

Telecommunications Policy – It’s Broken and Needs Urgent Review: Other Countries Can Do It. Why Not Hong Kong?

Introduction

Almost exactly one year ago, on 24 May 2017, Hong Kong Telecommunications (HKT) Limited (“HKT”) published a paper entitled “Fit for the Future? Spectrum Options for Hong Kong.” This paper was the culmination of a series of five papers and one open letter (the “Papers”) published by HKT in the period 15 December 2016 to 24 May 2017 in which HKT detailed its concerns about Hong Kong’s outdated spectrum policy and management practices.¹ In the Papers HKT clearly explained the problems with the current system and identified concrete steps the Government and the Communications Authority (“CA”) could take to modernize policies and practices to meet the needs of a rapidly evolving and highly competitive industry.

In the eighteen months since HKT began issuing the Papers the Government has taken some small steps forward. Under sustained pressure from HKT and other mobile network operators, the CA has begun to plan for the release of new spectrum for mobile use.² While HKT welcomes these steps, and they represent a shift from the Government’s previous position of “no new spectrum for 3 years”, what the Government is offering are baby steps only; Hong Kong needs giant steps forward if it hopes to catch up with global leaders including China. Particularly disturbing is that the Government does not seem to understand what is at stake here and while making Hong Kong a “Smart City” is stated as a policy objective there seems to be no recognition that no city will be a smart city unless 5G is introduced early and widely.

Other countries have made enormous strides in freeing up new spectrum for mobile use in anticipation of 5G being an enabler of their smart city policies. Furthermore, they are looking to the future and making radical changes to their broader approach to spectrum management in order to enable operators in their jurisdictions to compete effectively in this rapidly evolving, highly competitive market. Eighteen months ago Hong Kong was falling behind and urgent steps needed to be taken. Now Hong Kong is even further behind and the Government and the industry regulator either do not know this or are simply refusing to acknowledge it. Either way the consequences are potentially disastrous for Hong Kong and its role as a regional hub and gateway to the Mainland. Hong Kong deserves better. What is needed is a radical overhaul of the whole approach to telecommunications policy and spectrum management in Hong Kong and the implementation of a forward looking system which is truly fit for the future.

¹ The Papers are: Open letter to the Secretary for Commerce and Economic Development and the Chairman, Communications Authority regarding “Radio Spectrum in Hong Kong” (15 December 2016); The Facts about the Admin Fee – and Why Spectrum Costs Drive Increases in the Admin Fee.” (21 December 2016); “Spectrum Supply in Hong Kong” (10 January 2017); Spectrum Trading in Hong Kong - Why are we waiting?” (18 January 2017); “What is True 5G? And Why Spectrum Is So Important?” (8 February 2017); “Fit for the Future? Spectrum Options for Hong Kong.” (24 May 2017).

² In its Work Plan promulgated on 21 March 2017, three months after HKT published the first of the Papers, the CA finally set out some preliminary plans for the release of spectrum for mobile use in Hong Kong. See here: https://www.coms-auth.hk/en/media_focus/press_releases/index_id_1423.html

The issues raised in the Papers are now more pertinent than ever. In this paper, HKT restates the central problems with the current system and outlines the fundamental questions which the Government and the regulator must ask when considering future policy and regulatory prescription. This is followed by an outline of the steps which the Hong Kong Government and the CA have taken in the past eighteen months. Finally there is a summary of key steps which have been taken in other jurisdictions to facilitate the emergence of the products and services of the future. We need look no further than Mainland China for an example of what can be done by a progressive and forward thinking regulator. If others can do it, why not Hong Kong?

What are the problems?

The world of wireless data consumption is changing fast and the advent of the 5G era will accelerate this. 5G is not just faster mobile broadband. In the future, millions of customers with Smartphones will see explosive growth to accommodate billions of connected devices (including Smartphones) all with different connectivity requirements. Billions of sensors and connected devices will serve applications such as M2M (machine-to-machine), V2X (vehicle-to-everything), robotics, industry 4.0, Smart Cities and Smart Home requirements. However, realization of these services and applications is virtually impossible without sufficient spectrum at the right frequency bands as well as the necessary network infrastructure to make use of it.

There is widespread consensus in the industry globally that this presents huge challenges which cannot be resolved using traditional systems of spectrum management. The sheer amount and range of spectrum needed to support emerging and innovative services will mean that the existing system of spectrum planning, allocation and charging will no longer be sustainable. Also the existing infrastructure will be inadequate to support the use of the new spectrum needed. It will therefore also be necessary to put in place robust policies to enable the installation and maintenance of the necessary infrastructure.

The Government and the regulator are stuck using 20th century policy prescriptions that were developed for a voice-centric mobile world when the future is all about 21st century massive-data and video applications. A simple “patch-up” or doing the same things (e.g. issuing a consultation paper or holding an auction) a bit earlier isn’t the answer. The future needs vision and a radical overhaul of the policy and regulatory framework. The Government is looking at the “trees” and not seeing the “forest”. In short, nothing less than a holistic review and fundamental change is going to deliver the results that Hong Kong needs to become a “Smart City”.

In addition, the policies and approach being taken by the Government and the regulator are at odds with the Greater Bay Area strategy. Mainland China is determined to use the Greater Bay Area as its centre of innovation and turn it into a technology powerhouse. It would be ironic to see China leap ahead and Hong Kong left behind as a “poor cousin” simply because Hong Kong couldn’t get its policy and regulatory environment appropriately tuned to the forward-looking needs of the Greater Bay Area.

Five questions that are fundamental to the future policy and regulatory prescription.

Question 1 - Is Government policy solely driven by maximizing spectrum auction receipts?

The Government clearly obtains a “windfall gain” every time it auctions spectrum therefore it might be concluded that the Government relies on this windfall to balance its books – indeed spectrum auctions in various countries have been justified solely on this basis. However, it is well known that Hong Kong has had a decade of Budget surpluses and holds record fiscal reserves therefore it simply does not need the money raised from spectrum auctions. If so, this opens up various alternative policy options for Hong Kong. No-one is expecting that telecoms operators will get spectrum “for free” – operators have always paid for spectrum – but the Government needs to give serious consideration to the way in which it calculates and levies charges for spectrum use e.g. in the past the Government has adopted alternative pricing mechanisms such as SUF’s (Spectrum Utilisation Fees) that are levied annually and are tax-deductible expenses for operators (whereas the IRD currently rules that lump sum auction fees are capital in nature and not allowable tax-deductible expenses.)

Question 2 – Why should the Government “tax” spectrum upfront?

Spectrum on its own has little value – spectrum is only an input to a much larger economic activity. Operators create value by putting the spectrum into use and creating “wireless bandwidth”. This is a technically complex exercise that entails building advanced networks throughout Hong Kong – outdoors, indoors and within confined areas such as the MTR network and road tunnels. Building networks requires the operators to invest billions of dollars; maintaining and operating these networks throughout their working lives requires even more billions of dollars. Clearly operators would prefer to build networks wherever it is economically viable to build however if operators are forced to pay for spectrum costs as a lump sum then there is a grave risk that some investment which would have gone into building networks would be soaked up in paying excessive auction prices for spectrum.

An alternative, and preferred, approach would be to not levy spectrum fees upfront but to charge for the spectrum on the basis of the economic activity derived from the use of this spectrum i.e. the bandwidth created from the spectrum. Operators only earn revenues when they create bandwidth and sell it to consumers under a variety of pricing plans in a highly competitive market. Therefore it is feasible for the Government to levy spectrum fees based on a percentage of the revenues earned by operators in putting the spectrum to use. In effect this would move the Government from charging for spectrum as an input to economic activity to charging for spectrum as an output of the economic activity it supports. This is not a new concept because this is indeed the approach the Government adopts by charging fixed telecoms operators “wayleave” charges for use of public streets to lay their copper and optic-fibre cables (wayleave charges are levied on an operator’s fixed revenues and charged annually).

Question 3 – Does the Government want low consumer prices?

Obviously the answer ought to be “yes” – but why does the Government pretend that globally high spectrum prices will not impact consumer prices? Of course higher spectrum charges will feed directly into consumer prices! The higher the spectrum prices paid by operators then the higher the cost that must be passed on to consumers – it is simply irresponsible to pretend otherwise or to simplistically assume that operators will absorb the cost when industry profitability is already in serious decline. If the Government genuinely wants low consumer pricing then it would reduce upfront spectrum costs and encourage operators to build networks and maximize revenues which could support spectrum costs on a “pay as you go” basis.

Question 4 – Does the Government care about a vibrant and healthy telecoms sector?

If the Government truly wants 5G adoption and if it wants Hong Kong to become a Smart City then it really ought to care about the state of the telecoms sector. Telecommunications is the bedrock infrastructure that currently supports Hong Kong's pillar industries (in particular financial services) and without telecoms infrastructure there will be no sustainable Smart City applications. If the Government cares then it ought to act as a facilitator rather than a tax-collector or an obstructer. There are two things that the Government ought to do as policy reforms – the first is to change its spectrum assignment and charging policies and the second is to facilitate access to sites, in particular those owned by the Government, for cell-sites. The Government bureaucracy is riddled with both overlapping and unclear responsibilities with respect to assets which are either owned by the Government or whose use is somehow restricted or controlled by the Government³ for example lamp-posts, street signs, bus shelters, public toilets etc etc. Many of these sites are perfect for the tens of thousands of cell-sites that operators need for 5G networks. Negotiating with the Government on individual sites is a nightmare – often taking several years and often ending up in a “no” answer because of the objection of one or other of the many Government departments involved. There needs to be a simple and efficient one-stop shop to facilitate access to Government sites.

Question 5 – Does the Government care about Hong Kong companies thriving and exporting their skills?

For decades Hong Kong has been a global leader in telecoms and several Hong Kong companies have taken these skills offshore to expand their business and create employment. Current policy is not accommodating in terms of Hong Kong retaining its leadership position in telecoms – indeed even the telecoms operators from China have a stronger claim for leadership in 5G as it is a stated national policy objective that China will lead 5G globally and the Chinese Government has structured its spectrum policies to support 5G development. Also, if the Hong Kong Government insists on extracting high, up-front auction fees for spectrum then it needs to understand that only the telecoms operators with the “deepest pockets” will survive – and that may mean Hong Kong companies will be squeezed out.

What is needed?⁴

The answers to the five questions above should frame a proper discussion and review of telecoms policy and regulation in Hong Kong. The Government should be prepared to give this matter priority rather than indulge in mindless consultation papers that are being churned out “by rote” following a broken formula. The Government seems to consult on everything it wants to trot out but isn't listening to the views of the telecoms industry when the industry submits views and the Government does not want to address the real issues or even engage in constructive dialogue. This is a recipe for disaster.

The issues are not difficult – indeed most have been solved by more progressive policy-makers and regulators around the world (including in China). There are models to follow and adopt – and they can be done quickly. Below are some of the detailed changes that need to be made.

³ For example where land use is subject to special conditions imposed by the Government.

⁴ For further details regarding any of the points summarized in this section please read the Papers, in particular, “Fit for the Future? Spectrum Options for Hong Kong.”

1. Spectrum Assignment: Much more spectrum and wider bandwidths

- Current spectrum available is woefully inadequate to support anticipated future demand.
- More spectrum is needed to support:
 - Greater capacity requirements;⁵
 - Higher and higher user data speed;⁶
- Spectrum in different frequency bands has different characteristics. To meet the widely varying demands of future services and applications, new spectrum at new frequencies and with much wider bandwidths is required. Bandwidths from 100MHz - 1GHz are needed to realize the benefits of 5G technology. This is far wider than the current bandwidths needed for older generations (2G – 200KHz; 3G – 5MHz; 4G - 20 MHz).
- In fact, a range of spectrum is required for meaningful 5G rollout, including:⁷
 - Spectrum below 2 GHz (e.g. 700 MHz): This serves as the "Coverage Layer" providing wide-area and deep indoor coverage.
 - Mid-Frequency band between 2 – 6 GHz, initially in particular the band known as 3.5 GHz or C-band: at this frequency, bandwidths of at least 100 MHz per operator are required in order to realize the potential of 5G in a meaningful manner.⁸
 - High frequency bands above 6GHz: These serve specific use cases that require extremely high data rates. Bandwidths of at least 800 MHz of contiguous spectrum per operator are required to satisfy the need for very high capacity.
- 5G networks need spectrum in all these three ranges at the same time. The CA should make available the maximum amount of spectrum possible in one assignment process. This would enable operators to have an overview of all the spectrum that is available and allow them to pick and chose the spectrum they want based on need, availability and cost. The current model of drip feeding spectrum into the market forces operators to bid very aggressively in order to acquire the limited amounts of spectrum available each time because they simply have no idea what spectrum they might be able to acquire in the future and under what conditions. This might maximize the money going into the Government coffers however, as highlighted above, it is harmful to consumers and the economy. Furthermore, the Government is not short of money.

⁵ Higher data usage, more connected users and many, many more connected devices (billions not millions).

⁶ Ultra high speed connections are needed for more bandwidth hungry applications (e.g. 4K video, VR,) and a much lower latency (delay) is needed for mission critical applications e.g. real time robotic control , connected cars.

⁷ Extracted and modified from Huawei's 5G Spectrum Public Policy Position available at <http://www.huawei.com/en/about-huawei/public-policy/5g-spectrum>

⁸ 3.5 GHz /C-Band covers spectrum in the range 3.3 GHz – 4.2 GHz and 4.4 GHz – 5 GHz. The 200 MHz of spectrum in the 3.4 GHz – 3.6 GHz frequency band is allocated to mobile services on a co-primary basis in almost all countries throughout the world. 3.5 GHz/C-band spectrum is particularly important as it is the primary band identified by the World Radiocommunications Conference ("WRC") for the introduction of 5G globally. Many regulators, including in Mainland China, have taken steps to make available other portions of C-Band spectrum in order to be able to make available bands of at least 100MHz to each operator in their jurisdiction. See chart on page 15.

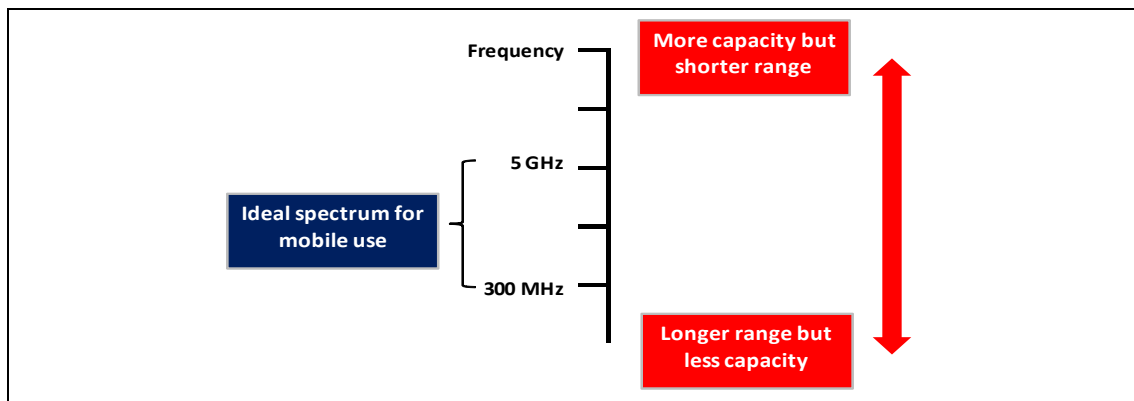


Figure 1: Differences in capacity and range of different frequency bands

2. Spectrum Assignment: A new way of managing spectrum assignments

The Telecommunications Ordinance (“TO”) and the Government’s Radio Spectrum Policy Framework mandate that spectrum should be managed efficiently, for the benefit of the community and in a way that facilitates the introduction of advanced and innovative communications service.⁹ Spectrum assignments therefore need to be managed in a way which recognizes the need of operators to be able to move fast and also facilitates innovation by removing barriers to the introduction of new applications and services. Specifically:

- Spectrum should be licensed on a *technology neutral basis*. Given the speed of innovation in technology and mobile services operators should be free to decide the best use for their spectrum as technology changes.
- Spectrum should be *licensed on a perpetual basis or with an expectation of renewal*. This is not new for Hong Kong.¹⁰ Unless the spectrum is being used inefficiently or a licensee has seriously infringed its licence, spectrum should be re-assigned back to the incumbent holder upon the expiry of the assignment period. This is global best practice.
- *Spectrum trading should be implemented*. Spectrum trading has been successfully implemented in most developed markets. Spectrum trading provides flexibility to mobile operators in how they manage their supply of spectrum and makes it easier for them to ensure that they have the spectrum they need and are using it efficiently without having to wait years for another auction. It enables change to happen quickly, efficiently and consistent with technological advances.

⁹ See section 32G (1) TO. The Spectrum Policy Framework can be found here: <http://www.cedb.gov.hk/ccib/eng/legco/pdf/spectrum.pdf>

¹⁰ In 2006, spectrum in the 900/1800 MHz band was re-assigned back to the incumbent spectrum holders.

3. Spectrum Charging: A new way of charging for spectrum

- As millions of Smartphones become billions of connected devices and demand for spectrum grows exponentially, the traditional system of charging for spectrum on a per MHz basis at prices decided by auction will no longer be workable. Taking the Government’s proposals in the Second Consultation Paper regarding 900/1800 spectrum¹¹ as an example, a mobile network operator (“MNO”) would be paying at least HK\$ 54 million per MHz for the 2x10 MHz of spectrum in the 1800 MHz band which will be offered to it on a right-of-first-refusal basis (“RFR Spectrum”).¹² This equates to HK\$1.08 billion simply for the right to continue to use 20 MHz of spectrum which it is already using to provide mobile services and has previously paid for. As illustrated in the charts below, Hong Kong operators are already paying rates per MHz which are multiples above what operators in other jurisdictions are paying.

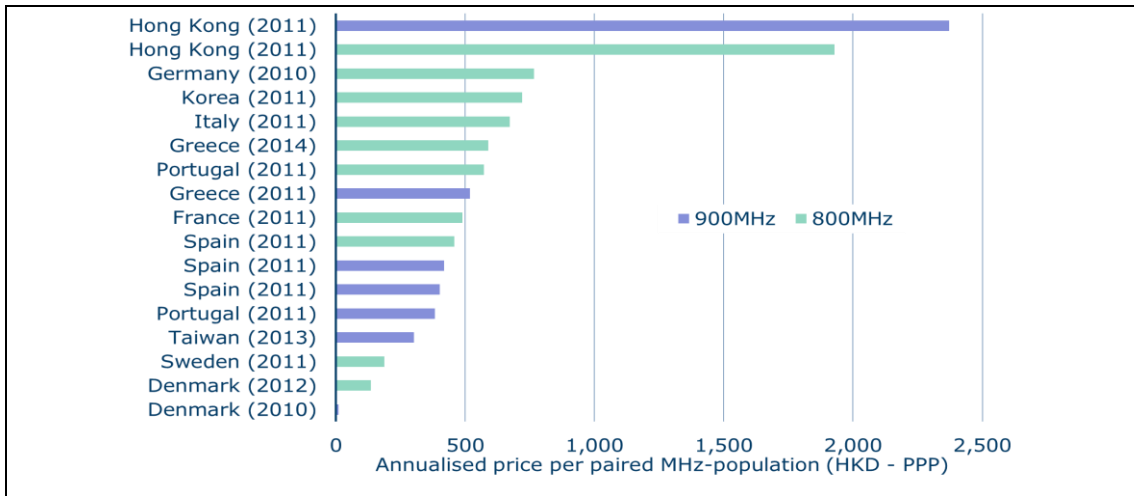


Figure 2: Benchmark prices for spectrum in the 800/900 MHz band taken from presentation by Network Strategies on *Spectrum in Hong Kong: what is the optimal price?* (28 November 2016)

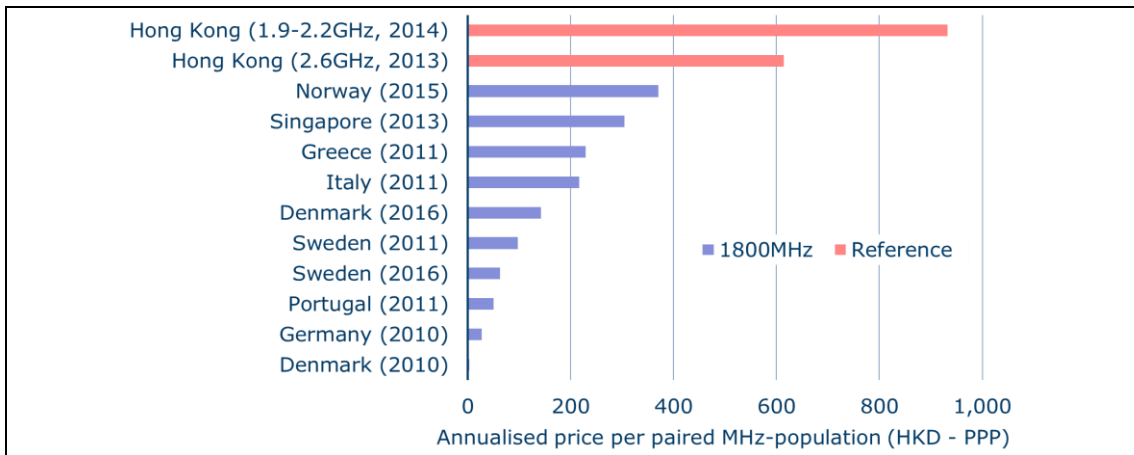


Figure 3: Benchmark prices for spectrum in the 1800 MHz band taken from presentation by Network Strategies on *Spectrum in Hong Kong: what is the optimal price?* (28 November 2016)

¹¹ Arrangements for the Frequency Spectrum in the 900MHz and 1800 MHz Bands upon Expiry of the Existing Assignments for Public Mobile Telecommunications Services and the Spectrum Utilisation Fee issued on 14 February 2014. Available here https://www.coms-auth.hk/filemanager/en/content_711/cp20170213_e.pdf

¹² Based on the minimum auction prices set out in the Second Consultation Paper.

- In a world where much larger blocks of spectrum are needed (hundreds of MHz per operator rather than tens of MHz) the Government must rethink how it charges for the use of spectrum, otherwise the spectrum charges payable by the operators will be extortionate, leaving operators unable to offer services in Hong Kong at an affordable price and leaving few funds for network investment.¹³ A more sensible approach, which allows the Government to share in the success of 5G would be to levy spectrum charges on the basis of a fixed percentage of 5G revenues. Indeed this type of approach was adopted in the award of the original 3G spectrum back in 2001.

4. *Affordable access to new sites for cell sites*

- Affordable access to new sites for mobile cells is already an issue for mobile network operators. Future spectrum for 5G is expected to be of a much higher frequency than that currently used for mobile services.¹⁴ As a result of the different characteristics of the new spectrum, the coverage provided by cell sites will be greatly reduced and consequently at least 10 times more cell sites will be needed. Likewise the Government should take urgent steps to facilitate the opening of street furniture (e.g. lamp posts, telephone booths) for mobile cell site installation. Street furniture is ideal for mobile cell site installation as it is widely available across the territory and close to street level which is perfect for mobile cell sites operating at high frequencies, yet the process for obtaining access to these facilities is hugely complicated not least due to the significant number of Government departments whose consent is required.
- Under the TO, fixed line operators have a right of access to buildings in order to install and maintain equipment. Mobile operators have no such right and it is increasingly difficult to acquire cell sites in private buildings and other locations where sites are acquired solely by commercial negotiations. The main reason for this is that these mobile cell sites are not primarily servicing the occupants of the building in question but the surrounding area instead therefore it is difficult to reach agreement with the building owner to acquire space without significant commercial incentives. The Government must take steps to facilitate access in a timely fashion and at a reasonable cost for all mobile operators to buildings and other locations, in particular monopoly facilities such as the MTR and road tunnels. Such access is essential if Hong Kong is to provide ubiquitous 5G coverage and become a truly Smart City. The current system where access for the installation of cell sites and other equipment is dependent on commercial owners/landlords who are able to charge as much as they like is unworkable. The situation would be vastly improved if, for example, the Government were to establish policies on 'utility' status for telecommunications.

¹³ Many of new applications and services can only be charged at ultra low rates. For example, it has been widely reported in the media that the proposed level of charges of wireless IoT services could be in the range of HK\$20 per annum per device. See for example www.pcmarket.com.hk/2017/11/01/sigfox 網絡正式運作-20 年費搶生意

¹⁴ Current spectrum for mobile use is all below 3GHz. In future spectrum in frequency ranges well above 6GHz will be needed.

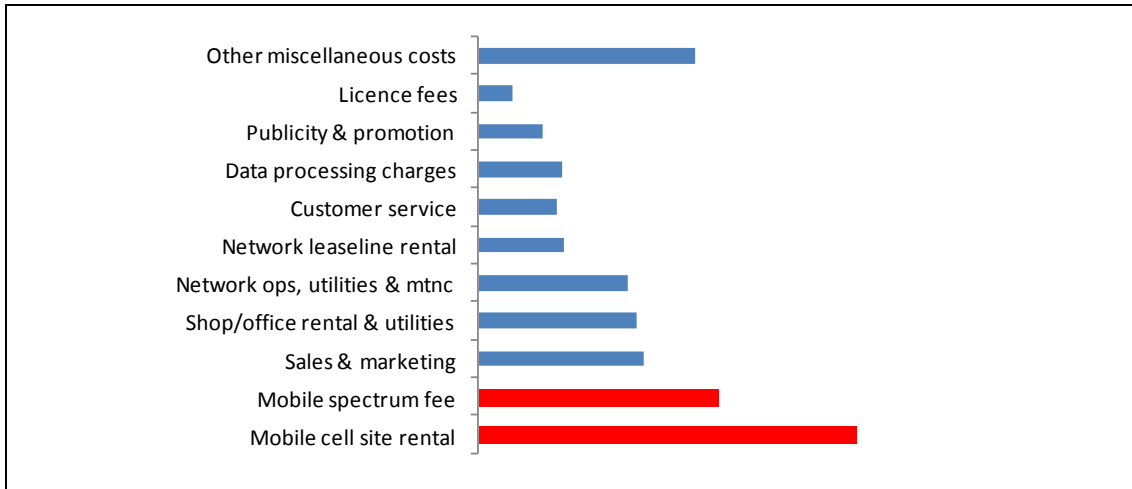


Figure 4 HKT's SUF payments and cell site rental relative to mobile operating expenses for the year ended 31 December 2015

What have the Government and the CA done in the past 18 months?

1. Spectrum Assignment: Much More Spectrum and Wider Bandwidths

While the CA has taken some steps towards the release of new spectrum for mobile use, there appears to be a complete lack of urgency in the approach. Rather than expediting the release of the vast amounts of new spectrum needed for 5G and setting out a “menu” of all available spectrum from which operators may chose what they want, as it has been urged to do by mobile operators, the CA continues to follow its old model of drip feeding spectrum into the market band by band and auctioning it off for the maximum possible gain for the Government revenues. This is completely unacceptable.

- **700 MHz band:** The CA has at least twice delayed analogue switch off (“**ASO**”) dates from the original target of 2012, then 2017 and now until at least the end of 2020 and subject to review. There is not even a target date for switch off. While the CA cites the need for frequency co-ordination with Mainland China this does not appear to be a credible excuse for delay when SARFT has been managing 700MHz for LTE trials. The CA should start planning for the release of this spectrum even if it is conditional and based on the situation in Mainland China.

- *C-Band Spectrum*: The CA is making available only 200 MHz of spectrum in this band because of the historic use of this frequency band for satellite transmissions. However re-assigning only 200MHz is on average only 50 MHz per incumbent operator: only half the minimum requirement to support 5G. This is without even considering the potential new entrants frequently referred to by the Government. The CA's recently issued consultation paper acknowledges that the operators will want bands of 100 MHz and that there is therefore insufficient spectrum available to meet demand. Other countries, including Mainland China (see below) have taken proactive steps to ensure that they make available sufficient spectrum to allow each operator in their jurisdiction to have 100MHz. Why can't Hong Kong? Furthermore, this key spectrum for 5G will not even be auctioned until late 2019 at the earliest. Why can this not be done sooner, even if operators have to wait for the actual assignment of the spectrum? There are two other problems with the Government's C-band proposals – the first concerns excessive exclusion zones around Tai Po and Stanley that will preclude territory-wide services and second, the Government avoids a basic law of physics in that satellite transmissions do not penetrate into confined spaces e.g. the MTR's underground network, shopping malls, road tunnels etc. If satellite services do not use the C-band spectrum in these enclosed "indoor" locations why is the Government refusing to accept that basic fact? And why isn't the Government prepared to assign the entire C-band spectrum to mobile operators in these enclosed "indoor" locations? After all these locations are where MNO's have extremely high congestion and where they need to use the most spectrum. This would be an effective and efficient use of spectrum consistent with the Government's stated spectrum management policies.
- *High Frequency Bands – 26 - 28GHz*: 4GHz of spectrum is available in this band. Much of this spectrum is currently unused could be made available now but the CA insists that this cannot be done until 2019 at the earliest, after it has re-auctioned the 900/1800 spectrum for the highest possible prices.

Over the next 2 years the Government's plan is currently as follows:

- Auction the 900/1800 band spectrum at the end of this year (2018).¹⁵
- After obtaining the highest possible prices from operators for the 900/1800 spectrum the Government will then proceed to auction the C-Band spectrum in late 2019¹⁶ squeezing yet more money out of operators.
- In the interim, sometime in early 2019, the Government proposes to assign spectrum in the 26GHz and 28 GHz bands to operators on a basis which is, as yet, unclear.¹⁷

Depending on the spectrum in question, it can take operators two years or more to roll out a network using newly acquired spectrum. Consequently, on the above schedule, Hong Kong will not be ready to launch 5G services until around 2022. This is significantly behind other countries, some of which are planning commercial roll outs as early as 2019. Rather than drip feeding this spectrum into the market in three steps thereby squeezing the maximum amount of money out of operators, it should be perfectly possible to auction or assign all the spectrum at the same time giving operators clear sight of what is available and allowing them to make choices. After all, there is only one year between the proposed dates for the first and last steps. It should be possible to delay the 900/1800 auction or perhaps advance the C-Band auction or take some other steps to make all this spectrum available at the same time. However, the CA will not even consider this.

¹⁵ This is spectrum which mobile operators are already using to provide mobile services under licences which expire in 2020 and 2021. See also page 7.

¹⁶ See the Consultation Paper "Arrangement for Assignment of the spectrum in the 3.4 – 3.6 GHz Band for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee available here: https://www.coms-auth.hk/filemanager/en/content_711/cp20180502.pdf

¹⁷ A consultation on this is expected later this year.

If more spectrum cannot be made available to enable operators to maximize the full benefit of 5G, why can the CA not allow the pooling of spectrum for operators' shared use? For example, if two operators each with 50MHz of C-Band spectrum are able to pool their spectrum, together they will have 100MHz and be able to deliver the promised 5G data speeds – double the speed they would each individually be able to achieve with solely 50MHz of spectrum. However, currently the CA will not allow this. Furthermore why can't spectrum pooling be extended to other spectrum bands making spectrum available and then allowing operators to share spectrum in any bands rather than subjecting them to complicated, disruptive and very expensive spectrum auctions allegedly with the aim of introducing new competition to the market but without any evidence that this is remotely likely.

HKT acknowledges the 580 MHz of spectrum in the 5GHz band currently used for Wi-Fi that the CA recently announced would also be made available for shared use for 4G mobile services.¹⁸ However this is not 5G spectrum. This is not new but shared existing spectrum which is also used for the provision of public Wi-Fi services and it is therefore unreliable and subject to potential interference from other users. It is not a substitute for the dedicated spectrum that MNO's need for reliable, high quality services. It will be used by operators for 4G LTE services but it does nothing to help Hong Kong keep up with 5G developments. It does not help operators at all in their endeavours to launch commercial 5G services as soon as possible and it is disingenuous for the CA to imply otherwise.

- *A new way of managing spectrum assignments; A new way of charging for spectrum; Affordable access to new sites for cell sites*

On all the other key points raised by HKT eighteen months ago, the Government has shown no inclination to think differently or indeed to make any forward looking changes at all. Indeed it barely seems to acknowledge that there are any issues to be addressed.

- *A new way of managing spectrum assignments*
 - *Technology neutral licences:* Far from adopting a technology neutral approach, the Government will impose new restrictions in the new licences for 900/1800 spectrum. Licensees will be required to seek the CA's permission before ceasing 2G services. The same restrictions will apply to all future technology generations. This seems to contradict the policy direction and statutory requirement to promote the efficient use of spectrum for the maximum benefit of the community.
 - *Perpetual licence terms/expectation of renewal:* Again, far from taking the opportunity to adopt best practices, the Government continues to propose the same legacy 15 year licence terms for spectrum.

- *Spectrum trading*: In a move which runs completely contrary to global best practices, the Communications and Creative Industries Branch, Commerce and Economic Development Bureau (“**CEDB**”) is recommending that spectrum trading should not be introduced in Hong Kong in the short to medium term.¹⁹ The CEDB’s justifications for this include that “spectrum trading may work in economies that have long or perpetual spectrum assignment regime, which is not applicable in Hong Kong”, and “in most markets where spectrum trading has been introduced the volume of mobile spectrum trading has been relatively low”, and “the supply of available spectrum in the [sub-3GHz] bands in the primary market would remain constrained in the short term. In face of such constraint, it is unlikely that spectrum holders would be willing to sell their spectrum resources in the secondary market.” and that “[o]verall demand for spectrum trading might also be affected by the ongoing spectrum auctions...MNOs or other interested parties might wait for the release of new spectrum and secure it for a full 15 years’ term rather than entering into commercial negotiations with incumbent spectrum assignees to trade for the assigned spectrum (which involves additional transaction cost) for the remaining duration of the assignment period.” There could not be a better example of backward and self-justifying policy making than this. This is the opposite of what a forward looking regulator would do: It uses the existing out-dated regime to justify not making any changes. All of the justifications for maintaining the status quo (no spectrum trading) can either be fixed by the CEDB and CA as explained in this paper (introduce long or perpetual assignment regimes, make more spectrum available and as much as possible all in one go) or involve commercial decisions which are up to individual operators and not for the Government and the regulator to second guess (will there be low volumes of trading? Whether MNOs would prefer to trade or wait to secure spectrum for a full 15 year term?). The introduction of spectrum trading should be a relatively simple matter. Other countries have done it successfully. What is the problem in Hong Kong? It seems the only the Hong Kong government benefits from this as it will continue to secure its lucrative auction receipts. This is yet another example of a missed opportunity to take steps to introduce a really effective, fit for the future spectrum policy and management system.
- *Review of Telecommunications Ordinance*: Way back in 2012 when the Broadcasting and Telecommunications Authorities were merged to form the Communications Authority, the Government identified the review and amendment of the Telecommunications and Broadcasting Ordinances as a priority. The Hong Kong General Chamber of Commerce submitted a paper to the Government on 25 November 2014²⁰ setting out the views of its members on the extensive changes which need to be made to these Ordinances and including draft clauses for the new legislation for the Government’s consideration. Six years later the Government is only now commencing a public consultation on the review. Based on the proposals for the Broadcasting Ordinance,²¹ according to which no changes at all are proposed to the licensing regime, the scope of the review appears to be remarkably limited and lacking in vision. One of the reasons for the very limited scope appears to be the tight time frame within which changes need to be implemented, particularly in the telecommunications sector in light of the imminent arrival of 5G, but this process could, and should, have started six years ago. Then there would have been plenty of time to implement the required changes. This is a huge missed opportunity for a substantial overhaul of the regulatory system. But it is not too late to make some progress if the Government has the will to move forward rather than continue to procrastinate.

¹⁹ <http://www.legco.gov.hk/yr17-18/english/panels/itb/papers/itb20180611cb4-1200-5-e.pdf>

²⁰ See: <http://www.chamber.org.hk/FileUpload/201411251631265682/TO-BO20141125.pdf>

²¹ Which have already been subject to public consultation this year. See here: http://www.cedb.gov.hk/ccib/eng/paper/pdf/BOTOREview_1%28eng%29.pdf

○ *Spectrum Charging: A new way of charging for spectrum*

The Government has conducted two public consultations relating to different bands of spectrum recently. The first was in relation to spectrum in the 900/1800 band. This is spectrum already being used by mobile operators to provide mobile services. The second is in relation to spectrum in the 3.4 – 3.6 GHz band (C Band). This is spectrum newly allocated for mobile services. In both cases the Government proposes to follow the old model of auctioning the spectrum for the highest possible price. In relation to the 900/1800 spectrum, the Government has set the minimum price for the RFR and auctioned spectrum at HK\$54 million and HK\$38 million respectively. If all the available spectrum is sold for the minimum RFR/ auction price only, the Government will be richer to the tune of HK\$8.88 billion. This is HK\$8.88 billion which operators cannot invest elsewhere. This is the cost of 200MHz of spectrum only. As explained above this level of pricing is many multiples above the levels paid by operators elsewhere in the world and completely unsustainable.²²

○ *Affordable Access to new cell sites:*

No progress has been made on this at all despite repeated requests from the industry. This may be pending the imminent review of the Telecommunications Ordinance (see above) but, if so, it is very, very late in the day.

²² A Report published by HSBC Global Research in May 2018 entitled “5G in Asia; Generation Gap” stated: “In some markets, regulators are doing more to limit the value-destructive competition over spectrum – good examples are the recent award in Taiwan and the upcoming award in Korea [see pages 16 of this paper]. However, in other markets spectrum is seen as a key revenue generator for governments: India, Thailand and Hong Kong are our main concerns here.” (Page 4) and “...we believe the [Hong Kong] government will structure the timing [of the auctions] so as to maximize revenue from the auctions. We also note that the 200MHz identified [in the C-Band] is too small to offer meaningful 5G services. We look for more details on how the government might free up more spectrum. (page 66)”

What have other countries done?

As shown in figure 5 below, large scale 5G trials using various spectrum bands have started across the globe and commercial roll outs are being planned for the very near future in leading markets.²³ This section focuses on the steps which have been taken in Mainland China, the European Union and South Korea as examples of what can be achieved by a forward looking regulator.

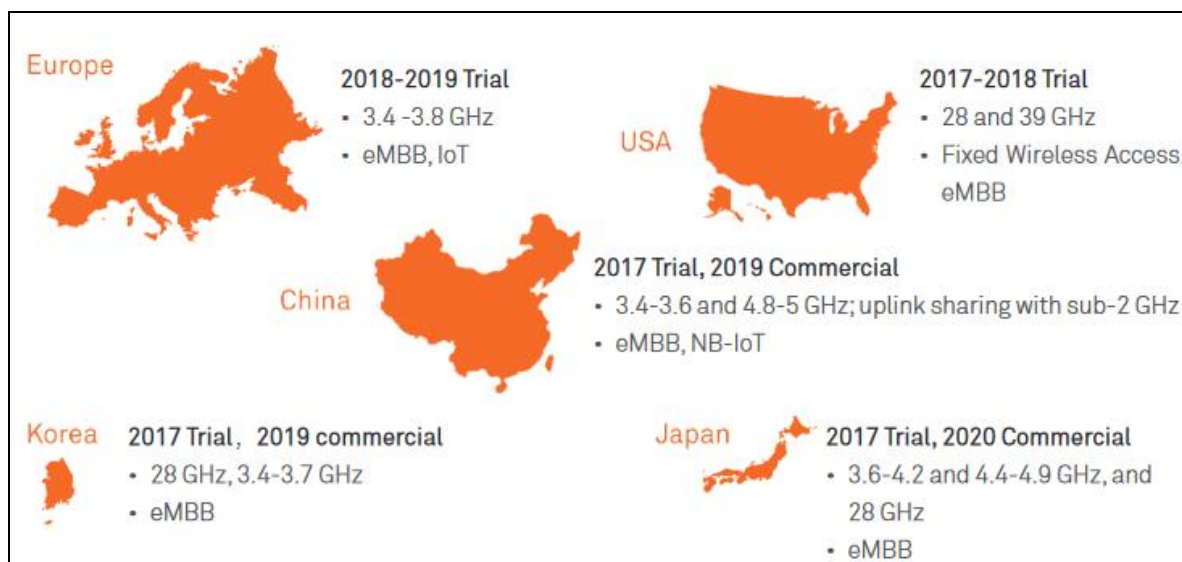


Figure 5: 5G trials and commercial spectrum plans in leading markets by 2020²⁴

Mainland China:

Hong Kong does not need to look far for an example of what can be done. Mainland China has been extremely forward looking when considering what spectrum to make available and how this spectrum should be managed. Indeed, it is stated national policy that China will lead 5G globally. Particularly worthy of note are the following:

- *C-Band spectrum:* Unlike the Hong Kong regulator, MIIT has taken proactive steps to ensure that all existing Mainland mobile operators will have access to 100MHz of spectrum in this crucial frequency band. This is the minimum required for this band to support 5G. In addition to the 3.4GHz – 3.6 GHz range,²⁵ the MIIT has also allocated an additional 300 MHz in the 3.3 GHz – 3.4GHz and 4.8 GHz – 5.0 GHz ranges for mobile services. This means that Mainland China is making available more than twice the amount of spectrum in this band than Hong Kong yet it has one less network operator. MIIT has allocated this spectrum into 4 outdoor bands and one indoor band.²⁶ Each of the three Mainland operators will therefore be able to have access to at least one outdoor band of 100MHz. Furthermore, in recognition of the significance of spectrum prices and in a move specifically targeted at lowering spectrum costs for operators, the NDRC has recently announced very significant reductions in spectrum fees for this band.²⁷ These are as follows:

²³ There are many more 5G trials ongoing than shown in figure 5 including in South Africa, Canada, New Zealand. All are using 200MHz at 3.5GHz and 800MHz at 28GHz.

²⁴ Extracted from Huawei's 5G Spectrum Public Policy Position available at: <http://www.huawei.com/en/about-huawei/public-policy/5g-spectrum>

²⁵ This is the range specifically allocated for mobile use by the World Radio Communications Conference. See page 5 and footnote 8.

²⁶ 3.3 -3.4 GHz is designated for indoor use only.

²⁷ http://www.ndrc.gov.cn/gzdt/201804/t20180424_883233.html

- Fees have been cut by 37.5% from RMB 8 million per MHz to RMB 5 million per MHz.²⁸ When the revised fees are compared with the prices which Hong Kong operators are being asked to pay for spectrum, the difference is staggering: Hong Kong operators will be paying 8.8 times as much per MHz and **1681** times as much per MHz per pop for their RFR Spectrum as their Chinese counterparts are paying for their newly priced C-Band spectrum.
- Fees will be waived completely for the first 3 years after the issue of the 5G licence and will be charged at 25%/50%/75%/100% of the new fee standard for the fourth / fifth / sixth / seventh year.
- Fees for limited use spectrum (e.g. for indoor use only) are set at 30% of the new fee standard.

This in stark contrast to the CA who have completely avoided addressing the use of this spectrum band indoors only (specifically in the MTR) despite repeated requests from HKT.²⁹

- *High Frequency Spectrum – 20 - 40 GHz*: MIIT is planning to make 2GHz per operator available in these spectrum bands. This is double the amount that the Hong Kong regulator is considering while again, there are fewer operators in Mainland China.
- *700 MHz*: SARFT has been managing 700MHz for LTE trials. A pilot trial was conducted in Shanghai and was subsequently extended to four other provinces; Guangdong, Guizhou, Chongqing, Gansu.



Figure 6: Global availability and planning of the C-Band spectrum

European Union:

- *700 MHz*: The European Union has adopted 2020 as the common deadline for repurposing the 700 MHz band. This ties in with the EU requirements for operators to initially deploy 5G by 2020 (in at least one city in each member state). France and Germany auctioned this band as early as 2015. Italy is set to auction spectrum for 5G services this year in the 694 – 790 MHz, 3.6 – 3.8 GHz and 26.5 – 27.5 GHz bands.

²⁸ For spectrum used nationally. The same percentage cut will be applied to spectrum used within a province.

²⁹ See also page 10.

- *C-Band*: As long ago as 2014, Europe CEPT ECC Decision 11(06) designated the frequency bands 3.4GHz – 3.6 GHz and 3.6GHz – 3.8 GHz (a total of 400 MHz, double the amount being made available in Hong Kong) on a non-exclusive basis to mobile/fixed communications networks. Many countries, including the UK have already begun to assign this spectrum to operators.³⁰
- Spectrum trading has already been introduced in the European Union and countries, in particular the UK, are adopting perpetual licences / expectation of renewal in accordance with generally accepted best practices.

South Korea:

- *700 MHz*: As long ago as July 2015, the Ministry of Science, ICT and Future Planning announced that 40 MHz of spectrum in the 700 MHz band will be re-farmed for mobile use.
- *C-Band and 28 GHz*: The South Korean Government will hold an auction for 3.5 GHz and 28 GHz spectrum on June 15 2018. In terms of spectrum pricing and management, it is particularly noteworthy that the Government has decided to distribute the spectrum evenly among the country's three operators rather than allocating the largest portion of spectrum to the highest bidder. The Government also plans to limit bid amounts to stop the auction from being overly competitive and burdening the winners with high spectrum costs. This is in direct contrast to the approach of the CA which continues to set minimum rather than maximum prices for spectrum actions and assign spectrum to the highest bidder.³¹
- Korean operators already trialled 5G during the 2018 PyeongChang Winter Olympics. KT has announced plans to launch commercial 5G services in March 2019.

Conclusion

HKT acknowledges the (small) steps that the Government has taken in the past eighteen months. However, there is a very real danger that this is too little and too late. The CA has stated that it is actively laying the groundwork for the launch of 5G services in 2020. However, this is completely misleading. Making spectrum available by 2020 does not allow the launch of 5G services by 2020. As the CA is very well aware, it can take around two years for spectrum assignees to prepare the roll out of the network using newly acquired spectrum. If the CA sticks to its publicly stated schedule for making new spectrum available, it is simply not possible for 5G services to be available in Hong Kong by 2020.³² On the CA's schedule, territory wide coverage will not be available until 2022. The piecemeal approach of drip feeding spectrum into the market incrementally and auctioning it to obtain the maximum possible price is unsustainable and risks causing huge damage to Hong Kong's position as a regional hub and the development of its broader economy. This cannot be allowed to happen. The future development of Hong Kong's position as a global leader in technology and a leading Smart City depend on the Government adopting a forward looking approach to telecommunications policy and spectrum management to facilitate the emergence of new technologies and applications. The Government must stop being complacent and waiting to see what others will do first and make some bold decisions. Specifically, the Government must immediately take steps to:

³⁰ In the UK, OFCOM published a discussion document in March 2018 entitled "Enabling 5G in the UK" in which it recognized the importance of 5G and outlined its role in the development of 5G services in terms of releasing different types of spectrum bands for 5G, ensuring site access and planning are not a barrier and acting as a facilitator to work across different sectors to encourage them to work together to understand the potential applications of 5G. Available here: https://www.ofcom.org.uk/_data/assets/pdf_file/0022/111883/enabling-5g-uk.pdf

³¹ <https://www.telecomasia.net/content/south-korea-hold-5g-auction-june-15>

³² Indeed HSBC's "5G in Asia Generation Gap" (see also footnote 22) states "...the [Hong Kong] regulator looks likely to delay spectrum award making Hong Kong service launch likely to be later than other markets in the region." (Page 66).

- Consolidate the release of the 900 MHz and 1800 MHz, C-Band and 26GHz – 28 GHz spectrum. Provide mobile operators with a menu which will enable them to select, in one process, the spectrum that they wish to acquire.
- Develop specific plans to make the 700 MHz spectrum available for mobile use, even if this has to be conditional and subject to the situation in Mainland China.
- Facilitate access to Government owned sites for the installation of cell sites by simplifying the process required to obtain consent.
- Provide a clear, simple and enforceable statutory right of access for mobile operators to enter buildings, shopping malls, MTR and road tunnels etc to install and maintain the equipment necessary to realize the potential of 5G.
- Change the way in which it charges for spectrum. Move to a charging model based on a fixed percentage of 5G revenue.
- Introduce spectrum trading, fully technology neutral licences and perpetual assignments or, at least, an expectation of renewal.

The most recent recommendation from the CEDB regarding spectrum trading, which relies on the limitations of the existing out-dated policy and regulatory regime to justify not making forward looking changes, does not auger well.

Hong Kong Telecommunications (HKT) Limited
11 June 2018