

SINGAPORE TELECOM MOBILE PTE LTD

**RESPONSE TO IDA CONSULTATION PAPER –
SPECTRUM FRAMEWORK FOR FOURTH GENERATION (4G) MOBILE
COMMUNICATION SYSTEMS IN SINGAPORE**

1. INTRODUCTION

- 1.1. Singapore Telecom Mobile Pte Ltd (**SingTel Mobile**) refers to the Info-communications Development Authority of Singapore (**IDA**) consultation paper dated 29 March 2010 on the spectrum framework for fourth generation (4G) mobile communication systems (**Consultation Paper**).
- 1.2. SingTel Mobile is licensed to provide Public Cellular Mobile Telecommunications Services (**PCMTS**) in Singapore and has acquired 2G Spectrum Right(s) to provide 2G mobile services and 3G Spectrum Right(s) to provide 3G mobile services. SingTel Mobile also acquired Wireless Broadband Access (**WBA**) Spectrum Right(s) and is licensed to provide wireless broadband services.
- 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 General Packet Radio Service (**GPRS**) and High-Speed Packet Access (**HSPA**) technology and wireless services on our WiFi platform, SingTel Mobile has a strong interest in the proposed allocation of 4G spectrum in the 1900/2100 MHz frequency band.
- 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 – General Comments
Section 4 – Specific Comments
- 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. SingTel Mobile supports the IDA's initiative to consult industry on the allocation framework for 4G spectrum in order to support the growing demand for higher speed mobile broadband services. SingTel Mobile submits that the existing spectrum resource allocated for the wireless and mobile networks is unlikely to be able to support market demand over the next five (5) years without additional spectrum in view of the accelerated growth of mobile broadband data usage.
- 2.2. SingTel Mobile notes that the IDA is only considering making spectrum for 4G services available only after 2015, i.e. after the expiry of the existing WBA Spectrum Rights in 2015. SingTel Mobile submits that there are good reasons for the IDA to make available the additional unallocated 2.5 GHz spectrum prior to 2015.
- 2.3. SingTel Mobile submits that it is unlikely that the 900 MHz, 1800 MHz and 2.1 GHz spectrum can be re-farmed for 4G services in the foreseeable future as this spectrum will still be required to support legacy handsets and inbound roamers.
- 2.4. SingTel Mobile recommends that the IDA:
- (i) make available the 700 MHz - 800 MHz band for 4G services;
 - (ii) make available the 2.3 GHz and 2.5 GHz paired bands allocated under the existing WBA Spectrum Rights for 4G services upon expiry of the WBA Spectrum Rights; and
 - (iii) make available the additional unallocated frequency spectrum prior to 2015.
- 2.5. In view of the increasing urgency for more spectrum to be made available, SingTel Mobile submits that the IDA should use its best endeavours to conclude the regional harmonisation of the 2.5/2.6 GHz frequency as soon as possible so that more spectrum can be made available prior to 2015.
- 2.6. SingTel Mobile submits that existing WBA Spectrum Rights holders of 2.3 GHz and 2.5 GHz (which includes the three (3) Public Cellular Mobile Telephone Services (PCMTS) licensees) be granted first right of refusal in respect to their existing allocation that falls within each contiguous 10 MHz block. This facilitates rollout of 4G technologies even before 2015.

- 2.7. Existing WBA Spectrum Rights holders should be granted a first right of refusal in relation to 2.3 GHz and 2.5 GHz to extend their existing frequency spectrum allocations by up to 20 MHz in a contiguous band.
- 2.8. SingTel Mobile agrees with the IDA's proposed spectrum channelling plan option A of Annex A of the Consultation Paper.
- 2.9. SingTel Mobile agrees that the proposed arrangements provide sufficient flexibility for operators to adopt the appropriate technology that best serves their business objectives.
- 2.10. SingTel Mobile agrees that a guard band of 5 MHz is sufficient.
- 2.11. SingTel Mobile recommends that the IDA use the TDD band at the edges between the TDD and FDD bands as guard bands instead of the FDD band as SingTel Mobile expects greater demand for the FDD band.
- 2.12. The IDA should not specify the guard block requirement. SingTel Mobile submits that this should be left to the mobile operators to coordinate amongst themselves.
- 2.13. SingTel Mobile recommends that the IDA allocate blocks of at least 10 MHz spectrum lot size as anything smaller would not be spectrally efficient for Orthogonal Frequency-Division Multiple Access (**OFDMA**)-based 4G technologies such as LTE and WiMAX.
- 2.14. SingTel Mobile submits that in order for the full potential of 4G technologies to be realised, at least 10 MHz to 20 MHz of contiguous spectrum should be made available for allocation to each operator.
- 2.15. SingTel Mobile does not support the IDA proposal for an interleaved band plan as it presents the potential issue of operators being allocated different amounts of spectrum and the possibility of allocating a disproportionate amount of TDD spectrum.
- 2.16. SingTel Mobile recommends that the IDA adopt Option A of Annex A of the Consultation Paper to give all operators an equal chance of obtaining a full 20 MHz lot size of FDD spectrum.
- 2.17. SingTel Mobile agrees with the IDA proposal to retain the existing channelling plan at the 2.3 GHz band, and submits that the IDA should allocate the spectrum in blocks of 10 MHz lot size.

- 2.18. SingTel Mobile submits that the IDA should distinguish between existing PCMTS licensees, WBA Spectrum Rights holders and greenfield operators when imposing rollout and service provisioning obligations. Only greenfield operators and WBA Spectrum Rights holders (which are not existing PCMTS licensees) should be subject to service provisioning and coverage obligations to ensure that they offer a similar quality of service that the existing PCMTS licensees, are already offering on the existing mobile networks. It is not necessary to impose additional obligations on the existing PCMTS licensees.

3. GENERAL COMMENTS

SingTel Mobile supports the IDA decision to make available 4G spectrum

- 3.1. SingTel Mobile supports the IDA's initiative to consult on the allocation framework for 4G spectrum in order to support the growing demand for mobile broadband. As the IDA notes in the Consultation Paper, the 4G mobile communication system is gaining momentum worldwide and developments have already begun in some countries therefore it is timely to begin reviewing the spectrum framework for Singapore.
- 3.2. The availability of 4G spectrum will reduce business uncertainty and facilitate operators in making plans for optimal investment(s) into the new 4G technology. Further, existing MTOs will also have greater confidence to invest in and evolve the existing 3G/HSPA systems to inter-work with the new 4G technology.
- 3.3. However, SingTel Mobile is concerned with various issues raised by the IDA in its Consultation Paper and provides its response to those issues in the following sections.

4G spectrum only available after 2015

- 3.4. The IDA has indicated that 4G spectrum will only be made available after 2015, i.e. after the expiry of the existing Wireless Broadband Spectrum Rights in 2015, which implies that there will be a 5-year gap in which mobile operators will not be allocated any additional frequency to sustain the rapid growth of mobile broadband traffic.
- 3.5. We further note that the IDA is in the process of coordinating with the neighbouring countries to gain a larger amount of 2.5 GHz which would be made available after 2015 for the purposes of 4G services.
- 3.6. SingTel Mobile urges the IDA to reconsider its position. In fact, SingTel Mobile submits that there are good reasons for the IDA to allocate the additional amount of

2.5 GHz spectrum before 2015. With the growing popularity of smartphones and the accelerated rate of growth of mobile broadband consumption, we stress that the existing spectrum resource may not be able to support market demand.

Refarming of 900/1800 MHz and 3G spectrum

- 3.7. SingTel Mobile does not think that refarming 900 MHz, 1800 MHz and 2.1 GHz frequency spectrum for 4G deployment will be an efficient way forward in the foreseeable future.
- 3.8. The world's mobile cellular subscriptions are still largely dominated by GSM and 3G customers. Refarming of the 900 MHz, 1800 MHz and 2.1 GHz spectrum for 4G will mean that the spectrum cannot be effectively used to support GSM and 3G networks which will remain largely prevalent. Mobile operators must be able to support these networks, as well as the associated handsets for their consumers as well as roamers.
- 3.9. SingTel Mobile notes that the current Public Cellular Mobile Telephone Services Spectrum Rights (for 900 /1800 MHz frequency spectrum) and the 3G Spectrum will not expire till 2017 and 2021 respectively. These frequency spectrum should therefore be left for the deployment of GSM and 3G services and networks. The IDA should consider allocating frequency spectrum in other frequency bands, e.g. either the 700 MHz or the 2.3/2.5 GHz frequency bands.

700 MHz frequency band

- 3.10. SingTel Mobile recommends that the IDA consider making available the 700-800 MHz band for 4G technologies. As mentioned in paragraph 4 of the Consultation Paper, spectrum in this band has already been allocated in the US for wireless broadband use since January 2008 so both network equipment and terminal devices are already available for commercial use today.
- 3.11. It is widely known that the deployment of 4G services in the 700 MHz frequency band using the LTE technology has strong industry support due to the relative ease of upgrading from current 3G networks over to LTE mobile broadband, compared to the significant infrastructure build-out that WiMAX requires. Fewer cell sites have to be built and penetration into buildings is better at the 700 MHz spectrum LTE uses. LTE is considered by many to be the natural successor to current-generation 3G technologies, in part because it updates UMTS networks to provide significantly faster data rates for both uploading and downloading

- 3.12. Hence, the IDA should not discount or ignore the possibilities of making use of the 700 MHz spectrum to offer 4G services.

2.3 GHz and 2.5 GHz frequency bands for the deployment of 4G services and networks

- 3.13. SingTel Mobile notes that an alternative to using 700 MHz is to use the 2.3 GHz / 2.5 GHz frequency spectrum for the deployment of 4G services, i.e. the current wireless broadband access frequency bands in Singapore.
- 3.14. Therefore, notwithstanding our recommendation to the IDA regarding the use of the 700 MHz, SingTel Mobile also supports the IDA's proposal to make available the 2.3 GHz and 2.5 GHz paired bands for future 4G services. SingTel Mobile submits that the IDA make available the 2.3 GHz and 2.5 GHz paired bands allocated under the existing WBA Spectrum Rights for 4G services upon expiry of the WBA Spectrum Rights.
- 3.15. We are also concerned that the IDA is only considering making available spectrum for 4G services only after 2015, i.e. the IDA intends to allocate additional frequency spectrum after 2015.
- 3.16. SingTel Mobile urges the IDA to reconsider this position. In fact, SingTel Mobile submits that there are good reasons for the IDA to allocate the additional amount of 2.5 GHz spectrum before 2015. With the growing popularity of smartphones and the accelerated rate of growth of mobile broadband consumption, we stress that the existing spectrum resource may not be able to support market demand. Hence, it may be imperative for the IDA to allocate additional 2.5 GHz spectrum in the near future, instead of waiting till 2015 so that mobile operators can support consumer demand for more bandwidth.
- 3.17. SingTel Mobile submits that the IDA should expedite its coordination efforts with the neighbouring countries in order to release more 2.5 GHz spectrum to Singapore and that the additional 2.5 GHz spectrum gained should be allocated to the mobile operators as soon as possible.

Grant of spectrum to existing WBA Spectrum Rights holders

- 3.18. Existing WBA Spectrum Rights holders of 2.3 and 2.5 GHz (which include the 3 PCMTS licensees) clearly have interests in continuing with the rollout of services and deployment of the next generation of services, i.e. 4G, using the available spectrum.
- 3.19. SingTel Mobile therefore submits that IDA should allow first right of refusal for existing WBA Spectrum Rights holders of 2.3 and 2.5 GHz to retain their existing allocation that falls within each contiguous 10 MHz block. This will facilitate existing WBA Spectrum Rights holders to roll out 4G technologies like LTE even before the current spectrum rights expire in 2015. The WBA Spectrum Rights holders should also be allowed to trade their spectrum, subject to IDA's approval, so as to use the spectrum efficiently.
- 3.20. SingTel Mobile also submits that IDA should allow first right of refusal for existing WBA spectrum rights holders of 2.3 and 2.5 GHz to extend their existing spectrum by up to 20 MHz in a contiguous band. Non-contiguity will result in inefficient spectrum usage which is contrary to the IDA-stated objectives to maximize usage of limited frequency resource. Such first right of refusal provisions will enable existing WBA spectrum rights holders to invest in their existing network with greater business confidence even before their current spectrum rights expire in 2015.

4. SPECIFIC COMMENTS

Question 1

IDA invites view and comments on the projected spectrum requirements to meet end users' demand for mobile broadband beyond 2015. To what extent can the existing wireless and mobile networks support the anticipated increase in mobile traffic?

IDA also invites view and comments on the likely technologies for the deployment of 4G communications system that will meet end users' mobile communication needs beyond 2015.

- 4.1. The IDA has thus far not given any indication as to whether any additional spectrum will be made available after the last lot of 3G frequency has been allocated¹. SingTel Mobile submits that the existing spectrum resource allocated for the wireless and mobile networks is unlikely to be able to support market demand over the next five (5) years without additional spectrum in view of the accelerated growth of mobile broadband data usage.
- 4.2. The mobile market is deluged with a large array of data-hungry mobile devices and with the majority of consumers opting for these devices², the demand for broadband data is highly likely to accelerate at a faster rate than the already explosive growth seen in the market today. Therefore the timeline proposed by IDA to offer 4G spectrum after 2015 runs the risk of creating a potential supply gap.
- 4.3. In view of the increasing urgency for more spectrum to be made available, SingTel Mobile submits that the IDA should use its best endeavours to conclude the regional harmonisation of the 2.5/2.6 GHz frequency as soon as possible so that more spectrum can be made available prior to 2015.
- 4.4. Allocating the additional spectrum early will also reduce business uncertainty and facilitate operators in making concrete plans for optimal investment(s) into the new 4G technology. The existing operators will also have the confidence to invest in evolving the existing 3G/HSPA systems to inter-work with the new 4G technology.
- 4.5. As indicated in the preceding sections, the likely technologies for the deployment of the 4G mobile system are Long Term Evolution (**LTE**) and Worldwide Interoperability for Microwave Access (**WiMAX**). These technologies are not only

¹ IDA consultation paper dated 29 March 2010 on the Allocation of 3G Spectrum in the 1900/2100MHz Frequency Band

² "Up to 80% of handsets sold are smartphones", Straits Times, 14 April 2010

available today but have already been deployed commercially. This further supports SingTel Mobile's position that new frequency should be made available prior to 2015 to encourage and facilitate existing operators to introduce more innovative mobile offerings and higher data speeds into the market as soon as possible.

Question 2

IDA invites views and comments on the possible radio-frequency spectrum bands, besides the 700/800 MHz, 2.3 and 2.5 GHz bands, that would be suitable for 4G mobile communication systems and the likely timeframe for deployment. To what extent are the 900 MHz, 1800 MHz and 2.1 GHz alternative bands for 4G deployment? Are there other frequency bands that are currently not allocated but could be potential candidates for 4G system deployment?

- 4.6. SingTel Mobile submits that it is not likely that the 900 MHz, 1800 MHz and 2.1 GHz can be re-farmed for 4G deployment in the foreseeable future as these spectrum will still be required to support legacy handsets and inbound roamers. In addition, these frequencies have been assigned to existing operators on a long term basis and will expire no earlier than 2017.

Question 3

IDA invites views and comments on the demand for the 2.5 GHz band after 2015 in Singapore, and the technologies that are currently being developed for use in the 2.5 GHz band. Are these likely to complement or substitute existing networks? Please also comment on the availability of the network equipment.

- 4.7. SingTel Mobile supports the IDA's proposal to make available the 2.5 GHz paired bands for future 4G services but submits that additional frequency should made available for allocation as soon as possible and not along the proposed timeline of after 2015.
- 4.8. If additional 4G frequency will only be available after 2015, it will create business uncertainty for mobile operators and increase the risk of making technology investments in the existing and/or new network. This will not only deprive consumers of new technology but Singapore will also lag behind many other countries in the deployment of 4G technologies such as LTE.
- 4.9. The Consultation Paper has also noted that 4G services are available commercially (e.g. TeliaSonera in Sweden using the 2.5/2.6 GHz band) and a number of countries have either already allocated frequencies for 4G technologies (e.g. Hong Kong) or have plans to do so within the next two (2) years (e.g. UK). This clearly demonstrates

that 4G network equipment is readily available today and is currently in use therefore there is no reason to delay the allocation of 4G spectrum for five (5) more years.

Question 4

IDA invites views and comments on the paired and unpaired spectrum arrangements in the 2.5 GHz band after 2015.

- 4.10. SingTel Mobile notes that the IDA has proposed to divide the 2.5 GHz spectrum into 2 x 70 MHz of paired spectrum, with 120 MHz duplex spacing and 50 MHz of unpaired spectrum; and that it will remain technology-neutral and will not prescribe any particular standard for the 4G system deployment.
- 4.11. SingTel Mobile agrees with the proposed spectrum arrangements for the paired and unpaired spectrum at 2.5 GHz and the IDA's stand on remaining technology-neutral.
- 4.12. SingTel Mobile further concurs with the IDA's view that the proposed arrangements provide sufficient flexibility for operators to adopt the appropriate technology that best serves their business objectives.

Question 5

IDA invites views and comments on whether the size of 5 MHz guard band at the frequency boundaries between paired and unpaired spectrum is sufficient to safeguard the adjacent band. IDA invites views on our proposal not to specify guard block requirement between licensees using TDD or FDD band.

- 4.13. SingTel Mobile agrees that a guard band of 5 MHz at the frequency boundaries between the paired and unpaired bands is sufficient and proposes that the IDA use the TDD band at the edges between the TDD and FDD bands as guard bands instead of the FDD band. Similar to the experience in overseas markets that the IDA has noted in the Consultation Paper³, we foresee that demand for FDD spectrum may be greater than that for TDD spectrum hence the use of FDD spectrum should be maximised.
- 4.14. SingTel Mobile agrees that the IDA should not specify the guard block requirement; and submits that this should be left to the mobile operators to coordinate amongst themselves on the necessary guard block requirement between licensees given that such a practice has been carried out successfully thus far without the need for IDA intervention.

³ Paragraph 13

Question 6

IDA invites views and comments on whether allocating 5 MHz spectrum lot size is appropriate for the current technologies in the 2.5 GHz band. IDA also invites views on our proposal to allocate spectrum in individual blocks of 5 MHz and let operators who need a larger carrier size to combine multiple blocks together. Alternatively, should the IDA allocate in larger blocks based on multiples of 5 MHz?

- 4.15. SingTel Mobile proposes that the IDA allocate blocks of at least 10 MHz spectrum lot size instead of the proposed allocation of 38 blocks of 5 MHz spectrum lot size.
- 4.16. A spectrum block of less than 10 MHz is not spectrally efficient for Orthogonal Frequency-Division Multiple Access (**OFDMA**)-based 4G technologies such as LTE and WiMAX. Moreover, a 10 MHz spectrum block will create less fragmentation and complexity for those operators keen to combine multiple blocks together to form a larger carrier size.

Question 7

IDA invites views and comments on our proposal for an interleaved band plan with combinations of 15 MHz and 20 MHz paired spectrum blocks as well as 25 MHz of unpaired spectrum blocks available for assignment in contiguous block of 15 MHz, 20 MHz and 25 MHz respectively by IDA and whether this would be appropriate.

IDA also invites views and comments on the practical measures that operators would implement to allow coexistence of MSS and mobile services in the same band in the border areas so that more spectrum blocks can be made available.

- 4.17. SingTel Mobile submits that in order for the full potential of 4G technologies to be realised, at least 10 MHz to 20 MHz of contiguous spectrum should be made available for allocation to each operator.
- 4.18. SingTel Mobile does not support the IDA proposal for an interleaved band plan and recommends that the IDA adopt Option A of Annex A to give all operators an equal chance of obtaining a full 20 MHz lot size of FDD spectrum.
- 4.19. The IDA's proposed alternative for an interleaved band plan may result in the following issues:
- (a) create an unlevel playing field since each operator will be allocated a different amount of spectrum to compete in 4G technologies; and

- (b) allocate a disproportionate amount of TDD spectrum. As indicated in our response and in paragraph 13 of the Consultation Paper, demand for FDD spectrum tends to be greater than that for TDD spectrum therefore allocating the largest block of 25 MHz in the TDD band is incongruent with this observation.

- 4.20. Practical measures adopted by the mobile operators to allow the coexistence of mobile services with neighbouring countries' services is expected have limited effectiveness especially in the coastal and border areas, and in high rise buildings. This is evidenced by the experience with the existing 2G and 3G networks for which coordination efforts have limited results mainly because of the nature of radio propagation. Ultimately, cross-border interference will have an impact on the quality of service experienced by the consumers. This makes it critical for the IDA to expedite frequency harmonization efforts with neighbouring countries prior to allocating the 2.3/2.5 GHz band for 4G deployment.

Question 8

IDA invites views and comments on the likely technologies for the 2.3 GHz band and the availability of network equipments for use in the band. IDA also invites views on our proposal to retain the existing channelling plan for the 2.3 GHz band and to allocate the spectrum 11 blocks of 5 MHz when the band is re-allocated after 2015. Please also comment on whether the current amount of 50 MHz spectrum available in the 2.3 GHz band is sufficient to meet industry demands after 2015.

- 4.21. SingTel Mobile agrees with the IDA proposal to retain the existing channelling plan at the 2.3 GHz band, and submits that the IDA should allocate the spectrum in blocks of 10 MHz lot size.

Question 9

IDA invites views and comments on what is an appropriate time frame for IDA to allocate the 2.3 GHz and 2.5 GHz bands. Should the allocation of the 2.3 GHz band proceed separately from that of the 2.5 GHz band, given greater uncertainty over the timeframe in which the 2.5 GHz band would be available? If so, when would be an appropriate time frame for IDA to allocate the 2.3 GHz band?

- 4.22. SingTel Mobile submits all frequency spectrum (whether in the 2.3 GHz or 2.5 GHz frequency bands) should be made available for allocation at the same time at the expiry of the current WBA Spectrum Rights. The 2.3 GHz frequency band should not be treated independently of the 2.5 GHz frequency band when both are designated for 4G technologies and are used primarily to meet similar industry demands. Allocating

both 2.3 GHz and 2.5 GHz spectrum at the same time will offer greater visibility of the spectrum resource available to the market, facilitate the operators' decision to deploy a TDD 4G network, FDD 4G network or both; and allow operators to make a more informed decision in terms of network investment.

- 4.23. In addition to the 2.3 GHz and 2.5 GHz band, IDA should also make available the 700-800 MHz band for 4G technologies. As mentioned in paragraph 4 of the Consultation Paper, spectrum in this band has already been allocated in the US for wireless broadband use since January 2008 so both network equipment and terminal devices are already available for commercial use today. SingTel Mobile has also provided its views on this under the section on General Comments above.
- 4.24. Additional 4G spectrum regardless of the frequency band should be allocated as soon as possible. Allocating the additional spectrum early will also reduce business uncertainty and facilitate operators in making concrete plans for optimal investment(s) into the new 4G technology. The existing operators will also have the confidence to invest in evolving the existing 3G/HSPA systems to inter-work with the new 4G technology.

Question 10

IDA invites views and comments on what would be a fair and efficient allocation mechanism for the 2.5 GHz band. In the case where there are existing deployments in the band, should IDA grant first rights of refusal for the current right-holders?

- 4.25. The Singapore mobile market is already a highly competitive and mature one today. The need to meet the demand of existing users should be of paramount consideration. IDA should therefore ensure sufficient spectrum resource is made available for incumbent operators to cater for these needs. Consequently, SingTel Mobile agrees that IDA should grant first rights of refusal for current spectrum right holders, and that the holders are allowed to trade their spectrum, subject to IDA's approval, so as to use the spectrum efficiently.
- 4.26. SingTel Mobile submits that existing WBA Spectrum Rights holders of 2.3 GHz and 2.5 GHz (which includes the three (3) Public Cellular Mobile Telephone Services (PCMTS) licensees) be granted first right of refusal in respect to their existing allocation that falls within each contiguous 10 MHz block. This facilitates rollout of 4G technologies even before 2015.
- 4.27. SingTel Mobile also submits that IDA should allow first right of refusal for existing WBA Spectrum Rights holders of 2.3 and 2.5 GHz to extend their existing frequency

spectrum allocations by up to 20 MHz in a contiguous band. Non-contiguity will result in inefficient spectrum usage which is contrary to IDA stated objectives to maximize usage of limited frequency resource. Such first right of refusal provisions will enable existing WBA Spectrum Rights holder to invest in their existing network with greater business confidence even before their current spectrum rights expire in 2015.

Question 11

IDA invites views and comments on the proposal to impose both service provisioning and coverage obligations on the operators awarded the 2.3 GHz and 2.5 GHz spectrum after 2015. In particular, what would be an appropriate service provisioning obligation and the time frame for deployment bearing in mind that the spectrum assignment is likely to take effect only from 1 Jul 2015? Similarly, what would be an appropriate measure for service coverage obligation and the timeframe for deployment?

- 4.28. SingTel Mobile submits that the IDA should distinguish between existing PCMTS licensees, WBA Spectrum Rights holders (which are not existing PCMTS licensees) and greenfield operators and when imposing rollout and service provisioning obligations:
- (a) The three (3) PCMTS licensees i.e. the incumbent MTOs have already rolled out a nationwide GSM and 3G network and deployed services commercially. These MTOs are not likely to rollout a separate 4G network; their 4G deployment will be one that complements and inter-operate with existing networks. Incumbent MTOs will however be incentivised to make full use of the 4G frequency spectrum allocated as they have existing customers and demand for bandwidth that need to be fulfilled. For example, the incumbent MTOs can deploy 4G at hot spots to off-load traffic from high traffic HSPA sites. They can then progressively deploy the new 4G frequency throughout the network in tandem with customers' requirements. We therefore believe that incumbent MTOs should not be subject to same coverage or service provision obligations as those that should be imposed on greenfield operators or operators who are only WBA Spectrum Rights holders.
 - (b) WBA Spectrum Rights holders (i.e. those which are not existing PCMTS licensees but may also obtain additional spectrum for deployment of 4G services) have not rolled out any nationwide networks. It is reasonable therefore that they should be subject to more stringent rollout and coverage provisions, including nationwide rollout obligations as well as service

provision requirements. End-users will therefore be able to enjoy service quality that they currently are able to obtain using the GSM and 3G networks.

- (c) Greenfield operators (i.e. new operators who obtain frequency spectrum through the exercise being contemplated by the IDA currently) who have not deployed any networks or provided any commercial services should also be subject to stringent rollout and coverage provisions, including nationwide rollout obligations as well as service provision requirements for the same reasons as listed above for WBA Spectrum Rights holders-only.