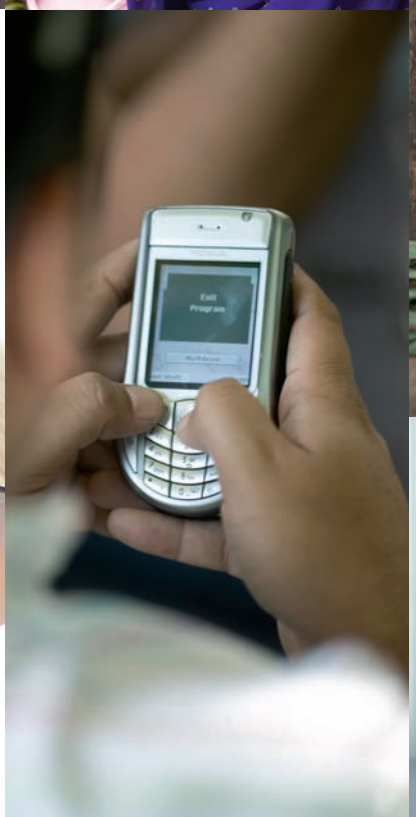
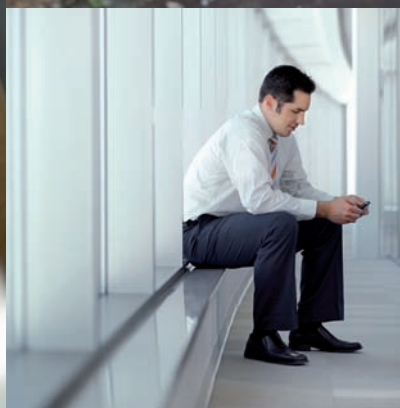
The Digital Dividend:
How to Deliver Broadband for All





The Future of Mobile Communications

At a time of financial crisis, growth of the mobile communications sector will stimulate economic development. During a period of climate change, adoption of mobile solutions across varied sectors of the economy will help to lower emissions.

Recognising the many other benefits of providing access to mobile broadband has led governments across the world to focus on ensuring that regulation is in place to encourage the growth and contribution of the mobile industry. Programmes such as Digital Britain, Australia's National Broadband Network, Digital Bangladesh 2021 and Saudi Arabia's Universal Service Strategic Plan - and a great many more - all seek to address the need to provide consumers with increased and equitable access to mobile broadband services.

Delivering this access carries with it a requirement for appropriate spectrum. While existing allocations have catered for over 4 billion mobile voice subscribers, new spectrum is required to provide mobile broadband services to that same global community.

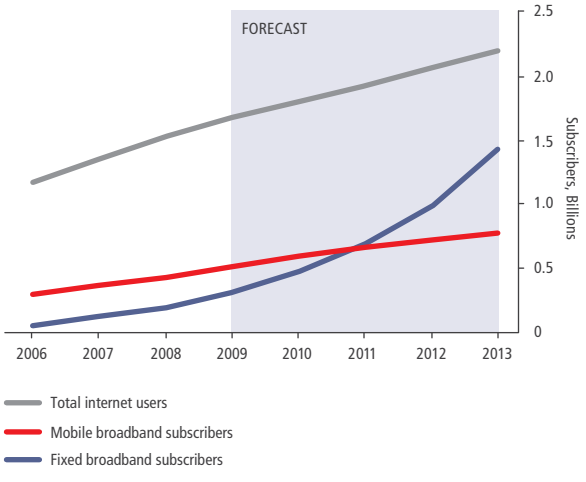
"Broadband is no longer a luxury. It has become the core infrastructure of the modern economy, which is needed to support advanced applications and services for governments, businesses and consumers. If we take the right steps together now, broadband networks will serve as a platform in the coming years for innovation, growth and development."

Sami Al Basheer Al Morshid, Director, ITU Telecommunication Development Bureau

"I believe that the biggest threat to the future of mobile in America is the looming spectrum crisis. What happens when every mobile user has an iPhone, a Palm Pre, a BlackBerry Tour, or whatever the next device is? What happens when we quadruple the number of subscribers with mobile broadband on their laptops or netbooks? The short answer: We will need a lot more spectrum."

FCC Chairman Julius Genachowski, October 2009

Forecast Subscriber Growth



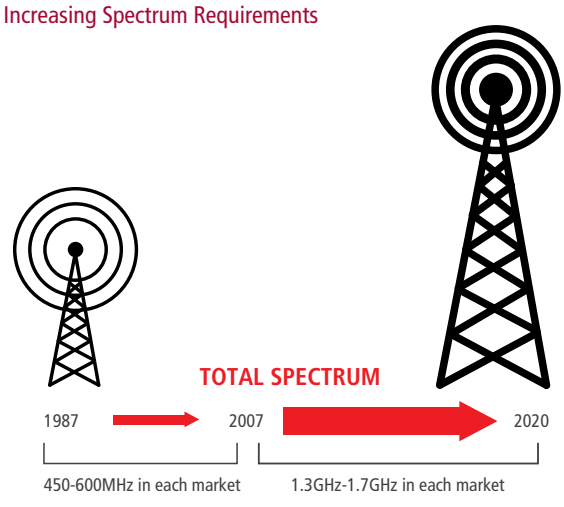
Sources: Informa Telecoms & Media; ITU; Forrester Research

Spectrum for Mobile Broadband

Giving all citizens access to mobile broadband requires action from both government and industry. Mobile operators, who have raised finance and started to roll out mobile broadband networks, are developing business plans to ensure they can provide sufficient capacity to meet future demand. Governments now need to provide clear, consistent regulation and sufficient spectrum to support these plans.

At least a three-fold increase in spectrum availability will be required by 2020 to meet the predicted growth in demand for mobile broadband services. This spectrum will be found in a number of different bands but for the provision of universal broadband access the most important is the low-frequency, UHF band. In many countries, spectrum in this band will be freed up following the switchover from analogue to digital television; in others such spectrum can be freed up by refarming from military or other services currently occupying the band.

Increasing Spectrum Requirements



Digital Dividend: The Economic and Social Opportunity

Spectrum efficiency savings made from the transition to digital broadcasting and the refarming of the UHF band provide an opportunity for governments and citizens to benefit from a "digital dividend".

The digital dividend spectrum in the UHF range has very good propagation characteristics and is highly suitable for the roll-out of mobile broadband in rural and other difficult-to-reach areas. Allocating the digital dividend spectrum to mobile will mean that network operators require fewer base stations, meaning less capital investment is needed to bring broadband to all areas.

"Unequal access to ICT impedes productivity and innovation."

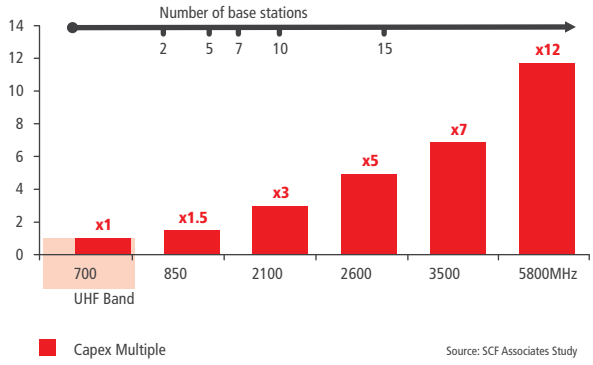
UN Secretary General Ban Ki-moon

Following the recommendations of the ITU's World Radiocommunication Conference (WRC) in 2007, governments across the globe have actively pursued policies to facilitate use of digital dividend spectrum by mobile broadband as soon as possible. Where obstacles exist to this allocation, realisation of the economic and social benefits of the digital dividend has spurred their removal.

In the UK, for example, the need to re-plan digital television in order to create a harmonised digital dividend allocation will incur a cost which the regulator Ofcom estimates as between £0.2-0.8 billion. However, the economic benefit of a harmonised digital dividend allocation to mobile, which Ofcom estimates at £3.2 billion over 20 years, easily outweighs this.

At a European level, a report for the European Commission conducted by Analysys Mason estimates that the total economic value of the digital dividend is between €150 and €700 billion, across the EU[1].

Why the UHF band is so important for mobile



Source: SCF Associates Study

The price of providing mobile broadband using the UHF band is approximately 70% lower than providing the services based on the 2100MHz band. This means UHF-based networks can be rolled out quickly and cost-effectively, bringing cheaper services to consumers.

1. http://www.analysysmason.com/Consulting/Services/Strategy-consulting/Spectrum-management/Digital-dividend/Exploiting-the-digital-dividend--a-European-approach/Final-report-for-the-European-Commission/

Government Priorities for the Digital Dividend

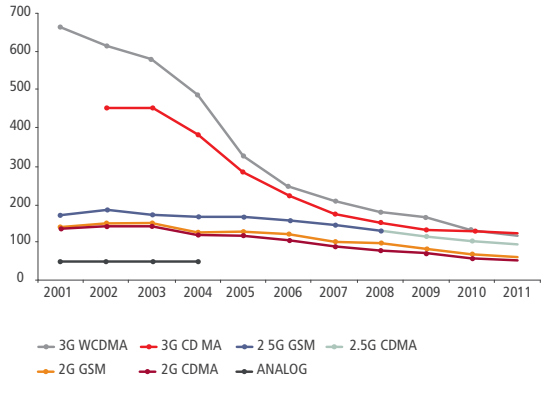
Many national administrations have already announced their intention to allocate part of the digital dividend to mobile and others are well advanced in their plans to do so. While the social and economic benefits of an allocation to mobile broadband are generally understood, two factors remain critical:

1. Harmonisation

Harmonisation of frequencies within each region will reduce cross-border interference, enable people to use their devices when travelling outside their home country and, most importantly, enable equipment manufacturers to realise economies of scale. Maximising economies of scale will lower the cost of deploying mobile networks and lower the prices that consumers pay for mobile devices. GSMA studies have shown that spectrum fragmentation can significantly increase the costs of ownership to consumers, and that developing markets are particularly sensitive to such costs.

Why Frequency Harmonisation Matters

Average selling price for handsets (US$)



Source: LECG analysis of data from Strategy Analytics and Yankee Group.

2. Timeliness

To ensure efficient availability of mobile broadband services for their citizens, governments need to act now to provide a clear roadmap for the future availability of spectrum. Even in countries where digital switchover is not scheduled for several years, governments will serve their citizens best by giving clear guidelines as to the future availability of spectrum. Without visibility of likely spectrum allocations and clear roadmaps for the award of licences, mobile equipment vendors and operators can neither plan for network roll-outs, nor invest in the development of infrastructure and devices.

Digital Dividend Spectrum Bands for Mobile

WRC 07 identified blocks of harmonised digital dividend spectrum for different regions of the world. Since then, industry and governments have progressed with the fine-tuning of these spectrum blocks into specific band plans.

Decisions taken now on spectrum allocations will have long-term and far-reaching consequences. Governments in all regions should follow one of the existing international band plans that either have been or are being agreed by ITU bodies such as CEPT in Europe, APT in Asia Pacific and ATU in Africa. Harmonisation with neighbouring countries within a region should be a critical objective of these agreements. The GSMA is encouraging governments to allocate digital dividend spectrum to mobile in blocks of 20MHz, which would enable operators to realise the full potential of mobile broadband to provide high-speed services to large numbers of users simultaneously. Where local conditions do not allow the allocation of 20MHz blocks, significant benefits can still be delivered with spectrum blocks of 15MHz or even 10MHz.

WRC Spectrum Identifications

Region 1
(Europe, Africa, the Middle East west of the Persian Gulf including Iraq, the former Soviet Union and Mongolia): 790-862 MHz band (i.e. 72MHz in total)

Region 2
(The Americas, Greenland and some of the eastern Pacific Islands): 698-806MHz band (i.e. 108MHz in total)

Region 3
(Asia, east of and including Iran and most of Oceania): The majority to follow Region 1 and nine countries to follow Region 2

Conclusion

Making available digital dividend spectrum for mobile broadband has been the subject of huge effort from a wide coalition of supporters including regulators, ministries, manufacturers, operators, service providers and other parties. Planning activity which began years before WRC 07 has since increased substantially at national, regional and global levels.

The manufacturing community, having been given the green light by the WRC to develop next-generation equipment for the digital dividend frequencies, is now ready for decisions made by national governments and regional bodies. This accelerated product development has made LTE equipment available for deployment by network operators using digital dividend frequencies in 2010.

The countries which will be first to benefit from these devices are those that have already put in place regulation on the use of the digital dividend. It is positive that other regions are following decisions already taken in Europe and the US. Regulation on the digital dividend is being finalised in Asia Pacific and Latin America. African nations are accelerating their digitisation programmes and in the Middle East the focus on providing universal access to broadband has never been stronger.

To achieve the ultimate goal of using the digital dividend to bring mobile broadband to all, governments which have not yet allocated digital dividend spectrum should act now to:

- Provide clear visibility of future spectrum availability.
- Allocate spectrum on a regionally harmonised basis.
- Allocate spectrum in large contiguous blocks.

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The Digital Dividend in Africa

Mobile technology is revolutionising the lives of millions of people in Africa and will continue to be the primary means for the great majority to access voice, data and internet-based services. Mobile broadband has the potential to improve access to health care and education, create new business opportunities and access to markets, and ultimately to help eradicate extreme poverty.

When developing a regulatory framework for mobile broadband, policy makers can learn from the experience of rolling out voice and SMS in Africa. Success has been greatest where regulators:

- Allocate sufficient spectrum in appropriate frequency bands to competing mobile operators to support demand.
- Are non-interventionist, relying on competitive ecosystems.

The digital dividend offers a real opportunity for governments in Africa to allocate the right spectrum for mobile broadband on a regionally harmonised basis and in a timely way.

Status

2009 saw digital switchover programmes start to take shape throughout Africa. In some countries, such as South Africa and Kenya, these are scheduled for completion by 2012. The whole Southern African region is due to switch off analogue signals by 2014 and other parts of Africa will also be in a position to allocate digital dividend spectrum well before the ITU deadline for analogue switch-off.

Regional groups such as CRASA are beginning to study optimal harmonisation plans and as this momentum spreads throughout Africa, the continent will increasingly be able to maximise the social and economic benefits of the digital dividend.

GSMA position and advice

The GSMA believes that policy makers in Africa should adopt an ambitious target of making available a substantial quantity of spectrum below 1GHz, in non-fragmented allocations. These spectrum allocations should be aligned regionally and internationally where possible, in order to benefit from economies of scale (so reducing the cost of terminals for consumers) and from frequency co-ordination to limit cross-border interference.

There are currently several internationally recognised band plans for UHF spectrum (either agreed or in development). To reap the full social and economic benefits of the digital dividend, African nations need to ensure they allocate digital dividend spectrum in accordance with one of these band plans. However, they need to carefully weigh up the options that are available. Since Africa is in ITU Region 1, following the CEPT agreed band plan (790-862MHz) would seem to be an obvious choice. This choice would also reduce cross-border interference issues with other ITU Region 1 countries, such as European countries facing the Mediterranean Sea.

However, there may be circumstances where adoption of one of the other internationally recognised band plans - 696-806MHz or 698-806MHz - may be better suited to national market conditions (for example, where there is widespread use of part of the CEPT band for existing CDMA services at 850MHz). Similarly, if there is currently limited national use of the bands below 790MHz for broadcasting, it may be worth considering the 696-806MHz or 698-806MHz option in order to release more spectrum overall for mobile broadband. A pragmatic approach would be to ensure that digital TV spectrum is initially awarded from the lower part of the band (470MHz), and the final decision, to award spectrum above 698MHz, should be delayed pending a detailed cost benefit analysis.

Band plans in Africa that maximise the amount of available spectrum, could offer a significant extra benefit by ensuring the widest geographical coverage of broadband via mobile. However, such band plans must be harmonised to ensure economies of scale in the manufacture of mobile network infrastructure and devices which will reduce the overall cost of ownership to consumers.

Another factor to consider is the plans of immediate neighbouring countries. If a "cluster" of immediate neighbours is to adopt one plan, then it may make sense to follow that option (if all other things are equal). Such "clustering" could help with managing cross-border interference, and with roaming between those countries.

Where to go for more information

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The Digital Dividend in Asia Pacific

Asia Pacific is the world's largest mobile market. Since 2003, it has more than tripled in size and added over a billion connections. Over the next five years, an additional one billion connections are expected to be added, with the Asia Pacific market projected to exceed three billion connections in 2013.

The mobile ecosystem is a major contributor to the Asia Pacific economy, contributing nearly 3% of aggregate GDP, and directly and indirectly employing over 10 million people. Mobile voice communication is currently the only form of voice communication for many people in the region and it is likely that mobile will also be the primary form of data communications and rich internet access for the majority of people in Asia Pacific.

As the transition from terrestrial to digital TV looms on the horizon for developed markets in the region, such as Singapore and Australia, and some emerging markets such as Indonesia, an unprecedented amount of spectrum is expected to become available through the digital dividend. At the same time some countries in Asia, such as India, Bangladesh and Pakistan, which have previously used the UHF band for other purposes, are looking into allocating this spectrum to mobile. It is absolutely essential that sufficient harmonised UHF spectrum is re-allocated to mobile services so that the mobile industry can continue to deliver high-quality services, especially mobile broadband.

Status

Many Asia Pacific administrations are already progressing towards the development of regulation to allocate the digital dividend spectrum. The Wireless Forum of the Asia Pacific Telecommunity is developing a recommended band plan for use in the region, taking advantage of the benefits that having a long-standing allocation to mobile services – unique to the Asia Pacific region – can bring to the area.

Implementation issues

The Asia Pacific – ITU Region 3 – voted at the World Radiocommunication Conference in 2007 for slightly different band plans. This means governments must make decisions on which will best suit the interests of their citizens. Cross-border interference will need to be negotiated with neighbours bilaterally in each case.

GSMA position and advice

Many administrations in the Asia Pacific region have already started to move towards allocating the wider band at 698-806MHz rather than the Region 1 band at 790-862MHz.

The GSMA believes that spectral efficiency is best served by exploring the possibility of this and, where necessary, assessing whether digital TV can be amply served below the 698MHz boundary. Studies undertaken elsewhere – notably by the European Commission – have shown a significant economic and social benefit in allocating dividend spectrum below the 790MHz bar.

A pragmatic approach to planning would be to ensure that digital TV spectrum is allocated first at the bottom of the 470-862MHz band, and a detailed assessment carried out as to whether channels above 698MHz can be freed for use by mobile broadband.

The GSMA also supports the work being done by the APT Wireless Forum to examine band planning options for the UHF digital dividend bands. The GSMA believes that it is important to ensure that as many countries as possible can adopt compatible band plans for this spectrum. This will help ensure that Asian consumers and economies can derive the maximum benefits from economies of scale.

Avoiding a proliferation of different digital dividend plans in the Asia Pacific region is important to the development of the band for LTE mobile broadband.

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The Digital Dividend in Latin America

Latin America has witnessed rapid take-up of mobile broadband and now has more than 50 commercial HSPA networks in more than 20 countries, delivering services to over 7 million subscribers. As the demand for affordable broadband services and internet connectivity increases, significant quantities of additional spectrum will be needed to ensure consumer demand for mobile broadband can be met.

While many governments in Latin America are well advanced with plans to license the AWS and 2.6GHz bands in 2010, many remain undecided on the allocation of digital dividend spectrum to mobile, yet it is this low frequency UHF spectrum which offers the greatest opportunity for the delivery of mobile broadband to remote and underserved areas. Increased penetration of mobile broadband will not only enhance the lives of consumers, it will bring enormous economic benefits in terms of jobs, improved productivity, competitiveness and GDP contribution. It will also lay the foundations for the delivery of new commercial and public services such as eCommerce, eLearning, eHealth and eGovernment.

Status

The US awarded spectrum for mobile broadband services in the UHF band in March 2008, and orders are now being placed with vendors to supply equipment. It is expected that the first US commercial network will be deployed in 2010. This is likely to help kick-start the market for devices and infrastructure in Latin America.

Analogue switchover is still some way off in many Latin American countries – it is scheduled for 2016 in Brazil, for example, and not until 2021 in Mexico. However, the upper part of the UHF band is relatively clear in many Latin American countries, which should experience no substantial impediments to allocating this spectrum to mobile broadband before the switchover. Chile and Argentina, which are progressing with the implementation of digital switchover, are expected to be the first to assign digital dividend spectrum to mobile. Other countries, such as Mexico and Colombia, have begun working on clearing the UHF band. CITEL is likely to establish a working group to consider optimal band plan options for assigning these frequencies in a harmonised way across the Latin America region.

GSMA position and advice

The GSMA believes that Latin America stands to benefit greatly from the availability of the UHF digital dividend spectrum for mobile broadband services. Mobile broadband is likely to be the main delivery mechanism in many markets for broadband services for the foreseeable future.

However, for individual markets in Latin America to derive the maximum benefit from UHF for mobile broadband, they need to be able to take advantage of economies of scale, particularly in terminal production. This means not only that Latin American countries should use the same frequencies, but that – as far as is practically possible – they should also use the same band plans.

The GSMA urges governments in Latin American countries to support the work which will be done on band plans within CITEL, and to seek to ensure that the smallest possible number of band plans is used in the region.

Where to go for more information

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