



NEW ZEALAND DEFENCE FORCE

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Radio Spectrum Band III Consultation

Radio Spectrum Policy and Planning
Ministry of Business, Innovation and Employment
PO Box 2847
Wellington

Dear Sir

CONSULTATION DOCUMENT – OPTIONS FOR 174-230MHZ

Reference: Consultation Document dated April 2016.

1. Introduction

The New Zealand Defence Force (NZDF) is a significant government user of radiocommunications and the frequency spectrum both in terms of the wide diversity of radio applications employed and the amount of spectrum allocated for defence activities. In particular, NZDF has an on-going interest in the use of spectrum in the VHF range and because of this interest, NZDF is supportive of the initiative by the Ministry of Business, Innovation and Employment (the Ministry) to engage in consultation with interested parties on the future use of the 174 – 230 MHz frequency band. In this submission, NZDF provides its views and responses to the questions outlined in “Options for 174 – 230 MHz: Consultation Document” prepared by the Ministry.

Spectrum has become a key enabler in providing NZDF capability both overseas for operational activities, and in New Zealand for a variety of purposes including training, equipment development, and certain operational military tasks such as air, land and maritime operations. Over the last few years NZDF has introduced a number of new technologies that rely on and are enabled by access to spectrum. At the same time NZDF has been conscious of the responsibility to ensure all use of radio based systems are as spectrally efficient as possible within operational and economic constraints.

NZDF is and will continue to be heavily dependent on effective access to spectrum for a range of applications such as:

- Voice and data communications, command and control functions.
- Intelligence gathering, surveillance and reconnaissance activities.

- Navigation and radio-location, positioning and timing.
- Weapons systems operation.

Established in-service capabilities, plus the requirements inherent in current and future Defence Capability Plans, are forcing an increased NZDF dependency on access to spectrum. In particular, the increase in the operational tempo of military activities over the last several decades has driven a dramatic increase in overall NZDF demand for spectrum and the future growth of this demand is projected to not only continue but to accelerate.

Given that spectrum is such a critical enabler for the capabilities that NZDF uses in operations within New Zealand and internationally, often in conjunction with Allied military partners, it is essential that spectrum considerations are included at all stages of the Capability Systems Lifecycle (CSLC) developed by NZDF for all systems. Further, it is critical that we “train as we fight” to ensure operational maturity is maintained. As a consequence, NZDF proactively injects spectrum considerations into decision making during the early stages of a CSLC in order to facilitate feasible and achievable solution design as well as to mitigate the need for potential refits once the particular capability is in service.

In regard to the use of VHF frequency bands, NZDF takes this opportunity to re-confirm the importance of frequency bands in this part of the spectrum to meeting the needs of the New Zealand military. This importance is emphasised in the responses of NZDF to the questions contained in the Consultation Document as provided in the following section.

2. NZDF responses to “Options for 174 – 230 MHz: Consultation Document”

2.1 NZDF response to Question 1

Radio Microphones

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

NZDF recognises that closure of the 700 MHz band for radio microphone use may have lead to difficulties for the operation of some of these short range devices from a spectrum point of view. However, NZDF considers that radio microphones must continue to operate as secondary users without causing harmful interference to primary users in any particular band.

A continuation of the GURL regime in a portion of Band III for radio microphones as secondary users should only be considered on the basis of demonstrated demand, confirmation of equipment availability of recognised standards and provided new primary users following the re-allocation of Band III will be adequately protected.

2.2 NZDF response to Questions 2 & 3

Digital Audio Broadcasting

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

NZDF is aware of selected trials of DAB transmissions by Kordia in a portion of Band III and also, with the agreement of NZDF, in a portion of spectrum above 230 MHz. However, NZDF is also unaware if there is a publically agreed plan for the introduction of DAB technology in New Zealand at this stage.

While developments concerning DAB technology and the somewhat limited take-up of these services in Band III overseas are of interest so too is the recent growth of Internet streaming of audio content as identified by the Ministry.

NZDF agrees with the Ministry that DAB may become an orphaned technology in the not too distant future as a consequence of the widespread attraction of consumers to Internet streaming. NZDF is also aware of the growing popularity of streaming of broadcasting content to mobile devices such as smart-phones with the advent of 4G mobile services to be followed by the introduction of 5G mobile services.

The NZDF view is that provision of an allocation for DAB use in Band III is unnecessary at this time and if made it is likely to remain under utilised.

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?

NZDF has no comment to make concerning the specifics of DAB technologies.

2.3 NZDF response to Questions 4, 5 & 6

Land Mobile

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

As a member of the Public Safety Radio Frequency Management Group (PSRFMG), NZDF supports the policy of allocating certain bands to Emergency Services in New Zealand. These bands, designated by the Ministry as the ESA Band (75 – 80 MHz), ESB Band (138 – 144 MHz) and ESC Band (494 – 502 MHz), are for the sole use of the members of the PSRFMG and are used for voice and data radiocommunications restricted to non-commercial public safety and security operations relating to the protection of life and property.

In the VHF bands, operational requirements and technology trends including a requirement for increased radiocommunications functionality for Emergency Services and the change to digital technologies is leading to lessening demand for the ESA Band but increased demand for ESB Band channels. Even with the adoption of 12.5 kHz channelling in the ESB Band there is an increasing level of congestion now being experienced.

Recognising the on-going need for LMR narrowband voice and data applications by Emergency Services and in order to augment the limited extent of the ESB Band to meet future growth requirements, NZDF supports an allocation of a portion of Band III estimated to be of about 2 x 2.5 MHz for narrowband Emergency Services applications. Further study is required to quantify more precisely the additional spectrum capacity required and also to investigate the availability of suitable radio equipment. However, it is understood that there may be interest from some manufacturers in producing LMR equipment capable of operating at frequencies in bands above 174 MHz.

NZDF would also support consideration by the Ministry of a further allocation of up to approximately 2 x 4.5 MHz to LMR for commercial use in a portion of Band III adjacent or near adjacent to the allocation proposed above for Emergency Services. Provided conditions on the use of such an allocation are similar to existing LMR bands for commercial purposes, then an LMR allocation of this type would be compatible with the interests of NZDF. However, the issue of LMR equipment availability needs to be investigated further.

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?

Requirements or conditions on the use of the proposed additional Emergency Services allocation should be the same as for the ESB Band. Additionally, use should be restricted to digital technology and the new band should be channelled on the basis of 12.5 kHz channels but aggregation of adjacent channels to permit wideband applications should also be permitted. Conditions on transmitter powers (EIRP) and emissions for the proposed additional Emergency Services band should be the same as for the ESB Band.

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?

NZDF recommends that the spectrum management regime for the proposed additional Emergency Services LMR allocation should be the same as for the ESB Band; that is an administrative licensing or licence fee regime.

In addition, NZDF has the same position as other Government Emergency Services on any application of incentive pricing as a possible alternative to a licence fee regime. This position was advised to the Ministry in a letter dated 26 November 2014 from the WGRN Technology and Operations Committee in comments on the Review of the Radiocommunications Act 1989.

2.4 NZDF response to Questions 7, 8 & 9

Internet of Things

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?

NZDF notes that the Internet of Things (IoT) is not a service as defined in ITU-R documentation. Rather IoT is an application of either the fixed service or the mobile service. Therefore, an exclusive allocation for IoT spectrum is not appropriate.

NZDF further notes that spectrum required for applications encompassed by IoT is now a topic on the agenda for WRC-19. Studies have also been initiated in ITU-R Study Groups 1 and 5 on this matter. Although there is a view held by some countries that dedicated spectrum for the IoT may be required in the future, there is an opposing view held by other countries as demonstrated during the recent WRC-15 that IoT applications will be accommodated by either fixed service allocations or more likely mobile service allocations. Furthermore, the spectrum requirements for IoT applications have already been taken into account in the projected growth of mobile services in spectrum estimates for systems such as IMT-Advanced and IMT-2020.

It is also noted that the ITU-R intends to highlight the spectrum issues associated with IoT by holding a one day "Workshop on Spectrum Management for Internet of Things Deployment" in conjunction with Study Groups 1 and 5. The workshop is tentatively scheduled for late November 2016 and will aim to provide a high level view on some spectrum management issues related to the deployment of IoT taking into account on-going studies that have been initiated in Study Groups 1 and 5. While the proposed workshop will be of benefit, it is likely to be more of a scoping exercise rather than providing a clarification of IoT spectrum requirements. The emergence of a globally harmonised approach on IoT spectrum will be dependent on the completion of ITU-R studies towards the end of the current WRC-19 preparatory study period.

NZDF is also aware that the nature of IoT applications will depend upon the use of low cost radio devices based upon large scale economies in manufacture and international standardisation. IoT devices using mobile technologies such as LTE will benefit from the economies of scale as an integral part of on-going development of commercial mobile systems as well as the harmonisation of standards through the activities of 3GPP and the ITU-R. However, IoT devices reliant upon proprietary or non-standards based technologies are unlikely to benefit from economies of scale to the same extent. For this reason alone, it would be less than prudent for New Zealand to adopt a spectrum allocation in advance of evolving internationally harmonised approaches to spectrum for IoT.

In view of the early state of international studies on spectrum for IoT, the NZDF view is that it cannot be concluded that spectrum is required for IoT applications in Band III. In addition, any decision on possible spectrum for IoT should wait until ITU-R studies have determined whether or not there is a need for dedicated spectrum for IoT applications.

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

NZDF view is that IoT spectrum requirements should not be the subject of separate dedicated allocations at this stage. Once the ITU-R studies on IoT spectrum requirements have been completed and if these studies conclude that an additional allocation is warranted then and only then should there be a reconsideration of the matter.

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

It is premature to conclude on a licensing framework for IoT spectrum until ITU-R studies have been completed.

2.5 NZDF response to Question 10

Utilities

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?

NZDF recognises that utility companies are responsible for the provision and maintenance of community lifelines and the regularity of service supply across critical infrastructure for the benefit and welfare of the communities they serve. This responsibility has some parallels with but is different to the responsibilities held by Government Emergency Services. As such NZDF accepts that in times of civil emergencies the reliance utility companies must place in the provision of their radiocommunications services by commercial network operators may not meet the full needs of utilities especially in terms of priorities for restoration of service.

In the event that the Ministry decides that the provision of exclusive spectrum for utilities in Band III is warranted then this should be subject to appropriate protection for services in adjacent bands in order to minimise the potential for band edge interference issues.

2.6 NZDF response to Questions 11 & 12

New Zealand Defence Force

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

Yes. There is demand for this spectrum to revert to NZDF use and that this use is projected to continue in the long term.

By way of background, for the introduction of the third TV broadcasting channel in New Zealand in 1989 an agreement was reached between NZDF and the predecessor of the Ministry, for NZDF to release the upper portion of what became known as Band III, namely, 225 – 230 MHz. This extra spectrum segment of 5 MHz was required to facilitate the deployment of a national network for the new TV channel. This agreement was on the understanding that NZDF would regain access to this portion of the band in the event it was no longer required for TV broadcasting purposes and that NZDF had specific requirements to use the spectrum.

NZDF needs to regain access to the 225 - 230 MHz spectrum block now. The frequency range 225 – 400 MHz is the major recognised VHF band for military forces in a number of Western nations which are close allies of New Zealand and with whom NZDF undertakes joint operations. To facilitate operational coordination the NATO Joint Frequency Agreement (NJFA) provides a channel plan for the overall

band 225 – 400 MHz. The NJFA forms the basis for radio equipment interoperability; a function of significant importance whenever the NZDF is engaged in operations along with the military forces of allied nations. NZDF cannot afford to lack access to spectrum utilised by our partner nations military forces.

The NZDF is in the process of adopting the NJFA plan and currently has a number of radio systems that can operate across the range including the segment 225 – 230 MHz so that as soon as the spectrum segment is available again to NZDF it can be put into immediate use.

While the 225 – 230 MHz segment is relatively small in itself, since it is adjacent to the VHF spectrum currently used by NZDF its return will assist NZDF to achieve greater operational efficiencies. NZDF is migrating away from the use of legacy type radio systems towards current and future digital radios utilising wideband waveforms aimed at improving operational performance on the one hand and achieving greater spectral efficiency on the other. Hence, the availability of the 225 – 230 MHz band will, for example, enable certain NZDF radio systems to operate over their full spectral capability and thus achieve improved performance in the field.

A consequence of note to the Ministry of the migration to the use of digital systems and the return of access to the 225 – 230 MHz band is that NZDF will be able to concentrate the bulk of its VHF operations within the major Western military band and thus move away from the use of commercial frequency bands.

Further examples of systems that NZDF will be able to deploy to make use of the overall 225 – 400 MHz band include the following:

- Wideband systems that require 1.2, 3, 5 and 10MHz bandwidths ;
- Soldier radio waveform (SRW) systems.
- Wideband Networking Waveform (WNW) systems.
- UHF Satcom Mobile User Objective system (MUOS).
- Adaptive Networking Wideband waveform systems (ANW2).

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

In accord with previous undertakings and the response above to Question 11, NZDF proposes that the present military band administered by NZDF (MOU Ministry of Commerce-NZDF dated 16 March 1992) be extended down to 225 MHz from 230 MHz in order to align with the NATO NJFA channel plan for the overall band 225 – 400 MHz. Extending the lower bound of the NZDF administered VHF block from 230MHz down to 225MHz will provide opportunities for NZDF to gain spectral and operational efficiencies. It provides needed bandwidth in a relatively low frequency spectrum block consistent with NZDF operations in rugged environments and challenging conditions. It also reduces the need for NZDF use of bands designated for commercial use.

NZDF also proposes that the New Zealand allocation for 225 – 230 MHz is designated as “Government mobile services”.

2.7 NZDF response to Questions 13 & 14

Public Protection and Disaster Relief

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

NZDF agrees with the Ministry that it may be more prudent to align spectrum intended for broadband PPDR applications with other neighbouring countries in the UHF region of 700/800 MHz bands rather than in Band III. Moreover, noting the deployment of a broadband PPDR capability by Japan in Band III, it is understood that this deployment is limited to support of local access video links for transportable video cameras. Command vehicles are equipped with base stations which provide a video only service and backhaul to a command centre either via satellite or terrestrial radio system. It is further understood that Japan still intends to use spectrum in the 800 MHz band for a wide area broadband PPDR network.

Of greater relevance from a PPDR perspective to possible uses in Band III is the provision of spectrum for narrowband voice and data PPDR applications in order to relieve the growing congestion in the ESB Band (as outlined in the NZDF response to Question 4). Even with the advent of LTE technology based capability for broadband PPDR applications, a need will continue for narrowband voice PPDR applications for the foreseeable future. Recent information from ITU-R Study Group meetings supports this view, since in a number of countries current narrowband PPDR networks are expected to be retained to support voice services with new LTE based broadband networks used for data and video applications only.

As in the case of LMR equipment, the availability of appropriate equipment designed for PPDR applications capable of operating in the spectrum range above 174 MHz may be an issue in the short term. NZDF notes that most land mobile radio products currently available on the market are designed to operate up to but not above 174 MHz. Further investigation into the availability of equipment will be necessary before a decision can be made concerning an allocation for PPDR use in Band III.

NZDF supports an allocation for narrowband PPDR applications as outlined in the response to Question 4 subject to confirmation concerning the availability of suitable radio equipment.

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

As outlined in the NZDF response to Question 4, a preliminary estimate of the spectrum required is that approximately 2 x 2.5 MHz would be sufficient for narrowband Emergency Services applications in Band III. However, further study is required to quantify more precisely the spectrum capacity required for these PPDR applications. A detailed investigation on the availability of radio equipment should also be included in this study.

In the event that the Ministry decides to allocate Band III spectrum for PPDR, NZDF recommends in addition that New Zealand take a proactive position to promote global harmonisation for identification of PPDR applications in Band III. It is further

recommended that New Zealand submit contributions to appropriate ITU-R and APT meetings, since international adoption of an allocation for PPDR purposes would encourage more manufacturers to invest in development of equipment for PPDR use in Band III.

2.8 NZDF response to Question 15

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

NZDF has no comments to offer at this stage on other uses for Band III but may provide additional comments to the Ministry once submissions by other interested parties are available and have been reviewed by NZDF.

3. Summary of NZDF views on future use of Band III

NZDF proposals in order of priority for future allocations and uses within the band 174 – 230 MHz are summarised as follows:

- a) The band 225 – 230 MHz reserved for Government mobile services.
- b) An allocation of 2 x 2.5 MHz within the band 174 – 225 MHz reserved for Government Emergency Services and PPDR narrowband applications.
- c) An allocation of 2 x 4.5 MHz within the band 174 – 225 MHz for LMR use adjacent or near adjacent to the Emergency Services band.
- d) An allocation of, say, 2 x 2 MHz also within the 174 – 225 MHz band reserved for utility companies.

Yours sincerely



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for Chief of Defence Force

