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Department of Communications and the Arts and the Department of Foreign Affairs and Trade.

Review of Broadcasting Services in the Asia Pacific

To whom it may concern,

I am a professional engineer and prior to retirement in 2015 was Director of Broadcast Engineering for Seven West Media for over a decade. I was Seven's technical representative on the board of TXA, the joint venture company responsible for transmission services for the Nine, Seven and Ten metro market television networks.

I have been involved in broadcasting for practically my entire working life and have been a proud supporter of the ABC and the good work done by Radio Australia providing news and entertainment services to all Australians and international short wave listeners, no matter where they are located.

I will leave comments about "soft diplomacy" and the observations about the Chinese taking advantage of our recent withdrawal of HF radio services to others and will try to provide a technical perspective to the suggested methods to replace the HF radio services by the ABC and the advantages of the HF service for effective radio transmission to listeners over a vast region of the globe. I may use the terms "High Frequency (HF)" and "Short Wave" interchangeably.

It is absolutely clear that the substitutes for the HF radio service offered by the ABC were an after thought when their decision to cease HF transmission was questioned, and it is equally clear that little or no engineering input was provided to develop the alternatives offered. The reasons given for the removal of HF radio services to the technically astute seem bizarre as a comparison between HF services and those cited as a replacement are inexplicable.

The propagation characteristics of radio signals are determined by the frequency of transmission. High Frequency services (or Short Wave) exist in a sweet spot in the radio frequency spectrum that allows propagation over very large distances because at these frequencies the radio waves are refracted back to earth by an ionized layer in the atmosphere called the ionosphere. Normal AM transmission on the Medium Wave band like say, Sydney's 2GB do not reflect from the ionosphere and follow a mainly "ground wave" propagation method. For this reason, the distance covered by these Medium Wave services is less than that of Short Wave services.

FM broadcasting uses a frequency spectrum above the High Frequency spectrum called VHF (Very High Frequency). At these frequencies, the signal is not

refracted but rather punches through the ionosphere so these services are sometimes referred to as "line of sight". Line of sight means if the receiver can "see" the transmitter, communications can occur reliably, otherwise the signal has no way of reaching the receiver. In this case the range of propagation is much less than a Short Wave service. As a function of refraction from the ionosphere, Short Wave radio is the ONLY way services can be provided over very large distances without the use of some form of relay equipment (for example, Satellite). For this reason, no other method can be used to provide the efficiency and simplicity of long distance radio services as HF radio.

The notion that Short Wave services are "out of date" as identified by the ABC makes no sense, as the ability to propagate signals over large distances is a function of physics and not the result of a developed technology.

The beauty of the Short Wave band for radio transmission is the efficiency in providing services to isolated regions over a vast geographic distance. A single transmission site can provide services to listeners over an extremely large region and the listener can use very modest equipment to receive those transmissions.

The equivalent coverage using any other method requires many individual transmission sites near the location of the listener. The disadvantage when dealing with many different remote and isolated communities is the obvious cost in establishing these transmission facilities, the ongoing cost of power and maintenance and the need to provide programming to these isolated communities. If a community is not large enough to warrant the cost of a local installation they will simply miss out on receiving any services. The Short Wave transmission facility needs to be replaced with many hundreds of individual transmission facilities to achieve the same coverage.

A disadvantage to these local services is the probability that the local service will be disabled during times of extreme weather events. Cyclones can devastate the transmission services so when general communications is critically required, the transmission facility for that community is disabled. Short Wave services originating from a more stable weather location remains unaffected by remote cyclone activity providing a reliable and robust service to listeners in those remote communities.

The replacement methods suggested by the ABC leading to the shutdown of HF services unfortunately provides no real way forward for those who previously relied on HF services for their news and entertainment. They may be applicable in a city, but that is not the target audience for HF radio. HF radio is suitable for the most remote listener, removed from Internet streaming and FM radio services. It suits the most remote and impoverished communities as the service can be received with very simple and readily available receivers. The withdrawal of HF services impacts on the most vulnerable and remote people, something the ABC tragically failed to understand when HF Radio services were shut down.

To suggest the VAST service is an alternative is lacking any recognition that vast services require a carefully positioned satellite dish and a VAST receiver with activated smart card. The VAST service is excellent for some outback travellers but is certainly not a replacement for simple HF radio.

Suggesting listeners should download podcasts to replace real time news and entertainment is absurd and while the ABC may advocate Internet streaming services, data is not free of charge and for most HF radio users, accessing the Internet is simply not an option.

The ABC has previously provided services allowing all Australians and regional neighbours to access to their programming, irrespective of geographic location. I have enjoyed this most basic of services when travelling, always knowing that the sounds of the ABC can be found using a very basic HF AM radio. It provides a link to familiar voices no matter how isolated the location.

Some may advocate the transition to Short Wave services using new digital modulation techniques such as DRM. I cautiously support such trials but encourage the resumption of basic analogue AM HF services to allow the poorest and most isolated people access to Australian programming using existing equipment.

It was very disappointing to see that DFAT had no view on the removal of HF services with their submission to last years private members bill, "Australian Broadcasting Corporation Amendment (Restoring Shortwave Radio) Bill 2017" relying on the ABC to establish the best technical solution to provide services to the Pacific. The most basic research would have led them to the conclusion the ABC did not base their decision on any sound technical advice.

I hope this submission provides some insight into the elegant simplicity of HF radio providing vital news and entertainment to extremely isolated communities. The ABC has turned its back on the most isolated people in Australia providing no basic service for those who are not near a major center. It would be surely be a missed opportunity to do the same to our neighbours in Asia and the Pacific. Certainly the Chinese have seen value in providing services to those we have turned our backs on, perhaps we should reconsider this most short sighted decision.

Trevor Bird