For discussion
on 19 April 2021

Legislative Council
Panel on Information Technology and Broadcasting

Spectrum Assignment for the Provision of Public Mobile Telecommunications Services

PURPOSE

This paper briefs Members on the spectrum assignment plans of the Commerce and Economic Development Bureau (CEDB) and the Communications Authority (CA) for a number of frequency bands for the provision of public mobile telecommunications services.

BACKGROUND

2. To facilitate the introduction of advanced and innovative communications services, Hong Kong's spectrum policy aims to facilitate the most economically and socially efficient use of spectrum by assigning it to those who could make the best use of the spectrum, so as to encourage innovation, increase investment in infrastructure and provide reliable, affordable and high quality telecommunications services to consumers through competition.

3. In 2019, the Government assigned frequency spectrum in the 3.3 GHz, 3.5 GHz, 4.9 GHz, and 26/28 GHz bands in a timely manner for public mobile telecommunications use including the provision of fifth generation mobile (5G) services. Upon completion of the spectrum assignment, mobile network operators (MNOs) quickly rolled out their 5G networks. Starting from April 2020, MNOs launched their commercial 5G services in Hong Kong successively.

4. After its launch in Hong Kong for just one year, 5G service is progressing satisfactorily. As at March 2021, 5G coverage in Hong Kong has reached over 90% of the population, covering major shopping

centres and more than 50 mass transit railway (MTR) stations. The coverage of 5G networks in some core business districts or areas with high pedestrian flow even reaching 99%. The overall development and progress of 5G also surpassed many other economies and hold leading positions in international rankings. For example, according to a report released by a survey organisation Opensignal in February 2021, Hong Kong topped the world in terms of 5G coverage together with South Korea; and 5G user experience in Hong Kong also ranked eighth.

5. With technical capabilities of high speed, high capacity, high reliability, low latency communication and massive connectivity, 5G is opening up vast potential for various commercial and smart city applications such as smart living, e-commerce, telemedicine, autonomous driving, etc. In order to meet the needs of various 5G applications in terms of speed, capacity and coverage, there is a need to release more spectrum in different frequency bands to the market.

Public Consultations and Spectrum Assignment Arrangements

6. Between July and November 2020, the Secretary for Commerce and Economic Development (SCED) and the CA jointly conducted public consultations in relation to frequency allocation, assignment/re-assignment arrangements and the related spectrum utilisation fee (SUF)[1] for the spectrum in the 600 MHz, 700 MHz, 850 MHz, 2.5/2.6 GHz, and 4.9 GHz bands. There was general support for the proposed assignment/re-assignment of spectrum for public mobile use.

7. Having thoroughly considered the comments received in the public consultations, the CA and SCED promulgated four Joint Statements[2] on 30 March 2021 to announce their respective decisions

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[1] Sections 32H(2) and 32I(1) of the Telecommunications Ordinance (TO) empower the CA to allocate radio frequencies and to designate the spectrum which shall be subject to the payment of the SUF following consultation with the telecommunications industries and other affected persons; while sections 32I(2) and 32I(4) of the TO empower SCED to prescribe the method for determining the SUF and to specify the minimum fee of the SUF (including the minimum fee or reserve price of an auction used for determining the SUF).

[2] The Joint Statements have been uploaded onto the websites of the CEDB and the CA:

For the 600/700 MHz bands:
www.cedb.gov.hk/ccib/en/consultations-and-publications/consultation-

on the frequency allocation and assignment/re-assignment arrangements for the spectrum in these frequency bands, as well as the related SUF.

8. In gist, a total of 220 MHz of new spectrum in the 600 MHz, 700 MHz and 4.9 GHz bands, as well as 105 MHz of re-assigned spectrum in the 850 MHz and 2.5/2.6 GHz bands will be released to the market by way of auction. Summary of the assignment/re-assignment arrangements and indicative timetable are tabulated at **Annex**, and details of the frequency bands are set out below.

Newly Assigned Frequency Bands

(a) The 600 MHz and 700 MHz bands

9. Full digital television (TV) broadcast was implemented smoothly on 1 December 2020. At the meeting of the Panel on Information Technology and Broadcasting on 8 February 2021, the Office of the Communications Authority (OFCA) briefed Members about the measures in relation to migration of TV frequency channels[3]. Upon completion of the migration of TV frequency channels in end-November 2021, 70 MHz of spectrum in each of the 600 MHz and 700 MHz bands can be vacated and released to the market for purposes including high value-added public mobile telecommunications use (such as 5G), thereby allowing the valuable spectrum resources to be utilised more effectively.

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papers/joint_statement_600_700MHz_2021.pdf
www.coms-auth.hk/filemanager/statement/en/upload/558/600_700_mhz_statement.pdf

For the 850 MHz band:
www.cedb.gov.hk/ccib/en/consultations-and-publications/consultation-papers/joint_statement_850MHz_2021.pdf
www.coms-auth.hk/filemanager/statement/en/upload/557/850_mhz_statement.pdf

For the 2.5/2.6 GHz band:
www.cedb.gov.hk/ccib/en/consultations-and-publications/consultation-papers/joint_statement_2.5_2.6GHz_2021.pdf
www.coms-auth.hk/filemanager/statement/en/upload/556/2_5_2_6_ghz_statement.pdf

For the 4.9 GHz band:
www.cedb.gov.hk/ccib/en/consultations-and-publications/consultation-papers/joint_statement_4.9GHz_2021.pdf
www.coms-auth.hk/filemanager/statement/en/upload/555/4_9_ghz_statement.pdf

[3] All TV frequency channels currently operating in the upper part of the broadcast band (i.e. the 614 - 806 MHz band) will be migrated to the 470 - 614 MHz band.

10. Given the limited supply of spectrum in the low frequency band and its excellent radio propagation characteristics and penetrating power, it is expected that the 600 MHz band to be assigned for indoor deployment will be able to provide additional network capacity in congested or high traffic indoor mobile hotspots, such as MTR stations; while the 700 MHz band to be assigned for territory-wide use will provide extensive network coverage for 5G services across wide areas.

(b) The 4.9 GHz band

11. 80 MHz of spectrum in the 4.9 GHz band was already assigned to two MNOs for the provision of public mobile services in 2019 by way of auction. In view of the good radio propagation characteristics of the 4.9 GHz band for the provision of wide area coverage, and the capability for deployment at both indoor and outdoor locations in Hong Kong, it is desirable to release more spectrum in the band for deployment.

12. With OFCA further vacating 80 MHz of spectrum in the 4.9 GHz band, MNOs which do not hold any spectrum in the band might take the opportunity to acquire the spectrum, while incumbent assignees of the band also have an incentive to acquire additional spectrum in the band to expand their network capacities in a cost-effective manner.

Re-assigned Frequency Bands

(c) The 850 MHz band

13. The existing assignment of 15 MHz of spectrum in the 850 MHz band will expire in late 2023. Since the code division multiple access 2000 (CDMA2000) standard is becoming obsolete, the existing assignee undertook to the CA in February 2021 to voluntarily return the spectrum by November 2021, prior to the expiry of the assignment term[4]. This will enable re-assignment of the spectrum at the same time with assignment of the new spectrum in the 600 MHz

[4] There were no local customers subscribing to the mobile services provided using the spectrum in the 850 MHz band and no roaming services were provided using the spectrum under agreements signed with overseas operators.

and 700 MHz bands, and facilitate more efficient utilisation of spectrum resources.

(d) The 2.5/2.6 GHz band

14. The existing assignment of 90 MHz of spectrum in the 2.5/2.6 GHz band will expire in March 2024 and can be re-assigned by then. The 2.5/2.6 GHz band is currently generally deployed by MNOs for the provision of the fourth generation mobile (4G) services. Under the technology neutral principle, assignees are free to continue deploying it for 4G services, or refarm it for the provision of more advanced generation of public mobile services such as 5G for enhancing spectral efficiency.

Other Spectrum Assignment Arrangements

(e) The 26 GHz and 28 GHz bands

15. Apart from the assignment/re-assignment exercises of the low- and mid-frequency bands mentioned above, high frequency bands are also important in support of the provision of innovative telecommunications services. In April 2019, a total of 1 200 MHz of spectrum in the 28 GHz band was assigned to three MNOs[5] as per their applications for the provision of large-scale public mobile services. Such sufficient bandwidth enables the provision of extremely high speed and high capacity data transmissions to users at network hotspots.

16. The CA plans to invite second round applications in 2021 for assignment of the remaining spectrum in the 26 GHz and 28 GHz bands for the provision of large-scale public mobile services. In view of the ample supply of spectrum in the bands, the CA will follow the assignment method for the last round and assign the spectrum administratively. In line with the established SUF charging scheme, assignees will need to pay SUF for the use of the spectrum concerned only if 75% or more of the spectrum within the 26 GHz and 28 GHz bands is occupied[6].

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[5] 400 MHz of spectrum was assigned to each of the three MNOs by way of administrative assignment. The assignees currently do not need to pay SUF for the use of the spectrum as less than 75% of the spectrum in the 26 GHz and 28 GHz bands has been occupied.

[6] In that case, the SUF would be set at $21,600 per MHz per annum.

NEXT STEP

17. To implement the decisions on the assignment/re-assignment and SUF in relation to the above frequency bands, we will table the relevant subsidiary legislation for consideration of the Legislative Council through the negative vetting procedure. Our aim is to complete the exercise before the end of this legislative session. We plan to auction the spectrum in the 600 MHz, 700 MHz, 850 MHz, 2.5/2.6 GHz, and 4.9 GHz bands all together in a single auction to be conducted in the fourth quarter of 2021. In line with established practice, SCED will take into account all relevant factors and decide on the auction reserve prices nearer the time of auction.

18. The CA will continue to actively explore additional spectrum in other frequency bands for high value-added public mobile telecommunications use. Any new spectrum will be released to the market as soon as it is available. In addition, MNOs also have the flexibility to refarm the spectrum they currently hold in other frequency bands to provide various types of telecommunications services in Hong Kong.

WAY FORWARD

19. Members are invited to note and comment on the content of this paper.

Commerce and Economic Development Bureau
(Communications and Creative Industries Branch)
Office of the Communications Authority
April 2021

Annex

Summary of Arrangements for Assignment/Re-assignment of Spectrum

Frequency Band	Low-band			Mid-band		High-band
	600/700 MHz bands		850 MHz band	2.5/2.6 GHz band	4.9 GHz band	26/28 GHz bands
	600MHz	700MHz				
Assignment / Re-assignment	New assignment		Re-assignment		New assignment	Second round assignment
Assignment Method	By way of auction in the fourth quarter of 2021					By administrative assignment in 2021
Amount of Spectrum	70 MHz	70 MHz	15 MHz	90 MHz	80 MHz	2 500 MHz
Condition of Use	For indoor use only	For territory-wide use				
Network and Service Rollout Obligation (within 5 years)	At least 100 indoor base stations	Minimum 90% population coverage			Minimum 50% population coverage	2 500 radio installations for 400 MHz of spectrum already assigned
Start Date of Use	December 2021			March 2024	December 2021	2021