



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

**ALLOCATION OF SPECTRUM IN THE 1800 MHz FREQUENCY BAND**

**5 September 2008**

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## PART I: INTRODUCTION

1 Spectrum in the 1800 MHz frequency band has been allocated for Public Cellular Mobile Telecommunication Services (“PCMTS”) in Singapore. The “1800 MHz” band refers to the paired spectrum bands from 1710 MHz to 1785 MHz and 1805 MHz to 1880 MHz.

2 The 1800 MHz band is currently partially assigned to SingTel Mobile Pte Ltd (STM) and MobileOne Ltd (M1) and StarHub Mobile Pte Ltd (SHM) in their respective 2G Spectrum Rights. The 2G Spectrum Rights will expire on 31 December 2008.

3 In the Explanatory Memorandum on the Framework for the Reallocation of Spectrum in the 900MHz and 1800MHz Frequency Bands which IDA issued on 18 January 2008 (“Explanatory Memo”), IDA decided to make available, via an auction (“PCMTS Spectrum Auction”), 1 lot of spectrum in the extended-GSM (“EGSM”) band, 5 lots of spectrum in the 900MHz band and 12 lots of spectrum in the 1800 MHz band, to be used to provide PCMTS. Each lot of spectrum was 2 x 5 MHz. In March 2008, IDA concluded the allocation process and STM, M1 and SHM were awarded PCMTS Spectrum Rights for the frequencies shown in Table 1. The PCMTS Spectrum Rights will commence on 1 Jan 2009 and expire on 31 March 2017.

Table 1

Frequency Pairs		Assignment
Lower band (MHz)	Upper Band (MHz)	
885 – 890	930 – 935	SHM
890 – 900	935 – 945	M1
900 – 915	945 – 960	STM
1710 – 1715	1805 - 1810	STM
1715 – 1720	1810 – 1815	SHM
1720 – 1730	1815 – 1825	STM
1740 – 1760	1835 – 1855	SHM
1760 – 1780	1855 – 1875	M1

4 In the Explanatory Memo, IDA also explained that *“to cater to future demand, IDA will reserve 3 lots of 1800 MHz spectrum, as well as the remaining 1 lot of EGSM spectrum, for allocation after this Auction if it deems necessary. The reserved spectrum may also be made available for other uses, such as technical or market trials, research and development, mobile equipment testing, etc.”*

5 Since the award of the PCMTS Spectrum Rights in March 2008, there has been further industry demand for spectrum in the 1800 MHz for PCMTS. IDA is now seeking, through this public consultation, views on whether IDA should make available one of the 3 remaining lots of 1800 MHz spectrum via an auction process, taking to account current and future needs for Singapore’s scarce spectrum resources to promote innovation in, and growth of a vibrant infocomm industry in Singapore.

## **PART II: MANAGING THE SUPPLY OF 1800 MHZ SPECTRUM**

6 Based on the responses to the public consultation on the Reallocation of the 900 MHz and 1800 MHz frequency bands and recent industry demand, IDA understands that the main use of the 1800 MHz frequency bands will continue to be for PCMTS, particularly 2G services. While the band could also be used for 3G, Wireless Broadband applications and low power GSM, the responses indicated that the development in these areas is still limited.

7 Therefore, the growth of the 2G market is likely to be the main demand driver for 1800 MHz spectrum. Overall, the 2G subscriber base in Singapore has only increased by 7.7% in the past year, compared to the 3G subscriber base which grew by 64% in the same period. IDA believes that the 3G subscriber base is likely to continue to grow steadily as more consumers upgrade from 2G to 3G handsets. However, while 3G subscriptions will replace some 2G subscriptions, there could still be strong demand for 2G services, eg. from tourists and certain market segments (e.g. the pre-paid card segment). Hence, demand for 1800 MHz spectrum to provide 2G services is unlikely to diminish in the near to mid term.

8 However, the demand for more 1800 MHz spectrum for the provision of PCMTS services must be balanced with other industry needs. It would not be possible for IDA to avail all three remaining lots of 1800MHz spectrum for long term allocation on an exclusive basis. IDA needs to ensure that it has sufficient 1800 MHz in reserve to cater to temporary, trial and experimental uses. Examples of such uses include the use of spectrum for handset testing. Existing mobile operators may also need additional spectrum on a temporary basis to cope with surges in traffic volumes during large scale events held in Singapore. IDA is also aware that some airlines, such as Emirates Airlines, have recently started to provide GSM services onboard aircrafts to allow passengers to use their mobile phones during certain flights, i.e. Mobile Communications on Aircraft ("MCA"). Passenger use of mobile phones is currently prohibited on aircrafts in Singapore because of concerns of possible interference with aircraft avionics and navigation systems. However, if Singapore-registered airlines obtain approval in the future to install MCA equipment onboard their aircrafts, they also may require temporary use of some 1800 MHz spectrum for equipment installation, testing and maintenance, within the confines of the testing facilities. Overall, IDA's assessment is that it would be prudent for IDA to keep at least 2 lots of 1800 MHz in reserve for temporary, trial and experimental uses.

9 Given that there is industry demand for more 1800 MHz spectrum for PCMTS now, IDA is considering making available another 1 lot of 1800 MHz spectrum for the provision of PCMTS. The allowable use of the spectrum would be the same as the spectrum under the PCMTS Spectrum Rights, ie. the spectrum can be used to provide PCMTS, using 2G or 3G technologies, and other technologies which share a similar platform and allow higher speed data services, such as GPRS, EDGE or HSPA. IDA will also allow operators to provide other services such as WBA using the spectrum as long as they have met the requirement to provide PCMTS.

### **Question 1**

*IDA invites views and comments on whether IDA needs to reserve 1800 MHz for any other uses, other than temporary, trial and experimental use? How much 1800 MHz spectrum should IDA hold in reserve in the next 1-5 years? IDA also invites views on whether IDA should make available one 2x5 MHz spectrum lot for PCMTS.*

### PART III: PROPOSED ALLOCATION FRAMEWORK

10 If IDA proceeds to allocate more 1800 MHz spectrum for PCMTS services, IDA could adopt either of the following approaches:

- a. **Administrative allocation.** IDA could assign annual rights of use for the spectrum on a first-come, first-served basis.
- b. **Auction.** IDA could conduct an auction to assign the spectrum to the highest bidder.

11 In the PCMTS Spectrum Auction, IDA had put out a total of 18 lots of PCMTS spectrum in the EGSM, 900 MHz and 1800 MHz bands. Each interested bidder was allowed to indicate interest for up to 6 lots of spectrum in that exercise. All spectrum made available in the PCMTS Spectrum Auction, including the 12 lots of 1800 MHz spectrum that were made available were sold. Each of the three interested bidders in the PCMTS Spectrum Auction indicated interest for the maximum number of lots that they were allowed to bid for. It is therefore possible that if IDA were to make available another 1 lot of spectrum in the 1800 MHz band, there may be demand from more than one operator. Therefore, IDA recommends conducting an auction to allocate the 1800 MHz lot as this is a more transparent process, and promotes a more efficient allocation of the spectrum.

12 IDA proposes the following parameters for the auction:

- a. **Duration of spectrum right.** IDA considered the option of aligning the duration of the spectrum right for the additional 1 lot of 1800 MHz spectrum with the PCMTS Spectrum Rights, ie. from 1 Jan 2009 to 31 March 2017. However, the spectrum needs of mobile operators may change during the period as their subscriber base evolves, which may be accelerated with the introduction of full mobile number portability. Given that IDA intends to keep 2 lots of 1800 MHz in reserve for temporary, trial and experimental uses, IDA is unlikely to be able to allocate more 1800 MHz spectrum rights until all assigned PCMTS Spectrum Rights expire. To cater to the possibility that demand for 1800 MHz spectrum might change depending on the profile of each operators' mobile subscriber base, balanced against the scarcity of supply, IDA is of the view that a shorter spectrum right duration is preferable, so that IDA will have the flexibility to re-allocate the spectrum as demand changes. IDA thus proposes to set the spectrum right duration at 3 years.
- b. **Spectrum lot.** The 3 lots which were not assigned under the PCMTS Spectrum Rights are shown in Table 2. Currently, Lot C is assigned for temporary and experimental use. Therefore, IDA proposes to allocate either Lot A or B. IDA proposes to allow bidders to indicate which of the 2 lots they want. The lot which receives the highest bid will be assigned to that bidder. The winning operator is required to provide a guard band of at least 200 KHz on the lower frequency boundaries of the lot, unless it also holds the spectrum right for the spectrum lot on the left.

Table 2: Available lots

Lot	Lower Band (MHz)	Upper Band (MHz)
A	1730 – 1735	1825 – 1830
B	1735 – 1740	1830 – 1835
C	1780 – 1785	1875 – 1880

- c. **Reserve Price and Fees.** IDA proposes to set the reserve price at \$110,000, based on the reserve price of the PCMTS Spectrum Auction, after taking into account the spectrum right duration. IDA will also impose an annual spectrum fee of \$140,000, similar to the annual spectrum fee under the PCMTS Spectrum Rights.

13 While IDA notes that 1 lot of 1800 MHz spectrum is unlikely to be sufficient for a new entrant to provide nationwide PCMTS services, as a matter of principle, IDA will allow parties that are not existing providers of PCMTS services to participate in the auction. However, parties that successfully obtain any new spectrum right should apply for an FBO licence for the provision of PCMTS, if they do not already have one. For clarity, such operators will be subject to FBO licence fees and the same specific licence conditions for the provision of PCMTS as other licensed providers of PCMTS, such as the obligation to provide coverage for the whole island of Singapore (including MRT underground stations/lines and road tunnels), the offshore islands and the territorial waters up to 15km from the coast line of the island of Singapore.

**Question 2**

*IDA seeks views and comments on the whether IDA should auction the 2x5 1800 MHz lot, and on the proposed auction parameters.*

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

14 IDA would like to seek the views and comments from the industry and members of the public on whether IDA should make available one 2 x 5 MHz lot of 1800 MHz spectrum, and on the proposed allocation framework if the spectrum lot is to be allocated. This will allow IDA to have a better understanding of the issues and the different needs and requirements of various interested parties.

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, 3 October 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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