REGULATION OF INTERNET PROTOCOL (IP) TELEPHONY

Statement of the Telecommunications Authority

20 June 2005

INTRODUCTION

On 4 October 2004, the Telecommunications Authority (TA) issued a consultation paper on "Regulation of Internet Protocol (IP) Telephony" (the Consultation Paper). The Consultation Paper aimed at soliciting the views and comments from the industry and interested parties on significant issues related to IP Telephony services, namely (a) policy and licensing, (b) numbering resources, (c) interconnection and charge settlement and (d) consumer and other issues. The views collected were considered by the TA in formulating the regulatory framework for the emerging IP Telephony services in the market.

2. All stakeholders including the industry, consumer interest groups and the public have been invited to comment on all aspects of the proposals and related questions put forward in the Consultation Paper. By the closing of the consultation period, the TA received a total of 38 submissions from the following respondents:

Companies

- AT&T Global Network Services Hong Kong Ltd.
- China Resources Peoples Telephone Company Limited
- CM Tel (HK) Ltd.
- e-Kong Group Limited
- EasyLink Networks & Belgravia Group (Asia) Limited (ELN)
- HKdotCOM Ltd.
- Hong Kong Broadband Network Limited
- Hong Kong Cable Television Limited
- Hong Kong CSL Limited
- Hutchison Global Communications Limited
- Interactive Broadband Services Ltd. (iBBS)
- Microsoft Corporation
- New World Telecommunications Limited
- Pacific Supernet Limited

- PCCW-HKT Telephone Limited
- REACH Networks Hong Kong Limited
- SmarTone Mobile Communications Limited
- SUNDAY o/b Mandarin Communications Limited
- Systech Telecom Limited
- Wharf T&T Limited
- Zone Limited

Organisations

- The Computing Technology Industry Association (CompTIA)
- Consumer Council
- Hong Kong Internet Registration Corporation Limited (HKIRC)
- Hong Kong Internet Service Providers Association (HKISPA)
- Hong Kong Wireless Technology Industry Association (WTIA)
- Hong Kong Telecommunications User Group (HKTUG)
- International Chamber of Commerce (ICC)
- The Law Society of Hong Kong
- Senior Citizen Home Safety Association (SCHSA)
- The Society of Hong Kong External Telecommunications Service Providers

Individuals

- Dr. Xu Yan
- Mr. Eric Kwan
- Ms. Chan
- Dr. John Ure
- Legislative Councillor Hon Sin Chung Kai, JP

Telecommunications Numbering Advisory Committee (NAC) members

- PCCW-HKT Telephone Limited
- Wharf T&T Limited

3. The submissions can be downloaded from Office of the Telecommunications Authority (OFTA)'s website at www.ofta.gov.hk and a summary of these submissions is given in **Annex**. Having duly considered the submissions, the TA sets out in this Statement his considered views and decisions on the framework for the regulation of IP Telephony.

4. In this Statement, the term "IP Telephony" includes services that integrate voice with other types of communications such as data, text, image, video or multimedia conveyed partially or wholly over packet-switched networks, which comprise the public Internet and managed IP-based networks. "IP Telephony" has the same meaning as "Voice over Internet Protocol" or "VoIP". "IP Telephony" services in the three communications modes of (a) computer-to-computer, (b) computer-to-phone or phone-to-computer and (c) phone-to-phone may be provided by the relevant licensees subject to their fulfilment of the relevant licensing conditions.

5. For the avoidance of doubt, this Statement concerns only the framework for regulation of IP Telephony services as public telecommunications services. The operation of IP-based networks and services for private communications within an organisation continues to be not subjected to any licensing requirements.

REGULATORY ISSUES OF IP TELEPHONY

(A) Policy and licensing

Policy

6. With the support from the respondents to the Consultation Paper, the TA decides to adopt the following as the basic guiding principles in formulating the regulatory framework for IP Telephony:

(a) Apply the minimum and proportionate regulation on IP Telephony. The objectives of the regulation are to enhance long-term consumer interest and promote efficient investment in the telecommunications sector.

(b) Continue upholding "technology neutrality" as one of the principles in the regulation of public telecommunications networks and services including IP Telephony. Operators should be able to adopt, under their respective licences, any technologies provided that they operate

within the scope authorised, and comply with the conditions, under the licences.

(c) Continue to play a facilitator role so that the market should be allowed to manage the shape and pace of the transition to the IP-based operating environment. OFTA will ensure that the transition would take place in an orderly manner so as not to cause confusions to consumers and operators.

Provision by services-based operators

7. The majority of the views from the respondents indicated their support of allowing the services-based operators to provide IP Telephony services, in addition to the facilities-based operators[1]. Nevertheless, some of them opined that the rights of services-based operators in the provision of IP Telephony services should be limited and they should not be allowed to offer services similar to the existing conventional telephone services offered by Fixed Telecommunications Network Service (FTNS)/Fixed Carrier (FC) licensees.

8. The TA does not agree with the views that services-based operators should be barred from entering a particular sector of the services market. IP Telephony technologies enable the separation of services provision from facilities operation. Services-based operators are also capable of providing services that can meet demand in the market although this class of operators needs to rely on the facilities operators for the infrastructure for conveyance.

9. The TA notes that overseas administrations with similar liberalisation policies in the USA, Canada, UK, Japan, Singapore and Australia invariably have allowed not only facilities-based operators but also services-based operators to compete in the services market, including that for the provision of local voice telephony services. In other words, there is no requirement for the local voice telephony services to be solely provided by facilities-based operators.

10. In Hong Kong, in the service sectors other than local voice services, our existing regime allows the services-based operators (e.g. external

[1] In this Statement, "facilities-based operators" means a carrier who establishes and maintains facilities for transmission across unleased land and public streets. "Services-based operators" means operators who provide services using the transmission facilities of carriers. "Services-based operators" may establish and maintain facilities such as switches, routers, servers within buildings and leased land.

telecommunications services (ETS) licensees and Internet Service Providers (ISPs)) to offer IDD services and Internet access services in competition with the facilities-based operators. Given that the telecommunications market has been fully liberalized since January 2003, there should not be any regulatory barriers against the entry of services-based operators into any sector of the telecommunications market (unless physical constraints limiting the entry exist). Participation by services-based operators would enhance competition and consumer interest. Therefore, the TA cannot identify any reason for disallowing services-based operators to provide local voice telephony services of the nature similar or equivalent to the conventional telephone services.

11. The TA does agree that there should be level playing field between the facilities-based operators and the services-based operators in the provision of services. The TA decides to introduce a regulatory and licensing regime such that services-based operators can be authorised to enter the market to operate the local voice telephony services under licence conditions equivalent to those applicable to facilities-based operators for the operation of the equivalent classes of services. The major differences between FTNS/FC licensees and the services-based operators would be that the former have the additional rights and obligations related to rollout and operation of network facilities such as road opening, building access, sharing of facilities, etc. while the latter would not have these rights and obligations.

Licensing framework

12. Regarding the issue of whether a full set of licensing conditions under the current FTNS/FC licence or a sub-set of those conditions should be applied to IP Telephony services, there are two groups of views among the respondents. One group supports the application of the full set of FTNS/FC licensing conditions while the other group considers that only some of the conditions need to be applied.

13. In considering these comments, the TA considers that there can be a variety of IP Telephony services in the market with different capabilities and characteristics to meet the demand of different groups of users. IP Telephony regulation should not restrict the diversity and innovation of IP Telephony services which should be driven by the consumer demand and technological capabilities. In other words, in the market there would be services which have attributes similar to those of the conventional telephone services as well as those

which do not. For consumer protection, consumers should be able to readily distinguish between the two classes of services.

14. The TA maintains his view that operators providing like services should be regulated in like manner. This should be irrespective of whether they are facilities-based or service-based. To ensure a level playing field, the TA considers that it is reasonable to impose the equivalent of the relevant FTNS/FC licensing conditions to IP Telephony service providers[2] who market their local voice telephony services to the customers with service attributes similar to those of the conventional telephone services. However, it would be onerous if such FTNS/FC licensing conditions were to be fully applied to those IP Telephony service providers who are not offering customers with service attributes comparable to those of the conventional telephone services. The TA is of the view that a minimal set of licence conditions should be more appropriate for this type of IP Telephony services in order not to restrict unduly the shape of future development of this class of services. The TA would explain in detail in the later sections these service attributes.

15. Based on the above considerations, the TA adopts a two-class licensing approach for IP Telephony services. Services under Class 1 are those services that have all the attributes of the conventional telephone services and are required to fulfil the licensing conditions of FTNS/FC licences relevant to the provision of local voice telephony services. Class 2 services are those services that do not have all the attributes of the conventional telephone services and are only subject to minimal licensing conditions with the main purpose to protect consumer interests and safeguard fair competition.

16. To simplify the licensing arrangement, the TA would allow the existing FTNS/FC licensees to operate both Class 1 and 2 services under their existing FTNS/FC licences without the need for them to apply for separate service-based operator licences. However, certain licence conditions are irrelevant to the operation of Class 2 services. If they wish to waive the applicability of these licence conditions for the operation of Class 2 services, there is a need for them to seek appropriate licence amendments from the TA. It involves the replacement of a FTNS licence with a FC licence, if applicable, and/or amendment of certain conditions under the existing FC licence so as to waive their applicability to the operation of Class 2 services. In order to

[2] In this document, the term "service provider" refers to the provider of a service which may be facilities-based or services-based.

differentiate the Class 1 and 2 services provided by the same FTNS/FC licensee under a FC licence, the TA will, in the course of licence amendment, insert a licence condition to the effect that the FTNS/FC licensee has the obligation of complying with the licence conditions in full for its local telephony services unless it declares that its service is a Class 2 service in all marketing materials (e.g. advertisements, tariffs, etc.) and inform customers about the capabilities and limitations of the Class 2 service it offers[3].

17. The TA will create a new licence for services-based operators for the operation of Class 1 and Class 2 services. The licensee is not entitled to facilities-based rights, and not subjected to facilities-based obligations, related to building network infrastructure such as road opening, building access, sharing of facilities, etc. as stipulated in the FTNS/FC licences. As regards the rights and obligations for service provision, these will be similar to those applicable to FTNS/FC licensees for service provision. The licensee has the obligation of complying with the licence conditions applicable to Class 1 services in full for its local telephony services unless it declares that its service is a Class 2 service in all marketing materials (e.g. advertisements, tariffs, etc.) and inform customers about the capabilities and limitations of the Class 2 service it offers[4].

18. Although there are views suggesting that the existing Public Non-exclusive Telecommunications Services (PNETS) licences could be modified to allow the existing ISPs to provide IP Telephony services, the TA considers that a new services-based operator licence tailored for Class 1 and 2 services would be necessary. This is because the licensing conditions and fee structure to be imposed on Class 1 and 2 services would be different from those of existing PNETS licences.

Activities which fall outside of regulation in Hong Kong

19. The TA is of the view that any IP Telephony services which do not need number allocation from the TA should still be classified and regulated as Class 2 service if these service providers establish or maintain telecommunications equipment in Hong Kong in providing the IP Telephony services. Currently, according to section 8 of the Telecommunications Ordinance,

[3] The FTNS/FC licensee will be required to oblige its agents, contractors and resellers to comply with this requirement in marketing Class 2 services.

[4] The services-based licensee will be required to oblige its agents, contractors and resellers to comply with this requirement in marketing Class 2 services.

any service providers which do not establish or maintain means of telecommunications in Hong Kong are not required to obtain any licences. When the section 8(1)(aa)[5] under the Telecommunications Ordinance is brought into operation, the "offering of telecommunications services in the course of business" will be subjected to licensing if the act of offering takes place in Hong Kong. How this offering will be licensed or regulated will be dealt with in the relevant TA Statement relating to bringing section 8(1)(aa) into operation.

20. The provision of IP Telephone services by overseas websites will be outside the jurisdiction of the TA under the Telecommunications Ordinance unless the provision involving the establishment or maintenance of means of telecommunications, or offering of telecommunications services, takes place within the territory of Hong Kong.

Separation of service provision from network operation

21. In general, the respondents who have expressed views on this issue are supportive of the TA's proposal that the provision of IP Telephony services accessible over the broadband connections provided by another operator should be permissible. As such, the TA affirms his views in paragraph 70 of the Consultation Paper that there are three modes of provision of IP Telephony services over broadband connections:

(a) Mode 1 : The IP Telephony services are provided by the supplier of the broadband connection to the customer.

(b) Mode 2 : The IP Telephony services are provided by an IP Telephony service provider who has direct access to, and interconnection with, the broadband connection under a commercial agreement with the supplier of the broadband connection.

(c) Mode 3 : The IP Telephony services are provided by an operator as an application on the Internet which is accessed through the broadband connection. In this case, the IP Telephony service provider has no

[5] For the purpose of section 8(1)(aa), a person is to be regarded as offering a telecommunications service if (a) he makes an offer which, if accepted, would give rise to an agreement, arrangement or understanding for the provision of a telecommunications service by him or by another person with whom he has made an arrangement for the provision of the telecommunications service; or (b) he invites a person to make an offer of the kind referred to in (a) above.

commercial relationship with the supplier of the broadband connection specifically for the IP Telephony services, although there may well be other commercial relationship between the two operators (such as peer-to-peer arrangement) for the exchange of generic Internet traffic[6].

22. The TA notes that some respondents particularly the FTNS operators have expressed their concern on Mode 3 of IP Telephony services. They consider that the provision of IP Telephony services over the broadband Internet connection provided by another operator should be permissible but should be subject to commercial arrangements to be made between the IP Telephony service provider and the broadband connection provider. Nevertheless, other group of respondents including the ISPs supported that Mode 3 service should be allowed. The TA notes that Internet users are already accessing content, applications and services on the Internet and it is impracticable that the providers of these content, applications and services need to have a prior commercial relationship with numerous suppliers of Internet connections, broadband or narrowband, around the world. In particular, Mode 3 allows the nomadic mode of operation of IP Telephony services which serves a useful purpose and is likely to have substantial market demand. The TA therefore maintains his view that Mode 3 service should be allowed without mandatory requirement of having a prior commercial arrangement specifically for the IP Telephony services between the IP Telephony service provider and the supplier of the broadband connection. However, the TA does not preclude the conclusion of such commercial arrangements if the parties wish to. The customer of the broadband connection has already paid the operator concerned for the broadband connection and is therefore entitled to use the connection to access any content, application or service accessible from the connection.

23. The Mode 3 service providers will have no control over the quality of the broadband connection acquired by the customers and would not be in a position to guarantee the quality of end-to-end service to the customers. Unless a commercial arrangement exists between the supplier of the broadband connection and the IP Telephony service provider, the supplier of the broadband connection transmits the traffic of the IP Telephony services on a "best effort" basis. The service providers will have to highlight the limitation of this mode

[6] For example, ISPs have agreed to the guidelines and policies of the Hong Kong Internet Exchange (HKIX) published on its website whereby all the participating ISPs agree that HKIX is a "settlement-free interconnection point", i.e. "no settlement needs to be paid by the peering participants for the incoming and outgoing traffic" and "all participants should not filter traffic or routing table entries to or from any other participants unless it is justifiable"

of operation to their customers, otherwise they might be in breach of section 7M (prohibiting misleading or deceptive conduct) under the Telecommunications Ordinance. Market forces might drive providers to upgrade the service to Mode 2 or Mode 1 for services to fixed locations.

Licence fees

24. Similar to the licensing fee structure applicable to FTNS/FC licence, the annual licence fee of the new services-based operator licence for Class 1 and 2 services would be set on a cost-recovery basis to recover the costs incurred by OFTA in administering the licences. The proposed fee would include a fixed component plus a variable component that may vary with the number of subscribers served by the service providers.

25. According to the Telecommunications (Carrier Licences) Regulation, in the calculation of annual licence fee of FTNS/FC licence, the variable component is based on the number of "customer connections, made by telecommunications line or radiocommunications means, to the network established and maintained under the licence". In the conventional circuit-switched networks, the customer connections are made over physical access lines directly connected to the networks. Therefore in the current practice of calculating the annual licence fee under FTNS/FC licences, the number of physical access lines directly connected to the networks has been treated as the number of "customer connections"[7].

26. In the case of IP Telephony services, the customers may be connected through physical access lines connected to other networks. The services can also be accessed in a nomadic manner. As such, the number of physical access lines directly connected to the network of an FTNS/FC licensee can no longer represent the true number of "customer connections". It may be more appropriate to count the number of telephone numbers assigned to customers, or number of numbers in the numbering blocks allocated to a licensee, in calculating the variable component of the annual licence fee of FTNS/FC licence. For a level playing field between facilities-based and service-based operators, the same methodology should be applied in the calculation of licence fees under

[7] except when the FTNS / FC licensees separately provide broadband and voice services over the same physical access line, under which each of the licensees will report one customer connection for their own services and therefore the total number of customer connections is two, even though the number of physical access lines directly connected to the network is one only.

the services-based operator licence for Class 1 and 2 services where the services are assigned with numbers from the Hong Kong Numbering Plan.

27. The TA would conduct a separate consultation exercise with the industry shortly to address the licensing conditions and fee structure of the new services-based operator licence.

(B) Numbering Issues

Conformance to numbering plan

28. The views submitted on the issue of number allocation to IP Telephony services are quite diversified. Majority views are supportive of the proposal that IP Telephony service providers offering Class 1 services should share the same number blocks currently used by conventional telephone services over circuit-switched Public Switched Telephone Networks (PSTN). Some respondents consider that only FTNS/FC licensees are entitled to use the 8-digit numbers for conventional telephone services while others suggest that separate 8-digit number blocks with "non-2" and "non-3" prefixes should be allocated to the IP Telephony service providers offering Class 2 services.

29. After careful consideration of the different views submitted, the TA considers that for IP Telephony services launched and marketed as Class 1 services, customers should also be assigned with the same 8-digit numbers in the same numbering ranges currently assigned to the users of the conventional telephone services, i.e. to share the existing prefix "2" and "3" number blocks. The use of other 8-digit numbering resources for Class 1 services, including conventional telephone services, could be reviewed when the existing numbering resources of prefix "2" and "3" numbers cannot cope with the demand.

30. For Class 2 services, the TA has an open mind as to whether the allocation of a new range of 8-digit numbers, or numbers of length with more than 8 digits (e.g. 10 digits long with a 2-digit prefix plus an 8-digit subscriber number), or other alternatives, are appropriate for assignment to users.

31. There seems to be attractions in allocating a new 8-digit numbering range for services that are intended to be nomadic and Class 2 services, for ease of differentiation. However, in practice, it is impracticable to enforce, and

accordingly the TA does not intend to impose, a restriction on the use of 8-digit numbers with prefixes of "2" or "3" for nomadic use.

32. There has been concern that a surge of demand for numbers for Class 2 services would put pressure on the existing 8-digit numbering plan and necessitate an early transition to a 9-digit numbering plan. The transition to a 9-digit numbering plan would cause great social costs and therefore it is the intention of the TA to lengthen the remaining life of the existing 8-digit numbering plan as far as possible. However, without observing the demand for numbers for Class 2 services, it would be premature to stipulate that Class 2 services should immediately use a longer numbering length. Furthermore, technical studies need to be conducted on the technical implications of requiring Class 2 services to use a longer numbering length.

33. According to the preliminary study of the issue of the Calling Number Display (CND) service, the longest digit length of calling numbers that could be supported and displayed by the majority of in-use conventional telephone terminals is at most up to 10 digits. The other envisaged problem of using digit length longer than 10 is that the CND functionality of the Police's "999" emergency service centres may only support up to 10 digits. Network operators have so far not confirmed positively that they are ready, or will be ready in the near future, to route 10-digit numbers proposed for Class 2 services.

34. The decision yet to be made of adopting which numbering approach for Class 2 services would therefore depend on whether there would be sufficient 8-digit numbering resources available to cope with the future demand without significantly shortening the remaining lifetime of the existing 8-digit numbering plan, and whether there are any technical difficulties anticipated or additional cost required by network operators for network upgrade/re-configuration for routing of the 10-digit numbers. To address these uncertainties, the TA considers that there is a need to conduct further studies and consultation with the industry and particularly the Telecommunications Numbering Advisory Committee (TNAC) on these issues and seek their advices on the appropriate option to be adopted.

35. Numbers under the Hong Kong Numbering Plan are assigned to local operators to represent addresses or locations on the local networks for establishment of communications over the networks. The TA notes that one of the characteristics of some IP Telephony services is that the number is not

assigned to a fixed location but rather to the user for use of the service in a nomadic way, i.e. at any location as long as a broadband connection is accessible. With this special feature of IP Telephony services, preventing users from using Hong Kong numbers at places outside Hong Kong would be impracticable. The TA would observe the practices of overseas regulators and the development of any international norm in this area and may introduce regulation if justified in the future. In the meantime, the numbers under the Hong Kong Numbering Plan will be assigned only to local operators to represent addresses or locations on the local networks for establishment of communications over the networks.

36. The TA notes that some IP Telephony services currently available in the market may in fact be Class 2 services in nature but have used 8-digit numbers for conventional telephone services. Under the existing *"Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan (Cap. 106)"*, there is no restriction on the use by Class 2 services of 8-digit telephone numbers for conventional telephone services. Pending further consultation with the TNAC and the decision on which numbering approach to be adopted for Class 2 services, the TA will allow Class 2 services to use 8-digit numbers for conventional telephone services.

37. In order to make an efficient use of the limited 8-digit numbering resources to cater for the demand of IP Telephony service providers, the TA would also consult the TNAC to review the number block allocation criteria for Class 1 and 2 services and the need for the existing FTNS operators as well as the future Class 1 and 2 service providers to be subjected to tighter administrative control when they request for additional number blocks from the TA.

38. With respect to who should allocate the numbers there are two camps of views. Some FTNS/FC licensees are of the view that they should sub-allocate the number blocks to the services-based operators as they are at the same time providing the required hosting connections for them. On the contrary, some respondents such as the ISPs consider that it is more appropriate for the OFTA to directly allocate number blocks to the services-based operators for competition reasons. It is also because there would be a chance for termination of the hosting connection agreement between the FTNS/FC licensee and the services-based operator. When the numbers are returned to the FTNS/FC licensee concerned, both the service-based operator and end-customers might be adversely affected. The TA considers that OFTA

should be in the better position to allocate the number blocks directly to services-based operators. OFTA could take full control of the numbering resources to be used by these services-based operators and ensure that they would make efficient use of the scarce numbering resources.

39. Similar to the network operators or service providers that have now received number allocations from the TA, the providers of both Class 1 and 2 services should fully comply with the requirements of the numbering plan for telecommunications services in Hong Kong and follow the *"Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan (Cap. 106)"* in deploying and assigning the numbers for network operation and to their customers.

Number portability

40. According to the views submitted, most of the respondents support that the requirement of number portability should be applied to Class 1 services but not to Class 2 services. In considering that conventional telephone services and Class 1 services are of the same tier of services sharing the same group of 8-digit numbers, the TA considers that users of both Class 1 services and conventional telephone services could port their numbers across and among these services. In this regard, Class 1 service providers, facilities-based or services-based, are required to support number portability function. However, as there is technical limitation and complexity of adding additional administration databases (AD) for services-based operators of Class 1 services to interconnect with others to perform the number porting functions, the TA considers that it would be inevitable for services-based operators of Class 1 services to enter into commercial arrangements with a hosting FTNS/FC licensee to fulfil the requirement of number portability, instead of building their own AD databases.

41. Among the respondents who expressed their views on whether number portability is necessary for Class 2 IP Telephony services, the majority view is that number portability requirement should not be mandated or should be left as an option for the market to determine. The TA sees that if the approach of allocating a new range of 8-digit numbers or assigning 10-digit numbers is to be adopted for Class 2 services, there may be a need for all operators to invest in upgrading or modification of the existing number portability system or build an entire new system in order to support number portability for Class 2 services.

User demand of number portability for Class 2 services is also unknown at this stage. In view of the uncertainties of technical, cost and demand issues, the TA shares the majority views and considers that number portability requirement should not be mandated for Class 2 services initially. However the TA may initiate a review of the situation when the need arises.

(C) Interconnection and charge settlement

Any-to-any connectivity

42. Among the submissions received, majority views support that it is necessary to apply the "any-to-any connectivity" principle to Class 1 IP Telephony services but not necessarily Class 2 services. However according to the "*Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan*", one of the assignment principles says that all numbers and codes in the Hong Kong Numbering Plan should allow "any-to-any communications", i.e. any calling party can reach any called party by dialing the number or code of the called party, irrespective of the network used by the calling party or the called party and irrespective of whether the calling party is calling from overseas or from a local station. Therefore there is no reason to selectively single out and not to apply this principle to a Class 2 service if this service is using numbers under the Hong Kong Numbering Plan. If the Class 2 service is not using numbers under the Hong Kong Numbering Plan, the requirement of "any-to-any connectivity" should not apply. As such, the TA considers that both Class 1 and Class 2 services are required to fulfill the "any-to-any connectivity" principle whenever the numbers under the Hong Kong Numbering Plan are used for call routing regardless of the length of the numbers in terms of the number of digits.

Interconnection between operators

43. Regarding the question on whether the existing interconnection regime should be extended to IP Telephony services, the views from the respondents are diversified. Some respondents support that the existing interconnection regime should be extended to IP Telephony services while others disagree and consider that only operators having carrier status are entitled to the interconnection right. Some suggest that the TA should mandate FTNS/FC licensees to act as hosting operators for providing interconnection and number portability database dipping services to services-based operators of IP Telephony

services while others suggest that the TA should review the existing interconnection regime particularly on the charging issues. In order to facilitate "any-to-any connectivity", the services-based operators of IP Telephony services must be allowed to gain access to the PSTN by one means or another.

44. Having duly considered the views submitted, the TA considers that in gaining access to the circuit-switched PSTN, a service-based operator providing Class 1 and Class 2 services should seek a hosting connection to the network of at least one FTNS/FC licensee. This FTNS/FC licensee will then be responsible for the routing of the traffic of the IP Telephone services hosted to and from the networks other FTNS /FC licensees. The merit of this approach is that it would not further complicate the existing interconnection arrangements among networks and can avoid unnecessary delay in rolling out the IP Telephony services in Hong Kong. The terms and conditions of the interconnection agreements between the services-based operators of IP Telephony services and their hosting FTNS/FC licensees will be negotiated on a commercial basis. As there are multiple local fixed networks in the market, the TA considers that market forces should ensure that the services-based operators have fair access to the networks and he is not expected to intervene unless so doing furthers the long-term interest of consumers. The TA will also allow direct interconnection between platforms of service-based licensees offering Class 1 and 2 services subject to commercial agreement.

Calling Line Identification (CLI)

45. Majority of the submitted views agree that operators providing IP Telephony services should be obliged to fulfil the requirement of sending/receiving CLI to and from other fixed network operators/service providers. However, some of the supporting respondents specifically indicated that CLI requirement should only be imposed on the IP Telephony services offering Class 1 services. Considering that there is no technical problem for Class 1 or Class 2 IP Telephony platforms to transmit and receive the CLI to and from other PSTN/IP-based networks and that the requirement for sending and receiving CLI would be essential for settlement of inter-network interconnection charges (e.g. Local Access Charge (LAC)) and supporting the provision of calling number display (CND) and calling name display (CNAMD) services, the TA shares the majority view that IP Telephony service providers using numbers under the Hong Kong Numbering Plan should be required to provide CLI irrespective of whether it is providing Class 1 or Class 2 services. In this

regard, the TA will update the "*Code of Practice in relation to Calling Line Identification and other Calling Line Identification related services*" accordingly.

Payment of Interconnection charges, LAC and USC

Interconnection charges between networks

46. The TA considers that services-based operators of Class 1 and 2 services are required to enter into commercial agreement with one of the FTNS/FC licensee for hosting connection. Services-based operators of Class 1 and 2 services will not be directly involved in the charging mechanisms because under the commercial agreement, their hosting FTNS/FC licensee will be responsible for the payment of their relevant charges to others while they would pay to the hosting FTNS/FC licensee in return. Nevertheless, direct interconnection between the platforms of the IP Telephony service providers will be allowed subject to their own bilateral commercial dealings.

Interconnection charge between IP Telephony service and broadband access service providers

47. The TA maintains his view that the three modes of provision of IP Telephony services over broadband connections as described in paragraph 70 of the Consultation Paper and paragraph 21 of this Statement are permissible.

48. The TA affirms that Mode 3 is a legitimate mode of operation of IP Telephony services. Users who have paid for the broadband connection are entitled to access any application on the Internet. It would not be practicable for the provider of the broadband connection to have a prior commercial relationship with every provider of applications on the Internet. Mode 3 supports nomadic mode of operation and it would also be impracticable for the application provider to have a commercial relationship with every provider of broadband connection that may be used to access the application. However, the TA does not preclude the conclusion of such commercial arrangements if the parties wish to.

LAC

49. According to the submissions to the Consultation Paper, the views on LAC are quite diversified but they can be basically divided into two groups.

One group, which mainly comprises FTNS operators, considers that the existing charging principles of LAC should be continued for interconnection between IP Telephony and circuit-switched networks. The other group disagrees and considers that IP Telephony service providers should be entitled to receiving LAC payment from ETS operators instead.

50. The TA has mentioned above that it is necessary for IP Telephony services-based operators to enter into commercial agreement with one or more hosting FTNS/FC licensee(s) for interconnection with other circuit-switched networks. With such requirement, the hosting FTNS/FC licensee(s) would be responsible for handling all the interconnection charges, LAC, and USC due to the IP Telephony traffic of its client in accordance with the existing charging principles for interconnection. For example, if a customer of IP Telephony service makes or receives a local telephone call through the circuit-switched hosting network, the hosting FTNS/FC licensee will pay, or receive, a termination charge, as the case may be, in accordance with the existing charging arrangements, as if the local call were made or received by other customers directly connected to the hosting network. If a customer of IP Telephony service makes or receives an external telephone call through the circuit-switched hosting network, the hosting FTNS/FC licensee will receive a LAC from the provider of the external service in accordance with the existing charging arrangements, as if the external call were made or received by other customers directly connected to the hosting network. As regards how the interconnection charge between the services-based operator of IP Telephony services and the hosting FTNS/FC licensee, this is a matter for commercial agreement between the two operators and the TA is not expected to intervene unless so doing furthers the long-term interest of consumers.

51. Some respondents to our Consultation Paper consider that it is necessary for the TA to review the existing LAC charging mechanism and methodology in order to cater for the IP-based environment. However, the TA considers that the existing charging principles for LAC are set up based on a circuit-switched network model while IP Telephony services are carried over packet-switched networks. In interconnection between circuit-switched network and packet-switched networks, a gateway will be involved. In this regard, the existing LAC charging principles will remain unchanged over the circuit-switched interface of the interconnection gateway and the per minute LAC will continue to be calculated according to the cost of the circuit-switched network facilities invested in routing the external traffic and the volume of the

external traffic involved. Some FTNS operators said that external traffic carried over IP networks should also be captured for LAC payment - the IP addresses of the IP telephony traffic can be checked and recorded to determine whether the call is generated from overseas or not. The initial view of the TA is that this proposal which seems technically feasible may not be a practicable and cost-effective solution for operators to adopt in order to identify such traffic. Nevertheless, the TA welcomes any further view on this when conducting an overall review of the existing LAC charging regime and methodology in future.

52. The TA notes that interconnection arrangements between IP-based networks have their inherent mechanisms for fair compensation of the participating network operators and so far there has been no need for the regulator to intervene in the interconnection arrangements between IP-based networks. As such, there appears to be no need for the equivalent of the LAC mechanism to be developed for the IP-based environment. Nevertheless, the TA welcomes any further view on this when conducting an overall review of the existing LAC charging regime and methodology in future.

USC

53. Majority of the submitted views concurred that the USO and USC sharing mechanism should be reviewed. In this connection, the TA would conduct a comprehensive review of both the scope of the USO and the USC sharing mechanism and would consult the industry about the impact of IP Telephony services on USC. Nevertheless, before the review is completed and the proposed modifications are implemented, the existing USO/USC regime will apply.

54. Under the existing USO/USC regime, the methodology for the determination of the level of USC is based on the volume of external traffic routed between local and external networks. As such, IP Telephony traffic that is entirely routed over the Internet cannot be captured by the existing USO/USC regime no matter whether it is originated from or terminated at a local or overseas location. As such, no USC is to be involved under the existing USO/USC. The issue is, in an environment where traffic routed through circuit-switched and IP networks co-exists, whether the volume of traffic in terms of minutes routed through circuit-switched networks remains the appropriate basis for the apportioning of costs for meeting the USO and

calculating the level of USC. This should be considered in the review of the USO/USC regime.

55. However, if a customer of IP Telephony service makes or receives an external telephone call through the circuit-switched hosting network, the payment and receipt of USC associated with this call will be in accordance with the existing USO/USC regime, in the same manner as if the external call were made or received by other customers directly connected to the hosting network.

(D) Consumer and other issues

Directory enquiry

56. In the received submissions, there are diversified views on the question of which types of IP Telephony services should be required to provide directory enquiry service (DQ services) and printed directory to the customers. Some respondents supported that only IP Telephony service providers offering Class 1 services should be required to fulfil the requirement of providing the printed directory and DQ services. Some respondents consider that the DQ services should be a mandatory requirement for all types of IP Telephony service providers while others consider that the provision of DQ services and printed directory should be optional.

57. The TA is of the view that the provision of directory enquiry service and printed directory to customers free of charge should be a mandatory requirement for Class 1 services. Services-based operators providing Class 1 services may enter into commercial arrangement with their hosting FTNS/FC licensee(s) to make available the services to their customers. It would be voluntary for Class 2 service providers to offer the directory enquiry service and printed directory to their customers.

58. The majority of the respondents consider that there is no practical difficulty for a FTNS/FC licensee to include the customers of an IP Telephony service in the unified directory database. Taking into account this majority view and the decision that Class 1 service providers are required to provide DQ services and printed directory, the TA considers that a Class 1 service provider should incorporate the directory information of its customers such as names and telephone numbers into the unified directory database. Actually, this is a licence obligation currently for the FTNS/FC licensees. Services-based

operators providing Class 1 services is required to enter into commercial agreement with a FTNS/FC licensee to fulfil its obligation of providing DQ services. They should pass updated customer information on a regular basis to their hosting FTNS/FC licensees for updating the unified directory database. The TA would not make it a mandatory requirement for the Class 2 service providers but would allow them to provide such services through commercial arrangement with their hosting FTNS/FC licensees on a voluntary basis. Class 1 or Class 2 service providers under the new service-based operator licence will not have the right to request raw DQ data from FTNS/FC licensees for the establishment of their own unified DQ databases.

59. IP Telephony service providers would have to deploy the appropriate access codes (i.e. 108x) for access by their customers to DQ services. The use of such access codes is governed by the rules and requirements set out in the Hong Kong Numbering Plan and "*Code of Practice Relating to the Use of Numbers and Codes in the Hong Kong Numbering Plan*".

Access to emergency services

60. Majority respondents expressed that Class 1 services should be obliged to provide access to emergency services. However they do not consider access to emergency services should be mandated for Class 2 services.

61. As a Class 1 service may be used as a substitute for a conventional telephone service, for consumer protection, there is no doubt that a Class 1 service must provide free access to the emergency services through "999".

62. As regards Class 2 services, some services would clearly not be substitutes for conventional telephone services, and users may not be expected to use such services to summon help from the emergency services. However, for Class 2 services assigned with numbers from the Hong Kong Numbering Plan, given the "any-to-any connectivity" available from such services, there could be great confusion to users if "999" could not be accessed through the services. The TA also notes that some administrations such as the US[8] and Canada[9] have recently made a ruling that all VoIP services that can receive calls from, and

[8] "Interconnected VoIP services" referred to in FCC First Report and Order and Notice of Proposed Rulemaking, FCC 05-116, adopted on 19 May 2005 and released on 3 June 2005.

[9] Local VoIP service where the end-user is assigned an NPA-NXX number referred to in CRTC Decision 2005-21 dated 4 April 2005.

place calls to, telephones connected to the PSTN are required to provide their customers with access to emergency services.

63. After consideration of the submitted views, the customers' reasonable expectation and some overseas practices, the TA considers that Class 1 service providers are required to provide customers with free access to emergency services, and that Class 2 service providers are required to provide their customers with free access to emergency services if they assign their customers with numbers from the Hong Kong Numbering Plan. For other types of Class 2 services, provision of free access to emergency services is optional.

64. Unlike the conventional telephone services, the telephone number of an IP Telephony service may assigned to the user equipment or the user account instead of a physical location. IP Telephony users may carry their equipment along with them and make calls at any location inside or outside Hong Kong so long as a broadband connection is available. Such characteristic of IP Telephony service would make the location information in the customer database unreliable. It would be difficult for the emergency centre of the Police to determine whether the location of the call is identical to the address registered with the service provider. This is a problem inherent with the IP technology and needs to be addressed.

65. Among the proposed solutions offered by the respondents to our Consultation Paper, HKISPA opines that it may be technically feasible to trace the IP address of the calling party by contacting the ISP hosting the IP address. However, they consider this approach is not administratively efficient particularly when the ISP in question is located overseas. Sharing the views of some respondents such as CM Tel, CSL and Pacific Internet, the TA considers that, at the present stage of development of the technology, a practicable way to provide reliable location information to the emergency centre is to require the service providers, where they operate services to provide access to the emergency services, to set up a database for maintaining the most up-to-date information on the location of customers. This database should identify telephone numbers as potentially nomadic. The service provider should provide a mechanism whereby the customers can update their location information, and to remind the customers to do so, whenever they relocate their IP telephony equipment.

66. Accordingly, the TA considers that the provision of a database for maintaining the most up-to-date location information of customers in the manner given in the preceding paragraph should be a mandatory requirement for both Class 1 and 2 service providers where they provide access to the emergency service.

Backup power supply

67. Regarding the issue on whether the existing backup power supply requirement for "basic telephone line service" should be extended to the IP Telephony services, again there are two camps of views. One supports the requirement should be extended to IP Telephony services while the other disagrees.

68. On 26 September 2003, the TA issued the "*Code of Practice for the Provision of Backup Power Supply to Network Equipment of Fixed Telecommunications Network Services*" (the Code of Practice). According to the Code of Practice, any FTNS/FC licensee who is providing "basic telephone line service" is required to provide continuity of service during power outages. "Basic telephone line service" is defined in the Code of Practice as a fixed single-line telephone line service usable with a telephone set which is powered from the telephone line and which enables the user to use basic telephone line service without reliance on power supply from the customer premises.

69. The TA notes that the continuity of IP Telephony services may rely on the co-working of several sets of customer premises equipment such as broadband modem (e.g. ADSL modem or cable modem), IP telephone set, PC or adaptor (i.e. Integrated Access Device) connected in cascade with the conventional telephone set. All of these devices have to be powered from the customer premises because they are not designed to be powered by the telephone line in the same manner as the conventional telephone set used for the "basic telephone line service". In view of the technical constraints, the TA shares with the Consumer Council's view that imposing backup power supply requirement for IP Telephony services will not enable consumers to use telephony service during the outage of power supply on their premises. This is because the customer premises equipment concerned cannot function during the outage of domestic power supply. It may be argued that the customer premises equipment as supplied by the service providers could be required to be equipped

with built-in back up batteries. However, such battery-backup equipment may not be widely and readily available in the market yet.

70. Having duly considered the views of the respondents and the practical situations, the TA considers that Class 1 service providers are required to follow the requirements as stipulated in the TA Statement and "*Code of Practice for the Provision of Backup Power Supply to Network Equipment of Fixed Telecommunications Network Services*" issued on 26 September 2003 for the provision of backup supply system for the network equipment.

71. Where the implementation of IP Telephony service requires the installation of a modem, IAD or other types of equipment requiring power supply directly from the customer premises concerned, both Class 1 and 2 service providers are not required to provide the backup power supply to the network equipment for the IP Telephony services. The TA requires that all Class 1 and 2 service providers should explain clearly the power outage problem and limitation in offering the service. In order to draw the customers' attention on this limitation, Class 1 and 2 service providers are encouraged to affix a label or sticker to the equipment to alert customers to the fact that the equipment is not supplied with backup power supply and the service will be suspended during the power failure of customer premises.

72. The TA notes that some respondents particularly the Senior Citizen Home Safety Association (SCHSA) have expressed their concern over the lack of backup power supply for the IP Telephony services and the adverse impact on their "life-lines" users. Accordingly the TA considers that both Class 1 and 2 service providers must not offer to sell the service to "life-lines" users unless they provide backup power supply to the IP phone, IAD, modem and network equipment. The TA will include this as a licence condition or develop a mandatory guideline in order to ensure the compliance by service providers.

73. For those FTNS/FC licensees who are providing "basic telephone line service", the TA considers that they should continue to fulfil the existing requirement of providing backup power supply to operate and maintain continuous services in a manner satisfactory to the TA. This requirement applies to the particular type of IP Telephony service which is a "basic telephone line service" to which only a conventional telephone set is required for access without any other equipment that requires domestic mains power supply. The TA considers that such a requirement is necessary because it has been the user

expectation that they can get access to the telephone service by simply plugging a conventional telephone set into the telephone socket on the wall.

Quality of Service (QoS)

74. In response to the question of whether IP Telephony services offering Class 1 services should meet minimum quality standards, the majority view shows their support to this proposed requirement and opines that it can help consumers make informed choices. The TA shares the majority view and considers that Class 1 service providers should be required to prepare customer charters setting out the minimum standards of service to their customers and give guidance to their employees in their dealings with customers. Customer charters requirements have been given in the licences of FTNS/FC licensees.

75. The TA considers that Class 1 services irrespective of technology should meet the same quality standards applicable to the conventional telephone services currently provided under FTNS/FC licences. The quality of conventional telephone services has been safeguarded by competition in the market and in line with market-driven policy, so far no minimum quality standards have been prescribed by the TA for the conventional telephone services provided under FTNS/FC licences. In order to ensure that similar high quality standard is maintained with the introduction of IP Telephony services, the TA would consult the industry shortly on whether minimum quality standards of services should be prescribed, and any such standards when prescribed should be equally applicable to conventional telephone services and Class 1 services. However, the TA considers that Class 2 service providers do not need to follow the minimum quality of service standards.

CUSTOMER EDUCATION

76. Although the Consultation Paper does not specifically seek views on customer education, many respondents indicate in their submissions that customer education is important and propose that service providers should be required to clearly communicate to the end customers the capabilities and limitations of their IP Telephony services before signing up agreement with them. The TA subscribes to this view. To ensure that consumers are well-informed of the capabilities and limitations of the various forms of IP Telephony services, OFTA will work with the industry to develop the necessary guidelines and codes

of practice. Furthermore, OFTA would conduct publicity and consumer education programmes.

77. As stated in paragraphs 16 & 17, service providers marketing Class 2 services are required under licence conditions to declare in their marketing materials that the services being marketed is a Class 2 services. The TA expects that services providers in marketing Class 1 services (conventional telephone services or Class 1 IP Telephony services) might clearly identify their services as such, to differentiate them from Class 2 services. Without prejudice to licensees' general obligations to comply with section 7M, the TA will encourage such labelling of the services.

78. Even Class 1 services in full compliance with FTNS/FC licence conditions may have some characteristics different from conventional telephone services familiar to the consumers. Service providers of Class 1 and Class 2 services should clearly communicate to the consumers the limitations/capabilities of their services before signing up agreements with them. Examples are:

1) Service suspension during power outage on customer premises (paragraph 71),
2) The need to update location information on relocation (paragraph 65),
3) End-to-end quality of service not guaranteed where the customer acquires his own broadband connection to access the service (paragraph 23),
4) Number portability not available to Class 2 services (paragraph 41), etc.

INDUSTRY SELF-REGULATION

79. Without prejudice to licensees' general obligation to comply with section, the TA encourages the industry develop self-regulation to implement the above mentioned consumer protection and education measures, i.e. labelling of equipment (paragraph 71) and services (paragraph 77) and the marketing practices in order to ensure that the consumers are provided with sufficient and clear information about the limitations and capabilities of IP Telephony services before contract (paragraph 78).

WAY FORWARD

80. This TA Statement sets out the TA's views and decisions on the regulatory framework for IP Telephony services. The TA will follow up to implement the framework. As explained in this Statement above, there are a number of specific issues that need to be further discussed with the industry. It follows that by this Statement, with respect to issues in this Statement which are still subject to the TA's consideration or discussion with industry, the TA should not be taken to have formed any views, opinions or decisions for those issues. For the avoidance of doubt, this Statement is not purporting to exercise any of his powers under any of the provisions of the Telecommunications Ordinance in relation to any person directly or indirectly identified in this Statement.

81. Shortly after the issue of this TA Statement, the TA will initiate a consultation on the fee structure and licence conditions of the new services-based operator licence for Class 1 and Class 2 services (paragraph 27).

82. In parallel, OFTA will consult the Telecommunications Numbering Advisory Committee (TNAC) on numbering issues related to Class 2 services (paragraph 34 and 37).

83. Furthermore, another consultation will be conducted to review the existing USO/USC regime taking into account the emergence of IP Telephony service (paragraphs 53 and 54).

84. The TA welcomes any further view on the LAC regime in an IP-based environment and will take this into account when conducting an overall review of the existing LAC charging regime and methodology in future (paragraphs 51 and 52).

85. The TA will consult the industry on whether minimum quality of standard specifications should be prescribed for all Class 1 services (including conventional telephone services and Class 1 IP Telephony services) (paragraph 75).

Office of the Telecommunications Authority
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