

More Efficient Utilisation of the 8-digit Numbering Plan

Consultation Paper

29 October 2015

EXECUTIVE SUMMARY

S1. Hong Kong has since 1995 adopted an 8-digit numbering plan for telecommunications services. With the continuous development of telecommunications services, the demand for subscriber numbers, especially those for mobile services, has continued to rise. It is forecast the amount of 8-digit numbers currently available (as of September 2015) for allocation to mobile services may be used up by as early as **November 2018**. The Communications Authority (“CA”) proposes in this consultation document the following five measures with a view to achieving a more efficient use of the existing 8-digit numbering plan and making available additional number resources for mobile services –

- (a) Measure 1 - Relocating some of the existing numbers for paging services and re-allocating some of the numbers in the “7(0-3)X” levels for mobile services, which will be able to release 3.2 million numbers to meet the demand for mobile numbers for **24 months**;
- (b) Measure 2 - Re-allocating numbers in the “4X” level for mobile services, which will be able to release 5.6 million numbers to meet the demand for mobile numbers for **42 months**;
- (c) Measure 3 - Re-allocating vacant numbers in the “8(1-3)X” levels for mobile services, which will be able to release 0.98 million numbers to meet the demand for mobile numbers for **7 months**;
- (d) Measure 4 - Raising the threshold of utilisation rate for allocation of additional numbers to network operators, which will be able to release 2.42 million numbers to meet the demand for mobile numbers for **18 months**; and

- (e) Measure 5 - Releasing most of the Special Number Blocks^{s1} for normal allocation, which will be able to release a maximum of 3.52 million numbers to meet the demand for mobile numbers for **26 months**.

S2. If all the above five measures are to be implemented, a total of 15.72 million numbers will become available for allocation for mobile services. This will extend the life span of the existing 8-digit numbering plan by **around 10 years to September 2028**.

S3. The CA will closely monitor the market situation and the effectiveness of the new measures (as and when they are adopted) in maximising the use of the existing 8-digit numbering plan, and will in due course consider engaging an external consultant to conduct a study in order to prepare for the longer term development of the numbering plan in Hong Kong and to explore the various options including the possible need to migrate to a longer digit numbering plan for meeting the future number demand.

S4. The CA invites views from the public on the proposed measures and on the timeframe under which they should be implemented. A number of questions are set out in the consultation paper for soliciting specific inputs from the public and stakeholders. Any person who would like to submit to the CA views and comments in response to this consultation should do so in writing on or before **29 December 2015**.

^{s1} Special Number Blocks refer to number blocks in a special or easily recognisable pattern. Please refer to footnote 3, paragraphs 41 and 42 of the consultation paper for details.

INTRODUCTION

Telecommunications numbers are finite public resources. They are assigned to service users as their unique identifiers, in order that they may make/receive telephone calls to/from each other through telecommunications networks. Pursuant to section 32F of the Telecommunications Ordinance (Cap. 106) (the “Ordinance”), the CA is vested with the power in managing and administering the telecommunications numbering plan¹ of Hong Kong. The CA also has a statutory duty thereunder to promote the efficient and equitable allocation and use of numbers and codes for telecommunications services.

2. Hong Kong has since 1995² adopted an 8-digit telecommunications numbering plan. With the continuous development of telecommunications services in Hong Kong, the demand for telecommunications numbers has continued to rise. The expansion of mobile services is particularly phenomenal. There were over 16.7 million subscribers of mobile services as of July 2015, representing a mobile penetration rate at 228.8%, one of the highest in the world. The growing popularity of pre-paid mobile services has further fuelled the growth of mobile subscriptions in recent years. This is evidenced by the fact that pre-paid mobile services now take up more than 52.7% of the total mobile subscriptions in Hong Kong. Together with the advent of future generation mobile services, such as the Internet of Things, 5th generation mobile services, the consumption of mobile numbers is expected to continue in the years to come.

3. In light of the persistently high demand for mobile numbers and the finite amount of numbers in the 8-digit numbering plan, it is forecast the 8-digit numbers available for allocation to mobile services may be used up by as early as **November 2018** (see paragraph 11 below). There is a pressing need to deal with the mobile number shortage problem. Otherwise, the forthcoming exhaustion of the 8-digit numbers for mobile services may adversely restrict the growth of new mobile subscriptions and hinder further service innovations by the mobile network operators.

4. For the purpose of this public consultation, the CA has identified five possible measures, as follows, for the more efficient utilisation of numbers in the existing 8-digit numbering plan in order to cater for the mobile

¹ Under the Ordinance, “numbering plan” means the Hong Kong telecommunications numbering plan which sets out the plan of numbers and codes used or designed for use for or in connection with the establishment, operation and maintenance of any means of telecommunications in Hong Kong.

² Please refer to the report issued by the former Telecommunications Authority (“TA”) entitled “*A New Numbering Plan for Telecommunications Services in Hong Kong*” in January 1994 (http://tel_archives.ofca.gov.hk/en/numbering/final_report.pdf).

number shortage problem. Detailed proposals will be elaborated in the ensuing paragraphs of this paper –

- (a) Measure 1 - Relocating some of the existing numbers for paging services and re-allocating some of the numbers in the “7(0-3)X” levels for mobile services;
- (b) Measure 2 - Re-allocating numbers in the “4X” level for mobile services;
- (c) Measure 3 - Re-allocating vacant numbers in the “8(1-3)X” levels for mobile services;
- (d) Measure 4 - Raising the threshold of utilisation rate for allocation of additional numbers to network operators; and
- (e) Measure 5 - Releasing most of the Special Number Blocks³ for normal allocation.

5. The CA hereby invites public views on these proposed measures, and on the timeframe under which they should be implemented. For the avoidance of doubt, all the 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 or direction made by the CA. The review and the recommendations proposed in this consultation paper are without prejudice to the exercise of powers by the CA under the Ordinance or any subsidiary legislation thereof.

³ Special Number Blocks refer to number blocks in a special or easily recognisable pattern which is attractive, or is likely to be attractive, to a customer (or customers). These Special Number Blocks spread across number levels from “2X” to “9X”.

ADMINISTRATION OF THE NUMBERING PLAN

6. Pursuant to section 32F(3)(b) of the Ordinance, the CA has issued the “*Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan*” (“Code of Practice”)⁴, setting out the guiding principles and application procedures for the allocation and assignment of numbers and codes⁵ for different types of telecommunications services. According to the Code of Practice, the CA will allocate a block of 8-digit numbers to individual licensees in units of 10,000 numbers (“10k number blocks”)⁶, for their onward assignment to their customers. Licensees are required to comply with the relevant principles and requirements as set out in the Code of Practice when they assign to their customers subscriber numbers.

7. In administering the numbering plan and formulating the Code of Practice, the CA is minded to take into account the international practices and the recommendation of the International Telecommunication Union, so that the use of numbers and codes in the numbering plan, in particular for those that may be used in the international domain, is in line with the international best practices.

CURRENT UTILISATION AND REMAINING CAPACITY OF 8-DIGIT NUMBERS IN THE NUMBERING PLAN

8. Subscriber numbers used by end users are 8 digits in length. Numbers in the 8-digit numbering plan are, based on the leading digits, used for various types of telecommunications services. For example, subscriber numbers starting with “2”, “3” and “58” are for Class 1 fixed services (refer to as “fixed services” thereafter) or Class 2 fixed services⁷; subscriber numbers starting with “5” (except “58”), “6” and “9” are for mobile services; subscriber

⁴ The Code of Practice is available at <http://www.coms-auth.hk/filemanager/statement/en/upload/320/cop20150415e.pdf>.

⁵ In addition to numbers, there are codes with less than eight digits which are assigned to telecommunications licensees for the provision of other value-added telecommunications services or hotline services to their customers. There are also codes with less than 8 digits which are assigned to organizations for services carrying high volume of traffic e.g. telebet services, or providing expeditious access by the public e.g. government hotlines.

⁶ A 10k number block is a set of 10,000 numbers with a 4-digit prefix in the existing 8-digit numbering plan.

⁷ Class 1 fixed services are conventional telephone services to which subscriber numbers in the “2X” and “3X” levels are allocated. Subscriber numbers in the “58X” level are allocated for Class 2 fixed services, which do not have all the attributes of the conventional telephone services (Class 1 fixed services) and are only subject to minimal licensing conditions with the main purpose to protect consumer interests and safeguard fair competition. In particular, licensees providing Class 2 fixed services are not required to publish customer charter, provide directory service or support number portability for their subscribers.

numbers starting with “7” are for paging services; and subscriber numbers starting with “8” are for a combination of services.⁸ The Office of the Communications Authority (“OFCA”) posts the up-to-date numbering plan on its website for public information.⁹ The number resources and allocation rate for each number level in the numbering plan are set out in **Annex A** to this consultation paper.

9. In respect of numbers for fixed services, as of today, there are a total of 1.58 million vacant subscriber numbers in the “2X” (i.e. numbers starting with “2”) and “3X” levels which are available for allocation. Based on the past trend of number allocation to licensees, the number consumption rate for fixed services is about 13,000 per month.¹⁰ Accordingly, the CA estimates that all subscriber numbers in the “2X” and “3X” levels will be allocated by **December 2025**.

10. In respect of numbers for Class 2 fixed services, there are a total of 740,000 vacant numbers in the “58X” level which are available for allocation. Based on the past trend of number allocation to licensees, the number consumption rate for Class 2 fixed services is about 3,200 per month.¹¹ Accordingly, the CA estimates that all subscriber numbers in the “58X” level will be allocated by **January 2035**.

11. In respect of numbers for mobile services, there are a total of 4.97 million vacant numbers in the “5X”, “8(4-7)X” and “89X” levels which are available for allocation. Based on the past trend of number allocation to licensees, the number consumption rate for mobile services is about 133,000 per month.¹² The CA estimates that all mobile numbers in the “5X”, “8(4-7)X” and “89X” levels will be allocated by **November 2018**.

⁸ Some number blocks with the leading digit “8” are allocated for personal number service and freephone service while others are allocated for mobile services.

⁹ The Hong Kong numbering plan is available at http://www.ofca.gov.hk/filemanager/ofca/tc/content_311/no_plan.pdf.

¹⁰ The monthly fixed number consumption rate of 13,000 is derived from the maximum monthly fixed number consumption rate averaged over a 24-month period from October 2012 to September 2015 (please refer to **Annex B1** for details).

¹¹ The monthly number consumption rate of 3,200 for Class 2 fixed services is derived from the maximum monthly number consumption rate for Class 2 fixed services averaged over a 24-month period from October 2012 to September 2015 (please refer to **Annex B2** for details).

¹² The monthly mobile number consumption rate of 133,000 is derived from the maximum monthly mobile number consumption rate averaged over a 24-month period from October 2012 to September 2015 (please refer to **Annex B3** for details). As the consumption rate of mobile numbers fluctuates and will hinge on the development of future generation mobile services, the figure of 133,000, though higher than the actual monthly mobile number consumption rates recorded in recent months, provides a reasonable upper bound for planning purpose.

12. Please refer to Table 1 below for a summary of the status of utilisation of the 8-digit subscriber numbers allocated for different types of services, as well as the estimated timeframe under which the numbers currently available will be exhausted.

Table 1 - Usage Statistics of Subscriber Numbers for Different Types of Services

Type of services	<i>Fixed</i>	<i>Class 2 Fixed</i>	<i>Mobile</i>	<i>Paging</i>	<i>Personal Number</i>
Total amount of subscriber numbers (million)	15.6	0.9	29.2	8.67	2.7
Amount of subscriber numbers allocated (million)	14.02	0.16	24.23	3.48	1.72
Amount of unallocated subscriber numbers (million)	1.58	0.74	4.97	5.19	0.98
Allocation rate	89.9%	17.8%	83.0%	40.1%	63.7%
Consumption rate per month	13,000	3,200	133,000	No new number allocation in the past 5 years	No new number allocation in the past 5 years
Estimated time that all subscriber numbers will be allocated	Dec 2025	Jan 2035	Nov 2018	Not applicable	Not applicable

Remarks: 1. All figures are as at 30 September 2015.

2. Amount of unallocated subscriber numbers of each service type exclude those reserved under Special Number Blocks.

OPTION OF LONGER DIGIT NUMBERING PLAN

13. On the basis of past consumption rate and the persistently high demands, the shortage of the existing 8-digit numbers with respect to mobile services would be the most acute. One possible option to meet the number demand is the wholesale migration of the existing 8-digit numbering plan to a

longer digit one, so as to expand the number resources. The CA is however very conscious and mindful of the fact that such a migration will come with huge social and economic costs on the community. Apart from the implementation cost to be borne by all telecommunications network operators for network reconfiguration and database update, ordinary users of telecommunications services (individual, business and government users) also need to bear the relevant costs such as the upgrading of corporate telecommunications systems, printing of business cards, replacement of company signage, etc. in order to support a longer digit numbering plan. According to the analysis of an independent consultant commissioned by OFCA, the total cost in net present value to be borne by the community as a result of migration to a 9-digit or 10-digit numbering plan amounts to about HK\$1.1 billion.¹³ That aside, it should also be noted that the community would need time to adapt to the lengthened numbering plan and would inevitably experience some inconvenience during the transitional period of the migration. The CA considers that, unless there is concrete evidence that the 8-digit numbering plan is unable to cope with the current and future demand of the community and we have exhausted all possible measures for ensuring the efficient use of the existing 8-digit numbering plan, the option of migrating the existing 8-digit numbering plan to longer digit numbering plans should not be lightly pursued.

PROPOSED MEASURES TO ACHIEVE A MORE EFFICIENT UTILISATION OF THE EXISTING NUMBERING PLAN

14. The CA has identified five possible measures in order to make available additional number resources¹⁴ for allocation to mobile services. These measures are devised with the objectives of keeping to the minimum the social and economic costs on the community whilst maximising the use of the existing 8-digit numbering plan by improving the utilisation efficiency. The five measures are set out in the following paragraphs for public consultation.

¹³ Please refer to **Annex C** for the methodology of the estimation of the costs to be borne by the community as a result of migration to a longer digit numbering plan.

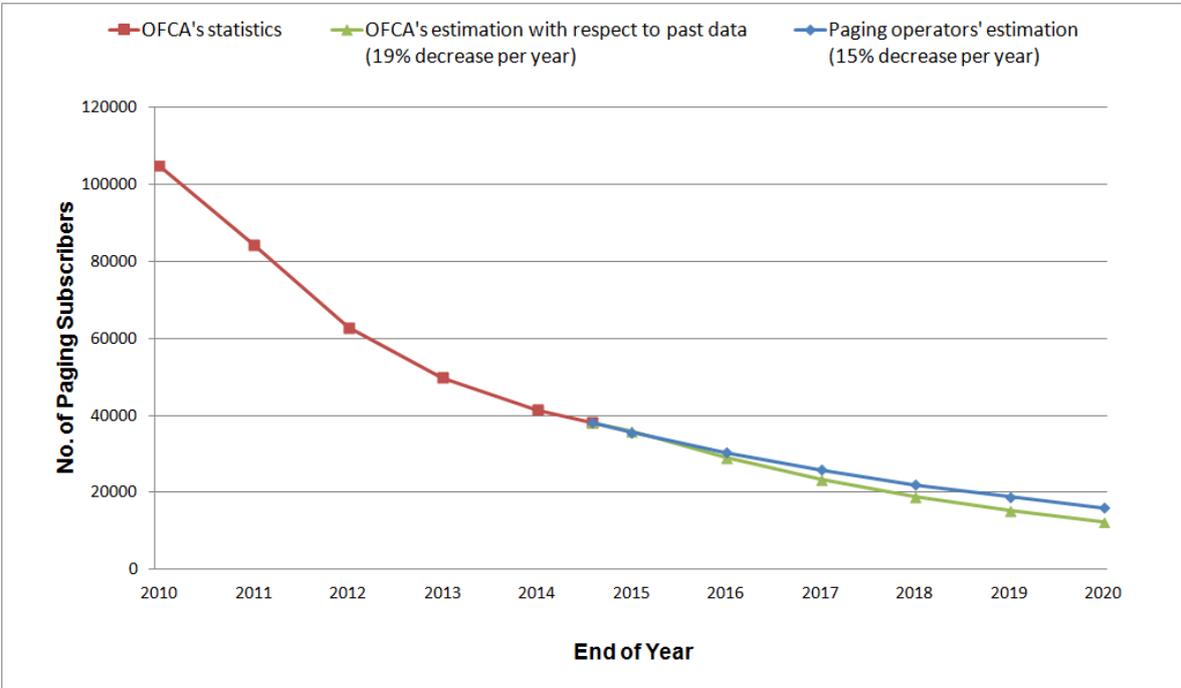
¹⁴ The number resources made available for mobile services in Measures 1 to 4 exclude those reserved as Special Number Blocks.

A. Measure 1 - Relocating Some of the Existing Numbers for Paging Services and Re-allocating Some of the Numbers in the “7(0-3)X” Levels for Mobile Services

Background

15. According to the existing numbering plan, 8-digit subscriber numbers in the “7X” level are generally allocated for use by paging services (see paragraph 15 of **Annex A**). Currently, number blocks in the “7(1-9)X” levels are being used for such purpose, while none of the number blocks in the “70X” level is so allocated for paging services. With the declining subscription of paging services in Hong Kong over the past two decades, only two paging operators remain in the market, and between them, as of July 2015, 38,120 active paging numbers are in use and they are scattered over a total of 348 10k number blocks in the “7X” level (save for “70X”). The ratio of the amount of paging numbers in use to the total amount of allocated paging numbers is as low as 1.1%. Such a low utilisation rate is a result of continuous churn out from paging services to mobile or other services. Looking forward, it is likely that the number of paging subscribers will continue to decrease over time. Figure 1 below shows the projected trend of paging subscribers in the coming years.

Figure 1 - Projected trend of number of paging subscribers in the coming years



The Proposal

16. With a view to improving the utilisation efficiency of numbers in the “7X” level, OFCA and the industry have explored the possibility of relocating active paging numbers in blocks with fewer active users to blocks with more active users, so that most of the number blocks in the “7(1-9)X” level can be vacated and re-allocated for mobile services or to cater for future longer digit migration if there is such a need. Taking into account the paging operators’ inputs on the amount of paging number blocks to be retained to minimise impact on their customers, a possible relocation arrangement is that the active paging numbers will commence relocation to a specific set of 28 10k number blocks in the “7(1-3)X” levels in 2020.¹⁵ Please refer to an illustration in **Annex D** for the technical details of the proposed relocation arrangement.

17. In 2020, it is estimated that there will be about 20,000 active paging subscribers. If the proposed relocation commences in 2020, 65% of these active paging subscribers, i.e. 13,000 may be affected in that they would have to change their paging numbers. After the completion of the paging numbers relocation exercise, all the paging subscribers will then be accommodated in fewer 10k number blocks, scattering over 0.28 million numbers in the “7(1-3)X” levels. The utilisation of the allocated paging numbers will then be 7.1%, representing a significant improvement as compared with the current figure of 1.1% (see paragraph 15 above). More importantly, it will free up a total of 3.2 million numbers for re-allocation to mobile services or to cater for future longer digit migration.

18. To proceed with the proposed relocation, the two licensees providing paging services will need to make arrangements with their relevant customers regarding change of their paging numbers to the “7(1-3)X” levels. The licensees will also need to enhance their systems for supporting the dual access capability so that calls to either the old paging number or the new paging number will be properly connected within a certain period after the relocation exercise. The licensees suggested that the whole relocation process would take around 18 to 24 months with the subsequent dual access period lasting for 12 to 24 months. With reference to the previous experience in number migration, the CA is of the view that the relocation arrangement should take no more than 18 months to complete with a dual access period lasting for six months. In other words, a period of 24 months should be sufficient.

¹⁵ These 28 10k number blocks in the “7(1-3)X” levels are designated by the paging operators according to (a) distribution of their customers across the “7(1-9)X” levels; and (b) their estimation of the number of active customers by 2020.

19. If the proposal is adopted, the number blocks in the “70X” level which is currently vacant and the existing vacant number blocks in the “7(1-3)X” levels can be re-allocated immediately for mobile services. Following the completion of the relocation of paging numbers mentioned above, additional number blocks in the “7(1-3)X” levels will be vacated as well for re-allocation for mobile services. Number blocks in the “7(4-9)X” levels will be reserved for the possible migration to a longer digit numbering plan in which the prefix “7” may be used as the leading digit for mobile numbers in the future.

Effect in Extending the Life Span of the Existing Numbering Plan

20. It is estimated that upon completion of the paging numbers relocation exercise, around 1 million numbers will be vacated from the “7(1-3)X” levels. Together with the currently vacant 2.2 million numbers in the “7(0-3)X” levels, a total of 3.2 million subscriber numbers could be made available. This will be able to meet the demand for mobile numbers for **24 months**.

Preliminary Considerations of the CA

21. The CA notes that the allocation of the entire “7X” level for paging services is no longer justifiable given that the subscriber base of paging services has shrunk to a very low level in recent years and the trend is expected to continue. Under Measure 1, the proposed relocation of paging numbers will improve the efficiency in using the allocated paging numbers in the “7X” level and releasing a large amount of vacant numbers for re-allocation to mobile services.

22. The CA also notes that the relocation of paging numbers may have impact on some existing paging subscribers including those deployed in mission critical systems (such as hospital paging systems) as well as other members of the public as the callers to the paging subscribers. The affected paging subscribers may need to change their contact information and notify others about the change, whereas other corporate paging subscribers, who have incorporated their paging numbers in their automatic message despatching or notification system, may need to reconfigure or modify their systems to accommodate the change. There is also a possibility that the mandatory requirement to change the existing numbers of the paging subscribers may induce them to terminate the paging services, thus further affecting the already shrinking paging industry. The relocation process will also incur certain costs to the paging operators. Fixed and mobile network operators will need to reconfigure their call routing arrangements to

accommodate the re-allocation of the “7(0-3)X” levels for mobile services and to support the dual access for relocated paging subscribers.

23. To summarise, the pros and cons of adopting Measure 1 include –

(a) Pros

- (i) The utilisation of subscriber numbers in the “7X” level will be improved;
- (ii) 3.2 million numbers will be made available for re-allocation as mobile numbers, which will be able to meet the demand of mobile numbers for 24 months; and
- (iii) The relocation of paging numbers will pave the way for future longer digit migration such that the leading digit “7” can be used as a prefix for mobile numbers in a longer digit numbering plan, if it is adopted in the future.

(b) Cons

- (i) The relocation of paging numbers may cause some inconvenience to about 13,000 paging subscribers as well as those who need to page these subscribers; and
- (ii) The mandatory requirement to change the existing numbers of the paging subscribers may induce them to terminate the paging services, thus further affecting the already shrinking paging industry.

Question A.1: *Do you agree that Measure 1 should be adopted to (a) enable more efficient utilisation of subscriber numbers in the “7X” level; and (b) re-allocate some number blocks in the “7(0-3)X” levels for mobile services?*

Question A.2: *Do you have any views on the proposed relocation of paging numbers? Do you anticipate any major impact on the general public given that the number of paging subscribers has in fact been decreased to a very low level?*

Question A.3: *What are your views on the amount of lead time required for the relocation of paging numbers, and the duration for the dual access period?*

Question A.4: *What are your views and comments on the pros and cons of Measure 1?*

B. Measure 2 - Re-allocating Numbers in the “4X” Level for Mobile Services

Background

24. Leading digit “4” has not been allocated for use as subscriber numbers, and is primarily used as network numbers for internal routing purpose (see paragraph 10 of **Annex A**). Since March 2015, the CA has allocated or reserved numbers in the “450X” level for machine-to-machine (“M2M”) services.¹⁶ Excluding those number blocks that are already assigned or reserved for network numbers and M2M services, 560 10k number blocks in the “4X” level as at 30 September 2015 are available for other purposes.

The Proposal

25. As one measure to alleviate the mobile number shortage problem, the CA proposes that the vacant 10k number blocks in the “4X” level should be allocated for use as 8-digit mobile numbers. Given that numbers with leading digit “4” are currently used by fixed and mobile network operators for internal network routing purpose, under this measure, all relevant network operators will be required to reconfigure their networks and systems to enable the use of “4X” level for mobile services.

¹⁶ M2M services refer to the communications services between machines/devices where data can be exchanged in an automatic or scheduled manner with little or no human intervention. M2M communications can be used for a wide range of industrial and commercial applications such as telemetry, remote control, remote monitoring, smart metering, fleet control, logistics support and tracking, home security, smart payment, etc. For details of the allocation of the leading digits “450” for M2M services, please refer to the TRAAC Paper No. 5/2014 available from http://www.ofca.gov.hk/filemanager/ofca/en/content_757/traac5_2014.pdf.

Effect in Extending the Life Span of the Existing Numbering Plan

26. If Measure 2 is adopted, a total of around 5.6 million numbers in the “4X” level can be re-allocated for use as mobile numbers. This will be able to meet the demand for mobile numbers for **42 months**.

Preliminary Considerations of the CA

27. Subject to the network reconfiguration work to be undertaken by fixed and mobile network operators, vacant number blocks in the “4X” level could be re-allocated to meet the demand for mobile numbers without affecting the general public. The CA notes though that there is reservation from the industry on the use of numbers in the “4X” level as some members of the public may not find that readily acceptable given the ominous association arising from the pronunciation of “4” in Chinese.

28. The CA considers that when there is still supply of numbers in other number levels, the allocation of the “4X” level could be accorded with lower priority. However, as there is now a foreseeable shortage of mobile numbers, leaving the “4X” level idle fails to make efficient use of the scarce number resources. Indeed, with the popularity of smartphones, telephone users attach less importance to telephone numbers nowadays because it is common to make calls through phonebook dialing. There are also ways to address such possible concern. For example, many pre-paid SIM cards are for short term use and their users should not be much bothered by the telephone numbers with leading digit “4”. Mobile network operators could actively consider using the “4X” numbers for pre-paid mobile services. With a large portion of mobile numbers are in fact assigned to pre-paid SIM cards, the assignment of “4X” numbers can release some numbers of other prefixes (such as numbers starting with “5”, “6” and “9”) currently used in pre-paid mobile services for assignment to post-paid mobile services. Also, with the popularity of tablet devices, many mobile network operators offer data-only SIM cards, which only allow users to access mobile data services, but not for making or receiving phone calls or short messaging services (“SMS”). The “4X” level numbers can also be assigned to these mobile data-only services to more efficiently utilise the existing number resources.

29. To summarise, the pros and cons of adopting Measure 2 are –

(a) Pros

- (i) The measure will release a large amount of currently vacant number blocks with a total of around 5.6 million numbers

which will be able to meet the demand for mobile numbers for 42 months; and

- (ii) The introduction of a new subscriber number range at the “4X” level will not have any adverse impact on the licensees, consumers or the general public.

(b) Cons

- (i) The mobile network operators and their customers may not welcome assignment of mobile numbers that start with the leading digit “4”.

Question B.1: *Do you agree that Measure 2 should be adopted?*

Question B.2: *What are your views on using “4” as the leading digit for mobile services? Is the arrangement of assigning numbers with leading digit “4” for mobile data services, pre-paid SIM services, etc. acceptable?*

Question B.3: *What are your views and comments on the pros and cons of Measure 2?*

C. Measure 3 - Re-allocating Vacant Numbers in the “8(1-3)X” Levels for Mobile Services

Background

30. Numbers in the “8(1-3)X” levels are currently allocated for personal number service (see paragraph 18 of **Annex A**). First introduced by operators in 1995, the service provides users with an individual 8-digit personal number over which they may have their calls forwarded to any other numbers that can reach them. However, the market demand for such personal numbers has been low. As at 30 September 2015, 0.98 million vacant numbers are available in the “8(1-3)X” levels.

The Proposal

31. For more efficient use of the number resources, the CA proposes that vacant number blocks in the “8(1-3)X” levels should be re-allocated for mobile services.

Effect in Extending the Life Span of the Existing Numbering Plan

32. If Measure 3 is taken on board, a total of 0.98 million numbers in the “8(1-3)X” levels can be allocated for mobile services. This will be able to meet the demand for mobile numbers for **7 months**.

Preliminary Considerations of the CA

33. The CA notes that personal number service is not popular since its introduction in 1995. Instead of leaving the numbers in the concerned number levels idle, the CA considers it justifiable to re-allocate some number blocks in the “8(1-3)X” levels for other purposes such as mobile services. The vacant numbers in the “8(1-3)X” levels can be made immediately available for allocation. Given that the existing “8(4-7)X” and “89X” levels are also allocated for mobile services, the CA expects that there is no need for fixed and mobile network operators to undertake much network reconfiguration work for routing mobile numbers in the “8(1-3)X” levels. The CA is minded that following the implementation of Measure 3, should it be adopted, there will no longer be any number blocks in the “8(1-3)X” levels to be set aside to cater for any possible revival in market demand for the personal number service in future, albeit that should be rather unlikely as projected from the current market demand.

34. In sum, the pros and cons of adopting Measure 3 are –

(a) Pros

- (i) The measure can be readily implemented with no adverse impact on the licensees, consumers as well as the general public; and
- (ii) The use of leading digit “8” for mobile services should be welcomed by the general public.

(b) Cons

- (i) There will be no spare number blocks in the “8(1-3)X” levels for personal number service should there be any revival in market demand, which, on the basis of current estimation, is rather unlikely.

Question C.1: *Do you agree with the adoption of Measure 3?*

Question C.2: *Do you have any views on whether the adoption of Measure 3 will have any impact on the personal number service?*

Question C.3: *What are your views and comments on the pros and cons of Measure 3?*

D. Measure 4 - Raising the Threshold of Utilisation Rate for Allocation of Additional Numbers to Network Operators

Background

35. According to the Code of Practice, a licensee should have assigned to its customers 70%¹⁷ of numbers from the allocated number blocks before it may make an application to the CA for additional subscriber numbers for the concerned service or else it will need to provide justifications.¹⁸ Such a threshold of number utilisation rate for allocation of additional numbers allows network operators to have enough stock or buffer of spare numbers to cater for their operational needs. The 70% threshold is applicable across the board to all licensees of fixed or mobile services, and Services-Based Operator (“SBO”) licensees for Class 1 and Class 2 services.

¹⁷ The current requirement of the utilisation threshold of 70% was adopted after a review conducted by the former Telecommunications Numbering Advisory Committee (“NAC”) in December 2008. Please refer to the discussion in the NAC Paper No. 1/2008, 2/2008 and 2/2010 (http://tel_archives.ofca.gov.hk/en/ad-comm/nac/nacpaper.html) and the minutes of the 59th NAC meeting (http://tel_archives.ofca.gov.hk/en/ad-comm/nac/minutes/nacm59.html).

¹⁸ See Appendix 3 of the Code of Practice, paragraph 2.7 for fixed services, paragraph 2.11 for Class 1 and Class 2 services under Services-Based Operator (“SBO”) Licence, paragraph 2.13 for mobile services; and paragraphs 2.15 and 2.16 for paging services. (<http://www.coms-auth.hk/filemanager/statement/en/upload/320/cop20150415e.pdf>)

The Proposal

36. The CA proposes to tighten the requirement for additional number application by raising the threshold of the number utilisation rate from 70% to 80%, such that the amount of unused numbers being held by the licensees, i.e. the pool of spare numbers, can be more efficiently utilised before they make fresh applications for allocation of additional numbers.

Effect in Extending the Life Span of the Existing Numbering Plan

37. Currently, 24.23 million mobile numbers have been allocated to licensees for mobile services in total and about 70% of them have already been assigned to end users. If the threshold of the number utilisation rate is raised from 70% to 80%, licensees of mobile services are required to meet the demand for mobile numbers with one-third of the numbers (i.e. 2.42 million) from their existing pool of spare numbers before they may make any fresh applications to the CA for allocation of additional numbers. The use of these spare numbers will be able to meet the demand for mobile numbers for **18 months**.

Preliminary Considerations of the CA

38. The CA notes that mobile network operators have reservation over the raising of the threshold as they consider that sufficient numbers should be kept in their stocks to cater for their operational needs. Some operators consider that the proposal may undermine the growth of the pre-paid SIM market as they need to pre-assign mobile numbers to pre-paid SIM cards for sale in the market. With fewer mobile numbers in hand, operators may not be able to offer adequate pre-paid SIM cards in their sale channels or they need to deploy the over-the-air method for assigning subscriber numbers to pre-paid SIM cards at the time of activation.

39. The CA is aware that Measure 4 will reduce the amount of spare numbers held by the relevant licensees of mobile services and licensees may need to take steps to streamline and reprioritise their internal service provision arrangements to adapt to the adoption of a higher utilisation rate. The CA is however conscious that the adoption of a higher utilisation rate will have an immediate benefit of extending the life span of the existing numbering plan without the corresponding need for operators to embark upon any network reconfiguration work as in the proposed measures outlined above. The CA considers that raising the threshold to 80% is a pragmatic and effective means to achieve more efficient use of the number resources. In this regard, the CA notes that Singapore, which has similar characteristics as Hong Kong

including (a) the adoption of the same 8-digit numbering plan; (b) high mobile services population penetration at 148.9% in July 2015¹⁹; and (c) well developed telecommunications infrastructure with a great variety of services, has pitched its threshold for additional number block allocation at 80% for quite a number of years.²⁰

40. To summarise, the pros and cons of adopting Measure 4 are –

(a) Pros

- (i) The proposed measure can readily extend the life span of the existing numbering plan for 18 months by requiring licensees to assign at least one-third of the unused numbers they currently hold before applying for additional allocation; and
- (ii) Implementation of the measure will not impact upon any service users, or require network operators to modify or reconfigure their networks.

(b) Cons

- (i) Licensees may need to streamline and reprioritise their internal service provisioning arrangements to adapt to the adoption of a higher utilisation rate; and
- (ii) The proposal may dampen the growth of the pre-paid SIM market as licensees will have fewer spare numbers for pre-assignment to pre-paid SIM cards for sale in the market if they do not deploy over-the-air number assignment.

Question D.1: *Do you agree with the adoption of Measure 4 by raising the threshold of the utilisation rate from 70% to 80% for application of additional number allocation from the CA?*

¹⁹ The mobile services population penetration of Singapore is available at <https://www.ida.gov.sg/Tech-Scene-News/Facts-and-Figures/Telecommunications/Statistics-on-Telecom-Services/Statistics-on-Telecom-Services-for-2015-Jul-Dec>.

²⁰ The Singapore numbering plan is available at https://www.ida.gov.sg/~media/Files/PCDG/Licensees/Numbering/NNP/NNP_WD.pdf.

Question D.2: *Do you have any views on whether the adoption of Measure 4 will have any impact on the operations of telecommunications networks and services by licensees?*

Question D.3: *What are your views and comments on the pros and cons of Measure 4?*

E. Measure 5 - Releasing Most of the Special Number Blocks for Normal Allocation

Background

41. According to section 32F(5) of the Ordinance, “*the Secretary [for Commerce and Economic Development] may by regulation (a) provide for (i) the allocation, assignment, lease or sale, whether by auction, tender or for consideration, or otherwise of; (ii) the amount of fees to be levied for, the right to use a number or a code, a block or blocks of numbers or a block or blocks of codes designated, ..., by the [Communications] Authority under subsection [32F](3)(c)*”; and under section 32F(3)(c) of the Ordinance, “*the [Communications] Authority may designate ... a number or a code, a block or blocks of numbers or a block or blocks of codes in the numbering plan to be the subject of special allocation, assignment, lease or sale as provided for under regulations made by the Secretary under subsection [32F](5).*”

42. A long list of Special Number Blocks has been reserved following two public consultation exercises conducted by the former Telecommunications Authority (“TA”) in February 1997²¹ and June 2002²² respectively, concerning the development and implementation of the proposed Special Number Arrangement (“SNA”) to allocate and assign Special Numbers to operators and consumers of telecommunications services in Hong Kong under sections 32F(5) and 32F(3)(c) of the Ordinance. A total of 5.7 million numbers are reserved as Special Number Blocks (each consists of

²¹ Public Consultation Paper on Special Number Arrangements issued on 4 February 1997 (http://tel_archives.ofca.gov.hk/en/report/r-condoc/rp97b043.html).

²² Public Consultation Paper on Special Number Arrangements issued on 14 June 2002 (http://tel_archives.ofca.gov.hk/en/report-paper-guide/paper/consultation/cp20020614.pdf).

100k numbers) in the numbering plan.²³ The list of these Special Number Blocks is given at **Annex E**. Thus far, there is no commonly agreed scheme among the industry players regarding the implementation for SNA, and as a result these Special Number Blocks have remained unallocated.

The Proposal

43. In order to fully utilise the scarce number resources in the numbering plan as far as possible, the CA proposes to de-reserve the 100k numbers of a Special Number Block save for those for which it is strictly necessary to be kept in reserve continually, such as reserving still the seeding blocks for future migration to a longer digit numbering plan.²⁴ As for each of the remaining 100k Special Number Blocks, only a 10k number block exhibiting certain patterns for the 4-digit prefix²⁵ will be kept in reserve continually. In gist, most of the numbers in the currently reserved Special Number Blocks will be released for allocation as ordinary subscriber numbers. Based on the proposed list given at **Annex F1**, 4.51 million out of 5.7 million numbers in the Special Number Blocks currently reserved will be released for normal allocation under Measure 5. The numbers that can be released are set out in **Annex F2**.

Effect in Extending the Life Span of the Existing Numbering Plan

44. If Measure 5 is adopted, a total of 3.52 million numbers (including the immediately available 2.17 million numbers in the “5X”, “6X”, “8(4-7)X”, “89X” and “9X” levels currently allocated to mobile services, and an additional 1.35 million numbers in the “7X”, “4X” and “8(1-3)X” levels pending the adoption of Measures 1, 2 and 3 respectively) will be allocated for mobile services.²⁶ The released numbers will be able to meet the demand of mobile numbers for **26 months**. In case Measure 5 but not Measures 1, 2 or 3

²³ The 5.7 million numbers include those numbers reserved under (a) the Special Number Block “303” which is currently allocated for use as access codes; and (b) the Special Number Blocks “323”, “333” and “888” which are the seeding blocks for future migration to a longer digit numbering plan, but exclude those numbers reserved under the Special Number Block “808” which is currently allocated for use as freephone numbers.

²⁴ Prefixes “3” or “7” may be added to the existing subscriber numbers in case of migration to 9-digit numbering plan whereas prefixes “33” or “88” may be added to the existing subscriber numbers in case of migration to 10-digit numbering plan. As such, Special Number Blocks “323”, “333”, “767”, “787”, “797”, “888” need to be reserved as seeding blocks for the possible migration in the future.

²⁵ The 4-digit prefixes in the patterns of ‘AAAA’ (e.g. 2222), ‘ABAB’ (e.g. 3535), and ‘ABCD’ (e.g. 6789) are regarded as special.

²⁶ 0.9 million numbers can be allocated for fixed services and 0.09 million numbers for Class 2 fixed services. The released numbers will be able to meet the demand of fixed numbers and Class 2 fixed services for 69 months and 28 months respectively.

is to be adopted, a total of 2.17 million numbers will still be made available for mobile services, which will be able to meet the demand of mobile numbers for 16 months.

Preliminary Considerations of the CA

45. In face of the imminent shortage of mobile numbers and the need to re-allocate vacant number blocks for mobile services, the CA considers it advisable to look into the feasibility of releasing some of the number resources currently held as Special Number Blocks. The number blocks to be released are either immediately available for allocation or will be ready so when the corresponding Measures 1, 2 and 3 are implemented. There should not be any extra network reconfiguration work to be undertaken by fixed and mobile network operators before allocation of these numbers. The CA will consider the progressive release of these number blocks and determine the sequence of their allocation should Measure 5 be adopted.

46. To summarise, the pros and cons of adopting Measure 5 are –

(a) Pros

- (i) A considerable amount of numbers, 3.52 million numbers in total (assuming the adoption of Measures 1, 2 and 3 as well) will be made available for allocation as ordinary mobile numbers, which will be able to meet the demand of mobile numbers for 26 months; or if only Measure 5 but not Measures 1, 2 or 3 is adopted, 2.17 million numbers which will be able to meet the demand of mobile numbers for 16 months; and
- (ii) The release of numbers from the Special Number Blocks will not have any adverse impact on the licensees, consumers and the general public.

(b) Cons

- (i) The amount of reserved numbers in the Special Number Blocks will be substantially reduced. This may become a constraint for any SNA to be introduced in the remaining life span of the 8-digit numbering plan.

Question E.1: *Do you agree with the adoption of Measure 5 by releasing most of the reserved numbers in the existing Special Number Blocks for ordinary allocation?*

Question E.2: *Do you have any views on the proposed list of Special Number Blocks to be reserved as set out in Annex F1?*

Question E.3: *What are your views and comments on the pros and cons of Measure 5?*

F. Order of Implementation of the Proposed Measures

47. Subject to the views and comments received, the CA will consider whether all or some of the above proposed measures will be adopted, and the timeframe involved in light of the actual rate of consumption of the mobile numbers in the coming years. As elaborated in the preceding paragraphs, Measures 2, 3, 4 and 5 (except for the release of those Special Number Blocks in the “7X” level²⁷) should not require any substantial changes or reconfigurations to the networks and systems of the relevant network operators. Subject to the decision of the CA following this public consultation, these measures could be implemented at an early timeframe. The number blocks made available under these measures will be injected into the respective pools of number blocks and made available for allocation in phases.

48. As regards Measure 1, the two licensees for paging services will have to make arrangements to relocate the numbers of some of the paging subscribers and to make provisions for the subsequent dual access period. Other network operators will also need to make necessary changes to their networks and systems to support the relocation exercise and to re-allocate the “7(0-3)X” levels for mobile services. These processes will take time. They will cause inconvenience to the affected paging subscribers and the general public at large. Having said that, it is worthwhile to point out that the number of paging subscribers has been declining continuously and will very likely decrease further in the coming years. At a certain point in time in future, it is expected that the subscriber base of paging services will drop to an even lower level such that the relocation of paging numbers to be performed will only directly affect a very small group of paging subscribers. With the above

²⁷ 270k numbers in “727X”, “737X”, “787X” and “797X” levels have already been allocated to paging operators. Upon paging numbers relocation (if Measure 1 is adopted), all the 270k numbers in these Special Number Blocks will be vacated.

considerations, the CA is of the preliminary view that Measure 1, if adopted, should be implemented the last when all the available number resources made available by other measures are about to be used up, such that its impact on the paging subscribers and the general public will be kept to a minimum.

49. Assuming Measures 2, 3, 4 and 5 (except for the release of Special Number Blocks in the “7X” level) are to be implemented, a total of 12.16 million numbers will become available for allocation for mobile services. This will be able to meet the demand for mobile numbers for 91 months and extend the life span of the 8-digit numbering plan from November 2018 to June 2026. Further, if Measure 1 (together with the release of Special Number Blocks in the “7X” level for mobile services) is to be implemented afterwards, an additional 3.56 million numbers can be made available for re-allocation for mobile services. This will further extend the life span of the 8-digit numbering plan to **September 2028**. In other words, the proposed measures, if all implemented, will be able to utilise the existing 8-digit numbering plan more efficiently and extend its life span by about 10 years. The contribution of each of the proposed measures in making available mobile numbers for allocation is summarised in **Annex G**.

Question F.1: *Do you have any views on the order of implementation of the five proposed measures? In what order should these five proposed measures be implemented?*

Question F.2: *Do you agree that Measure 1 should be implemented at a later time after Measures 2, 3, 4 and 5 have been implemented?*

FUTURE NUMBERING PLAN DEVELOPMENT

50. While the various measures proposed in this consultation paper should meet the demands of the market in the short and medium term, it is possible that the proposed number blocks set aside for mobile services may all be allocated some time in the future, should the consumption rate of mobile numbers continue to be unabated. While the CA will closely monitor the market situation and the effectiveness of the new measures in maximising the use of the existing 8-digit numbering plan, in order to prepare for the longer term development of the numbering plan in Hong Kong and to explore the various options including the need to migrate to a longer digit numbering plan for meeting the future number demand, the CA will in due course consider

engaging an external consultant to conduct a detailed study on the matter in the future.

INVITATION FOR COMMENTS

51. The CA invites views and comments on the issues and questions raised in this consultation paper. Any person who would like to submit to the CA views and comments in response to this consultation should do so in writing, preferably in electronic form, on or before **29 December 2015**. The CA may publish all or any parts of the views and comments received, and disclose the identity of the source in such matter as it sees fit. Any part of the submission that is considered commercially confidential should be marked clearly. The CA would take such markings into account in making its decision as to whether to disclose such information or not. Submissions should be addressed to:

By post: Office of the Communications Authority
29/F, Wu Chung House
213 Queen's Road East
Wan Chai, Hong Kong
(Attention: Senior Regulatory Affairs Manager (R22))

By fax: 2803 5110

By e-mail: numbering_plan@ofca.gov.hk

Office of the Communications Authority
29 October 2015

Number Resources and Allocation Rates of Subscriber Numbers in the Existing 8-digit Numbering Plan

This annex elaborates on the number consumption and utilisation rates of each number level in the existing 8-digit numbering plan.

Leading Digit “0”

2. According to the Recommendation E.164 published by the Telecommunication Standardization Sector of the International Telecommunication Union (“ITU-T”), national numbering plan administrators should adopt an international prefix composed of the leading digits “00” for access to the international telecommunications networks. ITU-T also recommends administrators to adopt a prefix composed of a single digit, preferably “0”, for access to their national trunk network²⁸ for domestic long distance calls where applicable.

3. In line with the international practice for not allocating the leading digit “0” for use as subscriber numbers as outlined above, the leading digit “0” in Hong Kong is primarily used as access codes for International Direct Dial (“IDD”) services for voice, facsimile and data calls. “001” and “002” are used as the prime access codes for IDD voice and facsimile/data calls via the network operator which the customer has chosen as his/her access line provider. Meanwhile, “003” to “009” are the access codes for IDD voice/facsimile/data services provided by individual fixed network operators so that a customer can make outgoing international calls via a particular fixed network of his/her own choice with calls originated from any local network. “000” is reserved for future expansion, while “01” to “09” are reserved for future trunk access in the region.

Leading Digit “1”

4. The leading digit “1” is allocated for use as short codes, access codes, network identifiers, network test and routing codes. In the existing numbering plan, these codes are of variable digit lengths ranging from 3 to 7 digits.

5. Short codes are defined as those numbers which consist of no more than 7 digits in length. They are either used for services with high

²⁸ Please refer to the “Annex to ITU Operational Bulletin No. 994 – 15.XII.2011: *Dialling Procedures (International Prefix, National (Trunk) Prefix and National (Significant) Number) (In accordance with ITU-T Recommendation E.164)*” published by ITU-T, December 2011.

volume of traffic so that public telecommunications networks will not be unduly overloaded or where expeditious access by customers is required. For example, customer service hotlines provided by fixed network operators use short codes with leading digits “10” or “12” (e.g. short codes with leading digits “10” are assigned to fixed network operators as their customer enquiry hotline, “108X” is for directory enquiry service, etc.), whereas mobile network operators use short codes with leading digits “17” for the same purpose. The short code “112” is for access to emergency services via mobile networks. Short codes with leading digits “13” are dialled by users to indicate specific customer preferences, e.g. the code “133” can be dialled by the originating party for blocking the calling number display for an outgoing call. Leading digits “15” and “16” are used as access codes for the external telecommunications services provided by SBO licensees. Leading digits “18” are for services that involve high volume of traffic, e.g. “18501”, “18503” and “18508” are the enquiry hotlines for time and temperature, “184X” and “188X” are the hotlines for Hong Kong Jockey Club’s telebet services, etc.

6. Meanwhile, numbers with leading digits “14” are assigned for use as network identifiers by individual fixed network operators, and numbers with leading digits “19” are universally allocated to all operators for use as short codes for network testing and routing purposes. These network identifiers, network test and routing codes are used internally within the network infrastructure of each operator and will not be passed across networks of different operators.

7. Given the finite supply of codes in the “1X” level, these short codes are scarce resources. Any request for assignment or allocation of short codes or blocks of short codes will be closely scrutinised by the CA. As enough short codes should be reserved to cater for future needs, the CA does not consider it an option to allocate numbers with leading digit “1” for use as subscriber numbers at this juncture.

Leading Digit “2”

8. Numbers with leading digit “2” are mainly allocated as 8-digit fixed numbers, with the exception of “200”, “207”, “208” and “209”, which are assigned to four fixed network operators as the access codes for their calling card services. In addition, a total of 0.2 million numbers are reserved as Special Numbers²⁹ and are not available for allocation to licensees as

²⁹ Please refer to Footnote 3, paragraphs 41 and 42 of the consultation paper for more information about Special Numbers and Special Number Blocks. The following Special Number Blocks in the “2X” level are reserved: “202” and “222”.

subscriber numbers. In summary, a total of 9.4 million 8-digit numbers in the “2X” level are available for use as fixed numbers. As at 30 September 2015, 8.9 million numbers have already been allocated to the relevant licensees, leaving 0.5 million numbers unallocated, representing an allocation rate of 94.7% in the “2X” level for fixed services.

Leading Digit “3”

9. Similarly, numbers with leading digit “3” are also mainly allocated as 8-digit fixed numbers, except for those numbers in the “30X” level which are used as access codes for the value-added services provided by SBO licensees (e.g. external telecommunications services, dial-up internet services, teleconferencing services, etc.), and for numbers in the “32X” and “33X” levels which are reserved for future migration to a longer digit numbering plan.³⁰ Out of these 7 million numbers available for allocation as fixed numbers, 0.8 million numbers are reserved as Special Numbers.³¹ The total amount of 8-digit number resources in the “3X” level available for use as fixed numbers is, therefore, 6.2 million. As at 30 September 2015, 5.12 million numbers have been allocated to the relevant licensees, leaving 1.08 million numbers unallocated, representing an allocation rate of 82.6% in the “3X” level for fixed services.

Leading Digit “4”

10. Numbers with leading digit “4” are generally used as network numbers for internal routing purpose. Network numbers are special numbers with a maximum digit length of 12 that are used internally by licensees providing fixed or mobile services to support the implementation of fixed and mobile number portability. These numbers are used to provide call routing information for calls terminating to numbers ported from one network to another. At present, numbers in the “4(0-3)X”, “45(1-9)X” and “4(6-9)X” levels are allocated for use as network numbers. Numbers in the “44X” level in the existing numbering plan are reserved for future longer digit migration. Nevertheless, the currently available options for the future migration no longer require the use of these numbers, and hence they can be released for allocation for network numbers or other purposes. For the “450X” level, “4500X”

³⁰ In the existing numbering plan, the following number blocks in the “3X” level are also reserved for future migration to a longer digit numbering plan: “373”, “377”, “378”, “380”, “381”, “382”, “383” and “388”. Nevertheless, the currently available options for the future migration no longer require the use of these number blocks. Hence, these numbers blocks can in fact be released for allocation to fixed services.

³¹ The following Special Number Blocks in the “3X” level for fixed services are reserved: “313”, “343”, “345”, “353”, “363”, “373”, “383 and “393”. In addition, “303”, “323”, “333” are also reserved as Special Number Blocks.

numbers with digit length of 12 is allocated for M2M services and “450(1-9)X” numbers with digit length of 12 are reserved to meet the future demand for such services. In addition, a total of 8 number blocks with 3-digit prefixes in the “4X” levels are reserved as Special Numbers.³² As at 30 September 2015, a total of 38 number blocks in 3-digit prefixes have already been allocated to the relevant licensees, leaving 53 number blocks in 3-digit prefixes unallocated, representing an allocation rate of 41.8% in the “4X” level for use by network numbers. Alternatively, if the unallocated number resource in the “4X” level is counted in unit of 10k number blocks with respect to the 8-digit number format (i.e. number blocks in 4-digit prefixes), more unallocated number resource is in fact available, equivalent to an amount of 560 10k number blocks.

Leading Digit “5”

11. Numbers with leading digit “5” are allocated as 8-digit fixed numbers or mobile numbers. Number blocks in the “5(1-7)X” and “59X” levels are allocated for mobile services, whereas those in the “58X” level are allocated for use as subscriber numbers for Class 2 fixed services. Apart from these allocations, the number block with leading digits “500” is reserved for future use, whereas numbers in the “50(1-9)X” levels are used as codes for value-added SMS/MMS (“multi-media messaging services”), e.g. mobile content services provided by content service providers through SMS/MMS.

12. Out of the 8 million numbers allocated for mobile services in the “5(1-7)X” and “59X” levels, a total of 0.9 million numbers are reserved as Special Numbers.³³ Hence, the total amount of 8-digit number resources in the “5X” level available for use as mobile numbers is 7.1 million. As at 30 September 2015, 6.43 million numbers have already been allocated to the licensees, leaving 0.67 million numbers unallocated, representing an allocation rate of 90.6% in the “5(1-7)X” and “59X” levels for mobile services.

13. As for the “58X” level allocated for Class 2 fixed services, 0.1 million numbers are reserved as Special Numbers.³⁴ Hence, the total amount of 8-digit number resources in the “5X” level available for use as Class 2 fixed numbers is 0.9 million. As at 30 September 2015, 160,000 numbers have

³² The following Special Number Blocks in the “4X” level are reserved: “404”, “424”, “434”, “444”, “454”, “456”, “464” and “474”.

³³ The following Special Number Blocks in the “5X” level for mobile services are reserved: “515”, “525”, “535”, “545”, “555”, “565”, “567”, “575” and “595”. In addition, “505” is also reserved as a Special Number Block.

³⁴ The following Special Number Block in the “58X” level for Class 2 fixed services is reserved: “585”.

already been allocated to the relevant licensees, leaving 740,000 numbers unallocated, representing an allocation rate of 17.8% in the “58X” level for Class 2 fixed services.

Leading Digit “6”

14. Numbers with leading digit “6” are primarily allocated as 8-digit mobile numbers, except for those in the number block of “600” which are reserved for future use. In addition, a total of 0.5 million numbers are reserved as Special Numbers.³⁵ Hence, the total amount of 8-digit number resources in the “6X” level available for use as subscriber numbers for mobile services is 9.4 million. As at 30 September 2015, all 9.4 million numbers have been allocated to the relevant licensees for provision of mobile services and there is no number block in the “6X” level available for allocation.

Leading Digit “7”

15. Numbers with leading digit “7” are allocated for paging services, with number blocks in the “70(0-6, 8-9)X” levels reserved for future use. In addition, a total of 430,000 numbers are reserved as Special Numbers.³⁶ As a result, the total amount of 8-digit number resources in the “7X” level available for use as paging numbers is 8.67 million. As at 30 September 2015, 3.48 million numbers have already been allocated to the relevant licensees, leaving 5.19 million numbers unallocated, representing an allocation rate of 40.1% in the “7X” level for paging services.

Leading Digit “8”

16. Numbers with leading digit “8” are used for different services, including freephone numbers, personal number service and mobile services. Moreover, numbers in the “88X” level are reserved for future migration to a longer digit numbering plan.

Freephone Numbers

17. At present, freephone numbers occupy the “80X” level. These toll-free numbers are subscribed by international organisations or companies

³⁵ The following Special Number Blocks in the “6X” level are reserved: “626”, “636”, “666”, “678” and “686”.

³⁶ The following Special Number Blocks in the “7X” level are reserved: “707”, “717”, “727”, “737”, “767”, “787” and “797”. Among these blocks, 270k numbers in the Special Number Blocks “727”, “737”, “787” and “797” have already been allocated to paging operators, thereby giving 430k reserved Special Numbers in the “7X” level.

for the provision of international customer services or enquiry hotlines. Callers can make calls to these freephone numbers free of charge. The related call charges, irrespective of whether the call are made from overseas locations, will be borne by the subscribers of the freephone numbers. According to the existing numbering plan, freephone numbers are 9-digit in length. At present, freephone numbers with leading digits “800” are available for allocation, whereas freephone numbers with leading digits “801” to “807” and “809”³⁷ are reserved for future use.

Personal Number Service

18. Numbers in the “8(1-3)X” levels are used for personal number service, which provides users with an individual 8-digit personal number over which they may forward incoming calls to any other numbers that can reach them. Due to the lack of demand for this type of service, the former TA had ceased to allocate number blocks in the “8(1-3)X” levels to the eligible licensees, i.e. licensees for fixed services with effect from 1 January 2009.³⁸ Out of these 3 million numbers available for allocation to personal number service, 0.3 million numbers are reserved as Special Numbers.³⁹ It leaves 2.7 million subscriber numbers in the “8(1-3)X” levels available for personal number service. As at 30 September 2015, 1.72 million numbers have been allocated to the relevant licensees, leaving 0.98 million numbers unallocated, representing an allocation rate of 63.7% in the “8(1-3)X” levels.

Mobile Services

19. Numbers in the “8(4-7)X” and “89X” levels (excluding the “852X” level which is reserved to avoid confusion with Hong Kong’s country code) are allocated for mobile services.⁴⁰ Among these numbers, a total of 0.6

³⁷ The number block “808” is reserved as a Special Number Block.

³⁸ Pursuant to the outcome of the discussion at the 59th NAC meeting held in December 2008, it was approved that no new “81X” to “83X” level numbers would be allocated to the eligible licensees, i.e. licensees providing fixed services, with effect from 1 January 2009. Please refer to the NAC paper no. 2/2008 (http://tel_archives.ofca.gov.hk/en/ad-comm/nac/paper/nac2008p2.pdf) and the minutes of the 59th NAC meeting (http://tel_archives.ofca.gov.hk/en/ad-comm/nac/minutes/nacm59.html).

³⁹ The following Special Number Blocks in the “8(1-3)X” levels are reserved: “818”, “828” and “838”.

⁴⁰ Pursuant to the outcome of the discussion at the 4th meeting of the Telecommunications Regulatory Affairs Advisory Committee (“TRAAC”) held in August 2013, it was approved that the “8(4-7)X” and “89X” levels would be re-allocated for mobile services. Please refer to the TRAAC paper no. 4/2013 (http://www.ofca.gov.hk/filemanager/ofca/en/content_757/traac04_2013.pdf) and the minutes of the 4th TRAAC meeting (http://www.ofca.gov.hk/filemanager/ofca/en/content_756/traac_min04.pdf).

million numbers are reserved as Special Numbers.⁴¹ As a result, the total amount of 8-digit number resources in the “8(4-7)X” and “89X” levels available for use as mobile numbers is 4.3 million.

Leading Digit “9”

20. Numbers with leading digit “9” are mostly allocated for mobile services, except for those in the “900X” level which are used for information services, while those in the “911X” and “99X” levels are allocated or reserved for use by emergency services. In addition, a total of 0.4 million numbers in the “9X” level are reserved as Special Numbers.⁴² Hence, the total amount of 8-digit number resources in the “9X” level available for use as mobile numbers is 8.4 million. As at 30 September 2015, all 8.4 million numbers have already been allocated to the relevant licensees for the provision of mobile services and there is no number block in the “9X” level available for allocation.

21. A table providing a summary of the utilisation of the number levels is set out in the **Appendix**.

⁴¹ The following Special Number Blocks in the “8(4-7)X” and “89X” levels are reserved: “848”, “858”, “868”, “878”, “890” and “898”.

⁴² The following Special Number Blocks in the “9X” level are reserved: “929”, “939”, “959” and “989”.

Appendix to Annex A

Summary of Number Resources and Allocation Rates of Subscriber Numbers in the Existing 8-digit Numbering Plan

Lead -ing Digit	Total Amount of Number Resources (A)	Reserved for Other Uses (special services / future use / future longer digit migration) (B)	Available Sub. No. (C) =(A)-(B)	No. Reserved as Special Numbers (D)	Sub. No. that can be Allocated (E) =(C)-(D)	Sub. No. Already Allocated (F)	Allocation Rate (G) =(F)/(E)	Unallocated Sub. No. (H) =(E)-(F)
“0”	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
“1”	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
“2”	10,000,000	400,000	9,600,000	200,000	9,400,000	8,900,000	94.7%	500,000
“3”	10,000,000	3,000,000	7,000,000	800,000	6,200,000	5,120,000	82.6%	1,080,000
“4” ¹	100 blocks ¹	1 block ^{1,2}	99 blocks ¹	8 blocks ¹	91 blocks ¹	38 blocks ¹	41.8%	53 blocks ^{1,2}
“5”	10,000,000	1,000,000	8,000,000 <i>(mobile services)</i>	900,000 <i>(mobile services)</i>	7,100,000 <i>(mobile services)</i>	6,430,000 <i>(mobile services)</i>	90.6% <i>(mobile services)</i>	670,000 <i>(mobile services)</i>
			1,000,000 <i>(Class 2 fixed services)</i>	100,000 <i>(Class 2 fixed services)</i>	900,000 <i>(Class 2 fixed services)</i>	160,000 <i>(Class 2 fixed services)</i>	17.8% <i>(Class 2 fixed services)</i>	740,000 <i>(Class 2 fixed services)</i>
“6”	10,000,000	100,000	9,900,000	500,000	9,400,000	9,400,000	100%	0
“7”	10,000,000	900,000	9,100,000	430,000	8,670,000	3,480,000	40.1%	5,190,000
“8”	10,000,000	2,100,000	3,000,000 <i>(personal numbers)</i>	300,000 <i>(personal numbers)</i>	2,700,000 <i>(personal numbers)</i>	1,720,000 <i>(personal numbers)</i>	63.7% <i>(personal numbers)</i>	980,000 <i>(personal numbers)</i>
			4,900,000 <i>(mobile services)</i>	600,000 <i>(mobile services)</i>	4,300,000 <i>(mobile services)</i>	0 <i>(mobile services)</i>	0% <i>(mobile services)</i>	4,300,000 <i>(mobile services)</i>
“9”	10,000,000	1,200,000	8,800,000	400,000	8,400,000	8,400,000	100%	0

All figures above are as at 30 September 2015.

Remarks:

1. Numbers in the “4X” level are used as network numbers. The amount of number resources is calculated by making reference to the amount of number blocks in 3-digit prefix.
2. In the existing numbering plan, the “44X” level (excluding “444” level which is reserved under Special Number Blocks) is reserved for future longer digit migration. Nevertheless, the currently available options for the future migration no longer require the use of these number blocks. Hence, these numbers blocks can in fact be released for allocation as network numbers or other purposes. The “450X” level is allocated for M2M services.

**Estimation of the Monthly Number Consumption Rate
for Fixed Services**

The monthly number consumption rate for fixed services is estimated to be 13,000.

2. The monthly number consumption rate is estimated by making reference to the maximum of the 24-month moving average monthly consumption rate of fixed numbers over the 36-month period between October 2012 and September 2015 (see table below).

Month	24-month moving average monthly fixed number consumption rate	Month	24-month moving average monthly fixed number consumption rate
Sep 2015	7,917	Sep 2013	5,417
Aug 2015	7,917	Aug 2013	7,500
Jul 2015	8,333	Jul 2013	7,083
Jun 2015	6,250	Jun 2013	8,333
May 2015	6,250	May 2013	8,333
Apr 2015	6,667	Apr 2013	8,333
Mar 2015	6,667	Mar 2013	8,333
Feb 2015	6,667	Feb 2013	8,333
Jan 2015	5,833	Jan 2013	8,333
Dec 2014	5,833	Dec 2012	8,333
Nov 2014	5,833	Nov 2012	11,250
Oct 2014	5,833	Oct 2012	12,917
Sep 2014	4,167		
Aug 2014	4,167		
Jul 2014	4,167		
Jun 2014	6,250		
May 2014	5,833		
Apr 2014	6,250		
Mar 2014	4,583		
Feb 2014	4,583		
Jan 2014	5,000		
Dec 2013	5,000		
Nov 2013	5,417		
Oct 2013	5,417		

Remarks:

The highest consumption rate in the past 36 months.

**Estimation of the Monthly Number Consumption Rate
for Class 2 Fixed Services**

The monthly number consumption rate for Class 2 fixed services is estimated to be 3,200.

2. The monthly number consumption rate is estimated by making reference to the maximum of the 24-month moving average monthly consumption rate of the subscriber numbers for Class 2 fixed services over the 36-month period between October 2012 and September 2015 (see table below).

Month	24-month moving average monthly Class 2 fixed number consumption rate	Month	24-month moving average monthly Class 2 fixed number consumption rate
Sep 2015	1,042	Sep 2013	2,500
Aug 2015	1,042	Aug 2013	2,583
Jul 2015	3,125	Jul 2013	500
Jun 2015	2,708	Jun 2013	917
May 2015	2,708	May 2013	917
Apr 2015	2,708	Apr 2013	917
Mar 2015	2,708	Mar 2013	917
Feb 2015	2,375	Feb 2013	1,333
Jan 2015	2,375	Jan 2013	1,750
Dec 2014	2,375	Dec 2012	1,750
Nov 2014	2,375	Nov 2012	1,750
Oct 2014	2,375	Oct 2012	1,750
Sep 2014	2,375		
Aug 2014	1,958		
Jul 2014	1,958		
Jun 2014	1,542		
May 2014	1,542		
Apr 2014	1,542		
Mar 2014	1,667		
Feb 2014	1,667		
Jan 2014	1,667		
Dec 2013	1,667		
Nov 2013	2,083		
Oct 2013	2,083		

Remarks:

 The highest consumption rate in the past 36 months.

**Estimation of the Monthly Number Consumption Rate
for Mobile Services**

The monthly number consumption rate for mobile services is estimated to be 133,000.

2. The monthly number consumption rate is estimated by making reference to the maximum of the 24-month moving average monthly consumption rate of the 8-digit mobile numbers over the 36-month period between October 2012 and September 2015 (see table below).

Month	24-month moving average monthly mobile number consumption rate	Month	24-month moving average monthly mobile number consumption rate
Sep 2015	35,000	Sep 2013	116,875
Aug 2015	34,617	Aug 2013	116,875
Jul 2015	38,333	Jul 2013	120,208
Jun 2015	43,750	Jun 2013	118,125
May 2015	47,917	May 2013	118,125
Apr 2015	48,333	Apr 2013	117,708
Mar 2015	52,083	Mar 2013	122,292
Feb 2015	52,083	Feb 2013	130,625
Jan 2015	50,000	Jan 2013	132,708
Dec 2014	54,167	Dec 2012	128,542
Nov 2014	52,917	Nov 2012	128,542
Oct 2014	52,917	Oct 2012	132,708
Sep 2014	57,083		
Aug 2014	55,417		
Jul 2014	67,083		
Jun 2014	70,417		
May 2014	82,083		
Apr 2014	86,250		
Mar 2014	90,417		
Feb 2014	97,083		
Jan 2014	101,875		
Dec 2013	102,292		
Nov 2013	106,042		
Oct 2013	102,708		

Remarks:

The highest consumption rate in the past 36 months.

**Estimation of the Social and Economic Costs
for Migration to a Longer Digit Numbering Plan**

With a view to arriving at a preliminary estimate on the social and economic costs associated with the migration to a longer digit numbering plan, OFCA commissioned an independent consultant in mid 2015 to conduct a quantitative assessment of the costs to be incurred by the community if the migration to a longer digit numbering plan is to proceed at this juncture.

2. According to the consultant, the total costs amount to **HK\$ 1,098 million**, with breakdown given below:

Categories of Affected Parties	Estimated cost
Individual users	HK\$ 75 million
Business users	
(i) Small and medium size enterprises	HK\$ 626 million
(ii) Large business	HK\$ 294 million
(iii) Government users	HK\$ 18 million
Fixed and mobile network operators	HK\$ 85 million
<i>Total</i>	<i>HK\$ 1,098 million</i>

Methodology of the Cost Estimation

3. The study has examined the costs to be incurred for the following parties in respect of the migration:

- (a) Individual users;
- (b) Business users, which are categorised into small and medium size enterprises; large businesses; and government users; and
- (c) Fixed and mobile network operators.

4. While the cost for individual users is primarily attributable to the update of their phonebooks, the cost components for business and government users are more diverse, including the replacement of stationery, replacement of advertising and promotional materials, replacement of signage, updating of equipment and databases, and the associated administration costs. For certain larger business users, their existing corporate telecommunications systems may not be capable of supporting a longer digit numbering plan and hence it will lead to capital expenditure for necessary equipment upgrade.

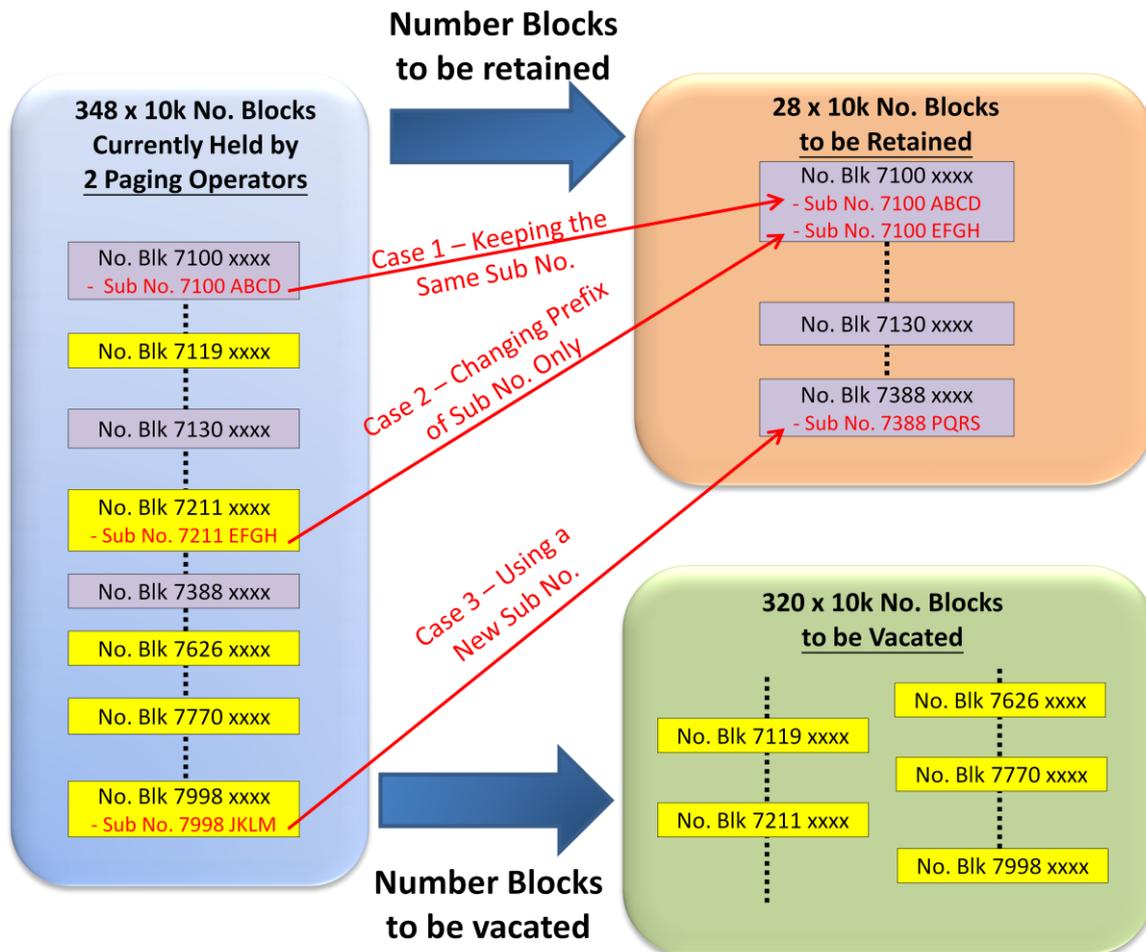
5. As for the fixed and mobile network operators, the cost components may include reprogramming their exchanges, updating internal systems (such as directory databases and enquiry systems, number portability system, voicemail system, billing system, customer services system etc.), updating payphones, replacement of systems that cannot support subscriber numbers beyond 8 digits, handling of misdialled calls and parallel running of systems, as well as customer service staff training and publicity campaign.

6. The study has made reference to the cost estimated by the Office of Communications of the United Kingdom in 2012, and adjustments have been made to reflect the cost difference between Hong Kong and the United Kingdom.

7. Apart from the above cost estimates, there are other intangible costs to the community associated with the migration to a longer digit numbering plan. Some of these intangible cost items include reputational costs of telecommunications network operators and businesses in situations when the change in numbers leads to unpleasant experience of their customers, inconvenience and the time spent for callers to dial longer numbers, potential loss of business due to lost traffic or misdialled calls, etc. Such intangible costs are not quantified and hence are excluded from the cost model of the consultant.

Proposed Arrangement for the Relocation of Paging Numbers

The information shown in the following diagram is for the purpose of **illustrating, as an example**, the proposed arrangement on the reallocation of active paging numbers in blocks with fewer active users to certain blocks with more active users. If the relocation of paging numbers is to be implemented, OFCA and the concerned parties will work out the actual arrangements.



The twenty eight 10k number blocks that the two paging operators prefer to use for housing paging subscribers after the paging numbers relocation exercise are listed below:

7100xxxx, 7111xxxx, 7169xxxx, 7225xxxx, 7291xxxx,
 7301xxxx, 7304xxxx, 7306xxxx, 7308xxxx, 7309xxxx,
 7321xxxx, 7323xxxx, 7327xxxx, 7328xxxx, 7330xxxx,
 7334xxxx, 7335xxxx, 7336xxxx, 7339xxxx, 7371xxxx,
 7372xxxx, 7373xxxx, 7382xxxx, 7384xxxx, 7388xxxx,
 7128xxxx, 7129xxxx, 7130xxxx

List of Special Number Blocks
Currently Under Reserve in the Numbering Plan

Number Level	Service Type / Usage	Special Number Blocks Reserved	
		Prefix	Quantity (x)
2x	Fixed	202, 222	200k
3x	Fixed	313, 343, 345, 353, 363, 373, 383, 393	800k
	Access Code	303	100k
	Reserved for Future Migration	323, 333	200k
4x	Network Number (proposed to be re-allocated for Mobile)	404, 424, 434, 444, 454, 456, 464, 474	800k
5x	Mobile	515, 525, 535, 545, 555, 565, 567, 575, 595	900k
	Class 2 Fixed	585	100k
6x	Mobile	626, 636, 666, 678, 686	500k
7x	Paging (proposed to be re-allocated for Mobile)	707, 717, 727, 737	400k ^(Note 1)
	Paging (to be reserved for future migration)	767, 787, 797	300k ^(Note 2)
8x	Freephone	808	1000k ^(Note 3)
	Personal Number (proposed to be re-allocated for Mobile)	818, 828, 838	300k
	Mobile	848, 858, 868, 878, 890, 898	600k
	Reserved for Future Migration	888	100k
9x	Mobile	929, 939, 959, 989	400k
Sub-total - Fixed Numbers			1.00 mil
Sub-total - Mobile Numbers (including those proposed to be re-allocated for mobile services)			3.90 mil
Sub-total - Class 2 Fixed Numbers			0.10 mil
Sub-total - Access Code			0.10 mil
Sub-total - Numbers Reserved for Future Migration			0.60 mil
Total Numbers in Special Number Blocks (excluding freephone numbers)			5.70 mil

Remarks:

- Note 1: 100k numbers in the Special Number Blocks “727” and “737” have been allocated to paging operators. Upon completing the proposed paging numbers relocation exercise, all these 100k numbers will be released, making available a total of 400k vacant numbers in the “7(0-3)X” levels for allocation.
- Note 2: 170k numbers in the Special Number Blocks “787” and “797” have been allocated to paging operators. Upon completing the proposed paging numbers relocation exercise, all these 170k numbers will be released, making available a total of 300k vacant numbers in the “7(4-9)X” levels for allocation.
- Note 3: In the numbering plan, freephone numbers in the “80X” level are of 9-digit in length. The Special Number Block “808” has a total of 1 million numbers which are available freephone numbers.

Proposed List of Special Number Blocks To be Kept in Reserve Continually

Number Level	Service Type / Usage	Special Number Blocks to be Reserved	
		Prefix	Quantity (y)
2x	Fixed	2020, 2222	20k
3x	Fixed	3131, 3434, 3456, 3535, 3636, 3737, 3838, 3939	80k
	Access Code	303 ^(Note 1)	100k
	Reserved for Future Migration	323 ^(Note 2) , 333 ^(Note 2)	200k
4x	Network Number (proposed to be re-allocated for Mobile)	4040, 4242, 4343, 4444, 4545, 4567, 4646, 4747	80k
5x	Mobile	5151, 5252, 5353, 5454, 5555, 5656, 5678, 5757, 5959	90k
	Class 2 Fixed	5858	10k
6x	Mobile	6262, 6363, 6666, 6789, 6868	50k
7x	Paging (proposed to be re-allocated for Mobile)	7070, 7171, 7272, 7373	40k
	Paging (to be reserved for future migration)	767 ^(Note 3) , 787 ^(Note 3) , 797 ^(Note 3)	300k
8x	Freephone	808 ^(Note 4)	1000k
	Personal Number (proposed to be re-allocated for Mobile)	8181, 8282, 8383	30k
	Mobile	8484, 8585, 8686, 8787, 8989	50k
	Reserved for Future Migration	888 ^(Note 2)	100k
9x	Mobile	9292, 9393, 9595, 9898	40k
Sub-total - Fixed Numbers			0.10 mil
Sub-total - Mobile Numbers (including those proposed to be re-allocated for mobile services)			0.38 mil
Sub-total - Class 2 Fixed Numbers			0.01 mil
Sub-total - Access Code			0.10 mil
Sub-total - Numbers Reserved for Future Migration			0.60 mil
Total Numbers to be Reserved (excluding freephone numbers)			1.19 mil

Remarks:

- Note 1: The Special Number Block “303” has been reserved for use as access codes for value-added telecommunications services and hence will not be available for allocation for use as subscriber numbers.
- Note 2: Special Number Blocks “323”, “333” and “888” will continue to be reserved to cater for future longer digit migration and will not be available for allocation for use as subscriber numbers.
- Note 3: Special Number Blocks “767”, “787” and “797” will continue to be reserved to cater for future migration to a 9-digit numbering plan under Measure 1 as proposed in the consultation paper. The numbers will not be available for allocation for use as subscriber numbers.
- Note 4: In the numbering plan, freephone numbers in the “80X” level are of 9-digit in length. The Special Number Block “808”, with a total of 1 million 9-digit numbers, will be kept in reserve for use as freephone numbers.

**Amount of Numbers within the Existing Special Number Blocks
Proposed to be Released**

Number Level	Service Type / Usage	Amount of Special Numbers Currently Reserved (x)	Amount of Special Numbers Proposed to be Reserved (y)	Amount of Numbers to be Released (z)=(x)-(y)
2x	Fixed	200k	20k	180k
3x	Fixed	800k	80k	720k
	Access Code	100k	100k	-
	Reserved for Future Migration	200k	200k	-
4x	Network Number (proposed to be re-allocated for Mobile)	800k	80k	720k
5x	Mobile	900k	90k	810k
	Class 2 Fixed	100k	10k	90k
6x	Mobile	500k	50k	450k
7x	Paging (proposed to be re-allocated for Mobile)	400k	40k	360k
	Paging (to be reserved for future migration)	300k	300k	-
8x	Freephone	1000k	1000k	-
	Personal Number (proposed to be re-allocated for Mobile)	300k	30k	270k
	Mobile	600k	50k	550k
	Reserved for Future Migration	100k	100k	-
9x	Mobile	400k	40k	360k
Sub-total - Fixed Numbers				
		1.0 mil	0.1 mil	0.9 mil
Sub-total - Mobile Numbers (including those to be re-allocated for mobile services)				
		3.9 mil	0.38 mil	3.52 mil
Sub-total - Class 2 Fixed Numbers				
		0.1 mil	0.01 mil	0.09 mil
Sub-total - Access Code				
		0.1 mil	0.1 mil	-
Sub-total - Numbers Reserved for Future Migration				
		0.6 mil	0.6 mil	-
Total Numbers (excluding freephone numbers)				
		5.7 mil	1.19 mil	4.51 mil

**Amount of Numbers Made Available for Mobile Services
by the Proposed Measures**

	Available Numbers for Mobile Services (million)	Estimated No. of Months that the Available Numbers can Meet the Demand for Mobile Numbers^(Note 1) (month)
Measure 1	3.2	24
Measure 2	5.6	42
Measure 3	0.98	7
Measure 4	2.42	18
Measure 5		
(a) Measure 5 only	2.17 ^(Note 2)	16
(b) with Measures 2 and 3	3.16 ^(Note 3)	24
(c) with Measures 1, 2 and 3	3.52 ^(Note 4)	26

Remarks:

Note 1: Assuming the monthly number consumption rate for mobile services at 133,000. Please refer to **Annex B3** for details.

Note 2: If only Measure 5 is implemented, a total of 2.17 million numbers in the Special Number Blocks in the “5X”, “6X”, “8X” and “9X” levels will be released for allocation to mobile services. Please refer to **Annex F2** for the breakdown of the available numbers released in the related number levels.

Note 3: If Measures 2 and 3 are implemented together with Measure 5, in addition to the 2.17 million numbers being released (as cited in Note 2 above), a further 0.99 million numbers in the Special Number Blocks in the “4X” and “8(1-3)X” levels will be released for allocation to mobile services. Please refer to **Annex F2** for the breakdown of the available numbers released in the related number levels.

Note 4: If Measure 1 is implemented together with Measures 2, 3 and 5, in addition to the 3.16 million numbers being released (as cited in Note 3 above), a further 0.36 million numbers in the Special Number Blocks in the “7X” level will be released for allocation to mobile services. Please refer to **Annex F2** for details.