



**CONSULTATION PAPER ISSUED BY THE
INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE**

ALLOCATION OF 10.5 GHZ FREQUENCY BAND

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PART I: INTRODUCTION

- 1 On 26 December 2007, the Info-communications Development Authority of Singapore (“IDA”) made available radio-frequency spectrum lots in the 10.5 GHz band for allocation through the auction process (referred herein as the “26 December 2007 Auction”). More details about the 26 December 2007 Auction can be found in the “Information Memorandum on the Auction of the 10.5 GHz Spectrum Rights” issued by IDA on 26 December 2007.
- 2 The auction did not proceed as there were no Initial Offers received for any of the 10.5 GHz spectrum lots made available. Since then, IDA had received renewed interest in the 10.5 GHz spectrum lots. In line with our efforts to optimise spectrum allocation, IDA is now reviewing the use of the 10.5 GHz band to see if it can be better utilised.

PART II: USE OF THE 10.5 GHZ FREQUENCY BAND

- 3 In the Information Memorandum on the Auction of the 10.5 GHz Spectrum Rights, IDA decided to allow the 10.5 GHz band to be used to operate point-to-point (“P2P”) and point-to-multipoint (“P2MP”) radio systems, only for wireless backhaul uses, to cater to industry demand and make better use of our spectrum resources.
- 4 Since the last auction, IDA has received some feedback from industry players indicating interest to deploy wireless access networks and services in the 10.5 GHz band. IDA notes that there are some proprietary products operating in the 10.5 GHz frequency band which can be used to deploy point-to-multipoint wireless access network. Internationally, many countries¹ have also allocated the 10.5 GHz band for Fixed Wireless Access technology using P2P or P2MP links without limiting the band to backhaul services. For instance, in Ireland, one of the operators uses the 10.5 GHz frequency spectrum to deploy a fixed wireless access platform for broadband connectivity.

¹ Countries which have allocated the 10.5 GHz band for Fixed Wireless Access include Malaysia, Ireland, Sweden etc.

- 5 While IDA maintains the view that the 10.5 GHz band would be allocated for P2P and P2MP links, IDA notes that there are no strong reasons to limit the use of the 10.5 GHz band only to backhaul. Therefore, to make better use of spectrum resources, IDA proposes to permit the 10.5 GHz band to be used to operate P2P and P2MP radio systems, regardless of whether the systems are deployed in the backhaul or access portion of the network. This will provide operators with the flexibility to use the 10.5 GHz band for the deployment of backhaul and access systems to provide telecommunication services.
- 6 However, unlike the allocation of spectrum rights in other spectrum bands, for example the 900MHz, 1800MHz, 2.3 GHz and 2.5 GHz band, where the policy intent of allocating spectrum in those bands was to make available spectrum for the provision of services to end users, the 10.5 GHz band will be allocated for operators to complement and enhance their existing wireless networks. Allowing the band to be used to deploy access network is a flexibility accorded to operators to optimise use of our spectrum resources. As such, IDA does not see the need to impose any conditions on usage of the band for access networks and services, including the provision of specific services to end users, rollout or coverage requirements *etc.*

Question 1: IDA invites views and comments on IDA's proposal to allow the 10.5 GHz band to be used to operate P2P and P2MP radio system, regardless of whether the spectrum is used in the backhaul or access portion of the operator's network.

Question 2: IDA invites views and comments on IDA's proposal not to impose any conditions on usage of the 10.5 GHz band for the deployment of access systems and services.

Technical Guidelines for Deployment of P2P and P2MP Radio Systems in the 10.5 GHz Band

- 7 To assist operators with the co-existence and co-ordination of their P2P and P2MP radio systems in the 10.5 GHz band, IDA intends to issue technical guidelines. The issuance of technical guidelines by IDA is not new and was done for the deployment of WBA networks in the 2.3 GHz and 2.5 GHz band. While not mandatory, operators are encouraged to take into account these guidelines, as well as implement further enhancements to suit their particular network deployment.

- 8 IDA proposes the following technical guidelines for the deployment of P2P and P2MP radio systems in the 10.5 GHz band, based on ITU recommendations:
 - a. **Transmission Power.** The output power (P) of the radio system should fall in the range 5 to 5000 W and the power delivered to antenna shall not exceed 0.5 W.

 - b. **Unwanted Emissions.** Operators should attenuate the power of any emissions outside of their frequency band of operation below the transmitter power (P) measured in watts. For base stations and mobile stations, the attenuation should be not less than $43 + 10 \log (P)$ dB at the channel edge based on a resolution bandwidth of 1 MHz or greater.

Question 3: IDA invites views and comments on IDA's proposed technical guidelines on transmission power and unwanted emissions for the deployment of P2P and P2MP radio systems in the 10.5 GHz band. IDA also invites views on whether there should be a cap on the output power (P).

PART III: SPECTRUM ALLOCATION MECHANISM

- 9 With the proposed modification to the allowable use of the 10.5 GHz band, IDA proposes to assign the available spectrum in the 10.5 GHz band by way of spectrum rights to interested operators through an auction process. This will enable all interested parties an equal and fair opportunity of accessing the spectrum.
- 10 The auction will proceed if the demand for the spectrum exceeds supply for any spectrum lot made available in the auction, subject to the provisions in the auction rules. The additional fees determined by the auction will be paid to IDA as a one-time upfront charge, over and above the annual spectrum management fee and other applicable system or service licence fee.
- 11 If demand falls within supply of spectrum in the band, IDA will not proceed with the auction and instead allocate the spectrum rights at the reserve price determined by IDA to interested operators, taking into account the spectrum bands requested by the operator.
- 12 This approach is similar to that which was adopted for the 26 December 2007 Auction. IDA also proposes to adopt the same auction rules as the 26 December 2007 Auction.

Question 4: IDA invites views and comments on IDA's proposal to assign the 10.5 GHz spectrum rights through an auction process based on the same set of auction rules that were designed for the 26 December 2007 Auction.

Auction Terms and Conditions

- 13 Although IDA has proposed to permit operators to use spectrum in the 10.5 GHz band to deploy systems in the access portion of the network, this would be a flexibility accorded to operators and not a requirement by IDA. Accordingly, IDA proposes to maintain the terms of the auction from the 26 December 2007 Auction as follows:

- a. **Spectrum right duration.** IDA recognises that given the upfront cost of a spectrum auction, operators would require more certainty as to the use of the spectrum to justify their investments in the systems required to use the spectrum. However, there is also a need for IDA to retain the flexibility to re-farm the spectrum in the future, bearing in mind that there is likely to be technological advances that bring about new services that can be provided using the band, as well as potential increased demand in future. Balancing the two, IDA proposes a spectrum rights duration of 5 years.
- b. **Spectrum block size.** The ITU's recommendation for P2MP links is to divide the band into 28 MHz or 30 MHz paired blocks.² To balance the needs of P2P and P2MP links, IDA proposes to divide the band into 14 MHz blocks. Auctioning the spectrum in single unpaired lots of 14 MHz will provide operators with the flexibility to use the spectrum for TDD or FDD technologies. Operators that require paired lots may choose to bid for 2 lots with sufficient separation distance to form a pair.
- c. **Cap on amount of spectrum.** IDA proposes not to cap the amount of spectrum that a single operator may obtain in an auction. Given that there are alternative fixed-line and wireless alternatives that can be used by operators to enhance their existing networks, IDA is of the view that it would not be necessary to configure the auction rules to allow multiple operators to successfully obtain the spectrum.
- d. **Annual spectrum management fee.** IDA proposes to set the annual spectrum management fee for the 10.5GHz band using the current spectrum fee framework. Under the current spectrum fee framework, the annual spectrum management fee imposed on exclusive links with bandwidths of 1 MHz or more is \$12,000 for the first MHz and \$300 per subsequent MHz of occupied bandwidth or part thereof. This works out to a recurrent annual spectrum management fee of \$15,900 per spectrum block per year.

² Recommendation ITU-R F.1568-1
Infocomm Development Authority of Singapore

- e. **Reserve price.** IDA proposes to set a reserve price of \$50,000 for each single lot of 14 MHz spectrum blocks.

Question 5: IDA invites views and comments on the proposed terms of the auction.

PART IV: INVITATION TO COMMENT

- 14 IDA would like to seek the views and comments from the industry and members of the public on the matters stated in the above paragraphs. This will allow IDA to have a better understanding of the issues at hand before issuing its decision.
- 15 All views and comments should be submitted in writing and in both hard and soft copies (Microsoft Word Format), and should reach IDA by **12 noon, 5 June 2008**. Respondents are required to include their personal or company particulars, correspondence address, contact number and email address in their submissions. IDA will make all or parts of any submissions made in response to this consultation paper public and disclose the identity of the source. Any part of the submission which is considered commercially sensitive must be clearly marked and placed as an annex to the comments raised. IDA will take this into account in its review. All comments should be addressed to:

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AND

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