

MEMO

Date: 11 March 2022

To: Len Starling, Radio Spectrum Management – Ministry of Business Innovation and Employment

Re: MBIE Five Year Spectrum Outlook 2022-2026

Feedback from NGCC to MBIE

Next Generation Critical Communications (NGCC) supported by New Zealand Police, Fire and Emergency New Zealand, St John Ambulance and Wellington Free Ambulance (the ES agencies) appreciate the Ministry of Business, Innovation and Employment (MBIE) Radio Spectrum Management (RSM) support to inform and enable innovation and public safety through the management of radio spectrum with the Public Safety Radio Frequency Management Group (PSRFMG).

The public safety sector is undergoing a generational transformation with the escalation of digital multimedia and workflow efficiency tools to support and improve the health and wellbeing of the public safety workforce and all those they serve. This transformation requires greater capacity and performance generating burgeoning growth in use of dedicated and public wireless networks by the public safety sector.

The public safety user base, whilst critical for national wellbeing, is small compared to the communications consumer market size nationally and globally. This smaller ecosystem requires a greater level of international collaboration to deliver tools and systems appropriate for this sector. Key to international collaboration is minimising wherever possible country specific features and functionality. NGCC thank MBIE for their efforts and focus in global and regional radio spectrum harmonisation.

We would like to highlight to RSM the World Radio Conference WRC23 Agenda Items 1.3 and 1.5. These items focus on regulatory measures for the 3600-3800MHz and 470-694MHz frequency bands and discussion how part of these frequency bands could be allocated to support public safety usage. Whilst agenda item 1.5 has a focus on Region 1 we encourage MBIE to support the inclusion of public safety allocation within these frequency bands for APT Region 3.

NGCC and supporting agencies would welcome the opportunity to discuss with MBIE a mechanism and process for public safety considerations to be included in all future band planning and harmonisation activities.

Regarding the published Work Plan Priorities NGCC have identified the following items that may have direct impact on public safety communications capability and welcome the opportunity to provide feedback during the development of these activities;

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Band Planning and technical studies:

- Review and re-plan 600 MHz spectrum, including technical consultation
- Review and re-plan 3.3-3.4 GHz, 3.4-3.8 GHz and potentially 3.8-4.2 GHz bands, including technical consultation
- Commence planning work for spectrum bands where management rights are due to expire from 2028

Allocation design and implementation:

- 5G spectrum - detailed consideration of allocation of spectrum rights: 3.3-3.41 GHz, 3.5 GHz, 3.8 -4.2 GHz and 24-30 GHz bands for 5G and associated technologies
- Investigate cost effective options to achieve greater utilisation and efficiency of the radio spectrum resource
- Consider the effect of spectrum sharing frameworks on public safety communications
- Progress implementation of decisions on the 1700-2300 MHz band

Regulatory management and administration:

- Continue to proactively engage in ITU and international trade issues relating to spectrum
- Develop and implement revised operational approach to small cell network licensing for rapid deployment of COWs.
- Develop options for law enforcement agencies regarding use of wireless electronic counter measures and associated technologies
- Look at opportunities to streamline radio interference management from non-radio devices

NGCC together with the ES agencies have selected P25 Phase 2 technology for the new PSN. There is multiple Vendor support of this technology in the ES bands, with the exception of ESA band. P25 Phase 2 technology was selected as it supports:

- Public Safety in a spectrum efficient trunked radio configuration, and
- Communications Security, and
- International Harmonisation with Public Safety Agencies, particularly Australia and US.

The outdoor propagation ranges in ESB and ESC bands are less than that of ESA band, so NGCC is committed to an investment in LMR sites necessary to maintain network coverage over the range of places where emergency services are employed. Range is supported by the ESB band.

While the technology provides the necessary capabilities for Public Safety and is efficient, NGCC notes that the ESB band is at capacity, and there is significant use of the ESC band with some remaining channels available for allocation.

Interference management is of concern to NGCC because of the impact it causes to communications and equipment. NGCC supports the outlook workplan objectives to improve management of interference.

NGCC accepts the view of RSM that Management Rights were the intended spectrum management vehicle under the current radiocommunications regime. Since the inception of the regime, it has been apparent that not all applications for spectrum use are now or would in future be usefully supported by Management Rights.

Supplement to current ES bands

A PSN future state may be supported by ESB and ESC band channels alone, with channels given over from existing use by the ES agencies to support the new P25 phase 2 network which is for their use. In the initial build and expansion phases however, the ES agencies will transition to the new network. During this time, the ES agencies will continue to operate their individual existing networks and the new shared network will be built, tested and tried out. Additional frequency allocations will be required within the P25 phase 2 channelling of the radio terminals. NGCC require assistance from RSM in obtaining access to such spectrum which may be outside the existing bands of use.

There is insufficient clear channelling available for the NZPSN in ESB band. Currently of the 200 channel pairs in the ESB band there are only 2 that are unused and available. Existing channel reuse is moderate, and greater frequency reuse is possible. NGCC will work closely with PSRFMG to achieve efficient use of the ESB band for all agencies.

However, this is a difficult undertaking. ESB band is shared by multiple agencies, only 3 of whom are served by the new network. The other agencies have an ongoing requirement for the number of channel allocations they have today. NGCC will require every assistance of RSM and the PSRFMG agencies in order to successfully replan ESB band in order for PSN to fit its new network in.

Indeed, more channels will be needed initially to provision capacity for the new PSN and migrate emergency services from their existing networks. Up to 1300 new ESB band channel allocations must be found to dimension the new PSN, in addition to ~1000 allocations that are held today. Already significant channel reuse in ESB band will become substantive with these additional allocations, perhaps around 12 times on average across the PSN ESB channels across NZ. This must be done seamlessly, as impacts on operational communications risks property, wellbeing and loss of life for agency staff and the general public. Adequate communications in times of emergency is imperative.

Additional wide area channels are needed that are within the radio equipment channelling range, and that match the coverage achieved by the ESB band channels they supplement. NGCC looks to RSM to create additional Government exclusive licences where needed, and assistance with channel swaps with other spectrum users, if needed.

NGCC would appreciate RSM's support in obtaining F band channels to supplement ESC band on the same basis.

Whilst not current within NGCC plans to use G-Band in the short term, NGCC would welcome the opportunity to obtain a G band allocation (174 - 184 MHz).

Given the capacity constraints of the current ESB and ESC Bands, access to previously reserved ESD band (850 MHz) is now required in cities to provide NGCC agencies with adequate capacity and low building entry losses for coverage of shopping malls, urban buildings, stadiums and similar venues. Currently the spectrum has been set aside, but no band plan exists. We ask that RSM open the ESD band to PSRFMG and NGCC.

Cellular bands

NGCC also plans to support the Agencies communications with Cellular services. This will permit wideband services to be delivered that will support such tasks as near real-time image transfer, video calling and database access for patient management or any operational agency activities that require high bandwidth.

NGCC will require our own spectrum resources in the near term (5 years), to support 3G, 4G and 5G cellular networking. 1427 MHz - 1575 MHz is unsuitable for such a purpose within that timeframe. Band 14 sought by Public Protection and Disaster Recovery (PPDR) agency Firstnet in USA and bands 28, 31 and 68 sought by PPDR agencies in Europe for this purpose are fully allocated in NZ. Of these, only band 28 is used by MNOs in NZ to provide LTE, but is fully subscribed.

Within the Global Public Safety Operators Committee (GPSOC) there is a drive towards greater use of cellular broadband. The LTE Band 3 (1800 MHz) spectrum set aside by RSM for this purpose in NZ is well suited for the NZPSN. Dedicated Cell-sites On Wheels (COW's) infrastructure utilising this spectrum will be needed specifically for the emergency services agencies to support rapid deployment of cellular coverage and priority capacity for emergency events, while avoiding interference issues with Mobile Network Operator's infrastructure. Further, it may be necessary for NGCC to deliver either a future standalone PSN cellular network or more likely as part of a shared infrastructure network, as is the current trend for public safety networks across Europe and the United States of America. As a minimum NGCC requires a spectrum block of 2 x 10 MHz LTE band 3.

In Europe the European Aviation Network (EAN) covers 35 countries with Direct-Air-to-Ground (DA2G) network for emergency services utilising Band 65 (2100 MHz). In New Zealand, spectrum has been obtained temporarily for DA2G trials. DA2G would facilitate uninterrupted coverage allowing emergency services the capability to communicate with their airborne colleagues. NGCC commends these initiatives, and notes that dedicated spectrum assignment for DA2G is necessary in order to avoid interference with terrestrially focused cellular networks. NGCC recommends that a portion of the LTE Band 65 spectrum that is currently unallocated in NZ be made available for a DA2G service.



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