



**Submission by
Free TV Australia Limited**

Australian Communications and Media
Authority

Digital television codes and standards

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EXECUTIVE SUMMARY

- In considering whether to exercise its powers under Parts 9A and 9B of the *Broadcasting Services Act 1992*, the Australian Communications and Media Authority (**ACMA**) must first identify where the market has failed to provide acceptable solutions to standardisation and technical issues in the transmission and reception of digital television broadcasting.
- Free TV Australia is confident that the existing structures for standardisation through Standards Australia and the industry managed supporting processes function effectively.
- The Standards Australia framework is supported by the development and maintenance of Operational Practices through Free TV's Engineering Committee, in consultation with the ABC and SBS.
- This framework has sufficient expertise and resources to develop standards which meet international best practice. The consultative and flexible nature of these structures allows industry to respond quickly to the constantly evolving specifications of digital broadcasting platforms.
- However, there are some key components of the digital television broadcasting chain where market-driven solutions have not eventuated specifically in relation to the performance of digital reception equipment. This is critical because the quality of digital television services as received by the viewer will be a key driver of digital take-up.
- Regulatory action is appropriate in these areas to ensure the Government's digital television policy objectives and the broadcasters' requirements are met.
- The low compliance rate of consumer electronics products with Australian digital terrestrial television broadcasting (**DTTB**) standards is a key concern and warrants regulatory action by ACMA to mandate minimum technical standards.
- Enforcing mandatory conformance to the Australian receiver standards will boost receiver performance and thus address a potential impediment to the consumer take-up of digital television receivers.
- In addition, a business model for a suitable testing and conformance service for digital television receivers is yet to be determined. Any future model will need the financial support of Government and industry.
- Minimum standards for receivers and a testing and conformance service are threshold requirements to be met before a labelling scheme for consumer electronics can be viable.
- To address the considerable difficulties faced by residents in multi-unit and high-rise apartment buildings in migrating to digital TV, owners, developers and lease holders of multiple dwelling units should be required to follow AS1367 in the installation of cabling for analog and digital services.
- The proposed framework for datacasting in Australia needs to be linked to a clearly defined set of transmission and receiver standards.

Introduction

Free TV Australia is the peak industry body representing all of Australia's commercial free-to-air television licensees.

Free TV welcomes the opportunity to comment in response to the Discussion Paper, *Digital Television – codes and standards*, released by the Australian Communications and Media Authority (**ACMA**) in December 2007. ACMA has sought comment on issues relating to the provisions under Part 9A and 9B of the *Broadcasting Services Act 1992*. Under those provisions, ACMA may determine technical standards, register industry codes and make industry standards for the transmission and reception of digital broadcasting services.

The specifications for digital television terrestrial broadcasting are constantly evolving. Regulatory intervention in the dynamic digital television environment may in some cases restrict industry's ability to quickly adapt to evolving technical developments.

In considering the possible exercise of its powers under Parts 9A and 9B of the *Broadcasting Services Act 1992*, ACMA should first:

- identify the specific areas in need of regulatory intervention;
- explain how any new code or standard would interact with existing standard-setting processes in the broadcasting chain;
- consider the possible costs to industry; and
- clearly identify the intended beneficiaries of any new code or standard.

Free TV is confident the existing structures for standardisation are working well. The Standards Australia framework and supporting processes have delivered widely supported and authoritative specifications. The Australian television broadcasting industry has participated actively in these processes.

The Standards Australia framework has delivered international 'best practice' specifications for digital television transmission and reception equipment, aerials and cabling. However, compliance is only mandatory for the digital television transmission standard at this time.

There are varying levels of compliance with non-mandatory standards. The impact of this is greatest on the viewers and compromises their ability to receive the full suite of benefits that digital television offers including sharp, clear pictures, CD quality sound and stable associated data. The quality and stability of digital services will be a key issue in driving the take-up and community acceptance of digital broadcasting in Australia.

There are other key components of the digital terrestrial television broadcasting chain where the market has failed to provide a timely and widely accepted solution and where regulatory intervention would address impediments to the take-up of digital television services. These components are directly related to the quality of digital television reception and include testing and conformance of equipment as well as the delivery of digital television to multi-unit dwellings.

This submission comments on the specific questions raised by ACMA in its discussion paper and provides comment on some additional issues.

Technical standards (Part 9A of the *Broadcasting Services Act 1992*)

1. Which organisation(s) have the expertise and representation resources to participate in the development of technical standards relevant to digital terrestrial television broadcasting?

Free TV endorses the existing Standards Australia framework and industry-managed supporting practices.

As the Discussion Paper acknowledges, the management of the transition from analog to digital will involve the coordination of efforts of a range of stakeholders, including the Australian Government, ACMA, free-to-air broadcasters, retailers and consumers.

As noted above Free TV is confident that the existing standardisation framework allows for the constantly evolving specifications of digital broadcasting platforms. Experience has demonstrated that this 'consensus model' for standards development, and the access to all major international standards frameworks that it provides, has facilitated accurate and plausible specification setting.

In setting up the co-regulatory framework for commencing digital terrestrial broadcasting, government, regulators and industry agreed that Standards Australia would house transmission and reception standards.

By 1998 Standards Australia had established a committee and sub-committee structure, attracted the participation of a wide range of industry and government technical experts and cemented affiliations with the relevant international standards organisations, including:

- the Digital video Broadcasting Project (**DVB**);
- the Digital Television Group (**DTG**);
- the European Broadcasting Union (**EBU**);
- European Telecommunications Standards Institute (**ETSI**);
- the International Electrotechnical Commission (**IEC**);
- the International Organization for Standardization (**ISO**);
- the International Telecommunications Union (**ITU**); and
- the Society of Motion Picture and Television Engineers (**SMPTE**).

Free TV fully endorses this framework which has continually attracted, facilitated and supported the expertise required to develop standards which meet international 'best practice'. In establishing a standardisation framework, the ability of the standards body to attract sufficient expertise in technical standardisation is crucial. This depends largely on the authority of the standards body and its ability to attract industry confidence.

Standards Australia's administrative, technical and publication infrastructure has enabled timely development of each version of each standard. The success of the framework and its documentary standards format can be

measured in many jurisdictions by the imitation of publication formats by those who have subsequently adopted DVB-T.

It should be borne in mind that DVB-T, COFDM based digital terrestrial television broadcasting is far more complex than its PAL analogue predecessor, offering many more options of transmission modes and an ability to carry a variety of services. Experience has demonstrated the involvement of a well-resourced and well-supported standardisation framework that encourages industry participation has been vital for the timely development of technical solutions to the application of DVB-T in Australia.

This has included the development of terrestrial coding and modulation standards that incorporate the unique requirements of High Definition Television (**HDTV**) and 5.1 channel surround sound.

While the Australian Government and regulatory agencies who guided the planning of DTTB took into consideration planning in the radio frequency domain, little consideration was given to the comprehensive integration of other components of the DTTB Transport Streams to ensure ultimate success of the planning in its entirety.

In reviewing the DVB standards for implementation of DVB-T in Australia, Australian television broadcasters found many specifications within the DVB standards did not meet Australian requirements. The Standards Australia process provided a framework in which to address these issues.

For example, the DVB-T standard's `parental_rating_descriptor` to this day does not meet the requirements of any individual national regulatory framework with respect to parental ratings. As a result, the Australian television industry needed to develop the Australian parental ratings codes which are tabulated in AS4933 and AS4599. In 2004 as a result of the the introduction of a dual classification system by ACMA, under which films are classified under the Office of Film and Literature Classification (**OFLC**) Guidelines, the parental ratings codes were reviewed.

In addition, Australia has a well established Australian teletext specification, originally developed by the then Department of Communications, Information Technology and the Arts (**DCITA**), for the successful implementation in Australia of closed captioning. This regulatory requirement was extended into digital television and the Australian television industry was required to develop specifications for the implementation of teletext for digital television. To ensure *dummy headers* are successfully delivered to the end users via the broadcaster's distribution and emission processes the Australian industry also developed an industry Operational Practice¹.

At the outset of DTTB standards development at Standards Australia, the complimentary Australian requirements were denoted by a printed "Aus" suffix in brackets. These complimentary requirements were accepted by manufacturers as they were essential toward making Australia's first 'horizontal' DVB-T platform successful.

¹ Refer Free TV OP 42

As an example, a requirement by all countries who adopt the DVB-T system is the maintenance by its broadcasting regulatory agency of the Network Identification Codes of the DVB Service Information. In Australia the Network Identification Codes were assigned by DVB and ETSI to the then Australian Broadcasting Authority and orderly assignments made to suit the Australian free-to-air broadcast system as a co-regulatory project with Australian television broadcasters.² This was detailed in correspondence between the then Australian Broadcasting Authority, the DVB Project office within the EBU and the then Federation of Australian Commercial television Stations (now Free TV Australia) from April to December 2000. This is contained within industry Operational Practice OP40.

The DVB local_time_offset_descriptor did not cater for the north/south daylight saving time shifts in Australia as well as the specified east/west time zones with respect to the Coordinated Universal Time (UTC) reference. This is contained within Operational Practice OP45³.

The DVB content_descriptor which did not reflect the program genres on Australian television. This is contained with Operational Practice 39.⁴ Close consultation between legislators and regulatory and industry technical experts on the maintenance and development of the standardisation framework has helped to minimise the impact on industry of the implementation of the DVB-T system. The existing arrangements have provided the means for considerable ongoing research and consultation amongst these parties and has been crucial in ensuring the effectiveness of technical standards for DTTB.

2. What is the level of interest among industry bodies and associations in the *development* of technical standards, and the areas of activity those standards might cover?

Free TV has a high level of interest in the development of well-researched, accurate and plausible technical standards. The quality and stability of digital television will underpin its success in Australia. The development of well-researched and authoritative standards which address any potential technical impediments to the quality and coverage of digital broadcasts is a key requirement for broadcasters.

Free TV has demonstrated its commitment to standardisation through its long-term membership of the EBU, DVB Project, DTG, ATSC, SMPTE, participation in ITU-R DTTB studies since the late 1980s and its provision of television broadcast industry Operational Practices for the last four decades. Free TV is committed to continue these practices into the future.

Australia selected the Terrestrial mode of the European developed Digital Video Broadcasting (DVB) system for its terrestrial television broadcasting conversion from analogue to digital television. Australian free-to-air television broadcasters

² Refer Free TV Operational Practice OP40 - DVB Original network id and network id assignments for Australia at http://www.freetv.com.au/Content_Common/pg-Engineering.seo

³ Refer Free TV Operational Practice OP45 Application of Time Related Tables in Australian DVB-T Systems at http://www.freetv.com.au/Content_Common/pg-Engineering.seo

⁴ Refer Free TV Operational Practice OP39 DVB Content Descriptor at www.freetv.com.au/Content_Common/pg-Engineering.seo

were foundation members of the European Broadcasting Union's DVB Project and continue to take part in its many technical groups as the dynamic DVB specifications and standards continue to evolve.

Australian free-to-air television broadcasters have been responsible for initiating and designing various specifications within the DVB standards framework including further development of the specification for SFNs, the carriage of AC-3 5.1 audio in a DVB transport stream and the specification for implementing software updates in consumer electronic equipment.

The existing, industry-supported standards AS4933 and AS4599, supported by the Operational Practice framework, appropriately reflect the range of digital television broadcasting activities that require coverage by technical standards. These standards have developed in response to the requirements of broadcasters throughout the implementation phase of digital television broadcasting.

However, there is a differing standardisation framework required to support datacasting in Australia. Channel A, as a service to be made available to the common domestic receiver, must comply with the DVB-T standardisation framework. This is in contrast to the different specifications required for Channel B.⁵

DVB Data broadcasting is complementary to the planning of DVB-T whereas the planning and implementation of mobile TV within the Australian datacasting regime is not. This was communicated to the Australian Broadcasting Authority (ABA) by Free TV between February and December 2004.

The continuing maintenance and development of the dynamic DVB specifications and standards requires considerable ongoing research and consultation between government, regulatory agencies and relevant industry sectors to ensure the effectiveness of technical standards. Therefore the proposed framework for datacasting in Australia needs to be linked to a clearly defined set of transmission and receiver standards.

It is often overlooked that while the majority of the DVB Project's specifications and standards are self contained or reference other standards within the DVB "family of standards", they also rely upon the performance and stability of a host of other local specifications. Standards Australia has provided a suitable framework in which to develop other Australian requirements.

In this regard, Free TV notes AS1417 – *Receiving antennas for radio and television in the frequency range 30 MHz to 1 GHz – Construction and installation*. This standard has been developed and updated to ensure the specifications for TV receiving antennas are optimised for the reception of DTTB signals in Australia.

Free TV also notes AS4542 – *Consumer television interfaces*, which provides designers, manufacturers, installers, testers and maintainers of consumer electronic equipment with parameters for the optimal and successful interfacing

⁵ Refer ETSI EN 301 192 Digital Video Broadcasting (DVB); DVB specification for data broadcasting

of digital tuners, digital TV integrated decoders, set top boxes, personal video recorders with video displays and audio systems.

It was firmly established in the ABA's planning regime for DTTB in Australia that the introduction of digital television adjacent to analogue television channels would require ancillary devices to have a larger channel selection range to that previously required.⁶ The DTTB Planning Handbook identifies that AS4542 is relevant to this issue. In addition, AS4542 details the specifications in the interfaces for base band audio levels to comply with the provisions established by Australian television broadcasters to address loudness in television soundtracks.⁷

3. What are the most appropriate arrangements to facilitate the development of technical standards to ensure all appropriate interests are represented?

The involvement of all relevant participants in the Standards Australia framework is the most appropriate means of facilitating robust technical standards.

Free TV is committed to the existing consensus-based committee and sub-committee structure of the Standards Australia framework. This framework has attracted the participation of a wide range of relevant industry and government technical experts and cemented affiliations with the relevant international standards organisations.

This is an open and consultative process and the best means of ensuring all appropriate interests are represented is to encourage all stakeholders with an interest in the development of technical standards for digital free-to-air television to commit to its ongoing operation. The 'consensus' model for standards development sponsored within Standards Australia and the access to all major international standards frameworks have facilitated the continuing developing of AS4599 and AS4933.

The ongoing maintenance and development of the dynamic DVB specifications and standards requires considerable ongoing research and consultation between government, regulatory agencies and industry to ensure the effectiveness of technical standards relevant to DTTB.

4. How effective are the two digital television standards developed Standards Australia?

The two Standards Australia digital television standards are highly effective and have been supported and endorsed by all broadcasting equipment and many consumer electronics manufacturers in Australia.

As outlined below, broadcasters have consistently complied with AS4599, suggesting the standard is highly effective. AS4599 has been published to reflect the specified requirements for digital terrestrial television broadcasting

⁶ Refer to ABA DTTB Planning Handbook – Section 3.7

⁷ Refer to EBU Technical Recommendation R86 and SMPTE RP 155.

Australia. It references ACMA planning for DTTB services, DVB standards, other international standards as well as Australian broadcasting industry Operational Practices.

The importance of AS4599 cannot be underestimated. It is referenced at five locations in the current edition of ACMA's Technical Planning Guidelines with respect to radiated signal characteristics, emission standards for broadcasting transmitters and in Appendix 4 – *Transmission Standard for the Australian Digital Terrestrial Service*.

The Australian DVB-T receiver standard, AS4933, provides the necessary information so that any DVB-T digital terrestrial television receivers made for operation in Australia will operate satisfactorily on Australian digital terrestrial television transmissions. AS4933 provides a 'Summary of the minimum DTTB receiver requirements for Australia' as well as providing additional information and recommendations to clarify preferred implementation if a feature is included in a DTTB receiver's design.

As evidence of the effectiveness of the two Standards Australia digital television standards, it should be noted that there are a series of other Australian standards upon which AS4599 and in particular AS4933 draw additional important specifications. These include AS1367 (*Coaxial cable and optical fibre systems for the RF distribution of analog and digital television and sound signals in single and multiple dwelling installations*), AS1417 (*Receiving antennas for radio and television in the frequency range 30MHz to 1 GHz – construction and installation*) and AS 4542 (*Consumer television interfaces*) These standards play an important role in delivering digital television to the Australian viewing public.

5. What is the current extent of compliance with the mandatory components of both Standards Australia standards?

With the qualifications, expertise, knowledge and experience gained with the international, DVB and Australian national standards framework, Australian television broadcasters have been constant adherents to the Australian transmission standard, AS4599.

AS4599 has been published to reflect the specified requirements for digital terrestrial television broadcasting in Australia. It references the ACMA planning for DTTB services, DVB standards, other international standards as well as Australian broadcasting industry Operational Practices. While it does provide guidance on requirements which might be encountered in Australian DTTB transmissions, AS4599 does not reflect non-mandatory specifications.

6. What is the current extent of compliance with the optional components of Standards Australia standards (where applicable)?

Compliance with the non-mandatory components of the standards vary.

Where possible, Australian television broadcasters have assisted the development of standards and industry Operational Practices for the development and entry of DTTB consumer electronic products into Australia.

The DVB standards and specifications for receivers are commonly referred to as a 'toolbox' of specifications and standards. The tools to be used in any broadcast cater for the many possible broadcast service variants allowable.

Many manufacturers consider the inclusion of all the tools in the 'toolbox' to be too expensive, so short-cuts are often taken in receiver design. Unfortunately, these are sometimes exposed when a broadcaster makes a change to their digital stream, resulting in a community of dissatisfied viewers and/or limits on the flexibility of the broadcast system.

Performance issues with digital receivers directly impact on broadcasters' ability to deliver new and innovative services.

In contrast to the references made to AS4599 within the broadcasting planning instruments for transmission (for example, ACMA's Technical Planning Guidelines), the Australian DVB-T receiver standard AS4933 is not referenced. In its April 2007 response to the ACMA determination specifying characteristics of a 'domestic digital television receiver', Free TV sought ACMA's agreement to have the determination include compliance to AS4933. This has not occurred.

As already noted, the performance of digital television broadcasting receivers underpins the take-up and community acceptance of digital broadcasting in Australia.

The low compliance rate of some consumer electronics products with AS4933 is a key concern for broadcasters in relation to the provision of attractive and reliable digital television services to viewers.

The low compliance rate also poses a threat to the legislated policy objectives of minimising the impact on consumers of the transition to new types of services and equipment.

By way of example Free TV registered its concerns to the ABA regarding the potential "software interference" which can result in DVB-T receivers as a result of incorrect Service Information values being assigned within the transport stream of a terrestrial service or "short cuts" / "work arounds" some consumer electronics manufacturers take in implementing DVB Service Information. The potential exists for one broadcast to "capture" a group of receivers and effectively lock out reception of other broadcasts. This occurs at a software level in the receiver while receiving good signals via the antenna from both broadcasters. Concerns were raised with the Australian Broadcasting Authority on this matter in November 2003.

As another example, Free TV notes the experience of Digital UK in the Whitehaven pilot switchover exercise undertaken in late 2007. Following switchover a small number of homes were unable to receive television due to the poor performance of a particular brand of set-top box which was known to experience software (channel storing) problems. These set-top boxes were required to be replaced.

In its discussion paper, ACMA noted it will consider regulatory intervention where the exercise of its powers will allow clear benefits to consumers of digital television, drive the take-up of digital services and address demonstrated

market-failure. The exercise of ACMA's powers under Part 9A to mandate AS4933 is consistent with these objectives.

Close consultation with the Australian broadcasting industry and the consumer electronics manufacturing industry would be crucial.

Industry Codes and Standards (Part 9B of the *Broadcasting Services Act 1992*)

7. Which organisation(s) have the requisite expertise and resources to participate in the development of industry codes relevant to digital terrestrial television broadcasting?

The suitability of any particular organisation for the development of an industry code will vary depending on the specific regulatory issue being considered.

Free TV has a proven track record in the successful management of the complete process of developing, monitoring and maintaining industry co-regulatory codes of practice in areas of direct relevance to the commercial free-to-air television broadcasting industry.

Free TV is the industry body responsible for the development and ongoing administration of the Commercial Television Industry Code of Practice. The Commercial Television Code of Practice has proven effective over time, with high rates of compliance and community recognition.

Free TV has extensive experience in managing the considerable public consultation requirements associated with co-regulatory codes of practice, with over 1300 submissions received to the recent review of the Commercial Television Code of Practice.

Free TV is also responsible for the ongoing monitoring of the performance of the code and reporting to ACMA on its performance. Free TV is also undertaking the development of the Commercial Television Industry Code of Practice for Multichannels.

Free TV also possesses the necessary specialist technical expertise required to develop any additional or complementary co-regulatory frameworks in the free-to-air digital television broadcasting environment. The Australian free-to-air terrestrial television industry has a long history of developing industry Operational Practices to improve the interoperability of television broadcast specifications. This has been developed in a co-regulatory framework between government, regulatory agencies and industry for over three decades. In the analogue television broadcasting environment this has resulted in the successful implementation of teletext and stereo television sound broadcasting.

Through its work on digital television implementation and standards development in Australia, Free TV has also developed close links with government, regulatory agencies, other industry sectors and relevant international organisations. These links would be crucial in developing a consensus-based, authoritative and widely supported co-regulatory framework.

With its experience and administrative infrastructure, Free TV would be well-placed to manage the development of an industry code of practice in relation to relevant free-to-air digital television broadcasting issues.

However, the range of issues for which ACMA may require industry codes to be developed under Part 9B of the Broadcasting Services Act 1992 is broad. The appropriateness of Free TV's involvement in the development of industry codes may vary accordingly. Further consultation would be required upon the development of any specific regulatory proposals.

8. What is the current level of interest among industry bodies and associations in the development of industry codes and the areas of activity that these codes might cover?

Level of interest in the development of industry codes

Free TV would only support the development of industry codes in areas where the market has clearly failed to provide an appropriate solution.

Australian terrestrial television broadcasters, through a framework maintained by Free TV's Engineering Committee, continue to develop and maintain Operational Practices as required by industry.

This framework has provided a responsive and flexible means through which emerging technical issues can be addressed. Given the speed at which audio-visual technologies evolve, this industry-driven process has been crucial in quickly overcoming potential impediments to the implementation and ongoing provision of digital terrestrial broadcasting in Australia.

The constantly developing nature of digital terrestrial television technologies means there is a clear risk that codes of practice or industry standards will quickly become deficient. A regulatory environment which cannot adapt to emerging challenges as they arise would impact on broadcasters' ability to deliver quality digital television services to all Australian viewers.

As stated above in relation to its Part 9A powers, it is vital that ACMA first demonstrate the areas in which the market has failed to deliver widely acceptable solutions before regulatory or co-regulatory action under Part 9B of the Broadcasting Services Act 1992 is considered.

The current Standards Australia framework for technical standards, supported by the industry-driven Operational Practice process, has been successful in providing well-researched, responsive and authoritative technical standards and benchmarks for the majority of issues covered by ACMA's new standards and code making powers. These structures have provided a market-driven response to technical implementation issues as they arise, in a timely and dynamic manner.

For example, in 1999 when the Australian transmission standard, AS4599, was published it referenced a series of 48 modified and 5 new clauses within the standards adopted for implementation of DVB-T in Australia. Initially the detail of these specifications and amendments were not included in the standard.

As a result of significant industry inquiry related to the Service Information amendments, Standards Australia published an amendment to AS4599 in 2001.

During this time frame an increased number of countries became interested in adopting DVB-T and as a result the DVB Project made some significant updates to the DVB standards. It was recognised that as a result of the dynamics of the DVB standardisation process and the number of amendments required to meet Australian requirements additional reference material was required that kept pace with the need for detailed clarification and the dynamic DVB review process. More detailed specifications in a series of industry Operational Practices was identified and agreed within Standards Australia as being an appropriate vehicle.

In the current edition of AS4599.1 (2007) the following industry Operational Practices are referenced:

- OP39 DVB content descriptor;
- OP40 DVB original network ID and network ID assignments for Australia;
- OP41 Logical Channel Descriptor;
- OP42 Distribution, Transmission, and Monitoring of Closed Captions on line 21/334;
- OP43 Service Replacement Service Procedures;
- OP44 Implementation of Electronic Service Guide Information;
- OP45 Application of Time Related Tables in Australian DVB-T Systems; and
- OP46 Implementation of System Software Upgrades in Australian DVB-T systems.

Areas of activity that codes might cover

- Section 130K of the Broadcasting Services Act 1992 sets out examples of matters that may be dealt with by industry codes and industry standards:
- the labelling of domestic reception equipment;
- electronic program guides, including the provision of information for the purpose of compiling electronic program guides;
- the numbering of digital services, including the use of logical channel numbers;
- application program interfaces;
- conditional access systems; and
- the updating of software used in domestic reception equipment.

Free TV's view regarding the merits of regulatory intervention in relation to these issues is addressed below.

Labelling of domestic reception equipment

The market has yet to develop and implement a system for the clear and uniform labelling of domestic reception equipment at the point of sale. As noted above, the performance of digital television reception equipment will be crucial in delivering high-quality digital television services to Australian viewers.

Free TV has advocated for the digital television reception standard to be made mandatory as a way of ensuring that the equipment provided to consumers is compliant with the technical parameters of digital television broadcasting in Australia.

Mandating a minimum set of technical standards for digital television receivers and enforcing those standards through a testing and conformance scheme should precede any consideration of a labelling scheme. Such a scheme would not be viable without certainty within industry and government as to which equipment will carry a label. In the development of any future labelling scheme, it may also be appropriate to require information for consumers that will help them identify analog equipment that will soon become obsolete. This would provide a disincentive to the continued purchase of equipment that is not future-proofed and the additional consumer information would boost community confidence in the switchover process.

Electronic program guides

The Discussion Paper notes that electronic program guides (**EPGs**) have been the focus of regulation in both the UK and the United States.

The Discussion Paper also notes the recent announcement by Free TV that commercial free-to-air television broadcasters would be openly broadcasting program listing information by 1 January 2008, effectively creating the basis for a seven day EPG.

This was an industry-initiated process facilitated through Free TV's Operational Practice framework. This initiative represents a market-driven solution to EPG provision for digital television and obviates the need for ACMA to exercise its regulatory powers to mandate EPG provision at this stage. Broadcasters would have strong concerns regarding any consideration of regulatory action in the absence of an identified market-failure.

The supply of EPG information will be dependent on the compliance with base level requirements designed to protect copyright, protect the integrity of the program information and facilitate collection of ratings information. These are reasonable conditions which reflect the particular interests of the commercial television industry in protecting the advertising funding base that underpins the free-to-air television platform.

Broadcasters have also agreed to provide the data directly to any other third party who wishes to supply an EPG. The provision of data would be subject to certain limited conditions which, similar to those outlined above, are a reasonable reflection of the need to protect the free-to-air television business model.

The provision of EPG information to personal video recorder (**PVR**) manufacturers is still very much in the implementation stage and there may be emerging technical issues to address throughout the early stages of operation. The institution of a restrictive regulatory framework around EPG provision would inhibit broadcasters' and manufacturers' ability to address any emerging issues in a timely and mutually-agreeable fashion.

It should also be noted that the industry's Operational Practice framework took the lead in developing technical solutions for the provision of EPGs using DVB-T in the Australian environment.

In 2003 as DVB-T transmission infrastructure and techniques developed within the Australian television broadcasting organisations and DVB-T receiver development increased, the Australian industry had sufficient confidence to develop interoperable specifications for program event information. This resulted in industry Operational Practice 44 which recommended the method of applying Electronic Service Guide (**ESG**) program information, for digital terrestrial television broadcasting in Australia, using the DVB `short_event_descriptor` and `extended_event_descriptor`, located in the Event Information Table sections (**EIT**) of the DVB standards.

The DVB implementation guidelines for the EIT were not specific in relation to a number of parameters and the industry Operational Practice framework provided a method for these to be regularly reviewed and revised as development progressed.

Numbering of digital services

Free TV strongly supports the existing logical channel numbering (**LCN**) system. As the Discussion Paper notes, broadcasters use LCNs as a powerful marketing tool for service promotion to the viewer.

The LCN system was developed for Australian application based on the UK system created by the UK Digital Television Group (**DTG**).

The semantics of the DTG implementation did not reflect the Australian channel set and was of little utility to receiver manufacturers in providing navigation features. Subsequently a clause was included in the Australia transmission standard AS4599, to reference an industry Operational Practice, OP41, which reflected the specific requirements developed in Australia.

Industry Operational Practice 41 has been reviewed and revised on three occasions to meet the requirements on receiver and transmission standards as they have evolved and is supported by the commercial and national free-to-air television broadcasters.

With the introduction of in-home datacasting services on the digital platform, consideration will need to be given to the interaction of the LCN system and any new service providers on the digital platform.

Free TV is confident that the existing Operational Practice framework works effectively to provide industry-supported, timely and authoritative solutions to emerging technical challenges. This framework has proven sufficiently flexible

to accommodate the inclusion of broadcasters outside the commercial free-to-air television industry such as the ABC and SBS and could potentially incorporate new industry participants if required.

As the process for the allocation of datacasting licences progresses, further consultation between the commercial free-to-air television industry, government, regulators and prospective datacasting service providers on this issue will be necessary. Regulatory intervention prior to exploration of all options for a cooperative industry-driven solution being explored would be premature.

Application program interfaces

In 2001 with the advent of the DVB Multimedia Home Platform (**MHP**) for interactivity in DVB services, the Federation of Australian Commercial Television Stations (now Free TV Australia) announced its intention to propose the DVB MHP specification for adoption in Australia.

In 2001 Amendment 1 of AS4599 included a reference to ETSI TS 101 812, the MHP standard. The standardization of the updates to the MHP specification have been progressing since. Initial deployments of MHP were on satellite platforms and then on terrestrial public service platforms in Europe. The majority of the deployments have been in hybrid broadcast/broadband networks, where the broadcast network is using the broadband network for complementary information, applications and, recently, video. Trials are continuing in Europe.

Free-to-air broadcasters in Australia have indicated that, as a minimum, set-top boxes for the Australian market should be manufactured to the MHP 1.0.2 standard. There is no mechanism for enforcing that position in Australia and virtually no DVB-compliant consumer products in Australia support MHP. Some MHP compliant applications were provided by the commercial free-to-air television industry however expensive equipment and low consumer interest meant the services were not continued. The industry is currently reviewing its position in regards to MHP. Free TV is aware that ABC Television is broadcasting some MHP applications nationwide on a trial basis.

Conditional access systems

The Television Broadcasting Services (Digital Conversion) Act 1998 deemed conditional access systems (**CASs**) must, as far as is practicable, be open to all providers of television broadcasting services transmitted in digital mode using the broadcasting services bands.

Toward that objective the Australia industry references ETSI ETR 289 *Digital Video Broadcasting (DVB); Support for use of scrambling and Conditional Access (CA) within digital broadcasting systems* in the Australian transmission standard in 1999. It provides support for a wide range of conditional access systems which are based on ISO-IEC 123818-1 (MPEG-2) [1] and the DVB specifications. The ETR specifies those aspects which are required for co-existence of multiple CASs in a single data stream.

Since the establishment of DVB-T services in Australia there has been no requirement for further development of conditional access systems to meet additional Australian requirements. Free-to-air broadcasters are required to operate on an open platform.

Free TV supports the underlying policy objective outlined above. Any CAS on the digital platform must be open access and must not impact on viewers' ability to access existing free-to-air services.

Updating of software used in domestic reception equipment

As a result of the DVB Project developing the specification for System Software Updates in 2002 Australian television broadcasters, in liaison with consumer electronics manufacturers, developed industry Operational Practice 46. OP46 sets out the method of implementing an over the air System Software Upgrade (SSU) to DTV consumer equipment.

This implementation is in accordance with ETSI standard TS 102 006 [4]. ETSI standard TS 102 006 [4], describes two profiles for implementing software upgrades to DVB-T consumer equipment in a network independent manner. The Australian implementation uses the simple profile in a 'background' mode with minimal interaction required from the television viewer. This OP has been used in Australia for the testing of trial implementations of over the air System Software Upgrades.

It should be noted that the provision of over the air software updates may be costly for industry to implement, given the bandwidth required to deliver such updates.

9. What is the most appropriate means of facilitating the development of industry codes to ensure all appropriate interests are covered?

As already noted, Free TV supports continuation of the existing frameworks for the development of industry-supported technical solutions in the implementation of DTTB in Australia. The best means of ensuring all appropriate interests are represented is to encourage all stakeholders with an interest in the development of technical standards and solutions for the free-to-air digital television platform to commit to and participate in its ongoing operation.

However, there are areas where regulatory intervention may be appropriate.

If ACMA were to establish a case for mandating industry codes of practice in relation to the matters raised in Part 9B of the *Broadcasting Services Act 1992*, close consultation with all relevant industry participants would be crucial.

There is a strong risk that regulatory intervention in the dynamic digital television environment will restrict industry's ability to quickly adapt to evolving technical developments. Consultation with relevant industry participants in the development of any codes will be vital in minimising any potential negative impacts of regulation.

10. To what extent is it necessary for ACMA to determine particular sections of the industry for the purpose of facilitating the development of industry codes?

and

11. What are the potential combinations of industry activities (listed at Appendix A) for the determination of particular sections of the industry?

ACMA must recognise the specialist sections that exist within the industry when considering this issue.

Free TV notes the list in Appendix A of the Discussion Paper which lists *potential combinations of industry activities*. We note that the list relates also to individual industry sectors, namely:

Television broadcasting

- Commercial television broadcasting
- National television broadcasting
- Community television broadcasting
- Subscription television broadcasting

Sound (radio) broadcasting

- Commercial radio broadcasting
- National radio broadcasting
- Community radio broadcasting
- Subscription radio broadcasting
- Narrowcasting radio broadcasting

Datacasting

Importers, manufacturers and suppliers of domestic reception equipment

Transmission and multiplex service providers

The organisations listed in Appendix A of the Discussion Paper are participating in the development of codes and standards for digital television broadcasting including Standards Australia forums which have researched and developed:

- AS 4599.1-2007: *Digital television – Terrestrial broadcasting – Characteristics of digital terrestrial television transmissions*; and
- AS 4933.1-2005: *Digital television – Requirements for Receivers Part 1: VHF/UHF DVB-T television broadcasts*.
- as well as
- AS1367:2007 *Coaxial cable and optical fibre systems for the RF distribution of analog and digital television and sound signals in single and multiple dwelling installations*;

- AS1417 *Receiving antennas for radio and television in the frequency range 30 MHz to 1 GHz*; and
- AS4542 *Consumer television interfaces*.

This is evidenced on the Standards Australia Committee CT-002 website⁸.

ACMA should consider that the list provided in Appendix A 'Industry activities' of the Discussion Paper reflects a list of industry sectors that may apply to the overarching activities of all digital broadcasting platforms.

ACMA should recognise these specialist individual industry sectors when considering industry code development, similar to ACMA's approach for existing industry codes of practice.

For example, the adoption of proprietary digital decoder technology by subscription television broadcasters would prevent the development of industry codes or standards relating to digital television transmission and reception capable of applying to commercial free-to-air and subscription television broadcasters.

Interoperability of equipment is not possible across these sections of industry and ACMA's approach to the identification of sections of the industry must reflect this fact.

An approach to industry sectors that takes into account the lack of interoperability will also be important when considering the consultative frameworks for standards development for free-to-air digital television.

12. Which bodies and associations may potentially represent sections of the industry so determined?

Free TV is the peak industry body representing all of Australia's commercial free-to-air television licensees. As already noted, Free TV would be well-placed to develop and maintain industry codes of practice in relation to issues of relevance to the commercial free-to-air television industry.

Issues of potential interest

13. Which other issues that should be noted as part of a preliminary consideration of the new codes and standards provisions?

Other issues which are of specific interest to Free TV Australia in relation to successful take up of free-to-air digital terrestrial television broadcasting relate to the performance of domestic receivers. The discussion below raises issues which may not be of immediate relevance to ACMA's codes and standards powers but which are relevant to successful digital switchover.

⁸ Refer <https://committees.standards.org.au/COMMITTEES/CT-002/>

Standards for DVB datacasting

The government's approach to the development of a framework for datacasting in Australia has raised concerns amongst broadcasters. The topic has often been debated without regard to the differing standardisation framework that may be required to support some aspects of datacasting.

As already noted, Channel A should conform to the same standards and Operational Practices as existing free-to-air broadcasters, if they are to be received by the existing free-to-air audience. However there are crucial differences in regards to the Channel B model. Whilst the DVB specifications provide that DVB Data broadcasting is complementary to the planning of DVB-T, the planning and implementation of mobile TV, if defined within the Australian datacasting regime, is not complementary to DVB-T. This was communicated to the ABA by Free TV between February and December 2004.

Testing and conformance

Free TV supports the establishment of a co-regulatory regime for the conformance testing and measurement of DTTB receiver performance in Australia to enhance the certainty of receiver functionality and allow the broadcasters to provide an enhanced range of services in line with the Government's policy objectives.

The House of Representatives Standing Committee on Communications, Information Technology and the Arts inquiry Digital Television: Who's buying it? recommended that the Australian Government work with stakeholders to establish a testing and conformance centre for digital television equipment.

If there were no move to mandate a minimum set of specifications for DVB-T receivers in Australia, ACMA should mandate a strategic subset of core parameters for conformance and performance testing of DVB-T receivers in Australia. These should include:

- the radio frequency and intermediate frequency tuning performance of receivers that meets the specifications in AS4933, which must relate or draw on key technical parameters from the DTTB planning regime in Australia;
- ability to decode the Australian values in the Network Information Table in accordance with ETSI TR 101 162 and industry Operational Practice 40;
- coding of Packet Identifiers in accordance with AS4599 and ETSI 300 468;
- refresh rates for DVB Service Information tables occur in accordance with ETSI TS 101 154, EN 300 468 / AS4599;
- stream content and components types are in accordance with AS4599 and ETSI EN 300 468;
- decoding of closed captions are in accordance with ETSI EN 300 472, EN 300 706 and industry Operational Practice 42;
- implementation and features of the parental_rating_descriptor are in accordance with AS4599 and AS4933;

- implementation and specifications of the local_time_offset descriptor are in accordance with AS4599 and industry Operational Practice 45; and
- base band audio parameters for audio reference levels are in accordance with AS4542.2 and decoded MPEG and AC-3 alignment levels are in accordance with AS4933.

A test and conformance service for digital television consumer electronics products is a worthwhile objective. The performance of consumer products is very important to the quality and stability of the DTTB platform and will underpin the success of digital television.

In the Australian market it has not been possible to develop a viable business model for a testing and conformance scheme. Commercial broadcasters and others have previously attempted to develop a successful business model. However, due to the small size of the Australian market no successful business model has been developed.

Any future business case will need to be jointly funded by Government and industry. Funding arrangements should recognise the benefits to manufacturers of such a service.

All alternatives should be considered in establishing this service. A test and conformance service for Australian digital television consumer electronics products may well be provided by overseas organisations rather than a physical entity in Australia. Organisations have been established overseas who have developed significant expertise in testing a series of separate national, corporate and industry platforms for DVB-T e.g. Digital TV Labs⁹ in the UK.

Free TV notes that a consultancy has been issued by the Department of Broadband, Communications and the Digital Economy (**DBCDE**) to investigate options for a testing and conformance scheme.

Television reception and antenna installation

In 2003 the UK DTI considered the topic of performance of television antennas for DTTB so crucial to the success of Digital Switchover that it commissioned a review of the technical performance of UK aerial installations. The summary recommendations in the report¹⁰ included:

- *There should be a targeted campaign to raise awareness of the importance of using benchmarked aerial and cable products. It should be aimed primarily at distributors and retailers, but also at trades involved in building construction, such as architects.*
- *The aerial benchmarking scheme should be encouraged and enabled to develop a test suite for active aerials, while manufacturers are encouraged to develop more models. This would provide a means of meeting aerial benchmark Standard 1 with a wideband product.*

⁹ Refer <http://www.digitaltv-labs.com/>

¹⁰ Refer http://www.digitaltelevision.gov.uk/pdf_documents/publications/AP5-14Aerial_Installations.pdf

The ACMA publication “Better Television and Radio Reception” comprehensively lists and differentiates the issues which should be addressed in relation to reception problems, electrical and radiofrequency interference. It also provides advice on the selection and installation of a television antenna. This publication focuses primarily on outdoor antenna installation.

The UK Department of Trade and Industry/Business, Enterprise and Regulatory Reform has also noted that about 30% of households use indoor aerials for reception of analogue TV and little is known about the performance of indoor aerials.

Free TV believes the increasing use of indoor antennas and the potential building penetration loss of the digital signal should not only be addressed in the ACMA publication “Better Television and Radio Reception” but also considered in the future in relation to a review of the planning of the digital television services.

AS1417 Receiving antennas for radio and television in the frequency range 30 MHz to 1 GHz - Construction and installation has been developed and is being updated to ensure the specifications for TV receiving antennas are optimised for the reception of DTTB signals in Australia. The planning model for DTTB in Australia incorporates characteristics of a *notional receiving* system. The parameters developed in 1999 were derived from the best technical information available to the ABA at that time.

Since then several industry forums have identified short comings in cabling, selection and installation of television receiving systems as a major impediment to successful reception of DTTB signals. One of the most significant has been a realisation that a large population of receiving antennas in Australia were not tuned for receiving television signals across Band III. The updating and maintenance of AS1417 is essential to provision of optimum specifications to manufacturers of receiving antennas for digital television.

The exercise of ACMA’s powers under Part 9A to mandate AS1417 would drive the take-up of digital services and address market failure. This would be consistent with ACMA’s stated approach to the exercise of its powers.

Given the critical threshold characteristic of the digital signals, a superior skill set is required by television antenna installers than previously required for PAL analogue.

The combination of the ACMA DTTB planning regime, AS4599 and AS4933 specify most elements of the digital broadcast system in Australia to meet the planning requirements of the DTTB services. However, the services are planned for reception at a height above group level of 10 metres.

However, a large proportion of the Australian television antenna population are not at 10 metres above ground level. This presents a gap between the planned signal strength at 10 metres and the signal level and quality of what is actually received at the receiver’s rf input socket from an antenna at a lower height above ground level. This path might be formed by a single antenna and lead-in on a single dwelling, or form part of a complex multi-unit rf feeder system.

Further study is required to consider how the difference between the planned height of the received signal and the actual height above ground level of the majority of the Australian antenna population will impact on the achievement of targeted digital signal quality at the receiver.

Multi-unit dwellings

Broadcasters have a regulatory obligation to follow AS4599. Owners, developers and lease holders of multiple dwelling units should have a complimentary obligation to follow AS1367 in the installation of cabling for analog and digital services.

AS1367 Coaxial cable and optical fibre systems for the RF distribution of analog and digital television and sound signals in single and multiple dwelling installations defines the specifications for and requirements for the cabling of a range of premises and buildings for distribution of analog and digital services including free-to-air TV and sound, subscription / Pay TV broadcasting. Observance of these specifications is essential for the accurate rf free-to-air distribution aspects in multi-unit and high-rise apartment buildings.

There is considerable difficulty for many residents in multi-unit and high-rise apartment buildings who attempt to migrate to digital TV reception.

Many residents encounter poor or non-functional TV reticulation/distribution outlets. These problems are not necessarily confined to older buildings and are often reported in buildings that are less than a few years old.

If the signal is marginal due to poor antenna and distribution system design the severe degradation of the picture and sound as the digital TV reaches its *digital cliff edge* is intolerable.

Marginal signals and poorly designed reception systems (i.e. antenna and distribution cabling) are unable to cope if the receiver is operating close to its threshold. Any slight change to the transmission characteristics may see the picture disappear.

In addition Free TV has received reports from confused viewers who attempt to install a digital receiver only to find they receive some channels but not others. This may be caused by inadequate design of the distribution system where some channels are fortuitously above the receiver's threshold margin and other channels are not. Alternatively the distribution system might have superseded arrangements where some analog channels are shifted to channels that are now allocated to digital, thus blocking those digital channels out.

These experiences contribute to consumer confusion and some perception of risk in moving to digital and must be addressed as part of the Government's overall strategy in promoting digital take-up.

Approximately one third of the Australian viewing public receive free-to-air television via a multiple dwelling unit distribution system. Broadcaster research indicates many of these systems are incapable of passing the digital services and need to be upgraded to the new standard. This is one of the major

impediments to digital switchover from analogue to digital terrestrial television broadcasting.

In its discussion paper, ACMA noted it would consider regulatory intervention where the exercise of its powers will allow clear benefits to consumers of digital television, drive the take-up of digital services and address demonstrated market-failure. The exercise of ACMA's powers under Part 9A to mandate AS1367 is consistent with these objectives.

Copy protection and content management

The DVB Project has just completed the finalisation of an open interoperable specification for Copy Protection and Content Management (**CPCM**) in digital broadcasting systems and home networks to provide end-to-end protection for content in all processes from the point of distribution to the end-user to the point of viewing/listening.

The secure implementation of DVB CPCM will be dependent on the establishment of a robust compliance and interoperability regime. While the implementation of the DVB CPCM specification is outside the scope of DVB and left to the market, Free TV believes the successful implementation will be preceded by successful technical compliance and interoperability testing and security of MHP applications. Until this work has been undertaken it is premature to consider mandating of CPCM. Further work will be vital in Australia's horizontal HDTV broadcasting chain to ensure confidence for broadcasters and other content providers. Free TV Australia acknowledges the complexity of specification in relation to DVB CPCM and supports further work through the existing frameworks for standardisation.

Data compression technologies

In the lead up to the evolution of digital television broadcasting standards, Australian television broadcasters participated in a co-regulatory framework which contributed significantly to the development of the Moving Picture Experts Group (**MPEG**) family of standards. These standards were based upon valuable experiments in Australia on digitisation of video content and subjective testing of the decoded images.

With the adoption of DVB-T for Australia in 1998, Australian television broadcasters adopted MPEG-2 coding in the Australian transmission standard AS4599. The transition to digital television in Australia is firmly based on the MPEG-2 standard.

Whilst the recently published AS4599 (2007) transmission standard establishes the specifications for MPEG-4/AVC/H.264 coding, this platform is not yet mature and has yet to reach a level of widespread industry confidence.

The transition to the platform should be viewed as a long-term issue for consideration at some future date. The prospect of transition provides significant challenges and costs for the industry and the viewing public in terms of the replacement of transmission and reception equipment.

Any migration from MPEG-2 to MPEG-4 is likely to require a simulcast period which will have implications for a broadcaster's spectrum. . A simulcast period would be necessary to allow for customer equipment transition where that equipment is not compatible with MPEG-4. Additional transmitters would also be required.

14. To what extent are there linkages or dependencies that span two or more issues of potential interest?

The major linkages in standardisation for DTTB arise from the features within the DVB standardisation framework that serve the Australian digital terrestrial television broadcasting legislative and regulatory framework.

The implications of the existing legislative and regulatory instruments on the DVB standardisation framework should not be underestimated, such is the complexity of the framework. An example is loss of functionality in a receiver due to mis-assignment and the potential collisions in DVB Network Identification coding.

The linkages that span the digital television broadcasting chain all relate directly or indirectly to radio frequency planning. For example, several broadcasters have experienced shortcomings when implementing SFNs. Another example is how the 'cliff effect' is manifested in the performance of the receiver.

Linkages and dependencies in the standardisation process require identification if they are to be nominated as benchmarks for performance, as change agents for performance improvement or future reviews for the necessary updates to planning for DTTB.

Accurate identification of linkages and dependencies within the terrestrial television broadcasting chain could lead to strategic change management via least invasive measures. For example, identifying the function of a parameter within a DVB compliant bit stream that requires a specific level of performance in a DVB-T compliant receiver.

15. What is your assessment of those issues where regulatory intervention would, in your view:

- **drive the take-up of digital services; or**
- **address market failure;**

and where:

- **industry is unlikely to resolve the matter within a reasonable timeframe;**
- **regulation will not impose unnecessary financial burdens on industry;**

and

- **the benefits of regulation are not outweighed by the costs;**

This submission has identified the key components of the digital terrestrial television broadcasting chain where the market has failed to provide a timely and widely accepted solution and where regulatory intervention would address

impediments to the take-up of digital television services. These components are directly related to the quality of digital television reception.

ACMA's powers under Parts 9A and 9B to make standards and codes provide the appropriate framework for mandating and enforcing the necessary minimum requirements.

This submission has proposed regulatory or government intervention to:

- mandate AS4933.1-2005, to ensure minimum standards for consumer reception equipment;
- establish a co-regulatory regime for the conformance test and measurement of DTTB receiver performance in Australia to enhance the certainty of receiver functionality and allow the broadcasters to provide an enhanced range of services;
- mandate AS1367 to ensure minimum standards for cabling systems for the rf distribution of digital television and sound signals in single and multiple dwelling installations; and
- establish a similar initiative to that developed in the UK for a registered digital installers scheme and undertake a review of the publication "Better Television and Radio Reception" to reflect the critical requirements for digital television reception.

Close consultation between legislators, regulators and relevant industry technical experts will help mitigate the financial impact of any regulatory or government intervention. Free TV would welcome the opportunity to provide further comment on the possible financial impacts of any specific regulatory proposals developed in the future.

16. What possible approaches or models may be implemented by industry and/or ACMA in relation to these issues?

Please refer to earlier detailed discussion regarding issues which warrant regulatory intervention.

17. Is it necessary to adopt a holistic approach where there are linkages or dependencies spanning two or more issues of potential interest?

ACMA must take a "holistic" or systems approach to the evaluation of the performance of the terrestrial television broadcasting system. This should be based on reaching industry consensus on a schematic model which identifies standards, specifications and potential market-failure at crucial points along the chain.

This submission has noted a clear link between the lack of mandatory requirements at key points of the free-to-air digital broadcasting chain and likely impediments to successful digital switchover. Carefully considered regulatory intervention in relation to testing and conformance of reception equipment and cabling will greatly assist a smooth transition to digital.

In considering regulatory intervention at any one point of the chain, ACMA must consider the likely impact on other components of the digital television broadcasting chain.

ACMA must also have regard to the propensity for explicit regulatory requirements to impose additional, implicit requirements on broadcasters.

The Discussion Paper identifies one of the *explicit* regulatory requirements placed upon free-to-air digital terrestrial transmissions by government at the outset of the digital conversion, i.e. a mandatory requirement for audio transmissions in Standard Definition (SD) digital TV mode to include the MPEG-1 Layer II audio mode.

From the outset of the establishment of the legislative, regulatory and standardization framework for free-to-air digital terrestrial transmissions in Australia there have also been a large number of *implicit* requirements which have required resolution as industry Operational Practices and standards to ensure the interoperability of reception of free-to-air digital terrestrial transmissions. Examples have included:

- the establishment of a quota for HDTV content which implied an agreed specification for HDTV formats; and
- the requirement to “simulcast” both SDTV and HDTV within each broadcaster’s multiplex influenced decisions on useful bit rates for combinations of modulation parameters in a 7MHz¹¹ channel.

In 2004 the then ABA established a requirement that the Commercial Television Industry Code of Practice recognize a new requirement that advertisements should not be excessively noisy or strident, and a requirement that licensees try to ensure that commercials do not sound louder than adjacent programming. This also provides an example of an *explicit* regulatory requirement placed on the free-to-air television broadcasters to develop an industry specification. The specification for audio levels and loudness followed considerable initial research into the contributing factors that influence the loudness characteristic in soundtracks.

In addition to these explicit requirements the ABA established digital planning parameters¹² which specified reference modulation for planning purposes that had a significant bearing on the reception characteristics and performance of DVB-T receivers in Australia.

¹¹ Australia was the first jurisdiction to require a 7MHz requirement in the DVB standards and as such influenced the DVB Project to reflect this in the DVB standards.

¹² Refer ACMA DTTB Planning Handbook, Table 2.1: Reference modulation for planning purposes