

## Telecommunications Regulatory Affairs Advisory Committee

### Better Utilisation of the 8-digit Numbering Plan

#### Purpose

This paper gives an overview of the current status of the 8-digit numbering plan and seeks Members' view on the proposed options to extend the lifespan of the 8-digit numbering plan, including the adoption of new number level for mobile services and the revision of the criterion for application for additional number block.

#### Background

2. As of 1st October 2014, there are 5.28 million 8-digit vacant numbers in the "52X", "57X" and "8(4-7,9)X" number levels which are currently available for allocation to mobile services.<sup>1</sup> Assuming that the monthly mobile numbers consumption rate is 145k,<sup>2</sup> all these vacant numbers will be used up in September 2017.

3. For Class 1 fixed numbers, there are 1.10 million 8-digit vacant numbers in the "2X" and "3X" number levels which are currently available for allocation. Assuming that the monthly Class 1 fixed numbers consumption rate is 14k,<sup>3</sup> all these vacant numbers will be used up in March 2021.

4. For Class 2 fixed numbers, there are 0.77 million 8-digit vacant numbers in the "58" number level which are currently available for allocation. Assuming that the monthly Class 2 fixed numbers

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<sup>1</sup> The number of vacant numbers available for allocation to mobile services excludes those number blocks reserved as special numbers.

<sup>2</sup> In the period between January 2011 and September 2014, the maximum monthly mobile numbers consumption rate over a 24-month period was 145k.

<sup>3</sup> In the period between January 2011 and September 2014, the maximum monthly Class 1 fixed numbers consumption rate over a 24-month period was 14k.

consumption rate is 3k,<sup>4</sup> all these vacant numbers will be consumed in February 2035.

5. In the light of the persistent demand for 8-digit mobile numbers, there is a pressing need to explore the number levels which can be re-allocated to mobile services following the exhaustion of the 8-digit vacant numbers in the “52X”, “57X” and “8(4-7,9)X” number levels.

6. In order to relieve the 8-digit mobile number shortage problem, the Telecommunications Numbering Working Group (“TNWG”) under the Telecommunications Regulatory Affairs Advisory Committee (“TRAAC”) convened four meetings from July 2013 to September 2014 to gather the views of the industry on the future planning and development of the Hong Kong numbering plan. Questionnaires were also sent to the operators to collect the statistics of the current number usage and the future demand forecast.

### **New Number Range for Mobile Services**

7. Two proposals were discussed with the industry at the TNWG meetings since July 2013 on the new number levels for mobile services.

#### *Proposal 1: Re-allocation of “7X” Paging Numbers*

8. “7X” numbers are currently allocated for the use of paging services. Under Proposal 1, “7X” number levels will be re-allocated for mobile services. The active paging numbers will need to be relocated into say a specific block in the “7X” number level to make available the majority of number blocks in the “7X” number level for mobile services.

#### *Proposal 2: Re-allocation of “4X” Network Numbers*

9. “4X” numbers are currently allocated for the use of network numbers. Under Proposal 2, some vacant “4X” numbers should be re-allocated for mobile services.

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<sup>4</sup> In the period between January 2011 and September 2014, the maximum monthly Class 2 fixed numbers consumption rate over a 24-month period was 3k.

10. There were, however, divergent views on Proposal 1 and Proposal 2 among the TNWG members. Some TNWG members, notably the mobile network operators, preferred Proposal 1 because they considered that prefix “4X” numbers might not be welcome by the general public as the pronunciation of the starting digit “4” in Cantonese is akin to that of “death”. Conversely, the paging operators preferred Proposal 2 because any migration of their paging subscribers to a new number range would occur later. By then, the number of paging subscribers would have decreased even further and therefore there would be less inconvenience caused to the public. Given that there was no consensus after several rounds of discussions, the TNWG recommended that the pros and cons of these proposals should be presented to the TRAAC for consideration.

*Lifespan of 8-digit Numbering Plan under Proposal 1 and Proposal 2*

11. Currently, there are 83k numbers in “7X” number level that are allocated to two paging operators for paging services. These 83k numbers are scattered over the “7(1-9)X” number levels. Meanwhile, the “70X” number level is reserved without assigning to any specific services. According to our statistics, there were about 44k paging subscribers in August 2014<sup>5</sup>.

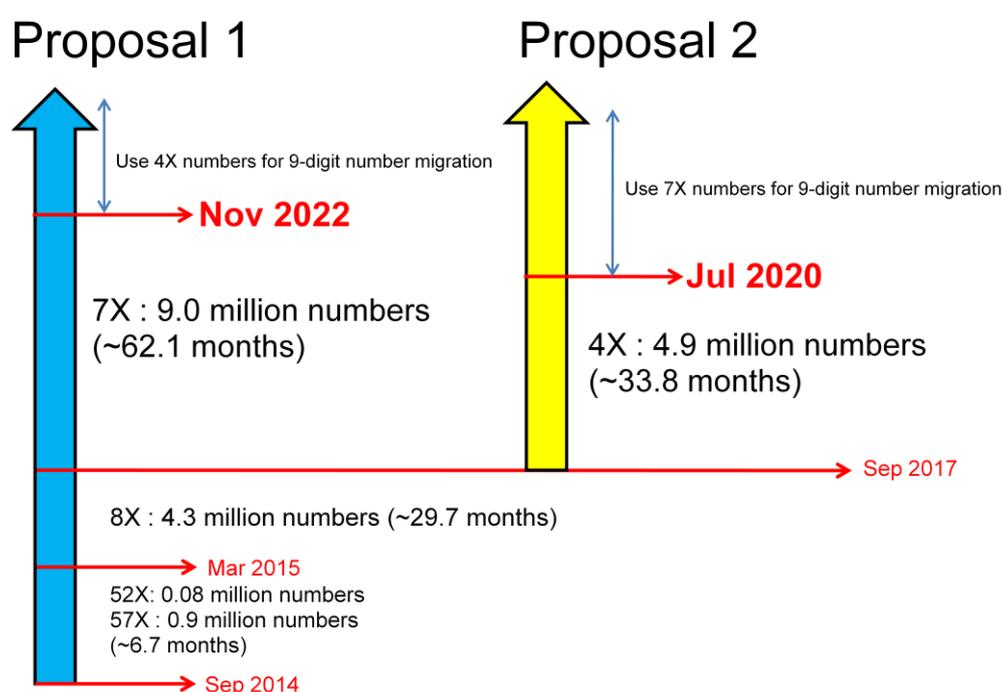
12. In Proposal 1, assuming that a 100k “7X” number block is reserved for paging services and the existing paging subscribers change their existing numbers to this number block, there will be 9 million “7X” numbers (excluding 900k special numbers) that can be re-allocated for mobile services.

13. In Proposal 2, assuming that “409(3-9)X”, “499(5-9)X” and “450X” are reserved for future use as network numbers in supporting number portability and for machine-to-machine communications, there will be 4.9 million “4X” numbers (excluding 800k special numbers) that can be re-allocated for mobile services.

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<sup>5</sup> According to the statistics reported by the paging operators, there were 43,614 paging subscribers in August 2014. For details, please refer to the website:  
[http://www.ofca.gov.hk/filemanager/ofca/en/content\\_108/wireless\\_en.pdf](http://www.ofca.gov.hk/filemanager/ofca/en/content_108/wireless_en.pdf)

14. The following chart illustrates the lifespan of the 8-digit numbering plan under Proposal 1 and Proposal 2 respectively, with the assumption of longer digit migration in 9-digit length in the future. It is also assumed that the mobile number consumption rate will be 145k per month. Under the above assumptions, Proposal 1 and Proposal 2 will be able to support the mobile subscriber growth under the current 8-digit numbering plan until November 2022 and July 2020 respectively.



*Longer Digit Migration Options under Proposal 1 and Proposal 2*

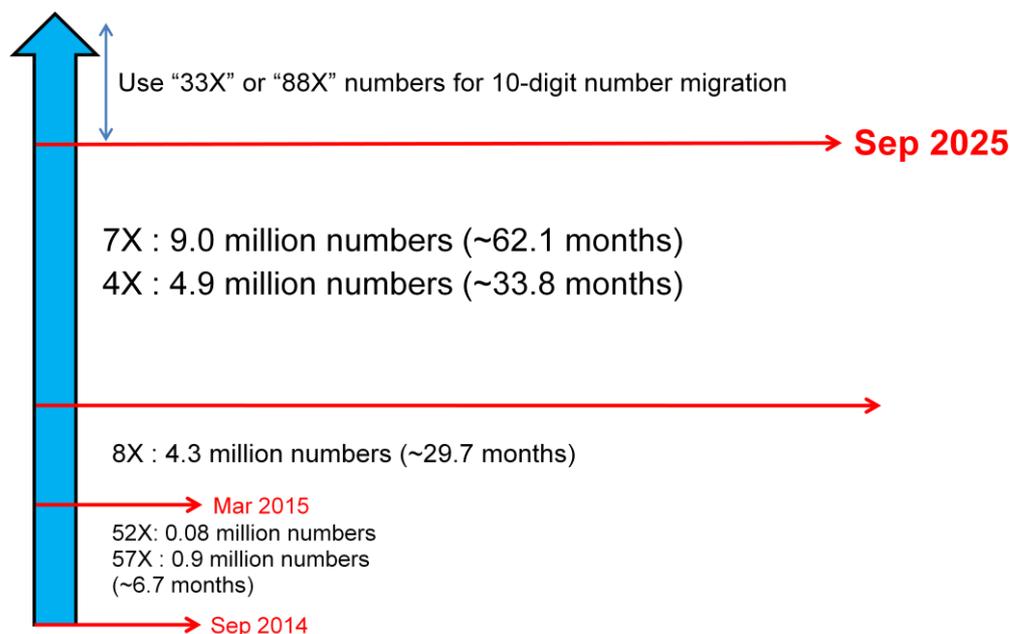
Migration to the 9-digit Numbering Plan

15. If Proposal 1, i.e. the re-allocation of “7X” numbers to mobile services, is adopted, “4” will ultimately become the leading prefix for migration to 9-digit numbering plan. The migration to 9-digit numbering plan is expected to take place in November 2022. With the concern as elaborated in paragraph 10 above, many TNWG members had reservation of using “4” as the leading prefix for migration to 9-digit numbering plan.

16. If Proposal 2, i.e. the re-allocation of “4X” numbers for mobile services, is adopted, “7” will ultimately become the leading prefix for migration to the 9-digit numbering plan. The migration is expected to take place in July 2020. It is expected that “7X” would be more acceptable to be the leading prefix by the general public as compared with the option of “4X”. However, the leading prefix of “4X” for mobile services will only last for 34 months in the 8-digit numbering plan. As a comparison, the re-allocation of the leading prefix “7X” for mobile services under Proposal 1 will last longer, i.e. 62 months, before migration to the 9-digit numbering plan.

Migration to the 10-digit Numbering Plan

17. If there is a decision for the Hong Kong numbering plan to directly migrate to the 10-digit numbering plan, both “4X” and “7X” numbers will be available for re-allocation to mobile services. And either “33X” or “88X” numbers will be used as the leading prefix for the 10-digit numbering plan migration. In this case, the release of “4X” and “7X” numbers will be able to support the 8-digit mobile subscriber growth until September 2025. The following chart illustrates the lifespan of the 8-digit numbering plan if both Proposal 1 and Proposal 2 will be adopted, one after another, under the same assumption that the mobile number consumption rate will be 145k per month.



*Lead Time for Implementation of Proposal 1 and Proposal 2*

18. In general, operators have to perform interoperability testing before a new number range can be released for application. According to the past re-allocation of “8(4-7,9)X” numbers to mobile services, the industry agreed a 2-month testing period for carrying out the interoperability testing.

19. In Proposal 1, the re-allocation requires to migrate the existing paging subscribers to a particular 100k “7X” number block such that the majority of “7X” number blocks can be freed up for re-allocation to mobile services. Therefore, the re-allocation would create possible service interruption to the existing paging subscribers as well as some relevant IT systems, e.g. hospital paging systems. To minimise impact on existing subscribers, it is advisable that a gradual migration of existing paging numbers should take place in around two to three years.

20. In Proposal 2, as only vacant “4X” numbers would be allocated, it is not expected to have any technical problems in implementing “4X” numbers for mobile services. All fixed network operators and mobile network operators, except PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited,<sup>6</sup> confirmed that they were technically ready to implement “4X” numbers for mobile services.

*OFCA's Recommendation*

21. In selection of an option, the Office of the Communications Authority (“OFCA”) is mindful of the need to prevent or minimise any unnecessary service disruptions or impacts to the existing users of telecommunications services. For Proposal 1 to be efficiently implemented, it is necessary to require the relocation of active paging numbers into a particular 100k number block to make available vacant number blocks in the “7X” number level. As a result, these active

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<sup>6</sup> PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited expressed in the TNWG meeting that as some vacant “4X” number blocks were currently deployed in its internal system, they needed one to two years to make changes to support the use of “4X” numbers as mobile numbers.

paging subscribers will suffer from service disruptions due to the number migration, and will also need to bear the additional costs incidental to changing the assigned paging numbers and updating their personal and business contacts. Moreover, some of the paging systems are currently used by certain mission critical systems, like the hospital paging systems. Any service interruptions to these systems should be avoided if there is another option available.

22. Furthermore, OFCA remains unconvinced that the leading digit “4” should not be allocated to mobile numbers at this juncture based on the reason that it may not be welcomed by the general public. Given that a large portion of mobile numbers are in fact assigned to pre-paid SIM cards, the usage of which is more dynamic as compared to the post-paid subscriptions, the available “4X” numbers can be assigned for these users if Proposal 2 is adopted. Moreover, the advent of tablet devices also create a strong business case for the introduction of data-only SIM cards, which only allow users to access mobile data services, but not for making or receiving phone calls or SMS. The “4X” numbers can also be assigned to these users so as to fully utilise the existing number resources. After all, if OFCA does not opt for Proposal 2 because of the concern, it would turn to be more undesirable in the longer term as there would only be a single leading digit choice, i.e. “4”, for the migration to the 9-digit numbering plan.

23. Taking into account the lead time required for implementing either of the options, there is a need for OFCA to make a timely decision on the new number range for mobile services. Having considered the pros and cons of the two options, OFCA is inclined to adopt Proposal 2 by re-allocating some vacant “4X” numbers from network numbers to mobile services.

24. In view of the options for the longer term development of the numbering plan, OFCA notes the views of TNWG members that an external consultancy study ought to be conducted to evaluate the need, options and relevant matters in relation to the longer digit migration. OFCA will at an opportune time consider engaging an external consultancy to study the future development of the numbering plan, such as longer digit migration, where appropriate.

## **Review of the Criterion for Application for Additional Number Block**

### *Current Utilisation Status of Subscriber Numbers*

25. Currently, when a licensee applies for additional subscriber numbers, it has to satisfy a minimum utilisation rate of 70% with the respective type of number blocks already allocated to that licensee, pursuant to the Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan. This 70% threshold of the number utilisation rate is applicable across the board to all licensees of fixed or mobile services, and Services-Based Operator (“SBO”) for Class 1 and Class 2 services.

26. The current requirement of the utilisation threshold of 70% was adopted after a review conducted in December 2008<sup>7</sup>. With the support of the members of the former Working Group on Numbering Issues under the former Telecommunications Numbering Advisory Committee (“NAC”), the former Telecommunications Authority raised the threshold of the number utilisation rate for allocating additional numbers from 60% to 70% in order to encourage more efficient use of telecommunications numbers.

27. As of 30 September 2014, 23.4 million 8-digit numbers were allocated to operators for mobile services. To facilitate the discussion of the review of the number utilisation threshold, a questionnaire on number usage was issued to the relevant licensees in June 2014 to collect the current utilisation status of subscriber numbers. According to the response to the questionnaire, there were about 16.0 million mobile numbers being utilised, accounting for an utilisation rate of 69% as at 30 June 2014.

28. In view of the growth of telecommunications services particularly the demand of 8-digit mobile numbers, it is suggested that the requirements for additional number application should be tightened up to

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<sup>7</sup> Please refer to the discussion in the Numbering Advisory Committee Papers No. 1/2008, 2/2008 and 2/2010: ([http://tel\\_archives.ofca.gov.hk/en/ad-comm/nac/main.html](http://tel_archives.ofca.gov.hk/en/ad-comm/nac/main.html))

prolong the lifespan of 8-digit numbering plan.

*Lifespan of 8-digit Numbering Plan under Different Utilisation Thresholds*

29. Assuming that the mobile numbers are consumed at a rate of 145k per month, the existing vacant mobile numbers will be able to support the demand for mobile numbers until September 2017, as discussed in paragraph 2 above.

30. If the threshold of the utilisation rate for allocating additional mobile numbers can be raised, the lifespan of the existing 8-digit mobile numbers will be extended. The following table illustrates the lifespan of 8-digit mobile numbers at different utilisation thresholds, under the same assumption of 145k monthly consumption rate for mobile numbers.

| <i>Number Utilisation Threshold</i> | <i>Period Extended</i> | <i>Lifespan of existing 8-digit mobile numbers</i> | <i>Lifespan of 8-digit mobile numbers under Proposal 1</i> | <i>Lifespan of 8-digit mobile numbers under Proposal 2</i> |
|-------------------------------------|------------------------|--|--|--|
| 70%<br>(Current threshold)          | N/A                    | Sep 2017   | Nov 2022   | Jul 2020   |
| 75%                                 | 8 months               | May 2018   | Jul 2023   | Mar 2021   |
| 80%                                 | 16 months              | Jan 2019   | Mar 2024   | Nov 2021   |
| 85%                                 | 24 months              | Sep 2019   | Nov 2024   | Jul 2022   |

31. Currently, there are 23.4 million mobile numbers allocated to operators for mobile services and about 70% of the allocated numbers have been utilised. By raising the utilisation threshold from 70% to 80%, it is expected that the amount of un-utilised numbers being allocated to the operators, i.e. the pool of spare numbers being held by the operators, will be lowered from 7.0 million to 4.7 million, before they can make any applications for additional numbers. Assuming the 145k monthly mobile numbers consumption rate, such 4.7 million spare numbers will be able to support the growth of mobile subscribers for 32

months. With these spare numbers held by operators as the buffer in meeting subscriber growth, it is expected that an utilisation threshold of 80% should not have any adverse impact on the normal business operations of the mobile operators. As a reference, Singapore which is also using an 8-digit numbering plan has pitched its threshold at 80% for years.

32. Besides, for the provision of pre-paid SIM services, operators may explore the feasibility of dynamic assignment of mobile numbers to the pre-paid SIMs over the air (“the OTA assignment method”) only at the time of service activation. This assignment method will further contribute to the efficient use of mobile numbers without pre-assigning any mobile numbers to the pre-paid SIMs well before service activation.

#### *Views of the TNWG*

33. The review of the requirements for additional number application was discussed at the TNWG meeting held on 24 September 2014. Mobile operators were concerned that sufficient numbers should be kept in their stock to cater for their operational needs. Also, some of them had not implemented the OTA assignment method because they considered the method impractical from their business perspectives. In general, they did not agree to the proposal of raising the number utilisation threshold.

34. Fixed operators did not express a strong objection to the proposal of raising the number utilisation threshold. They however showed concern about the application of the Direct-Dial-In (“DDI”) numbers if there was any change to the utilisation rate for fixed numbers because greater buffer in the numbering resources for fixed services would be required to meet growth of business customers.

#### *OFCA’s Recommendation*

35. In the light of above considerations, OFCA is of the view that there is a genuine need to revise the criterion for application for additional number blocks with a view to achieving more efficient use of numbers and in turn extending the lifespan of the 8-digit numbering plan.

Adoption of an increased utilisation rate will have the benefit of an extended lifespan of the 8-digit numbering plan by at least 16 months, and the postponement of any migration to a longer digit numbering plan which will incur substantial cost to the network operators and the public. While operators may need to revise their internal number assignment processes to cater for the increased utilisation rate, OFCA expects that the revision can be done through streamlining and reprioritising their internal service provisioning arrangements which should not cause much operational difficulties to them. After all, they can always make applications for new number blocks once the new threshold is met. It is therefore recommended that the threshold of the utilisation rate should be raised from 70% to 80%, which is applicable to all types of services across the board.

### **Recommendation**

36. To summarise, it is recommended that –
- (a) Proposal 2 will be adopted for re-allocating the vacant “4X” numbers except “409(3-9)X”, “499(5-9)X” and “450X” from network numbers to mobile services;
  - (b) the threshold of the utilisation rate for allocating additional numbers will be lifted from 70% to 80%;
  - (c) the Hong Kong Numbering Plan and the “Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan” will be updated to reflect the adopted changes in (a) and (b); and
  - (d) In the long term, an external consultancy study will be engaged to study the future development of the numbering plan, such as longer digit migration.

**Advice Sought**

37. Members are invited to give views and comments on this paper including but not limited to the recommendations given in paragraph 36 above.

**Office of the Communications Authority  
November 2014**