



**DECISION AND EXPLANATORY MEMORANDUM ISSUED BY THE
INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE ON THE
ALLOCATION OF 3G SPECTRUM IN THE 1900/2100 MHZ FREQUENCY BAND**

ISSUED ON 13 JULY 2010

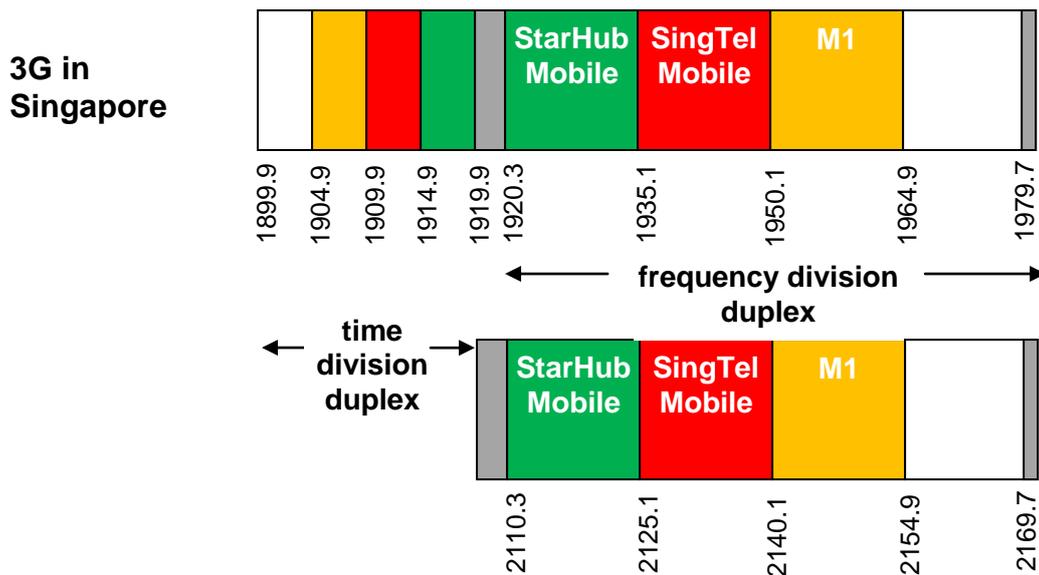
PART I: INTRODUCTION

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PART I: INTRODUCTION

1 The 1900/2100 MHz frequency band (“3G Band”) has been allocated for the provision of 3rd Generation Mobile Services (“3G services”) in Singapore. In 2001, IDA made available four lots of spectrum in the 3G Band, by way of an auction, for the provision of 3G services (“2001 Auction”). Three lots were assigned to M1, SingTel Mobile and StarHub Mobile at the reserve price of S\$100 million, via the 3G Spectrum Rights which will expire on 31 December 2021. The fourth lot of spectrum in the 3G Band was not assigned (see illustration on current assignment below). On 29 March 2010, IDA conducted a public consultation on the “Allocation of 3G Spectrum in the 1900/2100 MHz Frequency Band” (“Consultation”), concerning the allocation of the fourth 3G spectrum lot. The Consultation closed on 26 April 2010.



2 At the close of the Consultation, IDA received comments from four respondents:

- i. Ericsson
- ii. M1 Limited
- iii. Singapore Telecom Mobile Pte Ltd
- iv. StarHub Mobile Pte Ltd

3 IDA thanks all respondents for their inputs. The respondents generally agreed with the allocation of the remaining spectrum in the 1900/2100 MHz frequency band for 3G mobile communication systems and services. Some respondents raised concern with the market-based allocation approach. IDA has given careful and extensive considerations of the views received. The sections below discuss the key issues raised during the Consultation and IDA’s decision on the allocation of the 3G spectrum in the 1900/2100 MHz frequency band.

PART II: IDA'S DECISION ON THE ALLOCATION OF 3G SPECTRUM IN THE 1900/2100 MHZ FREQUENCY BAND

4 As the agency responsible for managing the radio frequency spectrum in Singapore, IDA's policy objective is to ensure efficient and optimal use of our scarce spectrum resource. In making available the remaining spectrum in the 3G Band for assignment, IDA seeks to ensure that the 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.

Spectrum Available for Assignment

5 The respondents generally agreed that demand for 3G services, including mobile broadband, would continue to grow steadily and supported IDA's proposal to make available the paired spectrum in three lots without the need for further provisioning of guard bands between the lots. The respondents also confirmed IDA's assessment that there was little commercial interest in the unpaired spectrum for which widespread use has only been observed in China, by one operator – China Mobile – for the deployment of Time Division Synchronous Code Division Multiple Access ("TD-SCDMA") technology, and supported IDA's proposal to reserve the spectrum for experimental, temporary and trial use.

6 One respondent also suggested that IDA consider re-farming the unpaired spectrum from 1900-1920 MHz and pairing it with the band 2090-2110 MHz for mobile broadband, and extending Lot C above the frequency 1979.7 MHz and 2169.7 MHz such that there would be three equally sized lots of 2x5 MHz considering that there has been no or very limited interest in Mobile Satellite Service above 1980 MHz in Singapore, i.e. to revise the frequency band of Lot C to 1974.9-1979.9 MHz/2164.9-2169.9 MHz.

7 As the industry has confirmed IDA's assessment on the demand for the paired and unpaired spectrum, IDA will proceed with the proposal to reserve the 5 MHz unpaired spectrum for trials and temporary use, and to make available the full 2x15 MHz paired spectrum in three roughly equal sized lots of 2x5 MHz for the provision of 3G systems and services ("3G Spectrum Lots") (see Table 1 below). In deciding to make available all the paired spectrum for assignment, IDA is nonetheless also mindful of competing demand for temporary use of the spectrum during major events such as the National Day Parade and the Formula One Race. IDA is cognisant that setting aside some paired spectrum for temporary, trial and experimental uses to meet ad-hoc and short-term requirements is not an efficient use of the spectrum which would have a high opportunity cost if it deprives operators from rolling out or expanding their network capacity to meet consumer demand for 3G services. As such, IDA will not be reserving any paired spectrum for temporary, trial and experimental uses. IDA will instead encourage parties who require use of the spectrum for temporary uses to negotiate with the spectrum right holders to use the spectrum. To facilitate such commercial negotiations, IDA intends to impose a general duty on the spectrum right holder to co-operate and negotiate with third parties on the use of their frequencies during major events that are considered necessary by the IDA. This is consistent with today's practice where operators

voluntarily negotiate with third parties on the shared use of their spectrum for a temporary period.

8 IDA will also not be requiring any guard bands to be set aside between the lots but will allow operators to coordinate amongst themselves, post spectrum allocation, to agree on the necessary guard bands. If the operators are unable to reach an agreement, IDA will determine the guard band.

Table 1: Available lots

Lot	Lower Band (MHz)	Upper Band (MHz)
A	1964.9-1969.9	2154.9-2159.9
B	1969.9-1974.9	2159.9-2164.9
C	1974.9-1979.7	2164.9-2169.7

9 As for the proposal to extend Lot C, IDA notes that our current 3G band plan is consistent with the ECC/DEC/(06)01 Decision¹ to centre the carrier nearest to 1980 MHz at 1977.2 MHz and the carrier nearest to 2170 MHz at 2167.2 MHz, which in turn determines the band edge of 1979.7 MHz for uplink and 2169.7 MHz for downlink respectively based on a carrier size of 5 MHz. As such, IDA will retain the spectrum assignments as set out in Table 1 above. Nonetheless, IDA is prepared to allow the successful bidder of Lot C to extend its use into the 200 kHz guard band provided that it is willing to undertake not to cause interference or to seek protection from interference from other services.

10 Regarding the same respondent's proposal on the unpaired spectrum, IDA agrees that it is conceptually attractive to re-farm underutilised spectrum for other more optimal use. However, as 15 MHz of unpaired spectrum in the 1900-1920 MHz band has already been assigned to the three mobile operators in the 2001 Auction and forms part of the operators' 3G Spectrum Right today, it is therefore not available for re-farming until the existing 3G Spectrum Rights expires on 31 December 2021. IDA also notes that internationally and domestically, there has been no pressing interest to convert the 1900-1920 MHz band from Time Division Duplex ("TDD") to Frequency Division Duplex ("FDD") operations.

Spectrum Allocation Approach

11 Three respondents were against IDA's proposal to allocate the 3G Spectrum Lots via an auction, on the grounds that: (i) there was no excess demand for the spectrum since previous spectrum auctions highlighted an absence of demand for mobile spectrum in Singapore other than from the three existing mobile operators; (ii) an auction would drive up the cost for supplying 3G services and in turn undermine the adoption of the services; (iii) the existing mobile operators had already invested heavily in rolling out extensive 3G networks in Singapore and they should be facilitated in meeting their requirement for additional 3G spectrum for radio capacity expansion including having a first-rights-of-refusal to the 3G spectrum; and (iv) the circumstances today were very different from 2001 when there was not yet any 3G deployment and therefore an auction under those circumstances would be the most

¹ ECC Decision of 24 Mar 2006 on the harmonised utilisation of spectrum for terrestrial IMT-2000/UMTS systems operating within the bands 1900-1980 MHz, 2010 – 2025 MHz and 2110-2170 MHz

efficient means to allocate resources and set the parameters for the rollout of nationwide 3G systems and services. Comparatively, since operators had already rolled out nationwide 3G systems today, there was no necessity to adopt the auction mechanism to allocate the remaining 3G spectrum. Instead, they suggested that IDA allocates the spectrum administratively amongst the three mobile operators equally as the more cost-effective approach and let the operators decide amongst themselves as to which specific 3G spectrum lot they should be granted. The fourth respondent supported the view that the price of spectrum payable by operators be kept to the minimum possible level to enable more attractive and affordable services to consumers.

12 IDA understands the three respondents' concerns and their preference not to bid for the 3G Spectrum Lots via an auction. Nonetheless, IDA has a duty to ensure the efficient and optimal use of our scarce spectrum resource. The mechanism by which spectrum is assigned to users plays a key role in encouraging its efficient and optimal use— if the spectrum is priced too cheaply, it will provide the wrong incentives and encourage users to request for and make inefficient use of the spectrum, instead of optimising the use of existing allocated spectrum. IDA has moved away from administrative allocation, where feasible, to a market-based allocation approach using auctions, especially when assigning highly contested spectrum, so as to allow market forces to set the price. This will ensure that the spectrum resource is allocated in the most efficient and transparent manner to those who value it the most, thereby promoting its efficient use because a spectrum user's ability to introduce innovative and competitive services to end-users and to deploy them quickly and efficiently increases the value of the spectrum to that user. As such, IDA's view is that the market-based allocation mechanism is still the most appropriate approach to allocate scarce spectrum resources, including the 3G spectrum. IDA has used auctions to assign spectrum for 2G and 3G public cellular mobile telecom services in the 900/1800 MHz bands, as well as Wireless Broadband Access services in the 2.3/2.5 GHz bands.

13 IDA notes that apart from the three respondents, there has been no other operator who indicated interest in the 3G spectrum, and indeed, previous 2G and 3G spectrum auctions did not see any newcomer. Nonetheless, until the 3G Spectrum Lots are formally made available and the market has responded, IDA cannot preclude the possibility of a new entrant. Assigning the 3G spectrum administratively to the three existing mobile operators will close off the market to a new entrant.

14 Contrary to the views of the respondents, IDA does not believe that assigning the 3G Spectrum Lots via an auction will drive up the cost for supplying 3G services and in turn undermine adoption. Conversely, there is no guarantee that if the 3G Spectrum Lots were assigned administratively, the operators will pass on the cost savings to the end users. The operators are likely to charge the end users a price they think the market can bear, independent of the cost of the 3G Spectrum Lots. IDA's view is that similar to operators' investments in 3G systems, the one-time payment for the spectrum is likely to be treated by operators as sunk cost, rather than being passed on to consumers in the form of higher prices. Competition in the provision of 3G services will also ensure that prices of 3G services remain competitive. IDA also disagrees that existing mobile operators should be given priority to the spectrum because of their heavy investment in rolling out extensive 3G

system. The mobile operators have entered the 3G mobile market and invested in the 3G systems on their own accord. They are fully aware of the minimum requirement for nationwide rollout obligation when they participated in the 2001 Auction, without expectation that more 3G spectrum will be allocated at a later date. They have benefitted, and will continue to benefit, from their investments in view of the strong growth of the 3G market in Singapore. Finally, the operators already have substantial amount of 3G spectrum. While IDA has allowed the operators to bid for the remaining 3G spectrum, there is no good reason for IDA to offer the existing operators priority. Lastly, while the situation today is very different from 2001, it does not change the considerations of whether to adopt the market-based approach to allocate the remaining 3G spectrum in the band, which is to encourage efficient and optimal use of our scarce spectrum resource. By allocating spectrum to persons who value it the most, the market-based approach ensures that essential spectrum is put in the hands of those best able to use it, and in turn foster greater innovation and competition for the benefit of consumers.

15 For the above reasons, IDA maintains its proposal to allocate the three lots of 2x5 MHz paired spectrum using a market-based approach. Similar to past auctions, if it turns out that there is no competing demand for the 3G Spectrum Lots, the 3G Spectrum Lots will be assigned at the reserve price.

Spectrum Lots and Spectrum Right Duration

16 IDA has decided to auction the 3G Spectrum Lots as specific lots, rather than generic lots, so that interested bidders can indicate which specific lot they want to bid for. IDA also intends to assign the new 3G Spectrum Lots no later than end November 2010. The newly released 3G Spectrum Lots will be valid for about 11 years and expire together with the existing 3G Spectrum Rights on 31 December 2021.

Cap and Spectrum Trading

17 While two respondents had suggested restricting existing 3G operators to only one 3G Spectrum Lot, instead of two, they did not provide strong justifications. IDA believes that some flexibility can be accorded to existing operators to decide if they need one or two lots. However, it will be necessary to impose a cap of maximum two lots, so as to prevent anyone of them from hoarding spectrum to limit their competitors' ability to expand their network capacity. For new entrants, there will not be any cap on the number of spectrum lots that they may bid for.

18 In addition, IDA agrees with some of the respondents' submission that the strict prohibition on spectrum trading may prevent existing 3G operators from mutually agreeing to re-assign the frequencies amongst themselves so as to improve spectrum usage. As such, IDA will provide a specific exception to allow *swapping* of spectrum amongst the existing 3G operators for the purpose of enhancing spectrum utilisation, while maintaining the general prohibition against spectrum *trading* within the first year from date of assignment, to prevent speculative activities for pure commercial profiteering purposes.

Rollout and Use Obligations

19 As the respondents did not object with IDA's proposal on the rollout and use obligations, IDA will require new entrants who successfully bid for the 3G spectrum to roll out nationwide systems and services within two years from the date of grant. Existing 3G operators who successfully bid for the spectrum would have to ensure that the spectrum is successfully put to use within one year from the date of grant.

Reserve Price and Fees

20 One respondent commented that the reserve price should be set at a nominal level that adequately recovers the cost of allocating the 3G spectrum, rather than based on the valuation of existing 3G spectrum rights.

21 IDA's view is that it is reasonable to value the new 3G spectrum based on the price paid by incumbent operators in 2001 (but discounted to its present value in 2010), in order to incentivise operators to use it efficiently. Although the 2001 Auction did not proceed, the reserve price of S\$100 million per lot was already a reduced price, taking into consideration that market sentiment towards 3G had weakened then and there was greater uncertainty over the business case for 3G. The reserve price also does not require operators to pay an annual licence fee for the provision of 3G services using the 3G spectrum. If there had been a fourth bidder in 2001, the fourth lot of 3G spectrum would have been assigned at S\$100 million then. Compared to 2001, the business case for 3G today is more established and the capital expenditure for network rollout would also be much cheaper. It is therefore not unreasonable to price the spectrum at \$100 million with relevant discounting today. As such, IDA will retain the proposal to set the reserve price for each lot of 2x5 MHz of 3G spectrum at S\$20 million inclusive of GST, without any further need for successful bidder to pay the annual licence fee from the provision of 3G services using the spectrum. IDA highlights that the inclusion of GST in the reserve price of the 3G spectrum is an exception adopted uniquely for this auction for consistency with the framework used in the 2001 Auction. This reserve price is exclusive of the one-time application and processing fee of S\$5,400 per spectrum lot.

Auction Format and Timing

22 Three respondents had objected to the combinatorial auction format. IDA therefore will revert to the simultaneous multiple rounds auction ("SMRA") format which was adopted for the Wireless Broadband Access Spectrum Rights Auction in 2005, where bidders may raise their bids for the spectrum lots which are auctioned simultaneously, over multiple rounds until demand equals supply. IDA will make available the Auction Rules in due course.

23 To allow interested bidders sufficient time to raise financing and review the auction rules in detail, as suggested by one respondent, IDA intends to issue the auction rules in July 2010 for industry's review and clarification. IDA intends to invite application and Initial Offers from interested parties for the new 3G Spectrum Lots in August 2010. Should auction proceed (i.e., demand for any specific lot exceeds supply as indicated by interested parties in their Initial Offers), IDA intends to hold the auction between September and October 2010 and assign the spectrum no later than

end November 2010. If auction does not proceed, IDA intends to assign the spectrum based on the Initial Offers in September 2010.