
Hutchison Telephone Company Limited

Response to the Second Consultation Paper on “Arrangements for the Frequency Spectrum in the 900 MHz and 1800 MHz Bands upon Expiry of the Existing Assignments for Public Mobile Telecommunications Services and the Spectrum Utilisation Fee”

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Executive Summary

Spectrum Re-assignment

1. Hutchison makes this submission in response to the Second Consultation Paper jointly issued by the CA and the SCED. In the Second Consultation Paper, the Government proposes the adoption of the “hybrid” option (Option 3), involving re-auctioning 60% of the 900/1800 MHz Spectrum. Option 1 (right of first refusal) and Option 2 (a full auction) appear to have been ruled out by the Government.
2. Hutchison continues to believe that giving a right of first refusal to the existing licensees of the 900/1800 MHz Spectrum under Option 1 is the only rational and reasonable choice for the Government to adopt. There are overriding public policy reasons why an auction should not be held. Our arguments are set out in detail in our response to the First Consultation Paper.

Disruption to Customer Service Continuity

3. The Government admits that the continuity of 4G services at certain MTR premises is a valid concern and hence needs to be resolved. Nonetheless, its proposal to re-assign only 2 x 10 MHz of spectrum in the 1800 MHz band to each of the incumbent spectrum assignees as RFR Spectrum is insufficient to mitigate the 4G service continuity problems.
4. The assumptions made under the network capacity assessment model deployed by the Consultant are too optimistic. The Plum Report did not address the significant negative impacts on quality of experience. Further, the assumptions on the progress of network upgrade in the Remaining MTR Stations and the effectiveness of the mitigating measures are too optimistic.
5. To ensure both continuity of services and quality of experience, we propose that 2 x 5 MHz of spectrum in the 900 MHz band (additional to the 2 x 10 MHz of spectrum in the 1800 MHz band as proposed by the Government) should be offered as RFR Spectrum, i.e. a total of 60% of the 900/1800 MHz Spectrum be divided equally between the four MNOs and the remaining 40% for auction.

Hindrance to Long-term Investment and Innovation

6. The Government’s preferred Option 3 would infringe the legitimate expectations of the MNOs. The possible loss of spectrum by the incumbent MNOs would depress incentives for investment. The costs of re-configuring the network and replacing lost capacity would divert resources away from expanding coverage or introducing innovative services to consumers. Such disruption to customer services, investment

and innovation will cause substantial damage to Hong Kong's international reputation for high quality, low cost telecommunications services.

7. The Government asserts that auction will promote competition and efficient use of spectrum. Embarrassingly, it has been proven wrong as shown in the case of 21 ViaNet. Indeed, the ever increasing demand for higher-speed wireless data and the vigorous competition between MNOs have already ensured that spectrum is efficiently utilised.

Excessive SUF is against the Public Interest

8. The Government's proposed levels of SUF are grossly excessive and will ultimately harm consumers. It is against the public interests to seek maximising Government revenues via collection of high spectrum fee, which inevitably causes adverse impacts on tariffs to be borne by mobile users. In the First Consultation Paper, we urged the Government to make it clear whether such exorbitant spectrum fee is a type of spectrum tax/ Government levy, but got no response.
9. The proposed method of setting SUF, where the minimum price for the RFR Spectrum is higher than the auction reserve price, is one-sided in favor of the Government and prejudicial to the incumbent MNOs. We propose that the price adjustment mechanism should be two-way, i.e. a downward price adjustment mechanism should be in place, subject to a floor price, in the event that the final price for the Auctioned Spectrum is lower than the minimum price for RFR Spectrum.
10. Regarding the method of payment of SUF, we propose a royalty-based payment scheme where the SUF would be calculated at a percentage of the local network service revenue, subject to a guaranteed minimum payment, to be paid annually over the period of assignment. Based on the fundamental nature of the SUF, it should be tax deductible irrespective of the method of payment.

Restrictions on Switching off 2G Network

11. The proposed license conditions requiring MNOs to seek the prior consent of the CA before phasing out their provision of 2G services and other generations of mobile services in the future is unnecessary and contradicts the "technology-neutral" approach traditionally adopted by the CA.
12. In view of the global experience and the rapid evolution of the mobile ecosystem, the Government should let the market decide the best technologies to take on board. Being at the forefront of the wireless technology, the MNOs should have the liberty to re-allocate the radio frequency spectrum to meet the market demand for more advanced mobile services for the benefits of consumers in the future.

Our Queries to the Government

13. In view of the 21 ViaNet case, how would the Government rectify the situation and avoid such disgrace from happening again? If spectrum trading is eventually allowed in Hong Kong, how would the Government prevent a new entrant who may engage in spectrum “hoarding” by paying a very high price for spectrum with an intention not to put it for immediate use, but to exclude competitors and bid up the price for future trading purposes?
14. Obviously, the Government has taken advantage of the stuck situation of the incumbent MNOs in setting the level of minimum price for the RFR Spectrum. Comparisons with international benchmarks have shown that our SUF are absurdly high on a global scale. Hence, we wonder, has revenue maximization become one of the Government’s objectives in setting spectrum policy at the expense of the long-term, healthy growth of the telecommunications industry in Hong Kong?
15. The current transfer of financial resources from the incumbent MNOs to the Government through grossly excessive SUF is unreasonable and unnecessary, severely hampering the MNOs ability to provide competitive tariffs to consumers. Once again, we urge the Government to response to our query – is such an exorbitant SUF a type of spectrum tax/ Government levy?

I. Introduction

1. Hutchison Telephone Company Limited (“**Hutchison**”) makes this submission in response to the second consultation paper on “Arrangements for the Frequency Spectrum in the 900 MHz and 1800 MHz Bands upon the Expiry of the Existing Assignments for Public Mobile Telecommunications Services and the Spectrum Utilisation Fee” (“**Second Consultation Paper**”) jointly issued by the Communications Authority (“**CA**”) and the Secretary for Commerce and Economic Development (“**SCED**”) on 14 February 2017¹.
2. Hutchison continues to believe that giving a right of first refusal to the existing licensees of their current holdings of frequency spectrum in the 900 MHz and 1800 MHz bands (“**900/1800 MHz Spectrum**”) under Option 1 is the only rational and reasonable choice for the Government to adopt. There are overriding public policy reasons why an auction should not be held. Our arguments are set out in detail in our response to the First Consultation Paper².
3. In the Second Consultation Paper, the Government proposes to adopt the hybrid administratively-assigned cum market-based approach for the re-assignment of the 900/1800 MHz Spectrum (Option 3), involving re-auctioning 60% of the 900/1800 MHz Spectrum currently held by the four existing mobile network operators (“**MNOs**”) ³. Option 1 (right of first refusal) and Option 2 (a full auction) appear to have been ruled out by the Government. Hence, we will focus our discussion on the Government’s preferred “hybrid” option in this paper.
4. In Part II of this submission we highlight and explain our views on the main issues in the Second Consultation Paper. Part III contains our answers to the specific questions raised in the Second Consultation Paper. Reference can be made to Part II of the submission for further explanations of these answers.

II. Response to Main Issues

Disruption to Customer Service Continuity

Service Degradation

5. The CA commissioned Plum Consulting London LLP (“**Consultant**”) to conduct a technical study on the impacts on the service quality arising from the spectrum re-

¹ In the interest of brevity, we use the term “the Government” to cover both the CA and SCED in this paper.

² The first public consultation on “Arrangements for the Frequency Spectrum in the 900 MHz and 1800 MHz Bands upon the Expiry of the Existing Assignments for Public Mobile Telecommunications Services and the Spectrum Utilisation Fee” issued by the Government on 3 February 2016.

³ The MNOs are Hutchison, SmarTone Mobile Communications Limited, Hong Kong Telecommunications (HKT) Limited, and China Mobile Hong Kong Company Limited.

assignment (“**Plum Report**”)⁴. Based on the Plum Report, the Government agrees that the continuity of 4G services at 43 MTR stations and the adjoining tunnels (“**Remaining MTR Stations**”) could be a matter of concern. Further, it acknowledges that where there would be a new entrant, 4G networks of two MNOs in high traffic areas are expected to experience service degradation in 2023⁵. Mindful of the risks, the Government states in the Second Consultation Paper that:

“Should the outcome of the Re-assignment of the 900/1800 MHz Spectrum in the new term be such that the MNOs are unable to retain the part of their respective spectrum holdings in the 1800 MHz band which is used for the provision of 4G services at MTR premises, the continuity of 4G services in the Remaining MTR Stations will be at risk, and service users will be adversely affected during the long lead time required to complete the configuration of the IRS in these stations.”⁶ [emphasis added]

6. In fact, such risks would escalate when we take into consideration the public security and safety issues, in particular MTR is predominantly a high traffic indoor area with confined spaces. If an accident happens inside the MTR premises, passengers would need to communicate with others through the use of mobile phones. We can’t image how chaotic it would be if all these communications were to be interrupted, bearing in mind that the MTR and Airport Express trains carry an average of about 4.69 million passengers per day.⁷ Hence, the provision of uninterrupted mobile phone services, especially in confined areas like MTR lines, has been clearly a crucial matter in public safety and security.
7. To mitigate the 4G service continuity problems, the Government adopts the Consultant’s recommendation on re-assigning 2 x 10 MHz of spectrum in the 1800 MHz band to each of the incumbent MNOs through the offer of a right of first refusal (“**RFR Spectrum**”), with the remainder of the 900/1800 MHz Spectrum for auction (“**Auctioned Spectrum**”). However, we consider that the proposed portion of the RFR Spectrum is insufficient to mitigate the 4G services continuity problems and the assumptions made in the Plum Report are too optimistic for the reasons stated below.

Over-Optimistic Assumptions made in the Plum Report

8. The Consultant reaches its conclusion (i.e. the proposed RFR Spectrum is sufficient to mitigate the service continuity problems) based on a number of assumptions which are questionable:

⁴ “*Technical Study in relation to the Re-assignment of Spectrum in the 900 MHz and 1800 MHz Bands upon Expiry of the Existing Assignments*”, by Plum Consulting London LLP, September 2016.

⁵ Paras. 28 & 37, The Second Consultation Paper.

⁶ Ibid at Para. 42.

⁷ Hong Kong: The Facts – Transport, May 2016, available at GovHK website: <http://www.gov.hk>.

- (a) It assumes that there would be minimal or no service quality issues when the network loading of the total network capacity reaches 80% while the DCO is zero⁸. However, it does not take into account the abnormal traffic scenarios and the significant impact on the quality of experience, which would deteriorate when the network loading increases. The deterioration would occur notwithstanding the DCO is at zero level. Indeed, the Consultant admits that the assessment model is “not a simulation or emulation of the network and that there will be limits to its accuracy as a result.”⁹ Simply put, it does not accurately reflect the real life situations.
- (b) It assumes that “the expected competition would make it unlikely that a new entrant can acquire more than 2 x 20 MHz of spectrum across the two bands (i.e. one-fifth of the 900/1800 MHz Spectrum).”¹⁰ This obviously underestimates the power and disruption of a new entrant which has strong financial resources to acquire more than 2 x 20 MHz of spectrum in auction.
- (c) It assumes that network upgrade (for instance, incorporation of LTE 2100, TD-LTE 2300 and LTE 2600) would be in good progress, ignoring the fact that no agreement has yet been entered into between MNOs and the MTR Corporation Limited (“MTRC”) on the upgrade of the integrated radio systems (“IRS”) in the Remaining MTR Stations¹¹. It does not address the potential service impacts should the upgrade schedules delay. Nor does it take into account the increasing data usage per subscriber which, partly driven by the very low-priced data plans recently offered in the market, would make it difficult for the MNOs with the reduced spectrum to meet the increased demands. Further, it fails to demonstrate how the RFR Spectrum could provide adequate capacity to mitigate the DCO at the Remaining MTR Stations.
- (d) It assumes that the proposed measures would work for specific MNOs to mitigate the service continuity problems. However, it is not clear that those MNOs who would suffer service degradation would be able to, as the Consultant suggests, offload more of its 4G traffic onto Wi-Fi (up to 10% of MNOs’ 4G traffic) and increase the number of 4G sectors by 10% annually from 2016 to 2023.¹² These assumptions are unrealistic. For instance, the proposed measures may not be technically feasible in certain areas due to complex radio environment in dense urban areas and Wi-Fi deployment over heavily polluted ISM bands for capacity offload. Further, Wi-Fi coverage is not available inside MTR tunnel tubes currently.

⁸ DCO, Demand Capacity Overage, is an assessment model developed by the Consultant to evaluate the impact on the quality of mobile services by comparing the projected traffic demand and the estimated network capacity. To calculate the DCO, the maximum allowable network loading threshold is set as 80% of the total network capacity. A zero DCO indicates minimal or no service quality issues.

⁹ Section B.4, The Plum Report.

¹⁰ Ibid at Section 3.7.1,

¹¹ Ibid at Section 4.1.

¹² Ibid at Section 4.5.1.

9. A further point on MTR. The Plum Report notes that MTR is predominantly a high traffic indoor area with confined spaces (on station concourses, platforms and in rail tunnels). The constraints of such an environment have made it difficult to apply the assessment model. As a result, the DCO was not presented in the case of MTR and the Consultant's view was given based on a qualitative assessment, instead of a quantitative analysis:

“It is not easy to model the MTR environment and the sort of full engineering modelling exercise required is outside the scope of this Study. This is due to the more granular and specific characteristics of each MTR location. Under these circumstances the simplifying assumptions and averaging effects that can be taken advantage of in the assessment model become less reliable to the extent that the result can be misleading. Also, establishing a demand profile for stations and on the trains requires a specific forecasting methodology. Forecasts from Cisco and other industry players, which are good for network wide modelling are unreliable when looking at an environment like the MTR. For this reason, we are not presenting modelling results for the MTR and our view given below is based on a qualitative assessment.” [emphasis added]¹³

Against this background, we doubt very much if the Consultant's recommendation (i.e. re-assigning only 2 x 10 MHz of spectrum in the 1800 MHz band, without taking into consideration any spectrum in the 900 MHz, as RFR Spectrum) could properly address the service continuity problems in the MTR.

Our Proposal: Additional RFR Spectrum in the 900 MHz Band

10. To ensure both continuity of services and quality of experience, we propose that 2 x 5 MHz of spectrum in 900 MHz band (additional to the 2 x 10 MHz in the 1800 MHz band as proposed by the Government) should be offered as RFR Spectrum, i.e. a total of 60% of the 900/1800 MHz Spectrum be divided equally between the MNOs and the remaining 40% for auction. This solution would create a level-playing field amongst the existing MNOs.
11. Loss of 900 MHz band would reduce incumbent MNOs' network coverage and capacity extensively, especially in the Remaining MTR Stations where no commercial agreement has been signed between the MNOs and MTRC. Hence, the schedule for upgrading the IRS to include 2.3 GHz and 2.5/2.6 GHz for supporting 4G services with frequency agile equipment remains at a very remote stage.
12. Indeed, the 900 MHz band which has the smallest propagation loss (i.e. best coverage) could provide not only high speed data services but also high quality voice services using Voice over LTE (VoLTE). It is particularly well-suited to deployment for

¹³ Section 5.1, The Plum Report.

indoor coverage, especially along the MTR lines, providing seamless and reliable quality of experience. As such, including 2 x 5 MHz of spectrum in the 900 MHz band as RFR Spectrum would effectively address the concerns over service continuity, which plays an equally important role as the spectrum (i.e. 2 x 10 MHz of spectrum in the 1800 MHz band) reserved by the Government as RFR Spectrum. More importantly, it would minimize the risk of service interruption and ensure public security and safety along the MTR lines. In a broader sense, it helps to put Hong Kong in a safer, less vulnerable situation.

Hindrance to Long-term Investment and Innovation

Disruption to Business Continuity

13. As stated in our response to the First Consultation Paper, Option 1 would best encourage continued investment and innovation, whereas Option 3 would discourage it. Since the 2G licences were granted in 2005/2006, the MNOs have spent huge amounts of money in network infrastructure. Indeed, the 900/1800 MHz Spectrum has already been extensively re-farmed from 2G services to 3G and 4G services. To take away the spectrum in these circumstances would effectively be penalising investment previously made by the MNOs and discouraging provision of better services to consumers. Worse still, this would set a bad precedent for investors when it comes to future investment decisions on technology evolution. With looming uncertainty over spectrum holding, there will be less investment interest in network improvements and new services using the 900/1800 MHz Spectrum for the next few years. Services such as NB-IoT and carrier aggregation of the 900/1800 MHz Spectrum which was a result of recent investment would have to be ceased to offer to consumers.
14. Substantial loss of spectrum by one or more MNOs could severely hamper their ability to compete effectively, and thereby harm market competition. By reducing the competitiveness of the Hong Kong market, such spectrum loss would reduce the ability and incentive of MNOs to invest and innovate in new services. The result of causing such disruption to customer services and business continuity would ultimately damage Hong Kong's international reputation for being one of the most advanced, sophisticated and cheapest telecommunications markets in the world.
15. We reiterate that the mere fact that the Government has stated that there is no legitimate expectation¹⁴ does not mean that there is none. When HTCL re-farmed its 900 MHz and 1800 MHz bands for use of 3G and 4G services respectively, it would expect that the investment would pay off enabling it to further invest in other advanced technology for the benefits of the company, its business partners, and mobile users as a whole. The World Bank has also noted the importance of licence

¹⁴ In the Radio Spectrum Policy Framework of 2007, the Government states that there is no legitimate expectation that there will be any right of renewal or right of first refusal upon the expiry of a spectrum assignment.

renewal for investment, which gives a positive signal for operators to continue to invest in their networks which have long payback times. Prospects for license renewal also offer needed assurance to operators to engage in long-term financing for their network¹⁵.

New Entrants Do Not Necessarily Achieve Spectral Efficiency

16. The Government speculates that an auction would increase competition and the efficient use of spectrum. It asserts in the Second Consultation Paper that:

“If part of the re-assigned spectrum is taken up by new entrants, they will need to make investment to build the networks from scratch and put the spectrum to use in a timely manner. Besides, new entrants may also be potentially more innovative and act as the maverick in their business offerings in order to make early inroads into the keenly competitive mobile telecommunications market.”¹⁶ [emphasis added]

17. The above view, however, has been proven wrong. The case of 21 ViaNet Group Limited (“**21 ViaNet**”), a new entry to the mobile telecommunications market in Hong Kong, was a slap in the face for the Government. By way of background, 21 ViaNet successfully bid for 30 MHz of unpaired spectrum in the 2.3 GHz band in February 2012, but ended up not utilising the spectrum to establish a mobile network for the provision of mobile services. The spectrum had been left idle for a few years. In 2015, 21 ViaNet, having failed to meet its network/ service coverage requirements, filed an application to the CA for amending its roll-out obligations to focus on village houses in rural and remote areas. The application was subsequently approved by the CA.
18. Contrary to CA’s wishful thinking, 21 ViaNet did not put the spectrum in use in a timely manner, not to mention having the ability to act as a maverick in the mobile industry. Given the 21 ViaNet case, we wonder, how would the Government rectify the situation and avoid such disgrace from happening again? We believe the CA owes the industry an answer. Furthermore, if spectrum trading is eventually allowed in Hong Kong, how would the Government prevent a new entrant who may engage in spectrum “hoarding” by paying a very high price for spectrum with an intention not to put it for immediate use, but to exclude competitors and bid up the price for future trading purposes?

¹⁵ “*Mobile Licence Renewal: What are the Issues? What is at Stake*”, by Boutheina Guermazi and Isabel Neto, The World Bank, June 2005.

¹⁶ Para. 56, The Second Consultation Paper.

Investment Efficiency

19. The possible loss of spectrum by the incumbent MNOs would depress incentives for investment and reduce efficiency in the industry as a whole. Should the MNOs lose all or part of their existing spectrum holding, they have to discard part of, or an entire, mobile communications network as dedicated equipment was installed for a specific frequency band or IRS, resulting in an enormous wastage of Hong Kong resources. The costs of re-configuring the network and replacing lost capacity by the incumbent MNOs would divert resources away from expanding coverage or introducing innovative services to consumers. A new entrant, on the other hand, would need to spend a substantial amount of money with considerable lead time to establish a new network infrastructure from scratch in Hong Kong. Ultimately, Hong Kong consumers would need to bear their enormous costs in this years-long network shuffling process.
20. Recent international experience has indicated that the general trend is towards consolidations between major mobile network operators, as seen in mature markets like the United Kingdom, Germany, and Denmark. In Hong Kong, the mobile market has become a 4-MNO play after the CSL-HKT merger in 2013. With one of the highest mobile penetration rates in the world at approximately 230% and a highly competitive mobile market, new entrants are not needed here. The MNOs, together with multiple MVNOs¹⁷ and resellers, have already made Hong Kong's mobile market vigorously competitive, as demonstrated in the recent offering of mobile data plans at nearly cutthroat prices. Moreover, entry of an additional player would further fragment the limited spectrum available in the market and detrimentally impede the MNOs' ability to aggregate spectrum to provide faster data speeds and hence improve quality of experience for mobile users.
21. Repeatedly, the Government has asserted that an auction is the best mechanism to guarantee that the spectrum is used efficiently. Being aware of the embarrassing case of 21 ViaNet, the Government still boldly states in the Second Consultation Paper that: "A SUF that reflects the full market value of the spectrum, as determined by the market through a competitive process, is important in ensuring that the spectrum resource is put into the hands of the MNOs which value it the most and will consequently put it to the most efficient use. This market-based approach in determining SUF is well-trying out in Hong Kong for well over a decade."¹⁸ This assertion assumes that, unless a high price is paid for spectrum, it will not be used efficiently, an assertion which is not borne out by the facts. Obviously, the Government has linked spectrum efficiency to spectrum prices (which we will discuss in more details in the next section) without giving any evidence whatsoever to show how the spectrum is not being utilised efficiently.

¹⁷ As at 24 May 2017, there are 28 service-based licensees providing MVNO (Mobile Virtual Network Operator) services in Hong Kong, OFCA's website: http://app1.coms-auth.hk/apps/telecom_lic/content/sbo_lic_list.asp.

¹⁸ Para. 63, The Second Consultation Paper.

22. From our view, what the industry really needs is a healthy investment environment which could ensure a cost-effective network infrastructure to support the large spectrum capacity required for sustaining the keen competition among the four MNOs and the 28 MVNOs, to foster a vibrant communications sector, and to safeguard Hong Kong's reputation as a regional communication hub.

Spectrum Utilisation Fee ("SUF")

Excessive SUF would be Counterproductive

23. In our response to the First Consultation Paper, we pointed out that the SUF has been set at grossly high and excessive level, as if the Government is levying a consumer tax on using mobile telecommunication service which is essentially a necessity nowadays. We urged the Government to make it clear whether such absurdly high level of SUF is a type of Government levy.
24. Disappointedly, the Government gave no response.
25. For the auction reserve price for both 900 MHz and 1800 MHz Spectrum, the SCED proposes that "it may be set between \$19 million per MHz and 54 MHz million per MHz and his present inclination is that the final value would be closer to the higher end"¹⁹. Similarly, regarding the minimum price for the RFR Spectrum for the 1800 MHz Spectrum, the SCED proposes that it "may be set between \$38 million per MHz and 67 MHz million per MHz and his present inclination is that the final value would be closer to the higher end"²⁰. [emphasis added]
26. Undoubtedly, the Government is not shy to set both the reserve price and the minimum price closer to the higher end of its estimates. This is risky. In a study on pricing of radio spectrum entitled "*The Need for a Conservative Approach to the Pricing of Radio Spectrum and the Renewal of Radio Spectrum Licences*" (the "**Study**"), economist has warned that extracting too high a price for SUF would be counterproductive, resulting in reduced investment and higher consumer prices. Government should instead take a conservative approach based on economic efficiency to choosing the right spectrum price:

"Confronted with a range of opportunity cost estimates means government will need to choose the "best" estimates. If it chooses a licence renewal fee towards the upper end of estimates, this increases the risk of setting the wrong price for the spectrum and would as a consequence jeopardise investment and adversely affect both digital productivity and the public interest."²¹

¹⁹ Para. 95, The Second Consultation Paper.

²⁰ Ibid at Para. 99.

²¹ "*The Need for a Conservative Approach to the Pricing of Radio Spectrum and the Renewal of Radio Spectrum Licences*", by Dr. Chris Doyle, Apex Economics, 14 December 2010.

27. There is a broader point here. Given that the mobile industry contributes GDP growth to our economy and create jobs²², the Government should be prudent in setting the SUF closer to the higher end, as it would run the risk of inefficiency by causing scaled-back investment and higher customer prices for mobile services. The Study concluded that the knock-on effect would pose a serious risk to digital productivity objectives. Proper assessment of costs and benefits should be conducted. Yet, we do not see any such cost-benefit analysis done by the Government from the two consultation papers.

International Benchmark

28. Regarding the levels of SUF for the 900/1800 MHz Spectrum, the SCED asserts that it should be set based on Hong Kong's past market benchmarks after taking into account local factors, rather than with reference to overseas spectrum auctions. Given the small geographical size and the high population density of Hong Kong, we agree that local factors are important; yet, international benchmarks should be indispensable in determining a reasonable level of SUF.
29. Just take for an example the reserve and final prices in the past Hong Kong spectrum auctions. In a recent report entitled "*Effective Spectrum Pricing: Supporting Better Quality and More Affordable Mobile Services*" recently published by the GSMA²³ ("**Spectrum Pricing Report**"), which conducted empirical research in conjunction with NERA Economic Consulting covering 325 spectrum band releases across 60 countries from 2000-2016, the reserve and final prices of Hong Kong stand out as some of the world's highest.
30. Figure 1 below shows the global trends in spectrum reserve prices during the period from 2000 to 2016. Just reading from the figures, it is not difficult to note that the reserve prices set for Hong Kong are approximately 4.5 times higher than the world average (Please refer to the red lines we marked for easy reference). For the upcoming spectrum re-assignment, the Government benchmarks its proposed reserve price and minimum price with the results of the 2.5/2.6 GHz band auction and 1.9-2.2 GHz band auction. These benchmarks appear to be lower than the Government's proposed pricing in the First Consultation Paper which made reference to the 850/900 MHz auction held in 2011. Yet, when comparing the proposed reserve price with the pricing for similar bands in other jurisdictions, our reserve prices jump out again as outliers on a global scale, as depicted in Figure 2 below. Moreover, there is an upward trend in our reserve prices as we marked in red lines. One point worth noting is that countries like Jordan and India also stand out as outliers as Hong Kong in Figure 2. Nonetheless, the population growth rates in these two countries are much higher than in Hong Kong.²⁴

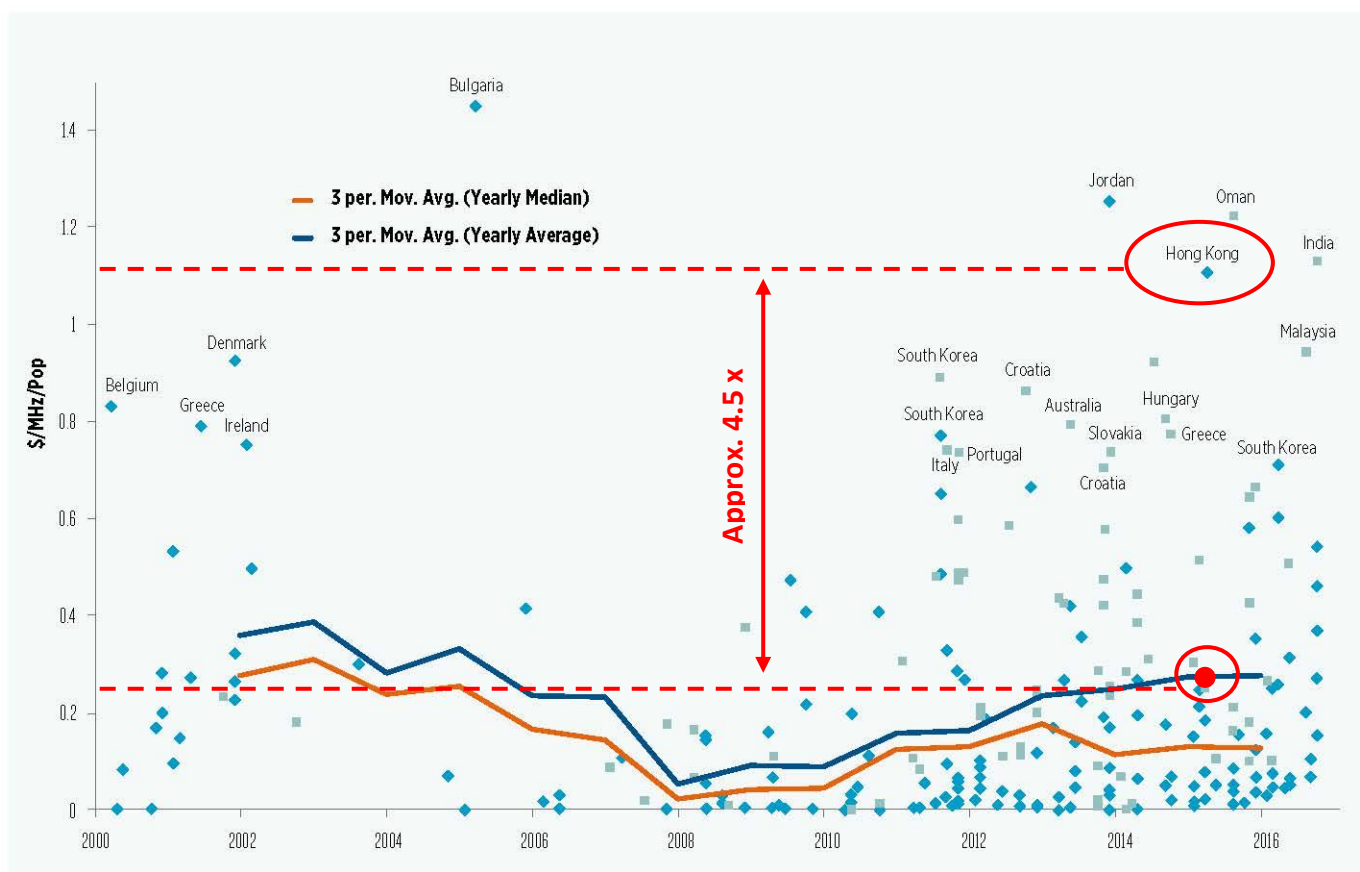
²² "*The Mobile Economy 2017*", by GSMA, states that mobile technologies and services generated 4.4% of GDP, equivalent to about \$3.3 trillion of economic value, and generated around 28 million jobs in 2016 globally.

²³ "*Effective Spectrum Pricing: Supporting Better Quality and More Affordable Mobile Services*", by GSMA, February 2017.

²⁴ The data is available at <http://data.worldbank.org/indicator/SP.POP.GROW>

31. Benchmarking the local auction results only without any reference to international benchmarks could be misleading. The Spectrum Pricing Report finds that damage has been done to consumers by policies that artificially inflate spectrum prices. Regulators should adopt spectrum policies that focus on creating social value, rather than simply driving up the cost of spectrum. They must fully appreciate their ability to maximize – or thwart – their digital futures when making policies that determine spectrum prices. Consistent with the academic literature, the Spectrum Pricing Report finds “statistical evidence linking higher spectrum prices to lower investment in 4G and higher consumer prices for data.”²⁵

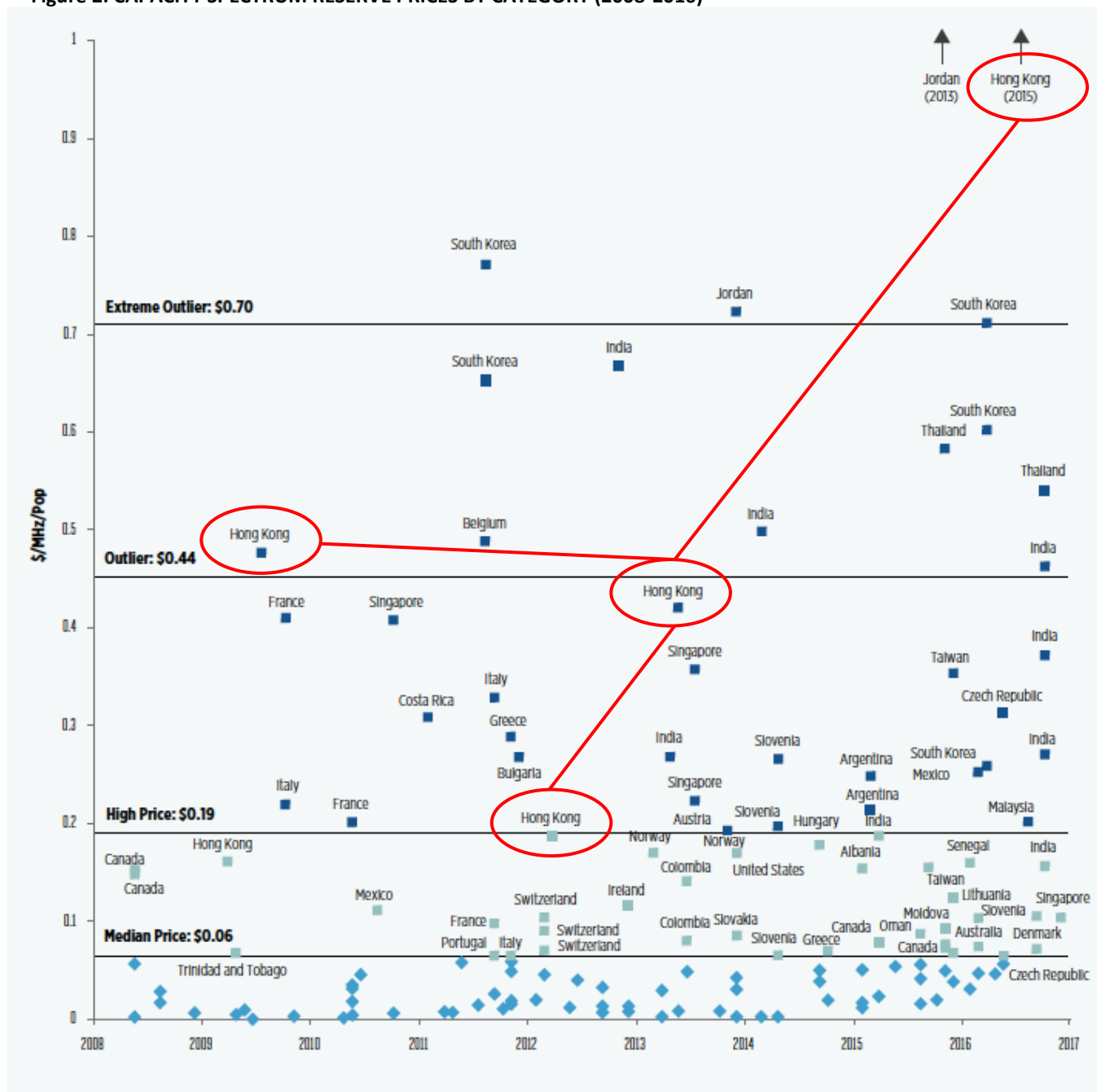
Figure 1: GLOBAL TRENDS IN SPECTRUM RESERVE PRICES, BY BAND AND AUCTION, 2000-2016



Notes: Green = Reserve prices for coverage bands below 1 GHz (700 MHz, 800 MHz, 850 MHz and 900 MHz); Blue = Reserve prices for capacity bands above 1 GHz (PCS, AWS, 1800 MHz, 2.1 GHz and 2.6 GHz).

²⁵ Page 18, The Spectrum Pricing Report.

Figure 2: CAPACITY SPECTRUM RESERVE PRICES BY CATEGORY (2008-2016)



Notes: Capacity bands include AWS, PCS, 1800 MHz, 2100 MHz and 2600 MHz; prices are adjusted for PPP exchange rates, inflation and licence duration, and include annual fees. Light Blue = observations \leq median price; Green = observations $>$ median price \leq 75th percentile; Dark Blue = observations $>$ 75th percentile including statistical outliers.

Minimum Price for the RFR Spectrum

32. Regarding the SUF for the RFR Spectrum, the SCED proposes that it should be set at the average SUF of the Auctioned Spectrum in the same frequency band, subject to a minimum price and a cap, whereas the minimum price is set higher than the auction reserve price. To justify its proposition, the SCED argues that the incumbent MNOs would enjoy the certainty of price and the first refusal right. Hence, they should bear the risk of paying a higher SUF in case the SUF of the Auctioned Spectrum is lower than the minimum price.
33. We disagree with the aforesaid proposal. Pegging the minimum price at a level above the reserve price would prejudice against the incumbent MNOs who have invested heavily in network infrastructure. In our view, the minimum price for the RFR Spectrum is partially linked to the final auction price in a one-sided manner in favor of the Government, given the upward price adjustment mechanism subject to a cap. It is important to note that the proposed cap is also set at a high level, i.e. 30% to 40% above the minimum price for the RFR Spectrum.
34. In case a linkage to the auction price is desired, we propose that the price adjustment mechanism should be two-way instead of one-way. That is, a downward price adjustment mechanism should also be in place, subject to a floor price, in the event that the final price for the Auctioned Spectrum is lower than the minimum price for RFR Spectrum. This is simply a matter of equity.
35. If the Government maintains its view that the RFR Spectrum has a feature that gives the incumbent MNOs certainty over assignment of the relevant spectrum and therefore should be priced marginally higher than the Auctioned Spectrum, then the downward price mechanism can be set in a way that it only triggers adjustment to the extent that the auction price is lower than the minimum price by more than a specific percentage, say 10%. We urge the Government to consider a more reasonable charging arrangement as we propose above to ensure a level playing field not only to the new entrants but also to the incumbent MNOs, who have invested so much for the industry.
36. Apparently, the Government takes advantage of the stuck situation of the incumbent MNOs in setting the level of minimum price for the RFR Spectrum. Comparisons with international benchmarks have shown that our SUF are absurdly high on a global scale. Hence, we wonder, has revenue maximization become one of the Government's objectives in setting spectrum policy at the expense of the long-term, healthy growth of the telecommunications industry in Hong Kong?
37. The current transfer of financial resources from the incumbent MNOs to the Government through grossly excessive SUF is unreasonable and unnecessary, severely hampering the MNOs ability to provide competitive tariffs to consumers. Once again, we urge the Government to response to our query – is such an exorbitant SUF a type of spectrum tax/ Government levy?

Method of SUF Payment and Tax Treatment

38. Annual installments, not lump-sum upfront payment, should be adopted for the payment of SUF for the benefits of the Government, mobile operators and consumers. Instead of the payment methods proposed under paragraph 102 of the Second Consultation Paper, we propose a royalty-based payment scheme where the SUF would be calculated at a percentage of the local network service revenue, subject to a guaranteed minimum payment, to be paid annually over the period of assignment. This royalty-based payment is the same as that adopted for the 3G Licensing granted in 2001.
39. From a commercial standpoint, when a business acquires an asset it would normally pay the amount in full upon purchase, unless under vendor financing, and title of the asset is transferred to the business on day one. On the other hand, if the business is only paying for the use of an asset over a period of time, and at no time does the business own the asset, the normal commercial practice is to make periodic payments to the asset owner. In the case of spectrum frequencies, as mobile operators are paying for the use of spectrum only without ownership, the regular periodic payment of SUF should be adopted.
40. The royalty-based payment should be the natural choice beneficial to all the interested parties (i.e. the Government, mobile operators and the general public) because:
- (a) To the Government, she can share the upside of the future services market, while risk is protected via the guaranteed minimum royalty payment requirement. Such payment mechanism also helps nurture the healthy development of the industry by encouraging more investments and competition.
 - (b) To the operators, their costs would be lowered because the financial burden of raising funds to pay for upfront SUF is eased, and the annual payment would match with cash flow and thus allow more early and timely investments in CapEx to gain efficiencies.
 - (c) To the general public, as the operators' costs are reduced and competition intensifies, there would be scope for lowering the telecommunication service charges and thus encourage the use of technology and innovation of mobile applications, which will improve business efficiency and create jobs.
41. As stated in paragraph 71 of the Second Consultation Paper, the Inland Revenue Department is of the view that SUF will be regarded as capital expenditure and therefore not tax deductible irrespective of the method of payment (i.e. either in form of lump sum payment or annual instalments). SUF is an essential cost of the mobile operators in providing the telecommunication services, which in the operators' view, is similar to a rental payment for the use of premises to carry on business generating profits subject to Hong Kong Profits Tax. Without tax deduction of this essential cost of business, operators will suffer a further 16.5% of costs on the SUF payment. They

have no other alternative but to pass these additional costs on to consumers. As such, the use of upfront lump sum payment method will increase the tariffs charged to consumers, which is against the public interest.

42. The proposed annual royalty-based payment scheme may require additional administrative support from OFCA annually to collect the SUF when compared to the lump-sum upfront payment. However, for the advantages set out under paragraph 33 above, the minimal additional administrative work to OFCA should not be a valid ground for implementing the lump-sum upfront payment method.

Restrictions on Switching Off 2G Networks

43. In the Second Consultation Paper, the Government proposes a new special condition (“SC”) for incorporation into the unified carrier licenses, requiring MNOs to seek the CA’s prior consent and make arrangements for the affected customers to the satisfaction of the CA before phasing out the provision of 2G services and other generations of mobile services in the future. This proposed SC is unnecessary and contradicts the “technology neutral” approach the CA has traditionally adopted, and would also be contrary to the Government’s traditional preference for “letting the market decide”.
44. Other jurisdictions around the globe are encouraging operators to migrate customers to 3G, 4G or even 5G services. For example, as early as in 2012, all mobile operators in Japan abandoned 2G services making it the first country to provide 3G and 4G-only networks. KT Corp of South Korea and CAT Telecom of Thailand switched off their CDMA networks in 2012 and 2013, respectively. In Australia, Telstra shut down its 2G services in 2016, whereas Optus and Vodafone Hutchison have scheduled to do so in the third quarter of 2017. In Singapore, a nationwide cessation of 2G networks and services already took effect from 1 April 2017. Taiwan is due to shut down its 2G network by the end of 2017.
45. Driven by the rapid evolution of mobile ecosystem, there is another form of migration. Some European operators are considering to keep their 2G networks and outcast their 3G networks, given the unique characteristics of 2G system (excellent voice coverage) and 3G system (which could be replaced by 4G and 5G technologies). For instance, Telenor Norway and T-Mobile Czech are planning to shut down 3G before 2G. Similarly, India, with its unique telecom market, is expected to become one of the first few countries to move to a 2G+4G market by shutting down 3G networks.²⁶
46. In view of the above global experiences and the mobile ecosystem, the Government should let the market decide the best technologies to take on board. In particular, the Government itself has projected that the volume of 3G traffic would only account for

²⁶ “Reliance Jio Effect: Will India be Amongst First Countries to Shutdown 3G Network?”, Mohit Rana, 26 May 2016.

2%, while 2G traffic will become “negligible” in 2023²⁷. We don’t understand why the Government is heading in the reverse direction, imposing regulatory restrictions on shutting down legacy networks. Being at the forefront of the wireless technology, the MNOs should have the liberty to re-allocate the radio frequency spectrum to meet the ever increasing market demand for more advanced mobile services for the benefits of consumers in the future. We therefore see no need for such a SC to be introduced at all.

²⁷ Para 32, The Second Consultation Paper.

III. Response to the Specific Questions in the Second Consultation Paper

Question 1: What are your views on the **proposals of the CA to adopt the hybrid administratively-assigned cum market-based approach for the Re-assignment of the 900/1800 MHz Spectrum, by re-assigning 2 x 10 MHz of spectrum in the 1800 MHz band** to each of the incumbent spectrum assignees through the offer of a right of first refusal, based on the overriding public policy reasons of safeguarding the provision of 4G services in the Remaining MTR Stations, and ensuring territory-wide continuity of 2G services if demands exist post 2020/21, and re-assigning the rest of the 900/1800 MHz Spectrum by way of auction?

1. Option 1 would guarantee customer service continuity and quality of 2G, 3G and 4G services. Potential loss of spectrum in the 900 MHz band would reduce incumbent MNOs' network coverage and capacity extensively, especially at indoor locations and MTR Stations. We suggest that, additional to the Government's proposal, 2 x 5 MHz of spectrum in the 900 MHz band should be assigned to the MNOs as RFR Spectrum, in order to maintain mobile service continuity and quality of experience. Please refer to paragraphs 5 to 22 of our submission above.

Question 2: What are your views and comments on the **methods of setting the SUF** as proposed in paragraphs 92 – 100 above?

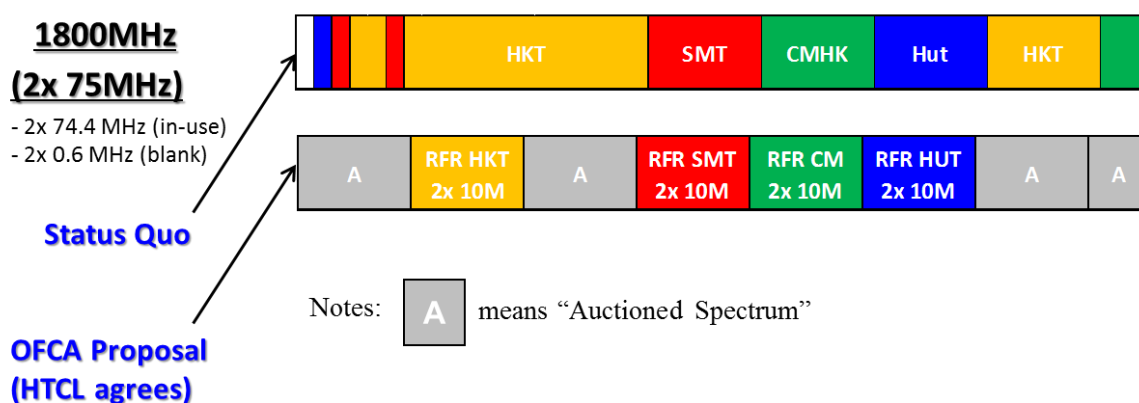
2. Please refer to paragraphs 23 to 37 of our submission above.

Question 3: What are your views and comments on the **method of payment of SUF**?

3. Please refer to paragraphs 38 to 42 of our submission above.

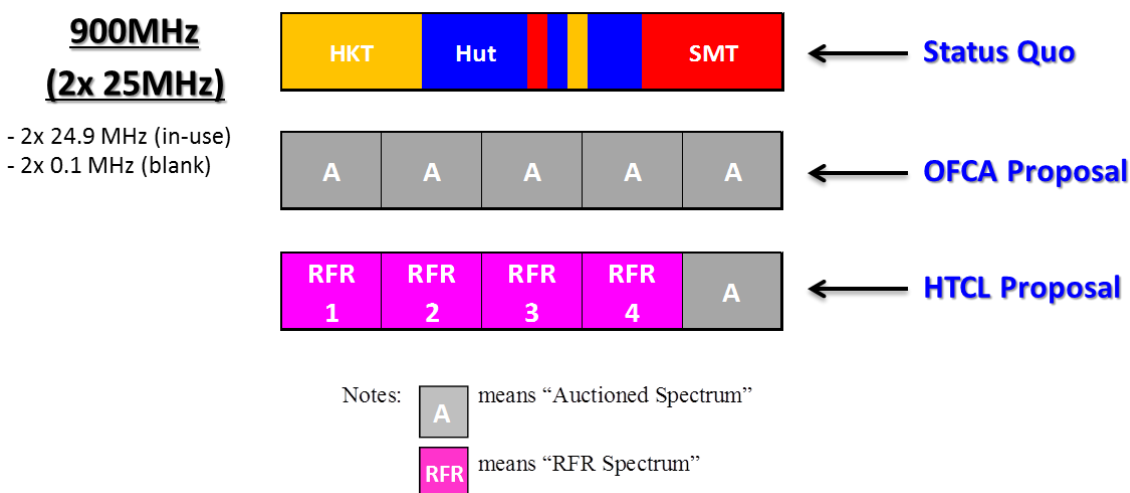
Question 4: What are your views on the **band plan** proposed above for the re-assignment of the **2 x 75 MHz of spectrum in the 1800 MHz band**? Would you consider the proposed frequency slots to be re-assigned to individual incumbent spectrum assignees as the RFR Spectrum an optimal arrangement from the industry's point of view?

4. We agree with the proposed band plan for the re-assignment of the 2 x 75 MHz of spectrum in the 1800 MHz band, as follows:



Question 5: What are your views on the **band plan** proposed above for the re-assignment of the **2 x 25 MHz of spectrum in the 900 MHz band**?

5. We propose that 2 x 5 MHz of spectrum in the 900 MHz band should also be assigned to each of the MNOs as RFR Spectrum. Please refer to paragraphs 5 to 12 of our submission above.



Question 6: What are your views on the use of the **SMRA format** that has been adopted in the spectrum auctions held by the CA in recent years to auction off the Auctioned Spectrum in the 900 MHz and 1800 MHz bands?

6. We have no objection to the proposed adoption of the SMRA auction format.

Question 7: What are your views on the **proposed SC** requiring all licensees to seek the prior consent of the CA and to make proper arrangements for the affected customers before phasing out their provision of 2G services and other generations of mobile services in the future?

7. The proposed SC is unnecessary and contradicts the “technology neutral” approach that the CA has traditionally adopted. Please refer to paragraphs 43 to 46 of our submission above.

Question 8: Do you have any views on **other aspects** of the proposed framework for the Re-assignment of the 900/1800 MHz Spectrum not explicitly asked in the questions set out in the paragraphs above?

8. Please refer to our submission under Part II above.