FINAL REPORT

International Benchmarking of Mobile Termination Charges - An Update

Submitted to

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1. EXECUTIVE SUMMARY

The Australian Competition and Consumer Commission ('ACCC') published its final decision in June 2004 to extend the declaration of mobile termination services ('ACCC Final Decision').[1] Optus is proposing to submit an undertaking to the ACCC specifying the terms and conditions on which it will supply its mobile termination service to other operators. In order to assist the ACCC in assessing the reasonableness of the terms and conditions of the proposed undertaking, Optus has requested Charles River Associates ('CRA') to update the international benchmarking analysis undertaken by CRA in May 2004.[2]

International benchmarking can provide a useful source of information for regulators in estimating the costs of supplying a service. However, for international benchmarking to yield meaningful information, it must take into account any significant differences in the supply conditions and operating environments between the comparator countries and the jurisdiction for which costs are being estimated. We maintain the view, expressed in CRA's May report, that consideration needs to be given to the key factors impacting on costs, especially those that are beyond the control of an operator. Where there are significant differences, adjustments should be made to the selected comparators to yield an estimate that is reflective of the conditions in the country of interest. It may not always be practical to take into account all differences between countries. Nonetheless, even where a factor is not explicitly accounted for, consideration of the direction and likely magnitude of its impact on costs may still provide meaningful information about the range within which costs can be expected to lie.

This Report builds on the analysis in CRA's May report and specifically takes into account:

- The ACCC's own use of international benchmarking in its Final Decision and its comments on CRA's May report;
- The Analysys report, *Examination of mobile termination costs – Final Report for ACCC,* of 30 June 2004; and
- New developments since CRA's May report, including:

1 *Mobile Services Review - Mobile Terminating Access Services*.

2 Throughout the present Report, we will refer to our earlier analysis as 'CRA's May report' which includes CRA, *The use of benchmarking in regulating mobile termination rates* (28 May 2004) and the supplementary material in a CRA memorandum, *Mobile termination: international benchmarking* (24 June 2004) submitted to the ACCC by Optus. CRA also presented the findings in its May report to the ACCC on 3 June 2004.

- The consultation document of the Austrian regulator projecting a LRIC estimate of between 14 and 16 Australian cents per minute ('cpm') for 2010;[3]
- The outcome of the review by the Belgian regulator of Mobistar's cost model determining a range of 26 – 33cpm;
- The nominal LRIC estimate of mobile termination of the Swedish regulator of 10cpm for 2007;
- A study reviewing international cost models reported by the New Zealand Commerce Commission providing a range of 10-17cpm;[4] and

Choice of comparators

The ACCC Final Decision indicated a preference for overseas cost estimates that are based, at least in part, on bottom-up cost modelling exercises. The ACCC commissioned Analysys to review the cost modelling exercises of a cross-section of countries and to identify jurisdictions with bottom-up LRIC estimates that are considered suitable for transformation to form an Australian benchmark. In Analysys' opinion:

> *LRIC estimates from the UK and (shortly) Sweden and Greece are likely to provide the most up to date cost estimates for possible transformation to Australia. LRIC estimates from Malaysia are also relevant because they capture LRIC specific features such as efficiency, and are applied to operators of neutral market share - however, local costs and coverage conditions in Malaysia are particularly distinctive.*[5]

The ACCC also identified that a LRIC estimate exists in South Korea and one is being developed in Israel using the same methodology.

For the purpose of the benchmarking exercise undertaken for this Report, we:

- Reviewed the suitability of the comparator countries nominated by Analysys (*viz.* the UK, Sweden, Greece and Malaysia) as well as the countries identified by the ACCC (*viz.* South Korea and Israel);

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3 Throughout the present Report, all 'cpm' figures are in Australian currency unless stated otherwise in the text.

4 For Austria, see *Konsultation: Ermittlung der Kosten der effizienten Leistungsbereitstellung für Terminierung in Mobilfunknetzen*, Telekom-Control-Kommission, November 2004. For Belgium, see *Décision complémentaire du 15/06/2004 Conseil de l'IBPT relative aux charges de terminaison de Mobistar*. For Sweden, see PTS press release, *PTS fattar beslut om skyldigheter för dominerande operatörer*, 06 July 2004. Ovum study as reported in New Zealand Commerce Commission, *Schedule 3 investigation into regulation of mobile termination - Draft Report*, 18 October 2004, para. 389. Source for all exchange rates: www.oanda.com (10-year average for all currencies except for the Euro, where a 7-year average has been used).

5 Analysys, *Examination of mobile termination costs – Final Report for ACCC*, 30 June 2004, p. iii.

- Reviewed the latest international developments in mobile termination regulation to examine the suitability of other potential comparators for transformation to an Australian benchmark; and

- On the basis of these reviews, we selected comparator countries with recent LRIC estimates that are publicly available *together with* the information on underlying assumptions and other modelling details.

We consider that where detailed information is publicly available and accessible, adjustments for differences in cost drivers can be made on a more informed basis to yield meaningful and reliable benchmarks. It is for this reason that we selected the cost estimates from the UK, Sweden and Malaysia as the basis for our benchmarking exercise.

We did not select the South Korean estimate because of the unavailability of any detailed information about that estimate,[6] or Israel because the details of its LRIC modelling are not made public.[7] We also did not select Greece as a comparator because the results of the Greek modelling exercise are not yet available. As we did not find any publicly available details of the modelling exercises undertaken in the other European countries, we did not include any of these countries in the benchmarking exercise undertaken for this Report.

Adjusting for Cost Differences

The ACCC's Final Decision identified nine factors that may give rise to differences in the cost of supplying mobile termination between countries, *viz.* geographic terrain, population density, network usage and scale, land and labour costs, spectrum allocations, the extent to which MNOs are vertically-integrated fixed and mobile network operators, network purchasing power, cost of capital in different jurisdictions, and the mobile technology employed.

A sub-set of these factors were considered in CRA's May report (*viz.* coverage areas, traffic volumes, and labour and land costs). For this Report, we have extended our earlier analysis to take into account all of the other cost factors identified by the ACCC. We made appropriate adjustments for those factors that were significantly different between Australia and the selected comparator countries. We did not adjust for spectrum allocations and network purchasing power as these two factors were expected to either have little impact on the Australian benchmark or imply that the Australian benchmark should be increased

6 We note that although Analysys advised on the development of the South Korean estimate, they have neither nominated it as a comparator nor discussed the estimate in its report for the ACCC. By making conservative assumptions in relation to some of the unknown details of the South Korean estimate, we obtained an indicative range of 15.17 – 22.27cpm by adjusting the South Korean estimate for differences in supply conditions between South Korea and Australia. See section 4.1 of this Report for a full discussion.

7 According to Analysys, "Israel represents a very distinct mobile market: very high penetration with very high levels of usage in a very small geographical area. In this sense, *its differences from Western Europe are at least as great as those of Australia*." (p. 23, *our emphasis*).

depending on the particular comparator country. Nor did we adjust for the impact of an operator being an integrated fixed-mobile operator. This means that our benchmarks are reflective of the costs of a mobile-only operator.

Results

Using the UK, Swedish and Malaysian estimates as benchmarks and taking into account differences in key cost factors between Australia and these countries respectively, we estimated the LRIC level of supplying mobile termination services in Australia to fall in the range of **9.99 – 20.07 cpm.**

This range is based on comparators that have used a LRIC-type methodology with an Equi-Proportionate Mark-Up approach to recover fixed and common costs and excluding any externality adjustment. The efficient level of termination charges would be likely to be above the estimated benchmarks to reflect Ramsey-Boiteux pricing and externalities.[8] While the general pricing approach is the same across the comparators, the existence of a range for the benchmarks may reflect differences in the detail of the methodologies, unaccounted for factors or errors in measuring network and non-network costs.

On the basis of the benchmarking exercise undertaken in this Report, we conclude that the ACCC's target price of 12cpm – which lies toward the lower bound of our estimated range – carries a substantial risk that termination charges will be set well below the LRIC incurred by Australian mobile operators in supplying termination services with potential harm to efficiency and overall welfare.

8 The explanation for, and empirical estimation of, appropriate adjustments for Ramsey-Boiteux pricing and externalities is presented in CRA, *Pricing Mobile Termination in Australia*, 20 December 2004.

2. STRUCTURE OF REPORT

This Report is structured as follows.

- Section 3 discusses the use of international benchmarking in mobile termination regulation and identifies key drivers of the cost of supplying mobile services.
- Section 4 examines the existing international estimates of the cost of supplying mobile termination and discusses the choice of comparators in line with the preference of the ACCC and its advisor, Analysys.
- Section 5 develops benchmarks of the cost of supplying termination services in Australia on the basis of the TSLRIC estimates from Malaysia, Sweden and the UK after adjusting for differences in cost factors.
- Section 6concludes and comments on the reasonableness of our estimates.

3. FACTORS IMPACTING THE COST OF PROVIDING MOBILE SERVICES

3.1. THE ROLE OF BENCHMARKING

Benchmarking offers a means by which regulators can gain an indication of the cost of supplying a particular service while avoiding the resource cost and delays associated with larger and formal cost modelling exercises. However, benchmarking will only be useful and meaningful where either:

- Sufficiently close comparators exist, i.e. there are cost estimates for services provided under similar conditions to the service of interest to the regulator; or
- Reasonable adjustments can be made to the comparators to take into account any significant differences in supply conditions.

Regulatory reliance on benchmarks that do not take into account relevant differences in conditions of supply risks imposing large welfare costs, such as would be the case were a regulated price to be set well below the efficient cost of supplying a service in a country because of a failure to take into account factors responsible for a higher cost of supplying the service in that country.

The dangers of simple benchmarking exercises that do not examine the potential for differences in factors that impact on telecommunications costs between countries are well recognised. A report for the European Commission on regulating mobile services notes:

> *Only if there is a clear case that cost structure, consumer demand characteristics and policy maker's objectives are very similar between two countries would it be appropriate to take the short-cut of using a regulated price from one to inform the best-practice price for another country.*[9]

The Productivity Commission's 1999 report, *International Benchmarking of Australian Telecommunications Services,* also recognises the need to take into account differences between countries in external factors outside the control of the industry that is the subject of international benchmarking. More recently, a Productivity Commission's Staff Research Report argued that

> *there are other factors associated with a carrier's operating environment, over which a carrier has limited control, which may affect prices … Perhaps most important among these other environmental factors, are differences in the way in which populations, and hence lines, are distributed in each country – that is, differences in line densities. There has been little argument about the relevance of these differences when comparisons are made within a country*.[10]

We further note that the proposed use of a simple benchmarking approach to determining interim prices for unbundled local loops by the Irish regulator was appealed to the Irish High Court in 2001. The proceedings were discontinued after the regulator adopted an alternative approach.[11]

Indeed while the ACCC's own advisor, Analysys, recommends that a cost model be developed in the medium term, Analysys also note that making some adjustments to international benchmarks for cost differences can be useful in the absence of a model being developed:

> *Simplified adjustments to costs using transformation proxies developed from simple measures such as traffic and coverage are, in reality just that – simplifications which can only go so far to producing a rigorous conclusion…these simplifications are useful as a short-term measure…*[12]

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9 Europe Economics, *Cost structures in Mobile Networks and their Relationship to Prices – Final report for the European Commission,* 28 November 2001, p.76.

10 Australian Productivity Commission: *Population distribution and telecommunications costs*, August 2000; available at www.pc.gov.au.

11 See, J.G. Sidak and H.J. Singer, *Interim Pricing of Local Loop Unbundling in Ireland: Epilogue* (Available at http://www.criterioneconomics.com/docs/Sidak%20Singer%20local%20loop%20unbundling%20003.pdf).

12 Analysys, *Examination of mobile termination costs – Final Report for ACCC*, 30 June 2004, p.ii.

In CRA's May report that was submitted to the ACCC by Optus, we adjusted for major identified sources of cost differences between Australian operators and the comparator operators chosen by the ACCC in its Draft report, i.e. operators in the US and UK. In particular, we adjusted for differences in coverage areas, traffic volumes and Australia's relatively low labour and land costs. On the basis of our analysis, we estimated a range of 14.3 – 20.1cpm[13] compared with the ACCC's target price of 12cpm. The ACCC rejected CRA's benchmarking analysis on the grounds that "the Commission believes it would be inappropriate to adjust for only a small subset of these factors in isolation of other possible adjustment factors. Doing so may be more misleading than making no adjustments at all.[14]

While the ACCC noted the possibility that adjusting for additional factors may reduce the lower bound of our (earlier) estimated range of 14.3 – 20.1cpm towards the ACCC's target price, it would be difficult to say on *a priori* grounds whether further adjustments will result in an estimated range that is narrower or wider than the one estimated by CRA.. Without an analysis of the magnitude and direction of the other relevant factors that impact on cost, there would seem to be little basis for rejecting a benchmarked price from within an estimated range in favour of a benchmarked price that lies outside the estimated range. A key purpose of this Report is to provide information on the impact of these other factors.

3.2. THE ECONOMICS OF MOBILE NETWORKS

In assessing the usefulness of international benchmarking, it is critical to have an understanding of the economics of mobile networks and, in particular, the key cost drivers in mobile.[15] Factors to examine in comparing costs of supplying mobile services between countries are:

- Exchange rate adjustment;
- Busy hour traffic;
- Network coverage, geographic terrain and population density;
- Technology and spectrum assignments;
- Input prices and cost of capital;
- Peak/off-peak traffic ratios and traffic loading;

13 CRA memorandum, *Mobile termination: international benchmarking*, 24 June 2004.

14 ACCC Final Decision, p. 215.

15 For a general overview of the structure of mobile networks, see in particular, see Chapter 3 of UK Competition Commission, *Vodafone, O2, Orange and T-Mobile Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks*, 2003.

- Quality of service;
- Network purchasing power; and
- Scope of service offered.

3.2.1. Exchange rate adjustment

In CRA's May report we adjusted for exchange rate differences using the most recent spot exchange rates on the basis that they were the most relevant for a forward-looking cost approach. The ACCC Final Decision appears to reject this approach in favour of using a 10-year average exchange rate.[16]

In its report for the ACCC, Analysys 'note that the choice of exchange rates varies EUR:AUD and GBP:AUD costs by no more than 2% and 3% respectively when taking different annual periods from EIU annual average data for the last ten years" (p. 4).

Notwithstanding the relatively small order of magnitude in the discrepancy between the spot and 10-year average exchange rates, we will use 10-year average exchange rates for currency conversion (except for Euro conversions in which the longest averages available are for 7 years) for the benchmarking exercise undertaken this Report.[17]

We have used modified Purchasing Power Parity exchange rates to account for differences in overall cost levels between countries. This is explained further in the sub-section on input prices below.

3.2.2. Busy hour traffic

One fundamental cost driver of mobile networks is the volume of busy hour traffic, particularly the total volume of calls and call attempts during the busiest hour of operation of the network. Network capacity will be built to cover the expected volume of busy hour traffic with a high degree of reliability, i.e. limiting the number of calls that fail due to an insufficient number of channels at times of unusually high demand. This section considers differences in overall traffic volumes while section 3.2.6 considers the potential for differences in the pattern of traffic over different times of day.

The extent to which traffic volumes affect unit costs will depend on the presence or otherwise of scale economies. One main source of scale economies is the

16 On page 232 of the Final Decision, the ACCC lists a number of concerns with CRA's use of UK cost estimates including conversion "at a single day's exchange rate (rather than a ten-year average)."

17 We decided on using 10-year average exchange rates to minimise the difference in the step taken to currency conversion between CRA and the ACCC.

ability to recover the cost of providing coverage across larger call volumes. Such scale economies will be greatest for networks with a significant coverage area relative to the volume of traffic and decline geometrically as traffic volumes grow. Scale economies also arise in relation to the network elements required to transport calls between base stations or between a point of interconnection and a base station. This part of the network is similar to fixed networks (indeed, links between base stations and mobile switching centres are often leased from fixed operators). As such, this part of the mobile network gives rise to similar scale economies as are exhibited in relation to the transit part of fixed networks. Other scale economies are likely to arise in relation to network intelligence and network design. Scale economies in the remaining parts of the network, i.e. the equipment required to carry calls between the base stations and handsets, are likely to be exhausted at relatively small traffic volumes.

Separate to scale economies arising from the higher utilisation of network equipment, a larger sized network may also enable an operator to obtain greater discounts from equipment vendors and thereby generate additional savings in unit costs compared with smaller operators.

The ACCC criticised CRA's May report for using "untested estimates (e.g., its choice of scale factor used)"[18] and suggested that we had "overlooked" an empirical study by McKenzie and Small[19] that did not find evidence of economies of scale in supplying mobile services (p. 232 of the Final Decision). We find this criticism puzzling because the ACCC itself assumes the existence of scale in its case for declaration throughout the Final Decision. For instance, the ACCC raises a concern that prices for fixed-to-mobile calls have declined slowly "despite significant increases in volume and hence expected cost savings due to economies of scale."[20] If the ACCC does believe that there are economies of scale then it should accept that this factor will tend to push up the unit costs of an Australian operator in comparison with the unit costs of an operator with larger volumes, such as a UK operator. In relation to the McKenzie and Small study, CRA explained in its May report (*cf.* footnote 13) that their study suffered from a very small sample of 28 firms. In fact, McKenzie and Small themselves admit that 28 is a small sample.[21] This is compounded by the fact that it was not possible to follow the same firms over the same years (due to panel attrition).

18 ACCC Final Decision, p.214.

19 D McKenzie and J Small, *Econometric Cost Structure Estimates for Cellular Telephony in the United States*, Journal of Regulatory Economics, 12 (2), pp.147-157, September 1997.

20 ACCC Final Decision, p. ix.

21 D McKenzie and J Small, *Ibid.*, p. 151.

In CRA's May report, we argued in favour of economies of scale on the basis of the study by Foreman and Beauvais[22] which represented the most robust study available at the time. We note that a recent study by Noguchi[23] estimates the economies of scale for NTT DoCoMo in the region of 0.11 for 2002. This corresponds, according to Noguchi's definition of scale economies,[24] to a scaling factor of 0.89 (close to the factor of 0.82 found by Foreman and Beauvais). In other words, a 1% increase in the number of subscribers has an average upward effect of 0.89% on total costs. The study is robust in that it follows all the NTT DoCoMo regional subsidiaries over a ten-year period. Scale economies are found to fall over this period and then stabilise from 2000 onwards at around 0.11. This suggests that even in a nearly saturated market like the Japanese one, there are ongoing scale economies. Another recent study by PricewaterhouseCoopers[25] also found significant fixed costs implying the presence of scale economies.

These studies confirm the assumption in our May report that the supply of mobile services gives rise to significant economies of scale. Analysys identifies two approaches to modelling scale economies: one approach based on a cost-volume function that CRA used in the earlier analysis and an alternative approach:

> *Estimate the proportion of costs that are long-run fixed costs, and assume remaining costs exhibit constant returns to scale…We also suggest that the costs associated with business overhead common costs could be isolated from any network scale proxies, and treated separately as a cost of fixed magnitude.*[26]

We have used this alternative approach in the current Report. We note that this approach will be conservative in developing benchmarks from higher volumes operators, such as the UK operators, because it will not reflect any additional scale economies beyond those reflected in fixed costs.

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22 RD Foreman and E Beauvais, *Scale Economies In Cellular Telephony: Size Matters*, Journal of Regulatory Economics, 16 (3), pp. 297-306, November 1999.

23 M Noguchi, *Economies of scale and scope in Japanese mobile markets and its policy implications*. Available at http://userpage.fu-berlin.de/~jmueller/its/conf/berlin04/Papers/noguchi.pdf.

24 Noguchi defines scale economies as equal to [1-(?lnC)/?lnQ)].

25 A Macpherson, *The size of fixed common costs in mobile networks: empirical evidence from Europe*, Vodafone Policy Paper Series, 1, pp.3-5.

26 Analysys, *Examination of mobile termination costs – Final Report for ACCC*, p.36.

3.2.3. Network coverage, geographic terrain and population density

A defining characteristic of mobile networks, in contrast to fixed networks, is that mobile networks provide subscribers with the ability to make and receive calls from anywhere within the network. A mobile network will be designed to provide a particular level of geographic and in-building coverage and network coverage is one of the main factors influencing customers' choice of one mobile network over another.

For a given volume of traffic, the greater the coverage area of a network the higher will be the network's unit costs. Coverage will account for the bulk of overall network costs for networks that have large coverage areas and relatively small traffic volumes. However, even for networks in densely populated countries, the cost of coverage can still amount to a significant proportion of total network costs, with the remaining costs relating to the additional capacity required once the initial coverage-related network has been fully utilised by the traffic in that area.

Coverage costs do not necessarily increase linearly with the area covered by a network and differences between countries impacting on the potential size of cell site areas can be considered. We first discuss the likely impact of differences between Australia and the comparators and then explain the modelling approach employed to adjust for these potential differences.

The degree of urbanisation is one factor that will impact on potential cell site areas. We note that 'headline' urbanisation rates are broadly similar between Australia, the UK, South Korea and Sweden but lower in Malaysia (see Table 1).

Table 1. Urbanisation rates in selected countries

Country	Urbanisation rate (%)
Australia	91
UK	90
Sweden	83
Malaysia	59
South Korea	83

Source: World Bank - World Development Indicators; Table 3.10. Data refer to 2002.

However, these headline rates hide substantial differences in *densities* within urbanised areas. In particular, urban densities tend to be much lower in Australia than the other countries considered in the benchmarking exercise - these figures stand at 1,683 people per squared kilometre in Sydney, 6,046 in London, 3,614 in

Stockholm, 5,697 in Kuala Lumpur and 14,773 in Seoul.[27] Thus urbanisation alone may suggest an upward adjustment to the benchmarks from the other countries (except for Malaysia) to account for Australia's much lower density urban areas. As far as Malaysia is concerned, we note that the overall urbanisation rate is much lower than in Australia, but as can be seen from Celcom's network coverage map,[28] many rural areas are not served at all by mobile operators. Thus while this factor should be accounted for, its impact may be moderate in practice.

In relation to non-urban areas, Analysys notes that "the (generally flatter) nature of increasingly remote Australian rural areas would give rise to larger cell areas than in undulating or mountainous countries, and therefore adjustments relating to estimated average cell sizes should be factored into an Australian proxy."[29] We note that the coverage areas of Australian mobile operators is predominantly along the eastern and south-eastern parts of the continent and spans the Great Dividing Range. For instance, within a short distance from Sydney, there are towns such as Mt. Victoria in the Blue Mountains at altitudes over 1000 metres. In contrast, most of the UK population is located on the plains of the south-east and the highest mountain in the UK, Ben Nevis, located in the remote Scottish Highlands only reaches an altitude of 1344 metres. The coverage areas of the Swedish mobile operators also do not appear more mountainous than those of the Australian operators. Malaysia and South Korea do appear more mountainous than the coverage areas of the Australian operators, although the differences may be reduced somewhat by the Malaysian and South Korean populations being predominantly in flatter coastal areas.

Network coverage, geographic terrain and population densities impact on cost by affecting the number of base stations and related equipment required for a given traffic level. In this Report, we have applied two alternative approaches to adjust for differing coverage conditions between countries.

- The first approach focuses on the number of base stations (also known as cell sites), scaled for traffic volumes. We assume that 90 per cent of network costs vary with the number of base stations. Hence, unit costs would be expected to be proportionately higher in a country that had more base stations for a given level of traffic volumes. This approach, which is explained more fully in Section 5, would recognise that a very mountainous country will result, *ceteris paribus*, in more base stations to reach subscribers and hence would tend to have higher unit costs.

27 Source: http://www.demographia.com/db-worldua.pdf.

28 Source: http://www.celcom.com.my/products/coverage/index.html.

29 Analysys, *Examination of mobile termination costs – Final Report for ACCC*, p.35.

- The second approach adjusts for coverage areas directly and traffic volumes. However, we have recognised differences in the cell areas for coverage-related cell sites in adjusting for coverage where there appeared to be significant differences between countries.

3.2.4. Technology and spectrum assignments

Network technology is another factor that may impact on the cost of delivering mobile services.

For the purposes of the formal benchmarking exercise, we have only considered GSM networks and hence our benchmarks will be most relevant to the Australian GSM networks. This was one reason for excluding the South Korean networks that are CDMA.

Within GSM, there is an issue as to whether costs differ between 900/1800MHz operators and 1800MHz-only operators. The ACCC previously criticised the earlier CRA analysis for using an average across these operators, rather than only a 900/1800MHz based benchmark. On the question of difference, Ofcom states: "Ofcom believes that the view that neither operator type had a significant cost advantage over the other (on an accounting basis) is reasonable."[30] Oftel did calculate a higher LRIC estimate for the 1800MHz operators but this was attributable to differences in economic depreciation.[31] The Malaysian Communications and Multimedia Commission also concluded that "Therefore MCMC is not convinced that there is a material difference in the costs of an efficient 1800MHz or 900MHz licensee with 20% of traffic in Malaysia".[32] Nonetheless, we have modelled the two types of UK operators separately in this report.

Turning next to spectrum allocations, differences in spectrum allocations can give rise to cost differences, although some regulators, like Ofcom, reached a different conclusion. Ofcom estimated the network cost differences resulting from changes in spectrum allocations as part of its recent review of spectrum pricing in the UK. Ofcom was seeking to determine prices for spectrum to reflect the opportunity cost of the spectrum measured as the impact of changes in network costs that would result from marginal increases or decreases in spectrum allocations. Ofcom concluded that current UK spectrum prices were close to the opportunity costs, implying that the impact of gaining or losing 2x1MHz of spectrum would change the annual costs of the UK operators by £0.712m for spectrum in the 900MHz

30 Ofcom, *Statement on wholesale mobile voice call termination,* June 2004, par.C.81.

31 Differences in economic depreciation need to be assessed with references to the levels of utilisation over the life of the networks and it is not clear that Australian operators would have lower economic depreciation costs than the UK operators.

32 MCMC, *A consultation paper on access pricing*, 13 May 2002, p.19.

band and £0.554m for spectrum in the 1800MHz band.[33] Given average UK operator minutes around 3.7 billion, even an additional 2x10MHz of spectrum would impact units call costs by less than a pence per minute.

Table 2. Spectrum allocation (MHz) in selected countries and for selected operators

	900MHz	1800MHz
Optus	2x8.3	2x15
Sweden (average of TeliaSonera, Tele2 and Vodafone)[34]	2x7.1	2x20.8
UK (900/1800MHz operators)	2x17.4	2x5.8
Malaysia (900MHz operators)	2x10	N/A
Malaysia (1800MHz operators)	N/A	2x25

Sources: European Radiocommunications Office, ERO Information Document on GSM Frequency Utilisation within Europe, March 2004; A Consultation Paper on Access Pricing, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002).

In any event, we do not believe there are clear reasons for expecting spectrum allocations to result in significant cost differences between Optus and the UK and Swedish operators. As shown in Table 2, Optus has 2x8.3MHz in the 900MHz band and 2x15MHz in the 1800MHz band. This is similar to that of the Swedish operators included in the cost modelling (TeliaSonera, Tele2 and Vodafone) that have on average 2x7.1MHz in the 900MHz band and 2x20.8MHz in the 1800MHz band.[35] Two of the UK operators have 2x17.4MHz spectrum in the 900MHz band and 2x5.8 MHz in the 1800MHz band while the other two have 2x30MHz spectrum only in the 1800MHz band.[36] Thus Optus has a smaller assignment in the 900MHz band and larger assignment in the 1800MHz band vis-à-vis the UK 900/1800MHz operators. The Malaysian operators have either 2x10MHz in the 900MHz band or 2x25MHz in the 1800MHz band[37] and thus may be disadvantage compared with Optus. Nonetheless, as discussed above the impact of such differences in spectrum allocations on costs should not be overstated. Our modelling approach, that takes into account differences in the number of base

33 Ofcom, *Spectrum Pricing: A consultation on proposals for setting wireless telegraphy act licence fees, 29 September 2004*, para. 4.2.1ff.

34 These are the three operators included in the Swedish LRIC model.

35 These are the 3 operators included in the Swedish LRIC model. European Radiocommunications Office, *ERO Information Document on GSM Frequency Utilisation within Europe*, March 2004.

36 European Radiocommunications Office, *ERO Information Document on GSM Frequency Utilisation within Europe*, March 2004.

37 *A Consultation Paper on Access Pricing*, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002).

stations for a given traffic level, will reflect the impact of any differences in spectrum allocations. As Analysys notes *"Spectrum is therefore one of the major inputs in the cost calculation, and is a key factor in determining the number of base station sites to be deployed to meet a given level of demand."*[38]

3.2.5. Input prices and cost of capital

For mobile networks, important inputs include telecommunications equipment (handsets and network equipment), spectrum, the cost of capital, labour, land, taxes, USO payments and the impact of topography and regulation (e.g. planning restrictions) on network design. The prices corresponding to these inputs can vary significantly from one country to another and also from one period to another. In practice, making robust adjustments for differences in input prices between countries is likely to be complicated. The Analysys Report initially suggests a 25% PPP adjustment, reflecting the fact that only about a quarter of *network* costs are incurred locally. Analysys go on to note that for the UK, the World Bank's PPP adjustment for 2001 of 74.8% could be modified to be in the range of 80-95%. The mid-point of this range indicates a 50% PPP adjustment. Using a 50% adjustment is conservative in the cases of UK and Sweden as it risks overcompensating for Australia's relatively low general cost level (indeed Analysys indicates that CRA's earlier analysis probably did overstate the extent to which Australian operators were able to benefit from Australia's low land and labour costs).

We have substituted our earlier land and labour costs adjustments made in our May report with a PPP adjustment, scaled by 50%, to capture the fact that not all costs are incurred locally. This translates to cost multipliers of 92.9% for the UK and 87.2% for Sweden based on OECD 2003 PPP comparative price levels. For Malaysia, applying a 50% PPP scale factor from the World Bank (given the absence of a OECD figure for Malaysia) implied a cost multiplier of 69.4%.

Another heterogeneous factor across countries is the cost of capital. As Analysys notes in its Report:

> *[w]e would however, expect that the ACCC's cost of capital range corresponds with the (real-terms) values adopted in recent European countries and other developed nations, therefore explicit adjustment for this category likely to be lower priority.*[39]

Nonetheless, we have used the actual costs of capital assumed in the cost modelling exercises in the benchmarked countries and account for differences with the estimated cost of capital for Optus.

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38 Analysys, *Examination of mobile termination costs – Final Report for ACCC* , p.12.

39 Analysys, *Examination of mobile termination costs – Final Report for ACCC*, 30 June 2004, p. 38.

Specifically, the post-tax nominal WACC for the wireless telecom industry was estimated to be 10.51% in the UK,[40] 11.20% in Malaysia,[41] 9.1% in Sweden[42] and **[commercial-in-confidence]** % in Australia (Optus).[43]

To provide an idea of the impact of varying the cost of capital, when Ofcom decided to lower its pre-tax nominal WACC estimate from 12.25% to 12% on 01 June 2004, the LRIC estimate for 2004/5 decreased on average by 0.04 ppm.[44]

In relation to Malaysia, the NERA Report on access pricing[45] notes that a 1 per cent increase in the assumption regarding the cost of capital would result in an increase in the estimated cost (fixed to mobile, local) from 13.96 Sens to 14.39 Sens.

Based on these results it would appear that differences in the cost of capital are unlikely to affect the final estimates significantly. Nonetheless, we have opted to adjust for such differences. **[commercial-in-confidence]**

3.2.6. Peak/off-peak traffic ratios and traffic loading

While networks are built for busy hour call volumes, the average cost per minute is calculated with reference to overall traffic volumes. Accordingly, the greater the ratio of off-peak traffic to peak traffic, the lower will be the average cost per minute, i.e. higher off-peak traffic volumes have relatively little impact on overall costs because they do not require additional capacity to be built (up to the level at which the off-peak volumes match the peak volumes). In mobile networks, the peak and off-peak traffic needs to be assessed in relation to particular cell sites. This implies that it is difficult to make cross-country comparisons of the 'peakiness' of mobile traffic.

Traffic loads are considered by Analysys as belonging to "secondary cost-influencing factors". In addition, Analysys comments that the so-called "M-curves" (i.e. peak traffic rates in the morning and in the evening), capturing traffic profile, are unlikely to vary much across "most highly penetrated developed markets".

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40 Ofcom - *Statement on Wholesale Mobile Voice Call Termination*, 01 June 2004, Annex B, Table 3.

41 *A Consultation Paper on Cost of Capital*, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002), p. 32 (midpoint).

42 PTS, *Utkast - LRIC prismetod för terminering av röstsamtal i mobilnät* (10 May 2004), p. 6 (midpoint); available at www.pts.se.

43 CRA, *Pricing Mobile Termination in Australia*, 20 December 2004.

44 Ofcom, *Statement on Wholesale Mobile Voice Call Termination*, June 2004 Annex C, Table 1.

45 *A Consultation Paper on Access Pricing*, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002), p. 21.

On a similar secondary issue, Ofcom notes that costs concerning location updates and HLRs are very small. In particular, these were originally excluded from the LRIC model. When included, they amounted to 0.19 pence per minute (about half an Australian cent per minute) for 2004/05.[46] Even if allowing for international variation in location update costs, these are unlikely to affect the final estimate significantly as they represent a very small component of total cost.

3.2.7. Quality of service

Quality of service can encompass a range of dimensions including the percentage of calls connected and completed successfully (i.e. without being blocked initially or dropped during the call) and the clarity of the call. Given the importance attached to quality of service by subscribers, much recent investment by operators has been aimed at improving call quality in areas that already have some, albeit weak, signal strength.

Many countries have surveys of service quality. These tend to be conducted using vehicle-mounted equipment and thus measure outdoor quality of service. They do not capture the quality of service for in-building calls even though this can also be an important source of difference between operators' services and between operators' costs.

The sensitivity analysis performed by NERA in the development of the LRIC model for Malaysia provides evidence of only a limited impact that reasonable changes in quality of service (as measured by the percentage of successful calls) have on operating costs.[47]

3.2.8. Network purchasing power

When a carrier is part of a large international group it may achieve better economies of scope and enjoy greater buyer power. Hence unit costs are likely to be lower for companies operating as part of a large group. It should be noted that a failure to control for this factor is likely to result in an *underestimate* of Optus' costs, at least in the cases of Sweden and the UK. This is due to the fact that between Optus and Singtel (its parent company), they achieve 7.44m subscribers.[48] This compares, for instance, with Vodafone having 128.0m

46 Ofcom, *Wholesale mobile voice call termination consultation – Explanatory Statement and Notification* (19 December 2003), Annex F, para. 3.2.4.

47 *A Consultation Paper on Access Pricing*, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002); Table 4.5.

48 http://home.singtel.com/news_centre/news_releases/2004-11-11.asp; the figure relates to September 2004. As a rule-of-thumb, we only included the subscribers of a subsidiary when the parent company had at least a 50% ownership stake.

subscribers worldwide[49] and T-Mobile (Deutsche Telekom) having 72.7m.[50] As for Sweden, the Tele2 group has 11.96m subscribers[51] and TeliaSonera 12.89m.[52] In Malaysia, Telekom Malaysia (Celcom) has 4.1m customers[53], Maxis 4.9m[54] and DIGI (part of Telenor) has 16.5m.[55]

Summarising, the differences in terms of network purchasing power between Australia and respectively, Sweden and Malaysia, do not seem dramatic. In relation to the UK, a failure to incorporate differences in network purchasing power will means that the benchmark underestimates Optus' costs.

3.2.9. Scope of service offered

The structure of services offered by operators impacts costs. The ACCC commented that in our May report we did not take SMS volumes into account and claimed that this was likely to suggest lower costs in Australia compared with the UK.[56] However, figures on SMS use stand at around 35 a month per subscriber in the UK (2003),[57] 50 in Malaysia (2003),[58] 18.4 in Sweden (2003)[59] and 26.3 in Australia (2003).[60] This suggests that by not including an SMS adjustment we are

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49 http://www.vodafone.com/section_article/0,3035,CATEGORY_ID%253D301%2526LANGUAGE_ID%253D0%2526CONTENT_ID%253D230672,00.html?

50 http://www.telekom3.de/en-p/comp/1-co/3-tm/home/t-mobile-profile-ar.html

51 http://www.nokia.com/downloads/operators/downloadable/datasheets

52 http://www.waymaker.se/templates/newsList.aspx?id=73&wm _org_id=5400

53 http://www.celcom.com.my/abt_celcom/media_centre/archives

54 http://www.maxis.com.my/personal/about_us/profile/world

55 http://press.telenor.com/PR/200410/965850_5.html

56 ACCC Final Decision, p. 232.

57 Ofcom – *The Communications Market 2004*, Telecommunications Appendices, Appendix 2, Tables 3 and 4 (CRA calculation: total SMS volume for 2003 divided by average subscribers' number for 2003). Volume of picture messages in 2003 is assumed to be negligible, as suggested by Par. 5.12 of *The Communications Market 2004 – Telecommunications.*

58 http://d-two.info/files/Asia%20Telecom%20Mobile%20Space%20Minges.pdf.

59 *Swedish Telecommunications Market 2003*; available at www.pts.se

60 Australian Communications Authority – *Telecommunications Performance Report 2002/03*, p. 89 (based on a projection given growth rate between from 2000/01 and 2002/03; then averaged between the 2002/3 figure and the 2003/4 projection).

actually being conservative in our estimation vis-à-vis Malaysia and the UK. As for Sweden, the difference does not seem to be dramatic.

A further potential adjustment relates to whether a mobile operator is integrated with a fixed operator. We have not adjusted for this so that our estimates, particularly from the UK, are most representative of a mobile-only operator.

4. CHOICE OF COMPARATORS

The ACCC states that by considering as broad a range of cost estimates from overseas jurisdictions as possible, it is able to account for differences in cost factors between different jurisdictions.[61] Nonetheless, the ACCC Final Decision is based on cost estimates from only four countries. Three of these (the UK, South Korea and selected US states) are densely populated while the fourth, Malaysia, has much lower labour and land costs compared with Australia.

In this section, we review the comparators that have been identified by the ACCC or nominated by its advisor (Analysys) as being suitable comparators. We also review the latest international developments in the regulation of mobile termination rates to examine the suitability of other potential comparators.[62]

For the purpose of the benchmarking that was undertaken for this Report, we selected cost estimates that are derived using LRIC-type models and for which modelling assumptions and other details are publicly available and accessible. This 'selection criterion' reflects our view that where such information is available, adjustments for significant differences between countries can be then made on a more informed basis.

61 ACCC, Final Decision, p. 215.

62 A large number of cost modelling exercises have been undertaken worldwide. A study by Ovum, reported by the New Zealand Commerce Commission, reports the range of mobile termination rates of seven regulatory cost models to be between 6-10 €cents per minute (10-17cpm). See New Zealand Commerce Commission, *Schedule 3 investigation into regulation of mobile termination - Draft Report*, 18 October 2004, para. 389. Original figures expressed in Euros. A 7-year average exchange rate has been used to convert from Euros into Australian Dollars.

4.1. REVIEW OF IDENTIFIED AND NOMINATED COMPARATORS

UK

The UK has been nominated by Analysys (in its report for the ACCC) to be an appropriate benchmark.

The UK cost estimates are fairly recent and they were the subject of a lengthy and open consultation process. We have therefore selected the UK as one comparator and built on the analysis in CRA's May report which was already inclusive of the most recent Ofcom's decision on termination charges.[63]

Sweden

The Analysys report also nominates Sweden as a potential international benchmark for Australia.

On 5 July 2004, the Swedish Regulatory Authority (PTS) set the termination rate at 0.7989 SEK per minute (15 cpm) based on the result of a LRIC study which estimated the nominal termination rate for 2007 at 0.5376 SEK (10 cpm).[64] Given the available and recent public information about the Swedish estimates, we selected Sweden an another comparator in our benchmarking exercise.

Malaysia

Malaysia has also been nominated by Analysys as an appropriate benchmark.

The Malaysian Communications and Multimedia Commission (CMC) determined mobile termination rates between 11.26 and 22.52 Sens per minute (5-10 cpm).[65] These rates are based on a LRIC model that was developed in 2002. The information that is publicly available on this model includes the modelling assumptions as well as calculation details. We therefore consider the Malaysian cost estimates to be a suitable comparator.

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63 See Ofcom's *Statement on Wholesale Mobile Voice Call Termination*, 01 June 2004.

64 *LRIC prismetod för terminering av röstsamtal i mobilnät*, p. 3; available at www.pts.se. The figure relates to 2004 and has been converted using a 10-year average exchange rate and a 50% PPP conversion factor (sources: www.oanda.com and OECD Main Economic Indicators, comparative price levels for 2003).

65 Malaysian Communications and Multimedia Commission – *Commission determination on the mandatory standard on access pricing* (28 June 2003); available at www.cmc.gov.my. A 10-year average exchange rate (not PPP-adjusted) has been used.

Greece

Greece is another country that has been nominated by Analysys as a good potential candidate for benchmarking. The Greek Telecom Regulator (EETT) commissioned a LRIC study but CRA was advised by the EETT that, as of November 2004, issues regarding common costs were still to be resolved and consultation with the operators would follow soon after. The EETT expects to publish the results following such consultation. The head of the EETT is reported to have said in June 2004 that the regulator may force mobile operators to cut their charges by about 40% over the next three years.[66] Vodafone's charges had been 17 €cents per minute (29 cpm)[67] at the time so that would imply a rate of around 10 €cents per minute (**17 cpm**) in mid-2007.

We therefore did not include Greece as a comparator in the benchmarking exercise undertaken for the present Report.

South Korea

South Korea developed its LRIC model in 2003, assisted by Analysys and Ovum. The Federal Communications Commission reported that, based on the Korean LRIC model, interconnection charges would amount to US$ 0.028 in 2004[68] (equivalent to 33.21 Won[69] or 4.49 cpm)[70].

However, there are a number of strong reasons (in our view) why South Korea could not be considered an appropriate comparator for our benchmarking exercise:

- The lack of publicly available information about South Korea's LRIC model would have made it difficult for us to conduct a full and proper analysis;

66 Reuters, *Vodafone Greece plans price cuts in Oct*, 15 September 2004. Available at http://uktop100.reuters.com/latest/Vodafone/top10/20040915-TELECOMS-GREECE-RATES.ASP.

67 The exchange rate used is a 7-year average, as explained earlier in the report.

68 Federal Communications Commission, *The Effect of Foreign Mobile Termination Rates on U.S. Customers*, IB Docket No. 04-398.

69 We used an average of the January 2004 exchange rate between US$ and Won. Source: www.oanda.com.

70 We used a 10-year average exchange rate. Source for exchange rates: www.oanda.com.

- The South Korean conditions are extremely different from the Australian ones. South Korea is a very dense and very small country (compared to Australia) and with an operator carrying twice as many subscribers as the typical Australian operator, and almost five times as many minutes, but only a quarter more base stations.[71] These factors result in a very low number of base stations per traffic volume, implying that South Korean networks can enjoy scale economies that are not achievable by the typical Australian operator; and

- All three South Korean operators have adopted a CDMA network, unlike the GSM 900/1800MHz we considered earlier. Nonetheless, one has to point out that there is some evidence against any significant cost difference between GSM and CDMA as far as coverage costs are concerned.[72]

Given the vast differences between the South Korean and Australian environments, it is likely that the underlying cost drivers are so different that using South Korea as a benchmark would involve calculations and adjustments on the basis of 'out-of-sample' data and overly extreme assumptions.

To elaborate, we adjusted the South Korean estimates using the same procedure and steps that we took in our benchmarking exercise detailed in Section 5 below. The adjusted South Korean cost estimates lie between **15.17–22.27 cpm**, depending on whether we adjust for base stations and traffic volumes or directly for coverage and minutes. These estimates are based on a number of relatively 'extreme' assumptions. Specifically, we assumed a geographic coverage of 90% of land mass, which is very high. This makes our estimates conservative; assuming lower coverage would in fact increase the estimates. We also assumed the cost of capital to be the same as in Australia (hence no adjustment) and the proportion of network costs out of total costs to be the same as in the UK (since it is a figure that was known *ex-ante*). We performed sensitivity analysis and found that the final estimates are not very sensitive with respect to such parameters. Another assumption concerned the proportion of coverage costs out of total network costs, which we assumed to be 10% (the lowest of all countries considered). Assuming a larger value would only augment our final estimates.

71 Data for subscribers, base stations and minutes relate to SK Telecom and are available at www.sktelecom.com; we scaled these down according to the December 2003 subscribers' market shares to reach the equivalent figures of a typical operator (assumed to be one third the size of the total market). Data for Australia provided by Optus.

72 Andersen Consulting, Detecon and Telemate Mobile Consultants, *The GSM-CDMA Economic Study*; available at http://www.sss-mag.com/pdf/fivexsum.pdf.

4.2. REVIEW OF LATEST INTERNATIONAL DEVELOPMENTS

Austria

The Austrian regulator (TKC) estimated, using a LRAIC methodology (equivalent to TSLRIC), a cost for mobile termination for the major Austrian operators of 23 cpm in 2000 and particularly noted the result that the cost of termination was found to be above the cost of origination.[73] In 2003, the Austrian regulator reduced mobile termination rates for the major operators to 18 cpm and capped the smaller operators' rates at 33 cpm.[74] Admittedly, as both the ACCC (Final Decision, p. 235) and the European Commission[75] point out, the LRAIC model has not been made explicit by the Austrian regulator.

In a recent consultation paper regarding the costs for the efficient provision of termination services, the TKC explicitly demanded that due to their significant market power, the three market leaders should set their termination charges based on LRAIC.[76] According to the TKC, the relevant LRAIC benchmark should be determined using two methods. The first method involved calculating the lowest existing termination charge of an efficient operator in the market. According to the second method, the LRAIC should be determined based on the average costs of a hypothetical market participant with an average market share. Ramsey pricing was not suggested by the TKC, nor was the inclusion of a network externality mark-up recommended.

The TKC estimated mobile termination costs of an operator with an average market share in the range between 8.5-9.5 €cents (14-16 cpm) for 2010. This figure may change as a result of the consultation.

We therefore did not include Austria in the benchmarking exercise undertaken for the this Report.

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73 *Telekom-Control Commission announces reduction of termination fees for mobile phones*; Press release of 03 August 2000; available at http://www.rtr.at/. The figure has not been adjusted into nominal 2004 terms.

74 *Telekom-Control Commission decision of 15 April 2003*; available at http://www.rtr.at/web.nsf/englisch/Portfolio_Presseinfos_nach+Datum_PresseInfoDatum_PInfo15042003TK?OpenDocument.

75 *Case AT/2004/0099: voice call termination on individual mobile networks - Comments pursuant to Article 7(3) of Directive 2002/21/EC.*

76 *Konsultation : Ermittlung der Kosten der effizienten Leistungsbereitstellung für Terminierung in Mobilfunknetzen*, Telekom-Control-Kommission, November 2004; available at http://www.tkc.at/web.nsf/deutsch/Portfolio_Konsultationen_bisherige_bisherigeKonsultationen_KonsultationKOREMobil?OpenDocument

Belgium

The Belgian telecommunications regulator (IBPT), in its decision of 23 September 2003,[77] reviewed the termination cost model presented by Mobistar. The ACCC had criticised CRA for being inconsistent with a document produced by CRA's US affiliate, which was stating that international benchmarks were being used as proxied for cost orientated rates.[78] Such document, however, as noted in the ACCC Final Decision in footnote 592, was published on 28 March 2003, six months before the IBPT Decision and related to an earlier decision.

The ACCC also points towards a presentation given by Mobistar[79] in support of its contention that international benchmarking was the basis for the regulation. However, this presentation actually concludes that "[t]he Belgian NRA decided to base the regulation of our MTR on [Mobistar's] cost model".[80]

After reviewing the model by Mobistar, the IBPT accepted the range estimated between 15.70-19.72 €cent per minute (27-33 cpm) in its decision of 23 September 2003. In a complementary decision of 15 June 2004,[81] the IBPT revisited its earlier audit in greater detail. Nevertheless, the modifications were minimal and the new range was 15.56-19.58 €cent (26-33 cpm). As far as the operator Proximus (Belgacom Mobile) is concerned, it is subject to a price cap, which was devised on the basis of the establishment of its cost model of mobile termination in 2001.[82] Finally, in the same document, the IBPT announces that a new generic cost model of mobile termination will be issued in early 2005.

As we did find any publicly available information on the Belgian cost model, we did not include Belgium in the benchmarking exercise for this Report.

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77 *Décision du Conseil de l'IBPT du 23 septembre 2003 relative aux charges de terminaison de Mobistar*, p. 10*;* available at http://www.bipt.be/ibpt.htm.

78 CRA, *Economic Analysis of Fixed-to-Mobile Call Termination*, 28 March 2003.

Charges, prepared for BellSouth International, CRA No. 4021, 28 March 2003, Table 1, page 12.

79 Philippe Vogeleer, *Competition Assessment in Mobile: Benchmarking as a Tool – The*

Mobistar Experience, 25 May 2004 at www.cerna.ensmp.fr/cerna_regulation/Documents/ColloqueBenchmarking/Vogeleer.pdf

80 *Ibid*, slide 14 of 17

81 *Décision complémentaire du 15/06/2004 Conseil de l'IBPT relative aux charges de terminaison de Mobistar;* available at www.ibpt.be.

82 See, for instance, *Décision du Conseil de l'IBPT du 5 août 2004 relative à la régulation des charges de terminaison MTR de l'opérateur Belgacom Mobile (Proximus);* available at http://www.bipt.be/ibpt.htm.

Finland

The Finnish Communications Regulatory Authority (FICORA) announced its final decision on 6 February 2004 designating particular mobile operators as having Significant Market Power (SMP) and requiring termination charges for mobile-to-mobile calls to be cost-oriented.[83] The decision came into effect on 1 March 2004 with Sonera lowering its termination rate by around 29.6% from 12.78 €cents to 9 €cents (22 to 15 cpm),[84] Radiolinja Origo Oy reduced its termination rates by 23.8% from 13.12 €cents to 10 €cents (22 to 17 cpm), Finnet announced its new rate at 11 €cents per minute (19 cpm).[85]

Essentially, the operators were setting new rates in response to FICORA's SMP decision of February 2004 rather than setting a new rate "result[ing] from mutual agreements between operators" (ACCC Final Decision, p236).

The ACCC tries to draw a line between cost-oriented and cost-based in its Final Decision (p. 236). However, 'cost-oriented' is a standard official term for cost-based prices used in European telecommunications regulation[86] as well as in international agreements to which Australia is a party such as the WTO's Basic Telecommunications Reference Paper. The ACCC also contends that the view that the new 2004 rates are cost-based is inconsistent with a 2003 CRA Report[87] referring to rates in Finland in 2003. However, since the new policy was announced in February 2004, it would have been impossible for CRA to take this into account 11 months earlier, in our US affiliates' Report of 28 March 2003.

To the best of our knowledge, the Finnish termination rates do not appear to be based on a LRIC-type model. We therefore did not include Finland in the benchmarking exercise for this Report.

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83 This sentence is in the *Decisions on Significant Market Power Regarding Mobile Termination Markets*- (1133/934/2003), (1134/934/2003) and (1135/934/2003) letters sent to Sonera Mobile Networks Oy, Finnet Verkot Oy and Radiolinje Origo Oy respectively on 06 February 2004. The sentence is not in Ålands Mobiletelefon Ab letter (1136/934/2003).

84 As in the other instances we use a 7-year exchange rate average.

85 FICORA press release, *Mobile phone operators lowered prices significantly – FICORA views this as a positive development*, 02 March 2004.

86 For instance, the European Commission's Recommendation 98/195/EC of 08 January 1998 on interconnection in a liberalised telecommunications market (Part 1 – interconnection pricing), recommends the use of long run average incremental costs for the assessment of "cost oriented" interconnection tariffs for terminating access.

87 CRA, *Economic analysis of fixed-to-mobile call termination charges*, 28 March 2003.

France

The French regulator, ART, determined rates of 25 cpm applying from 1 January 2004.[88] ART held a consultation to consider rate levels for future years, noting that on the basis of operators' cost information it estimated a termination cost of around 17 cpm for 2002.[89] The ACCC is of the view that ART included marketing costs in its pricing decision. This is contrary to what was in fact reported on p. 111-2 of the *Consultation publique sur l'analyse du marché de gros de la terminaison d'appel vocal sur les réseaux mobile* (April 2004):

> *Dans son examen des prix de la terminaison d'appel (Chapitre 4) et dans sa fixation du contrôle tarifaire associé aux remèdes (Chapitre 5), l'Autorité considère que les coûts pertinents n'incluent pas de coûts commerciaux.*[90]

Given that we did not find any other publicly available information about the estimated termination cost or model, we did not include France in the benchmarking exercise for this Report.

Italy

The Italian regulator, AGCOM, determined a mobile termination rate of 25 cpm in 2003 for operators with Significant Market Power (SMP), noting that this rate corresponded with the operators' audited costs. AGCOM also scheduled reductions of 10 per cent per year in the charge level in line with expected efficiency gains.[91] Actual mobile operators' costs are unlikely to harbour significant inefficiencies given that the networks are relatively young and have been developed in competitive markets. Thus, we do not believe there is a strong basis for disregarding regulatory decisions based on actual operators' costs. Moreover, we note that in the UK, the results of the cost modelling were adjusted to be line with actual operators' costs.

As we did not find any other public information about the Italian estimates, we did not include Italy in the benchmarking exercise for this Report.

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88 ART decisions nos. 03-1113 and 03-1114 of 27 October 2003 (http://www.art-telecom.fr/eng/index.htm).

89 ART, *Consultation publique sur l'analyse du marché de gros de la terminaison d'appel vocal sur les réseaux mobile*, April 2004, p.112.

90 We have translated this as: "In its examination of voice call termination rates (Chapter 4), and in its establishment of price control associated to remedies (Chapter 5), *the ART considers the relevant costs not to include marketing costs*." (*our emphasis*).

91 Autorità per le Garanzie nelle Comunicazioni, *Annual Report on activities carried out and work programme,* 30 June 2003; available at http://www.agcom.it/rel_03/eng/Relaz_eng_part04.pdf , p.146. Details to be found in the decision *Delibera n. 47/03/CONS* of 05 February 2003, available at www.agcom.it.

United States

The analysis undertaken in CRA's May report suggests that the average estimate out of the States of New York, Florida and California is 14.33 cpm (or 14.20 cpm with a 10-year average, 50% PPP adjusted exchange rate). As Analysys noted, the technology adopted by Sprint in California, Florida and New York, and considered in CRA's May report was in the 1900MHz band, instead of the combination of operators at 900/1800MHz, which exists in Australia. In addition, the Sprint figures related to 1999 and were therefore likely to be out-of-date.

For these reasons, we did not include these three US States in our present analysis.

4.2.1. Summary

By way of summary, we have tabulated the estimates determined by, or on behalf of, regulators that are explicitly stated to be based on an analysis of costs (see Table 3). We have used 10-year exchange rate averages (7-year for the Euro) to convert the estimates into Australian currency.

Table 3. Recent international mobile termination cost estimates (unadjusted for differences in cost factors)

Country	Estimate in Australian cents per minute
Austria (for 2010)	14-16
Belgium 2003 (Mobistar)	27-33
Finland 2004	15-19
France 2002	17
Italy 2003	25
Malaysia 2003	5-10
Sweden 2004	10
UK 2003 (estimate for 2004/05)[92]	13-14
ACCC's proposed target price (for 2007)	*12*

92 This is Ofcom's proposed target charge for 2005-06, incorporating an externality adjustment in the allocation of common costs. Excluding the externality would decrease the figure to 12-13 cpm. The range reflects the (minor) difference between 900/1800MHz operators and 1800MHz operators only.

5. INTERNATIONAL BENCHMARKING

This section spells out the detailed benchmarking analysis for the UK, Swedish and Malaysian comparators.

5.1. UK ESTIMATES

On 1 June 2004, Ofcom estimated the cost of mobile termination in 2004/05 in the UK to be 5.06 pence per minute (11.57 cpm).[93] This relates to dual band 900/1800MHz operators and excludes the externality surcharge of 0.57ppm[94] (1.30 cpm).

The network common cost component was calculated to be 4.59 ppm (10.50 cpm), whilst the non-network common cost mark-up has been estimated to be 0.47ppm (1.07 cpm).

As explained in Section 3.2.4, we believe that the cost estimates of the 1800MHz operators are also relevant to consider as they reflect a difference economic depreciation profile and it is not clear which one is closest to that of Australia as it will depends on the development of traffic over time. In this instance, Ofcom has set rates at 13.13 cpm, excluding the network surcharge (or 14.43 cpm with the surcharge). The network cost component has been determined to be 12.06 cpm and the non-network component 1.07 cpm.

Next, we consider adjustments to the UK comparator to take into account the differences in conditions impacting on costs between Australia and the UK.

Step 1 – Exchange rate adjustment

The first adjustment is through the exchange rate. As explained in Section 3.2.1, we used a 10-year average exchange rate to minimise the impact of short-term fluctuations.[95] We then applied 50% of the PPP adjustment.[96] Effectively, our final exchange rate is A$ 1 = £ 0.4373.

Step 2 – Cost of capital adjustment

[commercial-in-confidence]

93 Ofcom, *Statement on Wholesale Mobile Voice Call Termination*, 01 June 2004, Chapter 6, Table 1

94 All UK figures are in nominal 2004 values.

95 Source: www.oanda.com; 10 years from November 1995 to October 2004; annual averages; bid and ask rates averaged.

96 Source for PPP: OECD Main Economic Indicators (comparative price levels for 2003).

Step 3 – Adjustments for geographic terrain and network coverage

We adjusted for geographic terrain and coverage using the two alternative methodologies as outlined in Section 3.2.3. In the first approach, we chose the number of base stations (adjusted by traffic volume) to account for differences in the nature of the geographic conditions. In the second approach, we controlled for different coverage.

Specifically, to make the adjustments under the first approach, we began with figures relating to network and non-network costs (expressed in cpm). Our underlying assumption has been that 90% of the network costs are traffic driven. At the same time we adjusted for volume by dividing the number of base stations by the million of minutes of traffic. We therefore divided the UK network cost per minute by the ratio of base stations to minutes in Australia and then multiplied by the corresponding UK ratio and attributed a scale of 0.90.

The remaining 10% of network costs has been added to the non-network costs (adjusted for the difference in traffic volumes alone). The two effects (network and non-network components) are then aggregated to arrive at a figure of **17.65 cpm** for the 900/1800MHz networks, as reported in Table 4 below.

Table 4. Representative networks in UK and Australia; adjusted for minutes and base stations

	Technology	Cost Based Estimate without network externality (cpm)	Cost Based Estimate with network externality (cpm)	Network Coverage (Mil Km^2)	Base stations / Mil minutes
		(1)	(1)	(2)	(3)
UK	*900/1800MHz*	11.57	12.87	0.22	0.37
Australia		17.65	18.95	0.62	**[commercial-in-confidence]**
UK	*1800MHz only*	13.13	14.43	0.22	0.37
Australia		19.90	21.21	0.62	**[commercial-in-confidence]**

Sources and Notes: ***(1)*** *UK: Ofcom's Statement on Wholesale Mobile Voice Call Termination, 1 June 2004, Chapter 6. Australia: See analysis in this section. For exchange rates used, www.oanda.com (see Section 3.2 of this Report for the actual methodology)* ***(2)*** *UK: O2's Annual Review 2002 reports that its network covers 90% of the UK land mass. The UK's total land mass is 241,590 sq km (The CIA's The World Factbook). Australia: provided by Optus.* ***(3)*** *UK: Analysys UK LRIC model (April 2002 version) for traffic minutes. UK Competition Commission for base stations, "Vodafone, O2, Orange and T-Mobile: Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating*

calls from fixed and mobile networks", Table 7.5. Australia: Provided by Optus. Assumes **[c-i-c]***% of network costs are traffic-driven (proxied by base stations). These are total traffic minutes.*

We undertook the same analysis for the 1800MHz environment and this resulted into an estimate of **19.90 cpm**.

These figures are exclusive of the network externality surcharge. Adding the surcharge yields, respectively, **18.95** and **21.21 cpm**.

The intuition behind the increase from the original estimate is due to economies of scale that are present in the UK but that cannot be achieved by the typical Australian operator. This reflects a lower number of base stations (per traffic volume) in the UK.

We now turn to the second (alternative) approach, namely adjusting for heterogeneous coverage and minutes across the UK and Australia. In doing so, we account for scale economies implicitly. The results are reported in Table 5 below.

Table 5. Representative networks in UK and Australia; adjusted for minutes and coverage

	Technology	Cost Based Estimate without network externality (cpm)	Cost Based Estimate with network externality (cpm)	Network Coverage (Mil Km^2)	Traffic (billion minutes)
		(1)	(1)	(2)	(3)
UK	*900/1800MHz*	11.57	12.87	0.22	19.39
Australia		17.80	19.10	0.62	8.57
UK	*1800MHz only*	13.13	14.43	0.22	19.39
Australia		20.07	21.38	0.62	8.57

Sources and Notes: ***(1)*** *UK: Ofcom's Statement on Wholesale Mobile Voice Call Termination, 1 June 2004, Chapter 6. Australia: see analysis in this section. For exchange rates used, www.oanda.com (see Section 3.2 of this Report for the actual methodology)* ***(2)*** *UK: O2's Annual Review 2002 reports that its network covers 90% of the UK land mass. The UK's total land mass is 241,590 sq km (The CIA's The World Factbook). Australia: provided by Optus.* ***(3)*** *UK: Analysys UK LRIC model (April 2002 version) for traffic minutes. UK Competition Commission for base stations, "Vodafone, O2, Orange and T-Mobile: Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks", Table 7.5. Australia: Provided by Optus. These are total traffic minutes.*

A key difference between the UK and Australia is in relation to the network coverage. The coverage area of a typical UK mobile network is just over 0.2 million square kilometres.[97] On the basis of a version of the Analysys LRIC model, Oftel estimated that the costs of providing the coverage of the UK operator's amounts to 21 per cent of their total network costs.[98] Dividing across UK minutes, this translates to around 2.2 cpm.

In comparison, Optus network covers 0.62 million square kilometres, over 3 times the area of a UK network. Telstra's CDMA network is even larger at more than 1.4 million square kilometres.[99] If a UK network with UK volumes had to recover the cost of the Optus' network coverage, the costs associated with coverage could be around 3.1 cpm (assuming other factors constant), or 0.9 cpm higher than the UK. This would suggest a welfare maximizing charge level of 12.5 cpm, adjusting for the difference in coverage alone. In adjusting for coverage, we only accounted for half of the ratio of Australian to UK coverage. This effectively assumes that Australian cell areas for coverage-related cell sites are twice that of the UK.[100] As discussed in section 3.2.3, we do not believe there are substantial differences in the degree of urbanisation or geographic terrain between the UK and Australian operators' coverage areas to suggest larger differences in cell sites.

Another key difference is in relation to traffic volumes. An indication of the impact of the lower average traffic volumes of the Australian operators can be obtained by adjusting for the need to recover Optus' coverage over its lower volumes, 8,571 total traffic million minutes. Multiplying the ratio of average UK minutes to Optus minutes with the associated coverage costs of the Optus network yields **17.80 cpm** as Optus cost related to providing coverage, which is the figure reported in Table 5.

We took the same steps and calculations for the 1800MHz technology and arrived at an adjusted figure of **20.07 cpm**.

These last two figures do not include the network externality surcharge, which Ofcom raised to 0.5 ppm (in 2000/1 real terms). This amounts to approximately 1.30 cpm. Hence, the corresponding estimates for the two technological environments, inclusive of the externality surcharges, are respectively **19.10 cpm** and **21.38 cpm**.

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97 O2's *Annual Review 2002* reports that its network covers 90% of the UK land mass. The UK's total land mass is 241,590 sq km (The CIA's *The World Factbook*).

98 Oftel, *Network common costs*, 19 February 2002, Table 2.

99 Telstra, *2003 Annual Report*, p.21.

100 We note that simply examining the ratio of coverage area to the total number of cell sites is misleading as many cell sites will be capacity related and result in a more densely populated country having smaller cell sites.

To summarise, we have estimated Optus' mobile termination costs to fall in the range of **17.65 – 21.38 cpm**. We consider our estimates to be reasonably indicative given that they are based on Ofcom's cost estimate and appropriately adjusted for the differences in key cost drivers under Australian and UK supply conditions. Furthermore, our estimates are based on conservative assumptions. The cost of other Australian operators can be expected vary around this range taking into account their respective coverage areas, base stations and traffic numbers.

5.2. SWEDISH ESTIMATES

The National Regulatory Authority (PTS) commissioned a LRIC study the results of which were published in early July 2004.[101] The nominal LRIC estimate for 2007 was 0.5376 SEK per minute (10 cpm).

The procedure and steps taken in the case of Sweden are virtually identical to those taken for UK.

Step 1 – Exchange rate adjustment

The exchange rate conversion (using a 10-year average with a 50% PPP adjustment) is based on a rate of A$ 1 = SEK 6.0912 and yields an estimate of 8.83cpm.[102]

Step 2 – Cost of capital adjustment

We next adjusted for the difference in the cost of capital estimates between Sweden and Australia. As reported earlier, the cost of capital for the mobile industry (post-tax nominal WACC) has been estimated at **[commercial-in-confidence]** % for Australia.[103] The figure is relatively lower for Sweden at 9.1%.[104]

To adjust for the difference in the cost of capital, we used the sensitivity analysis performed in the development of the Swedish LRIC model.[105] This raised the initial estimate from 8.83 cpm to 9.21 cpm.

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101 *LRIC prismetod för terminering av röstsamtal i mobilnät*; available at www.pts.se.

102 Source for exchange rates: www.oanda.com; 10 years from November 1995 to October 2004; annual averages; bid and ask rates averaged. Source for PPP: OECD Main Economic Indicators (comparative price levels for 2003).

103 *LRIC of Mobile Termination* – Draft Report by CRA for Optus.

104 PTS, *Utkast - LRIC prismetod för terminering av röstsamtal i mobilnät* (10 May 2004), p. 6 (midpoint); available at www.pts.se.

105 Available at www.pts.se.

Step 3 – Adjustments for geographic terrain and network coverage

In this step, we proceeded with the two different adjustments for geographical terrain and coverage, separately, as described for the UK exercise.

In the case of the base station adjustment (and controlling for volume), our cost of capital adjusted estimate of 9.21 cpm rises to 10.88 cpm. The reason of this modification can be found in a slightly higher Australian ratio of base stations to traffic volumes, i.e. an Australian operator is unable to enjoy similar scale economies as a Swedish operator.

Table 6. Representative networks in Sweden and Australia; adjusting for minutes and base stations

	Cost Based Estimate (cpm)	Network Coverage (Mil Km^2)	Base stations / Mil minutes
	(1)	(2)	(3)
Sweden	8.83	0.27	0.48
Australia	10.88	0.62	**[commercial-in-confidence]**

Sources and Notes: ***(1)*** *LRIC prismetod för terminering av röstsamtal i mobilnät*, p. 3; available at www.pts.se. *Australia: See analysis in this section. For exchange rates used, www.oanda.com (see Section 3.2 of this Report for the actual methodology)* ***(2)*** *Sweden: TeliaSonera claims to have 75% of land coverage (www.teliasonera.com; business operations), Vodafone 57% (Annual Report, figure for March 2003); we chose the average value. Source for Swedish land mass: CIA's The World Factbook. Australia: provided by Optus.* ***(3)*** *Sweden: PTS LRIC model v2 for base stations (available at www.pts.se); 2003 data (www.teliasonera.com); Australia: data provided by Optus. Assumes 90% of network costs are traffic-driven (proxied by base stations). These are total traffic minutes.*

Table 7 reports our findings after adjusting for minutes and coverage. Unlike the case of the UK, we did not scale the Swedish/Australian coverage ratio by half, since both countries have similar coverage area per base station. The Swedish estimate stands at 9.99 cpm. The change from the initial figure has not been significant (after the PPP and the cost of capital adjustments) and this ensues from similar geographic conditions.

Table 7. Representative networks in Sweden and Australia; adjusting for minutes and coverage

	Cost Based Estimate (cpm)	Network Coverage (Mil Km^2)	Traffic (billion minutes)
	(1)	(2)	(3)
Sweden	8.83	0.27	5.71
Australia	9.99	0.62	8.57

Sources and Notes: ***(1)*** *LRIC prismetod för terminering av röstsamtal i mobilnät*, p. 3; available at www.pts.se. *Australia: see analysis in this section. For exchange rates used, www.oanda.com (see Section 3.2 of this Report for the actual methodology)* ***(2)*** *Sweden: TeliaSonera claims to have 75% of land coverage (www.teliasonera.com; business operations), Vodafone 57% (Annual Report, figure for March 2003); we chose the average value. Source for Swedish land mass: CIA's The World Factbook. Australia: provided by Optus.* ***(3)*** *Sweden: 2003 data (www.teliasonera.com). Australia: data provided by Optus. These are total traffic minutes.*

To summarise, our benchmarking exercise has found the Swedish estimates (adjusted for Australian conditions) to lie between **9.99** and **10.88 cpm**.

5.3. MALAYSIAN ESTIMATES

Malaysia embarked on a LRIC study in 2002 and set its mobile termination rates accordingly in 2003, between 7 and 14 cpm.[106] This broad range was explained by the cost differential between the costs of local fixed-to-mobile (FTM) calls and those long distance and/or via submarine. We opted for a weighted average that placed an 80% weight on local FTM calls, 15% on long distance and 5% on long distance via submarine. We therefore began from an estimate of 7.65 cpm.

Step 1 – Exchange rate adjustment

The exchange rate adjustment has been performed in the same way as described for the UK and Sweden. Unfortunately, the PPP conversion factor for Malaysia was not available from the OECD, since Malaysia is not a member country. We thus adopted the figures from the World Development Indicators 2002 published by the World Bank. Our final exchange rate arising from the 10-year average and 50% PPP conversion was therefore A$ 1 = MYR 1.6078. We then proceeded to elicit the components attributable to network and non-network costs.

Step 2 – Cost of capital adjustment

The Malaysian post-tax nominal WACC cost of capital for the wireless industry was estimated to be 11.20%.[107] We therefore made an adjustment to reach the Australian rate of **[commercial-in-confidence]** %, making use of NERA's sensitivity analysis.[108] This decreased our estimate from 7.65 cpm to 7.60 cpm.

Step 3 – Adjustments for geographic terrain and network coverage

In this step, we made two distinct adjustments for geographic terrain (whilst controlling for traffic volume).

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106 *Determination no. 1/2003* of the Malaysian Communications and Multimedia Commission (cost estimated for 2002); available at www.cmc.gov.my.

107 *A Consultation Paper on Cost of Capital*, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002), p. 32 (midpoint).

108 *A Consultation Paper on Access Pricing*, submitted by NERA to the Malaysian Communications and Multimedia Commission (May 2002).

Adjusting for differentials in base stations and minutes, in exactly the same fashion as for the UK, we obtained an estimate of 13.70 cpm (see Table 8). The cost driver here is clearly the number of base station per volume of traffic: in Malaysia this figure is more than 40% smaller than Australia. In order words, the Australian geographic terrain requires more base stations than the Malaysian conditions demand (after controlling for traffic volume).

Table 8. Representative networks in Malaysia and Australia; adjusting for minutes and base stations

	Cost Based Estimate (cpm)	Network Coverage (Mil Km^2)	Base stations / Mil minutes
	(1)	(2)	(3)
Malaysia	7.65	0.10	0.27
Australia	13.70	0.62	**[commercial-in-confidence]**

Sources and Notes: ***(1)*** *Malaysia: Determination no. 1/2003 of the Malaysian Communications and Multimedia Commission (cost estimated for 2002); available at www.cmc.gov.my. Australia: See analysis in this section. For exchange rates used, www.oanda.com (see Section 3.2 of this Report for the actual methodology)* ***(2)*** *Malaysia: The CIA's The World Factbook for land mass; for coverage, we estimated 30% from the coverage map available at www.celcom.com.my/products/coverage/index.html. Australia: provided by Optus.* ***(3)*** *Malaysia: Maxis Annual Report 2003 (data for 2002) for minutes; for base stations, average of Maxis Prospectus 2 (data for 31 December 2001) and Maxis Annual Report 2003 (data for end 2003). Australia: data provided by Optus. Assumes 90% of network costs are traffic-driven (proxied by base stations). These are total traffic minutes.*

With the alternative approach, as done in the previous cases, we considered coverage and traffic volume differentials. In adjusting for coverage, we only accounted for half of the ratio of Australian to Malaysian coverage. The reason is that coverage costs do not grow linearly with covered area. We thus obtained an estimate of 10.97 cpm (see Table 9). The intuition for the increase from the estimate of 7.60 cpm lies in the fact that Malaysia has smaller coverage but larger traffic and can therefore exploit scale economies that Australia cannot achieve.

Table 9. Representative networks in Malaysia and Australia; adjusting for minutes and coverage

	Cost Based Estimate (cpm)	Network Coverage (Mil Km^2)	Traffic (billion minutes)
	(1)	(2)	(3)
Malaysia	7.65	0.10	9.81
Australia	10.97	0.62	8.57

Sources and Notes: ***(1)*** *Malaysia: Determination no. 1/2003 of the Malaysian Communications and Multimedia Commission (cost estimated for 2002); available at www.cmc.gov.my; weighted average as explained in the text. Australia: See analysis in this section. For exchange rates used, www.oanda.com (see Section 3.2 of this*

Report for the actual methodology) ***(2)*** *Malaysia: The CIA's The World Factbook for land mass; for coverage, we estimated 30% from the coverage map available at www.celcom.com.my/products/coverage/index.html. Australia: provided by Optus.* ***(3)*** *Malaysia: Maxis Annual Report 2003 (data for 2002) for minutes. Australia: data provided by Optus. These are total traffic minutes.*

Summarising, our benchmarking exercise has estimated Malaysian mobile termination rates (adjusted for Australian conditions) to be between **10.97** and **13.70 cpm**.

5.4. SUMMARY

Given differences in key cost drivers, it would be remarkable were the costs of the Australian operators to be as the same as those of supplying mobile services in the countries that the ACCC has looked upon favourably as appropriate comparators, i.e. the UK, Sweden or Malaysia, *without any adjustment for different cost factors being made*. Even between European countries estimated termination costs differ significantly. As indicated in this Section, once differences in supply conditions are taken into account, the efficient level of termination charges for Australian operators are likely to be above the estimates relied on by the ACCC, which fall close to the bottom end of our estimated range.

While our estimated range may seem large, we note that even when TELRIC rates were estimated for the local loop by different US state regulators and thus in the same country using the same methodology, large differences were found even between states with similar population densities. For instance, Crandall and Sidak report estimates for Alabama and Washington (each with roughly 86 people per square mile) of US$11.33 and US$19.04 and note that "the large discrepancy in rates may reflect political factors that are not captured in the demographic or economic data or simply large errors in trying to estimate network costs".[109]

109 Crandall, R.W. and J.G. Sidak, "Should Regulators Set Rates to Terminate Calls on Mobile Networks?" in *Yale Journal on Regulation* (2004), p. 40.

6. CONCLUSION

In this section we summarise our findings and consider whether they would pass some "reality tests".

In our benchmarking exercise, we highlighted the appropriate cost drivers in the context of mobile termination rates and accounted for their differences across countries in as robust a manner as is possible on the basis of the available data. Specifically, we used PPP-adjusted 10-year average exchange rates and we concentrated on the differences in cost of capital, traffic volumes and proxies for geographic terrain (namely network coverage and base stations).[110]

Once the relevant adjustments are made, we obtained cost estimates between the range of 9.99 – 20.07cpm.

The ACCC Final Decision mentions the idea of "reality tests". In particular, the ACCC points out in its Final Decision (p. 232) that the cost estimates in CRA's May report do not satisfy some simple reality tests.

One of the ACCC's 'reality tests' focuses on CRA's 20.11 cpm estimate (which had been re-calculated for the UK).[111] The ACCC noted that since this is only slightly below what Optus is currently charging as its termination rate, the estimate is 'unrealistic.' However, this overlooks the fact that CRA's estimate of 20.11 cpm reflects all contributions to costs, including fixed and common costs, and it is thus not surprising that Optus finds this level operationally viable.

In ACCC's view, another 'reality test' that was not met (in ACCC's opinion) relates to overall interconnection costs. First, it should be noted that CRA's analysis has always focused on termination costs and not on origination costs (which are lower, especially if accounting for the network externality among the termination costs). Moreover, the total cost the ACCC refers to on page 232 of its Final Decision is an accounting cost related to a particular year, well known to be different from an economic cost. The difference is mainly driven by a different approach with regards the impact of the cost of capital and the calculation of depreciation: economic depreciation takes into account the fact that, for instance, handset subsidies should be discounted over several years since the effect will last until at least the medium run; a similar example would be marketing costs.

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110 That said, we have not dismissed any of the other potential cost drivers that we have identified and discussed in Section 3. Ideally, one should take into account all of the differences in supply conditions between countries. Such an 'ideal' exercise is neither possible nor practical because of data constraints or limitations. As we have explained earlier, focusing on the key cost drivers is an eminently reasonable (and defensible) approach so long as the choice of cost drivers, the differential adjustments that are made, and the underlying assumptions are transparent and unbiased.

111 CRA memorandum to Optus, *Mobile termination: international benchmarking*, 24 June 2004.

Another reality test suggested in the Final Decision is in relation to the level of retail prices. However, a country may have lower retail prices than another country if its retail mobile market is more competitive, even if underlying costs are similar or indeed higher in the first country.

It is unclear to us whether comparisons of international retail prices shed much (if any) light on cost structures across different jurisdictions. This is because market structures and market conditions in general can diverge fundamentally between countries. Specifically, if Australian market were more competitive than other markets, this would imply lower margins – differences in margins imply that little information on cost structures can be inferred by simply comparing international retail prices. Another potential difference is that between the structure of prices across services. An operator that charges low termination rates is likely to recoup its fixed and common costs over other retail services. This is also known as the "waterbed effect". As a result, choosing only one specific service and comparing its retail price level across countries is likely to overlook this effect.

To sum up, we believe that our range of cost estimates for mobile termination rates passes relevant 'reality tests'. We also believe that in the light of our updated and refined analysis, which takes into account ACCC's comments (on CRA's May report), our soundly adjusted cost-based estimates provide a useful basis to assist in the setting of mobile termination rates in Australia.