An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Review of the Satellite Earth Station Licensing Regime

Response to Consultation, Draft Decision with Draft Regulations, and Further Consultation

Response to Consultation

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Chapter 1

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, radio communications and broadcasting networks, postal and premium rate sectors in Ireland and in accordance with European ("EU") and Irish law. ComReg also manages Ireland's radio frequency spectrum ("radio spectrum" or "spectrum") and the national numbering resource.

1.2 Under the Communications Regulation Act 2002, as amended, ComReg has a range of functions and objectives in relation to the provision of electronic communications networks ("ECN"), electronic communications services ("ECS") and post which includes ensuring the efficient and effective use of the national radio spectrum resource. Readers are referred to Annex 2 for an overview of the legal framework and statutory objectives relevant to ComReg's management of the radio spectrum.

1.3 In its Radio Spectrum Management Strategy Statement ("RSMSS") for 2022 to 2024 (ComReg Document 21/136), ComReg committed to consult on, amongst other things, the authorisation of Satellite Earth Stations ("SES") below 3 GHz during the strategy period 2022 -2024. ComReg is of the view that a review of the SES licensing regime is timely due to the recent developments within satellite industry such as new use cases and related technology advancements (e.g. Low Earth Orbit ("LEO") constellations for the provision of broadband, satellite-based Internet of Things ("IoT") systems, imaging and monitoring of the earth and the atmosphere to understand the effects of climate change, etc.). While there has been limited demand for SES in Ireland to date, it seems likely that could change and perhaps with pace, due to industry advancements such as those outlined above. Therefore, it seems appropriate that ComReg should now ensure that the SES licensing regime is fit for purpose and future-proofed to meet any potential use case demand.

1.4 On 17 December 2021, ComReg issued a preliminary consultation on the review of the SES licensing regime (ComReg Document 21/135). The preliminary consultation examined, in particular:

- the current ComReg SES licensing regime;
- potential use cases for SESs; and
- emerging issues for satellite services.

1.5 ComReg also published a report (ComReg Document 21/135a) prepared by ComReg's economic and technical experts, DotEcon Limited ("DotEcon") and Axon Consulting ("Axon"), on the current situation regarding SESs in Ireland and how this may develop in the future. Document 21/135a was informed by, amongst other things:

- Interviews, as conducted by DotEcon/Axon and ComReg, with several stakeholders (the "Stakeholder Interviews");
- Analysing fixed SES licensing regimes in other European countries, which included benchmarking the licence types, licence/technical conditions, fees, and frequency bands, etc. of those regimes with the current SES licensing regime in Ireland

1.6 On the 4th of July 2022 ComReg published a response to consultation and further consultation[1] ("ComReg 22/56"). This document and accompanying Consultant's Report[2] ("ComReg 22/56a") also set out proposals and preliminary views regarding:

- the frequency bands that will be allocated for SES
- the technical conditions associated with SES licensing
- the fees associated with SES licensing

1.2 Respondents to Consultation 22/56 and 22/56A

1.7 Six interested parties responded to documents 22/56 and 22/56a:

- Amazon.com Services LLC ("Amazon") ;
- Amazon Web Services ("AWS");
- EUTELSAT Communications SA ("Eutelsat");
- Inmarsat Global Limited ("Inmarsat");
- OneWeb Communications SARL ("OneWeb");
- Starlink Internet Services Ltd. ("SpaceX")

1.8 ComReg would like to thank all for their submissions and has published the non-

[1] ComReg Document 22/56 – Review of the Satellite Earth Station Licensing Regime: Response to Consultation and Further Consultation – published 4 July 2022. https://www.comreg.ie/media/2022/07/ComReg-Document-22-56.pdf

[2] ComReg Document 22/56a – DotEcon Report: Review of the Satellite Earth Station Licensing Regime – published 4 July 2022. https://www.comreg.ie/media/2022/07/ComReg-2256a.pdf

confidential versions of the submissions in ComReg Document 23/32s.Having carefully considered all submissions, the points made therein and other relevant information, this document, among other things, sets out ComReg's assessment of, and views in relation to, the matters raised by respondents.

1.3 Structure of this Document

1.9 This Document is structured as follows:

- **Chapter 2:** sets out the responses received to Document 22/56 and Document 22/56A. This includes ComReg's assessment of the responses.
- **Chapter 3:** sets out ComReg's view in relation to the Regulatory Impact Assessment.
- **Chapter 4:** sets out ComReg's draft Decision.
- **Chapter 5:** sets out information on submitting comments in response to this consultation and draft Decision and outlines the next steps.
- **Annex 1:** Non- Geostationary SES Coordination Process.
- **Annex 2:** Relevant Legal Framework and Statutory Objectives Decision Instrument.
- **Annex 3:** Draft Licensing Regulations.
- **Annex 4:** sets out information on ComReg's approach for fees under Option 4

Chapter 2

2 Response to submissions received to Documents 22/56 and 22/56A

2.1 Introduction

2.1.1 This chapter sets out ComReg's consideration of respondents' views. The responses received are considered under the following headings:

- Licence types;
- Frequency bands;
- Sharing and compatibility;
- Technical conditions; and
- Fees

2.2 Licence Types

2.1 In Document 22/56 ComReg proposed to split the four SES licence types into two categories: Fixed Earth Stations ("FES") and Transportable Earth Stations ("TES") and to remove the Teleport licence category from the SES framework.

2.2.2 Views of respondents

2.2 Amazon, Eutelsat, Inmarsat, OneWeb, and SpaceX all support ComReg's proposal to remove the Teleport Earth Station licence.

2.3 OneWeb submits that ComReg's proposal for a single SES licence for the operation of multiple antennas/earth stations (within a given radius at a single site) is more aligned, in its view, with the opportunity cost of spectrum, for which a co-located array of antennas, using the same frequency, does not deny more spectrum from other users than a single antenna would.

2.4 Eutelsat submits that in some cases receive-only SES of the Fixed Satellite Service (FSS) might require SES licences to be protected in the long term, even if the risk of harmful interference is not expected in the short term. Eutelsat believes that this is especially relevant as the satellite industry requires long-term visibility for planning purposes.

2.5 Amazon and SpaceX both seek a revision of the definition of "Low Earth Orbit" as "falling between 700-1500 kilometres" (paragraph 3.6 of Document 22/56). For reference, Amazon states that it will operate satellites in LEO with an altitude range of 590km to 630 km while the SpaceX current Starlink non-geostationary constellation operates below 650km.

2.2.3 Views of DotEcon

2.6 In its report DotEcon notes the support of respondents for the removal of the Teleport licence types and permitting multiple antennas at the same site. In the absence of any submissions with regard its proposal that a 500m radius would be an appropriate size of an SES site which is in line with other countries. DotEcon continues to be of the opinion that a 500m radius around a central point is a reasonable size for defining an SES site. In practice a FES licence will grant the holder the right to use specific frequencies within 500m of a specific point, whereby antennas can be deployed anywhere within that radius.

2.7 On the matter of receive only SES, DotEcon agrees with Eutelsat that receive-only operation should be possible, but also notes that some receive-only use cases can operate effectively without interference protection. Therefore, DotEcon maintains its recommendation that protected receive-only FES licences are available, at ComReg's discretion, to operators who can provide evidence of their need for interference protection. This should not preclude access to interference protection when required for valid reasons.

2.8 DotEcon agrees with Amazon and SpaceX that the definition of LEO in Document 22/56 excludes some systems, such as those operated currently by Amazon and SpaceX, and notes that it had used the definition of an orbital period of 128 minutes or less (meaning altitude of up to ~2,000 km). Notwithstanding, and while these comments provide factual context, DotEcon maintains that they do not affect any of its recommendations or ComReg's proposals.

2.2.4 ComReg's Assessment

2.9 ComReg's notes that respondents generally welcome the proposal to remove the Teleport Earth Station licence and replace it with a single licence that permits multiple transmit antennas within a defined radius.

2.10 ComReg notes that respondents did not provide a view on DotEcon's proposal that in the case of multiple SES antennas on a single licence that a radius of 500m should apply.

2.11 ComReg notes and agrees with DotEcon that its proposal for a 500 metre radius aligns with that of other countries and should also be sufficiently modest that multiple

antennas do not impose additional costs on ComReg when assessing applications.

2.12 Regarding Eutelsat's comment on the potential need for future interference protection for receive only SES, ComReg observes that receive only SES generally operate on a secondary, licence exempt basis. However, as stated in Document 22/56, the nature of some services[3] is such that operators may request that the receive only SES is protected from harmful interference. ComReg's existing satellite licensing regime makes provision for the protection of receive only SES, and these are considered on a case-by-case basis.

2.13 ComReg notes and agrees with DotEcon's recommendation that protected, receive-only operation should only be available to operators who provide evidence that a receive only SES requires protection for a specific service such as Earth exploration-satellite services, meteorological-satellite services, or space research services. Notwithstanding the issuing of receive only SES licences is entirely at ComReg's discretion as set out in Document 22/56.

2.14 Regarding the submission from Amazon and SpaceX on ComReg's definition of "Low Earth Orbit" as falling between 700 - 1500 kilometres, ComReg observes that there is no ITU definition for Low Earth Orbit that would provide guidance. ComReg further observes that the European Space Agency defines a LEO[4] as *"normally at an altitude of less than 1000 km but could be as low as 160 km above Earth*" and that NASA defines a LEO as "Earth-centred orbits with an altitude of 2,000 km or less".[5]

2.15 Putting that aside, this consultation concerns the licensing of SESs and not satellite space stations, the definitions of LEO and MEO provided by ComReg in Document 22/56 were merely intended as an aid but will not inform the basis of any licensing framework arising from this consultation. Consequently, there is no requirement to revise the definition of Low Earth Orbit.

2.3 Frequency Bands

2.16 ComReg Document 22/56, set out ComReg's proposals and preliminary views regarding the frequency bands proposed to be allocated for SESs. In summary ComReg proposed:

- that the following sub 3 GHz frequency bands be opened to SES licencing:

  (i) 401 – 403 MHz;

[3] Such services include Earth exploration-satellite services, meteorological-satellite services, and space research services for receiving data only, for example such as meteorological data for weather forecasting purposes.

[4] https://www.esa.int/ESA_Multimedia/Images/2020/03/Low_Earth_orbit

[5] https://www.nasa.gov/leo-economy/faqs

(ii) 2025 – 2100 MHz; and

(iii) 2200 – 2290 MHz.

- to continue to make the 3.8 GHz – 4.2 GHz band available for SES licensing.
- to open the 27.5 GHz – 30 GHz band for SES licensing in accordance with the ITU and ECC Recommendations and Decisions.
- to open the 47.2 GHz – 50.2 GHz and 50.4 GHz – 52.4 GHz bands for SES licensing in line with ECC Decision (21)01 in order to meet the expected demand for SES in these bands.
- to monitor the discussions within the ITU and will consider the opening of the E-band for SES licensing following the publication of any relevant ECC Decision, and/or ECC or ITU Recommendation or Report on sharing and compatibility of services in the band.

2.3.2 Views of respondents

Frequency Bands Below 3 GHz

2.17 AWS and Inmarsat support the opening of the 401 – 403 MHz band.

2.18 AWS, Eutelsat, and Inmarsat support opening the S-band for SES licensing to align with the ITU allocation, specifically the opening of Earth-to-space communications in 2025 - 2110 MHz and space-to-earth communications in 2200 to 2300 MHz.

Other Frequency Bands

3.8 GHz – 4.2 GHz band

2.19 Eutelsat welcomes the clarification that ComReg will continue to make the 3.8 – 4.2 GHz (“C-band”) available for SESs. Eutelsat observes that the European Commission[6] has outlined that any harmonised technical conditions identified by CEPT should ensure the protection and the possibility of future evolution and development of incumbent spectrum users in the C-band.

Ka Band

2.20 Amazon sought clarity on the availability of the 17.7 - 20.2 GHz band for receive SES licensing for FSS. This band is currently allocated on a co-primary basis for the fixed-

[6] In its mandate to CEPT on technical conditions regarding the shared use of the 3.8 - 4.2 GHz frequency band for terrestrial wireless broadband systems https://ec.europa.eu/newsroom/dae/redirection/document/82230

satellite service (FSS) and fixed service.

2.21 Eutelsat supports ComReg's proposal to open the 27.5 - 30 GHz band for SES licensing in accordance with the ITU and ECC Recommendations and Decisions. SpaceX also strongly supports the proposal to open the 27.5 - 30 GHz band for SES licences. For its part, OneWeb welcomes the decision stating that this will align the license framework with both ITU and ECC decisions.

Q/V Band

2.22 Eutelsat contends that ComReg should make the entirety of the 37.5 - 42.5 GHz (space-to-Earth) and 42.5 - 43.5 GHz (Earth-to-space) bands available for satellite services and SES licensing. Eutelsat supports the proposal by ComReg to open the 47.2 - 50.2 and 50.4 - 52.4 GHz bands for SES licensing by implementing ECC Decision (21)01.

2.23 Eutelsat also encourages ComReg to consider the revision of ERC Decision (00)02 that addresses the use of the band 37.5 - 40.5 by downlink fixed satellite services (FSS) and fixed services (FS). The last revision adds the designation of the band 37.5 - 39.5 GHz for the use of coordinated FSS earth stations. Further, Eutelsat seeks to draw attention to ECC Decision (22)06 and associated Recommendations (22)01 and (22)02 currently under consultation. Eutelsat point out that these recommendations set the framework for deployment of MFCN[7] in the band 40.5 - 43.5GHz while keeping the possibility to operate SES.

2.24 OneWeb agrees with ComReg's proposal to open the 47.2 – 50.2 GHz and 50.4 – 52.4 GHz bands for SES licensing is in line with ECC Decision (21)01. However, OneWeb believes it is unclear if ComReg is considering the rest of Q/V band, and especially the ranges between 37.5 - 42.5 GHz which it has plans to use for feeder links in the next generation of gateways. OneWeb submits that that ERC Decision (00)02 harmonises the band 37.5 - 40.5 GHz inter alia for FSS operations in the space-to-Earth direction; that ECC Decision (02)04 identifies that the band 40.5 - 42.5 GHz may be used by coordinated FSS earth stations in the space-to-Earth direction, and that uncoordinated SES in the fixed satellite and broadcasting satellite services shall not claim protection from fixed and broadcasting stations. OneWeb request that ComReg consider opening 37.5 - 42.5 GHz for SES licensing.

E Band and bands above 100 GHz

2.25 SpaceX requests that ComReg permits operations in the 70/80 GHz band. It contends that in the case of the 70/80 GHz band, where spectrum remains abundant despite years of terrestrial deployments, the risk of spectrum scarcity is even lower, including for SESs, due to the unique physical properties of links in the band.

[7] mobile/fixed communications networks

Commercial licensing of SES in the 70/80 GHz band, in the view of SpaceX should be subject to any future harmonised efforts, and further encourages ComReg to support any such efforts in international fora.

2.26 Eutelsat is supportive of ComReg's monitoring of the discussions at ITU and CEPT level on the potential to open E band for SES licensing. E band is gaining attention from satellite operators and will likely be used in the future generations of satellites.

2.27 SpaceX supports ComReg's proposal to continue monitoring developments in the bands above 100 GHz.

2.3.3 Views of DotEcon

2.28 DotEcon notes the general support of respondents to ComReg's proposals regarding the bands below 3 GHz and remains of the view that ComReg should consider adding the sub-3 GHz ranges outlined in Document 22/56 to the SES framework.

Other Frequency Bands

Ka Band

2.29 DotEcon notes that respondents support the proposal to include the full 27.5-30 GHz frequency range in the SES licensing framework. DotEcon further notes that the corresponding space-to-Earth range of the Ka-band (17.7 – 20.2 GHz) is already open in Ireland, with the frequencies 19.7 – 20.2 GHz listed in the guidelines for SES licences, and the 17.1 – 19.7 GHz range available for licence exempt operation.[8]

Q/V Band

2.30 DotEcon recommends that ComReg proceed with its proposals to open the 47.2 – 50.2 GHz and 50.4 – 52.4 GHz to SES, in line with ECC Decision (21)01, given the broad support of respondents.

2.31 DotEcon observes that since the publication of Document 22/56 the ECC has approved a new Decision and two Recommendations[9] on MFCN operation in the 40.5 – 43.5 GHz range, including conditions to be placed on MFCN operators to ensure coexistence with satellite services. Consequently, DotEcon observes that while the 40.5 – 43.5 GHz range has not yet been formally designated for SES at CEPT level, given the developments in the band and the fact that it is allocated for SES by the ITU, ComReg may consider opening the 37.5 GHz – 43.5 GHz frequencies now if considered appropriate.

2.32 Regarding Eutelsat's proposal that the 42.5 – 43.5 GHz band be opened to SES,

[8] ComReg 20/47R2

[9] ECC Decision (22)06, ECC Recommendation (22)01 and ECC Recommendation (22)02

while it is not aware of any CEPT harmonisation decisions providing for satellite use of the band, DotEcon notes it is allocated for Fixed-Satellite (Earth-to-space) service by the ITU and recommends that ComReg could consider also making the 42.5 – 43.5 GHz band available for SES licensing.

2.3.4 ComReg's Assessment

Frequency Bands Below 3 GHz

2.33 ComReg notes the support of respondents regarding its proposals in respect of the frequency bands below 3 GHz.

2.34 ComReg agrees with Eutelsat's submission that the 2025 – 2110 MHz and 2200 – 2290 MHz frequency bands would be useful for space operation services, including telemetry and telecommand of satellites and could contribute to the development of the satellite industry in Ireland.

2.35 ComReg would like to clarify that one of DotEcon's recommendations as proposed by ComReg in Document 22/56 was to open the 2200 – 2290 MHz range for SES licensing and *not* the 2200 - 2300 MHz as referred to in the AWS submission.

2.36 ComReg notes and agrees with DotEcon's proposals that ComReg open the 401 – 403 MHz, 2025 – 2110 MHz and 2200 – 2290 MHz bands for SES.

Other Frequency Bands

2.37 ComReg welcomes the support of respondents regarding its proposals to continue to make the 3.8 GHz – 4.2 GHz band available for SES licensing.

Ka Band

2.38 ComReg notes the support of respondents to its proposal to open the 27.5 – 30 GHz band for SES licensing in accordance with the ITU and ECC Recommendations and Decisions.

2.39 Regarding Amazons request for clarity in respect of the 17.7 – 20.7 GHz band, ComReg observes that the 17.7 - 20.7 GHz band is allocated to the Fixed Service and the Fixed Satellite Service on a co-primary basis. ComReg further observes that Terminals for Satellite Services (space to Earth) in this band are permitted on a licence exempt basis as detailed in ComReg Document 20/47[10].

2.40 ComReg notes that ERC Decision (00)07[11] establishes the regulatory framework for the coordinated deployment of SESs in the 17.7 – 20.7 GHz band to enable co-

[10] https://www.comreg.ie/publication/permitted-licence-exemptions-for-terminals-for-satellite-services-4
[11] ECO Documentation (cept.org)

frequency sharing with the Fixed Services. This Decision notes that *"the risk of interference between FS and FSS terminals in low populated areas is low. The risk of interference increases in densely populated areas, and the sharing can be more difficult in some hot spot areas, although locally a significant amount of spectrum remains usable for FSS signal reception."* ComReg considers that the expected low number of SES deployments in Ireland will enable the co-existence of the Fixed Service and satellite services in this part of the Ka band and as such ComReg proposes to open the 17.7 – 20.7 GHz band for coordinated SESs.

Q/V Band

2.41 ComReg notes the submissions by Eutelsat and OneWeb in respect of the 37.5 - 42.5 GHz (space-to-Earth) and 42.5 - 43.5 GHz (Earth-to-space) parts of the Q/V band. In particular ComReg observes that;

- ERC Decision (00)02[12] harmonises the 37.5 - 40.5 GHz frequency band for the use of both Fixed Point-to-Point Services and SES operations in the space-to-Earth direction; and
- Considering l) of ERC Decision (00)02 observes *"that the probability of interference to FSS uncoordinated earth stations by FS stations is generally low within 37.5-39.5 GHz and can be further decreased with appropriate mitigation techniques for FS and FSS"*.

2.42 Regarding the 42 GHz band ComReg observes that;

- the 40.5 – 43.5 GHz ("42 GHz") frequency band is allocated for services such as Fixed Service, Satellite Service, Wireless Broadband (including 5G) and Radio Astronomy;
- on 14 April 2020, the European Commission issued a mandate to the European Conference of Postal and Telecommunications Administrations (CEPT) to develop least restrictive harmonised technical conditions suitable for next-generation (5G) terrestrial wireless systems for priority frequency bands above 24 GHz, including the 42 GHz frequency band[13]. These conditions should safeguard the continued operation and potential future development of systems in the relevant incumbent fixed service, radio astronomy service and fixed satellite service within the band;

[12] ECO Documentation (cept.org)

[13] ECC(20)057-A01_Mandate to CEPT on mm-wave bands.pdf

- In response to that mandate, on 18 November 2022 the CEPT issued a report[14] ('CEPT Report 82') specifying the least restrictive harmonised technical conditions in the 42 GHz frequency band, based on the concept of a Block Edge Mask (BEM), for the introduction of next-generation (5G) terrestrial wireless systems in this band, in compliance with the principles of technology and service neutrality; and

- In addition, CEPT has developed technical guidelines[15,16] to support the introduction of terrestrial systems providing WBB ECS in the 42 GHz frequency band, while allowing the continued use of FSS receiving and transmitting SESs in the relevant portions of the 42 GHz frequency band, as well as coexistence with FSS receiving earth stations in the adjacent 39.5-40.5 GHz frequency band.

2.43 The ECC's technical guidelines provide ComReg with the necessary tools to enable it to open the 42 GHz band for the SES licensing framework and any future MCFN deployments.

2.44 ComReg intends to open the 37.5 GHz – 43.5 GHz, 47.2 GHz – 50.2 GHz and 50.4 GHz – 52.4 GHz bands for SES licensing to meet the expected demand for SES in these bands given their likely use by the next generation of High Throughput and Very High Throughput Satellites.

2.4 Sharing and Compatibility

Implementation of the inter-operator coordination framework

2.45 In Document 22/56 ComReg expressed the view that the introduction of an inter-operator coordination process would ensure that it meets its statutory objectives for the efficient management and use of the radio spectrum, and to promote and create conditions for effective competition in the provision of ECN and ECS. To that end, ComReg proposed to introduce a notification process for new NGSO SES licence applications which would provide interested parties an opportunity to consider the technical parameters of the proposed deployment. Where an incumbent licensee considers that a proposed deployment would cause harmful interference to an existing SES, then it would need to submit evidence that coexistence would not be

14 CEPT Report 82: Report from CEPT to the European Commission in response to the Mandate 'to develop least restrictive harmonised technical conditions suitable for next-generation (5G) terrestrial wireless systems for priority frequency bands above 24 GHz', Harmonised least restrictive technical conditions for the 40.5-43.5 GHz frequency band, link: https://docdb.cept.org/document/28574.

15 ECC Recommendation (22)01 'Guidelines to support the introduction of MFCN in 40.5-43.5 GHz while ensuring, in a proportionate way, the use of FSS receiving earth stations in the frequency band 40.5-42.5 GHz and the use of FSS transmitting earth stations in the frequency band 42.5-43.5 GHz and the possibility for future deployment of these earth stations'.

16 ECC Recommendation (22)02 'Guidelines on measures to facilitate compatibility between MFCN operating in 40.5-43.5 GHz and FSS earth stations receiving in 39.5-40.5 GHz and to prevent and/or resolve interference issues'.

feasible as it would cause harmful interference.

Information policy

2.46 ComReg set out in Document 22/56 its view that one of the keys to the effective co-existence of shared services across bands is the provision of technical information regarding existing licences. The provision of licence information would not only assist ComReg in meeting its objectives of promoting competition between undertakings and ensuring the efficient use of spectrum, but it would also be in line with ComReg's 'Open by Default' approach to data, ensuring that data collected as part of its regulatory duties should be considered for publication as Open Data in line with Ireland's Open Data Strategy 2017 – 2022[17] for the benefit of all interested parties.

2.47 To assist in the sharing and compatibility process for new and existing licensees, ComReg set out in Document 22/56 its proposal to publish certain SES and fixed link licence information on its Siteviewer website.

2.4.2 Views of respondents

Implementation of the inter-operator coordination framework

2.48 Respondents were generally in favour of the coordination process proposed by ComReg in Document 22/56. However, SpaceX maintained that the process would involve a duplication of effort in its view, as operators already engage in coordination on a private basis.

2.49 Amazon supports the proposed approach to sharing and compatibility set out in Document 22/56 and welcomed ComReg's intention to make information available, via Siteviewer, relating to existing deployments. Amazon agree that greater transparency regarding what services are deployed in a particular area would assist current and prospective licensees with network planning and interference resolution.

2.50 AWS contends that it was not aware of any instance of harmful interference with terrestrial fixed links or other services in relation to such licensed usage and that its SES operations can co-exist with terrestrial users in similar bands without causing interference.

2.51 OneWeb states that it has generally no concern regarding interference between GSO and NGSO system gateways. It agrees that inter-operator coordination is necessary between NGSO systems to ensure that gateways of different systems do not interfere with each other. It also agrees with ComReg that a "spectrum splitting" proposal is challenging to implement and might not result in the most efficient usage of spectrum. OneWeb contends that ComReg should be mindful that the proposed notification

[17] Goal 5.1 of ComReg's Electronic Communications Strategy Statement for 2021 to 2023.

process for new NGSO SES licence applications should does not undermine the well-established ITU coordination procedure.

2.52 SpaceX submits that ComReg should not adopt the proposed notification process for new NGSO SES licence applications. Rather, SpaceX maintains that the proposed notification and comment process would duplicate and potentially undermine private coordination efforts, fostering inefficiency and inviting gamesmanship without any offsetting interference benefit. In furthering these views, SpaceX declares that it has "*significant experience coordinating with both GSO and NGSO operators to ensure efficient spectrum sharing*" and has coordinated in good faith with operators around the world. SpaceX does agree that publishing licensing information will facilitate better SES siting and coordination and it supports ComReg's preliminary view in that regard.

2.53 SpaceX further opines that ComReg should develop automated tools to speed up the licensing process. It proffers that such tools could include functionality to check prospective SESs against incumbent sites for interference based on accepted methodologies and rapidly grant licenses where harmful interference was not going to occur.

Information policy

2.54 AWS submits that the public disclosure of SES coordinates correlated to licensee name would make it easier for non-industry actors to potentially inflict harm on networks. AWS requests that ComReg consider providing licensees with an option to opt out of the publication of certain licence information, such as SES coordinates, which may be considered confidential by a licensee. AWS suggests that an alternative method be employed to address any interference concerns, such as limiting access to radio licence information to industry operators such as license holders and licence applicants.

2.4.3 Views of DotEcon

Implementation of the inter-operator coordination framework

2.55 DotEcon notes that the proposed notification process and framework for sharing and compatibility of NGSO SES are intended to be part of ComReg's licence application process, and so to support a system that largely relies upon good faith negotiations between operators. DotEcon also notes that any coordination process is bound to be imperfect and that, in rare cases, harmful interference may arise.

2.56 DotEcon further notes that the proposed process is intended to be consistent with the ITU approach – it does not in any way prevent operators from forming coordination agreements with one another in accordance with the ITU's coordination procedures and without any restrictions or intervention from ComReg. DotEcon

observes that if there are provisions for SESs in coordination agreements that have come out of the ITU process, these could be used as evidence in the ComReg notification process, such that the two procedures support each other rather than conflict.

2.57 DotEcon sees no reason why the process would undermine effective coordination between operators and believes that notifying incumbent operators of new applications is appropriate as it ensures incumbent SES operators can raise any concerns, accompanied by supporting evidence, before a licence is granted and progress is made with deployment of the new site.

2.58 DotEcon notes that the ability to make a complaint about interference to deny or delay access to spectrum from a new SES is a feature present under any regime where incumbents are given priority in terms of interference protection. DotEcon further notes that ComReg's proposals simply formalise the process for dealing with such claims and establishes a rule for where the burden of proof lies depending on how far apart the existing and new SESs are.

2.59 DotEcon notes a framework such as the one proposed limits incumbent operators' ability to claim protection beyond what they truly need, and there is little scope for operators to "leverage inefficiency". DotEcon anticipates that operators would use spectrum-sharing technologies going forward without ComReg needing to create further incentives to do so, in particular if spectrum/sites are becoming more heavily used.

2.60 In summary, DotEcon believes that it is appropriate for ComReg to apply a general condition to SES operators that requires them to coordinate in good faith , both during the notification process for new SESs and once the SES are operational.

Information policy

2.61 DotEcon maintains its recommendation that ComReg provides information on other satellite operations as well as terrestrial services, in order to facilitate coordination between operators and avoid harmful interference. While DotEcon observes it may be appropriate to restrict this information to those registered in cases where there are security concerns, it also notes that allowing operators to fully opt out of providing certain details risks could serve to undermine the intention to release more information.

2.62 DotEcon observes that allowing licensees to opt out from providing information about their licences being shared would undermine the intention to use a light-touch licensing regime relying on coordination amongst licensees and potential licensees. DotEcon notes that it cannot see how such a general opt-out regime could be compatible with an approach based on coordination amongst licensees and avoid risks of creating entry barriers. DotEcon observes that a reasonable approach might

be:

- for licence data, to the extent possible, to be in the public domain as a default;
- for such data to be partially redacted if the licensee could demonstrate to ComReg's satisfaction that there were sufficient security concerns from publishing complete information to outweigh the benefits of that information being made public to support coordination (including use of that information amongst both existing licensees and potential new licensees); and
- for the redacted information be available to both existing and potential licensees on request to ComReg and subject to non-disclosure obligations, but with consent not typically being withheld unless ComReg had good reason.

2.4.4 ComReg's Assessment

2.63 ComReg notes that respondents agree that the prevention and mitigation of harmful interference between SES is best managed by open cooperation and coordination between service providers.

Implementation of the inter-operator coordination framework

2.64 ComReg notes and agrees with One Web's contention that the proposed notification process for new NGSO SES licence applications should not undermine the well-established ITU coordination procedure.

2.65 ComReg does not agree with SpaceX's submission that ComReg's proposed notification process would duplicate and potentially undermine private coordination efforts. ComReg notes that the purpose of the notification process for new NGSO SES licence applications, as set out in Annex 1 below, is to ensure that new SESs can coexist with current and future systems. The notification process will provide interested parties with an opportunity to consider if any potential harmful interference may result from a proposed SES.

2.66 ComReg believes that SpaceX's contention that the notification process would encourage inefficiency and invite gamesmanship without any offsetting interference benefit is unfounded. ComReg notes that any submissions to the notification process must set out the reasoning and provide supporting information, which it would carefully assess before forming any final views.

2.67 Rather, ComReg contends that the best way for applicants to demonstrate coexistence with existing SES would be to have an agreement with the relevant

existing licence holder(s) which could be submitted as part of the applicant's application. However, it may not always be possible for an applicant to determine if other parties may be considering applying for a SES licence, therefore, the notification process provides all interested parties with an opportunity to submit comments in an open and transparent manner.

2.68 Regarding SpaceX's view that ComReg should develop automated tools to speed up the licensing process, ComReg observes that it has automated several licence application processes in recent years, including fixed links and PMR for the benefit of both ComReg and applicants. ComReg further observes that the development and upgrading of its licensing systems including automation is an ongoing process within the organisation. ComReg intends, where feasible, to continue its programme of automation of licence application processes and expects that this will include some aspects of the revised SES licensing framework as proposed in this document.

Information policy

2.69 ComReg welcomes the support of Amazon to its proposal to make greater information in relation to existing deployments available via Siteviewer and agrees that greater transparency about what services are deployed in particular areas will offer assistance to current and prospective licensees for network planning and interference resolution.

2.70 ComReg notes that AWS has not provided any evidence to support its submission that there is an increased likelihood that the public disclosure of certain radio licence information would make it easier for non-industry actors to potentially inflict harm to networks.

2.71 ComReg observes that since 2013[18,19] it has published the locations of mobile network base stations and it is not aware of any instance of harm by non-industry actors arising from the publication of this information.

2.72 ComReg further observes that several European National Regulatory Authorities ("NRAs") currently make radio licence information publicly available to varying degrees. For Example:

- Switzerland's Bundesamt für Kommunikation publishes information regarding mobile network stations, broadcasting stations and fixed links;[20]

[18] ComReg SiteViewer
[19] https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/mobile-licences/
[20] Maps of Switzerland - Swiss Confederation - map.geo.admin.ch

- The Consumer Protection and Technical Regulatory Authority of Estonia publishes licence information except for security services, governmental services and protection of personal information;[21] and
- Ofcom's System Information System provides, amongst other things, information on a range of radio licences including who has been assigned spectrum at specific locations.[22]

2.73 ComReg intends to publish a consultation in due course on a proposal to publish radio licence information in a transparent and accessible manner which would, amongst other things, assist facilitate coordination between operators and avoid harmful interference. ComReg considers that this would be in-line with Government's strategic objective of making data held by public bodies discoverable by citizens, businesses, and the Public Service.

2.5 Technical Conditions

2.74 In Document 22/56 ComReg set out the technical aspects considered by DotEcon as follows:

(a) Radiocommunications Equipment Directive
(b) Reference standards
(c) Operation mode
(d) Maximum transmit power
(e) Site clearance
(f) Airport exclusion and notification zones
(g) Other technical parameters

2.5.2 Views of respondents

Radiocommunications Equipment Directive and Reference standards

2.75 Amazon supports ComReg's approach to align the Irish licensing regime with international standards and the relevant European Directives/Decisions.

2.76 Inmarsat supports ComReg's proposal.

2.77 SpaceX agrees that ComReg should incorporate the relevant ITU, CEPT, and ETSI

[21] https://mtr.ttja.ee/
[22] Spectrum information portal - Ofcom

standards where appropriate to provide clarity to operators about sharing conditions.

Maximum transmit power

SpaceX requests that ComReg align its maximum transmit power regime with international best practices, including relevant ECC Decisions, Reports, and/or ITU Recommendations. However, SpaceX contend that limiting main beam EIRP to below 60 dBW, particularly in the Ka-band and in higher frequency bands, would have a detrimental impact on the ability of satellite operators to provide quality services to end users and would conflict with relevant ITU Radio Regulations. SpaceX seeks clarification that any such limits would not apply to gateway Earth stations that are fixed at a specified point.

Site clearance

2.78 Amazon is seeking a process to ensure that SES site locations and licenced spectrum are actually used by licensees for SES deployments.

2.79 SpaceX agrees that site clearance mechanisms are unnecessary to prevent harmful interference between operators and therefore should be removed from the Guidelines. Similarly, SpaceX cautions ComReg against establishing overly conservative protection criteria for airfields, particularly when those conservative criteria depart from the harmonized ECC Report 272[23].

Clarifications

2.80 Amazon requests further clarification as to:

- the polarisation aspect in the parameters; and
- the parameters associated to downlink operations in the Ka-band range.

2.5.3 Views of DotEcon

Maximum transmit power

2.81 DotEcon observes that ComReg does not impose transmit power limits for SES, except those deployed near airports. However, DotEcon also notes that SES are subject to any power limits set out in relevant ECC and ITU documents.

2.82 Regarding the SpaceX submission on power limits, DotEcon notes that in its previous report it had suggested that if ComReg wished to set power limits for each frequency band then it could do so on the basis of the relevant ETSI standards. DotEcon observes that for bands above 12 GHz, the EIRP limits in these ETSI standards give a range that is bounded below by 60 dBW. DotEcon did not however propose that

[23] ECO Documentation (cept.org)

ComReg needed to set specific limits if its current approach worked. DotEcon proposed in Document 22/56A that the application of the power limits set in the relevant ECC Decisions and Reports, and ITU recommendations, was a suitable approach to be adopted by ComReg and continues to recommend this.

Site clearance

2.83 DotEcon observes that site clearance conditions do not appear to be necessary to avoid harmful interference. DotEcon notes that respondents did not object to the proposal to remove this requirement and continue to recommend that ComReg removes the site clearance conditions from its SES licensing framework.

2.84 Regarding the submission from Amazon that ComReg should ensure licences are used for SES operation DotEcon notes that if Amazon is suggesting that SES licences would be used for something other than operating an SES, then it cannot see that this is any great concern. As it is already the case that SES licences only grant the holder the right to operate an SES, there is no need to change the licence conditions to address this point. On the other hand, if Amazon is concerned that licences would be taken out by operators who had no intention of deploying anything in the near future, then this is already taken account of in the proposed coordination process (i.e. these operators would not be able to block other potential licensees).

Clarifications

2.85 Regarding the various clarifications sought by Amazon, DotEcon notes that there are no explicit restrictions on the polarisation that SES can use, nor any suggestion or reason that some should be introduced. DotEcon observes that ComReg intends to publish antenna polarisation as part of its information policy to support coordination between operators, but this is a reporting requirement rather than a technical restriction.

2.86 DotEcon is also unclear precisely what Amazon is referring to regarding Ka band downlink parameters. If it is referring to the 17.7-20.2 GHz band for licence exempt terminals, then these parameters are provided in ComReg's document on licence exemptions and the international harmonisation decisions referenced therein (e.g. ECC/DEC/(00)07), whereas the parameters for licensed downlink operation for an SES are those in ComReg's SES guidelines.

2.5.4 ComReg's Assessment

Radiocommunications Equipment Directive and Reference standards

2.87 ComReg's welcomes the support of respondents to align the Irish licensing regime with international standards and the relevant European Directives/Decisions.

Maximum transmit power

2.88 It is unclear to ComReg what SpaceX is referring to when it states that *"limiting main beam EIRP to below 60 dBW, particularly in the Ka-band and in higher frequency bands, would have a detrimental impact on the ability of satellite operators to provide quality service to end users and would conflict with relevant ITU Radio Regulations."* ComReg observes that it does not currently limit the maximum EIRP permissible for SES operation across the various spectrum bands, nor has it made any proposals to do so as part of this consultation. ComReg takes, and intends to continue to take, account of power limits as specified by the ECC and ITU in their relevant documents when processing applications for SES licences to ensure that licensed SES are aligned with any harmonised power limits.

2.89 ComReg observes that DotEcon did not propose that ComReg needed to set specific power limits. Rather, DotEcon proposed in Document 22/56A that the application of the power limits set in the relevant ECC Decisions and Reports, and ITU recommendations, was a suitable approach and continues to recommend this.

Site clearance

2.90 ComReg notes the SpaceX submission in support of ComReg's proposal to remove the requirement for site clearance as part of the application process.

2.91 ComReg notes and agrees with DotEcon that site clearance conditions are unnecessary to avoid harmful interference. The SES site location choice is a matter for licensees and ComReg has no role as to how such sites are identified and used. ComReg agrees with DotEcon's proposal to remove the site clearance requirements from the SES licensing framework.

2.92 Regarding the submission by Amazon that ComReg should ensure licences are used ComReg observes that to date there is no evidence to suggest that SES licences granted by ComReg are not used as intended but would be happy to receive any evidence to the contrary from Amazon.

2.93 Notwithstanding, ComReg further observes that Regulation 17(10) of the Framework Regulations[24] provides that ComReg may, having regard to its objectives under Section 12 of the Communications Regulation Acts 2002 (as amended) (the "2002 Act") and Regulation 16 of the Framework Regulations and its functions under the Specific Regulations[25], lay down rules in order to prevent spectrum hoarding, in

[24] European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011) ("Framework Regulations")

[25] The 'Specific Regulations' comprise collectively the Framework Regulations, the Authorisation Regulations, the European Communities (Electronic Communications Networks and Services) (Access) Regulations 2011 (S.I. No. 334 of 2011), the European Communities (Electronic Communications Networks

particular by setting out strict deadlines for the effective exploitation of the rights of use by the holder of rights and by withdrawing the rights of use in cases of non-compliance with the deadline.

2.94 While no such rules have been currently laid down by ComReg in the proposed Satellite Earth Station Licence Regulations in Annex 3, ComReg reserves the right to specify such rules in the future and such rules may apply to rights of use for radio frequencies associated with SES Licences.

Clarifications

2.95 It is not clear to ComReg what Amazon is referring to in its request for clarification on the "polarisation aspect in the parameters". ComReg observes that it did not set out any detailed technical parameters in Document 22/56 rather, ComReg confirmed that it would continue to adopt the relevant ITU, ECC and ETSI standards for the licensing of SES. ComReg notes and agrees with DotEcon that there are no explicit restrictions on the polarisation that SES can use, nor any suggestion or reason that some should be introduced.

2.96 ComReg agrees with DotEcon that it is unclear precisely what clarity Amazon requests regarding the parameters associated to downlink operations in the Ka-band range. ComReg observes that, as noted by DotEcon, the parameters for licensed downlink operation for an SES are those in ComReg's SES guidelines. However, if the query relates to licence exempt terminals, then these parameters are provided in ComReg's satellite licence exemptions Document 20/47.[26]

2.5.5 Plum Report

2.97 Having carefully considered the submissions to Document 22/56, ComReg formed the view that it would be prudent to further specify and clarify the technical requirements for licensing SESs used in the Fixed Satellite Service. ComReg commissioned Plum Consulting Ltd. ("Plum") to provide advice on:

(a) Relevant frequencies identified by the ITU for SES use;

(b) Technical requirements for SES in bands above 3 GHz;

(c) Technical requirements for the 401 – 403 MHz, 2025 – 2110 MHz and 2200 – 2290 MHz frequency bands;

(d) Coordination of SES with aircraft; and

and Services) (Universal Service and Users' Rights) Regulations 2011 (S.I. 337 of 2011) and the European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations 2011 (S.I. No. 336 of 2011).

[26] ComReg-2047R4.pdf

(e) Coordination with fixed point to point links and other SESs

2.98 Plum notes in its Report,[27] that, in the case of SES, technical requirements are intended to enable coexistence with other co-frequency and adjacent band radio systems. Plum also notes conditions can be general, covering many satellite bands, or specific, i.e. defined for a given satellite band and they are typically specified in the relevant ITU Radio Regulations:

(a) Article 5 which provides a list of frequency bands allocated to satellite services together with footnotes associated with specific frequency bands describing technical and operational conditions. This includes the relevant satellite services that may utilise the band(s), associated coordination requirements and technical requirements for SESs (e.g. power limits, minimum antenna diameter, eirp density limits, power flux density limits produced by SESs at a given distance/height).

(b) Article 21 which addresses terrestrial and space services sharing frequency bands above 1 GHz and describes power limits for SESs (in the form of eirp as a function of the angle of elevation of the horizon or off-axis angle) and minimum angle of elevation. Power flux density limits are also specified for space stations as a function of arrival above the horizontal plane on the surface of the Earth.

(c) Article 22 which addresses space services and defines equivalent power flux density limits to protect GSO SES and satellite receivers from the aggregate emissions of NGSO systems, together with reference antenna patterns. Eirp limits (as a function of off-axis angle) are also defined for SESs operating in GSO (geostationary orbit) FSS (fixed satellite services) networks in Ku- and Ka-band frequencies.

2.99 Plum further notes that:

(a) In the case of SES transmit operation (i.e. Earth to space) the following apply:

(i) There is no restriction on eirp levels for Earth station elevation angles greater than 5 degrees (No. 21.9).

(ii) For Earth stations with elevation angles less than 5 degrees and frequencies listed in No. 21.12, Table 21-3, and shared with fixed or mobile services the eirp limits for the two frequency ranges 1 to 15 GHz and above 15 GHz are provided in No. 21.8.

[27] ComReg Document 23/32b

(iii) The eirp limits provided in No. 21.8 may be exceeded by not more than 10 dB subject to agreement (No. 21.11).

(iv) In the case of 13.75 – 14 GHz No. 21.13A provides the off-axis eirp for GSO FSS Earth station antennas smaller than 4.5 metre diameter.

(v) Earth station antennas shall not be employed for transmission at elevation angles of less than 3° except when agreed to by administrations concerned and those whose services may be affected. (No. 21.14)

(vi) Table 22-2 provides the epfd uplink limits in the geostationary-satellite orbit by emissions from all the Earth stations in a non-geostationary-satellite system in the fixed-satellite service in the listed frequency bands (No. 22.5D).

(vii) There are eirp limits provided for off-axis of the main lobe for GSO Earth stations in the bands 12.75 – 13.25, 13.75 – 14 and 14 – 14.5 GHz in Nos. 22.26 – 22.29, 22.31 and 22.37.

(viii) There are eirp limits provided for off-axis of the main lobe for GSO Earth stations in 29.5 – 30 GHz in Nos. 22.32, 22.35, 22.36, 22.38 and 22.39.

(b) In the case of SES receive operation (i.e. space to Earth) the following apply:

(i) In the case of receive Earth stations (s – E) No. 21.14 says, “In case of reception by an Earth station, the above value [3°] shall be used for coordination purposes if the operating angle of elevation is less than that value.”

(ii) The power flux-density at the Earth’s surface produced by emissions from a space station, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limit given in Table 21-4 that apply to the FSS. This applies to bands shared with fixed or mobile service (No. 21.16).

(iii) Tables 22-1A to 22-1E provide the epfd↓ limits at any point on the Earth’s surface radiated by non GSO satellite systems in the FSS (No. 22.5C) in the listed frequency bands.

2.100 Plum also recommends that applicants for a SES licence should be required to demonstrate that co-existence is possible with existing licensed Earth Stations and other licensed services, predominantly fixed terrestrial links. Specifically, applicants should identify the stations falling within the coordination contours, based on principles provided in Appendix 7 employing ITU-R space network software, and inform ComReg of any potential issues associated with the detailed coordination

process.

2.5.6 ComReg's Assessment

2.101 Plum's report identifies technical conditions which exist within the ITU Radio Regulations[28] (ITU RR") and are agreed internationally. Plum has not proposed any new or amended technical conditions, therefore ComReg is minded to make it a licence condition that SES licensees must comply with the relevant ITU RR articles as identified within the Plum report, ensuring harmonised operations internationally.

2.102 ComReg notes that regarding aircraft coordination, Plum has identified that the ECC Report 272 has set out appropriate maximum eirp levels from Earth Stations in the vicinity of aircraft in the 4-6, 12-18 and 18 – 40 GHz bands to ensure compliance with aircraft HIRF (High Intensity Radiated Field) protection criteria. ComReg had previously identified ECC Report 272 in Document 22/56 as being relevant in coordinating SES to ensure the aeronautical safety of aircraft. Therefore, ComReg intends to require SES licensees to comply with e.i.r.p. levels specified in Table 12 in ECC Report 272.

2.103 Regarding coordination with fixed point to point links and other SESs, ComReg notes that Plum has reviewed and summarised the coordination process as set out by the ITU. Plum recommends that ComReg should require licence applicants for new SES to undertake the steps outlined in Chapter 6 and Appendix A of its report. Having reviewed the coordination process, ComReg is minded to adopt the process as part of its SES licence application procedures to ensure that SES deployments can be coordinated to prevent harmful interference to other SES and fixed radio links.

2.6 Licence Duration

2.104 In Document 22/56, ComReg set out its preliminary view that a 12-month licence period, with the option to renew annually, is appropriate for the following reasons:

- it is consistent with the licence duration of other licence types issued by ComReg such as fixed radio links, business radio, etc. which are not awarded via a competitive process; and
- that licensees have the option to renew a licence upon payment of an annual fee, which requires licensees to consider each year if their spectrum assignment is still required or if they need to make any changes to their licence; and

[28] The ITU Radio Regulations is an international treaty governing the global use of radio-frequency spectrum and satellite orbits.

- it is consistent with the licence duration for SES by other European NRAs.

2.6.2 Views of respondents

2.105 AWS agrees that a 12-month, renewable licence term is a reasonable and effective term as a default condition. AWS proposes that provision be made for short term licences, pro-rated to a minimum of one month, or any monthly duration of up to 12 months, be made available.

2.106 Inmarsat supports ComReg's proposal.

2.107 In contrast both Amazon and SpaceX opine that ComReg extend the SES licence duration beyond the proposed 12 months to provide regulatory certainty and to reduce ComReg's administrative burden., Amazon submits that ComReg issue a ten-year SES licence to facilitate "*regulatory certainty*". Absent a ten-year term, Amazon believes it would be helpful to confirm that:

- a one-year license, once granted, has an indefinite term subject to payment of the annual fee; and
- that no additional paperwork is required for renewal

2.108 In its submission SpaceX contends that ComReg extend the current 12-month licensing period to at least five years. A five-year licence would, in its view, achieve the goals that ComReg set out in paragraph 3.82 of Document 22/56, particularly the ability to "allow licensees sufficient time to make a return on their investments, in line with the expected life-cycles of any technologies deployed.

2.6.3 Views of DotEcon

2.109 In its report DotEcon notes the benefits of licence duration in providing regulatory certainty to licensees. DotEcon further notes that operators have reasonable expectations of being able to renew their licences each year, as proposed by ComReg. Consequently, 12 month licence terms should not create any significant uncertainty over access to the spectrum over the duration of operators' investment cycles.

2.110 DotEcon disagrees with both Amazon and SpaceX that multiyear licences would reduce the administrative burden on ComReg noting that it is well used to managing annually renewable licences, which are far simpler to process than new licence applications.

2.111 In respect of Amazon's contention that in the interests of certainty that licence renewals should be indefinite, DotEcon observes that granting indefinite access to stakeholders would unduly restrict ComReg in its ability to carry out its spectrum

management duties and consequently would not recommend such an approach.

2.112 Regarding temporary SES licences DotEcon concurs with the views of AWS that they should be made available. DotEcon proposes that ComReg should ensure temporary licences are compatible with the revised licensing process and notification period. In most respects, temporary licences for Fixed SES would be non-renewable and not be required to go through the notification process, on the basis that these might be required at relatively short notice e.g. for one-off temporary projects. However, ComReg should reserve the right to require any coordination with existing operators if it has any concerns about potential interference.

2.6.4 ComReg's Assessment

2.113 ComReg notes respondents' submissions regarding licence duration and the need for regulatory certainty.

2.114 Regarding the AWS request that provision be made for shorter term licences of less than 12 months, ComReg observes that the temporary licence type is specifically for SES licences for a period of up to 11 months and the fees associated with same are charged on a pro rata monthly basis as set out in Annex 4 of this document. ComReg considers that this licence type is generally more suited to transportable SESs that are used for very short periods such as to cover sporting events, however, operators will also be able to apply for a temporary licence for fixed earth stations. ComReg will consider the need for the coordination of temporary FES licences on a case-by-case basis.

2.115 ComReg agrees with DotEcon's view that operators have a reasonable expectation that their licence will be renewed each year, ComReg's proposal for a 12-month licence duration should not create significant uncertainty and thereby provide investment certainty. The annual licence renewal process itself will remain unchanged with no additional administrative burden on the licensee.

2.116 ComReg notes and agrees with DotEcon that indefinite renewals as proposed by Amazon would unduly restrict ComReg's ability to carry out its spectrum management functions.

2.117 ComReg agrees with DotEcon's recommendation regarding licence duration and remains of the view that a 12-month licence duration is appropriate for the reasons set out in 22/56 and repeated above.

2.7 Fees

2.118 In Document 22/56, ComReg's preferred option in the Draft RIA was to use bandwidth as a factor for setting administrative fees for SES (Option 4). Under this Option, a licensee's fee for SES would depend on the bandwidth associated with its

licence. ComReg preferred this option because it met all likely use cases and weighted the burden of administrative costs on those users most likely to benefit from the deployment of those costs.

2.7.2 Views of respondents

2.119 Amazon contends that the SES licensing fee structure be cost based and driven by the principle of covering ComReg's administrative cost base to issue the licence". Amazon supports ComReg's preferred approach (Option 4) noting that it simplifies the proposed fee calculation. Amazon also requests that ComReg clarify that for transmit/receive licences, it will only charge for transmit bandwidth and not for receive bandwidth.

2.120 AWS supports ComReg's efforts to ensure that spectrum fees are objectively justified, transparent, non-discriminatory and proportionate. AWS submits that it understands the appeal of ComReg's proposed approach (Option 4) and suggests eliminating spectrum fees for SES licensees repeatedly accessing the same spectrum bandwidth common for TT&C[29] systems. AWS seeks clarification that ComReg's approach in such instances is to charge a single fee for both stations using the same spectrum, Further, AWS submits that the current formula "be applied such a manner as to charge all spectrum used as a unified total in the hands of a single same licensee, irrespective of the number of individual carriers, or applications made in respect of the relevant transmitter."

2.121 Eutelsat contends that the proposed fees are very expensive for large bandwidths. It submits that large bandwidths are often associated with higher frequency bands which, in its view, makes the frequency band an important factor that should be considered to determine fees It adds that the linear bandwidth fee proposal could be dissuasive for the growing number of SES using large bandwidths and could lead to higher fees than under the current framework. It suggests reducing or capping the fees for higher frequencies and/or for wider bandwidths.

2.122 Inmarsat supports ComReg's proposal.

2.123 OneWeb welcomes that the proposed fee structure is lower than the current fee structure. However, it states that it is planning to use approximately 2 GHz of uplink and 1.3 GHz of downlink in the Ka-band for its current generation of its gateways, and approximately 6 GHz of spectrum in the Q-V band for its next generation of gateway within the next 5 years. In such circumstances, OneWeb maintains that the proposed fee structure, under which it estimates that it would need to pay over

[29] The telemetry, tracking, and control ("TT&C") subsystem of a satellite provides a connection between the satellite itself and the facilities on the ground. The purpose of the TT&C function is to ensure the satellite performs correctly.

€250,000 per annum in its planned circumstances is prohibitive and unsustainable.

2.124 OneWeb contends that a flat unit price might not reflect higher frequency bands which will have more bandwidth available and limited spectrum denial impact than lower frequency bands. Rather, it suggests that a "more adequate mechanism should be using a weighting factor depending on the frequency", similar to what was implemented in a recent Australia ACMA pricing review.

2.125 SpaceX also disagrees with the proposal to use bandwidth as the primary driver for calculating licence fees and instead expressed a strong preference for a flat fee structure. It contends that the proposed bandwidth-focused methodology will discourage efficient spectrum usage and disincentivize operators from maximizing the potential of higher-frequency bands as they will prohibitively expensive. SpaceX maintains that the proposed fee structure "*undermines both the core value of the administrative cost recovery model—low, predictable fees tailored to cover the costs of processing the licences—and ComReg's statutory obligations in accordance with Section 12 of the 2022 Act*".

2.126 SpaceX adds that the proposed fee framework would make wide channels uneconomical, and operators would be faced with the prospect of limiting their technological capabilities to manage costs or declining to deploy SESs in Ireland. SpaceX opines that even if ComReg decided to change the per-MHz factor to facilitate larger bandwidths in the higher frequency bands, it could not do so without creating a distribution between frequency bands similar to Option 2.

2.127 SpaceX is further of the view that Option 4 would negatively impact consumers by taxing efficient use of high bandwidths in high frequency bands. It submits that when faced with high licensing fees, operators are often forced to pass this cost on to the consumer or divert scarce resources away from improving services quality and customer service. SpaceX considers that this negative externality will disproportionately affect lower-income users in remote areas that have the greatest need for satellite broadband.

2.128 SpaceX does however agree on the importance of an effective information policy to encourage spectrum efficiency and appreciates ComReg's proposal to include information for Fixed Links and SESs on SiteViewer. SpaceX also contends that there is no efficiency role for fees in terms of ensuring licences are assigned to the highest value users and that fees need not be higher than necessary to recover administrative costs. SpaceX also contends that there is no basis for charging different fees depending on the frequency band.

2.129 SpaceX favours Option 5 as, in its view, this *"*provides a flat, predictable fee structure that better enables better enables operators to focus available resources on innovation, competition, and consumer service; is scalable to accommodate future

use of high-frequency bands; and creates strong incentives for administrative efficiency."

2.7.3 Views of DotEcon

2.130 DotEcon observes that the views of respondents fall into two broad categories:

I. Clarification questions around what is subject to fees; and

II. Views on structuring the administrative cost recovery framework according to bandwidth.

I. Clarification Questions

2.131 In relation to Amazon's submission, DotEcon notes that the relevant measure for calculating fees is bandwidth licensed for protected operation and not necessarily just the transmit frequencies. It adds that there is no obvious reason why receive frequencies should be excluded from the fee calculation if subject to interference protection. However, it notes that operators often use receive frequencies on a non-protected basis alongside a 'transmit-only' licence and that in such cases, operators should only need to pay for the transmit frequencies.

2.132 In relation to the queries raised by AWS, DotEcon recalls that a SES licence would be for use of a specific frequencies at a specific site (defined by a circle with a 500m radius around a specified central geographical point). The licensee would be authorised to use the licensed frequencies with as many antennas as it likes within the boundary of the corresponding site.

2.133 Regarding the AWS question on whether two earth stations operating immediately next to each other using the same frequencies and bandwidth at any given time would be covered by a single fee. DotEcon notes that having two antennas operating within a common SES site using spectrum licensed for that site makes no difference to the fees the operator needs to pay, regardless of whether or not the frequencies used by those antennas overlaps or if the frequencies are used under multiple licences. However, if the two antennas are located such that they do not both fall within the bounds of a single SES site (as defined by AWS' licence(s)) then use of those antennas would be covered by different fees, even if they use the same frequencies

2.134 Additionally, DotEcon clarifies that with the proposed new licence structure, should an operator need to add frequencies to an already licensed site, it would need to do so by making a separate application for only those frequencies. There should never be a need for multiple licences for overlapping frequency ranges.

II. Structuring the administrative cost recovery framework according to bandwidth

2.135 DotEcon maintains its view that it is appropriate to charge a greater proportion of ComReg's administrative costs to high bandwidth users and disagrees with SpaceX's view that ComReg should implement a flat fee applicable to all. DotEcon notes that ComReg's fixed costs should be distributed so as to encourage efficient use of the spectrum by balancing the risks of pricing off different types of SES users. DotEcon maintains that bandwidth is still a reasonable proxy for different value users.

2.136 That said, DotEcon recognises the concerns of respondents that the approach proposed in Document 22/56a could result in high prices for large bandwidths, particularly as respondents outlined that bandwidth requirements are likely to increase in the coming years with the deployment of next generation satellite systems. DotEcon also notes that the implementation of the bandwidth charges as proposed in document 22/56a does leave a risk of over-recovery of administrative costs should large changes in demand for bandwidth materialise.

2.137 Considering this, DotEcon recommends that ComReg employs a concave pricing formula where the price per MHz falls as the amount of bandwidth licensed increases. DotEcon considers that concave pricing would improve incentives (relative to the linear approach) for larger users to locate SES in Ireland, particularly in the higher frequency bands, and notes that respondents were generally of the view that the linear fee approach would result in prohibitively high licence fees for large bandwidths. The pricing formula recommended by DotEcon is as follows:

$$Fee = c + \alpha BW^{\lambda}$$

Where:

- *BW* is the bandwidth in use at the site;
- *c* is the marginal cost to ComReg of issuing a licence;
- *α* is set such that total revenue equates ComReg's administrative costs; and
- λ determines the concavity of the fees.

2.138 DotEcon outlines that determining the concavity of fees (i.e., the rate at which fees reduce for additional bandwidth) is a matter of balancing the objectives and risks. For example, the more concave the fees (i.e., the lower the fee for additional bandwidth), the lower the risk of over recovery of costs following a large increase in bandwidth and the greater the incentives for larger bandwidth users to deploy SES in Ireland. However, making the pricing more concave would have the effect of increasing fees for smaller bandwidth users relative to the linear approach proposed previously and

risk undermining the objective of keeping prices reasonably low for lower value users.

2.139 DotEcon propose setting λ = 0.75 as, in its view, this would reduce the risk of significant over-recovery of costs and would result in moderate fees for large bandwidth users. If λ were to be set at a lower value (for example, λ=0.5), DotEcon considers that the fees for lower bandwidth users would risk pricing them off. As such, DotEcon recommends that:

- $\lambda = 0.75$; which implies
- $\alpha = 150$ is needed to recover administrative costs.

2.140 DotEcon notes that an operator may wish to use multiple frequency ranges at the same site and sees two equivalent approaches as to how this might work practically:

- **Approach 1**: An operator has multiple, coterminous licences at the same site, with separate licences required for non-contiguous frequencies and for frequencies added to a site at different times; or
- **Approach 2**: All frequencies used at a site would be covered by a single licence, with new frequencies added or existing frequencies removed via a licence amendment

2.141 DotEcon notes that both approaches would result in the same fees being charged as they both rely on the same principle of aggregating spectrum at a site for calculating the associated fees (as outlined in the formula above) and that the choice may be affected by the legal framing of licences or implementation requirements.

2.142 However, DotEcon recommends that if ComReg is to apply this approach of aggregating frequencies at a site for the purpose of calculating fees, it is important that if there are multiple licences linked to a site (Approach 1), they are coterminous so that there is clarity about the total bandwidth licenced at that site over the entire duration of a licence.[30]

2.143 DotEcon advise that if all frequencies at a site are included in a single licence (Approach 2), then there is no issue to resolve regarding co-expiry above. However, if spectrum is added to a licence in the course of a year, there would still be a need to apply a fee that covers the remainder of the year up to the expiry of the licence.

2.144 DotEcon notes that ComReg will need to put in place a process for moving from the current licence framework to a new one in light of the above. DotEcon considers that

[30] Whenever a licence is added to an existing site, the expiry date would be set to coincide with other licences at the site, so the licence may initially run for less than a full year before being renewable annually. In this case DotEcon anticipate the operator would pay a pro-rata fee for shorter initial licence term using the described formula

the approach to this will depend on the structure of licences at a site (single licence or multiple coterminous licences) but would need to account for the possibility that some licensees may have multiple licences that linked to the same site under the new regime.

2.7.4 ComReg's Assessment

2.145 ComReg notes that there is consensus among the respondents that the approach to determine fees should be administrative cost based.

2.146 ComReg notes that Inmarsat agreed with ComReg's proposal (Option 4), and that Amazon and AWS are generally supportive of ComReg's approach and ComReg recognises that the clarifications sought have been outlined in the above section and in section 7.1 of the DotEcon Report[31].ComReg considers the views of Eutelsat, OneWeb and SpaceX further below.

2.147 ComReg does not accord with SpaceX's view to implement a flat-fee approach. Rather, ComReg agrees with DotEcon that it is appropriate to distribute ComReg's fixed costs to encourage the efficient use of spectrum by not inefficiently choking off demand from lower value users which would also be to the detriment of consumers. ComReg's detailed assessment of this approach (Option 5) is discussed further in Chapter 3. ComReg notes that Eutelsat and OneWeb expressed similar concerns regarding fees for larger bandwidths under the approach proposed in Document 22/56 and made recommendations which had the same objective of reducing fees associated with large bandwidths. As set out in Chapter 3, ComReg maintains that Option 4 (the retention of bandwidth as a factor for setting administrative fees for SES) is the preferred approach. Further, ComReg notes that it must consider all users in determining a suitable fees approach. It would not be appropriate to only consider higher bandwidth users at the expense of smaller users, noting that lower bandwidth users (such as earth exploration, telemetry, and university research projects) are also efficient users of the radio spectrum

2.148 Considering the views of respondents, ComReg considers it appropriate to further examine how Option 4 could be implemented so as to:

(i) not dissuade larger bandwidth users from deploying SES in Ireland because fees that may become prohibitively high;

(ii) not inefficiently choke off demand from lower value users; and

(iii) mitigate the risk of excessive over recovery of ComReg's administrative costs.

2.149 In relation to (i) ComReg notes that under the approach proposed in Document

[31] See section 7.2 of Document 23/32a

22/56, the largest increases in licence fees would be for very large bandwidth users, with most other users experiencing lower or only modest increases relative to the existing fee schedule.[32] However, ComReg notes that respondents claimed that that the proposed linear-MHz charge could discourage demand for SES using large bandwidths, particularly as some of the next generation gateways will rely on large bandwidths in the higher frequency bands. Considering this, ComReg is of the view that there is merit in redistributing its fixed costs differently than the approach proposed in 22/56 but only to avoid scenarios where additional bandwidths could become prohibitively expensive.

2.150 In relation to (ii), ComReg is mindful that any redistribution of its fixed costs could have the effect of inefficiently pricing out lower value users. ComReg notes that because fees for lower value users under Document 22/56 were very small (due to lower bandwidth requirements) and typically in the hundreds of euros, there is some scope for relatively modest increases. Such modest increases would have a low risk of choking off demand for such uses. The extent to which lower value users are impacted is a function of the concavity of the fees - the more concave the fees, (i.e., the larger the λ), the higher the fees for lower bandwidth users. In that regard, ComReg considers an appropriate level of λ below.

2.151 In relation to (iii), ComReg notes that total bandwidth used in Ireland for SES might increase in the future, driven by a small number of large bandwidth users. As such, ComReg notes that the linear-MHz approach could result in an outcome where ComReg significantly over recovers on its costs because the increased bandwidth pushes the overall fees collected above ComReg's administrative costs. It is difficult to predict when such increases in bandwidth might happen and it is not realistic to include forecasts about bandwidth growth in the pricing model.

2.152 However, it is not possible to completely avoid the risk of cost over/under recovery. Frequent changes to the pricing formula on account of lumpy increases or decreases in total bandwidth would offload risks on to licensees and create investment uncertainty. In that regard, ComReg agrees with DotEcon that should such changes in bandwidth materialise, then this can be considered in the fee formula to mitigate the risk of significant over recovery.

2.153 Considering the above, ComReg agrees that moving from a linear fee structure to a concave fee structure is appropriate (i.e., where the marginal price per MHz falls as the amount of bandwidth licensed increases). This approach would reduce the risk of significant over recovery of costs relative to the linear approach proposed previously.

2.154 However, to determine the appropriate level of concavity, ComReg observes that this

[32] See paragraph 4.89 of Document 22/56

is a case of balancing the risks described above. In that regard, ComReg agrees with DotEcon's assessment that setting $\lambda = 0.75$ would reduce the risk of substantial over recovery while at the same time resulting in moderate prices for large bandwidth users. As illustrated in Table 1below, setting λ below 0.75 could risk pricing off lower value users. For example, moving from $\lambda = 1$ (i.e., linear) to $\lambda = 0.75$ increases the fees for 1 MHz Bandwidth from €130 to €250. However, lowering to $\lambda = 0.50$ increases to €670 significantly increasing the risk of pricing off low value users.

2.155 However, $\lambda = 0.75$ reduces the fee for a 2 GHz user from €60,000 to around €45,000 which is below both the linear fee and the fees set out under the olde fee schedule. For bandwidths of 10 GHz, setting $\lambda = 0.75$ reduces the fees by half compared to the fees proposed in Document 22/56 (i.e., from €300,000 to €150,000). Therefore, ComReg is of the preliminary view that $\lambda = 0.75$ is an appropriate level of concavity because it best achieves the balance of lowering the fees for large bandwidths exposure while limiting the risk of choking off lower value users.

2.156 ComReg agrees with DotEcon that, should an operator wish to have multiple frequency ranges linked to the same site, it would be appropriate to aggregate total frequencies at a site for the purpose of calculating fees using the above formula. ComReg notes that DotEcon considered two equivalent approaches to implementing this and is of the view that all frequencies used at a site could be covered by a single licence, with new frequencies added or existing frequencies removed via a licence amendment (approach 2 above).

2.157 In relation to transitioning from the current framework, ComReg notes the views of DotEcon and observes that, currently, where a licensee holds multiple licences at the same site, all licences held by that operator are due to expire on the same date. However, should a circumstance arise where an operator holds multiple licences at the same site with different expiry dates, ComReg agrees with DotEcon that the expiry dates may need to be aligned transition to the new framework.[33]

2.158 Consequently, ComReg agrees with DotEcon's recommendation to amend the pricing formula as described above and provides more detail in Annex 4.

Bandwidth	Existing Fee Schedule[34]€	Proposed in 22/56, €	Concave, € λ=0.75	Concave, € λ=0.**5**
1 MHz	1,500	130	250	670
10 MHz	1,750	400	944	1,902
50 MHz	2,250	1,600	2,920	4,131
500 MHz	12,750	15,100	15,961	12,846
2 GHz	50,250	60,100	44,960	25,591
10 GHz	250,250	300,100	150,100	57,100

Table 1: Fees associated with different levels of concavity

2.7.5 Future fee reviews

2.159 ComReg will continue to monitor the demand for SES and may adjust the level of fees over time so that total fees are broadly in line with ComReg's administrative costs. However, to avoid conducting repeated reviews, a fees review will only occur when there is a significant over or under recovery of ComReg's administrative costs or where there has been a significant change in market circumstances. This ensures that the new fees introduced in this review would be stable and provide certainty to licensees over relevant investment periods. Any changes would only be made where necessary to encourage the more efficient use 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.

[34] Based on a licensee operating in the 3-10 GHz frequency range and transmitting at 70dBW.

Chapter 3

3 Fees RIA

3.1 Introduction

3.1 In December 2021 ComReg published its consultation and associated DotEcon Report where it considered and identified current and potential future Satellite Earth Station ("SES") use cases and related matters which would assist ComReg in identifying what, if any, changes to the regime may be required to ensure it is fit for purpose and future proofed.

3.2 In July 2022, ComReg published a further consultation and associated DotEcon Report that set out its views in relation to methodologies that can be used to calculate applicable fees for SESs. In its draft RIA (Document 22/56) ComReg considered the impacts of the proposed fees on the relevant stakeholders and determined that its preferred option was to adopt the proposed new fee regime.

3.3 This chapter sets out ComReg's updated Regulatory Impact Assessment ("RIA") on the procedure for setting spectrum fees for the SESs and provides ComReg's preferred option having regard to the impact on stakeholders, competition, and consumers. It concludes with an assessment of the Preferred Option against ComReg's statutory remit, including relevant functions, objectives, duties and principles (as outlined in Annex 2).

3.4 ComReg conducted this RIA having careful regard to the relevant information available to it, including:

- the first DotEcon Report (Document 21/135a);
- the second DotEcon Report (Document 22/56a);
- the third DotEcon Report (Document 23/32a);
- the views of respondents to Document 21/135 and Document 22/56; and
- the stakeholder interviews conducted in 2021.

3.2 RIA Framework

3.5 A RIA is an analysis of the likely effect of proposed new regulation or regulatory change and, indeed, of whether regulation is necessary at all. The RIA should help identify regulatory options and establish whether the proposed regulation is likely to have the desired impact, having considered relevant alternatives and the impacts on

stakeholders. The RIA is a structured approach to the development of policy and analyses the impact of regulatory options. In conducting a RIA, the aim is to ensure that all proposed measures are appropriate, effective, proportionate and justified.

3.6 A RIA should be carried out as early as possible in the assessment of regulatory options, where appropriate and feasible. The consideration of the regulatory impact facilitates the discussion of options, and a RIA should therefore be integrated into the overall analysis. This is the approach which ComReg follows in this Draft Decision and this RIA should be read in conjunction with the overall Consultations.

3.7 In conducting the RIA, ComReg has regard to the RIA Guidelines[35], while recognising that regulation by way of issuing decisions, for example imposing obligations or specifying requirements in addition to promulgating secondary legislation, may be different to regulation exclusively by way of enacting primary or secondary legislation.

3.8 To ensure that a RIA is proportionate and does not become overly burdensome, a common-sense approach is taken towards a RIA. As decisions are likely to vary in terms of their impact, if after initial investigation, a decision appears to have relatively low impact ComReg may carry out a lighter RIA in respect of that decision.

3.2.1 Structure for the RIA

3.9 In assessing the available regulatory options, ComReg's approach to the RIA is based on the following five steps:

- **Step 1**: describe the policy issue and identify the objectives;
- **Step 2**: identify and describe the regulatory options;
- **Step 3**: determine the likely impacts on stakeholders;
- **Step 4**: determine the likely impacts on competition; and
- **Step 5**: assess the likely impacts and choose the best option.

3.10 In the following sections, ComReg identifies the specific policy issues to be addressed and relevant objectives. (i.e., Step 1 of the RIA process). Before moving on to Step 1 of the RIA, ComReg first makes some relevant observations below on the stakeholders involved and on ComReg's approach to Steps 3 and 4.

3.2.2 Identification of stakeholders and approach to Steps 3 and 4

3.11 Step 3 assesses the likely impact of the proposed regulatory measures on

[35] ComReg Document 07/56a, "*Guidelines on ComReg's Approach to Regulatory Impact Assessment*", published 10 August 2007, available at www.comreg.ie

stakeholders. Hence a necessary precursor is to identify such stakeholders. In this RIA, stakeholders fall into two main groups:

(i) Consumers (Impact on consumers is considered separately below);

(ii) Industry stakeholders.

3.12 The industry stakeholders comprise the providers and users of SES for the relevant use cases, which include:

- Broadcasting
- Mobile Communications
- Internet of Things (IoT)
- Earth Exploration and Remote Sensing
- Broadband (GEO and LEO constellations); and
- GPS and navigation

3.13 Step 4 assesses the impact on competition of the various regulatory options available to ComReg. In that regard, ComReg notes that it has various statutory functions, objectives and duties which are relevant to the issue of competition.

3.14 Of themselves, the RIA Guidelines and the Ministerial Policy Direction on Regulatory Impact Assessment[36] provide little guidance on how much weight should be given to the positions and views of each stakeholder group (Step 3), or the impact on competition (Step 4). Accordingly, ComReg has been guided by its primary statutory objectives which it is obliged to seek to achieve when exercising its functions. ComReg's statutory objectives in managing the radio frequency spectrum, as further outlined in Annex 1, include:

- promote competition[37];
- contribute to the development of the internal market[38];
- promote the interests of users within the Community[39];

36 Ministerial Direction dated 21st February 2003
37 Section 12 (1)(a)(i) of the 2002 Act.

38 Section 12 (1)(a)(ii) of the 2002 Act.

39 Section 12(1)(a)(iii) of the 2002 Act.

- 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[40];
- promote efficient investment and innovation in new and enhanced infrastructures[41].

3.15 In addition, ComReg is guided by regulatory principles and obligations provided for under the Common Regulatory Framework. Such principles and obligations are outlined further at Annex 1 and include:

- Regulation 19 of the Authorisation Regulations[42] permits ComReg to impose fees for rights of use, which reflect the need to ensure the optimal use of the radio frequency spectrum. ComReg is required to ensure that any such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose; and
- Regulation 17(3) of the Framework Regulations provides that, notwithstanding Regulation 17(2), ComReg may, through licence conditions or otherwise, provide for proportionate and non-discriminatory restrictions to the types of radio network or wireless access technology used for electronic communications services where this is necessary to:
    - avoid harmful interference,
    - protect public health against electromagnetic fields,
    - ensure technical quality of service,
    - ensure maximisation of radio frequency sharing,
    - safeguard the efficient use of spectrum, or
    - ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in accordance with Regulation 17(6).

3.16 In this document, ComReg has adopted the following structure in relation to Step 3 and Step 4 – the impact on industry stakeholders is considered first, followed by the impact on competition, followed by the impact on consumers. This order does not reflect any assessment of the relative importance of these issues but rather reflects

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

[41] Regulation 16(2)(d) of the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011, S.I. No. 333 of 2011 (the "Framework Regulations").

[42] European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011, S.I. No. 335 of 2011

a logical progression. In particular, a measure which safeguards and promotes competition should, in general, impact positively on consumers. In that regard, the assessment of the impact on consumers draws substantially upon the assessment carried out in respect of the impact on competition.

3.3 Step 1: Identify the policy issues & the objectives

Policy Issues

3.17 The spectrum available for SES services is a finite resource with many different services and users. The management of this resource 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 optimally and efficiently used.

3.18 This may also involve balancing a range of competing factors, including:

- appropriately meeting the requirements of all radio services, including commercial and public uses, such as public safety, national security, and health care; and
- promoting competition including ensuring that users derive maximum benefit in terms of price, choice, and quality, contributing to the development of the internal market, and promoting the interests of users within the Community.

3.19 Effective spectrum management also requires flexibility and responsiveness to adapt to changes in, among other things, technologies, demand from spectrum users and end-users, market developments and public policy. In that regard, ComReg identifies two broad regulatory tools that are relevant in allowing it to effectively manage to radio spectrum being made available for SES:

(i) Information Policy; and

(ii) Spectrum Fees.

Information Policy

3.20 ComReg is of the view that the information policy of the SES Licensing regime applications is likely to be central to the performance of its spectrum management functions. As noted by DotEcon, providing information on existing spectrum users' deployments is essential if SES licence applicants are expected to plan around existing users and if operator coordination is to be key to avoiding harmful interference.[43]

[43] Document 22/56a, section 7.5.

3.21 In some cases, where there is a possibility of harmful interference either between SES operators or with other terrestrial users, this can be best managed if the operators themselves have access to the necessary information to undertake a preliminary assessment regarding the likelihood of harmful interference (and the necessary mitigation/coordination procedures) and would be much more effective than trying to use fees for achieving an efficient outcome. In this way, the information policy of the SES Licensing regime applications is likely to be central to ensuring the efficient assignment and use of the radio spectrum

3.22 ComReg currently provides useful information on deployments to interested parties on mobile base stations on the Siteviewer[44] database and fixed radio links through the eLicensing[45] platform. In Document 21/136, ComReg signalled its intention to also make fixed radio links licence information publicly available on Siteviewer. ComReg noted that providing access to fixed radio link licence information would provide greater transparency regarding what services are deployed in particular areas and would assist operators with their network planning.

3.23 With that in mind, ComReg's information policy should be viewed as complementary to the role of spectrum fees, which is the subject of this RIA.

Spectrum Fees

3.24 Regulation 19 of the Authorisation Regulations permits ComReg to impose fees for rights of use which reflect the need to ensure the optimal use of the radio frequency spectrum. 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 its statutory objectives as set out in Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations.[46]

3.25 In that regard, the effective management of radio spectrum requires more than a purely technical consideration of spectrum efficiency. Functional and economic considerations must also be considered, including the extent to which the utilisation of spectrum meets a user's specific needs and the social and economic value that can be derived from it. This is particularly relevant in the current case where there is a variety of different users, providing different services using different technologies based on existing licence conditions (including spectrum fees).

3.26 Following stakeholder interviews, DotEcon identified several use cases that are supported by the operation of SES. Respondents to the consultation process provide

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

[45] https://elicensing.comreg.ie/

[46] The rights and obligations of ComReg in relation to the imposition of fees for rights of use are reflected in Articles 3 and 42 of Directive (EU) 2018/1972 establishing the European Electronic Communications Code (the "Code"). It is envisaged that the Authorisation Regulations and Framework Regulations will be replaced with new domestic legislation giving effect to the Code over the course of the proposed licencing regime.

some further details in relation to the use cases identified but did not suggest any additional uses. Therefore, ComReg is satisfied that the following are the relevant use cases in its consideration for this RIA. Readers are referred to Section 3 of Document 21/135a (the DotEcon Report) for further information on each of the following use cases:

- Broadcasting;
- Mobile Communications;
- Internet of Things (IoT);
- Earth Exploration and Remote Sensing;
- Broadband; and
- GPS and Navigation.

3.27 ComReg periodically conducts reviews of its licensing frameworks to ensure they remain fit for purpose. For instance, ComReg is also reviewing the Fixed Links licensing framework and will carry out a review of the PMR licensing framework in due course. Regarding satellite services, ComReg observes that the landscape has developed rapidly in recent years, noting the significant rollout of constellations of LEO satellites. The rapid deployment of LEO satellite constellations has enabled satellite broadband providers to provide a higher quality of service covering a wide coverage area.

3.28 While there are various methods of determining the level of a licence fee, some approaches, or even a combination of same, are likely to be more suitable than others. Therefore, the main policy issue to consider in this RIA is, in the context of ComReg's statutory objectives, how best to establish an objectively justified, transparent, non-discriminatory and proportionate fees framework for the SES licensing regime which facilitates the uses cases identified above.

Objectives

3.29 ComReg aims to design and carry out its review of the SES licensing regime in accordance with its broader statutory objectives (as outlined in Annex 1) including the promotion of competition in the electronic communications sector.

3.30 In addition, the focus of this RIA is to assess the impact of the proposed measure(s) (see regulatory options below) on stakeholders, competition, and consumers. ComReg can then identify and implement the most appropriate and effective means by which to set spectrum fees for the SES frequency bands, while achieving its relevant statutory objectives under section 12 of the 2002 Act of promoting

competition by, among other things:

- Encouraging efficient use and ensuring effective management of radio frequencies;
- Promoting regulatory predictability by ensuring a consistent regulatory approach;
- Safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition.

3.31 ComReg notes that, in achieving its objectives, it seeks to choose regulatory measures which maximise the benefits for consumers in terms of price, choice and quality.

3.4 Step 2: Identify and describe the regulatory options

3.32 The current SES licensing framework has been in place since 2007 and has enabled ComReg to effectively licence SES in Ireland that provide for a variety of uses. ComReg will evaluate the existing SES fees regime as an option, given its utility to date, and to fully understand the impact of any change to an alternative option. Therefore, ComReg notes that Option 1 is to maintain the status quo and extend the use of the existing SES fees regime for the foreseeable future.

3.33 Readers are referred to ComReg Document 00/64R3 for full details on the current fees for Fixed Earth Stations and Transportable Earth Stations. However, to aid readers assessment of this RIA, the following summary is provided:

- **First**, if a licensee is operating in the exclusive SES bands, the fee is €100 for each of the first ten licences and €25 per licence beyond this.
- **Second**, if a licensee is operating in one of the non-exclusive bands, then the fee for an SES Licence depends on three factors:
  - (i) Which frequency band? – where a licensee can choose from a range of frequency bands which are exclusive (12.5 – 12.75 GHz and 14.0 – 14.25 GHz) and/or shared (which range from 3 GHz to 30 GHz)[47]
  - (ii) What is the antenna power limit? – where a licensee can choose an EIRP across three different EIRP categories.[48]

[47] The full list of satellite frequency bands is provided in Appendix of Document 00/64R3.
[48] **1.** eirp < 50 dBW **2.** 50 dBW ≤ eirp ≤ 75 dBW **3.** eirp > 75 dBW

(iii) What is the bandwidth required? – where a licensee can choose between five different bandwidth categories[49].

3.34 Option 1 (the existing fees regime) is illustrated in Figure 1 below.

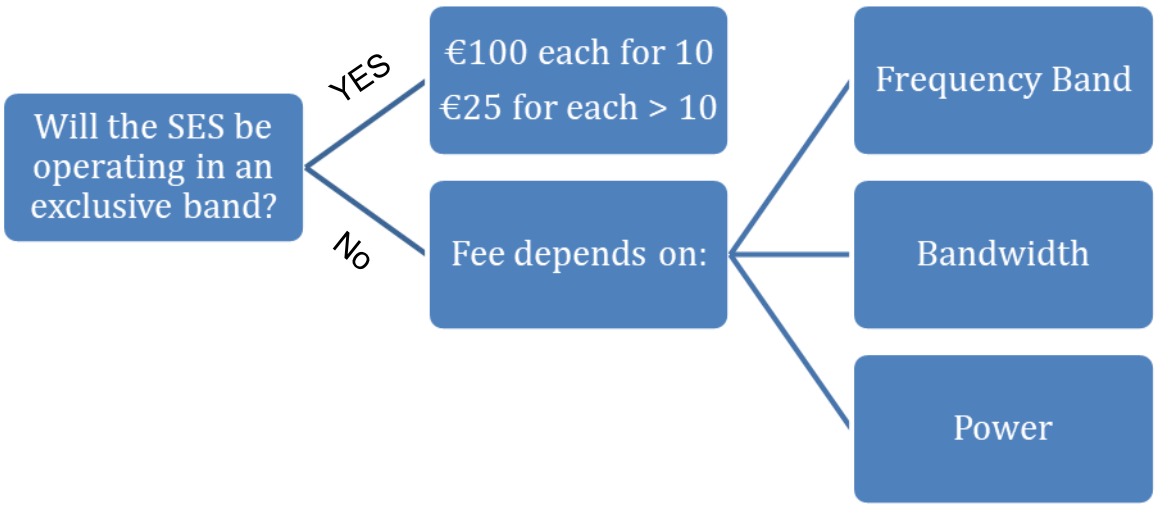

Figure 1: The current method for determining fees for SES (Option 1)

3.35 In relation to other potential options, there are various methods of determining spectrum fees and some approaches (or a combination of approaches) are likely to be more suitable than others. ComReg does not favour any one process for assigning new rights of use of spectrum as a matter of principle; it decides the most appropriate process in each individual case. Each approach will typically have its advantages and disadvantages and one process may, on balance, be found to be the most suitable in light of the particular circumstances, including the characteristics of the spectrum to be assigned, the types of rights of use to be awarded and the anticipated demand for the spectrum

3.36 At a high-level there are broadly two approaches to setting spectrum fees:

- **Administrative cost recovery:** a minimum requirement for fees is that ComReg recovers its administrative costs associated with managing spectrum licences. The cost recovery methodology in an administrative-based approach that sets total spectrum fees equal to the overall spectrum management costs. This is one of the simplest methodologies available, albeit widely adopted, especially when there is no threat of spectrum scarcity, and it may contribute to fostering spectrum demand. Spectrum fees should

[49] **1.** BW < 0.5, **2.**0.5 ≤ BW < 2, **3.** 2 ≤ BW < 11, **4.** 11 ≤ BW < 40, **5.** 40 ≤ BW ≤ 80, **6.** BW > 80

also allow spectrum regulators to recover reasonable administrative costs. Such costs include:

- one-off costs of awarding spectrum and issuing licences;
- policing licence conditions; and
- monitoring and resolving interference problems.

- **Opportunity cost based**: This encapsulates a range of approaches where there are varying levels of scarcity and potential scarcity that need to be resolved. They can be classified into two categories.
  - A competitive market mechanism such as an auction where the interaction of bidders during the award determines who wins the spectrum and the price paid.
  - Administratively determined fees which typically aim to proxy opportunity cost and/or provide incentives for licensees to use spectrum in an efficient way. Such approaches include Administrative Incentive Pricing ("AIP")[50] or Universal System Performance Pricing methodology (USPP)[51].

3.37 Clearly, there is a sequencing in determining the appropriate fees approach. If it is the case that the spectrum can be used freely, or relatively freely, across alternative potential users over a sufficiently long period, then an administrative cost recovery approach is more likely to be appropriate. In this circumstance, no further consideration of alternative approaches would be required because there would be no opportunity cost that needs to be reflected in fees because other users are not precluded.

3.38 Therefore, prior to setting out the regulatory options available to it, ComReg first assesses the extent to which issues of scarcity arise, or could arise, in the licensing of SES rights of use.

Assessment of interference and conflicts in demand

3.39 The information contained in this section is based on several sources of information, including but not limited to:

- the initial research and interviews with stakeholders conducted in late 2021;

[50] This attempts to set prices equal to opportunity cost, such that only the highest value users have an incentive to take up licences in the band

[51] This estimates the value of spectrum based on a set of relevant factors that are selected in advance (e.g. bandwidth).

- the First DotEcon Report (Document 20/135a);
- response to ComReg's consultation - Document 21/135; and
- the Second DotEcon Report (Document 22/56a).

3.40 In the context of SES, spectrum scarcity is determined by the likelihood that harmful interference would be created by licensing SES to a particular user and the resulting impact on the ability of other operators to use the same frequencies. Interference needs to be considered because it might imply an opportunity cost that needs to be reflected in SES licence fees and more specifically to the extent that other users are precluded by the need to protect SES and/or among terrestrial users.

3.41 DotEcon outlines two potential areas of interference that could create opportunity costs in the assignment of SES licences. [52]

(i) Interference amongst SES; and

(ii) Interference between SES and other terrestrial users

3.42 ComReg assesses each in turn below.

Interference amongst SES

3.43 There are two types of SES relevant to this assessment (i) Geostationary[53] ("GSO") systems and (ii) non-GSO[54] systems.

3.44 In its first Report, DotEcon was of the preliminary view that there was unlikely to be any significant interference between GSO SES, or between a GSO and non-GSO ground station. This is because both receivers and transmitters on SES are highly directional and point to the sky thereby limiting interference. Similarly, stakeholder interviews did not reveal any concerns about interference, and in any event, such interference is avoidable (e.g. by using elevation masks). Further, in response to Document 21/125, stakeholders agreed with DotEcon that harmful interference between two GSO systems, or between non-GSO and GSO, is unlikely[55].

3.45 However, in relation to interference between different non-GSO constellations, the stakeholder interviews indicated a greater potential for interference and suggested

[52] See Section 4.1 of Document 21/135a

[53] Objects in GSO have an orbital speed that matches the Earth's rotation, yielding a consistent position over a single longitude. As a result, they appear fixed in the sky when observed from the ground. GSO satellites are at around 36 000 kilometres above the Earth.

[54] Non-GSO satellites at medium Earth orbits (MEO) altitudes are between 8 000 and 20 000 kilometres above the Earth and low Earth orbits (LEO) altitudes are between 400 to 2 000 kilometres above the Earth. Non-GSO satellites move across the sky during their orbit around the Earth, non-GSO operators must deploy a fleet of satellites, generally called "constellations", to provide continuous service from these altitudes.

[55] The Second DotEcon Report, p22

that geographical separation would be necessary to manage this matter. The potential for interference between non-GSO constellations arises because antennas used to communicate with various satellites in the constellation are multi-directional from the same ground station and the techniques available to limit interference between neighbouring GSOs cannot be replicated effectively between non-GSOs.

3.46 The Second DotEcon Report agrees that sufficient geographic separation would be necessary to avoid harmful interference. However, this is not expected to create any issue of scarcity (in terms of access to suitable sites and spectrum) within Ireland. DotEcon notes that interference only arises if non-GSO operators have an incentive to place SES in proximity to each other. However, in its view, such issues are most unlikely to arise for the following reasons[56].

- There are currently fewer than sixty live SES licences in Ireland, of which only 16 are FES transmit licences and operators have sufficient flexibility[57] in their site selection. The supply of available sites in Ireland is more than enough to accommodate the needs of all SES operators.

- Many of the current licences belong to established use cases (e.g., broadcasting, government/community institutions) and growth in demand for SES to service these use cases is expected to be limited given the maturity of these use cases.

- Furthermore, the use of different types of technology, in particular optical links for intra-satellite communications, should reduce the number of SESs needed to provide a given level of coverage by passing data through a LEO system to the nearest SES. Over large distances, intra-satellite links may transfer data faster than fixed line networks as the optical signals are travelling in free space.

- Newer LEO systems aiming to provide high-capacity broadband may increase in the future, however, the satellite services are less than 0.1% of the overall market. Further, the number of LEO operators is likely to remain relatively small and depending on their system deployment, some satellite broadband providers may not require SESs in all countries in Europe.[58]

- If ComReg was to make available licence information of existing SES, operators might naturally choose to locate away from each other such that

[56] The Second DotEcon Report, Document 22/56a, p22.

[57] DotEcon notes that if stakeholders have full flexibility as to where to position their earth stations, then we would not expect there to be any issue of scarcity (in terms of access to suitable sites and spectrum) within Ireland, in particular given expectations over the likely relatively small number of SES in operation.

[58] A Technical Comparison of Three Low Earth Orbit Satellite Constellation Systems to Provide Global Broadband. Inigo del Portillo, Bruce G. Cameron, Edward F. Crawley - 2019

harmful interference would not be a concern because operators could coordinate. As discussed in Section 3.4, ComReg proposes to provide this information as a proportionate measure to reduce any potential for harmful interference.

3.47 Therefore, ComReg agrees with DotEcon that there is neither scarcity in sites for SES at present, nor any evidence that the increase in non-GSO systems will create spectrum scarcity for SES in the foreseeable future. As a result, interference between SES is likely manageable through coordination and modest geographic separation of SES.

Interference amongst terrestrial users

3.48 SES share frequency bands (except for two exclusive bands) on a co-primary basis with other services ("terrestrial users") and interference may occur between these uses and SES (e.g., the 28 GHz fixed links band overlaps with the Ka band used by SES). Terrestrial uses primarily refers to fixed links but also refers to other services that may be provided in the future over these bands e.g., 5G. Stakeholders have raised concerns that the expansion of 5G services in the 26 GHz band could limit the spectrum available to satellite operators. ComReg assesses the potential for interference/scarcity from Fixed Links and 5G below.

Fixed Links

3.49 In relation to Fixed Links, ComReg agrees with DotEcon that coexistence between SES and fixed links is feasible, and therefore the likelihood of harmful interference would be low. ComReg notes the following:

- Interference between terrestrial uses and satellite services is easily managed/avoided (i.e., because SES antennas point to the sky whereas, say, fixed links follow the curvature of the Earth and the difference in angles will often prevent interference occurring).[59]
- ComReg already assesses potential interference when processing fixed links and SES licence applications ensuring existing users are protected against interference from new licensees.[60]
- Interference can be avoided through coordination because satellite operators can position SESs where they will not interfere with fixed links. Further, ComReg is to make available further information on fixed links and

[59] The First DotEcon Repot, Document 21/135a, p23
[60] The Second DotEcon Report, Document 22/XX, p23

SES licences (through Siteviewer) which should support operator coordination between SES and fixed links.[61]

- There is general consensus amongst respondents to Document 21/135 that coexistence between SES and fixed links is feasible and potential instances of interference are likely to be low.[62]

3.50 Some stakeholders in response to Document 21/135 expressed concern about coexistence between SES and point-to-multipoint ("PMP") fixed links. More specifically, some contended that that it is potentially more difficult to plan SES operations around PMP links because there are multiple endpoints to a point to multi-point link (i.e. the location of the PMP system is known, but the other points change frequently)[63].

3.51 However, DotEcon is of the view that coexistence between SES and PMP links could be successfully managed through a transparent information policy and interference assessment at the application stage following the practice as currently set for case for PP links. Furthermore, ComReg notes that there are currently just two PMP link licences[64] in Ireland. Although this may change in the future, demand for PMP is likely to remain low and even where they do arise, they can be comfortably managed in the same way as PP links on application. In addition, ComReg intends to make PMP licence information available along with PP licence information.

3.52 Therefore, ComReg is of the preliminary view that interference issues in relation to fixed links are manageable.

5G spectrum

3.53 Concerns expressed by respondents around scarcity/interference in relation to 5G fall into three categories:

(i) Potential for interference between SES and 5G services in the same band;

(ii) Reduced availability of bands for satellite as further bands are assigned to 5G; or

(iii) Out of band interference from 5G services in adjacent bands.

3.54 In relation to (i), in most cases, 5G services will operate in bands assigned to mobile and there should not be any significant interference between mobile terrestrial services and SES in neighbouring bands (e.g. 26 GHz and the Ka band), provided

[61] Ibid
[62] See sections 2.5.2 and 2.5.3
[63] The first DotEcon Report, Document 21/135a, p29.
[64] Both licences are in the 28 GHz band.

that technical conditions to limit out of band emissions are enforced. The only exception to this is the 3.4- 3.8 GHz band, which has already been awarded[65] in Ireland, and in which there is some overlap with bands included in the SES guidelines for receive operation. ComReg can confirm that no significant issues in relation to this arose during the consultation on this band, nor has it arisen since as the licensed SES operate above 3.9 GHz.

3.55 Further, if any bands are assigned to 5G and SES, these will typically be in the higher frequencies (e.g. mmWave bands) which we would expect mobile operators to only require in larger towns and cities. Alternatively, SES are generally located in rural areas therefore, there is a large amount of scope for coordination and satellite operators can position their SESs accordingly to minimise the risk of disruption in the future.[66]

3.56 In relation to (ii), the process of making spectrum available to 5G could negatively impact spectrum available for SES increasing potential for scarcity in the future. However, DotEcon[67] advises that this issue is likely to be limited in practice:

- bands are harmonised for mobile (or any other) use at an international level, and this is neither a matter for ComReg in isolation nor within the scope of this review; and
- in any event, any future decisions regarding the bands that are being considered for future IMT use (e.g. 42 GHz) would most likely specify out-of-band emission limits in order to ensure the appropriate protection of any existing satellite services.

3.57 Furthermore, ComReg notes that such changes are made over time and availability of spectrum for SES would be considered at an international level when such decisions are made. ComReg can assess such scenarios in future reviews to the extent necessary, noting that SES is already allocated across 17 bands with over 6 GHz available.

3.58 In relation to (iii), the out of band 5G interference refers to 26 GHz potentially not giving sufficient protection for neighbouring Ka band users. However, this is a matter for any future 26 GHz award and DotEcon advises that ComReg should consider relevant technical studies, such as CEPT Report 068,[68] when it awards spectrum in that band. ComReg is of the view that such concerns can be comfortably addressed

[65] 3.6 GHz Band Spectrum Award | Commission for Communications Regulation (comreg.ie)

[66] Second DotEcon Report, Document 22/56a, p26.

[67] Second DotEcon Report, Document 22/56a, p27.

[68] CEPT Report 068 – Report B from CEPT to the European Commission in response to the Mandate "to develop harmonised technical conditions for spectrum use in support of the introduction of next-generation (5G) terrestrial wireless systems in the Union" Harmonised technical conditions for the 24.25-27.5 GHz ('26 GHz') frequency band. https://docdb.cept.org/download/119

in the context of any future 26 GHz Award as part of its normal practice in assigning spectrum rights of use.

3.59 Finally, ComReg notes that demand for SES licences in Ireland is comparatively low relative to other licence types as indicated in the table below. Although new use cases may require a large amount of spectrum, there is no evidence of a continuous growth in demand. This is consistent with views of respondents that, in general, operators have a relatively high degree of flexibility over where they can locate a SES, particularly where the satellite operator is providing an international service and can choose to locate a SES across different countries.

Licence Type	Number of live licences as of 30 June 2022
Satellite	55
Fixed Links (Point-to-Point and Point-to-Multipoint)	15,151
Business Radio	885
Radio Amateurs	2102

Table 2: Live licences as of June 2022

3.60 Considering the above, ComReg is of the view that there are no interference or scarcity issues arising in respect of future 5G services.

Conclusion on interference and scarcity

3.61 From the above, there is no significant interference and/or scarcity issues arising in respect of SES. To the extent that there is potential for interference in the future, this is likely to be very rare and the impact would be decidedly limited.

- First, there are good technical reasons why interference is unlikely to arise over the period of this review. For example, much of the rationale for a likely lack of interference relates to the fact that transmitter and receivers are highly directional which vary across different use cases, and this is very unlikely to change in the future.

- Second, the potential for interference is already assessed ex-ante by ComReg when processing SES licence applications ensuring existing users are protected against interference from new licensees. This will continue to be the case in the future.

- Third, it is more likely that discussions regarding coordination between applicants and licensees will occur than actual scarcity, meaning that the information policy is important in achieving efficient resolution of the limited conflicts that might occur between users.

- Fourth, in relation to bands potentially being provided for 5G use in the future, it is important to note that this is not currently planned. However, should it occur, it would only happen over a long period and beyond the period of this review. The impacts of any such a reallocation could be considered by ComReg in any future review.

- DotEcon is of the view that while ComReg should not assume that opportunity costs would always be close to zero, scarcity is sufficiently unlikely that it does not see any need to account for potential opportunity costs in the current fee schedule. This issue of potential scarcity can be revisited in future reviews.

3.62 Considering the above, ComReg agrees with DotEcon[69] that there is no efficiency role for the fees in terms of ensuring licences are assigned to the highest value users, as there is currently no evidence to suggest that scarcity is present or likely to materialise in the foreseeable future. The overall level of fees does not need to be any higher than necessary to cover ComReg's administrative costs. In that regard, the various regulatory options that would provide for opportunity cost pricing are not considered further in this final RIA.

Related Fixed Links Projects

3.63 ComReg notes that its views in relation to SES might appear to contrast with its preliminary views in relation to the Fixed Links Review[70] in which ComReg is of the preliminary view that fixed links are already at risk of potential scarcity in the future and more widespread congestion in the future than is currently the case.

3.64 However, the circumstances pertaining to the Fixed Links Review are markedly different for several reasons:

- **First**, there are no issues of potential scarcity or interference in SES for the reasons set out in the earlier assessment. For Fixed Links there is some scarcity in certain bands in the Dublin area and a risk of potential scarcity in other bands/areas of the country. On this basis ComReg has strong spectrum management grounds for an opportunity cost-based approach to

[69] The Second DotEcon Report, Document 22/56a, p48.
[70] See ComReg Document 22/93.

that licensing regime. Those grounds do not present in ComReg's review of SES licensing.

- **Second**, the potential for significant migration between Satellite Bands under an administrative cost recovery option is unlikely to arise. This is because of the ITU allocation of bands to specific services and, generally, operational bands of a satellite are decided prior to the launch of a satellite, therefore migration between bands is limited.[71]

- **Third**, the potential for increased spectrum hoarding incentives for SES under an administrative cost recovery option is low because the cost of holding those rights of use would not reduce significantly. More pertinently, licensees are dependent on specific bands due to the ITU allocation decisions. Such a scenario does not arise in respect of Fixed Links where licensees have preferences across a wide range of bands and can substitute between bands over time. (i.e. chains of substitution do not exist to the same extent with SES).

3.65 Furthermore, ComReg notes and agrees with the views of DotEcon in ComReg's proposal on Fixed Links, that congestion has already occurred in Dublin, and there are many users of the spectrum with growing demand for bandwidth. Alternatively in relation to SES:

- Demand for SES is low, and while new use cases may require additional spectrum, there is not a continuous growth in demand;

- DotEcon expects the SES demand to remain well below the level that would create scarcity of sites/spectrum or material opportunity costs for the foreseeable future;

- it is not feasible to incentivise the small number of satellite operators to spread out across bands, because they are often dependent on a specific band, whereas fixed links licensees are more likely to have a range of suitable bands available to them when installing a new link, and therefore some will respond to price differences; and

- It is simpler to resolve conflicts between SES by operator coordination, given the smaller number of users and the fact they are not reliant on key sites/paths.

3.66 Finally, ComReg would note that its views on the use of administrative cost pricing

[71] For example, since around 2010 onwards, a large number of satellite deployments have used the K band (11 GHz – 30 GHz) to take advantage of the large bandwidth available within the band's range. Future satellite deployments may be designed to operate in the Q and V bands.

for SES are not fixed and are subject to review in the future. While ComReg does not expect the situation to change for the foreseeable future, should circumstances change sufficiently, ComReg may need to reconsider its position, up to and including the possible reversion to opportunity-cost pricing if appropriate.

Remaining regulatory options

3.67 ComReg already set out that Option 1, as outlined earlier, is the status quo option. Considering the assessment on scarcity and interference above, ComReg notes that its basis for the remaining regulatory options is limited to fees based on administrative cost recovery. However, such charges can be implemented several ways. Administrative costs can be applied equally across all licensees or applied depending on how licensees use the spectrum such that some licensees could incur more administrative costs than others.

3.68 ComReg agrees with the view of DotEcon[72] that an approach that sets fees specifically for various use cases is likely to be difficult due to the variety of different use cases and the business cases that would support each would need careful assessment by ComReg. In particular, the level of fees at which operation is economically viable is likely to vary significantly between the use cases. For example, satellite broadband services provided by the emerging LEO systems are likely to have a higher valuation for SES when compared to lower value applications, such as earth exploration or telemetry. This could lead to an unduly complicated set of fees that would be subject to regular change. In any event, information required for such as assessment is unlikely to be available. Furthermore, because fees are administratively based, ComReg should be able to control for issues that might arise such as the choking off of demand for low value users (such as earth exploration, telemetry, and university research projects). Therefore, ComReg does not consider such an approach as a valid regulatory option.

3.69 Further, ComReg notes that removal of one or more of the three factors used to determine fees in Option 1 (i.e., frequency band, bandwidth and power) would have an impact on existing stakeholders. Therefore, in order to consider the impact on existing stakeholders, the regulatory options in this RIA should consider the inclusion or otherwise of each of the three factors, noting that the removal of all factors would correspond to the same administrative fee applying to all licensees regardless of usage. The inclusion of a particular factor means that administrative costs (or at least some portion of common costs) would be allocated according to that factor (i.e. if power was used as a factor, administrative costs would be allocated in proportion to the power used).

3.70 However, consideration of these three factors would lead to eight different options if

[72] The Second DotEcon Report, Document 22/56a, p49

each combination of factors was considered independently, in addition to Option 1 (which also maintains the level of fees rather than setting it based on administrative costs). However, ComReg considers that the interactions between the different factors are not sufficiently strong to merit defining regulatory options based on combinations of factors, but instead regulatory options can be based on individual factors. As a result, these options are not necessarily mutually exclusive. Therefore, each option below, following Option 1, considers one of the factors and assesses whether that factor is necessary to ensure the effective licensing of SES services across all combinations that include that factor. In this way, if any particular combination of factors is required to ensure the effective functioning of the SES Licensing framework, the preferred option will provide for the same which streamlines this RIA process.

3.71 Therefore, the regulatory options are as follows, noting that each option would cover the administrative costs incurred by ComReg to licence SES.

- **Option 1 -** the existing framework for setting fees would continue to apply, including the three factors to determine the fees for SES.
- **Option 2** - Frequency bands (including whether exclusive or non-exclusive) would be retained as a factor for setting administrative fees for SES. A licensee's fee for SES would depend on the frequency bands (including whether exclusive or non-exclusive) associated with its licence.
- **Option 3 -** Power would be retained as a factor for setting administrative fees for SES. A licensee's fee for SES would depend on the power level associated with its licence.
- **Option 4 -** Bandwidth would be retained as a factor for setting administrative fees for SES. A licensee's fee for SES would depend on the bandwidth associated with its licence
- **Option 5 -** No factor would be retained for setting administrative fees for SES. A flat fee would apply to all licensees irrespective of frequency band, bandwidth, or power.

3.5 Impact on Stakeholders

Identification of stakeholders

3.72 Step 3 assesses the likely impact of the proposed regulatory measures on stakeholders. Hence a necessary precursor is to identify such stakeholders who, in this RIA, fall into two main groups:

(iv) industry stakeholders as described above; and

(v) competition and consumers.

3.73 ComReg sets out below a comparative analysis of each of the three options regarding pricing outlined above, in terms of their impact on stakeholders, competition and consumers.

Impact on industry stakeholders

3.74 This section provides information on the impacts on industry stakeholders (as outlined above) arising from the regulatory options above.

3.75 ComReg notes that there are two broad categories of impacts relevant in this section:

- First, the impacts arising from how rights of use are assigned in each of the regulatory options (i.e., "Assignment Impacts"); and
- Second, the impact of the regulatory option on spectrum fees paid by Existing Licensees or would be paid by future licensees (i.e., "Financial Impacts").

3.76 Assignment Impacts refer to the nature and quantum of spectrum rights of use to be assigned to licensees. The choice of preferred option can impact an operator's ability to obtain the rights of use necessary to satisfy efficient demand and deliver one or more use cases. These impacts typically arise where issues such as congestion and scarcity arise, and/or where there is uncertainty about future fees and the extent to which they may change. As discussed earlier, there are no issues regarding scarcity and interference. Consequently, the Assignment Impacts are likely to be limited across all options.[73]

3.77 In relation to Financial Impacts, it is worth noting at the outset that the financial impacts that would arise from any of the Options would be relatively minor, with most Licensees facing reduced fees in the non-exclusive bands. The largest fee increases would depend on the circumstances of users and their spectrum assignments; however, the largest increases would arise for users who currently operate in the exclusive bands and operate with high power and or high bandwidth (depending on the preferred option(s)). ComReg notes that the majority of any increases would only however be in the order of hundreds of euro. SES licence revenues are already broadly in line with total administrative cost and any change would primarily be a redistribution of fees among users. Notwithstanding, for completeness and to inform its's overall preferred option, ComReg provides its preliminary views on the impact on stakeholders below, which it will revise following response to this consultation.

[73] ComReg notes that under Option 1 there is some uncertainty that this regime would persist in the future given the issues raised in this consultation. Option 5 is marginally simpler to understand compared to other because it is a flat fee regardless of uses.

3.78 With that in mind, ComReg notes that the impact of any one option depends on the extent to which each factor (i.e. band, bandwidth or power) varies across each Licensee. If, for example, all licensees use the same bandwidth then the use of this factor to distribute administrative costs would result in those costs being the same for all Licensees, and consequently would align with Option 5. Alternatively, if bandwidth varies across users, the applicable fees and associated impacts would also vary and impact stakeholders differently depending on how much bandwidth is used by them. Therefore, to determine stakeholder's potential views, it is useful to assess the extent to which Licensees differ in their choice of 1. Power, 2. Frequency Band and 3. Bandwidth.

1. Power

3.79 The vast majority of SES Licensees operate in the 50 dBW to 75 dBW range. Further, there are currently no users that considered higher power users (i.e. >75dBW). Therefore, the use of power (Option 3) is unlikely to be a significant issue for most stakeholders who would likely be indifferent about the inclusion of power as a factor to allocate administrative costs. Most users would pay a broadly similar fee and be similar to Option 5 which is a flat administrative fee across all Licensees.

2. Frequency Bands

3.80 In relation to frequency bands, current licences are spread between exclusive and non-exclusive frequency bands. Sixteen licences are for spectrum in the 14.0 - 14.25 GHz exclusive band. No live licences are approved for use in the other exclusive band (12.5 – 12.75 GHz). The remaining licences are spread across the shared-use bands though the majority are in the following Ku sub-bands:

- 10.7-11.7 GHz;
- 13.75-14 GHz;
- 14-14.25 GHz; and
- 14.25-14.5 GHz

3.81 Therefore, removing consideration of frequency bands (including whether exclusive or non-exclusive) when setting administrative fees for SES could potentially create asymmetric impacts across different stakeholders. In particular, the removal of the distinction between exclusive and shared use will increase the fees paid by existing licensees of exclusive bands. This arises because fees for the exclusive use bands are significantly lower[74] than for the shared bands and are based on the number of

[74] There is one instance where fees in the shared bands could be lower – i.e. a licensee that require 0.5MHz at a power less than 50 in Band greater than 30 GHz. Currently, there are no such Licensees.

SES licences held in those bands. In particular, the annual fee is €100 for each of the first 10 SESs and €25 for each additional SES.

3.82 ComReg assesses the potential impact on users of exclusive bands and non-exclusive bands below.

Impacts on users of exclusive bands

3.83 SES Licensees that operate in the exclusive bands (circa 40% of all SES Licensees) would likely prefer if fees remain at a similarly low level (e.g. €100). The removal of bands as a consideration would mean that there would be no price differential associated with operating in any frequency band, including whether the band is exclusive to SES. Users of exclusive bands would pay an administrative cost-based fee the same as shared band users for using the spectrum. Under Options 3, 4 and 5 all users of exclusive bands would have an increase in fees ranging in hundreds to low thousands of euros (single digit).

3.84 Therefore, ComReg is of the preliminary view that users of the exclusive bands (and particularly those that only use the exclusive bands)[75] would likely prefer Option 1 because, as noted above, there is a flat €100 fee for licences in the two SES exclusive bands. As noted by DotEcon, this effectively gives licensees in the exclusive bands a discount in the order of 90% relative to fees for the shared bands and this discount would be of the same order of magnitude. Similarly, such users would likely prefer Option 2 and the retention of bands and the distinction between exclusive and non-exclusive, noting that the €100 would be sufficient to cover ComReg's incremental costs of processing a licence.[76]

3.85 In relation to the remaining options, current users of the exclusive bands would also be likely to favour Option 4 because these Licensees (currently at least) tend to have lower bandwidth needs and would therefore also be likely to prefer to keep bandwidth as a consideration in determining fees[77]. The majority of SES Licensees using the exclusive bands operate in a similar power range to users of the non-exclusive bands and are therefore likely to be indifferent to the removal of power (Option 3) as a consideration for fees. Overall, these Licensees would prefer any option over Option 5 (or combination of options that excludes the use of bands) because such options would remove the consideration of frequency bands from determining fees entirely.

[75] There are 5 SES Licensees that only use the exclusive bands. There are some exclusive users that may prefer alternative options because they have a large amount of licences

[76] See Chapter 6 (Fees) and Section 8 of the Second DotEcon Report (Document 22/56a)

[77] It should be noted that this is not true of all Licensees and some Licensees in the exclusive bands have higher bandwidth requirements and would likely prefer Option 3.

Impacts on users of non-exclusive bands

3.86 SES Licensees in the non-exclusive bands (circa 60% of all Licensees) are charged depending on the band and the bandwidth they wish to be assigned at a particular power. Option 5 removes all considerations of those three factors and SES licensees would be assigned rights of use based on administrative cost recovery which would be spread equally across Licensees. Therefore, all SES Licensees (except those who also have licences in the exclusive bands) would prefer Option 5 to Option 1, noting that Option 1 is not based on administrative cost recovery and attracts higher fees for almost all bands regardless of power and bandwidth requirements[78]. Even those licensees who may be marginally better off under Option 1 currently would likely prefer Option 5 because the same fee would apply even if their power or bandwidth requirements increased in the future.

3.87 The extent to which a licensee would prefer any of the remaining options over Option 5 would depend on their usage requirements. For example, under Option 4 (retention of bandwidth), it is likely that the majority of licensees operating in the non-exclusive bands would see a reduction in their fees, but some large bandwidth users could face increases. Similarly, licensees with lower bandwidth requirements but higher power requirements would likely prefer options that removed power considerations because that would pass more administrative costs to higher bandwidth users. However, as noted above, most licensees tend to have licences that operate within the same range (i.e., 50 -75 dbW) so would likely be largely indifferent on use of power in determining fees.

Bandwidth

3.88 In relation to Bandwidth, and as illustrated in Figure 2the typical bandwidths used by licensees vary widely. At the low end, many operators use less than 10 MHz, with some using less than 1 MHz. Other SES licensees require much larger bandwidths, for example over 500 MHz. Therefore, the use of bandwidth is likely to cause fees to vary across stakeholders and impact licensees differently.

[78] Only bands above 15GHz with bandwidth requirements above 0.5 MHz would likely have lower fees than Option 1. There are currently no licensees fulfilling this requirement.

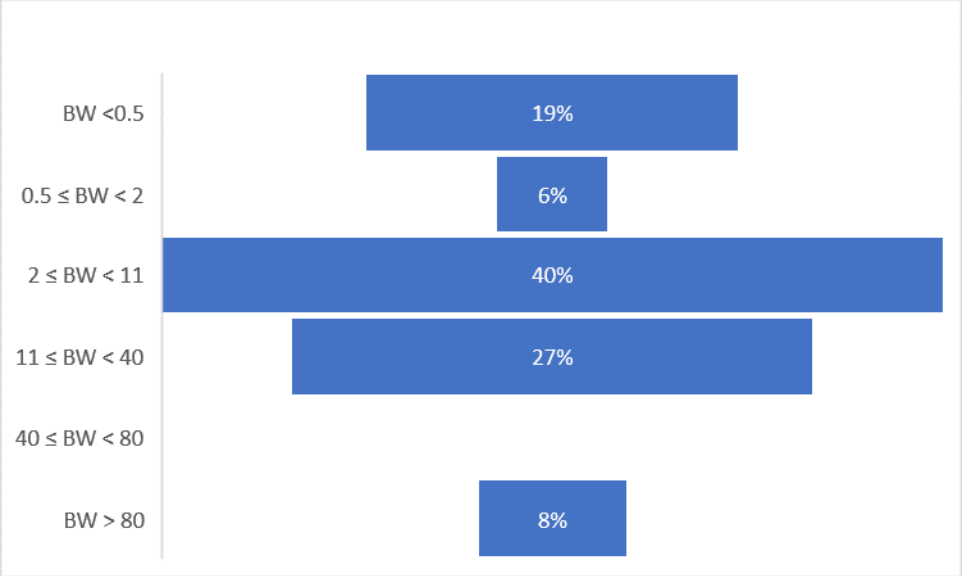

Figure 2: Percentage of licensees that use different bandwidth categories

3.89 The use of bandwidth as a factor simply means that the more bandwidth that is used the higher the fee, noting that overall total fees only cover ComReg's administrative costs. Figure 2 provides a high-level illustration of bandwidth use across licensees and the additional cost associated with bandwidth would fall approximately in line with same. For example, regarding users of the non-exclusive bands:

- Very low bandwidth users (up to 2 MHz) would face fee decreases. Depending on the frequency band that they are operating in under the current licensing regime, they may see fee decreases of hundreds of euros.
- In general, low bandwidth users (between 2 MHz and 11 MHz) would see a reduction in their licence fees in most instances.[79]
- In general, medium bandwidth users (between 11 MHz and 40 MHz) would mostly see either a reduction or modest increases (in the order of hundreds of euro) to their licence fees relative to the existing fee schedule;
- ComReg observes that there are currently no large bandwidth users (between 40 MHz and 79 MHz). Large bandwidth users would likely see fee increases relative to the existing fee schedule, depending on their spectrum requirements.

[79] Low power users (eirp < 50 dBW) in the high frequency bands would likely face fees that are either comparable or slightly higher than under the current regime. However, ComReg observes that there are currently no licences issued fall within these conditions.

- A small number of licensees use bandwidths greater than 1 GHz. These licensees would face similar fees or lower fees relative to the existing fee schedule.

3.90 Overall, the impact on SES Licensees ultimately depends on their usage requirements and there will inevitably be some Licensees that pay more while others would pay less under any Option relative to Option 1. However, as noted at the outset, because fees only cover administrative costs the impact on stakeholders is very modest.

3.6 Impact on competition

3.91 There are different elements to competition that are relevant in determining the impact of any of the preferred options. There is a natural overlap between the aims of the fee methodology and an assessment of ComReg's compliance with some of its statutory obligations, particularly that of promoting competition, in accordance with Section 12 of the 2002 Act.

3.92 These include:

(a) Encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources[80] ("Efficiency and Spectrum Management")

(b) Ensuring that there is no restriction or distortion of competition in the electronic communications sector[81] ("Distortions to competition");

(c) Promoting efficient investment and innovation in new and enhanced infrastructures[82] ("Efficient Investment"); and

(d) Safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition[83] ("Infrastructure based competition"). [84]

3.93 ComReg assesses each in turn below.

Efficiency and Spectrum Management

3.94 Under Option 1, ComReg's current fee schedule is based on:

[80] Section 12(2)(a) of the 2002 Act.
[81] Section 12(2)(a) of the 2002 Act.
[82] Regulation 16(2) of the Framework Regulations.
[83] Regulation 16(2) of the Framework Regulations.
[84] Impact on consumers assessed separately below.

- whether the frequencies used are in a satellite exclusive frequency band or a frequency band that is shared with other services;
- the bandwidth licensed; and
- antenna power (EIRP).

3.95 In principle, these are sensible as proxies for opportunity cost imposed on other users. However, absent evidence that opportunity costs are an issue to be concerned with, the approach to setting fees should be kept as straightforward as possible and additional costs should not be imposed, without good reason. Given ComReg's assessment of scarcity and interference above there would appear to be no efficiency or spectrum management reason to charge fees in this way. Therefore, Option 1 is unlikely to be necessary to encourage efficient use and ensure the effective management of the radio spectrum.

3.96 In relation to Options 2 to 5 which are based on administrative cost recovery, ComReg notes the views of DotEcon[85] that, while there are no efficiency grounds for setting the overall level of fees significantly above administrative costs, there may be efficiency arguments around ensuring that:

(i) each licensee covers the incremental costs incurred by ComReg as a result of its licence; and

(ii) fixed costs are distributed to avoid inefficiently choking off demand.

3.97 In relation to (i), incremental cost of processing a licence application would be the same across all options and there would be no difference between options. ComReg sets this fee at €100 per licence (See Chapter 3).

3.98 In relation to (ii), the concern here is that more marginal, low value users (such as earth exploration, telemetry, and university research projects[86]) could be priced off if too large a share of the common costs is recovered from them. As noted by DotEcon[87] if the administrative costs are spread evenly across all licences, there may be a number of potential licensees that are priced out of the market with zero benefit, harming businesses and/or consumers that may have benefitted from those services. There is a risk that Option 5 could result in such outcomes because administrative costs are applied evenly across all licensees under that Option.

3.99 If under Option 2, fees remained substantially lower in exclusive bands and low value users are able to choose the frequency bands they use freely, then such concerns

[85] The Second DotEcon Report, Document 22/56a, p43.

[86] includes satellites for research projects (e.g. run by universities or national research funding agencies) which may be budget constrained and unlikely to operate large amounts of ground station infrastructure (potentially working with ESaaS operators instead). See Document 20/135a Section 3.2.1.

[87] The Second DotEcon Report, Document 22/56a, p49.

would not arise. However, ComReg agrees with the views of DotEcon[88] that the current discount applied in these bands (which effectively amounts to a 90% discount) is unnecessary given the lack of scarcity of SES spectrum. ComReg notes that there are no efficiency or spectrum management reasons as to why the exclusive use of certain bands attracts a 90% discount. Moreover, it is likely that some low value users will prefer bands other than the exclusive bands.

3.100 Furthermore, and wholly apart for the designation of certain frequency bands as exclusive, there is no basis for charging different fees depending on the frequency band required by a licensee. As noted at the outset of this final RIA, there are no interference and scarcity concerns related to any of the bands under consideration. As noted by DotEcon, *"Even if there is more spectrum in the higher frequencies, there is no obvious scarcity of spectrum for SES in any of the bands, nor are any material opportunity costs likely to emerge in the near future. Therefore, there is no need to have per MHz charges that differ across bands to capture relative scarcity (or potential scarcity) of spectrum."*[89]

3.101 Under Option 3, while the risk is lower than Option 5, there would still be a risk that low value users would be choked off because while these low value users have low bandwidth requirements, they do not generally operate at lower power. As noted in the impact on stakeholders above, most licensees typically fall into the 50 – 75 dBW category and power is not a distinguishing factor across licensees. Therefore, the retention of power as a factor in determining fees could increase the risk of choking off such use cases where higher power was required. Conversely, ComReg is not aware of any use case that has low power and high bandwidth requirements.

3.102 Under Option 4, and because low value users are typically defined in relation to bandwidth used (which is low), there are clear advantages to allocating common costs in proportion to the bandwidth used. Under this Option, these users would cover the incremental cost of processing a licence, however the remaining administrative costs would be kept low in line with low bandwidth use, reducing the risk of these users being choked off unnecessarily.

3.103 Therefore, ComReg is of the preliminary view that Option 4 is preferred from an efficiency and spectrum management perspective.

Distortions to competition[90]

3.104 Option 1 has delivered a variety of important use cases, including Earth exploration,

[88] Document 22/56a, p51

[89] The Second DotEcon Report, Document 22/56a, p50

[90] DotEcon notes that the primary concern regarding competition that is strictly relevant to SES licensing would be that operators might use interference protection rights that come with SES licences to preclude others from deploying earth stations in Ireland (or certain parts of Ireland). However, this concern is unlikely to arise, is unrelated to fees and is assessed separately.

IoT, GSO Broadband, non-GSO Broadband, Mobile Communications and broadcasting. These services have been delivered for over ten years and ComReg is unaware of any anti-competitive hoarding having occurred in that time. This is unsurprising given that there has been no interference or scarcity issues in the intervening period. Furthermore, ComReg notes that because there are no interference or scarcity issues arising in the assignment of SES then issues around spectrum hoarding etc. are highly unlikely to arise in the context of administratively set fees under Options 2 - 5.

3.105 Potential distortions or restrictions to competition in the assignment of SES rights of mainly arise in relation to fees potentially choking off efficient access. DotEcon observes[91] that there is an argument for applying Ramsey pricing principles to the fee structure meaning that the administrative cost still needs to be covered, but high-value users would pay a greater share than low value users, ensuring that prices for smaller users are kept low enough to enable them to operate.

3.106 With that in mind, ComReg recognises that some licensees would be affected by high or poorly structured fees. This is particularly relevant if bandwidth use does not fully capture the value of a particular service. DotEcon notes[92] that there may well be a small number of use cases where the assumption about the value/bandwidth relationship does not apply to the same extent as for other use cases. The most significant example is the case of a low value, low bandwidth user (and some Earth exploration applications, for example, may fall into that category).

3.107 ComReg also notes that the range of users and applications may proliferate as it becomes easier to deploy large numbers of low-cost, low-power satellites that nevertheless meet capacity requirements. This includes satellites for research projects (e.g. run by universities or national research funding agencies) which may be budget constrained and unlikely to operate large amounts of ground station infrastructure (potentially working with ESaaS operators instead). Such users utilise low value applications, such as earth exploration, telemetry, and university research projects. Such projects depending on their output have high social and economic value.

3.108 Similarly, IoT users have very low bandwidth requirements. Most IoT systems rely on terrestrial network infrastructure. However, when such infrastructure is not available or does not provide sufficient coverage, satellite communication clearly has a role in providing IoT connectivity. IoT networks and services typically transmit low bandwidth chunks of data at regular intervals (e.g., status updates, measurements, and vehicle positioning). Such IoT systems have little or no requirement for higher bandwidths and the existing fees under Option 1 are highest (even at low

[91] The Second DotEcon Report, Document 22/56a, p49
[92] The Second DotEcon Report, Document 22/56a, p50

bandwidths) in the lower frequencies (e.g., 3GHz) which are of most relevance to IoT users.

3.109 Any concerns from such stakeholders on the level of fees are likely to be resolved by administrative cost pricing, provided it reflects incremental administrative costs, and by not charging where no additional interference analysis/management is necessary[93]. As discussed in 'Impact on Stakeholders' above, the risk of fees choking off efficient demand is higher under Options 3 and 5 and least likely to arise under Option 4 because this option significantly reduces the cost of low bandwidth uses.

3.110 Overall, ComReg is of the view that while distortions to competition are unlikely under all options, Option 4 is the least likely to result in distortions to competition, primarily because low value users are least likely to be choked off under that option.

3.111 Efficient investment and innovation

- Creating the conditions for promoting efficient investment and innovation in new and enhanced infrastructure involves ComReg exercising its regulatory functions in an appropriate and predictable fashion, thus providing regulatory certainty. As noted by DotEcon, the timeframe for a satellite project runs to many years, and consequently regulatory certainty is essential for investors.[94] Indeed, stakeholders noted in the trade-off between good geography and the regulatory regime, it often makes sense to prioritise the latter (especially within a broad area, where geographical conditions are similar, and a marginally better location is outweighed by a significantly better regulatory environment.[95]

- Promoting competition and encouraging efficient investment, in ComReg's preliminary view, means allowing for a cost-effective deployment of SES services and preventing inefficient duplication of investment caused by predictable changes to the regulatory regime. With that in mind, it is important that any option considers the likely long run development of the market to avoid future changes to the regulatory framework that could have been foreseen or give rise to additional cost.

- Under Option 1, investment in networks used to deliver services up to now could be considered efficient given the benefits to consumers and competition. However, it is unlikely that this Option can persist in the long run because the fee structure attempts to proxy opportunity cost where no opportunity costs exist or are likely to exist in the foreseeable future. Further, ComReg's assessment of use cases indicates that low value uses may

[93] Document 21/135a, p30.
[94] Document 20/135a, p21.
[95] Ibid

become more prominent in the future. In such circumstances, the fee structure under Option 1 could choke off use cases. depending on the requirement of those use cases. Such use cases can also encourage innovation and development involving new radio technologies or services and the SES regime can provide longer term spectrum access in the delivery of those services.

- Options 2 – 5 are based on administrative cost recovery and would provide some regulatory predictability if changes were unlikely to be required. Option 4 is unlikely to require any changes for the foreseeable future because it best protects against any choking off of low value use. Alternatively, Options 2, 3, and 5 have a higher risk of choking off demand (because bandwidth is not considered) and therefore changes may be required over the same period. Therefore, Option 4 would appear to be more likely to promote efficient investment.

Infrastructure based competition

3.112 Infrastructure based competition is competition among operators that physically own networks. This could be a fixed operator competing with a mobile operator or two operators which have similar networks competing against each other. As a general point, the SES regime provided under either Option would enhance the possibilities for infrastructure-based competition because it would allow operators to deploy services using SES even when alternative infrastructures are available (e.g., fixed/fibre/mobile).

3.113 As noted by DotEcon[96], in many cases, bands are shared between satellites and terrestrial services (primarily fixed links) that might compete for the same end customers, for example satellite broadband and FWA. There are now also several large LEO constellations in development to provide broadband, with some already launched and providing services. These ISPs focus on bringing broadband to areas with limited connectivity, but with lower latency possible due to the significantly closer proximity to the earth of LEO satellites.

3.114 DotEcon also observes that faster speeds and low latency will make these services competitive with terrestrial services in remote areas (e.g. Starlink intends to provide speeds of over 100 Mbps and latency as low as 20 ms).[97] This will provide increased competition in rural areas particularly those not currently served by fibre and more relevantly areas of the country where providing broadband is difficult due to geographic terrain (e.g., Black Valley and other related areas). Fees set to cover administrative costs across all options provides low-cost access to spectrum rights

[96] The Second DotEcon Report, Document 22/56a, p29.
[97] The First DotEcon Report, Document 21/135a, p16

of use.

3.115 In relation to other use cases, there is strong potential for infrastructure-based competition between satellite and other terrestrial services in relation to the Internet of Things (IoT). IoT systems communicate small amounts of information at a time, with devices only communicating with satellites for short bursts at any given time. This enables Satellite IoT systems to share spectrum efficiently with other services as they require less bandwidth, while not continuously transmitting, thereby reducing the possibility of interference.

3.116 IoT networks and services typically transmit low bandwidth chunks of data at regular intervals (e.g., status updates, measurements, and vehicle positioning). Further, such services tend to require low power to prolong better performance with every transmission. Satellite can also provide such requirements over long distances with low risk of interference which cuts down the amount of other infrastructure required to deploy a large-scale IoT project.

3.117 IoT systems using SES could be constrained by fees that do not reflect that IoT systems have very low bandwidth requirements. Indeed, infrastructure competition between satellite and terrestrial networks could be restricted if fees do not reflect this requirement. For example, mobile networks typically have a very low incremental cost of carrying IoT because of low bandwidth nature of the traffic. The potential for satellite providers to compete on a similar basis is important and should not be constrained in any way by how fees are structured. The proliferation of IoT systems means that infrastructure-based competition between satellite and terrestrial services will become more important in the future.

3.118 With that in mind, Option 4 best provides for this competition because it lowers the cost for services that require low bandwidth, such as IoT, and better allows for infrastructure-based competition.

3.119 Therefore, while there is unlikely to be a significant difference between Options 2 to 5, Option 4 is likely to better encourage infrastructure-based competition.

3.7 Impact on consumers

3.120 It can be generally assumed that what is good for competition, and what promotes investment in infrastructure, is good for consumers. This is because increased competition between operators brings benefits to their customers in terms of price, choice and quality of services. In that regard, options that are good for competition above are likely to be good for consumers.

3.121 Satellite services play an important role in enabling the applications that are often taken for granted today and includes emerging technologies that deliver improved

ways of delivering services to consumers and providing more productive capacity throughout the economy. The use cases are discussed in detail in the DotEcon reports and can be usefully categorised into (i) those that are provided directly to consumers and businesses in downstream markets and (ii) those that are used as inputs to other services that consumers value.

3.122 In summary and in relation to downstream services directly used by consumers, these include:

- Satellite broadband, which currently has a relatively marginal use but will be more relevant in very rural/remote areas where it might be the only means of connection.
    - LEO constellations will focus on bringing broadband to such areas with lower latency possible due to the significantly closer proximity to the earth of LEO satellites.
    - GSO systems will continue to be vital to provide services and advent of new high throughput and very high throughput GSO satellites has solidified their importance to the modern satellite sector.
- Households and businesses receive television distributed via satellite broadcast and there is still a large installed base of satellite TV receivers; therefore, the service is expected to remain important for the foreseeable future.

3.123 In summary, and in relation to inputs used to provide services that consumers are likely to value, the following are most relevant.

- Internet of Things (IoT) devices are used in a growing number of industries, such as agriculture, shipping and logistics, generally for telemetry and control purposes.
- Earth exploration and remote sensing satellites capture and transmit images of and information about the Earth’s surface from space. This covers a wide range of end user applications, including scientific observation, weather mapping, climate monitoring and defence uses.
- Satellite links can now serve as a complement to terrestrial communications networks, both as a reliable backup and as a primary means of providing backhaul services in some cases (e.g. from areas with no available fibre), because they are capable of the required throughputs.

3.124 Consumers are likely to prefer those options which maintain or improve services and

while at the same time not deterring entry or efficient investment. With that in mind, consumers are unlikely to have strong preferences between the different options because most use cases are provided for across all options that charge based on administrative costs. As noted above, the impacts on stakeholders and competition are relatively modest across all options. That said, consumers are likely to prefer Options 2 - 5 over Option 1 because Option 1 was designed based on use cases of over 15 years ago. Alternatively, Options 2 – 5 have been designed following stakeholder engagement over the most likely current use cases.

3.125 In relation to Options 2 – 5, consumers may prefer options that avoid providers facing increased input costs to downstream services. For example, consumers that use services that have high bandwidth requirements (e.g., broadband services) may not prefer Option 4 to the extent that it increases spectrum fees. However, as noted above, such increases are negligible relative to the entire user base which those providers are competing for, and such increases are highly unlikely to increase the cost of these services. Rather, consumers are likely to be more concerned with services that could be choked off and are therefore not available at all. Therefore, consumers are likely to prefer Option 4 because it reduces the risk of low value users being choked off for providing services.

3.126 Considering the above, ComReg is of the preliminary view that consumers are likely to prefer Option 4.

3.8 ComReg's preferred option

3.127 This RIA considers a number of regulatory measures available to ComReg within the context of the analytical framework set out in ComReg's RIA Guidelines (i.e., impact on industry stakeholders, impact on competition and impact on consumers). This section complements that analysis and provides an assessment of the extent to which any regulatory measure would, if implemented, be likely to achieve one or more of ComReg's statutory objectives in the exercise of its related statutory function or functions.

3.128 In light of the above, ComReg is of the preliminary view that Option 4 is preferred in terms of the impact on stakeholders, competition and consumers mainly because it is the Option that best provides for the provision of all use cases referred to in this consultation and appropriately weights the burden of administrative costs on those users most likely to benefit from the deployment of those costs.

3.9 Assessment of the Preferred option against ComReg's relevant statutory objective

3.129 This RIA identifies and considers the options potentially available to ComReg, within the context of the RIA analytical framework as set out in ComReg's RIA Guidelines (impact on industry stakeholders, the impact on competition and the impact on consumers). This RIA also analyses the extent to which those various options would facilitate ComReg to meet its statutory remit in managing the radio spectrum. This includes analysing the extent to which the various options would promote competition and ensure that there is no distortion or restriction of competition in the electronic communications sector, whilst also encouraging efficient investment in infrastructure, promoting innovation, and ensuring the efficient use and effective management of the frequency bands that are used to deliver SES.

3.130 In this section, ComReg assesses the Overall Preferred Option in the context of other statutory provisions relevant to the management of Ireland's radio frequency spectrum (which are summarised in Annex 2 of this document). It is not proposed to exhaustively reproduce those statutory provisions here. However, set out below is a summary of all statutory provisions which ComReg considers to be particularly relevant to the management and use of the radio frequency spectrum with an assessment (to the extent not already dealt with as part of the draft RIAs) of whether, and to what extent, the Overall Preferred Option accords with those provisions. In carrying out this assessment, ComReg has highlighted below some of the relative merits / drawbacks which would arise if it was to select some of the alternative options assessed under the draft RIA above.

3.131 For the purposes of this section, the statutory provisions which ComReg considers to be particularly relevant to the management of the radio frequency spectrum in the State are grouped as follows:

- general provisions on competition;
- contributing to the development of the internal market;
- to promote the interest of users within the Community;
- efficient use and effective management of spectrum;
- regulatory principles;
- relevant Policy Directions and Policy Statements; and
- general guiding principles (in terms of spectrum management, setting of fees and licence conditions).

- Objective justification;
- Transparency;
- Non-discrimination; and
- Proportionality.

3.9.1 General Provisions on Competition

3.132 There is a natural overlap between the aims of the draft RIA and an assessment of ComReg's compliance with some of its statutory obligations and, in particular, one of its statutory objectives under section 12 of the 2002 Act of promoting competition by, among other things:

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

3.133 In so far as the promotion of competition is concerned, Regulation 16(1)(b) of the Framework Regulations further requires ComReg to ensure that:

- ensuring that elderly users and users with special social needs derive maximum benefit in terms of choice, price and quality; and
- ensuring that, in the transmission of content, there is no distortion or restriction of competition in the electronic communications sector.[98]

3.134 Certain other provisions also relate to ComReg promoting and protecting competition in the electronic communications sector including:

- Regulation 16(2) of the Framework Regulations which requires ComReg inter alia to apply objective, transparent, non-discriminatory and proportionate regulatory principles by, inter alia, safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition;

[98] The final two statutory obligations were introduced by Regulation 16 of the Framework Regulations.

- Regulation 9(11) of the Authorisation Regulations which requires ComReg to ensure that competition is not distorted by any transfer or accumulation of rights of use for radio frequencies; and

- General Policy Direction No. 1 on Competition (26 March 2004) which requires ComReg to focus on the promotion of competition as a key objective, including removing barriers to market entry and supporting new entry (both by new players and entry to new sectors by existing players).

3.135 Based on the assessment provided in the RIA above, ComReg's view is that the Preferred Option in the draft RIA would best safeguard and promote competition to the benefit of consumers for the reasons set out in this RIA i.e. (Impact on Competition above). In particular:

- ComReg completed a detailed assessment which shows that no interference and/or scarcity issues arise in respect of the frequency bands used for SES meaning that no potential licensee would be denied access to what would be an essential input for those services.

- Spectrum fees are set solely to cover administrative cost and are set by reference to the bandwidth required which reduces the risks of lower value (low bandwidth users) being choked off from utilising the spectrum in the delivery of services.

3.9.2 Contributing to the development of the Internal Market

3.136 In achieving the objective of contributing to the development of the Internal Market, another of ComReg's statutory objectives under section 12 of the 2002 Act, ComReg considers that the following factors are of relevance for SES:

- the extent to which the Overall Preferred Option would encourage the establishment and development of trans-European networks and the interoperability of pan-European services, by facilitating, or not distorting or restricting, entry to the Irish market by electronic communication services providers based or operating in other Member States; and

- to ensure the development of consistent regulatory practice and the consistent application of EU law, the extent to which ComReg has had due regard to the views of the European Commission, BEREC and other Member States in relevant matters, in selecting an option and considering any regulatory action required by ComReg in respect of such an option.

Encouraging the establishment and development of trans-European networks and the interoperability of pan-European Services

3.137 ComReg notes the overlap between this objective and the objective of promoting competition in the provision of ECN/ECS. Encouraging the establishment and development of trans-European networks requires that operators from other Member States seeking to develop such networks are given a fair and reasonable opportunity to obtain spectrum rights of use required for such networks and, particularly, access to critical spectrum rights of use. Accordingly, options which would restrict or distort competition or otherwise unfairly discriminate against potential entrants (such as through pricing models which do not incentivise efficient use or encourage low value incumbent not to vacate) would not, in ComReg's view, satisfy the requirements of this objective.

3.138 ComReg notes the case studies completed by DotEcon which shows that fees under Option 1 are at the lower end of the fees range compared to other jurisdictions. With that in mind, the overall Preferred Option would be highly unlikely to restrict the development of trans-European networks because over all fees are broadly the same as Option 1 and any increases are primarily in the order of hundreds of euros. Further, ComReg refers to its preliminary finding that the Overall Preferred Option is highly unlikely to choke off demand for satellite-based services because fees are set at the lowest level subject to recovering administrative costs. Finally, ComReg notes that its preferred Option does not set different charges for specific users or use cases. Such an approach would also be in line with service and technology-neutrality requirements by not preferring existing services and technologies by virtue of incumbency.

Promoting the development of consistent regulatory practice and the consistent application of EU law

3.139 In relation to this aspect of contributing to the development of the internal market, ComReg continues to cooperate with other National Regulatory Authorities ("NRAs"), including closely monitoring developments in other Member States to ensure the development of consistent regulatory practice and consistent implementation of the relevant EC harmonisation measures and relevant aspects of the Common Regulatory Framework.

3.140 For instance, ComReg has had clear regard to international developments in the context of:

- ComReg considered the international aspects of the satellite licensing in Section 3.2 and 3.4 of Document 21/135 and noted that satellite services operate on an international basis and most stakeholders highlighted the

importance of implementing CEPT harmonisation decisions as quickly as possible.

- Annex B of the Second DotEcon report carefully considered SES licensing regimes in other jurisdictions (including fees). ComReg considered same in forming its view on the overall preferred Option. ComReg considered the fees regime in other jurisdictions in other to determine whether ComReg's proposed fees were excessive, considering fees charged in other jurisdictions.

- ComReg issued a Request for Information ("RFI") and received 18 responses from members of the Independent Regulators Group ("IRG")[99] which ComReg issued to gather, among other things, the most up to date information on SES Licensing; and

- ComReg and DotEcon held stakeholder meetings with international equipment manufacturers and vendors to inform its Preferred Option.

3.9.3 Promote the interest of users within the community

3.141 The impact of the Overall Preferred Option and other options on users and stakeholders from a more general perspective and in the context of ComReg's objective to promote competition has been considered in the context of the above RIA and it is not proposed to consider this matter further here.

3.142 ComReg also observes that most measures set out in Section 12(2)(i) to (iv) of the 2002 Act, aimed at achieving this statutory objective, are more relevant to consumer protection, rather than to the management of the radio frequency spectrum.

3.9.4 Efficient use and effective management of spectrum

3.143 Under section 10(1) of the 2002 Act, it is one of ComReg's functions to manage the radio frequency spectrum in accordance with a Policy Direction under section 13 of the 2002 Act. Policy Direction No. 11 of 21 February 2003 requires ComReg to ensure that, in managing spectrum, it takes account of the interests of all users of the radio frequency spectrum (including both commercial and non-commercial users) (see discussion on this policy direction below). Importantly, in pursuing its objective to promote competition under section 12(2)(a), ComReg must also take all reasonable measures to encourage efficient use and ensure effective management of radio frequencies. Section 12(3) of the 2002 Act also requires that in carrying out its functions, ComReg shall seek to ensure that measures taken by it are

[99] The Independent Regulators Group ("IRG") a group of European National Telecommunications Regulatory Authorities (NRAs) that functions as a forum for exchange of best practices and discussions on regulatory challenges in communications between NRAs

proportionate having regard to the objectives set out in section 12.

3.144 Regulation 9(11) of the Authorisation Regulations also provides that ComReg must ensure that radio frequencies are efficiently and effectively used having regard to section 12(2)(a) of the 2002 Act and Regulations 16(1) and 17(1) of the Framework Regulations.

3.145 In relation to Policy Direction No. 11, the draft RIA set out above considers the interests of all users of the radio frequency spectrum (and assesses the extent to which such interests are consistent with ComReg's own statutory obligations), both commercial and non-commercial. ComReg is of the view that the Overall Preferred Option is one that would safeguard and promote those interests. In particular, ComReg refers to the discussion on same in 'Spectrum management and efficiency above'.

3.146 ComReg is of the preliminary view that the Overall Preferred Option complies with the obligations contained in the above statutory provisions. ComReg is also of the preliminary view that Option 1 would fail to satisfy the above provisions to the same extent, if at all considering the increased requirement for bandwidth in the future.

3.9.5 Regulatory Principles

3.147 Under Regulation 16(2) of the Framework Regulations, ComReg must, in pursuit of its objectives under Regulation 16(1) and section 12 of the 2002 Act, apply objective, transparent, non-discriminatory and proportionate regulatory principles by, amongst other things:

- promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods; and
- promoting efficient investment and innovation in ECS networks and infrastructure.

Regulatory Predictability

3.148 ComReg notes that it places importance generally on promoting regulatory predictability and as illustrated below, has complied with this principle in carrying out the current process.

3.149 In the present context, ComReg considers the following objectives to be of particular importance to achieving the aims of this regulatory principle:

- promoting regulatory predictability in relation to availability of spectrum rights to other users of spectrum by applying an open, transparent, and non-discriminatory approach to accessing spectrum for Satellite services; and

- promoting regulatory predictability in relation to ensuring that the process used to determine fees is predictable and not subject to significant change such that it would compromise efficient investments.

3.150 In relation to the first objective, ComReg's approach is consistent with its general treatment of a scarce resource such that rights of use should be assigned to those who value it the most. In that regard, ComReg's scarcity and interference assessment provides clear evidence that spectrum rights of use for Satellite services are not scarce and therefore an administrative cost recovery approach is appropriate having regard to its statutory objectives.

3.151 In relation to the second objective, ComReg refers to its assessment under efficient investment below and its view that the conditions for promoting efficient investment and innovation in new and enhanced infrastructures investment involves ComReg taking its regulatory functions in an appropriate and predictable fashion as provided under Option 2. In that regard, ComReg considered that the timeframe for a satellite project is many years and investors need to know that the regulation will remain appropriate into the future. Therefore, ComReg notes that the fees proposed in this consultation would be unlikely to change save for annual CPI adjustments.

3.152 Considering the above, ComReg is of the view that the Overall Preferred Option complies with the regulatory principle of promoting regulatory predictability.

3.9.6 Efficient Investment and Innovation in New and Enhanced Infrastructures

3.153 ComReg considers that the Overall Preferred Option is consistent with the aims of this regulatory principle for the reasons set out in Section 3.9 3.9. Further, ComReg notes that:

- it provides for a range of outcomes and differentiated services noting that this option has been designed with existing and potential use cases in mind and consulted in detail on same in Document 21/135 and associated documents. ComReg was conscious that lower value (lower bandwidth) use cases may be choked off even within an administrative cost recovery approach and therefore applied an approach which takes account of bandwidth in determining the fees level.

- Its preferred option was informed by engagement with industry stakeholders including a detailed assessment on potential use cases and an analysis recent trends and developments in the satellite industry that might impact on demand and requirements for SESs.

3.154 ComReg also refers to the discussion on same in Efficient Investment and Innovation

in Impact on Competition section above.

3.9.7 Relevant Policy Directions and Policy Statements

3.155 ComReg has taken due account of the Spectrum Policy Statement issued by the then DCENR in September 2010, its Consultation on Spectrum Policy Priorities issued in July 2014 and its Statement of Strategy 2021 to 2023[100]. ComReg notes that the core policy objectives, principles, and priorities set out therein are broadly in line with those set out in the 2002 Act and in the European Electronic Communications Code (which has repealed the Common Regulatory Framework) and, in turn, with those followed by ComReg in identifying the Overall Preferred Option.

3.156 Section 12(4) of the 2002 Act requires ComReg, in carrying out its functions, to have regard to policy statements, published by or on behalf of the Government or a Minister of the Government and notified to it, in relation to the economic and social development of the State. Section 13 of the 2002 Act requires ComReg to comply with any policy direction given to ComReg by the Minister as he or she considers appropriate to be followed by ComReg in the exercise of its functions.

3.157 ComReg considers below those Policy Directions which are most relevant in this regard (and which have not been considered elsewhere in this chapter).

Policy Direction No.3 of 21 February 2003 on Broadband Electronic Communication Networks

3.158 This Policy Direction provides that:

> *"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."*

3.159 The purpose of this Policy Direction was to ensure that the regulatory framework for electronic communications plays its part in contributing to the achievement of the then Government's objectives regarding the rollout of broadband networks.

3.160 ComReg is cognisant of the fact that the three-year objective described in this policy direction has long since expired. In any case, ComReg is of the view that the Preferred Option is aligned with the objectives of the current Programme for

[100] https://www.gov.ie/en/publication/1a70d-statement-of-strategy-2021-2023/

Government. For example, in its Impact on Competition assessment above, ComReg recognises that some satellite services might be competing for end users with terrestrial services, (e.g., for rural broadband provision) and considered the extent to which such issues may arise in designing the SES regime. However, ComReg agreed with the views of DotEcon that precluding access to the market is unlikely because Satellite operators have a reasonable amount of flexibility when planning their networks and the impact of any blocking behaviour would be very marginalised.

Policy Direction No. 4 of 21 February 2003 on Industry Sustainability

3.161 This Policy Direction provides that:

> *"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".*

3.162 The purpose of this policy direction is to ensure that any regulatory decisions take due account of the potential impact on the sustainability of industry players, considering the business cycle at the time such decisions are taken.

3.163 ComReg observes that this policy direction concerns the sustainability of the industry rather than the position of individual players. In that regard, ComReg notes that total fees are broadly stable under its preferred option and may reduce depending on how licensees decide to deploy their networks in the future.

3.164 Notwithstanding, in its RIA above, ComReg has considered the impact of its Preferred Option in the context of all industry stakeholders, including different types of industry stakeholders, and refers the financial impact on these stakeholders in the Impact on Stakeholders section above. This shows that while Option 4 may result in some very modest increases for certain stakeholders, and in most cases in the order of hundreds of euros, this is highly unlikely to threaten industry sustainability.

Policy Direction No. 11 of 21 February 2003 on the Management of the Radio Frequency Spectrum

3.165 This Policy Direction provides that:

> *"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".*

3.166 The purpose of this policy direction is to ensure that ComReg achieves an appropriate balance between the interests of various users of the radio frequency spectrum the respective interests of commercial and non-commercial user.

3.167 In carrying out the draft RIA, ComReg has considered the Preferred Option in light of the interests of various categories of industry stakeholders and consumers. ComReg considered whether interference and scarcity issues would arise and noted that even where such interference might arise users could coordinate sufficiently to overcomes such issues.

3.168 ComReg is of the view, therefore, that it has complied with this requirement in carrying out the RIA and that the Preferred Option is the one that best serves the interests of all users of the radio frequency spectrum and strikes an appropriate balance where those interests may conflict.

General guiding principles (in terms of spectrum management, licence conditions and setting of licence fees)

3.169 ComReg notes that it is required to comply with the guiding principles of objectivity, transparency, non-discrimination, and proportionality in carrying out its functions under the 2002 Act and under the European Electronic Communications Code (which has repealed the Common Regulatory Framework). In relation to the current process, ComReg considers that these principles are most relevant in terms of its functions concerning spectrum use and management, attaching conditions to rights of use and the setting of licence fees.

3.170 In relation to spectrum management and use, ComReg notes that:

- Regulation 11(2) of the Authorisation Regulations requires that ComReg grants rights of use for radio frequencies based on selection criteria which are objective, transparent, non-discriminatory, and proportionate; and

- the regulatory principle set out in Regulation 16(2) of the Framework Regulations requires ComReg in pursuing its objectives to apply objective, transparent, non-discriminatory, and proportionate regulatory principles by, amongst other things, ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks and services.

3.171 ComReg notes that the above guiding principles are Irish and EU law principles that ComReg abides by generally in carrying out its day-to-day regulatory functions.

3.172 ComReg is of the view, having regard to the applicable legislation and legal principles, its draft RIAs and other analyses, its expert advice and reports, and the material to which it has had regard, that the Overall Preferred Option is objectively justified, transparent, proportionate, and non-discriminatory. In particular, the preferred option:

- is objectively justified given the detailed assessment provided in this RIA, including that it would be unlikely to distort or restrict competition and it better encourages the efficient use of the radio spectrum;
- would not give rise to discrimination in the treatment of undertakings because:
    - fees are based solely on administrative cost recovery and the allocation of these costs varies only in so much as a licensee requires more bandwidth; and
    - any change in fees arising from the Overall Preferred Option arise because the situation of some licensees is materially different from the other (i.e. some licensees have higher bandwidth requirements).
- whether fees increase, or decrease does not depend on the stakeholder but rather on the bandwidth;
- is transparent because, among other things:
    - the methodology is set out in Chapter 3 and the DotEcon Report whereby fees are determined based on a concave approach
    - ComReg provides an assessment of the impact on stakeholders (including financial impact) in the RIA above; and
    - the fees Chapter sets out how the preferred option would be implemented, including examples of same.
- is proportionate because, among other things:
    - the preferred option would accord with ComReg's statutory objectives and regulatory principles as described above;
    - there do not appear to be less onerous means by which these objectives and principles could be achieved; and
    - ComReg relies primarily on its information policy (discussed at the outset of the RIA) rather than fees to achieve its statutory functions, objectives and duties.

Conclusion

3.173 In light of the above, ComReg is satisfied that the Preferred Option complies with

those statutory functions, objectives and duties relevant to its management of the radio frequency spectrum.

4 Draft Decision

4.1 This chapter sets out ComReg's draft decision document based on the views expressed by ComReg in the preceding chapters and their supporting annexes.

Please note: The Regulations made by the Minister for Communications for the purpose of transposing the European Electronic Communications Code, namely the European Union (Electronic Communications Code) Regulations 2022, SI No. 444 of 2022, have yet, at the time of publication of this Consultation, to be commenced and the legal basis for this response to consultation and draft decision is accordingly the suite of regulations made in 2011 including in particular the Framework Regulations and the Access Regulations. Were the Electronic Communications Code Regulations to be commenced prior to the adoption of ComReg's final decision, ComReg will adopt its final decision referring to the relevant Regulations as appropriate. For the purpose of this response to consultation and draft decision, references to both the 2011 set of Regulations and to the Electronic Communications Code Regulations have been included.

Decision

1. DEFINITIONS AND INTERPRETATION

1. In this Decision, save where the context otherwise admits or requires:

"Authorisation Regulations" means the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations, 2011 (S.I. No. 335 of 2011);

"Communications Regulation Act 2002" means the Communications Regulation Act, 2002, (No. 20 of 2002), as amended;

"ComReg" means the Commission for Communications Regulation, established under section 6 of the Communications Regulation Act 2002;

"ECC Regulations" means the European Union (Electronic Communications Code) Regulations 2022, S.I. No. 444 of 2022

"Electronic Communications Network" and **"Electronic Communications Service"** have the meanings assigned to them in the Framework Regulations;

"Framework Regulations" means the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011, (S.I. No. 333 of 2011);

"Minister" means the Minister of Environment, Climate and Communications*;*

"**Licence**" means a licence granted in accordance with section 5 of the Act of 1926 in accordance with and subject to the matters prescribed in these Regulations to keep, have possession of, install, maintain, work and use Apparatus in a specified place in the State granted to the licensee

"**Duration of Licence**" means the duration of time from the commencement date that of a Licence;

"**Licence Fee**" means the fee for Satellite Earth Stations as set out in draft form in Schedule 2 to the Satellite Earth Station Regulations;

"**Renewal of Licence**" means a licence may be renewed from time to time by the Commission set out in the Satellite Earth Station Regulations;

"**Satellite Earth Station**" means apparatus for wireless telegraphy, located on the Earth's surface, intended for either the transmission of radio signals to a Space Station or the reception of radio signals from a Space Station;

"**Temporary Licence**" means a licence that is only valid for a limited time; and

"Wireless Telegraphy Act 1926" means the Wireless Telegraphy Act, 1926 (No. 45 of 1926), as amended.

2. DECISION-MAKING CONSIDERATIONS

2. In arriving at its decisions in this document, ComReg has had regard to:

   I. the contents of, and the materials and reasoning referred to in, as well as the materials provided by respondents in connection with, the below-listed ComReg documents (insofar as they are relevant to the present Draft Decision):

      a) ComReg Documents 21/135 and 22/56;

      b) ComReg Document 23/32 [document to which this draft Decision including draft Regulations is attached]; and

      c) the consultants' reports commissioned, and the advice obtained by ComReg, in relation to the subject-matter of the documents and materials listed above (insofar as they are relevant to the present decision) and, in particular, ComReg documents 21/135a, 22/56a, 23/32a and 23/32b;

II. the powers, functions, objectives and duties of ComReg, including, without limitation those under and by virtue of:

a) the Communications Regulation Act 2002, and, in particular, sections 10, 12 and 13 thereof;

b) the Framework Regulations, and, in particular, Regulations 13, 16 and 17 thereof / Regulations 4, 17 and 27 of the ECC Regulations;

c) the Authorisation Regulations, and, in particular, Regulations 9, 10, 11, 12, 15, 16, 17, 18(1)(c) and 19 thereof / Regulations 9, 14, 20, 24, 28, 36, 99(1)(c), 105 and 110 of the ECC Regulations;

d) Sections 5 and 6 of the Wireless Telegraphy Act, 1926; and

e) the applicable Policy Directions made by the Minister under section 13 of the Communications Regulation Act 2002.

III. and, noting that it has given all interested parties the opportunity to express their views and make their submissions in accordance with Regulation 11 of the Authorisation Regulations / Regulation 36 of the ECC Regulations and Regulation 12 of the Framework Regulations / Regulation 101 of the ECC Regulations.

3. DECISIONS

3. Having had regard to the above considerations, ComReg has decided:

I. subject to obtaining the consent of the Minister to the making by it of the Satellite Earth Station Licence Regulations, to make those regulations under section 6 of the Wireless Telegraphy Act 1926, prescribing relevant matters in relation to Satellite Earth Stations, including prescribing the form of the Licences concerned, their duration, fees, and the conditions and restrictions subject to which they are granted.

II. to grant Satellite Earth Station Licences, under section 5 of the Wireless Telegraphy Act 1926 to relevant applicants subject to the conditions and restrictions (including conditions as to suspension and withdrawal), prescribed in the Satellite Earth Station Regulations as currently set out in Annex 3 of Document 23/32 [this document]

Duration and Renewal of Licence

III. that a Licence shall, unless it has been revoked, withdrawn or surrendered, remain in force from the date of grant for a period of one year unless renewed.

IV. that a Temporary Licence shall, unless it has been revoked, withdrawn or surrendered, remain in force from the date of grant until the expiry date as specified in the licence, which shall not be greater than an eleven (11) month period, and shall not be renewed.

Licence Fees

V. that the Licence Fee shall be calculated in accordance with Schedule 2 as set out in the Satellite Earth Station Licence Regulations.

VI. the Licence Fee for any period of less than one year shall be calculated on a pro rata basis for such period.

VII. that if a Licence is surrendered by the Licensee, the Licensee may be entitled to a refund of the relevant Licence Fee on a pro rata daily basis.

VIII. that if a Licence is suspended or withdrawn due to a finding by ComReg of non-compliance with any relevant licence conditions, the Licensee shall not be entitled to be repaid any part of the Licence Fee paid by the Licensee, but shall still be liable to pay any sums, including interest, that are outstanding.

IX. that if the amount of radio frequency spectrum specified in a Licence is reduced, the Licensee may be entitled to a refund of the relevant Licence Fee already paid in the relevant year on a pro rata daily basis having regard to the nature of the amendment.

4. STATUTORY POWERS NOT AFFECTED

4. Nothing in this document shall operate to limit ComReg in the exercise of its discretions or powers, or the performance of its functions or duties, or the attainment of objectives under any laws applicable to ComReg from time to time.

Chapter 4

5 Submitting Comments and Next Steps

5.1 Submitting Comments

5.1 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 or the relevant accompanying consultant's report.

5.2 Please also set out your reasoning and all supporting information for any views expressed.

5.3 The consultation period will run until 17:00 on 28 April 2023 during which time ComReg welcomes written comments on any issues raised in this paper.

5.4 Submissions must be provided in written form (e-mail) to marketframeworkconsult@comreg.ie, clearly marked – "**Submissions to ComReg Document 23/32"**.

5.5 Electronic submissions should be submitted in an unprotected format so that they may be readily included in the ComReg submissions document for electronic publication.

5.6 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[101]).

5.7 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:

1. Preferably, submit both a non-confidential version and a confidential version of the response. The confidential version must have all confidential information clearly marked and highlighted in accordance with the instruction set out below and include the reasons as to why they consider any particular material to be

[101] ComReg Document 05/24, "*Guidelines on the treatment of confidential information*", published 22 March 2005, available at www.comreg.ie

confidential. The separate non-confidential version must have actually redacted all items that were marked and highlighted in the confidential version.

OR

2. Submit only a confidential version including the reasons as to why they consider any particular 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 nonconfidential redacted version and the respondent will have to provide the redacted non-confidential version in accordance with option A above.

5.8 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 particular 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% ✂].”

5.2 Next Steps

5.9 Following receipt and consideration of submissions in response to this draft Decision, and other relevant material, ComReg intends to publish a response to this draft Decision together with its final Decision including Regulations.

Annex 1: Non-Geostationary Satellite Earth Station Coordination Process

A 1.1 Non-Geostationary Orbit satellite ("NGSO") systems are inherently more complex than traditional geostationary systems as they utilise constellations comprised of hundreds of satellites in multiple low Earth orbital planes. These satellite systems are in motion so they must be tracked by steerable SES antennas. This contrasts with geostationary systems where the antenna points to a single satellite in the Clarke belt[102]. With steerable SES antennas operating at lower elevations the interference environment around NGSO SESs is more complex.

A 1.2 Recognising that the potential for harmful interference is greater for NGSO SESs, the ITU has defined Equivalent Power Flux Density ("EPFD") limits in the Radio Regulations to protect GSO networks from NGSO systems. There are also limits on GSO networks in Article 22 and Resolution 169 to protect NGSO systems. The antenna radiation pattern envelope must meet the minimum performance specified by ITU-R Recommendation ITU-R S.465, or ITU-R.S.580. The component of effective isotropic radiated power directed towards the horizon and the minimum elevation[103] angle above the horizontal must comply with ITU Regulations and not exceed those limits specified by Radio Regulations 21.8 – 21.15.

A 1.3 While coordination is a requirement under the ITU Radio Regulations these regulations only address coordination between different countries and do not consider the specific locations of SESs within an individual state. Therefore, due the possibility of overlapping portions of the spectrum being allocated to multiple operators, ITU coordination alone may not always be sufficient to guarantee harmonious coexistence of multiple SESs within the state. It may be necessary to have significant physical separation (tens of kilometres) between SESs to minimize interference. Therefore, inter operator coordination is beneficial in mitigating interference issues and ensuring the efficient use of the radio spectrum.

A 1.4 To assure coexistence with existing Licensees, applicants for SES licences (new licences and amendments to existing Licences) to operate with a NGSO system must demonstrate how coexistence is possible between their proposed non-

[102] The Clarke Belt is term used to describe a Geostationary Orbit. A Geostationary Orbit is a Geosynchronous Orbit which is located at a latitude of zero degrees, directly above the Earth's Equator.
[103] ITU Radio Regulation 21.14 stipulates that Earth station antennas shall not be employed for transmission at elevation angles of less than 3 degrees measured from the horizontal plane to the direction of maximum radiation.

geostationary satellite gateway and:

a) existing non-geostationary satellite gateways that are already licensed;

b) non-geostationary satellite systems for which an application has been made and which has been published for comment on ComReg's website; and

c) other co-frequency SESs registered with the ITU.

A 1.5 ComReg's notification process enables interested parties to submit any views they have on a proposed SES regarding, for example, potential harmful interference or the potential impact on future SES deployments. The notification process provides transparency to all interested parties and allows ComReg to consider views regarding SES deployments operating with NGSO systems [104]. The notification process does not conflict with nor attempt to replace the ITU procedures.

A 1.6 The following steps in the notification process are as follows:

Step 1 Prior to submitting an application, applicants should seek to have an agreement with regards to coexistence with relevant Licensees. The agreement can be either an ITU coordination agreement and/or a local coordination agreement whereby the relevant parties agree to work together to mitigate any potential harmful interference and to existing and future SES deployments in Ireland.

If no such agreement exists, the applicant should set out in detail, in their application, how the proposed SES would coexist with existing and future SES deployments. The applicant needs to set out in detail what measures can be put in place, by either the applicant and/or existing/future Licensees, to achieve coexistence, and provide an assessment of the potential impact on network availability and throughput for existing or future SES deployments. The information provided by the applicant would be subject to the provisions of ComReg's guidelines on the treatment of confidential information as set out in Document 05/24[105].

ComReg will review the application and assess whether applicant has provided a detailed plan with sufficient information for how coexistence can be achieved.

[104] Document11/34a sets out that ComReg is fully committed to a transparent consultation process and recognises that public policymaking can be enhanced through the active involvement and contribution of all stakeholders with an interest in particular policy developments. By ensuring that interested parties can express their views about a particular proposal, the decision-making process becomes better informed, more rigorous and more accountable. See ComReg Document 11/34a – Information Notice on ComReg Consultation Procedures – published 6 May 2011

[105] ComReg Document 05/24, "*Guidelines on the treatment of confidential information*", published 22 March 2005, available at www.comreg.ie

Step 2 ComReg will review the application and assess whether the applicant has provided a detailed plan with sufficient information for how coexistence can be achieved and may seek further information or seek clarity on specific points from the applicant.

Step 3 ComReg would then publish an Information Notice setting out the relevant information of the proposed SES and the applicant's proposals regarding coexistence with existing and future services. Interested parties will be invited to provide any views they may have on the proposed SES. Where an interested party is of the view that an SES Licence should not be granted, they will be required to provide evidence as to why the coexistence measures provided by the applicant will not succeed in limiting the impact to existing or future licensees. This shall include setting out why, in their view, the proposed coexistence measures are insufficient or unreasonable.

An existing licensee would need to provide sufficient evidence of harmful interference issues from any proposed new SES or use of a frequency band beyond a certain distance (20km) of their site. ComReg intends to reserve the right to address any disputes on a case-by-case basis, for example considering any perceived abuse of the system or lack of coordination efforts on the part of an incumbent Licensee.

Step 4 ComReg will then carefully consider any submissions before making a decision regarding the granting of an SES licence. Where required, ComReg may seek clarifications or additional information from the applicant on foot of any submissions received.

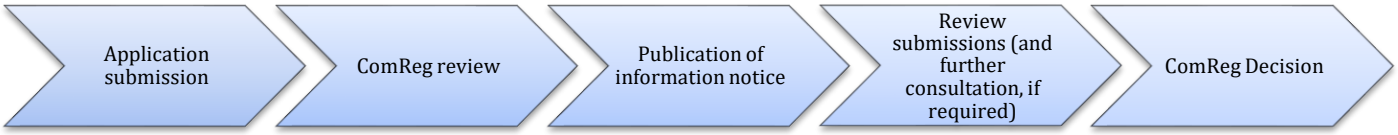

Figure 3: Overview of notification process

Annex 2: Relevant Legal Framework

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.

The Communications Regulation and Digital Hub Development Agency (Amendment) Act 2023 and the Regulations made by the Minister for Communications for the purpose of transposing the European Electronic Communications Code, namely the European Union (Electronic Communications Code) Regulations 2022, SI No. 444 of 2022 ("ECC Regulations"), have yet, at the time of publication of this Consultation, to be commenced. The relevant legal framework is accordingly the suite of regulations made in 2011 including in particular the Framework Regulations and the Access Regulations. Should the Electronic Communications Code Regulations be commenced prior to the adoption of ComReg's final decision, ComReg will adopt its final decision referring to the relevant Regulations as appropriate. For the purpose of this annex references to both the 2011 set of Regulations and to the ECC Regulations have been included.

A 2.1 The Communications Regulation Act 2002 (as amended by the Communications Regulation (Amendment) Act 2007) (the "2002 Act"), the European Electronic Communications Code (which has repealed the EU Common Regulatory Framework, namely the Framework and Authorisation Directives);[106] the corresponding Framework and Authorisation Regulations[107](which must be read in light of the EECC), and the Wireless Telegraphy Acts 1926 to 2009[108] 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 Response to Consultation and draft Decision document including draft Regulations.

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

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

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

A 2.2 Apart from licensing and making regulations in relation to licences, ComReg's functions include the management of Ireland's radio frequency spectrum in accordance with ministerial Policy Directions under Section 13 of the 2002 Act, having regard to its objectives under Section 12 of the 2002 Act, Regulation 16 of the Framework Regulations and relevant provisions of the European Electronic Communications Code. ComReg is to carry out its functions effectively, and in a manner serving to ensure that the allocation and assignment of radio frequencies is based on objective, transparent, non-discriminatory and proportionate criteria.

A 2.3 On 20 December 2018, Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code ("EECC") entered into force.

A 2.4 It is important to note that further to Article 125 ("Repeal") of the EECC, with effect from 21 December 2020, the EECC replaced the EU Common Regulatory Framework adopted in 2002 (and amended in 2009) under which ComReg has regulated electronic communications since 2003[109].

A 2.5 With some limited exceptions (see Article 124 of the EECC), Member States had until 21 December 2020 to transpose the EECC into national law[110]. The DECC is responsible for the transposition of the EECC[111] and ComReg has assisted the DECC in that regard as appropriate.

A 2.6 The Communications Regulation and Digital Hub Development Agency (Amendment) Act 2023 and the Regulations made by the Minister for Communications for the purpose of transposing the European Electronic Communications Code, namely the European Union (Electronic Communications Code) Regulations 2022, SI No. 444 of 2022, have yet, at the time of publication of this Consultation, to be commenced.

A 2.7 For the avoidance of doubt, electronic communications providers must continue to comply with their obligations, and ComReg will continue to regulate the electronic communications sector under its existing powers, and redress mechanisms for customers will continue unchanged until new legislation is commenced.

A 2.8 Notwithstanding, and for the avoidance of doubt, ComReg is satisfied that, to the best of its knowledge, the proposals contained in this document will not conflict with the objectives of the EECC or the obligations likely to be imposed on ComReg

[109] For the correlation table between relevant articles of the repealed Directives and the EECC, please see Annex XIII of the EECC available here- EUR-Lex - 02018L1972-20181217 - EN - EUR-Lex (europa.eu)
[110] With the exception of Articles 53(2), (3) and (4), and Article 54 (See Article 124).
[111] See, for example, https://assets.gov.ie/162712/1d774c6b-55d4-4b04-9253-8be6f24fb3ba.pdf

under national legislation implementing same.

A 2.9 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 Common Regulatory Framework

A 2.10 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. It'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[112];
- Contribute to the development of the internal market[113];
- Promote the interests of users within the Community[114]; and
- Unless otherwise provided for in Regulation 17 of the Framework Regulations[115], take the utmost account of the desirability of technological neutrality in complying with the requirements of the Specific Regulations[116] in particular those designed to ensure effective competition.[117]

Efficient management and use of the radio frequency spectrum

Framework Regulations

A 2.11 Regulation 17 of the Framework Regulations governs the management of radio frequencies of ECS. Regulation 17(1) requires that ComReg, subject to any directions issued by the Minister pursuant to Section 13 of the 2002 Act and having

[112] Section 12 (1)(a)(i) of the 2002 Act.
[113] Section 12 (1)(a)(ii) of the 2002 Act.
[114] Section 12(1)(a)(iii) of the 2002 Act.
[115] Note that management of radio spectrum, currently governed by Regulation 17 of the Framework Regulations, is provided for under Regulation 27 of the ECC Regulations
[116] The 'Specific Regulations' comprise collectively the Framework Regulations, the Authorisation Regulations, the European Communities (Electronic Communications Networks and Services) (Access) Regulations 2011 (S.I. No. 334 of 2011), the European Communities (Electronic Communications Networks and Services) (Universal Service and Users' Rights) Regulations 2011 (S.I. 337 of 2011) and the European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations 2011 (S.I. No. 336 of 2011).
[117] Regulation 16(1)(a) of the Framework Regulations.

regard to its objectives under Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations and the provisions of Article 8a of the Framework Directive[118], ensure:

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

A 2.12 Regulation 17(2) provides that, unless otherwise provided in Regulation 17(3), ComReg must ensure that all types of technology used for ECS may be used in the radio frequency bands that are declared available for ECS in the Radio Frequency Plan published under Section 35 of the 2002 Act in accordance with EU law.

A 2.13 Regulation 17(3) provides that, notwithstanding Regulation 17(2), ComReg may, through licence conditions or otherwise, provide for proportionate and non-discriminatory restrictions to the types of radio network or wireless access technology used for ECS where this is necessary to:

- avoid harmful interference;
- protect public health against electromagnetic fields;
- ensure technical quality of service;
- ensure maximisation of radio frequency sharing;
- safeguard the efficient use of spectrum; or

[118] Broadly equivalent to Article 4 of the EECC.

- 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 A4.14 Regulation 17(4) requires that, unless otherwise provided in Regulation 17(5), ComReg must ensure that all types of ECS may be provided in the radio frequency bands, declared available for ECS in the Radio Frequency Plan published under Section 35 of the Act of 2002 in accordance with EU law.

A 2.14 Regulation 17(5) 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 2.15 Regulation 17(6) requires that measures that require an ECS to be provided in a specific band available for ECS must be justified in order to ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in conformity with EU law such as, but not limited to:

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

A 2.16 Regulation 17(7) 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 defined by or on behalf of the Government or a Minister of the Government.

A 2.17 Regulation 17(8) provides that ComReg must, in accordance with Regulation 18, regularly review the necessity of the restrictions referred to in Regulations 17(3) and 17(5) and must make the results of such reviews publicly available.

A 2.18 Regulation 17(9) provides that Regulations 17(2) to (7) only apply to spectrum allocated to be used for ECS, general authorisations issued and individual rights of use for radio frequencies granted after 1 July 2011. Spectrum allocations, general authorisations and individual rights of use which already existed on 1 July 2011 are subject to Regulation 18 of the Framework Regulations.

A 2.19 Regulation 17(10) provides that ComReg may, having regard to its objectives under Section 12 of the 2002 Act and Regulation 16 and its functions under the

Specific Regulations, lay down rules in order to prevent spectrum hoarding, in particular by setting out strict deadlines for the effective exploitation of the rights of use by the holder of rights and by withdrawing the rights of use in cases of non-compliance with the deadlines. Any rules laid down under this Regulation must be applied in a proportionate, non-discriminatory and transparent manner.

A 2.20 Regulation 17(11) requires ComReg to, in the fulfilment of its obligations under that Regulation, respect relevant international agreements, including the ITU-RR and any public policy considerations brought to its attention by the Minister.

Authorisation Regulations

Decision to limit rights of use for radio frequencies

A 2.21 Regulation 9(2) of the Authorisation Regulations[119] provides that ComReg may grant individual rights of use for radio frequencies by way of a licence where it considers that one or more of the following criteria are applicable:

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

A 2.22 Regulation 9(10) of the Authorisation Regulations provides that ComReg must not limit the number of rights of use for radio frequencies to be granted except where this is necessary to ensure the efficient use of radio frequencies in accordance with Regulation 11[120].

A 2.23 Regulation 9(7) also provides that:

[119] Note authorisation of use of radio spectrum, currently provided for by Regulation 9 of the Authorisation regulations will be provided for under Regulation 28 of the ECC Regulations

[120] Note procedures for limiting the number of rights of use to be granted for radio spectrum, currently governed by Regulation 11 of the Authorisation Regulations, is provided for under Regulation 36 of the ECC Regulations

- where individual rights of use for radio frequencies are granted for a period of 10 years or more and such rights may not be transferred or leased between undertakings in accordance with Regulation 19 of the Framework Regulations[121], ComReg must ensure that criteria set out in Regulation 9(2) apply for the duration of the rights of use, in particular upon a justified request from the holder of the right.

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

Publication of procedures

A 2.24 Regulation 9(4)(a) of the Authorisation Regulations requires that ComReg, having regard to the provisions of Regulation 17 of the Framework Regulations, establish open, objective, transparent, non-discriminatory and proportionate procedures for the granting of rights of use for radio frequencies and cause any such procedures to be made publicly available.

Duration of rights of use for radio frequencies

A 2.25 Regulation 9(6) of the Authorisation Regulations provides that rights of use for radio frequencies must be in force for such period as ComReg considers appropriate having regard to the network or service concerned in view of the objective pursued taking due account of the need to allow for an appropriate period for investment amortisation.

Conditions attached to rights of use for radio frequencies

A 2.26 Regulation 9(5) of the Authorisation Regulations provides that, when granting rights of use for radio frequencies, ComReg must, having regard to the provisions of Regulations 17 and 19 of the Framework Regulations, specify whether such rights may be transferred by the holder of the rights and under what conditions such a transfer may take place.

A 2.27 Regulation 10(1) of the Authorisation Regulations[122] provides that, notwithstanding Section 5 of the Wireless Telegraphy Act,1926, but subject to any regulations under Section 6 of that Act, ComReg may only attach those conditions

[121] Note that transfer or lease of individual rights of use for radio spectrum, currently governed by Regulation 19 of the Framework Regulations are provided for under Regulation 33 of the ECC Regulations

[122] Note that conditions attached to rights of use for radio spectrum, currently government by Regulation 10 of the Authorisation Regulations are provided for under Regulation 9 of the ECC Regulations

listed in Part B of the Schedule to the Authorisation Regulations. Part B lists the following conditions which may be attached to rights of use:

- Obligation to provide a service or to use a type of technology for which the rights of use for the frequency has been granted including, where appropriate, coverage and quality requirements.
- Effective and efficient use of frequencies in conformity with the Framework Directive[123] and Framework Regulations.
- Technical and operational conditions necessary for the avoidance of harmful interference and for the limitation of exposure of the general public to electromagnetic fields, where such conditions are different from those included in the general authorisation.
- Maximum duration in conformity with Regulation 9, subject to any changes in the national frequency plan.
- Transfer of rights at the initiative of the rights holder and conditions of such transfer in conformity with the Framework Directive[124].
- Usage fees in accordance with Regulation 19[125].
- Any commitments which the undertaking obtaining the usage right has made in the course of a competitive or comparative selection procedure.
- Obligations under relevant international agreements relating to the use of frequencies.
- Obligations specific to an experimental use of radio frequencies.

A 2.28 Regulation 10(2) also requires that any attachment of conditions under Regulation 10(1) to rights of use for radio frequencies must be non-discriminatory, proportionate and transparent and in accordance with Regulation 17 of the Framework Regulations.

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

A 2.29 Regulation 11(1) of the Authorisation Regulations[126] provides that, where

[123] Note that the Framework Directive has now been replaced by the EECC.
[124] Note that the Framework Directive has now been replaced by the EECC.
[125] Note that fees for rights of use for radio spectrum currently governed by Regulation 19 of the Authorisation Regulations are provided for under Regulation 24 of the ECC Regulations
[126] Note that procedures for limiting the number of rights of use to be granted for radio spectrum, currently governed by Regulation 11 of the Authorisation Regulations are provided for under Regulation 36 of the Code Regulations

ComReg considers that the number of rights of use to be granted for radio frequencies should be limited it must, without prejudice to Sections 13 and 37 of the 2002 Act:

- give due weight to the need to maximise benefits for users and to facilitate the development of competition, and
- give all interested parties, including users and consumers, the opportunity to express their views in accordance with Regulation 12 of the Framework Regulations[127].

A 2.30 Regulation 11(2) of the Authorisation Regulations requires that, when granting the limited number of rights of use for radio frequencies it has decided upon, ComReg does so "…on the basis of selection criteria which are objective, transparent, non-discriminatory and proportionate and which give due weight to the achievement of the objectives set out in Section 12 of the 2002 Act and Regulations 16 and 17 of the Framework Regulations."

A 2.31 Regulation 11(4) provides that where it decides to use competitive or comparative selection procedures, ComReg must, inter alia, ensure that such procedures are fair, reasonable, open and transparent to all interested parties.

Fees for spectrum rights of use

A 2.32 Regulation 19 of the Authorisation Regulations permits ComReg to impose fees for rights of use which reflect the need to ensure the optimal use of the radio frequency spectrum.

A 2.33 ComReg is required to ensure that any such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and take into account the objectives of ComReg as set out in Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations[128]. It should be noted that Article 42 of the EECC contains provisions relating to "Fees for rights of use for radio spectrum and rights to install facilities" and provides at Article 42(1) that: "Member States may allow the competent authority to impose fees for the rights of use for radio spectrum or rights to install facilities on, over or under public or private property that are used for the provision of electronic communications networks or services and associated facilities which ensure the optimal use of those resources. Member States shall ensure that such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and shall take into account the general objectives of this

[127] Note that consultancy and transparency mechanism, currently governed by Regulation 12 of the Framework Regulations is provided for under Regulation 101 of the ECC Regulations

[128] Note that objectives of the regulator, currently governed by Regulation 16 of the Framework Regulations is provided for under Regulation 4 of the ECC Regulations

Directive." Article 42(2) provides that: "With respect to rights of use for radio spectrum, Member States shall seek to ensure that applicable fees are set at a level which ensures efficient assignment and use of radio spectrum, including by: (a) (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) (c) applying, to the extent possible, payment arrangements linked to the actual availability for use of the radio spectrum.[129]

Amendment of rights and obligations

A 2.34 Regulation 15 of the Authorisation Regulations[130] permits ComReg to amend rights and conditions concerning rights of use, provided that any such amendments may only be made in objectively justified cases and in a proportionate manner, following the process set down in Regulation 15(4).

Other Relevant Legislation and Policy Instruments

Wireless Telegraphy Act, 1926 (the "1926 Act")

A 2.35 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 2.36 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 revocation) as may be prescribed in regard to it by regulations made by ComReg under Section 6.

A 2.37 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 2.38 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;

[129] Article 42 of the EECC is reflected in Regulation 24 of the ECC Regulations.

[130] Note that amendment of rights and obligations, currently governed by Regulation 15 of the Authorisation Regulations is provided for under Regulation 14 of the ECC Regulations

- 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 2.39 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 2.40 Regulation 10(1) of the Authorisation Regulations provides that, notwithstanding section 5 of the Act of 1926 but subject to any regulations made under section 6 of that Act, where ComReg attaches conditions to rights of use for radio frequencies, it may only attach such conditions as are listed in Part B of the Schedule to the Authorisation Regulations.

Broadcasting and Other Media Regulation Acts 2009 and 2022 (the "2009and 2022 Acts")

A 2.41 Section 132 of the 2009 and 2022 Acts 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 and 2022 Acts; and
- a minimum of four DTT multiplex licences to the Coimisiún na Meán by request (see Sections 132(3) and (4) of the 2009 and 2022 Acts) for the provision of commercial TV content.

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

A 2.42 Article 4 of the Competition Directive provides that:

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

Radio Spectrum Policy Programme

A 2.43 On 15 February 2012, the European Parliament adopted 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 2.44 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.*
>
> *2. For the purposes of the first subparagraph of paragraph 1 and without prejudice to the application of competition rules and to the measures adopted by Member States in order to achieve general interest objectives in accordance with Article 9(4) of Directive 2002/21/EC, Member States may adopt, inter alia, measures:*
>
> *(a) limiting the amount of spectrum for which rights of use are granted to any undertaking, or attaching conditions to such rights of use, such as the provision of wholesale access, national or regional roaming, in certain bands or in certain groups of bands with similar characteristics, for instance the bands below 1 GHz allocated to electronic communication services. Such additional conditions may be imposed only by the competent national authority;*

(b) reserving, if appropriate in regard to the situation in the national market, a certain part of a frequency band or group of bands for assignment to new entrants;

(c) refusing to grant new rights of use of spectrum or to allow new spectrum uses in certain bands, or attaching conditions to the grant of new rights of use of spectrum or to the authorisation of new spectrum uses, in order to avoid the distortion of competition by any assignment, transfer or accumulation of rights of use;

(d) prohibiting or imposing conditions on transfers of rights of use of spectrum, not subject to national or Union merger control, where such transfers are likely to result in significant harm to competition; and

(e) amending the existing rights in accordance with Directive 2002/20/EC where this is necessary to remedy ex post the distortion of competition by any transfer or accumulation of rights of use of radio frequencies.

3. Where Member States wish to adopt any measures referred to in paragraph 2 of this Article, they shall act in conformity with the procedures for the imposition or variation of such conditions on the rights of use of spectrum laid down in Directive 2002/20/EC.

4. Member States shall ensure that the authorisation and selection procedures for electronic communications services promote effective competition for the benefit of citizens, consumers and businesses in the Union."

Policy Directions[131]

A 2.45 Section 12(4) of the 2002 Act provides that, in carrying out its functions, ComReg must have appropriate regard to policy statements, published by or on behalf of the Government or a Minister of the Government and notified to the Commission, in relation to the economic and social development of the State. Section 13(1) of the 2002 Act requires ComReg to comply with any policy direction given to ComReg by the Minister for Communications, Energy and Natural Resources ("the Minister") as he or she considers appropriate, in the interests of the proper and effective regulation of the electronic communications market, the management of the radio frequency spectrum in the State and the formulation of policy applicable to such proper and effective regulation and management, to be followed by ComReg in the exercise of its functions. Section 10(1)(b) of the 2002 Act also requires ComReg, in managing the radio frequency spectrum, to do so in accordance with a direction of the Minister under section 13 of the 2002 Act, while Section 12(1)(b) requires ComReg to ensure the efficient management and use of

[131] 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

the radio frequency spectrum in accordance with a direction under Section 13.

A 2.46 The Policy Directions which are most relevant in this regard include the following:

Policy Direction No.3 on Broadband Electronic Communication Networks

A 2.47 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 2.48 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 2.49 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 2.50 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 2.51 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 2.52 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 2.53 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 2.54 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 2.55 In so far as the promotion of competition is concerned, Regulation 16(1)(b) of the Framework Regulations also requires ComReg to:

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

A 2.56 Regulation 9(11) of the Authorisation Regulations also provides that ComReg must ensure that radio frequencies are efficiently and effectively used having regard to section 12(2)(a) of the 2002 Act and Regulations 16(1) and 17(1) of the Framework Regulations. Regulation 9(11) further provides that ComReg must ensure that competition is not distorted by any transfer or accumulation of rights of use for radio frequencies and, for this purpose, ComReg may take appropriate measures such as mandating the sale or the lease of rights of use for radio frequencies.

Contributing to the Development of the Internal Market

A 2.57 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 2.58 In so far as contributing to the development of the internal market is concerned, Regulation 16(1)(c) of the Framework Regulations also requires ComReg to co-operate with the Body of European Regulators for Electronic Communications ("BEREC") in a transparent manner to ensure the development of consistent regulatory practice and the consistent application of EU law in the field of electronic communications.

Promotion of Interests of Users

A 2.59 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.

A 2.60 In so far as promotion of the interests of users within the EU is concerned, Regulation 16(1)(d) of the Framework Regulations also requires ComReg to:

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

Technological Neutrality

A 2.61 As noted, unless otherwise provided for in Regulation 17 of the Framework Regulations, take the utmost account of the desirability of technological neutrality in complying with the requirements of the Specific Regulations in particular those designed to ensure effective competition.

Regulatory Principles

A 2.62 In pursuit of its objectives under Regulation 16(1) of the Framework Regulations and section 12 of the 2002 Act, ComReg must apply objective, transparent, non-discriminatory and proportionate regulatory principles by, amongst other things:

- promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods;
- ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing ECN and ECS;

- safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition;
- promoting efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, while ensuring that competition in the market and the principle of non-discrimination are preserved;
- taking due account of the variety of conditions relating to competition and consumers that exist in the various geographic areas within the State; and
- imposing ex-ante regulatory obligations only where there is no effective and sustainable competition and relaxing or lifting such obligations as soon as that condition is fulfilled.

BEREC

A 2.63 Under Regulation 16(1)(3) of the Framework Regulations, ComReg must:

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

Other Obligations under the 2002 Act

A 2.64 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;[132]
- have regard to international developments with regard to the radio frequency spectrum[133]; and

[132] Section 12(3) of the 2002 Act.
[133] Section 12(5) of the 2002 Act.

- 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.[134]

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

Annex 3: Draft Licensing Regulations

A 1.1 **Any final version of these regulations, which would be made by ComReg under section 6 of the Wireless Telegraphy Act 1926, is expressly subject to the consent of the Minister for the Environment, Climate and Communications under section 37 of the Communications Regulation Act 2002, as amended**

A 1.2 ComReg may make such editorial changes to the text of any final regulations as it considers necessary and without further consultation, where such changes would not affect the substance of the regulations

STATUTORY INSTRUMENTS.

S.I. No. of 2023

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WIRELESS TELEGRAPHY (SATELLITE EARTH STATION LICENCE) REGULATIONS 2023

S.I. No. of 2023

WIRELESS TELEGRAPHY (SATELLITE EARTH STATION LICENCE) REGULATIONS, 2023

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 6(1) of the Wireless Telegraphy Act 1926 (No. 45 of 1926) as substituted by section 182 of the Broadcasting Act 2009 (No. 18 of 2009), and with the consent of the Minister for the Environment, Climate and Communications (as adapted by the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 373 of 2020)) in accordance with section 37 of the Communications Regulation Act 2002 (No. 20 of 2002), hereby makes the following Regulations:

Citation

1. (1) These Regulations may be cited as the Wireless Telegraphy (Satellite Earth Station Licence) Regulations 2023.

(2) These Regulations shall come into force at the end of the period of one year beginning with the day on which they were made.

Interpretation and Definitions

2. (1) In these Regulations, except where the context otherwise requires:

“Act of 1926” means the Wireless Telegraphy Act 1926 (No. 45 of 1926);

“Act of 1972” means the Wireless Telegraphy Act 1972 (No. 5 of 1972);

“Act of 2002” means the Communications Regulation Act 2002 (No. 20 of 2002);

“Apparatus” means apparatus for wireless telegraphy as defined in section 2 of the Act of 1926 for terrestrial systems capable of providing Electronic Communications Services;

“Authorisation Regulations” means the European Communities (Electronic Communications) (Authorisation) Regulations, 2003 (S. I. No. 306 of 2003)

“Commission” means the Commission for Communications Regulation established under the Act of 2002;

“CPI” means the Consumer Price Index as published from time to time by the Central Statistics Office;

“Central Statistics Office” or “CSO” means the Central Statistics Office of Ireland or its successor;

“ECC Regulations” means the European Union (Electronic Communications Code) Regulations 2022 (S.I. No. 444 of 2022);

“Electronic Communications Network” and “Electronic Communications Service” have the meanings assigned to them in the Framework Regulations [ECC Regulations];

“EIRP” (i.e. equivalent isotopically radiated power) is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

“Fixed Satellite Service” means a Radiocommunication Service between Satellite Earth Stations at specified fixed points when one or more satellites are used;

“Framework Regulations” means the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011);

“Harmful Interference” has the meaning set out in the Framework Regulations;

“ICNIRP” means the International Commission on Non-Ionizing Radiation Protection;

“Licence” means a non-exclusive licence granted in accordance with section 5 of the Act of 1926 in accordance with and subject to the matters prescribed in these Regulations to keep, have possession of, install, maintain, work and use Apparatus in a specified place in the State granted to the licensee;

“Licensee” means the holder of a Licence;

“Non-exclusive”, in relation to a Licence, means that the Commission is not precluded from authorising the keeping and having possession by persons other than the Licensee, on a Non-Interference and Non-Protected Basis, of apparatus for wireless telegraphy for the radio frequency spectrum specified in the Licence;

“Non-Interference and Non-Protected Basis” means that the use of apparatus for wireless telegraphy is subject to no Harmful Interference being caused to any Radiocommunication Service, and that no claim may be made for the protection of apparatus for wireless telegraphy used on this basis against Harmful Interference originating from Radiocommunication Services;

“Fixed Earth Station” means a type of Satellite Earth Station operated within a 500 meter radius centred on a single geographic point;

“Radio Equipment Regulations” means the European Union (Radio Equipment) Regulations 2017 (S.I. No. 248 of 2017);

“Radiocommunication Service” means a service as defined in the Radio Regulations of the International Telecommunication Union involving the transmission, emission or reception of radio waves for specific telecommunication purposes;

"Regulations" means the Wireless Telegraphy (Satellite Earth Station Licence) Regulations, 2023;

"Satellite Earth Station" means apparatus for wireless telegraphy, located on the Earth's surface, intended for either the transmission of radio signals to a Space Station or the reception of radio signals from a Space Station, or both;

"Space Station" means apparatus for wireless telegraphy that is located on an object which is beyond the major portion of the Earth's atmosphere, and which is not a high altitude platform station;

"Temporary Licence" means a Licence that is issued only for a period up to a maximum of eleven months and which shall not be renewed;

"Transportable Satellite Earth Station" means a Satellite Earth Station which is transportable, which operates at varying locations, and which remains in a fixed location during operation; and

"Wireless Telegraphy" has the same meaning as set out in section 2 of the Act of 1926.

(2) In these Regulations –

(a) a reference to an enactment or regulation shall be construed as a reference to the enactment or regulation as amended or extended by or under any subsequent enactment or regulation;

(b) a reference to a Regulation or a Schedule is to a Regulation of, or a Schedule to, these Regulations, unless it is indicated that reference to some other enactment is intended;

(c) a reference to a paragraph or subparagraph is to the paragraph or subparagraph of the provision in which the reference occurs unless it is indicated that reference to some other provision is intended;

(e) A word or expression that is used in these Regulations and that is also used in the Act of 1926 has, unless the context otherwise requires, the same meaning in these Regulations that it has in that Act;

(f) A word or expression that is used in these Regulations and that is also used in the Act of 2002 has, unless the context otherwise requires, the same meaning in these Regulations that it has in that Act;

(g) A word or expression that is used in these Regulations and that is also used in the Framework Regulations or in the Authorisation Regulations has, unless the context otherwise requires, the same meaning in these Regulations that it has in those Regulations.

Licences to which these Regulations apply

3. These Regulations apply to Licences to keep, have possession of, install, maintain, work and use apparatus for wireless telegraphy for the purpose of the provision of a Satellite Earth Station, having the characteristics set out in Part 2 of the First Schedule of the Licence and operating in accordance with the technical conditions set out in Part 2 of the First Schedule of the Licence and at the location or locations set out in Part 2 of the First Schedule of the Licence.

Limitation of Licence

4. (1) A Licence granted under these Regulations does not grant to the Licensee named therein any right, interest or entitlement other than the right to keep, install, maintain, work and use, at a specified location or locations in the State, apparatus for wireless telegraphy for the purpose of the provision of a Satellite Earth Station.

(2) Nothing in these Regulations shall absolve the Licensee from any requirement in law to obtain such additional approvals, consents, licences, permissions and authorisations that may be necessary for the discharge of the obligations or the exercise of entitlements under the Licence. The Licensee is responsible for all costs, expenses and other commitments, financial and non-financial, in respect of the Licence and the provision of a Satellite Earth Station and the Commission shall bear no responsibility for such costs, expenses or commitments.

Application for Grant and Form of Licences

5. (1) An application for a Licence for a Fixed or Transportable Earth Station will be made to the Commission and shall be in writing in such form as may be determined by the Commission.

(2) A person who makes an application under paragraph (1) of this Regulation shall furnish to the Commission such information as the Commission may reasonably require for the purpose of assessing the application and carrying out its functions under the Act of 1926, the Act of 2002 and the Authorisation Regulations [ECC Regulations] and, if the person, without reasonable cause, fails to comply with this paragraph, the Commission may refuse to grant a Licence to the person.

(3) The Commission may issue a Temporary Licence for a period up to a maximum of eleven months which shall not be renewed.

(4) The grant of a Licence is subject to payment of the prescribed fee as set out in Schedule 2 to these Regulations.

(5) Subject to Regulation 7, a Licence shall be in the form specified in Schedule 1 with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations [ECC Regulations].

Duration and Renewal of Licences

6. (1) A Licence shall, unless it has been withdrawn or surrendered, remain in force from the date of grant for a period of one year unless renewed under these Regulations.

(2) A Licence may be renewed from time to time by the Commission under this Regulation.

(3) A Temporary Licence shall, unless it has been withdrawn or surrendered, remain in force from the date of grant until the expiry date as specified in the licence, which shall not be greater than an eleven-month period, and shall not be renewed.

(4) Prior to the expiration of a Licence, the Commission may, by notice in writing given to the Licensee or sent to the Licensee at the address of the Licensee specified in the Licence, renew the Licence for one year from the day following the expiration of the last previous period during which it was in force. The granting or renewal of a Licence shall be subject to the payment of the relevant fees in advance of the grant or expiry date and shall not be construed as warranting that the Licence shall be renewed at any time in the future.

(5) In considering whether to renew a Licence, the Commission shall have particular regard to:

(a) whether the Licensee has complied with these Regulations and the conditions attached to the expiring Licence;

(b) the efficient management and use of radio spectrum;

(c) the coexistence with other Licensees; and

(c) the avoidance of Harmful Interference.

Conditions of Licences

7. (1) Any Licensee that is granted a Licence under these Regulations and to which these Regulations apply shall:

(a) ensure that it complies with the conditions in its Licence and with these Regulations;

(b) ensure that all Apparatus installed, maintained, possessed or kept under the Licence is capable of operating within the radio frequency spectrum specified in the Licence;

(c) ensure that all Apparatus worked or used under the Licence is worked or used only in the radio frequency spectrum specified in the Licence and such radio frequencies shall be used in an efficient manner having utmost regard to any guidelines that may be issued and amended by the Commission from time to time in relation to the keeping, installing, maintaining, working and use of apparatus for wireless telegraphy;

(d) make payments of the fees as set out in Schedule 2 to these Regulations, and in accordance with Regulation 9 of these Regulations;

(e) not, without the prior written consent of the Commission, which shall not be unreasonably withheld, assign the Licence or any of the powers, duties or functions conferred by it or otherwise transfer any of the rights or obligations conferred by it;

(f) ensure that non-ionising radiation emissions from the Apparatus operated by the Licensee are within the limits specified by the guidelines published by ICNIRP, any radiation emission standards adopted and published by ICNIRP, or its successors, from time to time, any radiation emission standards of the European Committee for Electrotechnical Standardization and any radiation emission standards specified by national and European Community law;

(g) as soon as possible request the Commission to consider and decide on an amendment to the licence to reflect any proposed changes to the information contained in the Licence;

(h) furnish such information and reports in respect of the Licence, including relating to the Apparatus and its use, as may be requested by the Commission from time to time;

(i) comply with any rules to prevent spectrum hoarding as may be laid down by the Commission under the Framework Regulations [ECC Regulations];

(j) ensure that the Apparatus, or any part thereof, shall be installed, maintained, operated and used so as not to cause Harmful Interference;

(k) ensure compliance with any special conditions imposed under section 8 of the Act of 1972 and subject to which this Licence is deemed by subsection (3) of that section to be issued;

(l) ensure that, save as may be required by law, access to, and use of, the Apparatus is restricted to the Licensee, employees or agents of the Licensee, and persons authorised by or on behalf of the Licensee;

(m) where the Commission is satisfied that a Licensee has failed to comply with any provision of these Regulations or a condition of the Licence, and the Commission has served on the Licensee a written notice prohibiting the use of Apparatus by such date and time as may be specified in the notice, cease to use that Apparatus on or before the applicable date and time until such notice has been withdrawn by the Commission, and take such measures as may be specified by the Commission in the notice;

(n) upon becoming aware of any event likely to materially affect its ability to comply with these Regulations, or any conditions set out or referred to in any Licence, notify the Commission of that fact in writing no later than 5 working days upon becoming aware;

(o) on request from an authorised officer of the Commission permit the inspection of the Apparatus, enable access to the site or sites on which the Apparatus is located and produce the associated Licence for inspection;

(p) comply with all obligations under relevant international agreements by ITU Member States relating to the use of Apparatus and/or the frequencies to which they are assigned under a Licence;

(q) ensure that all Apparatus, or any part thereof, complies with the Radio Equipment Regulations; and

(r) comply with all international and national coordination requirements to ensure coexistence of services and prevent any Harmful Interference between Licensees and to other services.

7. (2) Having notified and obtained the written consent of the Commission, the Licensee may transfer the Licence to another Licensee where the attached conditions are maintained.

Enforcement, Amendment, Withdrawal and Suspension

8. (1) Enforcement by the Commission of compliance by a Licensee with conditions attached to their Licence shall be in accordance with the Authorisation Regulations [ECC Regulations], and any other requirements under applicable national or European Community law.

(2) The Commission may amend the Licence from time to time where objectively justifiable and in a proportionate manner. Any amendment shall be made subject to and in accordance with the Authorisation Regulations [ECC Regulations], and any other requirements under applicable national or European Community law.

(3) Where the Commission is of the opinion that, in the interest of the efficient and orderly use of apparatus for wireless telegraphy or radio frequency spectrum, it is desirable to do so, it may amend the Licence in accordance with the Authorisation Regulations [ECC Regulations].

(4) Without prejudice to paragraph (2) of this Regulation, at the request of the Licensee, the Commission may, if it considers it appropriate to do so, amend the Licence by adding to, deleting from or altering the radio frequency spectrum specified in the Licence on which the Apparatus may be used. Any such amendment shall be effected by notice in writing from the Commission specifying the amendment and given to the

Licensee or sent to the Licensee at the address specified in the Licence or notified to the Commission pursuant to the Licence.

(5) A Licence may be suspended or withdrawn by the Commission in accordance with the Authorisation Regulations[ECC Regulations], and any other requirements under applicable national or European Community law.

Licence Fees

9. (1) Fees as set out and provided for in the fees table in Schedule 2 are hereby prescribed in relation to Licences for the purpose of section 6 of the Act of 1926, as amended.

(2) The fees set out and provided for in Schedule 2 shall be payable by the Licensee to the Commission prior to the grant or renewal of a Licence.

(3) Fees shall be paid to the Commission by way of Electronic Funds Transfer or such other means, and on such terms (including terms as to the place of payment) as the Commission may decide. Where the date of payment falls on a Saturday, a Sunday or a public holiday payment shall be made on or before the last working day before the date of payment.

(4) Fees for any period of less than one year shall be calculated on a pro rata monthly basis for such period.

(5) If a Licence is surrendered by the Licensee, the Licensee may be entitled to a refund on a pro rata daily basis for the remaining period of the Licence of the relevant Licence Fee.

(6) If a Licence is suspended or withdrawn due to a finding by ComReg of non-compliance with any relevant licence conditions, the Licensee shall not be entitled to be repaid any part of the Licence Fee paid by the Licensee, but shall still be liable to pay any sums, including interest, that are outstanding.

(7) An amount payable by a Licensee may be recovered by the Commission as a simple contract debt in any court of competent jurisdiction.

(8) The fees will be implemented in accordance with Schedule 2.

Transitional Arrangements

12. (1) Subject to paragraph 2, the Wireless Telegraphy (Fixed Satellite Earth Stations and Teleport Facility) Regulations 2007 (S.I. No. 295 of 2007) are hereby revoked.

(2) A licence issued under the Wireless Telegraphy (Fixed Satellite Earth Stations and Teleport Facility) Regulations 2007 (S.I. No. 295 of 2007) in force immediately before the commencement of these Regulations will continue in force as if it had run continuously from the date of its issue until its next renewal date.

Licensee to satisfy all legal requirements

13. (1) Licences granted pursuant to these Regulations do not grant to the Licensee any right, interest or entitlement other than to keep, have possession of, install, and maintain, and to work and use Apparatus at a specified location or locations in the State.

SCHEDULE 1 WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (SATELLITE EARTH STATION LICENCE) REGULATIONS, 2023

LICENCE CERTIFICATE

Part 1

Licence Number: .....

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 6 of the Wireless Telegraphy Act, 1926 (No. 45 of 1926), transferred to the Commission for Communications Regulation by section 4 of the Communications Regulation (Amendment) Act, 2007 (No. 22 of 2007), grants to the Licensee specified, authorisation to keep, have possession of, install, maintain, work and use apparatus as specified in Part 2 of this Licence subject to the Licensee observing the conditions contained in Regulation 7 of the Wireless Telegraphy (Satellite Earth Station Licence) Regulations, 2023 (S.I. of 2023)

Licensee: .....

Address: .....

Satellite Earth Station Type: .....

Commencement and Termination Dates (if applicable):

The Licence comes into effect on ***DD/MM/YY*** and, subject to revocation or suspension, expires on ***DD/MM/YY*** unless renewed in accordance with these Regulations.

or

This Temporary Licence comes into effect on ***DD/MM/YY*** and shall expire on ***DD/MM/YY.***

Signed: .....

on behalf of the Commission for Communications Regulation

Date: .....

Part 2

Licence Details

Description and Characteristics of Apparatus

Frequency Assignment

Geographic Locations(s) of Apparatus

Technical Conditions

SCHEDULE 2 FEES PAYABLE

Annual Fees

The base fee for a SES licence is calculated as follows:

$$A = €100 + 150 \times (BW)^{0.75}$$

Where:

- A is the base fee for an annual SES licence;
- €100 is the marginal cost to ComReg of issuing a licence;
- 150 is the parameter level needed to recover administrative costs given a concavity of 0.75;
- BW is the total bandwidth in use at a particular site by a licensee. This can be Transmit and Receive OR, Transmit or Receive or Receive only where protection is sought on the receive; and
- 0.75 is the concavity parameter that adjusts total bandwidth.

The Annual Fee for a SES licence is equal to:

$$C = A \times (\frac{D}{100})$$

Where:

- A is the base fee for an annual SES licence;
- D is the CPI relevant to the period from a baseline date (where CPI=100); and
- C is the annual licence fee indexed to the Consumer Price Index.

Where a licence is required for a period less than 12 months, Licence Fees are applied pro-rata using the number of months for which the licence is granted as follows:

$$F = C \times (\frac{E}{12})$$

Where:

- C is the annual fee indexed to the Consumer Price Index;
- E is the number of whole months for which the SES licence is granted; and
- F is the appropriate fee to be paid.

If a Licence is granted for a period of less than one month, then, for the purpose of these calculations only, the licence shall be considered as a licence granted for a period of one month.

GIVEN under the Official Seal of the Commission for Communications Regulation,

day of 2023

Chairperson

On behalf of the Commission of Communications Regulation

The Minister for the Environment, Climate and Communications (as adapted by the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 373 of 2020)), in accordance with section 37 of the Communications Regulation Act, 2002, consents to the making of the foregoing Regulations.

GIVEN under the Official Seal of the Minister for Environment, Climate and Communications

day of 2023

Minister for the Environment, Climate and Communications.

EXPLANATORY NOTE

(This note is not part of the Instrument and does not purport to be a legal interpretation.)

These Regulations provide for the issue of licences for apparatus for Wireless Telegraphy for the provision of a Satellite Earth Station, for the regulation of such apparatus, and for the payment of fees by persons granted licences for that apparatus.

Annex 4: Concave approach under Option 4

Introduction

A 1.3 In Chapter 4 ("the RIA") ComReg set out its view that Option 4 was its preferred option, which sets fees based on administrative cost and taking bandwidth as a parameter in the calculation of same. This chapter further specifies this approach and considers other matters in relation to fees that will apply to the pricing of SES.

Fees

A 1.4 ComReg's administrative costs for managing the SES licensing framework are in the region of €140k per annum. Furthermore, the incremental cost of processing any SES licence application is estimated at approximately €100. Therefore, in order to ensure that every Licensee pays at least the incremental cost of processing a licence, €100 will act as a floor on all fees regardless of the bandwidth associated with the licence.

A 1.5 Under the preferred Option the fee calculation would be a two-part tariff:

- The first part, a constant applied to all licences, reflects the incremental cost of any SES licence application to ComReg.
- The second part of the tariff calculation is a per-MHz charge that distributes ComReg's fixed costs in proportion to bandwidth

A 1.6 This provides for an incremental administrative cost and a cost based on bandwidth, outlined as follows:

$$Annual\ Fee\ (in\ €) = 100 + 150(BW)^{0.75}$$

A 1.7 This implements Option 4 because each licensee covers the incremental costs incurred by ComReg as a result of its licence and the remaining fixed costs are distributed to avoid inefficiently choking off demand.

A 1.8 The bandwidth charge distributes ComReg's fixed costs to recover the remaining fixed costs of the SES licensing regime, based on the licences currently in operation.

A 1.9 Licences that are required for less than 12 months will continue to be adjusted pro-rata, as is the case under the current licensing regime, outlined as follows:

$$Temporary\ Licence\ Fee\ (in\ €) = A * \left(\frac{B}{12}\right)$$

where A is the relevant annual fee and B is the number of whole months for which the licence is granted.

Indexing of fees

A 1.10 In Document 22/56a, DotEcon advised that SES fees should be indexed on an annual basis according to CPI. In particular, DotEcon advised that:

- ComReg needs some way for fees to increase in line with its administrative costs over time and indexing in line with CPI should prevent the need for ComReg to review and potentially change fees frequently, even if administrative costs do increase at times.
- Operators face less uncertainty when planning investments if fees are indexed rather than updated in line with new administrative cost estimates, because they are likely better able to forecast inflation than they would be able to predict changes in ComReg's costs.

A 1.11 ComReg agrees that fees should be indexed for inflation (using CPI), and this is consistent with ComReg's long established approach of applying a CPI adjustment annual licence fee.[135] The CPI is the official measure of inflation in Ireland and is, therefore, an appropriate and accessible benchmark for measuring changes to the value of money. In this regard, the Central Statistics Office notes that the CPI "can also be used to update or determine the value of a sum of money from the past e.g. the equivalent value of £2,000 in 1951 to today's level. In effect, the CPI shows the change in the value of money over time".[136]

[135] See Document 15/131 and Document 16/49

[136] https://www.cso.ie/en/media/csoie/methods/consumerpriceindex/frequentlyaskedquestions16.pdf