



**Briefing Note 75  
(CRA-ENG-BN075)**

**DAB Eld and Sld code allocation**

Final

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V1.0

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## Contents

Abbreviations and Modal verbs.....	4
1 Scope.....	5
2 Regional DAB SId allocation schema .....	5
2.1 Audio programme SId codes .....	5
2.2 Data service SId codes.....	11
2.3 Schema for assigning codes from Reserved for Future Use code blocks .....	12
2.4 Future allocations .....	12
3 Regional DAB Eld allocation schema .....	13
4 Regional DAB SubChId allocation schema.....	14
5 Central database .....	14
6 References.....	15
7 Annex A: Background and current code usage.....	16
7.1 Background.....	16
7.2 SId codes relationship with FM PI codes .....	16
7.3 First five capital city codes.....	18
7.4 DAB Trials numbering issues .....	20
7.5 Canberra, Darwin and Hobart codes .....	20
7.6 Remote zone broadcasters.....	21
8 Annex B: Requirements.....	22
8.1 Overall requirements .....	22
8.2 Regional Commercial DAB requirements .....	22
8.3 Regional Community DAB requirements .....	23
8.4 Regional National DAB requirements .....	23
9 Annex C: Code definitions .....	24
9.1 Eld definition .....	24
9.2 SId definition .....	24
9.3 ECC and Country Id .....	25
9.4 SubChId .....	26
10 Annex D: RadioDNS lookup .....	26
11 Annex E: Example allocations .....	27
11.1 Example allocations for Hobart, Canberra and Darwin .....	27
11.1.1 Canberra .....	27
11.1.2 Darwin.....	30
11.1.3 Hobart .....	33
11.2 Example allocations for regional LAs.....	36

## Abbreviations and Modal verbs

For the purposes of the present document, the following abbreviations apply:

AAC	Advance Audio Coding
ABC	Australian Broadcasting Corporation
ACMA	Australian Communications and Media Authority
BSA	Broadcast Services Act
CBAA	Community Broadcasting Association of Australia
CRA	Commercial Radio Australia
DAB	Digital Audio Broadcasting as per [1]
DAB+	DAB using AAC audio coding
EId	Ensemble Identifier
ECC	Extended Country Code
EEP	Equal Error Protection
FEC	Forward Error Correcting code
FM	Frequency Modulation
FQDN	Fully Qualified Domain Name
LA	Licence Area
PI	Programme Identifier
RCZ	Remote Central Zone
RDS	Radio Data System
RFU	Reserved for Future Use
RNEZ	Remote North Eastern Zone
RWZ	Remote Western Zone
SBS	Special Broadcasting Service
SCId	Sub-Component Identifier
SFN	Single Frequency Network
SId	Service Identifier
SMX	Service MultipleXer
SP	Service Provider
SS-DAB	Small Scale-DAB
SubChId	Sub-Channel Identifier

### Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed except when used in direct citation.

## 1 Scope

This document describes the industry agreed methodology to be used to assign DAB+ service identifying codes in Australia. The codes covered are the Service Identifier (SId), Service Component Identifier (SCId), SubChannel Identifier (SubChId) and the Ensemble Identifier (EId) as defined in [1]. When combined these codes provide a world-wide unique identifier which is used to provide a range of DAB+ and hybrid radio (DAB+ and IP) features.

The methodology applies to all DAB+ services provided by commercial, community and national broadcasters. Under current legislation there are three types of multiplex. Category 1, exclusively for commercial and community broadcasting licensees. Category 2, which may be for commercial and community broadcasting licensees and national broadcaster licensees. Category 3, exclusively for the national broadcaster licensees. In this document the term 'Category 1 multiplex' is synonymous with both 'Category 1 multiplex' and 'Category 2 multiplex'. In the text below the term Service Provider is synonymous with licensee. The methodology is based on the Country Id schema provided in the DAB Registered Tables [2] and accommodates the CRA FM PI codes assignment methodology [4].

The background to the development of the code assignment schemas including the currently used codes for metros and regional trials is in section 7. The requirements used to develop the schemas are in section 8. Code definitions from [1] are in section 9 and a range of example code allocations for sample Licence Areas (LA) are in section 11.

Adherence to the allocated codes will ensure that DAB+ and hybrid digital radio deliver all features correctly and provide the best user experience possible.

## 2 Regional DAB SId allocation schema

### 2.1 Audio programme SId codes

The allocation of SId ranges is influenced by several factors:

1. The available number ranges given the existing use of some numbers for FM PI codes, see Table 7-1. **Error! Reference source not found.** The number of DAB+ multiplexes in a defined area is provided in Table 8-1 and Table 8-2. The number of commercial licence areas, the remote commercial zones and ABC local radio services by state is shown in Table 2-2.
2. The maximum number of DAB+ services which are likely to be provided per multiplex. The DAB standard allows a maximum of 64 subchannels per multiplex. In Australia all services are allocated to a single subchannel.

The available bit rate capacity per DAB multiplex is dependent on the FEC code rate used<sup>1</sup>. The weakest FEC code rate EEP-4A code provides a total multiplex service bit rate capacity of 1728 kbps; which allows for 54 services at the minimal bitrate of 32kbps. Using the standard EEP-3A code rate, which is used by the majority

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<sup>1</sup> Each subchannel has an independently assigned FEC code rate, here we only consider the case where all services/subchannels use the same FEC code rate.

of Australian and international services, the total ensemble capacity is 1152 kbps which allows for 36 services at 32kbps. Current capital city multiplexes have no more than 24 services.

In regional Australia there are 92 commercial licence areas and 3 remote area commercial zones which operate 1 or 2 services but also have many transmitter sites, up to 55 in the case of the Remote Western Zone.

Wide area community broadcasters are also present in many licence areas (LAs) and are accommodated in the code allocation schemas.

The number of SIDs to be allocated for each type of licence area is shown in Table 2-1.

Licence area type	Number of licence areas	Sid codes allocated to each licence area	Number of 64 code blocks
Commercial licence area	92	64	92
Remote commercial zones	3	512	24
National SFN area	45	64	45

**Table 2-1: Sid allocation for different licence area types**

Sid code blocks of 64 shall be allocated to each commercial licence area and National SFN area.

Sid code blocks of 512 codes shall be allocated to each remote commercial zone. This is sufficient to accommodate the large number of transmitter sites while still maintaining unique Sid codes for each service and allowing for any potential future new services to be provided at those sites.

The number of assigned 64 code blocks by state/territory is shown in Table 2-2. The allocation scheme provides multiple spare 64 code blocks for each state/territory.

Country ID	Region	Number of commercial LAs			Number of National local radio / SFNs	Total 64 code blocks used	Spare 64 code blocks
		>1 lic	solus	remote			
1	Cat.1 Metro	8					
2	Regional NSW / ACT	7	26	0	13	46	11
3	Cat.3 Metro				8		
4	Regional QLD	10	10	1	10	38	19
5	Regional SA and NT	0	6	1	6	20	37
6	Regional WA	1	13	1	7	29	28
7	Regional VIC / TAS	2	17	0	9	28	29
	Total regional LAs/SFNs	20	72	3	45		

**Table 2-2: Number of Commercial LAs and ABC local radio services by state/territory**

## Code block allocation

To segment the commercial, remote zone and national multiplex code spaces the following schema is used:

- All code blocks are allocated on 64 code boundaries
- The numbering for Commercial LAs starts at the bottom of the range and increments in blocks of 64 codes avoiding the FM PI code ranges which are Reserved for Future Use (RFU), i.e. base code 0x080
- Remote commercial zone services shall use the Country Id allocated to their parent services, i.e. RNEZ in Queensland uses Country Id 4, RCZ in South Australia/Northern Territory uses Country Id 5 and RWZ in Western Australia uses Country Id 6.
- Remote zone licence areas are allocated in blocks of 512 SId codes, starting at the bottom of the code space immediately above the upper FM code range, i.e. base code 0x9A0
- Numbering for the National multiplexes/SFNs starts at the top of the range and increments downwards in blocks of 64 codes again avoiding the FM PI code ranges, i.e. top of range base code 0xFDF

The allocation of the code blocks for Commercial LAs can be done in advance based alphabetically on the LA name, e.g. in NSW and ACT the first block is allocated to Albury, then Armidale, then Bathurst and so on as shown in Table 2-3.

The allocated code ranges for all commercial, remote zone and national areas are shown in Table 2-4.

## Allocation of SIds within code blocks

The allocation of SIds within each range allocated to a commercial licence area or national SFN then segments as follows:

1. Category 1 multiplex
  - a. Commercial services use the first 32 SIds (0 to 31)
    - i. If there are two service providers in a LA then each has a partition of 16 SIds with the first partition being allocated to the service provider with the name starting closest to 'A'
  - b. SIds 32-47 are RFU
  - c. Community services use the SIds 48 to 63
2. Category 1 multiplexes in remote zones
  - a. All services over all transmitter sites, whether in a SFN or not, have unique SId codes
  - b. Remote zone broadcasters can assign any code within their allocated range to any transmitter site
3. Category 3 multiplex
  - a. ABC services use SIds 0 to 31
  - b. SBS services use SIds 32 to 63
  - c. This is in-line with current practice in the main cities.
4. Broadcasters are free to assign codes from their allocated blocks as they prefer however it is suggested that all SId codes are allocated from the bottom of the range and then increment upward.

An example SId allocation for the Category 1 multiplex in Albury NSW is shown in Table 2-4.

The same rules are applied to the metro multiplexes established in Canberra, Darwin and Hobart, where the commercial broadcasters use Country Id 1 and national broadcasters Country Id 3. The Eld and SId allocations are shown in Table 2-5 and Table 2-6, while details are provided in section 11: Annex E: Example allocations.



Base code blocks				Regional NSW & ACT			Regional QLD			Regional SA & NT			Regional WA			Regional VIC and TAS		
Dec	base Sid (Hex)		codes allocated (Dec)	Country Id		2	Country Id		4	Country Id		5	Country Id		6	Country Id		7
start	start	finish		start	finish	Licence Area	start	finish	Licence Area	start	finish	Licence Area	start	finish	Licence Area	start	finish	Licence Area
0	0	79	122	2000	2079	NSW FM PI code allocation	4000	2079	NSW FM PI code allocation	5000	2079	NSW FM PI code allocation	6000	2079	NSW FM PI code allocation	7000	2079	NSW FM PI code allocation
122	7A	7F	6	207A	207F	<b>RFU</b>	407A	407F	<b>RFU</b>	507A	507F	<b>RFU</b>	607A	607F	<b>RFU</b>	707A	707F	<b>RFU</b>
128	80	BF	64	2080	20BF	Albury	4080	40BF	Atherton	5080	50BF	Alice Springs	6080	60BF	Albany	7080	70BF	Ballarat
192	C0	FF	64	20C0	20FF	Armidale	40C0	40FF	Bundaberg	50C0	50FF	Mt Gambier	60C0	60FF	Bridgetown	70C0	70FF	Bendigo
256	100	13F	64	2100	213F	Bathurst	4100	413F	Cairns	5100	513F	Murray Bridge	6100	613F	Bunbury	7100	713F	Burnie
320	140	17F	64	2140	217F	Bega	4140	417F	Charleville	5140	517F	Port Lincoln	6140	617F	Camarvon	7140	717F	Colac
384	180	1BF	64	2180	21BF	Broken Hill	4180	41BF	Charters Towers	5180	51BF	Riverland	6180	61BF	Esperence	7180	71BF	Devonport
448	1C0	1FF	64	21C0	21FF	Campbelltown	41C0	41FF	Emerald	51C0	51FF	Spencer Gulf North	61C0	61FF	Geraldton	71C0	71FF	Geelong
512	200	23F	64	2200	223F	Coffs Harbour	4200	423F	Gold Coast	5200	523F	<b>RFU</b>	6200	623F	Kalgoolie	7200	723F	Hamilton
576	240	27F	64	2240	227F	Cooma	4240	427F	Gympie	5240	527F	<b>RFU</b>	6240	627F	Karratha	7240	727F	Horsham
640	280	2BF	64	2280	22BF	Deniliquin	4280	42BF	Innisfail	5280	52BF	<b>RFU</b>	6280	62BF	Katanning	7280	72BF	Launceston
704	2C0	2FF	64	22C0	22FF	Dubbo	42C0	42FF	Ipswich	52C0	52FF	<b>RFU</b>	62C0	62FF	Mandurah	72C0	72FF	Maryborough (VIC)
768	300	33F	64	2300	233F	Gosford	4300	433F	Kingaroy	5300	533F	<b>RFU</b>	6300	633F	Merredin	7300	733F	Mildura
832	340	37F	64	2340	237F	Goulburn	4340	437F	Longreach	5340	537F	<b>RFU</b>	6340	637F	Narrogin	7340	737F	Queenstown
896	380	3BF	64	2380	23BF	Grafton	4380	43BF	Mackay	5380	53BF	<b>RFU</b>	6380	63BF	Northam	7380	73BF	Sale
960	3C0	3FF	64	23C0	23FF	Griffith	43C0	43FF	Maryborough (QLD)	53C0	53FF	<b>RFU</b>	63C0	63FF	Port Headland	73C0	73FF	Scottsdale
1024	400	43F	64	2400	243F	Gunnedah	4400	443F	Mt Isa	5400	543F	<b>RFU</b>	6400	643F	<b>RFU</b>	7400	743F	Shepparton
1088	440	47F	64	2440	247F	Inverell	4440	447F	Nambour	5440	547F	<b>RFU</b>	6440	647F	<b>RFU</b>	7440	747F	Swan Hill
1152	480	4BF	64	2480	24BF	Katoomba	4480	44BF	Rockhampton	5480	54BF	<b>RFU</b>	6480	64BF	<b>RFU</b>	7480	74BF	Wangaratta
1216	4C0	4FF	64	24C0	24FF	Kempsey	44C0	44FF	Roma	54C0	54FF	<b>RFU</b>	64C0	64FF	<b>RFU</b>	74C0	74FF	Warragul
1280	500	53F	64	2500	253F	Lismore	4500	453F	Toowoomba / Warwick	5500	553F	<b>RFU</b>	6500	653F	<b>RFU</b>	7500	753F	Warrnambool
1344	540	57F	64	2540	257F	Lithgow	4540	457F	Townsville	5540	557F	<b>RFU</b>	6540	657F	<b>RFU</b>	7540	757F	<b>RFU</b>
1408	580	5BF	64	2580	25BF	Moree	4580	45BF	<b>RFU</b>	5580	55BF	<b>RFU</b>	6580	65BF	<b>RFU</b>	7580	75BF	<b>RFU</b>
1472	5C0	5FF	64	25C0	25FF	Mudgee	45C0	45FF	<b>RFU</b>	55C0	55FF	<b>RFU</b>	65C0	65FF	<b>RFU</b>	75C0	75FF	<b>RFU</b>
1536	600	63F	64	2600	263F	Murwillumbah	4600	463F	<b>RFU</b>	5600	563F	<b>RFU</b>	6600	663F	<b>RFU</b>	7600	763F	<b>RFU</b>
1600	640	67F	64	2640	267F	Muswellbrook	4640	467F	<b>RFU</b>	5640	567F	<b>RFU</b>	6640	667F	<b>RFU</b>	7640	767F	<b>RFU</b>
1664	680	6BF	64	2680	26BF	Newcastle	4680	46BF	<b>RFU</b>	5680	56BF	<b>RFU</b>	6680	66BF	<b>RFU</b>	7680	76BF	<b>RFU</b>
1728	6C0	6FF	64	26C0	26FF	Nowra	46C0	46FF	<b>RFU</b>	56C0	56FF	<b>RFU</b>	66C0	66FF	<b>RFU</b>	76C0	76FF	<b>RFU</b>
1792	700	73F	64	2700	273F	Orange	4700	473F	<b>RFU</b>	5700	573F	<b>RFU</b>	6700	673F	<b>RFU</b>	7700	773F	<b>RFU</b>
1856	740	77F	64	2740	277F	Parkes	4740	477F	<b>RFU</b>	5740	577F	<b>RFU</b>	6740	677F	<b>RFU</b>	7740	777F	<b>RFU</b>
1920	780	7BF	64	2780	27BF	Tamworth	4780	47BF	<b>RFU</b>	5780	57BF	<b>RFU</b>	6780	67BF	<b>RFU</b>	7780	77BF	<b>RFU</b>
1984	7C0	7FF	64	27C0	27FF	Taree	47C0	47FF	<b>RFU</b>	57C0	57FF	<b>RFU</b>	67C0	67FF	<b>RFU</b>	77C0	77FF	<b>RFU</b>
2048	800	83F	64	2800	283F	Wagga Wagga	4800	483F	<b>RFU</b>	5800	583F	<b>RFU</b>	6800	683F	<b>RFU</b>	7800	783F	<b>RFU</b>
2112	840	87F	64	2840	287F	Wollongong	4840	487F	<b>RFU</b>	5840	587F	<b>RFU</b>	6840	687F	<b>RFU</b>	7840	787F	<b>RFU</b>
2176	880	999	282	2880	2999	NSW FM PI code allocation	4880	4999	QLD FM PI code allocation	5880	5999	SA/NT FM PI code allocation	6880	6999	WA FM PI code allocation	7880	7999	VIC/TAS FM PI code allocation
2458	99A	99F	6	299A	299F	<b>RFU</b>	299A	299F	<b>RFU</b>	299A	299F	<b>RFU</b>	299A	299F	<b>RFU</b>	299A	299F	<b>RFU</b>
2464	9A0	9DF	64	29A0	29DF	Young	49A0	49DF	<b>RNEZ</b>	59A0	59DF	<b>RCZ</b>	69A0	69DF	<b>RWZ</b>	79A0	79DF	<b>RFU</b>
2528	9E0	A1F	64	29E0	2A1F	<b>RFU</b>	49E0	4A1F	<b>RNEZ</b>	59E0	5A1F	<b>RCZ</b>	69E0	6A1F	<b>RWZ</b>	79E0	7A1F	<b>RFU</b>
2592	A20	A5F	64	2A20	2A5F	<b>RFU</b>	4A20	4A5F	<b>RNEZ</b>	5A20	5A5F	<b>RCZ</b>	6A20	6A5F	<b>RWZ</b>	7A20	7A5F	<b>RFU</b>
2656	A60	A9F	64	2A60	2A9F	<b>RFU</b>	4A60	4A9F	<b>RNEZ</b>	5A60	5A9F	<b>RCZ</b>	6A60	6A9F	<b>RWZ</b>	7A60	7A9F	<b>RFU</b>
2720	AA0	ADF	64	2AA0	2ADF	<b>RFU</b>	4AA0	4ADF	<b>RNEZ</b>	5AA0	5ADF	<b>RCZ</b>	6AA0	6ADF	<b>RWZ</b>	7AA0	7ADF	<b>RFU</b>
2784	AE0	B1F	64	2AE0	2B1F	<b>RFU</b>	4AE0	4B1F	<b>RNEZ</b>	5AE0	5B1F	<b>RCZ</b>	6AE0	6B1F	<b>RWZ</b>	7AE0	7B1F	<b>RFU</b>
2848	B20	B5F	64	2B20	2B5F	<b>RFU</b>	4B20	4B5F	<b>RNEZ</b>	5B20	5B5F	<b>RCZ</b>	6B20	6B5F	<b>RWZ</b>	7B20	7B5F	<b>RFU</b>
2912	B60	B9F	64	2B60	2B9F	<b>RFU</b>	4B60	4B9F	<b>RNEZ</b>	5B60	5B9F	<b>RCZ</b>	6B60	6B9F	<b>RWZ</b>	7B60	7B9F	<b>RFU</b>
2976	BA0	BDF	64	2BA0	2BDF	<b>RFU</b>	4BA0	4BDF	<b>RFU</b>	5BA0	5BDF	<b>RFU</b>	6BA0	6BDF	<b>RFU</b>	7BA0	7BDF	<b>RFU</b>
3040	BE0	C1F	64	2BE0	2C1F	<b>RFU</b>	4BE0	4C1F	<b>RFU</b>	5BE0	5C1F	<b>RFU</b>	6BE0	6C1F	<b>RFU</b>	7BE0	7C1F	<b>RFU</b>
3104	C20	C5F	64	2C20	2C5F	<b>RFU</b>	4C20	4C5F	<b>RFU</b>	5C20	5C5F	<b>RFU</b>	6C20	6C5F	<b>RFU</b>	7C20	7C5F	<b>RFU</b>
3168	C60	C9F	64	2C60	2C9F	<b>RFU</b>	4C60	4C9F	<b>RFU</b>	5C60	5C9F	<b>RFU</b>	6C60	6C9F	<b>RFU</b>	7C60	7C9F	<b>RFU</b>
3232	CA0	CDF	64	2CA0	2CDF	National SFN13	4CA0	4CDF	<b>RFU</b>	5CA0	5CDF	<b>RFU</b>	6CA0	6CDF	<b>RFU</b>	7CA0	7CDF	<b>RFU</b>
3296	CE0	D1F	64	2CE0	2D1F	National SFN12	4CE0	4D1F	<b>RFU</b>	5CE0	5D1F	<b>RFU</b>	6CE0	6D1F	<b>RFU</b>	7CE0	7D1F	<b>RFU</b>
3360	D20	D5F	64	2D20	2D5F	National SFN11	4D20	4D5F	<b>RFU</b>	5D20	5D5F	<b>RFU</b>	6D20	6D5F	<b>RFU</b>	7D20	7D5F	<b>RFU</b>
3424	D60	D9F	64	2D60	2D9F	National SFN10	4D60	4D9F	National SFN10	5D60	5D9F	<b>RFU</b>	6D60	6D9F	<b>RFU</b>	7D60	7D9F	<b>RFU</b>
3488	DA0	DDF	64	2DA0	2DDF	National SFN9	4DA0	4DDF	National SFN9	5DA0	5DDF	<b>RFU</b>	6DA0	6DDF	<b>RFU</b>	7DA0	7DDF	National SFN9
3552	DE0	E1F	64	2DE0	2E1F	National SFN8	4DE0	4E1F	National SFN8	5DE0	5E1F	<b>RFU</b>	6DE0	6E1F	<b>RFU</b>	7DE0	7E1F	National SFN8
3616	E20	E5F	64	2E20	2E5F	National SFN7	4E20	4E5F	National SFN7	5E20	5E5F	<b>RFU</b>	6E20	6E5F	National SFN7	7E20	7E5F	National SFN7
3680	E60	E9F	64	2E60	2E9F	National SFN6	4E60	4E9F	National SFN6	5E60	5E9F	National SFN6	6E60	6E9F	National SFN6	7E60	7E9F	National SFN6
3744	EA0	EDF	64	2EA0	2EDF	National SFN5	4EA0	4EDF	National SFN5	5EA0	5EDF	National SFN5	6EA0	6EDF	National SFN5	7EA0	7EDF	National SFN5
3808	EE0	F1F	64	2EE0	2F1F	National SFN4	4EE0	4F1F	National SFN4	5EE0	5F1F	National SFN4	6EE0	6F1F	National SFN4	7EE0	7F1F	National SFN4
3872	F20	F5F	64	2F20	2F5F	National SFN3	4F20	4F5F	National SFN3	5F20	5F5F	National SFN3	6F20	6F5F	National SFN3	7F20	7F5F	National SFN3
3936	F60	F9F	64	2F60	2F9F	National SFN2	4F60	4F9F	National SFN2	5F60	5F9F	National SFN2	6F60	6F9F	National SFN2	7F60	7F9F	National SFN2
4000	FA0	FDf	64	2FA0	2FDf	National SFN1	4FA0	4FDf	National SFN1	5FA0	5FDf	National SFN1	6FA0	6FDf	National SFN1	7FA0	7FDf	National SFN1
4064	FE0	FFF	32	2FE0	2FFF	<b>RFU</b>	4FE0	4FFF	<b>RFU</b>	5FE0	5FFF	<b>RFU</b>	6FE0	6FFF	<b>RFU</b>	7FE0	7FFF	<b>RFU</b>

FM PI codes
<b>RFU</b>
Commercial LA Sid codes
Remote zone Sid codes
National Sid codes

Table 2-3: Allocated code ranges for all commercial, remote zone and national areas

Country Id	2	ECC	0xF0	Eid	2080
<i>Services are examples only</i>					
Sid (Hex)	SCId	SubChId	Service Label	Broadcaster	AM / FM simulcast
2080	0	0	2AY	ACE	2AY
2081	0	1	audio service 2		
2082	0	2			
2083	0	3			
2084	0	4			
2085	0	5			
2086	0	6			
2087	0	7			
2088	0	8			
2089	0	9			
208A	0	10			
208B	0	11			
208C	0	12			
208D	0	13			
F0208F01	0	14	data service 2		
F0208F00	0	15	data service 1		
2090	0	16	Hit 104.9	SCA	Hit 104.9
2091	0	17	TripleM 105.7		TripleM 105.7
2092	0	18	audio service 3		
2093	0	19	audio service 4		
2094	0	20			
2095	0	21			
2096	0	22			
2097	0	23			
2098	0	24			
2099	0	25			
209A	0	26			
209B	0	27			
209C	0	28			
209D	0	29			
209E	0	30			
F0209F00	0	31	data service 3		
20A0	0	32		Rfu	
20A1	0	33			
20A2	0	34			
20A3	0	35			
20A4	0	36			
20A5	0	37			
20A6	0	38			
20A7	0	39			
20A8	0	40			
20A9	0	41			
20AA	0	42			
20AB	0	43			
20AC	0	44			
20AD	0	45			
20AE	0	46			
20AF	0	47			
20B0	0	48	2REM	Community	2REM
20B1	0	49	RPH 101.7		RPH 101.7
20B2	0	50	98.5 theLight		98.5 theLight
20B3	0	51			
20B4	0	52			
20B5	0	53			
20B6	0	54			
20B7	0	55			
20B8	0	56			
20B9	0	57			
20BA	0	58			
20BB	0	59			
20BC	0	60			
20BD	0	61			
20BE	0	62			
F020BF00	0	63	data service 4		

**Table 2-4: Sid assignments for Albury NSW**

Commercial / National	City	Eld	Sld range (hexadecimal)		Range size (decimal)	Broadcast network	Comments
			First	Last			
Commercial	Canberra	1300	1300	130F	16	CanberraFM	Proposed
Commercial			1310	131F	16	Capital	
Commercial			1320	132F	16	unallocated	
Commercial			1330	133F	16	CBAA	
Commercial			<b>full range</b>	<b>1300</b>	<b>133F</b>	<b>64</b>	
Commercial	Darwin	1340	1340	134F	16	Grant	Proposed
Commercial			1350	135F	16	unallocated	
Commercial			1360	136F	16	unallocated	
Commercial			1370	137F	16	CBAA	
Commercial			<b>full range</b>	<b>1340</b>	<b>137F</b>	<b>64</b>	
Commercial	Hobart	1380	1380	138F	16	Grant	Proposed
Commercial			1390	139F	16	SCA	
Commercial			13A0	13AF	16	unallocated	
Commercial			13B0	13BF	16	CBAA	
Commercial			<b>full range</b>	<b>1380</b>	<b>13BF</b>	<b>64</b>	

**Table 2-5: Eld and Sld ranges for Canberra, Darwin and Hobart permanent Category 1 multiplexes.**

Commercial / National	City	Eld	Sld range (hexadecimal)		Range size (decimal)	Broadcast network	Comments
			First	Last			
National	Canberra	3500	3500	351F	32	ABC	Implemented 2017
National			3D00	3D1F	32	SBS	
National	Darwin	3600	3600	361F	32	ABC	Implemented 2017
National			3E00	3E1F	32	SBS	
National	Hobart	3700	3700	371F	32	ABC	Implemented 2018
National			3F00	3F1F	32	SBS	

**Table 2-6: Eld and Sld ranges for Canberra, Darwin and Hobart permanent Category 3 multiplexes**

## 2.2 Data service Sld codes

Data services have a larger Sld codes which use 32 bits rather than 16 bits for audio programme services as shown in Figure 9-2. The data service Sld includes 8 bits for the ECC and the Service Reference has 20 bits instead of 12 for the audio programme Sld. To correlate the audio services provided in a multiplex to both the ensemble and the broadcaster the following schema shall be used:

1. The Service Reference for all data services for a service provider shall use a Service Reference from an audio programme Sld within their allocated range as bits b19 – b8 plus the data service reference extension in bits b7 – b0
  - a. This allows for 64 data service Slds in addition to the audio programme Slds allocated to the Service Provider.
  - b. The actual number of data services which can be implemented is limited by the number of sub-channels allocated to the Service Provider as defined in section 4.
  - c. While the service provider may choose any audio service Sld within their allocated range it is suggested that the last, or highest value, Sld in the allocated range be used.

- d. The use of the audio service SId for the Service Provider implies no linkage between the data service and the audio service and is meant only to associate the data service with the Service Provider.

For example, the first data service SId for ACE broadcasters in Albury, see the example in Table 2-4, should be constructed using the last audio SId as

ECC=0xF0 : country code=0x2 : Service Reference=0x08F : data service reference extension=0x00 = 0xF0208F00

The second data service SId will be 0xF0208F01.

For SCA in Albury the first data service SId, based on the last audio service SId, will be 0xF0209F00, the second will be 0xF0209F01 and so on.

### 2.3 Schema for assigning codes from Reserved for Future Use code blocks

As shown in section 2.1 the SId schema provides code blocks for each Category 1 Multiplex which are Reserved for Future Use (RFU). Those codes shall be assigned in the following manner:

1. RFU codes shall only be assigned if a Service Provider has exhausted their initial assignment of codes and all of those codes are used for on-air services
  - a. On-air services includes intermittent pop-up services
2. Allocation of SId codes for commercial services shall start at the bottom of the RFU range
3. Allocation of SId codes for community services shall start at the top of the RFU range
4. SId codes for any service which is not on-air for a period of 18 months shall be returned to the RFU pool
5. For Category 2 multiplexes the RFU code block shall be allocated to the national broadcasters<sup>2</sup>

### 2.4 Future allocations

While the SId code allocations are widely spread across the available codes there is significant unused code space for future use.

Potential future use may come from a number of sources including:

- Additional commercial LAs
- Additional ABC local services which require additional SFNs
- The establishment of local SBS services, although these may be able to be included in the existing national SFNs
- The deployment of Small Scale DAB (SS-DAB)
  - o This may be used for live event coverage, e.g. sports, local events or for small local community broadcasting.

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<sup>2</sup> Discussions in the Digital Radio Planning Committee (2016-17) did not identify any situations where Category 2 multiplexes may be established. This clause is included in case Category 2 multiplexes are established in the future.

- SS-DAB is very low power, typically less than 300W ERP<sup>3</sup>, and consequently will have an operating range of a few kilometres depending on the antenna height.
- Given that SS-DAB ensembles have few services, typically less than 8, the code space allocation can be decreased effectively increasing the number of available code blocks.

The most used code space is that of regional NSW/ACT where after full deployment with current Commercial LAs and local ABC stations/ national SFNs, 11 code blocks remain. This is adequate considering that the allocation of further wide area coverage will only be possible in central Australia where there is little current population. The other regional areas as shown in Table 2-2 have more code space available for future use with the next most used, regional Queensland, having 19 code blocks codes available after full DAB+ deployment. SS-DAB deployed in the 8 capital cities should use the Country Id 0x1 code space which has significant spare capacity.

All additional licence areas or extensions, including SS-DAB, will require the ACMA to approve transmission specifications including ERP subject to interference limits. Once a DRCP or trials licence is issued for any additional multiplex transmissions then SId and EId codes can be assigned.<sup>4</sup>

The Country Id 8 is reserved for future use and has not been assigned to any Category 1 or Category 3 multiplex at this time.

### 3 Regional DAB EId allocation schema

A close relationship between the SIds used for an area and the EId provides a simple solution.

- The EId for each area shall be the same as the first SId in the allocated code range. This will ensure that all EIds are unique.

Examples:

- Albury NSW Category 1 multiplex has the allocated SId range 0x2080 to 0x209F shall use the EId 0x2080.
- RNEZ shall use EId 0x49A0
- National SFN 1 in SA/NT shall use EId 0x5FA0

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<sup>3</sup> This general value is taken from the UK deployment examples, see the OFCOM website, e.g.

<https://www.ofcom.org.uk/research-and-data/tv-radio-and-on-demand/radio-research/small-scale-dab-final-report>

<sup>4</sup> The allocation of SId and EId codes for the future possible SS-DAB or additional licence areas may require this section to be adjusted once the details of those new established operating areas are defined.

## 4 Regional DAB SubChId allocation schema

The sub-channels Ids allocated on each multiplex shall use the following rules:

1. Category 1 multiplex
  - a. Commercial services use the sub-channels 0 to 31
    - i. If there are two service providers in a LA then each has a partition of 16 sub-channels with the first partition being allocated to the service provider with the name starting closest to 'A'
    - ii. Audio services should use the SubChId which aligns to the SId, i.e. the first audio service uses the lowest SId in the allocated block and also the lowest SubChId in that block
    - iii. Data services should use SubChId which aligns to the SId, i.e. the last audio service uses the highest SId in the allocated block and also the highest SubChId in that block.
      1. Subsequent additional data services should be assigned the next highest SubChId in the allocated block
  - b. Sub-channels 32-47 are RFU
  - c. Community services use the sub-channels 48 to 63
2. Category 3 multiplex
  - a. ABC services use sub-channels 0 to 31
  - b. SBS services use sub-channels 32 to 63
  - c. This is in-line with current practice in the main cities.

Table 2-4 shows an example SubChId allocation for Albury.

## 5 Central database

CRA provides a central database for DAB codes to both allocate active codes and act as a repository for the codes being used. The website is [www.codes.drba.com.au](http://www.codes.drba.com.au)

The website will allow individual Commercial, National and Community broadcasters to identify which code ranges have been allocated and then assign codes within their allocation for each market as multiplexes are established.

While the central database will provide a convenient centralised resource for the allocation and maintenance of assigned SId and EId codes the responsibility for the management of the codes remains the responsibility of the respective broadcast licensees and/or their industry bodies, e.g. CRA and CBAA.

This website is also used to document and provide FM RDS PI codes.

Read only access to the website is open to the public however data manipulation is limited to current Australian broadcasters, please contact CRA for access details through the [www.codes.drba.com.au](http://www.codes.drba.com.au) website.

## 6 References

- [1] ETSI EN 300 401v2.1.1 (2017-01), Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers
- [2] ETSI TS 101 756, Digital Audio Broadcasting (DAB); Registered Tables v.2.2.1, 2017-08
- [3] IEC62106, Radio Data System, 2009
- [4] CRA Engineering Briefing Note BN072, FM PI Code Assignment and DAB+ SId code Alignment
- [5] ETSI TS 103 270, RadioDNS Hybrid Radio; Hybrid lookup for radio services, v1.2.1, 2015-09
- [6] CRA Engineering Briefing Note BN50, DAB+ rollout, Darwin Multiplexer Ensemble Id and Service Ids
- [7] ETSI TR 101 496-2, Digital Audio Broadcasting (DAB); Guidelines and rules for implementation and operation; Part 2: System features, v1.1.2, 2001-05
- [8] ETSI TS 103 176v2.1.1 (2017-08), DAB Rules of implementation; Service information features
- [9] CRA-ENG-BN077, DAB+ Service Linking, 2018

## 7 Annex A: Background and current code usage

### 7.1 Background

When FM RDS was introduced the Australia radio industry did not establish a centralised allocation scheme for Program Identification (PI) codes; each broadcaster allocated PI codes independently; resulting in a somewhat random allocation of FM PI codes. The FM PI code for an analogue station does not match the Service Identification (SId) code used for the same (simulcast) DAB+ service. This causes some car radios to perform implicit service linking with un-associated services, e.g. 3MMM linked to ABCRN in Melbourne. In 2014 CRA developed a scheme for the allocation of PI codes, based on the use of state postcodes as defined in [4] which removed the possibility of any 'random' implicit service linking by removing any overlap from the defined code ranges for PI and SId codes. Implicit linkage from DAB to FM can also be avoided by entry in the SMX service linking tables to inhibit implicit linkage. There is no ability within the FM RDS system [3] to indicate a DAB link or to inhibit such implicit switching.

Given the issues encountered in Melbourne the industry considered whether to support or not support implicit linking between DAB and FM services. The industry position has been, since launch in 2009, to not support implicit linking for the following reasons:

- The current use of FM PI codes is not related to the current DAB SId codes;
- There is no way for AM services to link to simulcast DAB services. DAB to AM switching can be signalled in FIG 0/6 but once a receiver has switched to AM there is no method to switch back to DAB when that signal returns as AM broadcasters do not use AMSS;
- Previously most automotive receivers had single tuners so once they switched to an analogue service they could not detect whether the DAB signal had returned. Today most DAB receivers have dual RF receivers;
- The broadcasters did not want to change existing PI codes as that would disadvantage listeners (e.g. requiring them to reset preset buttons or rescan the receiver);
- There is no equivalent service on analogue for the 30 plus DAB+ digital-only stations in each market to link to.

This document extends the FM PI code allocation scheme developed in [4] to provide a method for the allocation of the DAB SId and Elds for multiplexes in regional Australia. The scheme is based on the Country Ids defined in [2] and described below as required by [1].

Allocations for SId and sub-channels are also provided for community services within the capacity allocation provided in the Broadcast Services Act (BSA), i.e. 2/9<sup>th</sup> capacity allocation per Category 1 multiplex.

### 7.2 SId codes relationship with FM PI codes

In Australia the preferred FM PI code values are based on state postcodes<sup>5</sup>, while the DAB SId codes are derived from the Country Id specified in the DAB Registered Tables [2]. Table 7-1 shows the FM PI code ranges

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<sup>5</sup> The details of state postcodes can be found at [https://en.wikipedia.org/wiki/Postcodes\\_in\\_Australia](https://en.wikipedia.org/wiki/Postcodes_in_Australia). While the postcode prefix is generally state based there are some exceptions for Post Office boxes and Large Volume Receivers (LVRs)



recommended for use in Australia [4] as well as the available DAB SId codes based on the Country Id which is also the first hexadecimal digit of the SId code.

Until 2014 broadcasters assigned FM PI codes independently. In 2014 the DTAC agreed on a FM PI code allocation scheme based on state / territory postcode prefixes. This means that no alignment exists between the FM PI codes and DAB SIds assigned in the 5 main capital cities where DAB was first deployed. See Table 7-2 for currently assigned SId codes. The lack of alignment between FM PI and DAB SId codes means that Implicit Linking will not work as intended [8].

To resolve this issue going forward, CRA's Digital Technical Advisory Committee (DTAC) has adopted a schema where there is no overlap between the code ranges for FM PI and DAB SId codes [4]. If FM/DAB+ service linking is required it can be explicitly signalled in FIG 0/6, see CRA-ENG-BN077 [9] for further information.

FM		DAB+		
State / Area	FM PI code	Country Id	State / Area	DAB+ SId code
ACT  Postcode prefix 2	0x1000 – 0x1079 (122) 0x1880 – 0x1999 (282) Total: 404	1	Capital Cities (all States & Territories) (Commercial and Community broadcasters)	Available range: 0x107A – 0x187F (2054) 0x199A – 0x1FFF (1638) Available total: 3692 Implicit linkage range is Reserved for Future Use (RFU): 0x1000 – 0x1079 (122) 0x1880 – 0x1999 (282) RFU total (404) Overall Total: 4096
NSW  Postcode prefix 2	0x2000 – 0x2079 0x2880 – 0x2999	2	Regional New South Wales	Available range: 0x207A – 0x287F 0x299A – 0x2FFF RFU 0x2000 – 0x2079 0x2880 – 0x2999
VIC  Postcode prefix 3	0x3000 – 0x3079 0x3880 – 0x3999	3	Capital Cities (National broadcasters)	Available range: 0x307A – 0x387F 0x399A – 0x3FFF RFU 0x3000 – 0x3079 0x3880 – 0x3999 Current Use ABC : SYD: 3000 - 300F MEL: 3100 – 310F BNE:3200 – 320F ADL: 3300 – 330F PER: 3400 – 340F SBS: SYD: 3800 - 380F MEL: 3900 – 390F BNE:3A00 – 3A0F ADL: 3B00 – 3B0F PER: 3C00 – 3C0F
QLD  Postcode prefix 4	0x4000 – 0x4079 0x4880 – 0x4999	4	Regional Queensland	Available range: 0x407A – 0x487F 0x499A – 0x4FFF RFU 0x4000 – 0x4079

				0x4880 – 0x4999
SA Postcode prefix 5	0x5000 – 0x5079 0x5880 – 0x5999	5	Regional South Australia and Northern Territory	Available range: 0x507A – 0x587F 0x599A – 0x5FFF RFU 0x5000 – 0x5079 0x5880 – 0x5999
WA Postcode prefix 6	0x6000 – 0x6079 0x6880 – 0x6999	6	Regional Western Australia	Available range: 0x607A – 0x687F 0x699A – 0x6FFF RFU 0x6000 – 0x6079 0x6880 – 0x6999
TAS Postcode prefix 7	0x7000 – 0x7079 0x7880 – 0x7999	7	Regional Victoria and Tasmania	Available range: 0x707A – 0x787F 0x799A – 0x7FFF RFU 0x7000 – 0x7079 0x7880 – 0x7999
NT Postcode prefix 8	0x8000 – 0x8079 0x8880 – 0x8999	8	Regional (future)	Available range: 0x807A – 0x88FF 0x899A – 0x8FFF RFU 0x8000 – 0x8079 0x8880 – 0x8999

**Table 7-1: FM PI and DAB+ SId code ranges by area**

Notes:

1. The codes assigned for remote broadcasters are allocated to the physical states where they are based
  - a. The Remote NE Zone (NEZ) broadcaster is based in QLD, and operates in QLD and NSW
  - b. The Remote Central Zone (RCZ) broadcaster is based in SA, and operates in SA, NT, NSW and VIC
  - c. The Remote Western Zone (RWZ) broadcaster is based in WA and operates in WA

### 7.3 First five capital city codes

Commercial, community and national DAB+ services were permanently licenced in five mainland capital cities in 2009. The currently used commercial SId and Eld code values are shown in Table 7-2.

In 2009, the Eld codes used for Perth, Adelaide and Melbourne 1 & 2 were incorrectly entered as F061, F051, F002 and F004 respectively. The SId ranges and values used for those multiplexes, shown in Table 7-2 correctly use the Country Id assigned in the DAB Registered Tables [2].

The use of the value 0xF for the Country Id (the first hexadecimal digital in the Eld) for the multiplexes in Perth, Adelaide and Melbourne associates them with Malaysia which is assigned that Country Id. Australia is distant enough from Malaysia to avoid any FM/DAB broadcast switching conflicts, however for hybrid radio the formation of the Bearer Id for the RadioDNS lookup of the Full Qualified Domain Names (FQDN) uses the Eld, see section 10 and [5]. Future hybrid radio services may experience issues if the same Eld and SId is used in Malaysia.

Broadcaster	City	Eid	Sid range (hexadecimal)		Range size (decimal)	Capacity CU	Link data rate kbps (EEP3A)	Audio kbps (EEP3A)	Broadcast network	Comments	
			First	Last							
Commercial	Perth	1000 (F061)	1000	1013	20	192	384	256	SCA		
Commercial			1014	101D	10	96	192	128	Grant/Capital		
Commercial			101E	1031	20	192	384	256	MML		
Commercial			1032	103B	10	96	192	128	DMG		
Commercial			103C	103D	2	0	0	0	unallocated		
Commercial			103E	1043	6	72	144	96	SCA		auction allocation
Commercial			1044	1045	2	24	48	32	Grant/Capital		auction allocation
Community			1046	1059	20	192	384	256	CBAA		
					<b>90</b>	<b>864</b>	<b>1728</b>	<b>1152</b>	Total	No spare capacity available	
Commercial	Adelaide	1001 (F051)	1060	1073	20	192	384	256	ARN		
Commercial			1074	1087	20	192	384	256	SCA		
Commercial			1088	109B	20	192	384	256	DMG		
Commercial			109C	109D	2	0	0	0	unallocated		
Commercial			109E	10A5	8	96	192	128	SCA		auction allocation
Commercial			10A6	10B9	20	192	384	256	CBAA		
Community							<b>90</b>	<b>864</b>	<b>1728</b>		<b>1152</b>
Commercial	Melbourne 1	1002 (F003)	10C0	10C9	10	120	240	160	Sport927		
Commercial			1106	1119	20	192	384	256	Pacific Star		
Commercial			111A	112D	20	192	384	256	DMG		
Commercial			112E	112F	2	0	0	0	unallocated		
Commercial			1132	1136	5	48	96	64	ARN		Sid allocated but no entitlement or allocation
Commercial			1137	1141	11	120	240	160	SCA		Sid allocated but no entitlement or allocation
Commercial			114C	115F	20	192	384	256	CBAA		
Community							<b>88</b>	<b>864</b>	<b>1728</b>		<b>1152</b>
Commercial	Melbourne 2	1003 (F004)	10CA	10DD	20	192	384	256	MML		
Commercial			10DE	10F1	20	192	384	256	SCA		
Commercial			10F2	1105	20	192	384	256	ARN		
Commercial			1142	1143	2	0	0	0	unallocated		
Commercial			1144	1149	6	72	144	96	SCA		auction allocation
Commercial			114A	114B	2	24	48	32	ARN		auction allocation
Commercial			1160	1173	20	192	384	256	CBAA		
Community							<b>90</b>	<b>864</b>	<b>1728</b>		<b>1152</b>
Commercial	Sydney 1	1004	1194	119D	10	96	192	128	SuperNetwork		
Commercial			119E	11B1	20	192	384	256	SCA		
Commercial			11B2	11BB	10	96	192	128	MML		formally 2KY
Commercial			11E4	11ED	10	96	192	128	MML		
Commercial			11EE	11EF	2	0	0	0	unallocated		
Commercial			11F0	11F3	4	48	96	64	SuperNetwork		auction allocation
Commercial			11F4	1201	14	144	288	192	SCA		auction allocation
Community			120C	121F	20	192	384	256	CBAA		
					<b>90</b>	<b>864</b>	<b>1728</b>	<b>1152</b>	Total	No spare capacity available	
Commercial	Sydney 2	1005	1180	1193	20	192	384	256	ARN		
Commercial			118C	11CF	20	192	384	256	DMG		
Commercial			11D0	11E3	20	192	384	256	MML		formally MRN
Commercial			1202	1203	2	0	0	0	unallocated		
Commercial			1204	1207	4	48	96	64	ARN		auction allocation
Commercial			1208	120B	4	48	96	64	SCA		Sid allocated but no entitlement or allocation
Commercial			1220	1233	20	192	384	256	CBAA		
Commercial							<b>90</b>	<b>864</b>	<b>1728</b>		<b>1152</b>
Commercial	Brisbane 1	1006	1254	125D	10	96	192	128	DMG		
Commercial			125E	1267	10	96	192	128	RadioTAB		
Commercial			1268	127B	20	192	384	256	ARN		
Commercial			1290	1292	3	0	0	0	unallocated		
Commercial			1293	129B	9	96	192	128	DMG		auction allocation
Commercial			129C	12A4	9	96	192	128	ARN		auction allocation
Commercial			12A5	12AD	9	96	192	128	SCA		auction allocation
Community			12CC	12DF	20	192	384	256	CBAA		
					<b>90</b>	<b>864</b>	<b>1728</b>	<b>1152</b>	Total	No spare capacity available	
Commercial	Brisbane 2	1007	1240	1253	20	192	384	256	SCA		
Commercial			127C	128F	20	192	384	256	MML		was Fairfax
Commercial			128A	12C2	9	96	192	128	SCA		auction allocation
Commercial			12AE	12B9	12	96	192	128	unallocated		Available CU
Commercial			12C3	12CB	9	96	192	128	ARN		auction allocation
Community			12E0	12F3	20	192	384	256	CBAA		
					<b>90</b>	<b>864</b>	<b>1728</b>	<b>1152</b>	Total	96 CU spare capacity available	
Overall range:			1000	12F3	756	Actual Sids allocated:			718		

**Table 7-2: Currently used Commercial Eld and Sid codes ranges**

The Eld and Sid values for the National multiplexes are shown in Table 7-3.

Commercial / National	City	Eld	Sid range (hexadecimal)		Range size (decimal)	Broadcast network	Comments	
			First	Last				
National	Adelaide	3300	3300	330F	16	ABC	3300 - 330A used	
National								F03033FF - ABC-SBS EPG
National					3B00	3B0F	16	SBS
National	Brisbane	3200	3200	320F	16	ABC	3200 - 320A used	
National								F03032FF - ABC-SBS EPG
National					3A00	3A0F	16	SBS
National	Melbourne	3100	3100	310F	16	ABC	3100 - 310A used	
National								F03031FF - ABC-SBS EPG
National					3900	390F	16	SBS
National	Perth	3400	3400	340F	16	ABC	3400 - 340A used	
National								F03034FF - ABC-SBS EPG
National					3C00	3C0F	16	SBS
National	Sydney	3000	3000	300F	16	ABC	3000 - 300A used	
National								F03030FF - ABC-SBS EPG
National					3800	380F	16	SBS

**Table 7-3: Currently used National Eld and Sid code ranges**

#### 7.4 DAB Trials numbering issues

The Canberra trial multiplex uses the Eld 0x1006, which is same Eld as is used for the Brisbane 1 multiplex. The Brisbane 1 multiplex Eld code is as per the original CRA number/code allocations. The current Canberra services have Sid values in the range 0x1234 to 0x1280, these values overlap with services on the Brisbane 1 and 2 multiplexes. It is suggested that the Canberra Sids be changed in line with the defined range when the Canberra multiplex becomes permanent. See Table 2-5.

The Darwin trial multiplex has a similar issue as the current Eld is 0x1007 which is the same as the Brisbane 2 multiplex. The Sids were allocated the range 0x122A to 0x1283 which is also used in Brisbane and Canberra. It is likely that the current 5 services use the first available numbers, i.e. 0x122A to 0x122E which overlaps with the CBAA Sid code range on the Sydney 2 multiplex of 0x1220 – 0x1233. It is suggested that the Darwin Sids be changed in line with the defined range when the Darwin multiplex becomes permanent. See Table 2-5.

#### 7.5 Canberra, Darwin and Hobart codes

The DAB Registered Tables [2] refers to Capital Cities in the Country Id numbering, as shown in Table 9-1. Consequently, the Category 1 multiplexes in Canberra, Darwin and Hobart also use Country Id 0x1.

The Sid and Eld codes used for the Canberra and Darwin trial multiplexes will need to be changed when the multiplex licences are made permanent, at which time the Canberra and Darwin transmissions will also change frequencies. Listeners will need to “rescan” their receivers to correctly populate the service list and be able to receive services.

The national broadcasters have aligned with the new schema for the roll out of their permanent services in Canberra, Darwin and Hobart, Sid details are provided in section 11.

## 7.6 Remote zone broadcasters

The remote zone transmissions are either a single service, e.g. 8SAT/RCZ, or 2 services in some RNEZ and RWZ sites. In addition, there are very few community services in the same general area served, exceptions are shown below, note HPONs and LPONs are not included.

Summary – data from ACMA on 31/8/2017

### Remote NE Zone

Operates under call signs 4BRZ (21) and 4RBL (34) with a total of 34 sites

- 38 are licenced as REMOTE COMMERCIAL RADIO SERVICE NORTH EAST ZONE RA1
- 17 are licenced as retransmissions

Most sites have both 4BRZ and 4RBL transmissions, 13 are single transmission sites, 21 have both transmissions

- 29 sites in QLD
- 5 sites in NSW

Sites with additional commercial/community transmissions to 4RBL/4RBZ

- Beaudesert – 1 commercial (4TAB)
- Bourke – 1 commercial RCZ (8SAT), 1 community (2CUZ)
- Century Mine – 1 community (8KIN)
- Goondiwindi – 2 commercial (2VM & 2NOW)
- Stanthorpe – 4 commercial (4AK, 4GR, 4RGD, 4WK), 1 community (4TEN)
- Tenterfield – 1 community (2TEN)

### Remote Central Zone

Operates under call sign 8SAT with a total of 40 sites

- 34 are licenced as REMOTE COMMERCIAL RADIO SERVICE CENTRAL ZONE RA1
- 6 are licenced as retransmissions

The site locations by state are

- 26 sites in SA/NT
- 4 sites in NSW
- 10 sites in Vic

Sites with additional commercial/community transmissions to 8SAT

- Bourke – 2 commercial (4BRZ, 4RBL), 1 community (2CUZ)
- Ceduna/Smokey Bay – 2 community (5CCR, 8KIN)
- Coober Pedy – 1 community (5DUS)
- Keith – 1 community (5TCB)
- Kingston SE – 1 community (5TCB)

## CRA-ENG-BN075

- Marysville – 1 community (3UGE)
- Mt Buller – 1 commercial (3SUN)
- Penong – 1 community (8KIN)
- Roxby Downs – 1 commercial (5AUU), 1 community (5ROX)
- Tennant Creek – 1 community (8KIN)

### Remote Western Zone

Operates under call signs 6SAT (55) and 6FMS (40) at a total of 55 sites

- 55 sites in WA
  - o 20 are licenced as REMOTE COMMERCIAL RADIO SERVICE WESTERN ZONE RA1
  - o 35 are retransmissions

Sites with additional commercial/community transmissions to 6SAT

- Derby – 1 commercial (6FMS), 1 community (6DBY)
- Meekathara - - 1 commercial (6FMS), 1 community (6MKA)

There are also sites with only 6FMS services (no 6SAT service).

## 8 Annex B: Requirements

### 8.1 Overall requirements

- Req 1. The scheme is required to provide both EId and SId codes that are compliant with [2]
- Req 2. The scheme is required to work within the available number ranges identified in [4]
- Req 3. All EId codes are unique – in both Australia and world-wide when the Extended Country Code (ECC) is included
- Req 4. All SId codes are unique within Australia
  - a. no SId can be used in more than 1 multiplex
- Req 5. The scheme includes all multiplex categories
  - a. i.e. Category 1, 2 and 3, Category 2 multiplexes are treated as a subset of Category 1
  - b. The scheme shall cater for all legislated multiplex categories.

### 8.2 Regional Commercial DAB requirements

The deployment of DAB in regional Australia requires a coordinated approach to the allocation of EId and SId codes. The number of EId and SId codes required across Australia is dependent on the number of Commercial licence areas of which there are 103. The number of LAs for each state / territory area as defined in Table 9-1 is shown in Table 8-1.

Country Id	State or territory area	Number of Commercial LAs	Comments
1	Capital cities (Commercial / Community)	8	All state and territory capital cities
2	Regional NSW and ACT	33	
3	Capital cities (National)	0	
4	Regional Queensland	21	Includes RNEZ LA
5	Regional South Aust. / Northern Territory	7	Includes RCZ LA
6	Regional Western Australia	15	Includes RWZ LA
7	Regional Victoria and Tasmania	19	
8	RFU	0	

**Table 8-1: Current number of Commercial RA1 licence areas by state / territory**

Req 6. A range of unique SIDs is required for each commercial LA.

### 8.3 Regional Community DAB requirements

Community broadcasters operates services in metropolitan, regional and remote areas of Australia. Current legislation requires planning according to commercial licence area, including for regional areas. Accordingly, the numbers of EID and range of unique SID codes for community broadcasting would be allocated according to the numbering scheme described in this document. The number of commercial RA1 licence areas is as described in Table 2-1

There is sufficient flexibility in the numbering scheme described in this document for possible future deployments that do not align with commercial RA1 licence areas, including possible future deployment of small-scale services. Note that current legislation does not provide for small-scale broadcasting at this time.

### 8.4 Regional National DAB requirements

The National broadcasters will require a number of regional SFNs in each state. The numbers are most likely to be driven by the number of ABC local radio services across Australia of which there are approximately 53 as shown in the breakdown in Table 8-2. Note that National services such as triplej and radio national are in addition.

Country Id	State or territory area	Number of ABC local radio services	Comments
1	Capital cities (Commercial / Community)	0	
2	Regional NSW and ACT	13	
3	Capital cities (National)	8	All state and territory capital cities
4	Regional Queensland	10	
5	Regional South Australia and Northern Territory	6	
6	Regional Western Australia	7	
7	Regional Victoria and Tasmania	9	
8	RFU		

**Table 8-2: Current ABC local radio services by state / territory**

- Req 7. A unique Eld is required for each National broadcaster regional SFN.
- Req 8. A range of unique SIds is required for each National broadcaster regional SFN.

## 9 Annex C: Code definitions

DAB services have a numbering scheme which ensures that every service deployed in the world has a unique identifier. The unique identifier uses hexadecimal numbering and is based on a set of codes:

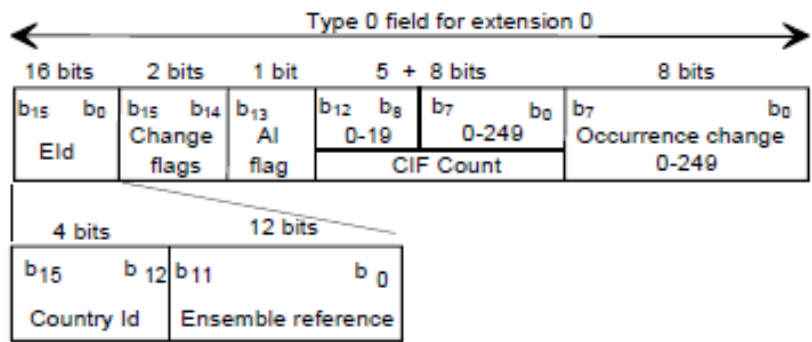
1. The Extended Country Code (ECC) – defined in [2], the ECC for Australia is 0xF0
2. The Country Identifier (Country Id) – defined in [2], the Country Ids for Australia are 1, 2, 3, 4, 5, 6, 7, 8
3. The Ensemble Id (EId) – the range for valid EIds is defined in this document
4. The Service Id (SId) – the ranges for valid SIds are defined in this document
5. The Service Component Id (SCId) – the range for valid SCIds is defined in this document
6. The Sub-Channel Id (SubChId) – the range for valid SubChIds is defined in this document

The following definitions are provided in the main DAB standard [1].

The signalling provided in the DAB system uses Fast Information Groups (FIGs) of different types. The FIGs are delivered through the Fast Information Channel (FIC). Relevant details are provided below, for the complete description see [1].

### 9.1 EId definition

EId is defined as: **Ensemble Identifier (EId)**: unique 16-bit code, allocated to an ensemble and intended to allow unambiguous world-wide identification of that ensemble, and is provided in FIG 0/0 and is constructed as



**Figure 9-1: Structure of FIG 0/0 (also see Figure 26 in [1])**

Where the Country Id is defined in [2] and the Ensemble reference is defined as: this 12-bit field shall indicate the number of the Ensemble allocated for use within a national area.

Given that the Ensemble reference has 12 bits there is a maximum of 4096 ensembles per Country Id.

### 9.2 SId definition

The SId is defined as: **Service Identifier (SId)**: 16-bit or 32-bit code used to identify a particular service, and provided in FIG0/2 and is constructed as shown in Figure 9-2.



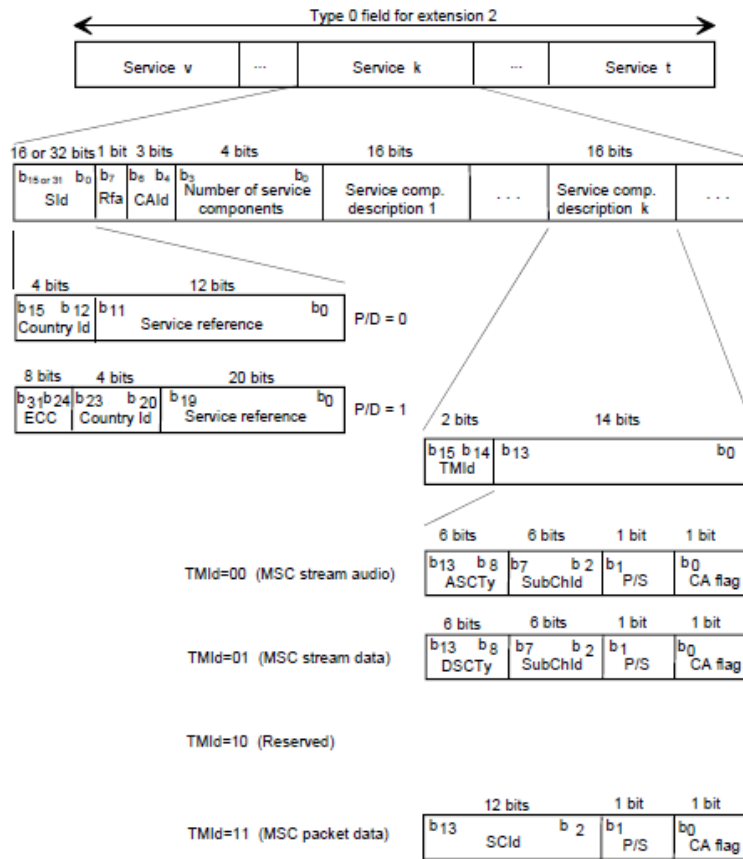


Figure 9-2: FIG 0/2 structure (also see Figure 21 in [1])

A 16 bit SId is used for audio programme services, a 32bit SId is used for data services.

[1] also states: Each service shall be identified by a Service Identifier (SId) which, when used in conjunction with an Extended Country Code (ECC), is unique world-wide. A service consists of a primary service component and optionally additional secondary service components. Each service component shall be uniquely identified by the combination of the SId and the Service Component Identifier within the Service (SCIDs).

The value of the ECC is provided in FIG0/9. The ECC for Australia is defined in [2]and has the value 0xF0.

The SCIDs are relative to the SId and use the value range of 0x0 to 0xF. The primary component in a group of services identified by SCIDs relative to a common SId always has the value 0x0.

In Australia only the primary Service Component is provided, no secondary services are associated with the primary as all services require their own sub-channel.

### 9.3 ECC and Country Id

The values of the ECC and Country Id are provided in the Registered Tables [2] and shown below in Table 9-1.

Australia:	AUS	ECC	Country Id
Capital Cities (commercial and community broadcasters)	acc	F0	1
Regional New South Wales and ACT	arn	F0	2
Capital Cities (national broadcasters)	acn	F0	3
Regional Queensland	arq	F0	4
Regional South Australia and Northern Territory	arc	F0	5
Regional Western Australia	arw	F0	6
Regional Victoria and Tasmania	arv	F0	7
Regional (future)	arf	F0	8

**Table 9-1: DAB Country Id in the Registered Tables**

In this table the Capital cities are composed of the original five metro cities (Adelaide, Brisbane, Melbourne, Perth and Sydney) plus the remaining three state and territory capital cities (Canberra, Darwin and Hobart).

#### 9.4 SubChId

The data for each service is transported in a Sub-Channel. FIG 0/2 provides the logical connections between SId, SCId and SubChId as shown in Figure 9-2. The SubChId has 6 bits and hence there is a maximum of 64 sub-channels per multiplex.

## 10 Annex D: RadioDNS lookup

RadioDNS can be used to identify the web address of a DAB service or FM station to provide hybrid radio services such as metadata delivery (text and images) and service and program information. The web address is referred to as the Fully Qualified Domain Name (FQDN).

The Bearer Id or FQDN used in RadioDNS relies on the service identification being unique worldwide, the details can be found in [5]. The bearer Id for DAB services is constructed as

[<uatype>]<scid>.<sid>.<eid>.<gcc>.dab.radiodns.org

where the <uatype> is optional and only used for non-audio services.

For example, the 2MMM DAB+ service in Sydney has the RadioDNS FQDN is

0.119F.1004.1F0.radiodns.org

The Bearer Id used in the SI.xml document as specified in [5] uses a reversed version of the FQDN lookup in the form

dab:<gcc>.<EId>.<SId>.<SCId><.uatype>]

which for 2MMM is dab:1F0.1004.119F.0

The lookup FQDN for FM services is defined as

<frequency>.<pi>.<gcc>.fm.radiodns.org

which for the same simulcast service 2MMM in Sydney on 104.9MHz is

10490.2049.F0.radiodns.org

The GCC is derived by combining the ECC and the Country Id as described in Annex A of [5] as

GCC = Country Id extended by ECC

For commercial capital city DAB multiplexes in Australia the Country Id =0x1 (derived from the SId of the service being received) and the ECC for Australia is 0xF0, the GCC is 0x1 extended by 0xF0 = 0x1F0.

## 11 Annex E: Example allocations

### 11.1 Example allocations for Hobart, Canberra and Darwin

#### 11.1.1 CANBERRA

Table 11-1 shows an example allocation of SId, SCId, SubChId and EId codes for commercial and community broadcasters Category 1 DAB+ transmission in Canberra. Table 11-2 shows the SId, SCId, SubChId and EId codes as implemented by the national broadcasters the ABC and SBS Category 3 DAB+ transmission in Canberra in December 2017.

Country Id	1		<i>Services are examples only</i>		
Eld	1300				
SId (Hex)	SCId	SubChId	Service Label	Broadcaster	AM / FM simulcast
1300	0	0	Hit 104.7	CanberraFM	2ROC
1301	0	1	Mix 106.3		1CBR
1302	0	2	Buddha radio		
1303	0	3	The Edge		
1304	0	4			
1305	0	5			
1306	0	6			
1307	0	7			
1308	0	8			
1309	0	9			
130A	0	10			
130B	0	11			
130C	0	12			
130D	0	13			
130E	0	14			
130F	0	15			
1310	0	16	2CA	Capital	2CA
1311	0	17	2CC		2CC
1312	0	18	Kix Country		
1313	0	19	My Canberra		
1314	0	20	Coles radio		
1315	0	21			
1316	0	22			
1317	0	23			
1318	0	24			
1319	0	25			
131A	0	26			
131B	0	27			
131C	0	28			
131D	0	29			
131E	0	30			
131F	0	31			
1320	0	32		Rfu	
1321	0	33			
1322	0	34			
1323	0	35			
1324	0	36			
1325	0	37			
1326	0	38			
1327	0	39			
1328	0	40			
1329	0	41			
132A	0	42			
132B	0	43			
132C	0	44			
132D	0	45			
132E	0	46			
132F	0	47			
1330	0	48	1XXR	Community	1XXR
1331	0	49	1ART		1ART
1332	0	50	1WAY		1WAY
1333	0	51	1VFM		1VFM
1334	0	52	1CMS		1CMS
1335	0	53	2QBN		2QBN
1336	0	54	1RPH		1RPH
1337	0	55			
1338	0	56			
1339	0	57			
133A	0	58			
133B	0	59			
133C	0	60			
133D	0	61			
133E	0	62			
133F	0	63			

Table 11-1: Example SId, SCId, SubChId and Eld codes for Cat 1 multiplex in Canberra

Country Id	3		<i>Services are on-air</i>		
Eld	3500				
SId (Hex)	SCId	SubChId	Service Label	Broadcaster	AM / FM simulcast
3500	0	0		ABC	
3501	0	1	ABC News		ABCNewsRadio
3502	0	2	Double J		
3503	0	3	ABC Jazz		
3504	0	4	ABC Country		
3505	0	5	ABC KIDS listen		
3506	0	6	ABC Canberra		666 ABC Canberra
3507	0	7	ABCRadioNational		ABCRadioNational
3508	0	8	ABC Classic		ABC Classic FM
3509	0	9	ABC Grandstand		
350A	0	10	triplej		triple j
350B	0	11	Unearthed		
350C	0	12			
350D	0	13			
350E	0	14			
350F	0	15			
3510	0	16			
3511	0	17			
3512	0	18			
3513	0	19			
3514	0	20			
3515	0	21			
3516	0	22			
3517	0	23			
3518	0	24			
3519	0	25			
351A	0	26			
351B	0	27			
351C	0	28			
351D	0	29			
351E	0	30			
351F	0	31			
3D00	0	32	SBS Radio 1	SBS	SBS Radio 1 - FM
3D01	0	33	SBS Radio 2		SBS Radio 2 - AM
3D02	0	34	SBS Chill		
3D03	0	35	SBS PopAsia		
3D04	0	38	SBS Arabic24		
3D05	0	39	SBS PopDesi		
3D06	0	36	SBS Radio 3		
3D07	0	37			
3D08	0	40			
3D09	0	41			
3D0A	0	42			
3D0B	0	43			
3D0C	0	44			
3D0D	0	45			
3D0E	0	46			
3D0F	0	47			
3D10	0	48			
3D11	0	49			
3D12	0	50			
3D13	0	51			
3D14	0	52			
3D15	0	53			
3D16	0	54			
3D17	0	55			
3D18	0	56			
3D19	0	57			
3D1A	0	58			
3D1B	0	59			
3D1C	0	60			
3D1D	0	61			
3D1E	0	62			
3D1F	0	63			

Table 11-2: Used SId, SCId, SubChId and Eld codes for Cat 3 multiplex in Canberra

### 11.1.2 DARWIN

Table 11-3 shows an example allocation of SId, SCId, SubChId and EId codes for commercial and community broadcasters Category 1 DAB+ transmission in Darwin. Table 11-4 shows the SId, SCId, SubChId and EId codes as implemented by the national broadcasters the ABC and SBS Category 3 DAB+ transmission in Darwin in December 2017.

Country Id	1		<i>Services are examples only</i>		
Eld	1340				
SId (Hex)	SCId	SubChId	Service Label	Broadcaster	AM / FM simulcast
1340	0	0	Hot 100	Grant Broadcasters	Hot 100
1341	0	1	Mix 104.9		Mix 104.9
1342	0	2	Kix Country		
1343	0	3	Classic Rock Digital		
1344	0	4	RadioTAB		
1345	0	5			
1346	0	6			
1347	0	7			
1348	0	8			
1349	0	9			
134A	0	10			
134B	0	11			
134C	0	12			
134D	0	13			
134E	0	14			
134F	0	15			
1350	0	16			
1351	0	17			
1352	0	18			
1353	0	19			
1354	0	20			
1355	0	21			
1356	0	22			
1357	0	23			
1358	0	24			
1359	0	25			
135A	0	26			
135B	0	27			
135C	0	28			
135D	0	29			
135E	0	30			
135F	0	31			
1360	0	32		Rfu	
1361	0	33			
1362	0	34			
1363	0	35			
1364	0	36			
1365	0	37			
1366	0	38			
1367	0	39			
1368	0	40			
1369	0	41			
136A	0	42			
136B	0	43			
136C	0	44			
136D	0	45			
136E	0	46			
136F	0	47			
1370	0	48	Radio Larrakia	Community	Radio Larrakia
1371	0	49	97 seven		97 seven
1372	0	50	Territory		Territory
1373	0	51			
1374	0	52			
1375	0	53			
1376	0	54			
1377	0	55			
1378	0	56			
1379	0	57			
137A	0	58			
137B	0	59			
137C	0	60			
137D	0	61			
137E	0	62			
137F	0	63			

Table 11-3: Example SId, SCId, SubChId and Eld codes for Cat 1 multiplex in Darwin

Country Id	3		<i>Services are on-air</i>		
Eld	3600				
SId (Hex)	SCId	SubChId	Service Label	Broadcaster	AM / FM simulcast
3600	0	0		ABC	
3601	0	1	ABC News		ABCNewsRadio
3602	0	2	Double J		
3603	0	3	ABC Jazz		
3604	0	4	ABC Country		
3605	0	5	ABC KIDS listen		
3606	0	6	ABC Darwin		ABC Radio Darwin
3607	0	7	ABCRadioNational		ABCRadioNational
3608	0	8	ABC Classic		ABC Classic FM
3609	0	9	ABC Grandstand		
360A	0	10	triplej		triple j
360B	0	11	Unearthed		
360C	0	12			
360D	0	13			
360E	0	14			
360F	0	15			
3610	0	16			
3611	0	17			
3612	0	18			
3613	0	19			
3614	0	20			
3615	0	21			
3616	0	22			
3617	0	23			
3618	0	24			
3619	0	25			
361A	0	26			
361B	0	27			
361C	0	28			
361D	0	29			
361E	0	30			
361F	0	31			
3E00	0	48	SBS Radio 1	SBS	SBS Radio 1 - FM
3E01	0	49	SBS Radio 2		SBS Radio 2 - AM
3E02	0	34	SBS Chill		
3E03	0	35	SBS PopAsia		
3E04	0	38	SBS Arabic24		
3E05	0	39	SBS PopDesi		
3E06	0	36	SBS Radio 3		
3E07	0	32			
3E08	0	33			
3E09	0	37			
3E0A	0	40			
3E0B	0	41			
3E0C	0	42			
3E0D	0	43			
3E0E	0	44			
3E0F	0	45			
3E10	0	46			
3E11	0	47			
3E12	0	50			
3E13	0	51			
3E14	0	52			
3E15	0	53			
3E16	0	54			
3E17	0	55			
3E18	0	56			
3E19	0	57			
3E1A	0	58			
3E1B	0	59			
3E1C	0	60			
3E1D	0	61			
3E1E	0	62			
3E1F	0	63			

Table 11-4: Used SId, SCId, SubChId and Eld codes for Cat 3 multiplex in Darwin



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### 11.1.3 HOBART

Table 11-5 shows an example allocation of SId, SCId, SubChId and EId codes for commercial and community broadcasters Category 1 DAB+ transmission in Hobart. Table 11-6 shows the SId, SCId, SubChId and EId codes as implemented by the national broadcasters the ABC and SBS Category 3 DAB+ transmission in Hobart in March 2018.

Country Id	1		<i>Services are examples only</i>		
Eld	1380				
Sid (Hex)	SCld	SubChId	Service Label	Broadcaster	AM / FM simulcast
1380	0	0	7HO	<b>Grant Broadcasters</b>	7HO
1381	0	1	G-Digital 1		
1382	0	2	G-Digital 2		
1383	0	3	G-Digital 3		
1384	0	4			
1385	0	5			
1386	0	6			
1387	0	7			
1388	0	8			
1389	0	9			
138A	0	10			
138B	0	11			
138C	0	12			
138D	0	13			
138E	0	14			
138F	0	15			
1390	0	16	Hit 100.9	<b>SCA</b>	Hit 100.9
1391	0	17	TripleM		TripleM
1392	0	18	S-Digital 1		
1393	0	19	S-Digital 2		
1394	0	20			
1395	0	21			
1396	0	22			
1397	0	23			
1398	0	24			
1399	0	25			
139A	0	26			
139B	0	27			
139C	0	28			
139D	0	29			
139E	0	30			
139F	0	31			
13A0	0	32		<b>Rfu</b>	
13A1	0	33			
13A2	0	34			
13A3	0	35			
13A4	0	36			
13A5	0	37			
13A6	0	38			
13A7	0	39			
13A8	0	40			
13A9	0	41			
13AA	0	42			
13AB	0	43			
13AC	0	44			
13AD	0	45			
13AE	0	46			
13AF	0	47			
13B0	0	48	Edge Radio	<b>Community</b>	Edge Radio
13B1	0	49	ultra 106five		ultra 106five
13B2	0	50	RPH		RPH
13B3	0	51	Hobart FM		Hobart FM
13B4	0	52			
13B5	0	53			
13B6	0	54			
13B7	0	55			
13B8	0	56			
13B9	0	57			
13BA	0	58			
13BB	0	59			
13BC	0	60			
13BD	0	61			
13BE	0	62			
13BF	0	63			

Table 11-5: Example SId, SCId, SubChId and Eld codes for Cat 1 multiplex in Hobart

Country Id	3		<i>Services are on-air</i>		
Eid	3700				
Sid (Hex)	SCId	SubChId	Service Label	Broadcaster	AM / FM simulcast
3700	0	0		ABC	
3701	0	1	ABC News		ABCNewsRadio
3702	0	2	Double J		
3703	0	3	ABC Jazz		
3704	0	4	ABC Country		
3705	0	5	ABC KIDS listen		
3706	0	6	ABC Hobart		ABC Radio Hobart
3707	0	7	ABCRadioNational		ABCRadioNational
3708	0	8	ABC Classic		ABC Classic FM
3709	0	9	ABC Grandstand		
370A	0	10	triplej		triple j
370B	0	11	Uearthed		
370C	0	12			
370D	0	13			
370E	0	14			
370F	0	15			
3710	0	16			
3711	0	17			
3712	0	18			
3713	0	19			
3714	0	20			
3715	0	21			
3716	0	22			
3717	0	23			
3718	0	24			
3719	0	25			
371A	0	26			
371B	0	27			
371C	0	28			
371D	0	29			
371E	0	30			
371F	0	31			
3F00	0	58	SBS Radio 1	SBS	SBS Radio 1 - FM
3F01	0	59	SBS Radio 2		SBS Radio 2 - AM
3F02	0	34	SBS Chill		
3F03	0	35	SBS PopAsia		
3F04	0	38	SBS Arabic24		
3F05	0	39	SBS PopDesi		
3F06	0	36	SBS Radio 3		
3F07	0	32			
3F08	0	33			
3F09	0	37			
3FOA	0	40			
3FOB	0	41			
3FOC	0	42			
3FOD	0	43			
3FOE	0	44			
3FOF	0	45			
3F10	0	46			
3F11	0	47			
3F12	0	48			
3F13	0	49			
3F14	0	50			
3F15	0	51			
3F16	0	52			
3F17	0	53			
3F18	0	54			
3F19	0	55			
3F1A	0	56			
3F1B	0	57			
3F1C	0	60			
3F1D	0	61			
3F1E	0	62			
3F1F	0	63			

Table 11-6:Used Sid, SCId, SubChId and Eid codes for Cat 3 multiplex in Hobart

## 11.2 Example allocations for regional LAs

The central database of SId/EId codes will be updated as new multiplexes are established, see [www.codes.drba.com.au](http://www.codes.drba.com.au).

----- **End of Document** -----