



Enabling Mobile Broadband: A Toolkit

EXECUTIVE SUMMARY

Introduction

This toolkit has been written to help regulators and governments understand the process they should follow in order to enable telecommunications operators to provide mobile broadband services to citizens. Mobile broadband has a large economic impact through direct spending on services and devices, expenditure on the mobile broadband ecosystem, and productivity and efficiency gains felt throughout the economy. For example, for a given level of mobile penetration, a 10% substitution from 2G to 3G has been shown to increase GDP per capita growth by 0.15%.¹

Broadband has the potential to transform entire economies by giving everyone in a country fast, reliable and always available access to information and communication. Delivering broadband to handsets through the mobile networks is a quick, cost efficient way for a country to realise these benefits of broadband. The advent of mobile broadband makes it economically viable to provide broadband to populations that might never have gained access to costly fixed broadband. Particularly in developing countries, regulators and governments are keen to encourage the roll out and uptake of mobile broadband.

This report has been written to enable regulators and governments to understand the process they must follow in order to enable telecommunications operators to provide mobile broadband services to citizens. It uses countries that have started the process as case studies to illustrate what lessons can be learned for other regulators. There is no one-size-fits-all strategy for enabling mobile broadband; each country has a unique set of incumbent users, legacy networks and mobile market structure. However, there are five stages of the process to enable mobile broadband which all countries will need to go through in some

way; these will be examined in Figure 1-2. Many regulators will be some way down the process and so will not need to use this report end-to-end; the stages and tasks have been put together so that regulators can use these to understand what work is needed in their country, and put together a suitable workplan.

Regulators should not see the first roll out of mobile broadband as the end goal. Many countries, having enabled mobile broadband and seen the demand for it, are looking to increase the amount of spectrum allocated to it. Once the process is completed regulators may wish to start it again for another frequency band. An awareness of the growing demand for mobile broadband will help regulators plan for the future, and plan how spectrum allocations will change over time.

Mobile broadband presents governments with a unique opportunity to provide their citizens with robust, reliable communications technology which can be used by everyone to increase productivity, wealth and social welfare. However, this will not occur without government support and spectrum allocation.

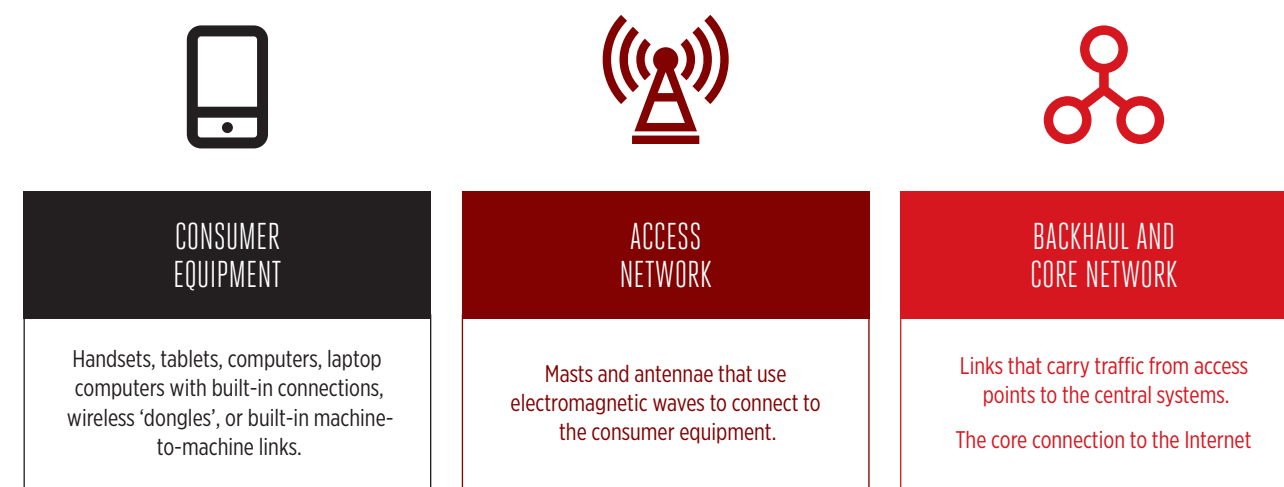
1. Deloitte (2012b)

MOBILE BROADBAND NETWORKS

A mobile broadband network operates on three levels, as shown in Figure 1-1

Source: Plum Consulting

Figure 1-1: Mobile broadband network structure



For an operator to be able to run a mobile network, they must have access to facilities to run both the access and core networks. Operators can run core networks using either fibre or microwave links, while access networks require access to electromagnetic spectrum. This spectrum must have the following characteristics:

- Be exclusively used by the operator, to prevent interference issues.
- Be located at the appropriate frequencies to enable compatibility with consumer devices.
- Have a sufficiently wide bandwidth for enough data to be transferred.

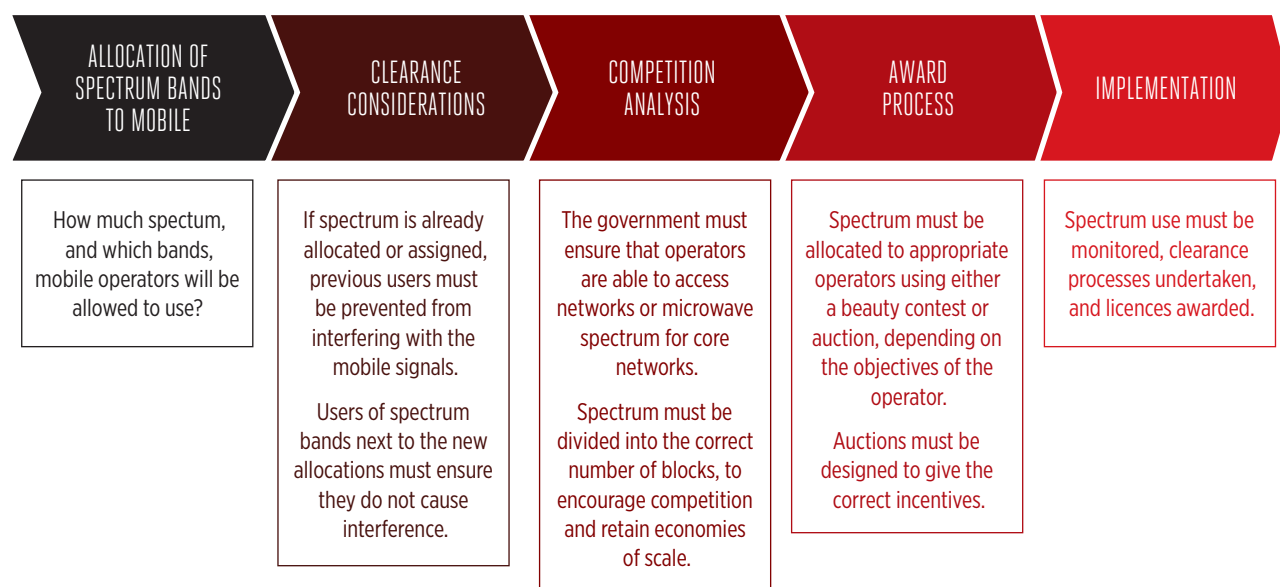
Historically, spectrum has been allocated to mobile communications in bands at 450 MHz, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz and 2100 MHz in various countries worldwide. As the world moves to digital terrestrial television, mobile networks are also being allocated spectrum in the 800 MHz and

700 MHz bands, with further spectrum available in the 2300 MHz, 2600 MHz and 3500 MHz bands. However, allocating sub-1 GHz bands to mobile should be the priority – the coverage characteristics of these bands make them most suitable for mobile broadband. Whilst the allocation of higher frequency bands to mobile brings benefits, the higher frequency bands are not a direct substitute for sub-1 GHz bands. Each country must make its own decisions over the allocation of spectrum, based on the demand for services and the number of operators, taking into account international harmonisation and experience.

This toolkit sets out the processes that must be followed for a government to enable mobile broadband so that its citizens can benefit from increased connectivity. Figure 1 2 illustrates the five general stages that must be followed. These five stages form the structure of the remainder of this toolkit.

Source: Plum Consulting

Figure 1-2: The overall process



As will be seen in this document, the largest consideration for regulators is the release of spectrum which will be used in the access network. While other considerations, like ensuring a core network can be built and assessing competition in the market, are important, these generally occur through general regulation of telecommunications industry.

This toolkit explains the objectives, results, and methodology used in each stage, presenting these as a series of questions that must be answered and decisions which must be made. The toolkit is divided into chapters according to the stages set out above. However, there are a number of considerations which span the entire process, including looking at the legal framework in a country, the state of broadcasting technology, and the demand for services. These are examined in the next section.

The process for enabling mobile broadband involves some tasks which can be highly complex, such as technical work on interference. The breadth of this report necessitates some level of simplification; it is beyond the scope of this report to cover these complex issues in depth, so where possible this report points to existing studies, toolkits and reports.

Many countries have national broadband strategies to both plan and encourage the roll-out of broadband. This toolkit will help regulators expand broadband coverage through mobile, so regulators should consider interaction between this process and the national broadband strategy.

This toolkit uses the term allocation to refer to the specified use of the band and the term assignment to refer to the spectrum that specific users have the right to use.

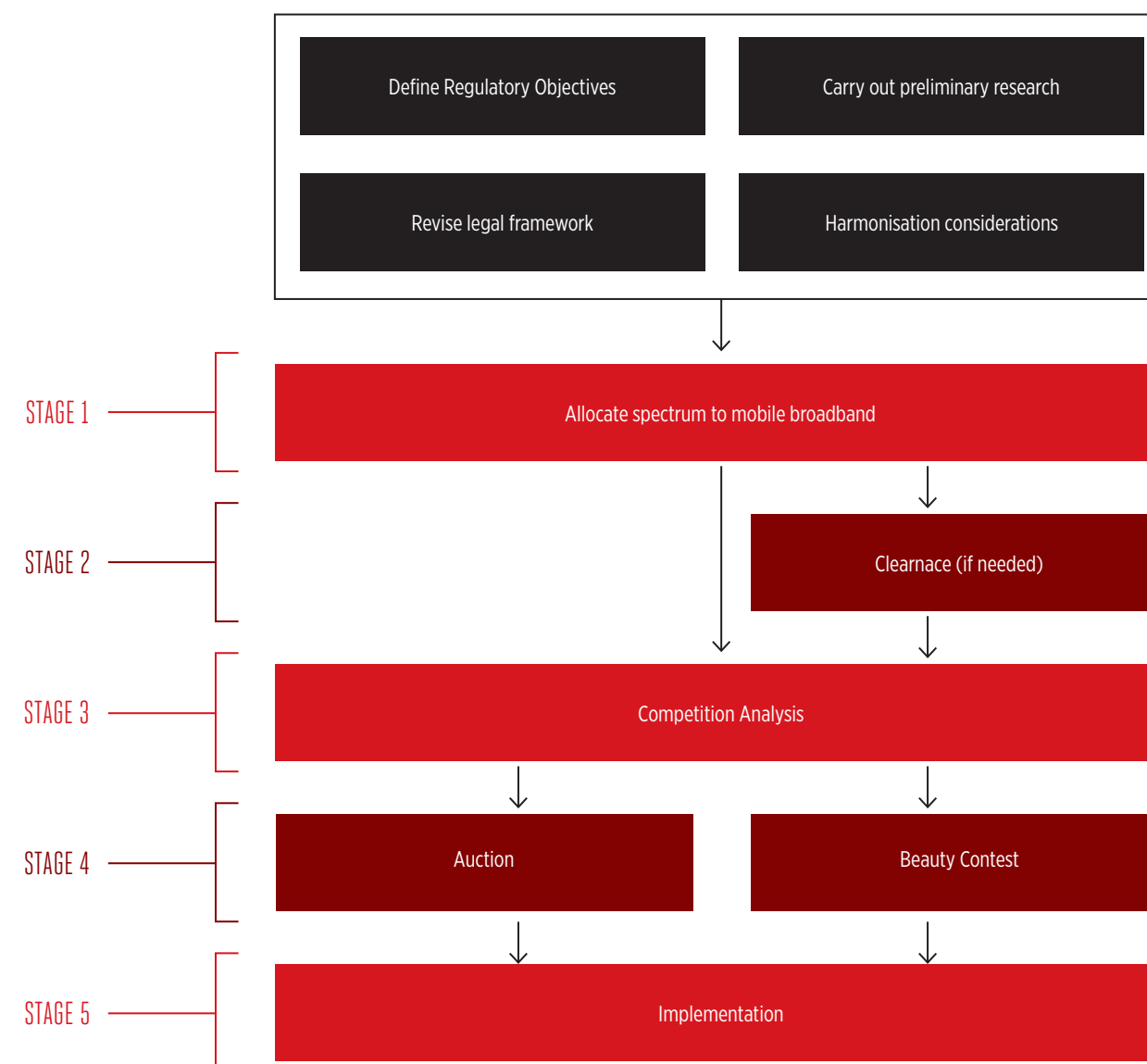
HOW TO USE THIS TOOLKIT

This toolkit sets out the essential work that must be carried out in order to enable a mobile broadband network to operate. However, in many countries parts of this work will have already been undertaken; further, other countries may not find that all tasks in the toolkit are applicable. For example, small island countries may not have a capacity constraint when running mobile broadband over existing spectrum, but they may still have to coordinate with neighbouring islands.

This toolkit should therefore be seen as a generic process, which must be adapted to each country's circumstances. To help with this, this toolkit includes a number of case studies at each stage, which shows how the general methodologies and theories have been applied.

Source:

Figure 1-3:



CONTENTS OUTLINE

The toolkit consists of 6 folders. In each folder will be the introduction, process overview and conclusion so that each might be used as a stand alone guide.

1. GENERAL ISSUES

- Regulatory aims
- Regulatory capabilities
- Non-spectrum constraints on mobile broadband
- Regional harmonisation
- ASO
- National budgeting
- Interference
- Benchmark countries
- Geography and demographics
- Preliminary legal tasks

2. ALLOCATION

- Carry out spectrum audit
- Carry out general market analysis
- Understand international spectrum frameworks
- Take account of other technologies
- Conduct impact study of incremental spectrum
- Decide on spectrum allocation

3. CLEARANCE

- Move incumbent users
- Set a reasonable timeframe for clearance
- Define acceptable interference levels
- Define mobile technology to be used
- Set guard bands and duplex gaps
- Requirements for temporary measures

4. COMPETITION ANALYSIS

5. AWARD PROCESS

- Define objectives of awards
- Decide on type of award process
- Estimate the value of the spectrum
- Beauty contest: Determine evaluation framework
- Beauty contest: Spectrum packaging
- Beauty contest: Set the price
- Auction: Decide auction format
- Auction: Decide block size and number
- Auction: Will there be spectrum caps
- Auction: Set the reserve price
- Decide on whether to charge annual fees
- Set the level of annual fees
- Hold award process

6. IMPLEMENTATION

- (Re)stack assignments
- Set a realistic date for mobile broadband switch on
- Update national frequency register
- Notify ITU and relevant regional bodies
- Conduct review
- Monitor spectrum to verify licence conditions

APPENDIX A: Acronyms and abbreviations

APPENDIX B: Bibliography

APPENDIX C: ITU allocations

Conclusion

This report has set out the process that should be followed by regulators and governments to enable mobile broadband in their countries. There are five stages of the process to enable mobile broadband which all countries will need to go through in some way: allocation; clearance; competition analysis; award; and implementation. Many regulators will be some way down the process and so will find different parts of this report useful.

Mobile broadband presents governments with a unique opportunity to provide their citizens with robust, reliable communications technology which can be used by everyone to increase productivity, wealth and social welfare. However, this will not occur without government support and spectrum allocation. By following the process set out in this report, governments will ensure that their citizens have access to the appropriate level of broadband access, with spectrum used in an efficient way.



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