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Commission for
Communications Regulation

Radio Spectrum Management Strategy Statement 2022 to 2024

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Chapter 1

1 Foreword

I am pleased to present the Commission for Communications Regulation's Radio Spectrum Management Strategy Statement for Ireland for the period 2022 to 2024.

As the body with responsibility for the management of the radio spectrum resource in Ireland, ComReg is responsible for ensuring effective management and efficient use of radio spectrum. This is an important role because radio frequencies are used to provide a wide range of communications networks, services and applications for the benefit of society. The importance of radio frequencies became even more apparent since the beginning of the Covid-19 pandemic as organisations and staff were required to conduct their work remotely.

The resilience of the people and the communications networks which we relied upon meant that society did not come to a complete standstill. Overnight there was a complete shift in how we worked, socialised and lived. Radio spectrum and the associated networks and services it enables were extremely important in supporting this change. In response to this extraordinary situation, ComReg consulted upon and put in place four temporary assignments of spectrum rights of use in the 700 MHz, 2.1 GHz and 2.6 GHz Bands which have been used to provide additional network capacity to address the increased traffic demands arising from the Covid-19 pandemic.

Climate change is an also important issue for the wireless communications sector. The sector is enabling decarbonisation across the economy, from remote working to the use of smart meters, and spectrum policy will play an important role in assisting this further. In 2019, ComReg completed the 400 MHz band spectrum award which placed it at the forefront of Europe for releasing spectrum for Smart Grid use. ComReg looks forward to contributing further to the efforts in tackling climate change over the course of this strategy period.

The continued rollout of 5G services should bring enhanced mobile broadband services and support new and innovative applications currently not supported by existing technologies. The effective management and efficient use radio spectrum will continue to remain important in the years ahead to facilitate the further rollout of future services. In that regard, ComReg has advanced its multi-band award for the release of spectrum rights for the provision of wireless broadband (both mobile and fixed broadband) services.

While the value of wireless networks in our daily lives became ever more obvious, sectors that rely on radio spectrum continue to make a valuable contribution to the Irish economy. ComReg conservatively estimates that the use of radio spectrum directly accounts for €4.2 billion of Gross Value Added and contributes c. €7.2 billion of Irelands National Income. Radio spectrum is also an important contributor to employment in Ireland and directly supports 19,000 jobs.

In preparing this strategy statement, ComReg consulted on its draft work plan for the years ahead and the factors underpinning it. This provided an opportunity for interested parties to contribute to the development of ComReg's spectrum work plan and help shape our priorities. I would like to thank all those who engaged in the consultation process; your views have been carefully considered in finalising our strategy and associated work plan.

This strategy statement sets out that work plan and ComReg's priorities, as Ireland's spectrum manager, for the coming period and complements ComReg's Electronic Communications Strategy Statement. It will inform ComReg in addressing the challenges we will face over the next two years, and my colleagues and I are committed to delivering the objectives outlined in this statement.

Commissioner Garrett Blaney

Chapter 2

2 Introduction

2.1 Background and Purpose

2.1 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. ComReg also manages Ireland's radio spectrum (or "spectrum") and national numbering resource.

2.2 Radio spectrum is a medium by which information may be transmitted wirelessly over distances ranging from a few metres to thousands of kilometres. It is a valuable national resource underpinning important economic, social and communications activities. These include widely used services, such as mobile/fixed wireless communications and broadband, radio and TV broadcasting, and the safe operation of air and maritime transport. Radio spectrum is also fundamental in the day-to-day operation of the emergency services and defence forces and is a vital input to many other services including important scientific applications, such as weather forecasting and monitoring the Earth's environment. However, it is a finite natural resource with competing uses and users and so it must be managed effectively and efficiently used.

2.3 To assist in the management of the radio spectrum resource, ComReg regularly sets out and updates its strategy for same and is also reflective of ComReg's strategic intents as set out in its 5-year Electronic Communications Strategy Statement[1]. ComReg's draft radio spectrum management plan for 2022 to 2024 is set out in Document 21/90 and ComReg's consideration of the responses received from interested parties to that consultation is set out in Document 21/136a.[2]

2.2 Structure of this document

2.4 The remainder of this document is structured as follows:

- **Chapter 3:** provides an introduction to Ireland's radio spectrum and the importance of managing the radio spectrum in Ireland;

[1] ComReg document 21/70 – Electronic Communications Strategy Statement 2021-2023 – published 30 June 2021
[2] See ComReg 21/136s for the non-confidential submissions received to Consultation 21/90

- **Chapter 4:** considers the factors informing ComReg's strategy for the period 2022 to 2024;
- **Chapter 5:** outlines ComReg's work plan for the period 2022 to 2024; and
- **Annex 1:** summarises ComReg's statutory framework relevant to the management of the radio frequency spectrum in Ireland

Chapter 3

3 The Framework for Spectrum Management in Ireland

3.1 Spectrum Policy and Spectrum Management in Ireland

3.1 This section sets out the relevant Government department roles in relation to spectrum policy and national broadcasting policy in Ireland, and ComReg's role in relation to its spectrum management responsibilities.

3.1.1 Spectrum Policy

3.2 The Department of the Environment, Climate and Communications ("DECC") is responsible for the development of policies relating to the regulation and optimal use of Ireland's radio spectrum. Spectrum policy is part of the national policy governing the telecommunications sector in Ireland. This includes next generation broadband, electronic communications services ("ECS") and international connectivity. The DECC also has the responsibility for spectrum use associated with national broadcasting policy.

3.3 The Department of Tourism, Culture, Arts, Gaeltacht, Sports, and Media ("DTCAGSM") is responsible for Ireland's national broadcasting policy.[3]

3.4 In developing the Radio Spectrum Management Strategy Statement for 2022 to 2024, ComReg has taken account of DECC's Communications and Digital policy[4] and DTCAGSM's Broadcasting and Media policy[5].

[3] See:
- S.I. No. 372 of 2020, the Broadcasting (Transfer of Departmental Administration and Ministerial Functions) Order 2020;
- S.I. No. 403 of 2020, the Culture, Heritage and the Gaeltacht (Alteration of Name of Department and Title of Minister) Order 2020; and
- S.I. No. 373 of 2020, the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020.

[4] https://www.gov.ie/en/policy/435802-communications-and-digital/, published 12 June 2020

[5] https://www.gov.ie/en/policy-information/b151e3-broadcast-media/, published 12 June 2020 and updated 3 November 2020

3.1.2 Spectrum Management: ComReg's mandate and role

3.5 The Communications Regulation Act 2002 (as amended by the Communications Regulation (Amendment) Act 2007) (the "2002 Act"), the European Electronic Communications Code[6] (which has repealed the EU Common Regulatory Framework (including the Framework and Authorisation Directives[7]), the corresponding Framework and Authorisation Regulations[8] (which must be read in light of the EECC), and the Wireless Telegraphy Acts 1926 to 2009[9] ("1926 Act") set out, amongst other things, powers, functions, duties and objectives of ComReg that are relevant to the management of the radio frequency spectrum in Ireland.

3.6 In exercising its function of the management of Ireland's radio spectrum (and in accordance with relevant ministerial Policy Directions given under section 13 of the 2002 Act), ComReg's spectrum management objective is to ensure the efficient management and use of the radio spectrum. ComReg is obliged to effectively carry out this function, including having regard to relevant government policy statements and international developments.

3.7 In the context of radio spectrum used for Electronic Communications Networks ("ECN") and ECS, one of ComReg's objectives is to promote and create the conditions for effective competition in the provision of ECN and ECS. In that regard, section 12(2)(a) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at the promotion of competition, including:

i. ensuring that there is no distortion or restriction of competition in the electronic communications sector;

ii. encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources; and

iii. ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality.

[6] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

[7] Directive No. 2002/21/EC of the European Parliament and of the Council of 7 March 2002 (as amended by Regulation (EC) No. 717/2007 of 27 June 2007, Regulation (EC) No. 544/2009 of 18 June 2009 and Directive 2009/140/EC of the European Parliament and Council of 25 November 2009) (the "Framework Directive") and Directive No. 2002/20/EC of the European Parliament and of the Council of 7 March 2002 (as amended by Directive 2009/140/EC) (the "Authorisation Directive").

[8] The European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011) and the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. No. 335 of 2011) respectively.

[9] The Wireless Telegraphy Acts 1926 to 1988 and Sections 181 (1) to (7) and (9) and Section 182 of the Broadcasting Act 2009.

3.8 Readers are referred to Annex 1 for an overview of the legal framework and statutory objectives relevant to ComReg's management of the radio spectrum.

3.9 ComReg, in preparing the strategy set out herein, has also of course had regard to the European Electronic Communications Code[10] ("the EECC") which replaces the common EU Regulatory Framework. The EECC is in the process of being transposed into draft Regulations by the DECC.

3.10 In fulfilling its spectrum management function, ComReg carries out a range of programmatic activities, including the:

- licensing of spectrum rights of use in Ireland for many varied uses;
- monitoring of radio spectrum usage in Ireland, including the enforcement of licence conditions and equipment standards; and
- promotion of Ireland as an ideal location for spectrum development through Test and Trial Ireland[11].

3.2 Spectrum management

3.11 The radio spectrum is a limited and valuable national resource that permeates all areas of communications, including radio, television, mobile (voice and data), aeronautical/marine navigation and satellite communications. Increased demand for the radio spectrum requires that it be used efficiently and that effective spectrum management processes be employed to maximise the benefits to society. The ability to take full advantage of the spectrum resource depends on the spectrum management activities that facilitates the implementation of radio systems with minimum radio interference.

3.12 However, as spectrum is a finite resource with many different services and users, spectrum management involves the careful consideration of a broad range of factors (e.g. administrative, regulatory, social, economic and technical) with a view to ensuring that radio spectrum is efficiently used. This may also involve balancing a range of competing factors, including:

i. appropriately meeting the reasonable requirements of all radio services, including commercial and public uses, such as public safety, national security and health care; and

[10] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code
[11] See Home (testandtrial.ie)

ii. for spectrum used for ECS and ECN, promoting competition including ensuring that users derive maximum benefit in terms of price, choice and quality, contributing to the development of the internal market, and promoting the interests of users within the Community.

3.13 A system of spectrum management is required to ensure the efficient assignment and subsequent use of scarce frequencies among competing uses and users. This is essential to promote competition within the relevant downstream markets, particularly given that spectrum is an essential input in the provision of many ECS and an inefficient assignment of spectrum has the potential to distort competition and create inefficient outcomes for society.

3.2.1 The importance of radio spectrum

3.14 Investments in services that utilise the radio spectrum support change and innovation across the entire Irish economy. This is because these services not only provide an efficient and reliable means of communication, but they also support economic activity across the whole economy.

3.15 Analysis carried out by ComReg conservatively estimates that the direct use[12] of radio spectrum in Ireland in terms of Gross Value Added has increased from approximately €4 billion in 2016 to €4.6 billion of in 2019.[13] When modest multiplier effects are taken into account, ComReg estimates that the contribution of radio spectrum to Irish Gross National (GNI) Income increased from €6.2 billion in 2016 to approximately €7.2 billion in 2019, accounting for 3.3% of Modified GNI.[14]

3.16 Radio spectrum is also an important contributor to employment. A conservative estimate of the number of employees in Ireland whose jobs are directly dependent on the use of radio spectrum was approximately 19,000 in 2019. The analysis also indicates that output per worker in the sectors analysed (€234,000) was higher than the economy wide average (€144,000) for 2019.

[12] This assessment is based on sectors where radio spectrum is a core input for the provision of goods and services. This includes not only wireless communications services but also aviation, mobile manufacturing, broadcasting, and mobile retail.
[13] See section 2.2.1 of ComReg Document 21/90 for more information on the methodology.
[14] In 2019, €4.6 billion is the direct contribution, €1.5 billion is indirect with the remaining €1 billion accruing from taxes and subsidies.

Social and secondary benefits of spectrum usage

3.17 There are also considerable social benefits arising from the use of radio spectrum that are not reflected in the above analysis given its primary focus on ECN and ECS. For example, the efficient functioning of the Gardaí, fire and ambulance services all depend on reliable mobile communications, while radio spectrum plays a major role in enabling the Defence Forces to carry out its duties both at home and overseas. Radio spectrum is also fundamental to the safe operation of air, sea and land transport. Business applications are also likely to be enabled through the use of the radio spectrum across a variety of sectors.

3.18 Access to the radio spectrum is also necessary for free-to-air television and radio broadcasting. Effective free-to-air delivery of national and regional broadcasting helps ensures media plurality, a greater expression of national and community cultural identity and the development of home-grown audio-visual content, including drama and documentaries.

3.19 Radio spectrum also enables the use of a wide variety of consumer applications enriching all our daily lives.

Figure 1: Examples of consumer applications that use radio spectrum

3.2.2 Spectrum management processes

International aspects of radio spectrum management

3.20 Radio spectrum usage propagates naturally beyond national borders. In this regard spectrum management requires active engagement in European and global spectrum management developments.

3.21 Due to international planning, the national use of specific frequencies or frequency bands may be constrained. This is particularly so in the aeronautical and maritime sectors where, because of the global nature of these services, ships and aircraft must use specific frequencies for navigation and communication purposes.

3.22 The frequency bands used by TV and radio broadcasting services have also been harmonised for many decades to facilitate coordination between neighbouring countries and to assist the development of consumer markets. More recently, an increasing number of radio frequency bands have been internationally harmonised for commercial radio systems, such as wireless mobile communications.

3.23 While the “allocation” and/or “assignment” of spectrum is a national function, the global regulation of spectrum is primarily within the remit of the International Telecommunication Union (“ITU”), while European regulatory functions lie with the EU and the European Conference of Postal and Telecommunications Administrations (“CEPT”). These bodies define the broad framework within which all spectrum users must operate, and in some cases, these bodies develop harmonised decisions, recommendations, and approaches for the use of spectrum.

3.24 Harmonised radio frequency bands provide considerable benefits in facilitating the development of international services, promoting economies of scale with respect to the manufacture of radio equipment (thereby lowering both the cost of deploying wireless networks and the cost of wireless devices for consumers), and minimising the risk of interference between users.

3.25 As the radio spectrum manager for Ireland, ComReg is charged with the implementation of international treaties, agreements and obligations[15] relating to the use of radio spectrum in the State. The implementation of these measures often requires action in relation to the allocation and/or assignment of radio spectrum as discussed below.

3.26 Along with the DECC, ComReg plays an active role in international fora to ensure that, as far as possible, decisions relating to the international radio spectrum regulatory framework meet Ireland's specific requirements. ComReg also participates in technical compatibility studies and in the development of technical standards to support more efficient and flexible use of the radio spectrum.

The allocation of radio spectrum in Ireland

3.27 The allocation of radio spectrum means "the designation of a given frequency band for use by one or more types of radiocommunications services, where appropriate, under specified conditions".[16] An allocation identifies the services that could potentially use a radio frequency band and is an important activity in facilitating the international coordination of radio spectrum between regional areas and neighbouring countries, thereby reducing the potential for interference while enabling economies of scale.

[15] The interference-free operation of radiocommunication systems across international borders is achieved through the implementation of the ITU Radio Regulations and Regional Agreements, and the efficient and timely update of these instruments through the processes of the World and Regional Radiocommunication Conferences. The ITU Radio Regulations, which have the status of an international intergovernmental treaty, provide a framework for the use of the radio frequency spectrum and satellite orbits. To keep pace with the fast development of technologies and the consequent convergence of services and technologies, the ITU Radio Regulations are revised every three to four years at a World Radiocommunication Conference. The last WRC was held in November 2019 in Egypt.

The radio spectrum decisions and recommendations of the CEPT (ECC Decisions and ECC Recommendations) are non-binding on national administrations. The list of ECC Decisions/Recommendations and their implementation status for all CEPT countries, including Ireland, is maintained at http://www.erodocdb.dk.

The radio spectrum decisions of the EU (the EU/EC Decisions) are binding decisions on EU Member States. These decisions are normally based on the relevant technical harmonisation measures as outlined in the CEPT reports to the EC and are generally adopted subsequent to the prior adoption of a CEPT ECC Decision. A list of EU Decisions/Recommendations is maintained at https://ec.europa.eu/digital-agenda/en/radio-spectrum-policy-document-archive

[16] European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. 333 of 2011).

3.28 Under the 2002 Act, ComReg is obliged to publish and revise a Radio Frequency Plan ("Plan")[17]. The Plan is comprised of a set of tables which sets out Ireland's radio spectrum allocations for 8.3 kilohertz (kHz) to 3000 Gigahertz (GHz), indicating the services to which each frequency band is allocated ("frequency allocations") in the radio spectrum and is an important tool for users of radio frequencies.

3.29 The Plan is updated regularly in line with the outcomes of the ITU World Radiocommunication Conferences ("WRCs") and other relevant developments, such as the adoption of European harmonisation decisions and recommendations for a particular radio frequency band or service.

3.30 In June 2021, alongside the publication of an updated plan[18] ComReg made available a Beta release of a new online version of the Plan, which provides search and reference functionality for stakeholders[19]. This is being made available for user testing purposes and provides early access to an interactive version of the RFPI for users to test and trial prior to formal release of the product, expected towards the end of 2021.

The assignment of radio spectrum in Ireland

3.31 The assignment of radio spectrum refers to the spectrum management activities that issues, and authorises the use of, rights of use of radio frequencies[20]. In Ireland, the possession and use of radio equipment requires authorisation from ComReg and this authorisation may take the form of either a licence or a licence-exemption under the 1926 Act[21].

3.32 Ideally, spectrum should be distributed efficiently, which means giving access to the combination of uses and users that maximises economic activity, subject to taking account of social welfare, public and other legitimate policy concerns. Granting spectrum rights of use to one user rather than another can greatly impact the extent to which the radio spectrum is efficiently used to deliver overall benefits for society.

[17] Section 35 of the 2002 Act.
[18] See ComReg document 20/58R2
[19] See https://rfpi.comreg.ie/
[20] A spectrum assignment refers to the rights of use for specific radio frequencies within a frequency band issued to an individual or for a station and usually under specified conditions (e.g. in the context of radio frequencies for ECS, one or more of the conditions identified in Part B of the Schedule to the Authorisation Regulations).
[21] Section 3(1) and section 3(6) of the Wireless Telegraphy Act 1926, as amended.

3.2.3 Promotion of effective competition in management of spectrum for ECS and spectrum management tools

3.33 As noted earlier, spectrum is an essential input in the provision of ECS and an inefficient assignment has the potential to distort competition and create inefficient outcomes for society. The following three principal methods are used to address these potential issues:

1) market access;

2) access to essential inputs; and

3) demand-side factors.

3.34 ComReg's 2021-2023 Electronic Communications Strategy Statement[22] identifies specific strategic intents and supporting goals that can be used to support those methods.

3.35 ComReg set out in its Electronic Communications Strategy Statement that the availability of spectrum is necessary for the entry and expansion of many operators in electronic communications markets. Therefore, the efficient management of the national radio spectrum (and numbering) resources is required to facilitate competition, enhance connectivity and promote efficient investment, taking into account the potential impact that the assignment and allocation of these inputs may have on downstream markets.

Strategic intention: Competition & Investment
Goal 1.6: The management of spectrum and numbers facilitates competition, enhances connectivity and promotes efficient investment.

Figure 2: Goal 1.6 of ComReg's 2021-2023 Electronic Communications Strategy Statement

3.36 Goal 1.6 of ComReg's Electronic Communications Strategy Statement reflects a primary objective of ComReg's spectrum management functions because effective competition between wireless service providers brings long term benefits to consumers in terms of enhanced competition, choice, quality of services and innovation. The efficient assignment and use of the radio spectrum is an important consideration in promoting efficient investment.

[22] ComReg Document 21/70 – Electronic Communications Strategy Statement 2021-2023 – Published 30 June 2021. https://www.comreg.ie/publication-download/electronic-communications-strategy-statement-2021-2023

3.37 In that regard, ComReg takes a proactive approach in ensuring the efficient assignment and use of the radio spectrum while facilitating competition and producing an optimal outcome for society. ComReg has a number of spectrum management tools that are designed to serve the interests of all users of the radio frequency spectrum and strike the right balance between those users while ensuring that spectrum is used efficiently, and that competition is not distorted. ComReg uses these tools as required, depending on the circumstances of each particular assignment, in order to derive the maximum benefit for society and contribute to the development of the internal market, while promoting the interests of users within the Community. These tools are illustrated in Figure 3 below.

Figure 3: Spectrum Management Tools

3.38 The appropriate deployment of these tools involves the careful consideration of a broad range of factors (including administrative, regulatory, social, economic and technical considerations) with a view to ensuring that radio spectrum is efficiently assigned and used. Any measures must also be objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose. The use of such spectrum management tools often requires detailed consideration with relevant stakeholders.

3.39 As part of its spectrum management function, ComReg monitors the market in order to remain informed of changes to the market since previous radio spectrum management strategy statements and spectrum awards. ComReg is conscious that the circumstances previously present may have changed or the market has developed such that the spectrum management tools referred to above may need to be deployed differently to promote competition and protect consumers. This approach is in line with ComReg's strategic intention to enable consumers to choose and use communications services with confidence.

Strategic intention: Consumer Protection
Goal 2.1: ComReg identifies and understands consumer harms.

Figure 4: Goal 2.1 of ComReg's 2021-2023 Electronic Communications Strategy Statement

3.40 In that regard, ComReg continually tracks end-user usage trends (see ComReg Quarterly Reports) and has completed various market research and forecasting in order to inform future spectrum management activities. For example:

- Mobile Consumer Experience survey 2019 (see Document 19/101);
- Connectivity Survey (See Document 21/30);
- Impact of Covid-19 on consumer use and perception of telecommunications services (see Documents 20/107, 21/06, 21/42); and
- ComReg Technology Survey (see Document 21/32b).

3.41 The following points have particular spectrum management implications:

- The Mobile Consumer Experience Survey highlighted several key issues and concerns with regard to mobile connectivity including:
    - inside the home is where consumers (c. 65%) mostly use their mobile phone for voice and data services;
    - the incidence of experiencing service issues in the house for calls/text and data (33%) is higher than the same service issues that occur outside the home (17%);
    - Voice calls remain an important service for consumers, with 93% using their mobile phone to make traditional voice calls using telephone numbers;
    - the main outdoor service issues across all types of consumers (rural and urban) relate to voice calls; and
    - rural consumers experience higher rates of service issues regardless of location with higher levels of service issues arising in the home or part thereof (i.e. indoors).

- The Impact of Covid-19 Surveys highlighted consumer perception of mobile connectivity during the Covid-19 pandemic including:
    - 3 in 4 of surveyed consumers strongly value being able to access and use their mobile phone during the ongoing Covid-19 pandemic (similar to Sept '20 levels).[23]
    - 69% of surveyed consumers used their mobile phone service to work from home/work remotely (including tethering) since 1st of March 2020; [23]
    - 87% of surveyed consumers believe that their mobile phone service for voice calls service is adequate to allow them to carry out work related activities while at home; and
    - 79% of surveyed consumers believe that their mobile phone for data / internet access service is adequate to allow them to carry out work related activities while at home. [23]
- The volume of mobile data traffic is increasing, for example in 2020 mobile data increased by 44% compared to 2019[24], and mobile data increased by 121% in Q3 2021 when compared to Q1 2019.[25] In addition, mobile voice services account for 87% of total voice traffic in Ireland.[26]
- The increase in mobile data traffic is also reflected in terms of consumers' average mobile phone usage per day. For example, a consumer may spend an average of 30 minutes per day on making/receiving traditional mobile call compared to 130 minutes per day on activities requiring MBB (e.g. emailing, social media, internet-based applications for voice calls, streaming TV apps and video-on-demand, streaming music and browsing general websites).[27]

3.42 ComReg completed the following work streams to (a) inform future spectrum award proposals, (b) provide additional consumer information and (c) improve the connectivity experience for consumers:

- On 18 December 2020, ComReg published its response to consultation and Decision on the Multi Band Spectrum Award for the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands (see ComReg Document 20/122 and Multi Band Spectrum Award webpage);
- Published "Improving connectivity in Ireland – Challenges, solutions and actions". (see Document 18/103);

[23] Document 21/42 – Impact of Covid-19 on consumer use and perception of telecommunications services - Survey Q1 2021
[24] Mobile data traffic was 539,697,814 GB in 2019 and 778,683,589 GB in 2020.
[25] Mobile data traffic was 120,721,496GB in Q1 2019 and 267,579,129GB in Q3 2021.
[26] ComReg Quarterly Key Data as of Q3 2021.
[27] Slide 51 of Document 19/101.

- Commissioned and published “Meeting Consumers’ Connectivity Needs” by Frontier Economics (see ComReg Documents 18/103a and 18/103b);
- Commissioned and published “Future Mobile Connectivity in Ireland” – by Oxera Consulting with Real Wireless (see ComReg Documents 18/103c and 19/124f);
- Commissioned and published “Coverage obligations and spectrum awards” by DotEcon (see ComReg Documents 18/103d and 19/124b);
- in response to the extraordinary situation presented by COVID-19, ComReg consulted upon and put in place four licensing frameworks (with the consent of the Minister[28] [29]) for the temporary assignment of spectrum rights in the 700 MHz Duplex, 2.1 GHz and 2.6 GHz Bands.[30] ComReg determined that the temporary assignment of spectrum rights of use was necessary as the ability to make or receive voice calls and access services over the internet (particularly indoors) was likely to be of significant importance and a key priority for consumers during the COVID-19 Situation;[31] [32] and
- Made available the Outdoor Mobile Coverage Map - a solution to provide consumers with a visual (geographic-based) means of presenting predicted mobile outdoor coverage throughout Ireland, through the use of an interactive website[33].

3.43 This approach is also consistent with ComReg’s strategic intention that end-users have widespread access to high-quality and secure communications networks, services and applications, specifically Goal 3.2 of the ECS Strategy Statement.

Strategic intention: Connectivity and Network Resilience
Goal 3.2: Utilising the regulatory toolkit, ComReg’s activities promote connectivity and/or incentivise infrastructure rollout.

Figure 5: Goal 3.2 of ComReg’s 2021-2023 Electronic Communications Strategy Statement

[28] The Minister for Communications, Climate Action and Environment.
[29] The Minister for the Environment, Climate and Communications.
[30] COVID-19: Temporary Spectrum Management Measures | Commission for Communications Regulation (comreg.ie)
[31] gov.ie - Speech of the Taoiseach, Leo Varadkar TD, Post Cabinet Statement, Tuesday 24 March 2020 (www.gov.ie)
[32] Working from home during COVID-19 (citizensinformation.ie)
[33] See https://coveragemap.comreg.ie/map

3.44 Regulated entities should be fully cognisant of their obligations, comply with them and have an internal culture of compliance. It is therefore ComReg's goal that regulated entities are pro-active in ensuring their own compliance, for example, with the conditions that attach to radio spectrum licences issued by ComReg. ComReg encourages operators to have robust internal controls to prevent and detect non-compliance.

3.45 In meeting its strategic intention regarding compliance and enforcement, ComReg actively monitors the radio spectrum[34] to ensure that it is being used in compliance with relevant regulations and authorisations and will intervene where appropriate.

3.46 ComReg publishes an annual report to inform interested parties of its radio spectrum compliance and enforcement activities, the relevant legal framework, and to provide information on existing and/or new compliance requirements.

Strategic intention: Compliance and Enforcement
Goal 4.1: Regulated entities are pro-active in ensuring their own compliance. **Goal 4.2: ComReg's compliance and enforcement activities are conducted using fair and objective processes and are targeted and prioritised appropriately.** **Goal 4.3: ComReg has an effective set of powers to incentivise compliance and effectively monitor and enforce.**

Figure 6: Goals 4.1, 4.2, and 4.3 of ComReg's 2021-2023 Electronic Communications Strategy Statement

3.47 ComReg recognises the need to engage with different stakeholder groups and interested parties. This engagement takes several forms, including forums, formal consultation[35] and publication of proposals on its website. This is consistent with ComReg's strategic intention to be an effective, agile and relevant regulator as expressed in Goal 5.3 of the ECS Strategy Statement.

[34] For example, ComReg undertakes market surveillance of products, radio frequency interference investigations, radio spectrum monitoring and compliance and enforcement activities.
[35] ComReg Document 11/34 – ComReg Consultation Procedures – published 6 May 2011

3.48 ComReg continuously engages with a range of regulatory bodies at an international level, including other European administrations, the Radio Spectrum Policy Group ("RSPG")[36], the ITU and the CEPT with the purpose of contributing to radio spectrum management regulatory policy discussions and inputting to regulatory decision making in an international setting. In some instances, ComReg has taken leadership roles in these bodies, in recognition of its standing as an expert-led and knowledge-driven regulator. International collaboration facilitates the development of an open and competitive environment in which innovation, creativity and competition can thrive.

3.49 This approach is consistent with ComReg's strategic intention to contribute to and learn from the best practices of others and devote considerable resources to understanding the regulatory analyses and decisions made by its international colleagues.

Strategic intention: Organisation
Goal 5.3: ComReg is proactive on engagement with a range of stakeholders **Goal 5.4: ComReg contributes to and learns from international best practice.**

Figure 7: Goals 5.3 and 5.4 of ComReg's 2021-2023 Electronic Communications Strategy Statement

[36] The Radio Spectrum Policy Group (RSPG) is a high-level advisory group that assists the European Commission in the development of radio spectrum policy – https://rspg-spectrum.eu/

Chapter 4

4 Factors informing ComReg's work plan for 2022-2024

4.1 A wide range of factors affect the demand for and the supply of radio spectrum including end-user demand, technology changes or advancements, the international harmonisation of radio spectrum, and relevant national or international policies.

4.2 These factors also influence each other. For example, increasing end-user demand for a service incentivises advancements in technologies used to provide these services and the development of international harmonisation measures or national/international policies, and vice versa.

4.3 In this chapter, ComReg outlines several factors which have informed its radio spectrum work plan for 2022 to 2024, including:

- International harmonisation of radio spectrum;
- World Radiocommunication Conferences;
- European Commission harmonisation decisions;
- End-user demand (and, in particular, for mobile broadband);
- Technology changes and advancements (service specific);
- The expiry of existing licences in the near future (e.g. within the next 5 years); and
- the ECS sector and climate change.

4.1 International harmonisation of radio spectrum

4.4 The international harmonisation process plays a key role in determining the demand for and the supply of radio spectrum, given its benefits in terms of facilitating economies of scale in the manufacture of radio equipment (which lowers both the cost of deploying wireless networks and the cost of wireless devices for consumers), and the minimisation of interference between users.

4.5 International harmonisation, and the benefits provided by it are particularly important for smaller countries such as Ireland, with limited ability to affect the technology roadmaps typically adopted by global suppliers of radio equipment.

4.6 Harmonised radio spectrum measures are set by a number of bodies including the ITU (and/or the constituent regional groups), the CEPT and the EU bodies. These bodies generally set a forward-looking work programme, and this provides an indication of future harmonisation measures. For example, readers are directed to the agenda item of the ITU world radiocommunication conference ("WRC") outlined below and the work plans of CEPT[37] and Radio Spectrum Policy Group.[38] In some instances, harmonisation decisions are obligatory on Member States thereby directly increasing the supply of spectrum at a national level and usually with a defined timeframe.[39]

[37] For example, the ECC Strategic Plan for the period 2020-2025 identifies the following major topics:

- To review, in line with Agenda Item 1.5 of WRC-23, the UHF band (470-960 MHz), taking into account the current use by PMSE in this band;
- Wireless broadband and connectivity, including mobile broadband, WAS/RLAN, backhaul, PMSE, verticals and use of higher frequency bands;
- Issues relating to general authorisations and licence exempt use of spectrum (e.g. SRDs, including for IoT/M2M, and other similar uses of spectrum);
- Next generation satellite systems (including mega Non-Geostationary-Satellite Orbit constellations and short duration satellites) and other initiatives which may require technical and/or regulatory conditions; and
- New business models and applications which may emerge based on the latest advances in network technologies, e.g. smaller cell sizes for 5G with appropriate backhaul infrastructure and neutral host network infrastructure models.

[38] The RSPG work programme for 2020 and beyond (RSPG20-005 Final Rev1) includes the following work items:

- Spectrum Sharing – pioneer initiatives and bands;
- Additional spectrum needs and guidance on the fast rollout of future wireless broadband networks;
- Role of Radio Spectrum Policy to help combat Climate Change;
- Peer review and Member States cooperation on authorisations and awards;
- World Radiocommunication Conference (WRC); and
- An opinion on the new EU Radio Spectrum Policy Programme (RSPP)

[39] In Europe, EU/EC decisions are obligatory on Member States, while CEPT decisions are non-binding and voluntarily adopted by its members.

4.7 In addition to the harmonisation of radio spectrum bands, the setting of harmonised radio equipment standards play an important facilitating role in spectrum management, particularly in terms of minimising the risk of interference between users. Within Europe, the main stakeholders responsible for setting these standards are the European Committee for Standardisation ("CEN"), the European Committee for Electrotechnical Standardisation ("CENELEC") and the European Telecommunications Standards Institute ("ETSI"). These bodies also work alongside national technical committees and various industry bodies, for example, the 3GPP[40] from which standards for mobile technologies (e.g. LTE, LTE+ and 5G NR) are developed.

4.8 ComReg actively engages in the work of the EC, the CEPT and the ITU where it has prioritised tasks and activities and where is has resources available to do so.

4.1.1 World Radiocommunication Conferences

4.9 The ITU Radio Regulations form an international treaty governing the use of the radio-frequency spectrum and the geostationary-satellite and non-geostationary-satellite orbits. Under the terms of the ITU Constitution, only a world radiocommunication conference can:

- revise the ITU Radio Regulations and any associated frequency assignment and allotment plans;
- address any radiocommunication matter of worldwide character;
- instruct the ITU Radio Regulations Board and the Radiocommunication Bureau, and review their activities; and
- determine questions for study by the Radiocommunication Assembly and its study groups in preparation for future WRCs.

4.10 The ITU Radio Regulations are reviewed and revised at world radiocommunication conferences which are held every three to four years. Revisions are made on the basis of an agenda item determined by the ITU Council, which take into account recommendations made by previous world radiocommunication conferences. The general scope of the agenda of a WRC is established four to six years in advance, enabled by the concurrence of a majority of ITU Member States.

[40] 3GPP, or the 3rd Generation Partnership Project, was initially formed in December and is an engineering organization that develops technical specifications which are then then transposed into standards by the seven regional Standards Setting Organizations (SSOs) that form the 3GPP partnership. For Europe, ETSI is the SSO for Europe.

4.11 The 38th World Radiocommunication Conference was hosted in Egypt from 28 October to 22 November 2019 and the outcome of WRC-19 has influenced the work plans of the relevant bodies of the EC and CEPT and consequently ComReg in the implementation of new harmonised measures. Annex 2 of the consultation on this strategy (Document 21/90) detailed the main topics and outcomes from the WRC-19.

4.12 Delegates at the WRC-19 also agreed the agenda of the next Conference in 2023, as well as the preliminary agenda for 2027. The agenda for WRC-23 sets the roadmap for important future technological developments, which will be addressed by both the ITU-R study groups and at regional level in the upcoming four years.

4.13 The agreed WRC-23 agenda contains nineteen specific and eleven standing agenda items, to be studied in the years between WRC-19 and WRC-23. Thirteen of these agenda items originate at least partially from proposals made by the CEPT.

4.14 Led by the DECC, Irish preparations for WRC-23 are underway. ComReg is heavily involved in this work and will assist the DECC to meet the objectives and goals that will be established in the national preparatory process.

4.15 The following are the major agenda items of interest to Ireland at WRC-23:

- Mobile Broadband and Broadcasting;
- Mobile Broadband Communications;
- Aeronautical Communications;
- Satellite Communications;
- Scientific Use of Spectrum; and
- Other Matters.

4.16 ComReg is actively engaged, within its resource constraints, in the work group preparing CEPT's input to WRC-23 as well as in the Radio Spectrum Policy Group which advises the European Commission on aspects of importance to the Union that will be dealt with at WRC-23.

4.2 European Commission harmonisation decisions

4.17 The adoption of EC harmonisation decisions on radio spectrum impacts ComReg's work plan as these decisions generally place obligations on EU Member States to carry out specific actions as set out in the decision within specific timeframes.

4.18 This section discusses a number of:

- existing harmonisation decisions, including those relevant to:
    - Wireless Broadband ("WBB") or Mobile and Fixed Communications Networks ("MFCN"); and
    - Intelligent transport systems ("ITS")[41] in the 5.9 GHz Band.
- future harmonisation decisions that are currently being drafted and which may influence ComReg's work plan once adopted.

4.2.1 Existing EC harmonisation decisions

Spectrum bands for WBB/MFCN

4.19 During the 2019-2022 period, several EC harmonisation decisions for WBB were adopted as outlined in Section 3.2.4 of Document 21/90. ComReg has undertaken actions to implement these EC Decisions, noting among other things that:

- the MBSA 2021 award process will assign spectrum in accordance with the relevant EC decisions for the 700 MHz, 2.1 GHz, and 2.6 GHz Bands;
- 3.6 GHz licences were amended to reflect the new harmonised technical parameters for Active Antenna Systems ("AAS") at 3.6 GHz Band base stations set out in Decision (EU) 2019/235, thus enabling the licensees to take advantage of the capabilities of AAS technology for increasing capacity and coverage on their 5G networks in the 3.6 GHz Band; and
- while actions have been taken to implement the EC decisions related to the 700 MHz Guard Bands and Duplex Gap, the 1.4 GHz Band and the 26 GHz Band, ComReg has yet to finalise its consultation process for these bands, prior to assignment of spectrum. Subject to demand and following the completion of the MBSA 2021, ComReg will continue its consultation on these spectrum bands, noting that it may also be appropriate to include other soon to be harmonised spectrum bands in any such consultation.

4.20 Regarding assigning spectrum in harmonised bands for liberalised use including for WBB/MFCN purposes, ComReg is currently focused on completing the MBSA 2021 award. The successful completion of that award, will increase the total amount of harmonised spectrum available for WBB and other services by 47% from 750 MHz currently to 1100 MHz post the award, as illustrated in Figure 8 below.

[41] ITS means a range of systems and services, based on information and communications technologies, including processing, control, positioning, communication and electronics, that are applied to a road transportation system or an urban rail transportation system, or both.

4.21 This will provide operators with a significant quantum of spectrum with which to develop their networks to meet the increasing demand for faster and more advanced mobile/WBB services. The spectrum to be assigned includes sub-1 GHz spectrum suitable for the provision of widespread coverage of 4G and new 5G services, as well as spectrum in bands above 1 GHz which is ideally suited to providing significant network capacity for mobile broadband and WBB services.

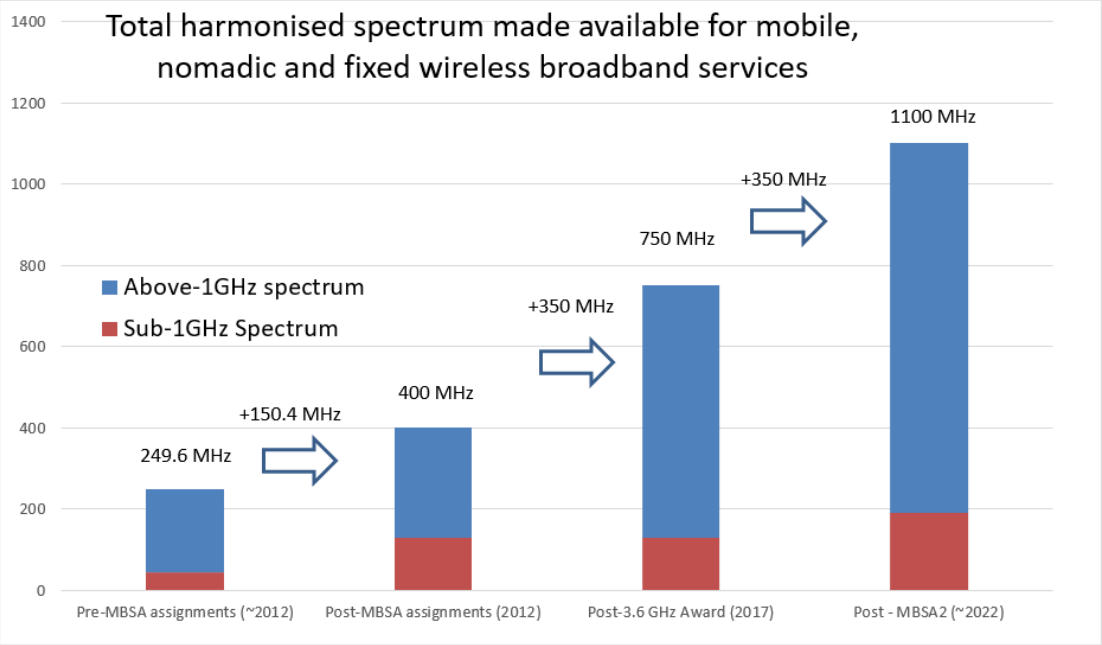

Figure 8: Total harmonised spectrum made available for mobile, nomadic and fixed wireless broadband services

Intelligent Transport Systems in the 5.9 GHz Band

4.22 Intelligent transport systems cover both road ITS[42] and urban rail ITS[43] and has the potential to offer major improvements in transport system efficiency, in traffic safety and in comfort while travelling.

[42] Road ITS include cooperative systems based on real-time communications between the vehicle (including cars, trucks, bicycles, pedestrian, etc.) and its environment (other vehicles, infrastructure, incl. industrial, agricultural, construction sites)

[43] Urban rail ITS consist of public transport systems permanently guided by at least one control and management system, intended to operate local, urban and suburban passenger services separated from general road and pedestrian traffic.

4.23 In October 2020 the European Commission published an updated ITS implementation decision ("(EU) 2020/1426")[44]. As a consequence, ComReg designated the frequency band 5875-5935 MHz for intelligent transport systems by allocating this frequency band, on a non-exclusive basis to ITS, in the December 2020 revision of the radio frequency plan for Ireland[45].

4.24 ComReg's work plan item for ITS for the period 2022 – 2024 is to consult on the manner in which the 5.9 GHz Band will be regulated for ITS in Ireland. This will include consideration of what elements of the ITS system may best be exempted from requiring a licence, what elements would require licencing as well as the licence regime (technical conditions, fees, award mechanism, etc.) that ComReg proposes to put in place.

Changes to the GSM-R licence regime

4.25 GSM-R is a digital communications system, based on the use of GSM technology, which has been developed to replace the existing analogue VHF/UHF rail network communications system. GSM-R, in contrast to public mobile GSM, constitutes a non-public communications network for use by European railway operators. In support of railway digitalisation and service innovation, GSM-R and its successor(s), including Future Railway Mobile Communication System ("FRMCS"), are now designated by the overarching term of Railway Mobile Radio ("RMR").

4.26 To support this transition to FRMCS, in September 2021 the EC harmonised the use of two frequency bands to facilitate the introduction of RMR[46]. This implementing decision requires Member States to:

- designate and make available on a non-exclusive basis the paired frequency bands 874.4-880.0 MHz and 919.4-925.0 MHz by January 2022; and
- based on national demand, designate and make available on a non-exclusive basis the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio at the latest by 1 January 2025.

[44] Commission implementing decision (EU) 2020/1426 of 7 October 2020 on the harmonised use of radio spectrum in the 5875-5935 MHz frequency band for safety-related applications of intelligent transport systems (ITS) and repealing Decision 2008/671/EC.
[45] See ComReg 20/58R1 – Radio Frequency Plan for Ireland – published 18 December 2020.
[46] Commission Implementing Decision (EU) 2021/1730 on the harmonised use of the paired frequency bands 874,4-880,0 MHz and 919,4-925,0 MHz and of the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio

4.27 During the 2022-2024 period ComReg intends to implement the changes required by the implementing decision. This may require new regulations to be put into place and provisions would need to be made to take into account the current GSM-R licence held by Irish Rail which is due to expire on 26 November 2026.

4.2.2 Future EC Harmonisation Decisions

4.28 This section discusses future EC harmonisation decisions and ComReg's intentions for such during the 2022-2024 period.

Frequency Bands Above 24 GHz

4.29 On 30 March 2020, the European Commission submitted to CEPT a mandate to develop least restrictive harmonised technical conditions suitable for next-generation (5G) terrestrial wireless systems for priority frequency bands above 24 GHz.[47]

4.30 In response to Task 3 of the EC mandate, dealing with the 66-71 GHz frequency band, CEPT published Report 78 which considers that the existing technical conditions contained in both EC Decision for SRD (EU) 2019/1345 and CEPT ERC Recommendation 70-03 are sufficient to allow for the introduction of MFCN 5G systems in that band and no changes are required at this time.

4.31 In response to Tasks (1, 2 and 4) of the EC mandate on 40.5-43.5 GHz frequency band, CEPT is drafting a Report which will consider, amongst other things, whether specific out-of-block limits are needed below 40.5 GHz for coexistence with services in the adjacent 39.5-40.5 GHz frequency band. This issue was not envisaged when the mandate was first developed.

4.32 In Ireland, fixed radio links are currently licensed in the 40.5 – 43.5 GHz (42 GHz) band, with 63 licences currently issued. The future use of the 42 GHz band will be subject to any decisions adopted by the EC and/or ECC. Therefore, ComReg intends to continue to monitor and input into the discussions on this matter at the EC and ECC. If any EC and/or ECC decisions are adopted during the 2022-2024 period, ComReg will consider the appropriate implementation of those decisions as required.

[47] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=66338

EC Mandate on 5G: 900/1800 MHz

4.33 On 12 July 2018, the European Commission submitted to CEPT a mandate to review the harmonised technical conditions for certain EU-harmonised frequency bands, including the 900 and 1800 MHz bands, and to develop least restrictive harmonised technical conditions suitable for next-generation (5G) terrestrial wireless systems.[48]

4.34 In response to the mandate, the CEPT has delivered its Report 72[49] and Report 80[50], and in November 2021, CEPT consulted upon a draft of the revised ECC Decision (06)13.[51]

- The CEPT Report 72 clarifies that within the 900 MHz band, narrowband systems including GSM and cellular IoT systems will continue to be in commercial operation for the foreseeable future. Furthermore, it sets out a frequency separation of 200 kHz for certain coexistence scenarios of terrestrial systems providing electronic communications services, including 5G NR.
- The CEPT Report 80 delivers a harmonised frequency arrangement and '5G-ready' harmonised least restrictive technical conditions for both bands. Active antenna systems are considered only for base stations in the 1800 MHz band. The outcome of the CEPT work ensures continued coexistence of terrestrial systems providing electronic communications services with GSM in the 900 MHz band, in line with the requirements of the GSM Directive.
- The draft of the revised ECC Decision (06)13 sets out CEPT's harmonised technical conditions for mobile/fixed communications networks (MFCN) including terrestrial IMT systems, other than GSM and EC-GSM IoT, in the bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz.

[48] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=57746

[49] CEPT Report 72 - Review of technical conditions in the paired terrestrial 2 GHz and the 2.6 GHz frequency bands, and the usage feasibility of the 900 MHz and 1800 MHz frequency bands - https://docdb.cept.org/download/129

[50] CEPT Report 80 - Channelling arrangements and least restrictive technical conditions suitable for ECS including 5G terrestrial wireless systems in the 900 MHz and 1800 MHz frequency bands, in compliance with the principles of technology and service neutrality - https://docdb.cept.org/download/3454

[51] ECC Decision (06)13 - *Harmonised technical conditions for mobile/fixed communications networks (MFCN) including terrestrial IMT systems, other than GSM and EC-GSM IoT, in the bands 880-915/925-960 MHz and 1710-1785/1805-1880 MHz* https://cept.org/files/9522/Draft%20revision%20of%20ECC%20Dec%20(06)13.docx

4.35 On the basis of both CEPT Reports, the Commission presented to the Radio Spectrum Committee at its RSC#75 meeting, for discussion, an initial draft of a Commission Implementing Decision (RSCOM21-20). That draft Decision should formally replace Commission Decision 2009/766/EC[52] while preserving compatibility with and amending the existing technical framework for the 900 MHz and 1800 MHz frequency bands as regards technical conditions suitable for next-generation (5G) terrestrial wireless systems..

4.36 At the RSC's 77th meeting a stable draft Commission Decision was agreed, and Member States were asked to submit final editorial comments by 14 December 2021. The European Commission stated it would make the updated translations available and launch the written procedure for the adoption of the implementing decision with a deadline of 14 January 2022.

4.37 Three Liberalised Use licences have been granted for the 900 MHz and 1800 MHz bands[53]. Therefore, ComReg intends to consider the appropriate implementation of the future EC Implementing Decision during the 2022-2024 period.

Harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of wireless access systems including radio local area networks

4.38 On 14 April 2020 the Commission gave a mandate to CEPT to amend Commission Decision 2005/513/EC[54] on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems ("WAS") including Radio Local Area Networks ("RLANs") following WRC-19.

4.39 The goal of the mandate is to implement the results of WRC-19 that revised Resolution 229 on the use of the bands 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz by the mobile service for the implementation of wireless access systems including radio local area networks. In particular, the mandate tasked the CEPT to explore new options for WAS/RLANs within the 5150-5250 MHz band and allowing the use of WAS/RLAN equipment on board vehicles (aircraft, road vehicles (cars, buses) and trains) and assess the feasibility of the usage of WAS/ RLANs for Unmanned Aircraft Systems ("UAS") radio links.

[52] Commission Decision of 16 October 2009 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community (notified under document C(2009) 7801)Text with EEA relevance (europa.eu)

[53] Mobile Licences | Commission for Communications Regulation (comreg.ie)

[54] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005D0513&from=EN

4.40 In response to the mandate, CEPT published Report 79[55] and the EC has drafted elements of a revised Commission Implementing Decision on 5 GHz WAS/RLANs for Member States to consider.

4.41 At the RSC's 77th meeting a stable draft Commission Decision was agreed, and Member States were asked to submit final editorial comments by 14 December 2021. The European Commission stated it would make the updated translations available and launch the written procedure for the adoption of the implementing decision with a deadline of 14 January 2022.

4.42 ComReg intends to consider the appropriate implementation of the future EC Implementing Decision during the 2022-2024 period.

The 3800-4200 MHz frequency band for terrestrial wireless broadband systems providing private local-area network connectivity

4.43 At its 75th meeting in July 2021, the EC introduced a discussion document[56] on the consideration of issuing a mandate to the CEPT to assess spectrum needs for the use of the 3800-4200 MHz frequency band[57] by terrestrial wireless broadband systems providing private local-area network connectivity ('private local networks') and to develop harmonised technical conditions for the shared use of the 3800-4200 MHz band.

4.44 On 22 November 2021, the draft Mandate[58] was adopted by the European Commission following a written procedure which sought the opinion of the Radio Spectrum Committee. The next step is for the Commission services to formally submit the Mandate to CEPT.

[55] CEPT Report 79 - Report from CEPT to the European Commission in response to the Mandate to amend Decision 2005/513/EC on the harmonised use of radio spectrum in the 5 GHz band for the implementation of WAS/RLAN following WRC-19 - https://docdb.cept.org/download/3453

[56] https://circabc.europa.eu/ui/group/af096568-9b95-4bb2-84db-45b307b06a22/library/dc872d5b-b071-4f76-bb6f-42efe180142e/details

[57] The band 3800 – 4200 MHz is allocated in Europe to three services on a co-primary basis (fixed, mobile and fixed-satellite (space-to-earth).

[58] Draft Mandate to CEPT on technical conditions regarding the shared use of the 3.8-4.2 GHz frequency band for terrestrial wireless broadband systems providing local-area network connectivity in the Union.

4.45 Relevantly, ComReg has received a number of enquiries related to private networks use of spectrum in the 3800-4200 MHz band. Therefore, ComReg intends to monitor and input to the development of any draft EC and ECC harmonising decisions on the use of the 3800-4200 MHz frequency band by terrestrial wireless broadband systems providing local-area network connectivity which could serve both private (e.g. enterprise) and public (e.g. community-type) networks.

The 6425 - 7125 MHz frequency band

4.46 The mobile industry has expressed an interest in the band 6425-7125 MHz as additional mid-band spectrum for MFCN since it has similar propagation conditions to the 5G pioneer band 3400–3800 MHz. This matter is being considered under agenda item 1.2 of WRC-23. Of relevance here for ITU Region 1 is the consideration of the frequency band 6425-7025 MHz for IMT (the band is already allocated to the mobile service on a co-primary basis). The ITU-R will:

- Study the technical, operational and regulatory issues pertaining to possible use of the terrestrial component of IMT in the band taking into account evolving needs, technical and operational characteristics of terrestrial IMT systems, evolution of IMT, deployment scenarios, needs of developing countries and time-frame in which spectrum would be needed; and
- Conduct sharing and compatibility studies (including with services in adjacent bands where appropriate) in order to protect services with an existing primary allocation, without imposing additional regulatory or technical constraints, and also, as appropriate, on services in adjacent bands.

4.47 At the time of publication of this document, the ECC had adopted a work item for WGSE[59] to study possible technical conditions under which Wireless Access Systems including Radio Local Area Networks could operate and coexist with existing services in the 6425-7125 MHz band, and any additional studies, dependent upon the CEPT position and the results of WRC-23. The EC has not indicated whether it would implement an EC harmonisation decision. ComReg intends to monitor and input to the discussions on this matter within European and at the ITU's WRC-23.

[59] Working Group Spectrum Engineering

4.3 End-user demand for mobile data (i.e. 3G, 4G, 5G services)

4.48 Quarterly mobile data traffic in Ireland increased by over 600% since 2016 (from 35 million GB per quarter to 267 million GB per quarter) as illustrated in Figure 9.

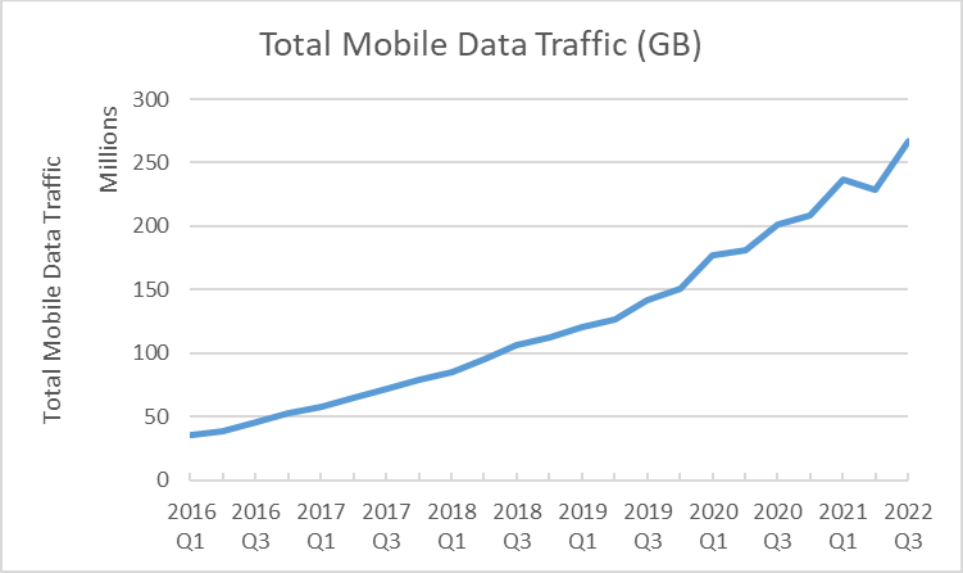

Figure 9: Total Mobile Data Traffic in Ireland per quarter

4.49 This period of rapid growth coincides with increased user demand, the changes in usage due to Government measures to tackle COVID-19, and the early stages of 5G rollout in Ireland.

4.50 Since the publication of the Mobile Data Forecast Report in 2018[60], annual mobile data traffic in Ireland closely followed the baseline scenario before rising above the baseline in 2020, largely due to increased requirements for data during COVID-19.

[60] See Document 18/35

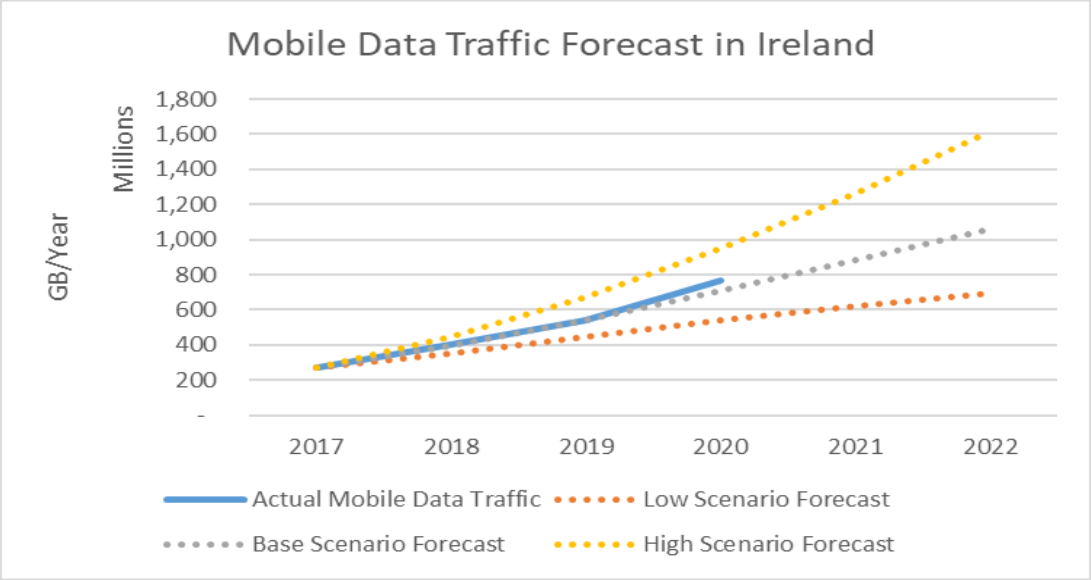

Figure 10: Mobile Data Traffic Forecast in Ireland

4.51 It is expected that demand for mobile data will continue to be strong in 2022 (however, growth is expected at a lower rate following spikes in 2020 and 2021 – see Section 3.2.1 of Document 21/90) and beyond, noting for example that in Western Europe, average monthly mobile data traffic is forecast to rise by 28% annually to 2026.[61]

4.52 ComReg intends to provide updated data forecasts in due course and during the lifetime of this Strategy Statement.

4.4 Technology changes and advancements

4.53 Technology changes[62] and advancements can affect both the demand for and supply of radio spectrum. Under normal circumstances such changes lead to a more efficient use of the radio spectrum and, in some instances, can result in faster or higher quality services being provided which may be sufficient to address increasing end-user demand for services. In other instances, this can result in spectrum being released from one service to another. [63]

4.54 Technology advancements can take many forms including the use of improved modulation or sharing techniques, and the ability for one service to use multiple spectrum bands at the same time using carrier aggregation.

[61] See Ericson Mobility Report June 2021.
[62] Technology changes happen on a less frequent basis than technology advancements. For example, the free-to-air analogue terrestrial television technology operated for over 50 years in Ireland before this technology was replaced by the free-to-air digital terrestrial television technology.
[63] For example, the switch-off of analogue TV broadcasting in 2012 allowed both more TV programme services to be delivered to Irish viewers and released the 800 MHz band for terrestrial networks capable of providing ECS and, in particular, mobile WBB services.

4.4.1 Mobile/WBB advancements in 4G and 5G networks

4.55 Technology advancements are part and parcel of each new generation of mobile technology (e.g. 3G, 4G, 5G, etc.) and are also rolled out during the lifetime of each generation of mobile technology. For example, current 4G networks now use technical advancements such as MIMO[64] and carrier aggregation[65] to provide improved (e.g. faster speeds[66]) services to end users, and the release of additional spectrum in the MBSA 2021 offers further opportunities for the advancement of existing and new services.

4.56 Over the last number of years, the rollout of 4G networks has further advanced in Ireland, and as of Q3 2021, the 4G technology is now the most widely subscribed to and used:

- 65% of mobile subscribers avail of a 4G subscription, compared to 18% availing of a 3G subscription and 13% availing a 2G subscription; and
- 87% of mobile data traffic was carried on the 4G technology, compared to 11% being carried on the 3G technology[67].

4.57 Further, 4G voice calling (VoLTE)[68] on mobile networks has been deployed on two mobile networks in Ireland, Eir and Vodafone, and the 4G technology has also been deployed on Fixed Wireless access ("FWA") to support faster internet speeds and increased data usage.

4.58 In relation to 5G, the rollout of these networks are still at an early stage, with mobile operators only relatively recently having launched 5G services. With the release of a significant amount of additional spectrum in the MBSA 2021 and an increasing availability and take-up of 5G enabled devices, the rollout and capabilities of 5G networks is likely to advance further over the duration of this strategy statement.

4.59 5G technology has the potential to enhance delivery of current WBB applications, such as mobile broadband and FWA, and to open up possibilities for new applications and use cases, such as local-area networks and aeronautical drone control over mobile networks[69].

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[64] MIMO (multiple-input and multiple-output) is a wireless technology that uses multiple transmitters and receivers to transfer more data at the same time.
[65] Aggregation of multiple carriers within frequency bands and across multiple frequency bands
[66] Current LTE-Advanced technology has the potential to offer increased peak data rates of 3 Gbps download and 1Gbps upload in line with ITU requirements for IMT Advanced - also referred to as 4G.
[67] https://www.comreg.ie/industry/electronic-communications/data-portal/tabular-information/
[68] Voice over LTE offers significantly higher voice quality than legacy circuit switched voice.
[69] This would allow drones to be operated beyond the line of sight. In that connection, CEPT is currently working on drafting a Decision to provide harmonised technical conditions for the usage of aerial UE for communications in several harmonised MFCN bands.

4.60 As illustrated in Figure 11 below, the ITU envisages that in the future a diverse number of applications will be supported by the 5G technology and has identified three main usage scenarios:

1. Enhanced Mobile Broadband ("eMBB")[70];
2. Ultra-Reliable Low-Latency Communications ("URLLC")[71]; and
3. Massive Machine-Type Communications ("mMTC")[72].

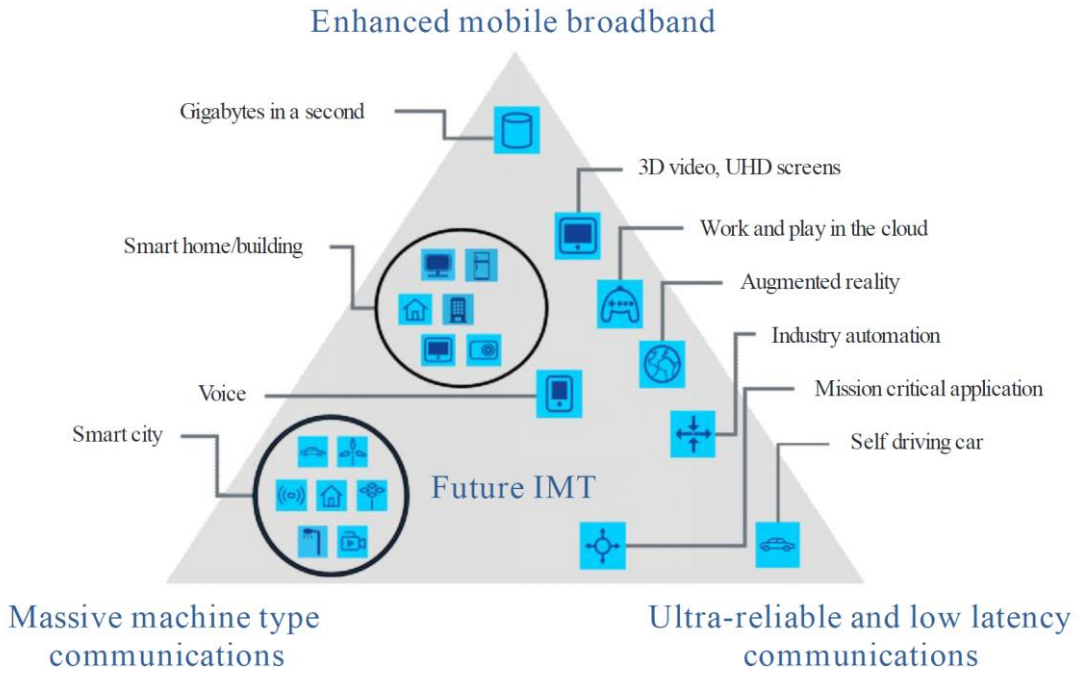

Figure 11: 5G Usage Scenarios

[70] This will cater to ever-growing demand for faster and higher volume data access, in particular for mobile data in high traffic areas - hotspots - such as busy city centres, stadiums and concert venues and will enhance delivery of broadband over FWA networks to domestic consumers.

[71] This will support applications that require uninterrupted and reliable data exchange such as autonomous driving and connected industries and automation (Industry 4.0), as well as gaming and virtual/augmented reality applications which will rely on low latency (i.e. very fast response times for communications between connected devices) to generate a seamless user experience.

[72] This will support a very large number of connected devices typically transmitting a relatively low volume of non-delay sensitive data. mMTC has the potential to extend the current IoT to include almost every machine communicating with other machines, for example for industrial production and for smart cities and smart grids.

4.61 As 4G networks advance, and 5G networks are rolled out, this will help address the expected strong future growth in demand for ever more data traffic on mobile networks, as noted in section 4.3 above. In addition, spectrum currently used for older technologies (e.g. 2G and 3G) will likely be re-farmed for newer more efficient technologies (e.g. 3G/4G/5G). In Ireland, this has already occurred with regard to the 900 MHz, 1800 MHz and 2100 MHz spectrum bands, where this spectrum is now being used for 3G/4G and the support of 5G services, and over time further spectrum bands may get re-farmed and legacy mobile technologies may get decommissioned.

4.62 This decommissioning process has already begun in Europe where, as of August 2021[73]:

- one MNO has switched off its 2G network in Switzerland;
- MNOs in five countries[74] have plans to switch off their 2G networks;
- MNOs have switched off legacy 3G networks in five countries[75]; and
- MNOs in 12 countries plan to switch off their 3G networks.

4.63 In Ireland, should an MNO wish to cease providing services on a technology, under the conditions of its licence[76] it is obliged to notify ComReg not less than 6 months prior to the cessation and use all reasonable endeavours, to ensure that any adverse effects on users from the cessation of use of a technology are minimised.

4.5 Licences expiring in the near future

4.64 Where existing spectrum rights of use are due to expire within the near future (e.g. the next five years) ComReg endeavours to set out its proposals on the future use of such bands well in advance of expiry including, where appropriate, defining and carrying-out an assignment process for same.

4.65 There are a number of licences that will expire in the period 2022 – 2027 (i.e. three years following the 2022 – 2024 timeframe of the Radio Spectrum Management Strategy Statement 2022 to 2024). ComReg sets out the current status of these bands and envisaged next steps in respect of same below.

[73] Source: Cullen International.
[74] The Netherlands, Norway, Poland, Sweden and Switzerland.
[75] All MNOs in Norway, two MNOs in Germany (with a third MNO scheduled to complete its 3G decommissioning by end 2021) and one MNO in each of the Czech Republic, Italy and the Netherlands.
[76] See Condition 6(12) of a Liberalised Use Licence, Condition 6(12) of a 3.6 GHz Band Liberalised Use Licence and Condition 6(1)(k) of a MBSA2 Liberalised Use Licence

4.5.1 2.1 GHz band

4.66 The frequency range 1920-1980 MHz and 2110-2170 MHz ("the Paired 2.1 GHz band") consists of 120 MHz of spectrum and is currently licensed in Ireland for the provision of Universal Mobile Telecommunications System ("UMTS" or "3G") services. These licences were issued following competitions in 2002 and 2007.

4.67 Spectrum rights in the Paired 2.1 GHz Band are currently licensed to Three, Vodafone and Meteor[77]. The licences held by Three and Vodafone will expire in 2022 as follows:

- Three holds two licences in the Paired 2.1 GHz Band, referred to as the "A Licence" (which expires on 24 July 2022) and the "B Licence" (which expires on 1 October 2022); and
- Vodafone holds one licence which expires on 15 October 2022.

4.68 The licence held by Meteor expires on 11 March 2027.

4.69 In Document 20/122, ComReg decided that the Paired 2.1 GHz Band would be included in its proposed award of spectrum rights of use suitable for the provision of WBB.

4.5.2 All Island Licence in the 1785 – 1805 MHz band

4.70 In 2007, a joint ComReg/Ofcom spectrum award was concluded which resulted in the granting of a licence for the 1785–1805 MHz frequency band for mobile wireless services on an all-island basis. On foot of same, a separate licence was issued in both jurisdictions to a single entity, Personal Broadband, for a period of 15 years. In Ireland, the licence was granted on 25 April 2007 under the Wireless Telegraphy (1785–1805 MHz Wireless Access Services) Regulations (S.I. 172 of 2007). This licence is due to expire on 24 April 2022.

4.71 In considering potential future uses of this band, ComReg notes:

- Regulation 6(1) of S.I. 172 of 2007 states that all licences shall expire after 15 years;
- there is no provision in S.I. 172 of 2007 for the renewal of licences granted under same;

[77] Previously a 5 MHz block of unpaired TDD spectrum rights was also licensed to the three MNOs in the frequency range 1900-1920 MHz ("Unpaired 2.1 GHz Band"). These spectrum rights have now been returned to ComReg. Vodafone and Meteor returned these spectrum rights on 11 March 2011 and 28 February 2013, respectively, and Three returned these spectrum rights on 2 October 2021

- that commercial services have not been deployed in either jurisdiction using the spectrum rights held under the licence;
- in 2014, the EC adopted Implementing Decision 2014/641/EU which requires Member States to designate and make available the 1785 – 1805 MHz band for audio PMSE[78] on a non-interference, non-protected basis;
- ComReg has implemented this decision for PMSE use in Ireland;
- the 1785-1805 MHz band is not subject to any harmonisation decision within CEPT or the EU for MFCN; and
- there are no plans at either an EU or ITU level to allocate the band for MFCN; and
- ComReg has set out its general position on the issue of licence expiry/ renewal in a number of publications.

4.72 ComReg has not identified at this point in time any future potential use of the 1785–1805 MHz band following the expiry of the existing licence. Therefore, ComReg does not intend to undertake any work regarding the band during the 2022-2024 period.

4.5.3 GSM – R

4.73 On 27 November 2015, ComReg issued a 10-year licence to Irish Rail for spectrum rights of use of the 876.2-879.6 MHz/921.2-924.6 MHz. As that licence is due to expire on 26 November 2025, ComReg intends to consider the future licensing of Railway Mobile Radio in light of the Commission Implementing Decision on the harmonised use of the paired frequency bands 874.4-880.0 MHz and 919.4-925.0 MHz and of the unpaired frequency band 1900-1910 MHz for Railway Mobile Radio. Please see section 4.2.1 above regarding ComReg's intentions for GSM-R for the 2022 to 2024 period.

[78] Programme Making and Special Events

4.6 The ECS sector and climate change

4.74 In its Electronic Communications Strategy Statement for 2021 to 2023, ComReg notes that increasing awareness and attention is being placed on the relationship between the ECS sector and climate change. While the sector is enabling decarbonisation across the economy, from remote working to smart meters, greater use of ECN/ECS services and devices could potentially increase waste and emissions. The European Commission has emphasised the importance of a sustainable digital sector and will consider measures to improve the circular economy performance of the digital sector as well as its energy efficiency.[79][80]

4.75 In 2019, ComReg issued a Call for Inputs[81] to better understand the relationship between connectivity and decarbonisation, the learnings from which help to shape a number of key projects and commitments in this strategy. ComReg is also actively contributing to an expert networking group on Sustainability at BEREC and will continue to monitor initiatives to address the carbon footprint of the ECS sector.

4.76 Over the coming year, ComReg will commission a study to investigate the impact of climate change on the electronic communications networks – fixed and mobile, in Ireland. The study, which is included as a listed item in the Government's Climate Action Plan[82], will look to assess the vulnerability of electronic communications networks to climate change, to develop an understanding of how climate change has been impacting, and how it can impact in the future, the resilience of the electronic communications sector.[83]

[79] Communication from The Commission to The European Parliament, The European Council, The Council, The European Economic and Social Committee and The Committee of The Regions. The European Green Deal COM/2019/640 Final - EUR-Lex - 52019DC0640 - EN - EUR-Lex (europa.eu).

[80] ComReg notes that the RSPG recently published an opinion on the role of radio spectrum policy to help combat climate change moving forward - RSPG21-041final-RSPG_Opinion_on_climate_change.pdf (rspg-spectrum.eu)

[81] Document 19/126 – Call for Inputs - Connectivity and Decarbonisation – 20 December 2019

[82] Climate Action Plan 2021 – published 5 November 2021. https://assets.gov.ie/203558/f06a924b-4773-4829-ba59-b0feec978e40.pdf

[83] See Action 227 of *"Interim Climate Actions 2021"*. Available at gov.ie - Climate Action Plan 2019 (www.gov.ie)

4.77 ComReg also notes that the Climate Action and Low Carbon Development (Amendment) Act[84] has been enacted, but not yet commenced. It is envisaged that this legislation will establish a legally binding framework with clear targets and commitments set in law, and ensure the necessary structures and processes are embedded on a statutory basis to ensure Ireland achieves national, EU and international climate goals and obligations in the near and long term. This framework, when established, will require ComReg and other public bodies to perform our functions in a way that is consistent with approved national climate plans, strategies, and objectives – as far as is practicable.

4.78 Of relevance, ComReg notes that:

a) in 2019 it completed the 400 MHz band spectrum award[85] which placed ComReg at the vanguard in Europe for the release of radio spectrum for Smart Grid use. The 400 MHz band spectrum award is a key enabler in the reduction of climate emissions, the assignment of which is complementary with Government policy:

- Project Ireland 2040[86] – National Strategic Outcome 8 of the National Planning Framework promotes a transition to a low carbon energy future and which requires decisions around developing and deploying new technologies such as smart grids;
- The National Mitigation Plan[87] – in which the DECC observes that the smart operation of the power system at both transmission and distribution level and energy efficiency will enable maximisation of the existing grid;
- SEAI Smart Grid Roadmap[88] – which states that by 2050, Smart Grids will see an accumulated reduction in energy related emissions by 250 million tonnes.

[84] Climate Action and Low Carbon Development (Amendment) Act 2021 (irishstatutebook.ie)
[85] https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/400mhz-band-spectrum/

[86] gov.ie - Project Ireland 2040 (www.gov.ie)
[87] gov.ie - National Mitigation Plan (www.gov.ie)
[88] Smartgrid-Roadmap.pdf (seai.ie)

b) The consultation on the Satellite Earth Station Licencing regime[89] (see section 5.2.6) intends to identify and consider, amongst other things, the current and future use cases relevant to the frequency bands allocated for various satellite services. For example, regarding Earth exploration-satellite services ("EESS")[90], the band 6425 - 7250 MHz is planned to be used globally by the Copernicus Imaging Microwave Radiometer ("CIMR"). This is one of the six high-priority candidate missions of the Copernicus programme that would increase its ability to serve as a tool for achieving the EU Green Deal (Climate change) objectives. The use of the spectrum band 6425 - 7250 MHz, critically relevant to EU Space Policy, is recognised under ITU RR footnote 5.458.[91]

[89] See Document 21/135

[90] The earth exploration-satellite service (EESS) enables the prediction of precise weather forecast because the large quantity of information required is gathered by EESS sensors. Long term effects on the climate can only be predicted by using active or passive EESS sensors to measure wave height, water temperature, ocean salinity, ozone concentration, and other relevant data on the behaviour of our environment.

[91] In the band 6 425-7 075 MHz, passive microwave sensor measurements are carried out over the oceans. In the band 7 075-7 250 MHz, passive microwave sensor measurements are carried out. Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6 425-7 075 MHz and 7 075-7 250 MHz.

Chapter 5

5 Radio Spectrum work plan for the period 2022-2024

5.1 Appropriate prioritisation of spectrum management workplan activities

5.1 ComReg aims to manage its workload in a manner that seeks to address the needs of a diverse range of stakeholders appropriately and pragmatically. Relevant considerations in this regard include:

- The capacity within the existing radio spectrum bands to meet spectrum needs. Where capacity exists, it may be possible to meet this demand via the existing spectrum assignments or to award new assignments using existing authorisation processes;
- The timing of the expiry of existing rights of use and the requirement for an appropriate re-assignment process in light of factors such as end user demand, harmonisation status, equipment availability and availability of related spectrum bands;
- The international harmonisation status of a spectrum band including any future harmonisation plans;
- The harmonisation status and appropriate timing for release of spectrum bands that are currently unassigned;
- The potential to liberalise the current restrictions placed on licensees which could increase the efficient use of spectrum, facilitate innovation and potentially free up capacity which could be made available for other uses;
- The potential for including multiple spectrum bands in a single award process where appropriate to meet ComReg's statutory objectives;
- The adoption of legislation (national or European) which requires ComReg to take defined actions within a set timeframe; and
- The potential for market mechanisms to address spectrum management

issues.

5.2 ComReg's spectrum work plan 2022 to 2024

5.2 The following outlines the spectrum work plan that ComReg currently intends to carry out within the time period 2022 to 2024[92].

5.2.1 Programmatic spectrum management functions

5.3 ComReg's programmatic work plan items for its spectrum management function for the period 2022 – 2024 are to:

i. Continue to issue licences for wireless telegraphy in accordance with the 1926 Act and the regulations associated with each licence type;

ii. Continue to conduct market surveillance on products being imported into the State;

iii. Continue to conduct surveys of transmission sites to assess compliance with licence conditions;

iv. Continue to monitor licence compliance and take enforcement action where appropriate;

v. Continue to investigate reports of harmful interference to the radio spectrum, giving appropriate priority to cases that have the greatest impact on a service providers ability to provide services;

vi. Continue to publish an annual report detailing activities in respect of market surveillance, investigations of radio interference and enforcement action;

vii. Continue a programme of measurement of NIR and publication of surveys on Siteviewer[93] as appropriate;

viii. Continue to promote Test and Trial Ireland and the benefits of using Ireland as a location to test or trial wireless products and services in a real-world environment;

ix. Advise and assist the DECC in its preparations for WRC-23 agenda items of relevance to Ireland, including participation in relevant CEPT and regional groups; and

x. Assist the DECC in the transposition of the EECC and implement same as appropriate.

[92] This work plan remains subject to emerging matters and the availability of appropriate resources to execute same.
[93] ComReg SiteViewer

5.2.2 MFCN

5.4 ComReg's work plan items for MFCN[94] for the period 2022 – 2024 are to:

i. Complete the Multi-Band Spectrum Award 2021 for the award of long-term spectrum rights of use in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz bands[95];

ii. Continue engagement with Eir and the IAA to resolve compatibility issues[96] between:

a) MFCN use in the 2.3 GHz band and Eir's RurTel network which operates in the 2.3 GHz band; and

b) MFCN use in the 2.6 GHz Band and the IAA's aeronautical primary radars which operate in the adjacent 2.7 – 2.9 GHz band;

iii. Facilitate, via the development of transition plans and grant of transition licences as appropriate, any transition activities[97] that might be required on the part of the Existing 2.1 GHz Band Licensees, the Existing 2.3 GHz Band Licensee (eir) and Winning Bidders in order to comply with the outcome of the Multi-Band Spectrum Award 2021;

iv. Consider the appropriate implementation of the future EC Implementing Decision which would replace Commission Decision 2009/766/EC - to enable the deployment of M2M technologies in the 900 MHz and 1800 MHz frequency bands;

v. Continue to implement relevant EC harmonisation decisions in the bands for MFCN in support of next generation terrestrial wireless systems;

vi. Continue to engage with the relevant stakeholders with a view to obtaining greater clarity on national policy on the use in Ireland of the 700 MHz Guard Bands and the 700 MHz Duplex Gap and, in particular, for BB-PPDR;

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[94] As noted in Document 21/96, ComReg's consideration of any further COVID-19 Temporary ECS licensing framework beyond 1 April 2022 will be considered at the appropriate time considering all relevant information

[95] Certain aspects of ComReg's decision (Document 20/122) for the MBSA 2021 are under appeal, and the indicative timing for the award is subject to change.

[96] See further section 5.2 of Document 20/122, *"Multi Band Spectrum Award - Response to Consultation and Decision - The 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands"*, https://www.comreg.ie/publication/multi-band-spectrum-award-response-to-consultation-and-decision-the-700-mhz-duplex-2-1-ghz-2-3-ghz-and-2-6-ghz-bands.

[97] i.e. adjustments to their networks.

vii. Continue to monitor developments in the 1.4 GHz band for MFCN and following the completion on MBSA 2021 and subject to demand consult on the award of some or all of this band, noting that any consultation process may also consider other harmonised spectrum bands available for award;

viii. Continue to monitor developments in the 26 GHz band with respect of 5G and following the completion of MBSA 2021 and subject to demand (e.g. reasoned submissions to responses to consultations, use of any test and trial licences issued, etc.), consult on making one or more portions of the 26 GHz band available, noting that any consultation process may also consider other harmonised spectrum bands available for award;

ix. Monitor work in the CEPT and the EC on the potential development of harmonised technical conditions for the shared use of the 3800 – 4200 MHz band by local-area network connectivity which could serve both private (e.g. enterprise) and public (e.g. community-type) networks and take actions as appropriate to support any harmonisation decisions adopted;

x. Continue its assessment of mobile network operators' compliance with licence coverage obligations through the drive test programme while investigating other methodologies to improve efficiency of the measurement of compliance with such obligations, including utilising the outdoor mobile coverage mapping data;

xi. Complete a strategic review of the best communication methodology to allow users to understand the impact of handset performance, taking into account current and future technologies. ComReg considers that such a review is appropriate given that, as current and future technologies, such as 5G, progress, the methodology of informing and allowing users to understand the factors which affect connectivity experience will evolve;

xii. Monitor and contribute to the EC's and CEPT's considerations[98] of what, if any, efficiencies might be introduced by a strategic review of the authorisation and licensing of spectrum for MFCN services in the future;

xiii. Continue to liaise with MNOs to gather network architecture data for the generation of outdoor coverage maps, make these available on the consumer section of ComReg's website and update the maps to include 5G mobile coverage;

[98] As outlined at paragraph 2.22 above

xiv. Consider administrative matters concerning the EC's spectrum divestment commitments in relation to the acquisition of Telefonica by Hutchison at the appropriate time if required;

xv. Continue to work with relevant parties to progress the remaining transition activities required from existing FWALA licensees in the 3.6 GHz Band to allow the winning bidders in the 3.6 GHz Band award to make full use of the band to provide services, in accordance with the transition rules of the award[99];

xvi. Update ComReg's Spectrum Leasing and Transfer Framework and guidelines, subject to completion of the Multi-Band Spectrum Award 2021 and the transposition of the EECC;

xvii. In relation to TV White Space ("TVWS") technology[100], and subject to resourcing capacity:

a) Continue to monitor regulatory and technology developments regarding the use of TVWS;

b) Continue to facilitate and monitor TVWS technology trials by issuing Test and/or Trial licences, as appropriate; and

c) Consider the use TV white space technology as part of any future discussions on the 470 – 698 MHz spectrum band.

xviii. Monitor and input to the discussions on the 6425 – 7125 MHz band within European and at the ITU's WRC-23.

xix. Close the 26 GHz band to new Fixed Wireless Access Local Area (FWALA) licence applications from 1 January 2022; and

xx. Provide updated mobile data forecasts during the lifetime of this Strategy Statement.

5.2.3 Broadcasting Services

5.5 ComReg's work plan items for Broadcasting Services for the period 2022 – 2024 are to:

i. Continue to engage in the international coordination of broadcasting transmitter stations;

[99] To date, a substantial amount of the 3.6 GHz Band spectrum has already been made available for use by Winning Bidders, which has enabled Winning Bidders to launch higher speed FWA and new5G services in the band. See further Document 20/117, "*3.6 GHz Band Transition Progress Report 2020*", https://www.comreg.ie/publication/3-6-ghz-band-transition-progress-report-2020.

[100] Noting that TVWS could be also used for services other than MFCN.

ii. Issue and amend, as appropriate, Digital Terrestrial Television ("DTT"), Digital Sound Broadcasting ("DSB") and Analogue Sound Broadcasting ("ASB") licences as requested in line with the broadcasting licensing framework;

iii. Provide advice as required to DTCAGSM and DECC, in relation to spectrum for broadcasting services; and

iv. Conduct a study to consider the current and future spectrum requirements of broadcasting services in Ireland in the frequency range 470-694 MHz noting its consideration at WRC-23 and the other potential uses (such as MFCN) for this spectrum band.

5.2.4 EC Harmonisation Decisions (non-MFCN)

5.1 ComReg's intended strategy for existing and future EC harmonising decisions for the upcoming period includes:

i. consulting on the manner in which the 5.9 GHz band will be regulated for ITS in Ireland, see section 4.2.1 above;

ii. consider the appropriate implementation of the future revised Commission Implementing Decision on 5 GHz WAS/RLANs; and

iii. consider the appropriate implementation of the Commission Implementing Decision on Future Railway Mobile Communication Systems.

5.2.5 Terrestrial Fixed Services

5.2 ComReg's intended strategy for Terrestrial Fixed Services for the upcoming period includes:

i. Conclude the consultation process of the Fixed Links Bands Review and if appropriate implement new guidelines and regulations for the fixed links licensing scheme;

ii. Continue to publish an annual report detailing the most up to date information regarding the licensing of fixed links;

iii. continuing to encourage licensees to use the latest technology in line with ensuring the efficient use of spectrum; and

iv. The publication of fixed links data on Siteviewer.

5.2.6 Licence Exempt Short Range Devices (SRDs)

5.3 ComReg has identified the following work plan items for SRDs for the period 2022 – 2024:

i. Continue to facilitate the use of SRDs to Ireland in accordance with international harmonisations measures and where necessary, revise ComReg document 02/71 on foot of EC and ECC harmonisation updates;

ii. Monitor, contribute to and promote Ireland's spectrum management position in relation to IoT;

iii. Implement the ECC Decision (04)08 on the harmonised use of the 5 GHz frequency bands for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) as amended July 2021; and

iv. Consider a review of all "National SRD Solution Only" entries in document 02/71.

5.2.7 Satellite Services

5.4 ComReg has identified the following work plan items for Satellite Services for the period 2022 – 2024:

i. Consult on, amongst other issues, the authorisation of satellite earth stations ("SES") below 3 GHz as well as the Satellite Earth Station Licencing regime during the strategy period 2022 - 2024;

ii. Continue to facilitate the licensing of satellite SES operating in spectrum above 3 GHz; and

iii. Continue to facilitate the exemption of individual licencing for certain classes of Terminals for Satellite Services by updating Document 20/47, as required.

5.2.8 Private Mobile Radio Services

5.5 ComReg has identified the following work plan items for Private Mobile Radio ("PMR") Services for the period 2022 - 2024:

i. Review the current licensing regimes for PMR and consult on, amongst other things, implementing a single unified, modern and fit for purpose licensing regime;

ii. Monitor and contribute to the spectrum management considerations of PMSE and take appropriate actions to implement harmonisation decisions; and

iii. Monitor and contribute to the spectrum management considerations in respect of broadband PPDR, noting that ComReg has already identified spectrum options for BB-PPDR in the 400 MHz and 700 MHz Guard Bands and 700 MHz Duplex Gap[101].

5.2.9 Radio Amateur Services

5.6 ComReg has identified the following work plan items, listed in priority, for the Radio Amateur services for the period 2022 - 2024:

i. Update the Radio Frequency Plan for Ireland ("RFPI") to align Amateur service and Amateur-satellite services with the European allocations;

ii. Update the current guidelines to:

- remove the errors noted in section A3.20 of the consultation document;
- update the competitions for which high power usage is permitted;
- add the bands included in the update to the RFPI;
- modify the table in Annex 1 of the guidelines to remove the columns "emission classification" and "modes" and make reference to the effect that licensees are, in terms of maximum bandwidth, modes and usage, to adhere to the IARU band plans and any applicable Irish national band plans;
- Move the five specific frequencies between 5 280 kHz and 5 405 kHz from section A1.4 of the guidelines (use requires additional authorisation) to section A1.3 of the guidelines (available for general use); and
- Modify section 6.3 of the guidelines that deals with automatic stations to take into account recently licensed and commissioned propagation beacons around 40 MHz.

iii. Seek, during the life of this strategy statement, to put in place a framework for novice licencing in Ireland. In order to do so ComReg will need to:

- Consult on its proposals;

[101] See Document 20/98

- request the Minister DECC, to sign into power new regulations; and

- tender for an external party to run any examination that may be required. At this time ComReg will consider if the examination is best offered online and whether such an examination could be taken at any time and in an online environment.

iv. With reference to section 5.1 and pending resources, consider further the matter of a general increase in permissible power for all licensees and/or individual authorisations for licensees wishing to operate at higher powers. Included in these considerations will be matters related to compliance with NIR, spurious emission and measurement of power.

5.2.10 Unmanned Aircraft Systems ("UAS")

5.7 ComReg has identified the following work items for UAS during the 2022-2024 period are:

i. Monitor developments in ECC working groups and project teams and consider the appropriate implementation of any future harmonised ECC Decisions;[102]

ii. Consider any cross-border coordination requirements in the case of UAS operating at the border;

iii. Engagement with the IAA regarding restrictions on spectrum usage at or near "No Fly zones";

iv. Ensuring protection of adjacent spectrum assignments within existing mobile networks; and

v. Setting emission limits specific to aerial UE's will be necessary to avoid interference to other services in some adjacent bands.

5.2.11 Aeronautical and Scientific Services

Aeronautical Services

5.8 ComReg's strategy for Aeronautical Services for the upcoming periods includes:

[102] The ECC Decision on the operation of UAS using existing mobile telecommunications infrastructure, is due from ECC PT1, in March 2022. The ECC report on spectrum solutions for UAS (other than MFCN) is expected from ECC FM59 by June 2022.

i. Continuing to promote Ireland's interest in relevant international fora to ensure adequate spectrum is available for aeronautical services; and

ii. Continuing to work with the IAA to promote the use of spectrum efficient technologies in the aeronautical bands, thereby maximising the spectrum available for growth and new applications.

Scientific Services

5.9 Radio spectrum is used for a wide range of applications that operate under the description of "scientific services", including radio astronomy, earth exploration-satellite services ("EESS"), space research and meteorological aids.

Licence regime for Meteorological Aids (MetAids)

5.10 ComReg has previously considered exempting Spectrum for Meteorological Aids ("MetAids") apparatus from the requirement to hold a licence but is concerned that this would not afford the service the appropriate protection necessary to carry out this important task.

5.11 Subject to resourcing, ComReg may consider the implementation of a licence regime during the 2022-2024 period. A licensing regime would facilitate the legal operation of radiosondes, dropsondes and rocketsondes in Ireland and provide protection against harmful interference.

Protecting Radiocommunication Services of Strategic Importance

5.12 ComReg is considering a number of radiocommunication[103] services that currently do not enjoy the same protection as licenced services but may require recognition and protection from harmful interference. The following services are examples of what can considered of strategic importance to Ireland and the European Union:

- Global Navigation Satellite System;
- Bands used for monitoring climate change;
- Bands used for earth exploration; and
- Radio Astronomy.

[103] Radiocommunication is defined as "telecommunication by means of radio waves" and telecommunication is defined as "Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems (see Article 1.6 and Article 1.3 of the ITU Radio Regulations edition of 2020).

5.13 These are services for which ComReg does not issue a license, the transmitters are not within the jurisdiction of Ireland but the reception of these transmissions is of:

- paramount importance to Irish consumers and/or;
- of strategic importance to Ireland, Europe or;
- of great importance to scientific study and endeavour.

5.14 As part of the 2022-2024 period, ComReg intends to consider the matter of how to protect services of strategic importance to Ireland, and to monitor and input into discussions on these types of services within Europe. An example of services of strategic importance are Global Navigation Satellite Systems (GNSS). ComReg notes that the CEPT is currently preparing a new ECC Decision[104] which has as its goal to:

- designate the frequency bands 1164 – 1215 MHz, 1237 – 1300 MHz and 1559 – 1620 MHz for the reception of GALILEO and GLONASS GNSS signals; and
- consider the coexistence between amateur service / amateur-satellite service and the radionavigation satellite receivers in the band 1240-1300 MHz.

5.15 The target date for delivery on this work item by the CEPT is May 2023.

5.2.12 Defence Force Use of Spectrum

5.16 ComReg intends to maintain awareness of international developments, particularly in CEPT through the Civil-Military Frequency Management Forum which brings together civil and military spectrum managers across Europe to address issues of mutual interest.

5.17 ComReg intends to continue to liaise with the Irish Defence Forces, as required, to resolve issues of mutual interest.

5.18 ComReg intends to explore with the relevant authorities opportunities to further enhance spectrum efficiency.

[104] http://eccwp.cept.org/WI_Detail.aspx?wiid=716

Annex: 1 Summary of legal framework and statutory objectives relevant to the management of the radio spectrum

A 1.1 The Communications Regulation Acts 2002 as amended[105] (the "2002 Act"), the European Electronic Communications Code (which has repealed the Common Regulatory Framework (including the Framework and Authorisation Directives),[106] the corresponding Framework and Authorisation Regulations[107], and the Wireless Telegraphy Acts1926 to 2009[108] set out, amongst other things, powers, functions, duties and objectives of ComReg that are relevant to the management of the radio frequency spectrum in Ireland and to this radio Spectrum Management Strategy Statement.

A 1.2 Apart from licensing and making regulations in relation to licences, ComReg's functions include the management of Ireland's radio frequency spectrum in accordance with ministerial Policy Directions under Section 13 of the 2002 Act, having regard to its objectives under Section 12 of the 2002 Act, Regulation 16 of the Framework Regulations and relevant provisions of the European Electronic Communications Code. ComReg is to carry out its functions effectively, and in a manner serving to ensure that the allocation and assignment of radio frequencies is based on objective, transparent, non-discriminatory and proportionate criteria.

A1.3 This annex is intended as a general guide as to ComReg's role in this area, and not as a definitive or exhaustive legal exposition of that role. Further, this annex restricts itself to consideration of those functions, objectives powers, and duties of ComReg that appear most relevant to the matters at hand and generally excludes those not considered relevant (for example, in relation to postal services, premium rate services or market analysis). For the avoidance of doubt, however, the inclusion of particular material in this annex does not

[105] The Communications Regulation Act 2002 (as amended), the Communications Regulation (Amendment) Act 2007, the Communications Regulation (Premium Rate Services and Electronic Communications Infrastructure) Act 2010 and the Communications Regulation (Postal Services) Act 2011.

[106] Directive No. 2002/21/EC of the European Parliament and of the Council of 7 March 2002 (as amended by Regulation (EC) No. 717/2007 of 27 June 2007, Regulation (EC) No. 544/2009 of 18 June 2009 and Directive 2009/140/EC of the European Parliament and Council of 25 November 2009) (the "Framework Directive") and Directive No. 2002/20/EC of the European Parliament and of the Council of 7 March 2002 (as amended by Directive 2009/140/EC) (the "Authorisation Directive")

[107] The European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011) and the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. No. 335 of 2011) respectively.

[108] The Wireless Telegraphy Acts 1926 to 1988 and Sections 181 (1) to (7) and (9) and Section 182 of the Broadcasting Act 2009.

necessarily mean that ComReg considers same to be of specific relevance to the matters at hand. All references in this annex to enactments are to the enactment as amended at the date hereof, unless the context otherwise requires. All references in this annex to enactments are to the enactment as amended at the date hereof, unless the context otherwise requires.

New European Electronic Communications Code

A 1.4 On 20 December 2018, Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code ("EECC") entered into force.

A1.5 It is important to note that further to Article 125 ("Repeal") of the EECC, with effect from 21 December 2020, the EECC replaced the EU Common Regulatory Framework adopted in 2002 (and amended in 2009) under which ComReg has regulated electronic communications since 2003[109].

A1.6 With some limited exceptions (see Article 124 of the EECC), Member States had until 21 December 2020 to transpose the EECC into national law[1]. The DECC is responsible for the transposition of the EECC[2] and ComReg has assisted the DECC in that regard as appropriate.

A1.7 ComReg understands that the EECC is unlikely to be transposed into national law until early 2022. **However, for the avoidance of doubt, electronic communications providers must continue to comply with their obligations, and ComReg will continue to regulate the electronic communications sector under its existing powers, and redress mechanisms for customers will continue unchanged until new legislation is introduced.**

A1.8 Notwithstanding, and for the avoidance of doubt, ComReg is satisfied that, to the best of its knowledge, the proposals contained in this document will not conflict with the objectives of the EECC or the obligations likely to be imposed on ComReg under national legislation implementing same.

A1.9 All references in this annex to enactments are to the enactment as amended at the date hereof, unless the context otherwise requires.

Primary Objectives and Regulatory Principles under the

[109] For the correlation table between relevant articles of the repealed Directives and the EECC, please see Annex XIII of the EECC available here- EUR-Lex - 02018L1972-20181217 - EN - EUR-Lex (europa.eu)

[1] With the exception of Articles 53(2), (3) and (4), and Article 54 (See Article 124).

[2] See, for example, https://assets.gov.ie/162712/1d774c6b-55d4-4b04-9253-8be6f24fb3ba.pdf

2002 Act and Common Regulatory Framework

A1.10 ComReg's primary objectives in carrying out its statutory functions in the context of electronic communications are to:

- promote competition[110];
- contribute to the development of the internal market[111];
- promote the interests of users within the Community[112];
- ensure the efficient management and use of the radio frequency spectrum in Ireland in accordance with a direction under Section 13 of the 2002 Act[113]; and
- unless otherwise provided for in Regulation 17 of the Framework Regulations, take the utmost account of the desirability of technological neutrality in complying with the requirements of the Specific Regulations [114] in particular those designed to ensure effective competition [115].

Promotion of Competition

A1.11 Section 12(2)(a) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at the promotion of competition, including:

- ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality;
- ensuring that there is no distortion or restriction of competition in the electronic communications sector; and
- encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.

A1.12 In so far as the promotion of competition is concerned, Regulation 16(1)(b) of the Framework Regulations also requires ComReg to:

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[110] Section 12 (1)(a)(i) of the 2002 Act.

[111] Section 12 (1)(a)(ii) of the 2002 Act.

[112] Section 12(1)(a)(iii) of the 2002 Act.

[113] Section 12(1)(b) of the 2002 Act.

[114] The 'Specific Regulations' comprise collectively the Framework Regulations, the Authorisation Regulations, the European Communities (Electronic Communications Networks and Services) (Access) Regulations 2011 (S.I. No. 334 of 2011), the European Communities (Electronic Communications Networks and Services) (Universal Service and Users' Rights) Regulations 2011 (S.I. 337 of 2011) and the European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations 2011 (S.I. No. 336 of 2011).

[115] Regulation 16(1)(a) of the Framework Regulations.

- ensure that elderly users and users with special social needs derive maximum benefit in terms of choice, price and quality, and
- ensure that, in the transmission of content, there is no distortion or restriction of competition in the electronic communications sector.

A1.13 Regulation 9(11) of the Authorisation Regulations also provides that ComReg must ensure that radio frequencies are efficiently and effectively used having regard to Section 12(2)(a) of the 2002 Act and Regulations 16(1) and 17(1) of the Framework Regulations. Regulation 9(11) further provides that ComReg must ensure that competition is not distorted by any transfer or accumulation of rights of use for radio frequencies, and, for this purpose, ComReg may take appropriate measures such as mandating the sale or the lease of rights of use for radio frequencies.

Contributing to the Development of the Internal Market

A1.14 Section 12(2)(b) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at contributing to the development of the internal market, including:

- removing remaining obstacles to the provision of electronic communications networks, electronic communications services and associated facilities at Community level;
- encouraging the establishment and development of trans-European networks and the interoperability of transnational services and end-to-end connectivity; and
- co-operating with electronic communications national regulatory authorities in other Member States of the Community and with the Commission of the Community in a transparent manner to ensure the development of consistent regulatory practice and the consistent application of Community law in this field.

A1.15 In so far as contributing to the development of the internal market is concerned, Regulation 16(1)(c) of the Framework Regulations also requires ComReg to co-operate with the Body of European Regulators for Electronic Communications (BEREC) in a transparent manner to ensure the development of consistent regulatory practice and the consistent application of EU law in the field of electronic communications.

Promotion of Interests of Users

A1.16 Section 12(2)(c) of the 2002 Act requires ComReg, when exercising its functions in relation to the provision of electronic communications networks and services, to take all reasonable measures which are aimed at the promotion of the interests of users within the Community, including:

- ensuring that all users have access to a universal service;
- ensuring a high level of protection for consumers in their dealings with suppliers, in particular by ensuring the availability of simple and inexpensive dispute resolution procedures carried out by a body that is independent of the parties involved;
- contributing to ensuring a high level of protection of personal data and privacy;
- promoting the provision of clear information, in particular requiring transparency of tariffs and conditions for using publicly available electronic communications services;
- encouraging access to the internet at reasonable cost to users;
- addressing the needs of specific social groups, in particular disabled users; and
- ensuring that the integrity and security of public communications networks are maintained.

A1.17 In so far as promotion of the interests of users within the EU is concerned, Regulation 16(1)(d) of the Framework Regulations also requires ComReg to:

- address the needs of specific social groups, in particular, elderly users and users with special social needs, and
- promote the ability of end-users to access and distribute information or use applications and services of their choice.

Regulatory Principles

A1.18 In pursuit of its objectives under Regulation 16(1) of the Framework Regulations and Section 12 of the 2002 Act, ComReg must apply objective, transparent, non-discriminatory and proportionate regulatory principles by, amongst other things:

promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods;

- ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks and services;
- safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition;
- promoting efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings and

by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, while ensuring that competition in the market and the principle of non-discrimination are preserved;

- taking due account of the variety of conditions relating to competition and consumers that exist in the various geographic areas within the State; and
- imposing ex-ante regulatory obligations only where there is no effective and sustainable competition and relaxing or lifting such obligations as soon as that condition is fulfilled.

BEREC

A 1.19 Under Regulation 16(1)(3) of the Framework Regulations, ComReg must:

- having regard to its objectives under Section 12 of the 2002 Act and its functions under the Specific Regulations, actively support the goals of BEREC of promoting greater regulatory co-ordination and coherence; and
- take the utmost account of opinions and common positions adopted by BEREC when adopting decisions for the national market.

Other Obligations under the 2002 Act

A1.20 In carrying out its functions, ComReg is required amongst other things, to:

- seek to ensure that any measures taken by it are proportionate having regard to the objectives set out in Section 12 of the 2002 Act;[116]
- 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[117]; and
- take the utmost account of the desirability that the exercise of its functions aimed at achieving its radio frequency management objectives does not result in discrimination in favour of or against particular types of technology for the provision of ECS.[118]

[116] Section 12(3) of the 2002 Act.

[117] Section 12(5) of the 2002 Act.

[118] Section 12(6) of the 2002 Act.

Policy Directions[119]

A1.21 Section 12(4) of the 2002 Act provides that, in carrying out its functions, ComReg must have appropriate regard to policy statements, published by or on behalf of the Government or a Minister of the Government and notified to the Commission, in relation to the economic and social development of the State. Section 13(1) of the 2002 Act requires ComReg to comply with any policy direction given to ComReg by the Minister for Communications, Energy and Natural Resources ("the Minister") as he or she considers appropriate, in the interests of the proper and effective regulation of the electronic communications market, the management of the radio frequency spectrum in the State and the formulation of policy applicable to such proper and effective regulation and management, to be followed by ComReg in the exercise of its functions. Section 10(1)(b) of the 2002 Act also requires ComReg, in managing the radio frequency spectrum, to do so in accordance with a direction of the Minister under Section 13 of the 2002 Act, while Section 12(1)(b) requires ComReg to ensure the efficient management and use of the radio frequency spectrum in accordance with a direction under Section 13.

A1.22 The Policy Directions which are most relevant in this regard include the following:

Policy Direction No.3 on Broadband Electronic Communication Networks

A1.23 ComReg shall in the exercise of its functions, take into account the national objective regarding broadband rollout, viz, the Government wishes to ensure the widespread availability of open-access, affordable, always-on broadband infrastructure and services for businesses and citizens on a balanced regional basis within three years, on the basis of utilisation of a range of existing and emerging technologies and broadband speeds appropriate to specific categories of service and customers.

A1.224 ComReg is conscious that the three year objective described in this policy direction has now expired making this direction less relevant currently.

Policy Direction No.4 on Industry Sustainability

A1.25 ComReg shall ensure that in making regulatory decisions in relation to the electronic communications market, it takes account of the state of the industry and in particular the industry's position in the business cycle and the impact of such decisions on the sustainability of the business of undertakings affected.

[119] ComReg also notes, and takes due account of, the Spectrum Policy Statement issued by the Department of Communications Energy and Natural Resources in September 2010.

Policy Direction No.5 on Regulation only where Necessary

A1.26 Where ComReg has discretion as to whether to impose regulatory obligations, it shall, before deciding to impose such regulatory obligations on undertakings, examine whether the objectives of such regulatory obligations would be better achieved by forbearance from imposition of such obligations and reliance instead on market forces.

Policy Direction No.6 on Regulatory Impact Assessment

A1.27 ComReg, before deciding to impose regulatory obligations on undertakings in the market for electronic communications or for the purposes of the management and use of the radio frequency spectrum or for the purposes of the regulation of the postal sector, shall conduct a Regulatory Impact Assessment in accordance with European and International best practice and otherwise in accordance with measures that may be adopted under the Government's Better Regulation programme.

Policy Direction No.7 on Consistency with other Member States

A1.28 ComReg shall ensure that, where market circumstances are equivalent, the regulatory obligations imposed on undertakings in the electronic communications market in Ireland should be equivalent to those imposed on undertakings in equivalent positions in other Member States of the European Community.

Policy Direction No.11 on the Management of the Radio Frequency Spectrum

A1.29ComReg shall ensure that, in its management of the radio frequency spectrum, it takes account of the interests of all users of the radio frequency spectrum.

General Policy Direction No.1 on Competition (2004)

A1.30 ComReg shall focus on the promotion of competition as a key objective. Where necessary, ComReg shall implement remedies which counteract or remove barriers to market entry and shall support entry by new players to the market and entry into new sectors by existing players. ComReg shall have a particular focus on:

- market share of new entrants;
- ensuring that the applicable margin attributable to a product at the wholesale level is sufficient to promote and sustain competition;
- price level to the end user;
- competition in the fixed and mobile markets;

- the potential of alternative technology delivery platforms to support competition.

Other Relevant Obligations under the Framework and Authorisation Regulations

Framework Regulations

A1.31 Regulation 17 of the Framework Regulations governs the management of radio frequencies for electronic communications services. Regulation 17(1) requires that ComReg, subject to any directions issued by the Minister pursuant to Section 13 of the 2002 Act and having regard to its objectives under Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations and the provisions of Article 8a[120] of the Framework Directive, ensure:

- the effective management of radio frequencies for electronic communications services;
- that spectrum allocation used for electronic communications services and issuing of general authorisations or individual rights of use for such radio frequencies are based on objective, transparent, non-discriminatory and proportionate criteria; and
- ensure that harmonisation of the use of radio frequency spectrum across the EU is promoted, consistent with the need to ensure its effective and efficient use and in pursuit of benefits for the consumer such as economies of scale and interoperability of services, having regard to all decisions and measures adopted by the European Commission in accordance with Decision No. 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the EU.

A1.32 Regulation 17(2) provides that, unless otherwise provided in Regulation 17(3), ComReg must ensure that all types of technology used for electronic communications services may be used in the radio frequency bands that are declared available for electronic communications services in the Radio Frequency Plan published under Section 35 of the 2002 Act in accordance with EU law.

[120] It should be noted that this Article has now been effectively replaced by Article 4 of the European Electronic Communications Code.

A1.33 Regulation 17(3) provides that, notwithstanding Regulation 17(2), ComReg may, through licence conditions or otherwise, provide for proportionate and non-discriminatory restrictions to the types of radio network or wireless access technology used for electronic communications services where this is necessary to—

- avoid harmful interference,
- protect public health against electromagnetic fields,
- ensure technical quality of service,
- ensure maximisation of radio frequency sharing,
- safeguard the efficient use of spectrum, or
- ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in accordance with Regulation 17(6).

A1.34 Regulation 17(4) requires that, unless otherwise provided in Regulation 17(5), ComReg must ensure that all types of electronic communications services may be provided in the radio frequency bands, declared available for electronic communications services in the Radio Frequency Plan published under Section 35 of the Act of 2002 in accordance with EU law.

A1.35 Regulation 17(5) provides that, notwithstanding Regulation 17(4), ComReg may provide for proportionate and non-discriminatory restrictions to the types of electronic communications services to be provided, including where necessary, to fulfil a requirement under the ITU Telecommunication Union Radio Regulations.

A1.36 Regulation 17(6) requires that measures that require an electronic communications service to be provided in a specific band available for electronic communications services must be justified in order to ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in conformity with EU law such as, but not limited to—

- safety of life,
- the promotion of social, regional or territorial cohesion,
- the avoidance of inefficient use of radio frequencies, or
- the promotion of cultural and linguistic diversity and media pluralism, for example, by the provision of radio and television broadcasting services.

A1.37 Regulation 17(7) provides that ComReg may only prohibit the provision of any other electronic communications service in a specific radio spectrum frequency band where such a prohibition is justified by the need to protect safety of life services. ComReg may, on an exceptional basis, extend such a measure in order to fulfil other general interest objectives as defined by or on behalf of the Government or a Minister of the Government.

A1.38 Regulation 17(8) provides that ComReg must, in accordance with Regulation 18, regularly review the necessity of the restrictions referred to in Regulations 17(3) and 17(5) and must make the results of such reviews publicly available.

A1.39 Regulation 17(9) provides that Regulations 17(2) to (7) only apply to spectrum allocated to be used for electronic communications services, general authorisations issued and individual rights of use for radio frequencies granted after the 1 July 2011. Spectrum allocations, general authorisations and individual rights of use which already existed on the 1 July 2011 Framework Regulations are subject to Regulation 18.

A1.40 Regulation 17(10) provides that ComReg may, having regard to its objectives under Section 12 of the 2002 Act and Regulation 16 and its functions under the Specific Regulations, lay down rules in order to prevent spectrum hoarding, in particular by setting out strict deadlines for the effective exploitation of the rights of use by the holder of rights and by withdrawing the rights of use in cases of non-compliance with the deadlines. Any rules laid down under this Regulation must be applied in a proportionate, non-discriminatory and transparent manner.

A1.41 Regulation 17(11) requires ComReg to, in the fulfilment of its obligations under that Regulation, respect relevant international agreements, including the ITU Radio Regulations and any public policy considerations brought to its attention by the Minister.

Authorisation Regulations

Decision to limit rights of use for radio frequencies

A1.42Regulation 9(2) of the Authorisation Regulations provides that ComReg may grant individual rights of use for radio frequencies by way of a licence where it considers that one or more of the following criteria are applicable:

- it is necessary to avoid harmful interference,
- it is necessary to ensure technical quality of service,
- it is necessary to safeguard the efficient use of spectrum, or
- it is necessary to fulfil other objectives of general interest as defined by or on behalf of the Government or a Minister of the Government in conformity with EU law.

A1.43 Regulation 9(10) of the Authorisation Regulations provides that ComReg must not limit the number of rights of use for radio frequencies to be granted except where this is necessary to ensure the efficient use of radio frequencies in accordance with Regulation 11.

A1.44 Regulation 9(7) also provides that:

where individual rights of use for radio frequencies are granted for a period of 10 years or more and such rights may not be transferred or leased between undertakings in accordance with Regulation 19 of the Framework Regulations, ComReg must ensure that criteria set out in Regulation 9(2) apply for the duration of the rights of use, in particular upon a justified request from the holder of the right.

where ComReg determines that the criteria referred to in Regulation 9(2) are no longer applicable to a right of use for radio frequencies, ComReg must, after a reasonable period and having notified the holder of the individual rights of use, change the individual rights of use into a general authorisation or must ensure that the individual rights of use are made transferable or leasable between undertakings in accordance with Regulation 19 of the Framework Regulations.

Publication of procedures

A1.45 Regulation 9(4)(a) of the Authorisation Regulations requires that ComReg, having regard to the provisions of Regulation 17 of the Framework Regulations, establish open, objective, transparent, non-discriminatory and proportionate procedures for the granting of rights of use for radio frequencies and cause any such procedures to be made publicly available.

Duration of rights of use for radio frequencies

A1.46 Regulation 9(6) of the Authorisation Regulations provides that rights of use for radio frequencies must be in force for such period as ComReg considers appropriate having regard to the network or service concerned in view of the objective pursued taking due account of the need to allow for an appropriate period for investment amortisation.

Conditions attached to rights of use for radio frequencies

A1.47 Regulation 9(5) of the Authorisation Regulations provides that, when granting rights of use for radio frequencies, ComReg must, having regard to the provisions of Regulations 17 and 19 of the Framework Regulations, specify whether such rights may be transferred by the holder of the rights and under what conditions such a transfer may take place.

A1.48 Regulation 10(1) of the Authorisation Regulations provides that, notwithstanding Section 5 of the Wireless Telegraphy Act,1926, but subject to any regulations under Section 6 of that Act, ComReg may only attach those conditions listed in Part B of the Schedule to the Authorisation Regulations. Part B lists the following conditions which may be attached to rights of use:

- Obligation to provide a service or to use a type of technology for which the rights of use for the frequency has been granted including, where appropriate, coverage and quality requirements.
- Effective and efficient use of frequencies in conformity with the Framework Directive and Framework Regulations.
- Technical and operational conditions necessary for the avoidance of harmful interference and for the limitation of exposure of the general public to electromagnetic fields, where such conditions are different from those included in the general authorisation.
- Maximum duration in conformity with Regulation 9, subject to any changes in the national frequency plan.
- Transfer of rights at the initiative of the rights holder and conditions of such transfer in conformity with the Framework Directive.
- Usage fees in accordance with Regulation 19.
- Any commitments which the undertaking obtaining the usage right has made in the course of a competitive or comparative selection procedure.
- Obligations under relevant international agreements relating to the use of frequencies.
- Obligations specific to an experimental use of radio frequencies.

A1.49 Regulation 10(2) also requires that any attachment of conditions under Regulation 10(1) to rights of use for radio frequencies must be non-discriminatory, proportionate and transparent and in accordance with Regulation 17 of the Framework Regulations.

Procedures for limiting the number of rights of use to be granted for radio frequencies

A1.50 Regulation 11(1) of the Authorisation Regulations provides that, where ComReg considers that the number of rights of use to be granted for radio frequencies should be limited it must, without prejudice to Sections 13 and 37 of the 2002 Act:

- give due weight to the need to maximise benefits for users and to facilitate the development of competition, and

- give all interested parties, including users and consumers, the opportunity to express their views in accordance with Regulation 12 of the Framework Regulations.

A1.451 Regulation 11(2) of the Authorisation Regulations requires that, when granting the limited number of rights of use for radio frequencies it has decided upon, ComReg does so *"…on the basis of selection criteria which are objective, transparent, non-discriminatory and proportionate and which give due weight to the achievement of the objectives set out in Section 12 of the 2002 Act and Regulations 16 and 17 of the Framework Regulations."*

A1.52 Regulation 11(4) provides that where it decides to use competitive or comparative selection procedures, ComReg must, inter alia, ensure that such procedures are fair, reasonable, open and transparent to all interested parties.

Fees for spectrum rights of use

A1.53 Regulation 19 of the Authorisation Regulations permits ComReg to impose fees for rights of use which reflect the need to ensure the optimal use of the radio frequency spectrum.

A1.54 ComReg is required to ensure that any such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and take into account the objectives of ComReg as set out in Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations.

Amendment of rights and obligations

A1.55 Regulation 15 of the Authorisation Regulations permits ComReg to amend rights and conditions concerning rights of use, provided that any such amendments may only be made in objectively justified cases and in a proportionate manner, following the process set down in Regulation 15(4).

Other Relevant Provisions

Wireless Telegraphy Act, 1926 as amended

A1.56 Under Section 5(1) of the 1926 Act, ComReg may, subject to that Act, and on payment of the prescribed fees (if any), grant to any person a licence to keep and have possession of apparatus for wireless telegraphy in any specified place in the State.

A1.57 Section 5(2) provides that, such a licence shall be in such form, continue in force for such period and be subject to such conditions and restrictions (including conditions as to suspension and revocation) as may be prescribed in regard to it by regulations made by ComReg under Section 6.

A1.58 Section 5(3) also provides that, where it appears appropriate to ComReg, it may, in the interests of the efficient and orderly use of wireless telegraphy, limit the number of licences for any particular class or classes of apparatus for wireless telegraphy granted under Section 5.

A1.59 Section 6 provides that ComReg may make regulations prescribing in relation to all licences granted by it under Section 5, or any particular class or classes of such licences, all or any of the following matters:

- the form of such licences,
- the period during which such licences continue in force,
- the manner in which, the terms on which, and the period or periods for which such licences may be renewed,
- the circumstances in which or the terms under which such licences are granted,
- the circumstances and manner in which such licences may be suspended or revoked by ComReg,
- the terms and conditions to be observed by the holders of such licences and subject to which such licences are deemed to be granted,
- the fees to be paid on the application, grant or renewal of such licences or classes of such licences, subject to such exceptions as ComReg may prescribe, and the time and manner at and in which such fees are to be paid, and
- matters which such licences do not entitle or authorise the holder to do.

A1.60 Section 6(2) provides that Regulations made by ComReg under Regulation 6 may authorise and provide for the granting of a licence under Section 5 subject to special terms, conditions, and restrictions to persons who satisfy it that they require the licences solely for the purpose of conducting experiments in wireless telegraphy.

Broadcasting Act 2009 (the "2009 Act")

A1.61 Section 132 of the 2009 Act relates to the duties of ComReg in respect of the licensing of spectrum for use in establishing digital terrestrial television multiplexes and places an obligation on ComReg to issue:

- two DTT multiplex licences to RTÉ by request (see Sections 132 (1) and (2) of the 2009 Act); and
- a minimum of four DTT multiplex licences to the BAI by request (see Sections 132 (3) and (4) of the 2009 Act) for the provision of commercial TV content.

Article 4 of Directive 2002/77/EC (Competition Directive)

A1.62 Article 4 of the Competition Directive provides that:

> *"Without prejudice to specific criteria and procedures adopted by Member States to grant rights of use of radio frequencies to providers of radio or television broadcast content services with a view to pursuing general interest objectives in conformity with Community law:*
>
> - Member States shall not grant exclusive or special rights of use of radio frequencies for the provision of electronic communications services.
> - The assignment of radio frequencies for electronic communication services shall be based on objective, transparent, non-discriminatory and proportionate criteria."