



Review of Australian Broadcasting Services in the Asia Pacific

Submission by:

Digital Radio Mondiale (DRM)
Consortium



Digital Radio Mondiale - DRM Submission

SCOPE OF CONSULTATION

The Governmental review of Asia Pacific Broadcasting Services has a very clear double aim: “The Department of Communications and the Arts and the Department of Foreign Affairs and Trade will conduct a review into **the reach of Australian broadcasting services in the Asia Pacific region**, including examining **whether shortwave radio technology should be used**. The review will include public consultation and the report of the review will be made public.”

EXECUTIVE SUMMARY

As the international, not-for-profit Digital Radio Mondiale (DRM) Consortium cannot add much publicly unknown information to the first point, we would like to address in more details the second point.

To the question: Should shortwave technology be used? our answer, advice and recommendation would be an emphatic, **yes**. Digital Shortwave, as part of the open, global Digital Radio Mondiale (DRM) standard can offer advantages that no other platform can match at this moment.

We are not addressing in our submission other platforms like satellite or IP, for the simple reason that in the Asia-Pacific region:

- **Radio remains as relevant and used as ever (despite popularity of mobiles) and shortwave is still very popular**
- **Radio has long engagement times, it provides a feast of content**
- **The environment and affordability drive people to radio listening**
 - **RADIO IS FREE TO CONSUME and OFFERS ANONYMITY**
- **4G and the not fully defined 5G mobile services demand spectrum in the higher bands. Listening on the mobile, a “one-to one” solution, is in any case limited (two-way needed and a radius of about 10km available, so coverage is uneven). The more listeners there are the more expensive it becomes, and the more spectrum is needed.**
- **The radio broadcast bands have unique properties for covering large areas**
 - **100% geographic coverage is possible**
 - **coverage of remote and areas affected by disaster is possible**

Radio is also as a “one-to-many” platform (as opposed to the expensive “one-to-one” mobiles or IP) extremely efficient.

High Frequency radio has particular advantages

- From one high powered transmitter you can cover a whole hemisphere. The transmitter can be completely in the control of the country owning it, i.e. Australia.

- In an emergency the radio receiver will work despite:
 - **electricity supply failure** (as the radio receiver can be battery powered)
 - failure of the mobile phone system
 - overloaded mobile phone system caused by people wanting to notify of their circumstances and to listen to warnings and instructions.
 - flat mobile phone battery. (All mobile phones must transmit their existence every 15 min so that the network knows which tower to use to ring the phone).
 - satellite phones don't work in heavy rain
 - failure of local satellite receiver
 - failure of local FM radio transmitter affected by the disaster

In the high frequencies there is only one digital sound broadcasting standard that can be used, i.e. DRM.

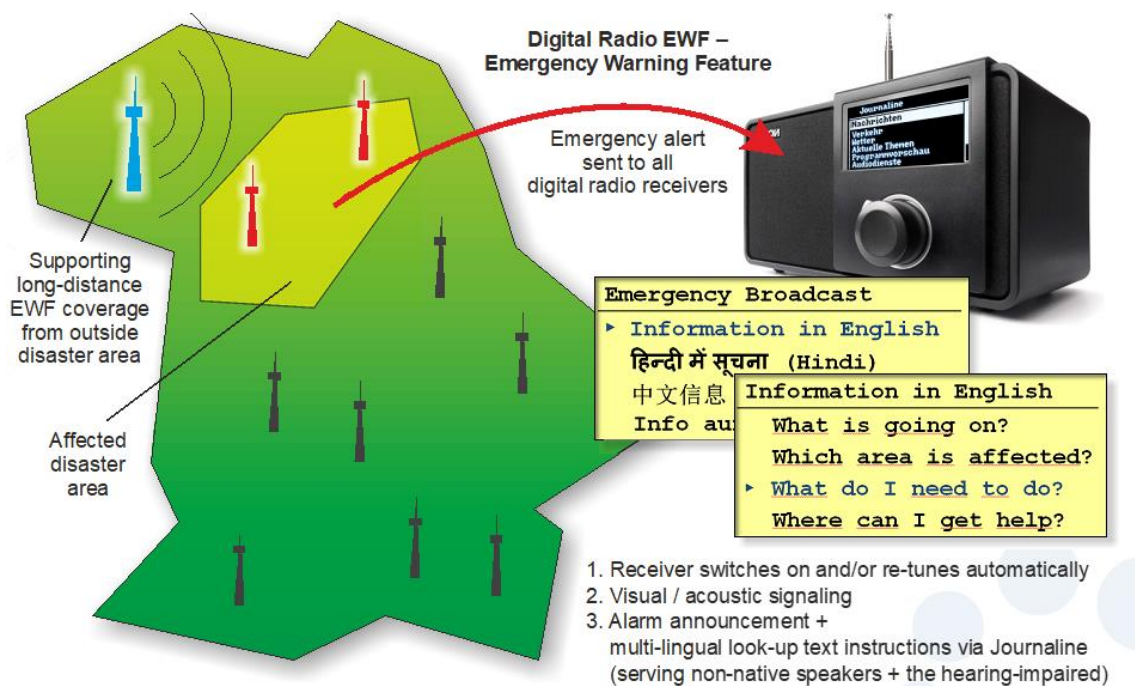
Digital Radio Mondiale, DRM, is the newest, most complete, open, and internationally recognised standard (by ITU and ETSI) for digitising radio in **all frequency bands** (both AM and VHF bands). It is able to serve all the coverage needs of any country, without any gaps; it can serve broadcasters for local and regional services to national and international, whatever the size and geography of the area targeted, and at much reduced energy costs.

DRM, using all bands and current network planning, is compatible also with the existing channelization and frequency plans, and thus a direct successor technology of the former analogue AM and FM standards. In short Digital radio, DRM, delivers significant:

- **Power/energy efficiency (using SW or MW in DRM can reduce the power used up to 80%)**
- **Spectrum efficiency (more programmes can be broadcast on one single frequency used for one programme in analogue)**
- **Use of the same transmitter sites / Topographic efficiency**

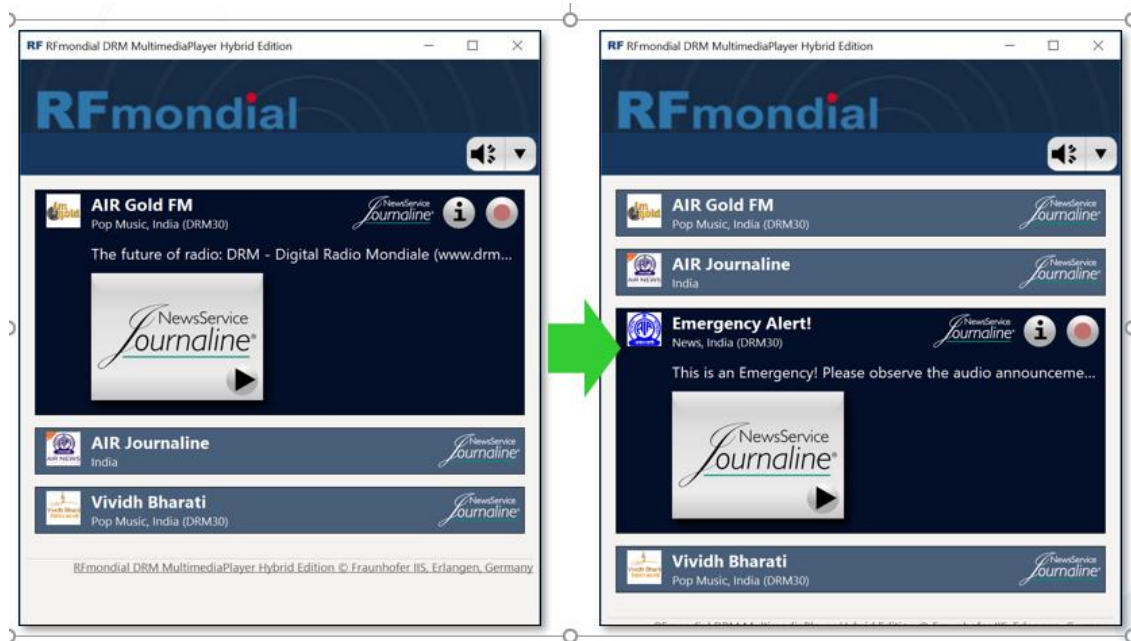
Therefore, DRM offers Australia the best, most secure and efficient way to communicate with all the countries with which it has trade and/or cultural alliances and with those whose Governments might be less open and democratic than Australia but where it wants to increase its influence by providing good multilingual information and information programmes with excellent sound quality, accompanied by data services. Broadcasting a credible news service to troubled countries in the region will promote peace, stability and fair relations in all domains.

The use of high powered, high frequency DRM has the advantage that it is transmitted from Australia and cannot be tampered with or jammed. DRM, unlike analogue, offers enhanced and stable audio quality that is FM-like (mono or stereo). DRM also offers multiservice data including Journaline (the enhanced text services, more information captured as RSS feeds or from other internet source), slideshows, multilingual text (practically being able to show any characters of any language not just Latin script), and the emergency warning functionality (EWF) in case of disaster. Here is an example of how DRM can deliver audio, text alerts, maps to an affected area only.



The Emergency Warning Functionality is part of the DRM standard and is clearly set out in this recent article: [“DRM Emergency Functionality Saves Lives”](#).

Here is an example of how an emergency alert message can be inserted when several programmes are on air switching from regular programmes to alerts and then quickly back.



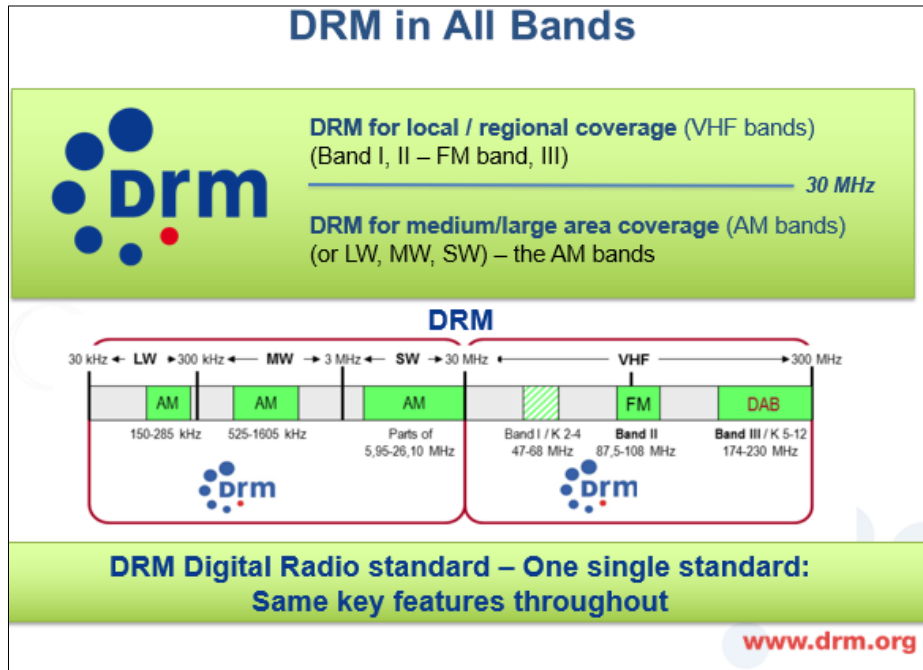
Australia is part of the United Nations' tsunami detection and warning network. Since Radio Australia switched off their High Frequency (Short Wave) transmitters on 31st January 2017, there is no way Australia can warn those in boats and the most populous islands of any cyclones, tsunamis or other disasters. With DRM, Australia will be able to alert people in many populated regions of the Pacific or Asia, thus saving many lives.

WHAT DRM CAN DELIVER FOR AUSTRALIAN BROADCASTING - in more detail

DRM is the most technologically advanced and newest global digital radio standard. It is **internationally standardized by ITU¹ and ETSI²** for digitising terrestrial radio broadcasts in all frequency bands (both AM and FM bands)

¹ ITU-R BS.1514-2, System for digital sound broadcasting in the broadcasting bands below 30 MHz (https://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-I!!PDF-E.pdf) and ITU-R BS.1114-9, Systems for terrestrial digital sound broadcasting to vehicular, portable and fixed receivers in the frequency range 30-3000 MHz (https://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1114-9-201506-I!!PDF-E.pdf)

² http://www.etsi.org/deliver/etsi_es/201900_201999/201980/



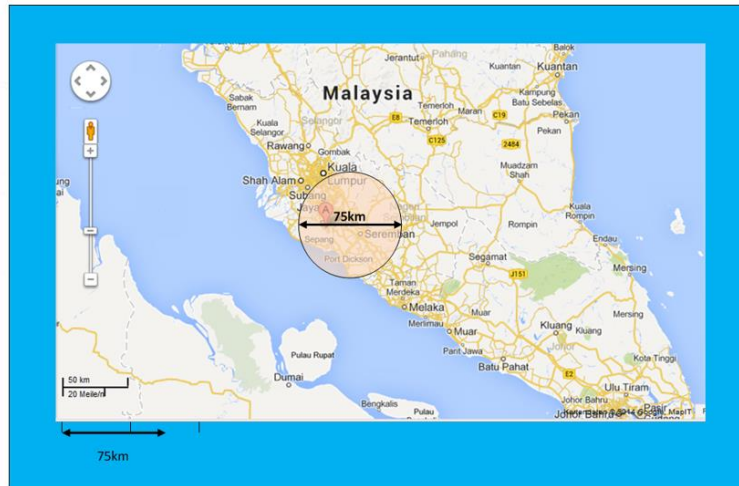
The following image illustrates clearly the capabilities of the DRM standard to be used in all frequencies, including band I, not used for TV any longer, band II (which is the sometimes full FM band) and band III for a variety of coverage scenarios.

While DRM for local coverage and DAB+ can only be heard locally DRM in HF can cover huge distances with excellent sound and extra services.

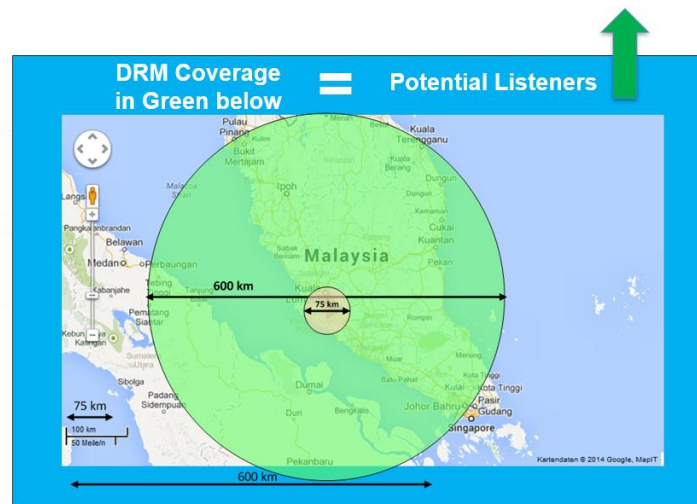
The picture below illustrates the DRM powerful capabilities for HF propagation compared to the one of DAB+ and to DRM in VHF (sometimes called DRM+), both used for local coverage In Australia this would look a bit like this:

Another comparison between coverage using FM and using DRM in AM (Medium Wave and Short Wave) is illustrated in the two pictures below

Coverage Example – FM 75 km



DRM Coverage = 600 km!



While analogue AM became less popular, digital AM has solved many of the big disadvantages of analogue (much improved audio quality, spectrum efficiency, substantial energy savings, additional programmes and services) and as such should be considered afresh and with an open mind, despite the decision taken in Australia to abandon shortwave in 2017.

Conventional radio broadcasting has been on MW (Medium Wave) and SW (Short Wave) bands –SW is mainly used for overseas services (though can be very effective domestically to cover the entire territory of Australia, as well). The medium wave MW and shortwave SW bands are reserved exclusively for radio broadcasting. SW signals can reach very long distances as signal propagation is using the ionospheric layers (radio signal is reflected from



the radio mirror in the sky – ionosphere - which is between 175 – 300 km above the earth. Almost all the broadcasters in the world have been using MW and SW bands for free-to-air broadcasting. In-band transmissions use Amplitude Modulation (AM) and being in the analogue mode this results in quality degradation – on MW, due to noises generated by industrialisation and on SW, due to signal fading caused by changes in the position of ionospheric layers. In digital some of the analogue disadvantages of MW and SW are overcome must be used as their digital format can provide not only excellent sound quality but also other value-added services.

This is exemplified by the following sound samples of the same BBC transmission recorded in Europe and Africa (with a 5,850km path over the equator – Nairobi/Vienna). Please listen by clicking the links below

[Analogue SW – Nairobi, 6190 kHz](#)

[DRM SW – Vienna, 3955 kHz](#)

Advantages of DRM for large area coverage (sometimes called DRM30) vs analogue AM

- DRM can deliver high quality stereo sound, whereas AM often fades, becomes distorted and makes a loud cracking sound when lightning occurs near the receiver.
- DRM radios can be tuned by selecting the name of a broadcaster and not the frequency like in the analogue world. A very useful feature as the frequency used will change between daytime and night-time and it also changes seasonally.
- DRM has as its feature the Emergency Warning Functionality (EWF) which can wake a radio from deep standby, tune the transmitter carrying the warnings, so that the warnings can be heard. They can be accompanied by warnings in multiple languages and maps of the affected areas.
- DRM could be used to transmit the pictures and text of the Radio Australia website (RSS feeds or satellite images of cyclones, for example).
- Space Weather Services section of the Bureau of Meteorology can predict the best frequencies to transmit on. The Alternate Frequency Table function in DRM radios allows the transmission of the frequencies used including new frequencies. This allows for automatic receiver frequency switching under the control of the broadcaster.

In the words of the Head of Distribution BBC World Service Nigel Fry, member of the DRM Consortium Steering Board: *“DRM was seen as an efficient replacement for the analogue AM transmissions. When we consider scarcity of spectrum for new uses and appreciate the characteristics of the radio broadcast bands we recognise the tremendous properties these continue to offer broadcasters to deliver programmes over sometimes very large distances and areas or in difficult terrain.*

For example, we currently serve one of our markets with 32 low power FM transmitters (each with a radius of about 40 kilometres) and about 20% of the country is covered. Apart from the electricity costs for these FM transmitters, there are other operational costs to do



with staffing, service and maintenance. In the future one single DRM short wave transmitter using a near vertical incidence and a power consumption of 6kW could offer at least two very good audio services (plus data) and 100% territorial coverage. 8 million households in cities and remote areas could be covered and the support costs considerably reduced.

Where medium wave frequencies and sites exist multi-channel (therefore multi-language, too) DRM broadcasts can be offered at improved quality, with reduced energy bills and running costs. Unlike analogue, DRM allows one frequency to be used repeatedly for the same service over a large area (a single frequency network), making more efficient use of the spectrum. DRM can transform the quality of the services on the AM bands to be clear and free of any of the interference and distortion. DRM provides text information and images, to complement programmes offering thus an enhanced experience to the listener. Recommended by ITU, DRM digital broadcasting has been proven to work excellently in the shortwave and medium wave bands. These bands remain key for international broadcasting delivering services without constraints of local ‘gatekeepers’.”³

WHAT IS THE BIG PICTURE IN THE REGION?

Radio Australia’s HF broadcasting was switched off on 31st January 2017. It previously shut down its HF broadcasts to Asia and PNG.

The following countries continue to use High frequency broadcasting to reach audiences isolated by terrain or distance or to get influence in other countries e.g. India in East Africa.

Beyond Reach Australia, Kununurra WA Religious broadcaster to Asia	National Broadcasting Corp of Papua New Guinea
Radio Bangladesh Betar	Philippines Broadcast Service
China Radio International	KBS World Radio
All India Radio	Radio Taiwan International
Radio Republic Indonesia	Radio Thailand
NHK Japan	BBC World Service Singapore
Voice of Malaysia	Radio Vanuatu
Radio New Zealand International⁴	Voice of Vietnam
Pakistan Broadcasting Corporation	Radio Romania

³ <https://www.radioworld.com/columns-and-views/drm-for-large-regions>

⁴ Digital Radio Mondiale transmissions www.DRM.org

Most broadcasters transmit in multiple languages to their own countries, their neighbours and much more widely. Bold indicates transmission in Digital Radio Mondiale for high quality sound, text and slideshow pictures.

The largest digital market in the world happens to be in Asia-Pacific. **India** has rolled out DRM and is making huge strides in using it internally and internationally as can be seen in this summary from May 2018:

- [Digital Radio Mondiale an Update from India](#)

The above summary gives important details about DRM receivers and especially about the car industry that has embraced DRM. In India about one million cars (to date) are fitted with DRM line-fit receivers.



Hyundai Models with DRM Recivers fitted	
•	Elantra
•	Tucson
•	Elite i20
•	Xcent
•	i20 Active
•	Grand i10
•	Creta
•	Verona

An interesting use of DRM is made in **New Zealand by RNZI** which has been using DRM for twelve years as a cheap distribution method. DRM signals are reconverted to analogue in many Pacific islands which get the service using digital/DRM rather than expensive satellites. So, DRM eliminates satellite hiring costs and retains a reliable signal during heavy rain to feed local FM stations.

Recently this use of DRM by RNZI was also highlighted in:

- [RNZI Remains Essential Voice of the Pacific](#)

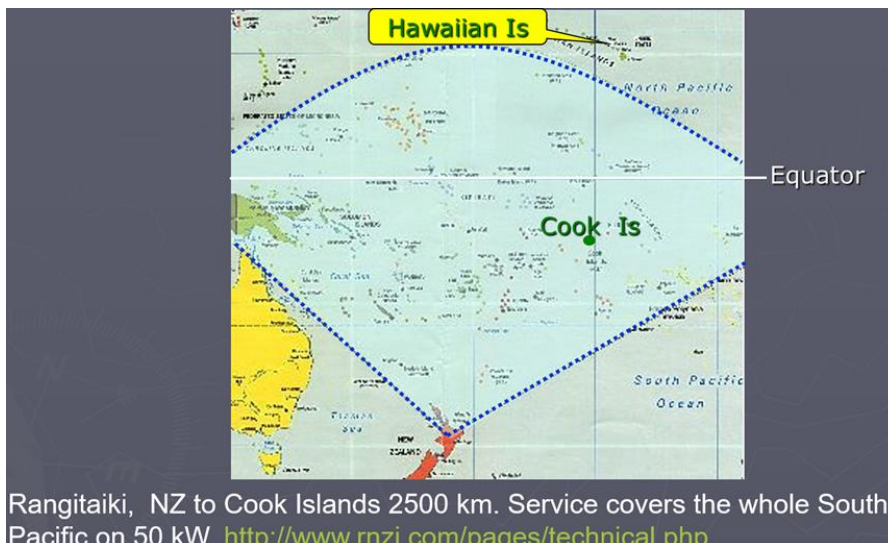


Tecsun Radios @TecsunRadios · 8h
The positive impact of shortwave radio is enhanced where Chief Ben Lovo and his family of Bongkil Village on Errmango, Vanuatu stated

"shortwave broadcasts from RNZI, during Cyclone Pam, allowed him to warn four villages of the danger, that saved hundreds of lives."



- [RNZ Pacific Using DRM to Feed Pacific Relay Stations](#)





Radio Republic Indonesia is interested in HF DRM to cover its 900 populated islands and the surrounding area. RRI is a member of the DRM Consortium and has tested DRM for large coverage and local coverage in the past three years. Their trial results have been submitted to ITU and the commitment of the country to DRM is firming up.

Voice of Vietnam has recently tested DRM, **Pakistan** is using DRM for local coverage and expanding the use, **Nepal** is highly interested. **Taiwan** has an important DRM installation. **Japan** has installed DRM transmitters for disaster warnings; Russia are all using or testing DRM. **China** itself seems committed to DRM in medium wave and shortwave (tested in April and July 2018). **Moreover, [China Radio International has taken over some of the ABC Radio Australia's old shortwave frequencies in the Pacific: 9580kHz and 7240kHz.](#)**

This shows that once abandoned for quick gain, these frequencies can be snapped up by others seeing value in them. Often once lost, they cannot be regained.

As mentioned in a recent article (Radioinfo, June 23rd) former ABC technologist and tech commentator Peter Marks thought there are several technologies available to international broadcasters "the shortwave and DRM are the most robust in times of crisis and disaster".

Conclusion

To preserve and increase its influence and contribute to the peaceful development of the region, Australia should start using high power Digital Radio Mondiale (DRM)⁵ from the centre of Australia or Shepparton Victoria as we believe some residual capacity is still there. Each transmitter could be transmitting either high quality stereo sound in English and another language simultaneously. Adding multilingual text and pictures would enhance the excellent audio programmes.

The Emergency Warning Functionality is part of the DRM standard, recognised by ITU and ETSI, and as such could be a useful alert system against cyclones, tsunamis and other disasters in populated regions of the Pacific or Asia. Australia must publicise in target countries the existence of these DRM broadcasts commencing in the Pacific Islands including NZ, India and Indonesia.

Radio Australia needs to restore the High Frequency broadcasting capability using the new Digital Radio Mondiale for not only the Pacific, but also all of Asia and Eastern Africa.

Radio Australia and the government should encourage the Australian manufacturers and exporters of HF two-way radios and digital radios to include DRM and DAB+ reception in all their products, as multi-standard chipsets are already available.

⁵ www.drm.org



Every Australian embassy and consulate could also be equipped with a DRM radio in both the office and on all vehicles with appropriate antennas for very reliable reception. This can be used in the case of emergencies as well as demonstrating the excellent sound, text and images and programs from Radio Australia.

Finally, Australia needs to be given modern DRM transmission capabilities, the means to promote receiver purchase and attractive, credible programmes which listeners want to hear.

The DRM Consortium is ready to support and supply extra information and respond to any questions in writing or in person. (www.drm.org and email: projectoffice@drm.org)