CONSULTATION PAPER ISSUED BY THE INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE

PROPOSED MACHINE-TO-MACHINE ("M2M") ACCESS CODE ALLOCATION FRAMEWORK

11 April 2013

CONSULTATION PAPER

PUBLIC CONSULTATION ON THE PROPOSED MACHINE-TO-MACHINE ("M2M") ACCESS CODE ALLOCATION FRAMEWORK

PART I: OBJECTIVE

1. The objective of this consultation is to obtain views and comments from the industry on the proposed machine-to-machine ("**M2M**") Access Code allocation framework to be included in the National Numbering Plan ("**NNP**").

PART II: BACKGROUND

2. In developing the framework that governs the allocation and use of telephone number resources, IDA has to strike a balance in ensuring that the framework will facilitate market innovation while ensuring that the limited number resources are used efficiently and optimally.

3. In recent years, various analyst reports and market forecast for M2M technology and its application have projected exciting growth potential for this market. The GSMA Asia Pacific Mobile Observatory 2011 report estimated that by end of 2011, there were 2 billion M2M connections globally, with about 740 million M2M connections in Asia Pacific. The same report stated that by 2020, the global M2M connections are expected to reach 13 billion, with the Asia-Pacific region expected to contribute around 41% of these total connections[1]. On 07 Feb 2013, the M2M World News published a report on the trend of M2M and forecast 18 billion M2M connections by 2022.

4. M2M typically uses the mobile telephony and/or Internet platforms to connect devices such as sensors and meters with computers to enable remote control of these equipment. Some of the typical applications are in areas such as surveillance equipment and alarms, transport, automation and reading of meters for electricity power and gas. The introduction of M2M technology and applications are also seen in Singapore in the recent months.

5. IDA assessed that it is not clear, when non-Mobile Subscriber Integrated Services Digital Network-Number ("**non-MSISDN**") identification and addressing standards, e.g., IPv6, for communication amongst M2M devices will be finalised and become mainstream for M2M addressing purposes. It would be appropriate that a numbering or an addressing framework to be developed in the meantime to facilitate the development and growth of M2M communication and services.

[1] Sources: Asia Pacific Mobile Observatory 2011, by GSMA, http://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/amofullwebfinal.pdf ; and M2M World News, "*Are we ready to profit a $1.2 trillion M2M market in the Internet of Things?*", http://m2mworldnews.com/2013/02/07/64712-are-we-ready-to-profit-a-1-2-trillion-m2m-market-in-the-internet-of-things/.

Pilot M2M Framework

6. In 2010, IDA evaluated the M2M data communication requirement and noted that M2M devices and machines need to be uniquely identified over Licensees networks. The demand for numbering or addressing resources for M2M communication will not be constrained by the size of Singapore's population. Therefore, the quantity of M2M devices and machines, if pervasively deployed, is expected to experience exponential growth and could reach millions within a few years.

7. In developing the pilot M2M framework in 2010, IDA assessed that it would not be appropriate to open up existing telephone number levels for M2M services as these number levels are established primarily for persons-to-persons telecommunication. For instance, the NNP provided the 8-digit number levels for fixed-line telephone services (starting with prefix "6") and mobile telephone services (starting with prefixes "8" and "9"), took into consideration the total capacity to cater for the long-term growth of these services and the ease of dialling by users. Allowing M2M services to use these number levels may exhaust the numbering capacity much sooner than expected.

8. To ensure that there is sufficient numbering capacity for all M2M devices and machines in the future, and to differentiate M2M services from other services, IDA has reserved a block of 4-digit M2M Access Code (i.e. "144X") for M2M services. IDA also took the view that a maximum digit length should be adopted. Based on the International Telecommunication Union ("**ITU**") E.164 numbering format, Singapore would allow numbers of up to 13-digit length, using the designated 4-digit Access Code (excluding the country code), based on current network routing technology and arrangements.

9. During the pilot phase, a licensee interested to provide M2M services would be allocated a unique 4-digit M2M Access Code. Licensees are permitted to extend the M2M Access Code to generate and permutate the required M2M numbers to be assigned to M2M devices or machines.

10. IDA did not stipulate further requirements on the use of the M2M Access Code issued by IDA in the pilot phase as it preferred to monitor M2M technology and business trends and developments before firming up the framework under the NNP.

M2M Evolution

11. IDA noted that many manufactures and equipment vendors have introduced new and innovative solutions for M2M services in the recent years. Besides data communication between devices, manufactures have allowed human intervention, e.g., allowing voice calls, in their M2M product design.

12. Many M2M service providers use mobile networks to set up communication for device access because mobile network is able to provide the coverage and service availability which is crucial for M2M communication. Furthermore, mobile roaming capability helps to ensure the M2M communication continue to function

when the M2M device or machine is overseas. M2M devices which are meant to be used globally are projected to generate substantial mobile roaming traffic over the next few years[2].

13. In view of the developments, IDA has reviewed the pilot M2M Access Code allocation framework with the aim of facilitating greater market innovation and improvement in the M2M Access Code utilisation.

PART III: PROPOSED M2M ACCESS CODE ALLOCATION FRAMEWORK

M2M Definition

14. The following M2M service definition is proposed for the use of M2M Access Code:

"*M2M communication refers to the automated communication between machines and devices. In cases where M2M communication includes voice communication, these shall mean voice services within a pre-defined service feature and/or within an intended or a closed user group".*

Question 1

a) IDA invites views and comments if the M2M service definition is suitable for the current and future M2M service development.

M2M Numbering Format and Charges

15. Both Facilities-based Operation ("**FBO**") Licensees and Service-based Operation (Individual) ("**SBO (I)**") Licensees intending to offer M2M services will be allowed to apply for an M2M Access Code. To better ensure optimal use of the allocated numbering resources, IDA intends to specify a 5-digit Access Code (i.e. "144XX") for M2M services and allow qualifying Licensees to self manage the rest of the following digits to form the M2M number. IDA encourages Licensees to utilise the full 13-digit (including the M2M Access Code) to maximise the addressing capacity. For example, if IDA allocates "14401" to Operator A, Operator A may extend the 5-digit M2M Access Code to a range of M2M numbers (e.g., from 14401 0000 0000 to 14401 9999 9999) for M2M addressing purposes. With 13 digits, each 5-digit number level will allow a total of 100 million numbers.

16. To facilitate ease of M2M Access Code adoption and at the same time to ensure effective use of the M2M numbers to the fullest extent possible, IDA proposes the following charging framework to be adopted:

[2] The survey conduct by MACH (http://www.mach.com) in 2012, which surveyed more than 100 representatives from global mobile network operators and communication service providers, found that more than three-quarters believe Wi-Fi (79%) and M2M roaming (77%) represent a great opportunity for revenue generation. The survey also noted that 22% of operators surveyed are already offering M2M specific roaming agreements, with 42% of operators expecting to put these in place within the next two years.

a. FBO Licensees may apply for up to three M2M Access Codes without charge. For each subsequent M2M Access Code allocated after the third Access Code, a fee of $10,000 per 5-digit M2M Access Code will be levied. IDA will allow international connectivity and international roaming[3] using the Access Code allocated.

b. SBO(I) Licensees may apply for up to two M2M Access Code without charge. For each subsequent M2M Access Code allocated after the second Access Code, a fee of $10,000 per 5-digit M2M access code will be levied.

c. Licensees allocated with M2M Access Codes are required to put the Codes into service within 12 months from the date of assignment by IDA. If the Licensees failed to fulfil the condition stated, IDA shall recover the allocated M2M Access Code and a "Recovery Fee" of $20,000 will be levied before Licensees can apply for further M2M Access Codes.

Question 2

a) IDA invites views and comments on M2M technology and market development, particularly views on estimated number of M2M devices and machines, and types of applications and services in the next 5 to 8 years.

b) IDA invites views and comments on the estimated timeframe for the establishment of non-MSISDN identification and addressing standards (e.g., IPv6) for M2M services and when this option will become mainstream for M2M addressing purposes.

c) IDA invites views and comments on IDA's proposed 5-digit M2M Access Code '144XX' (where 'X' is from '0 to 9'), particularly on any usability issues if 13-digit numbers are used for M2M addressing in the areas of domestic, international interconnectivity and international roaming.

d) IDA welcomes views and comments on the proposed charging arrangements for the M2M Access Code.

e) IDA invites any other views and comments on the management of M2M addressing to facilitate market innovation and to ensure efficient use of the numbering resources allocated.

Transition Arrangement

17. Licensees intending to provide M2M services will be required to comply with the M2M Access Code allocation framework when finalised. For Licensees who have been allocated with the 4-digit M2M Access Code during the pilot phase,

[3] M2M international interconnectivity refers to an M2M device in Singapore using a Singapore M2M number to communicate with a device or service outside Singapore, while international roaming refers to an M2M device with a Singapore M2M number that can continue to be used overseas outside of the Singapore networks.

IDA will work with them separately to align the finalised allocated numbers with the new M2M Access Code framework.

PART IV: INVITATION TO COMMENT

18. IDA hereby invites interested parties to submit written comments on the issues and proposals raised in this consultation paper.

19. Respondents are also invited to comment on any other issues not covered in this consultation document, but which are considered relevant to the review of the National Numbering Plan to facilitate M2M development and growth. IDA will consider the inputs submitted when making its decision.

20. All views and comments should be submitted in writing and send to IDA in both hard and soft copies (preferably in Microsoft Word format). Submissions should reach IDA by **12 noon, 10 May 2013**. Respondents are required to include their personal or company particulars, correspondence address, contact number and email address in their submissions.

21. All submissions should be addressed to:

    Aileen Chia (Ms)
    Deputy Director-General (Telecoms and Post)
    Info-communications Development Authority of Singapore
    10 Pasir Panjang Road
    #10-01 Mapletree Business City
    Singapore 117438

    AND

    Please submit soft copies via email with the email header “M2M Access Code Allocation Framework” to IDA_Consultation@ida.gov.sg.
    Hard copies may submit via fax to +65 6659 2502.

22. IDA reserves the right to make public all or part of any written submissions made in response to this consultation, and to disclose the identity of the respondent. Any part of the submission which respondent considers as commercially sensitive must be clearly marked and placed as a separate annex to the comments raised. IDA will take this into consideration when disclosing the information submitted.