



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

ComReg strategy to promote Over-the-Air provisioning

Strategy Document

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Chapter 1

Introduction

Project Background

- 1.1 The Commission for Communications Regulation (“ComReg”) is the statutory body responsible for the regulation of the electronic communications (telecommunications, radiocommunication and broadcasting networks), postal and premium rate sectors in Ireland in accordance with European Union (“EU”) and Irish Law.
- 1.2 ComReg manages the national numbering resource, among other responsibilities. Within the European Electronic Communication Code (the “EECC” or the “Code”) Articles on ‘Numbering Resources’, Article 93(6) requires Member States to promote over-the-air (“OTA”) provisioning to facilitate switching between service providers. Article 106(6) of the EECC states that NRAs may establish the details of the switching and porting processes, including requiring operators to provide porting services via OTA provisioning, where technically feasible.
- 1.3 In its Electronic Communications Strategy Statement for 2021 to 2023 (ComReg Document 21/70), ComReg set out its intention to:
 - commission an expert study to support the development of a strategy for the promotion of OTA provisioning in Ireland;
 - engage with both national and international stakeholders as part of this study; and
 - develop an action plan for promoting OTA provisioning.

OTA provisioning is the future of mobile switching

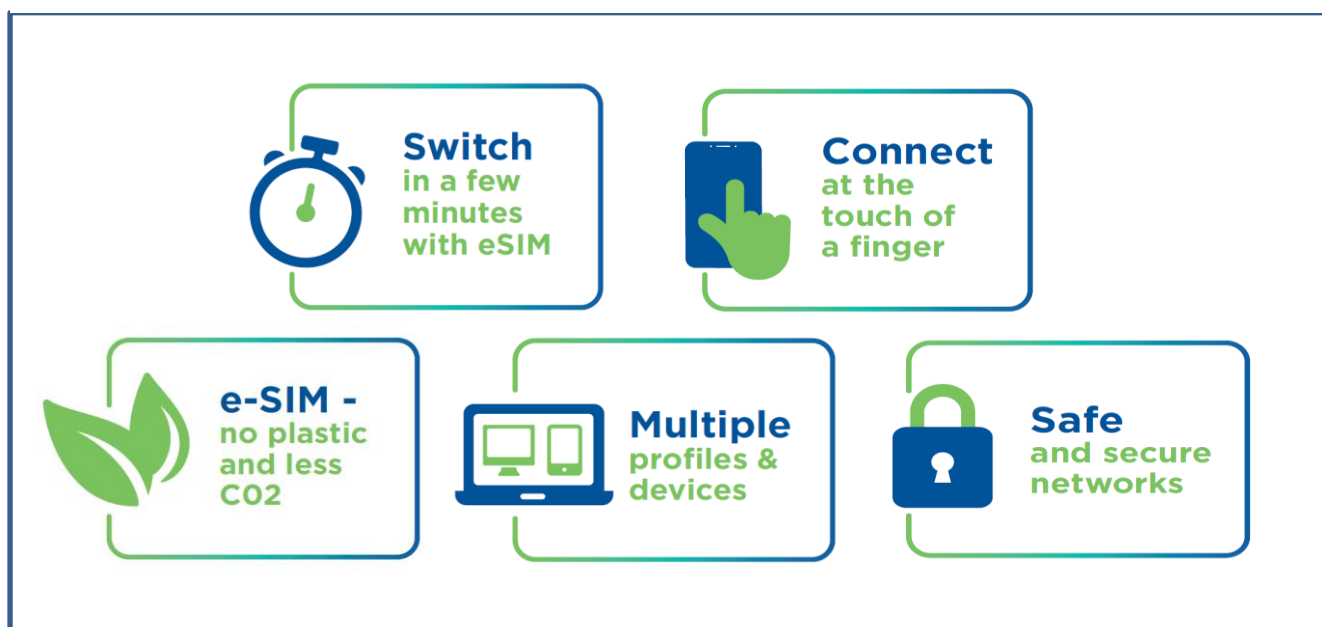
- 1.4 A Subscriber Identification Module (“SIM”) card is an integrated circuit that securely stores the International Mobile Subscriber Identity (“IMSI”) number and its related authentication key, within mobile telephony devices (such as mobile phones and tablets). A traditional SIM card must be removed and replaced in a device in order to switch provider.
- 1.5 OTA provisioning refers to the process of digitally activating or switching a mobile subscription, without the need to procure and replace a physical SIM card. OTA provisioning relies on ‘embedded’ SIM technology (“eSIM”). An eSIM is effectively a SIM card that is embedded directly into a device.
- 1.6 OTA provisioning represents the future of switching in mobile markets and will enable consumers and businesses alike to avail of fully digital switching, by switching

operator without the need to replace a physical SIM card¹. This could reduce the speed of a switching mobile provider for a typical consumer from a day or more to less than a few minutes.

- 1.7 OTA provisioning should be seen as a complement to existing sign-up and switching processes (e.g., in-store). It will provide consumers with additional means of signing up and switching across operators in the future. However, some consumers may retain a preference for existing services and should remain free to avail of existing processes that best suit their individual requirements.

OTA provisioning can make mobile markets work better for consumers and businesses

Figure 1: Key consumer benefits of OTA provisioning



- 1.8 OTA provisioning should improve competition in consumer segments of mobile markets, through reducing the time and effort required of consumers to switch providers.² Research by the Economic Social Research Institute found that the introduction of Mobile Number Portability, which also led to faster, easier switching had precisely this effect, leading to greater switching and reduced mobile prices³.
- 1.9 OTA provisioning should also benefit consumers through enabling connectivity of a greater range of devices, as well as through the provision of new and innovative

¹ WIK Report, pages 31, 59, 137, 144 & 147.

² See WIK Report, page 76.

³ Sean Lyons (2010) "Measuring the Effects of Mobile Number Portability on Service Prices"

services⁴.

- 1.10 OTA provisioning should increase competition in the Machine-to-Machine (“M2M”) segments of mobile markets through facilitating greater switching in M2M markets compared to the traditional SIM based switching, which could be prohibitively costly or complex.
- 1.11 OTA provisioning may also lead to a number of incidental benefits, including lower carbon emissions⁵ and the potential for enhanced network security.⁶

Developing ComReg’s strategy to promote OTA provisioning

- 1.12 ComReg commissioned WIK Consult GmbH (“WIK”) to assist in data gathering and the development of a vision and strategy for the promotion of the OTA provisioning in line with both the EECC and ComReg’s objectives. As part of this work, WIK was informed by data and information gathered from, amongst other sources:
- Interviews conducted by WIK and ComReg with industry stakeholders⁷;
 - Responses received from national regulatory authorities to a request for information⁸;
 - Analysis of market data and customer complaints; and
 - WIK’s own forecasts for eSIM deployment in Ireland.
- 1.13 On 8 November 2021, ComReg published WIK’s report (Document 21/114a) (the “WIK Report”) alongside a consultation (Document 21/114) (the “Consultation”) on its draft strategy to promote OTA provisioning. The Consultation outlined in particular ComReg’s preliminary views as to:
- the potential impact of OTA provisioning on consumers and competition;
 - the potential challenges to the full realisation of the benefits of OTA provisioning;
 - the proposed strategy for ComReg to promote OTA provisioning (the “Draft Strategy”), in line with the EECC and its statutory objectives; and
 - the proposed Guidance on OTA provisioning for Consumer Mobile (the “Draft Guidance”).
- 1.14 ComReg thanks interested parties for their submissions and has published the non-

⁴ See Section 5.1.1 of the WIK Report

⁵ See Section 4.3.2 of ComReg 21/114 and Section 5.3 of ComReg 21/114A

⁶ See Section 4.3.1 of ComReg 21/114 and Section 5.4 of ComReg 21/114A

⁷ This includes MNOs, MNO Groups, Industry Associations, eSIM solution providers and eSIM manufacturers.

⁸ Issued in March 2021 to members of the Independent Regulators Group.

confidential versions of the submissions in ComReg Document 21/48s.

- 1.15 Following ComReg's the response to consultation, ComReg has updated the vision and actions accordingly. For clarity, the assessment of the submissions is not contained here and ComReg refers readers to:
- ComReg's response to consultation (Document 22/48);
 - WIK's review of the submissions (Document 22/48b);
 - a consumer survey on OTA/eSIM commissioned by ComReg (Document 22/48c).
- 1.16 This document outlines the actions ComReg will adopt to promote OTA provisioning and to ensure that Irish mobile service providers deliver the best possible customer activation, switching and number porting experiences, in accordance with ComReg's statutory functions and objectives and within the requirements in Articles 93(6) and 106(6) of the EECC.

Structure of this document

- 1.17 The remainder of this document is structured as follows:
- **Chapter 2:** provides an overview of ComReg's strategy to promote OTA provisioning; and
 - **Chapter 3:** outlines ComReg's *Guidance on OTA provisioning for Consumer Mobile*.

Chapter 2

ComReg's strategy to promote OTA provisioning

2.1 This Chapter provides an outline of ComReg's proposed strategy for promoting OTA provisioning and is laid out as follows.

- First, ComReg describes its vision for the envisaged future state of OTA provisioning in Ireland over a 5-year period (the "Vision"); and
- Second, ComReg outlines its strategy to promote OTA provisioning, including its actions, timelines and expected engagement with industry (the "Strategy").

The Vision for OTA provisioning

2.2 A Vision enables ComReg to determine what potential future outcomes may best serve Irish consumers. A Vision facilitates the identification of potential challenges⁹ to the full realisation of the potential benefits of OTA provisioning, as well as actions to overcome such challenges. Both ComReg's Strategy and *Guidance on OTA provisioning for Consumer Mobile* (the "Guidance") are designed to achieve this overarching Vision.

2.3 Eight objectives define ComReg's Vision for OTA provisioning:

1. Consumers and M2M customers should have the ability to use OTA, for mobile activation, switching and (in the case of consumer mobile) porting.
2. OTA activation and switching for mobile devices should be as fast and as easy as possible.
3. Consumers should be provided with all information necessary to complete a successful switch using eSIM and OTA provisioning, supported by clear contractual terms in the case of M2M customers.
4. Switching should continue to be recipient-led for OTA consumer use cases, while collaboration will often be needed between the transferring and recipient provider in M2M OTA switching.

⁹ WIK and ComReg focus on areas where identifiable challenges exist.

5. Consumers should have the ability to use MNP in conjunction OTA provisioning, noting that:
 - The existing principles for the design of MNP should extend to any amended version of the MNP process
 - Porting by SIM needs to be retained.
6. OTA provisioning must be safe and secure.
7. OTA provisioning should enable new business models and not foreclose existing business models (e.g., MVNOs).
8. OTA provisioning should enable new forms of eSIM devices and a greater number of devices.

Challenges to the Vision for OTA provisioning in Ireland

2.4 The following seven potential challenges have been identified to the realisation of the Vision:

1. Delayed eSIM support by Irish MNOs for consumer mobile.
2. Potentially sub-optimal OTA provisioning processes.
3. Low consumer awareness of eSIM and/or OTA provisioning.
4. Barriers to M2M OTA switching should contracts not adequately enable switching.
5. Undermining MVNOs ability to compete effectively.
6. A number of future or international challenges.
7. Lack of information about developments in market.

2.5 Action may be required in respect of each of these challenges so as to mitigate any potential for delay or the nullification of any of the considerable benefits that will flow from OTA provisioning to Irish consumers and M2M customers.

ComReg strategy to promote OTA provisioning

Actions

2.6 Following publication of the Strategy, ComReg will:

- **Launch its strategy to promote OTA Provisioning**

ComReg will present its strategy, anticipated timelines, guidelines and targets to interested parties.

- **Conduct regular bilateral meeting with operators**

Such bilateral meetings will involve an examination of the steps required of each operator in adopting OTA provisioning, in line with ComReg's *Guidance on OTA Provisioning for Consumer Mobile*.

These bilateral meetings will provide an opportunity for ComReg and MNOs to work collaboratively in implementing OTA provisioning by Q4 2023 and for ComReg to monitor MNOs' progress in pursuit of that goal.

ComReg will review MNOs' progress in adopting OTA provisioning and, on foot of same, then assess the necessity or otherwise for further regulatory actions to ensure fully-digital OTA customer journeys within a reasonable period, or to ensure clear contractual terms empowering switching for M2M customers. Any such assessment will consider the necessity of using statutory powers to mandate action by industry.

- **Support a review of existing MNP processes by the MNP Committee (the "MNP Review")**

ComReg will facilitate or assist as appropriate a review by the MNP Committee of existing MNP processes, to ensure that such processes are geared towards enabling OTA provisioning. It is envisaged that the Committee will consider whether or not any improvements and/or changes are required to porting processes to support OTA provisioning and to improve the porting process, in light of ComReg's *Guidance on OTA provisioning for Consumer Mobile*.

The Committee should meet with ComReg on a minimum of three occasions and furnish a report on the findings of the MNP Review to ComReg.

- **Support OTA switching for M2M**

ComReg considers that MNOs should endeavour to facilitate OTA switching for M2M, where applicable, not least through the use of clear contractual terms. ComReg may consider the need for regulatory action to support M2M switching, including clear contractual terms, pursuant to transposition of the EECC. In the interim, ComReg will raise the views contained within the submissions received to the Consultation with the relevant regulatory bodies (see below).

- **Launch an awareness campaign to promote eSIM to industry, organisations and consumers**

ComReg will provide simple, timely and accessible information on OTA to end-users and the public. ComReg will build public awareness initiatives into our action plan at relevant times with consideration of market developments, as well as end-user needs and protections including for vulnerable and disabled consumers. ComReg will monitor confidence and awareness of consumers

regarding the use of eSIM and OTA provisioning and address information gaps, as relevant.

- **Monitor engagement between MVNOs and their hosts concerning eSIM support**

This action will be conducted in line with ComReg’s ongoing monitoring of the competitive dynamics in the Irish mobile market, as specified in Information Notice: The Role of MVNOs in evolving mobile markets – report by WIK Cosult (Document 21/101) (the “MVNO Study”)¹⁰. ComReg may hold bilateral meetings with interested MVNOs to facilitate this monitoring.

- **Gather information and data on eSIM adoption and activation**

ComReg does not currently gather data relating to eSIM deployment and OTA activation. Gathering such information, in particular in relation to eSIM deployment or activation, will facilitate monitoring of the market and the evaluation of ComReg’s action plan. This data may be gathered from a variety of sources, including directly from mobile providers or via consumer surveys. ComReg will discuss in bilateral meetings with operators what market data can be gathered to address this.

- **Promote consideration of OTA provisioning by BEREC/CEPT**

ComReg considers it appropriate to promote the WIK report and its key findings and ComReg’s strategy to international regulatory bodies such as CEPT and BEREC and discuss how such bodies could further assist in overcoming potential challenges (e.g., supporting OTA switching for M2M).

- **Review and evaluate developments in OTA provisioning in the future, as required**

ComReg may revisit and revise the strategy as needed, noting that a number of matters and concerns cannot be addressed at present given their international nature and/or the early state of eSIM deployment.

Timelines for the Strategy

- 2.7 Under the Strategy, ComReg establishes a target date, no later than 18 months from the launch of the strategy, for all Irish MNOs to aim to provide fully-digital provisioning and switching processes for consumer devices. This target date informs ComReg’s indicative timeline for engaging with operators individually and through the MNP Committee.
- 2.8 To coincide with the adoption of fully digital OTA provisioning, as highlighted above, ComReg will launch an awareness campaign to promote OTA provisioning with end-

¹⁰ The role of MVNOs in evolving mobile markets: Report from WIK Consult, published 13 October 2021, <https://www.comreg.ie/media/2021/10/ComReg-21101.pdf>

users.

2.9 In the interim, ComReg will:

- gather data on eSIM/OTA;
- support the MNP Review;
- raise awareness amongst consumers and industry regarding the benefits of eSIM and OTA provisioning to the market and consumers; and
- engage with international and European regulatory bodies to encourage monitoring of eSIM deployment and take-up including cross-border IoT.

2.10 ComReg may review its strategy as required, allowing it assess progress and examine matters on which it may be necessary to take action.

2.11 The OTA Strategy entails a large amount of engagement by ComReg with mobile operators and/or consumers. ComReg outlines an indicative timeline and work plan for this engagement in **Table 1** below¹¹.

Table 1: Indicative timeline and plan for ComReg's engagement with stakeholders

Industry engagement	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Communication to interested parties	Launch of strategy	-	-	-	-	Potential Strategy review / update
MNP Committee	Initial meeting	-	Second meeting	-	Third Meeting	Final Report
Bilaterals with MNOs	Initial meeting	Report on progress	Second Meeting	Report on progress	Third Meeting	Final Report
Bilaterals with interested MVNOs	Initial meeting	-	Second Meeting	-	Third Meeting	-
Consumer awareness campaign	-	-	-	-	-	To accompany introduction of OTA provisioning

¹¹ This workplan excludes actions which ComReg either take unilaterally (e.g., promoting consideration of eSIM/OTA provisioning by BEREC/CEPT) or which are unplanned and/or ad-hoc in nature (e.g., meetings with IoT/M2M customers or other organisations upon request).

Chapter 3

Guidance on OTA provisioning for Consumer Mobile

- 3.1 This Chapter provides ComReg's Guidance to operators on OTA provisioning for Consumer Mobile¹².
- 3.2 The Guidance provides operators with certain principles that, if followed, should ensure a simple and efficient switching process which is accessible for all end users, in particular end-users with accessibility requirements. While operators are free to implement OTA according to their own processes and procedures, through its Guidance ComReg seeks to assist operators by setting out what it considers to be best practice in OTA provisioning.
- 3.3 The Guidance has been drafted following consultation with interested parties, a full review and evaluation of the submissions received from stakeholders as outlined in Document 22/48 and the findings of WIK, in particular in relation to the technical feasibility of OTA provisioning.
- 3.4 Based on the above, ComReg has identified five broad principles it views as ensuring OTA consistent with its Vision, ensuring a simple and efficient switching process to ensure end-users' rights. These are that:
1. Consumers should be able to avail of seamless fully digital OTA customer journeys
 2. OTA activation and switching should be as fast as possible.
 3. Consumers should be provided with sufficient information to complete seamless OTA customer journeys
 4. OTA switching and porting should be recipient-led
 5. OTA provisioning should be safe and secure.

1. Consumers should be able to avail of seamless fully digital OTA customer journeys

- 3.5 Fully digital OTA consumer journeys should involve as few steps as possible on the part of the consumer. It should also enable consumers to take complementary actions (e.g., ability to cancel a previous subscription and/or port a number).

¹² This includes business and non-business users of traditional mobile phones and/or smartphones.

Specifically, in relation to OTA switching with a number port¹³, the two processes should work in conjunction with one another to provide a seamless experience for the end-user. The ability to port by SIM card must be retained.

- 3.6 While QR Codes may satisfy these requirements, they do so only where such QR codes are distributed digitally (e.g., by email or download). The distribution of QR codes by post or in-store does not meet ComReg's criteria as it does not constitute a "fully-digital" consumer journey.
- 3.7 In addition, providers should attempt to ensure that eSIM support and OTA provisioning (including processes, procedures and information) is accessible for all end-users, in particular end-users with accessibility requirements, bearing in mind the equivalence of access for disabled end-users that is envisaged by the Code.

2. OTA activation, switching and porting should be as fast as possible

- 3.8 Operators should ensure that consumer journeys for:
- OTA activation and or switching do not exceed 5 minutes¹⁴; and
 - OTA switching combined with porting do not exceed two hours¹⁵.
- 3.9 The speed of OTA switching is potentially impacted by, or dependent on, a number of related processes¹⁶. Operators must ensure that such processes do not undermine the realisation of faster switching times and delay the time required to complete effective OTA switching or porting.

3. Consumers should be provided with sufficient information to complete seamless OTA customer journeys

- 3.10 Consumers should be provided with all information necessary to complete a successful activation or switch. Such information should be communicated in clear and simple terms and provided in a timely and efficient manner (i.e., when needed by the consumer).
- 3.11 It is expected that service providers would provide clear accessible instructions for

¹³ MNP is of key importance to switching for consumer mobile and therefore critical to realising the full benefits of Over-the-Air switching that such processes integrate seamlessly with MNP processes

¹⁴ This refers to the activation or switching of a single device and assumes that a consumer completes all necessary steps in a timely and efficient manner.

¹⁵ Noting that 2 hours is the maximum allowable time for a port under MNP presently. This refers to a single line port.

¹⁶ Such processes include but are not limited to interactions with MNP, interactions with OEMs, handset swap policies and handset locking policies.

each smartphone model (e.g. Apple and Android) that offers eSIM support¹⁷. Such processes may require the cooperation of third parties (e.g., OEMs such as Apple, or other providers). In such cases, the information provided to, and requested from consumers should be streamlined in so far as is possible, in order to simplify and make accessible the actions required of the consumer.

- 3.12 In addition, providers should attempt to ensure that such information should also be accessible for all end-users' in particular end-users with accessibility requirements and geared to ensure that end-users' access needs are met and support the equivalence of access provisions for end-users with disabilities envisaged by Article 111 of the EECC.

4. OTA switching and porting should be recipient-led

- 3.13 OTA switching can and should be recipient-led, noting that this is possible under the GSMA standard¹⁸.

5. OTA provisioning must be safe and secure

- 3.14 Providers should ensure that their systems and solutions providers have the requisite accreditation for their chosen eSIM standard. Operators will need to ensure that their systems remain up to date with the latest accreditation to ensure the highest level of security possible and that their OTA provisioning offering has an in-built resilient and robust security system.
- 3.15 The personal details and credentials of the end-user *and* the device need to have in-built robust and resilient security features. Industry will also be expected to comply with such guidance as may issue from ENISA, ComReg, the DPC or the NCSC in Ireland or any other relevant security and cyber security authority in Ireland and within the EU.
- 3.16 Operators must take a pro-active approach in awareness raising and education in order to truly achieve consumer protection against cyber security incidents.

¹⁷ See for example Vodafone Ireland's instructions for each supported device. [Apple iPhone 12 mini - Activate eSIM | Vodafone Ireland](#)

¹⁸ GSMA "eSIM Whitepaper: The what and how of Remote SIM Provisioning" March 2018