



**INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE**

**PUBLIC CONSULTATION PAPER**

**REGULATORY FRAMEWORK FOR DEVICES USING ULTRA-WIDEBAND  
TECHNOLOGY**

**01 MARCH 2007**

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## **REGULATORY FRAMEWORK FOR DEVICES USING ULTRA-WIDEBAND TECHNOLOGY**

### **PART I: OBJECTIVE**

1. The objective of this public consultation paper is to obtain views and comments from the industry and members of the public on the regulatory framework for ultra-wideband (UWB) devices. IDA will take into account the different needs and requirements of the various parties, such as equipment vendors and radio system operators, in formulating a coherent regulatory framework.

### **PART II: BACKGROUND**

2. Traditional radio systems typically use dedicated frequency spectrum for sending and receiving radio signals in order to manage interference. Contrary to this approach, UWB technology operates by spreading its radio signals across a very large frequency band (typical bandwidth > 500 MHz). As a result of this fundamental difference, UWB has brought about a paradigm shift in how communication systems are designed and has affected the way frequency spectrum is managed.
3. UWB technology holds potential for a wide variety of new Short Range Devices (SRD) for communications, measurement, location tracking, imaging, surveillance and medical systems. In general, it can be broadly categorised into 3 types of UWB applications: 1) consumer and business data communication systems; 2) imaging systems; and 3) vehicular radar systems. Consumer and business data communication systems which are meant for the mass market, will use short-range communication UWB for wireless high data rate connections between computers and various consumer products. For UWB imaging systems, it is primarily used by professionals and the common types of UWB devices are listed as Ground and Wall-Probing Radar (GPR/WPR), surveillance and medical imaging devices. Vehicular radar systems, on the other hand, are automotive Short Range Radar (SRR) devices intended for installation in vehicles for collision avoidance, and thus enhance the safety of the driver and passengers.

### **PART III: PROPOSED REGULATORY FRAMEWORK FOR UWB**

#### **Overview**

4. UWB transmissions are low-powered and do not require exclusive access to any frequency bands. To facilitate the introduction of UWB devices in Singapore, IDA proposes to allow UWB devices to operate in frequency bands that have been assigned and allocated for use by other radiocommunication services (e.g. fixed-satellite (FSS), fixed services (FS) and, radionavigation), including those allocated to commercial entities for their exclusive use. As stated in the Spectrum

Management Handbook, IDA reserves the right to assign the use of exclusive frequencies for shared use with other low power or localised coverage networks where these networks will not cause harmful interference to the existing networks deployed using the allocated spectrum frequency.

5. Based on IDA's UWB trials, varying degrees of risk of interference to other services could be observed under close proximity distance, in line with compatibility studies carried out by the ITU<sup>1</sup>. To minimise the risk of interference from UWB devices to the existing services, IDA proposes a regulatory framework that is designed based on the nature of the 3 broad types of UWB applications and the frequency bands that their peak emissions occur in.
6. Under the regulatory framework, UWB devices will be required to comply with technical specifications for UWB devices, including emission limits. (See Annex A for IDA's proposed UWB emission limits for the 3 types of UWB applications). In setting up the UWB technical specifications, IDA will take into consideration rules and recommendations established in the USA, Europe and ITU. The technical specification for UWB devices will be finalised on further advice by the industry representatives at the Telecommunication Standards Advisory Committee (TSAC) chaired by IDA.

### Question 1

*IDA invites views and comments on the proposal to allow UWB devices to operate in frequency bands which are used for other radiocommunication services such as fixed-satellite (FSS), fixed services (FS) and radionavigation.*

### Question 2

*IDA also seeks views on the possible scenarios of harmful interference from UWB devices to other licensed bands and the possible measures to reduce the risk of interference.*

## **Type 1: Consumer and business data communication systems**

7. UWB devices for consumer and business data communication systems generally operate with peak emission in the 3400 – 10600 MHz band. While these devices are intended to be mass marketed to the end-users, the geographic distribution of UWB emissions from the devices is considered to be randomly scattered and is unlikely to result in aggregated interference. As the global consumer market is expected to bring about trans-border circulation of these portable UWB consumer devices, it may be impractical to license each device.
8. Based on the above, and with the objective of promoting the introduction of UWB technology, IDA is considering a licence-exempt approach for UWB devices to

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<sup>1</sup> ITU-R SG1 Recommendations [SM.1754, 1755, 1756 & 1757] and Report [SM.2057]

operate in the band of 3400 – 10600 MHz, if they meet the UWB technical specification. Such devices, however, should operate on a non-interference and non-protection basis.

9. In addition, UWB devices that are capable of reducing interference using certain mitigation techniques<sup>2</sup> may be allowed to transmit at a higher emission level (-41.3 dBm/MHz) within the 3400 to 4800 MHz band, as compared to generic UWB devices (see Annex A for IDA's proposed UWB emission limits). The licence-exempt approach also extends to these devices.

### Question 3

*IDA welcomes views and comments on the proposal to adopt a licence-exempt approach for UWB consumer and business data communication systems which comply with the UWB technical specification and operate with peak emission within the 3400 MHz and 10600 MHz band.*

### Question 4

*IDA further invites comments on the proposal to allow licence-exempt UWB devices implemented with mitigation techniques to operate at a higher peak emission level within the 3400 to 4800 MHz band as compared to generic UWB devices without mitigation techniques.*

## **Type 2: Vehicular radar devices**

10. In the USA and Europe, automotive SRR devices are designed to operate with peak emission in the 22-29 GHz and 79 GHz bands, i.e., *frequency bands 21650 – 29500 MHz and 77000 – 81000 MHz*. In general, these devices are used for detecting the location and movement of objects near a vehicle, enabling safety features such as near-collision avoidance warning, improving airbag activation, parking aid, and protecting pedestrian. These devices are usually used to enhance the safety of the driver and passengers in land transport vehicles, and are expected to be pre-installed features in vehicles imported into Singapore.
11. IDA proposes to permit automotive SRR devices that meet the UWB technical specification to operate on a licence-exempt basis, in order for vehicles to come with the new safety feature in Singapore. As they are licence-exempt and operate on non-interference and non-protection basis, such UWB devices will not be able to claim protection from interference by other radio services.

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<sup>2</sup> Mitigation techniques as defined in ITU-R SM.1757 and ITU-R SM.2057 can be used to reduce the risk of interference and helps to ensure compatibility of UWB devices with existing radio services.

### Question 5

*IDA welcomes views and comments on the proposal to adopt licence-exemption approach for UWB vehicular radar devices which comply with the UWB technical specification and operate with peak emission within frequency bands 21650 – 29500 MHz and 77000 – 81000 MHz.*

### **Type 3: Imaging systems**

12. The band below 960 MHz or in the frequency band 3100 to 10600 MHz is often associated with imaging systems such as measurement, ground/wall probing radar, surveillance and medical systems. In Singapore, the above frequency bands are currently occupied by other radiocommunication services such as aeronautical, mobile and fixed-satellite. Given that imaging systems need higher power than generic UWB devices, there is concern that the co-existence of UWB devices and existing radiocommunication services in the same bands could result in harmful interference to the latter.
13. Hence, to ensure the harmonised introduction of UWB imaging systems in the frequency bands, IDA intends to license imaging systems, on a case-by-case basis. This licensing is not likely to stifle the introduction of such UWB devices into Singapore as, unlike other UWB applications, the market for this application involves professional usage. The primary users would tend to be law enforcement agencies, fire and rescue organisations, scientific research institutions, healthcare practitioners, military and government entities. If need be, licensing conditions could be imposed to restrict the use of UWB imaging devices to further safeguard the existing users in the above bands from possible interference.

### Question 6

*IDA welcomes views and comments on the decision to license, on a case-by-case basis, the use of UWB imaging systems with peak emission below the 960 MHz or in the 3400 to 10600 MHz band.*

### Question 7

*IDA also seeks comments if licensing conditions are required as further safeguards to existing users in the abovementioned band. If so, please identify and explain the potential interference to the mobile and trunked services from the UWB imaging devices operating in the frequency band below 960 MHz. Please also explain what are the safeguard measures that could be adopted.*

14. For licensing of UWB devices, IDA intends to adopt the current licensing framework, which comprises of an annual spectrum fee and station fee. The spectrum fee component will be based on the common frequencies for in-building or on-site wireless systems, and will also depend on a number of factors such as

power emission, frequency bandwidth, coverage area, frequency band factor and re-use factor. IDA proposes to adopt an annual spectrum fee and station licence of \$300 and \$50 respectively, subject to future spectrum fee reviews.

### Question 8

*IDA welcomes views and comments on the proposed licensing fee structure for UWB devices. Please provide supporting reasons to justify your view.*

## **PART IV: INVITATION TO COMMENT**

15. IDA would like to seek the views from the industry and members of the public on the issues and proposals raised in this consultation paper. This will allow IDA to have a better understanding of the issues and the requirements of the interested parties. The questions are listed again below:
- a) *Views and comments on the proposal to allow UWB devices to operate in frequency bands which are used for other radiocommunication services such as the fixed-satellite (FSS), fixed services (FS) and radionavigation*
  - b) *Views and comments on the possible scenarios of harmful interference from UWB devices to other licensed band and the possible measures to reduce the risk of interference.*
  - c) *Views and comments on the proposal to adopt a licence-exemption approach for UWB consumer and business data communication systems which comply with the UWB technical specification and operate with peak emission within the 3400 MHz and 10600 MHz band.*
  - d) *Views and comments on the proposal to allow unlicensed UWB devices implemented with mitigation techniques to operate at a higher peak emission level within the 3400 to 4800 MHz band as compared to generic UWB devices without mitigation techniques.*
  - e) *Views and comments on the proposal to adopt licence-exemption approach for UWB vehicular radar devices which comply with the UWB technical specification and operate with peak emission within frequency bands 21650 – 29500 MHz and 77000 – 81000 MHz.*
  - f) *Views and comments on the proposal to license, on a case-by-case basis, the use of UWB imaging systems with peak emission below the 960 MHz or in the 3400 to 10600 MHz band.*

- g) Views and comments if licensing conditions are required as further safeguards to existing users in the abovementioned band. If so, please identify and explain the potential interference to the mobile and trunked services from the UWB imaging devices operating in the frequency band below 960 MHz. Please provide the basis for each comment made and explain what are the safeguard measures that could be adopted.*
- h) Views and comments on the proposed licensing fee structure for UWB devices. If the proposed fee structure is not appropriate, please provide supporting reasons to justify your view.*
16. Respondents are also invited to comment on any other issues not covered in this consultation document but which are considered to be relevant to the formulation of UWB regulatory framework. IDA will consider inputs submitted and make its policy decisions thereafter. IDA targets to announce the policy framework for UWB by second quarter 2007.
17. All submissions should be submitted in writing, in both hard and soft copy (preferably in Microsoft Word format), and must reach IDA before **12 noon 16 April 2007**. Respondents are required to include their personal or company particulars, correspondence address, contact number and email address in their submissions to this Consultation Paper. Comments and views should be addressed to:

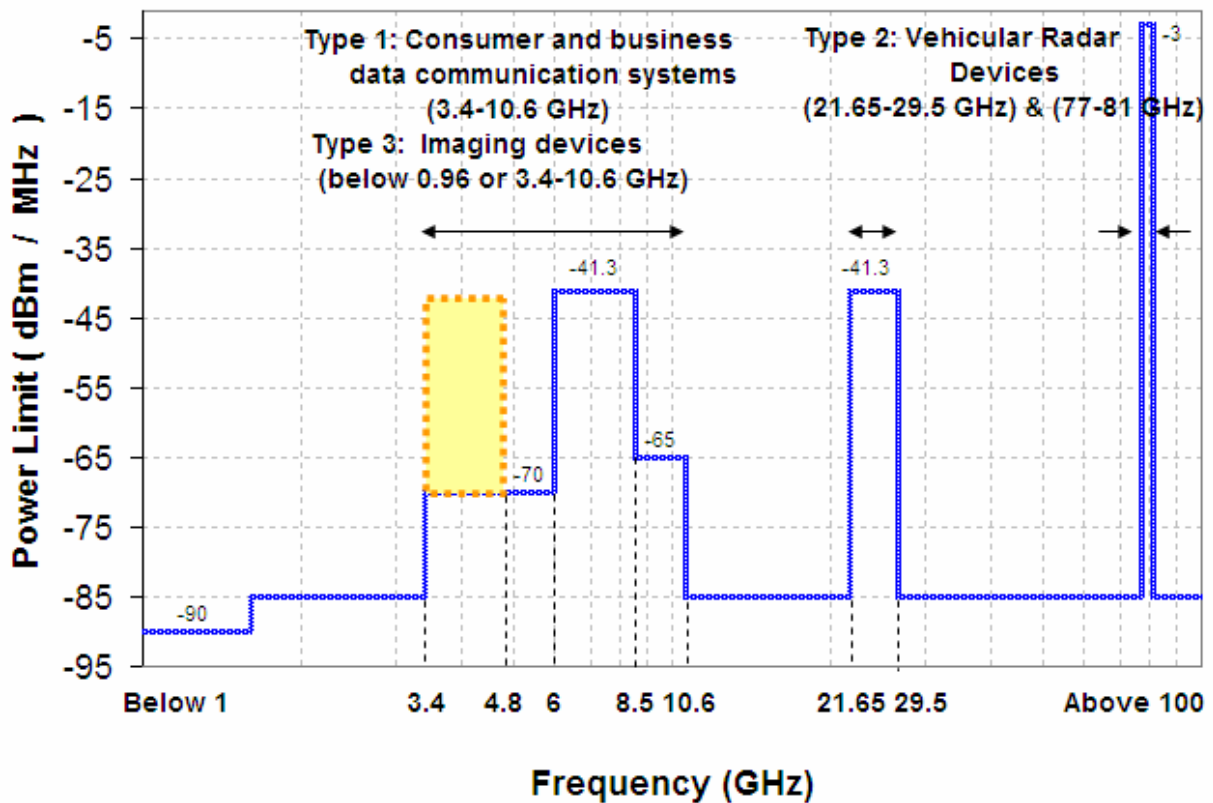
Mr Andrew Haire  
Assistant Director-General (Telecoms)  
Infocomm Development Authority of Singapore  
8 Temasek Boulevard  
#14-00 Suntec Tower Three  
Singapore 038988

**AND**

Please submit your softcopy via email to: [jason\\_teo@ida.gov.sg](mailto:jason_teo@ida.gov.sg)

18. IDA reserves the right to make public all written submission made in response to this consultation paper and to disclose the identity of the respondent. Any part of the submission, which is considered by respondents to be commercially confidential, should be clearly marked and placed as an annex. IDA will take this into account regarding disclosure of the information.

### Proposed UWB Emission Limits



Note: IDA proposes to allow UWB devices implemented with mitigation techniques to operate at a level of -41.3 dBm/MHz in the frequency band from 3.4 to 4.8 GHz. Otherwise, the emission limit is capped at -70 dBm/MHz.