



Submission: Options for 174-230 MHz Consultation Document

Date: 27/5/16

Submitted by: Stephen Buckland. General Manager, Sound Techniques Ltd, Chairman Wireless Users NZ

**Background:**

Radio microphones are an essential tool in modern communication and content creation regardless of the medium the message is being conveyed. The range of uses ranges from gyms, churches and lectures through to film and television, sports broadcasting, news gathering, live theatre, concerts and radio. There are competing demands for use of the airwaves but most of the other users rely on radio microphones to an increasing degree to generate the material being communicated.

Radio microphones for content creation have specific requirements which differ from other users of the radio spectrum. Some features may be less important for situations where audio quality and performance isn't critical. In others such as large scale events like concerts or international sports matches all these factors need to be considered. If New Zealand wants to continue to attract world class entertainment such as concerts and stage shows, international sports events and large scale film production, spectrum must be put aside for exclusive use for radio microphones. The significant economic benefits of such events reach beyond the events themselves to tourism, employment and other areas of the economy

**Radio microphones require:**

Low latency

Wide frequency response

No artefacts from compression

Wide dynamic range

Absolute Reliability Required

Drop-outs not acceptable

No clicks acceptable, especially in quiet periods

Historic events cannot be repeated

Premium quality is demanded

High resolution audio originate from production otherwise it is not possible to derive the various quality levels in distribution.

Multiple sound channels have to be mixed to one output and must sound natural.

Lossy compression of is not advisable in production because it leads to artifacts and latency in final distribution. Like other services, Content and Event Production cannot accept two compression schemes in cascade, i.e. production and distribution.

Licencing of part of the VHF III band for use by radio microphones may prove to be part of the answer for operating in an increasingly congested UHF RF environment and given the prospect of limited future access to the 600 MHz band where many radio microphone owners migrated after the sell-off of the 700 MHz band.

VHF Radio microphones were phased out during the 1990's for various reasons. There was more UHF spectrum available. In Auckland the amount of usable UHF spectrum is currently around 80 MHz. Other areas have more. VHF Band III provides a maximum of 56 MHz of spectrum

VHF devices require longer and more cumbersome antennae. The transmitters are larger and heavier. Because VHF frequencies have longer wavelengths, the devices themselves tend to be larger, heavier, and more expensive if they are engineered to the same quality standards as current-day UHF equipment. For example, the wavelength of 180 MHz is about 14 cm. Whereas a 550 MHz signal has a wavelength of only 4.5 cm. More compact transmitters are desirable in performance situations and more compact receivers are more useful especially when used for portable location work.

**Q1. Should spectrum in Band III be allocated for radio microphones? If so, how much spectrum would satisfy demand in this area?**

Users in New Zealand are dependent on developments and manufacturing for other territories. Sound Techniques represents two manufacturers which make equipment in the VHF III band, Lectrosonics Inc and Comtek. Both suppliers are in the USA. Both companies' current VHF equipment is designed for IFB and assisted listening. As per spectrum availability in USA, the minimum allocation required would be from 174 – 217 MHz

**Lectrosonics Inc VHF IFB system:**

Lectrosonics tunes from 174-216Mhz. EITSI mask - 200Khz bandwidth. For this to be an effective possibility for even wider application, Lectrosonics would need either a minimum three contiguous 8MHz TV channels reserved strictly for wireless microphone use, or broader spectrum access if shared with other users.

If it is fragmented, spectrum wise, it would be nearly impossible to engineer cost-effective solutions.

T4 transmitter key specifications

Operating Frequencies (MHz): 174.100 to 215.750 MHz

Available Frequencies: 239

Channel Spacing: 175 kHz

RF Power Output: 50 mW

IFB Mode: 100 Hz to 8 kHz,  $\pm 1$  dB

Audio Compressor: 2 to 1 (IFB mode)

While at the time of the first release of the product, there is only a companion analogue IFB receiver, the Lectrosonics Digital Hybrid Wireless system is included for potential compatibility with future products.

**Comtek**

Designed for remote programme monitoring; personal cueing; wireless tour guide assistive listening

Frequency Selection (216-217 MHz)

Frequency Response: 80 Hz to 10 kHz

Up to 5 compatible frequencies available within range.

10mW output power M216 transmitter battery powered

100mW output power BST-25-216 transmitter externally powered

## **Summary**

If a minimum of 24 MHz of spectrum up to 217 MHz was set aside for exclusive use by radio microphones, then users and manufacturers would have a degree of certainty in designing products for future use and some current users could migrate to this new band. The current licencing regime of General User licences for radio microphone use doesn't cater for the amount of radio microphones in use and further planning is necessary to cope with the growth in usage.

Sound Techniques Ltd: Unit 3, 1 Porters Ave, Eden Tce, Auckland 1024  
Phone 09 366 1750; email [stephenb@soundtq.co.nz](mailto:stephenb@soundtq.co.nz); [www.soundtq.co.nz](http://www.soundtq.co.nz)