HILL

Antelope Consulting

Responses to recommendations for the numbering regulation and numbering plan of Luxembourg

23 June 2021

Hill

rhill@hill-a.ch

http://www.hill-a.ch

Antelope Consulting

rem@antelope.org.uk

http://www.antelope.org.uk

Contents

Executive summary

This report results from a study by consultants Hill and Antelope of the Luxembourg numbering regulation and numbering plan for the Institut Luxembourgeois de Régulation (ILR). It incorporates the substance of the responses from stakeholders to the consultants' findings and recommendations in an earlier report (the "Study Report") and provides any revisions to the recommendations that take those responses into account.

Most of the revisions to the recommendations are clarifications. The most significant changes relate to:

- Controlling extraterritorial uses of numbers (Sections 2.2.2 and 2.2.3).
- Calculating the sizes of blocks containing extensions (Sections 2.3.6 and 2.4.5).

Some other topics attracted several varied responses that ultimately led to little or no changes in the recommendations. Among them are:

- Supplying numbers for service resale (Section 2.5.2).
- Unifying the treatments of number portability (Section 2.6.1, 2.6.3 and 2.6.4).
- Enhancing the rules governing premium rate services (Sections 3.4.3 and 3.6.23.6.2).
- Inhibiting the growth of number misuse and fraud (Sections 2.7.2 and 2.7.3).
- Introducing new numbers (Sections 3.1.3 and 3.6.2).
- Making fixed numbers uniform (Sections 3.2.1 and 3.2.2).
- Developing the availability and safety of nomadic services (Sections 3.2.33.2.3 and 3.2.4).
- Regulating M2M services (Sections 3.3.2 and 3.3.3).

1 Introduction

1.1 Purpose of this report

This report results from a study by consultants Hill and Antelope of the Luxembourg numbering regulation and numbering plan for the Institut Luxembourgeois de Régulation (ILR). It incorporates the substance of the responses from stakeholders to the consultants' findings and recommendations in an earlier report (the "Study Report") and provides any revisions to the recommendations that take those responses into account.

The stages of the work before the production of the Study Report provided:

- An evaluation of the Luxembourg numbering regulation and numbering plan, supplemented by extensive special studies of the situations in eight "reference countries" (Belgium, Denmark, France, Germany, Ireland, the Netherlands, Norway and Switzerland).
- A survey eliciting stakeholder views on relevant questions, consisting of a written questionnaire followed by a series of interviews.

For the survey, 43 completed questionnaires were tabulated and used to formulate the opinions in the Study Report.

For the consultation phase, which is summarised in this report, there were eight responses, but two came from group of operators. Fifteen distinct operators provided responses (either individually or as members of groups); five supplemented group responses with their own. The groups were:

- GIE Telcom (Eltrona Interdiffusion, e-Lux Mobile Telecommunication Services, Luxembourg Online, MTX Connect, Orange Communications Luxembourg, POST Luxembourg and Proximus Luxembourg).
- OPAL (BT Global Services Luxembourg, Cegecom, Eltrona Interdiffusion, Luxconnect, LuxNetwork, Orange Communications Luxembourg and Proximus Luxembourg).

Presumably the thirty or so operators who replied to the questionnaire but did not provide responses to the consultation had no particular objections to the findings and recommendations in the Study Report.

1.2 Arrangement of this report

Findings and recommendations in the Study Report for which there were no responses are not reproduced in this report. However, in order to facilitate references to the Study Report, the structure of that report is maintained here, so there are sections with no content.

The responses from the stakeholders have in some cases been moved partly or wholly to sections that appeared more appropriate to them. The main places from which paragraphs have been moved between differently numbered sections are noted in the text. Some of the responses have also been slightly reworded in consequence. Nonetheless the consultants believe that all the responses, other than single lines that deliberately disclaim making comments, are substantially present in this report.

2 The numbering rules with general application

2.1 Common concepts

2.1.1 The numbering regulation, numbering plan and numbering register

Original recommendation

- **The numbering plan and numbering register should be characterised in the revised numbering regulation at least to the extent of stating what mechanisms are adopted for changing them.**

POST

It would be of interest if all of the mechanisms for changing the numbering plan or the numbering register were clearly described.

The consultants

Indeed, the revised numbering regulation should provide these descriptions. The current numbering regulation indicates already the process for changing the numbering plan if allocated numbers are to be replaced; for that purpose its level of detail appears adequate. The main actions changing the numbering register are identified in Section 2.4.6 of the Study Report; other such actions might arise if discrepancies were found between the numbering register and the records held by the ECNS providers.

The consultants propose to maintain the recommendation.

2.1.2 Number assignment, allocation and designation

2.1.3 Further administrative actions

Original recommendation

- **The revised numbering regulation should include definitions of all those actions of ILR that change the rights and responsibilities of ECNS providers, such as "reservation", "withdrawal", "return" and "transfer".**

POST

POST does not share the opinion of the consultant and is of the view that the current legislation is clear on the issue. The French terms in the current numbering regulation are straightforward and do not need further definition.

The consultants

The revised numbering regulation might be used by organizations that do not know the connotations of the terms to organizations firmly based in Luxembourg, As remarked in Section 2.1.3 of the Study Report, changes to the rights and responsibilities of the ECNS providers need to be made precise; the discussions of transfer of numbers and of supply of number for resale confirm this.

The consultants propose to maintain the recommendation.

2.1.4 Fixed services, nomadic services and mobile services

Original recommendation

- **The revised numbering regulation should include definitions of "fixed service" ("*service fixe*"), "nomadic service" ("*service nomade*") and "mobile service" ("*service mobile*") that distinguish between them just according to the degrees of mobility offered.**

POST

The distinction could be useful if it has a clear impact on the regulation itself (i.e. a change in rights or responsibilities with respect to these services for ILR or the ECNS providers). These definitions should only be introduced if a real need exists.

[*A paragraph from the POST answer has been moved to Section 2.2.3.*]

The consultants

The consultants agree that definitions should be introduced only if they are needed; they usually follow this practice. In particular, nomadic services need to be distinguished from fixed services only if the distinction is needed. The purpose of the definitions in Section 2.1.4 of the Study Report is to indicate where the distinction between these services lies. A possible difference in the associated rights and responsibilities is discussed in Section 3.2.4 of the Study Report.

The consultants propose to maintain the recommendation.

Original recommendation

- **The revised numbering regulation should omit the definition of "geographic service" ("*service géographique*").**

POST

Given that end users can keep their numbers in case of moving, the term "geographic" is no longer relevant and the definition of "geographic number" could be omitted. The current numbering regulation actually focusses on "geographic number", not "geographic service".

The consultants

In the response "moving" is presumably restricted to "moving between communications" or even to "moving between premises and changing address"; it illustrates the need for care in distinguishing between "fixed service", "nomadic service" and "mobile service". As discussed in Section 2.1.5 of the Study Report, the emphasis is on services, not numbers; however, comments on including or excluding definitions apply equally to numbers and services.

The consultants propose to revise the recommendation as below, to mention both "geographic number" and "geographic service".

Revised recommendation

- **The revised numbering regulation should omit definitions of "geographic number" ("*numéro géographique*") and "geographic service" ("*service géographique*").**

2.1.5 Associations between numbers and services

Original recommendation

- **The revised numbering regulation should require an ECNS provider to alert users free of charge at the starts of communications to a number if the service using the number has higher prices than a service using a different number allocated to the same ECNS provider and having the same designation.**

OPAL

Unless the OPAL members are mistaken, following the introduction of flat rates for mobile subscriptions several years ago, there is no longer any billing difference at the national level between calls to numbers on the same network and calls to numbers on a different network, at least for OPAL members. Consequently the imposition of warning tones does not seem relevant.

POST

The use given in the recommendation (in Section 2.1.5 of the Study Report) resembles a value-added service, for which a higher price can be charged and specific number ranges are provided. In these cases, specific rules regarding the provision of clear information on the pricing exist.

Warning tones may reduce the customer experience (because of the time taken to listen to them or frequent occurrences of them). If a warning tone is introduced, customers should be allowed to unsubscribe from receiving it. However, the introduction of warning tones might incur very high implementation costs (which might have to be reflected in consumer prices) for rather limited value for the end user; for instance, SMS warning messages have been introduced for roaming services under EU regulations, but customers tend to unsubscribe from such services when roaming in the EU.

Standard services like calls to mobile or fixed numbers are very often covered in commercial bundles like flat fees which include the same tariffs or volume of minutes to all destination service providers. Also, a split of tariffs for international calls is very difficult and highly dependent on the terminating party and therefore a notification as suggested in the recommendation is nearly impossible.

The revised numbering regulation should foresee a mechanism to ensure that numbers with a given designation are used correctly by the operators rather than (implicitly) allowing different uses for numbers with the same designation.

The revised numbering regulation should be not overly complicated by introducing obligations that, in their essence, are general requirements applicable to all companies and end users and enshrined in other, more general, pieces of legislation.

Twilio

Twilio already has virtual numbers in Luxembourg. Given user demand, Twilio suggests that ILR consider allowing all types of numbers to be used virtually.

The recommendation to alert customers at the start of a communication if the service has a higher price will create challenges for compliance. Twilio suggests that ILR allow operators discretion in how they ensure price transparency for consumers before they incur these costs.

The consultants

The substance of Section 2.1.5 of the Study Report concerns the fact that already numbers may be used by services that are not always those for which the numbers are designated in the numbering plan; for instance, PBX extensions in fixed networks may address mobile

network termination points. The recommendation about the requirement for alerts is a consequence of this fact. The same requirement appears in the current numbering regulation in the context of prices for calls to ported numbers. It is intended as a safeguard, to be exercised at the discretion of ILR. The consultants expect that it would also have this intention in the context considered here.

However, the recommendation as stated above is too broad in its application. Though international calls should not cause a problem for it (because they are not made to numbers allocated by ILR), calls to shared revenue numbers might do so. Moreover, it does not mention the needs for ILR to exercise discretion and for customers to be able to deactivate or reactivate alerting; these are in separate articles of the current numbering regulation, and the consultants envisaged that they would be kept.

The recommendation is intended to protect against the possibility of exploiting commonplace numbers for expensive services (as has happened in countries when nomadic numbers are used as personal numbers with high call charges, for example). An alternative to it could be to require equal pricing for all numbers having the same designation or to allow revenue sharing only in calls to shared revenue numbers. It should not be needed in an orderly market.

The consultants propose to remove the recommendation.

2.1.6 Administrative arrangements for technical numbers

Original recommendation

- **ILR should consider publishing the descriptions of the management of technical numbers in guides to practice instead of in the revised numbering regulation.**

POST

The regulation itself should contain clear rules to be followed by the market players, such as rules on the usage of numbers or porting. However, descriptions of matters such as the one at hand should not be in legal instruments, due to the complexity of modifying them.

However, POST would welcome the publication of such documentation on the ILR website. In this documentation, ILR could include a clear definition of a technical number. For example, MSRN (“Mobile Station Roaming Number”) and Global Title numbers (such as SMSC addresses) are required, configured and used in mobile networks for the functioning of the mobile service according to the GSMA standard. Among others, NSPC or MNC are also considered as "technical numbers" by operators, as they are not attributed to the customers. However, at the same time they are part of the standard mobile numbering plan which is used for number attribution to end customers.

The consultants

The consultants agree that the documentation mentioned should not be in the numbering regulation but in guides to practice, as outlined in Section 2.1.7 of the Study Report.

The recommendations of the consultants are about number administration in which the regulator is involved. This concerns mainly numbers made available to the country through the ITU under ITU-T Recommendations E.164, Q.708, E.212, X.121 and E.118. Where administration does not involve the regulator (as, for example, with GSMA registration) numbering regulations have nothing to say.

In Luxembourg the term 'technical number' can be confined to NSPCs, ISPCs, DNICs, MNCs and IINs (mentioned without abbreviation in Section 2.1.7 of the Study Report). Technical numbers are not publicly accessible. There are other numbers that are not publicly accessible but that are not technical numbers in this sense, because they are taken from the numbering space used for public access and administered by the regulator; among them are the routing numbers (beginning with '0').

The consultants propose to maintain the recommendation.

2.1.7 Guides to practice

2.1.8 Codes of conduct

2.1.9 Delegation of tasks

2.2 Eligibility for number allocation

2.2.1 Organisations other than ECNS providers

Original recommendation

- **There is no clear case at present for allowing numbers from Luxembourg (other than certain voice short codes) to be allocated to organisations other than ECNS providers, given that the relevant numbers are portable.**

OPAL

The OPAL members agree with the recommendation. Numbers are scarce resources, so the OPAL members suggest staying with the current situation, in which only ECNS providers are allocated numbers.

POST

POST agrees with the recommendation. There is no clear need for allocating numbers to organizations other than ECNS providers. They may lack the necessary knowledge for managing numbers, encounter interconnection problems and ultimately face end-to-end connection issues. In order to avoid this, they will probably outsource numbering management (and network operation), but doing this puts in question the need for allocating numbers to them.

Proximus

If organizations other than ECNS providers are allowed to request numbers, they should also justify why numbers provided directly from an ECNS provider would not be sufficient. For some cases, if number portability or OTA provisioning is available, there is no clear need to allocate numbers directly to an organization which is not an ECNS provider.

The consultants

As implied in Section 2.2.1 of the Study Report, and as noted by one of the responses, number portability (or, failing that, OTA provisioning) is often needed if organisations other than ECNS providers are not allocated numbers.

The consultants propose to maintain the recommendation.

2.2.2 Organisations having extraterritorial uses of numbers

Original recommendation

- **ILR should permit extraterritorial uses of numbers in reciprocal arrangements with countries having regulatory requirements consistent with those of Luxembourg. Such countries may be inside or outside the EU.**

e-Lux Mobile

As with other GIE Telcom members, e-Lux Mobile believes that there is no need for a change to the regulation for extraterritorial use of mobile and M2M/IoT numbers. In addition to entry into force of the "roam like at home" principle in 2017, e-Lux Mobile suggests that in those countries where the permanent use of international numbers is not allowed the regulator disables permanent roaming. Therefore there should not be a need for reciprocal agreements to be signed between ILR and the home country regulators for an operator like e-Lux Mobile to provide international services through international roaming agreements.

GIE Telcom

Extraterritorial use of numbers refers to situations in which numbers that have been allocated in one country are used permanently in another country through physical infrastructure there. It is already possible in the current regulatory setting, since ILR can approve it. It is furthermore enshrined in the European Electronic Communications Code and will be transposed into the upcoming Luxembourg telecoms law.

In addition to the conditions stated in the upcoming law, the consultant suggests that the extraterritorial use of numbers should be submitted to the requirement of bilateral agreements between countries having a similar regulatory setting, in order to ensure a harmonised usage of numbers between two countries.

The GIE Telcom members welcome clarifications about the principle of extraterritorial use of numbers. However, they would like to raise awareness about the following issues:

- The requirement of a bilateral agreement is not part of the legal framework and should therefore not be considered in the revised numbering regulation.
- M2M/IoT numbers should be excluded from the scope of the extraterritorial use of numbers, since the devices equipped with M2M/IoT numbers are not necessarily stationary. In this context, the opinion in Section 3.3.1 of the Study Report that eCall services should be considered as M2M services is relevant. Indeed, cars may easily cross borders to countries with which no dedicated agreement for extraterritorial use of numbers has been reached.
- Mobile numbers should also be excluded from the scope of the extraterritorial use of numbers, due to entry into force of the “roam like at home” principle in 2017.
- The extraterritorial use of numbers incurs a risk of fraud, especially with premium numbers.

In order for extraterritorial use of numbers to be effective and safe, a clear framework needs to be developed; this is currently not provided or discussed by the consultants.

OPAL

Numbers are scarce resources, so the OPAL members do not favour the use of numbers abroad without supervision.

The European Electronic Communications Code allows the extraterritorial use of numbers, which has great value for M2M/IoT services. The usual sequence of actions between a user of a mobile device and a connectivity provider is not valid for them. Therefore the OPAL

members suggest that ILR allow extraterritorial use of numbers for specific uses and specific number ranges. M2M/IoT numbers are likely to be growing most in the years to come and will often not be limited to use in Luxembourg.

POST

POST suggests introducing measures to reduce the risk of fraud as well as the risk of non-compliance with the national legal framework (caller identification). The following points need to be highlighted:

- A bilateral extraterritorial agreement would still require an interconnection between the national operators to route the incoming calls, since numbers with the prefix +352 are still routed to Luxembourg. Thus, all calls have to be routed through Luxembourg networks and can then not be considered completely extraterritorial.
- A bilateral extraterritorial agreement would still require a direct interconnect not via transit to guarantee the user authentication for outgoing calls.
- Multiple operators (e.g. BT, Orange France) informed POST that they will block any calls to their respective countries that display a local originating number on international interconnect links (excluding, however, mobile due to outgoing roaming calls). Examples of such exchanges were sent to ILR in 2020 during the exchange with the consultants.
- The use of national numbers by extraterritorial service providers might stimulate spamming scenarios or fraud due to the trust that customer gives to national numbers in comparison with international numbers that are considered more “untrusted”.
- With respect to mobile numbers and M2M/IoT services, extraterritorial use no longer makes sense given the “roam like at home” principle established in 2017.

One scenario that POST has experienced is not clear in extraterritorial use or in the national landscape. When the customer is the owner of the phone number the number should only be routed by one operator for incoming and outgoing calls. The use of a phone number by another operator in parallel creates inconsistencies in the authentication of the customer and difficulties in preventing spamming, fraud and clear authentication of the user. Such problems have in particular been noticed with faked A-numbers coming over international networks.

Extraterritorial use of numbers must consider a clear number designation and therefore depend on the service offered.

Proximus

It might be interesting to clarify more from a technical point of view what is meant by extraterritorial use of numbers and clarify the difference from unauthorised spoofing, if any. Proximus understands that using (for example) geographic numbers in an extraterritorial way with a "presentation" calling line number should not be an issue and is not considered as an extraterritorial use of numbers. The use of geographic numbers in an extraterritorial way is linked to the choice of those numbers as the "network" numbers identifying the calling lines. Spoofing measures should take account of the possibility of extraterritorial use of numbers where allowed.

Twilio

Twilio welcomes the proposal to permit extraterritorial uses of numbers in reciprocal arrangements with countries inside or outside the EU having regulatory requirements consistent with those of Luxembourg. Twilio expects that, over time, this could extend at least to all the EU/EEA countries. Using the SHAKEN/STIR protocol could help to eliminate fraudulent use of numbers, which the consultants point out as the biggest concern about extraterritorial use of numbers. Allowing for extraterritorial use of numbers would have a highly beneficial effect for consumers, as it would allow businesses with no physical connection to a country but with online service offers of interest to many customers in that country to communicate with their customers more easily.

However, a precondition is to ensure that conditions and administrative burdens on operators remain manageable. For this purpose, ILR would need to clearly specify which number types can be used for which purpose in Luxembourg.

The consultants

There can be confusion between extraterritorial uses and roaming, perhaps due to the different interpretations of the term "extraterritorial uses". Broadly speaking, EU documents tend to include permanent roaming (but not temporary roaming) among extraterritorial uses while ITU recommendations exclude it.

The European Electronic Communications Code mentions prohibiting extraterritorial uses of numbers for interpersonal communications services, because of the risk of fraud. Doing so points to distinguishing M2M services from mobile services offering interpersonal communications, though this can be difficult to do in countries such as Germany where M2M services share the space of mobile numbers with interpersonal communications services. It also points to prohibiting permanent roaming (by mobile services offering interpersonal communications), but this is a matter for national policy: the "roam like at home" principle of

the Roaming Regulation draws a distinction between permanent roaming and temporary roaming but does not require EU member states either to permit or to prohibit permanent roaming. It offers limited defence against fraud unless there are effective network barriers to calls from numbers that have not been allocated.

Regulators in the EU are required to enter in a BEREC database the numbers that are permitted to have extraterritorial uses throughout the EU (and optionally throughout the world). The numbers in the database currently are intended for use by M2M services (or, in some cases from France, freephone services). The database in effect constitutes reciprocal arrangements between EU member states, where the shared regulatory framework should ensure consistency of the regulatory requirements. Of course, eCall services need extraterritorial uses (or at least permanent roaming) to be permitted in other countries having regulatory requirements similar to those in the EU.

The consultants propose to revise the recommendation as below, to confirm that permanent uses in Luxembourg of numbers from other countries are permitted when the regulatory requirements of the countries are consistent with those of Luxembourg.

Revised recommendation

- **ILR should permit permanent uses in Luxembourg of numbers (other than numbers for use in interpersonal communications services) allocated by the regulators in other countries if the other countries have regulatory requirements consistent with those of Luxembourg, regardless of whether the other countries are EU member states.**

Original recommendation

- **The revised numbering regulation should omit statements to the effect that:**
  - **Uses of numbers administered by ITU are permitted.**
  - **Extraterritorial uses of numbers from other countries are permitted in reciprocal arrangements with those countries.**

POST

POST does not share the point of view of the consultants and considers that the abovementioned statements would indeed be helpful. In effect, they allow for further clarification regarding:

- the upheld permission to use ITU numbers as an alternative to the extraterritorial use of Luxembourg numbers, and
- the fact that extraterritorial use of Luxembourg numbers is conditional on the fact that partner countries have equivalent regulatory requirements (if the condition is introduced by ILR in the reviewed regulation).

The consultants

The statements might obscure matters instead of clarifying matters. They can create doubts about what is or is not permitted, by raising questions such as "If the regulation states explicitly that some things are permitted, does it imply that other things are not permitted?" For these reasons the consultants continue to favour excluding such statements.

The consultants propose to maintain the recommendation.

2.2.3 Organisations assigning numbers to customers in Luxembourg

Original recommendation

- **ILR should consider requiring that an organisation can be allocated Luxembourg numbers only if either the allocations are permitted in reciprocal arrangements for extraterritorial uses of numbers or both of the following conditions apply:**
  - **The organisation assigns such numbers only to customers that have links with Luxembourg (but not necessarily permanent presence there); for instance, the customers might have family members, work associates or business clients in Luxembourg.**
  - **The organisation routes through interconnection points controlled in Luxembourg all communications to and from such numbers that it assigns to customers.**

e-Lux Mobile

Since its establishment e-Lux Mobile has been targeting and providing services to the international travellers market through direct roaming agreements and also under roaming sponsorships of global operators.

Although e-Lux Mobile is active in Luxembourg, it has not performed any marketing activity for the local market or gathered any active end users in Luxembourg since the beginning of its services. AII of the existing customers are from the international market.

It has been using MVNE platforms located in the Netherlands that are owned and operated by TATA Communications. It has a registered office and active personnel in Luxembourg who

have been in contact with ILR and other Government agencies since the beginning of its operations.

As per GSMA roaming standards inter-operator scenarios, e-Lux Mobile voice calls are routed through the visited network, so the voice calls are not routed to the home country. However e-Lux Mobile captures all the CDRs for voice and SMS for both mobile-originated and mobile-terminated calls and has been sharing these data whenever requested by related Luxembourg authorities for the last five years without any problem or delay. If, in addition to this data, lawful interception for voice and SMS traffic will also be demanded by these authorities for e-Lux Mobile's roaming customers, relevant authorities may coordinate lawful interception requests through the reciprocal authority in a related country.

AII the data traffic originating from the e-Lux Mobile international customers are routed through the MVNE Platforms in the Netherlands. Lawful interception can be provided through these platforms if requested.

Based on the structure and possibilities mentioned above e-Lux Mobile does not believe that a physical interconnection point in Luxembourg should be a condition for the extraterritorial usage of Luxembourg numbers.

Introduction of such conditions will damage the business model and revenues of e-Lux Mobile who became a tax payer in Luxembourg and is working on new projects and additional revenue streams to be accumulated in Luxembourg banks with the target of becoming a global MVNO like Lyca Mobile or Lebara Mobile, operating from Luxembourg

These efforts and success of e-Lux Mobile have already taken the attention of other global operators from EU, operating from Luxembourg, France, Italy and the Netherlands, to sign new roaming sponsorship and roaming services agreements with e-Lux Mobile.

e-Lux Mobile is hoping for support from ILR in the changing and evolving international electronic communication services market and industry standards, with the introduction of eSIM technology and M2M/IoT adopters, who are being targeted by e-Lux Mobile along with international travellers.

OPAL

The recommendations complicate sales processes for both mobile lines and fixed lines. Therefore the OPAL members suggest sticking to the rules previously stated, of allocating the numbers only to companies having a physical electronic communications infrastructure in Luxembourg.

POST

M2M/IoT numbers should be exempt from such conditions, which cannot always be met. For instance, the M2M numbers provided to automotive manufacturers for cars can easily move into a country with which no reciprocal agreement exists.

[*From the POST answer for Section 2.1.4*] If the revised numbering regulation includes definitions such as "nomadic service" and "fixed service", it should clearly mention that numbers are only to be used in Luxembourg, unless the purpose (and therefore the designation) of the numbers requires. For instance, freephone or inbound-only numbers should be allowed for use outside Luxembourg.

Moreover, considering its response under Section 2.2.2, POST can only agree with the second point.

Proximus

Lawful interception can be performed in the country of the ECNS provider without a Luxembourg address.

Twilio

Twilio welcomes the progressive approach in the recommendations, proposing a more liberal right for customers to be assigned numbers, subject to the organization routing through Points of Interconnection in Luxembourg or being based on an organization's customers' links to Luxembourg without necessarily having a permanent presence in the country. Such an approach would greatly benefit services which can guarantee local support across borders, as well as those services that are intrinsically virtual and where customers expect virtual interaction only. Twilio therefore recommends allowing a greater group of customers from within the EU/EEA to be entitled to state legitimate reasons for a need for a number from Luxembourg.

A generic example: if for instance, a German car manufacturer wants to run a call centre for all its franchised car dealerships across Europe, it would prefer to have numbers that are local to where the car dealers are physically located, so that their clients can call local numbers that they trust. However, where there are regulatory restrictions on the assignment of numbers, and the German car manufacturer running the call centre does not have a physical presence in all the countries where the car dealerships are located, numbers can only be assigned to the individual car dealerships, so a single call centre would be impossible. In this example, the links between a car manufacturer (a globally recognized brand) and local car dealerships (located in Luxembourg, run by local people from Luxembourg and known by local customers)

would likely establish a justification for legitimate links with Luxembourg. This scenario should therefore be permitted and not rendered unduly complex.

Verification of stable links with Luxembourg should not become an administrative burden for operators or for customers. Twilio therefore recommends that, if this recommendation is accepted, it should be sufficient for operators to accept a warranty from customers that they have a link to Luxembourg, rather than having to verify and collect evidence of the same which could end up requiring operators to make subjective judgements.

The consultants

A requirement that numbers are assigned only to customers that have stable links with Luxembourg seems natural but has limited value. It does not help with reducing the incidence of unwanted calls: tests on CLIs are not made more stringent by the claim that numbers are assigned only to such customers. It loses value in countries where fixed numbers have no geographic significance and high proportions of the population live near international borders. It might, however, moderate demand for numbers that are in short supply.

Lawful interception can be performed in the country of an ECNS provider without a Luxembourg address, though it is more complicated than it would be if there were such an address: it requires the execution of international letters rogatory. This appears to be the position taken for other legal instruments in Luxembourg: the form for ECNS provider notification and the laws on customer registration require contact details (for lawful interception staff and customers respectively) but do not require addresses (of interconnection points and customers respectively) in Luxembourg.

There are in fact two distinct possible requirements on ECNS providers: to have interconnection points controlled in Luxembourg and to accept only customers having addresses in (or at least links with) Luxembourg. Neither is imposed currently. The respondents to the consultation differ in their opinions of whether either should be imposed.

The consultants propose to revise the recommendation as below, to suggest considering that permanent uses in other countries of Luxembourg numbers are permitted when the regulatory requirements of the countries are consistent with those of Luxembourg, to suggest considering that numbers used by interpersonal communications services might be assigned only to customers having links with Luxembourg and to suggest considering that numbers used by interpersonal communications services might be assigned only to customers connected through interconnection points controlled in Luxembourg.

Revised recommendation

- **ILR should consider permitting permanent uses in other countries of numbers allocated by ILR if the other countries have regulatory requirements consistent with those of Luxembourg, regardless of whether the other countries are EU member states.**
- **ILR should consider allocating numbers for use in interpersonal communications services only to organisations that undertake that the numbers will be assigned only to customers that normally reside in Luxembourg or have stable links entailing frequent and substantial presence in Luxembourg.**
- **ILR should consider allocating numbers for use in interpersonal communications services only to organisations that undertake that the numbers will be assigned only to customers that are connected through interconnection points controlled in Luxembourg.**

2.3 Number administration

2.3.1 The removal of reservations

Original recommendation

- **ILR should consider eliminating reservations.**

OPAL

The OPAL members do not agree with the recommendation. Reservations should remain. Generally the OPAL members are satisfied with the current process.

POST

POST agrees that the current purpose and pricing of reservations induces low interest in them from operators. However, reservations could be redefined so that they could be considered as "guardians" for larger blocks with the purpose of simplifying the implementation of native routing within the corenetwork, where complexities may arise if blocks are too fragmented.

The consultants

The consultants envisage that numbers in the numbering plan can be protected from allocation by ILR and freed for allocation by ILR. As actions to protect numbers from allocation and to free numbers for allocation are needed for other purposes, there is no need for reservations as well. For instance, to simplify routing, numbers that occupy the gaps between allocated numbers might be protected from allocation (or "blocked", as they are in Section

2.4.6 of the Study Report). They could become free for allocation (or "free") after a short public hearing, and numbers that are free for allocation could be allocated by granting a request for allocation.

The consultants propose to maintain the recommendation.

2.3.2 Basic administrative processes

Original recommendation

- **The revised numbering regulation should state that requests for ILR to reserve, allocate, transfer or allow the return of numbers will normally be accepted or refused within three weeks.**

POST

POST agrees with the recommendation. The timeframe is consistent with the European Electronic Communications Code and the future Luxembourg telecoms law.

The consultants

The consultants propose to maintain the recommendation.

2.3.3 Block sizes

Original recommendation

- **ILR should accept requests to reserve, allocate, transfer or allow the return of numbers only for contiguous whole blocks, each of which has the minimum size specific to the class of numbers. For instance, for numbers with a block size of 1'000, an applicant requesting 2'000 numbers would be allocated two blocks each of 1'000 numbers, not one block of 10'000 numbers, and an applicant requesting 1 number would be allocated one block of 1'000 numbers. In consequence, ECNS providers can return only whole blocks.**

POST

POST does not see any need for changing the current block sizes.

Twilio

In line with Twilio's explanations in Section 2.5.2, Twilio does not agree with the proposal to limit the transfer of numbers to contiguous whole blocks but would suggest that this should be allowed for smaller blocks within those blocks. Again, allowing for transfer of a smaller block allows for new operators to enter the market in a more flexible way.

The consultants

The demand for smaller blocks can be met by the supply of numbers for service resale, if it is available as described in Section 2.5.2 of the Study Report.

The consultants propose to maintain the recommendation.

2.3.4 Number recycling

Original recommendation

- **The revised numbering regulation should carry over from the current numbering regulation the period of quarantine and the basis for regarding numbers as abandoned.**

POST

The period of quarantine could be reduced to three (3) months.

POST would welcome a clear definition, applicable to all the market players, of the criteria to be fulfilled for a number to be considered as abandoned. As stated in Section 2.3.4 of the Study Report, "requirements (including the period of quarantine and the basis for regarding numbers as abandoned) should apply to all numbers, regardless of whether the numbers have been ported".

The consultants

The period of quarantine is already quite short; reducing it could cause problems for customers. In Ireland, for example, it is thirteen months, so that numbers can be removed from paper directories.

The consultants propose to maintain the recommendation.

Original recommendation

- **The revised numbering regulation should require that:**
    - **Numbers that have been ported and that are regarded as abandoned cease to be ported, so that the ECNS providers to whom they were allocated take back all rights and responsibilities associated with them.**
    - **Customers are warned (potentially more than once) as their numbers proceed towards becoming regarded as abandoned.**
    - **Numbers that have been assigned are quarantined before they are assigned again.**

POST

Recycling already happens today.

OPAL

OPAL agrees with the recommendation; this process should remain as it is today.

Twilio

The consultants point out that the numbering plan has plenty of capacity for number availability. Twilio therefore sees no need to turn numbers off quickly and re-allocate them. An obligation for providers to do this poses a significant administrative burden which would only be justified in case of severe scarcity of numbers.

The consultants

Experience elsewhere is that unless recycling is performed numbers are lost. This is particularly so if numbers may be supplied for resale. The administrative burden of recycling is evidently not too great, given that some ECNS providers are doing it already.

The consultants propose to maintain the recommendation.

2.3.5 Utilisation thresholds

2.3.6 Numbering fees

Original recommendation

- **ILR should review the numbering fees, bearing in mind that:**
  - **Lowering the fees for allocated M2M numbers from €10 to €3 per 10'000 numbers could allow the elimination of reservations in favour of allocations, while making very little change to the payments by ECNS providers and receipts by ILR (on the assumption that reservations last two years).**
  - **Charging for each number with *n* digits too few (relative to the standard length) the fee for 10^n numbers having the standard length could hasten the withdrawal of fixed numbers having non-standard lengths.**
  - **Charging for each number with *n* digits too many (relative to the standard length) the fee for 1 number having the standard length could encourage the assignment of fixed numbers having the standard length.**
  - **Replacing the fees for portions of blocks by fees for complete blocks (of 1'000 numbers) could inhibit fragmentation.**

OPAL

The OPAL members are satisfied with the current M2M prices as long as the possibility of reserving numbers remains (as discussed in Section 2.3.1).

In Luxembourg, the standard length for a fixed number is eight digits, and nine digits for a mobile number. However, for historical reasons, many fixed numbers are shorter. Adapting them and setting up complete renumbering is not possible because of the workload and the cost for operators. Thus the OPAL members do not favour billing according to the length of the numbers for shorter numbers.

In addition to technical and operational matters independent of the operators, many companies configure their PBXs to add extensions to a number with a given length, so these companies have numbers having more than eight digits. In this case also the OPAL members do not favour billing dependent on the length of the numbers for longer numbers.

The OPAL members are satisfied with the current block size of 10'000 numbers and do not understand the basis for the recommendation on inhibiting fragmentation.

POST

In the configuration of a PRI, BRI or SIP trunk the operator can only set a maximum and minimum number length; setting the length for the extensions is not possible and seems very unrealistic in the actual Luxembourg landscape. The coordination with customers would be significant work for the operator and the customers, particularly if customers changed their ranges. It is not possible to have a complete view of the customer use of extensions.

Charging for each number with *n* digits too few (relative to the standard length) the fee for 10^n numbers having the standard length could increase the cost for operators and may impact customers, as these costs may have to be charged to customers for the shorter numbers that have five or six digits.

Charging for each number with *n* digits too many (relative to the standard length) the fee for one number having the standard length may be counterproductive. The numbering plan should be strict and forbid numbers having lengths above those defined for their ranges. This is already the case for mobile number ranges and some fixed number ranges. The variable lengths of fixed numbers in other ranges do not allow this granularity.

If operators are requested to report the number utilization and if the utilization thresholds are used as measures for new number allocation and reduction of fragmentation, then the pricing scheme applied to numbers could simply consider the number utilization (instead of having fees for a complete number block).

Twilio

Twilio does not completely understand the justification put forward in the recommendation for higher numbering fees to incentivize utilization. In any case, numbering fees must be proportionate, based on the objective administrative costs (according to Articles 13 and 16 of the European Electronic Communications Code). Higher fees would impact every user, not only those that are not using the numbers.

The consultants

The recommendation is intended to provide incentives for the prevention of hoarding, the return of fixed numbers having non-standard lengths and the improvement of utilisation; it does not suggest there should be forcible changes of numbers. The use of fees to provide such incentives is specifically allowed in the European Electronic Communications Code. A process for charging fees already operates in Luxembourg; it should be used to good effect.

One of the recommendations in 3.2.1 of the Study Report is that the numbers in new assignments to customers should have the standard length for the relevant number range.

Some of the charging suggestions stated above are applicable only to charging for numbers allocated before that recommendation is implemented; in particular, charging for numbers with too many digits is applicable only to such numbers. The consultants therefore question in what respect charging for numbers with too many digits would be counterproductive.

Different blocks are utilised to different extents. Consequently charging according to the utilisation of an allocation instead of the size of the allocation would add complications and provide no incentives to return unwanted numbers.

The fees for portions of blocks tabulated in the current numbering regulation encourage making multiple requests for the allocation of portions of blocks (each having fewer than 200 numbers, with the current fees). The resulting allocations might be scattered in different blocks and thereby fragment the numbering space. Of course, fees for portions of blocks become unnecessary if the recommendation on block size in Section 2.3.3 of the Study Report is adopted.

The consultants propose to revise the recommendation as below, to indicate that for the purpose of calculating fees the lengths of extensions are those approved in allocations, not those configured by customers.

Revised recommendation

- **ILR should review the numbering fees, bearing in mind that:**
    - **Lowering the fees for allocated M2M numbers from €10 to €3 per 10'000 numbers could allow the elimination of reservations in favour of allocations, while making very little change to the payments by ECNS providers and receipts by ILR (on the assumption that reservations last two years).**
    - **Charging for each number with *n* digits too few (in that the minimum number length approved in the allocation is *n* less than the standard length) the fee for 10^n numbers having the standard length could hasten the withdrawal of fixed numbers having other lengths.**
    - **Charging for each number with *n* digits too many (in that the maximum number length approved in the allocation is *n* more than the standard length) the fee for 1 number having the standard length could hasten the withdrawal of fixed numbers having other lengths.**
    - **Replacing the fees for portions of blocks by fees for complete blocks (of 1'000 numbers) could inhibit fragmentation.**

2.4 Number documentation

2.4.1 Roles of the numbering plan and numbering register

Original recommendation

- **Specific details of the designations of numbers (in the sense of Section 2.1.2), should be in the numbering plan, not in the revised numbering regulation. For instance, the numbering plan might show the range '23000000-23999999' as designated for fixed services and the range '45000000-45999999' as not yet designated for any services. In consequence, the revised numbering regulation should not mention specific numbers.**

POST

POST agrees with the recommendation. Also, specific numbers (such as the 04 range used for routing of ported mobile numbers) should not be mentioned in the revised numbering regulation, since they are directly managed in the Systor database.

[*A paragraph from the POST answer has been moved to Section 3.2.4.*]

The consultants

The consultants propose to maintain the recommendation.

2.4.2 Changes to the numbering plan

2.4.3 Publication of the numbering plan

Original recommendation

- **The numbering plan could usefully be published in the format of ITU-T Recommendation E.129.**

POST

The publication of the numbering plan could be automated with automated queries of the number register.

The consultants

Certainly improvements to the user interface are possible. However, as noted by respondents to the stakeholder questionnaire, the expense might not be justified.

The consultants propose to maintain the recommendation.

2.4.4 Access to the numbering register

Original recommendation

- **The numbering register should be publicly accessible.**

POST

POST has no specific comment on this, given that individual number allocation is already publicly available today.

The consultant

The currently published lists of individually allocated numbers do not cover all the relevant ranges. Nonetheless, they demonstrate that the information can be made publicly accessible without infringing confidentiality or incurring great expense.

The consultants propose to maintain the recommendation.

2.4.5 Audits of the numbering register

Original recommendation

- **ILR should conduct an annual audit of the numbering register, preferably at the time of issuing the invoices for numbering fees, to compare the records in the Systor database against the records held by the ECNS providers.**

OPAL

The OPAL members believe that the workload imposed by an annual audit of the numbering register will be too heavy for the operators. The OPAL members therefore ask that ILR reviews the frequency of this audit, if it wishes to do one.

The consultants

Annual audits are normal in the industry and not onerous for participants that maintain their records systematically. In Luxembourg the annual invoices could be inputs to them.

If audits occurred once every two years (for example), instead of once every year, then forecasts would cover two years and therefore become yet more uncertain.

The consultants propose to maintain the recommendation.

Original recommendation

- **The information provided by different ECNS providers for audits of the numbering register should be presented in the same format for holding by ILR in confidence, and should include:**
    - **The block size and number length (for each block).**
    - **The quantities of numbers assigned to customers, quarantined, ported in from other ECNS providers, ported out to other ECNS providers, supplied to other ECNS providers for service resale and used for internal network purposes (for each block).**
    - **The proportion of numbers expected to have been assigned to customers at the end of the next year (for each block).**
    - **The quantities of numbers expected to have been requested for allocation by the end of the next year (for each service).**

POST

POST considers that the consultants are referring to reporting rather than auditing. POST does not object to the principle of reporting, as already today regular reporting is done by the operators for biannual statistics or other reporting.

However, some information, namely the quantities of numbers expected to have been requested for allocation by the end of the next year (for each service), mentioned in Section 2.4.5 of the Study Report, appears irrelevant for reporting purposes and should thus be excluded. Based on market evolution it is difficult to estimate, particularly for M2M where the market and the volumes of use are moving very fast.

As mentioned already in Section 2.3.6, having a complete view of the customer usage of extensions is not possible for a PRI, BRI or SIP trunk. The variable lengths of fixed numbers do not allow this granularity.

Twilio

If ILR adopts the approach in the recommendation, the forecasts of numbers expected to have been assigned and numbers expected to have been requested for allocation should not be seen as binding in any way.

The consultants

Annual audits are normal in the industry and not onerous for participants that maintain their records systematically. In Luxembourg the annual invoices could be inputs to them.

Forecasts can help ILR in forward planning and consistency checking, even though they are inevitably uncertain (and not binding, of course).

The consultants propose to revise the recommendation as below, to indicate that for the purpose of annual reporting the lengths of extensions are those approved in allocations, not those configured by customers, and to make the non-binding nature of the forecasts clear.

Revised recommendation

- **The information provided by different ECNS providers for audits of the numbering register should be presented in the same format for holding by ILR in confidence, and should include:**
    - **The block size calculated from the maximum number length approved in the allocation of the numbers (for each block).**
    - **The quantities of numbers assigned to customers, quarantined, ported in from other ECNS providers, ported out to other ECNS providers, supplied to other ECNS providers for service resale and used for internal network purposes (for each block).**
    - **The proportion of numbers expected in a non-binding estimate to have been assigned to customers at the end of the next year (for each block).**
    - **The quantities of numbers expected in a non-binding estimate to have been requested for allocation by the end of the next year (for each service).**

2.4.6 States in the numbering register

Original recommendation

- **ILR should consider defining the states of numbers through an approach in which, instead of including extra details in the revised numbering regulation, ILR would prepare a guide to practice alongside the numbering register.**

POST

It should be clarified whether the state should refer to individual numbers or number ranges in order to avoid any confusion between the actions on individual numbers and number ranges.

The consultants

ILR might perform certain actions on individual numbers or on blocks.

The consultants propose to revise the recommendation as below, to mention that the state refers to individual numbers.

Revised recommendation

- **ILR should consider defining the states of individual numbers through an approach in which, instead of including extra details in the revised numbering regulation, ILR would prepare a guide to practice alongside the numbering register.**

2.5 Legitimacy of number supply other than by allocation or assignment

2.5.1 Transferring numbers between ECNS providers

Original recommendation

- **The revised numbering regulation should require that for a transfer of numbers:**
  - **Approval is obtained from ILR.**
  - **The parties are ECNS providers.**
  - **All of the rights and responsibilities associated with the numbers are passed from one party to the other.**

OPAL

The OPAL members consider that ILR involvement during a transfer of numbers is useful. However, ILR should be involved in the process to be informed, not to approve the transfer.

The OPAL members support transferring all the responsibilities from an operator to another when the numbers are transferred.

POST

The transfer of numbers should be allowed. POST would welcome further guidance by ILR to have a clear way of handling this.

The consultants

Transfers are in effect combinations of withdrawals and allocations, which involve ILR for good reasons. The same good reasons apply to transfers.

The consultants propose to maintain the recommendation.

2.5.2 Supplying numbers to service resellers

Original recommendation

- **If the revised numbering regulation provides for the supply of numbers for service resale, it should require that for any such supply of numbers for service resale:**
    - **The split of the obligations to fulfil numbering responsibilities is specified in the contract between the number supplier and the service reseller.**
    - **Approval is obtained from ILR if the split of the obligations to fulfil numbering responsibilities deviates from one specified in a regulation or a code of conduct endorsed by ILR which allows for such deviations.**
    - **The number supplier and the service reseller are ECNS providers.**
    - **The service reseller will not subsequently supply the numbers to another organisation.**

OPAL

The OPAL members do not favour banning the resale of numbers but suggest regulating it in a way avoiding restrictions and unnecessary barriers to innovative future models of distribution.

The OPAL members understand that, in the event of resale of numbers by an operator to a reseller who could resell them to others, the responsibilities of each lose visibility. This could cause problems for requests for surveillance by the police (for example). The OPAL members suggest that the resale of numbers is permitted, but only for the providers notified with ILR.

POST

The supply of numbers for service resale should be allowed, but clear definition and regulation of the split of responsibilities would be welcomed so that conditions of number supply are clearer and more straightforward.

Furthermore, numbers should only be supplied to resellers that are either ECNS providers or organisations whose activity is the provision of value-added services, such as aggregators of premium numbers (such as non-geographic numbers that are clearly defined for such use from their scope like freephone, inbound numbers, premium rate numbers). In the latter case, the resale of numbers would not exclude the responsibility of the ECNS provider for these numbers in the case of complaints (such as fraud with premium rate numbers).

POST agrees that any subsequent supply to a next party should be prohibited if this next party is not an ECNS provider or aggregator.

Proximus

This seems to be a good proposal to create openness in reselling. For an ECNS provider it is not always clear if numbers will be subject to reselling by its customers. The reseller should have the prime obligation to evaluate the notification to the regulator about the reselling of the services and the notification as ECNS reseller. It is also the reseller that should make contact with the ECNS provider to agree on the split of responsibilities. This could also be applicable in the MVNO context. The ECNS provider should not be held responsible if the reseller is not informing the ECNS provider or ILR. The split of responsibilities is also important for the judicial authorities to know which entity should be addressed for which question. The reseller is responsible to respect the regulation related to the numbers used in the resold services.

Twilio

The transfer of numbers between ECNS providers confers many benefits. Twilio believes that knowledge of who is using numbers is vital to both national numbering plan administrators and reputable ECNS providers that assign numbers. At the same time, any transparency issues arising from communications platform-as-a-service services can and should be addressed in ways that help protect consumers and reassure regulators without undermining the economic innovation and vitality brought by these services.

The transfer of numbers between registered ECNS providers supports the efficient management and distribution of numbers. In many cases, ECNS providers do not use more than a fraction of the number blocks that are assigned to them by the national numbering plan administrators. This system creates inefficiencies in the allocation of numbers, as companies that obtain number blocks in Luxembourg may end up holding unused numbers far in excess of their needs. This situation also creates an unnecessary administrative workload for the regulator to manage, assessing which numbers have been activated and which have been assigned but are not in use. If ILR plans to follow the proposal to only assign numbers for contiguous whole blocks, then number transfer is an important tool to allow for more efficient number management.

Twilio therefore suggests that ILR allows the transfer of numbers between ECNS providers, also in the form of reselling, to maintain competition and innovation in the Luxembourg telecommunications market, based on contracts that set out unequivocally the obligations split between the parties. Such clear allocation of responsibilities allows ILR to maintain knowledge of who is responsible for a certain number. Twilio believes that reselling between ECNS providers supports more transparency over numbering use than trading of numbers between end users.

The consultants

The supply of numbers for service resale would be made unnecessarily complicated if the service reseller was an aggregator that was not an ECNS provider. Moreover, it would increase the likelihood of number hoarding, if the aggregator was a number aggregator (not a content aggregator).

The consultants propose to maintain the recommendation.

2.5.3 Trading in numbers by customers

Original recommendation

- **ILR should consider facilitating the introduction of simple processes that would let individual assigned numbers be passed seamlessly between different customers of different ECNS providers.**

OPAL

The OPAL members have no objections to the recommendation but questions whether there really is demand for number trading in Luxembourg and has reservations about "simple processes". Consequently the OPAL members want to know what ILR plans to put in place before giving a more detailed opinion. They are available to discuss this in a working group.

POST

POST does not agree with the proposal. A "simple process" is not feasible due to the linkage between an individual assigned number and a service contract (between an ECNS provider and the customer). This linkage induces other legal obligations which in case of trade between customers may become impossible to be fulfilled by the initial ECNS provider. Any involvement of a further ECNS provider would further complicate the process.

The consultants

The "simple process" merely combines assignment and porting, so it should be little more complicated than they are. The "consideration" suggested in the recommendation could examine whether demand for a simple process would justify devising it.

The consultants propose to remove the recommendation.

2.6 Number porting

2.6.1 Consolidation of the portability regulations

Original recommendation

- **The revised numbering regulation should have a shared chapter on points common to both fixed number portability and mobile number portability.**

OPAL

The fixed and mobile number porting processes exhibit different features and the current presentation of these two processes is satisfactory. The OPAL members therefore do not see the value of the recommendation.

The consultants

Combining the descriptions of the processes as far as possible would expose their currently common features, the features that they could share after modest changes, and any necessarily different features. It could therefore lead to implementations that were cheaper for the ECNS providers and simpler for the users. Conversely, keeping the descriptions separate could result in growing divergence, cost and complication.

The consultants propose to maintain the recommendation.

Original recommendation

- **Corresponding details for fixed number portability and mobile number portability should be replaced by whichever is technically more advanced, if this is technically feasible.**

GIE Telcom

Despite the fact that a unified porting platform might sound appealing, the following should be borne in mind: (a) the current setting (i.e. with two separate platforms and databases) works flawlessly as no complaints in that regards have been noted on operators' side (nor are they aware of complaints made to ILR) and (b) the integration of mobile number portability into the fixed number portability platform (or vice versa) risks to induce high costs with no real added value for the end user. Indeed, additional cost will have to be borne by the operators which could be reflected on the consumer.

It follows from the above that the GIE Telcom members do not see a need to change the current setting.

MTX Connect

The subject of the national interconnection and associated regulations was overlooked by the consultants, introducing a gap in the overall recommendations; the consultants were focused on the numbering plan management and, specifically, on fixed and mobile number portability. Fixed and mobile number portability are dependent on the general terms and rules for the national interconnection. It seems that the consultants assumed that the national interconnection is already implemented by all market players.

As a newcomer to the Luxembourg market, MTX Connect has encountered certain issues while implementing national interconnection with the existing market players. These issues hinder our implementation and operation of services that are dependent on national interconnection. GIE Telcom membership itself does not guarantee successful mobile number portability implementation since the regulation of national interconnection is out of the scope of GIE Telcom.

In this light the proposed recommendations are given mostly to the existing well-established and fully interconnected players, while new market entrants, specifically with SG/M2M/IoT related services that might require access to the fixed and mobile number portability platforms, may experience issues while implementing the national numbering plan.

POST

Even though a unified database for portability purpose appears interesting, such a consolidation should be checked against the cost of implementation, because today two functional data bases exist.

[*From the POST answer for Section 2.6.2*] Fixed number portability could be added to the mobile number portability system. Simplification by integrating fixed number portability processes into the current Systor platform seems feasible, but risks inducing high implementation costs. Cost allocation between all the members has also to be ensured.

The consultants

The recommendation relates only to the requirements stated in the portability regulations, not to the porting platforms. Also, interconnection is outside the scope of the Study Report.

The consultants propose to revise the recommendation as below, to stress that it does not relate to the porting platforms.

Revised recommendation

- **Corresponding details in the regulations for fixed number portability and mobile number portability should be replaced by whichever is technically more advanced, if this is feasible despite the differences between the implementations.**

2.6.2 Administrative arrangements for porting

Original recommendation

- **The revised numbering regulation should specify requirements on the availability and use of CRDB data, instead of naming specific CRDB operators.**

MTX Connect

Concerning the recommendations on fixed and mobile number portability operations, the necessary measures and regulations should be introduced to allow market newcomers to successfully operate their allocated numbers while fully complying with the national numbering plan regulations.

Taking into account the importance of SMS services for subscribers (as second authentication factors, for example) the national interconnection regulations should include SMS services as well as voice to enable full operation of ported numbers.

The role of GIE Telcom could be expanded to facilitate the establishment of national interconnection, in addition to operating the mobile number portability platform, to further improve national numbering plan interoperability.

The interconnection regulations must be more specific in order to prevent commercial arrangements from being used as anti-competitive measures against market newcomers.

OPAL

The OPAL members do not agree with the recommendation. GIE Telcom and GIE FNP should remain explicitly named in the regulation.

POST

POST agrees that ILR should supervise porting processes and define the general guidelines. Currently, the mobile number portability system is managed by GIE Telcom, which has been created to define, choose and operate the platform and to ensure that all the required maintenance and other costs are borne equally in a transparent manner by all the participants.

[*A paragraph from the POST answer has been moved to Section 2.6.1.*]

Finally, it should be noted that the current way of handling fixed or mobile portability works flawlessly and POST does not see any need for changing it.

The consultants

Among the requirements of the porting platforms that could be specified in the revised numbering regulation are ones related to the establishment of interconnection. However, interconnection is outside the scope of the Study Report.

The recommendation relates to the requirements that should be placed on the porting platforms, regardless of which organisations operate the platforms and of whether there are separate platforms. Stating requirements, instead of naming specific operators, allows flexibility in implementation without suggesting direct involvement of ILR in managing the operations. No such direct involvement is envisaged.

The consultants propose to maintain the recommendation.

2.6.3 Consumer protection measures for porting

Original recommendation

- **The revised numbering regulation should specify the process and timescale for reversing porting if customers change their decisions.**

OPAL

The OPAL members agree with the recommendation.

The consultants

The consultants propose to maintain the recommendation.

Original recommendation

- **The revised numbering regulation should require that the right to port numbers is drawn to the attention of customers with every notice of change to the terms and conditions.**

OPAL

OPAL would like to point out that a consumer can request at any time the porting of a fixed or mobile number without waiting for an update of the general terms and conditions from the ECNS provider. Furthermore, because of the regulations currently in force in Luxembourg, the

operators tell consumers about their rights sufficiently. Thus the OPAL members do not favour complicating the communication to the consumers when their terms of sales change.

Twilio

Number porting is an established right that all customers are well aware and make use of. Requiring operators to draw the right to port numbers to customers' attention with every notice of change to the terms and conditions would create a significant additional burden on operators and is also potentially likely to prove irritating to customers who may have no intention of porting. Twilio believes that it is more important that customers be able to obtain information about porting at the time they are considering porting.

The consultants

Reminding customers of their right to change suppliers is a standard consumer protection practice. Doing it when customers are being told about changes in their terms and conditions can hardly be described as creating a burden for the suppliers or a complication for the customers.

The consultants propose to maintain the recommendation.

Original recommendation

- **The number regulation should require that any interruption to service during porting is limited to one working day.**

OPAL

For a fixed line technical problems related to the installation may arise when porting a number. It is therefore very difficult in certain cases to respect a deadline on the interruption of service as strict as that in the recommendation. The OPAL members therefore ask for the introduction of a way of handling exceptions when there are technical difficulties in porting.

The consultants

The consultants propose to revise the recommendation as below, to allow exceptions.

Revised recommendation

- **The number regulation should require that any interruption to service during porting is limited to one working day unless there are technical difficulties that are duly justified and explained to the customers.**

Original recommendation

- **ILR should consider requiring that the ECNS provider from whom a customer is porting a number does not contact the customer without being requested.**

OPAL

During the porting of a number, it is useful for the donor operator to know the reasons for the porting. The donor operator should have the right to contact former clients to analyze churn.

In addition, porting requests can sometimes be made in error. Giving operators the opportunity to contact their former customers would make it possible to avoid such errors.

POST

A significant coordination by all those involved in the migration process (ECNS donor and recipient, Integrator, customer) is necessary in order to prevent any service interruption.

In principle, the consumer protection measures for porting are already included in the "Code de la consommation" or the electronic communications law. The revised numbering regulation should at most refer to these rather than stipulate possible diverging rules.

The consultants

Conversations between the ECNS donor and the customer would be very difficult to confine to limited topics. A simple statement, that there should be no contact, is straightforward and most conducive to achieving the competitive effects of portability for society as a whole. Errors can always be communicated to the customer through the ECNS recipient.

The consultants agree that the revised numbering regulation should not overlap with other instruments. Constraints specific to numbering should be in the numbering regulation; for instance, a requirement that an ECNS donor should not contact the customer belongs in the rules about number portability, not in general rules about privacy.

The consultants propose to maintain the recommendation.

2.6.4 Practical difficulties with porting

Original recommendation

- **The size of a range that is ported (and that is often defined by the length of a PBX root) should be reflected in the portability database.**

OPAL

The OPAL members favour putting in the portability database the exact sizes of the number ranges being ported. However, they question how this is to be implemented in practice and

suggest that ILR organize a group to work on this and take into account the technical difficulties of this implementation.

POST

It is not possible to clearly define the range of the PBX extensions due to the variable lengths of numbers. As a root number could have multiple lengths it is not clear how to define this length in the number portability database. A technical implementation is not clear and standard.

The consultants

The range to be ported consists of one or more roots, together with all of the extensions extending any of those roots. The lengths of the longest extensions for each root can provide an upper bound on the quantity of numbers for the range.

By porting a root the recipient ECNS provider is porting all of the extensions, according to the fixed number portability regulation.

The consultants propose to maintain the recommendation.

2.7 Number misuse and fraud

2.7.1 The extent of the problem

Original recommendation

- **ILR should consider preparing a guide to practice on the provisions about international information sharing in ITU-T Recommendation E.156.**

POST

A restriction or verification of the ITU recommendations is not possible with all actors in the worldwide landscape (Transit, Terminating, Originating, VNO). Therefore the ITU recommendations identified in Section 2.7.1 of the Study Report might not achieve the desired goal.

The consultants

Though the ITU-T recommendations will not eliminate the problem they might reduce it.

The consultants propose to maintain the recommendation.

2.7.2 Technical treatments

Original recommendation

- **ILR should consider requiring that ECNS providers prepare to implement techniques for the barring and diversion of calls and messages.**

POST

The implementation of techniques for barring and diversion of calls and messages may be too costly in Luxembourg. Also, the main operators are reacting using their own tools to block numbers when cases are appearing on their network and do also warn their customers.

Twilio

Twilio understands the concerns about numbering misuse and fraud and agrees that clearly established rules are needed. However, care is needed to avoid blanket or insufficiently targeted regulatory restrictions from hampering legitimate (and indeed necessary) use cases and technology and service innovation to the detriment of businesses, public administrations, and ultimately the consumer.

Twilio devotes significant resources to combating fraud, spam, and misuse of numbers. Twilio supports a communications market that actively seeks out and removes malicious actors to maintain and enhance consumer trust. Its services can be used by companies in many different ways, and it carefully monitors customer actions to ensure regulatory compliance.

Twilio's existing practices to prevent fraudulent and spam communications help to prevent illegitimate CLI spoofing. These practices include:

- Requiring a Twilio customer to demonstrate that the organization has the right to use a phone number before allowing the Twilio customer to use that number for calling line identification (CLI) when initiating a call using Twilio's services.
- Disabling calls to high-fraud destinations that are rarely used for legitimate use-cases, using a system of geographic permissions.
- Strong prohibitions, in Twilio's Terms of Service and Acceptable Use Policy, against using Twilio's services "in connection with unsolicited, unwanted or harassing communications (commercial or otherwise), including, but not limited to, phone calls, SMS or MMS messages, chat, voice mail, video or faxes."

As an additional protection, Twilio does not support CLI proxying for international numbers.

Twilio is a member of M3AAWG (Messaging, Malware, and Mobile Anti-Abuse Working Group), an industry group that works against bots, malware, spam, viruses, DoS attacks and

other online exploitation. M3AAWG combats attacks across several platforms, including mobile, email, voice, and social messaging, leveraging its members to tackle abuse on platforms and services through technology, collaboration and policy. Twilio's work in M3AAWG focuses on developing best practices to prevent bad actors from exploiting phone numbers for fraudulent purposes.

Twilio is part of industry-wide efforts to ensure trust in the communications ecosystem. For example, Twilio sits on the board of the Alliance of Telecommunications Industry Solutions (ATIS) and co-chairs the Robocalling and Communication ID Spoofing group, which has been coordinating work on the implementation of the SHAKEN/STIR protocol in the United States. The goal of SHAKEN/STIR is to implement a system-wide program to digitally sign and verify calls, allowing consumers and business users to be confident that the caller ID information they are seeing has been verified. Twilio has developed an authentication process to comply with SHAKEN/STIR. Once SHAKEN/STIR is fully implemented amongst the rest of the communications industry, Twilio will be able to verify customer calls received on the Twilio platform, providing consumers with the information necessary to decide whether to answer the call or not.

Twilio supports consideration being given to the implementation of SHAKEN/STIR in Europe as well and is available to present concrete ideas to ILR. While several European countries, such as France under the auspices of ARCEP, have started to look more seriously into using SHAKEN/STIR, a successful approach will likely require EU-wide and ultimately global cooperation to ensure the authentication of numbers across country borders. This is especially important for smaller countries with a large amount of international calls. The SHAKEN/STIR protocol can help ensure that only responsible parties enact calls and that consumers can trust verified calls.

The consultants

The consultants would be surprised if implementations of such measures in Luxembourg were too costly. The costs would be reduced, of course, if the implementations of different ECNS providers shared a common approach. In any case, ILR will naturally look at the costs and benefits before requiring implementation.

The consultants propose to maintain the recommendation.

2.7.3 Legal treatments

Original recommendation

- **A working group should consider the technical and regulatory matters involved in preventing unwanted calls from becoming a problem in Luxembourg. These include:**
    - **The extent to which individual ECNS providers regard their own ways of preventing unwanted calls and messages as proprietary.**
    - **The mechanisms for customers to report unwanted calls and messages to the ECNS providers and relevant national authorities.**
    - **The protocols for ECNS providers and relevant national authorities to report unwanted calls and messages under ITU-T Recommendation E.156.**
    - **Any rules needed under the General Data Protection Regulation to let ECNS providers exchange information about call and message initiators.**
    - **Any shortcomings in the application at international boundaries of ECC Recommendation (19)03.**
    - **The introduction of "special allocated numbers" after the revised version of ITU-T Recommendation E.157 is approved.**
    - **The rules and techniques for authenticating CLIs, by straightforward rule application, certification and traffic pattern detection.**
    - **The feasibility of exploiting the number portability databases in implementing CLI authentication.**
    - **The split between network and terminal activities for the barring and diversion of unwanted calls and messages.**
    - **Ways of identifying and protecting the customers who are most likely to be harmed by unwanted calls and messages (which may well be especially directed at them).**

OPAL

The OPAL members question linking the management of fraudulent numbers to the numbering plan: this problem should perhaps be the subject of a separate study.

Otherwise, the first thought of the OPAL members on this subject is that the treatment of fraudulent calls and messages is part of the strategy of each operator, and therefore of their individual choices of the customer service they wish to put in place.

However, if ILR wants to create a common approach, the OPAL members suggest that this be discussed in a group working with the different operators. This would put forward a solution adapted to the size of the market in Luxembourg and to the problem observed (if there is one). It would therefore be advisable to analyze risk versus cost of investments, and assess also the impact on the business of operators if errors of assessment were committed and numbers were wrongly judged to be fraudulent.

In fact, there are already several questions:

- What to do if the number is not identifiable?
- What will be the types and permissions of access to this database?
- Who will administer the database and add or remove numbers?
- What are the criteria for deciding if an issue should be considered as fraudulent?
- Who will be responsible for this decision?
- What will be the procedures in the event of an error?

The OPAL members advocate greater caution and analysis to see what measures can be taken and to confirm the suggestions together with experts from the operators.

POST

POST agrees with the principle of creating a dedicated working group to tackle regulatory, process and technical issues related to unwanted calls. Such a working group should include all market players as well as ILR. However, POST is reluctant to share all tools and rules set up to prevent unwanted calls, for the following reasons:

- By sharing too much information on these topics a high risk that a fraudster can access this information and use it to bypass an operator fraud control system.
- The rules for blocking calls are permanently changing and adapted to the fraud scenarios; these dynamics do not allow any proper documentation and validation with the community.
- The rules are a competitive advantage to protect customers.
- The suppliers of fraud management solutions do not document for their customers all the rules implemented in their tools.

A strong regulation on this point will be very prohibitive and block a fast reaction to fraud or spam waves. This would reduce the customer experience and would increase the risk to the customer in case of fraud. If necessary, a workflow could regulate the process to request

information why a number has been blocked but only after blocking rather than before blocking the calls. Otherwise, the reaction of operators will probably be impeded.

It is necessary to implement and manage on the level of ILR a list of Originating Numbers that are considered as trusted, mainly for call centre campaigns being considered as “trusted” (e.g. Statec Campaigns). This list should be implemented by the operators in the spamming filters as whitelists to prevent any blocking.

A process should be defined and handled by ILR to define “trusted” Originating Numbers. These numbers can be national but also international.

The consultants

There are clearly many potential contributors to dealing with this problem. Several of them can bring experience from other countries, such as Belgium. A working group should be able to make good progress quickly.

The consultants propose to maintain the recommendation.

3 The numbering rules for particular services

3.1 The structure of the numbering plan

3.1.1 Description of the numbering plan

3.1.2 Assessment of the numbering plan

3.1.3 Demand for numbers

Original recommendation

- **There is no clear case at present for making more numbers that are not short codes usable over the next five years.**

GIE Telcom

There is a growing need for long numbers in the context of A2P SMS. Compared with short codes, long numbers have in particular the advantage that the format is known by foreign operators and therefore that value-added services can be delivered beyond Luxembourg. Examples for use cases are user authentication, notifications for medical appointments to be sent to commuters and notifications for order pick-up. Such value-added services can currently not be delivered cross-border using short codes.

In that regard, the GIE Telcom members recall submitting a regulatory proposal which, among other matters, asks for the use of the former voice mail numbers (6x8 xxx xxx) to be allowed for A2P purposes.

OPAL

It is difficult to foresee the evolution of needs in terms of fixed and mobile numbers, so the OPAL members agree with the recommendation.

POST

POST does not agree with the recommendation. Indeed, it has observed a growing need for long numbers in the context of A2P SMS. Unlike short codes, long numbers have the advantage that the format is known by foreign operators, so value-added services can also be delivered outside Luxembourg. Among other examples are user authentication, notifications for medical appointments to be sent to commuters, and notifications for order pick-up. Such value-added services can currently not be delivered cross-border using short codes.

GIE Telcom has provided ILR with a proposal in which it requests using the former voice mail numbers (6x8 xxx xxx) for A2P purposes.

The consultants

The recommendations in Section 2.1.4 of the Study Report are consistent with using messages from mobile numbers for A2P purposes that are free of charge to the recipient. Typically messages can be received internationally from mobile numbers but not from freephone numbers and shared revenue numbers (and other numbers used by value-added services). There should be no shortage of these numbers.

The use of freephone numbers and shared revenue numbers for SMS/MMS services (and, in particular, the introduction of more SMS/MMS short codes for A2P purposes) is considered in Section 3.6.2 of the Study Report.

The consultants propose to maintain the recommendation.

3.2 Fixed, nomadic and mobile numbers

3.2.1 The replacement of non-standard fixed numbers

Original recommendation

- **ILR should not convert non-standard numbers into standard numbers forcibly until there is clear evidence that the benefits will outweigh the cost and inconvenience. The cost will reduce over time as non-standard numbers naturally fall out of use.**

GIE Telcom

The consultants advocate partly restructuring the fixed numbering plan to free some numbering space that could be used for new services.

To the best of our knowledge, the currently available numbering space is sufficient to address demands, though some numbers might need different designations (e.g. the former voice mail numbers could be used for A2P SMS).

Moreover, such a restructuring would incur high costs, may be less high for operators, but foremost for the end users that have been allocated the concerned numbers. Since such customers are mostly corporate customers, their costs needed to change their contact details seems not to be in relation with the potential gain of the cleared numbering space.

In conclusion, the GIE Telcom members ask ILR not to proceed as suggested in the recommendation.

OPAL

As previously indicated in Section 2.3.6, the OPAL members believe that it is not necessary to force renumbering, which will be done when it occurs naturally.

POST

Because the open numbering plan allows variable extension number lengths on PBX lines, POST does not have accurate visibility of the internal numbering plan of each PBX line: the PBX customers manage it themselves. The change of the phone number length on existing non-standard numbers is a very complex process involving POST and PBX customers and having significant financial impact on the PBX customers. Therefore, POST is more in favour of a natural elimination of non-standard numbers by monitoring their continued use and withdrawing blocks that are no longer used.

POST supports the need to define a new number range with fixed number length allowing standard numbers for new assignments to customers.

The consultants

The consultants do not advocate partly restructuring the numbering plan or forcing renumbering, as indicated in the full discussions and recommendations in Section 3.2.1 of the Study Report. At the same time, they note that some respondents to the stakeholder questionnaire had favoured modifying or removing the non-standard fixed numbers.

The consultants propose to maintain the recommendation.

Original recommendation

- **The revised numbering regulation should require that the numbers in new assignments to customers have the standard length for the relevant number range.**

POST

Concerning the extension number for the PBX receptionist service (usually "1" in Luxembourg), POST suggests obliging new PBX numbers to use an extension number for receptionist with the same length as the rest of the PBX extensions in order to avoid an exception to the standard number rule.

The consultants

The consultants agree that obliging the extension for the receptionist to have the same length as the other extensions would be desirable. The recommendations discussed in Section 3.2.2, together with this recommendation, are appropriate to this.

The consultants propose to maintain the recommendation.

3.2.2 Number lengths for PBX extensions

Original recommendation

- **ILR should determine the quantity of numbers assigned to the extensions of a PBX case-by-case as a multiple of 100 or 1'000.**

OPAL

The OPAL members do not want ILR to decide case-by-case as in the recommendation. They favour rules pre-established by ILR, to ensure the fair management of different requests, regardless of the operator contacted by the consumer.

The consultants

The consultants agree that the rules should be laid down in advance by ILR and applied by the ECNS providers.

The consultants propose to revise the recommendation as below, to remove the possibility that ILR would determine extension lengths case-by-case.

Revised recommendation

- **ILR should lay down principles so that ECNS providers determine the quantity of numbers assigned to the extensions of a PBX as a multiple of 100 or 1'000.**

Original recommendation

- **The revised numbering regulation should prohibit publicising added digits (beyond the standard length for the relevant number range) after a number is allocated or say that added digits will be treated as private (and therefore not guaranteed to be ported or even accessible by dialling). This should be so for all numbers, though the problem arises mainly with fixed numbers.**

OPAL

The OPAL members agree with the recommendation. They add that it would also be necessary to no longer authorize these numbers by exceptional dispensation as is the case today.

POST

POST understands the advantages of a fixed defined length numbering plan. However, as explained in Sections 2.4.5 and 3.2.1, POST doubts that its implementation is realistic based

on the Luxembourg existing numbering plan. The change of length on existing numbers is a very complex process involving customer, operator, integrator and risks having a very significant economic impact on the customers (e.g. Receptionist "1").

The consultants

The consultants are not suggesting that numbers should be changed; they are suggesting that numbers should be publicised only if they have appropriate lengths.

If the numbers are to be ported their maximum lengths should be known to the customer requesting the porting, so the requirement to treat them as private could be deleted from the recommendation.

At other times the numbers should appear to the public as if they had standard lengths where possible, in order to reduce confusion. For fixed numbers and nomadic numbers the standard length is eight; for mobile numbers it is nine.

The consultants propose to revise the recommendation as below, to ensure that publicised numbers (such as that of the receptionist) have lengths no greater than the standard lengths.

Revised recommendation

- **The revised numbering regulation should require that assigned numbers that are likely to become publicly known have lengths no greater than the standard lengths for the relevant number ranges. This should be so for all numbers, though the problem arises mainly with fixed numbers.**

3.2.3 The support for emergency calls

Original recommendation

- **The revised numbering regulation should require that services using fixed numbers or mobile numbers provide accurate caller location information automatically in emergency calls.**

GIE Telcom

Support for emergency calls is a matter that involves all market players and requires a common solution in order to provide effective support.

However, it should be noted that such support can also be provided by organisations that are not ECNS providers, such as Google or Facebook which collect tremendous amounts of accurate location data. Also, device manufacturers can play an important role in this provision of support for emergency call as can be seen with the AML (Advanced Mobile Location) solution.

The GIE Telcom members are ready to play an important role in supporting emergency services by providing relevant user location information. Yet they are also of the view that they alone are not able to always provide the relevant user location in its most accurate form, such that other organisations should also be part of this task.

The GIE Telcom members encourage ILR to set up a working group for this subject in order to discuss and establish a commonly agreed and unified solution. The GIE Telcom members are willing to actively participate in this working group.

OPAL

For locating an emergency call made from a mobile number the AML project in course of development in Luxembourg will cover this recommendation.

However, locating an emergency call made from a landline number faces a technical constraint: it is technically not possible to automatically locate a user in Luxembourg. The OPAL members therefore do not support this recommendation.

POST

The provision of accurate caller location to emergency call centres (PSAP)is already mandatory through other legislative acts.

However, end user location for emergency purposes could also be provided by other, possibly non-ECNS providers such as Google. Indeed, Google may provide more precise information about the customer location than operators, because Google collects information about the user location in its services (e.g. Google Maps). In some countries (e.g.China), the Google location database is integrated and consulted for providing such information whenever an end user calls emergency services.

Fixed and mobile operatorsshould not be obliged to provide GPS locations, because the GPS location is collected by device software, provided that the user has given its consent. Implementing such location services solutions would represent a heavy burden for operators associated with significant costs.

Advanced Mobile Location (AML) is in the process of being implemented but requires adaptations on smart phones and therefore commitments from device manufacturers.

There is a need for a stronger regulation of the OTT offering voice and messaging services providers so they comply with such requirements.

Twilio

Twilio is highly concerned about the proposal to change to a system where CLI is automatically updated from networks or databases and is required for all fixed and mobile numbers. It would create immense unnecessary burdens for any service where it is impossible or exceedingly unlikely that the customer would use the number for outbound emergency calling. Many legitimate services are inbound-only, for example, ridesharing services use numbers to shield the identities of drivers and riders to avoid stalkers. Contact centres may choose to make available inbound-only services. In addition, obtaining such information from the networks and terminals may not be precise enough to locate a caller beyond a general location. If operators were required to support CLI for such use cases, huge administrative and technical burdens would arise for operators, without any foreseeable benefit for consumers, regulators or any other stakeholders.

The consultants

The response suggesting that providing caller location information is technically impossible presumably relates to the use of fixed numbers for nomadic services. If people in Luxembourg expect services using fixed numbers to provide accurate caller location information automatically in emergency calls, then nomadic services should not be permitted to use fixed numbers unless they maintain accurate caller location information. They could do this by maintaining databases that their customers were obliged to update before invoking their applications for making outbound calls.

The need for OTT providers of voice and messaging services to comply with emergency call requirements is to some extent reinforced by the EU court decision that a service that charges for outbound calls should be regulated as an ECNS. The consultants agree that inbound-only services should not be required to support emergency calls.

The consultants propose to revise the recommendation as below, to exclude inbound-only services.

Revised recommendation

- **The revised numbering regulation should require that services using fixed numbers or mobile numbers and permitting outbound calls provide accurate caller location information automatically in emergency calls.**

Original recommendation

- **The revised numbering regulation should require that any limitations on the support for emergency calls (including caller location information) are drawn to the attention of, and required to be acknowledged by, customers periodically.**

OPAL

The OPAL members question the linkage between the recommendation on informing consumers and the numbering plan.

The consultants

The requirement to inform customers is already in the law. The proposed recommendation makes it more concrete. In the absence of a separate regulation on emergency service calls (except that listing local emergency numbers) the revised numbering regulation is the most suitable location for it.

The consultants propose to maintain the recommendation.

3.2.4 The use of fixed numbers by nomadic services

Original recommendation

- **ILR should consider developing a communication plan to inform users about the meaning in numbers, discussing particularly the absence of geographic significance in numbers and the nature of nomadic services.**

OPAL

In Luxembourg, in time fixed numbers will all become nomadic, so it makes no sense to have a difference between nomadic numbers and geographic numbers.

The trend today is to have a unique number through which the customer will be contacted, whether the call is taken from a fixed position or a mobile phone. The OPAL members therefore ask that the regulation integrates, along with the use of fixed numbers on mobile devices, the use of mobile numbers on fixed devices.

POST

ILR should define the difference between nomadic and fixed numbers in terms of the restrictions (e.g. location, incoming and outgoing calls, lawful interception, access technologies, number portability, emergency calls, ...). The difference should be based on use (mobility, access over Internet) but not exempt nomadic numbers from legal requirements.

[*From the POST answer for Section 2.4.1.]* How the nomadic services should present caller location is currently unclear and should be clearly defined in a working group of the different market players.

Proximus

Proximus questions the need to differentiate between fixed services and nomadic services. Due to the technical evolution towards VoIP and the capabilities of private networks, operators have less control over how customers use their services, whether fixed or nomadic. Customers have no flexibility to evolve their fixed services towards nomadic services based on the same numbers and would be forced to change numbers to benefit from technology evolution.

Twilio

Twilio welcomes the proposal to consider a distinction based on the mobility of services rather than between fixed, mobile and nomadic numbers. Twilio recommends that ILR takes this opportunity to adopt a forward-looking approach to nomadic services, notably given the likelihood that most traditional fixed use will de-facto be nomadic in practice (e.g., employees will be able to take their office calls anywhere using their computer, which became a widespread practice during COVID-19 related lockdown periods).

The consultants

Among the respondents to the consultation there is a general inclination to remove the distinction between fixed and nomadic services and therefore between fixed and nomadic numbers. The consultants are uneasy about removing the distinction if there are different expectations about caller location information in emergency calls.

The consultants propose to revise the recommendation as below, to mention the provision of caller location information instead of the nature of nomadic services, as it is the principal concern.

Revised recommendation

- **ILR should consider developing a communication plan to inform users about the meaning in numbers, discussing particularly the absence of geographic significance in numbers and the provision of caller location information.**

3.2.5 The use of fixed numbers by mobile services

3.3 Machine-to-machine numbers

3.3.1 The use of machine-to-machine numbers for particular services

Original recommendation

- **The revised numbering regulation should adopt a definition of "telematic service" ("*service télématique*") that avoids requiring M2M services to be mobile services and that resembles closely the definitions by other regulators in the EU, such as "a telematic service is a wholly or partly automated communication service which consists of the exchange of data or voice between devices with limited or no human interaction".**

POST

POST is not able to take a clear position on the recommendation. The proposed definition is confusing as to what should be considered as a telematic service and whether such a service uses a mobile or fixed infrastructure. Hence POST asks for further clarification.

The consultants

The definition is independent of the infrastructure. It is an example, exhibiting the properties that are likely to be characterise M2M services. In particular, it does not include a requirement for M2M services to support mobility.

The consultants propose to maintain the recommendation.

Original recommendation

- **The revised numbering regulation should clarify that IoT services and eCall services are M2M services and can therefore use M2M numbers.**

Proximus

Proximus agrees with the recommendation.

The consultants

The consultants propose to maintain the recommendation.

3.3.2 The porting of machine-to-machine numbers

Original recommendation

- **The revised numbering regulation should require that M2M numbers assigned in or after 2022 are portable, given that portability is technically feasible for M2M systems, advantageous for competition and favoured by most ECNS providers.**

GIE Telecom

M2M/IoT is indeed an evolving market with steadily growing importance, especially with the emergence of 5G and its possibilities in domains like smart metering, smart cities and smart manufacturing.

However, the crucial element with M2M/IoT is the service provided, rather than the number used to provide the service. In that context, and given that Luxembourg market players do not face any demand for porting M2M numbers, the obligation to ensure portability should be considered very carefully. Operators might incur high costs for setting up M2M portability processes and the corresponding platform that might not be used at all by end users.

In light of the above, the GIE Telcom members ask ILR to carefully investigate the real need for M2M portability.

OPAL

The OPAL members favour M2M number portability to avoid blocking future development opportunities.

POST

The crucial element with M2M/IoT is the service provided, rather than the number used to provide the service. For instance, the number might relevant within a given application (eCall, bCall, …) where the number is only used for call back services and is therefore provided within the application at the time of the call. For most M2M uses, the number itself remains irrelevant.

Given that Luxembourg market players do not face any demand for porting M2M numbers, the obligation to ensure portability of such numbers should be considered very carefully. Indeed, operators might incur high costs for setting up M2M portability processes and the corresponding platform that might not be used at all by end users.

ILR should investigate the real need for M2M portability looking at the fact that the phone number is not of any value. POST shares the GSMA opinion on the matter, which is exemplified at https://www.gsma.com/iot/wp-content/uploads/2017/11/E.164position.pdf.

Proximus

The added value to impose number portability for these numbers is indeed questionable. The relevance of the specific M2M numbers for the customer is very limited compared to numbers used by interpersonal communication services where there is a major impact if changing number is imposed. There is the physical replacement issue for M2M equipment both for changing number and number portability. Also M2M numbers can be used in extraterritorial mode which makes it irrelevant to impose number portability as the potential alternative operators would need to have access to all portability systems in the different countries to cover each case of number portability. Requiring number portability for M2M would have a major cost for the industry without any benefit for the competition. The OTA provisioning looks more relevant in this case of switching M2M provider. Therefore the recommendation to impose number portability for M2M numbers should be further analyzed taking into account our previous comments.

The consultants

In practice at least OTA provisioning or number porting is necessary if organisations other than ECNS providers are not to be allocated numbers. Though OTA provisioning, without porting numbers, might be sufficient in some cases, there is not an established process for performing it (by contrast with number porting). Moreover, in some cases it is not sufficient and number porting is necessary; for instance, an organisation that supervises “smart” houses might have a database holding an M2M number for each house.

The GSMA opinion is discussed in Section 3.3.2 of the Study Report.

The consultants propose to maintain the recommendation.

3.3.3 Potential restrictions on machine-to-machine numbers

Original recommendation

- **The revised numbering regulation should extend conditions of use from mobile numbers to M2M numbers. In particular, the conditions of use related to the support for emergency calls (including caller location information) should apply to M2M numbers as well as to mobile numbers.**

OPAL

The OPAL members have not so far been opposed to extending to M2M numbers the conditions of use of mobile numbers. However, finalizing their opinion awaits an understanding of the impact on the ancillary services that use '112' and '113'.

POST

POST considers that M2M applications might need the support of voice calls in certain scenarios. An example is eCall, which is an EU requirement for cars. In this case, the requirement of emergency calls, including localisation and the possibility of calling back, can be supported.

Moreover, based on the long lifetime of M2M devices (e.g. eCall and smart metering), changes in the requirements over time will be difficult to implement. This in turns renders periodical reviews difficult.

Proximus

M2M should remain outside the scope of the regulation. Proximus refers to the position of ETNO on the draft revision of the roaming regulation, soon to be on the ETNO website (www.etno.eu).

There is no need to extend the access to emergency calls to M2M numbers. Where these number ranges are used for eCall, the localisation and the access to emergency services are organised through a specific protocol included in the eCall solution. There is no need to impose this requirement as it is embedded in the eCall solution. For other applications, given the nature of the M2M services, the access to the emergency service is not relevant compared to interpersonal communication services, as they concern by definition machine-to-machine services with little or no human interaction.

Twilio

The recommendation to require M2M services to support emergency calling ignores the use cases behind M2M calls and overly restricts this type of service. Operators would have to warn customers repeatedly over time and would potentially require customers to report their locations- a highly impractical solution. Such a requirement contradicts all intentions of allowing more flexibility around the designation of numbers described by the consultants earlier on: no flexibility is gained if reducing the distinction between numbers to their level of mobility goes in hand with additional burdens on operators and on users such as requiring emergency caller location information from M2M numbers. Even the European Electronic Communications Code explicitly allows for exemptions on emergency services for M2M, for good reason.

The consultants

The consultants consider that eCall services are not the only ones in which emergency calls might be needed. For instance, alarm systems, whether for buildings or for people, might need

them, too. At this stage requiring the conditions of use for M2M numbers to be as in the recommendation appears an appropriate precaution; if these conditions were not required initially, systems might need to be retrofitted with them later.

The consultants propose to maintain the recommendation.

3.4 Freephone, shared cost, shared revenue and "other" numbers

3.4.1 Supplies of freephone numbers

3.4.2 The removal of shared cost numbers

Original recommendation

- **ILR should consider withdrawing, and removing the designations of, all shared cost numbers.**

POST

Given the Luxembourg numbering space and geographical area, POST does not see any use for shared cost numbers. Anyway, nomadic numbers could be used, though these will then need to cover international customers that require national numbers.

The consultants

The consultants propose to maintain the recommendation.

3.4.3 Consumer protection measures for shared revenue numbers

Original recommendation

- **The current limit of €30 per call should apply not only to calls charged per call but also to calls charged per minute, so a call charged at €1 per minute could have charges applied for 30 minutes, but a call charged at €2 per minute could have charges applied for 15 minutes, and so on.**

OPAL

Billing per call and billing per minute are based on different business models. The OPAL members therefore do not agree with the recommendation. These limits (billing per call and billing per minute) should remain separate and as they are, with a limit of €30 if the billing is per call, and a limit of 30 minutes if the billing is per minute.

POST

POST does not see a need to change the current limits of €2 per minute (in case of calls charged per minute) and €30 per call (in case of calls charged per call). POST is not aware of any complaints to its customer service or ILR mediation services.

The consultants

A single price limit of €30 is simplest for consumers to understand and makes shared revenue fraud less attractive. The shared revenue market in Germany has operated successfully for years with that limit to total call cost. Further, the internet, together with alternative payment mechanisms, is gradually supplanting traditional premium rate services, especially those with high costs per call.

The consultants propose to maintain the recommendation.

Original recommendation

- **ILR should consider prohibiting the use of shared revenue numbers whenever waiting may be required, irrespective of the service intent (in queues for customer care calls, for example).**

POST

With respect to prohibiting the use of shared revenue numbers whenever waiting may be required, it should be noted that ECNS providers are unable to control how fast a call is handled by the content provider, so the prohibition seems therefore hardly enforceable through the ECNS provider.

The consultants

A prohibition on placing of calls on hold can be enforced by extending techniques for enforcing existing prohibitions, such as those on the use of particular shared revenue numbers for particular content.

The consultants propose to maintain the recommendation.

Original recommendation

- **ILR should consider specifying in the revised numbering regulation who is responsible for making price announcements and for publishing price information for calls to shared revenue numbers.**

OPAL

The consumer is duly informed at the start of the call of the pricing that will be applied. The regulation should state explicitly that this information must be provided by the content provider.

POST

Clarification on who is responsible for the price announcements is indeed welcome.

POST agrees with this proposal but adds that clear rules need to be defined about who is responsible for the actions stated in the proposal. For instance, ECNS providers should not be obliged to refund or compensate end users in case of abuse, since they merely provide the connection between the end user and the content provider.

The consultants

The consultants agree that it is important to define which parties to the provision of shared revenue services are responsible for which aspects of compliance and which consequences result from non-compliance. This is so also for the services provided on SMS/MMS short codes (which are premium rate services, too). Future regulation should clarify responsibilities on such matters, including (but not limited to) the provision of pricing information.

The consultants propose to revise the recommendation as below, to take account of this.

Revised recommendation

- **The revised numbering regulation should specify for premium rate numbers the compliance responsibilities (of ECNS providers, content aggregators, content providers and any other parties involved), together with the consequences of any non-compliance. In particular, it should state who is responsible for making price announcements and for publishing price information for calls to shared revenue numbers.**

Original recommendation

- **ILR should consider incorporating in the revised numbering regulation additional measures from ECC Recommendation (07)02 by requiring that:**
    - **Basic services should remain available in disputes over payments for shared revenue services.**
    - **Payments to shared revenue content providers should be delayed sufficiently to let suspected abuses be detected and should be suspended rapidly to let suspected abuses be investigated.**
    - **Refunds or compensation should be paid to customers suffering from abuses.**

OPAL

In the event of a dispute, the OPAL members consider that it is legitimate to ask the consumer to pay the costs that are not related to the dispute if the consumer wants to keep the line and basic services available. Furthermore, the consumer will pay the bill in at most three (3) months, this time being considered sufficient to settle the dispute and know who is responsible.

Though an automatic and proactive suspension of payment is not desirable, suspension should be possible when abuse is detected.

it is necessary to distinguish between fraud and abuse and to know the origin of uses of services. Operators are not responsible for bad uses of services by consumers; before repaying consumers they need to know who is responsible.

The consultants

The consultants agree that customers should be expected to settle those parts of bills that are not in dispute, within normal time limits. For disputed amounts, they suggest that any payment should be required following an investigation and well-founded decision about the disputed amount, rather than after a fixed time. The consultants also assume that refunds or compensation would be confined to justified cases and amounts.

The consultants propose to revise the recommendation as below, to reflect these points.

Revised recommendation

- **ILR should consider incorporating in the revised numbering regulation additional measures from ECC Recommendation (07)02 by requiring that:**

- **Services not in dispute, and paid for as normal, should remain available in disputes over payments for shared revenue services.**
- **Payments to shared revenue content providers should be delayed sufficiently to let suspected abuses be detected and should be suspended rapidly to let suspected abuses be investigated.**
- **Refunds or compensation payments that are found to be justified after investigation should be paid to customers suffering from abuses.**

Original recommendation

- **ILR should consider regulating shared revenue numbers through an approach in which, instead of including extra rules in the revised numbering regulation:**
  - **Requirements on shared revenue numbers in the revised numbering regulation would be only ones that embody lasting general principles; for instance, the current limit of €30 per call might be omitted, to make future variation easier.**
  - **ILR would develop and issue for consultation a code of conduct for services using shared revenue numbers, taking into account the existing unofficial documents.**
  - **ILR would endorse the final code of conduct to give it legal force.**

POST

The revised numbering regulation should include limits such as the €30 per call, to avoid abuses and fraud.

The consultants

The consultants agree that cost limits on shared revenue calls should be retained, but they could be in a code of conduct developed as outlined above.

The consultants propose to maintain the recommendation.

3.4.4 Potential ranges of "other" numbers

Original recommendation

- **ILR should designate numbers (other than short codes) for new services only if there is a clear demonstration of demand that cannot be met by services using existing numbers.**

POST

A2P SMS based on long numbers display a clear demand that cannot be met by currently available means for value-added services.

The consultants

As indicated in Section 3.1.3, the demand for A2P SMS free of charge to the recipient can be met by using mobile numbers. The former voice mail numbers could be adapted to that end.

The consultants propose to maintain the recommendation.

3.5 Voice short codes

3.5.1 Existing ranges of voice short codes

Original recommendation

- **ILR should make the ECNS providers aware that their uses of voice short codes that have not been duly allocated can be ended without notice.**

POST

The discussion of voice short codes that have not been duly allocated, in Section 3.5.1 of the Study Report, is not complete: it does not consider that some particular services voice mail short codes are reserved only for the customers of the operator and are configured to be inaccessible from other networks. Hence, they do not interfere with the numbering plan. Moreover, short codes are implemented in a specific way and do not clash with long numbers. For instance, it is possible to use numbers from the 600 range as well as the twelve-digit M2M numbers in the 60 range without any risk of interfering.

Accordingly POST asks ILR not to end without notice the use of voice short codes that have not been duly allocated.

The consultants

ILR has not even been given records of what these codes are, so it could easily allocate numbers that would clash with them. Forming one number from the initial digits of another is confusing for customers, even if technical differences in input can distinguish them.

The consultants propose to maintain the recommendation.

3.5.2 Potential ranges of voice short codes

Original recommendation

- **ILR should designate voice short codes for new services only if there is a clear demonstration of demand that cannot be met by services using existing voice short codes.**

POST

POST agrees with the recommendation.

The consultants

The consultants propose to maintain the recommendation.

3.6 SMS/MMS short codes

3.6.1 Administrative arrangements for SMS/MMS short codes

Original recommendation

- **The revised numbering plan should state which numbers can be allocated as SMS/MMS short codes, even if ILR formally delegates the task of allocation.**

MPulse

In the interest of a formalisation of today's setup, continued consistency amidst MNOs implementations and a general enhancement of service opportunities/diversification, MPulse encourages a definition of specific and/or multi-usage (voice, SMS) ranges of codes. MPulse also strongly encourages the creation of multi-purpose four-digit or five-digit codes that are easy to remember, for use cases where communication referring to these codes is not done in written or permanent form (e.g. donation campaigns on the radio, at public events, marketing info request services, competitions…).

POST

POST would welcome a statement in the revised numbering regulation on which numbers can be allocated as SMS/MMS short codes. This could prevent any misuse of numbers that have different designations for SMS/MMS short codes purposes as, when enshrined in the regulation, ILR can easily enforce remedies against such misuse.

The consultants

The consultants propose to maintain the recommendation.

Original recommendation

- **ILR should consider taking full authority over the allocation of SMS/MMS short codes, instead of formally delegating the task.**

MPulse

MPulse is in favour of this position, as it would guarantee consistency and legal and business certainty to stakeholders that would use such short codes. A high-level definition of processes to be implemented and deadlines to be met for short code activation might also be helpful to make sure stakeholders could effectively plan and deploy services across all mobile networks.

MPulse also recommends considering defining and endorsing the respective roles of stakeholders (MNOs, technical enablers, content providers and service providers), both transposing the components of today's setup that have proven to be efficient and enhancing those that need improvements or where market dynamics or self-regulation has not proved to be successful.

OPAL

The OPAL members consider the current functioning to be satisfactory and considers that it is not necessary to change the way in which SMS/MMS short codes are allocated.

However, if ILR decides to make changes, the OPAL members ask to be consulted in order to best assess the impacts of these changes, in particular on the flexibility granted by the current system.

POST

SMS/MMS short codes are not allocated to one ECNS provider but are shared among all operators. Currently, the cooperation between ECNS providers, aggregators, subscribing companies and end users is working fine.

As stated in Section 3.6.1 of the Study Report, "ECC Recommendation (06)03 advises that the regulator should take final responsibility for SMS/MMS short codes if existing national solutions are unsatisfactory". POST is not aware of complaints to any ECNS provider or ILR, so POST does not see grounds for any change in that regard.

The consultants

The respondents to the stakeholder questionnaire suggested that the way of allocating SMS/MMS short codes could be improved if ILR had more direct involvement. ILR has received complaints about SMS/MMS short codes in the past.

Changes in the authority exercised by ILR would involve due consultation.

The consultants propose to maintain the recommendation.

Original recommendation

- **ILR should consider regulating SMS/MMS short codes through an approach in which, instead of including extra rules in the revised numbering regulation:**
    - **ILR would develop and issue for consultation the code of conduct for services using SMS/MMS short codes, taking into account the existing unofficial documents.**
    - **ILR would endorse the final code of conduct to give it legal force.**

MPulse

MPulse agrees with the recommendation. Today's industry self-regulation code of conduct contains some inconsistencies and rules that can logically or technically not be met, as well as a series of discretionary rights that - if enacted - do have substantial business impacts without defining adequate or neutral procedures for evaluation, escalation or remediation. Also enforcement would be easier across the value chain with all stakeholders if the document had legal force. One topic to be addressed is the definition of principles and rules that apply to ECNS, as today's self-regulation document only contains obligations for content providers and

rights for MNOs (i.e. to define a setup with suitable checks and balances and procedures meeting essential legal principles that would apply to all stakeholders, taking into account, endorsing and enforcing their respective roles).

OPAL

The OPAL members caution that MMS will disappear soon and that in Luxembourg there are no MMS short codes. SMS short codes have been in decline for several years.

The OPAL members do not understand and have therefore no interest in introducing now a regulation for SMS/MMS short codes. This is all the more so since the good collaboration between the various operators of the Luxembourg market, whether OPAL members or not, means that the situation is stable.

POST

A code of conduct would be developed by the Luxembourg market players and ILR. A consultation on the existing document does not appear necessary at this time. Endorsement by ILR could however play an important role in making the code of conduct respected by every market player.

The consultants

The consultants propose to maintain the recommendation.

3.6.2 Potential ranges of SMS/MMS short codes

Original recommendation

- **ILR should consider having measures for dealing with SMS/MMS short codes analogous to the measures for dealing with shared revenue numbers. Among these would be letting customers bar messages to and from SMS/MMS short codes free of charge, in accordance with ECC Recommendation (06)03.**

MPulse

Mpulse agrees with the recommendation. To its knowledge, all Luxembourg-focused MNOs have systems in place that allow customers to request the blocking of messages from short codes. These systems may though be enhanced by the implementation of finer granularity and additional options, as sometimes customer requests for blocking result in a restriction of all short code-based services, including information and free services (e.g. SMS for account activation). This leads to additional customer complaints requiring investigations and additional escalation that might have been prevented by the implementation of a more sophisticated system in the first place.

POST

GIE Telcom has submitted a proposal on SMS/MMS short codes, and more precisely on the use of (a) long numbers, in particular the former mobile voice mail numbers (6x8 xxx xxxx), for A2P purposes and (b) alphanumerical codes. The GIE Telcom proposal also includes consumer protection measures, such as tariff identification, protection against spamming or misuse of trusted company names in the case of alphanumerical codes. POST asks ILR to consider these in its revised numbering regulation.

Similar (consumer protection) measures to those for shared revenue numbers are not relevant for SMS/MMS short codes as the uses of these two types of numbers differ completely.

Original recommendation

- **ILR should consider introducing more SMS/MMS short codes for A2P uses (such as password delivery) free of charge to the recipient, if technical barriers to unsolicited communications are introduced.**

MPulse

MPulse agrees with the recommendation. However, it thinks that the relation between introducing additional codes and introducing technical barriers may not result in fewer unsolicited communications. MPulse believes that the opposite is true, since the use of a Luxembourg short code requires the stakeholder to abide by national rules and to sign agreements with national ECNS (directly or indirectly), so there is a certain level of exposure and accountability, with effectively very low levels of spam messages. On the opposite side, use of international routes or originating numbers/alphanumerical codes allows for senders to take advantage of a certain level of opacity, resulting in less exposure and sometimes in aggressive if not illegal message-sending behaviour.

MPulse believes that the introduction of additional ranges and the increased level of transparency and exposure of stakeholders by providing them with a wider range of short codes (and potentially additional features) would lead to lower levels of unsolicited communications. In parallel, the introduction of additional filters and protective measures at the entry points of Luxembourg's MNO networks tackling this kind of messages from international locations and numbers might be helpful, while making sure that stakeholders would have the same technical abilities and features when using national connectivity as they

do have with international service providers or ECNS (as sometimes feature sets of international routing providers are indeed more advanced than those of national ECNS).

POST

POST does not agree with the proposal to introduce more SMS/MMS short codes for A2P uses, as there is currently no shortage of them.

Alphanumerical codes appear to be better suited for one-way A2P purposes (e. g. password delivery, notifications, etc.) and have the merit of being immediately identifiable and free of charge to the recipient.

Twilio

Twilio would highly welcome the introduction of more A2P short codes free of charge to the recipient. This would support legitimate public service, not-for-profit and commercial applications that are increasingly being developed and used.

The consultants

The respondents to the consultation on balance favour having more SMS/MMS short codes for A2P uses if there are suitable protective measures. However, more demonstration of demand is desirable.

The consultants propose to maintain the recommendation.

Original recommendation

- **ILR should consider introducing more SMS/MMS short codes for P2A uses (such as donations and competitions) with price ceilings higher than the current one of €5 per message, if the safeguards against money laundering are adequate.**

MPulse

Mpulse strongly agrees with this position. Its customers (value-added content or service providers using short codes) have expressed their interest in this kind of service, and similar implementations in other countries prove that this can be highly successful and beneficial to all stakeholders in the value chain.

Money laundering would actually be less of an issue in this case, as all players in the value chain are identified and today's procedures applying to premium messaging already prevent money laundering, because of effective "know your customer" procedures put in place at

account opening and adequate monitoring of usage and anomaly detection ("Know Your Transactions") by intermediate players and technical enablers such as our company. Also P2A doesn't allow for "consumer to consumer" payments: receiving payments requires to be identified and accepted as a (professional or institutional) customer by ECNS or intermediate operators or resellers. With regards to best practices in the prevention of money laundering that had been put in place in other contexts (traditional bank payments, money remittance…), this setup already eliminates the vast majority of potential money laundering schemes as consumers in the mass market cannot be at the receiving end.

POST

ILR could define a dedicated range. The modalities such as costs and revenue sharing definition should however remain an operator responsibility.These modalities can also be developed commonly by all the market players and further enshrined in a code of conduct endorsed by ILR.

The consultants

The safeguards against money laundering continue to deserve scrutiny; for instance, an organisation that was accepted as a customer by ECNS providers might still be engaging in money laundering.

The cost and revenue sharing principles would be considered according to the extent to which ILR assumed responsibility for developing the code of conduct, as implied by Section 3.6.1 of the Study Report.

The consultants propose to maintain the recommendation.

Original recommendation

- **The revised numbering regulation should require "double agreement" procedures for SMS/MMS short codes, alphanumerical sender identification codes and shared revenue numbers.**

MPulse

Mpulse agrees with the recommendation. In addition to this, it might be interesting to address two challenges in this context:

- Ensure that MNOs provide a suitable technical feature set to operate such "double agreement" processes properly using the same channel (e.g. both free or regular rate

messages and premium messages on the same short code – a feature which hasn't been implemented today by most Luxembourg MNOs).

- Cater for alternative authorisation processes such as receiving an A2P authorisation code and filling in this code on a web page, which can be sometimes more effective than exchanging SMS messages back and forth as these messages are by definition unstructured. MPulse recommends the goals and requirements (without binding the definition to specific processes, mechanisms, channels or technologies), including the burden of proof of such consent given by consumers that would lie on the provider of such a service or short code owner.

POST

Since "double agreement" procedures for SMS/MMS short codes are already included in the current regulation, POST asks which specific points should be added or clarified.

The consultants

Allowing a "double agreement" procedure to involve the use of multiple channels or of one channel for multiple formats is not precluded by the recommendation. However, it could introduce complications and make evasion more likely, so it should not be introduced readily.

The recommendation is to adopt "double agreement" procedures for all the relevant means of identification, not just SMS/MMS short codes.

The consultants propose to maintain the recommendation.

Original recommendation

- **A working group should consider possible enhancements to the roles of SMS/MMS short codes. These include:**
    - **Letting the SMS/MMS short codes, the freephone numbers and the shared revenue numbers be used by both voice services and SMS/MMS services.**
    - **Designating some SMS/MMS short codes for a single purpose each (such as balance checking) that would be supported by all of the networks.**

MPulse

This proposal would indeed be the most pragmatic and efficient way to define and implement a revised SMS/MMS short code framework.

OPAL

SMS/MMS short codes should be made available as voice short codes.

POST

End user protection can be achieved more easily if the usage (voice or message service) remains distinguished for SMS/MMS short codes, the freephone numbers and the shared revenue numbers.

POST agrees with the principle that some short codes can be reserved for specific uses. However, the implementation of this principle (i.e. migration of existing uses to such reserved short codes) might be complicated because currently the same application may usedifferent short codes. One-way A2P SMS can also be handled by alphanumerical codes.

Twilio

Twilio supports the recommendation to consider letting SMS/MMS short codes be used with both SMS and voice, as well as allowing for the SMS-enablement of freephone and toll-free numbers, as this would be beneficial for customers and meet a clear demand from public administrations and businesses.

The consultants

Again the contributions to a working group should allow for fairly rapid progress.

The consultants propose to maintain the recommendation.