

At the recent Broadcasting Summit in Sydney, the ABA was represented by a number of speakers, including Giles Tanner, General Manager. Here are the edited highlights of his address.



## Successful strategies for launching digital radio

Successful strategies for launching digital radio is my allotted topic, but there is a problem: a successful strategy implies that choices have been made, that no one in Australia seems ready to make yet or, crucially, to stake their money on.

Rather, we continue to look overseas and wait for successful technologies and business models to emerge that we might be able to modify and adapt for local conditions. This might well be the wisest strategy — but it suggests that what we need right at the moment is not a successful launch strategy but strategies for making the right choice of system, for deciding whether, how and by whom it will be introduced and for avoiding decisions in the meanwhile that might inadvertently cut off promising options.

### **What is digital radio?**

Suppose we say that it includes any digital system able to deliver audio entertainment and information to mobile receivers. This describes quite a diverse assortment of systems that either exist or are under development, some of them purpose-built or especially well suited to distribution via terrestrial transmitters — such as the US IBOC systems for FM and AM radio, Eureka DAB, Digital Radio Mondiale (DRM) and the Japanese ISDB-Tn system. It also includes hybrid satellite-terrestrial systems, such as XM and Sirius Satellite Radio in the US and WorldSpace, which already has a presence in Australia. I am going to confine myself to three

systems, IBOC, Eureka and DRM — IBOC because it is expressly designed for digitalisation of free-to-air, analog terrestrial radio and the other two because, although they are green field technologies, they appear to be well suited to providing terrestrial, free to air radio customised to provide locally-relevant content to the same sorts of geographical areas as those currently served by analog radio.

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### **Eureka DAB**

Eureka has been around so long, some pundits were predicting it would become obsolete before it ever found a market niche.

On 9 January this year, *Media Guardian* in the UK was able to report that British shops sold out of digital receivers over Christmas, more than doubling the UK's receiver population to 135 000 and hopefully heralding the birth of the world's first mass-market for free-to-air digital radio. At £99, it appears, a digital radio

*1 Julia Day, 'Digital Radio Sales Go Through the Roof,' Media Guardian, 9 January 2003 at [MediaGuardian.co.uk](http://MediaGuardian.co.uk).*

broadcasting receiver is an attractive consumer item in the UK, so perhaps we should pause a moment for a closer look at that British model.<sup>1</sup>

There's a lot more to it than \$A300 receivers. There are years of work and millions of pounds invested, multiplexes licensed and operating across the country, numbers of new commercial services on air, some ground-breaking experimentation with non-audio services and reportedly very big investment by the BBC in new digital channels as well. This is not just a few incumbent radio stations simulcasting on digital and we should not draw the conclusion that it is simply a question of receiver prices. If there is a moral to this good news story from the UK, it is that affordable receivers will be one ingredient, another will be large-scale investment in infrastructure and new content — what Richard Hooper, outgoing head of the UK Radio Authority, has called 'years of hard work and sweat and toil'.

Under current administrative arrangements, responsibility for approving Eureka trials belongs with both the ABA and the Australian Communications Authority. This is because Eureka has been implemented to date using VHF (Band III) spectrum (used in Australia for television and currently administered by the ABA) and UHF spectrum in the so-called L-Band (1.5GHz) administered by the ACA. It is a 'green field' technology, able to operate in addition to and without affecting AM or FM radio. While Eureka was also intended for delivery of satellite

services in its early development, all current applications are terrestrial and there is decreasing interest in the satellite application world-wide.

The supply of VHF Band III spectrum looks extremely tight until after analog television is switched off, as Australia has decided to use VHF for digital television and datacasting.

If we look at Sydney as an example, VHF Band 3 is almost entirely used up. Only 7MHz of spectrum remains and that is divided awkwardly into 6MHz and 1MHz on either side of channel 10. Though the situation is not as grim in all areas, the same basic pattern of maximum exploitation of VHF Band 3 can be seen throughout major regional markets, the VHF spectrum gobbled up for television digitalisation because it is superior to UHF for wide area coverage.

Only 6MHz of VHF Band III — television channel 9A — could be used by Eureka in the five major Australian cities.<sup>2</sup> That is sufficient for only three Eureka channels — make that four if we were able to re-tune channel 10 one megahertz upwards; no easy thing and sure to be vigorously opposed by the Ten Network. Three channels translate into a mere 15 or at most 20 radio services, if near-CD quality is the goal. The situation in the country is variable and not always so grim but in general the ABA would have serious problems finding sufficient VHF spectrum for regional radio if a conversion model were adopted. Another problem for a conversion model using VHF in regional Australia is that in order to avoid adjacent channel interference with television, digital radio would also frequently

be constrained to operate from television rather than radio sites, resulting in completely different coverage areas as between analog and digital radio in many areas.

For this reason, preliminary planning work in Australia has tended until recently to focus on L-Band.

### L-Band vs VHS Band 3?

In 1998–99, a Technical Working Group consisting of government and industry

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engineers developed a detailed notional allotment plan to see whether the L-Band could accommodate all existing radio services ‘plus 20 per cent’.

Its conclusions were tentative and care is needed in summarising them. In short, the remaining vacant parts of the L-Band would not be quite sufficient to accommodate all existing analog services at near-CD quality. Of course, everyone might not want to convert now or need such a high bit-rate — and if radio ever got serious about L-Band, more space could be made by the migration over time of other services that currently use parts of L-Band, though this would not be without sensitivities.<sup>3</sup> To conclude, the

group showed that, while vacant spectrum on L-Band was hardly super-abundant, there was substantial spectrum still available and the potential exists for full conversion of existing services using L-Band alone over time.

Unfortunately, present indications are that L-Band is less attractive to radio broadcasters than VHF. One reason is the different ways that VHF and L-Band signals propagate over distance. While a single VHF transmitter at Artarmon could serve all of Sydney, a mosaic of five or six L-Band transmitters would be needed to do the same job. This might be viable in big cities but it is hard to imagine a terrestrial L-Band network ever matching the coverage of rural analog services, surely a key criterion if we adopt a conversion-based approach.

Another objection is that L-Band transmissions suffer higher penetration loss through buildings, making it harder than VHF to receive indoors. Last year I had the good fortune to speak with a number of Canadian broadcasters, whose long-running experiment with Eureka is confined to the L-Band, and they downplayed this supposed disadvantage. They said they were happy with L-Band and indeed there were some arguments that it was better than VHF.

That being said, the Canadians appeared to have no strategy whatsoever to achieve ‘same coverage’ outside of cities and major highways, though conversion of VHF television to digital and consequent surrender of spectrum was mentioned as a possible long-term solution.

Eureka DAB is an ABA responsibility to the extent we take the VHF Band 3 route; an ACA responsibility if we take the L-Band route. Unless, of course, the Minister decided to add the relevant bits of the L-Band to the broadcasting services bands.

Unfortunately, there is another complication. Eureka, unlike FM radio, is a

<sup>2</sup> By comparison, in the relatively spectrum-poor UK, the near-equivalents of VHF television channels 11 and 12 are available for Eureka.

<sup>3</sup> These include fixed point-to-point links and Telstra’s Digital Radio Concentrator System, which provides basic telephony services to remote homesteads.

broadband technology. By means of a multiplex, it uses a single channel around 1.5 MHz in width to carry multiple services simultaneously — five if CD quality is desired, more if only FM or AM quality is required.<sup>4</sup>

The regulatory scheme for non-BSB spectrum is, at least superficially, somewhat better able to cope. The ACA would be able, if it so desired, to allocate the channels either as transmitter licences or as spectrum licences and individual services carried on those channels would then be able to approach the ABA as required and obtain content authorisation in the form of non-BSB broadcasting licences. However, a weakness of this approach is there are no mechanisms in the ACA's legislation that would enable Ministerial reservation of capacity for national broadcasters and merit-based allocation of some services to community broadcasters, nor would it deal easily with a conversion model if one were adopted.

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If Eureka is seriously to be part of the future of free-to-air radio, I suggest the regulatory scheme for non-broadcasting services bands spectrum is also deficient.

The ownership and control limits of the Broadcasting Services Act also have implications for Eureka. Initial planning for Eureka currently requires cooperation between the ACA and ABA and its introduction would probably require significant amendments to law.

**The US In Band, On Channel (IBOC) systems**

IBiquity's FM IBOC system has been

*4 An FM radio transmitter uses a channel 150kHz wide, or around a tenth the width of a Eureka channel, which is 1.536MHz wide.*

attracting a lot more favourable interest since 2001, when word filtered back from the (USA) National Association of Broadcasters Convention that the FM version of the technology actually worked — at least, in a bus driving around Las Vegas during the conference. There has always been scepticism among engineers about whether IBOC can work with

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analog radio, which uses very narrow channels and is typically highly congested already, without encountering one or more of the following problems:

1. failure to deliver sufficient bits per second to represent an improvement on the analog service
2. failure to operate at sufficient power to match analog coverage or
3. causing interference to its parent or neighbouring analog services.

Last year, IBiquity approached the US spectrum regulator, the Federal Communications Commission, to approve widespread trials of both the FM system and an IBOC system for AM radio. Predictably, there are some limitations. To patch up any holes in the digital coverage area, it is proposed that IBOC receivers will revert, as necessary, to the analog signal. This means the audio content on the analog and digital services has to be the same, which might help to explain IBiquity's recently trademarked new name for the system, HD Radio. A more unfor-

tunate limitation to the AM version of IBOC is that, because of interference problems, it is only able to operate in daylight.

From a regulatory point of view, IBOC need not detain us long. An FM IBOC transmission is basically an ancillary signal carried on two, narrow side-bands, one on each side of the analog transmission. Its audio content is going to be the same as the parent signal, albeit it will be 'HD' quality. As such, it will always be a broadcasting services bands service.

As it is a simulcast, its content will be authorised by the parent broadcasting licence and the only issue for the ABA will be whether those rakish side-bands are going to cause interference to neighbouring analog services in congested areas. The ABA is already doing work on this.

Unlike Eureka, the IBOC systems do not need much work on regulatory strategies. Provided they do not cause interference, they could be introduced tomorrow at the ABA's discretion. Anyone wishing to test the system can simply approach us — provided, of course, they are able to obtain transmitters and receivers from the US for testing. To date iBiquity has been extraordinarily secretive about its system and this, rather than any ABA or government reluctance to sanction IBOC trials, has been the reason no one has heard it yet in Australia.

**Digital Radio Mondiale**

A third digital radio technology, under development but worth watching, is the European Digital Radio Mondiale system — a technology with the potential to augment, rather than compete with, Eureka DAB.

Digital Radio Mondiale is a narrowband digital terrestrial system that uses an HF or MF channel only 9kHz wide to deliver 25kbs of data, enough for a single service that to my ear sounds like FM. Unfortunately, it requires a clear channel, so


would need to replace or be squeezed in alongside existing analog radio services, though interestingly, work is being undertaken on a variant of DRM: useable digital and analog radio signals share the same channel. Such a system would facilitate conversion of all analog services to digital.

DRM was developed for long-distance terrestrial broadcasting, the very wide-coverage niche currently occupied by HF and MF-AM radio. DRM could allow international services such as Radio Australia to go digital without the cost of high power satellites, or it could be used to replace wide-coverage AM services such as ABC regional radio.

In terms of regulatory responsibility, the MF spectrum used by AM radio is ABA turf while HF spectrum used by, say, Radio Australia, is administered by the ACA. As DRM is a narrowband system providing one service per channel, the ABA would be able to licence new DRM services under current law.

### **Working for success**

The ABA and ACA stand ready to facilitate trials of any digital radio technology. The ABA recently made VHF channel 9A available in Sydney for consumer-focussed trials of Eureka DAB,

coordinated by Commercial Radio Australia on behalf of a consortium of broadcasters. The trial has been delayed by a number of factors, including management of potential interference issues to adjacent television transmissions. The ABA is currently in contact with Commercial Radio Australia about the likely commencement date of the trials and any preliminary tests and will make spectrum available as required. 

**The full text of this address, including slides, is on the ABA web site:**  
[www.aba.gov.au/abanews/speeches/index.htm](http://www.aba.gov.au/abanews/speeches/index.htm)

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## **Field surveys & black spots**

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council has applied for funding under the Television Black Spots Program. Spectrum is scarce, but planning work indicated that analog channels are available, although there was subsequent concern about the possibility of interference to viewers using the Selby analog television translators.

In January 2003, Broadcast Australia and GTV9 Melbourne conducted field strength measurements at Healesville, Selby, Marysville, Warburton and Northern Kalorama to confirm channel availability and coverage of the proposed Healesville retransmissions. Representatives from Network TEN, Broadcast Australia, the Department of Communications, Information Technology and the Arts, and ABA engineering staff were present during this survey.

As a result of this survey work, the ABA is confident that the Healesville analog television retransmission services can be established with minimal disruption to existing viewers. It is possible there will be interference to reception of the Selby translator in a relatively small area outside the intended coverage of this translator. However, the survey results indicate that viewers in this area would have alternative signal sources and few if any would be watching the Selby services. Nevertheless, careful management of the start-up process by the Shire of Yarra Ranges will be required should the shire accept funding under the program.



### **The Television Black Spot Program:**

The ABA's involvement, providing its planning expertise, is critical to the delivery of the Television Black Spot Program. At the end of February 2003, the program had replaced obsolete analog television equipment at 181 retransmission sites (at a cost more than \$4.5 million), and 535 new services in 175 black spot areas (at a cost of nearly \$13 million). A further 79 communities have been offered funding under the new services component of the program and are submitting fully costed proposals to establish television services at new retransmission sites.

### **For more information**

To contact the ABA: Freecall 1800 810 241  
To contact the Department of Communications, Information Technology and the Arts, Freecall 1800 680 841 or go to the web site: [www.dcita.gov.au/tvfund](http://www.dcita.gov.au/tvfund)