Ofcom

Briefing for analysts: Telecoms

18 November, 2013

Welcome

Ed Richards, Chief Executive, Ofcom
Agenda

- **Spectrum Management Strategy**  Steve Unger
- **Mobile Data**  Graham Louth
- **Mobile Annual Licence Fees**  Charles Jenne
- **Fixed Access Market Review**  Stuart McIntosh
- **Questions**  Ed Richards

Spectrum Management Strategy

Steve Unger, Chief Technology Officer, Ofcom
Radio spectrum is vital to the UK economy

- The hidden infrastructure that underpins technology, manufacturing and services
- Ofcom estimates long-term consumer value of 4G spectrum alone to be £20bn
- Total economic value of UK spectrum estimated at £52bn* pa
- That figure has grown 25% in real terms over five years

* Source:Analysys Mason for BIS/DCMS, 2013

Several major initiatives completed since 2005

- Pioneered market-led approach: liberalisation, trading & auctions
- Managed TV digital switchover and released 4G spectrum
- Contributed to successful 2012 Olympics

... but we have also learnt a few key lessons along the way
Where we are today: key metrics

Good progress in developing market-led approach

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2013</th>
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</thead>
<tbody>
<tr>
<td>Tradable</td>
<td>15%</td>
<td>84%</td>
</tr>
<tr>
<td>Awarded</td>
<td>4%</td>
<td>12%</td>
</tr>
<tr>
<td>Liberalised</td>
<td>0%</td>
<td>21%</td>
</tr>
<tr>
<td>Licence exempted</td>
<td>19%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Importance of working with Government

- All Market access, 75%
- Crown only: 25%
- Overlap: 29%

Tomorrow’s challenges

- Growing intensity and dynamism of spectrum use
- Wider range of applications (smartphones, tablets, M2M etc.)
- Fewer obvious opportunities for release of dedicated low frequency spectrum
- Growing relevance of higher frequency spectrum
- New spectrum sharing techniques
Spectrum management strategy consultation

The consultation document outlines:

- Our approach to spectrum management, refined in light of our experience over the past 10 years
- Analysis of future developments in major uses of spectrum
- Proposed priorities for the next 10 years of spectrum regulation

Future changes in spectrum demand

- We looked at demand and supply and scored them for impact and urgency

<table>
<thead>
<tr>
<th>Spectrum uses</th>
<th>Significance of potential changes</th>
<th>Urgency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile and wireless data</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>TV Broadcasting – DTT</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Licence Exempt and SRDs</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>PMSE</td>
<td>High</td>
<td>High</td>
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<tr>
<td>Emergency Services</td>
<td>Medium</td>
<td>High</td>
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<tr>
<td>Business Radio</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Utilities</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Space</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Fixed Wireless Service – Fixed Links</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Radio Broadcasting</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Aeronautical and Maritime</td>
<td>Low</td>
<td>Low</td>
</tr>
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</table>

Note that Amateur sector has not been analysed in same way.
This led us to identify seven priority areas

**Sector-focused priorities**
- Mobile and wireless data demands
- Future of PMSE use of spectrum
- Supporting Government in considering Emergency Services needs

**Band-focused priorities**
- 700 MHz strategy implementation and DTT’s long term future
- Potential competing demands at 450 – 470 MHz

**Cross-cutting priorities**
- New spectrum sharing opportunities
- RF equipment standards and performance

... but many other issues will also be highly relevant

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**Mobile wireless and spectrum sharing priorities**

<table>
<thead>
<tr>
<th>Priority</th>
<th>When?</th>
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<tbody>
<tr>
<td>Securing 98% indoor coverage for 4G</td>
<td>2017 at latest</td>
</tr>
<tr>
<td>MoD release of 2.3 and 3.4 GHz</td>
<td>2015/16</td>
</tr>
<tr>
<td>New international spectrum allocations for mobile ~ 500 MHz?</td>
<td>2015</td>
</tr>
<tr>
<td>Prospect of 700 MHz release</td>
<td>2018 +</td>
</tr>
<tr>
<td>TV White Spaces; from trial to commercial use</td>
<td>2013-15</td>
</tr>
<tr>
<td>Extension of 5 GHz Wi-Fi band?</td>
<td>2016?</td>
</tr>
<tr>
<td>New bands for Dynamic Spectrum sharing – possibly in MOD bands</td>
<td>2016?</td>
</tr>
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</table>

Mobile data strategy consultation expected shortly
Mobile Data

Graham Louth, Director of Spectrum Policy, Mobile and Auctions

Recap 4G auction outcome
4G developments

- EE launched in October 2012 – now has over 1 million customers – aiming to achieve 98% coverage by end 2014
- Telefonica O2 and Vodafone now also offering 4G – aiming to achieve 98% coverage ahead of target (Telefonica required to do so by end 2017 at the latest)
- H3G has announced plan to launch before end of this year
- EE recently announced launch of LTE-Advanced, using spectrum in both 1800 MHz and 2.6 GHz bands – offering speeds of up to 300Mbit/s

Beyond smartphones and tablets...

Global number of internet-connected devices

- The number of devices overtook human beings in 2008
- It will not be just mobiles and tablets that are connected, but everything: cars, cows, coffee machines and cardiac monitors

Source: CISCO IBSG
Machine to Machine: The ‘Internet of Things’

- Potentially millions of UK devices
- Thousands of applications
  - Smart grids
  - Personal healthcare
  - Traffic management
- All of them will need spectrum

The next generation of mobile

Demand for data generated by wireless and mobile devices in 2030 could be 80 times higher than in 2012.
Three routes to meeting demand:
More sites, more spectrum and better efficiency

Total mobile network capacity = Spectrum ‘More MHz’ × More efficient technology ‘More bits per MHz’ × Networks ‘More mobile sites’

Capacity increase predictions: Real Wireless

From a spectrum perspective, we have three priorities

1. Low frequency: More cleared low frequency spectrum to deliver good coverage
2. High frequency: Increasing the total amount of spectrum available for use in smaller cells
3. Spectrum sharing: New ways of sharing spectrum to increase supply and reduce barriers to entry
UHF Strategy – 700 MHz band

- Will be globally co-allocated to mobile at World Radio Conference in late 2015 (WRC-15)
- No decision yet as to whether to make it available for mobile in the UK and if so on what timescale (but unlikely to be before 2018 at earliest)
- Would require changes to DTT network – currently being considered
- Could bring significant benefits to consumers through further enhancements to mobile data services – currently being assessed
- Plan to consult on costs and benefits in first half of next year

2.3 & 3.4 GHz spectrum award

- 190 MHz of spectrum being released by MoD
- Internationally identified for wireless broadband use
- TD-LTE technology already available
- But spectrum not yet widely available across rest of Europe
- Award to be run by Ofcom – expected second half of 2015
- Currently consulting on band plan for 3.4 GHz band and level of interest from stakeholders
Dynamic spectrum access – white spaces

High power TV broadcasts using the same frequency need to leave spaces between their coverage areas to avoid interference.

These frequencies can be used in the “white spaces” in between by lower-power devices.

Ofcom working with trial and database applicants

Microsoft  Google  KINGS College LONDON  neul
nominet  BT  MEDIATEK  KTS Wireless
Department for Transport  harmonics  ADAPTRUM  click4internet  MELD TECHNOLOGY
iiconectiv  Fairspectrum  SPECTRUM BRIDGE  LS Telecom
The future....

- Additional frequencies beyond UHF TV band
- More intelligent databases
- ‘Sensing’ devices that provide more information about spectrum availability

Mobile annual licence fees

Charles Jenne, Director, Spectrum Policy Group
Ofcom’s proposals

• Comparison of current fees and proposed fees at base level of ALF (For EE and H3G, based on spectrum holdings after transfers are completed on 1 October 2015)

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</tr>
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<tbody>
<tr>
<td>900 MHz</td>
<td>12.4</td>
<td>69.3</td>
<td>12.4</td>
<td>69.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>24.8</td>
<td>138.5</td>
</tr>
<tr>
<td>1800 MHz</td>
<td>3.2</td>
<td>13.8</td>
<td>3.2</td>
<td>13.8</td>
<td>24.9</td>
<td>107.1</td>
<td>8.3</td>
<td>35.7</td>
<td>39.7</td>
<td>170.4</td>
</tr>
<tr>
<td>Total</td>
<td>15.6</td>
<td>83.1</td>
<td>15.6</td>
<td>83.1</td>
<td>24.9</td>
<td>107.1</td>
<td>8.3</td>
<td>35.7</td>
<td>64.5</td>
<td>308.9</td>
</tr>
</tbody>
</table>

Source: Table 5.3 of the 10 October Consultation Document

Context

• Government Direction from December 2010:

“(1) Ofcom must revise the sums prescribed by regulations under section 12 of the WTA for 900 MHz and 1800 MHz licences so that they reflect the full market value of the frequencies in those bands.

(2) In revising the sums prescribed OFCOM must have particular regard to the sums bid for licences in the Auction.”
Approach

UK 4G Auction outcome
- 800 MHz: £30m per MHz
- Paired 2.6 GHz: £5m per MHz

International benchmarks for 900 and 1800 MHz
- Absolute values
- Relativities for 900 and 1800 spectrum against 800 and 2.6 spectrum

Technical evidence

Conversion from Lump Sum Value to Annual Licence Fee

Annuity over 20 years

Real post-tax WACC (4.1%) with 11% uplift for tax advantage

Constant in real terms, adjusted for inflation
Next steps

- Consultation published on 10 October
- We will consider all responses before publishing our statement

Fixed Access Market Review
(including charge control and BT quality of service)

Stuart McIntosh, Group Director, Competition
Overview: FAMR

• Review began in the second half of 2012
• The review covers:
  – Wholesale Local Access (copper and NGA)
  – Analogue and digital lines
  – Related charge controls (including LLU/WLR)
  – Openreach’s service levels (for copper services)
• We are now considering responses to the consultation document published in early July 2013

Summary of our provisional findings

Wholesale Local Access (WLA) – Copper, Cable and Fibre
• Provisional Finding: BT continues to have market power (KCOM in Hull)
• Proposed Remedies:
  – local loop unbundling (with charge control),
  – sub-loop unbundling and access to ducts and poles (cost orientated), and
  – access to BT’s new fibre-based network (allowing BT pricing flexibility)

Wholesale analogue telephone lines
• Provisional Finding: BT continues to have market power (KCOM in Hull)
• Proposed Remedies: wholesale line rental service (with charge control)

Wholesale digital telephone lines (ISDN2 and ISDN30)
• Provisional Finding: BT continues to have market power (KCOM in Hull)
• Proposed Remedies: wholesale ISDN services (with ‘safe-guard’ charge control)
LLU/WLR charge control proposals

- The current charge control expires in March 2014; future controls will expire in March 2017
- Current rental prices and our July proposals:

<table>
<thead>
<tr>
<th></th>
<th>Current price</th>
<th>July proposals (base case)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLR</td>
<td>£93.27</td>
<td>£90.66</td>
</tr>
<tr>
<td>MPF</td>
<td>£84.26</td>
<td>£85.61</td>
</tr>
<tr>
<td>SMPF</td>
<td>£9.75</td>
<td>£9.23</td>
</tr>
</tbody>
</table>

Nominal charge for 2014/15 |
Charge control for 2015/16 to 2016/17

- **However**, we are consulting shortly on a number of additional points, including in relation to quality of service, which will include revised base case figures

**Major areas of focus**

- Openreach’s Quality of Service
- LLU/WLR Charge Controls
- Margin on Superfast Broadband Services
Quality of service

- BT's (Openreach) quality of service – provisioning and repair – has declined since 2009 and been variable during this period
- We now consider quality of service needs to feature more explicitly in the regulatory framework (to supplement EOI/functional separation)
- Our current proposals:
  - Enhanced reporting of KPIs for LLU, WLR and GEA services
  - A clear regulatory requirement as to which aspects of services must be covered by Service Level Agreements and Service Level Guarantees
  - A process for future contract modification negotiations with a clearly defined role for the OTA and Ofcom; and
  - Setting minimum performance standards for LLU and WLR provisioning and repair

LLU/WLR Charge Controls

BT's Regulatory Financial Statement (2013)
- Since publishing the consultation BT has produced its 2013 RFS
- This RFS has updated cost/volume information and includes a number of allocation changes
- We need to determine how and to what extent we use this new RFS data

Charge Control Parameters, for example:
- Efficiency
- Basket design
- Certain costs allocations
- Cost of capital

Quality of Service
- Cost implications of minimum performance standards
Fibre-based services and SFFB Margin

• We propose to maintain the current framework for regulating BT’s fibre-based services:
  – BT has to provide access to these services – virtual unbundled local access (VULA)
  – BT retains pricing flexibility, but…
  – BT is required to maintain sufficient margin between its wholesale (VULA) and retail (Infinity) prices

• To provide more certainty to BT, and other CPs, we intend to provide more guidance on how we would assess a potential margin squeeze

Next steps

• November/December Consultation
  – Covering the LLU/WLR charge control and quality of service issues

• March 2014 Draft Statement to the Commission
Questions?

Speaker biographies
Ed Richards

Ed Richards is the Chief Executive of Ofcom, appointed in October 2006. Previously Ed was Chief Operating Officer, responsible for Strategy, Market Research, Finance, HR and other functions.

Strategy responsibilities included Ofcom’s strategic thinking on the communications sector and covering economic issues and consumer policy.

Ed was previously Senior Policy Advisor to the Prime Minister (Tony Blair) for Media, telecoms, the internet and e govt and Controller of Corporate Strategy at the BBC.

He has also worked in consulting at London Economics Ltd, for Gordon Brown MP, for the N.C.U. and began his career as a researcher with Diverse Production Ltd where he worked on programmes for Channel 4.

Ed is currently a Director of Thames Water Utilities Limited, a Director of Donmar Warehouse, a Governor of The London School of Economics & Political Science.

Stuart McIntosh

Stuart McIntosh joined Ofcom as Group Director, Competition in January 2008 and was appointed to the Ofcom Board in July 2008.

The Competition Group undertakes much of the economic and competition analysis undertaken by Ofcom in regulating the sectors for which it is responsible including telecommunications, broadcasting and Post.

Prior to joining Ofcom, Stuart was a Strategy partner in IBM’s communications practice in the US.

Before that Stuart held senior positions in PwC, where he led PwC’s Telecoms Consulting Practices (in both the UK and the US) and Adventis, a boutique strategy consultancy. Stuart began his career as an Economist in the UK’s Government Economic Service. He also worked for BT for a period of 4 years where he held the position of Head of Business Economics.

Stuart holds degrees in economics from the London School of Economics.
Steve Unger

Steve Unger is Ofcom’s Chief Technology Officer, and is also the Group Director responsible for Ofcom’s strategic approach to communications regulation.

His group is responsible for critically evaluating external market and regulatory developments, and leading the process of setting Ofcom’s strategic priorities. He is also responsible for several specific policy areas, including Ofcom’s work on Communications Infrastructure.

Steve previously worked in industry – for two technology startups, both of whom designed and operated their own communications networks, and as a consultant advising a variety of other companies on the commercial application of new wireless technologies. He has a Physics MA and a PhD in Astrophysics.

Charles Jenne

Charles Jenne joined Ofcom in June 2006 as Director of Policy in the Spectrum Policy Group. He is responsible for overseeing a portfolio of major projects, which currently include the revision of Annual Licence Fees for the 900 and 1800MHz licences and the Ofcom Spectrum Management Strategy. Other recent projects he has led include the decisions to liberalise the MNO licences including, most significantly, the decision to vary EE’s 1800MHz licence so as to allow 4G services in late 2012 as well as the project to award a licence to Arqiva to provide interim DTT services in the 600MHz band in June 2013.

Prior to joining Ofcom, Charles was a partner in the strategy consulting practice of PricewaterhouseCoopers (PwC) and then IBM where, amongst other roles, he led the competitive markets advisory team working in the gas and power sectors on the design and implementation of new markets for both wholesale and retail energy. He also had responsibility for economic regulation services, working with a wide range of clients in UK and overseas on sector restructuring, the design of new contracting and regulatory arrangements and a number of regulatory reviews of pricing, service quality etc.
Graham Louth joined Ofcom in December 2003 as Director of Spectrum Markets, tasked with making the changes necessary to allow spectrum users to decide how to make best use of this invaluable national resource, rather than being dictated by the regulator.

More recently, as Director of Spectrum Policy, Mobile and Auctions, he has been responsible for ensuring that existing and prospective mobile network operators are able to make the best possible use of existing spectrum, and have access to critical bands of new spectrum such as the 800MHz and 2.6GHz bands, so as to be able to deliver the best possible mobile services to UK consumers and citizens at competitive prices.

Prior to joining Ofcom, Graham spent over 10 years working as a consultant with the leading telecoms strategy advisors Analysys, ultimately as head of their regulatory practice worldwide. Whilst at Analysys, Graham played a leading role in the development of regulatory thinking and practice in a number of economic and policy areas, working closely with clients such as the European Commission, the IDA in Singapore and Ofcom in the UK.