



Licensing to support the mobile broadband revolution

A report for the GSM Association
Executive Summary
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Mobile phones have become the main means for making voice calls in the world and have brought telecommunications access to many of the world's people for the first time. Now the industry is in the middle of another major transformation with rapidly growing take-up of mobile broadband services across both developed and emerging markets. Mobile data traffic is expected to increase 18-fold between 2011 and 2016 with growth rates being highest in emerging markets, including the Middle East and Africa, Asia Pacific, Central and Eastern Europe and Latin America.

Spectrum is the lifeblood of the mobile industry. The amount of spectrum made available and the terms on which it is made available fundamentally drive the cost, range and availability of mobile services. Across the world, substantial new spectrum is needed to support ongoing growth in both traditional voice and new broadband mobile services. It is also critical that the rights to use the spectrum are provided in a way that enables the industry to deliver maximum benefits to consumers. The rapid growth in demand for spectrum increases the importance and the difficulty of efficient spectrum management. The GSMA has commissioned this report to examine the experience with mobile spectrum licensing around the globe to date and draw out the lessons for policy. A key focus is on what works well in emerging markets and how the lessons can be applied to the additional spectrum to be allocated over the new few years. Choosing the correct spectrum policy will be particularly important in emerging markets where mobile services can be expected to provide the principal access to high-speed data, as they have with voice.

The countries that get their spectrum policy right will achieve widespread access to affordable and innovative mobile broadband services. Strong communications infrastructure, in turn, brings significant wider economic benefits including in boosting productivity and living standards. Governments that currently face significant fiscal demands also stand to benefit both directly from licensing revenues as well as more generally through the higher economic growth generated by access to mobile broadband.

Achieving a flexible licensing framework to support substantial new investment

Traditionally, many governments imposed highly prescriptive operating and spectrum licences that required operators to supply only certain services and/or use specific technology (although other countries have not had separate operating and spectrum licences). Given the rapid pace of technological and market developments, restrictive licensing requirements will limit operators' ability to make the best use of their networks to supply services and risk delaying the investment required to introduce new broadband services. Detailed spectrum licences that are specific to one operator, type of service, network or technology also risk distorting competition if operators supplying competing services face different licence conditions. While, in the past, operators have been subject to extensive restrictions, many licensing authorities provide little guidance on their own approaches to forthcoming spectrum issues. This increases regulatory risk and deters operators from making the large investments required to deploy new technologies and services.

Following are our key recommendations in relation to reforming the overall licensing framework:

- *Recommendation 1* - Licensing authorities should progressively remove restrictions that unduly restrict operators from determining which services they will provide and the technology that they will use. Restrictions that do not result in clear net benefits should be relaxed. Operating licences should be expanded to cover a greater range of services or, where appropriate, replaced altogether by simpler authorisations or class licences. Where restrictive operating licences are maintained they should be separated from licences for the use of spectrum. Spectrum licences should, in general, contain spectrum management provisions only or principally. This will assist changes in business activities and spectrum holdings and support the evolution of technologies and the different needs between radio spectrum management and other aspects of the licence. Operators offering similar services should be subject to the same terms and conditions.
- *Recommendation 2* - Spectrum should be managed to ensure that a country obtains maximum benefit from the use of its spectrum resources. Spectrum rights should be assigned to the services and the operators who can generate the greatest benefits to society from the use of that spectrum, i.e. to achieve the efficient use of spectrum. Market-based approaches represent a key means to ensure that spectrum is used to supply the services most in demand and operators are able to use the best available technology to deliver those services.
- *Recommendation 3* - Licensing authorities should ensure that the overall licensing framework offers stability and transparency to reduce regulatory risk and promote investment. Key principles should include:
 - establishing and adequately resourcing an independent regulator with responsibility for operator and spectrum licensing among other matters;
 - announcing in advance a long term plan for reform of the spectrum and operating licensing framework;
 - facilitating international harmonisation so that equipment and devices use the same frequency bands to support international roaming and enable the realisation of scale economies in manufacture;
 - publicly setting out the criteria and process to be followed in licensing decisions and including public written consultation in advance of key decisions being made with both consultation responses and the assessment of input in reaching final decision being published;
 - clearly defined spectrum rights that are backed up by a robust compliance/enforcement regime;
 - taking a holistic approach to licensing that ensures that the overall package enables the ongoing development of the mobile industry (including a process for the renewal of licences at their expiry); and
 - taking into account investors' legitimate expectations and providing compensation mechanisms where decisions are made in conflict with those expectations.

Freeing up spectrum resources to meet growing demand

Licensing authorities can take a number of key steps to free up spectrum that is currently poorly utilised and use that spectrum to deliver higher valued services. In particular, authorities should both identify what spectrum rights are able to be assigned to provide additional spectrum capacity as well as enabling current spectrum assigned for mobile services to be used more effectively. Enabling flexible/technology neutral use of spectrum so that operators who currently use spectrum for 2G services have the ability to determine when the use of part or all of this spectrum should be changed for 3G and newer mobile technologies such as Long Term Evolution (LTE) services. This is an important way to expand over time the services able to be carried with existing spectrum as well as facilitating lower cost services, expanded geographic coverage and better indoor coverage, depending on the bands considered.

- *Recommendation 4* – Current rights to use spectrum should be clearly specified and spectrum bands that are currently idle or being poorly utilised (including by public sector agencies) should be considered for re-allocation to services that could use the spectrum to generate greater benefits for society.
- *Recommendation 5* – Licensing authorities should publish a road map of the planned release of additional spectrum bands to maximise overall benefits from the use of spectrum including taking into account the benefits of international harmonisation. In doing so, aligning spectrum rights with the internationally harmonised mobile spectrum bands will ensure that operators and their customers can acquire competitively provided equipment and devices and that customers can readily access international roaming services.
- *Recommendation 6* - Licensing authorities should progressively remove service and technology restrictions in existing mobile spectrum usage rights to enable operators to choose when to deploy mobile technologies that can technically co-exist so as to increase spectral capacity, reduce cost of provision, extend coverage to rural areas and improve indoor coverage. Operators themselves are likely to be best placed to determine the speed of migration particularly recognising that 2G services are likely to remain important for the next 5 to 10 years.
- *Recommendation 7* - New spectrum usage rights within the mobile bands should be issued on a service and technology neutral basis subject to the use of technologies which can technically co-exist without intolerable interference.
- *Recommendation 8* - Licensing authorities should facilitate harmonisation of spectrum through allocating radio frequency bands in accordance with international agreements and by applying spectrum management approaches aligned with international best practice.

Assignment and renewal of licenses

A major forthcoming issue for many licensing authorities is to determine what should happen to spectrum rights as licences approach the end of their initial term. Uncertainty about the future rights to spectrum can lead to operators reducing or delaying investment in upgrading their networks and deploying new services. Securing funds for investment is difficult in the current economic environment even for established players. As such, authorities should be alert to the real danger that their investment incentives can be undermined by uncertainty over future rights. The loss of rights to spectrum currently being used for the supply of services also carries risks to customers in relation to the loss of service. Reflecting these risks, many authorities have established a presumption of licence renewal with only exceptional and well specified circumstances under which licences will not be renewed. More generally, where licences are to be re-assigned or assigned for the first time, authorities will need to determine whether market-based or administrative approaches will best promote efficient allocation of spectrum in the specific market context.

- *Recommendation 9* – Licensing authorities should clearly set out their approach to licence renewal in advance (a range between 2 to 4 years as a minimum should be adequate) of the expiry of the licence so as to avoid network investment being postponed. The authorities should publish the criteria that they will use to assess renewal as well as the terms and conditions that will apply to the renewed licence.
- *Recommendation 10* - There should be a presumption in favour of licence renewal for operating and spectrum licences to encourage long-term investment and minimise the risk of service disruption to customers. Reasons for not renewing licences should be limited to spectrum replanning, where there is little risk of stranding substantial investments, or where there has been a serious breach of licence conditions which should be evident in advance of the renewal time. Exceptionally, a licence may not be renewed in relation to the whole or part of the relevant spectrum so as to promote competition through re-assignment of spectrum. However, before not renewing a licence for this reason, regulators should first (i) assess whether competition is already effective in the market; (ii) identify whether competition can be promoted by other means such as the release of alternative spectrum; and (iii) assess whether the expected competition benefits will exceed the potential costs such as in relation to spectrum replanning, customer migration and the risk of deterring investment.
- *Recommendation 11* – Re-auctioning spectrum at the end of the licence should be limited to situations where there has not been evidence of substantial investment and there is a reasonable prospect that spectrum will be re-assigned between operators (or where additional, alternative spectrum is being made available), or situations where an existing licensee decides to reject a licence renewal offer. In most cases, the existing operators would be expected to re-acquire the licence with the consequence that an auction only creates unnecessary uncertainty and costs.
- *Recommendation 12* – Where spectrum is to be re-assigned or assigned for the first time, licensing authorities should determine the approach or combination of approaches to assigning licences taking into account their particular objectives as well as the likely advantages and disadvantages of the different approaches in the particular market context drawing on both theory and practical experience. Licensing authorities should attach priority to ensuring effective competition in downstream markets for services to end-users. Whether an auction or beauty contest is adopted, the detailed design of the approach is important. Open auctions are likely to be superior to sealed bid auctions for spectrum relevant to mobile broadband services in terms of promoting efficient spectrum use.

Efficient pricing of spectrum

The overall level of licence fees (including upfront and annual charges) can significantly impact market outcomes including the number of players that enter the market and, particularly where annual charges are levied, the prices for mobile services. There is a strong economic case to avoid the level of licence fees being determined on the basis of revenue maximising objectives. Rather, licence fees can be used to help recover the administrative costs of the licensing process and of managing spectrum and, in some circumstances, to encourage efficient spectrum use.

Following is our key recommendation in relation to spectrum pricing:

- *Recommendation 13* - Licence fees, if any, should generally be limited to recovering the administrative costs of the licensing process and associated regulatory costs (including spectrum management costs). However, where there is excess demand for spectrum, then an auction or administrative assignment of spectrum with a charge set in line with the Marginal Forward Looking Opportunity Cost (MFLOC) of spectrum should be considered. Indexation or benchmarking may prove a practical means to estimate MFLOC in particular circumstances. The MFLOC should be estimated conservatively to reduce the risk that valuable spectrum will be left idle. It is also important that the estimated prices are set appropriately relative to spectrum prices in other bands. The relative merits of upfront licence fees versus annual charges should be considered with regard to the particular market circumstances.

Promoting competition

The approach to spectrum licensing can significantly impact competition in the mobile services markets. There is a case for regulators to ensure that national spectrum resources do not become excessively concentrated in the control of only one or two operators. However, there is also a danger if spectrum becomes too fragmented as mobile operators would be prevented from realising scale economies so that service costs and prices are higher than otherwise. Generally, licensing authorities should ensure that operators are able to expand their access to spectrum if they are delivering value and attracting customers.

- *Recommendation 14* - Licensing authorities should aim to ensure effective competition in the downstream markets for mobile services. Many sector regulators and competition authorities have accepted that three to four national operators are likely to be sufficient to achieve effective competition.
- *Recommendation 15* - Specific measures to promote competition should only be imposed in markets where there is market failure and competition would otherwise be ineffective and where those measures are assessed as being likely to result in greater benefits than costs. Spectrum caps, spectrum set-asides, bidding credits, competition law enforcement and open access requirements carry advantages and disadvantages and should be assessed in relation to the specific market context.

Reviewing non-price terms and conditions

Efficiency can be promoted by licences that support operators making substantial investments that reflect fundamental market conditions rather than requirements imposed by regulators. Many governments have traditionally included a range of terms and conditions in licences which go beyond those necessary for the intrinsic purpose of the licence to authorise market access and/or manage the use of spectrum. However, licence conditions tend to be relatively inflexible and can create the risk of market distortions as competition develops in telecommunications markets. Alternative, targeted regulation is likely to better achieve particular goals such as the control of market power and promoting universal access.

Following are our key recommendations in relation to non-price terms and conditions:

- *Recommendation 16* – Licensing authorities should introduce licence terms for mobile operators that are at least in line with the expected payback period for the investments and should consider the introduction of indefinite licence terms (with a specified minimum term, i.e. 15 years).
- *Recommendation 17* - Licensing authorities should provide for national licences where customer demand and/or scale economies are likely to support national provision as being most efficient. Where regional licences are under consideration, the auction process itself could be used to determine whether regional or national licences are valued most highly.
- *Recommendation 18* – As an alternative to licence obligations, governments should achieve universal access and competition objectives through policies that help to change the underlying economics of extending access or entering the market or through alternative targeted regulation.
- *Recommendation 19* – Licensing authorities should enable voluntary spectrum trading between operators and facilitate trading through well specified spectrum rights, long licence terms and minimizing administrative costs. Such trading helps to ensure that spectrum remains efficiently assigned over time. Competition concerns should be assessed taking into account the specific circumstances of each trade, although certain safe harbours could be established such as where the operator acquiring the spectrum has a market share below a certain threshold and/or the spectrum represents a relatively small share of the overall spectrum available for those services.



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