

Development of Small Cells and Wi-Fi in Hong Kong

Telecommunications Users and Consumers Advisory Committee
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Purpose

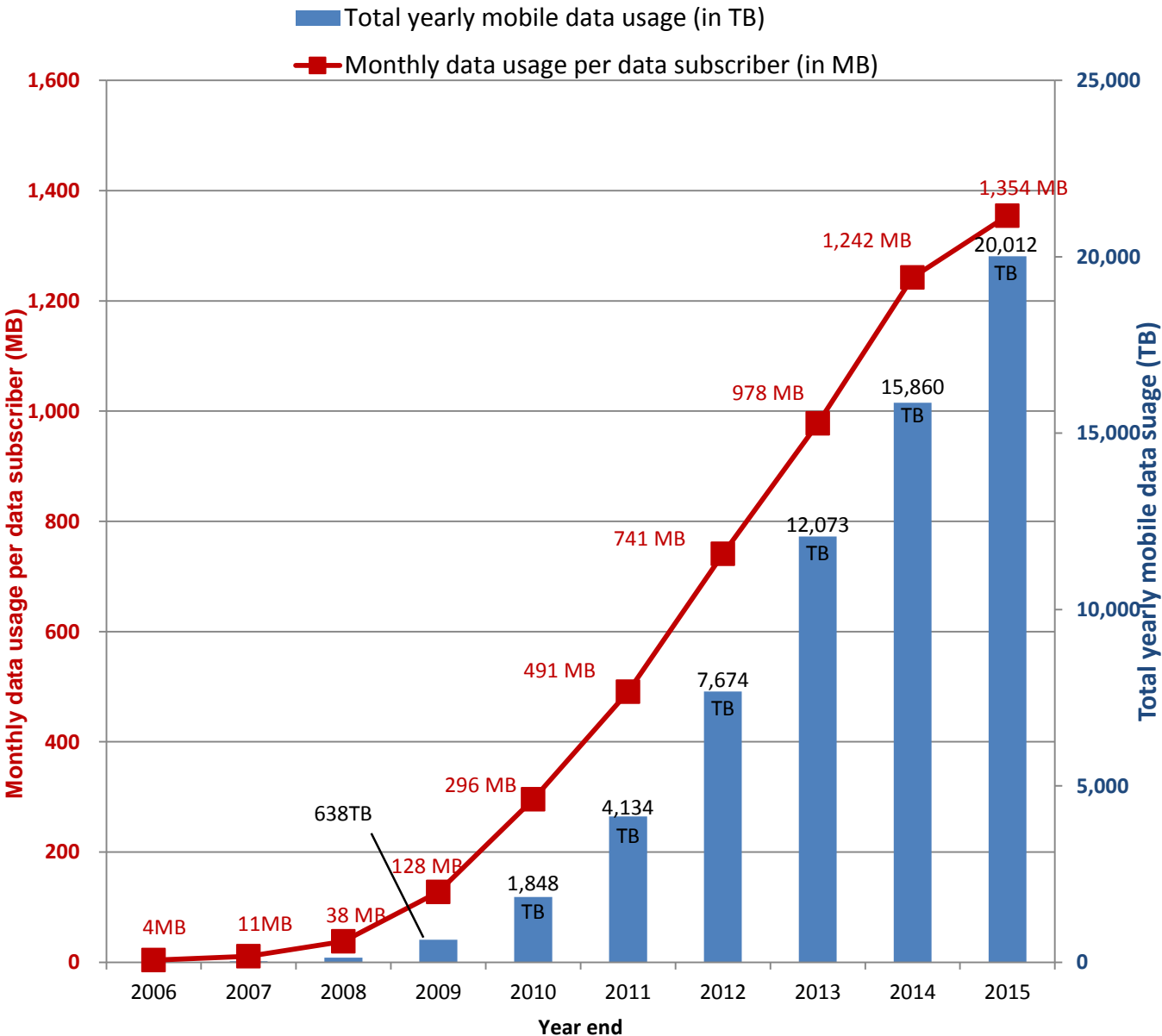
- To brief Members about:
 - Development of small cells and Wi-Fi in Hong Kong
 - How OFCA facilitates such developments

Demand for Mobile Data

- Mobile data services have increasing demand across the globe with the advancement of mobile technologies in the recent years, the popularity of intelligent mobile devices (e.g. smartphones and tablets) and widespread use of some common mobile broadband applications, e.g.
 - social networking and messaging
 - internet browsing
 - real-time video streaming



Rapid Growth of Mobile Data Usage in HK



Comparison made to	Growth of monthly data usage per data subscriber	Growth of total yearly data usage
Last 12 months	9%	26%
Last 2 years	38%	66%
Last 3 years	83%	161%
Last 5 years	357%	983%

How to Support Mobile Data Growth?



- More spectrum efficient technologies (e.g. 3G to 4G to 5G)
- Denser networks (e.g. more cell sites including the use of **small cells**)
- **Wi-Fi** offload (i.e. shifting data on to Wi-Fi networks)
- Releasing more spectrum for mobile services



What is Small Cell?

- “Small cell” is an umbrella term for operator – controlled, low-powered mobile base stations
- Small cells typically have a range from 10 metres to several hundred metres. This contrasts with a typical “macro cell” that might have a range of up to several kilometres
- The term “small cell” may cover micro-, nano- pico-cells and femtocells installed at customer premises

Advantages of Small Cells

- Increase network capacity, thus serving more customers and achieve higher data throughput per user
- Bring users closer to base stations, thus improving signal reception
- More cost effective and easier to find suitable installation sites for small cells as compared to macro base stations

Deployment of Small Cells

- As of end April 2016, Hong Kong has over 43,500 base stations, including both macro and small cells
- Small cells account for about 34% of all the base stations, which are mainly deployed in indoor areas with lower emission power

Femtocells in Customer Premises

- Femtocell is a special type of small cell deployed by mobile network operators (“MNOs”) in customer premises for improving the indoor coverage and reception of radio signals within buildings
 - Light-handed regulatory regime adopted by OFCA to facilitate deployment of femtocells by MNOs
 - Requirement of very small emission power ($< 0.1\text{W}$)
 - Restricted to indoor operation inside customer premises
 - Femtocell is connected to a broadband access line installed inside the customer premises
- All four MNOs are allowed to deploy femtocells under their licences

Possible Deployment Locations for Small Cells

- Payphone Kiosks



- Lamp Posts



- Bus Stops / Shelters



- Shops on the Street



Other Measures to Facilitate Deployment of Small Cells

- OFCA has implemented a One-stop Application Procedure since 2009 to facilitate installation of roof-top and indoor mobile base stations by MNOs and obtaining relevant approvals from government departments
- OFCA has been coordinating with other government departments for the use of government facilities to install mobile base stations
- OFCA facilitates deployment of macro and small cells and extension of mobile broadband coverage by assignment of microwave frequencies to MNOs for backhaul links
 - connection of mobile cells to core network, in particular for those located in remote and rural areas

Radiation Safety

- As small cells could be installed indoors and at street level, radiation safety could be a concern
- Similar to ordinary mobile base stations, MNOs are required to:
 - comply with the same standard as set out in the “*Code of Practice for the Protection of Workers and Members of Public Against Non-Ionizing Radiation Hazards from Radio Transmitting Equipment*”; and
 - obtain approval from the CA before bringing small cells into operation

Deployment of Public Wi-Fi



- Public Wi-Fi services provide good substitute and offload for mobile data especially in hot spots
- Light-handed licensing and regulatory approach adopted by the CA for public Wi-Fi services
 - Operate on unlicensed spectrum in the 2.4 GHz / 5 GHz bands
 - 5 carrier licensees authorised to provide municipal Wi-Fi services that cover public streets and over unleased government land as well as indoor areas (shopping malls, restaurants, etc)
 - 45 class licensees registered to provide indoor Wi-Fi services, such as at shopping malls, restaurants

Safety and Security of Public Wi-Fi

- Similar to mobile base stations, radiation safety of public Wi-Fi Access Points is ensured by requiring them to:
 - comply with the same standard as set out in the “*Code of Practice for the Protection of Workers and Members of Public Against Non-Ionizing Radiation Hazards from Radio Transmitting Equipment*”; and
- OFCA has issued “*Guidelines on the Security Aspects for the Design, Implementation, Management and Operation of Public Wi-Fi Service*” to provide practical guidance on the **security aspects** of public Wi-Fi to the service providers

Extensive Public Wi-Fi Coverage

- More than 41,200 registered access points for providing public Wi-Fi services
 - MTR stations, Airport Express stations and trains, buses, ferries, etc.
 - Offices, shopping malls, coffee shops, restaurants, convenient stores, etc.
 - Public hospitals, public libraries, parks, tourist spots, etc.

Free Wi-Fi Service

- GovWiFi programme
 - Wi-Fi services provided by the government (around 3,100 hotspots at 603 government venues, as of March 2016)
- Wi-Fi.HK
 - Wi-Fi services provided by public and private organisations (over 17,000 hotspots, including 3,100 at government venues)
- Free Wi-Fi at public hospitals
 - As a pilot project in 2015, Hospital Authority collaborated with Wi-Fi service providers to provide 1 hour free Wi-Fi service at public areas of 6 public hospitals



Expansion of Coverage of Wi-Fi.HK



- In the 2016 Policy Address, the Government pledged to progressively expand the coverage of Wi-Fi.HK by
 - increasing the existing 17,000 to 34,000 hotspots
 - targeting to complete the expansion within 3 years
 - covering different venues (such as public housing estates, public hospitals, markets, parks, sitting-out areas, promenades, tourist spots, public transport interchanges, land boundary control points, youth centres and study rooms run by the Government & non-profit making organisations, etc.)

Conclusion

- OFCA will continue to facilitate deployment of small cells and Wi-Fi in Hong Kong
- OFCA will keep dialogue with the industry, government departments and other stakeholders to facilitate such deployments for the provision of better coverage and higher capacity to meet the increasing demand for wireless data and support smart city applications

Thank you