

# **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**

**2 May 2018**

### **PURPOSE**

This consultation paper is jointly issued by the Communications Authority (“CA”) and the Secretary for Commerce and Economic Development (“SCED”) to seek views and comments of the industry and interested parties on the arrangements for assignment of the spectrum in the 3.4 – 3.6 GHz band (“3.5 GHz band”) for the provision of public mobile services and the related spectrum utilisation fee (“SUF”).

### **BACKGROUND**

#### **Supply of Radio Spectrum for the Provision of Public Mobile Services**

2. In Hong Kong, the mobile penetration rate reached 247.5% in December 2017, one of the highest in the world, with an average monthly mobile data usage per capita exceeding 4 Gigabytes. Looking ahead, we expect persistent demand from the industry for more spectrum for the provision of public mobile services in view of the consistent surge in mobile data usage, and the development of enhanced applications and services, especially with the advent of fifth generation mobile (“5G”) technologies that are expected to be available for commercial launch in or around 2020.

3. On 21 March 2017, the CA published a Work Plan<sup>1</sup> for making available additional radio spectrum to meet the demand for public mobile services, including 5G services, towards 2020 and beyond. The 3.5 GHz band is one of the spectrum bands identified in the Work Plan as a source of additional spectrum supply.

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<sup>1</sup> The relevant press release is available at:

[https://www.coms-auth.hk/en/media\\_focus/press\\_releases/index\\_id\\_1423.html](https://www.coms-auth.hk/en/media_focus/press_releases/index_id_1423.html).

The spectrum concerned includes the spectrum in the 698 – 806 MHz band, the 3.5 GHz band, the 24.25 – 27.5 GHz band and the 27.5 – 28.35 GHz band.

4. In addition, the CA publishes the Spectrum Release Plan (“SRP”)<sup>2</sup> on an annual basis to inform the industry of the potential supply of radio spectrum to the market in the following three years. The latest SRP, released on 1 February 2018, has identified 200 MHz of spectrum in the 3.5 GHz band which is expected to be available in the timeframe of 2018 – 2020.

### **World Trend in the Use of the 3.5 GHz Band**

5. Since 2000, an increasing number of economies have considered the use of the 3.5 GHz band for public mobile services. The World Radiocommunication Conference (“WRC”) held in 2007 identified the 3.5 GHz band for use by those economies wishing to implement International Mobile Telecommunication (“IMT”) services, i.e. public mobile services. With the consistent demand for additional radio spectrum below 6 GHz for public mobile services, the use of the 3.5 GHz band for public mobile (including 5G) services has gained momentum in many major economies including the United States, the United Kingdom and other countries in Europe, Australia and the Mainland.

6. In June 2017, the Ministry of Industry and Information Technology (“MIIT”) of the Mainland issued a consultation notice setting out the guiding principles for the use of the 3.3 – 3.6 GHz band and the 4.8 – 5 GHz band, which have both been identified for the provision of IMT-2020 services in the Mainland<sup>3</sup>. In November 2017, MIIT promulgated its decision to allocate the 3.3 – 3.6 GHz and 4.8 – 5 GHz bands for the provision of 5G services, with the 3.3 – 3.4 GHz band being confined to indoor use only<sup>4</sup>.

### **Re-allocation of the 3.5 GHz Band for Mobile Service**

7. At present, the 3.4 – 3.7 GHz band is primarily being used in Hong Kong for various satellite applications. On 28 March 2018, the CA

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<sup>2</sup> The SRP is available at:  
[https://www.coms-auth.hk/filemanager/en/content\\_613/spectrum\\_plan2018\\_en.pdf](https://www.coms-auth.hk/filemanager/en/content_613/spectrum_plan2018_en.pdf)

<sup>3</sup> The consultation paper (in Simplified Chinese only) is available at:  
<http://www.miit.gov.cn/newweb/n1146285/n1146352/n3054355/n3057735/n3057748/c5672371/content.html>

<sup>4</sup> The statement (in Simplified Chinese only) is available at:  
<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757020/c5907905/content.html>

issued a statement entitled “Change in the Allocation of the 3.4 – 3.7 GHz Band from Fixed Satellite Service to Mobile Service” (the “Re-allocation Statement”)<sup>5</sup> promulgating its decision to change the primary<sup>6</sup> allocation of radio spectrum in the 3.4 – 3.7 GHz band from fixed satellite service (“FSS”) (space-to-Earth) to mobile service for the provision of public mobile services in Hong Kong with effect from 1 April 2020. In gist,

- (a) 200 MHz of spectrum in the 3.4 – 3.6 GHz band (i.e. the 3.5 GHz band) will be made available for the provision of public mobile services.
- (b) mitigating measures should be adopted for the co-existence of different radiocommunications services operating in the 3.4 – 4.2 GHz band, including –
  - (i) introduction of a guard band in the 3.6 – 3.7 GHz band to provide frequency separation for public mobile services operating in the 3.5 GHz band and FSS operating in the 3.7 – 4.2 GHz band;
  - (ii) imposition of restriction zones on the deployment of mobile base stations of public mobile services operating in the 3.5 GHz band and adoption of precautionary measures by prospective spectrum assignees to protect the existing earth stations for telemetry, tracking and control (“TT&C”) of satellites in orbit (“TT&C Stations”) located in Tai Po Industrial Estate and Stanley; and
  - (iii) adoption of a set of baseline requirements<sup>7</sup> for Satellite Master Antenna Television (“SMATV”) systems<sup>8</sup> and licensed systems of external fixed telecommunications network services (“EFTNS”) and self-provided external telecommunications systems (“SPETS”) receiving signals

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<sup>5</sup> The Re-allocation Statement is available at:  
[https://www.coms-auth.hk/filemanager/statement/en/upload/441/ca\\_statements20180328\\_en.pdf](https://www.coms-auth.hk/filemanager/statement/en/upload/441/ca_statements20180328_en.pdf)

<sup>6</sup> Different services are classified as “primary” or “secondary”. Stations of a “secondary” service shall not cause harmful interference to or claim protection from stations of “primary” services operating in the same frequency band.

<sup>7</sup> The information note is available at:  
<https://www.coms-auth.hk/filemanager/statement/en/upload/440/i0012e.pdf>

<sup>8</sup> The existing SMATV systems which were licensed on or before 28 March 2018 will be eligible for a subsidy scheme for implementing the upgrade as discussed in paragraph 33 below.

in the 3.7 – 4.2 GHz band such that, with the necessary mitigating measures implemented, they will be protected from harmful interference from public mobile services operating in the 3.5 GHz band. The implementation of the baseline requirements is mandatory for those SMATV systems which wish to be protected. EFTNS/SPETS systems should make reference to the said baseline requirements. SMATV/EFTNS/SPETS systems operating in the 3.7 – 4.2 GHz band, as at the date of the Re-allocation Statement i.e. 28 March 2018, which have implemented appropriate mitigating measures (“Upgraded Systems”) will be protected from any harmful interference from public mobile services which will subsequently operate in the 3.5 GHz band. In case there is harmful interference caused to any of these Upgraded Systems, the mobile network operators (“MNOs”) whose services is causing problems of interference will be held accountable for any necessary remedial actions. Likewise, any subsequently-established radio station(s) of EFTNS, SPETS and SMATV should cater for the local radio environment before its installation at a particular location.

## **ASSIGNMENT ARRANGEMENTS FOR THE SPECTRUM IN THE 3.5 GHZ BAND**

### **Legal and Regulatory Framework**

8. Under section 32G(1) of the Telecommunications Ordinance (Cap. 106) (“TO”), the CA has the statutory duty to promote the efficient allocation and use of the radio spectrum as a public resource of Hong Kong. Sections 32H(2) and 32I(1) of the TO empower the CA to assign radio frequencies and to designate which of them shall be subject to the payment of SUF following consultation with the telecommunications industry and other affected persons as required under section 32G(2) of the TO. 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 (i.e. the auction reserve price). In exercising the respective statutory powers conferred on them by the TO, the CA and SCED hereby jointly initiate the present public consultation to solicit views on the arrangements for the assignment and licensing of the spectrum in the 3.5 GHz band, as well as the related SUF.

9. Section 4(4) of the Communications Authority Ordinance (Cap. 616) stipulates that the CA, in performing its functions, must have regard to the following matters which appear to the CA to be relevant in the circumstances: (a) the fostering of an environment that supports a vibrant communications sector to enhance Hong Kong’s position as a communications hub in the region; (b) the encouragement of innovation and investment in the communications market; (c) the promotion of competition and adoption of best practices in the communications market for the benefit of the industry and consumers; and (d) acting in a manner consistent with the provisions of the Hong Kong Bill of Rights Ordinance (Cap. 383).

10. The Radio Spectrum Policy Framework<sup>9</sup> (“Framework”) promulgated by the Government in April 2007 sets out the policy objectives and the guiding principle in spectrum management which the CA should take into account in discharging its spectrum management responsibilities under the TO. By its statement issued in April 2007, the former Telecommunications Authority (“TA”) (now the CA) explained that, in exercising his statutory powers under the TO, he would, in addition to all relevant considerations as required by law, give due regard to the Framework to the extent that there would be no inconsistency with the objectives and provisions of the TO<sup>10</sup>.

11. Pursuant to the Framework, the policy inclination is that a market-based approach will be adopted in spectrum management wherever the CA considers that there are likely to be competing demands from providers of non-Government services, unless there are overriding public policy reasons to do otherwise.

### **Demand for Spectrum in the 3.5 GHz Band**

12. In view of the potential market demand for enhanced mobile broadband services, massive connections to enable Internet of Things (“IoT”), as well as ultra-reliable and low latency communications, the mobile industry worldwide is now spearheading the development of 5G services. The 3.5 GHz band is amongst the first frequency band(s) identified by many economies for 5G deployment. In addition, spectrum in the 3.5 GHz band has good radio propagation characteristics similar to that in the sub-3 GHz band (i.e. spectrum

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<sup>9</sup> The Framework is available at: <http://www.cedb.gov.hk/ccib/eng/legco/pdf/spectrum.pdf>

<sup>10</sup> The former TA statement on the Framework is available at: [http://tel\\_archives.ofca.gov.hk/en/tas/others/ta20070424.pdf](http://tel_archives.ofca.gov.hk/en/tas/others/ta20070424.pdf)

in frequency bands lower than or equal to 3 GHz) which is being widely used for the provision of public mobile services. Local MNOs have also indicated keen interest in using spectrum in the 3.5 GHz band to deploy their 5G services. Manufacturers and vendors are also expected to make available 5G equipment and devices operating in the 3.5 GHz band in the market within the coming few years.

13. There is a range of carrier bandwidths (including 5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz and 100 MHz) for deploying 5G radio access network in the 3.5 GHz band. Information provided by equipment vendors indicates that the use of a bandwidth of 100 MHz of spectrum is able to realise desirable downlink speeds in the order of a few Gbps for the provision of enhanced mobile broadband services in the initial stage of 5G development. As the spectrum in the 3.5 GHz band has been planned for the provision of 5G services in many major economies in the world, it is expected that there are likely to be competing demands when the spectrum is released to the market in Hong Kong.

14. Having regard to the above, **the CA considers that there are likely to be competing demands for the radio spectrum in the 3.5 GHz band.** As such, according to the guiding principle in spectrum management as set out in the Framework, a market-based approach should be adopted for the assignment of the 200 MHz of spectrum in the 3.5 GHz band, unless there are overriding public policy reasons to do otherwise. As the CA has not identified any such overriding public policy reasons thus far in this case, the CA considers that a market-based approach should be adopted to assign the spectrum.

### **Assignment of Spectrum by Auction**

15. Auction is regarded as the most appropriate market-based approach for the assignment of spectrum resources as it provides a fair, transparent, objective and economically efficient means to determine to whom the spectrum should be assigned. The CA, therefore, proposes to assign the 200 MHz of spectrum in the 3.5 GHz band by way of auction.

16. As the telecommunications market in Hong Kong is fully liberalised, subject to paragraph 17 below, the CA sees no reason to impose any restriction on the number of players in the market and hence the eligibility of applicants for participation in the auction for spectrum in the 3.5 GHz band. Accordingly, the CA proposes that the 200 MHz of spectrum in the 3.5 GHz

band should be open for bidding by all interested parties, including incumbent MNOs and new entrants.

17. Similar to previous spectrum auctions, the CA considers that there should only be minimal qualification requirements for registering bidders’ interest and for demonstrating the capability of the bidders to provide satisfactory service. The CA preliminarily considers imposing the following qualification requirements on a bidder. In short, a bidder should –

- (a) lodge with the Government a specified amount of deposit which may be forfeited if the bidder violates the auction rules or fails to take up the licence after winning the auction; and
- (b) demonstrate its capability to provide service in fulfilment of the licensing obligations to the satisfaction of the CA and submit any other relevant supporting information that the CA may deem necessary.

*Question 1: Do you have any views on assigning the spectrum in the 3.5 GHz band through an auction?*

**Band Plan**

18. To cater for different amounts of radio spectrum that may be required by MNOs for meeting their business demands and taking into account the 5G technologies that will be deployed<sup>11</sup>, the CA proposes to divide the 200 MHz of spectrum in the 3.5 GHz band into ten frequency blocks, each with a bandwidth of 20 MHz, as shown in Table 1 below -

**Table 1: Frequency blocks and bandwidth**

<b>Frequency blocks</b>	<b>Frequency Range (in MHz)</b>	<b>Bandwidth</b>
A1	3400 – 3420	20 MHz
A2	3420 – 3440	20 MHz

<sup>11</sup> In December 2017, the 3<sup>rd</sup> Generation Partnership Project (“3GPP”) announced the release of the first set of 5G New Radio (“NR”) specifications. The 3GPP technical specification TS 38.104 entitled “NR; Base Station (BS) radio transmission and reception” specifies that the channel bandwidths in the 3.5 GHz band range from 5 MHz up to 100 MHz (see NR Band n77 and n78). The 3GPP technical specification TS 38.104 is available at: <https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3202>

<b>Frequency blocks</b>	<b>Frequency Range (in MHz)</b>	<b>Bandwidth</b>
A3	3440 – 3460	20 MHz
A4	3460 – 3480	20 MHz
A5	3480 – 3500	20 MHz
A6	3500 – 3520	20 MHz
A7	3520 – 3540	20 MHz
A8	3540 – 3560	20 MHz
A9	3560 – 3580	20 MHz
A10	3580 – 3600	20 MHz

*Question 2: Do you have any views on the proposed band plan with division of the available spectrum into ten frequency blocks, each with a bandwidth of 20 MHz?*

## **Spectrum Cap**

19. The CA considers that any over-concentration of spectrum may potentially pose competition risks, in situations where MNOs acquire further spectrum not for the purpose of capacity expansion but to foreclose rivals, thereby raising their marginal costs for capacity expansion. By denying competition access to sufficient spectrum as an essential service input, the effectiveness of their rivals in constraining the pricing power of these MNOs with larger spectrum holdings would necessarily diminish.

20. As elaborated in paragraphs 12 and 13 above, the spectrum in the 3.5 GHz band has been identified as one of the 5G pioneer bands in various economies and with emerging global consensus on using that band for the early rollout of 5G services, it is highly likely that 5G equipment and devices first available on the market would be compatible with the 3.5 GHz band. As such, it is unlikely for other sub-3 GHz spectrum to serve as a ready substitute for spectrum in the 3.5 GHz band for rollout of 5G services, at least in the short-term. Furthermore, use of spectrum in higher frequency 5G candidate bands (such as the 26 GHz and 28 GHz bands) for providing mobile service is subject to much shorter propagation distance and likewise may not be able to serve as a substitute for the 3.5 GHz band. Hence, noting the significance and scarcity of the 3.5 GHz band for the early rollout of 5G services in Hong Kong, the CA considers that a cap should be imposed on the amount of spectrum in the 3.5 GHz band that may be acquired by any bidder in the auction.

21. In considering the appropriate level of the cap to address the competition risk arising from potential over-concentration of spectrum, the

CA has also taken into account the technical consideration that maximum spectral efficiency could be achieved with a 100 MHz channel bandwidth in the 3.5 GHz band. Having considered all relevant factors, the CA henceforth proposes to impose a cap of 100 MHz of spectrum in the 3.5 GHz band on any bidder in the auction to be conducted.

*Question 3: Do you have any views on the proposed spectrum cap of 100 MHz to be imposed on any bidder in the auction?*

### **Auction Format and Timing**

22. With a view to facilitating successful bidders to achieve higher spectral efficiency of the acquired spectrum in the 3.5 GHz band, the CA proposes that spectrum in this band should be assigned in contiguous blocks. Since the simultaneous multiple-round ascending auction format of frequency-specific blocks, which has been used in spectrum auctions in Hong Kong in the past, is not best suited for the assignment of contiguous blocks of spectrum to successful bidders in an auction, the CA proposes to conduct the auction of spectrum in the 3.5 GHz band by using a clock auction format, followed by an assignment stage, to ensure that contiguous frequency blocks in the 3.5 GHz band can be assigned to successful bidders with a view to promoting optimal spectral efficiency for use of the spectrum.

23. Under the clock auction format, all frequency blocks put to auction are generic. Bidders will bid for the number of frequency blocks they wish to acquire at a particular price rather than for the specific blocks in the frequency band. Bidding will take place over a number of rounds, with the round price increasing in each round in which the demand from bidders exceeds the available supply, until the total demand for frequency blocks from all bidders is equal to or less than the total supply. Following completion of the clock auction, there will be an assignment stage in which each of the successful bidders may bid for the priority to select the locations of the contiguous frequency blocks. The arrangement in this second stage of the auction will ensure that all the successful bidders in the first stage of the auction will ultimately be assigned contiguous frequencies.

24. Subject to the outcome of this consultation exercise, the CA is minded to make a decision on the relevant assignment arrangements of the available spectrum around the end of 2018. Taking into account the time needed for enacting the relevant legislative amendments, the auction is expected to be conducted at the end of 2019 at the earliest.

*Question 4: Do you have any views on the proposed format of and timing for the auction?*

## **LICENSING ARRANGEMENT**

### **Licensing and Validity Period**

25. The CA proposes to issue each successful bidder, be it a new entrant or an incumbent licensee, with a new unified carrier licence (“UCL”). In line with the term of a UCL, the radio spectrum in the 3.5 GHz band will be assigned for a validity period of 15 years for the provision of public mobile services. For incumbent licensees who successfully bid spectrum in the proposed auction, it is their own choice and initiative to apply to the CA for combining their existing UCLs with the new UCL to be issued.

### **Restriction on Frequency Swap**

26. With the proposed auction format as explained in paragraphs 22 and 23 above, contiguous frequency blocks will be assigned to each successful bidder according to the bidding result in the assignment stage. In order to ensure genuine competition and to realise the full market value of each individual frequency block, the CA proposes that swapping of any frequency assignment in the 3.5 GHz band within the first five years counting from the date of the frequency assignment will generally not be allowed.

### **Open Network Access Requirement**

27. It is anticipated that high speed data access and a variety of innovative services and applications can be supported by future 5G networks. In view of the fact that additional spectrum of the 200 MHz in the 3.5 GHz band will be made available for the provision of territory-wide 5G services and given the proposed spectrum cap of 100 MHz, there could be a scenario whereby there will only be two successful bidders in the auction. Taking also into account the fact that currently there are four MNOs and 29 mobile virtual network operators providing 2G/3G/4G services in the market, it is anticipated that not each and every interested bidder will be able to acquire spectrum in the 3.5 GHz band for the provision of 5G services. It is therefore necessary to provide an avenue to enable mobile service providers to access to future 5G mobile networks operating in the 3.5 GHz band to further promote competitive supply of 5G services to end customers. In this connection, the

CA proposes that any successful bidder who is assigned spectrum in the 3.5 GHz band will be required to open up at least 30% of its network capacity for access by other non-affiliated mobile service providers. The specific licence obligation would be modelled on the open network access (“ONA”) requirement previously imposed on successful bidders of the spectrum in the 1.9 – 2.2 GHz band for the provision of third generation mobile services. The relevant licence condition for ONA will be specified in the UCL to be issued to the successful bidders. Further details will be provided in the Information Memorandum to be published for the auction of spectrum in the 3.5 GHz band.

*Question 5: Do you have any views on the proposed ONA requirement?*

### **Protection of TT&C Stations**

28. TT&C Stations are set up for daily operation of particular satellites (which includes manoeuvring the satellites in orbit and monitoring the operational status of the satellites) and they are important for the normal operation of the licensed satellite networks. TT&C functions, if under interference, might have drastic consequences including the potential loss of the satellites concerned or damage to other satellites.

29. As set out in the Re-allocation Statement, the CA has decided to impose restriction zones in Tai Po Industrial Estate and Stanley (where TT&C Stations are located) to constrain the deployment of mobile base stations of public mobile services operating in the 3.5 GHz band so as to protect TT&C Stations from desensitisation. Details of the restriction zones are set out at Annex B of the Re-allocation Statement. Nevertheless, in case any operation of mobile base stations located outside the restriction zones cause desensitisation or other interference to the TT&C Stations, spectrum assignees shall be responsible for taking all necessary measures to prevent or rectify the situation, including removal of such mobile base stations as the last resort.

30. As set out in paragraph 27 of the Re-allocation Statement, a TT&C channel of some 1 MHz bandwidth in operation at the lower edge of the 3.5 GHz band would require greater protection to avoid co-channel interference. In this connection, spectrum assignee of the Frequency Block A1 shall take reasonable measures to install, maintain and operate the service and the network, and in particular the operation of the radio channel overlapping with the 3.400 – 3.405 GHz range, in such a manner as to not cause any harmful interference to the operation of that TT&C channel within the restriction zones. Specifically, but without limitation, the spectrum

assignee shall coordinate with the operator of the TT&C Station concerned for the implementation of the necessary protection measures.

31. It is mentioned in the Re-allocation Statement (paragraph 4.17 of Annex A) that in order to prevent inadvertent operation of mobile terminal or handset operating in the 3.5 GHz band from affecting the TT&C Station in the vicinity, spectrum assignees should take all necessary measures to avoid such interference, such as by adopting network-based solution to ensure that their mobile networks may force handover of connected mobile terminals or handsets operating in the 3.5 GHz band to other mobile base stations operating in other frequency bands when these mobile terminals or handsets are in the vicinity where the TT&C Station concerned is located.

32. In order to enforce the requirements mentioned in paragraphs 29 to 31 above, the CA proposes to impose such requirements as conditions in the licences to be granted to the spectrum assignees.

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

### **Subsidy Scheme to Support Upgrade of Existing SMATV Systems**

33. The CA is mindful of the cost required for upgrading some 1 600 existing SMATV systems (which are serving some 890 000 outlets). Since the SMATV systems affected are serving the general public and considering that their owners/users may not have the necessary expertise or resources to implement the upgrade in a timely manner, the CA considers that there is a need to address funding issues relating to upgrading eligible SMATV systems (i.e. those covered by existing SMATV licences on or before 28 March 2018) so that these systems will be protected from any harmful interference from public mobile services to be operating in the 3.5 GHz band. Since the prospective assignees of the spectrum in the 3.5 GHz band will benefit from this spectrum re-allocation, the CA considers that it is reasonable to require them to establish and administer a subsidy scheme for this purpose.

34. The subsidy to support the upgrade of the eligible SMATV systems (i.e. those covered by existing SMATV licences on or before 28 March 2018) will be granted on a one-off basis and will not cover recurrent expenses such as maintenance or repair. Only one count of upgrade per SMATV system is allowed and the maximum amount of subsidy will be capped at HK\$20,000 per SMATV system. All subsidy claims for the upgrade of the existing SMATV systems shall be made within one year from

the launch of the subsidy scheme. Details will be specified in the Information Memorandum to be published for the auction.

35. The CA proposes that prospective spectrum assignees should jointly set up and administer a fund for the purpose of subsidising the upgrade of eligible SMATV systems affected by the proposed spectrum re-allocation and assignment exercise. The administrative work includes, inter alia, handling of applications from eligible applicants for subsidy and issuing subsidies to eligible applicants. Each of the prospective spectrum assignees should deposit into the fund an amount which is proportionate to the quantity of spectrum acquired to cover all the subsidies to be granted as well as the administrative cost of the subsidy scheme. The prospective spectrum assignees shall set up the fund and propose the modus operandi for its operation to the satisfaction of the CA. The obligation on establishing and administering the fund, including the exact amount of funding to be contributed by each successful bidder, will be set out in the Information Memorandum to be published for the auction. Interested parties should take into consideration such obligation in considering whether to participate in the proposed spectrum auction.

*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?*

### **Technology Neutrality**

36. For assignment of spectrum for public mobile services, in general the CA will adopt a technology neutral approach whereby the assignees are free to use whatever technology they choose based on widely recognised standards for service provision. Although spectrum in the 3.5 GHz band is widely expected to be used by the industry for initial deployment of 5G services, the CA will adhere to this technology neutral approach in assigning and licensing the spectrum concerned. In other words, the assignees will be free to use the spectrum for providing 5G or other generations of mobile services under their UCLs, so long as the technology to be used is a widely recognised standard and will not cause any harmful interference to legitimate services. This approach will enable successful bidders to deploy the state-of-the-art technology in a timely and flexible manner to best meet the market demand.

*Question 8: Do you have any views on the adoption of a technology neutral approach in respect of the use of spectrum in the 3.5 GHz band?*

### **Network and Service Rollout Obligation**

37. In order to prevent spectrum hoarding and to ensure that the auctioned spectrum will be put into efficient use for the timely provision of advanced telecommunications services for the benefit of the general public, network and service rollout obligations are in general imposed on successful bidders of a spectrum auction.

38. Taking into account the time required by successful bidders to deploy their 5G equipment using the new spectrum in the 3.5 GHz band for the provision of 5G services and having regard to the rollout requirements prescribed for successful bidders in previous auctions, the CA proposes to require each successful bidder to roll out its network and service in order to provide a minimum coverage of 50% of the population with regard to its mobile services within the first five years counting from the date of issue of the licence<sup>12</sup>.

39. While a new entrant may need to build an entirely new network, an incumbent licensee may deploy the newly acquired spectrum in existing or new base stations for the purpose of expanding the existing network capacity. The CA is inclined to mandate each successful bidder, whether new entrant or incumbent licensee, to lodge a performance bond for safeguarding its compliance with the rollout obligation. In case the successful bidder is an incumbent licensee, it may make use of its existing network to fulfill the proposed network rollout requirement if it can demonstrate to the satisfaction of the CA that the newly acquired spectrum has been deployed in the network. The amount of the performance bond will be specified by the CA nearer the time of the auction.

*Question 9: Do you have any views on the proposed network and service rollout obligations, as well as the associated performance bond to be imposed on successful bidders?*

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<sup>12</sup> The same requirement with respect to mobile services has been imposed for spectrum in the 2.5/2.6 GHz band newly assigned by way of auction in June 2013.

## **SPECTRUM UTILISATION FEE**

40. Under the Framework, SUF will in principle be applicable to all non-Government use of radio spectrum. Therefore, SUF should be paid by successful bidders for use of the spectrum in the 3.5 GHz band.

41. While the exact amount of SUF will be determined by auction, each frequency block will be subject to a reserve price which should be set at a level that represents the minimum base value of the spectrum for the purpose of kick-starting the competitive bidding process. The auction reserve price will be specified by SCED nearer the time of the auction.

42. Regarding the method of payment of SUF, SCED notes that the current assignment exercise involves a total of 200 MHz of spectrum and the amount of SUF involved is potentially substantial. There are hence justifications to afford greater flexibility to spectrum assignees to make financial arrangement for the payment of SUF, having regard to their individual financial situation. As such, SCED proposes that spectrum assignees will be given a choice to pay the SUF either by –

- (a) lump sum payment upfront, which is the lump sum amount determined in auction; or
- (b) annual instalments, with the first instalment equivalent to the lump sum amount obtained in (a) above divided by 15 (i.e. the number of years of assignment), and subsequent instalments increased every year by a pre-set fixed percentage which aims to reflect the time value of money to the Government.

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

## **INVITATION OF COMMENTS**

43. This consultation paper sets out preliminary views and proposals of the CA and SCED on the assignment arrangements of the spectrum in the 3.5 GHz band for the provision of public mobile services, and the related SUF. For the avoidance of doubt, all the information given and views expressed in this consultation paper are for the purpose of discussion and consultation only. Nothing in this consultation paper represents or constitutes any decision made by the CA or SCED. The proposed arrangements set out in this consultation

paper are without prejudice to the exercise of the powers by the CA and SCED under the TO or any subsidiary legislation thereunder.

44. The CA and SCED would like to seek views from the industry and any interested party on the issues discussed in this consultation paper. Views and comments should reach OFCA **on or before 13 June 2018**. **Late submissions will not be considered.**

45. Submissions received will be treated as public information and the CA and SCED may publish all or part of the views and comments received, and disclose the identity of the source in such manner as they see fit. Any part of the submissions considered commercially confidential should be clearly marked. The CA and SCED would take such markings into account in making the decision as to whether or not to disclose such information. Submissions should be sent to –

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](mailto:consult-3.5GHz@ofca.gov.hk)

An electronic copy of the submission should be provided by email to the address indicated above.

**Commerce and Economic Development Bureau  
(Communications and Creative Industries Branch) and  
Office of the Communications Authority  
2 May 2018**