An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Proposed Radio Spectrum Management Operating Plan for 2025 - 2028

Consultation

Reference: ComReg 24/65

Version: Final

Date: 01/08/2024

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
1 Lárcheantar na nDugaí, Sráid na nGildeanna, BÁC 1, Éire, D01 E4X0.
One Dockland Central, Guild Street, Dublin 1, Ireland, D01 E4X0.
Teil | Tel +353 1 804 9600 Suíomh | Web www.comreg.ie

Legal Disclaimer

This Consultation is not a binding legal document and also does not contain legal, commercial, financial, technical or other advice. The Commission for Communications Regulation is not bound by it, nor does it necessarily set out the Commission's final or definitive position on particular matters. To the extent that there might be any inconsistency between the contents of this document and the due exercise by it of its functions and powers, and the carrying out by it of its duties and the achievement of relevant objectives under law, such contents are without prejudice to the legal position of the Commission for Communications Regulation. Inappropriate reliance ought not therefore to be placed on the contents of this document.

Content

Section Page

Annex

Section Page

Table of Figures

Section Page

Table of Tables

Section Page

1 Introduction

1.1 Background and Purpose

1.1 The Commission for Communications Regulation ("ComReg") is the statutory body responsible for the regulation of the electronic communications (telecommunications, radiocommunication and broadcasting networks), postal and premium rate sectors in Ireland in accordance with European Union ("EU") and Irish law. ComReg also manages Ireland's radio spectrum (or "spectrum") and national numbering resource.

1.2 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 used efficiently.

1.3 ComReg's current Radio Spectrum Management Strategy Statement from 2022 to 2024 ("ComReg Document 21/136"[1]) was published in 2021, and set out, among other things, its work plan priorities at that time. ComReg's radio spectrum management operating plan (otherwise known as a work plan) for the period 2022-2024 was included at Chapter 5 of ComReg Document 21/136.[2]

1.4 Following a review of the current work plan period, this document details, and invites comments from interested parties on ComReg's proposed Radio Spectrum Management Operating Plan ("RSMOP") for the period 2025 to 2028 as set out in Chapter 6. ComReg will separately consult on a strategy statement in respect of all its functions, which will inform the management of the radio spectrum resource.

1.5 This RSMOP includes ComReg's proposals for its core programmatic spectrum management activities together with proposed activities in a number of radio spectrum services categories, where among other things, ComReg proposes to:

[1] Radio Spectrum Management Strategy Statement 2022 to 2024 | Commission for Communications Regulation (comreg.ie)

[2] Chapter 5 of Document 21/136 is titled "*Radio Spectrum work plan for the period 2022-2024*"

(i) Consult and put in place, as appropriate in the first half of the 2025-2028 period, a licensing regime for local-area Wireless Broadband ("WBB") systems, which could be used for, among other things, private mobile (4G, 5G etc.) networks. This would be subject to demand and progress continuing at European (CEPT/EU) level to harmonise the 3.8-4.2 GHz band for local area WBB systems (low to mid-power). This might also encompass spectrum in the lower part of the 26 GHz Band (24.250 – 24.745 GHz (495 MHz) – Block C); and

(ii) Consult, towards the middle of the 2025-2028 period, on spectrum for WBB/Mobile Fixed Communication Network ("MFCN") use. Such a consultation would, among other things, consider the expiry of MBSA1 licences in 2030 and the multiple harmonised spectrum bands for WBB/MFCN use. Spectrum in the 1.4 GHz band would be considered, and perhaps spectrum in the 26 GHz band should clear evidence of demand emerge.

1.6 This is an important radio spectrum management consultation and ComReg encourages readers to carefully consider the material and proposals in this document. The responses to this consultation will represent current likely demand for a particular service or spectrum band and consequently will inform ComReg's final plan and its radio spectrum activities for the 2025-28 period.

1.2 Structure of this Document

1.7 The remainder of this document is structured as follows:

- **Chapter 2:** outlines the framework for spectrum management in Ireland and provides information on ComReg's mandate and approach to spectrum management.
- **Chapter 3:** presents a review of the non-MFCN radio spectrum plan for the period 2022-2024.
- **Chapter 4:** sets out ComReg's considerations on radio spectrum for MFCN/WBB services and in so doing reviews ComReg's actions in the 2022-2024 period while identifying candidate MFCN/WBB work plan proposals for the 2025-2028 period.
- **Chapter 5:** outlines a number of factors that inform ComReg's work plan proposals for the 2025-2028 period.
- **Chapter 6:** sets out ComReg's proposed radio spectrum work plan for the 2025-2028 period. This includes ComReg's proposals for its core programmatic spectrum management activities together with proposed

activities in a number of specific radio spectrum service categories.

- **Chapter 7:** sets out details of the next steps including the requirements for making submissions.
- **Annex 1:** Summary of ComReg's statutory framework relevant to the management of the radio frequency spectrum in Ireland.
- **Annex 2:** World Radiocommunication Conferences 2023 and 2027.
- **Annex 3:** Information on the 1.4 GHz, 3.8-4.2 GHz and 26 GHz bands.
- **Annex 4:** Analysys Mason disclaimer.
- **Annex 5:** List of recent ECC Decisions.

2 The Framework for Spectrum Management in Ireland

2.1 Spectrum Policy and Spectrum Management in Ireland

2.1 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.

2.1.1 Spectrum Policy

2.2 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.

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

2.4 In developing the RSMOP for 2025 to 2028, ComReg has taken account of DECC's Communications and Digital Policy[4] and; the DTCAGSM's[5] Broadcasting and Media Policy[6]. ComReg has also considered, among other things, Ireland's Digital Connectivity Strategy[7] and the National Strategic Roadmap for the EU Digital Decade Policy Programme[8].

2.1.2 Spectrum Management: ComReg's mandate and role

2.5 The Communications Regulation Act 2002 (as amended) (the "2002 Act"), the

[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/

[5] Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media

[6] https://www.gov.ie/en/policy-information/b151e3-broadcast-media/

[7] https://www.gov.ie/en/publication/f1f85-digital-connectivity-strategy/

[8] gov - Ireland's National Strategic Roadmap for the EU Digital Decade Policy Programme (www.gov.ie)

European Electronic Communications Code ("EECC") Directive[9] which has been transposed into Irish law by S.I. No. 444 of 2022, the European Union (Electronic Communications Code) Regulations 2022 (the "ECC Regulations"), and the Wireless Telegraphy Acts 1926 to 2009[10] (the "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.

2.6 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.

2.7 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 this 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.

2.8 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.

2.9 ComReg, in preparing the proposed plan of work set out herein, has also had regard to the other provisions of the EECC which have been transposed in the Communications Regulation and Digital Hub Agency (Amendment) Act 2023.[11]

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

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

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

[11] By virtue of S.I. No. 299 of 2023, the Communications Regulation and Digital Hub Development Agency (Amendment) Act 2023 (Commencement) (No.2) Order 2023.

- 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.[12]

2.11 Further details of these activities are set out in Chapter 3.

2.2 Spectrum Management

2.12 The radio spectrum is a limited and valuable national resource that permeates all areas of communications, including radio, television, mobile (voice and data), aeronautical and 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 facilitate the implementation of radio communications systems with minimum radio interference.

2.13 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

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 European Community.

2.14 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.

[12] See Home (testandtrial.ie)

2.15 ComReg employs a broad but integrated approach to spectrum management that addresses both the scope and nature of action across its radio spectrum activities, as shown in Figure 1.

Figure 1: Spectrum Management - an integrated approach

2.2.1 The importance of the radio spectrum

2.16 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.

2.17 In 2019, ComReg commissioned Frontier Economics to estimate the economic contribution of the radio spectrum.[13] The methodology ultimately used by Frontier Economics featured in the 2019 to 2021 Radio Spectrum Management Strategy Statement. The methodology was further utilised in the current Radio Spectrum Strategy Statement 2022-2024.[14]

2.18 In that Statement, ComReg estimated that the contribution of radio spectrum to Irish Gross National Income (GNI) in 2019 increased from €6.2 billion in 2016 to approximately €7.2 billion in 2019, accounting for 3.3% of Modified GNI[15]. It was also estimated that the number of employees in Ireland whose jobs are directly

[13] See ComReg Document 18/118a
[14] See Section 2.2.1 of Document 21/90
[15] Modified GNI is an economic indicator developed by the CSO that estimates the size of the economy appropriately adjusted for globalisation activities that disproportionately affect Irish economic aggregates.

dependent on the use of radio spectrum was approximately 19,000.

2.19 This approach measures economic activity by calculating Gross Value Added in sectors where spectrum is used as a core input (i.e. where without it, demand for services in that sector would be significantly reduced). The sectors assessed were Broadcasting, Mobile, Aviation, Mobile Manufacture, Fixed Wireless, PMR, Satellite and Mobile Retail. This methodology uses data from both the Companies Registration Office ("CRO") and the Central Statistics Office ("CSO").

> ***Gross Value Added*** = *Gross Operating Surplus + Compensation of Employees + Mixed Income + (Taxes on Products - Subsidies on Products*

Figure 2: Gross Value Added

2.20 ComReg proposes to use the same approach for ComReg's RSMOP. However, ComReg notes that there have been some market developments in the sectors and proposes to make two changes on account of this. First, in light of the exit of Carphone Warehouse from the market in 2021, ComReg proposes to remove the Mobile Retail sector. Second, given the divestment of certain tower assets to mobile tower companies from Mobile Network Operators ("MNOs") since the last assessment, ComReg proposes to include the Mobile Tower sector,

2.21 Furthermore, in the intervening period, the disruption to economic activity due to COVID-19 has diminished overall estimates given temporary reductions in employment and profitability across certain industries (e.g. aviation). This primarily impacts 2020, 2021 and the early part of 2022. Therefore, ComReg proposes to base its estimates on the latest available data for 2023.

2.22 ComReg welcomes any comments on its proposed methodology or the nomination of any other sectors that might be included as part of its assessment.

Social and secondary benefits of spectrum usage

2.23 There are considerable social benefits arising from the use of radio spectrum. 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 using the radio spectrum across a variety of sectors.

2.24 Access to radio spectrum is also necessary for television and radio broadcasting. Effective free-to-air delivery of national and regional broadcasting helps to ensure media plurality, a greater expression of national and community cultural identity and

the development of home-grown audio-visual content, including drama and documentaries.

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

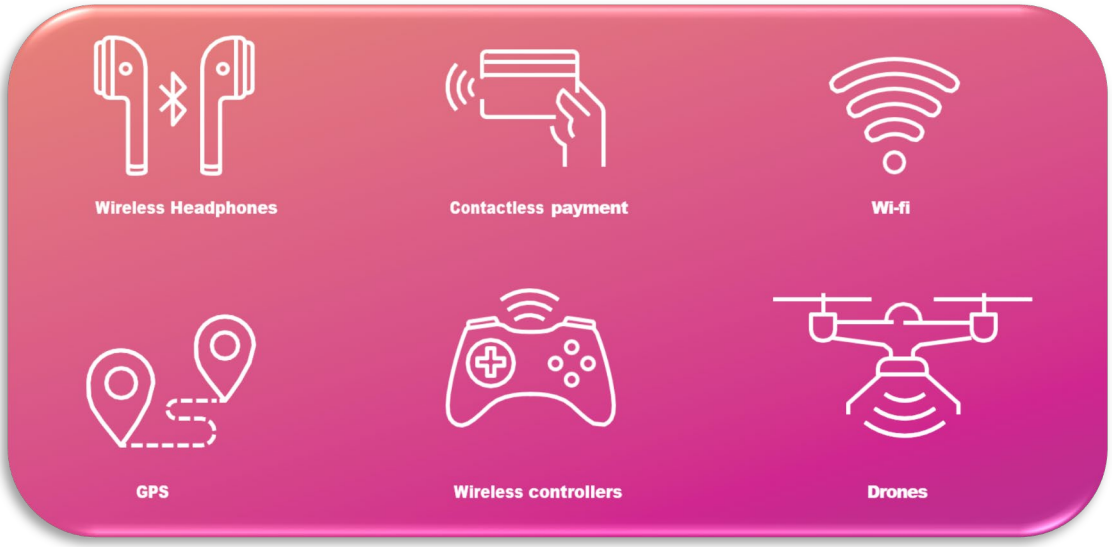


Figure 3: Examples of consumer applications that use radio spectrum

2.2.2 Spectrum Management Processes

International aspects to spectrum management

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

2.27 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.

2.28 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 ECS, such as mobile communications.

2.29 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.

2.30 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.

2.31 As the radio spectrum manager for Ireland, ComReg is charged with the implementation of international treaties, agreements and obligations[16] 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.

2.32 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

2.33 The allocation of radio spectrum means "*the designation of a given frequency band for use by one or more types of radio communications services, where*

[16] 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 most recent WRC was held during November and December 2023 in Dubai.

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 ECO Documentation (cept.org).

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.

appropriate, under specified conditions"[17]. 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. It thereby reduces the potential for interference while enabling economies of scale.

2.34 Under the 2002 Act, ComReg is obliged to publish, and revise, a Radio Frequency Plan ("Plan")[18]. 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.

2.35 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.

2.36 Alongside the publication of an updated plan[19] an online version is available, which provides an interactive search and reference functionality for stakeholders.[20] ComReg is committed to providing, in June of each year, an update of the online version of the Plan. Subsequently in December of each year ComReg provides a further update of the online version as well as publishing a pdf version of the Plan.

2.37 The June 2024 update includes many elements of the changes made at WRC-23 as well as the more normal updates that take into account changes to the European Common Allocations[21] and also National and European Legislation.

The assignment of radio spectrum in Ireland

2.38 The assignment of radio spectrum refers to the spectrum management activities that issues, and authorises the use of, rights of use of radio frequencies.[22] 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

[17] European Union (Electronic Communications Code) Regulations 2022 (S.I. 444 of 2022).
[18] Section 35 of the 2002 Act.
[19] See ComReg document 20/58R5.
[20] See Radio Frequency Plan For Ireland https://rfpi.comreg.ie/
[21] The ECA (European Common Allocations) is the CEPT harmonised frequency allocation plan and can be found online at: ECO Frequency Information System (cept.org)
[22] 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 D of Schedule 1 to the Electronic Communications Code Regulations).

under the 1926 Act.[23]

2.39 Ideally, spectrum should be assigned efficiently, which means giving access to the combination of uses and users that maximises economic activity, subject to taking account of social, 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.

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

2.40 Radio 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.

2.41 ComReg's 2023-2025 Electronic Communications Strategy Statement[24] ("Electronic Communications Strategy Statement") identifies specific strategic intents and supporting goals that can be used to support those methods.

2.42 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. The growing demand for radio spectrum is driven by society's ever-increasing use of data-intensive services while on the move and away from the office and home. 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.

[23] Section 3(1) and section 3(6) of the Wireless Telegraphy Act 1926, as amended.
[24] ComReg Document 23/34 – Electronic Communications Strategy Statement 2023 – 2025 – published 13 April 2023.

2.43 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.

2.44 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 several 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 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 European Community. These tools are illustrated in Figure 4 below.

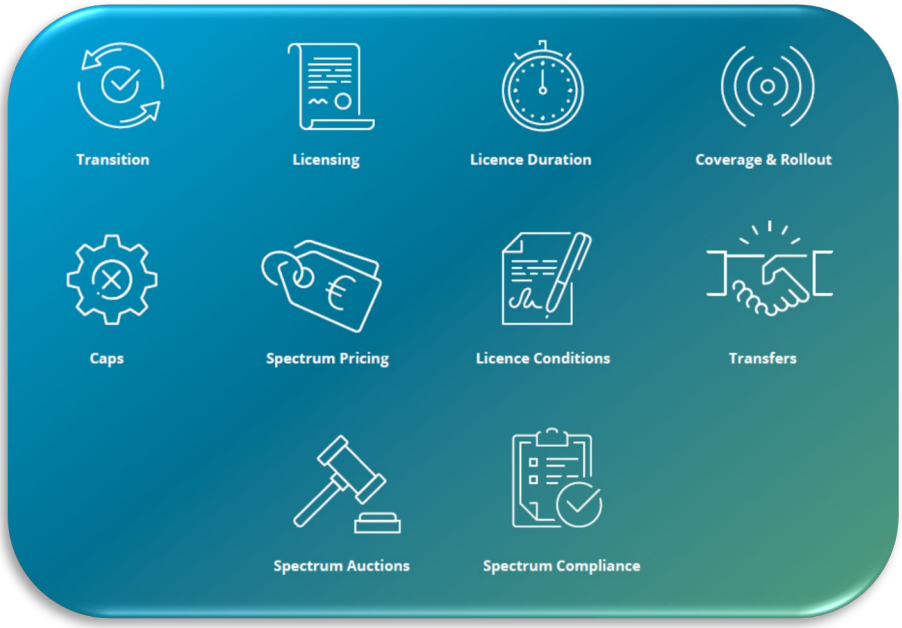


Figure 4: Spectrum Management Tools

2.45 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 proposed use of such spectrum management tools often requires detailed consideration with relevant stakeholders.

2.46 As part of its spectrum management function, ComReg monitors the market to remain informed of changes to the market since previous radio spectrum plans and spectrum awards. ComReg is conscious that circumstances may have changed or the market has developed such that its spectrum management tools may need to be deployed differently to promote competition and/or 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.

2.47 ComReg also tracks end-user usage trends (see ComReg Quarterly Key Data Reports)[25] and has completed various market research and forecasting in order to inform future spectrum management activities. For example:

(a) In Q1 2024 the number of 5G subscriptions was 1.58 million, which was a 40% year on year increase.

(b) Combined mobile subscriptions increased by 8.7% year on year and Machine to Machine (M2M) subscriptions increased by 20% year on year.

(c) The volume of mobile data traffic is increasing with a 20% year on year increase in Q1 2024.

(d) While voice traffic is reducing, mobile voice services accounts for 76% of the total voice traffic in Ireland in Q1 2024.

2.48 In August 2023, ComReg undertook a Broadband Connectivity consumer survey with the goal to monitor consumer use of broadband and obtain views on broadband services in Ireland. The results of that survey show:

(a) 44% of respondents now work from home online at least one day a week.[26]

(b) over 4 out of 5 respondents stated that Wi-Fi is the method used most often to connect PCs/laptops, smart TVs, and games consoles at home.

(c) 30% of the respondents who indicated that they did not have a fixed broadband connection, stated that they access internet over their smartphone instead.

[25] Quarterly Key Data Report | Commission for Communications Regulation (comreg.ie)
[26] ComReg Document 23/76 – Broadband Connectivity Survey 2023 – published 15 August 2023.

2.49 ComReg published in October 2022 the Mobile Consumer Experience – 2022 Survey results.[27] Its key findings include:

- 87% of respondents deemed it important or critically important to have mobile phone coverage within their home;
- During a one-month period, 37% of respondents experienced loss of signal when using call / text functions on mobile networks, while 32% experienced loss of signal when using data. Those in very rural areas noted higher incidences of disruptions; and
- Over 50% of respondents experienced daily issues in relation to voice calls/texts in their home or a specific part of their home. Those in rural areas were impacted more, with 62% of rural dwellers experiencing daily issues in a part of their home. The issues related primarily to dropped calls and being unable to receive a call or a text.

2.50 To (a) inform future spectrum award proposals, (b) provide additional consumer information and (c) improve the connectivity experience for consumers, ComReg has made available an interactive Outdoor Mobile Coverage Map[28] to provide consumers with a visual (geographic-based) means of presenting predicted 2G, 3G, 4G and 5G outdoor mobile coverage[29] for mobile service[30] providers in Ireland.

2.51 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. This is consistent with Goal 3.2 of the Electronic Communications 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.

[27] Mobile Consumer Experience Survey 2022 | Commission for Communications Regulation (comreg.ie)
[28] Outdoor Mobile Coverage Map
[29] The map shows signal strength ranging from very good, good, fair, fringe and no coverage and the map data is updated periodically throughout the year.
[30] Currently there are 10 mobile service providers on the Outdoor Mobile Coverage Map. 48, An Post Mobile, Clear Mobile, Eir, GoMo, Lycamobile, Tesco Mobile, Three, Virgin Media, and Vodafone.

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.

2.52 Regulated entities should be fully cognisant of their obligations, comply with them and have an internal culture of compliance. It is 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.

2.53 In meeting its strategic intention regarding compliance and enforcement, ComReg actively monitors the radio spectrum[31] to ensure that it is being used in compliance with relevant regulations and authorisations and will intervene where appropriate.

2.54 ComReg publishes information annually to inform interested parties of its radio spectrum compliance and enforcement activities including KPI's,[32.]

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.

2.55 ComReg recognises the need to engage with different stakeholder groups and interested parties. The engagement takes several forms, including forums, formal consultation[33] and publication of proposals on its website. This is consistent with ComReg's strategic intention to be an effective, agile and relevant regulator as

[31] For example, ComReg undertakes market surveillance of products, radio frequency interference investigations, radio spectrum monitoring and compliance and enforcement activities.
[32] https://www.comreg.ie/industry/radio-spectrum/spectrum-compliance/
[33] ComReg Document 24/02 – Consultation Procedures Review: Response to Consultation – published 11 January 2024.

expressed of the Electronic Communications Strategy Statement.[34]

2.56 ComReg continuously engages with a range of international regulatory bodies including other European administrations, the Radio Spectrum Policy Group ("RSPG"),[35] the ITU and the CEPT. This engagement contributes to radio spectrum management regulatory policy discussions and to input on 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.

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

[34] See Strategic Intent 5 of the Electronic Communications Strategy Statement.
[35] 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://radio-spectrum-policy-group.ec.europa.eu/index_en

3 Review of the 2022-2024 Period (Non-Mobile Fixed Communication Network)

3.1 In this chapter, ComReg reviews its 2022-2024 plan and associated work plan, as set out in Chapter 5 of Document 21/136, using the following broad categories:

- ComReg's spectrum management function (i.e. programmatic work);
- Broadcasting services;
- Terrestrial Fixed services;
- EC Harmonisation Decisions non-Mobile Fixed Communication Network (non-MFCN);
- Licence-Exempt Short Range Devices (SRDs);
- Satellite Services;
- Private Mobile Radio Services;
- Radio Amateur Services;
- Unmanned Aircraft Systems ("UAS");
- Aeronautical, Maritime, Scientific Services; and
- Defence Forces use of spectrum.

3.2 ComReg's review of its activities for MFCN services is set out in Chapter 4 below.

3.1 Programmatic spectrum management work

3.3 In section 5.2.1 of Document 21/136, ComReg identified the following programmatic work items for the period 2022 – 2024:

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 relevant products being imported to the State;

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

iv. Continue to monitor 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. Maintain a programme of measurement of Non-Ionising Radiation (NIR) and publication of surveys on Siteviewer[36] as appropriate;

viii. 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[37] agenda items of relevance to Ireland, including participation in relevant CEPT and regional groups; and

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

3.4 ComReg's activities in relation to the above programmatic work items are set out below, with the exception of its activities to assist DECC in its preparations for WRC-23 which are discussed in Chapter 5.

3.1.1 Radio Licensing

3.5 Figure 5 presents the total number of radio spectrum licences in force (i.e. 'live' licences) in Ireland from 2019 to 2024, and highlights that the demand for licences generally continues to grow, in the main for fixed point-to-point radio links ("fixed radio links"). As of 30 June 2024, the number of licences totalled 22,337 representing a **25% increase** in the five years since 30 June 2019.

[36] ComReg's SiteViewer website https://siteviewer.comreg.ie/#explore
[37] https://www.itu.int/wrc-23/

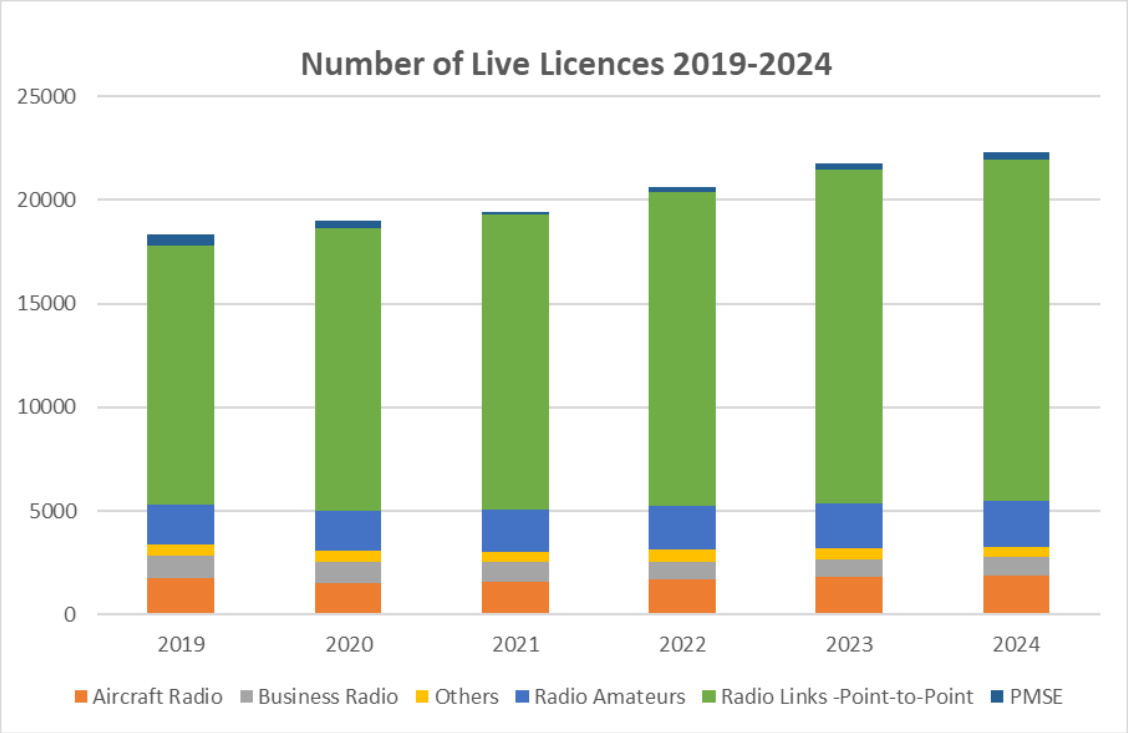


Figure 5: Number of live licences 2019-2024

3.6 While licences are issued for a wide variety of purposes some radio spectrum licences are more in demand than others. Fixed radio links licences have experienced a 30% increase in the number of fixed radio links in Ireland over the past 5 years. As of 30 June 2024, there were 16,459 fixed radio link licences, representing circa 73% of all live licences. Fixed radio links are used mainly by fixed and mobile operators, broadcasters, and utilities to provide transmission capacity and networks, and to provide redundancy and back-up for other networks.

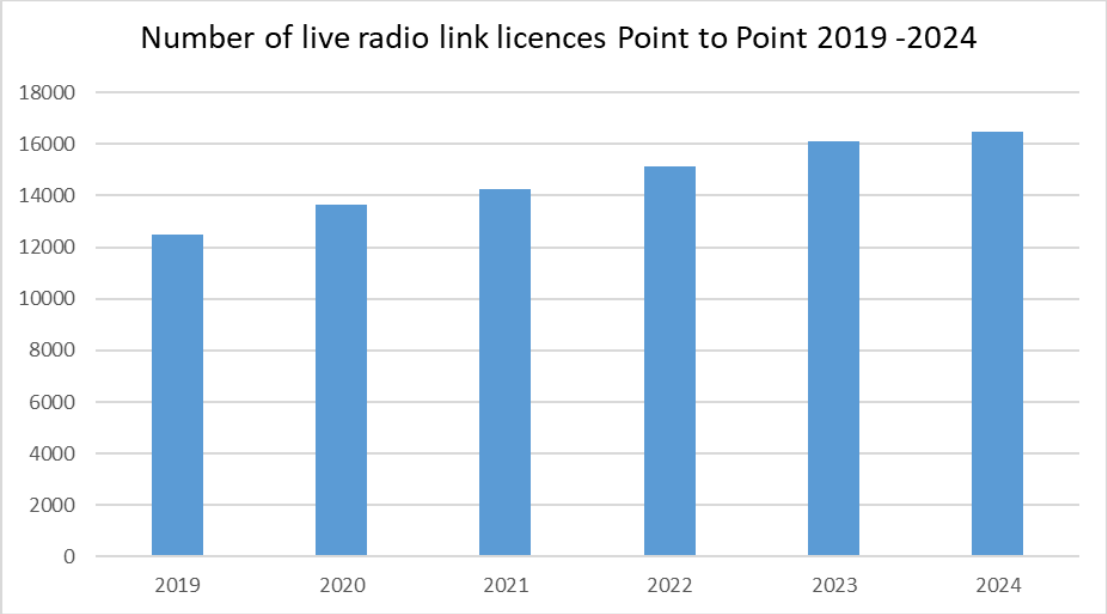


Figure 6: Number of live fixed radio link licences 2019 – 2024

3.7 Licences for business radio, aircraft radio and amateur stations also remain popular. As of 30 June 2024, there were 4,963 live licences for these licence types, representing circa 22% of all live licences. The number of aircraft radio licences granted has increased by 6% during the period 2019 to 2024. Due in the main to Covid restrictions, Program Making and Special Event (PMSE) licences significantly reduced between 2019 and 2021 from 533 licences to 124 licences. However, between 2021 and 2023 the PMSE licences granted rebounded, with 328 issued as of June 2023. In June 2024, 383 PMSE licence were granted. The number of radio amateur station licences had increased to 2,216 in June 2024, an increase of 15% over June 2019.

3.8 The remaining radio licences cover a variety of licence types including liberalised use licences (which facilitate the provision of mobile services), trunked mobile radio, air traffic services and land-based maritime services licences (which facilitate the safe operation of air and sea transport).

3.2 Monitoring, compliance and enforcement

3.9 ComReg is responsible for monitoring, compliance and enforcement of the 1926 Act along with relevant legal obligations arising from the Electromagnetic Compatibility ("EMC")[38] and Radio Equipment ("RE")[39] Directives, as transposed

[38] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

[39] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment.

into national law, within the State.

3.10 These activities include:

- random surveys of transmission sites for compliance with licence conditions regarding non-ionising radiation;
- investigation of harmful radio interference to licensed operators;
- enforcement action, including the execution of search warrants and subsequent prosecutions in respect of unlicensed use of the radio spectrum; and
- market surveillance of products, including compliance checks on items being imported to the State through cooperation with Customs.

3.2.1 Radio Frequency Interference Investigations

3.11 Radio Frequency Interference ("RFI") describes radio frequency signals that disrupt legitimate electronic communications services, whether entirely, partially, or temporarily. RFI can affect any radio communications service including but not limited to emergency services, air traffic control, mobile phone services, business radio, microwave links and broadcast services.

3.12 RFI is caused by one wireless communications device transmitting at or near the same frequency as another or it can be caused by electromagnetic fields generated by various electronic devices, such as lights and computers. RFI can be unintentional: for example, it can be caused by incorrectly or poorly installed radio systems or by faulty or non-compliant electrical or electronic equipment.

3.13 All RFI complaints received by ComReg are classified into three categories, Type A (immediate response), Type B (response within 5 working days) and Type C (essentially queries resolved through the provision of information), depending on the severity or impact of the harmful interference.[40] .

3.14 For the period 2022 to 2023, ComReg received zero (0) Type A, 27 Type B and 15 Type C radio frequency interference reports as outlined in Figure 7 below.[41] ComReg's Spectrum and Intelligence Investigations (SII) unit achieved a 100% KPI response for Type B reports during this period. Mobile phone boosters accounted for 52% of interference sources.

[40] https://www.comreg.ie/industry/radio-spectrum/spectrum-compliance/radio-interference/
[41] Spectrum Intelligence and Investigations | Commission for Communications Regulation (comreg.ie)

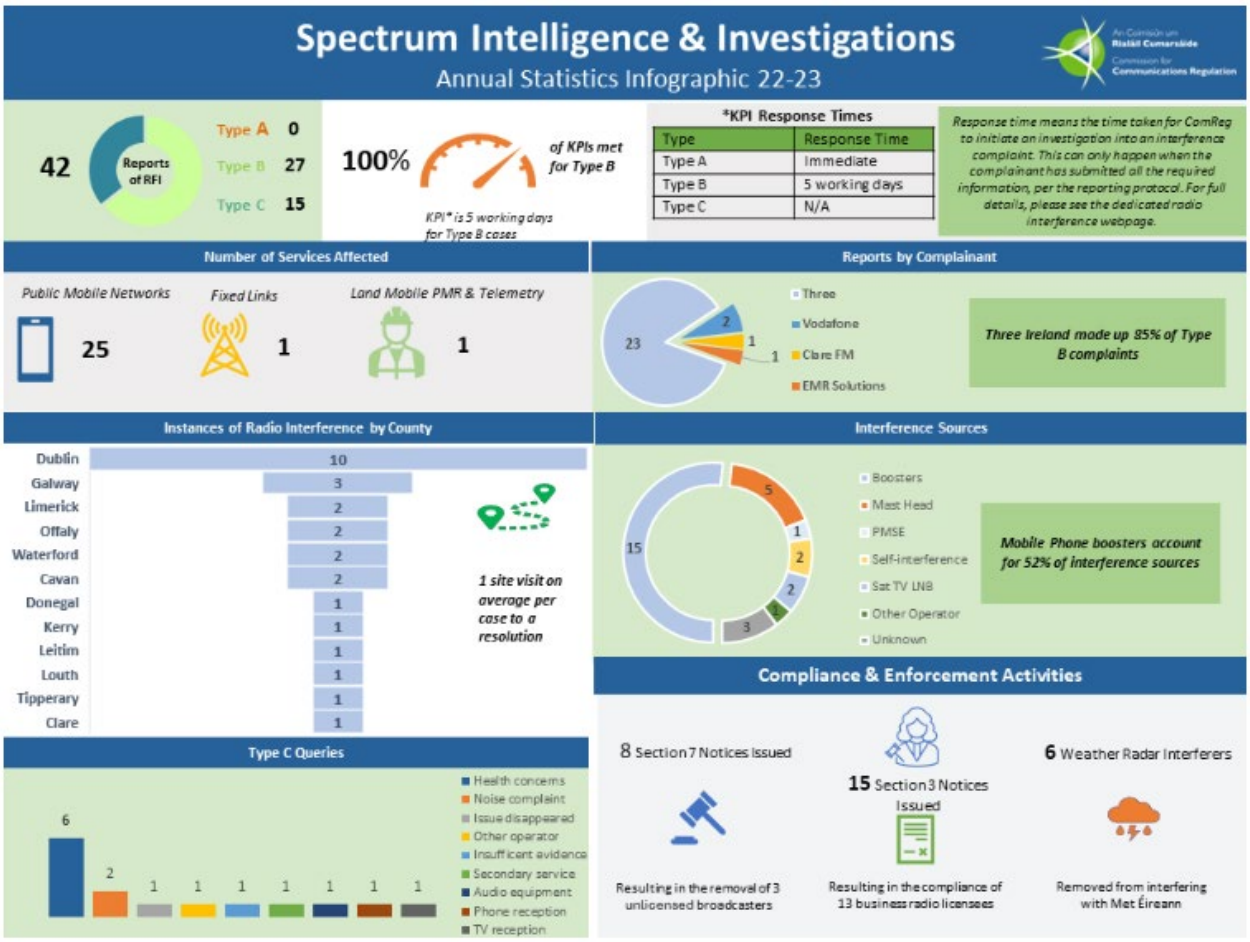


Figure 7: Spectrum Intelligence and Investigations Annual Statistics Infographic 2022 - 2023

5GHz RLAN interference to Meteorological Radars

3.15 In Ireland, Met Éireann operates two meteorological radars in the 5 470 – 5 570 GHz frequency band (Dublin and Shannon) that are used for weather forecasting purposes.

3.16 Harmful interference to meteorological radars caused by non-compliant Radio LANs ("RLAN")[42] operating in the 5 GHz band is a Europe wide issue that is being addressed by both CEPT and AdCo[43] RED. The non-compliance generally arises when RLAN operators disable the DFS and TPC modes[44] of the RLAN equipment to enable them to access additional channels of operation or to increase the power

[42] A Radio LAN (RLAN) is a radio access system used to provide wireless access between computer devices. RLAN are mostly used as a wireless access system to the Internet. This can be an access point at home, to have wireless access to a broadband internet connection. It can also be an access point at a hotspot, such as an airport lounge or a cafe.

[43] European cooperation on market surveillance takes place through informal groups of market surveillance authorities, called Administrative Cooperation Groups (AdCos).

[44] IEEE Std 802.11h provides mechanisms for dynamic frequency selection (DFS) and transmit power control (TPC) that is used to satisfy regulatory requirements for operation in the 5 GHz band.

and thereby the range of operation of their equipment. Consequently, the RLAN equipment can be detected by meteorological radars often tens of kilometres away. This can result in the radar being overpowered by the RLAN signal such that it cannot detect the weather conditions.

3.17 To mitigate the impact of the harmful interference from RLANs, Met Éireann must apply filtering to its radars which reduces the sensitivity of the radars and consequently the accuracy of the forecasting ability of the radars.

3.18 During the 2022 to 2024 period, ComReg continued to work with Met Éireann and to address the on-going harmful interference issues arising from non-compliant RLAN equipment adversely affecting the radars at both Shannon and Dublin airports. In this regard several improvements were made to the original methodology developed in the 2020-2021 work period regarding the detection and removal of non-compliant RLANs.

3.19 The improvements include scheduled regular scans undertaken by Met Éireann to detect interfering RLAN devices. Met Éireann conducts several scans over 1-2 days. Devices that show up in several scans are provided to ComReg showing the current scan and all other previous scans. This allows ComReg to concentrate its resources on those devices that are most likely to be causing persistent harmful interference.

3.2.2 Non-Ionising Radiation Monitoring

3.20 Non-Ionising Radiation ("NIR") emissions from transmitter sites remains an important matter. ComReg requires, as a condition of a General Authorisation as well as of various Wireless Telegraphy licences,[45] that operators of transmitting stations ensure that their installations comply with the NIR emission limits specified in the latest guidelines published by the International Commission on Non-Ionising Radiation Protection ("ICNIRP").[46] In addition, in 2019 the functions of Environmental Protection Authority ("EPA") were expanded to cover public exposure to non-ionising radiation in the electromagnetic spectrum[47] , and the Health and Safety Authority is the body responsible for occupational exposure to NIR.[48]

3.21 In 2003, ComReg commenced its Programme of Measurement of Non-Ionising

[45] See Condition 8 of the Conditions for the provision of Electronic Communications Networks and Services – ComReg Document 03/81R6. https://www.comreg.ie/publication-download/general-authorisation-for-the-provision-of-electronic-communications-networks-and-services

[46] ICNIRP is a body of independent scientific experts and is formally recognised as an official collaborating non-governmental organization by the World Health Organization. For further information see: www.icnirp.org

[47] https://www.epa.ie/our-services/monitoring--assessment/radiation/

[48] https://www.hsa.ie/eng/topics/physical_agents/electromagnetic_fields/

Radiation[49], which entails annual audits of compliance by operators with their General Authorisation/Wireless Telegraphy Licence conditions relating to NIR. Each annual audit involves surveying a sample number (circa 80) of sites and transmitter types (including 2G, 3G, 4G and 5G mobile telephony, radio and TV broadcast, wireless broadband etc.) countrywide. To date, over 1,900 such individual site surveys have been conducted and emissions measured at all surveyed sites, without exception, have been found to fall well below the ICNIRP limits for general public exposure to NIR.

3.22 Results of all site surveys undertaken by ComReg are summarised and published quarterly in the NIR Reports. Copies of individual site survey reports can be viewed on Siteviewer[50] , an on-line map facility provided by ComReg, which allows the public to view details of mobile phone base stations throughout Ireland.

3.2.3 Spectrum Monitoring

3.23 During the period under review, ComReg procured and commenced the rollout of its new Radio Frequency Monitoring Network ("RFMN"). This network, when complete, will consist of two mobile monitoring stations and seven fixed stations; one in Cork, one in Shannon and five in Dublin. To date the two mobile stations and three fixed stations in Cork, Shannon and Dublin have been installed and commissioned. The installation of additional fixed sties in Dublin is advancing and should be complete by the end of 2024.

3.24 All of the monitoring stations have the ability to monitor the radio spectrum from 30 kHz up to 6 GHz.

3.25 Once fully commissioned the RFMN will greatly enhance ComReg's ability to monitor and measure radio spectrum licence compliance, identify and remove sources of harmful interference including illegal broadcasters.

3.2.4 Market surveillance of products

3.26 ComReg is the designated market surveillance authority ("MSA") and competent authority in Ireland under the EMC and RE Directives, as transposed into national law[51], within the State.

3.27 During the period under review, ComReg discharged its duties as an MSA through

[49] https://www.comreg.ie/industry/radio-spectrum/site-viewer/non-ionising-radiation-information/
[50] https://siteviewer.comreg.ie/#explore
[51] European Communities (Electromagnetic Compatibility) Regulations 2016 and 2017 (S.I. No. 145 of 2016 and S.I. No. 69 of 2017, amended by S.I. No. 316 of 2023), and European Union (Radio Equipment) Regulations 2017, as amended (S.I. No. 248 of 2017 amended by S.I. No. 30 of 2024).

its Product Safety Unit ("PSU"). Activities undertaken included:

(a) Compliance checks on products being imported at their point of entry into the State, through cooperation with Customs;[52]

(b) The initiation of programmatic visits to the premises of economic operators[53] by authorised officers to conduct checks on samples of radio equipment made available on the market in the State; and

(c) Online market surveillance of radio equipment for sale to end-users in Ireland via e-commerce platforms.

3.28 In August 2023, ComReg initiated its first product safety communications campaign. The purpose of this and future campaigns is to help economic operators best understand their obligations in respect of the radio equipment they place on the market, and how proactive engagement with ComReg can help with this, and to educate and inform End-Users.

3.29 ComReg engaged with other market surveillance authorities across the EU to improve harmonisation.

3.30 In 2024, ComReg published its first report detailing its activities since the establishment of the PSU.[54]

3.3 Test & Trial Ireland

3.31 Ireland has a capability and reputation for research and excellence in wireless innovation and technology. Wireless technologies, in the form of new products and services, are evolving to meet new communication trends. Some of the key drivers of innovation in wireless technologies include meeting the consumers' desire for fast, reliable, ubiquitous connectivity; new efficient wireless systems and radio access technologies including industry collaboration and academic research; and the continued growth of use cases for IoT devices.

3.32 Test & Trial Ireland[55] enables entrepreneurs, researchers and developers to test or trial wireless technologies quickly and at a low cost in a wide variety of frequency bands in Ireland. As shown in Figure 8 below, the number of test and trial licences granted per year since 2019 has been broadly consistent with an average of circa 30 licences being issued per year.

[52] Customs Division of the Revenue Commissioners
[53] Manufacturers (or their authorised representative), importers and distributors
[54] See Product Safety Unit Annual Report 2023 | Commission for Communications Regulation (comreg.ie)
[55] See https://www.testandtrial.ie/

3.33 The test licence[56] issued to CONNECT[57] to allow the advanced experimentation on next generation communication networks (i.e. 5G communications) under real work conditions is an example of Test and Trial Ireland facilitating research and innovation.

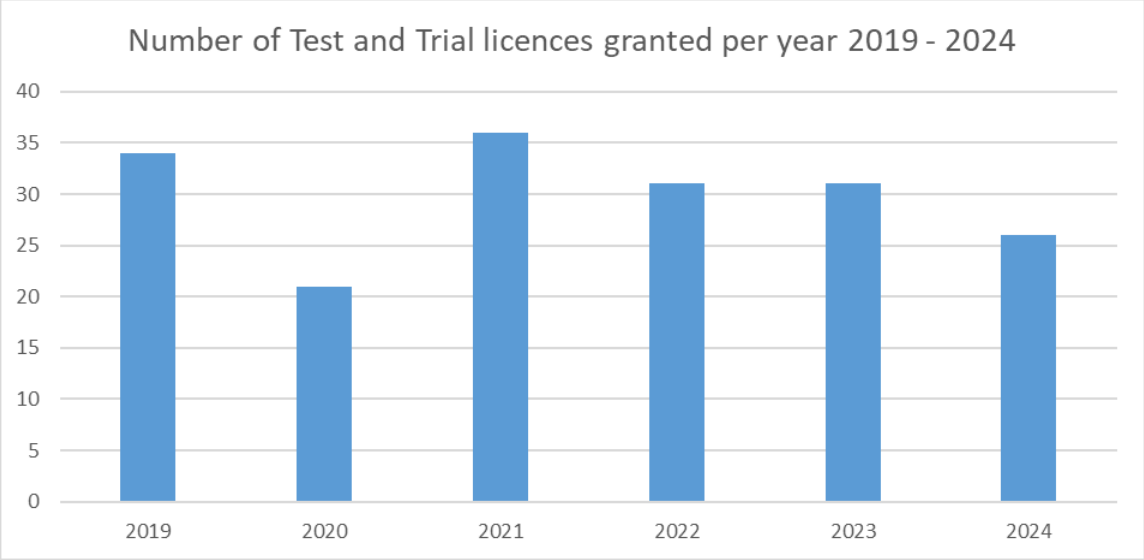


Figure 8: Number of Test / Trial licences granted per year 2019- 2024

3.34 ComReg is committed to continuing its support for Test & Trial Ireland for the benefit of new and returning Test & Trial Ireland clients.

3.4 Broadcasting Services

3.35 ComReg's 2022 – 2024 workplan for Broadcasting Services[58] was to:

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

(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

[56] ComReg awards Test licence suitable for 5G to TCD telecoms researchers | Commission for Communications Regulation
First 5G test licence awarded by ComReg will enable next-gen communications networks research - News & Events | Trinity College Dublin (tcd.ie)
[57] Connect is a SFI research centre for Future Networks located in Trinity College Dublin.
[58] Broadcasting Services include ASB (FM/AM/LW), DSB (DAB/DAB+), and DTT (DVB-T) services.

(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.

3.4.2 Background

3.36 The Broadcasting Act 2009[59] (the "2009 Act") concerns "broadcasting services" as defined therein. Amongst other things, the 2009 Act provides that Raidió Teilifís Éireann ("RTÉ") and the Coimisiún na Meán (formally "Broadcasting Authority of Ireland") shall hold certain licences, in respect of the various radio and television broadcasting services which they provide and that ComReg shall grant such licences. In this regard, radio spectrum for the transmission of broadcasting services (i.e. radio and television services) is currently provided for as follows:

- Two (2) DTT Multiplex licences are issued to RTÉ for the provision of DTT services. These licences expire on 13 December 2031;
- One (1) ASB licence is issued to RTÉ for the provision of FM radio services. This licence expires on 13 May 2029; and
- ASB licences are issued to Coimisiún na Meán for the provision of commercial FM radio services on a case-by-case basis for a maximum period of 10 years.

3.37 Previously ComReg had also issued a DSB licence to RTÉ. However, RTÉ surrendered its licence in 2021 following the cessation of its Digital Audio Broadcast ("DAB") services.[60]

3.4.3 ComReg broadcasting activities in 2022-2024 period

International coordination

3.38 During the 2022-2024 review period, ComReg continued to engage with the international coordination process to ensure the efficient and effective use of broadcasting spectrum, in particular with Ofcom, our nearest neighbour in terms of spectrum management co-ordination.[61]

3.39 This workplan activity will continue for the coming period.

[59] The Broadcasting Act 2009, available www.irishstatutebook.ie
[60] See https://about.rte.ie/2021/03/02/rte-to-cease-dab-transmission-digital-radio-services-to-remain/ for more information.
[61] ComReg engages with Ofcom UK (its nearest neighbouring country) through frequent bilateral meetings to discuss coordination requirements for broadcasting services in both jurisdictions.

Issue and amendment of licences

3.40 During the 2022-2024 review period, ComReg:

- continued to issue ASB licences to Coimisiún na Meán for the provision of commercial FM radio services; and
- amended RTÉ's ASB licence. This reflected RTÉ's decision to cease its longwave 252 kHz analogue sound broadcasting service for RTÉ Radio 1 from 14 April 2023.[62]

3.41 For the DTT Multiplex and DSB licences, no new licences were issued and no existing licences were amended.

- The two DTT Multiplex licences issued to RTÉ were issued in early 2020 and no amendments have been made to these licences since then; and
- There are no DSB licences in Ireland currently.

3.42 This workplan activity will continue for the 2025-2028 period.

Provide advice on spectrum for broadcasting services

3.43 During the review period, ComReg continued to provide advice as required on spectrum for broadcasting services, and in particular supported DECC as well as representing Ireland at WRC-23 where the current use of the 470-960 MHz band (by broadcasting and mobile) was considered (see Chapter 5 below).

3.44 This activity will continue for the 2025-2028 period.

Future use of 470-694 MHz band Future use of 470-694 MHz band

3.45 During this review period, studies on the current use of the 470-694 MHz frequency band in International Telecommunications Union ("ITU") Region 1, and discussions on its future use were considered at WRC-23 in relation to Resolution 235 of that conference.

3.46 The outcomes of the WRC-23 are set out in its "Final Acts".[63] In relation to the 470-694 MHz frequency band in Ireland:

- a new secondary allocation was added to the mobile, except aeronautical mobile, service, for the 470-694 MHz frequency band (see new footnote no. 5.295A on page 13 of the Final Acts); and

[62] See https://www.rte.ie/news/2023/0331/1367393-long-wave/ for more information.
[63] See https://www.itu.int/pub/R-ACT-WRC.16-2024

- Resolution 235 was modified so as to invite the IRU-Radiocommunications ("ITU-R") to review of the spectrum use of the frequency band 470-694 MHz or parts thereof for some countries in ITU Region 1 (including Ireland) in time for WRC-2031 (see page 463 of the Final Acts). The modified Resolution 235 resolves to:
  - review the spectrum use and needs of applications of broadcasting and mobile services within the frequency band 470-694 MHz; and
  - based on the above review, update the sharing and compatibility studies for coexistence conditions and develop new studies, as appropriate, taking into account existing primary and secondary services and footnote no. 5.295A, and to propose technical and regulatory conditions.

3.47 Noting, among other things, the information set out in the paragraph below, ComReg proposes to include an item on the future use of the 470-694 MHz band in the 2025-2028 workplan, where it envisages that it would continue to monitor and engage with relevant international working groups, and input into discussions as appropriate in relation to the future use of the 470-694 MHz band.

3.48 In support of the above, ComReg observes that:

(a) article 4 of EC Decision (EU) 2017/899[64] obliges EU Member States *"to ensure availability at least until 2030 of the 470-694 MHz ('sub-700 MHz') frequency band for the terrestrial provision of broadcasting services";*

(b) spectrum in the 470-694 MHz band is currently allocated to, coordinated for, and used for DTT broadcasting services in Ireland, and elsewhere in the EU, with many DTT licences due to expire in the 2030s;

(i) In Ireland, the Broadcasting Act 2009[65] (as amended) obliges ComReg to provide spectrum for up to six DTT multiplex licences.[66] Spectrum in the 470-694 MHz has been internationally

[64] Article 4, of Decision (EU) 2017/899 states that *"on the use of the 470-790 MHz frequency band in the Union Member States shall ensure availability at least until 2030 of the 470-694 MHz ('sub-700 MHz') frequency band for the terrestrial provision of broadcasting services*".

[65] The Broadcasting Act 2009, available at: www.irishstatutebook.ie.

[66] See Sections 132(1), 132(2) and 132(4):
- Section 132(1) provides that ComReg, upon request by RTÉ, shall issue a single television Multiplex licence to RTÉ;
- Section 132(2) provides that ComReg, upon request by RTÉ and following consultation with the Minister for Communications and the Coimisiún na Meán (formally the Broadcasting Authority of Ireland or "BAI"), shall issue a second television multiplex licence to RTÉ; and
- Section 132(3) obliges ComReg, upon request, to provide up to four DTT multiplex licences to Coimisiún na Meán. A request for additional multiplex licences is provided for under Section 132(4). The Coimisiún na Meán has not requested such a licence.

coordinated[67,68] (a process that took over 4 years) to provide spectrum for any such DTT multiplex licences, and to date two DTT Multiplex licences have been issued to RTÉ, while there has been no requests from Coimisiún na Meán. RTÉ's DTT licences expire on 13 December 2031.

(ii) Across the EU, spectrum in the 470-694 MHz band has been coordinated and made available for the provision of DTT broadcasting services, with many DTT licences expiring in the 2030s. The number of DTT multiplexes and usage varies across Europe, with Member States such as Italy and Spain having a large number of DTT multiplexes and others, including Ireland, having less DTT multiplexes.[69]

(c) the future use of the frequency band 470-694 MHz beyond 2030 is currently of topical interest in the EU[70] and the UK (our nearest neighbouring country for spectrum management co-ordination) where Ofcom, in May 2024, issued a report to the UK Government on the "Future of TV Distribution".[71] In that report Ofcom noted that:

(i) many of the UK's DTT multiplex licences expire in 2034, and some even sooner, and so there was a need for clear vision and careful planning of universal TV for the long term;

(ii) *"For the first time, many broadcasters have told us that they foresee a tipping point at which it is no longer economically viable to support DTT in its current form."* (emphasis added); and

---

67 ComReg Document 17/23, "*Information Notice - Progress update on DTT migration to below the 700 MHz band: International coordination of Ireland's DTT spectrum plan*" published 31 March 2017, available at: https://www.comreg.ie/

68 Ireland currently has coordination agreements on the use spectrum in the 470-694 MHz band for broadcasting (i.e. DTT) services with the equivalent regulatory bodies in the UK and in France, as well as with the Western European Digital Dividend Implementation Platform group ("WEDDIP")

- ComReg Document 17/23A "*MoU to Co-Ordinate DTT Frequency Plans Between Ofcom and ComReg*", published 31/03/2017 available at https://www.comreg.ie/
- ComReg Document 17/23c, "*Agreement Between Ireland and France Concerning Frequency Co-ordination of DTT in the band 470 - 694 MHz*", published 31/03/2017, available at https://www.comreg.ie/
- ComReg Document 17/23d, "*DTT Frequency Plan in the Band 470 - 694 MHz Between the Administrations of Belgium, France, Germany, Ireland, Luxembourg, the Netherlands, the United Kingdom*", published 31/03/2017, available at https://www.comreg.ie/

69 See LS Telecom and VVA for the EC, *"Study on the use of the sub-700 MHz band (470-694 MHz)"*, published November 2022, https://op.europa.eu/en/publication-detail/-/publication/8c6755a1-4f55-11ed-92ed-01aa75ed71a1/language-en

70 See for example, *"RSPG Opinion on Strategy on the future use of the frequency band 470-694 MHz beyond 2030 in the EU"* Document RSPG23-035 (October 2023)

71 See https://www.ofcom.org.uk/consultations-and-statements/category-1/future-of-tv-distribution

(iii) *"There are three broad approaches to the future of DTT for industry and Government to consider"*
(a) "Investment in a more efficient DTT service"
(b) *"Reduce DTT down to a core service (known as a 'nightlight');"* and
(c) *"Move towards DTT switch-off over the 2030s"; and*

(d) the future use of the 470-694 MHz band in ITU Region 1 (including Ireland) will continue to be studied by the ITU for consideration in time for WRC-2031.

Expiry of RTÉ's ASB licence

3.49 Noting the upcoming expiry of RTÉ's ASB licence on 13 May 2029, ComReg proposes to include an item on this in the 2025-2028 workplan, where ComReg proposes to engage with RTÉ, and consult as necessary, on the potential need for a further ASB licence sufficiently in advance of licence expiry.

3.5 EC Harmonisation Decisions (non-MFCN)

3.50 In Document 21/136, ComReg set out that it would:

(a) consult on the manner in which the 5875-5935 MHz band (the "5.9 GHz band") would be regulated for Intelligent Transport Systems ("ITS") in Ireland;

(b) consider the appropriate implementation of a future revised Commission Implementing Decision on the 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz frequency bands (the "5 GHz band") for Wireless Access Systems including Radio Local Area Networks (WAS/RLANs); and

(c) consider the appropriate implementation of the Commission Implementing Decision on Future Railway Mobile Communication Systems.

3.51 In that regard, ComReg has:

(a) commenced a work item to implement Decision (EU) 2020/1426 on the harmonised use of radio spectrum in the 5875-5935 MHz frequency band for safety-related applications of ITS. The work item will consider the potential national demand from Road ITS and Urban Rail ITS and any national coordination with the 5925 MHz – 5935 MHz range which is currently allocated to fixed radio links on a primary basis. ComReg expects to complete the implementation of Decision (EU) 2020/1426 by 2025;

(b) implemented Decision (EU) 2022/2307 by designating and making available the 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz frequency bands for WAS/RLAN use within ComReg Document 02/71, as amended; and

(c) begun a work item to consult on the implementation of 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. See section 6.2.5 below for further information.

3.6 Terrestrial Fixed Services

3.52 In Document 21/136, ComReg set out its intention to:

(a) conclude the consultation process of the Fixed Links licensing review and if appropriate implement new guidelines and regulations for the fixed links licensing scheme;

(b) continue to publish an annual report detailing the most up to date information regarding the licensing of fixed links;

(c) continue to encourage licensees to use the latest technology in line with ensuring the efficient use of spectrum; and

(d) publish fixed links data on Siteviewer.

3.53 In that regard, ComReg:

(a) Completed the Fixed Links licensing review consultation with the publication of Document 23/61[72] wherein ComReg decided to:

(i) open up larger bandwidth channels for certain frequency bands;

(ii) remove the high-low search radius requirement for the 80 GHz band;

(iii) allow the use of multi-band aggregation;

(iv) make the 13 GHz and 15 GHz bands available for licensing in the congestion area;

(v) designate the 13 GHz, 15 GHz, 18 GHz and 23 GHz band as congestion bands within the congestion area; and

[72] ComReg Document 23/61 – Review of the Fixed Radio Links Licensing Regime: Response to Consultation and Decision D04/23 – published 4 July 2023.

(vi) introduce a new fee regime based on a number of characteristics of the Fixed Link, including its bandwidth, frequency band, and whether there is congestion in that frequency band and at that location.

(b) Continued to publish an annual report detailing the most up to date information regarding the licensing of fixed links, see documents 21/97, 22/104, and 23/119; and

(c) Published a consultation regarding the publication of radio spectrum licence information[73] (including fixed radio links) to meet its obligations under the Access to Information on the Environment Regulations.[74] ComReg is carefully considering the responses to that consultation and intends on publishing its response to consultation in due course.

3.7 Licence-Exempt Short-Range Devices ("SRD"s)

3.54 In Document 21/136, ComReg set out its intention to:

(a) 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 European Commission ("EC") and Electronic Communications Committee ("ECC") harmonisation updates;

(b) monitor, contribute to and promote Ireland's spectrum management position in relation to IoT;

(c) implement the ECC Decision (04)08 on the harmonised use of the 5 GHz frequency bands for WAS/RLAN as amended July 2021; and

(d) consider a review of all "National SRD Solution Only" entries in document 02/71.

3.55 In that regard, ComReg has:

(a) continued to facilitate the use of SRDs to Ireland in accordance with international harmonisations measures by revising ComReg document 02/71 on foot of EC and ECC harmonisation updates. Most notably, the implementation of Decisions (EU) 2022/179 and (EU) 2022/2307,[75]

[73] ComReg Document 24/13 – Publication of Radio Spectrum Licence Information – published 19 February 2024.
[74] S.I. No. 133/2007 - European Communities (Access to Information on the Environment) Regulations 2007.
[75] Designating and making available the 5150-5250 MHz, 5250-5350 MHz and 5470-5725 MHz frequency bands for WAS/RLAN use.

Decision (EU) 2022/180,[76] Decision (EU) 2022/172,[77] and Decision (EU) 2021/1067;[78]

(b) implemented the ECC Decision (04)08 on the harmonised use of the 5 GHz frequency bands for WAS/RLAN; and

(c) reviewed the "National SRD Solution Only" entries in document 02/71 and concluded that no change is currently required to those entries.

3.8 Satellite Services

3.56 In Document 21/136, ComReg set out its intention to:

(a) consult on, amongst other issues, a new licensing regime for satellite earth stations ("SES") during the strategy period 2022 - 2024;

(b) to facilitate the licensing of SES; and

(c) to facilitate the exemption of individual licencing for certain classes of Terminals for Satellite Services[79] by updating Document 20/47, as required.

3.57 In that regard, ComReg:

(a) concluded its consultation on the Satellite Earth Station ("SES") Licensing regime with the publication of Document 23/96.[80] ComReg decided, amongst other things, to open a number of new frequency bands for SES licensing, implement a non-geostationary satellite earth station coordination process, and to introduce new fees. The new fees are designed to encourage the efficient use of the radio spectrum and ensure the effective management of the radio frequency spectrum to promote competition and maximise the benefits for consumers in terms of price, choice and quality;

[76] EC update of harmonised technical conditions in the area of radio spectrum use for short-range devices.
[77] Harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands
[78] Harmonised use of radio spectrum in the 5945-6425 MHz frequency band for the implementation of wireless access systems including radio local area networks (WAS/RLANs).
[79] Terminals for satellite services (TSS) are a type of apparatus used to communicate with a satellite from the Earth (terrestrial, at sea or aeronautical). TSS are used to provide business/consumer communications such as telephony, data and broadband.
[80] ComReg Document 23/96 – Review of the Satellite Earth Station Licensing Regime: Response to Consultation and Decision D08/23 – published 4 October 2023.

(b) licensed 7 fixed satellite earth stations ("FES") and 8 transportable satellite earth stations within the 2023/2024 operating year 1 July 2023 to 30 June 2024, see Figure 9 below.

(c) continued to update Document 20/47[81] to implement ECC Decisions[82] related to the use of terminals for satellite services.

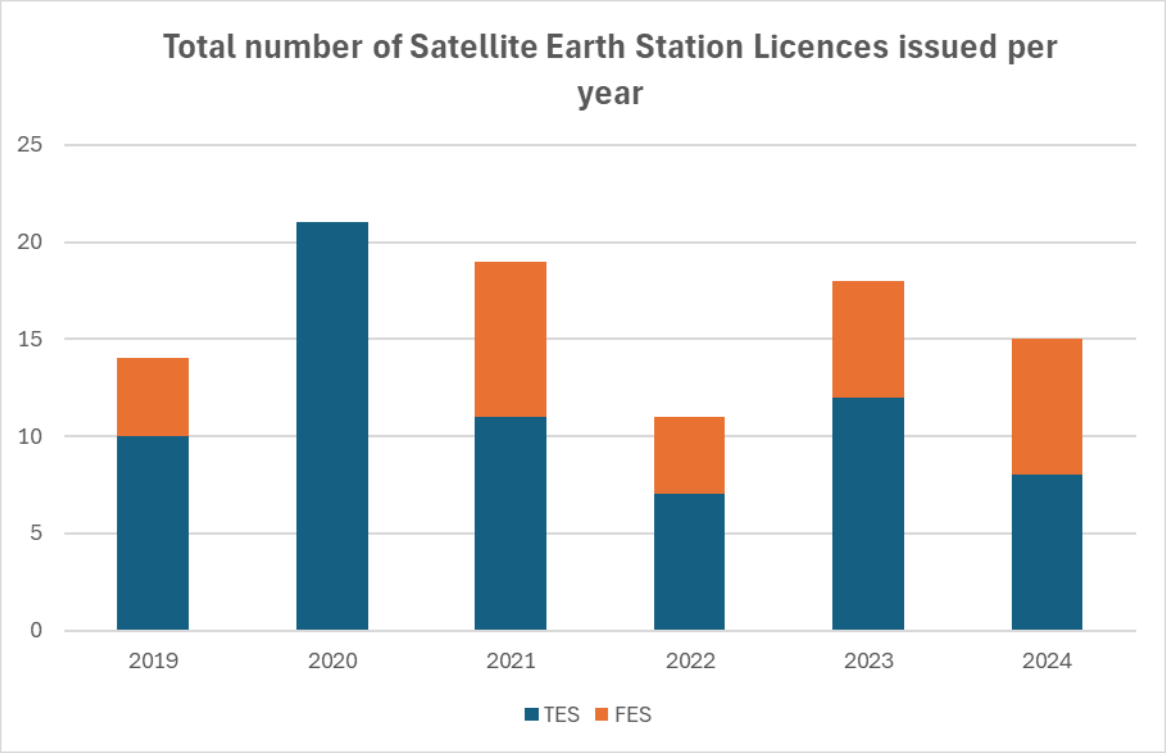


Figure 9: Total number of Satellite Earth Station Licences issued per year

[81] ComReg Documents 20/47R3, 20/47R4, and 20/47R5
[82] https://docdb.cept.org/document/category/ECC_Decisions?status=ACTIVE

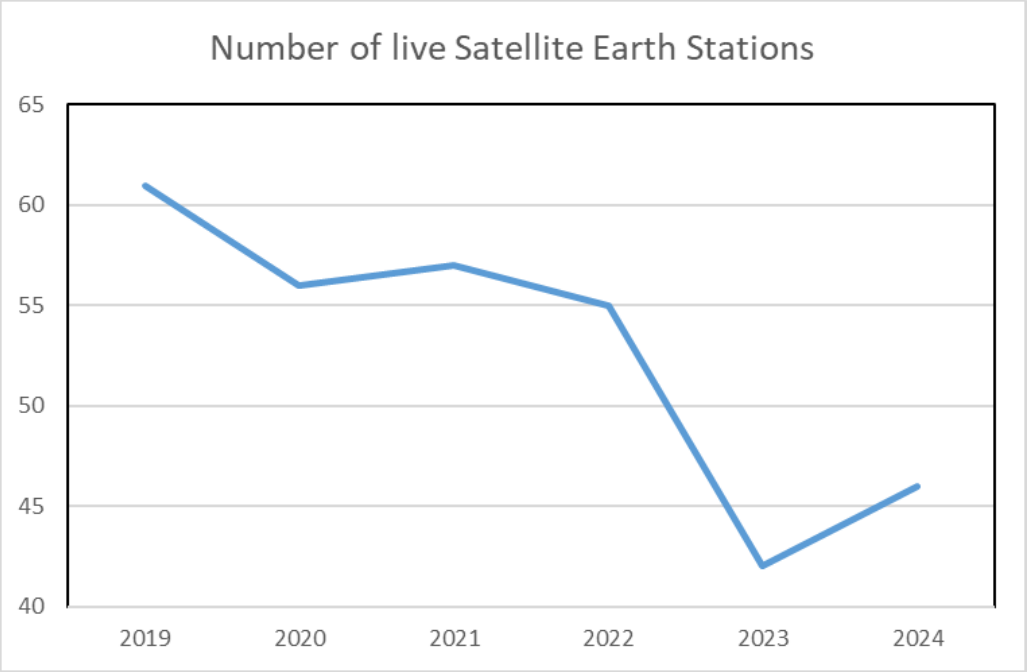


Figure 10: Number of live Satellite Earth Stations

3.9 Private Mobile Radio Services

3.58 In Document 21/136 ComReg identified the following as work items for Private Mobile Radio ("PMR") Services for the period 2022 – 2024:

(a) review the current licensing regimes for PMR and consult on, amongst other things, implementing a single unified, modern and fit for purpose licensing regime;

(b) monitor and contribute to the spectrum management considerations of Programme Making and Special Events ("PMSE") and take appropriate actions to implement harmonisation decisions; and

(c) monitor and contribute to the spectrum management considerations in respect of broadband PPDR, noting that ComReg has already identified spectrum options for Broadband Public Protection and Disaster Relief ("BB-PPDR") in the 400 MHz and 700 MHz Guard Bands and 700 MHz Duplex Gap.

3.59 In that regard, ComReg notes that:

(a) the review of the current licensing regimes for PMR has been delayed for resource reasons. However, ComReg intends on publishing an initial consultation in Q2 2025 which will set out ComReg's preliminary views on the current regimes and proposals on a new PMR licensing regime;

(b) following the completion of the Multi Band Spectrum Award 2022 (MBSA2) the PMSE licensing guidelines[83] were updated to reflect that the 700 MHz band[84] was no longer available for PMSE licensing; and

(c) it has continued to engage with the Office of the Government's Chief Information Officer ("OGCIO") to obtain clarity in relation to the State's three BB-PPDR spectrum options in the 400 MHz and 700 MHz bands.

3.10 Telemetry Systems

3.60 A telemetry system is a wireless telegraphy system, generally operating in the VHF and UHF frequency bands using narrowband SCADA[85] technology, by which automated measurements are made and other data collected at remote or inaccessible locations, and transmitted to receiving stations for monitoring, recording or remote-control purposes.

3.61 Telemetry systems are primarily used by organisations such as utility and industrial companies, where continuous monitoring of operations and control of equipment at multiple locations is necessary to ensure the proper function of processes and equipment.

3.62 In 2014, ComReg introduced a licensing framework for telemetry systems under the Wireless Telegraphy (Licensing of Telemetry Systems) Regulations 2014, S.I. 240 of 2014.[86] Telemetry licences are available under two different licence types:

(a) National; and

(b) Regional:

(i) On-site;

(ii) Local Area; and

(iii) Wide Area.

3.63 The first Telemetry Systems licences issued under S.I. 240 of 2014 expire in 2024.

[83] ComReg Document 08/08 R7 – Guidance Notes Radio Licensing for Programme Making and Special Events Use in Ireland – published 8 March 2023.
[84] The 2700 MHz band" means 703 MHz – 733 MHz paired with 758 MHz – 788 MHz
[85] SCADA means Supervisory Control and Data Acquisition systems that connect remote pieces of infrastructure wirelessly to control centres, providing utilities with real-time situational awareness on the status of their systems, which include, for example, energy management systems which optimise generation and high-voltage transmission of energy.
[86] https://www.irishstatutebook.ie/eli/2014/si/240/made/en/pdf

3.64 ComReg conducted a consultation[87] on a new licensing regime for telemetry systems to determine if licensees still require a regime for telemetry systems following the expiry of their current licences. ComReg completed the Telemetry Systems licensing review consultation with the publication of Document 24/25.[88] Therein ComReg decided to introduce a new licensing regime for telemetry services which came into effect on 21 May 2024 with the making of S.I. 266 of 2024.

3.65 To provide guidance and allow applications under the new licensing regime Comreg published Document 24/45 Licensing of Telemetry Systems in the VHF and UHF Spectrum Bands Guidelines for Applicants and Document 24/46 Application for Telemetry Radio Licence.[89]

3.11 Memoranda of Understanding

3.66 Spectrum coordination between ComReg and other jurisdictions is an enduring matter. The goal of spectrum coordination is to minimise the occurrence of cross-border radio interference between licensees operating in different jurisdictions, while at the same time maximising the use of radio-based services in each territory. Ireland utilises Memoranda of Understanding (MoU) between it and other regulators to facilitate the use of the radio spectrum resource at and across national borders.

3.67 Given that the United Kingdom (UK) is Ireland's closest neighbour, and that radio-based services are more likely to be impacted when such services operate in close proximity to one another, the majority of currently implemented MoUs/Coordination Agreements are solely between the spectrum management agencies in Ireland (ComReg) and in the UK (Ofcom). Where required, however, multilateral coordination agreements are also in place between Ireland and several other international neighbours, dealing with, for example, broadcast services where very high powers from very high towers are utilised.

3.68 On 13 December 2023, ComReg signed an arrangement between 24 CEPT Administrations[90] for the coordination of the frequency assignment of stations in the 1 452 – 1 492 MHz frequency band.[91] The arrangement alleviates the requirements for signatories to coordinate frequency assignments with respect to

[87] Telemetry Systems: The introduction of a proposed new licensing framework in the VHF and UHF frequency bands | Commission for Communications Regulation (comreg.ie)
[88] Telemetry Systems: The introduction of a new licensing framework in the VHF and UHF frequency bands. Response to Consultation and Decision with final Regulations | Commission for Communications Regulation (comreg.ie)
[89] Telemetry | Commission for Communications Regulation (comreg.ie)
[90] Ireland, Austria, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Latvia, Lithuania, Malta, Moldova, Montenegro, North Macedonia, Norway, Serbia, Slovak Republic, Slovenia, Spain, and Sweden.
[91] Please see:https://www.comreg.ie/media/2023/07/1.4-GHz-CEPT-MoU-5-July-2023.pdf

Broadcast Satellite Services ("BSS") in this band.

3.69 ComReg is currently finalising updates to the existing MoU[92] with the United Kingdom concerning procedures for coordination of frequencies used by land mobile radio communication networks for specific bands in the spectrum range 703 – 2 690 MHz. In particular, and in addition to some minor editorial amendments, the MoU will:

(a) broaden its scope to further cover mobile/fixed communications networks (MFCN) operating in the 3 400 – 3 800 MHz frequency band. This will replace the existing MoU covering the band which is currently in force and was agreed in 2008;

(b) take both synchronised and unsynchronised use into account when setting out appropriate trigger values for Time Division Duplex (TDD) systems operating in both the 2 600 MHz and 3 600 MHz frequency bands; and

(c) stipulate use, going forward, of the latest version of Recommendation ITU-R P.452 as the propagation model to employ for interference field strength prediction.

3.12 Radio Amateur Services

3.70 In Document 21/136 ComReg identified the following work items in respect of the Amateur Service:

(a) Update the Plan to align Amateur service and Amateur-satellite services with the European allocations;

(b) Update the then current guidelines to take account of a number of matters raised by respondents to consultation document 21/90;

(c) Seek, during the life of this strategy statement, to put in place a framework for novice licencing in Ireland; and

(d) consider a general increase in permissible power for all licensees and/or individual authorisations for licensees wishing to operate at higher powers.

3.71 In that regard, ComReg notes that:

(a) the Plan was updated to align Amateur service and Amateur-satellite services with the European allocations;

[92] Last updated in May 2020 - Please see: https://www.comreg.ie/media/2020/04/703-2690-MHz-MoU-IRL-UK_01-05-2020.pdf

(b) with the publication of the Amateur Station Licence Guidelines[93] it:

(i) corrected the errors identified in A3.20 of Document 21/90;

(ii) removed the requirement for additional authorisation from a number of frequency bands;

(iii) opened new frequency ranges to the amateur service; and

(iv) made 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.

(c) work for consulting on a new framework for novice licencing will progress once project resourcing is identified. However, ComReg intends to begin a comprehensive review of the Amateur Service licensing regime (including a proposed novice licensing framework) during the 2025-2028 period; and

(d) the consideration of a general increase in permissible power for all licensees has also been deferred (discussed further below in section 6.2.10). Notwithstanding, ComReg will consider an increase in power as part of a comprehensive review of the Amateur Service licensing regime.

3.72 ComReg's proposed Amateur Station work items for the 2025 – 2028 period are discussed further in section 6.2.10.

3.13 Unmanned Aircraft Systems

3.73 In Document 21/136, ComReg set out its intentions to:

(a) Monitor developments in ECC working groups and project teams and consider the appropriate implementation of any future harmonised ECC Decisions;

(b) Consider any cross-border coordination requirements in the case of Unmanned Aircraft Systems ("UAS") operating at the border;

(c) Engage with the Irish Aviation Authority ("IAA")[94] regarding restrictions on spectrum usage at or near "No Fly zones";

(d) Ensure protection of adjacent spectrum assignments within existing mobile networks; and

[93] See ComReg Documents 09/45R5 and 09/45R6.
[94] https://www.iaa.ie/

(e) Set emission limits specific to aerial User Equipment ("UE") will be necessary to avoid interference to other services in some adjacent bands.

3.74 ComReg has closely followed and contributed to the development of a number of ECC documents related to UAS:

(a) ECC Report 332[95] which sets out results for the technical compatibility studies related to the UAS for governmental use of command and control links as well as payload links in the 1 880-1 900 MHz and 1 900-1 920 MHz;

(b) ECC Report 348[96] which addresses the usage of aerial UE in the 1.8 GHz,[97] 2 GHz[98] and 2.6 GHz[99] MFCN harmonised frequency bands with AAS base stations ("BS") such as analysing the possible additional risk of interference created by AAS BS on adjacent systems when serving aerial UE or by aerial UE communicating with AAS BS;

(c) ECC Report 352[100] which addresses the assessment on the feasibility of spectrum solutions for the operational needs for governmental use (excluding military use) of UAS and establishes the relevant technical conditions within the frequency bands 1880-1900 MHz and 1910-1920 MHz;

(d) ECC Decision (22)07[101] which sets out harmonised technical conditions for the usage of aerial UE for communications based on LTE and 5G NR in the bands 703-733 MHz, 832-862 MHz, 880-915 MHz, 1 710-1 785 MHz, 1 920-1 980 MHz, 2 500-2 570 MHz and 2 570-2 620 MHz harmonised for MFCN. The harmonised technical conditions enable communication links between the aerial UE and MFCN using bands harmonised for MFCN; and

(e) ECC Recommendation (24)02 which sets out guidance for the use of governmental UAS (excluding military use) operating within the frequency bands 1 880-1 900 MHz and 1 910-1 920 MHz.

---

95 ECC Report 332 – Technical compatibility studies related to UAS (Unmanned Aircraft System) in the 1880-1920 MHz band – published 28 January 2022

96 ECC Report 348 – Usage of aerial UE in 1.8 GHz, 2 GHz and 2.6 GHz frequency bands with MFCN AAS base stations – published 18 November 2022.

97 1710-1785 MHz paired with 1805-1880 MHz.

98 1920-1980 MHz paired with 2110-2170 MHz.

99 2500-2690 MHz.

100 ECC Report 352 – Harmonised conditions and spectrum bands for the operation of governmental Unmanned Aircraft System (UAS) – published 16 June 2023

101 ECC Decision (22)07 – Harmonised technical conditions for the usage of aerial UE for communications based on LTE and 5G NR in the bands 703-733 MHz, 832-862 MHz, 880-915 MHz, 1710 - 1785 MHz, 1920-1980 MHz, 2500-2570 MHz and 2570-2620 MHz harmonised for MFCN – published 18 November 2022.

3.75 To date, there has been no requirement to undertake cross-border coordination requirements in the case of UAS operating at the border. However, ComReg continues to engage with relevant parties at a national and European level and will develop coordination procedures when required.

3.76 ComReg notes that while the IAA has identified restricted geographic zones for UAS,[102] the IAA has not requested ComReg to consider putting in place restrictions on spectrum usage at or near "No Fly zones". However, ComReg will continue to engage with the IAA as appropriate.

3.14 Aeronautical and Scientific Services

Aeronautical Services

3.77 In document 21/136, ComReg set out its intention to:

(a) to promote Ireland's interest in relevant international fora to ensure adequate spectrum is available for aeronautical services; and

(b) 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.

3.78 ComReg has ensured that adequate spectrum is available for aeronautical services and engages with the AirNav Ireland[103] and the IAA on common matters.

3.79 ComReg issues licences for radio equipment on-board Irish aircrafts under the Wireless Telegraphy (Aircraft Station Licence) Regulations 2009 (S.I.193 of 2009).[104] In doing so, ComReg liaises closely with the IAA which has the overall responsibility for the regulation of aeronautical services in Ireland.

3.80 Figure 11 below identifies the number of active aircraft radio licences in recent years. As of June 2024, there were 1895[105] live aircraft radio licences in Ireland indicating a 21% increase since 2021. The marked increase from the 2021 – 2024 period is due in the main to a post-COVID increase in air travel requiring additional licences for Aircraft Radio licences.

[102] https://www.iaa.ie/general-aviation/drones/uas-geographic-zones
[103] https://www.airnav.ie/home
[104] http://www.irishstatutebook.ie/eli/2009/si/193/made/en/print
[105] https://www.comreg.ie/industry/radio-spectrum/licensing/statistics/

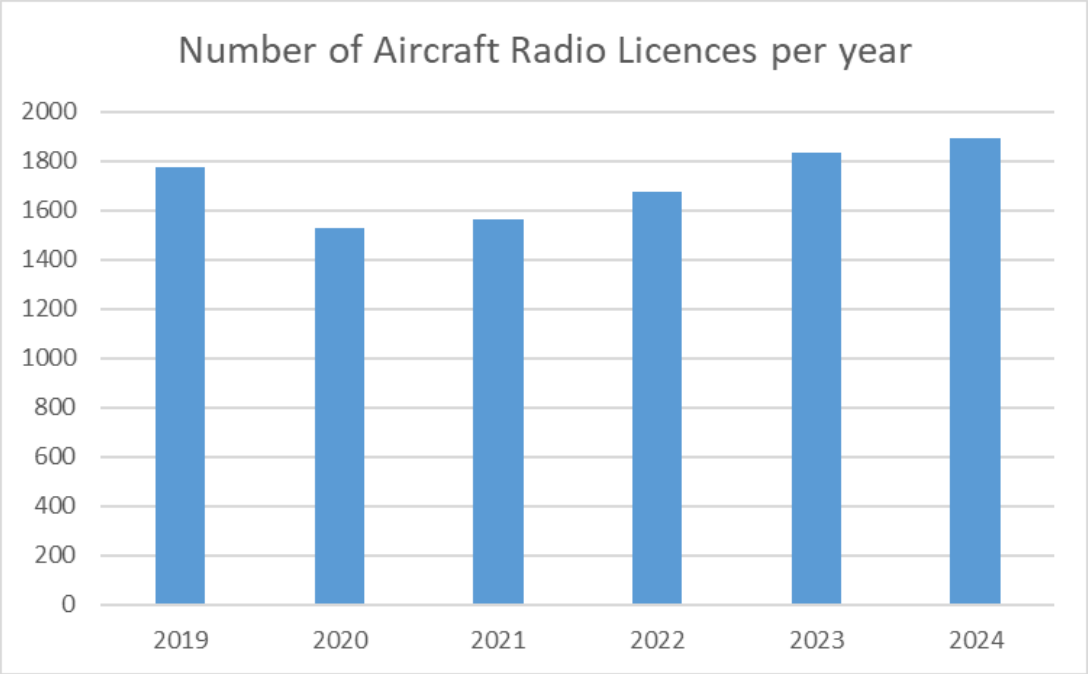


Figure 11: Number of live Aircraft Radio licences 2019 - 2024

Scientific Services

3.81 In Document 21/136, ComReg set out its intention to:

(a) subject to resourcing, consider the implementation of a licence regime for Meteorological Aids (MetAids);

(b) consider the matter of how to protect services of strategic importance[106] to Ireland, and to monitor and input into discussions on these types of services within Europe.

3.82 ComReg will progress these matters once appropriate resourcing is identified.

3.15 Defence Forces Use of Spectrum

3.83 In document 21/136, ComReg set out its intention to:

(a) maintain awareness of international developments, particularly in CEPT through the Civil-Military Frequency Management Forum;

(b) to liaise with the Irish Defence Forces, as required, to resolve issues of mutual interest; and

[106] Examples include Global Navigation Satellite System, monitoring climate change, earth exploration, and radio Astronomy.

(c) explore with the relevant authorities opportunities to further enhance spectrum efficiency.

3.84 ComReg continues to engage with the Defence Forces on spectrum issues of mutual interest.

4 Spectrum for MFCN/WBB

4.1 This chapter sets out ComReg's considerations on radio spectrum that can be used for MFCN/WBB services and in so doing reviews ComReg's actions in the 2022-2024 period, while progressively identifying candidate MFCN work plan proposals for the 2025-2028 period[107].

4.2 Firstly, background information to MFCN services in Ireland is outlined, including information on the:

- licensing frameworks and licences issued for MFCN services;
- mobile and fixed wireless access ("FWA") markets in Ireland, as sourced from ComReg Quarterly Key Data Report ("QKDR") statistics;
- amount of harmonised spectrum assigned in Ireland for MFCN services; and
- MNO's deployment of this harmonised spectrum.

4.3 Following this, information is outlined on a number of MFCN-related factors that inform ComReg's work plan proposals for the 2025-2028 period, including information on:

- the volume of mobile data traffic forecast in Ireland for the 2024-2028 period,
- the expiry or withdrawal of MFCN licences up to 2033 (i.e. 5 years after the end of the 2025-2028 period);
- some MFCN technology changes and advances.

4.4 Finally the actions that ComReg carried out in relation to each of the 2022-2024 MFCN workplan (i.e. Section 5.2.2 of Document 21/136) are reviewed and candidate MFCN work plan proposals for the 2025-2028 period are progressively identified, where among other things ComReg propose that it would:

- Consult and put in place, as appropriate in the first half of the 2025-2028 period, a licensing regime for local-area WBB systems, which could be used for, among other things, private mobile (4G, 5G etc.) networks. This would be subject to demand and progress continuing at European (CEPT/EU) level to harmonise the 3.8-4.2 GHz band for local area WBB systems (low to mid-

[107] In making proposals for the 2025-2028 period in this chapter, ComReg has considered appropriate prioritisation considerations as set out in Section 6.1 of this document.

power). This might also encompass spectrum in the lower part of the 26 GHz Band (24.250 – 24.745 GHz (495 MHz) – Block C); and

- Consult, towards the middle of the 2025-2028 period, on spectrum for WBB/MFCN use. Such a consultation would, among other things, consider the expiry of MBSA1 licences in 2030 and the multiple harmonised spectrum bands for WBB/MFCN use. Spectrum in the 1.4 GHz band would be considered and perhaps spectrum in the 26 GHz band should clear evidence of demand emerge.

4.5 This an important radio spectrum management consultation and ComReg encourages readers to carefully consider the material and proposals in this document. The responses to this consultation will represent current likely demand for a particular services or spectrum band and consequently will inform ComReg's final plan.

4.1 Background Information

4.6 MFCN services (i.e. mobile services, mobile wireless broadband and FWA services) remain an important role in the Irish telecommunications sector, as outlined below.

4.1.1 MFCN licensing information

4.7 There are three MNOs in Ireland being:

(i) Eircom Limited (trading as Eir, "Eir") (previously trading as Meteor Mobile Communications Limited);

(ii) Three Ireland (Hutchison) Limited ("Three"); and

(iii) Vodafone Ireland Limited ("Vodafone").

4.8 These MNOs provide MFCN services using a range of licence types including:

- a 3G licence and 2.1 GHz band liberalised use licences in the 2.1 GHz band which expires on 11 March 2027;
- MBSA1 liberalised use licences in the 800 MHz, 900 MHz and 1800 MHz bands which expire on 12 July 2030;
- 3.6 GHz band liberalised use licences which expire on 31 July 2032; and
- MBSA2 liberalised use licences in the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz bands which expire on 13 February 2042.

4.9 Additionally, there are a number of FWA operators providing FWA broadband services using licensed spectrum in the 3.6 GHz and 10.5 GHz bands, and

licence-exempt spectrum in the 5.8 GHz band.

4.1.2 MFCN market information

4.10 ComReg's most recent QKDR statistics[108] show increased mobile and FWA subscriptions and data traffic as outlined below.

4.11 For mobile services, at the end of Q1 2024:

- there were 9,848,149 mobile subscriptions in total - up 9% from the previous year – which included:
  - 5,779,514 mobile voice and data subscribers - up 3% from the previous year;
  - 385,099 mobile broadband subscribers - up 0.3% from the previous year; and
  - 3,683,536 M2M subscribers - up 20% from the previous year;
- the mobile penetration rate (excluding MBB and M2M) was 108.2% - the same as the previous year; and
- mobile data traffic volumes in Q1 2024 were 425,211 Terabytes – up 20% from previous year and up 82% compared to Q1 2021 (3 years ago), which is an average growth rate of 22% per annum.

4.12 In relation to FWA services, the QKDR statistics for Q1 2024 show that:

- there were 90,636 fixed wireless subscribers - up 4% from the previous year – which represents 5.5% of total fixed broadband subscribers; and
- FWA data traffic volumes in Q1 2024 were 88,839 terabytes – up 10% from the previous year and up 43% compared to Q1 2021 (3 years ago), which is an average growth rate of 13% per annum. FWA traffic represents 4.3% of total fixed broadband traffic volumes.

4.13 Considering the three years since Q1 2021, Figure 12 and Figure 13 below illustrates the increases in mobile subscriptions and volume of mobile and FWA data traffic over the period.

[108] https://www.comreg.ie/industry/electronic-communications/data-portal/tabular-information/

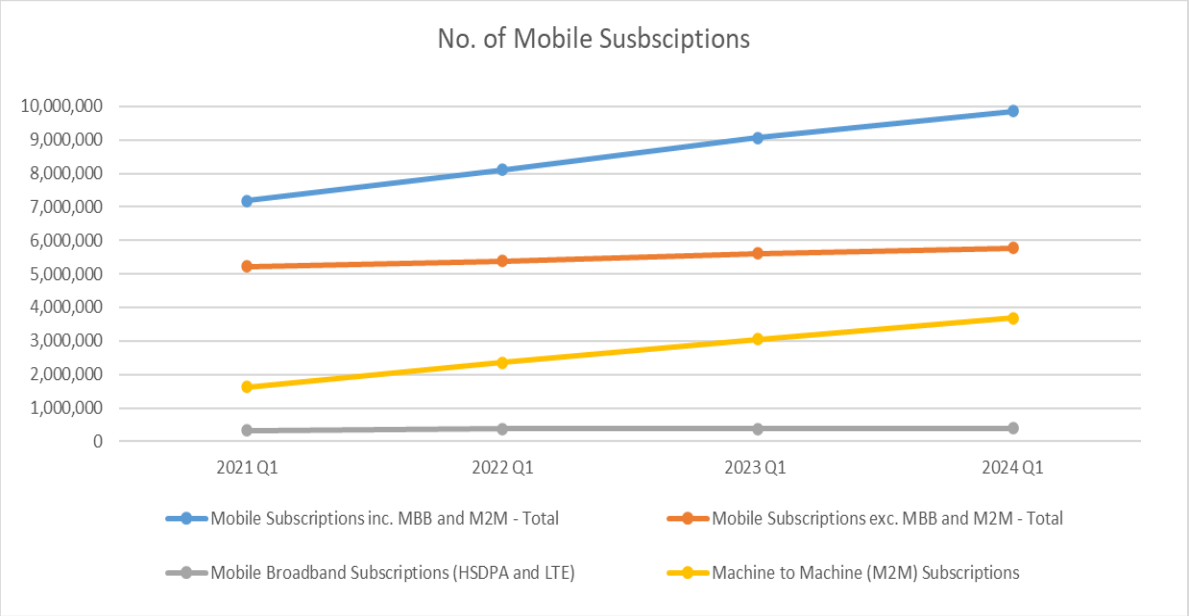


Figure 12: Number of Mobile Subscriptions (2021 Q1-2024 Q1)

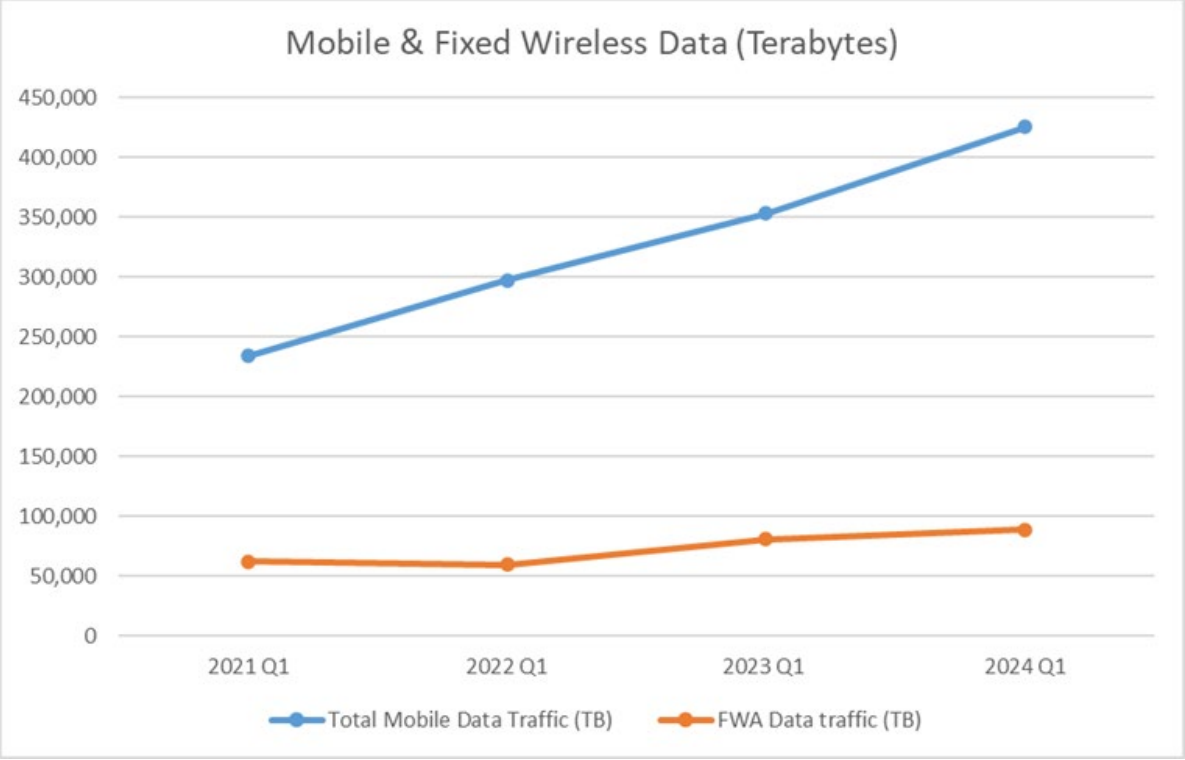


Figure 13: Mobile and FWA data traffic (2021 Q1 – 2024 Q1)

4.1.3 Harmonised spectrum assigned for MFCN services

4.14 ComReg has progressively assigned additional harmonised radio spectrum to the market that can be used for MFCN services, increasing over fourfold since 2012, as

illustrated in Figure 14 below.

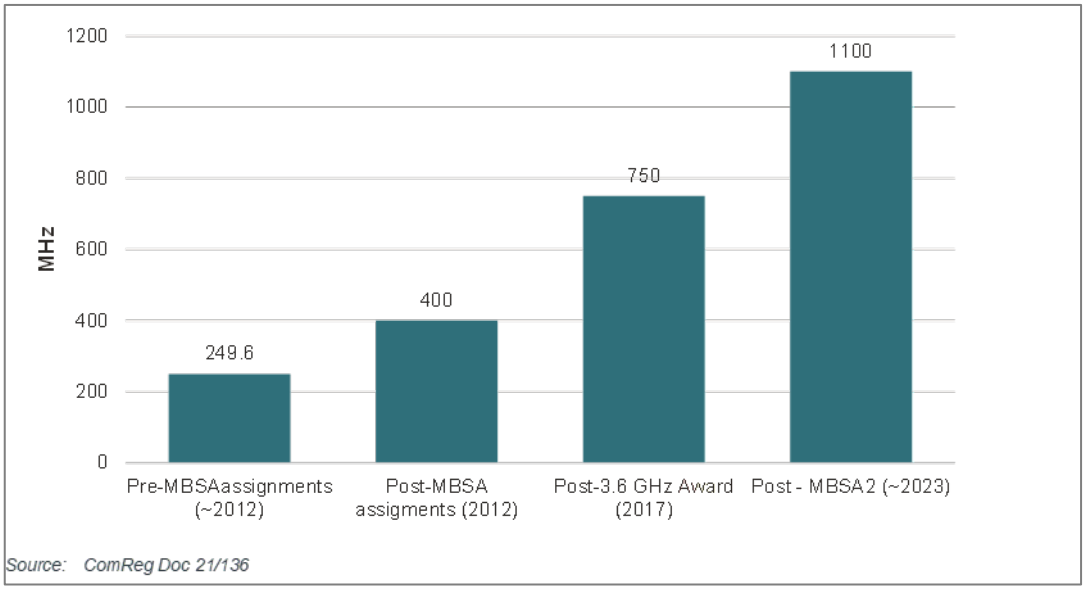


Figure 14: Amount of harmonised spectrum assigned for MFCN use

4.15 In 2017, ComReg assigned 350 MHz of spectrum in the 3.6 GHz band, one of the 5G pioneer bands in Europe. This is an increase of 87% compared to the amount of spectrum previously assigned.

4.16 In 2023, 465 MHz of spectrum was assigned in the second Multi-Band Spectrum Award (MBSA2 award) of which 60 MHz was in the sub-1 GHz range and 405 MHz was in the above-1 GHz range. This increased the amount of assigned spectrum by 345 MHz or a 46% increase, as 120 MHz of spectrum in the 2.1 GHz band was a re-assignment of an existing band in use.

4.1.4 Number of licensed sites in the MNO's licence schedules

4.17 Over the last number of years the MNOs have deployed an increased amount of spectrum at more sites as indicated in Table 1 below.

Table 1: Number of licensed sites per frequency band in MNO's licence schedules (2020 and Q1 2024)

Band	Number of sites listed in MNO's licence schedules in 2020[109]			Number of sites listed in MNO's licence schedules as of Q1 2024[110]		
	Eir	Three	Vodafone	Eir	Three	Vodafone
700 MHz	n/a	n/a	n/a	2371	1409	1349
800 MHz	1060	1865	1555	2461	2393	2086
900 MHz	1932	2164	2032	2519	2776	2221
1800 MHz	643	1534	1019	1609	2195	1553
2.1 GHz	1414	1743	1441	1607	1660	1067
2.3 GHz	n/a	n/a	n/a	15	n/a	n/a
2.6 GHz	n/a	n/a	n/a	n/a	77	99
3.6 GHz	205	155	52	358	547	300
Overall Total	2055	2397	2340			

4.18 This increase in spectrum availability has enabled the MNOs to expand both network coverage and capacity.

4.19 The information in Table 1 above also suggests that there remains scope to further increase network capacity and coverage (to a lesser extent) noting for example that:

- spectrum in the 700 MHz bands has not been rolled out to the same extent as spectrum in the 800 MHz and 900 MHz bands by two of the MNOs (Three and Vodafone) (see Figure 15 below); and
- spectrum in the 2.3 GHz, 2.6 GHz and 3.6 GHz bands is considerably less deployed than spectrum in the 1800 MHz and 2.1 GHz bands (see Figure 16 below).

[109] See Table 7 of ComReg Document 20/122 which is based on information from the Siteviewer database as of December 2020.
[110] See https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/mobile-licences-2/

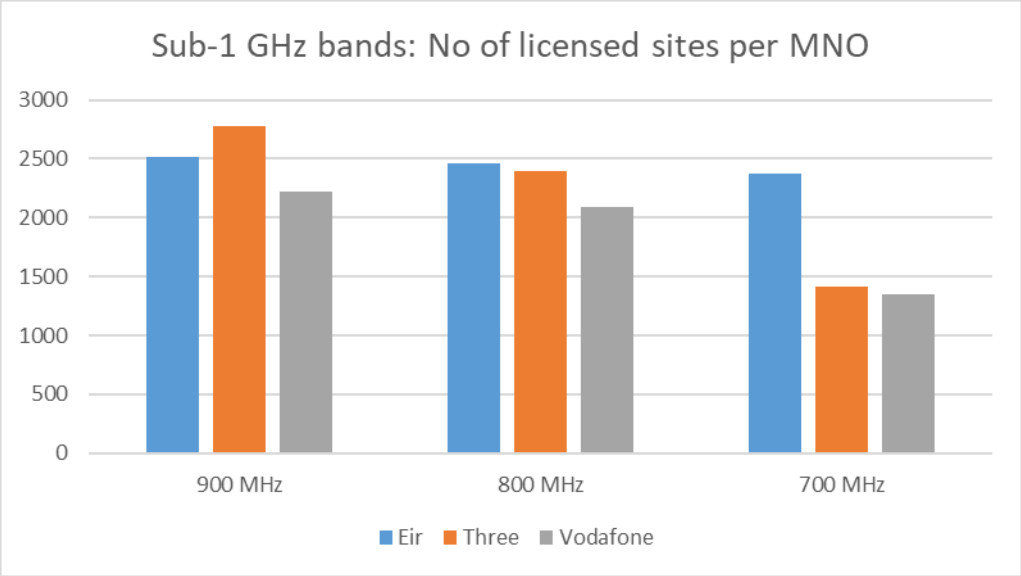


Figure 15: Sub-1 GHz bands: No. of licensed sites per MNO (Q1 2024)

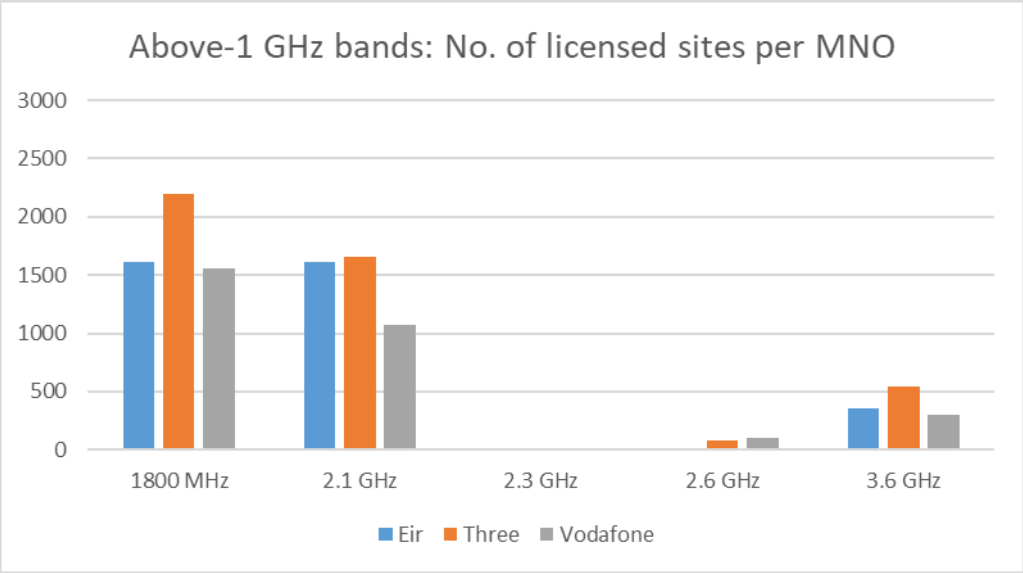


Figure 16: Above-1 GHz bands: No. of licensed sites per MNO (Q1 2024)

4.2 MFCN-related factors

4.20 This section considers several MFCN-related factors that inform ComReg's proposed work plan:

- the mobile data traffic forecasts for the period 2024-2028;
- the upcoming expiry of MFCN licences within 5 years of the end of the 2025-2028 work plan period (i.e. up to 2033); and

- MFCN technology changes and advances.

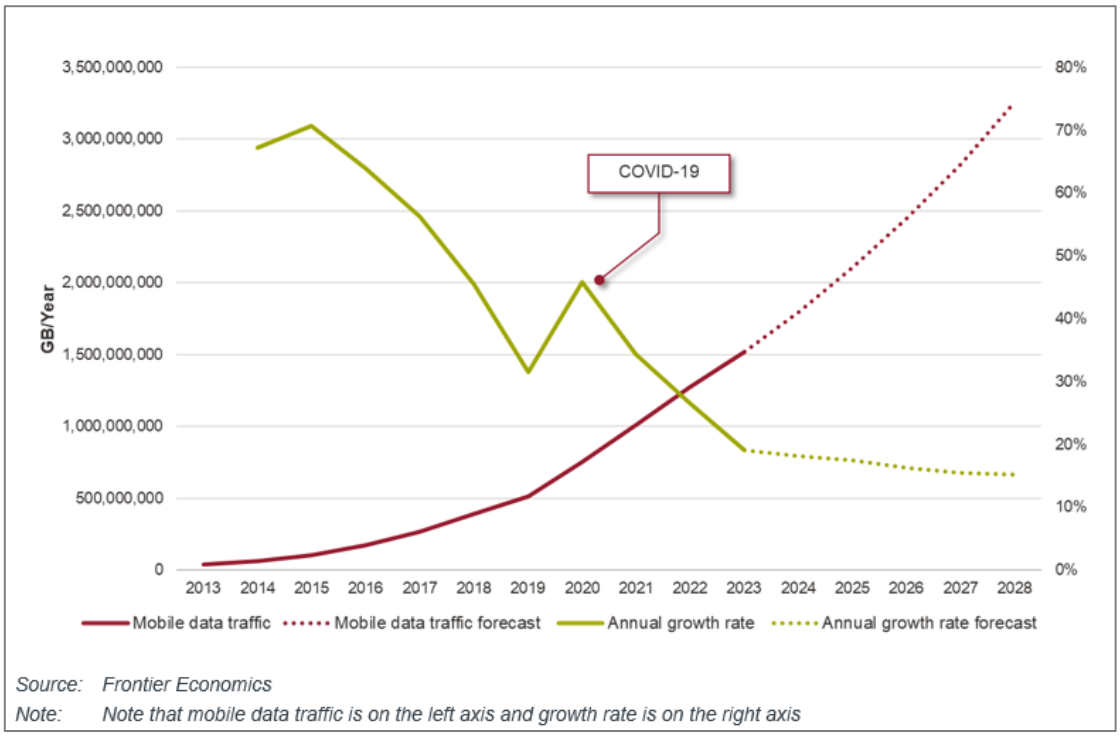
4.2.1 Mobile data traffic forecasts for the 2024 – 2028 period

4.21 As observed earlier, the volume of mobile data traffic has continued to increase growing at an average rate of 22% per annum since Q1 2021.

4.22 ComReg recently commissioned Frontier Economics ("Frontier") to forecast the likely growth in mobile data traffic in Ireland for the period 2024 to 2028. This has been published as Document 24/58a.[111]

4.23 Taking both demand and supply side factors into consideration, Frontier forecasts that by 2028 total mobile data traffic is expected to have grown 2.2 times when compared with 2023, that is from 1,500 petabytes (PB)[112] per year in 2023 to 3,200 PB in 2028.

4.24 This represents an average growth forecast of 16.5% per year during until 2028, a notable reduction when compared to earlier years as illustrated in Figure 17 below.



Source: Frontier Economics
Note: Note that mobile data traffic is on the left axis and growth rate is on the right axis

Figure 17: Central forecast of mobile data traffic volumes and annual growth rate

[111] See also ComReg's accompanying Information Notice (ComReg Document 24/58) setting out a summary of Frontier's forecast.
[112] 1 petabyte = 1,000,000 gigabytes

4.2.2 Expiry of MFCN licences

4.25 Below information is set out on the upcoming expiry or withdrawal of MFCN licences up to 2033 (i.e. 5 years after the end of the 2025-2028 period):

(a) Dense Air's 3.6 GHz band liberalised use licence in the 3.6 GHz band which is withdrawn with effect from 31 July 2024;

(b) Eir's 3G licence and 2.1 GHz band liberalised use licence in the 2.1 GHz band which expires on 11 March 2027;

(c) Eir, Three and Vodafone's MBSA1 liberalised use licences in the 800 MHz, 900 MHz and 1800 MHz bands which all expire on 12 July 2030; and

(d) Eir, Imagine, Three and Vodafone's 3.6 GHz band liberalised use licences in the 3.6 GHz band which all expire on 31 July 2032.

(a) Return of Dense Air's 3.6 GHz band licence

4.26 Following correspondence from Dense Air, ComReg accepted the surrender of Dense Air's 3.6 GHz Band licence with effect from Wednesday 31 July 2024.

4.27 This spectrum rights returned by Dense Air are:

- 25 MHz nationwide in the 3410–3435 MHz part of the 3.6 GHz band; and
- 35 MHz in the urban regions of Dublin, Cork, Limerick, Galway and Waterford, in the 3580–3615 MHz part of the 3.6 GHz band.

4.28 In relation to these returned spectrum rights ComReg notes that:

- at this time there is likely to be little demand for these rights as prior to handing back the 3.6 GHz band licence to ComReg, Dense Air would inevitably have exhausted its other options to sell or transfer the spectrum rights to other parties; and
- as ComReg completes its proposed 2025-2028 MFCN workplan, and notably its proposal to consult on the expiry of MBSA1 licences (as discussed below), it is likely that spectrum in the 3.6 GHz band may need to be considered in the round.

(b) Expiry of Eir's 3G licence and 2.1 GHz band liberalised licence

4.29 In relation to the expiry of Eir's 3G licence and its 2.1 GHz band liberalised licence in March 2027, ComReg observes that the expiry of both licences has already been addressed as:

- the MBSA2 award provided access to 2.1 GHz spectrum rights in two time slices thereby facilitating Eir in obtaining a long-term (until 2042) MBSA2 liberalised use licence with the same 2.1 GHz band spectrum rights as it currently holds; and
- Eir and the other MNOs have already completed their transition activities in the 2.1 GHz band to align their networks with their MBSA2 assignments.

(c) Expiry of the MBSA1 licences on 12 July 2030

4.30 Regarding the expiry of the 800 MHz, 900 MHz and 1800 MHz spectrum rights in the MBSA1 licences on 12 July 2030, ComReg intends to commence its consultation process on the expiry of these licences during the 2025-2028 work plan period.

4.31 Consulting on this matter during 2026, would afford circa 3½ to 4½ years in advance of licence expiry on 12 July 2030, and would be a similar timeframe to that required for the MBSA1 and MBSA2 awards both of which were more complex.[113]

2025-2028 MFCN workplan

4.32 ComReg proposes to consult with the market during this period on its proposals to address the expiry of MBSA1 liberalised use licences on 12 July 2030, noting that any such consultation may also consider other harmonised spectrum bands available for award at that time.

(d) Expiry of the 3.6 GHz band liberalised use licences on 31 July 2032

4.33 In relation to the expiry of the 3.6 GHz band liberalised use licences on 31 July 2032, ComReg observes that as it completes its proposed 2025-2028 MFCN workplan, and in particular its proposal to commence its consultation process on the expiry of MBSA1 licences, the expiry of the 3.6 GHz Band licences may logically need to be considered in the round.

4.34 Equally ComReg observes that it could be suitable to exclude the 3.6 GHz band from the MBSA1 process and consider its expiry in a separate process, similar to how the 3.6 GHz band award was managed previously.

4.35 Running a single band award is generally less complex and quicker to run than a

[113] The MBSA2 award was completed in January 2023 and was delayed by litigation. The first consultation on the MBSA2 award (Document 18/60) was issued in June 2018, circa 4½ years in advance of the MBSA2 completion date of January 2023.
The MBSA1 award was completed in December 2012, having initially been proposed as a single-band award for the 900 MHz band, and subsequently expanded to include both the 1800 MHz and 800 MHz bands. The first consultation on the MBSA1 award (Document 08/57) was issued in July 2008 circa 4½ years in advance of the MBSA1 completion date of January 2013.

multi-band award, noting that for the 3.6 GHz band award, the first consultation was issued in July 2015, circa 2 years in advance of its completion in June 2017.

4.2.3 MFCN technology changes and advancements

4.36 Technology changes 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 new services being provided or faster or higher quality services being provided, both of which may be sufficient to address user-demand. In other instances, this can result in spectrum being released from one service to another.

4.37 This section provides information on three technology changes that may affect the use of MFCN spectrum, being:

(i) MNO's plans to switch-off their 2G and 3G networks in order to re-farm the MFCN spectrum for more advanced and efficient technologies such as 4G and 5G;

(ii) The use of MFCN spectrum for private mobile (4G / 5G) networks; and

(iii) The potential use of MFCN spectrum for satellite Direct-to-Device ("satellite D2D") communications.

(i) Switch-off of 2G and 3G networks

3G switch-off

4.38 Across Europe, and elsewhere, MNOs are or have switched-off their 3G networks in order to re-farm this MFCN spectrum for more advanced and efficient technologies such as 4G and 5G.

4.39 For the countries in Western Europe, information from Cullen International[114] indicates that, in 19 countries at least one MNO has switched off its 3G network, and that in six of those countries one MNO switched off 3G this year in 2024.

4.40 In Ireland, Vodafone is undertaking a phased switch off, of its 3G network[115] which it expects to complete by early 2025[116]. Neither Three nor eir have shared similar plans to date.

[114] https://www.cullen-international.com/client/site/documents/CTTEEU20240042 (28 May 2024)

[115] ComReg Document 24/61: "2G/3G Switch off Guidance for Mobile Network Operators", available here: https://www.comreg.ie/media/2024/07/ComReg-2461.pdf. The document outlines ComReg's expectations with regard to the reasonable endeavours mobile network operators should take to minimise the adverse effects of any cessation of use of a terrestrial system.

[116] https://www.irishtimes.com/business/2024/06/18/vodafone-set-to-shut-off-irish-3g-mobile-network-by-early-2025/

2G switch-off

4.41 Similarly, across Europe, the switch-off of 2G networks is underway, although this is far more limited than the switch-off of 3G networks.

4.42 Information from Cullen International[117] indicates that in three countries (France, Switzerland and the Netherlands) at least one MNO has switched off its 2G network.

4.43 In Ireland, no MNO has brought forward any plans for 2G switch-off to date.

Licence Obligation – switch-off of a technology

4.44 Noting that the switch-off of a technology was a possible event that could occur over the lifetime of a liberalised licence, ComReg included the following licence obligation in the MBSA1, 3.6 GHz Band and MBSA2 liberalised use licences.

> *(a) notify the Commission [ComReg], not less than 6 months prior to the proposed cessation of use of any terrestrial system listed in Schedule 1 to which the Liberalised Use Licence relates and;*
>
> *(b) use all reasonable endeavours, to ensure that any adverse effects on users from the cessation of use of a terrestrial system are minimised.*

4.45 To date, only Vodafone has notified ComReg of an intention to switch-off a technology, specifically its 3G network. Vodafone provided a notification to ComReg 6 months in advance of its earliest 3G switch-off and it has engaged with ComReg in relation to using reasonable endeavours to ensure that any adverse effects on users are minimised.

4.46 Over the 2025-2028 period of this work plan, and as the Irish MNOs make plans for any 3G or 2G network switch-off, ComReg would expect further MNO notifications and their full collaboration to minimise any adverse effects on users.

BEREC report on 2G/3G phase out practices and challenges

4.47 Finally, ComReg observes that in December 2023, BEREC published a report on 2G/3G phaseout practices and challenges[118], which usefully sets out a high-level analysis of some of the main issues faced by a variety of stakeholders in 2G / 3G phase-out with a focus on the potential impacts on end-users and an overall

[117] https://www.cullen-international.com/client/site/documents/CTTEEU2024004 2 (28 May 2024)
[118] https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-2g3g-phaseout-practics-and-challenges

stakeholder analysis.

(ii) The use of MFCN spectrum for private mobile (4G / 5G) networks

4.48 Private mobile networks are non-public mobile networks that can use licensed, unlicensed, or shared spectrum, and are typically operated in a limited geographical area.

4.49 Private mobile networks are intended to augment existing capabilities and introduce new possibilities that other systems are unable to support. These networks have applications across many sectors, including: Manufacturing, Education, Transportation; and Power Utilities.

4.50 While private mobile networks are not a new concept (see Section 3.9 above) the use of 3GPP-based technologies such as 4G and 5G and spectrum harmonised for such MFCN technologies is novel and a growing trend. For example:

- Data from a February 2024 GSA report on Private mobile networks[119] indicates a growing number of new private mobile network customer references[120] (based on 4G LTE, and increasingly 5G technologies) as shown in Figure 18 below.

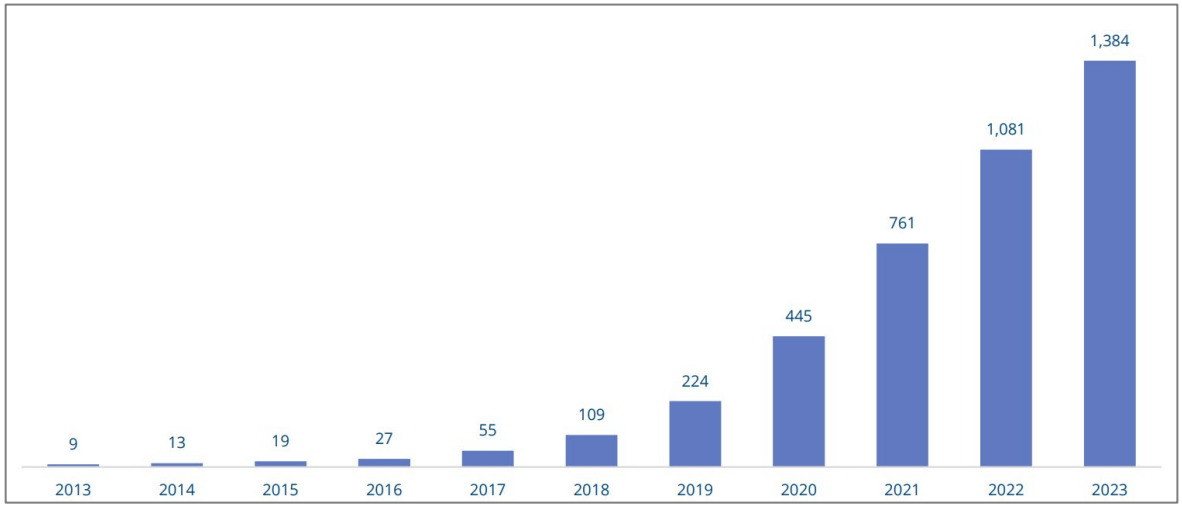


Figure 18: New private mobile (4G/5G) network customer references by year (Source GSACOM)

[119] GSAcom Report, "Private Mobile Networks", February 2024

[120] The GSA counts customer references as unique organisations or government entities deploying one or more 3GPP-based 4G LTE or 5G networks in a given country that are worth more than €100,000 Source: Private-Mobile-Networks: Member report February-2024 | GSA (gsacom.com)

- For the Paris Olympics, Orange is deploying a private 5G Stand Alone ("SA") network across key event venues to better support TV broadcasting[121]; and

- In Europe, countries are beginning to make available spectrum for local-area WBB networks that could support private mobile (4G / 5G) networks, and technical harmonisation work in being carried in CEPT and the EC to harmonise spectrum for use. This is discussed further in Section 4.3.7. below.

4.51 To bring this development to Ireland, ComReg proposes to consult, and subsequently put in place a local-area WBB licensing framework. This is discussed further below.

(iii) Potential use of MFCN spectrum for satellite Direct-to-Device ("satellite D2D") communications

4.52 As discussed in Chapter 5 the use of satellites to directly communicate with user devices is not a recent development.

4.53 However its use to directly communicate with unmodified mobile handsets is new and is a potential technology disruptor that could even change the satellite services market and increase the services provided to mobile handsets.

4.54 Satellite D2D services can be provided using spectrum allocated to mobile satellite services (MSS) or with spectrum allocated to mobile services and assigned to MNOs. For the purposes of MFCN spectrum, it is the latter approach that is of relevance here.

4.55 Noting the potential importance of this technology development and that regulatory discussions are expected to take place over the coming years (see Chapter 5 for details), ComReg proposes to monitor developments and input into discussions as appropriate during the 2025-2028 workplan. In addition, ComReg would endeavour to facilitate the test or trialling of such services in Ireland.

4.3 MFCN: Review 2022-2024: Proposals 2025-2028

4.3.1 List of 2022-2024 MFCN workplan actions

4.56 ComReg's work plan for Mobile and Fixed Communications Network ("MFCN") services for the period 2022 – 2024 was to:

[121] For the Paris 2024 Olympic and Paralympic Games, Orange is equipping 15,000 athletes, offering a dedicated range of offers for foreign visitors and relying on 5G Private Stand Alone to connect several major venues - Newsroom Orange Group

i. Complete the second Multi-Band Spectrum Award ("MBSA2") 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;

ii. Continue engagement with Eir and the AirNav Ireland[122] (formerly the IAA) to resolve compatibility issues between:

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

   (ii) 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 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 MBSA2;

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 1 800 MHz frequency bands;

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

vi. 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;

vii. monitor developments in the 1.4 GHz band for MFCN and following the completion on MBSA2 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. monitor developments in the 26 GHz band with respect of 5G and following the completion of MBSA2 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

[122] AirNav Ireland provides air navigation services.

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 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. 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;

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. work with relevant parties to progress the remaining transition activities required from existing Fixed Wireless Access Local Area ("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;

xvi. Update ComReg's Spectrum Leasing and Transfer Framework and guidelines, subject to completion of the MBSA2 and the transposition of the EECC;

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

(i) monitor regulatory and technology developments regarding the use of TVWS;

(ii) facilitate and monitor TVWS technology trials by issuing Test and/or Trial licences, as appropriate; and

(iii) Consider the use of 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 6 425 – 7 125 MHz band within European and at the ITU's WRC-23;

xix. Close the 26 GHz band to new FWALA licence applications from 1 January 2022; and

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

4.3.2 Completing the MBSA2

4.57 Bullets (i), (ii) and (iii) of the 2022-2024 MFCN workplan referred to ComReg's actions to:

- complete the MBSA2[123] to assign long-term spectrum rights of use in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz bands;
- engage with Eir and AirNav Ireland (formally the IAA) to resolve compatibility issues with respect to MFCN use in the 2.3 GHz and 2.6 GHz bands; and
- facilitate any transition activities that might be required by the existing licensees in the 2.1 GHz and 2.3 GHz bands.

Completing the MBSA2: A positive outcome delayed by litigation

4.58 Following the discontinuance of Three's appeal[124] of ComReg's MBSA2 Decision[125], ComReg successfully completed the MBSA2 in January 2023 resulting in nearly €450 million in spectrum fees[126] with the issue of circa 20-year licences to the four winning bidders, being:

- Eir;

[123] Information on the MBSA2 is available at https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/

[124] High Court Record Number: 2021/9 MCA.

[125] Document 20/122, "Multi Band Spectrum Award – Response to Consultation and Decision", published 18 December 2020, available at www.comreg.ie

[126] This includes both the upfront Spectrum Access Fees (SAFs) determined by the auction and the ongoing Spectrum Usage Fees (SUFs) which are payable over the duration of the licence.

- Imagine Communications Limited ("Imagine");
- Three; and
- Vodafone.

4.59 The MBSA2 successfully awarded 465 MHz of spectrum rights across the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz bands, an increase of 46% on the amount of spectrum previously assigned.[127] Only one lot remained unsold, the top 2.6 GHz Time Division Duplex (TDD) spectrum block, which was constrained by usage restrictions given the adjacent 2.6 GHz Frequency Division Duplex (FDD) users.

4.60 All three MNOs increased their spectrum holdings winning a combination of 700 MHz spectrum (ideal for coverage) and higher frequencies (ideal for capacity). Imagine, the largest fixed wireless broadband operator in Ireland, doubled its spectrum holdings by adding an additional 55 MHz of higher frequency spectrum nationally.

4.61 While the completion of the MBSA2 took longer than expected (in the main due to Three's appeal, which delayed the assignment of some MBSA2 spectrum rights by up to 14 months[128,129]) with consequential costs to the Irish economy[130], the MBSA2 nonetheless achieved a very positive outcome for Ireland and should promote further competition in the provision of MFCN or WBB services in Ireland,[131] noting in particular that:

---

[127] MBSA2 documents on the award outcome or commencement of rights include:
- Document 22/105, ComReg Information Notice, *"Multi Band Spectrum Award – Results of the Main Stage",* published 14 December 2022;
- Document 23/06, ComReg Information Notice, *"Multi Band Spectrum Award – Final Assignment Plan",* published 12 January 2023; and
- Document 23/35, ComReg Information Notice, *"Multi Band Spectrum Award (MBSA2) update: Commencement of all MBSA2 spectrum rights - Supporting new 5G investments and its substantial benefits",* published 14 April 2023;

[128] Based on the expected commencement dates in the MBSA2 Information Notice (Document 21/40) of 14 February 2022 (for the 700 MHz, 2.3 GHz and 2.6 GHz bands) and 16 October 2022 (for the 2.1 GHz band), spectrum rights in the:
700 MHz, 2.3 GHz and 2.6 GHz bands were delayed between circa 11 to 14 months; and
2.1 GHz band were delayed between circa 3 to 6 months.

[129] Annex 2 of Document 24/11 sets out a chronology of the main events in the MBSA2 award and its litigation.

[130] In the MBSA2 High Court proceedings, ComReg obtained reports from economic experts Dr. Dan Maldoom (ComReg Document 23/35a) and Professor J. Peter Clinch (ComReg Document) which estimate the likely economic benefits from the widespread deployment of 5G to be in the order of €1 bn per annum.

[131] See
- Document 24/11a, *"Multi Band Spectrum Award (MBSA2) – DotEcon's Award Evaluation Report",* published 13 February 2024; and
- Document 24/11, ComReg Information Notice *"Multi Band Spectrum Award (MBSA2) – DotEcon's Award Assessment",* published 13 February 2024.

- The additional MBSA2 spectrum allows existing network operators to improve and expand their existing services as well as roll-out new high-speed 5G and FWA services. The MBSA2 spectrum is ideally suitable for the widespread provision of advanced 5G services, and the improvement of other mobile and fixed WBB services, such as 4G (LTE) or FWA.
- Comparing pre and post-award differences in spectrum holdings across MNOs, spectrum asymmetry has reduced, measured both in absolute terms and as a percentage of total MNO holdings.[132]
- The assignment of 700 MHz spectrum is ideal for coverage as it allows for the cost-effective deployment of widespread 5G coverage, including on transport paths and in rural areas. This is particularly important in Ireland given our challenging demographic characteristics and the high and exponential costs associated with deploying very high levels of coverage.
- Spectrum rights in the 2.1 GHz, 2.3 GHz and 2.6 GHz bands are expected to be used to provide additional network capacity to support enhanced services (5G and 4G) where there are a greater number of consumers or to deliver FWA services over wide areas.[133]
- The MBSA2 licence conditions set out a suite of coverage obligations which oblige the three MNOs, as licensees with 700 MHz spectrum, to expand their current networks to provide and maintain:
    - a 3 Mbit/s service to 99% of the population within 3 years and 92% of the geographic area of Ireland within 7 years;
    - a 30 Mbit/s service to 95% of the population, 90% of motorways, and 80% of primary roads within 7 years; and
    - a 30 Mbit/s service to 345 specific locations[134] (within 7 years, consisting of 40 business and technology parks (including “strategic sites”), 65 hospitals, 24 higher education campuses, 14 air and seaports, 160 train and bus stations, and 42 top visitor attraction information points.
- The higher frequency bands have rollout obligations to ensure the efficient use of this spectrum by obliging:
    - the MNOs to work and use 1,200 base stations in the 2.1 GHz band (all three MNOs) and 525 base stations in each of the 2.3 GHz band (Eir

[132] See Section 2.1 of Document 24/11a

[133] See for example, GSA Report “FWA Market Update November-2022”, which provides information on the evolving extent and nature of availability of FWA broadband services based on LTE or 5G technologies worldwide, available from www.gsacom.com

[134] These specific locations are specified in Annex 4 of ComReg Document 21/40, “Multi Band Spectrum Award - Information Memorandum and Draft Regulations The 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands”, published 16 April 2021, available at www.comreg.ie.

only), the 2.6 GHz FDD band (Three and Vodafone only) and the 2.6 GHz TDD band (Vodafone only) within 4 years; and

- Imagine to work and use 290 base stations in each of the 2.3 GHz band and the 2.6 GHz TDD band within 4 years.

Engagement with Eir and AirNav Ireland to resolve compatibility issues with MFCN in 2.3 GHz and 2.6 GHz bands

4.62 During 2022 to 2024, ComReg continued to engage with Eir in relation to its RurTel network which operates in the 2.3 GHz band, and AirNav Ireland (formally the IAA) in relation to its aeronautical primary radars which operate in the 2.7 – 2.9 GHz band.

4.63 In relation to Eir's RurTel network, the compatibility of MFCN deployments in the 2.3 GHz band is now an internal issue for Eir as, in the MBSA2 award, Eir was assigned 60 MHz of spectrum in the 2.3 GHz band which included the 2 307 – 2 327 MHz frequency range used by the RurTel Point to Multi-Point radio links.

4.64 In relation to AirNav Ireland's aeronautical primary radars in the 2.7 – 2.9 GHz band, ComReg included a licence condition in the MBSA2 licences to provide protection to these radars during the transition period until filters are deployed. During this review period, ComReg continued its engagement with AirNav Ireland in relation to the deployment of filters, and understands that AirNav Ireland:

- completed the installation of filters on the Star 2000 radars in Shannon and Cork airports in December 2021, thus addressing the compatibility issues in relation to those radars.;
- completed the civil aspects of the build for the new radar (with filter) at Tooman (County Dublin) and is expecting to commission this radar in Q1 2025;
- expects to decommission the unfiltered TA10M Radar at Dublin Airport 4 weeks after the commissioning of the Tooman radar; and
- expects to install the filter and change the frequency on the remaining Star 2000 radar in Dublin airport 6 weeks after decommissioning the TA10M radar.

4.65 Noting that the compatibility issue with AirNav Ireland's radars remains incomplete, ComReg proposes to retain this matter in its 2025-2028 workplan.

Transition activities in the 2.1 GHz and 2.3 GHz bands

4.66 Following the completion of the MBSA2 auction, and based on proposals received from the MNOs, ComReg, in February 2023, set out a transition plan for the 2.1

GHz band[135] to ensure the orderly changeover [136] to the new MBSA2 spectrum assignments.

4.67 On 3 March 2023, the transition activities for the 2.1 GHz band were completed by each of the MNOs.[137]

4.68 In relation to the 2.3 GHz band, and based on a proposal from Eir, ComReg, on 14 April 2023, adopted a plan for the transition of Eir's RurTel services out of the 2.3 GHz and 2.4 GHz Bands.[138]

4.69 Since then, Eir has reduced the extent of its RurTel network and decommissioned some radio links. Eir provides regular updates to ComReg on its progress[139] with the most recent update envisaging that the RurTel network would be decommissioned by Q4 2024.

4.70 Noting that Eir's transition activities in the 2.3 GHz band remain to be completed, ComReg proposes to maintain this matter in its 2025-2028 workplan.

4.3.3 Harmonisation of spectrum for MFCN

4.71 Bullets (iv), (v) (xii) and (xviii) of the 2022-2024 MFCN workplan referred to ComReg's actions to:

- implement relevant EC and CEPT harmonisation decisions in MFCN spectrum bands, with bullet (iv) explicitly referring to the 900 MHz and 1800 MHz bands; and
- monitor and input into CEPT, EC and ITU discussions on harmonisation measures, with bullet (xviii) explicitly referring to the 6 425 – 7 125 MHz band ("Upper 6 GHz band").

Implementation of MFCN harmonisation decisions

The 900 MHz and 1800 MHz bands

4.72 ComReg is currently in the process of completing its actions to implement EU

[135] Document 23/13, *"Multi Band Spectrum Award – The 2.1 GHz Band Transition Plan"*, published 10 February 2023, available at www.comreg.ie.
[136] Transition activities refers to the adjustments required by each MNO to align its network with the outcome of the MBSA2 process for the 2.1 GHz band.
[137] See Annex 2 of Document 23/35
[138] Document 23/39a, *"Multi Band Spectrum Award (MBSA2) – Rurtel Transition Plan",* published 14 April 2023.
[139] The non-confidential version of these updates are published on ComReg's website in Microsoft Excel Format in MBSA2(23)013 (update of 17 April 2024).

Decision 2022/173[140] with regard to the 900 MHz and 1800 MHz bands, and thereby provide for advancements such as the emergence and integration of 5G and IoT technologies, and the use of Active Antenna Systems ("AAS")[141] in the 1800 MHz frequency band.

4.73 In May 2024, ComReg consulted[142] on its proposed amendments to the MBSA1 technical conditions for the 900 MHz and 1800 MHz bands to implement EU Decision 2022/173, and in June 2024 ComReg set out its response to consultation and decision[143] which adopted the proposed amendments.

4.74 To complete this project, ComReg is engaging with DECC to seek consent from the Minister for the Environment, Climate and Communications to make the amending regulations, following which amendments would be made to the licences.

The 2.3 GHz band

4.75 In 2023, ComReg completed its actions to implement the update to CEPT ECC Decision 14(02)[144] and provide for the use of AAS in the 2.3 GHz band.

4.76 In June 2023, ComReg consulted[145] on its proposed amendments to the MBSA2 technical conditions for the 2.3 GHz band and, in August 2023, set out its response to consultation and decision[146] which adopted the proposed amendments.

4.77 Subsequently, ComReg:

- on 29 November 2023, made, with the consent of the Minister for the Environment, Climate and Communications, the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1

[140] Decision (EU)2022/173, *"Commission Implementing Decision of 7 February 2022 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing electronic communications services in the Union and Repealing Decision 2009/766/EC",* available at https://eur-lex.europa.eu/

[141] Active Antenna System ("AAS") is a technology that uses electronically steerable antennas to improve network coverage and capacity.

[142] ComReg Document 24/34, *"Proposed amendments to technical conditions for the 900 MHz and 1800 MHz bands - Implementation of EU Decision 2022/173 and repeal of Decision 2009/766/EC*", published 8 May 2024..

[143] ComReg Document 24/52, *"Amendments to technical conditions for the 900 MHz and 1800 MHz bands - Implementation of EU Decision 2022/173*", published 21 June 2024.

[144] ECC Decision (14)02, *"Harmonised technical and regulatory conditions for the use of the band 2300-2400 MHz for Mobile/Fixed Communications Networks (MFCN)"* approved 27 June 2014, amended 10 March 2023, available at https://docdb.cept.org/

[145] ComReg Document 23/54, *"Proposed amendment of MBSA2 technical conditions for the 2.3 GHz Band - Update to ECC Decision (14)02",* published 20 June 2023..

[146] ComReg Document 23/69 D06/23, *"Amendment of MBSA2 technical conditions for the 2.3 GHz Band - Update to MBSA2 Licences & Regulations",* published 28 August 2023.

GHz, 2.3 GHz and 2.6 GHz Bands) (Amendment No. 2) Regulations 2023" (S.I. No. 594 of 2023); and

- amended the MBSA2 licences to reflect the above amendments to the 2.3 GHz band.

Monitor and input into MFCN harmonisation discussions

4.78 During the review period, ComReg continued to monitor, participate and input into CEPT, ITU and EC groups and committees in relation to discussions on the harmonisation of spectrum for MFCN or WBB services. The considerations in these groups are numerous and wide-ranging, and readers are referred to their respective websites for detailed information.[147]

4.79 However, set out below are ComReg's observations on the latest developments for a number of MFCN spectrum bands, noting that harmonisation decisions for these bands may be adopted over the coming period.

The 6 425 – 7 125 MHz band (the "Upper 6 GHz" band)

4.80 Following the amendment of the ITU Radio Regulations by identifying[148] the Upper 6 GHz band in ITU Region 1 for the terrestrial component of International Mobile Telecommunications ("IMT"),[149] discussions at the EC RSC[150] have shown support to develop a mandate to be issued to CEPT.

4.81 While this mandate remains to be finalised[151], the text of the current draft[152] would request CEPT to study the feasibility of and develop least restrictive harmonised technical conditions for the potential shared use of the Upper 6 GHz band for the provision of WBB ECS and by Wireless Access Systems, including Radio Local Area Networks (WAS/RLANs).

4.82 ComReg will continue to monitor and contribute, as appropriate, to harmonisation discussions in relation to the Upper 6 GHz band.

---

[147] For example, the
- Electronic Communications Committee (ECC) (https://www.cept.org/ecc),
- EC Radio Spectrum Committee (RSCOM) (https://digital-strategy.ec.europa.eu/en/policies/radio-spectrum-committee), and
- EC Radio Spectrum Policy Group (RSPG) (https://radio-spectrum-policy-group.ec.europa.eu/index_en)

[148] Final Acts (WRC-23), Agenda item 1.2, footnote 5.457E at https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.16-2024-PDF-E.pdf

[149] IMT stands for 'International Mobile Telecommunications', including 5G and beyond.

[150] See https://circabc.europa.eu/ui/group/af096568-9b95-4bb2-84db-45b307b06a22/library/e446a876-46a5-41e3-ac30-2e49dd1ab87d/details

[151] See RSC Chair's report of 3 July meeting

[152] See RSCOM24-04rev2

The 40.5 – 43.5 GHz band (the "42 GHz" band)

4.83 In 2020, the EC mandated[153] CEPT to develop least restrictive technical conditions ("LRTC") for next generation (5G) terrestrial wireless systems capable for priority frequency bands above 24 GHz, including the 42 GHz band.

4.84 In response, CEPT, in November 2022, approved CEPT Report 82[154] and ECC Decision(22)06[155] setting out CEPT's views on the harmonised LRTC for MFCN in the 42 GHz band.

4.85 Within the EC Radio Spectrum Committee ("RSC") various drafts of an EC implementing decision on the 42 GHz band were discussed, and in June 2024, the opinion of the RSC was sought and a positive opinion was obtained. The Commission Implementing Decision on the 42 GHz band is now being submitted for formal adoption by the European Commission.

4.86 The formal adoption of this Commission Implementing Decision on the 42 GHz band will:

- establish the essential harmonised technical conditions for the availability and efficient use of the 40.5 – 43.5 GHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services; and
- require that Member States designate and make available on a non-exclusive basis the 40.5 – 43.5 GHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services, in compliance with the technical conditions set out in the Annex to the Decision by 31 December 2026.

The 3.8 GHz to 4.2 GHz band

4.87 In 2021, the EC mandated[156] CEPT to develop 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.

4.88 Such local-area network connectivity (with base stations operating at low/medium power) could provide services for vertical[157] uses and possibly other terrestrial

[153] See https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=66338
[154] See https://docdb.cept.org/document/28574
[155] See https://docdb.cept.org/document/28571
[156] See https://ec.europa.eu/newsroom/dae/redirection/document/82230
[157] Local vertical applications refer to specific use cases and applications of WBB technology (5G) that are tailored to meet the unique needs and requirements of particular industries, businesses, or sectors within a localized or specific geographical area.

wireless use cases[158], subject to an authorisation decision at Member State level.

4.89 CEPT's technical studies to consider this mandate are advancing. In July 2024, CEPT published a draft ECC Decision 24(01)[159] and a draft CEPT report[160] was submitted to the EC for consideration at the RSC meeting of 3 July 2024. CEPT's final deliverables on this mandate are expected in Q4 2024.

4.90 In tandem with the submission of CEPT's reports to the EC, informed discussions and decisions with regard to potential adoption of an EC implementing decision on this band are expected to take place, noting that, in the latest draft of the EU Roadmap for the 3.4 - 4.4 GHz band,[161] end-2025 is envisaged as date for the adoption of any such decision.

2025-2028 workplan

4.91 Noting the above and the ongoing work of the various CEPT, ITU and EC groups and committees in relation to the harmonisation of spectrum for MFCN or WBB services, ComReg proposes to continue to monitor, engage and input into harmonisation discussions and to implement harmonisation decisions as appropriate.

4.92 In addition, ComReg observes that the implementation date of 31 December 2026 for the recently adopted EC Decision on the 42 GHz band falls within the 2025-2028 workplan period.

4.3.4 The 700 MHz Guard Bands and 700 MHz Duplex Gap

4.93 Bullet (vi) of the 2022-2024 MFCN workplan referred to ComReg's actions to 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 Broadband Public Protection and Disaster Relief ("BB-PPDR").

4.94 EC Decision (EU) 2016/687[162] harmonises the 700 MHz Guard Bands and the 700

---

158 As noted in the footnote 13 of the mandate, *"Wireless local-area connectivity could serve both private (e.g. enterprise) and public (e.g. community-type) networks"*

159 Draft ECC Decision (24)01, *"Harmonised technical conditions for the shared use of the 3.8-4.2 GHz frequency band by low/medium power terrestrial wireless broadband systems (WBB LMP) providing local-area network"*

160 Draft CEPT Report 088, *"Report from CEPT to the European Commission in response to the Mandate on shared use of 3800-4200 MHz by terrestrial wireless broadband systems providing local-area network connectivity (WBB LMP)"*

161 "Ensuring Safe Coexistence Between Mobile Networks and Aircraft Radio Altimeters Within the Frequency Range 3.4-4.4 GHz in the Union", Version 1, 18 April 2024,

162 EC Decision (EU) 2016/687 of 28 April 2016 *"on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union"*

MHz Duplex Gap for use by various wireless terrestrial systems (PPDR, Supplemental Downlink ("SDL"), Machine to Machine radio communications ("M2M"), and Programme making and special events ("PMSE")), with the choice subject to national decisions.

4.95 During the review period, ComReg continued its engagement with the Office of the Government's Chief Information Officer ("OGCIO") and understands that the OGCIO is actively considering each of the three BB-PPDR spectrum options proposed by ComReg,[163] being:

- 2 × 3 MHz in the 414 – 417 MHz / 424 – 427 MHz part of the 400 MHz Band (3GPP Band 88); and
- 2 × 8 MHz in the 700 MHz Duplex Gap; and
- 700 MHz Guard Bands consisting of:
  - 2 × 5 MHz in the frequency range 698 – 703 MHz / 753 – 758 MHz band (i.e. 3GPP Band 68); and
  - 2 × 3 MHz in the frequency range 733 – 736 MHz / 788 – 791 MHz (i.e. 3GPP Band 28B)

4.96 Further investigations, including the possibility of tests in a real-life environment (using Test and Trial Ireland) are envisaged before the OGCIO is in a position to determine its BB-PPDR spectrum preferences and timings for same.

4.97 Noting the above, ComReg proposes to maintain this item on the 2025-2028 workplan.

4.3.5 The 1.4 GHz band

4.98 Bullet (vii) of the 2022-2024 MFCN workplan referred to ComReg's actions to monitor developments in the 1.4 GHz band for MFCN and, following the completion of MBSA2 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.

4.99 The 1.4 GHz Band consists of 90 MHz of spectrum in the 1 427 – 1 517 MHz frequency range. During the review period, ComReg continued to monitor 1.4 GHz band developments, both in relation to potential MFCN deployments and its existing use, as summarised below.

[163] ComReg Document 20/98, *"Broadband Public Protection and Disaster Relief (BB-PPDR) Spectrum Options, October 2020 Update"*, published 14 October 2020.

(i) Harmonisation of the 1.4 GHz band

4.100 The 1.4 GHz band has been harmonised in Europe for WBB Supplemental Downlink ("SDL") since 2018, with the centre part of the band (i.e. 1 452 to 1 492 MHz) (the "1.4 GHz Centre Band") having been harmonised earlier in 2015.[164]

4.101 The EC Decision on the 1.4 GHz band[165] recognises that parts of the 1.4 GHz band are currently used for fixed links and Article 2(3) (set out below) provides Member States with some time-limited flexibility to continue to use parts of this band for the operation of terrestrial fixed wireless services.

'3. If they [Member States] designate and make available only a portion of the 1 427-1 452 MHz or of the 1 492-1 517 MHz frequency bands in accordance with paragraph 2, Member States: (emphasis added)

(a) shall ensure that any existing use is maintained to the extent strictly necessary, and with the aim to progressively make these bands available for terrestrial systems capable of providing wireless broadband electronic communications services; (emphasis added)

(b) shall ensure that such spectrum portion primarily constitutes together with the 1 452-1 492 MHz frequency band a contiguous frequency band;

(c) may allow, up to 1 January 2023, and longer if no national demand has been identified for wireless broadband electronic communications services in accordance with Articles 3 and 6 of Decision No 243/2012/EU, the use of part of these bands for the continued operation of existing terrestrial fixed wireless services or of other existing use, which cannot share the use of these bands with wireless broadband electronic communications services.' (emphasis added)

(ii) Existing use of 1.4 GHz band for fixed links

4.102 In the 1.4 GHz band, a total of 15 MHz (10MHz + 5 MHz) (i.e. the 1 427-1 437 MHz and 1 512-1 517 MHz frequency ranges) is currently allocated, assigned and used for fixed links. As of 30 June 2024, there were 60 fixed link licences live in these frequency ranges with these licences having been granted to a variety of licensees, being the ESB Networks (43 licences), local radio broadcasters (13 licences), the Defence Forces (three licences), and 2RN (one licence).

4.103 During the review period, ComReg consulted on the future use of the 1.4 GHz

[164] Decision (EU) 2018/661 of 26 April 2018 amending Decision (EU) 2015/750 of 8 May 2015
[165] COMMISSION IMPLEMENTING DECISION (EU) 2018/661

band in its *"Review of the Fixed Radio Link Licensing Regime"*[166] and decided to allow for the continued use of the 1.4 GHz band for fixed links noting, among other things, that:

- the 1.4 GHz band is subject to an EC Decision the ultimate objective of which is *"…to ensure take-up of the full 1 427-1 517 MHz frequency band or, in the absence of national demand, a portion thereof, for downlink-only wireless broadband electronic communications services*";[167]
- *"In relation to the future use of the 1.4 GHz band, existing licensees and interested parties should take the above information into account when planning any future fixed link deployments in this band."*; and
- Following the completion of MBSA2, ComReg would consider whether to consult on an award of some or all of the 1.4 GHz Band to facilitate the introduction of WBB and/or MFCN in the band.

(iii) Monitoring 1.4 GHz band developments for MFCN

4.104 In relation to the potential use of the 1.4 GHz band for MFCN services, ComReg observes that:

- across Europe, countries have adopted different approaches to assigning spectrum in the 1.4 GHz Band for WBB/MFCN. Based on information from Cullen International[168] for 21 European countries (see Annex 3 for further details):
  - 10 countries, including Ireland, have yet to assign any spectrum in the 1.4 GHz band for MFCN services;
  - 6 countries have held an award for or assigned the 1.4 GHz band; and
  - 5 countries have assigned the 1.4 GHz Centre Band, with 3 of these countries (Germany, Italy and the UK) assigning spectrum in 2015, at a time when harmonisation only applied to the 1.4 GHz Centre Band;
- there is a developing device ecosystem for 3GPP Band n75 (i.e. 5G in the 1.4 GHz band). In July 2024 there were 113 devices available– having risen from just 24 devices at the end of 2022; and
- for the 1.4 GHz Centre Band there is a large device ecosystem for 3GPP Band b32 (i.e. 4G in the 1.4 GHz Centre Band), which was at 1,147 devices in July 2024.

---

166 See for example, Sections 3.2.8 of ComReg Document 21/134, Section 3.3.10 of ComReg Document 22/93 and Section 2.1.2 of ComReg Document 23/61,

167 Recital 15 of Decision (EU) 2015/750

168 https://www.cullen-international.com/client/site/documents/CTSPEU20240005 (Version 16 February 2024)

(iv) MBSA2 and the 1.4 GHz band

4.105 During the MBSA2 process, ComReg consulted on the potential inclusion of the 1.4 GHz Band in that award.[169] However, for the reasons set out in ComReg Document 20/122[170] it was decided not to include the 1.4 GHz Band (or any part of it) in that award. Among other things, ComReg noted that:

> *"while the 1.4 GHz Centre Band is available for use and a device ecosystem is beginning to develop, effective management of the radio frequency spectrum in order to promote competition would be better facilitated by not including the 1.4 GHz Centre Band in the MBSA2 Award".*[171]*; and*

> *"ComReg understands from an assessment of the apparatus specified in MNO licences that the base station equipment (base transceiver station and antennas) are primarily multi-band and cover existing bands, such as the 800 MHz, 900 MHz, 1800 MHz, and 2.1 GHz bands, but also the 700 MHz Duplex, 2.6 GHz Band, and to a lesser extent the 2.3 GHz Band. However, existing base station equipment does not appear to cover the 1.4 GHz Centre Band. If so, an operator assigned 1.4 GHz Centre Band rights would therefore likely need to install additional/new specialised antenna equipment in order to use such rights."*[172] *(emphasis added)*

4.106 In relation to the latter point and the need to install additional/new specialised antenna equipment for 1.4 GHz band, this would likely have required significant additional investment to upgrade sites with either new antennas that cover existing bands and the 1.4 GHz band or adding new antennas specifically for the 1.4 GHz band.

4.107 Based on analysis of the apparatus currently licensed in the MNOs' licences, ComReg observes that the issue of deploying antennas with 1.4 GHz band capability is still largely there, with operators typically having equipment that covers the sub-1 GHz frequencies and then mid-band frequencies from circa 1800 MHz upwards. While some MNOs have now deployed some mid-band apparatus in certain cells with an ability to operate in the 1.4 GHz band, perhaps indicating that the 1.4 GHz Band is part of these operators' long-term plans, other MNOs appear to have virtually no network provision for the deployment of the 1.4 GHz band.

---

[169] See relevant text in ComReg Documents 18/60, 19/59R, 19/124, and 20/122.
[170] See for example, paragraphs A4.69 to A4.100, A4.119 to A4.122, A4.134 to A4.135 of ComReg Document 20/122.
[171] See para A4.122 of ComReg Document 20/112
[172] See para A4.86 of ComReg Document 20/122

4.108 As noted earlier, the MBSA2 award was completed in early 2023 and 465 MHz of spectrum rights was awarded, an additional 46% on the amount of spectrum previously assigned.

4.109 The assignment of the MBSA2 spectrum assignment is likely to have reduced the MNO's demand for the release of spectrum in the 1.4 GHz band for MFCN, in the near-term and potentially up to 2030, noting that:

- the MBSA2 spectrum will likely be used to provide services similar to those potentially available with the 1.4 GHz band (e.g. 4G and 5G), noting also that the service possibilities of the 1.4 GHz band are reduced compared to MBSA2 spectrum, as it must be deployed in SDL mode;
- while the 1.4 GHz band could be deployed to provide additional coverage or network capacity, the MBSA2 spectrum rights also provides for this, again noting that the coverage and network capacity capability of the 1.4 GHz band are constrained by its SDL use; and
- for the immediate future (and potentially up to 2030) the MNOs seem likely to focus their investments on expanding their networks to utilise the recently assigned MBSA2 spectrum and to meet the coverage and rollout conditions of the MBSA2 licences, where the MNOs are obliged to:
    - achieve and maintain a suite of coverage obligations within 3, 5 and 7 years of the earlier commencement of 700 MHz spectrum rights in their licences (i.e. by 2026, 2028 and 2030); and
    - rollout and maintain a minimum number of base stations in each of the 2.1 GHz, 2.3 GHz, 2.6 GHz FDD, and 2.6 GHz TDD bands within 4 years of licence commencement (i.e. by 2027).

(v) 2025-2028 workplan proposal

4.110 Noting the above, ComReg proposes to include two items related to the 1.4 GHz band in the 2025-2028 workplan.

4.111 First, ComReg proposes to investigate the potential for the existing fixed links licensees using the 1 427-1 437 MHz and 1 512-1 517 MHz frequency ranges of the 1.4 GHz band to migrate out of the band over time, and take actions as appropriate (e.g. maintain status quo, set a date to close the band for fixed links, etc.) having consideration to whether there would be market demand for MFCN services to use the full of the 1.4 GHz band in the future.

4.112 In support of this proposal, ComReg observes, in particular, that:

- the ultimate objective of the EC Decision on the 1.4 GHz band is to ensure the take-up of the full 90 MHz of the 1.4 GHz band for WBB ECS, subject to market demand;
- there are spectrum efficiencies in being able to award large blocks of contiguous spectrum compared to smaller-sized blocks; and
- in general, the most recent awards of the 1.4 GHz band across Europe have been for the full 1.4 GHz band.

4.113 Second, ComReg proposes that, towards the middle of the 2025-2028 workplan period, it would consult on spectrum for WBB/MFCN use, and that this would consider multiple harmonised spectrum bands WBB/MFCN use including the 1.4 GHz band.

4.114 In support of this proposal, ComReg observes that:

- the assignment of MBSA2 spectrum (465 MHz of spectrum rights, or an additional 46% on the amount of spectrum previously assigned) is likely to have reduced the MNOs need and demand for the release of spectrum in the 1.4 GHz band for MFCN in the immediate term (and potentially up to 2030). As noted above, MBSA2 spectrum can be used to provide 5G and 4G service, for both coverage and capacity purposes, and for the immediate future, the MNOs are likely to focus their investments on expanding their networks to utilise their recently assigned spectrum and meet the coverage and rollout conditions of the MBSA2 licences; and
- towards the middle of the 2025-2028 workplan period, and sufficiently in advance of the expiry of MBSA1 licences in the 800 MHz, 900 MHz and 1800 MHz bands in 2030, ComReg proposes to consult on same, noting this consultation process may also consider other harmonised spectrum bands available at that time.

4.3.6 The 26 GHz band

4.115 Bullet (viii) of the 2022-2024 MFCN workplan referred to ComReg's actions to monitor developments in the 26 GHz band with respect to 5G and, following the completion of MBSA2 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.

4.116 The 26 GHz Band consists of 3,250 MHz of spectrum in the 24.25 to 27.5 GHz frequency range and, during the review period, ComReg continued to monitor developments in the 26 GHz band as summarised below.

(i) Harmonisation of the 26 GHz band for MFCN

4.117 Since 2019, the 26 GHz Band has been harmonised at European level for terrestrial systems capable of providing WBB[173] and, among other things, this EC decision recognises that other systems may use parts of the 26 GHz band:

- Article 2 obliges Member States to designate and make available the 26 GHz band on a non-exclusive basis;
- Article 3 requires that any MFCN terrestrial systems deployed in the 26 GHz band appropriately protects earth stations and satellite systems within or adjacent to the 26 GHz band as set out in that Article;
- Article 4 allows for the continued operation of fixed links if the MFCN terrestrial systems can co-exist through managed shared spectrum use; and
- Article 5 allows for the continued deployment of earth stations, such that this does not impose disproportionate constraints on MFCN systems.

4.118 In addition, Article 54(1)(b) of Directive (EU) 2018/1972 establishing the European Electronic Communications Code (the "EECC Directive") obliges Member States by 31 December 2020 to take appropriate measures to:

> *"...allow the use of at least 1 GHz of the 24,25-27,5 GHz band, provided that there is clear evidence of market demand and of the absence of significant constraints for migration of existing users or band clearance." (emphasis added)*

(ii) ComReg's previous consultations on the 26 GHz band

4.119 ComReg has consulted on making available the 26 GHz Band for MFCN services in a number of consultations as outlined below.

4.120 First, as part of the MBSA2 process, ComReg consulted upon the potential inclusion of 26 GHz band in that award process. In June 2018, ComReg set out its preliminary view that:[174]

"the 26 GHz Band should not be considered for inclusion in this award process, and instead be assigned under a separate, subsequent award process, the timing and other particulars of which would be determined via separate consultation and in light of relevant developments."

4.121 All respondents to that consultation who provided comments on this matter agreed with ComReg's proposal to exclude the 26 GHz band from the proposed award, and ComReg's assessment of the 26 GHz band, among other things, noted

[173] Decision (EU) 2020/590 of 24 April 2020 amending Decision (EU) 2019/784 of 14 May 2019.
[174] See ComReg Document 18/60.

that:[175]

- *"there remains a lack of clarity on the potential use and the business case for the 26 GHz Band, as well as the appropriate framework for assigning spectrum rights in this band. In this regard, ComReg notes that further clarity is likely to become available over time as other jurisdictions advance their respective 26 GHz award plans, and studies are carried out by BEREC, CEPT and other bodies*"; (emphasis added);
- *"while the standardisation process for the 26 GHz Band has become more developed, there remains very low availability of 5G devices";* (emphasis added); and
- *"there remains a lack of demand for spectrum rights in this band for 5G purposes. While respondents were generally of the view that this will be an important band in the future, ComReg observes that 5G networks are likely to be first deployed using spectrum in the sub-6 GHz bands and spectrum rights in the 26 GHz band and other 'high bands' would likely be used for the subsequent densification of 5G networks."* (emphasis added).

4.122 Second, and to assist ComReg's considerations, ComReg commissioned Plum Consulting and IDATE to consider the future use of the 26 GHz band in Ireland.

4.123 In January 2021, their report (the *"26 GHz Band 5G Study*")[176] was published alongside a ComReg Information Notice,[177] the latter of which provided summary information on the *26 GHz Band 5G Study* and invited submissions from interested parties. Among other things, the following key findings from the report were noted:

- *"there is little usage of the band internationally or in Europe as there is limited demand to use the band brought about by business case uncertainty"*; (emphasis added);
- *"an international harmonised approach to releasing the 26 GHz band for WBB ECS is not evident – again driven by business case uncertainty"*; (emphasis added);
- *"the potential demand in Ireland does not indicate a significant or urgent requirement to award spectrum in the band"*; (emphasis added); and

[175] See Section 3.4.9 of ComReg Document 19/59R
[176] ComReg Document 21/07a, "26 GHz Band 5G Study - A study by Plum Consulting and IDATE regarding the future use of the 26 GHz Band." 26 January 2021
[177] ComReg Document 21/07, "*26 GHz Band 5G Study - A study by Plum Consulting and IDATE regarding the future use of the 26 GHz Band."* 26 January 2021

- *"any approach adopted requires sufficient flexibility for ComReg to cater for any future demand for 5G services, that may occur (horizontally or vertically) while also appropriately protecting incumbent services."* (emphasis added).

4.124 Third, in September 2021, ComReg consulted on its proposed radio spectrum management strategy for the period 2022-2024[178] where, in relation to the 26 GHz band, ComReg proposed to:

> *"continue to monitor developments in the 26 GHz band with respect of 5G 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."*

4.125 Submissions received on the *26 GHz Band 5G Study* and the proposed radio spectrum management strategy 2022-2024 were considered together in Annex 1 to ComReg's response to consultation on its Radio Spectrum Management Strategy 2022-2024[179] (published December 2021) where, in summary, it was observed that:

- the use case demand for 5G in the 26 GHz Band is very limited and may develop over time;
- since the *26 GHz Band 5G Study* was published, demand for some potential use cases (e.g., verticals) may even have reduced given the potential harmonisation of mid-band spectrum (e.g. 3.8-4.2 GHz) in the future;
- the following two tranches of the 26 GHz Band were unassigned and could be considered for WBB ECS as part of any initial award process:
  - the 400 MHz tranche at the bottom of the band between 24.3 GHz and 24.7 GHz, which some other countries have generally proposed for local/low power/indoor use[180], noting the requirement to protect the Earth Exploration Satellite Service (passive) and the Radio Astronomy Service in the 23.6-24.0 GHz frequency band; and
  - the 1 GHz tranche at top of band between 26.5 GHz and 27.5 GHz;
- in relation to the 1 GHz tranche, while some respondents opined that additional spectrum should be made available for the initial award, no evidence had been presented to suggest that the use case demand for 5G services in the 26 GHz Band had developed any further. ComReg therefore

[178] ComReg Document 21/90, "Proposed Strategy for Managing the Radio Spectrum 2022 to 2024", published 10 September 2021.
[179] ComReg Document 21/136a, "*Strategy for Managing the Radio Spectrum 2022 to 2024 - Response to consultation on ComReg's draft Radio Spectrum Management Strategy Statement for 2022 to 2024",* published 17 December 2021.
[180] See https://www.cullen-international.com/client/site/documents/CTSPEU20240026

saw no reason to disagree with Plum/IDATE's analysis in the *26 GHz Band 5G Study* that, over the coming decade, the limited demand for 5G services could easily be accommodated in the upper 1 GHz tranche of the 26 GHz band when required;

- while two MNOs (Vodafone and Three) requested that ComReg review the usage in the 26 GHz band and produce an overall plan for the band, neither submitted any evidence to support increased use cases. ComReg was therefore of the view that there was no pressing need to limit the existing point-to-point or national block licences in the 26 GHz Band;
- while ComReg's approach in most harmonised WBB ECS bands to-date has tended towards national or large regional awards, there is not a strong basis for such an approach in relation to the 26 GHz band (e.g. given its poor propagation characteristics) and a localised approach, as recommended by Plum/IDATE, would likely be more appropriate; and
- appropriate licence conditions (e.g., use-it-or-lose-it, fees, etc.) may be required to ensure efficient spectrum use.

(iii) Monitoring developments in 26 GHz band for MFCN

4.126 In relation to the potential use of the 26 GHz band for MFCN services, ComReg firstly observes that devices are potentially available in two 3GPP bands - band n257 for the 26.5 to 29.5 GHz frequency range and band n258 for the 24.25 to 27.5 GHz frequency range. However, for both 3GPP bands, the device ecosystem of 5G devices is low (see bullets below) and:

- for n258, in July 2024 there were 63 devices, haven rise by only 14 devices since 2022**;** and
- for n257 in July 2024 there were 59 devices haven risen by only 5 devices over this last two years.

4.127 Furthermore, devices appear focused on markets where 5G networks for the 26 GHz Band have been deployed (e.g. the US). For example, while certain models of the Apple iPhone 13, 14 and 15 are now capable of operating in the 26 GHz band, these models are only available for the US and Puerto Rico regions and are not supported in Ireland or Europe.[181]

4.128 In relation to spectrum in the 26 GHz band which has been made available or assigned for WBB purposes, information from Cullen International[182] shows that across Europe, countries have adopted different approaches to assigning spectrum in the 26 GHz band for WBB/MFCN.

[181] https://www.apple.com/hk/en/iphone/cellular/
[182] https://www.cullen-international.com/client/site/documents/CTSPEU20240003%20 (16 Feb 2024)

4.129 As of July 2024, and from the 21 European countries identified by Cullen International,

- 12 countries including Ireland, have yet to assign any part of the 26 GHz band for WBB services;
- 7 countries have awarded nationwide licences for MFCN/WBB with the 26.5 to 27.5 GHz part of the 26 GHz band being awarded or made available for award in all of these countries;
- 6 countries have established local area licences and for most of these countries, spectrum in the lower part of the 26 GHz band (starting at 24.25 GHz) has been identified for such local use, although Germany's local licensing regime is for spectrum across the full of the 26 GHz band; and
- 1 country, the UK, plans to award citywide licences and local licences.

(iv) Test & Trial Ireland – 26 GHz Band

4.130 It is normal for ComReg to experience some interest in testing equipment and even trialling services in a spectrum band, prior to that spectrum band being licensed. This has occurred previously with other spectrum bands and services (e.g., the use the 70/80 GHz band for fixed links, and the trialling of 3G/LTE services in the 900/1800 MHz bands) and provides a useful indication of demand.

4.131 Since the *26 GHz Band 5G Study* was published, ComReg has continued to promote and highlight the availability of 26 GHz band for test and trial purposes (e.g., through Test & Trial Ireland and through online awareness campaigns[183]).

4.132 Even with its best efforts, ComReg has not received any applications or expressions of interest using Test and Trial Ireland to conduct either tests or trials in the 26 GHz band.

(v) Existing Use of 26 GHz Band

4.133 In Chapter 5 of the *26 GHz Band 5G Study*, information on the allocation and use of the 26 GHz band and adjacent bands in Ireland was provided, as shown in Figure 19 below.

[183] Online awareness campaigns include "Have your say" and "the 26 GHz Band 5G Study" conducted via Linkedin from January 2021 through to October 2021.

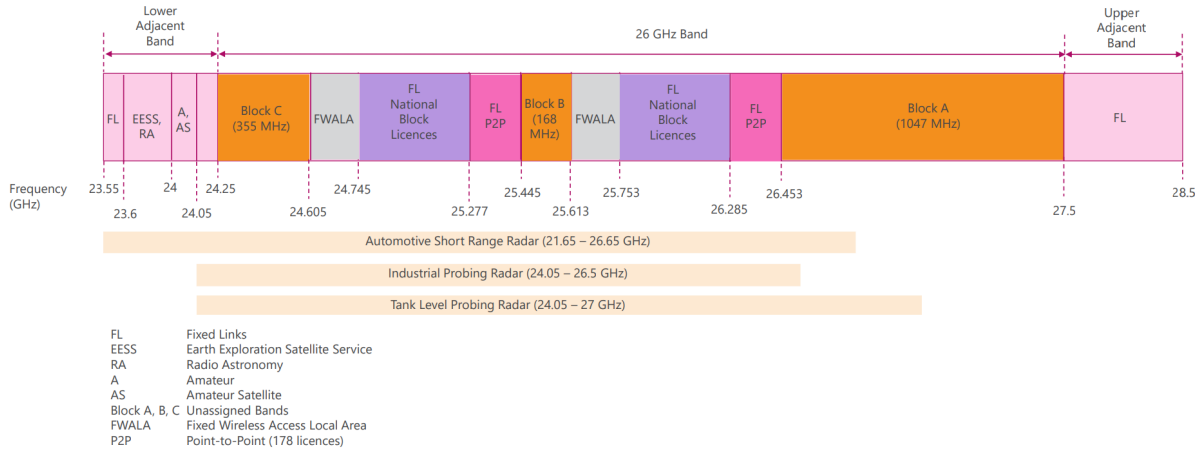


Figure 19: Allocation and use of the 26 GHz band and adjacent bands in Ireland in 2021

4.134 At that time, the *26 GHz Band 5G Study* noted that the existing allocation and assignment of the 26 GHz band included:

- a Fixed Wireless Access Local Area ("FWALA") allocation in 24.605 – 24.745 GHz / 25.613 – 25.753 GHz, whereas in January 2021 there were no assignments in this band;
- national block licences enabling Point-to-point (PP) fixed link operation in 24.745 – 25.277 GHz / 25.753 – 26.285 GHz; and
- 178 individually co-ordinated PP link licences operating in the 25.277 – 25.445 GHz / 26.285 – 26.453 GHz band (as of November 2020).

4.135 Since then, ComReg has closed the 26 GHz band for FWALA applications. The 280 MHz of spectrum previously allocated to FWALA is now vacant and potentially available for MFCN/WBB use.

4.136 In relation to the use of the 26 GHz band for fixed links, and over the period 2021 to 2023, ComReg considered the future use of the 26 GHz band for fixed links in its review of the fixed links licensing regime[184] where ComReg decided to allow continued use for fixed links (both individual licences and block licences).

4.137 In that regard, ComReg noted, among other things, that there was no strong basis to limit the use of any existing licensing regimes for fixed links or block allocations or to announce migration plans for same, given the lack of demand for spectrum in the 26 GHz band for MFCN.

4.138 Presently, the three MNOs continue to hold 26 GHz National block licences (in 24.745 – 25.277 GHz paired with 25.753 -26.285 MHz) and which do not expire

[184] See ComReg Documents 23/61, 22/93, 21/134, and 21/109

until 1 August 2028. As of 30 June 2024, there were circa 4,300 fixed links deployed in this band, which indicates that the 26 GHz band has more fixed links deployed within it than any of the other fixed link spectrum bands.[185]

4.139 In addition, as of 30 June 2024 there were 43 live individually co-ordinated radio link licences operating in the 25.277 – 25.445 GHz / 26.285 – 26.453 GHz portion of the 26 GHz band. The number of individually co-ordinated radio links in the 26 GHz band has decreased over time, with this sustained reduction likely to be due to the MNOs migrating links to their 26 GHz national block licences.

Table 2: Licensees holding individually co-ordinated radio link licences in 26 GHz band as of 30 June 2024

Licensee	No. of 26 GHz individual Point to Point fixed links licences
Viatel Ireland Ltd	14
Virgin Media Ireland Ltd (PP)	8
Eircom Ltd	7
Vodafone Ireland Ltd	6
Three Ireland (Hutchison) Limited	4
Dun Laoghaire/Rathdown County Council (IT)	1
Kildare County Council (IS Projects)	1
Radio Services and Building Ltd	1
Zirdai Ltd	1

4.140 Figure 20 below sets out the current band plan for the 26 GHz band based on information for July 2024.

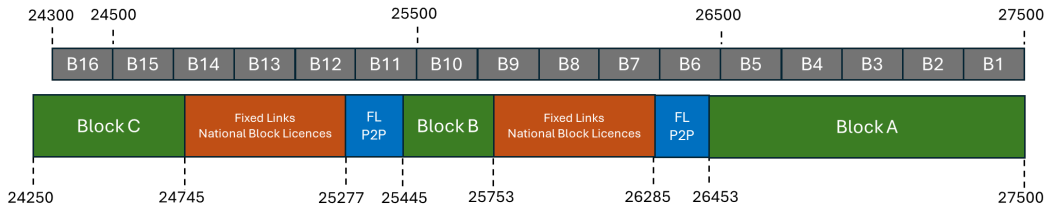


Figure 20: Band plan for 26 GHz band – valid as of July 2024

4.141 The above figure shows that presently there are three unassigned portions of

[185] See Figure 4 of ComReg Document 23/119 for information on the number of fixed links per frequency band.

spectrum within the band potentially available for MFCN:

- 26.453 – 27.500 GHz (1 047 MHz) – Block A;
- 25.445 – 25.753 GHz (308 MHz) – Block B; and
- 24.250 – 24.745 GHz (495 MHz) – Block C.

(vi) 2025-2028 workplan

4.142 Noting the above, ComReg proposes that towards the middle of the 2025-2028 workplan period, it would consult on spectrum for WBB/MFCN use, and that this consultation would consider multiple harmonised spectrum bands WBB/MFCN use, and potentially consider the 26 GHz band should clear evidence of demand emerge at that time.

4.143 In support of the above, ComReg observes that:

- currently there is a lack of demand for spectrum in the 26 GHz band for MFCN/WBB services;
- access to spectrum in the 26 GHz band for test and trial purposes is available via Test and Trial Ireland;
- the 26 GHz Band is already well organised (see Figure 20 above) with three large tranches of unassigned spectrum, one of which is greater than 1 GHz, as would be required under Article 54(1)(b) of the EECC Directive, should there be clear evidence of demand. As noted in ComReg's review of the Fixed Link licensing regime, there does not appear to be any strong basis to limit the use of any existing licensing regimes for fixed links or block allocations or to announce migration plans for same at this point in time, given the lack of demand for spectrum in the 26 GHz band for MFCN;

4.144 In addition, ComReg proposes that:

- in the first half of the 2025-2028 time period, it would consult and put in place as appropriate, a licensing regime for local-area WBB systems (low to mid-power). As discussed in Section 4.3.7 below, this would consider spectrum in the 3.8-4.2 GHz band and potentially spectrum in the lower part of the 26 GHz Band (24.250 – 24.745 GHz (495 MHz) – Block C) noting that some countries across Europe have local area WBB licensing regimes for spectrum in the lower part of the 26 GHz band (starting at 24.25 GHz).
- conduct a consultation on a new award and licensing framework for the 26 GHz national block licences prior to the expiry of the current 26 GHz national block licences for fixed links in August 2028 (see section 6.2.7 below).

4.3.7 The 3.8-4.2 GHz band

4.145 Bullet (ix) of the 2022-2024 MFCN workplan referred to ComReg's activity to monitor work in the CEPT by the EC on the potential development of harmonised technical conditions for the shared use of the 3 800 – 4 200 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.

4.146 During the review period, ComReg monitored developments in the 3.8 to 4.2 GHz band as summarised below.

(i) Harmonisation of the 3.8-4.2 GHz band

4.147 As noted in Section 4.3.3 above, technical studies to develop harmonised least restrictive technical conditions for this band for local area WBB systems (low to mid-power) have advanced, and there is an EU roadmap developed to address compatibility issues with radio altimeters in the upper adjacent 4.2 GHz band over the longer term.

4.148 Based on current information it is expected that:

- by Q4 2024, CEPT will have defined and adopted harmonised LRTCs for the 3.8 to 4.2 GHz band for local area WBB systems (low to mid-power), and will finalise its report on same for submission to the EC; and
- by end 2025, an EC implementing decision for the 3.8 to 4.2 GHz band may be adopted.

(ii) Existing use of 3.8-4.2 GHz band

4.149 In Ireland, there is some very limited existing use of the band. As of 30 June 2024, there were 3 satellite earth station licences licensed in the band, all located within the Dublin area.

4.150 In addition, as of July 2024 there were two Test Licences and one Trial licence in this band regarding 5G applications including private networks, 5G small cell operations and Open RAN.[186]

(iii) MFCN development in 3.8 - 4.2 GHz band

4.151 As the 3.8 - 4.2 GHz band forms part of 3GPP Band n77 frequency range (3.3 – 4.2 GHz) - where many countries have a MFCN spectrum allocation or

[186] For example CONNECT, located in Trinity College Dublin is researching intelligent network control in 5G OpenRAN systems see First 5G test licence awarded by ComReg will enable next-gen communications networks research - News & Events | Trinity College Dublin (tcd.ie)

assignment within that range - it has a very good device ecosystem.

4.152 As of July 2024, there are 1736 devices with 3GPP Band n77 (i.e. 5G) capability, having grown substantially over the last 5 years as shown in Figure 21 below.

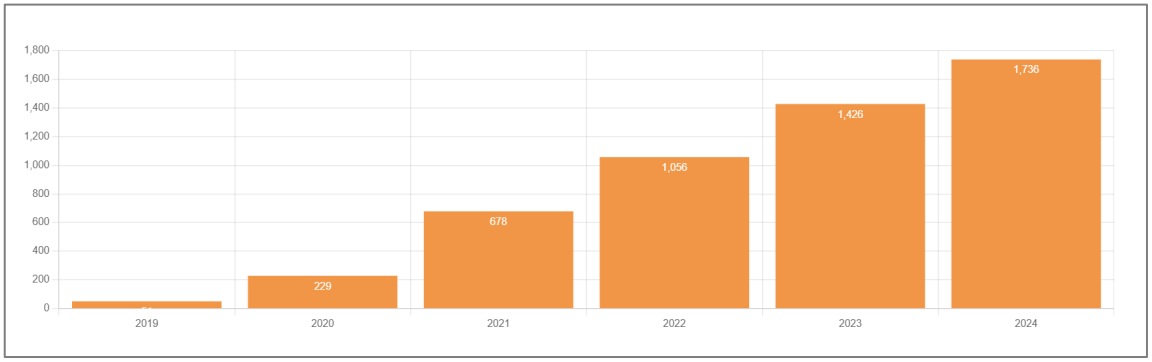


Figure 21: Number of 5G devices in 3GPP band n77 (including the 3.8-4.2 GHz band). Source GAMBOD database www.gsacom.com

4.153 In Europe, spectrum in some or all of the 3.8-4.2 GHz band is being made available/assigned for local 5G networks in a growing number of countries.

4.154 Based on information from Cullen International[187] and regulator websites[188], ComReg observes that use of spectrum in the 3.8 GHz-4.2 GHz band is now emerging, with spectrum haven been made available or proposed in at least 7 European Countries (see Annex 3 for details).

4.155 In Ireland, spectrum in the 3.8-4.2 GHz band has also been issued for the purposes of testing/trialling 5G applications, including private networks, 5G small cell operations and Open RAN. In addition, ComReg has also recently received a number of queries from interested parties seeking to understand whether Ireland plans to implement licensing frameworks for local area private networks.

(iv) 2025-2028 workplan

4.156 Noting the above, ComReg proposes to include an item on the 3.8-4.2 GHz band in the 2025-2028 workplan.

4.157 Specifically, subject to demand and progress continuing at European (CEPT/EU) level to harmonise the 3.8 GHz band for local area WBB systems (low to mid-power), ComReg envisages that in the first half of the 2025-2028 time period, it would consult and put in place, as appropriate, a licensing regime for local-area WBB systems, which could be used for, among other things, private wireless networks.

[187] https://www.cullen-international.com/client/site/documents/CTSPEU20240026
[188] See https://nkom.no/aktuelt/nkom-has-opened-3-8-4-2-ghz-for-local-area-5g-networks

4.158 Spectrum in the 3.8 – 4.2 GHz band would be considered in that consultation process, noting in particular that:

- with progress to harmonise the 3.8-4.2 GHz band for 5G purposes, countries across Europe are increasingly making this band available for local WBB access and, generally, there appears to be a growing demand for access to spectrum in the 3.8-4.2 GHz band for 5G purposes; and
- a licensing regime for local-area WBB access would further facilitate the development of private mobile networks, where interested parties may require local access to spectrum. Presently in Ireland commercial private mobile networks have been facilitated using spectrum assigned to the MNOs[189] or with dedicated nationwide spectrum.[190]

4.3.8 MFCN licence compliance

4.159 Bullet (x) of the 2022-2024 MFCN workplan referred to ComReg's actions to continue its assessment of MNOs' 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.

4.160 During the period of this review, ComReg continued to carry out this action as summarised below.

(i) Assessing MNO coverage obligations

4.161 In relation to assessing MNOs' compliance with their coverage obligations, ComReg carried out two drive tests, Summer 2022[191] and Winter 2022[192,] where it was observed that:

- the MNOs were complying with their MBSA1 coverage obligation of >70% population coverage; and
- in relation to the 2100 MHz band, assessing compliance on the basis of the combined coverage of all technologies deployed in the 2100 MHz

189 For example, https://sponsorship.org/esa-awards/2024s-buocet-vodafone-ireland-and-irish-rugby-5g-mobile-private-network/

190 For example, ESB was assigned nationwide spectrum in the 400 MHz band and is deploying a private mobile network with this.

191 ComReg Document 22/82, *"Assessment of Mobile Network Operators Compliance with Licence Obligations (coverage) Summer 2022",* published 30 September 2022.

192 ComReg Document 23/45, *"Assessment of Mobile Network Operators Compliance with Licence Obligations (Coverage) Winter 2023",* published 10 May 2023.

band (i.e. 3G, 4G and 5G as appropriate) was appropriate as each MNO had deployed two or more technologies in this band.

4.162 In addition, ComReg carried out preparatory work to use information from ComReg's outdoor mobile coverage mapping tool to assess MNOs' compliance with their coverage obligations. This will play a considerable role in ComReg's future assessments noting that:

- the MBSA2 licences identify that ComReg's radio network planning tools, supported by field measurements where appropriate, is the key component in assessing compliance with the coverage obligations; and
- the first MBSA2 coverage obligations are to be achieved by Q1 2026, i.e. 3 years after the earliest commencement of 700 MHz spectrum rights in an MNO's MBSA2 licence and be maintained thereafter. Further coverage obligation milestones are to be achieved and maintained after 5 and 7 years.

(ii) 3.6 GHz licence compliance

4.163 During the 2022-2024 period, ComReg also assessed the compliance of licensees with their 3.6 GHz band licence conditions, being their obligations in relation to base station rollout and Quality of Service (QoS)[193], and will continue to do so going forward.

4.164 In that regard, ComReg found two licensees, Dense Air and Vodafone, to be non-compliant with their respective base station rollout licence obligations for the periods of time as set out in:

- ComReg Documents 22/107[194] and 24/26[195] for Vodafone; and
- ComReg Documents 22/106[196] and 23/38[197] for Dense Air.

4.165 Dense Air's non-compliance related to the period December 2022 to May 2023 and to not working and using the required 15 Rollout Base Stations in at least 4 counties for the South East Region by 25 March 2022, 3 years from the Licence Commencement Date for same Region.

[193] QoS obligations in the 3.6 GHz band licence relate to network availability and voice call standard.
[194] ComReg Document 22/107, *"Notification of a Finding of Non-Compliance to Vodafone Ireland Limited with respect to the 3.6 GHz Regulations"*, published 15 December 2022.
[195] ComReg Document 24/26, "*Vodafone Ireland Limited- non-compliance with respect to Regulation 6(1) of the Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016 (S.I. No. 532 of 2016)"*, published 11 April 2024.
[196] ComReg Document 22/106, "Notification of a Finding of Non-Compliance to Dense Air Ireland Limited with respect to the 3.6 GHz Regulations", published 15 December 2022.
[197] ComReg Document 23/38, "ComReg issues an Opinion of Non-Compliance to Dense Air Ireland Limited with respect to the 3.6 GHz Regulations", 2 May 2023

4.166 Vodafone's non-compliance related to the period December 2022 to April 2024 and to:

(i) not working and using the required 15 Rollout Base Stations for the South East Region by 21 November 2021, 3 years from the Licence Commencement Date for same Region; and

(ii) not working and using the required 15 Rollout Base Stations in at least 4 counties for the South East Region.

(iii) 2025-2028 Workplan proposal

4.167 Noting that each of the MFCN licences has important licence conditions (e.g. coverage, rollout or QoS conditions) to be achieved at specified milestone dates, and maintained thereafter, monitoring MFCN licensee compliance will remain an important part of ComReg's future work.

4.168 ComReg therefore proposes to include an MFCN licence compliance item in the 2025-2028 workplan.

4.3.9 Other MFCN workplan items

(i) Best communication methodology to allow users understand the impact of handset performance

4.169 Bullet (xi) of the 2022-2024 MFCN workplan related to ComReg completing a strategic review of the best communication methodology to allow users to understand the impact of handset performance, given that, as current and future technologies, such as 5G, progress, the methodology to understand the factors which affect connectivity experience will also evolve.

4.170 During the 2022-2024 period, ComReg continued to inform consumers of relevant factors to consider to "get the most out of your mobile service"[198]. This included providing information on the factors that can cause poor mobile coverage (e.g. the distance to a mobile phone mast) and how building materials used to improve insulation in the home can often limit mobile coverage.

4.171 Information from ComReg's work on measuring the performance of mobile handsets[199] during the years 2018 to 2020 has helped inform this advice. While it appears that consumers may have a general understanding that handset performance may differ somewhat between devices, consumers generally value other factors more (e.g. price, camera, functionality) when choosing their

[198] https://www.comreg.ie/advice-information/mobile/get-the-most-out-of-your-mobile-service/
[199] See ComReg Documents 18/05, 18/78, 18/82, 18/85, 18/109, 19/67, 19/110 and 20/121.

handsets. For example, the Digital Consumer Trends Survey 2024[200] showed that in Ireland, price was the most important factor for consumers purchasing a smartphone, followed by battery life, storage capacity and camera quality.

4.172 Noting the above among other factors, ComReg has discontinued its handset performance measurement programme.

(ii) Outdoor Mobile Coverage Map

4.173 Bullet (xiii) of the 2022-2024 MFCN workplan related to ComReg continuing to liaise with the MNOs to gather network architecture data for the generation of outdoor mobile coverage maps[201,] making these available on the consumer section of ComReg's website and updating the maps to include 5G mobile coverage.

4.174 ComReg continues to liaise with the MNOs and collect mapping information. ComReg publishes three updates per annum to the outdoor mobile coverage map, including 5G since September 2022.

4.175 The outdoor coverage map is an important tool for consumers. It allows consumers assess the level of outdoor mobile coverage they might reasonably expect to experience in their own localities or other areas, assisting them in making informed purchase choices regarding their mobile coverage requirements.

4.176 Noting the above, ComReg proposes to maintain this item on its 2025-2028 workplan.

(iii) Administrative matters concerning the EC's spectrum divestment commitments in relation to the acquisition of Telefonica by Hutchison

4.177 Bullet (xiv) of the 2022-2024 MFCN workplan related to ComReg considering administrative matters concerning the EC's spectrum divestment commitments in relation to the 2014 acquisition of Telefonica by Hutchison.

4.178 During the review period no action was required regarding this matter.

4.179 Noting that the EC's spectrum divestment commitments can be exercised at any time prior to 1 January 2026[202], ComReg proposes to maintain this work item on its 2025-2028 workplan.

[200] Digital Consumer Trends Survey
[201] https://www.comreg.ie/outdoor-mobile-coverage-map/
[202] m6992_4894_3.pdf (europa.eu)

(iv) Progressing 3.6 GHz band transition and commencement of spectrum lots

4.180 Bullet (xv) of the 2022-2024 MFCN workplan related to ComReg continuing to work with relevant parties to progress the remaining FWALA transition activities in the 3.6 GHz band.

4.181 During the review period, 3.6 GHz Band transition work continued. Currently there is only one existing FWALA licensee with a 3.6 GHz band transition licence (Imagine).

4.182 ComReg provides regular progress updates, among other things, published a 3.6 GHz Transition Progress Report for 2023[203] and updated ComReg's *3.6 GHz Band Transition* webpage.[204]

4.183 From the 292 Transition Service Areas (TSAs) of existing FWALA licensees at the start of transition, data as of 17 June 2024 indicates that:

- 238 TSAs (81%) have been cancelled;
- 46 TSAs (16%) are current but have been modified (in frequency or area); and
- 8 TSAs (3%) are current and remain unaltered.

4.184 In tandem with the completion of 3.6 GHz band transition activities, additional spectrum lots have been commenced in the licences of the winning bidders such that for:

- Imagine, Meteor and Three, all their spectrum lots have commenced;
- Dense Air, all but four (4) spectrum lots limited to Waterford City have commenced; and
- Vodafone, all but ten (10) spectrum lots have commenced.

4.185 Noting that the 3.6 GHz band transition activities continue, ComReg proposes to maintain this item on the 2025-2028 workplan.

(vi) Updating ComReg's spectrum transfer and lease framework

4.186 Bullet (xvi) of the 2022-2024 MFCN workplan related to ComReg updating its Spectrum Leasing and Transfer Framework and guidelines, subject to completion

[203] ComReg Document 23/43, "*3.6 GHz Band Transition - Progress Report 2023*", published 9 May 2023

[204] https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6-ghz-band-transition/

of the MBSA2 and the transposition of the EECC.

4.187 ComReg's progress to complete this work plan item is advanced and a consultation is to issue in Q3 2024.

4.188 Noting the above, and as the process to update ComReg's spectrum transfer and lease framework is ongoing, ComReg proposes to maintain this item on the 2025-2028 workplan.

(vii) TV White Space (TVWS)

4.189 Bullet (xvii) of the 2022-2024 MFCN workplan related to ComReg:

- continuing to monitor regulatory and technology developments regarding the use of TVWS;
- facilitating TVWS trials as appropriate; and
- considering the use of TVWS as part of any future discussions on the 470 – 698 MHz spectrum band.

4.190 During the review period ComReg issued a number of trial licences to facilitate TVWS research in Ireland. The last such trial licence expired in October 2023 and since then no further interest in TVWS trials has been expressed to ComReg.

4.191 In relation to monitoring TVWS regulatory and technology developments and considering its future use, ComReg observes that, in February 2024, Ofcom the UK Regulator for spectrum management:

- closed its TV white space device authorisation framework following the termination of the last remaining operator (RED Technologies) of TV white space databases in the UK; and
- plans to revoke its Licence Exemption Regulations for WSDs (the Wireless Telegraphy (White Space Devices)(Exemption) Regulations 2015).[205]

4.192 Noting the above, ComReg does not propose to include a TVWS item in the 2025-2028 workplan. Instead, ComReg's monitoring of spectrum management generally will inform ComReg of any particular TVWS developments.

(viii) Closure of the 26 GHz band for FWALA

4.193 Bullet (xix) of the 2022-2024 MFCN workplan referred to ComReg closing the 26 GHz band to new Fixed Wireless Access Local Area (FWALA) licence applications

[205] Ofcom, Radio Communication Licences, "TV White Space: licensing manually configurable white space devices, available at www.ofcom.org.uk

from 1 January 2022.

4.194 This action was completed as planned. There are no FWALA licences in the 26 GHz band and the 26 GHz band is not available for FWALA licensing.

(ix) Mobile data traffic forecast

4.195 Bullet (xx) of the 2022-2024 MFCN workplan referred to ComReg providing updated mobile data traffic forecasts.

4.196 As noted in section 3.2.2 above, this action was completed.

- ComReg Document 24/58a[206] sets out Frontier Economic's mobile data traffic volume forecast for Ireland for 2024 to 2028; and
- ComReg Document 24/58[207] sets outs ComReg's Information Notice on same.

4.197 Noting that Frontier Economics' mobile data traffic volume forecast for Ireland runs for the entire 2025-2028 period, ComReg considers this matter served.

[206] ComReg Document 24/58a, "Mobile Data Traffic Forecast in Ireland (2024-2028) - A report by Frontier Economics", published 12 July 2024.
[207] ComReg Document 24/58, "Mobile Data Traffic Forecast in Ireland (2024-2028) - Summary of main findings", published 12 July 2024.

5 Factors informing ComReg's proposed work plan for 2025 to 2028

5.1 Many factors can affect the demand for and the supply of radio spectrum including consumer needs, technology changes or advancements, the international harmonisation of radio spectrum, and relevant national or international policies.

5.2 None of these factors are mutually exclusive. For example, increasing end-user demand for a service spurs advancements in technologies used to provide these services along with the development of international harmonisation measures or national/international policies.

5.3 In this chapter, ComReg discusses various factors which have informed its draft radio spectrum work plan for 2025 - 2028, including:

- International harmonisation of radio spectrum as determined by
  - World Radiocommunication Conference 2023 and 2027; and
  - European Commission harmonisation decisions; and
- Technology changes and advancements (service specific).

5.1 International harmonisation of radio spectrum

5.4 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.

5.5 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.

5.6 Harmonised radio spectrum measures are set by several 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, which usefully provides a pointer for 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[208] and Radio Spectrum Policy

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

Group.[209] 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.[210]

5.7 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[211] from which standards for mobile technologies (e.g. LTE, LTE+ and 5G NR) are developed (see Figure 22).

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

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.

[209] The RSPG work programme for 2024 and beyond (RSPG203-045 Final) includes the following work items:
Peer review and Member States cooperation on authorisations and awards;
World Radiocommunication Conference (WRC);
Long-term vision for the upper 6 GHz band (2030 and beyond);
6G strategic vision; and
Assessment of future usage of the frequency band 470-694 MHz within the EU.

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

[211] 3GPP, or the 3rd Generation Partnership Project, was initially formed in 1998 and is an engineering organization that develops technical specifications which are then transposed into standards by the seven regional Organizational Partners that form the 3GPP partnership. For Europe, ETSI is the SSO for Europe.

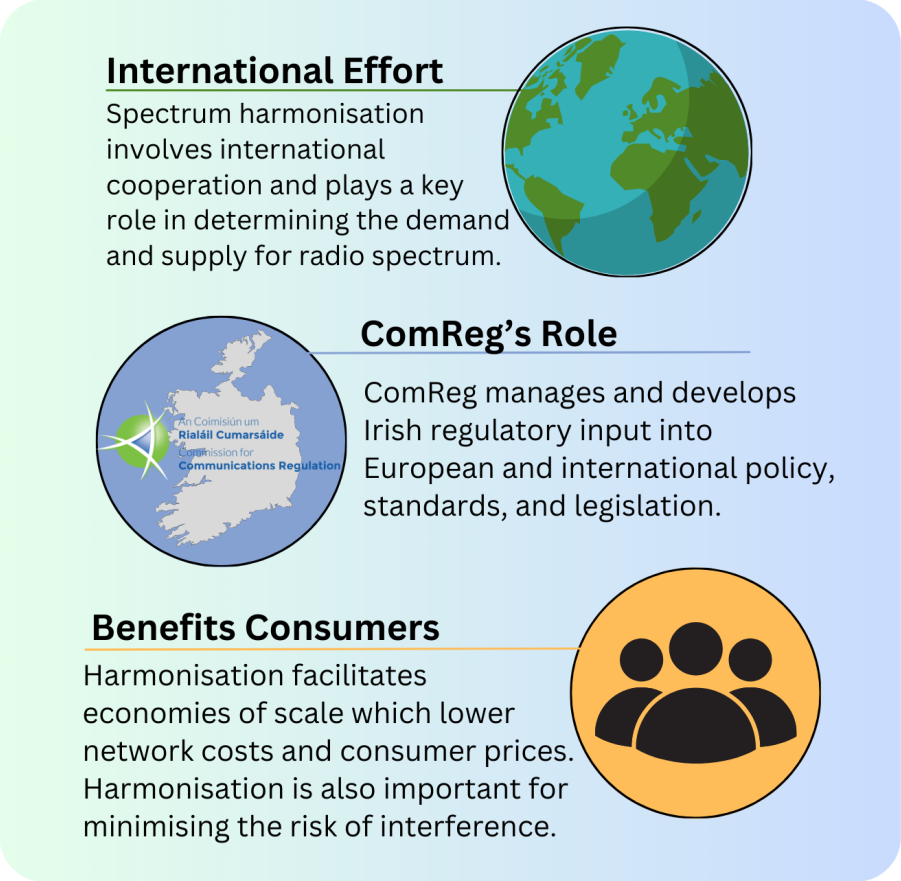


Figure 22: International harmonisation of radio spectrum

5.1.1 EC harmonisation decisions

5.9 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.

5.10 The following are existing and potential future EC Harmonisation Decisions which ComReg is aware of and will factor into its proposed work plan for 2025-2028:

Existing EC Harmonisation Decisions

(a) Decision (EU) 2020/1426[212] – 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;

[212] Implementing decision - 2020/1426 - EN - EUR-Lex (europa.eu)

(b) Decision (EU) 2021/1730[213] – Commission implementing Decision (EU) 2021/1730 of 28 September 2021 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;

(c) Decision (EU) 2022/2324 [214]– Commission Implementing Decision (EU) 2022/2324 of 23 November 2022 amending Decision 2008/294/EC, to include additional access technologies and measures for the operation of mobile communications services on aircraft (MCA services) in the Union; and

(d) Decision (EU) 2024/1467[215] – Commission Implementing Decision (EU) 2024/1467 of 27 May 2024 amending Implementing Decision (EU) 2019/785 on the harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union

Potential future EC Harmonisation Decisions

(a) Harmonised technical and operational conditions for the usage of non-Active Antenna Systems (non-AAS) aerial terminal stations (ATS) in EU-harmonised frequency bands for terrestrial systems capable of providing electronic communications services[216];

(b) The shared use of the 3.8-4.2 GHz frequency band for terrestrial wireless broadband systems providing local-area network connectivity[217];

(c) Harmonisation of the frequency bands 40.5 – 43.5 GHz for terrestrial systems capable of providing wireless broadband electronic communications services[218];

(d) Permanent mandates on Short Range Devices (SRD)[219] and Ultra Wideband ("UWB") technology[220] .

5.1.2 The 2023 World Radiocommunication Conference (WRC-23)

5.11 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 WRC can:

[213] Implementing decision - 2021/1730 - EN - EUR-Lex (europa.eu)
[214] Implementing decision - 2022/2324 - EN - EUR-Lex (europa.eu)
[215] Implementing decision - 2024/1467 - EN - EUR-Lex (europa.eu)
[216] https://ec.europa.eu/newsroom/dae/redirection/document/101599
[217] https://ec.europa.eu/newsroom/dae/redirection/document/82230
[218] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=66338
[219] https://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=7494
[220] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=66339

- 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.

5.12 The ITU Radio Regulations are reviewed and revised at world radiocommunication conferences which are held every three to four years for this purpose. Revisions are made on the basis of an agenda item determined by the ITU Council, which takes 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, with the concurrence of a majority of Member States.

5.13 The 39th World Radiocommunication Conference was hosted in Dubai, UAE from 20 November to 15 December 2023. Over the month 3 900 delegates from 163 ITU Member States attending the conference, in addition the ITU-R representing international organizations, equipment manufacturers, network operators and industry forums, who attended as observers.

5.14 The Irish delegation[221] to WRC-23 underpinned matters of national importance by supporting the CEPT common positions on each issue as well as positions that had to be supported as determined by the European Council.[222]

5.15 The outcome of WRC-23 has influenced the work plans of the relevant bodies of the EC and CEPT and consequently ComReg in the implementation of new harmonised measures where relevant.

5.16 The following were the main topics discussed at WRC-23:

- identification of spectrum for IMT;
- Maritime and Aeronautical Communications;
- Satellite Communications; and
- Scientific Use of Spectrum.

5.17 Further detailed information on the discussions of these topics at WRC-23 can be

[221] In line with its priorities ComReg was able to contribute two staff members to the Irish delegation, which as one of the smallest delegations, was comprised of four persons (not all in full time attendance).

[222] This document is not released to the public – see https://data.consilium.europa.eu/doc/document/ST-12534-2023-INIT/en/pdf

found in Annex 2.

5.1.3 The 2027 World Radiocommunication Conference (WRC-27)

5.18 Delegates at the WRC-23 agreed the agenda for the next Conference scheduled to be held in 2027, as well as the preliminary agenda for 2031.

5.19 The agenda for WRC-27 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. The agreed WRC-23 agenda contains nineteen specific and several standing agenda items, all of which will be studied in the years between WRC-23 and WRC-27. Reflecting the current growth area in telecommunications the agenda is heavily focused on satellite communications.

5.20 Led by the DECC, Irish preparations for WRC-27 are underway. ComReg is involved in these provisions and will assist the DECC to meet the objectives and goals that will be established in the national preparatory process.

5.21 ComReg has provisionally identified[223] the following WRC-27 agenda items as important for Ireland:

- Studies on IMT, including new allocations to the mobile-satellite service for direct connectivity between space stations and IMT;
- Maritime and Aeronautical Communications;
- Satellite Communications; and
- Scientific Use of Spectrum.

5.22 Further detailed information on the agenda items for WRC-27 and the preliminary agenda items for WRC-31 can be found in Annex 2.

5.23 ComReg is engaged in the work group preparing CEPT's input to WRC-27 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-27.

5.2 Technology changes and advancements

5.24 Technology changes[224] and advancements can affect both the demand for and

[223] ComReg's view will evolve as CEPT studies commence, the technical details are finalised and the implications for Ireland (if any) become clearer. Ireland will also need to take into account the requirements of the European Space Agency and the European Council.

[224] 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.

supply of radio spectrum. Under normal circumstances such changes lead to a more efficient use of the radio spectrum and can often result in faster or higher quality services. In other instances, this can result in spectrum being released from one service to another.[225]

5.25 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.

Satellite direct-to-device services (Satellite D2D)

5.26 Being able to make a voice call or send data via a satellite from a consumer handset is not new. Iridium had its first call in 1999 and is providing service today to nearly 400,000 commercial voice and data subscribers as of the end of 2022.[226] Numerous other companies offer similar voice and/or data services to subscribers, e.g. Inmarsat,[227] Globalstar,[228] Thuraya,[229] etc. For all these services the customer requires a bespoke handset to access the service.

5.27 A potential *game changer* however is the ability of consumers to use their existing mobile phone to access satellite services for:

- Emergency communications (usually announcing emergency and the provision of location data);
- Short text messaging (SMS);
- Voice services; and
- Data services.

5.28 This service enjoys several different nomenclatures including:

- Satellite direct-to-device service ("satellite D2D") (as used in the title of this section);
- Satellite direct-to-mobile;
- Satellite direct-to-cell ("satellite D2C"); and

[225] 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.
[226] Rachel Jewett, "Iridium posts double-digit revenue increase in 2022, surpasses 2M subscribers," ViaSatellite, February 16, 2023.
[227] See - IsatPhone 2 (inmarsat.com)
[228] See - SPOT X™ | Globalstar AP
[229] See - Thuraya XT-LITE | Satellite Phone - Thuraya Mobile Satellite Communications Company

- NTN or Non-Terrestrial Networks

5.29 For industry this development presents the opportunity to develop a new revenue source and Figure 23 shows a predicted service revenue from providing satellite D2D.

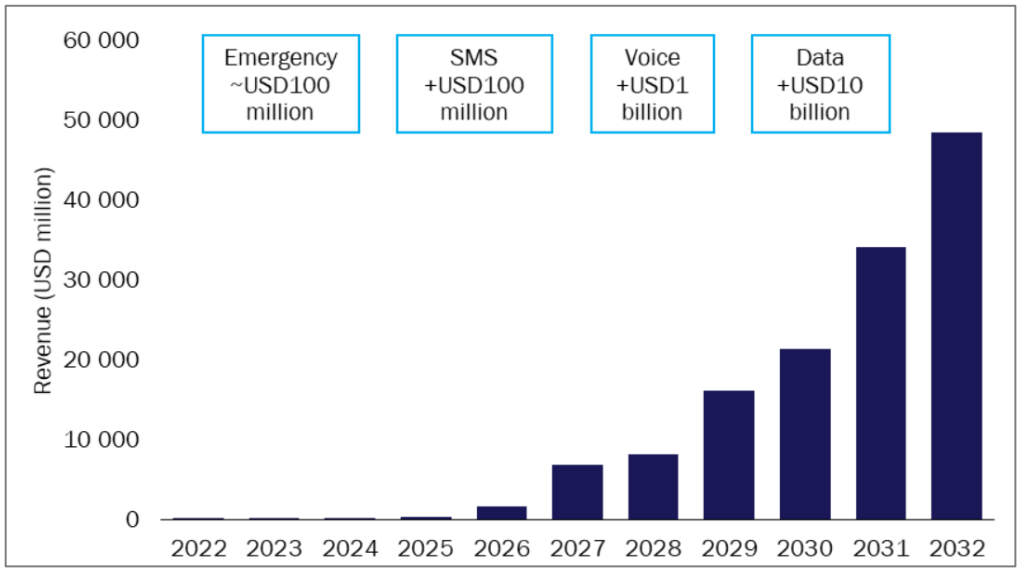


Figure 23: Predicted satellite D2D service revenue, worldwide, 2022–2032 (Source: Analysys Mason – see Annex 4)

5.30 ComReg has been approached by several companies looking to develop satellite D2D services, and extends to the provision of a Test & Trial Ireland licence to help develop the technology.[230] There have also been several announcements demonstrating strategic connections between satellite companies, mobile operators and handset/chip manufacturers. These include Apple and Globalstar[231], Iridium and Qualcomm[232,] SpaceX and T-Mobile[233] , AST SpaceMobile with AT&T[234] and AST SpaceMobile and Vodafone.[235]

5.31 There are currently two models for spectrum usage by satellite D2D services:

1. The use of spectrum allocated to mobile satellite services (MSS). In this model, the handset has the capability to receive and transmit on spectrum bands that have been allocated to satellites for use to mobile consumers. In the case of the Apple and Globalstar partnership, the downlink from the satellite to the consumer handset is in the 2 GHz S-Band and the uplink from the handset to

[230] See https://www.testandtrial.ie/en-ie/
[231] Why Apple is spending $450 million on satellites for its new iPhone (emergingtechbrew.com)
[232] Iridium Announces New D2D Direction - Nov 9, 2023
[233] T-Mobile Takes Coverage Above and Beyond With SpaceX - T-Mobile Newsroom
[234] AT&T CEO says company is ahead in satellite-to-cellular connectivity | Fierce Wireless
[235] Vodafone and AST SpaceMobile complete world's first space-based 5G call using a conventional smartphone

the satellite is in the 1.6 GHz L-band. Both of these spectrum bands are independent of mobile network operators and the use of the L-band for such services has been exempted from the requirement for a licence in Ireland.

2. The use of spectrum already allocated to mobile services and assigned to mobile network operators. In this model, the handset has no additional requirements but instead of communicating to a terrestrial base station, it instead maintains connectivity with a satellite which appears as a base station.

5.32 At the ITU this topic is being considered under an agenda item at WRC-27 which is examining possible new allocations to the mobile-satellite service for direct connectivity between space stations and IMT user equipment to complement terrestrial IMT network coverage.

5.33 Within the CEPT, project team FM44 will explore the regulatory and technical elements of satellite based Direct-to-Cell (D2C) communications via existing available smartphones.[236] ComReg is actively engaged with FM44 and will participate in its work. An ECC Report is expected in February 2025. This will provide insights into the regulatory and technical elements of this type of service for further consideration.

5.34 In addition, regulatory discussions are expected to take place within other groups, including:

- the opinion of the RSPG has been requested on the EU-level policy approach to satellite Direct-to-Device (D2D) connectivity and related Single Market issues[237]; and
- BEREC held a workshop in May 2024 to explore the emerging trends in satellite communication and direct-to-device non-terrestrial networks.[238]

[236] https://eccwp.cept.org/default.aspx?groupid=19
[237] RSPG24-023 FINAL, published 18 June 2024
[238] See https://www.berec.europa.eu/en/news-publications/news-and-newsletters/berec-workshop-satellite-technologies-in-mobile-communications

6 Proposed spectrum work plan 2025 to 2028

6.1 Appropriate prioritisation of spectrum management workplan activities

6.1 In determining the appropriate prioritisation of its spectrum management workplan activities, 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 spectrum 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.

6.2 Proposed spectrum work plan 2025 to 2028

6.2 The following outlines the spectrum work plan that ComReg currently proposes to carry out within the period 2025 to 2028.[239]

6.2.1 Programmatic Spectrum Management Activities

6.3 ComReg's programmatic work plan items proposed for its spectrum management function for the period 2025 to 2028 are to:

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

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

iii. monitor licence compliance and take enforcement action where appropriate;

iv. 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;

v. conduct a programme of measurement of NIR and publication of surveys on Siteviewer[240] as appropriate;

vi. 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;

vii. coordinate Ireland's use of radio spectrum internationally with other jurisdictions, updating MoUs/Coordination Agreements as appropriate,

viii. Advise and assist the DECC in its preparations for WRC-27 agenda items of relevance to Ireland, including participation in appropriate EC, CEPT and regional groups; and

6.2.2 MFCN/WBB

6.4 ComReg's work plan proposal items for MFCN for the period 2025 – 2028 are to:

[239] This work plan remains subject to emerging matters and the availability of appropriate resources to execute same.

[240] https://siteviewer.comreg.ie/#explore

(i) Engage with AirNav Ireland to resolve compatibility issues between MFCN use in the 2.6 GHz Band and AirNav Ireland's aeronautical primary radars which operate in the adjacent 2.7 – 2.9 GHz band;

(ii) Engage with Eir to facilitate its transition activities to decommission Eir's RurTel network in the 2.3 GHz and 2.4 GHz bands;

(iii) Monitor and engage as appropriate into CEPT, EC and ITU groups discussing harmonisation measures for MFCN, noting in particular that discussions on the potential shared use of the 6 425 – 7 125 MHz band (i.e. "Upper 6 GHz band") would be expected to take place during this period;

(iv) Implement relevant EC harmonisation decisions in the bands for MFCN use, noting that the implementation of the EC Decision on the 42 GHz band would fall within this 2025-2028 time period;

(v) 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;

(vi) Investigate the potential for the existing fixed links licensees using the 1 427-1 437 MHz and 1 512-1 517 MHz frequency ranges of the 1.4 GHz band to migrate out of the band over time, and take actions as appropriate (e.g. maintain status quo, set a date to close the band for fixed links usage, etc.) having consideration to whether there would be market demand for MFCN services to use the full of the 1.4 GHz band in the future;

(vii) Consult and put in place, as appropriate in the first half of the 2025-2028 time period, a licensing regime for local-area WBB systems, which could be used for, among other things, private mobile (4G, 5G etc.) networks. This would be subject to demand and progress continuing at European (CEPT/EU) level to harmonise the 3.8-4.2 GHz band for local area WBB systems (low to mid-power) and would potentially spectrum in the lower part of the 26 GHz Band (24.250 – 24.745 GHz (495 MHz) – Block C).

(viii) Consult, towards the middle of the 2025-2028 period, on spectrum for MFCN/WBB use. Such a consultation would, among other things, consider the expiry of MBSA1 licences in 2030 and the multiple harmonised spectrum bands for MFCN/WBB use. Spectrum in the 1.4 GHz band would be considered and perhaps spectrum in the 26 GHz band should clear evidence of demand emerge.

(ix) Monitor and assess MFCN licensees' compliance with their coverage, rollout and quality of service licence obligations;

(x) 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;

(xi) Consider administrative matters concerning the EC's spectrum divestment commitments in relation to the 2014 acquisition of Telefonica by Hutchison as required;

(xii) Work with relevant parties to progress the remaining 3.6 GHz Band transition activities and commence all 3.6 GHz band spectrum lots in accordance with the transition rules of the award;

(xiii) Update ComReg's Spectrum Transfer and Lease Framework in accordance with the EECC Regulations;

(xiv) Monitor developments and input into discussions, as appropriate on satellite D2D services which would use spectrum assigned for MFCN use, and facilitate, as appropriate, the test or trialling of such services in Ireland, as appropriate.

6.2.3 Broadcasting Services

6.5 ComReg's work plan proposal items for Broadcasting Services for the period 2025 – 2028 are to:

i. Engage in the international coordination of broadcasting transmitter stations;

ii. Issue and amend, as appropriate, DTT, DSB and 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;

iv. monitor and engage with relevant international working groups, and input into discussions as appropriate in relation to the future use of the 470-694 MHz band; and

v. Engage with RTÉ, and consult as necessary, on any potential need for a further RTÉ ASB licence sufficiently in advance of licence expiry on 13 May 2029.

6.2.4 Market surveillance of products

6.6 ComReg's proposed work plan items for the market surveillance of products for the period 2025 – 2028 are to:

(a) conduct compliance checks on products:

(i) at their point of entry into the Union market in the State, through cooperation with Customs;

(ii) during authorised officer visits at the premises of economic operators;[241]

(iii) made available on the market via online offerings to End-Users in Ireland on e-commerce platforms; and

(iv) that come to ComReg's attention from reactive workstreams, where required.

(b) conduct communication campaigns to help economic operators best understand their obligations and how proactive engagement with ComReg can help, and to educate and inform End-Users. The expected outcome is improved compliance with Article 3.2 of the RE Directive (radio equipment effectively uses and supports the spectrum's efficient use to avoid harmful interference).

(c) publish a Product Safety report detailing activities with respect to ComReg's role as the market surveillance authority for the RE and EMC Directives

(d) engage with both national and international fora to improve harmonisation on the application of the RE Directive across the EU.

6.2.5 Railway Mobile Radio

6.7 GSM for Railway ("GSM-R") is a narrowband non-public communications network used by European railway operators. Due to technological obsolescence, it is likely that industrial support for GSM-R may not be assured beyond 2035. The Future Railway Mobile Communication System[242] ("FRMCS") is the wideband successor to GSM-R and is a key element of the European Railway Traffic Management System ("ERTMS"). GSM-R and its successor(s), including FRMCS, are designated as Railway Mobile Radio ("RMR").

6.8 In that regard, the EC issued Decision (EU) 2021/1730 in 2021 that harmonises conditions for the availability and efficient use of radio spectrum for the Railway Mobile Radio (RMR) in the bands 874,4-880,0 MHz, 919,4-925,0 MHz and 1 900-1 910 MHz[243] Decision (EU) 2021/1730 requires Member States to, amongst other

[241] Manufacturers (or their authorised representative), importers and distributors
[242] https://uic.org/rail-system/telecoms-signalling/frmcs
[243] Commission Implementing Decision (EU) 2021/1730 of 28 September 2021 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 (notified under document C(2021) 6862) (Text with EEA relevance) - Publications Office of the EU (europa.eu)

things:

- 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 RMR at the latest between 1 January 2022 and 1 January 2025.

6.9 ComReg has commenced a project to consult on a proposed new licensing regime for RMR to implement the framework in advance of the expiry of Irish Rail's current GSM-R licence in November 2025. The consultation will consider, among other things, frequency bands, fees and licence duration.

6.10 ComReg intends to publish its public consultation during Q4 2024 and complete the consultation in advance of Irish Rail's current GSM-R licence expiry in November 2025.[244]

6.2.6 Private Mobile Radio Services

6.11 The management of the radio spectrum involves licensing electronic communication networks such as Private Mobile Radio ("PMR") which provide closed user group communications. PMR continues to be a popular communication system in circumstances where groups of mobile terminals need to communicate on a "one to all" basis or where the traffic is between a control point and one or more mobile terminals.

6.12 Some of the main uses are for public safety and security, public utilities (power, water, transport etc.) and industrial and commercial users such as taxi services, security firms, factories, etc. The VHF and UHF bands are generally used for PMR and are harmonised for PMR across Europe, although there is now a trend to also use MFCN spectrum for private mobile (4G/5G) networks as discussed earlier in Chapter 4.

PMR Licensing information

6.13 ComReg issues six types of PMR licences along with permits for paging systems.[245].

[244] GSM – R | Commission for Communications Regulation (comreg.ie)

[245] Licensees use different licences for different types of services, therefore it should be noted that the number of licences in each type is not indicative of the importance these licence types play in the everyday business of organisations who rely on them e.g. Trunked radio licence

6.14 Figure 24 provides information on the number of licences issued per licence type from 30 June 2019 to 30 June 2024. Business Radio accounts for the largest number of licences issued, with the majority of applications being licence renewals.

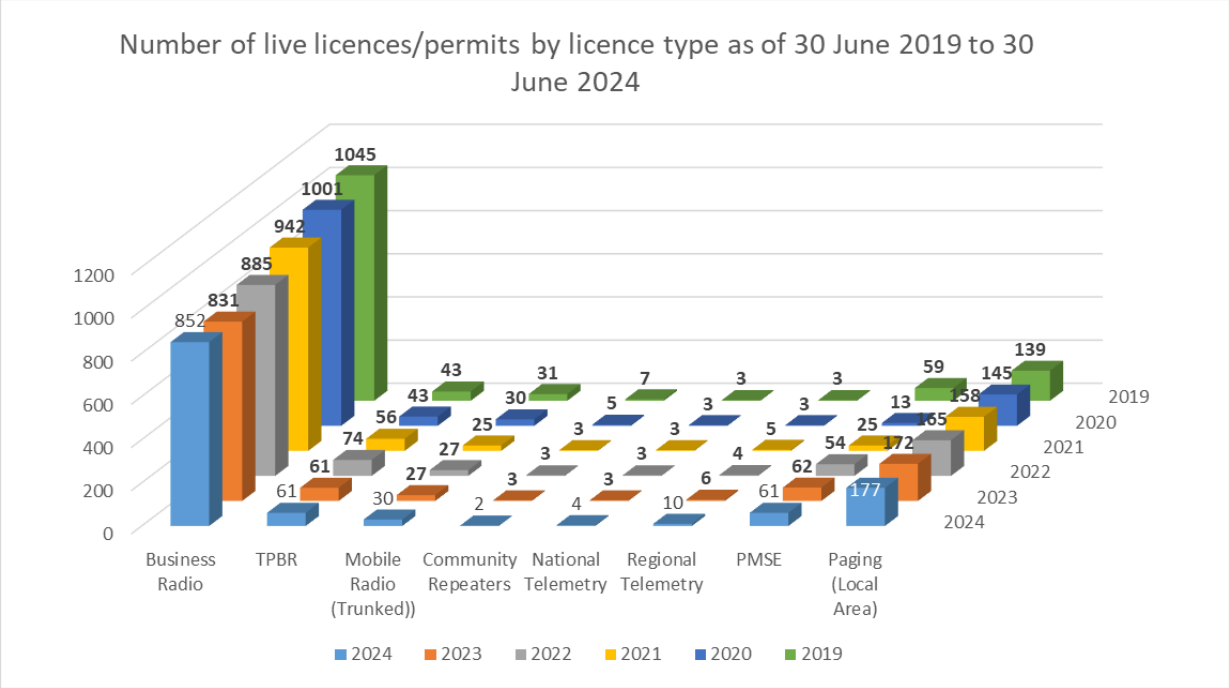


Figure 24: Number of live licences/permits by licence type 2019-2024[246]

numbers are low but these are essential for transport operators (Trunked) and utility companies (Telemetry) to provide essential services. For further information please see https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/business-radio/

246 The figures for PMSE are the total figures of licences issued for the relevant 12-month period. A PMSE licence may be issued for a period of 1-day to a maximum of 6-months.

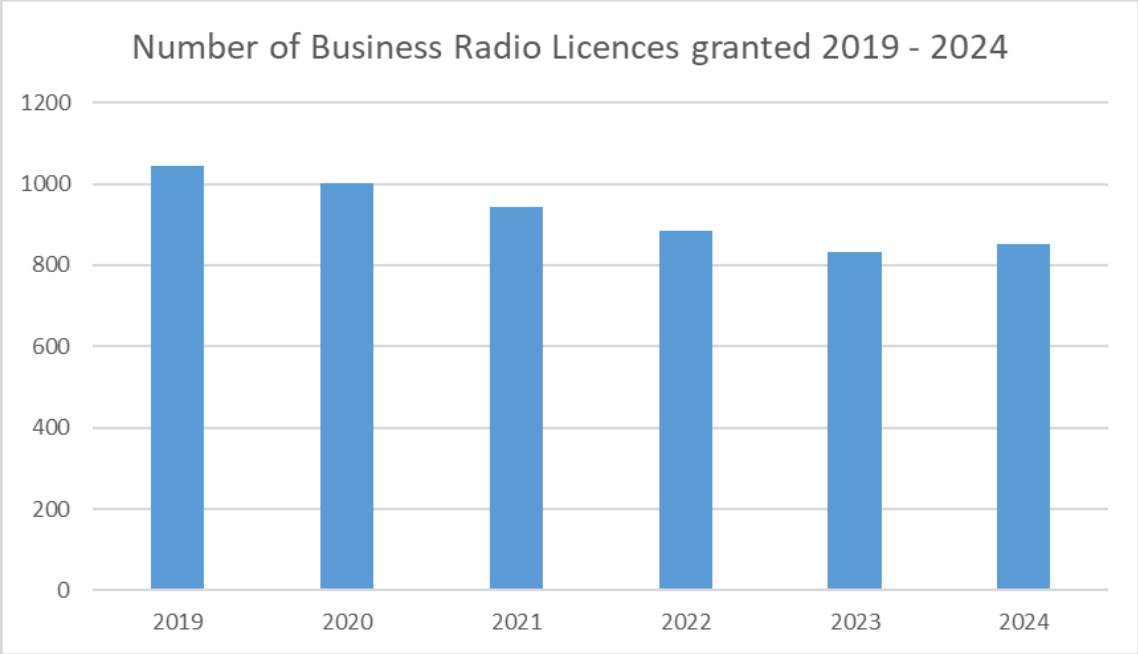


Figure 25: Number of Business Radio licences granted 2019-2024

6.15 There is a slight increase of 2.5% in the demand for Business Radio licences when compared to June 2023. However, when compared to 2019, demand remains low (circa -18%), the changes in demand may be a result of Covid and businesses migrating to other communication systems such as mobile phones, or to services provided by Third-Party Business Radio licensees thereby removing the need for an individual business radio licence. Nevertheless, ComReg expects that demand for licences will endure for some time yet.

Review of the PMR licensing regime

6.16 The current various PMR regulations were made between 1949 and 2005.[247] ComReg is of the view that it is timely to conduct a review of the current PMR licensing framework to take account of new technological advancements and service demands.

6.17 ComReg's intended work activity for PMR includes completing a review of the current licensing regime:

[247]
S.I. No. 320/1949 – Wireless Telegraphy (Business Radio Licence) Regulations, 1949, as amended by S.I. No. 2 of 1956, S.I. No. 181 of 1957, S.I. No. 73 of 1982 , S.I. No. 88/1983, S.I. No. 84/1985, and S.I. No. 75/1986;
S.I. No. 83/1988 – Wireless Telegraphy (Community Repeater Licence) Regulations, 1988;
S.I. No. 435 of 2002 – Wireless Telegraphy (Mobile Radio Systems) Regulations, 2002; and
S.I. No. 646 of 2005 – Wireless Telegraphy (Third Party Business Radio Licence) Regulations, 2005.

(a) Completing a benchmarking exercise of the existing PMR Licensing Regimes in Ireland against licensing regimes and frequency bands in other European countries;

(b) Reviewing the frequency bands allocated for PMR and consider whether any changes are necessary to promote the efficient use of existing and/or new frequency bands;[248]

(c) Reviewing current demand and investigate the trends in demand for those bands, including future demand of existing and potential alternative use cases;

(d) Examining the current PMR Licensing fee methodologies and identifying options for more appropriate fee methodologies, if required;

(e) Considering the implementation of a single unified licensing regime that is future proofed; and

(f) Identifying any transition activities which may need to happen to implement any future licensing regime.

6.18 Upon completion of its review ComReg, proposes to consult on any proposed changes to the current regimes including new regulations.

Third-Party Business Radio Licensing regime

6.19 In 2005, ComReg introduced a flexible and cost-effective licensing scheme for Third Party Business Radio ("TPBR"), using frequencies in the VHF (150-170 MHz) and UHF (450-470 MHz) bands. TPBR licences are generally held by radio equipment suppliers to provide commercial radio services to third-parties, providing the business radio community with a versatile service offering that can be tailored to meet the short term or longer term needs of individual users.

6.20 Following a public consultation[249] the TPBR licensing scheme was reopened in September 2020 for another five-year period[250] . ComReg issued 74 licences to 17 licensees between 29 September 2020 and 30 November 2022. ComReg notes that the current TPBR licences will begin to expire from 28 September 2025. Therefore ComReg proposes to consult on reopening the TPBR licensing regime in parallel with reviewing the PMR licensing regimes.

[248] Current frequency bands used for PMR are limited to sub-1 GHz, however, the review would consider demand from private network use cases for spectrum above 1 GHz.

[249] https://www.comreg.ie/publication-download/third-party-business-radio-consultation-on-re-opening-the-third-party-business-radio-scheme .

[250] https://www.comreg.ie/publication-download/third-party-business-radio-response-to-consultation-and-decision-on-re-opening-the-third-party-business-radio-scheme

6.2.7 Terrestrial Fixed Services

6.21 A Radio Link (or "Fixed Link") is a wireless connection for the transmission of information between two or more fixed locations using electromagnetic waves.[251] Radio Links can provide an alternative or a complement to copper cables or fibre. They are used for a variety of applications, including backhaul for mobile network base stations, distributing TV signals from studios to broadcast transmitter sites, providing direct voice or data connection to end users and connecting nodes within private or corporate communication networks.

6.22 Radio Links are currently operated in Ireland under three distinct licensing types:

(a) Individual Fixed Links Regime;[252]

(b) 26 GHz National Point-to-Point Block Regime;[253] and

(c) Licence-exempt Radio Links.[254]

The Individual Fixed Links Regime

6.23 The individual Fixed Links regime is governed by the S.I. No. 593 of 2023 – Wireless Telegraphy (Fixed Radio Link Licence) Regulations 2023 ("the 2023 Regulations"), while the associated fixed links guidelines document[255] provides information on the technical requirements for Fixed Links, the licence application process; and licensing information.

6.24 ComReg currently grants two types of individual Fixed Link licences:

(a) Point-to-Point[256] ("P-P") Fixed Links are typically used within telecommunications core networks, a broadcast contribution and distribution links. Such links may also be used as small cell backhauling within local access networks to connect access points such as Radio Local Area Network ("LAN") hotspots and cells to the core network; and

(b) Point-to-Multipoint[257] ("P-MP") Fixed Links are normally used within access networks, enabling network operators to provide services without

[251] Fixed Links in the context of this review refers to Fixed Wireless Services, such as voice or data traffic, delivered by Fixed Links between specified geographic locations. Fixed Service is defined by the International Telecommunication Union ("ITU") as a radiocommunication service between specified fixed points.
[252] https://www.comreg.ie/media/2023/12/SI-593-of-2023.pdf
[253] https://www.irishstatutebook.ie/eli/2018/si/158/made/en/pdf
[254] https://www.comreg.ie/publication-download/permitted-short-range-devices-srds-in-ireland
[255] ComReg Document 23/112 – Fixed Radio Links Licensing Guidelines – published 4 December 2023
[256] A wireless system connecting two fixed geographic locations.
[257] A wireless system connecting more than two fixed geographic locations.

the need to install conventional cables. A P-MP network topology provides a communication route (on a single radio channel for each sector) from one central point to several terminals where users are located. Each user location may be served directly from the central location or via one or more radio repeaters.

6.25 ComReg proposes to continue to issue fixed radio link licences and update the fixed links guidelines document as required to ensure that fixed links efficiently use the assigned radio spectrum.

26 GHz National block licences

6.26 In 2018, ComReg awarded fifteen blocks (2 x 28 MHz) of 26 GHz spectrum to Three Ireland (Hutchinson) Limited, Meteor Mobile Communications Limited and Vodafone Ireland Limited for a ten-year period.[258] The licences granted following the award permit licensees to operate point-to-point radio links, on a nationwide basis as backhaul network infrastructure for mobile communication networks.

6.27 The use of 26 GHz national blocks for fixed links continues to service an important need. Currently, there are circa 4,300 fixed links deployed in this band, more in fact than any of the other fixed link spectrum bands.[259]

6.28 ComReg intends to consult on a new award and licensing framework for 26 GHz national block licences prior to the expiry of current licences in August 2028.

Fixed Radio Links Annual Report

6.29 ComReg published its first Fixed Radio Link Annual Report (ComReg document 19/89)[260] in 2019. This was followed by subsequent reports in ComReg document 20/93,[261] 21/97,[262] 22/104,[263] and 23/119.[264]

6.30 The purpose of the Fixed Radio Links Annual Report is to provide the most up to date information regarding the licensing of fixed radio links granted under S.I. No. 593 of 2023.

---

[258] ComReg Document 18/53 – Results of the 26 GHz Spectrum Award 2018 – published 19 June 2018. https://www.comreg.ie/publication/results-of-the-26-ghz-spectrum-award-2018/

[259] See Figure 4 of ComReg Document 23/119 for information on the number of fixed links per frequency band.

[260] Fixed Radio Links Annual Report for 2019 | Commission for Communications Regulation (comreg.ie)

[261] Fixed Radio Links Annual Report 2020 | Commission for Communications Regulation (comreg.ie)

[262] Fixed Radio Links – Annual Report 2021 | Commission for Communications Regulation (comreg.ie)

[263] Fixed Radio Links: Annual Report for 2022 | Commission for Communications Regulation (comreg.ie)

[264] Fixed Radio Links Annual Report for 2023 | Commission for Communications Regulation (comreg.ie)

6.31 The Fixed Links Annual Report typically includes:

(a) background of fixed radio links deployment in Ireland;

(b) the licensing regime for fixed radio links in Ireland;

(c) current demand and trends for individual fixed radio links licences across all the frequency bands;

(d) related ComReg work items; and

(e) CEPT's[265] current fixed service work programme.

6.32 While most frequency bands are uncongested, demand for Fixed Links is growing and there is always the likelihood of greater scarcity arising in the future. With that in mind, ComReg is mindful that if left unaddressed, it might lead to further congestion, reducing spectrum availability and harming the efficient delivery of services in the future.

6.33 Such a possibility prompted ComReg under the 2023 Regulations to introduce higher fees for certain spectrum bands within a specific geographical area, called the "congested area". Currently the congested area fees apply to links in National Grid 3122 and 3123 (Ordnance Survey of Ireland ("OSI")) in the 13 GHz, 15 GHz, 18 GHz, and 23 GHz frequency bands.[266]

6.34 ComReg intends to monitor congestion and adjust as necessary in light of changes in demand. Any indications of congestion will be reflected by ComReg in the publication of the Fixed Links annual report.

Fixed links in the High Frequency range (3 MHz – 30 MHz)

6.35 In response to ComReg Document 21/134,[267] Raft Technologies Limited submitted that several bands in the 3 MHz – 30 MHz range which are allocated to the Fixed Service should be made available for the licensing of fixed radio links. In Document 22/93, ComReg noted, amongst other things, that the 3 MHz – 30 MHz frequency range is used intensively worldwide, usually by several users together, and national and international coordination is required to prevent harmful interference between licensed users. ComReg further noted that the ECC has not published any harmonising decisions on the use of 3 MHz – 30 MHz range for fixed services.

6.36 In that regard, ComReg set out that it did not propose to open the 3 MHz – 30 MHz

[265] https://www.cept.org/
[266] See pages 12 & 13 of ComReg Document 23/112 – Fixed Radio Links Licensing Guidelines for additional "congested area" information.
[267] ComReg Document 21/134 - "Review of the Fixed Radio Links Licensing Regime" – 17 December 2021

frequency range as part of that consultation process. Instead, ComReg stated that it may consider proposing a work item as part of its future consultation on its work plan for the 2025 – 2028 period.

6.37 Since the publication of Document 22/93, ComReg notes that:

(a) the ECC has not published any harmonising decisions on the use of 3 MHz – 30 MHz range for fixed services;

(b) the ECC has not received any requests from interested parties for its Project Team on the Fixed Service ("SE 19")[268] to consider developing any work items such as developing an ECC Report to study co-existence of different services within the 3 MHz – 30 MHz frequency range. Such a report could potentially be used to inform a harmonising ECC Decision or Recommendation; and

(c) In 2023, a group called the "Shortwave Modernization Coalition" petitioned the Federal Communications Commission (FCC) of the United States to allow data communications on multiple bands within the 2 MHz – 25 MHz range with up to 20 KW, including in bands immediately adjacent to spectrum allocated to the Amateur Service. The FCC publicly published the petition and asked for any comments in response.[269] The FCC has yet to decide on the petition. However, ComReg notes that some respondents, such as the National Association for Amateur Radio,[270] are of the view that the proposal could potentially cause significant harmful interference to many users of adjacent spectrum allocations.[271]

6.38 Finally, as there may be a significant number of issues to consider as part of any consultation on a potential licensing regime for fixed links in the 3 MHz – 30 MHz frequency band and having regard for the other proposed work items for 2025-2028 period, ComReg intends to keep the matter under consideration. Any future work that might emerge would be contingent on demand and resourcing availability.

6.2.8 Availability of Radio Spectrum Information

6.39 Information relating to radio spectrum is important for many parties with an interest in the electronic communications market, including electronic network and service providers, equipment manufacturers, broadcasters, end-users, and the general public. ComReg recognises that the quality and availability of information on radio

[268] https://cept.org/ecc/groups/ecc/wg-se/se-19/client/introduction
[269] https://www.fcc.gov/ecfs/search/search-filings/results?q=(proceedings.name:(%22RM-11953%22))&limit=100&page=0
[270] The American Radio Relay League (ARRL) is the largest membership association of amateur radio enthusiasts in the United States https://www.arrl.org/
[271] https://www.arrl.org/news/arrl-files-comments-against-seriously-flawed-hf-rules-petition

spectrum facilitates the entry of new players into the electronic communications market and can reduce network and service deployments.

6.40 In section 3.4.5 of ComReg Document 21/90, ComReg set out how it provides fixed link data information to applicants on the eLicensing[272] portal for network planning purposes via a frequency band usage checker and mapping graphical user interface ("GUI"). The eLicensing mapping GUI provides applicants with a view of the direction and location of licensed fixed links. ComReg notes that the provision of this information has assisted applicants to identify suitable frequency bands and locations for potential links.

6.41 ComReg has a statutory obligation to progressively publish environmental information as set out in the Access to Information on the Environment Regulations 2007[273] (the "AIE Regulations") and Directive 2003/4/EC[274] (the "AEI Directive"). In that regard, ComReg published Document 24/13[275] wherein it proposed to publish the relevant radio spectrum information in respect of licences granted by ComReg commencing with fixed radio links.

6.42 Aside for the statutory obligation to make information progressively available, ComReg is of the view that the publication of radio spectrum information would result in improved competition and innovation in the provision of wireless communication services, as access to radio spectrum information can:

(a) reduce timescales and costs associated with market entry;

(b) reduce risk and uncertainty reading spectrum availability; and

(c) create greater awareness of opportunities to access unused spectrum, encouraging new, innovative wireless applications.

6.43 ComReg is carefully considering responses received to Document 24/13 and will publish its response to consultation in due course.

6.2.9 Satellite services

6.44 Satellite communications provide a variety of applications such as:

(a) aeronautical and maritime safety;

[272] eLicensing - Login - ComReg
[273] S.I. No. 133 of 2007 – European Communities (Access to Information on the Environment) Regulations 2007
[274] DIRECTIVE 2003/4/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC
[275] ComReg Document 24/13 – Publication of Radio Spectrum Licence Information – published 19 February 2024.

(b) Broadcasting services such as direct-to-home multichannel television and satellite digital radio;

(c) Earth Exploration and Meteorological services;

(d) Mobile and fixed telecommunications (satellite phones, direct-to-device, and intercontinental telecommunications links);

(e) Satellite broadband;

(f) Satellite news gathering; and

(g) Space research, earth exploration service (EES) applications.

WRC-23

6.45 ComReg notes that at WRC-23 it was decided, amongst other things:

(a) to upgrade of the allocation of the frequency band 14.8-15.35 GHz to the space research service (agenda item 1.13);

(b) to allow earth stations in motion (ESIM) provide mobile broadband services to aircraft and vessels in existing FSS frequency bands under certain technical, regulatory and operational conditions (agenda items 1.15 and 1.16);

(c) to adopt a regulatory framework for satellite-to-satellite links in Ka-band (26.5-40 GHz) which allows satellite systems in lower orbits to download data to the ground by using satellites in higher orbits as data relay links (agenda item 1.17); and

(d) that many of the agenda items for the next conference WRC-27 relate to satellite services, with a focus on non-geostationary satellite systems.

MSS with CGC

6.46 ComReg granted Mobile Satellite Services with Complementary Ground Control ("MSS with CGC)" licences to Inmarsat Ventures Ltd in 2018 and a licence to Echostar Mobile Limited in 2019. Those licences expire on 13 May 2027.

6.47 On the 7 February 2024, the Radio Spectrum Policy Group ("RSPG") published, following consultation,[276] an opinion on assessment of different possible scenarios for the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz by the

[276] RSPG23-042 – Draft RSPG Opinion on assessment of different possible scenarios for the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz by the Mobile Satellite Services beyond 2027 – published 25 October 2023. https://radio-spectrum-policy-group.ec.europa.eu/document/download/fbe859f2-07a6-48e7-8f0b-eeb0a0e4be03_en?filename=RSPG23-042final-Draft_Opinion-MSS-public_version.pdf

Mobile Satellite Services beyond 2027 (the "Opinion").[277] The RSPG sets out ten recommendations to the EC as to the most appropriate way forward regarding the frequency bands 1980-2010 MHz and 2170-2200 MHz beyond 2027.

6.48 The RSPG recommends, amongst other things, that the European Commission and Member States examine the underlying 2 GHz mobile satellite service ("MSS") legislation and framework for a competitive outcome in a timely fashion before the current 2 GHz MSS with CGC national authorisations expire.

6.49 Therefore, ComReg intends to engage with the EC and other Member States as appropriate in considering any future authorisation regime for the frequency bands 1980-2010 MHz and 2170-2200 MHz. In the meantime, ComReg will monitor compliance of licence conditions by the existing MSS with CGC licensees.

Licence-exempt use of satellite terminals

6.50 Terminals for Satellite Services (TSS) are a type of apparatus used to communicate with a satellite from the Earth (terrestrial, at sea or aeronautical). TSS are used to provide business/consumer communications such as telephony, data, and broadband.

6.51 Some examples of TSS include Aircraft satellite terminals, satellite terminals on Mobile Platforms, satellite terminals on Vessels, High E.I.R.P Satellite Terminals and Low E.I.R.P Satellite Terminals.

6.52 Certain TSS can operate in Ireland on a non-interference and non-protected basis in accordance with the requirements set out in ComReg Document 20/47 document (and any revisions thereof), and by Exemption Order Wireless Telegraphy Act 1926 (Section 3) (Exemption of Terminals for Satellite Services) Order 2020.

6.53 In that regard, ComReg proposes to continue issuing SES licences, updating 20/47, and contributing to work within ECC on the outcomes of WRC-23 and in preparing a common position for the relevant satellite service agenda items scheduled for WRC-27.

6.2.10 Amateur Services

6.54 The amateur service and amateur-satellite service was established by the International Telecommunication Union (ITU), through the International Telecommunication Regulations, as "*a radiocommunication service for the purpose*

[277] RSPG24-007 – RSPG Opinion on assessment of different possible scenarios for the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz by the Mobile Satellite Services beyond 2027 – published 7 February 2024. https://radio-spectrum-policy-group.ec.europa.eu/document/download/b1f597f2-d6b5-44e5-878d-ea09bdd8a1d7_en?filename=RSPG24-007final-RSPG-Opinion-MSS-public_version.pdf

of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest".[278]

6.55 ComReg's Amateur Station licensing regime allows suitably qualified persons, known as radio amateurs, to use radio equipment for the purpose of conducting experiments and communicating via wireless telegraphy. A variety of radio spectrum bands have been allocated to the service within the International Table of Frequency Allocations, as set out in Document 20/58R5.

6.56 Currently, there are over 2,216 radio amateurs licensed by ComReg. Figure 26 shows the steady growth in the number of licenced radio amateurs reflecting spectrum demand for Amateur use.

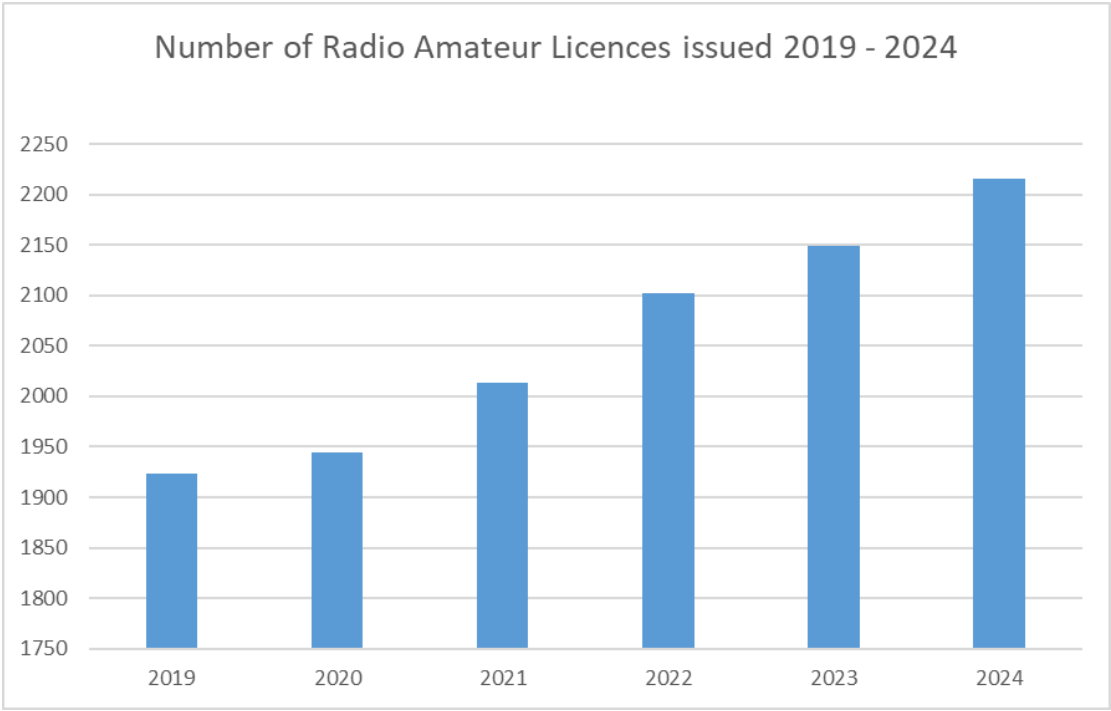


Figure 26: Number of Radio Amateur licences issued 2019-2024

6.57 The qualification process involves an examination based on the Harmonised Amateur Radio Examination Certificate ("HAREC")[279] standard as set down by CEPT. The Irish Radio Transmitter Society ("IRTS")[280] manage these examinations on behalf of ComReg. Figure 27 shows the continuing increase in people obtaining a HAREC in Ireland, noting the strong demand post-COVID, i.e. in 2023.

[278] See 1.56 of the ITU Radio Regulations, edition of 2020.
[279] Recommendation T/R 61-02 - Harmonised Amateur Radio Examination Certificate – 16 February 2024 and available at https://docdb.cept.org/download/4424.
[280] See the IRTS website for more information www.irts.ie

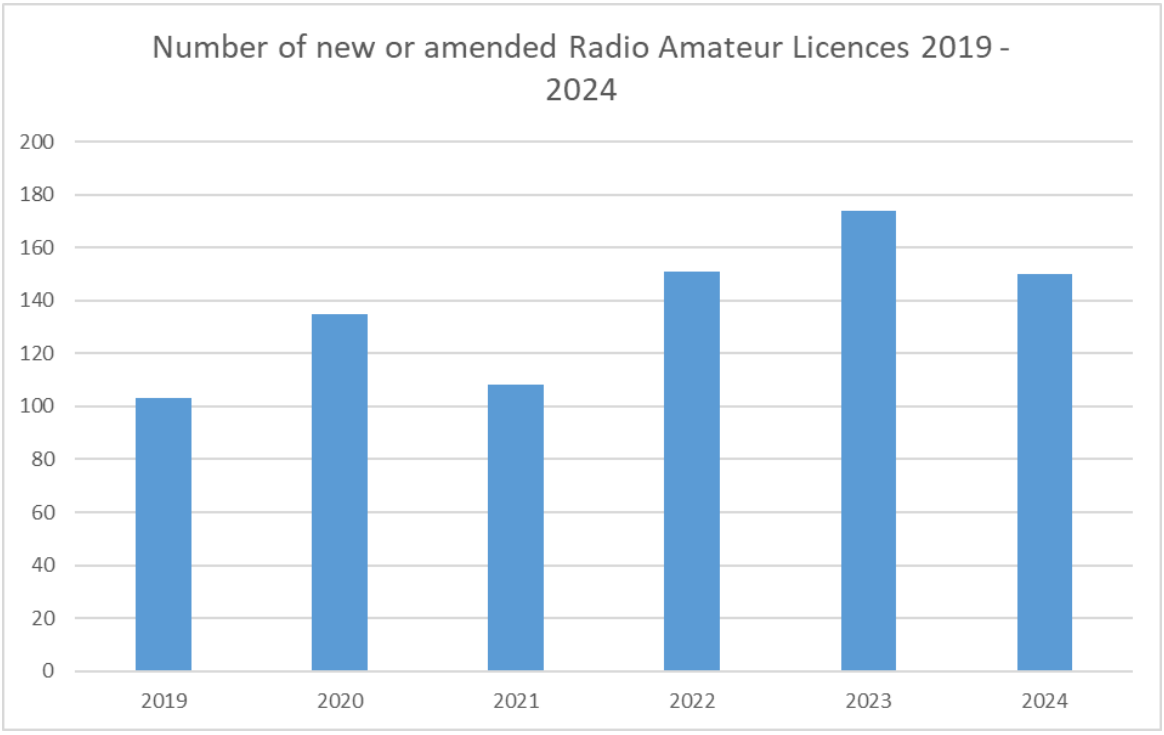


Figure 27: Number of new or amended Radio Amateur licences issued 2019-2024

6.58 Members of the amateur radio community contend that interest in the Amateur Service is increasing and that a form of novice licensing would assist in maintaining that interest and could be a gateway to obtaining a HAREC standard qualification. It is further contended that a novice licence and an associated callsign is required to enable people to engage with radio frequency engineering as a STEM[281] activity.

6.59 However, ComReg notes that the absence a novice licensing regime not currently impeding anyone from learning about electronics or radio propagation. For example, PMR446, CB, LoRa, etc. can be accessed on a licence-exempt basis. Online propagation tools are also available to assist in learning about radio propagation, for example: https://rsgb.org/main/technical/propagation/on-line-propagation-tools/ and https://www.itu.int/en/ITU-R/study-groups/rsg3/Pages/iono-tropo-spheric.aspx.

6.60 To put in place a framework for novice licensing in Ireland ComReg would need to:

- Begin a work item to consult on its proposals;
- Request the Minister DECC, to sign into power new regulations; and

[281] Science, Technology, Engineering, and Mathematics ("STEM").

- If required, tender for an external party to run any examination that may be required[282].

6.61 As noted earlier, ComReg proposes to begin a comprehensive review of the Amateur Service licensing regime (including a proposed novice licensing framework, coordination of automatic stations, the HAREC examination format, callsign allocations, etc.) during the 2025-2028 period.

6.62 ComReg also proposes to 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.

6.63 ComReg anticipates responses from representative bodies that may raise a number of matters for ComReg to consider. ComReg has noted that matters, such as the following but not limited to, have been raised by radio amateurs in online forums and at radio amateur events:

- adding the suffix /P to a call sign to signify portable operation;
- limitations applicable to mobile operations; and
- limitations applicable to maritime-mobile operations.

The 23 cm spectrum band (1240 – 1300 MHz)

6.64 All Irish radio amateurs have access to the 23 cm spectrum band on a secondary basis limited to 22 dBW. The band is also allocated on a primary basis to the earth exploration-satellite service, the radiolocation service, the space research service (active) and the radionavigation-satellite (s-E)(s-s) service (RNSS).

6.65 During the ITU-R Radio Assembly (RA) in November 2023, members approved[283] a new ITU-R recommendation M.2164 that provides "*guidance on technical and operational measures for the use of the frequency band 1240-1300 MHz by the amateur and amateur-satellite service in order to protect the radionavigation-satellite service (space-to-Earth)*".[284]

6.66 It is important to note that this ITU-R Recommendation is intended as guidance and consequently there is flexibility for Administrations to take no action,

[282] 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.
[283] A report on this aspect of the RA from the amateur radio service viewpoint can be found here: https://www.iaru.org/wp-content/uploads/2023/11/Report-from-ITU-RA_Nov-2023.pdf
[284] The recommendation can be found here: https://www.itu.int/rec/R-REC-M/recommendation.asp?lang=en&parent=R-REC-M.2164

implement the guidance in full, apply parts of the guidance or apply more stringent technical limitations in their territory.

6.67 ComReg is of the view that:

- There have been no cases of harmful interference to the RNSS where the cause of the interference is related to Amateur radio operation. Therefore, implementing the guidance in M.2164 is not a proportionate action;
- The requirements of M.2164 are demanding and thus implementation and verification measurements would require more knowledge than can be expected from a radio amateur whose technical knowledge is limited to the HAREC syllabus. If at some point it was required to implement M.2164, ComReg would need to consider making this band available under an individual authorisation on proof of the necessary competence; and
- As airports are the primary concern in the sub-band 1 240 - 1 256 MHz, ComReg has the option, if interference occurs, to establish zones around airports in which transmissions are prohibited.

6.2.11 Unmanned Aircraft Systems

6.68 In 2022 the ECC published Decision (22)07 which sets out harmonised technical conditions for the usage of aerial UE for communications based on LTE and 5G NR in the bands radio 703-733 MHz, 832-862 MHz, 880-915 MHz, 1 710 – 1 785 MHz, 1 920-1 980 MHz, 2 500-2 570 MHz and 2 570-2 620 MHz harmonised for MFCN.[285] ECC Decision (22)07 sets out that CEPT administrations should, amongst other things:

- depending on the market demand, allow the usage of aerial UE in the 880-915 MHz and 1920-1980 MHz frequency band without specific operational and technical conditions beyond those already applicable to UE in ECC Decisions in the given bands; and
- that for operation of aerial UEs in the bands 703-733 MHz, 832-862 MHz, 1 710-1 785 MHz, 2 500-2 570 MHz and 2 570-2 620 MHz, implement the operational and technical conditions as defined in Annex 1 of ECC/DEC/(22)07.

6.69 In January 2024, the EC mandated CEPT to develop harmonised technical and operational conditions for the use of non-AAS aerial terminal stations in EU-harmonised frequency bands for terrestrial systems capable of providing ECS.[286]

[285] ECC Decision (22)07 (cept.org)
[286] https://ec.europa.eu/newsroom/dae/redirection/document/101599

6.70 The mandate addresses the following frequency bands: 700 MHz, 800 MHz, 900 MHz, 1800 MHz, the paired terrestrial 2 GHz band and 2.6 GHz (both its paired and unpaired portions), and a final CEPT report is to be provided by March 2025.

6.71 Following this, the EC, with the assistance of the Radio Spectrum Committee, may apply the results of this mandate in support of an EU-level technical harmonisation measure under the Radio Spectrum Decision (Decision 676/2002/EC).[287]

6.72 ComReg proposes to monitor developments in ECC working groups and project teams and consider the appropriate implementation of any future harmonised ECC Decisions, and any future EC Decisions.

6.2.12 Aeronautical and Scientific Services

Aeronautical Services

6.73 For the 2025-2028 period, ComReg proposes to:

(a) promote Ireland's interest in relevant international fora to ensure adequate spectrum is available for aeronautical services; and

(b) work with the IAA and AirNav Ireland to promote the use of spectrum efficient technologies in the aeronautical bands, thereby maximising the spectrum available for growth and new applications.

Scientific Services

6.74 For the 2025-2028 period, ComReg proposes to:

(a) Subject to resourcing, consider the implementation of a licence regime for Meteorological Aids (MetAids);

(b) consider the matter of how to protect services of strategic importance[288] to Ireland, and to monitor and input into discussions on these types of services within Europe.

6.2.13 Defence Forces Use of Spectrum

6.75 ComReg will 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

[287] Decision 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 European Community, OJ L 108, 24.4.2002, p. 1

[288] Examples include Global Navigation Satellite System, monitoring climate change, earth exploration, and radio Astronomy.

mutual interest.

6.76 ComReg proposes to liaise with the Irish Defence Forces to resolve issues of mutual concern. The Irish Defence Forces,[289] use radio in a variety of ways, most notably in relation to maritime, aeronautical and tactical applications.

6.77 ComReg notes that the report of the Commission on the Defence Forces includes the procurement of a primary radar system to enhance situational awareness with recognised maritime and air pictures through the acquisition and development of primary radar, coastal radar and associated systems to allow the development of a Recognised Air Picture to support national security".[290] The Detailed Implementation Plan has a planned timeline of delivery of military radar by 2028.[291]

6.78 ComReg proposes to engage with the Irish Defence Forces on radio spectrum compatibility issues to ensure that:

(a) The primary radar system can operate without harmful interference from commercial and other users operating in the same or adjacent bands; and

(b) Commercial and other users in both the same and adjacent bands are protected from any harmful interference that may be generated by the primary radar system.

6.2.14 Global Navigation Satellite System (GNSS) Repeaters

6.79 GNSS repeaters are fixed location devices designed to re-transmit GNSS (e.g. Galileo, GPS) signals unchanged inside buildings to provide a usable signal for GNSS receivers that are out of sight of the GNSS satellite constellation or that they are unable to connect to GNSS signal simulators.

6.80 The CEPT published two reports, ECC Report 129[292] on technical compatibility and ECC Report 145[293] on an authorisation framework which may be used for GNSS repeaters. Subsequently the CEPT published ECC Recommendation (10)02,[294] recommending the authorisation of GNSS repeaters on a licensed basis. Some of the key recommendations are:

- that the operation of GNSS repeaters should be limited to the bands 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz;

[289] See www.military.ie
[290] See page 26 of Report of the Commission on the Defence Forces, report-of-the-commission-on-defence-forces.pdf (military.ie)
[291] codf-detailed-implementation-plan_2023_final.pdf (military.ie)
[292] ECO Documentation (cept.org)
[293] ECO Documentation (cept.org)
[294] Minutes March 2007 (cept.org)

- that the use of radio frequencies by GNSS repeaters should only be authorised on a site-specific basis, mobile use should not be authorised;

6.81 ECC Recommendation (10)02 also recommends that the use of radio frequencies by GNSS repeaters should be restricted to professional applications for:

- Government associated agencies, including law enforcement, fire and rescue organizations and the contractors supporting them;
- Companies in the military and civilian aviation industry, including aircraft and avionics manufacturers and relevant maintenance facilities;
- Manufacturers of GNSS chipsets and integrators of such chipsets into other equipment;
- Manufacturing, production and test facilities where GNSS is an integral part of the finished product; and
- Operators of indoor facilities where emergency services need to continue tracking GNSS where it is otherwise unavailable.

6.82 Subject to the availability of resources, ComReg proposes to begin a work plan item for GNSS repeaters for the period 2025 – 2028 to consult on an authorisation regime to allow the operation of GNSS repeaters at fixed locations to users of professional applications as outlined in ECC Recommendation (10)02.

6.2.15 RFMN

6.83 ComReg's work plan proposal for RFMN for the period 2025 – 2028 is to increase the geographical coverage of the RFMN by identifying two further sites outside of Dublin and completing the installation of monitoring equipment.

6.2.16 Licence-Exempt Short-Range Devices

6.84 Short Range Devices ("SRDs") is a legacy term that is intended to cover radio equipment which have a low capability to cause interference. SRDs occupy a range of frequency bands ranging from very low frequencies (kHz) to microwave frequencies (GHz). Due to their low power and localised usage, SRDs are generally regarded as having a low capability of causing interference. This is confirmed by extensive compatibility analysis studies which consider all the existing systems in the bands being considered. Consequently, SRDs have generally been made exempt from the need for individual licences, subject to compliance with certain technical conditions.

6.85 SRDs include devices such as inductive applications, model control, road transport and traffic telematics ("RTTT") systems, cordless telephones, alarms, field disturbance and Doppler apparatus ("FDDA") systems, wireless microphones, and wireless local area networks ("WLANs").

6.86 The Internet of Things ("IoT") refers to a network comprised of physical objects (such as people and machines) capable of gathering and sharing information. Many current IoT deployments, such as Sigfox and LoRa, fall into the category of SRDs and operate in the licence-exempt frequency ranges. Other IoT technologies, include NB-IOT or LTE-M.

6.87 It is widely expected that the deployment of IoT, including Intelligent Transport Systems ("ITS") and machine to machine ("M2M"), will increase over time and that this will impact economic growth and social development.

6.88 Since the publication of Document 21/136, ComReg has published three revisions of Document 02/71 on the permitted short-range devices in Ireland. A summary of the key amendments to those revisions is listed below:

(a) Document 02/71R14 included the implementation of Decisions (EU)2022/180, (EU)2022/179, Decision (EU)2022/172, and (EU)2021/1067;

(b) Document 02/71R15 included the implementation of Decision (EU) 2022/2307; and

(c) Document 02/71R16 included an update of requirements for SRDs in Ireland. This revision aligned the short-range devices exemptions in Ireland with the publication of a revised version ERC Recommendation 70-03 published on 8 March 2024.

6.89 ComReg proposes the following work plan items for SRDs for the period 2025 – 2028:

(a) to facilitate the use of SRDs in Ireland in accordance with international harmonisations measures and where necessary, revise ComReg document 02/71[295] on foot of EC and ECC harmonisation updates;

(b) Monitor, contribute to and promote Ireland's spectrum management position in relation to IoT; and

(c) to participate in CEPT working groups on SRDs.

[295] See 02_71-R16.pdf (comreg.ie)

7 Next Steps and Submitting Comments

7.1 Submitting Comments

7.1 All input and comments are welcome. It would make the task of analysing responses easier if comments were referenced to the relevant section / paragraph number in each chapter and annex in this document.

7.2 Please also set out your reasoning and all supporting information for any views expressed.

7.3 ComReg invites views from interested parties on all aspects of the Proposed Radio Spectrum Management Operating Plan. The consultation period will run over the next 30 days until 17:00 on the 30th of August 2024 to comply with ComReg's Consultation Procedures.[296] ComReg welcomes written comments on any issues raised in this paper.

7.4 Submissions must be provided in written form (e-mail) to marketframeworkconsult@comreg.ie, clearly marked – "**Submissions to ComReg Document 24/65**".

7.5 Electronic submissions should be submitted in an unprotected format so that they may be readily included in the ComReg submissions document for electronic publication.

7.6 ComReg appreciates that respondents may wish to provide confidential information if their comments are to be meaningful. To promote openness and transparency, ComReg will publish all respondents' submissions to this notice, as well as all substantive correspondence on matters relating to this document, subject to the provisions of ComReg's guidelines on the treatment of confidential information (Document 05/24).[297]

7.7 In this regard, respondents should submit views in accordance with the instructions set out below. When submitting a response to this notification that contains confidential information, respondents must choose one of the following options:

Option A

7.8 Preferably, submit both a non-confidential version and a confidential version of the response. The confidential version must have all confidential information clearly

[296] Consultation Procedures Review – Response to Consultation | Commission for Communications Regulation (comreg.ie)

[297] ComReg Document 05/24, "Guidelines on the treatment of confidential information", published 22 March 2005, available at www.comreg.ie

marked and highlighted in accordance with the instruction set out below and include the reasons as to why they consider any material to be confidential. The separate non-confidential version must have redacted all items that were marked and highlighted in the confidential version.

OR

Option B

7.9 Submit only a confidential version including the reasons as to why they consider any material to be confidential and ComReg will perform the required redaction to create a non-confidential version for publication. With this option, respondents must ensure that confidential information has been marked and highlighted in accordance with the instructions set out below. Where confidential information has not been marked as per our instructions below, then ComReg will not create the non-confidential redacted version and the respondent will have to provide the redacted non-confidential version in accordance with option A above.

7.10 For ComReg to perform the redactions under Option B above, respondents must mark and highlight all confidential information in their submission as follows:

a) Confidential information contained within a paragraph must be highlighted with a chosen colour,

b) Square brackets must be included around the confidential text (one at the start and one at the end of the relevant highlighted confidential information),

c) A Scissors symbol (Symbol code: Wingdings 2:38) must be included after the first square bracket.

For example, “Redtelecom has a market share of [✂ 25% ✂].”

7.2 Next Steps

7.11 Following receipt and consideration of submissions in response to this, and other relevant material, ComReg intends to finalise its plan for managing the use of radio spectrum in Ireland for the period 2025 – 2028 and publish same alongside a response to this consultation document together with all non-confidential responses received.

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

A 1.1 The Communications Regulation Act 2002 (as amended) (the "2002 Act"), the European Electronic Communications Code (which has repealed the EU Common Regulatory Framework, namely the Framework and Authorisation Directives)[298] , as transposed by S.I. No. 444 of 2022, the European Union (Electronic Communications Code) Regulations 2022 (the "ECC Regulations") and the Communications Regulation and Digital Hub Development Agency (Amendment) Act 2023 (the "2023 Act"), and the Wireless Telegraphy Acts 1926 to 2009[299] set out, amongst other things, ComReg's functions and objectives that are relevant to the management of the radio frequency spectrum in Ireland and to this preliminary consultation.

A 1.1 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, and Regulation 4 of S.I. No. 444 of 2022.

A 1.2 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 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.

The 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

[298] Directive 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.
[299] The Wireless Telegraphy Acts 1926 to 1988 and Sections 181 (1) to (7) and (9) and Section 182 of the Broadcasting Act 2009.

Communications Code ("EECC") entered into force.

A 1.5 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.[300]

A 1.6 With some limited exceptions (see Article 124 of the EECC), Member States had until 21 December 2020 to transpose the EECC into national law.[301] The statutory instrument transposing key provisions of the EECC has been published as S.I. No. 444 of 2022[302] and has been commenced by the Minister.[303] Other provisions of the EECC have been transposed in the Communications Regulation and Digital Hub Agency (Amendment) Act 2023, which has also been commenced.[304]

A 1.7 All references in this annex to enactments are to the enactment as amended at the date hereof unless the context otherwise requires.

Primary Functions and Objectives and Regulatory Principles under the 2002 Act and EEC as transposed.

A 1.8 ComReg's relevant functions pursuant to Section 10 of the Communications Regulation Act 2002, as amended, include the management of the radio frequency spectrum and the national numbering resource. ComReg's primary objectives in carrying out its statutory functions in the context of electronic communications are to:

- 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;
- Promote competition[305];
- Contribute to the development of the internal market[306;] and
- Promote the interests of users within the Community.[307]

[300] 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)
[301] With the exception of Articles 53(2), (3) and (4), and Article 54 (See Article 124).
[302] S.I. No. 444 of 2022, The European Union (Electronic Communications Code) Regulations 2022.
[303] By virtue of S.I. No. 300 of 2023, the European Union (Electronic Communications Code) (Amendment) Regulations 2023.
[304] By virtue of S.I. No. 299 of 2023, the Communications Regulation and Digital Hub Development Agency (Amendment) Act 2023 (Commencement) (No.2) Order 2023.
[305] Section 12 (1)(a)(i) of the 2002 Act.
[306] Section 12 (1)(a)(ii) of the 2002 Act.
[307] Section 12(1)(a)(iii) of the 2002 Act.

A 1.9 ComReg, in carrying out its regulatory tasks specified in S.I. No. 444 of 2022, shall take all reasonable measures which are necessary and proportionate for achieving the objectives set out in Regulation 4(3), including the objective to promote connectivity and access to, and take-up of, very high-capacity networks, including fixed, mobile and wireless networks, by all consumers and businesses in the State[308].

Management of radio spectrum

A 1.10 Regulation 27 of S.I. No. 444 of 2022 governs the management of radio spectrum. Regulation 27(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, Regulation 4 of S.I. No. 444 of 2022, and Article 4 of the Directive, ensure:

a) the effective management of radio frequencies for ECN and ECS;

b) that the allocation of, the issuing of general authorisations in respect of, and the granting of individual rights of use for radio spectrum for ECN and ECS are based on objective, transparent, pro-competitive, non-discriminatory and proportionate criteria; and

c) ensure that harmonisation of the use of radio frequency spectrum by ECN and ECS 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 competition, economies of scale and interoperability of networks and 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 EU (namely the Radio Spectrum Decision).

A 1.11 Regulation 27(3) provides that, without prejudice to Regulation 27(4), ComReg must ensure that all types of technology used for the provisions of ECN or ECS may be used in the radio spectrum declared available for ECSs in the Radio Frequency Plan published under Section 35 of the 2002 Act in accordance with EU law.

A 1.12 Regulation 27(4) provides that, notwithstanding Regulation 17(3), 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 ECS where this is necessary to:

[308] Regulation 4(3)(a) of S.I. No. 444 of 2022.

a) avoid harmful interference;

b) protect public health against electromagnetic fields;

c) ensure technical quality of service;

d) safeguard the efficient use of spectrum; or

e) 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 27(7).

A 1.13 Regulation 27(5) provides that without prejudice to Regulation 27(7), ComReg must ensure that all types of ECS may be provided in the radio spectrum, declared available for ECS in the Radio Frequency Plan published under Section 35 of the Act of 2002 in accordance with EU law.

A 1.14 Regulation 27(6) provides that, notwithstanding Regulation 17(4), ComReg may provide for proportionate and non-discriminatory restrictions to the types of ECS to be provided, including where necessary, to fulfil a requirement under the International Telecommunication Union Radio Regulations ("ITU-RR").

A 1.15 Regulation 27(7) requires that measures that require an ECS to be provided in a specific band available for ECS shall be justified in order to ensure the fulfilment of a general interest objective as laid down by or on behalf of the Government or a Minister of the Government in accordance with EU law including, but not limited to:

a) safety of life;

b) the promotion of social, regional or territorial cohesion;

c) the avoidance of inefficient use of radio frequencies; or

d) the promotion of cultural and linguistic diversity and media pluralism, for example, by the provision of radio and television broadcasting services.

A 1.16 Regulation 27(8) provides that ComReg may only prohibit the provision of any other ECS 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 laid down by or on behalf of the Government or a Minister of the Government in accordance with European law.

A 1.17 Regulation 27(9) provides that ComReg shall regularly review the necessity of any restrictions imposed under Regulation 27 and shall make the results of such reviews publicly available.

A 1.18 Regulation 27(10) requires ComReg to, in the fulfilment of its obligations under Regulation 27, respect relevant international agreements, including the ITU-RR and other agreements adopted in the framework of the ITU applicable to radio spectrum, any public policy considerations brought to its attention by the Minister.

Authorisation of use of radio spectrum

A 1.19 Regulation 28(1) of S.I. No. 444 of 2022 provides that ComReg shall facilitate the use of radio spectrum, including shared use, under a general authorisation under Regulation S.I. No. 444 of 2022 and limit the granting of individual rights of use for radio spectrum where such rights are necessary to maximise efficient use in light of demand and taking into account the criteria set out in Regulation 28(2).

A 1.20 Regulation 28(2) of S.I. No. 444 of 2022 provides that ComReg may decide to grant individual rights of use for radio frequencies by way of a licence taking account of:

a) the specific characteristics of the radio spectrum concerned;

b) the need to protect against harmful interference;

c) the development of reliable conditions for radio spectrum sharing, where appropriate;

d) the need to ensure technical quality of communications or service;

e) objectives of general interest as laid down by or on behalf of the Government or a Minister of the Government in conformity with EU law; and

f) the need to safeguard the efficient use of spectrum.

A 1.21 Regulation 28(3) provides that when considering whether to issue general authorisations or to grant individual rights of use for the harmonised radio spectrum, taking into account technical implementing measures adopted in accordance with Article 4 of the Radio Spectrum Decision, ComReg shall seek to minimise problems of harmful interference, including in cases of shared use of radio spectrum on the basis of a combination of general authorisation and individual rights of use.

A 1.22 Regulation 29(1) of S.I. No. 444 of 2022 provides that ComReg shall attach conditions to individual rights of use for radio spectrum in accordance with Regulation 9(1) in such a way as to ensure optimal and the most effective and efficient use of radio spectrum. Regulation 29(7) provides that Regulation 29 is without prejudice to the Act of 1926.

Publication of procedures

A 1.23 Regulation 30(2)(a) of S.I. No. 444 of 2022 requires that ComReg shall, having regard to the provisions of Regulation 27 of the S.I. No. 444 of 2022, establish open, objective, transparent, non-discriminatory and proportionate procedures for the granting of individual rights of use for radio spectrum and cause any such procedures to be made publicly available.

Duration of rights

A 1.24 Regulation 31(1) of S.I. No. 444 of 2022 provides that rights of use for radio spectrum shall be in force for such period as ComReg considers appropriate in light of the objectives pursued in accordance with Regulation 36(2) and (3), taking due account of the need to ensure competition, as well, as in particular, effective and efficient use of radio spectrum, and to promote innovation and efficient investments, including by allowing for an appropriate period for investment amortisation.

A 1.25 Regulation 31(2) provides that where ComReg decides to grant individual rights of use for radio spectrum for which harmonised conditions have been set by technical implementing measures in accordance with the Radio Spectrum Decision in order to enable its use for wireless broadband electronic communications services for a limited period, it shall ensure regulatory predictability for the holders of the rights over a period of at least 20 years regarding conditions for investment in infrastructure which relies on the use of such radio spectrum, taking account of the requirements referred to in Regulation 31(1).

Conditions attached to rights of use for radio spectrum

A 1.26 Regulation 9(1) of S.I. No. 444 of 2022 provides that, notwithstanding Section 5 of the Wireless Telegraphy Act,1926, but subject to any regulations under Section 6 of that Act, where ComReg specifies conditions to be attached to rights of use for radio spectrum, it may only attach such conditions as are listed in Part D of the Schedule 1. Part D lists the following conditions which may be attached to rights of use:

- Obligation to provide a service or to use a type of technology within the limits of Regulation 27, including, where appropriate, coverage and quality of service requirements.
- Effective and efficient use of radio spectrum in conformity with the Regulations.

- Technical and operational conditions necessary for the avoidance of harmful interference and for the protection of public health against electromagnetic fields, taking utmost account of Recommendation 1999/519/EC where such conditions are different from those included in the general authorisation.
- Maximum duration in conformity with Regulation 31, subject to any changes in the National Frequency Allocation Plan.
- Transfer or leasing of rights at the initiative of the holder of the rights and conditions of such transfer in conformity with these Regulations.
- Fees for rights of use in accordance with Regulation 24.
- Any commitments which the undertaking obtaining the rights of use has made in the framework of an authorisation or authorisation renewal process prior to the authorisation being granted or, where applicable, to the invitation for application of rights of use.
- Obligations to pool or share radio spectrum or allow access to radio spectrum for other uses in specific regions or at national level.
- Obligations under relevant international agreements relating to the use of radio spectrum bands.
- Obligations specific to an experimental use of radio frequencies.

A 1.27 Regulation 9(2) provides that (a) any attachment of conditions under Regulation 1) or (b) non-application under paragraph (1) of conditions to undertakings of a class or type as may be determined by ComReg, to rights of use for radio spectrum shall be non-discriminatory, proportionate and transparent and in accordance with Regulation 27.

A 1.28 Pursuant to Regulation 9(3) of S.I. No. 444 of 2022, an undertaking shall comply with the conditions attaching to rights of use for radio spectrum applicable to it.

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

A 1.29 Regulation 36(1) of S.I. No. 444 of 2022 provides that, without prejudice to Regulation 35, where ComReg concludes that a right to use radio spectrum cannot be subject to a general authorisation and where it considers whether to limit the number of rights of use to be granted for radio spectrum, it shall, inter alia, without prejudice to Sections 13 and 37 of the 2002 Act:

- clearly state the reasons for limiting the rights of use, in particular by giving due weight to the need to maximise benefits for users and to facilitate the development of competition and review the limitation at intervals which it considers reasonable or at the reasonable request of any undertaking affected as appropriate; and
- give all interested parties, including users and consumers, the opportunity to express their views in accordance with Regulation 101.

A 1.30 Regulation 36(2)(a) of S.I. No. 444 of 2022 provides that ComReg may decide , having taken into account the matters referred to in paragraph (1)(a) and (b), that the number of rights of use for radio spectrum referred to in that paragraph ought to be limited and, where the Regulator so decides, it shall clearly establish, and give reasons for, the objectives pursued by means of a competitive or comparative selection procedure under this Regulation, and where possible quantify them, giving due weight to the need to fulfil national and internal market objectives.

A 1.31 Regulation 36(7) provides that where the granting of rights of use for radio spectrum needs to be limited, ComReg shall grant such rights on the basis of selection criteria and a selection procedure which are objective, transparent, non-discriminatory and proportionate. Any such selection criteria shall give due weight to the achievement of the objectives and requirements of section 12 of the Act of 2002 and Regulations 4, 16 and 27.

Fees for spectrum rights of use

A 1.32 Regulation 24(1) of S.I. No. 444 of 2022 permits ComReg, subject to sections 13 and 37 of the Act of 2002, to impose fees for rights of use for radio spectrum, which reflect the need to ensure the optimal use of the radio spectrum.

A 1.33 Pursuant to Regulation 24(2) of S.I. No. 444 of 2022, 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 the general objectives of the Directive and Regulation S.I. No. 444 of 2022. Regulation 23(3) provides that with respect to rights of use for radio spectrum, ComReg shall seek to ensure that applicable fees are set at a level which ensures efficient assignment and use of radio spectrum by: (a) setting reserve prices as minimum fees for rights of use for radio spectrum by having regard to the value of those rights in their possible alternative uses; (b) taking into account costs entailed by conditions attached to those rights; and (c) applying, to the extent possible, payment arrangements linked to the actual availability for use of the radio spectrum.

Amendment of rights and obligations

A 1.34 Regulation 14(1) of S.I. No. 444 of 2022 permits ComReg to amend rights, conditions and procedures concerning rights of use for radio spectrum, provided that any such amendment may only be made in objectively justified cases and in a proportionate manner, taking into consideration, where appropriate, the specific conditions applicable to transferable rights of use for radio spectrum or for numbering resources.

Other Relevant Legislation and Policy Instruments

Wireless Telegraphy Act, 1926 (the "1926 Act")

A 1.35 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.

A 1.36 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 withdrawal) as may be prescribed in regard to it by regulations made by ComReg under Section 6.

A 1.37 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.

A 1.38 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.

A 1.39 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.

A 1.40 Regulation 9(1) of S.I. No. 444 of 2022 provides that, notwithstanding section 5 of the Act of 1926 but subject to any regulations made under section 6 of that Act, where ComReg specifies conditions to be attached to rights of use for radio spectrum, it may only attach such conditions as are listed in Part D of Schedule 1 to S.I. No. 444 of 2022.

A 1.41 Regulation 30(7) of S.I. No. 444 of 2022 provides that for the purpose of Regulation 30, a general authorisation for the use of radio spectrum shall be facilitated by way of an order made by ComReg under section 3(6) of the 1926 Act, declaring that a particular class or description of apparatus for wireless telegraphy is one to which the licence requirements of section 3 of the 1926 Act do not apply.

Broadcasting Act 2009 (the "2009 Act")

A 1.42 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 2002/77EC (Competition Directive)

A 1.43 Article 4 of the Competition Directive[309] 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."

Radio Spectrum Policy Programme

A 1.44 On 15 February 2012, the European Parliament adopted, via a Decision[310], the five- year Radio Spectrum Policy Programme ("RSPP") which establishes a multi-annual radio spectrum policy programme for the strategic planning and harmonisation of the use of spectrum. The objective is to ensure the functioning of the internal market in the Union policy areas involving the use of spectrum, such as electronic communications, research, technological development and space, transport, energy and audiovisual policies.

A 1.45 Among other things, Article 5 of the RSPP, entitled "Competition", provides:

> "*1. Member States shall promote effective competition and shall avoid distortions of competition in the internal market for electronic communications services in accordance with Directives 2002/20/EC and 2002/21/EC*
>
> *They shall also take into account competition issues when granting rights of use of spectrum to users of private electronic communication networks."*

Policy Directions[311]

A 1.46 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,

[309] Commission Directive 2002/77/EC of 16 September 2002 on competition in the markets for electronic communications networks and services.
[310] Decision No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multiannual radio spectrum policy programme
[311] 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

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.

A 1.47 The Policy Directions which are most relevant in this regard include the following:

Policy Direction No.3 on Broadband Electronic Communication Networks

A 1.48 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.

Policy Direction No.4 on Industry Sustainability

A 1.49 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.

Policy Direction No.5 on Regulation only where necessary

A 1.50 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

A 1.51 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

A 1.52 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

A 1.53 ComReg 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)

A 1.54 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; and
- the potential of alternative technology delivery platforms to support competition.

Promotion of Competition

A 1.55 Section 12(2)(a) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at the promotion of competition, including:

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

- ensuring that there is no distortion or restriction of competition in the electronic communications sector; and
- ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality.

A 1.56 Regulation 34(1) of S.I. No. 444 of 2022 provides that ComReg shall promote effective competition and avoid distortions of competition in the internal market when deciding to grant, amend or renew rights of use for radio spectrum for electronic communications networks and services in accordance with these Regulations.

Contributing to the Development of the Internal Market

A 1.57 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:

I. removing remaining obstacles to the provision of ECN, ECS and associated facilities at Community level;

II. encouraging the establishment and development of trans-European networks and the interoperability of transnational services and end-to-end connectivity; and

III. 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.

A 1.58 In so far as consolidating the development of the internal market is concerned, Regulation 17(2) of S.I. No. 444 of 2022 provides that in carrying out its tasks under these Regulations, ComReg shall, taking the utmost account of its objectives under section 12 of the Act of 2002 and Regulation 4, contribute to the development of the internal market by working with national regulatory authorities in other Member States, BEREC and the European Commission in a transparent manner to ensure the consistent application of the Directive.

Promotion of Interests of Users

A 1.59 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 ECS;
- 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.

Technological Neutrality

A 1.60 Further to Regulation 4(5) of S.I. No. 444 of 2022, ComReg, in pursuit of the policy objectives referred to in paragraph (3), shall apply impartial, objective, transparent, non-discriminatory and proportionate regulatory principles by, inter alia —(c) applying European Union law in a technologically neutral fashion, to the extent that this is consistent with the achievement of the objectives set out in paragraph (3).

Regulatory Principles

A 1.61 Further to Regulation 4(5) of S.I. No. 444 of 2022, ComReg, in pursuit of the policy objectives referred to in paragraph (3), shall apply impartial, objective, transparent, non-discriminatory and proportionate regulatory principles by, inter alia: promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods and through cooperation with each other, with BEREC, with the RSPG and with the European Commission:

- ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing ECN and ECS;
- 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 infrastructure, competition, the circumstances of end-users and, in particular, consumers that exist in the various geographic areas within the State, including local infrastructure managed by individuals on a not-for-profit basis, and
- imposing ex-ante regulatory obligations only to the extent necessary to secure effective and sustainable competition in the interest of end-users where there is no effective and sustainable competition and relaxing or lifting such obligations as soon as that condition is fulfilled. BEREC

A 1.62 Under Regulation 4(4) of S.I. No. 444 of 2022, ComReg must:

- having regard to its objectives under section 12 of the 2002 Act and its tasks under these Regulations, actively support the goals of BEREC of promoting greater regulatory coordination and consistency; and
- take the utmost account of guidelines, opinions, recommendations, common positions, best practices and methodologies adopted by BEREC when adopting decisions for the markets in the State.

Other Obligations under the 2002 Act

A 1.63 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;[312]
- have regard to international developments with regard to the radio frequency spectrum;[313] 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.[314]

[312] Section 12(3) of the 2002 Act.
[313] Section 12(5) of the 2002 Act.
[314] Section 12(6) of the 2002 Act.

Annex 2: World Radiocommunication Conferences 2023 and 2027

The 2023 World Radiocommunication Conference (WRC-23)

A 2.1 The following are the main topics and outcomes from WRC-23:

- The identification of spectrum for International Mobile Telecommunications (IMT), for expanding broadband connectivity and developing IMT mobile services, also known as 4G, 5G and, in the future, 6G. New spectrum identified includes the 3 300 – 3 400 megahertz (MHz), 3 600 - 3 800 MHz, 4 800 - 4 990 MHz and 6 425-7 125 MHz frequency bands in various countries and regions;
- For non-geostationary fixed-satellite service Earth Stations in Motion (ESIMs), the conference identified new frequencies to deliver high-speed broadband onboard aircraft, vessels, trains, and vehicles;
- Support for the modernisation of the Global Maritime Distress and Safety System (GMDSS), WRC-23 took regulatory actions including the implementation of e-navigation systems to enhance distress and safety communications at sea;
- The allocation of additional frequencies for passive Earth exploration satellite services to enable advanced ice cloud measurements for better weather forecasting and climate monitoring;
- Allocation of new frequencies to the aviation industry for aeronautical mobile satellite services (117.975-137 MHz). This new service will enhance bi-directional communication via non-GSO satellite systems for pilots and air traffic controllers in every situation, especially over oceanic and remote areas;
- Allocation of the bands 15.41-15.7 GHz and 22-22.2 GHz in Radio Regulations Region 1 and some Region 3 countries to the aeronautical mobile service for non-safety aeronautical applications. This will enable aircraft, helicopters, and drones to carry sophisticated aeronautical digital equipment for purposes such as surveillance, monitoring, mapping, and filming, and have the capacity to transfer large data from these applications using wideband radio links;
- Endorsement of the decision by the International Bureau of Weights and Measures (BIPM) to adopt Coordinated Universal Time (UTC) as the de

facto time standard by 2035, with the possibility to extend the deadline to 2040 in cases where existing equipment cannot be replaced earlier; and

- Recognition of the importance of space weather observation in a new Resolution and a new Article in the Radio Regulations to recognize the operation of space weather sensors as part of the meteorological aid service to observe space weather phenomena including solar flares, solar radiation and geomagnetic storms which can interfere with radiocommunication services including satellites, mobile phone services and navigation systems.
- A new secondary allocation, to the mobile, except aeronautical mobile, service has been agreed for implementation through a country footnote, which applies to the entire frequency band 470-694 MHz. The footnote's country list will encompass most CEPT countries.
- Resolution 235 has been modified to, amongst other items, enable:

  a) a review, after WRC-27, of the spectrum use of the frequency band 470-694 MHz or parts thereof for some countries in Region 1; and,

  b) based upon this review, consideration of:

  i) possible regulatory actions in the frequency band 614-694 MHz at WRC-31; and

  ii) possible regulatory action to protect radio astronomy services in the frequency band 608-614 MHz.

A 2.2 For detailed information on each agenda item, the CEPT position and the outcome of the conference, ComReg points the reader to the CEPT ECC report – https://cept.org/files/130712/WRC-23%20report%20from%20week%204.pdf [315]

The 2027 World Radiocommunication Conference (WRC-27)

A 2.3 ComReg has preliminarily identified[316] the following WRC-27 agenda items as important for Ireland:

- Possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes;

[315] WRC-23 report from week 4 (cept.org)

[316] ComReg's view will evolve as CEPT studies commence, the technical details are finalised and the implications for Ireland (if any) become clearer. Ireland will also need to take into account the requirements of the European Space Agency and the European Council.

- studies on IMT in 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz;
- regulatory actions to update Appendix 26 of the Radio Regulations in support of aeronautical mobile (OR) HF modernisation;
- To develop power flux-density (pfd) and equivalent isotropically radiated power (e.i.r.p.) limits for inclusion in Article 21 of the Radio Regulations for fixed-satellite, mobile-satellite and broadcasting satellite services to protect the fixed and mobile services in 71-76 GHz and 81-86 GHz;
- Possible allocations and regulatory actions on mobile-satellite service (MSS) in 1427-1432 MHz (space-to-Earth), 1645.5-1646.5 MHz (space-to-Earth) and (Earth-to-space), 1880-1920 MHz (space-to-Earth) and (Earth-to-space) and 2010-2025 MHz (space-to-Earth) and (Earth-to-space) required for the future development of low-data-rate non-geostationary mobile-satellite systems;
- possible new allocations to the mobile-satellite service for direct connectivity between space stations and IMT user equipment to complement terrestrial IMT network coverage;
- studies of technical and regulatory provisions necessary to protect radio astronomy (RAS) operating in specific Radio Quiet Zones and, in RAS primary allocated frequency bands globally, from aggregate radiofrequency interference caused by non-GSO systems; and
- regulatory provisions for receive-only space weather sensors and their protection in the Radio Regulations.

Preliminary agenda for WRC-31[317]

A 2.4 Potential new allocations to fixed, mobile, radiolocation, amateur, amateur-satellite, radio astronomy, Earth exploration-satellite (passive and active) and space research (passive) services in 275-325 GHz;

A 2.5 Possible frequency bands for Non-beam and Beam Wireless Power Transmission (WPT) to avoid harmful interference to the radiocommunication services caused by WPT;

A 2.6 Aeronautical and maritime earth stations in motion communicating with non-geostationary space stations in 12.75-13.25 GHz;

A 2.7 Inter-satellite service allocations in 3700-4200 MHz and 5925-6425 MHz, and

[317] Square brackets [ ] indicate that some frequency ranges may need further refinements at WRC-27.

associated regulatory provisions, to enable links between non-geostationary orbit satellites and geostationary orbit satellites;

A 2.8 Possible primary allocation in [694-960 MHz in Region 1], 890-942 MHz in Region 2, [3400-3700 MHz in Region 3] to the aeronautical mobile service (AMS) for the use of International Mobile;

A 2.9 Telecommunications (IMT) user equipment in terrestrial IMT networks by non-safety applications;

A 2.10 Identification of the frequency bands [102-109.5 GHz, 151.5-164 GHz, 167-174.8 GHz, 209-226 GHz and 252-275 GHz] for IMT;

A 2.11 Improving the utilisation of VHF maritime radiocommunication;

A 2.12 Improving the utilisation and channelisation of maritime radiocommunication in the MF and HF bands, including potential revisions of Article 52 and Appendix 17;

A 2.13 Possible allocations to the radionavigation-satellite service (RNSS) (space-to-Earth) in [5 030-5 150 MHz and 5 150-5 250 MHz];

A 2.14 Possible new primary allocation to the Earth exploration-satellite service (Earth-to-space) in 22.55-23.15 GHz;

A 2.15 Upgrade of the secondary allocation to the Earth exploration-satellite service (EESS) (space-to-Earth) in the [37.5-40.5 GHz] band or possible new worldwide primary frequency allocations to the EESS (space-to-Earth) within [40.5-52.4 GHz;

A 2.16 Possible new allocations to the Earth exploration-satellite service (active) in the frequency bands [3 000-3 100 MHz] and [3 300-3 400 MHz] on a secondary basis;

A 2.17 Coexistence between spaceborne synthetic aperture radars (SAR) operating in the Earth exploration-satellite service (active) and radiodetermination service in the frequency band 9 200-10 400 MHz, with possible actions as appropriate;

A 2.18 Possible regulatory actions, including a review of the allocation of the frequency band 614-694 MHz to the mobile service for countries listed in No. 5.15A.

Annex 3: Information on 1.4 GHz, 3.8-4.2 GHz and 26 GHz bands

<table>
<tr><th>Spectrum Band</th><th>Existing Use</th><th>Device Ecosystem (4G or 5G Device) (Source GSA GAMBOD tool – July 2024)</th><th>Status in other European countries</th></tr>
<tr><td>1.4 GHz Band

(90 MHz in band from 1427 MHz to 1517 MHz)</td><td>Point-to-Point links in the 1427-1437 MHz and 1512-1517 MHz range (i.e. 15 MHz)

60 live licences as of July 2024</td><td>Relevant 3GPP band plans are:
b32 (LTE),
n75 (5G) and
n76 (5G)[318]
<table><tr><th>3GPP band</th><th>Devices</th></tr><tr><td>b32</td><td>1,147</td></tr><tr><td>n75 or n76</td><td>113</td></tr><tr><td>n75</td><td>113</td></tr><tr><td>n76</td><td>86</td></tr></table></td><td>Full band made available in 6 countries - Austria (2020), Belgium (2022), Denmark (2021), Finland (2021), Slovenia (2021), Switzerland (2019)

Centre band awarded in 5 countries - Germany (2015), Italy (2015), Netherlands (2020), Romania (2022), and the UK (2015) ,

Not yet made available in 10 countries - Czech Republic; France, Greece, Hungary, Ireland, Poland, Portugal, Slovakia, Spain, Sweden

Source: Cullen international [319]</td></tr>
<tr><td>3.8-4.2 GHz Band</td><td>Satellite earth stations (3 licences</td><td>Relevant 3GPP band plans is:</td><td>Some use now emerging: - Belgium (2023), Denmark (2021), Finland (proposed), France (2022), Poland (2023), the UK (2019), Norway (2024)</td></tr>
</table>

[318] b32 relates to 1452-1492 MHz (i.e. 1.4 GHz Centre Band), n75 relates to 1432 to 1517 MHz (i.e. top 85 MHz of 1.4 GHz Band), n76 relates to 1427 to 1432 MHz (i.e. bottom 5 MHz of 1.4 GHz Band)

[319] https://www.cullen-international.com/client/site/documents/CTSPEU20240005 (Version 28 June 2024)

<table>
<tr><th>Spectrum Band</th><th>Existing Use</th><th>Device Ecosystem (4G or 5G Device) (Source GSA GAMBOD tool – July 2024)</th><th>Status in other European countries</th></tr>
<tr><td>(400 MHz)</td><td>as of July 2024 – all in Dublin area).

2 Test Licences & 1 Trial licence issued as of July 2024</td><td>• n77 (5G) [320]

<table><tr><th>3GPP band</th><th>Devices</th></tr><tr><td>n77</td><td>1736</td></tr></table></td><td>Source: Cullen International[321] and Norwegian Regulator[322]</td></tr>
<tr><td>26 GHz Band

(3.25 GHz in the 24.25 – 27.5 GHz frequency range)</td><td>26 GHz National Block Licensing (24.745 – 25.227 GHz paired with 25.753 - 26.285 MHz)

• circa 4300 fixed links as of July 2024)

Fixed Links (25.227-25.445 GHz paired</td><td>Relevant 3GPP band plans are:
• n258 (EU)(5G)
• n257 (USA)(5G) [323]

<table><tr><th>3GPP band</th><th>Devices</th></tr><tr><td>n258 or n257</td><td>89</td></tr><tr><td>n258</td><td>63</td></tr><tr><td>n257</td><td>59</td></tr></table></td><td>Seven (7) countries have awarded nationwide licence for 26 GHz band for 5G: Austria (2024), Denmark (2021), Finland (2020), Greece (2021), Italy (2018), Slovenia (2021), Spain (2022).

Six (6) countries have established or plan to establish local area licences: Austria (24.3-24.9 GHz), Denmark (24.25-24.65 GHz), Finland (24.25 – 25.1 GHz), Germany (24.25 – 27.5 GHz), Spain, Sweden (24.25 – 25.1 GHz)

UK plans to award citywide licences and local licences.

12 countries have yet to assign spectrum in 26 GHz band for 5G: - Belgium, Czech Republic, France, Hungary, Ireland,</td></tr>
</table>

[320] n77 relates to 3300 to 4200 MHz
[321] https://www.cullen-international.com/client/site/documents/CTSPEU20240026
[322] See https://nkom.no/aktuelt/nkom-has-opened-3-8-4-2-ghz-for-local-area-5g-networks
[323] n257 relates to 26.50 – 29.50 GHz; n257 relates to 24.25 – 27.50 GHz.

Spectrum Band	Existing Use	Device Ecosystem (4G or 5G Device) (Source GSA GAMBOD tool – July 2024)	Status in other European countries
	with 26.285 – 26.453 GHz) • 43 licences as of July 2024		Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia and Switzerland , Source: Cullen international[324]

[324] https://www.cullen-international.com/client/site/documents/CTSPEU20240003%20 (28 June 2024)

Annex 4: Analysys Mason Disclaimer

A 4.1 The following disclaimer applies to Figure 22.

Analysys Mason Disclaimer

Date: 22/03/2024

Analysys Mason Ltd. disclaimer to use for ComReg

Figures, projections and market analysis from Analysys Mason which are contained in this document are based on publicly available information only and are produced and published by the Research Division of Analysys Mason Limited independently of any client-specific work within Analysys Mason Limited. The opinions expressed in the Analysys Mason material cited herein are those of the relevant Analysys Mason report authors only. Analysys Mason Limited maintains that all reasonable care and skill have been used in the compilation of the publications and figures provided by Analysys Mason's Research Division and cited in this document. However, Analysys Mason Limited shall not be under any liability for loss or damage (including consequential loss) whatsoever or howsoever arising as a result of the use of Analysys Mason publications, figures, projections or market analysis in this document, by **ComReg** its servants, agents, or any recipient of this document or any other third party. The Analysys Mason figures and projections cited in this report are provided for information purposes only and are not a complete analysis of every material fact respecting any company, industry, security or investment. Analysys Mason figures and projections in this document are not to be relied upon in substitution for the exercise of independent judgment. Analysys Mason may have issued, and may in the future issue, other communications that are inconsistent with, and reach different conclusions from, the Analysys Mason material cited in this document. Those communications reflect the different assumptions, views and analytical methods of the analysts who prepared them and Analysys Mason is under no obligation to ensure that such other communications are brought to the attention of any recipient of this document. The Analysys Mason material presented in this document may not be reproduced, distributed or published by any recipient for any purpose without the written permission of Analysys Mason Ltd.'

Annex 5: List of recent ECC Decisions

A 5.1 The following is a list of the ECC Decisions implemented in the last strategy period.

Table 3 ECC Decisions implemented during the 2022 - 2024 period

Document Number	Document Title
ECC Decision (23)01	on the use of the band 40.5-42.5 GHz by earth stations in the fixed-satellite service (space-to-Earth) and broadcasting-satellite service and on the use of the band 42.5-43.5 GHz by earth stations in the fixed-satellite service (Earth-to-space)
ECC Decision (22)03	on technical characteristics, exemption from individual licensing and free circulation and use of specific radiodetermination applications in the frequency range 116-260 GHz amended 8 March 2024
ECC Decision (22)02	on regulation to operate Autonomous Maritime Radio Devices (AMRD) in CEPT
ECC Decision (22)01	on free circulation and use of Mobile/Fixed Communication Networks (MFCN) terminals operating under the control of terrestrial networks
ECC Decision (21)02	on the harmonised frequency band 76-77 GHz, technical characteristics, exemption from individual licensing and free circulation and use of High-Definition Ground Based Synthetic Aperture Radar (HD-GBSAR) updated 1 July 2022
ECC Decision (21)01	ECC/DEC/(21)01 of 5 November 2021 on the use of the bands 47.2-50.2 GHz and 50.4-52.4 GHz by the fixed-satellite service (Earth-to-space) updated 4 March 2022

A 5.2 During the period of the current strategy statement, ComReg plans to consider a number of existing ECC decisions for implementation, as listed in the following table.

Table 4 ECC Decisions & Recommendations to be considered for implementation during 2025 – 2027 strategy period

Document Number	Document Title
ECC Decision (22)07	on harmonised technical conditions for the usage of aerial UE for communications based on LTE and 5G NR in the bands 703-733 MHz, 832-862 MHz, 880-915 MHz, 1710-1785 MHz, 1920-1980 MHz, 2500-2570 MHz and 2570-2620 MHz harmonised for MFCN
ECC Decision (16)02	ECC/DEC/(16)02 of 17 June 2016 on harmonised technical conditions and frequency bands for the implementation of Broadband Public Protection and Disaster Relief (BB-PPDR) systems amended on 8 March 2019
ECC Decision (13)03	ECC/DEC/(13)03 of 8 November 2013 on the harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) latest amended on 2 March 2018