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To Whom It May Concern,

**Submission to the Committee regarding Australian Broadcasting Corporation Amendment (Restoring Shortwave Radio) Bill 2017**

## **The author**

I hold a Broadcast Operator's Certificate of Proficiency which is a qualification that used to be required to operate a high power broadcast station transmitters. A long career in both commercial and public broadcasting, mostly in technical roles but also as a producer and commentator.

For the past decade I have been providing technology explanation and commentary on the ABC RN Breakfast program. I have also written for technology magazines and appeared on numerous radio and television programs to explain technology and its impact on society.

I'm also a life-long shortwave listener and Amateur Radio operator, call sign VK2TPM, first licensed in 1978.

## **Reasons given by the ABC for ceasing short wave broadcasting**

Referring to the statement<sup>1</sup> outlining the reasons why the ABC exited Shortwave radio transmissions, I wish to challenge the following points:

- Shortwave is an "outdated technology"
- The FM transmitter network is "robust"
- Shortwave reaches a "very limited audience"

## **Shortwave is an "outdated technology"**

The term shortwave refers to a range of frequencies from about 1.6-30Mhz<sup>2</sup> which have the unique benefit of being reflected by upper layers of the atmosphere at times when they are struck by charged particles emanating from the sun. These layers are called the ionosphere. Note that shortwave is also known as High Frequency (HF).

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<sup>1</sup> <http://about.abc.net.au/press-releases/shortwave-radio/>

<sup>2</sup> [https://en.wikipedia.org/wiki/Shortwave\\_radio](https://en.wikipedia.org/wiki/Shortwave_radio)

These layers efficiently reflect radio signals so that even quite low power transmissions can be clearly received with small, low cost receivers thousands of kilometres away from the transmitter - in fact beyond line of sight.

The Australian Bureau of Meteorology (BOM) has a group called Space Weather Services<sup>3</sup> (SWS) that provides data about the state of the ionosphere so that regular users can plan the times and frequencies that will be most effective for reaching the desired destination. Clients of SWS, aside from shortwave broadcasters, include<sup>4</sup>:

- Airservices Australia
- State Emergency Service
- AMSA
- EMCOMNET
- Australian Antarctic Program
- Virgin Australia
- 1RSU
- JetStar
- SA Coast Radio
- QANTAS
- ACMA
- SFO Arinc
- HF Radio Club
- AEMO
- Stockholm Radio
- PNG Air Services
- DFES

The BOM continues to invest<sup>5</sup> in the SWS which is a key service for users of shortwave (they refer to it as HF). At a presentation by members of the SWS at a radio field day at Wyong, NSW in February 2017, the importance of HF was mentioned in the context of the likely scenario that communications satellites would be disabled if a regional conflict were to break out. Shortwave would then be a vital fallback mode of communications.

## **Amplitude Modulation outdated?**

As shortwave is very much in use as a modern band for efficient communication, then perhaps the part that is outdated is the transmission mode called Amplitude Modulation (AM).

AM trades simplicity and low price on the receiver for more investment on the transmission side. AM is much less efficient in energy terms at the transmitter and takes up about double the bandwidth of other modes that are commonly used on shortwave for voice communication.

This investment in the AM transmitters means that very low cost shortwave radios, affordable in emerging countries, are available. A large number of receivers are in the market with new models being released regularly<sup>6</sup>.

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<sup>3</sup> [http://www.sws.bom.gov.au/About\\_SWS](http://www.sws.bom.gov.au/About_SWS)

<sup>4</sup> [http://www.sws.bom.gov.au/Products\\_and\\_Services](http://www.sws.bom.gov.au/Products_and_Services)

<sup>5</sup> <http://www.sws.bom.gov.au/Category/About%20SWS/Space%20Weather%20Services%20Review/doc/Management%20Response.pdf>

<sup>6</sup> <http://swling.com/Radios.htm>

There are new modes, generally using digital modems to get signals through even poor band conditions. India is deploying a network of Digital Radio Mondiale<sup>7</sup> stations that provide noise free FM quality across a large country but at the cost of more expensive receivers.

Radio New Zealand International<sup>8</sup> is capable of and has transmitted DRM in the past.

When a government does not wish its people to be able to get news from outside sources a frequent tactic has been to attempt to jam the frequency by transmitting noise on the same frequency within the country.

The Voice of America shortwave program VOA Radiogram<sup>9</sup> runs regular test transmissions where various digital text modes are transmitted and reception reports are invited from listeners around the world. These digital mode transmissions can be decoded even when signals are very weak or are subject to local interference as might be experienced when deliberate jamming is in progress.

Modern digital modes over shortwave radio are at the cutting edge of technology and very low power signals (100mW) transmitted in the WSPR<sup>10</sup> mode are often decoded right around the globe<sup>11</sup> well below the noise floor.

AM may be an old, relatively inefficient mode but there are alternatives that are available. AM remains well suited where a target audience may need to tune in with the lowest cost receivers.

## **The FM transmitter network is “robust”**

Local FM transmitters are vulnerable during times of crisis in two ways. First, by being deliberately turned off locally.

During the military coup in Fiji in 1987, Sitiveni Rabuka closed down the local radio stations (AM and FM) from memory but was incensed that the ABC and BBC using a borrowed ABC Short wave transmitter were still broadcasting the news he didn't want people to hear<sup>12</sup>.

Again during the military coup in Fiji in 2009, Frank Bainimarama has the power removed from the local ABC FM radio stations<sup>13</sup>.

Second, during extreme weather or perhaps Tsunami events it is likely that local FM transmitting antennas will be damaged and power will be lost for extended periods.

These are examples of times where shortwave transmissions are vital and may be the only way of learning of global response to local political events, relief efforts, further warnings.

Radios which can be powered by hand crank, solar or battery are widely available.

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<sup>7</sup> <http://www.drm.org>

<sup>8</sup> <http://www.radionz.co.nz/international>

<sup>9</sup> <http://voaradiogram.net>

<sup>10</sup> <http://www.physics.princeton.edu/pulsar/K1JT/wspr.html>

<sup>11</sup> <http://wsprnet.org/drupal/wsprnet/map>

<sup>12</sup> Sydney Morning Herald, October 7, 1987 story titled: “BBC is heard in Fiji via Australia”

<sup>13</sup> <https://solivakasama.wordpress.com/2009/04/15/frank-bainimarama-shuts-abcs-fm-radio-stations-in-fiji/>

## Shortwave reaches a “very limited audience”

It's true that quantifying the shortwave audience is difficult. By definition the most isolated listeners are going to be those who most value this lifeline and are also least likely to appear in surveys.

ABC correspondents have experienced a warm welcome when meeting isolated communities as they have heard them on shortwave radio.

For example, the ABC's correspondent Liam Cochrane arriving in Dillon's Bay on Erromango Island in Vanuatu after Cyclone Pam (cyclone was in March 2015, his arrival on Erromango may have been 1 April or thereabouts). He noted<sup>14</sup>: 'We expected the worst. Death, injury, hunger. But when we arrived, the Dillon's Bay village chief ... told me they knew the cyclone was approaching, so they sheltered in the two solid buildings in the village. Most houses were flattened but not a single injury. I asked him how he knew the cyclone was approaching. He said, 'ABC Radio' (shortwave).

Discontinuing shortwave transmissions will diminish the number of radios out in the field so that when a crisis occurs, and emergency communication via shortwave is needed, it will be less effective.

## Conclusion

Shortwave broadcasting is an efficient and effective way of broadcasting information throughout our region and it is robust in the face of political or environmental disruption.

It is likely that the previous configuration of transmitters was not the most economical way of transmitting and I propose that a review of lower cost configurations be undertaken.

Distribution of low cost shortwave receivers would be a valuable part of our aid program.

Establishment of regular modern digital mode text news transmissions will pay off in the future as a way to get news out to local journalists in times of political crisis.

Shortwave is not outdated, the alternative networks are not robust and the audience is underestimated.

Sincerely,

Peter Marks

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<sup>14</sup> <http://www.abc.net.au/news/2016-12-09/pacific-nations-lose-shortwave-radio-services/8108032>