



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

The potential issue of short-term spectrum rights of use in the 700 MHz and 2.1 GHz bands from October 2022

DotEcon Report – Recommendations on a framework for short-term licences, including benchmarking

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Recommendations on
a framework for short-
term licences,
including
benchmarking

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Contents

1	Introduction.....	1
1.1	Background.....	1
1.2	Scope.....	1
1.3	Objectives.....	2
1.4	Structure of report.....	4
2	Current licences	5
2.1	The 700 MHz band.....	5
2.2	The 2.1 GHz band	6
3	Licensing framework.....	10
3.1	Bands.....	10
3.2	Eligibility.....	11
3.3	Need for administrative award	13
3.4	Duration.....	14
3.5	Structure of fees.....	14
4	Pricing.....	17
4.1	Efficiency	17
4.2	Estimating market price.....	18
4.3	Benchmarking results.....	19
4.4	Short-term licence discount	21
4.5	Proposed prices for short-term licences.....	26
5	Other licence framework options.....	29
5.1	No short-term licences for 700 MHz and/or 2.1 GHz.....	30
5.2	Short-term licences for 2.3 GHz and/or 2.6 GHz	33
5.3	Short-term licences available to parties other than MNOs.....	34
5.4	Short-term 2.1 GHz licences not available to Eir	35
5.5	Relax constraints on spectrum allocations.....	37
5.6	Tighter restrictions than current spectrum assignments.....	39
5.7	Delayed take-up of licences	39
6	Other pricing options	41

6.1 Temporary COVID licence fees.....	41
6.2 Based on future auction outcome.....	42
6.3 Alignment with 2012 MBSA prices.....	43
6.4 Current licence fees (2.1 GHz only).....	43
6.5 Non-zero price for Eir in 2.1 GHz band.....	45
Annex A Benchmarking	47

Tables & Figures

Table 1: Summary of existing 2.1 GHz rights of use.....	9
Table 2: Incremental profitability of a 20-year licence under different growth rates	24
Table 3: Calculation of short-term licence fees.....	27
Table 4: Sample for prices of 700 MHz licences.....	50
Table 5: Summary statistics for 700 MHz observations.....	51
Table 6: sample for prices of 2.1 GHz licences	53
Table 7: Summary statistics for 2.1 GHz observations.....	53
Table 8: Step-by-step changes relative to MBSA2 benchmarking - 700 MHz band	56
Table 9: Step-by-step changes relative to MBSA2 benchmarking - 2.1 GHz band	58
Figure 1: Observations from 700 MHz licences.....	52
Figure 2: Observations from 2.1 GHz licences	54

1 Introduction

1.1 Background

In December 2020, ComReg published its Decision (the 'Decision')¹ regarding the Multi Band Spectrum Award for assigning rights of use for spectrum in the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz bands (the 'MBSA2'). In January 2021, Three lodged an appeal against the Decision (the 'Appeal'). The case was heard in June 2021, following which further written submissions were sought and submitted in October and November 2021, at which point judgment was reserved.

As the Appeal did not prevent actions being taken to implement the Decision, ComReg progressed with the award process, including accepting applications from interested parties and qualifying bidders. In May 2022, notice of the commencement of the Main Stage of the auction was given to bidders and the commencement date was set for July 2022. Shortly after, Three brought an application to stay the award process. A court order staying the auction for an indefinite period until delivery of the reserved judgment was made on 21 July 2022. ComReg has appealed that order.

As a result, it is now highly unlikely that ComReg will be able to issue new licences before certain existing rights of use in 2.1 GHz and 700 MHz bands expire in October 2022, and some form of interim licensing is likely to be relevant for avoiding significant disruption to consumers. The extent of the delay is still unknown and depends on when a judgment on the Appeal is delivered and its implications for the award process. However, the latest indication from the Court was that any stay would likely be in place for "no more than a few months".

1.2 Scope

ComReg has asked DotEcon to consider and provide economic advice on the potential assignment of spectrum rights of use to

¹ ComReg document 20/122
(<https://www.comreg.ie/media/2020/12/ComReg20122.pdf>)

cover the interim period between the expiry of certain existing rights of use in October 2022 and the commencement of MBSA2 Liberalised Use Licences (the 'interim period'). This includes consideration of:

- which bands (if any) to make short-term licences available in;
- which parties short-term licences should be available to and whether any constraints should apply on how they may be used;
- the method for allocating short-term licences; and
- appropriate prices for short-term licences.

1.3 Objectives

ComReg's primary objectives in carrying out its statutory functions in the context of electronic communications and the management of radio frequency spectrum are set out in the Communications Regulation Act, 2002 and the Framework Regulations², and include:

- promoting competition;
- contributing to the development of the internal market;
- promoting the interests of users within the Community;
- ensuring the effective management and efficient use of the radio frequency spectrum in Ireland; and
- unless otherwise provided for in Regulation 17 of the Framework Regulations, taking the utmost account of the desirability of technological neutrality in complying with the requirements of the relevant Irish regulations, in particular those designed to ensure effective competition;
- granting licences on the basis of objective, transparent, non-discriminatory and proportionate criteria.

When establishing a framework for short-term licences, ComReg should consider its statutory objectives in the context of the situation, where short-term licences would be a temporary measure before long-term rights of use can be awarded when the MBSA2 is ultimately run. In this particular situation (and given the decision about short-term licensing that ComReg has been forced to make) it should be recognised that the appropriate approach to meeting the objectives, and the extent to which each of them bears relevance to the design

² S.I. No. 333/2011 - European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011

of the (short-term) licensing framework, is likely to be different compared with the scenario where long-term rights of use are being assigned.

*Minimising
consumer
disruption is the
primary objective*

We understand that the primary reason for potentially needing short-term licences is clearly to minimise disruption to consumers that might occur if current 700 MHz and/or 2.1 GHz licences are allowed to expire without provision for service continuity. This follows from ComReg's objective to promote the interests of users of telecoms services, as well as considerations around efficient use of the spectrum in both the short- and long-run. In particular, if disruption to consumers were to arise in the event that short-term licences were not made available, then spectrum would clearly not be being efficiently used in the short run.

It is important to recognise that the relevant considerations around efficiency are likely to be different for short-term licences compared with awarding long-term rights of use. For example, the efficient allocation of long-term rights of use will take account of the potential for network and service development that may be infeasible over the short-term and too risky without the certainty of returns on the investment for a longer horizon than the duration of short-term licences. An efficient assignment of long-term rights of use might involve a significant change in spectrum holdings amongst the MNOs, and potential assignment of spectrum to new entrants. With short term licences (with no guarantee of access to spectrum over a longer period), the same assignment:

- may not arise due to the high costs of investing in use of the spectrum for new/improved services compared with the risk of losing the spectrum after just a few months; and
- may not even represent the optimal use of the spectrum over the short period covered by short-term licences if it leads to a disruption to consumers.

For similar reasons, the scope for promoting long-term competition and development of the internal market through the short-term licences is likely to be limited compared to awarding long-term licences. Moreover, ComReg should be cautious that providing short-term access to spectrum does not allow advantaged positions to be established that might distort the assignment of long-run usage rights when an auction is eventually run (which we discuss in detail in Section 3). Therefore, the optimal use of spectrum in the long run is still a relevant consideration for the design of a short-term licensing

regime, even though we are not directly awarding long-term usage rights.

Other considerations are also important

With these points in mind, whilst avoiding adverse effects on consumers constitutes the main focus of our recommendations, there are other considerations that should be considered by ComReg when determining an appropriate framework for any short-term licensing measures, including:

- avoiding distortions to competition in downstream markets; and,
- avoiding creating any embedded/persistent advantages or disadvantages for participants in the MBSA2 award process, once an auction is eventually run, risking the efficiency of long-run spectrum allocation; and

Broadly speaking, and noting the differences between short-term licences compared to long-term rights of use above, these objectives are met by a short-term licence regime that, as far as possible, leaves the current spectrum landscape unchanged (which naturally involves issuing of short-term licences that are service and technology neutral), thereby avoiding adverse competitive effects and risks of distorting the eventual award of long-term rights. Deferral of benefits of an efficient award of long-term rights across all the MBSA2 bands – which may entail reconfiguration of holdings across the MNOs and spectrum being won by other parties – is unavoidable due to the current stay on running the auction.

1.4 Structure of report

In Section 2 we set out our understanding of the current situation regarding existing rights of use in the 700 MHz and 2.1 GHz bands. Section 3 provides details of our recommendations regarding the licensing framework, and Section 4 describes the recommended approach to setting prices.

In Sections 5 and 6 we discuss alternative options regarding the licensing framework and pricing that have been considered, and the reasons why those have been rejected as unsuitable.

Annex A sets out details of the benchmarking exercise used to establish an estimate of market value for the spectrum expected to be available for short-term licences.

2 Current licences

2.1 The 700 MHz band

COVID licences in the 700 MHz band

In April 2020, as an emergency measure, ComReg issued Temporary ECS licences ('COVID licences') in the 700 MHz band to the three MNOs (Vodafone, Three and Eir) to support increased network traffic resulting from the COVID-19 pandemic. Each MNO was offered access to up to 2x10 MHz of 700 MHz spectrum via short-term three-month licences, with the option to renew for a further three months. A fee of €100 applied for each licence assignment and subsequent renewal.

All three MNOs took up a 700 MHz Covid licence for the maximum quantity of 2x10 MHz available to them. The specific frequency ranges assigned were³:

- Eir - 703 to 713 MHz paired with 758 to 768 MHz;
- Three - 713 to 723 MHz paired with 768 to 778 MHz; and
- Vodafone - 723 to 733 MHz paired with 778 to 788 MHz.

Since expiry of these initial 700 MHz COVID licences, ComReg has established a new COVID licensing framework every six months (with the same licence duration/renewal options and based on the same frequency ranges assigned to each operator). On each occasion, all three MNOs have taken up (and subsequently renewed) their COVID licences.⁴

The most recent 700 MHz COVID licences were issued on 2 April 2022 and subsequently renewed on 2 July 2022. These licences are due to expire on 1 October 2022. Given that these licences were only made available, in the exceptional circumstances created by COVID-19, as part of the Irish Government's emergency measures against COVID-19, and that no Government restrictions have been in place since March 2022 (and are not expected in the future), ComReg notified operators

³ See ComReg document 20/27 (<https://www.comreg.ie/media/2020/04/ComReg-2027.pdf>)

⁴ Full details of the Covid licence allocations over the period since April 2020 can be found on ComReg's website (<https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/covid-19-temporary-spectrum-management-measures/>).

on 5 July 2022 that it does not intend to offer new COVID licences beyond 1 October 2022.⁵

2.2 The 2.1 GHz band

Current long-term 2.1 GHz licences

Vodafone, Three and Eir all currently hold licences for spectrum in the 2.1 GHz band, with varying bandwidths and expiry dates. These are long term (20-year) licences, but those of Vodafone and Three are due to expire in 2022, while Eir's licence expires in 2027.

Vodafone has a licence for 2x15 MHz that commenced in 2002 and expires on 15 October 2022. Eir has a licence for 2x15 MHz that commenced in 2007 and expires on 11 March 2027. Three has two licences (an 'interim A licence' and a 'B licence')⁶ giving access to a total of 2x20 MHz of spectrum:

- Three's B licence, which commenced in 2002, is for 2x15 MHz of spectrum and expires on 1 October 2022. Under the terms of the MBSA2 Decision⁷, Three may be assigned a short-term interim rights of use licence (an 'interim B licence') for some or all of the associated blocks for the period from 2 October to 15 October 2022, in return for a fee of €120,508 per 2x5 MHz block.
- Three held an A licence for 2x15 MHz of spectrum until it expired on 24 July 2022. Under the terms of the Decision, Three was entitled to apply for an interim rights of use licence (an 'interim A licence') for some or all of the associated blocks for the period from 25 July 2022 to 15 October 2022, in return for a fee of €725,415 per 2x5 MHz block. Three applied for, and was granted, an interim A licence for one of the 2x5 blocks which commenced on 25 July 2022. It therefore no longer has access to the two other blocks associated with its expired A licence.

⁵ See ComReg document 22/58 (<https://www.comreg.ie/media/2022/07/ComReg2258.pdf>)

⁶ When 2.1 GHz rights of use were assigned in 2002/2007 they were assigned as either an A licence or a B licence, where the A and B licences differ in the attached rollout and coverage obligations. Three initially held an A licence and a B licence, whereas Vodafone and Eir both have B licences.

⁷ Three's Appeal is not concerned with any of the provisions within the MBSA2 Decision for liberalisation or extension of existing 2.1 GHz licences and these aspects of the Decision are not currently suspended. The current stay only concerns running of the Main Stage auction.

Early liberalisation option

The 2.1 GHz licences issued in 2002 and 2007 imposed restrictions on licensees to use the spectrum for the provision of UMTS/3G services.⁸ Under the terms of the MBSA2 Decision, all MNOs were given the option to liberalise their 2.1 GHz licences, allowing them to use the spectrum on a service and technology neutral basis, at any time between the making of regulations on foot of the Decision and licence expiry.

No fee would be charged to any licensee for taking up the liberalisation option for the period up to and including 15 October 2022. Eir would potentially be subject to a liberalisation fee for the period 16 October 2022 to 11 March 2027, depending on prices apportioned to the 2.1 GHz Time Slice 1 lots in the award (using the methodology set out in Annex 14 of the MBSA2 Information Memorandum⁹). However, given that the award will now not be completed in time for new 2.1 GHz Time Slice 1 licences to be issued before 15 October 2022, we anticipate that the period for which Eir may be subject to a liberalisation fee based on the award outcome may need to be reviewed by ComReg.

At the time of writing, both Vodafone and Three have taken up the option to liberalise their existing 2.1 GHz licences¹⁰, but Eir has not.

2.1 GHz COVID licences

As with 700 MHz, the 2.1 GHz band was included in ComReg's measures to support the MNOs with the changes to network traffic resulting from the COVID-19 pandemic. This was in the form of the COVID licences (as described above for 700 MHz) that effectively liberalised the existing 2.1 GHz rights of use assigned to the MNOs at the time (i.e. allowed the spectrum to be used on a service and technology neutral basis rather than being restricted to UMTS/3G). The terms of the 2.1 GHz COVID licences were the same as for the 700 MHz band i.e. 3-month licences with the option to renew for a further 3-months. The €100 fee, as noted above for the 700 MHz COVID licences, also allowed for a licence to be issued for three months, with a further €100 fee applied on renewal.

Initially, all three MNOs took up the 2.1 GHz COVID licences available to them for three months and renewed the licences.

⁸ Note that any Interim A or Interim B licences issued to Three would be service and technology neutral and not bound by the usage restrictions originally imposed on the licences issued in 2002.

⁹ ComReg document 21/40

¹⁰ As stated on the ComReg website at <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/>

Since expiry of the first licensing framework, ComReg has established further temporary licensing frameworks (with the same licence duration/renewal options) every six months. Vodafone and Three continued to hold 2.1 GHz COVID licences until 1 July 2021. Our understanding is that by this time they had both liberalised their existing 2.1 GHz licences through the option available to them under the MBSA2 Decision and, therefore, no longer required the COVID licences. Eir still holds a 2.1 GHz COVID licence, which is due to expire on 1 October 2022.

As with 700 MHz, ComReg announced on 5 July 2022 that it does not intend to offer further 2.1 GHz COVID licences beyond 1 October 2022.

*Summary of
current licences*

Table 1 below provides a summary of the 2.1 GHz rights of use currently held by the three MNOs. With the delay to the MBSA2 award, as things stand:

- Vodafone and Three will no longer have rights to use any 2.1 GHz spectrum as of 16 October 2022; and
- Eir will no longer have access to 2.1 GHz COVID licences as of 2 October 2022 and would need to liberalise its 2.1 GHz licences under the option provided in the MBSA2 Decision in order to continue using the spectrum on a service and technology neutral basis.

Table 1: Summary of existing 2.1 GHz rights of use

Licensee	Licence type	Bandwidth	Expiry date	Liberalised	Used with COVID licence
Vodafone	B	2x15 MHz	15 October 2022	Yes	NA
Three	A (Interim licence)	2x5 MHz (since 24 July 2022, 2x15 MHz previously)	15 October 2022	Yes	NA
	B	2x15 MHz	1 October 2022 (Option to obtain an interim B licence from 2 Oct to 15 October)	Yes	NA
Eir	B	2x15 MHz	11 March 2027	Via COVID licence	Yes (Expires 1 Oct 2022)

3 Licensing framework

In this Section we set out our recommendations on the structure of the framework for potential short-term temporary licences ('short-term licences') covering the period between expiry of current rights of use and the commencement of new long-term rights of use (the 'interim period').

Alternative options that have been considered, but which do not form part of the recommendations, are discussed in Section 5 below.

3.1 Bands

Short-term licences for 700 MHz and 2.1 GHz only

In terms of the spectrum to be made available, we recommend that ComReg offers short-term licences only for spectrum in the 700 MHz and 2.1 GHz bands (i.e. the bands available in the MBSA2 that are currently being used in a similar manner to their likely long-term use) and not for the 2.3 GHz or 2.6 GHz bands (which are either unused or transitioning from legacy usage).

This approach supports the continuation of services already being provided using 700 MHz and 2.1 GHz spectrum and avoids potential disruption to consumers. Including 2.3 GHz and 2.6 GHz is unnecessary to support this objective.

Furthermore, allowing access to short-term licences for spectrum not currently used could inadvertently create 'toehold' advantages for some operators that could distort the outcome of the MBSA2 when it is ultimately run. Toehold advantages may arise where parties obtain short-term access to spectrum, then take decisions (such as associated sunk network investments) that commit them to competing strongly for continued access to that spectrum when long-term rights are subsequently auctioned. Competitors in that auction may be discouraged by the relative advantage that the short-term licensees already have. In auctions with common value uncertainty, disadvantaged bidders may be particularly exposed to winner's curse, as to win they must overcome that relative disadvantage, leading to more cautious bidding and so exacerbating that disadvantage.¹¹

¹¹ Bulow, Huang and Klemperer, *Journal of Political Economy*, pp 427-454, Vol 107, No 3 (June 1999).

This logic is often seen in equity markets, where a raider may buy a small 'toe-hold' in a target company prior to contesting a full-takeover. The toe-hold gives a predictable and commonly known advantage in bidding for a controlling equity stake, due to the need to offer all existing shareholders a common price. Similar reasoning has been advanced in some anti-trust cases.¹²

In our view, this issue of potential toe-hold advantages being created by short-term licences means that it is best to leave current spectrum holdings in the MBSA2 bands as far as possible unchanged, thereby allowing undistorted competition in the eventual auction of long-term usage rights. Otherwise, if the short-term licensing regime opened the possibility of either new bands being available, or significant rearrangement of existing bands, there could be rivalry for short-term spectrum access amongst interested parties aimed at securing toe-hold positions towards long-term access. Without a competitive process to resolve this rivalry for short-term licences, there is significant risk of inefficiency. Furthermore, some parties may be in a better position than others to create or identify toe-hold opportunities, but not be the most efficient long-term users of that spectrum; this creates the potential for short-term access to distort the long-term allocation.

As noted above, the inclusion of the 2.3 and 2.6 Bands in the proposed short-term licensing framework is not necessary or justified in the context of the main objective of avoiding potential consumer disruption.

3.2 Eligibility

Short-term licences available only to the MNOs

For similar reasons, we recommend that short-term licences are available only to the MNOs, who are the only parties with current licences for the 700 MHz and 2.1 GHz bands. This follows from the service continuity objectives, as removing access to spectrum already being used could negatively impact on operators' ability to continue providing the services already available to consumers. However, we do not see any clear argument for opening the short-term licence scheme to other operators in terms of minimising consumer disruption. Other operators would have to be able to demonstrate that they could equally use the spectrum to avoid consumer disruption that

¹² Monopolies and Mergers Commission report on proposed merger between Manchester United plc and BskyB, 1999.

would otherwise occur during the interim period. However, it is difficult to envisage this being a realistic possibility.

Moreover, it would potentially create unfair advantages for some operators in the MBSA2 if they are able to use short-term licences for investing in new services in advance of the award of long-term licences, potentially creating toe-hold advantages in the eventual award of long-term usage rights.

MNOs should be offered short-term licences for existing holdings only

In a given band, we recommend that each MNO should have the option to apply for a short-term licence for up to the amount of spectrum held as on 1 Oct 2022. Effectively, this would simply allow for maintaining the status quo in terms of spectrum holdings to support continuation of rights of use that could arguably be required for providing existing services during the interim period. There would be no compulsion for MNOs to take up this option.

For the avoidance of doubt, this would include the option for Eir to apply for a liberalised short-term licence in the 2.1 GHz band in relation to the spectrum held under its licence expiring in 2027. This would enable Eir to use the spectrum on a service and technology neutral basis without the need to liberalise its current licence with the option provided for in the Decision.

With the proposed approach, under the short-term licensing framework:

- Vodafone would be able to apply for up to two 2x5 MHz blocks in the 700 MHz band and three 2x5 MHz blocks in the 2.1 GHz band;
- Three would be able to apply for up to two 2x5 MHz blocks in the 700 MHz band and four 2x5 MHz blocks in the 2.1 GHz band; and
- Eir would be able to apply for up to two 2x5 MHz blocks in the 700 MHz band and three 2x5 MHz blocks in the 2.1 GHz band.

Specific frequency assignments would match current licences

For any operator, the specific frequency assignment associated with a short-term licence would fall within the frequencies currently licensed by the operator in the relevant band. Reassignments of frequencies, even if agreed amongst operators, are potentially problematic due to the potential that this could impact consumers even during a short transition and affect the position of other parties bidding for spectrum in the subsequent auction.

Unused spectrum would not be reallocated

Whilst this is a matter for ComReg, we recommend that ComReg does not allow operators to apply for short-term licences for amounts of spectrum in excess of existing holdings,

even if there are unused frequencies available. As above, we would be concerned about creating unfair toe-hold advantages going into the MBSA2, and there is no service continuity argument for doing so.

3.3 Need for administrative award

Competitive award process not required or feasible

The current stay and ComReg's overarching objective to avoid consumer disruption make it infeasible to conduct a competitive award process for interim usage rights open to all interested parties. The proposed approach implies the need for an administrative award of short-term licences, rather than a competitive process. If short-term licences are granted only to the MNOs and only in relation to their existing spectrum holdings, there can be no scope for a conflict in demand for any of the available licences, and there is, therefore, no need for any process to resolve that. The MNOs would be offered the short-term licences that would be available to each of them and could choose whether to apply for them or not.

Even if there were scope for conflicting demand in applications for short-term licences (e.g. if other bands were available, or if other parties were offered access to short-term licences) a competitive process (i.e. an auction) would not be feasible or appropriate given there is very little time between now and the expiry of current licences to establish, prepare for, and run a suitable competitive award process, in particular if any form of public consultation was required. For these reasons, we consider it appropriate in any case for short-term licences to be allocated administratively rather than through a competitive process.

Short-term licences should be taken when offered or not at all

Short-term licences would need to be applied for in advance of expiry of existing licences to avoid any gaps where the spectrum would be unavailable. If unexercised when offered, we recommend that an option for short-term access to spectrum would lapse and could not be subsequently exercised at a later date. Again, this is because our concern is primarily with service continuity. If the option is not exercised when offered, the operator clearly does not need it for service continuity, and we consider it appropriate for ComReg to seek to avoid the risks of distorting the eventual competitive award of spectrum by allowing access to the spectrum at a later date that would (presumably) be used for new services.

3.4 Duration

Short-term licence duration and start dates

The extent of the delay to the award resulting from the Appeal and the stay (and the duration for which short-term licences would be needed) cannot be known in advance, although the Court's view is that this will be relatively short. The duration of short-term licences should be sufficiently short so that there is not a long lead time before new long-term licences can begin once the MBSA2 has been completed.

In terms of commencement of the initial short-term licences:

- 700 MHz short-term licences would need to commence on 2 October 2022, on expiry of the existing Covid licences;
- For Vodafone and Three, the 2.1 GHz short-term licences would need to commence on 15 October 2022;
- Eir would need to have the option of a 2.1 GHz short-term licence that covered the period from 2 October to 15 October 2022, to account for the expiry date of its Covid licence.

3.5 Structure of fees

Fees would apply for short-term licences

For the 700 MHz band, all MNOs would be required to pay a fee for being issued a short-term licence. For the 2.1 GHz band, Vodafone and Three would also be required to pay a fee for a short-term licence.

As we discuss in detail in Section 4, there is a strong case that these fees be based on an estimate of likely market value of the spectrum for various reasons, all ultimately related to ensuring that spectrum is used optimally given the circumstances pertaining over the short-term duration of the licence:

- Setting fees at below this level would mean that MNOs would unreasonably benefit from the requirement that spectrum be administratively allocated in line with current use. If access were on highly favourable terms (say a price of zero or a peppercorn access charge as with COVID licences) there could be concern about distortions of competition relative to other providers of marginal competing services (e.g. FWA access, or even fixed broadband access);
- With regard to the 2.1 GHz band, there is need to ensure that Eir, whose licence will continue beyond October 2022, is treated fairly relative to Three and Vodafone. The

different termination dates of existing licences mean that all three operators are not in directly comparable positions, so whilst Eir's spectrum fees are based on an assessment of the value of that spectrum when its licence was awarded,¹³ it is reasonable for Three and Vodafone to pay a fee based on estimated market value now;

- At the margin, allowing access to these bands at prices significantly below market value risks distorting long-run investment decisions by operators. An operator might commit to retaining spectrum in a band when it might have bought less or switched to a different band had the MBSA2 auction been run according to its original timetable, and this decision might become locked-in if associated sunk investment in network equipment is made. As discussed above, this may lead to toe-hold advantages in a subsequent award of long-term usage rights, leading to a distorted and inefficient allocation and use of those rights.

Note that if a market price is charged for short-term spectrum access and MNOs do not exercise all the options to take spectrum, this does not necessarily mean that the price has been set too high and an inefficient outcome created. Rather, at the market price it may be that an MNO does not want to take up all of the short-term rights available to it, as it is planning to reduce its holding in that band in the long run. For example, we have seen already that Three has chosen not to extend all of its 2.1 GHz spectrum rights using the extension option set out in the MBSA2 Decision, presumably as in the long run it wishes to have a mix of spectrum across various capacity bands, rather than continuing to hold relative more blocks than other MNOs in the 2.1 GHz band. Charging at market price is necessary if MNOs are to have the correct incentives to continue to make efficient decisions now concerning their long-run spectrum positions.

*Liberalised access
for Eir*

We recommend that Eir would be allowed to apply for short-term licences in relation to its existing (unliberalised) 2.1 GHz licences without additional cost and use that spectrum on a liberalised basis without the need to use the liberalisation option provided for under the MBSA2 Decision. This is based on the premise, as detailed below, that the fees for 2.1 GHz short-term licences would be below the level of fees Eir is already paying for its current licence. There is no clear benefit, or

¹³ The price paid by Eir was administratively determined at the time of award, rather than determined by an auction, but was nevertheless set by ComReg with a view to the likely market value of the spectrum at the time.

argument for, requiring Eir to pay a fee beyond what it is paying for its current licences unless that falls below what the other operators must pay for short-term licences. This is also consistent with the approach taken to early liberalisation of the existing 2.1 GHz licences within the MBSA2 Decision, where Eir would only be required to pay a liberalisation fee for the period covered by Time Slice 1 if the prices achieved in the MBSA2 auction indicated it would be otherwise paying below what others would be paying for liberalised spectrum. The fees for short-term licences are discussed in detail below in Section 4.

4 Pricing

Our recommendation, set out in Section 3 above, is that short-term licences be assigned administratively. Therefore, it is not feasible to use a competitive process to determine fees and these will need to be set by ComReg.

Below, we set out of our recommendations for appropriate fees. Setting very low fees (e.g. at the same level as for the Covid licences, or based on administrative cost), as suggested by the MNOs in their responses to ComReg document 22/63, would not be appropriate and would risk distortions to competition. A more suitable approach, given ComReg's objectives, would be to set prices that reflect market value.

To form recommendations on this basis, we use benchmarking of prices achieved for spectrum in the relevant bands elsewhere to give an estimate of market value. However, these benchmarked prices are for long-term licences, and so some reduction to the price estimate may be relevant to account for the short-term nature of the short-term licences.

4.1 Efficiency

Fees below market value

Given that an administrative decision is being made to restrict availability of short-term usage rights at 700 MHz and 2.1 GHz to existing spectrum holders (i.e. the MNOs), MNOs should not enjoy unreasonable benefits from such access that are unavailable to other parties. This would be the case if these bands were made available at a price lower than a reasonable estimate of market value. Not only would this be discriminatory treatment in the MNOs' favour, but it might, at the margins, distort competition between mobile services and other forms of connectivity.

Arguments that the opportunity cost is zero

The argument, advanced by some of the MNOs, that the opportunity cost of the spectrum subject to short-term licences is essentially zero because no operators other than the MNOs can contend this spectrum is incorrect. The only reason that spectrum would not be available to others is because of a decision to make short-term licensing available only to the MNOs, on the assumption that the MNOs are best placed to prevent the consumer disruption that could arise as a result of the delayed assignment of long-term rights of use in the 700 MHz and 2.1 GHz bands following the Court approved stay.

Even if this assumption is correct, this does not mean that alternative users are absent, but rather that such users have been precluded from expressing their interest in the spectrum. This includes the possibility that some MNOs might want a greater quantity of spectrum than currently being used, which is ruled out in the short-term licensing regime, but would again create an opportunity cost for other MNOs.

Therefore, there is no reason why the MNOs should benefit from the presumption that they are the efficient users by paying a price of zero (or close to zero if ComReg's administrative charges are recovered). This would amount to an unreasonable transfer of resources to the MNOs and clearly be discriminatory in their favour. It would risk distorting competition at the margins between mobile services and other services providing connectivity, such as fixed services including rural Wireless Local Loop (WLL) services, even if those services might not formally fall into the same relevant market. Whilst these risks to competition may be modest if the short-term licensing regime is short-lived, clearly there is no reason for ComReg to run such risks and there is always the possibility that short-term licences could be required for an extended time.

These concerns are particularly acute in the case of the 2.1 GHz band, as Eir's existing licence would continue during any short-term licensing regime. Offering Vodafone and Three access to comparable spectrum at a zero (or close to zero) price would be discriminatory and potentially distort competition amongst the three MNOs.

4.2 Estimating market price

Best estimate is more appropriate than conservative

In estimating a reasonable price for short-term spectrum access, it is appropriate to use a best estimate of market price. This contrasts with the approach taken by ComReg for setting minimum prices for past spectrum awards and for the MBSA2, where minimum prices are typically set conservatively, knowing that competition will likely determine a higher price in any case.

However, in the context of the proposed administratively assigned short-term licences, there is no scope for use of a competitive award process to establish the market price. ComReg does not have sufficient information about potential users' business models to realistically estimate individual valuations and establish the true opportunity cost of spectrum.

Therefore, it is necessary to establish an estimate of the market value by some other means. Our proposal is to use benchmarking of prices achieved in awards for the same bands in other jurisdictions to form expectations of the market value of the spectrum in Ireland, correcting for differences in factors such as population. There are potential alternative approaches that could be taken (such as retrospective pricing based on the outcome of the MBSA2, or using prices achieved in the 2012 MBSA) but these ruled out for the reasons discussed in Section 6.

4.3 Benchmarking results

Summary of benchmarking results

Details of the benchmarking analysis and the results are set out in Annex A . In summary, the benchmarking suggests that the market price for a 20-year¹⁴ licence likely falls in the range:

- 0.45-0.55 Euro per MHz per capita (€/MHz/Pop) for 700 MHz licences; and
- 0.25-0.35 €/MHz/Pop for 2.1 GHz licences.

It is then necessary to determine a point within these ranges that provides a best estimate of market price that can be used as the basis for setting short-term licence fees.

The minimum prices currently set for the spectrum for the MBSA2¹⁵ are equivalent to prices for a 20-year licence of:

- 0.47 €/MHz/Pop. for the 700 MHz band; and
- 0.25 €/MHz/Pop. for the 2.1 GHz band.

MBSA2 minimum prices are a lower bound

Given that ComReg set the minimum prices (i.e. the present discounted value of lowest possible SAF and stream of SUFs over the duration of a licence) at a level expected not to exceed market price to minimise the risk of inefficiently choking off demand. Therefore, these minimum prices can be reasonably viewed as a lower bound on the estimated market price for the spectrum, and it is reasonable to consider that the market price estimate should be above the MBSA2 minimum prices. This is supported by the fact that the MBSA2 minimum prices fall at

¹⁴ The benchmarking output gives prices for 20-year licences as that roughly aligns with the (total) duration of new rights of use to be made available in the MBSA2.

¹⁵ Based on a discounted sum of SUFs and the lowest possible SAF given the auction reserve prices, using ComReg's latest real mobile WACC estimate.

the lower end of the range of price estimates resulting from the benchmarking.

In the context of setting reserve prices for an auction, the implications of setting reserve prices incorrectly are asymmetric. If the reserve price is set a little too low, then additional rounds within the auction will be needed, but otherwise a similar outcome can be expected. However, if the reserve price is set too high, this could suppress applications, set the clearing price and potentially leave spectrum unsold. Therefore, it makes sense in this context to set reserve prices conservatively.

Arithmetic mean is the relevant metric for setting short-term licence fees

When setting minimum prices for the MBSA2¹⁶, we used the geometric mean of the benchmarking data points as the relevant metric. This was because, in the context of the benchmarking data, the geometric mean was more conservative than the arithmetic mean, putting less weight put on higher price observations. The result is that setting minimum prices with reference to the geometric mean meant that we could be more confident that clearing prices would ultimately be above minimum prices.

However, for short-term licences we are seeking a best estimate of market value, rather than a deliberate underestimate (as when setting minimum prices). In setting fees for short-term licences, there are adverse consequences both from setting fees too low and too high. If fees are set too low, this risks discriminatory treatment in favour of short-term licensees and various competitive distortions (as discussed above in Section 3.5). Setting fees too high could lead to MNOs not exercising their option to use short-term spectrum; however, this may not necessarily be inefficient (for example, if an operator wants to move to a different configuration of spectrum on the long run and judges that the MBSA2 auction might be held soon).

Therefore, the geometric mean is likely to be too low to be the most relevant reference point for this purpose. Instead, we believe that in this instance the arithmetic mean is the more appropriate metric, as this gives equal weight to all observations, rather than reduced weight to higher observations. This reflects that we have no particular reason to treat the adverse consequences of the estimate of market value being too high or too low as being of very different magnitudes.

The benchmarking analysis reports results for several different samples, specifically:

¹⁶ See ComReg documents 19/59b and 21/39b

- all observations from competitive awards in the last 10 years;
- all observations from competitive awards in the last five years;
- all observations from competitive awards in Europe in the last 10 years; and
- all observations from competitive awards in Europe in the last five years.

In all cases, we have taken measures to exclude any observations that would, by generally accepted criteria, constitute outliers.

European awards in the last 5 years is the relevant sample

The most relevant of these sample/subsamples for the purpose of setting short-term licences prices is observations from competitive European awards in the last five years. We expect that European awards are most likely to reflect market conditions in Ireland, whilst looking only at the last five years better takes into account more recent developments (and expected future developments) in technology and demand conditions than if we look at awards much further in the past.

On this basis, a reasonable starting point for setting fees for short-term licences is therefore the mean for competitive European licences in the last five years, specifically:

- 0.52 €/MHz/Pop. for the 700 MHz band; and
- 0.27 €/MHz/Pop. for the 2.1 GHz band.

However, these estimates reflect the value of 20-year licences, whereas the short-term licences are for a much shorter duration (potentially only three months according to the Court). There is an argument that it might be appropriate to apply some discount to estimate the 20-year licence value for setting short-term licences fees. This is discussed in detail below.

4.4 Short-term licence discount

Spectrum falling within the MBSA2 Decision would have been assigned until February 2042. However, due to the stay in force pending the substantive judgment in Three's appeal of the MBSA2 Decision, it is not currently feasible for ComReg to assign long-term rights.

Assignment under short-term licences not guaranteed for the long-term

As we understand it, ComReg's current proposal with regard to short-term licences for the 700 MHz and 2.1 GHz bands is to put in place a framework for three months. ComReg will make provision for the possibility of a short renewal of no more than

a further three months. There is no guarantee that MNOs benefitting from short-term licences would necessarily win a comparable amount of spectrum once an auction of long-term rights can eventually be run:

- In the 700 MHz band, even if all lots are won by MNOs only, there is potential for outcomes other than all three MNOs winning 2 blocks each;
- In the 2.1 GHz band, it is likely that there will eventually be some wider reconfiguration of existing spectrum holdings, with operators seeking some mix of 2.1 GHz, 2.6 GHz and 2.3 GHz spectrum. Operators other than the MNOs may also win spectrum amongst these bands. Even if unsuccessful, competition from such bidders could affect the relative prices of different bands, in turn affecting winners' preferred mix of spectrum. This makes the eventual allocation of long-run rights across these three bands difficult to predict.

Furthermore, it is currently unclear when the MBSA2 auction might be run. The delay to the award might be relatively short but could feasibly last for several years.

Uncertainties may limit investment in 5G

Given these uncertainties about when the auction might run and its eventual outcome, it is likely that MNOs would not make significant sunk investments in new 5G network infrastructure on the basis of short-term licences. Investments may become stranded if an operator fails to secure necessary spectrum in the eventual auction of long-term rights. In their submissions to ComReg, MNOs indicated that short-term access to 700 MHz spectrum would be used to continue to provide 4G services, rather than to support 5G services requiring new investment.

Estimated value of 20-year licences may not apply directly to short-term rights, although the difference is likely to be small

The benchmarking exercise set out in the annex reports results for 20-year licences. The minimum prices set in the MBSA2 Decision assume similar long-term access and so are expressed in comparable terms. However, we need to consider whether it is reasonable to apply these estimates of market value directly to short-term licences, which do not provide long-term investment uncertainty.

While it is possible there could be some diminution of the value of spectrum access rights due to their short-term nature, there are several countervailing factors that limit this impact:

- Every MNO is in a similar position, so each may be limited in their ability to invest by the short-term nature of short-term spectrum access, which also means that rivals are less

likely to pursue investments to gain a competitive advantage;

- Although part of the additional revenues associated with new 5G services may be delayed, the large and costly investments associated with bringing 5G to the 700 MHz band and bringing various capacity bands into use are also delayed; and
- Coverage obligations on the 700 MHz band set out in the MBSA2 Decision (which would negatively impact on the value of long-term rights of use) do not apply.

Estimating the impact of short licences on value

Overall, it is difficult to assess the magnitude of the impact on spectrum value from only awarding short-term use rights, rather than long-term licences. Whilst it is possible this could have adverse effects on investment incentives, the magnitude of the profitability impact on MNOs – and so the consequence for market value of the spectrum – is much less certain and may be limited by the mitigating factors above.

If long-term access to additional spectrum, especially the 700 MHz band, leads to vigorous competition for 5G traffic, including from new market segments, through new investment in network infrastructure and innovative services, it is even conceivable that, because of the oligopolistic market structure, MNOs could benefit if this competition is deferred for all of them by delaying the award of long-term rights.¹⁷ [✂]

Full modelling of the valuation implications of short-term spectrum access would require consideration of the risk associated with MNOs losing access to short-term usage rights once an auction is run and the implications of MNOs who are inflexible in accommodating changes to their spectrum holdings. Such analysis is clearly infeasible without detailed

¹⁷ Whilst the value of an opportunity to a single party will necessarily be reduced if constraints are imposed on that opportunity, this is not necessarily the case for several parties engaged in strategy interaction, as rival behaviour may change in response. The MNOs constitute a small oligopoly and the effect of rivals' investment being held back by lack of long-term access to spectrum.

knowledge of MNOs' investment planning and their assumptions about possible future auction outcomes.

An alternative, more simplified, approach is to suppose that the value of long-term licences is accrued to a greater extent in the tail end of the licence, where benefits from earlier investments are accrued. The overall value of a licence represents the present discounted value of the incremental profits associated with that licence. We might assume that these grow over time, so that a smaller part of the overall value of a licence should be ascribed to its earlier years than its later ones.

The table below shows the implications of various assumptions about the rate of growth of the incremental profitability due to a 20-year licence. For example, if we assume 1% annual growth, then this means that profitability in the final year is 22% higher than the first year. Assuming a 3.36% real discount rate, the profitability growth implies that 6.2% of the value of the licence – which is the present discounted value of the incremental profits due to the licence – is due to the first-year benefits. If we had assumed instead that the value of the licence was the same (i.e. the same present discounted value of benefits to the licensee), but that incremental profits were constant over time instead, then about 6.7% of the value of the licence would be due to the first year. Therefore, assuming a growth in incremental profit of 1% per annum lowers the implied first-year profit by about 8% relative to assuming flat profits over time.

Table 2: Incremental profitability of a 20-year licence under different growth rates

Assumed growth of profitability (per annum)	0%	0.5%	1%	2%	4%
Final year profit to first year profit ratio	100%	110%	122%	149%	219%
First year to licence value ratio	6.7%	6.5%	6.2%	5.7%	4.7%
Implied discount relative to flat profitability	0.0%	-4.0%	-8.0%	-15.7%	-30.1%

Some short-term licence discount might be appropriate, but is not essential

We lack information to determine what part of the overall value of a long-term licence is ascribable to its early years. Indeed, with long-term access to spectrum through a new licence, it might be reasonable to expect initial heavy investment by an operator, followed by recouping of that investment over the remainder of the licence. In the absence of firm long-term access, that initial investment might not be forthcoming, and the operator might simply continue operating as usual (for example, continuing with 4G service in that band rather than investing in 5G). Therefore, it is not impossible that the restriction on competition created by only short-term usage rights being available could even boost the value of spectrum in the short-term relative to long-term rights of use, which would likely be associated with heavy investment in the short term.

For these reasons, we consider that it is not essential to discount the estimated value of a long-term usage right to determine a fee for short-term spectrum use and that it would be reasonable simply to apply the 20-year benchmark price, amortising this in a constant stream of payments. Even if an operator won a long-term spectrum right and made new investments associated with that spectrum, the benefits of that investment would not materialise immediately. The initial benefits of a long-term licence would in any case be associated with additional spectrum used within a 'business as usual' scenario where existing services are maintained and improved, much as with a short-term usage right.

Nevertheless, some caution is appropriate given the uncertainties involved. The indicative calculations above show that it is possible that a short-term licence might be worth less than the value of a long-term licence might imply if we alternatively amortise the 20-year value into an increasing stream of benefits rather than a constant one. A 'discount' in the range of 5-15% is plausible on this basis. However, larger discounts beyond this range become implausible because they implicitly assume that the incremental profitability due to a long-term licence is very much larger in its final years than its initial ones:

- Whilst there may be strong growth in data traffic, and new services offered, these also come at significant cost in terms of network build. Experience to date is that consumers have tended to spend broadly similar sums on mobile services whilst data allowances and data use has grown. Therefore, the incremental profitability associated with the licence cannot be expected to grow in line with data traffic.

Furthermore, the incremental profitability associated with a licence will always be constrained by competition with rival operators and the need to make costly investments to maintain competitiveness.

- If it were the case that the incremental profitability benefits of spectrum were expected to grow strongly over time as a general feature, then we would expect to see a strong upward time trend in spectrum prices. This is not shown in the benchmark data from other award processes.

For these reasons, we conclude that it may be reasonable to make some reduction in the estimated benchmark price of long-term licences to reflect possible reduced value associated with short-term licences to control the risk that MNOs inefficiently choose not to take up the option of short-term spectrum access, but this discount should be modest. Equally, it may be reasonable to make no such reduction for the reasons set out above. However, a substantial reduction is not justified and comes at the risk of discriminatory treatment in the MNOs favour and associated competitive distortions (as discussed above).

4.5 Proposed prices for short-term licences

Calculation of proposed prices for short-term licences

This section sets out our proposed fees for short-term licences. In summary, we recommend fees for 3-month short-term licences of:

- EUR 401,000 for each 2x5 MHz block in the 700 MHz band; and
- EUR 212,000 for each 2x5 MHz block in the 2.1 GHz band.

These have been calculated as follows, for each band:

- Start with the mean price resulting from the benchmarking analysis based on the sample of competitive European awards in the last five years. These are 0.518 €/MHz/Pop. for the 700 MHz band and 0.273 €/MHz/Pop. for the 2.1 GHz band, each assuming a 20-year licence;
- Apply a 10% reduction to the mean to account for the short-term nature of short-term licences though, as discussed in Section 4.4, this is a cautious approach and the discount may be unnecessary;
- Calculate a price for a 20-year licence for a 2x5 MHz block, using the latest CSO population data;

- Amortise the licence value into annual payments using a real interest rate (calculated as the mobile WACC of 5.46% less assumed inflation of 2.1%) assuming a constant annual profit stream over the 20-year licence duration;
- Divide the annual price by four to give a price for a 2x5 MHz block for a three-month period (or whatever short period ComReg may choose for short-term rights).

Details of the calculations are set out in the table below.

Table 3: Calculation of short-term licence fees

		700 MHz	2.1 GHz	Units
Benchmark (mean, last 5 years, EU competitive awards)		0.518	0.273	€/MHz/pop (2022 prices, 20 yr licence)
Adjustment for short-term licence	-10%	0.466	0.246	€/MHz/pop (2022 prices, 20 yr licence)
Latest CSO population	5,123,536			
Price per 2x5 MHz block (20-years)		23,885,925	12,588,528	€/MHz/pop (2022 prices, 20 yr licence)
Real interest rate (assumed future inflation)	3.36%			Nominal WACC of 5.46% less assumed inflation of 2.1% per annum
Amortisation (value for first year / value for 20 years assuming a constant profit stream)	6.72%			
Price per 2x5 MHz block per annum		1,605,476	846,129	€ (2022 prices)
Price per 2x5 MHz block per quarter		401,000	212,000	€ (2022 prices), rounded to 3 s.f.

These prices are very close to the minimum prices currently set for the MBSA2, which were set in 2019 on publication of the

Draft Decision and have not been subsequently changed. Adjusting the MBSA2 minimum prices into current (July 2022) terms, by applying inflation of 10.45% (CPI since the publication of the Draft Decision) puts them at:

- 0.518 €/MHz/Pop. for the 700 MHz band; and
- 0.273 €/MHz/Pop. for the 2.1 GHz band.

The proposed fees for short-term licences are, therefore, well below (in the order of 10%) the MBSA2 minimum prices in current terms.

5 Other licence framework options

In this section we discuss alternative approaches to various aspects of the short-term licensing framework that could potentially be taken by ComReg, and why they do not form part of our recommendations.

In considering various options, the primary objective is to minimise disruption to existing services and consumers, although it is important to avoid unnecessary adverse effects, especially to the efficiency of the long-run allocation of spectrum once an auction is eventually run, that might result from the short-term licensing framework.

General concern over creating toe-hold advantages with alternative approaches

A general, and significant, concern is that granting access to spectrum through short-term licences in advance of the MBSA2 when not required for avoiding consumer disruption could in fact lead to unfair “toe-hold” advantages that might distort the outcome of the award of long-term licences when ultimately run. This has already been discussed in Section 3.1 above as a reason for restricting both which bands are included in the short-term licensing regime, and which parties may access these short-term rights.

If the spectrum could be used by an operator, for example, to invest in rolling out new services and negotiation of long-term contracts, that would create a strong imbedded need for that operator to win long term rights of use for the spectrum. Not only would the operator then have stronger incentives to bid more aggressively in the award for the spectrum in question than it might otherwise¹⁸, but other bidders, knowing the relative advantage of the short-term licensee, would face stronger winners’ curse, which would tend to exacerbate that advantage. Disadvantaged bidders might switch to other bands to avoid competing directly with advantaged short-term licensees. Therefore, there are various ways in which the short-term licensing could potentially affect competition for long-term usage rights once an auction can eventually be held. Approaches to short-term licences that give short-run access to spectrum without any clear need from the perspective of service

¹⁸ The operator’s relative valuation for the bands used with short-term licences would be increased compared to its valuations for other bands, due to the additional investment costs that would need to be incurred if winning spectrum in the other bands. Therefore, the bidder would be less willing to switch between bands than it would if it had not already rolled out services using a particular band through interim licensing.

continuity may risk creating distortions to long-run spectrum allocation through the creation of these toe hold advantages.

5.1 No short-term licences for 700 MHz and/or 2.1 GHz

Operators do not have any rights to use spectrum beyond expiry of existing licences. ComReg is not obliged to offer short-term licences, but may do so at its discretion if appropriate for meeting its spectrum management obligations. One alternative option for ComReg is, therefore, to not make short-term licences available for one or both of the 700 MHz and 2.1 GHz bands.

Service continuity is the main argument for 2.1 GHz / 700 MHz short-term licences

The main argument for making short-term licences available in the 2.1 GHz and/or 700 MHz bands is for service continuity to avoid disruption for consumers. Were this not a concern, there is no obvious reason for short-term licences to be offered at all. Moreover, making short-term licences available when not required for avoiding consumer disruption could lead to concerns over distortions to the MBSA2, as discussed above.

The need for 2.1 GHz for service continuity seems clear

For the 2.1 GHz band, the argument that the spectrum is needed by the MNOs for continuity of services seems clear cut, in particular for Vodafone and Three whose licences expire in October 2022. For Eir this is less important as its licence does not expire until 2027 and it has the option to liberalise its licence under the terms of the MBSA2 Decision in any case. There is a separate question, however, of whether Eir should still be granted access to a 2.1 GHz short-term licence, discussed further below.

The three MNOs have used frequencies in the 2.1 GHz band since 2002 or 2007 and it is not unreasonable to expect that the band is an integral part of their networks, irrespective of developments resulting from the COVID-19 pandemic. In their responses to ComReg document 22/63, all MNOs highlighted the importance of the 2.1 GHz band to their existing services, stating that significant degradation of service would occur if they were to lose access to the band, which would impact negatively on consumers. Three notes that it was able to reduce its holdings from 2x30 MHz to 2x20 MHz when its A licence expired in July 2022 but asserts that [X

Y].

In addition, we do not see any significant risk of distortion to the award outcome from issuing short-term licences for the 2.1 GHz band if these are assigned only for spectrum held under existing rights of use and so simply preserve the status quo. Investment in use of the 2.1 GHz spectrum will have already been made, including with regard to liberalised use of the spectrum which was already allowed under the terms of the Decision. Therefore, short-term licences for the MNOs, for no more than the amounts of spectrum already held and at prices that are not too low, are unlikely to change the position of operators going into the MBSA2 auction when eventually run.

700 MHz short-term licences appropriate but not essential

The situation is less clear for the 700 MHz band, as that was unused before COVID licences and access was only granted on an emergency basis to temporarily combat the impact of the Government's pandemic measures on mobile traffic. There is, therefore, a question over whether access to the 700 MHz band is still necessary for avoiding consumer disruption, given the removal of Government restrictions regarding COVID-19, and to what extent operators might be able to use short-term rights to invest in new services and gain an unfair advantage in the award of long-term rights of use.

In their responses to ComReg document 22/63:

- Vodafone highlights that it is reliant on the 700 MHz band to meet demand in rural and suburban areas that has arisen as a direct result of the pandemic, and that it would not be able to build the additional sites needed to avoid consumer disruption in the short-term should temporary access to the 700 MHz band be removed.
- Eir says that although data traffic growth has stabilised in 2022, it remains at an elevated level, and asserts that *"the effects of the COVID Pandemic remain as valid today as it did during the initial Government lock-down initiatives"*, citing continued effects of the pandemic resulting from a slow return to office working and continued remote working. Eir indicates that it is reliant on temporary access to the 700 MHz band to support greater dependency in rural areas, and that removal of access to the band would pose a significant risk of degradation in customer experience.
- Three also asserts that, although Government restrictions have been lifted, there has been a permanent change to working habits and the incidence of home working. It highlights the results of a survey conducted by the CSO in November 2021, which suggests the rate of working from

home has increased from 23% before the pandemic to 65% afterwards, and that many people (who can do so) would continue to work from home when pandemic restrictions are no longer in place. As with Vodafone and Eir, Three highlights the importance of the 700 MHz band for the provision of services to customers in rural and suburban areas (i.e. those the Government has targeted with its remote working policy) and that removal of access to the band would cause serious degradation or even loss of service to consumers across all three MNO networks.

We reiterate that use of the spectrum and investment in network deployment during the course of the temporary COVID licences does not confer an automatic right on operators to continue using the spectrum, as ComReg was always clear that spectrum access was being granted as an emergency measure. In particular, it is important to note that use of the spectrum in itself does not indicate a continued need for it to mitigate the direct impact of COVID, as that usage could simply be the result of meeting demand for new/improved services that would have been there irrespective of the pandemic. However, the evidence provided by the MNOs does suggest that even though COVID-19 measures have lapsed, traffic patterns have not returned (and may never return) to their previous structure. Therefore, the 700 MHz band is likely being currently used to support remote working, particularly in rural areas. While continuation of access to the 700 MHz band is not essential, there would be some risks to quality of service if the band were to become unavailable during the interim period.

In terms of the risk to the outcome of the MBSA2 through the creation of toe-hold advantages from short-term licences, this may be more of a concern for 700 MHz than for 2.1 GHz, given the requirement for investment in the 700 MHz band and the potential opportunities for deployment of new services that would not otherwise have been there in advance of the MBSA2. However, we note that those opportunities would already have been present for the MNOs under the COVID licensing framework, and investment in use of the 700 MHz band has already begun. We therefore do not envisage that granting short-term licences should have any substantial impact on the position of operators going into the MBSA2, provided that each MNO is limited to two blocks of 700 MHz and prices are not too low.

Overall, making spectrum in either the 700 MHz or 2.1 GHz bands unavailable during the interim period would pose a risk

of disruption to services and consumers in relation to the current services provided by the MNOs. Given the relatively low risk to the eventual outcome of the MBSA2 of allowing continued access to the spectrum to the MNOs on the basis of continuing existing spectrum holdings, on balance we do not recommend an approach where existing 700 MHz and 2.1 GHz licences are allowed to expire without measures to allow for continued access to the spectrum.

5.2 Short-term licences for 2.3 GHz and/or 2.6 GHz

Some operators, whether MNOs or others, may have a demand for (temporary) access to the 2.3 GHz and/or 2.6 GHz bands during the interim period, when long-term licences for those bands would have started if the MBSA2 had not been delayed. An option available to ComReg is, therefore, to consider making available short-term licences for those bands as well as for 700 MHz and 2.1 GHz. In its response to ComReg document 22/63, Eir suggested that temporary 2.3 GHz and 2.6 GHz licences could be offered on a site-by-site basis to accommodate operator demand until the award of long-term rights.

The 2.3 / 2.6 GHz bands are not needed for service continuity

However, making 2.3 GHz and 2.6 GHz available for short-term licences, at present, has no relevance for the primary objective of supporting service continuity and minimising consumer disruption. These bands have not been used to date for mobile services, and in addition we note that 2.6 GHz COVID licences were offered to the MNOs in April 2020 but were not taken up, suggesting that they were not necessary in addition to the 700 MHz and 2.1 GHz licences to mitigate the impact of the pandemic. Investment in use of 2.3/2.6 GHz short-term licences would presumably, therefore, be related to the rollout of new or improved services, rather than continuity of existing services. Therefore, we have concerns over operators gaining toe-hold advantages in the award of long-term licences, as discussed above.

Additional spectrum only needed if (new) exceptional circumstance arise

The only reason that we can see for making short-term licences available in these bands is if further significant changes in demand were to arise as a result of COVID-19 (or other unforeseen event) that meant additional spectrum was needed to support existing networks. However, it is very difficult to envisage such a situation arising, where the strain on networks

is worse than it was at the height of the pandemic to date. Were such an event to subsequently occur (and the MBSA2 delayed significantly), it would always be available to ComReg to take further action at that time.

Difficult to assign 2.3 GHz / 2.6 GHz spectrum if conflicting demand

A further concern is that delayed access to 2.3 GHz and 2.6 GHz spectrum could be disadvantageous for parties other than the three MNOs who may be interested in using this spectrum (for example, for wireless local loops). However, without the ability to run a competitive award process, it is difficult to see how ComReg could resolve conflicting demands on this spectrum.

Recommendation that 2.3 GHz / 2.6 GHz short-term licences are not made available

For these reasons we do not recommend making short-term licences available in the 2.3 GHz band or the 2.6 GHz band. ComReg may wish to retain the right to open up the spectrum (on a temporary basis) in the future if it determines there is a need to do so, but we would not expect circumstances in which it would be relevant to arise.

5.3 Short-term licences available to parties other than MNOs

Short-term licences for non-MNOs not needed for service continuity

Our recommendations set out above restrict access to the short-term licences to only the MNOs i.e. the current users of the spectrum. It is feasible that other parties may wish to gain access to the spectrum over the interim period, but this would be presumably for the purpose of deploying new services or expanding (rather than maintaining) existing services given those operators are not currently using the spectrum in question. Therefore, opening the short-term licensing framework to parties other than the MNOs would have no relevance for the objective of minimising consumer disruption.

Concerns over toe-hold advantages

In addition, because of the investment that would be required for those operators to use the spectrum and the potential to build an 'incumbent position' on the frequencies in advance of the award of long-term rights of use, the concerns about distortions to the outcome of the MBSA2 discussed above would be applicable.

For these reasons we do not recommend making short-term licences available to parties other than the MNOs.

5.4 Short-term 2.1 GHz licences not available to Eir

Eir does not strictly need a short-term licence in the 2.1 GHz band

Eir's 2.1 GHz licence runs until 2027, so it does not need a short-term 2.1 GHz licence to gain access to 2.1 GHz spectrum over the interim period. However, as discussed in detail in Section 2.2, its current long-term licence is restricted to UMTS/3G. Although it has the option to liberalise that spectrum and use it on a service and technology neutral basis under the terms of the MBSA2 Decision, it has not yet chosen to do so and is instead using the spectrum on a liberalised basis using a 2.1 GHz temporary COVID licence which expires on 1 October 2022.

Delays to the award also delays clarification on any liberalisation fee

The delay to the MBSA2 has the effect of delaying clarification of the price that Eir would need to pay for liberalisation of its existing 2.1 GHz licence, which under the MBSA2 Decision is determined from the auction result. Therefore, at least in theory, the delay to the auction creates some additional uncertainty for Eir about the price it might need to pay for liberalisation. However, it remains the case that Eir would be very unlikely to need to pay any additional fee for liberalisation, as it is paying much more for its current 2.1 GHz licence than our estimates of likely market value.¹⁹ Therefore, we consider that this issue is of little practical relevance.

Two options: Eir can get a 2.1 GHz short-term licence or not

ComReg has two broad options in terms of allowing Eir access to liberalised 2.1 GHz spectrum over the interim period:

1. Allow Eir to apply for a short-term licence that allows it to use its current 2.1 GHz holdings on a liberalised basis without needing to liberalise using the option provided in the MBSA2 Decision.
2. Do not allow Eir access to a short-term licence in the 2.1 GHz band as a short-term measure, requiring Eir instead to use the option provided in the MBSA2 Decision if it wishes to use the spectrum on a liberalised basis (noting that this would require Eir to commit to potentially paying a liberalisation fee when the MBSA2 award has been completed, though as discussed above we consider this unlikely).

¹⁹ See ComReg document 19/59a, Section 3.3.4

No benefit from forcing Eir to liberalise existing licence (or use restricted spectrum) over the short-term period

Our recommended approach is option 1. The only practical difference between the two is that under option 2 Eir would be committed to potentially paying a liberalisation fee for the period between the start of new 2.1 GHz licences and the expiry of Eir's current licence in 2027, depending on the outcome of the MBSA2. We see no reason for requiring Eir to be in that situation at this point and doing so would also be inconsistent with the approach taken by ComReg with the issuing of COVID licences. Also, the option to liberalise under the MBSA2 Decision has, arguably, become less useful for Eir due to the unknown length of the delay to the award process and Eir should not be penalised for this reason, but this is a minor concern given that no fee is likely to be paid anyway (in our view).

Previous arguments against temporary liberalisation option no longer applicable

In ComReg document 19/59a (our auction design report) we suggested that we would not want to create a situation where Eir could liberalise its current licence and then revert to using it on a restricted basis following the award and determination of its liberalisation fee. This was the reason for requiring Eir to liberalise for the full remainder of its licence term (and commit to potentially paying a liberalising fee) or not at all. Whilst we would still not view that as an attractive situation, effectively it has already been created by the (necessary) issuing of COVID licences, which has allowed Eir to use its 2.1 GHz spectrum on a liberalised basis but with the prospect of reverting to UMTS/3G use only in October 2022. Allowing Eir to use short-term licences, therefore, does not fundamentally change the situation as we now find it, but allows for Eir to choose between liberalising or reverting at a later date.

Short-term licence option for Eir supports continuity of services

We also consider that allowing Eir to apply for a short-term licence would be supportive of the objective to minimise disruption to consumers, especially if Eir could use the short-term licence at no additional cost, as proposed. In particular, even without access to a short-term licence Eir may choose not to use the liberalisation option in the Decision given the uncertainty over whether it would have to pay a fee later on. In this case, given that Eir has been repeatedly applying for the 2.1 GHz COVID licence, it is understood that it is now using the spectrum for providing consumers with services other than UMTS/3G that would need to be switched off and would face degradation/cessation of their services and presumably cause consumer disruption.

Recommend that Eir has access to a 2.1 GHz short-term licence

Given that there are some potential benefits from allowing access to short-term licences to Eir, that it would be consistent with the framework for COVID licences, and that there are no obvious downsides, our recommendation is to allow Eir to apply for a short-term licence in the 2.1 GHz band at no additional charge.

5.5 Relax constraints on spectrum allocations

Our recommendation is that the MNOs are able to apply for short-term licences for up to, but not exceeding, the amount of spectrum they hold under existing rights of use in each of the 700 MHz and 2.1 GHz bands on 1 October 2022. MNOs could opt for short-term access to less spectrum than they currently hold if they wish (for example, they might wish to do so in anticipation of holding a different mix of spectrum once the award is eventually run).

MNOs could be allowed to expand holdings via short-term licences

In theory, there could be scope to relax those constraints and allow the MNOs to apply for more spectrum where available. For example, under the premise that only the 700 MHz and 2.1 GHz bands are made available for short-term licences and only the MNOs would be able to apply for them:

- two 2x5 MHz blocks of 2.1 GHz spectrum are currently unused following the expiry of Three's A licence and its decision to take only one block under an interim A licence, and could be included in the spectrum available for short-term licences; and
- should any operator not take up a short-term licence for all of the spectrum currently used, the released block(s) could be reallocated to other operators.

No relevance for service continuity, and concerns over toe-holds

However, similar arguments apply in this case as for the option to allow access to short-term licences for parties other than MNOs. There is no basis for giving the MNOs access to more spectrum than they currently have on the grounds of service continuity and avoiding consumer disruption until the award of long-term licences. In addition, giving operators access to spectrum they are not currently using could allow them to generate a toe-hold advantage on that spectrum going into the award and affect the efficiency of long-run spectrum allocation, as discussed above.

General support from MNOs for continuation of existing holdings

In their responses to ComReg document 22/63, none of the MNOs claimed any need for access to additional spectrum beyond what they already have to avoid disruption to consumers. Vodafone and Three support the continuation of existing holdings, although Three notes, whilst recognising it may be out of scope of purpose of the short-term licences, that the two currently unallocated 2.1 GHz blocks might be used *"during the Interim or short-term licence period to "tidy-up" the assignments or prepare for transition"*. Eir believes an assignment of 2x20 MHz to each of the MNOs would be appropriate, suggesting that *"would be without prejudice to the long-term assignment of spectrum in this band"* but accepts that maintain existing holdings would be an appropriate backup to maintain efficient use of the spectrum until the award of long-term rights.

Rebalancing of spectrum holdings is for the MBSA2

Whilst we recognise that there may be some benefits from a potential redistribution of spectrum across the MNOs, it is important to recognise that it is not the purpose of the short-term licences to resolve any need for a rebalance of spectrum holdings, not least as this is not a process open to parties other than the MNOs. That is ultimately the role of the MBSA2 award, with short-term licences simply in place to maintain the status quo and avoid disruption to consumers in the interim period. In addition, the inclusion of the 2.1 GHz, 2.3 GHz and 2.6 GHz bands means the MBSA2 auction would allow for wider ranging adjustments to the portfolio of higher frequencies amongst operators, which is likely to be important to achieve an efficient allocation of these capacity bands, including possibly accommodating users other than the three MNOs. Contrary to the views of Eir, it would be potentially distortive to the outcome of the award process to effectively imbed a new assignment of 2.1 GHz spectrum in advance of the auction.

Beginning transition now risks discriminating in favour of MNOs

We have proposed that short-term licences would be restricted to the MNOs on the basis of existing frequency assignments. It would be inappropriate to facilitate any sort of transition process without participation from all parties who may win spectrum in the eventual award of long-term rights, not just the MNOs. Such potential future spectrum winners may be disadvantaged in the award of long-term licences if the MNOs are able to assert their preferences over frequency assignments without taking into account the interests of these other potential winners. Therefore, moving ahead with transition arrangements now risks discriminating in favour of the MNOs and we recommend that ComReg reject Eir's proposal for accelerated transition during any short-term licensing regime.

5.6 Tighter restrictions than current spectrum assignments

In theory, an option for ComReg is to restrict short-term licences such that one or more of the MNOs would not have access to as much spectrum as held under current licences.

Forcing a reduction in holdings risks disruption to existing services/consumers for no clear benefit

However, we do not see any clear need or benefit from applying such restrictions and would not recommend doing so. There are no competition concerns under the current holdings that would suggest any of the MNOs should face tighter restrictions, noting that the current holdings are compliant with the competition caps set for the MBSA2 award, and there are no efficiency benefits that we can see from freeing up some of the spectrum currently assigned to the MNOs and making it available to others on such a short-term basis.

In addition, all MNOs, in their responses to 22/63 have highlighted their reliance on all of the spectrum they currently have access to in both the 700 MHz and 2.1 GHz bands for maintaining existing services, in which case reducing the spectrum they have access to would risk a disruption to services and consumers. Even if operators' claims in this regard may be difficult to independently verify, the proposed prices should provide sufficient incentives for operators to not take up the short-term licences unless needed.

Therefore, there is no justification for preventing the MNOs from accessing short-term licences for up to their existing spectrum holdings in the 700 MHz and 2.1 GHz bands.

5.7 Delayed take-up of licences

In terms of applying for short-term licences, our recommendation is that the MNOs should be required to apply for all of the short-term licences they will want to use over the interim period when made available in advance of current licence expiry. There would be no scope for any operator to take up a short-term licence at a later stage if it had failed to do so when initially offered. Furthermore, if an operator were to initially apply for some, but not all, of the spectrum they were entitled to under the short-term licensing framework, they would not be able to apply for a short-term licence for more spectrum subsequently.

No justification for allowing delayed take-up

We do not see any clear need or benefit to allowing delayed take-up of short-term licences. The short-term licences are for avoiding disruption to existing services over the interim period, and if an operator does not need spectrum at the start of that period it clearly does not need it for continuity of services subsequently. Indeed, subsequent take-up would suggest that the operator was wanting to deploy new services, or somehow anticipate the award of long-term rights, which again raises concerns about toe-hold advantages.

ComReg may retain the rights to assign unused spectrum at a later date if it deems appropriate, but we anticipate that would only be relevant in exceptional and unforeseen circumstances.

6 Other pricing options

In this section we discuss other potential approaches to setting licence fees, and why they do not form part of our recommendations.

6.1 Temporary COVID licence fees

The MNOs support continuation of COVID licence fees (or similar)

For the COVID licences, operators were required to pay a peppercorn fee of €100 in advance of each licence issue or renewal. One option for ComReg would be to apply the same fees to short-term licences, and in their responses to 22/63, the MNOs have all supported this as a potential approach.

Low fees risks distortion to competition and long-run investment incentives

However, as set out in further detail already in Section 4, we do not believe it would be appropriate to set fees for short-term licences that are significantly below market price as:

- fees set below market price would give benefits to the MNOs that are not available to others solely because of a necessary administratively determined decision to restrict short-term licences to only the MNOs in order to prevent consumer disruption that could arise as a result of the delayed assignment of long-term rights of use in the 700 MHz and 2.1 GHz bands following the Court approved stay;
- setting very low fees (at, or close to zero) would risk distorting competition at the margin between mobile and other services;
- very low prices for 2.1 GHz short-term licences would create an asymmetry in prices paid by Vodafone and Three relative to Eir for comparable spectrum, potentially distorting competition amongst MNO; and
- allowing access to the spectrum for a fee significantly below market value risks distorting long-run investment incentives, leading to suboptimal use of spectrum in the long run.

We do not recommend fees significantly below market value

For these reasons we do not recommend setting short-term licence fees at the same level as for the Covid licences. The same arguments apply for other options that would lead to fees significantly below the market price of the spectrum (e.g. fees set to cover administrative costs only).

6.2 Based on future auction outcome

Option to retrospectively set fees based on the MBSA2 outcome

Starting from the premise that fees for short-term licences should be based on the market price of the spectrum (potentially with a small discount applied to reflect the short-term nature of the licences), one option would be to use the outcome of the MBSA2 to estimate prices for the relevant bands and apply prices retrospectively based on that. This would be similar to the approach proposed for determining the liberalisation fee, if any, that would be charged to Eir if it were to use the liberalisation option in the Decision.

This is arguably the most accurate way of establishing a market price for the spectrum in Ireland as it would be based directly on prices achieved for the spectrum in a competitive setting, although (if an auction with package bidding were to be used) even this approach would be complicated by the need to form an estimate based on package prices (rather than prices for specific lots/bands).

Potential for distorted bidding if outcome affects short-term licence fees

The main problem with this approach in the context of short-term licences is that it could lead to distorted bidding in the auction, in particular as all MNOs would have incentives to bid with the aim of keeping prices for the relevant bands low to reduce charges for short-term licences. This could reduce competition within the award and potentially even result in an inefficient outcome, as non-MNOs would not have such incentives and Eir would be in a somewhat different position to Vodafone and Three (as it would not be required to pay a fee for liberalised interim rights in the 2.1 GHz band).

Requires upfront commitment to pay an unknown fee

Furthermore, this approach would require operators to commit in advance to paying a fee at a level and for a period that is unknown. This poses a risk to operators and the uncertainty could even lead to some short-term licences not being taken up. Whilst we recognise Eir would face a similar risk in relation to a potential fee for liberalising its 2.1 GHz spectrum, the risk in terms of short-term licences is likely to be greater given our view that Eir would be unlikely to need to pay a liberalisation fee, whereas short-term licence fees would be paid for certain.

Retrospective pricing is not appropriate

For these reasons, we do not believe that retrospective pricing on the back of the award outcome would be appropriate.

6.3 Alignment with 2012 MBSA prices

An alternative approach to determining fees for short-term licences based on estimated market prices would be to use the prices achieved for similar spectrum in the 2012 multiband spectrum award in Ireland.

Possible to use 2012 MBSA outcome to set short-term licence fees

In particular, the fees for short-term licences in the 700 MHz band could be based on prices achieved in 2012 for the 800 MHz and 900 MHz bands, while the fees for 2.1 GHz licences could be based on the previous price achieved for 1800 MHz frequencies. However, given that the award was combinatorial (CCA) we would only be able to form estimates of the prices achieved. That would likely need to use a similar methodology to that proposed for establishing an estimate of the price achieved for 2.1 GHz Time Slice 1 spectrum for the purpose of determining a liberalisation fee for Eir.

Situation 10 years ago unlikely to represent the market now. Full benchmarking more appropriate.

One potential benefit that could be argued is that it would allow for basing fees on prices achieved in the context of the Irish market. However, given developments in technology and market conditions over the last 10 years, as well as the different positions of operators going into the awards, we cannot automatically assume that prices achieved in 2012 are reflective of market prices that would be achieved in the MBSA2 today. We believe, therefore, that using this single, outdated, observation to estimate current market price of the 700 MHz and 1800 MHz bands is likely to be less accurate than a full benchmarking exercise that pools a much greater amount of (more recent) information.

We therefore do not recommend using the 2012 MBSA prices to as the basis for short-term Licence fees.

6.4 Current licence fees (2.1 GHz only)

Using current 2.1 GHz fees consistent with setting fees for Three's interim A/B licences...

For the 2.1 GHz band, another obvious option for setting short-term licence fees would be to roll over the fees being paid by the MNOs for their current 2.1 GHz licences. This would be consistent with the approach to setting fees that would be charged to Three for interim A and B licences up to 15 October 2022 (an aspect of the MBSA2 Decision that was not challenged by Three's appeal), and with ComReg's approach to licence extensions in the past.

...but there are good arguments for deviating from past approaches this time

In ComReg document 20/122a we argued that, where possible, there was benefit in ComReg applying a consistent approach to licence extension fees in terms of predictability for licensees, and that “*there needs to be sufficient reason to use a different approach*”. In the case of the short-term licence fees in question, we believe there is a sufficient reason.

Fees for existing licences likely above current market value – potentially inefficient to charge above market value

The benchmarking exercises conducted for the purposes of setting MBSA2 minimum prices as well as supporting the conclusions of this report, suggest that the current market price of the 2.1 GHz spectrum is likely to be significantly lower than the fees paid for the current licences. Whilst the interim A and B licences for Three cover a relatively short period²⁰ (when current licence fees would still apply for the other two licensees), the same is not necessarily true for short-term licences beyond 15 October 2022.

Whilst the delay to the award (and the duration of short-term licences) could be fairly short, depending on developments in the legal proceedings there is potential for it to run for a longer period. That could be a long time to charge licensees a price that is expected to be above current market value (in particular during a time when revised licence fees – resulting from the MBSA2 – were expected to apply) and could even lead to short-term licences being inefficiently not taken up or returned to ComReg. On that basis, we believe that in these specific circumstances there is likely to be a greater benefit from using fees that are in line with estimates of current market prices than from applying consistency with past approaches to licence extensions.

Regulatory predictability unlikely to be undermined with different approach

Moreover, given the exceptional circumstances in which these short-term licences are being offered, combined with the expectation that current licence fees are greater than the expected market price, we do not envisage any risk of undermining regulatory predictability and altering expectations over how ComReg would deal with licence extensions in more typical scenarios.

Inappropriate to use Eir’s existing fees as justification for charging the same to others

We anticipate a potential argument that Vodafone and Three should be the same as what Eir is paying for equivalent spectrum over the interim period. For the reasons already discussed above, ComReg should avoid charging Vodafone and Three a fee that is significantly below market value (i.e. at or close to zero), giving them a large benefit that is not available

²⁰ Just under three months for the interim A licence, 2 weeks for the interim B licence.

to Eir, potentially distorting competition between the MNOs and potentially also distorting long-term efficient allocation and use of spectrum. However, it would also not be appropriate for the level of fees being paid by Eir for its existing licences to dictate what others must pay for new licences in the band. Whilst the fees for Vodafone and Three should be reflective of market value they do not need to be exactly the same as what Eir is currently paying, which was determined by circumstances when Eir's licence was originally awarded. Taking that approach would risk inefficient (short-term) use of the spectrum and potential disruption to consumers if Vodafone and/or Three were to not take up short-term licences solely due to excessive and unreasonable charges.

On the basis of the arguments above, we do not recommend setting 2.1 GHz short-term licence fees at the same level as current 2.1 GHz licence fees.

6.5 Non-zero price for Eir in 2.1 GHz band

A question that arises in the context of the 2.1 GHz band is whether Eir should be required to pay any fee for a short-term licence, given it would allow Eir to use the spectrum on a liberalised basis which it could not do under the terms of its current licence.

No justification for charging Eir a fee for a 2.1 GHz short-term licence on top of its current licence fees (unless that is lower than short-term fees for others)

The arguments around this option are similar to those made in relation to whether Eir would be required to pay a liberalisation fee for the period following expiry of Vodafone's 2.1 GHz licences (at which point new 2.1 GHz licences were expected to be in force). In particular, as discussed above, benchmarking of award prices achieved in other jurisdictions suggests that the fees Eir is paying for its current (restricted use) 2.1 GHz licence are very likely above the current market price of liberalised spectrum. Therefore, there is a good argument that Eir should not be required to pay any additional fee for liberalised use of the spectrum, provided that does not result in it unfairly paying less for liberalised 2.1 GHz spectrum than Vodafone and/or Three over the same period.

Our recommended prices for short-term 2.1 GHz licences to be charged to Vodafone and Three are below the level of fees for current 2.1 GHz licences. If ComReg were to adopt our recommendations, we therefore do not see any justification for charging Eir an additional fee for taking up a 2.1 GHz short-term licence. If, however, ComReg were to charge a fee in

excess of Eir's current licence fees (which we anticipate is highly unlikely), it would be appropriate for Eir to pay the difference. This approach is consistent with the principles behind the determination of any liberalisation fee that would be charged to Eir if it liberalised its licence via the option provided for in the Decision.

Annex A Benchmarking

In this annex we present the results of a benchmarking exercise, using the prices at which licences for the use of spectrum in the 700 MHz and 2.1 GHz bands have been sold under competition across different jurisdictions to form a reasonable expectation about the likely price at which licences would sell under competition in Ireland.

This analysis is similar to the benchmarking carried out for the purpose of determining recommendations on minimum prices for the MBSA2, but with some updates/differences:

- this benchmarking uses an updated dataset (including awards that were completed since the previous benchmarking exercise);
- we use an improved methodology for identifying competitively sold licences relatively to the previous benchmarking – previously a lot was included in the sample if any lots in the same award were sold above reserve (even if the lot in questions was not), but we now consider the price of lots individually to determine whether they are included;
- price adjustments (to give comparable observations) are carried out using the updated real mobile WACC in Ireland recently determined by ComReg;
- prices are now in current (2022) terms rather than in 2021 terms.

As we are interested in prices that emerge from competition, we only look at licences that sell above reserve prices i.e. where the price is set by the bidding process rather than by the regulator.²¹

To compare across different licences and awards, we adjust licence prices to reflect differences in licence duration, bandwidth and population, and convert them all to the same currency and base year.

²¹ Licences will only sell at reserve if there is no excess demand at that price. This could be a result of spectrum caps (which are quite common in relation to low frequency spectrum) preventing bidders from reflecting their full demand for spectrum at reserve prices. It is also possible that there was simply insufficient demand for the spectrum at the reserve price(s), irrelevant of any bidding constraints. In either case, the price at which such licences sold does not necessarily reflect opportunity costs, or the price at which excess demand would have been resolved if there had been competition. Therefore, we exclude such observations from our analysis

The benchmarking approach is widely used worldwide and has been used by ComReg as input for determining the minimum prices that apply when spectrum licences are sold by auction, including in relation to the upcoming MBSA2.²² A key difference between using benchmarks for setting minimum prices and for our purpose here of recommending short-term licence fees, is that with minimum prices we are interested in determining a conservative estimate of market value, but for the short-term licences we believe the fees should be set closer to a central estimate.

In summary, from our benchmarking exercise we estimate that the competitive price for 20-year licences in Ireland would be likely to be around:

- 0.45-0.55 Euro per MHz per capita for 700 MHz licences; and
- 0.25-0.35 Euro per MHz per capita for 2.1 GHz licences.

In both cases, our recommended price range is lower than the price achieved for spectrum open to competition in the most recent European spectrum auction for spectrum in these bands (i.e. the Belgian 5G auction), which provides reassurance about there not being a significant downward move in prices.

A.1 Benchmarking methodology

A.1.1 Observations

Our analysis draws on observations on the price of licences which sold above reserve in spectrum auctions that have taken place in the last ten years. The observations have been taken from our in-house spectrum awards database, which is based on data available in the public domain.

We have used two different samples, one for each band. Within each sample we check for outliers, where an observation is considered an outlier if the value:

- lies more than three standard deviations away from the sample arithmetic mean; and/or
- lies beyond the outer fence (the outer fence is defined as three times the interquartile range from the first and third quartiles respectively) from the median.

²² ComReg document 19/59b and document 21/39b (benchmarking update)

We have not identified any outliers.

When looking at summary statistics, we consider the full sample for each band, and also smaller sub-sets within each sample, specifically considering:

- only European auctions; and
- only auctions completed within the last five years.

We consider the most recent observation for both bands (the Belgian 5G auction) to be of particular interest, given that this is the most recent European auction of licences in these bands. In this award some spectrum lots were reserved for entrants (including some 700 MHz spectrum), and some for existing operators (including some 2.1 GHz spectrum). These reserved lots were sold in a preliminary stage at reserve prices and have been excluded from the analysis. Therefore, the price observations for the 2022 Belgian auction only reflect the price of lots that were sold under competition.

A.1.2 Comparability across observations

In order to obtain price figures that are comparable across different auctions:

- We have calculated a 'total price' for each licence as the discounted present value of the stream of all known fees for the licence (including not only the price determined in the auction, but also any ongoing licence fees where known, as bidders would take these into account when deciding what to bid for a licence). We use a real discount rate of 3.36%. This discount rate has been calculated as ComReg's 2022 estimate of the nominal WACC for mobile network operators (5.46% per annum), minus the inflation rate assumed for the calculation of the WACC estimate (2.1%).²³ This discount rate is slightly lower than the one used for the most recent benchmarking exercises performed in the context of setting and checking the minimum prices for MBSA2 (4.35%), which was based on the 2020 estimate of WACC for mobile network operators²⁴ and assumed inflation of 1.5%.
- We have normalised all licences to a common duration of 20 years (to broadly align with the total duration of new

²³ See ComReg documents 22/47 and 22/47a (https://www.comreg.ie/?d1m_download=weighted-average-cost-of-capital-annual-update-2022)

²⁴ See ComReg documents 20/122, 20/122a, 21/39b and MBSA2(21)046.

rights of use to be assigned in the MBSA2), assuming that the total price is a constant stream of monthly prices over the duration of the licence and using the real discount rate of 3.36%.

- We have converted prices to common currency terms. To do so we converted all licence prices to US Dollars using purchasing power parity PPP exchange rates²⁵ at the time of the corresponding award; adjusted for inflation using the United States Consumer Price Index (CPI) to express prices in 2022 terms; and converted them to Euro (again using PPP exchange rates).²⁶ Therefore, all prices are expressed in 2022 Euro terms.
- We have calculated the average price per MHz per capita (i.e. per population covered by the licence)²⁷ for spectrum in each band in each award.²⁸ Therefore, we have a single observation for each award.²⁹

A.2 Price for 700 MHz licences

The sample for prices of 700 MHz spectrum licences contains 22 observations, for the awards shown in Table 4.

Table 4: Sample for prices of 700 MHz licences

Award	Date
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²⁵ Price data is adjusted according to Purchasing Power Parity (PPP) exchange rates to reflect the value of the licence price relative to the value of a basket of comparable goods and services in that country. This allows us to account for differing levels of cost of living, tax structures and other factors which may affect the general level of prices across countries. PPP exchange rates account for price differences and levels of affluence between countries and are less prone to speculative fluctuation compared to a market exchange rate.

²⁶ For these calculations we used data provided by the IMF in their World Economic Outlook (WEO) database of April 2022 (<https://www.imf.org/en/Publications/SPROLLS/world-economic-outlook-databases#sort=%40imfdate%20descending>). The average inflation for 2022 is an estimate, which likely to be lower than actual inflation for this year given the evidence available so far. Therefore, in reality we expect 2022 prices to be somewhat higher than our estimates in this analysis.

²⁷ We use population figures provided by the IMF in their World Economic Outlook (WEO) database of April 2022 (<https://www.imf.org/en/Publications/SPROLLS/world-economic-outlook-databases#sort=%40imfdate%20descending>).

²⁸ For awards in which regional licences were assigned, the population coverage for each licence is the population in the corresponding region, rather than the country population.

²⁹ Where several licences for the same band were sold in the same award, the observation will only provide a weighted average price across these.

Fiji, multiband	24/07/2013
New Zealand, 700MHz	22/01/2014
Canada, 700MHz	13/02/2014
Brazil, 700MHz	07/10/2014
Germany, 700MHz, 900MHz, 1500MHz and 1800MHz	19/06/2015
France, 700MHz	24/11/2015
Finland, 700 MHz	24/11/2016
Saudi Arabia, 700 MHz and 1800 MHz	04/06/2017
Uruguay, 700 MHz and 1700/2100 MHz	05/09/2017
Paraguay, 700 MHz	04/01/2018
Saudi Arabia, 700 MHz, 800 MHz and 1800 MHz	11/02/2018
Tanzania, 700 MHz	08/06/2018
Italy, 5G	02/10/2018
Sweden, 700 MHz	11/12/2018
Norway, 700 MHz and 2.1 GHz	05/06/2019
Hungary, 5G	26/03/2020
The Netherlands, multiband	21/07/2020
Austria, 700 MHz, 1500 MHz, and 2100 MHz	11/09/2020
Greece, 5G	16/12/2020
United Kingdom, 700 MHz and 3.6-3.8 GHz	17/03/2021
Hong Kong, 5G	26/10/2021
Belgium, 5G	20/06/2022

The summary statistics of the adjusted price (Euro per MHz per capita) for the full sample and sub-samples are reported in Table 5. The mean is slightly lower when looking only at European auctions, but higher when we look only at the most recent five years. The geometric mean is higher as we narrow our sub-sample, by looking only at European auctions and when looking only at the most recent five years. The median is only affected by whether we look at the most recent five years, increasing slightly in this case, but not when looking only at European auctions.

Table 5: Summary statistics for 700 MHz observations

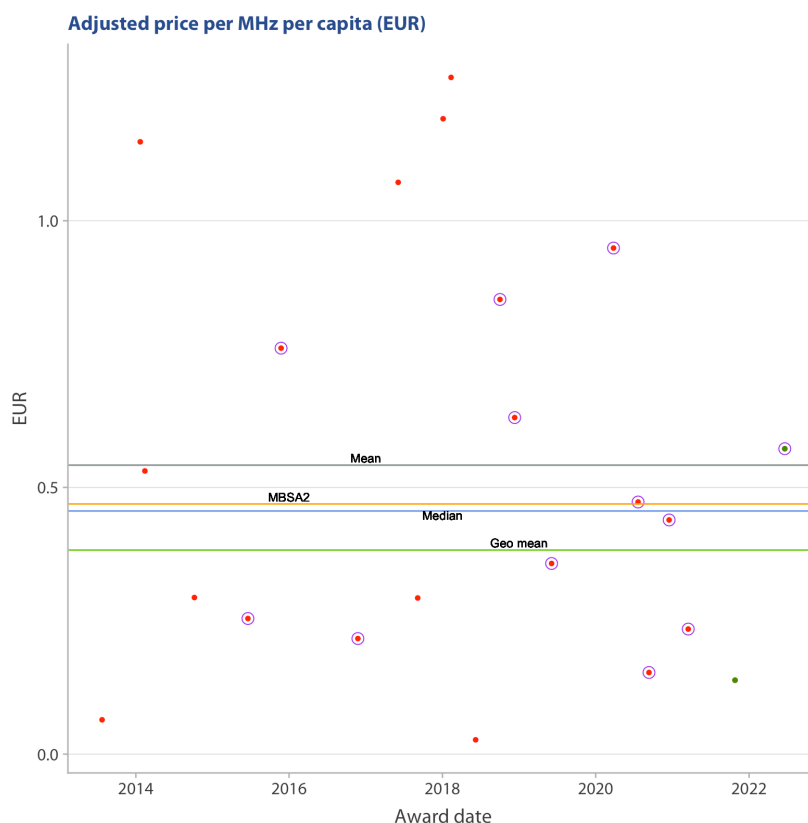
Sub-sample	No. of observations	Mean	Std. dev.	Geometric mean	Median
All	22	0.542	0.389	0.383	0.456
In the last five years	15	0.577	0.403	0.407	0.473
European	12	0.491	0.265	0.423	0.456
European in the last five years	9	0.518	0.265	0.451	0.473

Figure 1 plots the observations for prices of 700 MHz spectrum licences, each represented with a dot. The dots shown in green correspond to observations for awards that have taken place since the last benchmarking exercise performed in relation to

the MBSA2 minimum prices. Observations from European auctions are identified with a purple circle.

We also plot the mean (grey line), geometric mean (green line) and median (blue line) values for the sample and, for reference, the minimum price set for 700 MHz licences in the MBSA2 (0.469 Euro per MHz per capita, orange line).³⁰

Figure 1: Observations from 700 MHz licences



Given the observations available, we would expect the competitive price of 20-year 700 MHz spectrum licences to be centered around 0.45-0.55 Euro per MHz per capita. However, the price corresponding to the most recent European auction (the Belgian 5G auction) is in fact just above this range, at 0.573 Euro per MHz per capita.

³⁰ This minimum price has been calculated by adding the SAF and the stream of SUFs that would correspond to a 1-MHz, 20-year licence, using the discount factor of 3.36%, and dividing it by the provisional population figure provided in June 2022 by the Central Statistics Office for 2022 (<https://www.cso.ie/en/releasesandpublications/ep/p-cpr/censusofpopulation2022-preliminaryresults/>)

A.3 Price for 2.1 GHz licences

The sample for prices of 2.1 GHz spectrum licences contains 15 observations, for the awards shown in Table 6.

Table 6: sample for prices of 2.1 GHz licences

Award	Date
Colombia, 4G	26/06/2013
Peru, AWS	22/07/2013
Bangladesh, 3G	08/09/2013
Pakistan, 3G and 4G	23/04/2014
Hong Kong, 2.1 GHz	08/12/2014
Ukraine, 2100MHz	23/02/2015
India, 800MHz, 900MHz, 1800MHz and 2100MHz	25/03/2015
Turkey, 4.5G (4G) Auction	26/08/2015
Slovenia, 1800 MHz and 2100 MHz	08/08/2016
Slovenia, remaining 1800 MHz and 2100 MHz	05/09/2016
Hungary, 5G	26/03/2020
The Netherlands, multiband	21/07/2020
Austria, 700 MHz, 1500 MHz, and 2100 MHz	11/09/2020
Greece, 5G	16/12/2020
Singapore, 2.1 GHz	07/12/2021
Belgium, 5G	20/06/2022

The summary statistics of the adjusted price (Euro per MHz per capita) for the full sample and sub-samples are reported in Table 4. The mean is lower when we only consider the most recent (in the last five years) and European-only auctions. The median is slightly higher when looking at European-only auctions over the last ten years, but is lower when looking only at the most recent five years, whilst the geometric mean is lower both when we look at the most recent five years and when we look at European-only auctions.

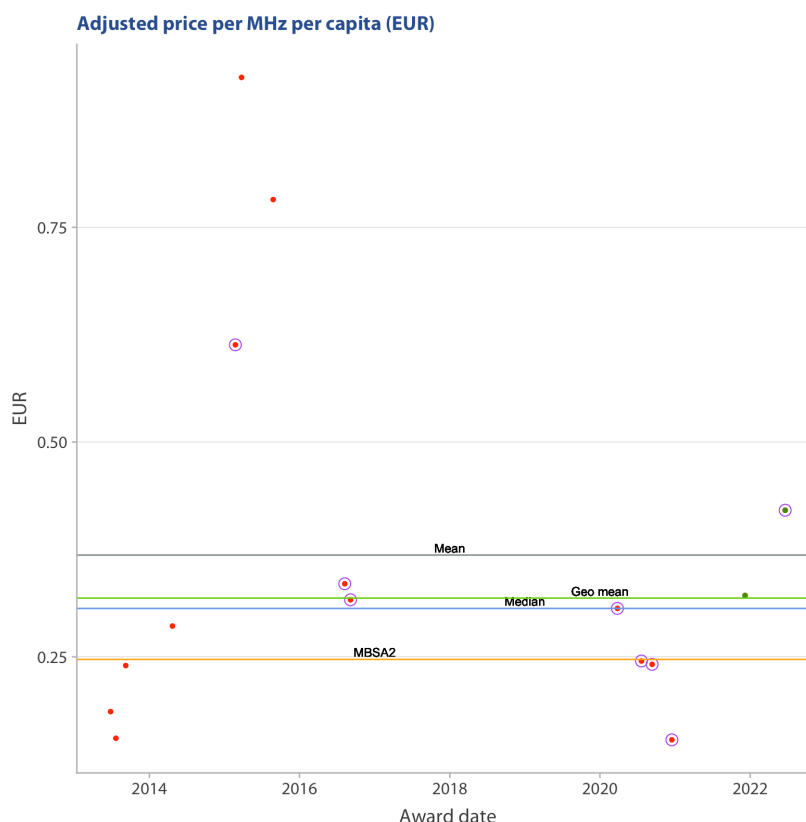
Table 7: Summary statistics for 2.1 GHz observations

Sub-sample	No. of observations	Mean	Std. dev.	Geometric mean	Median
All	15	0.368	0.229	0.318	0.306
In the last five years	6	0.281	0.090	0.269	0.276
European	8	0.329	0.139	0.306	0.311
European in the last five years	5	0.273	0.099	0.259	0.245

Figure 2 plots the observations for prices of 2.1 GHz spectrum licences. As in the corresponding figure for the 700 MHz band:

- each observation is represented with a dot, with green dots indicating new observations and purple circles indicating European auctions; and
- we also plot the mean (grey line), geometric mean (green line) and median (blue line) values for the sample and, for reference, the minimum price set for 2.1 GHz licences in the MBSA2 (0.247 Euro per MHz per capita, orange line).³¹

Figure 2: Observations from 2.1 GHz licences



Given the observations available, we would expect the competitive price for 20-year 2.1 GHz spectrum licences to be centered around 0.25-0.35 Euro per MHz per capita. However, as for the 700 MHz band, the price corresponding to the most recent European auction (the Belgian 5G auction) is also above this range, at 0.421 Euro per MHz per capita.

³¹ As for the price of 700 MHz licences, this minimum price has been calculated by adding the SAF and the stream of SUFs that would correspond to a 1-MHz, 20-year licence, using the discount factor of 3.36%, and dividing it by the provisional population figure provided in June 2022 by the Central Statistics Office for 2022 (<https://www.cso.ie/en/releasesandpublications/ep/p-cpr/censusofpopulation2022-preliminaryresults/>).

A.4 Comparability with MBSA2 benchmarking for minimum prices

There are a number of differences between the present benchmarking analysis and that which was used for setting minimum prices for the MBSA2 (the 'MBSA2 benchmarking'):

- The most recent MBSA2 benchmarking analysis was run in 2021, and the most recent ten years back then went back to 2010; the current cut-off point for the last 10 years is 2013, so observations included in the MBSA2 benchmarking that took place before 2013 have been dropped.
- We have adopted a new approach for identifying licences sold at competitive prices relative to when the MBSA2 benchmarking was completed. For the MBSA2 benchmarking we considered prices to be competitive if they were from an auction where any lots sold above reserve. However, this previous approach failed to identify cases in which some specific bands in multiband awards sold without competition, for example due to tight caps. In such cases, price observations reflected reserve prices, rather than competitive prices. Our current approach has been refined to deal with these cases, by only retaining price data for lots that sold above reserve. Therefore, some of the awards included in the MBSA2 benchmarking are now excluded.
- We have updated the real discount rate, reflecting the most recent estimate of the WACC (and inflation forecast) for the mobile sector (the current analysis uses a discount factor of 3.36%, whilst the MBSA2 benchmarking used a discount factor of 4.35%).
- In the current analysis we convert prices to 2022 Euro, whilst for the most recent MBSA2 reserve benchmarking prices were converted to 2021 Euro.

In this section we look at the impact of these changes by applying them in turn and calculating intermediate results. These are shown in Table 8 and Table 9.

Table 8: Step-by-step changes relative to MBSA2 benchmarking - 700 MHz band

Sub-sample	Summary statistic	Impact of...				
		Adding new observations ³²	Dropping pre-2013 awards ³³	Dropping observations at reserve ³⁴	Update of discount factor	Convert to 2022 Euro
All	No. obs.	26	25	22	22	22
	Mean	0.440	0.424	0.505	0.518	0.542
	Std. dev.	0.296	0.292	0.360	0.372	0.389
	Geo. mean	0.324	0.312	0.357	0.366	0.383
	Median	0.400	0.389	0.432	0.436	0.456
In the last five years	No. obs.	18	18	15	15	15
	Mean	0.459	0.459	0.536	0.551	0.577
	Std. dev.	0.314	0.314	0.371	0.385	0.403
	Geo. mean	0.332	0.332	0.378	0.388	0.407
	Median	0.426	0.426	0.452	0.452	0.473
European	No. obs.	15	15	12	12	12
	Mean	0.435	0.435	0.462	0.469	0.491
	Std. dev.	0.250	0.250	0.249	0.253	0.265
	Geo. mean	0.358	0.358	0.397	0.404	0.423
	Median	0.412	0.412	0.432	0.436	0.456
European in the last five years	No. obs.	12	12	9	9	9
	Mean	0.447	0.447	0.488	0.495	0.518
	Std. dev.	0.252	0.252	0.249	0.253	0.265
	Geo. mean	0.368	0.368	0.425	0.431	0.451
	Median	0.432	0.432	0.452	0.452	0.473
Belgium 5G	Value	0.537	0.537	0.537	0.547	0.573

³² The new observations added are for the 2021 5G award in Hong Kong and the 2022 5G award in Belgium.

(footnote continued)

³³ The observation dropped is for the 2011 Auction 92 in the United States.

³⁴ The observations dropped are for the 2017 multi-band award in Iceland, the 2020 700 MHz and 3600 MHz award in Luxembourg, and the 2020 5G award in the Czech Republic, as 700 MHz licences in these awards sold at reserve.

Table 9: Step-by-step changes relative to MBSA2 benchmarking - 2.1 GHz band

Sub-sample	Summary statistic	Impact of...				
		Adding new observations ³⁵	Dropping pre-2013 awards ³⁶	Dropping observations at reserve ³⁷	Update of discount factor	Convert to 2022 Euro
All	No. obs.	23	18	15	15	15
	Mean	0.442	0.369	0.341	0.352	0.368
	Std. dev.	0.341	0.292	0.208	0.219	0.229
	Geo. mean	0.338	0.296	0.296	0.304	0.318
	Median	0.287	0.273	0.285	0.293	0.306
In the last five years	No. obs.	8	8	6	6	6
	Mean	0.241	0.241	0.265	0.269	0.281
	Std. dev.	0.094	0.094	0.085	0.086	0.090
	Geo. mean	0.222	0.222	0.253	0.257	0.269
	Median	0.243	0.243	0.260	0.264	0.276
European	No. obs.	11	10	8	8	8
	Mean	0.267	0.283	0.306	0.314	0.329
	Std. dev.	0.146	0.143	0.131	0.133	0.139
	Geo. mean	0.233	0.252	0.284	0.292	0.306
	Median	0.252	0.268	0.286	0.298	0.311
European in the last five years	No. obs.	7	7	5	5	5
	Mean	0.233	0.233	0.257	0.261	0.273
	Std. dev.	0.098	0.098	0.093	0.094	0.099
	Geo. mean	0.213	0.213	0.244	0.248	0.259
	Median	0.234	0.234	0.234	0.234	0.245
Belgium 5G	Value	0.396	0.396	0.396	0.402	0.421

³⁵ The new observations added are for the 2021 2.1 GHz award in Singapore and the 2022 5G award in Belgium.

(footnote continued)

³⁶ The observations dropped are for the 2010 3G auction in India, the 2010 multi-band auction in Germany, the 2011 multi-band auction in the Republic of Korea and the 2012 3G auction in Thailand.

³⁷ The observations dropped are for the 2016 multi-band award in the Republic of Korea, 2017 multi-band award in Iceland, and the 2019 700 MHz and 2.1 GHz award in Norway, as 2100 MHz licences in these awards sold at reserve