

Digital Dividend Review : Ofcom Stakeholder Event

15 February 2006

Agenda

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|----------------------------|----------------|-------------|
| • Introduction | Stephen Carter | 10.00-10.10 |
| • Overview & Context | Philip Rutnam | 10.10-10.30 |
| • UHF Spectrum and the RRC | Greg Bensberg | 10.30-10.50 |
| • Consultancy Study | Amit Nagpal | 10.50-11.10 |
| • Q & A Session | All | 11.10-11.50 |
| • Next Steps | Philip Rutnam | 11.50-12.00 |

Stephen Carter
CEO

Introduction to the Digital Dividend Review

- What is the Digital Dividend Review ?
- Why is Ofcom running the DDR ?
- What are we trying to achieve ?

- Key Timescales
 - DDR – 2006/07
 - RRC – June 2006
 - DSO 2008 – 2012

The Ambition:
Make the UK the leading country for wireless investment & innovation

Philip Rutnam

Overview and Context

Digital Dividend Review – Project Scope

- DSO timetable for 2008 – 2012 confirmed by the Government in September 2005
- DSO will lead to major changes in use of spectrum in UHF band
 - 32 channels will be re-used for the six existing terrestrial multiplexes
 - up to 14 clear channels in UHF Bands IV and V
 - “interleaved” spectrum available between the six existing terrestrial multiplexes
- The Digital Dividend Review (DDR) is the project which will examine the options in relation to future use of spectrum in Bands IV and V, excluding spectrum used by 6 DTT multiplexes
- DDR related to, but distinct from, DSO. Includes:
 - channels 21-69 excluding use by 6 DTT MUXes (each channel = 8MHz)

Digital Dividend Review – Objectives

Ofcom's principal duty under the Communications Act is to further the interests of citizens, and to further the interests of consumers, where appropriate by promoting competition. Ofcom has a duty to secure:

- optimal use of the electro-magnetic spectrum, and
- availability of a wide range of electronic communication services, and television and radio services.

Ofcom is also required to act in accordance with principles of good regulation, and in conformity with EU law.

In order to make robust decisions on how to award this spectrum, Ofcom needs to embark on an extensive project with several work streams:

- Economic, technical and market analysis
- Designing an award process that leads to the optimal approach most likely to generate the maximum benefits from the spectrum.

Aim is to maximise benefits to society, not to raise revenue.

Introduction to the DDR Team

Philip Rutnam	Project Sponsor
Greg Bensberg	Project Director
Paula Guest	Project Manager

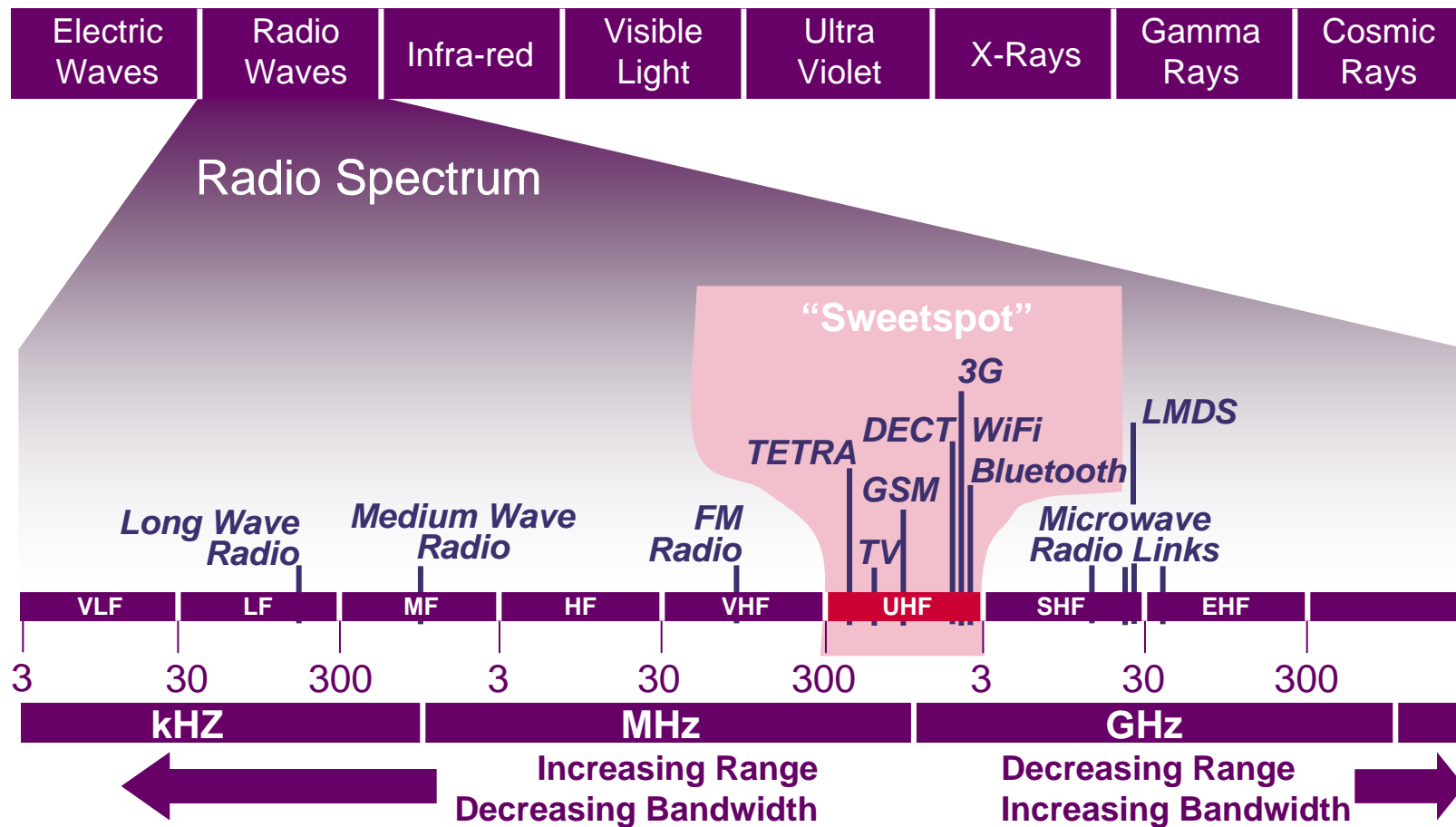
Key team members

Graham Louth, Director of Spectrum Markets
Becky Stuttard, Senior Economist
Lara Stoimenof, Project Manager – Consultancy

Consultancy Team

Analysys	DotEcon – economic
Andrew Wright – Project Director	Aegis, Masons – technical
Amit Nagpal – Project Manager	Damian Tambini – broader
Lee Sanders – Stakeholder Engagement Manager	social value

The Radio Spectrum



Ofcom's Spectrum Management Agenda

The Given: Fulfil our statutory duties

Ensure optimal use of the spectrum

Take account of the needs of all spectrum users

Maximise economic benefits of the spectrum

The Ambition: Make the UK the leading country for wireless investment & innovation

More flexible and responsive – more opportunities for innovation

More clarity for the market – less regulation, better focussed

A competitive communications market, providing opportunity for returns on investment

There are three possible ways to manage spectrum

Command & control

All decisions made by the regulator

Approach that has historically been adopted for over 90% of the spectrum

Market mechanisms

Decisions made in the market

Approach advocated by Cave Reviews. Now being implemented by trading, liberalisation, and spectrum awards

Licence-exemption

Regulator sets some rules, but no licensing

Approach currently adopted for 9% of spectrum. Some argue for radical increase

Ofcom's reform agenda

Ofcom is making fundamental changes in spectrum management:

- to reduce reliance on command and control
- to extend role of market mechanisms
- to increase, at margins, spectrum available for licence-exempt use

Why?

The regulator cannot know as much as the market, and so cannot make decisions as well as the market.

Uses and technologies continually changing – erosion of traditional boundaries.

Regulation is slow. It can add to scarcity, barriers to entry, and impose very large (hidden) costs.

Ofcom's spectrum vision

- **Spectrum should be free of technology, policy and usage constraints as far as possible**
- **It should be simple and transparent for licence holders to change the ownership and use of spectrum**
- **Rights of spectrum users should be clearly defined and users should feel comfortable that they will not be changed without good cause**

Spectrum Framework Review, June 2005

Specific changes

Spectrum trading and liberalisation

- introduced in late 2004, being extended across multiple licence classes

Spectrum release

- programme of spectrum awards already planned in 12 vacant or under-used bands
- including 1781-1785/1876-1880MHz, 1452-1492MHz, 2500-2690MHz

Reduced regulation

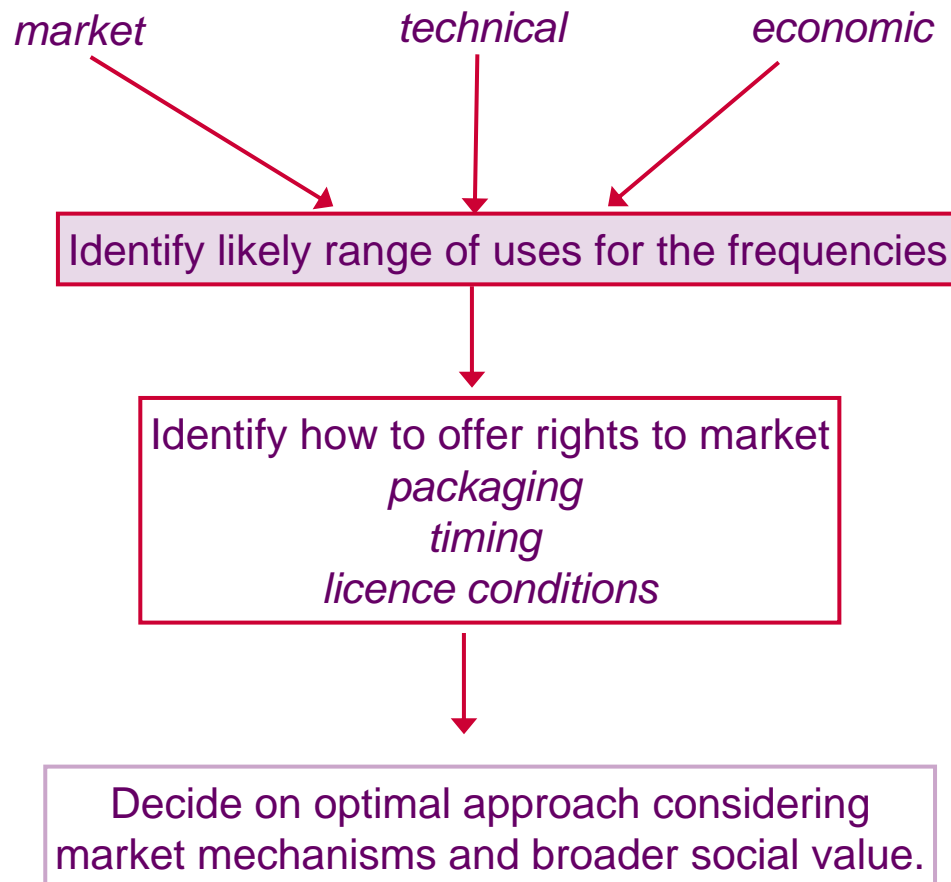
- more licence-exempt uses, such as UWB, RFID

Technology and use neutrality

- through spectrum awards and liberalisation

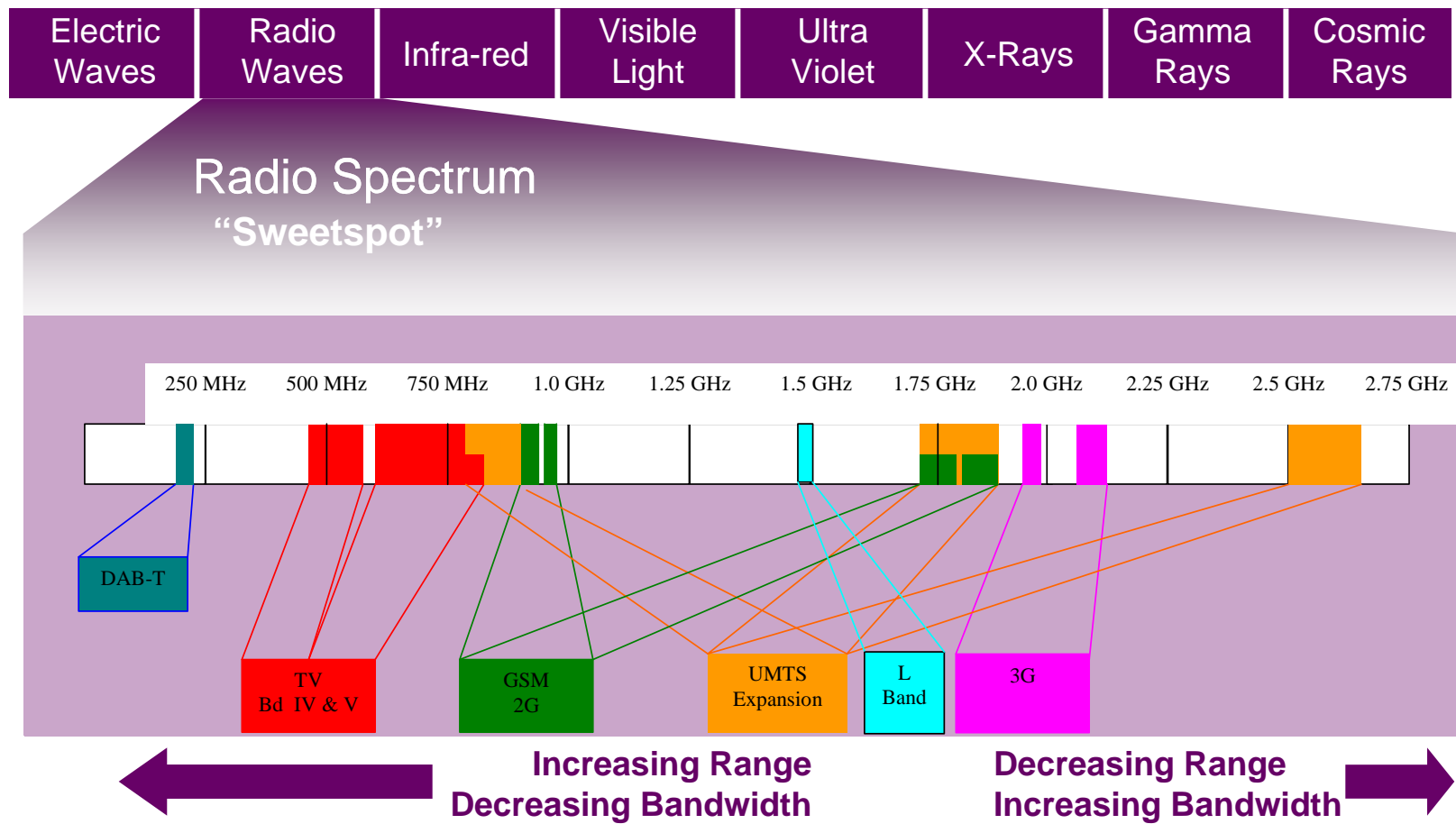
Fundamental roles of regulator remain: protecting against harmful interference, meeting international obligations, protecting critical citizen and consumer interests. Other interventions - exceptional, and require very clear justification.

This award – three fundamental tasks



Greg Bensberg
DDR Programme Director
UHF spectrum & the RRC

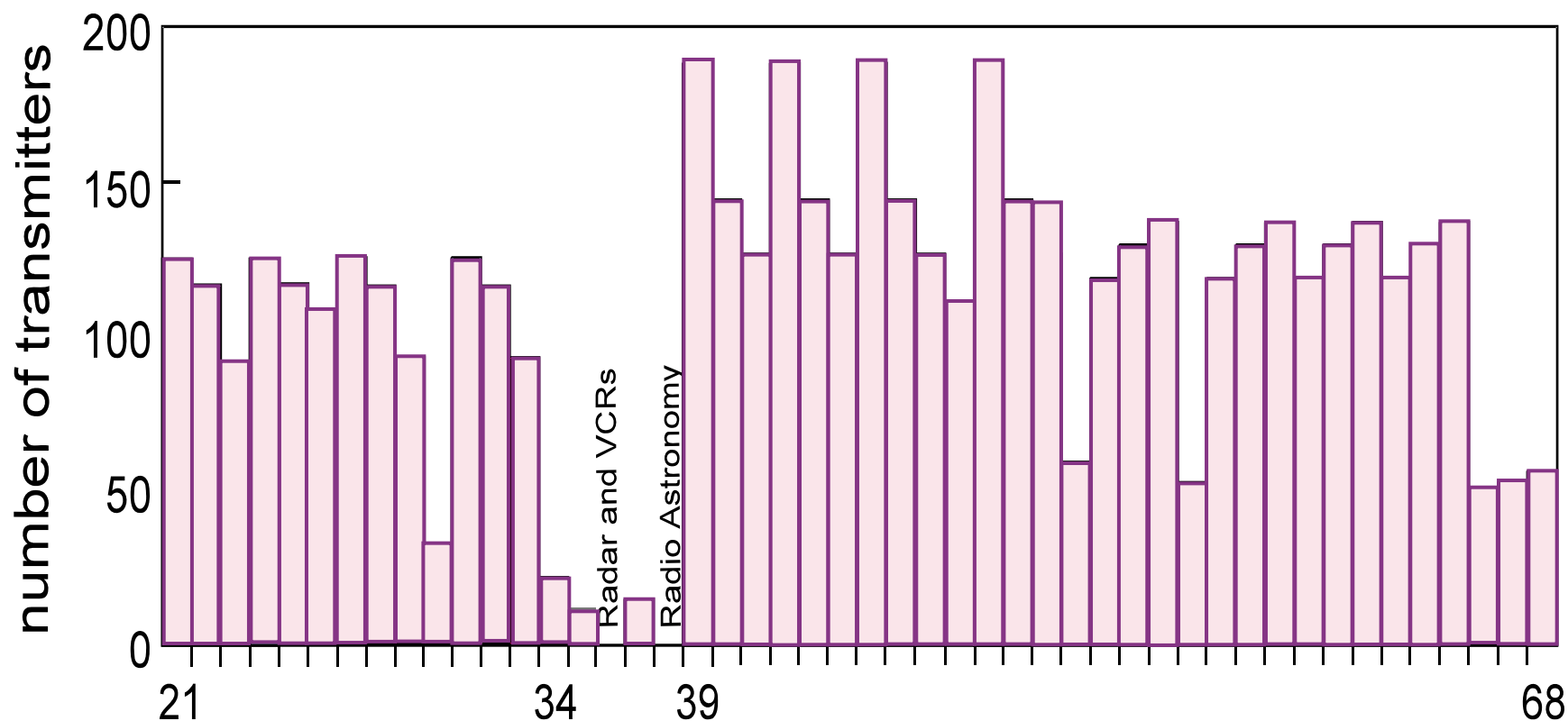
The Radio Spectrum



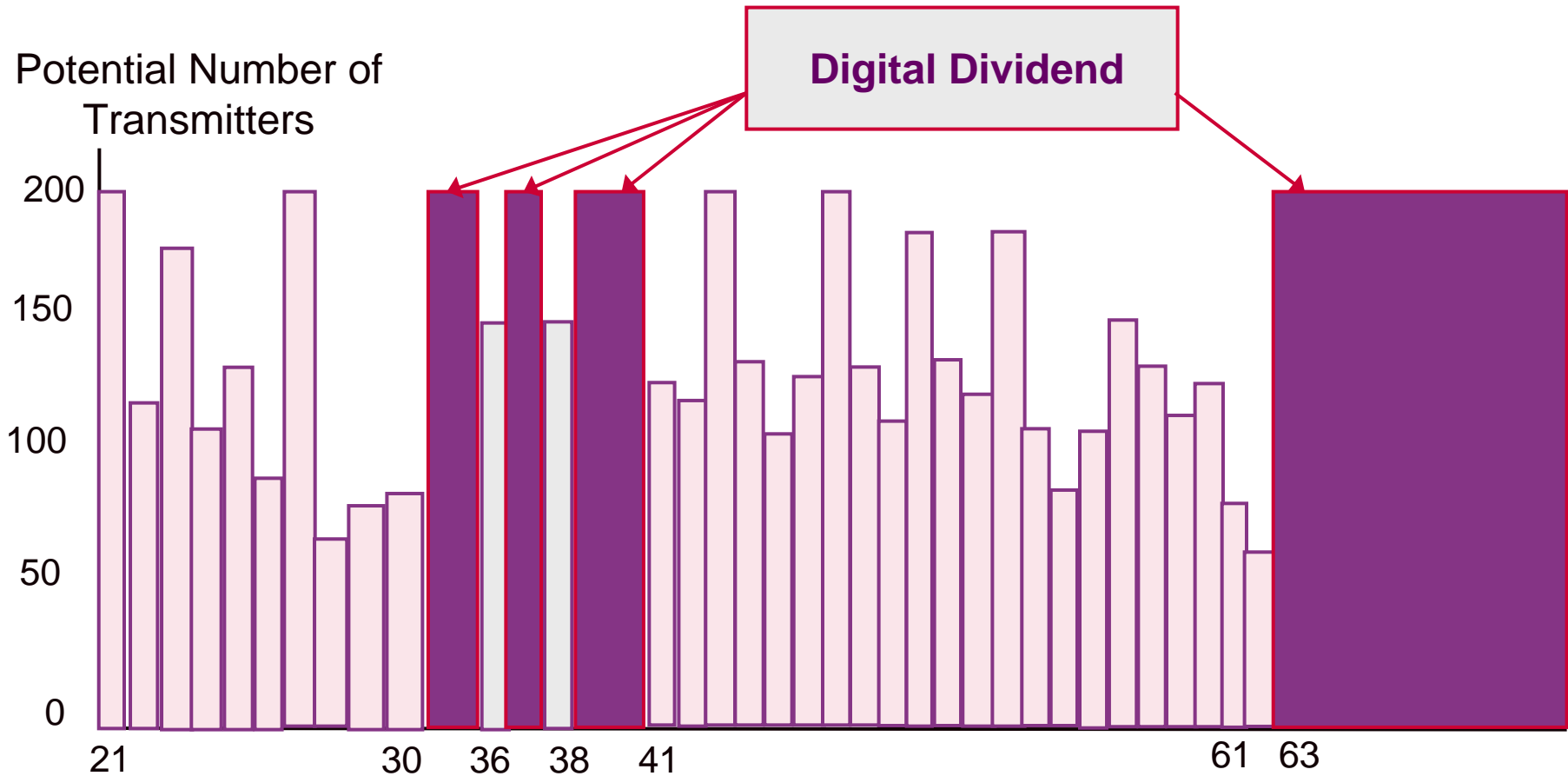
Digital Switchover & the UHF Spectrum

- Terrestrial broadcasters currently use 46 UHF channels to transmit their services
 - **Analogue:** Five analogue terrestrial television networks, four of which are broadcast from 1,154 transmitter sites. A small number of RSLs also broadcast within the UHF band
 - **Digital:** Six digital terrestrial television (DTT) networks which are broadcast from 80 transmitter sites
- The analogue services will be switched off as part of the digital switchover process with the DTT multiplex operators being given new assignments to enable them to improve their coverage and to facilitate the clearance of 14 UHF channels
- Expected outcome is that three multiplexes carrying public service content will operate from all analogue sites and are expected to match analogue coverage levels
- The other three multiplexes will operate from up to 200 transmitter sites and are expected to achieve around 90% coverage

Existing use of UHF Bands IV/V in the UK



Post DSO – DTT use of UHF Bands



International context – UHF Planning & Negotiations

- Stockholm Plan – 1961
 - Has been basis for European Broadcasting for over 40 years
 - Will be updated by the Geneva 2006 RRC
- EU Perspective
 - EU Framework for Spectrum Management – Decisions and Recommendations
 - Increased movements towards harmonisation
 - EU turning attention to Digital Dividend
- Regional Radio Conference, June 2006
 - will agree new plan for this spectrum band for Europe, Africa and Middle East
 - negotiations based on “central case” of high power TV broadcasting
 - but range of possible uses is envisaged
- RRC conclusions, and outcome of bilateral negotiations that will follow it, will set the spectrum quality that is available to new uses in the UK:
 - power limits (to prevent interference into other countries)
 - protection from interference from other countries

RRC-06 Scope

- Digital broadcasting planning in the bands:
 - 174 – 230 MHz (Band III)
 - 470 – 862 MHz (Bands IV and V, Channels 21 to 69)
- Sound and Television broadcasting
- Other radio services having international status

Challenges

- Last major television planning conference for Europe was in 1961
- RRC-06 not only has broader scope (geographically and radio services) but it is the first ITU planning conference to produce a detailed frequency assignment plan in spectrum that is already heavily used to provide services to the general public
- RRC input is quite complex, different countries are expressing their requirements using either assignments & allotments
- Not straightforward to attribute transmitters to allotments
- ‘Educated’ guesses have been made for modelling

RRC-06 – The Outcome

The rewards

- Wide range of digital broadcasting services – television and radio
- Considerable scope for additional services – not necessarily broadcasting (digital dividend)

Life after RRC-06

- RRC is not the end, but the beginning
- It will result in significant further work
 - Significant work to develop full digital television switchover plan involving bilateral discussions
 - Release of digital dividend
- Outcome of RRC on 174 – 230 MHz (Band III) may have impact on a number of different services (PMR / DAB)

RRC – 06 Process timetable

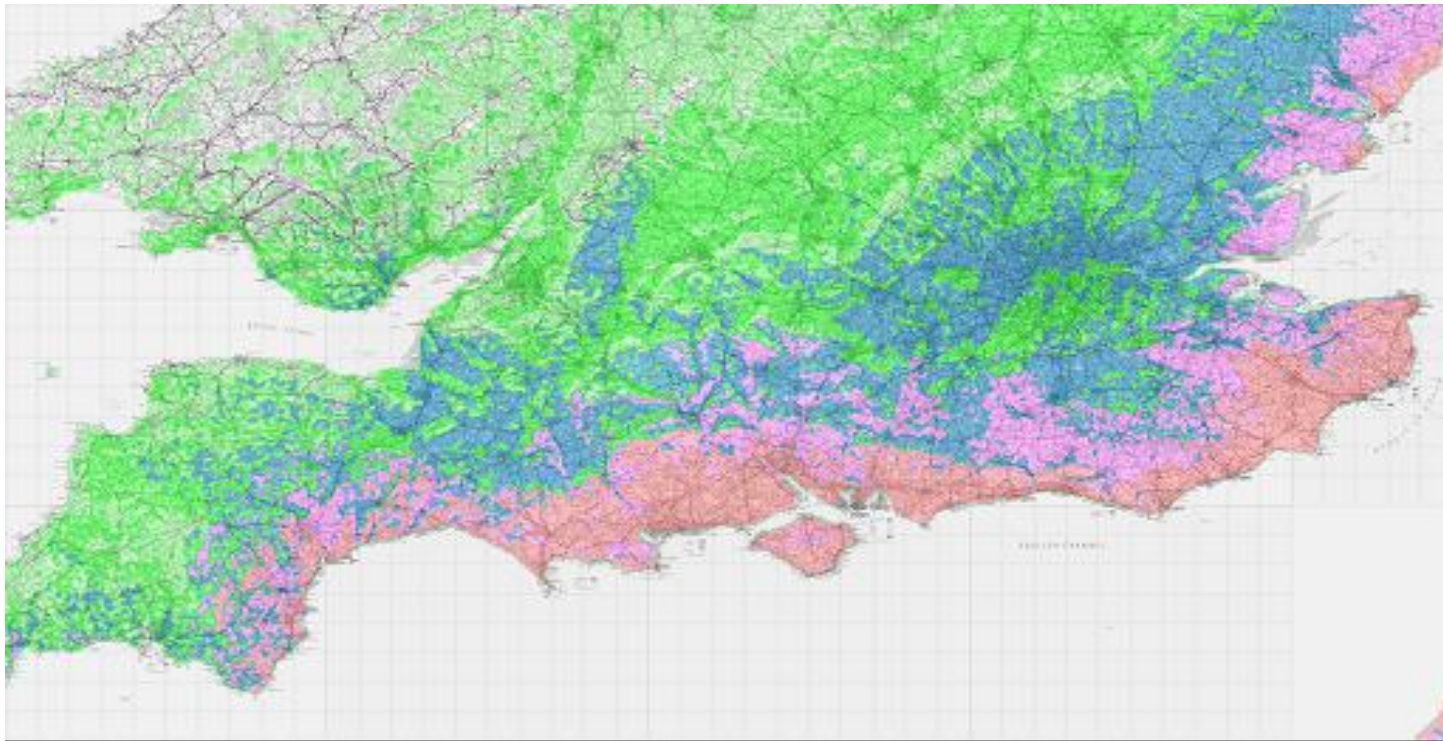
- In order to produce a comprehensive draft plan for consideration at RRC-06, the ITU agreed the following timetable:
 - National requirements submitted - Feb 05
 - Data validated, corrected and published – May 05
 - First planning exercise - Jun/Jul 05
 - Results published - Jul 05
 - Second submission of requirements - end Oct 05
 - Repeat process with draft Plan produced - Feb 06
 - RRC considers draft plan and country reactions, and produces final Agreement and Plan - 15 May to 16 Jun 06 in Geneva

UHF Spectrum

- The released spectrum will comprise both the fourteen cleared UHF channels together with any remaining capacity within the interleaved spectrum being used by the DTT operators
- Any new service wishing to operate within this released spectrum will have to take into account:
 - the need to protect the coverage and reception of the planned DTT services, and
 - the need to operate within the agreements reached by the UK at the RRC
- In order to carry out the detailed market, technical and economic appraisal required to highlight total potential citizen / consumer benefits it is necessary to assess how these technical issues could affect a range of services that could operate within the released spectrum, these services could include:
 - One way – fixed broadcast - (e.g. DTT)
 - One way – mobile broadcast - (e.g. Mobile TV)
 - Two way – mobile comms - (e.g. 3G)
 - Two way – fixed comms - (e.g. BWA, WiMax)

Incoming interference per channel

Map showing the extent of incoming interference from DTT transmissions on the continent. This is based upon known and assumed details of continental networks



Technical Modelling Activities

- Incoming / outgoing interference per channel
- Likely form of continental DTT and other networks
- Interference limits for different services
 - Outgoing and incoming
- Adjacent channel interference/performance
- MFN v SFN coverage implications
- 'infill' of missing assignments
- Effect of Hole punching

Amit Nagpal

Consultancy Study

(see separate presentation for slides on the consultancy study)

**Philip Rutnam, Greg Bensberg,
Graham Louth, Amit Nagpal
Q & A Session**

Philip Rutnam

Next Steps

Next Steps

- Next steps
 - Ofcom Briefing Summer 2006
- Staying in touch
 - DDR@ofcom.org.uk
 - www.ofcom.org.uk/radiocomms/ddr
- Contribute to our consultants work
 - Workshops / One-to-One interviews / Questionnaire
 - DDRconsultancystudy@analysys.com