



**DECISION AND EXPLANATORY MEMORANDUM ISSUED BY INFOCOMM
DEVELOPMENT AUTHORITY OF SINGAPORE ON THE FRAMEWORK FOR
THE ALLOCATION OF SPECTRUM IN THE 1800 MHZ FREQUENCY BAND**

ISSUED ON 2 DECEMBER 2008

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PART I: INTRODUCTION

1. On 5 September 2008, IDA issued a public consultation on “The Allocation of Spectrum in the 1800 MHz Frequency Band” (“Consultation”). The Consultation closed on 3 October 2008.
2. IDA has finalised the framework, and will subsequently issue the Information Memorandum on the Auction of the 1800 MHz Spectrum Right (“Information Memorandum”). IDA invites operators and companies to participate in the spectrum allocation process.

**PART II: OVERVIEW OF COMMENTS RECEIVED ON THE
ALLOCATION OF SPECTRUM IN THE 1800 MHZ
FREQUENCY BANDS**

3. At the close of the Consultation, IDA received comments from three respondents:
 - i. MobileOne Limited;
 - ii. Singapore Telecom Mobile Pte Ltd; and
 - iii. StarHub Mobile Pte Ltd.
4. IDA thanks all respondents for their inputs. Two respondents agreed with the allocation of spectrum in the 1800 MHz frequency bands for Public Cellular Mobile Telecommunication Services (“PCMTS”), while one respondent did not support the proposed allocation. IDA has given careful and extensive consideration to the views received. The sections below discuss the key issues raised during the Consultation and IDA’s decision on the allocation of the 1800 MHz spectrum.

PART III: IDA’S POLICY OBJECTIVES & APPROACH

5. The 1800 MHz frequency band is one of the bands allocated for PCMTS in Singapore. In March 2008, IDA assigned twelve 2 x 5 MHz lots of spectrum in the 1800 MHz band as part of the PCMTS Spectrum Rights commencing on 1 January 2009. IDA seeks to ensure that the remaining 1800 MHz spectrum is allocated in a way which makes the

most efficient use of this scarce resource to promote innovation in, and growth of a vibrant infocomm industry in Singapore.

PART IV: IDA'S DECISION ON THE ALLOCATION OF SPECTRUM IN THE 1800 MHZ FREQUENCY BAND

Assignment of 1800 MHz Spectrum

6. Two respondents agreed with IDA's proposal to allocate additional 1800 MHz spectrum for PCMTS, while one respondent did not support the proposed allocation.
7. Of the two respondents which supported the allocation of 1800 MHz spectrum, one said that there is continuing strong demand for 2G mobile services and was of the view that IDA should make the two lots of 1800 MHz available for assignment to mobile phone operators for the provision of PCMTS, and reserve only one lot of 1800 MHz spectrum for temporary, trial and experimental uses. The other respondent expressed interest to obtain additional 1800 MHz spectrum to provide PCMTS based on Long Term Evolution ("LTE") technology. It was of the view that there was no need to reserve any 1800 MHz spectrum for temporary, trial and experimental uses, as there was spectrum available in the 2100 MHz and extended GSM bands which could be used for such purposes.
8. The one respondent that did not support the proposed allocation of 1800 MHz spectrum was of the view that there is no need to allocate more spectrum for PCMTS given that there had been no excess demand for spectrum in the recent PCMTS spectrum auction and that bidders should have assessed their spectrum requirements from 1 January 2009 onwards in the PCMTS spectrum auction. It noted that IDA had stated that it was reserving 3 lots of 1800 MHz for future use and argued that bidders would have responded differently to the earlier auction if they had known that IDA would conduct another round of auction for the reserved spectrum lots. It was thus of the view that assigning additional 1800 MHz spectrum so soon after the earlier PCMTS spectrum auction would undermine IDA's spectrum allocation framework and introduce uncertainty for bidders. This may also deter potential bidders from participating in future auctions and encourage them to lobby for spectrum after the auction has closed. The respondent also noted that the three mobile operators currently had approximately the same number of mobile customers, and was concerned that the assignment of an additional lot would result in an unbalanced situation where one operator has more spectrum than

others. Nonetheless, if IDA were to make spectrum available, it agreed that IDA should reserve 2 lots for temporary, trial and experimental use.

9. IDA would highlight that it had clearly stated in the Explanatory Memorandum on the Framework for the Reallocation of Spectrum in the 900 MHz and 1800 MHz Frequency Bands issued on 18 January 2008, 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.”* Therefore, bidders should have been aware of the possibility that IDA would allocate the reserved spectrum following the PCMTS spectrum auction.
10. IDA had issued the public consultation to propose the allocation of the 1800 MHz spectrum only because there had been *further industry demand for 1800 MHz spectrum* after the award of the PCMTS Spectrum Rights in March 2008. The comments of two respondents, highlighted in paragraph 7, indicate that there is indeed additional demand for the spectrum for PCMTS. It is therefore reasonable for IDA to make available additional 1800MHz spectrum for PCMTS.
11. Nonetheless, IDA notes that there is a potential that, having recently conducted the PCMTS spectrum auction, the assignment of more 1800 MHz spectrum may unintentionally encourage operators to “game” future auctions in anticipation that more spectrum would subsequently be assigned in the near future. To avoid this, IDA will, in this case, structure the allocation framework for the 1800 MHz spectrum in a manner that ensures that the operators are unable to obtain the spectrum on better terms as compared to the earlier 1800 MHz spectrum assigned under the PCMTS Spectrum Rights.
12. With regard to the number of lots of 1800 MHz spectrum that IDA should assign in this auction, IDA needs to strike a balance between the needs by mobile operators and the requirements for temporary, trial and experimental uses in the near future. IDA has already assigned eighteen 2x5 MHz lots of spectrum in the 900 MHz and 1800 MHz bands for the provision of PCMTS under the PCMTS Spectrum Rights. IDA is of the view that making one additional 2x5 MHz lot of spectrum should be sufficient to meet the current demand for PCMTS, in particular for the provision of 2G services.
13. On the other hand, the demand for 1800MHz spectrum for temporary, trial and experimental uses may increase, as handset manufacturers begin testing LTE enabled handsets within the next few years. These trials would require more temporary use spectrum than the current GSM handset trials. IDA is of the view that it should set aside sufficient

spectrum for temporary use to facilitate trials of new technologies and services and promote wireless innovations.

14. On balance, **IDA has decided to make available one 2x5 MHz lot of 1800 MHz spectrum for PCMTS** in this allocation exercise. The permitted use of the spectrum would be the same as for the spectrum in 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.
15. IDA will reserve the remaining two 2x5 MHz lots of 1800 MHz spectrum for temporary, trial, experimental and other uses at this juncture. At this point, IDA does not foresee that it would be able to release any more 1800 MHz spectrum for PCMTS on long term assignments in the near future. Nonetheless, should there be further industry demand for 1800 MHz spectrum for PCMTS on long term assignments after this allocation exercise, IDA will duly consider the requests. IDA would seek industry feedback on any proposal to issue more long term spectrum rights in the 1800 MHz band before making its final decision on the issue.

Lot size

16. One respondent proposed splitting the 2 x 5 MHz lot into 3 parts, each 2 x 1.5 MHz, given that the likely spectrum use would be for 2G services, to avoid an unbalanced distribution of spectrum between the 3 mobile operators.
17. IDA is of the view that the distribution of spectrum between the 3 mobile operators should be in line with their valuation of the spectrum. The needs of each operator are different and there is no policy reason why IDA would require all 3 operators to have the same amount of spectrum. Instead of trying to ensure a balanced distribution of spectrum, IDA focuses on ensuring that spectrum is assigned to the operator that can derive maximum value from it. IDA also notes that suggestion to split the spectrum lot to smaller 2 X 1.5 MHz lots is likely to lead to an outcome where the remaining 1800 MHz spectrum would be in odd sizes, which may not be conducive for temporary, trial and experimental uses. Therefore, IDA has decided to assign the spectrum in a single 2x5 MHz lot. If operators do not need the full 2 x 5 MHz lot, they can subsequently trade part of the spectrum lot with other operators, subject to IDA's approval.

Assignment mechanism

18. One respondent was of the view that there was no need to auction the 1800 MHz spectrum and that IDA should administratively allocate the spectrum. The other two respondents did not object to assigning the spectrum by an auction.
19. Given that more than one operator has expressed interest in the 1800 MHz spectrum, and that IDA has decided to assign only one lot of spectrum, IDA is of the view that an auction would be the best mechanism to ensure that the spectrum is allocated in a fair and efficient manner.

Spectrum Lot

20. Of the 3 remaining lots of 1800 MHz spectrum (shown in Table 1), IDA had proposed to allocate either Lot A or B, depending on which lot receives the highest bid.

Table 1: Available lots

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

21. One respondent agreed with IDA's proposal to make lots A and B available. However, another respondent expressed the view that IDA should provide equal opportunity for existing mobile operators to acquire additional contiguous 1800 MHz spectrum. It therefore asked for Lot C to be made available. Another respondent was of the view that Lots A and C should be reserved for temporary, trial and experimental uses, to ensure sufficient separation between the frequencies ear-marked for such use. It therefore proposed that only Lot B be made available.
22. IDA had earlier proposed to reserve Lot C as it was currently assigned for temporary and experimental use. Nonetheless, to allow the 3 mobile operators to have equal opportunity to get additional 1800 MHz spectrum which is contiguous to their PCMTS spectrum, IDA will allow bidders to bid for either Lot A, B or C. The lot which receives the highest bid will be assigned to that bidder. To ensure that existing users of the spectrum are given ample time to migrate their operations to alternative spectrum lots, IDA will commence the 1800MHz Spectrum Right on 1 April 2009.

Guard Band

23. One respondent suggested that IDA review the requirement for the guard band to 100 kHz from the lower band of the frequency pairs.
24. IDA is of the view that a 100 kHz guard band is insufficient. The requirement 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, is consistent with the requirement for the rest of the PCMTS spectrum auctioned earlier. IDA will therefore adopt this requirement. IDA also notes that if the winning bidder already holds a PCMTS Spectrum Right, it would be able to choose a lot which is contiguous to the 1800 MHz spectrum block which it has under its PCMTS Spectrum Right, and thereby avoid having to set aside additional spectrum for the guard band. Operators that deploy 3G or other UMTS services will be required to provide additional guard bands, based on the ECC Report 082.

Spectrum Right Duration

25. One respondent was of the view that the duration of the spectrum right should extend to 31 March 2017, ie. expire together with the PCMTS Spectrum Rights, for greater business certainty. On the other hand, another respondent was of the view that the spectrum right should be for 2 years, so that IDA would have the flexibility to re-assign the spectrum if the demand situation changes. The third respondent did not express any views on this issue.
26. Having considered the responses, **IDA will set the spectrum right duration at 8 years, commencing on 1 April 2009.** While IDA had earlier proposed a 3 year spectrum right duration so that there would be more flexibility to re-assign the spectrum, IDA recognises that a longer spectrum right is necessary to give greater business certainty, particularly if operators are interested to use the spectrum for LTE. The 8 year duration means that the spectrum right will expire together with the other PCMTS Spectrum Rights on 31 March 2017. The operator that is assigned the spectrum right may choose to return the spectrum to IDA before the expiry of the spectrum right if it no longer needs the spectrum. Alternatively, it may trade the spectrum with other operators, subject to IDA's approval.

Auction Format

27. IDA has decided to use an ascending auction. In such an auction, bidders bid against each other, with each subsequent bid higher than the previous bid. The auction ends when no bidder is willing to bid higher. This is how IDA auctions telephone numbers and is similar to the clock auction format used by IDA for other spectrum auctions. Further details of the auction framework will be given in the Information Memorandum.

Reserve Price and Fees

28. There were no objections to IDA's proposed reserve price of \$110,000. However, the proposed reserve price was based on the earlier proposed spectrum right duration of 3 years. Since IDA will now set the

spectrum right duration at 8 years, IDA has decided to set the reserve price at \$300,000, which is the same as the price paid for each lot of 1800 MHz spectrum in the PCMTS Spectrum auction. This is in line with the statement in paragraph 11, that operators will not be able to obtain spectrum via this allocation exercise on better terms compared to the earlier PCMTS spectrum auction.

29. There were no comments on IDA's proposed annual spectrum management fees. IDA will therefore impose an annual spectrum management fee of \$140,000. IDA will also impose an Application and Processing Fee of S\$22,500. This will ensure that the operator which gets the spectrum lot will be no better off, even if there is no competing bidder, than the bidders in the earlier PCMTS spectrum auction.
30. In addition to the above fees associated with the PCMTS Spectrum Rights, operators will also be subject to licence fees, currently set at 1% Annual Gross Turnover ("AGTO"), for the provision of PCMTS under their FBO licences.

Licences and Roll-out Requirements

31. If a bidder does not already have an FBO licence for the provision of PCMTS, it must apply for one once it successfully obtains the 1800MHz Spectrum Right. In this regard, IDA will require the successful bidder to comply with the same specific FBO licence conditions relating to service coverage 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. It will also be required to rollout its systems and services within 2 years from when the 1800 MHz Spectrum Right is issued. For the avoidance of doubt, the annual spectrum management fees will apply even for the period where the successful bidder has yet to roll out its system and services.
32. If an existing 3G Licensee obtains the 1800 MHz Spectrum Right and wishes to use the spectrum to provide 3G services, it will be required to seek IDA's approval to amend their existing 3G FBO Licences and Radio-Communications Network Licences before providing 3G services using the PCMTS Spectrum Rights. In this regard, the existing 3G Licensee will have to pay a FBO licence fee set at 1% AGTO, for the provision of 3G services under its 3G FBO Licence using the 1800 MHz Spectrum Rights.

33. If an existing FBO Licensee obtains the 1800 MHz Spectrum Right and wishes to use the spectrum to provide PCMTS services using LTE, it will be required to seek IDA's approval to amend its existing FBO Licences and Radio-Communications Network Licences before providing such services.

PART V: SPECTRUM ALLOCATION RULES AND PROCESSES

34. IDA will release the Information Memorandum containing information on the application process for the 1800 MHz auction, as well as the auction rules and other relevant documents, in December 2008. These documents will be found on the IDA website at www.ida.gov.sg, under the "Policy and Regulation" section.
35. The table below sets out the *indicative* dates for the key milestones leading up to the auction.

Milestone	Date
Issue Information Memo and Auction Rules	17 Dec 2008
Latest date for submission of written queries	24 Dec 2008
Submission of Application Form, Initial Offer Document and Bank Guarantee	7 Jan 2009
Announcement of whether Auction will proceed	9 Jan 2009
Information Session	14 Jan 2009
Notification of Auction Details	16 Jan 2009
Auction Start Date	21 Jan 2009