



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Review of the Fixed Radio Links Licensing Regime

Preliminary Consultation

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An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation

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Chapter 1

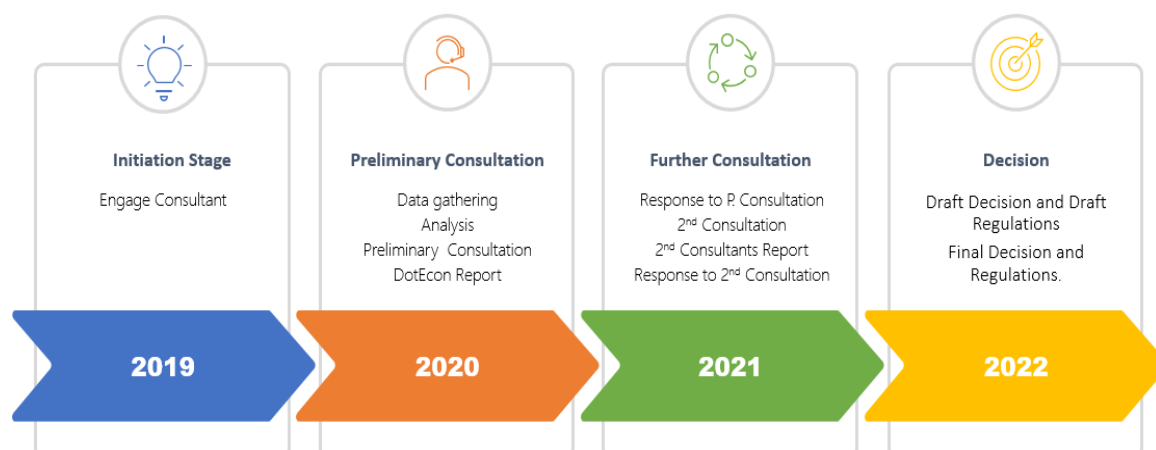
1 Introduction

- 1 The Commission for Communications Regulation (“ComReg”) is the statutory body responsible for the regulation of the electronic communications (telecommunications, radiocommunication and broadcasting networks), postal and premium rate sectors in Ireland in accordance with European Union (“EU”) and Irish Law.
- 2 ComReg also manages the radio frequency spectrum (“radio spectrum” or “spectrum”) and the national numbering resource, among other responsibilities. Radio Spectrum is a valuable national resource underpinning important economic social and communications activities.
- 3 In its Radio Spectrum Management Strategy Statement for 2019 to 2021 (ComReg Document 18/118¹), ComReg set out its plans regarding fixed radio links (“Fixed Links”) and committed to:
 - review the Fixed Radio Links Guidelines Document 09/89R2² (“the Guidelines”);
 - examine the opening of new frequency bands for Fixed Links; and
 - review the current Fixed Links licensing regime, which would include considering the future use of certain frequency bands and the current fixed links regulations³.
- 4 In all, it is envisaged that Fixed Radio Links Licensing Regime Review (“the regime”) will comprise several stages, each culminating in a public consultation and ultimately lead to a final Decision as appropriate, currently earmarked for 2022. The project overview and estimated timelines are outlined in Figure 1 below:

¹ <https://www.comreg.ie/publication/radio-spectrum-management-strategy-statement-2019-to-2021/>

² ComReg Document 09/89R2 – Guidelines to Applicants for Radio Links Licences – published 6 July 2017. https://www.comreg.ie/media/dlm_uploads/2017/06/ComReg-0989R2.pdf

³ S.I. No. 370/2009 - Wireless Telegraphy (Radio Link Licence) Regulations, 2009

Figure 1: Indicative timeline for the Fixed Links review

- 5 A Fixed Link, also known as a microwave link, is a wireless connection for the transmission of information between two or more fixed locations using electromagnetic waves⁴. Fixed Links can provide an alternative or a complement to copper cables or fibre and are used for a variety of applications, including backhaul for mobile network base stations; distributing TV signals from studios to broadcast transmitter sites; providing direct voice or data connections to end users and connecting nodes within private or corporate communication networks.
- 6 There are currently twenty radio spectrum bands ranging from 1.3 GHz to 80 GHz⁵ which are allocated for Fixed Links in Ireland (“Fixed Link Bands”). The Fixed Links Bands are far from homogenous, as demonstrated by the varying propagation characteristics of each of these bands, which in the round accommodate a diverse set of use cases for Fixed Links. For example, radio spectrum bands below 2 GHz are suitable for television and radio broadcast distribution to remote transmitters due to the long distances (≥ 35 km) that the signal can travel and the minimal data requirements of such links. On the other hand, radio spectrum bands above 36 GHz are suitable for mobile backhaul and wireless broadband in dense urban areas because the channel bandwidth facilitates greater data transmission and the signal does not need to travel very far (< 3 km).

⁴ Fixed Links in the context of this review refers to Fixed Wireless Services, such as voice or data traffic, delivered by Fixed Links between specified geographic locations. Fixed Service is defined by the International Telecommunication Union (“ITU”) as a radiocommunication service between specified fixed points.

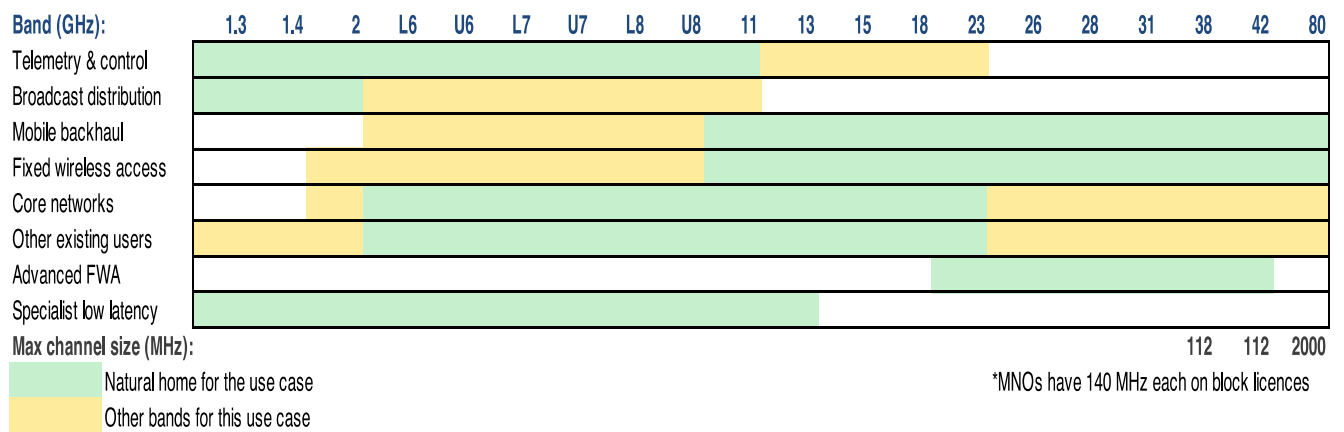
⁵ See section 2.2 of this document

- 7 The most significant use case across the twenty spectrum Fixed Link Bands is backhaul for public mobile networks, followed by fixed wireless access and backhaul for fixed networks. The combined number of Fixed Links licences for these use cases has increased year-on-year, and currently represents over 95% of all Fixed Links licences in Ireland. The demand for the spectrum bands allocated for Fixed Links is however dynamic and the popularity of spectrum bands has changed over time. For example, prior to 2010, demand was typically focused on spectrum bands in the 13 GHz to the 38 GHz range, however as technology and consumer demand for wireless broadband evolved, bands such as 11 GHz, 18 GHz and 80 GHz, together with greater channel bandwidths, have become more prevalent.
- 8 This preliminary consultation, the first consultation of several as earlier outlined, aims to consider and identify what, if any, changes are required to ensure that the regime is suitable to facilitate future uses of Fixed Links, in accordance with ComReg's statutory functions and objectives. The consultation will also take account of wider spectrum management matters regarding the Fixed Link Bands considering market, technology and international changes. The consultation will:
- review the current use of the Fixed Link Bands, understand how this has evolved, and consider the future demand for the existing and future frequency bands ("Candidate Bands");
 - assess the different current use cases provided by Fixed Links, and consider potential alternative/future use cases;
 - assess the market and technology trends affecting future demand for frequency bands from those use cases;
 - consider proposed changes to the Guidelines for Fixed Links (for example allowing shorter fixed link path lengths); and
 - review the current licensing regime for Fixed Links and consult on any proposed changes to licence duration, conditions, fees etc. including new regulations to replace S.I. no. 370 of 2009⁶.
- 9 This preliminary consultation document and accompanying consultant's report examines in particular:
- the existing and potential use cases (i.e. those with the potential to evolve and/or emerge over the foreseeable future) for the current Fixed Link Bands, and potential use cases for the Candidate Bands in Ireland;
 - recent trends in demand for all use cases identified nationally and internationally, and forecast the likely demand for each use case over the foreseeable future in Ireland; and

⁶ S.I. No. 370/2009 - Wireless Telegraphy (Radio Link Licence) Regulations, 2009

- the need for any of the Fixed Link Bands and/or Candidate Bands to be made available for, or reallocated from, some or all of the use cases identified.
- 10 ComReg is publishing alongside this document an interim report (Document 20/109A) prepared by ComReg’s economic and technical expert, DotEcon Limited (“DotEcon”), on the current situation regarding the Fixed Links environment in Ireland and how this may develop in the future. That report (“the DotEcon Report”) was informed by, amongst other things:
- interviews, as conducted by DotEcon and ComReg, with several stakeholders including existing users and equipment manufacturers (the “Stakeholder Interviews”);
 - responses received to a voluntary request for information (RFI) issued in March 2020 to current fixed link licensees⁷ (the “Licensee RFI”)⁸; and
 - responses received to an additional RFI sent by ComReg issued in March 2020 to members of the Independent Regulators Group⁹ (“IRG”) (the “IRG RFI”)¹⁰.
- 11 This document relevantly summarises the matters discussed in the DotEcon Report and readers are referred to the DotEcon report for more detail on those matters. At a high level these relate for example to the existing and potential use cases, see Figure 2 below, and for a summary of the preliminary findings, see Table 1.

Figure 2: Bands suitable for each use case



⁷ In March, ComReg issued the request for information (“RFI”) to 82 of the 153 licence holders (as of 30 June 2019), selected to cover firms of all user types and broad use cases. ComReg issued the Licensee RFI to a further 12 relevant stakeholders (e.g., vendors and firms providing installation services). The RFI included a questionnaire and a request for the provision of data. ComReg received a response rate of 56% accounting for 35% of licensees and 94% of Fixed Link licences. In light of the disruption caused by Covid-19 to businesses, ComReg extended the deadline for providing responses by over 8 weeks. ComReg welcomes any non-respondent or non-recipient wishing to provide data to contact ComReg, which can issue further of the Licence RFI.

⁸ ComReg is satisfied that a representative sample of Licences responded, with responses received from firms with varying business types, numbers of Fixed Links licences and increasing/declining number of Fixed Links licences.

⁹ 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.

¹⁰ In total 22 members of the IRG provided responses to the IRG RFI.

Table 1: Summary of issues on which ComReg is seeking views

Topic	Views sought on the potential
Addition of new spectrum	Opening of the W-Band (92 – 114 GHz)
	Opening of the D-Band (130 – 174 GHz)
Future proofing of regime	Block licencing of 80 GHz – for urban centres
	Block licencing of any new bands
	Updating of the technical parameters of the Guidelines
Freeing up spectrum	Re-opening 13 and 15GHz bands in the congested areas to new applications
	Increasing of channel sizes in 13 and 15GHz bands to 112 MHz
Improvements to eLicencing	Providing greater information for licence holders when making applications
Pricing and Congestion	Pricing methodologies
	Role of information vs. pricing as a means to tackle congestion

- 12 ComReg includes specific questions for interested parties on its Preliminary views and findings contained in 343.4 and 4.1 to 4.10. In addition, ComReg seeks and welcomes the views of interested parties on all aspects of the preliminary findings set out herein which will be used to inform ComReg’s future consideration of a licensing framework (including any fees) for the Fixed Link Bands. As outlined at paragraph 4 above, it is ComReg’s intention to follow up on such matters in a further consultation, followed by a response to consultation and draft Decision as appropriate.
- 13 In addition, ComReg notes that some of the information contained in this document relates to other spectrum management matters, which may be of interest to stakeholders. Section 2.3 briefly discusses these matters which are already being considered in separate consultations or will be in the future and any views of stakeholders on those matters will be addressed in those consultations. In that regard, ComReg provides information on such matters in order to assist stakeholders in providing information relevant to the review of the Fixed Link Bands.

14 Finally ComReg notes readers may have an interest in Document 20/93¹¹ - “*Fixed Radio Links Annual Report - Annual Report 2020*”, published on 30 September 2020, in which ComReg set out the most up to date information regarding the licensing of fixed radio links granted under S.I. 370 of 2009.¹² Separately, and in its 2019 Fixed Links Annual Report, information has been provided on changes to the eLicensing application system, as well as ComReg’s plans for further planned changes. Readers are referred to Document 19/89¹³ if they wish to access that information.

15 This document is laid out as follows:

- **Chapter 2:** sets out some background and discusses potential uses of the band.
- **Chapter 3:** use cases and trends in Ireland.
- **Chapter 4:** sets out details of key aspects of Fixed Links including existing and potential uses, current and future trends and potential option in relation to re-assignment of bands to/from Fixed Links.
- **Chapter 5:** sets out ComReg’s view in relation to the Regulatory Impact Assessment.
- **Chapter 6:** details how to submit comments and the next steps in the process.
- Annex 1: Provides information on each of the Fixed Link Bands regarding the relevant ECC/ITU Recommendations, the number of licences issued each year since 2010, and the main licensees in each band.
- Annex 2: Contains Tables and Figures supporting the analysis in Chapter 3.
- Annex 3: Provides maps which show the distribution of Fixed Links for each Fixed Link Band in 2010 and 2020.
- Annex 4: Provides information on ComReg’s Legal Framework and Statutory Objectives.

¹¹ Document 20/93 is the second annual report on Fixed Links and plans on publishing such annual reports annually going forward, in order to provide certainty and improve transparency for users of Fixed Links.

¹² <http://www.irishstatutebook.ie/eli/2009/si/370/made/en/pdf>

¹³ Fixed Radio Links Annual Report for 2019, see <https://www.comreg.ie/publication/fixed-radio-links-annual-report-for-2019>

Chapter 2

2 Background Information

16 This Chapter provides some background information relevant to the preliminary consultation, including information on:

- the Fixed Link licensing regime;
- the Fixed Link Bands; and
- other spectrum management matters which are related to the Fixed Link Bands.

2.1 The Fixed Link Licensing Regime

17 Fixed Links form one of the primary types of network infrastructure for electronic communications networks¹⁴, and are important for the provision of electronic communications services such as mobile and broadband.

18 Fixed links are currently operated in Ireland under three different licensing models, which are described in detail below:

- Individual Fixed Links Regime¹⁵;
- 26 GHz National Point-to-Point Block Regime¹⁶; and
- Licence-exempt Fixed Links¹⁷.

Individual Fixed Links Regime

19 The individual Fixed Links regime is governed by the S.I. No. 370 of 2009 – Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (“the 2009 Regulations”)¹⁸, while the Guidelines provides information on the technical requirements for Fixed Links, the licence application process; and licensing information.

20 ComReg currently grants two types of individual Fixed Link licences:

¹⁴ Alongside cellular mobile networks, leased lines, fibre etc

¹⁵ <http://www.irishstatutebook.ie/eli/2009/si/370/made/en/pdf>

¹⁶ <http://www.irishstatutebook.ie/eli/2018/si/158/made/en/pdf>

¹⁷ <https://www.comreg.ie/publication-download/permitted-short-range-devices-in-ireland-3>

¹⁸ <http://www.irishstatutebook.ie/eli/2009/si/370/made/en/pdf>

- Point-to-Point¹⁹ (“P-P”) Fixed Links are typically used within telecommunications core networks and as broadcast contribution and distribution links. Such links may also be used as small cell backhauling within local access networks to connect access points such as Radio Local Area Network (“LAN”) hotspots and cells to the core network; and
- Point-to-Multipoint²⁰ (“P-MP”) Fixed Links are normally used within access networks, enabling network operators to provide services without the need to install conventional cables. A P-MP network topology provides a communication route (on a single radio channel for each sector) from one central point to several terminals where users are located. Each user location may be served directly from the central location or via one or more radio repeaters.

21 The bands allocated for Fixed Links in Ireland, and the channel arrangements within those bands, are in keeping with harmonised CEPT/ITU recommendations.²¹ Accordingly, the number of spectrum bands allocated for Fixed Links in Ireland is similar to approaches taken in other European countries,²² and is necessary to accommodate the wide range of use cases and link length/capacity requirements for those use cases.

Individual Link Licence fees

- 22 The annual fee for an individual licence is dependent on the requested bandwidth and frequency band. For a P-MP link, the annual fee is four times the annual fee for a P-P link²³ to take account of its greater utility and footprint, relative to P-P Links. The current schedule of Fixed Link licence fees is shown in Table 2 and Table 3 below and has been taken from Part 2 of the 2009 Regulations.
- 23 A single channel dual polarity link is a link having both vertical and horizontal polarisation on the same path and same frequency channel. In the 2009 Regulations the fees for a dual polarity link licence were set to be the same as a single link licence. This was intended to encourage the efficient use of spectrum by creating an incentive to licensees who have multiple links on the same path to consider using both polarisations on the same frequency channel instead of two separate channels. Dual polarisation²⁴ is mandatory for all new fixed link applications where more than one link is required on the same path in the same frequency band.

¹⁹ A wireless system connecting two fixed geographic locations.

²⁰ A wireless system connecting more than two fixed geographic locations

²¹ https://docdb.cept.org/document/category/ECC_Recommendations?status=ACTIVE

²² See ECC Report 173 - Fixed Service in Europe Current use and future trends post 2016 - <https://docdb.cept.org/download/6fd0de6b-f796/ECCRep173.PDF>

²³ See page 28 of ComReg Document 09/89R2.

²⁴ A single channel dual polarity link (SCDP) is a link having both vertical and horizontal polarisation on the same path and same frequency channel

- 24 Temporary licences can be granted for up to a maximum period of six months, and the licence fees are applied on a pro-rata basis to the relevant annual fee using the number of months for which the licence is granted.

Table 2: Fee schedule for Fixed Link licences

Frequency Band	Annual Licence Fee BW < 3.5 MHz	Annual Licence Fee 3.5 MHz < BW < 20 MHz	Annual Licence Fee 20 MHz < BW < 40 MHz	Annual Licence Fee BW > 40 MHz
F < 1 GHz	€750	N/A	N/A	N/A
1 GHz ≤ F < 17 GHz	€1,000	€1,100	€1,200	€1,500
17 GHz ≤ F < 37 GHz	€750	€825	€900	€1,125
37 GHz ≤ F < 39.5 GHz	€550	€605	€660	€825
F > 39.5 GHz	€100	€110	€120	€150

Table 3: Fee schedule for Fixed Link licences on a High Usage Path or in a Congested Area²⁵

Frequency Band	Annual Licence Fee BW < 3.5 MHz	Annual Licence Fee 3.5 MHz < BW < 20 MHz	Annual Licence Fee 20 MHz < BW < 40 MHz	Annual Licence Fee BW > 40 MHz
F < 1 GHz	€900	N/A	N/A	N/A
1 GHz ≤ F < 17 GHz	€1,200	€1,320	€1,440	€1,800
17 GHz ≤ F < 37 GHz	€900	€990	€1,080	€1,350
37 GHz ≤ F < 39.5 GHz	€660	€726	€792	€990
F > 39.5 GHz	€120	€132	€144	€180

²⁵ The Congested Area is a geographic area within the Dublin area in the range E310000 to E320000 and N220000 to N240000, or 53°13'9.44"N to 53°23'14.2"N and 6°21'14.2"W to 6°11'48.32"W

Individual Link Licence Application Process

- 25 ComReg aims to process individual Fixed Link licence applications within ten working days or less; however factors beyond ComReg's control can lead to a longer turnaround time (e.g. incorrect and/or incomplete information in an application, or a slow response from applicants when ComReg seeks further information). A large volume of applications for Fixed Links in high demand geographical areas can also affect turnaround times as ComReg staff may have to conduct an interference analysis across multiple frequency bands and/or channels.
- 26 Licensees should use the most efficient technology and modulation schemes to ensure the efficient use of the assigned spectrum. ComReg only grants licences for radio equipment that meets the minimum mandatory technical requirements such as:
- minimum transmission capacity requirement;
 - minimum antenna requirement - Class 3 antenna; and
 - mandatory equipment class - Class 1, 2 or 3 were applicable²⁶.

26 GHz National Point-to-Point Block regime

- 27 National P-P block licences in the 26 GHz band licences were granted under S.I. 158 of 2018²⁷. Licensees can deploy Fixed Links in a designated portion of the 26 GHz band without needing to apply to ComReg for individual Fixed Link licences.²⁸
- 28 All of the 26 GHz block licences have a ten-year duration and permit licensees to operate P-P Fixed Links on a national basis utilising "Frequency Division Duplexing" technology.
- 29 Spectrum Usage Fees (SUFs) for a licence are the sum of the SUFs for each 2 × 28 MHz lot included in that licence. For each 2 × 28 MHz lot included in a licence, the SUF is €25,000 per annum plus an annual CPI adjustment.

Licence-exempt Fixed Links regime

- 30 Fixed links may also be operated on a licence-exempt basis in designated bands as set out in ComReg Document 02/71R²⁹, as amended.

²⁶ https://www.comreg.ie/media/dlm_uploads/2017/06/ComReg-0989R2.pdf

²⁷ S.I. No. 158/2018 - Wireless Telegraphy (National Point to Point Block Licences) accessible at <http://www.irishstatutebook.ie/eli/2018/si/158/made/en/print>

²⁸ ComReg Document 18/53 - <https://www.comreg.ie/publication/results-of-the-26-ghz-spectrum-award-2018>

²⁹ <https://www.comreg.ie/publication/permitted-short-range-devices-in-ireland-3>

31 No fees apply to Fixed Links operated on a licence-exempt basis.

2.2 Current Individual Fixed Link Bands

32 There are currently twenty Fixed Link Bands ranging from 1.3 GHz to 80 GHz allocated for Fixed Links, as outlined in Table 4 below³⁰. The Fixed Link Bands are far from homogenous, as demonstrated by the varying propagation characteristics of each of these bands, which in the round accommodate the diverse use cases for Fixed Links.

33 In 2014 ComReg suspended³¹ the acceptance of new applications for Fixed Links within the congestion area due to the exhaustion of all available channels within the 13 GHz and 15 GHz frequency bands.

34 Part of the 26 GHz band, namely 24.745 – 25.277 GHz paired with 25.753 GHz – 26.285 GHz, is allocated for national P-P block licences.

Table 4: Frequency bands available in Ireland

Band	Frequency	Channel Spacing	CEPT or ITU Recommendations for channel arrangements
1.3 GHz	1370 – 1375 MHz and 1512 – 1517 MHz	0.25 MHz 0.5 MHz 1 MHz	CEPT Recommendation T/R 13-01 E, Annex A
1.4 GHz	1375 – 1385 MHz and 1427 – 1437 MHz	0.25 MHz 0.5 MHz 1 MHz	CEPT Recommendation T/R 13-01 E, Annex B
2 GHz	2025 – 2110 MHz and 2200 – 2290 MHz	3.5 MHz 7 MHz 14 MHz	CEPT Recommendation T/R 13-01 E, Annex C
L6 GHz	5.925 GHz – 6.425 GHz	29.65 MHz	CEPT Recommendation 14-01 E, Annex 1
U6 GHz	6.425 – 7.125 GHz	20 MHz 40 MHz	CEPT Recommendation 14-02 E, Annex 1
L7 GHz	7.125 – 7.425 GHz	14 MHz 28 MHz	CEPT Recommendation 02-06 Annex 1
U7 GHz	7.425 – 7.725 GHz	7 MHz 14 MHz 28 MHz	CEPT Recommendation 02-06 Annex 1
L8 GHz	7.725 – 8.275 GHz	29.65 MHz	ITU-R F. 386-8, Annex 6
U8 GHz	8.275 – 8.5 GHz	3.5 MHz 7 MHz 14 MHz	ITU-R F. 386-8, Annex 2
11 GHz	10.7 – 11.7 GHz	40 MHz	CEPT Recommendation 12-06 E

³⁰ Please see Annex 1 in ComReg 09/89 for further details on licensing of fixed links within each band.

³¹ https://www.comreg.ie/?dlm_download=13-ghz-and-15-ghz-frequency-bands-within-dublin

Band	Frequency	Channel Spacing	CEPT or ITU Recommendations for channel arrangements
13 GHz	12.75 – 13.25 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz 56 MHz	CEPT Recommendation 12-02 E
15 GHz	14.5 – 15.35 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz 56 MHz	ITU-R F. 636-4
18 GHz	17.7 19.7 GHz	27.5 MHz 55 MHz 110 MHz	CEPT Recommendation 12-03 E, Annex A
23 GHz	22.0 – 22.6 GHz and 23.0 - 23.6 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz 56 MHz 112 MHz	CEPT Recommendation T/R 13-02 E, Annex A
26 GHz	Part of 24.5 - 26.5 GHz band namely: 25.277 – 25.445 GHz and 26.285 – 26.453 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz	CEPT Recommendation 13-02 E, Annex B
28 GHz	Part of 27.5 - 29.5 GHz band namely: 27.9405 - 28.4445 GHz paired with 28.9485 - 29.4525 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz 56 MHz 112 MHz	CEPT Recommendation T/R 13 02 Annex C
31 GHz	31.0 – 31.3 GHz paired with 31.5 -31.8 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz	Channel plan follows CEPT Recommendation (02)02
38 GHz	37 – 39.5 GHz	3.5 MHz 7 MHz 14 MHz 28 MHz 56 MHz 112 MHz	CEPT Recommendation T/R 12-01 E, Annex A
42 GHz	40.5 – 43.5 GHz	7 MHz 14 MHz 28 MHz 56 MHz 112 MHz	CEPT Recommendation (01)04
70/80 GHz	71-76 GHz / 81 – 86 GHz	250 MHz – 2.25 GHz	CEPT Recommendation (05)07

- 35 The following frequency bands are used for Fixed Links on a licence-exempt basis (the “Licence Exempt Bands”) provided that the Fixed Links are operated with the technical specifications as set out in ComReg Document 02/71R, as amended.

Table 5: Licence Exempt Frequency Bands

Band	Frequency
2.4 GHz	2400 – 2483.5 MHz
5.8 GHz	5.725 – 5.875 GHz
17 GHz	17.1 – 17.3 GHz
24 GHz	24.0 -24.25 GHz
60 GHz	57 – 71 GHz

2.3 Other spectrum management matters which are related to the Fixed Link Bands

- 36 Given the large number of Fixed Link Bands and potential uses cases being considered as part of this consultation, this review necessarily considers information that relates to other spectrum management matters. ComReg notes that some of these matters are already being considered in separate consultations or will be in the future and any views of stakeholders on those matters will be addressed in those consultations. In that regard, ComReg provides the following information on such matters in order to assist stakeholders in providing information relevant to the review of the Fixed Link Bands.

Satellite Services

- 37 In a number of cases, certain frequency bands are allocated to Fixed Services³² and Fixed-Satellite Services³³ on a co-primary basis.³⁴ For example, the 17.7 – 19.7 GHz frequency band is allocated at a European level to fixed services and fixed-satellite services, however ComReg has to date not allocated the 17.7 – 19.7 GHz frequency band to fixed-satellite services.

³² <https://www.itu.int/en/ITU-R/terrestrial/fmd/Pages/default.aspx>

³³ <https://www.itu.int/ITU-R/go/space/en>

³⁴ ComReg Document 20/58 – Radio Frequency Plan for Ireland – published 7 July 2020.

<https://www.comreg.ie/publication/radio-frequency-plan-for-ireland-7>

- 38 In its action plan for 2020/2021, ComReg outlines its intention to review the existing satellite earth station licensing regime.³⁵³⁶ This review would encompass all the frequency bands allocated for Fixed Satellite Services³⁷. ComReg intends to publish an initial consultation document in Q2 2021, seeking the views of interested parties regarding, amongst other things, the frequency bands that should be allocated for fixed-satellite services in Ireland. Any future shared use of frequency bands would consider sharing/compatibility studies undertaken by The European Conference of Postal and Telecommunications Administrations (“CEPT”) and/or the International Telecommunications Union’s (“ITU”).

1.4 GHz

- 39 At WRC-15, the two frequency bands adjacent to 1452-1492 MHz (i.e. 1427-1452 MHz and 1492-1517 MHz) (together the “1.4 GHz Extension Bands”) were identified globally for International Mobile Telecommunications (“IMT”) systems. The 1.4 GHz Extension Bands were harmonised in November 2017 by the European Electronic Communications Committee (“ECC”)³⁸ for Mobile/Fixed Communications Networks Supplemental Downlink (“MFCN SDL”). In April 2018, the EC issued an implementing decision which harmonises the entire 1.4 GHz Band (i.e. 1427–1517 MHz) for terrestrial systems capable of providing ECS in the EU (“1.4 GHz EC Decision”).³⁹
- 40 The 1.4 GHz EC Decision provides that Member States should have national flexibility to use portions of the 1.4 GHz Extension Bands to cater for international military agreements or to respond in a time-limited manner to specific national needs for the continued operation of terrestrial fixed wireless services.

³⁵ As identified in its Radio Spectrum Management Statement for 2019 – 2021, ComReg Document 18/118.

³⁶ <https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/satellite/>

³⁷ Appendix 2 of ComReg Document 00/64 as amended sets out the frequency bands allocated to Fixed Satellite Services in Ireland <https://www.comreg.ie/media/2016/04/ComReg0064-R3.pdf>

³⁸ ECC/DEC/(17)06 - The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) – 17 November 2017: available at <https://docdb.cept.org/>.

³⁹ Commission Implementing Decision (EU) 2018/661 of 26 April 2018 amending Implementing Decision (EU) 2015/750 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union as regards its extension in the harmonised 1427-1452 MHz and 1492-1517 MHz frequency bands.

- 41 As part of the proposed Multi Band Spectrum Award (“MBSA2”), the future use of the 1.4 GHz Band was considered in ComReg’s Consultation Document 18/60⁴⁰. For the reasons detailed in ComReg Documents 19/59R⁴¹ and 19/124⁴², ComReg’s preliminary view remains unchanged, that is that the 1.4 GHz Band (both the 1.4 GHz Centre Band and the 1.4 GHz Extension Bands) should not be included in the Proposed Award.
- 42 ComReg will continue to monitor developments in the 1.4 GHz Band and may provide additional clarifications on same in future consultation documents on the Fixed Links review, following any final Decision on MBSA2.⁴³
- 43 The future award of the 1.4 GHz Band will be determined by a separate consultation process, which would commence following any final Decision and Award of spectrum currently being consulted upon as part of the proposed Multi-Band Spectrum Award.⁴⁴

26 GHz

- 44 As part of the MBSA2 consultation process, the future use of the 26 GHz Band was considered in ComReg’s Consultation Document 18/60⁴⁵. For the reasons detailed in ComReg Documents 19/59R⁴⁶ and 19/124⁴⁷, ComReg stated that the 26 GHz Band should not be included in the Proposed Award and all respondents to the consultation agreed with ComReg’s proposal to exclude this band from same.
- 45 In its current public action plan⁴⁸, ComReg has included an action to issue an Information Notice and Consultant’s report in Q4 2020 on an appropriate licensing framework or frameworks for assigning spectrum in the 26 GHz band for MFCN/ECS.

⁴⁰ See section 3.2 of ComReg Document 18/60 – Proposed Multi Band Spectrum Award: Preliminary consultation on which spectrum bands to award.

⁴¹ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-including-the-700-mhz-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

⁴² <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-response-to-consultation-and-draft-decision-the-700-mhz-duplex-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

⁴³ <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/>

⁴⁴ <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/>

⁴⁵ See section 3.2 of ComReg Document 18/60 – Proposed Multi Band Spectrum Award: Preliminary consultation on which spectrum bands to award.

⁴⁶ See paragraph 3.115 of Document 19/59R - <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-including-the-700-mhz-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

⁴⁷ See section 3.2.3 of Document 19/124 - <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-response-to-consultation-and-draft-decision-the-700-mhz-duplex-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

⁴⁸ <https://www.comreg.ie/media/2020/07/Action-Plan-Ye-300621-.pdf>

40.5-43.5 GHz

- 46 In advance of the ITU World Radio Conference in 2019 (“WRC-19”), the CEPT considered the 40.5-43.5 GHz frequency band to have good potential for future harmonisation in Europe for IMT. That band was identified at WRC-19 as facilitating the development of 5G mobile networks. At the ECC’s 52nd meeting in March 2020, a new work item on a new ECC Decision on MFCN in 40.5-43.5 GHz (comprising a band plan and technical conditions suitable for 5G) was adopted.⁴⁹
- 47 The CEPT is also developing a report in response to an EC mandate to develop least restrictive harmonised technical conditions suitable for next-generation (5G) terrestrial wireless systems for 40.5-43.5 GHz.⁵⁰
- 48 ComReg will continue to monitor and input into the discussions of this matter at the EC and ECC. Upon the adoption and publication of any future EC and/or ECC Decision, ComReg will consider the appropriate implementation of those decisions.

WAS/RLAN above 5 GHz

- 49 In 2017, the EC issued a Mandate to the ECC to study feasibility and identify harmonised technical conditions for a sustainable and efficient use on a coexistence basis of the 5925-6425 MHz band for wireless access systems including radio local area networks (WAS/RLANs).⁵¹
- 50 In response to the mandate, the ECC has published two reports, ECC Report 302⁵² and ECC Report 316⁵³ and is considering the submissions to the public consultation on the draft CEPT Report 75 (Report B) on “*Harmonised technical parameters for WAS/RLANs operating on a coexistence basis with appropriate mitigation techniques and/or operational compatibility/coexistence conditions, operating on the basis of a general authorisation*”, and the submissions to the public consultation on the draft ECC Decision (20)01 “*on the harmonised use of the frequency bands 5945 to 6425 MHz for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs)*”. Draft CEPT Report 75 and draft ECC Decision (20)01 are expected to be considered for adoption and publication at the ECC plenary meeting in November 2020.

⁴⁹ See PT1_34 work item at <http://eccwp.cept.org/default.aspx?groupid=27&go=true>

⁵⁰ See PT1_37 work item at <http://eccwp.cept.org/default.aspx?groupid=27&go=true>

⁵¹ http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=50343

⁵² Sharing and compatibility studies related to Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz
<https://docdb.cept.org/download/cc03c766-35f8/ECC%20Report%20302.pdf>

⁵³ Sharing studies assessing short-term interference from Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) into Fixed Service in the frequency band 5925-6425 MHz
<https://docdb.cept.org/download/8951af9e-1932/ECC%20Report%20316.pdf>

- 51 In its most recent report to the EC's Radio Spectrum Committee,⁵⁴ the ECC stated that it has identified some elements on which further discussions are required and that it will further consider these elements, after the public consultation phase of draft CEPT Report 75. The ECC has also noted that further technical work is also being undertaken in parallel within ECC Working Group Spectrum Engineering⁵⁵ which will also be considered when finalising draft ECC Decision (20)01.
- 52 ComReg will continue to monitor and input into the discussions of this matter at the EC and ECC. Upon the adoption and publication of any future EC and/or ECC Decision, ComReg will consider the appropriate the implementation of those decisions.

⁵⁴ <https://circabc.europa.eu/ui/group/af096568-9b95-4bb2-84db-45b307b06a22/library/12aa19ee-83fc-42a1-bfb5-430bd5cad24c/details>

⁵⁵ <https://cept.org/ecc/groups/ecc/wg-se/client/introduction/>

Chapter 3

3 The use of fixed links in Ireland

53 This Chapter provides information and analysis on the existing and potential use cases for Fixed Links⁵⁶ in the State and is laid out as follows.

- First, ComReg assesses the existing use cases for Fixed Links in Ireland (“Existing Use Cases”)
- Second, ComReg assesses the use of Fixed Links in an International context (“International Use Cases”)
- Third, ComReg assesses emerging trends and other potential uses cases (“Other Potential Use Cases”)

54 The Chapter concludes with ComReg’s preliminary views on the potential use cases for Fixed Links which would be used to inform ComReg’s considerations in the relation a future licensing framework for the Fixed Link Bands.

3.1 Existing Use Cases

55 ComReg’s assessment of existing use cases is assessed under the following headings.

- Use cases for Fixed Links;
- Users of Fixed Links;
- Trends in use of Fixed Links;
- Geographic scope of Fixed Links; and
- Future Trends in Fixed Links.

Use cases for Fixed Links

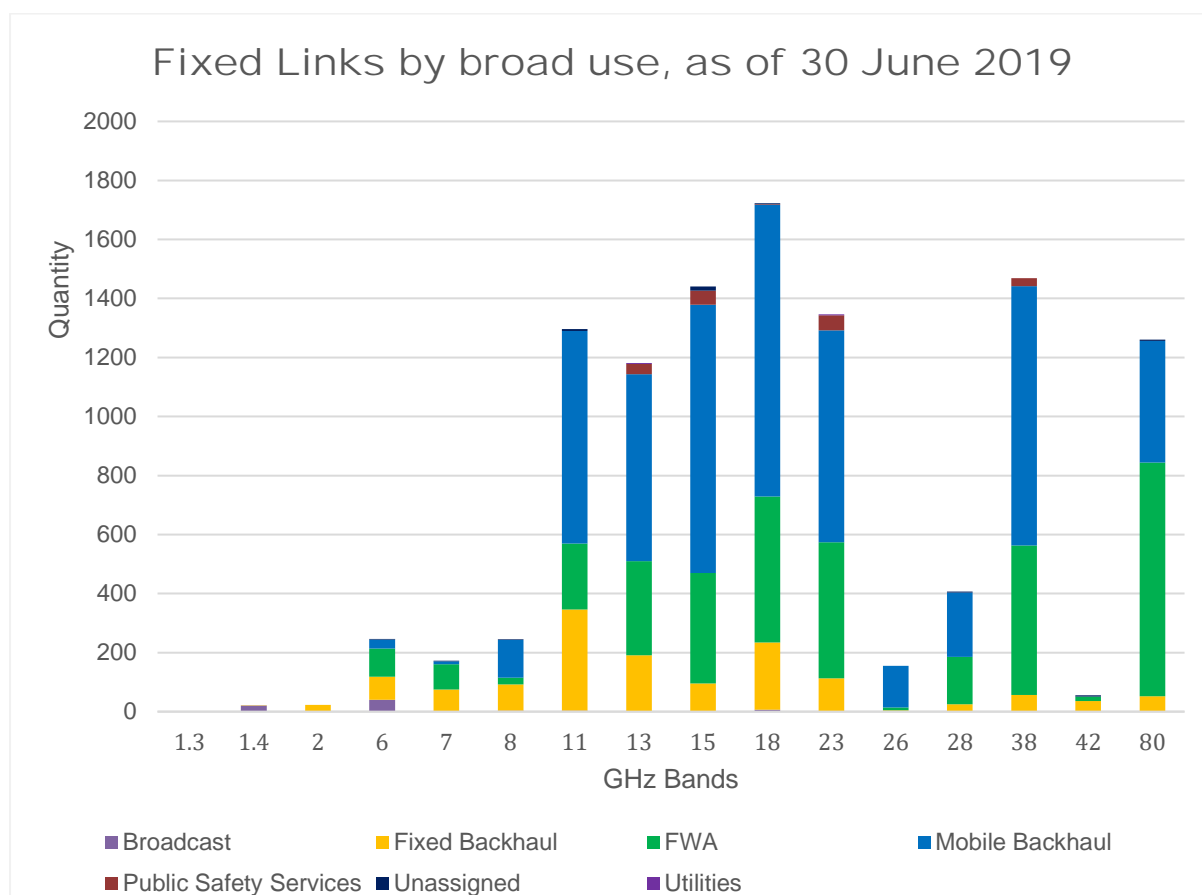
56 The licensing application process of itself does not require applicants to provide information on the intended use case for an individual licenced Fixed Link. However, in order to inform this review, and as part of its Licensee RFI, ComReg sought a breakdown of the broad use cases by band between 2016-2019. A total of 37 respondents provided data covering 11,301 of the 12,510 P-P Fixed Links licences

⁵⁶ ComReg throughout this chapter refers to Fixed Links licences in lieu of Fixed Links but notes that the there are instances where a single Fixed Link licence is not equivalent to a single Fixed Link (e.g., Dual Polarity).

in place at 30 June 2019⁵⁷, from a broadly representative sample⁵⁸. Figure 3 below outlines the broad uses to which P-P in the Fixed Link Bands is put:

- Broadcasting is the most prominent use in the 1.4 GHz band;
- Mobile backhaul use accounts for the majority of links between the 11 and 38 GHz Bands;
- Fixed wireless access (“FWA”) comprises the majority of Fixed Links in the 80 GHz Bands, and
- Fixed Links used solely to provide connectivity within a primarily fixed line network (“Fixed Backhaul”) accounts for a minor share of Fixed Links in most Bands.

Figure 3: Snapshot of broad use of individually licenced P-P Fixed Links among RFI respondents, as of 30 June 2019

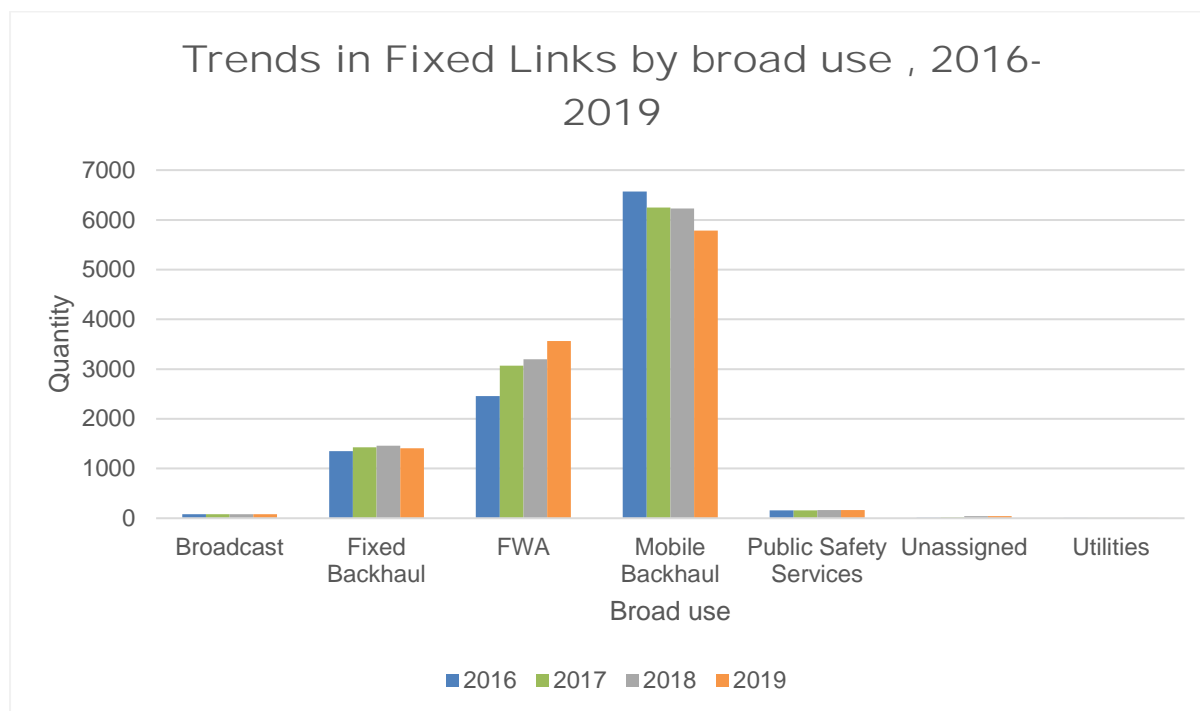


⁵⁷ Unassigned links are where an operator did not indicate a use case for a given Fixed Link, which comprise an insignificant share (<1%) of respondents Fixed Links.

⁵⁸ ComReg is satisfied that a representative sample of licencees provided data on broad use type, with responses received from firms with varying business types, numbers of Fixed Links licences and increasing/declining number of Fixed Links licences.

- 57 Figure 4 indicates an increase in individually licenced P-P Fixed Links used in the provision of FWA, although the use of individually licenced Fixed Links for Mobile Backhaul remains substantial at around 6,000 links⁵⁹.

Figure 4 Trends in broad use cases of individually licenced P-P Fixed Links among RFI respondents, 30 June 2016 – 30 June 2019



- 58 ComReg notes the decline in individually licenced P-P Fixed Links for mobile backhaul is concentrated in the 15 GHz (-34%), 23 GHz (-69%), 26 GHz (-25%) and 38 GHz (-25%) bands, which experienced the largest absolute declines between 2016 and 2019⁶⁰ as shown in Figure 5. ComReg notes that this diminution was partially offset by an increase of P-P Fixed Links for mobile backhaul in the 18 GHz (+48%), 80 GHz (+565%) and 28 GHz (+100%) bands. ComReg notes that the mobile network operators (“MNOs”) experienced contrasting trends in the use of Fixed Links for Mobile Backhaul⁶¹ during this period, given that:

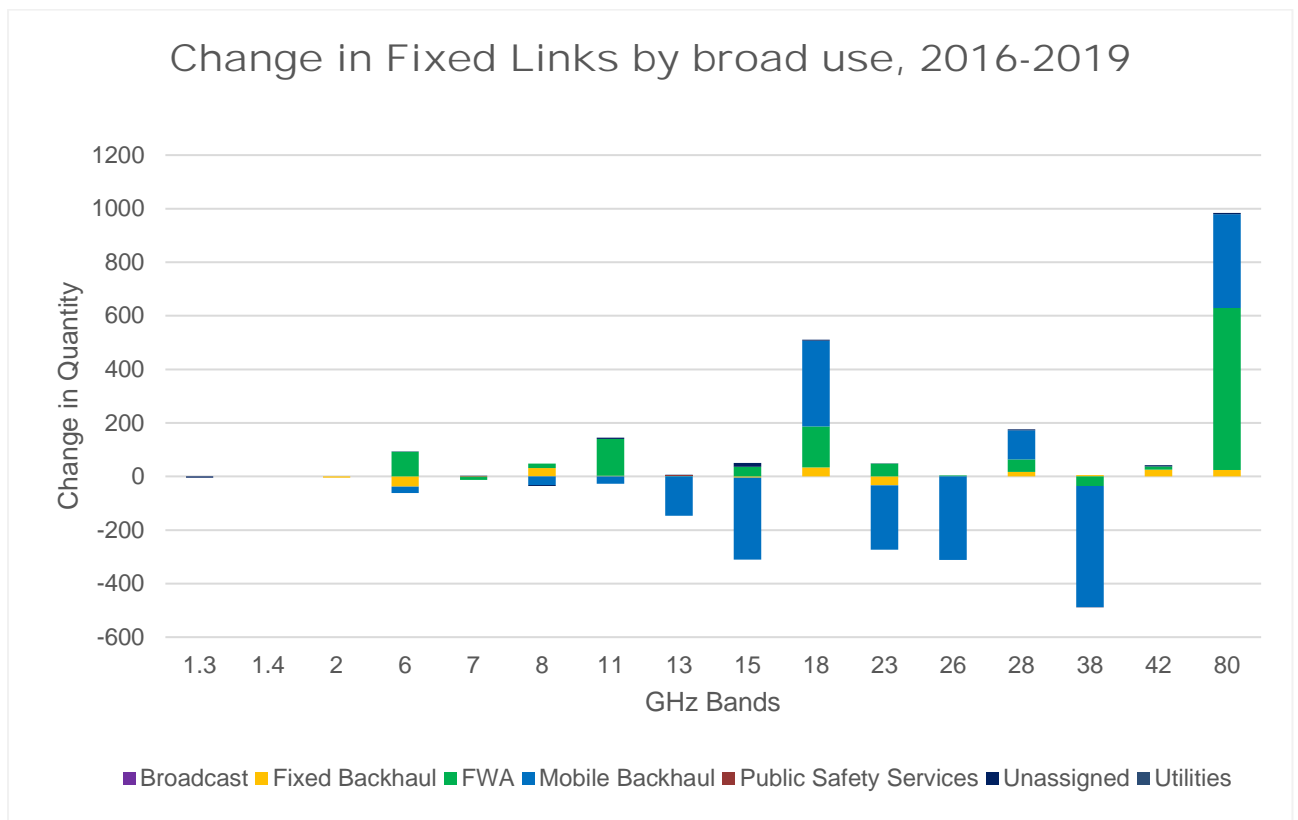
⁵⁹ As of June 2019. This figure does not include Fixed Links in the Licence Exempt 26 GHz Band.

⁶⁰ ComReg notes that MNOs interviews with MNOs, responses to the Licencee RFI and data on sites in the 26 GHz Block Licence all indicate that the decline of individually licenced Fixed Links has been more than offset by the increase in Fixed Links in the 26 GHz Block Licences. ComReg is therefore of the view that the concurrent decline in individually licenced Fixed Links reflects the use of Block Licences in network planning and not a decline in demand for Fixed Links for Mobile Backhaul more generally.

⁶¹ It should be noted that the Licencee RFI extends only to 30 June 2019. The number of Fixed Links increased substantially between 30 June 2020, with one MNO (Meteor) accounting for much of this increase. Therefore while the composition of Fixed Links for Mobile Backhaul between 2016-2019 may be informative and may be sensitive to the time period (i.e., the trend may have reversed in 2020), ComReg notes the aggregate decline in licenced Fixed Links may reflect factors other than a fall in demand (e.g., MNOs switching to use of Fixed Links in the 26 GHz Block Licences).

- One MNO drove most of the decrease in individually Fixed Links for mobile backhaul, both in aggregate and within each band;
- One MNO experienced a modest increase in the number of Fixed Links deployed for Mobile Backhaul between 2016-2019; and
- One MNO experienced a small decline in the number of Fixed Links from 2016-2019 but provided data showing this was offset by a greater increase in the deployment of P-P Fixed Links for Mobile Backhaul in its 26 GHz Block Licence.

Figure 5: Change in individually licenced Fixed Links by broad use among RFI respondents, 30 June 2016 – 30 June 2019



59 Both stakeholder interviews and the Licensee RFI indicated some inertia in their choice of bands for deploying Fixed Links (i.e., operators typically use the same band for Fixed Links over time). Operators provided several reasons for this inertia, some of which are not mutually exclusive and include factors such as an operator's familiarity with certain bands, familiarity with related equipment and the holding of inventory for replacement equipment and parts for equipment already in use. ComReg notes that operators appear somewhat more flexible when considering bands for new Fixed Link deployments, rather than when renewing the licence for a legacy Fixed Link (i.e., once chosen, a given Fixed Link typically remains in the same band)⁶². This is consistent with the slow change in the distribution of Fixed Links across bands, which appears to be driven by new Fixed Links licences (e.g., FWA at 80 GHz) rather than by the replacement of existing Fixed Links.

Users of Fixed Links in Ireland

60 The users with the largest number of P-P Fixed Links are:

- MNOs which primarily use Fixed Links for mobile backhaul;
- Fixed network operators which primarily use Fixed Links as an economic alternative to leased lines and optical fibre in its Fixed Backhaul;
- Fixed wireless access operators which use Fixed Links for the provision of fixed wireless broadband; and
- Broadcasters which use Fixed Links to distribute signals to transmission sites.

61 Most of the Fixed Links in the State are licensed to MNOs (c. 50%)⁶³, followed by Fixed Network operators (c. 30%)⁶⁴ and FWA operators (c. 20%)⁶⁵, with the remainder (<5%) being owned by a variety of bodies, including local authorities, utilities and broadcasters⁶⁶⁶⁷. The composition of use cases differs between bands with:

⁶² Operators listed the cost of training and replacing old equipment, as well as the lifespan of Fixed Link equipment as reasons not to switch band, among other reasons.

⁶³ For the purposes of this analysis, all rights of use are licenced to MNOs are attributed to Mobile Backhaul. This figure encompasses licences for both MNOs mobile and fixed operations.

⁶⁴ In the following sections, users classified as "fixed network operators" are identified as such based on their core business. This includes among other things, providers of wholesale connectivity services that utilise fixed links as part of their wholesale offering. Many of the links licensed to such operators may be used to provide backhaul capacity to third parties, such as mobile networks, local authorities, and/or utilities.

⁶⁵ In the following sections, users classified as "fixed wireless access operators" are identified as such based on their core business and include providers of retail broadband services such as Imagine Communications Group

⁶⁶ The actual percentages exceed 100% as this calculation double counts Fixed Network Operators that also provide FWA services. For more information, please see Table 6 in Annex 2.

⁶⁷ Please see Tables 6 and 7 in Annex 2 for further information on the licensees of Fixed Links in various bands.

- Broadcasters⁶⁸ and Local Authorities own most Fixed Links in the 1.3 and 1.4 GHz Bands;
- MNOs operating the majority P-P Fixed Links in all but one of the bands between 11 and 38 GHz⁶⁹;
- FWA and Fixed Network operators operating the majority of Fixed Links in the bands above 40 GHz.

62 The only users of licensed P-MP Fixed Links are:

- Eircom Ltd, which has 29 P-MP licences which are used in relation to Rurtel⁷⁰; and
- State Services, which have two licences.

63 Based on the response to ComReg's RFI, the primary category of operators of Fixed Links in Licence Exempt Bands are providers of wireless access (FWA or backhaul in Fixed Networks).

Trends in use of Fixed Links in Ireland

64 This section analyses the trends for licensed and licensed exempt Fixed Links.

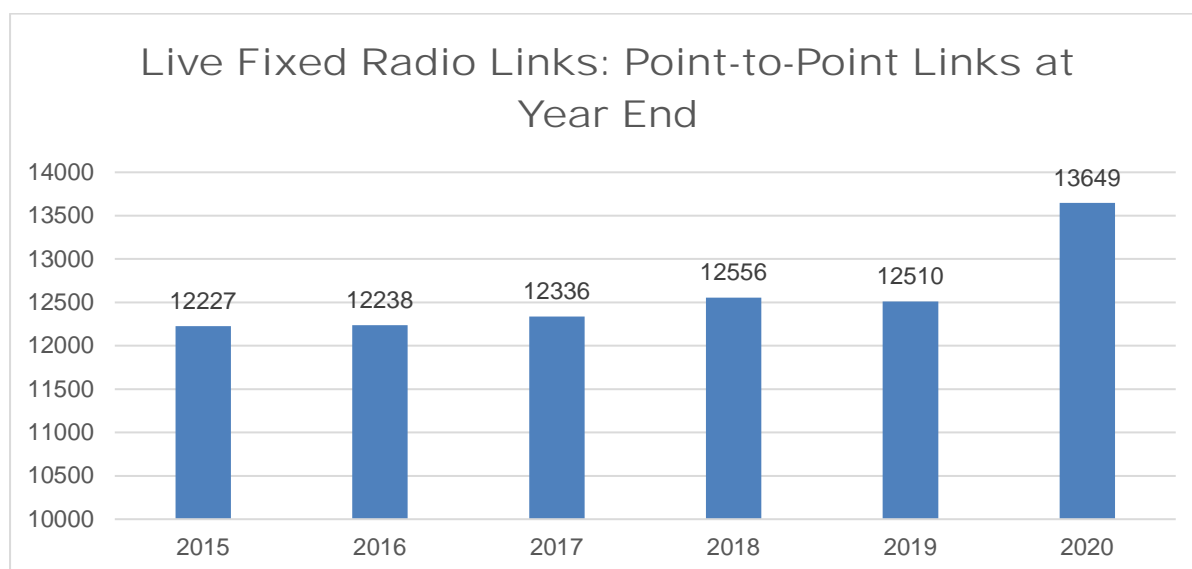
Licensed Links

65 The bulk of Fixed Links in the State are P-P, with 13,649 links in effect as of 30 June 2020. The growth of P-P Fixed links in recent years is shown in Figure 6 below. ComReg notes that the increase in P-P Fixed Links licences in between 30 June 2019 and 30 June 2020 is attributable to an increased numbers of Fixed Links licences held by Meteor and Eir, Imagine, Leeson and Enet in higher frequency bands. ComReg notes that some, but not all, of this increase is attributable to a temporary need for wireless backhaul for the National Broadband Plan, which should ultimately be replaced.

⁶⁸ This grouping includes both 2RN and Radio Broadcasters.

⁶⁹ The exception of 28 GHz with 48% with MNOs accounting of P-P Fixed Links

⁷⁰ ComReg note that the Rurtel licences are deployed in the 2.3 GHz band and this matter is being addressed by the MBSA2 consultation and these licences therefore do not impact the Fixed Link Band Review.

Figure 6: Point-to-Point Fixed Links, 2015-2020⁷¹

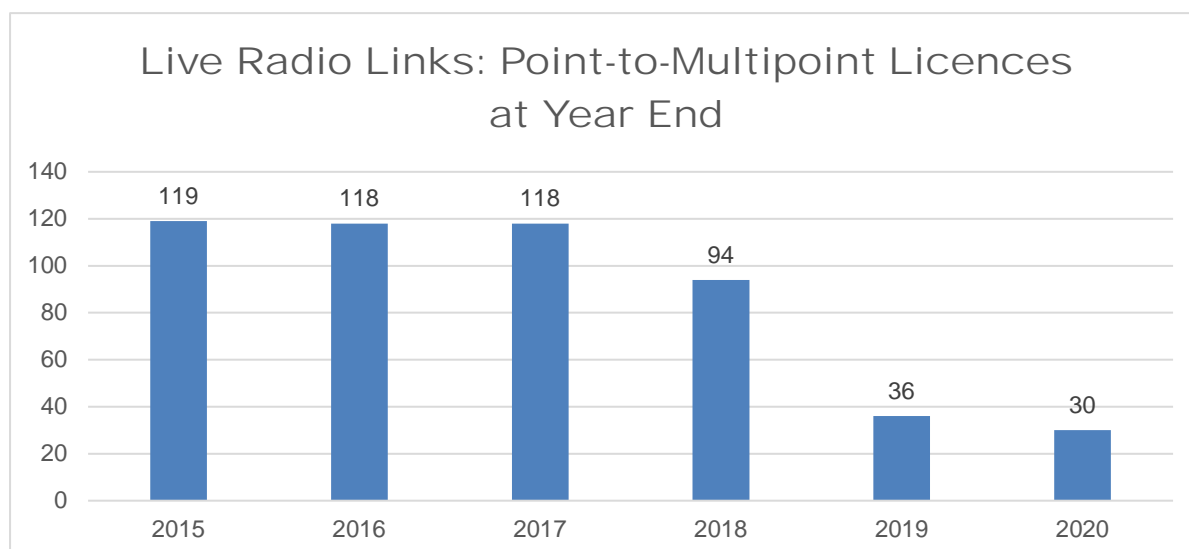
- 66 While the number of Fixed Links has remained relatively stable (or fallen slightly) for bands below 11 GHz, the number of Fixed Links has been more volatile in bands 11 GHz and above. ComReg notes strong year-on-year increases in the number of P-P Fixed Links in the 11 GHz, 18 GHz, 28 GHz and 80 GHz bands, and decreases in the number of P-P Fixed Links in 15 GHz, 23 GHz, 26 GHz and 38 GHz in recent years.
- 67 P-MP Fixed Links have only ever accounted for a minority of the Fixed Link licences granted by ComReg. The number of P-MP Fixed Links has been decreasing further in recent years due, in the main, to a number of operators decommissioning legacy equipment, in particular ESB Networks cancelling its P-MP licences as it migrated to the SCADA⁷² telemetry networks utilising its national telemetry licence⁷³. The decline of P-MP Fixed links in recent years is shown in Figure 7 below.

Figure 7: Point-to-Multipoint Fixed Links licences, 2015-2020

⁷¹ Years are assessed on a June to June basis (e.g. 2015 refers to June 2015 – June 2016).

⁷² Supervisory, Control and Data Acquisition.

⁷³ <https://www.comreg.ie/industry/radio-spectrum/licensing/search-licence-type/telemetry/>



Licence exempt Fixed Links

68 For the purposes of this review, ComReg requested information on the use of Fixed Links in the Licence Exempt Bands in the Licensee RFI⁷⁴. A total of 15 respondents to the RFI stated their use of licence exempt Fixed Links⁷⁵. Separate ComReg data indicates that ComReg's RFI data did not capture the majority of licence exempt Fixed Links, due to a number of FWA operators with a large number of Licence Exempt FWA Fixed Links⁷⁶ failing to respond. ComReg therefore places limited weight on trends in this data as representing trends for all licence exempt Fixed Links. Bearing this in mind, ComReg notes the use of Fixed Links among these 15 users has increased in recent years with most of the licence exempt Fixed Links deployed for FWA in the 5 GHz band. Data gathered separately by ComReg on broadband subscriptions delivered by FWA corroborate this finding and indicates that the number of Fixed Links in the Licence Exempt Bands used for the provision of FWA for 2.4 GHz and 5 GHz bands has increased from Q1 2020.

Geography of Fixed Links in Ireland

69 Maps showing the location of Fixed Links in each band in 2010 and 2020 are included in Annex 3. ComReg notes that while Fixed Links span the entire State, Fixed Links are concentrated nearer to urban population centres.

Future demand for fixed links

70 ComReg notes the emerging and future trends outlined in Chapter 3 of the DotEcon Report, including:

⁷⁴ The DotEcon Report contains in-depth analysis of this in Annex B

⁷⁵ ComReg cross checked this data against data received from broadband operators in relation to the provision of Broadband via FWA in the Licence Exempt bands.

⁷⁶ Specifically data gathered by ComReg on broadband subscriptions provided via FWA in the Licence Exempt bands.

- continued demand for increases in bandwidth;
- impact of deeper fibre penetration and the National Broadband Plan;
- demand for wider channels in existing bands;
- availability of spectral efficient technology;
- development of advanced technologies; and
- emergence of specialist low latency links.

71 ComReg agrees with DotEcon’s assessment of these trends, which it expects to persist over the medium term (the next 10 years) noting that the pace of an emerging trend may vary from year to year. Furthermore, ComReg notes that the impact on demand for Fixed Links of particular factors/developments will be:

- different across bands (e.g. the impact of fibre may increase and decrease demand for Fixed Links in different Bands);
- partly determined by the business plans of licensees (e.g. take up of newer equipment); and
- partly determined by the business plans of firms other than the licensees (e.g. the rollout of Fibre).

3.2 The use of Fixed Links in Ireland in an International context

72 Certain interviewees stated that Ireland has a natural higher reliance on Fixed Links for mobile and fixed backhaul as a result of Ireland’s geography and topology, with small distant population centres separated by hilly terrain. These physical and demographic characteristics result in cost and coverage advantages from using wireless Fixed Links relative to wired solutions, increasing the cost of wired solutions in rural areas and increasing the number of sites with line of sight.

73 While noting the importance of Fixed Links to electronic communications services (“ECS”) in Ireland, ComReg notes that Ireland does appear to have a moderately higher reliance on P-P Fixed Links relative to comparable EU countries⁷⁷.

International trends in the use of Fixed Links

74 In total 22 members of the Independent Regulators Group (“IRG”) provided a response to the IRG RFI which ComReg issues in order to gather, among other things, the most up to date information on trends in the use of Fixed Links. The key findings broadly mirror the trends in the use of Fixed Links in Ireland which are that in recent years there has been an:

⁷⁷ Please see Figure 50 in Annex 2 for further information.

- increasing demand for Fixed Links at higher frequencies (above 11 GHz, but in particular above 30 GHz); and
- increasing demand for capacity in Fixed Links.

75 ComReg notes that other European countries have experienced similar growth in P-P Fixed Links, with CEPT finding that the number of P-P Fixed Links grew 50% from 2010 to 2016 across 23 states⁷⁸. This finding is supported by research undertaken by the ITU finding that Fixed Links have grown in this period as the result of an increase in demand for mobile backhaul services⁷⁹. CEPT found that the increase in use of Fixed Links between 2010 and 2016 was concentrated in certain bands including 13 GHz, 15 GHz, 18 GHz, 23 GHz and 38 GHz. CEPT characterised several higher bands as “*preparing to take off*”, including 32 GHz, 50 GHz, 70/80 GHz and 92 GHz with several administrations considering the introduction of light licensing in 70/80 GHz.

76 Given the above, ComReg is satisfied that the Existing Use Cases in Ireland are broadly typical of the use cases internationally and while the level of usage may vary depending on the use case, there does not appear to be any use cases internationally that are not already provided for in Ireland.

3.3 Other potential use cases for Fixed Links

77 The stakeholder interviews and research completed as part of this review suggest the potential emergence of several new use cases for Fixed Links including:

- **advanced fixed wireless services** in urban areas using next generation technology and P-MP/mesh network architecture to deliver fixed wireless broadband over the mmWave bands at much higher speeds than possible with traditional P-MP systems; and
- **specialist low latency links** (e.g. for financial trading, where the straight-line path of Fixed Links may provide lower latency than long, indirect fibre routes with many switching/routing nodes).

78 ComReg agrees with DotEcon’s assessment of the potential use cases which may potentially develop over the medium term (the next 10 years) and will take these into its considerations. ComReg notes that these potential use cases relate to specific band ranges (as noted by DotEcon the key bands for advanced FWA services and specialist low latency links are 23-42 GHz and 6-13 GHz respectively).

⁷⁸ CEPT “*Fixed Services in Europe: Current use and future trends*” ECC Report 173

⁷⁹ ITU “*Fixed Service use and future trends*” Report ITU-R F.2323-1 - https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-F.2323-1-2017-PDF-E.pdf

3.4 Preliminary views on potential uses cases for Fixed Links

79 For the reasons set out above and as outlined in the DotEcon Report, ComReg is of the preliminary view that the potential use cases for the bands assigned for use by Fixed Links are:

- narrowband telemetry and control applications;
- broadcast distribution;
- backhaul from mobile cell sites;
- fixed wireless access;
- links within core networks;
- advanced fixed wireless services in urban areas; and
- specialist low latency links (e.g. for financial trading).

80 ComReg accords with the potential use cases listed by DotEcon and concurs with the analysis that informed same. ComReg considers these use cases are appropriate as they:

- take account of the stakeholders' interviews which consider a variety of users and vendors, equipment manufactures;
- take account of the detailed data and views collected by existing users as part of the Licensee RFI;
- consider potential use cases in other jurisdictions;
- are consistent with the assessment provided in this chapter; and
- reflect the views of other stakeholders in related consultations (i.e. MBSA and the Radio Spectrum Management Strategy Statement).

81 ComReg notes that the information was obtained from stakeholders and was carefully analysed. Such use cases will be considered in determining the future licensing framework for the Fixed Link Bands.

82 These findings are of course preliminary in nature. ComReg has not made any decisions on the future use of either the Fixed Link Bands or Candidate Bands and all comments regarding the potential uses identified above, or others, are welcome.

Q1: ComReg seeks the views of interested parties on the existing and potential use cases identified above and whether there are other use cases that should be considered in determining an appropriate licensing framework. In the case of other potential use cases please provide supporting material for your answers.

Chapter 4

4 Preliminary Findings

83 The DotEcon Report sets out a number of interim conclusions which are relevant to ComReg's considerations on a future licensing framework for the Fixed Link Bands. This chapter summarises those conclusions and other issues raised during the stakeholder engagement while also providing ComReg's preliminary views. Readers are referred to the DotEcon Report (Document 20/109A) for a detailed discussion on each of its interim conclusions and other issues raised during the stakeholder engagement.

4.1 Spectrum availability and channel arrangements

84 During the stakeholder interviews, some parties expressed an interest in 112 MHz channels being made available in the 13 GHz and 15 GHz bands. DotEcon observes that there may be little downside to making larger channels available, where feasible and in line with the international recommendations, and that ComReg should consider, for example, making 112 MHz channels available in the 13 GHz and 15 GHz bands.

85 Separately, DotEcon notes that:

- in November 2019 the ITU updated Recommendation F.636-5 (11/2019)⁸⁰ on channel arrangements in the 15 GHz bands to include 112 MHz channels.
- the ECC is currently considering the doubling of the maximum channel widths for the 11 GHz, 18 GHz, 23 GHz, 28 GHz, 32 GHz and 38 GHz bands, with an initial report due to be published for consultation in September 2020.⁸¹
- the 13 GHz and 15 GHz bands are not included as part of that report and following the findings and any adjustments to the recommendations, ComReg should consider amending the range of channel sizes it offers accordingly in the relevant frequency band(s).

⁸¹ ComReg notes that the report was published on 2 October 2020 as ECC Report 319 <https://docdb.cept.org/download/b7f53395-a40b/ECC%20Report%20319.pdf>

ComReg's preliminary view

- 86 ComReg agrees with DotEcon's view that where larger channel bandwidth have been recommended by the CEPT and/or the ITU then these should be made available as part of the Fixed Link licensing regime. ComReg notes that in its response to its 2012 fixed links survey, ComReg Document 12/104⁸², ComReg permitted the use of wider channels in the 13 GHz, 15 GHz, 18 GHz, 23 GHz and 38 GHz bands. Therefore, where the ITU and/or CEPT updates its recommendations regarding channel arrangements for Fixed Link, ComReg intends to update its Guidelines to reflect those new arrangements, where appropriate.
- 87 However, ComReg observes that the CEPT and ITU recommended channel arrangements for the 13 GHz band do not provide for 112 MHz channels. If ComReg was minded to open 112 MHz channels in the 13 GHz band, then only two channels could be made available due to the limited quantum of spectrum in the band. The number of 56 MHz channels in the band is already limited to four channels.
- 88 Regarding the 15 GHz band, ComReg notes that the ITU has updated Recommendation F.636-5 (11/2019) to include 112 MHz channel arrangements. The number of 56 MHz channels currently available in Ireland is limited to seven channels. If ComReg was minded to open 112 MHz channels in the 15 GHz band, then only four channels could be made available.
- 89 To allow for 112 MHz channels in the 13 GHz and 15 GHz band could have the effect of limiting the number of channels available to operators in areas of high demand. However, ComReg is of the view that there may be some benefit in opening 112 MHz channels in the 13 GHz and 15 GHz bands.
- 90 ComReg welcomes the views of respondents on making the 112 MHz channels available in the 13 GHz and 15 GHz bands for Fixed Links, including any views on the timing of such.

Q2. ComReg seeks views of interested parties regarding the current and future channel arrangements for all the Fixed Link Bands in ComReg's Guidelines document 09/89R2, and any other channel arrangements recommended or being considered by the CEPT and/or ITU. Please provide evidence and reasoning for your views.

⁸² ComReg Document 12/104 – Response to Survey and Decision Fixed Links Survey – published 17 September 2012.

4.2 Block licences

- 91 The DotEcon Report notes that block licences offer strong benefits for users who want to be able to deploy a large number of links at similar frequencies at short notice. DotEcon identifies the 32 GHz, 80 GHz, 92-114.25 GHz, 130 – 174 GHz bands as potentially suitable for Block licensing at some point in the future.
- 92 Block Licences could ensure a more efficient use of the radio spectrum in certain circumstances and depending on the use case and users. ComReg considers that block licensing offers the following advantages:
- It allows licensees to deploy P-P links at their own discretion (within the conditions of the licence)
 - It allows interference between links themselves to be managed by the block licensee rather than across potentially multiple different users
 - Licensees can deploy links with bandwidth limited only by the number of (contiguous) national blocks held.
 - For operators deploying a sufficiently large number of Fixed Links, national blocks may be cheaper than multiple individual link licences.
- 93 Therefore, block licences can provide significant additional flexibility for operators deploying multiple P-P links. In that regard, ComReg is of the preliminary view that, where appropriate, block licensing could be suitable for the assignment of certain Fixed Link Bands.

32 GHz band

- 94 DotEcon notes that the 32 GHz band (31.8-33.4 GHz) is a potentially suitable alternative to the 26 GHz Band for block licensing. For example, if some (beyond the 1 GHz available) or all of the 26 GHz band was required for 5G services the 32 GHz band could be used as alternative to provide Fixed Links (e.g. backhauls).
- 95 DotEcon is also of the view that the 32 GHz band should be made available for block assignments where there is sufficient demand. In summary:
- If the 32 GHz band was identified as a replacement for block licence in the 26 GHz, this would not arise until 2028 when the 26 GHz block licences expire.
 - However, to the extent that there may be demand for the 32 GHz band from other use cases before 2028 there is no reason for delaying access to the spectrum.

ComReg's preliminary view

- 96 ComReg notes DotEcon's view regarding the 32 GHz band and agrees that where there is sufficient demand for access to the band then ComReg should consider licensing the band as appropriate. In that regard, ComReg also notes that CEPT currently does not consider the 32 GHz band as a priority band for 5G and is of the view that the 32 GHz band should remain designated primarily for fixed services and fixed-satellite services.⁸³ ERC Recommendation (01)02 sets out the preferred channel arrangements, up to 112 MHz, for Fixed Service systems operating in the 32 GHz band.⁸⁴
- 97 In 2012, ComReg consulted on opening the 32 GHz band for Fixed Links as part of its fixed links survey. While a number of operators expressed some interest in the 32 GHz band, ComReg decided that the band may be made available for individual Fixed Links in the future pending a review of the release of further spectrum and the demand for spectrum for Fixed Links use in the 31 GHz band. ComReg notes however that to date, there has been no demand for Fixed Links in the 31 GHz band, and only limited demand for the 28 GHz and 42 GHz bands which were made available for Fixed Links in 2012.

80 GHz band

- 98 There are currently ~1,800 links in the 80 GHz band, over 1,000 of which are in Dublin. DotEcon notes that regional block licensing may be more appropriate than national licences given the limited use of 80GHz in rural areas and likely concentration of links in urban centres. In that regard, DotEcon notes that individual link licences already granted in the band could make any sort of reorganisation to facilitate block licences in Dublin difficult, without which the benefit to regional block licences in 80 GHz may be reduced. Further, it is likely to be useful for high density networks in urban areas and a national block licence may not ensure the efficient use of the radio spectrum to the same extent as individual licences.
- 99 Notwithstanding, in other urban areas there are relatively few links (the largest number being ~75 links in Cork) and DotEcon notes that sub-national block licensing may be a suitable approach in urban areas.

⁸³ CPG19-9 Minutes – CEPT Brief on WRC-19 Agenda Item 1.13:

https://www.cept.org/Documents/cpg/53499/cpg-19-143-annex-iv-13_cept-brief-on-ai-113

⁸⁴ <https://docdb.cept.org/download/3ab0c961-4f74/REC0102.pdf>

ComReg's preliminary view

100 ComReg agrees with DotEcon that a reorganisation of the 80 GHz band within the Dublin region may not be an appropriate approach to managing the 80 GHz band given the existing uses already provided. However, ComReg is open to receiving views on whether it is appropriate at this point to make provision for block licences in other urban areas (e.g. Limerick, Cork, Galway, Waterford) and what benefits, if any, there would be to such an approach.

101 ComReg welcomes the views of interested parties on whether the 80 GHz Band should continue to be assigned on an individual basis or whether there is scope for the use of block licensing now or in the future.

Other potential suitable frequency bands

102 Regarding other frequency bands which may be suitable for block licensing, ComReg notes that:

- As previously noted, to date no licenses have been issued by ComReg for the 31 GHz band (31.0 - 31.3 GHz paired with 31.5 - 31.8 GHz);
- the CEPT has published recommendations for the channel arrangements in the W-band (92-114.25 GHz) and D-band (130 – 174.8 GHz). In Document 18/118⁸⁵, ComReg stated that it would implement those recommendations once equipment for Fixed Links in these bands became available. ComReg notes from the responses to its RFI and interviews that some Vendors anticipate launching radio equipment for Fixed Links in these bands in the coming years.

Q3. ComReg seeks the views of interested parties on block licensing one or more of the frequency bands listed above, and/or any other relevant frequency bands. Please provide supporting material that informs your position.

4.3 Application and licensing process

103 During the course of the stakeholder interviews, regarding the individual link licence application process, operators mainly expressed concerns over channel availability in geographic areas of high demand, and the turnaround time between applying for and being granted a licence.

Channel availability

⁸⁵ ComReg Document 18/118 – Radio Spectrum Management Strategy Statement 2019 to 2021 – published 20 December 2018

- 104 Interviewees noted that due to high demand for links in certain frequency bands at certain geographic locations, it was difficult to determine whether an application would be approved for licensing. As a result, some operators submit multiple applications for different channels and/or bands at the same time in the hope that at least one would be approved, with any surplus applications being cancelled prior to processing by ComReg.

ComReg's preliminary view

- 105 ComReg notes that it can be particularly difficult to predict the likelihood of an application being approved. The factors that can affect application approvals are the output power of the link, the receive thresholds of the radios, and the number of Fixed Links licensed at a geographic location. In 2020, ComReg introduced a new function on its eLicensing platform⁸⁶ to allow applicants to view the Fixed Links already licensed in a particular geographic area. This enables applicants to consider which channels may be available in an area and better plan their fixed link deployment. ComReg notes that the stakeholder interviews revealed positive support for this new tool as it better armed applicants when preparing an application⁸⁷.
- 106 ComReg agrees with DotEcon's view that further improvements in providing licensed Fixed Links information would improve the efficiency of the application process. Therefore, ComReg is of the view that it should make licensed Fixed Links information more generally available to interested parties. This could include, for example, making the licensed fixed link information available to view and download from ComReg's siteviewer website,⁸⁸ as discussed in the current Radio Spectrum Management Strategy Statement.
- 107 While this would enable operators to better plan their Fixed Links deployment, and generally provide greater transparency regarding Fixed Link information in Ireland, it would also be in line with the Government's data transparency, accessibility, and reusability principles in its public service data strategy for 2019-2023.⁸⁹

Application and licence turnaround times

- 108 Several interviewees expressed a view that licence turnaround can, on occasion exceed ComReg's 10-day target.

⁸⁶ <https://elicensing.comreg.ie/>

⁸⁷ For more information on the recent improvements to the Fixed Link application process on ComReg's eLicensing platform, please see ComReg's Fixed Radio Links Annual Report for 2020 at www.comreg.ie

⁸⁸ <https://siteviewer.comreg.ie/>

⁸⁹ <https://www.gov.ie/en/publication/1d6bc7-public-service-data-strategy-2019-2023/>

ComReg's preliminary view

109 ComReg notes that the application process can take more than 10 days during periods when there is high demand for Fixed Links. In the past, ComReg has addressed this issue by putting additional resources into its licensing team to process the increased volume of applications. However, resourcing is not the sole factor that affects turnaround times, other factors include, but are not limited to:

- applicants providing incorrect information in their application, which results in ComReg staff having to seek the correct information from the applicant;
- applicants not providing link budgets to enable ComReg staff to check that the correct information has been provided;
- delays by applicants in responding to ComReg staff emails seeking confirmation of channel changes or seeking additional information;
- operators not providing ComReg with their fixed link deployment plans sufficiently in advance to enable ComReg to ensure that it has sufficient resources available to process an increase in applications.

110 All of the factors listed above have an impact on the turnaround time for licence applications, and while ComReg plans its resources to target a maximum 10-day turnaround time, an improvement in planning by the applicants along with early demand forecasts to ComReg so that it could better manage resource flow could have a positive outcome for all.

Q4: ComReg seeks the views of interested parties on the measures that could be taken to improve the turnaround times for fixed links licence applications and would assist licensees in their network planning. Please provide supporting evidence for your answers.

4.4 Fixed radio links Guidelines

111 The Fixed Radio Links Guidelines Document 09/89R2 ("the Guidelines") was first published in 2009 and has subsequently been revised twice to take account of the opening of new bands and bandwidths, and the suspension of the acceptance of new Fixed Link applications in the 13 GHz and 15 GHz frequency Bands within the Dublin region.

112 The Guidelines set the requirements that applicants for individual Fixed Link licences must follow, both at the application stage and subsequently as licence conditions. The Guidelines include, amongst other things:

- guidance that encourages efficient use of the spectrum, such as the use of certain technologies and network planning approaches such as XPIC configurations; and
- explicit restrictions that prevent obviously inefficient use of the bands, for example minimum path length requirements.

113 DotEcon usefully notes that the Guidelines may need to be reviewed regularly in order to keep pace with equipment development and to accommodate new technology that would involve expanding the list of techniques explicitly mentioned in the Guidelines.

114 Furthermore, DotEcon observes that, provided the Guidelines do not specifically prohibit the deployment of spectrum efficient equipment, it should be possible for licensees to use new equipment as soon as it is available. To demonstrate this point, DotEcon considers the use of active interference cancellation techniques that allow reuse of the same channels at a small angle of separation. DotEcon is of the view that because ComReg's interference analysis does not include links licenced to the same operator, it would be possible for an operator to use this technique to install additional links already, if they do not interfere with other licensees. DotEcon notes that such technology could allow multiple users to jointly licence and coordinate their links through the same account.

115 DotEcon is of the view that there are little downsides to making larger channels available, where feasible and in line with the relevant international recommendations. DotEcon notes that in bands where ComReg already permits the maximum channel size ComReg's approach of following international guidance on channel sizes is beneficial and concludes that in such cases ComReg should not define new wider channels unless these are included in updated international recommendations. DotEcon states that where ComReg decides to increase channel sizes it should do so by:

- applying certain amendments to the band plans, in line with CEPT and ITU recommendations, as outlined in Chapter 6 of the DotEcon Report; or
- allowing users to make applications for multiple channels as a package (i.e. a request for two contiguous channels, but not either individually).

ComReg's preliminary view

116 ComReg agrees with DotEcon's view that the Guidelines document should be reviewed on a regular basis to reflect equipment and technology developments. ComReg notes that it has revised the current Guidelines document on two occasions to take account of changes, while the previous version, ComReg Document 98/14R was revised six times. ComReg will continue to update the guidelines document in line with equipment and technological developments.

- 117 ComReg also concurs with DotEcon's view that licensees should be able to deploy new equipment and techniques not specifically referred to in the guidelines. However, any such deployment would have to be notified in advance to ComReg to consider and determine if the equipment and techniques would cause any interference issues to other licensees.
- 118 ComReg's notes that licensees may also have a requirement to use techniques such as Band Carrier Aggregation ("BCA"), which combines multiple frequency bands over the same radio link to increase the capacity of a link. An example of BCA is using the 15 GHz band with 80 GHz band on the same radio link over a distance of 6-8 km.⁹⁰ Under the Guidelines, the minimum path length for the 15 GHz band would not allow for the use of BCA on a link shorter than 9km. Therefore, ComReg is of the view that there may be merit in allowing shorter path lengths for Fixed Radio Links that use techniques such as BCA to increase capacity.
- 119 Regarding channels sizes for Fixed Links Bands, ComReg takes CEPT and/or ITU recommendations into account when amending frequency band plans to ensure that their use is harmonised so that licensees can use standard equipment in the bands.
- 120 With regard to DotEcon's suggestion to allow applicants to submit applications for multiple channels as a package, ComReg also notes that until 2017 applicants could submit multiple channel requests as a single application. This option was removed in 2017 due to an issue where one channel request could delay the licensing of the other channel requests in the application if an interference issue arose. Consequently, ComReg would not favour reintroducing this option as part of the licensing process.

Q5: ComReg welcomes the views of interested parties regarding the matters discussed in DotEcon's report and ComReg's preliminary views regarding the Guidelines document and the technical parameters therein. Respondents should provide appropriate supporting information when expressing any views.

Q6: ComReg also welcomes views on any further technical matters regarding the deployment of Fixed Radio Links a respondent may deem relevant. Again, Respondents should provide appropriate supporting information when expressing any views.

⁹⁰ See ECC Report 320 - <https://docdb.cept.org/download/55908deeb5e4/ECC%20Report%20320.pdf>

4.5 Pricing

- 121 Regulation 19 of the Authorisation Regulations permits ComReg to impose fees for rights of use that reflect the need to ensure the optimal use of the radio frequency spectrum.
- 122 In addition, 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.
- 123 DotEcon observes that while there is still value in setting fees for the Fixed Link Bands, focusing on the information policy of the individual link applications is more likely to be effective in coordinating users than attempting to put in place the theoretically optimal fee structure. ComReg notes that while spectrum fees will continue to form a part of ensuring the optimal use of the fixed link frequencies, an appropriate information policy should form a key part of any licensing framework and encouraging the efficient use of the radio spectrum. ComReg will set out its view in relation to that information in the next phase of this review.
- 124 In relation to any fees which might apply, ComReg notes there are a variety of methodologies that can be used to calculate applicable fees for Fixed Link Bands. ComReg does not envisage one particular approach being suitable to account for all of the various bands and associated uses, given that there are potentially quite different considerations for each band. For example, where excess demand exists or may exist in the future, an opportunity cost methodology or proxy for same may be appropriate but that may not be appropriate for other bands where spectrum is more freely available. In such cases, fees should incentivise potential users to assess its actual need for spectrum and select the most appropriate spectrum band from a range of alternatives.

125 As set out in Chapter 1, a full review of the Fixed Links fee schedule will follow this preliminary consultation. Interested parties will be given a further opportunity to provide views on the future licensing frameworks in future consultations.

Q:6 ComReg seeks views from interested parties on:

- specific aspects of the guidelines that should be reviewed (i.e. is there any aspect of the guidelines that may inhibit certain uses or technologies outlined above);
- information that ComReg could provide in order to ensure better coordination of frequencies and encourage the efficient use of the spectrum more generally;
- the structure of the fee schedule (e.g. views on the likely value differences across bands, bands likely to be more or less valuable, congestion charging).
- any pricing methodologies that would be suitable for some or all of the Fixed Link Bands (taking account of demand and supply considerations as may apply to each).

Where appropriate, please provide supporting material with your response.

4.6 1.4 GHz band

126 In its report, DotEcon notes the 1.4 GHz band is harmonised at a European level for providing electronic communications for MFCN, and that ComReg has already considered awarding the band as part of the Proposed Multi Band Spectrum Award.

⁹¹ DotEcon also notes that the 1.4 GHz band may be used for the continued operation of existing terrestrial fixed wireless services or of other existing use, up to 1 January 2023, and longer if no national demand has been identified for wireless broadband electronic communications services.⁹²

127 DotEcon is of the view that sufficient notice should be provided to current Fixed Links users in the event that ComReg was minded to repurpose the band for wireless broadband electronic communications services.

⁹¹ ComReg Document 19/124 – Proposed Multi Band Spectrum Award - Response to Consultation and Draft Decision The 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands – published 20 December 2019.

⁹² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D0661&from=EN>

ComReg's preliminary view

- 128 The future use of the 1.4 GHz Band was considered in the MBSA2 consultation process, where for the reasons set out in Consultation Document 18/60⁹³, ComReg Documents 19/59R⁹⁴ and 19/124⁹⁵, ComReg's preliminary view is that the 1.4 GHz Band (both the 1.4 GHz Centre Band and the 1.4 GHz Extension Bands) should not be included in the Proposed Award.
- 129 ComReg will continue to monitor developments in the 1.4 GHz Band may provide additional clarifications on same during this review and following any final Decision on MBSA2. The future award of the 1.4 GHz Band will be determined by a separate consultation process, which would commence following any final Decision and Award of spectrum currently being consulted upon as part of the proposed Multi-Band Spectrum Award.⁹⁶

Q7: ComReg seeks the views of interested parties on the current and potential future use of the 1.4 GHz Band and whether all of this band should be included in an award for wireless broadband in the future.

Q8: To the extent that respondents are of the view that the 1.4 GHz Band should be awarded for wireless broadband, ComReg seeks the views of respondents on when those rights of use should be assigned.

Where appropriate, please provide supporting material with your response.

Respondents should note that views on the award of the 1.4 GHz band for WBB will form input to ComReg's separate consultation process to consider same, which would commence following the award of spectrum in the MBSA2.

⁹³ See section 3.2 of ComReg Document 18/60 – Proposed Multi Band Spectrum Award: Preliminary consultation on which spectrum bands to award.

⁹⁴ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-including-the-700-mhz-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

⁹⁵ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-response-to-consultation-and-draft-decision-the-700-mhz-duplex-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

⁹⁶ <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/>

4.7 13 GHz and 15 GHz bands

- 130 In its report, DotEcon notes from its review of ComReg's Fixed Links licence data that demand for the 13 GHz and 15 GHz bands was steadily increasing until around 2015 when a sharp drop occurs, with an increased use of dual polarisation links in these bands in more recent years.
- 131 DotEcon observes that there will likely have been licence cancellations in those bands in the Congested Area⁹⁷ (in particular if there was or is a need for some users to move into other bands where wider channels can be used) but with no scope for other users to apply for licences for vacated frequencies. DotEcon is of the view that this may then explain part of the decline in usage observed for the 13 GHz and 15 GHz bands in addition to other views as set out in Chapter 2 of DotEcon's Report. DotEcon also observes that if this is the case then ComReg's continued suspension of accepting applications for those bands in the Congested Area could risk high value spectrum being left unassigned.

ComReg's preliminary view

- 132 In ComReg Document 14/32⁹⁸, ComReg advised that due to the exhaustion of all available channels within the Congested Area it was suspending the acceptance of applications for new Fixed Links in the 13 GHz and 15 GHz bands within the Congested Area. ComReg also stated that it would keep the matter of availability of channels in this limited geographic area under review and would advise of any future availability in the 13 GHz and 15 GHz bands if or when it arises.
- 133 ComReg notes DotEcon's observations and is of the preliminary view that it is timely to consider re-opening the 13 GHz and 15 GHz bands in the Congested Area for applications for new Fixed Links.

Q9: ComReg seeks the view of interested parties on the potential re-opening of the 13 GHz and 15 GHz bands in the Congested Area. Please provide supporting information with your response.

⁹⁷ The Congested Area is a geographic area within Dublin in the range E310000 to E320000 and N220000 to N240000, or 53°13'9.44"N to 53°23'14.2"N and 6°21'14.2"W to 6°11'48.32"W.

⁹⁸ ComReg Document 14/32 – 13 GHz and 15 GHz Frequency Bands within Dublin. Suspension of the acceptance of new Fixed Link Applications in certain areas. – published 17 April 2014.

4.8 26 GHz band

- 134 In its report, DotEcon notes the 26 GHz band has been identified as a pioneer mmWave band for 5G and has been harmonised by the EC for wireless broadband ECS.⁹⁹ ¹⁰⁰ Member States are required to make at least 1 GHz available in the band for 5G by the end of 2020¹⁰¹, subject to demand. Member States may also allow the continued operation of fixed links within the 26 GHz band, if such fixed links can co-exist with the WBB ECS through managed shared spectrum use. DotEcon observes that the use case for 5G in the band is currently unclear and suitable technology (particularly in terms of power efficient terminals) undeveloped.
- 135 DotEcon is of the view that there is no immediate need to make any decisions on the future of Fixed Links in the band, and ComReg may wish to wait until the 5G situation is clearer.

ComReg's preliminary view

- 136 ComReg noted that as part of the MBSA2, the future use of the 26 GHz Band was considered in ComReg's Consultation Document 18/60¹⁰². For the reasons detailed in ComReg Documents 19/59R¹⁰³ and 19/124¹⁰⁴, ComReg stated that the 26 GHz band should not be included in the Proposed Award and all respondents agreed with ComReg's proposal to exclude this band from same. In its current public action plan¹⁰⁵, ComReg has included an action to issue an Information Notice and Consultant's report on the appropriate licensing framework or frameworks and the options for assigning spectrum in the 26 GHz band for MFCN/ECS.

Q10: ComReg seeks views from interested parties on the current use of the 26 GHz Band for Fixed Links. Respondents should note that any views in relation to the future use of the band for other technologies and uses (e.g. wireless broadband-ECS/5G) will be considered separately as part of ComReg's 26 GHz Study due to be published in Q4/2020.

⁹⁹ Commission implementing decision (EU) 2019/784 on harmonisation of the 24,25-27,5 GHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services in the Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D0784&from=EN>

¹⁰⁰ Commission Implementing Decision (EU) 2020/590 of 24 April 2020 amending Decision (EU) 2019/784 as regards an update of relevant technical conditions applicable to the 24,25-27,5 GHz frequency band <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588257184465&uri=CELEX:32020D0590>

¹⁰¹ Article 54 of Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018L1972>

¹⁰² See section 3.2 of ComReg Document 18/60 – Proposed Multi Band Spectrum Award: Preliminary consultation on which spectrum bands to award.

¹⁰³ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-including-the-700-mhz-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

¹⁰⁴ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-response-to-consultation-and-draft-decision-the-700-mhz-duplex-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

¹⁰⁵ <https://www.comreg.ie/media/2020/07/Action-Plan-Ye-300621-.pdf>

4.9 D-bands and W-bands

- 137 DotEcon observes that during the interviews, the W-band (92 – 114.25 GHz) was mentioned by several interviewees as a band that could be made available for Fixed Links. Equipment manufacturers tended to be more convinced of the usefulness of both the W-band and the D-band (130 – 174 GHz). Equipment manufacturers noted that equipment for these bands is still in development and technical specifications (e.g. ETSI standards) are not yet available, although they are expected by the end of this year (2020).
- 138 DotEcon observes that the D-band has potential for use of substantially different technology to the lower bands, which would support very high capacities, whereas the W-band would have a limited effect in terms of making new use cases possible, as it would in practice be an extension to the 80 GHz band.
- 139 DotEcon is of the view that the D-band and W-band may be useful in the future to address increasing demand for bandwidth but should not be opened for Fixed Links until equipment is readily available.

ComReg's preliminary view

- 140 ComReg is of the preliminary view that the D-band and W-band have the potential to address bandwidth requirements for ultra-high capacity links in urban areas. ComReg notes that the CEPT has published recommendations^{106 107} which set out the channel arrangements. However, and noting the views of interviewees regarding equipment availability, ComReg is of the view that those bands should only be opened once equipment is readily available.

Q.11 ComReg seeks the views of interested parties on the potential future use of the D-band and W-band and the equipment availability for those bands. Please provide supporting information with your response.

¹⁰⁶ <https://docdb.cept.org/download/a5533f97-5a92/Rec1801.pdf>

¹⁰⁷ <https://docdb.cept.org/download/476602d1-6145/ECCRRec1802.pdf>

4.10 Licence exempt / light licensing

- 141 DotEcon notes that, according to the RFI responses, most licence exempt Fixed Links currently operate in the 5.8 GHz licence-exempt band, and because they have operated almost exclusively in rural areas, the risk of interference has been lower. DotEcon notes that for some users of the licence exempt bands (the 5 GHz, 17 GHz and 24 GHz bands), licence fees are relatively more important, compared to users of the individually licensed links who need the interference protection and choose bands based on link length and reliability requirements.
- 142 DotEcon also notes that although the 17 GHz band has been removed from ECC/REC/70-03¹⁰⁸ for short range devices in 2012, this does not preclude its continued licence exempt use for Fixed Links.
- 143 DotEcon is of the view that as the bands are important to some users, ComReg should not make any changes to the 5 GHz, 17 GHz or 24 GHz bands, because:
- there are no harmonisation measures that require the bands to be used for other purposes;
 - no stakeholders suggested any particular changes to the bands; and
 - closing any of these bands could force users into the licensed bands, which would not be in the interest of the current licence exempt users and could create or exacerbate congestion issues in other bands.
- 144 DotEcon notes that Fixed Radio Link stakeholders did not suggest that any changes to the licence-exempt framework to mitigate interference issues, and that many highlighted the benefits of the status quo in allowing them to deploy new links quickly and at little cost. However, DotEcon has set out potential options for light licensing in the current licence-exempt bands if there were significant interference issues in those bands:
- One option would be to implement a registration requirement where the operator would register site coordinates, equipment used, and frequencies of the link, but would not have to pay any fee or await approval.

¹⁰⁸ <https://docdb.cept.org/download/25c41779-cd6e/Rec7003e.pdf>

- A second option would be a 'self-co-ordinated' approach where radio links would be registered in the same manner as the first option above but a fee would also be paid per link annually, albeit at a much lower rate than standard licences. ComReg would not carry out an interference analysis, meaning it is quicker for new link registrations to be processed. In the event of an interference issue arising, radio links registered first would be priority and any newly registered links would have to move channel or band. DotEcon is of the view that this granting of priority is a stronger intervention than simply basic registration requirements and would likely require ComReg involvement if there were disputes between users.

ComReg's preliminary view

- 145 Regarding the 17 GHz band, ComReg notes that the reason the CEPT removed the 17 GHz band from ECC/REC/70-03 in 2012 was due to there being no harmonisation measure for the band for wideband data transmission equipment outside of Europe, and CEPT noted in CEPT Report 44¹⁰⁹ there was limited usage of the band across Europe.
- 146 ComReg also notes that equipment is available for the 17 GHz band and the band is used for Fixed Links in Ireland, and the CEPT's SRG/MG group¹¹⁰ have recently discussed the possibility of reintroducing the 17 GHz band in a future revised version ECC/REC/70-03 as a result of the band becoming more widely used in some European countries.
- 147 ComReg notes the information provided in the RFI responses and the interviews but is of the preliminary view that no change of use is required for the current-licence exempt bands, including the 60 GHz band.
- 148 Regarding Light Licensing, ComReg does have a registration requirement for radio links deployed in the 5.8 GHz band.¹¹¹ The purpose of the registration requirement was to facilitate management of the band in the event of changes being necessitated by European standards or regulatory developments and to afford users in the band, adequate notice of any anticipated changes, rather than to address interference issues between Radio Links in the 5.8 GHz band.¹¹²
- 149 ComReg is of the preliminary view that a Light Licensing framework is not required at this time to address interference issues in the licence-exempt bands. ComReg notes that to date the use of licence-exempt frequency bands has worked well for many operators, and generally those operators are able to work together to resolve interference issues between radio links using those bands.

¹⁰⁹ <https://docdb.cept.org/download/7562556d-ba65/CEPTREP044.PDF>

¹¹⁰ <https://www.cept.org/ecc/groups/ecc/wg-fm/srdmg/client/introduction/>

¹¹¹ <https://www.comreg.ie/industry/licensing/5-8-ghz-registration/>

¹¹² See ComReg Document 03/42 <https://www.comreg.ie/media/2018/06/ComReg0342.pdf>

Q12: ComReg seeks the views of interested parties on the current and future use of the 5.8 GHz, 17 GHz, 24 GHz and 60 GHz licence-exempt bands, and the requirement to implement a Light Licensing framework to address interference issues in the licence-exempt bands. Please provide evidence in support of your views.

Chapter 5

5 Regulatory Impact Assessment

- 150 ComReg has published Regulatory Impact Assessment (RIA) Guidelines ¹¹³ (Doc 07/56a), in accordance with a policy direction to ComReg¹¹⁴, which state that ComReg will conduct a RIA in any process that may result in the imposition of a regulatory obligation, or the amendment of an existing obligation to a significant degree, or which may otherwise significantly impact on any relevant market or any stakeholders or consumers. However, the Guidelines also note that in certain instances it may not be appropriate to conduct a RIA and, in particular, that a RIA is only considered mandatory or necessary in advance of a decision that could result in the imposition of an actual regulatory measure or obligation. The Guidelines further state that where ComReg is merely charged with implementing a statutory obligation, it will assess each case individually and will determine whether an RIA is necessary and justified.
- 151 In this Consultation, ComReg is not imposing a regulatory obligation but is setting out its preliminary views on the various technical parameters of each frequency band and its potential uses. Information received as part of this consultation will be used to further inform ComReg's views and may result in the imposition of specific regulatory options. Therefore, an RIA is not included at this stage in the process but is likely to form part of future consultations depending on the nature of measures finally proposed by ComReg.

¹¹³ Guidelines on ComReg's approach to RIA (2007)
www.comreg.ie/media/dlm_uploads/2015/12/ComReg0756a.pdf

¹¹⁴ Ministerial Policy Direction made by Dermot Ahern T.D. Minister for Communications, Marine and Natural Resources on 21 February 2003

Chapter 6

6 Submitting Comments and Next Steps

6.1 Submitting Comments

- 152 All input and comments are welcome. However, it would make the tasks analysing responses easier if comments were referenced to the relevant section / paragraph number in each chapter and annex in this document.
- 153 Please also set out your reasoning and all supporting information for any views expressed.
- 154 The consultation period will run until 17:00 on Monday 7 December 2020 during which time ComReg welcomes written comments on any issues raised in this paper.
- 155 Responses must be submitted in written form (email) to the following recipient, clearly marked – Submissions to ComReg 20/109:

Mr. Martin O Donoghue

Commission for Communications Regulation

Email: marketframeworkconsult@comreg.ie

- 156 Electronic submissions should be submitted in an unprotected format so that they may be readily included in the ComReg submissions document for electronic publication.
- 157 ComReg appreciates that respondents may wish to provide confidential information if their comments are to be meaningful. In order 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).
- 158 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:
- A. 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 confidential. The separate non-confidential version must have

actually redacted all items that were marked and highlighted in the confidential version.

OR

- B. 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 have not been marked as per our instructions below, then ComReg will not create the non-confidential redacted version and the respondent will have to provide the redacted non-confidential version in accordance with option A above.

159 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.

160 For example, “Redtelecom has a market share of [~~25~~].”

6.2 Next Steps

161 When it has concluded its review of all submissions received and other relevant material, ComReg’s intention would be to publish a response to consultation, a further consultation and a further consultant’s report follow by a draft decision as appropriate.

162 The further consultation and further consultant’s report aims to;

- Consider the design of a licensing framework that best provides for the effective management and efficient usage of the Fixed Links band identified in this consultation and the responses.
- Provide a new fee schedule for Fixed Links that facilitates the greatest number of use cases, in order to ultimately promote greater use of the spectrum that are identified in this consultation and the responses;

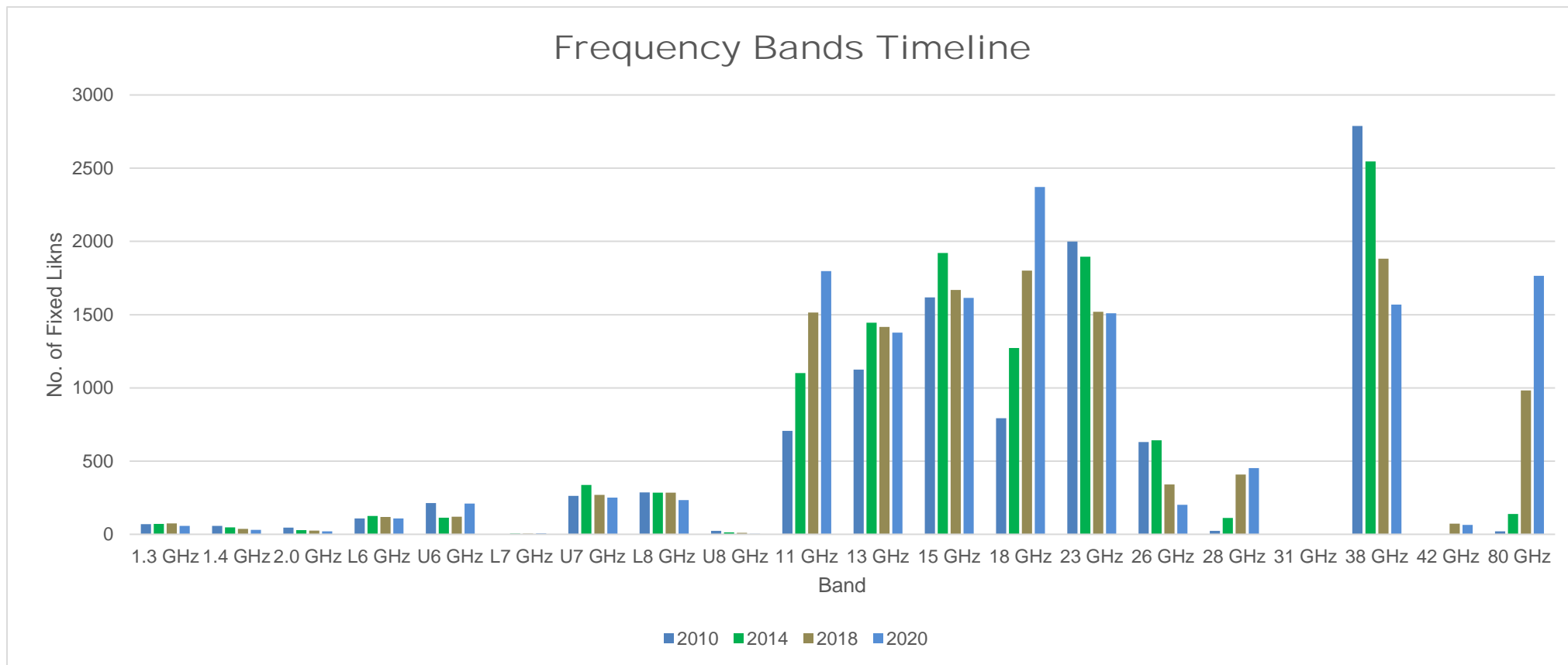
- Review the technical conditions and guidelines for the deployment Fixed Links in the bands identified and consult on any proposed changes; and
- Advise and consult on new regulations to replace S.I. o. 370 of 2009.

Annex 1: Fixed Link across the Fixed Links Bands

Overview

163 Figure 8 display the use of Fixed Links by band in 2010, 2014, 2018 and 2020.

Figure 8: The use of P-P Fixed Links by band, 2010-2020

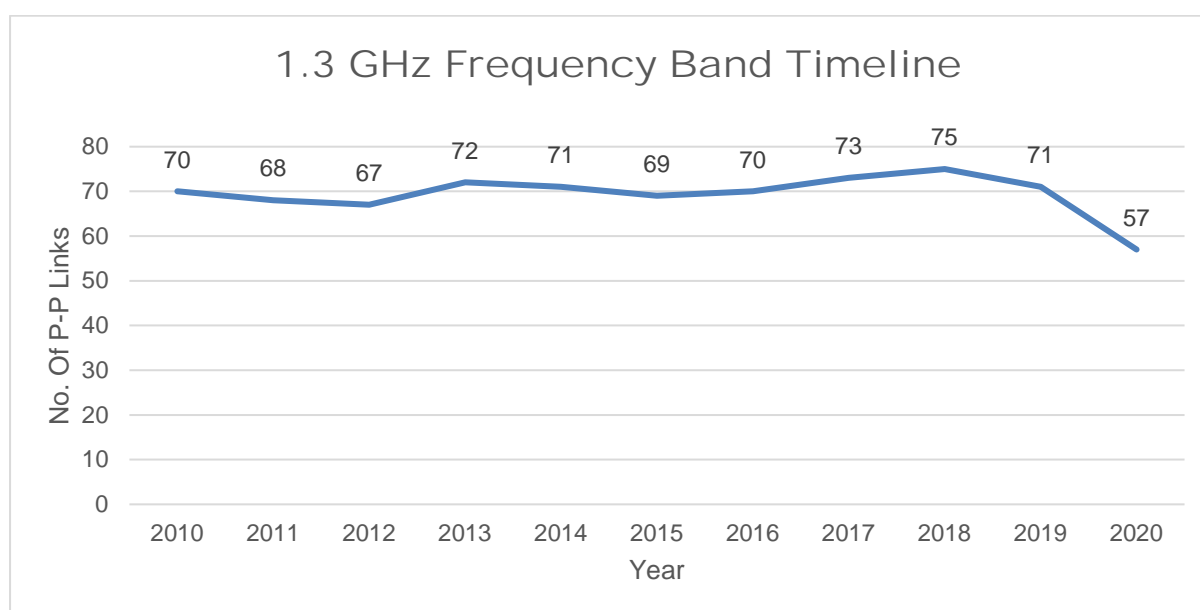


The 1.3 GHz Frequency Band

164 The preferred channel arrangements for the 1.3 GHz frequency band are set out in ECC T/R 13-01¹¹⁵. This was first published in 1993 and the latest amendment is from February 2010.

165 As of 30 June 2020, there were 57 P-P Fixed Links in the 1.3 GHz band. Since 2010, the number of licences granted for this band was steady until 2019 when there was decline in the number of licences due to two licensees not renewing their licences. This can be seen in Figure 9 below.

Figure 9: The 1.3 GHz Frequency Band Timeline

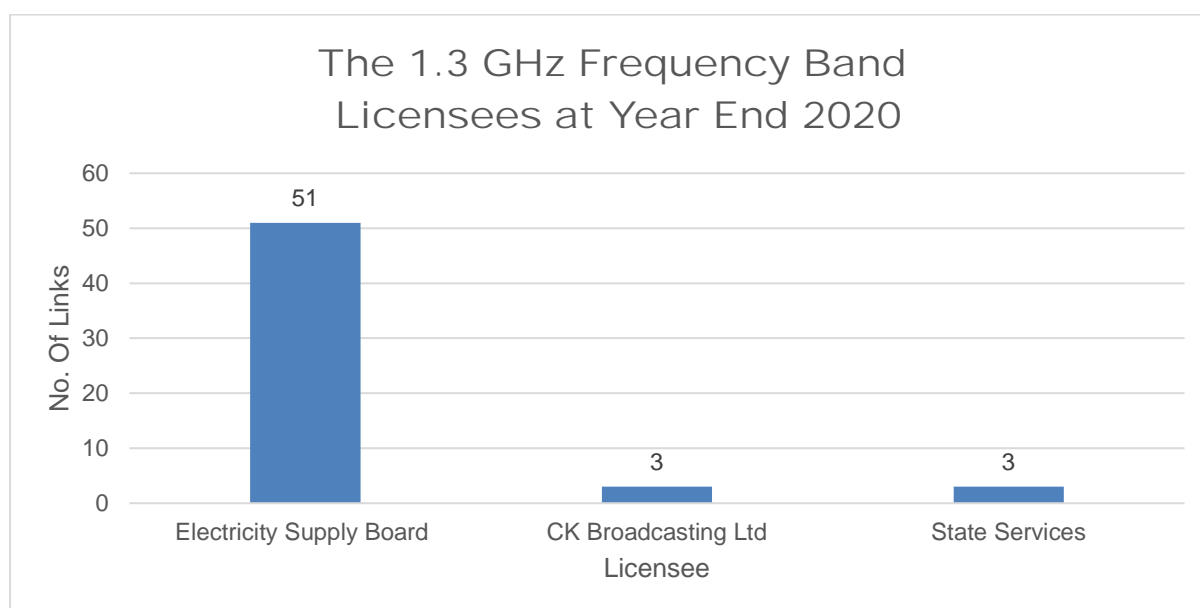


166 There are three licensees using the 1.3 GHz frequency band as at 30 June 2020. The licensees of the 1.3 GHz frequency band in Ireland are:

- Utilities;
- Broadcasters; and
- State Services.

167 This can be seen in Figure 10.

¹¹⁵ <https://docdb.cept.org/download/142b8ce4-8669/TR1301E.PDF>

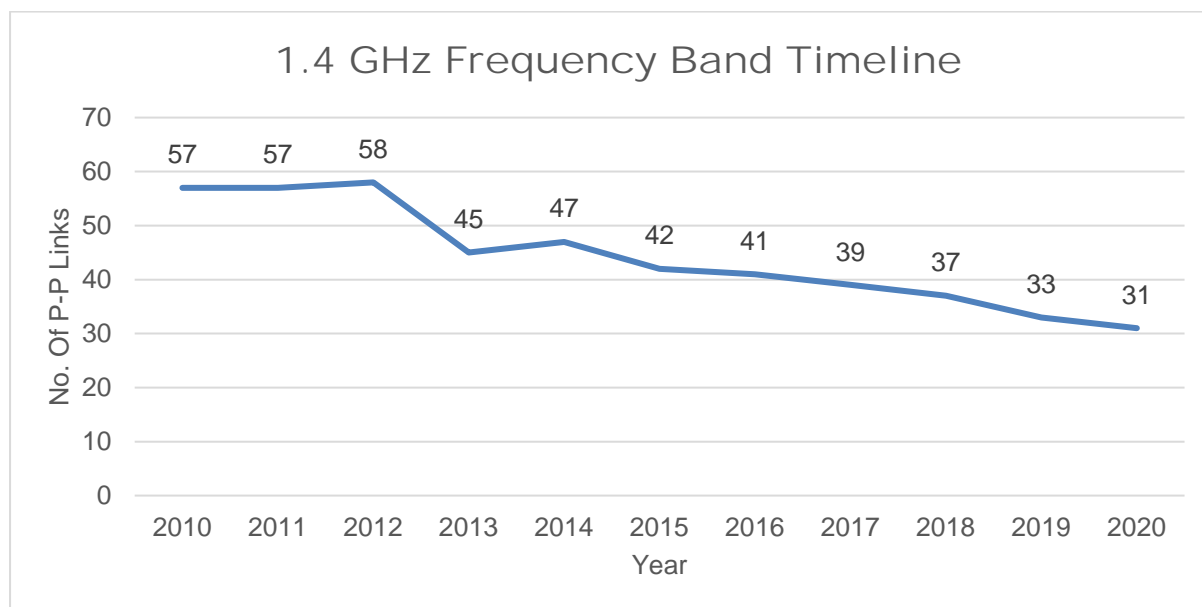
Figure 10: The 1.3 GHz Frequency Band Licensees

The 1.4 GHz Frequency band

- 168 The preferred channel arrangements for the 1.4 GHz frequency band are set out in ECC T/R 13-01¹¹⁶. This was first published in 1993 and the latest amendment is from February 2010.
- 169 As of 30 June 2020, there are 31 P-P Fixed Links for the 1.4 GHz band in Ireland. The trend was steady from 2019 until 2012 when it starts to decline from 2013 onwards due to various licensees not renewing and cancelling their licences. This can be seen in Figure 11 below.

¹¹⁶ <https://docdb.cept.org/download/142b8ce4-8669/TR1301E.PDF>

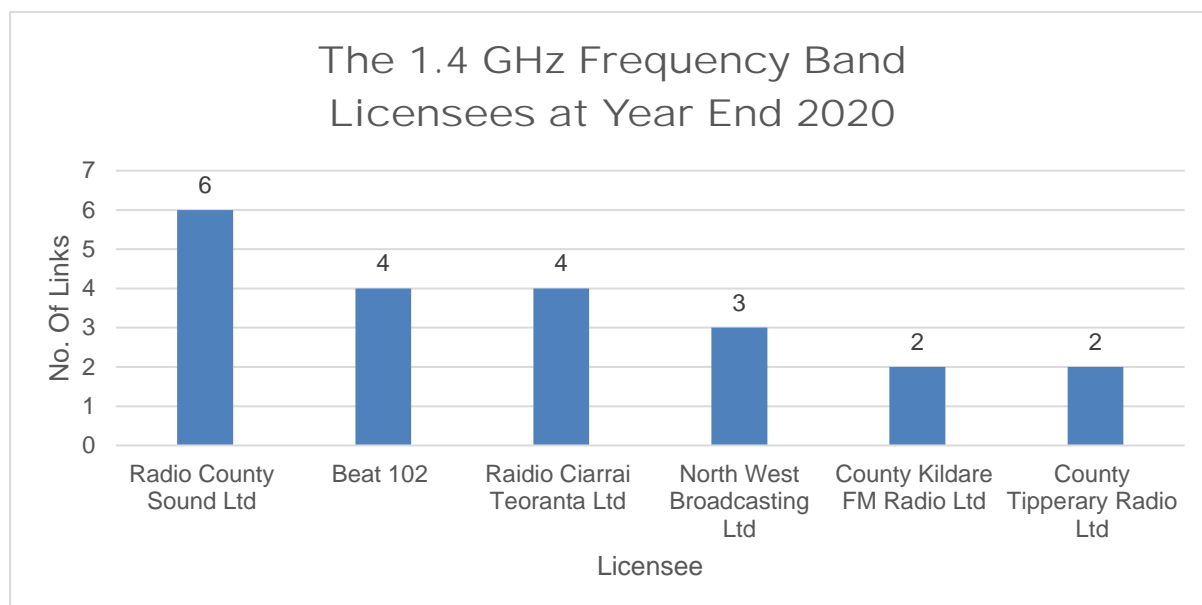
Figure 11: The 1.4 GHz Frequency Band Timelines



170 There are sixteen licensees using the 1.4 GHz frequency band as at 30 June 2020. The only licensee of the 1.4 GHz frequency band in Ireland are Broadcasters.

171 This can be seen in Figure 12.

Figure 12: The 1.4 GHz Frequency Band Licensees

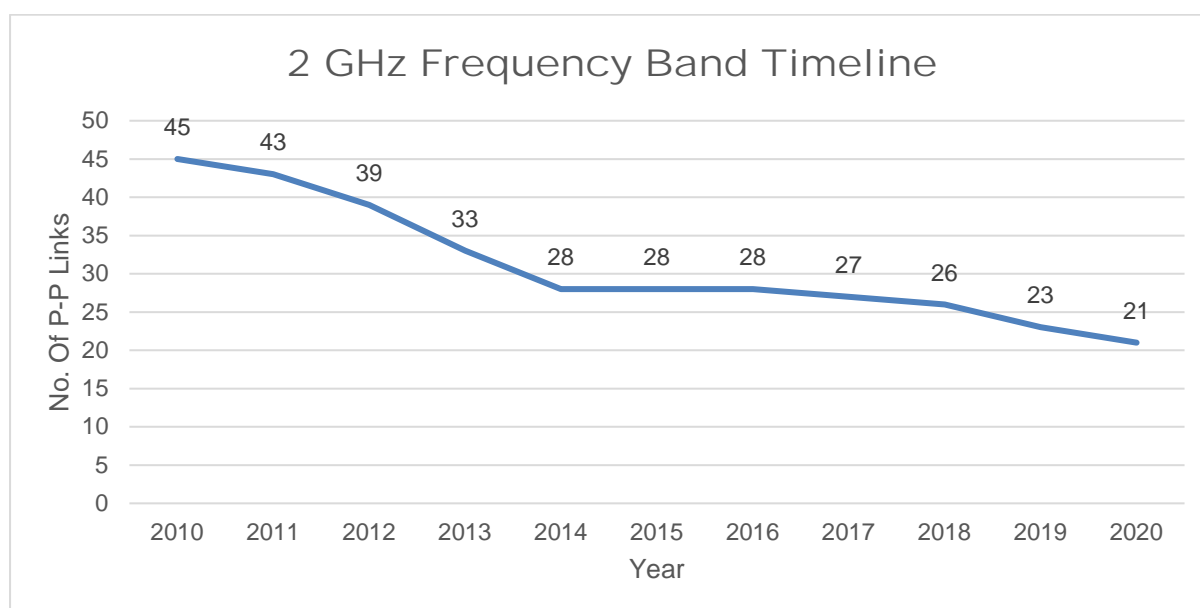


The 2 GHz Frequency Band

172 The preferred channel arrangements for the 2 GHz frequency band are set out in ECC T/R 13-01¹¹⁷. This was first published in 1993 and the latest amendment is from February 2010.

173 As of 30 June 2020, there are 21 P-P Fixed Links for the 2 GHz band. The trend has been declining since 2010. This can be seen in Figure 13 below.

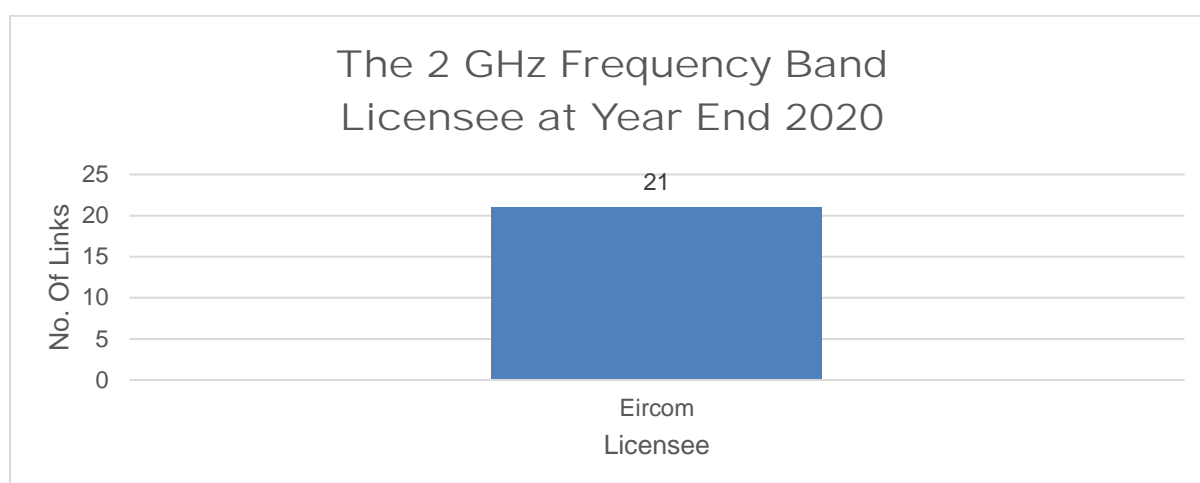
Figure 13: The 2 GHz Frequency Band Timeline



174 There is one licensee using the 2 GHz frequency band as at 30 June 2020.

175 This can be seen in Figure 14.

Figure 14: The 2 GHz Frequency Band Licensee



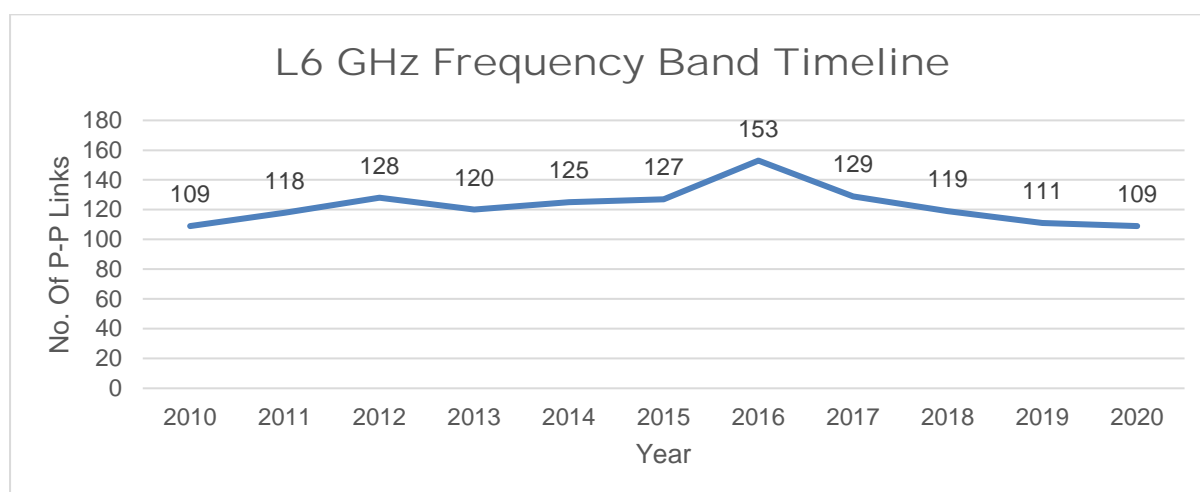
¹¹⁷ <https://docdb.cept.org/download/142b8ce4-8669/TR1301E.PDF>

The L6 GHz Frequency band

176 The preferred channel arrangements for the L6 GHz frequency band are set out in ECC T/R 14-02¹¹⁸. This was first published in 1995 and the latest amendment is from May 2015.

177 As of 30 June 2020, there are 109 P-P Fixed Links for the L6 GHz band. The number of Fixed Links grew steadily between 2010 and 2016 before beginning to fall. The decrease is as a result of various licensees not renewing and cancelling their licences. This can be seen in Figure 15 below.

Figure 15: The L6 GHz Frequency Band Timeline



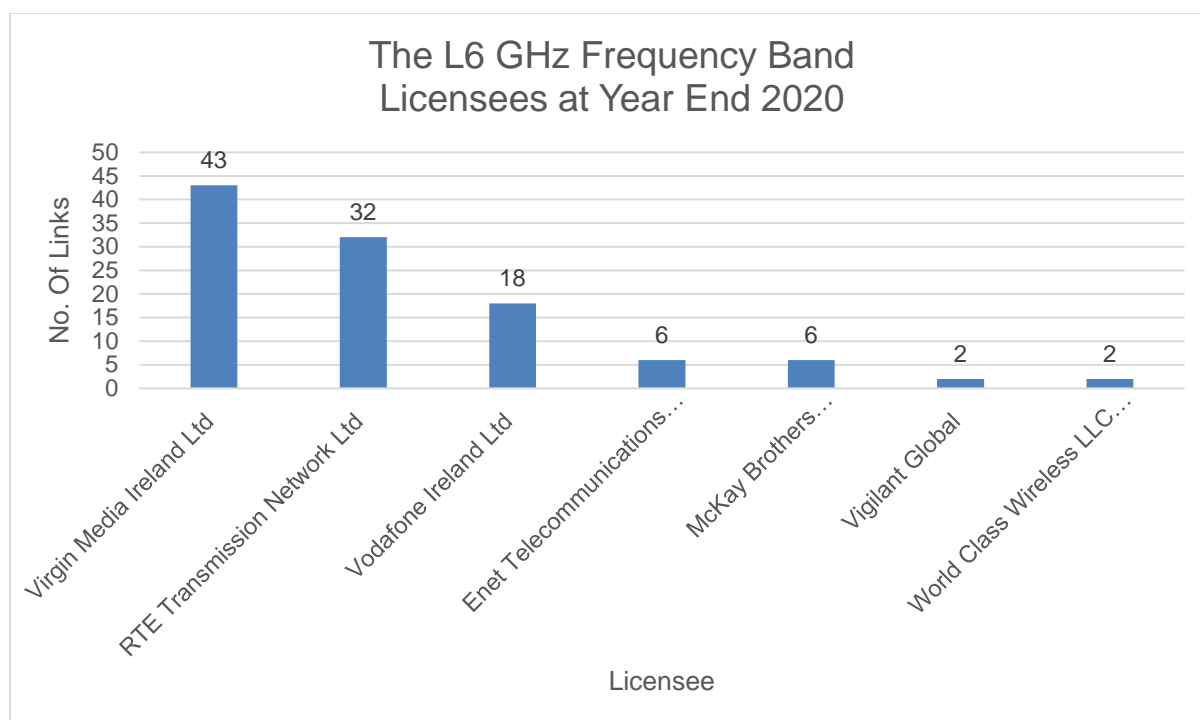
178 There are seven licensees using the L6 GHz frequency band as at 30 June 2020. The licensees of the L6 GHz frequency bands in Ireland are:

- Broadcasters;
- MNOs; and
- FWA.

179 This can be seen in Figure 16.

Figure 16: The L6 GHz Frequency Band Licensees

¹¹⁸ <https://docdb.cept.org/document/828>

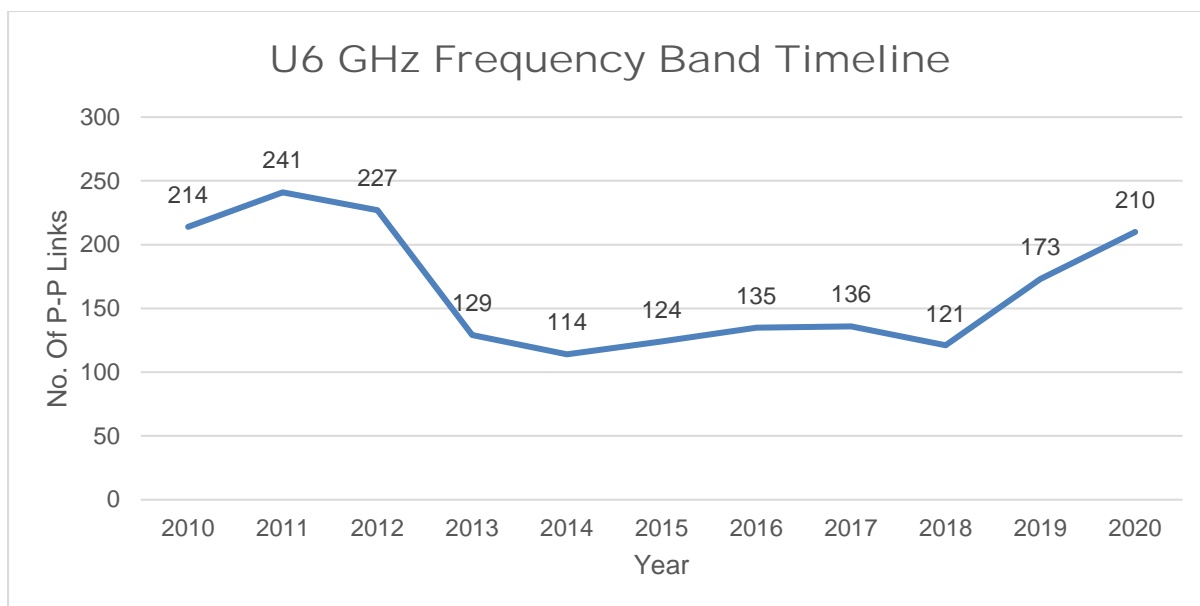


The U6 GHz Frequency band

- 180 The preferred channel arrangements for the U6 GHz frequency band are set out in ECC T/R 14-02¹¹⁹. This was first published in 1995 and the latest amendment is from September 2014.
- 181 As of 30 June 2020, there are 210 P-P Fixed Links for the U6 GHz band. The trend increases from 2010 to 2011. From 2011 to 2015 there was a decrease but increase from 2016 to 2017. The trend decreases again from 2017 to 2018 however it increases again from 2018 onwards. This can be seen in Figure 17 below.

Figure 17: The U6 GHz Frequency Band Timeline

¹¹⁹ <https://docdb.cept.org/download/5570c6c2-1438/ERCREC1402.PDF>

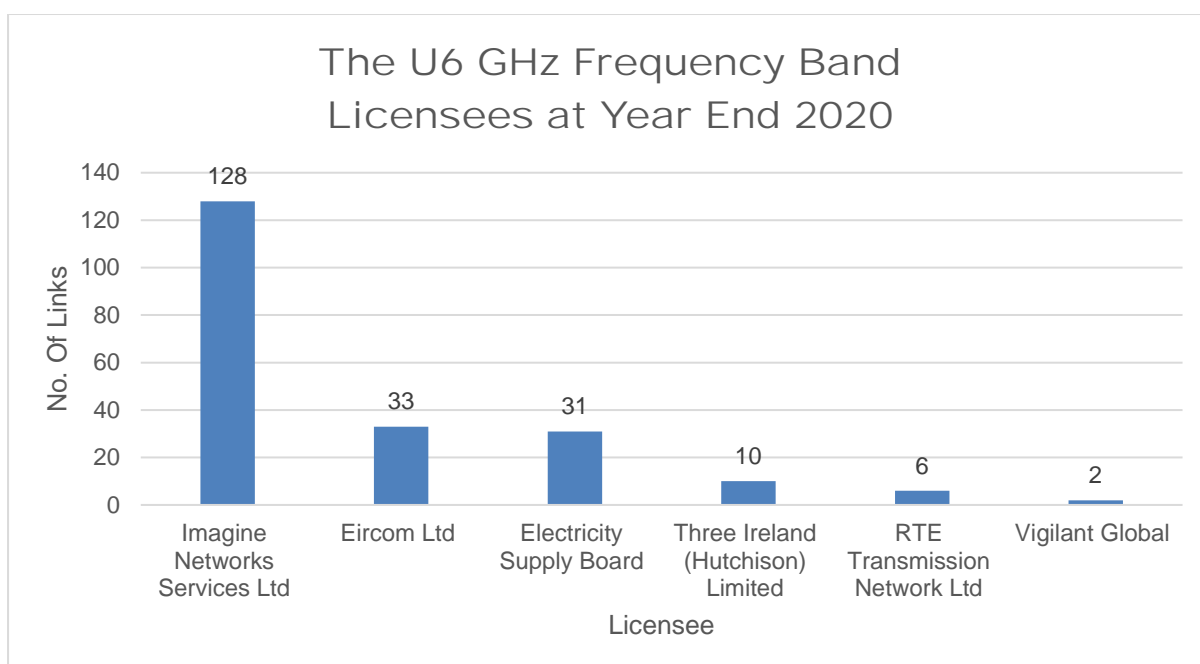


182 There are six licensees using the U6 GHz frequency band as at 30 June 2020. The licensees of the U6 frequency band in Ireland are:

- FWA;
- Utilities; and
- MNOs.

183 This can be seen in Figure 18.

Figure 18: The U6 GHz Frequency Band Top Licensees

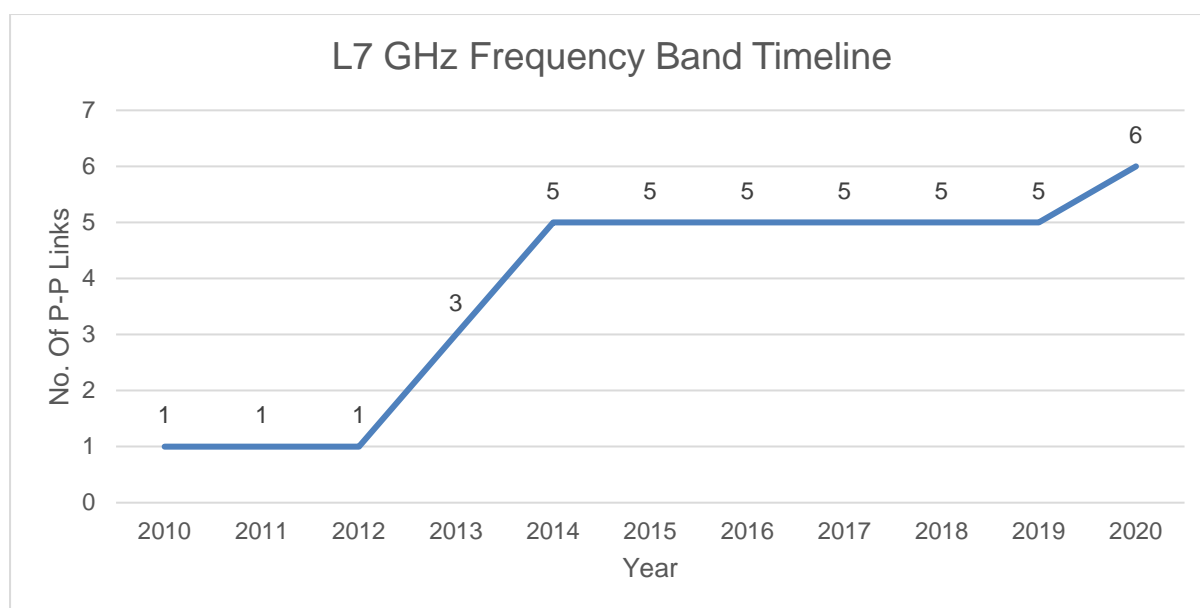


The L7 GHz Frequency band

184 The preferred channel arrangements for the L7 GHz are set out in ECC Recommendation (02)06¹²⁰. This was first published in 2007 and the latest amendment is from June 2015.

185 As of 30 June 2020, there are 6 P-P Fixed Links for the L7 GHz band. The trend was steady from 2010 to 2013 until it increased from 2013 onwards. The trend can be found in Figure 19 below.

Figure 19: The L7 GHz Frequency Band Timeline



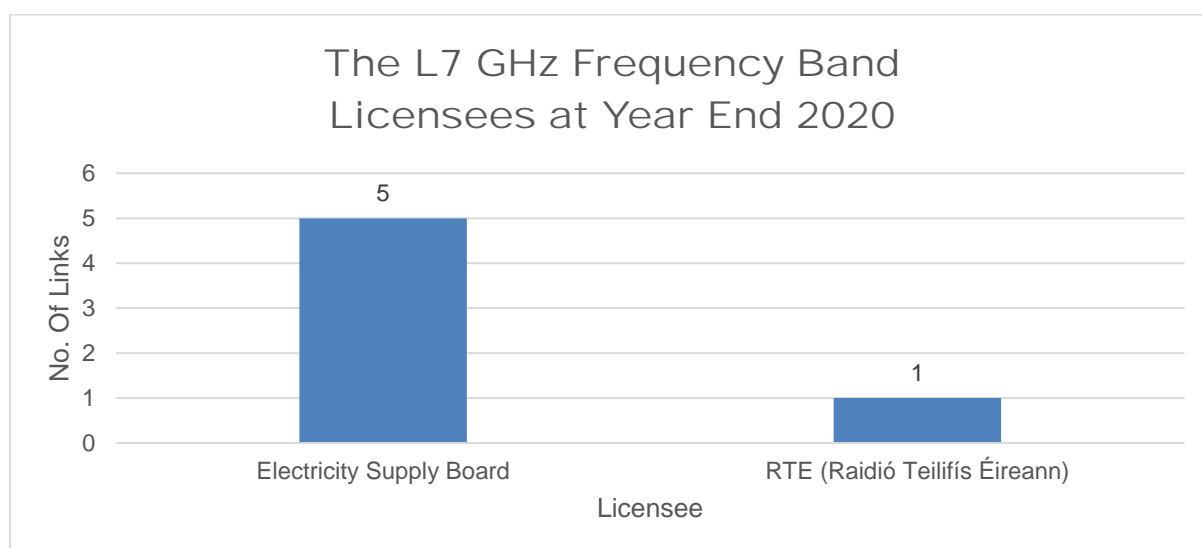
186 There are two licensees using the L7 GHz frequency band as at 30 June 2020. The licensees of the L7 GHz frequency band in Ireland are:

- Utilities; and
- Broadcasters.

187 This can be seen in Figure 20.

¹²⁰ <https://docdb.cept.org/download/f31c5a64-0fc9/REC0206.PDF>

Figure 20: The L7 GHz Frequency Band Licensees

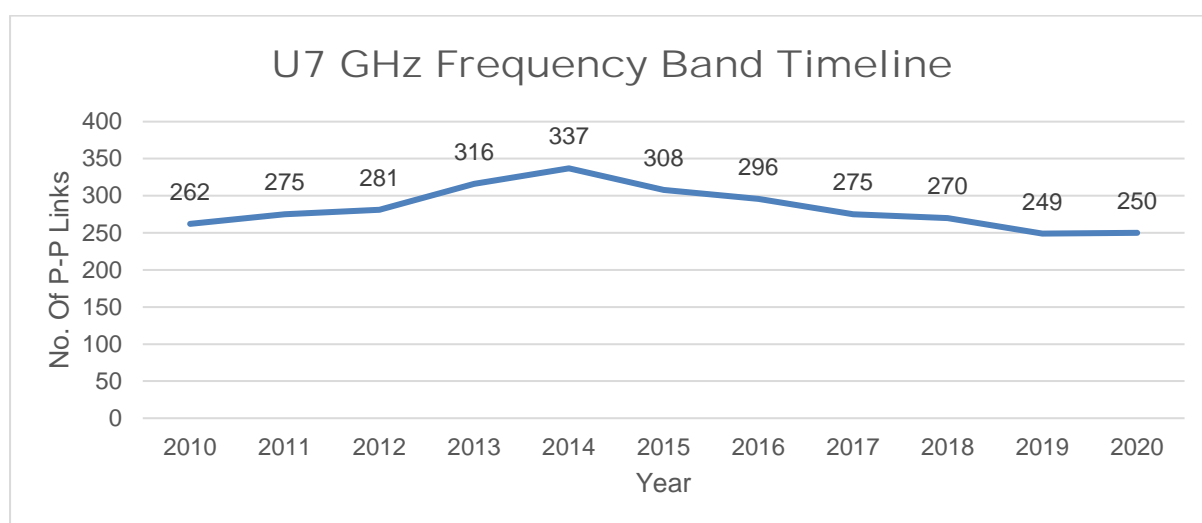


The U7 GHz Frequency band

188 The preferred channel arrangements for the U7 GHz frequency bands are set out in ECC Recommendation (02)06¹²¹. This was first published in 2007 and the latest amendment is from June 2015.

189 As of 30 June 2020, there are 250 P-P Fixed Links for the U7 GHz band. The number of links were increasing from 2010 until 2014 when it starts to decrease from 2015-2019 and has been steady from 2019 onwards. This trend can be found in Figure 21 below.

Figure 21: The U7 GHz Frequency Band Timeline



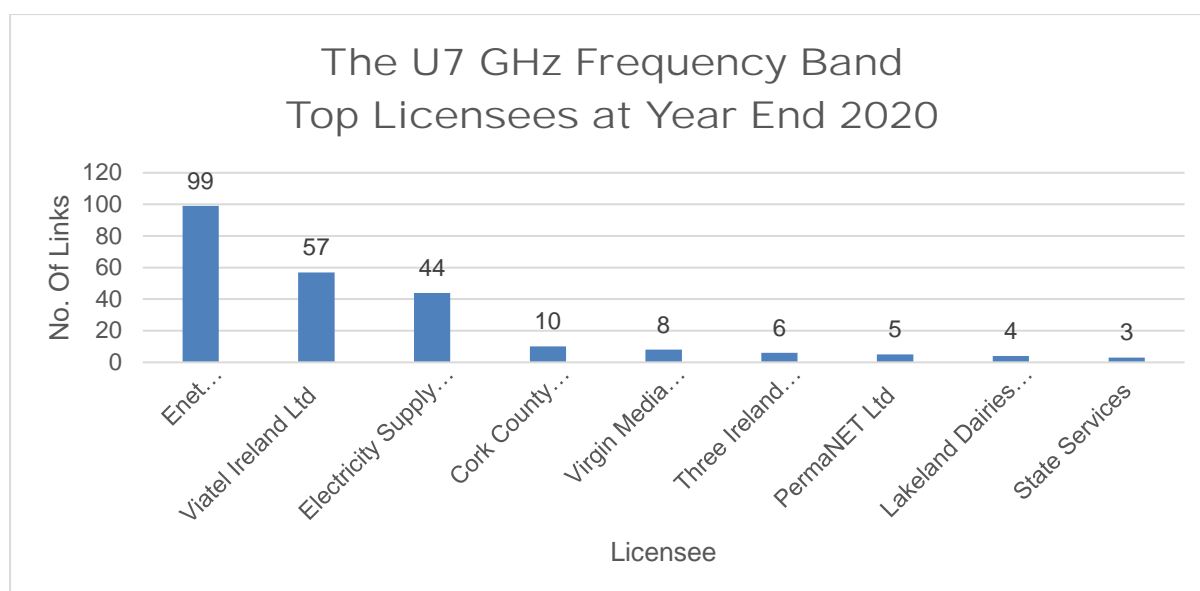
¹²¹ <https://docdb.cept.org/download/f31c5a64-0fc9/REC0206.PDF>

190 There are eighteen licensees using the U7 GHz frequency band as at 30 June 2020. The main licensees of the U7 GHz frequency band in Ireland are:

- FWA;
- Utilities;
- Local Authorities;
- MNOs; and
- State Services.

191 This can be seen in Figure 22.

Figure 22: The U7 GHz Frequency Band Licensees



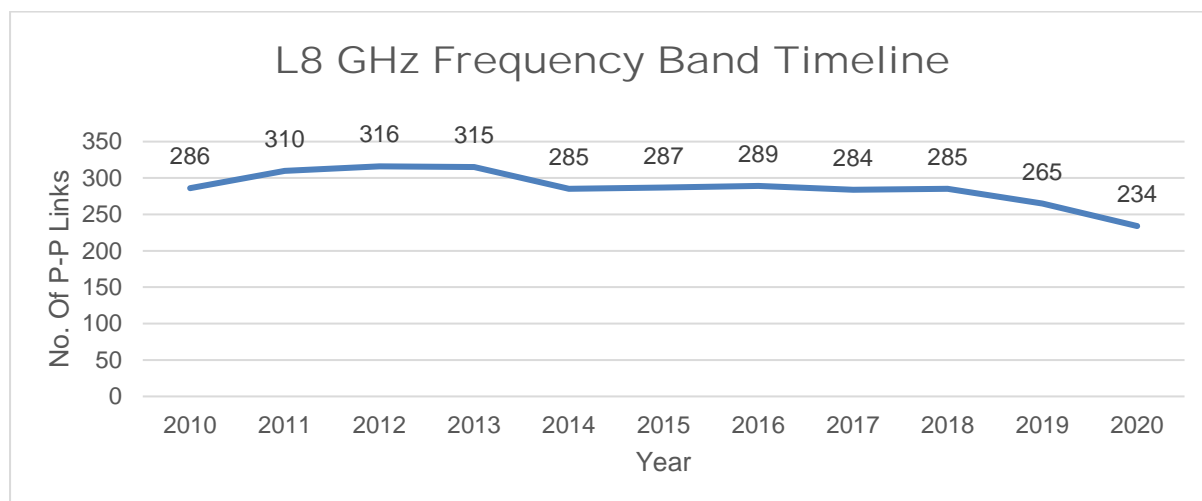
The L8 GHz Frequency band

192 The preferred channel arrangement for the L8 GHz are set out in ITU Recommendation ITU-R F.386-9¹²². This was first published in 1963 and the latest amendment is from February 2013.

193 As of 30 June 2020, there are 234 P-P Fixed Links for the L8 GHz band. The trend increases from 2010 to 2013 and decreases from 2013 onwards due to various licensees not renewing and cancelling their licences. The trend can be found in Figure 23 below.

¹²² https://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.386-9-201302-I!!PDF-E.pdf

Figure 23: The L8 GHz Frequency Band Timeline

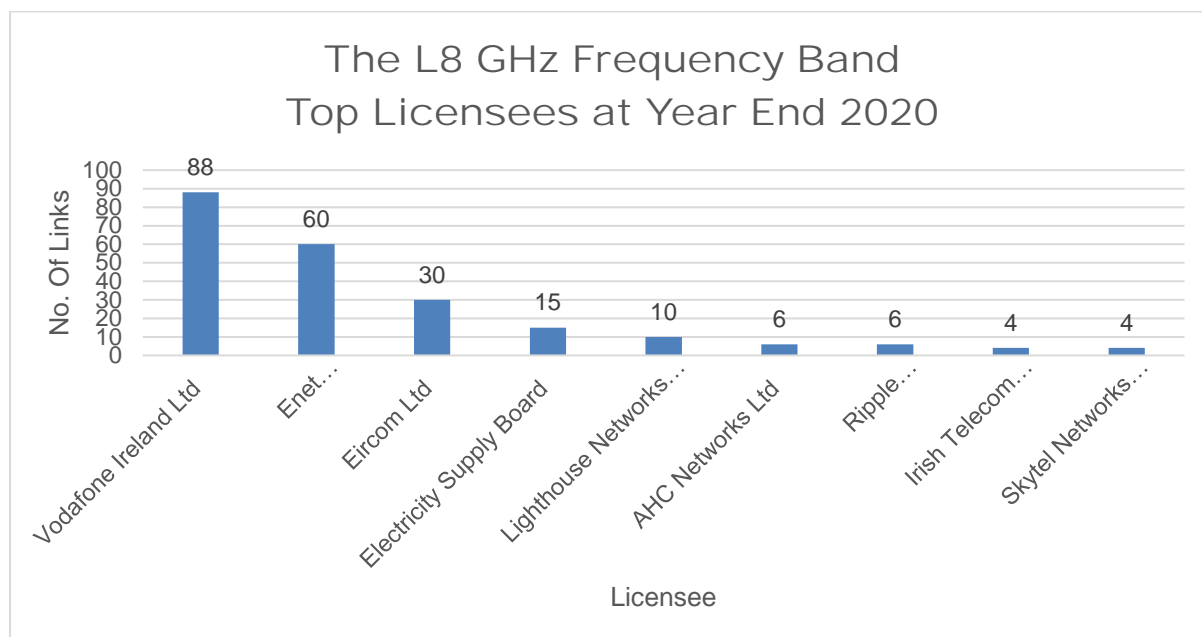


194 There are sixteen licensees using the L8 GHz frequency band as at 30 June 2020. The main licensees of the L8 GHz frequency band in Ireland are:

- MNOs;
- FWA; and
- Utility Providers.

195 This can be seen in Figure 24.

Figure 24: The L8 GHz Frequency Band Licensees

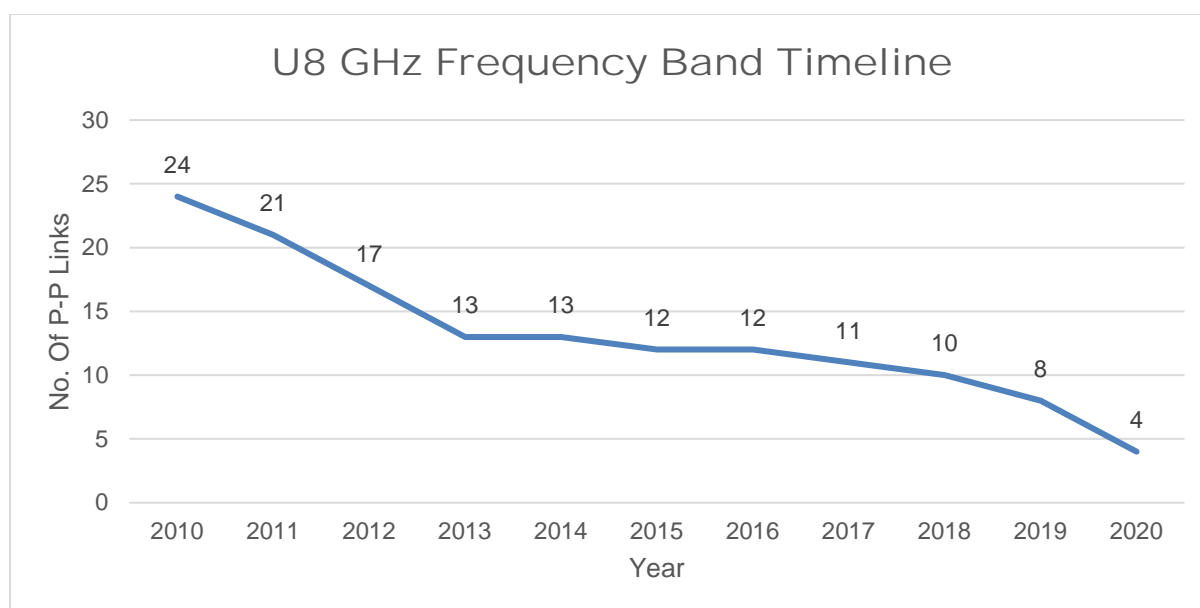


The U8 GHz Frequency band

196 The preferred channel arrangements for the U8 GHz frequency band are set out in ITU Recommendation ITU-R F.386-9¹²³. This was first published in 1963 and the latest amendment is from February 2013.

197 As of 30 June 2020, there are 4 P-P Fixed Links for the U8 GHz band. This trend is decreasing since 2009 due to various licensees not renewing their licences. The trend can be found in Figure 25 below.

Figure 25: The U8 GHz frequency band Timeline



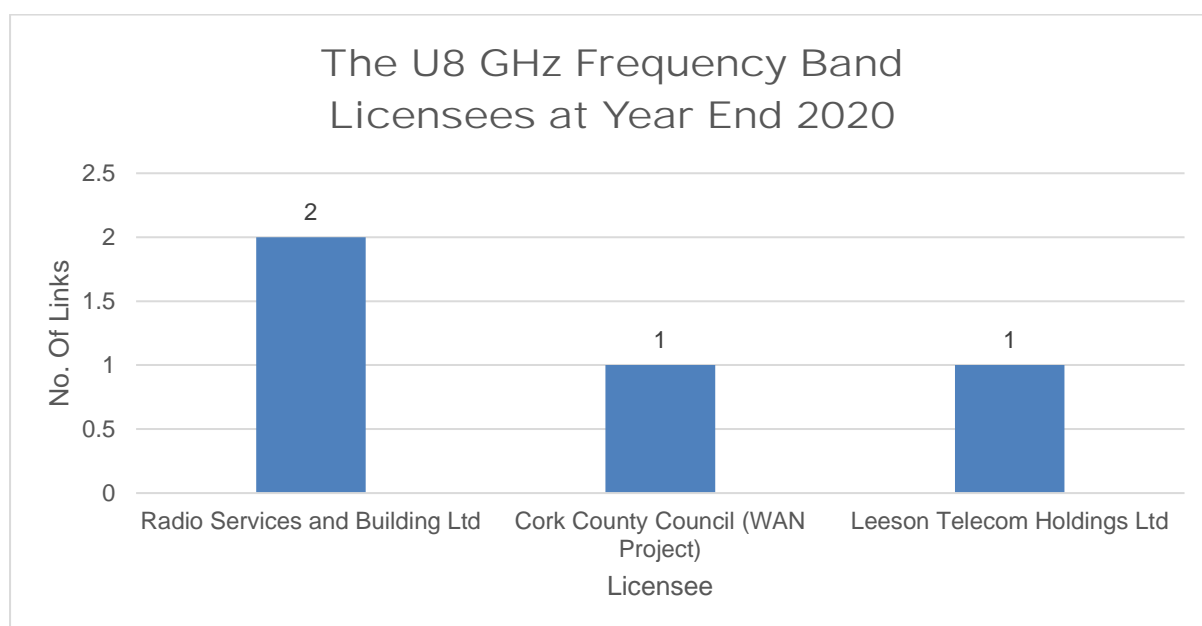
198 There are three licensees using the U8 frequency band as at 30 June 2020. The licensees of the U8 GHz frequency band in Ireland are:

- Broadcasters;
- Local Authorities; and
- FWA.

199 This can be seen in Figure 26.

¹²³ https://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.386-9-201302-I!!PDF-E.pdf

Figure 26: The U8 GHz Frequency Band Licensees

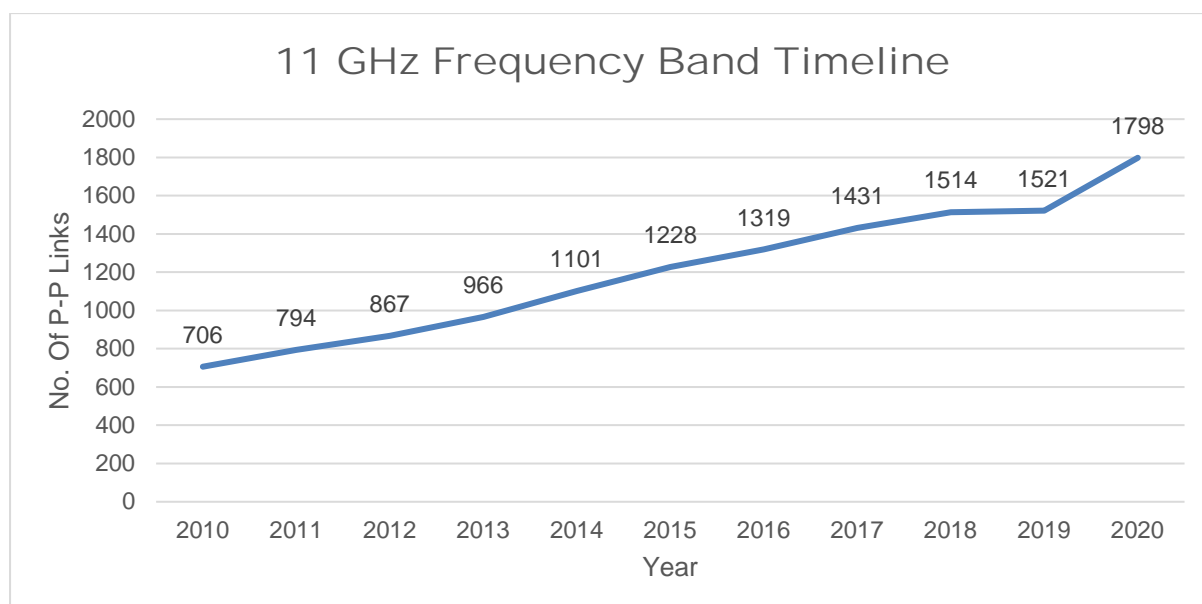


The 11 GHz Frequency band

200 The preferred channel arrangements for the 11 GHz frequency band are set out in ECC T/R 12-06¹²⁴. This was first published in 1996 and the latest amendment is from May 2019.

201 As of 30 June 2020, there are 1798 P-P Fixed Links for the 11 GHz band. The trend is increasing since 2010. This can be seen in Figure 27 below.

Figure 27: The 11 GHz Frequency Band Timeline



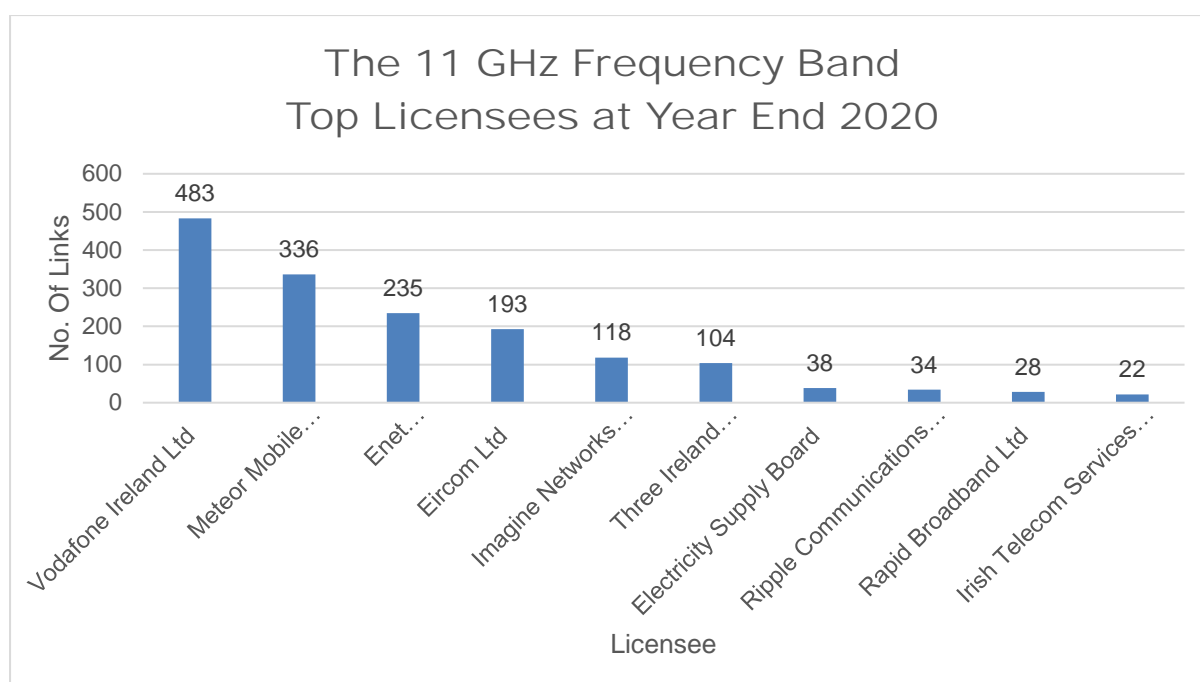
¹²⁴ <https://docdb.cept.org/download/ec0e693a-0cc3/REC1206.pdf>

202 There are fifty-six licensees using the 11 GHz frequency band as at 30 June 2020. The main licensees of the 11 GHz frequency band in Ireland are:

- MNOs;
- FWA; and
- Utilities.

203 This can be seen in Figure 28.

Figure 28: The 11 GHz Frequency Band Licensees



The 13 GHz Frequency band

204 The preferred channel arrangements for the 13 GHz frequency band are set out in ERC Recommendation 12-02¹²⁵. This was first published in 1994 and the latest amendment is from June 2007.

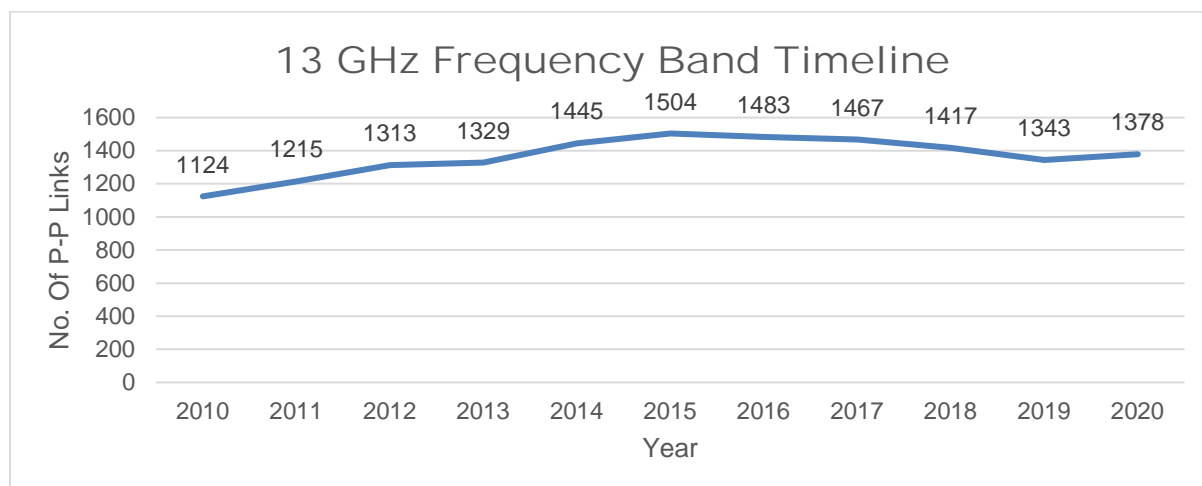
205 ComReg has suspended the acceptance of new Fixed Links applications in the 13 GHz frequency band within the greater Dublin area since 2014¹²⁶.

206 As of 30 June 2020, there are 1378 P-P Fixed Links for the 13 GHz band. The trend increases from 2010 to 2015. It starts to decrease from 2016 to 2019 however it increases again from 2020. This can be seen in Figure 29 below.

¹²⁵ <https://docdb.cept.org/download/37dcc204-ccf0/REC1202E.PDF>

¹²⁶ https://www.comreg.ie/media/dlm_uploads/2015/12/ComReg1432.pdf

Figure 29: The 13 GHz Frequency Band Timeline

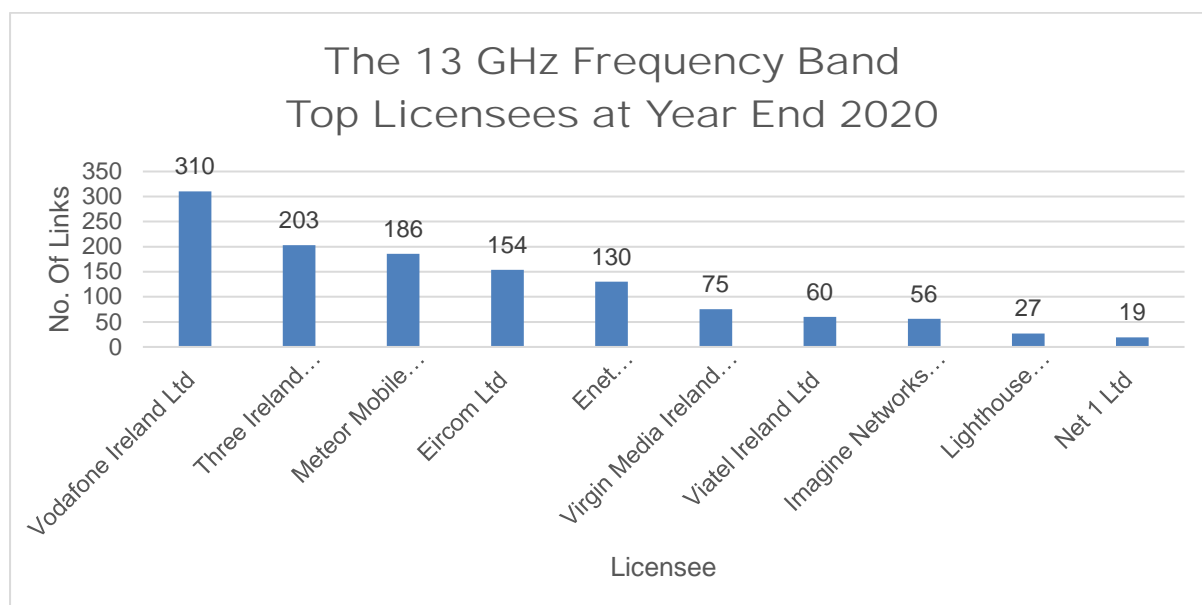


207 There are fifty-two licensees using the 13 GHz frequency band as at 30 June 2020. The main licensees of the 13 GHz frequency band in Ireland are:

- MNOs; and
- FWA.

208 This can be seen in Figure 30.

Figure 30: The 13 GHz Frequency Band Licensees



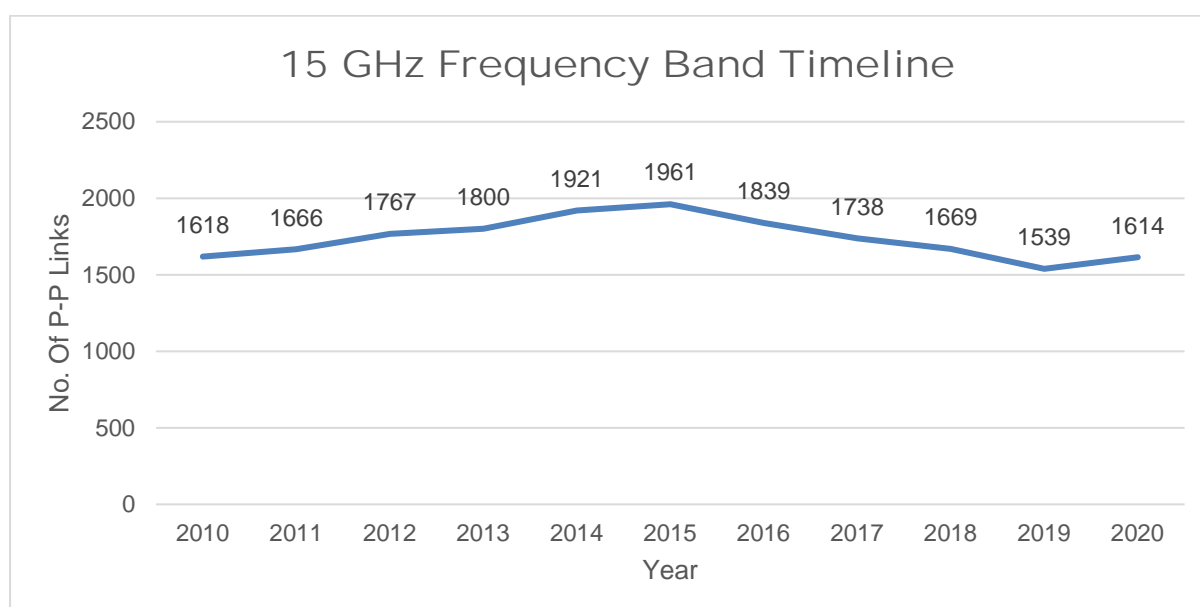
The 15 GHz Frequency band

209 The preferred channel arrangements for the 15 GHz frequency band are set out in Recommendation ITU-R F.636-5¹²⁷. This was first published in 1986 and the latest amendment is from November 2019.

210 ComReg has suspended the acceptance of new Fixed Links applications in the 15 GHz frequency band within the greater Dublin area since 2014¹²⁸.

211 As of 30 June 2020, there are 1614 P-P Fixed Links for the 15 GHz band. The trend increases from 2010 to 2015. It starts to decrease from 2016 to 2019 however it increases again from 2020. This can be seen in Figure 31 below.

Figure 31: The 15 GHz Frequency Band Timeline



212 There are thirty-nine licensees using the 15 GHz frequency band as at 30 June 2020. The main licensees of the 15 GHz frequency band in Ireland are:

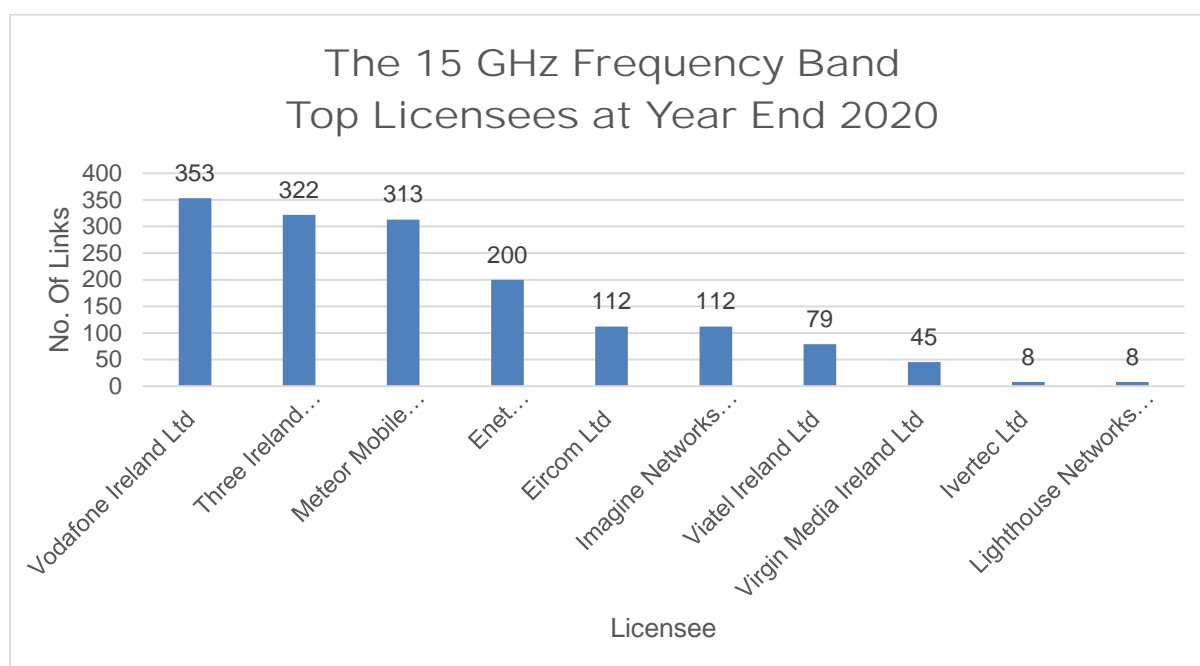
- MNOs; and
- FWA.

213 This can be seen in Figure 32.

¹²⁷ https://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.636-5-201911-I!!PDF-E.pdf

¹²⁸ https://www.comreg.ie/media/dlm_uploads/2015/12/ComReg1432.pdf

Figure 32: The 15 GHz Frequency Band Licensees



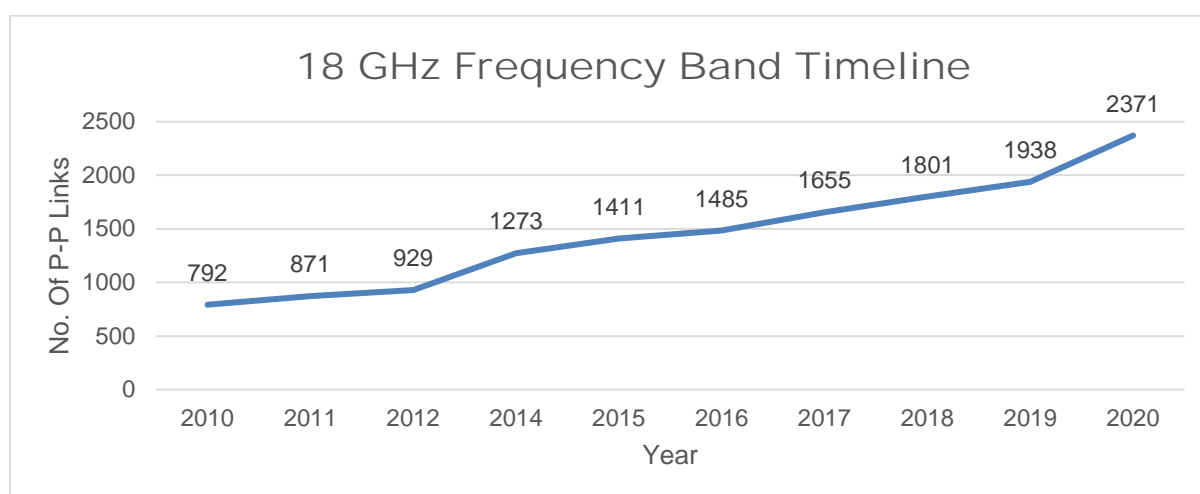
The 18 GHz Frequency band

214 The preferred channel arrangements for the 18 GHz frequency band are set out in ERC Recommendation 12-03¹²⁹. This was first published in 1996 and the latest amendment is from May 2019.

215 The 18 GHz frequency band is part of the congested area in Dublin since 2009.

216 As of 30 June 2020, there are 2371 P-P Fixed Links for the 18 GHz band. The trend is increasing since 2009. This can be seen in Figure 33 below.

Figure 33: The 18 GHz Frequency Band Timeline



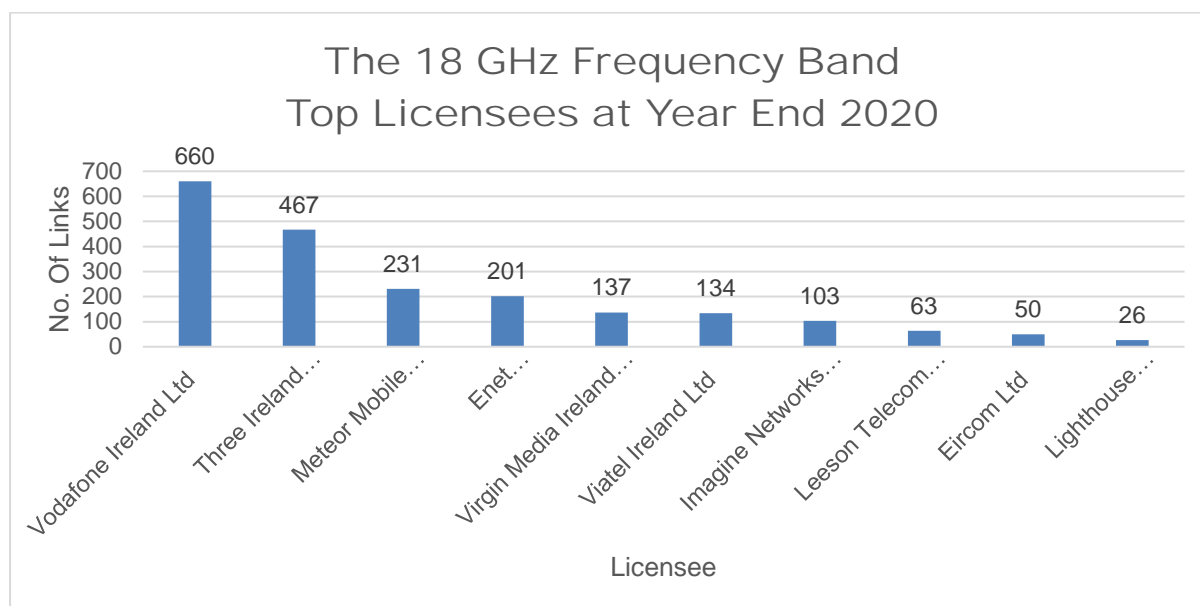
¹²⁹<https://docdb.cept.org/download/f509b4c9-4936/REC1203.pdf>

217 There are sixty-eight licensees using the 18 GHz frequency band as at 30 June 2020. The main licensees of the 18 GHz frequency band in Ireland are:

- MNOs; and
- FWA.

218 This can be seen in Figure 34.

Figure 34: The 18 GHz Frequency Band Licensees



The 23 GHz Frequency band

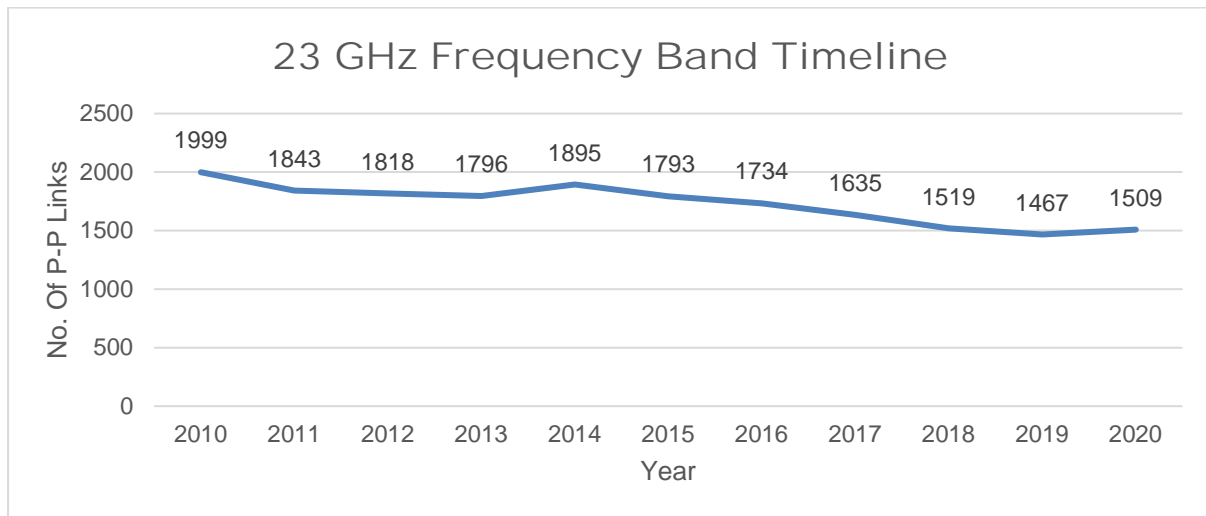
219 The preferred channel arrangements for the 23 GHz frequency band are set out in ECC T/R 13-02¹³⁰. This was first published in 1993 and the latest amendment is from May 2019.

220 The 23 GHz frequency band is part of the congested area in Dublin since 2009.

221 As of 30 June 2020, there are 1509 P-P Fixed Links for the 23 GHz band. The trend decreases from 2010 to 2013. It starts to increase in 2014 and decreases from 2015 to 2019. However, it starts to increase from 2020. This can be seen in Figure 35 below.

¹³⁰ <https://docdb.cept.org/download/2dce417c-b219/TR1302.PDF>

Figure 35: The 23 GHz Frequency Band Timeline

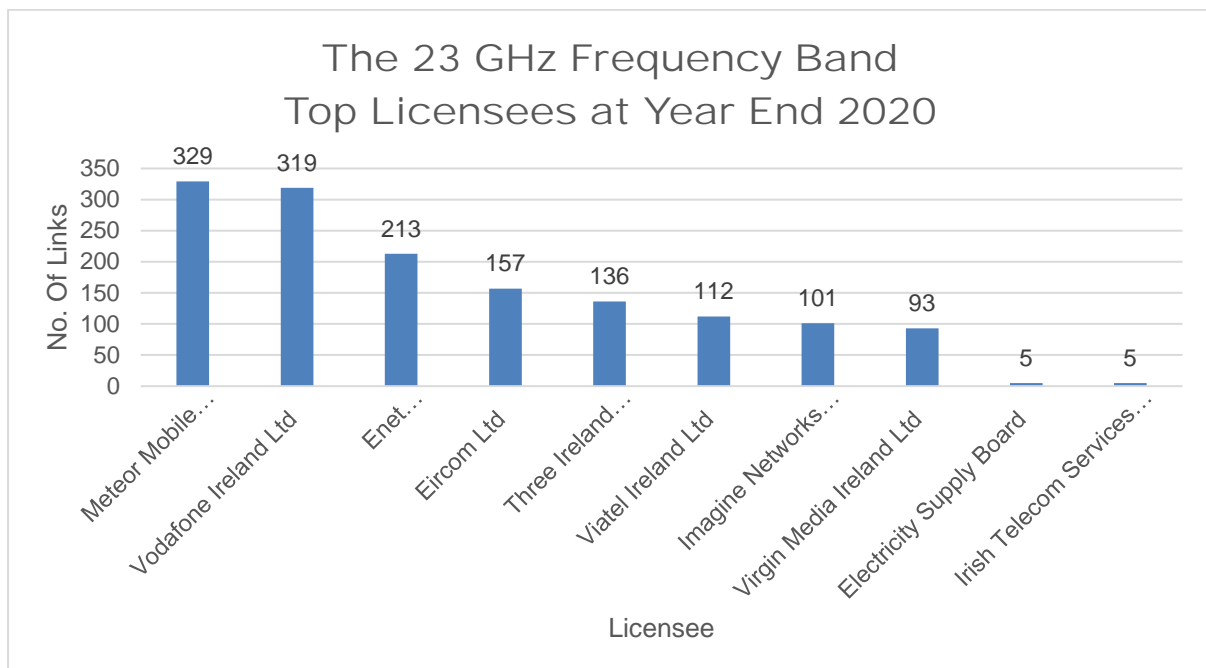


222 There are thirty-two licensees using the 23 GHz frequency band as at 30 June 2020. The main licensees of the 23 GHz frequency band in Ireland are:

- MNOs;
- FWA; and
- Utilities.

223 This can be seen in Figure 36.

Figure 36: The 23 GHz Frequency Band Licensees

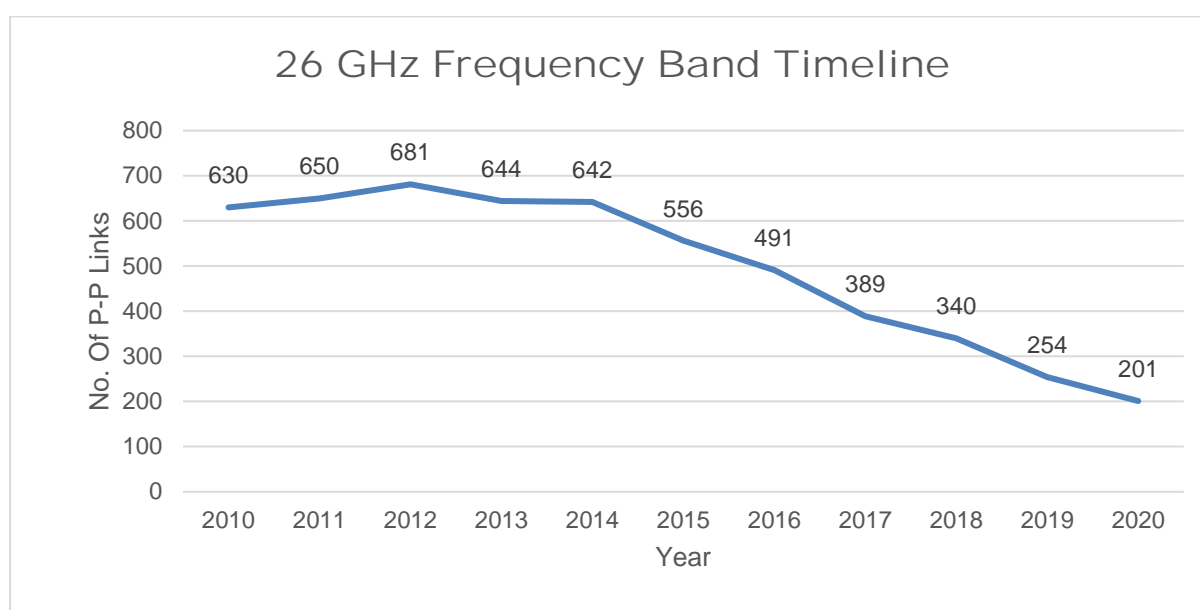


The 26 GHz Frequency band

224 The preferred channel arrangements for the 26 GHz frequency band are set out in ECC Recommendation T/R 13-02 ¹³¹. This was first published in 1993 and the latest amendment is from May 2019.

225 As of 30 June 2020, there are 201 P-P Fixed Links for the 26 GHz individual licence band¹³². The trend decreases from 2013 onwards due to licensees not renewing and cancelling their licences. This can be seen in Figure 37 below.

Figure 37: The 26 GHz Frequency Band Timeline



226 There are nine licensees using the 26 GHz frequency band as at 30 June 2020. The licensees of the 26 GHz frequency band in Ireland are:

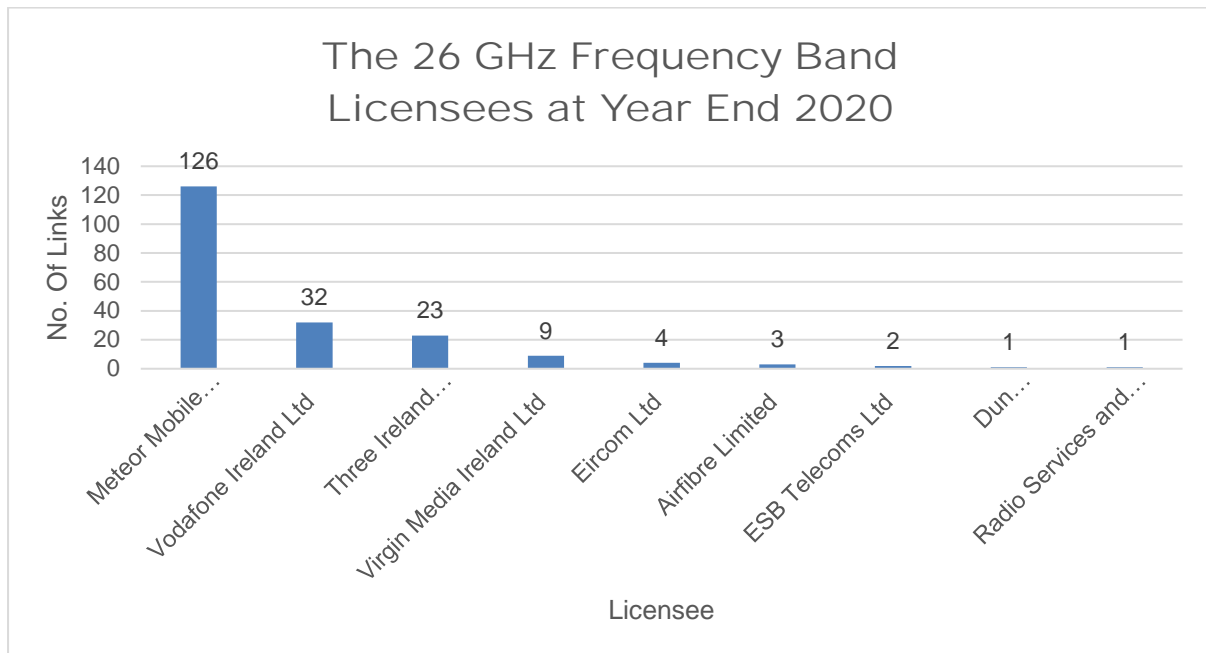
- MNOs;
- FWA;
- Local Authorities; and
- Broadcasters.

227 This can be seen in Figure 38.

¹³¹ <https://docdb.cept.org/download/2dce417c-b219/TR1302.PDF>

¹³² This does not include number of registrations in the 26 GHz band block licences

Figure 38: The 26 GHz Frequency Band Licensees

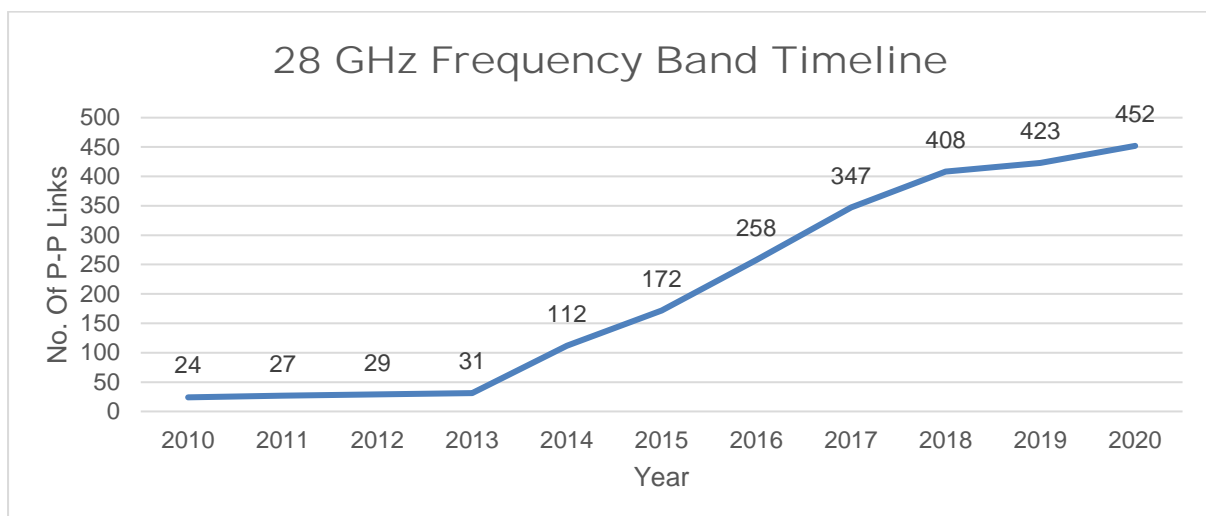


The 28 GHz Frequency band

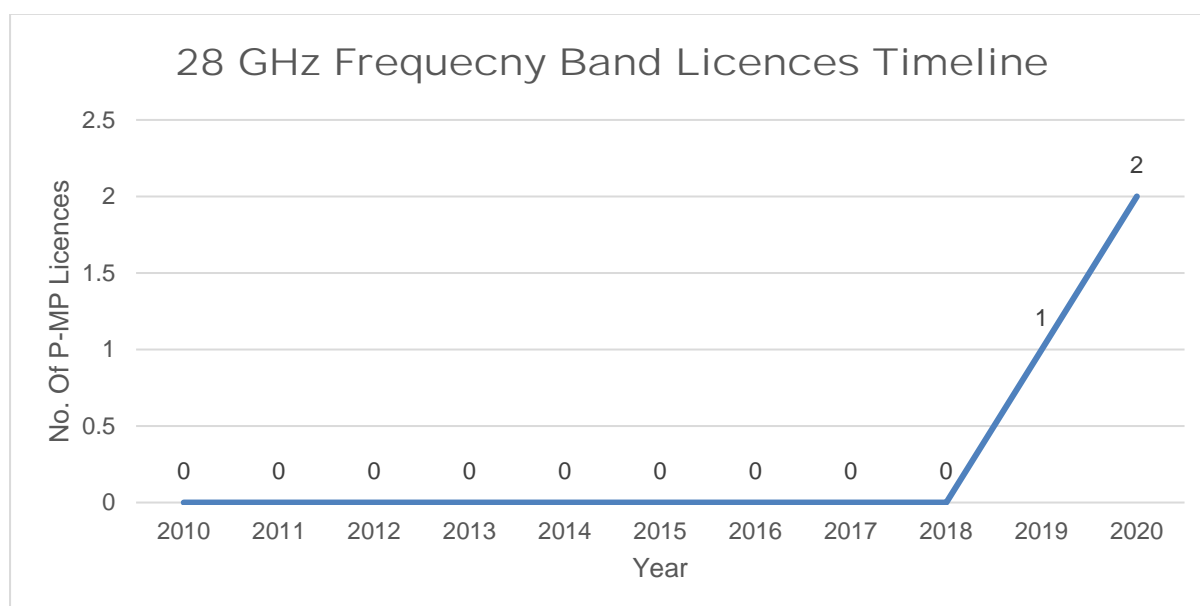
228 The preferred channel arrangements for the 28 GHz frequency band are set out in ECC Recommendation T/R 13-02¹³³. This was first published in 1993 and the latest amendment is from May 2019.

229 As of 30 June 2020, there are 452 P-P Fixed Links & 2 P-MP licences for the 28 GHz band. The trend for P-P links is increasing since 2009 for P-P and increasing since 2019 for P-MP. This can be seen in Figure 39 and Figure 40 below.

Figure 39: The 28 GHz Frequency Band Timeline



¹³³ <https://docdb.cept.org/download/2dce417c-b219/TR1302.PDF>

Figure 40: The 28 GHz Frequency Band P-MP Timeline

230 There are 13 licensees using the 28 GHz frequency band for P-P and one licensee using the 28 GHz frequency band for P-MP as at 30 June 2020. The main licensees of the 28 GHz frequency band for P-P in Ireland are:

- MNOs;
- FWA; and
- Local Authorities.

231 The main licensee of the 28 GHz frequency band for P-MP in Ireland are:

- State Services.

232 This can be seen in Figure 41 and Figure 42.

Figure 41: The 28 GHz Frequency Band Licensees

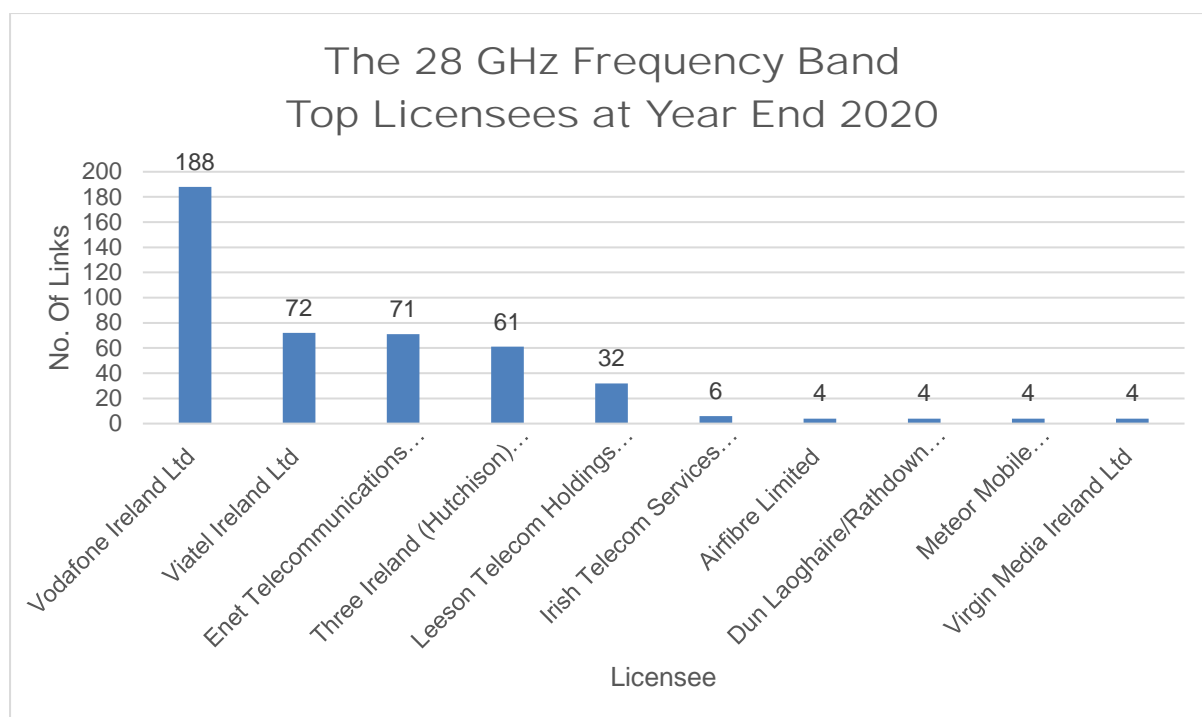
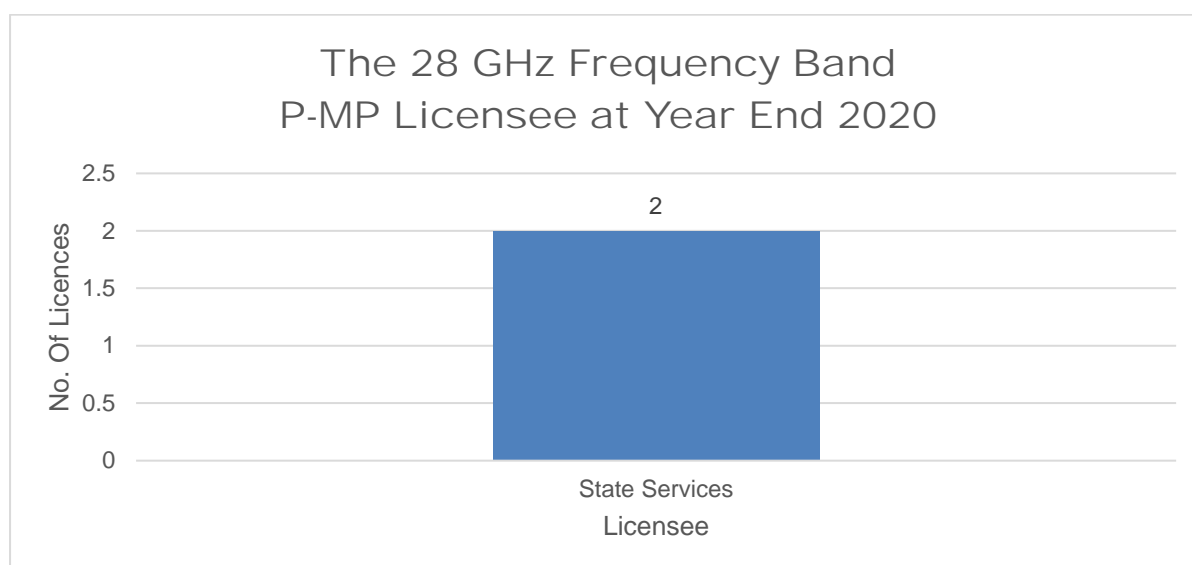


Figure 42: The 28 GHz Frequency Band P-MP Licensee



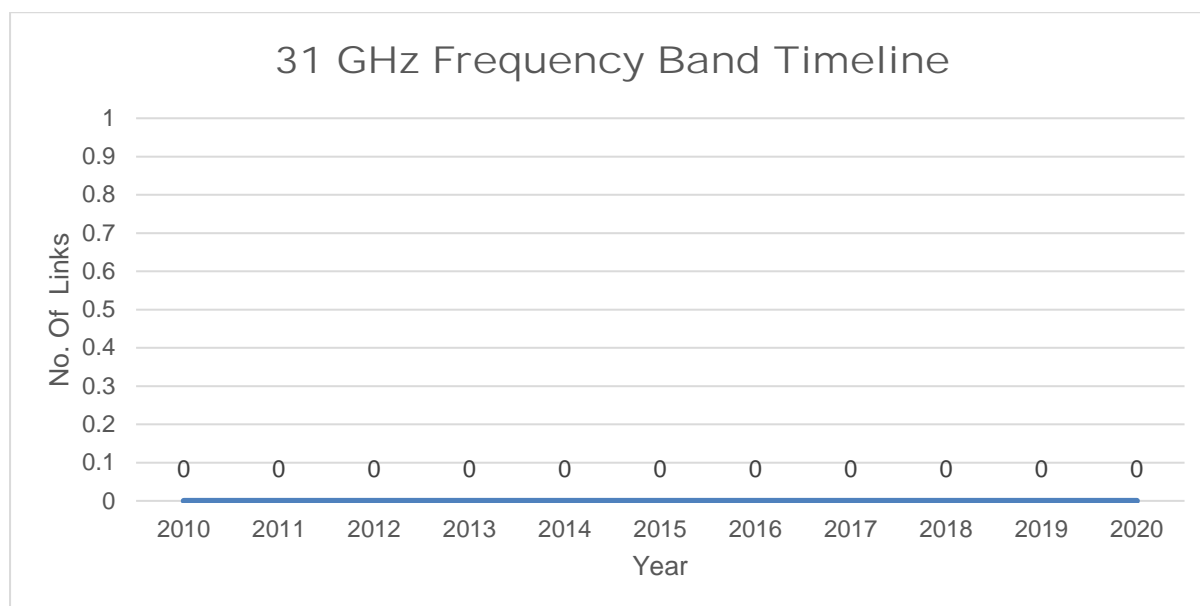
The 31 GHz Frequency band

233 The preferred channel arrangements for the 31 GHz frequency band are set out in ECC/REC/(02)02¹³⁴. This was first published in 2002 and the latest amendment is from February 2010.

¹³⁴ <https://docdb.cept.org/download/d9aa1d17-0482/REC0202.PDF>

234 As of 30th June 2020, there are no licence Fixed Links for the 31 GHz frequency band and this trend dates back to 2010. This can be seen in Figure 43 below.

Figure 43: The 31 GHz Frequency Band Timeline



235 There are no licensees of the 31 GHz frequency band in Ireland as at 30 June 2020.

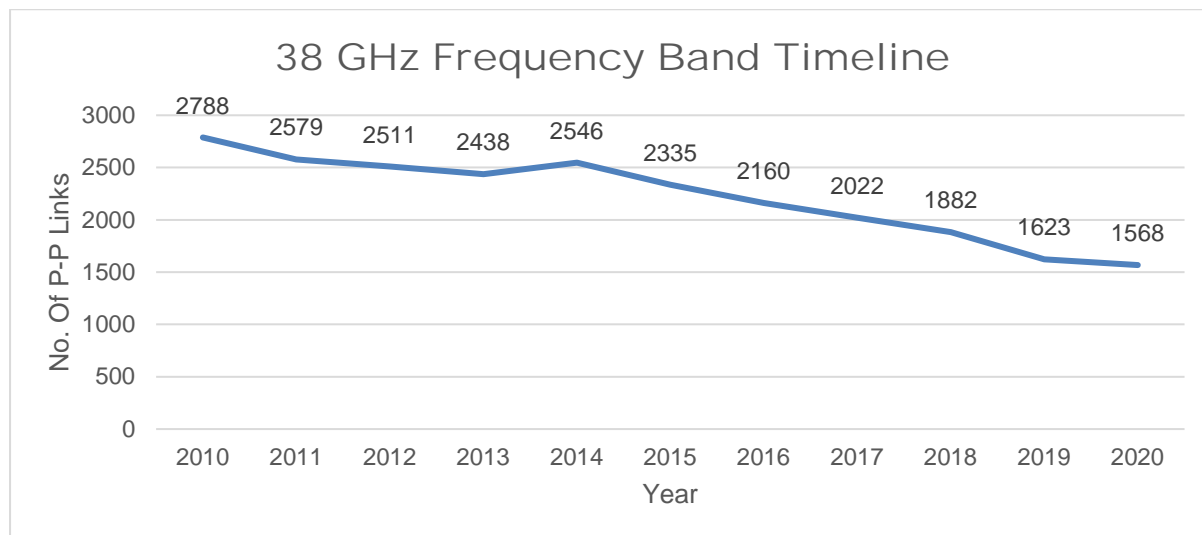
The 38 GHz Frequency band

236 The preferred channel arrangements for the 38 GHz frequency band are set out in ECC Recommendation T/R 12-01¹³⁵. This was first published in 1991 and the latest amendment is from May 2019.

237 As of 30 June 2020, there are 1568 P-P fixed links for the 38 GHz band. The trend is decreasing since 2010 due to various licensees not renewing or cancelling their licences. This can be seen in Figure 44 below.

¹³⁵<https://docdb.cept.org/download/72f54bed-094c/TR1201.pdf>

Figure 44: The 38 GHz Frequency Band Timeline

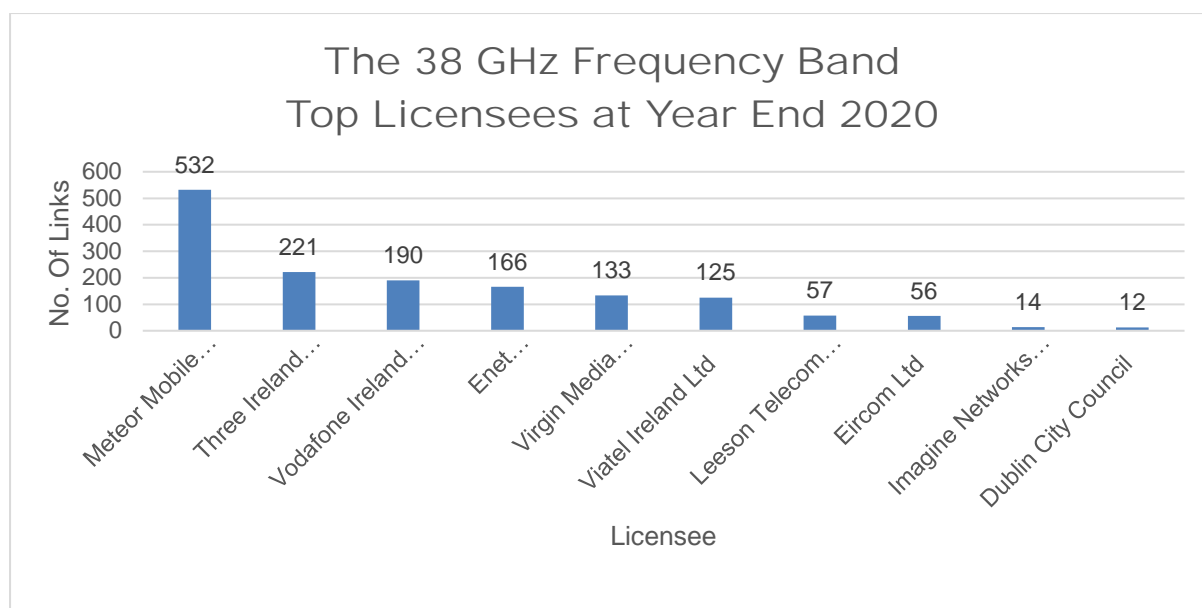


238 There are thirty-six licensees using the 38 GHz frequency band as at 30 June 2020. The main licensees of the 38 GHz frequency bands in Ireland are:

- MNOs;
- FWA; and
- Local Authorities.

239 This can be seen in Figure 45.

Figure 45: The 38 GHz Frequency Band Licensees

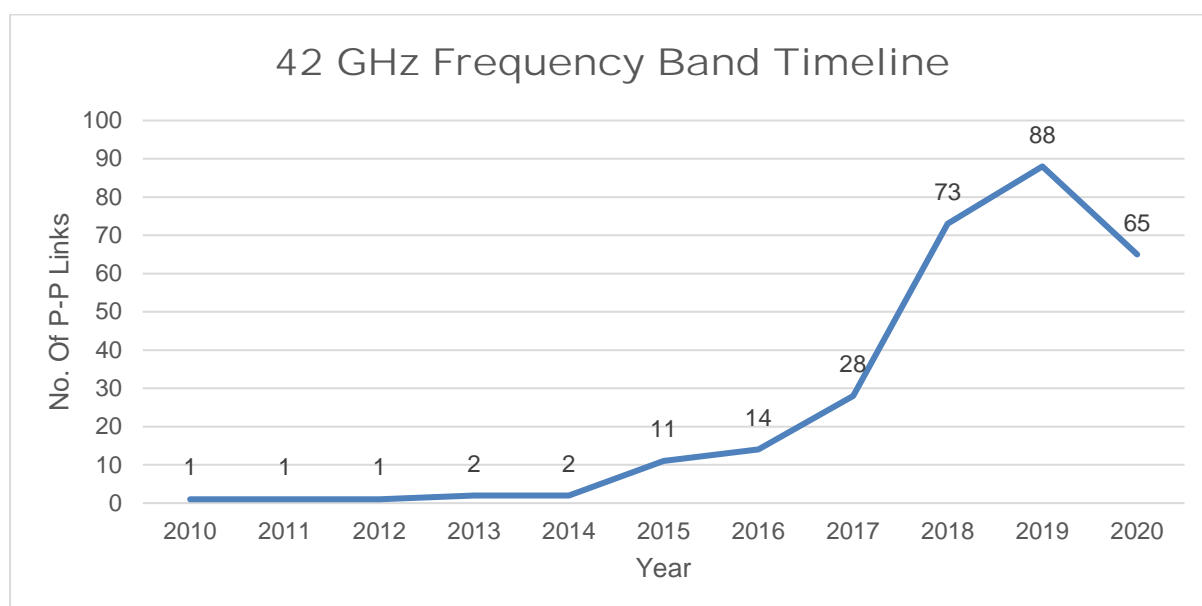


The 42 GHz Frequency band

240 The preferred channel arrangements for the 42 GHz frequency band are set out in ECC Recommendation (01)04¹³⁶. This was first published in 2001 and the latest amendment is from May 2014.

241 As of 30 June 2020, there are 65 P-P Fixed Links for the 42 GHz band. The trend was increasing from 2010 until 2019 however it starts to decrease from 2020 due to various licensees cancelling their licences. This can be seen in Figure 46 below.

Figure 46: The 42 GHz Frequency Band Timeline



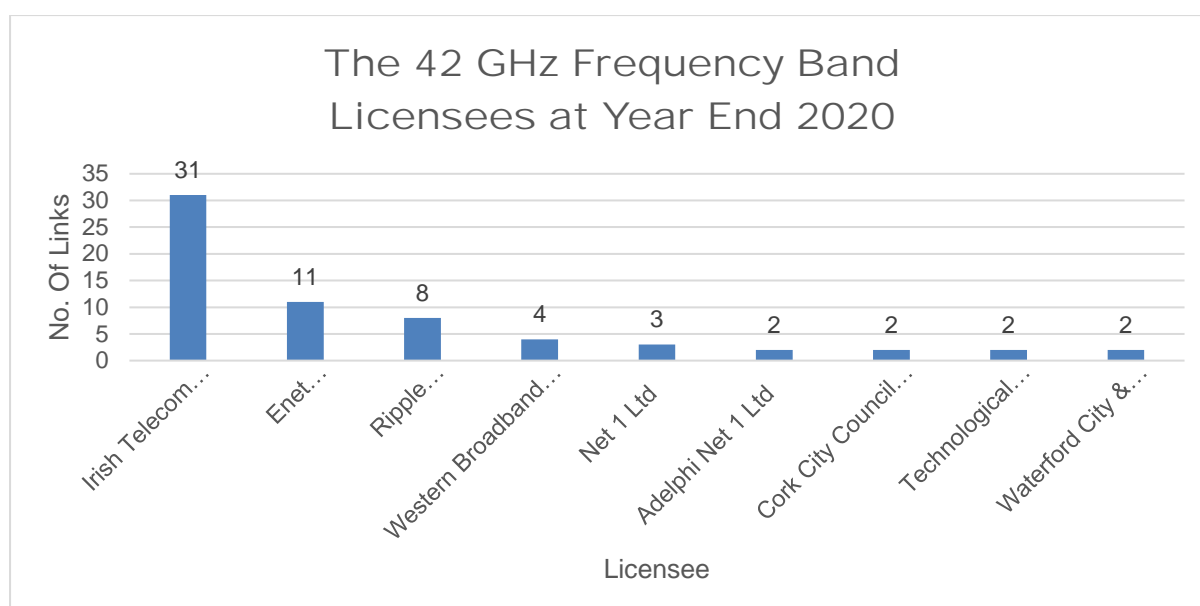
¹³⁶ <https://docdb.cept.org/download/4681aa93-6ed4/REC0104.PDF>

242 There are nine licensees using the 42 GHz frequency band as at 30 June 2020. The licensees of the 42 GHz frequency bands in Ireland are:

- FWA;
- Local Authorities; and
- Third Level Institutions.

243 This can be seen in Figure 47.

Figure 47: The 42 GHz Frequency Band Licensees



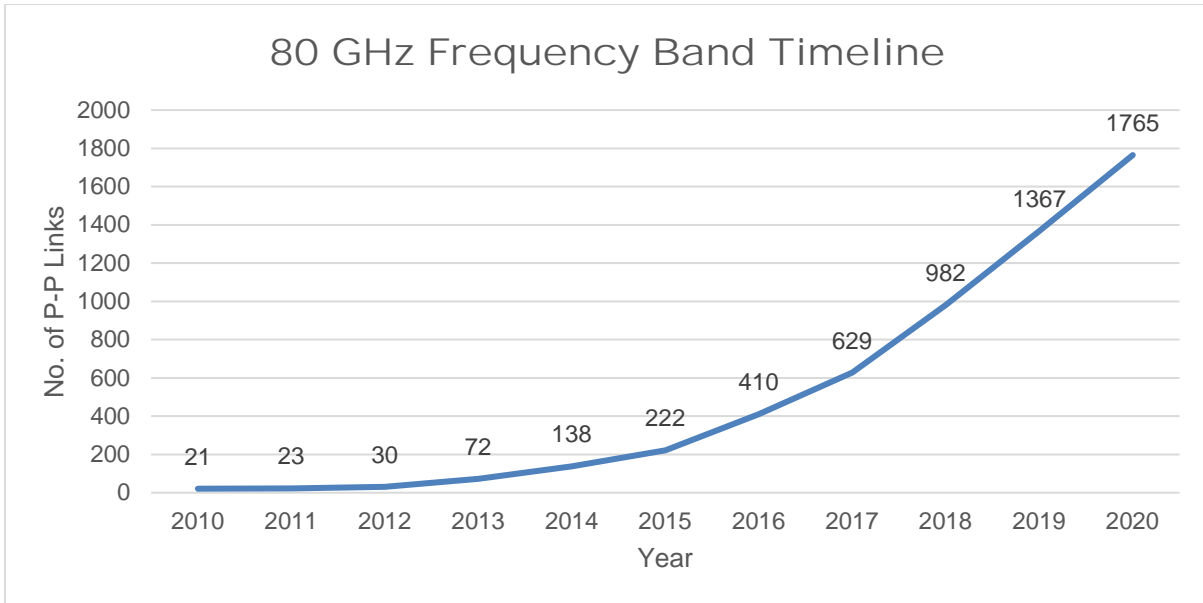
The 70 / 80 GHz Frequency band

244 The preferred channel arrangements for the 70 / 80 GHz frequency band are set out in ECC/REC/(05)07¹³⁷. This was first published in 2005 and the latest amendment is from May 2013.

245 As of 30 June 2020, there are 1765 P-P fixed links for the 70 / 80 GHz band. The trend is increasing since 2009. This can be seen in Figure 48 below.

Figure 48: The 70 / 80 GHz Frequency Band Timeline

¹³⁷ <https://docdb.cept.org/download/9c4f8690-d0e1/REC0507.PDF>

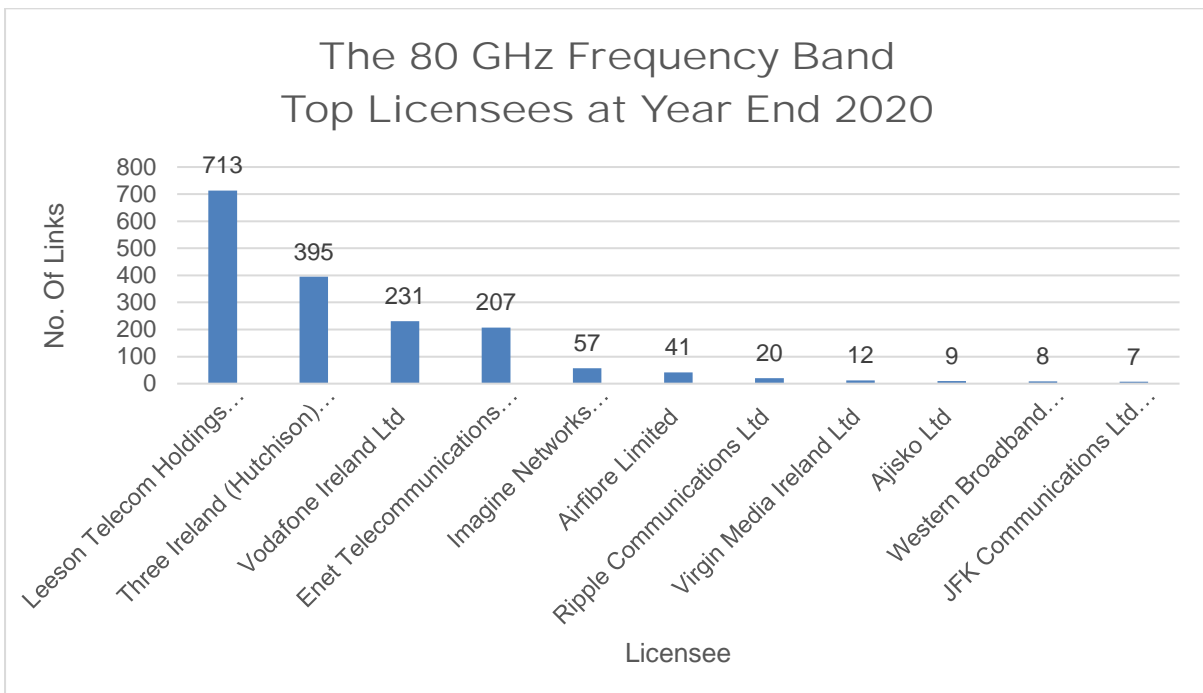


246 There are forty licensees using the 80 GHz frequency band as at 30 June 2020. The main licensees of the 70 / 80 GHz frequency bands in Ireland are:

- FWA; and
- MNOs.

247 This can be seen in Figure 49.

Figure 49: The 70 / 80 GHz Frequency Band Licensees



Annex 2: Tables and Figures supporting Chapter 3

248 This annex contains tables and figures in relation to information as outlined in chapter 3.

Table 6: Point-to-Point Fixed Link assignments as of 30 June 2020, by user category

User type	1.3 GHz	1.4 GHz	2.0 – 2.3GHz	L6 GHz	U6 GHz	L7 GHz	U7 GHz	L8 GHz	U8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	38 GHz	42 GHz	80 GHz	Total
Mobile Networks	0%	0%	100%	17%	20%	0%	2%	50%	0%	62%	62%	68%	59%	62%	92%	56%	64%	0%	35%	56%
Fixed Networks	0%	0%	0%	45%	0%	0%	68%	37%	25%	22%	26%	22%	27%	28%	4%	41%	31%	88%	56%	31%
Fixed Wireless Access	0%	0%	0%	13%	61%	0%	44%	35%	0%	28%	21%	22%	18%	21%	1%	17%	12%	31%	20%	21%
Utilities	89%	0%	0%	0%	15%	83%	18%	7%	0%	2%	1%	1%	1%	1%	1%	0%	0%	0%	0%	2%
Local Authorities/Government	0%	0%	0%	0%	0%	0%	6%	1%	25%	1%	3%	1%	2%	0%	0%	1%	2%	6%	1%	2%
Broadcasters	5%	97%	0%	29%	3%	17%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Public Safety	5%	3%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%
Other	0%	0%	0%	2%	1%	0%	2%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%	0%
Credit Union	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Source: ComReg analysis of licensing data. Note: the total column reflects the total links attributed to a user category across all bands. A number of users were active both in the operation of Fixed Links for FWA and Fixed Networks. These operators are therefore included under both Fixed Networks and Fixed Wireless Access headings and the sum of the percentages contained in the total Column therefore exceeds 100%. ComReg notes that while this approach may overstate the true ownership of Fixed Links by Fixed Network operators, this approach is preferable to arbitrarily assigning the user to only one column. The total row is however the correct number of licences active as of 30 June 2020 (includes VHF and other minor licences not displayed). Darker green shading of a given cell represents higher percentages.

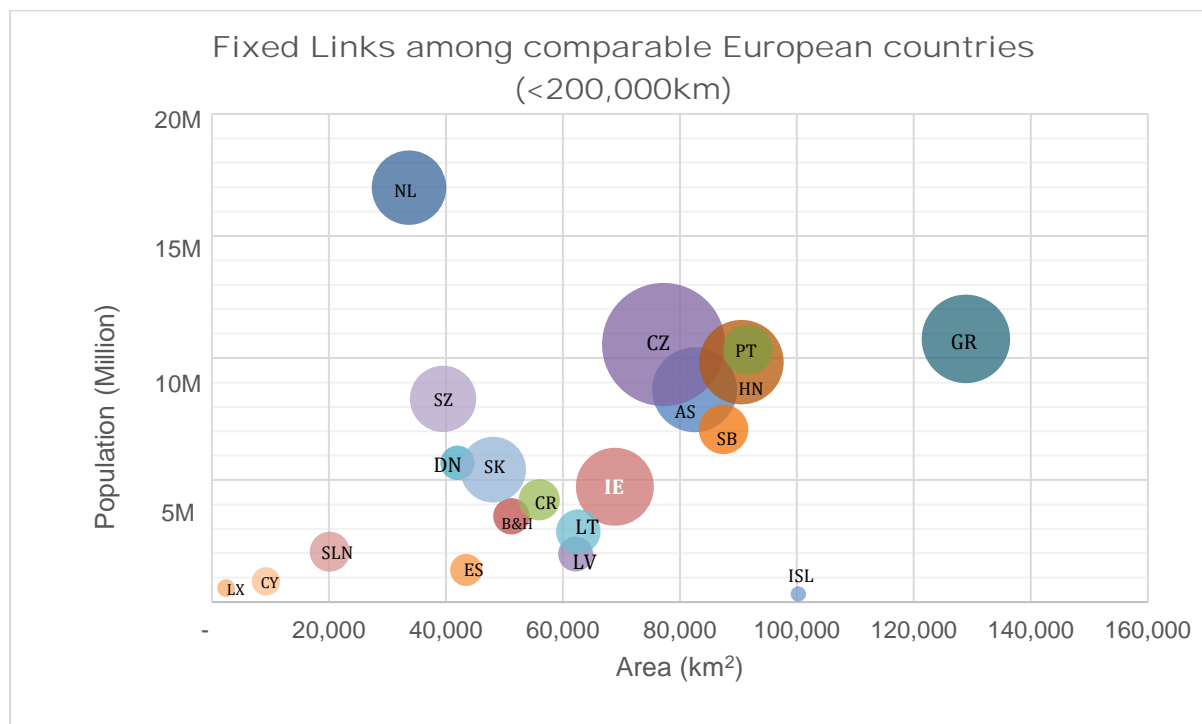
Table 7: Fixed Links per Operator as at 30/06/2020

Licensee	Number of Fixed Links
Vodafone Ireland Ltd (“Vodafone”)	2,872
Meteor Mobile Communications Ltd (“Meteor”)	2,057
Three Ireland (Hutchinson) Ltd (“H3IRL”)	1,948
Enet Telecommunications Ltd (“Enet”)	1,599
Leeson Telecom Holdings Ltd (“Leeson”)	875
Eircom Ltd. (“Eir”)	811
Imagine Networks Services Ltd (“Imagine”)	689
Viatel Ireland Ltd. (“Viatel”)	652
Virgin Media Ireland Ltd (“Virgin”)	567
Electricity Supply Board Networks DAC (“ESB Networks”)	223

Table 8: Fixed Links in Licence Exempt Bands among the 15 respondents, 2016-2019

Band (GHz)	30 June 2016	30 June 2017	30 June 2018	30 June 2019
17	51	79	89	106
5	5,303	5,817	6,038	5,781
24	11	26	34	52
54-71	0	0	3	5

Figure 50: Numbers of Fixed Links in 19 comparable European countries, as of 2016¹³⁸



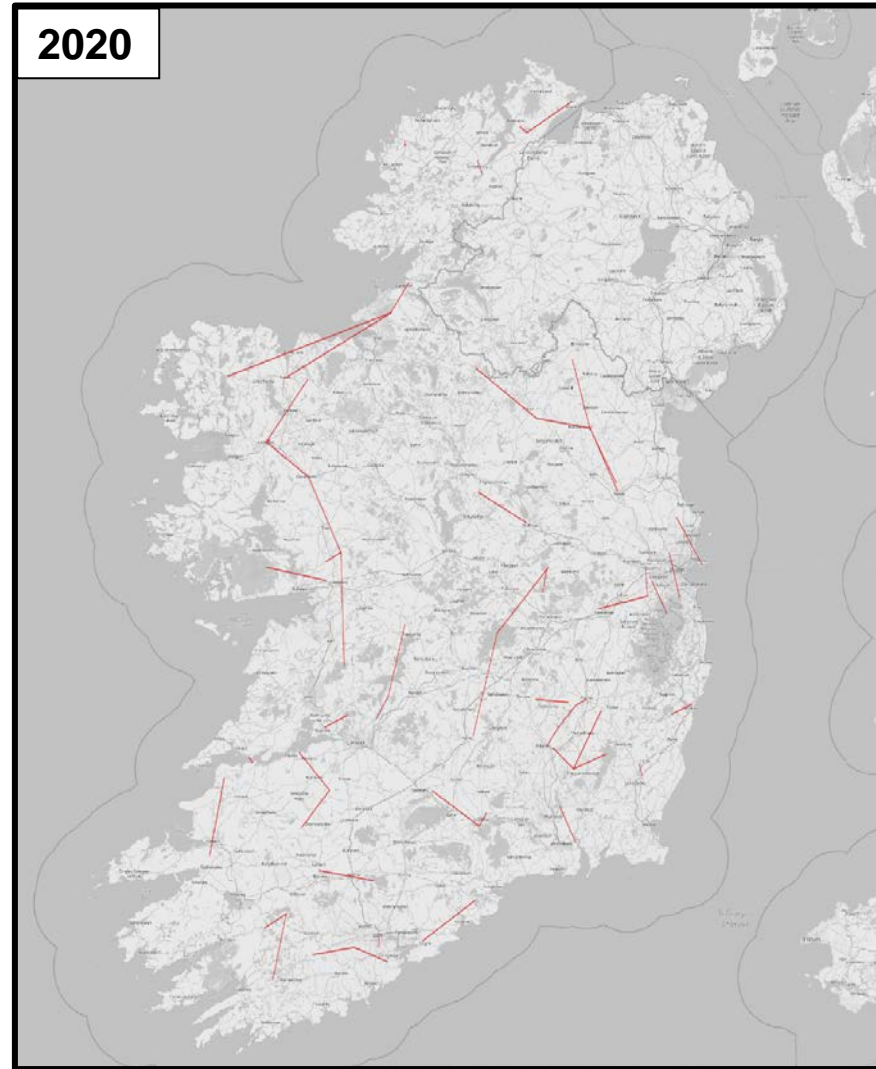
Source: ComReg analysis of OECD data combined with survey data gathered by the CEPT

¹³⁸ ECC Report 173 “Fixed Service in Europe - Current use and future trends post 2016”. ComReg notes that the figures provided may contain some measurement error due to potential differences between countries in licencing regimes and reporting of this data to CEPT (e.g., differences in the use and reporting of block licences). This is however the best data available to ComReg at this time and is included for the purpose of providing information

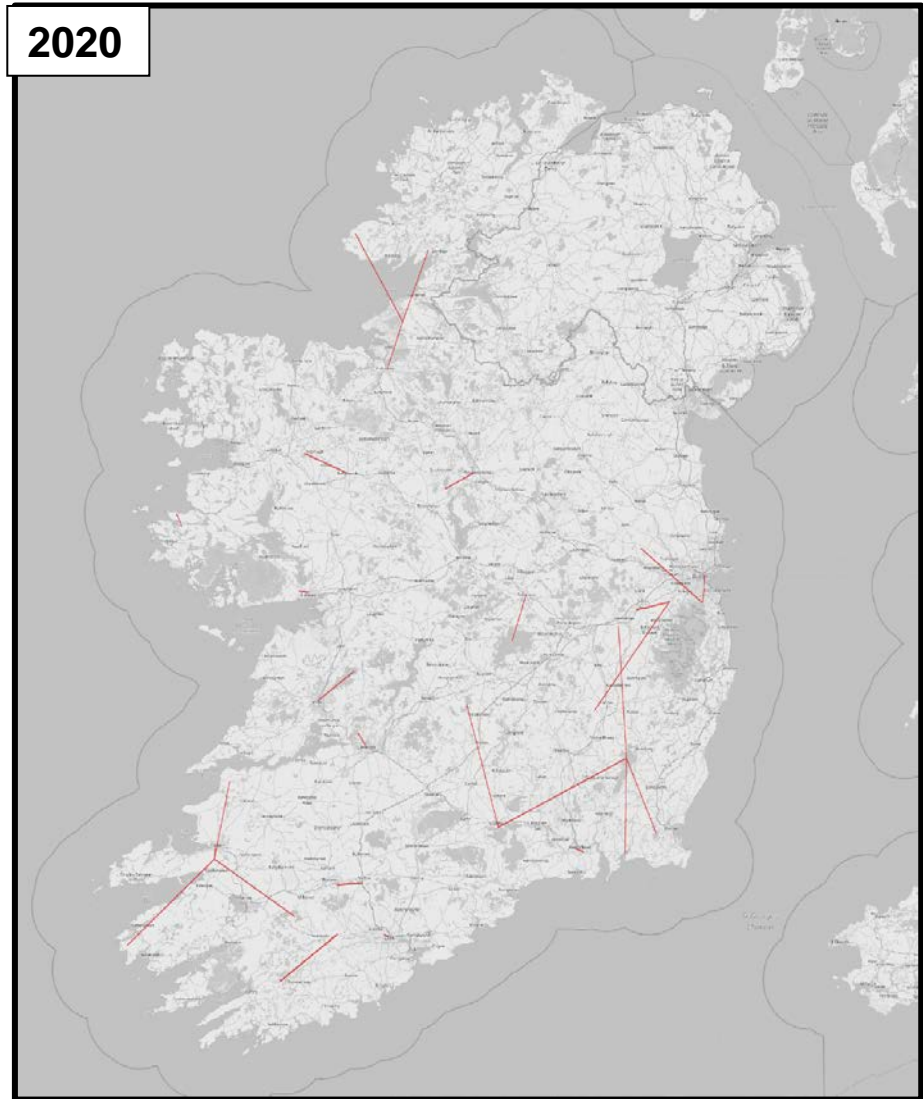
Annex 3: Mapping of Fixed Links 2010 and 2020

249 This Annex contains maps of the Fixed Links for each of the existing licenced Fixed Link Bands as of 30 June 2010 and 30 June 2020. ComReg does not ensure the accuracy of the maps given the nature of the information (licensing applications are constantly being made) and large map ratio.

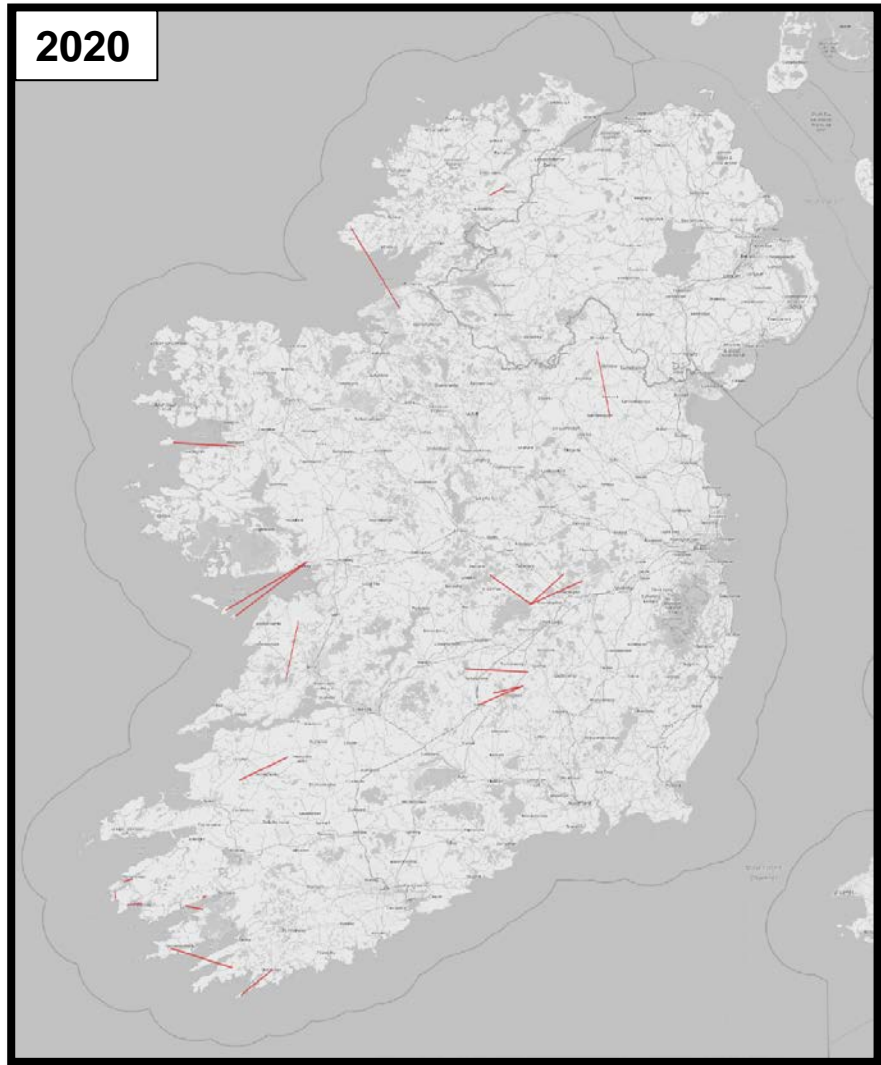
1.3 GHz Nationwide, 2010 and 2020



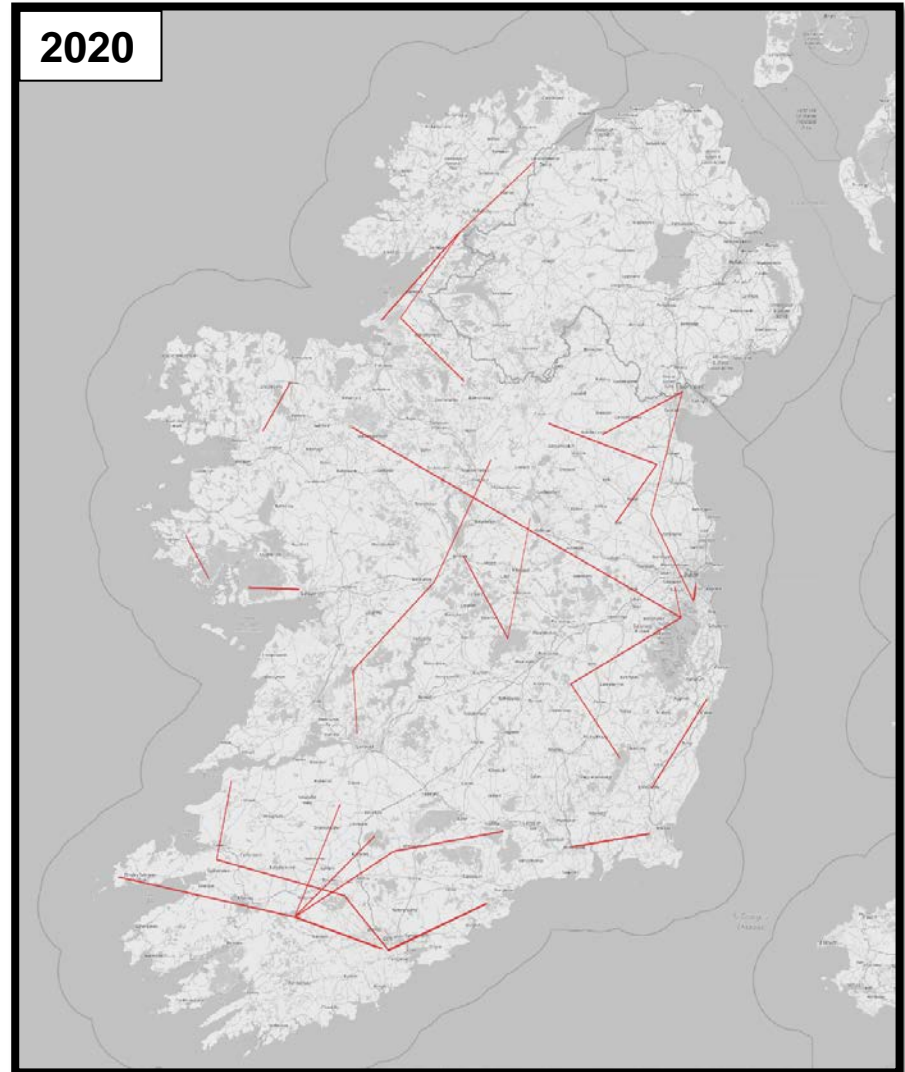
1.4 GHz Nationwide, 2010 and 2020



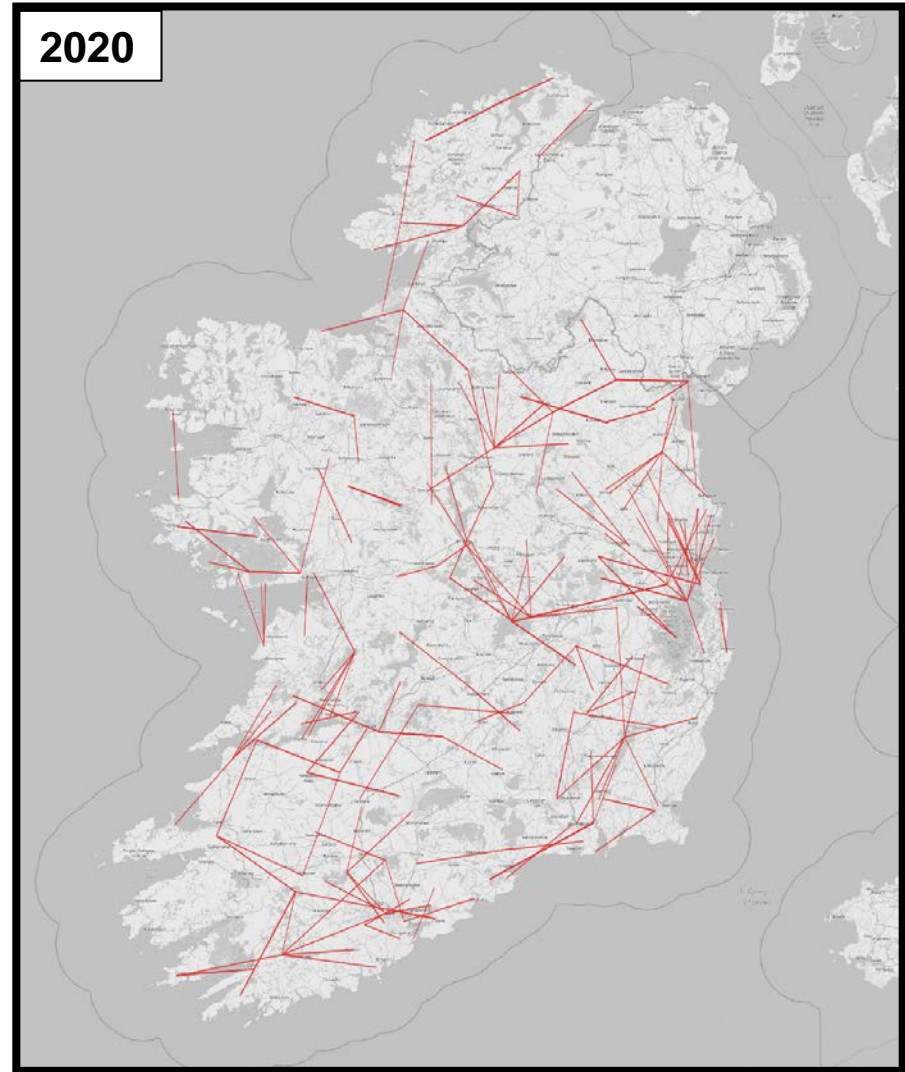
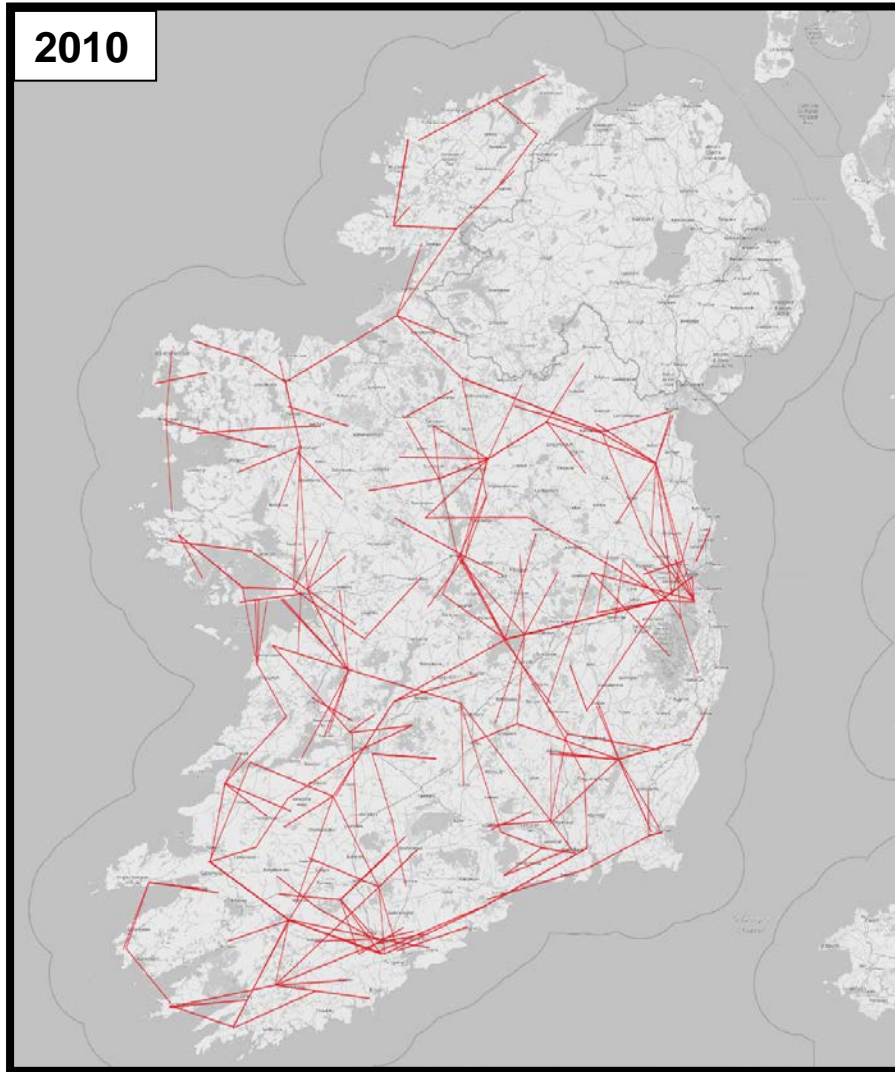
2 GHz Nationwide, 2010 and 2020



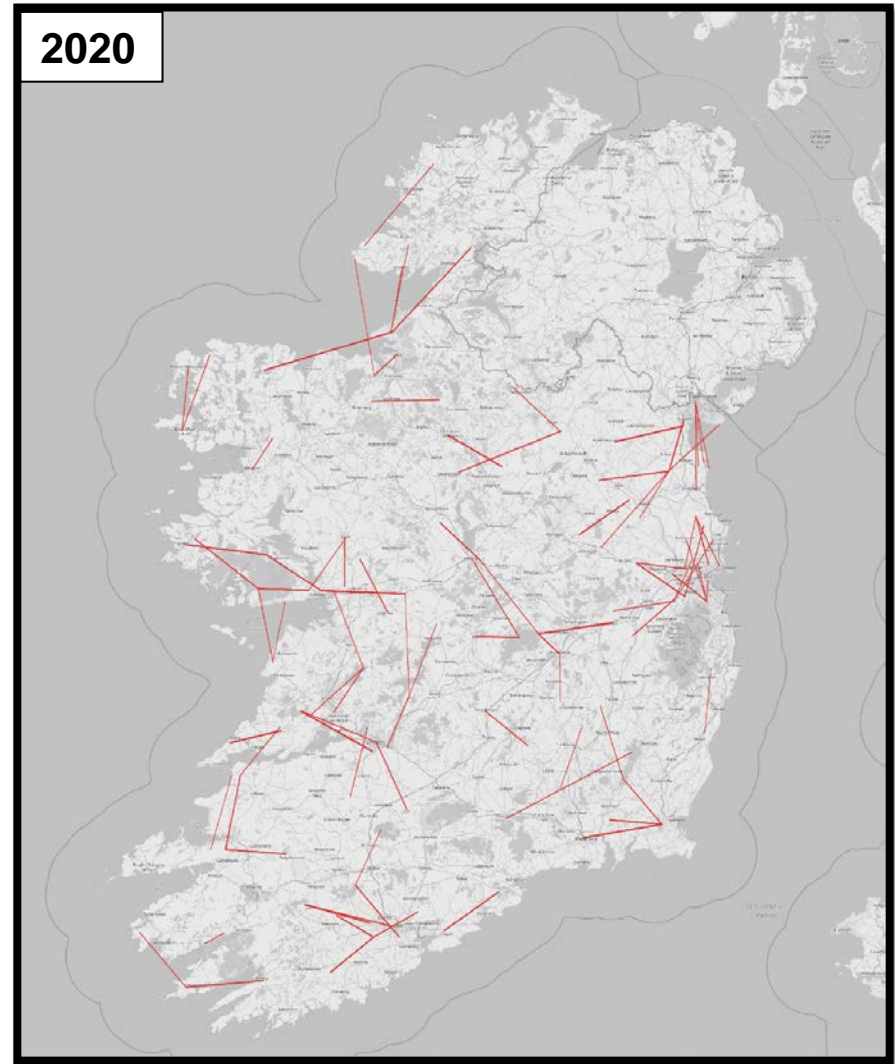
6 GHz Nationwide, 2010 and 2020



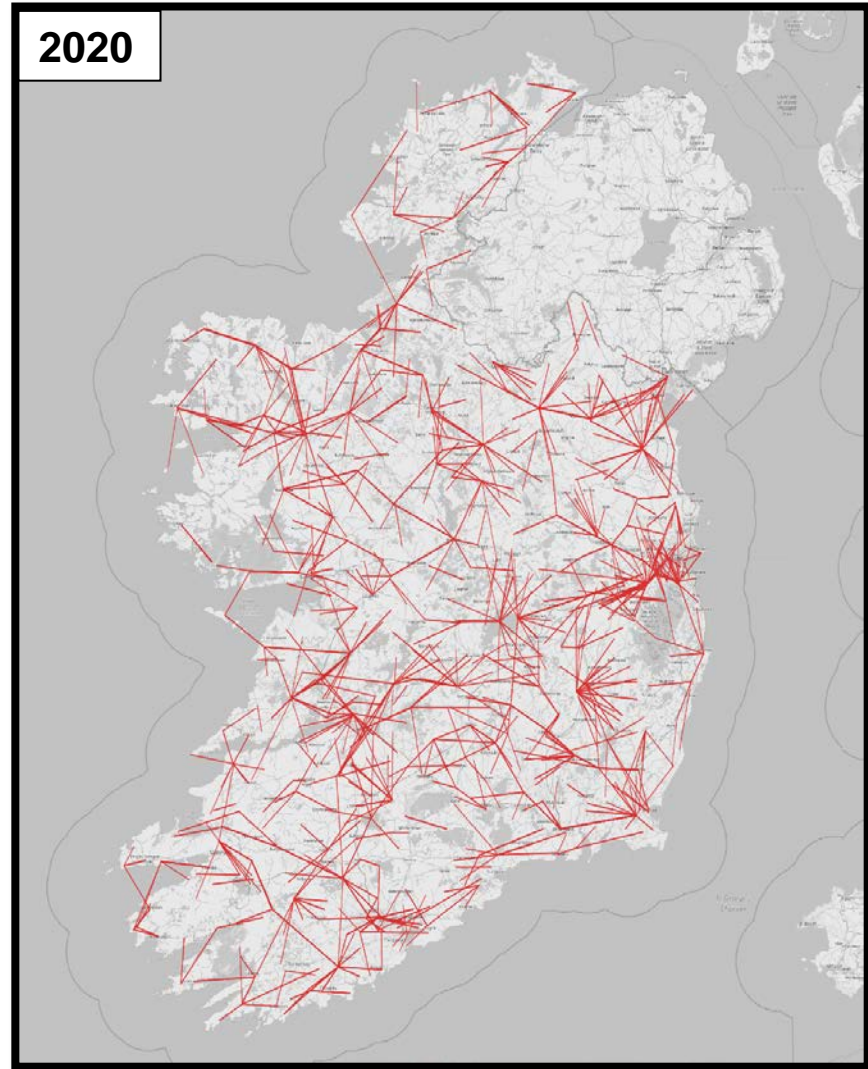
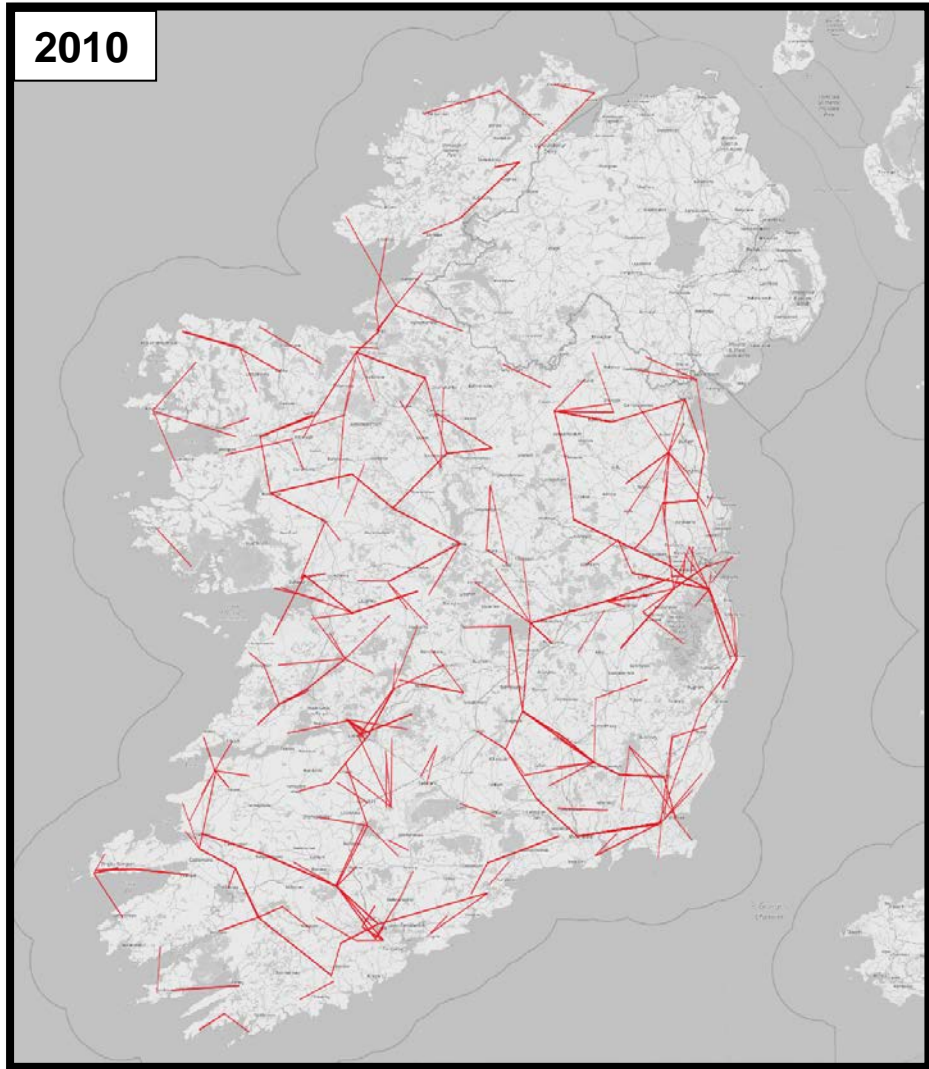
7 GHz Nationwide, 2010 and 2020



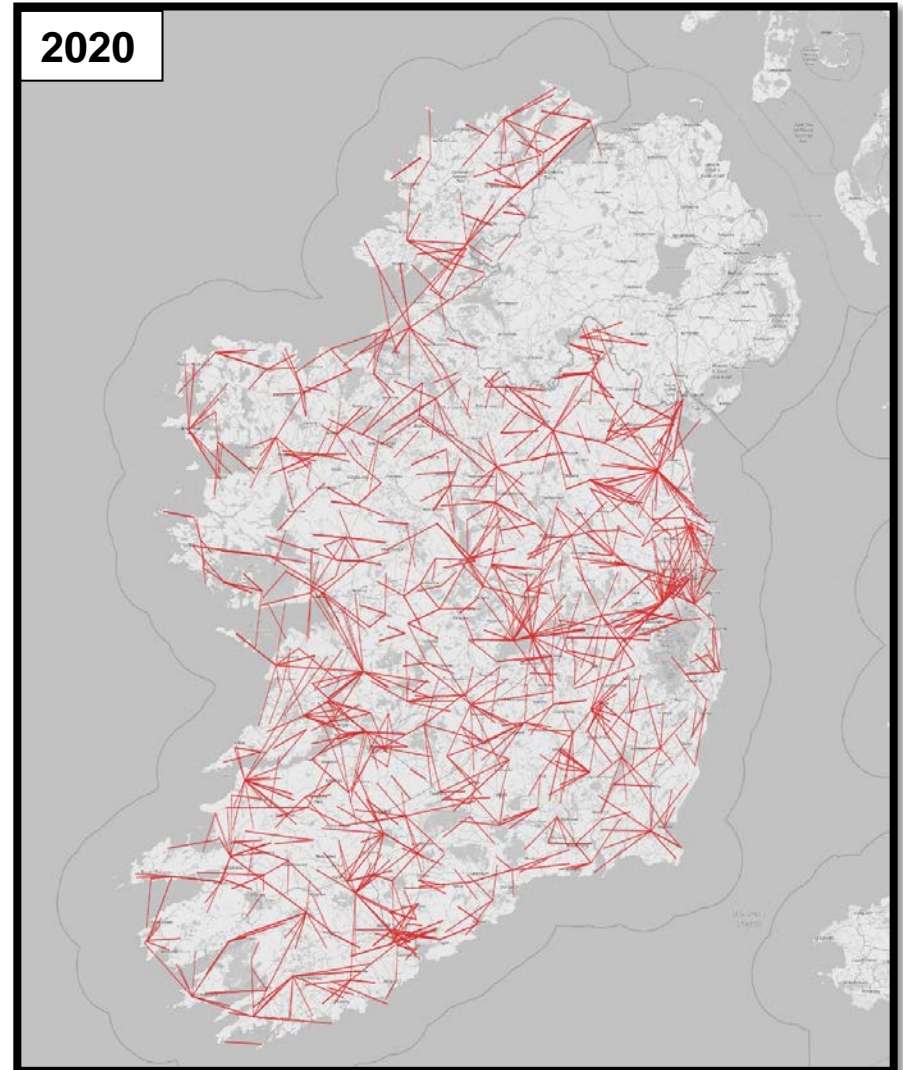
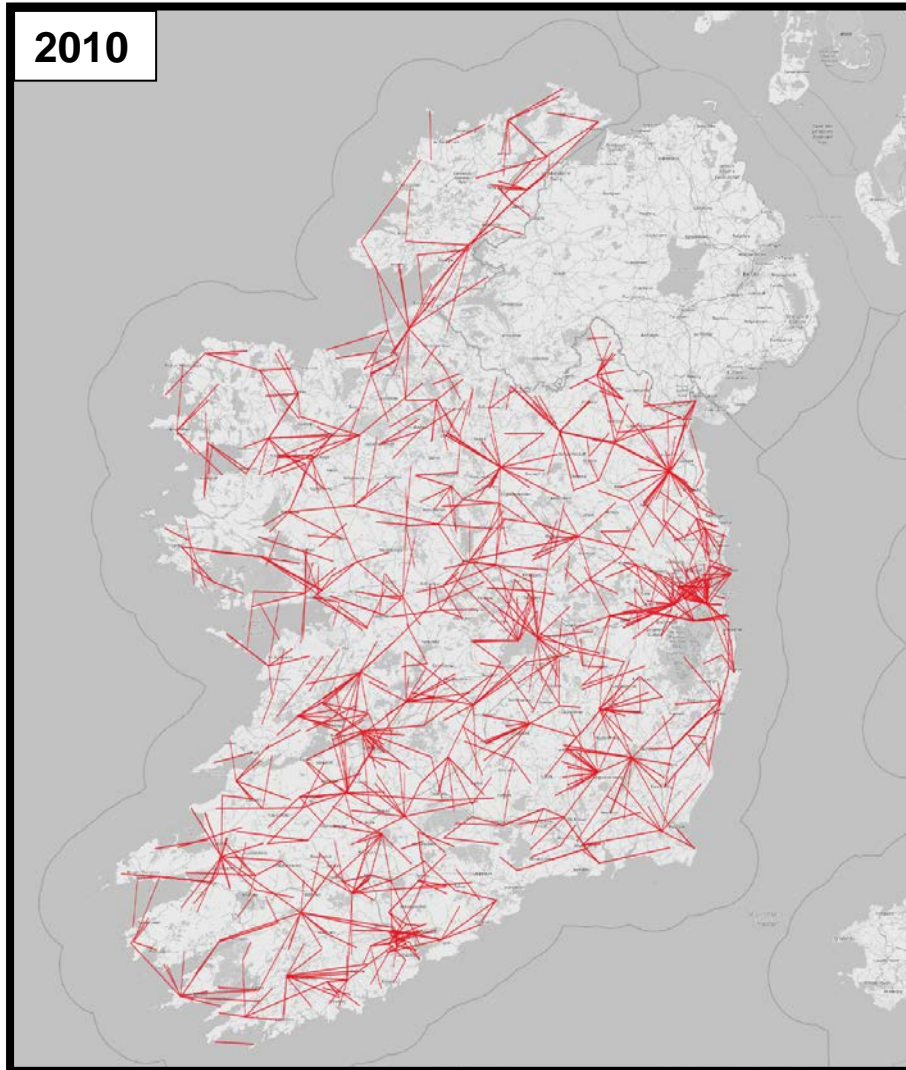
8 GHz Nationwide, 2010 and 2020



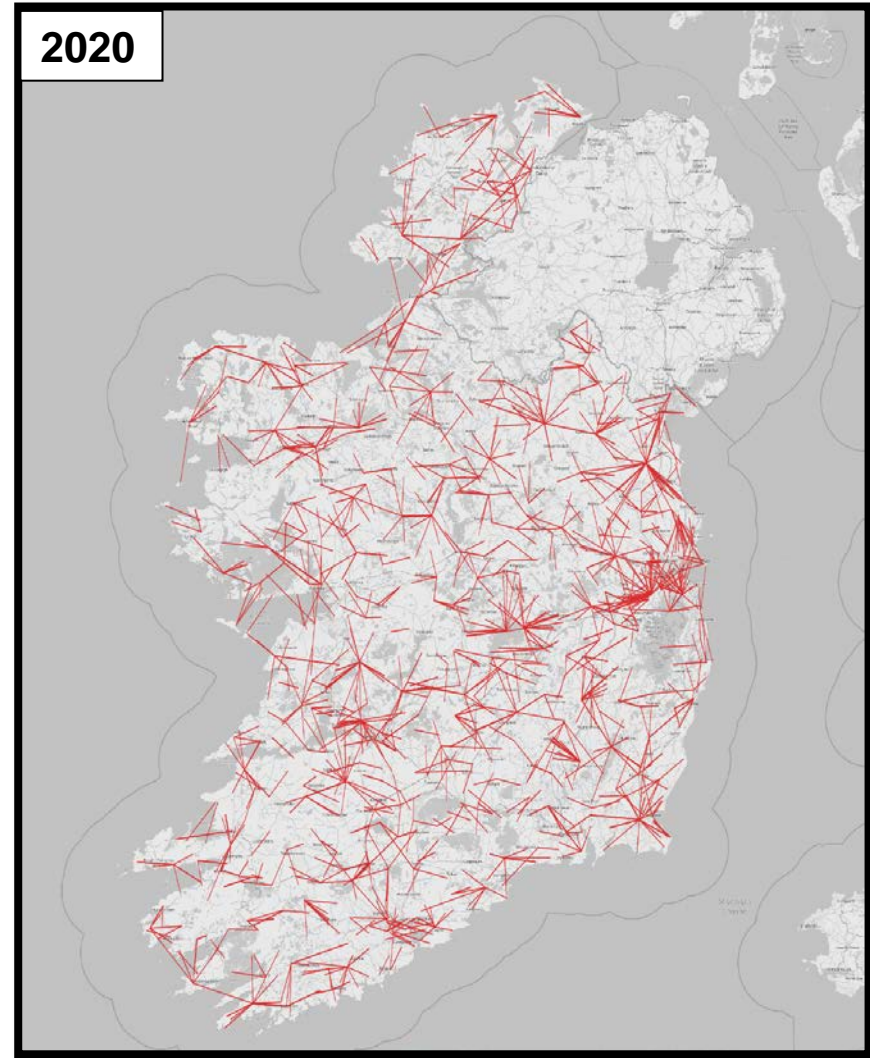
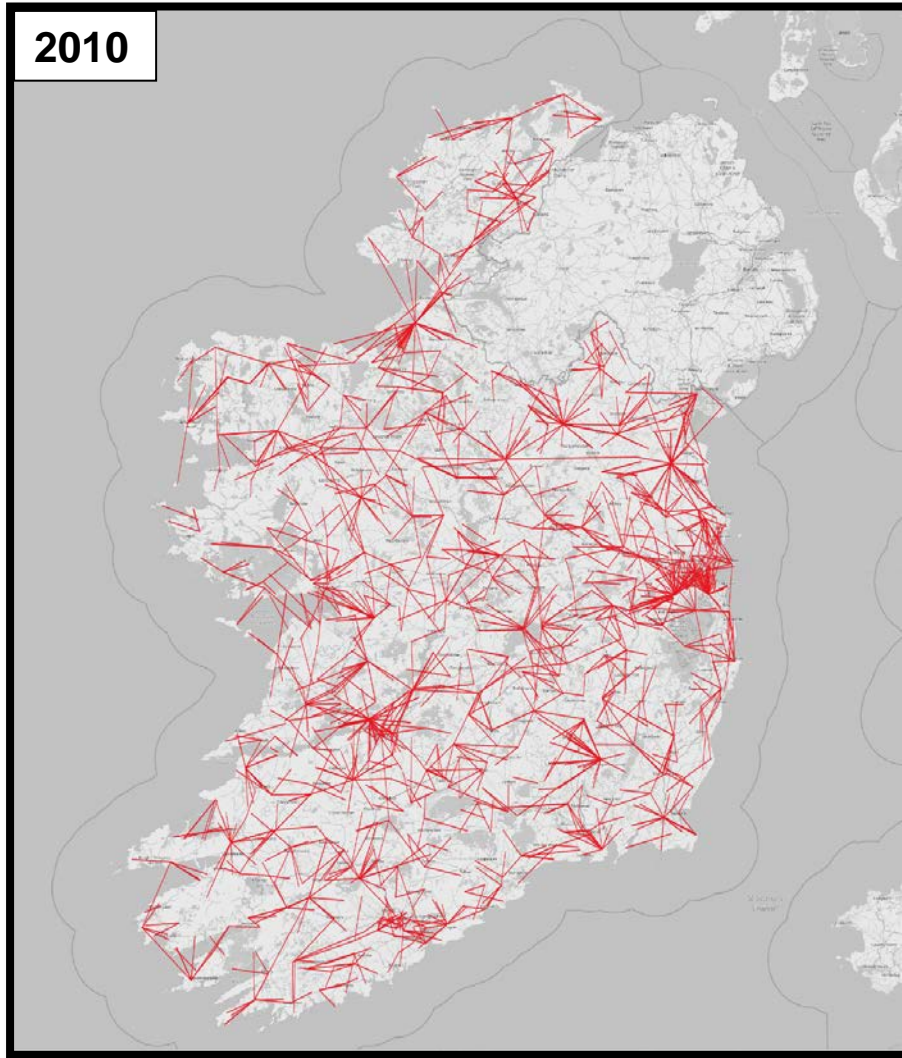
11 GHz Nationwide, 2010 and 2020



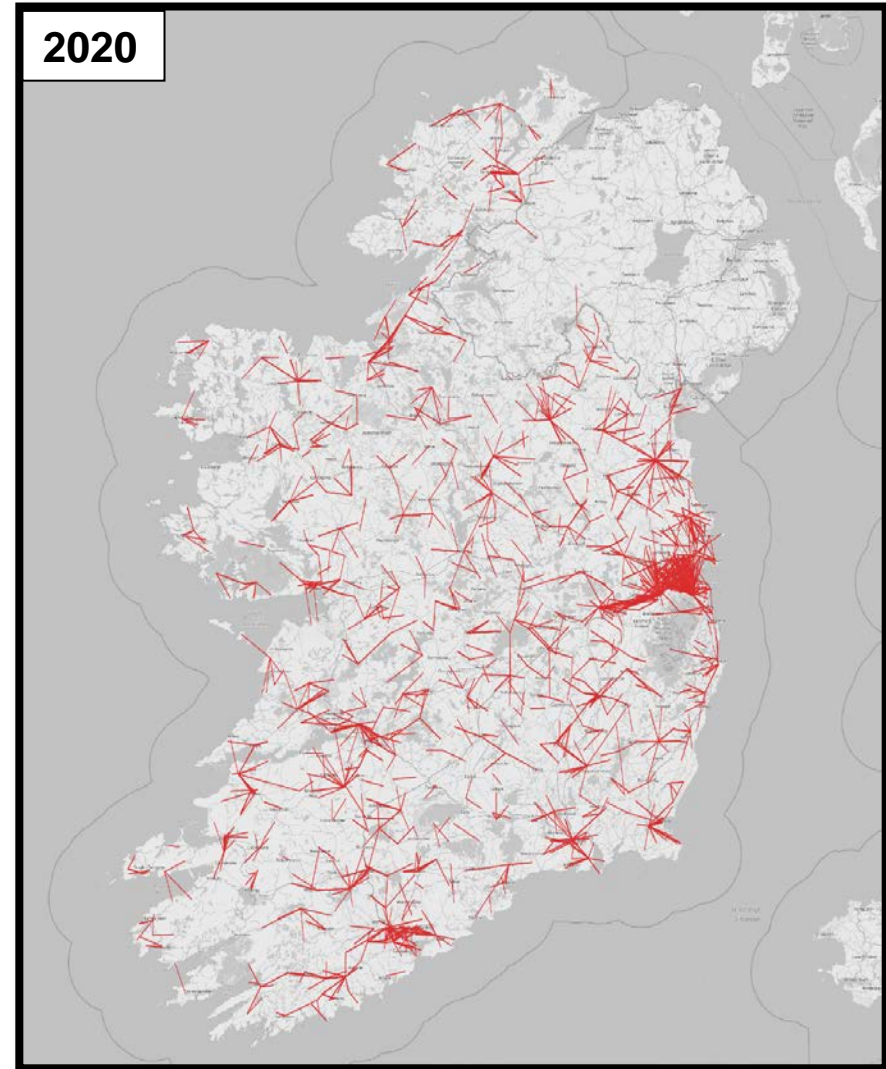
13 GHz Nationwide, 2010 and 2020



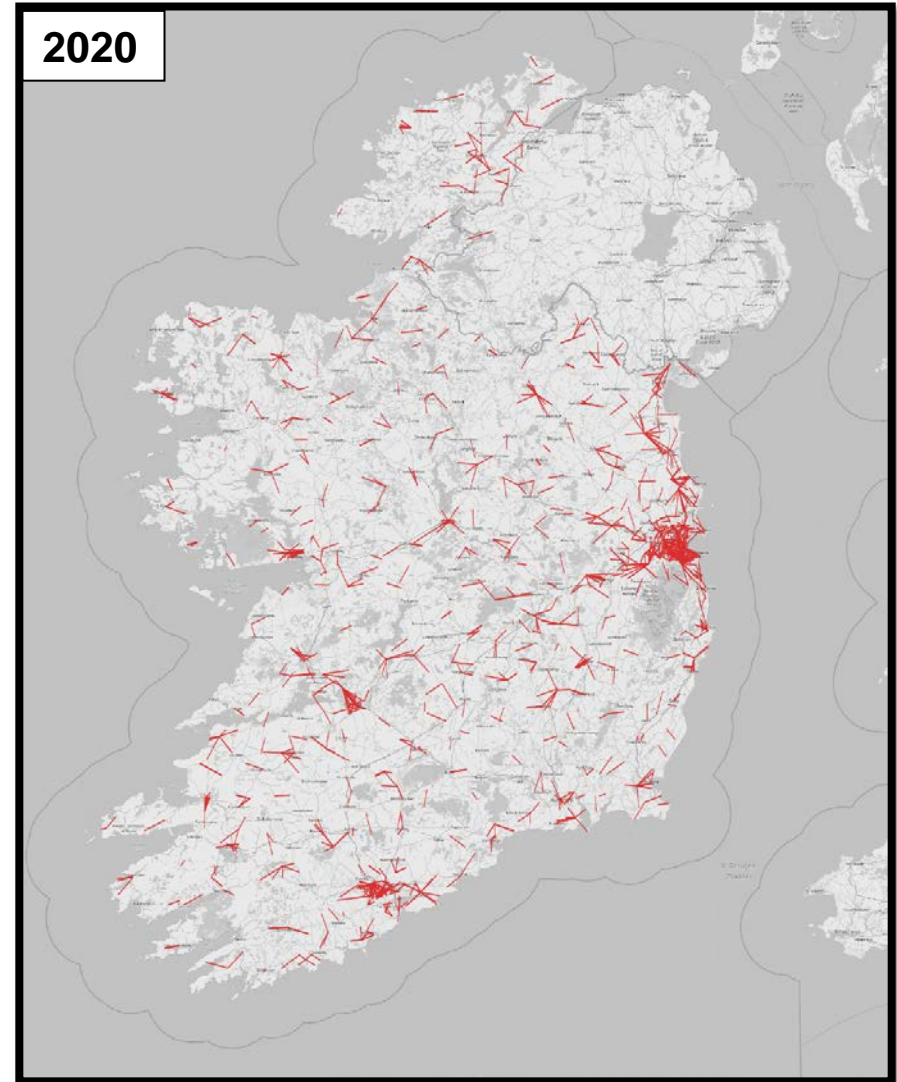
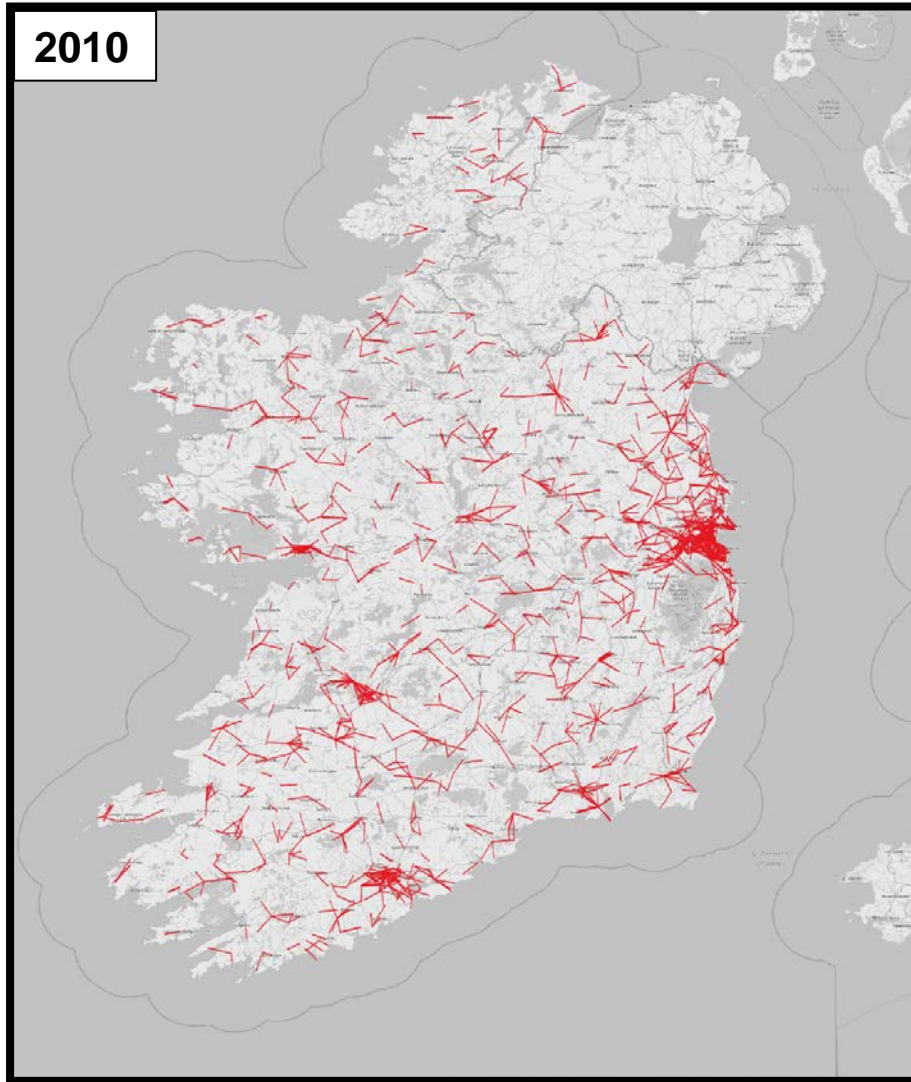
15 GHz Nationwide, 2010 and 2020



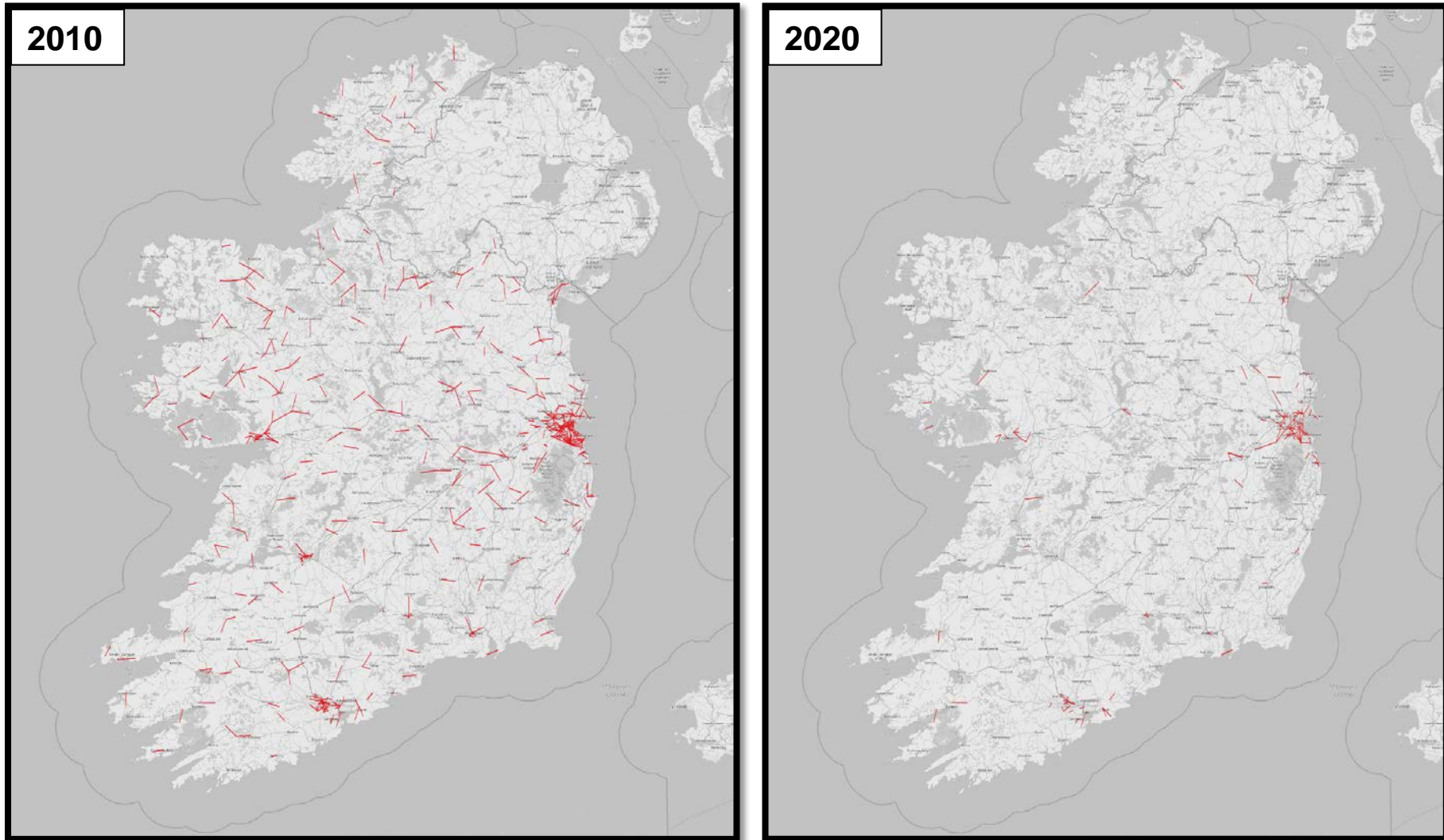
18 GHz Nationwide, 2010 and 2020



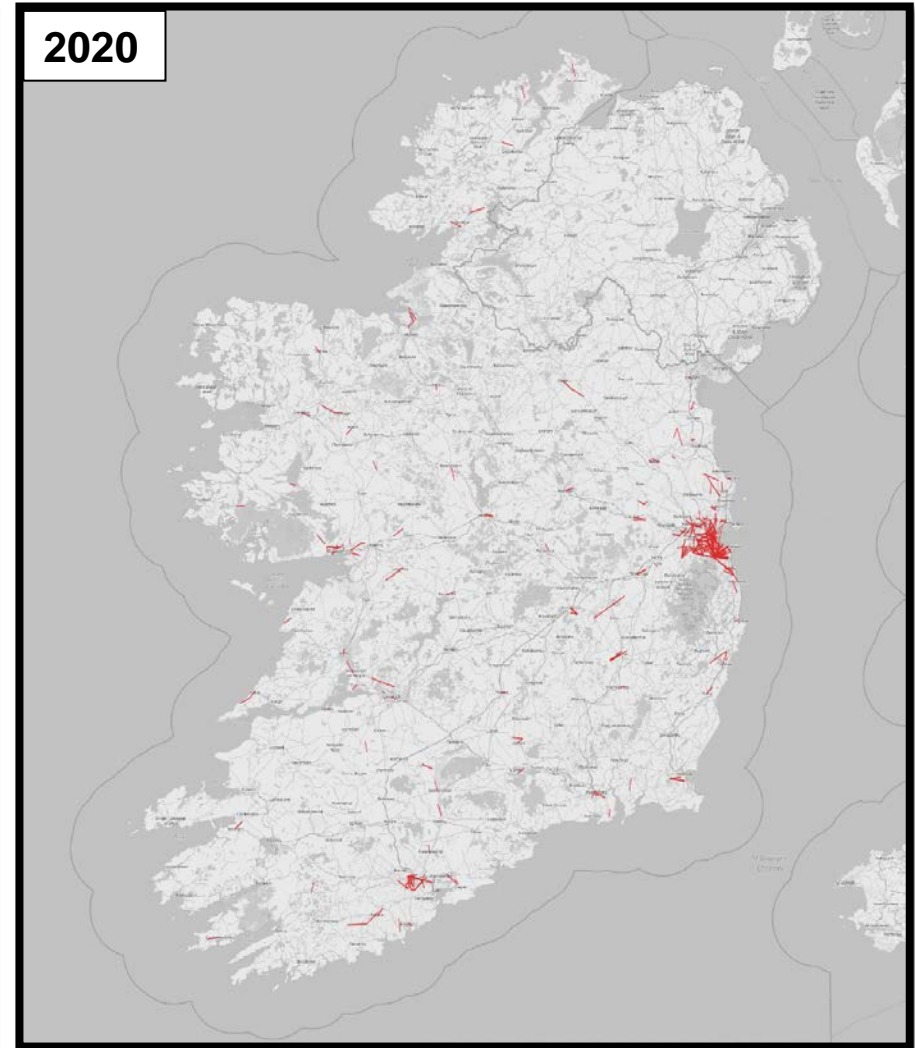
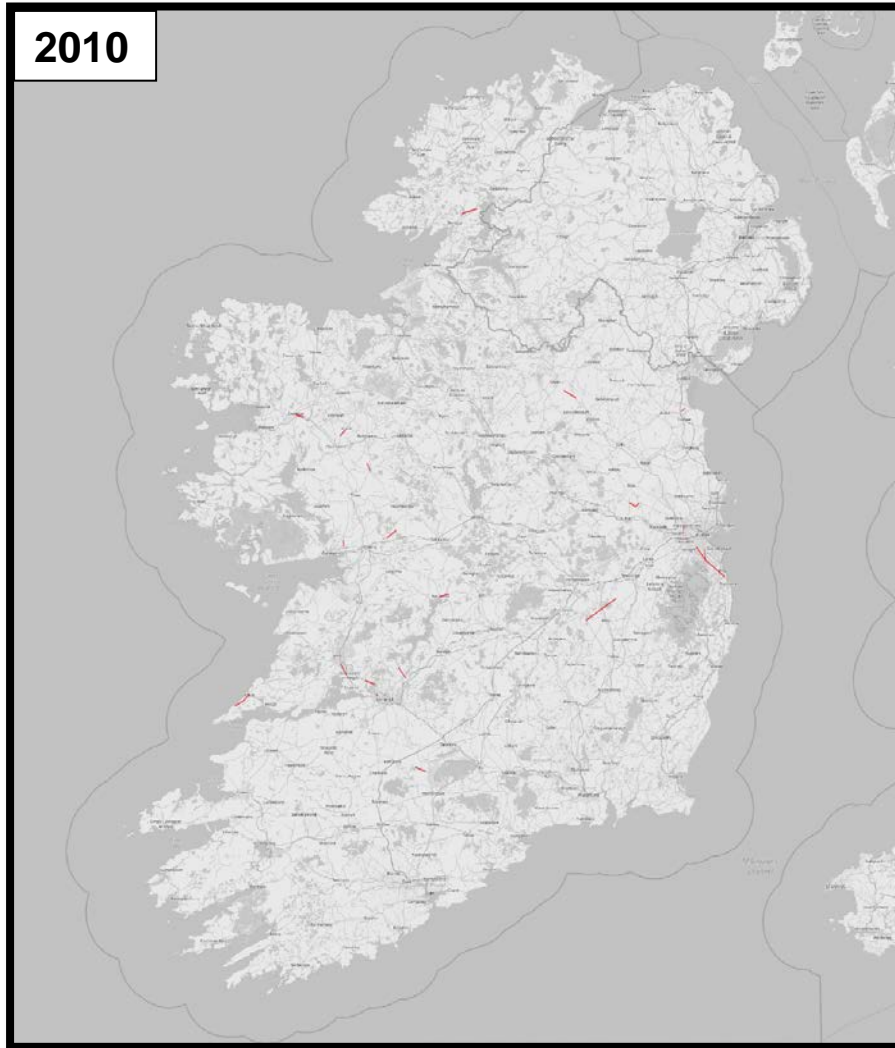
23 GHz Nationwide, 2010 and 2020



26 GHz Nationwide, 2010 and 2020



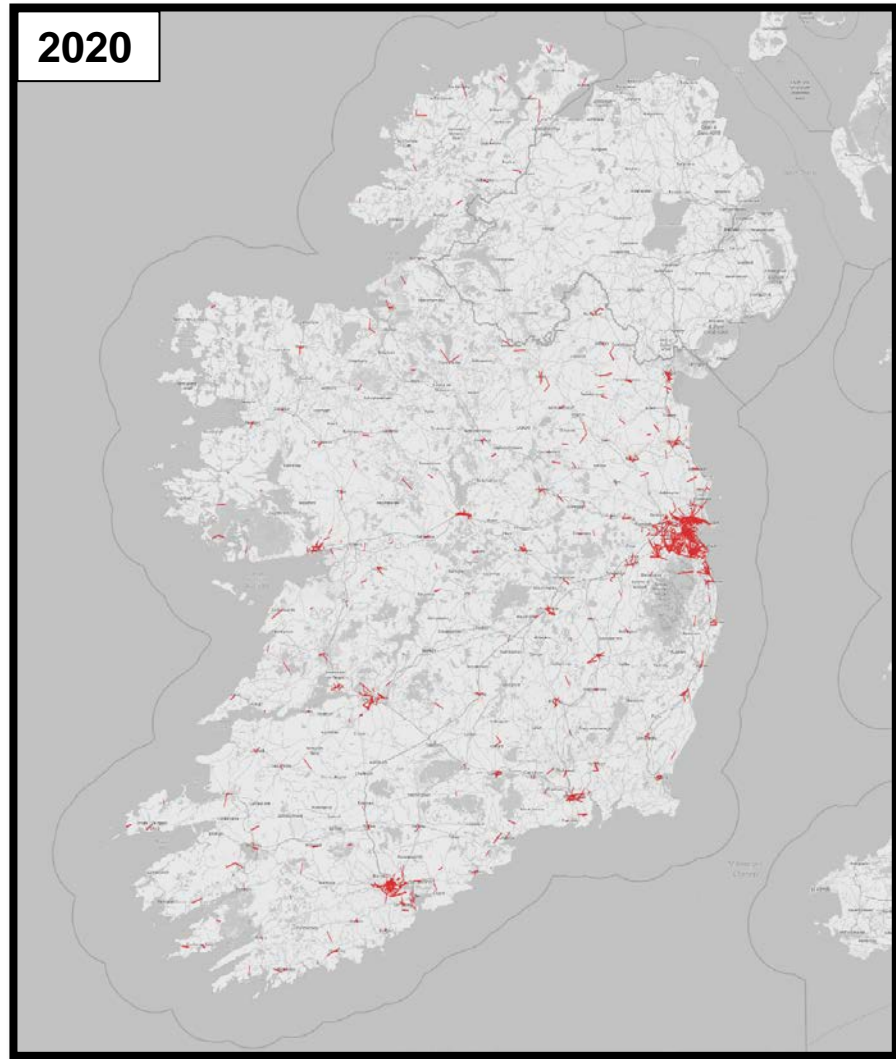
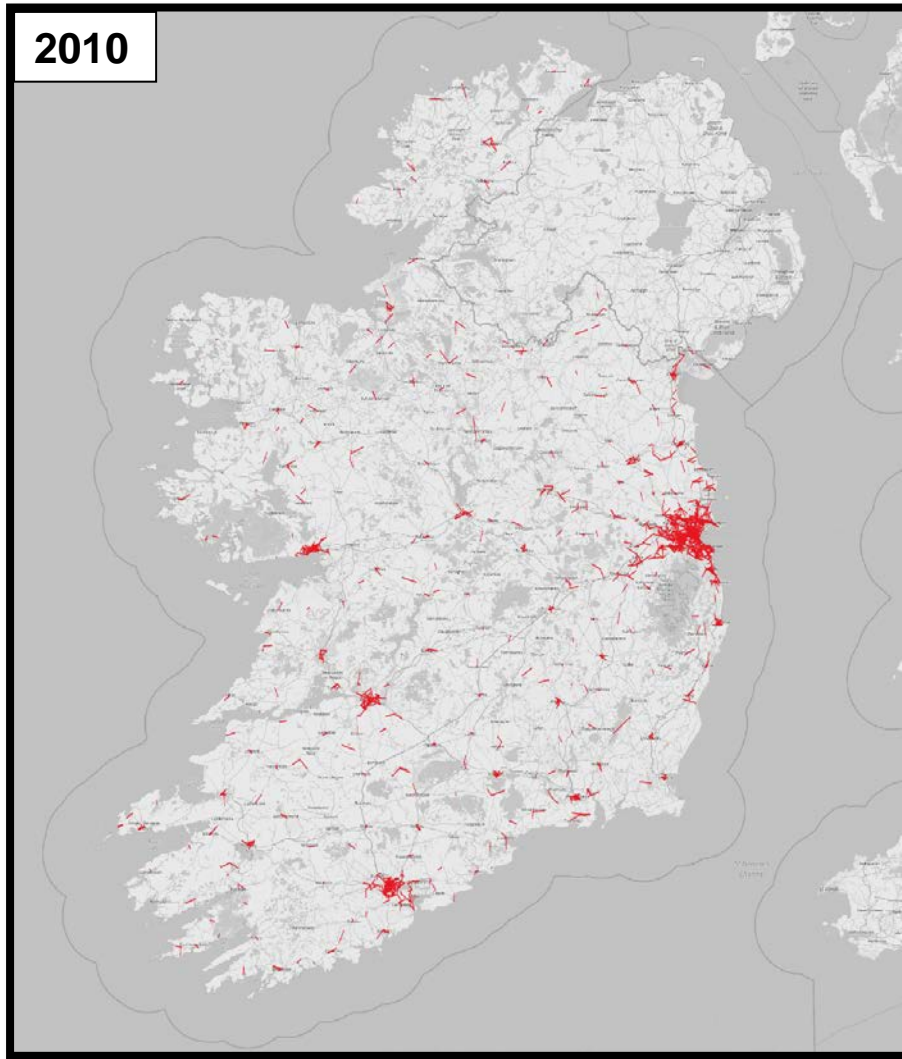
28 GHz Nationwide, 2010 and 2020



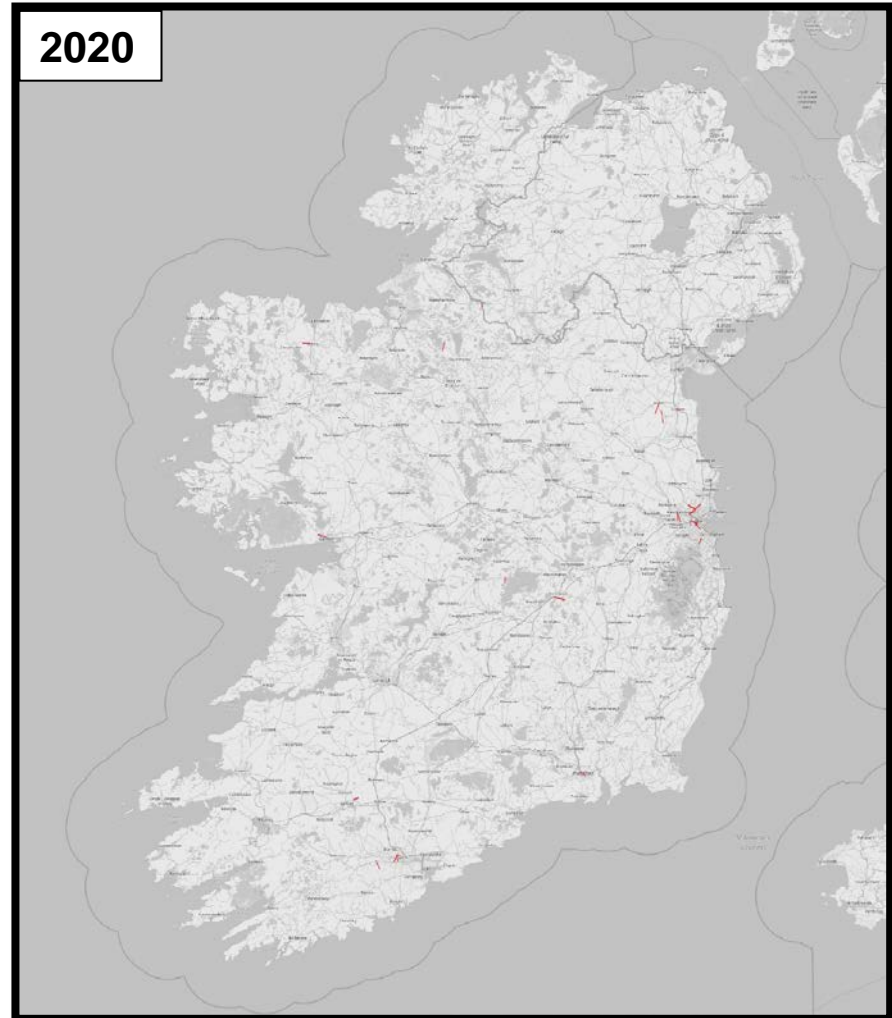
31 GHz Nationwide, 2010 and 2020



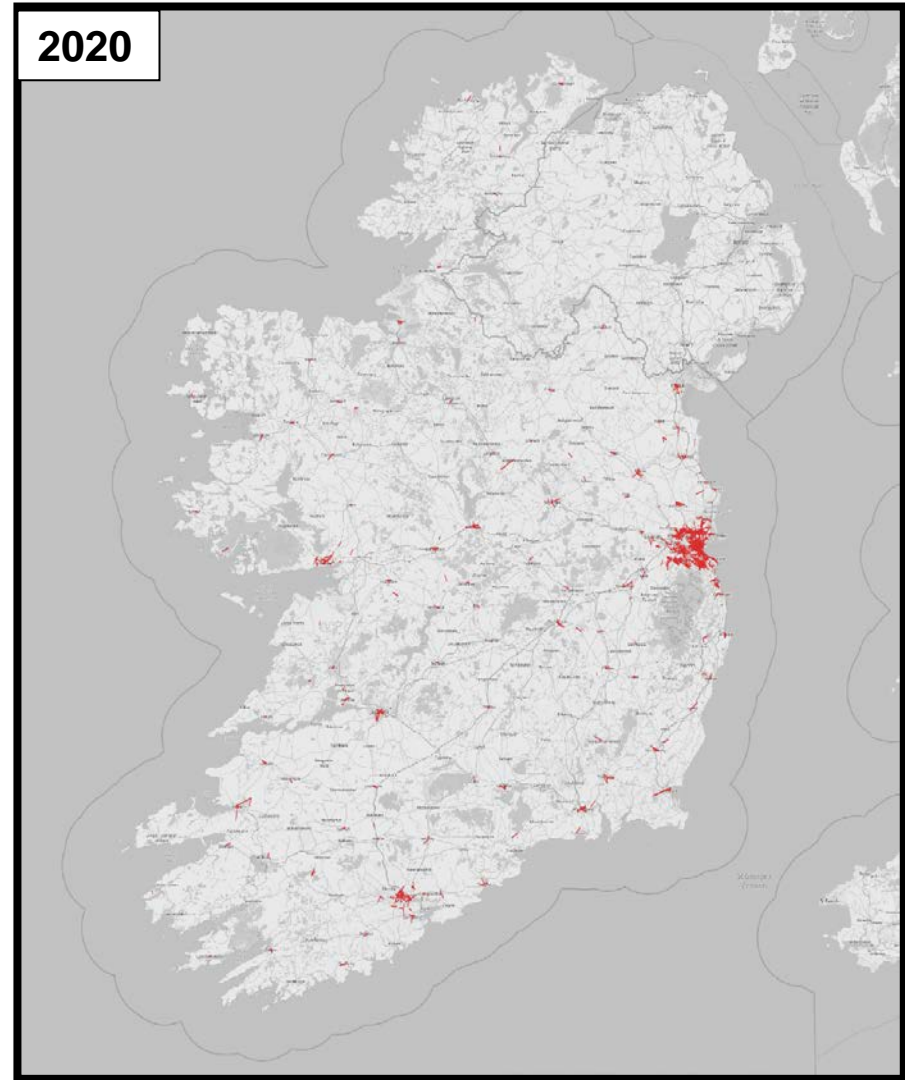
38 GHz Nationwide, 2010 and 2020



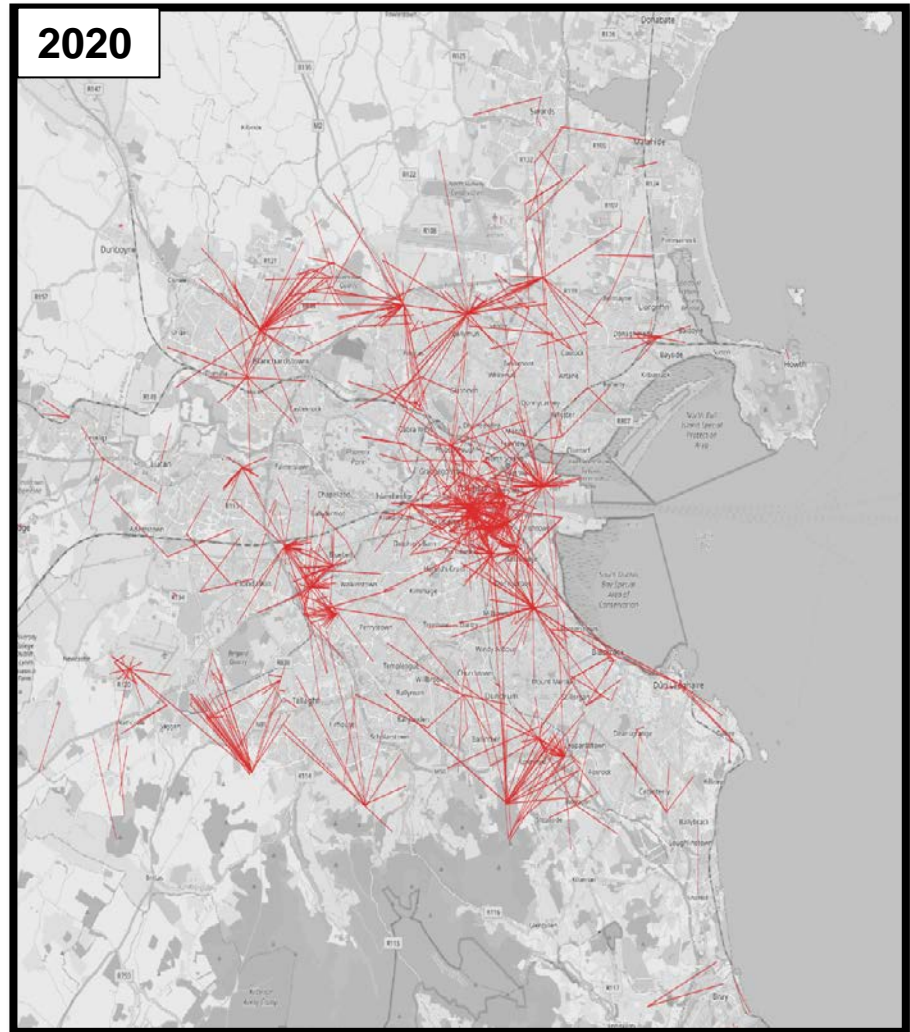
42 GHz Nationwide, 2010 and 2020



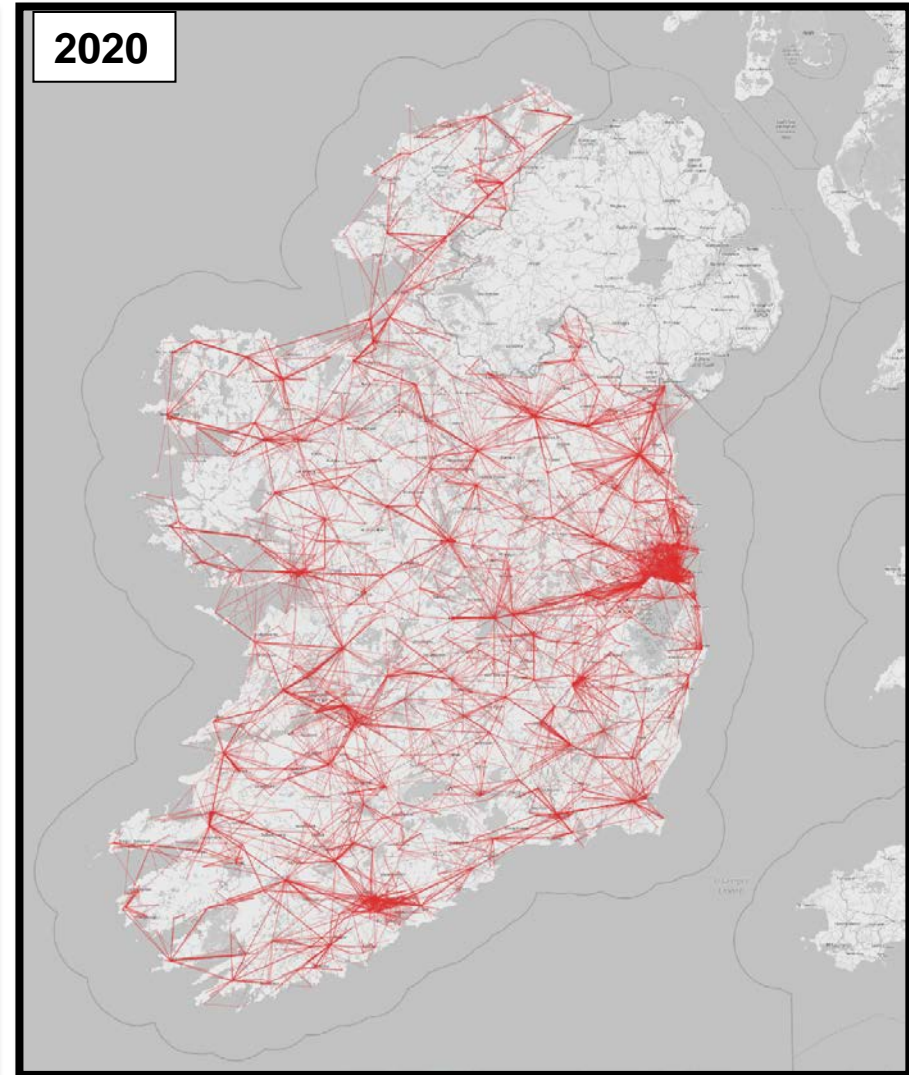
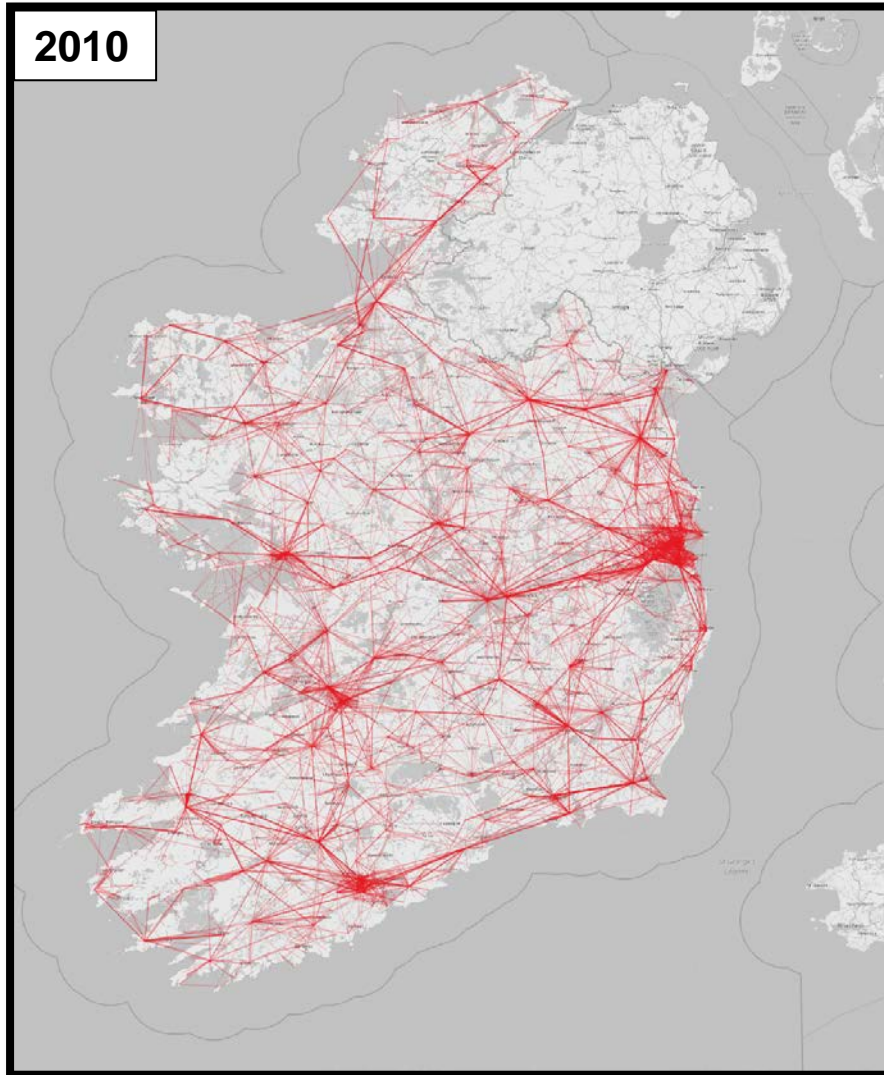
80 GHz Nationwide, 2010 and 2020



80 GHz Dublin, 2010 and 2020



All Bands, 2010 and 2020



Annex 4: Legal Framework and Statutory Objectives

- A 1.1 The Communications Regulation Act 2002 (as amended by the Communications Regulation (Amendment) Act 2007) (the “2002 Act”), the EU Common Regulatory Framework (including the Framework and Authorisation Directives¹³⁹ as transposed into Irish law by the corresponding Framework and Authorisation Regulations¹⁴⁰), and the Wireless Telegraphy Acts 1926 to 2009¹⁴¹ set out, amongst other things, ComReg’s functions and objectives that are relevant to the management of the radio frequency spectrum in Ireland and to this preliminary consultation document.
- A 1.2 This annex is intended as a general guide as to ComReg’s role in this area, and not as a definitive or exhaustive legal exposition of that role. Further, this annex restricts itself to consideration of those functions, objectives powers, and duties of ComReg that appear most relevant to the matters at hand and generally excludes those not considered relevant (for example, in relation to postal services, premium rate services or market analysis). For the avoidance of doubt, however, the inclusion of particular material in this annex does not necessarily mean that ComReg considers same to be of specific relevance to the matters at hand.
- A 1.3 All references in this annex to enactments are to the enactment as amended at the date hereof, unless the context otherwise requires.

New European Electronic Communications Code

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

¹³⁹ 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”).

¹⁴⁰ 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.

¹⁴¹ The Wireless Telegraphy Acts 1926 to 1988 and Sections 181 (1) to (7) and (9) and Section 182 of the Broadcasting Act 2009.

A 1.5 The EECC replaces the EU Common Regulatory Framework adopted in 2002 (and amended in 2009). With some limited exceptions (see Article 124 of the EECC), Member States have until 21 December 2020 to transpose the EECC into national law.¹⁴² Until then, the existing EU Common Regulatory Framework will continue to apply. However, ComReg has taken account of the EECC in this preliminary consultation.

A1.1 Primary Functions and Objectives and Regulatory Principles under the 2002 Act and Common Regulatory Framework

A 1.6 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. Its 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 Act¹⁴³;
- promote competition¹⁴⁴;
- contribute to the development of the internal market¹⁴⁵;
- promote the interests of users within the Community¹⁴⁶; and
- unless otherwise provided for in Regulation 17 of the Framework Regulations, take the utmost account of the desirability of technological

¹⁴² With the exception of Articles 53(2), (3) and (4), and Article 54 (see Article 124).

¹⁴³ Section 12(1)(b) of the 2002 Act. Article 8 of the Framework Directive identifies “*encouraging efficient use and ensuring the effective management of radio frequencies (and numbering resources)*” under the broader objective regarding the promotion of competition.

¹⁴⁴ Section 12 (1)(a)(i) of the 2002 Act.

¹⁴⁵ Section 12 (1)(a)(ii) of the 2002 Act.

¹⁴⁶ Section 12(1)(a)(iii) of the 2002 Act.

neutrality in complying with the requirements of the Specific Regulations¹⁴⁷ in particular those designed to ensure effective competition.¹⁴⁸

A1.1.1 Efficient management and use of the radio frequency spectrum

Framework Regulations

A 1.7 Regulation 17 of the Framework Regulations governs the management of radio frequencies for 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 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, 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 the EU.

A 1.8 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 1.9 Regulation 17(3) provides that, notwithstanding Regulation 17(2), ComReg

¹⁴⁷ 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).

¹⁴⁸ Regulation 16(1)(a) of the Framework Regulations.

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
- 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).

A 1.10 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 1.11 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 1.12 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 1.13 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 1.14 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 1.15 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 1.16 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 1.17 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 1.18 Regulation 9(2) of the Authorisation Regulations provides that ComReg may grant individual rights of use for radio frequencies by way of a licence where it considers that one or more of the following criteria are applicable:
- it is necessary to avoid harmful interference;
 - it is necessary to ensure technical quality of service;
 - it is necessary to safeguard the efficient use of spectrum; or

- it is necessary to fulfil other objectives of general interest as defined by or on behalf of the Government or a Minister of the Government in conformity with EU law.

A 1.19 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.

A 1.20 Regulation 9(7) also provides that:

- where individual rights of use for radio frequencies are granted for a period of 10 years or more and such rights may not be transferred or leased between undertakings in accordance with Regulation 19 of the Framework Regulations, ComReg must ensure that criteria set out in Regulation 9(2) apply for the duration of the rights of use, in particular upon a justified request from the holder of the right.
- where ComReg determines that the criteria referred to in Regulation 9(2) are no longer applicable to a right of use for radio frequencies, ComReg must, after a reasonable period and having notified the holder of the individual rights of use, change the individual rights of use into a general authorisation or must ensure that the individual rights of use are made transferable or leasable between undertakings in accordance with Regulation 19 of the Framework Regulations.

Publication of procedures

A 1.21 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 1.22 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 1.23 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 1.24 Regulation 10(1) of the Authorisation Regulations provides that, notwithstanding Section 5 of the Wireless Telegraphy Act, 1926, but subject to any regulations under Section 6 of that Act, ComReg may only attach those conditions listed in Part B of the Schedule to the Authorisation Regulations. Part B lists the following conditions which may be attached to rights of use:

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

A 1.25 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 1.26 Regulation 11(1) of the Authorisation Regulations provides that, where ComReg considers that the number of rights of use to be granted for radio frequencies should be limited it must, without prejudice to Sections 13 and 37 of the 2002 Act:

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

A 1.27 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 1.28 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 1.29 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 1.30 ComReg is required to ensure that any such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and take into account the objectives of ComReg as set out in Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations.

Amendment of rights and obligations

A 1.31 Regulation 15 of the Authorisation Regulations permits ComReg to amend rights and conditions concerning rights of use, provided that any such amendments may only be made in objectively justified cases and in a proportionate manner, following the process set down in Regulation 15(4).

Other Relevant Legislation and Policy Instruments

Wireless Telegraphy Act, 1926 (the “1926 Act”)

- A 1.32 Under Section 5(1) of the 1926 Act, ComReg may, subject to that Act, and on payment of the prescribed fees (if any), grant to any person a licence to keep and have possession of apparatus for wireless telegraphy in any specified place in the State.
- A 1.33 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 1.34 Section 5(3) also provides that, where it appears appropriate to ComReg, it may, in the interests of the efficient and orderly use of wireless telegraphy, limit the number of licences for any particular class or classes of apparatus for wireless telegraphy granted under Section 5.
- A 1.35 Section 6 provides that ComReg may make regulations prescribing in relation to all licences granted by it under Section 5, or any particular class or classes of such licences, all or any of the following matters:
- the form of such licences;
 - the period during which such licences continue in force;
 - the manner in which, the terms on which, and the period or periods for which such licences may be renewed;
 - the circumstances in which or the terms under which such licences are granted;
 - the circumstances and manner in which such licences may be suspended or revoked by ComReg;
 - the terms and conditions to be observed by the holders of such licences and subject to which such licences are deemed to be granted;
 - the fees to be paid on the application, grant or renewal of such licences or classes of such licences, subject to such exceptions as ComReg may prescribe, and the time and manner at and in which such fees are to be paid; and
 - matters which such licences do not entitle or authorise the holder to do.

A 1.36 Section 6(2) provides that Regulations made by ComReg under Regulation 6 may authorise and provide for the granting of a licence under Section 5 subject to special terms, conditions, and restrictions to persons who satisfy it that they require the licences solely for the purpose of conducting experiments in wireless telegraphy.

A 1.37 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 Act 2009 (the “2009 Act”)

A 1.38 Section 132 of the 2009 Act relates to the duties of ComReg in respect of the licensing of spectrum for use in establishing digital terrestrial television multiplexes and places an obligation on ComReg to issue:

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

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

A 1.39 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 1.40 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 1.41 Among other things, Article 5 of the RSPP, entitled “Competition”, provides:

A 1.42 *“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.*

A 1.43 *They shall also take into account competition issues when granting rights of use of spectrum to users of private electronic communication networks.*

A 1.44 *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 1.45 *(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;*

A 1.46 *(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;*

A 1.47 *(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;*

A 1.48 *(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;*

- A 1.49 *(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.*
- A 1.50 *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.*
- A 1.51 *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.”*

A1.1.7 Policy Directions¹⁴⁹

- A 1.52 Section 12(4) of the 2002 Act provides that, in carrying out its functions, ComReg must have appropriate regard to policy statements, published by or on behalf of the Government or a Minister of the Government and notified to the Commission, in relation to the economic and social development of the State. Section 13(1) of the 2002 Act requires ComReg to comply with any policy direction given to ComReg by the Minister for Communications, Energy and Natural Resources (“the Minister”) as he or she considers appropriate, in the interests of the proper and effective regulation of the electronic communications market, the management of the radio frequency spectrum in the State and the formulation of policy applicable to such proper and effective regulation and management, to be followed by ComReg in the exercise of its functions. Section 10(1)(b) of the 2002 Act also requires ComReg, in managing the radio frequency spectrum, to do so in accordance with a direction of the Minister under section 13 of the 2002 Act, while Section 12(1)(b) requires ComReg to ensure the efficient management and use of the radio frequency spectrum in accordance with a direction under Section 13.
- A 1.53 The Policy Directions which are most relevant in this regard include the following:

Policy Direction No.3 on Broadband Electronic Communication

¹⁴⁹ 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

Networks

A 1.54 ComReg shall in the exercise of its functions, take into account the national objective regarding broadband rollout, viz, the Government wishes to ensure the widespread availability of open-access, affordable, always-on broadband infrastructure and services for businesses and citizens on a balanced regional basis within three years, on the basis of utilisation of a range of existing and emerging technologies and broadband speeds appropriate to specific categories of service and customers.

Policy Direction No.4 on Industry Sustainability

A 1.55 ComReg shall ensure that in making regulatory decisions in relation to the electronic communications market, it takes account of the state of the industry and in particular the industry's position in the business cycle and the impact of such decisions on the sustainability of the business of undertakings affected.

Policy Direction No.5 on Regulation only where necessary

A 1.56 Where ComReg has discretion as to whether to impose regulatory obligations, it shall, before deciding to impose such regulatory obligations on undertakings, examine whether the objectives of such regulatory obligations would be better achieved by forbearance from imposition of such obligations and reliance instead on market forces.

Policy Direction No.6 on Regulatory Impact Assessment

A 1.57 ComReg, before deciding to impose regulatory obligations on undertakings in the market for electronic communications or for the purposes of the management and use of the radio frequency spectrum or for the purposes of the regulation of the postal sector, shall conduct a Regulatory Impact Assessment in accordance with European and International best practice and otherwise in accordance with measures that may be adopted under the Government's Better Regulation programme.

Policy Direction No.7 on Consistency with other Member States

A 1.58 ComReg shall ensure that, where market circumstances are equivalent, the regulatory obligations imposed on undertakings in the electronic communications market in Ireland should be equivalent to those imposed on undertakings in equivalent positions in other Member States of the European Community.

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

Spectrum

A 1.59 ComReg shall ensure that, in its management of the radio frequency spectrum, it takes account of the interests of all users of the radio frequency spectrum.

General Policy Direction No.1 on Competition (2004)

A 1.60 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

“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;

(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.”

A1.1.2 Promotion of Competition

A 1.61 Section 12(2)(a) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at the promotion of competition, including:

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

A 1.62 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 1.63 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.

A1.1.3 Contributing to the Development of the Internal Market

A 1.64 Section 12(2)(b) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at contributing to the development of the internal market, including:

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

A 1.65 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.

A1.1.4 Promotion of Interests of Users

A 1.66 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 1.67 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.

A1.1.5 Technological Neutrality

A 1.68 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.

A1.1.6 Regulatory Principles

A 1.69 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.

A1.1.7 BEREC

A 1.70 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.

A1.1.8 Other Obligations under the 2002 Act

A 1.71 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;¹⁵⁰
- have regard to international developments with regard to the radio frequency spectrum¹⁵¹; and
- take the utmost account of the desirability that the exercise of its functions aimed at achieving its radio frequency management objectives does not result in discrimination in favour of or against particular types of technology for the provision of ECS.¹⁵²

A1.2 Other Relevant Obligations under the Framework and Authorisation Regulations

Regulation 23 on security and integrity and Regulation 24 on implementation and enforcement of Regulation 23

A 1.72 Regulation 23 provides:

23. (1) Undertakings providing public communications networks or publicly available electronic communications services shall take appropriate technical and organisational measures to appropriately manage the risks posed to security of networks and services. In particular, measures shall be taken to prevent and minimise the impact of security incidents on users and interconnected networks.

(2) The technical and organisational measures referred to in paragraph (1) shall, having regard to the state of the art, ensure a level of security appropriate to the risk presented.

(3) Undertakings providing public communications networks shall take all appropriate steps to guarantee the integrity of their networks, thereby ensuring the continuity of supply of services provided over those networks.

(4) (a) An undertaking providing public communications networks or publicly available electronic communications services shall notify the

¹⁵⁰ Section 12(3) of the 2002 Act.

¹⁵¹ Section 12(5) of the 2002 Act.

¹⁵² Section 12(6) of the 2002 Act.

Regulator in the event of a breach of security or loss of integrity that has a significant impact on the operation of networks or services.

(b) Where the Regulator receives a notification under subparagraph (a), it shall inform the Minister of the said notification and, with the agreement of the Minister, it shall also, where appropriate, inform the national regulatory authorities in other Member States and ENISA.

(c) Where it is considered that it is in the public interest to do so the Regulator, with the agreement of the Minister, may inform the public in relation to the breach notified under subparagraph (a) or require the undertaking to inform the public accordingly.

(5) The Regulator shall annually submit a summary report to the Minister, the European Commission and EINSAs on the notifications received and the actions taken in accordance with paragraph (4).

(6) An undertaking that fails to comply with the requirements of paragraph (4)(a) or (c) commits an offence.

A 1.73 Regulation 24 provides:

24. (1) For the purpose of ensuring compliance with Regulation 23 (1), (2) and (3), the Regulator may issue directions to an undertaking providing public communications networks or publicly available electronic communications services, including directions in relation to time limits for implementation.

(2) The Regulator may require an undertaking providing public communications networks or publicly available electronic communications services to—

(a) provide information needed to assess the security or integrity of their services and networks, including documented security policies, and

(b) submit to a security audit to be carried out by a qualified independent body nominated by the Regulator and make the results of the audit available to the Regulator and the Minister. The cost of the audit is to be borne by the undertaking.

(3) An undertaking in receipt of a direction under paragraph (1) shall comply with the direction.

(4) An undertaking that fails to comply with a direction under paragraph (1) or a requirement under paragraph (2) commits an offence.