

**Submission to the Australian
Competition and Consumer
Commission**



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**WIK Mobile Network and Cost Model
and
MTAS Pricing Principles Determination
1 July 2007 to 30 June 2009**

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1. Introduction

The Australian Competition and Consumer Commission (the Commission) engaged WIK Consult to develop a bottom-up TSLRIC+ cost model (the WIK cost model) to estimate the cost of providing mobile terminating access services (MTAS). The Commission has indicated that the outputs of the WIK cost model will be used to support any future pricing principles applicable from July 2007 to June 2009.

Vodafone's submission focuses on two key aspects of the cost modelling process: the appropriate application of any output of the WIK cost model; and the technical aspects of the actual WIK cost model.

The appropriate application of the WIK cost model to future pricing principles

Vodafone understands that the object of the WIK cost model is to inform the Commission about the cost of providing MTAS and it may be used by the Commission in its decision to implement any future pricing principles. When deciding the appropriate application of the WIK cost model outputs to any future pricing principles — including whether to continue explicit price guidance — Vodafone believes that the Commission should be guided by a review of the effectiveness of the 2004-07 pricing principles against the stated objectives.

To help inform the Commission on this, Section Two of Vodafone's submission looks at the following issues:

- whether lowering the mobile termination rate (MTR) has had any measurable effect on the level of competition in the fixed-line market¹; and
- whether continuation of the explicit pricing guidance would be consistent with the long term interest of end-users (LTIE).

Section Three discusses the matters that the Commission must take into account when setting pricing principles, as set out in Part XIC of the *Trade Practices Act 1974* (TPA) and recent Australian Competition Tribunal (the Tribunal) decisions. As Vodafone understands, the pricing principles are to be based on the outputs of the WIK cost model; therefore, the assumptions and inputs used in the cost model must also be consistent with these matters.

Technical aspects of the cost model

Vodafone wishes to raise several concerns over the technical aspects of the WIK cost model — some of which have been raised in previous correspondence with the Commission. Section Four discusses general concerns about the WIK cost model, and Section Five outlines specific concerns about the inputs and assumptions used in the cost model.

Vodafone shows that the WIK cost model significantly underestimates the cost of providing MTAS for an efficient new entrant. Given the results of our analysis, Vodafone has strong concerns over the robustness of the WIK cost model. Vodafone submits that it would be inappropriate for the Commission to base any pricing principles on the outputs of the WIK cost model without first having undertaken significant amendments.

¹ Fixed-line market refers to the bundle of fixed-line telephony services that include national STD calls, fixed-to-mobile calls, and international calls.

2. Appropriate application of the WIK cost model to future pricing principles

Vodafone submits that the Commission should be guided by a review of the effectiveness of the 2004-07 pricing principles against the stated objectives, when deciding the appropriate application of the WIK cost model outputs to any future pricing principles — including whether the explicit pricing guidance contained in the 2004-07 pricing principles should continue in the 2007-09 pricing principles. Vodafone suggests that this should involve analysing whether:

- there is a correlation between lower MTRs and increased competition in the market for fixed-line telecommunications services; and
- specific pricing guidance is consistent with the LTIE.

Vodafone believes that if a correlation between lower MTRs and increased competition existed, then a reduction in the MTR from 24 cpm to 12 cpm over three years would have resulted in a measurable increase in fixed-line competition. However, available market evidence indicates that this has not been the case. The analysis below demonstrates that the reductions in MTRs have not assisted non-integrated fixed-line operators like AAPT and Primus compete with the integrated fixed-line operators.

Therefore, Vodafone submits that it is increasingly untenable to advocate the position that competition in the fixed-line market will be promoted by further reducing the MTR in any future pricing principles.

Additionally, we believe that the Commission should also review whether the use of specific pricing guidance in the MTAS pricing principles is consistent with the LTIE. Vodafone notes that developments in the market environment — such as fixed to mobile substitution — and in the economic literature since 2004 raise doubts over the validity of the presumption that market negotiated MTRs will be above the welfare-maximising level. Consequently, Vodafone submits that it should no longer be assumed by the Commission that explicit pricing guidance is consistent with the LTIE.

Vodafone recommends that the Commission take these factors into account when designing and implementing the pricing principles 2007-09. Based on the evidence provided in this section, Vodafone does not support the inclusion of explicit pricing guidance in any future pricing principles.

2.1 Lower MTRs and the effect on competition in the fixed-line market

The 2004 *Mobile Services Review: MTAS Final Decision* (the Report) identified the weak competitive pressures in the fixed-line market as the central justification for the regulation of MTAS and the introduction of explicit pricing guidance. The Report recognised that while there are many fixed-line providers, Telstra's dominant market share of over 60 per cent limits the

ability of competing fixed-line providers to restrain prices² — further, the Report stated that high MTRs enabled Telstra to maintain its dominant position³.

As a result, the Commission advocated that declaration, combined with an appropriate pricing principle would permit fixed-to-mobile (FTM) providers to compete more effectively against the dominant incumbent operator, Telstra. The Commission stated that through lowering the MTR, FTM providers will be able to better compete in the relevant market⁴.

A subsequent increase in competition within that market would be demonstrated through one or all of the following⁵:

1. reduction in the price of fixed-line services;
2. changes in the market share (specifically, a reduction in Telstra's share); and/or
3. increased non-price competition (e.g. better quality of service).

Have prices decreased in the fixed-line market?

Since the introduction of the 2004-07 pricing principles, MTRs have been reduced from 21 cpm in 2004 to 15 cpm in 2006. Over the corresponding time period, the average retail revenue from FTM calls has reduced from 37.3 cpm in 2004 to 33.2 cpm in 2006. However, while this may appear to indicate greater competition, the actual FTM margin (the difference between wholesale cost and retail revenue) has increased from 16.2 cpm in 2004 to 18.8 cpm in 2006 which — given the falling MTR — is a 26 per cent increase in the percentage mark-up from 44.7 per cent to 56.6 per cent. Thus, while the main wholesale cost of FTM calls has been reduced, the margin accrued by Telstra on every FTM call has actually increased. This is not consistent with increased competition for FTM calls.

Table 1

<i>Type of call</i>	Telstra average retail revenue (cents per minute)				
	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>
National	13.2	12.6	13.1	13.1	12.7
International	43.0	41.5	40.9	40.3	37.6
Fixed-to-mobile	38.0	38.1	37.3	35.8	33.2
Total average revenue	21.6	21.4	22.1	22.2	21.3
Regulated MTR	21.0	18.0	15.0
FTM margin	16.3	17.8	18.8

Source: Telstra Annual Reports

The Commission and the Tribunal have noted that a focus on FTM calls may not fully reflect the competitive response of fixed-line carriers — regard should also be had to the total price change in the 'bundle' of fixed-line services. Table 1 shows that the revenue per minute from all

² ACCC, 2004, *Mobile Services Review: Mobile Terminating Access Service*, p. 119.

³ *Ibid.*

⁴ *Id.*, at p. 122.

⁵ *Id.*, at p. 123.

national, international and FTM minutes has reduced marginally by 0.8 cpm from 2004. However, there was a spike in revenue per minute over 2004 and 2005, due largely to an increase in the revenue per minute from national STD calls. In the four years from 2003 to 2006, the revenue per minute from the bundle of fixed-line products has only decreased 0.1 cents. This is despite a 6 cpm reduction in the cost of MTR and a technology-driven reduction in the cost of other assets required for fixed-line services.

Vodafone notes that the market evidence (Table 1) does not support the argument that the introduction of explicit pricing guidance in the 2004-07 pricing principles resulted in a decrease in the price of fixed-line products, and importantly, we also note that over the term of these pricing principles, Telstra has *increased* its margin on FTM calls.

Table 2 shows the percentage of usage for each type of fixed-line call (national, international and FTM) included in the bundle of fixed-line services. Vodafone notes that the percentage of international call minutes has decreased slightly between 2003 and 2006. This indicates that the stability in the average revenue per minute (Table 1) cannot be explained by an increase in the proportion of international calls.

Vodafone also notes that there has been substitution away from national calls (fixed-to-fixed) and towards FTM calls, which is most likely due to the increased penetration of mobile phones in the market. The growth in FTM calls, combined with the increased margin received by Telstra for each FTM minute (Table 1), may in part explain why the market outcome predicted in the Report — that lowering the MTR would enable FTM providers to compete more effectively against the dominant incumbent operator, Telstra⁶ — has not occurred.

Table 2

<i>Type of call</i>	Percentage of total minutes of use			
	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>
National	66.17	63.60	60.98	58.95
International	5.34	4.86	4.57	4.36
FTM	28.49	31.54	34.45	36.69

Source: Telstra Annual Reports

Has the market share of the incumbent changed?

Vodafone notes that if the explicit pricing guidance contained in the 2004-07 pricing principles has resulted in reducing the market power of the integrated operators, this should be evidenced by a consistent decreasing trend in the market share of the incumbent — relating to the three equal drops of three cents per minute in the regulated MTR rate. However, over the three years of the pricing principles, Telstra's market share has been decreasing at a decreasing rate (Table 3) — that is, over the period of regulated declining MTRs, the incumbent has been able to slow its market share decline. Vodafone submits that this is inconsistent with the hypothesis that the reduction in MTR has caused competition in the fixed-line market

⁶ Id., at p. 121.

Table 3

<i>Operator</i>	Market share							
	<i>Total fixed bundle (%)</i>				<i>Fixed-to-mobile (%)</i>			
	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>
<i>Integrated operator</i>								
Telstra	63.57	62.25	60.69	60.29	68.92	66.44	64.17	63.98
YOY change	..	-2.08	-2.51	-0.65	..	-3.60	-3.42	-0.29
Optus	14.60	15.15	15.90	16.74	13.84	14.51	15.60	15.44
YOY change	..	3.76	4.97	5.25	..	4.79	7.53	-1.01
<i>Independent operator</i>								
AAPT	8.92	9.20	8.98	8.26	8.80	8.51	8.21	8.00
YOY change	..	3.16	-2.41	-8.00	..	-3.26	-3.56	-2.51
Primus	4.45	4.35	3.79	3.57	3.26	3.05	2.83	2.97
YOY change	..	-2.25	-12.94	-5.60	..	-6.53	-7.13	5.16
Other	7.36	8.66	10.46	10.85	5.18	7.50	9.20	9.60
YOY change	..	17.63	20.80	3.68	..	44.81	22.71	4.41

Source: IDC Australia

The Commission stated that the introduction of the explicit pricing guidance contained in the 2004-07 pricing principles would enable non-integrated operators to compete more effectively against the integrated operators in the fixed-line market⁷. However, Vodafone notes that the market share evidence since 2003 does not support this hypothesis (Table 3). The non-integrated operators, Primus and AAPT have lost, rather than increased, market share as would have occurred should lower MTRs have resulted in increased competition in the market. The growth in the market share of 'other' independent fixed-line operators, while initially increasing, has flattened significantly over the term of the pricing principles.

Vodafone submits that these trends provide evidence that the stated objective of the explicit pricing guidance contained in the 2004-07 pricing principles has not been achieved. Consequently, Vodafone is of the view that the Commission should review the need to include explicit pricing guidance in any future pricing principles covering July 2007 to June 2009.

⁷ ACCC, op. cit., at p. 121.

Has the quality of service improved?

The Commission and the Tribunal have noted that in the absence of price competition, an increase in competition could be demonstrated through improved quality of fixed-line services. Both the Telecommunications Industry Ombudsman (TIO) and the Australian Communications and Media Authority (ACMA) collect quality of service information for fixed-line services and providers. The TIO, in its annual report, publishes the number and types of complaints it receives from end users. Table 4 shows that between 2003-04 and 2005-06, total complaints relating to fixed-line providers increased 44.6 per cent. Fixed-line complaints relating specifically to the level of customer service — including failing to deal with the complaint, failing to act on the customer's request, inadequate or incorrect advice, and lengthy waiting time — increased 223.9 per cent.

Table 4

<i>Complaints</i>	TIO fixed-line complaints		
	<i>2003-04</i>	<i>2004-05</i>	<i>2005-06</i>
Total	36 167	44 559	52 294
YOY change	-2.8%	23.2%	17.4%
Customer service	4 451	7 649	13 106
YOY change	35.4%	71.8%	71.3%

Source: Telecommunications Industry Ombudsman Annual Reports

The customer satisfaction levels, as reported in ACMA's *Telecommunications Performance Report 2004-05*, have remained relatively stable between 2003 and 2005. For example, 27 per cent of respondents were completely dissatisfied with fault repairs in 2003, compared to 26 per cent in 2005. In both 2003 and 2005, 67 per cent of respondents were completely satisfied with fixed-line fault repairs.

These quality of service measures indicate that there has been no systematic improvement in the level of quality in the services provided by fixed-line providers. Vodafone submits that this is further evidence that the inclusion of explicit pricing guidance in the 2004-07 pricing principles has not resulted in increased competition between the fixed-line operators.

2.2 Is explicit price guidance consistent with the LTIE?

When reviewing whether the explicit pricing guidance contained in the 2004-07 pricing principles should continue in the 2007-09 pricing principles, the Commission must consider whether this is consistent with the LTIE. Vodafone submits that developments in the economic literature indicate that market negotiated MTRs will not be above the welfare-maximising level, and hence, will be in the LTIE.

As a result, Vodafone does not believe that the Commission should issue explicit pricing guidance in the 2007-09 pricing principles. Vodafone's experience with negotiations during 2006 demonstrates that the explicit pricing guidance contained in the 2004-07 pricing principles removes the ability to engage in commercial negotiations with other carriers.

Vodafone notes two specific developments that support these arguments: implications of fixed-mobile substitution for whether MTAS is a monopoly bottleneck; and countervailing buying power of fixed-line operators.

Fixed-mobile substitution removes monopoly bottleneck of MTAS

Fixed-mobile substitution (FMS) refers to the choice of consumers to use their mobile phones in preference to their fixed-line connection. FMS may be evidenced through consumers disconnecting their fixed-line service in favour of mobile subscription (line substitution) or it could be more discrete and be shown through consumers preferring to use their mobiles as the main provider of voice communication (call substitution).

The Commission and ACMA have recognised the existence of FMS and its growing importance in the market. In the February 2007 Senate Estimates hearings, the Commission stated that:

... the rate of substitution, particularly of mobiles, whilst difficult to measure empirically, would be widely accepted as having increased.⁸

Similarly, ACMA stated in its annual report of the performance of telecommunications:

The trends of a reducing average mobile phone bill and reducing call charges, compared with increasing fixed-line rental charges, combined with the advantages of mobility and expanding service functionality of mobile phones, are factors driving the fixed-to-mobile substitution of services.⁹

The existence of FMS is influential in the determination of whether the provision of MTAS is a monopoly bottleneck. The Commission referred¹⁰ to a 2002 paper of Wright to support the conclusion that owners of mobile networks have a bottleneck over the termination of FTM calls:

In most countries, the fixed-line network collects the proceeds from ... [a FTM] ... call, but pays the cellular firm a termination charge for completing the call. This gives the cellular firms a kind of bottleneck over terminating calls.¹¹

However, Wright's more recent paper (Wright and Hausmann 2006¹²), concludes that the monopoly outcome of these cost models does not hold when FMS is introduced. That is, once subscribers are able to choose between using the fixed or mobile networks to make calls, market based termination rates do not reflect monopoly prices. Wright and Hausmann find that:

... the market determined mobile termination rate is considerably closer to the welfare maximising termination rate than a regulatory determined termination rate based on cost.¹³

Wright and Hausmann¹⁴ calibrate their cost model using Australian-specific data for 2004 and estimate the welfare maximising termination level to be around 18 cpm. While slightly below

⁸ Cosgrave, M., *Senate Standing Committee on Economics Additional Budget Estimates*, 15 February 2007, Committee Hansard, p.E20.

⁹ ACMA, *Telecommunications Performance Report 2004–05*, p. 83.

¹⁰ ACCC, *op. cit.*, p. 50.

¹¹ Wright, J., 'Access Pricing Under Competition: an Application to Cellular Networks', *The Journal of Industrial Economics*, Volume L, No. 3, September 2002, pp. 289-90.

¹² Wright, J. and Hausmann, J., *Two sided markets with substitution: Mobile termination revisited*, paper presented to conference on 2 sided markets in Toulouse, June 2006. http://econ-www.mit.edu/faculty/download_pdf.php?id=1366.

¹³ *Ibid.*, at p. 30.

their estimate for the market equilibrium, this rate is significantly above the cost levels assumed by the Commission in the 2004-07 pricing principles — between 5 and 12 cpm — and the cost estimated in the WIK cost model — 7.3 cpm. Wright and Hausmann conclude that ‘regulating termination charges to cost results in lower welfare than the unregulated equilibrium.’¹⁵

While Vodafone is not advocating the outputs of Wright and Hausmann’s cost model — the estimates used indicate it can only be seen as a rough estimate — we support the two key principles derived from their econometric model:

1. it is incorrect to rely on economic studies (including Wright’s 2002 paper) that ‘prove’ that the supply of termination is a monopoly bottleneck since these cost models do not include fixed-mobile substitution; and
2. when consumers can choose between making mobile or fixed phone calls, the market equilibrium MTR is significantly closer to the welfare-maximising MTR than the ‘cost-based’ regulated rate.

Going forward, these effects can only be expected to grow stronger. In a situation where virtually all fixed-line callers to mobiles have the alternative of a mobile-to-mobile call, there is a real market constraint on the MTR, which makes the case for continuing explicit pricing guidance in any future pricing principles questionable.

Countervailing buying power

The Commission has expressed the view that mobile network operators (MNOs) have monopoly power over MTAS on their network and face little effective constraints on the exercise of this power — and therefore, in the absence of regulation, MNOs would impose monopoly prices and would damage competition in the fixed-line market.

Vodafone disagrees with this view and notes that it fails to take into account the countervailing buying power (CBP) of the incumbent fixed-line operator. Vodafone notes developments in the theory of bargaining which demonstrate that fixed-line incumbents are able to use their CBP to effectively constrain the ability of mobile operators to charge above the welfare-maximising level of providing MTAS.

CBP exists when a particular purchaser (or group of purchasers) of a good or service is sufficiently important to its suppliers to influence the price charged for that good or service. In the specific context of MTAS, there are a number of factors that can attribute CBP to the purchasers of MTAS, specifically:

- importance of the originating operators as outlets for the seller (i.e. terminating MNOs), in particular, when the former is a transit service provider;
- option not to purchase or delay reaching an agreement; and
- option to withhold payments.

Binmore and Harbord¹⁶ demonstrate that the mandatory requirement to provide interconnection services does not remove the CBP of the fixed-line incumbent. CBP may be exercised by threatening to delay reaching an agreement in case the buyer believes the terms offered by the

¹⁴ Id., at p. 23.

¹⁵ Id., at p. 23.

¹⁶ Binmore, K. and Harbord, D., 2005, ‘Bargaining over fixed-to-mobile termination rates: Countervailing buying power as a constraint on monopoly power’, *Journal of Competition Law and Economics*, Vol. 1, pp. 449-72.

seller are unreasonable (for example, relative patience/impatience of each negotiating party). Alternatively, when the buyer is a net payer of call termination revenues, as it would typically be for the fixed-line incumbent, it could attempt to affect the terms of trade by unilaterally deciding to withhold payments of termination revenues, thus putting the terminating MNO under financial strain.

In a bilateral monopoly negotiation, with neither party having an option to refuse to bargain, Binmore and Harbord¹⁷ argue that the non-incumbent network has the characteristics that mean it will have less power than the incumbent fixed-network operator. As a result, incumbent operators will not agree to a termination rate that is significantly above the cost of providing the service. That is, even though mandatory interconnection removes the possibility of incumbent networks from refusing to negotiate, MNOs are unable to exercise any monopoly power they may have over MTAS on their network.

3. Matters to take into account when setting pricing principles

Vodafone submits that the legislative requirements for making final arbitration determinations (for which the pricing principles are made) and the interpretation of the provisions by the Tribunal in *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1 has two broad implications for the development of a cost model from which pricing principles are to be set:

- first, the network design must reflect the realities for rolling out, operating and maintaining a network within the Australian market. It must reflect the engineering standards for dimensioning, resilience and design (including adherence to planning restrictions, government standards, and industry standards such as ITU and GSMA); and
- second, the cost inputs (CAPEX and OPEX) used in the cost model must also reflect the realities of operating a mobile network in the Australian market.

Part XIC of the TPA contains a number of common matters that must be taken into account when performing regulatory functions. Specifically, when assessing whether to declare a service, assessing the reasonableness of terms and conditions of access in ordinary access undertakings and when making final arbitration determinations pursuant to s.152CR, the promotion of the 'long-term interests of end-users' (LTIE) is the touchstone. In addition to the LTIE criterion, when assessing the reasonableness of terms and conditions of access in ordinary access undertakings and when making final determinations in access arbitrations, the following common matters are required to be taken into account:

- the long-term interests of end-users;
- the legitimate business interests of the provider;
- the provider's investment in facilities used to supply the declared service;
- the interest of the those who have a right to access the service;
- the direct costs of providing the service;
- the operational and technical requirements necessary for the safe and reliable operation of a carriage service or a telecommunications network or a facility; and

¹⁷ Ibid., at p. 470.

- the economically efficient operation of a carriage service, a telecommunications network or a facility.

The Commission notes in *Access Pricing Principles – Telecommunications* (1997) that when arbitrating access disputes the Commission must have regard to the same matters as it does when assessing the reasonableness of ordinary access undertakings. In addition to these common criteria, there are two further matters the Commission must take into account when making a final determination to an arbitration:

- any pricing principles determined under s.152AQA(1) in relation to the declared service that is the subject of the arbitration¹⁸; and
- the value to a party of extensions, or enhancement of capability, where that cost is borne by someone else.

Vodafone believes that the Commission — in setting the pricing principles used to inform final determinations and the assessment of ordinary access undertakings — must be guided by the Tribunal's interpretation of the common assessment criteria in *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1.

The precedent set by the Tribunal in *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* is directly applicable to the structure and inputs used in the WIK cost model as it deals with the assessment of cost modelling approaches, assumptions and inputs against the common assessment criteria of Part XIC.

The Commission and the Tribunal accept that the underlying economic principle of price regulation in non-contestable markets is to emulate the outcome achievable in contestably competitive markets. The result is setting a price that is based upon the forward looking efficient costs of providing the service. The Commission states in the guide to *Access Pricing Principles – Telecommunications* that a benchmark for an efficient price is:

... the price that would occur, given the characteristics of the market, if the access provider faced effective competition. (1997, p.12)

Similarly, the Tribunal considers 'that in general terms the prices in access undertakings should reflect and not exceed the forward looking efficient economic costs' of providing the service¹⁹.

Therefore the relevant question is what price existing network operators would set in a contestable market, subject to the threat of entry. The Tribunal makes it very clear that it must also be recognised that any new entrant would not have the ability to price at the level of an operator that has significant scope and scale. Regard must be had to the actual process new entrants adopt to gain a foothold in the market. In particular, the Tribunal recognises that the assessment criteria do not require it to set a benchmark achievable only in the theoretical perfectly competitive market. The assessment criteria introduce aspects that reflect market realities. The Tribunal states:

... the terms of s.152AH directs the assessment of reasonableness towards some aspects of market outcomes that go beyond over-simplified assumptions that could only be appropriate were perfect competition a realistic outcome.²⁰

¹⁸ Section 152AQA(6).

¹⁹ *Telstra Corporation Limited* [2006] ACompT 4 at [46].

²⁰ *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1, at [73].

More specifically, the Tribunal states that it is not clear that the objective of economic efficiency leads to a price based on the costs achievable by a new entrant only after some indefinite period of time. Both the requirements of the Act and the objective of economic efficiency dictate that the appropriate efficient benchmark must reflect realities in the market. The Tribunal states that:

It can be seen that, in seeking to emulate the outcomes realisable in a competitive market, some regard must be had to the actual process (the dynamics) by which operators compete and establish themselves in the market.²¹

and;

As might be expected, this means that the task of deciding how to assess the efficient forward looking costs of a new entrant must involve some balancing of opposing considerations and must take account of the actual markets in which the relevant services are provided.²²

The Commission's assessment of Vodafone's MTAS undertaking²³ advocated that the relevant efficient benchmark is an operator with scale that is achievable by all MNOs, that is, a 25 per cent market share. The Tribunal considered that using a benchmark operator with the scale and scope achievable by all MNOs may provide an indication of how a hypothetical competitive market may operate and the outcomes that may be produced by such a market. However, the Tribunal recognised the difficulties associated with a determination of what may be considered to be 'achievable' scale and scope. The Tribunal rejected the view that 25 per cent is achievable by all MNOs noting that where an attempt is made to determine the issue of an appropriate benchmark operator, regard must be made to 'market realities'²⁴. The market reality is that not all operators will aim to service the complete market, or all of Australia, or provide fixed as well as mobile services. In summary, operators may prefer to service niche markets, and that this is the reality of how a new entrant may behave.

A further 'reality' that must be addressed is the need for an operator to adopt a suitable technology migration strategy, required to match competitors' product and service developments. In the context of today's forward looking operator, this means a migration from an existing 2G network to a dual 2G/3G network, capable of serving both the existing 2G customer base, and those who choose to upgrade to 3G handsets. It is important to note that this migration is relevant to voice services, since a 3G customer will need to receive voice calls on the 3G network, whenever their handset is registered on the 3G network. We return to this point in our detailed comments on the WIK cost model.

²¹ *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1, at [73].

²² *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1, at [74].

²³ *Assessment of Vodafone's mobile terminating access service (MTAS) Undertaking – Final Decision*, March 2006.

²⁴ *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1, at [80].

4. General comments on the WIK cost model

Vodafone is concerned by the approach adopted by WIK in the development of the cost model. These concerns, which have been expressed to the Commission in previous correspondence, are:

- the lack of visibility of the cost model's algorithms;
- the lack of consultation with Australian MNOs; and
- the lack of calibration of the cost model to Australian conditions.

Vodafone's first concern is the inability to fully understand the WIK cost model through an analysis of the algorithms that underpin the calculation of the cost model's output. While Vodafone respects the wishes of WIK to protect its intellectual property, this could have been done in a manner which allowed relevant parties to fully understand the cost model's workings.

Second, Vodafone believes that proper consultation on the cost model requires access to all underlying algorithms of the cost model. Notwithstanding the comprehensive documentation that WIK has provided, and the compiled version of the cost model, there will remain ambiguities and uncertainties over precisely how the methodology has been implemented in the cost model. It is possible that Vodafone, and other respondents, will not be aware of important cost modelling issues that only become apparent once the cost model algorithms are studied. These can only be verified by allowing access to the actual cost model coding. In all other major regulatory consultations with which Vodafone has been involved (e.g. UK, Netherlands, Sweden, Greece, Romania) full access to the cost model algorithms has been made available.

Vodafone is concerned by the 'one shot' opportunity to comment on the WIK cost model. Other telecoms regulatory authorities have taken account of the need for cost model development to be an iterative process.

The cost model developed for OPTA in the Netherlands commenced with an industry working group meeting to discuss conceptual issues on 27 September 2005. This was followed by a series of subsequent industry working group meetings discussing different aspects of the cost model, leading to a draft framework cost model (without fully calibrated data) distributed to operators in December 2005. Subsequent draft cost models were also distributed to the industry, with the final cost model released at the end of June 2006.

The UK cost modelling exercise took longer than this. The programme commenced in February 2005, with an initial paper presented to industry in June 2005, and a first consultation version of the cost model (with dummy data) issued to the industry in October 2005. This was followed by a second draft version in March 2006. A full consultation version of the cost model was issued to stakeholders in September 2006. Ofcom will issue a final version of the cost model at the end of March 2007. The whole process will have taken about two years.

Third, Vodafone also has concerns regarding the lack of calibration in the WIK cost model. WIK holds that calibration is only applicable in so far as it ensures all 'relevant' costs are included. WIK also holds that the role of calibration is not to sacrifice the theoretically efficient design of the cost model network by inflating components to the 'cost realities' of actual networks in operation in Australia (WIK Report, p.6).

By not taking into account the 'cost realities' of actual networks in operation in Australia the WIK cost model fails to take account of the Tribunal's counsel that:

...in seeking to emulate the outcomes realisable in a competitive market, some regard must be had to the actual process (the dynamics) by which operators compete and establish themselves in markets...the terms of s.152AH direct the assessment of reasonableness towards some aspects of market outcomes that go beyond over-simplified assumptions that could only be appropriate were perfect competition a realistic outcome.²⁵

Vodafone disagrees strongly with WIK's assertion that calibration should not involve taking into account the realities of designing, dimensioning and operating a network in Australia. Any new entrant will face the same practical problems and trade-offs that the current MNOs have faced when rolling-out their networks. Further, the purely theoretical approach adopted by WIK directly contradicts the requirements of Part XIC, in particular s.152CR in an access arbitration context, which requires that regard must be had to:

- the legitimate business interests of the carrier or provider, and the carrier's or provider's investment in facilities used to supply the declared service (s.152CR(b)); and
- the direct cost of providing access to the declared service (s.152CR(d))²⁶.

In not taking into account these matters, the WIK cost model fails to have regard to the realities of operating a network in the Australian market.

The WIK cost model will not (other than by coincidence) reflect the Australian operating environment due to absence of any attempt at proper calibration. Calibration should take place at two levels: network dimension; and network costs.

The first, calibration of network dimension, is critical for the cost model to be an accurate representation of the resources needed to provide the correct level of network coverage and capacity. Without any network dimension calibration the WIK cost model will suffer from the following shortcomings:

- it will fail to take account of the actual 3D terrain topography (compared to the 2D cost modelling exercise undertaken by WIK); and
- it will fail to take account of the geographic, seasonal and time-of-day traffic distribution of traffic, which will depend on the Australian market, and cannot be captured in a few simple parameters such as the percentage of traffic in the busy hour. For example, the percentage of traffic in the busy hour will vary between residential and business districts, and even within residential and business districts. Local network planning can take account of these variations, but it will not be captured in the WIK cost model. There can, therefore, be no guarantee that the WIK cost model will accurately reflect real world network design.

²⁵ *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1, at [73].

²⁶ It is clear from the case of *Telstra Corporation Limited* [2006] ACompT 4 (2 June 2006) that the assessment of the "direct cost" of providing access focuses on the direct cost of the relevant service provider, and not any other service provider. See, for example, the decision of the Tribunal at [92]. This is of course different to any assessment as to whether such costs may be "efficient", which is relevant to the criteria in s.152CR(1)(g) and s.152AB(2)(e).

The second, calibration of network costs, is also critical for the cost model to capture Australian specific factors that will impact on network operational costs. For example, base station maintenance will depend on unique Australian factors of labour costs, utility costs (particularly power), and support costs (e.g. motor vehicles). These costs cannot be taken from international benchmarks without, at least, verification against actual Australian costs.

4.1 Scorched earth approach

The WIK cost model adopts a scorched earth approach to the design of the 'efficient' mobile network. WIK substantiates this approach on the basis that it best replicates the design of an efficient new entrant network, which — according to WIK — guarantees truly bottom-up cost modelling in that it pays no regard to the realities of BTS placement (WIK Report, p.7).

While the WIK approach may result in a theoretically optimal network design, such a result does not reflect 'market realities', nor does it reflect the reality of rolling out a network in Australia which would be experienced by the hypothetical efficient new entrant. An efficient new entrant is unable to ignore the physical realities, and the planning requirements to which the placement of BTSs must adhere.

For these reasons, other regulator-developed bottom-up cost models (Sweden, UK and Greece) effectively utilise the scorched node approach by reconciling the cost models with the number of BTSs in real world networks. That is, they assume that the efficient new entrant is restricted in its placement of BTSs to existing BTS locations. This approach would better reflect the 'market realities' of network design within Australia.

Vodafone can provide numerous examples where environmental and/or legal reasons have prevented us from rolling out network assets at their engineering-efficient position. A recent example in Queensland involved the placement of BTS sites that used a microwave link requiring line of sight. Initially these sites were placed according to engineering requirements — however, soon after commission it became obvious that there were local environmental factors which hampered the microwave link. Consequently, Vodafone had to develop alternative network topology incurring additional CAPEX and OPEX costs.

These events occur regularly, and ignoring these factors will under-estimate the cost of rolling out and operating a mobile network in Australia. Further, since these factors are out of the control of the network operator, an efficient new entrant would not be able to avoid these costs. As a result, a scorched node approach better reflects the network realities that a new efficient entrant would face.

4.2 Network dimensioning

The WIK cost model estimates the traffic level as a calculation from dimensioning factors. While this is true to some degree, the process of dimensioning — that is, ensuring that the network has adequate assets to deal with spikes in traffic — does not affect the level of network traffic experienced over a year.

The WIK cost model uses the following network dimensioning factors:

- busy hour percentage: 8.5 per cent;

- traffic usage per subscriber: 8.3 mEr; and
- number of Busy days a year: 250 (using a 5 day average).

Based on these factors and the equation outlined on page 92 of the WIK Report, WIK estimate the level of usage for the efficient network to be 28.8 billion minutes a year.

Busy hour percentage

WIK estimates that the busiest hour accounts for 8.5 per cent of the daily traffic. This is based on its experience 'for other industrialised countries like Australia' (p.107). WIK estimates the 8.5 figure from its fixed switched network cost model in Germany and the assumption that total usage in the fixed network is six times greater than mobile networks. Such an approach is inadequate for dimensioning a mobile network in Australia, as mobile network usage is significantly 'more peaky' than that incurred in fixed networks, irrespective of the proportion of fixed-line to mobile usage.

Further, there are no engineering reasons for the assumption adopted, and there is no estimate for the busy hour percentage likely to be adopted by a hypothetical efficient new entrant. Furthermore, use of such a figure does not reflect the market realities of mobile network dimensioning in Australia.

The figure of 8.5 significantly under-estimates Vodafone's busy hour traffic, which accounts for [c-i-c] per cent of daily traffic. Vodafone's busy hour traffic has consistently been around [c-i-c] per cent. Therefore, it is reasonable to expect that this is the percentage faced by a new entrant.

Changing the busy hour percentage assumption from the original 8.5 to reflect Vodafone's actual busy hour percentage of [c-i-c] results in an increase in the MTR of 2.7 cents per minute.

Full-day equivalents per year

The WIK cost model uses 250 days per year as the 'number of full-day equivalents in a year' (p. 107). From the information presented in the WIK Report, it is unclear why the 250 day figure was used.

In line with International Telecommunication Union Telecommunication Standardization Sector (ITU-T) standards, there are three approaches to dimensioning — five day average, three day average and one day per week average. The ITU-T E.492 Recommendation recommends that mobile networks should, for any month, identify the four highest daily figures, and provision the network based on the second highest of these figures. This equates to a one day per week average. Vodafone engineers are not aware of any engineering standards that recommend provisioning the network on a five-day average.

The decision to use one particular average is ultimately a trade-off between ensuring quality of service and minimising cost. Using too long an average results in unacceptable network congestion, whereas too short an average may result in over-dimensioning. [c-i-c]

Adopting the three-day average for network dimensioning — replacing 250 days with [c-i-c] — results in an increase of the MTR by 6.2 cents per minute.

Vodafone notes that the WIK cost model is unable to change the dimensioning assumptions without automatically changing the annual volume of traffic. For a given level of annual traffic, increasing the busy hour percentage and peak average day limit will increase the number of network assets, and therefore increase the cost of termination. However, the WIK cost model is unable to accurately deal with changes to dimensioning figures without changing the annual traffic usage. This does not reflect the realities of network dimensioning in a real-world mobile network.

4.3 Traffic profiling

Vodafone notes that the WIK cost model does not contain any ability to profile the distribution of traffic. The WIK cost model uses population densities to estimate the placement of network assets, however it does not estimate the distribution or profile of traffic usage. Failure to do so has implications on the accuracy of the cost model's outputs.

The failure to accurately model the traffic profile of the network is likely to result in inaccurate transmission usage. For example, in order to accurately calculate the amount of links needed between locations, the level and peak of usage between the two sites needs to be known. For example, the link between Sydney and Melbourne will have significantly higher usage than the link between Sydney and Brisbane. Accurate traffic profiling is also needed in order to accurately estimate the number of near and far hand-overs and accurate locations of network assets.

Inaccurate traffic profiling results in inaccurate treatment of near-end and far-end handover interconnect protocols. This magnifies the inaccuracies of transmission usage as well as leads to inaccurate routing factors for MSCs.

A further error in the WIK cost model that can be attributed to the lack of traffic profiling is the assumption that the time difference between Perth and the east coast of Australia results in a 'traffic reduction factor of ten per cent for the busy hour on the core links to and from MSC locations'. Vodafone regards this assumption as highly improbable for several reasons. First, Western Australian traffic accounts for around [c-i-c] per cent of Australian traffic. It is therefore extremely improbable that Western Australian traffic could justify a ten per cent reduction in peak traffic. Further, in the absence of traffic profiling, there is no evidence to reasonably assume that the peak hours of the eastern states and Perth overlap to any significant degree.

4.4 Treatment of 3G within the WIK cost model

The Commission requested that the WIK cost model adopt 2G technology to estimate the cost of providing MTAS. However, Vodafone believes that the costs and risks of 3G cannot be ignored in mobile network cost modelling since this technology is expected to be the most efficient to meet the forward looking requirements of the market.

Vodafone notes that the requirement to take into account the realities of operating in the Australian market means that the Commission must have regard to the costs of operating a converged 2G/3G network. In addition, the MTAS Declaration applies to terminating services provided over any mobile technology (2G or 3G). Vodafone strongly advocates that the

regulated rate of MTAS must take into account the cost of providing MTAS over the declared technologies. That is, it is incorrect to set the price of MTAS based purely on the cost of 2G technology, where MTAS is also provided using 3G technology.

WIK claim in the cost model report that the cost of providing MTAS over 3G is likely to be cheaper than providing it over 2G. This may be the case in the long run and in the theoretically perfect world assumed by the WIK cost model but there are a number of factors that will increase the cost of a 3G network (relative to a 2G network) in the short-to-medium term including migration costs, demand uncertainties, increased costs for early adopters.

Converged network should be the focus

Regardless of whether the Commission agrees that MTAS over 3G is more expensive than MTAS over 2G in the relevant period of declaration, Part XIC requires that the Commission have regard to the market realities that would affect the behaviour of any efficient new entrant. Vodafone believes that the Commission and WIK should focus on the cost of providing MTAS over the converged networks that *all* MNOs in Australia operate — and will continue to do so during the declaration period — and which can be reasonably expected that any efficient new entrant would also operate during the regulatory period.

Mobile GSM networks operating in Australia utilise both 2G (900 & 1800 MHz) and 3G (2100 MHz) technologies to deliver mobile services. All calls travel through a converged core network, which is common to both 2G and 3G technologies, regardless of which spectrum a call originates or terminates.

Whether 3G will or will not provide lower costs for the provision of MTAS should not be the debate, rather the relevant query should focus on what is the cost of providing MTAS over the converged networks. Namely, even if providing MTAS over a stand-alone 3G technology is cheaper than stand-alone 2G technology, the fact that networks are converged — that is, utilise simultaneously 2G and 3G technologies in parallel radio access networks, with traffic using both networks (and need to, because many customers retain 2G handsets) — means that the cost of MTAS will be higher than a network utilising only one technology.

Vodafone does not support the proposed treatment of 3G within the WIK cost model. The Commission should have regard to the additional costs of providing MTAS over converged networks that utilise both 2G and 3G technologies, when setting the pricing principles for 2007-09. The relevant legislative benchmark requires that the Commission take into account the costs that an efficient new entrant would incur should they enter the market now. Given the current state of technology, the requirement to cover a certain percentage of the population, and nature of consumer demand, any new entrant would roll out a converged network utilising both 2G and 3G technologies. Vodafone believes that this is the price benchmark that would be set in a competitive market for MTAS.

4.5 Conclusion on the general approach adopted by the WIK cost model

Vodafone is unable to be confident that the outputs of the WIK cost model produce robust and accurate estimates of the cost of providing MTAS. In addition, Vodafone is unable to provide comments on how the WIK cost model estimates the outputs, due to the restrictions on access to the algorithms used.

The economic justification for cost modelling is to estimate the likely costs incurred by an efficient new entrant. Importantly, the Tribunal has explicitly stated that pricing based on the efficient new entrant benchmark must take into account the realities of supplying MTAS in Australia. Vodafone notes that the WIK cost model does not do this — and WIK has rejected such an approach through the model design.

Vodafone submits that the WIK cost model is designed in such a way that the Commission is unable to rely on its outputs when determining the pricing principles for 2007-09.

5. Specific comments on WIK inputs

With the limited consultation period and access to the WIK cost model, Vodafone is only able to highlight the key inputs and elements of the WIK cost model that do not reflect the market realities of network design and dimensioning and the cost realities of operating a network in Australia. Vodafone notes that there are more errors in the cost model than addressed here in this section.

Vodafone wishes to identify the following key deviations from the actual operation of the Vodafone network in the inputs used in the WIK cost model:

- traffic distribution error;
- WACC
- site sharing assumption;
- asset prices;
- routing errors;
- failure to include voicemail capability;
- failure to include signalling transfer points;
- failure to account for network resilience; and
- OPEX and common cost mark-up.

5.1 Traffic distribution error

Vodafone wishes to highlight an oversight in the WIK cost model. In the scenario involving an operator covering 92 per cent of the population with a market share of 17 per cent, the WIK cost model estimates the proportion of traffic allocated to voice termination as 37.6 per cent. However, when this figure is entered into the cost model, the cost of termination increases from 7.3 cpm to 7.6 cpm. Vodafone assumes that an error was made in not changing the traffic distribution when it estimated the 7.3 cpm output. Vodafone anticipates that the Commission will correct this error.

5.2 WACC

Vodafone submits that the WIK cost model under-estimates the WACC, due to the use of unrealistically low WACC elements, including the risk-free rate and the market risk premium.

Vodafone notes that the WIK cost model assumes a market risk premium of 4.5 per cent. Vodafone submits that this underestimates the market risk premium that should be applied to the mobile industry. The Commission has explicitly stated that the appropriate market risk premium for the fixed-line network is six per cent²⁷. Vodafone believes the Commission should apply the same market risk premium that it has previously applied in telecommunications regulatory decisions.

Similarly, the Commission had accepted the use of the 10-year Australian government bond rate in determining the risk-free interest rate for the recent Telstra PSTN undertaking²⁸. This was the approach adopted by Vodafone in its 2005-06 RAF Report, and equates to 5.65 per cent. Vodafone sees no reason to justify the variation adopted in the WIK cost model. The rate adopted by WIK of 4.34 per cent underestimates that rate that has been accepted as reasonable by the Commission.

An efficient new entrant would face the same cost of capital as those companies currently engaged in supplying mobile services in Australia. Vodafone strongly suggests that the Commission adopt a WACC that reflects the rate accepted for mobile companies in Australia. Vodafone submits that the Commission use the Vodafone WACC, of around [c-i-c] per cent, for the scenario involving an operator with 92 per cent coverage and 17 per cent market share — as has been deemed reasonable by both the Commission and the Tribunal in the recent MTAS undertaking²⁹.

Inputting a WACC value of [c-i-c] per cent (as used in the 2005-06 Vodafone RAF Report), results in an increase in the price of MTR of around 0.5 cents per minute.

5.3 Site sharing assumption

Vodafone notes that the WIK cost model assumes that MNOs share 2G BTSs and other assets (repeater sites). WIK claim that it is clear that MNOs realise cost savings from site sharing. Vodafone notes that this assumption is incorrect. Further, this error appears to stem from a misunderstanding of operators' relationship with BTS site owners like Crown Castle.

Vodafone collocates some of its BTS sites with Crown Castle, Telstra or Optus. However, this arrangement does not result in any annualised reduction in the cost of installing, and leasing BTS sites. Collocation enables Vodafone to transfer BTS expenditure from upfront CAPEX to annualised OPEX (access payment plus leasing fee). However, the focus of the WIK cost model is the *annualised* cost of running a network — the cost model is concerned with *annualised* CAPEX and *annualised* OPEX.

Collocation results in a transfer from *annualised* CAPEX to *annualised* OPEX to the same, if not greater amount. From the perspective of the WIK cost model, the total network cost to be

²⁷ ACCC, *Assessment of Telstra's PSTN and LCS Undertaking*, November 2006 p. 95

²⁸ *Ibid.*, p. 79.

²⁹ *Application by Vodafone Network Pty Ltd & Vodafone Australia Ltd* [2007] ACompT 1, at [261].

allocated to MTAS does not change because of collocation. Vodafone suggests that the simplest way to deal with the reality of the co-location relationship is to remove the site sharing assumption. Alternatively, the Commission could increase OPEX to an equivalent amount, but Vodafone does not recommend this approach as it would be difficult to ensure that the OPEX increase reflects the decrease in CAPEX.

The Commission may ask why Vodafone and other operators engage in collocation if it does not change the *annualised* cost of the network. Vodafone can highlight three key reasons why we choose to collocate:

1. it is extremely difficult to roll-out greenfield BTS sites because of a lack of suitable land or buildings, the high legal costs and time involved with negotiating new access and lease arrangements for every new BTS. In addition, planning laws can delay building of a site for several years;
2. given the delay in getting approval to build new BTS sites, collocation enables Vodafone to roll out new assets significantly quicker. Ensuring a quick response to network coverage or expansion issues is a vital business requirement; and
3. acquiring adequate CAPEX to pay the initial upfront payment is difficult, costly and time consuming — even though the annualised cost of BTS deployment does not change with collocation.

Removing the site sharing factors (macro, micro and repeater) increases the estimated MTR by around 0.8 cpm.

5.4 Asset prices

Vodafone wishes to address two key points with respect to the asset price assumptions in the WIK cost model. Vodafone will highlight where the assumptions differ from the cost reality of CAPEX in Australia and where the WIK cost assumptions differ from the assumptions adopted in calibrated European cost models — UK, Netherlands and Sweden.

The cost reality of CAPEX in Australia

Vodafone is only able to provide information on its recent costs of deploying radio network assets. It is difficult to give an accurate replacement value of the core network assets included in the WIK cost model. The WIK cost model applies the concept of Mobile Switching Centre (MSC) nodes. However, this technology is being replaced with the Release 4 split architecture, consisting of Media Gateway (MGW) nodes in the access layer and MSC Server (MSS) in the control layer. While old architecture is still in use and supported, new or replacement equipment can only be sourced that use the Release 4 split architecture. Modern pricing information from vendors reflect this — for example, the cost of a stand alone MSC is not easily attainable due to the use of Nokia's MGW & MSS nodes from the split architecture.

Vodafone's deployment team have confirmed that the assumed asset replacement cost for BTS investment differs significantly with respect to BTS macrocell site construction, omni sector macrocell equipment and 3-sector microcell equipment:

- the average cost to Vodafone of its most recent macrocell site constructions demonstrate that the cost of construction is [c-i-c].
- the average replacement cost for omni-sector macrocell equipment is [c-i-c].

- the average replacement cost for three-sector microcell equipment is [c-i-c].

Changing the WIK assumption to match the realities of replacing those radio assets in Australia results in an increase in the MTR of around 0.68 cpm.

The cost assumptions adopted in calibrated European markets

As noted above, Vodafone is unable to supply accurate replacement costs for 2G-specific core assets due to modern core assets using Release 4 split architecture. In the absence of vendor specific replacement costs, Vodafone suggests that the WIK cost model pay due regard to the cost estimates used in comparable European studies.

Table 5 below compares the asset prices used in the WIK cost model to the cost models used in three European countries — the UK³⁰, Netherlands³¹ and Sweden³². The highlighted cells indicate where the WIK cost model differs significantly from the costs used in the European cost models. Vodafone notes that while WIK claim to have benchmarked their asset prices against those used in the EU regulatory cost models — UK, Netherlands, Sweden and a German WIK study — the figures used appear to differ significantly from the figures actually used in the UK, Netherlands and Sweden cost models.

The WIK cost model significantly underestimates the CAPEX of both macrocell, microcell site preparation compared to the UK cost model, and underestimates the cost of macrocell, microcell and picocell equipment compared to both the UK and Sweden cost models. In addition, the WIK cost model underestimates BSC site costs. Vodafone's experiences in Australia and Europe indicate that such underestimation is not justified based on Australian-specific factors.

Vodafone also notes that the BSC and MSC hardware costs are between 20 to 30 per cent cheaper in the WIK cost model than the average of the costs adopted in the UK, Netherlands and Sweden cost models. Vodafone is unaware of any factors that justify this disparity with European prices. The WIK cost model notes that asset prices are benchmarked on European prices — if this is accurate, it appears to Vodafone that an error has occurred in WIK's benchmarking or conversion process.

Vodafone also wishes to highlight that the Dutch cost model is the only cost model that has lower CAPEX than the WIK cost model. This result is consistent with the expectations of Vodafone. The Netherlands is regarded as having geographical features that best reflect the engineering optimal environment for mobile networks. This is substantially different to the Australian geography, which poses many difficulties in the design and roll-out of mobile networks.

Vodafone notes that the most significant variance in the cost arises from BSC and MSC software. The cost of software (BSC and MSC) in the WIK cost model is assumed to be 25 per cent of the hardware costs. Vodafone strongly rejects this assumption. Vodafone engineers in both Vodafone Australia and Vodafone Group have confirmed that the cost of software for both the MSC and BSC is typically equal to the cost of hardware. The cost of software for the HLR is, based on Vodafone's worldwide experience, twice the cost of hardware.

³⁰ Ofcom Sep-06 version, 2007/08 costs.

³¹ OPTA BULRIC cost model - Cost model v.3 (Annex D Final).

³² PTS Bottom-up cost model v.2.

In addition, the WIK cost model incorrectly assumes that the asset lifetime of software is five years. Vodafone supports the use of two years, as this reflects the reality experienced by Vodafone Australia and Vodafone Group of the expected lifetime of software, given the constant upgrading demanded by vendors. The Commission may argue that software upgrades are not related to the provision of MTAS, however, much of the complexity of software upgrades relate to ensuring the integrity of existing functionality. In addition, vendors do not provide support for assets that use non-updated software. Therefore, the competitive benchmark of an efficient new entrant would still face constant two-yearly software upgrades in order to maintain vendor support for its assets.

Adopting the average European costs increases the MTR from 7.3 cpm to 9.8 cpm — an increase of 2.5 cpm.

Replacing the average EU costs with the actual observed recent costs of BTS site construction, omni-sector macrocell and three-sector microcell increases the cost of MTAS by 6.8 cpm.

Correcting for incorrect asset lifetime of software (moving from five to two years) results in an increase in the cost of MTAS by an additional 2 cpm.

Table 5

Comparison of WIK cost model asset prices									
Asset type	Aus Basic Capex A\$	Markup ³³ %	Aus Capex A\$	UK Capex A\$ @Xrate 2.45	NL Capex A\$ @Xrate 1.67	SE Capex A\$ @Xrate 1.67	Aus/UK Capex ratio	Aus/NL Capex ratio	Aus/SE Capex ratio
Macrocell: site acquisition and preparation and lease	134,000	5.5%	141,370	192,485	133,253	92,384	0.73	1.06	1.53
Macrocell: equipment (omni sector)	98,000	5.5%	103,390	146,471	45,763	142,805	0.71	2.26	0.72
Macrocell: equipment (2 sector)	110,000	5.5%	116,050	172,091	n/a	166,605	0.67	n/a	0.70
Macrocell: equipment (3 sector)	121,000	5.5%	127,655	197,711	45,763	174,566	0.65	2.79	0.73
Microcell: site acquisition and preparation and lease	86,000	5.5%	90,730	122,714	50,763	44,344	0.74	1.79	2.05
Microcell: equipment	61,000	5.5%	64,355	71,705	45,763	65,462	0.90	1.41	0.98
Picocell: site acquisition and preparation and lease	69,000	5.5%	72,795	76,696	50,763	18,477	0.95	1.43	3.94
Picocell: equipment	46,000	5.5%	48,530	71,705	22,882	29,458	0.68	2.12	1.65
Macrocell: additional TRXs	8,000	5.5%	8,440	10,364	4,547	9,601	0.81	1.86	0.88
BSC: base unit	2,903,000	5.5%	3,062,665	3,433,704	4,123,127	5,976,065	0.89	0.74	0.51
MSC: processor	3,166,000	5.5%	3,340,130	3,045,571	5,466,924	7,091,735	1.10	0.61	0.47
MSC: software	922,000	5.5%	972,710	2,079,379	2,833,391	6,433,645	0.47	0.34	0.15
MSC: buildings (building preparation)	2,052,000	5.5%	2,164,860	3,786,590	1,674,018	4,058,248	0.57	1.29	0.53
MSC: BSC-facing port increment	3,000	5.5%	3,165	3,980	n/a	3,819	0.80	n/a	0.83
MSC: interconnect-facing port increment	3,000	5.5%	3,165	3,980	n/a	3,819	0.80	n/a	0.83
MSC: switch-facing port increment	3,000	5.5%	3,165	3,980	n/a	3,819	0.80	n/a	0.83
HLR	2,721,000	5.5%	2,870,655	2,748,189	1,953,954	2,400,279	1.04	1.47	1.20
SMSC	1,821,000	5.5%	1,921,155	1,176,927	3,465,905	545,518	1.63	0.55	3.52
Remote switching sites (BSC and RNC)	150,000	5.5%	158,250	1,837,614	3,682,840	n/a	0.09	0.04	n/a
Total CAPEX			15,273,235	19,181,858	9,102,699.86	27,260,650	0.80	1.68	0.56

³³ The 5.5 per cent mark up is calculated from table A2 in the WIK Report. It does not include the network management markup.

5.5 Routing errors

The WIK cost model estimates routing figures endogenously in the cost model. However, the routing figures used contain several errors, which users are unable to correct —Vodafone is unable to investigate how this impacts the estimated cost of providing MTAS.

First, the cost model assumes that the routing figures for the HLR is one for all of the services provided. However, the HLR is engaged only for terminating calls³⁴, be it on-net or off-net incoming. The information required to make a call is downloaded to the VLR — the HLR plays no active role. This results in routing factors of one for incoming and off-net incoming only. This is unable to be amended in the WIK cost model.

Second, the WIK cost model does not adequately deal with traffic profiling and near-end and far-end handovers with resulting implications for MSC routing — as well as transmission costs. Vodafone does not have confidence that the routing factors estimated endogenously within the WIK cost model reflect the real profile of Australian mobile traffic. Accurate traffic profiling is an extremely complex task and this, in part, explains why other NRA cost models set routing exogenously based on the traffic profile of the relevant country.

Again, due to the cost model setting routing factors endogenously, Vodafone is unable to estimate the effect these errors have on the level of the cost of providing MTAS.

5.6 Voicemail capability

The WIK cost model does not include a voicemail system (VMS). All mobile networks provide voicemail services, which apply to both on-net and off-net incoming calls. The investment in the VMS is significant and should be allocated among two of the three voice services identified in the WIK cost model (on-net and off-net incoming) — calls terminating on other networks utilise their VMS.

In addition to the actual hardware cost of the voicemail system, the VMS also has cost implications for transmission and software. Mobile networks typically deploy a centralised VMS, that is, one VMS located in city with greatest traffic usage, due to subscribers constantly moving locations. As a result, all VMS deposits and retrievals must be trunked to this location. Vodafone's VMS is located in [c-i-c], meaning that VMS deposits and retrievals utilise transmission resources from their origination source, or point of interconnect (POI), to the VMS in [c-i-c]. This may have large cost implications for the WIK cost model. However, due to the cost model's inability to adequately deal with traffic profiling and failure to include a VMS, Vodafone is unable to estimate the effect.

Failure to include a VMS means that the WIK cost model under-estimates the cost of providing MTAS. Vodafone has used the ComVerse Insight™ pricing tool to estimate the current cost³⁵ of a VMS to be [c-i-c].

³⁴ The process of updating the VLR does require the use of some network assets, however, the usage is insignificant compared to terminating use of the HLR. Vodafone recommends that the cost model should assume HLR is engaged, to all practical purposes, only for terminating calls.

³⁵ Prices were originally quotes in Euro. Converted to AUD based on 1 EUR = 1.68 AUD.

5.7 Signalling Transfer Points

It does not appear that the WIK cost model includes any signalling transfer points (STP) in the modelling of the transmission elements of the network. STP functionality is a stand-alone function in the Vodafone network and requires significant resources, in particular due to mobility management.

STP routes signalling information required for the set up of all voice and data services, on-net and off-net. STP are installed as a 'mated pair' — meaning two running in parallel. The STP is fully duplicated and designed so if one STP fails, the other STP can handle all the network traffic.

Estimating the replacement cost of STP is a complex task, and we have been unable to do so for this submission. However, in our 2003 MTAS Undertaking, we estimated the gross replacement costs of STP to be [c-i-c]. Vodafone engineers have confirmed that the replacement cost is unlikely to have decreased, and given the increase in traffic, is likely to have risen.

5.8 Interconnect protocols and transmission costs

The WIK cost model does not address the realities of the Australian industry rules surrounding the provision of interconnect services. The interconnect protocols adopted in Australia increase the cost of transmission for mobile networks due to two factors.

First, the PSTN interconnect protocols require that mobile networks perform far-end handovers from the mobile to the PSTN networks. That is, the mobile network must trunk the call over its transmission network to the POI closest to the destination location, where it is then handed-over to the PSTN network.

Second, mobile networks also bear the cost of transmission for PSTN originated calls terminating on their network. The PSTN network is unable to locate where the mobile B-party is located. As a result, the PSTN network performs a near-end handover. That is, the call is transferred to the mobile network at the POI closest to the PSTN origination location. The mobile network bears the cost of trunking this call from the near-end POI to the location of the mobile subscriber.

Vodafone is unable to see how this error affects the output of the WIK cost model. However, given that the transmission costs account for around 22 per cent of total costs, Vodafone would expect a material change in the estimated cost of providing MTAS.

5.9 Network resilience

The WIK cost model addresses network resilience through capacity limitation parameters. WIK comment that the numbers of BSC and MSC locations also reflect a combination of optimisation and resilience. Resilience, in the WIK cost model, results in higher transmission costs than otherwise. Importantly, WIK does not address network failure issues as 'equipment is already engineered in a way that ... can be considered to be very reliable' (WIK Report, pp. 73-4).

While Vodafone notes WIK's confidence in the build quality of mobile network vendors, no mobile operator allows their network to have a single point of failure that impacts of the entire network. This criticism applies to the WIK having only one HLR, one SMSC, and one VMS — assuming WIK correct the error of not including a VMS.

The locations predicted by the WIK cost model for MSCs also appear to under-play the influence of network resilience requirements. The WIK cost model predicts one MSC per state (five in total). No network operator, or vendor, would recommend such a risky network design. This would be the case even if traffic was evenly distributed among the states. However, due to the large concentration of traffic in NSW and Victoria, network resilience, and capacity requirements, it is required that there be at least two or three MSCs in each of the States.

[c-i-c]

Vodafone's network contain [c-i-c] MSCs. Vodafone considers that the WIK cost model should include at least this number. Resilience considerations as well as traffic profiling requirements (as noted above the WIK cost model contains no traffic profiling capability) justify the use of [c-i-c] MSCs. The number of location of MSCs is not dictated simply on utilisation percentages and minimum distance between assets.

The restrictions in the cost model means that Vodafone cannot accurately calculate the effect of adopting a realistic resilience policy would have on the cost of providing MTAS. However, Vodafone is able to make the following amendments to the cost model:

- [c-i-c] MSCs (min. distance 200km): increase MTR by around 4.1 cpm; and
- two HLR (double cost element): increase MTR by around 0.1 cpm.

5.10 OPEX and common costs mark-up

The WIK cost model assumes an OPEX mark-up of 11 per cent, and a common cost mark-up of ten per cent on the annualised CAPEX figure. Vodafone notes that these figures substantially under-estimate the actual OPEX and common costs incurred by operators in the Australian market, and also under-estimates the average mark-ups adopted in European cost models — except for SMSC-related OPEX (Table 6).

Table 6

<i>Asset type</i>	Ratio of OPEX mark-up		
	<i>AU/UK OPEX ratio</i>	<i>AU/NL OPEX ratio</i>	<i>AU/SW OPEX ratio</i>
Macrocell: site acquisition and preparation and lease	0.70	1.56	0.75
Macrocell: equipment (omni sector)	0.63	2.76	0.29
Macrocell: equipment (2 sector)	0.66	n/a	0.27
Macrocell: equipment (3 sector)	0.67	3.40	0.26
Microcell: site acquisition and preparation and lease	1.36	1.00	1.44
Microcell: equipment	0.79	1.72	0.35
Picocell: site acquisition and preparation and lease	2.18	0.80	2.31
Picocell: equipment	0.59	1.29	0.59
Macrocell: additional TRXs	0.63	1.86	0.28
BSC: base unit	0.73	1.07	0.30
MSC: processor	0.90	0.64	0.81
MSC: software	0.53	0.25	0.39
MSC: buildings (building preparation)	0.47	0.69	1.37
MSC: BSC-facing port increment	0.41	0.08	0.30
MSC: interconnect-facing port increment	0.40	0.08	0.30
MSC: switch-facing port increment	0.40	0.08	0.30
HLR	0.61	1.22	1.43
SMSC	11.86	0.14	8.32
Remote switching sites (BSC and RNC)	0.04	0.20	n/a
Total ratio (excluding SMSC)	0.71	1.10	0.69

Based on Vodafone's worldwide experience operating mobile networks, the cost of operating a network in Australia is substantially higher than the cost of operating a network in Europe. Vodafone believes that the use of the European average would still under-estimate the OPEX cost any network would incur in Australia — including the benchmark new efficient entrant.

As shown in Table 6, the WIK cost model OPEX mark-up is 70 per cent of that used in the calibrated UK cost model, 69 per cent of the Swedish cost model and 110 per cent of the Dutch cost model. It is not surprising that the Dutch cost model contains low OPEX given the ideal network factors presented by the topology of the Netherlands.

Using the WIK assumption that OPEX is 11 per cent of the annualised CAPX figure, the cost model estimates OPEX to be \$158.7m. However, Vodafone's 2005-06 RAF Report showed that the network related OPEX was [c-i-c]. This represents a [c-i-c] per cent mark-up.

The Commission may argue that Vodafone's OPEX percentage is too high and represents inefficiencies. However, such a conclusion is invalid. It is reasonably expected that an efficient new entrant would not be able to secure OPEX expenditure at a lower level since its lack of size would preclude it from bargaining lower cost outsourcing arrangements, or from benefiting

from large scale purchases. Vodafone contends that an efficient new entrant is likely to have a similar percentage of OPEX expenditure, if not more.

Using Vodafone's OPEX percentage ([c-i-c]) increases the MTR by around 9 cpm.

The WIK cost model assumes that common organisational costs represent 10 per cent of annualised CAPEX expenditure. However, Vodafone is of the view that such a figure substantially underestimates the cost of operating a mobile network in Australia. Further, given the country-specific characteristics that determine the operating costs — e.g. population and traffic distribution, distance, labour force, wage rate, etc — international studies are likely to prove of little benefit. Vodafone believes that the most rigorous approach to determining the operating costs of a new entrant is to analyse the common costs of mobile-only operators. An efficient new entrant should incur a similar percentage of common costs. It is important to note that Vodafone's market size (around 17 per cent share) indicates that we are unlikely to be incurring significant diminishing returns to scale and management. This can be compared to Optus and Telstra, where the common costs should reflect inefficiencies given the size of the organisation (for example, operating concurrent offices in different states). While economies of scale may result in lower OPEX percentages for larger networks, such scale does not apply to common organisational costs.

Vodafone's 2005-06 RAF Report showed that the organisational related OPEX was [c-i-c]. This represents a [c-i-c] per cent mark up. Correcting for this increases the MTR by around 5 cpm.

6. Concluding comments on WIK cost model

Vodafone has identified the key errors in the inputs used in the WIK cost model. Due to the limited consultation time, and limited access to the workings of the WIK cost model, Vodafone has been unable to provide a thorough analysis of the cost model and we have been able to fully address and correct for the deficiencies we have identified (e.g., routing factors and design faults).

However, Vodafone is able to correct for the errors that the cost model allows, namely:

- network dimensioning;
- traffic distribution;
- WACC;
- site sharing factor;
- asset prices (Vodafone-specific and European averages);
- software asset lives;
- some network resilience elements;
- OPEX mark-up; and
- common operating costs.

Correcting these inputs, in the manner described above, results in the WIK cost model estimating the cost of termination for the Vodafone network as 44.8 cpm. A break down of the individual errors of shown below in Table 7.

Table 7

Effect of individual corrections to the WIK cost model	
<i>Corrections</i>	<i>Change in output (cpm)</i>
Traffic distribution	0.3
Busy hour percentage	2.7
Number of busy days per year	6.2
Weighted Average Cost of Capital (WACC)	0.5
Asset prices	6.8
Asset lifetime of software (2 yrs)	2.0
Site sharing assumption	0.8
Network resilience and capacity:	
– MSCs;	4.1
– HLR	0.1
OPEX mark-up	9.0
Common operating cost	5.0
Total effect	37.5

Vodafone is extremely concerned that *reasonable* inputs, based on accepted engineering principles and cost inputs that an efficient new entrant is likely to incur, estimates the cost of providing MTAS to be 44.8 cpm. Vodafone suggests that there are two possible reasons from this result — there are significant errors in the algorithms of the WIK cost model that users cannot see; or the cost of providing MTAS is above 40 cents per minute.

The existence of these two possibilities clearly indicates that the Commission cannot rely upon the outputs of the WIK cost model to support any future decrease in the MTR, including through any MTAS pricing principles applicable from July 2007 to June 2009.

Further, the weight of market evidence combined with the development of economic literature suggests that there is little justification for the imposition of explicit pricing guidance in the 2007-09 pricing principles.