This document is a response to the "Discussion document: Technical Arrangements of the 3.5GHz Band", released by MBIE in June 2019.

This response is submitted on 12 July 2019 by:

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The main purpose of this submission is to bring to MBIE's attention two aspects that may further enhance the technical arrangements of 3.5GHz band in NZ.

1. Possible overlap with C-band: Section 5.2 of the discussion document specifies the frequency range of C-band for satellite downlink as 3800-4200MHz. On the other hand, the table of radio spectrum usage in NZ (more specifically PIB21, issue 10 of May 2019) specifies that the C-band starts at 3700MHz. Please refer to page 73 of [1], which the author has last accessed on 12 July 2019.

While the discussion document says that new licenses in the frequency range 3800-4200MHz band will only be issued selectively, this appears to have excluded the first 100MHz of the existing C-band. MBIE might want to release more information about its plans for 3700-3800MHz band.

2. Future Proofing the Frame Structure: Figure 1 of the discussion document shows the proposed frame structure, which will presumably carry uplink and downlink traffic in 5G networks. MBIE may also want to consider the inclusion of "discovery frames", which will allow the 5G enabled devices to "discover" each other, even in the absence of network coverage. This new feature of discovering other nearby devices does not exist in 4G and pre-4G systems but is expected to be a key feature in 5G. Network-independent device discovery and communication can potentially provide coverage in far-fetch areas (rural townships, etc.) and in emergency situations. NZ can lead the way by having a discussion around discovery frames right at the outset of 5G deployment in the country.

The structure of the discovery frames has been standardized by the 3rd Generation Partnership Project (3GPP), for example in [2]. It is recommended that the entire 3.5GHz band should be synchronized to a specific "discovery frame structure", in addition to the frame structure shown in Figure 1 of the discussion document. The author and his team has proposed modifications to the 3GPP discovery frame structure, which have been validated using numerical analysis and published after international peer-review [3-5]. MBIE may consider allocating frequency bands for discovery purposes.

References:

[1] Table of Radio Spectrum Usage in New Zealand (PIB 21), Issue 10, May 2019. Available online at: https://www.rsm.govt.nz/assets/Uploads/documents/pibs/ff001f5055/table-of-radio-spectrum-usage-in-new-zealand-pib-21.pdf
[2] 3GPP, "Study on LTE device to device proximity services; Radio aspects", TR 36.843. Online at: https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=2544
[3] Jaffry, S; Hasan, S. F.; Gui, X., "Neighborhood-aware Out-of-Network D2D Discovery", IET Electronics Letters, 2018.
[4] Jaffry, S; Zaidi, K; Shah, S. T; Hasan, S. F.; Gui, X., "D2D Neighborhood Discovery by a Mobile Device", IEEE International Communications Conference (ICC), 2019 (accepted for publication).
[5] Jaffry, S; Hasan, S. F.; Gui, X; Kuo, Y-W, "Distributed Device Discovery in ProSe Environments", IEEE Region 10 Conference (TENCON), 2017.