



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

# Short-term licensing framework for spectrum rights in the 700 MHz and 2.1 GHz Bands from October 2022

DotEcon Report – Assessment of responses to Document 22/72 in relation to fees

**Reference:** ComReg 22/78a

**Date:** 21/09/2022

# Assessment of responses to ComReg document 22/72

Prepared for ComReg

21 September 2022

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# 1 Summary

ComReg is unable to proceed with award of spectrum through the MBSA2 process because of a Court-ordered stay on the Main Stage auction brought by Three. Given that Vodafone and Three have licences in the 2.1 GHz band that will soon expire in October 2022, some form of temporary licensing is needed.

Separately, early access to spectrum at 700 MHz at a nominal licence fee (€100) has been provided by ComReg's Covid-19 emergency licensing regime, which is also coming to an end in October 2022. Without further provisions for temporary access to 700 MHz spectrum there is a danger of adverse effects on network performance if traffic patterns do not fully revert to their pre-Covid state.

The respondents (Eir, Three and Vodafone) agree that there is a need for temporary licensing of the 2.1 GHz and 700 MHz bands to avoid consumer disruption. The area of disagreement with ComReg is the fee that should apply.

There are several potential concerns that arise from setting spectrum fees far below market value:

- If short-term spectrum is only made available to the MNOs, then they would enjoy a selective benefit;
- At the margin, such a benefit could distort competition with other communications providers;
- In the 2.1 GHz band, there is a further problem that a low price would selectively benefit Three and Vodafone, not Eir;
- A low price might encourage inefficient take-up of short-term usage rights to gain advantages in a subsequent award of long-term rights.

Whilst respondents argued strongly against the fourth concern above, the previous three were largely not addressed.

There is also a danger from setting fees for short-term licences too high, in that spectrum may inefficiently be left fallow. However, all respondents also argued strongly for the need for such licences due to the adverse impact of spectrum access being withdrawn at short notice. This strong need would seem to limit this risk significantly.

The potential for distortions if fees for short-term licences are set too low means that, contrary to the assertions of some respondents, the sole concern is not that all short-term usage

rights be allocated. Rather there is a balance of considerations. Setting a fee too far below, or too far above, the market value of the spectrum would not be compatible with ComReg's objective of optimal spectrum use.

Three argues at length that the fee should be zero on the basis that there is no opportunity cost, as short-term rights would be offered only to the MNOs, with each limited to a quantity that would prevent the possibility of competing demands. However, this fails to recognise that other users are precluded from using this spectrum only because ComReg was forced to make an administrative award in favour of selected operators due to the prevailing circumstances, not because other potential demand is absent. Other potential users are still present. Even amongst the MNOs there might be some contention for short-term rights if they were not restricted in the quantities they could take up.

ComReg's objectives are best met by setting a short-run fee based on market price. This exercise is made more difficult by the fact that ComReg has been compelled to make an administrative award of the relevant rights rather than use a competitive auction. Accordingly, a market price must be arrived at using other sources. To aid robustness, we have estimated a market price for long-term spectrum rights using mutually reinforcing cross-checks. First, we use data from auction outcomes in comparable other countries. Second, we also have confirming data from the MBSA2 minimum prices, where initial bids have been lodged by MBSA2 applicants and indicate that these minimum prices are not excessive. Finally, as a further cross-check also rooted in the Irish circumstance, we note that comparable bands awarded by ComReg in the 2012 MBSA process yielded prices far above those proposed here.

The MNOs have responded with concerns about the process for taking an estimated market price for long-term, 20-year licences and deriving a price for short-term licences from this. We have taken account of this. In particular, to derive the short-term fee, we amortise the long-term value and associate a small part (about 6%, given that future benefits of long-term licences are discounted by operators' cost of capital) to the initial year of the licence. Furthermore, to be cautious, we assume some growth in profitability over the course of the licence.

Some respondents have then suggested extremely large discounts be applied to this calculation due to the limitations of a short-run licence in terms of its ability to support long-term network investment (particularly in 5G). Eir suggests fees should be cut to a tenth of ComReg's proposal. However, this is

tantamount to suggesting that nearly all of the value of a long-term licence in the relevant bands is only delivered in its tail end and only once substantial 5G investment it made. This is clearly incompatible with the extensive use that is already being made of 700 MHz and 2.1 GHz spectrum for 4G services and the claims that there would be significant disruption if that access were withdrawn. These are not entirely *de novo* licences, but they continue to make available to the same operators access to spectrum that they have already had in extensive use for some time already.

In addition, claims that the value of a long-term licence should be assumed to be backloaded are incompatible with the accounting treatment that all the MNOs currently apply to spectrum licences, which uses straight-line depreciation.

We largely agree with the MNOs that significant long-term investment associated with 700 MHz and 2.1 GHz will be held back by a delay in the MBSA2 process if only short-run licences being available. However, this does not mean that short-run licences are not valuable to operators. Operators are already extensively using 2.1 GHz and 700 MHz bands, even though 700 MHz has only been made available to date on a temporary basis. Furthermore, as noted in our first report, there is an offsetting benefit, as competition associated with costly new 5G investment is deferred, as each MNO's rivals are in a similar position.

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## 2 Introduction

### 2.1 Background

In Document 22/72, ComReg set out proposals for a short-term licensing framework of up to 6 months duration to provide for rights of use in the 2.1 GHz and 700 MHz bands from the expiry of current licences in those bands in October 2022 (the 'short-term period'). ComReg's proposals were supported by recommendations from DotEcon, set out in the accompanying Document 22/72a.

The need for short-term licences has arisen due to an appeal of ComReg's Decision on the multiband award for spectrum in the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz bands (the 'MBSA2') and a subsequent stay on the award process pending a substantive decision on the appeal, meaning that ComReg will now not be able to issue new long-term rights in the 700 MHz and 2.1 GHz bands before expiry of existing licences. The primary purpose of the short-term licences would be to mitigate the disruption to consumers of existing services that would likely arise if operators ceased to have access to the spectrum in question over the interim period.

### 2.2 Proposals subject to consultation

In summary, the proposals set out by ComReg are as follows:

- Short-term licences would be available in the 700 MHz and 2.1 GHz bands;
- These licences would be offered only to the MNOs, who would be able to obtain short-term licences for up to the amount of spectrum held in each band at licence expiry on 1 and 15 October 2022 as appropriate;
- Short-term licences would allow for liberalised use of the spectrum on a national basis;
- They would run for an initial three months, with the potential provision to renew for a further three months;
- For each 3-month period, the following fees would apply:
  1. EUR 401,000 for each 2x5 MHz block in the 700 MHz band; and



2. EUR 212,000 for each 2x5 MHz block in the 2.1 GHz band<sup>1</sup>.

The fees proposed are based on an estimate of the market value of the spectrum following a benchmarking exercise, with the value of 20-year licences amortised into a quarterly charge, and a further 10% “discount” applied as a precaution in case the short-term nature of the licences reduced their value significantly. This meant that about 6% of the value of a 20-year licence was ascribed to cash flow benefits created by the licence in the first year (as later profits are discounted by the cost of capital of the operator).

In our first report (Document 22/72a) we noted that it was not clear what impact the short-term nature of interim licences would have on the value of spectrum. These bands are already in use and all operators have significant deployments of base stations using these frequencies. We understand from ComReg that the rate of roll-out has exceeded that of the 800 MHz band which formed part of the MBSA1 award in 2012. Indeed, the rationale for emergency Covid-19 licensing of the 700 MHz band was that spectrum could be brought into use sufficiently rapidly to meet new traffic demands caused by changed working and travel patterns.

In the longer run, the 700 MHz band is expected to become a key band for wide-area 5G coverage. Whilst having only short-run access to spectrum may impede significant investments associated with 5G, equally operators benefit from their competitors facing a similar restriction. Competition through the deployment of new 5G services and the associated investment expense may be deferred, to the benefit of MNOs, though this may also defer additional revenues from 5G (for example, from new services or market segments). The overall net effect on MNOs’ long-term profits is ambiguous and might even be a net benefit for operators’ profitability to the extent that a phase of more vigorous competition in deployment of 5G, especially to relatively expensive to serve rural areas, is restrained and expensive investment deferred.

For these reasons, it is better to interpret the “discount” being applied by ComReg to derive a fee for short-term access as a

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<sup>1</sup> The fees for short-term licences in the 2.1 GHz band would apply only to Vodafone and Three. Under the proposals, Eir would be offered a short-term licence at no additional cost given the fees for its current (restricted use) licence are above the level of fees considered appropriate for a short-term licence for 2.1 GHz spectrum.

precautionary measure given uncertainties around the value of short-term spectrum, rather than expression of a firm view that the market value of short-term spectrum access is materially lower than implied by simple straight-line amortisation of the market value of 20-year licences.

In our recommendations to ComReg, we considered fees based on market value to be appropriate, as lower fees would risk various distortions to competition. In particular:

- Charging fees significantly below market value would represent an unreasonable and selective transfer of resources to the MNOs resulting from the administrative decision to restrict access to the short-term licences to only the MNOs. In turn, this risks distortions of competition at the margin between MNOs and other services providing connectivity (e.g. rural Wireless Local Loop services);
- In the 2.1 GHz band, Eir would still be paying fees associated with its existing 2.1 GHz licence (which would continue throughout the interim period and whose price was previously set by ComReg in light of prevailing spectrum valuations at that time). Therefore, offering comparable spectrum to Vodafone and Three at significantly lower cost would provide a selective benefit to them and could potentially distort competition between the MNOs; and
- ComReg is proposing only to issue licences for a short period (three months, with possible roll-over for a further three months). Nevertheless, at the margin, allowing access to the bands at prices significantly below market value, even for a short time, risks distorting long-run investment decisions by operators. It is possible that an operator might retain spectrum in a band when it would have bought less or switched to a different band had the MBSA2 auction been run according to its original timetable. Where the operator makes network investment linked to that spectrum, this could lead to toe-hold advantages in a subsequent competition for long-term usage rights, leading to a distorted and inefficient allocation. Therefore, even though these spectrum rights are short-term, there is potential for adverse long-run consequences if these were made available at significantly below market value.

## 3 Overview of responses

ComReg received three responses to the consultation, one from each of the MNOs (Eir, Three and Vodafone).

In general, the respondents were supportive of the proposals to make short-term licences available for the 700 MHz and 2.1 GHz bands to cover the short-term period and agreed that the primary reason for short-term licences is to avoid disruption to consumers.

### 3.1 Arguments for lower fees

The main objections raised were in relation to the fees, regarding both the arguments for setting fees based on market value, as well as the methodology for calculating them and the benchmarking analysis. Our report, therefore, focusses on these topics.

The primary arguments advanced for lower fees varied significantly across the MNOs. In particular, Three raised objections to setting fees on the basis of market value at all, arguing that:

- ComReg has misinterpreted the Authorisation Regulations and there is no requirement for ComReg to set fees that reflect value; and
- ComReg often sets fees for spectrum rights with reference to opportunity cost, but in the case of these short-term licences there are no alternative users apart from the three MNOs and opportunity cost is, therefore, zero.

Whilst the other two MNOs argued that fees were too high, neither claimed that fees should be zero (or close to zero) and recognised at least the principle of a fee based on estimated market price in some form.

### 3.2 Distortions from low prices

None of the respondents, comprising the three MNOs who are also the incumbent licensees, provided a response in relation to the concerns about potential distortions to competition that could arise from fees below market value leading to the three MNOs enjoying a selective benefit not available to others. This

could affect competition between mobile and other services operating at the margin. It would also affect the relative treatment of MNOs within the 2.1 GHz band, where only Vodafone and Three would enjoy the benefit of a lower short-term licence fee (as Eir's existing licence would continue).

All MNOs disagreed with the suggestion that setting fees too low could distort long-term investment decisions that might then lead to toe-hold advantages in the award of long-term rights and distortions to the outcome of the award. The main argument provided against this, by all three respondents, is that 3-month licences are simply too short to allow for making any long-term investment decisions.

### 3.3 Estimating market value

All MNOs contended DotEcon's estimate of a market-based price was too high. There were various objections – most of a minor or technical nature, considered below – to the mechanics of the benchmarking exercise used to estimate the market price of long-term spectrum access. However, all three MNOs contended that larger discounts to reflect the short-term nature of this licensing were needed; one suggested a discount as large as 90%.

The MNOs' arguments for lower fees primarily revolve around their claims that the benchmarking exercise overstates the value of short-term licences (which the MNOs assert are not comparable to the long-term licences included in the benchmarks and offer little or no gains over the expected duration) and that the discount applied to counter this is too low.

Vodafone and Eir both appear to accept the approach of starting with a market value estimate for 20-year rights of use and then applying a discount to account for the short duration of the short-term licences. However, they are of the view that the discount recommended by DotEcon and applied by ComReg is much too small and does not adequately reflect the depressed value of short-term licences relative to long-term rights of use.

Vodafone suggests a modified approach where:

- The starting point is the value of 20-year licences used as the basis for setting the minimum<sup>2</sup> prices for the MBSA2 (which are 0.47 €/MHz/pop for 700 MHz and 0.25 €/MHz/pop for 2.1 GHz).
- For 700 MHz, the fee is reduced to reflect the limited use of the spectrum to MNOs, with a suggestion to reduce the starting price to [  $\times$  ■  $\times$  ] (i.e. a [  $\times$  ■  $\times$  ] reduction), in line with the percentage of its own sites at which Vodafone uses the band. Vodafone does not specify how the reduction would work for other MNOs, who may make greater use of 700 MHz spectrum at present and so would therefore pay more than Vodafone. In our view, this approach raises major concerns about the efficient use of spectrum, as it gives incentives to use spectrum at a limited number of base stations to reduce fees, leaving those frequencies fallow elsewhere. This would be clearly contrary to the requirement that ComReg set fees to promote optimal use of spectrum.
- For 2.1 GHz, Vodafone suggests the price should be at most the minimum price set for the MBSA2, but could arguably be lower to avoid choking off demand for short-term spectrum rights. Vodafone does not propose a specific price.

Eir simply suggests that the reduction on the benchmarked prices should be closer to 90% rather than the 10% applied by ComReg. No factual or theoretical basis for the 90% reduction is offered.

Three takes a different stance on the back of its arguments above, suggesting two alternatives:

- On the one hand it seems to be of the view that, since there is no need to set fees based on market value, fees set nominally or to cover ComReg's administrative costs would be appropriate (leading to a peppercorn fee being charged).

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<sup>2</sup> In the MBSA2 the "minimum price" consists of two elements, the "reserve price" and the "spectrum usage fees". The reserve price for spectrum lots is the lowest upfront price that a winning bidder will pay as a spectrum access fee (SAF). The SAF may be higher if there is competition for a lot in the auction. The spectrum usage fees (SUFs), set out in the MBSA2 Information Memorandum, are payable annually and are fixed in real terms and indexed by inflation. Therefore, winning a spectrum lot entails paying at least the reserve price and ongoing SUFs. The present discounted value of these payments is referred to as the "minimum price" in the MBSA2 documents. We maintain this terminology in this document.

- If ComReg does not take this approach, then Three considers that setting fees retrospectively based on the outcome of the MBSA2 should be considered, but gives few details.

Three also argues that the proposed method for determining a precautionary discount does not fully account for the short-term nature of the licences, arguing that the use of spectrum in the long term typically swings from loss making in the early years to profits later on. Three suggests, in the illustrative model applied by DotEcon that in determining an appropriate discount, it would be reasonable to set the assumed growth rate for free cashflows higher (to at least 8%), implying a larger discount.

## 4 DotEcon's response

In this section, we consider main arguments put forward by respondents. We defer consideration of detailed issues about benchmarking and the estimate of market prices to the following Section 5.

None of these comments from respondents leads us to revise the recommendations made in our first report.

### 4.1 Objectives

Eir commented that fees are *"excessive and punitive in the context of the rationale for issuing temporary licences with the sole objective of mitigating consumer detriment."*<sup>3</sup>

As set out in our first report, the overall objective of a short-term licensing regime is to ensure optimal use of spectrum. Without a short-term licensing regime, access to 700 MHz and 2.1 GHz spectrum would end with short notice, which could create consumer disruption, providing the underlying need for short-term licensing. However, consumer disruption is not the "sole objective" and a range of considerations come into play when setting fees for interim spectrum access.

In particular, as set out in our first report, there are a variety of concerns that arise if fees for short-term spectrum access are set at prices well below market value:

- the selective transfer of resources to the MNOs (as only they can benefit from such spectrum access);
- the consequent potential for distortion of competition at the margin between MNOs and other communications providers;
- Vodafone and Three having a selective benefit from access to 2.1 GHz spectrum at a low price unavailable to Eir; and
- the potential for encouraging inefficient take-up of short-term usage rights aimed at securing advantages in winning long-term spectrum rights once auctioned.

Respondents have primarily focussed on the final concern above, arguing that this ignores the fact that short-term licences do not provide any foundation for long-term

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<sup>3</sup> Eir response to 22/72, page 3.

investment decisions.<sup>4</sup> As we discuss in detail below, we do not disagree that short-term licences are less likely to support associated network investments, but the question of how access to short-term licences might affect a subsequent auction of long-term rights is much broader than this.

Notably, respondents largely did not address the first three concerns above at all. Irrespective of any debate about longer-term effects of short-term licensing, we maintain our conclusion that there are risks of distortions arising from setting fees too low.

There is also a risk from setting fees too high: that efficient use of spectrum might be discouraged. However, this risk is limited by existing users having a strong need for spectrum in the short-term if they have little time to make alternative arrangements if that spectrum were to become unavailable. This need is implicitly acknowledged by the MNOs when asserting that consumer disruption is a significant concern (as Eir does in the quote above).

In the context of very short-term licensing, there is likely to be a range of fees that are broadly compatible with both avoiding distortions arising from low fees and avoiding inefficiently pricing off operators. This is because over short time frames all the various economic actors with which we are concerned have limited ability to react and change their behaviour. Therefore, although there is inevitably uncertainty around estimating a reasonable market value for spectrum rights to set fees, significant problems are only likely to arise from setting fees much too high or much too low. As a result, we can tolerate uncertainty in estimates of market value.

Vodafone rightly notes that ComReg's objective is to ensure optimal use of the spectrum. However, Vodafone then argues that there are no feasible alternative users for this spectrum in the short-term, and hence no efficiency incentive to set a high price for short-term usage; ComReg's usual justification for charging market value does not apply. This is correct in the sense that spectrum prices – such as set within an auction – are typically used to resolve competing demands on scarce resources. However, potential competing demands for short-term access to 700 MHz and 2.1 GHz spectrum are being resolved by the administrative decision to offer limited amounts of spectrum solely to the incumbent MNOs. Whilst price might not, therefore, have a role in resolving competing demands,

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<sup>4</sup> Eir response to 22/72, page 3.



there are nevertheless still implications from setting that price too low or too high, as set out above. ComReg's objective of optimal use would not be met by prices are either much too high or much too low.

Three has claimed that DotEcon itself did not see a long-term risk of distortion to competition arising from the grant of either 700 MHz or 2.1 GHz spectrum in the short-term. Three highlights<sup>5</sup> the sections of DotEcon's report that say we do not envisage distortions to the outcome of the MBSA2 from giving MNOs access to short-term licences they already hold. Three says that the conclusions are not conditional on any particular licence fees applying. We disagree with this reading of our previous report. Three's quote in regard of 700 MHz spectrum explicitly says that the impact of operators going into the award should not be substantially affected by the award of short-term licences provided that "*prices are not too low.*"<sup>6</sup> To the extent that we did not state explicitly that similar considerations apply to the 2.1 GHz band, we now clarify that they do. Indeed, for 2.1 GHz interim licences there is the additional issue that low prices confer a selective benefit on Vodafone and Three, but not Eir.

## 4.2 Zero opportunity cost

There is no merit in Three's claim that opportunity costs are zero because only the incumbent MNOs would be given the option for short-term licences, and then also subject to limits on the number of blocks sought that would preclude any conflict caused by an MNO seeking to expand its holding of spectrum usage rights. This argument ignores that an administrative decision by ComReg is being made to grant access to spectrum selectively and prevent any competing demands.

By Three's logic, any situation in which an administrative selection of spectrum users had been made would imply that they had a zero opportunity cost, as other users would be precluded *by definition* once that selection had been made. This is an essentially circular argument. If it were correct, then no fees (or at most ComReg's administrative costs) could be recovered whenever an administrative selection of licensees had been made.

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<sup>5</sup> Three response to ComReg document 22/72, page 5.

<sup>6</sup> ComReg document 22/72a, Section 5.1.

There appears to be an implicit assumption within Three's argument that it would be infeasible for ComReg to grant short-term spectrum access to any other parties, or to in any way vary existing spectrum holdings of the MNOs in the relevant bands. Therefore, if there are no alternative outcomes in terms of how spectrum is used in the short-run, there can be no lost opportunities to set an opportunity cost. However, this argument is wrong for several reasons:

- It is implicit in the proposals that rolling over existing usage of spectrum in the two bands is *likely* the most efficient short-run use of that spectrum given the potential for consumer disruption. That is the underpinning assumption behind administrative award to only the incumbent MNOs, but this does not *in any way* imply that there could not be alternative users or allocations of this spectrum that could also generate value, and which are being precluded by the chosen method of administrative award. It may be that the existing users have a strong case for continued access to spectrum to avoid disruption, but by itself this does not mean that there are not alternative users for the spectrum.
- It is clearly feasible for ComReg to undertake alternative means of allocating short-term usage rights that would not automatically roll-over existing spectrum holdings for the MNOs. Notwithstanding concerns about avoiding consumer disruption due to the short notice if access to spectrum were lost, it might be possible to award only part of the available spectrum to the MNOs administratively to mitigate disruption, with the remainder opened to allcomers. This is not the recommended course of action for ComReg, as maintaining existing holdings for the MNOs is likely the efficient outcome in the very short term. However, other allocations of the available spectrum are clearly feasible in principle, implying that opportunity costs are not zero.
- Short-term spectrum rights going unused is not necessarily inefficient. If short-term licences were taken up at a zero price, this might, at the margin, create risks of various distortions. Avoiding such distortions and ensuring optimal use of spectrum requires setting a fee for short-term rights that is reflective of market value.

In regard to the final point above, Three argues that proposed fees for both the 700 MHz and 2.1 GHz bands are excessive, which presents a barrier to take-up that is not in the interests of end-users and, therefore, contrary to ComReg's statutory obligations. This is incorrect, as there is the possibility that if

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short-term usage rights are offered at sufficiently low fees (say zero or administrative cost for clarity), then take-up may lead to distortions that are not in end-users' interests:

- providing selective and preferential access to spectrum to just some parties at below market price may lead to distortion of competition;
- at a low price, there could be incentives to take up those rights with a view to gaining an advantage when eventually competing for long-term rights even if they had little short-run use.

In such cases, it would not necessarily be inefficient for those short-term rights to be unallocated if such a long-term distortion could be avoided.

Three has claimed that excessive fees have already led to short-term licences being turned down in relation to the 2.1 GHz Interim Licences offered under the MBSA2 Decision. These were options for Three to make a short technical extension (of at most a few months) on existing licence terms to align their licence expiry dates. Three held six existing 2x5 MHz blocks on which this option could be exercised (double that held by Vodafone or Eir in the band due to the Telefónica-Hutchison merger). We understand from ComReg that Three has chosen to extend its licence in regard of four of those six blocks.

However, this does not mean that this outcome is inefficient or problematic. Three has itself indicated that it is capable of continuing its services with [redacted]. Indeed, Three might be seeking to re-balance its spectrum holdings to create a more even portfolio of spectrum holdings across different bands after the MBSA2, rather than have a long-term position in the 2.1 GHz band. This possibility illustrates our earlier point about the potential for short-run spectrum allocation to have long-run effects: had Three been able to extend all six blocks for a peppercorn fee, it might well have done so – even though it appears that Three does not need all six blocks in the 2.1 GHz band – to benefit from the preferential price and to hold some incumbency advantage when competing for that band in the subsequent auction of long-term rights.

Three points to the €100 fee charged by ComReg for Covid-19 licences as evidence that the opportunity cost associated with temporary rights is likely zero and argues that it is now inconsistent for ComReg to set a higher fee based on market price. However, this is not a fair interpretation of ComReg 20/21

(the original consultation document setting out ComReg's proposals for temporary spectrum management following the Covid-19 emergency). ComReg only mentions the possibility of a zero opportunity cost in the context of allowing liberalised use by the MNOs of spectrum already licensed to them in existing technology-specific 2.1 GHz licences, where existing use clearly precludes any other users.<sup>7</sup> In regard of other bands, ComReg does say that "*opportunity costs ... are likely to be minimal so there is no basis for significant SUFs to be levied.*"<sup>8</sup> However, this is on the basis that any application should demonstrate that "*the spectrum rights applied for can be readily used*"<sup>9</sup> and that such use was likely optimal given the needs of the Covid-19 situation. This requirement effectively rules out any users for the 700 MHz band except the incumbent MNOs. Given the very particular circumstances created by this emergency and the need for ComReg to act quickly, it is unreasonable to now claim that this is a precedent.

A more relevant precedent is the extension of existing 2.1 GHz licences for Three under the MBSA2 Decision. These short extensions until October 2022 involve a fee equivalent to the original price of the existing 2.1 GHz licences (taking into account the shorter period of the extension). The proposed fee for 2.1 GHz short-term licensing after October 2022 is lower than this.

Finally, Three claims there is an inconsistency between charging a non-zero (or non-trivial) fee for short-term licences and the situation in the MBSA2 auction, where Three cannot bid for a third 700 MHz lot due to the sub-1 GHz cap and so cannot impose an opportunity cost on other winners of 700 MHz spectrum if Three wins two lots of 700 MHz itself. This is a very tenuous argument. It ignores that Three is unable to bid for a third block of 700 MHz spectrum in the MBSA2 auction for competition reasons; for the same reason, we can rule out any approach to short-term licensing of 700 MHz that resulted in Three having a third block of 700 MHz spectrum. However, this does not then imply that there are no potential alternative users for the two blocks of 700 MHz spectrum granted administratively to Three, including possibly the other MNOs, and so there may be non-zero opportunity cost.

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<sup>7</sup> ComReg 20/21, §3.61.

<sup>8</sup> ComReg 20/21, §3.65,

<sup>9</sup> Ibid.

## 4.3 Setting a market-based fee

Three's observation that ComReg is not *obliged* to charge full market price under the Authorisation Regulations is irrelevant. The Regulations say that ComReg *may* set a fee to ensure optimal use of spectrum.

As set out above and in our first report, there are a variety of reasons why ComReg's objectives would not be well met by setting a fee significantly below an estimate of market value, including selective enrichment of some or all MNOs, possible distortions of competition as a result and the potential for distorting the eventual allocation of long-term spectrum usage rights. Therefore, ComReg is clearly entitled by the Authorisation Regulations to set a fee, and a non-trivial fee is indicated by ComReg's objective of optimal spectrum usage.

## 4.4 Longer-term impacts

All the MNOs were dismissive of the potential that excessively cheap short-term usage rights could be distortive in that it might encourage take-up of short-term rights to build a "toehold" advantage when long-term rights are awarded by auction. The primary argument advanced was that there would not be associated investment in infrastructure triggered by short-term licences and so there could not be long-term effects.

All respondents argued that 3-month licences are too short to allow for making any long-term investment decisions. For example, Eir argued that temporary licences do not provide any foundation for long-term investment decisions:<sup>10</sup>:

- Long-term decisions can only be made when there is certainty over access to long-term spectrum rights. No MNO has guaranteed long-term access until after the MBSA2, so the conditions to support long-term investment are not currently present.
- Temporary licences are not to be used for new business i.e. 5G, which is the technology MNOs would most likely invest in with new long-term licences. Even if 5G were permitted in temporary licences, the uncertainty would prevent significant investment.

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<sup>10</sup> Eir response to 22/72, page 3.

Regarding the second point, it is not the case that ComReg is proposing any technological restrictions on short-term licences. These would be technologically neutral in the same manner as the long-term licences that MBSA2 would have awarded.

Nevertheless, we broadly agree that incentives for significant new infrastructure investment will be suppressed if spectrum bands critical for deployment are only available on a short-term basis. However, this observation from the MNOs that investment incentives may be weakened – which is not contended – does not adequately address our concerns set out in our first report about longer term consequences from short-term licence allocation.

Even in the most favourable case that the short-term licences lasted only 3 months, 700 MHz spectrum could be integrated to some degree into MNOs existing networks, even if significant new investments in 5G were yet to be made. Indeed, MNOs are already using 700 MHz spectrum to a degree in existing networks. Unwinding this situation entails some cost and disruption to MNOs, so there is some advantage conferred to incumbent users when competing for long-term rights.

A simple example illustrates the point. Suppose that one MNO had limited appetite for 700 MHz spectrum and might be price sensitive regarding how much it acquired in a future auction. (This is not entirely hypothetical, as Vodafone did not acquire any 700 MHz spectrum in the UK 5G auction in 2021.) This MNO might have an alternative long-run plan of relying on other spectrum bands if long-term rights for 700 MHz were judged too costly in a subsequent auction. However, if short-run usage rights are offered at a peppercorn fee, this might induce that MNO to change its plans and stick with using 700 MHz long-term. Its greater commitment to retaining 700 MHz spectrum could create a possible toe-hold advantage in a subsequent auction and may make rival bidders less likely to compete against it, reinforcing this effect.

It is important that we do not prejudge the eventual outcome of the MBSA2 auction once run. Whilst it may be likely that the available 700 MHz blocks end up being equally shared amongst all three MNOs, this is far from the only possible outcome and the auction will determine what long-run allocation of spectrum is efficient. At present, the three MNOs have taken different approaches to using temporary access to 700 MHz spectrum under Covid-19 licences. In its consultation response, Vodafone explained how it had taken a more selective approach to deploying 700 MHz spectrum within its existing network, not

least as changes in traffic patterns due to Covid-19 might at some point be reversed, with traffic moving back into urban centres; in contrast Three and especially Eir appear to have moved ahead with broader use of 700 MHz spectrum.

Therefore, there is some diversity in operators' views about how best to use short-term access to spectrum. If an operator judges that a cautious attitude to deployment of spectrum available on an short-term basis is available, it would be inappropriate to bias that decision by making further access to that spectrum available at far below a market price.

Clearly there are many possibilities, and such eventualities may not come to pass. However, we can see no good reason why ComReg would want to run the risk of such distortions to long-run efficient spectrum allocation by setting a fee for short-run spectrum access far below a reasonable estimate of market value.

## 4.5 Retrospective fees

An option suggested by both Eir (in its response to ComReg document 22/63) and Three was to set fees for short-term licences retrospectively on the basis of the MBSA2 auction outcome.

There appears to be some confusion amongst respondents over the approach that ComReg would take to the commencement date of long-term licences awarded by a delayed MBSA2 process. At present, the Information Memorandum sets out a start date. If this could not be achieved due to delay, then licences would start on a later date, with short-term licences in the 700 MHz and 2.1 GHz bands running for three months and with the possibility of a rollover for a further three months. Therefore, contrary to Three's assumption there would not be any overlap of short-term and long-term licences that could raise concerns about double-charging for the same usage right.

In principle, it would be possible to determine a price for short-term spectrum access after the MBSA2 auction is held on the back of the auction result itself. There are some technical details in terms of how prices for 700 MHz and 2.1 GHz lots could be extracted from a combinatorial auction in which bids are made for packages. However, this issue has already been addressed within the MBSA2 Decision itself, as an analogous calculation is proposed to calculate a liberalisation fee for Eir's existing 2.1 GHz licence. Therefore, this approach is feasible.

However, there are two significant problems with such retrospective pricing. First, although short-term licences are offered initially for 3 months, with the possibility of a 3-month extension, it is not known when the MBSA2 auction itself will be run. Even if a judgment is delivered on Three's substantive appeal by the High Court within the next few months, we cannot know the implications of that judgment and whether changes to the MBSA2 process might be required, with a potential need for re-consultation in some cases. This leaves MNOs with risks as they do not know (and cannot readily forecast) when the scale of these retrospective payments will become known.

Furthermore, the scale of these payments could even be determined by an auction process that is different to that set out in the MBSA2 Decision in currently unknown ways. If the structure of the auction changed following the High Court's judgment, any process for calculating retrospective payments that ComReg set out now – in advance of that judgment – may become infeasible, invalid or inappropriate. In our view, this issue of uncertainty about when the auction might run and what form the auction might take is sufficient to rule out retrospective pricing regardless of any other concerns that might arise.

The second concern is that, to the extent that bidders face payments for short-term licences determined by how they bid within the eventual MBSA2 auction, this may change their bidding incentives. The details depend on exactly how fees for short-term licences would be determined by the auction outcome. However, a simple example might be that competition amongst the MNOs for 700 MHz spectrum might be discouraged if this increases the retrospective price for short-term usage of 700 MHz. At present, there are good incentives for MNOs to compete for additional lots of 700 MHz created by the pricing algorithm used within the auction (core pricing, where prices are determined by opportunity costs set by losing bids, in effect a form of second-price auction where a winner's price is determined primarily by the bids of others, not its own bids). These incentives to compete for additional spectrum within the auction could be diluted by MNOs paying a uniform price for short-term licences determined by the auction.

Three considers that operators are not going to alter their bidding for 20-year licences to make a saving on a 3-month one. However, this observation is over-simplistic, as it fails to consider the specifics of the incentives provided by the auction




and how these might be changed. The pricing algorithm in the MBSA2 Main Stage auction is such that what winners pay is largely independent of what they themselves bid; their bids determine what they win, but not what they pay, which is determined by losing bidders and the reserve price set by ComReg (below which ComReg will not sell the spectrum rights of use). Therefore, we start from a position where there is little incentive not to compete for additional lots, as even if competing for more lots is unsuccessful, this does not raise the price that a bidder pays for winning a smaller number of lots. Therefore, we start with an auction that has good incentives for competition over quantities of spectrum. However, if we then add a retrospective price for short-term spectrum rights derived from the auction outcome, we create a situation where there is a price penalty from competing for additional lots. Therefore, it is clear that there would be a competition moderating incentive created, as we are starting from a situation in which such an incentive is largely absent.

Three's proposals for a retrospective price are not fully articulated but might be read at one point as suggesting that the MBSA2 licences could be left as commencing as currently planned. We are unclear on what exactly Three had in mind, and details of what happens if short-term licences are not simply reinstated by the eventual MBSA2 auction is not discussed. Nevertheless, suppose hypothetically the formal licence commencement dates for licences eventually awarded by the MBSA2 auction remain the same, then corrections are applied if the amounts of spectrum won in the auction differ from the amounts of 700 MHz and 2.1 GHz used under short-term licensing. There is a major flaw in this approach, as when the auction is run, then the MNOs will have already enjoyed the benefit of short-term licences. Even if the award allocated licences that are pre-dated to prior to the award, this does not affect their valuation, as this depends on the future utility of the licence once awarded. Therefore, such a scheme would effectively allow short-term use of spectrum for free. We are unclear if this is the approach that Three had in mind, but it is clearly untenable.

## 4.6 Discounts and market value

The most contentious matter concerns whether a discount should be applied to estimates of the market value of conventional long-term spectrum licences in the 700 MHz and

2.1 GHz bands. However, the MNOs responses vary significantly on this issue:

- Without prejudice to its view that prices should not be based on market value in the first place, Three suggests that the approach to calculating the discount inadequately reflects the value of long-term spectrum licences in their early years, and that the assumed annual profitability growth rate should be increased to 8% (effectively giving a larger discount);
- Vodafone's suggestion for short-term licence fees for the 2.1 GHz band is to set the price to (at most) what we have proposed anyway. The MBSA2 minimum price for 2.1 GHz (updated to account for the new Weighted Average Cost of Capital and Irish population estimate) is 0.247 €/MHz/pop (which Vodafone rounds to 0.25). ComReg's proposed price for short-term licences for 2.1 GHz is 0.246 €/MHz/pop. Therefore, Vodafone's concerns appear limited to the 700 MHz band, where it suggests a [  $\times$    $\times$  ] discount based on the number of sites deployed in that band. Vodafone appears to accept the broad principle of fees based on the market value of conventional long-term spectrum rights, but contends that the discount for short-term rights should be much larger for the 700 MHz band;
- Eir suggests a 90% discount for both bands, but this is unevidenced and no explanation is offered for why such a deep discount is justified.

In our first report, we made clear that there are conflicting effects at work on spectrum value if offered in a short-term regime rather than as conventional long-term licences:

- Short term access may impede associated investment in network facilities where these are linked to specific spectrum bands and would become stranded if similar long-term spectrum rights are not won at a subsequent auction. This avoids immediate investment costs, but also forgoes the future benefits of those investments once they pay back;
- At the same time, similar constraints apply to competitors, so there is a competitive benefit for MNOs through rivals being discouraged from making investments due to having only short-term spectrum access. Put simply, rivals cannot steal a march on one another, as the short-term licence regime applies equally to all MNOs. This restraint on competition is of significant value to MNOs within a concentrated oligopoly with only three network operators,

especially given the large scale of investment needed to deliver rural 5G services (where 700 MHz spectrum would clearly be important).

We largely agree with respondents' comments that short-term spectrum access is likely to suppress new network investments to some extent, especially rural 5G deployment in the 700 MHz band. However, respondents made little comment beyond this observation. In particular, they did not engage with the conflicting effects on spectrum valuation set out in our first report (and summarised above). We remain of the view that there are conflicting effects on valuation from spectrum only being available for short periods (one or two quarters) arising because of the oligopolistic nature of competition in the sector.

Whilst significant investment linked to particular bands may be impeded without long-term access to spectrum, equally existing spectrum is still usable within existing networks to provide both capacity and additional speed. We understand from ComReg that MNOs have been making significant use of 700 MHz spectrum within their 4G networks, with 700 MHz now in use at over 3,500 sites. Spectrum at 2.1 GHz is already well used as long licences are now coming to an end. Therefore, there is significant benefit to short-term spectrum licences deployed for 'business as usual' with existing network infrastructure. Indeed, the MNOs implicitly acknowledge this situation when agreeing with ComReg that short-term licensing is necessary to prevent consumer disruption.

In our first report, we presented a stylised model that took the net present value of a 20-year spectrum licence and amortised that value in an annual fee. We concluded that about 6% of the value of a 20-year licence could be ascribed to the first year given reasonable assumptions about the cost of capital.

With this stylised mode, we looked at various assumptions about the growth of the free cashflows associated with that licence (i.e. the difference between cashflows with and without the licence). Broadly, one might expect some growth in cash flows over time, but, as we noted in the first report, overall spending on mobile network services has not increased in line with data traffic and the increased capability of mobile devices. Therefore, there are limits on revenue growth, not least the share of consumers' income available to spend on such services. This is in any case a stylised model, as in practice there might be positive cashflows initially as capacity is added to existing infrastructure, turning negative when network investment is

made and becoming positive later once that investment is recouped.

In our first report, we presented a table (Table 2 in that report, reproduced as Table 1 below) showing how assuming various growth rates for free cashflows generated by a licence leads to different attribution of the overall value of a 20-year licence to its first year. The faster profits are assumed to grow, the more of the licence value is in its tail end and the smaller that part of its value ascribable to its first year.

*Table 1: Incremental profitability of a 20-year licence under different growth rates [8% case added]*

<b>Assumed growth of profitability (per annum)</b>	<b>0%</b>	<b>0.5%</b>	<b>1%</b>	<b>2%</b>	<b>4%</b>	<b>8%</b>
Final year profit to first year profit ratio	100%	110%	122%	149%	219%	466%
First year to licence value ratio	6.7%	6.5%	6.2%	5.7%	4.7%	3.1%
Implied discount relative to flat profitability	0.0%	-4.0%	-8.0%	-15.7%	-30.1%	-54.4%

In response, Three suggests that the assumed rate of profitability growth should be 8% or more per annum. We have added the case of an 8% per annum growth rate to the table (extreme rightmost column). This implies that at the end of a licence, profitability will be approaching five times greater than at the start of the licence (in real terms). We excluded such possibilities as implausible in our first report.

Three's view that this assumed growth rate of profits should be larger appears to be based on the observation that there will be negative cashflows associated with a licence when investments are made, followed by a later payback. However, such profit for cashflows does not by itself justify assuming a high rate of growth for cashflows, as what is relevant is the average rate of growth of profitability over the licence, rather than the detailed swings in profitability during the course of the licence.

A simple stylised example illustrates the point<sup>11</sup>:

- Suppose that during a 20-year licence, an operator has positive cashflow of +€1 for the first year (the new spectrum being used for business as usual prior to investing in associated network infrastructure);
- Cashflows drop to -€10 during the second year, when costly network investments are being made;
- For the remaining 18 years of the licence, the cashflow is +€2, so the investment has paid back, quickly doubling the initial cashflow.

This cashflow profile has a present discounted value of about €17 using a real cost of capital of 3.36% per annum (the rate assumed for mobile operators by ComReg for regulatory purposes and used through our benchmarking exercise). If the operator had not made the investment, then the "business as usual" cashflow of €1 per annum would have continued, giving a present discounted value of about €15. Therefore, the network investment is profitable, as it increases the present discounted value by about €2.

In this example, 5.8% of the overall value of the licence is ascribable to its first year. This is the case even though the steady-state profitability is assumed to double thorough a network investment (from €1 at the start to €2 after the investment),

To create a similar present discounted value through uniform growth of the cash over the licence (starting again from first year profitability of €1) only requires a growth rate of 1.65% per annum. This is because, although we are assuming the network investment has a substantial effect on steady-state profitability, there is also a substantial investment cost needed to deliver this. As a result, the impact on the investment on the attribution of long-term licence value to the first year is small. If instead the operator had not invested and just taken the "business as usual" cashflow of €1 per year, then about 6.7% of the overall present discounted value would be achieved in the first year, as compared with 5.8% if the network investment is made; this is roughly the same level of discount (10%) as suggested might be applied in our first report.

Therefore, there is nothing in Three's observation that a long-term licence might need a substantial network investment to

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<sup>11</sup> The exact numbers are unimportant and only establish a broad structure for relative cashflows at different times during the licence.

deliver future profits that necessarily implies a much smaller proportion of licence value in its early period. What this depends on is how much value a "business as usual" scenario can deliver from a licence as compared with making a new network investment to expand services.

Whilst this is only an illustrative example, it does show that for Three's argument that little value should be attributed to the initial period of a licence, then it is necessary for the associated network investment associated with the spectrum to yield large excess returns (in excess of the cost of capital). This is needed for cashflows at the end of the licence to be large enough and to raise the overall value of licence; if the cashflows at the start of the licence are unaffected by that network investment, this tends to reduce that part of the licence value attributable to the initial period. However, this scenario is implausible for two reasons:

- We would expect such excess returns from a network investment – in this case 5G investment - to be strongly constrained by competition between MNOs and limited to the cost of capital, plus possibly some further risk premium (associated with project risk and investment irreversibility);
- The bands subject to short-term licensing (700 MHz and 2.1 GHz) are already in extensive use by the MNOs. The argument that there would be significant consumer disruption without a short-term licensing regime could not arise otherwise. Therefore, there is significant utility in this spectrum even without associated investment in 5G.

Given Three's proposal that a higher cashflow growth rate should be applied to determine amortisation, we checked how the MNOs treat the cost of acquiring spectrum licences within their accounts. These costs are spread over the life of the licence using a depreciation schedule. All three MNOs use straight-line depreciation<sup>12</sup>, which assumes equal cashflow benefit from the licence in each year of its life. This is equivalent to a 0% growth of profitability assumption in the table above, equivalent to applying no discount at all.

If Three were correct that the incremental profitability benefit of acquiring a spectrum licence were so heavily loaded into the tail end of the licence, then straight-line depreciation would be inappropriate. Instead, economic depreciation of the licence

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<sup>12</sup> See the MNOs 2020 annual reports and financial statements at page 16 (Three), page 23 (Vodafone) and page 20 (Eir).

should be loaded onto its tail, which it is not. Therefore, Three's proposal appears inconsistent with its own accounting policy.

## 5 Benchmarking

The operators also provided comments on aspects of the benchmarking that they disagreed with:

- Eir highlighted several countries it considered should be excluded from the 700 MHz benchmarking because the circumstances in those awards (number of MNOs and/or amount of spectrum) did not reflect those in Ireland. It also (incorrectly) states that the benchmarks are not adjusted for differences in payment schedules;
- Vodafone and Three suggest that the revised approach to excluding lots sold at reserve was inappropriate as these still represent valid data points;
- Three also argues that the geometric mean should be used instead of the arithmetic mean.

In summary, we disagree with these comments and believe that the benchmarking as applied is appropriate.

The sample of awards considered was selected for objective reasons (i.e. by looking only at European awards within certain timeframes). Adjustment for income levels in different countries is made through the use of PPP (purchasing power parity) exchange rates. In a statistical exercise, it would be inappropriate to cherry-pick particular awards for exclusion. In any case, with a three network operator market, Ireland's mobile markets are probably less competitive than the European average, which in turn is likely to raise achieved spectrum prices in Ireland relative to those comparators.

The comparators should include only those awards where a price has been established by competition. In cases where lots were sold at reserve price, we are observing the consequence of the administrative decision to set the reserve price at that level. Clearly reserve prices could have been set at a different level, so there is less information in such outcomes than competitive awards, where prices reveal opportunity costs. Furthermore, given that EU regulators typically set reserve prices by benchmarking comparable awards within Europe, there is a danger of circularity if benchmarking exercises then include reserve prices set by other benchmarking exercises.

The exclusion of lots sold at reserve price is simply an improvement on the approach to avoiding prices that have been set administratively (rather than through bidding in an auction) that has been applied in all of our previous



benchmarking exercises<sup>13</sup> for ComReg. We remain of the view that this well-used approach is appropriate, noting that no objections to the old approach have been raised in the past.

Finally, we remain of the view that use of the arithmetic mean for the purpose of setting fees for short-term licences is the most appropriate approach here. As discussed in detail in our previous reports, the geometric mean gives a *conservative* estimate of market value and is appropriate for setting minimum prices *below* the level where we can reasonably expect final prices to be set by an auction process. This arises because the geometric mean gives less weight to auctions with higher prices. However, for the current purposes of recommending short-term licence fees we are looking to establish the *best* estimate of market value, for which it is better to give equal weight to all benchmark observations.

Furthermore, it is important to recognise that the benchmarking output only provides the starting point for determining fees. A discount is then applied to account for the short-term nature of the licences and the uncertainty over the impact of that on value. We can cross-check these results with other specific datapoints, including Irish-specific ones (as discussed in Section 6 below).

## 5.1 Views of respondents

Eir contests that several benchmarked countries are inappropriate and should be removed. Specifically, Eir suggests that observations from Belgium, France, Hungary, Italy and Sweden should be removed on the basis that they have four-player MNO markets and/or the amount of 700 MHz spectrum available was less than 2x30 MHz (with artificially constrained supply leading to higher prices), which is not consistent with the state of play in Ireland.<sup>14</sup>

Eir also is of the understanding that the benchmark data is not adjusted for differences in payment schedules. It proposes that where payments can be made in instalments, these must be adjusted for the time value of money.<sup>15</sup> Eir cited Italy and

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<sup>13</sup> In previous benchmarking exercises we excluded awards where all lots in the relevant band sold at the reserve price. We now exclude lots sold at reserve even if other lots sold at a higher price.

<sup>14</sup> Eir response to 22/72, page 4.

<sup>15</sup> Eir response to 22/72, page 4.

Belgium as examples of countries where payments could be made in instalments.

Vodafone and Three both expressed concerns over the revised method for identifying competitive price observations. Vodafone is unsure of the effect of excluding licences sold at reserve but suggests in those cases the reserve price is the market value. Three contests that spectrum sold at reserve represents the highest fee obtained for that particular assignment, so those references are as valid as any and it is incorrect to exclude them. Three also argues that if the spectrum was set aside for some purpose (e.g. for a new entrant) and sold at reserve, then that spectrum should not be discarded without adjusting prices for other spectrum to reflect artificially inflated prices resulting from a reduced supply for other bidders.

Three also highlights the use of the arithmetic mean as the reference point for setting short-term licence fees, rather than the geometric mean that was considered more appropriate by DotEcon and ComReg for the purposes of establishing minimum prices for the MBSA2. It contests that switching from using the geometric mean to the arithmetic mean seems inconsistent given the acknowledged uncertainty in using benchmarking and barriers to use of the spectrum that are created with excessive prices. In particular, Three makes reference to a passage from a previous report prepared by DotEcon<sup>16</sup> in relation to the approach to that which recognises the uncertainty associated with benchmarking, and the problems that creates for administratively setting fees for liberalised spectrum. On this basis, Three recommends that DotEcon continues to use the geometric mean for short-term licence fees.

## 5.2 Assessment of responses

### *Payments in instalments*

We first respond to Eir's suggestion that the benchmarking does not account for the time value of money where licence payments can be made in instalments, as this appears to be a simple misunderstanding. For the avoidance of doubt, when establishing price points for the benchmarking, adjustments for payments that can be made in instalments are made wherever the relevant information is available. In particular, a licence fee is

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<sup>16</sup> ComReg document 19/59a, Section 3.3.4

calculated as the net present value of the discounted stream of payments associated with that licence. Further details can be found in Section A.1.2 of ComReg document 22/72a (our previous report in relation to short-term licences).

Regarding the two examples highlighted by Eir:

- In Belgium, winning bidders were given the option of paying upfront or in instalments with the so-called 'legal interest rate' applied.<sup>17</sup> This rate (1.5% as of March 2022) is determined by the Belgian government for various contractual purposes and may change over time. For the benchmarking we assumed the fees were paid upfront as we are not aware of which option winners chose, nor what changes they might expect to the future legal interest rate. Whilst there is some difference in NPV between the two (depending on future inflation and operators' internal discount rates, which we cannot know and would need to make assumptions about), this difference is modest. Assuming all winners chose to pay in instalments rather than upfront causes the Belgian 700 MHz benchmark to fall from 0.572 to 0.510 €/MHz/pop (roughly a 10% change) and the 2.1 GHz benchmark to fall from 0.421 to 0.368 €/MHz/pop (roughly a 12% change). However, given that interest rates are likely to rise over time, this is very likely an overstatement of the benefits of the phased payment option.
- For the Italian award, the timing of payments for 700 MHz licences was incorrectly recorded in DotEcon's award database. We have now corrected this, and the revised corresponding price point is 0.747 €/MHz/Pop (previously 0.852 €/MHz/Pop).

Re-running the benchmarking using the revised data (corrected Italian data and assumed payment in instalments in Belgium) has a small impact on the overall results, with the mean (for competitive European awards in the last five years) falling from 0.518 to 0.499 €/MHz/pop for the 700 MHz band, and from

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<sup>17</sup> This rate is used to calculate interest payments if salaries or severance payments are not paid on time and for other matters involving deferred payment in civil contracts (but not punitive interest for late payments). It is set annually by the Belgian government and tends to track general interest rate movement. Historically, it has been as high as 12% during the early 1980's when inflation and interest rates were relatively high compared to today. Therefore, it might be expected that the Belgian legal interest will increase from its current value given the expectation of further significant interest rate increases being made by the ECB in the short to medium-term.

0.273 to 0.263 €/MHz/pop for the 2.1 GHz band. These changes are not sufficiently large to suggest that the fees proposed by ComReg (which are still below these benchmarks) are too high and need to be adjusted accordingly.

*Removal of specific observations*

In response to Eir's recommendation that a number of observations be removed from the 700 MHz benchmarking, we first note that prices achieved in spectrum awards are affected by a wide range of factors that will differ across countries and awards, including (but not limited to) the number of MNOs/bidders, the quantity of spectrum available (both within the band in question as well as potential substitutes), existing spectrum holdings, the auction format used, spectrum caps applied, any licence restrictions/obligation, and the characteristics of the market. No individual observation is going to be a perfect match for the state of play in Ireland. Rather we rely on a range of broadly comparable countries and then average, having corrected for income effects by use of a PPP exchange rate.

We focus on certain sub-samples of comparators, based on high-level differences that could reasonably be expected to affect general valuation levels, such as geographic location and the timing of awards. We particularly focus on European awards in the last five years, which we consider the most relevant set of comparable awards in the context of the MBSA2 in Ireland. We also exclude observations where prices are at reserve (i.e. where prices have been effectively set by the auctioneer rather than valuations revealed through a competitive process).

Benchmarking aims to pool information from multiple sources to give a reasonable estimate of the market average, effectively smoothing the differences across reasonably comparable countries/awards. Whilst some countries will have higher than average prices for whatever reason, others will have lower than average prices. Selectively picking certain parameters as the basis for excluding specific observations risks distorting the results of the benchmarking. While Eir seems to have selected awards with higher than average prices to exclude, we note that a similar exercise could be performed to find reasons for excluding observations where prices are lower than average.

Eir's proposal also seems to be based on the assumption that only three parties (i.e. the incumbent MNOs) would be interested in the 700 MHz band in Ireland and that spectrum prices will be moderated by weak competition for spectrum. Whilst we acknowledge the MNOs would appear to be the most likely users of the band, we cannot rule out the possibility of

entry following the MBSA2 or other bidders that, even if they do not win any 700 MHz spectrum, might have an interest in the band and influence the prices. It would be inappropriate to remove observations from the benchmarking based on an assumption over the number of parties interested in long-term rights when we do not know what that will be.

Indeed, given that there are only three mobile network operators in Ireland, it is likely that downstream mobile markets are somewhat less competitive than the European average. This might increase the value of spectrum licences relative to the average European country, contrary to Eir's assumption.

We, therefore, disagree with Eir that the observations it highlights should be removed from the 700 MHz benchmarks, noting also that Eir did not object to awards in France, Sweden and Italy being included in the benchmarking for determining the MBSA2 minimum prices.<sup>18</sup>

For similar reasons, we do not agree with Three that where observations are excluded as a result of lots selling at reserve due to being set-aside, adjustments to the prices for other lots in the award should be made to account for the reduction in supply. This is not an appropriate (or indeed feasible) approach. Such set-aside measures remove both supply and demand from an auction. It is impossible to know precisely how any individual factor will have affected the prices achieved in an award and what adjustment should be applied in response (noting that Three has not provided any details of what it considers appropriate).

*Exclusion of lots  
sold at reserve*

Vodafone and Three have both argued that it is incorrect to discard licences sold at reserve and that they are valid data points (with Vodafone suggesting that in those cases the reserve price is the market price). This is in relation to the approach where only lots sold at a 'competitive' price (i.e. a price exceeding the reserve) are included in the benchmarking, with other lots (sold at the reserve price) excluded. The main reason for doing this is that lots selling at reserve is often caused by regulators setting *overly* tight caps or reserving spectrum inefficiently, preventing competition for spectrum. The prices for these lots are therefore established by the auctioneer, rather than on the basis of valuations revealed through a competitive bidding process, and do not necessarily reflect the

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<sup>18</sup> The 700 MHz awards in Hungary and Belgium had not taken place at the time of preparing the benchmarking for the MBSA2 minimum prices.

opportunity cost of the spectrum or the clearing price if there had been competition.

To be clear, the principle of identifying and using prices from 'competitive' awards is not new in the context of our benchmarking exercises. Indeed, for the MBSA2 minimum prices, although we reported the output for all observations in our report, we primarily used the benchmarking output for the subset of European competitive awards in the last 10 years as the relevant reference point.

The only difference between the previous approach and the latest benchmarking for short-term licence fees is that we have this time used an improved method for identifying competitive observations. In the past, a lot was included as part of a competitive observation if any lot in the same award sold at a price above reserve. This meant that several lots sold at the reserve price would have been included in the estimate of market value based on observations considered competitive. With the updated approach, we now look at the prices of lots individually to determine which prices are competitive and exclude any lots that sold at the reserve price, irrelevant of whether other lots in the same award sold at a higher price.

Note that the previous approach also excluded lots that were sold at reserve (i.e. where all lots in an award sold at reserve) from the set of competitive observations, and no objection to this was raised at the time during the consultation process. Neither Vodafone nor Three has provided any argument as to why the exclusion of lots sold at reserve was previously considered acceptable but is no longer valid under the improved methodology.

For these reasons, we do not see any basis for revising the approach to the benchmarking in this regard.

*Use of the  
arithmetic mean*

Three has argued that the uncertainty over benchmarking and the consequences of setting fees too high means that it is more appropriate to use the geometric mean than the arithmetic mean as the relevant reference point for setting short-term licence fees.

In our original report, we have clearly set out the reasons why we believe the geometric mean is a more suitable metric for setting minimum prices in the context of an auction, as it helped in setting a conservative reserve price for the auction by giving less weight to relatively high price benchmarks. However, in the current situation we are trying to obtain a best estimate of price

and there is no reason to treat observations differently, making a simple arithmetic mean more appropriate. In particular:

- The consequences of setting minimum prices for an auction too high are more severe than if minimum prices are too low. Therefore, there is benefit in setting minimum prices conservatively. In this context, using the geometric mean (which is more conservative than the arithmetic mean) as the reference point for minimum prices is appropriate. It means that we can be more confident that minimum prices are strictly below the market value demand, that demand would not be choked off and that clearing prices would ultimately be set by bidding in the auction (above minimum prices).
- For short-term licences, there are consequences to setting prices either too high or too low, with no reason to consider these being of significantly different magnitude or priority. In this case, we consider it appropriate to seek a best estimate of market value, which is better achieved by using the arithmetic mean than the geometric mean.

Three has not contested either of these arguments but seems primarily concerned that using the less conservative metric (the arithmetic mean) would represent too high a risk of setting excessive prices. In any case, as set in Section 6 following, the proposed fees for short-run access are below the minimum prices set for the MBSA2 award. [REDACTED]

[REDACTED]

Furthermore, as Section 6 shows, prices established for comparable bands in the previous MBSA auction held in 2012 were very much higher.

## 6 Comparison of price proposals

In the table below, we summarise the proposed fees and the various supporting benchmarks and comparators that are relevant. We also report the various counterproposals made by respondents.<sup>19</sup>

The table reports both the fee chargeable for 3 months of short-term access to a 2x5 MHz block of spectrum, and the equivalent price of 20-year licence on a per MHz, per head of population basis. The conversion is made by amortising the price of a long-term licence assuming flat cashflow benefits over time, using a 3.36% real cost of capital (the rate assumed by ComReg for regulatory purposes).

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<sup>19</sup> The set of counterproposals also includes the suggestion from Three in its response to ComReg document 22/63 that short-term licence fees could be set (on a pro-rata basis) equal to the spectrum usage fees (SUFs) that would apply to long-term rights of use for the spectrum following the MBSA2. See Three's response to ComReg document 22/63, pages 6 and 7.



	Recommended fees	Benchmark (before 10% discount)	Revised benchmark (before 10% discount)	MBSA2 minimum price	Mean estimate range from latest published MBSA2 benchmarking	Belgian benchmark	Eir 2.1 GHz existing licence price	Benchmark from MBSA award for 800-900 MHz and 1800 MHz	Eir's counter-proposal I	Vodafone counter-proposal	Three counter-proposal I	Three counter-proposal II	Three counter-proposal III
<b>Fee for 3 months for 2x5 MHz block</b>													
<b>700 MHz</b>	401,000	446,000	430,000	404,000	378,000 – 541,000	439,000	NA	772,000	44,600	[X [REDACTED] X]	~ 0	203,538	249,733
<b>2.1 GHz</b>	212,000	235,000	226,000	213,000	226,000	317,000	823,000	386,000	23,500	213,000	~ 0	107,245	131,438
<b>Equivalent €/MHz/pop for 20-year licence</b>													
<b>700 MHz</b>	0.466	0.518	0.499	0.469	0.439-0.628	0.51	NA	0.896	0.0518	[X [REDACTED] X]	~ 0	0.236	0.290
<b>2.1 GHz</b>	0.246	0.273	0.263	0.247	0.262	0.368	0.956	0.448	0.0273	0.247	~ 0	0.125	0.153

<b>Notes</b>		Mean reported with equal amortisation across years	Corrections to Belgian and Italian data points	Present discounted value of reserve price and SUFs	Lower point for 700 MHz is the mean for that band alone, higher point is the mean for 700, 800 and 900 MHz bands pooled	Assumes payments subject to legal interest rate (1.5% in March 2022) plus discounted future annual payments	Discounted present value of all payments over licence lifetime	Auction revenue allocated in proportion to the minimum prices of lots, with adjustment for duration and contemporaneous population discount on benchmark	90% discount on benchmark	A discount on 700 MHz and not more than the MBSA2 minimum price for 2.1 GHz. The discount for 700 MHz varies depending on the number of sites per operator.	Zero opportunity cost, but possibly ComReg's admin cost recovered	8% cashflow growth in amortisation calculation, ascribing less value to the first year of a long-term licence	Based on SUFs for long-term rights of use only. 3-month fee calculated as the annual SUF divided by four.
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From the table, it can be seen that:

- The proposed fees for interim access to both 700 MHz and 2.1 GHz are closely similar, but slightly below, the MBSA2 minimum prices established by the auction reserve prices and SUFs;
- Revision of our benchmark data for Belgium and Italy has a largely immaterial effect on our best estimate of market value from current data, which remains above the proposed fees;
- The previous benchmarking exercise conducted to set the MBSA2 minimum prices (and so without the benefit of more recent data) yielded broadly compatible estimates of market price;
- The most recent relevant benchmark is the Belgian 5G auction conducted this year yielded a similar price for 700 MHz spectrum and a significantly higher price for 2.1 GHz spectrum;
- Eir's existing 2.1 GHz licence, which will continue to run during short-term licensing of 2.1 GHz to Vodafone and Three, has a price that is almost four times higher than the proposed short-term licence fee for 2.1 GHz;
- The MBSA award run by ComReg in 2012 awarded spectrum in 800 MHz and 900 MHz bands, which is comparable in technical characteristics to 700 MHz spectrum and also 1800 MHz spectrum, which is comparable to 2.1 GHz spectrum. This yielded prices that were 80-90% higher than the proposed fees.

We have also included various counterproposals from the MNOs on the right-hand side of the table:

- Eir proposes fees at 10% of the benchmark price;
- Vodafone proposes a fee for 700 MHz at [  $\times$  ████████  $\times$  ] of the benchmark price, and for 2.1 GHz at no more than the MBSA2 minimum price;
- Three's first proposal is a zero fee or a small charge for administrative cost recovery in issuing licences;
- Three's second proposal is for a modification of the amortisation method used to derive the fee for short-term access to spectrum from long-run licence prices, leading to a fee roughly half that proposed by ComReg;
- Three made a further proposal for retrospective pricing based on the MBSA2 auction outcome, but this is ruled out for reasons discussed earlier. In any case, this would necessarily result in fees above those implied by the MBSA2 minimum prices;
- Three also suggested, in its response to ComReg 22/63, that short-term licence fees could be set based on the (pro-rated) spectrum usage fees set for the MBSA2.

As we have set out above, there are likely to be a range of fees for short-term licences that are compatible with optimal spectrum use. However, fees that are set too low risks selectively enriching the MNOs,

given that short-term licences are not open to others, and causing various distortions. With the exception of Three's proposal for retrospective pricing and Vodafone's suggestion for the 2.1 GHz band, all of the MNOs' proposals entailing setting a definite fee for short-term spectrum now would set it far below any reasonable estimate of market value. Therefore, all of these proposals are most likely incompatible with optimal spectrum use.

Finally, we note that the Belgian regulator, BIPT, has very recently announced fees for extension of 900 MHz and 2.1 GHz licences held by three MNOs.<sup>20</sup> For a 2x5 MHz block, this would involve a payment of €1.55m per quarter for 900 MHz spectrum and €625k per quarter for 2.1 GHz. BIPT's fee for 900 MHz is almost four times that proposed by ComReg, and almost three times for 2.1 GHz.

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<sup>20</sup> [https://www.commsupdate.com/articles/2022/09/16/bipt-extends-2g-3g-licences-until-year-end/?utm\\_source=CommsUpdate&utm\\_campaign=409a54c3da-CommsUpdate+16+September+2022&utm\\_medium=email&utm\\_term=0\\_0688983330-409a54c3da-8873573](https://www.commsupdate.com/articles/2022/09/16/bipt-extends-2g-3g-licences-until-year-end/?utm_source=CommsUpdate&utm_campaign=409a54c3da-CommsUpdate+16+September+2022&utm_medium=email&utm_term=0_0688983330-409a54c3da-8873573)