
The DAB+ rollout in Australia progress continues...

Dr. Les Sabel, Technical Committee, WorldDAB / Consultant to CRA

Bangkok, 27 April 2017

This is a story of how the radio industry can move forward

A way of working, collaborating to make an industry better so that all parties benefit

Stakeholders

- Listeners
 - Want content expansion, quality, interactivity, simplicity
- Broadcasters
 - To increase their reach, competitiveness, profits
- Regulators
 - Balanced control, reduced costs and red tape, reduced disputes
- Government
 - Appropriate content delivery, emergency support
- Everyone!!



Where is DAB+ in Australia now – April 2017

Trials 2000 to 2008 - DAB

Metro rollout 2009 – DAB+

Metro repeaters

- established 2009
- 13 installed to 2016 – ongoing

Ongoing enhancement of content

- Genres
- Branding
- Multimedia
- Monetisation

2017

- Car take-up – now over 34% of all new cars
- Receivers – over 3M receivers sold
- Listeners – over 27% of listening



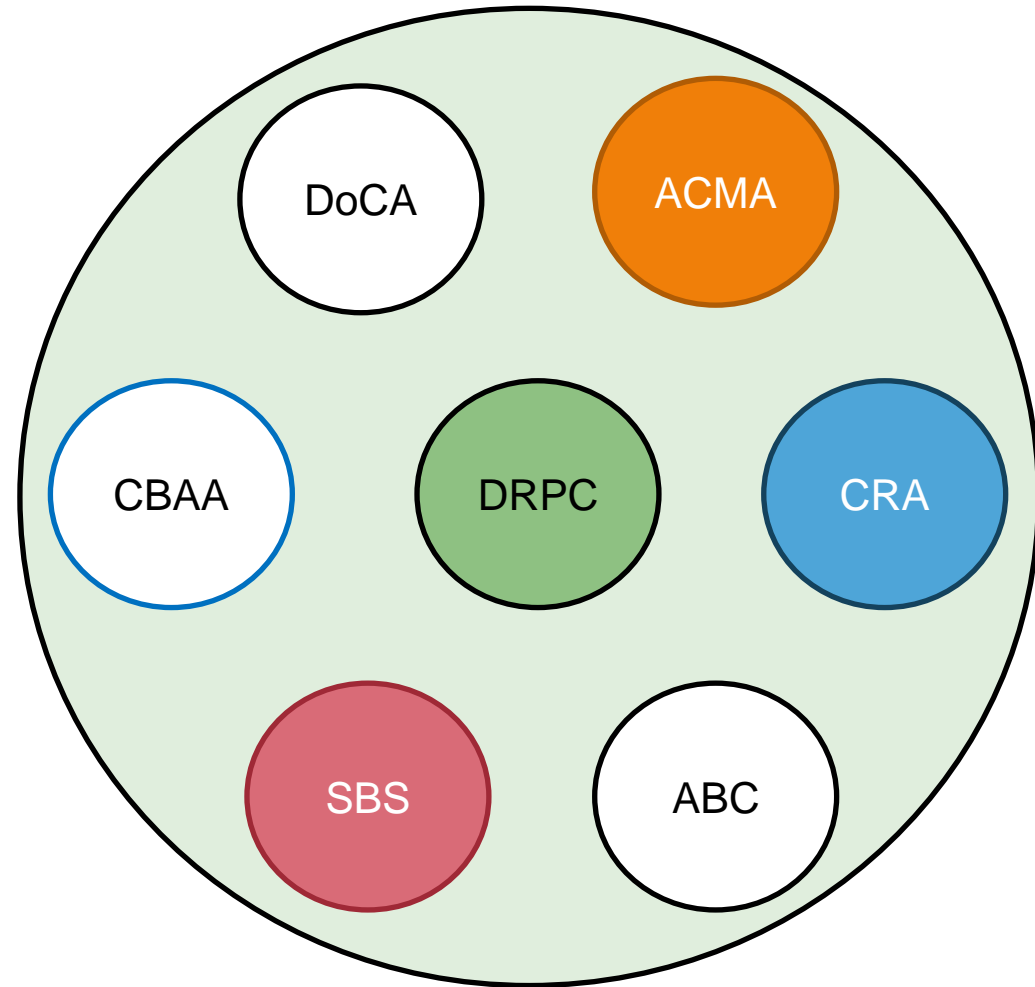
What about DAB+ in regional Australia

Trials in Canberra and Darwin from 2010 to present

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



What about DAB+ in regional Australia

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 channels

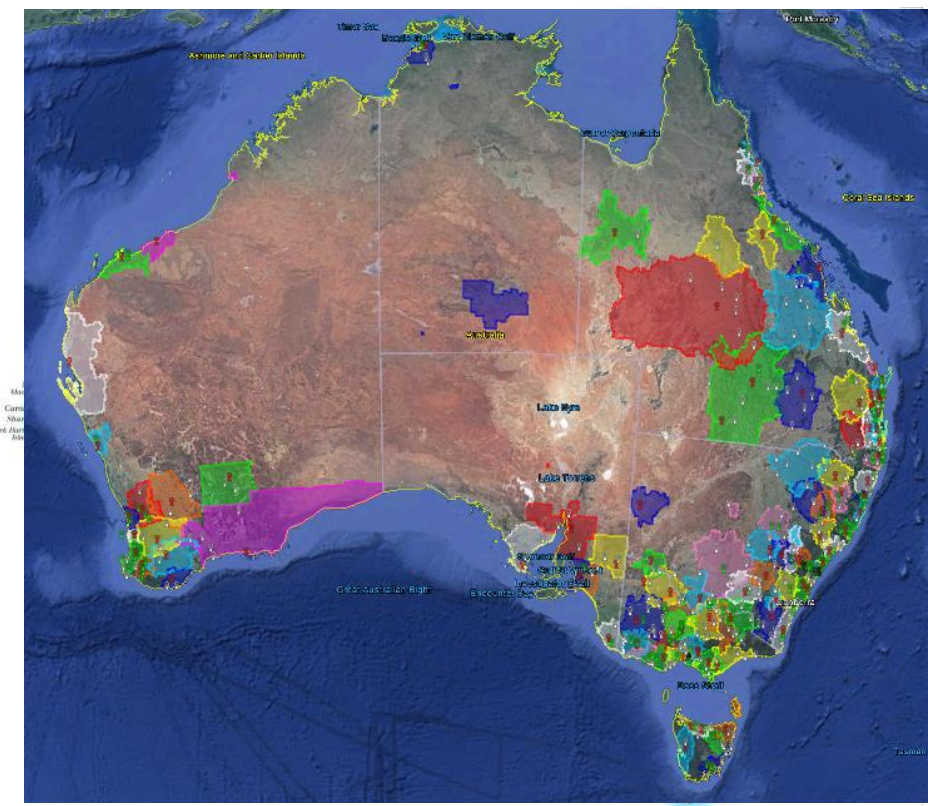
**A Technical Sub-Committee was formed
in November 2015**



Technical planning for regional Australia

Issues to resolve

- Planning methodology
 - Coverage of population and roads
 - 103 commercial licence areas
 - Issue – there are only 8 DAB+ channels available
 - Issue – PSBs want their own networks – no sharing!
- Technical planning base parameters
 - Field strength classes (vehicle, suburban, urban, dense urban)
 - Interference allowances, protection ratios and prediction
 - Limited spectrum requires sharp focus on accuracy to ensure appropriate balance of coverage/power and interference



Australian DAB+ spectrum 8A to 9D



← Typical European / Asian spectrum →

How did we do it?

Technical Sub-Committee

- Assigned the task of developing the Planning Principles
- Strong cross industry participation
- Balance the needs of commercial, public service and community broadcasters
- A pragmatic approach by all stakeholders to ensure success



- Review of current situation
- Broadcaster requirements
- Scenario formation – channel allocation between PSB and Commercial / Community – allocation scenarios 4/4, 5/3, 6/2, 7/1



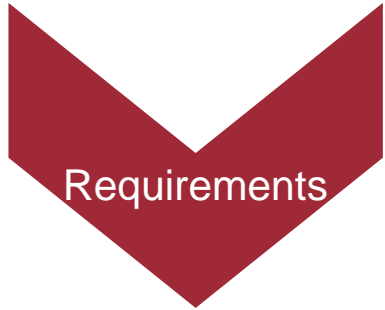
- Base parameter investigations
- Coverage and interference analysis
- Interference matrix method
- Additional options – Licence area aggregation



- Scenario updates and reviews
- Refinement of base parameters
- Documentation

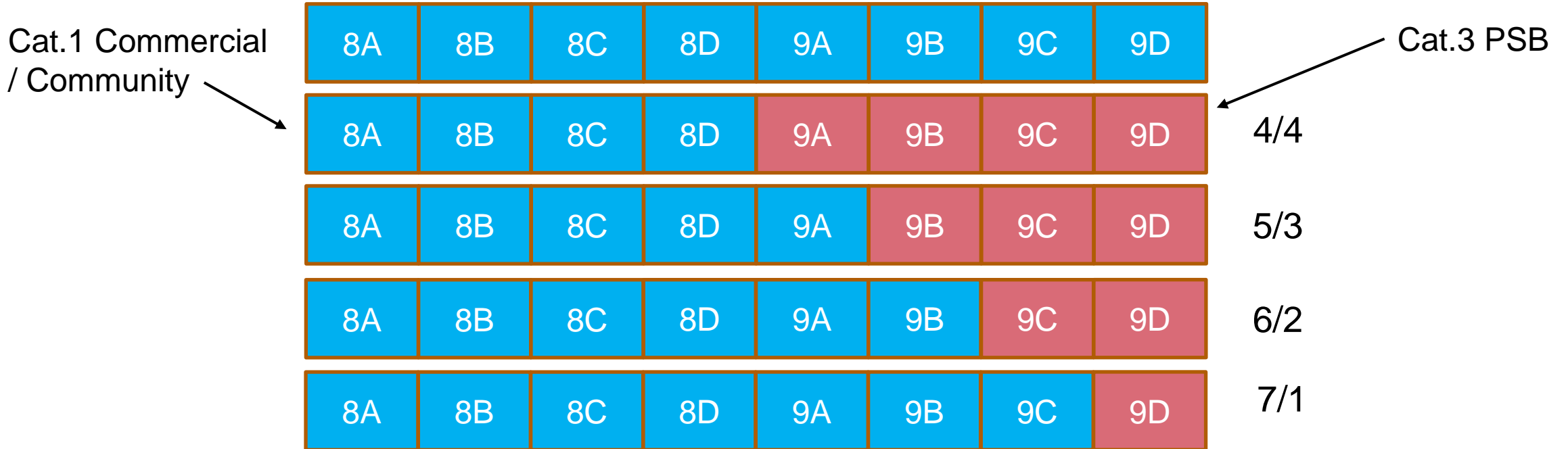


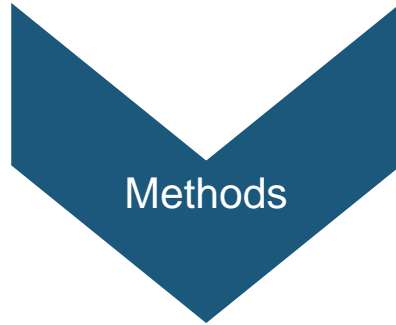
- Planning Principles



- Review of current situation
- Broadcaster requirements
- Scenario formation – channel allocation between PSDB and Commercial/Community – allocation scenarios 4/4, 5/3, 6/2, 7/1

Determine a planning structure and method to optimise the use of the available spectrum between Public Service and Commercial & Community Broadcasters





- Base parameter investigations
- Coverage and interference analysis
- Interference matrix method
- Additional options – Licence area aggregation

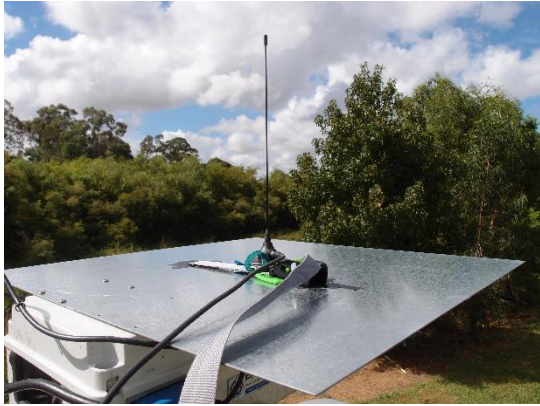
Steps

1. Re-assess the base planning parameters
 - Location Variation Standard Deviation
 - 10m Height loss
 - Man-made-noise and interference
 - Rayleigh fading allowance
 - Co-Channel Interference Protection Ratio
2. Determine the interference analysis method – ACMA interference matrix method
3. Selection of transmission sites to cover population centres and main roads
4. Review Licence Area aggregation
 - Rejected on a business basis

Numerous field trials and laboratory testing by CRA and ABC

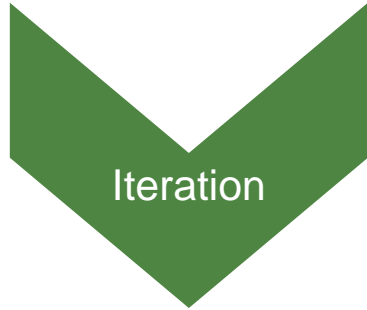
Methods

- Base parameter investigations
- Coverage and interference analysis
- Interference matrix method
- Additional options – Licence area aggregation



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









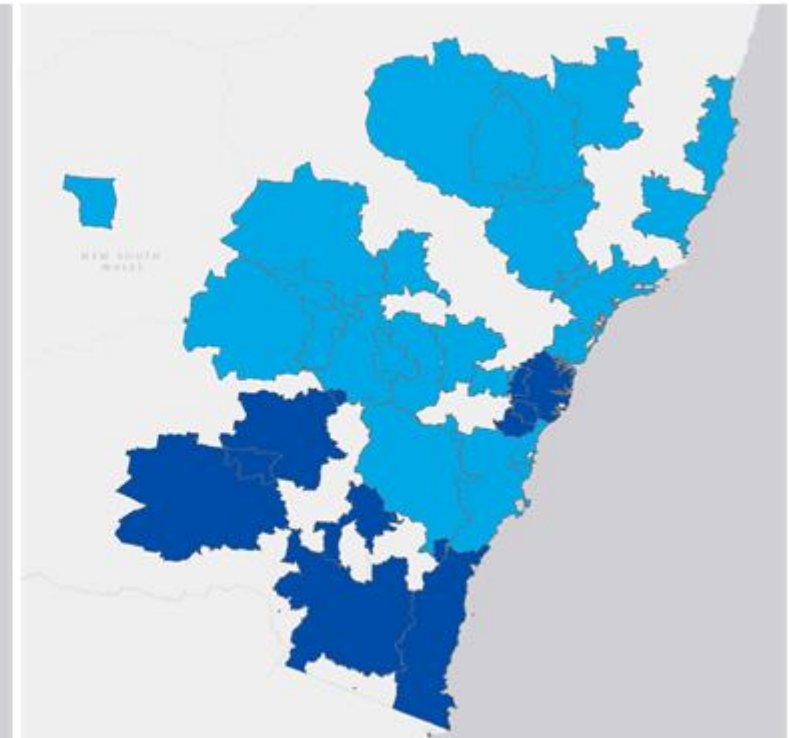
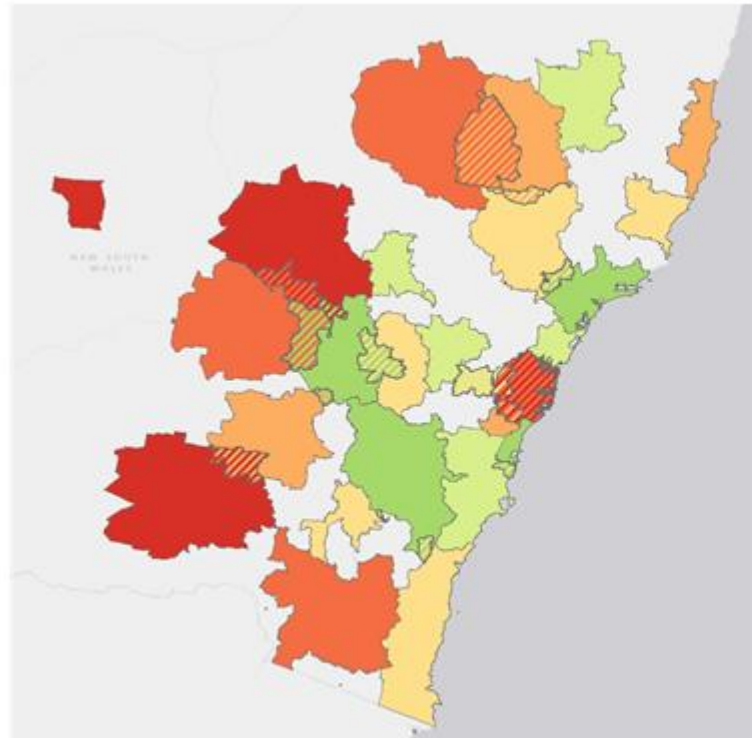
- Scenario updates and reviews
- Refinement of base parameters
- Documentation

Multiple iterations with different scenarios and numbers of commercial licence areas

1. 400kms from Sydney
2. SE Queensland
3. Southern NSW / Central Victoria

Legend

	Block 1		Block 5
	Block 2		Block 6
	Block 3		Block 7
	Block 4		Block 8





- Scenario updates and reviews
- Refinement of base parameters
- Documentation

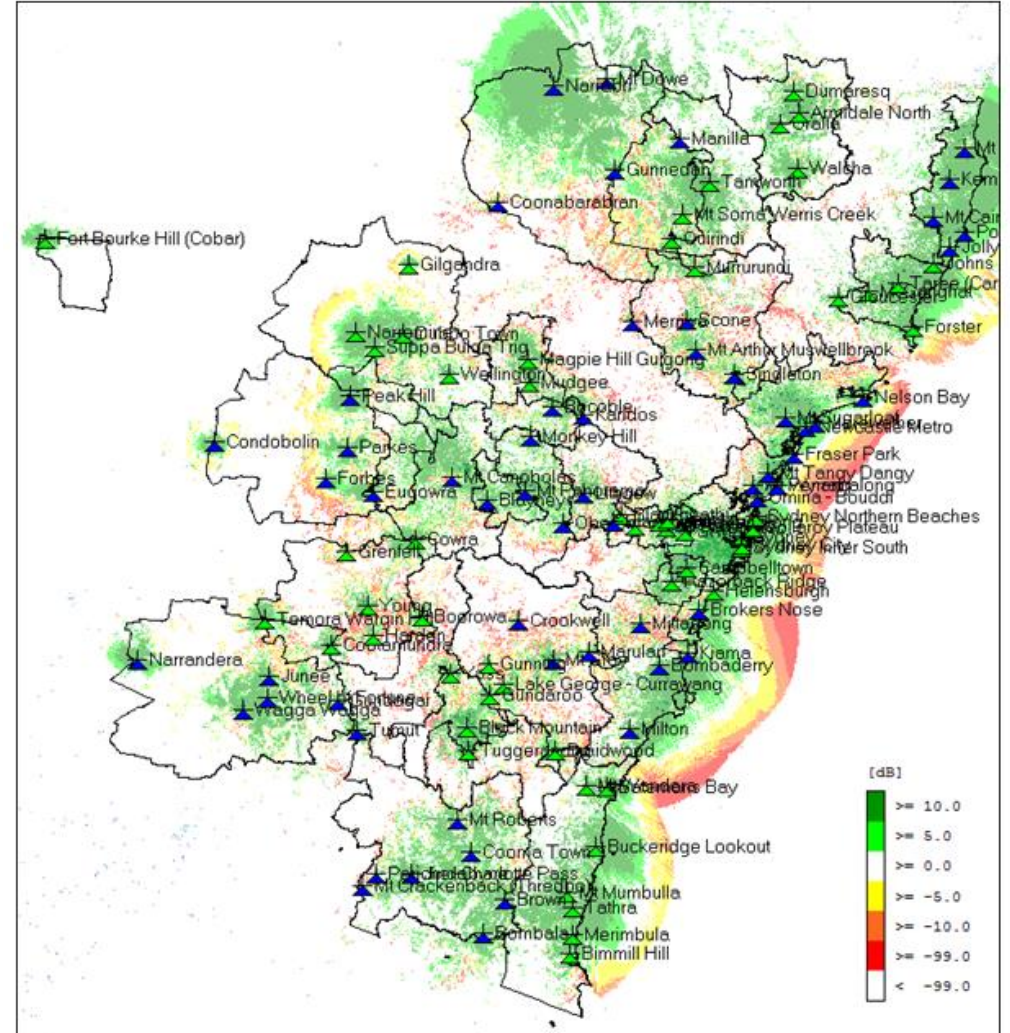
Interference analysis table for 25 LAs within 400kms of Sydney

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	ARM	BTH	BEG	CAM	CBR	COM	DUB	GOS	GLB	GDH	KAT	KEM	LIT	MUD	MUS	NEW	NOW	ORA	PAR	SYD	TAM	TAR	WAG	WOL	YNG	
1	ARM	0	0	0	0	0	0	3	0	6224	0	7116	0	52	1167	341	0	0	0	0	9506	1249	0	0	0	
2	BTH	0	0	3	3513	266	0	2191	544	788	6	6515	0	39657	3732	850	6359	498	63846	1147	90459	42	0	16	712	1389
3	BEG	0	3	498	24	9330	41609	0	0	14947	0	0	0	0	0	0	26826	2	0	144	0	0	0	3758	65	
4	CAM	0	3513	24	0	71	0	0	77062	1392	0	451429	0	225613	3088	1376	32979	189208	6316	0	2638960	0	26	0	235251	0
5	CBR	0	266	9330	71	0	12874	0	9	24543	0	207	0	489	0	0	5839	1083	75	906	0	0	4813	135	3538	
6	COM	0	0	41609	0	12874	428	0	0	2376	0	58	0	30	0	0	2683	2	0	5	0	0	1676	31	133	
7	DUB	0	2191	0	0	0	0	0	0	1497	0	0	270	8500	875	0	0	23118	3571	23	197	0	0	0	132	
8	GOS	3	544	0	77062	9	0	0	32	0	76227	25	16597	780	10398	294106	1789	452	0	1180566	61	736	0	9922	0	
9	GLB	0	788	14947	1392	24543	2376	0	32	22	0	1573	0	2741	15	0	12956	1681	36	4690	0	0	553	1343	962	
10	GDH	6224	6	0	0	0	1497	0	0	4	0	21	47	638	3679	452	0	64	4	0	22169	56	0	0	0	
11	KAT	0	6515	0	451429	207	58	0	76227	1573	0	0	340927	1679	1820	19647	28445	4039	0	2114742	0	12	58	131984	178	
12	KEM	7116	0	0	0	0	0	25	0	21	0	6	96	0	539	3045	0	0	0	19	338	93342	0	0	0	
13	LIT	0	39657	0	225613	489	30	270	16597	2741	47	340927	96	0	10436	6722	22698	24182	13819	76	1587026	213	650	3	28392	477
14	MUD	52	3732	0	3088	0	0	8500	780	15	638	1679	0	10436	0	6085	16542	276	4500	720	92799	808	16	3	22	339
15	MUS	1167	850	0	1376	0	0	875	10398	0	3679	1820	539	6722	6085	96	113750	278	1272	0	19079	17351	3053	0	491	0
16	NEW	341	6359	0	32979	0	0	0	294106	0	452	19647	3045	22698	16542	113750	0	581	4317	0	253256	14795	49258	0	4854	0
17	NOW	0	498	26826	189208	5839	2683	0	1789	12956	0	28445	0	24182	276	278	581	10	1719	0	501270	0	0	29	362621	109
18	ORA	0	63846	2	6316	1083	2	23118	452	1681	64	4039	0	13819	4500	1272	4317	1719	0	17524	76214	84	0	1549	680	24409
19	PAR	0	1147	0	0	75	0	3571	0	36	4	0	0	76	720	0	0	0	17524	12	0	0	0	632	0	2548
20	SYD	0	90459	144	2638960	906	5	23	1180566	4690	0	2114742	19	1587026	92799	19079	253256	501270	76214	0	1458	76	342	0	1927631	116
21	TAM	9506	42	0	0	0	0	197	61	0	22169	0	338	213	808	17351	14795	0	84	0	76	0	389	0	0	0
22	TAR	1249	0	0	26	0	0	0	736	0	56	12	93342	650	16	3053	49258	0	0	0	342	389	0	0	60	0
23	WAG	0	16	0	0	4813	1676	0	0	553	0	58	0	3	3	0	0	29	1549	632	0	0	0	0	0	26292
24	WOL	0	712	3758	235251	135	31	0	9922	1343	0	131984	0	28392	22	491	4854	362621	680	0	1927631	0	60	0	0	0
25	YNG	0	1389	65	0	3538	133	132	0	962	0	178	0	477	339	0	0	109	24409	2548	116	0	0	26292	0	44



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Analysis of the performance of Single Frequency Networks for PSBs





- Planning Principles

The Planning Principles

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

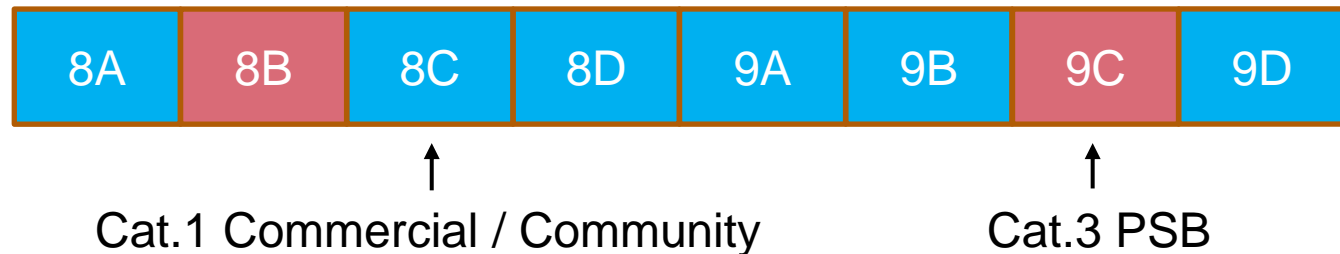
- Adopt a 6/2 allotment scenario

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





- Planning Principles

Principle 5 - RF planning parameters

- Protection Level EEP-3A (FEC code rate ½).
- 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 1st adjacent DAB to DVB-T channel
- CCI reduced to 12dB

Planning field strengths (dB μ 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

Industry consultation

The DRPC approved the planning principles in December 2016

The Planning Principles and DRCPs for Canberra, Darwin, Hobart and the Gold Coast were published in an industry consultation in December 2016

The ACMA held an Industry Day in February 2016

- Provide feedback to the industry as a whole on the outcomes
- A opportunity to provide feedback to the ACMA
- Discussion of the next steps



Where are we now?

ACMA planning process

- DRCPs have been issued for **Canberra, Darwin, Hobart** and the **Gold Coast**
 - The necessary legislated steps are in progress
 - JVC formation, CBAA deeming
- DRMT licence and start-up day moving forward
- Further legislative changes to improve economically feasibility
- Review of all transmission DAB+ sites and deliver a final country wide allotment plan
- Designing the next phase of Licence Area deployments in 2018 and 19

Expectations

- Phase 1 regional deployments
 - Canberra and Darwin on full licences by end 2017
 - Hobart and the Gold Coast on air in 2018
- Phase 2 regional deployments
 - Around 17 Licence Areas
 - 2018 / 19 time frame
 - Increase population coverage
- Phase 3
 - Around 15 – 20 Licence Areas
 - 2020 / 21 timeframe

Increase
population
coverage from 63
to 72%

Increase
population
coverage from 72
to 80%

Increase
population
coverage to >85%

What have we learnt?

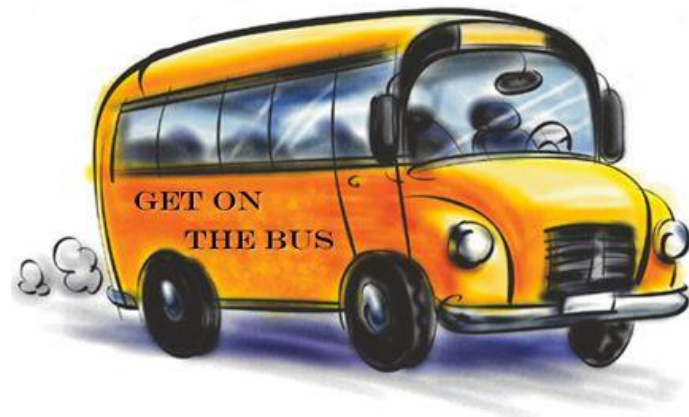
- Demonstrates the democratic process – industry **MUST** have input to ensure the processes and costs are fair and encourage the broadcast industry to move forward
 - Especially relevant considering competition from (unregulated) IP “radio” and audio delivery
- Important considerations
 - Marketing to the listeners
 - Get good content out there
 - Bring the listeners with you
 - Make it easy
 - Low cost receivers
 - Auto

The industry as a whole must often collaborate and compromise to ensure that the industry stays healthy

Collaborate on engineering and compete on content

Conclusions

- Broadcasting is long term
- Engage with cross industry stakeholders
- New technology means the broadcasters must move first
 - DAB+ broadcast,
 - IP plays a key role in connectivity, multimedia, blackspot reach
- Be proactive
 - Inform your **listeners** to bring them with you – build the excitement



The journey continues....

Thank you

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