LCQ19: Spectrum for provision of fifth generation mobile services

Following is a question by the Hon Charles Mok and a written reply by the Acting Secretary for Commerce and Economic Development, Dr Bernard Chan, in the Legislative Council today (June 20):

Question:

To tie in with the launch of the fifth generation (i.e. 5G) mobile service in the market in 2020, the Communications Authority (CA) has decided to re-allocate the radio spectrum in the 3.4 – 3.7 GHz band from fixed satellite service (FSS) to mobile service with effect from April 1, 2020. Moreover, in order to avoid radio interference with the existing earth stations for telemetry, tracking and control of satellites in orbit (TT&C Stations), CA has decided to set up restriction zones in Tai Po (which will cover areas including the entire Tai Po District, Shatin, Ma On Shan, Fanling, Sai Kung, and the core areas of scientific research activities in the Hong Kong Science Park and The Chinese University of Hong Kong) and Stanley, in which the installation of mobile base stations of public mobile services operating in the 3.4 – 3.6 GHz band (3.5 GHz band) is forbidden. Some members of the information and technology sector have relayed to me that the setting up of such restriction zones will render members of the public residing and working in the restriction zones unable to use 5G mobile service in future, directly affecting scientific research activities and smart city development. In this connection, will the Government inform this Council:

(1) of the respective populations of the two aforesaid restriction zones, and the respective numbers of households, courts/estates, industrial buildings, office buildings, shopping centres, schools, universities, companies and scientific research institutions (if any) covered by them (set out in a table);

(2) whether CA has assessed (i) the impact on the daily lives of the residents in the zones, (ii) the impact on the scientific research and economic activities in the zones and (iii) the losses to be sustained by the entire local economy (including the loss caused by the failure to provide 5G mobile service in the zones), to be brought about by the setting up of the two restriction zones; whether CA will remove the two restriction zones, or reduce their coverage; if CA will, of the details and the implementation timetable;

(3) whether CA had, before deciding to re-allocate the aforesaid spectrum, studied (i) the identification of alternative sites for relocating the existing TT&C Stations and (ii) the minimum area to be covered by the restriction zones; if CA had, of the details; if not, the reasons for that;

(4) apart from the two restriction zones, whether CA has studied forbidding the installation of mobile base stations of public mobile services operating

in the 3.5 GHz band in other areas or locations; if CA has, of the areas or locations involved and the reasons for that; and

(5) whether CA has plans to relocate the FSS-related facilities to avoid the impact of the setting up of the restriction zones on the use of 5G mobile service and scientific research activities; if CA does, of the details of the plans and the implementation table?

Reply:

President,

Consolidated reply to the five parts of the question is as follows.

Hong Kong and the Asia-Pacific region have been allocating the 3.4 – 4.2 GHz band for use by satellite services for years. Currently, there are two satellite companies in Hong Kong which operate a total of 12 satellites. These satellites are important external telecommunications facilities for Hong Kong as a telecommunications hub in the region. At present, the two satellite companies have set up earth stations for telemetry, tracking and control (TT&C Stations) in Tai Po and Stanley for the operation of the satellites in space orbit. In view of the development of mobile communications in recent years, upon frequency coordination with the Mainland authorities and completion of the relevant public consultation exercise, the Communications Authority (CA) decided in March 2018 to re-allocate the 3.4 – 3.7 GHz band from satellite services to mobile services, and to assign the 3.4 – 3.6 GHz band (3.5 GHz band) for public mobile services with effect from April 1, 2020. This arrangement provides an advance notice of about two years to the affected licensees so that they can make necessary changes and adjustment. Since the TT&C Stations will still need to make use of the 3.4 – 3.7 GHz band to operate the satellites already launched, and the base stations for mobile services may cause interference to the TT&C Stations, in making its decision on the re-allocation, the CA has to impose restriction zones around these TT&C Stations whereby future deployment of base stations for mobile services (including the fifth generation (5G) mobile services) operating in the 3.5 GHz band inside the restriction zones will not be allowed.

According to the "Projections of Population Distribution 2015-2024" published by the Planning Department, the population in these two restriction zones is roughly estimated to be around 740 000. However, we must point out that coverage of 5G services will be available in these restriction zones in future (as explained below). We do not have other breakdowns as requested in part (1) of the question.

To ensure that the current spectrum management is in line with the 5G development, apart from re-allocating the 3.5 GHz band for public mobile services (including 5G services), the CA also plans to allocate the 26 GHz band (24.25 – 27.5 GHz band) and the 28 GHz band (27.5 – 28.35 GHz band) for public mobile services. Such spectrum, which is planned for assignment in 2019-2020, amounts to a total of 4 300 MHz, seven times more than the aggregate amount of spectrum currently deployed for the second, third and

fourth generation (2G, 3G and 4G) mobile services. Hence, 5G services will be provided through a number of frequency bands, instead of relying on the 200 MHz of spectrum in the 3.5 GHz band alone. Besides, in accordance with the technology neutral principle, operators may refarm their existing 2G/3G/4G spectrum for 5G services. The CA will continue to identify more spectrum for 5G services. All the spectrum can be used for provision of 5G services to cover areas within the restriction zones applicable to the 3.5 GHz band.

In late May 2018, mobile network operators (MNOs) proposed to the Office of the Communications Authority (OFCA) some measures for reducing the size of the restriction zones. Whether the measures proposed by MNOs are feasible will need to be examined by way of in-depth technical analysis and/or field tests. OFCA has already set up a working group comprising satellite operators and MNOs in order to identify options which are technically feasible and acceptable to all operators. The working group already convened its first meeting in early June and will continue to conduct regular discussions.

As for MNOs' proposal to relocate the existing TT&C Stations, there is no legal basis for the CA to unilaterally request satellite operators to relocate their existing TT&C Stations which are legally set up, invested and put to use. In fact, the TT&C Stations concerned have been in operation for more than 20 years. Satellite operators indicated that the relocation of TT&C Stations will not only involve substantial investment, but will also disrupt their operation. That said, if satellite operators have plans to relocate their stations or set up new backup stations to reduce the constraints on employing spectrum in the 3.5 GHz band for 5G services, OFCA will provide full assistance.

In sum, any concern on 5G development and coverage in individual areas being affected due to the need to protect satellite services when using spectrum in the 3.5 GHz band is one-sided, and reflects that those having such concern may not have a full picture of the 5G development. As advised by the Commerce and Economic Development Bureau and OFCA on various occasions, the first batch of new 5G spectrum is primarily in the 26 GHz and 28 GHz bands which the CA plans to assign in early 2019, ahead of the assignment of spectrum in the 3.5 GHz band. Various areas of Hong Kong, including the restriction zones applicable to the 3.5 GHz band, can have 5G coverage by using spectrum in the 26 GHz and 28 GHz bands at an earlier stage.