Telecommunications Regulatory Affairs Advisory Committee

Minutes of the Fifth Meeting
Held on Tuesday, 29 November 2013 at 2:30 p.m.
in OFCA Conference Room, 20/F Wu Chung House

Present

Mr Danny Lau	Office of the Communications Authority (OFCA) (Chairman)
Mr Chaucer Leung	OFCA (Secretary)
Ms Agnes Tan	Wharf T&T Limited (Wharf T&T)
Mr Raymond Chan	Hong Kong Cable Television Limited
Mr Joseph Leung	Hong Kong Wireless Technology Industry Association
Mr Peter Lam	PCCW-HKT Telephone Limited, Hong Kong Telecommunications (HKT) Limited and Genius Brand Limited (HKT)
Mr Fred Lam	Hong Kong Police Force
Mr Ivan Leung	SmarTone Communications Limited and SmarTone Mobile Communications Limited (SmarTone)
Mr Clifford Ho	Towngas Telecommunications Fixed Network Limited
Mr William Brown	Hutchison Global Communications Limited and Hutchison Telephone Company Limited (Hutchison)
Mr Vincent Lam	The Institution of Engineering and Technology Hong Kong (IETHK)
Mr York Mok	Ad personam
Mr Kenneth Kwok	ComNet Telecom (HK) Limited (ComNet)
Mr Allen Law	Services-based operators (SBOs) as a group
Ms Eva Chan	Ad personam
Prof Xu Yan	Ad personam
Dr Andrew Simpson	Ad personam
Mr Eric Yeung	Small and Medium Enterprises

Ms Christine Lee	Mobile virtual network operators (MVNOs) as a group
Mr Stephen Chan	External telecommunications services (ETS) providers as a group
Mr Andrew Hung	HKC Network Limited
Mr Brian Ho	TraxComm Limited
Ir Andy Lam	The Hong Kong Institution of Engineers (HKIE)
Mr Alex Cheng	China Mobile Hong Kong Company Limited (CMHK)
Mr Charles Yeung	Hong Kong Broadband Network Limited
Ms Alison Ko	CSL Limited (CSL)
Mr Richard Leung	New World Telecommunications Limited

In Attendance

Mr Malcolm Leung	Wharf T&T
Mr Y C Chan	Television Broadcasts Limited
Mr Andrew Shao	TVB Network Vision Limited
Mr Kevin Chu	HKT
Mr Adam Wong	HKT
Mr T L Or	SmarTone
Mr Eric Lee	SmarTone
Mr Henry Chan	Hutchison
Dr K F Tsang	IETHK
Mr Michael Lee	The European Union-Hong Kong-Macao Information Communication and Technology Business Council
Mr Chris Wong	ComNet
Mr H C Hung	Reach Networks Hong Kong Limited
Mr Johnny Siu	Amateur radio societies as a group
Mr Simon Heung	Digital Broadcasting Corporation
Mr Francis Kwok	Radio Television Hong Kong
Dr Bernard Fong	HKIE
Mr Kingsley Yuen	CMHK

Mr Y C Lui	CSL
Ms C Y Tam	CSL
Mr Ricky Tsui	Independent Commission Against Corruption (ICAC)
Dr Simon Wong	ICAC
Ms Linda Yu	OFCA
Ms Helen Lai	OFCA
Ms Sharis Tam	OFCA
Mr Wilson Lee	OFCA

Absent with Apologies

Dr Victor Hung	Consumer Council
Hon Charles Mok	Hong Kong Information Technology Federation
Mr Gilbert Chan	Communications Association of Hong Kong
Mr Richard Mallett	Hong Kong Telecommunications Users Group
Mr Y H Chan	External fixed operators as a group
Mr Raymond Wong	Paging operators as a group
Ms Christy Ditchburn	Telstra International HK Limited and Telstra International Limited
Ms Fannie Cheung	Ad personam

The Chairman welcomed Members to the fifth meeting of the TRAAC. He said that some items to be discussed at today's meeting would also be of interest to the members of the Radio Spectrum and Technical Standards Advisory Committee (SSAC). As such, SSAC members were also invited to attend this particular meeting.

Item 1 Confirmation of Minutes of Last Meeting

2. The Chairman advised that the draft meeting minutes of the fourth TRAAC meeting were circulated to Members for comment on 7 October 2013. As there was no comment received from Members, the

minutes of the fourth meeting held on 22 August 2013 were confirmed without amendment.

Item 2 Matters Arising

Item 6 of the Minutes of the Second TRAAC Meeting - Restriction of Certain Mobile Terminals in respect of LTE Networks

3. The Chairman updated Members that subsequent to the last TRAAC meeting, the Chairman of the Appeal Board had decided the terms of the case stated to the Court of Appeal. The hearing of the appeal had been scheduled for 29 November 2013 and was being held concurrently with this meeting. Separately, the appellant had submitted further information to OFCA relating to its complaints made under the competition provisions of the Telecommunications Ordinance (TO). OFCA was now processing the complaints in accordance with the established procedures.

(Post Meeting Note: The Court of Appeal had reserved its judgement after hearing the arguments of both parties on 29 November 2013. On 17 December 2013, the Court of Appeal handed down its judgement and allowed the appeal.)

Item 3 of the Minutes of the 4th TRAAC Meeting - Re-allocation of Number Blocks within "8x" Level for Mobile Services; and
Item 5 of the Minutes of the 3rd TRAAC Meeting - Proposals of the Telecommunications Numbering Working Group

4. At the invitation of the Chairman, the Secretary, Mr Chaucer Leung, reported that the proposed revisions to the relevant sections of the numbering plan, the "Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan" as well as the set of HKCA specifications and documents related to number portability had been completed. OFCA would arrange posting of the revised documents on the websites shortly. Mr Leung indicated that number blocks within "57x" would be allocated for mobile services after the exhaustion of "52x", followed by number blocks within "8(4-7,9)x".

(Post Meeting Note: The revised documents were uploaded on OFCA's websites in early December 2013.[1])

Progress of the Next Generation Network Working Group (NGNWG)

5. Mr Chaucer Leung briefed Members that the NGNWG had convened the fourth meeting on 30 August 2013 after the last TRAAC meeting and discussed the issues on in-building broadband/fibre access. As members of the NGNWG were of views that there had been no major or systematic difficulty in arriving at in-building broadband/fibre access arrangements, it was considered that the existing regime was considered acceptable and the NGNWG would keep in view whether there would be any need for new arrangement at a later stage.

6. Concerning NGN interconnection trial, Mr Leung said that members of the subgroup on NGN interconnection architecture were working on the possible extension of the test plan to cover both direct and indirect interconnection configuration. Meanwhile, three interconnection trials among three pairs of fixed/mobile network operators (viz. (a) between a mobile and a fixed network operator; (b) between the fixed and mobile networks of two affiliated operators; and (c) between two fixed network operators) were being arranged.

Item 3 **Arrangements for the Frequency Spectrum in the 1.9 - 2.2 GHz Band upon Expiry of the Existing Frequency Assignments for the Provision of 3G Mobile Services and the Spectrum Utilisation Fee (TRAAC Paper No. 8/2013 - Presentation Slides)**

Item 4 **Findings of the Consultancy Study Commissioned by the Government on Any Impact on Service Quality and Customers of Adopting the Hybrid Option (TRAAC Paper No. 9/2013 - Presentation Slides)**

[1] Copies of the numbering plan, code of practice and number portability documents can be obtained at http://www.ofca.gov.hk/en/industry_focus/telecommunications/portability/index.html.

Item 5 **Views of the Communications Authority on the Consultancy Study Commissioned by the Incumbent 3G Operators on Impact Assessment of Re-auction of Spectrum in the 1.9 - 2.2 GHz Band in Hong Kong (TRAAC Paper No. 10/2013 - Presentation Slides)**

7. At the invitation of the Chairman, Ms Linda Yu and Ms Helen Lai gave presentations on TRAAC Paper No. 8/2013[2] and TRAAC Papers No. 9 and 10 /2013[3] respectively. The Chairman pointed out that the decisions in relation to the re-assignment arrangements of the 118.4 MHz of paired spectrum in the 1.9 – 2.2 GHz band (3G Spectrum) upon expiry of the existing assignment and the spectrum utilisation fee (SUF) had been announced by the Communications Authority (CA) and the Secretary of Commerce and Economic Development (SCED) respectively in a joint statement issued on 15 November 2013 (Statement).[4] OFCA would like to take this opportunity to brief Members of the decisions, the findings of the consultancy study commissioned by the Government (Study)[5] as well as the views of the CA on the consultancy study of Plum Consulting (Plum)[6] as commissioned by the incumbent 3G operators. Members were welcome to provide their views and comments, and OFCA would be prepared to respond to any queries, points or comments made by Members.

General

8. Ms Agnes Tan noted that there were a number of areas in which

[2] The presentation slides are available at http://www.ofca.gov.hk/filemanager/ofca/en/content_757/traac08_2013_p.pdf.

[3] The presentation slides are available at http://www.ofca.gov.hk/filemanager/ofca/en/content_757/traac09_2013_p.pdf and http://www.ofca.gov.hk/filemanager/ofca/en/content_757/traac10_2013_p.pdf.

[4] The Statement is available at http://www.coms-auth.hk/filemanager/statement/en/upload/237/ca_statements20131115_en.pdf.

[5] A copy of the Study report can be obtained at http://www.ofca.gov.hk/filemanager/ofca/common/reports/consultancy/cr_201311_01_en.pdf.

[6] A copy of the Plum report can be obtained at http://www.plumconsulting.co.uk/pdfs/Plum_Sep2013_HK_2.1GHz_re-auction_impact_assessment.pdf.

the CA disagreed with the findings in the Plum report. She queried whether the CA had any subsequent communications with the incumbent 3G operators or Plum. In response, the Chairman said that in deliberating on the way forward of the 3G Spectrum re-assignment arrangements, the CA had given due consideration to, *inter alia*, all submissions received in the two rounds of consultation including the Plum report which was provided to OFCA on 19 September 2013. Notwithstanding the late submission of the Plum report, the incumbent 3G operators as well as Plum were invited to a meeting of the CA on 19 October 2013 to present and supplement any new information they had in relation to the Plum study.

9. In response to Ir Andy Lam's enquiry on whether the CA had taken into account the views and comments of the public in formulating its decision, Ms Linda Yu said that the CA received a total of 43 submissions to the second consultation (including 25 submissions from members of public and a few from business organisations) as well as 19 submissions to the first consultation. As could be seen from Appendix 1 of the Statement, the CA had set out its responses to the submissions and addressed their concerns. Ms Yu added that views and comments of members of public, business organisations and the industry had provided useful inputs to the CA in finalising its decision on re-assignment of the 3G Spectrum.

SUF and Performance Bond

10. Mr Peter Lam asked how the auction reserve price of $48 million per MHz and the SUF cap of $86 million per MHz were determined, as he noted that the auction reserve price for 3G Spectrum was significantly higher than the amount of $15 million per MHz as in the last spectrum auction for the 2.5/2.6 GHz band. As the auction was scheduled to be conducted in the fourth quarter of 2014 (which was about two years before the expiry of the existing frequency assignments), he wondered what would be the timing for the concerned SUF payment, whether it should be made upon conclusion of the auction or upon the expiry of the existing assignments in October 2016. Overall speaking, Mr Lam opined that the SUF levels were too high.

11. In response, the Chairman and Ms Yu pointed out that as the SUF of the 3G Spectrum to be re-assigned to the incumbent 3G operators through right of first refusal (RFR Spectrum) would be linked to the SUF of the 3G Spectrum to be re-assigned through auction (Re-auctioned Spectrum), the SCED was of the view that the reserve price for the Re-auctioned Spectrum would be pitched at a level significantly higher than the reserve prices set for all the spectrum auctions in the past, thereby minimising the possibility of an unreasonably low SUF due to strategic bidding behaviour of the incumbents. Ms Yu added that, in setting the reserve price of the Re-auctioned Spectrum, references had been made to the SUF of the spectrum in the 850/900 MHz and 2.5/2.6 GHz bands as determined by the auctions conducted in March 2011 and March 2013 respectively.

12. In respect of the lower limit of the SUF for RFR Spectrum ($66 million per MHz), the Chairman drew Members' attention that the Government had subscribed to the views of the submissions and had treated the 5 MHz of unpaired spectrum as being on a par with the paired spectrum in the 1.9 – 2.2 GHz band in the calculation of SUF based on the 2015/16 royalty payment. On this basis, the lower limit of the SUF for the RFR spectrum had been adjusted downwards from $77 million per MHz as proposed in the second consultation paper[7] to $66 million per MHz in the decision.

13. In respect of the SUF cap, Ms Linda Yu said that the introduction of the cap was to address the concern of the incumbent 3G operators made during the first and second consultations over the lack of certainty by the dependence of the SUF of the RFR Spectrum on that of the Re-auctioned Spectrum. Under this arrangement, the incumbent 3G operators would be advised of both the upper and lower limits of their financial commitment under the right of first refusal arrangement. As regards the level of the SUF cap ($86 million per MHz), Ms Yu said that it was calculated at a certain percentage above the minimum SUF with a view to giving a reasonable range within which the market value of the RFR Spectrum would be determined.

[7] The second consultation paper is available at http://www.coms-auth.hk/filemanager/en/share/cp20121228.pdf.

14. In respect of the timing of the SUF payment, Mr Chaucer Leung said that the plan was to require the spectrum assignees of both the RFR Spectrum and Re-auctioned Spectrum to lodge a performance bond with the Government to guarantee payment of the SUF some time in 2016 before the 3G Spectrum was re-assigned in October that year. The detailed arrangements would be set out in the letter offering the RFR Spectrum to the incumbent 3G operators and in the Information Memorandum to be published for the auction of the Re-auctioned Spectrum in 2014.

15. In response to Ms C Y Tam's enquiry on whether there would be a performance bond for new entrants to rollout their 3G network, Ms Linda Yu clarified that there would be a performance bond for network and service rollout for new entrants to the band and incumbent 3G operators which had acquired any Re-auctioned Spectrum not originally held by them,[8] and there was no restriction on the technology to be employed for the concerned spectrum under the principle of technology neutrality. Ms Yu and Ms Helen Lai added that it would be a commercial decision for mobile operators on the type of services to be offered. In the commercial reality, mobile operators would continue to offer 3G services as long as there was market demand.

16. On the query about the restriction as proposed in the second consultation paper that the successful bidders of Re-auctioned Spectrum would not be allowed to swap their holding at least in the first five years of the spectrum assignment period,[9] the Chairman and Mr Chaucer Leung said that it was intended for the restriction to be implemented as proposed and the detailed information would be provided in the Information Memorandum to be issued in 2014.

Impact on Service Quality and Customer Migration

17. Mr Ivan Leung referred to slide 4 of TRAAC Paper No. 10/2013 (presentation slides) concerning the CA's disagreement with Plum's

[8] See slide 18 of TRAAC Paper No. 8/2013 (presentation slides).

[9] See paragraph 54 of the second consultation paper.

estimation of reduction in 3G data download speed by 27% if all incumbent 3G operators were unable or chose not to acquire any Re-auctioned Spectrum. Mr Leung pointed out that according to the Study report, the throughput for 3G hotspot network of the most affected incumbent 3G operator would be reduced by 33% during the busy hour.[10]

18. Ms Helen Lai responded that it was the calculation methodology adopted by Plum with which the CA disagreed. According to Ms Lai, Plum's calculation of service degradation, in terms of 3G data download speed, only focused on the current 3G capacity of the incumbent 3G operators and failed to take into account such other relevant factors as the ample capacity available in 4G networks as well as any change in demand for 3G services over the transitional period before the re-assignment. As for the Study, Ms Lai explained that throughput, which was defined as the lesser of demand and total network capacity, was calculated for reference only. On the other hand, the Study model assessed the impact on service quality by calculating and comparing an indicator known as the "design capacity overage" or "DCO".[11] According to the Study findings, if the incumbent 3G operators failing to acquire the Re-auctioned Spectrum implemented the mitigation measures, the DCO in 2016 for the most affected operator would be increased by a range of one to four percentage points only.

19. The Chairman used a three-lane tunnel as an example to explain why a reduction in capacity might not necessarily result in an adverse impact on service quality. Even when one of the three lanes closed down (i.e. a reduction in capacity), if the traffic was reduced by a similar or even a larger magnitude (say, fewer vehicles using the tunnel during the night time or due to opening of a new expressway nearby), the drivers in the tunnel might not necessarily experience any traffic jam inside the tunnel even with only two lanes.

20. Mr Chaucer Leung added that according to the Study findings, for the 3G hotspots (e.g. in the MTR), the design capacity was already not

[10] See Exhibits 7.21 and 7.27 of the Study report.

[11] DCO is an indicator of the severity of the demand in excess of the network design capacity. A DCO figure of 100% indicates there is no network capacity available. A figure of 0% indicates that all demand is able to be met. DCO = maximum of zero and (demand – utilisation × capacity) / demand. For details, please refer to section 7 of the Study report.

sufficient to accommodate the demand, giving rise to impact on service quality. In order to improve and maintain service quality, the consultant commissioned by the Government suggested that the incumbent 3G operators should implement appropriate measures including spectrum refarming as well as making efficient use of 4G spectrum by migrating 3G customers and hence diverting more data traffic to their 4G networks. Such an approach was analogous to the tunnel example, in that some of the traffic in the "3G tunnel" could be diverted to the "4G tunnel", rather than having all the traffic handled by the congested lanes.

21. In response to Mr Adam Wong's enquiry about how the uplink noise problem of 3G voice services in the MTR could be eased by the deployment of 4G spectrum, the Chairman explained that if a portion of traffic was diverted from the 3G network to the 4G network, the noise level in the 3G network would be reduced accordingly. The Chairman expected that the 3G network would become less congested if the incumbent 3G operators could serve some of their mobile data customers using both of their 3G and 4G networks.

22. On the comment from Ms Alison Ko that the Study report had not addressed the extreme situation such as the MTR and was therefore not able to reflect the reality, the Chairman clarified that 3G hotspots were defined in the Study as the busiest cell sites (generally 15% - 20% of the total sites) which carried 40% of the entire network traffic, and hence already included those cell sites in the MTR. The Chairman added that the CA, having made an independent assessment of the Study report as well as all other relevant matters, had come to the view that the 3G service quality in the busy areas such as the MTR would be improved if the incumbent 3G operators could make better use of their 4G spectrum. In respect of the commercial negotiation between the MTR and the mobile network operators, the CA encouraged both sides to negotiate in good faith with a view to reaching an agreement, failing which either party may seek assistance from the CA. The CA might resort to the power under section 14(1A) or section 36A of the TO, as the case may be, if the circumstances so warranted.

23. In response to Dr Andrew Simpson's enquiry whether the CA had assessed the impact on service quality in case those incumbent 3G

operators failing to acquire the Re-auctioned Spectrum did not implement any mitigation measure, the Chairman explained that (a) the incumbent 3G operators could actively participate in the auction to bid for the Re-auctioned Spectrum; (b) if the incumbent 3G operators failing to acquire any Re-auctioned Spectrum implemented appropriate measures, any service degradation that might ensue from a reduction in spectrum holding could be effectively mitigated; and (c) in the commercial reality and under the keen market competition, the incumbent 3G operators (and mobile operators in general) would be expected to employ various measures and strategies to improve their service quality and maximise customer retention, or otherwise they would lose their customers to their competitors.

24. Mr William Brown expressed concerns about the practicality of migrating customers from 3G to 4G services, as he noted that Hong Kong had all along been promoting customer choice and customers would be free to choose between 3G and 4G services. Ms Agnes Tan queried about any increase in service charge had a subscriber of 3G services migrated to 4G services.

25. The Chairman clarified that it was not the CA's intention of requiring any operator to force customers to move from 3G to 4G services. Indeed, based on the past experience on the analogue to digital conversion in the early 90s as well as the uptake of 2G and 3G handsets in previous years, it was envisaged that customers would purchase new handsets/mobile devices with 4G capability and hence could be served by the 4G networks, given the price difference between 3G and 4G devices with similar hardware configuration became minimal and gradually disappeared over time. Moreover, based on a survey conducted by the Chinese University of Hong Kong in August 2012, the CA expected that the majority of mobile data users would have replaced their 3G mobile devices with integrated 3G/4G models in the coming three years, as part of their normal device replacement cycle and in response to the promotional offers of the mobile operators.

26. In respect of the price level of the service plan, Mr Chaucer Leung said that based on OFCA's understanding of the current market situation, mobile network operators no longer distinguished between 3G

and 4G service plans (except for budget plans) but offered integrated mobile data service plan, under which customers would be served by a cluster of 2G/3G/4G networks. Customers with compatible mobile devices would be able to enjoy any of 2G, 3G or 4G services by subscribing to such integrated mobile data service plan.

Issues relating to Competition and Investment

27. Prof Xu Yan said that the Government had long adopted a pro-competition policy for the telecommunications market in Hong Kong. He noted that the outcome of effective competition would normally lead to a better service quality, lower price, and/or an environment which would encourage investment. However, for the present exercise, he understood there were arguments that (a) there would be a degradation by a certain degree rather than an improvement in the quality of services; (b) irrespective of implementation of spectrum refarming, mobile operators would have to incur a higher cost to maintain the current level of service quality thereby resulting in a higher service price; and (c) although there would be an increase in investment, it was expected that such investment would be made by the incumbent 3G operators to maintain the service quality of 3G services or by any new entrant on the rollout of its 3G network, rather than on 4G or new services. Prof Xu referred to the survey recently conducted by Policy 21[12] that the general public might not be aware of the possible degradation in service quality or increase in service price, other than that there might be more choices after re-assignment of 3G Spectrum.

28. In response, the Chairman clarified that there would not be any alleged degradation in service quality if the incumbent 3G operators made efficient use of their 4G spectrum. While the re-assignment of 3G Spectrum using the hybrid option might introduce competition, this was not the sole objective for the present exercise. There were other policy objectives to be met in the re-assignment of 3G Spectrum.[13] As regards

[12] Details of the survey findings can be found at http://www.pccw.com/About+PCCW/Media+Center/Press+Releases/Detail?guid=f3a50606bd9c1410VgnVCM1000006a8ba8c0____&language=en_US.

[13] Referring to paragraphs 23 to 46 of the Statement, the multiple spectrum re-assignment objectives are ensuring customer service continuity, efficient spectrum utilisation, promotion of effective competition, and encouragement of investment and promotion of innovative services.

the survey results mentioned by Prof Xu, the Chairman considered that the results might be influenced by the survey questions. Mr Chaucer Leung added that the survey questions had been premised solely on the Plum report, to which the CA disagreed with the methodology as well as the findings (particularly the CA was of the view that any service degradation that might ensue from a reduction in the 3G Spectrum holding could be effectively mitigated had the incumbent 3G operators implemented appropriate measures). As such, the survey results could not offer objective inputs for the decision making of the CA.

29. On the comment about the extra network investment to be incurred by the incumbent 3G operators failing to acquire any Re-auctioned Spectrum, Ms Helen Lai pointed out that under such a scenario, the concerned operators did not need to pay the relevant SUF for that part of spectrum. While Plum estimated that the four incumbent 3G operators might need to spend a total of $853 million on their networks if all of them failed to acquire the Re-auctioned Spectrum, such an amount would be significantly less than the SUF payable for the Re-auctioned Spectrum.

Competing Demand and Market-based Approach in Spectrum Assignment

30. Mr Kevin Chu asked the meaning of "competing demand" and the criteria in establishing that there was competing demand which warranted adoption of a market-based approach in re-assignment of 3G Spectrum. Mr Chu sought clarification on whether the said demand would be for 3G services or the demand in general as well as on how the Government or the CA had arrived at such a view. Mr Chu queried whether there was competing demand for 4G spectrum if there was ample capacity in the 4G networks.

31. In response, Mr Chaucer Leung said that there was competing demand when the demand for spectrum was greater than the supply. Such demand was generally referred to the demand for specific blocks of spectrum, and in this case the 118.4 MHz of 3G Spectrum that was due for re-assignment. Regarding the basis for affirming the competing demands for 3G Spectrum, Ms Linda Yu explained that, as noted from the submissions to the two rounds of public consultation, the incumbent 3G

operators were keen for re-assignment of all of the 3G Spectrum, while parties without any 3G Spectrum expressed interest in acquiring the spectrum. According to Ms Yu, the CA had also made its own independent assessment and confirmed, along with the submissions, that the demand for spectrum as driven by robust growth of mobile data would never be met by the limited supply.

32. Concerning Mr Chu's query on whether there was competing demand for 4G spectrum if there was ample capacity in the 4G networks, the Chairman explained that in making its own assessment, the CA noted that there was "ample capacity" in the 4G spectrum of the mobile network operators. The CA was of the view that the congestion problem in the 3G Spectrum in MTR areas could be alleviated if mobile operators could make more efficient use of their 4G spectrum. The Chairman remarked that "ample capacity" in the 4G networks in that sense did not mean that there was no competing demand for the 4G spectrum. Mr Chaucer Leung and Ms Linda Yu said that it was clearly demonstrated in the auction of spectrum in 2.5/2.6 GHz band conducted earlier this year as well as in 2009, where there had been intensive bidding for many rounds before the demand finally matched the supply. Ms Yu added that, taking the 2013 auction as an example, the level of SUF established doubled the auction reserve price, which was already pitched at a relatively high level compared with those in the earlier auctions. Such an auction outcome would not have taken place without a keen competing demand for the 4G spectrum. Concerning the 4G network capacity, Ms Helen Lai considered that there might not necessarily be any direct relationship between the demand for 4G spectrum and the capacity currently available on the 4G network. Furthermore, 4G services had just been launched in recent years. It took time to grow and would depend very much on the marketing strategies of the mobile network operators.

33. In response to Mr William Brown's enquiry on whether the market-based approach would prevail over the four criteria/objectives of spectrum re-assignment, or vice versa, in re-assigning the 3G Spectrum, Ms Linda Yu clarified that it was essentially a two-step approach. As stated in the Radio Spectrum Policy Framework (SPF), the guiding principle in spectrum management was that "*a market-based approach*

will be used 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".[14]

34. On this basis and given the affirmation of competing demands for the 3G Spectrum by the CA, a market-based approach should be adopted for spectrum re-assignment. The CA then evaluated the performance of three proposed spectrum re-assignment options against the four spectrum re-assignment objectives. The CA acknowledged that the potential seriousness of the effects on service quality and reception especially in indoor areas, if all of the 3G Spectrum were put to auction, constituted an overriding public policy reason for it to deviate from the full-fledged market-based approach. The CA took the view that the hybrid approach rather than the other two options could best serve the multiple objectives in spectrum re-assignment including the maintenance of customer service continuity, in the light of the circumstances of the case.

LTE-Advanced and Maximum Number of Mobile Network Operators

35. Mr Adam Wong queried whether there would be a maximum number of mobile network operators in the market, as he noted that in order to achieve the highest data rate of 1 Gbps using Long Term Evolution (LTE)-Advanced technology, a mobile network operator would need five 2 x 20 MHz contiguous spectrum for carrier aggregation. Compared with neighbouring economies like Singapore, Australia and Mainland China, each of them had only three mobile network operators and it was therefore possible for these operators to aggregate the necessary spectrum to achieve a data rate of up to 1 Gbps. Mr Wong was concerned that the 3G Spectrum might become more fragmented after re-auction, and in the long run Hong Kong might not be able to compete with these economies in terms of higher speed mobile data services.

36. In response, the Chairman and Mr Chaucer Leung said that the CA would leave it to the market to determine the optimal number of

[14] See paragraph 8 of the Statement and paragraph 3.1 of the SPF at http://www.cedb.gov.hk/ctb/eng/legco/pdf/spectrum.pdf.

players in the market. Pending the completion of switching off of analogue television services (also known as analogue switch-off or ASO) and cross-boundary frequency coordination for digital dividend, there would unlikely be any new spectrum supply in the coming few years. As such, the adoption of hybrid option for spectrum re-assignment could provide an opportunity not only for new entrants to enter the market, but also for the incumbent 3G operators to revisit their spectrum holdings and consider acquiring adjacent spectrum blocks to make up 2 x 20 MHz so as to enable them to provide higher speed mobile data services. Such an opportunity would not be allowed under the *status quo* option.

Spectrum Trading

37. In response to Dr Andrew Simpson's enquiry about the latest situation of implementation of spectrum trading in Hong Kong, the Chairman clarified that the subject matter was under the purview of the policy bureau. Spectrum trading was a complicated subject involving various implementation issues, for example, how best to guard against anti-competitive trading. The policy bureau would study the feasibility of spectrum trading in Hong Kong and conduct a comprehensive assessment of the impacts on the market before deciding the way forward. OFCA would continue to support the policy bureau in considering the matter.

Item 6 Any Other Business

38. The Chairman said that the next TRAAC meeting would be convened in around April / May 2014 tentatively.

39. There being no other business, the meeting was adjourned at 4:50 pm.

40. Merry Christmas and Happy New Year.

Office of the Communications Authority
January 2014