



Telecom New Zealand Limited

**Submission in respect of the Commerce
Commission's Issues Paper in relation to its
Schedule 3 Investigations into Amendments to
the Roaming and Co-location Services**

Public Version

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A SUMMARY

1. Summary

1.1. This submission is Telecom's response to:

- (a) The Commission's "Issues Paper" of 15 December 2006; and
- (b) Vodafone's undertaking in respect of national roaming and co-location services (dated 19 January 2007).

Roaming

1.2. Telecom's view is that the existing degree of regulation of roaming (i.e. as a specified service) is sufficient. We do, however, think there need to be amendments to the existing service specification in relation to the 10% coverage threshold requirement. We consider that the coverage threshold should be designed to ensure an entrant is committed to infrastructure build.

1.3. We also consider that the restrictive definition of access seeker for roaming should be broadened. At present the definition excludes Telecom and Vodafone, and in our view that exclusion should be removed. Any operator seeking to build a new network should be able to avail itself of the access that is available to new entrants. A roaming regulation that bars access to an established operator looking to migrate technologies amounts to an asymmetric regulatory barrier to efficient technology selection.

1.4. We recommend some other amendments, including allowing regulated roaming on 3G, and not just 2G networks.

1.5. While we consider roaming should remain a specified service, if the Commission is minded to recommend designation, we consider that roaming should be priced on a retail minus basis.

Co-location

1.6. We consider that it is not necessary for co-location to become a designated service. We have successfully established co-location arrangements with a number of other organisations [

]TCNZRI. The existence of so many co-location arrangements indicates that commercial negotiation is working. We therefore do not see any need for co-location to become a designated service.

1.7. We do, however, have a standard pricing principle which we consider should be adopted in the event that the Commission recommends co-location become a designated service.

Other comments

1.8. We make some general comments on the relationship between roaming and co-location and the need for these to be considered as separate,

not as substitute, options. The key interrelationship relates to the incentives created for access seekers to invest.

- 1.9. We also discuss the need for a cost benefit analysis in the assessment of whether to make changes to the existing level of regulation in respect of roaming and co-location.
- 1.10. Finally, we make some comments on Vodafone's undertaking. In particular we focus on the fact that Telecom is specifically excluded from taking advantage of the undertaking. We also note that Vodafone's undertaking relates only to its 2G network – we consider that the undertaking should include access to Vodafone's 3G network.

B ROAMING

2. Background

- 2.1. The national roaming service in the Telecommunications Act 2001 ("the Act") is designed to provide a cellular mobile telephone operator with the opportunity to begin providing nationwide services before it has completed its network build, by roaming on the network of another provider.
- 2.2. Roaming should be a means to an end (to facilitate entry), rather than the end in itself. This is supported by the fact that the existing service specification in the Act requires a commitment to national network build.
- 2.3. The service has been available since the Act came into force at the end of 2001. In that time, as we advised the Commission last year, [

]TCNZRI.

- 2.4. At this stage we consider it unlikely that anyone would seek roaming on Telecom's network rather than Vodafone's network, as we are unaware of any other party contemplating the deployment of a CDMA 2000 based mobile network. However, Telecom is open to any commercial approach from an operator wishing to roam on Telecom's network.

3. Issues with current service specification

- 3.1. The roaming specification in the Act contains certain requirements that an access seeker must satisfy to apply for regulated roaming. We support the Commission's decision to investigate the appropriateness of the requirements for roaming. Experience has shown that certain of these requirements, in particular the coverage requirement, are not well understood and would therefore benefit from clarification or simplification.
- 3.2. As a general principle, we consider that if the specification is to be updated it should be done in a manner which provides the correct investment incentives. We set out below our detailed comments on some of the requirements.

Coverage

- 3.3. The Act currently requires an access seeker to have rolled out a new cellular mobile network that covers no less than 10% of the area in which the New Zealand population normally lives or works.
- 3.4. Given that the purpose of roaming is to provide an entrant with national coverage while they build out their own network, a minimum coverage threshold is one way of ensuring that an entrant is committed to infrastructure investment, and not just looking for cheap network access. If no minimum coverage footprint is required as part of an

initial capital investment, then the regulation effectively mandates MVNO access to an access provider's network (minimum core network and services layer but with no Radio Access coverage footprint). For that reason there needs to be a demonstration early on of an intention to invest in infrastructure.

- 3.5. Telecom is in favour of some form of coverage threshold, to ensure an entrant's commitment to ongoing investment. However, there are difficulties with the existing 10% threshold. In particular, the current threshold does not guarantee investment above the 10% level. In our view the Commission should therefore consider other methods of ensuring the commitment to invest. We propose retaining an initial 10% coverage requirement that has to be met to obtain regulated access on the basis of roaming and introducing a further coverage target of 50% or 80% coverage within 5 years. This would mean the entrant could start operations sooner and with less committed investment, in exchange for a commitment to a serious network build program.
- 3.6. As noted above, it is also difficult to assess what the current 10% coverage threshold actually requires. Telecom proposes that the threshold be determined with respect to the access provider's network coverage. That is, an access seeker should be required to build to a level that is equal to a specified percentage of the access provider's network coverage. Network coverage might be measured by the number of the access provider's macro cell-sites. Given the relative propagation differences between access seeker and access provider networks, a 10% population target may need to be initially translated to be approximately 15% of the access provider's total macro cellsites.
- 3.7. Roaming should then cease to be available in areas where an access seeker has built out its network, and price terms for roaming should be left to commercial agreement after 5 years (at which point the access seeker will have a network covering at least 50%).

3G

- 3.8. At present regulated roaming would only provide an access seeker with access to a second generation ("2G") network. At the time the Act was passed 2G was the current market technology. However, in reality any new entrant entering the mobile market now will need to enter with a 3G offering. We therefore consider that 3G-3G roaming should be included. End-users will be significantly disadvantaged in a "2G only roaming" situation and will not receive the full benefits of new 3G services such as video telephony, video streaming and high speed data. A 2G only roaming scenario would effectively introduce a coverage limitation to these services when one of the key objectives of introducing national roaming is to remove coverage as an initial point of competitive differentiation.

Description of an access seeker

- 3.9. Telecom's view is that the description of an "access seeker" should be broadened. At present the definition:

- (a) Excludes Telecom and Vodafone
- (b) Refers only to cellular mobile network operators, rather than operators of other wireless networks (such as WiMAX)
- (c) Requires potential access seekers to have sufficient radio spectrum rights to enable them to roll out a nationwide cellular mobile telephone network.

3.10. In our view, for the reasons set out below, the definition should:

- (a) include Telecom and Vodafone as access seekers;
- (b) continue for now to exclude operators of other wireless networks;
- (c) remain as it is in relation to the requirement to have sufficient radio spectrum rights for a national rollout.

Including Telecom and Vodafone as access seekers

3.11. In our view neither Telecom nor Vodafone should be excluded from being access seekers to the regulated roaming service, for several reasons.

3.12. First, the policy reasons for maintaining the exclusion are not obvious. In fact, maintaining the exclusion can only actually reduce competition and therefore lessen customer benefits in the long-run or at best not affect either – we cannot see any scenario in which such an exclusion would best promote the s18 purpose statement.

3.13. As is prudent for any mobile operator, Telecom is continually reviewing its options in relation to the technology we use to deliver mobile services. As the Commission will be aware, a number of commentators globally have expressed concerns about the future ability of CDMA to be able to compete with mobile services provided over a UMTS network such as Vodafone operates. In particular they have focussed on concerns about the relative global roaming footprint of the two technologies, the abilities of each to provide new and improved services and the different costs associated with the end-user devices and hand sets for each technology.

3.14. These concerns have lead Telecom to consider the benefits of, and make contingency for, switching from CDMA technology to UMTS technology should we deem that to be the optimal path. Telecom has by no means reached a decision on this, however it is something that we keep in mind as we review our options in the mobile market.

3.15. A primary reason for allowing roaming access for new entrant networks is to lower the cost of rollout which in turn lowers the risk of entry, promotes the growth of competition and increases the likelihood of competitive entry. We believe it is important that the Commission understand that this logic is equally relevant in a technology migration decision. If Telecom or Vodafone were to migrate technologies we would face the same issues of increased costs as investment is made with relatively little chance of earning real returns until a complete

network has been rolled out. If Telecom were to roll out a UMTS 2GHz network we would be using higher frequency spectrum than we use for CDMA at 850MHz. We would therefore require more transmission towers to compensate for the reduced coverage provided from each UMTS 2GHz site, because of the basic physics involved – lower frequency spectrum has better ability to penetrate and propagate than higher frequencies. We might be able to take advantage of our existing cellular transmission sites, however, a nationwide UMTS 2GHz network would still require approximately 600-800 additional cellular sites. This increases the costs and risk of a migration decision in much the same way that the costs and risk faced by a new entrant are influenced by access (or lack of access) to roaming at reasonable commercial prices.

- 3.16. If the commentators mentioned above prove to be correct, and CDMA does become uncompetitive with UMTS, then Telecom's migration to a UMTS network would be necessary to preserve or enhance the existing level of competition.
- 3.17. As such, we think that any operator seeking to build a new network should be able to avail itself of the access that is available to new entrants.
- 3.18. From an economic perspective roaming has the effect of reducing the transaction costs of technology migration. In general this would be considered socially desirable, as a decision to migrate would reflect a view that the destination technology was preferred by (and therefore more beneficial to) the bulk of the market and consumers than the existing technology. It would be socially inefficient if transaction costs prevented such a migration, in the same way that transaction costs that otherwise prevent efficient trade from taking place are detrimental to the economy.
- 3.19. We note that when considering the issue of the potential for technology migration, the Commission is likely to be drawn into a general debate over the potential costs and benefits of having a single or dual technology mobile market. If confronted with this issue, we believe that the Commission should view this problem from the 'conventional' standpoint of a competition regulator: that is, the Commission's role is to ensure that markets work as effectively as possible by lowering entry barriers and transaction costs where appropriate, and then allowing the market to work. Although the technology issues are a fundamental feature of the market that the Commission will need to understand, we think it is for the market to decide which technologies to pursue.
- 3.20. Finally, we note that it is not the case that because of its size an incumbent will be in a position to negotiate roaming on commercial terms, whereas an entrant will not. Indeed, the opposite is likely to be the case in practice. If the Commission should conclude that due to technology issues there is in effect a roaming monopoly in New Zealand, then that is as true for an incumbent (on another technology) wanting access as it is for a new entrant. Furthermore, the hosting network may have more incentive to deny an incumbent access than a new entrant. This is because an incumbent operator has an established market position and deep expertise in the local market

that, all else equal, makes it a far more threatening competitor than an entirely new entrant. For these reasons, a roaming regulation that bars access to an established operator looking to migrate technologies amounts to an asymmetric regulatory barrier to efficient technology selection.

Include other wireless networks:

- 3.21. Telecom considers it too early to determine whether it would be advantageous to widen the definition of access seeker to include operators of other wireless networks, such as WiMAX. While it is commonly accepted that there will be convergence of a number of wireless standards, and the emergence of multi-band devices that would enable roaming across competing technologies, it is not yet clear how and when that convergence will occur, what the competition and market effects of it will be or whether regulatory intervention will be necessary to facilitate it.
- 3.22. In our view the Commission should not seek to regulate before there is demonstrable market failure..

Spectrum requirement

- 3.23. Our view is that the requirement for an access seeker to have sufficient spectrum for a national network should remain. We consider this requirement necessary to ensure that potential access seekers are operators that are committed to deploying a nationwide network.

4. Specified versus designated service

- 4.1. Telecom proposes that there should be no change to the current regulation of roaming; that is, Telecom does not consider there is a need to make roaming a designated service under the Act, for the reasons set out below. However we have also provided some comments on the appropriate approach to pricing should the Commission decide to make roaming a designated service.

Designation

- 4.2. Telecom considers roaming should remain a specified service, because, at a principle level, there is no facility in a mobile network that might be regarded as exhibiting features of an essential facility that is a possible bottleneck (as there is in a copper access network for example).
- 4.3. Further, there is no indication that commercial roaming is not working. As we have mentioned above there has been [

]TCNZRI Obviously we cannot comment on whatever approaches Vodafone has had in relation to roaming.

- 4.4. The Commission proposed in *A Review of Cellular Mobile Market Entry Issues (para 68)* that a possible barrier to the development of a third network is an entrant's perception of the risk of entering into a roaming agreement with either Telecom or Vodafone. The risk is due to the fact that Telecom and Vodafone mobile services operate on different cellular

platforms that are not interoperable. Therefore, the entrant must also choose and commit to one technology platform. The Commission posits even though Telecom and Vodafone may compete to provide the entrant the roaming service before the entrant commits to one of the operators, once the entrant has made its choice and struck a deal with one of the operators that operator may then be able to exert market power.

- 4.5. In Telecom's view this is an unlikely outcome. Roaming is, and should remain, a transitory measure designed to facilitate the initial build of a network. Before entry, the entrant should be able to enter into a contract that is fixed for long enough for it to build most (if not all) of its network. In doing so, it can avoid the risk of such ex post hold-up by the hosting network.

Approach to pricing roaming

- 4.6. As noted above, Telecom does not consider that it is necessary for roaming to be a designated service. If, however, the Commission is minded to recommend designation of roaming, Telecom has views on the appropriate pricing principle. Correctly establishing the roaming price is critical.

Retail-minus pricing

- 4.7. In our view, the appropriate methodology is one based on the retail price minus avoided costs saved pricing in the case where the access provider faces limited (or is likely to face lessened) competition in a market for the service. However, we note that roaming is a somewhat unusual access service, as in general the access seeker will rely much more heavily on high cost parts of the network (coverage sites) than a reseller, and this will become more and more evident as the access seeker progressively rolls out its network. In the following discussion, we explain why we think a retail minus methodology should be chosen, but then also consider the implications of the specific features of roaming access.
- 4.8. If and when competition is not limited or is not likely to be lessened, then the access price should not be regulated and it should be left to commercial negotiation, although the terms and conditions may be determined as a specified service.
- 4.9. A retail price minus avoided costs saved pricing methodology is appropriate because it allows the access seeker a relatively pure wholesale price early on in the access seeker's network roll-out that corresponds to the return the access provider earns on its network investments on average. Therefore, if the access provider is earning economic rents on its network investment due to limited competition before roaming, this wholesale price will create the incentive for the access seeker to invest in its own network in order to compete for this economic rent. This is particularly true in the early stages of build, when most of the host network is being used.
- 4.10. Telecom does not however consider the average cost saved approach sustainable or necessary in the long run, for the following reason.

- 4.11. As the access seeker builds out its network while the access price is regulated, the access seeker's influence on retail prices will increase, and the access seeker's incentives to build will change. Regarding the incentives to build, in order to maximise its returns, the entrant would choose to build cell sites that cost less than the national roaming wholesale price on a per minute basis and rely on national roaming to provide access to the higher cost or low yielding cell sites. The entrant will focus build on low cost/high demand areas and over time its roaming demand will reduce to the relatively high cost (low demand) parts of the host network. Therefore, the marginal cost faced by the entrant, is the access price of national roaming, and it will become less than the host's long run marginal cost in high cost areas. This means that the entrant faces an artificially low marginal cost.
- 4.12. This would have a significant effect on a rational access seeker's retail pricing decision. The access seeker's marginal cost will influence the retail price for its mobile services. As the entrant faces an artificially low marginal cost, the resulting retail prices as well as the regulated access price may not result in sufficient revenue to meet the long run cost of the incumbent's higher cost or low yielding cell-sites, thereby decreasing their economic viability.
- 4.13. There are a number of options available to deal with this issue, namely:
- (a) The regulated retail minus methodology could allow for adjustments over time to allow for the increasing cost of the network being used by the access seeker;
 - (b) The access seeker can be required to build out coverage (the traditional approach with 2G networks);
 - (c) The designated roaming service can be removed at some point (based either on time, network coverage, or competition thresholds), and replaced by a specified service; or
 - (d) A two tier pricing principle that enables the access provider to charge different prices for rural and metro areas.
- 4.14. The Commission should consider all of these options. Telecom's current view is that option (c) should be adopted, which amounts to returning the issue of the access price to commercial negotiation at the earliest practical opportunity. Telecom favours this approach for the following reasons.
- 4.15. Once the access seeker's network becomes reasonably established, it will be in a position to negotiate a commercial access price for roaming with the incumbent. This is because the access provider will still be required to provide access to the roaming service, as it is a specified service. Also, having a network provides the access seeker with options. It can choose to use the roaming service at a negotiated price, it may choose to build out its own network, or it may choose not to roam on specific parts of the network. It is worth noting that Vodafone's and Telecom's mobile network do not have exactly the same geographic coverage. The trade off in the build-buy decision between roaming and building a cell-site is discussed in section 7.

- 4.16. The access provider also has strong economic incentives to agree a roaming access price with an access seeker with an established network that is clearly committed to the market. In particular, such an agreement may provide the access provider with the opportunity to earn revenue and enhance the utilisation of network capacity in high cost areas.
- 4.17. This proposal is not without regulatory precedent. Other regulators that have proposed the retail minus pricing methodology include Ofcom National Roaming, A further Consultation, 22 July 2004, Annex A, Para A.9. and Eircom Opening the Market for Third Generation Mobile Services (3G Mobile), Response to Consultation, December 2000, para 3.5.4.1. However, it is worthwhile noting that none of these regulators have actually regulated the access price for roaming.
- 4.18. We note that while Telecom favours a retail minus pricing approach, the implications for entry (and for the host network) depend upon the ultimate price set, more than on the methodology. This is because as noted roaming deals do not use all the network, but will generally more heavily utilise relatively high cost parts of the network, particularly in the later stages of roll-out. Therefore, a roaming price that is low relative to these costs may stall network build out by the access seeker and may also make investment in high-cost or low yielding cell-sites unattractive for the incumbent. The ultimate question is whether the access price maintains the correct incentives at the margin, however calculated.
- 4.19. Finally we note that if the Commission came to the view that a cost based pricing principle should be used, then a price rising over time would be justified assuming an entrant will focus first on building out in low cost and/or high traffic areas, and then work out to high cost/low traffic areas. This would suggest that a rising price should be calculated in order to reflect the actual average costs of the parts of the access provider's network that are used over the period of the entrant's build program. Establishing the appropriate bounds would require analysis of actual network costs if a cost based principle was used.

Avoided costs

- 4.20. Having established that a retail minus approach is appropriate, we consider that the appropriate avoided costs should include:
- (a) The appropriate retail cost that are deducted would be the same as defined under the avoided cost saved and the actual cost saved pricing principle as defined by the Telecommunications Act; and
 - (b) Additional costs deducted would include cost of terminating a call on a fixed or other mobile network.

Voice and data

- 4.21. A single retail-minus price should not cover both voice and data services as these are separate retail services with pricing that is based on different units. It is not clear these different units could be made

comparable in order to arrive at a single price that would be meaningful. Furthermore, differentiating the roaming price by services is not an issue in other jurisdictions. As we understand it, roaming services have normally had separate prices set for voice, data and messaging services for example:

'For some services, notably data services such as GPRS, minutes used may not be the most appropriate charging basis. Such services may be more appropriately charged according to usage or "by the bit". In the event that the parties cannot agree on a charging basis, Ofcom is likely to determine that roaming usage will be charged on the same basis as the 2G mobile operator's relevant retail products taking into account charges for content or other value added components not provided.' (see **page 23, Ofcom roaming consultation 2004**)]

TSLRIC pricing

4.22. For a detailed cost estimate some form of TSLRIC (either top down or bottom up) is probably the only viable option.

Appropriate benchmark for a cost-based roaming service

4.23. In Telecom's view, cost-based mobile termination rates would not be appropriate for a cost-based roaming service. Mobile termination rates are calculated from network average costs. Roaming agreements on the other hand will generally facilitate the use of high cost parts of the network (particularly rural coverage areas). As such, mobile termination rates will understate the appropriate costs.

C CO-LOCATION

5. Background

- 5.1. Telecom began rolling out mobile phone sites in 1987, and today has 948 mobile phone sites (854 Macro sites and 94 micro sites). Of these, Telecom owns approx 170 sites freehold (primarily existing exchange or microwave sites). The remaining 686 sites are held by some form of tenure less than freehold i.e. lease or licence. Telecom has 308 Co-sites and 65 shared facilities with other operators. We have already provided the Commission with detailed information about the co-location arrangements we currently have in place, and do not repeat that information here. However, in summary we have a number of agreements in place with organisations including BCL(Kordia), TeamTalk, Vodafone, NZ Police and others. [

]TCNZRI

- 5.2. Telecom uses the Co-location Code and Master Services Agreement as the basis for any agreement, which limits the matters to be negotiated.

6. Specified versus designated service

- 6.1. In our view there is no need for the Commission to make co-location a designated service. As we have outlined above, and in previous submissions, we have many existing co-location agreements. More importantly, [

]TCNZRI demonstrates the efficacy of commercially negotiated co-location. We therefore consider it is not necessary for co-location to be regulated further.

- 6.2. In addition, Telecom considers that there are no policy reasons for regulating the access price of co-location because cell-sites are not a "bottleneck" for the provision of mobile services. All the inputs required to build a cell-site are derived from competitive markets. Cell-site equipment is supplied by a competitive international market, and the market for real-estate is also competitive. This point is supported by the observation that since 1990 the number of Telecom cell-sites increased from approximately 100 cell-sites to over 940 cell-sites. Vodafone has also been able to obtain sites over time in a similar manner, and even in densely populated countries in Europe four or more networks have been successfully rolled out.

- 6.3. This is also supported by the fact that, as noted above, there is already a large number of agreements amongst several carriers to co-locate on each other's cellular and radio transmission sites. This does raise a possible consequence of regulating the price of co-location, which is to dampen the development of commercially negotiated pricing of co-location.

Pricing for co-location

- 6.4. Despite this, should the Commission make co-location a designated service, Telecom has views on the appropriate method of determining pricing. Telecom considers that at least part of any co-location pricing

model could be based on a specific formula. In our negotiations with access seekers to date we have used the same formula used by the Commission to calculate annual costs in its TSO and TSLRIC determinations. We have set this out below.

- 6.5. Having derived an annual cost via this formula, the cost is then allocated to the parties on a pro rata basis. In our negotiations to date we have agreed to allocate costs in relation to the number of antennas on the mast and use of floor space within equipment rooms. Annual actual opex costs are also shared on the same pro rata basis.
- 6.6. The pricing model includes:
- (a) An annualised establishment cost; and
 - (b) A pro rate share of actual operating costs.
- 6.7. The annualised establishment cost will be calculated in accordance with the principles set down by the Commerce Commission in its mobile determinations to date. The calculation will be made by applying an annualisation factor (calculated as set out below) to the Modern Equivalent Value ("MEV") of the asset.

$$\text{Annualisation factor} = \left[\frac{1+r}{1+a} \right]^u * ((1+a)^{(t-1)}) * (r-a) / (1 - \left[\frac{1+a}{1+r} \right]^n)$$

Where:

Agreed values:

a	=	annual change in price of asset	0%
r	=	pretax WACC (use post tax WACC 10.5%/0.67)	15.7%
u	=	time to build (years)	0
n	=	economic life of the asset (years)	20
t	=	year for which calculation made	1

- 6.8. This formula is suitable for calculating costs associated with existing plant. However where new plant is required specifically to meet the needs of the access seeker then, we have agreed in our negotiations to date, that the access seeker should bear all these costs. An example might be the costs of upgrading power to the site if existing facilities are inadequate to meet the additional needs of the access seeker.

Generic site types/forms

- 6.9. Telecom uses a number of generic infrastructure designs i.e. for masts and containers etc. As noted above we have provided considerable information on these issues to the Commission and, rather than repeating that here, refer the Commission to those previous presentations.
- 6.10. In short, however, there are approximately 17 mast types with a number of standard heights ranging from 12m to 25m, the costs of which are fairly standardised (i.e. for a 20m type 5 mast etc). However masts and container types are often mixed together depending on the site specific conditions and resource consenting requirements. Not all parts of the site however can have standardised costs; for example foundations are usually site specific taking into account not just infrastructure but soil conditions, wind loadings etc

and are a significant component of the site cost. Additionally power, telecommunications and access costs are all variable depending on the particular routes available on sites and the distances required to reach the roads or other connecting network. As a result site costs even amongst groups of sites using similar infrastructure can vary. As both Telecom and Vodafone use different infrastructure types this would be even more complicated. As such it is probably easier to generate a list of generic costs related to different infrastructure components than to try to simplify into a set number of generic site types. This is the approach we have taken in negotiations to date.

D ADDITIONAL COMMENTS ON ROAMING AND CO-LOCATION

7. Inter-relationship between roaming and co-location

- 7.1. Roaming and co-location should not be thought of as simple substitutes. Roaming, which can only provide the access seeker with at best equal service and quality functionality to the access provider (and even this is technically challenging) is and should be primarily concerned with facilitating nationwide entry and completing access seekers' network coverage. Co-location, which does facilitate service and quality differentiation by the access seeker, is concerned with facilitating expansion of access seekers' network coverage.
- 7.2. Depending on the capital and risk profiles of a particular operator, an access seeker may utilise roaming, co-location or a mixture of both at varying times in the deployment of its network infrastructure but in general should progressively reduce utilisation of roaming in favour of co-location and/or deployment of separately owned base stations or cell sites, due to:
- (a) the competitive differentiation afforded the access seeker by deploying its own proprietary infrastructure and systems;
 - (b) the issues an access seeker will face with designing an homogenous customer proposition across its and the access provider's networks; and
 - (c) the technical challenges associated with roaming and data roaming in particular and the increased complexity these will create for the access seeker.
- 7.3. For the Commission's purposes we consider the key inter-relationship between roaming and co-location is the incentives or disincentives the roaming price can create for an access seeker to invest in co-location or sole ownership of base stations/cell sites. For very similar reasons to those outlined immediately above we consider the Commission should prefer co-location to roaming access in the medium to long term and ensure any regulated services and terms are consistent with this approach.
- 7.4. In determining whether to use roaming, co-location or both, an access seeker must make a trade-off between operating and capital costs:
- (a) roaming has no capital cost and initially has low but growing operating costs associated with call charges within the roaming coverage area;
 - (b) expanding coverage using co-location has medium capital and operating costs (but not growing); and
 - (c) expanding coverage using separate sites has higher capital cost and lower ongoing operating cost.
- 7.5. Placing any regulatory requirements for coverage expansion aside, and also assuming that all services are supported within the roaming area,

then the business case to expand coverage beyond the initial coverage area offered by a new entrant operator will depend on the cost of roaming call charges (\$ per call minute) multiplied by volume of calls in the coverage area, versus the capital and operating costs of deploying the new coverage (generally \$ per base station).

- 7.6. The economic decision as to when it is best to expand the coverage area to reduce operating costs and also if co-location is desirable in reducing operating costs will be impacted by the terms of the roaming agreement (in particular price terms), the cost to deploy new base stations and the relative capital saved versus rental operating cost associated with co-location.
- 7.7. If roaming costs are set at too low a level, then it would require a significantly large volume of call traffic in an area to justify expanding the access seeker's coverage area with capital investment.

8. Technical and practical issues associated with roaming

- 8.1. There are a number of technical and practical issues associated with roaming which make it a far from perfect network solution and which inevitably impact on the customer proposition that can be offered by an access seeker. We have provided a few examples of some of these below. None of these are insurmountable and in fact roaming arrangements have been very successfully put in place in a number of countries, including Australia and the UK and international roaming (which do in most cases provide more limited functionality than would be expected in a domestic roaming situation) is also commonplace.
- 8.2. At a practical level the sheer complexity of operating a roaming arrangement creates its own complexities and costs for each party. On an on-going basis for example, the access seeker and provider will need to resolve:
 - (a) the access seeker's device capabilities to operate across multiple technologies (if relevant);
 - (b) management of subscribers' locations across multiple networks, authentication of what services they are entitled to receive and at what tariff rates etc;
 - (c) management and delivery of services across multiple technologies and through multiple network providers, especially those that require higher levels of quality of service ("QoS") and latency etc in order to function properly;
 - (d) billing of data services with different levels of QoS and latency etc;
 - (e) compatibility of technical interfaces between the networks required to control and interconnect traffic and for subscriber management information; and
 - (f) what grades of services are agreed between networks, eg prioritisation of roaming traffic versus home traffic under overload conditions.

- 8.3. On top of these issues there are also a raft of technical roaming issues which must be dealt with when implementing voice and data roaming, Examples are:

Voice roaming

- 8.4. Two major issues commonly raised with voice roaming are security and call handoff:
- (a) Security: Authentication and protection against fraudulent or cloned phones “pretending” to be customers of the access seeker is a key issue for any access provider of roaming services;
 - (b) Call handoff: Handoff of calls between roaming networks (even of same technology) is not easily possible, so roaming arrangements generally include boundaries defining coverage areas where roaming is possible and where roaming not permitted.

Data roaming

- 8.5. Data services (or data applications) often require QoS and latency limits in order to support end-to-end services or applications. The roaming network may not support or offer the required QoS or latency necessary to support a roaming customer’s end-to-end services. In this case the roaming traffic may be denied service, or best effort service will be available. This can prevent the access seeker offering some services that it supports on its network in areas where it is roaming onto another operator’s network. This has obvious consequences for the customer proposition that the access seeker is able to deliver.
- 8.6. In the future, billing of additional grades of service (eg QoS for VoIP) rather than pure data volume will be an issue.

E COST BENEFIT ANALYSIS, MARKET DEFINITION AND COMPETITION ASSESSMENT PROCESS

9. Cost Benefit Analysis

- 9.1. When considering whether to make roaming and co-location designated and specified services, the Commission must follow the procedure in Schedule 3 of the Act.
- 9.2. When the Commission makes a recommendation under Schedule 3, it must give consideration to the s18 purpose of the Act (see s19 of the Act). Any recommendation must be one that best gives, or is likely to best give, effect to the s18 purpose.
- 9.3. The Commission must also keep in mind that the principles of good regulation and the policy of the Act dictate that the minimum level of regulatory intervention that is necessary to meet the desired policy objectives should be a guide; that it is only appropriate where the market has failed or is likely to fail to meet policy objectives in the absence of regulation; and the benefits of regulatory intervention exceed the costs resulting in a net long-term benefit to end-users.
- 9.4. Only if there is clear evidence that there is benefit to end-users in the long run should regulation be extended.
- 9.5. The words of s18 are clear – the focus is on the long-term interests of end-users. Telecom finds it difficult to reconcile section 18 and the following statement by the Commission (paragraph 33):

In any quantitative assessment of the benefits and costs of regulation in the context of a Schedule 3 investigation, the Commission's primary focus is on the impact of regulation under a consumer welfare approach, where only changes in consumer surplus are measured.

- 9.6. This statement and s18 may be reconciled if by "consumer welfare approach" the Commission is adopting a long-run approach to the measurement of consumer surplus, i.e., one that acknowledges the role of profits in spurring firms to serve the long-run interests of consumers.¹ However, this would be an unusual use of the term, and in the past the Commission has analysed consumer welfare using static models that treat transfers of surplus as a benefit (see, e.g., the mobile termination reports).
- 9.7. A cost benefit analysis of the factual and counterfactual of increased regulation is key to determining whether in fact recommending ongoing regulation best gives, or is likely to best give, effect to the purpose in s18 of the Act. By not carrying out a cost benefit analysis against the two scenarios of regulation versus no regulation there is a risk of bias

¹ In which case the consumer welfare and total welfare standards are basically equivalent.

towards regulation. Accordingly, Telecom considers that a thorough treatment of the public cost and benefit issues is required.

- 9.8. Telecom therefore considers that the Commission should evaluate the benefits and costs of regulation in both qualitative and quantitative terms. While quantification is not necessarily easy, it makes underlying assumptions transparent and provides assistance in understanding the relative magnitudes of costs and benefits.
- 9.9. At its most general the cost benefit analysis compares the total benefits for end-users of telecommunications services under a factual that involves the Commission undertaking the proposed regulatory action, with the total benefits under a counterfactual that involves the Commission not undertaking the proposed regulatory action.
- 9.10. A cost benefit analysis, particularly one with a focus on the long-term interests of end-users, should take into account the impact of uncertainty and forecast error.
- 9.11. Regulatory price setting involves setting prices and other parameters for a period (e.g., five years), based on forecasts of the future. However, the more uncertain is the future, the greater is the risk that a regulator would fail to achieve the objective of setting prices.
- 9.12. Uncertainty can be incorporated into cost benefit analyses using techniques such as Monte Carlo simulations. In Monte Carlo simulations the distributions of possible values of variables representing the assumptions of interest are specified. Then these variables are repeatedly randomly sampled from these distributions and inserted into models which calculate the corresponding impacts of such variation on outcomes of interest (e.g. welfare). This produces a range (distribution) of net present values that results from the underlying distribution of the critical variables. Under both the factual and counterfactual scenarios the following should be taken in consideration.
- 9.13. In Telecom's view it is important that the Commission maintain a clear distinction in its thinking between the roaming and co-location issues, as although they are related they have quite different objectives.
- 9.14. In general, national roaming is used to provide national coverage during build. Its primary objective is to ensure that a competitor can offer a competitive service quality from an early point in its network construction program, implying that the assets it has invested in can earn relatively normal margins in the early years of operation. Critically, it is normally a transitory measure, and in most jurisdictions this is guaranteed by compulsory build requirements.² The key issue

² For instance, the UK operators are required to rollout their 3G networks to 80% of the population by end 2007. EU rollout requirements are set out in http://www.pts.se/Archive/Documents/SE/3G%20rollout%20status%20rapport%20om%203Gutvecklingen%20i%20Europa%20PTS_ER_2002_22%20oktober%202002.pdf p.9ff.

with roaming is whether the potential sunk costs of entry absent the availability of roaming become such that entry does not occur.

- 9.15. Co-location on the other hand is used to lower the cost of construction (if indeed co-location results in lower costs). From a competition policy perspective, the key issue with co-location is whether or not it is viable to build out additional competing networks if co-location is not available.
- 9.16. Clearly there is some interaction between the prices of the roaming and co-location services. The relative price between roaming and co-location/standalone installations is important as it determines the build/buy trade-off (and in turn the price of co-location impacts the entrant's decision either to co-locate or acquire their own site, as co-location is a form of build). If roaming is expensive and co-location is relatively cheap, then the incentive will be to build faster than if roaming is cheap and co-location is expensive (or unavailable). Likewise if roaming is cheap then it can be used as a substitute for co-location in expensive locations. However, this is just to say that adjusting the cost of co-location is adjusting the cost of build, and that unless there are mandatory build requirements, cheap roaming will result in cream skimming or arbitrage opportunities at the network level. As a result it is important to be clear about the objective of any intervention in the price of roaming, and whether it is intended as a transitory measure designed to facilitate a networks own build, or as a substitute for building a network.

10. Co-location price regulation: potential benefits and costs

- 10.1. In Telecom's view there are the following potential costs and benefits associated with making co-location a designated service:
- (a) Regulation of the co-location access price may reduce the incentive for the access seeker and/or access provider to build cellsites, thus reducing network coverage:
 - If the access price is set too low, it could easily result in a situation where it is better to wait for another operator to set up a site and then seek co-location rather than invest in greenfield sites. Many site applications do not succeed.
 - If competitors are sharing sites, then there is no competitive advantage from building new coverage sites, which will reduce the incentive to build those sites.
 - (b) Cell-site co-location may reduce the operational efficiency of cell-sites due to increased radio interference reducing the efficiency of current installations
 - (c) There is a potential benefit in environmental amenity from fewer towers as a result of more co-location, however this may be offset by the presence of significantly larger towers supporting multiple carriers' networks.

11. Roaming price regulation: potential costs and benefits

11.1. We consider there are the following potential costs and benefits associated with making roaming a designated service:

- (a) An entrant is able to achieve a competitive quality level relatively quickly;
- (b) Roaming may result in access seekers not investing in their own networks. This may reduce the level of innovation and diversity of services offered to consumers in the long-run by reducing or removing the incentive to compete on quality of network coverage and capacity, particularly if priced too low;
- (c) Potential efficiency gains through sharing low use cell-sites (eg rural coverage sites);
- (d) Transaction costs associated with relationship between the host network and the access seeker (account management costs, coordination issues of various type including increased difficulty in forecasting and managing demand on the network).

12. International Experience

12.1. International precedent is that a credible and committed entrant will be able to secure both roaming and co-location deals on commercial terms. Although in some jurisdictions rights conferred by regulation have been in the background,³ there is little evidence to suggest that regulatory intervention in the area of roaming or co-location has significantly impacted the development of mobile markets. Given this, Telecom's view is that although amending these services will marginally alter the entry incentives, it is highly unlikely that they will in practice alter the strategic decisions taken by potential entrants.

12.2. On this point, Telecom notes that an entrant will not build a national mobile network on the basis of a short term business plan. Rather at least 10 years or more will be modelled. The key assumptions in the plan will be expected market growth, prices in the long term, market share expectations, growth of valued added products and so on. Against this, changes to roaming and/or co-location regulation will have only marginal impacts on an entry decision. Noting this, the Commission should be wary of being persuaded to offer excessively cheap access to services like roaming. In doing so, it may encourage entry by firms with short term planning horizons that do not have credible long term business plans, and inadvertently allow inefficient entry to occur at the expense of firms that have invested in providing services in New Zealand for the long term.

³ For example, 3G roaming rights in Europe.

- 12.3. To the best of our knowledge, there has been relatively little regulatory focus on domestic roaming to support entry, and examples of co-location intervention are very rare. We are not aware of regulators setting the price of either service.
- 12.4. Roaming has not normally been required during the development of 2G networks, and typically three or four networks have been built without domestic roaming arrangements in place. There are exceptions of course,⁴ but even then agreements appear to be commercially negotiated and there is not a great deal of public information available about the terms of roaming agreed. The most important exceptions to the 'no regulatory focus on domestic roaming' rule we are aware of are within Europe in Denmark and (possibly) Ireland.
- 12.5. With respect to Denmark, we understand that roaming across 2G networks (by both 2G and 3G network operators) was made mandatory, with mobile network operators being required to meet all reasonable requests for national roaming. The charges for roaming were not regulated, however, but subject to commercial negotiation.⁵ (These conditions have now been removed, due to lack of substantial market power in any relevant market.) With respect to Ireland, the ACCC reports⁶ that ComReg was considering imposing a roaming requirement, however it is unclear whether this was implemented.
- 12.6. In the case of 3G entrants, roaming rights have been imposed in Europe in a number of jurisdictions to assist those 3G players that did not already have 2G networks. It appears that at least Austria, Belgium, Denmark, France, Greece, Ireland, Italy, Spain, Sweden and the United Kingdom have imposed some type of national roaming entitlement for 3G entrants. Of those where we have found some reference to roaming arrangements (Denmark, Ireland and the UK), it appears that arrangements are generally commercial in nature. We are not sure of the arrangements in other countries. Certainly in the case of the UK however, where Hutchison 3G has entered with domestic roaming arrangements, the service has been established by commercial tender without significant regulatory intervention.

⁴ Luxembourg appears to have a late 2G entrant building an 1800 GSM network that has a roaming agreement to facilitate entry. This appears to be commercially negotiated, as the incumbent has announced it will cease to supply roaming as the entrant has achieved significant coverage. This is noted in the EC's latest report on Electronic Communications Regulations and Markets – the '11th report'.

⁵ This is described in the European Commission's 6th Report, at page 18, available at: http://europa.eu.int/information_society/policy/ecom/doc/implementation_enforcement/annualreports/6report/annexes/annex2.pdf

⁶ ACCC investigation of Domestic Inter-carrier Roaming Services, available at: <http://www.accc.gov.au/content/item.phtml?itemId=708246&nodeId=bd2cd78737ca9deae62d296b0ac34d15&fn=Final%20report%E2%80%94mobile%20domestic%20inter-carrier%20roaming%20service.pdf>

- 12.7. Given the predominance of commercial roaming agreements there is no basis to conclude that regulatory intervention has had any significant impact on entry or actual market outcomes. Likewise, regulatory threat (which for example we understand was used in Australia in the early days of 3's entry) may or may not have impacted the market. The evidence would suggest that in most cases commercial deals would have eventuated regardless of the regulator's position.

F VODAFONE'S UNDERTAKING

13. Introduction

- 13.1. Vodafone has submitted an undertaking in respect of roaming and co-location. The undertaking, if accepted, will be effective for five years, although the Commission can recommend that the undertaking should expire earlier.
- 13.2. Telecom wishes to comment on certain aspects of Vodafone's undertaking.

14. Excluded Operator

- 14.1. In its undertaking, Vodafone defines Telecom as an "Excluded Operator", meaning Telecom cannot access the terms of the undertaking without Vodafone's approval "which may be withheld at Vodafone's absolute and sole discretion." In addition, Vodafone states that it "will be the exclusive provider in New Zealand of services equivalent or similar to the Vodafone Roaming Services to members of the Access Seeker Group". In its submission in support of its undertaking, Vodafone says (paragraphs 44 and 45):

"Only an access seeker for the regulated roaming service may benefit from the Undertaking. Under no circumstances can Telecom benefit from these terms.

"An access seeker must not resell or assign the bare roaming service to any other party. It can offer wholesale services using the roaming service with consent from Vodafone.

- 14.2. Vodafone has not put forward any argument to justify these restrictions. We consider that these restrictions have the potential to significantly limit competition for roaming services. This may happen in two ways – in the upstream and downstream markets.
- 14.3. As we have already mentioned, Telecom is reviewing the technology options for providing mobile services. It is not inconceivable in the near future that Telecom may move to a network technology that is compatible with Vodafone's network technology. Therefore, Telecom may be able to offer access seekers an alternative to Vodafone's roaming service. The Commission has indicated in its earlier paper "A Review of Cellular Mobile Market Entry Issues" (10 October 2006) that a possible reason for the lack of development of an upstream market is that Vodafone and Telecom operate technically incompatible networks.
- 14.4. In future, if Telecom and Vodafone were to operate compatible networks, the exclusivity arrangement in Vodafone's undertaking would still prevent access seekers roaming onto networks other than Vodafone's. Therefore accepting the undertaking in its present form would perpetuate the status quo, and would not further the Commission's aim of developing roaming services. As competition is based on providing customers with choice, this limitation on the access seekers' choice will place a limit on the competition for roaming services.

- 14.5. Second, by specifically excluding Telecom from the possibility of roaming onto Vodafone's network, Vodafone is limiting the options available to its only competitor currently in the retail market. If Telecom decides to move to a technology that is compatible with Vodafone's roaming service, then allowing Telecom to take up Vodafone's roaming service, while Telecom builds its own network, will reduce the time it takes Telecom to offer retail customers new services. As a result, consumers would benefit sooner if roaming is available because of the early availability of new competing services.
- 14.6. Finally, it is worth noting that Telecom does not place similar exclusivity constraints on its wholesale customers, who are also competitors in the retail market. Vodafone's proposal would set an unusual precedent.

15. Vodafone's exclusion of 3G and HSDPA networks

- 15.1. We have already indicated that we think the roaming service in the Act should be amended to include 3G networks. In addition, in our view it would be appropriate for Vodafone to include its 3G and HSDPA (or future HSPA) network in its commercial undertaking.
- 15.2. Vodafone's proposed undertaking includes voice, SMS and data services delivered over its 2G GSM and GPRS network, and it excludes services delivered over its 3G or HSDPA networks⁷. Vodafone states that it will have no obligation to provide roaming over any other part of any network.
- 15.3. We do not think Vodafone's roaming service should be limited to 2G, for the following reasons.
- 15.4. First, as we have already indicated in relation to the roaming service under the Act, it is very unlikely that an access seeker will be interested in rolling-out a GSM network. Looking forward, there is a wide variety of developing network technologies, however 2G GSM and GPRS is becoming outdated technology. Access seekers may deliver services that are similar to those currently delivered over 2G, however this does not mean that they are "2G" services.
- 15.5. Also, we note that Vodafone has specifically provided for the possibility that it may decommission its 2G network in any area, for example if it lost some of its 2G radio spectrum management rights (see clause 3.3(a) of Schedule 3 of the undertaking). At the extreme, the ultimate outcome could even be that Vodafone moves away from 2G altogether. The effect of this would be to reduce the access seeker's mobile services footprint.

⁷ See definition of "Vodafone Network" in Vodafone's undertaking, and para 43 of Vodafone's accompanying submission.

15.6. Therefore, Telecom recommends that Vodafone's undertaking be technology agnostic so as to allow roaming on both its 2G and 3G networks.

16. Non-discrimination

16.1. As the undertaking is drafted it does not specify that Vodafone will treat roaming traffic in the same way as it treats its own traffic, for example in the event that the network became temporarily overloaded or for more permanent network developments.

16.2. Telecom's view is that the undertaking should make it clear that Vodafone will not discriminate against traffic on its network that is roaming traffic.