

Updating benchmark datasets for expiring spectrum licences

Consultation paper

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Executive summary

The majority of in-force spectrum licences are due to expire between June 2028 and October 2032. Since 2023, the Australian Communications and Media Authority (ACMA) has undertaken a consultative process to guide our assessment of options for the spectrum covered by expiring spectrum licences (ESLs) and to facilitate applications for renewal by incumbent licensees. The ESL process has comprised 4 stages:

- consultation on the process
- information-gathering and stakeholder views on spectrum use
- preliminary views on renewal and pricing arrangements
- preferred views on renewal application and pricing.

For the pricing component of the process, Stage 4 culminated in the release of the ACMA's [preferred views on pricing](#) paper (the preferred views paper) on 20 May 2026. This paper outlined the benchmarking methodology used to derive indicative prices for licences in each frequency band that is included in this ESL process, expressed as single dollar per MHz per head of population (\$/MHz/pop) prices.

This paper outlines our proposed approach to updating benchmarking datasets with new spectrum award information, converting renewal prices into spectrum access charges (SACs) using population projections, and the consultation arrangements that will support a transparent and predictable approach to renewal pricing for licensees.

Benchmark datasets will be updated until 6 months before each renewal application period

In the preferred views paper, we proposed to update the benchmark dataset before each renewal application period by incorporating new spectrum awards. This will ensure renewal prices continue to reflect the most recent market evidence available when renewal decisions are made. The suitability of new spectrum awards will be assessed against the established exclusion criteria developed through the Stage 4 consultation process. Consistent with stakeholder feedback and advice from DotEcon, eligible awards occurring up to 6 months before the commencement of each renewal application period will be included in the benchmark dataset. This approach balances the use of contemporary market evidence with the need to provide certainty to licensees. The renewal application period for 850 MHz and 1800 MHz is currently open, so no new awards will be added to the datasets for these bands.

The benchmarking methodology will incorporate updated World Bank data and a minor amendment to the treatment of indexation

The benchmarking methodology relies on World Bank purchasing power parity (PPP) and related economic datasets, which are updated annually. We propose to use the latest available World Bank datasets in the currency conversion step of the pricing methodology to support the incorporation of new benchmark observations. As these inputs vary across countries and years, they cannot be readily replaced with a single equivalent assumption. The preferred prices for the 850 MHz and 1800 MHz bands will not change as a result of these updates, as the application windows for those bands have already opened.

We also propose a minor amendment to the application of indexation in the preferred views methodology to simplify the incorporation of new awards. Under this approach, benchmark

values would continue to be indexed using the fixed annual rate of 2.5% adopted in the preferred views paper. The key change is that both existing and newly included benchmark awards will be indexed directly to the commencement date of licences in the relevant ESL band before we derive a single price point, rather than after. This is a mechanical change to the sequencing of calculations to ensure new benchmarks can be added simply and will not impact on unit prices.

Fixing population estimates in advance will provide greater certainty and transparency for licensees

SACs are proposed to be calculated using the \$/MHz/pop price identified by the ACMA for the relevant band, the licence bandwidth and the population of the licence area. As population changes over time, a clear and consistent approach is required for estimating the population used in SAC calculations. Our approach relies on Australian Bureau of Statistics (ABS) population data and population projections from the Federal Budget. We seek stakeholder views on this methodology and on when population estimates should be fixed during the renewal process, with the objective of balancing the use of up-to-date information with certainty and transparency for licensees.

We propose consultation arrangements to support transparency and stakeholder input on benchmark dataset updates and updated renewal prices

The preferred views paper proposed targeted consultations on updates to benchmark datasets and resulting renewal prices before future renewal application periods begin. In this paper, we set out the proposed arrangements for those consultations, including their scope, timing and duration. The proposed consultations are intended to enhance transparency and stakeholder participation by providing visibility of proposed additions to benchmark datasets, their impact on benchmark prices and the resulting updated \$/MHz/pop prices for the relevant band.

Issues for comment

We invite comments on the issues set out in this paper:

1. We propose to continue using the latest available World Bank PPP datasets in the currency conversion step of the ESL pricing methodology. Do you have any comments on the proposed use of the latest available World Bank data when updating benchmark prices?
2. We propose a minor amendment to the preferred views methodology to apply indexation directly to the commencement date of the relevant ESL band. Under this approach, benchmark awards in the original dataset would first be expressed in 2025-dollar values and then be indexed from 31 December 2025 to the relevant commencement date, while newly included benchmark awards would be indexed from the date of issue of the award. Do you have any comments on the proposed treatment of indexation for both existing and new benchmarks? In particular, are there alternative approaches that should be considered?
3. To project population figures out to licence commencement dates, we plan to use the methodology outlined in the [Converting prices into spectrum access charges](#) chapter of this paper. Do you have any comments on the proposed methodology for projecting licence area populations to licence commencement dates?
4. The ACMA's preference is to fix the population projections to be used in the SACs for a band at a point before the renewal application period for licences in the band begins. Do you have any comments on our preferred timing for fixing population projections, being 6 months before commencement of the relevant renewal application period?
5. We seek stakeholder views on the proposed timing of band-specific consultations on updated renewal prices. This includes whether consultation papers should be published according to a predetermined schedule, or as soon as practicable following the derivation of updated renewal prices. Which approach do you prefer for the timing of the band-specific consultations?
6. We invite stakeholder feedback on whether a 6-week consultation period for each band provides an appropriate balance between allowing sufficient time for stakeholder engagement and ensuring the timely publication of final benchmark prices.

Introduction

In this paper, the ACMA presents the proposed process for updating the benchmark dataset used to derive the \$/MHz/pop prices for ESLs.

In our preferred views paper released in May 2026, we indicated that benchmark datasets would be updated to include more recent spectrum awards to ensure that ESL renewal prices reflect contemporary market conditions. This paper focuses on the arrangements for implementing that approach, including how new spectrum awards would be assessed and incorporated into the dataset used to derive \$/MHz/pop renewal prices.

The benchmarking methodology itself will remain broadly unchanged from that adopted in the preferred views paper. The methodology was informed by 2 previous rounds of consultation, through the release of the [preliminary views on pricing](#) paper in April 2025 and the [updated preliminary views on pricing](#) paper in December 2025. During that process, we also engaged DotEcon to independently review the approach to benchmarking on 2 separate occasions. The final approach adopted in the preferred views paper reflects stakeholder feedback and that independent expert advice.

The renewal application period for licences in the 850 MHz and 1800 MHz bands commenced on 18 June 2026. As the renewal application period for these bands is already open, we do not intend to update the benchmark datasets, population estimates or any other supporting data inputs used to derive proposed spectrum access charges (SACs) for those licences. The proposed SACs for the 850 MHz and 1800 MHz bands will continue to be informed by the preferred views paper.

For licences in the remaining spectrum bands, with renewal application periods commencing between 2027 and 2030, we propose to include new spectrum awards that have occurred up until 6 months before the opening of the relevant application period. This approach would allow newly available benchmark evidence to be identified, assessed and, where appropriate, incorporated into the pricing analysis.

The paper outlines:

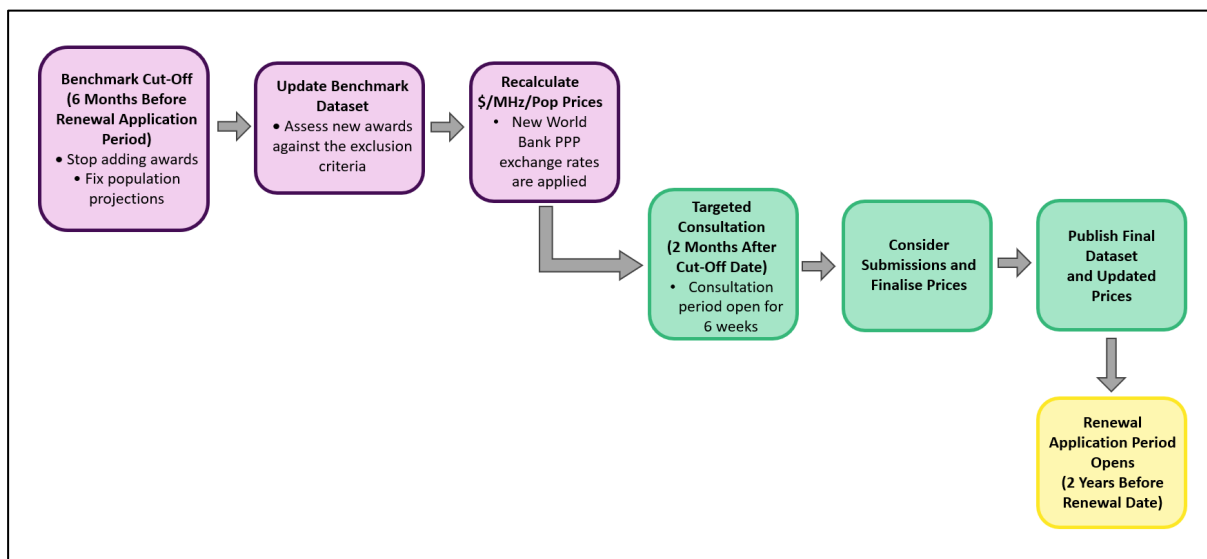
- the proposed approach for updating the benchmark dataset. This includes how new spectrum awards would be incorporated into the dataset and reaffirms the proposed cut-off date for the inclusion of new awards
- how \$/MHz/pop renewal prices would be converted into SACs, including the use of population projections and the proposed point at which population estimates would be fixed for each ESL band
- the proposed consultation process for updating benchmark data and prices. It explains how we propose to undertake focused, time-limited consultation for each individual band on additions to the benchmark dataset and the resulting \$/MHz/pop price.

Given the pricing methodology was settled through the preferred views paper, the principal focus of this consultation is implementation of the process for updating benchmark data in the period leading up to each band's renewal application period. In particular, we seek stakeholder views on the timing and duration of the consultations for each band and on the appropriate point at which population estimates used in the calculation of SACs should be fixed for an ESL band.

Future updates to benchmarking data

This chapter outlines the proposed approach to updating benchmark datasets in the future. Figure 1 provides an overview of the proposed process for updating benchmark datasets, consulting on any resulting price changes and finalising updated \$/MHz/pop prices before the commencement of the relevant renewal application period.

Figure 1: Proposed process for updating benchmark datasets



The discussion in this chapter focuses on how new spectrum awards will be identified and incorporated, how we will incorporate updated economic data from the World Bank in the currency conversion step and how benchmark values will be indexed to the relevant licence commencement date. The proposed arrangements for population projections and the scope and timing of the targeted consultations are discussed in subsequent chapters.

Assessing and incorporating new spectrum awards

Identifying awards for inclusion

New awards will be identified through publicly available sources, including regulator websites and industry publications. We will assess relevant new awards for inclusion in the benchmark dataset and publish the proposed additions. We intend to undertake a focused public consultation for each individual band on these additions and the resulting updated preferred \$/MHz/pop price. This will provide stakeholders with visibility of the included awards and an opportunity to provide feedback. Further details on the proposed scope and timing of these consultations are provided in the [Proposed consultation on benchmark data updates](#) chapter of this paper.

Exclusion criteria

New spectrum awards identified for potential inclusion in the benchmark dataset will be assessed against the exclusion criteria developed through consultation during Stage 4 of the ESL process and informed by advice from DotEcon. These criteria, which were published in our preferred views paper and are set out in [Appendix A](#), will continue to be applied when determining whether a spectrum award will be included in the benchmark dataset.

Time trend analysis

The time trend analysis and associated benchmark sample restrictions adopted in our preferred views paper will continue to be applied when updating benchmark datasets. Where a statistically significant time trend was identified for a band, we will retain the corresponding benchmark sample restrictions rather than rerunning the time trend analysis as new awards become available. This approach is intended to maintain the stability of the benchmarking methodology and ensure that changes in \$/MHz/pop prices are driven primarily by new benchmark evidence.

Cut-off date

In the updated preliminary views on pricing consultation, we proposed applying a cut-off date of 6 months before the commencement of a renewal application period for the inclusion of new spectrum awards. This approach received support from a number of stakeholders during consultation and was also supported by DotEcon. It was subsequently adopted in the preferred views paper. This timing would provide sufficient opportunity to verify any additions to the benchmark dataset, update the benchmarking analysis, recalculate preferred renewal prices on a \$/MHz/pop basis and consult on any resulting changes. Establishing the cut-off in advance of the renewal application period would also ensure that updated preferred renewal prices are available to licensees before renewal applications open, supporting informed decision-making and providing greater planning certainty. The proposed cut-off dates under this approach are outlined in Table 1.

Table 1: Cut-off dates for each band

Band grouping	Band	Benchmarking dataset cut-off	Beginning of renewal application period	Licence expiry
Sub-1 GHz	850 MHz	N/A – application period open	18 June 2026	17 June 2028
Lower 1–3 GHz	1800 MHz	N/A – application period open	18 June 2026	17 June 2028
Upper 1–3 GHz	2.5 GHz	1 April 2027	1 October 2027	30 September 2029
Sub-1 GHz	700 MHz	1 July 2027	1 January 2028	31 December 2030
Upper 1–3 GHz	2.3 GHz	25 January 2028	25 July 2028	24 July 2030
3.4 GHz	3.4 GHz	14 June 2028	14 December 2028	13 December 2030
Lower 1–3 GHz	2 GHz	12 April 2030	12 October 2030	11 October 2032

Currency conversion

The benchmarking methodology relies on World Bank PPP exchange rates and other economic data to convert international benchmark prices into equivalent A\$ values. The World Bank publishes updates for these datasets annually on 1 July, which also include revisions to figures from the preceding 2 years.

As a result of the most recent update, the values of some benchmark observations have changed, leading to new \$/MHz/pop prices that differ slightly from those published in our

preferred views paper. The magnitude and direction of price changes vary across bands, because each band's benchmark sample contains a different mix of countries and award dates. For example, bands with a greater proportion of benchmark awards from 2024 and 2025 are likely to be more affected by the World Bank's revisions than bands with relatively few awards from those years, as the annual updates revise data from the preceding 2 years. Changes to the preferred views \$/MHz/pop prices resulting from these updates, which will serve as the reference point for assessing any future changes to preferred views \$/MHz/pop prices, are summarised in Table 2.¹

Table 2: Price in \$/MHz/pop

Band grouping	Band	Preferred views	2026 World Bank updates
Sub-1 GHz	700 MHz	0.6618	0.6604
Lower 1–3 GHz	2 GHz	0.3389	0.3404
Upper 1–3 GHz	2.3 GHz	0.1754	0.1759
	2.5 GHz	0.1774	0.1779
3.4 GHz	3.4 GHz	0.1732	0.1731

To support the incorporation of new benchmark awards, we propose to continue using the latest available World Bank datasets when updating benchmark prices. New benchmark observations require corresponding PPP exchange rates from the year in which the award occurred to provide equivalent A\$ values. Unlike other benchmarking inputs, these exchange rates vary across countries and therefore cannot reliably be estimated using a single equivalent assumption based on previous years. All other aspects of the currency conversion and cohort analysis in the methodology would remain unchanged.

Question 1

Do you have any comments on the proposed use of the latest available World Bank data when updating benchmark prices?

Indexation

Our preferred view is to apply a fixed annual indexation rate of 2.5% to benchmark values from 31 December 2025 when updating the benchmark dataset in the future. Retaining a fixed indexation assumption provides certainty and stability by ensuring that changes in preferred prices are driven primarily by new market evidence, rather than differences between forecast and actual inflation outcomes.

To incorporate new benchmark awards within this fixed indexation framework, it is necessary to bring both existing and new benchmark awards to a consistent timing so that a single price can be determined. As prices will be determined separately for each band and all licences in a band will, if renewed, commence on the same day, there will be a single licence commencement date associated with each preferred price update. Therefore, benchmark

¹ Table 2 includes only the later-expiring bands for which we intend to update preferred prices with future benchmarking data but these updates may have also affected existing benchmark datasets used for the 850 MHz and 1800 MHz bands. However, given the renewal application period opened for these bands on 18 June 2026, before the World Bank data updates on 1 July 2026, we do not intend to amend the preferred \$/MHz/pop price for these bands.

values can be indexed directly to the relevant licence commencement date using the compounded daily equivalent of the annual 2.5% rate.

- For benchmark awards included in the original dataset, which are expressed in 2025 A\$ values, indexation will be applied from 31 December 2025 to the relevant licence commencement date.²
- For new benchmark awards to be included since our preferred views paper was released, indexation will be applied from each award's date of issue to the licence commencement date for the relevant ESL band. This adjustment will be made individually for each new award included in the benchmark dataset.

While prices will be determined separately for each band, we note that we will continue to take account of benchmark evidence from the broader band group. This approach enables the fullest additional market evidence possible to be incorporated for bands with later licence commencement dates.

This change is effectively an amendment to step 4 of our pricing methodology, as it will now index benchmark values directly to the licence commencement date of the relevant ESL band for both existing and new benchmark awards, rather than to an earlier common reference date. The updated preferred single-year price for an ESL band will therefore reflect the value at the licence commencement date. Consequently, step 7 of the methodology, which in our preferred views indexed benchmark values from the common reference date to the licence commencement date, will no longer be required. This refinement is mechanical in nature and will not result in any changes to price outcomes. Additionally, all other aspects of the methodology will remain unchanged. A summary of the pricing methodology reflecting this amendment is available at [Appendix B](#).

Question 2

Do you have any comments on the proposed treatment of indexation for both existing and new benchmarks? In particular, are there any alternative approaches that should be considered?

² For example, assume a licence start date is 1 January 2030. There are 1,462 days between the end of 2025 and the licence start date. An annual inflation rate of 2.5% corresponds to a daily compounded rate of approximately 0.006765%. Applying this rate over 1,462 days results in a CPI index value of 1.103962, calculated as $(1 + 0.006765\%)^{1462}$. The benchmark value would therefore be increased by around ~10.4% to express it in 1 January 2030 dollar terms.

Converting prices into spectrum access charges

A SAC for a licence is calculated by multiplying the licence's band's \$/MHz/pop price by the bandwidth and licence area population. While licence bandwidth is fixed, the population of licence areas can change over time and should therefore be updated before calculating SACs.

In this chapter, we outline our approach to projecting population figures out to licence commencement dates and illustrate its application for the 850 MHz and 1800 MHz bands, for which renewal application periods have already commenced. We seek stakeholder views on this approach and, importantly, on the timing of when we undertake population projections for later-expiring ESL bands.

Population projection approach

We intend to estimate the population of each spectrum licence area on the commencement date of renewed licences by applying a population growth factor to the 2021 Census population figures contained in the *Hierarchical cell identification scheme (HCIS) - List of population data*, which is available to download via the [ACMA website](#). This is consistent with how SACs were calculated in the previous ESL process and how starting prices for spectrum auctions have historically been calculated.

We consider it appropriate to determine a single population growth factor for each ESL band and apply that factor consistently across all licences within the band. Fixing the factor at a defined point in the renewal process would provide greater certainty regarding the population estimates used to calculate SACs, while supporting the timely preparation of SAC determinations. Further details on the options for this approach are provided in the [Timing of population projections for later-expiring bands](#) section of this chapter.

To calculate the population growth factor for each ESL band, we calculate projected national population growth between the date of the Census that the HCIS data is derived from (currently the 2021 Census, which was on 10 August 2021) and the licence commencement date of the relevant ESL band.³ We derive this using the Estimated Resident Population (ERP) series published by the ABS in its *National, state and territory population* publication, as well as Budget forecasts.

- We first find the estimated national population in the ERP series at the Census date. For the 2021 Census, this is based on the published June 2021 and September 2021 quarter population estimates and the implied daily growth rate between those quarters.
- We then take the latest available quarterly ERP estimate and extend that figure to the licence commencement date for the relevant ESL band using population growth rates derived from the latest Budget population forecasts.
- The population growth factor for each ESL band is then calculated as the change in estimated national population between the Census date and the licence commencement date.

³ We will use the most recent Census data for the HCIS cells as it becomes available, to ensure the SACs best reflect the value of the geographic coverage of individual spectrum licences. We expect 2026 Census population data to be available for HCIS cells in the second half of 2027.

We can then estimate the population of each licence area of an ESL at the licence commencement date by multiplying the licence area's HCIS population (based on Census data) by the population growth factor. This is outlined in more detail by way of example for the 850 MHz and 1800 MHz bands in the following section.

Population projections for the 850 MHz and 1800 MHz bands

The renewal application period for the 850 MHz and 1800 MHz bands commenced on 18 June 2026. The population estimates for these bands are therefore based on the most recent ERP data available at that time (the December 2025 quarter release, which was published on 18 June 2026) and the Budget projections released in May 2026. The calculations use 2021 Census population data, which was the most recent Census information available when the renewal application period commenced. To illustrate the application of the methodology described above, we set out the calculation steps used to derive the population growth factor for these bands below.

Step 1: Estimate the national population on the Census date

The Census date (10 August 2021) falls between the June and September 2021 quarters in the ERP series.

Step 1(a): Calculate the daily population growth factor between the June 2021 and September 2021 quarters

$$A = \text{Daily population growth factor} \times \left(\frac{\text{September 2021 population}}{\text{June 2021 population}} \right)^{\frac{1}{92}}$$

Where 92 is the number of days between 30 June 2021 and 30 September 2021.

$$A = \left(\frac{25,704,774}{25,685,412} \right)^{\frac{1}{92}}$$

$$A = 1.000008191$$

Step 1(b): Find the implied population at the Census date

$$B = \text{June 2021 population} \times \text{Daily growth factor}^{41}$$

Where 41 is the number of days between 30 June 2021 and 10 August 2021.

$$B = 25,685,412 \times A^{41}$$

$$B = 25,685,412 \times 1.000008191^{41}$$

$$B = 25,694,039$$

Step 2: Estimate the national population at the licence commencement date

We next find the latest available population figure in the ABS ERP series, then project the population series to the licence commencement date. To perform these projections, we use implied growth rates from population estimates published in Appendix A of [Budget Paper No. 3](#), which include estimates for 30 June and 31 December each year. These forecasts are intended to extend the ERP series and therefore provide a consistent basis for projecting population growth from the latest available ERP estimate to the licence commencement date.

Step 2(a): Identify latest ABS ERP population figure

The latest available population figure is for December 2025: 27,801,023.

$$C = 27,801,023$$

Step 2(b): Estimate national population at latest available date in Budget estimates before licence commencement date

The last population estimate before the licence commencement date is for 31 December 2027 (before 18 June 2028).

The 2026–27 Budget included population estimates of 27,813,000 for 31 December 2025 and 28,532,000 for 31 December 2027, implying population growth of 2.59%.

$$D = C \times \frac{\text{Budget December 2027 population}}{\text{Budget December 2025 population}}$$

$$D = 27,801,023 \times \frac{28,532,000}{27,813,000}$$

$$D = 27,801,023 \times 1.025851$$

$$D = 28,519,713$$

It should be noted that if the latest ABS ERP population figure was for the March or September quarter, there would not be a directly corresponding population estimate in the Budget, as forecasts are only published for June and December each year. In these cases, we would take the equivalent Budget figure as the midpoint between the relevant June and December figures published (for example, September 2025 would be the midpoint of June 2025 and December 2025 in the Budget).

Step 2(c): Estimate implied daily population growth in 6-month period that incorporates the licence commencement date

$$E = \left(\frac{\text{Budget June 2028 population}}{\text{Budget December 2027 population}} \right)^{\frac{1}{182}}$$

Where 182 is the number of days between 31 December 2027 and 30 June 2028.

$$E = \left(\frac{28,700,000}{28,532,000} \right)^{\frac{1}{182}}$$

$$E = 1.0000332258$$

Step 2(d): Estimate the national population at licence commencement date

$$F = D \times E^{170}$$

Where F equals the estimated national population at the licence commencement date, and 170 is the number of days between 31 December 2027 and 18 June 2028.

$$F = 28,519,713 \times 1.0000332258^{170}$$

$$F = 28,676,538$$

The estimated national population on 18 June 2028 is therefore 28,676,538.

Step 3: Calculate the population growth factor

We now need to find the difference between the estimated national population on the licence commencement date and the estimated national population on the Census date to determine the population growth factor.

$$G = \frac{F}{B}$$

$$G = \frac{28,676,538}{25,694,039}$$

$$G = 1.116077488$$

Step 4: Estimate the licence area population at the licence commencement date

The population growth factor derived in the previous step can be used to estimate the population of licence areas in each ESL in the 850 MHz and 1800 MHz bands by multiplying it by the 2021 Census HCIS population data.

$$\text{Licence area population} = \text{HCIS population of licence area} \times G$$

Question 3

Do you have any comments on the proposed methodology for projecting licence area populations to licence commencement dates?

Timing of population projections for later-expiring bands

For the remaining ESL bands expiring later than the 850 MHz and 1800 MHz bands, we have considered whether population projections should be updated in response to each individual renewal application or whether they should be fixed at an earlier point in the renewal process. Updating projections for each application would allow the most recent available population data to be used. However, we consider it preferable to fix the projections at an earlier point to provide licensees with greater certainty about the population inputs that will be used to calculate their SACs with reference to preferred \$/MHz/pop prices. We are therefore seeking stakeholder feedback on the point in the renewal process at which population projections should be fixed.

Our preference is that the population projections should be fixed at the 6-month benchmark cut-off date. Under this approach, the population growth factor would be determined using the most recent population data available at the 6-month benchmark cut-off date and would not be updated further. We consider this approach would provide greater certainty to licensees regarding the basis on which SACs will be calculated and would allow the proposed population estimates to be published and consulted on as part of the band-specific consultations.

We have also considered the following timings for population projections to be fixed as either:

- the start date of the renewal application period for the relevant band
- when the first application in a band is received.

These alternatives would allow more recent population data to be incorporated into SAC determinations than under the 6-month benchmark cut-off date approach. However, given

the relatively short period between the benchmark cut-off date and the commencement of the renewal application period, any resulting change in the population growth factor is likely to be minor. On balance, we consider that the marginal increase in accuracy from using more recent population data and forecasts would not outweigh the benefits of certainty and transparency associated with fixing population estimates 6 months before each renewal application period opens.

Question 4
Do you have any comments on our preferred timing for fixing population projections, being 6 months before commencement of the relevant renewal application period?

Proposed consultation on benchmark data updates

Before the commencement of each relevant renewal application period, we intend to undertake targeted public consultations on updates to the benchmark dataset. Separate consultations would be conducted for each spectrum band, aligned with the timing of the relevant renewal application period.

Scope of consultations

As part of each consultation, we propose to publish:

- spectrum awards proposed for inclusion in the benchmark dataset (country, band, award date and equivalent A\$/MHz/pop price)
- the net effect of the new data on the single-year \$/MHz/pop price as compared with what was set out in our preferred views paper
- the updated \$/MHz/pop value for the full licence duration of the relevant band
- the modelling spreadsheet underpinning the updated \$/MHz/pop price.

Each consultation process will provide stakeholders with an opportunity to comment on:

- the suitability of proposed additions to the benchmark dataset, including the comparability of those awards and their consistency with the ACMA's exclusion criteria
- any additional spectrum awards they consider should be included in the dataset
- the extent of any changes to updated \$/MHz/pop prices relative to those published in the preferred views paper.

The matters outlined above are intended to guide stakeholder feedback, but comments are welcome on any aspect of the approach that stakeholders consider relevant.

Timing of consultations

When consultation papers should be released

We are considering 2 options for the timing of the consultations on updated benchmark prices for each band. We invite stakeholders to comment on whether consultation papers for each band should be released according to a set publication schedule, or as soon as practicable after the relevant benchmark cut-off date.

Under the first approach, consultation papers would be released a set period after the cut-off date, such as 2 months. For example, for the 2.5 GHz band, where the benchmark cut-off date would be 1 April 2027, we would aim to release the consultation paper on or around 1 June 2027. The renewal application period would then open on 1 October 2027.

Under the second approach, consultation papers would be released after the benchmark cut-off date and once we have completed our analysis of the new spectrum awards and reached the updated \$/MHz/pop prices. This approach would make updated benchmark prices available to stakeholders at the earliest opportunity, although the timing of publication may vary between bands.

We prefer the first option, under which consultation papers would be released according to a predetermined publication schedule. We consider this approach strikes an appropriate balance between providing stakeholders with certainty about the timing of consultations and supporting the timely update of renewal prices.

Question 5

Which approach do you prefer for the timing of band-specific consultations?

Duration of consultations

We propose that under either approach, the consultations would remain open for 6 weeks, as we expect this would provide stakeholders with sufficient time to review proposed additions to the benchmark dataset and calculate their resulting SACs. We note that extending the consultation period further may disadvantage licensees by delaying the publication of final prices.

Question 6

We invite stakeholder feedback on whether a 6-week consultation period for each band provides an appropriate balance between allowing sufficient time for stakeholder engagement and ensuring the timely publication of final benchmark prices.

Consideration of submissions and finalisation

Following the close of each consultation period, we will consider stakeholder submissions before finalising the benchmarking dataset and the resulting \$/MHz/pop price. We encourage stakeholders to provide supporting evidence for any additional spectrum awards they consider should be included in the dataset. Where appropriate, we may revise the dataset and recalculate the \$/MHz/pop price in response to views raised in submissions. The updated preferred \$/MHz/pop price will be published before the commencement of the renewal application period for the relevant band.

Invitation to comment

Making a submission

We invite comments on the issues set out in this discussion paper.

- [Online submissions](#) can be made by uploading a document. Submissions in PDF, Microsoft Word or Rich Text Format are preferred.
- Submissions by post can be sent to:
The Manager
Economics Advisory Section
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

The closing date for submissions is 5pm (AEDT), **Wednesday 9 December 2026**.

Consultation enquiries can be emailed to ESL@acma.gov.au.

Publication of submissions

We publish submissions on our website, including personal information (such as names and contact details), except for information that you have claimed (and we have accepted) is confidential.

Confidential information will not be published or otherwise released unless required or authorised by law.

Privacy

View information about our policy on the publication of submissions, including collection of personal information during consultation and how we handle that information.

Information on the Privacy Act 1988, how to access or correct personal information, how to make a privacy complaint and how we will deal with any complaints, is available in our [privacy policy](#).

We may use an artificial intelligence (AI) tool to analyse and summarise your submissions for internal purposes to inform the process for updating benchmarks and future individual band consultations. This may include using AI to summarise submissions you provide that may contain personal information.

Appendix A: Exclusion criteria

Category	Criterion	Description
Uncompetitive award	Uncompetitive format	Spectrum awards that were administrative and do not provide genuine market information (for example, 'beauty contests', direct allocations and licence renewals).
	Limited participation	Spectrum awards where it was infeasible to increase above reserve given the number of bidders participating and/or binding caps.
	Material amounts of spectrum unsold	Spectrum awards where significant amounts of the spectrum offered went unsold. It is not necessary to exclude all awards with unsold spectrum (for example, if spectrum only went unsold in unattractive regions or encumbered lot categories).
Licences not comparable	Special obligations	Prices of awards that incorporate onerous rollout obligations or investment commitments that do not reflect full market valuation. Awards will only be excluded under this criterion if the obligations are explicitly interventionist (not 'use-it-or-lose-it' conditions).
	Use-case restricted	The licences on offer are not comparable as they could not be held by the operators holding existing licences in Australia due to being restricted to or configured for a different use case.
	Residual awards	Awards of lots that were undesirable in the main award, typically involving materially limited bandwidths or short-term licences.
Measurement issues	Incorrect information	Spectrum awards where there is a clear reason to expect prices or other information are incorrect and a correction is not possible.
	Lack of information	Sufficient information to calculate award prices is unavailable (for example, prices, bandwidths, durations or population numbers are not public, per band prices cannot be calculated, there is insufficient information on annual fees).

Appendix B: Pricing methodology

Step 1: Compile benchmark dataset

The benchmarking dataset used in this methodology is compiled from publicly available sources on market-based spectrum allocations and is designed to capture a diverse range of observed market outcomes. Any benchmarking exercise requires a sufficiently large and relevant sample, therefore our dataset includes a substantial number of domestic and international spectrum awards to ensure broad coverage and representativeness.

The dataset has been constructed based on a default position of including spectrum awards, unless there is a clear and compelling reason to exclude them. While all spectrum awards occur within specific political, regulatory, market and technological contexts, the majority are considered to provide a reasonable indication of market value when assessed as part of a large international sample.

The benchmark data have been compiled from a range of sources such as the ACMA's internal awards database, market research services and official publications released by national regulators. The dataset has also been supplemented with spectrum award information provided by industry stakeholders and consultants involved in the ESL process, where this information could be independently verified.

The outcome of this step is the creation of a benchmarking dataset that is sufficiently broad to support robust analysis, while excluding awards that are unlikely to provide reliable information about market value or where there is insufficient information available to calculate consistent \$/MHz/pop prices. This dataset forms the basis for subsequent standardisation steps.

Information collected for each spectrum award

For each spectrum award considered for inclusion, the following information is collected. This information is required to calculate benchmark prices and to apply the standardisation steps set out later in this appendix.

Table 3: Information required for benchmark prices

Item	Description
Price	Total price of the allocation in local currency. This includes upfront payments and ongoing fees where relevant.
Bandwidth	The amount of spectrum awarded, expressed in MHz.
Population	Population covered by the award. This is typically national population but may be a subset of the population where the allocation does not cover the entire country.
\$/MHz/pop	The price divided by the bandwidth divided by the population. This is the actual benchmark price to be used to inform our methodology. It may be a weighted average if the bandwidth sold is not the same across the whole population being considered.

Item	Description
Licence dates and duration	Licence commencement and expiry dates, from which the licence duration is derived and used to standardise awards to a consistent duration.
Exchange rate information	Purchasing power parity (PPP) exchange rates applicable at the time of allocation, used to convert benchmark prices to Australian dollars.
Award format and conditions	Information on the award mechanism and any material licence conditions relevant to comparability.

Only awards for which this information is publicly available or can be reliably derived are included in the benchmarking dataset.

Exclusion criteria

While the methodology generally favours inclusion, spectrum awards are excluded where there is strong evidence that observed prices do not reliably reflect market value or are not suitable for benchmarking. Exclusions are intended to remove awards that likely deviate significantly from market-based valuations, rather than to exclude awards simply because prices appear unusually high or low.

The exclusion criteria are grouped into three broad categories and are summarised in [Appendix A](#).

Dataset maintenance

The benchmarking dataset is regularly reviewed and updated as new spectrum awards are issued and additional information becomes available. Awards suggested by stakeholders are evaluated against the same inclusion and exclusion criteria applied to all other awards. If previously included awards are later found to meet the exclusion criteria, they are removed from the dataset to maintain consistency.

Step 2: Convert valuations to consistent duration

In step 2 we apply a flat annuity approach to convert benchmark prices with different licence durations into a common 365-day valuation. This conversion is undertaken using a discount rate based on the weighted average cost of capital (WACC) of 8.49%.⁴

A post-tax WACC is used rather than a pre-tax measure, as this facilitates international benchmarking by controlling for differences in corporate tax regimes across countries. A nominal WACC is applied to ensure consistency with the use of nominal cash flows.

Given the long duration of spectrum licences, valuations are appropriately informed by long-term investment considerations rather than short-term market conditions. We apply a WACC that reflects long-run investment expectations and can be applied consistently across allocations undertaken in different years.

While ideally a country- and year-specific WACC would be applied to each benchmark valuation, doing so would be heavily resource intensive for limited benefit. For practical and

⁴ The WACC is the cost of debt and the cost of equity combined, which can be used to discount cash flows for predetermined future periods to estimate present value.

methodological consistency, a single long-term WACC applicable across a range of contexts is therefore adopted.

Standardising licence lengths is complicated by the presence of licence durations that are not multiples of whole years. To account for this, we amend the standard flat annuity formula to derive 365-day valuations from any licence duration. The standard flat annuity formula to calculate the present value of a series of cashflows is:

$$PV_n = A \times \left\{ \frac{1 - \left(\frac{1}{1+r}\right)^n}{r} \right\} \quad (1)$$

Where:

PV_n = present value of the series of cashflows

A = the nominal value of each cashflow

r = discount rate

n = number of cashflows in the series.

The equation can also be rearranged to calculate the value of A in terms of PV_n :

$$A = PV_n / \left\{ \frac{1 - \left(\frac{1}{1+r}\right)^n}{r} \right\} \quad (2)$$

We want to calculate the present value of the cashflows for n periods (where $n = 365$) based on the present value of cashflows for a longer number of periods (L periods). To do this, we effectively determine the value of A based on the present value of cashflows for L periods (PV_L), then use the value of A to determine PV_n :

$$PV_n = A \times \left\{ \frac{1 - \left(\frac{1}{1+r}\right)^n}{r} \right\}$$

$$PV_n = \left[PV_L / \left\{ \frac{1 - \left(\frac{1}{1+r}\right)^L}{r} \right\} \right] \times \left\{ \frac{1 - \left(\frac{1}{1+r}\right)^n}{r} \right\} \quad (3)$$

This formula can be simplified into what we have used in our benchmarking process for licence duration adjustments:

$$PV_n = PV_L \times \left\{ \frac{1 - \left(\frac{1}{1+r}\right)^n}{1 - \left(\frac{1}{1+r}\right)^L} \right\} \quad (4)$$

When using the formula in this step, $n = 365$ and L = number of days of the original licence duration. Because we are calculating licence length based on the number of days, r is set to 0.02233%, which is the compounded daily equivalent of the annual WACC of 8.49%

This step results in the ‘per MHz per pop’ prices in local currencies all being converted to have the same single-year valuation in days.

Step 3: Convert to Australian dollars using PPP exchange rates

Step 3 will convert all benchmark valuations into Australian dollars using purchasing power parity (PPP) exchange rates.

PPP exchange rates reflect the relative prices for an equivalent basket of items in different countries. PPP exchange rates are less volatile than spot exchange rates and are likely to better reflect both domestic labour costs and the purchasing power of WBB customers within a country.

We use the 'PPP conversion factor, GDP (LCU per international \$)' indicator from World Development Indicators data from the World Bank, and data from the International Monetary Fund for Taiwan's PPP exchange rate. The World Bank periodically updates these datasets and the most recent available data are used when converting benchmark values.

Where spectrum awards are conducted in a non-local currency, such as US dollars or euros instead of the local currency, we calculate an implied PPP exchange rate. We take the ratio of PPP to spot exchange rates against the Australian dollar, then apply that ratio to the spot exchange rate of the currency that was used for the award.⁵

Step 4: Carry forward valuations to commencement

As spectrum licences are awarded in different years, benchmark prices are not directly comparable without an adjustment for changes in the general price level over time. Step 4 therefore applies Consumer Price Index (CPI) adjustments so that benchmark observations are expressed at the commencement date of the relevant ESL band.

We use ABS CPI data to account for changes in the general price level over time. For each year, a single CPI value is calculated as the average of the available quarterly indices. The CPI series is then rebased to 2025, which is set equal to one, with all other years expressed relative to this base year. Benchmark prices observed in 2025 or earlier are first carried forward to 2025 by dividing each price by the corresponding rebased CPI index value for the year in which it was observed. These rebased observations are then indexed from the end of 2025 to the relevant licence commencement date. For periods beyond 2025, we apply a constant annual inflation rate of 2.5%, consistent with the midpoint of the Reserve Bank of Australia's target inflation range.⁶

New benchmark awards incorporated into the dataset after 2025 are not rebased to 2025-dollar values. Instead, these observations are indexed directly from the award date to the relevant licence commencement date using the same 2.5% annual inflation assumption.

The annual inflation rate is converted into a daily rate and applied over the relevant number of days. The result of this step is that all benchmark observations are expressed in Australian dollars at the commencement date of the relevant ESL band. As benchmark observations

⁵ For example, Uruguay auctioned the 700 MHz band in 2017 in US dollars. In 2017, Uruguay's PPP exchange rate was 15.77 Uruguayan pesos to A\$1, while its spot exchange rate was 21.98 Uruguayan pesos to A\$1, which means the PPP exchange rate was 71.8% of the spot exchange rate. We took the spot exchange rate of US\$0.7664 = A\$1 and multiplied it by 71.8% to find an implied PPP exchange rate of US\$0.5500 for Uruguay.

⁶ For example, assume the licence commencement date is 1 January 2030, and the present value is current for 31 December 2025. There are 1,462 days between the end of 2025 and the licence commencement. An annual inflation rate of 2.5% corresponds to a daily compounded rate of approximately 0.006765%. Applying this rate over 1,462 days results in a CPI index value of 1.103962, calculated as $(1 + 0.006765\%)^{1462}$.

are indexed directly to the licence commencement date, no further inflation adjustment is required later in the methodology.

Under this approach, the remaining steps of the methodology are applied separately for each ESL band rather than at the band-group level. This better aligns the methodology with future benchmark updates, while not resulting in any material change to benchmark price outcomes.

Step 5: Conduct time trend testing

It is important that the methodology reflects time trends in spectrum valuations. Changes in underlying market conditions over time, including shifts in spectrum supply and demand, technological developments and evolving use cases, mean that prices observed in earlier awards may not be representative of contemporary market conditions.

As part of the preferred views benchmarking analysis, benchmark awards for each band group were divided into 2 periods: awards before 2018 and awards from 2018 onwards. Mann-Whitney U tests were then applied to assess whether there were statistically significant differences between the 2 periods. This approach was used to identify whether prices observed in more recent awards differed systematically from earlier outcomes, without imposing strong assumptions about the form of any underlying time trend.

Where a statistically significant difference between time periods is identified at the $p \leq 0.05$ level, the benchmark dataset was restricted to awards from 2018 onwards. This year represents the midpoint of the dataset and aligns with the global commencement of spectrum awards for 5G services. Applying this restriction helped ensure that the benchmarking analysis was anchored to valuations that reflected contemporary technologies, market structures and demand conditions.

For future benchmark updates, the time trend analysis undertaken as part of the preferred views process will not be rerun. Instead, the benchmark sample restrictions established through that analysis will continue to apply. Accordingly, benchmark datasets for the 700 MHz, 850 MHz, 1800 MHz and 2 GHz bands will remain restricted to benchmark observations from 2018 onwards, while the existing benchmark samples for all other bands will continue to apply. This approach maintains the stability of the benchmarking methodology and ensures that changes in benchmark prices are driven primarily by new benchmark evidence.

Step 6: Deriving a single price point

After we have tested and controlled for time trends within our benchmark prices, single price points are derived from the resulting sample of benchmark observations expressed at the commencement date of the relevant ESL band. This is done through calculating a robust and efficient measure of central tendency and then conducting cohort analysis to determine if this result is reflective of jurisdictions most similar to Australia.

Step 6A: Calculating central estimates for each band sample

We calculate single prices using the geometric mean. The geometric mean is calculated by taking the n th root of the product of all values in the sample, where n is the number of observations.⁷ It is effectively the same as averaging the values after they have been

⁷ For example, multiplying 4 values (0.6, 0.4, 0.1 and 1.1) gives 0.0264; taking the 4th root of this value results in an average of 0.4031.

converted to logarithms, then converting that average back to a normal number. This makes it well suited to spectrum prices, which usually cluster and spread out in a pattern where differences are best understood in percentage terms. Using the geometric mean helps reduce the impact of unusually high or low prices and gives a more representative central estimate.

Step 6B: Cohort analysis

Cohort analysis is used to identify subsets of benchmark observations that are most comparable to Australia, ensuring the final price estimate reflects relevant market evidence. This process involves compiling supplementary data to assess comparability and applying sequential statistical tests to determine which cohort’s geometric mean should be used.

Compiling supplementary data and assigning observations to cohorts

In assessing international benchmark prices, we consider their relevance to Australian market conditions. The cohort variables we have used to determine comparability are population density and real GDP per capita, reflecting comparability in geography and income levels.

Table 4: Information required for benchmark prices

Item	Description
Population density	Population divided by the land area of a country, measured in persons per kilometre squared. Population density often correlates negatively with spectrum prices.
Real GDP per capita	Real GDP reflects the value of all goods and services produced in an economy and is also a measure of national income. Real GDP per capita correlates positively with spectrum prices.

World Development Indicators data from the World Bank is used for population density and real GDP per capita. For population density, we use the ‘Population density (people per sq. km of land area)’ indicator, and for real GDP per capita, we use the ‘GDP per capita (constant 2015 US\$)’ indicator.

For Taiwan, data was sourced from the International Monetary Fund and converted into a format consistent with World Bank data, as equivalent World Bank data were not available for this jurisdiction.

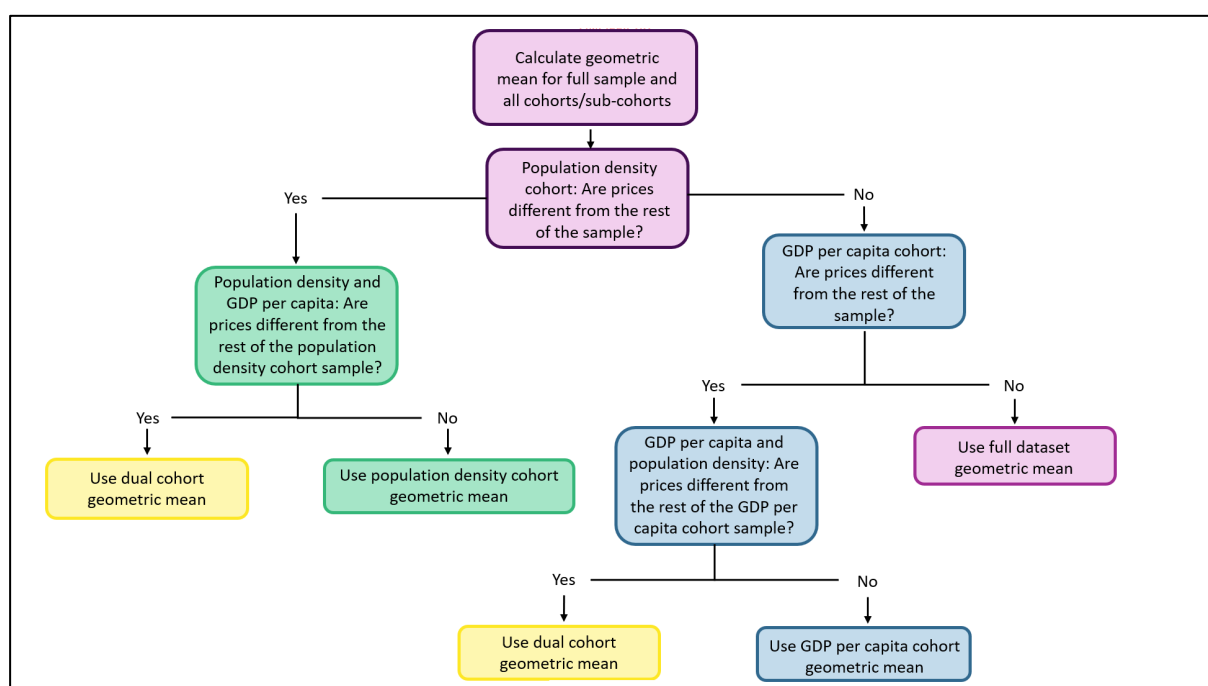
For each benchmark price, we calculate the ratio of the relevant cohort variable for the benchmark country to Australia’s corresponding value in the same year. Where a benchmark country’s value exceeds Australia’s, the ratio is mirrored to ensure that the maximum weight remains one and that proportional deviations in either direction attract the same weight (for example, values that are half or double Australia’s both receive a weight of 0.5).

Benchmarks are included in the population density cohort if their ratio is greater than or equal to 0.1, while benchmarks are included in the real GDP per capita cohort if their ratio is greater than or equal to 0.7.

Cohort analysis decision tree

The cohort analysis process uses a sequential decision tree to identify which group of benchmark observations provides the most relevant evidence for Australia. At each step, statistical tests are applied to determine whether the geometric mean should be based on the full sample, a single cohort, or an intersection of cohorts. The diagram below shows how this process works, followed by a step-by-step explanation of each decision point.

Figure 2: Cohort analysis – decision tree diagram



Step 1: Population density cohort test

We first consider observations that fall within the population density cohort and the remainder of the dataset. A Mann-Whitney U test is conducted at the $p \leq 0.01$ significance level to assess whether prices in the population density cohort are statistically different from those in the rest of the sample.

Step 2: Dual cohort subset test (population density and real GDP per capita)

If a statistically significant difference is found, the analysis proceeds to the dual-cohort subset, which includes observations within both cohorts. The Mann-Whitney U test is again conducted for this subset, comparing for statistically significant differences between observations in both cohorts versus observations only in the population density cohort. If evidence of a statistically significant difference is detected, the geometric mean for this group is used. If not, the geometric mean for the population density cohort is used.

Step 3: GDP per capita test

If no evidence is found for the population density cohort, the same process is repeated for the real GDP per capita cohort.

Step 4: Dual cohort subset test (real GDP per capita and population density)

If a statistically significant difference is found, the analysis proceeds to the dual-cohort subset. The Mann-Whitney U test is again conducted for this subset, comparing for statistically significant differences between observations in both cohorts versus observations only in the real GDP per capita cohort. If evidence of a statistically significant difference is detected, the geometric mean for this group is used. If not, the geometric mean for the real GDP per capita cohort is used.

Step 5: Default to full benchmark sample

If neither the population density nor real GDP per capita cohorts show evidence of statistically significant differences, the geometric mean is calculated from the full benchmarking dataset.

Step 7: Expand valuations to desired durations

Having derived a single benchmark price that represents a robust measure of central tendency for the relevant band, we now expand the value ranges from 365 days to the desired full licence duration. This is performed using the flat annuity formula (equation (4)) from step 2, with the only difference being that L will equal 365 days, while n will equal the number of days of the desired licence duration.

For example, to convert a valuation from 365 days to 4,784 days (which would be the duration of renewed 3.4 GHz band licences that expire on 18 January 2044), we could use the following flat annuity formula:

$$PV_n = PV_L \times \frac{\left(1 - \left(\frac{1}{1+r}\right)^n\right)}{\left(1 - \left(\frac{1}{1+r}\right)^L\right)} \quad (4)$$

Where:

PV_n = present value of the series of cashflows for the desired licence duration

PV_L = present value of the series of cashflows for the known valuation

r = discount rate – the compounded daily value (0.02233%) of the annual WACC value of 8.49%

n = number of days in the desired licence duration (4,784)

L = number of days for the known valuation (365)

Following the use of this formula, we have estimated a single price for the desired licence duration at the commencement date of the relevant ESL band.