

16th April, 2020

Response to “Re-planning options for frequency bands within 1710-2300 MHz”

Sennheiser ANZ, welcomes the opportunity to comment on the *Re-planning options for frequency bands within 1710-2300 MHz*, specifically relating to **Radio microphones in the 1800 MHz Duplex Gap**.

Sennheiser electronic GmbH is an audio company specializing in the design and production of a wide range of high-fidelity products, including microphones, headphones, and aviation headsets for personal, professional and business applications. Our market consists of a cross section of musical instrument retailers, broadcasters, tertiary institutes, live sound engineers, rental companies, film industry sound mixers and other radio microphone and in-ear monitor users.

The discussion document proposes to re-purpose the 1800 MHz duplex gap (1785-1805 MHz) to accommodate radio microphones, complying with ETSI standard EN 300 422-1.

Accommodating radio microphones in the 1800 MHz duplex gap would ensure that sufficient spectrum is available for this use in lieu of the previous clearance of the 700 MHz band in 2013.

Sennheiser ANZ strongly endorses making the 1800 MHz duplex gap (1785-1805 MHz) available to radio microphone users.

Being a duplex gap, the frequency band from 1785 MHz to 1805 MHz is reserved exclusively for audio transmission, allowing users the freedom of not having to plan their systems around primary users or search for gaps between TV channels. This spectrum is completely free of other users. In addition, the band is available not only right across New Zealand but also in Australia, allowing users to travel across the country and into Australia confident that their system will operate without interference.

In 2011, Sennheiser was the first manufacturer to launch wireless microphone systems that transmit at a frequency of 1800 MHz. In 2013, Sennheiser ANZ successfully deployed 1800 MHz radio microphone products from its evolution wireless G3 series in Australia. The 1800 MHz product range was embraced by radio microphone users and remains a staple in the company’s current evolution wireless G4 product portfolio.

Sennheiser 1800 MHz transmitters and receivers are available in the following frequency range:

Frequency Range	Bandwidth	Number of Frequencies
1785–1800 MHz	15 MHz	1,500

Transmitters and receivers have 20 frequency banks respectively.

It should be noted that re-purposing the 1800 MHz duplex gap to accommodate radio microphones should be viewed as an adjunct to, not replacement of, the existing 500 and 600 MHz bands. Opening up the 1800 MHz duplex gap will work to ease pressure on the already congested 600 MHz band, but the nature of 1800 MHz transmission, while an appropriate solution for many applications does have limitations that preclude its deployment in environments currently serviced by the 600 MHz band such as those outlined below.

Regarding the question of appropriate guard bands for achieving compatibility between radio microphone use and mobile networks operating below 1785 MHz and above 1805 MHz, our advice from Sennheiser's Dr. Andreas Wilzeck, Head of Spectrum and Innovation, Research and Innovation reads as follows:

Instead of guard bands it is more appropriate to use a so-called Block Edge Mask (BEM), see ECC report 191 (attached) or German regulation.

- 1785 MHz - 1805 MHz Maximum transmit power 85 mW e.i.r.p.
- Below 1785 MHz a maximum of -17 dBm in RBW=200 kHz (RBW=Resolution Bandwidth)
- Above 1805 MHz a maximum of -37 dBm (handheld) or -23 dBm (body worn), each in RBW=200 kHz

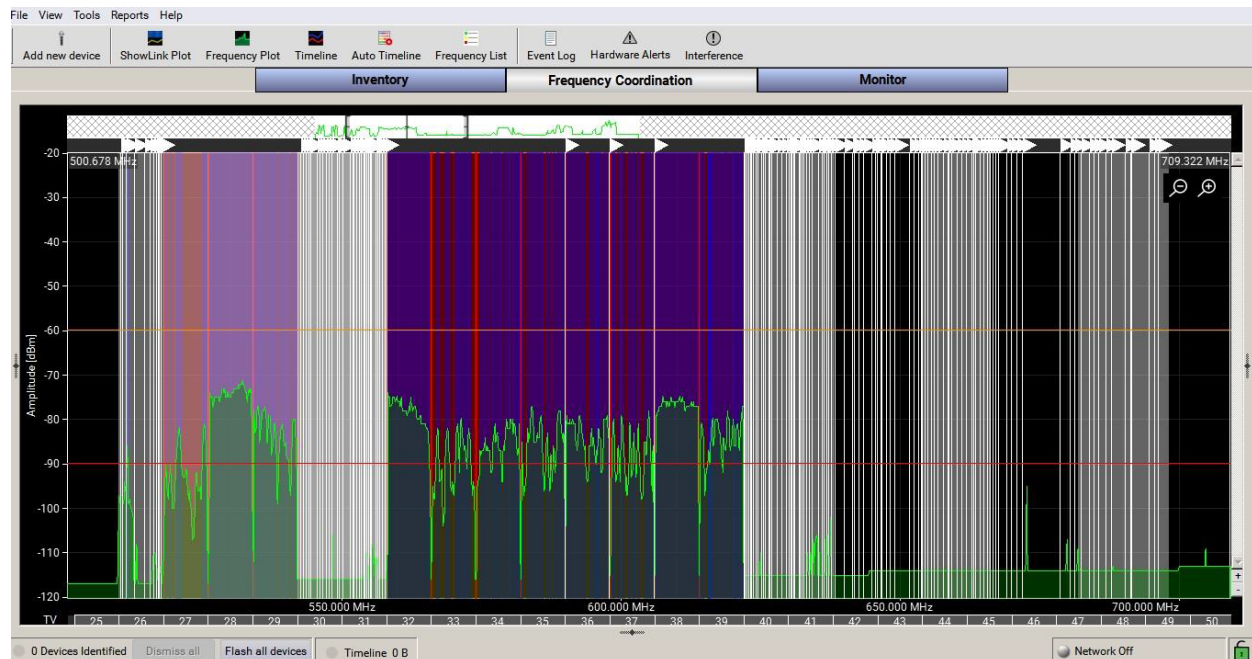
No occupied bandwidth requirement.

Large events

A major event such as an All Blacks Test Match, can require up to 70 frequencies for radio mic usage. Such high demand has required the use of the entire 76MHz bandwidth in the 600MHz band. The equivalent amount of available spectrum does not exist in other current bands allocated for radio mic usage.

The RSM has indicated in the past that the 500MHz band would probably suffice for radio microphone usage, but there simply isn't the available clean spectrum in this band. New Zealand Rugby Union's ability to continue to host All Blacks games in Auckland would be severely compromised.

In Auckland open air we have as little as 24MHz of clean spectrum available to us in the 500MHz band (the rest is unusable because of strong DTV transmitters). If currently unused DTV transmitters commence broadcasting, the available spectrum reduces to 8MHz. In stark contrast we have available at any location in New Zealand, 76MHz of clean spectrum in the 600MHz band. If we lose this 76MHz without having an alternative we cannot meet the RF demands of events.



This graphic shows the frequencies used across the day during the Auckland City Limits Festival 2018 at Western Springs, which is very close to Eden Park. The final count of frequencies across all stages was around 160. This clearly illustrates how strong the active DTT channels are at that location and the lack of available clear spectrum in the 500MHz band.

Similar density of DTT transmissions in the 500MHz band is also prevalent in other parts of Auckland, Hamilton City, Tauranga, Wellington and Nelson.

Other large or major events

Vodafone Music Awards, broadcast and viewed on TV, online and by several thousand attendees at the venue. RF channel count for audio: 84

Christmas in the Park, turnout of 50,000 in Christchurch, 70,000 in Auckland, viewers of the broadcast: 300,000 people. RF channel count: 46

Laneways Festival Auckland: 13,000 people, 63 audio RF channels across the festival at pre-planning. Auckland City Limits festival Auckland: 25,000 tickets, close to 160 frequencies across the festival over the day.

WOMAD festival, New Plymouth: A completely sold out Saturday put the site at capacity with 12,500 audience members and 17,000 people in total (including all of the workers, artists and vendors). 85 audio RF channels across the festival site.

Again, all of these large events need a large bandwidth of spectrum to accommodate radio microphone and in-ear-monitoring usage. International guest, artists and media rely on available spectrum, too. From our perspective; 600MHz is already established, suppliers have functioning equipment. It is a spectrum band that is used in wide parts of the globe, and therefore compatible with international guest's equipment.

The usage of radio microphones is burgeoning.

Film and Television Production

Film and television production is reliant on radio microphones and IFB equipment for program creation. Radio microphones are used extensively in sports production, news production, reality television, documentaries, drama, soaps, and feature films.

Telecommunication companies need to keep in mind that should they wish to venture into local sports production rights, then they'll need to use radio mics to create the content.

Media Organisations

The advance of technology has forced traditional print media organisations to introduce video content on their websites, so they too are regular users of radio mics. With greater usage there is also greater potential of conflict of frequencies when all the various media organisations arrive at the location of a significant news event. Such organisations are naturally unable to pre-plan their movements, so the requirement for them to have nationally available clear spectrum is vital.

Education

Tertiary institutes and schools rely on radio microphones for a range of activities from lectures through to school productions. Many of these operate on limited budgets and cannot afford to buy new equipment on a regular basis.

Stage Production

The days of the lyric theatre and the cabled handheld microphone have long gone and most productions use radio microphones

Value to Community, Financial and Cultural

Recent report from ATEED Auckland Major Events Strategy

"Auckland's mega summer: Music stars and sport make \$13.1m for the regional economy"

http://www.nzherald.co.nz/entertainment/news/article.cfm?c_id=1501119&objectid=12034766

The Lions tour 2017, attended by almost 350,000 people, estimated TV audience was approximately 10 million viewers in New Zealand and over 230 million international viewers. Furthermore, nationally, the tour contributed \$194m to the GDP and created 2507 jobs. Depending on the match the RF channel count for audio was at 70-85, across all local suppliers, media, broadcast and match officials, including our international guests.

Nielsen's New Zealand Multi-Screen Report (October 2017)

<http://www.nielsen.com/nz/en/insights/reports/2017/kiwis-and-live-television-keeping-it-real.html> shows that consumers are continuing to watch broadcast TV and 90% of this viewing is spent watching live content. On average, 77% or 3.1 million Kiwis (aged 10+) watch broadcast TV each week and live viewing was the dominant viewing behaviour across all age groups.

The Ministry of Business, Innovation and Employment manages this site:

<http://www.majorevents.govt.nz/>

"New Zealand Government works in partnership with the event sector to support New Zealand's growing reputation as an attractive destination for major events of global significance."

Any enquiries should be addressed to:

Stephen Buckland,

Chair, Wireless Users New Zealand

Email: stephenb@soundtq.co.nz

Ph: 09 366 1750

11A Violet St, Mt Albert

Auckland 1025