

22 August 2018

Office of the Communications Authority
29/F Wu Chung House
213 Queen's Road East
Wanchai, Hong Kong

Attention: Head, Regulatory 3
Fax: 2803 5112
Email: consult-26-28GHz@ofca.gov.hk

Re: Proposed Allocation of the 26 GHz and 28 GHz Bands to Mobile Service and the Associated Arrangements for Spectrum Assignment and Spectrum Utilisation Fee Consultation Paper, dated 26 July 2018.

Dear Sir/Madam,

APT Satellite Company Limited (herein after referred to as "APT"), as a listed domestic satellite operator and licensee of HKSAR, has reviewed the Invitation Paper issued by CA on the Proposed Allocation of the 26 GHz and 28 GHz Bands to Mobile Service and the Associated Arrangements for Spectrum Assignment and Spectrum Utilisation Fee Consultation Paper, dated 26 July 2018 , and would like to express its concerns and provide responses to the Questions raised in the Consultation Paper as contained in this document.

It has been widely noticed that, CA has and continues to launch waves of frequency reallocation in provision to 5G future deployment. Such intentions have involved 300MHz bandwidth in the 3.5GHz band, and up to 4100 MHz bandwidth in the 26/28 GHz band, out of which, 2150 MHz are currently allocated to FSS as primary service. In this regard, drastic impact on FSS industry in Hongkong is inevitable.

Having witnessed the development of telecommunication industry in Hongkong and many other regions globally, two fundamental values have been constantly emphasized and cherished, they are technology innovation and embracement of international communities.

As a traditional international telecommunication hub, Hongkong upholds its role via two external channels, international fiber and satellite. Over the past decades, Hongkong has accommodated two domestic satellite operators operating more than 10 satellites to serve both local public and as international telecommunication service provider. Together with satellites operated by mainland and overseas, the density of satellites landed in Hongkong demonstrated strong support from the satellite industry in enhancement of the leading position for Hongkong in the global telecommunication community.

While boosting the deployment of 5G by offering privileges to Mobile Service against others in addition to ample frequency supplement, APT would suggest that CA also recognize the innovations rapidly developed in the satellite industry, such as HTS type of satellites, incorporated roles in the 5G ecosystem for satellite technology, the unique capability to serve the underserved communities and to maintain/restore telecommunication during natural disasters. All of these would not be feasible if without the support of required frequency recourses.

General Impact to APT

It should be pointed out that, though the typical Ka uplink candidate band ranges from 27 to 31 GHz (in total 4000 MHz), incorporated with the intended reallocation, the overall feasibility status could be summarized as below:

- 27.00-28.35 GHz (1350MHz), reallocation to MS,
- **28.35-28.60 GHz (250MHz)**, GSO FSS protected by epfd limits from NGSO
- 28.60-29.10 GHz (500MHz), NGSO FSS band

- 29.10-29.50 GHz (400MHz), GSO FSS sharing with feeder links for NGSO MSS
- **29.50-30.00 GHz (500MHz)**, GSO FSS protected by epfd limits from NGSO
- 30.00-31.00 GHz (1000MHz), typical government/military band

In conclusion, out of the total 4000MHz uplink frequency band, only 750MHz or 18.75% is remaining for GSO FSS to apply without restrictions from other services, which reveals shortage of frequency beyond tolerable.

Among the frequency bands proposed to be candidates for future 5G deployment, APT would like to express its concerns to below three bands that overlapping APT's applications:

- The frequency band of **27.5-28.35 GHz** has been the major FSS uplink capacity to Ka band satellites across the globe. Especially in Hong Kong and mainland China, this band is essential and have already been in use for multiple satellites operational.

APT currently has two succeeding satellite projects under construction and scheduled to be launched during the period of 2018-2019, all of which are configured with Ka band payloads. The 27.5-28.35 GHz capacity has already been designed to be the fundamental and irreplaceable component for the APT satellite network(s) and heavily used.

Additionally, APT has already started the process of Ka band hub station(s) construction in Hong Kong. Such station(s) will function as the primary hub for the upcoming APT ka band satellite(s), including High Throughput Satellite(s), hence any limitation or interference cannot be accepted and would cause severe impact on the services.

- The frequency band of **27-27.5 GHz** has been allocated for FSS by the Radio Regulations, APT has initiated its plans to develop future satellite projects employing such band.
- The frequency band of **24.75-25.25 GHz** has been identified by the Radio Regulations for Broadcasting Satellite Service feeder link service as in footnote 5.535 of Article 5. In consideration of the nature of BSS type of

services, sharing studies are required.

Responses to CA Questions

Question 1

What are your views on the proposed allocation of the 26/28 GHz bands to mobile service and of the sub-band of 24.25 – 24.45 GHz to fixed service, both on a primary basis? What are your views on the protection of radio stations of co-primary users on a first-come-first-served basis?

APT Response:

APT does not share the view from CA as contained in paragraph 14 of the Consultation Paper, where CA indicated that preliminary study results could be extended from the 26 GHz band to the 28 GHz band. As a matter of fact, ITU studies has already excluded the 28GHz band for IMT use from the WRC-19 Agenda Item 1.13, which indicates that global 5G harmonization has been rejected on the worldwide basis. Additionally, it has been noticed that CA respected the study results/allocation trend from ITU and denied application for HAPS in the 26/28 GHz band in Hongkong, as stated in paragraph 18 of the Consultation Paper. Following the same principle, CA is recommended to promote its regulations in compliance to the ITU study results/allocation trend with regard to IMT deployment in the 28 GHz band.

Combined with above findings and reasons elaborated in section **General Impact to APT**, APT is of the view that allocation in the 28GHz band should be avoided, the feasibility of allocation in the 26GHz band should be considered on basis of upcoming study results from WRC-19.

In consideration of the proposed first-come-first-served principle, APT would like to point out that, a satellite itself is a piece of delicate machine and the key component of a satellite network. A typical satellite construction process

composes below stages:

- a) Up to 7 years planning/coordination stage,
- b) 3-4 years' construction stage, and
- c) 15-20 years' space operation stage.

However, the design/configuration of a satellite cannot be altered ever since stage b). APT is of the strong view that, the 5G services, as the later comer, cannot interfere, degrade or limit FSS transmission, service quality or applications/distribution in any form.

Question 2

Do you have any views on adopting an administrative assignment approach for the release of spectrum in the 26/28 GHz bands?

APT Response:

It has been noted that CA considers the technical trend from major entities, economies, organizations and ITU. However, unlike some of the economies geographically located isolated from other regions, such as the US (region 2) or Japan (isolated from other countries), Hongkong shares the border with mainland China. Consequently, compatible frequency allocation scheme would better support the feasibility of both 5G and FSS.

Back in June 2017, MIIT had launched public consultation on the 5G allocation in the Millimeter-Wave Bands, which included only 24.75-27.5/ 37-42.5GHz and excluded the 27.5-28.35 GHz band. It is suggested that CA should incorporate considerations from a wider scale and especially trends from Hongkong's neighboring regions/territories.

APT is therefore of the view that, it is inappropriate to adopt administrative approach to assign 27.5-28.35 GHz band for future 5G deployment.

Question 4

Do you have any views on the proposal of assigning (a) 3300 MHz to 3700 MHz of spectrum in the 26/28 GHz bands for the provision of large scale public 5G services; and (b) the remaining 400 MHz to 800 MHz of spectrum in the two frequency bands to other entities for the provision of 5G services in specified locations on a shared basis?

APT Response:

As stipulated in the Consultation Paper paragraph 14, “*Preliminary study results show that subject to certain deployment constraints, IMT services are compatible with the existing services in the 26 GHz band*”, and considering that the function, usage, terminal types, development stage, application scale for FSS in the 28GHz differs from that of the 26GHz band, it is therefore suggested that CA limit the “large scale public 5G services” within the frequency band of 24.35-24.75 / 25.25-27.0 GHz, and develop possible mitigation measures before releasing 24.75-25.25 GHz for “specified location services”.

Question 7

Do you have any preference on the assignment of spectrum in either the 26 GHz or 28 GHz band?

APT Response:

As stipulated in response to Question 4, it is suggested that CA,

- limit the “large scale public 5G services” within the frequency band of 24.35-24.75 / 25.25-27.0 GHz,
- develop possible mitigation measures before releasing 24.75-25.25 GHz for “specified location services”, and
- avoid allocation for MS in the 27-28.35 GHz band.

Question 8

What are your views on the proposed assignment method for the Shared Spectrum?

APT Response:

As stipulated in response to Question 4, it is suggested that CA limit the spectrum for 5G services in specified locations on a shared basis under a total of 400-500 MHz and within the 24.75-25.25 GHz band.

Question 11

Do you have any views on the proposal for SUF as set out in paragraphs 45 to 50 above?

APT Response:

As indicated in the Consultation Paper note 13, APT does not agree to the concept of FSS uplink denies FS link in the co-primarily allocated frequency band. Fixed service shared with more than 80% of the overall frequency bands. Allocations of co-primary scheme between FS and other services are found in most of the shared bands. The concept of Co-primary, in its nature, does not deny another type of service to share the same band, should there be proper effort made to meet the compatibility. FSS uplinks featured high power with high elevation and small quantity, while FS links featured lower power with low elevation and designable transmitting direction. Like in many other co-primary allocated bands, both services can and have already been proved to be compatible to co-exist on a world-wide basis.

On the contrary, sharing between the MS stations would involve much efforts from all possible aspects. Such complexity is not introduced by the exitance of FSS stations, but a nature inherited by 5G network from its frequency re-use framework.

APT is of the view that, the SUF scheme should represent a most beneficial path for both the public interest and the development of new technologies. We would like to draw the kind attention from CA/SCED to a most recent event

conducted by the authorities of mainland China. In April 2018, in order to encourage the innovation applied in the satellite industry for HTS type of satellite (operating in 17.7-21.2 / 27.5-31GHz band), the National Development and Reform Commission has revised the SUF scheme, which waived the uplink SUF payable by end users or by gateway stations. (see http://www.ndrc.gov.cn/zcfb/zcfbtz/201804/t20180424_883229.html)

In conclusion, APT is of the general view that, the proposed SUF charging scheme and the criteria is not suitable for FSS stations, which neither denies nor complexes the sharing with other services. Vice versa, the charging of FSS applications would not change the sharing complexity introduced by MS network itself.

APT Satellite Company Limited.