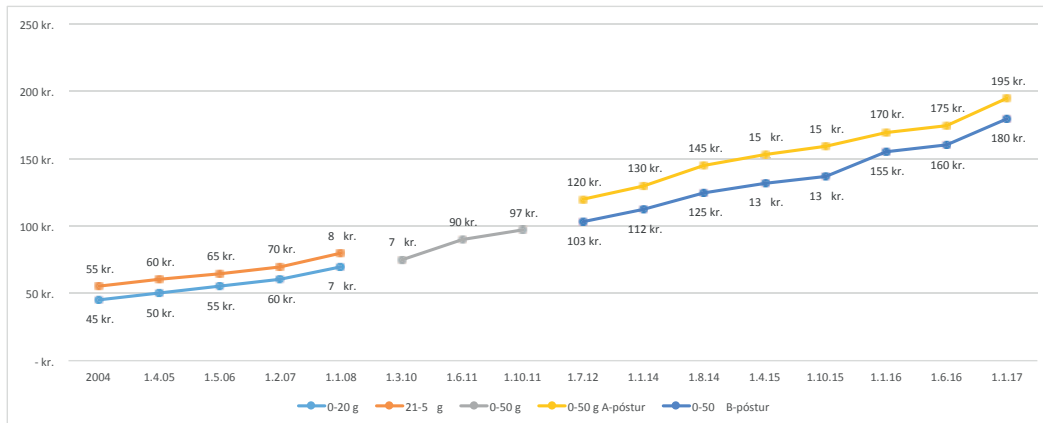
As is known, Íslandspóstur (ÍSP) operates the state monopoly of distribution of post under 50 g. The role of the PTA, with respect to the company's tariff within monopoly is to endorse the tariff based on real costs with the addition of reasonable profit.

With respect to increase in tariff within monopoly, the development of past years continued. In 2016, the PTA authorised increases in tariff on the one hand, of 10% at the beginning of the year and on the other hand, of 3% in the middle of the year. About 2/3 of these increases result from a decline in letter post. For this reason, one cannot link ÍSP tariff increases within monopoly to general price trends. It should also be noted that about one third of the increases are the result of increased salaries costs subsequent to new collective agreements, as salaries and related costs represent about 70% of ÍSP opex within monopoly.

The Administration is however concerned that these ÍSP price rises may weaken the position of letter post as a

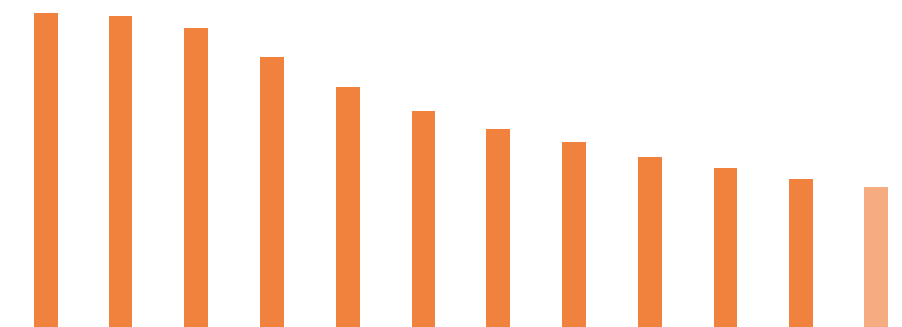
product on the market and as a means of communication between people. For this reason, the Administration has in recent years made several decisions which allow ÍSP to simplify its distribution system and thus make economies in the long-term. Most recently, a decision was made to authorise a reduction in the number of distribution days in the most expensive part of the distribution system, where the average cost is many times that of other locations.

In the same way, it is normal for stakeholders to ask whether the price increases are reasonable and for them to point out that company products other than those within monopoly have not increased as much. In answer to these comments, it is appropriate to point out that the Administration has no direct involvement with other ÍSP tariffs. Much work has however been done in recent years by the PTA, in connection with examination of separation of ÍSP accountancy where such separation within the company is a key issue when taking a position on individual requests for increases in tariff within monopoly, as is examination of underlying costs of individual products offered by ÍSP.



Development of Íslandspóstur tariff within monopoly 2004-2016

NB: kr = ISK



Development of number of letters within monopoly 2006-2017

Source: Post and Telecom Administration

CHANGES IN DISTRIBUTION

Reduction in delivery days in the countryside

Towards the end of 2015, the PTA endorsed an ÍSP request for reduction in delivery days in the countryside. ÍSP implemented the changes on 1 April 2016. In the decision by the Administration it was among other things prescribed that the company would calculate final costs that were saved with the changes and would report this to the PTA when the changes had finally come into force and experience had been gained from them. The same report should also provide information on the main problems that arose with the changes, if any, such as complaints from parties sending post and from recipients, and how the company reacted to them.

ÍSP delivered the report in question at the beginning of 2017.

In the report, it was among other things stated that direct savings from the changes amounted to approximately ISK 170 million in 2016 and in addition to this, certain economies were achieved e.g. latitude for sorting post had increased. The impact of the economies was thus estimated at approximately ISK 200 million per annum. These figures matched initial projections.

The ÍSP report dealt with the number of registered deliveries and their impact on distribution in the countryside, with the impact of the changes on company staffing, with the issues on which complaints had been made subsequent to the changes and how the company had informed about the change in service.

The PTA received three complaints relating to changes in the number of distribution days in the countryside. The Administration also received a number of telephone calls where inhabitants complained about these changes. There were however no complaints received from large stakeholders who, for example send large volumes of post, such as for example banks or other senders of bulk post.

There is no reason to doubt that those parties who complained about the service to ÍSP and/or to the PTA had been inconvenienced by the changes. From the number of complaints received one can however draw no other conclusion than that the changes did not cause general inconvenience for users of postal services, regardless of whether the user was a recipient or a sender. The changes affected 7000 households in the country.

Access points

There were a few changes to the ÍSP network of access points during the year. Access to an access point is included in the concept of universal service in postal services. The ÍSP access point at Vogar was then served by a postal vehicle instead.

This, the number of traditional access points for the whole country has now been reduced to 61. At locations where there is no access point, then the service is provided by ÍSP with traditional deliveries (landpóstur) or by operating a postal vehicle which can be visited at a number of smaller villages.

Letter boxes

The change was introduced from and including 1 January 2016 that recipients of post in the countryside where letter boxes are located at the entrance to the driveway shall bear the cost of their purchase, setting up and maintenance.

Up to this point in time ÍSP has borne this cost without there being an obligation to do so according to the law on postal services or from other derived rules. The change, however affirms that post recipients in the countryside are themselves responsible for setting up the letter boxes. In the light of the fact that ÍSP had set up these boxes for many years it was considered appropriate to impose this obligation in an unequivocal manner on recipients in the countryside. This cost has always been borne by recipients in urban areas.

It should be noted that before the obligation was transferred unequivocally to the recipients of post, the ÍSP had renewed many of the letter boxes that the company had set up. This was a project that had been ongoing during recent years. The status of this issue should therefore be satisfactory across the country.

CONSUMER ISSUES

One of the Post and Telecom Administration's main tasks is to protect consumer interests on the electronic communications and postal markets and to support consumer protection in their transactions with electronic communications companies and postal service operators. Consumers are faced with varied and complex options on the electronic communications market, both with respect to choice and configuration of equipment and connections and not least with respect to choice of service provider. The Administration publishes information for consumers, participates in measures to protect personal data and personal privacy and works on assuring maintenance and security in public electronic communications networks.

The Administration's main tool for the provision of information is its website www.pfs.is where part of the web is dedicated to consumers. Consumers can also send communications and complaints to the Administration if they feel that their rights have been infringed with respect to legislation and regulation on electronic communications or postal services. Such complaints are in their hundreds every year though only some end in the formal complaint process.

PRICE MONITORING ON THE ELECTRONIC COMMUNICATIONS MARKET

Companies on the electronic communications market are obliged to notify the Post and Telecom Administration and its customers of all price changes. In the case of price increases, they shall be notified with at least 30 days' notice. In addition to this, the Administration monitors tariffs on the companies' websites. The PTA has published the website Reiknivél.is for a number of years which provides a calculator for electronic communications costs for consumers. This website has now been discontinued as very significant changes have occurred to the composition of prices and service options offered by the electronic communications companies and new service items have been added.

A new section on the PTA website will be opened to replace the calculator, where it will be possible to access tables with price comparison between all companies on the market for up to three of the least expensive service options for each type of service. It is expected that this information will be accessible on the PTA website before the middle of 2017.

MAJOR CHANGE IN PRICING OF ROAMING WITHIN THE EEA

From and including 1 August 2016, electronic communications companies discontinued separate tariffs for the use of mobile phones and other mobile devices in roaming within the EEA. Instead of this, the price for this service is according to the national tariff for the subscription that each customer has with the relevant mobile

phone company with the addition of a separate weighting which varies for each type of use. In the case of telephone calls this means that a user who is e.g. in Germany and who calls another mobile phone within Germany or within another country in the EEA, will pay according to the national tariff of his electronic communications company in Iceland with the addition of 5 eurocents weighting which is ISK 8.71. According to the exchange rate that was fixed for use of roaming until 1 July 2017. It does not matter whether a call is made to an Icelandic telephone or telephone which is registered in another EEA state.

Use	Euro	ISK
To call	0.05	8.71
To answer	0.0114	1.98
Send SMS	0.02	3.48
Receive SMS	Free	Free
Data use, each MB	0.05	8.71

This represented significant change as maximum prices for roaming that had been in force during the past years were discontinued and in their place the national tariff of each mobile phone company was used with the addition of a fixed weighting for each type of use. The weighting is low and therefore in most instances it is less expensive than before to use a telephone or other mobile device within the EEA.

As has been the case, the price for Icelandic users of roaming is fixed in ISK for the year. The average exchange rate for the month prior to the coming into force of the changes is used and the exchange rate that applies from 1 August 2016 until 1 July 2017 is ISK 140.56 per €.

CANCELLATION OF SEPARATE ROAMING CHARGES IN THE MIDDLE OF 2017

Roaming prices based on the national price with the addition of a weighting is however only a temporary step towards full cancellation of roaming charges within the EEA. It is expected that the weighting will be cancelled in mid-June 2017 if the Icelandic authorities have adopted the EU regulation to this effect. After this change comes into force, consumers will pay the same for use of telephone and for data volume on their journeys within the EEA as they pay at home. At that time, provisions will be introduced on fair maximum use of roaming service on the basis of normal journeys in what will be called a "fair use" provision. It will be permissible to impose a weighting on use, which is in excess of what can be considered "fair use".

Rules are still in force on the obligation for electronic communications companies to send a warning to their customers about data use in roaming, i.e. that customers receive a warning when the cost for data use in roaming has reached 80% of the €50 maximum. The rule still also applies that data use in roaming will be closed at the €50 maximum unless the customer specifically requests that it be opened.

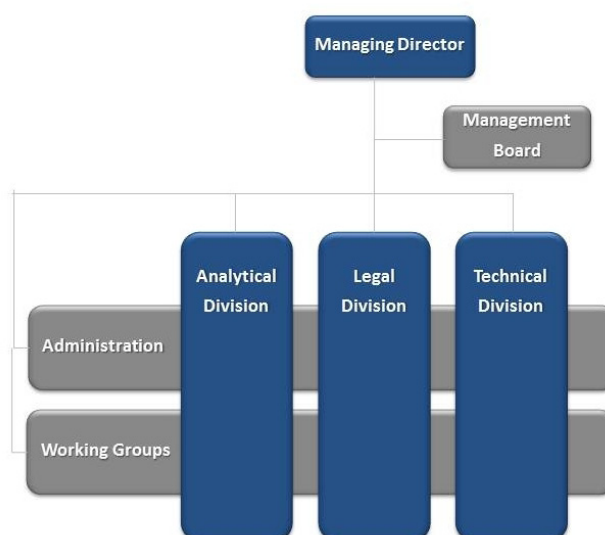
RULES OF PROCEDURE ON REGISTERING AND DISSEMINATION OF INFORMATION IN TELEPHONE DIRECTORIES

In January 2016, the Administration published new rules on registering and dissemination of information on subscribers that have been allocated numbers in fixed line and mobile phone systems. Work has been ongoing on a review of rules of procedure with respect to how such registering and dissemination has been carried out since the new structure for dissemination of telephone directory information came into force on 1 July 2014.

The Administration examined all provisions of the rules of procedure and stakeholders were given the opportunity to submit observations and proposals for amendments while the review was being conducted. Further consultation was also requested with stakeholders on the amendments that the Administration plan to make to the rules.

As the Administration had received submissions about mistakes and about there being failings in treatment of telephone directory information, the research company MMR was appointed to make a study of work procedures of the electronic communications companies with respect to this information. The study was made in July and its conclusions were published in September. The conclusion stated that none of the electronic communications companies examined in the study were considered to have fulfilled the requirements made for registering and dissemination of telephone directory information in the database of HÍN, the organisation which manages this information. The companies were subsequently instructed to remedy these issues and the Administration announced that it would make a similar study at a later date. It is expected that the study will be made in the first part of 2017 and it is hoped that improved work procedures will have been adopted by the electronic communications companies and that significant remedies will have been applied with respect to the handling of telephone directory information.

POST AND TELECOM ADMINISTRATION 2016



The Managing Director of the Post and Telecom Administration is Hrafnkell V. Gíslason

The Management Board consists of the Managing Director and the heads of divisions.

PTA staff in 2016 numbered twenty four.

Analytical Division is responsible for market analyses, imposition and follow-up on financial obligations on electronic communications companies that have been designated as having significant market power subsequent to analysis, including cost analysis and separation of accountancy.

The Division collects information on pricing and statistics and is responsible for processing and publishing of such information. The Analytical Division also deals with various financial analyses on the post and electronic communications market.

Legal Division is responsible for handling administrative communications, settling disputes, the imposition and surveillance of obligations that are not financial in nature, universal service and consumer issues. The Division also handles international communications.

Technical Division is responsible for organisation and management of matters relating to frequencies and it monitors the use of frequencies. This Division monitors the market for electronic communications devices, is responsible for the collection and recording of information on electronic communications infrastructure along with processing of geographical information and inspects radio equipment on board ships. The Technical Division also provides other divisions with consultancy on technical issues that may affect the Administration's surveillance role. The national Computer Security Incident Response Team, CERT-IS, is also operated within the division.

Administration is responsible for matters related to operations, information systems, human resources, quality issues and promotion and it provides support for all internal work of the Administration.

Two working groups operated within the PTA during the year; a market analysis team and CERT-IS.

REGISTERED PROVIDERS OF ELECTRONIC COMMUNICATIONS NETWORKS AND SERVICE

Licence holder	Issued/ Registered	Services
1819 - Nýr valkostur ehf.	20.6.2014	Directory enquiry service
365-miðlar ehf.	17.1.2013	Mobile and data transmission service
Advania hf.	17.4.2002	Data transmission service
Alterna Tel ehf.	8.1.2010	Voice telephony, mobile and data transmission
Alþingi	23.3.2015	Transmission of radio and television signals
Austurljós ehf.	5.3.2015	Data transmission and service
Ábótinn ehf.	28.3.2003	Data transmission and service
Árvakur ehf.	26.1.2015	Directory enquiry service
Ásaljós	18.8.2015	Operation of fixed electronic communication network
Backbone ehf.	25.8.2010	Data transmission and service
Bloomberg Finance L.P.	19.7.2007	Leased line and network
Boðleið Þjónusta ehf.	1.12.2015	Voice telephony, mobile telephony and operation of fixed data transmission network
Brimrún ehf.	3.4.2008	Data transmission via satellite
BT Solutions Limited, útibú á Íslandi	28.7.2014	Data transmission services
Caze ehf.	9.12.2013	Data transmission services
Colt Technology Services AB	29.9.2015	Data transmission services
Databox ehf.	13.12.2010	Voice telephony and network
Datacell ehf.	25.8.2010	Data transmission services
Davíð og Goliát ehf.	3.5.2010	Voice telephony and data transmission
DCN Hub ehf.	10.12.2012	Mobile and data transmission services
DVD-Margmiðlun ehf.	6.2.2004	Broadcast cable network
Equant á Íslandi ehf.	7.7.2004	Data transmission service
Eyja- og Miklaholts- hreppur	29.9.2015	Fixed data transmission network
Factor ehf.	30.5.2013	Data transmission and service
Farice ehf.	2.9.2003	Submarine cable
Feris ehf.	6.1.2014	Data transmission service
Fjarskiptafélag Skagabyggðar	8.6.2016	Data transmission network
Fjarskiptafélag Skeiða- og Gnúpverjahrepps ehf.	8.3.2013	Data transmission network
Fjarskipti hf.	27.3.2007	Voice telephony, mobile, data transmission and network
Fjölnet ehf.	26.10.2001	Voice telephony, data transmission and network
Fónn ehf.	26.5.2009	Voice telephony, data transmission and network
Gagnaveita Helgafellssveitar	18.8.2015	Operation of fixed electronic communication network

Gagnaveita Hornafjarðar ehf.	13.2.2013	Electronic communication networks
Gagnaveita Reykjavíkur ehf.	23.3.2007	Data transmission and service
Gagnaveita Suðurlands ehf.	9.12.2013	Data transmission service
Gagnaveitan ehf.	8.6.2011	Electronic communication services
GlobalCall ehf.	4.9.2008	Voice telephony
Global Mission Network ehf.	16.12.2014	Transmission of radio and/or television signals
Halló ehf.	23.5.2014	Directory enquiry service
Hátiðni hf.	24.1.2001	Voice telephony, data transmission and network
Hitaveita Tálknafjarðarhrepps	24.6.2015	Data transmission network
Hópkaup ehf.	28.4.2015	Directory enquiry service
Hringdu ehf.	9.11.2010	Voice telephony and data transmission service
Hringiðan ehf./Vortex Inc.	3.12.1998	Voice telephony, data transmission and network
Hvalfjarðarsveit	31.3.2014	Electronic communication networks
iCell ehf.	25.8.2010	Voice telephony, mobile, data transmission and network
Icelandair ehf.	14.2.2014	Network
IMC Ísland ehf.	27.6.2000	Mobile DSC 1800
Internet á Íslandi hf.	3.2.1998	Network, voice telephony and data transmission
IRJA ehf.	3.5.2010	Data transmission
Isavia ohf.	30.12.2010	Voice transmission service for aircrafts and operation of fixed electronic communication network
Já hf.	21.11.2007	Publication of directories, directory enquiry service
Kukl ehf.	20.3.2009	Voice telephony, data transmission and network
Landhelgisgæsla Íslands	1.1.2011	Management and lease of NATO's optical fibre network
Level 3 Communications Iceland ehf.	1.12.2015	Operation of fixed electronic communication network and data transmission service
Lindin, kristið útlarp	26.1.2015	Transmission of radio and television signals
LÍF í Mýrdal ehf.	15.9.2014	Fixed data transmission network
Ljós og gagnaleiðari ehf.	10.8.2009	Data transmission network
Ljósfesti ehf.	19.12.2016	Operation of fixed electronic communication network
Loki Telecom ehf	4.5.2015	Fixed and wireless telecommunication networks, fixed and wireless data transmission and transmission of radio and television signals
Magnavík ehf.	1.4.2004	Data transmission service
Martölvan ehf.	26.11.2007	Voice telephony, data transmission and network
Míla ehf.	4.4.2007	Network
Mobiweb Telecom Limited	19.12.2016	Mobile service
Nepal hugbúnaður	21.2.2005	Data transmission service and wireless data transmission
Neyðarlínan hf.	6.10.1999	Voice telephony - emergency service
Nextgen Mobile Ltd.	11.11.2013	Mobile and data transmission service
Nordic Networks ehf.	24.11.2016	Submarine cable and data transmission service
Nova ehf.	12.7.2006	Voice telephony and data transmission
Nýherji hf.	12.12.2011	Data transmission

OnAir S.A.R.L.	29.4.2008	Mobile communication services on aircraft (MCA)
Opex ehf.	12.9.2013	Voice telephony and data transmission service
Opin kerfi hf.	25.2.2011	Data transmission service
Orkufjarskipti hf.	24.1.2001	Electronic communication network
Radíó ehf. - Íslensk fjarskipti	22.8.2006	Telecommunication service
Radíóvík ehf.	14.5.2004	Cable network
Rafey ehf.	18.8.2015	Operation of fixed electronic communication network
Rangárljós	29.8.2016	Operation of fixed electronic communication network
Rekstrarráðgjöf og bókhald ehf.	24.3.2014	Data transmission service
Ríkisútvarpið ohf.	29.7.1997	Transmission of radio and television signals
Sensa ehf.	19.12.2016	Data transmission service via fixed electronic communication network
Símafélagið ehf.	15.10.2008	Voice telephony and network
Símaþjónustan ehf.	28.6.2013	Voice telephony
Síminn hf.	1.4.2007	Voice telephony, mobile, data transmission and network
Sjónvarpsmiðstöðin ehf.	8.10.2009	Data transmission service
Snerpa ehf.	17.8.2000	Network, voice telephony and data transmission
Softverk ehf.	20.3.2009	Voice telephony, data transmission and network
SportTV ehf.	12.8.2013	Transmission of radio and television signals and telecommunication service
Streaming Media ehf.	10.10.2014	Wireless network, fixed and wireless data transmission and transmission of radio and television signals
Stykkishólmsbær	2.5.2002	Data transmission network
Sumarsól ehf.	1.12.2015	Directory enquiry service
TELE Greenland A/S	24.6.2008	Submarine cable
Tengir hf.	20.9.2002	Fiber optical network
Thor Telecom Ísland ehf.	15.10.2014	Fixed and wireless data transmission and transmission of radio and television signals
Tismi BV	5.3.2015	Voice and mobile telephony
TSC ehf.	18.1.2002	Voice telephony, data transmission and network
Tölvu- og rafeindaþjónusta Suðurlands ehf.	29.3.2004	Data transmission service
Tölvun ehf.	25.4.2003	Data transmission and service
Tölvustöð ehf.	15.4.2009	Data transmission service
Upplýsingatæknifélagið Omnis ehf.	28.1.2013	Data transmission service
Vegagerðin	7.1.2016	Operation of fixed electronic communications network
Viking Travel slf.	5.3.2013	Wireless network, wireless data transmission and voice and mobile telephony
Þekking - Tristan hf.	16.1.2004	Data transmission and service
Þorvaldur Stefánsson	14.10.2014	Maritime mobile
Öryggisfjarskipti ehf.	6.10.2008	Telecommunication service and network / TETRA





POST AND TELECOM
ADMINISTRATION
IN ICELAND