Digital Convergence Australia

SUBMISSION TO THE

PRODUCTIVITY COMMISSION INQUIRY INTO

AUSTRALIA'S BROADCASTING LEGISLATION

SEPTEMBER, 1999

Digital Convergence Australia
Submission to the Productivity Commission

Overview

The point of this submission is to expose the flawed and incorrect nature of the key technical arguments that are made in support of the propositions advanced in the August 1999 supplementary submission by FACTS. It specifically addresses the topics of Digital Channel Planning, Single Frequency Networks (SFNs) and High Definition Television (HDTV). In making it our aim is to demonstrate that:

- spectrum planning that optimises the deployment of SFNs, thereby achieving the efficiency necessary to allow the maximum number of new services, is both desirable and technically feasible, and
- standard definition and high definition digital signals can and should be broadcast together at all times, thereby facilitating technical standards that enable the use of affordable, world-standard set top boxes.

Introduction

Digital Convergence Australia (DCA) consists of AEMA (The Australian Electronic Manufacturers Association), AIIA (The Australian Internet Industry Association), ASTRA (the Australian Subscription Television and Radio Association), Austar, Fairfax, Foxtel, News Ltd, Optus and OzEmail. It has been formed with the aim of ensuring that Australia remains at the forefront of the digital information revolution and that the information society includes all Australians in an open, cost effective and timely manner. Its Charter forms Attachment 1 to this submission.

Many of the members of DCA have made independent submissions to the inquiry. This submission is not intended to supplement these. Rather its point is to correct some of the technical inaccuracies in the August 1999 supplementary submission by FACTS on the topics of Digital Channel Planning, Single Frequency Networks and High Definition Television.

Background

FACTS members have established a passive analogue television oligopoly market. With the introduction of digital television their present approach is clearly designed to:

- Protect their mass-market advertising revenues by prolonging their exclusive analogue franchises. These are already threatened by growth of subscription television and the Internet and could be undermined by availability of digital video recording technology.

- Entrench ownership of the loaned 7 MHz adjacent channel spectrum thereby limiting access opportunities for new and competitive services. The longer they are able to hold onto spectrum for both digital and analogue services, the less opportunity exists for competitive new services to benefit customers. This required

delaying their push for multi-channelling as it is not compatible with the promise of near theatre quality HDTV with surround sound that was used to secure 7 MHz free spectrum.

- Prevent competitive digital access to the broadcast spectrum by maintaining the moratorium on new broadcast services, narrowly defining datacasting so as to limit its viability, replicating their analogue spectrum gerrymander in the conversion to digital and by decrying the use of efficient digital spectrum planning techniques eg the wide deployment of SFNs.

- While utilising bandwidth through high definition transmissions, minimise their costs of introducing digital television by delaying local production of HDTV, initially broadcasting only up-converted SDTV and by deferring the need to provide a competitive datacasting service.

- Delay the return of analogue spectrum by discouraging the fast up-take of digital television through forcing expensive HDTV receivers on the market, narrowly defining datacasting, restricting multi-channelling by the national broadcasters and by establishing a dominant digital positioning as barrier to future competitive entry.

Digital Channel Planning and Single Frequency Networks

Australia's transition to digital television provides a once only opportunity to introduce entirely new services which, at this stage, are just beginning to be glimpsed in a variety of markets around the globe. For some time the members of DCA have been concerned that the outcome of the planning process for the allocation of spectrum for digital television and datacasting services could fall short of the legislated requirements and indeed could stifle the commercial development of new datacasting and broadcasting services.

Any such outcome that falls short of the possibilities and fails to provide sufficient useful spectrum for new services. It would be anti-competitive and would leave Australia well behind other nations in the emergence of the new digital economy and its services. This would lead to consumer uncertainty and disappointment resulting in a reluctance to spend on digital products with Australian households then lagging behind the communications revolution. It would also close off opportunities for employment and exports for our communications and information technology industries.

In light of the foregoing, it is clear that spectrum planning must be undertaken in such a way as to maximise the usefulness of this public asset for the provision of large quantities of data and new services to all Australians and not limit it simply to the continued supply of television programming.

DCA members certainly understand the time pressures for existing analogue broadcasters to plan, order and install necessary digital infrastructure so that digital broadcasting can commence on 1 January, 2001 and do not wish to cause any delay in achieving that goal. In fact, some DCA members expect to make many of the same purchasing decisions as the television networks and are keen to start their businesses. In this regard DCA has argued that the ABA should adopt a strategy for a phased rollout which meets the digital start date for the majority of the population and rapidly extends this to provide equal coverage with analogue "as soon as practicable".

Importantly, such an approach would avoid unfortunate planning choices, which would forever restrict the opportunities for new services, being made on the basis of inadequate time or information. It should also secure a sound base for harnessing the communications opportunities that will arise in the decades ahead and ensure households, and particularly young Australians, have access to a user friendly system in the lounge room offering real choice.

The ABA has been sympathetic to this approach despite attempts by FACTS to extend their analogue spectrum gerrymander into the digital era. The key to achieving spectrum efficiency in the digital era is the deployment of SFNs which facilitate many more services than is possible under the outdated planning advocated by FACTS. FACTS' unstated objective is to waste bandwidth thereby stymieing competitive new entrants and entrench the existing broadcasters as gatekeepers for all services receivable on televisions. Much of the misguided technical information in their supplementary submission furthers this objective.

Following consultations with the ABA, members of DCA commissioned BCL, the highly experienced and internationally respected consultancy arm of TVNZ, to undertake a detailed study regarding the implementation of SFNs in Australia. This included a detailed investigation into the viability of implementing a Band III SFN to cover those parts of the Sydney commercial licence area that are not sufficiently covered from the "Artarmon Triangle". In doing this Willoughby Channel 8 was to be used as representative of a digital service from the Artarmon Triangle. While there are some aspects of BCL's work that can be fine-tuned to even further improve its results, it provides a clear endorsement of the practicality of deploying a SFN to free-up spectrum to accommodate additional new digital entrants.

The ABA was most complimentary about the thoroughness of the BCL study, which provided considerably more detail than their own studies and subsequently advised that there was nothing in the report and its conclusions with which they had any problems. The study is now being used as the starting point for the ABA's SFN consultation group.

In summary the study concluded that:

- The existing Kings Cross and North Head sites are probably not required, but can be operated as repeaters off the Artarmon Triangle if broadcasters want to implement these sites for ease of reception with existing antenna alignments;

- The Central Coast sites of Gosford, Wyong and Bouddi are required with fixed links to achieve adequate ERP's, that cannot be achieved with simple repeaters, and to allow the guard interval protected areas to be optimised;

- The resultant SFN causes minimal self-interference within the Sydney licence area. It is estimated that 1210 people above suburban grade coverage and 491 above rural grade coverage would suffer interference (in total 0.045% of the area's population of approximately 3.7 million);

- Adjacent channel interference to services direct from the Artarmon Triangle will be caused in the close vicinity of the SFN sites. To avoid this any viewers in the vicinity of the translators who are watching the Artarmon Triangle services direct may have to watch the analogue translators instead (as should be the case already).

Deployment of this SFN frees up the channels adjacent to the analogue channels that are currently used at Kings Cross, North Head and at the three Central Coast sites. These would otherwise be required to achieve equivalent coverage to analogue.

Indeed, the coverage achieved under this proposal is superior to that of the current analogue services. No one within the licence area that receives an acceptable analogue signal will receive an inferior digital signal, in fact many will receive vastly improved signals. Moreover, with SFN, the deployment of very low power, low cost repeaters could be used to eliminate interference in residual localised pockets of poor reception, such as those viewers in the pocket of shadow to the north of Collaroy Plateau.

BCL has reviewed FACTS' comments regarding the deployment of SFNs. Their comments are at Attachment 2. These demonstrate that FACTS' technical claims regarding the limitations on SFNs are fallacious.

One of the arguments used by FACTS to decry the use of SFNs is based on "*the continued ability to provide local program and commercial inserts as part of a licence area…in areas [overlap regions] like the NSW Central Coast and the Gold Coast and Sunshine Coast*". The reality is that this rarely (if ever) happens in these overlap regions, as it is a breach of licence conditions. Overlap regions are already designated "dual zones" allowing for metropolitan stations to operate and deliver non-localised content in aggregated regional markets. If metropolitan stations now intend to offer localised content to the overlap regions they would need to apply for a new regional licence and request the ABA declare the region a "triple zone". This would be at the expense of new datacasting services.

It would be bad public policy for scarce spectrum to be used in such a manner. It would also be bad public policy for it to be squandered through acquiescence with FACTS' calls to perpetuate inefficient planning that does not fully exploit SFNs. However, if either of these occur, then the free-to-air stations concerned should incur additional expense comparable with the market value of the spectrum for other uses, in order to ensure that the spectrum fees what would otherwise be new services is not forgone by the Government.

FACTS also argues against the use of conditional access systems to control signal overlap, as "*intrusive big brother technology*" claiming that "*a requirement to use conditional access would also add significantly to the operating cost of a digital television, and make the system much more error prone*". The simple fact is that this already happens in Europe without inconveniencing viewers. Moreover, conditional access is necessary to enable considerable e-commerce opportunities to be generated by enabling customer-specific data and transactions on digital televisions.

From the foregoing it is clear that:

- the key technical arguments that are made in support of the digital channel planning and SFN propositions advanced by FACTS in their August 1999 supplementary submission are fallacious, and

- spectrum planning that optimises the deployment of SFNs, thereby achieving the efficiency necessary to allow the maximum number of new services, is both desirable and technically feasible.

HDTV

Perhaps the key factor in the success of digital television will be the attractiveness of the service proposition. If migrating to digital does not result in a significant improvement over the analogue, there will not be sufficient incentive to replace existing analogue equipment.

In this regard, FACTS' position on HDTV is driven by their belief "*that HDTV will be the norm for all television sets a decade from today…consumer demand for higher quality will drive this*". As can be seen from responses to the DCITA Options Paper on HDTV, this view is not shared by many including News Limited, Fairfax and Philips whose responses form Attachments 3 to 5 respectively.

As various parts of the world come to grips with the problems associated with the migration from analogue to digital television, it is becoming clear that few are gambling that the change will be driven purely by the viewer's desire for HDTV. The UK, the countries of Europe, Singapore, India and the other nations that have adopted the DVB standard all are opting for evolutionary approaches rather than a revolutionary one-off change straight from analogue to the highest quality of digital HDTV that has been conceived. It is this radical change that is proposed by FACTS.

It is increasingly evident that a range of other propositions including new data and interactive services, low cost receivers and a range of portable information and entertainment devices will be important factors in the successful take-up of digital television. While the members of DCA respect the desire and right of the free-to-air broadcasters who believe HDTV and surround sound will be the driver, we believe that ultimately the market and the consumers will make the final determination. It is therefore essential that the legislation not inhibit the future development of these markets whichever path the future evolution takes, nor require customers to undertake unnecessary risk or expense by having to second guess how this will develop.

There are ultimately a small number of key issues in selecting appropriate formats. These are the:

- quality of the display (and typical viewing environment);
- number of pixels per frame and the scan type;
- aspect ratio 4:3 or 16:9;
- production resolution;
- transmission data rate; and
- processing power and cost to decode the compressed stream.

The first three of these relate entirely to the end product. At present the debate is rendered largely academic since only very expensive studio or laboratory grade displays actually display anything approaching the 1920x1080 interlaced (1920x1080I) format preferred by FACTS. This format is the highest quality format

that an MP@HL (high definition) decoder can handle and is the accepted "production format". Lower format resolutions are currently more appropriate as a consumer format and manufacturers are currently only prepared to mass-produce screens to display these.

The 720x576 progressive (720x576P) format that can support a high aspect ratio screen is emerging as a very practical global candidate for a consumer format HDTV as it is well matched to display technology. Interestingly, the interlaced form of the same format is the highest quality Standard definition Television (SDTV) format that an MP@ML (standard definition) decoder can handle in Australia's 50Hz system.

Transmission rates are clearly of importance given the limited bit rate in a single 7MHz channel, but only the production format favoured by FACTS (1920x1080I) currently demands rates approaching the full bit rate. Further improvement in compression techniques is expected which will allow more spare capacity even with 1920x1080I.

While it may be argued that processing power and cost to decode will not be issues in the future this is certainly not currently the case with greatly increased storage and six times greater processing power required by MP@HL compared to MP@ML. The extent to which this changes will depend heavily on the worldwide market for MP@HL decoders. Current estimates of the additional retail price are in the $300 range.

There is one way forward which meets both the concerns of those who believe HDTV alone is too much, too soon and those who are concerned that commencing with SDTV alone will forever lock out a progression to HDTV. This is the simulcasting of a digital SDTV signal whenever a HDTV signal is transmitted as has been proposed by the Australian Consumers Association, News Limited, Fairfax and Phillips. This allows the market to evolve and does not irrevocably block potential future outcomes and desires.

When analogue transmissions cease, a decision on digital television format can then be made on the basis of actual experience. As is demonstrated by the following scenarios this leaves all options open while ensuring that any resultant legacy problem can be easily and inexpensively managed.

Scenario 1: HDTV is dominant.

All new receivers sold are HDTV capable. Provide one or two of the new channels on a temporary basis to support a SDTV multiplex dedicated to simulcast regular HDTV transmissions to the declining population of legacy SDTV receivers.

Scenario 2: HDTV all the time but only on niche channels.

HDTV is of interest to particular broadcasters to niche audiences who operate specific HDTV channels. Other channels support SDTV only. Most new receivers sold are SDTV. The HDTV/SDTV simulcast requirement becomes optional.

Scenario 3: HDTV part of the time.

Most new receivers are HDTV capable but there is an ongoing SDTV base that must be supported with two or three multiplexes. Will possibly evolve toward

scenario 1 as the additional cost of HDTV declines relative to SDTV or scenario 2 otherwise.

Scenario 4: HDTV fails as a consumer proposition.

No new receivers are HDTV compatible and no transmissions are made. No legacy problem exists, as existing HDTV receivers are SDTV capable.

Having demonstrated how a range of service propositions can be promoted by selecting appropriate formats and simulcasting a digital SDTV signal whenever a HDTV signal is transmitted, it is constructive to consider a hypothetical range of receiver products against the parameters of cost and display quality. This is illustrated in Figure 1. This diagram comes from a DVB publication "Receiver Opportunities of World DTTB Standards – A Receiver Manufacturer's View" by C M Huizer and J van der Meer and shows Philips' estimates of the relative cost of implementing a selected set of receiver options.

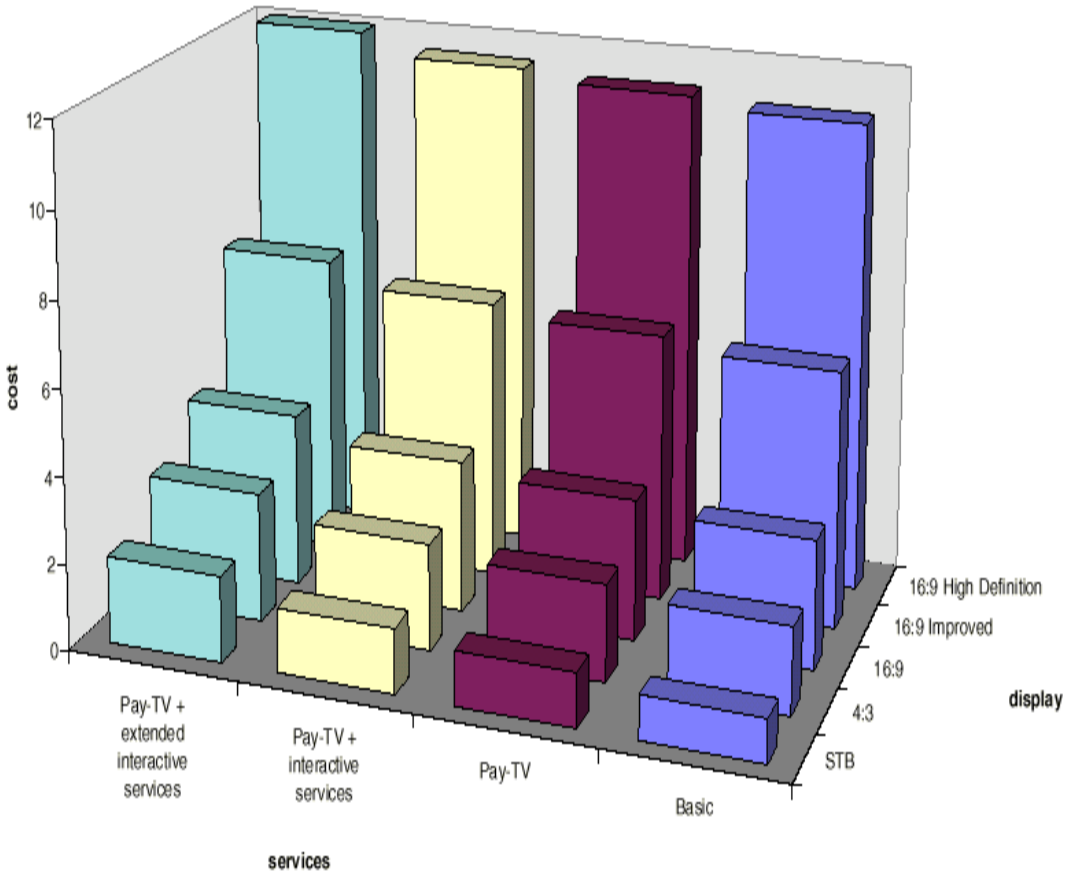

Figure 1 Cost of receiver options associated with display quality and new services

Figure 1 demonstrates that new services will be far more affordable than high definition picture quality. It also illustrates the relatively high cost of HDTV. This will be a deterrent to a rapid uptake of digital television.

The receiver options relating to picture quality and new services in Figure 1 are:

- STB:- Set Top Box with no display. The picture is substantially improved compared with analogue but limited by the interface to the analogue TV set used for display. Minimum video standard required is MP@ML.

- 4:3:- Integrated TV with conventional CRT display. Picture substantially improved over analogue. Minimum video standard required is MP@ML.

- 16:9:- As per 4:3 above. This is the most cost-effective solution to display all material without compromises. Minimum video standard required is MP@ML.

- 16:9 improved:- As per 16:9 above with improved picture processing. Advances in digital signal processing (eg progressive scan conversion) combined with low-cost silicon implementations allow for impressive picture improvement using SD display technology. Minimum video standard required is MP@ML.

- 16:9 High Definition:- HDTV sets with considerable additional cost to realise a convincing improvement in picture quality compared with 16:9 improved. Minimum video standard required is MP@HL.

- Basic:- Standard receiver with simple Electronic Programme Guide (EPG).

- Pay-TV:- As per basic plus support for Conditional Access (CA) including PSTN return channel and enhanced EPG to support pay-per-view.

- Pay TV + basic interactive services:- As per Pay TV plus information browsing, e-commerce etc. This is likely to be necessary for a basic datacasting service.

- Pay TV + extended interactive services:- As per Pay TV + basic interactive services plus games, local storage (eg hard disk) to retrieve data overnight and store “plug-in’s”. This will support an advanced datacasting service.

From the foregoing it is apparent that:

- the key technical arguments that are made in support of the HDTV propositions advanced by FACTS in their August 1999 supplementary submission are fallacious, and

- standard definition and high definition digital signals can and should be broadcast together at all times, thereby facilitating technical standards that enable the use of affordable, world-standard set top boxes.

Digital Convergence Australia

Attachment 1

CHARTER

Digital Convergence Australia (DCA) believes that the transition to digital terrestrial broadcasting has benefits for all Australians. Spectrum is a finite resource owned by the Australian people and managed by the Government on their behalf. Use of this spectrum must be optimised to achieve diversity of operation and content. Equally technical standards must facilitate interoperability between services and allow a viable consumer proposition to be created.

The founders of DCA are comprised of leaders and industry associations in six relevant industry segments: subscription broadcast services, Internet services, telecommunications, publishing, datacasting and consumer electronics.

The group is committed to ensuring that:

- the efficient planning of the terrestrial broadcasting spectrum is not thwarted by incumbent spectrum users;

- Australia benefits from efficient planning of the terrestrial broadcasting spectrum, by fully employing the new technical capabilities and other advantages of digital transmission over analogue, in order to maximise the number of 7MHz channels for new entrants so that a diverse range of media interests will be able to offer consumers digital services in a competitive market;

- all interested parties are consulted as part of the digital spectrum planning and technical standards setting processes, so as to ensure that Australia's digital environment delivers the potential for the greatest number of cost-effective services, applications and products to consumers;

- Australia fully complies with the internationally accepted Digital Video Broadcast (DVB) standards, including ensuring backward compatibility with existing DVB consumer compliant equipment, thereby enhancing competition by minimising barriers to entry through interoperability of services;

- Australia adopts widely internationally compatible and deployed transmission and receiver specifications which allow the use of low cost set top boxes (STB), thereby allowing consumers to make the choice between a basic, low-cost STB and more expensive STBs with greater functionality;

- Australia embraces interoperable end to end digital transmission systems for terrestrial, satellite and cable, fixed and mobile reception that promotes rapid deployment and acceptance by the public.

Achieving these goals will ensure the Australian public benefits from a vibrant digital television and datacasting industry that delivers a vast range of news, information, entertainment, education and e-commerce products of extraordinary diversity.

Attachment 2

TVNZ (AUSTRALIA) PTY LIMITED
ACN 062 953 940

To : John Ward
News Ltd

Date : 2 September, 1999

Dear John,

I have scripted some comments regarding Single Frequency Networks (SFN's) after reading the extract you forwarded to me from the FACTS submission to the Productivity Commission. The submission does not reflect our positive experience with SFN's and is generally over negative about the their usage. Our position based on all the planning work performed to date (including the design a Sydney SFN) and from our practical experience (of installing and operating a real SFN) is one of confidence that they will work and work well.

The following points are raised in an attempt to clarify some of the issues the FACTS submission raised.

1 Key Parameters of an SFN

One of the key principles to get the benefits from a SFN is that the signals in the network are identical. This means the program content must be the same as well as the modulation scheme.

If the program content is to be different (as may be required for regional breakouts) then the system cannot be planned or operated as a single frequency network.

The submission refers to different modulation schemes. It is unclear what is meant by this as, to our knowledge, only one modulation scheme is under discussion in Australia, namely DVB-T. We surmise therefore that the submission is referring to the number of carriers to be used.

Although the DVB standard allows for variations in a number of parameters (ie error correction, number of carriers…) the parameters must be the same within the SFN to get the benefits of the SFN. One of the key parameters is the number of carriers. The DVB standard allows either 2k or 8k carriers. The longest guard interval and hence

best multipath performance is gained with the 8k option. This is the option we would recommend for both the main and the in-fill services for broadcasting.

In the UK the systems are using 2k carriers. The main reason being that the only decoders readily available at the start up were 2k carrier decoders. There is now talk of changing to 8k to allow an SFN implementation however there is now (already) a legacy issue (where most decoders can only decode 2k carrier signals). If the UK were starting now then I have no doubt that they would be implementing 8k decoders now they are readily available.

2 Adjacent Channel Interference

Adjacent channel interference occurs when then is a strong signal on the channel higher or lower than the one wanted to be received. This disparity of signal levels usually occurs near to translator sites where viewers are trying to receive the main transmitter site in the presence of the stronger adjacent channel translator signal.

Because of the proposed allocation of digital frequencies or in fact any new frequencies it is likely that adjacent channel issues will become more prevalent. The number of people affected will be very small, close to the site (within a few hundred metres) and there is an immediate remedy – they can watch the translator frequency (ie the stronger signal) by retuning their TV set and perhaps redirecting their antenna. As our report to you on a Sydney SFN demonstrates, the number of viewers so affected is negligible.

3 Robustness of the Digital Signal

Compared to the analogue single, the digital signal is extremely robust and can tolerate and use multipath reflections. There have been many demonstrations in moving vehicles receiving perfect pictures. Flutter due to aircraft and truck movement hasn't been experienced in any of the installations we have had involvement with.

4 The SFN Experience So Far

Trials of SFN's have shown that even in a mixed analogue/digital environment there is minimal interference (tending to zero).

Planning for the Sydney area shows that an SFN will work successfully and there will be almost no interference. Coverage will be better and more widespread that for the analogue services currently broadcasting. Using an SFN will allow for easy expansion for new areas of population and to in-fill pockets around Sydney not currently covered by the main analogue transmitter or its translators.

Best Regards

Ian Gair

Attachment 3

NEWS LIMITED

Incorporated In South Australia
ACN 007 871 178

RESPONSE TO OPTIONS PAPER

ON DIGITAL TELEVISION

FORMAT STANDARDS (HDTV)

August, 1999

RESPONSE TO OPTIONS PAPER ON DIGITAL TELEVISION FORMAT STANDARDS (HDTV)

OVERVIEW

Since December 1998, when our response to the issues paper was formulated, it has become clear that:

- the cost of HDTV displays capable of receiving the 1920x1080 interlaced scan format favoured by the free-to-air broadcasters and some manufacturers is reducing far more slowly than other digital technology. Accordingly, the retail price of receivers capable of displaying transmissions in this format (currently in excess of $30,000) is unlikely to be a consumer proposition for many years; and

- internationally, consumer demand for digital television is being driven by the provision of greater choice (multi-channelling); the availability of new innovative services (datacasting) and improved picture quality (not necessarily HDTV).

For digital television to be a success in Australia it is essential that there is a compelling consumer proposition to ensure a fast uptake. This will require a low cost set-top-box/receiver option, the provision of multi-channelling by the national broadcasters and the introduction of a new open datacasting industry . Mandating that HDTV transmissions utilise the highest possible format will be inimical to this.

News Limited's proposal is that during the analogue-digital simulcast period broadcasters should be able to transmit a range of HDTV formats, however they must simultaneously provide an SDTV base level version of that transmission. When analogue transmissions cease, broadcasters will be free to transmit any HDTV format. Their decision will then be made on the basis of actual experience and with knowledge of consumer reaction.

HDTV FORMATS AND REGULATION

As various parts of the world come to grips with the problems associated with the migration from analogue to digital television, it is becoming clear that few are gambling that the change will be driven purely by the viewer's desire for HDTV. It is increasingly evident that a range of other propositions including new data and interactive services, low cost receivers and a range of portable information and entertainment devices will be important factors in the successful take-up of digital television.

While we acknowledge the right of the free-to-air broadcasters to believe HDTV and surround sound will be the driver, we believe that ultimately the market and the consumers will make the final determination. It is therefore essential that the legislation not pre-empt that consumer decision.

There are three main points to consider when developing the regime to apply in Australia. They are that:

- there will not be a commercially viable uptake of receiver equipment which can actually display 1920X1080I as it will be too expensive – both as an absolute sum and in comparison to other options;

- there is a range of other less expensive HDTV options will be more compatible with display technology as well as more bandwidth efficient; and

- 720X576I (the preferred digital SDTV option) when displayed, is dramatically better than the analogue image displayed today.

Given these, if one were to mandate a single HDTV format today which would bring the maximum benefits to the maximum number of consumers, it would have to be 720x576P.

Evolutionary proposal for the introduction of digital television in Australia

The UK, the countries of Europe, Singapore, India and the other nations that have adopted the DVB standard all are opting for evolutionary approaches rather than a revolutionary one-off change straight from analogue to the highest quality of digital HDTV that has been conceived.

The incumbent free-to-air broadcasters have been granted, free of charge, valuable and scarce spectrum in the broadcasting services bands to allow them to transmit the highest possible form of HDTV. They have argued that only that product would encourage and ensure the consumer take-up of digital television. Within this 7MHz there is sufficient excess bandwidth to concurrently provide a SDTV signal and any one of a range of HDTV options. The provision of this SDTV signal ensures that:

- A far greater number of Australian consumers will be able to enjoy the benefits of digital transmissions - digital television will not be the domain of the elite;

- inexpensive, multi-functional, world standard set top boxes can be used by the mass market;

- a fast take up of Digital Television is promoted;

- new industries such as datacasting and broadband Internet services embracing e-commerce can assist in the take-up of the total digital broadcasting experience in the average Australian household;

- manufacturers can provide receivers and set top boxes with confidence that a significant market exists;

- free-to-air stations will not be disadvantaged and can invest in HDTV content with confidence. They will then be uniquely placed to market to the consumer and promote higher level set top boxes or receivers for the reception of HDTV; and

- satisfaction with the Government's decision to provide 7MHz free of charge to the incumbent broadcasters is underwritten by ensuring consumer benefits flow to the greatest extent possible.

In light of the above, we propose that Australia adopt a staggered approach, the key steps being:

1. *At commencement of digital – keep options open.*

   During the analogue-digital simulcast period broadcasters may transmit any HDTV format desired and must simultaneously provide an SDTV base level version of that transmission. It is very dangerous, and in this proposal unnecessary, for regulators to attempt to define any specific subset of possible MP@HL formats given the lack of clarity of possible future market directions. The Standards Australia definition is an acceptable definition for consumer HDTV.

2. *When analogue transmissions cease – decide on basis of actual experience what formats to adopt or mandate.*

   The support of SDTV receivers will not create an ongoing legacy issue as this can be efficiently addressed following the return of the analogue spectrum in 2008.

PRIME TIME AND SPECIFIC PROGRAMMING REQUIREMENTS

Quotas for locally produced HDTV product should form part of content requirements, as discussed in our earlier submission. If local material is not produced in HDTV and the Government accepts the free-to-air networks' intention to do no more than up-convert SDTV, the full benefit of HDTV for those consumers who purchase receivers capable of displaying it will be lost. And HDTV will then be seen as little more than a consumer scam.

PROVISION FOR NATIONAL, REGIONAL AND REMOTE BROADCASTERS

While our views on the important role of the national broadcasters in driving HDTV have not changed, we now support some flexibility in prescribing their HDTV formats and targets. This would allow them greater opportunity for multi-channelling, and that will be even more important in developing an initial consumer proposition for DTV.

Our views on regional and remote broadcasters are unchanged.

Attachment 4

Fairfax Submission on HDTV Formats Options Paper

Executive Summary

Fairfax welcomes the Department of Communications Information Technology and Arts Discussion of Options Paper regarding digital television format standards (High Definition Television) ("Options Paper"). We are pleased that the policy importance of this issue is being recognised and explored, and that the Department has recognised the option of requiring all HDTV programming to be simultaneously transmitted in SDTV. In our view, this option delivers both the benefits of HDTV for those who choose to invest in HDTV displays, and well as enabling Australian consumers to use cheap, world standard SDTV set-top boxes (STBs) which are being produced in great numbers for European markets. Requiring the simultaneous transmission of SDTV whenever HDTV is broadcast preserves the government's original policy decision to adopt HDTV while ensuring compatibility with the rest of the world.

This is crucial because Australia is now alone in the DVB world in proposing to transmit HDTV without SDTV. Developments over the last several months have crystallised the policy issue of whether Australia should have a continuous SDTV signal. If we do not, we risk paying a heavy price at every level of the production chain, and especially in the cost of consumer equipment.

HDTV must be accompanied by SDTV

In our original submission to this review we emphasised the need for main profile at main level (MP@ML) transmission with MPEG 1 - Layer II (MPEG) sound (collectively known as SDTV) in order to allow consumers to use cheap, world standard STBs which are being produced in very large numbers for European markets. In our view, the best way to achieve this aim while remaining consistent with the government's original policy decision to adopt HDTV, is to require all HDTV (MP@HL with Dolby Digital) transmissions to be accompanied by a SDTV signal within the same 7MHz channel.

Australia is alone in proposing HDTV only transmission

Australia has adopted the Digital Video Broadcast - Terrestrial (DVB-T) standard for terrestrial digital television transmission. This standard has been adopted by 18 other countries including the UK, France, Germany and 12 other European countries as well as India, Singapore and New Zealand.[1] All of these other countries have adopted an approach of broadcasting SDTV at all times with HDTV being transmitted as an optional extra, if at all.[2]

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1 See http://www.dvb.org./dvb_framer.htm

2 See eg Singapore where "Singapore broadcasters are expected to start off with SD programming in the initial stage" but "for special occasions, they might broadcast in HD, such as during the National Day Parade." Charlotte Ong, "SBA paving a clearer path for broadcasters to go digital", APB, July 1999, page 17.

This means that the vast majority of STBs being produced for the more than 1.4 billion[3] consumers in these markets will be capable of decoding only SDTV and will go blank if a HDTV only signal was broadcast. In the UK, where ONdigital is providing SDTV boxes free to consumers with a subscription, over a quarter of a million such STBs are already in consumers' homes in the first 6 months of operation.[4] The BSB / BIB (Open…) box, also now free, is expected to reach penetration of one million by late 1999, and five million by 2004. This is a clear indication that economies of scale will continue to push the price down.

Given these developments, it is increasingly compelling for Australia to adopt a transmission standard that would deliver to Australian consumers the benefits of the huge economies of scale available in the production of SDTV STBs.

HDTV STBs will be far more expensive that SDTV STBs

It has been suggested that there would be no significant price difference between a HDTV box and a SDTV box. Not only is this suggestion contrary to common sense, but it is unsupported by any firm evidence.

HDTV STBs have a number of additional components which will inevitably make them more expensive than an equivalent SDTV box. Firstly, decoding MP@HL requires significantly greater processing power and 6-8 times the memory required for MP@ML decoding. Secondly, decoding a Dolby Digital sound stream also requires greater processing power than decoding a MPEG 1- Layer II sound stream.[5] In addition, because Dolby Digital is a proprietary standard, manufacturers must pay a licence fee to Dolby Laboratories.

A visit to the electronics section of a local Hi-Fi or department store gives some indication of the very significant price differential caused just by the addition of Dolby Digital decoding. An entry level amplifier with Dolby Digital decoding retails for between A$200-250 more than the equivalent amplifier without Dolby Digital decoding.[6]

Moreover, current prices for existing STBs show an even larger price differential. The cheapest HDTV STB available in the US (the RCA DTC100) has a suggested retail price of US$649.[7] This is a box which downconverts HDTV to SDTV for display on a SDTV television set. STBs which decode and output HDTV range from US$1500 - $3000.[8] Yet in the UK they are giving SDTV boxes away and Fairfax has a firm quote for a SDTV box which has been modified to suit Australian 7MHz channels for US$200.[9]

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3 Combined 1998 populations of DVB countries from www.popin.org/pop1998/2.htm

4 See http://www.digitag.org/dtg_ondigital8july.htm

5 There is some confusion over the issue of the additional cost of Dolby Digital decoding, which is sometimes compared to MPEG 2 surround sound decoding rather than to MPEG 1 - Layer II decoding. Dolby Digital and MPEG 2 are both surround sound formats which will add significant extra cost to the STB. In contrast, MPEG 1 - Layer II is a mono or stereo sound format which is automatically included in all SDTV chips.

6 Source: Grace Bros & Georges Electronics Sydney City Stores.
Kenwood KRF-8010 (5 x 100w amplifier with Dolby Digital decoding): $1099
Kenwood KRF-7010 (5 x 100w amplifier without Dolby Digital decoding): $845
Yamaha RX V595 (amplifier with Dolby Digital decoding included): $1140
Yamaha RX V592 ("Dolby Digital Ready" amplifier without the Dolby Digital decoding circuitry): $940

7 Consumer Electronics Manufacturers Association March 1999. Attachment A.

8 *ibid.*

9 Quote from Pace Micro Technology plc. Attachment B.

These price differentials are based on STBs which actually exist and are available for purchase, not on speculative predictions. While prices for both HDTV and SDTV STBs are likely to come down between now and 1 January 2001, the economies of scale are very heavily in favour of the SDTV box. Of all the countries that have adopted DVB-T transmission, only Australia, Singapore and possibly Sweden are proposing to transmit HDTV at all, with the later two simulcasting with SDTV on the rare occasion HDTV is transmitted. Thus, even assuming that 50% of the STBs sold in Singapore and Sweden have HDTV decoding, the market for DVB HDTV boxes will be less than 2% of the market for SDTV STBs.[10]

The result of the economies of scale so heavily favouring the SDTV box is that the very large current price differential between a SDTV box and a HDTV box is unlikely to decrease and may even increase, at least in relative terms, over time. Thus a SDTV box is certain to be substantially cheaper than an equivalent HDTV box for the foreseeable future. Moreover, the purchase of a HDTV box delivers no benefit to consumers unless they also acquire a HD display. Given that this runs to several times the cost of the box, with no comparable volume drivers evident on world markets, this is unlikely to be attractive.

HDTV / SDTV simulcast is the DVB endorsed approach

The transmission of a SDTV signal in addition to a HDTV signal within the same 7MHz channel is not only technically achievable but it is the method of HDTV implementation advocated by the chairman of the relevant DVB committee - Ken McCann.[11] He states: "[t]his enables *a simulcast approach to SDTV and HDTV* to be adopted, with each version of the program independently optimized to provide optimum quality at the minimum total bit rate" and "*HDTV can be efficiently added to DVB transmissions in a way that does not disadvantage the owners of standard definition IRDs* or prejudice the rapid and successful implementation of digital television at standard definition."[12] [Emphases added].

The Options Paper raises the issue of the cost and technical implications for broadcasters and equipment manufacturers of simulcasting HDTV and SDTV. The above statements make it clear that the way DVB intended HDTV to be implemented is in simulcast with SDTV, not on its own. Thus perhaps a more relevant question for this review is what are the cost and technical implications of implementing HDTV without SDTV as FACTS advocate. In any case FACTS has stated in its initial submission to this review its members "will rely predominantly on 'upconverted' standard format program material for some time" and have argued against any requirements for HDTV originated programming on the basis of the additional elements of their distribution chain that they would have to convert from SDTV to HDTV at "enormous" cost. These arguments reveal that HDTV is far more expensive than SDTV at every stage in the supply chain from camera to the consumer's TV screen. The cost implications of requiring SDTV to be broadcast with HDTV at all times are minimal because all equipment which can handle HDTV can also handle SDTV and, as

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[10] While some broadcasters in the US have adopted HDTV, the US has adopted the ATSC digital TV standard rather than DVB, so US HDTV STBs will be incompatible with the Australian DVB transmission system. In any case even the 275 million consumers in the US market are dwarfed by the 1.4 billion consumers in the market for DVB SDTV STBs.

[11] Chairman of the MPEG Implementation Guidelines Group within the DVB Technical Module.

[12] Ken McCann, "DVB and MPEG - Devising HDTV Guidelines" *Supplement to World Broadcast News,* November 1998 pages 12-14.

noted above, almost all program material will be SDTV in the first place and thus will not require modification to be broadcast in SDTV format.

In order to be able to transmit both HDTV and SDTV within the same 7MHz channel, broadcasters may not be able to adopt the very highest resolution within MP@HL (1920 x 1080 at 50Hz interlaced) but would be able to adopt any of the middle and lower range formats within the MP@HL. The reality is that 1920 x 1080i is a production standard which even the best HDTV consumer television sets are not capable of displaying. It is for this reason that only a very small percentage of US broadcasters are transmitting HDTV in this format while the other digital broadcasters have adopted the 720p or 480p formats. SBS had already recognised this trend in its initial submission to this review when it stated that "SBS would use 720x576x50P [576p] in 16:9 format as our normal HDTV format."

HDTV only transmission is a technically flawed approach

As we stated in our initial submission to this review, the government's own forecasts recognise that the number of consumers purchasing HDTV displays will be extremely limited (4% of digital TVs in 2005). The other 96% of consumers converting to digital will have to convert the HDTV signal down to SDTV and thus will not gain any picture quality enhancement from HDTV (as compared to SDTV).

Indeed technical studies have shown that upconverting SDTV material to HDTV for transmission and then downconverting it again to SDTV at the STB will result in a loss of signal quality compared to straight SDTV transmission.[13] The authors of this study state "[t]here are, however, a number of technical reasons that indicate that such a proposal [to upconvert SDTV material to HDTV] would not only be *wasteful in transmission bandwidth* ... but also *lead to inferior picture quality* at the consumer display."[14] [Emphases added]. In addition, as noted in the Department's initial Discussion Paper for this review, because less error correction can be included in a HDTV transmission, consumers at the edges of coverage areas may get a worse picture if HDTV only is adopted.

An important feature of DVB digital transmission is the ability to receive a clear picture on portable and mobile devices, even while moving. These portable and mobile devices will generally have small screens and no surround sound capability and thus will gain no benefit from HDTV. For this reason and because the greater demands of HDTV decoding would add additional complexity, limit battery life and cause heat dissipation problems, mobile and portable devices will almost certainly only be able to receive SDTV signals. If HDTV is broadcast without an accompanying SDTV signal, Australians will be cut out of this important market segment.

As noted in our contemporaneous submission in relation to digital TV retransmission, transmission of HDTV without any SDTV signal will cause significant problems for pay TV operators seeking to retransmit FTA digital signals on their SDTV satellite and future cable TV systems, and is inconsistent with the government mandated standard for digital satellite pay TV.

Thus it is clear that transmission of HDTV without an accompanying SDTV signal is a poor technical option which will degrade picture quality for the vast majority of consumers

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[13] See Alois Bock & Gordon Drury, "The Introduction of HDTV into Digital Television Networks", *SMPTE Journal*, August 1998 page 552.

[14] *id.* page 554.

without HDTV displays, limit interoperability with pay TV and forestall the development of the mobile and portable market in Australia.

Standards Australia has not and will not resolve this issue

The recent debate and vote by Standards Australia CT2 Committee on the Digital TV Transmission Standard - DR 99047 indicates that Standards Australia is not the appropriate forum for resolving policy issues such as HDTV/SDTV simulcast. In this forum a large number of participants[15] raised concerns regarding the transmission of HDTV and Dolby Digital only, without any SDTV signal with MPEG sound, but most were ultimately convinced by "advice from Standards Australia (that) consideration of the standard for the purposes of the ballot must be confined to technical reasons."[16] Ultimately the final transmission standard has merely provided broadcasters with a range of technical options for digital transmission and has not dictated which options broadcasters must use. While this was a considerable change from the original proposal, it does not address the policy issue which remains for this inquiry.

Standards Australia itself obviously considers that the issue of mandating simulcast of SDTV whenever HDTV is transmitted is a policy matter for the government, not a technical standards issue. This view is reflected in the comments of many of the industry participants in the transmission standard debate.[17] It is therefore timely that in the context of this review and the concurrent review of digital TV retransmission the government has the opportunity to make a policy decision on this issue.

HDTV originated programming

While Fairfax does not have strong views on the amount of HDTV programming that the FTA broadcasters should be required to transmit, it will be evident from the discussion above that Fairfax considers that upconversion of SDTV material to HDTV for transmission is a waste of bandwidth which will produce a poorer quality picture for the consumer. Consequently, any goals and targets for HDTV should concentrate on HDTV originated programming rather than upconverted programming.

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[15] Of the 18 participants registering votes, 9 raised concerns about Dolby Digital or HDTV only transmission. Four of these (Digital Convergence Australia "DCA", Cable & Wireless Optus, Australian Consumers Association "ACA" and Australian Subscription Television and Radio Association "ASTRA") consequently voted NO to the standard in the first round of voting, while five others (Australian Information Industry Association "AIIA", Community Broadcasting Association of Australia "CBAA", Consumers Telecommunications Network Inc "CTN", Telstra and NTL Australia) voted YES with comments registering their concerns regarding requirements in the standard for receivers to have HDTV and Dolby Digital decoding and/or the failure of the standard to require simulcast of SDTV with MPEG sound whenever HDTV is transmitted.

[16] See CT-2 Postal Ballot Report, summary of CTN position.

[17] See eg CBAA: "Legislation that required broadcasters to simulcast SDTV whenever HDTV was in use would allow for a wider range of receiver solutions. In the absence of such legislation, the Draft Standard necessarily allows for HDTV and SDTV formats without the requirement for their simultaneous transmission by a broadcaster. ... Whether that is the correct consumer proposition for Australia is a moot point, but it is not one for Standards Australia to contemplate. *It is a policy matter for the government*." [Emphasis added]
CTN: "It would therefore be inappropriate to block a technical standard on the basis of the flawed policy framework."
DCA: "DCA's concerns related to the transmission of MP@HL and AC-3 without MP@ML and MPEG I sound remain. Although we now accept the position stated by a number of other voters that these issues are best dealt with at a policy level rather than as a technical standards decision."

Conclusion

Australia is alone in the DVB world in proposing to transmit HDTV without any accompanying SDTV signal. Australia is in this lonely position not because it is a world leader in digital TV - it clearly isn't - but because its proposed approach is contrary to the DVB endorsed method of HDTV implementation, is technically flawed and will deny Australian consumers the benefits of the economies of scale available from world standard SDTV STBs.

The government has a chance to prevent this while preserving its original decision to support the adoption of HDTV. This chance requires the government to mandate that all HDTV transmissions are accompanied by a SDTV simulcast within the same 7MHz channel.

Attachment 5

PHILIPS

A response to The Department of Communications, Information Technology and the Arts
'Discussion of Options' paper:

Review of Digital Television Format Standards (High Definition Television)

A submission by

Philips Sound and Vision
The Consumer Electronics division of Philips Electronics Aust. Ltd
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Executive Summary

- Successful consumer products are the direct result of an industry wide agreement on standards for the product, a consumer need and affordability.

- Digital TV provides an opportunity to review & change the Australian TV channel spacing from the existing mixture of 7MHz and 6MHz to 8MHz. It provides spare capacity for ancillary services and room for future needs.

- Transmission & reception of true HDTV, as desirable as that may be, is *very* costly for both the FTA broadcaster and the viewer.

- Philips maintains that Australia requires a flexible Digital Television system that provides interoperability between Free to Air broadcasters, Pay TV operators and Datacasters to ensure mass market appeal offering consumer choice.

- To achieve interoperability throughout the industry, a better approach is to require the FTA's (by legislation) to transmit Standard Definition TV (SDTV) at all times as well as High Definition TV (HDTV). SDTV provides *near studio quality* pictures. The use of MPEG audio with Digital TV should be mandatory (by legislation) to maintain interoperability. Philips views the legislative inclusion of SDTV with HDTV as an evolutionary process that aims to establish Digital TV in the market place. As well, it provides ALL consumers with a choice:
    - Purchase an affordable Digital SDTV with near studio quality pictures, or
    - Purchase a very expensive HDTV with high definition pictures

- A limit of three *(Option 2)* MP@HL HDTV Progressive Scan only display formats:
    1. 720 x 576 x 50Hz, 1:1 progressive scan (16:9 aspect ratio)
    2. 1280 x 720 x 50Hz, 1:1 progressive scan (16:9 aspect ratio)
    3. 1920 x 1080 x 25Hz, 1:1 progressive scan (16:9 aspect ratio)

  Progressive scan formats are best suited for displaying graphics and text such as those found on the internet, electronic program guides and personal computers.

- MPEG2, an open audio standard, must be the mandatory audio system for Digital TV.

- HDTV + SDTV with MPEG audio provides interoperability and a choice of services for the consumer at affordable prices. The government **must** mandate HDTV + SDTV with MPEG sound to ensure Digital TV is within the reach of **all** Australians and not just a privileged few!

1.0 Introduction

When Australians were introduced to B&W television in 1957, it was the technology that ended our isolation from the rest of the world by bringing it into our living room. At the same time it began to dilute the distance between country Australia with the major capital cities.

During the next 40 years, there was one major technology change to television, when in 1975 Australia switched to colour transmissions. The take up rate of CTV in Australia surpassed all expectations with faster penetration rates than those of either Europe or the United States. In essence however, a B&W TV manufactured in 1957 can *still* display today's analogue colour transmission to give a B&W picture with mono sound. Transmission and reception standards have remained basically the same since 1957!

Many advances in television technology have occurred to the consumer's TV. With the aid of "smart" electronics, microprocessors and ever improving production techniques the humble television has truly enhanced the viewing experience. It is hard to imagine a TV without a cordless remote control, On Screen Display (OSD) user menus, stereo sound, auto-tuning or options like Picture in Picture (PIP) and or 100Hz flicker free picture technology.

Australians have embraced many consumer products:

Successful Consumer Products	**Where are they now?**
Compact Cassette	8 Track Cartridge Players
FM Stereo	Reel to Reel Tape Recorders
VHS VCR	Quadraphonic Sound
Compact Disc	Beta VCR
DVD	AM Stereo
CD Disc Recordable / Rewriteable	Vinyl Record Players

Successful consumer products are the direct result of an **industry wide agreement** on **standards** for the product, a **consumer need** and **affordability**.

In 1984 the Compact Disc player (a Philips/Sony invention) was the world's first consumer experience with a digital product and it continues to be an outstanding worldwide success.

The introduction of **Digital Television** is the next major digital technology milestone for Australians, offering consumers quality pictures, near CD quality sound, as well as exciting ancillary services such as internet access, email, home banking, electronic program guides; all centered around the TV set. Finally an opportunity for true convergence between television and computers to satisfy the rapidly increasing population of computer literate consumers. It will also educate and encourage non-computer literate consumers to use this new medium.

It also presents exciting opportunities for all sectors of the TV industry, from pre-production, filmmakers, broadcasters, studio & transmission equipment manufacturers, television manufacturers and retailers.

For government, an opportunity to deliver regulation/legislation for a flexible Digital Television system to ensure interoperability between Free to Air (FTA) broadcasters, Pay TV operators and Datacasters, that provides choice for ALL Australians at an affordable price. Philips strongly supports the introduction of Digital TV in Australia; it will be the bridge for the successful transition from the existing analogue TV system to Digital TV.

2.0 8MHz TV Channel Spacing

DVB-T Digital TV system for 7MHz was chosen to fit the existing *Australian* channel spacing regime and facilitate the conversion process. We believe that while this has merits for the conversion process, it seriously underestimates future technology advances.

As demonstrated time and time again in the computer industry, the rapid advances in CPU clock speed's, processing power, through-put, and hard disk drive capacities that have increased from around 40MB in the early 1990's to 4GB of today, digital technology marches on. Whilst such rapid advances may not occur in Digital TV, spare capacity in the data pipe is a very desirable option.

The case for 8MHz channel spacing is a reality for Digital TV that cannot be ignored. It provides spare capacity for ancillary services and room for future needs.

As the Australian VHF / UHF TV spectrum is not over-crowded like those of Europe and the UK we strongly recommend this issue be re-examined prior to the introduction of Digital TV. Now is an opportune time to review and change channel spacing. There are *no* similarities between the existing analogue transmissions and Digital TV transmissions except for content; both transmission systems are mutually exclusive!

3.0 High Definition TV and Standard Definition TV

Consumer expectation of High Definition Digital Television dramatically differs from technical HDTV specifications and it could be argued that most consumers would mistake a DVD picture displayed on a current analogue widescreen colour TV as HDTV! **Transmission & reception** of **true HDTV**, as desirable as that may be, is *very* costly for both the FTA broadcaster and the viewer.

After exhaustive testing of the available Digital TV systems with HDTV capability, the European DVB-T system was chosen for Australia. DVB-T uses MPEG digital technology to provide two levels of picture definition:

- Main Profile at Main Level (MP@ML) - Standard Definition TV (SDTV)
- Main Profile at High Level (MP@HL) - High Definition TV (HDTV)

The Free to Air broadcasters propose that they only transmit HDTV (MP@HL) format using Dolby AC-3 audio. They have indicated that for most of the time, the transmitted source material will be up-converted from standard definition to high definition. It is also acknowledged throughout the industry that up-conversion will be the norm for many, many years due to lack of high definition source material.

The Minister for Communications in 1995 mandated that Pay TV satellite services be DVB compliant using MP@ML transmission format with MPEG audio. The Pay TV industry also

adopted the Government mandated satellite standard for the cable network. This makes the FTA broadcasters proposal for HDTV incompatible with existing and future digital SDTV Pay TV hardware!

Philips maintains a **successful Digital TV** system **in Australia** requires **a flexible standard** that provides **interoperability between Free to Air broadcasters, Pay TV operators and Datacasters** to ensure **mass market appeal**.

3.1 The case for including MP@ML SDTV Display Format with HDTV

To achieve interoperability throughout the industry a better approach is to require the FTA's (by legislation) to transmit in (MP@ML) - Standard Definition TV (SDTV) at all times as well as (MP@HL) High Definition TV (HDTV). The use of MPEG audio should be mandatory (by legislation) to preserve interoperability. Technically, this is well within DVB-T's specifications and capabilities. Transmission of SDTV also avoids picture quality losses during up-conversion to HDTV followed by down-conversion back to SDTV as would be the case with Set Top Box decoders. SDTV also provides a standard format for ALL operators for data exchange without the need for re-conversion. Philips views the legislative inclusion of SDTV as an evolutionary process that aims to establish a common ground for all players. As well, it provides ALL consumers with a choice:

- Purchase an affordable Digital SDTV with near studio quality pictures, or
- Purchase a very expensive HDTV with high definition pictures

This approach gives consumers choice and affordability with an easy transition path to Digital TV. As the technology matures, and prices fall, the consumer path to HDTV becomes clear. For global TV set manufacturers like Philips, it enables Australia to share the global DVB-T manufacturing effort, ensuring product availability at affordable prices and mass market appeal. It also avoids Australia's isolation from the global DVB-T manufacturing community because our Digital TV standards are unnecessarily different!

3.2 SDTV and Datacasting

By providing a legislative framework to include SDTV with HDTV transmissions, it also provides opportunities for datacasting. With the inclusion of a modem, consumers can "surf the net", send emails, e-commerce and other services without the need of a dedicated Personal Computer. Datacasting will encourage the take-up of Digital TV. It provides opportunities for TV set manufacturers to include conditional access hardware within the TV set.

3.3 MP@HL HDTV Display Formats

A limit of three MP@HL HDTV display formats, Philips supports the following in priority order as indicated:

720 x 576 x 50Hz, 1:1 progressive scan (16:9 aspect ratio)
1280 x 720 x 50Hz, 1:1 progressive scan (16:9 aspect ratio)
1920 x 1080 x 25Hz, 1:1 progressive scan (16:9 aspect ratio)

Our preference for progressive scan (non-interlaced) display formats as opposed to interlaced formats is based on our experience as the world's second largest manufacture of computer monitors. The first colour monitor standard; CGA, was based on the current analogue CTV standard, which uses interlaced scanning. Consumers were unhappy with this display format and it was quickly followed by the EGA standard. It too had a short life and replaced by the VGA standard. This non-interlaced display format in now the minimum standard with all monitors capable of displaying at least 1024x768 @ 70Hz or better. During this period, a second interlaced display format was introduced, 1024x768 @ 43.5Hz or 87Hz (XGA - 8514 standard); it also had very poor market use. In addition to HDTV pictures, **progressive scan formats** are **best** suited **for displaying graphics and text** such as those found on the internet, electronic program guides and personal computer inputs.

3.4 Display Format Options for HDTV

The DCITA Issues Paper proposed four broad options for HDTV formats; *Option 2* provides the technical flexibility for both broadcasters and receiver manufacturers. This is in addition to our recommendations for inclusion of a legislative SDTV standard, as detailed in Section 3.1.

3.5 Regulatory Standards for Digital TV Receivers

As detailed in Section 3.1, the legislative inclusion of SDTV with HDTV transmissions presents TV set manufacturers with product options that may lead to consumer confusion. To avoid this confusion, regulations must be drafted to ensure Digital TV's receiver's fall into two categories:

- ***Digital TV*** - TV's capable of SDTV reception only
- ***HDTV*** - TV's capable of HDTV **and** SDTV reception

4.0 Digital TV Sound Format

The default sound system for SDTV/HDTV when using DVB-T is MPEG2 audio. **MPEG2 audio is an open standard designed for broadcasters and TV receiver manufacturers alike.** In the receiver, the SDTV/HDTV decoder chipset contains both the sound and picture MPEG decoders as a tightly integrated set to reduce component count and provide end user cost benefits. MPEG audio has a long and successful worldwide history in consumer electronics, such as Video CD, Microsoft computer operating systems Windows 95, 98 and NT, in solid state audio systems, DVD players and all DVB compliant Pay TV systems. Additionally, the rapid emergence of MP3 (MPEG3) portable audio that can be downloaded from the Internet is a testament of its success and adaptability.

MPEG2 audio provides receiver manufacturers many options for receiver design including mono sound for small portables, stereo and surround-sound for family receivers and multi-channel audio for high end products. In future generations of HDTV receivers, we envisage an additional optical/digital audio output(s) for discerning HDTV buyers (such as home theatre users) that enables them to use an external multi-channel audio decoder.

There appears to be pressure in Australia to adopt the propriety Dolby AC-3 multi-channel audio system for HDTV. Statistics suggest that there are some 20,000 AC-3 decoders amongst 6.8 million Australian households. This does **not** establish Dolby AC-3 as the de-facto multi-channel audio standard for Australia. To date, the multi-channel audio format & marketing battle has just begun; it will be many years before a clear or preferred multi-channel audio system is established. The cost of providing Dolby AC-3 multi-channel audio (i.e. additional license fees and hardware complexity) for all classes of TV receivers is NOT an economical proposition.

“To rashly adopt another such unique (“orphan”) pairing of sound and vision standards for an Australian HDTV system that might not, in any case, be starting seriously for some time, would seem to this observer most unwise” Philips echo’s the sentiments of Mr A N Thiele (DCITA submission) regarding the non-standard preference of Dolby AC-3 to MPEG2 audio.

5.0 Conclusion

YES HDTV + SDTV with MPEG sound provides interoperability and a choice of services for the consumer at affordable prices. The government **must** mandate HDTV + SDTV with MPEG sound to ensure Digital TV is within the reach of ALL Australians and not just a privileged few!

NO HDTV ONLY with Dolby AC-3 sound as proposed by FACTS, will appeal to a very, very small portion of the Australian TV market because of its very high cost (estimated at approx. $12 - $15K AUD), and it’s inability to provide true HDTV pictures. For many years much of the content will be up-converted SDTV material. The proposed FACTS standard is a closed shop exclusive to FTA’s that does not address interoperability among the various parties and positions Australia at the end of the international digital TV queue.

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