

# DAB+ Distribution

## Australian case study

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Current status

The challenges for regional expansion

The approach

The Planning Principles

Allotment planning

Results

Summary

# Introduction

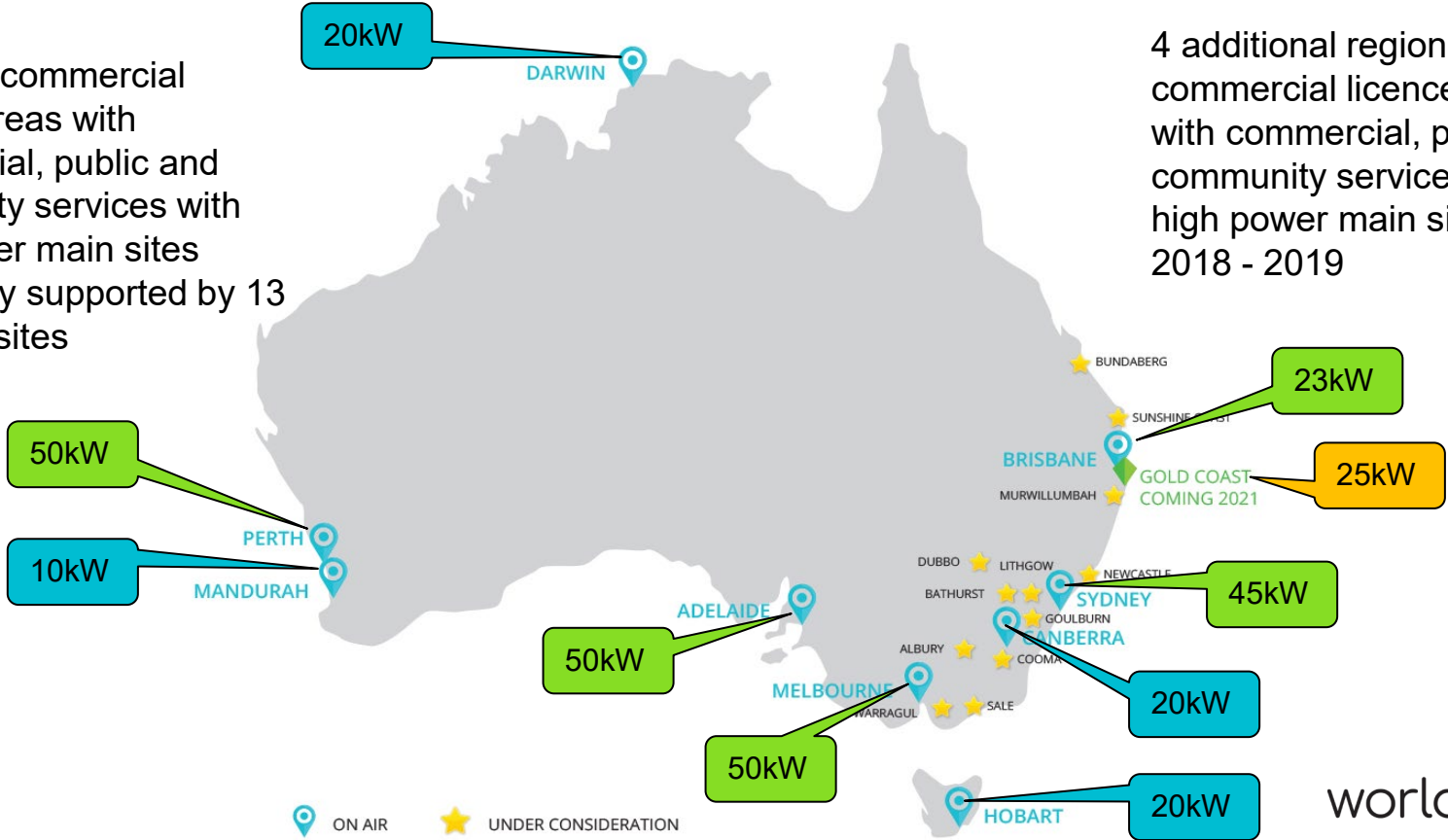
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- Australian broadcasters committed to DAB+ in 2007 and have been expanding coverage ever since
- Starting with the then highest power DAB+ transmissions in 2009 in the 5 main metro cities
- The challenge is to expand that coverage to the wider regional population
- So where are we now...

# Current status

Initially 5 commercial licence areas with commercial, public and community services with high power main sites  
Eventually supported by 13 repeater sites

4 additional regional commercial licence areas with commercial, public and community services with high power main sites in 2018 - 2019

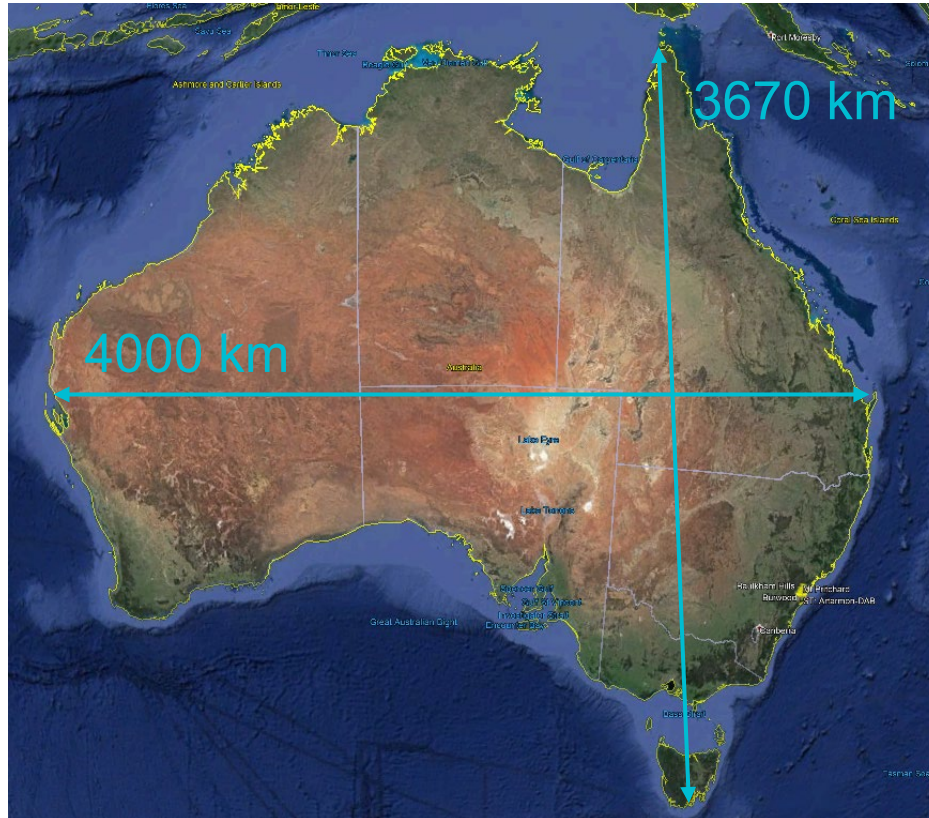


ON AIR    UNDER CONSIDERATION

# Regional expansion

## The challenge

### 1. Size



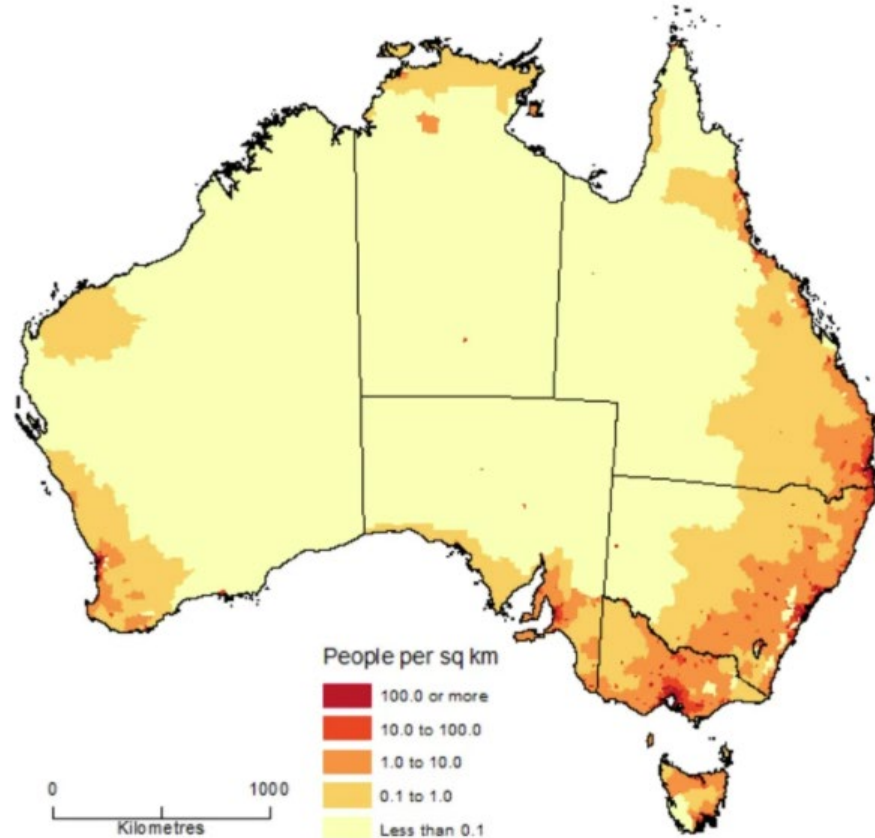
# Regional expansion

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The challenge

2. Population density

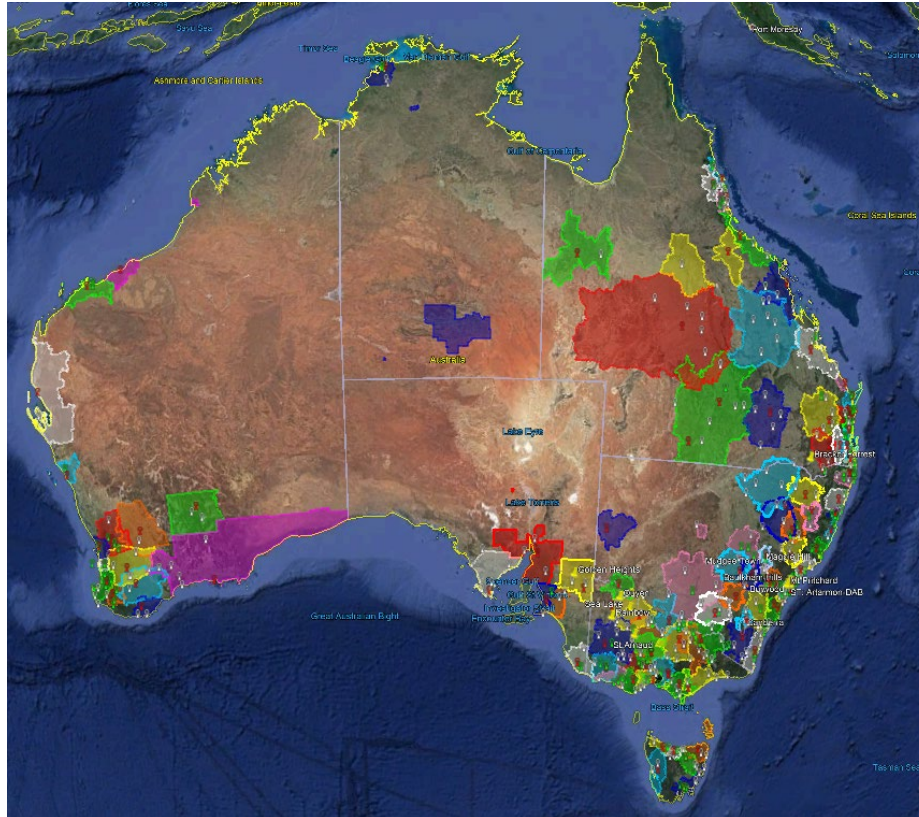
The 5 main metro cities  
have over 60% of the  
total population



# Regional expansion

The challenge

3. Commercial licence areas = 103



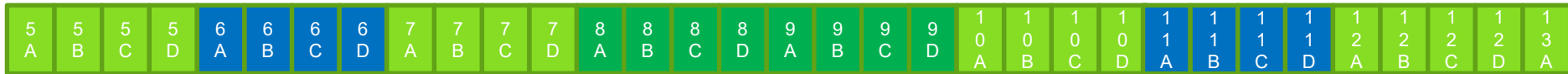
# Regional expansion

The challenge

4. Only 8 frequency blocks across Australia

5. The Public Service Broadcasters want their own multiplexes – no sharing with commercial and community

Australian DAB+ spectrum 8A to 9D



Typical European / Asian spectrum  
32 frequency blocks



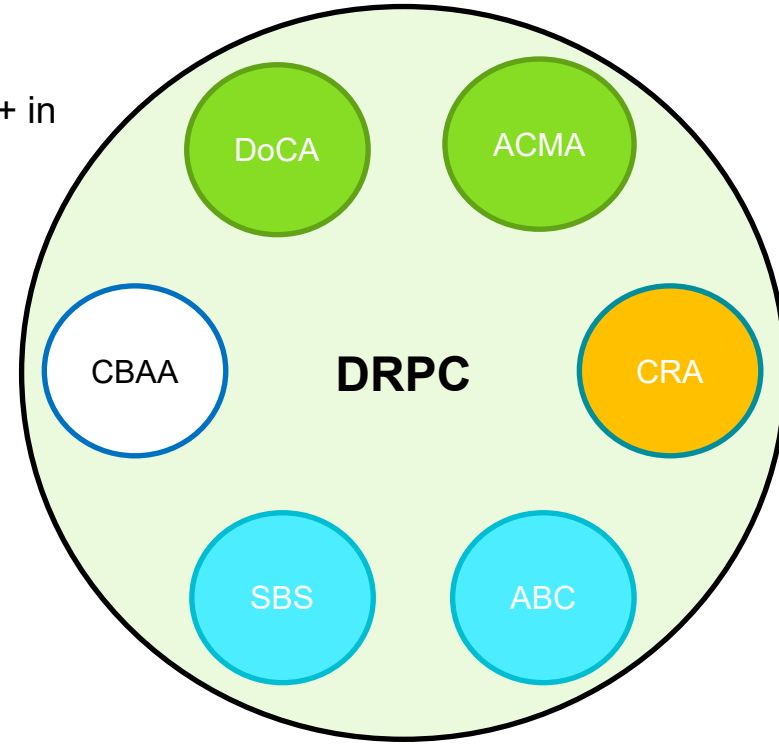
# The approach to regional planning

## What about DAB+ in regional Australia

In 2015 the industry decided it must move forward with DAB+ in regional Australia

The **Digital Radio Planning Committee** was formed

- The Australian Communications and Media Authority
- Commercial Radio Australia
- The Australian Broadcasting Corporation
- The Special Broadcasting Service
- The Community Broadcasting Association of Australia
- The Department of Communications and the Arts



# The approach to regional planning

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## What did the DRCP find?

- Times have changed!
- Policies have not been adjusted – no regional focus
- Technical planning is evolving across the globe
- Implementation process is too heavy
- Allotment planning process is complicated due high demand and small number of frequency blocks



**A Technical Sub-Committee was formed in November 2015**

# The approach to regional planning

## Technical planning for regional Australia

### Issues to resolve

- Planning methodology
  - Coverage of population and roads
  - 103 commercial licence areas
  - Minimise Capex means minimal transmissions sites
  - Need commercial Cat.1 and PSB Cat.3 multiplexes in all licence areas
- Technical planning base parameters
  - Field strength classes (vehicle, suburban, urban)
  - Interference allowances, protection ratios and prediction
- Limited spectrum requires sharp focus on accuracy to ensure appropriate balance of coverage/power and interference



# The Planning Principles

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- The Technical Sub-Committee was tasked with developing a set of Planning Principles which would then be used to undertake allotment planning in Australia
- In light of new tools and knowledge gained over the last 20 years since the basic planning approaches were developed the TSC re-examined the technical parameters which the ACMA were using for DAB planning purposes
  - CCI and ACI Protection ratios
  - Location Variation SD
  - Man Made Noise
  - Planning height and Height loss
  - Antenna gains for different types of reception
  - Building entry loss
  - Rayleigh CNR

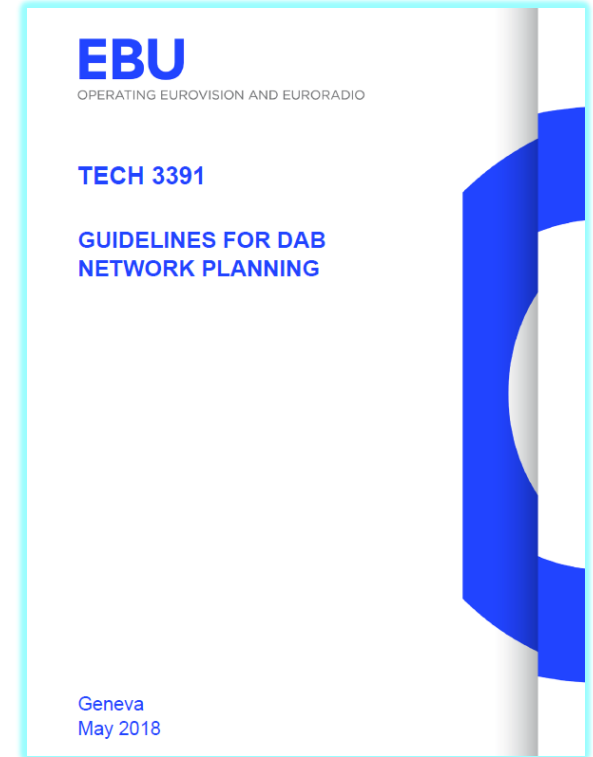


# The Planning Principals

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The TSC analysis involved:

- Extensive field and laboratory testing to re-evaluate current settings
  - Undertaken by CRA with assistance from the ABC
  - Discussions with the EBU and participation in the working group which developed the latest planning recommendations EBU TECH 3391
- Development of a new matrix based Allotment Planning method for inter-Licence area CCI minimisation by the ACMA
- Multiple scenarios were analysed and discussed to reach agreement on the Planning Principles and published in December 2016



# The Planning Principals

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## Principle 1 – Overall planning approach

- The planning of a licence area should address the wider area through the development of a regional plan encompassing all areas which may be affected by the transmissions in the target **licence area**.

## Principle 2 - Proposed frequency allotment planning approach

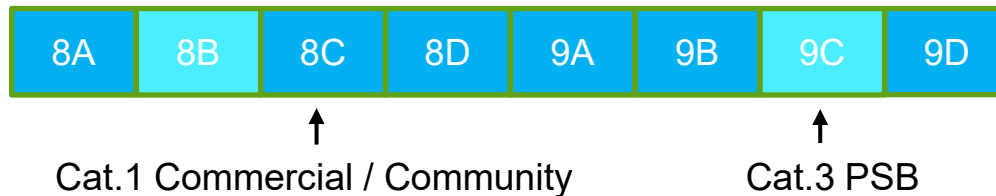
- Adopt a 6/2 allotment scenario

## Principle 3 - Licence area aggregation

- Assume no Licence Area aggregation

## Principle 4 - Transmitter site selection

- Co-siting of DTV-DAB and DAB-DAB
- Earlier deployment has precedence



# The Planning Principles

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## Principle 5 - RF planning parameters

- Protection Level EEP-3A (FEC code rate  $\frac{1}{2}$ ).
- LV SD of 4.0 dB
- Height gain to convert field strengths required at 1.5 m to 10 m will be 10 dB.
- Assumed antenna gain for mobile devices will be -10 dBd, and for portable devices will be -8 dBd.
- Allowances for man-made noise and interference of 1 dB each at both 1.5 m and 10 m antenna heights.
- A Rayleigh fading allowance of 4.6 dB, the minimum CNR for an error free Rayleigh channel is 12 dB.
- The planning field strengths to be used in planning digital radio are as below
- ACI PR increased to -5dB for 1<sup>st</sup> adjacent DAB to DVB-T channel
- CCI reduced to 12dB

Planning field strengths (dB $\mu$ V/m)			
	Mobile	Suburban	Urban
Location availability target	99%	95%	95%
Minimum median equivalent field strength (1.5 m)	50	54	60
Minimum median equivalent field strength (10 m)	60	64	70

# Allotment Planning

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The Allotment Planning process was agreed to

- be based on a single main transmitter ERP of 5 kW, in some cases with non-circular antenna HRPs
- no repeaters would be included
- only CCI would be considered

The allotment planning was completed in 2018.

Broadcasters are free to **apply for higher power transmissions** on the basis that those transmissions would not cause unacceptable interference to other licence areas

- Applications for power increases need to go through a rigorous technical and public consultation process.



# Results

- The process was used for the planning of permanent services in Canberra, Hobart, Darwin and Mandurah with all resulting in increased ERP values and implementation in 2018 and 2019
- The process is currently underway with a Public Consultation on the increase of ERP in the Gold Coast from 5kW to 25 kW



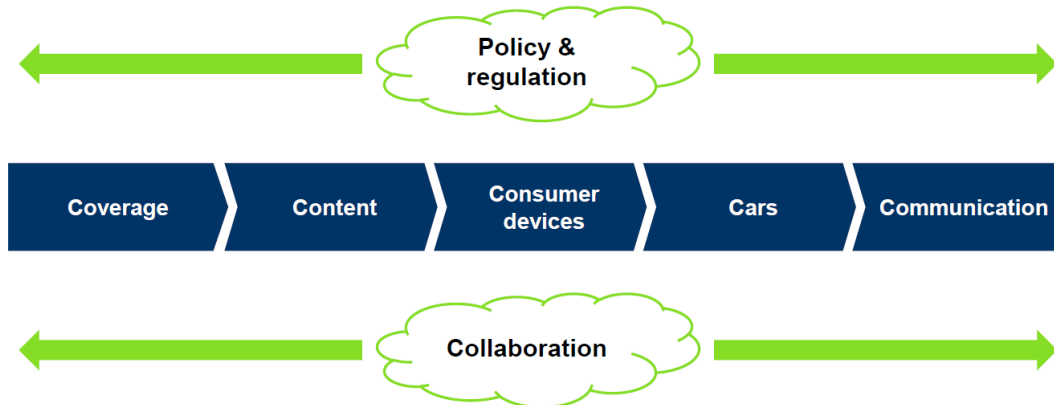
# Summary

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- The challenge to plan DAB+ in Australia had many hurdles
- Discussion and cooperation by all stakeholders has resulted in a positive outcome with an agreed planning process in place
- Different countries will have their own issues and areas of concern which could be resolved using a similar approach

Key to success is collaboration

The Five Cs



world dab

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# Thank you

*For further information, please contact:*

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