

**Guidelines on the Principles and Methodologies for the
Interconnection Charges to Mobile Virtual Network Operators and
Tariffs for Content or Service Providers
by Mobile Carrier Licensees Operating in the 1.9-2.2 GHz Band**

Industry Consultation Paper

6 August 2004

Introduction

1. On 22 October 2001, the Telecommunications Authority (TA) granted four mobile carrier licences for the provision of third-generation mobile telecommunications (3G) services in the 1.9 – 2.2 GHz band in Hong Kong.

2. On 19 March 2004, the TA issued a consultation paper¹ on the licensing arrangement for the existing second-generation (2G) mobile telecommunications services operating in the 825 – 960 MHz and 1710 – 1880 MHz bands upon expiry of the relevant licences between July 2005 and September 2006. Since the ‘open network access’ arrangements for the licences to be issued have yet to be finalised, they should fall outside the scope of this consultation exercise.

3. Under Special Condition (SC) 12 of a mobile carrier licence for 3G services, the licensee, i.e. a mobile network operator (MNO), is obliged to provide open network access (ONA) to non-affiliated mobile virtual network operators (MVNO) and/or content or service providers (CSP) for up to 30% of its network capacity. The licensee has to publish a reference network capacity agreement (NCA) to facilitate commercial negotiations with MVNOs on the terms and conditions for the provision of ONA. It must also publish the tariffs, including the relevant terms and conditions, for the provision of ONA to CSPs².

4. In the event that the MNO fails to reach a commercial agreement on the terms and conditions for ONA with a MVNO, the TA is empowered under

¹ *Licensing of Mobile Services on Expiry of Existing Licences for Second Generation Mobile Services, Analysis of Comments Received, Preliminary Conclusions and Further Consultation*, 19 March 2004.

² The terms ‘non-affiliated’, ‘MVNO’, ‘CSP’, ‘network capacity’ and ‘NCA’ are defined under SC 12 of the mobile carrier licence.

SC 12 of the mobile carrier licence and section 36A of the Telecommunications Ordinance (the Ordinance) to determine such terms and conditions. For a CSP which is not a telecommunications licensee, it is entitled to ONA under SC 12 at published tariffs under SC 14 (tariffs) and 18 (provision of tariffed service). If the TA considers the published tariffs to be unfair, discriminatory or anti-competitive, he may determine such tariffs pursuant to SC 12. Where the CSP is a telecommunications licensee, it may make a request for determination under section 36A of the Ordinance on the terms of interconnection with the MNO.

5. In the “*Hong Kong Third Generation Mobile Services Licensing Information Memorandum*” (the IM) published in July 2001, the TA pledged to issue guidelines³ on the principles and methodologies in setting the tariffs and the reference NCA on the basis of which commercial negotiations or TA determinations are to be conducted. Accordingly, the TA initiates this consultation to solicit inputs from the industry.

6. In this consultation paper, the TA has set out the scene and expressed his preliminary view on various issues related to the subject. The purpose of the guidelines is to lay down the charging principles and methodologies, while the specific terms and conditions, or the explicit level of charges, are to be commercially negotiated or determined by the TA on a case by case basis. Interested parties are invited to make submissions **on or before 6 October 2004**. The TA will give due consideration to all responses in finalizing the guidelines.

Policy objectives

7. The overall policy framework of ONA has been given in the IM as follows:

- to provide fair and adequate compensation to MNOs for the network resources consumed under ONA;
- to maintain commercial incentives for mobile network investments;
- to establish a level playing field between network-based and

³ Sections 2.2.6.1 and 2.2.6.2 of the IM.

service-based mobile operators; and

- to promote the development of content, applications and services in the mobile communications market.

8. It has to be recognized that ONA in relation to 3G networks is mandatory access to network infrastructure that is new investment, part of which has yet to be made, and the demand for the capacity available over the networks is being developed. To meet the policy objectives of fair compensation to MNOs and maintaining commercial incentives for network investment, the principles and methodologies for the determination of interconnection charges and tariffs for these developing networks would not necessarily be the same as those applicable to legacy networks, in which the investment has been made some time ago and for which the demand is already mature.

9. One objective of ONA is to enable operators that do not have right to the 3G spectrum may participate in the 3G business by investing in the core network and operating as MVNOs. The principles and methodologies for the determination of the interconnection charges for MVNOs should aim to provide a level playing field between the MNOs and the MVNOs. The MVNOs should be given a fair opportunity to participate in the market to compete with the MNOs, but the costs and risks of the MNOs and the MVNOs should be appropriately balanced.

10. On the other hand, the ONA is intended to facilitate the delivery of content, applications and services by CSPs to their customers. Many of these CSPs are small and medium-sized enterprises and are not expected to have the resources to invest in 3G networks. They participate in the market as wholesale customers to the MNOs and MVNOs and use the services of these operators to deliver their products to customers. The principles and methodologies for the determination of tariffs for CSPs should aim to provide fair compensation to the MNOs while at the same time promote the development of content, applications and services in the 3G services market.

The Accounting Manual for mobile carrier licensees

11. Under SC 7 of the mobile carrier licence, a licensee shall prepare separate accounts for different services or business activities or types of

services or business activities (each referred to as a Business) as identified in the Accounting Manual (AM) to be issued by the TA pursuant to section 7H of the Ordinance. The purpose of accounting separation is threefold, namely

- to determine the network turnover and spectrum utilisation fee (SUF) payable by the licensee under SC 2;
- to determine the cost base for ONA to MVNO and/or CSP; and
- to assist any investigation by the TA on competition related matters. The TA is currently in the process of consulting the licensees on the development of the AM.

12. SC 12 of the mobile carrier licence requires a licensee to provide network access on a non-discriminatory basis to affiliated and unaffiliated parties. Discrimination includes discrimination relating to ONA charges. In addition, a licensee is also required under SC 13 to ensure its provision of goods or services to any affiliated party or to any Business of the licensee shall be on arm's length commercial terms. These 'non-discriminatory' and 'arm's length' requirements imply that the same principles and methodologies adopted in determining the ONA charges to non-affiliated MVNOs and CSPs should also apply to

- the 'internal transfer pricing' between the licensee's network and non-network Business; and
- transactions for the provision of network services between the licensee and affiliated companies.

As such, the TA will make direct reference to the guidelines issued upon the conclusion of this consultation exercise in the process of developing the parts of the AM concerning 'internal transfer pricing' between Businesses within the licensee, and transactions between the licensee and affiliated companies. Such reference will ultimately have a bearing on the calculation of network turnover and SUF.

13. In a nutshell, the TA considers that a single and consistent set of 'cost based' principles should fulfil all of the following:

- section 36A of the Ordinance on the determination of interconnection charges between MNOs and MVNOs if and when necessary;
- the 'non-discriminatory' provision under SC 12 for ONA;
- the 'arm's length' and 'anti-avoidance' provisions under SC 13

for the calculation of network turnover and SUF based on cost recovery.

Commercial agreements

14. The TA is mindful that, despite his intention to issue guidelines upon concluding this consultation, commercial agreements should always prevail against regulatory intervention. So long as the terms and conditions of an NCA can be reached on a commercial basis, the TA is not normally in a position to challenge the principles and methodologies behind.

15. In particular, the TA is aware that the transactions between the MNOs and CSPs are commonly based on a revenue-sharing arrangement. So long as commercial agreements can be concluded and there is no complaint that the arrangement is unfair, discriminatory or anti-competitive, the TA will not normally intervene into the arrangement.

16. Under SC 12.13 of mobile carrier licences, a licensee must file every NCA with the TA. If the TA considers that any NCA is entered into with the purpose or effect of mitigating or minimizing network turnover for the purpose of calculating SUF, he is empowered under the anti-avoidance provisions of SC 13 to make a determination. Although the TA cannot rule out the possibility that the ONA charges may be set at below cost to affiliated and non-affiliated service providers for the purpose of mitigating or minimizing SUF liability, he remains optimistic that the MNOs will be discouraged from doing so, given the adverse impact on the competitive positions of their own retail businesses.

Charging principles

Costing principles – LRAIC or FDC?

17. In the IM, the TA specified that any determination on the ONA charges to MVNOs should be based on the principles of long run average incremental cost (LRAIC). As for tariffs to CSPs, the TA stated that “*the TA may review and set the tariff applicable to non-affiliated CSPs by reference to the lower of the charges determined on a cost-plus or retail-minus basis*” and that “*the*

*current approach for regulated published tariffs is that the TA applies a tariff based on fully distributed cost (FDC)”⁴. The differences between LRAIC and FDC are twofold. First, LRAIC is based on current cost while FDC may be based on historical cost. Second, FDC includes shared common expenses such as corporate overheads while LRAIC may not. In the subsequent sections, the TA will explain why these differences should be insignificant for the calculation of ONA charges, given the nature of the 3G market. As mentioned in paragraph 12, the TA is of the preliminary view that **the ONA charges to MVNOs, tariffs to CSPs and the internal transfer prices should be based on a single and consistent set of principles.***

Relevant costs – short run or long run?

18. According to cost recovery principles, the interconnection charge or tariff should just be able to recover the relevant costs plus a normal return on relevant investments. Charges at this level should send an accurate ‘build’ or ‘buy’ signal to the market, such that a typical market participant would be indifferent between providing services through investing in its own network or paying for access to another operator’s network.

19. Relevant cost refers to the operating expenses and capital expenditures attributable to the provision of network access services. From the network operator’s perspective, these costs are incremental because they can be avoided without the provision of such access services. It is generally accepted that the concepts of ‘relevant’, ‘incremental’ and ‘avoidable’ should be interpreted in a long-run context to take into account the entire investment horizon of a telecommunications network. For capital costs that typically involve lump-sum upfront investments, the expenditures should be annualised over the asset lifespan in the calculation of access charges. It is only when the ‘long run’ costs are recovered would there be sufficient incentives for operators to build a telecommunications network.

20. The costs of all the network components involved in the provision of access should be regarded as relevant costs, including the apportioned costs for those network components that are used to support multiple services. This is known as the ‘total service’ approach.

⁴ Section 2.2.6.2 of the IM under “Terms of intervention”.

21. The TA recognizes that there are different approaches in the construction of a 3G network. An MNO may simply construct a stand-alone full-fledged 3G network, or it can build a 3G network as an overlay to its existing 2G network. For an MVNO that operates its own core network and seeking an access to radio spectrum only, the relevant network components should include the radio access network (RAN) of the MNO only. Alternatively, an MVNO or a CSP may seek direct connection with the core network (CN) of the MNO, in which case the relevant network components should include both the RAN and CN. If the RAN or CN of the MNO supports both 2G and 3G services, the cost should be suitably apportioned so as to determine the ONA charges applied to 3G. The TA will determine the method of apportionment of the common costs between 2G and 3G in the development of the AM.

22. It is more debatable whether the common costs at the corporate level (also known as ‘overheads’) should be considered as relevant costs for the provision of network access. For network access services provided by an incumbent network during the infant stage of competition in the service market, overheads are often regarded as ‘indirect fixed costs’ because the negligible level of consumption on network resources is unlikely to causally increase expenses at the corporate level. On the contrary, the 30% ONA obligation represents a sizeable amount of network capacity of an MNO. The level of corporate overheads is unlikely to stay constant without this obligation. The TA considers that if the ‘buy’ option can avoid the overheads, investment incentives on 3G network infrastructure would be dampened.

23. Moreover, for the provision of ONA by 3G networks, the inclusion of corporate overheads is justifiable because 3G is a new market i.e. the MNOs are unlike incumbents who typically built the bulk of their networks during the times of a protected market environment, i.e. when the market was less risky. In fact, they are making investment decisions as and when the risk of competition mounts in the 3G market, which is also partly attributable to the availability of ONA. Therefore, compensation must be adequate in order to maintain a level playing field while preserving investment incentives. Therefore, the TA is of the preliminary view that **the relevant costs for the provision of ONA should follow the principles of ‘long run’ and ‘total service’, including corporate overhead costs.**

Reference carrier – efficient, mean, marginal or individual?

24. Another critical issue is whether the relevant costs across different MNOs should be determined based on the ‘efficient carrier’, ‘marginal carrier’, ‘mean carrier’ or ‘individual carriers’. The pros and cons of these alternatives are listed in the table below:

	Efficient carrier	Marginal carrier	Mean carrier	Individual carriers
Relevant cost	Lowest unit cost among all networks	Highest unit cost among all networks	Average unit cost among all networks	Different unit costs for each network
Level of ONA charges	Low	High	Moderate	Vary
Fair compensation to network operators?	Adequate for the most efficient network, inadequate for others	Adequate for the marginal network, excessive for others	Excessive for more efficient networks, inadequate for less efficient ones	Adequate for every individual network
'Build' or 'Buy'?	Only the most efficient network operator will build	All network operators will build	Only more efficient network operators will build	Individual network operators may build to differentiate on quality
Facilities-based competition?	Low level of investments	Yes, but rewards inefficiency and leads to over-investment	Some degree	Optimal level of investments, with variety of price and network quality
Level playing field?	Tilted in favour of service providers	Tilted in favour of network operators	Level, discourage differentiation on quality	Level, encourage differentiation on quality
Commercial agreement likely?	Unlikely	Unlikely	Not very likely	Most likely
TA determination needed?	Yes, once and for all	Yes, once and for all	Quite likely, once and for all	Less likely, but determinations needed for each network separately

The TA is keenly aware that the network configurations are likely to vary significantly amongst different MNOs. Having studied the pros and cons of the above options, and after considering the policy objectives mentioned in paragraph 7, the TA is of the preliminary view that **the relevant costs of ONA charges should be the cost of individual carriers.**

Cost standard – current or historical cost?

25. Cost standard refers to the choice between current and historical cost. The current cost standard sends an accurate and contemporary ‘build’ versus

‘buy’ signal to the market. However, it may overcompensate incumbent operators in some situations, e.g. building and land assets might have been acquired in the past at a lower cost or the network assets might have been fully or partially depreciated. On the contrary, the historical cost standard reflects the actual cost incurred by the network operator. It is more objective than current cost and does not depend on assumptions on a forward-looking basis. It is almost universally accepted among regulators with similar liberalisation and pro-competition policies as in Hong Kong to adopt the current cost standard in the determination of interconnection charges.

26. For the 3G market, the difference between current and historical cost should be minimal at the present stage because the 3G networks are newly constructed or yet to be constructed. Having considered the policy objective to sustain commercial incentives for network investment going forward, the TA is of the preliminary view that **the current cost standard should be adopted in the calculation of ONA charges.**

Current cost of network assets – revaluation or replacement?

27. Establishing the current cost over a given period for the provision of a service involves working out two current cost components - the cost of the network assets apportioned to that particular period, and the cost of operating and maintaining the asset during the period. While the latter for a particular period is simply the current operating and maintenance cost (e.g. staff cost) for that period, there are two common ways in which the current costs of network assets apportioned to a particular period can be derived, namely the *replacement cost* approach and the *asset revaluation* approach.

28. Under the **asset revaluation** approach, a piece of asset is restated based on either its *net realizable value* (NRV) or *net present value* (NPV). NRV refers to the estimated current selling price less any further costs to be incurred for asset disposal, while NPV equals to the sum of discounted net cash flow (the revenue generated from the asset minus the expenses required to maintain and operate the asset) expected to be generated over the remaining life span of the asset. The fall in the NRV or NPV of the assets during the period is the cost of the assets apportioned to that period. This approach is also called ‘economic depreciation’. For telecommunications markets, while both NRV and NPV

are theoretically sound and equivalent, NRV is difficult to apply given the substantial discount in liquidating network assets, and NPV is subject to projections over a relatively long horizon amid uncertainties in demand, competition and regulatory environment. The TA sees practical difficulties in the implementation of the asset revaluation approach as the data required to estimate reliably the NRV or NPV is likely to be intensive.

29. Under the **replacement cost** approach, the cost of latest available equipment or technologies in the market will be considered. When the latest available equipment is based on the same technology as the existing assets, the replacement cost will be calculated based on absolute valuation i.e. volume of equipment multiplied by current equipment price. In situations where new and improved technologies have emerged, the replacement of existing assets would follow the principle of ‘modern equivalent assets’ i.e. modern equipment cost adjusted for any difference in operating performance⁵. The replacement cost is then apportioned over the economic life of the assets based on one of the accounting depreciation methods discussed in paragraphs 35 - 36. **The TA is of the preliminary view that an accounting depreciation method based on the replacement cost approach should be adopted.**

Modern equivalent assets – ‘scorched node approach’ (SNA) or ‘scorched earth approach’ (SEA)?

30. The network topography of ‘modern equivalent assets’ can be based on either the SNA or the SEA. Under SNA, the new *equipment* costs of *individual components* of a network based on its *existing* configuration are to be considered. Under SEA, the replacement cost of the *network as a whole*, with an *optimised* configuration based on the latest *technology*, is to be considered.

31. The SEA is the most forward-looking approach amongst all. ONA charges will likely to be reduced when new and improved technologies emerge, potentially resulting in sub-economic returns on the existing network topography. Meanwhile, potential entrants may lose the incentive to ‘build’, since they may as well obtain the cost benefits via ONA without having to invest and bear the risk of obsolescence. The TA is concerned that the

⁵ For example, where the new equipment has greater capacity than the existing equipment, the value attributed to that equipment should be written down to reflect its lower functionality.

availability of ONA charges based on SEA would discourage the development of the mobile industry.

32. Under SNA, when new technologies emerge, the MNO will still be entitled to full cost recovery of its existing network topography. The ONA charges based on SNA would likely be higher than that based on SEA, but the TA considers that a balance has to be struck against encouraging market entry and maintaining sufficient incentive for network investment.

33. The concepts of SNA and SEA are particularly relevant to access to legacy networks which might be based on old technologies. In the case of 3G networks newly built based on modern technologies, there may be little practical differences between SNA and SEA initially. As a matter of principle, having considered the pros and cons of the above alternatives, the TA is of the preliminary view that **the current cost for the provision of ONA should be the replacement cost based on the SNA approach.**

Asset life – physical or economic life?

34. There are two ways that bring the asset life of a telecommunications network to an end:

- the ‘wear and tear’ of the network over a finite period of time, although in practice such wear and tear can be ‘repaired’ through reinvestment i.e. network maintenance and upgrade;
- the emergence of new technologies, rendering the network obsolete.

The first is often called the ‘physical life’ of an asset. In contrast, the ‘economic life’ of an asset brings both into the equation. Emergence of new technologies may not be accurately predicted in advance, but the likelihood and the risk of such should be taken into account in making network investments. Given the capital intensity of telecommunications investments and the dynamic nature of the business, the TA is of the preliminary view that **network assets should be depreciated over the economic life in the calculation of ONA charges.** Otherwise, the amount of incentives would not be commensurate with the risk of mobile network investments.

Annualisation methods – straight-line, accelerated or flat annuity?

35. As mentioned in paragraph 29, capital investments on network assets are to be apportioned over the economic life of the assets in the calculation of ONA charges. There are three commonly adopted annualisation methods:

- Under the *straight-line* method, the book value of asset depreciates in a linear scale over its life span. A cost of capital is then applied to the net book value of asset outstanding at the beginning of each year.
- Under the *accelerated* method, the book value of asset depreciates in constant-percentage decline over its life span (the initial rate of decline is faster than the linear scale). A cost of capital is then applied to the net book value of asset outstanding at the beginning of each year. The accelerated method achieves similar results as the ‘tilted-annuity’ method.
- Under the *flat annuity* method, the asset depreciates according to an financial amortisation schedule. A cost of capital is then applied to the net book value of asset outstanding at the beginning of each year.

36. A number of observations can be made on the comparison between the three annualisation methods:

- The flat annuity method results in constant annual charges (after cost of capital) every year. The straight-line method results in constant annual charges before cost of capital, but higher annual charges after cost of capital during the initial years and progressively lower charges over time. The accelerated method results in even more tilted annual charges. Higher charges during initial years may deter service-based market entry, while lower charges towards the latter years may be insufficient to sustain network investments.
- All three annualisation methods are financially equivalent, as the sum of discounted annual charges over the entire period are always the same for each method, and exactly equal to the

initial amount of investment. The only difference is the timing of charges.

- Each method has its own advantages. The flat annuity method produces the same annual charge every year, thus saving the administrative effort in revising the ONA charges year by year. The accelerated method is more reflective of the economic depreciation pattern of assets and would better simulate market prices if there is a negative equipment price trend. The straight-line method is simple, and most commonly adopted in statutory accounts.

Holding gain or loss – financial capital maintenance (FCM) or operation capital maintenance (OCM)?

37. As stated in paragraph 29 above, the depreciation in each of the three cases above would be based on the replacement cost of a ‘modern equivalent asset’. In some other jurisdictions such as in Europe, the calculation of current cost for each period is adjusted for ‘holding gain or loss’ of the modern equivalent asset⁶. Inclusion or exclusion of the holding gain or loss are essentially two widely accepted approaches for current cost accounting – the FCM approach (in which holding gain/loss is included) and the OCM approach (in which holding gain/loss is excluded) with different policy objectives. OCM ensures that sufficient fund is maintained to continue the production of services, but FCM ensures that the initial financial investment is preserved. In the context of calculating ONA charges for the 3G networks, the TA considers that the FCM approach is more consistent with the policy objective of maintaining investment incentive for network infrastructure. The TA is of the preliminary view that **the ONA charges should incorporate the holding gain/loss.**

38. The TA also considers whether the holding gain or loss under the FCM approach should be accrued to the year in which the gain or loss was incurred, or amortised over the remaining economic life of the assets. When there is a steady decline trend in equipment prices, accruing the holding gain/loss will yield similar results to the accelerated depreciation method, while amortizing holding gain/loss will yield similar results to the use of the historical cost

⁶ Holding gain or loss is defined as the unrealised gain or loss arising from the change in asset value during the holding period.

standard. As such, the accrual approach seems to resemble the economic depreciation pattern better. However, in exceptional circumstances when an abrupt writedown of assets is needed, the accrual approach may result in excessively fluctuation in ONA charges, i.e. sharply inflated for one year, then drastically decline afterwards. As such, the TA preliminarily considers that **holding gain/loss should not be amortised, save in exceptional circumstances.**

Depreciation – summary of preliminary considerations

39. Overall, the TA also considers that the adoption of economic life have already taken into account economic obsolescence of assets, as discussed in paragraph 34. The adoption of a suitable WACC (paragraph 50) would also reflect the risk of obsolescence. The adoption of the FCM approach would cater for asset depreciation as a result of declining price trend in the market. As such, the TA is of the preliminary view that **depreciation of network assets for the calculation of ONA charges should be based on:**

- the current cost standard;
- the replacement cost of ‘modern equivalent assets’;
- the ‘scorch node approach’;
- the economic life of assets;
- the straight-line depreciation method;
- the financial capital maintenance approach;
- recognizing holding gain/loss during the year in which the gain/loss is incurred, save in exceptional circumstances; and
- adopting a WACC that corresponds to the risk of economic obsolescence of network assets.

Network capacity

40. Network capacity is the denominator in the calculation of ONA charges. It is defined under SC 12 of mobile carrier licenses as “*the volume of*

traffic capable of being sent over a Relevant Network⁷ of an MNO over a period of defined duration". SC 12 also provides the individual licensees with the flexibility in establishing their own methodologies to determine their network capacity provided to non-affiliated service providers, although the TA reserves the power to modify such methodologies if he considers them to be unfair or inaccurate.

41. The IM also provided some guidance on the principles in measuring network capacity⁸. In accordance with common industry practice, network capacity of telecommunications networks with circuit-switching and packet-switching capabilities can be measured in terms of *busy-hour traffic* (e.g. Megabits or Megabytes per hour) or *total traffic* carried over a defined period of time (e.g. Megabits or Megabytes per day). The TA recognizes that the network operators will dimension its network based on the busy-hour traffic requirement derived from the projected usage pattern of their services. From this angle, the 'busy-hour traffic' basis seems to be more directly linked to the level of capital expenditure for rolling out a mobile network. In contrast, the 'total traffic' basis in a certain sense averages out the network utilisation over a defined period of time and across a number of locations, resulting in a relatively more uniform charge applied regardless of time and location of network access. Some network operators may consider this method to be more straightforward and easier to meter.

42. In accordance with SC 12 of the mobile carrier licence, **MNO may choose whether its network capacity should be measured based on busy-hour traffic, total traffic over a defined period or any other methods as appropriate.** However, the TA is of the preliminary view that **a single and consistent methodology should apply to the ONA charges to all MVNOs and CSPs that it connects, as well as its own internal transfer price.**

43. Notwithstanding the requirement for a single and consistent methodology to be applied to the ONA charges to all MVNOs and CSPs, given the complex characteristics of the 3G market, the TA recognizes that discounts may not necessarily constitute discriminatory pricing *per se*, so long as any difference in the level of charges applied to different service providers are

⁷ Relevant Network means a telecommunications network incorporating base station equipment operating within the radiocommunications frequency assigned by the TA under the mobile carrier licence.

⁸ Section 2.2 and Appendix D of the IM.

justified based on objective criteria, such as differences in cost⁹. For example:

- It is permissible for a MNO to provide discounts on bulk purchases in terms of traffic volume, data rate or contract duration. This means, in particular, that MNO may set different ONA charges based on different commitment periods or volumes. Such discounts should be justified by quantitative analysis of cost savings and published in the form of reference NCA for MVNOs or tariffs for CSPs pursuant to SC 12.9, subject to scrutiny by the TA in accordance with SC 14, 15, 16 and 18. The MNO should not restrict the availability of such bulk discounts to other service providers meeting such objective criteria.
- It is also permissible for a MNO who opts for the ‘busy-hour traffic’ basis to provide ‘off-peak’ discounts for ONA, as the TA recognizes that off-peak usage improves the utilisation pattern of network capacity and drives down average unit cost. Again, such discounts must be cost-justified, published and made available to service providers based on objective criteria. However, the MNO will not be allowed to set peak charges on the ‘busy-hour traffic’ basis and off-peak charges on the ‘total traffic’ basis. The TA will not regard any justification based on inconsistent cost principles as objective. Instead, he is likely to find such charges discriminatory against off-peak usage, potentially in breach of SC 12.
- An MNO should not set the ONA charges to non-affiliated service providers on the ‘busy-hour traffic’ basis and the internal transfer price on the ‘total traffic’ basis, or vice versa, with the purpose or effect of mitigating or minimizing the amount of network turnover for the calculation of SUF. Such charges would not only be considered by the TA as discriminatory (in breach of SC 12), but also as an avoidance (in breach of SC 13).

44. Another dimension for measurement of network capacity is the choice between *actual utilisation* and *efficient capacity* in the calculation of ONA charges. The TA notes that every network has a ‘pole’ capacity in theory, but in practice a certain level of redundancy or backup is always required to maintain

⁹ Under UK regulation on prices and access charges, only ‘undue’ discrimination is prohibited. A discrimination is defined as undue when there is no objective justification for such discrimination.

performance stability and cater for fluctuations in the usage pattern. 'Efficient capacity' refers to the 'design' capacity, which is net of any backup or redundancy¹⁰. On the other hand, 'actual utilisation' refers to the level of usage as recorded. Actual utilisation depends on the actual demand in the market. The difference between actual utilisation and efficient capacity is the level of 'idle' capacity¹¹. In fact, idle capacity is rather common during the initial phase of market development, as network operators tend to reserve a certain level of spare capacity in anticipation of rapid growth in demand.

45. The criticism on the use of 'efficient capacity' in the calculation of ONA charges is that the non-affiliated service providers seeking ONA from MNOs will be free from the burden of idle capacity and the risk of demand expectations. As explained in the paragraph above, idle capacity is rather common for a developing market like 3G. On the contrary, it can also be argued that the use of the 'actual utilisation' measure would deter competitive market entry by imposing excessive ONA charges during the initial period when the 3G networks are under-utilised. The TA sees problems with using either the 'efficiency capacity' or the 'actual utilisation'.

46. One approach to resolve this problem is to apply the principle that network operators 'bear the risk' and service providers 'pay the price'. The risk borne by network operators should be recovered from service providers seeking ONA through the cost of capital. If 'efficient capacity' is used, the risk of idle capacity will be fully borne by the MNO, and accordingly the cost of capital should be higher. If 'actual utilisation' is used, the risk of idle capacity will be shared by the MVNO, and accordingly the cost of capital should be lower.

47. Another approach is that it is not necessary for a 3G MNO to recover all its cost in the initial years. The cashflow of a network investment is likely to be negative in the initial years, but the net present value of the investment assessed over the entire investment period would possibly be positive. The ONA charges should be sufficient to enable the MNO to recoup its investment in the assets used for providing ONA over the economic life of the assets. Therefore the actual utilisation for each year over the economic life should be considered to derive an 'effective utilisation factor' based on which the ONA

¹⁰ In practice, the difference between 'pole' and 'design' capacity is often derived based on a 'loading factor' assumption.

¹¹ In theory, efficient capacity should always be higher than actual utilisation. In practice, however, it depends on the 'loading factor' assumption applied.

charges should cover the capital cost, operating cost and cost of capital for the ONA assets used.

48. **The TA invites comments from the industry before deciding the approach measure of network capacity in the determination of ONA charges.**

Cost of capital

49. Cost of capital refers to the required level of return on investment that compensates for the risk involved in such investments. In the IM, the TA stated that he intended to allow a cost of capital “*in the order of 20%*” for the first three years of the mobile carrier licences issued in October 2001, and that a review will be conducted after this initial period¹². In view of the rapidly changing market environment and the dynamic nature of the telecommunications industry, the TA finds it appropriate to conduct such a review at this point of time.

50. It has generally been accepted that **the cost of capital should be calculated in the form of weighted average cost of capital (WACC)**. The cost of equity will be based on the capital asset pricing model (CAPM). The cost of debt will be based on the risk free rate and specific company debt premium. There are multiple factors driving the level of WACC, including capital structure, interest rate, equity market return, trading volatility, credit rating, industry characteristics, competitive landscape, cash flow profile etc. The TA will take these factors into account in determining the level of WACC as and when he makes a determination on ONA charges upon the request of any party. Given the intense capital investment, competitive pressure and technology risk involved, the TA is of the preliminary view that **the WACC for the 3G network business should be above market average**.

51. Parameters related to the determination of WACC may be company specific. In line with paragraph 24, the relevant WACC for the calculation of ONA charges will be that of individual carriers.

¹² Section 2.2.6.1 of the IM, under “Terms of intervention”

Periodic review

52. The TA recognizes that 3G mobile services is a dynamic and developing market in which the competition environment or technology may change rapidly in the future. As such, he is prepared to review the guidelines as and when necessary, either at his own initiatives or upon request from the industry, to ensure that the charging principles will continue to reflect the prevailing market conditions and remain in line with the overall ONA policy objectives. He is of the preliminary view that **the guidelines will be reviewed no less frequent than every three years.**

Invitation for comments

53. The TA invites comments from the industry and any other interested party on the issues raised and preliminary views expressed by the TA, or any other relevant issue. Comments should be made in writing and reach the Office of the Telecommunications Authority on or before **6 October 2004**. The TA reserves the right to publish all views and comments and, accordingly, any part of a submission considered commercially confidential should be clearly marked together with the reasons for such claims.

54. Submissions should be addressed to:

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29/F Wu Chung House
213 Queen's Road East
Wanchai
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[Attention: Mr Herbert Fung, SRAM(C)3]
Fax: 2803-5112
E-mail: hchfung@ofta.gov.hk

An electronic copy of the submission should be provided by e-mail to the address indicated above.

Office of the Telecommunications Authority

6 August 2004