



Spectrum Pricing

**Submission to The Australian Government
Department of Communication and Arts**

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Vodafone Hutchison Australia Pty Limited (**VHA**) welcomes the opportunity to comment on the Department of Communication's draft proposals on Spectrum Pricing.

VHA supports reform in spectrum pricing to introduce efficient pricing principles, transparency of government decision-making processes to enhance certainty, and consistent licensing framework to facilitate spectrum transitioning and thus increasing flexibility. Setting the right price for spectrum is crucial in terms of facilitating efficient spectrum allocation and incentivising efficient use of spectrum.

With respect to the Department's proposals, VHA has three key observations:

1. There should be a general framework for allocation decisions, which articulates the principles and factors informing the decision-making process and provides transparency on how the framework is constructed and applied
2. Market-based allocations should be preferred for new allocations of spectrum where demand exceeds supply. Market-based allocation mechanism, such as auctions, need to be well-designed and need to promote the long-term interests of end-users in downstream markets. The Government will often raise revenue from auctions but auctions should not be designed with this outcome as the primary objective. Reserve prices should be set to encourage efficient allocation of spectrum.¹
3. Opportunity cost pricing should be the basis of administered allocation spectrum pricing, which will generally occur where supply exceeds demand or when regulatory intervention is required to reallocate spectrum to new uses because parties cannot practically trade licences due to incompatible technical conditions between the old and new use

¹ The relationship between reserve prices and revenue outcomes for Government is complex. Recent auctions (e.g., the regional 1800 MHz auction) have demonstrated that low reserve prices can deliver raise significant revenue for Government by fostering competition for the spectrum.



Introduction

The electromagnetic spectrum is a core asset in our digital economy, and the radiofrequency spectrum that enables transmitting radiocommunications has been a critical resource for numerous purposes, from economic to social, and cultural. The effective allocation and use of radiofrequency spectrum is of the utmost strategic importance for modern economies.

While the demand for spectrum is increasing due to the many and diverse applications (e.g., communications, broadcasting services, fixed services, defence, satellites, navigation, etc.), and spectral capacity has increased due to technological advancements, spectrum still remains as a finite and scarce resource. If our economy is to flourish, it is essential that Australia promotes the highest economic and social value from the allocation and management of its spectrum resources.

The licensing system is the foundation of an effective spectrum management framework. Well-defined property rights overcome the 'tragedy of the commons' nature of spectrum resources. However, the creation of property rights generates new issues (e.g., the potential monopolisation of property rights). Therefore, a critical spectrum management role for the Government (or its regulator) is to define the property rights, and promote competition in contestable industries and avoid excess concentration of spectrum rights to ensure economic efficiency from their use. This way, spectrum is distributed amongst users in a way that incentivises them to collectively generate the greatest welfare for society, including both consumers and firms.

As the policymaker's objective is to allocate spectrum efficiently to its highest value use, the policymaker needs to consider future use and demand. As such, market-based mechanisms such as auctions or spectrum trading provide the best means for the regulator to overcome uncertainty regarding future demand and information asymmetries between itself and potential users of the spectrum.

Spectrum trading is a first-best solution that does not require regulatory intervention. However, band plans and licences for spectrum often impose conditions to ensure spectrum can be used for a particular purpose and this inhibits spectrum trading between different purposes. For instance, broadcasting spectrum is not readily optimised for mobile use. In such circumstances, regulatory intervention is required to reallocate the spectrum when new uses of the spectrum are of higher value than incumbent uses.

For new or reallocated spectrum, auctions have become the preferred means of allocating spectrum where demand for the spectrum outweighs its supply – again the use of market-based mechanism helps to overcome the regulator's uncertainty regarding the future value of the spectrum to different operators and ensures spectrum is allocated to users who value it the most. Care is required with spectrum auctions as the highest value use to a spectrum acquirer may not be the highest value use for an economy. For instance, limiting competitors' access to spectrum can be used as a barrier to entry and, as such, some users could acquire spectrum for anti-competitive reasons to derive value through the creation of market power in downstream markets. Most spectrum auctions in Australia and around the world impose



allocation limits to prevent concentration of holdings and to promote the long-term interest of end-users in downstream markets.

In circumstances, where supply exceeds demand – users of the spectrum may consume more of the spectrum than is efficiently required for their use. In the short-term, this is unproblematic as there are few alternative uses however, in the long-term, other uses might emerge that could make use of the spectrum imposing a significant cost to the economy if the spectrum is priced below its opportunity cost when it is allocated. There are recent examples of this occurring in the allocation of the 3.5 GHz spectrum to nbn and WISPs only a few years ago. The spectrum access charges for access to this spectrum is likely to be far below its economic value.

Opportunity cost pricing provides the mechanism to discover trade-offs in alternative uses of spectrum, and creates avenues to achieve optimal outcomes and ensure efficient spectrum management for the economy as a whole. Opportunity cost pricing is particularly relevant when licence conditions inhibit spectrum trading and there are emerging uses of spectrum. In addition, opportunity cost pricing provides a sound foundation for the Government to consider bespoke pricing arrangements for new spectrum by enabling an assessment against the next best alternative use of the spectrum.

Auctions do not necessarily ensure efficient spectrum allocation. There is a strong interplay between auction design, reserve prices and allocation limits. In order to ensure allocation outcomes are in the long term public interest, it is imperative for a single institution to take responsibility for spectrum allocation decisions and be held accountable for the impact of subsequent impact of allocation processes. We support the Department's proposal in the Radiocommunications Bill to make the ACMA responsible for this process however, for the proposal to be effective the Bill needs to include clear criteria for the ACMA (and the ACCC) to make a competition assessment.

As mentioned in our submission for Spectrum Review in 2014, the Government often has dual objectives around spectrum allocation decisions: maximizing public benefit and revenue. Irrespective of the role of the Government as a regulator, advisor or a user, these objectives may be in conflict with each other at times, risking flexibility and economic efficiency in spectrum management. Therefore, meticulous framework design on spectrum management is essential.



Comments on draft proposals

Allocation decisions

One of the key objectives of spectrum management is to allocate spectrum for specific uses to meet demand and prevent interference. This requires the allocation mechanism to not only be efficient, but also effective in the sense that they are consistent and transparent.

Guidelines published by ACMA will help with providing transparency, certainty and consistency on the decision framework for how the choice of allocation and pricing mechanisms are determined. However, it is also important to ensure administrative processes are timely and efficient to foster growth and innovation from the future use of the spectrum.

Does industry seek any specific guidance from the ACMA on how it approaches spectrum pricing decisions? Where is clarity required in the decision making process?

Clarity is required on the definition and use of decision making frameworks adopted by ACMA on pricing policies (e.g. reserve prices at auctions). Also, clarity is required on how and why the guidelines are implemented (and not implemented in certain cases).

Are there times where the Government should not charge users the same amount for the same type and amount of spectrum, through the use of bespoke pricing arrangements?

It is conceivable to charge users different amounts for the same type and amount of spectrum through bespoke pricing arrangements, particular if transactions are occurring at different points in time. The Government's approach to Vodafone's unsolicited offer on the unsold 700 MHz spectrum, whereby the Government conducted a public consultation on a proposed bespoke pricing arrangement, represents a good example of how to assess demand and consider the implementation of such arrangements. In that instance, the proposed bespoke price reflected the highest observed market price for similar low band spectrum in Australia.

The Government and the regulator should exercise caution when bespoke prices are below the observed market price. Such prices could create arbitrage opportunities and the potential for 'windfall' gains if spectrum is sold to some parties at a lower price than other parties. Moreover, below-market bespoke pricing may create incentives for regulatory gaming with some users potentially 'holding out' for a lower price.

It is important to distinguish between the social benefits generated by particular users of spectrum and the price of spectrum. The spectrum price should not be discounted because particular users of the spectrum generate social benefits. If there are social benefits generated from a particular use, then the Government should explicitly subsidise the user to acquire spectrum at the opportunity cost price rather than implicitly subsidise the user through a discounted spectrum price.



What reasons justify the Government entering bespoke pricing arrangements? How can these arrangements ensure efficient allocation of spectrum?

In theory, variations in willingness to pay justify the use of bespoke pricing arrangements without distorting economically efficient outcomes. Allocation decisions driven by willingness-to-pay typically ensure spectrum is put to its best use and delivers an efficient allocation of spectrum.² However, in practice, information asymmetries, uncertainty about the future, the promotion of competition and fairness considerations make pricing along the demand curve difficult for policymakers to implement and there is significant risk of spectrum being left fallow when policymakers over-estimate demand for the spectrum (or prospective users' willingness-to-pay for it) or mis-time the spectrum allocation process (e.g., macro-economic or other circumstances in financial markets might lead to constraints on some prospective bidders).

Market-based allocations

Market based allocations, and auctions in particular, have become the most popular allocation mechanism for new spectrum when demand exceeds supply. Vodafone supports the continued use of auctions for major spectrum allocations.

Market based allocations need to be well designed to be competitive, and thus effective. In fact, the most important issues for auction design are to ensure efficient allocation, to promote downstream competition and investment and to mitigate entry-detering behaviour. In the case of these latter objectives, allocation limits should serve as a safeguard against a lack of competition in the downstream market from concentrated spectrum holdings, and reserve prices should create the incentive to participate in the auction and enhance price discovery. A well designed auction also induces truthful bidding through its pricing and activity rules.

Are there specific bands that industry would seek to have transitioned from administratively set fees to competitive market-based allocations? What is an ideal timeframe to achieve this?

Given the increasing data traffic and demand in MBB services within the industry, there are certain bands that need to be transitioned from administratively set fees to competitive market based allocations. Through advanced modelling with industry partners, VHA determined that the ensure 300MHz of the 3.4-3.7GHz band ought to be set aside for allocation to meet the projected demand for 5G services in Australia. Unfortunately, some of the metro 3.4 GHz spectrum is set aside for the NBN which NBN may choose to use (or not) for their fixed wireless service. The band is an example where administratively set fees are likely

² There is a potential for high willingness-to-pay for spectrum to be generated by a lack of competition in downstream markets caused by a lack of competitor access to spectrum. Safeguards are required to prevent acquisition of spectrum for anti-competitive purposes.



to be well-below the opportunity cost price of access the spectrum. It is worth noting the NBN only pays these fees if it takes up the licences, making it even less likely that administratively set fees are providing appropriate price signals as to the highest value use of this spectrum.

How can government ensure that reserve prices allow upwards movement while still managing competitive behaviour?

Generally, reserve prices should be set at the opportunity cost price of spectrum in the alternative use. For example, if the spectrum is being used by Wireless ISPs and the ACMA are proposing to allocate the spectrum for use by mobile services, the reserve prices should be informed by the cost of relocating Wireless ISPs to their next best technology alternative (e.g., relocation to a new spectrum or deployment of additional sites). A reserve price set at this level ensures the Kaldor-Hicks criterion is met, whereby the revenue generated from the auction is sufficient to, in theory, compensate the existing users to cease operating in the band. (Note the Kaldor-Hicks criterion is satisfied without compensation necessarily taking place).

In practice it might be difficult for the regulator to implement opportunity cost pricing to set reserve prices due to uncertainty and information asymmetries. The risks from incorrectly set reserve prices are asymmetric. If reserve prices are too low there is a potential for spectrum to be sold without the Kaldor-Hicks criterion being met. However, if reserve prices are too high there is a potential for the spectrum to remain unsold and the Kaldor-Hicks will almost certainly not be met. On balance, policymakers may wish to take a conservative approach to setting reserve prices to avoid the risk of spectrum being left fallow.

It is worth noting that, even when reserve prices are set at conservative levels, this does not mean that the spectrum prices cannot reach the market value (as seen in 1800MHz and unsold 700MHz auctions in 2016 and 2017, respectively). Data from 325 spectrum band allocations over 60 countries shows that from 2008 to 2016, the average final price paid for spectrum sold at auction increased 3.5 fold, while average reserve prices increased over 5-fold³. This imbalance creates inefficiencies in spectrum allocation, resulting either in unsold spectrum or higher consumer prices to recover artificially high operator costs driven by reserve prices set significantly above opportunity cost. Therefore, the fact that the gap between reserve prices and auction outcomes has narrowed, and that a number of auctions ended up with unsold spectrum suggests that high reserve prices create significant inefficiencies. Australian policymakers should avoid this mistake at future auctions by taking a conservative approach to setting reserve prices, albeit one that is informed by the opportunity cost of existing users of the spectrum.

Under what limited scenarios will short-term instalments be an appropriate approach for market-based licence payments?

³ GSMA. (2017). Effective Spectrum Pricing: Supporting better quality and more affordable mobile services.



Short-term payment instalment options should be regarded as a legitimate and primary means of collecting spectrum access charges. The current inflexibility in the collection of spectrum access charges prevents users from having long-term certainty over their investments. As such, short-term instalments should always be considered for licence payments (regardless of the allocation process) as it enables the ACMA to issue licences with longer terms while providing users with flexibly payment arrangements. This reform is critical in the transition from one-year apparatus licence terms to the new licensing regime, with the latter ideally providing a longer licence terms.

In addition, the introduction of short-term instalments helped contribute to the successful outcome at the unsold 700 MHz auction, where there was strong competition and a new entrant was able to effectively compete for the spectrum.

Payment terms should be a parameter in the allocation of licenses with the flexibility to set the parameter to upfront payment or an annual payment (or some hybrid of the two approaches). More flexible arrangements will lead to higher rate of return as financial constraints for potential users are reduced, and spectrum revenue and cost are better tied over time. Given that instalment payments would ordinarily include an indexation factor to cover the government's cost of capital, government should by and large be indifferent as to whether payment is received in one or more instalments.

The current approach to payment terms creates a mismatch for spectrum users between payment and the cash flow generated from spectrum use (payment could be required up to 18 months prior to license issue), imposing a significant and inefficient cost on spectrum users. The approach could lower the return from the spectrum sale and discourage spectrum acquisition since the value of spectrum is not realised until after the license is issued. It is worth noting the arbitrary approach to advance payments has led a wide range of payment requirements being imposed by the ACMA, which seems inconsistent with the objective of ensuring timely payment before a licence commences to ensure the risk (to the Government) of default is low. In any case, if the concern is the risk of default, the risk management approach taken by the ACMA is overly conservative and inconsistent with best practice approaches to financial risk management.

Administered allocations

In circumstances where spectrum cannot be traded, efficient pricing mechanisms create the right incentive to provide highest value spectrum use. Setting prices through market based allocation ensures this by default, and therefore administered allocation procedures should be designed to create the same incentives and maintain consistency in spectrum management.

Administered allocations are often desirable as they provide a mechanism to take into account public policy objectives or specific criteria (e.g. coverage plans or services). Nevertheless, an administered allocation scheme should be designed around the main objective of pricing spectrum to incentivise efficient use of spectrum (and enable spectrum to move to its highest use), and provide consistency and transparency on allocation decisions. The challenge in using administered allocations is to correctly



identify and assess the spectrum user that will deliver the highest value since the regulator (or Government) may not always have complete information about the value of spectrum to the user.

Opportunity cost pricing in an administrative allocation context is intended as an estimate of what the spectrum value might be in a market context. In addition to the alternative highest use element, opportunity cost pricing also includes an element on incentivising the efficient use of allocated spectrum discouraging “spectrum hoarding”, speculative acquisitions and under-utilisation.

Other than the parameters listed above, are there any additional parameters that should be incorporated into the formula?

As previously mentioned, the regulator faces uncertainty and information asymmetries in setting opportunity cost prices for administered allocations. In some jurisdictions regulators have applied a scalar fraction of the estimated opportunity cost price to ensure efficient use of the spectrum and avoid the risk of spectrum being left fallow (e.g., the UK’s Ofcom).⁴ This may be warranted, particularly with the introduction of opportunity cost pricing for administered allocations to ensure stakeholders have sufficient time to make adjustments to their operations if the value they derive from the spectrum is lower the administratively set price.

Are there scenarios where opportunity cost pricing is not a valid pricing approach for pricing spectrum?

Generally, opportunity cost pricing provides the appropriate foundation for most spectrum allocation decisions. In some instances, the opportunity cost price (excluding administrative fees) could be zero. Even at times when the opportunity cost of allocating spectrum to a particular purpose for government is almost negligible, administrative fees that reflect transaction costs could be used to allocate spectrum. By allocating the property right (rather than the spectrum being retained by the ACMA), the licence will be “in-market” and hence tradable, if high-value uses emerge for the spectrum those users could acquire the licence on the secondary market. This approach ensures that highest value use of the spectrum can be achieved while preventing artificial scarcity for spectrum. (Under the current system, new uses for the spectrum often need to wait for the ACMA to determine whether spectrum can be designated for a particular use, then identify which spectrum might be suitable and then commence a reallocation process – the lengthy and cumbersome significantly impedes innovation by slowing the commercial development of novel new uses of the spectrum).

How can the ACMA improve its approach to opportunity cost pricing?

It is important to clarify whose opportunity cost is being measured. The opportunity cost in consideration is the foregone value to the Government if the spectrum was used by an alternative industry with different,

⁴ Ofcom (2009), *Policy Evaluation Report: AIP*.



non-compatible technical conditions. That is, policymakers should focus on the inter-industry opportunity cost. In the Department's 15-year licence re-issue process from 2012, the Government set the price based on the opportunity cost to a theoretically modelled mobile network operator. Revenue generation was an explicit consideration for Government in re-issuing the spectrum licences. However, it is not clear this methodology led to any improvement in the efficient allocation of spectrum for the 800, 1800 and 2100 MHz bands and arguably the approach led to some spectrum bands being significantly under-valued (e.g., the 3.4 GHz band).

In our experience, revenue generation objectives are not consistent with the objective of efficient allocation of spectrum. The ACMA should not incorporate revenue generation into its approach to opportunity cost pricing nor should it distort its measure of opportunity cost pricing to model intra-industry cost behaviour – spectrum trading is the preferred approach to differences intra-industry value. If revenue generation is an explicit objective then the Government should set this objective explicitly, and broaden the base for revenue generation across all users of the spectrum.



Legislative and cost-recovery framework

The proposed changes in the legislative and cost recovery framework aim to simplify and streamline the spectrum pricing process. However, in applying opportunity cost pricing and broadening the cost recovery base the proposed changes could impose significant changes on many spectrum users. It is imperative that stakeholders are provided with sufficient time to adjust their operations to the new regime. A considered approach that conservatively implements these changes will help facilitate the transition.

Are there any barriers that would limit a spectrum framework as described above? Does the revised spectrum framework sufficiently simplify the current spectrum pricing framework? Are any components above unnecessary, or are any additional components necessary?

The major barriers that would limit the proposed spectrum framework would be timing and uncertainty. In terms of uncertainty, the consolidated pricing and tax arrangements should be clearly articulated and the new framework should be clearly defined in order to provide full transparency into the process. In general, the proposed framework sufficiently simplifies the current pricing framework. VHA should note, however, the structure of access charge in the proposed value-based fee framework should be clarified. Assuming that the access charge is composed of opportunity cost and administrative fee components, how the administrative fee is determined (and weighted) across different bands should be clearly defined not only to reflect the transparent value of spectrum, but also to establish the economic value of alternative denied use of spectrum.

Should both costs and value be priced into the fee for spectrum? Should costs be explicitly recovered through a separate tax? What level of transparency of costs and fees would most help users?

Spectrum access charges should not be considered as a tax. They are a charge for access to the spectrum and intended to reflect the value of that property right. If both costs and value are to be priced into the fee for spectrum, a flat fee construct will provide the simplest and most certain approach to recover direct costs. Full transparency of costs and fees will assist in planning and evaluating the use and need for spectrum.