Spectrum Management

Case Study: Australia

INTERNATIONAL TELECOMMUNICATION UNION
Spectrum Management Case Study: Australia

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Mobile phone coverage

: Government funded
: Commercial

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Evolution of fixed, mobile and Internet users in Australia
<table>
<thead>
<tr>
<th>Year</th>
<th>Action</th>
<th>Organisation</th>
</tr>
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<tr>
<td>1905</td>
<td><em>Wireless Telegraph Act 1905</em></td>
<td>Postmaster-General’s Dept (PMG)</td>
</tr>
<tr>
<td>1946</td>
<td>International telecommunications</td>
<td>Overseas Telecomm. Commission (OTC)</td>
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<tr>
<td>1975</td>
<td>New State-owned operator</td>
<td>Telecom Australia</td>
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<tr>
<td>1981</td>
<td>Satellite operator</td>
<td>AUSSAT</td>
</tr>
<tr>
<td>1989</td>
<td>Competition in value-added services</td>
<td>AUSTEL</td>
</tr>
<tr>
<td></td>
<td>Telecommunications regulator</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>Duopoly</td>
<td>Telstra (Telecom + OTC) &amp; Optus (ex-AUSSAT)</td>
</tr>
<tr>
<td>1992</td>
<td><em>Radiocommunications Act 1992</em></td>
<td>ABA</td>
</tr>
<tr>
<td></td>
<td><em>Broadcasting Act 1992</em></td>
<td></td>
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<tr>
<td>1993</td>
<td>Independent spectrum manager</td>
<td>Spectrum Management Agency (SMA)</td>
</tr>
<tr>
<td>1994</td>
<td>1st spectrum auction</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td><em>ACA Act 1997</em></td>
<td>ACA (SMA + AUSTEL)</td>
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</table>
Radiocommunications Act 1992

Early 1990’s REFORM
> market-based system;
> more efficient administrative system;
> spectrum management agency

Main objective: Maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum.

√ Spectrum Management Agency (SMA) → ACA
√ New category of licences
√ Auctions
√ More flexible regime for standards conformity

√ Spectrum re-allocation procedures
√ Competition limits to auction
√ Health & safety EMR standards

1997 amendment
Radiocommunications and Broadcasting Regulatory Environment

Minister for Communications, Information Technology & the Arts

Policy

Australian Government
Department of Communications, Information Technology and the Arts

Government Regulators

Australian Communications Authority

Australian Broadcasting Authority

Australian Competition & Consumer Commission
Promoting Competition and Fair Trading

Users

• AMTA
• ATUG
• SETEL
• CTN

Operators

• Carriers
• Broadcasters
• Radiocommunications Community (Government & Non Government)

Industry-based bodies

• ACIF
• Standards Australia
• Telecommunications Industry

Equipment Suppliers

• Radiocommunications and Telecommunications

Advisory Committees

• IRAC
• RCC

Users Operators Industry-based bodies Equipment Suppliers Advisory Committees
“Australia was one of the first countries to recognise the potential for market-based reforms, using property rights, to increase efficiency in spectrum use. The Radiocommunication Act 1992 went beyond the traditional, equipment-specific licensing approach to introduce class licences and technology-neutral spectrum licences to meet the needs of new technologies.”

*The Productivity Commission Inquiry Report, July 2002*
Spectrum Management in Australia

“\textit{We manage our radio spectrum for political reasons rather than technical, giving special privileges to specific companies and industry sectors. There's a dead-hand on all spectrum allocations in this country that serves to kill competition, and reduces the viability of electronics manufacture and design.}

Spectrum scarcity is artificially manufactured in Australia by specifying limits designed for congested cities, and based on old technologies. The restricted range of spectrum is then auctioning in large blocks as a 'scarce resource' to the few companies which can afford to bid and buy.

\textit{This happens in both broadcasting and radiocommunications.}”

\textbf{Stewart Fist, CROSSROADS The Australian, June 1998}
Key elements of spectrum management

STANDARDS
- Provides predictability and certainty, and a framework for minimising interference.

LICENSING
- Defines rights & obligations of spectrum users, especially re interference management.

SPECTRUM PLANNING
- Where these are the most efficient way of managing interference.

Provides predictability and certainty, and a framework for minimising interference.
Spectrum Planning

ITU WRC

ITU Table of Frequency Allocations

International level

Spectrum Strategy

Australian Radiofrequency Spectrum Plan

National level

Public consultation

ACA consultative bodies: RCC, IRAC

Band plan’s
- frequency
- administrative
Licensing and device registration framework

Apparatus Licensing
- Site specific
- Device specific
  • Device certification
  • Defined protection ratios
  • Published co-ordination procedures

Tradeable, leasible
National public-access Database Asset
- Non-specific
  "public Park"

Class Licensing
- Mass-market devices – dedicated ‘park’
- Non-mass-market devices – negotiated co-existence

Spectrum Licensing
- Area specific
  semi-Service specific
  • Device certification
  • Notional receiver
  • Approved propagation modelling methods
  • Clear technical interference framework

All devices registered - for easy co-ordination

Source: Telstra Regulatory Directorate, 2003

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Apparatus x Spectrum Licences

- *Apparatus licensing*—traditional—usually involves frequency coordination between known sites with specific types of devices with known characteristics.

- *Spectrum licensing*—new paradigm—requires the protection of an area with generalised characteristics that are trying to be technology neutral:
  - therefore need to protect an area for the duration of the licence
  - protecting the right to future device deployment.

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Auction
(price-based spectrum allocation)

“Where demand exceeds offer”

- 1st auction: MDS (Multipoint Distribution Stations), 2300 MHz (1994-95)
- ...
- PCS: 800 & 1 800 MHz (1998), 800 MHz (1999), 1.8 GHz (2000)
- ...
- 3G: 2 GHz (2001)
- ...

ACA’s Forward Program of future spectrum auctions (http://auction.aca.gov.au):
- FWA: 3.4 GHz (current project)
- ...
- 3G: 2.5 GHz (low priority)
Australian 3G Spectrum Acquired At Low Cost

Total A$ Price Pop *

* Prorata to Australian population & 60MHz
Spectrum Trading

Radiocommunications Act 1992

85 Trading spectrum licences
(1) …, the licensee of a spectrum licence may assign, or otherwise deal with, the whole or any part of the licence.

Standard Trading Unit: commodity-like unit of spectrum, covering the geographical area authorised by the licence. STUs can be traded individually or in multiples.

Secondary market/trading platform: online exchange for radio frequency spectrum (2002).

Spectrumdesk.com
Radiocommunication equipment compliance arrangements

- ACA mandatory Standards
- Standards Australia
- New equipment
- Declaration of Conformity
- Device description
- Evidence on which the Declaration was made (e.g., Test Report)
- Test Report
- Accredited testing body (e.g., accredited by National Association of Testing Authorities (NATA))
- C-Tick mark

Levels:
- Level 1: New equipment
- Level 2: Declaration of Conformity + Device description + Evidence on which the Declaration was made (e.g., Test Report)
- Level 3: Test Report
EMC product compliance arrangements

- **ACA mandatory Standards**
- **New product**
  - Declaration of Conformity*
  - Product description*
  - Test Report (or Technical Construction File)
- **Level 1**
  (*: voluntary)
- **Level 2**
- **Level 3**

**Accredited testing body** (e.g., accredited by National Association of Testing Authorities (NATA))

- **C-Tick mark**

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*International Telecommunication Union*
Accreditation Process

Number of assignments registered

Number of Accredited Persons (AP’s)

- AP's
- ACA
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
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<tbody>
<tr>
<td>1995</td>
<td>Consultation</td>
<td>Spread Spectrum (SS) Devices framework</td>
</tr>
<tr>
<td>1996</td>
<td>SS Class Licence</td>
<td>RLAN in 2.4 &amp; 5.8 GHz (including 802.11b technology)</td>
</tr>
<tr>
<td>May 2000</td>
<td>Consultation</td>
<td>RLAN in 5 GHz band</td>
</tr>
<tr>
<td>Late 2000</td>
<td>LIPD Class Licence</td>
<td>RLAN in 5.2 &amp; 5.8 GHz (including 802.11a technology)</td>
</tr>
<tr>
<td>Dec. 2002</td>
<td>SS Class Licence</td>
<td>RLAN in 2.4 &amp; 5.8 GHz (update to include other technologies)</td>
</tr>
<tr>
<td>July 2003</td>
<td>LIPD Class Licence</td>
<td>RLAN in 900 MHz, 2.4, 5.2 &amp; 5.8 GHz (update to include other technologies)</td>
</tr>
<tr>
<td>Jan. 2004</td>
<td>Consultation</td>
<td>RLAN &amp; FWA in 5 GHz band post WRC-03</td>
</tr>
</tbody>
</table>
Ultra Wide-Band (UWB)

ITU-R Recommendations (SM-series)

FCC Rules & Regulations (Part 15)

ERC Recommendation (SRD)

UWB licensing arrangements

Class Licence

Background paper (May 2003)

2004
Review/Reform Processes

• **Radiocommunication Review**: to evaluate the appropriateness, effectiveness and efficiency of the provisions of the *RCA* and related legislation and the associated administrative processes that underpin the regulatory framework for spectrum management in Australia (Final Report: August 2001).

• **Productivity Commission Inquiry**: to review the market-based radiofrequency spectrum management reforms incorporated into the *RCA* and related legislation and the performance of the ACA in administering these reforms (Final Report: December 2002).

• **ACA/ABA merger proposal**: consultation to enable a more complete consideration of the merits of a merged organization in comparison with retaining the existing institutional arrangements (on-going).
“Spectrum licensing in Australia is an important case study of modern spectrum management where a higher degree of flexibility is available for more spectrum efficient uses.”
(Motorola Labs, Paris, France, April 2001)

“The (Australian) framework is an innovative variation on conventional interference management techniques.”
“A number of other national authorities... have begun to introduce a more generic approach to licensing access to radio spectrum... Of these, the Australian approach is the most fundamental reform of traditional spectrum management methods.”
(UK Cave Review, March 2002)