



GSMA Public Policy Position

Spectrum Auctions

October 2012

Summary

Context

The environment for spectrum auctions is increasingly complex as governments release new allocations of spectrum in existing mobile bands; manage the renewal of licences coming to the end of their initial term; and release new spectrum in new bands for mobile broadband services. Effective and efficient management of this complex environment is critical to ensure continued investment in, and development of, mobile services.

Position statements

1. Efficient and effective allocation of spectrum is critical to ensure that the full value of mobile to national economies can be realised and the full potential to deliver societal good realised.
2. Auctions can provide an economically efficient means to allocate spectrum when there is competition for scarce spectrum resources and demand is expected to exceed supply.
3. Auctions should not be designed to maximise short-term revenue for governments.
4. Auctions are not the only option available to governments to manage spectrum allocation and should only be used in appropriate circumstances.
5. Throughout the auction design and execution process, regulators should work with stakeholders to ensure the auction design is fair, transparent and appropriate for the specific market circumstances.
6. There is no 'one size fits all' design for spectrum auctions. Each auction needs to be designed to meet the market circumstances and to achieve the specific objectives set by government.

Background

Efficient and effective allocation of spectrum is critical to ensure that the full economic and societal value of mobile can be realised. Mobile services are not only used by retail consumers but are also critical for many other sectors in the economy to realise their full economic potential, enabling, for example, significant productivity improvements and innovation. For the mobile industry, economically and technically efficient allocation of internationally harmonised spectrum is critical to ensure operators have the opportunity to secure the spectrum resources required to invest in infrastructure and innovation as well as to deliver services to consumers and businesses.

Auctions are one approach available to government and regulators to allocate spectrum to operators. Administrative assignments and beauty parades are alternative approaches that may, in certain specific market circumstances, be more appropriate for the allocation of spectrum resources. Market based approaches (auctions) are however generally preferred as a means of allocating spectrum, especially where when there is competition for scarce spectrum resources and demand is expected to exceed supply.

Auctions are typically designed to meet a number of societal, market and economic objectives and should not be focused on short term revenue maximisation for the exchequer. The greatest value to governments is through the effective use of the spectrum to enable mobile and mobile broadband services. Excessive auction fees, or inappropriate reserve prices, may negatively impact consumer pricing and inhibit the ability for operators to invest in network deployment, ultimately impacting GDP growth and innovation in other sectors of the economy.

The environment for spectrum auctions is increasingly complex as governments release new allocations of spectrum in existing mobile bands; manage the renewal of licences coming to the end of their initial term; and release new spectrum in new bands for mobile broadband services. Effective and efficient management of this complex environment is critical to ensure continued investment in, and development of, mobile services. There is no single solution for governments. The specific circumstances of the each market need to be considered, with industry stakeholders involved at all stages of the decision process through an open and transparent consultation process, to ensure the approach chosen will ensure an economically efficient allocation of spectrum is developed delivering the desired government objectives whilst also meeting the needs of industry, investors and citizens.

In the right circumstances, and when designed and implemented in the right way, spectrum auctions are likely to be the most economically efficient means of spectrum allocation to the bidders who value the spectrum the most. Auctions are however not appropriate in all circumstances and governments should consult with industry and other relevant stakeholders to determine the best approach to allocating spectrum in their specific circumstances.

Government Objectives

When allocating spectrum, governments will want to achieve one or a number of goals. These objectives vary in priority by market, but are likely to be common to all governments when allocating spectrum:

- **Economic objective:** Allocate the spectrum to the players that will use it most efficiently and effectively, creating the maximum long term economic value from the scarce resource.
- **Societal objective:** Ensure that the maximum long-term societal value can be created from the spectrum, as opposed to seeking short-term revenue generation for government.
- **Technical objective:** Ensure the efficient technical implementation of services. For mobile and mobile broadband, this means the allocations should align with agreed, harmonised band plans and support contiguous allocations that enable the design and implementation of efficient and cost effective networks.
- **Investment objective:** Use the spectrum allocation process to encourage investment in the deployment of networks and the implementation of new services. The greatest societal value and long-term economic value from spectrum comes from the future use of the spectrum and not from revenues generated by its initial sale.
- **Revenue objective:** Many governments have a short-term revenue objective from the auction process. Valuations should be realistic — not excessive — and enable fair competition for the spectrum resources. Any fees applied to the spectrum should not punish efficient use of the spectrum or distort downstream markets.
- **Market structure:** Ensure a competitive market structure that can be supported through the allocation of spectrum resources.
- **Fair allocation:** Ensure a fair and transparent allocation process to ensure applicants understand the basis of the procedural rules and conditions and have the information required to value the spectrum they are bidding for.

When to Use Auctions

Well-designed auctions, with clearly defined licence rights and obligations, clearly defined rules and a transparent process provide the opportunity for governments to ensure spectrum is effectively assigned and efficiently used.

Governments need to assess the specific market circumstances and consider the objectives they wish to achieve. They also should consult with stakeholders before agreeing on an allocation approach. Factors influencing the decision on the allocation approach include:

- The amount and type of spectrum available
- The expected demand for the spectrum
- The overall objectives of the government
- The regulatory capacity to support the allocation process
- The amount of likely competition for the available spectrum
- The likely value of the spectrum

Spectrum auctions have typically been used as an allocation approach in a scarcity situation for specific spectrum and for new spectrum allocations (e.g., the 2.1GHz band for 3G services). Auctions should only be used for licence renewal when there is a reasonable prospect of a reallocation of resources between operators or where an existing licensee decides to reject a renewal offer. To date, most markets have used an administrative procedure for licence renewal, primarily because markets have been seen to be competitive and the economic value of continuity of service has been seen by governments to outweigh any potential benefit of using auctions to determine the economic value of the spectrum.

The Auction Process

When governments use an auction process to allocate spectrum, it is critical that a clear, transparent and consultative process in determining the auction approach is followed. Key elements of the process include the following:

- Consultation with the operators and other stakeholders throughout the process is essential. This will ensure that any potential flaws in the auction design and any potential distortions to the efficient outcome of the auction are highlighted in advance. Whilst individual operators will have preferences for particular solutions, they will also have a deep understanding of the potential risks related to auction design. A well-executed consultation process will highlight these risks and mitigate poor auction outcomes.
- A clear and open process is critical. Most auction formats are a transparent way of allocating scarce resources between competing operators and mitigate against many of the transparency risks, such as subjective judgements and can avoid the potential for corruption related to beauty parades and administrative procedures. Auction rules need to be complete, clear and consistently applied. These rules need to be published, and consulted on, in advance. The execution of the auction should also be transparent and logistically equal for all bidders. Online auctions (rather than paper based) are always preferred as they remove most logistical and physical risk and allow for greater transparency in the bidding process.
- Spectrum roadmaps and plans are critical to valuing spectrum effectively. More bands are becoming available for mobile use, and existing licences are also coming up for renewal. Without a clear roadmap of spectrum plans and a clear

understanding of licence renewal plans, there is significant risk in the valuation of individual spectrum awards.

- Uncertainty needs to be minimised. Bidding for spectrum is a significant commercial risk for operators. Having a clear understanding of what spectrum resources they are bidding for, what the obligations related to any particular licence will be, what rights are attributed to the spectrum, what charges will be levied during the life of the licence and the duration of the licence, all defined before the auction, is required for operators to determine an appropriate value for the spectrum. The greater clarity and certainty that can be provided, the more likely an efficient allocation of spectrum will happen and the greater the return for governments and society.

Auction Types

There are a number of alternative auction designs, from multi-round auction formats, including combinatorial clock auction (CCA) first used by Ofcom in the UK, simultaneous multi-round ascending auction (SMRA) first used by the FCC and derivative auction formats including SMRA with augmented switching used by the Norwegian PTT and across Scandinavia through to simplistic first price single bid (sealed bid) auctions.

Multi-round formats are the most likely to realise an efficient allocation of spectrum and to ensure spectrum ends up with those who value it most and are likely to use it to benefit customers and society in general. Other than extreme simplicity of execution, there are no advantages to a single bid auction over multi-round auction formats. Whilst trying to simplify auctions is important to minimise risk, over-simplification can increase the risk disproportionately and lead to poor outcomes.

Whilst multi-round auction formats are preferred, each design format has its strengths and limitations, which are dependent on the market circumstances and the objectives the government and regulators. Consultation on the type of auction, as part of the overall consultation process on the auction design, is critical.

Designing Auctions

Auctions need to be designed to meet the specific market circumstances and to deliver the objectives for that specific auction. There is no single optimum solution or preferred design that can be applied. There are, however, a number of areas for governments to consider in the design and a number of high-level principles that do apply in most circumstances.

Packaging

Packaging spectrum for auctions is highly dependent on the spectrum that is being made available; there is no single way that suits all circumstances. There are, however, a number of considerations that should be factored into any decision on packaging.

- Technical considerations should be included in packaging. Contiguous blocks of spectrum and wider channels are important to realise efficiencies in mobile broadband. For network efficiency, 2x5MHz is the minimum block size for LTE. For FDD LTE networks, 2x10MHz is considered to be the minimum requirement for operators deploying broadband networks.
- Ensuring the allocation of spectrum aligns internationally and can be harmonised is critical. Non-standard configurations will devalue the spectrum, lead to increased device costs and, in the worst case, result in the spectrum being unsold or unused.
- Competition in auctions is important to realise the true value of spectrum. Packaging should allow for competition but should not increase exposure risk¹ for bidders.
- Concrete versus abstract or generic blocks²: Where spectrum blocks are similar and significant variations in value across lots are not expected, then abstract (generic) blocks simplify the auction design. When abstract blocks are used, a secondary allocation (assignment of specific blocks) process is required. Understanding whether value disparities exist, as well as the relationship between spectrum lots, before defining auction packages is critical to achieving a successful outcome from the auction.

Clarity of Process and Conditions

For auctions to be effective, it is essential for bidders to have all of the information required to be able to value spectrum and to manage the auction process.

- Clarity of auction rules and subsequent licence conditions are critical to ensure an efficient outcome of the auction.
- It is critical that any obligations and conditions are known and understood in advance, and that there is confidence from bidders they will be applied and will remain consistent over the duration of the licence. Conditions across all spectrum or related to specific packages need to be rational, realistic and commercially viable.
- For the auction design, it is essential that all rules of the auction are clearly defined, do not overly burden participants and are clearly communicated, exhaustive and robust.
- Increased availability of information prior to and during the bidding process reduces levels of uncertainty, allowing bidders to price spectrum accurately, reducing the risk of poor outcomes from the auction.

¹ An exposure risk is where a bidder sees value in synergies across a number of different spectrum packages that will not be realised unless they secure all of the packages.

² A concrete block is where the specific frequency is identified in the package. Abstract or generic blocks are where an amount of spectrum is identified but not the exact allocation.

Reserve Pricing

The setting of adequate reserve prices is complex, but is extremely important for a successful auction outcome. If the reserve price is set improperly, it may discourage or block auction participation by existing operators or potential new entrants, hinder the price-discovery process and ultimately keep spectrum out of efficient use. The price level needs to be set at a level that discourages frivolous and speculative bidding for spectrum; however, if set too high, it may discourage the participation of serious bidders.

- Auctions are used as a mechanism to determine the market price, so reserve pricing should be set as low as possible, potentially with other auction conditions applied to prevent speculative bidding for spectrum resources, and the auction should be designed to encourage bidders to compete, in order to determine the market value of the spectrum.
- Pre-determination of unrealistic reserve price values will lead to spectrum being unsold (and therefore creating no value) or potentially result in spectrum being acquired at an uneconomic rate with a subsequent impact on the services and prices available to end users.
- Price discovery should be encouraged by setting adequately low reserve prices and allowing dynamic bidding, including the change of blocks and bands during the auction.
- An effective outcome of the assignment can be achieved by running an adequate prequalification procedure. Requesting details on the bidders' experience in network design and service creation, as well as their financial ability to pay for the spectrum rights and rollout costs. This will prevent spectrum from being allocated to unqualified players and will mitigate acquisition of spectrum by entities that speculate on the future value of the spectrum with no intention of deploying networks.

Spectrum Caps

In allocating spectrum, designing auctions and packaging lots, regulators often take a view on the competitive structure of the downstream market. Spectrum caps are a mechanism employed to prevent spectrum concentration that adversely affects the downstream market. Caps can be helpful, but need to be deployed cautiously to avoid unintended consequences and, ultimately, poor outcomes for consumers.

- Caps are a mechanism that prevents the possibility of spectrum hoarding and downstream market concentration, but if defined too tightly they can harm the ability of operators to effectively and efficiently deploy next-generation networks.
- Spectrum caps, when applied holistically, can be an effective way of enabling a redistribution of spectrum amongst market players, and potentially to new entrants. The caps should allow for all market players to be able to deploy networks in a technically and economically efficient manner.

- Using spectrum caps to force a reallocation of spectrum with the specific purpose of facilitating market entry for new entrants can lead to spectrum fragmentation and inefficiencies which, ultimately, will have an impact on consumers and businesses using the services.
- Alternative licence conditions relating to network deployment and spectrum usage may, in many circumstances, lead to more effective outcomes for consumers than specific spectrum caps.

Multi-Band Auctions

As with most auction design elements, the appropriateness of simultaneous auctions (multiple bands being auctioned together) versus sequential auctions (bands being auctioned one after the other) is dependent on specific market conditions.

- If the release of available spectrum is likely to be significantly delayed in order to create a simultaneous auction, then sequential auctions may be preferred.
- Where there are strong dependencies between spectrum bands for capacity and coverage, simultaneous auctions are preferred to reduce exposure risk and to ensure networks can be deployed in a technically and economically efficient way.
- The choice of sequential or simultaneous auctions should be determined by assessing which approach is likely to result in the most effective and technically efficient use of the spectrum that delivers the greatest long-term value to the economy and society.
- The effectiveness of either approach will be dependent on a clear spectrum road map with well-defined rights and conditions understood in advance.
- Where multiband auctions are implemented, it is important that the auction design be clear and the process not overly complicated. Rules and conditions for the assignment procedure should fit the specific circumstances and allow for openness, transparency, flexibility, efficiency of spectrum use. Excessive restrictions and obligations should be avoided, giving room for post-procedural market solutions (e.g., trading, leasing and sharing options).

Summary and Recommendations

Efficient and effective allocation of spectrum is necessary to realise the full value of mobile for the economy and society. Auctions can provide an economically efficient means to allocate spectrum when there is competition for scarce spectrum resources and demand is expected to exceed supply. To be effective, auctions need to be well designed and well implemented. Governments should:

- Design auctions to ensure the economically and technically efficient allocation of internationally harmonised spectrum, encouraging investment in infrastructure and use of the spectrum to deliver services to consumers and businesses.

- Clearly define licence rights and obligations, and set the auction rules and process to promote competition and downstream market efficiency.
- Consult the operators and other stakeholders throughout the auction process to ensure potential flaws in the auction design or potential distortions in the outcome of the auction are highlighted in advance.
- Aim for the long-term economic value of the spectrum to the economy through technically and economically efficient deployment of mobile networks — not for short-term revenue generated by auctions.
- Design auctions to meet the market circumstances and to achieve the specific objectives of that specific auction; do not apply a generic template.

###

GSMA Government and Regulatory Affairs

A country's citizens benefit most when the private and public sectors work together in a spirit of openness and trust. To this end, the GSM Association is committed to supporting governments and regulators in their efforts to introduce pro-investment telecommunications policies.

The GSMA's government and regulatory affairs team represents the mobile industry around the world, advocating for a regulatory environment that encourages investment, maximises innovation and creates opportunity for mobile operators, the wider mobile ecosystem and mobile users. Through direct engagement with governments, we help to shape the global regulatory agenda.

Visit www.gsma.com/publicpolicy.