

13 June 2018

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

Attention: Principal Regulatory Affairs Manager (R13)

Fax: 2116 3334

Email: consult-3.5GHz@ofca.gov.hk

Re: Arrangements for Assignment of the Spectrum in the 3.4 – 3.6 GHz Band for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee Consultation Paper, dated 2 May 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 Consultation Paper jointly issued by the Communications Authority ("CA") and the Secretary for Commerce and Economic Development ("SCED") on the proposed Arrangements for Assignment of the Spectrum in the 3.4 – 3.6 GHz Band for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee Consultation Paper, dated 2 May 2018, and would like to provide its views and comments as contained in this document.

General objections on the impact of APT services

APT currently operates 5 in-orbit satellites namely APSTAR-5, APSTAR-6, APSTAR-6C, APSTAR-7 and APSTAR-9, all of which were under CA licenses and providing services within the affected frequency band of 3.4-3.7 GHz. APT irritates that, to operate a satellite network, the APT ground station located at Taipo is the essential and critical component for each of APSTAR satellites. The two major functions of the APT ground

station shall not be affected:

- a) TT&C service, which comprise the functions of Telecommand, Telemetry and Ranging.
- b) Satellite services and Network Management, in which (i) the downlink services on those transponders in 3.4 – 3.7GHz frequency band leased by customers, to be connected with Tai Po earth station, and (ii) network operation team will monitor all traffic onboard the satellite to maintain the service quality by way of active or passive technical support for the traffic from entire satellite coverage.

Though the discussion on the protection of case a) is still being fiercely discussed, APT deeply regret to have found out that CA has repeatedly ignored our request for protection as in case b). APT strongly objects the current position of CA which will result the total loss of APT's capability to provide the FSS services in Hong Kong and manage our own satellite network within the affected frequency band, collectively there are 40 x 36MHz equivalent transponders in this frequency band on Apstar satellites.

In connection to the consultation paper, APT would like to provide its responses to the Questions raised by CA.

Question 6: Do you have any views on the proposed requirements as set out in paragraphs 29 to 31 above?

Comment: APT support the protection of TT&C services and strongly objects the neglect of Satellite Services and Network Management protection.

- a) The proposed establishment of the Restriction Zone by the CA was based on below factors:
 - Avoidance of line-of-sight scenario from 5G base station into Satellite antenna, which ensure max antenna isolation is achieved by managing 5G signals arrives Only at -10 dBi gain direction of satellite antenna.
 - Mitigation of Co-frequency interference to TT&C channel(s) within 3.4-3.6 GHz
 - Mitigation of Closely adjacent band interference to TT&C channels within 3.6-

3.7 GHz

- Mitigation of Out of band interference to both TT&C and services.

The Restriction Zone is the Only feasible procedure to serve above purposes.

- b) APT would like to emphasize that, any interference to the control of the satellite may lead to unexpected drastic consequences. APT requests 7x24 un-interrupted operation of the TT&C services across 3.4-4.2 GHz band. In case the actual harmful interference occurs,
- OFCA should be prepared with proper mechanism and procedures of interference source locating;
 - resolution on timely basis, including procedure to shut down the offending 5G base station(s) should be mandatory to minimize the possible impact;
 - the reoccurrence of the interference by the offending 5G base station(s) shall be strictly prohibited before proper adjustments are enforced and verified by OFCA and affected satellite operator.
- c) Considering that neither the current mitigation measures in discussion, nor the Restriction Zone scheme yet provides sufficient protection to 3400-3405 MHz satellite TT&C service, APT would like to understand possible outcome of the allocation within such band should the coordination continues to fail in reaching a compatible sharing scenario.
- d) The consultation have addressed the protection of TT&C from 5G base station, OFCA is suggested to request the submission of feasible implementation procedures by the 5G operators with regard to the network-based mitigation measures in avoidance of mobile device/handset (aggregate) interference affecting the TT&C services.
- e) OFCA is suggested to demonstrate consequences should the 5G licensee fails to comply with the requirements and conditions imposed.

Question 7: Do you have any views on the proposed subsidy scheme for the upgrade of existing SMATV systems, including the funding and administrative arrangements for issuing the amount of subsidies to the affected system owners/users?

Comment: APT supports the necessary aid prepared in support of the SMATV upgrade.

However, it should be taken into account that such scale of the project may require time extension due to delays incurred during implementation.

a) Insertion loss is inevitable

Due to the fact that bandpass filter will be required to achieve high rejection towards 3.4-3.6 GHz band, insertion loss is inevitable within the working band of 3.7-4.2 GHz, in this regard,

- all links operating in the 3.7-4.2 GHz are subject to evaluation whether or not such loss is within an acceptable level,
- links operating close to the 3.7 GHz edge will suffer higher loss, the level of which may result the interruption of the reception.

b) Implementation difficulties

A SMATV system was designed in a way that no such filter was required to be inserted on LNB. In this regard, it should be determined whether or not such filter would be feasible to be installed on each of the antennas. In some cases, adding of the filter would cause the unbalanced position of the LNB which can no longer be physically supported by the original structure.

c) Unexpected factors

Considering that all 1600+ SMATV sites are required to be upgraded within a short period of time, after the subsidy received and before the launch of 5G, and that the price for hiring of capable mechanics in Hong Kong fluctuates rapidly as the market demand rises, OFCA is therefore advised to consider possible increase of the subsidy.

Should the upgrade be much delayed due to insufficient support, OFCA is suggested to consider delay of 5G launch to avoid massive interruption of SMATVs.

d) 5G implementation guideline

It has been noted that the CA statement was based on previous studies of LNB out of band rejection performance report, which was conducted with several assumption. Some of the assumptions are essential such as the relative position/distance between a 5G base station and a SMATV. In this connection, OFCA is advised to publish necessary guidelines for the 5G implementation to meet the required assumptions.

Question 10: Do you have any views on the proposals in relation to SUF above?

Comment: APT recalls the significant difference in SUF between 6.425-7.025 GHz (HK\$3600/MHz/annum) and other C band uplink frequency (HK\$432/MHz/annum), which was proposed back in April 2017 by the Commerce and Economic Development Bureau. The cancellation of the FSS allocation in 3.4-3.7 GHz frequency band will prohibit satellite operators from service provision. The affected band is the designated downlink frequency range paring with 6.425-6.725 GHz in the uplink. APT therefore suggests SCED reconsider their position in the SUF taking into account the loss of the downlink paring frequency due to the re-allocation. It is expected that the SUF for 6.425-6.725 GHz band will be equal to the others.

Yours sincerely,



CHEN Xun

Vice President

APT Satellite Company Limited.