



An Coimisiún um  
**Rialáil Cumarsáide**  
Commission for  
**Communications Regulation**

# Spectrum Lease Determination

Lease of spectrum rights in the 3.6 GHz band from each of Dense Air Ireland Limited, Meteor Mobile Communications Limited and Vodafone Ireland Limited to Imagine Communications Ireland Limited

**Reference:** ComReg 21/46

**Date:** 10/05/2021

**Additional Information**

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# 1 Introduction and background

- 1.1 The procedures and guidelines for transfers and leases of spectrum rights of use for electronic communications services (“ECS”) in the 700 MHz<sup>1</sup>, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2.6 GHz and 3.6 GHz bands in Ireland are set out in Commission for Communications Regulation (“ComReg”) Document 14/11R.<sup>2</sup>
- 1.2 On 6 August 2020<sup>3</sup> and 21 September 2020<sup>4</sup>, Imagine Communications Ireland Limited (“Imagine”)<sup>5</sup> submitted to ComReg notifications regarding its proposal to lease spectrum rights in the 3.6 GHz band from each of Dense Air Ireland Limited (“Dense Air”), Meteor Mobile Communications Limited (“Eir”), and Vodafone Ireland Limited (“Vodafone”) (the “Previous Leases”) at 23 locations (“Previous Lease Areas”). At a high level, Imagine leased:
- 20 MHz of Dense Air’s 3.6 GHz Band spectrum at 5 locations (see Annexes 1 and 2 of Document 20/75);
  - 20 MHz of 3IRL’s 3.6 GHz Band spectrum at one location (see Annexes 3 and 4 of Document 20/89);
  - 20 MHz of Vodafone’s 3.6 GHz Band spectrum at three locations, 40 MHz at one further location; and 60 MHz at another further location (see Annexes 5 and 6 of Document 20/89); and
  - 20 MHz of Meteor’s 3.6 GHz Band spectrum rights at twelve locations (see Annexes 1 and 2 of Document 20/89).
- 1.3 The Previous Leases expired on 21 March (Dense Air) and 12 April (Eir, Vodafone and 3IRL).
- 1.4 Imagine has submitted to ComReg three separate further notifications to lease

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<sup>1</sup> Decision (EU) 2017/899 of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union requires EU Member States to allow the transfer or leasing of spectrum rights of use in the 700 MHz (694-790 MHz) band.

<sup>2</sup> ComReg Document 14/11R, ‘*Spectrum Transfer and Lease Framework in Ireland - Procedures and Guidelines, and Notification Form(s)*’, revised 12 October 2017.

<sup>3</sup> ComReg Document 20/75 – Spectrum Lease Notification: Proposed lease of spectrum rights in the 3.6 GHz band from Dense Air Limited to Imagine Communications Ireland Limited – published 19 August 2020.

<sup>4</sup> ComReg Document 20/89 – Spectrum Lease Notification: Proposed lease of spectrum rights in the 3.6 GHz band from each of Meteor Mobile Communications Limited, Three Ireland (Hutchison) Limited, and Vodafone Ireland Limited to Imagine Communications Ireland Limited. – published 29 September 2020.

<sup>5</sup> Imagine Communications Ireland Limited provides fixed wireless ECS.

spectrum rights in the 3.6 GHz band (collectively the “Proposed Leases”):

- On 18 March, Imagine submitted a notification to lease spectrum rights from Dense Air (“Proposed Dense Air Lease”). On 25 March, ComReg published Document 21/25<sup>6</sup>, being a notice on same;
- On 25 March, Imagine submitted a notification to lease spectrum rights from Eir (“Proposed Eir Lease”). On 26 March, ComReg published Document 21/27<sup>7</sup>, being a notice on same; and
- On 1 April, Imagine submitted a notification to lease spectrum rights from Vodafone (“Proposed Vodafone Lease”). On 9 April, ComReg published Document 21/36<sup>8</sup>, being a notice on same.

1.5 In these notices on the Proposed Leases, ComReg set out:

- by way of background and context, material regarding ComReg’s recent spectrum leases to date;
- relevant technical details of the lease notification and other relevant material; and
- the process by which interested parties could make submissions on the Proposed Leases and next steps.

1.6 ComReg does not repeat this background information and refers interested parties to Documents 21/25, 21/27 and 21/36.

1.7 ComReg did not receive any submissions in response to Document 21/25, 21/27 and 21/36.

1.8 This document sets out the written determination, having regard to the procedures and guidelines set out in Document 14/11R in particular.

## 1.1 Background – key aspects of framework for spectrum

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<sup>6</sup> ComReg Document 21/25 – “Spectrum Lease Notification: Proposed Lease of spectrum rights in the 3.6 GHz Band from Dense Air to Imagine Communications” - published 25 March 2021.

<sup>7</sup> ComReg Document 21/27 – “Spectrum Lease Notification: Proposed Lease of spectrum rights in the 3.6 GHz Band from Meteor Mobile Communications Limited to Imagine Communications” - published 26 March 2021.

<sup>8</sup> ComReg Document 21/36 – “Spectrum Lease Notification: Proposed Lease of spectrum rights in the 3.6 GHz Band from Vodafone Ireland Limited to Imagine Communications” - published 16 April 2021.

## leases in Ireland

- 1.9 In October 2017, ComReg published its response (“Document 17/82”)<sup>1</sup> to the public consultation (“Document 17/47”)<sup>2</sup> on its proposed framework for spectrum leases in Ireland (“Spectrum Lease Framework”). ComReg also updated its spectrum transfer procedures to reflect its decisions on the Spectrum Lease Framework (“Document 14/11R”).
- 1.10 While the draft Wireless Telegraphy (Transfer of Spectrum Rights of Use) (Amendment) Regulations have yet to be made, there is no impediment to the Proposed Leases in the 3.6 GHz Band.<sup>9</sup>
- 1.11 In addition to Document 14/11R and S.I. No. 532 of 2016, ComReg would highlight Regulation 19 of the Framework Regulations<sup>10</sup> and Regulation 9(11) of the Authorisation Regulations<sup>11</sup>.
- 1.12 Readers are also referred to Annex 2 of Document 20/122 for a general overview of the legislative framework relevant to ComReg’s spectrum management function.

## 1.2 Background - 3.6 GHz Band, 3.6 GHz Band Award and Transition

### 3.6 GHz Band

- 1.13 The 3.6 GHz Band comprises the frequency range 3 400 – 3 800 MHz and in Ireland a total of 350 MHz is assigned to licensees for the purposes of providing ECS.<sup>12</sup>
- 1.14 The 3.6 GHz Band is one of the three “Pioneer 5G candidate bands” in Europe<sup>13</sup> and its use is harmonised in Europe by way of European Commission decisions (EU) 2019/235 and 2008/411/EC.<sup>14</sup>
- 1.15 3.6 GHz Band rights of use in Ireland are service- and technology-neutral, and use

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<sup>9</sup> See, in particular, the Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016 (S.I. No. 532 of 2016) at <http://www.irishstatutebook.ie/eli/2016/si/532/made/en/print>

<sup>10</sup> European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011).

<sup>11</sup> European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. No. 335 of 2011)

<sup>12</sup> The remainder comprises a 10 MHz guard band (between 3 400-3 410 MHz) and spectrum used by State Services.

<sup>13</sup> [https://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion\\_5G.pdf](https://rspg-spectrum.eu/wp-content/uploads/2013/05/RPSG16-032-Opinion_5G.pdf)

<sup>14</sup> Commission Implementing Decision (EU) 2019/235 of 24 January 2019 on amending Decision 2008/411/EC as regards an update of relevant technical conditions applicable to the 3400-3800 MHz frequency band (notified under document C(2019) 262) (Text with EEA relevance.)



cases include mobile broadband, fixed wireless broadband and small cells.

### **3.6 GHz Band Award<sup>15</sup>**

- 1.16 On 22 May 2017, ComReg announced the results of its 3.6 GHz Band Award (“Award”) which resulted in five Winning Bidders, across over nine regions (four rural and five urban), together “Regions”) and assigned on a contiguous basis.<sup>16</sup>
- 1.17 The 9 licence regions are shown in Figure 2 in **Annex 1**.

### **3.6 GHz Band Transition**

- 1.18 Prior to the Award, the 3.6 GHz Band was used to provide fixed wireless broadband services (and phone services in some cases) to 21,665 existing customers, predominantly in rural areas. In those areas, the then existing operators may have been the only available provider of broadband services, such as to homes and schools.
- 1.19 In order to ensure continued services for those existing customers who were at risk of losing their service while Winning Bidders prepared for the deployment of their services (e.g. trials), ComReg developed a Transition licensing framework - which it consulted upon extensively with interested parties and implemented by way of the rules of the Award - which all participants to the Award agreed to be bound by.<sup>17</sup> Essentially, this Transition licensing framework allows existing operators to continue to provide services to their customers until such time that Winning Bidders were ready to roll-out commercial services.
- 1.20 Relevantly, as Imagine was both a Fixed Wireless Access Local Area licensee and a Winning Bidder in the Award, Imagine was eligible to apply for, and currently holds, a 3.6 GHz Band Transition Protected Licence (“TPL”)<sup>18</sup>, to facilitate the completion of its Transition Activities as provided for under Section 3.8 of the IM.
- 1.21 Further details on 3.6 GHz Band Transition activities is available on ComReg’s website.<sup>19</sup>

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<sup>15</sup> For more information, please see:

<https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6ghz-band-spectrum-award/>

<sup>16</sup> Full details of the results are set out in Document 17/38 and corresponding Media Release.

<sup>17</sup> These rules are contained in the 3.6 GHz Band Spectrum Award Information Memorandum (Document 16/71) (“IM”).

<sup>18</sup> See Section 2.6 of <https://www.comreg.ie/publication/3-6-ghz-band-spectrum-award-information-memorandum/>

<sup>19</sup> See: <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6-ghz-band-transition/>

## 1.3 Structure of document

1.22 The remainder of this document is structured as follows:

- **Chapter 2** sets out ComReg's assessment of the Proposed Leases and determination.
- **Annex 1** contains an analysis of Imagines' spectrum holdings.

## 2 Determination

2.1 This chapter outlines ComReg's determination and is structured as follows:

1. A brief description of the notifying parties and their spectrum holdings;
2. Imagine's existing 3.6 GHz Band spectrum holdings;
3. Proposed Leases;
4. Imagine's post-lease 3.6 GHz Band spectrum holdings; and
5. Assessment.

### 2.1 The Notifying Parties

#### 2.1.1 Business activities of the notifying parties

- 2.2 **Imagine** is the largest Wireless Internet Service Provider ("WISP") with circa 39,000 fixed broadband subscribers (2.6% market share by subscriptions) as at Q4 2020.<sup>20</sup> Imagine does not provide mobile telecommunications services.
- 2.3 **Vodafone** is a mobile network operator ("MNO") with circa 2.7 million mobile subscribers (37.5% market share by subscriptions). Vodafone also provides fixed line and mobile broadband services and has 291,000 fixed broadband subscribers (19.2% market share by subscriptions)<sup>21</sup>.
- 2.4 **Meteor** is a MNO and a wholly-owned subsidiary of Eircom Group which has circa 1.2 million mobile subscribers (16.7% market share by subscriptions). Eircom Group also provides fixed line and mobile broadband services and has circa 453,000 fixed broadband subscribers (29.9% market share by subscriptions)<sup>22</sup>.
- 2.5 **Dense Air** (previously Airspan Spectrum Holdings Ltd) is a wholesale provider of telecommunications solutions, in particular neutral-host small cells for 4G LTE and 5G networks. Dense Air provides what it refers to as "*network as a service*" on its own spectrum with optional managed services (including operational and technical support).<sup>23</sup> Dense Air is ultimately a subsidiary of Airspan Networks, a network

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<sup>20</sup> Quarterly Key Data Report, Q4 2020.

<sup>21</sup> Quarterly Key Data Report, Q4 2020

<sup>22</sup> Quarterly Key Data Report, Q4 2020

<sup>23</sup> See <https://denseair.net/our-solution/>.

densification solution provider with more than 1,000 customers in over 100 countries around the world<sup>24</sup>.

## 2.1.2 Existing overall spectrum holdings of the notifying parties

2.6 The existing spectrum holdings<sup>25</sup>, capable of use for the provision of public wireless ECS, of the notifying parties is shown in **Table 1**: Spectrum holdings of parties capable of use for the provision of public wireless ECS

Band	Vodafone	Meteor	Imagine	Dense Air
800 MHz	20 MHz	20 MHz	-	
900 MHz	20 MHz	20 MHz	-	
<b>Total sub-1 GHz</b>	<b>40 MHz</b>	<b>40 MHz</b>	-	
1800 MHz	50 MHz	30 MHz	-	
3.6 GHz	85 MHz in rural regions and 105 MHz in the cities	80 MHz in rural regions and 85 MHz in the cities	60 MHz in each of the rural regions	25 MHz in rural and 60 MHz in the cities
2.1 GHz FDD	30 MHz	30 MHz		
<b>Total supra-1 GHz</b>	<b>185 MHz</b>	<b>145 MHz</b>	<b>60 MHz</b>	<b>60 MHz</b>
<b>Total</b>	<b>225 MHz</b>	<b>185 MHz</b>	<b>60 MHz</b>	<b>60 MHz</b>

2.7 below.<sup>26</sup>

<sup>24</sup> For further information, please <https://www.airspan.com/about-airspan/>.

<sup>25</sup> The figures exclude leases or other temporary rights of use.

<sup>26</sup> This excludes temporary spectrum rights issued under ComReg's Covid-19 Temporary Spectrum Management Measures, TPL and Previous Leases.

**Table 1: Spectrum holdings of parties capable of use for the provision of public wireless ECS**

Band	Vodafone	Meteor	Imagine	Dense Air
800 MHz	20 MHz	20 MHz	-	
900 MHz	20 MHz	20 MHz	-	
<b>Total sub-1 GHz</b>	<b>40 MHz</b>	<b>40 MHz</b>	-	
1800 MHz	50 MHz	30 MHz	-	
3.6 GHz	85 MHz in rural regions and 105 MHz in the cities	80 MHz in rural regions and 85 MHz in the cities	60 MHz in each of the rural regions	25 MHz in rural and 60 MHz in the cities
2.1 GHz FDD	30 MHz	30 MHz		
<b>Total supra-1 GHz</b>	<b>185 MHz</b>	<b>145 MHz</b>	<b>60 MHz</b>	<b>60 MHz</b>
<b>Total<sup>27</sup></b>	<b>225 MHz</b>	<b>185 MHz</b>	<b>60 MHz</b>	<b>60 MHz</b>

## 2.2 Imagine's existing 3.6 GHz Band spectrum holdings

- 2.8 Imagine's existing 3.6 GHz Band spectrum holdings consist of 60 MHz in each (in the frequency range 3560 to 3620 MHz) in each of four rural licence regions (i.e. Borders, Midlands and West; South West; East and South East) held under its 3.6 GHz Band Liberalised Use Licence ("LU Licence").
- 2.9 Imagine also holds rights in various parts of the band in 134 Transition Service Areas ("TSAs") under its TPL.
- 2.10 These TSAs correspond to local service areas in which Imagine previously operated under the 3.6 GHz Band FWALA licensing scheme prior to the Award. At the start of Transition immediately after the Award, all TSAs had a 20 km radius boundary around a defined centre point. As Transition has progressed, the area of some TSAs has been reduced to reflect completion of Transition Activities which affect only part

<sup>27</sup> Note that these numbers are the maximum assigned to the licensee in any given region.

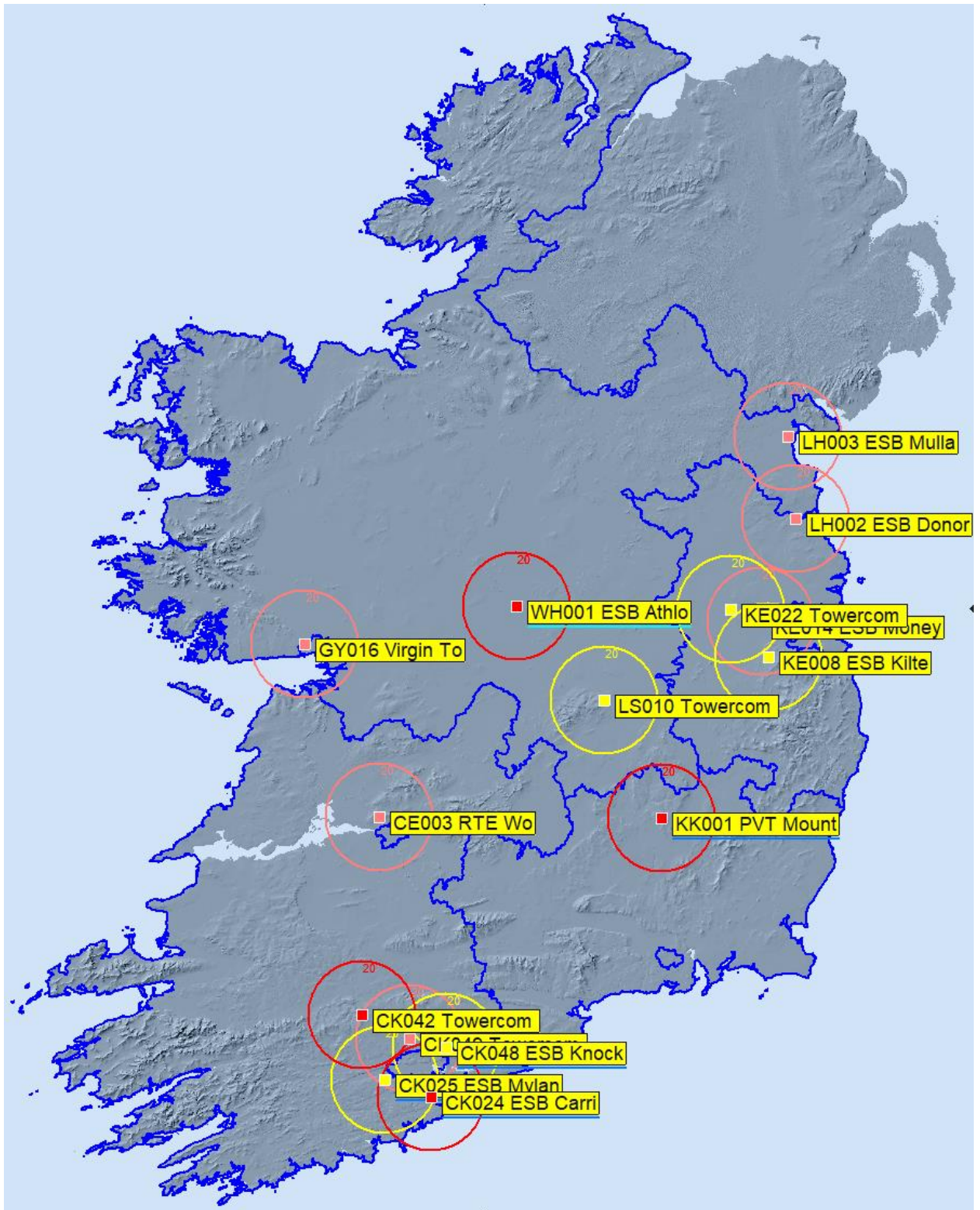
of a TSA and to facilitate ongoing Transition Activities in the remainder of the TSA

- 2.11 In addition to having a defined geographic area, TSAs are assigned frequency ranges which derive from the previous channel plan for 3.6 GHz Band FWALA licensing from before the Award, which included a number of paired and unpaired channels. In many cases, the frequency ranges of Imagine's TSAs have reduced as Transition has progressed.
- 2.12 Further details of Imagine's TPL holdings, including the locations of same, are set out in **Annex 1**.

## 2.3 The Proposed Leases

- 2.13 Details of the Proposed Leases are set out in Annexes 1 of Documents 21/25, 21/27 and 21/36 and readers are referred to same.
- 2.14 At a high level, the Proposed Leases entail Imagine leasing:
- 20 MHz of Meteor's spectrum (in the frequency range 3620 to 3640 MHz) at six locations;
  - 20 MHz from Dense Air (in the frequency range 3410 to 3430 MHz) at eight locations; and
  - 20 MHz of Vodafone's 3.6 GHz Band spectrum at two locations, 40 MHz at one further location; and 60 MHz at another further location (in the frequency range 3480 to 3540MHz).
- 2.15 Each location consists of an area of 20 km radius around an existing Imagine base station ("Proposed Lease Area" or "PLA"). The Proposed Lease Areas are shown at **Figure 1** below.
- 2.16 The Proposed Leases are for three months initially, followed by a further three-month period subject to the prior agreement by the relevant parties, and approval by ComReg. The following assessment has been conducted on the basis of a potential 6-month lease.
- 2.17 The Proposed Leases do not entail any amendments to the conditions of the 3.6 GHz Band Liberalised Use Licences of Dense Air, Vodafone or Meteor.

Figure 1: Map of Proposed Lease Areas



## 2.4 Imagine's 3.6 GHz Band spectrum holdings following the Proposed Leases

- 2.18 As the Previous Leases have expired, they do not form part of the assessment of the potential impacts of the Proposed Leases.
- 2.19 As noted above, the Proposed Leases would increase Imagine's 3.6 GHz Band spectrum holdings by 20MHz-60MHz in the 15 unique PLAs<sup>28</sup>, relative to Imagine's holdings absent the Proposed Leases.
- 2.20 It is not, however, a straightforward task to assess Imagine's current spectrum holdings in the PLAs because:
- most of the PLAs correspond directly to Imagine's TSAs (i.e. they are not concentric in most cases);
  - in many cases, PLAs are overlapped by multiple TSAs in a particular frequency range, but not necessarily across the entire area of the PLA;
  - TSAs in different frequency ranges often overlap different parts of PLAs; and
  - in the frequency range 3560 – 3620 MHz, where Imagine holds spectrum rights in the four rural Regions under its LU Licence, 9 PLAs<sup>29</sup> are partly overlapped by urban Regions where Imagine does not hold 3.6 GHz Band spectrum rights<sup>30</sup>.
- 2.21 Therefore, if a PLA is not entirely overlapped by one or more TSAs in a particular frequency range, the question arises as to whether the TSA frequency range should constitute part of Imagine's current spectrum holdings for that PLA and, in particular, where the geographic overlap may be relatively small (e.g. 20%).
- 2.22 Therefore, ComReg has assessed Imagine's current spectrum holdings in each quadrant<sup>31</sup> of each of the PLAs - rather than in the entirety of each PLA – which should provide sufficient granularity to capture the contributions of significant TSA overlaps within the PLAs. The average increase in Imagine's spectrum across all

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<sup>28</sup> ComReg notes 3 of the 18 PLA's overlap and there are therefore 15 unique PLA's.

<sup>29</sup> KE008, KE014, KE022, GY016, CE003, CK024, CK025, CK048, and CK049

<sup>30</sup> A detailed discussion of the issues and ComReg's approach, including examples of same, are detailed in the Annex.

<sup>31</sup> i.e. North East, South East, South West and North West Quadrants



site quadrants is 28%<sup>32</sup>.

2.23 As a result of Imagine's spectrum holdings under its TPL (which vary across different parts of the State), Imagine's post-lease spectrum holdings in the relevant areas will rise by 20 – 60 MHz as shown in **Table 2**: This results in Post-Lease holdings of a maximum<sup>33</sup> of:

- 80 MHz in 2 PLAs;
- Between 140 MHz and 149 MHz in 3 PLAs;
- 165 MHz in 2 PLAs;
- 185 MHz in 3 PLAs;
- 190 MHz in 1 PLA; and
- 210 MHz in 4 PLAs.

## 2.5 Assessment

2.24 By way of background, ComReg recalls that its guidelines for the determination of whether a spectrum transfer or lease would likely distort competition - as set out in Chapter 3 Document 14/11R - are to be interpreted and applied flexibly having regard to the specific circumstances of each case.<sup>34</sup> For example and other things being equal, a transfer or lease with prima facie greater potential to raise competition concerns (such as in terms of quantum of spectrum rights involved, the relative existing spectrum holdings of the notifying and other relevant parties before and following the proposed transfer or lease, and/or the duration of lease etc.), would likely involve a more exhaustive assessment of the matters identified in the guidelines, including a likely corresponding higher burden on the notifying parties in terms of the information required to inform such an assessment.

2.25 In the present matter, ComReg would particularly note the quite limited duration of the Proposed Leases (i.e. 3 months initially, and up to 6 months overall), the relative spectrum holdings of the relevant parties (both pre- and post-lease) and the broader context in which the Proposed Leases are occurring (i.e. COVID-19 and the impact of the measures to address same (e.g. tele-working) on electronic communications

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<sup>32</sup> This figure excludes the SW quadrant of CK048 ESB Knockraha 220kV, in which absent the Proposed Leases Imagine does not hold spectrum, see footnote 37.

<sup>33</sup> Represented by the quadrant in each PLA with the greatest quantum of spectrum holdings.

<sup>34</sup> Paragraph 33 of Document 14/11R.

networks).

- 2.26 In addition, ComReg has, in this particular instance, chosen to assess the likely impact of the Proposed Leases collectively, which is a conservative approach as the potential impacts would necessarily be greater than that of any individual proposed lease.
- 2.27 In light of the above context, ComReg outlines out its assessment below.
- 2.28 **First**, and in the context of market definition, ComReg recalls paragraph 39 of Document 14/11R which states:

*“It is not always necessary to reach a firm conclusion on market definition - for example, where it is clear that the proposed spectrum transfer or lease is not likely to raise competition concerns on any reasonable definition of the market.”*

- 2.29 In the present case, it appears sufficient to consider the Proposed Leases in the narrow context of the relative distributions of holdings in the relevant spectrum band, noting, of course, the potential for other competitive constraints when viewed more broadly, such as in terms of alternative spectrum bands (e.g. fixed wireless access services provided using licence-exempt spectrum) and alternative technologies (e.g. mobile broadband and fixed broadband etc).
- 2.30 **Second**, and in that context, ComReg does not consider that the post-lease 3.6 GHz Band spectrum holdings of Imagine are likely to distort competition noting, among other things:
- that Imagine presently holds 60 MHz under its LU Licence out of a total of 350 MHz assigned in rural regions in the 3.6 GHz Band (or circa 17%), noting also the service-and technology-neutral rights in this band;
  - Imagine’s existing holdings under its TPL (as detailed in the Annex), whilst being counted according to the methodology described herein and accounting for a considerable proportion of Imagine’s post-lease spectrum holdings, are nevertheless ultimately temporary as Imagine holds them subject to the Transition Rules and, in particular, the commercial deployment plans of the relevant Winning Bidder/s;
  - the very short-term nature of the Proposed Leases (see further below); and
  - the overall quantum of spectrum Imagine would hold under the Proposed Leases is less than that held by Imagine under the Previous Leases.

2.31 By way of context, ComReg observes the following differences between the Proposed Leases and the Expired Leases:

- A reduction of 20 MHz of Meteor's spectrum at six locations;
- An increase of 20 MHz of Dense Air's spectrum at three locations;
- A reduction of 20 MHz of Vodafone's spectrum at one location; and
- A reduction of 20 MHz of 3IRL's spectrum at one location.

2.32 The very short-term nature of the Proposed Leases limits the potential for material competitive distortions to arise because, among other things:

- the Proposed Leases are stated to be for use in providing FWA services to Imagine's pre-existing customers only;<sup>35</sup> and
- the benefits to Imagine from the Proposed Leases (i.e. additional capacity and better quality of service) are short-lived, thereby reducing the ability and incentive to seek to increase its prices (or reduce its output) on foot of same without concern as to the reactions of its competitors and/or customers.

2.33 **Third**, ComReg recalls the broader context in which the Proposed Leases are occurring (i.e. COVID-19 and the impact on measures to address same on electronic communications networks)

2.34 For the reasons outlined above, ComReg considers that the Proposed Leases would not be likely to distort competition and determined that the Proposed Leases may be put into effect for a period of six months from 11/05/2021.

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<sup>35</sup> See page 4 of the lease agreement between Imagine with Dense Air in ComReg Document 20/75.

# Annex 1: Imagine's spectrum holdings

## *The increase in Imagine's spectrum holdings as a result of the Proposed Leases*

A 1.1 The impact of the Proposed Leases on Imagine's spectrum holdings in each PLA relative to its spectrum holdings absent any leases on a per quadrant basis is shown in **Table 2** below.<sup>36</sup>

**Table 2: Summary of the accumulation of spectrum by Imagine on a PLA basis**

Proposed Lease Area	Proposed Lease Arrangement	Freq Range (MHz)	Imagine's Spectrum Holdings before Lease (MHz)				Additional Quantum of Spectrum (MHz)	Imagine's Spectrum Holdings during Lease (MHz)				%Increase of Imagine's Spectrum Holdings - Lease Period/Current (within each quadrant)			
			NE	SE	SW	NW		NE	SE	SW	NW	NE	SE	SW	NW
LH002 ESB Donore Drogheda	Dense Air/Imagine	3410 - 3430 MHz	60	60	60	60	20 MHz	80	80	80	80	+33%	+33%	+33%	+33%
KE014 ESB Moneycooley	Dense Air/Imagine	3410 - 3430 MHz	110	110	145	145	20 MHz	150	150	185	185	+36%	+36%	+28%	+28%
CE003 RTE Woodcock Hill	Dense Air/Imagine	3410 - 3430 MHz	129	129	129	109	20 MHz	149	149	149	129	+16%	+16%	+16%	+18%
GY016 Virgin Tonabrocky	Dense Air/Imagine	3410 - 3430 MHz	145	145	145	145	20 MHz	165	165	165	165	+14%	+14%	+14%	+14%
CK025 ESB Mylane	Meteor/Imagine	3620 - 3640 MHz	175	175	60	123	40 MHz	210	210	100	155	+20%	+20%	+67%	+26%
	Dense Air/Imagine	3410 - 3430 MHz													
CK048 ESB Knockraha 220kV	Dense Air/Imagine	3410 - 3430 MHz	140	175	0	175	40 MHz	155	210	100	190	+11%	+20%	<sup>(37)</sup>	+9%
	Meteor/Imagine	3620 - 3640 MHz													
CK049 Towercom Whitechurch	Dense Air/Imagine	3410 - 3430 MHz	175	175	175	148	20 MHz	190	190	210	170	+9%	+9%	+20%	+15%

<sup>36</sup> ComReg's rationale for this approach is explained below.

<sup>37</sup> Not possible to calculate percentage for this Quadrant as the initial holding is 0 MHz..

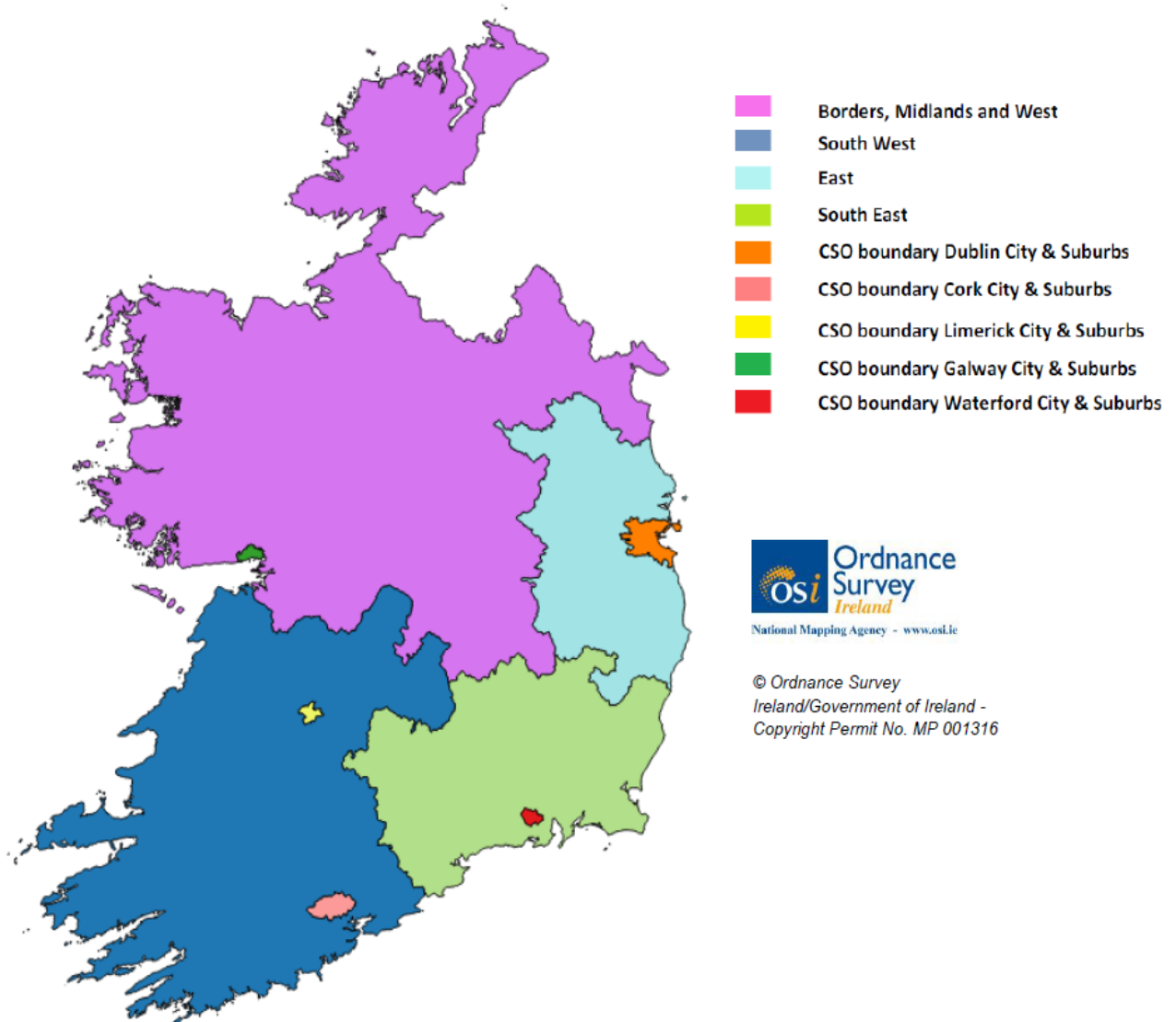
Proposed Lease Area	Proposed Lease Arrangement	Freq Range (MHz)	Imagine's Spectrum Holdings before Lease (MHz)				Additional Quantum of Spectrum (MHz)	Imagine's Spectrum Holdings during Lease (MHz)				%Increase of Imagine's Spectrum Holdings - Lease Period/Current (within each quadrant)			
			NE	SE	SW	NW		NE	SE	SW	NW	NE	SE	SW	NW
LH003 ESB Mullagharlin	Dense Air/Imagine	3410 - 3430 MHz	60	60	60	60	20 MHz	80	80	80	80	+33%	+33%	+33%	+33%
CK024 ESB Carrigaline MW	Vodafone/Imagine	3540 - 3560 MHz	175	60	60	175	40 MHz	210	80	120	210	+20%	+33%	+100%	+20%
	Meteor/Imagine	3620 - 3640 MHz													
KE008 ESB Kiltel	Meteor/Imagine	3620 - 3640 MHz	135	94	145	145	20 MHz	175	114	165	185	+30%	+21%	+14%	+28%
LS010 Towercom Cappard	Meteor/Imagine	3620 - 3640 MHz	145	145	120	60	20 MHz	165	165	140	80	+14%	+14%	+17%	+33%
KE022 Towercom Cappagh	Meteor/Imagine	3620 - 3640 MHz	145	145	145	120	20 MHz	185	185	165	140	+28%	+28%	+14%	+17%
WH001 ESB Athlone TC	Vodafone/Imagine	3480 - 3500 MHz	80	80	80	80	60 MHz	140	140	140	140	+75%	+75%	+75%	+75%
		3500 - 3520 MHz													
		3520 - 3540 MHz													
CK042 Towercom Bweeng	Vodafone/Imagine	3520 - 3540 MHz	98	175	123	123	20 MHz	114	190	139	139	+16%	+9%	+13%	+13%
KK001 PVT Mount Nugent	Vodafone/Imagine	3500 - 3520 MHz	115	115	115	115	40 MHz	145	145	145	145	+26%	+26%	+26%	+26%
		3520 - 3540 MHz													

## Imagine's current 3.6 GHz Band spectrum holdings

### Imagine's LU Licence Spectrum Holdings

A 1.2 Under the 2017 3.6 GHz Band Spectrum Award<sup>38</sup>, ComReg made 3.6 GHz Band spectrum available in nine Regions of the State as identified in **Figure 2**.

**Figure 2: Regions in the 3.6 GHz Band Award**



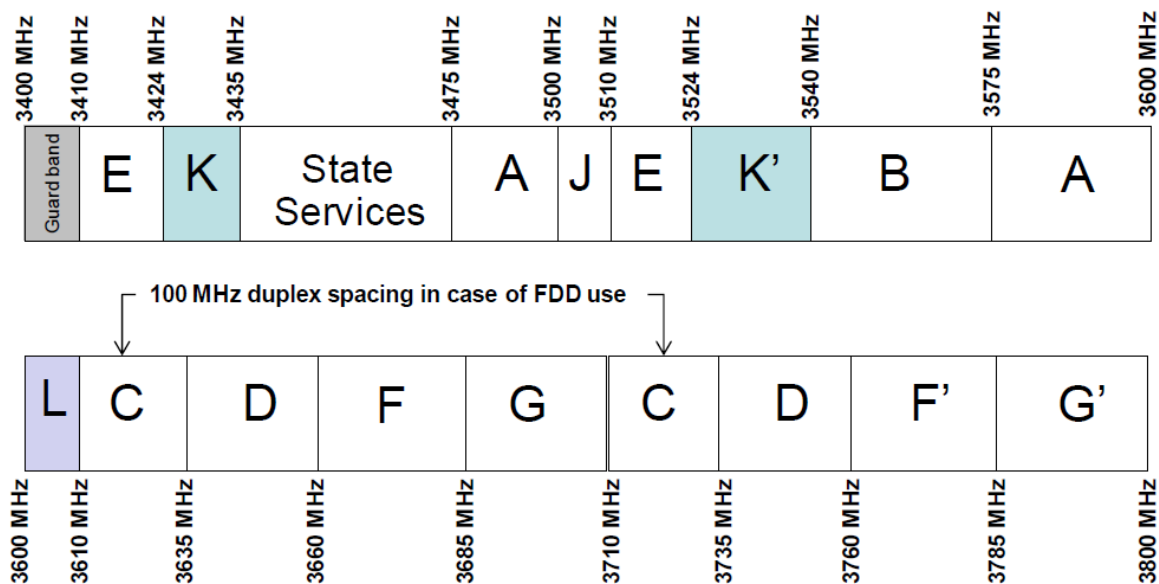
<sup>38</sup> For more information, please see:

<https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6ghz-band-spectrum-award/>

### Imagine's TPL Spectrum Holdings

- A 1.3 Imagine currently holds rights of use to spectrum in various parts of the 3.6 GHz Band in 134 Transition Service Areas ("TSAs") under its TPL.
- A 1.4 These TSAs correspond to local service areas where Imagine previously operated under the 3.6 GHz Band FWALA licensing scheme prior to the 3.6 GHz Band Award. At the start of Transition immediately after the Award, all TSAs had a 20 km radius boundary around a defined centre point. As Transition has progressed, the area of some TSAs has been reduced to reflect completion of Transition Activities which affect only part of a TSA and to facilitate ongoing Transition Activities in the remainder of the TSA.
- A 1.5 In addition to having a defined geographic area, TSAs are assigned frequency ranges which derive from the previous channel plan for 3.6 GHz Band FWALA licensing from before the Award, which included a number of paired and unpaired channels as shown in **Figure 3**.

**Figure 3: Previous FWALA channel arrangements in the 3.6 GHz Band**



- A 1.6 In many cases, the frequency ranges of Imagine's TSAs have reduced as Transition has progressed and Imagine has vacated parts of the spectrum in those TSAs to make that spectrum available for other Winning Bidders to roll out new services.

A 1.7 Having originally held spectrum rights in 241 TSAs under its TPL, Imagine now has 134 TSAs which are licensed in respect of the frequency ranges identified in **Table 4**.

**Table 3: Number of Imagine TSAs by Frequency Range<sup>39</sup>**

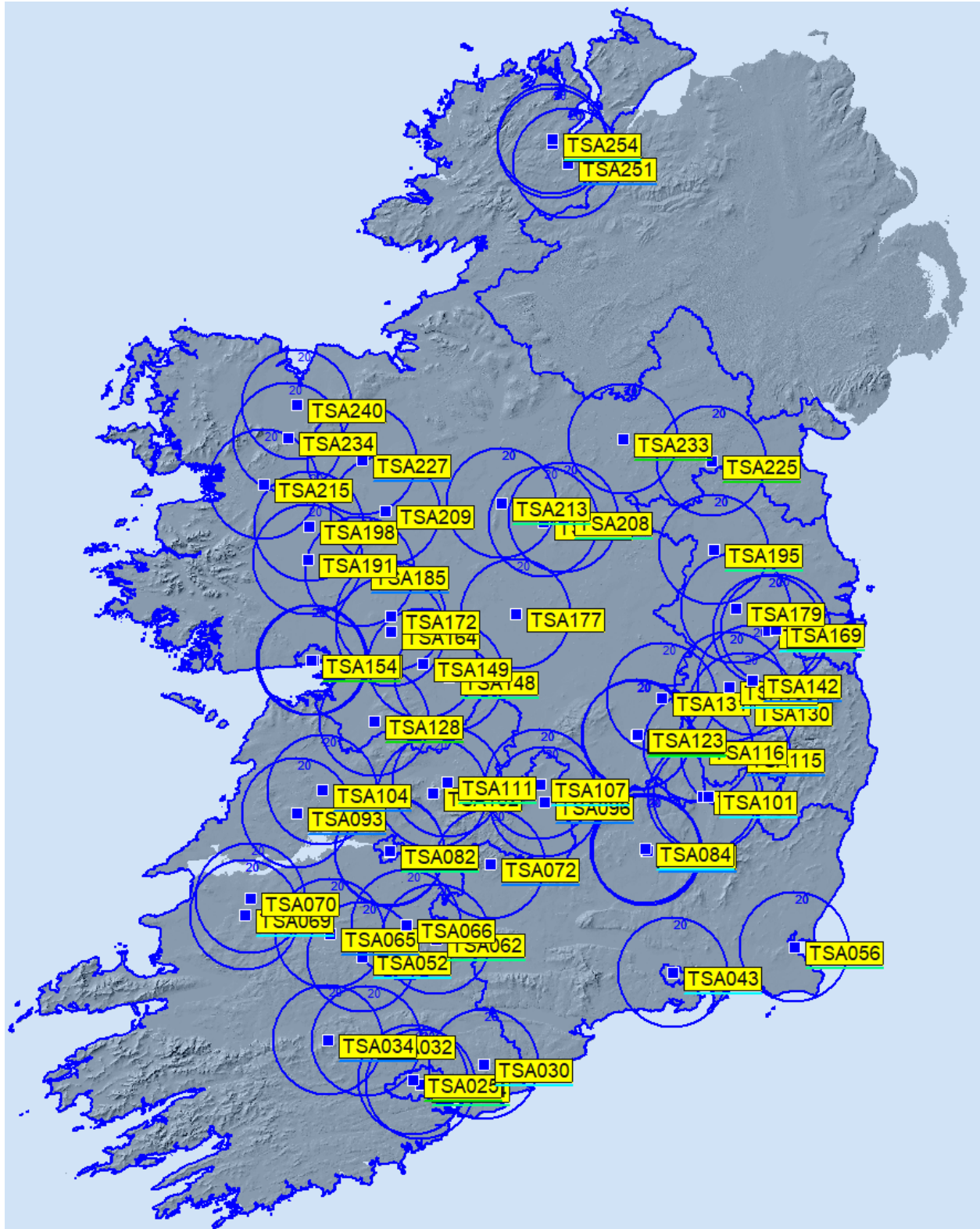
Frequency Range/s Licensed in TSA	No. TSAs
3410-3424 MHz and 3510-3524 MHz	3
3424-3435 MHz and 3524-3540 MHz	2
3475-3500 MHz	25
3475-3500 MHz and 3575-3600 MHz	2
3475-3500 MHz and 3580-3600 MHz	1
3500-3510 MHz	24
3510-3524 MHz	22
3524-3540 MHz	22
3540-3560 MHz	29
3540-3575 MHz	2
3635-3660 MHz	2
<b>Total TSAs</b>	<b>134</b>

A 1.8 Together, Imagine's current TSAs cover most of the geographic area of the State as can be seen in **Figure 4**.

<sup>39</sup> As of 7 September 2020.



Figure 4: Locations of Imagine's TSAs



## **Approach to assessing Imagine's 3.6 GHz Band spectrum holdings**

A 1.9 ComReg has assessed the current spectrum holdings in each of the PLAs using the approach outlined in A 1.9 of Document 20/77.

A 1.10 ComReg does not repeat the explanation of this approach and refers interested parties to Documents 20/77.

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