SECOND CONSULTATION ON PROPOSED FRAMEWORK FOR THE ALLOCATION OF SPECTRUM FOR INTERNATIONAL TELECOMMUNICATIONS ("IMT") AND IMT-ADVANCED SERVICES AND FOR THE ENHANCEMENT OF COMPETITION IN THE MOBILE MARKET

Submission by StarHub Mobile Pte Ltd to the Info-communications Development Authority of Singapore

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Introduction

1. StarHub Mobile Pte Ltd ("**StarHub**") thanks the Info-communications Development Authority of Singapore (the "**Authority**") for the opportunity to comment on its proposals for the allocation of spectrum for IMT and IMT-advanced services, and for the enhancement of competition in the mobile market in Singapore.

Auction Rules and Spectrum Caps:

2. StarHub welcomes the release of additional spectrum for the provision of mobile services in Singapore. We believe that the mobile network operators ("**MNOs**") in Singapore are well-placed to maximise the economic value from this scarce resource, and, in doing so, improve the quality of mobile services provided to consumers and companies in Singapore.

3. Given the importance of the upcoming spectrum auction, it is essential that the Authority set out clear and definitive auction rules. It should also provide the industry with an opportunity to comment on these rules before they are finalised. In particular, we note that spectrum caps are a key part of any spectrum auction, as these provide a clear indication on the regulator's long-term plans and intention on spectrum allocation, and allow the MNOs to carefully craft their business plans and bidding strategies for the auction.

4. We would note that Singtel has been vocal in its call for spectrum caps, stating that such caps are needed to create a "*level playing field*", and to ensure that all of the MNOs "*are granted an equal opportunity to acquire the spectrum needed to provide effective competition*".[1]

5. StarHub agrees with Singtel's comments. We would add that spectrum caps are needed to: (1) prevent any monopolisation of spectrum; and (2) allow all MNOs to obtain sufficient spectrum to provide high quality mobile services in the market. The Authority will need to consider spectrum caps in totality, to prevent any MNO from maximising its spectrum holdings in every single auction, and ending-up with a disproportionately large amount of spectrum overall. We would also highlight that the sub-1 GHz bands are extremely valuable resources, and the Authority needs to carefully consider a spectrum cap for the entirety of the sub-1 GHz bands. This ensures that every MNO can obtain a reasonable amount of this resource.

6. If spectrum caps are not set (or are not set at effective levels), this would enable one MNO to achieve dominance in spectrum holdings, and to reduce the competitiveness of the market. Such an outcome would also mean that existing operators would be denied access

[1] Please see Optus' submission in response to ACCC Discussion Paper "Spectrum Competition Limits", April 2015, accessible at: http://www.accc.gov.au/system/files/Optus%20Submission_4.pdf.

to their current spectrum allocations. This would result in a significant disruption of services to customers.

Rules for a New Entrant:

7. StarHub has reviewed the Authority's proposal to facilitate a new MNO entrant into the mobile services market, and we have serious concerns with the proposal. StarHub does not see how the addition of a fourth MNO can generate significant benefits for customers in Singapore.

Further Infrastructure-based Competition Unnecessary

8. Singapore is a small and mature mobile market, with extremely high penetration rates. The Authority has also acknowledged the competitiveness of the mobile services market.

9. The focus of the MNOs in Singapore has been on attracting and retaining customers based on service quality and innovation. The MNOs have made very large investments in their networks and in new technologies, meeting not just the needs of their customers, but also complying with the Authority's stringent quality of service ("**QoS**") and resiliency requirements. With a new infrastructure-based operator, the total network investments needed to operate in Singapore would be uneconomic for the ecosystem. We believe that a new smaller infrastructure-based operator is simply not needed in market.

10. In fact, rather than having a new entrant, the opposite is happening in other mature markets such as the United Kingdom, [2] Germany, [3] Denmark[4] and Mexico[5] where the trend is consolidations between major MNOs. In fact many major markets are converging towards three MNOs. Leaders in the European Union ("**EU**") have called for consolidations to take place, urging regulators to adopt a balanced approach towards competition, in order to improve global performance of the EU MNOs.[6] In Asia, the Indonesian Telecom Minister has stated that he sees the potential for only three or four firms long-term in the Indonesian mobile market, and has been urging consolidation of operators (in a country that has a population of nearly 250 million).[7] With so many countries seeing consolidation in their mobile markets, it is important to ask why Singapore should be heading in the reverse direction.

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[2] The UK has converged from a five / six player market into a likely three player market with: (1) Three and O2 to merge; (2) BT acquiring EE (which was originally a merger of T-Mobile and Orange); and (3) Vodafone UK.

[3] Telefonica acquired E-Plus in October 2014, moving the market from four to three players.

[4] Telenor and Telia have proposed to merge, moving the market from four to three players.

[5] AT&T acquired Iusacell in January 2015, moving the market from four to three players.

[6] http://www.fiercewireless.com/europe/story/merkel-backs-calls-european-telco-consolidation/2014-05-09.

[7] "Minister's mantra: cooperate, compete and or consolidate" Bank of America Report, 20 August 2015.

11. In supporting its push for a new MNO entrant, the Authority has credited its Next Generation Nationwide Broadband Network ("**NGNBN**") with increasing competition in the fixed broadband market. We would respectfully note that the success of the NGNBN cannot be directly compared to the introduction of a fourth MNO into the market. For the NGNBN:

- A nationwide fibre network had been established, where no such network had previously existed. In the case of the mobile market, three nationwide networks already exist.

- The Government funded the nationwide fibre network infrastructure. In the case of the mobile market, the three nationwide networks were funded via private sources.

12. In comparison, under its current proposal, the Authority is proposing to facilitate the entry of an additional infrastructure player into an already saturated market with three other infrastructure players, competing on the same technologies and services already available in the market. There are no guarantees that this new player can provide any new services or innovation on existing services.

Spectrum Fragmentation and Declines in Service Quality:

13. In a long term evolution ("**LTE**") and LTE-advanced environment, MNOs need access to sufficient amounts of spectrum to continually improve broadband speeds, and to meet increasing demands from their customers.

14. The entry of a fourth MNO will further fragment the limited spectrum available for MNOs in the market. This will significantly impede the ability of all MNOs to aggregate spectrum to provide faster speeds and better quality. This means a poorer customer experience for Singaporeans, and a negative impact on Singapore's ongoing push for global competitiveness in mobile broadband speeds. Today, Singapore is at the global forefront of mobile broadband speeds.[8] Allowing further spectrum fragmentation will hold Singapore back in its global rankings.

15. We therefore believe that the Authority needs to carefully balance its desire for increased competition against the potential negative impact to the national agenda and the deterioration of service quality and speeds for customers in Singapore.

Level Playing Field Needed:

16. StarHub would also raise concerns with the preferential treatment being accorded to the new entrant.

[8] According to the Akamai "State of the Internet Report (Q1 2015)", Singapore's average and peak mobile connectivity rates are amongst the highest in the world. In particular, Singapore's global ranking for peak mobile rates are behind only Australia and Japan.

17. Firstly, the Authority is proposing to subsidise the cost of valuable and scarce spectrum resources for the new entrant. However, subsidising a new entrant is no guarantee of longevity, especially if the new entrant is relying on that subsidy for market entry.

18. Secondly, if the Authority wishes to see additional facilities-based competition, the new entrant must be required to comply with all regulatory obligations currently imposed on the existing MNOs. Not only will this ensure a level playing field, it also ensures that the new entrant provides its customers with a quality of service in-line with the Authority's requirements.

19. If the Authority simply wants competition in the market, its existing policy of encouraging the introduction of more mobile virtual network operators ("**MVNOs**") is sufficient. There are a number of MVNOs in the market already, and we believe that this trend will continue.

20. StarHub's detailed comments and responses to the Authority's queries are attached below. While StarHub strongly believes that a fourth MNO is unnecessary, our comments herein also cater for the potential scenario where the Authority proceeds with the facilitation of a new entrant into the market. We sincerely appreciate the Authority's consideration of StarHub's comments, and we would request the opportunity to meet with the Authority to discuss our comments in greater detail.

Question 1
The proposed allocation of the 700 MHz band together with other suitable bands for mobile services in the next spectrum allocation exercise; and the mechanism to allow the delay of the commencement date of the 700 MHz spectrum right, and correspondingly, the expiry date as well as the spectrum right payment due date, in the event of a delay in the ASO.

21. StarHub believes that the 700 MHz band is important for the growth of 4G services in Singapore, and we welcome the allocation of the 700 MHz band in the upcoming auction. We note that the 700 MHz band has already been allocated in countries such as Australia, Taiwan and New Zealand, with countries such as South Korea and Japan also planning to introduce LTE in the 700 MHz band in the near future.

22. The critical issue for StarHub is when the 700 MHz band will be ready for use. We note that the Authority is working on a 2018 – 2020 timeline for the release of the 700 MHz band, and we would urge the Authority to provide more information once the exact release date is confirmed. This information is of critical importance to the MNOs, to enable them to plan their infrastructure investments with greater certainty.

23. StarHub recognises that the 2018 – 2020 timeline is dependent on foreign entities, and there is a potential risk that these dates may still shift. We therefore agree with the Authority's proposal that, should there be any delays in the commencement date of the 700 MHz spectrum right, the expiry date and the payment due date should also be shifted back accordingly.

24. In addition, the Authority must ensure that the 700 MHz band is free of interference by the determined allocation date. Any MNO that obtains a "dirty" part of the spectrum will be significantly disadvantaged. To ensure a level playing field, the entire 700 MHz band should only be assigned for use when it is fully free of interference. This also improves the ease of management of the spectrum (reducing the need for multiple auction exercises to cater for different end-dates for the spectrum).

Question 2
a) The proposed 800 MHz band plan based on the 3GPP band 26, or a combination of 3GPP band 27 and band 5 (excluding the EGSM band), including views on the possible phased approach and timeline to migrate existing users of the band; and
b) the impact to existing users (i.e., Trunked radio and SRD) of the 800 MHz band plan based on the 3GPP band 26, or a combination of 3GPP band 27 and band 5 (excluding the EGSM band).

25. StarHub's preference is for the 800 MHz band to be released in a combination of 3GPP band 27 and band 5 (excluding the EGSM band). Not only will more spectrum be made available, our market research also shows that more devices are available for use in these bands. This will provide increased benefits to customers, and improves economically efficient usage of the band.

26. Again, StarHub's primary concern is when this band will be released for mobile services. Given the strong customer demand for mobile data services, we believe that the 800 MHz band must be re-farmed for mobile services as soon as practicably possible, in order to maximise the economic value of the spectrum. We respectfully submit that, if the 800 MHz band remains with its current use, this would be an inefficient use of the spectrum, disadvantaging customers in Singapore. We would therefore request that the Authority detail the expected timeline for migration of existing users out of the band.

27. As highlighted above, the sub-1 GHz bands are of critical importance for the provision of mobile services. Therefore, once the 800 MHz band is made available, it must also be included in the overall caps for sub-1 GHz bands.

Question 3
The allocation of the short-term spectrum rights for the EGSM band, including the approach to extend the short-term spectrum right.

28. Today, the existing MNOs have to comply with the Authority's stringent 3G QoS standards specifying both nationwide outdoor coverage of 99% and indoor coverage of 85%. Given the strong propagation characteristics of the 900 MHz band, the band is essential for meeting the Authority's QoS requirements. Without access to the 900 MHz band, it would not be possible to meet the QoS standards.

29. On its part, StarHub relies heavily on its existing allocation of 2 x 5 MHz of 900 MHz spectrum (in the EGSM band) to meet the Authority's 3G QoS requirements. Without this spectrum, there would be immediate gaps in StarHub's mobile coverage, which could not be easily remedied without a very large, and disproportionately costly, increase in the footprint of StarHub's 3G base stations.

30. Accordingly, StarHub's comments are premised on the fact that all MNOs, including StarHub, need to have a minimum 2 x 5 MHz of 900 MHz spectrum in order to comply with the Authority's 3G QoS standards. If any MNO does not have access to the 900 MHz spectrum, come 2017, there would be severe deterioration of 3G services, and potential disruptions to a large number of mobile customers in Singapore.

First Right of Refusal ('**FROR**"):

31. Given the essential nature of the 900 MHz band, StarHub welcomes the FROR for the EGSM band. We note that the proposed FROR is under review, and Authority is still assessing whether the existing interference in the EGSM band could be cleared by 31 March 2017. We would urge caution on this matter. This timeline is fully dependent on foreign entities outside of the Authority's control. It would be extremely difficult, if not impossible, for the Authority to obtain any guarantees that the EGSM spectrum would be cleared of any interference by 2017.

32. In addition, StarHub would urge the Authority to increase the duration of the FROR. Respectfully, a 3 – 5 year allocation period is insufficient, and creates significant business uncertainty for StarHub. StarHub has already been disadvantaged by the ongoing

interference in the EGSM band, having had to re-tune its base stations to a clean part of the band. Once the interference is cleared, StarHub would again need to re-tune its base stations to align with the Authority's requirements.

33. We therefore suggest that the EGSM band should be granted to StarHub on a FROR basis for the same duration as the remainder of the 900 MHz band. This also reduces the administrative burden on the Authority, and ensures that StarHub's customers can continue to enjoy a quality 3G service for the longer term. Under this scenario, StarHub's FROR could be counted towards its spectrum cap. However, if the FROR rights were for a more limited period, this allocation should not count towards the spectrum cap, as counting the spectrum towards the cap would create artificial scarcity in the 900 MHz spectrum.

Reservation of Spectrum for the High Speed Rail ("**HSR**") Project:

34. We believe that it is critically important for the Authority to confirm whether the allocation of 2 x 5 MHz of EGSM spectrum for HRS rail communications is confirmed. StarHub is concerned that allocating the EGSM spectrum for the HSR will not maximise the economic value that can be derived from the band. Furthermore, once the EGSM is allocated to the HSR, the Authority may have no further opportunities to re-farm this band for other services (e.g., 5G services) in the future.

35. Nonetheless, should the Authority decide to allocate 2 x 5 MHz of EGSM spectrum for the HSR project, we would respectfully note the following:

- The use by the HSR would be limited to certain parts of Singapore only (i.e., in the Jurong area, where the HSR will terminate). It may be possible to allow usage of the band in other parts of Singapore, subject to the winning MNO agreeing not to interfere with the operations of the HSR. This would result in more efficient usage of the band.

- We would encourage the HSR to use LTE technologies for its rail communications. We understand that this technology will be available in the near future, and it will more efficiently utilise the spectrum. The HSR rail communications should not utilise legacy 2G / GSM technologies, which are less spectrally efficient, and are being phased out globally (including by the MNOs in Singapore).

36. StarHub's detailed proposals on the EGSM band set-out in paragraphs 2 to 5 of our confidential submission.

Question 4
a) The proposed re-allocation of the L-band for wireless broadband in Singapore in the longer term and
b) The allocation of L-band for trial, temporary use, and/or commercial services in the interim period.

37. We note the research into the use of the L-band and have been closely monitoring developments in this area. We understand that the L-band has been auctioned for supplemental downlink services in countries such as Germany and the United Kingdom.[9]

38. StarHub believes that there will be interest in using this band for mobile services in the longer-term, and that this band will improve mobile broadband speeds and quality. Nonetheless, this would also depend on future developments in equipment and devices which utilise the L-band. We look forward to more information on the proposed allocation framework for the L-band in Singapore.

39. We would also reiterate the need for spectrum caps to cover all bands once they are released for long-term allocation. This ensures that no single MNO can hold a disproportionate amount of overall spectrum.

Question 5
a) The proposed approach for local operators to coordinate with neighbouring countries' operators to address potential co-channel interference in the use of the 2.5 GHz band;
b) The use of the proposed 5 MHz guard band in the 2.5 GHz band to prevent interference between TDD and FDD systems operating in adjacent bands, versus the imposition of suitable mitigation measures to prevent interference; and
c) The possible adoption and/or suitable restriction levels for Block Edge Mask, synchronisation of TDD networks and any other suitable mitigation measures to prevent co-channel or adjacent channel interference between different TDD systems or between TDD and FDD systems.

Cross-border Coordination:

40. As the Authority would be aware, it is very challenging for the Singapore MNOs to negotiate with our overseas partners. The reality is that, given Singapore's relatively small size, any interference by overseas operators into Singapore will have a major impact on mobile services in Singapore; whereas interference from Singapore into the overseas country will have a relatively limited impact on mobile services in that country Therefore, active intervention by the Authority is needed to coordinate with overseas regulators, to ensure that the requirements imposed on the Singaporean MNOs are also applied fairly to overseas MNOs.

41. This is particularly important for sub-1 GHz coordination, as any interference will have a significant impact on mobile data speeds. As coordination for the sub-1 GHz bands does not fall within the scope of this consultation, we would be happy to have a separate discussion with the Authority over StarHub's concerns on the matter.

[9] In June 2015, Vodafone and Deutsche Telekom purchased the L-band in a spectrum auction. In August 2015, Qualcomm agreed on an L-band spectrum deal with Vodafone UK and Three UK.

Guard Band and Mitigation between TDD and FDD Systems:

42. StarHub supports the proposed 5 MHz guard band. We believe that this is sufficient to ensure mitigation between the TDD and FDD systems operating in the 2.5 GHz band.

Availability of Spectrum in the TDD Bands:

43. We would respectfully request the Authority to clarify whether additional spectrum could be made available in the 2.3 GHz band. We note that there is a significant amount of unallocated spectrum in the band, and it may be viable for the Authority to explore "cleaning-up" the band for mobile services. Again, we believe that the MNOs are best-placed to maximise the economic value of the spectrum bands; and that leaving the spectrum in its existing usage would result in inefficiencies.

44. In addition, we note that the TDD bands could be available for allocation well before 1-April 2017. We would appreciate if the Authority could clarify whether the TDD bands could therefore be allocated early, and if so, what the attached conditions would be.

Question 6
The proposed allocation of the spectrum bands in the next allocation exercise, including on the proposed uses and spectrum right durations of the spectrum bands, the proposed 'Clock Plus' auction format, as well as the appropriate spectrum caps and regulatory obligations to ensure the optimal use of the spectrum.

Use of spectrum:

45. StarHub has no objections to the Authority's definition of 4G and IMT-Advanced systems and services. We would add that it is also important for the Authority to continue allowing the MNOs to deploy 3G services and systems in the 900 MHz band. This is necessary for the MNOs to comply with the Authority's 3G QoS standards.

Spectrum Caps:

46. We reiterate that a critical part of any spectrum auction is the cap on the amount of spectrum any individual MNO can win. Setting clear spectrum caps would:

- Provide clarity to the industry as to the Authority's longer-term view on spectrum limits, allowing MNOs to bid with certainty for the spectrum they want.

- Prevent any MNO from amassing the majority of spectrum in Singapore. This is particularly important in the LTE-Advanced environment, where an MNO with a significantly larger spectrum holding would be the only MNO which could provide the highest-speed mobile services in the market. Without spectrum caps (or if the caps are inadequate), an MNO with the financial resources would be in a position to corner the market, to the detriment of smaller MNOs and reducing the level of competition in the market.

47. As highlighted above, Singtel has supported the imposition of spectrum caps in Australia. It has acknowledged that, should spectrum caps not be imposed, the incumbent MNO in Australia (Telstra) would have "*the opportunity to acquire more spectrum than it requires to provide efficient network capacity*" and "[i]*t is possible that Telstra may acquire excess 1800 MHz spectrum for the purpose of preventing the other MNOs from offering competitive network services*".[10]

48. We strongly believe that the same principle applies in Singapore. It is critical to prevent any one MNO (particularly the MNO with the largest market capitalisation) from acquiring excess amounts of spectrum, and preventing other MNOs from offering competitive services in the Singapore mobile market.

49. Based on overseas practice, we also note that spectrum caps have been routinely implemented in spectrum auctions held in Germany,[11] United Kingdom,[12] Australia[13] and Switzerland,[14] amongst others. Typically, regulators have placed caps on the sub 1-GHz spectrum being made available for auction.

StarHub's Proposal:

50. In terms of the actual caps, we would highlight the following points:

- Firstly, all three existing MNOs must have a minimum 2 x 5 MHz of 900 MHz spectrum, in order to comply with the Authority's 3G QoS standards. Accordingly, the spectrum caps should be structured to ensure that no single MNO is able to win all available 900 MHz spectrum.

- Secondly, the sub-1 GHz spectrum is particularly valuable and critical for the provisioning of 4G mobile services. A cap must therefore be placed on the total amount of sub-1 GHz spectrum that any single MNO could win.

- Thirdly, it is not in the interest of consumers if one MNO managed to win most, if not all of the available TDD spectrum in the 2.3 GHz and 2.5 GHz bands. A spectrum cap for the TDD bands is therefore also needed.

51. StarHub therefore proposes the following spectrum caps:

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[10] Please see Optus' submission in response to ACCC Discussion Paper "Spectrum Competition Limits", April 2015, accessible at: http://www.accc.gov.au/system/files/Optus%20Submission_4.pdf.

[11] In 2010, the German regulator imposed a cap on the 800 MHz band based on the MNO's existing 900 MHz holdings.

[12] In 2012, the UK regulator imposed caps on the post-auction holdings of both sub-1 GHz and total spectrum.

[13] In 2013, the Australian regulator imposed caps on the 700 MHz band and the 2.6 GHz band.

[14] In 2012, the Swiss regulator imposed caps (amongst others) on the 900 MHz band, sub-1 GHz band in total as well as the total spectrum on offer.

- A standalone cap on the 900 MHz band, to prevent an MNO from winning all spectrum in this band. This is necessary given the propagation characteristics of 900 MHz spectrum.

- A cap on the total sub-1 GHz spectrum, to prevent an MNO from monopolising the low band spectrum. Upon the release of the 800 MHz band, this band should also be included within the sub-1 GHz band spectrum cap.

- A cap on the TDD spectrum, to prevent any one MNO from obtaining excessive amounts of TDD spectrum.

- Structuring the caps to ensure that, if there are three MNOs, no one MNO can win more than 50% of each spectrum band (rounded to a sensible number). If there are more than three MNOs, this limit should be proportionately reduced. This ensures a more equitable distribution of spectrum, while still encouraging competitive bidding during the auction.

52. StarHub's detailed proposal on spectrum caps is set-out in paragraphs 6 to 8 of our confidential submission.

53. We believe that our proposals are fair and reasonable. However, as the Authority has not set-out any preliminary proposal for the spectrum caps, it is unclear whether StarHub's proposals are in-line with the Authority's thinking on this matter. Given the critical importance of the spectrum caps, StarHub would therefore respectfully request that the Authority carry out a further consultation on the spectrum caps, before the auction rules are finalised.

<u>Duration of Spectrum Rights:</u>

54. Currently, the Authority is proposing a spectrum right duration of: (a) 3 – 5 years for the FROR for the EGSM band; and (b) 12 – 16 years for the remaining spectrum bands. This is a very wide range, and it is important that the Authority clarify how the exact durations will be determined.

55. For the reasons stated above, StarHub would respectfully disagree with the 3 – 5 year duration for the EGSM band. We believe that the duration for this band should be the same as for the remaining spectrum bands. This provides StarHub with certainty on its spectrum holdings, improves administrative efficiency by reducing the need for further auction in the short term, and recognises the disadvantages that StarHub has faced (and will continue to face) with the ongoing interference in the band.

56. In terms of overall spectrum right durations, we believe that the Authority should be considering durations significantly longer than 16-years. If the Authority wants serious long-term investments in infrastructure, this should be reflected in the durations of its spectrum rights awarded. Having longer spectrum rights provides more certainty to the industry, and also reduces the administrative burden on the Authority.

Spectrum Auction Fee:

57. We would also urge the Authority to relook the manner in which it charges the spectrum auction fee. The current method of requiring a lump-sum upfront payment imposes a very heavy burden on all MNOs. StarHub proposes that this payment could be spread out through the duration of the spectrum, thereby avoiding large CAPEX outlays for spectrum rights.

58. We note that the ability to pay for spectrum rights over multiple years (rather than as a lump-sum payment) would also have an impact on the willingness of MNOs to bid for the spectrum. We therefore do not believe that the Authority would be financially worse-off as a result of such a payment arrangement.

Assignments of Spectrum Allocations:

59. We would also respectfully request that the Authority allow the existing MNOs to address the assignments of the spectrum lots amongst themselves before any involvement from the new entrant (should there be a new entrant). As the existing MNOs may have live services in the bands and must also manage live customers, it is important to allow the existing MNOs to sort out any differences amongst themselves first. StarHub would be happy to provide more comments on this matter once the Authority details the rules for the auction.

Question 7
The proposed facilitation framework for the new MNO, including on the set-aside spectrum, the reserve price for the set-aside spectrum, the auction format, and the regulatory obligations on the new MNO.

60. StarHub believes that all MNOs must be required to compete on fair and even terms. The Authority's proposal to significantly subsidise a new MNO entrant already creates a distorted and discriminatory playing field. The new entrant cannot be further favoured by an advantageous regulatory regime, which allows it to offer a poorer standard of service to customers in Singapore. We strongly submit that any new entrant must be held up to the same high standards as the existing MNOs.[15] We must respectfully question the logic of facilitating the entry of a new entrant into the market, and allowing that new entrant to offer a worse service to customers than is already available in the market.

61. If the Authority simply wants competition in the mobile services market, it can continue with its policy of facilitating the entry of MVNOs.

62. In-line with StarHub's comments, we therefore welcome the Authority's confirmation that the new entrant will not be granted mandated roaming onto other MNOs'

[15] For the Authority's reference, we have provided more details on the regulatory obligations imposed on StarHub in paragraph 11 of StarHub's confidential submission.

networks. Mandated roaming is not the way to achieve world-class infrastructure, and would simply encourage the new entrant to rely on other MNOs as a crutch.

Reserved Spectrum:

700 MHz and 900 MHz bands:

63. Under the Authority's proposal, almost 30% of the sub-1 GHz band spectrum is being reserved for the new entrant. StarHub believes that this is excessive, and creates an artificial scarcity in the low-band spectrum. This is also extremely unfair to the existing MNOs who have 'live' customers in the 900 MHz band, and must also comply with the Authority's stringent 3G QoS standards. We would also highlight the following issues:

- There is no strong reason why the new entrant needs spectrum in both the 700 MHz and 900 MHz bands. As the Authority is aware, there is no road-map for carrier aggregation involving both these bands. We have spoken to various vendors and none have indicated that they will facilitate low band carrier aggregation anytime in the foreseeable future. The current 3GPP specifications typically define carrier aggregation with one low band only, and in combination with two high bands.

- If the Authority allocates spectrum in both the 700 MHz and 900 MHz bands to the new entrant, there is a high risk that one of the bands will not be used, or will be used sub-optimally. Any inefficient allocation of spectrum will have a detrimental impact on what other MNOs can do, and ultimately impact customers in Singapore.

- The sub-1 GHz spectrum is critical for MNOs to serve their customers, and a sufficient amount of low band spectrum is needed to provide reasonable data speeds. Without access to sufficient amounts of sub-1 GHz spectrum, very serious deteriorations in service quality and potential disruptions of services to existing customers would occur.

64. For the above reasons, StarHub submits that the Authority should not reserve the 700 MHz band for the new entrant. 2 x 10 MHz of spectrum in the 900 MHz spectrum is sufficient for the new entrant to speedily rollout its nationwide network. Allowing existing MNOs to have access to a larger amount of 700 MHz also facilitates the migration of existing customers from the 900 MHz band to the 700 MHz band.

TDD bands:

65. For the TDD bands, we are concerned that the proposal to reserve 20 MHz of 2.3 GHz spectrum for the new entrant will create an 'orphaned' 10 MHz of TDD spectrum. The leftover 10 MHz is unattractive, and StarHub cannot foresee any MNO deploying a nationwide network just for this very small amount of spectrum. If this 10 MHz of spectrum ends-up being unallocated, this would mean an inefficient auction outcome for Singapore, which would end-up disadvantaging customers who are denied faster broadband services.

66. As an alternative, we believe the Authority could consider reserving 20 MHz of 2.5 GHz TDD spectrum for the new entrant instead. This leaves 30 MHz of 2.3 GHz spectrum and 25 MHz of 2.5 GHz spectrum available for auction, which would be a significantly more attractive proposition for the MNOs. This option is likely to result in a significantly higher level of spectrum utilisation, and to higher levels of infrastructure investment.

67. If the Authority believes that 2.5 GHz spectrum is not suitable for the new entrant, it may wish to consider increasing the amount of spectrum reserved in the 2.3 GHz band to 30 MHz instead. This removes the 'orphaned' spectrum scenario. It would also alleviate the need to reserve 700 MHz spectrum for the new entrant.

Reserve Price for New Entrant:

68. We strongly disagree with the significant subsidy being offered to the new entrant by way of the discounted reserve price. This cheapens the value of a scarce resource, and has the real potential of encouraging speculative bidding for the spectrum. We are deeply concerned that a company could seek to enter the market through overpromising and ultimately under-delivering on its promises. Even worse, a company could seek to bid for the spectrum with no real intention to meet the associated rollout obligations.

69. Such companies could very well seek to rent or lease the valuable spectrum to other operators, and profit from the low price it was charged for that spectrum. This would be extremely disruptive to the market, and adversely impact consumers and the industry as a whole.

70. The Authority has suggested that a new entrant could bring about greater competition and innovation. However, while a discounted price for spectrum might artificially improve the initial business case of a new entrant, this may not lead to sustainable entry into the market. The Authority is aware that the existing MNOs are seeing increasing pressure on voice and SMS revenues. Data revenues are also decreasing due to the increasing and widespread availability of alternatives such as Wi-Fi. Further erosion of revenues as a result of a new entrant will simply further discourage investments in infrastructure and innovation, and affect the sustainability of the industry as a whole.

71. If the Authority wants to encourage service innovation, it must also allow a reasonable rate of return on investments. Further depressing the revenues of the existing MNOs will not achieve this outcome.

72. Therefore, the Authority's intention to lower the entry barrier for a new entrant must be carefully weighed against the need for the new entrant to provide credible market entry, and the ability of existing MNOs to invest and innovate. We have also highlighted other factors that the Authority may wish to consider in paragraphs 15 to 23 of StarHub's confidential submission.

73. If the Authority is prepared to consider StarHub's proposal to spread out the payment of the spectrum throughout the duration of the spectrum, this should provide sufficient incentive for a new entrant into the market, without any need for further subsidy.

Obligations on New Entrant:

74. If the Authority believes a subsidy is genuinely necessary to incentivise new entry, stringent obligations must be placed on the new entrant, to ensure that this subsidy is "well-spent", and that there are genuine benefits accrued to Singaporeans. StarHub therefore suggests the following obligations to be tied to the subsidy:

- The subsidy must be linked to the actual auction price for the spectrum. If the auctioned price increases, the reserve price for the new entrant should also go up. This would then accurately reflect the real market price of the spectrum on offer.

- Any subsidy granted must be mirrored by a performance bond ("**PB**") obligation, requiring any new entrant to rollout a nationwide network. Given the significant subsidy provided, the standard 5% PB for facilities-based operators is not sufficient to ensure compliance and ensure that the new entrant is adequately capitalised. We would note that significant PB obligations were imposed on StarHub as part of its market entry obligations, with the PBs released only after StarHub met its various service and deployment milestones.

  We do not believe that simply imposing financial penalties after the new entrant has failed its obligations is an effective way of enforcing compliance. There is the real possibility that the new entrant may simply not have the resources to pay any significant financial penalties imposed on it. An upfront PB is therefore necessary to: (a) ensure that the new entrant is financially stable enough to enter the capital intensive mobile services market; and (b) act as a key incentive for the new entrant to meet its regulatory obligations. If the new entrant was credibly financed, a PB tied to the value of the subsidy provided would not represent a significant burden on its resources.

- The Authority must have a stringent pre-qualification phase, to ensure that potential new entrants are serious about entering the mobile services market, and will comply with the rollout obligations. Given the significant subsidy being provided, any pre-qualification exercise must be as stringent as that undertaken under the pre-qualification phase for the NGNBN project. StarHub's suggestions on possible pre-qualification requirements are set-out in paragraphs 24 to 26 of our confidential submission.

  We would also respectfully request that the Authority consult the industry on the pre-qualification criteria for the new entrant.

75. In addition, regardless of the subsidies on offer, a level playing field amongst the new entrant and the existing operators must be established. As such, the following obligations should apply on any new entrant into the market:

- The Authority must ensure that the new entrant efficiently utilises all spectrum bands that it is allocated. This benefits customers, and prevents the new entrant

from hoarding spectrum that it does not need or use, with the longer-term goal of monetising the spectrum. For this reason, we believe that it is inappropriate to reserve the 700 MHz spectrum for a new entrant,

- The new entrant must be subject to all existing regulatory obligations imposed on the existing MNOs (e.g., QoS, resiliency obligations, prepaid registration, reporting requirements, customer protection obligations, licence conditions, interconnection with other operators, etc).

  Otherwise, this will not result in fair competition, and would instead lead to sub-standard coverage and poorer service quality for customers. If the Authority wants this spectrum auction to encourage further facilities-based competition, it is only reasonable to require potential new entrants to meet the high quality of service and coverage obligations that are set for existing MNOs.

- If the new entrant only offers data services, it should not be allowed to enter into the number portability arrangement. The new entrant must offer voice and SMS services in order to be allowed number portability. Accordingly, if the new entrant offers voice services, all obligations for the provisioning of voice (e.g., emergency calls, number management etc) should also be required

- The Authority needs to establish rigorous rollout obligations, stating upfront that roaming on another MNOs' network or the leasing / renting of other MNO's infrastructure cannot be part of the nationwide rollout obligations. Otherwise, the Authority may simply be facilitating the entry of a pseudo-MNO, which more closely resembles an MVNO, as a new entrant seeks to benefit from subsidised spectrum, whilst trying to avoid investing in network infrastructure.

  The Authority will also need to confirm that nationwide coverage obligation includes the offshore islands and the territorial waters up to 15km from the coast line of the island of Singapore. This would be consistent with the obligations imposed on the existing MNOs in the last spectrum auction.

- The Authority must ensure that the new entrant cannot lease or sell the spectrum before it fully meets its rollout obligations. This must be established upfront in the auction rules.

- The new entrant cannot be allowed to bid against existing MNOs for bands where it has already been given reserved spectrum. This is essential to allow the remaining MNOs to have a reasonable and fair allocation of spectrum.

Summary of Key Points:

76. To summarise the key points of StarHub's position, we believe that the following conditions should be a key part of the Authority's framework for the new entrant:

- The Authority should not reserve the 700 MHz spectrum for the new entrant. It also needs to reconsider the allocation of 20 MHz of spectrum in the 2.3 GHz band for the new entrant;

- There is no reason to subsidise entry for a new MNO. If the Authority believes a subsidy is genuinely necessary, the actual reserve price paid must be linked to the auction prices to reflect the actual market value of the spectrum. In addition, a PB tied to the value of the subsidy must be imposed on the new entrant, to ensure that it complies with its regulatory obligations (including rollout requirements); and

- The obligations imposed on the existing MNOs must also be imposed on the new entrant. This ensures that the new entrant provides a quality service to its customers and enables a level playing field amongst the MNOs in the market.

Question 8
The proposed negotiation principles to facilitate wholesale access negotiations between "thick" MVNOs and MNOs.

77. We agree with and support the Authority's proposals on MVNOs. StarHub believes that the Authority's proposals are sensible, and there are already a number of MVNOs in the market.

78. However, we believe that the access framework for MVNOs should not apply to any new entrant. A new entrant that has obtained reserved spectrum should be in the business of running its own network, not acting as an MVNO. It is important to avoid a situation where the new entrant sets out to test the market as both an MNO and an MVNO, then chooses to move to the business model which is more profitable.

79. We would respectfully suggest that the new entrant be explicitly prohibited from purchasing wholesale voice or SMS services from the existing MNOs. Such services must be provided over the new entrant's own mobile network.

Conclusion

80. A summary of the key points of StarHub's submission is as follows:

- Given the uncertainty over the availability of the 700 MHz band, we agree that the Authority should allow the expiry date for the rights, and the payment due date, to be pushed back (depending on the start date of the spectrum). We also believe that the entire 700 MHz band must be free of interference before the rights to that band commence. This ensures that no winning bidder is unfairly discriminated against.

- The 900 MHz band is critical for providing 3G services and for compliance with the Authority's 3G QoS standards. All MNOs will need a minimum 2 x 5 MHz of spectrum in this band.

- StarHub supports the proposal to grant a FROR for the EGSM band. However, there needs to be more certainty on this band, and the duration for the FROR must be extended to coincide with the remaining 900 MHz spectrum.

- The Authority should make more spectrum available in the 2.3 GHz band, and have the TDD bands available for allocation even before 1-April 2017.

- The Authority should set clear spectrum caps on: (1) the 900 MHz band; (2) the sub-1 GHz band; and (3) the TDD band. This provides certainty to the industry and prevents any one MNO from monopolising spectrum rights.

- The proposed duration of the spectrum rights needs to be significantly lengthened to encourage long-term investments in infrastructure and technology.

- Payments for the spectrum rights should be spread out throughout the duration of the spectrum. This relieves the heavy burden imposed on MNOs who currently have to make a one-time substantial CAPEX outlay for spectrum rights.

- We are concerned by the proposed framework to facilitate a new entrant. We see no benefit to a new MNO entering the market as this will reduce investments and innovation and further fragment spectrum availability. This will be to the detriment of customers and Singapore as a whole.

- There is no reason why the Authority needs to reserve the 700 MHz spectrum for the new entrant as the 900 MHz band is sufficient for the deployment of nationwide 4G coverage. The new entrant will not be able to use both the 700 MHz and 900 MHz spectrum efficiently, and this would result in sub-optimal usage of the spectrum bands. The 700 MHz band should be made available to all MTOs (subject to the spectrum cap).

- No subsidy should be provided to the new entrant as this encourages speculative bidding for the spectrum. If a subsidy is provided, the reserve price for the new entrant must be linked to the auction prices, in order to reflect the actual market value of the spectrum. Any subsidy must also be tied to significant PB guarantees, to guarantee rollout by the new entrant. The new entrant must also be prohibited from selling, renting or leasing the spectrum.

- If the Authority intends to facilitate competitive infrastructure entry, it should also require the new entrant to comply with all regulatory obligations that the existing MNOs comply with. This ensures a level playing field and a minimum quality of service for customers.

- The Authority must clearly set out that the new entrant must meet its rollout obligations via its own infrastructure, and not through any leasing / renting arrangement from other MNOs or via a roaming arrangement.

- We welcome the Authority's proposals to facilitate wholesale access for MVNOs. However, the Authority should disallow any new entrant from acting as an MVNO in the market. This ensures that the new entrant focuses on rolling out its own infrastructure capabilities, and not relies on other parties' infrastructure.

81. StarHub is grateful for the opportunity to comment on this matter. We welcome the opportunity to provide further comments on the detailed auction framework (including spectrum caps and the obligations on the new entrant) once these have been drafted by the Authority. StarHub would also request a meeting with the Authority before the auction rules are finalised.

StarHub Mobile Pte Ltd
26-August 2015