

ABC TRANSMISSION - ENSURING ALL AUSTRALIANS HAVE ACCESS TO ABC BROADCASTS

A paper by SUE PINNOCK with valuable input from PETER LINDENMAYER (both ABCF-National), and ALAN HUGHES (retired ABC WA senior broadcast engineer and lecturer).

Pages 1-8 of this paper deal mainly with Television; Radio follows from Page 9.

Brief Background

The ABC's radio and television services are accessible to the majority of the Australian population via a network of transmission towers across the country. However, these transmissions do not reach remote populations in inland Australia.

As a background to ABC transmission issues, the reason that the ABC gave for cutting its High Frequency (HF) service (shortwave, SW) into the South Pacific and the Northern Territory was the impact of the reduction in its government funding and the redirection of funds to digital broadcasting in Canberra, Hobart and Darwin. The closure of the 3 NT transmitters completed the closure of all ABC HF broadcasts. The ABC's defence is that all the affected listeners can use the Viewer Accessed Satellite Television (VAST) which carries ABC radio. However, this technology is expensive, affected by weather conditions, and those people in remote areas have no radio at all whilst travelling or working in vehicles or boats. As "compensation" the ABC has given a few VAST satellite receivers to 4WD radio clubs.

Australia has also lost an important arm of its soft diplomacy strategy with HF being cut to the South Pacific and the people living there, very often remotely, have sorely missed important emergency information to help keep them safe during natural hazards. Cutting these HF services saved the ABC less than \$4 million per year. The Minister for Foreign Affairs at the time said little about the closure of HF to the South Pacific.

Radio New Zealand (RNZ) Pacific continues HF broadcasting. Radio Australia has been replaced by HF China Radio International (CRI). Both RNZ Pacific and CRI transmit in analog and digital HF radio (Digital Radio Mondiale i.e. DRM) (<https://www.acma.gov.au/what-digital-radio>).

BAI

Across the rest of Australia, the ABC broadcasts radio and TV to the Australian population via a network of transmission towers. The ABC has never run transmitters. Originally it was the Post Master General Department, followed by Telstra and in 1999 the Commonwealth Government sold all ABC/SBS transmitter sites. They are now owned by a private company currently called BAI Communications, an Australian based company majority-owned by Canadian pension funds. For the last few decades, most of the ABC's transmissions have been delivered under contract to BAI Communications. The ABC pays BAI for transmission services. <https://www.baicomunications.com/our-services/broadcast-services/>

The Royal Commission into National Natural Disaster Arrangements Report

The Royal Commission into National Natural Disaster Arrangements Report made the following observations about Emergency Information and Warnings (Chapter 13):

Apps cannot be relied upon as a single source of emergency information. While they are useful tools for the public, they are not intended to be a stand-alone source of emergency information. (13.96 p.303).

Government and emergency service agencies rely heavily on essential infrastructure such as power lines and telecommunication towers, to distribute emergency information and warnings to the public. During the 2019-2020 bushfire season some essential infrastructure was severely affected by fire and did not operate reliably, if at all. As a result, communities did not have constant access to landline or mobile phone communications, the internet or television.in these situations, the public relied on ABC and community radio as the source of emergency warnings information. (13.111 p.306).

Radio provides an important “lifeline” to rural and regional communities that have no other means of obtaining information. While radio services are an important source of emergency information, where access to mobile phone networks, television and the internet are not available, radio transmission towers are also vulnerable to damage caused by bushfires. Having a battery powered AM radio improves redundancy by reducing the reliance on electricity supplies (13.112, page 306). *[NB: Alan Hughes, retired senior broadcast engineer, advises that this is incorrect. Nearly all of the affected fire areas are covered by ABC Local Radio which is on FM].*

Although radio transmissions are sometimes more reliable than other media for receiving emergency warnings advice, no single communication medium is impervious to the impact of natural disasters (13.113 page 306). *[NB: Alan Hughes advises that this is incorrect. A high frequency, high power transmitter in the centre of Australia is in an area free of disasters and can cover the whole of Australia with emergency warnings via Digital Radio Mondiale. See Alan Hughes’ and ABC Friends National’s submissions to the RC on National Natural Disaster Arrangements].*

The ABC is Australia’s publicly funded national broadcaster. Although neither the Australian Broadcasting Corporation Act 1983 nor the ABC Charter prescribe a role for the ABC in emergency broadcasting, the ABC does broadcast emergency warnings.....it has developed its role during emergencies (13.115 page 307). The ABC has significant coverage through its radio transmission network that affords it a unique position to deliver emergency warnings information. The ABC told the Royal Commission that its AM radio network is accessible to over 99% of the Australian population. The ABC also operates an extensive range of FM radio and digital television services (13.116 page 307). *[NB: Alan Hughes says that ABC Local Radio is transmitted on FM throughout from the Great Dividing Range to the sea from Cairns to the Victorian border, Northern Tasmania and all of Victoria except the Mallee/Wimmera. The main exceptions are the capital cities. The ABC Local Radio transmitter in the Bateman’s Bay area was burnt down. It is an FM transmitter.]*

During the 2019-2020 bushfires, the ABC experienced a significant surge in the public’s use of its services across a range of platforms the ABC provided emergency warnings information in relation to over 950 natural hazard events over the course of the bushfire season (13.117 page 307).

ABC Funding

In the April 2019 Federal Budget, the ABC was allocated \$1,065.4 million. Of this \$186.6 million (17.5%) was used for transmission and distribution services for AM/FM/DAB+ radio and television, most of which is paid to BAI leaving \$878.8 million (82.5%) for ABC general (operational) activities. The \$186.8 million is paid to those who have contracts to ‘service & maintain’ the towers around the country (ABC Annual Report 2020, page 117).

The cost of netcasting live TV and radio programs over the internet is not included in the distribution services.

ABC 2020 Annual Report

The 2020-21 operational revenue from Government of ~\$879 million represents a decrease in real funding of \$389 million or 30.7% since 1985-86 as depicted in the chart ‘ABC Operational Revenue from Government’ (ABC Annual Report 2020, page 119).

The Problem

Outside of the main footprint of transmitters run by BAI, the ABC's signals (and those of SBS) are retransmitted by a number of other providers from 206 smaller localised towers, a list of which can be found on the ACMA website. A myriad of businesses and organisations pay for booster retransmission towers to get signals into their areas and the maintenance of many sites is funded by local councils, Aboriginal Corporations and mining companies. Many of these sites also contain FM transmitters for ABC Local Radio, JJJ and occasionally ABC Classics. It is up to the owners to contract out their maintenance.

In relation to TV, the most important of these retransmitters is Regional Broadcasting Australia Holdings (RBAH), owned by the commercial television broadcasters who hold regional and remote area television licences: WIN Network, Southern Cross Austereo, Prime Media Group (Prime7/GWN7), Imparja, Nine Entertainment Co (NBN), and Seven West Media (7 Queensland). Prime7/GWN7, NBN and 7 Queensland run the high powered regional transmitters and translators for smaller communities. BAI Communications provides all ABC TV/FM radio services from transmitters nationally (except re-transmitters). TX Australia Pty. Ltd. (TXA) provides transmitters for capital city Seven and Nine Networks. It is common for transmitter towers to be shared. Australians receive these broadcasts free.

There have been reports that there are towers which are in need of repair to ensure transmission and there are costs involved (see following link):

<https://www.theland.com.au/story/6962921/why-you-might-not-be-able-to-watch-abc-sbs-on-your-tv-soon/>

The problem is that the company RBA Holdings Pty Ltd (RBAH) has been caring for, at its own expense, necessary equipment for ABC/SBS transmission and says it can no longer afford the maintenance. A spokesperson for RBAH said it could no longer continue to fund the ongoing repair, upgrade and maintenance of the ABC and SBS transmission services without any financial contribution from the national broadcasters or federal government.

The spokesperson went on to say that as equipment at RBAH's 90 transmission sites reaches its end of life.... this will mean that ABC and SBS services will progressively cease to be available on broadcast television in those areas.

This is a real problem for ongoing broadcasting in rural and regional, with the ABC referring people affected to VAST (satellite) to receive services. If RBAH stops transmitting the ABC and/or SBS, viewers in regional areas would have to install a satellite dish and buy a VAST receiver just to receive the ABC and SBS. For people operating on VAST (satellite dish and receiver for each location) as a substitute to broadcasting, receivers can only receive either TV or radio at a given time not simultaneously. In addition, VAST costs consumers and relies on fixed satellite dishes so it is not useful in mobile situations. In a house installation it costs around \$500 for a dish, receiver, 20m cable and a satellite finder. Labour is not included in that price. A \$300 receiver is needed for each additional TV or radio. People travelling in caravans are paying \$2200 for installation using an auto pointing antenna to find the satellite.

If a small community/township wants to be a retransmitter, it will need to have a satellite dish/low noise converter, 5 channel DVB-S2 to DVB-T converter modules, 5 low powered UHF TV transmitter, combiner and 20 m tower. A maintenance contract and electricity are also required.

The situation is likely to become more complex if the Government implements the proposals in its December 2020 *Media Reform Green Paper: Modernising television regulation in Australia*, which proposes (amongst other things) that "the television spectrum would also be rationalised by moving the ABC and SBS to more efficient transmission arrangements as well as rationalising unused broadcasting spectrum. The first

consequence of the rationalisation would be to combine the signals of different broadcasters into what are known as 'multiplexes'. Currently, each free-to-air television service broadcasts from its own dedicated multiplex transmitter; however, the planned rationalisation of spectrum would allow services to be shared across multiplexes; for example, five services in a particular market could be consolidated across three multiplexes in that market. Sharing multiplexes is a more efficient way of using radiofrequency spectrum and should have little noticeable impact to viewers." (p.6)

While there are significant benefits to moving to these new broadcasting technologies, it is likely to involve additional expenditures by the ABC and SBS and/or its transmitting /retransmitting organisations. Who would bear these costs, and their capacity to pay, remains unclear. Further technical advice on this would be useful.

It is essential that ABC and SBS programs continue to be made available to regional and remote communities. There are some immediate issues arising from the additional burden on the public broadcasters of payments now required to RBAH, and it is hoped that answers to Senator Patrick's Questions on Notice (see Appendix 1, pp. 5-7) will provide more information on the scale of these costs and what (if any) assistance is provided to cover them. ABCF should continue to monitor these and advocate where appropriate. There are also a number of longer term transmission-related issues, including how best to service communities outside the retransmission umbrellas: broadcast services to Pacific communities, and the implications of moving to "multiplexing" signals. ABCF would benefit from additional technical and policy advice on these matters, and may wish to consider working with ABC Alumni and seeking input from members with expertise in these fields.

See Appendix 1, pp. 7-8 for Peter Lindenmayer's follow up questions in response to Answers to Senator Patrick's Questions On Notice.

Summary

The main points re ABC Transmission are:

1. It is important for our democracy and the quality of our society that all Australians, including those in regional areas, are able to access ABC (and SBS) services free or at minimal expenses.
2. This depends heavily on re-transmission of signals, the cost of which is borne by many organisations, an arguably inefficient and fragile arrangement.
3. A large chunk (around a fifth) of the ABC's budget already goes to transmission expenses, but until recently it has not been asked to fund the costs of re-transmission.
4. Some regional areas have already lost ABC/SBS signals for a period of time due to RBAH seeking compensation for maintenance costs.
5. The recent request by RBAH for ABC and SBS to cover the maintenance costs of its retransmitters will increase the burden on the public broadcasters.
6. There is a risk that this precedent of payment to RBAH and general cost pressures will lead to at least some other retransmission providers to seek funding for the maintenance of their services, putting additional pressure on the public broadcasters and jeopardizing communities' access to services.
7. Changes in broadcasting technologies proposed by the Government may increase the capital and/or maintenance costs of re-transmission services, adding further pressure for payments.
8. These factors suggest that a broader review of TV and radio transmission services may be appropriate.

APPENDIX PAGES 5-8

Appendix 1 Questions On Notice: Senator Rex Patrick

Questions On Notice about ABC transmission were put by Senator Rex Patrick in Dec 2020 and answers supplied in Feb 2021. **Because transmission is a complex issue, and the questions are all pertinent, questions and answers have been included below.**

DEPARTMENT OF INFRASTRUCTURE, TRANSPORT, REGIONAL DEVELOPMENT AND COMMUNICATIONS

Question No. 2456

Senator Patrick asked the Minister representing the Minister for Communications, Cyber Safety and the Arts, Senator the Hon Linda Reynolds CSC upon notice, on **18 December 2020**:

[The questions were taken on notice, and the Minister's written responses provided to Senator Patrick's questions have been inserted in italics]

With reference to the Transmission Network Infrastructure: Failures of Regional Broadcasting Australia Holdings (RBAH) equipment has resulted in outages of Australian Broadcasting Corporation (ABC) and the Special Broadcasting Service (SBS) content. RBAH's position is that the cost for the rectification and maintenance of this transmission infrastructure adopted will have to be borne by the ABC and SBS, which is at present an unplanned expense.

1. How much is this additional cost to the ABC and SBS?

These matters are currently the subject of commercial negotiations between the national broadcasters and RBAH.

2. What contracts have been signed with RBAH and what is the scope of those contracts?

The national broadcasters have not yet finalised any contractual agreements with RBAH.

3. How much funding has the Government provided to RBAH over the past five years?

RBAH has received the following funding from the Government over the past five years (2015-16 to 2020-21):

\$379,079.50 (ex. GST) in 2015-16 as the initial milestone payments for actual expenses incurred in upgrading and implementing improved television reception infrastructure in the Hunter NSW region and in Crookwell NSW.

\$364,821.80 (ex. GST) in 2016-17 as the final milestone payments for actual expenses incurred in upgrading and implementing improved television reception infrastructure in the Hunter NSW region and in Crookwell NSW.

\$5,000 (ex. GST) in 2019-20 for actual expenses incurred in commissioning a structural analysis of a tower located at Peppers Mountain NSW in order to reduce television interference, caused by atmospheric ducting, at Stroud NSW.

4. What was the scope this funding was provided to address?

See the response to Question 3.

5. Has the Minister committed to securing this additional funding for the ABC and SBS; if not, will the Minister do so? Now that RBAH is receiving funding from the ABC and SBS for the maintenance of its retransmission towers there is a high likelihood that the owners of other retransmission network

infrastructure (towers) will seek funding from the public broadcasters?

The Government is providing nearly \$3.2 billion to the ABC and \$887 million to SBS, over the three years from 2019-20, which includes funding for transmission and distribution services. This represents a substantial investment of public funds in the national broadcasters and allows the ABC and SBS to provide comprehensive television, radio and digital media services.

6. Have any other retransmission network infrastructure owners approached the ABC, SBS and/or Government seeking funding?

No

7. Will the Minister commit to securing the additional financial assistance for the ABC and SBS should this occur?

See the response to Question 5.

8. Which other transmission network owners are the ABC or SBS relying on for their broadcasting?

The ABC has contracts with BAI Communications for the provision of its terrestrial transmission services. The SBS has the following transmission service providers:

- BAI Communications
- TXA
- Optus
- Telstra
- Self-help providers (a category that can include local councils, mining companies, or local community organisations in remote and regional Australia).

Question on notice no. 2457

Senator Rex Patrick: asked the Minister representing the Minister for Communications, Urban Infrastructure, Cities and the Arts on 18 December 2020—

With reference to the Transmission Network Infrastructure:

[The questions were taken on notice, and the Minister's written responses provided to Senator Patrick's questions have been inserted in italics]

In the medium to longer term, the reliance on multiple retransmission providers commercial, local government and Commonwealth providers for the provision of important television information (including for emergency broadcasts) introduces risks to continuity, transmission quality and public safety, as well as reducing efficiency.

1. What options have been considered for broadcasting Australian Broadcasting Corporation (ABC) and Special Broadcasting Services (SBS) services to the Australian population?

SBS television and radio services are delivered to audiences on various transmission platforms in partnership with a range of service providers. SBS operates in a pluralist delivery environment across television and radio broadcast, including analogue and digital terrestrial transmission; satellite delivery; and, digital delivery. This delivery mix is assessed from time to time, taking into account factors such as the availability of new technology and audience needs.

The ABC considered funding a terrestrial service via BAI Communications or RBAH. The ABC also considered VAST satellite services which would have required community funding (for purchasing reception equipment).

2. What cost benefit analyses have been undertaken in regards to the broadcasting options?

SBS undertakes cost-benefit analyses as a matter of course when broadcasting options are introduced or renewed to implement the option which has the best audience and business outcome. Due to the infrastructure involved such arrangements are usually made on a long term basis. The ABC is still in commercial discussions about the provision of these services. The end objective is that all Australians in RBAH footprint areas will continue to have access to terrestrial broadcast television services.

3. What risk assessments have been undertaken in relation to:

- a. continuity;
- b. transmission quality; and
- c. public safety (through interruption to emergency broadcasts)?

The SBS Risk Management Plan and risk assessment identifies and addresses the major risks and opportunities associated with SBS activities. This includes the consideration of risk in achieving SBS's strategic objectives. The SBS Risk Management Plan is reviewed annually.

SBS undertakes risk assessments as a matter of course as broadcasting options are considered and reviewed. These assessments include consideration of continuity, transmission quality and public safety. For example, dual site diversity supports continuity of service in significant markets; and service level agreements govern transmission quality. SBS's transmission arrangements take into account the need to ensure audiences receive vital information including during emergencies. Systems and products are actively monitored, with standard incident management and review processes in place.

The ABC has multiple technological delivery platforms via which it provides services to Australian audiences, including terrestrial television, satellite direct to home television, radio and digital services. The ABC provides emergency broadcasts primarily via its local radio services, supplemented by information delivered via its TV and other radio services, online audio streaming, retransmission on VAST, and a wide range of emergency information on News Digital, dedicated ABC Emergency pages, and related social channels.

4. Has the Department of Infrastructure, Transport and Regional Development and Communications (the Department) examined the potential benefits and drawbacks of re-establishing a single publicly-owned retransmission provider?

No

5. If not, will the Minister commit to tasking the Department with examining the potential benefits and drawbacks of moving to a single publicly-owned retransmission provider?

The National Transmission Network Sale Act 1998 provides the regulatory framework for the provision of national broadcasting and other transmission services, including retransmission services. This framework continues to operate as intended.

The following series of questions (formulated by Peter Lindenmayer) arose as a result and Sen Patrick's Office is following up with a second batch of Questions On Notice.

Proposed questions to the Minister and/or Department of Communications.

At last Senate Estimates Senator Patrick asked about progress in negotiations between ABC, SBS and RBAH about payments for the maintenance of the towers. Surprisingly, the response (provided as a Question on Notice) was that negotiations had not concluded.

- Have these negotiations now been completed?

If not yet completed

- why is there a continuing delay in finalizing them, and
- what are the consequences in terms of maintenance of the facilities?

If negotiations have been completed

- what are the terms of the contract, including price? (If the response is that these are Commercial-in-Confidence, is this justified ?)
- How many and which retransmission towers are covered by the contract, and for what length of time?
- How much are the ABC and SBS paying for this maintenance?

In answers to questions at last Estimates (Response 3, QON 2456) the Dept of Communications advised that the Government (presumably through the Dept of Communications?) has made transmission-related payments to RBAH of well over \$700,000 over the past few years.

- If the Government accepted responsibility for making these payments then, why has it now transferred responsibility for payment of transmission facilities to the ABC and SBS? Who directed this policy change?

More generally, it is clear that across the country the transmission and re-transmission of ABC and SBS signals is delivered by facilities owned and maintained by a wide range of organisations, from large multinational companies to small regional councils and niche organisations. It is likely that there is a wide range of technical skills and motivations across these different bodies.

- Does the Department of Communications believe that this is the most effective and economically efficient arrangement, and the one that best ensures security of services, particularly in emergencies?

If yes

- What is the basis for this assessment?
- Has the Department conducted any evaluations of broadcasting transmission systems in the last few years? (If so, are these publicly available?)
- Is a more up to date assessment now due?
- Given the increasing concern about cyber warfare and hacking by both state and non-state actors, has the Department considered the potential vulnerabilities of our radio and TV transmission systems to attacks of this nature?
- If so, what protections have been put in place?

What expertise does the Department of Communications hold in the highly technical areas of radio and television transmission engineering? Or is it forced to look outside the Department for this expertise?

ABC TRANSMISSION – ENSURING ALL AUSTRALIANS HAVE ACCESS TO ABC BROADCASTS

This section of the paper deals with RADIO.

RECAP:

ABC Funding:

Of \$1,065.4 million in the 2019 Federal Budget: 17.5% (186.6 million) was used for transmission and **distribution services for AM/FM/DAB+ Radio and Television** most of which is paid to BAI Communications, leaving \$878.8 million (82.5%) for ABC general (operational) activities.

Problem:

Across Australia, the ABC broadcasts radio and TV to the Australian population via a network of transmission towers. The ABC has never run transmitters. For the last few decades, most of the ABC's transmissions have been delivered under contract to BAI Communications. Outside of the main footprint of transmitters run by BAI, the ABC's signals (and those of SBS) are retransmitted by a number of other providers from 206 smaller localised towers, a list of which can be found on the ACMA website.

A myriad of businesses and organisations pay for **booster** retransmission towers to get signals into their areas and the maintenance of many sites is funded by local councils, Aboriginal Corporations and mining companies. It is up to the owners to contract out their maintenance.

In relation to TV, the most important of these retransmitters is Regional Broadcasting Australia Holdings (RBAH). RBAH run the high powered regional transmitters and translators for smaller communities. There are towers in need of repairs to ensure ABC /SBS transmission and there are costs involved. **RBAH is no longer prepared to fund the ongoing repair, upgrade and maintenance of the ABC and SBS transmission services without any financial contribution from the national broadcasters of federal government.**

Senator Rex Patrick has posed Questions on Notice (QoN) to find out information about impacts on ABC funding in response to this issue (Dec 2020). Questions and Answers received and a list of extra questions which could be asked are included on pages 5-8.

SUMMARISING MAIN POINTS RE ABC TRANSMISSION. From page 4 of paper.

1. It is important for our democracy and the quality of our society that all Australians, including those in regional areas, are able to access ABC (and SBS) services free or at minimal expenses.
2. This depends heavily on re-transmission of signals, the cost of which is borne by many organisations, an arguably inefficient and fragile arrangement.
3. A large chunk (around a fifth) of the ABC's budget already goes to transmission expenses, but until recently it has not been asked to fund the costs of re-transmission.
4. Some regional areas have already lost ABC/SBS TV signals for a period of time due to RBAH seeking compensation for maintenance costs.
5. The recent request by RBAH for ABC and SBS to cover the maintenance costs of its retransmitters will increase the burden on the public broadcasters. If this does not happen, the viewer would have to buy a satellite dish and receiver for the ABC and SBS and a TV antenna for commercial TV.
6. There is a risk that this precedent of payment to RBAH and general cost pressures will lead to at least some other retransmission providers to seek funding for the maintenance of their services, putting additional pressure on the public broadcasters and jeopardizing communities' access to services.
7. Changes in broadcasting technologies proposed by the Government may increase the capital and/or maintenance costs of re-transmission services, adding further pressure for payments.
8. **These factors suggest that a broader review of TV and radio transmission services may be appropriate.**

TRANSMISSION OF ABC RADIO (AND SBS).

In a letter (MC20-003322, 8 Sept 2020) to Steve Georganas (MP Labor) in reply to a constituent in the electorate of Adelaide about ABC funding, the Minister for Communications, Cyber Safety and the Arts, Paul Fletcher wrote:

In response to the ABC's 5 Year Plan "we welcome the focus on strengthening the ABC's presence in suburban, outer urban and regional areas".

He also wrote "All media are operating in a tough environment.... Australian media companies are responding to this challenging environment in a variety of innovative ways to reduce the cost of broadcasting infrastructure..."

Radio transmission offers an opportunity to do the above.

Alan Hughes (Retired ABC WA Broadcast Lecturer) has important input re point 8 above. He argues what needs to be done by the Government and the ABC in relation to RADIO transmission.

See items 1,2,3 below and rationale.

1. "The ABC commit to switching all radio broadcasting from analog (AM/FM) to all digital (DRM and DAB+) within 10 years, with a capital city analog switch off in 5 years."

Rationale: The switchover from analog to digital TV caused a large increase in the variety of programs and improvements of picture/sound quality. After 2013 there has been a big drop in electricity consumption by terrestrial TV.

Benefits of digital radio (Digital Radio Mondiale (DRM) and DAB+)

In 2017 the ABC closed **high frequency transmissions (SW radio)** for the NT/Kimberley WA. In addition, they also switched off the high frequency broadcasts to the last coverage area: South Pacific.

MAPS TO SHOW EXTENT OF TRANSMISSION AREA OF HIGH FREQUENCY RADIO ARE INCLUDED AT END.

Why digital? FM and AM are analog. It is not possible for FM or even AM radio to cover the large areas as those shown in the maps of high frequency transmission.

FM uses line of sight transmission from high towers, and AM uses ground waves which follow the ground which also absorbs the signal. In both cases obstructions block the signal.

High Frequency (SW) by contrast directs the signal a couple of hundred of kilometres into the sky where it is reflected back to earth making the terrain irrelevant. It can also travel long distance. **Digital Radio Mondiale (DRM) is digital HF radio.**

In general the frequencies:

- below 3 MHz including the Medium Frequency band, commonly called "AM band" travel along the ground,
- 3 – 30 MHz is the **High Frequency band (DRM) which uses the reflections from the ionosphere.**
- 30 – 300 MHz or **Very high frequency band (DRM+) contains band 1, 2 and 3 (e.g. Band 1 DRM)** and as the frequency increases becomes more and more, line of sight.

The low frequency end of the spectrum cannot carry as much data as the high frequency end. This is why DRM in the HF band and below can only carry 1 quality music program but DRM+ can carry 3 quality music programs. Speech requires less data.

Digital Radio Mondiale (DRM) improves sound quality and adds additional features such as emergency warnings, images and text. Digital radio delivers better sound quality than traditional AM/FM radio, easy tuning (by station name) and pause and rewind options. Digital radios have small screens which can display program-related information, such as 'now playing' details, in text and - on some receivers - graphics. News headlines, weather details, traffic updates can also be provided on-screen.

WHAT FOR WHERE?

DAB+: in the capital cities.

ABC/SBS DAB+ digital radio started 12 years ago in all mainland state capital cities and Hobart, Canberra and Darwin, 2 years ago.

Band 1 DRM: suitable for regional areas.

HF DRM: suitable for remote.

If a high powered, high frequency DRM (HF DRM) transmitter was installed in the centre of Australia and transmitted in all directions it could cover the whole continent. It is away from any emergencies and can be solar powered so the electricity supply is not a cause of failure. When there are no emergencies it can transmit ABC News and ABC Sport so that it earns its keep and we know it is working!

If DRM was fully operational, you would be able to drive from a capital city to the centre of Australia. You could select ABC Sport and initially the receiver would select the DAB+ channel and as that becomes weaker the receiver would switch to Band 1 DRM and when that signal becomes weak it would switch to HF DRM. The reverse would occur travelling back to the capital city.

The benefits of the switchover from analog to digital (DAB+/Band 1 DRM/HF DRM) for radio will:

- give all but remote Australians an increase of from between 1 to 5 programs up to the 18 excellent sound quality ABC/SBS programs available to capital city dwellers (DAB+). Band 1 DRM can carry many more programs than HF DRM which has a maximum of 3 speech programs. **This means rural and regional areas would receive all 18 ABC/SBS programs with ABC Local Radio for the region in place of capital city local radio.**
- provide ABC News on Radio and ABC Sport to all Australians regardless of where they are in Australia and its surrounding waters. Currently remote Australia has large areas of no radio at all when in vehicles, boats and on horseback. The only signal which can reach right across Australia from a single transmitter is high power, high frequency DRM (HF DRM). A high power, high frequency transmitter (HF DRM) at Kulgera NT could carry Emergency Warnings, ABC News and ABC Sport which are live regardless of location. Other than via the VAST system, the provision of all 18 ABC/SBS programs is not possible. **The aim is to give coverage of relevant popular programming whilst mobile.**
- provide an Emergency Warning System regardless of location in Australia and its surrounding waters to give voice announcements, map images, detailed text instructions, redirecting vehicle navigation around closed roads available to those in the affected area as well as private access to similar for each emergency service.

- mean a drop in electricity consumption, which will considerably reduce production of greenhouse gases and make it easier to power transmitters with renewable electricity. The amount of electricity consumed to move a program from the studios to the listeners' ears: AM uses the most, followed by the internet particularly mobile internet, FM and lastly DAB+ and DRM digital radio. Telstra has admitted that they are the largest single consumer of electricity in Australia.

The financial motivation for the switchover from analog to digital radio is the cost savings of decommissioning 1287 transmitters, saving maintenance and operations costs to be replaced by a single Band 1 DRM transmitter for ABC/SBS radio (18 ABC/SBS programs) on each of 66 existing medium to high powered ABC TV/FM towers across regions.

AM broadcast transmitter sites can be sold, some of which are quite valuable. BAI Communications probably own them, but it could be made a condition of sale that the proceeds go into new DRM transmitters.

Conversion of commercial radio will reduce their transmission costs as well.

There are 2.35 million DAB+ listeners for ABC/SBS and commercial/community broadcasts. The ABC does not promote it. The ABC /SBS promote streaming instead, which boosts the profits of the telcos. The ABC & SBS should promote their own DAB+ digital radio transmissions instead.

2. "Commonwealth politicians to add emergency broadcasting to the ABC Charter"

Rationale: The ABC correctly claims that Emergency warning broadcasting is not in the ABC's Charter. The ABC needs it to be added so that they can get some of the emergency communications money for which the telcos are lobbying. The profit making telcos are continually pressuring politicians, regardless of the 1400 mobile phone base stations which failed for a considerable time during the 2019/2020 fires.

Emergency Warning functionality of digital radio is much more reliable and does not have the terrain created blackspots. The ABC is not pushing its barrow on Emergency Broadcasting.

3. "The ABC equip and promote the emergency warning functionality of digital radio with the emergency services and Ministers of Communications, Home Affairs and state ministers for emergency services including services heads, vehicle and receiver manufacturers."

Rationale: Emergency Warning Functionality will need the approval of the Minister for Communications.

The Minister will have to approve a conversion from AM/FM to DRM in regional and remote areas.

The Minister for Communications is responsible for the ABC, SBS and ACMA. The ACMA use the Standards Australia [standard AS4943](#) which will be updated to include all the functions available in DRM standards. (It includes transmitters and receivers).

DRM/DAB+ Receivers.

The decommissioning of transmitters cannot occur until the Band 1 transmitter (on 66 existing medium to high powered ABC TV/FM towers across regions) is on air and listeners have time to buy DRM/DAB+ radios.

There is no point in Emergency broadcasts if there are no receivers of transmissions. The Minister will have to direct customs to prevent the import of radios which will not be fully optioned DRM/DAB+ receivers. There is even a DRM/DAB+ radio which fits in the boot of car. It is controlled by Bluetooth which can feed the sound to the factory fitted AM/FM car radio.

In order to slowly get rid of analog radios, determine a switch off date for AM and FM, to accelerate sales and keep prices of receivers low.

There has to be widespread use of digital radio in the community and in emergency services. This means that to get the audience to buy receivers they need the attraction of additional program choice, images, text, better sound and quicker updates of vehicle traffic management and road closures, even major traffic accidents on highways.

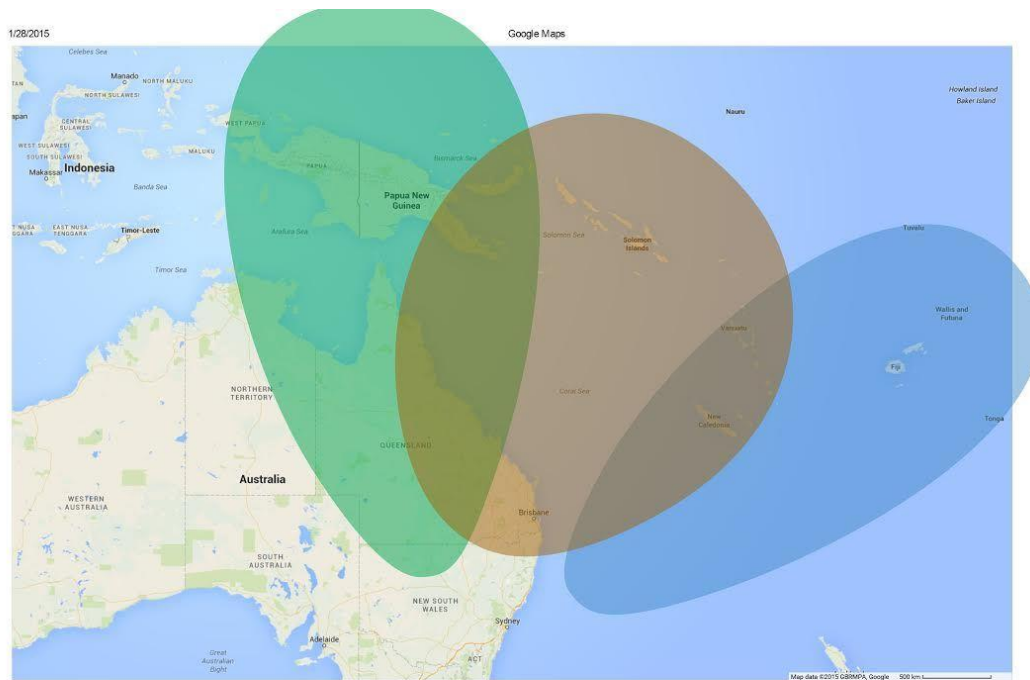
Norway has already switched from FM to DAB+ successfully and the Swiss will do it next year in 2022. [The telcos have switched off analog 1G, CDMA (a mobile phone technology which Telstra promoted in country areas because you could be further from the base station) was switched off in around 2000, 2 G was switched off in 2016 for Telstra, in 2017 Optus and in 2018 for Vodaphone and they will switch off 3G in 2024 making all those phones redundant!]

MAPS ON FOLLOWING PAGE

NB: Alan Hughes has prepared national lists of TV and Radio retransmitters including sites, call signs, frequencies etc.

PDFs of these are available upon request.

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<https://www.google.com.au/maps/@-17.5838023,159.2451044,5z>

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Diagram A: footprint of SW transmitting from three 100kW transmitters at Shepparton, Vic, into the islands of the South Pacific (from West Papua east to Tonga).

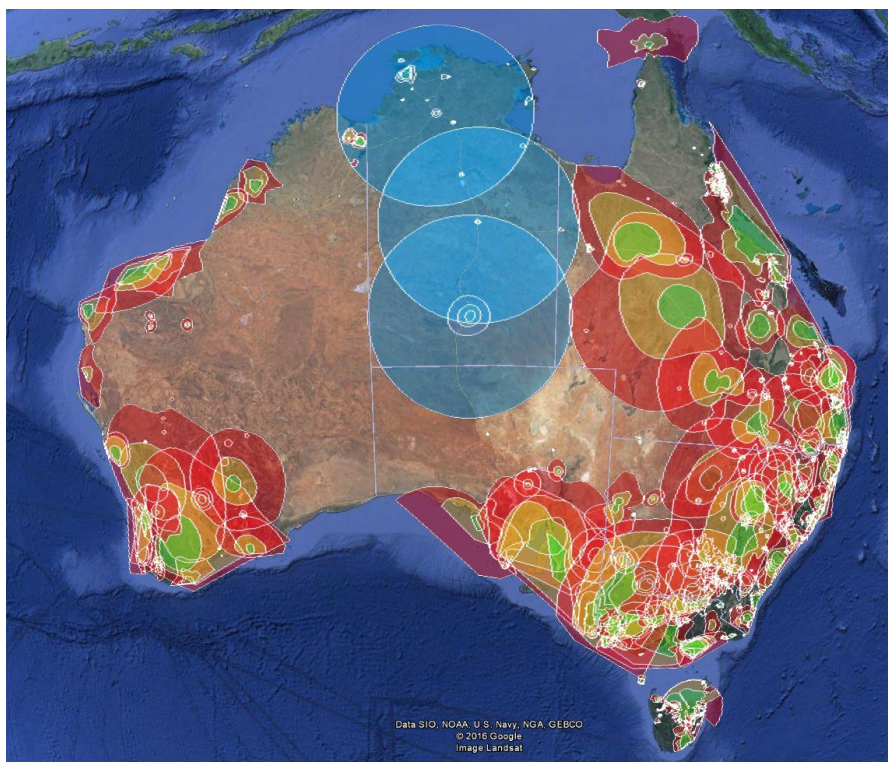


Diagram B: footprint of SW transmitting from three 50 kW transmitters at Tennant Creek, Alice Springs and Katherine.