



**Australian
Broadcasting
Authority**

**THE ABA's
GENERAL APPROACH TO
DIGITAL TERRESTRIAL TELEVISION
BROADCASTING PLANNING**

AS VARIED APRIL 2002

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1 GLOSSARY OF ACRONYMS

ABA	Australian Broadcasting Authority
ABC	Australian Broadcasting Corporation
ACA	Australian Communications Authority
BSB	Broadcasting Services Bands
COFDM	Coded orthogonal frequency division multiplexing
CTC	Commercial Television Conversion (Scheme)
DCITA	Department of Communication, Information Technology and the Arts
DCA	Digital Convergence Australia
DCP	Digital Channel Plan
DTCPCG	Digital Television Channel Planning Consultative Group
DTTB	Digital Terrestrial Television Broadcasting
ERP	Effective Radiated Power
FACTS	Federation of Australian Commercial Television Stations
HDTV	High Definition Television
LAP	Licence Area Plan (Analog Television)
NTA	National Transmission Agency
NTC	National Television Conversion (Scheme)
PAL	Phase alternating line (current Australian analog transmission standard)
RF	Radio frequency
SBS	Special Broadcasting Service
SFN	Single Frequency Network
VCR	Videocassette recorder
VHF	Very High Frequency (30-300 MHz / includes channels 0-12 / Bands I, II and III)
UHF	Ultra High Frequency (300-3000 MHz / includes channels 28-69 / Bands IV and V)
SDTV	Standard Definition Television
CTC	Commercial Television Conversion Scheme
NTC	National Television Conversion Scheme

2 HOW TO USE THIS BOOK

The ABA's General Approach to Digital Terrestrial Television Broadcasting Planning – As Varied April 2002 should be used as a companion to the following:

- terrestrial television digital channel plans (DCPs) for Australia;
- the discussion and explanatory papers accompanying the draft and final DCPs; and
- the *Digital Terrestrial Television Broadcasting Planning Handbook – As Varied April 2002 (DTTB Planning Handbook)*¹, which provides the technical guidelines for planning television services.

The ABA's General Approach to Digital Terrestrial Television Broadcasting Planning – As Varied April 2002 outlines the decision-making processes that the ABA has used in determining the DCPs for digital terrestrial television broadcasting (DTTB) in Australia. The discussion and explanatory papers accompanying draft and final DCPs outlines the ABA's reasons and assumptions underpinning its preliminary views and decisions in particular markets.

COMMENTS

The Australian Broadcasting Authority (ABA) welcomes feedback on the content or format of its publications.

Comments on *The ABA's General Approach to Digital Terrestrial Television Broadcasting Planning – As Varied April 2002* may be made to the ABA as follows:

by email: digital@aba.gov.au

by mail: The ABA's General Approach to Digital Terrestrial Television
Broadcasting Planning - As Varied April 2002
Australian Broadcasting Authority
PO Box 34
BELCONNEN ACT 2616

by fax: (02) 6253 3277

¹ *Digital Terrestrial Television Broadcasting Planning Handbook – As Varied April 2002* Australian Broadcasting Authority (<http://www.aba.gov.au/tv/digitaltv/planning/handbook.htm>).

3 THE ABA'S GENERAL APPROACH TO DIGITAL PLANNING

3.1 OVERVIEW OF THE PLANNING PROCESS

Schedule 4 to the *Broadcasting Services Act 1992* ('the Act') sets out arrangements for the conversion, over time, of the transmission of television broadcasting services from analog mode to digital mode. Under the arrangements, the ABA is required to formulate two schemes for conversion – a commercial television conversion scheme, and a national television conversion scheme.

The ABA formulated the Commercial Television Conversion (CTC) Scheme in March 1999. The Scheme commenced on 9 June 1999. The ABA varied the CTC Scheme on 21 December 2000. The ABA formulated the National Television Conversion Scheme (NTC) Scheme in December 1999. It was approved by the Minister for Communications, Information Technology and the Arts on 2 February 2000, and commenced on that date. The Minister approved a variation to this scheme on 20 December 2000.

Under both schemes, the ABA must make digital channel plans that allot additional channels to broadcasters so as to enable them to transmit programs in analog and digital modes during a simulcast period.

The policy objectives to Schedule 4 of the Act (subclauses 6(3) and 19(3)) and the general principles to which the ABA has regard in preparing a DCP are discussed below.

All technical and general assumptions considered by the ABA are set out in the *DTTB Planning Handbook – As Varied April 2002*.

3.2 PLANNING CRITERIA

The DCPs are prepared having regard to the policy objectives set out in subclauses 6(3) and 19(3) of Schedule 4 to the Act, including the matters mentioned in sections 9 of both the CTC and NTC Schemes, (see the Legislative Framework at **Appendix 1**). The ABA also taken regard of the technical assumptions set out in the *DTTB Planning Handbook – As Varied April 2002*.

3.2.1 Policy Objectives of the Broadcasting Services Act 1992

- *The ABA must have regard to the policy objectives of the Commercial Television Conversion Scheme and the National Television Conversion Scheme mentioned in subclauses 6(3) and 19(3) of Schedule 4 to the Broadcasting Services Act 1992.*

The policy objectives in subclause 6(3) (a) to (n), relevant to the preparation of a DCP, are summarised below with comments on the extent to which each objective has been achieved.

Note that subclauses (h), (ha), (i), (k) and (m) are not considered relevant to the digital channel planning process.

- Subclauses 6(3)(a), (b) and (c):

The policy objectives of the CTC Scheme state that:

- *transmissions are required to commence in Standard Definition Television (SDTV) digital mode on 1 January 2001 in metropolitan areas, and on a date to be determined by the ABA between 1 January 2001 and 1 January 2004 in regional areas; and*
- *there is to be a simulcast period of 8 years or longer in each area.*

The policy objectives of the NTC Scheme state that:

- *transmissions are required to commence in SDTV digital mode by a date as is ascertained in accordance with an implementation plan that was given by the broadcaster;*
- *there is to be a simulcast period to begin by such date as is ascertained in accordance with an implementation plan.*

At an early stage in the conversion process, consultations with broadcasters revealed that they required certainty about channel allotments at least 18 months before digital transmissions were scheduled to commence. This required the ABA to finalise all relevant parts of the DCP in mid-1999 to ensure the broadcasters sufficient time to procure equipment, establish transmission facilities and carry out testing. DCPs for metropolitan areas were varied in 2000 to include digital channel allotments for repeaters in the markets.

Commercial and national broadcasters commenced digital transmissions at the main transmission sites in the metropolitan markets on 1 January 2001.

The ABA is now undertaking the planning of digital television services in the regional areas of Australia.

- Subclauses 6(d):

- *Broadcasters should be authorised to use one or more additional channels to transmit their services in digital mode in an area.*

In assigning digital channels to existing commercial and national analog broadcasters, the DCPs meet this policy objective.

- Subclauses 6(e):

- *The additional channels should occupy the same amount of bandwidth as the channels currently used by broadcasters to transmit in analog mode in an area.*

All additional channels allotted to broadcasters in the DCPs occupy 7 MHz, the same bandwidth as channels used for analog transmissions.

- Subclauses 6(f) and (j):

- *Transmissions in SDTV digital mode should achieve the same level of coverage and potential reception quality as transmissions in analog mode as soon as is practicable.*

The ABA has prepared the *DTTB Planning Handbook* in consultation with existing and potential broadcasters and relevant Government agencies.

The Handbook provides broadcasters and planners with:

- a methodology for achieving the 'same level of coverage,' with discussion on the technical basis for determining the methodology;
- general and technical assumptions required to meet the legislative requirements outlined in the commercial and national conversion schemes; and
- an explanation of the technical planning processes involved in planning new digital television services, as well as the conversion of existing analog television services.

- Subclauses 6(g):

- *During the simulcast period there should, as far as is practicable, be co-location of transmitters used for analog and digital transmissions.*

The DCPs have been developed on the assumption that existing analog sites will be used for digital transmissions as far as practicable. In drawing up channel-planning options for the ABA to consider, the Digital Television Channel Planning Consultative Group (DTCPCG) assumed that digital services would operate from the same main sites as used for analog transmission.

- Subclauses 6(l):

- *The ABA is to consult broadcasters about the implementation of the scheme.*

Existing broadcasters convened a Federation of Australian Commercial Television Stations (FACTS) Specialist Group, originally called the Spectrum Planning Committee, with the aim of developing a DCP for Australia. The Group originally did not include representatives from the subscription television industry, potential new broadcasters, narrowcasters or the Australian Communications Authority (ACA).

At the Spectrum Planning Committee's meeting of 28 August 1998, the ABA proposed the Committee expand to represent the broader industry and become an advisory group reporting to the ABA, which was renamed the DTCPCG.

The DTCPCG now includes representatives from the ABA, metropolitan and regional commercial and national broadcasters, Transmission Facility Providers, the ACA, Pay TV operators, potential datacasters and FACTS.

The role of the DTCPCG is as follows:

to advise and make recommendations to the ABA on the development of the Digital Channel Plans. The Group will also advise the ABA on some of the general technical assumptions, which it may take into account in developing the Digital Channel Plans.

The DTCPCG has prepared several digital television channel planning options for the ABA's consideration. In order to do this, the DTCPCG adopted the following broad planning parameters and assumptions.

Table 2: DTCPCG Planning Parameters and Assumptions

- | |
|---|
| <ol style="list-style-type: none">1. The DCP is to be developed on the basis of matching PAL coverage for a minimum of six DTV services, plus any additional requirements identified by the ABA for datacasting;2. The DCP is to be developed on the basis of power levels required after the end of transition (ie after analog is turned off);3. The DCP is to be completed in a time-frame which permits digital broadcasting to commence by the dates specified in the 24 March 1998 statement by the Minister for Communications, the Information Economy and the Arts.²4. The DCP is to be based on capacity required to provide HDTV to the edge of the licence area (assumed approx 19.3 Mbit/s capacity) and overspill at the boundary addressed;5. National services should assume licence area boundaries matching those for commercials; |
|---|

² Senator the Hon Richard Alston, Minister for Communications, the Information Economy and the Arts, op.cit.

6. The modulation mode used for planning should be that used for test transmissions for the field tests in Sydney, although the 8k COFDM modulation system may need to be employed for some SFNs if required;
7. The DCP should generally be based on UHF in regional areas; however, it should indicate if there is a Band III digital option available where there are existing VHF analog stations;
8. Planning should initially assume use of the same main transmission sites as used for analog;
9. Digital television channel allocations should aim for services being either adjacent or in the same band as the related analog television service; and
10. The DCP is to be developed on the basis of allotting Band III channels to existing metropolitan broadcasters in the five mainland State capital cities to the extent possible.

The DTCPCG created sub-groups to consider digital channel planning options for each area. These sub-groups developed options for each of draft DCPs, which were then circulated for submissions. The plans were then redrafted for consideration and final determination by the ABA, the body with ultimate responsibility for the DCPs.

3.2.2 General Principles

In addition to the policy objectives of subclauses 6(3) and 19(3) of Schedule 4 to the Act, the ABA has developed some general principles to which it has regard in preparing a DCP. Some of these are included within the matters that the ABA must and may have regard to under section 9 of both the CTC and NTC Schemes. Others are policy objectives specifically identified by the ABA and should be considered as 'other matters that the ABA considers relevant' in accordance with subsection 9(8) of both the CTC and NTC Schemes. The weight to be given to each of these matters will vary from case to case.

The ABA considers the following policy objectives relevant, in no particular order:

- To ensure efficient use of the spectrum;
- To maximise the efficiency and competitiveness of the broadcasting industry;
- To minimise interference to analog channels;
- To minimise the likely cost and disruption to consumers;
- To minimise the likely cost to the broadcasting industry and the operators and owners of transmission towers;
- Analog TV channels are only to be moved on the condition that there is no direct cost to the viewers concerned and only after full consultation with those viewers and other appropriate bodies and persons, for example the relevant members of Parliament;
- No person's viewing of (or method of access to) a commercial or national television broadcasting service should be removed or otherwise significantly degraded within any licence area.

- Existing VHF broadcasters should, as far as possible, be treated equality in each market; and
- Subject to identifying adequate spectrum for conversion of existing analog services, spectrum should be planned on the basis of maximising the number of 7 MHz channels in any market.

- Efficient Use of Broadcasting Spectrum
(subsections 9(2) – CTC and NTC Schemes)

The relevant matters in subsection 9(2) of the CTC Scheme:

- *The ABA must have regard to the need to plan the most efficient use of the spectrum for broadcasting services or other uses, including the need for spectrum to be made available for allocation for the purposes of the transmission of datacasting services under, and in accordance with the conditions of, datacasting licences.*

The relevant matters in subsection 9(2)(a) of the NTC Scheme:

- *The ABA must have regard to the most efficient use of the spectrum*

This includes such matters as:

- the use of previously 'forbidden' channels (for example, adjacent channels to existing analog channels);
- the use of single frequency networks (SFNs) where appropriate, given current technical knowledge;
- not using VHF Band I for digital transmissions due to susceptibility to electrical noise;
- not using VHF Band II, as this is heavily used by FM radio services;
- not using channel 5A of VHF Band III, to comply with international radiofrequency allocations;
- not using channel 9A in some areas because many existing channel 10 services were assigned according to a now-superseded channel arrangement. Channel 9A is only available in these areas as a 6 MHz channel, until after analog services cease operation on channel 10;
- where possible, avoiding the use of channels 68 and 69, at the request of the ACA; and
- the use of digital channels in the same grouping as existing analog channels in an area, as far as possible.

The ABA seeks to maximise the number of channels available across all markets, balanced against other objectives. However, different numbers of additional services, or no additional services at all, may be possible in particular areas.

The internationally recognised UHF broadcasting spectrum for the Asia-Pacific region spans 392 MHz (470 to 862 MHz) allowing the use of forty-nine UHF Band IV and V channels with a television channel bandwidth of 8 MHz. However, in Australia the spectrum allocated for television broadcasting in the UHF Band is limited to 300 MHz

(520-820 MHz). In order to partly compensate for the limited UHF television spectrum made available for broadcasting in Australia, 7 MHz bandwidth channels are used, thereby permitting the use of forty-two 7 MHz channels.

Analog television services are transmitted on VHF (channels 0-12) and UHF (channels 28-69). Channels are grouped into three bands within VHF and two bands within UHF as follows:

- VHF Band I: channels 0-2
- VHF Band II: channels 3-5
- VHF Band III: channel 5A (137-144 MHz)
channels 6-12 (174-230 MHz)
- UHF Band IV: channels 28-35
- UHF Band V: channels 36-69

The parts of the broadcasting services bands suitable for digital use are Bands III, IV and V, which comprise VHF channels 5A (137-144 MHz), 6 to 12 (174-230 MHz) and UHF channels 28 to 69 (526-820 MHz).

- Channels in Band I (VHF channels 0, 1 and 2) are not considered suitable for digital transmissions, as they are susceptible to interference from electrical noise. It is possible that advances in digital broadcasting may make Band I useable some time in the future.
- Channels in Band II (VHF channels 3, 4 and 5) are within the spectrum used for FM radio in Australia and, therefore, are generally not available for digital television services.
- Channel 5A in Band III is suitable for digital transmissions, although no new television services will be planned using channel 5A as the channel has been internationally allocated to other services, including space services and low earth orbiting satellites.
- Channels 9A and 12 have only recently become available to broadcasters, following the closure of radionavigation services that once used this spectrum.
- In areas where channel 10 is used for analog services, channel 9A is a 6 MHz channel (202-208 MHz) due to the alignment of existing channel 10 services (208-215 MHz) with a now-superseded channel arrangement. Channel 9A is, therefore, not suitable for transmitting commercial and national digital television services in such areas.
- Channel 12 has only recently become available for transmitting television services. No analog services are currently transmitted on channel 12. It is a clear channel, which should be used for digital services wherever possible in order to make most efficient use of available spectrum.

The UHF analog television allotment plan is generally based on the use of Band IV channels for wide coverage services and Band V channels for translators and gap-fillers to complement the wide coverage VHF/UHF services. However, there are significant exceptions, where Band V has been used for wide coverage services. The same premise is generally being used in the planning of digital television services.

- Exploitation of VHF and UHF Transmission Characteristics

(subsections 9(8) – CTC and NTC Schemes)

- *The ABA may also have regard to other matters it considers relevant.*

There is imperfect knowledge about digital television coverage at this stage. Neither VHF nor UHF is inherently preferable - both have different characteristics, which may result in greater spectrum efficiency depending on various conditions:

Table 1: Characteristics of VHF and UHF

VHF	UHF
<ul style="list-style-type: none"> • Propagation characteristics may provide better signal coverage past obstacles such as rough terrain, heavy vegetation and buildings. • Larger coverage can result in spectrum efficiency, through use of fewer transmitters. • VHF receive and transmit antennas: <ul style="list-style-type: none"> - are physically larger than UHF antennas; - in high signal level areas an outdoor receive antenna may not be needed due to lower signal losses in penetrating buildings; and - Have broader beam width, and therefore receive ‘ghosting’ and unwanted signals. - VHF receive antennas have larger ‘effective area’ and require lower field strength for reception. • Possibility of second harmonic interference from FM radio. • VHF TV receivers have lower “noise figure” 	<ul style="list-style-type: none"> • Not as susceptible to artificial noise. • Line-of-sight propagation. • Spectrum efficiency may be improved as ‘reuse distance’ is less than that of VHF • UHF receive antennas have advantages over VHF receive antennas as they: <ul style="list-style-type: none"> - are less expensive; - are smaller (with less environmental impact); - have higher gain and better directivity to reject unwanted signals; and - present a lower wind profile in cyclonic areas. • No second harmonic interference from FM radio. • UHF TV receivers have higher “noise figure”

- Digital Interference with Existing Analog Transmissions

(subsections 9(6) – CTC and NTC Schemes)

- *The ABA may also have regard to any interference that digital transmission using a particular channel is likely to cause to analog transmission.*

An important objective of both the DTCPCG and the ABA in developing the DCPs is to avoid, as far as possible, interference between digital and analog transmissions.

Interference criteria are set out the *DTTB Planning Handbook – As Varied April 2002*.

It is important to note that there is imperfect knowledge about the interference characteristics of digital signals and, consequently, about the potential for interference between digital and analog services. This knowledge will improve as more digital tests are carried out.

In the ABA's judgement, in view of the tight timetable for implementing digital conversion, digital channel planning should proceed on the basis of current knowledge about digital signal characteristics. At the same time, the ABA recognises that revisions to the DCP may be required at a later stage as the results of digital tests become available.

- Cost and Disruption to Consumers

(subsections 9(5) - CTC and NTC Schemes)

- *The ABA may also have regard to the likely cost, and disruption, to consumers caused by having to receive commercial and national television broadcasting services in digital mode using allotted channels.*

As far as possible, digital channels have been allotted in such a way as to minimise costs to consumers. When allotting channels for a market, particular attention is given to ensuring that, as far as possible, consumers would not be required to purchase an additional receive antenna.

Analog television services are transmitted on VHF (channels 0-12) and UHF (channels 28-69). Channels are grouped into three bands within VHF and two bands within UHF (as shown above). In some markets, all television services are only on VHF or only on UHF; in other markets, both VHF and UHF are used.

In order to receive the best television reception, consumers require an antenna or antennas that correspond to the channel band or bands being used in their market. For example, if television services are being transmitted on channels 2, 7, 9, 10 and 28 in a particular market then, in theory, consumers might need to purchase three antennas – a VHF Band I antenna, a VHF Band III antenna and a UHF Band IV antenna. In practice, however, consumers may find that an adequate picture can be obtained using only two antennas, or a combined Band I/III/IV antenna.

The polarity of transmissions in a market can affect the cost of receive antennas. In a particular market, for example all services in a band might be transmitted in horizontal polarity only, or vertical polarity only. Other markets may use a mix of polarities.

For example, in the Canberra market, analog services in Band III are transmitted with vertical polarity and analog services in Band IV are transmitted with horizontal polarity. In this case, consumers may need to purchase a special receive antenna with both horizontal and vertical crosspieces.

The directional alignment of receive antennas is also an important consideration. Co-location of transmitters, used to provide analog and digital services in an area, will mean that consumers can use a single receive antenna or antennas towards a single transmit site for analog and digital reception. Transmission from different locations will require many consumers to purchase an additional antenna.

Antennas capable of receiving analog transmissions will also be capable of receiving digital transmissions, provided that channels allotted for digital transmissions are in the same or nearby band, are transmitted in the same polarity as analog transmissions and provided also that analog and digital transmitters are co-located.

As noted above, the DTCPCG's planning parameters and assumptions included statements that digital television channel allocations should aim for services being either adjacent or in the same band as the related analog television service, and that analog and digital transmitters are co-located.

The ABA acknowledges that channels 36, 37 and 38 are often default RF output channels for Video Cassette Recorders (VCRs) and ancillary devices, such as Pay-TV set top boxes. Devices such as VCRs can be connected to a television in a number of ways. One of which is to use a radio frequency (RF) output channel. VCRs typically have an RF output channel preset to channel 36, 37 or 38. Use of these channels for broadcasting services can result in interference to the television's reception of the VCR or ancillary device output. However, in some instances, the ABA needs to utilise these channels for digital television services to achieve the best possible overall outcomes for the public. Such interference can be overcome reasonably simply, and at no cost, by viewers following the instruction manuals for the VCR (or other ancillary device) and television to tune in an alternative channel. However, before viewers can do this they need to be aware of what is causing the interference, and it is therefore necessary for broadcasters to run a public information and education campaign about the possibility of interference and how it can be solved. Several such campaigns have already been conducted in a number of areas with good results.

It should be stressed that the possibility of interference to VCRs and Pay-TV set top boxes is not limited to channels 36, 37 and 38 as these devices may already have been re-tuned or may have been supplied on different default channels. Accordingly, the ABA's Interference Management Scheme (Part 7 of the Technical Planning Guidelines³) requires broadcasters to conduct information campaigns when commencing digital services on any channel. Prior to digital services commencing in a market, the ABA will prepare detailed advice on channel options for retuning VCRs and other ancillary equipment. The ABA, broadcasters, FACTS and Digital Broadcasting Australia (DBA) may provide timely information on alternative connection methods and how to retune devices to alternative RF channels

- Costs to Broadcasting Industry

(subsections 9(4) – CTC and NTC Schemes)

- *The ABA may also have regard to the cost to holders, national broadcasters, tower owners, tower operators and site operators, of:*
 - (a) *allotting particular channels; and*
 - (b) *digital transmission using the channels.*

³ The ABA's *Technical Planning Guidelines* are available for viewing at <http://www.aba.gov.au/radio/licensing/tpg/index.htm>

In the DCPs, channels have been allotted, to the maximum extent possible, in such a way as to minimise costs to the broadcasting industry and related parties. Broadcasters have been assigned channels in the DCP that maximise their capacity to use existing infrastructure, such as transmitting antennas, sites and towers.

In metropolitan markets, where possible, broadcasters who transmit an analog service on VHF were allotted VHF channels for their digital service and, similarly, broadcasters that transmit an analog service on UHF were allotted UHF channels for their digital service. In this way, some broadcasters will be able to use standby transmitters for their digital services, while others may be able to use existing antennas to transmit services in both analog and digital mode.

In developing DCPs, the ABA assumes that digital coverage from existing sites will ultimately match analog coverage from those sites, thereby minimising the need to establish permanent additional sites for transmission of digital services.

During the simulcast period, it will be necessary in some instances to operate digital services at lower power to reduce interference with existing analog services. In such cases, it may be necessary to establish temporary transmission facilities to meet the policy requirement to achieve equivalent digital coverage as soon as practicable after the start of the simulcast period.

Use of some digital channels may depend on the digital assignee taking responsibility for public interest considerations of changes to existing analog transmissions. Assignment of the digital channel may depend on these analog transmission and reception issues being adequately addressed by the licensee. This may require the digital broadcaster to bear some or all of the cost of installing new analog transmission facilities and providing assistance to viewers with any necessary consequential re-tuning of domestic TV receivers or changes to domestic receive antennas. This would be necessary to overcome interference caused by the new digital service and to ensure continued analog reception during the simulcast period.

The ABA has the power to impose conditions on a broadcaster's television broadcasting licence and/or transmitter licence(s), so as to require a licensee to discharge its responsibilities in this regard. In considering whether to impose any such conditions, the ABA would have regard to any agreements reached between broadcasters about such matters and any undertakings made to the ABA.

- Channel Assignment Guidelines

(subsections 9(8) – CTC and NTC Schemes)

- *The ABA may also have regard to other matters it considers relevant.*

In the DCPs, channel assignments to broadcasters are in accordance with the following channel assignment guidelines. These guidelines are intended as a starting point and may be varied depending on particular circumstances.

Table 3: Channel Assignment Guidelines

The guidelines will be applied in the order given below:

- If the lower adjacent channel to an analog service is available for digital use, then that channel is to be assigned to the broadcaster operating the analog service. If this channel is not available; and then
- If the upper adjacent channel to an analog service is available for digital use, then that channel is to be assigned to the broadcaster operating the analog service. If neither the lower nor the upper adjacent channels are available; and then
- Remaining channels are then assigned by assigning the lowest available digital channel to the broadcaster operating the analog service with the lowest channel and each channel is then assigned in turn by increasing channel number.

If, in any DCP, the use of SFNs is proposed, the ABA will give consideration to a range of factors in assigning digital channels, applying the above steps where appropriate.

The ABA's adoption of the above guidelines does not preclude the ABA from deciding on different assignments, on a case-by-case basis, in any given area.

The ABA's July 1999 channel assignment guidelines were framed in the context of the metropolitan markets where the ABC and three commercial broadcasters operate on VHF, and SBS operates on UHF. The reasoning underpinning the guidelines adopted in July 1999 is set out in *the ABA General Approach to Digital Terrestrial Television Broadcasting Planning - July 1999 - Channel Assignment Guidelines Explanatory Paper, Appendix 1*.

Given that digital television planning has been completed in metropolitan markets, the channel assignment guidelines have been varied (April 2002) to the affect of removing the reference in the last part of the last criteria 'although where sufficient channels are available, a broadcaster's digital channel should be in the same band as their analog service (VHF Bands I and II excepted).'

At the main transmitter sites in regional markets, two broadcasters operate in the VHF band, and the remainder in the UHF band. The channel assignment guidelines have been varied because in regional markets where four VHF channels are allotted, it would leave two VHF services unassigned to broadcasters.

4 APPENDIX 1 - THE LEGISLATIVE FRAMEWORK

PART 2 – COMMERCIAL TELEVISION

6 Commercial television conversion scheme

- (1) As soon as practicable after the commencement of this clause, the ABA must, by writing, formulate a scheme (the **commercial television conversion scheme**) for the conversion, over time, of the transmission of commercial television broadcasting services from analog mode to digital mode.
- (2) The commercial television conversion scheme is to be divided into the following Parts:
 - (a) Part A, which is to deal with licence areas that are not remote licence areas;
 - (b) Part B, which is to deal with remote licence areas.

Policy objectives

- (3) Part A of the commercial television conversion scheme must be directed towards ensuring the achievement of the following policy objectives:
 - (a) the objective that each holder of a commercial television broadcasting licence for a metropolitan licence area is required to commence transmitting the commercial television broadcasting service concerned in SDTV digital mode in that area on 1 January 2001;
 - (b) the objective that each holder of a commercial television broadcasting licence for a regional licence area is required to commence transmitting the commercial television broadcasting service concerned in SDTV digital mode in that area by such date during the period:
 - (i) beginning on 1 January 2001; and
 - (ii) ending immediately before 1 January 2004;as the ABA determines under the scheme;
 - (c) the objective that there should be a transitional period for a licence area, that is:
 - (i) to be known as the **simulcast period**; and
 - (ii) to run for 8 years or for such longer period as is prescribed in relation to that area; and
 - (iii) in the case of a metropolitan licence area—to begin on 1 January 2001; and
 - (iv) in the case of a regional licence area—to begin on the date determined in relation to that area in accordance with paragraph (b);throughout which the holder of a commercial television broadcasting licence for that area is required to transmit simultaneously the commercial television broadcasting service concerned in both analog mode and SDTV digital mode in that area;
 - (d) the objective that, throughout the simulcast period for a licence area, the holder of a commercial television broadcasting licence for that area should be authorised, under one or more transmitter licences, to use one or more additional channels to transmit the commercial television broadcasting

- service concerned in digital mode in that area;
- (e) the objective that each additional channel should occupy 7 MHz of bandwidth;
 - (f) the objective that, as soon as is practicable after the start of the simulcast period for a licence area, and throughout the remainder of that period, the transmission of a commercial television broadcasting service in SDTV digital mode in that area should achieve the same level of coverage and potential reception quality as is achieved by the transmission of that service in analog mode in that area;
 - (g) the objective that, during the simulcast period for a licence area, there should, as far as is practicable, be co-location of:
 - (i) transmitters used by the holder of a commercial television broadcasting licence for that area to transmit the commercial television broadcasting service concerned in digital mode in that area; and
 - (ii) transmitters used by the holder to transmit that service in analog mode in that area;
 - (h) the objective that, at the end of the simulcast period for a licence area, all transmissions of commercial television broadcasting services in analog mode in that area are to cease;
 - (ha) the objective that, after the end of the simulcast period for a licence area, each holder of a commercial television broadcasting licence for that area is to transmit the commercial television broadcasting service concerned in digital mode in that area using such channel or channels as the ABA allots under the scheme or a digital channel plan, having regard to:
 - (i) the need to plan the most efficient use of the spectrum; and
 - (ii) the other relevant policy objectives of the scheme;
 - (j) the objective that, after the end of the simulcast period for a licence area, the transmission of a commercial television broadcasting service in SDTV digital mode in that area should achieve the same level of coverage and potential reception quality as was achieved by the transmission of that service in analog mode in that area immediately before the end of that period;
 - (k) the objective that holders of commercial television broadcasting licences be permitted to use any spare transmission capacity that is available on the digital transmission channels for the purpose of the transmission of either or both of the following:
 - (i) datacasting services provided under, and in accordance with the conditions of, datacasting licences;
 - (ii) designated teletext services;
 - (l) the objective that the ABA is to consult holders of commercial television broadcasting licences about the implementation of the scheme;
 - (m) the objective that, if the implementation of the scheme affects particular broadcasting transmission towers, the ABA is to consult the owners and operators of those towers;
 - (n) the objective that, in allotting channels under the scheme or a digital channel plan, the ABA must have regard to:
 - (i) the need to plan the most efficient use of the spectrum; and
 - (ii) the other relevant policy objectives of the scheme.

PART 3—ABC/SBS TELEVISION

19 National television conversion scheme

- (1) As soon as practicable after the commencement of this clause, the ABA must, by writing, formulate a scheme (the *national television conversion scheme*) for the conversion, over time, of the transmission of national television broadcasting services from analog mode to digital mode.

Note: Under clause 32, the scheme does not take effect until approved by the Minister.

- (2) The national television conversion scheme is to be divided into the following Parts:
 - (a) Part A, which is to deal with coverage areas that are not remote coverage areas;
 - (b) Part B, which is to deal with remote coverage areas.

Policy objectives

- (3) Part A of the national television conversion scheme must be directed towards ensuring the achievement of the following policy objectives:
 - (a) the objective that each national broadcaster is required to commence transmitting the national television broadcasting service concerned in SDTV digital mode in a metropolitan coverage area by such date as is ascertained in accordance with an implementation plan that was given by the broadcaster, and is in force, under clause 20;
 - (b) the objective that each national broadcaster is required to commence transmitting the national television broadcasting service concerned in SDTV digital mode in a regional coverage area by such date as is ascertained in relation to that area in accordance with an implementation plan that was given by the broadcaster, and is in force, under clause 20;
 - (c) the objective that there should be a transitional period for a coverage area, that is:
 - (i) to be known as the *simulcast period*; and
 - (ii) to begin on the date mentioned in whichever of paragraphs (a) and (b) is applicable; and
 - (iii) to end at the end of the simulcast period (within the meaning of paragraph 6(3)(c) of this Schedule) for the licence area that corresponds to that coverage area;throughout which a national broadcaster is required to transmit simultaneously the national television broadcasting service concerned in both analog mode and SDTV digital mode in that coverage area;
 - (d) the objective that, throughout the simulcast period for a coverage area, each national broadcaster should be authorised, under one or more transmitter licences, to use one or more channels to transmit the national television broadcasting service concerned in digital mode in that area;
 - (e) the objective that each additional channel should occupy 7 MHz of bandwidth;
 - (f) the objective that, as soon as is practicable after the start of the simulcast period for a coverage area, and throughout the remainder of that period, the transmission of a national television broadcasting service in SDTV digital

- mode in that area should achieve the same level of coverage and potential reception quality as is achieved by the transmission of that service in analog mode in that area;
- (g) the objective that, during the simulcast period for a coverage area, there should, as far as is practicable, be co-location of:
 - (i) transmitters used by a national broadcaster to transmit the national television broadcasting service concerned in digital mode in that area; and
 - (ii) transmitters used by the national broadcaster to transmit that service in analog mode in that area;
 - (h) the objective that, at the end of the simulcast period for a coverage area, all transmissions of national television broadcasting services in analog mode in that area are to cease;
 - (ha) the objective that, after the end of the simulcast period for a coverage area, each national broadcaster is to transmit the national broadcasting service concerned in digital mode in that area using such channel or channels as the ABA allots under the scheme or a digital channel plan, having regard to:
 - (i) the need to plan the most efficient use of the spectrum; and
 - (ii) the other policy objectives of the scheme;
 - (j) the objective that, after the end of the simulcast period for a coverage area, the transmission of a national television broadcasting service in SDTV digital mode in that area should achieve the same level of coverage and potential reception quality as was achieved by the transmission of that service in analog mode in that area immediately before the end of that period;
 - (k) the objective that national broadcasters be permitted to use any spare transmission capacity that is available on the digital transmission channels for the purpose of the transmission of datacasting services provided under, and in accordance with the conditions of, datacasting licences or for the purpose of the transmission of national radio broadcasting services;
 - (l) the objective that the ABA is to consult with national broadcasters about the implementation of the scheme;
 - (m) the objective that, if the implementation of the scheme affects particular broadcasting transmission towers, the ABA is to consult the owners and operators of those towers;
 - (n) the objective that, in allotting channels under the scheme or a digital channel plan, the ABA must have regard to:
 - (i) the need to plan the most efficient use of the spectrum; and
 - (ii) the other relevant policy objectives of the scheme.
- (3A) The ABA must consult with national broadcasters about the implementation of the scheme.
- (4) Subclause (3) does not prevent the national television conversion scheme from allowing a national broadcaster to transmit the national television broadcasting service concerned in digital mode in a regional coverage area during the whole or a part of the period:
- (a) beginning on 1 January 2001; and
 - (b) ending immediately before the start of the simulcast period for that area;

so long as that transmission complies with such requirements as are ascertained in accordance with the scheme.

- (5) Subclause (3) does not prevent Part A of the national television conversion scheme from allowing a national broadcaster to transmit, on a test basis, the national television broadcasting service concerned in digital mode in a coverage area before the start of the simulcast period for that area, so long as that transmission:
 - (a) complies with such requirements as are ascertained in accordance with that Part of the scheme; and
 - (b) occurs during a period ascertained in accordance with that Part of the scheme.
- (5A) For the purposes of paragraphs (3)(ha) and (n), in determining the most efficient use of the spectrum, the ABA is to have regard to:
 - (a) the need for spectrum to be made available for allocation for the purposes of the transmission of datacasting services under, and in accordance with the conditions of, datacasting licences; and
 - (b) such other matters as the ABA considers relevant.
- (6) The objective mentioned in paragraph (3)(g) (which deals with co-location of transmitters) does not prevent Part A of the national television conversion scheme from making provision for the location of digital transmitters otherwise than as mentioned in that paragraph, where the ABA is satisfied that an alternative location is appropriate having regard to:
 - (a) the remaining objectives set out in subclause (3); and
 - (b) the costs that are likely to be incurred by the national broadcaster concerned; and
 - (c) such other matters (if any) as the ABA considers relevant.

COMMERCIAL TELEVISION CONVERSION SCHEME 2000

Section 9 of the Commercial Television Conversion Scheme provides the following for preparation of digital channel plans:

9 Preparing draft digital channel plan

- (1) If the ABA wishes to make a digital channel plan, it must prepare a draft version of the plan, having regard to the matters in this section.
- (2) The ABA must have regard to the need to plan the most efficient use of the spectrum for broadcasting services or other uses, including the need for spectrum to be made available for allocation for the purposes of the transmission of datacasting services under, and in accordance with the conditions of, datacasting licences.
- (3) The ABA must have regard to the policy objectives of this scheme mentioned in subclause 6(3) of Schedule 4 to the Act.
- (3A) The ABA must have regard to the objectives set out in subclause 6(5B) of Schedule 4 to the Act, for the purpose of ensuring that the digital channel plan makes arrangements for a holder that makes an election under paragraph 6(5A)(d) of that Schedule.
- (4) The ABA may also have regard to the cost, to holders, tower owners, tower operators and site operators, of:

- (a) allotting particular channels; and
 - (b) digital transmission, using the channels.
- (5) The ABA may also have regard to the likely cost, and disruption, to consumers caused by having to receive commercial television broadcasting services in digital mode using allotted channels.
 - (6) The ABA may also have regard to any interference that digital transmission using a particular channel is likely to cause to analog transmission.
 - (7) If a regional equalisation plan is in force for a particular area, the ABA may also have regard to the plan.
 - (8) The ABA may also have regard to other matters it considers relevant.

NATIONAL TELEVISION CONVERSION SCHEME 2000

Section 9 of the National Television Conversion Scheme provides the following for preparation of digital channel plans:

9 Preparing draft digital channel plan

- (1) If the ABA wishes to make a digital channel plan, it must prepare a draft version of the plan, having regard to the matters in this section.
- (2) The ABA must have regard to:
 - (a) the need to plan the most efficient use of the spectrum; and
 - (b) the relevant policy objectives in clause 19 of Schedule 4 to the Act.
- (4) The ABA may also have regard to the cost, to national broadcasters, tower owners, tower operators and site operators, of:
 - (a) allotting particular channels; and
 - (b) digital transmission, using the channels.
- (5) The ABA may also have regard to the likely cost, and disruption, to consumers caused by having to receive commercial television broadcasting services in digital mode using allotted channels.
- (6) The ABA may also have regard to any interference that digital transmission using a particular channel is likely to cause to analog transmission.
- (7) If a regional equalisation plan is in force for a particular area, the ABA may also have regard to the plan.
- (8) The ABA may also have regard to other matters it considers relevant.