

Ministry of **Economic
Development**



M a n a t ū Ō h a n g a

Spectrum Allocations for Ultra Wide Band Communication Devices

Report on Outcomes of Industry Consultation

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Executive Brief

The Ministry released in April 2008 the discussion paper *Spectrum allocations for UWB Communication Devices* to find an appropriate licensing arrangement for UWB communications in New Zealand. The paper considered recent developments in the regulation of UWB communications and related technical standards adopted by our trading partners internationally. It solicited the opinions of UWB vendors, potential operators, existing spectrum users and other stakeholders on appropriate technical standards and a number of related issues. The discussion paper presented four possible options: status quo, European, United States and the Korean/Japanese frameworks. The Ministry proposed to adopt the European regulatory framework, which involves a GUL type of licence based on ETSI technical standards.

The submissions received support the Ministry's proposal of adopting the European harmonised framework for UWB communications devices in New Zealand. In light of this support, the Ministry will create a GUL framework introducing the post 2010 emission limits established by Europe (which was the favoured approach by the NZ submitters) without a transitional limit mask. The post 2010 emission limits are more stringent than those adopted for the transition period prior to 2010. The proposed emission limits are described in Appendix B.

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Glossary

CEPT	Conference of European Posts & Telegraphs
EC	European Commission
ECC	Electronic Communications Committee
e.i.r.p	equivalent isotropically radiated power
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission (USA)
GUL	General User Licence
GURL	General User Radio Licence
RF	Radio Frequency
UWB	Ultra Wide Band

1. Purpose

In April 2008, the Ministry released the discussion paper *Spectrum Allocations for Ultra Wide Band Communications Devices*. Industry was invited to comment on an appropriated licensing arrangement for UWB communications devices in New Zealand. The Ministry's discussion paper presented four possible options: status quo, European, United States and the Korean/Japanese frameworks. The Ministry proposed to adopt the European regulatory framework, which involves a GUL style of licence based on ETSI technical standards.

This paper reviews the submissions received and identifies the proposed approach to licensing of UWB communication devices.

2. Submissions

In response to the discussion paper on *Spectrum Allocation for UWB Communications Devices* the Ministry received six submissions. These were provided by diverse interests including cellular operators, fixed service operators, equipment manufacturers and an industry Standards body.

The parties who provided submissions were:

Full name of Submitter	Abbreviation
Telecom NZ	TNZ
Vodafone NZ Ltd	Vodafone
Kordia Ltd	Kordia
WiMax Forum	WiMax Forum
IBM	IBM
Ubisense	Ubisense

A breakdown of the individual responses to the discussion paper on *Spectrum Allocations for UWB Communication Devices* is provided in Appendix A.

3. Analysis

The Discussion Paper posed several questions for comment. This section discusses these questions in relation to the comments received.

3.1 Question 1

Do you agree with the analysis of regulatory framework options for UWB communications?

All submitters agreed with the analysis and inclusion of the four regulatory options. Kordia commented on establishing further clarity between the transitional maximum emission levels prior to 2010 (fig 3 of the discussion paper) and the post 2010 values proposed by EU (fig 4 of the discussion paper). This is addressed in section 3.2 of this report.

3.2 Question 2:

Do you agree with the proposal to implement the European harmonised licensing framework for UWB communications devices in New Zealand?

All submitters agreed on adopting the European framework, noting that it represents the most robust and protective GUL for existing services.

Comments and suggestions from the submitters are summarised below:

- Vodafone is interested in product compliance and certification. Vodafone is of the view that a key issue for the success of UWB deployment is product compliance with the NZ GUL. It suggested establishing stringent mechanisms to control the import of non-compliant products. These mechanisms should involve steps such as certification of importers and appropriate enforcement. In this regard, the Ministry notes that the creation of a GUL for UWB communications products will involve adding the UWB ETSI standards to the current product compliance regime, for enforcement.
- The WiMax Forum proposed adding further clarity to the proposal in terms of maximum EIRPs and mitigation techniques. These suggestions have been incorporated in the detailed framework provided in Appendix B of this document.
- Telecom suggested that the European framework represents a manageable level of interference risk in respect to their DMR fixed links, and therefore the European mask and technical constraints should be followed. It also proposed that the aggregate level of interference posed by UWB devices should be 10 dB below the thermal noise of licensed receivers.

The Ministry is of the view that the adoption of the more stringent emission limits imposed by the European post 2010 framework will afford sufficient protection to the services concerned. Imposing an aggregate limit level of 10 dB below the noise floor of receivers, in the Ministry's view, would be impractical due to difficulties in defining a standard receiver and measuring and enforcing the aggregate UWB emissions. In this regard, ETSI considers aggregate interference as an extreme situation, especially outdoors. It suggests taking into account all the relevant parameters for aggregation to occur, for instance; device numbers in interfering range, distribution in time of the emissions of each device, propagation characteristics and geographic distribution.

The Ministry further notes that the risk of harmful interference to DMR fixed links through aggregate interference of UWB communication devices is very small. This is primarily due to the short range – low power nature of UWB devices and the physical isolation provided by high site fixed microwave installations and antenna discrimination.

- Kordia broadly supported the proposal but also expressed concern about the potential for harmful interference to their DMR fixed links. Kordia's concerns refer specifically to situations involving UWB devices operating in very close proximity and in bore-sight to fixed link antennas. In this regard, Kordia suggests applying the post 2010 limits from day one, which are more stringent.

The Ministry agrees with the view of adopting the post 2010 European framework which affords more protection to existing fixed services in the 4.2-4.8 GHz band. The Ministry notes that the EU framework has been established taking into consideration a range of compatibility studies between UWB and concerned services. The EU approach also encourages tighter radio product specifications across the concerned bands to mitigate harmful interference, in addition to the operational constraints contained in the framework.

Adopting the EU standard does present the risk of aligning New Zealand with a technical standard which has fewer products available at present in comparison to the US standard. However, UWB communication devices conforming to the post 2010 standard are already available in Europe and more are being developed.

The proposed NZ framework can be further reviewed and adjusted in collaboration with industry should any issues arise in future.

3.3 Question 3:

Do you have suggestions for any other alternatives for regulating UWB communication devices in New Zealand?

All submitters are in agreement that the European framework is the most appropriate framework. Some submitters have provided the following suggestions:

- Kordia proposed applying additional regulatory details as necessary, taking into account the specific situation of existing services in New Zealand. It suggests considering the application of additional operational constraints within the GUL conditions for the protection of existing services. In this regard, the Ministry considers that the operational restrictions imposed by the European post 2010 framework provide a reasonable protection margin. The proposed GUL can be reviewed and adjusted in collaboration with industry to account for additional operational constraints should this become necessary in future.

3.4 Conclusions

The Ministry plans to implement the post 2010 European harmonized framework for licensing UWB communication devices in New Zealand by way of a General User Licence (GUL).

This framework, in Ministry's view, provides a reasonable balance between the protection of existing services and allowing the deployment of UWB communications technology in New Zealand.

The New Zealand GUL framework will introduce the emission limits established by Europe post 2010 without a transitional limit mask. These emission limits are described in Appendix B.

Appendix A

Summary of Submissions

Submitter	Q1. Do you agree with the analysis of regulatory framework options for UWB communications?	Q2. Do you agree with the proposal to implement the European harmonised licensing framework for UWB communications devices in New Zealand?	Q3. Do you have suggestions for any other alternatives for regulating UWB communication devices in New Zealand?
Telecom	Agrees	Agrees. It considers that the proposed European framework represents a manageable level of interference risk in respect to Telecom DMR technologies operating in the bands concerned. It suggests establishing an aggregate interference limit for UWB devices of 10 dB below the thermal noise of licensed receivers.	No suggestions
Vodafone	Agrees	Agrees. It acknowledges the ongoing review nature of the standard and suggests adopting the latest revision. It also suggests emphasising measures to control non compliant products and establishing appropriated product certification.	Suggests strengthening product compliance and product certification processes in order to prevent the risk of interference from non compliant products.
Kordia	Agrees	Agrees. It suggests applying the EU proposed power limit levels post 2010 from day one, without following the EU transitional period prior 2010. Suggests clarifying the difference	Suggests considering operational control measures in the GUL that can help minimising the risk of harmful interference to fixed links.

Submitter	Q1. Do you agree with the analysis of regulatory framework options for UWB communications?	Q2. Do you agree with the proposal to implement the European harmonised licensing framework for UWB communications devices in New Zealand?	Q3. Do you have suggestions for any other alternatives for regulating UWB communication devices in New Zealand?
		between the EU limit levels prior (transitional) and post 2010 in terms of the proposed EU spectral mask. It recommends further investigating performance protection aspects of digital microwave links in specific bands.	
WiMax Forum	Agrees	Agrees	Suggests adding detail to the proposal by means of making reference to the ECC emission limits table (fig.4) It also suggests stating that the ECC emission mask represents maximum power levels (fig.3)
IBM	Agrees	Agrees	No suggestions
Ubisense	Agrees	Agrees	No suggestions

Appendix B

Detailed framework for UWB Communication Devices proposed for New Zealand

- Licensing framework: General User Licence (non-interference and non-protected basis, as per GUL regime in New Zealand)
- Technical requirements as specified in ETSI EN 302 065.
- Maximum EIRP, frequency range and other operational conditions: as per figure 1 and figure 2 (ETSI EN 302 065 below)
- Indoor operation is permitted. For outdoor operation, devices and infrastructure at a fixed location or connected to a fixed outdoor antenna are not permitted.
- Operation of devices onboard aircraft is not permitted under this framework.

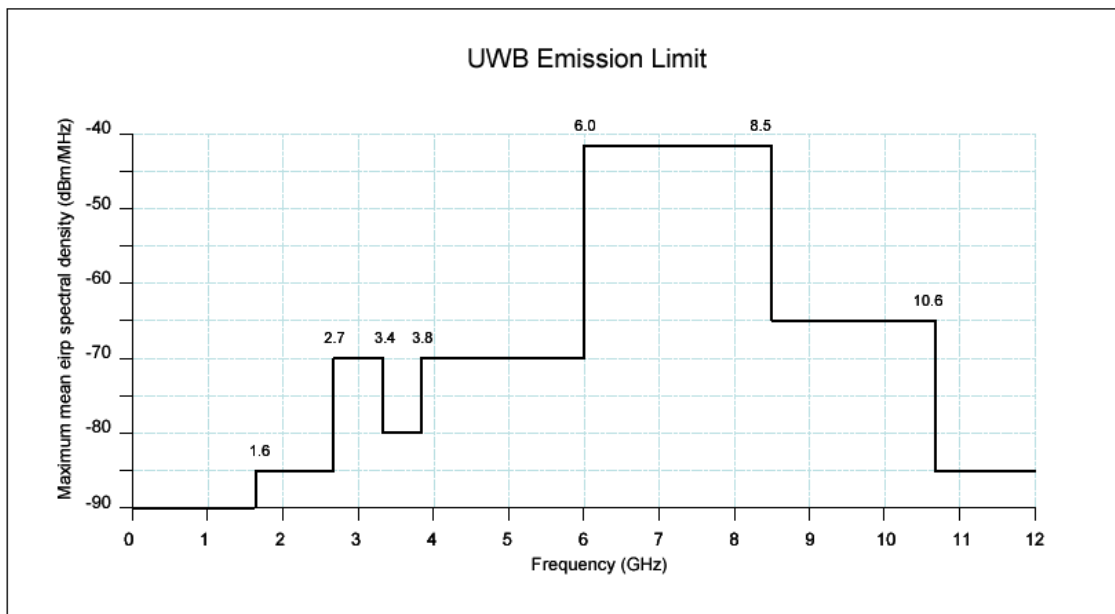


Figure 1: GUL emission limits mask

Frequency range	Maximum mean e.i.r.p. spectral density (dBm/MHz)	Maximum peak e.i.r.p. (measured in 50 MHz)
Below 1.6 GHz	-90 dBm	-50 dBm
1.6 to 2.7 GHz	-85 dBm	-45 dBm
2.7 to 3.4 GHz	-70 dBm	-36 dBm
3.4 to 3.8 GHz (Note 1)	-80 dBm	-40 dBm
3.8 to 4.2 GHz (Note 1)	-70 dBm	-30 dBm
4.2 to 4.8 GHz (Notes 1 and 2)	-70 dBm	-30 dBm
4.8 to 6 GHz	-70 dBm	-30 dBm
6 to 8.5 GHz (Note 2)	-41.3 dBm	0 dBm
8.5 to 10.6 GHz	-65 dBm	-25 dBm
Above 10.6 GHz	-85 dBm	-45 dBm

Figure 2: Mean and peak power emission limits

Note 1: Low duty cycle.

If low duty cycle is implemented, devices in this band may operate at:

- (a) a maximum mean e.i.r.p spectral density of -41.3 dBm/MHz; and
- (b) a maximum peak e.i.r.p of 0 dBm.

(Low duty cycle as per ETSI EN 302 065, section 4.1.7)

Note 2: Road & Rail vehicles.

(1) For devices installed in road and rail vehicles, where transmit power control is implemented:-

- (a) the maximum mean e.i.r.p. spectral density is -41.3 dBm/MHz.
- (b) the maximum peak e.i.r.p is 0 dBm.
- (c) the transmit power control must operate with a range of 12 dB below the maximum mean e.i.r.p spectral density.

(2) For devices installed in road and rail vehicles, where transmit power control is not implemented:

- (a) the maximum mean e.i.r.p. spectral density is -53.3 dBm/MHz; and
- (b) the maximum peak e.i.r.p is -12 dBm.

Definitions

- **Maximum mean e.i.r.p. spectral density** is the highest signal strength measured in any direction at any frequency within the defined range, where the mean e.i.r.p spectral density is measured with a 1 MHz resolution bandwidth, an RMS detector and an averaging time of 1ms or less.
- **Maximum peak e.i.r.p.** is the highest signal strength measured in any direction within the defined range, where the peak e.i.r.p. is measured within a 50MHz bandwidth centred on the frequency at which the highest mean radiated power occurs.