Results of Survey: Migration from PSTN/ISDN to

Next Generation Networks (NGN)

Questionnaire prepared by ECC/WG NaN/

Project Team Technical Regulatory Issues (PT TRIS)

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- Annex 2

TABLE OF CONTENTS

[Introduction 3](#_Toc485041450)

[Question 1 4](#_Toc485041451)

[Question 1.1 5](#_Toc485041452)

[Question 2 6](#_Toc485041453)

[Question 3 7](#_Toc485041454)

[Question 4 9](#_Toc485041455)

[Question 5 11](#_Toc485041456)

[Question 6 12](#_Toc485041457)

[Question 7 14](#_Toc485041458)

[Question 8 16](#_Toc485041459)

[Question 9 18](#_Toc485041460)

[Question 9.1 19](#_Toc485041461)

[Question 10 20](#_Toc485041462)

[Question 11 22](#_Toc485041463)

[Question 11.1 23](#_Toc485041464)

[Question 11.2 24](#_Toc485041465)

# Introduction

In the last few years, incumbent operators in many CEPT countries have announced plans for phasing out PSTN and ISDN services with a view to a full migration to an IP-based NGN. In overall terms these plans have not been fully implemented as fast as was originally anticipated and many ambitious migration plans have either been shelved or redefined.

There are several reasons which may explain why PSTN/ISDN has not been phased out earlier including:

* An unconvincing business case for making a full transition to IP;
* Investment in mobile and broadband given higher priority;
* PSTN/ISDN has proved to be very reliable with few problems;
* Long standardisation process for new systems (IMS/NGN).

In order to develop a better understanding of the issues, this questionnaire, developed by the CEPT/ECC/WG NaN Project Team on Technical Regulatory Issues (PT TRIS), aimed to gather information from CEPT administrations on migration strategies for PTSN/ISDN to all-IP networks in a European context including on the associated challenges and regulatory issues.

There were initially only 11 responses to the Questionnaire and therefore it was decided at the last meeting of the ECC Working Group on Numbering and Networks (WG NaN) in Oslo (October 2014) to extend the deadline to 31 October 2014. An additional 8 responses were received making a total of 19.

# Question 1

Does your incumbent fixed network operator have an official plan for PSTN migration? (e.g. by making a public announcement or releasing information to the media?)

|  |  |  |
| --- | --- | --- |
| Country | Response  | Comments |
| Switzerland  | Yes  |  |
| Lithuania | No  |  |
| Russian Federation | Yes  |  |
| Slovenia | No  |  |
| Austria | Yes  |  |
| Bulgaria | Yes  |  |
| Malta | No  |  |
| Romania | Yes  |  |
| Portugal | No  |  |
| Czech Republic | No  |  |
| Norway | Yes  |  |
| Germany | Yes  |  |
| Cyprus | No  |  |
| Croatia | Yes  |  |
| Montenegro | Yes  |  |
| Latvia | No  |  |
| Denmark | Yes  |  |
| France | No  |  |
| Ireland | No | NGA is an overlay and PSTN is being retained. |

## Question 1.1

If yes to Question 1, what is the time schedule for expected shut-down of PSTN-services?

|  |  |  |
| --- | --- | --- |
| Country | Response | Sub Question: If yes to Question 1.1, are there major differences between the incumbent and other PSTN-providers? Please specify |
| Switzerland  | End of 2017  | No major differences, just different time schedules  |
| Russian Federation | The time schedule for shut-down is not defined yet  | incumbent provider has more finance  |
| Austria | No official shut-down date been announced. We expect PSTN services to be around for some further time as the incumbent NGN has been introduced with feature parity, i.e. the majority of PSTN services will also be available with the IP-based NGN.  | No information available.  |
| Bulgaria | There is no schedule for a shutdown of PSTN services. The incumbent has announced a forecast that more than 1 million end users will be able to receive more services based on broadband access until the end of 2014. First the 3 biggest towns will be covered and along the years all other areas.  | No  |
| Romania | Yes, Telekom Romania (PSTN provider in Romania) announced the deadline for shutting-down of PSTN services on 31. Dec. 2017  | In Romania, there is no other PSTN provider  |
| Norway | 2017, but is likely to be extended  | No  |
| Germany | Until 2018  | The plans deviate significantly. Some providers do not yet plan to migrate.  |
| Croatia | End of 2015  | Alternative operators are already on IP  |
| Montenegro | The end of the 2015.  | There are no more PSTN providers. Only Crnogorski Telekom provides it.  |
| Denmark | No public announcement, but it has been communicated that PSTN is expected to be phased out over the years up to 2020  | No information  |

# Question 2

How will future interconnection between telephony providers be supported in your country?

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | A combination of both SS7- and SIP-interconnection  |
| Lithuania | SS7-based interconnection will continue (via gateway)  |
| Russian Federation | A combination of both SS7- and SIP-interconnection  |
| Slovenia | Full transition to SIP-based interconnection  |
| Austria | Full transition to SIP-based interconnection  |
| Bulgaria | A combination of both SS7- and SIP-interconnection  |
| Malta |  |
| Romania | A combination of both SS7- and SIP-interconnection  |
| Portugal | A combination of both SS7- and SIP-interconnection  |
| Czech Republic | A combination of both SS7- and SIP-interconnection  |
| Norway | A combination of both SS7- and SIP-interconnection  |
| Germany | A combination of both SS7- and SIP-interconnection  |
| Cyprus | A combination of both SS7- and SIP-interconnection  |
| Croatia | Full transition to SIP-based interconnection  |
| Montenegro | Full transition to SIP-based interconnection  |
| Latvia | Full transition to SIP-based interconnection  |
| Denmark | A combination of both SS7- and SIP-interconnection  |
| France | Full transition to SIP-based interconnection  |
| Ireland | Currently only SS7-based interconnection and IP Gateway. Likely to be a combination of both SS7- and SIP-interconnection in future.  |

\* Likely to be a combination of both SS7 and SIP-interconnection in Ireland in the future.

# Question 3

In relation to your response to Question 2 above, please specify which alternative(s) are mandated by the NRA?

|  |  |  |
| --- | --- | --- |
|  Country | Response | Sub-Question: Do you foresee major technical problems or threats in adopting SIP/IP-based interconnection? If so, please explain. |
| Switzerland  |  | Yes, managing SIP credentials  |
| Lithuania | SS7-based interconnection via gateway is short term solution. NRA is not defined now any alternatives but in future it could define.  | No  |
| Russian Federation | At present, the NRA does not mandate any alternatives. Providers solve these issues by themselves.  | We see the problems related to safety, the QoS and overload  |
| Slovenia |  | No  |
| Austria | In fact, the migration from PSTN to an IP based NGN of the incumbent fixed network operator A1 Telekom Austria (A1TA) was finished in 2013. TKK’s (Telekom-Control-Kommission) decision on M3/2007 on interconnection is technology neutral, but imposes interconnection at a single PoI (point of interconnection) with one regulated rate calculated based on NGN. Hence the interconnection can be requested based on TDM or IP. At the moment it is not foreseeable, how long the transition phase, where both SS7 and IP-interconnections are deployed, will last.  | Currently some mobile and fixed alternative network operators are already interconnecting via IP for e.g. voice services. Beside SIP some mobile operators are also using BICC for this purpose. Furthermore SIGTRAN is widely deployed for the transport of SS7 over IP. |
| Bulgaria | SS7 interconnection is mandatory. SIP interconnection is under free trade agreements. Currently CRC is working on implementing rules for IP interconnection.  | Currently CRC and providers carry out consultation meetings as the main goals are to define: -The appropriate SIP protocol version applicable to all providers. -Quality parameters for interconnection and services.  |
| Malta |  |  |
| Romania | There is not a NRA decision, it is operator’s option depending on market demand.  | Based on discussions with the operator, we do not foresee major technical problems. However, there is no pressure on switching to SIP/IP-interconnection either.  |
| Portugal | It is foreseen to mandate the provision of both solutions (SS7 and SIP trunk) to the SMP (incumbent operator).  | The technical solution should be agreed between operators. The NRA will act as mediator.  |
| Czech Republic | Both  | No  |
| Norway | No specific technical interface is mandated, but interconnection must be offered.  | No severe problems or threats are experienced so far, but many options and variants of SIP/IP-based interconnection can be a complicating factor.  |
| Germany | SIP based interconnection. Detail specifications have been worked out by the national interconnection standardization group AKNN. (See http://www.aknn.de/index.php/1731/0/). | No  |
| Cyprus | N/A  | N/A  |
| Croatia | It is foreseen to mandate the provision of both solutions (SS7 and SIP trunk) to the SMP (incumbent operator).  | The technical solution should be agreed between operators. The NRA will act as mediator  |
| Montenegro |  | Crnogorski Telekom will use experience of other Natco’s and operators for applied solution. As it was happened, fraud can be easier made in this environment.  |
| Latvia | There are not alternatives mandated by the NRA, now. NRA is planning to mandate a combination of both SS7- and SIP-interconnection for migration from PSTN to NGN in transitional stage, but full transition to SIP based interconnection in future.  | NRA does not foresee major technical problems or threats in adoption SIP/IP-based interconnection, jet.  |
| Denmark | The incumbent having both PSTN- and VoIP-end users is mandated to give access to both SS7- and SIP-interconnect.  | No  |
| France | N/A  | The main issue with the transition from SS7 to SIP at the interconnection level is to make sure all services traditionally provided over SS7 (especially for business customers like signalling and latency-sensitive services) are implemented properly in IP to ensure a continuity of service to end-users.  |
| Ireland | No specific technical interface is mandated, but interconnection must be offered. |  |

# Question 4

What are the main drivers for the PSTN-migration? (tick more than one box if appropriate)

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | Old equipmentVendor supportStaff competence |
| Lithuania | Operational costsOld equipmentVendor support |
| Russian Federation | Old equipmentVendor supportStaff competenceOther: new services, attraction of investments |
| Slovenia | Operational costsOld equipmentVendor support |
| Austria | Operational costsOld equipmentVendor supportThis question should be addressed towards operators, so the answer is best guess from a regulator's point of view. |
| Bulgaria | Operational costs |
| Malta |  |
| Romania | Operational costsOld equipmentVendor support |
| Portugal | Operational costsVendor supportStaff competence |
| Czech Republic | Other: No information yet |
| Norway | Operational costsVendor support |
| Germany | Operational costsOld equipmentVendor supportStaff competence |
| Cyprus | Operational costsOld equipmentVendor support |
| Croatia | Operational costsOld equipmentVendor support |
| Montenegro | Operational costsOld equipmentVendor support |
| Latvia | Operational costsOld equipmentVendor support |
| Denmark | Operational costsOld equipmentVendor supportStaff competence |
| France | Operational costsOld equipmentVendor supportStaff competenceOther: At the interconnection level, the migration towards IP is driven by the fact that SS7 interconnection, for historical reasons, requires much more interconnection points than IP-based interconnections. |
| Ireland | Currently N/A. Ultimately operational costs and lack of vendor support may force migration. |

# Question 5

What kind of migration strategy is planned?

|  |  |
| --- | --- |
| Country | Response |
| Switzerland |  |
| Lithuania | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Russian Federation | A combination of technical and commercial migration (see also Questions 6 and 7). |
| Slovenia | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Austria | Technical migration i.e. the end customer will keep the existing fixed voice service with no or only minor changes (see also Question 6).  |
| Bulgaria | Technical migration i.e. the end customer will keep the existing fixed voice service with no or only minor changes (see also Question 6).  |
| Malta |  |
| Romania | Technical migration i.e. the end customer will keep the existing fixed voice service with no or only minor changes (see also Question 6).  |
| Portugal | Commercial migration i.e. the end customer must change his subscription to alternative voice services (see also Question 7).  |
| Czech Republic | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Norway | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Germany | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Cyprus | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Croatia | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Montenegro | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Latvia | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| Denmark | A combination of technical and commercial migration (see also Questions 6 and 7).  |
| France |  |
| Ireland | N/A |

# Question 6

If technical migration is planned, what type of solution? (tick more than one box if appropriate)

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | Technical conversion of PSTN-lines to DSL/VoIP-service?  |
| Lithuania | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)  |
| Russian Federation | Technical conversion of PSTN-lines to DSL/VoIP-service technical conversion of PSTN-lines to DSL/VoIP-service |
| Slovenia | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-service |
| Austria | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)  |
| Bulgaria | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-serviceSpecial ”fixed telephone” connected to mobile networks |
| Malta |  |
| Romania | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-service |
| Portugal |  |
| Czech Republic | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-service |
| Norway | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Special “fixed telephone” connected to mobile networks? Comment: PSTN-emulation not yet decided, but is likely in some areas. |
| Germany | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)  |
| Cyprus | Technical conversion of PSTN-lines to DSL/VoIP-service |
| Croatia | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-service Comment: Technical conversion of PSTN-lines to DSL/VoIP-service is Main migration scenario, but PSTN-emulation via access gateway is used in some cases for voice only customers. |
| Montenegro | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-service Comment: Technical conversion of PSTN-lines to DSL/VoIP-service is Main migration scenario, but PSTN-emulation via access gateway in some cases for voice only customers. |
| Latvia | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Technical conversion of PSTN-lines to DSL/VoIP-serviceOther: VoIP via fibre (GPON) |
| Denmark | PSTN-emulation via access gateway (e.g. in DSLAM or MSAN)Other: Technical migration for POTS services using PSTN-simulation |
| France | At the access level, no migration is currently planned. |
| Ireland | N/A |

# Question 7

If commercial migration is planned, what type of alternatives will be offered to existing PSTN-subscribers? (tick more than one box if appropriate)

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre) Comment: IP telephony over DSL or fibre |
| Lithuania | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)  |
| Russian Federation | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)  |
| Slovenia | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)  |
| Austria |  |
| Bulgaria |  |
| Malta |  |
| Romania | N.A. |
| Portugal | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)Alternative mobile servicesOther: services for customers without broadband access and outside mobile coverage (e.g. fixed radio access, satellite).  |
| Czech Republic | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)Alternative mobile services  |
| Norway | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)Alternative mobile services  |
| Germany | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)Alternative mobile services  |
| Cyprus | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)  |
| Croatia | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)  |
| Montenegro | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)Alternative mobile services Comment: VoBB is main scenario. Fibre rollout is in progress in Crnogorski Telekom, but alternative mobile services not initially planned, only in limited situation if it is not possible to provide voice service based on regular migration scenarios. |
| Latvia | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre)  |
| Denmark | Alternative voice service via broadband access (e.g. VoIP-services over xDSL, cable-TV, fibre) Comment: POTS over broadband will be a commercial alternative to POTS + broadband. ISDN alternatives will include SIP-trunk + IP-centrex |
| France | N/A |
| Ireland | N/A |

# Question 8

What are the main reasons for choosing a technical and/or commercial migration strategy? (tick maximum two alternatives)

|  |  |
| --- | --- |
| Country | Comment |
| Switzerland  | Other: Due to the general technological evolution the operators are finally forced to make technological migrations |
| Lithuania | Minimize network upgrade costsMinimize customer handling costs |
| Russian Federation | Minimize network upgrade costsMinimize customer handling costsKeep down customer churn |
| Slovenia | Minimize network upgrade costs  |
| Austria | Minimize customer handling costsKeep down customer churn Comment: Again, this question should be addressed towards operators, so the answer is best guess from a regulator's point of view. |
| Bulgaria | no information |
| Malta |  |
| Romania | Minimize customer handling costsKeep down customer churn |
| Portugal | Minimize network upgrade costsKeep down customer churn |
| Czech Republic | Minimize network upgrade costs |
| Norway | Minimize network upgrade costsKeep down customer churn |
| Germany | Keep down customer churn |
| Cyprus | Minimize network upgrade costsMinimize customer handling costsMinimize marketing costs |
| Croatia | Minimize network upgrade costsMinimize customer handling costs |
| Montenegro | Minimize network upgrade costsMinimize customer handling costs |
| Latvia | Minimize network upgrade costsMinimize customer handling costs |
| Denmark | Minimize network upgrade costsMinimize customer handling costsKeep down customer churn |
| France |  |
| Ireland | N/A |

# Question 9

Do operator(s) in your country have a universal service obligation (USO) to provide public telephone service?

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | Yes  |
| Lithuania | Yes |
| Russian Federation | Yes  |
| Slovenia | Yes  |
| Austria | Yes  |
| Bulgaria | Yes |
| Malta |  |
| Romania | No |
| Portugal | Yes |
| Czech Republic | No  |
| Norway | Yes  |
| Germany | Yes  |
| Cyprus | Yes  |
| Croatia | Yes |
| Montenegro | Yes  |
| Latvia | Yes  |
| Denmark | Yes |
| France | Yes  |
| Ireland | Yes |

## Question 9.1

If yes, how is this service obligation required to be delivered?

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | Only by PSTN + other technologies in special cases  |
| Lithuania | Only by PSTN  |
| Russian Federation | Only by PSTN |
| Slovenia | By all technologies incl. VoIP (technology neutral)  |
| Austria | Only by PSTN + other technologies in special cases |
| Bulgaria | By all technologies incl. VoIP (technology neutral)  |
| Portugal | By all technologies incl. VoIP (technology neutral)  |
| Norway | Only by PSTN + other technologies in special cases |
| Germany | By all technologies incl. VoIP (technology neutral)  |
| Cyprus | Only by PSTN + other technologies in special cases |
| Croatia | By all technologies incl. VoIP (technology neutral)  |
| Montenegro | By all technologies incl. VoIP (technology neutral)  |
| Latvia | Only by PSTN + other technologies in special cases |
| Denmark | By all technologies incl. VoIP (technology neutral)  |
| France | By all technologies incl. VoIP? (technology neutral)  |
| Ireland | Only by PSTN + other technologies in special cases (e.g. fixed mobile solution in very rural areas) |

# Question 10

Also, if you answered "Yes" to Question 9 does the USO include technical QoS requirements? Please provide further information below.

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | The SU provider must provide yearly to the NRA a QoS report containing: - Network installation and repair time statistics - Availability of network access statistics - Telephony and narrow band services quality statistics - Wide band services (internet access) quality statistics - Billing and helpdesk performance statistics - Public payphones quality statistics |
| Lithuania | Yes  |
| Russian Federation | I cannot say anything on this subject  |
| Slovenia | QoS parameters for USO services are mandated by General Act.  |
| Austria | Please refer to <https://www.rtr.at/en/tk/UDVerordnung>.  |
| Bulgaria | QoS requirements according to USD 2002/22/EO  |
| Malta |  |
| Romania |  |
| Portugal | Yes. Please consider Annexes 2 in sections 2.2 (Telephone service at a fixed location), 3.2 (Public payphones) and 4.2 (Telephone directory enquiry service) contained in the following link: <http://www.anacom.pt/streaming/final_decision_USP_07february2012.pdf?contentId=1122782&field=ATTACHED_FILE>  |
| Czech Republic |  |
| Norway | No specific technical QoS-requirements apart from providing access to a "digital network"  |
| Germany | No.  |
| Cyprus | YES. There are in place QoS indicators about voice telephony. (e.g. Time for initial line installation, fault rate, Fault recovery time, call failure rate, service response time, call recovery time, allegations of bill errors). |
| Croatia | QoS parameters for USO services are mandated by Ordinance on universal services. ([http://www.hakom.hr/UserDocsImages/2011/propisi\_pravilnici\_zakoni/Pravilnik%20o%20univerzalnim%20uslugama%20u%20elektroničkim%20komunikacijama%20NN%2023\_09.PDF](http://www.hakom.hr/UserDocsImages/2011/propisi_pravilnici_zakoni/Pravilnik%20o%20univerzalnim%20uslugama%20u%20elektroni%C4%8Dkim%20komunikacijama%20NN%2023_09.PDF))  |
| Montenegro | Yes, it is prescribed to fulfil the requirements in accordance by Law and the Rule on Quality of Universal Services In accordance to the Law on electronic communications, the services of the Universal Service shall include: 1) meeting any reasonable user’s request for the access to public electronic communications network and publicly available electronic communications services on a fixed location, which enables the use of voice communication and data transfer rate which enables functional Internet access; 2) providing the service of universal telephone directory (hereinafter: “Universal Directory”) and universal enquiry service for subscriber numbers (hereinafter: „Universal Enquiry Service“); 3) use of public pay telephones or other publicly available points for provision of voice services at any time, in accordance with the reasonable requests and needs of end users, in terms of geographic coverage and service quality; 4) special measures and benefits for the persons with reduced mobility and persons with disabilities, including the access to emergency services, enquiry service for subscriber numbers and directory of subscribers, which enables them to have the same possibilities of access to the publicly available telephone services as the other end users as well as the appropriate selection of operators available to the majority of end users. However, it is prescribe by specialized regulation of Government of Montenegro to exclude the obligation of providing public phones within USO (point 3). Also, Telenor (which is obliged to provide USO 1. and 4. points above) is mobile operator which currently does its USO obligation via FWA (Fixed Wireless Access). The other operator has been elected to provide USO obligations from points 2. i 4. |
| Latvia | NRA has defined the following parameters for the universal service: - Supply time for initial connection - Unsuccessful call ratio; - Fault repair time - Call set up time; - Response times for operator services; - Response times for directory enquiry services; Values of universal service quality parameters are determined by Regulator, except the parameter “Supply time for initial connection”, that is declared by universal service provider for the current year. |
| Denmark | No  |
| France | Yes, the universal service specifications include QoS requirements, like time limits for connection of new customers and service delivery, time limits for service reestablishment after a breakdown, and more technical requirements like the call set up time and the call failure rate.  |
| Ireland | Yes. Refer to ComReg Document 14/71 on [www.comreg.ie](http://www.comreg.ie)  |

# Question 11

Are PSTN-Services being sold without restrictions to new customers in your country?

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | No  |
| Lithuania | Yes  |
| Russian Federation | Yes  |
| Slovenia | No  |
| Austria | Yes  |
| Bulgaria | Yes  |
| Malta |  |
| Romania | Yes  |
| Portugal | Yes  |
| Czech Republic | Yes  |
| Norway | Yes  |
| Germany | No  |
| Cyprus | Yes  |
| Croatia | No  |
| Montenegro | No  |
| Latvia | Yes  |
| Denmark | No  |
| France | Yes  |
| Ireland | Yes |

## Question 11.1

Are PSTN-services being sold without restrictions to new customers in your country?

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | No  |
| Lithuania | Yes  |
| Russian Federation | Yes  |
| Slovenia | No  |
| Austria | Yes  |
| Bulgaria | Yes  |
| Malta |  |
| Romania | Yes  |
| Portugal | Yes  |
| Czech Republic | Yes  |
| Norway | Yes  |
| Germany | No  |
| Cyprus | Yes  |
| Croatia | No  |
| Montenegro | No  |
| Latvia | Yes  |
| Denmark | No  |
| France | Yes  |
| Ireland | Yes |

## Question 11.2

If no to Question 11.1, what restrictions apply? (tick more than one box if appropriate)

|  |  |
| --- | --- |
| Country | Response |
| Switzerland  | Only available in specific geographic areas  |
| Slovenia | Only available in specific geographic areas Comment: In other areas Telco already made migration (replace legacy telephone exchange with Softswitch). Incumbent operator has not officially announced PSTN/ISDN migration, but unofficially migration is expected in 2018. |
| Germany | Other restrictions Please specify in the "Remarks" field below: PSTN is only offered, when technically and commercially feasible. |
| Croatia | Only available in specific geographic areasOther: PSTN is only offered, when technically feasible. |
| Montenegro | Only available in specific geographic areas Comment: PSTN services are available only in specific areas where the migration is not implemented. |
| Denmark | Other: PSTN-services are sold without restrictions, if available |