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### SINGAPORE TELECOM MOBILE PTE LTD

#### RESPONSE TO CONSULTATION PAPER - PROPOSED FRAMEWORK FOR THE REALLOCATION OF SPECTRUM IN THE 900 MHZ AND 1800 MHZ FREQUENCY BANDS

##### 1 INTRODUCTION

1.1 Singapore Telecom Mobile Pte Ltd (**SingTel Mobile**) refers to the Info-communications Development Authority of Singapore (**IDA**) consultation paper dated 28 June 2007 on the proposed regulatory framework for the reallocation of spectrum in the 900 MHz and 1800 MHz frequency bands (**Consultation Paper**).

1.2 SingTel Mobile is licensed to provide mobile telecommunications services in Singapore and has successfully acquired 2G and 3G Spectrum Right(s) and a 2G and 3G FBO licence.

1.3 SingTel Mobile is committed to the provision of state-of-the-art mobile telecommunications services and technologies in Singapore. As a leading provider of mobile telecommunications services over 2G and 3G networks, high speed data services through GPRS and HSDPA technology and wireless services on our WiFi platforms, SingTel Mobile has a strong interest in the proposed framework for the reallocation of spectrum in the 900 MHz and 1800 MHz frequency bands.

1.4 SingTel Mobile welcomes the opportunity to make this submission on the Consultation Paper and the various issues identified by the IDA.

1.5 This submission is structured as follows:

Section 1 – Introduction

Section 2 – Executive Summary

Section 3 – Detailed Response

Section 4 – Conclusion.

1.6 SingTel Mobile would be pleased to clarify any of the views and comments made in this document, as appropriate.

##### 2 EXECUTIVE SUMMARY

2.1 The key points made by SingTel Mobile in this submission for the IDA's consideration are as follows:

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***Continued demand for 2G mobile services on the 900 MHz and 1800 Mhz bands***

- (a) SingTel Mobile considers that no compelling case exists for the proposed reallocation of spectrum on the 900 MHz and 1800 MHz frequency bands.
- (b) There is a continuing need for mobile operators to use the 900 MHz and 1800 MHz frequency bands to provide 2G mobile services in Singapore.
- (c) The key driver for the proposed spectrum reallocation would be evidence that the existing mobile operators were not efficiently utilizing the allocated 2G spectrum. This is not the case.
- (d) Existing mobile operators are efficiently utilizing the allocated 2G spectrum to serve the current base of 3.73 million 2G GSM end-users. Mobile operators have also made substantial investments in 2G network infrastructure, as well as enhancements to this infrastructure over the years (such as GPRS).
- (e) If existing mobile operators were not permitted to continue using the allocated 2G spectrum, they would be unable to achieve an effective rate of return on their investments or comply with the terms of their respective FBO licences, which require the provision of 2G mobile services until 2017.

***Benefits associated with deployment of 3G and other services in 900 MHz and 1800 MHz bands are not relevant in Singapore***

- (f) The benefits associated with the deployment of 3G services in the 900 MHz and 1800 MHz band are limited in a city-state such as Singapore. While overseas studies suggest that there are specific benefits associated with the deployment of 3G services in the 900 MHz band (particularly cost savings in rural and regional areas), these benefits are not as relevant in Singapore and are likely to be outweighed by the costs associated with reallocation.
- (g) Singapore has already realized the benefits associated with 3G technology with the deployment of 3 nationwide 3G networks. This differs to other countries that are using 3G deployments in the 900 MHz band to achieve nationwide coverage or to cover rural and regional areas.
- (h) Similarly, there are no compelling reasons for the allocation of the 900 MHz and 1800 MHz frequency bands for wireless broadband services or low power GSM in the short or medium term:

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- (i) the IDA has already allocated the 2.3 GHz and 2.5 GHz frequency bands for wireless broadband services and this allocation is likely to prove sufficient going forward
- (ii) there is limited demand for fixed-to-mobile convergence products that use low power GSM technology and there is no evidence to suggest that a reallocation of existing 2G spectrum is required to meet demand for such services in Singapore.

### ***Guard bands***

- (i) The 900 MHz and 1800 MHz frequency bands should continue to be allocated in 200 KHz allotments and guard bands should continue to be 200 KHz in size to ensure an efficient use of spectrum. The size of the guard band is likely to be larger if 3G services were to be deployed on these frequencies.

### ***SingTel Mobile does not support a Greenfield allocation of spectrum***

- (j) SingTel Mobile does not support a 'Greenfield allocation' of spectrum. Existing mobile operators have made substantial investments in 2G network infrastructure and services and are efficiently utilizing the 2G spectrum to provide services to 3.73 million 2G end-users. There is alternative spectrum available for new entrants to utilise in the unlikely event of market entry.
- (k) The mobile operators acquired their current 2G spectrum using a market based approach. The 2G spectrum fees currently paid by mobile operators are based on market determined prices.
- (l) Any change to the allocation of 2G spectrum is likely to have significant adverse impact on services, result in the incurrence by existing mobile operators of substantial costs in replacement of equipment and infrastructure, require testing and also affect roaming services. These costs will be passed through to Singaporean consumers.
- (m) The existing 2G Spectrum Rights should be extended or renewed. Alternatively, existing mobile operators should be provided the 'first right of refusal' in respect of existing 2G spectrum and 2G spectrum lots, along the lines of that made available by OFTA in Hong Kong to GSM and PMS operators.
- (n) The extended or renewed 2G Spectrum Rights should be granted for the same period of time as 2G FBO licence to avoid inconsistency between a licensee's spectrum rights and licence obligations. This will ensure that existing mobile

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operators are given the proper degree of regulatory certainty in relation to their spectrum rights and ability to fulfil their FBO licence obligations in the relation to the supply of 2G mobile services.

### ***Other matters***

- (o) SingTel Mobile supports the proposal that any party that obtains frequency spectrum be required to first obtain an FBO licence to offer PCMTS.
- (p) SingTel Mobile supports the proposal in relation to spectrum management fees, annual recurrent fees and the annual licence fees at 1% of AGTO.
- (q) However, SingTel Mobile submits that a framework that leads to a situation where more than one mobile operator may indicate a preference for one lot (of 5 MHz) creates uncertainty to the existing mobile operators and will lead to an increase in cost to be borne by the industry and end-users. As stated above, SingTel Mobile submits that the IDA should extend or renew the existing 2G Spectrum Right(s) granted to the existing mobile operators.
- (r) SingTel Mobile does not see much potential use arising from the 800 MHz frequency band. There are only limited deployments of 3G GSM services on this frequency band throughout the world (e.g. Australia and North America).

2.2 SingTel Mobile submits its detailed comments in the following sections.

## **3 DETAILED RESPONSE**

### **PART II - ALLOWABLE USE FOR THE SPECTRUM**

- 3.1 The IDA has stated that the 900 MHz and 1800 MHz spectrum can be refarmed for use in the provision of 3G mobile services, wireless broadband applications and low power GSM.
- 3.2 While this may potentially be the case, SingTel Mobile submits that the 900 MHz and 1800 MHz frequency bands should continue to be used to deliver 2G GSM services in Singapore and that there is no compelling reason to refarm these frequency bands at this point in time.

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### ***Continued need for 950 MHz and 1800 MHz frequency bands to be used for 2G GSM mobile services***

- 3.3 SingTel Mobile submits that there is likely to be significant demand for 2G mobile services for many years to come and it would be premature for 900 MHz and 1800 MHz frequency bands to be refarmed while there is continued demand for 2G mobile services on these frequencies.
- 3.4 There is no basis for the refarming of existing 2G spectrum, unless it can be shown that spectrum is not being utilised efficiently. This is not the case in Singapore, which has one of the highest mobile penetration rates in the world and widespread usage of 2G mobile services on the 900 MHz and 1800 MHz frequency bands. There are currently 3.73 million subscribers to 2G mobile services. Whilst growing, 3G subscriptions only form a quarter of the total number of mobile subscriptions.
- 3.5 The need for spectrum to remain available for 2G services on the 900 MHz band has been recognised by Ovum:<sup>1</sup>

*“there must be enough 900MHz spectrum for GSM, which currently carries most of the operators’ voice traffic and which is also still the main source of revenues”.*

- 3.6 Mobile operators have also made substantial investments in 2G network infrastructure and enhancements to this infrastructure over time (such as GPRS) to drive the development of new innovative services.
- 3.7 If existing mobile operators were not permitted to continue using this spectrum, they would be unable to realise the benefits of their extensive network investments or properly fulfil their respective FBO licence obligations in relation to 2G services (which do not expire until 2017).
- 3.8 In short, it is critical that sufficient spectrum is made available to mobile operators to support the continued provision of existing 2G GSM services on the 900 MHz and 1800 MHz frequency bands to 3.73 million subscribers.

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<sup>1</sup> Ovum, *Directions are set for UMTS 900 in France*, 11 July 2007.

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***Deployment of 3G services in the 900 MHz frequency band is not relevant in the Singaporean context***

- 3.9 SingTel Mobile recognises that there may have already been several deployments of 3G mobile services in the 900 MHz band and that further deployments are planned in the future.
- 3.10 However, SingTel Mobile also notes that the benefits of such deployments primarily relate to improvement in indoor and outdoor coverage and coverage of rural areas. These improvements are not issues of significance in a city-state such as Singapore.
- 3.11 Ovum, in its recent study for the GSM Association<sup>2</sup>, concluded that the benefits of deploying UMTS in the 900 MHz would include:
- (a) expanded coverage area
  - (b) improvement in outdoor and indoor user experience
  - (c) more cost effective deployment of rural mobile broadband services.
- 3.12 SingTel Mobile submits that these potential benefits are not directly relevant to Singapore. The dynamics of network deployment in a city-state such as Singapore is very different to that in larger countries, such as Australia and European countries.
- 3.13 Given the differences in land mass between Singapore and most other countries, Singaporean mobile operators do not face the same difficulties as mobile operators in other countries to achieve nationwide coverage and do not face the same cost pressures associated with network deployment in rural and regional areas.
- 3.14 SingTel Mobile also notes that in most countries where 3G mobile services have been deployed on the 900 MHz band (or are in the process of being deployed), the network deployment has been justified as a means of achieving nationwide 3G coverage or represents the first significant deployment of a 3G service by the relevant operator in that country.
- 3.15 This situation does not arise in Singapore, where the benefits of 3G technology have already been realised through the deployment of 3 nationwide 3G network. There are also stringent regulatory requirements put in place in relation to 3G service quality as well as street level coverage as well as in-building coverage. Consequently, there is little or nothing to be gained by using the 900 MHz and 1800 MHz frequency bands for 3G deployment.

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<sup>2</sup> Ovum, *Market Study for UMTS900: A report to the GSMA*, February 2007.

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3.16 Furthermore, we note that 3G equipment at 900 MHz is not yet widely available. In light of the above, SingTel Mobile submits that there is no compelling reason at this stage for deployment of 3G using the 900 MHz or 1800 MHz frequency bands in Singapore.

### ***Wireless Broadband Services have already been allocated spectrum***

3.17 SingTel Mobile does not consider that wireless broadband services need to use spectrum on the 900 MHz and 1800 MHz bands. The IDA has already allocated the 2.3 GHz and 2.5 GHz frequency bands for Wireless Broadband Access (**WBA**) services and this allocation should prove sufficient to meet demand going forward.

3.18 In 2005, the IDA conducted an auction during which all the 25 WBA spectrum lots identified in the 2.3 GHz and 2.5 GHz bands were auctioned. As a result 6 new WBA licensees obtained spectrum at a total cost of S\$9.84 million. A total of 140MHz has been allocated to 6 WBA licensees for the rollout of WBA services.

3.19 To date, however, there are still limited rollouts on the 2.3 GHz and 2.5 GHz frequency bands auctioned in 2005. Due to the lack of formalised WiMAX certification for CPE, rollouts are therefore on proprietary systems.

3.20 Furthermore, the IDA has selected and funded 3 operators to rollout a nationwide broadband wireless network, known as wireless@SG. These operators provide end-users with free 512 kbps services currently at close to 3,500 locations across Singapore as at June 2007. The number of locations is continuing to grow. As at end-June 2007, there were over 400,000 registered users. This deployment is also likely to limit the range of WiMAX deployments (and hence, limit the demands for spectrum from licensees).

3.21 In any case, it is unlikely that WiMAX deployments will require the use of the 900 MHz or 1800 MHz frequency bands. As the IDA itself indicates, even the WiMAX Forum does not actively consider using 900 MHz and 1800 MHz frequency bands for any form of WiMAX rollout.

3.22 On this basis, SingTel Mobile consider that there is no need to use 900 MHz and 1800 MHz frequency bands for wireless broadband services in the short to medium term.

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### *Low power GSM*

- 3.23 There is no evidence to suggest that a reallocation of existing 2G spectrum is required to meet demand for fixed-to-mobile convergence (FMC) products that use low power GSM technology.
- 3.24 SingTel Mobile submits that the demand for such services is likely to be limited and that there is no evidence to suggest that a reallocation of the existing 2G spectrum is necessary to meet demand for FMC products. Indeed, there are a range of other offerings that would mitigate against the take up of FMC products in Singapore:
- (a) prices for fixed and mobile telephony are already very low;
  - (b) end-users with broadband connections already have access to a multitude of VoIP offerings; and
  - (c) end-users can also readily access the thousands of WiFi hot spots throughout Singapore to make free or cheap VOIP calls.

### *Frequency bands for 3G spectrum have already been allocated, with additional lots available*

- 3.25 The IDA has already identified the 2100 MHz frequency band for 3G mobile services.
- 3.26 SingTel Mobile submits that there is no compelling reason to use the 900 MHz and 1800 MHz frequency bands for 3G mobile services, when there are spectrum lots still available in the 2100 MHz band.
- 3.27 In 2001, the IDA auctioned 4 lots of 3G spectrum on the 2100 MHz frequency band. 3 lots were acquired at \$100 million each. As such, there is a remaining lot of 3G spectrum in the 2100 MHz band available for further 3G deployments, if required.
- 3.28 In summary, whilst there may be other potential uses for the 900 MHz and 1800 MHz frequency bands, SingTel Mobile submits that it is not necessary to allocate these frequency bands to such alternative or potential uses in the near future. The 900 MHz and 1800 MHz frequency bands should continue to be allocated to the existing mobile operators for the efficient provision of 2G GSM services in Singapore.



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### PART III AVAILABLE SPECTRUM

#### (i) 5 MHz lots

- 3.29 As indicated above, the 900 MHz and 1800 MHz frequency bands have been identified for the provision of 2G GSM services. Mobile operators in Singapore have made substantial investments in their 2G network infrastructure and equipment to efficiently operate on 900 MHz and 1800 MHz frequency bands. The 2G Spectrum Rights(s) granted to the existing mobile operators should be extended or renewed.
- 3.30 The efficient use of the 2G spectrum by the existing mobile operators is evidenced by the fact that Singapore now has one of the highest mobile penetration rates in the world, with close to 111% of the population subscribing to a mobile telecommunications service – 3.73 million subscribe to 2G GSM services. Whilst growing, 3G subscriptions only form a quarter of the total mobile subscriptions.
- 3.31 The mobile operators have efficient use of the spectrum based on the existing allotment (i.e. in 200 KHz allotments). Therefore, although the IDA has indicated that spectrum may be allocated in lots of 5 MHz, as this is more suitable for the provision of higher channel bandwidths and 3G services, for the purpose of 2G GSM usage, SingTel Mobile does not believe that it is necessary to allocate the spectrum in lots of 5 MHz.
- 3.32 In short, the 900 MHz and 1800 MHz spectrum should continue to be allocated in 200 KHz to prevent wastage and inefficient allocation.

#### (ii) Spectrum to be made available

- 3.33 SingTel Mobile submits that the existing mobile operators will continue to require the amount of 2G spectrum that they currently have to serve the current base of 3.73 million 2G GSM end-users.
- 3.34 Each mobile operator has made efficient use of the 2G spectrum that has been allocated. Where spectrum is not required, spectrum has been voluntarily returned to the IDA.
- 3.35 SingTel Mobile also believes that there are no disincentives to entering the mobile telecommunications services market. There is a remaining lot of 3G frequency available for further 3G deployment, if required. In addition, there is spectrum available on the Extended GSM (EGSM) frequency band (i.e. the 880 - 890 MHz / 925 – 935 MHz band) to accommodate any requirements for 2G GSM spectrum.

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### (iii) Guard bands

- 3.36 A 'guard band' is narrow part of the radio spectrum between the frequency bands allocated to different mobile operators, for the purpose of preventing interference. It separates two wider frequency ranges to ensure that both can transmit simultaneously without interfering with each other.
- 3.37 A 'guard band' which is smaller in size and yet serves to minimize interference effectively is clearly a more efficient usage of frequency spectrum. The larger the size of a 'guard band', there is concurrently less efficient usage of frequency spectrum.
- 3.38 The current minimum size of the guard bands in the 900 MHz and 1800 MHz is 200 KHz. Where there is co-existence of GSM and 3G services on these frequency bands, the size of the guard bands will inevitably need to be larger.
- 3.39 The Electronics Communications Committee (ECC) Report 082 describes in detail the conditions on which the UMTS900/1800 can be introduced in urban, sub-urban and rural areas in co-existence with 3G UMTS and/or GSM with minimum interference. The exact guard band size can only be computed based on detailed studies of the operating scenarios and is dependent on the capability of the equipment in minimizing the interference between systems.
- 3.40 Nonetheless, allocating the frequency bands to the provision of only 2G GSM services clearly minimizes any wastage involved through allocation of 'guard bands'.
- 3.41 In terms of the proposed arrangement for the provision of guard bands, SingTel Mobile submits that none of the proposals identified in the IDA's Consultation Paper would offer an optimal solution. The purpose of requiring a guard band is to ensure that there is no interference between mobile operators' networks.
- 3.42 Hence, SingTel Mobile believes that it is more appropriate that the IDA pre-provision the guard bands based on a specific principle. The principle could be as identified in paragraph 18 of the Consultation Paper or any other principle, as long as it ensures efficient usage and provisioning.

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### PART IV PROPOSED ALLOCATION FRAMEWORK

#### (i) Greenfield allocation

- 3.43 The IDA has proposed a ‘Greenfield allocation’ of spectrum at the expiry of current 2G Spectrum Rights. Under the IDA’s proposal, mobile operators will not receive a preference or residual right in relation to the reallocation of 2G spectrum.
- 3.44 The IDA has justified its position on several grounds, including the opportunity for interested buyers to procure a scarce resource, avoiding the perpetuation of legacy imbalances, ensuring the most efficient use of spectrum. The IDA has also stated that the expiry of spectrum rights without any residual right to spectrum is a normal business risk.
- 3.45 SingTel Mobile strongly disagrees with the IDA’s suggested approach and its rationale for such an approach.
- 3.46 With mobile penetration in Singapore at 111%, SingTel Mobile submits that the opportunity for interested buyers to procure spectrum in the 900 MHz and 1800 MHz frequency bands is a mere theoretical possibility. Further entry in the Singaporean mobile market is unlikely given the current levels of mobile penetration and intense levels of competition in this market.
- 3.47 In any case, there is ample spectrum to accommodate another licensee in the unlikely event of new entry. There is approximately 20 MHz of spectrum in the 1800 MHz frequency band that may be allocated to a new entrant (4 lots of 5 MHz each). The IDA is also able to make available the spectrum on the EGSM frequency band (i.e. the 880 - 890 MHz / 925 – 935 MHz band) to accommodate any requirements for 2G GSM spectrum. There is also 3G spectrum available on the 2100 MHz frequency band.
- 3.48 Given the very low likelihood of new entry and the availability of spectrum to accommodate any new entrant, SingTel Mobile considers that the opportunity for interested buyers to procure spectrum in the 900 MHz and 1800 MHz frequency bands is a mere theoretical possibility and should not be used as a basis for justifying a ‘Greenfield allocation’ of spectrum.

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### *So called 'legacy imbalances'*

- 3.49 SingTel Mobile does not consider the 'legacy imbalances' identified by the IDA to be problematic or justifying a 'Greenfield allocation'. There are approximately 5 lots of 5 MHz on the 900 MHz band and 3 times more frequency on the 1800 MHz frequency band. Given that there are approximately 3.73 million 2G GSM subscribers in Singapore today, it is neither logical nor feasible to expect that all 3 mobile operators can acquire spectrum in the 900 MHz frequency band.
- 3.50 The fact that a mobile operator has only acquired spectrum on one band (900 MHz or 1800 MHz band) does not reduce the competitive advantage for that operator. Notably, StarHub Mobile acquired only 1800 MHz spectrum upon its entry into the mobile market in 2000 and has successfully achieved approximate 33% of the market by March 2007. Similarly, a mobile operator can have spectrum on both bands and can still deploy its 2G GSM network efficiently, as is the case with SingTel Mobile and M1.
- 3.51 SingTel Mobile also notes that mobile operators have acquired the spectrum based on a market based approach. In 2001, the IDA established an auction framework for the acquisition of all mobile frequency spectrum (including 2G). Mobile operators were required to obtain their additional spectrum under the auction framework and acquire a Spectrum Right. Any existing spectrum that mobile operators had been allocated was then converted into a Spectrum Right with a duration of 7 years (with a provision for extension or renewal) and annual charges were aligned to be the same as the IDA's determined prices as outlined in the Information Memorandum for the auction of 2G mobile communication Spectrum Rights. In doing so, the IDA indicated that the change to the allocation and pricing of the 2G frequency spectrum already allocated to mobile operators was a move towards a 'market based pricing approach'. As such, the mobile operators are paying a market rate for the use of the spectrum that they had acquired.
- 3.52 Finally, SingTel Mobile submits that the allocated 2G spectrum is being used efficiently and that a 'Greenfield allocation' will not result in any efficiency improvements.
- 3.53 Hence, SingTel Mobile submits that there is no reason to adopt the 'Greenfield allocation' of spectrum in the 900 MHz and 1800 MHz frequency bands.

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### *Renewal or Extension of Existing Spectrum Right(s)*

- 3.54 SingTel Mobile submits that the reallocation of spectrum should take into account the following:
- (a) ensuring that there is a climate of certainty for mobile operators to continue investing in their 2G network infrastructure and services
  - (b) ensuring that mobile operators have sufficient spectrum to serve the existing 2G GSM end-users
  - (c) minimizing disruption to the 3.73 million existing 2G GSM subscribers
  - (d) preventing frequency interference and inconvenience to customer.
- 3.55 Existing mobile operators who have acquired frequency spectrum in the 900 MHz and 1800 MHz frequency bands have made use of the spectrum efficiently to serve customers. In doing so, a considerable amount of investment has been made to deliver a wide variety of high quality services to the customers.
- 3.56 Existing mobile operators have invested in regular system upgrades, site acquisition and other operating costs. These investments were made on the basis that the regulatory environment would permit the existing mobile operators to achieve a reasonable rate of return on their network infrastructure, including through certainty in relation to frequency planning.
- 3.57 SingTel Mobile, M1 and StarHub Mobile have all invested in in-building coverage, radio coverage for the carriage of mobile traffic in underground MRT tunnels and road tunnels. Their network infrastructure is designed based on the existing frequency plan.
- 3.58 Whilst the IDA has indicated that upon expiry of the current Spectrum Right(s), it would reallocate spectrum based on a 'Greenfield allocation' and mobile operators would need to factor this as a 'business risk', it remains a fact that the regulatory environment must provide for a climate of business certainty in order to incentivise existing mobile operators to continue investing in their 2G networks.
- 3.59 SingTel Mobile notes that the Spectrum Rights granted in 2001 and 2002 expire in September 2008 (i.e. the durations were for a maximum of 8 years). It is not reasonable to expect that business expectations and investments are realized in 8 years.

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- 3.60 A change in the method of frequency allocation will invariably change the frequency plan and will result in service disruption, lead to a replacement of all associated equipment and increase the costs to be borne by the mobile operators (which will need to be passed through to end-users). These costs are described further below.

### ***Service Disruption***

- 3.61 A ‘Greenfield allocation’ method will inadvertently result in service disruptions.
- 3.62 First, a new frequency plan would need to be implemented. Currently, the frequency plan has been formalized with the mobile operators operating in their allocated frequency bands. If a ‘Greenfield allocation’ is adopted, it is possible that an existing mobile operator will acquire bands that differ from the existing allocation. Each mobile operator would be required to implement this new frequency plan in its network. This will inevitably cause service disruption to the users.
- 3.63 Changing a frequency plan in a highly urbanised environment like Singapore is a significant task, given the density of the buildings in both the CBD and in the HDB estates, involving changes to cover street level coverage and in-building coverage. It is our experience that end-users will be extremely resistant towards a degradation in service levels associated with such a change.
- 3.64 Second, any changes in the frequency plan will mean that coordination is required with the existing “owners” of the frequency bands to be able to achieve a rollover. This includes time for frequency re-plan, cutover, optimisation, drive tests. Concurrently, mobile operators need to work on the basis that the network adjustments and the degradation expected are not overly severe during the overlapping period. This cannot be achieved within a short span of time. In short, disruptions to existing mobile services would occur. End users will experience dropped calls, no dial tone, congestion (e.g. when one part of the network works on the new plan and another exists on the old plan) or a lack of coverage etc.
- 3.65 Third, a change is likely to invite frequency interference with overseas operators. Mobile operators will need to work with the foreign operators on the new frequency band, which we elaborate further in the following sections.

### ***Impact on infrastructure / equipment***

- 3.66 The change in frequency plan will mean that any existing mobile network infrastructure that has been designed based on the current frequency plan will need to be changed out (i.e. replaced by equipment that is designed to operate on the new

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frequency plan). The equipment that has to be replaced includes antenna systems, filters, repeaters etc. Again, there is likely risk of service disruption.

- 3.67 For example, the network combiner infrastructure in the existing MRT, road tunnels and in-building projects has been designed based on the 3 mobile operators' existing frequency. Where a new frequency plan is implemented, all this equipment will need to be replaced, resulting in service disruptions and potential delay of the projects.
- 3.68 SingTel Mobile would also highlight that the cost of replacement equipment will be significant and would have to be passed through to consumers.
- 3.69 Again, we note with concern that 3G equipment at 900 MHz (for example) is not yet widely available. Allocating the 900 MHz and 1800 MHz frequency bands for the deployment of 3G in the short term will result in inefficiencies under such circumstances.

### ***Roaming***

- 3.70 Roaming services will also be affected should the frequency plan be changed. Currently, mobile operators who establish roaming arrangements with overseas mobile networks are required to exchange information in relation to the frequency bands that they operate on.
- 3.71 Any reallocation method that results in a change of the frequency bands for the existing mobile operators will require all the mobile networks who have established roaming arrangements with the existing mobile operators to update their network information. Where there is a 'tiding over' period for cutover, this will generate even more confusion.
- 3.72 SingTel Mobile notes that according to statistics available from the Singapore Tourist Board, in the year 2006 alone, there were approximately 9.7 million foreign visitors to Singapore, most of whom visited from a country which has deployed GSM network. Users of these countries who roam in Singapore will not be able to fully enjoy GSM services. Clearly, this will have material and significant impact on Singapore's reputation as an international hub for business purposes.
- 3.73 In particular, the largest volume of tourists is from the South East Asian region, largely from Malaysia and Indonesia. Considerable time and effort has been spent in managing frequency channels with cross-border networks. A change to the frequency plan will place existing cross-border frequency coordination in jeopardy and is likely to result in interference issues.

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### *Time frame*

- 3.74 Whilst the IDA has requested for information pertaining to the timeframe and additional temporary spectrum required for cut-over, SingTel Mobile notes that it is not possible to estimate the timeframe and temporary spectrum needed without knowing the full scale of the changes.
- 3.75 For example, mobile operators would need to know the following before they could even plan and anticipate the time required:
- (a) the amount of spectrum that they would be allocated;
  - (b) the number of sites affected which will determine the equipment/infrastructure to be replaced;
  - (c) the extent of coordination required with both local and foreign operators during implementation stage;
  - (d) in relation to the radio coverage in the underground MRT tunnels and road tunnels, testing will have to be carried out and this is subject to coordination with the infrastructure providers in the tunnels, with other mobile operators as well with the necessary government agencies for the purpose of installation, testing, drive tests etc; and
  - (e) in relation to in-building coverage, testing will have to be carried out and this is subject to coordination with the building owner.

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### *First Right of Refusal to be Granted & Extension of Spectrum Rights*

- 3.79 It is notable that impact on the industry and end-users was a key determinant of the decision made in Hong Kong. In 2003, the Hong Kong regulator – the Office of the Telecommunications Authority (**OFTA**) - consulted on the licensing of mobile services upon expiry of the then existing licenses for 2G services in Hong Kong. In November 2004, OFTA decided that the existing 9 GSM and PCS licensees should all have first right of refusal towards obtaining a new mobile licence that obtaining the necessary frequency in the frequency bands allocated for their usage. In making its decision, the OFTA indicated that it:



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*“took into account the importance of providing a stable investment environment and ensuring continuity of customer service. It was also recognized that the nine incumbent GSM and PCS licensees had been providing satisfactory service to their subscribers with continuous investments and improvements”*

- 3.80 For the same reasons, SingTel Mobile submits that the existing mobile operators should have their 2G Spectrum Rights extended or renewed, or alternatively, be granted the ‘first right of refusal’ to retain the 2G frequency spectrum that they already have in the 900 MHz and 1800 MHz frequency bands without the requirement for them to undergo an auction in order to obtain the spectrum.
- 3.81 It is imperative that the spectrum allocation framework provides for certainty in business investment such that the mobile operators can continue to invest in and deliver high quality services to their consumers. SingTel Mobile believes that the IDA should extend or renew the existing Spectrum Rights or grant a ‘first right of refusal’ to the existing mobile operators and allow for their existing Spectrum Rights to be extended for a specific duration, with no change to the frequency allocation. SingTel Mobile believes that this is a proposal that will go towards preventing the significant costs and disruptions described above.
- 3.82 Furthermore, SingTel Mobile would stress that the existing Spectrum Rights have been granted, and the existing frequency has been allocated and obtained using a market-based approach. It is therefore neither fair nor reasonable for the IDA to institute a new allocation method that changes the method of frequency allocation and changes the framework.
- 3.83 Finally, if the IDA wishes to ensure that spectrum is used efficiently (which it is, in any case), it could permit FBOs that have committed to rollout obligations and/or FBOs that have already rolled out their networks to trade the spectrum they may have with each other. However, spectrum trading should be limited to these FBOs to prevent parties from engaging in spectrum trading for speculative reasons.

(ii) Allocation by specific frequency bands

- 3.84 As indicated above, SingTel Mobile supports a proposal where the existing 2G Spectrum Right(s) are extended or renewed or existing mobile operators have the ‘first right of refusal’ in retaining the frequency spectrum that they already have in the 900 MHz and 1800 MHz frequency bands and their existing Spectrum Rights are simply extended for a specific duration.

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- 3.85 As SingTel Mobile has pointed out, any change in the frequency plan will entail service disruptions, possible interference, replacement of equipment as well as significant increase in costs.
- 3.86 Hence, SingTel Mobile does not support a proposal where the mobile operators indicate their preference in the form of anonymous spectrum lots. Neither does SingTel Mobile support allocation in lots of 5 MHz, for the reasons identified in the preceding sections.
- 3.87 SingTel Mobile believes that indicating anonymous lots of 5 MHz brings no benefits, to the contrary, it creates uncertainty for mobile operators. As the IDA has said, this may lead to a situation where more than one operator may indicate a preference for one lot – this arises where mobile operators are unable to indicate their preference for the existing lots in 200 KHz.
- 3.88 Nonetheless, SingTel Mobile believes that these can be avoided should the IDA extend the existing Spectrum Rights of the mobile operators upon their expiry in 2008. In short, the existing mobile operators should be able to indicate their preference for their existing spectrum lots and obtain these through an extension of their existing Spectrum Rights. Alternatively, existing mobile operators should be provided the ‘first right of refusal’ in respect of existing 2G spectrum and 2G spectrum lots, along the lines of that made available by OFTA in Hong Kong to GSM and PMS operators.

### (iii) Duration of spectrum right

- 3.89 SingTel Mobile believes that the duration of any Spectrum Rights for the use of the 900 MHz and 1800 MHz frequency bands should be no less than the duration of the existing Spectrum Rights and should, in fact, be for the term of the FBO licence held by the mobile operators (i.e. until 2017).
- 3.90 As indicated previously, it is not reasonable to expect that a business realize its expected rate of return in a period of 8 years. In the case of 3G spectrum, the IDA had provided for a Spectrum Right of 20 years commencing 2001.
- 3.91 Hence, SingTel Mobile believes that the IDA should grant Spectrum Rights for at least the term of the FBO licence held by the mobile operators. This provides for continuity in delivery of 2G GSM services to the existing 3.73 million customers and incentivises the existing mobile operators to maintain investment in their 2G GSM networks.

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### (iv) Need for FBO licence

- 3.92 SingTel Mobile supports a proposal where the any party that obtains frequency spectrum would be required to first obtain a Facilities-based Operator (**FBO**) licence to offer public cellular mobile telephone service (**PCMTS**).
- 3.93 In relation to deployment of 3G technologies in the 900 MHz and 1800 MHz frequency bands, SingTel Mobile has offered our views in the preceding sections.
- 3.94 Frequency spectrum is a natural resource that is used to provide radio-communication services. It is therefore reasonable that parties who acquire frequency spectrum should be fully prepared and responsible for making use of the resource to provide a telecommunication service for the public good.
- 3.95 To ensure that parties who acquire frequency spectrum are fully committed towards discharging their obligations in the FBO licence, we propose that:
- (a) any party who wishes to acquire frequency spectrum must concurrently either already have an FBO licence or concurrently apply for an FBO licence to offer PCMTS;
  - (b) the same party must provide a commitment to rollout its PCMTS by a certain date; and
  - (c) where the same party is unable to meet the rollout commitment, it must then return the frequency obtained.
- 3.96 SingTel Mobile believes that these measures will ensure that parties who enter the market to provide 2G GSM services will be fully committed towards meeting the public good and refrain from acquiring spectrum unnecessarily or engage in spectrum trading that increases the costs to the industry.

## **PART V PROPOSED PRICING**

### (i) Fees for allocation and use of new spectrum rights

- 3.97 SingTel Mobile supports the IDA proposal in relation to:
- (a) spectrum management fee for the new Spectrum Rights;
  - (b) annual recurrent spectrum management fee(s) at S\$140,000; and
  - (c) annual licence fee of 1% of annual gross turnover (AGTO) arising from the provision of 2G GSM services

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on the basis that these would be a continuation of the charges being borne by the existing mobile operators.

- 3.98 However, SingTel Mobile would caution against a framework that leads to a situation where more than one operator may indicate a preference for one lot (of 5 MHz) (i.e. an auction). Again, for the reasons we have pointed out in the preceding sections this it presents uncertainty to the existing mobile operators and will invariably lead to an increase in cost to be borne by the industry. A solution would be to allow for the existing Spectrum Rights, with the existing spectrum lots, to be extended upon their expiry in 2008. Alternatively, existing mobile operators should be provided the 'first right of refusal' in respect of existing 2G spectrum and 2G spectrum lots, along the lines of that made available by OFTA in Hong Kong to GSM and PMS operators.
- 3.99 However, and notwithstanding our views, should there be an instance of deployment of 3G technologies and services in the 900 MHz and 1800 MHz frequency bands, SingTel Mobile believes that there are mechanisms and means in place currently that serves to distinguish the revenues arising from the provision of 2G GSM services compared to those arising from the provision of 3G services, such that revenues arising from the provision of 3G services (regardless of the frequency bands used) would not be subject to the 1% of AGTO as an annual licence fee.
- 3.100 To this extent, the underlying frequency band that is used to deliver the 3G service is irrelevant. It is therefore not necessary to adopt an approach of apportionment using network usage etc. On the contrary, using a ratio of traffic carried on one frequency band as compared to another is, as the IDA indicated, only a proxy and serves no other purpose than to introduce a level of complexity in the processes involved for recognizing revenues.
- 3.101 The existing mobile operators should therefore be allowed the implement the same or similar mechanisms they have put in place today to ensure that differentiate the revenues for the purpose of licence fees. For example, a customer who has subscribed to a 3G price plan would be considered a 3G customer, regardless whether he has made use of the 3G service on one frequency band as compared to another frequency band. This ensures clarity in determining the services delivered to the customer and clarity in recognizing the revenues earned.

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### PART VI CONSULTATION ON 800 MHZ BAND

3.102 SingTel Mobile does not see much potential use arising from the 800 MHz frequency band. There are limited deployments of 3G GSM services on this frequency band throughout the world (e.g. Australia and North America).

#### 4 CONCLUSION

4.1 In summary, SingTel Mobile considers that no compelling case exists for the proposed reallocation of spectrum on the 900 MHz and 1800 MHz frequency bands. There is a continuing need for existing mobile operators to use the 900 MHz and 1800 MHz frequency bands to provide 2G mobile services in Singapore.

4.2 Existing mobile operators are efficiently utilizing the allocated 2G spectrum to serve the current base of 3.73 million 2G GSM end-users. Mobile operators have also made substantial investments in 2G network infrastructure, as well as enhancements to this infrastructure over the years (such as GPRS).

4.3 The benefits associated with the deployment of 3G services in the 900 MHz and 1800 MHz band are limited (if any) in a city-state such as Singapore. In any event, Singapore has already realized the benefits associated with 3G technology with the deployment of 3 nationwide 3G networks. This differs to other countries that are using 3G deployments in the 900 MHz band to achieve nationwide coverage or to cover rural and regional areas.

4.4 Similarly, there are no compelling reasons for the allocation of the 900 MHz and 1800 MHz frequency bands for wireless broadband services or low power GSM in the short or medium term. The IDA has already allocated the 2.3 GHz and 2.5 GHz frequency bands for wireless broadband services and this allocation is likely to prove sufficient going forward and there is limited demand for fixed-to-mobile convergence products that use low power GSM technology.

4.5 Any change to the allocation of 2G spectrum is likely to have significant adverse impact on services, result in the incurrence by existing mobile operators of substantial costs in replacement of equipment and infrastructure, require testing and also affect roaming services. These costs will be passed through to Singaporean end-users.

4.6 The existing 2G Spectrum Rights should be extended or renewed. Alternatively, existing mobile operators should be provided the 'first right of refusal' in respect of existing 2G spectrum and 2G spectrum lots, along the lines of that made available by OFTA in Hong Kong to GSM and PMS operators.