Commission for
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Numbering for Machine-to-Machine Communications

Consultation

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Content

Section Page

Annex

Section Page

Table of Figures

Figure Page

1 Introduction

1 Machine to Machine (M2M) refers to technologies that allow both wireless and wired systems to communicate with other devices of similar ability. M2M communication is growing rapidly, driven in no small part by the expansion of next generation telecommunications technology and a decline in the cost of the embedded wireless modules and sensors that enable M2M services. This continued improvement in the infrastructural environment around M2M has led to a rapid growth of applications and services that meet users' business and lifestyle needs. M2M communications are already deployed in Ireland. These deployments are based on existing numbering/addressing resources whose use for this purpose could not have been seen. It seems prudent, if not essential that a more targeted long term numbering resource designed specifically for M2M purposes should be made available to satisfy the demand for numbers arising from the emerging M2M services.

2 Section 2 of this document gives background on M2M outlining progress to date and its predicted benefits and deployments in the future,

3 Section 3 of this document discusses key issues regarding M2M numbering and addressing, where ComReg presents its proposals. ComReg does not consider that the proposals within this document give rise to the need for a Regulatory Impact Assessment ('RIA') as described in Section 4, and ComReg presents the Next Steps in Section 5.ComReg's statutory functions, as set out in the Communications Regulation Act 2002, as amended, are detailed in Annex: 1. Those statutory obligations and functions provide the legislative framework under which ComReg operates and are therefore of fundamental importance to ComReg's decision making process, to its Consultations, to its Responses to Consultations and to its Decisions.

4 Annex 2 provides relevant information from other European countries with regards to decisions made in respect of M2M and numbering matters.

5 Annex 3 outlines ComReg's proposed changes to the Numbering Conventions based on proposals presented in this document, that have been built on discussions/correspondence held within ComReg's Numbering Advisory Panel, and on responses to an exploratory questionnaire as presented in Annex 4.

2 Background

6 The basic building block of the Internet of Things is machine-to-machine communication (M2M), in which devices communicate directly with one another with minimal or no human intervention. Different networking technologies can be used to connect M2M devices, depending on the amount of mobility needed, quality required, data rate, Duty Cycle and the degree of dispersion of devices over an area[1]. Mobile wireless is a technology suited for many applications, whilst fixed-line communications are also suited in cases where mobility is not essential and where physical access between devices is not a problem.

7 Applications deployed using M2M have so far been relatively specialised in nature, though this may change as the market and services evolve, with parties considering M2M as a potential source of new revenue and/or as a means of creating efficiencies and cost savings. For example, it has been reported that a main driver of M2M adoption in Europe will be the automotive industry. From 2015 all newly registered motor vehicles will need to be equipped with an eCall emergency call system and car manufacturers are expected to integrate embedded SIMs in order to meet these requirements[2].

8 The importance of the M2M debate figures prominently in the views of many market futurists, for example;

- The GSMA forecasts a connected universe of up to 50 billion connected devices by 2020[3], and GSMA reiterated the important role M2M will play in the future of communications at its annual GSMA Mobile World Congress[4],
- Analysys Mason[5] predicts that the global market for M2M device connections will grow from 62 million devices in 2010 to 2.1 billion devices in 2020[6]. With an estimated year-on-year growth rate of 36% - 52%, M2M seeks to be one of the fastest-growing connectivity sectors in the next decade, and

[1] http://oecdinsights.org/2012/01/31/the-internet-of-things/
[2] 2013 M2M predictions from Jürgen Hase, VP of M2M Competence Center at Deutsche Telekom and Chairman of the M2M Alliance - See http://www.fiercewireless.com/europe/press-releases/2013-m2m-predictions-j-rgen-hase-vp-m2m-competence-center-deutsche-telekom#ixzz2F1DzKTGV
[3] GSMA article published 3 October 2012, http://www.gsma.com/mobilefordevelopment/the-other-m2m-opportunity-enhanced-utility-access-in-emerging-markets
[4] http://www.gsma.com/newsroom/gsma-the-rise-of-connected-devices-will-drive-mobile-operator-data-revenues-past-voice-revenues-globally-by-2018#.UTnALM1bduI.email
[5] http://www.analysysmason.com/Research/Content/Reports/RRE02_M2M_devices_forecast/
[6] GSM World Website: “GSMA Outlines Potential for Embedded Mobile: Enabling a World of Connected Devices”; February 15, 2010. Http://www.gsmworld.com/newsroom/press-releases/2010/4635.htm

- GE estimates[7] that the "Industrial Internet" has the potential to add $10-15 trillion (€7.7-11.5 trillion) to global GDP by 2030 and reduce billions of dollars of waste across major industries such as healthcare, energy and transportation. While this recent report is primarily focused on the impacts on heavy industries (aviation, energy etc.) it does also cover a range of other sectors[8].

9 The following graphics, Figure 1 and Figure 2 from Informa Communications[3], show what a typical M2M application consists of and how the roles in a typical application may be broken down.

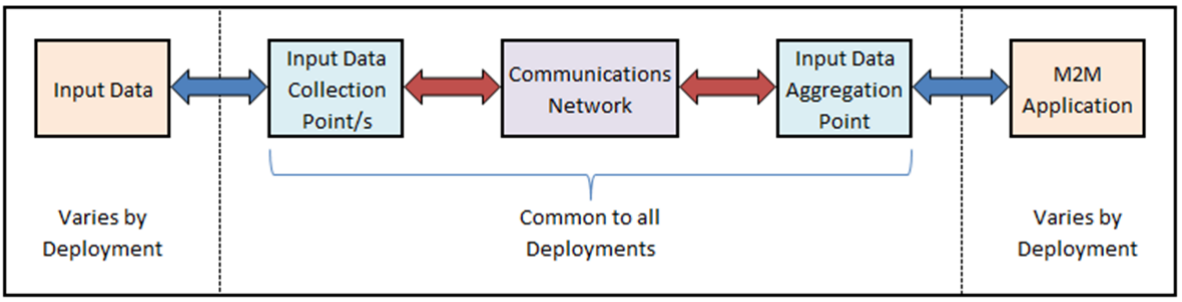

Figure 1: M2M generic application process

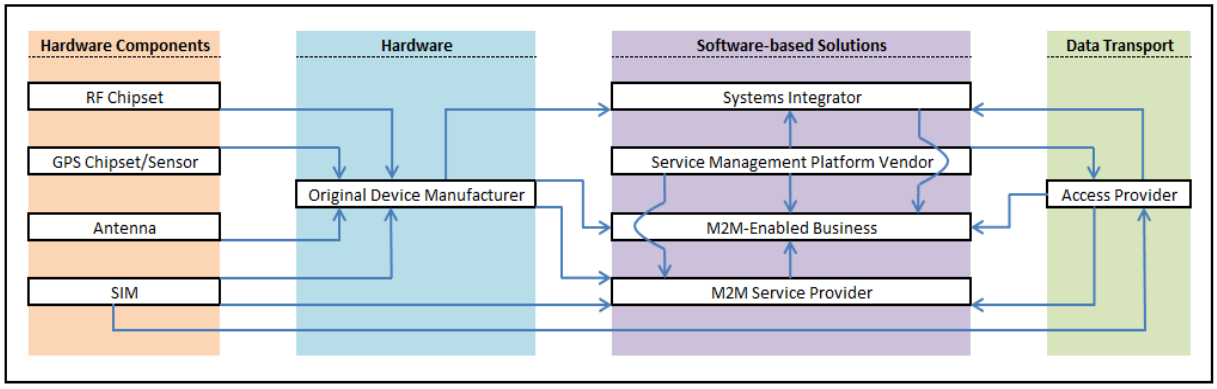

Figure 2: M2M Value chain – interplay of roles

10 The hardware devices that provide the input signals to an M2M application and the output alerts or actuation, will typically take the form of sensors, actuators of some sort and/or visual presentations of monitored material. The latter could for instance be provided by building security cameras or personal alarm systems for elderly or incapacitated people.

[7] GE report, published 26 November 2012, http://files.gereports.com/wp-content/uploads/2012/11/ge-industrial-internet-vision-paper.pdf
[8] Techcentral article published 27 November 2012, http://www.techcentral.ie/20386/industrial-internet-to-add-trillions-to-global-gdp-by-2030#ixzz2FJBPYbS0

11 Machina Research has provided market forecasts for Ireland for M2M connections from 2010 to 2020, as shown in Figure 1[9], which predicts that there will be 25 million M2M connections in Ireland by 2020.

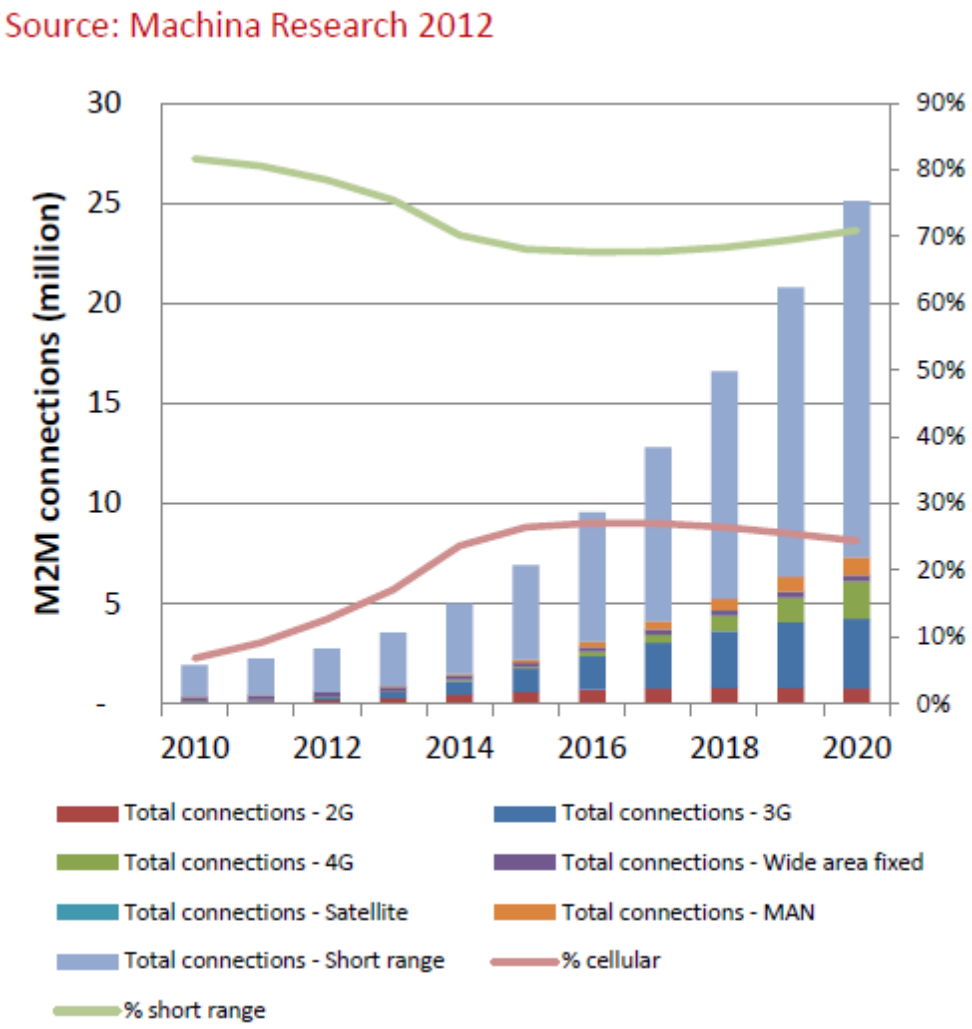

Figure 3: Global M2M Connections, from 2010 to 2020.

[9] Extracted from a slide pack of a presentation by Machina to ComReg, August 2012.

12 As shown in Figure 1, analysts predict that in the medium-to-long term, about one third of M2M applications will run on mobile networks. The balance will be on fixed networks or Short Range Devices, or possibly make use of some other form of wide area wireless network solution. Some service providers and manufacturers propose the setting aside of dedicated radio spectrum for this purpose, whilst others such as Neul in the UK propose the use of UHF white space spectrum for M2M. ComReg's policy is to address spectrum-related issues in line with the work programme it sets out in its Spectrum Management Strategy. The current Strategy (Document 11/89[10]) covers the period 2011 - 2013. It is intended that the next Spectrum Management Strategy will consider spectrum management issues related to M2M. Interested parties will be welcome to make submissions at that time to assist ComReg in determining the spectrum related priorities for the near and medium future.

13 Ireland's current SRD framework is also of interest given that it allows for operation, on a licence-exempt basis, many different types of short-range applications across a wide variety of frequency bands. This for example includes M2M applications such as Road Transport and Traffic Telematics (RTTT), RFIDs, tracking, tracing and data acquisition and Active Medical Implants (AMI). Different power limits and operational requirements apply, depending on the frequency band of operation. These operational requirements are detailed in ComReg's SRD document 02/71R6[11].

14 Smart metering is an example of an M2M application gaining much attention currently. Smart meters are electronic devices capable of measuring energy consumption and providing real time information to the customer on usage and costs. In Ireland a National Smart Metering Programme (NSMP) is already underway, championed by the Commission for Energy Regulation (CER). The NSMP is currently in its second phase, with the CER having recently published an Information Paper and a number of reports[12] on the programme's status and plans.

15 Smart metering technologies have taken advantage of spectrum available within the main unlicensed radio bands, including 2.4GHz, 868MHz, 434MHz and 169MHz.Use of spectrum in these bands is subject to application for a test or trial licence[13] and approval from ComReg.

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[11] Document published 19 December 2011, see http://www.comreg.ie/_fileupload/publications/ComReg0271R6.pdf

[12] GE report, published 26 November 2012, http://files.gereports.com/wp-content/uploads/2012/11/ge-industrial-internet-vision-paper.pdf

[13] For information on Test and Trial Ireland see www.testandtrial.ie

3 Numbering and Addressing

16 M2M communications solutions are already in operation in Ireland utilising existing national numbering ranges and addressing resources, a situation that has been sufficient heretofore. Continuing use of these existing numbering resources for the potentially very many M2M applications that may emerge in the coming years could put an undue strain on the existing supply of numbers, whilst reducing capacity for other more established communications services. ComReg considers it timely to investigate the possibility of a more targeted long term numbering resource for the exclusive use of M2M applications and services. This section considers specific numbering solutions for M2M applications.

3.1 E.164 telephone numbering for M2M

17 M2M applications require networks capable of long range connectivity including coverage across national borders, ubiquitous coverage and flexible scalability. Internet Protocol version 6 (IPv6) addressing has potential as a long term solution for addressing M2M devices but E.164 numbering[14] appears to be preferred by operators and M2M service providers in the short to medium term, as it leverages the existing capabilities (billing, routing, authentication etc.) of fixed and mobile networks.

18 While E.164 numbering can offer relatively simple implementation within current network infrastructures, the potential number of M2M devices to be accommodated is huge and this implies a need for very large number blocks to address M2M devices. In many European countries, including Ireland, there is a real risk that existing numbering ranges will be unable to provide sufficient numbering capacity for M2M applications while also meeting traditional numbering demands. Rapid exhaustion of E.164 number ranges could therefore occur and it is appropriate for ComReg to address this issue in an expedited manner. Other European countries have already created specific number ranges with large capacity for exclusive use by M2M[15].

19 The issue of numbering and addressing for M2M devices has been discussed and deliberated upon at various international fora including WG NaN[16].

20 In 2010, the ECC published a report[17] in which it considered a number of options to address the M2M challenge. This report drew the following conclusions:

[14] The international public telecommunication numbering plan, http://www.itu.int/rec/T-REC-E.164/en
[15] See Annex 2
[16] The Electronic Communications Committee (ECC) Working Group on Numbering and Networks
[17] ECC Report 153 available at http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP153.PDF

- The expected annual growth rate of required M2M numbers over the period 2010 to 2020 is approximately 20%;
- In the longer term, IPv6 addressing will become important as an alternative numbering resource for M2M applications. However, there is great uncertainty about how long this will take and therefore M2M numbering policy should be flexible enough to act as a longer term solution;
- A significant number of CEPT countries have insufficient capacity within their existing numbering plans to accommodate numbering requirements for M2M applications; and
- A complete harmonised approach on possible M2M numbering solutions is not needed in Europe.

21 The report also presented four numbering options for M2M applications:

(1) Use existing mobile number ranges;
(2) Use a new number range;
(3) Use an international numbering solution; or
(4) Use network internal numbers.

22 In the short to medium term, the use of all options can be envisaged. In cases where there is a need to distinguish M2M services from traditional mobile services, Option (1) has to be excluded. Options (2) and (4) are needed if the growth of M2M is larger than expected or if adequate capacity does not exist. Option (3) would require a co-ordinated international approach led by the ITU.

23 In May 2011, the ECC made a recommendation (ECC Recommendation (11)03[18]), which set out (amongst other things) that;

- National Regulatory Authorities (NRAs) should establish numbering solutions for M2M applications as part of the national numbering plans;
- A long term solution is IPv6 or numbers/addresses other than E.164 numbers should preferably used for M2M applications;
- NRAs should consider opening up new number ranges for M2M applications;
- Number length should be as long as possible (maximum of 15 digits for E.164 numbers); and.
- the NRA should ensure that the new number range(s) are not used as an alternative to existing number ranges to escape regulatory requirements

[18] ECC Recommendation (11)03 - Numbering and Addressing for Machine -to Machine (M2M) Communications, published 5 May 2011.

3.2 National consideration of M2M numbering

24 In early 2012 ComReg circulated a questionnaire to its Numbering Advisory Panel[19] to ascertain the panel's views on the M2M numbering challenge. The questionnaire was tightly scoped, being focused solely on the numbering aspects and on inter-operator/cross-border issues, such as routing and billing. Responses to the questionnaire are summarised in Annex: 4 and discussed below.

25 NAP members generally believe that existing mobile, geographic and non-geographic numbers should not be used for M2M applications. Reasons for this include:

- A risk of exhausting the existing ranges;
- In the case of non-geographic and existing PRS numbers, limitations on access from overseas; and
- Inter-operator billing difficulties and a risk of incurring unnecessary expense.

26 In the main, NAP members accept that a need could arise for alternate M2M services and business models in practice, though there was some reluctance to the use of the existing 15XX Premium Rate Service (PRS) ranges. Given that it is not possible to predict business models or interconnection regimes which may be implemented in the future in M2M with premium rate (e.g. one time transaction based services as opposed to subscription type M2M services) transactions. This led to a universal preference from NAP for the designation of a new M2M range or ranges, rather than rely on existing voice-oriented ranges.

27 Most respondents also preferred nomadic ranges for M2M purposes.

28 It was unclear from questionnaire responses whether a single range or multiple ranges was preferred. ComReg is conscious that there may be numerous benefits in initially designating different sub-ranges for different services. This could be beneficial for users of M2M from a routing and billing perspective, whilst also being administratively simpler for ComReg to manage the different sub-ranges.

29 For instance, if 077 is the overall M2M range then;

- 077-1 could be designated for fixed-line services;
- 077-7 for mobile services; and

[19] The NAP is a specialist committee that provides guidance to ComReg on key issues concerning numbering policy and number management.

- 077-9Y for alternative M2M services (where ‘Y’ indicates the specific sub-range).

To avoid risk of exhaustion, 077-2 could then be reserved for expansion of fixed-line services and 077-8 for expansion of mobile services.

30 NAP members diverged on the number of digits to be used for M2M numbers, with some preferring use of the maximum number length that would not result in cross-border difficulties and others preferring to maintain the current number lengths in use in Ireland.

31 There was consensus that regulatory obligations concerning access to emergency services and number/service portability need to be addressed.

32 While most NAP members felt that there is no absolute urgency to address M2M numbering at this moment, it was also recognised that any procrastination could lead to longer term problems. The prevailing risk remains that in absence of targeted action now any proliferation of M2M services on existing voice numbers could deplete that numbering resource, subsequently resulting in very costly disruption and a difficult and costly task of migrating large numbers of developed M2M services onto a new range.

3.3 ComReg’s View

33 ComReg proposes to address the issue of a new M2M numbering range sooner rather than later, given the risks described above and ECC recommendations on same. In that respect it is ComReg's view that action should be taken immediately to mitigate the risk that any sudden snow-balling demand for numbers from the M2M sector could drive future number changes that might adversely impact ordinary consumers or M2M services, or both.

Q. 1 Do you agree with ComReg that a new number range for M2M should be introduced as soon as possible? Please set out the reasons for your answer.

34 There has been broad discussion on whether or not separate ranges are required for different types of M2M applications. It is ComReg's preliminary view that a single M2M range will provide sufficient capacity for future M2M applications. ComReg cannot predict future business models or interconnection regimes, therefore considers it prudent to initially breakdown such a dedicated M2M range into a limited set of sub-ranges (e.g. 077-1+ and 077-2+ for mobile initially and 077-8+ and 077-7+ for fixed applications); the use of 077-9+ as an option for premium M2M numbers could also be considered (subject to discussions below). This could provide efficiencies with respect to routing and billing for users. ComReg could review practicalities and usage patterns on a periodic basis, and these sub-range distinctions could be allowed to lapse in time, if found to be unnecessary.

Q. 2 Do you agree with ComReg's preliminary view that an overall single M2M range will adequately meet the needs of all M2M providers whether fixed or mobile, and with the use of lead digits to distinguish between fixed and mobile (at least until review)? Please set out the reasons for your answer.

35 With regard to number length, ComReg considers that the new number range should be as long as is reasonable. This would avoid the need for future expansion of the range to meet a later scarcity of capacity. According to ITU-T recommendation E.164, the maximum permissible number length is 15 digits, which would include the '353' country code for Ireland. As these numbers are destined to be embedded in M2M firmware or software the number of digits should not pose any practical problems. If a 2-digit access code, for ComReg's preferred range of +353-77, is used (or 077 if dialled internally in Ireland), then 10-digit subscriber numbers are possible for M2M purposes.

36 A 10-digit subscriber number[20] (i.e. maximum length, allowing for our 3-digit country code) would provide 10 billion numbers for M2M use. This is two digits longer than the longest existing subscriber number range in Ireland at present (i.e. the mobile number range used to access voicemail services[21]). As highlighted in Annex 2, other EU countries that have already designated number ranges for M2M have generally adopted a 10 or 11 digit format for their M2M subscriber numbers, leading to national capacities of 10 or 100 billion M2M numbers, respectively.

[20] The subscriber number is the part that follows the country code and area (or network) code

[21] Voicemail services are now predominantly accessed by dialling 171 regardless of service provider. Before this common approach was used voicemail was accessed by dialling the subscriber's mobile number with a preceding digit "5" in the digit sequence for the subscriber part of the number. For example, to access the voicemail number of 087 1234567 one would dial 087 **5**1234567. This is the longest subscriber number range currently operational in Ireland. ComReg's proposal is to introduce an M2M range that is two digits longer.

37 ComReg proposes to precede this 10 digit subscriber number by a two digit access code, preferably the code 77 (i.e. resulting in a nationally-dialled number of 077-123 456 7890 after trunk prefix '0' is added [22]). As this lies adjacent to the 076 range - used for IP-based and nomadic services - in the numbering plan, recognition of the 'special' nature of both ranges may be facilitated (where 'special' refers to non-standard characteristics)

Q. 3 Do you agree with ComReg's proposal to introduce a number range in the format 077-123 456 7890, thereby providing ten billion numbers for M2M applications? Please state the reasons for your answer.

38 The standard[23] block size for number allocations is 1000 for geographic and non-geographic numbers and 100,000 for mobile numbers. As can be seen from Machina's predictions in Figure 1, one third of M2M connections are expected to be mobile, with a minority using fixed-line solutions. Given that there is expected to be far more mobile devices, ComReg considers that the minimum block size for M2M allocations should initially be 100,000 for qualifying mobile applicants and 10,000 for qualifying fixed-line applicants. Doing so should afford practical and administrative efficiency for M2M users and ComReg.

Q. 4 Do you agree with ComReg's preliminary view that the standard block size for M2M numbers should initially be 100,000 for qualifying mobile applicants and 10,000 for qualifying fixed-line applicants? Please give reasons for your answer.

39 M2M PRS could potentially also emerge, as recognised by the NAP and numbering needs to be available for those. PRS, typically content services in nature, are inherently price dependent and the selected number range for any PRS service is actually a mechanism by which charging for that specific content occurs. In the M2M world, ComReg foresees PRS usage as being once off, transaction based services. For example, when services are required sporadically (e.g. for updating software in a car) rather than on a regular basis (where a subscription based business model may be appropriate), M2M PRS could allow for such sporadic and infrequent communications via a specific numbering range.

[22] If dialled internationally, this number would be presented as +353-77-123 456 7890.
[23] ComReg would reserve the right to allocate larger blocks (e.g. 1M numbers) in exceptional cases; for example if a strong case was made by a very large manufacturer, such as an auto manufacturer.

40 NAP oppose the usage of capacity in the existing 15XX PRS number ranges (above),for M2M purposes. ComReg agrees with NAP that this number range is not appropriate as it does not allow for international access. It is ComReg's preliminary view that if M2M premium rate services emerge in the future this need can ideally be met from the proposed 077-9Y range (discussed above), which is 15 digits in length in total including country code and access code.

Q. 5 Do you agree with ComReg's view that any emerging M2M premium rate services should be accommodated using the proposed 077-9Y range?

Please provide reasons for your views.

Q. 6 Do you agree with ComReg that if new PRS M2M number ranges are to be assigned, only a limited number of these is needed (e.g. 3 per-minute and 3 per-call number ranges)? Please set out the reasons for your answer.

3.4 M2M & E.212

41 ITU Recommendation ITU-T E.212[24] defines a unique international identification plan for public fixed and mobile networks providing users with access to public telecommunication services. The E.212 identification plan was originally developed for use in public land mobile networks (PLMN) to identify geographical areas, networks and subscriptions.

42 E.212 numbering uses a 15 digit decimal string called the international mobile subscription identity (IMSI). Every SIM card in every mobile device in the world has a unique IMSI number which is used to identify the home country, the home network and the subscriber attached to that network. The IMSI consists of three fields:

i. **Mobile Country Code (MCC)** – The MCC identifies the country where the mobile network is located. The MCC for Ireland is 272.

[24] Recommendation ITU-T E.212 - The international identification plan for public networks and subscriptions – Available at: www.itu.int

ii. **Mobile Network Code (MNC)** – The MNC identifies a mobile network in a particular country. For example, the MNC for Vodafone in Ireland is 01. So 272-01 identifies Vodafone's network in Ireland. ComReg administers the allocation of MNCs in Ireland as part of its numbering plan management function. According to the E.212 recommendation, MNCs are only to be assigned to, and used by, public networks offering public telecommunication services.

iii. **Mobile Subscription Identification Number (MSIN)** – The MSIN is the third field of the IMSI. It is up to 10 digits in length, and is administered by the relevant operator to identify individual subscriptions on its network.

43 Utilising mobile networks for M2M services will require each communicating M2M device to have the capability to attach to an available mobile network, thereby requiring SIM functionality in all addressable M2M devices. This raises some challenges in the context of number portability and switching between service providers.

3.5 Number Portability & Block Re-allocation in the M2M environment

44 In conventional mobile devices, mobile customers can easily switch between underlying service providers by changing the SIM card in their device. Regulatory procedures are also in place to ensure that a subscriber can keep its existing mobile telephone number, albeit on a new SIM card with a different IMSI to identify the new service provider's underlying network.

45 In the M2M environment where a customer may have thousands or even tens of thousands of widely dispersed devices[25], switching SIM cards in order to change service provider is not a viable solution given the cost, effort and timescale involved in visiting each device. The promotion of competition is a regulatory objective to ensure a vibrant market in M2M services and other solutions are needed to avoid "operator tie-in". These require M2M devices to have IMSI numbers that are independent of the underlying mobile network operators.

46 A wide range of M2M applications is emerging. These include utility Smart Metering for which there is a single customer (i.e. the utility company) but with potentially millions of end user devices. Under current arrangements, if the utility company wishes to change network operator (e.g. for commercial reasons) it would need to change the SIM cards in millions of devices. That is clearly not a practical solution, as every smart meter would need to be visited to have its SIM swapped out.

[25] Such as smart metering or eCall applications.

47 Given the nature of M2M applications there may not be the same need to ensure that numbers can be ported when switching service providers. The National Numbering Conventions[26] provide for the situation in which a large contiguous block of numbers can be re-assigned from one operator to another, at the request of the number-holder, provided the applicant is the sole user of that block. While such moves are expected to be very rare, it is important that an M2M Service Provider (SP) can efficiently move its services from an unsatisfactory operator to one that better meets its needs, without the necessity to initiate large numbers of ports. For historical reasons[27], the relevant Convention only speaks of fixed-line customers but ComReg considers that limitation should be removed.

Q. 7 Do you think there is a need to provide for number portability for the M2M communications market? Please give reasons for your answer.

Q. 8 Do you consider that the block re-allocation process described above (and covered by Numbering Convention 10.5-4) is adequate to meet the needs of M2M SPs who wish to move all of their services from one network operator to another? Is this process more appropriate for M2M than number portability or are both needed? Please give reasons for your answer.

Q. 9 Do you agree that the National Numbering Convention 10.5-4 should be amended[28] by rewording it to support number block re-allocation for all large number blocks, regardless of technology (i.e. principally by removing the reference to “fixed-line” in the Convention)? Please give reasons for your answer.

[26] See http://www.comreg.ie/_fileupload/publications/ComReg1117.pdf
[27] The Convention, which was adopted before full mobile number portability was introduced will be reconsidered in the course of a review of the conventions to be conducted during 2013.
[28] Note: While this issue comes to the fore within the current M2M consultation, ComReg considers that the proposed change also has relevance for other services.

3.6 The practicality of switching service provider

48 To achieve economies of scale, the manufacturers of M2M devices would undoubtedly prefer to install the M2M identification functionality at the point of manufacture and not have to provision country-specific SIM modules after devices reach their national points of distribution in the marketplace. A number of different solutions could be considered to meet this need and to facilitate more seamless switching between service providers. These possible solutions are described in 3.6.1..

49 MNCs are administered by the national numbering plan administrator within each country in accordance with the principle in Annex B of the ITU-T Rec. E.212. This Annex B states the principles for the assignment of mobile network codes (MNCs) within geographic MCCs. According to ITU-T Recommendation E.212 MNCs are only to be assigned to, and used by, public networks offering public telecommunication services.

3.6.1 Shared MCC and National Roaming

50 The ITU designated the MCC 901 as a shared MCC. This allows for the provision of Mobile Network Codes (MNCs) that are not tied to any one national market. Service providers that qualify for an MNC under MCC 901 are able to operate cross-border services using a single SIM with a single price for data connectivity.

51 Some M2M providers appear to have found this approach to be beneficial, as it allows SIM functionality to be configured in devices at the point of manufacture. It also allows M2M providers to negotiate agreements with several mobile network operators on either a national or an international roaming basis.

52 This approach requires some co-ordination at the international level with the ITU. Efficient management of such a scheme might best be handled by the direct allocation of MNCs and their own blocks of numbers to such very large entities.

Q. 10 Do you agree that a Shared MCC+MNC provides an acceptable and practical solution to the problem of operator tie-in while also meeting the need for economies of scale in the manufacture and distribution of M2M devices? Please set out the reasons for your answer.

53 M2M operators could be at something of a disadvantage by not having MNCs when seeking to negotiate commercial contracts with mobile providers. Acquiring its own MNC (whether a national MNC or a shared international one), could provide more negotiating power to M2M operators when agreeing contracts with mobile providers and in relation to roaming agreements. Such agreements could facilitate commercially viable communications coverage within remote regions. M2M SPs equipped with their own MNCs could be better placed to complete viable roaming agreements with as many different mobile providers as necessary to achieve full coverage at competitive prices.

54 Opening up access to MNC's could stimulate competition by enabling balanced negotiations that promote the growth of M2M. A large M2M SP holding its own MNC could have more leverage when entering negotiations with a potential partner MNO over its roaming (and other) rates. As it would no longer be dependent on the specific package that a mobile operator is prepared to offer, but could change SIM and other settings over the air, competition in the marketplace for M2M would be enhanced. Furthermore, switching to a new MNO at any stage would be much simpler and less costly for an M2M SP because the SIM cards themselves that are installed in the M2M devices would not need replacing.

55 The Netherlands has raised[29] with ITU-T the question of whether large organisations should be provided with their own MNCs for M2M purposes and it is clear that this is an issue also being considered in other countries.

56 The ITU recently held a consultation on the "Possibility of parallel usage of 2 and 3 digit E.212 Mobile Network Codes (MNCs) under one geographic Mobile Country Code (MCC)", with its formal position yet to be finalised. In any case, ComReg is guided by the rules and recommendations outlined by the ITU in these matters. Should the ITU recommend the issuing of MNCs to such M2M organisations and change the criteria as currently stipulated in Annex B of the ITU-T Rec. E.212, ComReg will duly accordingly consider the matter of making such MNCs available.

Q. 11 If the ITU decide to permit M2M SPs access to MNCs, do you believe that ComReg should directly allocate MNCs and M2M numbers to very large M2M SPs? What is a minimum threshold (i.e. number of M2M applications) that ComReg could require an SP to utilise to justify access to such a MNC? Please provide reasons for your answer.

[29] Contribution by Netherlands to ITU-T STUDY GROUP 2: "Machine-to-Machine consequences for number resources E164 and E212"

4 Regulatory Impact Assessment (RIA)

57 ComReg has considered the need for a RIA during the development of this consultation document and concluded that one is not necessary or appropriate.

58 Firm decisions are proposed only in respect of numbering for M2M. In that respect, ComReg has a responsibility under legislation[30] to ensure that adequate numbers and number ranges are provided for all publicly available electronic communications services. ComReg is also required to set down conditions to be attached to the Rights of Use for numbers[31], including the designation of service for those numbers, and that obligation also covers M2M numbers. Carrying out this consultation process is a direct response to meeting those obligations in the most effective manner.

59 ComReg will have due regard to all views expressed before arriving at its decisions. It is not anticipated that any such decisions, which are aimed at facilitating a still developing market, will have a major effect on any actor.

60 ComReg‟s published RIA Guidelines[59] (Doc 07/56a), in accordance with a policy direction to ComReg[60], state that ComReg will conduct a RIA in any process that may result in the imposition of a regulatory obligation, or the amendment of an existing obligation to a significant degree, or which may otherwise significantly impact on any relevant market or any stakeholders or consumers. However, the Guidelines also note that in certain instances it may not be appropriate to conduct a RIA and, in particular, that a RIA is only considered mandatory or necessary in advance of a decision that could result in the imposition of an actual regulatory measure or obligation, and that where ComReg is merely charged with implementing a statutory obligation then it will assess each case individually and will determine whether a RIA is necessary and justified.

61 In this Consultation, ComReg considers that it is not imposing a discretionary regulatory obligation but is acting under a statutory obligation imposed on it by legislation, as described above.

[30] See Annex: 1, and especially A1.8 and A1.9
[31] Authorisation Regulation 14(1)

5 Next steps

62 ComReg has put forward a number of specific proposals in this document for consideration by interested parties and now invites feedback that will help to guide it on steps it should take regarding M2M and the associated numbering issues that arise. The responses will be taken into account in ComReg's Response to Consultation document which will be published following analysis of all submissions made.

63 The next steps regarding ComReg's numbering proposals are expected to include any assignment of M2M number ranges that may be designated, along with the subsequent updating of:

(a) the National Numbering Conventions;

(b) ComReg's Numbering Applications Document; and

(c) ComReg's Numbering Status Report.

64 The consultation period will run from 28 March 2013 to 9 May 2013.

65 Responses must be submitted in written form (post or email) to the following recipient, clearly marked "Submissions to ComReg 13/33":

Ms. Sinéad Devey

Commission for Communications Regulation

Irish Life Centre

Abbey Street

Freepost

Dublin 1

Ireland

Phone: +353-1-8049600

Email: marketframeworkconsult@comreg.ie

66 All comments are welcome; however it will make the task of analysing responses easier if comments are referenced to the relevant question numbers from this document. **In all cases please provide reasons in support of your views.**

67 As all responses will be published, those submitted electronically must be unprotected, to facilitate online publication. In submitting any response, please also set out your reasoning and supporting information for any views expressed.

68 Finally, it may be necessary for respondents to provide confidential information in their submissions. Confidential information must be clearly identified as such. ComReg will publish all of the responses it receives to this consultation, subject to its guidelines on the treatment of confidential information[32].

[32] See Document 05/24 at http://www.comreg.ie/_fileupload/publications/ComReg0524.pdf

Annex: 1 Legal basis

Policy Objectives

A1.1. The policy objectives set down for ComReg in the Act of 2002[33] form the background against which its decisions are taken.

A1.2. In exercising its functions in relation to the electronic communications sector, ComReg is required to have regard to those statutory objectives as set out in Section 12 of the Communications Regulation Act, 2002. These objectives require ComReg:

- To promote competition;
- To contribute to the development of the internal market;
- To promote the interests of end-users within the Community; and
- To ensure the efficient management and use of the radio spectrum and numbers from the national numbering scheme in the State.

A1.3. In working towards these objectives, the Act provides guidance as to the principles that ComReg is required to follow to meet these objectives. In the context of the numbering proposals currently under review, only a subset of the full list of measures is relevant. Some could be relevant in respect of the trans-national aspect of certain M2M services. The following extracts have been taken from Section 12 of the Act, which states[34]:

A1.4. In relation to the objectives referred to in subsection (1)(a), the Commission shall take all reasonable measures which are aimed at achieving those objectives, including- :

(a in so far as the promotion of competition is concerned:
(i) ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality;
(iv) encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.

(b) in so far as contributing to the development of the internal market is concerned—
(i) removing remaining obstacles to the provision of electronic communications networks, electronic communications services and associated facilities at Community level,
(ii) encouraging the establishment and development of trans-European networks and the interoperability of transnational services and end-to-end connectivity,

[33] Communications Regulation Act, 2002
[34] See Section 12(2) of the Communications Act 2002 for full listing

(c) in so far as promotion of the interests of users within the Community is concerned:

(iii) contributing to ensuring a high level of protection of personal data and privacy,

(iv) promoting the provision of clear information, in particular requiring transparency of tariffs and conditions for using publicly available electronic communications services,

(v) encouraging access to the internet at reasonable cost to users, and

(vii) ensuring that the integrity and security of public communications networks are maintained.

A1.5. Regulation 12(5) of the Act states that in carrying out its functions, the Commission shall have regard to international developments with regard to electronic communications networks and electronic communications services, associated facilities, postal services, the radio frequency spectrum and numbering. Regulation 12(6) requires ComReg to support technological neutrality while exercising its functions aimed at achieving the above objectives.

Numbering and Number Allocation

The majority of the proposals put forward by ComReg in this document relate to numbering and therefore the following regulations are relevant:

A1.6. The National Numbering Scheme is[35] "… *the scheme administered by the Regulator which sets out the sequence of numbers or other characters which must be used to route communications to specific locations, terminals, persons or functions on public electronic communications networks*".

A1.7. Framework Regulation 20(4) establishes that it is an offence for anyone other than ComReg to assign numbers from the scheme, unless those numbers have been specifically allocated to them by ComReg (i.e. secondary allocation of numbers allocated to network operators by ComReg to their own customers is permitted and normal).

A1.8. Framework Regulation 20 assigns specific responsibilities to ComReg in respect of the numbering scheme. The Regulator shall:-

- Grant rights of use for all national numbering resources for all publicly available electronic communications services (subject to ensuring the proper management of the national numbering scheme in accordance with ComReg's objectives under section 12 of the Act of 2002 and [Framework] Regulation 16).

[35] Framework Regulations (SI No. 333 of 2011)

- Do so in a manner that gives fair and equitable treatment to all undertakings providing publicly available electronic communications services (subject to ensuring the proper management of the national numbering scheme).
- Establish objective, transparent and non-discriminatory procedures for granting rights of use for national numbering resources.
- Ensure that adequate numbers and numbering ranges are provided for all publicly available electronic communications services.
- Subject only to limitations which may be specified by the Minister on the grounds of national security, from time to time publish the details of the national numbering scheme and significant subsequent additions or amendments to it.

A1.9. Furthermore Regulation 13(2) of the Authorisation Regulations states that "*The Regulator shall establish open, transparent, non-discriminatory and proportionate procedures for the grant of rights of use for numbers and shall cause any such procedures to be made publicly available*."

A1.10. The National Numbering Conventions (currently ComReg 11/17) is ComReg's main vehicle for setting out the framework for management and use of numbering resources and for making its procedures open and transparent, while the Numbering Applications Procedures (currently described in ComReg 11/18) inform potential number users of how to apply for numbers and it provides them with formats for that purpose.

Public Consultations

A1.11. Under Framework regulation12, where ComReg "*intends to take a measure in accordance with the specific regulations or intends to provide for restrictions in accordance with Regulation 17(3) and (5), which have a significant impact on a relevant market, the Regulator shall … publish the text of the proposed measure, give the reasons for it, including information as to which of the Regulator's statutory powers gives rise to the measure, and specify the period within which submissions relating to the proposal may be made by interested parties*". … The Regulator may then, having considered any representations received, take the measure with or without amendment.

A1.12. ComReg's obligation to ensure the existence of adequate numbers and numbering ranges is described at A1.7 and A1.9 above, whereas its powers regarding rights of use for numbers in this context derive from Authorisation

Regulations 13 and 14. The latter are implemented in the National Numbering Conventions, as described in A1.9 above.

A1.13. ComReg does not believe that meeting its obligation to provide adequate numbers – which clearly also applies to numbers for M2M purposes - through the medium of new dedicated number ranges (i.e. as against requiring existing ranges to be used) will "*have a significant effect on a relevant market*". Indeed it may be considered a prudent step to meet ComReg's other obligations of efficient and effective management of the numbering scheme.

A1.14. Nevertheless, ComReg is keen to seek the views of industry and consumers on the specific approaches it proposes to take to M2M numbering, with the aim of adopting the most effective approach possible, and with the widest consensus. The proposed amendments to the National Numbering Conventions to cover these changes can also conveniently undergo consultation during this process.

Tariffs and Access

A1.15. The setting down of formal retail tariff ceilings by ComReg and its predecessor the ODTR goes back to the first version of the National Numbering Conventions in 2000, though de facto tariff ceilings already existed before the ODTR was set up. Since 2002, the underpinning legislation has been Regulation 14(1) and its Condition C1 of the Schedule to the Authorisation Regulations, published that year.

A1.16. The current Regulation 14(1) ("Conditions attached to rights of use for numbers") states that: "*The Regulator shall, as soon as practicable after the commencement of these Regulations, specify conditions to be attached to a right of use for numbers only as are listed in Part C of the Schedule*."

Condition C1 of Part C then states that [a condition which may be attached to rights of use for numbers is] "*Designation of service for which the number shall be used, including any requirements linked to the provision of that service and, for the avoidance of doubt, tariff principles and maximum prices that can apply in the specific number range for the purpose of ensuring consumer protection in accordance with section 12(2)(c)(ii) of the Act of 2002*."

A1.17. Machine-to-Machine communications, by definition, do not (normally) directly affect consumers and it will usually be the case that consumers – even for calls to machines within the home – will remain unaware of the telephone numbers set up during the installation phase to receive those M2M calls. For that reason, when ComReg carries out its duty under Regulation 14(1) to set conditions of use for M2M numbers, it should in most cases avoid setting

pricing conditions designed to ensure consumer protection. It is also the case that operators are already very aware that the success of M2M communications depends critically upon very low charges, and if they are to negotiate effectively to be the carriers of such services then they need to support those existing pricing practices of the marketplace. The self-interest motivation should therefore obviate any need to intervene regarding retail prices.

A1.18. Wholesale pricing for M2M is best left to the marketplace to resolve, with the regulator only stepping in if development of M2M is being stunted nationally through unreasonable or discriminatory practices. In the event that such a situation arises, it would be incumbent upon ComReg to examine compliance vis-à-vis (inter alia) the Access Regulations and – if relevant – to examine the details of any disputes that might be brought to its attention.

Annex: 2 NRAs which have developed an M2M policy

A2.1. ComReg is aware of initiatives already taken by some other European NRAs with respect to M2M, though generally this has been limited to providing numbering resources for M2M purposes. The known list is as follows;

Country	M2M Numbering Policy?	Description of approach	Policy introduced
Belgium	Yes	Non-geographic, fixed-mobile agnostic network code, dedicated to M2M.	01-Oct-2012
Denmark	Yes	IMSI only identifier to be used for M2M. No dedicated number range specified.	01-Dec-2009
Finland	Yes	Awaiting further details.	Not known
Luxembourg	Yes	Awaiting further details.	Not known
Netherlands	Yes	Dedicated M2M number ranges for mobile.	01-Dec-2011
Norway	Yes	Dedicated M2M number ranges for mobile.	Pre-2009
Spain	Yes	Dedicated M2M number ranges for mobile.	01-Apr-2012
Sweden	Yes	Separate dedicated M2M number ranges for fixed and for mobile.	Pre-2011

A2.2. The numbering details applicable to those initiatives are as follows:

Country	Country Code	Code Type	Code	Serial Code Digit Length	Total Allocation	Block Size	Max Blocks
Belgium	32	NDC	11	11	100 billion	1 million	10,0000
Denmark	45	MNC	n/a	6	n/a	Not known	n/a
Netherlands	31	MNC	97	11	100 billion	Not known	n/a
Norway	47	MNC	59	6	1 million	10,000	100
Spain	34	MNC	59	11	100 billion	Not known	n/a
Sweden	46	MNC	719	10	10 billion	Not known	n/a
		NDC	378	10	10 billion	Not known	n/a

Annex: 3 Proposed Changes to National Numbering Conventions

Proposed New and/or Amended Text

A3.1. If, following this consultation, ComReg concludes that a new number range for M2M should be introduced as soon as possible, it will introduce new text to the National Numbering Conventions (NNC) and related documents along the following lines:

Amendment of National Numbering Conventions

A3.2. Section 8.1 “The rights of Authorised Persons to numbers/ number blocks” will be amended to the following:

> 3 Except as otherwise indicated herein, and/or for efficient management purposes, primary allocation or reservation of most numbering resources is made only to (authorised) undertakings (network operators or certain service providers), who are then responsible for carrying out secondary allocation in accordance with these Conventions;

A3.3. New 'Designations of Service' and 'Conditions attached to rights of use' will be inserted in the Conventions, covering the new M2M number range(s), as follows:

Machine-to-Machine (M2M) Numbers (077 Range) and Services

Designation of Service	Requirements linked to the provision of service
M2M numbers are designated for use with services in which both ends of the communication link are normally terminated on devices (and/or applications), and where human involvement in individual communications is minimal or non-existent. 'Devices' in this sense might take the form of sensors, actuators, routing instruments, monitors, display terminals measuring equipment or similar inanimate objects. M2M numbers are non-geographic in nature and are not intrinsically translated into other numbers. The range is currently sub-categorised into M2M numbers for use on fixed-line networks (077-1 and 077-2), M2M numbers for use on mobile networks (077-7 and 077-8) and M2M numbers for PRS (077-9Y), though this distinction may be removed in due course if it is found to not be useful. Unlike geographic or personal numbers which are limited to Ireland (apart from short-term nomadic operation), the M2M range may be used over indefinite periods outside of Ireland without conflicting with these Numbering Conventions. *Note: This obviously cannot imply that the 077 numbers, which inherently lie behind the +353 country code, will operate on the PSTN's of other countries.* Blocks of 077-1 and 077-2 M2M numbers will be allocated to fixed-line network operators with M2M customers, Blocks of 077-7 and 077-8 M2M numbers will be allocated to entities holding their own mobile network codes (MNCs), and 077-9 M2M numbers to entities utilising PRS. Blocks of 077-5 numbers will be held in reserve for potential use equivalent to the shared cost voice services operating on 1850 and 1890 and/or for use equivalent to other voice services (apart from PRS), such as DQ [Directory Enquiries].	1 077 numbers shall be assigned to addressable termination points (usually devices) on machine-to machine applications. 2 077-1 and 077-2 numbers shall only be used for applications using fixed-line communications. 3 077-7 and 077-8 numbers shall only be used for applications using mobile communications. 4 Optional convention: 077-9 numbers shall only be used for applications using premium rated M2M services. [Temporary Note: The sub-division of this 077-9 group into per-minute and per-call sub-categories would follow discussions within ComReg's Numbering Advisory Panel)] 5 077 numbers shall not be used for applications for which other number ranges are suitable. *Note: This need not preclude inter-action with 077 numbers by services on other number ranges, so long as that inter-action is secondary to the main M2M usage of the 077 numbers.* 6 The subscriber number, which follows the national destination code of 077 (see Figure 4 [of the Conventions]) shall consist of a first digit 1, 2, 5, 8, or 9 as described opposite, plus 8 digits.

A3.4. The existing 'Designation of Service' for Mobile Network Codes (currently Section 10.7.11 of the NNC) will be amended, as follows:

<table>
<tr><th colspan="2">Mobile Numbers, Mobile Codes and Services</th></tr>
<tr>
<td>

Designation of Service: Affected text

…

Mobile network codes (MNCs) are issued to network operators from the range 01-99, to be used in accordance with ITU-T Recommendation E.212, only in conjunction with their mobile telecommunications service offerings in Ireland.

The allocation of Mobile Subscriber Identification Numbers (MSINs), which are *inter alia* part of the GSM and UMTS IMSI structure, is currently carried out directly to their subscribers (i.e. within SIM cards) by individual operators who have been allocated Mobile Network Codes (MNCs). It is the responsibility of these operators to ensure that MSIN allocation is managed efficiently in order to ensure sufficient numbers are available for all the operator's users, within the context of a single MNC.

Requirements linked to the provision of service: Affected text

2 Mobile communications numbers shall only be used for the purposes for which they are allocated (e.g. E.164 numbers as subscriber numbers, mailbox numbers etc; E.212 codes as described in ITU-T Recommendation E.212);

</td>
<td>

Designation of Service: New text

…

Mobile network codes (MNCs) are issued to network operators and to very large Machine-to-Machine (M2M) service providers from the range 01-99, to be used in accordance with ITU-T Recommendation E.212, only in conjunction with their mobile telecommunications service in Ireland or their M2M offerings, as appropriate.

The allocation of Mobile Subscriber Identification Numbers (MSINs), which are *inter alia* part of the GSM and UMTS IMSI structure, is currently carried out directly to their subscribers (i.e. within SIM cards) by individual operators or M2M providers who have been allocated Mobile Network Codes (MNCs). It is the responsibility of these entities to ensure that MSIN allocation is managed efficiently in order to ensure sufficient numbers are available for all the entity's needs, within the context of a single MNC.

Requirements linked to the provision of service: New text

2 Mobile communications numbers shall only be used for the purposes for which they are allocated (e.g. E.164 numbers as subscriber numbers, mailbox numbers etc; E.212 codes as described in ITU-T Recommendation E.212). Mobile E.164 numbers (i.e. 08X numbers) may be used for M2M purposes but users should be aware that future number changes could occur during the lifetime of those numbers, resulting in the addition of expansion digits – therefore the use of the designated M2M numbers instead is recommended.;

</td>
</tr>
</table>

A3.5. If ComReg concludes, following analysis of responses to this consultation, that number blocks should be allocated directly to large organisations (as described in Section 3.6), then the following sub-sections of Annex 1 of the Conventions shall be amended along the lines shown below:

A3.6. Amendment of Section A1.1: General Criteria

2 Under the terms of Regulation 4(8) of the Authorisation Regulations a person (undertaking) not required to notify is also deemed to be authorised. ~~However,~~ ~~s~~Such persons ~~are not~~ may be eligible to receive numbering resources from ComReg if it is deemed that this facilitates more efficient or effective management of numbering resources or that it significantly benefits competition or innovation in the marketplace. Applications for numbers based on these latter criteria will be evaluated strictly on a case-by-case basis for the present; [*Note: For the avoidance of doubt, ComReg considers at this point that entities providing M2M communications services (as opposed to those offering specific M2M devices) will generally fit the definition of "undertaking" within the spirit and meaning of the framework regulations and (subject to the outcome of this consultation) it will view applications from such entities in that light*.]

A3.7. Amendment of Section A1.2: Geographic & Non-geographic Numbering Criteria

1 Only Authorised Persons who have made a notification to ComReg showing they are providers of a publicly available electronic communications network or service, or those who comply with A1.1-2 above, shall be eligible to apply for primary allocation or reservation of geographic and/or non-geographic numbers;

A3.8. Amendment of Section A1.3: Mobile Numbering Criteria

1 Only Authorised Persons who have made a notification to ComReg showing they are providers of a publicly available electronic communications network or service, or those who comply with A1.1-2 above, shall be eligible to apply for a Mobile Network Code (MNC) and/or for primary allocation or reservation of mobile numbers;

2 Apart from those complying with A1.1-2 above, mobile network codes (MNCs) will only be issued to network operators who can demonstrate that they provide or have convincing plans to install or otherwise achieve effective contractual control over adequate infrastructure to operate either a full mobile network service or a mobile virtual network service (MVNO) or a large-scale fixed network mobile-type service that requires the use of an MNC for its operation;

5 Applicants for mobile numbers are required to provide supporting information, as described in the Numbering Application Form, which will be evaluated by ComReg. For mobile operator services based on new or innovative technologies, this includes *inter alia* a requirement to demonstrate that the services to be provided on the requested numbers will transparently handle inter-cell handover and roaming (at national and international levels) to the levels expected by mobile consumers

A3.9. Amendments to Conventions in respect of M2M PRS or Shared Cost Services.

It is difficult to provide proposed wording for numbering changes that might be decided in respect of M2M PRS or Shared Cost services (if any) or indeed in respect of designation of service or conditions attached to rights of use for geographic or mobile numbers in advance of decisions being made to cater for such number ranges. Such decisions can in turn only be made once respondents' views have been analysed. Nevertheless, ComReg believes that the draft text for the other areas proposed in the above paragraphs provides a sufficiently strong flavour of how any such text might look.

Annex: 4 Numbering Advisory Panel Feedback regarding M2M Numbering

A4.1. The summarised results of a questionnaire circulated to ComReg's Numbering Advisory Panel (NAP) are presented below, for information. Six relatively detailed responses were received, representing the considered views on M2M numbering of the mainstream fixed and mobile telecoms operators active in Ireland. Those views will be again reviewed by ComReg alongside the numbering-specific responses received to this current consultation, when deriving our draft decisions on the future of M2M numbering in Ireland.

A4.2. Summary of NAP views on M2M Numbering:

a. Respondents mostly agreed that only a new number range (or number ranges) should be used for M2M, and this/these should support nomadic operation.

b. Two schools of thought emerged regarding number length (i.e. number of digits). The first school supported number ranges of the lengths currently in use (i.e. for voice services) so that any existing M2M user could easily migrate. The second school preferred to use the maximum number length possible, to avoid future number scarcity/exhaustion.

c. Fixed-line coverage and mobile coverage should both be provided and cross-border operation (including between here and NI) should be supported.

d. Some support was expressed for the provision of premium rate ranges.

e. Number portability might or might not be appropriate for M2M but most respondents considered that if it is provided, then the current processes would need change to handle the complexity of M2M numbering (i.e. due to the large number of device capabilities that must be supported).

f. Timescale wasn't felt to be pressing on the M2M issue at present. Nevertheless, it was pointed out that leaving matters rest would inevitably result in existing number ranges being used for M2M purposes, leading to significant difficulties (and opposition) arising if these were required to subsequently migrate onto special M2M ranges.

Annex: 5 Abbreviations

AMI	Active Medical Implants
ARPU	Average Revenue Per User
BEREC	Body of European REgulators in Communications
BB	Broadband
CEPT	Conference of Post and Telecommunications Administrations
CER	The Commission for Energy Regulation
DC	Duty Cycle
EC	European Commission
ECC	Electronic Communications Committee
EU	European Union
GSM	Global System for Mobile Communications
GSMA	GSM Association
HAN	Home Area Network
IMSI	International Mobile Subscription Identity
INTUG	International Telecommunications Users Group
IoT	Internet of Things
IP/IPv6	Internet Protocol (version 6)
ITU	International Telecommunications Union
MCC/MNC	Mobile Country Code/Mobile Network Code
M2M	Machine to Machine (communications)
MNO	Mobile Network Operator
MSIN	Mobile Subscription Identification Number
NAP	ComReg's Numbering Advisory Panel
NRA	National Regulatory Authority
NSMP	National Smart Metering Programme
OTAP	Over The Air Provisioning (e.g. of software, settings etc.)
PLMN	Public Land Mobile Network
PRS	Premium Rate (telecommunications) Services
RF	Radio Frequency
RFID	Radio Frequency Identification
RIA	Regulatory Impact Assessment
RTTT	Road Transport and Traffic Telematics
SIM	Subscriber Identification Module
SME	Small and Medium Enterprises
SP	Service Provider
SRD	Short Range Device (For ETSI it is also System Reference Document)
UMTS	Universal Mobile Telecommunications System
WAN	Wide Area Network

Questions

Section Page