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**Session 6 : Spectrum**

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Fabio, Mindel, fellow speakers, distinguished guests, ladies and gentlemen,

It is my pleasure to share with you today Hong Kong's spectrum management policy and the major spectrum-related issues that are handled by the Communications Authority ("CA").

*Market Overview*

2. Let me first give you an overview of the mobile telecommunications market in Hong Kong. We have a population of only 7 million plus, but we have some 17 million SIM cards, equivalent to a mobile penetration rate of 229%. About three-quarters of our mobile customers are mobile broadband users, and each consumes, on average, 1.5 Giga Byte of data per month.

3. With a small and compact market such as ours, we have four mobile network operators and 23 mobile virtual network operators, offering a great variety of affordable services to consumers. For instance, 3G plans are offered as low as US\$11 per month and 4G plans are offered as low as US\$19,

US\$32 and US\$57 per month for 1 GByte, 5 GByte and unlimited usage respectively.

4. In point of fact, our mobile telecommunications market is fully liberalised since service launch in the 1980s. There is no restriction on the number of service providers or foreign investment in their operations. The only restraining factor is the supply of radio spectrum, which, as we all know, is a scarce public resource. To facilitate market development, it is the Communications Authority's policy to ensure timely release of the radio spectrum to the market, so that consumers can benefit from the state-of-the-art mobile technology and services. And, indeed, Hong Kong is always at the forefront of mobile applications.

5. Following the launch of 4G-LTE services back in November 2010, there is continuous enhancements in service speed, culminating into the launch in last December of the 300 Mbps LTE-A service in our mobile market. Thanks to the inter-site carrier aggregation technology, two mobile network operators are actively upgrading their networks to support the peak download data rate up to 450 Mbps, with the use of multiple carriers in different frequency bands for its customers. Along with the expected availability of compatible smart phones, such a high speed mobile service, which will be network-wide ready in 2016, will enhance audio and video streaming, support speedy data download and improve user experience in general.

6. The use of radio spectrum in Hong Kong is not confined just to the mobile platform. A new entrant lately decided to use the 30 MHz of unpaired

spectrum that it has acquired in the 2.3 GHz band to provide wireless fixed broadband services, targeting the scattered village houses in the rural and remote areas of Hong Kong. In a way, the move to such a niche service by this new operator is rather understandable, given the equally intensely competitive fixed telecommunications market we have in Hong Kong.

7. Again, with a small and compact market such as ours, we have 24 fixed network operators offering services to our community, with seven of them actively rolling out their self built networks. Our household penetration for fixed broadband services has exceeded 83%. 87% and 79% of our residential households have a choice of at least two and three local self-built fixed networks respectively. These penetration rates are all the more impressive as under our market-driven regulatory approach, the roll-out of these broadband networks in Hong Kong are solely based on private sector investments, without any funding or subsidy from the Government.

8. By offering higher-speed broadband services at more affordable prices, the wireless fixed broadband services provide the villagers with a very attractive service alternative to the copper-based Internet services provided by the fixed services incumbent. The use of spectrum in the expansion of wireless fixed broadband services would not only complement the coverage of our highly penetrated fixed services but also manifest its role in reducing the digital divide in Hong Kong.

## *Efficient Use of Radio Spectrum Is a Challenge*

9. With our heavy reliance on spectrum-based communications and many other services in our daily life, the efficient use of spectrum has become all the more important. This is especially so as all the 610 MHz of spectrum for the provision of public mobile and wireless fixed telecommunications services has been so released to the market. With the need to coordinate with Mainland China, the digital dividend to be made available from the switching off of the analogue terrestrial TV services is not expected to realise until 2020, the earliest. While we have been participating actively in the preparatory work for the WRC-15<sup>1</sup> to be held next month, the availability of any new IMT<sup>2</sup> spectrum is still uncertain.

10. Hence, with little prospects of any new spectrum for mobile and wireless broadband services in sight, it is incumbent upon the Communications Authority to ensure efficient allocation and use of the radio spectrum as a scarce public resource of Hong Kong. The licensing mechanisms for assignment and re-assignment of spectrum seek to achieve that. As a guiding principle, we adopt a market-based approach in assigning spectrum with competing demands from providers of non-Government services, unless there are overriding public policy reasons to do otherwise. This guiding principle has been put in effective use for the assignment of new spectrum through auction on various occasions, which work to ensure that only operators which value it the most and are able to put it to the most effective use could secure the

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<sup>1</sup> It refers to the World Radiocommunication Conference to be held in Geneva on 2 – 27 November 2015.

<sup>2</sup> IMT stands for “International Mobile Telecommunications”.

use of spectrum, for the benefit of our many service users. So far, we have assigned 421 MHz of new spectrum through auctions which has fetched for the public coffer a total of US\$1.43 billion of spectrum utilisation fees.

11. New assignment aside, it is of equal importance that operators make efficient use of the assigned spectrum in hand. Under our technology-neutral principle, operators may freely refarm their assigned spectrum for higher generation services with better spectral efficiency according to their own business plans. Hitherto, a large portion of the spectrum originally deployed for the provision of voice service has already been refarmed for 3G/4G services.

12. Since our spectrum assignment is not a perpetual one, but one that lasts for a fixed tenure of 15 years each, the way we re-assign spectrum when the current assignment periods end is crucial to ensure efficient use of spectrum and the further and sustained development of our mobile market. In this connection, we are now handling, at different stages, two major spectrum re-assignment exercises. The first involves the re-assignment of 120 MHz of spectrum in the 1.9 – 2.2 GHz band (“3G spectrum”) upon expiry of the existing term of assignments in 2016. The second one is the re-assignment of the 200 MHz spectrum in the 900 MHz and 1800 MHz bands (“2G spectrum”), the existing term of assignments of which will expire in 2020/21.

#### Update on Re-assignment of 3G Spectrum

13. The decision of the Communications Authority in 2013 on the

re-assignment of 120 MHz of 3G spectrum upon expiry of the current term of assignment in 2016, is the very first time that we put the principle of a market-based approach into practice on spectrum re-assignment. The spectrum has not been re-assigned as of right to the incumbents. After a long drawn out battle with the incumbent 3G operators during the public consultation process, and in view of the fact that 3G spectrum is still the core spectrum deployed by our mobile operators for the provision of mobile data services in Hong Kong, also bearing in mind the overriding concern about the continuity and quality of mobile data services, especially in indoor areas, along the mass transit underground system in Hong Kong for instance, we decided to adopt a hybrid administratively-assigned cum market-based approach for re-assignment of the 3G spectrum in November 2013. Put simply, each incumbent 3G operator may retain, through the administrative assignment arrangement, 2/3 of its spectrum holding, and the rest would be put out for public auction.

14. The decision has precipitated a merger between two (out of then five) mobile network operators. The Communications Authority, wearing its hat as the competition authority in the Hong Kong telecommunications sector, approved the merger with conditions attached, one of which being the divestment of spectrum by the merged network operator, in order to neutralize the “substantially lessening competition” effect of the merger transaction. Taking into account the divestment, the Communications Authority, as the spectrum assignment and licensing authority, assigned a total of 70 MHz of spectrum to the incumbent 3G operators through the right of first refusal, with the remaining 50 MHz of spectrum put out for auction. The auction was successfully completed in December last year. The outcome amply

demonstrates that the hybrid approach enables the incumbent 3G spectrum assignees to rationalise their 3G, and then their overall spectrum holdings, and ensure the efficient use of their spectrum holdings. Albeit the auction has not attracted any new entrant this time round, the re-auctioned spectrum was assigned to existing market players desperate for the spectrum and willing to acquire it at a higher spectrum utilisation fee. The 3G spectrum auction fetched a spectrum utilisation fee of US\$6.3 million per MHz on average. Overall speaking, the hybrid approach ensures service continuity on the one hand, and promotes competition and efficient utilisation of spectrum on the other.

15. The completion of the auction about two years before the 3G spectrum re-assignment to take place in October 2016 allows sufficient time for the incumbents and the new spectrum assignees to prepare for the necessary network re-configuration and roll-out of the networks. We have set up a Technical Working Group to coordinate technical matters among all the mobile network operators with an aim for their smooth spectrum handover at the D-Day.

*The Next Battle: Re-assignment of Radio Spectrum in the 900 MHz and 1800 MHz bands*

16. Our new battle in spectrum management is the re-assignment of 200 MHz of radio spectrum in the 900 MHz and 1800 MHz bands. The sub-1 GHz spectrum possesses superb radio propagation characteristic apt for provision of network coverage. The existing term of these assignments will

expire between November 2020 and September 2021. Contrast with the 3G spectrum re-assignment exercise, the amount of spectrum involved in the coming exercise is much larger, and the process, we believe, is much more complicated because of a number of factors. Let me explain.

17. First, the 200 MHz of spectrum which is subject to re-assignment is a sizable chunk of the available spectrum, representing 35% of the spectrum currently assigned for our public mobile services. It has all been deployed intensively for the provision of a full range of 2G, 3G and 4G services. Imagine the huge battle we are going to have with the incumbents on any re-assignment options involving auctioning off the spectrum. Second, these bands are still the core bands for the provision of voice services. In mapping out the re-assignment approaches, we may need to factor in the need to ensure 2G service continuity for local low-end users and inbound roamers – which seems to support some form of hybrid formula, yet again. Third, due to the legacy of the use of the concerned spectrum initially for the provision of voice service, the spectrum is highly fragmented, with some frequency blocks with bandwidth of just 2 x 0.8 MHz. The need to defragment the existing band plans, in order to promote efficient spectrum utilisation, is self evident. Fourth, unlike the case of equal assignment of the 3G spectrum in the last exercise, our four mobile network operators are assigned with different amounts of spectrum in the two frequency bands concerned and the spectrum to be re-assigned account for 23% to 46% of their respective spectrum holdings. With that much at stake, one can expect strong resistance against a full market-based option. Finally, with spectrum in the two frequency bands to be re-assigned at the same time and a large amount of spectrum involved, plenty



of hybrid re-assignment options are available for examination.

18. These are issues coming to our minds when we kicked off the preparatory work for re-assignment of the 900 MHz and 1800 MHz spectrum a couple of months ago. It is our plan to conduct two rounds of public consultation on the matter, with the first public consultation paper to be issued in January 2016. The aim is to work out an approach which best meets the CA's multiple objectives in spectrum re-assignment, namely ensuring customer service continuity, efficient spectrum utilisation, promotion of effective competition, and encouragement of investment and promotion of innovative services, and to have the spectrum utilisation fee reflecting the genuine value of the spectrum. The Communications Authority will announce the decision on spectrum re-assignment around November 2017 to allow time for any offer of spectrum through the right of first refusal, the spectrum auction, and the necessary network re-configuration before the spectrum re-assignment takes effect in 2020/21.

### *Concluding Remarks*

19. To conclude, I would say radio spectrum is one of the most important issues facing the telecommunications industry now and in the future. I am glad that this forum provides the opportunity every year for us to exchange views and experience in handling the scarce spectrum resource. While the supply of radio spectrum is limited, the demand for it will continue to be insatiable, for mobile broadband services, Internet of Things and so on.

Therefore, we are duty bound to make efficient use of all available spectrum. Apart from the licensed spectrum for mobile and wireless broadband services, we will not neglect any possibility of more gainful use of the unlicensed spectrum (such as Wi-Fi bands and perhaps TV White Space). In the long run, we will bank on continuous technological breakthrough to bring about higher spectral efficiency, and on WRC-15 in exploring additional radio spectrum to meet the public demand.

20. Thank you very much.