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]

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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.

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[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/