



**Arrangements for the Frequency
Spectrum in the 1.9 - 2.2 GHz
Band upon Expiry of the Existing
Frequency Assignments for 3G
Mobile Services –
Consultation Paper**

Submission by CSL Limited to
the Office of the Communications Authority

15 July 2012

Contents

		Page
1	Executive Summary	1
1.1	CSL Limited	1
1.2	Spectrum review and the Hong Kong mobile market	1
1.3	Principles informing CSL's submission	2
1.4	CSL's recommended option	3
1.5	Spectrum pricing	3
2	Paired Spectrum – Option 1	5
2.1	Efficient Spectrum Utilisation	6
2.2	Encouragement of Investment and Promotion of Innovative Services	6
2.3	Customer Service Continuity	8
2.4	Promotion of Effective Competition	10
2.5	Other considerations	13
2.6	Conclusion on Option 1	13
2.7	Method 1 – Direct-Calculated Approach (LCA method)	14
2.8	Method 2 – Market Benchmark Approach	16
2.9	Method 3 – Auction Approach	17
2.10	Pricing Method Conclusion	18
3	Paired Spectrum - Option 2	18
3.1	Efficient Spectrum Utilisation, Encouragement of Investment and Promotion of Innovative Services	19
3.2	Promotion of Effective Competition	20
3.3	Customer Service Continuity	22
3.4	Substitutes and Alternative Technologies	23
4	Paired Spectrum - Option 3	25
4.1	Efficient Spectrum Utilisation, Encouragement of Investment and Promotion of Innovative Services	26
4.2	Customer Service Continuity	26
4.3	Promotion of Effective Competition	27
4.4	Band Plan	28

4.5	Spectrum Pricing	28
5	Unpaired Spectrum	29

1 Executive Summary

1.1 CSL Limited

CSL Limited (**CSL**) is a leading operator in the mobile telecommunications market in Hong Kong, which is arguably the most competitive mobile telecommunications market in the world.

Established in 1983, CSL is Hong Kong's first mobile operator. CSL is also the first mobile company in Hong Kong to employ a distinctive market segmentation strategy, using leading-edge technologies to provide customer-focused services. CSL has continually updated its network and delivers innovative voice and data services through state of the art world leading technology. For example:

- in 2010, CSL launched the world's first LTE/DC-HSPA+ network, the next generation of mobile broadband network providing significantly increased capacity and speed; and
- in March 2009, CSL launched the international award winning Next G™ network. Next G™ is a world-class all-IP HSPA+ commercial mobile broadband network.

CSL is a subsidiary of Telstra Corporation Limited, Australia's leading domestic and international telecommunications and information services provider.

CSL welcomes the opportunity to provide comments on the consultation paper "*Arrangements for the Frequency Spectrum in the 1.9 – 2.2 GHz Band upon Expiry of the Existing Frequency Assignments for 3G Mobile Services*" (**Consultation Paper**), prepared by the Communications and Technology Branch of the Commerce and Economic Development Bureau (**CEDB**) and the Office of the Communications Authority (**OFCA**).

CSL's submission addresses the options for paired and unpaired spectrum as outlined in the Consultation Paper. This submission is structured as follows:

- In depth analysis of why CSL considers either renewal of licences or the offer of a right of first refusal (**RFR**) under Option 1 are the most efficient and effective ways to allocate spectrum in the 1.9-2.2 GHz bands upon expiry of the current assignments in October 2016.
- Detailed discussion of CSL's views as to the pricing methods set out in the Consultation Paper.
- Responses to each of the remaining questions posed by the Secretary for Commerce and Economic Development (**SCED**) and OFCA in the Consultation Paper.

1.2 Spectrum review and the Hong Kong mobile market

CSL considers that it is an opportune time to review the arrangements for 3G spectrum assignment. As OFCA points out in the Consultation Paper, there has been exponential growth in mobile telecommunications services in recent years. In particular, convergence of technologies and the adoption of smartphones and tablets with data hungry applications, have resulted in unprecedented demand for mobile data. Worldwide, this

trend of rapid growth will likely increase tenfold by 2016 due to proliferation of data intensive services and applications, intelligent networks and machine-to-machine communications.¹

OFCA's spectrum decisions over many years have brought about a regulatory environment conducive to the rapid growth of mobile services in Hong Kong. As noted in the Consultation Paper, mobile data usage in Hong Kong grew 450-fold in the five years to end 2011, with total usage increasing 124% in 2011 alone.

It is clear that spectrum decisions have strategic implications in shaping and promoting investment, innovation and growth in telecommunications markets. In particular, it is crucial to ensure that sufficient spectrum is made available, allocated and priced in the appropriate manner, to meet technical requirements and achieve both optimal spectrum use and market efficiency. This paper evaluates the spectrum allocation and pricing options put forward in the Consultation Paper and argues for an approach that is both consistent with the spectrum policy objectives set out in the 2007 *Radio Spectrum Policy Framework* (**Spectrum Framework**) as well as CEDB's mission.

1.3 Principles informing CSL's submission

CSL recognises that OFCA's guiding principle in reconciling competing demands for spectrum is to adopt a market-based approach to spectrum allocation. CSL endorses the principle that pricing for spectrum takes account of demands for spectrum, in order to ensure most efficient use of spectrum. CSL also notes that re-allocation of spectrum once initially allocated and in extensive use by consumers (such as is the case with the 1.9-2.2 GHz spectrum) also requires consideration of other social and consumer welfare objectives. These are:

- encouragement of efficient investment;
- promotion of innovative services;
- efficient spectrum utilisation;
- promoting customer service continuity and minimising unnecessary customer disruption or confusion; and
- promotion of effective competition.

These objectives are consistent with those set by SCED and OFCA in fulfilment of CEDB's mission² and we have considered each of these objectives in determining CSL's responses to OFCA's questions below.

In addition to the objectives set by SCED and OFCA, CSL suggests the following further social and consumer welfare objectives:

- conformity to international standards and norms, to facilitate lower handset and deployment costs; and

¹ Telecomasia, 'Mobile data set to swell tenfold by 2016' (17 May 2012) <<http://www.telecomasia.net/content/mobile-data-set-swell-tenfold-2016>>.

² Consultation Paper, 7.

- facilitating international roaming, so as to enable Hong Kong to remain a preeminent international business centre and one of the key gateways to Greater China.

1.4 CSL's recommended option

CSL submits that OFCA should adopt the approach taken in the UK of renewing the incumbent 3G operators' licences on a continuing (ongoing) basis, subject to payment of annual fees. Renewal of these licences at an appropriate negotiated commercial price would maximise achievement of social and consumer welfare objectives and provide the necessary regulatory certainty to achieve the above objectives while deriving an appropriate revenue outcome for Government. Negotiated and commercially priced licence renewal as the most efficient option to facilitate continued benefits to be derived from very substantial fixed and long term investments while incentivising operators to continue to improve efficiencies in use of spectrum allocated to them.

Alternatively, if licence renewal at an appropriate negotiated commercial price is not endorsed by OFCA, CSL recommends Option 1 in preference to either Option 2 or Option 3.

Option 1 entails the incumbent 3G licensees being offered a RFR with respect to their existing spectrum allocations in the 1.9-2.2 GHz bands. Option 1 is preferred to either Option 2 or Option 3 because Option 1 best encourages continued efficient investment and innovation in the Hong Kong mobile market. In the event the incumbent 3G licensees are not granted a RFR, they will likely be forced to engage in massive write-offs of the significant investment which has been sunk into their licences. This will also put at risk future investment in Hong Kong. Similarly, without the RFR and the associated regulatory certainty, service interruptions, confusion and general inconvenience to the public will likely result. These are unnecessary and undesirable outcomes and inconsistent with identified social and consumer welfare objectives.

Option 2, by contrast, essentially involves a 'greenfields' re-allocation of relevant spectrum. Such an approach may make sense when spectrum assets are first released or where licensees have not made efficient use of their allocations. However, this is not the case in Hong Kong, where the incumbent 3G licensees have invested heavily in their networks over time and utilised their spectrum allocations both efficiently and with considerable innovation. Were OFCA to choose Option 2, regulatory uncertainty would prevail, investment and innovation would suffer and considerable inconvenience to customers would result. Further, Option 2, while carrying the distinct possibility of new entry into the market via the auction, will likely result in customer disruption and also in reduction of ongoing expenditure in network upgrade and modernisation, as investment returns are constrained by costs of servicing debt taken on to secure availability of spectrum.

Option 3, while possibly less disruptive than Option 2, carries similar risks in relation to uncertainty, the associated detrimental impact upon investment and innovation and further customer service disruption. Any aim of introducing a new entrant would likely result in the unintended consequence that competition is diminished, rather than enhanced, as competition in the already highly competitive Hong Kong mobile market is unlikely to be sustainably increased as ongoing network investment will be constrained by costs of capital. New entry can be encouraged (without the risks inherent in auctions) via other means, such as allocation of new spectrum or acquisition.

1.5 Spectrum pricing

CSL sees some merit in considering the use of the 'least cost alternative' (LCA) pricing method but is unable to provide more definitive comments in the absence of any detail as

to how the LCA pricing method would be practically applied. In the absence of any implementation detail as to the LCA method, CSL prefers the market benchmarking approach (Method 2), provided that the benchmarks used are appropriate to renewal of existing spectrum allocations for built networks rather than greenfields allocation of spectrum. In this regard, CSL submits that the prices at earlier auctions of 2.5/2.6 GHz and 2.3 GHz spectrum (held in 2009 and 2012, respectively) provide a useable and appropriate guide for prices that allowed and did not substantially constrain subsequent rapid deployment of network infrastructure to efficiently utilise that spectrum. Projections as to pricing for the proposed auction of 2.5/2.6 GHz spectrum in 2013 are not an appropriate benchmark both because it cannot be reliably predicted whether such prices can be achieved, or if achieved, whether the effect of such pricing would be to constrain subsequent deployment of network infrastructure because of the need to service debt taken on by bidders to acquire such spectrum.

As to the hybrid auction pricing method proposed at paragraph 32 of the Consultation Paper (Method 3), CSL submits it would prove ineffective and unreliable in determining the SUF. Such hybrid auction processes are particularly susceptible to gaming by participants and offer little transparency and certainty for incumbents.

In addition, the Option 3 spectrum pricing alternatives put forward by OFCA under Questions 13 and 14 similarly lack transparency, rationality and will likely produce inequity.

As to payment of the SUF, CSL favours the payment of the SUF as an annual fee for the duration of the licence. This would provide an ongoing incentive for efficient spectrum use. Annual payments would also minimise the impact on the licensee's cash flows.

2 Paired Spectrum – Option 1

Question 1: *Given there is clear indication of competing demand for the 3G spectrum, are there good public policy reasons for the TA to adopt Option 1, instead of the market-based approach as stipulated in the Framework, when the current 3G frequency assignments expire in October 2016?*

CSL supports Option 1 (under which the incumbent 3G operators are granted an RFR to acquire the originally assigned 2 x 15MHz of 3G spectrum upon expiry of the current assignment in October 2016).

However, given the level of investment already made by the incumbent licensees over many years, it is likely that each incumbent would exercise an RFR if offered. CSL therefore submits that licence renewal at an appropriate price would effectively achieve the same result as Option 1 but with less cost and delay. Accordingly, licence renewal is the preferred option.

Option 1 is consistent with the RFR offered to the then GSM and PCS licensees when their licences expired in 2006. At the time, OFCA's predecessor, the Office of the Telecommunications Authority (**OFTA**), made its decision based on the following considerations:

*“The TA is aware of the consideration to provide a stable investment environment and to ensure continuity of services ... [GSM and PCS licensees] have also been making efficient use of the scarce frequency spectrum assigned to them. If they 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 (emphasis added).**”³*

OFTA's statement encompasses the objectives set by SCED and OFCA for the forthcoming decision on 3G spectrum and also accords with what CSL regards to be 'good public policy reasons' under the Spectrum Framework.

The same stable investment environment and minimisation or negation of service disruption could also be assured were OFCA minded to renew the licences of the incumbent 3G operators, as has occurred in countries such as the United Kingdom, Australia and New Zealand. Short of this, however, the RFR contemplated by Option 1 offers the most reliable method to achieve this result. This would avoid the dislocation of, and inconvenience to, large numbers of customers forced to migrate to other mobile operators. Further, licensees would have the necessary certainty to further invest in existing and new networks. This in turn would reinforce customer and investor confidence in Hong Kong's telecommunications market.

³ OFTA, 'Licensing of Mobile Services on Expiry of Existing Licences for Second Generation Mobile Services - Analysis of Comments Received, Preliminary Conclusions and Further Consultation', 5 (19 March 2004) <<http://www.info.gov.hk/archive/consult/2004/mobile.pdf>>.

2.1 Efficient Spectrum Utilisation

In addition to it being desirable from a public policy perspective, OFCA is required to “promote the efficient allocation and use of the radio spectrum as a public resource of Hong Kong”.⁴ Where there has been under-use of licensed spectrum, efficiency may be best served by reallocation of spectrum via a market-based approach (such as under Option 2). Conversely, and as noted by the Australian Department of Broadband, Communications and the Digital Economy (**DBCDE**) in the context of licence renewal:

“...where there is an extensive and efficient service being provided there is less incentive to let a licence expire and create uncertainty for the incumbent through a reallocation process. Reallocating in this circumstance could result in lower investment and innovation and affect consumer services.”⁵

CSL submits that the incumbent 3G licensees’ past use of spectrum amply demonstrates that the 3G spectrum is fully and efficiently utilised. According to the mobile services statistics published by OFCA,⁶ the mobile penetration rate in Hong Kong reached 216% as of April 2012, one of the highest rates in the world. The number of 3G customers also exceeds the total population of Hong Kong with the 3G mobile penetration rate reaching 112%.⁷ In particular, the number of 3G customers has increased over **11-fold** from 635,965 in December 2005 to 7,416,909 in December 2011. During the same period, mobile data usage experienced exponential growth, with a 900-fold increase.

On the international front, according to data published by the International Telecommunication Union (**ITU**)⁸, Hong Kong had 74.5 active mobile broadband subscriptions per 100 inhabitants, the sixth highest in the world.

The strong growth of 3G customers, mobile broadband subscriptions and mobile data usage each clearly demonstrates that mobile operators have invested in their 3G networks and made efficient use of 3G spectrum. Conversely, there is no basis to suggest that the 3G incumbent operators have not made efficient use of their spectrum assigned. Additionally, it is difficult to see how efficiency in the 1.9-2.2 GHz band could be improved by either spectrum redistribution or new entry. Each incumbent has a 2 x 15 MHz assignment. Redistribution would either have no effect or would inequitably dilute an incumbent’s spectrum assignment with a windfall gain to the other players. New entry would dilute the assignments of all operators.

Licence renewal at an appropriate negotiated commercial price or the grant of an RFR to existing 3G licensees would provide the most reliable pathway by which Hong Kong’s strong record of efficient use of spectrum could continue.

2.2 Encouragement of Investment and Promotion of Innovative Services

In order to promote investment and innovation, both certainty and confidence in the regulatory regime are necessary. The regulatory regime must also be transparent. Where uncertainty persists about spectrum licence continuation, incumbent licensees will

⁴ *Telecommunications Ordinance*, section 32G(1).

⁵ DBCDE, *Public Interest Criteria for the re-issue of Spectrum Licences* (2009), 6.

⁶ OFCA, *Key Statistics for Telecommunications Services in Hong Kong – Wireless Services* (3 July 2012) <http://www.ofca.gov.hk/filemanager/ofca/common/media/data_stat/wireless_en.pdf>.

⁷ The number includes 4G customers – given that 4G service is only at the infancy stage of the life cycle, the number of 4G customers is insignificant when compared with that of 3G customers.

⁸ ITU, *ICT Facts and Figures – 2011* (25 October 2011) <<http://www.itu.int/ITU-D/ict/facts/2011/material/ICTFactsFigures2011.pdf>>.

have legitimate reason to delay capital investments and other innovations. Providing an environment that promotes investment and innovation is therefore vital for optimal spectrum management. This point was recognised by the New Zealand Ministry of Economic Development, noting the flow on risks attending uncertain regulatory environments:

*“networks utilising spectrum may take decades to develop and as such the potential loss or risk at renewal is measured by the cost of the dependant network, including its customer base rather than the value of the spectrum. As such related market and financing risk may also arise from any regulatory risk that spectrum licences or rights may not be renewed or renewed on materially different terms.”*⁹

Operating a mobile communications network necessarily entails high initial and recurrent capital costs. Creating and maintaining an environment that promotes substantial investment is crucial to licensees planning further network build and service enhancement and facilitating efficient utilisation of spectrum by ensuring that spectrum reuse is optimised to accommodate growth in spectrum usage over the medium and longer terms. A lack of transparent and predictable regulation, particularly in relation to maintaining confidence in the continued availability of spectrum, eliminates the incentive for licensees to continue to maintain and invest further in their network, especially as the end of the licence term draws near.

The New Zealand regulator recognises that this can lead to a:

*“loss of quality in the network over the last few years of a fixed licence term as the owner reduces capital investment to factor the risk of losing its licence (or not having its licence renewed) [which] is not in the long term interest of end users...”*¹⁰

In an era of rapid technological advancement in the mobile space, it is absolutely critical for operators to have continued investment to improve network capacity, capability and speed and provide innovative services in order to meet customer demand (particularly for mobile data). Network investments always span a number of years. Mobile operators need to have a reasonable rate of return in order to recoup their investments. In the absence of regulatory certainty beyond October 2016, it is exceedingly difficult for the incumbent 3G operators to make investment decisions for the adoption of new technologies and/or network upgrades. There is simply no incentive for them to make further investments over the remaining life of the current 3G spectrum assignment. This would be a setback for the mobile industry and detrimental to the society as a whole.

It is of paramount importance that OFCA creates a certain regulatory environment which encourages long term investments by operators. Ultimately, doing so is for the long term benefits and interests of consumers. Recognising this, the New Zealand Government decided to renew the incumbents' 850/900MHz licences. The Hon. Amy Adams, Communications and Information Technology Minister, noted:

⁹ Final Report, *Allocation and Acquisition of Radio Spectrum - Report* prepared for the New Zealand Ministry of Economic Development on Competition Safeguards in relation to initial allocation of and secondary markets for radiofrequency spectrum in New Zealand, prepared by Market Dynamics Pty Ltd and Moore Wright Associates Pty Ltd, 2003.

¹⁰ Hon. David Cunliffe, Minister for Communications, *Cabinet Paper: Arrangements for the Renewal of Radio Spectrum Management Rights Used for Cellular Services* (4 April 2007), [12], [20], [25] <<http://www.rsm.govt.nz/cms/pdf-library/policy-and-planning/radio-spectrum/rights-at-expiry/cabinet-paper-arrangements-for-the-renewal-of-radio-spectrum-management-rights-used-for-cellular-services-109-kb-pdf>>.

“The companies’ renewal of this spectrum through 2031 means they can make long-term infrastructure investment decisions. Over time this will bring New Zealanders better mobile technology and services.”¹¹

Were OFCA not to renew the licences of incumbent 3G operators or offer them a RFR, this would likely lead to substantial write-offs of the significant investment that has been made and would place future investment in the Hong Kong mobile market at risk. CSL has invested hundreds of millions of dollars to enhance its network coverage, capacity, capability and speed. All along it has provided quality innovative services that improve the lives of customers. To cite just a few examples:

- In 2006, CSL took the lead in enhancing mobile coverage in country parks through working with various governments in order to protect the safety of hikers and visitors in remote locations.
- In 2008, CSL in collaboration with the Senior Citizen Home Safety Association (**SCHSA**) launched a “Mobile Link Service”¹² which is an innovative 24-hour outdoor support and care service to promote the social inclusion of the elderly aged 60 or above by empowering their independence and mobility in the community.
- In 2009, CSL launched the international award winning Next G™ network. Next G™ is a world-class all-IP HSPA+ commercial mobile broadband network.
- In 2010, CSL was the first mobile operator in Hong Kong to re-farm its 900MHz spectrum to support UMTS-900 third generation mobile services to improve network coverage. CSL also launched the world’s first LTE/DC-HSPA+ network to dramatically increase network capacity and speed with low latency, bringing Hong Kong to the forefront of mobile technology and application.
- In 2012, CSL together with other mobile operators gave full support to the Communications Association of Hong Kong (**CAHK**) to launch *“the world’s first 50222 SMS Hiker Tracking Service which helps locate hikers’ latest position for easier tracking shall rescue be needed.”*¹³

Similar examples could be cited for the other incumbent operators. This proven track record of continued investment and innovation by the existing 3G operators is continuing and should give SCED and OFCA confidence that renewal or an RFR would promote an environment conducive to future investment and innovation.

2.3 Customer Service Continuity

A key social and consumer welfare objective is to minimise consumer detriment while achieving economic efficiency. It might be suggested that if a newly established network using new delivery technologies could be markedly more efficient in its utilisation of spectrum, that this is sufficient justification for a reallocation of spectrum to accommodate that new network and promote take-up of the new technologies, and that any consumer detriment through switching technologies is transitional and minimal. However, we

¹¹ New Zealand Government, Media Release, ‘Cellular spectrum renewals completed’ (29 March 2012) <<http://www.national.org.nz/Article.aspx?articleId=38206>>.

¹² The Mobile Link Service has won many awards both locally and internationally for its innovative solution to improve the lives of the elderly including the “Grand Prize of the Digital Opportunity Award in the World Information Technology and Services Alliance (WITSA) Global ICT Excellence Awards 2010” <<http://hkitf.org.hk/press-release>> and the “2010 World Summit Award-mobile (WSA-mobile): m-Inclusion & Empowerment” <<http://www.wsa-mobile.org/winner/mobile-link-service-52520101104>>.

¹³ CAHK, ‘Press Release - The world’s first “50222 SMS Hiker Tracking Service”’ (9 January 2012) <http://www.cahk.hk/News/383/SMS_Launch_PR.pdf>.

consider that that argument is not correct, that the economic efficiency of continued development of existing networks is frequently under-valued, and that the consumer detriment associated with change from one network to another, or one network service provider to another network service provider, is often understated. Reallocation of spectrum to new licensees (as compared to renewal or RFR for existing licensees) may lead to consequences such as:

- service interruptions, customer confusion and general public inconvenience;
- inconvenience and loss of amenity for consumers, with inevitable coverage and service quality changes and at least transitional detriments while networks transition;
- rendering obsolete of existing network equipment and network support infrastructure, adding to costs of operation and knock-on effect on prices to consumers; and
- the likelihood that customer confidence will be adversely affected if customers are forced to migrate to different operators.

It might be suggested that a 'spill' of licences through reallocation stimulates innovation and updating of both networks and customer equipment. However, that stimulus already exists for existing operators, faced with continued strong downward pressure on prices to consumers and expectations of smartphone consumers for ever higher upload and download rates. Operators can only service existing and future demand through ever more efficient utilisation of spectrum.

In other words, the capital costs associated with adaptation of mobile networks to cope with growth in spectrum usage are substantial and ongoing: the mobile networks in operation today are radically different from the mobile networks that were built when licences were initially granted or that were in operation five years ago. It is therefore incorrect to think that capital costs of existing mobile networks are largely amortised and recovered. It is also incorrect to think that a high price for spectrum re-licensing will not affect consumer welfare and will not deter further capital investment in mobile networks: each dollar paid for spectrum will require diversion of expenditure from network upgrade and can only be serviced through revenue derived from provision of services. In this sense high prices for spectrum usage effect a reallocation of consumer surplus from mobile users to the general public financed by the mobile operators required to pay high prices for spectrum usage. Spectrum prices should reflect the value of spectrum, but not to the extent that efficient investment in building networks is deterred and the cost of using mobiles is substantially increased.

Further, mandatory upgrades of consumer devices can only be justified if significant technological or service functionality improvement will result, so that the benefits of the new technology/device outweigh the inconvenience and cost of replacement of the existing technology/device. Conversely, if there was a spill of existing spectrum licences (as might be the case in an auction) all the inconveniences described above could occur.

Migration issues could be handled with minimal disruption if licensees maintain control of both the outgoing and incoming networks. However, it is difficult to imagine how migration issues could be handled smoothly if consumers are forced to migrate from an incumbent licensee's network to an alternative, new licensee's network given the likely lack of control over migration issues that the incoming and outgoing licensees would have.

The distinct possibility of churn as a result of an auction also casts doubt on whether the existing number porting system can support a sudden surge of porting requests.

These concerns were acknowledged by Mr Peter Harris, Secretary of the Australian DBCDE, in his comments at the recently concluded *Radcomms 2012 Conference* in Melbourne, Australia:

*“While renewal by auction looks attractive, the reality is that it is also a costly disturbance to firm and consumer alike if the spectrum churns. And churn isn’t of itself a useful public policy outcome.”*¹⁴

The TA recognised the importance of ensuring continuity of customer service when it decided to renew the GSM and PCS licences in 2004.¹⁵

In the United Kingdom, Ofcom decided in June 2011 to vary the 2100MHz 3G mobile licences to a perpetual basis such that the licences will continue in force unless or until revoked by Ofcom.¹⁶

The Australian Government adopted a similar approach when it decided to renew the 800MHz and 1800MHz spectrum licences in February 2012. Senator the Hon Stephen Conroy, Minister for Broadband, Communications and the Digital Economy, noted the importance of continuity to mobile customers and operators:

*“reissue of licences will provide certainty about the continuity and operation of mobile and wireless communication networks ... This decision has involved a careful evaluation of how the public interest is served by allowing renewal of current licences.”*¹⁷

In Singapore, the Infocomm Development Authority (**IDA**) agreed in 2008 to offer an RFR to incumbent licensees in the 900 MHz and 1800 MHz bands, even though the regulator decided that the spectrum allocations would be put to auction. IDA made this decision explicitly “to avoid unnecessary spectrum churn and more importantly, service disruption to end-users.”¹⁸

CSL therefore submits that, for the benefits of society as a whole, the UK’s approach of renewing the 3G licence on a perpetual basis should be adopted, as it will ensure that the negative consequences of service disruption do not eventuate. Alternatively, the RFR under Option 1 should be offered to the incumbent 3G operators.

2.4 Promotion of Effective Competition

Hong Kong has long been recognized as one of the most competitive markets in the world for mobile telecommunications services. The former Information Technology and Broadcasting Bureau acknowledged as much during the initial auction of 3G spectrum in

¹⁴ P Harris, Secretary, DBCDE, Speech on spectrum reform delivered at the Radcomms 2012 conference in Melbourne (6 June 2012) <http://www.dbcde.gov.au/newsroom/department_speeches/spectrum_reform>.

¹⁵ OFTA, ‘Licensing of Mobile Services on Expiry of Existing Licences for Second Generation Mobile Services’, 3 (29 November 2004) <http://tel_archives.ofca.gov.hk/en/tas/mobile/ta20041129.pdf>.

¹⁶ Ofcom, ‘Statement on variation of 2100MHz Third Generation Mobile Wireless Telegraphy Act Licences’ (20 June 2011) <<http://stakeholders.ofcom.org.uk/binaries/consultations/2100-MHz-Third-Generation-Mobile/statement/statement.pdf>>.

¹⁷ Media release of the Australian Government ‘Renewal decision provides certainty for mobile consumers’ (10 February 2012) <http://www.minister.dbcde.gov.au/media/media_releases/2012/015>.

¹⁸ IDA, ‘Decision and Explanatory Memorandum issued by Infocomm Development Authority of Singapore on the framework for the reallocation of spectrum in the 900 MHz and 1800 MHz frequency bands’, 6-7 (18 January 2008) <<http://www.ida.gov.sg/Policies%20and%20Regulation/20070628103037.aspx>>. The auction did not take place in any event due to insufficient initial offers being made in the two-stage clock-combinatorial auction process. IDA allocated the available spectrum lots based on the incumbents’ initial offers. No new entrant made an offer.

2001.¹⁹ The CA also notes in the Consultation Paper that Hong Kong has one of the most competitive mobile markets in the world. Although Hong Kong is not a member of the Organisation for Economic Co-operation and Development (**OECD**), the OECD recently pointed out that “infrastructure competition continues to deliver leading performance” in Hong Kong.²⁰

Hong Kong only has a population of 7.1 million but accommodates five mobile network operators (**MNOs**) which service more than 15 million customer accounts. Additionally, an unprecedented 11 mobile virtual network operators (**MVNOs**) provide services to more than a million customers.²¹ The Hong Kong mobile market has reached saturation point with an extremely high penetration rate of 216% as of April 2012. There is stiff competition amongst the incumbent 3G operators, all of which are full-fledged players with several years experience in the market.

CSL submits that neither licence renewal nor offering the RFR to the incumbent 3G operators would reduce the high level of competition in the Hong Kong mobile market. The possibility of new entrants entering the mobile market after October 2016 would also not be excluded. Indeed, if the incumbent 3G operators had their licences renewed or were offered the RFR, competition in the Hong Kong mobile market would likely be further promoted, as we explain below.

The non-exclusion of new entrants is demonstrated by the following, in relation to both existing market conditions and anticipated future conditions:

- A new entrant successfully bid for a bandwidth of 30MHz spectrum in the 2.3GHz band auction conducted in February 2012. The new entrant is required to have network and service rollout five years from the grant of the licence.
- OFCA will release five blocks of 5MHz paired spectrum in the 2.5GHz/2.6GHz band for auction in early 2013 and potential new players will have an opportunity to bid for the spectrum.²²
- Similarly, when the switch-off of analogue television services is complete (by end of 2015²³ subject to frequency coordination with Mainland China), the ‘digital dividend’ arising from the analogue switch off may be used for mobile services. New entrants will have at least an equal opportunity to acquire that spectrum.

The above also shows that future competition in the Hong Kong mobile market will centre around the provision of 3.5G and 4G services which utilise spectrum other than the 1.9-2.2 GHz bands.

CSL recognises that Option 1 would not result in new entrants in the 1.9-2.2 GHz bands if licences were renewed or all the incumbents exercised an RFR. However, even if the number of players in an already highly competitive market were not increased, this is by no means a sub-optimal result for competition. The intuitive assumption that ‘more competitors equal more competition’ is far from certain, given the relationship between

¹⁹ OFTA Press Release (18 July 2001) <http://tel_archives.ofca.gov.hk/en/press_rel/2001/jul_2001.html#1>.

²⁰ OECD, *Communications Outlook 2011*, 41.

²¹ OFCA, *Key Statistics for Telecommunications Services in Hong Kong – Wireless Services* (3 July 2012) <http://www.ofca.gov.hk/filemanager/ofca/common/media/data_stat/wireless_en.pdf>.

²² OFCA, ‘Assignment of the Available Radio Spectrum in the 2.5/2.6GHz Band for Wireless Broadband Services’ (4 July 2012) <http://www.coms-auth.hk/filemanager/common/policies_regulations/ca_statements/07_2012.pdf>.

²³ Press Release of the Hong Kong Government “Analogue television switch off working target deferred to end 2015” (22 June 2011) <<http://www.info.gov.hk/gia/general/201106/22/P201106220280.htm>>.

market size, the number of market participants, efficient investment and innovation. We explore this point in our response to question 4 below.

Competition is best understood as a process rather than a situation and is reflective of the underlying structure of a market. The underlying market structure is affected by, among other things, whether the particular regulatory setting is conducive to and promotes investment. In deciding not to oppose the merger of Vodafone and Hutchison's Australian mobile services operations, the Australian Competition and Consumer Commission (**ACCC**) explicitly recognised that competition in the Australian public mobile telephone services market is driven by the need for investment. The ACCC pointed to:

"... the changing nature of the mobile telecommunications industry and the increasing need for mobile network operators to have sufficient scale to be able to continue to make significant investments in their network capabilities.

In reaching its decision the ACCC considered evidence which showed that absent the merger, the parties are unlikely to sustain the significant investment in their mobile networks to provide competitive high speed data services, such as mobile broadband.

*'Ongoing investments are needed to meet the increased customer demand for bandwidth-hungry data services, including mobile broadband. In this respect, the ACCC considers that mobile voice and data services will continue to converge in the future,' [then] ACCC Chairman, Mr Graeme Samuel said.*²⁴

OFCa also recognises the nexus between competition, scale and investment in its *Guidelines on Mergers and Acquisitions in Hong Kong Telecommunications Markets*. Competition in industries such as telecommunications, which entail high sunk costs, can be enhanced through market developments such as vertical integration. OFCA acknowledges the pro-competitive potential of vertical integration based on efficiencies in transaction cost savings and economies of scale, and the ability to reduce the risk of investment.²⁵ Such considerations factored into the decision by OFTA to consent to China Mobile's acquisition of Peoples.²⁶

Licence renewal or an RFR under Option 1 would promote competition by giving regulatory and investment certainty to incumbent licensees. This in turn would give licensees further incentive to invest and innovate. Such an outcome allows licensees to better compete by distinguishing their services from those of their competitors. As mentioned above, the ACCC recognised the need for, *"[o]ngoing investments ... to meet the increased customer demand for bandwidth-hungry data services, including mobile broadband."*²⁷

CSL also submits that licence renewal or an RFR may also encourage the future development of a secondary spectrum market (and therefore more competition) by removing regulatory uncertainty around licence continuation, which is one of the greatest barriers to trading licences. The introduction of spectrum trading in Hong Kong is still under consideration, but was recommended in a report commissioned by the Commerce,

²⁴ ACCC Press release, 'ACCC not to oppose proposed merger of Vodafone and Hutchison' (29 May 2009) <<http://www.accc.gov.au/content/index.phtml/itemId/874495>>.

²⁵ OFCA, *Guidelines on Mergers and Acquisitions in Hong Kong Telecommunications Markets* (3 May 2004) 34 <http://tel_archives.ofca.gov.hk/en/report-paper-guide/guidance-notes/gn_20040503.pdf>.

²⁶ OFTA, *Decision granting consent under the Telecommunications Ordinance to the acquisition of Peoples by China Mobile* (2005) CDN 0197, Attachment A, 29 <http://tel_archives.ofca.gov.hk/en/report-paper-guide/report/rp20051223.pdf>.

²⁷ See note 24 above.

Industry and Technology Bureau (CITB).²⁸ Uncertainty around renewal at the expiry of the licence makes licensees extremely reluctant to trade licences towards the end of the term, as neither buyer nor seller is able to value the licence with sufficient reliability.

2.5 Other considerations

An important factor for SCED and OFCA to consider is the alignment of spectrum use with international trends. A major area which may be affected by changes in spectrum use is roaming arrangements. The ability to roam internationally across public mobile telecommunications networks promotes continued commercial investment, tourism, and the development of the digital economy. Continued international alignment of spectrum usage is vital to ensure that visitors to Hong Kong, and Hong Kongers abroad, can roam.

Similarly, major events which take place in Hong Kong involve inbound roaming users and the temporary deployment of terminal equipment by foreign participants taking advantage of Hong Kong's alignment with worldwide spectrum allocations, as well as established connectivity and application-level continuity agreements between international operators.

Needless to say, roaming arrangements depend on the continued availability of services which in turn depends on regulatory and investment certainty in relation to the spectrum allocations within which those services are provided. Such arrangements would likely be significantly disrupted were major changes in either the licensees or the use of licensed spectrum to occur – both distinct possibilities under Options 2 and 3. Therefore, CSL considers that either licence renewal or offering the RFR under Option 1 to be the options which would best ensure the necessary certainty in relation to roaming arrangements.

2.6 Conclusion on Option 1

For the foregoing reasons, CSL submits that either licence renewal on a perpetual basis (the UK approach) or offering the RFR to the incumbent 3G operators under Option 1 will accord best with the public interest. Additionally, either of these options are the most likely to accomplish CEDB's mission as stated in the Consultation Paper:

- *“Foster a business-friendly environment and attract investments in Hong Kong;*
- *Position Hong Kong as the premier digital city and telecommunications hub of Asia; and*
- *Promote high value-added, creative and high technology activities in Hong Kong, leveraging on the very strong services and manufacturing sectors in Hong Kong and in the Pearl River Delta respectively.”*

The value of regulatory certainty cannot be underestimated in fulfilling CEDB's mission. From this certainty flows all the public policy reasons CSL identifies in preferring licence renewal or, short of that, the RFR under Option 1: continued efficient utilisation of spectrum; encouragement of investment and innovation; service continuity; and promotion of effective competition.

Question 2: *In offering the right of first refusal to the incumbent 3G operators to acquire the 1.9 – 2.2GHz spectrum under Option 1, what would be the preferred method for setting the SUF so that it may reflect the full market value of the spectrum?*

²⁸ *Spectrum Policy Review: Final Report* (2006), 100 <www.cedb.gov.hk/ctb/eng/paper/pdf/SPR-Final_report.pdf>.

CSL agrees with OFCA's stated desire to set the SUF such that it reflects, as far as possible, the full market value of the spectrum in the 1.9 – 2.2 GHz band. However, it is important to ensure that the principles used to inform the determination of the SUF are consistent and transparent. In particular, CSL submits that, as a starting point, OFCA should determine the SUF in a clear, consistent and competitively neutral manner. As CSL noted in an earlier submission to the then OFTA,²⁹ if the governing principles of the pricing methodology are not clear, consistent and transparent, or if the SUF is determined arbitrarily without consultation with the relevant stakeholders and without regard to current market dynamics and international best practice, the SUF may, in fact, deter efficient investment decisions.

The Consultation Paper repeatedly acknowledges that competition in mobile services in Hong Kong is very keen and intense. A consequence of this degree of competition is that mobile carriers in Hong Kong tend to enjoy lower margins and profitability in comparison to carriers elsewhere in the world. In addition, some infrastructure owners charge exorbitant access fees to mobile operators for providing mobile coverage in their premises. Such fees often constitute monopoly rents as there is no alternative site from which a mobile operator could provide coverage, nor is there a competing infrastructure, further eroding the margins and profitability of mobile operators. In this context, the payment of exorbitant SUFs for the renewal of spectrum licences will inevitably lead to those costs being passed through to customers. The potential effect on customers will therefore need to be considered when determining the SUF.

In CSL's view, the three pricing methods proposed in the Consultation Paper all have their own unique risks, the consequences of which will need to be examined in detail before a determination as to the preferred method is made. In the absence of any implementation detail as to the LCA method, CSL prefers the market benchmarking approach (Method 2), provided that the benchmarks used are appropriate to renewal of existing spectrum allocations for built networks rather than greenfields allocation of spectrum. In this regard, CSL submits that the prices at earlier auctions of 2.5/2.6 GHz and 2.3 GHz spectrum (held in 2009 and 2012, respectively) provide a useable and appropriate guide for prices that allowed and did not substantially constrain subsequent rapid deployment of network infrastructure to efficiently utilise that spectrum. Projections as to pricing for the proposed auction of 2.5/2.6 GHz spectrum in 2013 are not an appropriate benchmark both because it cannot be reliably predicted whether such prices can be achieved, or if achieved, whether the effect of such pricing would be to constrain subsequent deployment of network infrastructure because of the need to service debt taken on by bidders to acquire such spectrum.

As to the hybrid Method 3, CSL considers this to be an unviable option for the reasons discussed below.

CSL also proposes that payment of SUF be based on an annual payments scheme.

2.7 Method 1 – Direct-Calculated Approach (LCA method)

As noted in the Consultation Paper, the LCA method measures the additional cost that a MNO would have to incur in enhancing its network if a small block of the spectrum it currently uses were to be taken away such that the quality and quantity of the services produced would continue to be the same.

²⁹ *CSL Limited Response to OFTA Consultation Paper: Spectrum Utilisation Fee for Spectrum Assigned Administratively* (3 March 2011), 2.

The SUF is generally set at the difference between the lowest priced alternative means of delivery and the cost of the current means of delivery so that the cost of providing the same service with two different means is essentially the same. As explained in the Consultation Paper, the LCA method reflects the opportunity costs of the MNO in utilising the spectrum and provides the incentive for the MNO to use the spectrum efficiently. This method usually generates a range of SUF's depending on the assumptions about technologies and traffic growth in the future.³⁰

In the absence of any implementation detail as to the LCA method, CSL prefers the market benchmarking approach (Method 2), provided that the benchmarks used are appropriate to renewal of existing spectrum allocations for built networks rather than greenfields allocation of spectrum. Pending further details as to proposed implementation of the LCA method, CSL draws OFCA's attention to the following issues and limitations with the LCA method generally::

- One of the limitations of the LCA method is that it assumes, MNOs are supposed to be indifferent monetarily as to whether to purchase the spectrum or enhance their networks, because the costs are allegedly the same. In reality, however, this is often not the case. Indeed, there is a good argument that the SUF for the spectrum should be lower than the opportunity cost (the value of the next best alternative forgone) due to the risk associated with purchasing spectrum. When an MNO commits to the purchase of 15-year spectrum, it must bear the risk of any deviation in technology and traffic growth from the original assumption in the next 15 years. Conversely, if the MNO opts for infrastructure build instead of spectrum purchase, it can delay the necessary infrastructure investment until the actual need arises and can scale accordingly if the 3G traffic changes in the future. It is currently unclear to CSL whether OFCA's proposed LCA method adequately deals with the added risk and inherent uncertainty associated with the purchase of spectrum.
- It is important to note that assumptions as to technology and traffic growth will be different for each MNO. Such assumptions may lead to a range of opportunity cost estimates. It is not yet clear how OFCA would propose to choose the 'best' estimate for the purpose of setting the SUF.
- As noted in an Apex Economics report, if OFCA were to choose a licence renewal fee towards the upper end of the estimates, this would increase 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.³¹ The report goes on to note that:

*"There is an asymmetric economic impact associated with the selection of an opportunity costs-based spectrum licence renewal fee. In terms of efficiency, setting the price too high outweighs the cost for setting the price too low. Given this asymmetry, it is prudent to approach the setting of spectrum fees conservatively and err towards lower value estimates of opportunity cost. Therefore, the 'best' price is that compatible with a conservative approach."*³²
- CSL requests that OFCA confirms whether it would adopt a similarly conservative approach to determine the SUF based on LCA estimates.

³⁰ Consultation Paper, 11.

³¹ Apex Economics, 'The need for a conservative approach to the pricing of radio spectrum and the renewal of radio spectrum licences (14 December 2010) (ii) <<http://www.AMTA.org.au/pages/Spectrum.Licence.Renewal>>.

³² Ibid.

2.8 Method 2 – Market Benchmark Approach

In the absence of definitive information with respect to Method 1, CSL prefers Method 2 as the appropriate method for determining the SUF. However, CSL's support for this option is qualified.

As noted at 2.1 above, OFCA is required under the *Telecommunications Ordinance* to "promote the efficient allocation and use of the radio spectrum as a public resource of Hong Kong".³³ CSL interprets this objective for spectrum management policy as one which seeks to optimise social and consumer welfare as a whole. At the level of spectrum pricing, this ideally results in a policy which is embedded in market realities and relying less on abstract calculations, as is the case with attempts to derive the true value of spectrum based on opportunity cost or other methodologies such as company valuations of spectrum-owning enterprises.

CSL submits that, overall, market benchmarking is the approach most likely to arrive at the true value of spectrum. Market benchmarking has the advantage of transparency, which is indispensable to any process designed to determine a true and fair market value for spectrum. This is well recognised by regulators and in relevant economic literature. For example, the Australian Communications and Media Authority noted that the direct use of the "price of spectrum in auctions or trades in secondary markets" is the simplest approach, is transparent, objective and does not "require potentially uncertain values of non-spectrum inputs/assets" such as are employed in the company valuation methodology.³⁴

However, CSL also recognises the difficulties associated with market benchmarking, as noted in the Consultation Paper. Comparisons between different frequency bands and between market values obtained in different markets and at different points in time can introduce considerable uncertainty into the process.³⁵ Like any form of market comparisons, attempts to find 'like for like' comparators of themselves lead to controversy as to the extent of 'likeness'. That noted, benchmarking is often successfully applied in more complex and disparate markets affected by many factors, such as in re-pricing of global IT and business process outsourcing arrangements. The difficulty for the benchmarker is objectively assessing what factors have influenced pricing in individual cases and then 'normalising' for factors which render a comparison inappropriate for the subject matter being priced.

Prices drawn from the 2.5/2.6 GHz auction expected to be held in the first quarter of 2013 are an insufficient basis to determine the true value of SUF and in particular for determining prices that allowed and did not substantially constrain subsequent rapid deployment of network infrastructure to efficiently utilise the spectrum auctioned. Where significant investment by operators has occurred since a particular auction, the price paid in that auction is a more reliable indicator of the value operators placed on that spectrum and a price which does not impede network build. Such prices would therefore be more appropriate for market benchmarking purposes. Moreover, as CSL has drawn attention

³³ *Telecommunications Ordinance*, section 32G(1).

³⁴ Australian Communications and Media Authority, *Opportunity Cost pricing of Spectrum: Public Consultation on Administrative Pricing for Spectrum Based on Opportunity Cost* (April 2009) 10-11
<http://www.acma.gov.au/webwr/assets/main/lib310867/ffc12-09_final_opportunity_cost_pricing_of_spectrum.pdf>. See also

³⁵ Plum Consulting, *Administrative Incentive Pricing of Radiofrequency Spectrum: Final Report for ACMA* (23 October 2008) 28
<http://www.acma.gov.au/webwr/assets/main/lib310867/ffc12-09_app_a_1_plum_report_to_acma.pdf>.

to elsewhere in this submission, the present circumstances are those where operators have invested in their networks over time.

CSL proposes instead that OFCA uses prices paid in earlier auctions in the 2.5/2.6 GHz and 2.3 GHz bands as market benchmark reference points. These auctions occurred in January 2009 and February 2012, respectively.³⁶ As such, they offer a much more rational basis to assess the prices paid against investment outcomes.

In addition to the proposed 2013 auction of 2.5/2.6 GHz spectrum occurring too late to be useful from an analytical point of view, there is a degree of inequity in using the outcomes of an auction yet to be held as a benchmarking reference point. Because prices paid in that auction are unknown, asking operators to consider Method 2 on this basis detracts from the transparency necessary for spectrum price determination. Such an expectation is inconsistent with the principles of fairness and transparency required at all levels of spectrum management and pricing determination.

Further, CSL's suggested approach for Method 2 is consistent with efficient spectrum management outcomes in relation to pricing. CSL submits that a pricing approach which takes into account continued network expansion and upgrade accords better with stated policy objectives than an uncertain methodology which carries the possibility of factoring in inflated spectrum prices. Were spectrum prices which are too high to be used as the benchmark reference point, this would have the effect of taxing the incumbent operators for their efficient use of spectrum and continued network investment over time. Neither the *Telecommunications Ordinance*, the Spectrum Framework or SCED and OFCA's mission require such a retrograde outcome to be a feature in SUF determination.

2.9 Method 3 – Auction Approach

CSL does not accept that Method 3 will lead to a clear and transparent process, nor is it likely to determine an SUF that reflects the true market value of the spectrum.

It is not clear to CSL why OFCA would propose holding what would be an expensive, administratively burdensome and potentially difficult 'mock' auction process to determine the SUF.

CSL notes the following difficulties with this approach:

- An auction of this type is particularly susceptible to gaming by participants, especially if they are aware that incumbents will be held to the highest bid if they wish to exercise their RFR. Such an auction could lead to artificially high bids, and therefore, an artificially high SUF which does not reflect the true market value of the spectrum. This increases the risk that the incumbents will decide against exercising their RFR, which would likely cause significant customer disruption.
- From a public policy perspective, such an approach suffers from all of the problems that a true auction would. This includes a lack of certainty on the part of incumbents as to the outcome of the auction (and therefore the SUF payable), with such uncertainty affecting efficient investment decisions. Further, the surrender of spectrum to a new entrant would result in significant customer churn.
- According to OFCA's proposal, incumbents would be required to pay a deposit to participate in the auction. Such deposit would be non-refundable to incumbents if

³⁶ See Provisional Successful Bidder Notices, http://tel_archives.ofca.gov.hk/en/industry/broadband/success1.pdf (2.5/2.6 GHz) and http://tel_archives.ofca.gov.hk/en/industry/2.3GHz/2.3ghz_psbns.pdf (2.3 GHz).

they opted against exercising their RFR following the auction. If the deposit is significant, the incumbent is virtually committed to pay for the spectrum without knowing beforehand how much it may need to pay to renew its licence. As such, there is little transparency and certainty around this process for incumbents in respect of the SUF it may need to pay to renew their licences.

- If the auction results in the determination of an artificially high SUF, incumbents may be forced to make a legitimate and commercially reasonable decision to forgo their RFR, and forfeit their deposit. The forfeiture of the deposit would constitute a heavy penalty for making a reasonable commercial decision.

For these reasons, CSL submits that this approach, which is without international precedent, is unlikely to produce a fair and transparent SUF.

2.10 Pricing Method Conclusion

As noted above, CSL is not yet in a position to determine whether the LCA method is an appropriate mechanism for determining the market value of the spectrum. Further details are needed as to the precise model OFCA is contemplating for the purposes of this consultation. Following the receipt of further details, CSL would be happy to provide its informed view as to the appropriateness of this pricing method.

However, if OFCA is minded to opt for market benchmark approach in determining the SUF, CSL submits that OFCA should benchmark the previous results in the 2.5/2.6GHz and 2.3GHz auction which was conducted in early 2009 and early 2012 respectively. This has the advantage of being able to be related to subsequent network investment in order to better reflect those prices as a true value paid for spectrum. Using the 2013 auction of 2.5/2.6 GHz spectrum effectively rules out this possibility.

However, irrespective of the pricing method OFCA applies, CSL submits that the SUF should be paid as an annual payment for the duration of the renewed licence rather than as an up-front lump sum payment. As noted in the OFTA Consultation Paper 'Spectrum Utilisation Fee for Spectrum Assigned Administratively' (26 November 2010), the annual payment of SUF has advantages over up-front lump sum payments. Annual charges provide a better on-going incentive for efficient spectrum use as the user is regularly reminded of the cost of using spectrum. And, as far as the licence holder is concerned, annual charges minimise the impact on cash flows.

Annual payment would be compatible with OFCA's objective to ensure that there are ongoing incentives for licensees to make efficient use of their spectrum.

It is CSL's view that an annual payment system would appropriately balance the interests of OFCA (in creating ongoing incentives for incumbents to use their allocated spectrum) and incumbents (for their business and cash flow interests).

3 Paired Spectrum - Option 2

CSL does not support Option 2. A 'greenfields' re-allocation of all the assigned spectrum in the 1.9-2.2 GHz band would cause major uncertainty, service disruption and seriously diminish the investment attractiveness of 3G spectrum. Inefficient write-offs necessitated by regulatory uncertainty would reflect poorly on Hong Kong as an investment destination.

All of the above consequences run counter to SCED and OFCA's stated public policy objectives and can easily be avoided if OFCA adopts CSL's recommended option of

licence renewal at an appropriate negotiated commercial price or, failing that, granting the incumbent 3G operators an RFR under Option 1.

Specifically under Option 2, CSL submits that:

- the inherent uncertainty of re-auction would seriously undermine the incumbent 3G operators' investment and network planning, resulting in the longer term reduction of network capacity;
- even though new players would likely enter the mobile market post-auction, effective competition would not likely be promoted due to their being an excess of operators in the highly mature and therefore constrained (and already highly competitive) Hong Kong market;
- further, a greater number of market participants would see investment returns diminish in the longer term, putting a further brake on investment;
- current spectrum assignments would likely be significantly reshuffled as a result of the auction process, necessitating extensive network reconfiguration and disruptive customer migration, all of which would likely involve excessive (but avoidable absent re-auction) CAPEX and OPEX for operators which could otherwise be spent on genuine innovation;
- customer service continuity is significantly at risk: severe customer service interruptions, customer confusions and general public inconvenience are all undesirable and unacceptable social consequences to society;
- forecast capacity constraints in other bands make them poor substitutes for lost spectrum; and
- networking offloading technologies, though potentially promising, will be insufficient to address forecast demand for mobile data and in any event suffer from interference and co-ordination difficulties.

3.1 Efficient Spectrum Utilisation, Encouragement of Investment and Promotion of Innovative Services

Question 3: *How would the prospect to re-auction the entire 120MHz of spectrum in the 1.9 – 2.2 GHz band impact on the investment plan and network planning of the incumbent 3G operators, and how would that further impact on their mobile network capacity?*

CSL considers Option 2 would be the most disruptive to both the incumbent 3G operators and their customers. CSL does not support Option 2. Re-auction of the entire 120MHz of 3G spectrum is essentially a 'greenfields' approach that would create a very high level of uncertainty in relation to spectrum usage upon expiry of the current licence term. As mentioned in CSL's responses to Question 1, the incumbent 3G operators' investment decisions will be adversely affected and distorted.

'Greenfields' auctions may be "best suited to providing an initial economically efficient distribution of the spectrum resource", when the true value of spectrum is not known.³⁷ This is commonly the case when spectrum is first released to the market. However, it is

³⁷ ITU, Report ITU-R SM.2012-3, Economic aspects of spectrum management, 18 (September 2010) <<http://www.itu.int/pub/R-REP-SM/en>>.

less common in situations where a market has reached maturity (as in Hong Kong) and operators have already made significant network investments and built up strong customer bases over several years. The resulting uncertainty would needlessly jeopardise investment and innovation and cause serious disruption to services.

CSL believes that it is one of OFCA's roles to create regulatory certainty that fosters investment and innovation. However, re-auction of the entire 3G spectrum creates an uncertain regulatory environment which discourages further investment since return on investment beyond the spectrum expiry date is significantly at risk. In the worst case scenario, investment may be held up for the remainder of the current 3G spectrum assignment. Such a development would make long-term capital investments unviable. As OFCA rightly points out in the Consultation Paper, adoption of new technologies and/or network upgrades would be constrained due to lack of investment; hence the development of innovative mobile data services would become stagnant.

From a network planning perspective, CSL considers the following:

- By 2016, for customers with 4G capable devices, 3G is a slower and lower capacity data network compared with 4G, but can provide an acceptable user experience in lightly loaded conditions;
- For customers with 3G capable devices, 2G is a substitute for voice services only but definitely not for data services; and
- Customers themselves decide what devices to purchase. The operator has very little control whether customers should be on 4G, 3G, or 2G depending on what they expect from using mobile services.

If the entire 120MHz block is re-auctioned it will have a major adverse impact on network planning. With spectrum uncertainty, network planning on 3G will become more conservative or even constrained as the financial calculations used to justify network investment will have to assume a shorter lifetime for network equipment coinciding with the spectrum expiry date (typically network equipment has a lifetime of 5 years or more). Also, it is clear that overall network capacity will be reduced versus the situation where there is more spectrum certainty as network investment on 3G network is reduced. Customers with 3G devices will suffer the most.

3.2 Promotion of Effective Competition

Question 4: *The number of players in the mobile telecommunications market may or may not remain unchanged after the auction. Would competition in the mobile market be enhanced if the entire 120MHz of spectrum in the 1.9 – 2.2GHz band is to be re-auctioned under Option 2?*

OFCA recognises the Hong Kong mobile market as already highly competitive, yet considers "it is possible that new players may bring about even keener competition by introducing innovative services or new business paradigms."³⁸ While it is theoretically possible that new entrants could emerge through an auction process if Option 2 is adopted, this by no means ensures that competition will be enhanced. On the contrary, if too many players exist in the mobile market, it will likely be detrimental to competition in the longer term.

³⁸ Consultation Paper, 14.

In any event, an imperative towards new entry is difficult to argue. OFCA cited in the Consultation Paper recent auction experience in the Netherlands as an exception to the usual practice of using auctions to assign newly-released spectrum. However, to the extent the Netherlands experience involves a re-auction of spectrum (as opposed to the auction of new spectrum), the management policy of the regulator was in large part focussed on bringing new entrants in to a market which only had three MNOs for a population of almost 17 million.³⁹ As noted in CSL's responses to Question 1, the Hong Kong mobile market is much more competitive, with 5 MNOs and 11 MVNOs. A need for new entry does not arise.

Most importantly, if too many new players enter the small Hong Kong mobile market, it may have the effect of reducing competition in the long term. More players may not mean more competition. This seems counter-intuitive, but is readily understood when one considers the large fixed, sunk and recurring nature of capital investment in mobile networks. Initial network deployment requires substantial sunk investment before an operator begins to realise returns. As revenues begin to expand, incremental investment is continually needed to expand capacity ahead of customer demand. This trend is even more pronounced with 3G given the higher frequencies in which 3G operates and which require smaller, more tightly packed base stations and thus a much higher capital expenditure from the outset.

Given the largely fixed and sunk nature of mobile network costs, stiff competition can place significant downward pressure on prices. Such price decreases may be attractive to consumers, but short term benefits such as these will be offset by decreasing innovation in the longer term. As competitors come to have reduced resources to invest in new technology and product development, they lose the incentive to do so. This is called the Schumpeterian effect⁴⁰ and the small and highly competitive Hong Kong mobile market would be a prime candidate for this outcome to occur were the fine competitive balance to be upset. The likely entry of new operators as a result of auction processes under either Options 2 or 3 would increase the likelihood of this eventuating.

Moreover, re-auction will create uncertainty which discourages investment and inhibits the development of innovative services. Customers' service continuity will be at risk and service disruptions to millions of customers using 3G mobile services a distinct possibility. All these unacceptable social consequences have been fully elucidated in CSL's responses to Questions 1 and 3.

Additionally, re-auctioning the entire 3G spectrum would give the incumbent 3G operators more incentive to bid for spectrum in the auction given their existing customer bases and capital investments. In order to secure spectrum which is highly valuable to them for those reasons, their bidding will become aggressive, likely resulting in a very high auction price. In turn, a high auction price would mean that resources available for capital investment in networks become less, the cost of the auction ultimately being passed to consumers.

The already fiercely competitive nature of the Hong Kong mobile market means SCED and OFCA have little cause for concern in this area. The MVNO licensing regime is also an effective regulatory vehicle, allowing service providers who do not have spectrum rights to offer mobile services at the retail level. Whilst Hong Kong has four 3G MNOs,

³⁹ Telecompaper, 'Dutch plan major frequency auction for October' (6 January 2012) <<http://www.telecompaper.com/news/dutch-plan-major-frequency-auction-for-october>>.

⁴⁰ Named after Joseph Schumpeter. See J Schumpeter, *Capitalism, Socialism, and Democracy* (1942). See also G C Loury, 'Market structure and innovation', (1979) 93(3) *Quarterly Journal of Economics* 395-410.

the fifth MNO in the capacity of a MVNO has launched 3G mobile broadband services to compete with the existing 3G MNOs. In addition, the unprecedented total of 11 MVNOs in Hong Kong has already been mentioned above.

The Hong Kong mobile market exerts tremendous pressure on the existing players to make efficient use of spectrum and provide better and innovative services to consumers. The possibility of potential new players being at the forefront of service innovation and performing better than incumbents as suggested in the Consultation Paper is only a hypothetical scenario. In fact, CSL has proven itself that it has used state of the art world leading technology to offer innovative services to customers (please refer to CSL's responses to Question 1). Also, there is no evidence to suggest that the incumbent 3G operators will perform worse than a hypothetical new entrant. On the contrary, the costs of the disruptive impact of re-auction on both the incumbent 3G operators and consumers are entirely certain and detrimental (please refer to CSL's responses to Questions 1 and 3) and completely outweigh the benefit, if any, arising from a hypothetical new entrant.

3.3 Customer Service Continuity

Question 5: *What would be the transitional plans for an incumbent 3G operator if under Option 2(a) it cannot retain any of its original frequency assignment; (b) it can retain only part of its original frequency assignment; and (c) it gets spectrum in a different sub-frequency band?*

Question 6: *What are the estimated costs and the areas of investment for implementing the transitional plans for tackling the three scenarios mentioned in Question 5?*

All of the transitional plans mentioned assume that the overall user experience is maintained before, during, and after the events in question:

Option 2(a)

Under Option 2(a) whereby the incumbent 3G operator does not retain any 1.9-2.2 GHz spectrum, 3G customers with low data usage would be migrated to 2G, resulting in an overall degraded data usage experience. 3G customers with moderate data usage would either have to obtain a 4G device at additional cost to continue service with the incumbent 3G operator. CSL does offer a UMTS900 MHz carrier for 3G services, however losing the entire 1.9-2.2 GHz band would simply overload this carrier; customers would have to be migrated to 2G or 4G which will again be overloaded.

More usage on 2G will be problematic, as 2G spectrum is being continuously re-farmed to 4G; more importantly, the 2G data experience is not a substitute for 3G data even for low bandwidth users. Investments in 2G are subsiding as more efficient 3G and 4G technologies are available. Putting more loading on 2G can only result in a degraded user experience for all users on 2G.

Moving more usage to 4G is desirable in general from a network perspective, but even current 4G spectrum allocations (including the future 'digital dividend' band) are widely regarded as not being sufficient beyond 2016 at current rates of data growth. With limited spectrum, the mobile network operator is left with only two options: either invest in more radio base stations or degrade the overall quality of service. Inevitably a combination of additional investment coupled with degradation in service quality will result. Implementing more radio base stations in Hong Kong on a large scale is simply not possible as the network is currently very dense; there is a limit to the number of base stations that can be implemented as locations where new radio base stations can be easily built are limited at best. Additionally site rental costs are very high in Hong Kong. This difficulty in implementation coupled with high ongoing costs will limit the overall scale of implementation. Thus operators will do what they can, but overall user experience will suffer as the impact of limited spectrum and exploding data usage take hold.

The migration to 4G also depends on whether customers are willing to purchase a new 4G device either through a stand-alone one-time purchase or through higher priced service plans. In addition, it will cause chaos and inconvenience to all customers if they are forced to migrate to either 2G or 4G during a short period of time.

Option 2(b)

For Option 2(b), under which the incumbent 3G operator maintains a subset of its current spectrum, there would be a combination of Option 2(a) (i.e. forced migration of customers to 2G or 4G) and adding additional 3G network equipment and cell sites depending on the amount of 3G frequency retained. Each additional cell site would require huge costs per year for site rent, rate, utilities and backhaul. This will increase both CAPEX and OPEX costs of the incumbent 3G operators, which will eventually have to be passed onto customers. Again, the chaos and inconvenience caused by customer migration as mentioned in Option 2(a) would be a serious concern.

Option 2(c)

For Option 2(c) whereby the incumbent 3G operator receives spectrum in a different sub-band, there would be massive reconfiguration required. Many systems sharing common infrastructure by multiple operators will have to be reconfigured since the connection points are tuned for specific frequencies. This reconfiguration will be disruptive as it requires physical reconnection and cannot be done remotely. CSL has installed hundreds of these systems in major shopping malls, meeting spots including the airport, convention centre, and in the MTR.

If the spectrum obtained is non-contiguous, then additional radio amplifiers at each base station will be required. Additional radio hardware covering the new sub-band would be deployed in busy traffic areas. This would substantially increase CAPEX costs, with changes in OPEX costs assuming the overall spectrum allocation is the same before and after the spectrum re-auction. In general, non-contiguous spectrum is less efficient from an infrastructure perspective and requires more complicated radio equipment. As an example, the current 3G standard of DC-HSPA+ requires two contiguous UMTS channels; non-contiguous channels are not supported.

In addition, there are other significant impacts that need to be considered. In-building coverage in many locations is covered using repeaters. These repeaters do not support non-contiguous spectrum. Additional repeaters and significant network tuning would be required.

Conclusion

At this juncture, it is difficult to estimate the costs for the above disruptive changes as they depend on a number intertwining factors, e.g., the amount of 1.9-2.2 GHz spectrum retained, whether the 1.9-2.2 GHz spectrum is contiguous, the overall traffic forecast for mobile data usage, 4G device penetration and 3G device penetration, etc.

3.4 Substitutes and Alternative Technologies

Question 7: *If an incumbent 3G operator is unable to obtain any of the 3G spectrum or if it manages to obtain less spectrum than what it currently has, to what extent could the spectrum that it currently holds in other frequency bands act as an effective substitute for the spectrum foregone?*

OFCA drew attention in the Consultation Paper to the exponential growth in mobile data traffic in recent years in Hong Kong. Between 2006 and 2011 there was more than a 450-fold increase in mobile data usage, with a 124% increase in 2011 alone. Greater interest in, and reliance on, smartphones, tablets and other mobile devices for a wide

variety of services is likely to continue fuelling this growth.⁴¹ Given the current forecasts for mobile data demand, current spectrum holdings would be a poor substitute.

Forecast capacity constraints also provide an argument for accelerating the introduction of spectrum trading in Hong Kong. For example, in the event incumbent operators re-farm further spectrum allocations as 4G services become more prevalent, spectrum freed up could be assigned to other operators, including new entrants (with appropriate oversight by OFCA). Appropriate arrangements for spectrum trading could be in place by October 2016 to facilitate this. OFTA's policy inclination in the Spectrum Framework is to support the eventual introduction of spectrum trading in Hong Kong.⁴²

Question 8: *How effective would be the application of alternative technologies (e.g. Wi-Fi, femtocell, etc.) help economise on the use of radio spectrum through offloading the mobile data traffic?*

CSL does not consider that the application of alternative technologies as mentioned above is sufficient to offload mobile traffic.

Wi-Fi will help offload mobile data traffic but there are major issues that need to be overcome. Under the current regulatory regime, the frequency bands allowed for Wi-Fi are used on a shared basis in an uncoordinated manner with no limitation on the number of service providers. While Wi-Fi equipment should not cause harmful interference, it is not protected from harmful interference caused by other authorised telecommunications equipment.⁴³

Specifically, Wi-Fi needs to be coordinated amongst all the operators since all 3G mobile networks in Hong Kong are busy in the same places, e.g. the MTR. Wi-Fi as a technology also has issues with large amounts of data traffic. For example, a good 20 Wi-Fi access points are visible outside the Sogo department store in Causeway Bay. Should these access points become very busy, they will essentially interfere with one another and severely decrease the performance of all Wi-Fi points in the area.

Femtocells are essentially smaller low cost base stations. While they show some promise, the fact that femtocells still have not caught on in the 3G space despite being in the market more than 5 years indicates that there are technical difficulties which femtocells must overcome.

Heterogeneous networks (**het-nets**) are also being actively discussed as a way to maximize overall network efficiency. Het-Nets make use of small cells (e.g. Wi-Fi and femtocells), but include a layer of network intelligence to co-ordinate usage and keep the customer experience high. While these technologies may show promise, the main issue remains: there is simply too much forecast demand for mobile data; all spectrum is required to meet that demand; above all, new network architectures are needed to offer the connection speeds that customers demand.

⁴¹ Consultation Paper, at [8].

⁴² Spectrum Framework, 4.

⁴³ OFTA Statement, *Class Licence for the Provision of Public Wireless Local Area Network Services* (17 January 2003) <<http://tel.archives.ofca.gov.hk/en/tas/others/ta20030117.pdf>>.

4 Paired Spectrum - Option 3

CSL does not support Option 3. As noted in CSL's responses to Option 1, CSL recommends licence renewal at an appropriate negotiated commercial price. Short of this, CSL recommends the RFR under Option 1. CSL considers these options present the best opportunity to realise SCED and OFCA's public policy objectives as discussed in Question 1.

Although CSL supports an RFR under Option 1 as a second option behind licence renewal at an appropriate negotiated commercial price, the RFR under Option 3 is devalued due to its pairing with an auction element in the hybrid nature of the Option. CSL therefore submits that the disadvantages under Option 2 associated with an auction of currently utilised spectrum still attend Option 3:

- negative affect on the investment decisions of incumbents given the relative uncertainty surrounding the outcome of the auction;
- discouragement of innovation due to a disincentive to invest in the remainder of the licence term and beyond;
- customer inconvenience if spectrum were to change hands as a result of the auction;
- purported enhancement of competition in the (already highly competitive) Hong Kong mobile market but in all likelihood competition (along with investment returns) will diminish due to there being too many players in a relatively small market.

In addition to the above, CSL makes further Option 3-specific observations in respect of SCED and OFCA's four key public policy objectives.

As to the spectrum pricing options considered in Questions 13 and 14, CSL regards neither of them as viable due to their lack of transparency and equity.

Were OFCA to choose Option 3, however, CSL agrees that it is slightly less disruptive than Option 2 in terms of regulatory certainty for the incumbent 3G operators and service continuity to customers – provided, of course, the incumbents are offered an RFR of two-thirds of the original 3G spectrum, i.e. a contiguous band of 2 x 10MHz paired spectrum. However, CSL remains of the view that licence renewal at an appropriate commercial negotiated price is the best option; short of this, CSL supports an RFR under Option 1.

Question 9: *Do you have any comment on the preliminary proposal of the TA to offer each of the incumbent 3G operators the right of first refusal to a frequency assignment of 2 x 10MHz of 3G spectrum post October 2016 under Option 3?*

Question 10: *Similar to Question 1, given there is clear indication of competing demand for the 3G spectrum, are there good public policy reasons for the TA to offer Spectrum RFR to the incumbent 3G operators, instead of assigning it through the market-based approach as stipulated in the Framework, when the current 3G frequency assignments expire in October 2016?*

Question 11: *Do you have any comment on the preliminary proposal of the TA under Option 3 to devise an arrangement so that all interested parties will have the opportunity to get hold of at least a contiguous band of 2 x 10 MHz of paired 3G spectrum?*

4.1 Efficient Spectrum Utilisation, Encouragement of Investment and Promotion of Innovative Services

Under Option 3, if all the incumbents exercise the Spectrum RFR (as defined in the Consultation Paper), there will be 2 x 20MHz paired spectrum available for Spectrum Re-auctioned. OFCA also proposes that all interested parties are given the opportunity to obtain at least a contiguous band of 2 x 10MHz paired spectrum in Spectrum Re-auctioned which translates into two blocks of 2 x 10MHz paired spectrum.

Although it is arguably less destructive than the 'greenfields' approach under Option 2, the auction mechanism under Option 3 is nevertheless at odds with internationally accepted spectrum management principles in respect of spectrum which is already efficiently utilised. As we have noted previously, spectrum auctions are justifiable when new spectrum is first released to the market or when existing spectrum has been inefficiently utilised, left idle or is to be re-farmed for new uses (e.g. the 'digital dividend' spectrum).

This has been consistently recognised by Ofcom over many years in the course of the regulator's review of the UK spectrum framework. Ofcom regards spectrum auctions as appropriate for releasing vacant or unused spectrum⁴⁴ which is "unencumbered by existing use".⁴⁵ In India, the regulator took a decision to re-farm the 900 MHz band. However, all options for doing so involved the incumbent licensees being allocated replacement spectrum in another band.⁴⁶ Although CSL would not support the Indian regulator's approach, contrary to Option 3 the overall spectrum holdings of the incumbent licensees arguably remain undiluted if replacement spectrum is granted to them.

By contrast, under Option 3, re-auctioning spectrum which has been used efficiently and innovatively over many years unjustifiably dilutes the holdings of the incumbents and creates for them a significant disincentive to invest, in particular over the remainder of the licence term. The result would be needless degradation of the 1.9-2.2 GHz band as investment decisions based on certainty in relation to existing spectrum allocations would be called into question.

4.2 Customer Service Continuity

OFCA's spectrum allocation proposal under Option 3 will mean that some incumbent 3G operators can only retain 2 x 10MHz after the Spectrum RFR and Spectrum Re-auctioned are allocated. In view of the explosive growth of mobile data, the spectrum held by those incumbents would be insufficient to meet customer demand. Customers will necessarily experience degradation of service as a result. Forecasts show that two-thirds of the world's mobile data traffic will be video by 2016,⁴⁷ further accelerating the growth rate of mobile data. In addition, the disadvantages of Options 2(b) and 2(c) as given in CSL's responses to Question 5 will almost certainly eventuate. In any event, customer service disruption is inevitable.

⁴⁴ Ofcom *Spectrum Framework Review: Implementation Plan* (2005) 12, 15 <<http://stakeholders.ofcom.org.uk/binaries/consultations/sfrif/summary/sfr-plan.pdf>>.

⁴⁵ DotEcon and Analysys Mason Group, *Allocation Options for Selected Bands: Final Report for Ofcom* (2005) 64, 75 <<http://stakeholders.ofcom.org.uk/binaries/consultations/sfrif/annexes/bands.pdf>>.

⁴⁶ Telecom Regulatory Authority of India, *Recommendations on Auction of Spectrum* (23 April 2012) 40-1 <http://www.trai.gov.in/RecommendationDescription.aspx?RECOMEND_ID=368&qid=1>.

⁴⁷ Cisco Systems, Inc., *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016* (24 February 2012) 3 <http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf>.

Further, CSL notes OFCA's assessment that Option 3 may, in some respects, be preferable to Option 2 as incumbents will retain the option to keep 2 x 10 MHz of 1.9-2.2 GHz band, and also participate in the auction for further spectrum. This, OFCA believes, may mean less disruption to the business, and customers, of incumbents. However, the effect on the business of incumbents, and their customers, will depend largely on how the hybrid auction is to be conducted.

For example, if the auction offers 2 x 5 MHz bands, then it is possible for incumbents to bid for the carved out bands and retain the same spectrum configuration to minimize any disruption. However, if the bands auctioned are in the denomination of 2 x 10 MHz bands, then all incumbents (and therefore their customers) will experience disruption as spectrum bands will either reduce or expand if they successfully bid for the re-auctioned bands adjacent to their entitlement. In any case, business and customer disruption is inevitable, regardless of the auction outcome.

4.3 Promotion of Effective Competition

The Consultation Paper clearly assumes that there is likely to be intense competition for the 1.9-2.2 GHz band and, on the basis of this assumption, Option 3 appears to be intended to facilitate the entrance of new market players, purportedly to create further competition in the Hong Kong mobile market. CSL, however, does not anticipate that there will be much interest in the spectrum from new entrants given the impending auction of the 2.5/2.6 GHz bands which will be used for 4G services. New entrants may be more interested in competing for 4G spectrum if they are serious about investing in technology development and innovative services.

In any event, encouraging new entrants into the Hong Kong mobile market would be more efficiently achieved through the allocation of new spectrum (which is currently unassigned and idle). As noted in the Consultation Paper, the 1.9-2.2 GHz band has 20MHz of unpaired spectrum that remains idle since its assignment to the incumbent 3G operators (each incumbent has been assigned 5MHz of unpaired 3G spectrum).⁴⁸ Opening this idle spectrum to the market would provide an opportunity for a new entrant without the uncertainty and disruption inherent in the auction mechanisms under Options 2 and 3.

Further, it must be not be overlooked that new players can also enter the Hong Kong mobile market through acquisition. As has been recognised for a long time in Hong Kong, "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."⁴⁹ New entrants taking advantage of this business-friendly framework would also mean the problems associated with auctions are avoided.

However, as noted in CSL's responses to Question 4, the Hong Kong mobile market is neither in demand of new players nor would their entry necessarily promote effective competition. After Spectrum Re-auctioned is allocated, if there are new entrants who successfully bid for spectrum, this will result in there being more than four 3G mobile network operators. The increase in the number of players may lead to price competition in the short-term, but it may not translate to maximize consumer benefits. In the long-term, customer experience will significantly deteriorate due to the dilution of spectrum held by each network operator. Further, reduced investment and innovation in the longer

⁴⁸ Consultation Paper, 3.

⁴⁹ OFTA Consultation Paper, *Licensing of Mobile Services on Expiry of Existing Licences for Second Generation Mobile Services* (1 August 2003) 7 <<http://www.info.gov.hk/archive/consult/2003/prs-e.pdf>>.

term will likely be caused by the Schumpeterian effect noted in CSL's responses to Question 4.

Short of licence renewal at an appropriate negotiated commercial price, therefore, the best course of action for OFCA to adopt is Option 1, i.e. offering the RFR to the four incumbent 3G operators to acquire the original 2 x 15MHz paired spectrum.

4.4 Band Plan

Question 12: *Taking into account the merits of having contiguous spectrum of 2 x 10 MHz paired spectrum and the investment in capital equipment that the incumbent operators have already put in the 3G spectrum, should the TA draw up the band plan as described in paragraph 46?*

As noted above, CSL does not support Option 3. However, if OFCA were to adopt Option 3, CSL would support, with full consultation, the proposal for OFCA to draw up a band plan as described in paragraph 46.

CSL submits that it is critical for operators to have contiguous spectrum holdings in the 1.9-2.2 GHz band. Separating the spectrum between Spectrum RFR and Spectrum Re-auctioned would greatly decrease the value of the spectrum. The capital costs to support non-contiguous spectrum are much higher as additional radio hardware is needed for spectrum that is too far apart.

4.5 Spectrum Pricing

Question 13: *What are your views and comments on the proposed arrangements discussed in paragraph 54?*

Paragraph 54 suggests that incumbent 3G operators will be offered a higher SUF for the Spectrum RFR and a lower reserve price will be set for the Spectrum Re-auctioned in anticipation of keen competition for the Spectrum Re-auctioned. The incumbents are then left to make a commercial decision as to whether they surrender their RFR and compete for the Spectrum Re-auctioned in anticipation of winning the same frequencies at a lower SUF.

CSL notes that the Consultation Paper does not specify how the SUF would be set for the Spectrum RFR, nor does it specify the manner in which the reserve price will be determined for the Spectrum Re-auctioned.

Accordingly, CSL submits that the manner in which these prices are set must be transparent, fair and equitable to both the incumbents exercising the Spectrum RFR and interested parties participating in the Spectrum Re-auctioned. However, at present, there is little in the Consultation Paper to suggest that how these prices will be determined in consultation with stakeholders in a transparent and open manner.

CSL considers that this method of SUF determination is simply not a viable option. Such a process is, to CSL's knowledge, is untested and without international precedent. We have no empirical evidence, therefore, that this process will yield an efficient and effective outcome for incumbents, other participants, or the consumers in general. Further, the process appears to be unnecessarily over-engineered and overly complicated in comparison to Option 1 and the proposed valuation methods discussed earlier in the Consultation Paper.

CSL also notes that if the SUF for the Spectrum RFR is set too high, the incumbent 3G operators will have no choice but to surrender their Spectrum RFR in order to avoid exposing their companies to unbearable risk. If this were the case, the whole spectrum

arrangement exercise would be drawn back to Option 2. The result then would be uncertainty for incumbents, with consequential effects on their investments decisions, and disruption to customers if spectrum were to change hands following the auction.

Question 14: *What are your views and comments on the proposal to benchmark the SUF of Spectrum RFR with the Spectrum Re-auctioned as proposed in paragraphs 55 – 58 above?*

CSL strongly objects to the proposal to benchmark the SUF of the Spectrum RFR with the Spectrum Re-auctioned. This approach requires incumbent 3G operators to commit an unknown level of SUF to be determined in the Spectrum Re-auctioned before the auction takes place if they decide to exercise the Spectrum RFR. Further, the incumbents are still required to pay the SUF (the average SUF of Spectrum Re-auctioned) even though they consider the SUF of the Spectrum Re-auctioned reaches an unrealistic and unreasonably high level which is not sustainable for any business case. In the circumstances, the incumbents' business will be jeopardized and the damage will be irreparable.

It is unjust and inequitable to impose such an unreasonable condition on incumbents by requiring them to make a prior financial commitment on an uncertain level of SUF which is beyond their reasonable control and only made known to them after the auction. This approach is very dangerous and risky without any empirical study and has not been tested or adopted in overseas jurisdictions. It undoubtedly exposes the incumbents to unreasonable regulatory and business risks which are not conducive to investment and are contradictory to CEDB's stated policy objective of "*fostering a business-friendly environment and attracting investments in Hong Kong*".

CSL believes that OFCA must provide certainty and confidence in the regulatory regime in order to promote investment and innovation in the Hong Kong mobile telecommunications industry. However, the process described in paragraphs 55-58 provides no level of certainty for incumbents in respect of the SUF that may be payable to retain their spectrum licence. This in turn creates uncertainty as to spectrum licence continuation, and ultimately, disincentivises continued innovation and investment in mobile services, with resultant negative effects for consumers.

It should be emphasized that offering the RFR not only is in the interests of the incumbents, but is also beneficial to the consumers for service continuity. It is unfair to impose harsh, onerous and unreasonable condition on incumbents if they decide to exercise the RFR.

5 Unpaired Spectrum

Question 15: *What are your views on the proposal to put the unpaired 3G spectrum to reserve?*

Currently, each of the incumbent 3G operators has been assigned 5MHz of unpaired 3G spectrum. That the unpaired spectrum has been left idle is not the fault of the incumbent 3G operators. The 5MHz bandwidth is simply too small to be useful for next generation TDD-based radio technologies. From this perspective, CSL does not object to putting the unpaired 3G spectrum to reserve. Alternatively, please refer to 4.3 above.

Submitted by CSL Limited

15 July 2012