

## **MiMOMax Submission to the MBIE Consultation Document:**

### **Options for 174 – 230 MHz.**

MiMOMax Wireless Limited, offers this comment on questions raised in the Radio Spectrum Management consultation document “Options for 174-230 MHz - Review of option for allocating spectrum in VHF Band III”.

#### **About MiMOMax Wireless Limited.**

MiMOMax Wireless Limited (MWL) is a spin-off company from the Advanced Wireless Research Group at Tait Electronics Limited (TEL). It was co-founded by Paul Daigneault and Doug McConnell (CTO) in 2007 and services a large international customer base, including; Australia, New Zealand, United Kingdom, United States and the Middle East, to name a few. MWL and TEL are separate legal entities, however, both companies are owned by the same Trust originally established by Sir Angus Tait.

The MiMOMax Space Time Diversity system utilises the propagation property that radio signals travelling via different paths will by definition arrive at a remote receiver at different times. The MiMO concept utilises multiple antennas at both transmit and receive ends to not only increase the radio channel throughput but also to improve the received signal quality. This commercially available solution is capable of delivering spectral efficiency up to 16 b/s/Hz in narrow band licensed channels.

MiMOMax has an extensive program of R&D and manufacturing based in Christchurch and is well coupled to New Zealand Universities and other global research institutes.

MiMOMax’s comments are based on its experience, its research, and its international communications business along with its appreciation of the distinctiveness of New Zealand’s radio communications environment.

#### **Response to Questions.**

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

**MiMOMax Response:** No. Spectrum in this range is valued for its propagation characteristics; characteristics of little relevance to radio microphones. Given that there is other spectrum available for that application this band should be reserved for services that can fully utilise its unique propagation characteristics. Consequently no Band III spectrum should be made available for radio microphones.

##### **Q2. Should spectrum in Band III be allocated for DAB? If yes, why? If not, why not?**

**MiMOMax Response:** MiMOMax has no current interest in Broadcasting and the decision on allocating spectrum for this purpose should be made elsewhere based solely upon the economics of its introduction or otherwise. Consideration should be given to the wider economic benefits from allocating this spectrum to other end users, specifically Utilities and mission critical entities. If DAB allocations are to be considered, then extensive technical studies should be undertaken by MBIE to determine the viability for high powered Broadcast and other mission critical services to coexist within Band III allocations.

**Q3. Would an allocation of 14 MHz in the form of eight 1.536 MHz frequency blocks be an appropriate spectrum allocation for DAB in New Zealand? If not, how many multiplexes would be more appropriate for current demand?**

**MiMOMax Response:** As stated in Q2 ,MiMOMax has no current interest in Broadcasting and the decision on allocating spectrum for this purpose should be made elsewhere based solely upon the economics of its introduction or otherwise

**Q4. Should spectrum in Band III be allocated to LMR? If yes, how much spectrum would satisfy demand in this area?**

**MiMOMax Response:** Yes, the current VHF LMR Bands are heavily utilised to the point that free channels can be difficult to find in many parts of the country. Because of this shortage, commercial and critical infrastructure operators lack access to the spectrum critical to the rapidly growing communication requirements that are essential to the operation of their business.

The Band III frequencies are ideal for communications over the range of 10s to 100+ km and it would be very unwise to squander them on services that do not require this coverage

The frequencies would be ideally suited to provide both point-to-point (primarily; Full Duplex, spectrally efficient Mission Critical Digital LMR backhaul with Strict QOS and low latency/jitter, low latency power line tele-protection and general IP data applications) and point-to-multipoint (primarily Full Duplex high rate (IP) SCADA) communications for Utilities), as the coverage is well matched to the operational areas of typical Utilities in NZ. The demand for these communications is growing rapidly driven by the need for more efficient, reliable and intelligent power distribution (Smart Grid) and increasing requirements for water management and quality.

These frequencies are also ideally suited for linking / back-haul for digital mobile radio, particularly for mission critical services including emergency services.

MiMOMax believes these frequencies should be reserved for solutions that offer high spectral efficiency enabling: .

- Point-to-point IP links with strict QOS and low latency/Jitter
- Point-to-Point low latency links for Protection applications, Electrical Utilities. (other industries?)
- Full Duplex PtMP SCADA radio solutions catering for legacy serial networks and new generation IP based M-to-M applications.
- The ability to operation with high availability over long and difficult RF paths.

**Q5. If spectrum is allocated to LMR, should there be technological requirements around the use of this spectrum? If yes, why? If not, why not?**

**MiMOMax Response:** There should be technological requirements for the use of this spectrum including:

- The imposition of a 12.5 kHz raster, allowing 12.5, 25 and 50 kHz channels allocations for both Point-to-Point and Point-to-Multi-Point services.
- A 4.5 MHz or higher split for two frequency channels
- A minimum level of spectral efficiency should be established.
- Preference should be given to solutions offering higher spectral efficiency

As Band III is now greenfield spectrum it would make sense to us, to reserve it primarily for services that have needs difficult to accommodate within traditional LMR spectrum such as smart networks, distribution automation, common frequencies over wide areas, including the whole of New Zealand.

**Q6. If spectrum is allocated to LMR, is it appropriate to charge a fee for this use or transfer the spectrum to the management rights regime? If yes, why? If not, why not?**

**MiMOMax Response:** Yes, there ought to be a charge on spectrum use but this should be limited to recovering the real cost of allocating and managing the spectrum allocations. We are not in favour of selling the spectrum management rights as that is likely to significantly increase the cost to the user, for no additional benefit.

We should be careful to avoid adding additional costs to essential services such as power and water distribution that flow on to the end user.

On the issue of fees we feel strongly that where the frequencies are licenced for a point to multipoint system then the fees per remote station should be substantially less than the fees for a point to point terminal. It would seem to make more sense to charge a single fee for the whole of the point to multipoint system regardless of the number of remote terminals. That fee should be no more than the revenue that would accrue from the realistic typical number of number of point to point links that could be accommodated on a single frequency in the same region. It seems inappropriate to penalise users who have a large number of outstations each with low channel usage.

**Q7. Is there a demand for exclusive spectrum in Band III, either now or in the future, for IoT technologies? If yes, which IoT technologies are demanding this spectrum?**

**MiMOMax Response:** From our current view, there is currently no demand for VHF IoT and there is no dedicated equipment available; currently all IoT products operate in ISM bands, in GSM bands or in LTE bands.

In general there are higher frequency bands that are more suitable for IoT applications with the possible exception of rural electricity and water distribution and similar networks.

**Q8. If spectrum is allocated to IoT, how much spectrum would satisfy demand in this area?**

**MiMOMax Response:** MiMOMax has no current view on the requirements of this spectrum for IoT, further investigation would be required to establish an understanding of market needs..

## **Q9. Which type of licensing framework is most appropriate for spectrum allocated to IoT**

**MiMOMax Response:** We believe that frequencies should be able to be licenced on an individual basis and that it is not appropriate or in the best interests of New Zealand to sell the management rights to a third party.

## **Q10. Is there demand for exclusive Band III spectrum for utility companies? If yes, what types of uses are driving this demand and how much spectrum do these uses require?**

**MiMOMax Response:** Yes there is a definite demand. The drive to increase efficiency and reliability of both power and water distribution networks requires substantial intelligence and communications throughout the network. In order to enable the required communications additional frequencies, with sufficient reach, are required for these networks. Band III frequencies are ideal for this purpose.

### **Supporting Statement From Orion New Zealand Ltd.**

Canterbury Electricity Network owner Orion New Zealand has both New Zealand's and the world's largest deployment of MiMOMax Technology. The submission points raised here that would allow this spectrum to be used by this technology are very important to us and other Critical Infrastructure Operators that choose to deploy this technology. Of significant interest to us is the greater reach this spectrum would allow compared to UHF for higher frequencies. Questions relating to the support of this submission by Orion New Zealand Ltd can be directed to Neville Digby [Neville.digby@oriongroup.co.nz](mailto:Neville.digby@oriongroup.co.nz)

## **Q11. Is there demand for NZDF use of spectrum between 225–230 MHz?**

**MiMOMax Response:** MiMOMax has no view at this stage on this allocation.

## **Q12. Should spectrum in Band III be allocated to NZDF? If yes, why? If not, why not?**

**MiMOMax Response:** MiMOMax has no view at this stage on this allocation.

## **Q13. Should New Zealand consider PPDR uses in Band III? If yes, why? If not, why not?**

**MiMOMax Response:** Yes we believe consideration should be given although it is unclear to us what allocations would be required.

## **Q14. If there is demand for PPDR in Band III, how much spectrum would satisfy this demand?**

**MiMOMax Response:** MiMOMax have no current view on this requirement.

## **Q15. Are there any other uses of Band III that should be considered? If yes, please describe.**

**MiMOMax Response:** We believe that this spectrum has multiple applications and has real benefits for longer paths that cannot be satisfied by higher frequency bands. Therefore we believe that a significant allocation should be made available for both point to point and point to multipoint

systems, that will not be well served by other bands. This is essential for networks that require communications for public safety, utilities and other mission critical communications particularly in rural New Zealand.

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**End of Submission.**