



November 30, 2018

Radio Spectrum Management Policy and Planning
Ministry of Business, Innovation and Employment
PO Box 2847
WELLINGTON 6140

Re: IoT VHF Testbed Rules – Consultation Draft November 2018

Dear Sir or Madam:

Microsoft appreciates the opportunity to comment on the RSM's 'IoT VHF Testbed Rules – Consultation Draft November 2018'. We applaud RSM for initiating this Consultation and want to share some of our learnings from our 'FarmBeats' program, which utilizes IoT sensors that communicate over the VHF spectrum band. Under experimental license, at several farms within the United States and elsewhere, Microsoft is conducting trials of an IoT sensor with an incorporated tri-band (VHF, UHF, and 900 MHz) licence-exempt radio to demonstrate sustainable agriculture using a combination of terrestrial / aerial data collection, cloud computing and data analytics ('FarmBeats'). Microsoft believes the VHF IoT Testbed will be able to leverage the greater range afforded by lower transmission frequencies, the better penetration through foliage, and the potential of non-line-of-sight operation. In addition to agriculture, we believe the testbed can also support large-scale environmental monitoring as well as applications in extractive industries that operate predominantly in rural areas

Based on our experience, we make the following suggestions:

- (1) During the three-year tenure period, as proposed, RSM should make the 210-220 MHz band available through experimental licenses to approved persons. Ultimately, though, Microsoft believes that RSM should move to make these frequencies available for licence-exempt use to all persons, with type certified IoT devices. Part of the IoT test bed should include demonstration of how licence-exempt operations can work. For example, we believe the proposed rules are sufficiently flexible to allow multiple IoT devices utilizing contention-based protocols to share a single 200 kHz channel.
- (2) Flexibility is also important with respect to the size of the licensing area. In our FarmBeats pilots, we observed that the farmer's interest in IoT often extends only to the border of the farm/pasture. In these instances, we believe the smaller or more precise the licence area, the more likely it will be highly utilized. We recognize, though, that other VHF IoT applications may operate over a considerably much larger geographic area. RSM might consider allowing a licensee to subdivide a licensed area through a secondary market transaction.
- (3) To ensure that the band will be used for narrow channel IoT communications rather than broadband communications, we agree with RSM that the maximum operational bandwidth of the IoT radio should be no greater than 200 kHz. Further, we put forward that no channel bonding be allowed.

- (4) We agree that 200 mW eirp limit is appropriate. We are pleased that RSM is allowing IoT test bed operators the maximum flexibility of choosing combinations of conducted power and antenna gain for the VHF IoT radios.
- (5) Emission masks will be relatively expensive for applications where low-cost IoT sensors are required. RSM should not specify adjacent channel emission limits within 210-220 MHz band. But RSM does need to ensure that the adjacent channel emission limit below 206 MHz and above 224 MHz are below the threshold for harmful interference for the respective services. If necessary, RSM's first choice should be to prohibit use of the outermost IoT channels in the band rather than require a stringent emissions mask.
- (6) Different IoT use cases require different duty cycles. We agree that RSM should not limit duty cycle for the initial phase of the IoT testbed. Instead, RSM may want to look at what the United States Federal Communication Commission did in 47CFR Part 15.231(a) of its rules ('Periodic operation in the band 40.66-40.70 MHz and above 70 MHz'), where 'Continuous transmissions, voice, video and the radio control of toys are not permitted', as an alternative approach.

Please let us know if you have questions or require additional information on our FarmBeats IoT testbeds. Thank you again for the opportunity to comment on this Consultation.

Sincerely,

Russell Craig
National Technology Officer
Microsoft New Zealand
Russell.Craig@microsoft.com

Michael Daum
Director, Technology Policy
Microsoft CELA-PRA-TPIG
mdaum@microsoft.com