Final report for Telstra

Benchmarking Mobile Termination Access Service in Australia

Review of the methodology

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NETWORK STRATEGIES
• Telecommunications Strategy •

0 Executive summary

The Australian Competition and Consumer Commission (ACCC) has commissioned a benchmarking analysis to inform its draft decision for the final access determination (FAD) for price terms for declared mobile terminating access service (MTAS). The benchmark sample for Australian mobile voice termination and SMS services consisted of all those jurisdictions for which TSLRIC costing models were publicly available. Information from the cost models was used to adjust the results to better match Australian conditions.

This adjustment methodology requires the availability of mobile cost models for each of the sample jurisdictions, which greatly limits the size of the benchmark sample. The sample encompassed nine jurisdictions with all but one (Mexico) from Europe. Unlike other countries that have set rates using benchmarking – such as Estonia, Latvia, Lithuania and New Zealand – it is difficult to identify countries comparable to Australia with respect to mobile cost drivers. Hence some adjustments are required in order to derive a mobile termination rate suitable for Australia. An alternative adjustment approach would be a statistical model which aims to incorporate the key components of variation in mobile termination rates. This would require a larger sample, however with this approach it may be possible to relax the need for the availability of the original cost models.

On reviewing the relevant cost models, we found that the ACCC's consultants had not in all cases used the most recent available versions, and that some cost models were released over three years ago. We recommend that the most up-to-date versions of cost models be used for benchmarking as these reflect current demand profiles while results from older models are likely to be misleading in regard to a forward-looking benchmark rate. With respect to very dated models we recommend that the Commission either drop these from the sample or consider giving less weight to those results.

As the benchmark sample selection did not involve any criteria for comparability with Australian conditions, it is crucial that subsequent adjustments for country-specific factors are robust and defensible for this regulatory proceeding. We find that insufficient supporting analysis has been presented in the report to enable us to reproduce many values, including both the original benchmark values and the adjustments.

Furthermore we have identified a number of problems with the adjustments, including:

- incorrect currency conversion rates
- potential errors in the adjustments for spectrum fees
- out-of-date and invalid elasticity assumptions for the technology mix and WACC assumptions
- partial and possibly misleading adjustments for network scale
- highly subjective and unsupported adjustments for geographic terrain.

Potential adjustments not considered by the ACCC's consultants include:

- network size or coverage
- variations in common costs.

The report includes estimates of termination rates beyond 2015 that rely only on a single example – that of the UK. Such estimates are likely to be extremely unreliable, unless it is envisioned that Australian 4G deployment strategies and traffic profiles are expected to be similar to those of the UK. There has been no attempt to analyse results for this period from the other models to see how they compare with those from the UK model.

Given the methodological issues we identified, together with the lack of transparency regarding a number of calculations we conclude that the benchmark results may be unreliable and recommend that, at a minimum, further information be provided by the ACCC and its consultants to support the benchmark estimates.

As a sanity check we compared the ACCC's benchmark estimate for Australia (1.61 cents) with a larger sample of countries with cost-modelled LRIC-based mobile voice termination rates that are applied in 2015. Our sample reflects pure LRIC and LRIC+ (TSLRIC) rates for 30 countries (including the nine WIK benchmark countries). We found that the

benchmark estimate is just higher than the lower quartile of this sample and is below the lowest LRIC+ rate (Belgium). Given the differing nature of the mobile network environments – in particular the much greater coverage area in Australia – this does not appear to be a credible outcome for a LRIC+ benchmark suitable for Australia. Consequently we recommend that the ACCC revisits the assumptions used in the benchmarking analysis and addresses the methodological issues that we have identified.

Very few jurisdictions have imposed price controls for SMS termination. If the ACCC was to derive a benchmark rate for SMS termination it should consider establishing a sample that includes those jurisdictions with cost models that estimate the cost of SMS termination. With regards to the proposed methodology:

- the conveyance cost should be based on the mix of 2G and 3G SMS traffic, rather than the mix of voice traffic
- SMSC costs and financial parameters should be based on those of Australian operators rather than international benchmarks.

Benchmarking Mobile Termination Access Service in Australia

Final report for Telstra

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1 Introduction

The Australian Competition and Consumer Commission (ACCC) has recently released its draft decision for the final access determination (FAD) for price terms for declared mobile terminating access service (MTAS)[1]. This included rates for the mobile voice terminating access service and the SMS termination service, which were based on a benchmarking analysis conducted on behalf of the ACCC by WIK-Consult (WIK)[2].

This report is a review of the benchmarking analysis and methodology. Our review is based on the WIK report as well as a supplementary spreadsheet provided by the ACCC on 2 June 2015. This spreadsheet contained additional information relating to the benchmark data used in the WIK report.

Following this introduction, this report includes:

- discussion of the benchmark sample (Section 2)
- review of the adjustment methodology used for mobile voice termination (Section 3)
- review of the approach used for SMS termination (Section 4)
- our concluding remarks (Section 5).

In the Annex we compare the ACCC's draft benchmark estimate for mobile voice termination services with a wider sample of LRIC-based values derived using cost modelling.

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1 Australian Competition and Consumer Commission (2015), *Mobile Terminating Access Service: Final access determination – draft decision*, May 2015.

2 WIK-Consult (2015), *Benchmarks for the Cost of the Mobile Termination Access Service in Australia*, final report, 15 April 2015.

Although this report has been commissioned by Telstra, the views expressed here are entirely our own.

2 The benchmark sample

2.1 Selecting the sample

A benchmarking approach was used to derive the rate for mobile voice termination. The benchmark sample consisted of nine jurisdictions that had implemented TSLRIC pricing frameworks for mobile termination and for which the costing model was publicly available.

A number of other jurisdictions that use the TSLRIC methodology were rejected by WIK:

- the cost model was not publicly available (Austria, Bahrain, Belgium, Germany, Greece, Israel, Luxembourg, Malaysia, Turkey)
- the cost model did not include the assumptions and data used to calculate the termination rates (Lithuania and Slovakia)
- the cost of termination could not be determined by a TSLRIC-compatible method (France).

WIK required the jurisdiction to have a publicly available cost model, as certain information sourced from the models was required for its adjustment process, as well as for the approach used for the SMS termination rate. Furthermore, while most of the benchmark countries set termination rates based on pure LRIC, their cost models also estimate and allocate common costs to derive TSLRIC (LRIC+) results.

The selection of the sample is thus driven solely on the basis of the availability of a mobile cost model that can produce TSLRIC-compatible results. Selection is not based on any criteria that match Australian conditions, nor is the sample size large enough to minimise the effects of any sampling bias.

2.2 Models included within the sample

In the documentation provided by WIK, for each cost model the development year and a link for each country is specified.[3] However in some instances the reference presents multiple versions of the cost model, or the reference is updated with the most recently released version of the model. WIK provides no guidance as to the actual version that was used, so it is possible that our analysis may be based on a different model version than that used by WIK.

2.2.1 Denmark

WIK appears to have used the 2012 version of the Danish regulator's cost model (5.0vF). More recent versions are available on the Danish language part of the regulator's website. The most recent version[4] – 5.01 – was used to set prices for 2015.

We observe that the more recent model has very different demand forecasts to those of the earlier model – voice traffic is slightly higher (Exhibit 2.1), SMS traffic has fallen (Exhibit 2.2) and data traffic is several multiples higher (Exhibit 2.3). This will have major implications for the allocation of costs to voice termination.

3 WIK-Consult (2015), *Benchmarks for the Cost of the Mobile Termination Access Service in Australia*, final report, 15 April 2015, appendix.

4 See https://erhvervsstyrelsen.dk/afgoerelser-2014-0.

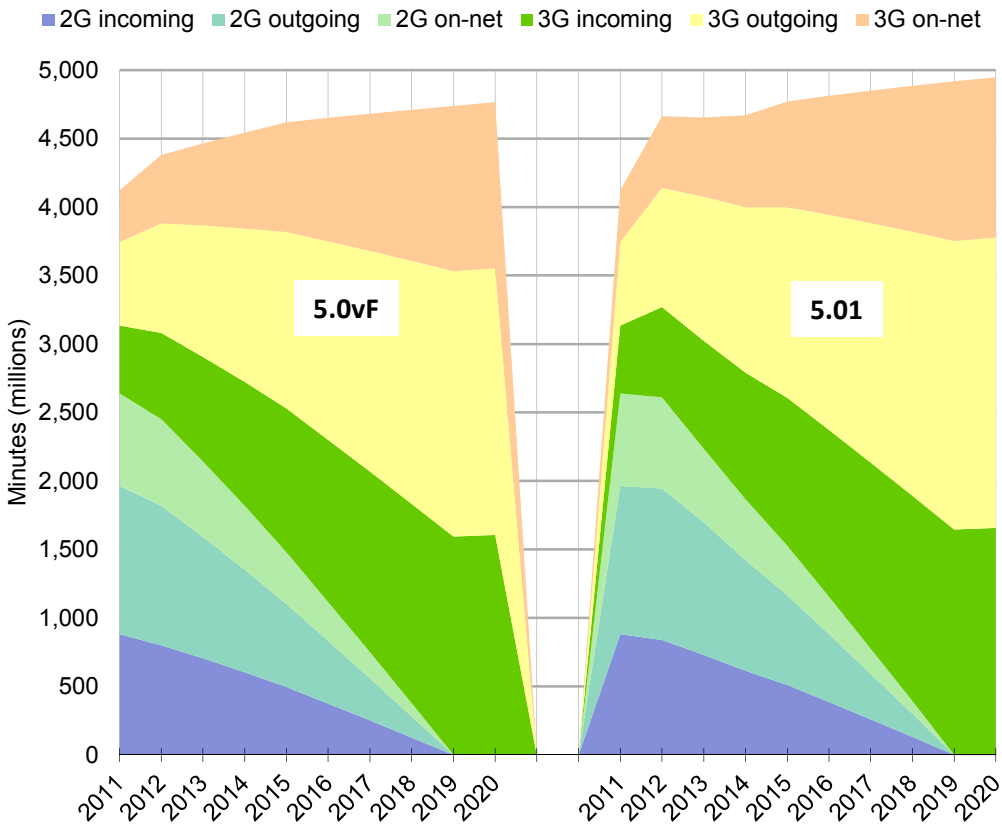

Exhibit 2.1: *Comparison of voice demand projections for versions 5.0vF and 5.01 of the Danish cost model [Source: DBA]*

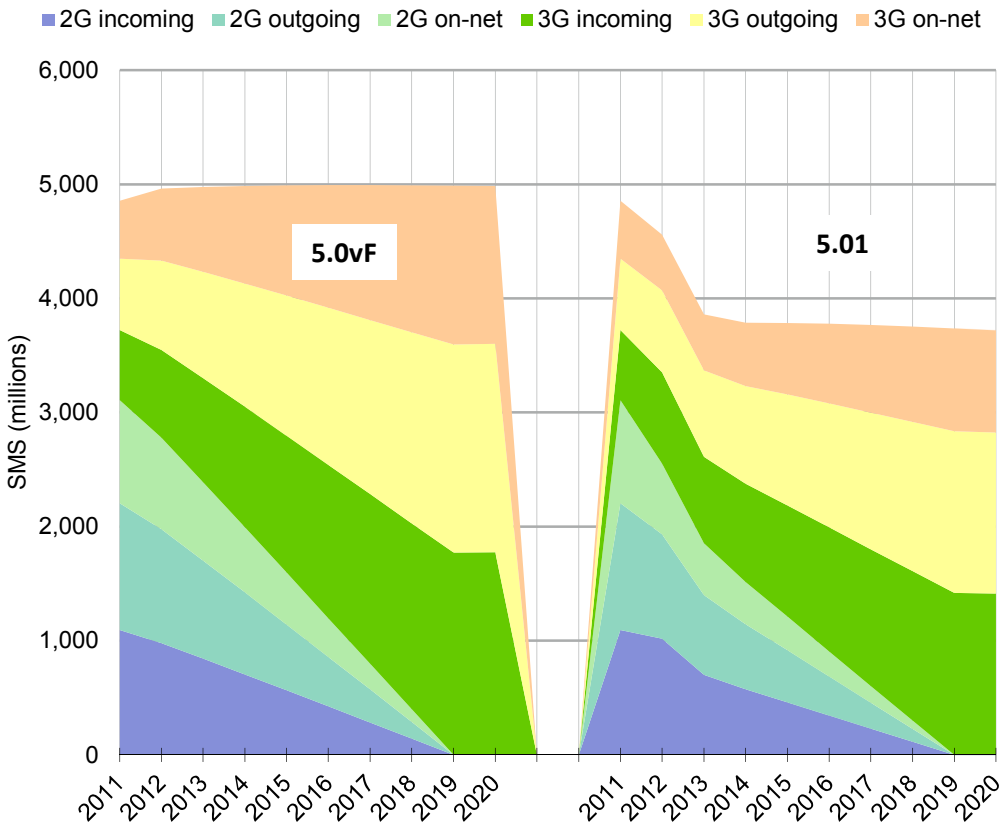

Exhibit 2.2: *Comparison of SMS demand projections for versions 5.0vF and 5.01 of the Danish cost model [Source: DBA]*

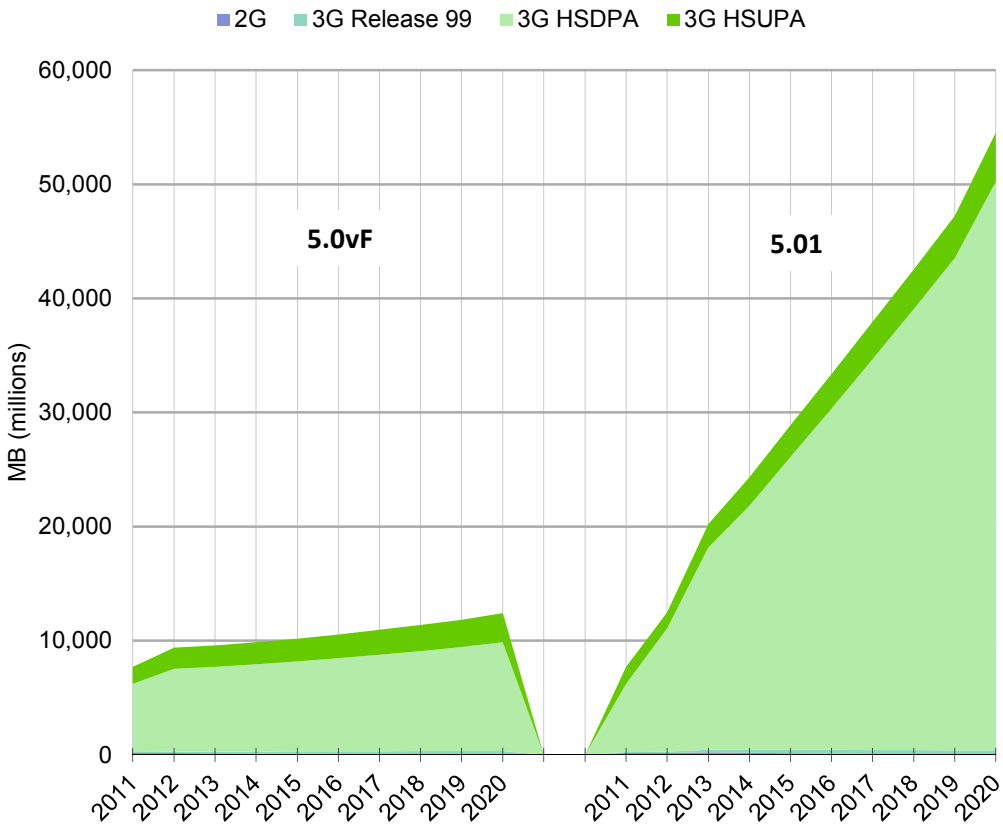

Exhibit 2.3: *Comparison of data demand projections for versions 5.0vF and 5.01 of the Danish cost model [Source: DBA]*

We would strongly recommend the more recent version of the Danish cost model be used for benchmarking. The 2012 version does not reflect current demand profiles and is thus likely to be misleading in regards to a forward-looking benchmark rate.

Both versions of the models perform the calculations based on real 2006 DKK. The results are presented in nominal terms, with the conversion based on an assumed inflation multiplier.

2.2.2 Mexico

The national regulatory authority in Mexico (Instituto Federal de Telecomunicaciones – IFT) commissioned Analysys Mason to develop a cost model for determining termination mobile prices for 2015.[5]

The model calculates the long-run incremental cost (LRIC) of providing mobile voice interconnection and SMS services for a 2G+3G network, and calculations are performed in real terms with 2013 as the base year. A bottom-up approach with scorched-node calibration was applied to model a mobile network with national coverage, using spectrum in the 850MHz and 1900MHz bands to provide 2G and 3G coverage, respectively.

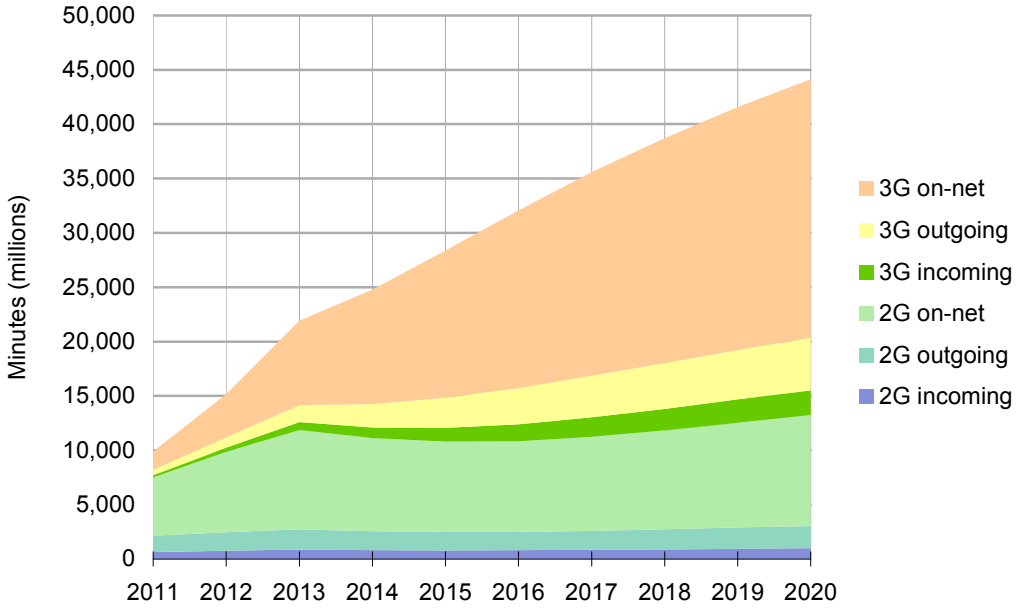

Exhibit 2.4: *Voice demand for Mexico, 2011 to 2020 [Source: IFT]*

5 IFT (2015), *Cost model for the determination of termination prices for year 2015*, available at http://portalanterior.ift.org.mx/iftweb/industria-2/unidad-de-prospectiva-y-regulacion/modelo-de-costos-utilizado-para-determinar-las-tarifas-de-interconexion-aplicables-al-ano-2015/.

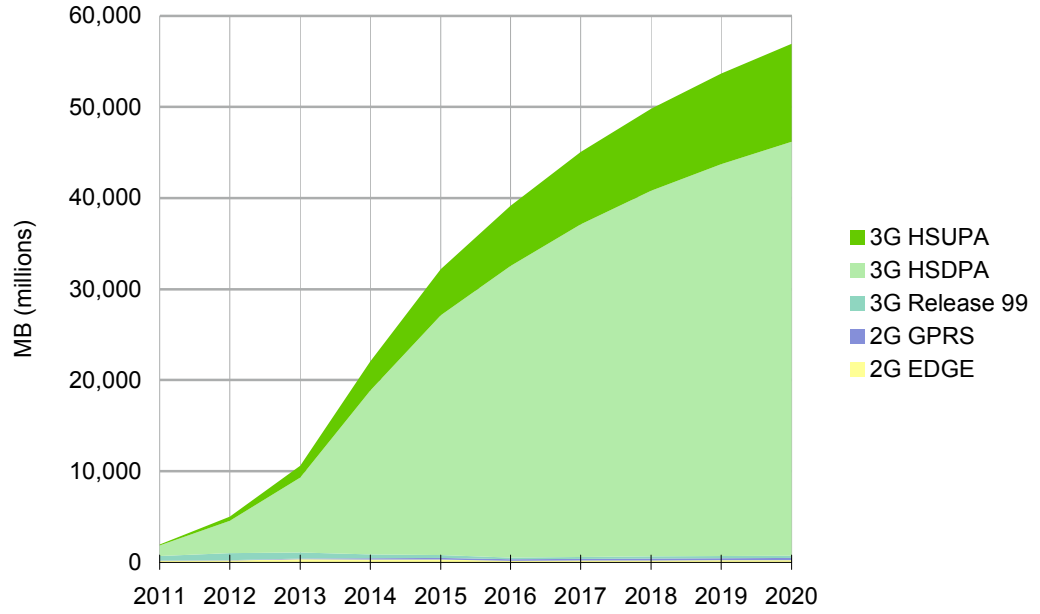

Exhibit 2.5: *Data demand for Mexico, 2011 to 2020 [Source: IFT]*

2.2.3 Netherlands

In 2013 Analysys Mason updated the Netherlands's wholesale fixed and mobile termination pricing models for the telecommunications regulator (Onafhankelijke Post en Telecommunicatie Autoriteit, OPTA).[6] The bottom-up models implement two costing standards, pure BULRIC and BULRIC plus, to estimate termination prices for a hypothetical existing operator.

Although 2009 is the base year for cost inputs and calculations, the mobile model presents both real and nominal results. The model assumes that the hypothetical existing operator has a market share of 33.3% and serves 2G and 3G traffic by using spectrum in 900MHz, 1800MHz and 2100MHz bands.

6 Analysys Mason (2013), BULRIC Model, available at https://www.acm.nl/nl/publicaties/publicatie/11645/Notificatie-ontwerpbesluit-marktanalyse-vaste-en-mobiele-gespreksafgifte-2013-2015/.

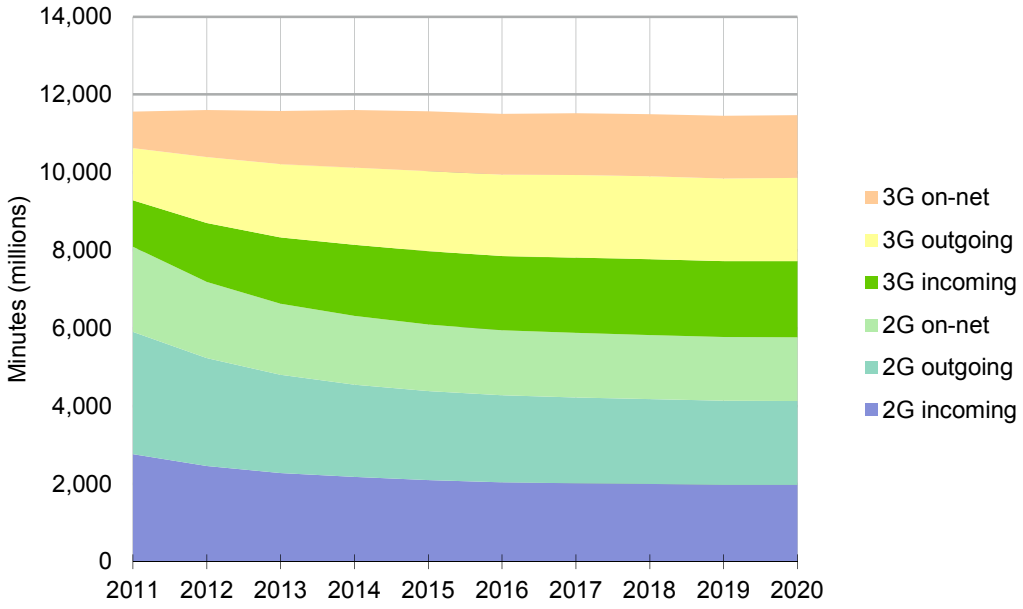

Exhibit 2.6: *Voice demand for the Netherlands, 2011 to 2020 [Source: OPTA]*

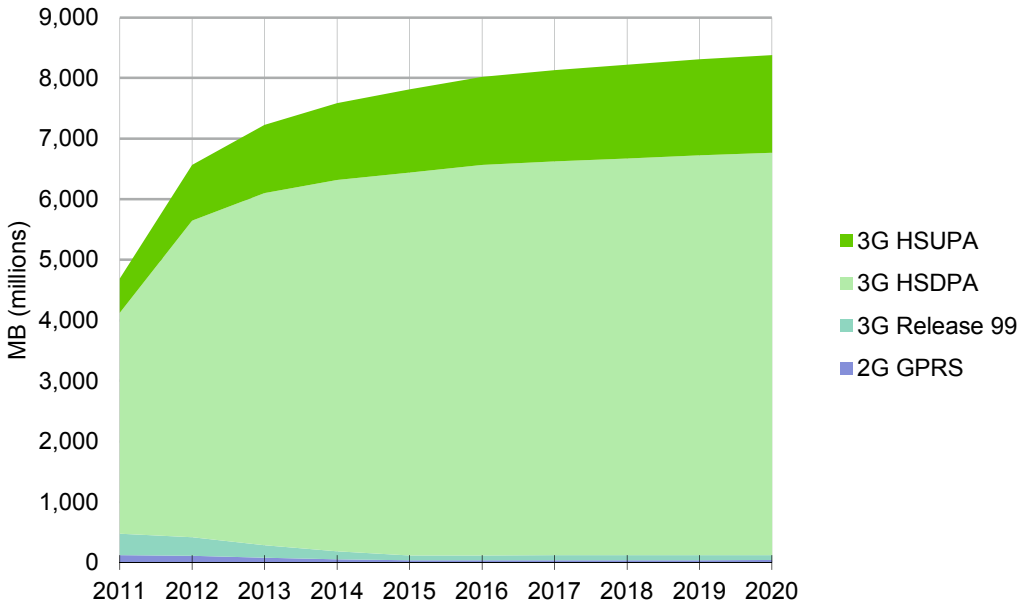

Exhibit 2.7: *Data demand for the Netherlands, 2011 to 2020 [Source: OPTA]*

2.2.4 Norway

WIK appears to have used the most recent version of the Norwegian cost model (v8.1). We note that WIK states that the year of development for the Norwegian model was 2013, however the latest version was updated in mid-2014.

The demand projections include 2G, 3G and 4G technologies (Exhibit 2.8 and Exhibit 2.9).

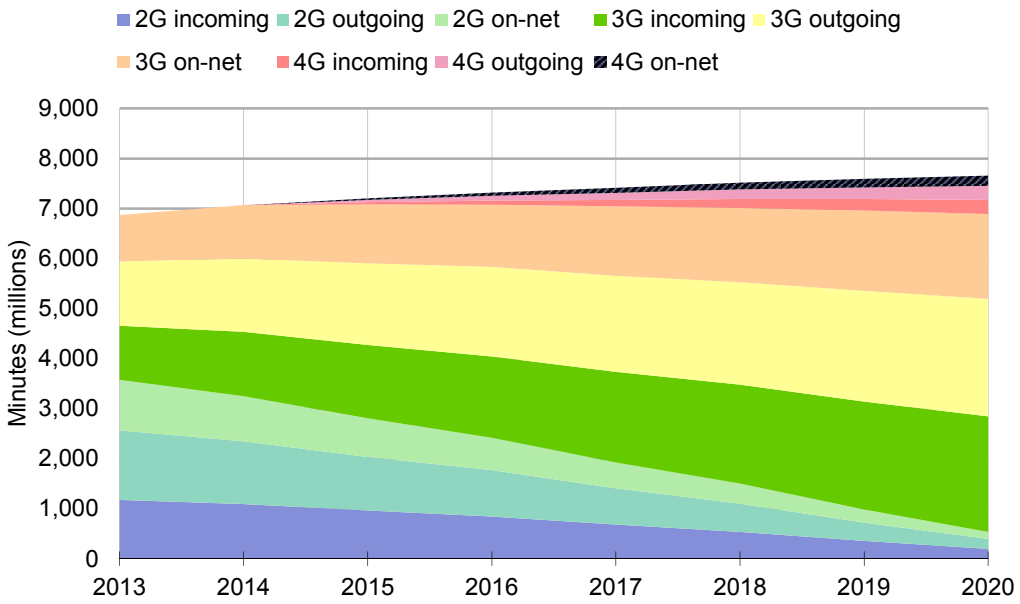

Exhibit 2.8: *Voice demand for Norway, 2013 to 2020 [Source: NKOM]*

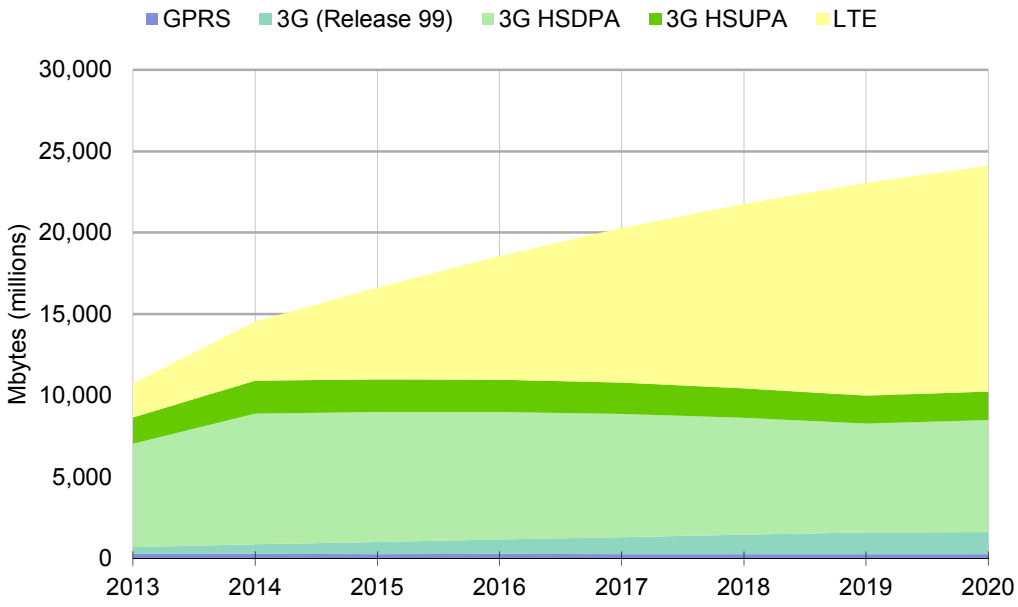

Exhibit 2.9: *Data demand for Norway, 2013 to 2020 [Source: NKOM]*

While the model calculations are performed in real 2005 NOK, the final results are presented in nominal terms, converted using an assumed inflation factor.

2.2.5 Portugal

As part of the 2012 mobile termination price determination, the Portuguese regulator ANACOM (Autoridade Nacional de Comunicações) commissioned Analysys Mason to develop a LRIC model for the purposes of establishing the cost of mobile voice termination in Portugal.[7]

A bottom-up approach was selected to model a 2G+3G network with outdoor and indoor coverage, and a scorched-node calibration was applied to radio sites, BTS and NodeB. The model calculates two increments: 'pure' LRIC and Long-Run Average Incremental Cost

7 ANACOM (2012), *Termination rates on mobile networks*, available at http://www.anacom.pt/render.jsp?contentId=1125693&languageId=1#.VVwPb4yN3RY

Plus (LRAIC+). Pure LRIC was used for the regulated rate. Calculations are performed in real terms with 2011 as the base year.

More recently, in April 2015, ANACOM engaged Analysys Mason to update the model developed for the 2012 price determination with the aim of determining mobile termination rates for the next regulatory process.[8] The proposed model – the draft version of which is undergoing a public consultation process – retains the modelling principles of the 2012 model with the addition of 4G network and services.

In contrast to the voice demand projections in the 2012 version of the model, which shows 2G / 3G traffic constantly increasing, the more recent preliminary version of the model presents a forecast of declining 2G / 3G traffic from 2016 onwards (Exhibit 2.10) The forecast for 4G traffic suggests that part of the decline on 2G / 3G voice minutes is due to a migration of traffic to the 4G network. In the case of data traffic both models have similar forecasts for 3G data. The preliminary 2015 model incorporates 4G data projections which for year 2020 quadruple the total 3G data traffic (Exhibit 2.15). These differences and the incorporation of 4G traffic will have major implications for the allocation of costs to voice termination and data.

8 ANACOM (2015), Consultation on Wholesale markets of voice call termination on individual mobile networks - market analysis and costing model (obligation to control prices), available at http://www.anacom.pt/render.jsp?contentId=1354357&languageId=1#.VVwO6fmyTRY.

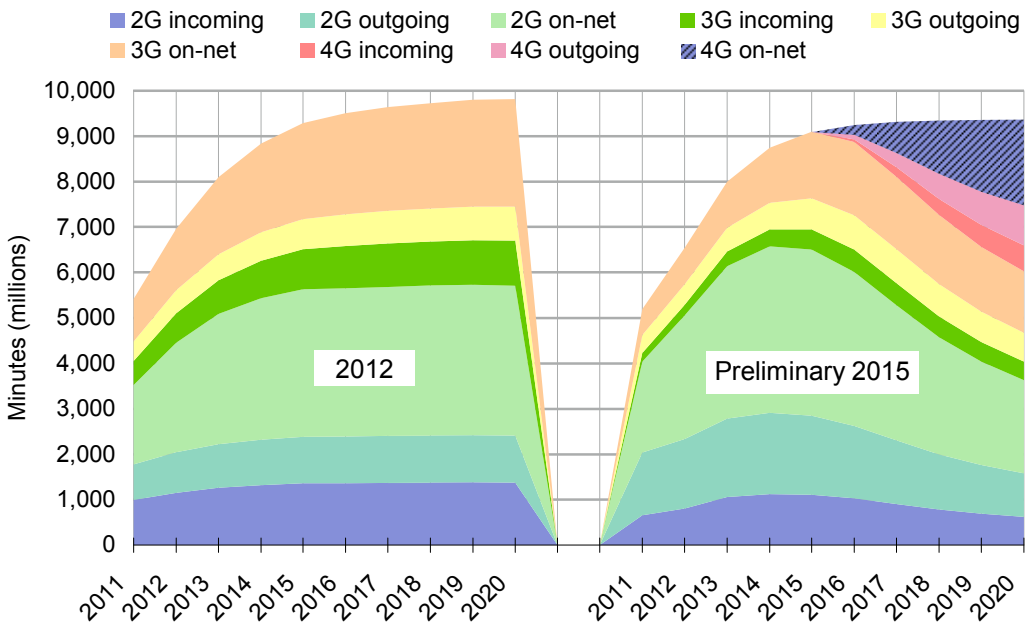

Exhibit 2.10: *Comparison of voice demand projections for the 2012 and preliminary 2015 versions of the Portuguese cost model [Source: ANACOM]*

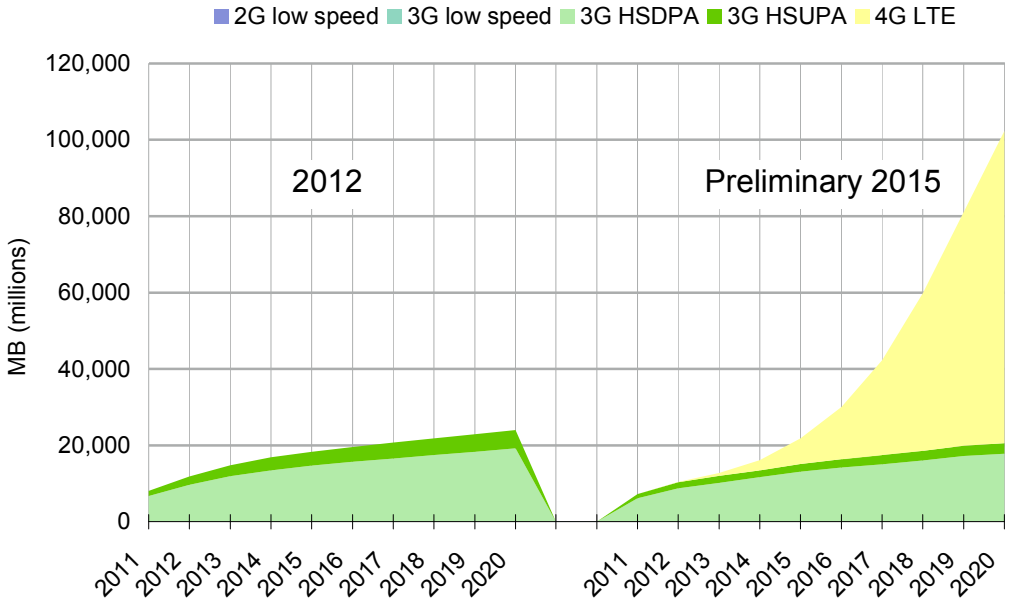

Exhibit 2.11: *Comparison of data demand projections for the 2012 and preliminary 2015 versions of the Portuguese cost model [Source: ANACOM]*

2.2.6 Romania

In 2013 TERA Consultants developed a model for the Romanian National Authority for Management and Regulation in Communications (ANCOM) to regulate wholesale services by setting efficient cost-oriented tariffs.[9] The model for mobile call termination tariffs is a bottom-up cost model (in accordance with the 2009 European Commission Recommendation) and implements two cost standards – pure LRIC and LRIC+.

The mobile model's cost inputs and calculations are performed in nominal values. Although the model can implement scenarios for specific operators (Orange, Vodafone, Cosmote, RCS&RDS), the final costs are calculated for a generic operator scenario.[10] The generic operator is assumed to have a market share of 25% of 2G and 3G subscribers and traffic and a total of 35MHz[11] of spectrum in the 900MHz, 1800MHz and 2100MHz bands.

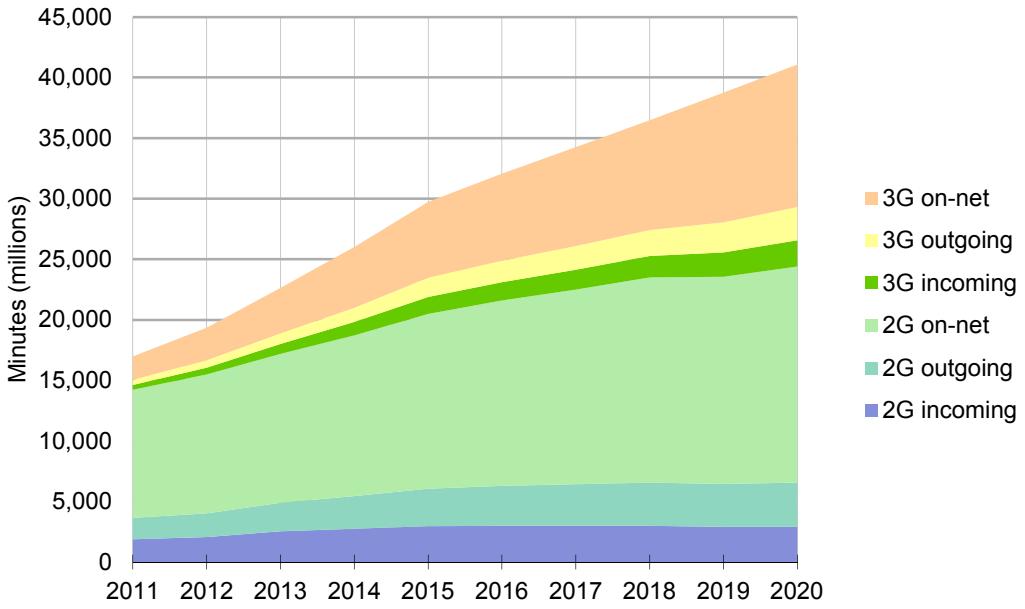

Exhibit 2.12: *Voice demand for Romania, 2011 to 2020 [Source: ANCOM]*

9 TERA Consultants (2013), Calculation of the costs of efficient provision for some electronic communications services provided at the wholesale level in Romania: Pricing Documentation, available at http://www.ancom.org.ro/en/lric-2011-2013_4348.

10 TERA Consultants (2013), Calculation of the costs of efficient provision for some electronic communications services provided at the wholesale level in Romania: Mobile Model Documentation, available at http://www.ancom.org.ro/en/lric-2011-2013_4348.

11 2×10MHz in the 900MHz and 1800MHz bands and 2×15MHz in the 2100MHz band.

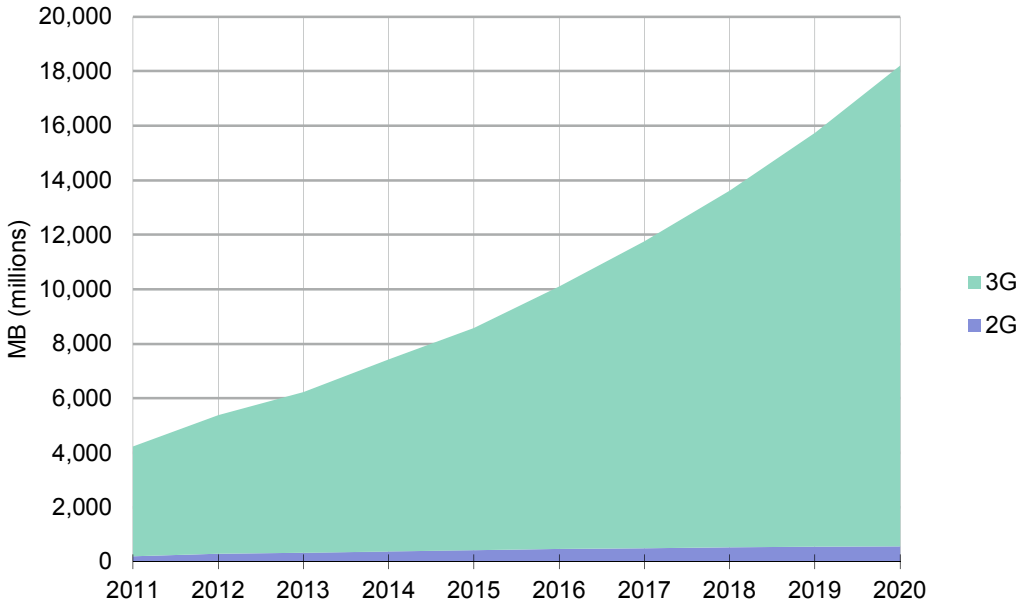

Exhibit 2.13: *Data demand for Romania, 2011 to 2020 [Source: ANCOM]*

2.2.7 Spain

In December 2011 the Spanish Comisión Nacional de los Mercados y la Competencia (CNMC) commenced a public consultation relating to the pricing principles and indicative prices for mobile termination rates. For this purpose, the CNMC commissioned an external consultant (SVP Advisors) to develop a cost model to estimate the price of the declared services.[12]

The final version of the model was released in February 2012, and uses a bottom-up approach to dimension a 2G+3G+4G network based on GSM (including GPRS and EDGE), UMTS (including HSPA) and LTE. Spectrum in the 900MHz, 1800MHz and 2100MHz bands was used in the modelling of the network.

12 CNMC (2012), *Market of mobile voice termination services,* available at http://www.cnmc.es/es-es/telecomunicacionesysaudiovisuales/regulaci%C3%B3n/an%C3%A1lisisdemercados/an%C3%A1lisisdemercados-revisi%C3%B3n2013.aspx

The model calculates the LRIC and LRAIC cost of providing mobile voice termination services however, as in the case of Mexico and Portugal, the final price determination was based on the pure LRIC results.

No more recent version of the model is currently available. Demand forecasts do not therefore take into account the dramatic changes in mobile traffic that have been experienced by operators over the past few years. Voice traffic assumes modest growth over the period to 2020 (Exhibit 2.14), but the data traffic demand does not reflect the exponential growth we expect to see in current demand projections (Exhibit 2.15). In fact, data traffic in 2015 is projected to be 1.9 times that in 2012 with a declining growth rate over the period 2012 to 2020. Note that the default scenario does not include LTE data traffic. It is possible to compare the demand projections with data on actual traffic volumes subsequently released by the CNMC.[13] In 2013 (the most recent year currently available) the annual growth in total mobile data traffic across all operators was 37.9% – significantly higher than the 26.7% projected growth for the same year in the CNMC's model. We would now view these projections as being extremely conservative.

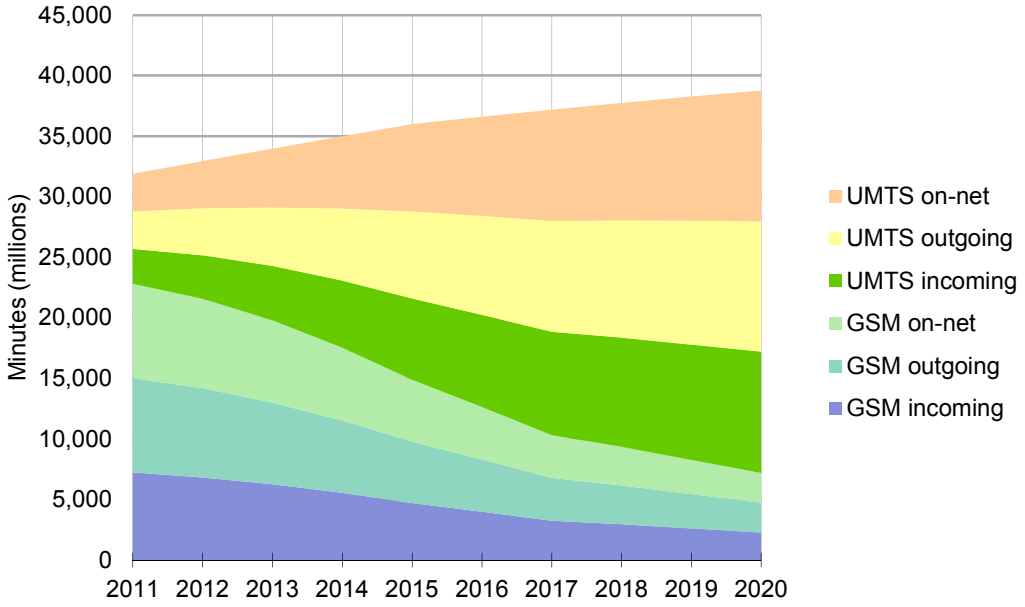

Exhibit 2.14: *Voice traffic demand for Spain – default scenario [Source: CNMC]*

13 CNMC (2015), *Informe Anual 2014*. Available at http://data.cnmc.es/datagraph/jsp/inf_anual.jsp.

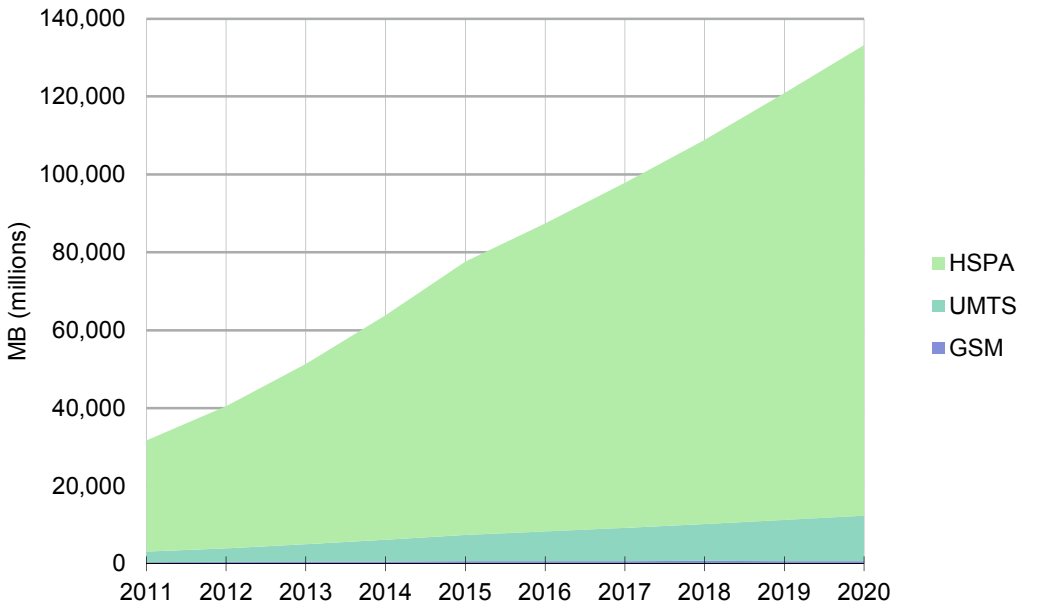

Exhibit 2.15: *Data traffic demand – default scenario [Source: CNMC]*

2.2.8 Sweden

We assume that WIK has used the 2014 version of the model that is applicable to the current mobile termination rates in Sweden. These rates were effective as from 1 July 2014.

A more recent 2015 version of the Swedish cost model has also been released, however this has recently undergone a consultation process and no final version has yet been released. The final recommendation is expected to be released in July 2015.

Note that both models are in real 2010 SEK. Although the models also include assumed inflation multipliers, the results are only presented in real terms.

Both models include three operator scenarios: Generic GSM (2G), Generic UMTS (3G) and Generic integrated (a mix of 2G, 3G and LTE). The default scenario appears to be Generic UMTS, however WIK is likely to have used the Generic integrated scenario in its analysis in order to obtain the separate 2G and 3G results.

There have been only relatively small changes to the demand projections in the more recent preliminary version of the model: for the year 2015 both voice (Exhibit 2.16) and data traffic (Exhibit 2.17) have increased slightly. It should be noted that the Swedish model is updated annually and used to set prices only for the following year – it is therefore less crucial that demand projections for subsequent years reflect anticipated growth trends. We would therefore expect that the demand projections of both models for 2015 would be reasonable reflections of market trends for that year.

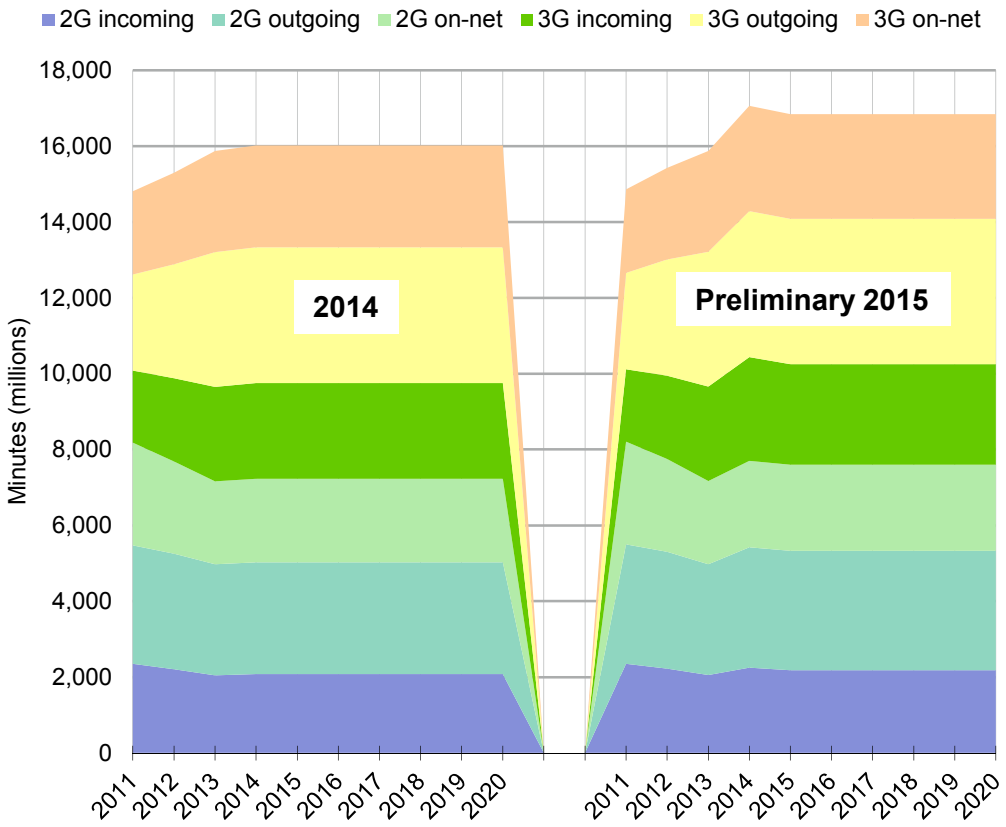

Exhibit 2.16: *Comparison of voice demand projections for the 2014 and preliminary 2015 versions of the Swedish cost model, Generic integrated scenario [Source: PTS]*

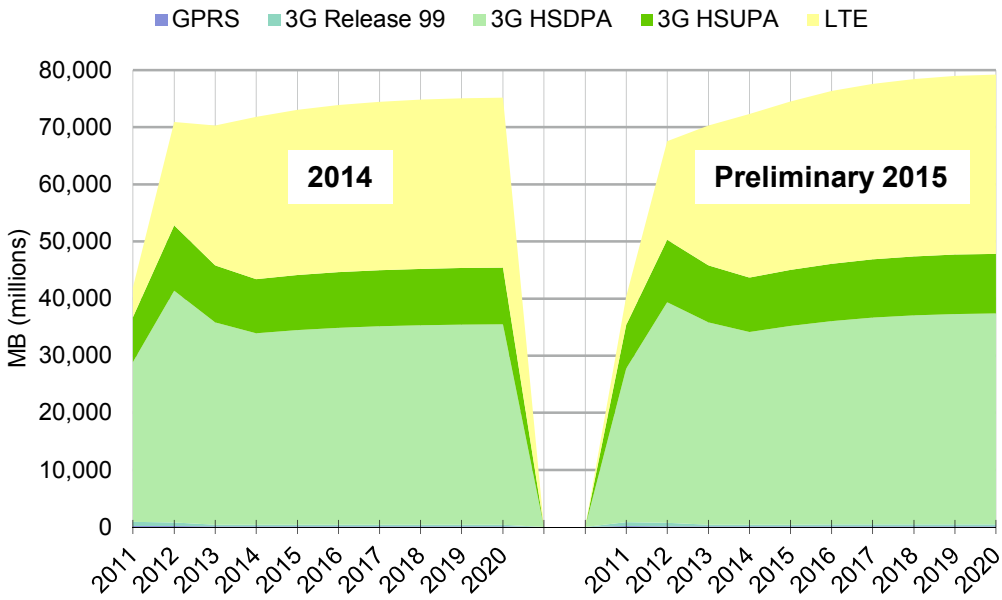

Exhibit 2.17: *Comparison of data demand projections for the 2014 and preliminary 2015 versions of the Swedish cost model, Generic integrated scenario [Source: PTS]*

2.2.9 United Kingdom

In 2014 Analysys Mason updated the mobile network cost model for the UK communications regulator, Ofcom.[14] This model was released for consultation and the final version was published in 2015. The 2015 version has been used to determine the mobile termination rates for 2015-18.[15] However WIK's benchmark values appear to be based on an earlier 2014 version. Note that the results of the two versions differ.

In the later version, traffic demand has changed from the 2014 version. Voice traffic is slightly lower and 2G voice is a higher proportion of total voice traffic (Exhibit 2.18). Data traffic is lower (Exhibit 2.19).

14 Ofcom (2015), Mobile call termination market review 2015-18, available at http://stakeholders.ofcom.org.uk/consultations/mobile-call-termination-14/.

15 Ofcom (2015), Mobile call termination market review 2015-18 – Final statement, available at http://stakeholders.ofcom.org.uk/consultations/mobile-call-termination-14/statement/.

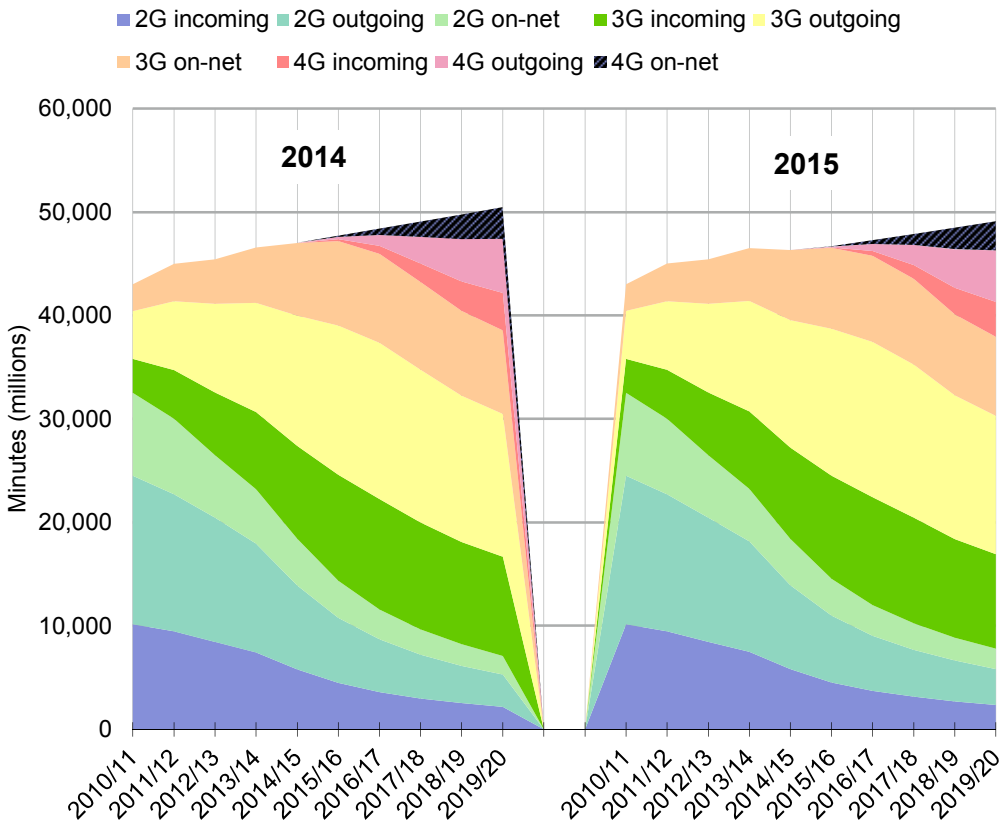

Exhibit 2.18: *Voice demand for the UK, 2010/11 to 2019/20 [Source: Ofcom]*

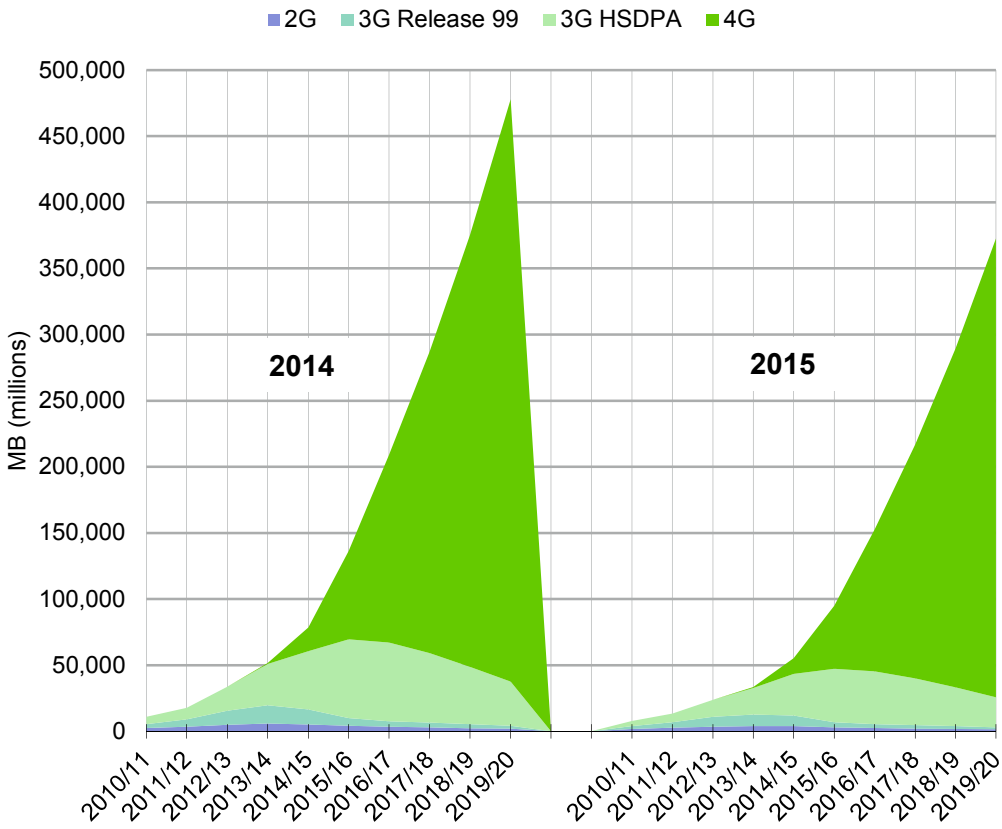

Exhibit 2.19: *Data demand for the UK, 2010/11 to 2019/20 [Source: Ofcom]*

We would therefore recommend that the 2015 version of the UK model be used as this is likely to include a more up-to-date projection of demand.

The 2015 bottom-up model determines termination rates for a mobile communications provider (MCP) providing services to 2G, 3G and 4G subscribers. It is assumed that the MCP serves 2G and 3G traffic using spectrum in the 1800MHz and 2100MHz bands. Two cost standards – pure LRIC and LRIC+ – are implemented in the model and the calculations are performed in real terms with 2013 as the base year.

2.3 Are there any other suitable jurisdictions?

We have not been able to identify any other jurisdictions that have publicly available TSLRIC cost models. We have checked the approach used for mobile termination in a number of other countries:

- cost model is available, but produces only pure LRIC results (that is, without common costs): France
- cost model is available but all data has been removed: Czech Republic, Poland, Slovakia
- cost model is not available: Belgium, Croatia, Cyprus, Hungary, Israel, Italy, Luxembourg, Malaysia, Malta, Slovenia, Turkey
- latest mobile termination rates are set using an alternative approach
  - fully allocated cost model: Finland
  - benchmarking: Estonia, Iceland, Latvia, Lithuania

One possibility for increasing the size of the benchmarking sample is to include pure LRIC results with an assumed mark-up for common costs. Indeed an adjustment for differing levels of common costs could be applied to all the benchmark estimates. Note that any such mark-up should ideally reflect the common costs applicable to Australian operators rather than a benchmark value from other jurisdictions.

2.4 Summary

We recommend that the most up-to-date versions of cost models be used for benchmarking as these reflect current demand profiles while results from older models are likely to be misleading in regard to a forward-looking benchmark rate. In particular we note:

- **Denmark and the UK**: more recent versions of the cost models are already available and as such benchmark values should be based on these versions
- **Portugal and Sweden**: new interim model versions are currently under consultation, and so prior to completing the benchmarking analysis the ACCC should check to see if final versions are available for use

- **Spain**: consider either omitting from the sample or assigning a lower weight to the results as the cost model is extremely outdated.

3 Mobile voice termination

3.1 Overview

The ACCC's terms of reference specified that the data used to derive a benchmark estimate for mobile termination should be cost-based rather than the termination rates adopted in regulatory decisions. This will ensure that the rates exclude any non-cost adjustments – such as glide paths – applied by the regulators.

The terms of reference also require the outputs from the cost models to be adjusted to take into account country-specific factors that may affect the cost of mobile termination in Australia.

Consequently WIK applied a series of adjustments to the cost model outputs, encompassing:

- currency conversion
- spectrum fees
- technology mix
- weighted average cost of capital (WACC)
- network usage
- geographic terrain.

3.2 Original benchmark values

WIK presents the original benchmark values in local currency and 'calculated for the year 2015'. We have reviewed the benchmark models and found that in several cases – such as the Swedish model – the results are expressed only in real terms rather than nominal terms (Exhibit 3.3). Such models may also include an inflation multiplier so it is therefore possible to convert real rates to nominal rates.

Country	*Currency*	*WIK 2015 voice termination cost (nominal)*	*Network Strategies findings*	*Notes*
Denmark	DKK øre	9.069	9.069	DKK øre, nominal (2012 model)
			7.949	DKK øre, nominal (2015 model)
Mexico	USD cent	1.727[1]	1.159[3]	USD cent, real 2013
Netherlands	EUR cent	1.844	1.844	EUR cent, nominal
Norway	NOK øre	15.882	15.882	NOK øre, nominal
Portugal	EUR cent	1.925	1.817	EUR cent, real 2011
Romania	EUR cent	1.166	1.166	EUR cent, nominal
Spain	EUR cent	1.417[2]	0.748[3]	EUR cent, nominal
Sweden	SEK öre	12.210	11.406[4]	SEK öre, real 2010
UK	GBP pence	1.129	1.086	GBP pence, real 2013 (2014 model)
			0.973	GBP pence, real 2013 (2015 model)

1 LRAIC+ results.

2 LRIC+ results.

3 Pure LRIC results.

4 Generic integrated operator scenario.

Exhibit 3.1: *Original benchmark values as contained in the models [Source: WIK, Network Strategies]*

We then converted real rates to nominal terms, using the assumed inflation multipliers contained in the models. In some instances we have not been able to reproduce WIK's value (Exhibit 3.2).

Country	*Currency*	*WIK 2015 voice termination cost (nominal)*	*Network Strategies 2015 voice termination cost (nominal)*
Denmark	DKK øre	9.069	(2012 model) 9.069 (2015 model) 7.949
Mexico	USD cent	1.727[1]	1.249[3]
Netherlands	EUR cent	1.844	1.844
Norway	NOK øre	15.882	15.882
Portugal	EUR cent	1.925	1.925
Romania	EUR cent	1.166	1.166
Spain	EUR cent	1.417[2]	0.748[3]
Sweden	SEK öre	12.210	12.222
UK	GBP pence	1.129	(2014 model) 1.129

1 LRAIC+ results

2 LRIC+ results

3 Pure LRIC results

Exhibit 3.2: *Comparison of 2015 nominal benchmark values [Source: WIK, Network Strategies]*

In the case of Mexico and Spain the results presented by WIK are for LRAIC+ and LRIC+ calculations, respectively. While both models include pure LRIC and LRAIC+ / LRIC+ calculations, only pure LRIC results are presented in the model and obtaining the LRAIC+ / LRIC+ results is not straightforward.

3.3 Currency conversion

Selecting an appropriate method

Benchmarking requires conversion of local currencies into a common unit of currency. WIK has applied an equally weighted combination of Purchasing Power Parity (PPP) exchange rates and average market exchange rates over a ten year period. WIK justifies this 'blended' or hybrid approach on the grounds that:

- some mobile network assets are purchased in international markets implying that nominal exchange rates are relevant
- some mobile network-related costs are locally sourced implying that PPP rates are relevant since 'Australia is one of the more expensive countries in terms of PPP'.

As evidence of the acceptability of the approach WIK cites the New Zealand Commerce Commission which it advised on the issue in the 2011 MTAS proceedings in New Zealand. However it should be noted that the Commerce Commission has not consistently applied such an approach. For example, the hybrid approach is inconsistent with that used by the Commission in its 2006 MTAS investigation in which ten year average spot rates were applied[16].

It is also notable that, apart from the ACCC in this current proceeding, to our knowledge no other regulator has followed the Commerce Commission's precedent in adopting a hybrid exchange rate for currency conversion in benchmarking exercises. In regulatory benchmarking currencies are typically converted to the local currency using either current market exchange rates (or an average over a period of time) or PPP rates, but not a combination of market exchange rates and PPP rates.

We believe the origin of this approach was its application by the consultants Ovum when benchmarking wholesale interconnection rates in South America in circumstances where exchanges rates fluctuated considerably. However Ovum does not consistently and solely apply this unusual approach. The ACCC presented comparative rates from Ovum for unconditioned local loop service (ULLS) monthly charges in its 2008 draft that had been converted to Australian dollars using two currency conversion methods: 'PPP', and 'no PPP' (market exchange rates)[17]. We note that Ovum subsequently produced a report containing ULLS benchmarks using its blended approach for currency conversion. It was not surprising that the results differed to the earlier results. This simply highlights the sensitivity of benchmarking results to the currency conversion method, and hence it is essential that the appropriate approach is applied.

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16 Commerce Commission (2006), *Reconsideration Final Report on whether mobile termination should become a designated or specified service*, 21 April 2006.

17 Australian Competition and Consumer Commission (2008), *Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking, draft decision,* November 2008. See page 42.

So what is the appropriate currency conversion method for benchmarking the cost of mobile termination? PPP is the ratio of the costs of a basket of goods in two countries each calculated in their own currency units. These costs reflect labour and other input costs, profit margins, indirect taxes and also, indirectly, capital costs. Hence in applying PPP rates we convert the benchmark rates to a common currency unit, and at the same, adjust for average cost differences between countries. On the other hand, market exchange rates are quite different as they are subject to volatile capital movements, bearing little or no relation to relative prices or relative inflation rates. As such they cannot adequately adjust for cost differences between countries, as typically they diverge substantially from a level which would equalise prices in a common currency.

WIK may argue that it has addressed this issue or market exchange rate volatility by averaging over a ten year time horizon, but there is a fundamental flaw in its recommended approach. There is no theoretical justification for blending market exchange rates with PPP rates. In attempting to adjust across countries for mobile network input costs WIK has double-counted. The relevant adjustments are already captured in the PPP conversion.

In applying the blended approach we infer that WIK is attempting both to adjust for different currencies and to adjust for different mobile termination input costs. However in using PPP as a means of adjusting for different currencies, we are at the same time capturing:

- different wage levels between countries
- different equipment prices between countries
- varying capital charges.

Furthermore WIK's approach is logically inconsistent. Goods that are internationally traded by one country may in fact be purchased domestically within another country. In this case the implication of WIK's approach is that weightings would need to be adjusted for each country in the benchmark sample.

We conclude that PPP rates alone are necessary and sufficient for currency conversion for benchmarking MTAS. PPP rates address inter-country price level differences whereas market exchange rates do not. We recommend that the ACCC applies PPP rates as the method of currency conversion in its benchmarking exercise.

WIK's calculations

From Table 4-2 it appears that the following steps were taken by WIK to derive its blended exchange rate:

- estimate the average ten-year exchange rate using data from the Reserve Bank of Australia (2015) and XE (2015) (column 3 of Table 4-2)
- source PPP rates from the World Bank (2015) – (column 4 of Table 4-2)
- adjust average ten-year exchange rates by multiplying these by PPP rates – (column 5 of Table 4-2)
- take the mean of the average ten-year exchange rates and the adjusted exchange rates to calculate the blended rate – (column 6 of Table 4-2).

As World Bank PPP rates for 2015 are not available yet, the source of WIK's 2015 PPP rates is unclear. The latest available World Bank PPP rates are for 2013, and these do not match with the rates presented by WIK (Exhibit 3.3)[18]. It is also unclear what time period was used for ten-year rates or if daily or monthly data was used to derive the average over the period.

	PPP rates (USD 2013)	*PPP rates (LCU:AUD)*	*PPP rates (AUD:LCU)*	*WIK PPP rate*
Australia	1.5221	1.0000	1.0000	
Denmark	7.6734	5.0414	0.1984	1.231
Mexico	8.0420	5.2835	0.1893	2.667
Netherlands	0.8287	0.5444	1.8367	1.455
Norway	9.2038	6.0468	0.1654	1.067
Portugal	0.5888	0.3869	2.5849	2.000
Romania	1.6646	1.0936	0.9144	3.200
Spain	0.6801	0.4468	2.2382	1.778
Sweden	8.8073	5.7863	0.1728	1.231
United Kingdom	0.6985	0.4589	2.1790	1.455
United States	1.0000	0.6570	1.5221	–

Exhibit 3.3: *PPP exchange rates [Source: World Bank 2013]*

18 We used the World Bank data series PPP conversion factor, GDP (LCU per international $).

Furthermore, we see no point in multiplying average ten-year exchange rates by PPP rates to adjust the exchange rate for PPP, as WIK has done.

If a blended approach it to be used (which we do not recommend), the correct approach is:

- multiply the benchmark in the local currency by the PPP rate to derive the benchmark value in Australian currency using PPP exchange rates
- multiply the benchmark in the local currency by the average ten year exchange rate to derive the value in Australian currency using market exchange rates
- take the mean of the two benchmark values to calculate the blended rate.

If we correct both WIK's approach and the PPP data then the average benchmark is 2.581 Australian cents rather than WIK's 3.137 cents for the blended rate (Exhibit 3.4).[19]

We also calculated the benchmark results using our own data for average ten-year market exchange rates[20] and obtained 2.280 Australian cents rather than WIK's 2.302 cents. This is a much smaller difference than the results for the blended rates, as we obtained very similar values to WIK from our estimation of average ten year market exchange rates.

Using PPP rates alone, as we recommend, yields 2.883 cents.

19 Note that the Mexican cost model is in USD. The resultant rates are converted to local currency as a final step. We have therefore calculated the rate based on PPP by converting the USD rate to Mexican pesos (MXN) using the annual average market exchange rate for 2014 and then applying the Mexican PPP rate.

20 Daily market exchange rates were for the period 1 January 2005 to 31 December 2014 and were sourced from the Reserve Bank of Australia (EUR, GBP and USB) and Oanda (remaining currencies).

	PPP (Network Strategies)	*Market rates (Network Strategies)*	*Market rates (WIK)*	*Blended rate (Network Strategies)*	*Blended rate (WIK)*
Denmark	1.799	1.840	1.894	1.819	2.113
Mexico	4.347	1.950	1.947	3.148	3.569
Netherlands	3.387	2.786	2.786	3.087	3.420
Norway	2.627	2.997	3.137	2.812	3.241
Portugal	4.976	2.909	2.908	3.942	4.362
Romania	1.066	1.762	1.762	1.414	3.699
Spain	3.171	2.141	2.141	2.656	2.973
Sweden	2.110	1.995	1.999	2.052	2.230
United Kingdom	2.460	2.143	2.141	2.301	2.627
Average	2.883	2.280	2.303	2.581	3.137

Exhibit 3.4: *Benchmark results [Source: Network Strategies, WIK]*

We conclude that the benchmark values obtained by WIK following its currency conversion are unreliable as the PPP data is unsupported by any evidence and the adjustment method is incorrect.

Note that although we disagree with WIK's currency conversion, in our analysis of the subsequent adjustments we have used WIK's converted benchmarks in order to explore the effects of each adjustment rather than the combined effect of a change in the conversion rate together with the individual adjustment.

3.4 Spectrum fees

WIK applies an adjustment to account for differences in spectrum fees – this is one of the larger adjustments made to the benchmarks.

Spectrum used for mobile telecommunication is typically obtained via a competitive process, such as a spectrum auction. Mobile networks typically reflect the characteristics of the local environment, which in turn influence the valuation of the spectrum, and the price paid by operators. These characteristics include:

- subscriber distribution and traffic density
- mix of urban, suburban and rural areas
- coverage area
- terrain
- traffic levels
- the amount of spectrum available.

Furthermore, the value placed on spectrum by operators is affected by the different propagation characteristics of the different bands. As an illustration, the 2010 multi-band spectrum auction in Germany achieved very different prices for similar lot sizes across the different bands (Exhibit 3.5), indicating that price drivers may differ from band to band.

Band	*Lot size*	*Number of lots*	*Minimum price per lot (EUR, millions)*	*Maximum price per lot (EUR, millions)*
800MHz	2 × 5MHz	6	570.8	627.3
1800MHz	2 × 5MHz	5	19.9	21.6
2000MHz	2 × 4.95MHz	4	66.9	103.3
2000MHz	5MHz (unpaired)	1	5.7	5.7
2000MHz	14.2MHz (unpaired)	1	5.7	5.7
2600MHz	2 × 5MHz	14	17.36	19.1
2600MHz	5MHz (unpaired)	10	8.2	9.1

Exhibit 3.5: *Summary results of the 2010 German auction for selected spectrum bands [Source: Bundesnetzagentur]*

There are a number of other factors which could influence the price paid for spectrum. These may include (but not be restricted to):

- short- or medium-term economic conditions which may affect the ability (or desire) of players to invest at a particular time
- conditions being placed upon the spectrum licences – as one example, in the United States the FCC imposed conditions for a public-private partnership to create a national

public safety broadband network on D Block in the 2008 700MHz spectrum auction, however the block failed to reach the reserve price[21]

- the number of players competing for lots within the spectrum band
- the availability of spectrum in other bands that could be substituted for the spectrum band in question.

Variation in the cost of spectrum within the models could therefore be due to a variety of circumstances:

- a high (or low) per-MHz price due to high (or low) prices achieved at auction
- the modelled operator may hold a relatively large or relatively small spectrum holding in a specific band, in comparison with other modelled operators
- the mix of high and low value spectrum bands held by the operator.

Furthermore, the quantity of spectrum and the mix of spectrum bands held by the operator will have an influence on the network costs. There is a strong relationship between the amount of spectrum and the cost of radio equipment. An operator with less spectrum is likely to incur higher equipment costs, due to the need to address capacity issues by increasing spectral efficiency, which can be achieved via strategies such as cell splitting or the deployment of more advanced wireless technologies – HSPA+, HSPA+ Advanced, LTE and LTE Advanced – as well as implementing MIMO techniques.

The mix of spectrum bands will also have an effect on costs. Operators place greater value on sub-1GHz spectrum due to its superior propagation characteristics compared with higher frequency bands. The sub-1GHz bands therefore require fewer cell sites for coverage thus reducing costs.

This means that the modelled operator's network costs are intrinsically linked with its spectrum holdings. By simply removing spectrum costs – as WIK has done in its adjustment process – there has been no consideration of the influence of the characteristics of the operator's spectrum holdings on network costs overall. For example, an operator may have incurred relatively high spectrum costs due to gaining a large spectrum holding in the 900MHz band, but this may have also enabled that operator to deploy a lower cost

21 For a discussion of the US 700MHz spectrum auction, see http://www.strategies.nzl.com/wpapers/2008014.htm.

network than if it had a smaller amount of 900MHz spectrum or if it had additional spectrum in the less expensive 1800MHz or 2100MHz bands. Conversely, an operator with a relatively small quantity of spectrum may have lower spectrum fees but incurs higher network costs.

We therefore conclude that WIK's spectrum fee adjustment represents only a partial adjustment of the effect of spectrum fees on mobile termination costs.

Spectrum allocation

WIK presents the spectrum allocation per operator in the benchmark models for spectrum bands used to provide 2G and 3G services (Exhibit 3.6). We have reviewed the spectrum allocations in the models and found that in the case of the UK model there are differences with the values presented by WIK.

Country	*900MHz*	*1800MHz*	*2100MHz*	*Total*
Denmark	8.8	18.8	15.0	42.6
Mexico	5.0	21.7	-	26.7
Netherlands	1.6	18.2	20.0	49.8
Norway	11.0	8.4	15.0	34.4
Portugal	8.0	6.0	20.0	34.0
Romania	10.0	10.0	15.0	35.0
Spain	10.2	22.3	21.0	53.5
Sweden	7.2	10.0	15.0	32.2
United Kingdom	-	30.0	10.0	40.0

Exhibit 3.6: *Spectrum allocations per operator in the benchmark models [Source: WIK]*

The UK model assumes that 2×30MHz of 1800MHz spectrum is available for providing 2G services and that 2×10MHz of this spectrum is then refarmed for 4G purposes in 2012/2013.[22] However WIK has assumed a total of 40MHz of spectrum, suggesting that it did not adjust the 1800MHz holding as a result of the refarming.

22 Ofcom (2014), *MCT review 2015–2018: Mobile network cost modelling*, 4 June 2014, section 2.6, page 12

In regards to the spectrum for 3G services the UK model assumes that 2×10MHz of 2100MHz spectrum is available at the beginning of the modelled period and that the modelled operator gains access to an additional 2×5MHz in 2012/2013, totalling 2×15MHz in the 2100MHz spectrum band. WIK is only assuming 2×10MHz in this band, which underestimates the modelled operator's 3G holding.

Adjustment for spectrum fees

WIK's adjustment for spectrum fees consists of a two-step procedure which firstly eliminates from the country benchmarks the components due to the spectrum fees, and secondly (after adjusting for the technology mix, the WACC, network usage and geographic terrain) adds the cost per minute that Australian operators on average incur due to spectrum fees.

Exhibit 3.7 shows WIK's benchmarks excluding the share of spectrum fees, blended and broken down by technology, and the percentage reduction due to the exclusion of this fee in the original blended 2G/3G benchmark.

Country	*Benchmarks with spectrum fees eliminated (AU cents)*			*Reduction in blended results*
	Blended	*2G*	*3G*	
Denmark	1.973	2.825	1.573	7%
Mexico	3.112	4.150	2.474	13%
Netherlands	2.865	3.448	2.216	16%
Norway	3.058	5.308	1.619	6%
Portugal	4.289	4.353	4.190	2%
Romania	3.364	4.135	1.728	9%
Spain	2.777	3.420	2.303	7%
Sweden	2.229	3.223	1.412	0%
UK	2.328	2.405	2.278	11%

Exhibit 3.7: *Benchmarks with spectrum fees eliminated [Source: WIK, Tables 4-2 and 4-3]*

We have rerun the models excluding spectrum fees related costs and compared the results with those presented by WIK. Our results differ for Norway and Portugal.

We found that in the case of Norway there is a difference of 4% (2G) and 6% (3G) (Exhibit 3.8). The Norwegian blended results presented by WIK are for what the model describes as 'LRIC+++' – this represents uplifts of the pure LRIC costs to include common costs, location update costs and overheads. While the model provides blended LRIC+++ it does not include the equivalent disaggregated results for 2G and 3G. Nevertheless these values can be obtained using additional calculations based on intermediate values included in the model. The WIK report does not include the details of its calculations – for either the 2G or 3G benchmarks including spectrum fees – hence, it is not possible to identify the causes of the differences between our results and those of WIK. The results for blended LRIC+++ match, so clearly there is an unexplained discrepancy in the calculations for 2G and 3G LRIC+++.

	WIK report	*Network Strategies*	*% difference*
Results including spectrum fees			
2G	n.a.	5.871	n.a.
3G	n.a.	1.822	n.a.
Blended	3.240	3.240	0%
Results excluding spectrum fees			
2G	5.308	5.539	4%
3G	1.619	1.719	6%
Blended	3.058	3.057	0%

Exhibit 3.8: *Benchmark results for Norway – AU cents [Source: WIK, Network Strategies]*

In the case of Portugal the model includes two cost components for spectrum – an upfront cost and yearly fees. Our analysis indicates that the values presented by WIK exclude only the upfront cost but include the yearly spectrum fees. If both costs are excluded the blended result is reduced by 0.4% (Exhibit 3.9).

	WIK report	*Network Strategies**	*% difference*
2G	4.353	4.251	-0.9%
3G	4.190	4.141	-4.9%
Blended	4.289	4.207	-0.4%

* Results exclude spectrum up-front cost and yearly fees

Exhibit 3.9: *Benchmark results for Portugal – AU cents [Source: WIK, Network Strategies]*

The second step of the adjustment for spectrum fees involves adding an estimated spectrum cost incurred by a hypothetical efficient operator to the benchmark estimates.

WIK assumes that the hypothetical efficient operator incurs spectrum fees in the following bands:

- 700MHz
- 800MHz (850MHz)
- 900MHz
- 1800MHz
- 2GHz
- 2.3GHz
- 2.5GHz.

In fact, Telstra is the only mobile operator that has spectrum holdings in all of these bands. VHA has no 700MHz or 2.5GHz spectrum, and Optus has no 800MHz spectrum.

WIK claims that its estimated fees are averaged across three operators, but this is not correct. For example:

- WIK's assumed 700MHz/2.5GHz fee is the average price paid in the 2013 auction by Optus and Telstra – an average across three operators should also take into account that one operator (VHA) did not acquire spectrum in these bands
- similarly, the 800MHz fee is the average across two operators, ignoring the fact that one operator (Optus) has no spectrum in this band.

So while the individual spectrum band fees may represent an average paid by the operators that have holdings in each band, the total across all bands therefore clearly does not correspond to an average spectrum cost for an Australian operator as claimed by WIK[23]. If WIK's total spectrum cost was multiplied by three it would be greater than the total spectrum fees paid by the three operators. In effect, WIK has made an implicit assumption regarding the quantity of spectrum held, despite claiming that this was irrelevant. There is a clear assumption that the hypothetical efficient operator has holdings in every band.

It should also be noted that the spectrum costs assumed by WIK may represent an inefficient allocation of spectrum. For example the UMTS technology used for 3G services requires spectrum in multiples of 5MHz (paired). If an "average" spectrum cost corresponds to a 3G spectrum holding that is **not** a multiple of 5MHz (paired)[24], then the hypothetical efficient operator would be paying fees for 3G spectrum it could not use.

With regard to the spectrum costs for all bands – except for 900MHz which is treated separately – WIK calculates a simple annuity based on a 15-year licence term and a WACC of 5.43%. For the 900MHz band, WIK has used an annual licence fee.

We note that regulatory cost models – such as those used to determine mobile termination rates – typically employ tilted annuities rather than simple annuities as these are a better approximation of economic depreciation. It would be possible to modify WIK's methodology to incorporate tilted annuities, however there would need to be assumptions regarding the tilt and the years in which the upfront spectrum fees were paid.

WIK assumes that there is an opex cost of 2% of the upfront capital cost, except for the 900MHz band. In this case WIK reverse engineers the annual fee using the annuity calculation to estimate a notional upfront fee, and the assumed 2% opex is calculated from that notional fee. An uplift of 10% is then applied to represent common costs.

We find that WIK's second step for the spectrum fee adjustment could be improved by:

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23 WIK-Consult (2015), *Benchmarks for the Cost of the Mobile Termination Access Service in Australia*, final report, 15 April 2015, page 38.

24 The spectrum holding in the band can be deduced by dividing the spectrum fee by the spectrum access charge, expressed in terms of AUD/MHz/population, and by the estimated population.

- making an explicit assumption regarding the spectrum holdings of the hypothetical efficient operator, thus providing more transparency for ensuring that the hypothetical efficient operator is an appropriate proxy for an Australian operator
- using tilted annuities in the annualisation calculation.

3.5 Technology mix

Implementation of the more efficient 3G technology has resulted in significant cost decreases in comparison with 2G networks, which has been reflected in reductions in cost-based mobile termination rates. WIK seeks to adjust for differing mixes of 2G and 3G technology by applying an adjustment to the benchmark rates.

The adjustment aims to take into account the differing proportions of voice traffic carried over 2G and 3G technologies. WIK states that in Australia 6% of voice traffic is on 2G and the remaining 94% on 3G. In all the cost models used by WIK in its benchmarks the proportion of 2G traffic is much higher. WIK therefore seeks to estimate the effect on cost via assumed demand elasticities and the change in traffic due to adjusting the 2G and 3G traffic volumes.

WIK's source for its elasticities is a study it undertook for the New Zealand Commerce Commission.[25] This study was based on models dating from the period 2006 to 2008, including:

- WIK 2G mobile cost model applied to three types of countries
  - small densely populated country
  - medium sized, densely populated country
  - large sparsely populated country
- Analysys Mason 2G mobile cost model for the United Kingdom[26].

25 WIK-Consult (2008), *Cost Driver Sensitivity Analyses with Mobile Cost Models*, final report, 22 December 2008.

26 WIK also reviewed Analysys Mason cost models for France, the Netherlands, Norway and Sweden but did not report on the results of similar sensitivity tests for these models.

In its analysis of these 2G cost models, WIK found that the elasticity with respect to traffic volume varied between -0.37 and -0.71, based on decreasing demand by 28.5%. We have considerable reservations regarding the use of these elasticities.

Out-of-date

The models used in WIK's study are now almost ten years old and thus may not accurately reflect the effects on current costs due to changes in demand.

Only 2G

The elasticities relate only to 2G networks. While we know that the costs of 3G technology are lower than 2G, it is simply not possible to infer – as attempted by WIK – an elasticity for 3G demand from a 2G study. Nor it is possible to infer the relativity between a 2G and 3G demand elasticity.

WIK uses an elasticity of -0.5 for 2G which is slightly below the midpoint from its earlier study. For 3G its assumed elasticity is -0.3 which is just below the lower bound from the same study.

Greater changes in traffic than assumed by elasticity estimate

The changes in demand associated with WIK's adjustments are far greater than that used for its elasticity estimate. The 2G traffic volume is being reduced by between 81% and 91%, while for 3G the traffic volume is being increased by between 38% and 194%. Elasticity is normally not constant along the cost curve. It is therefore invalid to apply WIK's elasticity estimate in these cases.

The very low level of 2G traffic assumed for Australia implies that the 2G network is driven purely by coverage requirements rather than capacity. Therefore the costs of the 2G network are largely fixed – that is, not volume-dependent. WIK's elasticity estimate would not apply in this instance, as it would be based on a mix of capacity- and coverage-driven costs.

We therefore find that there is no evidence to support WIK's elasticity assumption and associated adjustment for the technology mix. The underlying methodology is reasonable, but without a robust elasticity assumption it must be considered largely abstract in nature.

3.6 WACC

It is well known that the results of cost models are very sensitive to the assumed WACC value. WIK applies an adjustment for this factor using an elasticity estimated from the study undertaken for the New Zealand Commerce Commission described in Section 3.5.[27]

We have several concerns regarding the use of WIK's estimated elasticity.

Out-of-date — The models used in WIK's study are now almost ten years old, and relate solely to 2G technology. Given changes in the mix of technology – in particular with the effect of lower costs associated with 3G – it would be inappropriate to apply the resultant elasticities to current models.

Invalid for reduction in WACC to 5.43% — WIK's sensitivity analysis for the WACC was based solely on the impact of increasing the WACC from 10% to 15%. As WIK has noted, the value of the elasticity is not constant along the cost curve. WIK's application of this elasticity to the current situation in which the various WACC values – ranging from 6.29% to 12.95% – are reduced to 5.43% may therefore be misleading.

We therefore conclude that WIK's use of the elasticity estimate for the WACC adjustment is invalid.

Given that WIK has access to all the cost models used for the benchmark estimates, it is puzzling as to why it did not consider simply adjusting the individual WACC values in each model to the desired assumption. This would be a far superior approach to that of applying inappropriate elasticities.

27 WIK-Consult (2008), *Cost Driver Sensitivity Analyses with Mobile Cost Models*, final report, 22 December 2008.

3.7 Network size and usage

There are network characteristics other than just the technology mix that may result in cost differences between the various sample countries and Australia. While WIK examines differences in network usage (discussed below), it does not consider the scope, or coverage, of the network.

In its use of network usage expressed as traffic per site, WIK attempts to adjust for differences in network scale, however this only partially addresses the coverage issue. Mobile networks with larger coverage areas will have more base stations, and – especially for rural areas – are likely to have more backhaul, expressed in terms of total distance, so that the average backhaul distance per site is likely to be greater. This will clearly have an effect on costs for fibre or leased line backhaul.

Only Mexico has a coverage area of comparable size to those in Australia – the European countries are significantly smaller in size (Exhibit 3.10).

Country	*Coverage area (km^2)*				
	2G	*3G*	*HSPA*	*4G*	*Total*
Denmark	42 258	42 258			
Mexico[1]					1 982 059
Netherlands	33 286	24 051			
Norway	411 221	202 135			
Portugal (2012)[1]					92 024
Portugal (2015)[1]					92 024
Romania	221 852	152 079			
Spain	499 145	510 237		516 333	
Sweden[2]	333 217	272 042	163 863	2 552	
United Kingdom (2014)	228 462	201 158		89 435	
United Kingdom (2015)	228 462	201 158		89 435	

1 No breakdown of coverage by technology was available for Mexico or Portugal.

2 Coverage for Generic integrated operator scenario.

Exhibit 3.10: *Coverage areas of modelled networks [Source: regulators' cost models]*

We have reproduced WIK network usage calculations and found that in two cases – Spain, and the UK – there are significant differences with our results (Exhibit 3.11). Also note that for those countries where more recent versions of the models are available, the traffic per site has increased (with the exception of the UK).

Country	*WIK*		*Network Strategies*		*% difference*	
	Users per site	*Traffic per site (GB)*	*Users per site*	*Traffic per site (GB)*	*Users per site*	*Traffic per site (GB)*
Denmark (2012)	636	3,596	635	3,569	-0%	+0%
Denmark (2015)	n.a.	n.a.	607	9,941	n.a.	n.a.
Mexico	2,683	5,104	2,681	5,092	-0%	-0%
Netherlands	1,444	1,838	1,458	1,848	+1%	+1%
Norway	430	3,429	427	3,429	-1%	+0%
Portugal (2012)	1,392	3,759	1,392	3,756	0%	-0%
Portugal (2015)	n.a.	n.a.	1,079	4,437	n.a.	n.a.
Romania	729	1,323	724	1,340	-1%	+1%
Spain	1,013	6,016	1,461	6,014	+44%	+0%
Sweden (2014)	434	8,864	439	8,872	+1%	+0%
Sweden (2015)	n.a.	n.a.	466	8,922	n.a.	n.a.
UK (2014)	877	6,440	916	6,450	+4%	+0%
UK (2015)	n.a.	n.a.	1,079	5,602	n.a.	n.a.

Exhibit 3.11: *Network usage [Source: WIK, Network Strategies]*

WIK does not provide in its report any details regarding the exact information used to derive these results hence we have based our calculations on the output of publicly available cost models in the benchmark countries and additional supporting information provided by the ACCC.

In the case of Spain the number of users per site our calculated result is 44% higher than the WIK value. The ACCC has provided us with the details of the sources of traffic volumes and sites supposedly used by WIK. While our calculations for traffic per site match WIK's, the difference in the number of subscribers per site are inconsistent with WIK's calculations. The data provided by the ACCC for number of sites is the sum of three input categories (site tower, roof, and micro) for 2015 (12 228) which differs from the

number of total GSM+UMTS sites provided in the model (17 794). This difference will clearly have an impact on the adjustments based on network usage.

Similarly to Spain, in the UK model traffic per site calculations match but there is a 4% difference for users per site. In this case we used the same number of sites as indicated in both the model and the ACCC's supplementary information which suggests that WIK's calculations for users per site may be incorrect.

WIK does not provide any information regarding its derivation of its Australian averages for users and traffic per site, however given the above discrepancies we would recommend that the calculation be reviewed.

We do not agree with WIK's claim that it has demonstrated via its network usage measure (total traffic in GB per site) that the cost of voice termination should be lower in Australia than in the benchmark countries due to the higher traffic volumes. Traffic per site will only provide a partial – and thus incomplete – indication of cost differences due to network scale. Consequently we find that WIK's adjustment is inappropriate and may be misleading.

3.8 Geographic terrain

While it is well-known that the nature of the geographic terrain will have an effect on the costs of a mobile network, in these types of benchmarking exercises it is extremely difficult to quantify the relative differences in terrain between the various sample countries. As far as we are aware there is no international standard for terrain classification at the country level. Without such a standard, any attempts at classification and adjustment must be highly subjective and subject to considerable uncertainty.

WIK divides the countries in the benchmark sample are divided into three groups:

- more mountainous territory than Australia – Norway
- similar degree of mountainous territory to Australia – Mexico, Portugal, Romania, Spain, United Kingdom
- less mountainous territory than Australia – Denmark, Netherlands, Sweden.

This classification was based on a visual inspection of topographic maps. We assume that this inspection encompassed the entire country rather than being restricted to the mobile coverage areas, which is likely to introduce a degree of error associated with the subjective judgement. In some countries mobile coverage extends over almost the entire land area, others still have significant areas without coverage.

We also note that the propagation of radio signals is affected by several topographic features – including buildings, vegetation and weather conditions – in addition to mountains and hills. As they can significantly attenuate radio signals, sophisticated planning tools are used to estimate path loss and signal strength at various locations. Consequently it is important that cost adjustments should include all the factors and not be limited to only mountainous terrains.

For those countries that are considered less mountainous than Australia, WIK increased the benchmark costs by 3%, and for the more mountainous country the benchmark costs were reduced by 3%. This value was chosen from a simulation analysis using WIK's earlier 2G mobile termination model for the ACCC: by setting all areas to 'flat' WIK found that Australian costs were reduced by 2.59%. This figure, rounded up, was then used as the adjustment factor.

WIK's simulation analysis only provides information on how costs may reduce for a country similar to Australia if the terrain was changed from its current characteristics to flatter – it provides no information to quantify a potential uplift relevant for a more rugged environment. The 3% decrease for Norway is therefore only a notional adjustment with no basis in evidence.

In regards to the countries categorised as having less mountainous terrain than Australia, there may be other terrain characteristics that could result in costs being somewhat higher than those of completely 'flat' areas. For example Denmark encompasses over 400 islands separated by relatively narrow straits, which could prove to be a challenge for radiofrequency planning. Again we find that WIK's adjustment factor is unlikely to represent the effect of terrain on costs.

We note that an adjustment of 3% in either direction is very small. This adjustment would be far less than the sample variation expected even in a much larger random sample of

countries more similar to Australia than those in WIK's existing sample. In our view there is therefore little benefit to apply this adjustment. In fact such an adjustment is far more likely to introduce additional sources of error within the modified benchmark estimate.

3.9 Common costs

As part of the adjustment for spectrum fees, and also in its methodology for deriving a benchmark SMS termination rate (described in Section 4), WIK has assumed a mark-up of 10% for non-network common costs. It claims that this figure is based on WIK's experience, yet it does not consider comparing this assumption against the mark-ups within the sample cost models.

Some of the sample cost models – for example the UK and Norwegian models – include a value for non-network common costs, which is allocated to the per-minute termination costs to derive the TSLRIC, while others assume a percentage mark-up – the Spanish model uses a mark-up of 2% and the Swedish model 6%.

One potential adjustment that could be performed would be to remove the non-network common costs from the benchmark rates and then add a value that would be appropriate for an Australian hypothetical network operator.

3.10 Benchmark values for 2016 to 2020

In its estimation of benchmark values for the period 2016 to 2020, WIK's analysis was based solely on the UK (2014) model as this was the only example in its sample that included voice over LTE. This is the draft model released for consultation, not the final version released in 2015 (see Section 2.2.9). We believe the more recent version should be used.

The draft 2015 Portuguese model – not considered by WIK – also includes voice on 4G. If the final version of this model becomes available, we would recommend that it be considered within the analysis. If this is not feasible within the ACCC's timeframe, then

the draft version should be reviewed. The Norwegian model also includes voice over 4G – WIK did not explain why this model was not considered.

There is some risk associated with a benchmark based on a single country, or even a very small sample. It is more difficult to identify the appropriate relationship between the country of interest and the benchmark estimate. There may be local factors or assumptions, not considered within any adjustments, which may result in cost differentials.

WIK investigates two approaches for estimating benchmark values beyond 2015:

- applying the trend in voice termination costs derived from the UK model to the benchmark estimate for Australia
- estimate a blended rate based on 3G and 4G voice termination costs derived from the UK model.

We have checked these approaches for both the 2014 and 2015 versions of the UK model.

Trend analysis

In the first approach, WIK estimates the annual percentage change in the UK termination rates for the period 2016 to 2020, as well as a 'compound rate', or the percentage change over that five-year period. WIK then applied the compound rate to the 2015 Australian benchmark estimate and then set the intervening years via linear interpolation.

For purposes of comparison, we have used WIK's estimate of the Australian benchmark rate. Our own calculations for both the 2014 and 2015 versions of the UK model resulted in very similar results to those of WIK – the differences may be due to rounding issues (Exhibit 3.12). Note that for the 2015 version of the model we have extrapolated the inflation rate beyond 2018 as this was not included within the model.

Year	*WIK's benchmark (AU cents)*	*Network Strategies' benchmark (AU cents)*	
	UK 2014 model	*UK 2014 model*	*UK 2015 model*
2015	1.61	1.61[1]	1.61[1]
2016	1.53	1.52	1.52
2017	1.44	1.44	1.44
2018	1.36	1.35	1.35
2019	1.27	1.26	1.26
2020	1.18	1.18	1.18

1 The starting (2015) value is assumed the same as WIK's value.

Exhibit 3.12: *Benchmark estimates for years 2015 through 2020 based on trend in UK voice termination rates [Source: WIK, Network Strategies]*

While this method is quite straightforward, it assumes that the costs of voice termination in Australia will exhibit the same trend as in the UK over the next five years. This would encompass similar trends in demand, in 4G deployment strategies and in 2G migration.

Blended 3G and 4G termination costs

WIK's second approach involves deriving a blended 3G and 4G termination rate based on the relative cost of termination of 3G and 4G as well as the proportion of 4G traffic, with all information sourced from the 2014 UK model.

Again we have applied WIK's methodology to both the 2014 and 2015 versions of the UK model. Note that in the more recent model the proportion of 4G traffic has fallen (Exhibit 3.13).

Year	*Share of voice being carried over 4G (WIK)*	*Share of voice being carried over 4G (Network Strategies)*	
	UK 2014 Model	*UK 2014 Model*	*UK 2015 Model*
2016	1%	1%	0%
2017	5%	5%	3%
2018	12%	12%	9%
2019	19%	19%	17%
2020	24%	24%	23%

Exhibit 3.13: *Share of voice being carried over 4G [Source: WIK, Network Strategies]*

In the more recent UK model 4G costs represent a higher proportion of the 3G costs (Exhibit 3.14).

Year	*WIK estimate*	*Network Strategies estimates*	
	UK 2014 model	*UK 2014 model*	*UK 2015 model*
2016	0.28	0.28	0.33
2017	0.28	0.28	0.34
2018	0.30	0.30	0.36
2019	0.31	0.31	0.38
2020	0.32	0.32	0.41
Average	0.30	0.30	0.36

Exhibit 3.14: *Relationship of the voice termination cost for 4G to that of UMTS [Source: WIK, Network Strategies]*

Applying WIK's methodology for deriving the 2020 benchmark estimate, we obtained a slightly different result, which could be due to rounding issues, but this also indicates the sensitivity of the result to the input values (Exhibit 3.15). Note that while WIK's approach assumes the 2020 traffic level, this does not correspond to the cost relationship between 4G and UMTS. That cost relationship will be dependent on traffic volumes.

	Unit	*WIK estimates*	*Network Strategies estimates*	
		UK 2014 model	*UK 2014 model*	*UK 2015 model*
Average of the cost of carrying termination over UMTS	AU cents	1.61	1.61[1]	1.61[1]
Cost of carrying termination over UMTS after application of adjustments	AU cents	1.40	1.40[1]	1.40[1]
Relation of cost of voice over 4G to that over 3G on the basis of the relation shown in the UK model	cents/cents	0.3	0.3	0.4
Derived cost of voice over 4G	AU cents	0.42	0.41	0.51
Shares of 4G in the provision of voice in the UK model	%	24%	24%	23%
Blend 3G and 4G costs according to the weights of the two technologies in the UK model	AU cents	1.16	1.17	1.20

[1] This value is assumed to be same as WIK's value.

Exhibit 3.15: *Derivation of the cost in 2020 based on the component costs of 3G and 4G [Source: WIK, Network Strategies]*

Key characteristics of this approach:

- assumption of the share of 4G voice in 2020, based on that of the UK model
- uses an average ratio of 4G costs to 3G costs, based on the UK model, rather than corresponding to same year as used for the share of voice demand
- no 2G costs in the blended result, despite the UK model still including 2G traffic in 2020.

Again, relying on only a single example assumes that Australia will exhibit similar trends to those expected in the UK, with regard to demand, technology deployment and migration.

WIK does not appear to have examined future trends in voice termination costs in any other model. While we recognise that those models did not include 4G voice, there may be useful information on future trends that could inform the derivation of benchmark estimates in those years, and thus placing less reliance on only a single example.

3.11 Summary

We have identified a number of problems with the adjustments performed by WIK, including:

- incorrect currency conversion rates
- potential errors in the adjustments for spectrum fees
- out-of-date and invalid elasticity assumptions for the technology mix and WACC assumptions
- WIK's network usage adjustment only partially adjusts for variations in network scale and as such may be misleading
- highly subjective and unsupported adjustments for geographic terrain.

Potential adjustments not considered by WIK include:

- network size or coverage
- variations in common costs.

In our view the adjustments that will have the greatest effect on the resultant benchmark estimates are:

- currency conversion
- technology mix
- network scale (encompassing both traffic and coverage)
- spectrum fees.

WIK's adjustment methodology requires the availability of mobile cost models for each of the sample jurisdictions, which greatly limits the size of the benchmark sample. Unlike other countries that have set rates using benchmarking – such as Estonia, Latvia, Lithuania and New Zealand – it is difficult to identify countries comparable to Australia with respect to mobile cost drivers. Hence some adjustments are required in order to derive a mobile termination rate suitable for Australia. An alternative adjustment approach would be a statistical model which aims to incorporate the key components of variation in mobile termination rates. This would require a larger sample than that used by WIK, however with

this approach it may be possible to relax the requirement that the original cost models must be available.

WIK's estimation of termination rates beyond 2015 relies only on a single example – that of the UK. Such estimates are likely to be extremely unreliable, unless it is envisioned that Australian 4G deployment strategies and traffic profiles are expected to be similar to those of the UK. There has been no attempt to analyse results for this period from the other models to see how they compare with those from the UK model.

4 SMS termination

4.1 Benchmarking for SMS termination

SMS termination is regulated in New Zealand, with prices being based on benchmark data from jurisdictions with TSLRIC pricing. When the Commerce Commission set the rate in 2011[28] only three countries were deemed suitable for inclusion within its benchmark sample: Denmark, Malaysia and Israel.

Other countries with LRIC-based SMS termination charges are Indonesia and Turkey. In fact very few jurisdictions have introduced price regulation for SMS termination, which creates difficulties in establishing a benchmark sample suitable for deriving an estimate for Australia.

SMS termination is not one of the defined markets in the European Union (EU). As at the end of 2014 only three of the 28 EU countries regulated SMS termination: Denmark, France and Poland. In December 2014 the French regulator, ARCEP, issued a draft determination in which the SMS termination rates had been updated, however the European Commission found that there was insufficient evidence to support ARCEP's findings that the SMS termination market had been analysed in accordance with European

28 Commerce Commission (2011), *Standard Terms Determination for the designated services of the mobile termination access services (MTAS) fixed-to-mobile voice (FTM), mobile-to-mobile voice (MTM) and short messaging services (SMS)*, Decision 724, 5 May 2011.

competition law principles for the purpose of *ex ante* regulation.[29] Subsequently ARCEP withdrew its draft decision but will continue to monitor the SMS termination market.[30]

Note that some of the regulatory cost models considered by WIK (for example the Swedish and UK models) calculate the cost of SMS termination, even though the service is not regulated. It would therefore be possible to expand a benchmark sample by including these results.

4.2 Approach used by WIK

WIK devised an alternative approach for SMS termination, with the rate consisting of two components:

- conveyance cost, set in relation to the mobile voice termination rate
- SMS-specific cost, based on a benchmark annualised cost for SMS centres (SMSCs).

Although the conveyance cost has been derived using normal design practice and industry accepted assumptions, the source of WIK's assumption for proportions of 2G and 3G SMS in Australia is unclear. It seems WIK has calculated the number of messages equivalent to a minute of voice call assuming the percentages of 2G and 3G SMS are the same as voice traffic, that is 6% for 2G and 94% for 3G. Despite WIK's statement that the proportions of voice traffic are based on the actual data collected from three operators in Australia, there is no information to support or justify adopting the same proportions for SMS. In addition this assumption affects the subsequent calculations as the final conveyance cost per SMS is estimated using the voice termination rate (based on 2G and 3G blending of voice traffic). Instead of directly using the termination rate for voice, the SMS cost calculation should use a blended rate based on the mix of 2G and 3G SMS.

29 European Commission (2014), *Commission decision concerning: Case FR/2014/1670: Wholesale SMS termination on individual mobile networks Opening of Phase II investigation pursuant to Art.7 of Directive 2002/21/EC1 as amended by Directive 2009/140/EC*, C(2014) 9270 final, 28 November 2014.

30 ARCEP (2015), *ARCEP places SMS termination markets under supervision*, press release, 29 January 2015.

Benchmark SMSC capital costs were obtained from the TSLRIC cost models of the sample used to determine mobile voice termination rates. These models were up to three years old, and thus it is quite possible some costs may be out-of-date. Furthermore capacity of the SMSCs does not appear to have been considered – capacity may have some influence on cost.

We have compared the unit costs and other characteristics of SMSCs within the cost models (Exhibit 4.1 – note that the currency conversion uses WIK's exchange rates). These are 2015 costs per unit in nominal terms – note that some models are based on real costs, so the unit costs were adjusted by the inflation factors used by the models. Note the wide ranges for the unit capacity and assumed maximum utilisation.

We have not been able to reconcile the unit capital costs in the models with those reported by WIK. For example the SMSC unit capital cost from the UK model (2014) is drastically lower than the one reported by WIK. The model assumes an aggressive price trend which lowers the SMSC unit cost significantly between 2009 and 2015. However it is unclear how WIK derived its value as details are not provided.

	Network Strategies unit capital cost (LCU 2015, nominal)	*Network Strategies unit capital cost (AUD 2015)*	*WIK unit capital cost (AUD)*	*Capacity (SMS per second)*	*Maximum utilisation (%)*
Denmark (2012)	1 227 166	285 930	330 920	400	38%
Denmark (2015)	1 194 834	278 396	-	400	38%
Mexico	2 463 595	5 092 251	2 930 945	1000 (HW) 400 (SW)	80%
Netherlands	1 705 336	3 161 693	2 788 014	1000 (HW) 400 (SW)	80%
Norway	15 256 452	3 112 316	4 255 727	500	70%
Portugal (2012)	1 318 384	2 987 458	2 381 992	4500 (HW) 1500 (SW)	80%
Portugal (2015)	1 317 348	2 985 111	-	4500 (HW) 1500 (SW)	80%
Romania	616 698	1 956 783	1 041 527	361	80%
Spain	432 526	907 440	854 998	1 000 000[1]	-
Sweden	3 163 714	578 960	1 395 360	1000	40%
United Kingdom (2014)	23 406	54 442	5 229 858	5800	80%
United Kingdom (2015)	24 895	57 906	-	5800	80%

1 SMS in busy hour.

Exhibit 4.1: *SMSC characteristics [Source: regulator cost models]*

WIK selected a benchmark capital cost at the upper end of SMSC costs from the benchmark sample. Various assumptions regarding economic life, operating costs and a mark-up of 10% for common costs (see Section 3.9) were used to determine the annualised costs (Exhibit 4.2).

	Economic lifetime (years)	*Opex as % of 2015 unit capex*
WIK assumptions	8	10%
Denmark	8	29.1%
Mexico	5	5%
Netherlands	5	8.2%
Norway	6	41.2%
Portugal (2012)	5	21.1%
Portugal (2015)	5	16.3%
Romania	7	11.8%
Spain – hardware	8	26.5%
Spain - software	4	26.5%
Sweden	6	169.4%
United Kingdom (2014)	10	1.4%
United Kingdom (2015)	10	1.1%

Exhibit 4.2: *Annualisation assumptions for the SMSC [Source: WIK, regulator cost models]*

Given the wide range in specifications and costs for the SMSC it would be preferable to use financial data sourced from Australian operators rather than WIK's combination of benchmark costs and assumptions.

5 Concluding remarks

The ACCC's benchmark sample for Australian mobile voice termination and SMS services consisted of all those jurisdictions for which TSLRIC-compatible costing models were publicly available. As the benchmark sample selection did not involve any criteria for comparability with Australian conditions, it is crucial that the subsequent adjustments for country-specific factors are robust and defensible for this regulatory proceeding.

We have identified a number of shortcomings in the adjustment methodology and we find that insufficient supporting analysis has been presented in the WIK report to enable us to reproduce many of the values, including both the original benchmark values and the adjustments. Although the spreadsheet provided by the ACCC did contain some helpful information with respect to network usage calculations, there are still many gaps. Our particular concerns include:

Benchmarks do not include the latest information

For the current regulatory proceeding it is important that the underlying data reflects the current view of a forward-looking environment. Some of the models used are several years old, and more recent versions are available for some jurisdictions in the sample. Clearly the most up-to-date information should be used.

No information on adjustments to 'original' benchmark values

While WIK presents benchmark values it claims represent the raw or original values from cost models, in some cases it is clear that WIK has made adjustments to derive these values – for example, from real to nominal values. With no supporting explanation of the adjustments, we have been unable to reproduce all of the claimed original benchmark values.

Inappropriate currency conversion method and incorrect calculations

The benchmark values obtained by WIK following its currency conversion are unreliable as its PPP data is unsupported by any evidence and the adjustment method is incorrect. Furthermore, PPP rates alone are necessary and sufficient for currency conversion for benchmarking MTAS. PPP rates address inter-country price level differences whereas market exchange rates do not. We recommend that the ACCC applies PPP rates as the method of currency conversion in its benchmarking exercise.

Inappropriate adjustment for spectrum fee

WIK's simple removal of spectrum costs does not consider the influence of the characteristics of the operator's spectrum holding on network costs overall. As such WIK's spectrum fee adjustment represents only a partial adjustment of the effect of spectrum fees on mobile termination costs.

Furthermore spectrum costs added to the adjusted benchmarks do not represent the average spectrum costs of an Australian operator as is claimed by WIK.

We recommend that the ACCC consider:

- making an explicit assumption regarding the spectrum holdings of the hypothetical efficient operator, thus providing more transparency for ensuring that the hypothetical efficient operator is an appropriate proxy for an Australian operator
- using tilted annuities in the annualisation calculation.

Spectrum calculations cannot be reproduced

On reviewing the spectrum allocations in the models we found that in the case of the UK model there are differences with the values presented by WIK. We also reran the models excluding spectrum fees related costs and compared the results with those presented by WIK. We found discrepancies in the cases of Norway and Portugal.

Invalid WACC adjustment	WIK's use of an elasticity estimate for the WACC adjustment is invalid as the underlying data is out-of-date and its sensitivity analysis is misleading.
Network usage adjustment may be misleading	WIK's adjustment for network usage only partially addresses variations in cost due to network scale, and as such may give misleading results.
Geographic adjustment factor unlikely to represent effect of terrain on costs	WIK's simulation analysis only provides information on how costs may reduce for a country similar to Australia if the terrain was changed from its current characteristics to flatter – it provides no information to quantify a potential uplift relevant for a more rugged environment. Furthermore the quantification of differences in terrain is highly subjective in nature and is unlikely to deliver sufficiently robust result for a regulatory proceeding.
Inappropriate assumption for technology mix adjustment	There is no evidence to support WIK's elasticity assumption and associated adjustment for the technology mix. While we find that the underlying methodology is reasonable, without a robust elasticity assumption it must be considered largely abstract in nature.
Missing variables in adjustment for network usage	There are network characteristics other than just the technology mix that may result in cost differences between the various sample countries and Australia. While WIK examines differences in network usage, it does not consider the scope, or coverage, of the network.

We recommend that the ACCC addresses the methodological issues we have identified. Given these issues and the lack of transparency regarding a number of WIK's calculations and the difficulties we encountered in attempting to reproduce many of these calculations, we conclude that the benchmark results may be unreliable. As such at a minimum we

recommend that further information be provided by the ACCC and its consultants to support the benchmark estimates.

As a sanity check we compared WIK's benchmark estimate for Australia (1.61 cents) with a larger sample of countries with cost-modelled LRIC-based mobile voice termination rates that are applied in 2015 (Annex A). Our sample reflects pure LRIC and LRIC+ (TSLRIC) rates for 30 countries (including the nine WIK benchmark countries). We found that the WIK benchmark estimate is just higher than the lower quartile of this sample and is below the lowest LRIC+ rate (Belgium). Given the differing nature of the mobile network environments – in particular the much greater coverage area in Australia – this does not appear to be a credible outcome for a LRIC+ benchmark suitable for Australia.

With respect to SMS termination, to date very few jurisdictions have imposed price controls. If the ACCC was to derive a benchmark rate for SMS termination it should consider establishing a sample that includes those jurisdictions with cost models that estimate the cost of SMS termination. With regards to the WIK methodology:

- the conveyance cost should be based on the mix of 2G and 3G SMS traffic, rather than the mix of voice traffic
- SMSC costs and financial parameters should be based on those of Australian operators rather than international benchmarks.

Annex A: Mobile termination rates – a wider sample

We have identified a larger sample of countries with LRIC-based mobile voice termination rates that are applied in 2015 (Exhibit A.1). This shows how the pure LRIC rates for the jurisdictions in WIK's sample, as well as its benchmark estimate, compare with rates in other countries.

In this instance we have used PPP rates for currency conversion, as we believe that this will provide a better appreciation of the relativities of the various countries than the rates used by WIK.

These are the regulated rates and thus may also include some adjustments made externally to the underlying cost model results (such as glide paths), The rates were set over the period 2010 to 2015 and include both pure LRIC and LRIC+ (TSLRIC) based rates. Countries that use other approaches – such as benchmarking – have not been included in this sample.

The pure LRIC rates from WIK's sample countries tend to have lower voice termination rates, however this could be due to specific environmental factors.

WIK's benchmark estimate for Australia (1.61 cents) is just higher than the lower quartile of this sample (1.55 cents) and between the pure LRIC UK and Netherlands rates. It is also below the lowest LRIC+ rate (Belgium) in the sample. Given the differing nature of the mobile network environments – in particular the much greater coverage area in Australia – this does not appear to be a credible outcome for a LRIC+ benchmark suitable for Australia.

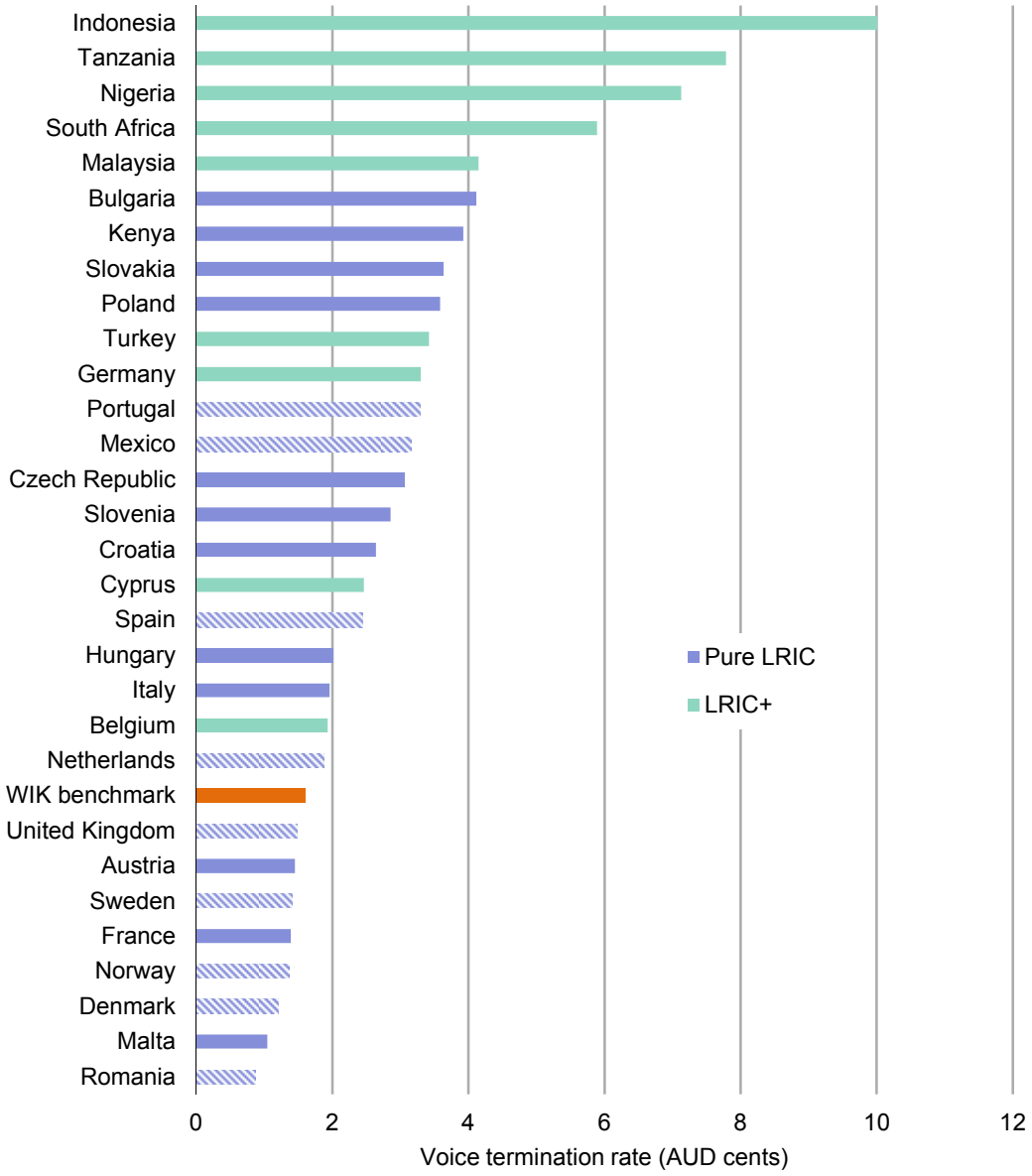

Exhibit A.1: *Mobile voice termination rates for 2015 – derived from LRIC-based methods (AUD using PPP rates). Shaded countries are included in WIK's sample [Source: Network Strategies]*