Tait Submission to the 174 MHz to 184 MHz: Land Mobile Radio Technical Consultation.

To:
Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
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Tait Limited, trading as Tait Communications, offers its response to questions posed in the Radio Spectrum Management consultation document "174 to 184 MHz: Land Mobile Radio technical consultation October 2017".

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About Tait Communications

Tait delivers solutions for a variety of organisations and industries including public safety agencies, government services, utilities and urban transport providers. While manufacturing and most corporate functions are based in Christchurch, New Zealand, Tait has an international customer base with offices in Australia, the USA, Latin America, Europe, Canada, England, and Singapore. The private business of Tait re-invests heavily in research and development, with strong links to New Zealand Universities and Crown Research Institutes.

RESPONSE TO QUESTIONS

Allocation Design

Q1. Should any other objectives apply to the allocation of 174 MHz to 184 MHz for LMR services?

Tait Response:

The reason industry asked for this band was to provide relief for the congestion being experienced in the current VHF bands. Tait believes that the objectives listed by the Ministry addresses that need.

Q2. Do you have any comments on the proposal to manage 174 - 184 MHz under the management rights regime?

Tait Response:

Tait does not favour one regime over the other provided the interests of spectrum users remains paramount.

Q3. Do you agree that a resource charge (set through the sale price) be applied to spectrum rights in the LMR frequencies between 174 MHz to 184 MHz? If not, how should the Ministry manage demand for spectrum?

Tait Response:

Tait has no comment on this question other than to say that existing provisions of "use it or lose it" would likely achieve the same aim. However the resource charge method would be more cost effective for the Ministry and this would need to be balanced against the cost to the user.

Q4. Do you agree that 6.25 kHz is an appropriate channel bandwidth as the basic building block for the channel plan in 174-184 MHz?

Tait Response:

Yes we do, this is becoming a general LMR standard as spectrum is re-farmed or re-engineered.

Q5. Do you agree the maximum channel width should be 12.5 kHz for voice services?

Tait Response:

Yes we do, while there are technologies that utilise a 25 kHz channel bandwidth with a spectral efficiency equivalent to one voice channel per 6.25 kHz this technology is designed for high density traffic and uses architecture akin to a cellular system. This technology has also seen very limited deployments in this band.

The 174-184 MHz band is in the VHF part of the spectrum and is valued for its coverage rather than traffic density and as such the technologies currently using 12.5 kHz systems are more suited to it.

Further the 174-184 MHz band is intended to be an extension of the EE band which specifies 6.25 or 12.5 kHz channel bandwidths and we see no benefit to be had in adopting a different plan.

Q6. Do you agree that 4.6 MHz is an appropriate duplexer spacing for this band?

Tait Response:

Tait products and those of most suppliers to these markets are agile and can be programmed for a variety of duplexer spacing. It makes sense to replicate the EE band spacing and so that would be Tait's recommendation.

Q7. What should be the balance between simplex and duplex channels? Should more simplex channels be provided for?

Tait Response:

Tait has no comment on this question other than to suggest the answer be based upon the congestion being experienced in the EE band.

Q8. Should the duplex repeater base transmit channels be in the upper or lower portion of the band?

Tait Response:

Tait products and those of most competitors are agile and can be programmed to accommodate either option; however a continuation of the EE band structure would make sense.

Q9. Should the different channel sizes be interleaved in the channel plan or grouped according to size?

Tait Response:

If the basic raster is 6.25 kHz and wider channel bandwidths are formed by aggregating these 6.25 kHz blocks then there is no reason to group according to size. Doing so could potentially reduce efficiency if there is a requirement for channels of a specific size that exceeded the number provided for in the band plan.

Q10. Do you have any other comments on the configuration of duplex and simplex channels?

Tait Response:

Tait has no comment on this question other than to reiterate that this band should be in essence an extension of the EE band.

Q11. Would you or your organisation be interested in purchasing management rights (nationwide access) in 174 MHz to 184 MHz? If so, would this be for duplex channels, simplex channels or both?

Tait Response:

As a manufacturer of two-way radio equipment, Tait has limited requirements for operating frequencies. These are typically used for small field test systems local to our manufacturing and development base in Christchurch. Most other testing uses attenuators and RF loads to prevent radiation outside the prescribed limits. As a result Tait does not foresee a need to purchase such rights.

Q12. Do you have any comments on whether simplex licences should be issued on a shared use basis or for exclusive use in the coverage area?

Tait Response:

The rationale behind shared use is to ensure the spectrum is efficiently utilised. If it is to be made exclusive then the licensee should be required to demonstrate a suitably high occupancy rate.

Q13. Do you have any comments on whether the duplex channels should be offered as paired rights or as 'single channel' rights?

Tait Response:

Duplex channels are by their very nature paired; if only one channel is required then a simplex channel should be assigned.

Q14. Do you have any comments on what services should be allowed in 174 MHz to 184 MHz and how management rights could be configured for these services?

Tait Response:

As noted previously, the 174-184 MHz band is in the VHF part of the spectrum and is valued for its coverage rather than traffic density and as such the technologies currently using 12.5 kHz systems are more suited to it. This band tends to be preferred for rural and wide area use, while voice is still the predominant service; however Tait also sees increased demand for data services driven by the capabilities of cellular coverage where this is not always available. Tait also observes that newer digital radio standards, such as DMR, include data transport capabilities which are much more easily integrated seamlessly with voice services and so a provision for increased data limits should be considered.

Q15. What, if any, maximum channel width should be set for the different duplex and simplex services? Please provide reasons for why you propose any particular maximum.

Tait Response:

Refer to questions one and five. However, regardless of what is decided upon there should be some discretion retained within the Ministry to make allocations outside the normal since the field of communications technology and commercial developments are evolving and companies such as Tait have a need from time to time to access spectrum for testing these developments and these needs may lie outside a tightly prescribed band plan.

Q16. Should some fixed to multipoint services be permitted in 174 MHz to 184 MHz? If so, what types of service and what other restrictions, if any, should be applied to these services?

Tait Response:

Yes we do; as 174-184 MHz is virgin spectrum it would make sense to make provision for services that have needs difficult to accommodate within traditional LMR spectrum.

Further the 174-184 MHz band is in the VHF part of the spectrum and is valued for its coverage rather than traffic density and as such would meet the coverage needs of such services. Systems serving remote monitoring and distribution automations are two that would benefit.

Were this to occur then transferring those services from existing LMR bands to this new band would free up commensurate spectrum in those bands for reassignment to general LMR use.

Q17. Should mesh networks be permitted in 174 MHz to 184 MHz?

Tait Response:

Mesh networks are more associated with IoT than LMR and should be reserved for IoT spectrum.

Q18. What term is appropriate for the LMR management rights between 174 MHz to 184 MHz?

Tait Response:

Existing management rights have a term of up to 20 years. However for the services envisaged in the 174-184 MHz band technology and commercial developments are more volatile and a shorter term of perhaps 10 years would be appropriate provided there was a provision for the incumbent to renew if required.

Q19. Do you have any comments on the proposed allocation method for management rights and/or spectrum licences?

Tait Response:

Tait does not hold a strong viewpoint but as noted in earlier responses this band is seen as an extension of the EE band and as such the chosen allocation method should align with that currently in place for the EE band and so fit with existing users and use cases. There is a balance to strike between the cost and complexity to the Ministry to manage allocations and this will determine the ultimate method.

Q20. Do you have any comments on how the reserve price for a management right should be set?

Tait Response:

Tait has no comment on this question.

Q21. Do you have any comments on payment terms for management rights?

Tait Response:

Tait has no comment on this question.

Q22. Do you have any comments on how to set the resource charge for spectrum licences in Crown management rights in 174 MHz to 184 MHz?

Tait Response:

Tait has no comment on this question.

Q23. If geographic coverage is used to set the resource charge, what signal strength contour should be used to set the coverage extent? Should the coverage be limited to continuous coverage or also include fortuitous coverage? Why?

Tait Response:

Tait has no comment on this question.

Q24. Should any resource charge be set and imposed annually or as a single upfront payment?

Tait Response:

Traditionally spectrum costs in the form of licence fees are imposed annually which may suit cash flow management for spectrum users. Note that the users of LMR services are very different to rights managers for a service such as cellular communications or programme broadcasting.

Q25. Which option is preferred to manage regional variations in demand and how should the regions be identified? Do you have an alternative mechanism to manage regional variations in demand?

Tait Response:

A tiered pricing arrangement for high density regions could be a good way to prevent spectrum banking but there would need to be a balance to prevent legitimate users from being unfairly impacted.

Q26. Do you consider that allocation of LMR spectrum rights between 174 MHz to 184 MHz should be subject to acquisition caps? If so, why and what should these caps be?

Tait Response:

Having the ability to assign some form of cap would be valuable. This would be best managed on a case-by-case basis as a general prescription could be limiting in some instances.

Q27. Do you consider that implementation requirements should be imposed on LMR management rights and / or spectrum licences in 174 MHz to 184 MHz? If so, why and what should these be?

Tait Response:

Yes we do; the reason for opening this band is to provide relief for the current VHF spectrum shortage. A lack of implementation requirements would not necessarily encourage this and could also have the reverse effect of encouraging spectrum banking.

Q28. Do you consider there should be any requirement regarding access to or use of other LMR frequencies if an entity holds licences in 174 MHz to 184 MHz and other LMR frequencies managed under the radio licensing regime?

Tait Response:

Tait has no comment on this question.

Management Rights

Q29. What Adjacent Frequency Emission Limits and protection limits should apply to management rights for LMR in 174 MHz to 184 MHz? Should these align with the out of band emissions in the equipment standards? Why or why not?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then limits should be aligned with those already in place which will allow seamless roaming over both bands.

Q30. Should management rights be created (and retained) at one channel wide or be able to be amalgamated? If amalgamated, should restrictions on the maximum channel width and number channels be specified on the management right?

Tait Response:

They should be engineered to meet the needs of spectrum users and as such should be flexible. Ideally a management right in this service should essentially be modelled on licences currently issued which provide limits and can also prescribe individual licence requirements.

Q31. What level should the power floor be set at?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then limits should be aligned with those already in place which will allow seamless roaming over both bands.

Technical Requirements

Q32. Should the Ministry approach the technical specifications for these bands similarly to radio licensing? If so, why?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then technical specifications should be aligned with those already in place which will allow seamless roaming over both bands.

Leaving the performance decisions to various operators or rights managers opens the possibility of a reduction in interoperability and a consequent reduction in efficient spectrum utilisation.

Note that spectrum licences issued under existing management rights are invariably licenced to the rights owner and since there are no other users the issue of standard and specifications can be safely left to the owner.

Q33. Are there particular technical specifications which you consider must be identified?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then technical specifications should be aligned with those already in place which will allow seamless roaming over both bands.

Q34. Should the management rights set the maximum power for wanted emissions or the AFELs be relied on to manage adjacent channel emissions? Why or why not?

Tait Response:

Traditionally the maximum radiated power is set to provide geographic isolation between adjacent channel services which has the effect of increasing the efficiency of the spectrum usage. If this is allowed to increase it may well suit one particular licensee but disadvantage another. However if managed correctly it may not be an issue.

Q35. Should private and Crown management rights be treated differently? If so, how and why?

Tait Response:

Tait has no comment on this question.

Q36. Should a minimum field strength be specified for simplex and/or duplex LMR services between 174 MHz to 184 MHz? If so, why?

Tait Response:

Yes it should. Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then limits should be aligned with those already in place and in this case a common harmful interference protection level would facilitate seamless roaming over both bands

Q37. Should private and Crown management rights be treated differently or have different minimum field strengths specified? If so, why?

Tait Response:

Tait has no comment on this question.

Q38. Should a maximum coverage area be specified for simplex and/or duplex LMR services for Crown management rights in 174 – 184 MHz? If so, how and what should this be? Please give reasons for your views

Tait Response:

Tait has no comment on this question

Q39. What should the Maximum Permitted Interfering Signal be set at on LMR spectrum licences in 174 MHz to 184 MHz? Why?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then limits should be aligned with those already in place which will allow seamless roaming over both bands.

Q40. Should there be any consideration made to the difference between the MPIS being set over the entire protection area and the interference threshold in PIB 38 being set at the receiver?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then limits should be aligned with those already in place which will allow seamless roaming over both bands.

Q41. Should only digital LMR services be permitted in the duplex and / or simplex frequencies between 174 MHz to 184 MHz? If so, why or why not?

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then modulation systems should be aligned with those already in place which will allow seamless roaming over both bands.

Q42. What equipment standards, if any, should be applied to the use of LMR services in 174 MHz to 184 MHz? Please provide reasons for your views

Tait Response:

Since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then equipment standards should be aligned with those already in place which will allow seamless roaming over both bands.

Q43. Should DMR codes be required on LMR licences in 174 MHz to 184 MHz? If so, why or why not?

Tait Response:

No they should not be mandated since DMR is just one technology likely to be used in this band. Instead if there is a need then licences should be endorsed at the time of issue to reflect the needs of individual technologies.

'Non-Standard' LMR Service Configurations

Q44. Should some channels between 174 MHz to 184 MHz be reserved for trunked dispatch services? If so, should this be provided for in private management rights and / or Crown management rights? Why?

Tait Response:

Traditionally trunking is not used in LMR bands, so the answer to this question would need to reflect a need due to congestion in existing trunking bands. Note that this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band and since trunking is not a service supported in EE band there should be no need for it here.

Q45. Should linear repeaters be allowed in the LMR channels between 174 MHz to 184 MHz? If so, should this be provided for in private management rights and / or Crown management rights? Why?

Tait Response:

Linear repeaters should only be permitted in circumstances that do not increase the coverage area of the base system, for instance for infill in a dead spot.

Q46. Should back to back linking be restricted in the LMR channels between 174 MHz to 184 MHz? If so, should this be provided for in private management rights and / or Crown management rights? Why?

Tait Response:

Tait has no comment on this question.

Q47. Should the fixed and mobile transmit channels be strictly enforced? If so, why?

Tait Response:

The basic 6.25 kHz raster should be strictly enforced for efficiency and interoperability reasons but aggregation should be considered at the licensing level if it can be shown to meet a need.

Other Matters

Q48. Do you have any comments on the proposed timing of the allocation of these frequencies?

Tait Response:

Tait has no comment on this question.

Q49. Do you have any comments on the proposal to review the implementation and effectiveness, and / or the timing of the proposed review?

Tait Response:

Tait has no comment on this question.

Q50. Do you have any other comments?

Tait Response:

Although this is a theme presented throughout this submission it is worth repeating; since this band is seen as an extension of the EE band to relieve congestion currently being experienced in that band then all conditions imposed should be aligned with those already in place in EE band which will allow seamless roaming over both bands. Regardless of the ultimate structure adopted the Ministry should retain some discretion to vary conditions from time to time to suit unplanned spectrum requirements.

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