An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Review of Mobile Numbering

Submissions to Consultation 18/03

Submissions to Consultation

Reference: ComReg 18/47

Version: Final

Date: 11/06/2018

An Coimisiún um Rialáil Cumarsáide
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Submissions Received from Respondents

Document No:	18/47
Date:	11 June 2018

Consultation:	18/03
Response to Consultation:	18/46

Content

1: ALTO

alto

alternative operators in the communications market

Consultation: *Review of Mobile Numbering - Promoting Innovation and Facilitating New Services*. Ref: 18/03

Submission By ALTO

Date: March 7th 2018

1. Introduction

1.1 ALTO is pleased to respond to the ComReg's consultation entitled: Review of Mobile Numbering – Promoting Innovation and Facilitating New Services. Ref: 18/03.

1.2 ALTO responds in a limited manner and deals with M2M numbering and international standards mainly.

1.3 It is a matter for each ALTO member to respond to ComReg with substantive replies to areas in this consultation.

2. Consultation Response

2.1 ALTO notes that M2M numbering applications have global possibilities, and global customers, and therefore discussions about numbering should be global.

2.2 ALTO submits that ComReg should not introduce national regulation creating a fragmented regulatory landscape.

2.3 Instead, ALTO urges ComReg to engage intensively in the relevant ITU Study Group 20 on M2M and IoT, as well as in similar debates on EU level.

2.4 Furthermore, IOT and M2M are relatively new services which should be allowed to develop with maximum flexibility.

2.5 NRAs like ComReg should not mandate what identifiers/numbers that M2M services should use, but should instead look to lower barriers to entry and regulatory burden for ECS providers.

2.6 While ALTO agrees that more mobile numbers are needed, and that the new ranges suggested appear to be good candidates, we submit the conditions of use should be consistent insofar as is possible

across different number types, e.g. number portability might not be relevant for the M2M range. ComReg should look at reducing administrative and regulatory burden for ECS providers including around Conditions of Use.

2.7 ALTO does not agree that eligibility for E.212 and E.164 numbers should be expanded beyond ECS providers. These numbers are important for network security.

2.8 ALTO generally welcomes ComReg's clarification in the consultation about extraterritorial use of these new number ranges.

2.9 ALTO anticipates further consultation on this subject generally.

ALTO

7 March 2018

2: AT&T

AT&T Comments on ComReg's Document 18/03:
Review of Mobile Numbering—Promoting Innovation and Facilitating New Services

7 March 2018

AT&T is pleased to provide the following comments on ComReg's *Review of Mobile Numbering—Promoting Innovation and Facilitating New Services* ("the Consultation"), as published on the ComReg website on 24 January 2018.[1] Given its leadership in working with customers to develop mobile solutions,[2] AT&T welcomes the opportunity to inform the development of a long-term numbering scheme for mobile communications services that will facilitate the deployment of new and innovative Machine-to-Machine/Internet of Things ("M2M")[3] services in Ireland.

Introduction

AT&T commends ComReg for commissioning a comprehensive review of mobile numbering resources by InterConnect Communications (the "ICC Report")[4] to aid its numbering policy decisions. The ICC Report acknowledges the global nature of M2M services and, notably, states that M2M services "are among the most dynamic."[5] Indeed, the provision of M2M communications encompasses a complex ecosystem of innovative players—most notably connectivity providers (mobile, fixed and satellite network operators), hardware manufacturers (equipment manufacturers and device manufacturers), software/application service providers (telematics, data analytics, billing solutions), and system integrators—that are developing new services and capabilities for the benefit of consumers, industry and society. Newer

[1] AT&T has responded to ComReg previously relative to developing numbering policy. For example, among other engagements, we provided comments to ComReg Document 15/60: *Review of the Numbering Conditions of Use and Application Process* (August 2015). We elaborate on some of those comments in this consultation, with more than two years of additional industry insight and experience on the impact of numbering issues.

[2] AT&T pioneered M2M services in the first stages of development and now has a proven M2M success record with more than 38.5 million connected devices, including 17.8 million connected cars on the AT&T network, as of 4Q17, plus industry analyst recognition for solution deployment experience and capability. For example, in GlobalData's latest global IoT product report on AT&T, principal analyst Kathryn Weldon characterises AT&T as "a leader in the global IoT services market" and writes that AT&T has "excellent traction" for its IoT initiatives and rates AT&T "very strong" in value-added services, vertical markets, partnerships and connectivity (GlobalData, *AT&T-Global Industrial IoT Services Product Assessment*, August 2017). Most notably, AT&T's multinational enterprise customers have sought our expertise to deliver truly global solutions. In fact, last year AT&T signed an agreement with IDA Ireland and Dublin City Council to collaborate and exchange information about smart cities solutions. *See* http://about.att.com/story/smart_cities_dublin_ireland.html

[3] ComReg uses the term M2M in the Consultation to refer to "the exchange of information between machines, through a mobile or fixed network, with limited or no human intervention" and to incorporate the Internet of Things or IoT (Consultation, at fn. 1 on page 8, page 57). For consistency, AT&T uses the term M2M in like manner throughout these comments.

[4] InterConnect Communications, *Review of Mobile Numbering Resources: ComReg T04174 COM-16-399* (23 November 2017). *See* (ComReg reference 18/03a).

[5] ICC Report, at page 8.

players, such as those companies providing networks based on low-cost, energy-efficient ultra-narrowband cellular networks or new solutions by established companies using drones[6] or power lines[7] continually enter the market. Solutions are being introduced in the areas of the industrial internet of things ("IIoT"), transportation, health and wearables, smart home and appliances and smart cities,[8] among others. However, the new applications may not adhere to traditional network concepts and regulatory frameworks. Moreover, as the industry grows, policymakers should expect and encourage further innovations that will stimulate investment. Critically, investment will flow between geographies, with M2M services often developed for a global market.[9]

The global nature of the M2M market, coupled with increasing consumer mobility,[10] its exponential growth trajectory and the general technological transformation in networking and service delivery, warrants a globally-minded flexible policy approach that facilitates the inventive and seamless deployment of M2M services. AT&T suggests that having a pro-investment regulatory climate open to diversity is essential to maximise M2M's impact on the Irish economy, as well as the global M2M opportunity.[11] AT&T's comments, therefore, focus more generally on the need for elasticity[12] when developing viable mobile numbering policy and address some of the components of such, namely: (1) extraterritorial use of national numbering resources, including through permanent roaming; (2) flexibility in numbering assignment; (3) a variety of numbering options for eCall and (4) restraint on imposing mandates for switching mechanisms (*e.g.*, over-the-air provisioning).

[6] *See* AT&T Blog, *Taking Flight with Connected Drones: AT&T Foundry Envisions the Future of Unmanned Aerial Vehicles* (May 2016). *See* http://about.att.com/innovationblog/connected_drones

[7] AT&T announced a new approach to smart grid applications and connected experiences. *See* AT&T Press Release, *AT&T Labs' Project AirGig Nears First Field Trials for Ultra-Fast Wireless Broadband Over Power Lines* (September 2016). *See* http://about.att.com/newsroom/att_to_test_delivering_multi_gigabit_wireless_internet_speeds_using_power_lines.html

[8] According to the ICC Report, these verticals represent "key areas where M2M technologies are likely to develop quickly" (ICC Report, at page 181).

[9] ComReg states that service providers in Ireland are "increasingly developing their products and services for a global market"(Consultation, at page 9). Likewise, service providers based in other geographies (*e.g.*, AT&T) design and deliver M2M services to a global market. In other words, service providers in other geographies have products and services that could be deployed in Ireland to its economic and technological benefit.

[10] The ICC Report, at page 164.

[11] This is particularly important given Ireland's dependency on trade. *See* https://ec.europa.eu/ireland/news/key-eu-policy-areas/economy_en

[12] Moreover, the ICC Report (at page 164) states that currently M2M market development is "very uncertain." This further requires numbering policies that allow for the greatest breadth of options so as not to inadvertently thwart development by foreclosing solutions. AT&T commends ComReg for its intention to take such an approach.

Extraterritorial Use of Irish Numbers (Q4.)

Do you agree with ComReg's position that new Irish E.164 numbers for non-personal services and Irish MNCs should be made available to be used on an extraterritorial basis for international M2M service?

AT&T supports ComReg's recommendation to make available new Irish E.164 numbers (*i.e.*, those in the proposed 088 M2M range),[13] and indeed all Irish E.164 numbers used to provide M2M services, and E.212 Mobile Network Codes ("MNC") for use on an extraterritorial basis for international M2M services. AT&T's experience demonstrates that one of most effective solutions for global M2M services is to explicitly allow the extraterritorial use of numbering resources (*e.g.*, E.164 numbers and E.212 codes[14]).[15] However, we emphasise that such extraterritorial use of numbering resources for M2M services should work in *both* directions—that is, in addition to ComReg allowing the use of Irish national numbering resources outside of Ireland, ComReg should also clearly allow the use of non-Irish numbering resources within Ireland in the same manner as defined for the use of Irish numbers.[16] While this appears to be ComReg's intention in its proposals for the use of overseas numbers and MNCs in Ireland, as described in

[13] AT&T agrees that to address concerns about potential number exhaustion, a special range of numbers for M2M would be appropriate, since it would permit the introduction of a new, exclusive number block using a longer number sequence (with the full 15 digits) in the E.164 format. The length of E.164 numbers for mobile users was selected to balance the needs of the efficient use of numbering with the human factors of communicating and dialing a convenient length. To achieve that balance, in Ireland, as well as Europe, the average length of E.164 number ranges typically does not exceed 12 digits (including trunk code). Machines, however, have no such need for convenience and so for M2M a full 15-digit number allocation, as proposed by ComReg, is appropriate. AT&T also supports ComReg's view to not mandate migration to the new number range.

[14] As AT&T advocates for the extraterritorial use of *overseas* numbers as well, when we use the term "E.212 code" we refer to the Mobile Country Code ("MCC") in addition to the MNC.

[15] ComReg acknowledges that mobile operators continue to rely on mobile numbers and they will remain relevant for a time (Consultation, at pages 13, 38). Indeed, because machines need to be uniquely identified and addressed to communicate, it is likely that E.164 numbers will be necessary for some time with M2M devices. Many devices and applications developed today use E.164 numbers and this will continue throughout the lifecycle of the product. With many consumer and industrial products having a lifespan of 10 to 20 years, an ongoing supply of E.164 numbers will be needed. And for the highly integrated high-volume, low-cost electronic modules, a retrofit or upgrade to an alternate numbering resource would be uneconomical. Although several of the top 10 monitored networks have significant IPv6 deployment, this is by no means pervasive and none has reached 100 percent (as of 14 February 2018 *see* http://www.worldipv6launch.org/measurements/). Therefore, to reach a global M2M market, device manufacturers will consider the breadth of IPv6 deployment before beginning development on IPv6-only devices. There also will be a substantial overlap period where both IPv6 and E.164 numbers are in use. It is estimated it will take 5 to 10 years for IPv6 to become widely available. The ICC Report suggests a 5- to 8-year transition period (ICC Report, at page 170). If the field lifecycle of a device is 20 years, E.164 numbers could be needed for the next 30 years.

[16] In fact, this is already occurring. "There is real demand for such extraterritorial use" (Consultation, at page 14). "Extraterritorial use is now happening on a widespread basis in the marketplace, with Irish numbers and SIMs already being used abroad permanently and overseas numbers and SIMs (both EU and non-EU) being used in Ireland (emphasis added)" (Consultation, at pages 36, 48).

our answer to Question 13, AT&T believes that ComReg should confirm more clearly that the use of overseas (and ITU) number resources in Ireland *by way of international permanent roaming* is acceptable.

E.164 M2M Number Assignment (Q.11)

Do you agree with the eligibility criteria that E.164 M2M numbers can be assigned to MNOs, MVNOs and only to M2M Service Providers that can both justify the requirement and manage the resources?

AT&T supports widening the eligibility criteria for mobile number resources to facilitate existing and emerging M2M services and therefore agrees with ComReg's proposal to permit E.164 numbers to be assigned to a Mobile Network Operator ("MNO"), Mobile Virtual Network Operator ("MVNO") or M2M Service Provider ("SP") that can justify the requirement and manage the resources. However, as ComReg points out, the M2M value chain may have many different configurations. Therefore, for the avoidance of doubt about what constitutes an M2M SP (or indeed an MVNO which by ComReg's definition could range from a full MVNO to a mobile reseller[17]), AT&T recommends that ComReg's proposed eligibility criteria in Section 6.2 of the Numbering Conditions should be amended to refer explicitly to "authorised undertakings", as follows:

> *"Rights of use for E.164 M2M numbers shall be granted to MNOs, MVNOs and only to* ***other authorised undertakings (such as*** *M2M Service Providers****)*** *that can both justify the requirement and can manage the resources".*

E.212 MNC Code Assignment (Q12.)

Do you agree with the eligibility criteria that E.212 MNC can be assigned to M2M Service Providers?

AT&T supports ComReg's proposal to permit E.212 codes to be assigned directly to M2M SPs that can justify the requirement and manage the resources, and to only grant a second MNC after appropriate justification is provided.[18] Liberalising MNC assignment would align Ireland with the practice of the many key EU countries that do not restrict E.212 code assignment to MNOs and MVNOs.[19]

In responding to comments submitted by AT&T in 2015 to ComReg Document 15/60: *Review of the Numbering Conditions of Use and Application Process*, ComReg stated that "there is a need for all applicants for MNCs and Mobile Numbers to own mobile network infrastructure and, as MNCs and Mobile

[17] ComReg states that "An MVNO is defined as an authorised undertaking that, through a contractual agreement with an Irish MNO, has access to a mobile network to provide a mobile service." Consultation, at page 59.
[18] Consultation, at page 64.
[19] Other EU Member States have generally concluded they should expand the assignment of MNCs beyond MNOs or MVNOs (Consultation, at page 64).

Numbers are a national resource, elements of the infrastructure should be located within the State."[20] AT&T urges ComReg to reconsider that approach in light of technology developments in recent years. To extract the greatest benefit from opening MNC assignment in a global market, AT&T suggests that, while an undertaking would need to make use of certain network infrastructure elements (in particular a Home Location register), an MNC applicant should neither be required to own such infrastructure nor should there be a requirement for such infrastructure elements to be located in country to apply for an MNC. Instead, MNC assignment procedures should be sufficiently flexible to accommodate different business and implementation models (*e.g.*, based on technological evolution) to adequately meet market demands. MNC applicants may have distributed network architectures, with network elements located in different countries. Indeed, many telecom operators are implementing or considering plans for Network Function Virtualisation ("NFV")[21] where current network hardware elements are evolving to virtual, software-based functions inside a general-purpose computing infrastructure. In other words, network technology is evolving rapidly, with an increasing amount of functionality being virtualised through software-defined networking. Thus, there is a risk that overly prescriptive requirements will not be future-proof, in that some network elements in such a proposal might not be required at all in the future.

Finally, AT&T believes that while there may be potential benefits to liberalising some numbering assignment policies to extend the direct allocation of MNCs to M2M SPs, there are concerns in granting MNCs to parties other than authorised undertakings (*i.e.,* M2M users rather than MNOs, MVNOs or M2M SPs). According to the Body of European Regulators for Electronic Communications ("BEREC"), for example, allowing M2M users to be assigned MNCs raises questions of the technical and economic conditions of MNC assignees.[22] Operational and security issues also would need to be addressed, including what regulatory requirements would apply to the M2M user, how would switching operate and with what risks, and what would be the impact on MNC resources.

Extraterritorial Use of Non-Irish Numbers in Ireland (Q13.)

Do you agree that ComReg should, for the avoidance of doubt, make clear in the Numbering Conditions that the regulatory obligations attached to the General Authorisation, and the conditions set out in Section 3.1 of the Numbering apply to the use by undertakings, for M2M services in the State, of numbers assigned by the ITU, or overseas numbers?

AT&T supports ComReg's determination to ensure "that there is explicit permission for the use of overseas numbers in Ireland."[23] AT&T also agrees that ComReg should expressly provide for the use of numbers

[20] ComReg Decision No. D08/15 (December 2015), at para. 203.
[21] *See* http://www.att.com/Common/about_us/pdf/AT&T%20Domain%202.0%20Vision%20White%20Paper.pdf
[22] *BEREC Report on Enabling the Internet of Things*, Report BoR 16(39) (February 2016). *See* http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/5755-berec-report-on-enabling-_the-internet-of-things, at page 30.
[23] Consultation, at page 67.

assigned by the ITU and overseas numbers ("non-Irish numbers") by subjecting them to the regulatory obligations attached to the General Authorisation in circumstances where an electronic communications service ("ECS") or an electronic communications network is being provided in Ireland (*e.g.*, where there is a contract to provide an ECS to an Irish customer). However, we believe that, in the case of non-Irish numbers *permanently* roaming in Ireland, the overseas operator (to which the non-Irish numbers are assigned) is not providing a local ECS in Ireland. Overseas operators are not required to file a notification with ComReg (under Regulation 4(3) of the Authorisation Regulations) in respect of *temporary* roaming by their non-Irish customers in Ireland. The same approach should apply where the overseas operator has concluded a contract with a customer outside of Ireland to deliver a global M2M solution with coverage in Ireland delivered through *permanent* roaming using the overseas service provider's international agreements with Irish MNOs, which are duly authorised as public electronic communications networks and subject to ComReg's jurisdiction on such matters.

AT&T believes that the use of permanent roaming as a technical and commercial platform brings unparalleled efficiency for the deployment of M2M communications across the globe. Moreover, in most cases, without roaming M2M applications simply may not be viable. Therefore, to facilitate the growth and development of M2M services, ComReg should explicitly confirm that the extraterritorial use of non-Irish numbering resources in Ireland by way of permanent roaming is acceptable, including in circumstances where the assignee of those resources is not itself providing ECS in Ireland and is therefore not subject to the regulatory obligations attached to the General Authorisation or the conditions set out in Section 3.1 of the Numbering Conditions.

Numbering Resources for eCall (Q14.)

Do you agree with ComReg's proposal to allow numbers from the proposed new M2M numbering range to be used for eCall in Ireland? Note that numbers from existing mobile ranges, Global ITU numbers and national numbers from other countries may also be used for eCall.

AT&T believes that to facilitate the successful deployment of eCall services in Ireland, ComReg should ensure flexibility in the E.164 numbering options available for eCall services and permit, as equally valid and permissible, the use of Irish numbers, including those from existing ranges and the proposed new M2M 088 range, the extraterritorial use of numbers from other countries and the use of Global ITU numbers. As ComReg notes, this approach is fully consistent with the recently adopted European Conference of Postal and Telecommunications Administrations ("CEPT")/Electronic Communications Committee ("ECC") Recommendation (17)04 on numbering for eCall.[24] AT&T's expectation is that many

[24] Consultation, at page 70. *See* ECC Recommendation (17)04 – Numbering for eCall (November 2017), recommendations 3, 4 and 5.

eCall-equipped vehicles sold in Ireland will use non-Irish numbers.[25] The use of non-Irish numbers for eCall in Ireland also relieves demand for Irish numbers. Finally, where eCall In-Vehicle Systems ("IVS") using non-Irish numbers are able to roam on all Irish mobile networks, this may provide better geographical coverage than IVS using Irish numbers. This could be particularly relevant in the context of a service that will only be used in emergencies (while acknowledging that national 112 or 999 roaming is available in Ireland).

Switching Mechanisms (Q15.)

Do you agree with ComReg's analysis of the options for switching M2M service provider and the broad requirement for further study in this area?

AT&T agrees with ComReg that at this time there is no need for regulatory intervention to mandate any particular switching mechanism, such as introducing prescriptive regulations for over-the-air ("OTA") provisioning or requirements for mobile number block reassignment (i.e., the transfer of rights of use of numbers within a given number block from one service provider to another).[26] AT&T also agrees that Mobile Number Portability ("MNP") may have limited relevance in the context of M2M services, given that human end users typically do not interact with, or even need to know, the E.164 number associated with an M2M application.[27]

As ComReg rightly noted, OTA provisioning is already being used in certain sectors (*e.g.*, automotive) and to the extent available, OTA should be offered but not prescribed. In fact, AT&T wishes to highlight progress that the industry has made in developing and promoting OTA capability since the first release of the GSMA embedded SIM specification. The later versions of the specification, now at version 3.2,[28] enable full, interoperable OTA provisioning between different carriers and different SIM card vendors. With the embedded SIM or embedded Universal Integrated Circuit Card ("eUICC"), the profile of the SIM (which includes the MNC), can be changed over-the-air after manufacture. This allows for changes to

[25] To illustrate, to achieve the necessary economies of scale, an automotive original equipment manufacturer ("OEM") often partners with a single MNO that can deliver wireless connectivity in several countries where the OEM seeks to sell its vehicles. By relying on a single MNO for its global wireless connectivity needs, the OEM can negotiate one wireless connectivity contract, use one E.212 code in all of its SIMs, use E.164 numbers sourced from one MNO, and use the ordering, provisioning and billing systems of one MNO. This avoids the need for the OEM to maintain separate SIM card inventories for each country; to know during manufacture the ultimate destination of each vehicle; to make substantial financial investments to integrate its data centres and help desks with a domestic MNO in each of the markets where it intends to sell vehicles; and to maintain multiple platforms with each MNO.

[26] ComReg rightly acknowledges that further study is needed to consider functional requirements of block reassignments as a switching mechanism, given the lack of experience with MNC assignment to M2M SPs in Ireland. A case-by-case approach is a good place to start.

[27] Consultation, at page 72.

[28] GSMA's Remote Provisioning Architecture for Embedded UICC Technical Specification, V 3.2 (June 2017). *See* https://www.gsma.com/newsroom/wp-content/uploads//SGP.02_v3.2_updated.pdf

profiles of different MNOs over the life span of the product, preventing lock-in to the original MNO and offering increased options to end users and M2M SPs without the need for regulatory intervention. AT&T also notes that incorporating an OTA capability inevitably adds costs to an M2M solution. While this may be justified for higher value products such as cars that will be in use for many years, it may be uneconomic for a lower value, more disposable M2M device that might only be used for a year or two. AT&T, therefore, cautions against the adoption of a "one-size-fits-all" regulatory policy approach towards OTA switching, which would reduce operating flexibility, inhibit innovation and increase costs in new M2M offerings and business models.

Given the evidence of successful cooperation between market participants to design and implement working OTA solutions, and absent any demonstrable market failure, AT&T commends ComReg's restraint by not imposing, for example, OTA obligations, including establishing adoption timelines, in favour of further study, especially since the matter is being considered by CEPT and BEREC.[29]

* * *

AT&T commends ComReg for engaging stakeholders to inform numbering policy to advance competition and innovation in the M2M market in Ireland. Adopting the right policies, particularly allowing the extraterritorial use of numbering resources with permanent roaming, will enable Ireland's numbering resources to be used to the maximum benefit. Notably, it is these globally-minded, business-friendly policies that continually put Ireland among the world's top destinations for business.[30] Indeed, Ireland's attractive business climate "starts with positive leadership and policies."[31] AT&T agrees. By adopting policies that leverage M2M's geographic agnosticism and the new business models that engenders, Ireland benefits, as does the world. AT&T would be pleased to answer any questions concerning these comments.

AT&T
7 March 2018
www.attglobalpolicy.com

[29] Consultation, at page 77.
[30] In Forbes' *Best country for business rankings 2018* Ireland is again in the top 10. *See* https://www.forbes.com/sites/kurtbadenhausen/2017/12/19/the-u-k-tops-forbes-best-countries-for-business-2018/#53cafc8426de
[31] *See* https://www.idaireland.com/

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Dublin, 22 February 2018

Dear Sir, Madam,

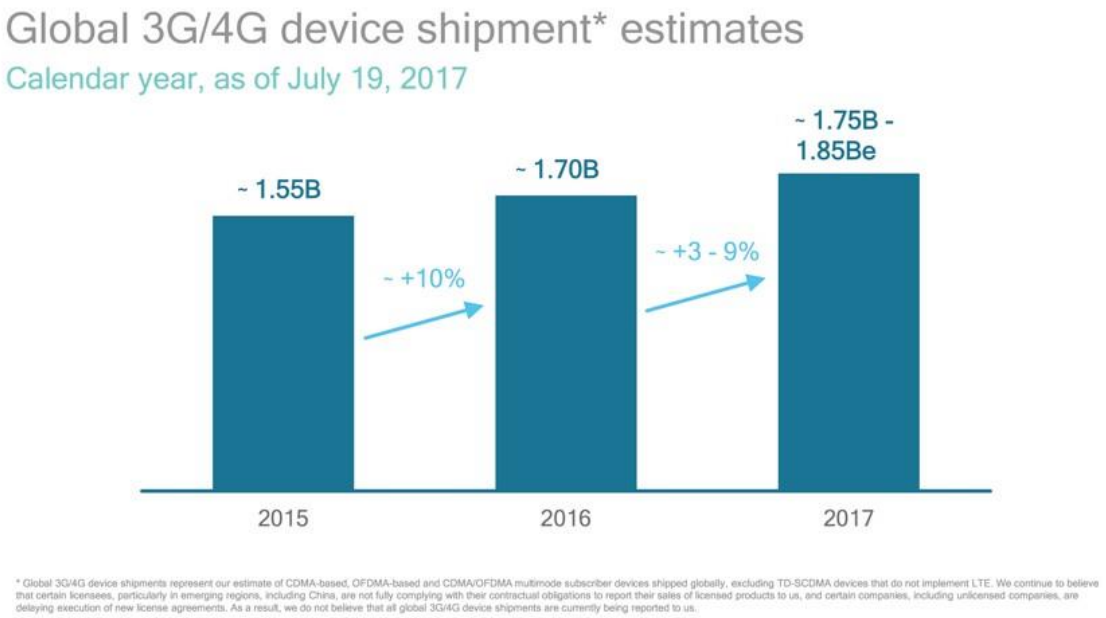
Re.: ComReg 18/03

Cubic is happy to respond to the ComReg consultation on the Review of Mobile Numbering (ComReg 18/03). Please find below our answers to the questions posed in your consultation paper. If you have any questions about our responses, or would like additional information, please don't hesitate to contact us.

Q1:
In the IoT and M2M spaces Cubic foresees very significant demand for numbers. The need for numbers will depend on the use case.

A first use case Cubic is familiar with, would be an automotive manufacturer that wants to include a SIM for telemetry, infotainment, eCall etc. in each vehicle. One major automotive brand will produce roughly 10 million cars for the European market over a period of 3 years. Worldwide they produce roughly 10 million a year. Cubic currently has one such global customer and has the ambition to provide services to several automotive companies; each demanding 10 million numbers.

Another use case that we are working on is, that Cubic embeds a connectivity solution in a chip-set of its shareholder Qualcomm. The chipset would then come ready with "Connectivity-as-a Service" which requires an IMSI and MSISDN. Below is a table of the number of 3G/4G device shipments in which a Qualcomm solution is used. Not all chips will have this CaaS capability but if 5% of shipments were to include it, Cubic would have an annual demand of 87 million numbers.



Q2:
Cubic can agree with ComReg's proposal regading the use of 082, 084, 080 and 081.

Q3:
Cubic can fully support ComReg's proposal to expand the eligibility for E.164 mobile numbers and E.212 MNC to OTT service providers.

The reason is that in the area of M2M and IoT there are many independent network and platform providers that offer specialised services that most national operators cannot provide. For example, Cubic is active in the 'niche' of global connectivity for automotive customers. The requirements of the automotive industry are specific and Cubic is focused on them and has developed a reputation in this area.

A local operator in most cases doesn't have the platform, knowledge and reach to be active in such a specialised area. That's why Cubic is able to partner with big operators because even they can only offer a service in one particular country or a few at most. They partner with specialists such as Cubic to still get a piece of (in this case) the automotive pie.

Companies such as Cubic therefore have a real value add, and they need access to E.164 mobile numbers and E.212 MNCs. The premise of network slicing in 5G is also to give specialist providers a slice of the network, so Cubic believes that ComReg's view is compatible with future technical developments.

Q4:
Cubic fully endorses ComReg's view that the new E.164 mobile numbers and E.212 MNCs should be made available for use on an extraterritorial basis. In line with CEPT rules, most NRAs in Europe allow the use of foreign IMSIs and foreign MSISDNs if the originating country approves of the extraterritorial use of these numbers.

Many M2M and IoT application are cross-border. In particular in the automotive space, OEMs want a single SIM and a single IoT platform that can be used across the world. Multiple SIM types and solutions complicate the production process and make a car more difficult and expensive to make. So there is a clear demand for cross-border M2M/IoT solutions.

Q5:
In Cubic's view an operator should be free to choose what numbers it wants to use. But clearly using domestic mobile numbers from the 083, 085, 086, 087 and 089 ranges is less efficient. ComReg could incentivise industry to use the new M2M range by pricing it more cost effectively. Operators will need large amounts of numbers, so they will value that licensing M2M numbers is more cost-effective.

Q6:
Cubic believes the estimates are realistic.

Q7:
There are a few steps that need to be taken but it will take considerable time before the numbers are fully reachable internationally.

First step is to notify the ITU. Additionally, ComReg should follow standard practice and write to all Irish operators to open up the range. It is particularly important that eir as the default carrier opens up the new 088 range. Carriers abroad will often not interrogate a number beyond the country code and send any +353 traffic to eir. Other foreign operators will do the same if they come across an Irish number with a prefix they don't recognise. Once routing with eir in Ireland has been established and tested, then operators abroad can be notified.

Cubic would suggest that there are two additional things that ComReg could do: -

a) Write to all their European counterparts to notify them of the introduction of the new number range and ask them to email their operator list;
b) Notify a regulator in a country where an Irish licence holder of the 088 range has issues with reachability.

Q8:
Reachability of the M2M numbers is crucial as they might be used for eCall purposes. In such an automotive use case, cars need to be able to be reached by emergency call centres in case of an accident. Therefor the numbers much be reachable by all European operators if an eCall service is going to be used.

In Europe all operators have a duty to implement routing to a new official number range, but experience tells that this can easily take a number of years to complete.

However, by choosing the 088 range ComReg has elected a (former analogue) range that most likely will already be in the routing table of many international operators. Many operators will interrogate a +353-8xxx number and deem it as an Irish mobile number and route to their default transit operator in Ireland.

Therefore, what is very important is that eir (and to a lesser degree BT) are able to route the calls. This needs to be set up first. Once this has been done, Ireland can notify operatoirs abroad. Many international operators who have to route a call to this number range will simply send it to the default operator in a country and rely on them for onward routing. Therefore, it is important that eir can handle the 15-digit range.

Operators that use the new M2M range will have to notify the carrier community and do regular tests to make sure that these carriers have implemented the range. They will also need to notify the operators they have roaming and other wholesale contracts with of the new number range they now use.

The delivery of SMS messages is often crucial for M2M products. SMS is used for Over-The-Air (OTA) modification of the device and eSIM settings. If an operator uses its own SMSC and HLR it is able to send messages to these numbers.

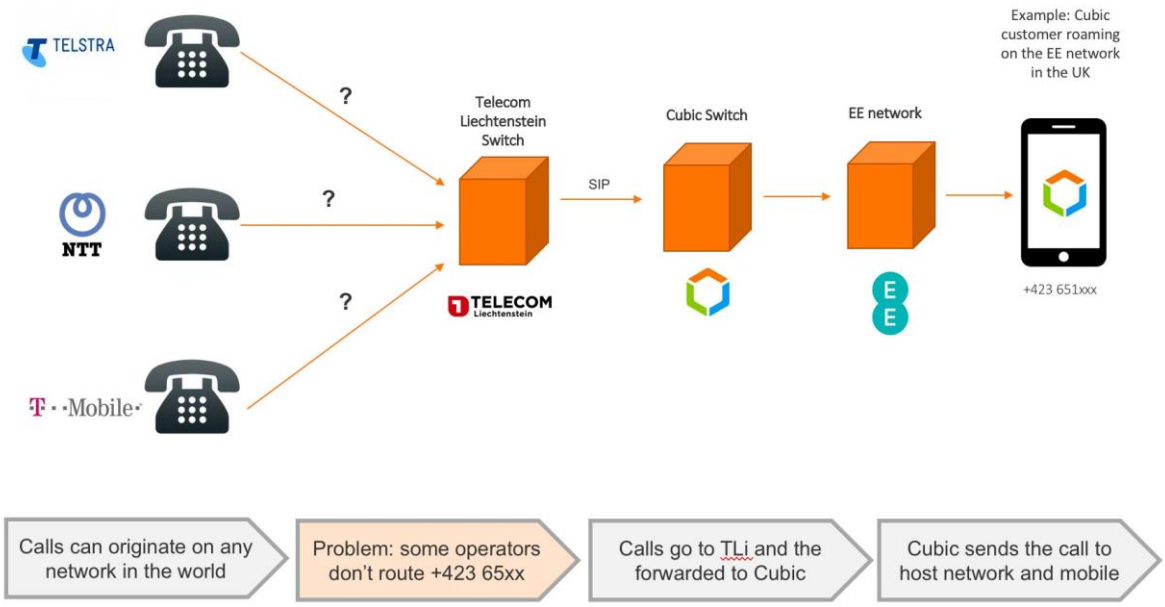
However, if full SMS reachability is required all mobile operators world-wide will have to know which operator “owns” the number block because for SMS delivery the HLR of the Irish operator is required. The Irish operator of the new M2M range would have to start propagating the number range through SMS hubs and by sending out notifications to all operators.

When an operator implements a roaming agreement with a foreign operator, the reachability gets fully tested during the IREG process. However, it is extremely difficult to achieve full reachability of inbound calls as they can originate on any operator in the world. As owner of the numbers you never know where an inbound call may originate from; there are thousands of operators world-wide. Each operator uses various trunk and transit

operators who are a vital part of the chain. Cubic has experience that calls from a large mobile operator in the USA would intermittently not terminate, depending on the transit operator used.

It is virtually impossible to test all the operators and permutations. Sigos tests can show if you SIM works in a particular country, but it doesn't answer the question if your number is reachable from every operator. You can test most of the main operators by going in country and doing dial-tests. However, customer complaints are the main way to be alerted of problems with the long tail of smaller operators.

We have experience with Liechtenstein numbers and after many years, reachability is still not 100%. Many operators in the Far East don't route the numbers. The problem is illustrated below:



The graph shows that calls originating on some foreign networks don't reach the default operator and therefore don't get terminated. As the receiving service provider, you don't know that call attempts were made and you have no influence on the routing of the calls from these operators. It is therefore difficult to remedy this in any quick way. In the above example, Cubic has to write to each of the operators to make sure they update their routing tables and that these operators inform their international carriers of where calls need to be routed to.

Q9:

In a period of 12 months a lot can be achieved, and in Europe reasonable reachability can be achieved with targeted operators (MNO and fixed line incumbent; MVNOs probably not). But there will still be a long tail of international operators that won't route the calls

properly. Crucially, eir, as default operator in Ireland, will have to be able to route the calls and transit them to the Irish operator that owns the number block.

Q10:
Cubic can agree with the digit structure and the terms of use. However, we would like to challenge the definition of M2M.

Cubic provides services to the car industry and to other industries, and these services are more and more of a mixed nature. In other words, on the same SIM card with a single number, there is a mix of pure M2M services (such as telematics), services with very limited human intervention (mapping, news etc) and WiFi services with human intervention.

The technical architecture of the services demands the use of the same MSISDN across multiple countries. We cannot use a German number in German, a Dutch number in the Netherlands, and Irish number in Ireland etc. This problem is particularly prevalent in Europe where we have many countries and M2M devices that cross borders a lot.

The definition of the M2M service as proposed by ComReg is very restrictive, as it would make the use of the new number range for such a mixed bundle of services impossible. Cubic would therefore ask to make a slight modification, to make such bundles possible.

> *"M2M Numbers shall only be used for the provision of an M2M service, or a bundle of services in which an M2M service is a predominant component."*

Q11:
Cubic can fully support the eligibility criteria set-out in section 5.9.

This section touches on lock-in for customers, and in an indirect way, the need for service portability. By way of clarification, Cubic sees a very rapid increase of the the use of the new eUICC 3.1 standard that allows a SIM card to be reprogrammed with a new operator profile.

A large M2M customer that would want to change service provider, or connectivity provider, would therefore only need to swap the operator profile on the eSIM. The E.164 numbers are not customer facing, so the number doesn't create a lock in. With such a profile swap you would get a different E.164 number and no customer impact.

Q12:
Cubic can fully support the ComReg proposal with regard to E.212 MNC eligibility criteria. Cubic is an Irish M2M platform and service provider that would welcome the ability to obtain an Irish MNC and establish our wholesale and roaming agreements by means of an Irish number range.

Q13:
Cubic always worked on the basis that it has to obtain a license or general authorization in the country where the services are provided, independent which number range is used. We have an extensive legal department that investigates the local requirements.

Therefore, Cubic has no issue with the clarification suggested by ComReg.

Q14:
Cubic can agree with the use of the new M2M numbers for eCall in Ireland. In fact, for these numbers to be of use to Cubic, this would have to be the case in Ireland an all other EEA-countries.

Q15:
Cubic believes that the current national requirements for MNP should not apply to the M2M number range.

a) In the M2M space numbers are not customer facing and therefore the portability of an individual number will never be required.
b) Requiring service providers to use the MNP system would require a lot implementation costs for all operators and no gain.
c) It isn't clear that the current MNP system in Ireland is able to deal with 15-digit numbers.
d) There are alternative ways to implement a form of MNP that can bring the pro-competitive benefits.

As mentioned before, it is important that an M2M customer has the ability to switch provider. With eSIMs, and in particular with eSIMS that adhere to the new eUICC 3.1 standard, service portability is very easy. By means of an OTA one can put a new number of even new SIM profile on the SIM and transfer the service from one connectivity provider to another, or even from one platform provider to another.

The actual E.164 number is almost irrelevant because a new service provider will prefer to OTA a profile with their own number range.

Number portability can also be achieved on a number block level. A service provider could transfer the ownership/management of a block of numbers to a new service provider.

We agree with ComReg that further study on this topic is required.

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4: Eir Group

eir Group

Response to ComReg Consultation:

Review of Mobile Numbering
Promoting Innovation and Facilitating New Services

ComReg Document 18/03

7th March 2018

DOCUMENT CONTROL

Document name	eir Group response to ComReg Consultation Paper 18/03
Document Owner	eir Group
Status	Non-Confidential

The comments submitted in response to this consultation document are those of Eircom Limited (trading as 'eir' and 'open eir') and Meteor Mobile Communications Limited ('MMC'), collectively referred to as 'eir Group'.

Response to Consultation

Q. 1 Do you agree with ComReg's assessment of demand for numbers for Interpersonal Mobile Communication (P2P) services?

eir agrees with ComReg's assessment that there is little growth in the demand for P2P numbers.

Q. 2 Do you agree with ComReg's proposals to use 082 and 084 for future P2P mobile services and not to use 080 and 081 for mobile services?

eir agrees with the proposal to retain 082 and 084 for potential future P2P services.

Q. 3 Do you agree with ComReg's proposal to expand eligibility for E.164 mobile numbers and E.212 MNCs to OTT Service Providers that qualify as an ECS, provided they can justify the requirement and have a contract with an Irish MNO to access their network?

eir agrees with ComReg's proposal noting ComReg's assurance that "*If ComReg's proposal is adopted then such OTT SPs shall be subject to all regulatory obligations that apply to authorised undertakings including conditions attached to RoU for numbers including number portability, access to emergency services, etc.*"[1]

Q. 4 Do you agree with ComReg's position that new Irish E.164 numbers for non-interpersonal services and Irish E.212 MNCs should be made available to be used on an extraterritorial basis for international M2M services?

eir has no objection to ComReg's proposal to make the 088 range available for M2M use on an extra-territorial basis.

[1] Para. 88, ComReg 18/03

Q. 5 Do you agree with ComReg's proposal that National M2M services should also use the proposed new number range introduced for M2M?

eir has no objection for the 088 range being made available for use for future M2M services noting ComReg's position that existing services should not be forced to migrate to the 088 range. It should be noted that the 3GPP standards do provide for MSISDN-less subscriptions, meaning that not every M2M device will need a MSISDN. As such we do not see a clear case that the 088 range should have the maximum permissible number length of 15 digits.

Q. 6 Do you agree with ComReg's forecasts for National and extraterritorial M2M connections?

eir is not in a position to offer a firm view on forecast requirements from the Irish numbering resources. From a technical stand point it is sufficient to rely solely on the IMSI to authenticate and establish a data bearer with the IoT device. Where a voice capable IoT device is not required, particularly in use cases with significant volume, a MSISDN will not need to be assigned. As such we do not see a clear case that the 088 range should have the maximum permissible number length of 15 digits.

Q. 7 Beyond notification to ITU, what other processes could be followed to expedite the opening up of numbers internationally. Based on your experiences to date, what timescales might apply?

eir considers a 12 month implementation period is appropriate.

Q. 8 How quickly do you consider the required international routing could be in place for any new numbers? What notifications, testing mechanisms or other measures could be used to quickly ascertain and progress the status of routing of international traffic for Ireland?

See 7 above.

Q. 9 Is 12 months a reasonable timeline for implementing the new M2M number range on national and international networks? If not, please provide an alternative timeline.

See 7 above.

Q. 10 Do you agree with the proposed definitions and RoU conditions for the proposed 088 M2M range?

eir agrees with the proposed definitions and RoU conditions with the exception that we do not believe there is a basis for the 088 range to have the maximum permissible number length of 15 digits.

Q. 11 Do you agree with the eligibility criteria that E.164 M2M numbers can be assigned to MNOs, MVNOs and only to M2M Service Providers that can both justify the requirement and can manage the resources?

eir agrees that the eligibility criteria are appropriate and proportionate to promote the efficient use of numbering resources.

Q. 12 Do you agree with the eligibility criteria that E.212 MNC can be assigned to M2M Service Providers?

ComReg proposes that ""*Rights of use for MNCs shall only be granted to MNOs, MVNOs and M2M Service Providers. A right of use for one MNC shall be granted upon first application and the basis for any request for an additional right of use for an MNC must be fully set out*".eir agrees that the eligibility criteria are appropriate and proportionate to promote the efficient use of numbering resources.

Q. 13 Do you agree that ComReg should, for the avoidance of doubt, make clear in the Numbering Conditions that the regulatory obligations attached to the General Authorisation, and the conditions set out in Section 3.1 of the Numbering Conditions, apply to the use by undertakings, for M2M services in the State, of numbers assigned by the ITU, or overseas numbers?

eir has no objection to the proposed clarification.

Q. 14 Do you agree with ComReg's proposal to allow numbers from the proposed new M2M numbering range to be used for eCall in Ireland? Note that numbers from existing mobile ranges, Global ITU numbers and national numbers from other EU countries may also be used for eCall.

eir has no objection to allowing numbers from the 088 range to be used for eCall. It is a requirement for eCall that the device is provisioned with a MSISDN.

Q. 15 Do you agree with ComReg's analysis of the options for switching M2M service provider and the broad requirement for further study in this area?

eir agrees that it is appropriate for further study in this area as reliance on the existing MNP solution may not be appropriate.

Q. 16 Do you have any observations on any other related issues of relevance to the subject matter of this consultation?

No.

5: Three

Review of Mobile Numbering

Response to Doc 18/03

March 2018

Three.ie

Introduction

Three is pleased to comment on ComReg's Review of Mobile Numbering. We support most of the proposals in the consultation document, albeit with some qualification. We believe further on-going work will be necessary in this area, particularly as the Machine to Machine market is still in its development stage and the scope of service and service requirements are not yet stable.

Three recommends further work in a number of specific areas as the decisions to change numbering will not be easily reversible. Our specific comments are provided below in response to the questions.

Response

Q. 1 Do you agree with ComReg's assessment of demand for numbers for Interpersonal Mobile Communication (P2P) services? Please explain the basis of your response in full and provide any supporting information.

Yes, Three agrees with ComReg's views regarding demand for E.164 numbers to be used for person to person (P2P) communications. Demand for numbers for this purpose has been relatively stable in recent years with low growth. There are several natural factors to indicate that demand for these numbers should reach a natural plateau (or at least low growth phase):

- There is a natural limit to the amount of different personal telephone numbers that an individual will want to use as their contact number;
- The adoption of mobile phones for personal communications has already happened. With penetration above 100%, the need for new numbers for P2P use should be stable and modest;
- Demand has been stable for the past number of years.
- With the adoption of conservation measures recently, and some unused NDCs in the 08X range, it would seem that there is enough spare capacity within the existing numbering scheme to provide for P2P services for a number of years to come. This is the case even if only two of the three available NDCs were to be used for P2P communications.

Q. 2 Do you agree with ComReg's proposals to use 082 and 084 for future P2P mobile services and not to use 080 and 081 for mobile services? Please explain the basis of your response in full and provide any supporting information.

Three agrees with ComReg's proposal that 080 and 081 should be not be used for mobile services. This is a logical conclusion to draw at this time based on current national and international use of these NDCs.

Three also agrees that it makes sense now to allocate a new and distinct NDC to be used for M2M applications. Regarding the choice of which of the available NDCs are to be reserved for mobile P2P vs M2M, we disagree with ComReg's proposal. It makes more sense to allocate 082 as the access code for the new M2M services, leaving 084 and 088 available for P2P. This provides a more logical grouping together of similar services:

Prefix	Use	International Number Length
080	Reserved – misdial potential.	N/A
081	Currently fixed PSTN use	11
082	Proposed M2M mobile range	15
083	P2P Mobile	12/13
084	P2P Mobile (Reserved)	12/13
085	P2P Mobile	12/13
086	P2P Mobile	12/13
087	P2P Mobile	12/13
088	P2P Mobile (Reserved)	12/13
089	P2P Mobile	12/13

We believe it is logical to group the P2P number ranges together. This gives some small usability benefit, but more importantly keeps the ranges with similar number length in a consecutive range, which is an advantage for setting number length on switches.

We do not believe there is any advantage in allocating 088 for M2M use now over and above 082. It has been almost 18 years since this number range ceased to be used for mobile service, and at that time the number length was 11 digits. It is doubtful that any international switches have retained this range, and if so the number length might be incorrect.

We support the proposal to use the maximum international number length, although some work will be necessary to verify that all networks are capable of managing this length.

Q. 3 Do you agree with ComReg's proposal to expand eligibility for E.164 mobile numbers and E.212 MNCs to OTT Service Providers that qualify as an ECS, provided they can justify the requirement and have a contract with an Irish MNO to access their network? Please explain the basis of your response in full and provide any supporting information.

Three agrees that there is merit in expanding the availability of both E.164 and E.212 numbering, however this should be done in a cautious manner. If ComReg opens access to new types of user, then this cannot be easily reversed when services have been rolled out - even if it is discovered that the use is inappropriate or incorrect. In

addition, non-discrimination would require the opening of access to all other similar types of use.

Both the E.164 and E.212 number types have been developed over time to meet specific network and user requirements. In the case of E.164 numbers they are used by networks to route communications to the correct destination, but also there are usability factors that have been build up within the number structure over years of use.

The E.164 country code 353 denotes Ireland, and this allows networks to identify that calls to this code should be routed to Ireland. E.212 numbers were developed to facilitate mobile communications, and allow networks to provide various functions like international roaming. Various ITU-T standards have developed that ensure international networks function together in a predictable fashion, and all new recipients should adhere to the same standards.

Three is concerned that the qualification criteria in Section 6.3 of the Numbering Conditions are not adequate, and at minimum should require that the recipient has a physical presence in Ireland. Otherwise, there is no need to use Irish numbering, and no benefit to Ireland in their use – just cost.

Q. 4 Do you agree with ComReg's position that new Irish E.164 numbers for non- interpersonal services and Irish E.212 MNCs should be made available to be used on an extraterritorial basis for international M2M services? Please explain the basis of your response in full and provide any supporting information.

Three agrees that extraterritorial use of numbers can be permitted in some circumstances; however there must be a benefit to Irish citizens or to the national economy to doing so. ComReg needs to ensure that the recipient of these numbers has a real and substantial link to Ireland and that the use will be beneficial to Ireland. Otherwise ComReg may find that it simply becomes a numbers provider for service providers who do not operate in the Irish market, have no presence here, and do not provide service here. In this case, capacity in the Irish numbering scheme would be used in a way that provides no national benefit whatsoever. There is a cost to provision of numbering from Ireland. This would remain, but for no benefit. In addition, ComReg will have limited or no ability to enforce numbering conditions on a recipient who does not have a presence here and does not operate within the jurisdiction.

Q. 5 Do you agree with ComReg's proposal that National M2M services should also use the proposed new number range introduced for M2M? Please explain the basis of your response in full and provide any supporting information.

Yes, Three agrees with this proposal. M2M services have different service features than P2P services, so it makes sense that they should use the M2M access code:

- they do not need a separate number for voicemail access, so it would be inefficient to allocate numbers from the P2P numbering resource for M2M use;
- In addition, the switching/porting process for M2M is different than that for P2P number;
- Use of P2P numbers by national M2M services would drive demand and could unnecessarily cause a requirement for a P2P number change.

Q. 6 Do you agree with ComReg's forecasts for National and extraterritorial M2M connections? Please explain the basis of your response in full and provide any supporting information.

Yes, ComReg has received forecasts from multiple service providers, and Three has no basis on which to contradict these figures.

Q. 7 Beyond notification to ITU, what other processes could be followed to expedite the opening up of numbers internationally. Based on your experiences to date, what timescales might apply? Please highlight any actions that ComReg can take to assist with any additional processes identified. Please explain the basis of your responses in full and provide any supporting information.

In the first place, ComReg is correct to use the maximum number length of 15 digits if this is possible. Even nationally, it has been Three's experience that some networks have difficulty in analysing, routing, and providing CLI to this length. The use of the 15 digit number length would most likely rule out the use of a 5-digit routing prefix with these numbers.

Following this consultation, ComReg should confirm with all significant service providers that they can use this number length, and if network modifications are required. A period of 12 months to implement seems reasonable if no major network changes are required.

For international opening, in addition to the actions outlined by ComReg, service providers should request their international carriers, roaming partners, and partner networks to open access.

Q. 8 How quickly do you consider the required international routing could be in place for any new numbers? What notifications, testing mechanisms or other measures could be used to quickly ascertain and progress the status of routing of international traffic for Ireland? Please explain the basis of your responses in full and provide any supporting information.

ComReg should allow 12 months for opening of a new NDC for the first time. The block would need to be allocated and "loaded" on a switch here in Ireland first, with some test numbers opened. After that, requests would be sent to international networks to open access, and it would be reasonable to allow 6 months to complete this.

Q. 9 Is 12 months a reasonable timeline for implementing the new M2M number range on national and international networks? If not, please provide an alternative timeline. Please explain the basis of your response in full and provide any supporting information.

See above Q.8.

Q. 10 Do you agree with the proposed definitions and RoU conditions for the proposed 088 M2M range? Please explain the basis of your responses in full and provide any supporting information.

While Three does not disagree with the proposed conditions, they do not seem adequate to ensure that the numbers are used in a way that brings benefit to Ireland or in a way that allows ComReg to ensure consumer protection. ComReg should require as a minimum that the numbers are associated with a HLR or switch that is physically located in Ireland, even if they are for extraterritorial use. It does not seem practical for ComReg to monitor and enforce compliance with consumer protection rules in every country throughout the world. Extraterritorial use should remain subject to Irish law and the conditions of the General Authorisation in addition to local consumer protection rules where the service is delivered.

Q. 11 Do you agree with the eligibility criteria that E.164 M2M numbers can be assigned to MNOs, MVNOs and only to M2M Service Providers that can both justify the requirement and can manage the resources? Please explain the basis of your response in full and provide any supporting information.

Yes, we agree with the eligibility conditions proposed, however do not believe they are sufficient in current form. While the criteria include justification for the requirement, there is no clarity as to what is necessary to meet this justification. ComReg should clarify that in order to be eligible for an assignment of E.164 numbers, an undertaking must be authorised to provide an ECS in Ireland and actually provide an ECS in Ireland. The recipient of the numbers should be required to establish and maintain its own infrastructure in Ireland (which is used in providing the service dependant on E.164 numbers), or to have contracted with a provider to have dedicated access and control over the necessary infrastructure in Ireland.

There is a cost to provide numbering resource from the national numbering scheme to all recipients. This includes administration and management, but there are also indirect costs from building number ranges on networks, number exhaustion, etc. If it was possible for an undertaking to simply receive the allocation of numbers, and provide service outside of Ireland with no connection here, this would bring no benefit, but would still cause the costs. In the worst case, it could drive artificial demand for Irish numbers leading to number exhaustion and number changes.

Q. 12 Do you agree with the eligibility criteria that E.212 MNC can be assigned to M2M Service Providers? Please explain the basis of your response in full and provide any supporting information.

No, the criteria do not seem adequate. E.212 numbering has developed from a requirement to allow identification of roaming terminals separately from the E.164 number, and with established technical conditions. They are used to communicate with the Home Location Register (HLR) of the customer in order to provide service on a roaming network. As a minimum, all applicants should either have a HLR located in Ireland, or have access to and control of infrastructure that will provide this function, which is located in Ireland.

Q. 13 Do you agree that ComReg should, for the avoidance of doubt, make clear in the Numbering Conditions that the regulatory obligations attached to the General Authorisation, and the conditions set out in Section 3.1 of the Numbering Conditions, apply to the use by undertakings, for M2M services in the State, of numbers assigned by the ITU, or overseas numbers.

Yes, but it is difficult to understand what effect this inclusion will have in practice. ComReg is unlikely to be able to be able to withdraw, modify or in any way manage numbers that have been allocated in a different country.

Q. 14 Do you agree with ComReg's proposal to allow numbers from the proposed new M2M numbering range to be used for eCall in Ireland? Note that numbers from existing mobile ranges, Global ITU numbers and national numbers from other EU countries may also be used for eCall. Please explain the basis of your response in full and provide any supporting information.

Three agrees that the new M2M numbers (088 or 082) should be available for allocation to be used for eCall. We note that one of the main reasons ComReg has proposed this is to ensure that a CLI is presented when an eCall is made; however this will not be resolved simply by allocating E.164 numbers. It will work in the case where the undertaking to whom the number has been allocated is also the operator

of the network that originates the call. Where this is not the case (i.e. roaming call), it is necessary for the network operator who has provided the SIM to have a roaming agreement with the originating network for the call. This will allow the originating network to contact the HLR of the SIM to obtain the CLI (E.164).

Q. 15 Do you agree with ComReg's analysis of the options for switching M2M service provider and the broad requirement for further study in this area? Please explain the basis of your response in full and provide any information in support of your response or may be relevant to further study.

Three agrees that further work is needed before any conclusion is drawn in relation to switching in the M2M market. From an economic analysis perspective, the nature of the services and different pricing would indicate that that M2M mobile communication is in a different market than P2P mobile communication.

For P2P mobile communication, it was established that the lack of number portability is a barrier to switching, and as a consequence was an inhibitor of competition in that market. This is primarily based on human factors associated with the use of numbers – over time the end user would have built up an established network of contacts that use their number. They may also have printed business cards, made signs, etc. To change the number would instantly lead to loss of contact which is a barrier to switching.

This does not apply in the case of M2M. These numbers are generally used only by a limited number of users, and often in a closed user group. Changing the E.164 numbers is not a barrier to switching service provider for M2M service. Instead, changing IMSI (E.212 number) is a more significant barrier. For a P2P service, changing IMSI is relatively easy – just insert a new SIM card in the terminal. Logistically, this is more difficult and probably more costly for a network of M2M devices. E.164 number portability does not solve this problem. Further, when changing SIM (E.212) it is also possible to change the E.164 with only incremental effort, so the real barrier to service switching is in changing the SIM, not the phone number. Over-the-air programmable SIMs could solve this issue.

There are further difficulties with providing portability for M2M numbers. The existing P2P porting system is efficient and effective, but designed with limited scope. To participate in this porting requires all undertakings that have been allocated numbers to join the porting "Deed of Adherence", contribute towards costs, receive a porting prefix, and establish connectivity with the central porting system. If membership was to be expanded to cater for multiple M2M service providers, this would drive increased complexity and cost into the existing P2P porting system.

The different number length for M2M could also be an issue for the P2P porting system. Note our comments above Q.7 – we believe there would be difficulties for

some networks to use a full 15 digit number in addition to a routing prefix. It is also possible that the existing P2P porting platform might have difficulties in using 15-digit numbers, this is unknown.

Three believes M2M is a service that is distinct from P2P, otherwise there would be no point in having a separate number range. Service portability will not apply between M2M and P2P numbers (or between M2M and Fixed numbers). Any consideration of E.164 porting for M2M needs to be regarded as a distinct process, separate from P2P.

Q. 16 Do you have any observations on any other related issues of relevance to the subject matter of this consultation? Please explain the basis of your response in full and provide any information in support of your response.

Three would ask ComReg to consider whether there is any restriction on an undertaking pairing an Irish E.164 (MSISDN) number with an E.212 (IMSI) number from another country, provided the conditions of use for both sets of numbers are met. This could allow greater flexibility in service provisioning and management.

6: Verizon Ireland

verizon

Verizon Response to ComReg's "Review of Mobile Numbering Promoting Innovation and Facilitating New Services" Consultation

Introduction

1. Verizon Ireland Ltd. ("Verizon Ireland") welcomes the opportunity to respond to ComReg's "Review of Mobile Numbering Promoting Innovation and Facilitating New Services" consultation, reference 18/103 (the "Consultation")[1].

2. Verizon is the global IT solutions partner to business and government. As part of Verizon Communications – a company with nearly $131 billion in annual revenue – Verizon serves 98 per cent of the Fortune 500. Verizon caters to large and medium businesses and government agencies and is connecting systems, machines, ideas and people around the world for altogether better outcomes.

3. Please note the views expressed in this response are specific to the Irish market environment and regulatory regime and should not be taken as expressing Verizon's views in other jurisdictions where the regulatory and market environments could differ from that in Ireland.

About Verizon

4. Verizon is the global IT solutions partner to business and government. As part of Verizon Communications – a company with over $120 billion in annual revenue – we serve 98 per cent of the Fortune 500. Verizon caters to large and medium businesses and government agencies and is connecting systems, machines, ideas and people around the world for altogether better outcomes.

5. Verizon is a global player. Outside of the US, Verizon provides a broad spectrum of global communication products and enterprise solutions, predominantly to large business and government customers. Being active across the EU, we generally welcome any initiative that aims to bring further harmonization and legal certainty, and reduce administrative burden at EU and national levels.

6. Local Verizon subsidiaries are established locally in most European Union ("EU") Member States, and provide services in over 150 countries worldwide. Operating in

[1] https://www.comreg.ie/publication-download/review-mobile-numbering-promoting-innovation-facilitating-new-services

almost all of the 28 EU Member States Verizon is very well aware of how Regulatory measures are applied (differently) across the EU. With regards to "Machine-to-Machine Communication" (M2M) and "Internet of Things services" (IoT) which are increasingly pan-European or even global in nature, we see a strong demand for a single pan-European or as far as possible a global market driven approach for M2M and IoT.

General comments

7. M2M and IoT represent the next leap forward in the evolution of Internet-based services by connecting machines, devices, and industries to improve delivery of services and process management to increase efficiencies, often without human interaction.

8. M2M and IoT solutions are still emerging and in early stages of development. M2M and IoT are nonetheless already radically changing consumer interaction with utilities, healthcare, local government services and retail, to name just a few of the sectors M2M and IoT touch today. It will also enable businesses to provide consumers with products and services that deliver personal, context-aware experiences, an advancement that will have a profound impact on how organizations do business and relate to their customers.

9. M2M and IoT are about new business models and applications of largely existing technology, rather than a technological revolution. It is therefore important to recognize that a sound policy framework is already in place to deal with most of the policy issues relating to M2M and IoT (e.g. numbering, roaming, security, privacy, etc.). Whilst some elements may call for some fine-tuning of existing policies, there is no need to re-invent policy specifically for most of the M2M and IoT issues.

10. The use case for many M2M and IoT devices is global, as sensors often transmit data that crosses borders, is analyzed and re-transmitted, and is managed through global systems and the cloud. For example, a wireless M2M device could be manufactured in Country A, provisioned with a SIM card and shipped from country B, and purchased by a consumer in Country C, who then takes the device to Country D for a permanent or extended period. Given these global use cases, citizens of every country should benefit from M2M and IoT services. As a consequence national regulators in the EU should not further restrict extraterritorial use of foreign or national numbers before a consensus has been reached at EU level.

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Answers to ComReg's questions

Question 1: Do you agree with ComReg's assessment of demand for numbers for Interpersonal Mobile Communication (P2P) services?

Verizon Ireland sees an increasing demand for mobile numbering resources in general driven by a variety of services provided to end-customers both interpersonal and M2M and IoT. Given the innovative and evolving nature of M2M and IoT services, ComReg as well as other EU governments and inter-governmental organizations should create a space that (1) does not introduce new technology-specific regulations unless they are demonstrably necessary, (2) relies to the maximum extent possible on generally-applicable requirements in areas such as privacy and security, and (3) refrains from extending to M2M and IoT existing sectoral regulations like those used for telecommunications services.

Of particular concern is the sweeping interest at the International Telecommunication Union (ITU) in the development of standards and recommended regulations for M2M and IoT services. The ITU has established a group to lead on these issues—Study Group 20—and is bringing M2M and IoT issues into the existing group on charging and tariffs. In these groups, the ITU is treating M2M and IoT services as traditional "telecommunications service" over which the ITU would have jurisdiction. This approach sets the stage for the ITU to promulgate model regulations for roaming, security, privacy, and pricing for M2M and IoT services. Many countries transpose such ITU recommendations into their own national laws. Such efforts to impose outdated regulatory classifications would impede the development of the IoT. We urge all EU governments to engage intensively in the relevant ITU Study Group 20 on M2M and IoT, as well as in similar debates on EU level.

Question 2: Do you agree with ComReg's proposals to use 082 and 084 for future P2P mobile services and not to use 080 and 081 for mobile services?

Verizon Ireland agrees that the demand for mobile numbering resources will be driven by the increasing demand for mobile communications services. But, as described below we don't see a demand for numbering resources in Ireland that shall exclusively support only P2P or only M2M services.

Question 3: Do you agree with ComReg's proposal to expand eligibility for E.164 mobile numbers and E.212 MNCs to OTT Service Providers that qualify as an ECS, provided they can justify the requirement and have a contract with an Irish MNO to access their network?

Besides traditional portability of resources like E.164 numbers, Irish numbering resources like Mobile Network Codes (MNCs) and International Mobile Subscriber

Identities (IMSIs) which are an important element of network security should only be available to entities registered as providers of electronic communications services. Rather than extending the eligibility for MNCs and IMSIs at this early stage of the market development, national regulatory bodies as well as the European Commission (EC) should consider lowering barriers to market entry and reducing administrative burden for providers of Electronic Communications Services.

Question 4: Do you agree with ComReg's position that new Irish E.164 numbers for non-interpersonal services and Irish E.212 MNCs should be made available to be used on an extraterritorial basis for international M2M services?

While we currently do not see an urgent need for E.164 number ranges exclusively for non-interpersonal services in Ireland, we welcome a clarification about extraterritorial availability of national number ranges. But beyond new Irish E.164 numbers for non-interpersonal services and Irish E.212 MNCs, ComReg should clarify that all numbers should be allowed to be used abroad and foreign numbers should be allowed to be used in Ireland without any restrictions.

Question 5: Do you agree with ComReg's proposal that National M2M services should also use the proposed new number range introduced for M2M?

A recent BEREC report finds that the expected growth of M2M and IoT devices will in general not exhaust numbering resources. Both extraterritorial and international global numbers[2] are being used to deploy connected services.

We believe that at this stage, countries and other international actors should refrain from mandating that M2M or IoT services should use specific identifiers. Instead, providers should continue to have maximum flexibility in deciding what identifiers they will rely upon because different IoT services or M2M users may have different requirements. Any effort to mandate M2M specific identifiers will result in fragmented markets and barriers to entry, especially if the mandated identifiers are inconsistent between countries.

Question 6: Do you agree with ComReg's forecasts for National and extraterritorial M2M connections?

See response to Question 1

[2] As assigned by the ITU. See http://www.itu.int/net/ITU-T/inrdb/e212_901.aspx

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Question 7: Beyond notification to ITU, what other processes could be followed to expedite the opening up of numbers internationally. Based on your experiences to date, what timescales might apply?

No response

Question 8: How quickly do you consider the required international routing could be in place for any new numbers? What notifications, testing mechanisms or other measures could be used to quickly ascertain and progress the status of routing of international traffic for Ireland?

No response

Question 9: Is 12 months a reasonable timeline for implementing the new M2M number range on national and international networks? If not, please provide an alternative timeline.

No response

Question 10: Do you agree with the proposed definitions and RoU conditions for the proposed 088 M2M range?

See response to Question 1

Question 11: Do you agree with the eligibility criteria that E.164 M2M numbers can be assigned to MNOs, MVNOs and only to M2M Service Providers that can both justify the requirement and can manage the resources?

See response to Question 3

Question 12: Do you agree with the eligibility criteria that E.212 MNC can be assigned to M2M Service Providers?

See response to Question 11

Question 13: Do you agree that ComReg should, for the avoidance of doubt, make clear in the Numbering Conditions that the regulatory obligations attached to the General Authorisation, and the conditions set out in Section 3.1 of the Numbering Conditions, apply to the use by undertakings, for M2M services in the State, of numbers assigned by the ITU, or overseas numbers?

See response to Question 5

Question 14: Do you agree with ComReg's proposal to allow numbers from the proposed new M2M numbering range to be used for eCall in Ireland? Note that numbers from existing mobile ranges, Global ITU numbers and national numbers from other EU countries may also be used for eCall.

See response to Question 5

Question 15: Do you agree with ComReg's analysis of the options for switching M2M service provider and the broad requirement for further study in this area?

See response to Question 5

Question 16: Do you have any observations on any other related issues of relevance to the subject matter of this consultation?

No response

Verizon Ireland
7 March 2018

7: Vodafone

Vodafone response to ComReg 18/03

Review of Mobile Numbering

Promoting Innovation and Facilitating New Services

Vodafone welcomes the publication of this consultation on Mobile Numbering and the opportunity to respond. We have significant experience of working with carriers to open up supranational numbering resources around the globe and are happy to share experiences with Comreg on this topic as the market develops

Consultation Questions

Q. 1 Do you agree with ComReg's assessment of demand for numbers for Interpersonal Mobile Communication (P2P) services? Please explain the basis of your response in full and provide any supporting information.

We agree that demand for numbers for Interpersonal Mobile Communications is not likely exceed the capacity created by ComReg's current proposals.

There are a number of reasons for this:

- Percentage penetration for P2P services is not likely to significantly exceed current levels – and so any future demand increase should approximately follow population increase levels.
- Countering this increase, improvements in SIM technology and improvements in efficiency of the porting process and number management, will enable improved number management efficiency.
- Recent discussions at the Mobile Number Porting Forum have indicated that industry now have a feasible technical solution to allow number repatriation to be operated effectively. This will allow for a significant quantity of numbers to be returned to the pool of available numbers on an ongoing basis.
- Work done by the Fixed Number Forum has identified that more efficient ways of operating may also contribute to future efficiency - this work could be replicated in the Mobile industry group.

Q. 2 Do you agree with ComReg's proposals to use 082 and 084 for future P2P mobile services and not to use 080 and 081 for mobile services? Please explain the basis of your response in full and provide any supporting information.

Yes, we agree, these are reasonable proposals. In order to avoid consumer confusion, it is best to avoid use of 080 and 081 for mobile services at this stage, but further consideration could be given to use of 081 in the future if demand requires further numbers.

Q. 3 Do you agree with ComReg's proposal to expand eligibility for E.164 mobile numbers and E.212 MNCs to OTT Service Providers that qualify as an ECS, provided they can justify the requirement and have a contract with an Irish MNO to access their network? Please explain the basis of your response in full and provide any supporting information.

This may require further study to examine the implications.

We are aware that in some other EU countries the eligibility for IMSI (E.212) is restricted to MNO, MVNO, and MVNE. MS-ISDN (E.164) can be allocated to OTT service providers provided a specific set of preconditions are met.

Q. 4 Do you agree with ComReg's position that new Irish E.164 numbers for non-interpersonal services and Irish E.212 MNCs should be made available to be used on an extraterritorial basis for international M2M services? Please explain the basis of your response in full and provide any supporting information.

We have no objection to this process. With any additional allocation of number to new groups any requirements for number porting should be clear to all parties.

It is difficult to scale what quantity of numbers these new service providers may require. Consideration should be given on an ongoing basis to ensure that services to Irish customers are not compromised by possible requests for very large number sets by new services using numbers exterritorialy.

Q. 5 Do you agree with ComReg's proposal that National M2M services should also use the proposed new number range introduced for M2M? Please explain the basis of your response in full and provide any supporting information.

We agree with this proposal – the number of future required numbers may be large and is best catered for in the proposed dedicated range.

Q. 6 Do you agree with ComReg's forecasts for National and extraterritorial M2M connections? Please explain the basis of your response in full and provide any supporting information.

This is a reasonable estimate. There is considerable uncertainty both in the demand, and in the number set, that various users and applications will use.

This estimates are likely to cater for the foreseen demand.

Q. 7 Beyond notification to ITU, what other processes could be followed to expedite the opening up of numbers internationally. Based on your experiences to date, what timescales might apply? Please highlight any actions that ComReg can take to assist with any additional processes identified. Please explain the basis of your responses in full and provide any supporting information.

- Vodafone has significant experience of working with carriers to open up supranational numbering resources around the globe.
- Vodafone has found that official documentation from ITU-T and clear submissions in the bulletins help in communicating the opening of these new supranational ranges and are useful to present to operators around the globe to help accelerate the opening of these ranges.
- It is important that carriers do not delay in opening up ranges as this can have a detrimental impact on IoT customers. In the past, our experience is that certain carriers have refused to open up these numbers on the basis that they have been identified with fraud, and this has taken months to resolve.
- It is also important that carriers do not refuse to open up ranges in that country to try and further their own domestic interests. Certain carriers are in fact still refusing to open up our ITU supranational ranges on their networks.

- Comreg, in conjunction with BEREC and other international bodies such as the ITU, should issue clear requirements that carriers are obliged to open up international and supranational numbers on their networks
- Vodafone has also found that the legacy association of these number ranges to premium services such as maritime and satellite have hindered the opening of the ranges, both commercially and strategically and steps should be taken within both ITU and ComReg to communicate that these ranges are now multiuse and should not be deemed only associated to premium services.
- In some markets, operators (either driven by national position or internal decisions) have limited the number of digits that they can process on the various systems (e.g. billing). Vodafone has found that the association of partial IMSI and/or >12 digit MSISDNs have caused delays on several operators in the IREG testing and subsequent opening of the ranges.
- Vodafone has seen that the timescales for opening these numbers internationally varies greatly, depending on local processes, legacy knowledge and/or competitive strategy. In Europe, for example, with the right levers and support from ITU and others, 75% could be opening in 12-18 months

Q. 8 How quickly do you consider the required international routing could be in place for any new numbers? What notifications, testing mechanisms or other measures could be used to quickly ascertain and progress the status of routing of international traffic for Ireland? Please explain the basis of your responses in full and provide any supporting information

- In the GSMA there is the process that any changes to numbering ranges is communicated to the parties through the operator's International Roaming Database (IR.21). Depending on the numbering range, it could be that some testing is required and sim cards exchanged. The suggested time frame is that changes should be communicated three months before implementation.
- Depending on the routing path (e.g. GRX) and/or roaming services (e.g. CAMEL), the operator may need to conduct additional IR.xx tests

Q. 10 Do you agree with the proposed definitions and RoU conditions for the proposed 088 M2M range? Please explain the basis of your responses in full and provide any supporting information.

- Overall, we agree with ComReg's assessment which is a very helpful contribution to further the discussion about the needs of customers with IoT requirements in multiple countries, and the important role that numbering has to play in that respect.
- We also support ComReg's reference in the M2M definition to services with "limited or no human intervention". As the M2M market evolves, there will be new services that are ostensibly M2M services albeit with limited human intervention. Examples of such products are the consumer IoT products recently launched by Vodafone, which use supranational resources assigned by the ITU. These products should be captured by the M2M definition.
- We also agree with ICC's recommendation to Comreg that any M2M service which includes emergency calling as part of the service should have limited voice capabilities. We recommend that the M2M definition be expanded to recognize this, in the following way:
  - ""M2M service "means a service consisting of the exchange of information between machines, through a mobile or fixed network, with limited or no human intervention. This includes emergency calling with limited voice capabilities".
- We do however have a significant concern with one aspect of the definition of M2M, in that it refers explicitly to the exchange of information between machines "through a mobile or fixed network". This is not consistent with technological neutrality. The IoT market is much broader than just fixed and mobile with many devices connect through other technologies, for examples in unlicensed spectrum or via satellite. We recommend that the explicitly reference to "through a mobile or fixed network" be removed from the definition of M2M.

Q. 13 Do you agree that ComReg should, for the avoidance of doubt, make clear in the Numbering Conditions that the regulatory obligations attached to the General Authorisation, and the conditions set out in Section 3.1 of the Numbering Conditions, apply to the use by undertakings, for M2M services in the State, of numbers assigned by the ITU, or overseas numbers?

- We agree with ComReg's proposed Condition as set out in paragraph 228 of the Consultation. It is helpful that Comreg recognises that more than one type of numbering resource can be used to supply M2M services and there should be equivalent regulatory treatment of each.

Q 14 Do you agree with ComReg's proposal to allow numbers from the proposed new M2M numbering range to be used for eCall in Ireland? Note that numbers from existing mobile ranges, Global ITU numbers and national numbers from other EU countries may also be used for eCall. Please explain the basis of your response in full and provide any supporting information.

- We agree with ComReg's proposal. Specifically, we support ComReg's view to make it clear that supranational numbering resources assigned by the ITU can be used for eCall in Ireland.
- This is consistent with Vodafone's current eCall numbering strategy and also the recent CEPT recommendation which states that that CEPT administrations, when considering E.164 and/or E.212 numbering resources for eCall, should:

  > "permit the use of global numbering resources (assigned by ITU TSB) or national numbering resources from another country (extra-territorial use or roaming) within the national territory for addressing eCall devices".

Q. 15 Do you agree with ComReg's analysis of the options for switching M2M service provider and the broad requirement for further study in this area? Please explain the basis of your response in full and provide any information in support of your response or may be relevant to further study.

- Paragraph 204 of the Comreg decision states that "Comreg nevertheless understands that a key concern of such (large) M2M users is being locked in to a single Service Provider. ComReg notes however that such users have the right to switch SP on request".
- We note that no reference is made to the 'large M2M users' who have articulated these concerns to Comreg. The reference to this legal right is shown in footnote 63 as Regulation 25 of the Universal Service Regulations and further highlighted in paragraph 267. This is one of the key reasons given to increase the flexibility in the assignment criteria for M2M resources and ComReg's view that M2M switching "must be provided for".
- It is not clear to us that, as ComReg state, Regulation 25 of the Universal Service Regulations confers a legal right on customers to be able to switch service provider. Consistent with the provisions of the Universal Service Directive, this regulation does of course give subscribers the right to port numbers, but that is clearly a distinct requirement. It does not mandate a switching right per-se for users of P2P mobile communication services, let alone a switching right that should be applied to M2M customers.

- This can be further evidence by the text of the Universal Service Directive, as follows:
    - 'In order to take full advantage of the competitive environment, consumers should be able to make informed choices and to change providers when it is in their interests" (emphasis added)
    - "This does not preclude the imposition of reasonable minimum contractual periods in consumer contracts."
    - "Number portability is a key facilitator of consumer choice and effective competition in competitive markets for electronic communications" [1]
- We think this is an important distinction to note, as the rationale for the number portability right is that it is the number itself that is an important element of ensuring choice and competition in the provision of mobile communication services. There is no such comparable significance associated with the number for M2M services, as Comreg itself recognises in section 6 of its consultation. This has also been recognised by BEREC.[2]
- In Section 6, Comreg further sets out that "the overarching rationale for (service provider portability) is that the ability to switch Service Providers underpins the concept of competition and of consumer choice and applies equally to the M2M context as it does to traditional telecommunications". However, we would argue that the M2M market exhibits a number of important differences to P2P mobile communications services, as follows:
    - IoT markets are highly fragmented - IoT applications and services are very diverse making it difficult to perceive of an all-encompassing category that would adequately reflect vertical and horizontal competitive dynamics across multiple sectors and industries. There a wide range of possible service application and ranges of product use from cars to thermostats and health monitors.
    - Markets for IoT products are immature or fast evolving - In most areas IoT products and services are in the early stages of development. This means that predicting market behaviour will be very difficult. A lack of robust data on market dynamics will inevitably leave a large margin of error when assessing the impact of regulatory intervention on future competitive potential of IoT products and services. The market can clearly be described as vibrant driving innovation and competition. In this environment and similar to markets in early stages, the fast evolution of IoT uses in these sectors makes it difficult to

[1] Recital 47 to the 2009 Amending Universal Service Directive p
[2] BEREC report on enabling the Internet of Things, February 2016

perceive future barriers to competition based on present characteristics of the market and number of possible growth paths.

- IoT is more than just connectivity - Another feature of IoT is that service providers will be offering a number of value added services (e.g. advanced analytics capabilities) to the end-user, which often derive value from the additional functionality of that service provider's IoT platform. Connectivity is thus only one of many elements that that require consideration in the context of interoperability and switching. Limiting the scope of assessment at this early stage may thus lead to a piecemeal approach risking the creation of artificial regulatory barriers to IoT connectivity solutions today.

- So there is clearly no "one size fits all" approach when it comes to IoT switching. We do agree with Comreg that OTA switching is the basis that switching should take place, when it has been requested by the customer, and this is a capability that we provide when requested to do so.
- Ultimately, we do also agree with ComReg's conclusion not to propose specific national regulatory requirements for M2M switching. We will be happy to share experiences with Comreg on this topic as the market develops.