
**PUBLIC CONSULTATION ON THE
PROPOSED FRAMEWORK FOR THE
REALLOCATION OF SPECTRUM IN
THE 900 MHZ AND 1800 MHZ
FREQUENCY BANDS**

**Submission by StarHub Ltd to the
Info-Communications Development
Authority of Singapore**

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PROPOSED FRAMEWORK FOR THE REALLOCATION OF SPECTRUM IN THE 900 MHZ AND 1800 MHZ FREQUENCY BANDS

SUMMARY:

1.1 StarHub welcomes the opportunity to comment on IDA's proposed framework for the reallocation of the spectrum in the 900 MHz and 1800 MHz bands. We believe that an open and transparent discussion of the alternatives is essential in the allocation of these bands.

1.2 We agree with IDA that the critical issue in allocating 900 MHz and 1800 MHz spectrum is ensuring that the spectrum is used efficiently. As Ofta noted in 2003, in its consideration of 2G spectrum reallocation in Hong Kong:

"The existing 2G licensees are likely to utilize the allocated spectrum more efficiently than new entrants, especially in the near term, given the significant sunk investments in constructing a mobile network for operation."

1.3 StarHub strongly believes that the most sensible method of allocating the existing 2G spectrum rights is to extend the term of those rights for the existing operators. The 7-year term of the existing spectrum rights is extremely short by international standards, and extending that term to match international norms would encourage additional 2G rollout and investment.

1.4 IDA has stated that StarHub suffers from "*legacy imbalances and distortions*" in not having access to 900 MHz frequencies. StarHub agrees with the point, but believes that these imbalances and distortions can be corrected simply by assigning to StarHub some of the unassigned frequencies in the Extended GSM band. If IDA is seeking to correct legacy imbalances and distortions, we do not believe that a full "green-fields" auction of all existing 2G spectrum rights is necessary.

1.5 StarHub is very concerned by the proposal in the Consultation Paper to use a "green-fields" auction as the means of reallocating the existing 2G spectrum rights. If implemented, such an auction could potentially lead to:

- A serious disruption of services for existing 2G customers (and there are currently 3.7 million 2G customers in Singapore);
- A serious disruption of services for international visitors to Singapore carrying 2G phones;
- The inefficient write-off of millions of dollars of investment in the existing 2G networks (which could impact on Singapore's reputation as an investment reputation); and
- An inefficient use of the 2G spectrum (as the existing 2G licensees are likely to utilize the allocated spectrum more efficiently than any new entrant).

1.6 If IDA wishes to explicitly encourage new entrants into the Singapore mobile market, we believe that the most effective way of carrying this out would be through the allocation of new mobile spectrum (which is currently unassigned and idle). StarHub is aware of 15 MHz of 3G spectrum, 15 MHz of 1800 MHz spectrum, and 10 MHz of 900 MHz spectrum that is currently unassigned.

1.7 If IDA wishes to go ahead with an auction of the existing 2G spectrum rights (a move StarHub would not support), we believe that it would be essential for IDA to ensure that: (i) a vigorous prequalification procedure is implemented to minimise opportunities for speculation in

spectrum; (ii) any new entrant must face the same rollout obligations and timetables as the existing operators (to ensure a level playing field exists); and (iii) existing operators must have Right-of-First-Refusal (“RoFR”) over the spectrum bands they currently occupy (to provide some certainty to customers in regard to service provision, and to operators in regard to ongoing investment).

1.8 Looking at international best practice, we are not aware of any country that has allocated operational 2G spectrum by way of a “green-fields” auction. In the case of Hong Kong, the existing 2G operators were given the RoFR over the bands they occupied, so as to avoid any disruptions to services or investment continuity. Australia and New Zealand have also taken similar approaches in recent reallocation exercises. Implementing a “green-fields” auction for spectrum currently being used would certainly put Singapore out of line with international best practice.

1.9 StarHub is pleased to address these issues in greater detail in response to IDA’s specific questions.

TECHNICAL USES FOR THE SPECTRUM

Question 1

IDA invites views and comments on whether there are any other potential technologies and services that may be deployed in the 900 MHz and 1800 MHz frequency bands in the near term (1 – 5 years), and whether there is demand for low power GSM in Singapore.

2.1 StarHub believe that, over the next 1-5 years, it is highly unlikely that the 900 and 1800 MHz bands will be used for anything other than cellular mobile services. Telecommunications equipment is manufactured for specific frequency bands, to comply with international spectrum allocations, to avoid interference. If equipment for other technologies was produced for the 900 and 1800 MHz bands, it would lack international acceptance and economies of scale, and could well have a higher cost than equivalent cellular mobile equipment produced for the same band.

2.2 StarHub is aware that Japan has indicated that it might use spectrum in the 900 MHz band for proprietary wireless broadband standards. However, as Japan does not make extensive use of GSM services, this allocation can be made without a significant opportunity cost. The same cannot be said for Singapore.

2.3 StarHub also believes that, for the next 1 – 5 years, the 900 MHz and 1800 MHz frequency bands will still be pre-dominantly used for 2G services. While it is technically possible to use 900 MHz for 3G services, it is important to note that:

- (a) 3G in the 900 MHz band is most useful for covering large geographic areas (such as Australia), which would not be particularly relevant for Singapore;
- (b) There is no immediate shortage of 3G spectrum in Singapore (and 15 MHz of 3G spectrum is currently unallocated);
- (c) The three existing mobile operators have already built out their 3G networks using 1900 MHz spectrum; and
- (d) At least for the initial phase (1 – 5 years), it is likely that 3G equipment for the 1900 MHz band will be more cost-effective and widely-available than 3G equipment for the 900 MHz band.

2.4 In regard to low-power GSM services, StarHub is aware of spectrum allocations in the United Kingdom for this application. However, in the absence of internationally-agreed spectrum allocations and standards for low-power GSM services, the commercial viability of this service is currently unclear. StarHub therefore believes that, over the next 1 – 5 years, the primary usage for the 900 MHz and 1800 MHz frequency bands in Singapore will be 2G cellular mobile services.

ALLOWABLE USE FOR THE SPECTRUM

Question 2

IDA invites views and comments on the proposal to allow the 900 MHz and 1800 MHz frequency bands to be used for the provision of nationwide PCMTS using 2G and 3G technologies and other technologies which share a similar platform and allow higher speed data services, such a GPRS, EDGE or HSDPA/HSUPA/HSPA, and whether IDA should allow other services or technologies to be deployed, and the implications of doing so.

3.1 StarHub is aware of countries such as Finland and Australia that are working with the 900 MHz band for 3G services. However, as noted above, we think that the primary application for 3G 900 MHz would be in covering large geographic areas, when the primary (1900 MHz) bands are not available.

3.2 StarHub submits that the 900 MHz and 1800 MHz frequency bands should be restricted to 2G GSM services only (including GPRS services). We would note that there are 3.7 million 2G customers for the 900 MHz and 1800 MHz spectrum, and so it would be inefficient to use those bands to provide 3G services. In addition, it is important to note that there is unallocated 3G spectrum that could be used, if there is demand for that spectrum.

3.3 Allocating the 900 MHz and 1800 MHz frequency bands to 2G services would ensure that the most efficient use is made of the spectrum (in terms of the number of customers served). In addition, in taking this step, IDA would avoid the issue of licence fee calculation (as highlighted in Question 11 of the Consultation Paper), as there would be a clear separation between 2G and 3G customers.

3.4 However, StarHub recognises that some flexibility might be needed, over time, to facilitate the transition from one technology to another. We understand that, in future, an operator might no longer have a need for 2G spectrum (for example, if its customers have migrated to 3G services), and there might not be unallocated 3G spectrum available for use. In such cases, we can see an argument for allowing the spectrum to be used for 3G services. In such circumstances, where the spectrum is not supporting customers, we can see an argument for allowing the spectrum to be allocated by way of an auction (as such a move would not create service disruption or necessitate inefficient investment write-offs).

IDA also invites views on the traffic patterns for 3G services going forward eg. Whether traffic is likely to be more data-centric in future. Based on these projections, would the 3G spectrum rights issued in 2001 be sufficient? If not, when would there be a need for additional spectrum for 3G services?

3.5 StarHub believes that voice traffic will continue to be the major driver of 3G services over the next 5 years. We also believe that the migration and adoption of 3G services will be evolutionary, rather than revolutionary. We would highlight that, despite the first 3G trials being launched in 2004, nearly 75% of all mobile customers in Singapore are still utilising 2G networks.

3.6 It is StarHub's view that the 15 MHz of 3G spectrum allocated to each of the existing mobile operators will be sufficient to cater for demand over the next 1 – 5 years. StarHub would highlight that, in Hong Kong, incumbent 2G operators were allocated only 10 MHz of 3G spectrum, as OFTA felt that they could upgrade their existing 2G systems. However, it must be noted that this position is based on the assumption that existing mobile operators would retain their existing allocation of 2G spectrum.

5 MHz LOTS

Question 3

IDA seeks views and comments on whether the spectrum should be allocated in lots of paired 5 MHz spectrum per lot.

4.1 StarHub supports IDA's proposal to allocate 900 MHz and 1800 MHz spectrum in lots of paired 5 MHz bands. We believe that this allocation would give operators some measure of flexibility, without reducing the assigned spectrum to impractically-small bands.

SPECTRUM TO BE MADE AVAILABLE

Question 4

IDA invites views and comments on the potential demand for spectrum in the 900 MHz and 1800 MHz frequency bands in the next 7 years. In particular, IDA seeks views on:

- (i) the amount of spectrum that existing 2G operators would require for continuity of 2G service or other value-added services;
- (ii) whether existing 3G operators would require spectrum in these bands for 3G expansion or other value-added services, and if so, the amount of spectrum likely required;
- (iii) whether there is potential for new players to enter the market by obtaining spectrum in these bands, and if so, the minimum amount of spectrum required by a new entrant.

For each of the responses in this question, please provide IDA with the assumptions made to calculate the amount of spectrum.

Qn 4(i) – Spectrum for 2G Services

5.1 StarHub would note that the answer to this question contains commercially-confidential information. StarHub's answer is therefore set out in the confidential section of this submission (Annex A).

Qn 4(ii) – Whether existing 3G operators will require additional 3G Spectrum

5.2 StarHub believes that the current allocation of spectrum in the 1900 MHz frequency band to the existing mobile operators will be sufficient for the next 7 years (provided that we continue to have access to our existing 2G spectrum rights). We therefore do not believe that it will be necessary for the 900 MHz and 1800 MHz frequency bands to be allocated for 3G purposes. As noted above:

- As there are 3.7 million customers in Singapore for 2G services, any allocation of the 900 MHz and 1800 MHz frequency bands to 3G services is likely to be an inefficient use of spectrum;
- There is still unallocated spectrum available in the 1900 MHz band, which is suitable for 3G services; and
- If a point in time is reached at which 2G spectrum is no longer needed for 2G services, and its reallocation could be carried out in an undistruptive manner, an argument could be made for reallocating the spectrum by way of an auction.

Qn 4(iii) – New Entrants

5.3 It is important to note that the Singapore mobile market already has a penetration rate of over 111%, as of June 2007. The Senior Minister of State for Information, Communications and the Arts, Dr Balaji Sadasivan, has commented that "*Singapore's mobile market remains one of the most competitive markets in the region*";¹ while the IDA has described the mobile market in Singapore as

¹ <http://www.mica.gov.sg/Parliament/Sitting%2018-07-05.htm>

“mature and competitive”.² In such circumstances, it is questionable whether market entry by new operators is feasible (particular if they face the same licence obligations as the existing operators).

5.4 However, should a new operator wish to enter the mobile market in Singapore, we note that there is already extensive unallocated spectrum available for use. This unallocated spectrum includes: 15 MHz of 3G spectrum, 15 MHz of 1800 MHz spectrum, and 10 MHz of 900 MHz spectrum. StarHub would respectfully suggest that, if IDA is seeking to encourage competitive entry into the Singapore mobile market, the most effective option for implementing this policy would be through the allocation of new (and unassigned) spectrum to the new operator(s). We believe that this option would be less disruptive for customers, and less damaging to the investments that have already been made in the 2G networks, than a “green-fields” auction.

GUARD BANDS

Question 5

IDA seeks views and comments on the minimum size of the guard band required in cases where 2G networks co-exist with 3G networks and/or other services or technologies such as WiMax, in order to ensure minimal risk of interference among networks. IDA also seeks views and comments on the proposed arrangement for the provision of guard bands.

6.1 StarHub would note that there is currently no available research as to the minimum GSM-to-WCDMA guard band requirements for the co-existence of these networks. However, given that the existing GSM-to-GSM guard band is 200kHz, we would expect the GSM-to-WCDMA guard band to be wider.

6.2 In regard to the proposed arrangements for the provision of guard bands, StarHub can see the logic in having a clearly established principle for the allocation of guard bands between mobile operators.

‘GREENFIELD’ ALLOCATION

Question 6

IDA seeks views and comments on the pros and cons for both new entrants and existing rights holders of a ‘greenfield’ allocation of the spectrum.

7.1 In considering a “green-field” reallocation of the existing 2G spectrum rights, we believe that it is important to understand the current situation in the 2G mobile market. As of June 2007, there were 3,732,900 2G mobile customers in Singapore (up from 3,732,100 in June 2006). The existing 2G networks provide a nationwide level of coverage and service quality that is unmatched anywhere else in the region. We believe that the existing operators’ collective investment in their 2G networks would be measured in billions of dollars (please see Annex A for the basis of this statement).

7.2 Having considered the matter carefully, StarHub cannot see any significant advantage in the “green-field” allocation proposed in the Consultation Paper. However, we can see major disadvantages in such an arrangement. In particular:

- **Speculation:** We believe that a “green-field” reallocation would promote speculation, as third parties will be aware of the cost and dislocation to the existing operators if those operators had to relocate out of their existing spectrum bands.

² <http://www.ida.gov.sg/News%20and%20Events/20050712123200.aspx?getPagetype=20>

- ➔ **Customer Disruption.** As Ofta noted in November 2004, “*there are more than 7 million mobile customers in Hong Kong [and] ... GSM and PCS services have become a general commodity penetrating all walks of our society and affecting every aspect of our daily life. ... If they [the existing 2G operators] were not allowed to continue offering their services to their customers, there would be severe service interruptions, causing confusion and inconvenience to the public. The social consequence would not be acceptable to society as a whole.*” We believe that this argument is entirely applicable to Singapore and its 3.7 million 2G customers.

If a “green-fields” auction is implemented, and the existing mobile operators lose their access to 2G spectrum, there could be a significant service disruption to 2G customers. Even if new operators come into the 2G market, they will need a considerable time to establish a reliable nationwide network, and they will not be in a position to immediately serve the “stranded” 2G customers. The net result of a “green-fields” auction could well be the disruption of 2G cellular services, and economic dislocation.³

- ➔ **International Roaming.** Each year, millions of visitors arrive in Singapore, carrying 2G phones (please see Annex A for details). The existing operators have built up, over a number of years, the commercial and technical arrangements to carry the roaming calls for these visitors. If the existing operators do not have access to 2G spectrum, they will not be able to offer 2G international roaming services. A “green-fields” spectrum reallocation could therefore disrupt the provision of international roaming services to the large number of 2G roamers visiting Singapore each year.
- ➔ **Inefficient Spectrum Utilisation.** The existing mobile operators are using the 2G spectrum rights very efficiently, serving over 3.7 million customers with only 85 MHz of 2G spectrum. It is highly unlikely that a new entrant could utilise the existing 2G spectrum rights with the same level of efficiency. In Hong Kong, Ofta noted that “*the existing 2G licensees are likely to utilize the allocated spectrum more efficiently than new entrants, especially in the near term, given the significant sunk investments in constructing a mobile network for operation.*” If IDA is concerned about the efficiency with which the spectrum is used (as the Consultation Paper suggests), it is important to note that a “green-fields” reallocation of the existing spectrum rights could lead to inefficient spectrum utilisation.
- ➔ **Inefficient Investment Write-Offs.** As noted above, the existing operators have each invested hundreds of millions of dollars in their 2G networks, in order to comply with their licence obligations. This investment has gone into base stations, towers, mobile switching centres, billing systems, etc. If the mobile operators are unable to continue providing 2G services, it is possible that a proportion of their 2G investments could be used in their 3G networks. However, in such circumstances, it is likely that significant write-offs would have to be made to the existing 2G investments, and we do not believe that this would be an efficient outcome.
- ➔ **Discouraging New Investment in 2G.** The existing 2G operators have been making ongoing investments in their 2G networks, in additional coverage and capacity, as well as new services and applications. If IDA decides to implement a “green-fields” spectrum reallocation, this will inject considerable uncertainty and risk into ongoing 2G investments (which may have only 12 months to run before they have to cease). It is therefore likely that a “green-fields” reallocation would deter new investment in 2G, to the ultimate detriment of customers and the Singapore market.

³ In 2004, Ofta noted that: “*the direct offer of new licences to the existing 2G licensees would minimize the potential disturbance to existing consumers of 2G mobile services.*”

- **Disruption to Investment Reputation.** We believe that the consequences of a “green-fields” reallocation, in terms of disruption to services and inefficient write-offs would reflect poorly on Singapore as an investment destination. We would highlight that, in its 2003 consultation paper on the future of 2G spectrum rights, Ofta highlighted the importance of establishing “*a stable investment environment*” in deciding the future licensing arrangements for mobile services in Hong Kong.
- **Increased Costs.** We believe that any “green-fields” spectrum reallocation would inevitably create additional costs for the mobile operators. In addition to the spectrum charges (which we believe would rise if a spectrum auction is implemented), any auction result that requires an operator to change the spectrum it uses will inevitably increase costs for operators. For example, Combiner Ports in tunnels are currently mapped to the frequencies allocated to the existing operators, and any modifications will create costs for the operators. StarHub would submit that increased costs will inevitably impact on charges to consumers and the level of network investment.

7.3 If the spectrum being allocated was entirely new, and there were no legacy imbalance issues to resolve, we could see an argument for a “green-fields” allocation methodology. However, given its inherent costs and disadvantages, we strongly submit that a “green-fields” auction is inappropriate for the existing 2G spectrum rights.

7.4 StarHub believes that a more effective and appropriate method of allocating the existing spectrum rights would be to extend the term of those rights for the existing operators. It is important to note that the 7-year term of the spectrum rights is extremely short by international standards. By way of comparison, the term of 2G spectrum rights in Australia is 15 years, in New Zealand it is 20 years, in Hong Kong it is 15 years, and in Malaysia it is 20 years. A 7-year spectrum right discourages investment in 2G infrastructure, and artificially restricts the ability of an operator to generate a return on its investment.

7.5 StarHub submits that the term of the existing spectrum rights should be extended out by an additional 8-years (with a pro-rata licence fee), via an administrative process. This approach would provide service continuity for customers, would encourage further investment in 2G networks and services, and would reinforce investor confidence in the Singapore telecommunication sector (and avoid the numerous disadvantages of a “green-fields” reallocation).

7.6 In its Consultation Paper, IDA has correctly noted that SingTel and M1 have both been allocated spectrum in the 900 MHz frequency band, but that StarHub has not. The Consultation Paper goes on to highlight the difficulties that such “*legacy imbalances and distortions*” can create. StarHub agrees that it is disadvantaged in not having access to 900 MHz frequency, as the superior propagation characteristics of 900 MHz spectrum over 1800 MHz are well known. However, we do not believe that a “green-fields” auction is needed to resolve this problem. There is currently unallocated spectrum in the Extended GSM band (880 – 890 MHz and 925 – 935 MHz). A segment of this band could simply be allocated to StarHub by way of an administrative assignment, and this would correct much of the legacy imbalances and distortions (without the need for a “green-fields” auction and the dislocation it would cause).

7.7 IDA has highlighted that one of its considerations, in establishing an allocation framework, is ensuring that new entrants should have the opportunity to access mobile spectrum. StarHub would note that there are currently several spectrum bands, suitable for mobile services, which are idle and which could be assigned to a new entrant.⁴

⁴ These bands include:

- The 900 MHz band (880-890 MHz and 925-935 MHz);

7.8 As noted above, it is questionable whether the Singapore mobile market is capable of supporting additional operators. However, if IDA wishes to allocate spectrum to new entrants, we would recommend that IDA allocates spectrum from one of the unassigned (and idle) bands, rather than re-allocating spectrum which is already under use, and which has seen significant investment.

IDA also seeks comments on how the concerns set out in paragraphs 22(a), (b) and (c) can be adequately addressed if a ‘greenfield’ allocation of spectrum approach is not pursued.

7.9 As noted above, StarHub believes that an administrative allocation, extending the term of the existing 2G spectrum rights for the existing operators, is the most appropriate mechanism for reallocating those rights. We believe that a 7-year licence term is too short to allow investors to generate a return on their investments, and that a “green-fields” auction would have significant disadvantages which “*would not be acceptable to society as a whole.*” In regard to the questions IDA has raised, StarHub would offer the following comments:

- (a) *Opportunity for Interested Buyers to procure a scarce resource.* As noted above, if IDA is seeking to attract new entrants into the mobile market, StarHub would suggest that they be allocated spectrum from one of the unassigned (and idle) bands, rather than re-allocating spectrum that is already in use. This option would be less disruptive for customers than a “green-fields” auction, and could allow new entrants the opportunity to access 1900 MHz spectrum (which is likely to be more attractive than 2G spectrum for a new entrant).⁵
- (b) *Avoid perpetuating legacy imbalances.* As highlighted in paragraph 7.6 (above), StarHub submits that the legacy imbalances and distortions can be speedily resolved simply through the allocation to StarHub of spectrum from the (largely unassigned) Extended GSM band. While the legacy imbalances do create a serious competitive disadvantage for StarHub, they can be addressed without the need for a disruptive “green-fields” auction.
- (c) *Ensure most efficient Use of Spectrum.* StarHub respectfully submits that this question has been answered in Ofta’s 2003 analysis, which concluded that: “*the existing 2G licensees are likely to utilize the allocated spectrum more efficiently than new entrants, especially in the near term, given the significant sunk investments in constructing a mobile network for operation.*” The existing mobile operators are serving 3.7 million 2G mobile customers, on a nationwide-basis, with a very high quality of service, and we strongly believe that this is the most efficient use of the spectrum. We do not believe that a new entrant would be able to utilise this spectrum with an equivalent level of efficiency.

7.10 Generally, StarHub does not consider that auctions would be the most efficient mechanism for allocating spectrum. The only circumstances in which we believe spectrum could be auctioned is if IDA allows existing 2G spectrum to be used to provide 3G services. In such a case, there is a definite change in the use to which the spectrum is being put, and so an auction could be appropriate.

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- The 1800 MHz band (1730.5-1739.5 MHz, 1925.5-1934.5 MHz, 1779.9-1785 MHz, and 1874.9-1880 MHz; and
 - The 1900 MHz band (1964.9-1979.7 MHz and 2154.9-2169.7 MHz, and 1899.5-1904.9 MHz.

⁵ In addition, as Ofta noted in 2003, “*there is no domestic or foreign investment restrictions for the telecommunications sector in Hong Kong. Interested parties are free to enter the market through acquisition.*” Telekom Malaysia’s acquisition of a shareholding in MobileOne clearly illustrates that this statement is also applicable for new entrants wishing to operate in Singapore.

7.11 Nevertheless, if IDA decides to go ahead with an auction of the existing 2G spectrum rights (a move StarHub would not support), we believe that there are three elements that would be critical to such an auction:

- First, it would be necessary for IDA to establish a detailed pre-qualification exercise, to minimize speculation in the auction bidding, and to ensure that only established and capable operators can participate in the exercise. Only parties with a bona-fide interest in providing mobile services in Singapore should be allowed to participate in the auction, to ensure that opportunities to speculate and game are minimised.
- Second, it would be critical to ensure that new operators face the same licence obligations (particularly in terms of coverage, rollout, and quality of service) as the existing operators, to ensure that the regulatory framework is competitively-neutral.
- Third, we believe that it would be essential for IDA to implement a Right-of-First-Refusal (“RoFR”) mechanism⁶ for existing rights-holders. This would provide a stable investment environment and minimize the potential disturbance to existing customers of 2G mobile services.

7.12 Looking at international best practice, StarHub has been unable to find any country that has used a “green-fields” auction to allocate existing 2G spectrum rights. Hong Kong, in considering this matter, decided that a RoFR mechanism was necessary to prevent serious service disruptions and damage to the investment climate.⁷ New Zealand has also decided on a RoFR mechanism for mobile spectrum, deciding in April 2003 on a policy for the reallocation of spectrum rights on expiry, which provides that subject to case-by-case assessment, replacement rights will be offered to existing right holders five years before expiry, and that if the renewal offers are rejected, the rights will be reallocated by auction. Disruption of services to customers, and the stability of the investment climate were also important considerations in New Zealand. In regard to digital radio services, Australia has also put in place a RoFR mechanism for existing spectrum users.

7.13 StarHub strongly believes that the costs of a “green-fields” auction for the existing 2G spectrum rights would be very high, and that the disadvantages would be numerous. We therefore believe that an administrative extension of the existing 2G spectrum rights (together with the allocation of additional mobile spectrum – if IDA is seeking to encourage competitive entry into the market) is a more effective option. StarHub submits that, if IDA wishes to auction off the existing 2G spectrum rights, a number of mechanisms (including RoFR for existing rights-holders) must be implemented.

⁶ By “Right-of-First-Refusal”, StarHub is referring to a pre-emptive right, given to the operators currently holding 2G spectrum rights, which would allow them to indicate an interest in retaining those rights. The spectrum auction would only take place for those spectrum rights where RoFR was not exercised by an existing operator.

⁷ In reaching its decision, Ofta set out the considerations it believed were relevant for deciding the future licensing arrangements for 2G mobile services. These considerations were: (i) to ensure choice of services; (ii) to provide stable investment environment; (iii) to ensure efficient use of spectrum; (iv) to ensure continuity of customer service; and (v) to maintain technology neutrality. We respectfully believe that these considerations are also appropriate for Singapore.

Question 7

IDA seeks operators' feedback on the implications of such network adjustment, and how IDA can mitigate such network adjustment and minimise disruption to end users, bearing in mind IDA's policy objective of ensuring efficient use of the spectrum. In particular, IDA seeks operators' feedback on the timeframe and processes of cutting over from the operators' existing frequency bands to its new frequency bands, whether additional temporary use frequencies are required for such cut over, and if so, the minimum amount of temporary use spectrum required.

8.1 StarHub would emphasize the magnitude of the network adjustments that a "green-fields" auction could potentially generate. Despite the fact that 3G services have been in operation for nearly three years, Singapore only has 1.25 million 3G lines. Moving the remaining 75% of mobile lines in Singapore over to 3G would be extremely challenging, and would take a number of years. The period of time required by a new entrant to build their network up from scratch, to match the coverage of the existing operators, and to create the necessary international roaming arrangements, would also be measured in years.

8.2 Using StarHub as a case study, considerable planning work was carried out by StarHub before the award of the Public Cellular Mobile licence in May 1998. Nevertheless, the construction of StarHub's mobile network continued until the launch of services (nearly two years later). Looking at the example of Hong Kong, we would highlight that Ofta gave the TDMA and CDMA licensees a migration period of three years as part of the 2G spectrum reallocation process. In the event that a "green-fields" auction is held in Singapore, the resulting migration could well be more complex, and involve more customers, than the TDMA/CDMA migration in Hong Kong. Therefore, the migration period in Singapore may need to be longer.

8.3 If IDA decides to proceed with a "green-fields" auction of the existing 2G spectrum rights, it would certainly be important for IDA to allocate temporary frequencies to facilitate the migration of customers. StarHub submits that the minimum amount of temporary frequency required for this migration must match the amount of frequency that needs to be "vacated" by the existing operator. If an equivalent amount of spectrum is not allocated, this would inevitably impact on the operators' coverage and capacity, and the quality of service delivered to customers.

8.4 In regard to the time period for the migration, this will depend on the size of the migration and the number of operators involved. But, as noted above, the migration might conceivably have to extend over several years. It is important to note that any migration exercise will have to involve a range of third parties, including those parties providing mobile infrastructure in road and MRT tunnels. Given the complexity, cost and time involved in such a migration, StarHub respectfully suggests that a less disruptive (and more cost-effective) option would be to extend the term of the existing 2G spectrum rights, and to allow a gradual migration of customers over to the 3G networks.

ALLOCATION BY SPECIFIC FREQUENCY BANDS

Question 8

IDA seeks views and comments on whether operators should be allowed to indicate interest for specific spectrum lots, as opposed to anonymous spectrum lots.

9.1 It is important to note that not all spectrum lots are equal. As noted above, the superior propagation characteristics of 900 MHz spectrum over 1800 MHz are well known. Similarly, some spectrum bands may be more (or less) subject to interference than others. Operators are therefore likely to have a preference for one spectrum lot over another.

9.2 Therefore, if IDA decides to proceed with a spectrum auction, StarHub believes that it will be necessary for IDA to identify the different spectrum lots, and allow operators to indicate an interest in specific spectrum lots. This approach would also provide a degree of certainty to operators, and would enable existing operators to “choose” to bid for lots that can minimise disruption to their network and customers. StarHub does not believe that anonymous spectrum lots would serve any practical purpose.

9.3 Nevertheless, as noted above, if an auction is adopted, StarHub believes that there is a need for the auction rules to be carefully drafted to prevent speculators from participating in the auction. In particular, we believe that a pre-qualification exercise would be needed to “weed-out” all those parties who are not bona-fide operators with an intention of providing services in Singapore; as well as an obligation for any new entrant to comply with the same licence obligations as the existing operators.

DURATION OF SPECTRUM RIGHT

Question 9

IDA seeks views and comments on whether a 7-year duration for the new spectrum rights is reasonable.

10.1 StarHub believes that the duration of a spectrum right should reflect, *inter alia*, the licence obligations (and licence duration) set for an operator. If an operator is required to make heavy investments in its network, in order to comply with the obligations of its licence, the spectrum right must have a sufficient duration to enable operators to generate a return on that investment. In the case of Singapore, 2G mobile operators are given 17-year licenses (and they can only terminate their 2G services with IDA’s written approval in advance), and have very heavy rollout and quality of service obligations. However, the duration of 2G spectrum rights is only 7-years, which we believe is insufficient.

10.2 As noted above, the standard duration for a 2G spectrum right in Hong Kong, Australia, Malaysia and New Zealand is in the order of 15-20 years (and the licence obligations faced in those countries are considerably less onerous than those in Singapore). We believe that a 7-year duration for 2G spectrum rights would be out of line with international best practice, and would not provide sufficient time to recover network investments.

10.3 As an absolute minimum, we believe that 2G spectrum rights should have a duration of 15-years (and preferably 20-years). On this basis, we believe that the existing 2G spectrum rights should have their term extended by an addition 8 years, to put them in line with the duration of spectrum rights in jurisdictions such as Hong Kong and Australia.

FEES FOR ALLOCATION AND USE OF NEW SPECTRUM RIGHTS

Question 10

IDA seeks views and comments on the proposed fee structure for successful bidders of the new 900 MHz and 1800 MHz spectrum rights.

11.1 StarHub has no objection to the proposed fee structure.

Question 11

IDA seeks views and comments on the proposed approach, and suggestions on alternative approaches, to differentiate services provided over the existing 3G spectrum rights from those provided over other spectrum bands like the 900 MHz or 1800 MHz bands for the purposes of licence fee collection.

11.2 As noted above, StarHub believes that the present allocation of 15 MHz of spectrum per operator in the 1900 MHz band is currently adequate for 3G services. We note that there is unassigned spectrum in the 1900 MHz band that is suitable for use by 3G operators; and we see that 3G in the 900 MHz band is more useful for covering large geographic areas. Therefore, we do not see an immediate need to allocate 900 MHz for 3G services. This being the case, we believe that the existing licence fee structure can continue without modification.

11.3 However, StarHub accepts that if IDA does allow 900 MHz to be used for 3G services, this would greatly complicate the calculation of licence fees. However, we do not believe that the suggestion in the Consultation Paper, that 3G revenues should be assessed based on relative network usage, would be practical. The information systems the mobile operators have in place are generally focussed on collecting the data necessary for customer billing, and may be unable to provide the type of information IDA is seeking.

11.4 For example, if a call commences in a 3G band and ends in a 2G band, it is highly unlikely that a mobile operator would be able to determine the point at which the call changed bands (as this information is not needed for billing purposes). It is therefore unclear, under the methodology proposed in the Consultation Paper, whether this call would be treated as a 3G call or not.

11.5 StarHub believes that the most effective mechanism for determining licence fees is to assess revenues based on the customer's service characteristics. For example, if a customer has a 3G SIM card and contracts for 3G services, we believe that they should be considered a 3G customer, and the revenue they generate should be caught within the 3G licensing regime. We believe that this is the most sensible way of addressing the licence fee issue.

11.6 However, for the avoidance of doubt, we would emphasise our earlier statement that we believe the existing 900 MHz and 1800 MHz spectrum bands should be restricted to 2G GSM services. We do not believe that there is an immediate need to allow those bands to be allocated for 3G services. We therefore see that there will be a clear demarcation between 2G and 3G customers (and the revenues they generate for operators).

USE OF 800 MHz BAND

Question 12

IDA seeks views and comments on the potential uses of the 800 MHz spectrum band, whether there is industry interest in the band and the potential for new entrants obtaining spectrum in the band.

12.1 The 800 MHz spectrum band includes the 880-890 MHz range, which has been assigned (along with the 925-935 MHz range) as the Extended GSM band. There are only 25 MHz of spectrum available in the GSM 900 MHz band, and this range has been fully allocated to MobileOne and SingTel. StarHub therefore believes that there would be significant benefits in making spectrum in the Extended GSM band available for 2G cellular mobile services.

12.2 Such an allocation would help to address the “*legacy imbalances and distortions*” highlighted in the Consultation Paper. The allocation would also improve the quality of service customers receive, given the propagation characteristics of 900 MHz spectrum. As the Extended GSM band is largely unallocated, we respectfully submit that IDA should open this band up for use.

CONCLUSION

13.1 StarHub strongly agrees with IDA on the need to ensure that spectrum is used efficiently. We also agree with Ofta that, in reallocating existing 2G spectrum rights, it is also necessary to ensure continuity of customer service; to provide a stable investment environment; to ensure choice of services; and to maintain technology-neutrality.

13.2 Based on these criteria, we believe that the most effective method of reallocating the existing 2G spectrum rights would be to extend the term of those rights by 8 years (via an administrative assignment). In parallel, if IDA wanted to encourage new entry into the market, or if it wanted to correct the “*legacy imbalances and distortions*” in the 2G spectrum allocations, it could make available additional (and unassigned) mobile spectrum. Such a move would:

- Ensure continuity of service, without the need for any damaging service disruptions for Singapore customers and international roamers.
- Provide a stable investment environment, allowing operators to generate a return from their 2G networks; and to invest further in coverage, capacity and new services.
- Ensure that 2G customers continue to have a choice of providers.
- Be technology-neutral, particular if new spectrum is made available.
- Be the most efficient use of the spectrum (with Ofta noting, in comparable circumstances, that the “*existing 2G licensees are likely to utilize the allocated spectrum more efficiently than new entrants, especially in the near term*”).

13.3 On the same grounds, StarHub would disagree with the Consultation Paper’s proposal to implement a “green-fields” auction of the existing 2G spectrum rights. We believe that such an auction has the potential to cause considerable service disruptions to the 3.7 million 2G customers served by the existing operators, and well as to the millions of 2G roaming customers visiting Singapore each year. A “green-fields” auction could also potentially necessitate the write-off of hundreds of millions of dollars of investment in 2G infrastructure, with flow-on implications for Singapore’s investment reputation. Given the costs and dislocation inherent in a “green-fields” auction, we believe that this approach is inappropriate for the existing 2G spectrum rights.

13.4 If IDA nevertheless still wishes to proceed with an auction (in spite the costs of such a move), StarHub strongly believes that it would be necessary for IDA to implement a rigorous prequalification mechanism (to minimize speculation) and to ensure that any new entrants are subject to the same coverage and rollout obligations as the existing operators. Furthermore, we strongly believe that it would be critical for IDA to implement a RoFR mechanism in the auction, to provide a measure of certainty in regard to service continuity and investment stability.

13.5 We would highlight that, in considering the reallocation of existing 2G spectrum rights, both Hong Kong and New Zealand have implemented RoFR mechanisms, because of the need to ensure service stability and investment certainty. If IDA decides to implement an auction for the existing 2G spectrum rights, we believe that a similar approach is essential.

13.6 StarHub is grateful to IDA for conducting an open and transparent consultation process, and for the opportunity to comment. Nevertheless, we believe that a “green-fields” auction is inappropriate for spectrum which is currently serving 3.7 million customers, when there is unassigned spectrum available for allocation.

StarHub Mobile Pte Ltd
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