Office of the Director of
Telecommunications
Regulation

CONSULTATION PAPER

Mobile Accounting Separation and Costing Methodologies

Document No: ODTR 02/86

Date: 11 October 2002

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Foreword

I am pleased to begin this consultation on accounting separation and costing methodologies to apply to the mobile operators in Ireland. Having completed a similar exercise for the fixed market, it is clear that preparation of a comprehensive set of separated accounts is a complex exercise and not to be undertaken lightly.

One of the difficulties that we may reasonably expect throughout this process is the nature of the Irish mobile market with two operators who have been designated as having Significant Market Power. Consequently any form of accounting separation shall need to carefully consider how consistency of treatment can be achieved. This may necessitate consideration of the issue at quite a detailed level.

Against this, we need to achieve a balance so that any requirements that may be imposed will not unduly burden the operators concerned.

I believe that the proposals in this consultation strike a reasonable balance between achieving consistent and transparent treatment while not being overly cumbersome and at the same time providing this Office with the necessary information to meet its regulatory requirements.

I look forward to receiving the responses to the consultation and recognise that this will be an iterative process that will be developed and refined in the future.

Etain Doyle,

Director of Telecommunications Regulation.

1 INTRODUCTION

The Director of Telecommunications Regulation ("the Director") is responsible for the regulation of the Irish Telecommunications sector in accordance with national and EU legislation. In particular, according to the Interconnection in Telecommunications Regulations (SI No. 15 of 1998 Art. 10), the Director "shall encourage adequate and secure interconnection in the interests of all users in a manner that promotes economic efficiency and gives the maximum benefit to users".

Regulation 10 of the regulations states amongst other things that the Director shall act with regard to:

- the need to ensure satisfactory communications for end users
- the need to stimulate a competitive market in telecommunications services
- the need to ensure the fair and proper development of a harmonised European telecommunications market
- the principles of non-discrimination (including equal access) and proportionality.

In addition, in Regulation 9 (5), for reasons of (market) transparency, the Director may publish such information as she considers shall contribute to an open and competitive market while taking account of considerations of commercial confidentiality.

Penetration rates in the Irish mobile telecommunications market are now 77%[1] with the two main operators, Vodafone and O2, having a combined market share of around 97%. In light of this potential market concentration and in order to assist in addressing SMP mobile operators' legal obligation with respect to transparency and cost orientation, the Director has initiated this consultation process on Mobile Accounting Separation and Costing Methodologies.

On the wholesale side, the high mobile termination rates of many mobile operators in Europe have given rise to widespread concern about the competitiveness of the mobile termination market. In response to this concern both the EU and various NRAs in Europe are in the process of investigating mobile termination rates (MTR). Prior to these investigations, which began in 1999, Irish mobile termination rates were below the European average. However, MTRs in Ireland stayed unchanged until the middle of 2002 by which time they no longer compared favourably with the European average. In mid 2002 Vodafone and O2 decreased their Irish termination rates significantly with the result that they are once again below the European average. However, there is currently no evidence that the existing level of termination rates would compare favourably with the rates that would prevail in a truly competitive market.

In addition to examining mobile termination charges, the EU and some NRAs have begun investigations into the rates levied on mobile users roaming abroad. The rate charged to the roaming consumer is a function of the network charge levied by the visited network as well as the home mobile operator's retail charging principles. Thus, looking at the wholesale costs structure may not be sufficient to address the issues surrounding roaming rates.

[1] ODTR Communications Market Quarterly Review June 02 (Document ODTR 02/50)

For these reasons the Director believes there is merit in gathering information from the mobile operators in order to gain insights on the underlying cost structures of both the mobile network business and the mobile retail business.

The primary objective of Accounting Separation is to enable the creation of meaningful Profit and Loss Statements and calculations of return on products and services or groups of products and services. More specifically, the information is designed to assist the ODTR in relation to the following:

- Assessing the relationship between termination charges and termination costs and also the relationship between any other charges and costs for any other services which are offered on an interconnection basis
- Assessing if unfair cross subsidisation exists between the various interconnection and retail products
- Assessing the profitability and the return on capital of individual services and groups of services.
- Examining the level of infrastructure sharing costs and revenues.

Accounting Separation is a useful tool that enables regulators to gather simultaneously information on retail and wholesale markets. This is an important benefit of the approach as the Director is mindful of the workload imposed on operators by separate and concurrent investigations into wholesale and retail markets. In addition, the Director is mindful that gathering this level of information may lead to more informed decision making. However, it should be recognised that Accounting Separation is just one of the regulatory tools that the ODTR may use in discharging these responsibilities and that Accounting Separation does not make these other tasks redundant.

The purpose of this consultation process is to outline the information that the Director expects the mobile operators to prepare and present in the Separated Accounts. Accounting Separation requirements would only apply to those operators which have been designated[2] as having Significant Market Power in the 'market in the State for interconnection' in Ireland, namely Vodafone and O2.

The Director notes that there are various options available regarding the scope of accounting separation, especially with regard to the level of dis-aggregation and the costing methodologies applied. The Director is now undertaking a consultation on Mobile Accounting Separation and Costing Methodologies. Due to the detailed and technical nature of some of the information, a technical overview and glossary of terms pertaining to mobile networks is included in the Appendices (Appendix I and Appendix VI respectively)

[2] In December, 1999, the Director designated Vodafone as having Significant Market Power in the 'Market in the State for Interconnection' in Decision Notice 15/99. In July 2001, the Director designated O2 as having SMP in the 'Market in the State for Interconnection' in Decision Notice 10/01.

Interested parties are invited to submit their views in writing on the questions posed in the Consultation document before 5pm on Friday 22 November 2002 to:-

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All comments are welcome, but it would make the task of analysing responses easier if respondents refer to the relevant question numbers in this document. Where material that is commercially sensitive is included in a response, this should be included in an annex and clearly marked "confidential". Information of this nature will not be disclosed to the public.

The ODTR will analyse the comments received, take them into consideration and intends to issue a Decision Notice in December 2002.

This consultative document does not constitute legal, commercial or technical advice. The Director is not bound by it. The consultation is without prejudice to the legal position of the Director or her rights and duties to regulate the market generally.

2 OVERVIEW

2.1 DOCUMENT OVERVIEW

This consultation document contains the following sections:

- *Chapter 3 Legislative Background* – This chapter lays out the relevant legislation on this topic.
- *Chapter 4 Dis-aggregation* – This chapter discusses the proposed level of dis-aggregation at the revenue and cost level having regard to the proposed business lines and products. This chapter does not include any discussion of the costing methodology. This is addressed in the following chapter. However, the issues surrounding allocation of costs to the dis-aggregated businesses and products within that business are discussed.
- *Chapter 5 Costing Methodologies* – This chapter addresses the basis under which the accounts should be prepared, HCA, CCA etc and associated issues such as network externalities etc.
- *Chapter 6 Asset Revaluation* - This chapter addresses the underlying asset revaluation methodologies.
- *Chapter 7 Format of Accounts* - This chapter presents the proposed format of the statements.
- *Chapter 8 Procedural Matters* – This chapter addresses issues relating to timing of publication, auditing requirements etc.
- *Appendices* – In order to make navigation through the document easier, much of the background material has removed to the appendices. It should be noted that some questions are contained in appendices.

2.2 OVERVIEW OF ACCOUNTING SEPARATION REQUIREMENTS

The Director's proposed approach is to require financial statements for the total network business plus each constituent network service. In addition the Director proposes that financial statements be prepared for the retail business as a whole plus each of three retail bundles, residential post-paid, business post-paid and prepaid. It is not proposed that all of this information would be published, but only the financial statements for each of the network and retail businesses as a whole. In calculating retail bundles operators may find it useful to perform the intermediate step of calculating financial statements for each retail product and pro-rating these across the relevant retail bundles. However it is not proposed that this be a requirement.

It is intended that the financial statements for each entity would comprise a Profit & Loss (P&L) Statement, a Statement of Mean Capital Employed and a Statement of Return on Mean Capital Employed.

The object of the exercise is to evaluate the profitability and rate of return for each entity as if it were a stand alone business. The proposal is that where one entity sells internally to another (for example a network wholesale service to a retail service), that the seller should be allowed recover its costs plus a mark-up (or capital charge) to allow it to make a return (calculated as the business's cost of capital). The Director also proposes that financial statements for entities which consume internal resources (i.e. retail businesses which use network resources) should include their share of all costs incurred by the operator to provide that service, including the

costs of providing the associated network service. Similarly, their Statement of Mean Capital Employed should include not just the retail business's own assets, but their share of the network assets used to provide the underlying wholesale services. This also means that, since we are looking at the costs of retail services as a whole, that the margin uplift equal to the return on mean capital employed (referred to as "Capital Charge" throughout this paper) allowed to the wholesale network business should not be counted a cost as, from this perspective, it represents an artificial internal uplift.

In reconciling the separated accounts to the financial statements it follows that the sum of the retail businesses plus the external turnover and external costs of the wholesale business and the "Other" business should reconcile to the audited financial statement.

3 LEGISLATIVE BACKGROUND

There is a range of relevant legislation in this area, both on the European and the national level, the most relevant of which is summarised below.

3.1 LEGISLATION AT THE EUROPEAN LEVEL

European Commission Legislation

- *Council Directive 97/33/EC on interconnection in Telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP)*

Accounting Separation

Interconnection legislation provides that organisations providing public telecommunications networks and/or publicly available services and which have been designated by the NRA as having SMP, and which offer interconnection services to other organisations are required to keep separate accounts for their activities relating to interconnection and 'other activities'. These accounts should identify all elements of cost and revenue, 'with the basis of their calculation and the detailed attribution methods used, related to their interconnection activity including an itemised breakdown of fixed asset and structural costs.'

NRAs "may publish such information as would contribute to an open and competitive market, while taking account of considerations of commercial confidentiality."

European Commission Recommendations

In addition to 97/33/EC, the Commission has published a separate recommendation on accounting separation.

Commission Recommendation of 8 April 1998 on interconnection in a liberalised telecommunications market – Part 2 – Accounting separation and cost accounting (98/322/EC)

This Recommendation concerns the implementation of accounting separation and cost accounting systems by operators designated by their NRA as having significant market power in accordance with Article 8(2) of Directive 97/33/EC for implementation of interconnection obligations, with particular regard to the principles of transparency and cost orientation.

3.2 LEGISLATION UNDER NEW ONP FRAMEWORK

A New Regulatory Framework for the regulation of electronic communications networks, services and associated facilities has been adopted by the European Commission. This comes into force on 25th July 2003. Five new directives replace the current regulatory regime and covers Framework; Access; Universal Service; Authorisation and Data Protection. Member States have 12 months to complete transposition which includes the enactment of necessary legislation and the establishment of appropriate administrative procedures. In the interim, the

current regulatory framework remains in force and SMP obligations still hold, until such time when market reviews have been completed.

3.3 IMPLEMENTATION OF EUROPEAN LEGISLATION INTO DOMESTIC LAW

The European Communities (Interconnection In Telecommunication) Regulations, 1998, SI No. 15 of 1998, transposing the above directive (Council Directive 97/33/EC).

Interconnection Regulations

Regulation 8(3) requires "an organisation imposing a charge for interconnection shall ensure that charges for interconnection shall follow the principles of transparency and cost orientation".

Pursuant to Regulation 8(5), "the Director may direct an organisation to justify its charges for interconnection and, where appropriate, shall direct that the charges be adjusted in cases where an interconnection charge does not comply."

Regulation 9(2) and 9(3) require accounting separation for all operators specified in Regulation 4(2)(a) designated as having SMP, including mobile operators.

Under Regulation 9(2), an organisation which has significant market power in the market in the State for interconnection and which offer interconnection services to other organisations "shall keep separate accounts for their activities related to interconnection and other activities so as to identify elements of cost and revenues with the basis of their calculation and the detailed attribution methods used".

Regulation 9(3) obliges SMP operators to provide "such financial information as may be required by the Director from time to tine and to the level of detail required". In addition, the Director may under Regulation 9(5) publish such information as "she considers shall contribute to an open and competitive market", while taking account of considerations of commercial confidentiality. This regulation applies to any organisation which provides a public network or a public telecommunications service.

3.4 CONDITIONS IN THE IRISH MOBILE TELECOMMUNICATIONS LICENCES

Mobile Telecommunications Licenses for Vodafone and O2 (ODTR document number 00/01 and 00/03).

The license conditions state that licensees shall provide all documents, records, accounts, estimates or other information requested by the Director. The Director may publish information while having regard for professional secrecy. In the event of unfair cross subsidisation by a licensee, the Director may direct the licensee to cease to engage in this practice. Licensees shall provide the Director with full accounting information, hereby observing directives from the Director. Licensees shall maintain and provide accounting and other information as specified by the Director.

4 DIS-AGGREGATION

4.1 INTRODUCTION

This section relates to the level of granularity at which both costs and revenues should be traced or dis-aggregated. In order to meet the objectives of consistency of treatment, transparency and cost orientation it is important that costs and revenues should be dis-aggregated to the greatest level possible.

Furthermore, as stated in the introduction the primary objective of Accounting Separation is to enable the creation of meaningful Profit and Loss Statements and calculations of return on products and services or groups of products and services. These statements cannot be produced if costs, revenues or products are highly aggregated.

The published financial accounts of MNOs are prepared at a highly aggregated level. However, given the absence of restrictive legacy systems and the level of customer segmentation and price differentiation in the mobile market, it is the view of the Director that the internal systems of the MNOs should support a high degree of flexibility and granularity. Moreover, the MNOs have been aware of the investigations being performed at both the EU level and NRA level with regard to termination rates and international roaming rates which by their nature may have necessitated MNO's preparing information to the level of dis-aggregation being suggested herein.

It should be noted that to a certain extent the level of dis-aggregation advocated is independent of the costing methodology applied. For this reason the document considers both topics in separate sections in order to encourage more targeted responses. This means, for example, that positive or negative responses regarding dis-aggregation will not necessarily imply positive or negative responses regarding the proposed costing methodology.

Due to the depth and breadth of the subject matter under discussion, a graphical map of the proposed approach is included to aid readers in navigating through this chapter. Users should be aware that this graph does not attempt to pre-empt the consultation process; the call for views are included in each discrete subject matter area and users should respond using these.

4.2 OBJECTIVE

Dis-aggregation in terms of Accounting Separation can be read as the lowest common grouping of costs and revenues subject to full tracing of costs to each separate and distinct cost type and group and likewise revenues to each distinct product.

In addition, the mobile market may introduce new products and services especially data services. In order to future proof the information systems under development by the MNOs it may be more efficient to detail as many of these potential requirements as possible in advance of the rollout.

To this end the Director is minded to require a high level of dis-aggregation.

4.3 CHAPTER OVERVIEW & ROAD MAP

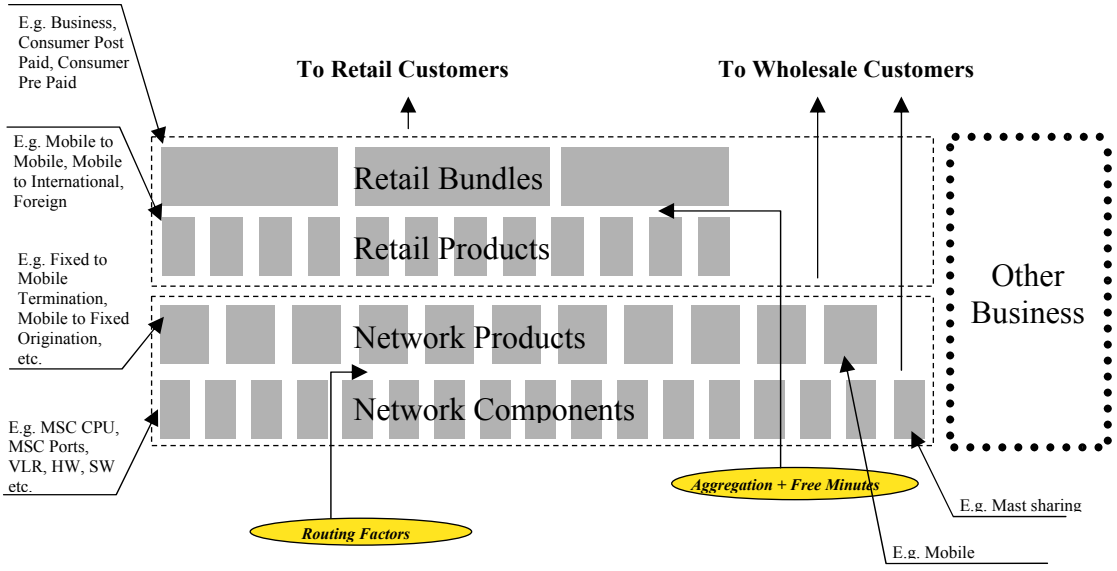
To assist in the usability of this section the discussion of dis-aggregation is split between the overall business dis-aggregation and dis-aggregation within the two relevant businesses, the network business and the retail businesses. Dis-aggregation has been split into cost dis-aggregation and product dis-aggregation. This does not suggest that the concept of matching costs with revenues shall not be applied rather that there is not always a one to one relationship between costs and revenues. The valuation bases and treatment of increments etc are included in the costing methodology section. (Chapter 5)

4.4 BUSINESS DIS-AGGREGATION

The Mobile Network Operators operate at least two distinct businesses, the mobile retail business and the mobile network business. MNOs may also operate other businesses which are not concerned with the mobile telephony network or retail businesses such as land and building investments, retail outlets, investments in non associated third parties etc. which are not subject to mobile accounting separation.

The costs, revenues and capital employed attributable to these other businesses should be aggregated into a third business category termed 'Other'. Mobile Accounting Separation is only concerned with relevant mobile and retail operations; it is not intended that financial information pertaining to non relevant businesses be provided as part of this process except insofar as it is required to enable the full reconciliation of the Financial Accounting figures to the Historic Cost Accounting figures. However, if any costs are shared between the retail, network and 'other' business the basis of allocation should be laid out in a note to the reconciliation statement, in particular any shared buildings, overhead etc. should be specifically noted.

The picture below gives an overview of how the dis-aggregation process as envisaged would work. Within the two main businesses, network and retail there are further major categories of dis-aggregation and the picture below provides an overview of this.



Network Components and Network Elements belong to the Network Business and Retail Products and Retail Bundles belong to the Retail Business. The terms are defined below:

Network Element – A network element is defined as a piece of equipment which is usually separately priced by the equipment vendors and performs specific functions within the mobile network. The main network elements are MSC, BSC, BTS and transmission links between them. Network elements may be made up of different network components. There is generally a one-to-many relationship between network elements and network components.

Network Component - Taking the MSC as the example, within the MSC there are separate functional modules which perform different tasks. The MSC CPU performs the processing of messages whether signalling or traffic related; the VLR processes the location updates for visitors to that MSC area; the ports connect the MSC to the transmission layer etc. The same call, such as a fixed to mobile call, may make different usage of the various components to another call type such as an on-net SMS message. Thus, in order to support informed allocations the usage factors or 'Routing Factors' as they are termed should be calculated at the network component level rather than the network element layer.

Network Product – a network product is generally the lowest level at which a service is sold from the mobile network business to the mobile retail business or wholesale parties, usually it represents a call type (there is one notable exception to this classification, namely infrastructure sharing which may be sold at the component level, for example mast sharing). There are seven main product groups identified at this point in time:

- Origination
- Termination
- International Roaming
- SMS
- GPRS
- VPN and
- Infrastructure Sharing.

Within each product group there may be more than one product. For example, an on-net origination call is a separate product from a mobile to international call. This level of dis-aggregation is necessary because each call type may exhibit different usage of each of the network components and thus should be separately analysed. APPENDIX V - Proposed List of Network Products includes a more comprehensive list of the network products.

It is envisaged that new products may come on line in which case they should also be subject to dis-aggregation and should not be bundled with existing products, especially data products, VPN products, mobile number portability and infrastructure sharing products. Likewise, the outcome of the ODTR project on Market Definitions, which is due to be completed in June 2003, may define additional network products. It is envisaged that the MNO's would analyse to the greater level of detail between the final accounting decision notice and the markets definition decision notice.

Retail Product – a retail product is the retail equivalent of the network product and represents how the 'network' products are sold to the retail market. Not all network products are offered on the retail market by an MNO, e.g. fixed to mobile call termination is not a retail product of an MNO but is offered to wholesale Interconnection customers.

Retail Bundle – a retail bundle reflects the way the MNOs package their offerings to the market. The Director proposes to define retails bundles as residential post-paid, business post-paid and prepaid. The following retail products may be included in the retail bundle:

- Periodic Subscription
- Free Minutes
- Retail Product Call Types
- Roaming charges

4.5 DIS-AGGREGATION AT THE COST LEVEL

The basic premise behind cost allocation is that a cost should be recovered from that product (in the case of Mobile Retail service it is noted that more than one network product is required to provide service to the customer) that causes the cost to be incurred. Identifying cost drivers or appropriate cost allocations can help in this regard. A cost driver is a factor that causes variation in the cost of an individual element of provision of a product or service.

The following level of dis-aggregation has been determined to ensure that a greater number of cost drivers may be more accurately applied to individual costs. Both capital charges and operating costs should be analysed under this process.

Costs are split into seven broad categories:

1. Network Costs
2. Subscriber Costs
3. Customer Acquisition Costs
4. Customer Servicing Costs
5. External Interconnection Costs
6. Spectrum and licence fees
7. Common and Joint Overhead Costs

4.6 THE NETWORK COST GROUP

The primary objective of grouping costs into this category is to ensure that all network assets and associated operating costs are charged to the network business and that non relevant costs are not charged directly[3] to the network business. The network cost group should include the costs of all network elements that should be allocated to the underlying traffic or capacity related products. This is because capacity is the main cost driver or allocation method as opposed to elements that are driven by the number of subscribers.

In any utility business the majority of network assets must exist in order for any retail product to be produced. As a result, there is no single product that drives the investment in certain network elements. However, from the cost allocation perspective each network element that exists in the network cost group should be allocated its share of that element's costs on the basis of usage of that element. In the fixed network while many products share the same network elements they may use the network element with different degrees of intensity and to

[3] In this instance the term 'directly' means that network costs should be reported separately in so far as no costs from the other cost categories should be included in the statements in this cost group.

the extent that this is the case will not incur the same network charge. This is also the case in the mobile industry.

All relevant network elements should be analysed at both the functional and physical level to ensure that the correct treatment is applied. Mean net asset values and operating costs should be separately analysed and not aggregated as this impacts on the eventual Profit and Loss and Return on Capital Employed calculations.

The mobile network comprises two discrete physical and logical layers, the transmission or connectivity layer, and the network element layer. The transmission layer comprises the following paths, which are both-ways paths:

- (G)MSC- MSC
- MSC- BSC
- BSC – BTS
- BTS-SIM

The functional layer or network element layer comprises many network elements and within each element many components. The intention is that analysis is performed at the component level and routing factors calculated and applied at this level. As a result, for example, the MSC CPU component may have a different routing factor than the MSC VLR component for an individual network product.

In order to ensure that products are attributed the correct level of network costs it is advantageous that shared physical infrastructure is separated out before allocating network costs to the underlying incoming and outgoing products. In order to recognise the true costs of the network, the costs associated with physical infrastructure *rented to other parties* and the revenue earned from physical infrastructure *rented from other parties* should be included. This rule should hold true for any form of infrastructure sharing.

Q. 1. Do you agree with this level of dis-aggregation as regards the seven cost groups?

Q. 2. Do you agree that network elements should be analysed at the component level?

Q. 3. Do you agree that shared infrastructure costs and revenues should be taken into account?

If you do not agree please state your reasons and outline an alternative approach that would meet the objectives of the ODTR stated in the introduction.

4.7 CALCULATION OF ROUTING FACTORS

Routing factors show the usage of a component by a network product. Routing factors are based on analysis of the usage of the network component by the full range of network products and should be specific to each call type, both incoming and outgoing. There are two potential options for calculating routing factors. The first option is to blend the traffic and

signalling usage of the component to arrive at a 'blended rate'. The second option is to calculate the traffic and signalling load by each network component and then calculate the routing factors.

There are inherent weaknesses in the blended approach because some network products, such as SMS and termination, carry a much higher signalling load than traffic load in percentage terms. Likewise aggregating signalling and traffic ignores the fact that some network components may use 80% of their capability to serve signalling jobs and only 20% to serve the traffic conveyance. However, given the workloads involved with segregating signalling and traffic capabilities for each network component, the Director is minded not to impose full segregation of the network routing factors between traffic and signalling. A more detailed discussion of the signalling layer and its impacts is provided in APPENDIX III - Options for Treatment of the Signalling Layer.

Given the significance of the routing factor to the overall network product costs the Director is minded to require the MNOs to provide full details of the calculation methodology behind each routing factor and all associated documentation. A more detailed discussion of routing factors may be found in the in APPENDIX IV – Routing Factors.

Q. 4. Do you agree with the blended treatment of routing factors and with the documentation requirements associated with routing factors provided by the MNOs? If not and you believe that the signalling layer should be separately analysed before routing factors are calculated please provide some suggestions on how the signalling load could be calculated and secondly on how the signalling load could be allocated to signalling jobs.

Q. 5. Do you agree with the formulation of routing factors as described in APPENDIX IV? If not please give reasons.

4.8 THE RETAIL COST GROUP

The retail cost group encompasses all the costs and revenues associated with the retail arm of the business. Retail costs are in the main split into the four groups mentioned in the section 4.5, namely;

- subscriber costs;
- customer servicing costs;
- customer acquisition costs; and
- direct external interconnection costs.

In order to improve the transparency of the accounts the Director is minded to request that each cost block be separately identified within the separated accounts. A further discussion of each cost block is provided below.

4.9 SUBSCRIBER COSTS

Subscriber costs are costs that are directly attributable to the number of subscribers and do not include any costs that are driven by capacity demands. These costs should not be

aggregated with network costs. They are used as inputs for the Retail Product Bundle statements using subscriber numbers as the allocation key.

Q. 6. Do you agree with this treatment?

4.10 TREATMENT OF HANDSET PROCUREMENT AND PROVISIONING COSTS

The costs associated with procurement and provisioning of handsets may be significant. However, as they are not part of the network it is the Director's current opinion they should be charged not to the network business but to the retail business. Similarly, she is also minded to require that handset procurement and provisioning costs also be charged to the retail business.

Q. 7. Do you agree that the SIM card is the appropriate Network Terminating Point? If not, please provide your views with outlining the functional and technical reasons for opting for another NTP.

Q. 8. Do you agree that handset procurement and provisioning costs should be charged to the retail business?

4.11 CUSTOMER ACQUISITION AND CUSTOMER SERVICING COSTS

This grouping is similar to the Subscriber Costs group insofar as the drivers for these costs are also a function of subscribers. However, this category relates to costs that generally are incurred within the marketing and commercial functions of the MNO.

Customer Acquisition Costs- These costs relate to the activities associated with attracting potential customers to the network and in some cases are specific to customer segments.

Customer Servicing Costs – These costs relate mainly to the costs of running the customer help desks, customer complaint desks, customer billing and payments and ongoing general marketing. The MNOs should be able to allocate costs to the major segments; business post paid, residential post paid and prepaid, given that customer service centres generally have different access numbers per segment.

Q. 9. Do you agree that in the first instance customer acquisition and servicing costs should not be charged to Network Products?

Q. 10. Do you believe that unclaimed credits by Prepaid Customers may be significant in so far as customer revenues from prepaid may not have a linear relationship with underlying network usage?

4.12 EXTERNAL INTERCONNECTION COSTS

4.12.1 Conveyance Charges

MNO's pay interconnection fees for calls that terminate or transit via the interconnecting partner's network. The fee payable is set by the call type and is built up from costs and the routing factors of the interconnecting partner for that particular call. These costs should be charged in detail to the retail call or product in the product bundle level.

Q. 11. Do you agree with the allocation of interconnection conveyance charges to retail products?

4.12.2 POI set up costs & Interconnect Links

The Points of Interconnect are generally established such that the operator that sends the traffic pays for the links associated with the traffic stream. Consequently the costs for commissioning POI's and testing POI's, and periodic charges for the lease of incoming links should not be charged to Termination products.

Q. 12. Do you agree that the POI commissioning and testing costs, and periodic charges for interconnection links should be charged only to Origination Traffic?

4.13 SPECTRUM AND LICENCE FEES

Annual spectrum fees can be regarded as part of the cost of operating the network which can legitimately be passed on to interconnecting parties. On the other hand up front licence fees and administration fees are general costs of doing business. The Director is minded to allocate annual spectrum fees to the network with licence fees being charged to retail bundles.

Q. 13. Do you agree with the proposed treatment?

4.14 COMMON COSTS

Common costs relate to costs which are common and not directly incurred as a result of any one product. However, the Director believes that the categories of costs that should be treated as common costs should be kept to a minimum. For example, most accommodation

costs can be traced directly to individual services. However a decision needs to be made as to whether a portion of common costs should be allocated to network services.

Given that common costs can distort the underlying ratios the Director is minded to require operators to allocate and apply these costs to the product and product bundles as opposed to the network components. The advantage of not allocating common and joint costs to the network is that it enables the true cost of network components to be determined and also provides transparency as part of the overall process. In the interests of transparency, the Director is further minded to require that common costs be charged on a separate line from direct operating costs and depreciation costs in the Profit and Loss Statements.

Q. 14. How do you think common costs should be allocated? In your response please indicate what costs you would expect to be treated as common or joint.

Q. 15. Do you agree that common costs should be recorded as a separate line item in profit and loss statements?

4.15 TREATMENT OF EXTRAORDINARY AND EXCEPTIONAL ITEMS

It is reasonable to assume that the activities of the mobile operators could give rise to extraordinary and/or exceptional items periodically. However, to ensure greater transparency and clarity in the presentation of information, the Director is minded to disclose separately on the face of the appropriate P&L (which will be determined according to the facts of each case) the effect of each extraordinary and/or exceptional item. In addition a full explanation of both the item in question and its accounting treatment should be provided in a note to the accounts.

Q. 16. Do you agree with the proposed treatment?

4.16 PRODUCT DIS-AGGREGATION

To date in the debate about the level of the termination rate, both regulators and MNOs have bundled all termination products or call types into a generic 'termination product' and all origination products or call types have been bundled into a generic origination product. This treatment reflects the focus of the investigations which was to determine the appropriate blended per minute rate of termination. However, such high level of aggregation may limit the usefulness of separated accounts.

In any case, for separate accounts to be useful it is necessary to develop an understanding of the underlying costs and their drivers as they relate to individual products. It is the opinion of the office that the level of usage of network elements depends to a large part on the call type, with different call types using more and different network elements than others. For example, a mobile to International call uses the GMSC whereas an on-net call does not, likewise an SMS message will have a higher utilisation of MSC CPU relative to other call types.

To address this issue the Director is minded to request a high level of dis-aggregation such that the turnover and direct costs (internal and external) of each product can be traced through the accounts. Both the capital element and the operating costs should be allocated to each network product (with the signalling loading, if deemed applicable (see APPENDIX III)) in line with the routing factors identified for each component and each call type.

The Director is also minded to request that results are analysed by product bundles so as to determine the profits being made on a customer segment basis. See APPENDIX V - Proposed List of Network Products for a full listing of network product types.

The turnover earned by each product type and the direct costs both internal and external incurred by the product should be included as separate line items in the Retail Bundle Profit and Loss statement.

Q. 17. Do you agree with this level of dis-aggregation for network products?

4.17 TREATMENT OF 3G/UMTS UNDER ACCOUNTING SEPARATION

The EU directorate with responsibility for telecommunications is currently appraising the treatment of 3G/UMTS networks. One of the key discussion points is the means by which network or infrastructure sharing shall be achieved. It is anticipated the directorate will complete their deliberations before the end of the year. For this reason the Director does not consider it appropriate to address the issue of accounting for 3G as part of this consultation process.

4.18 TREATMENT OF DEBTORS AND CREDITORS

4.18.1 Interconnection Debtors and Creditors

Given that debtors and creditors are a function of the underlying interconnection charges these debtors and creditors should be allocated to the underlying traffic types that cause them to occur. Consequently, the Termination products will show a debtor or an increase in the Working Capital Requirement (WCR) to the extent of monies due from external parties. The Origination products will show a creditor or a decrease in the WCR to the extent of monies owed to external parties. However, overall the Network Business should only show the net effect of both the interconnection debtors and creditors.

4.18.2 Retail Debtors

External debtors should be traced to the retail bundle that they utilise and analysed in this manner.

Q. 18. Do you agree with the treatment of interconnection and retail debtors and creditors as described above?

5 COSTING METHODOLOGIES

5.1 INTRODUCTION

This section evaluates alternative costing methodologies which could be used in the development of the separated accounts for mobile operators. The section also discusses other associated issues such as the treatment of cost differences between the operators, Cost of Capital of mobile operators, network externalities and mark-ups.

5.2 COSTING METHODOLOGIES

In determining which costing methodology or methodologies should be employed in deriving the mobile separated accounts, two broad issues need to be addressed:

- Whether costs should be measured in historic or current cost terms?
- Whether costs should be measured in marginal, incremental or fully allocated cost terms?

These issues are clearly inter-linked. For example, while it is in principle possible to measure incremental cost in historic cost terms such an approach is unlikely to be used in practice.

5.3 HISTORIC OR CURRENT COST MEASURES IN THE CONTEXT OF THE MOBILE MARKET

The major arguments for developing accounts in historic cost terms is that historic cost valuations represent an objective benchmark of costs and that they tie back to the actual values in the companies' report and accounts. In addition, historic cost measures are easier to develop since they require neither asset re-valuations nor the development of new depreciation calculations.

However, where there has been significant cumulated general price inflation and/or where there have been large movements in asset specific prices, historic cost asset measures may provide a very misleading view of the replacement values of assets in the network. Further distortions may be caused by improvements in equipment quantities and the existence of fully depreciated assets.

While general price inflation has been relatively low in recent years, the cumulated impact of this inflation over the lifetimes of assets may not be negligible. More significantly, there is some evidence that the prices of specific assets have changed over recent years. Hence, the ODTR believes that if separate accounts are only developed in historic cost terms they could provide an inaccurate view of the actual costs of operators. As a result, the Director is minded to also require asset values to be presented in terms of Current Cost Accounting (CCA) values.

On the other hand, the Director also recognises that historic cost statements can be related back to the companies' asset registers and that the companies' accounts are presented in historic cost terms. Thus, historic cost accounts have a role to play in the reconciliation process. Therefore, the accounting separation information should also be produced on the

basis of Historic Cost Accounting (HCA) with a reconciliation statement between this basis and current cost accounts.

Further considerations on how asset revaluation on the basis of CCA should be carried out are presented in Chapter 6 of this document.

5.4 MARGINAL[4], INCREMENTAL[5] OR FULLY ALLOCATED COSTS[6]

In a fully allocated costing system all costs are allocated to one or another service, even where a cost is not caused by a single service. Hence, as noted below, fully allocated costing systems are often considered to apportion common costs in an arbitrary manner. By way of contrast, LRIC is defined as the cost caused by the provision of a defined increment of output given that all costs can, if necessary, be varied and that some level of output is already produced. For the purposes of Regulatory Accounting a broader definition of LRIC is often employed such that the increment is defined as the total service volume and that the cost base is uplifted by an allocation of a portion of common and joint costs. In practice, regulatory models calculate average incremental cost.

Marginal cost is the cost resulting from a very small change, in output. In practice, marginal cost is often examined in terms of a small percentage increase or decrease in output. Marginal cost can be measured in either short or long run terms although the latter approach is more common in telecommunications where, at least for fixed networks, short run marginal costs are generally extremely low.

Traditionally costing systems have tended to measure fully allocated costs although in telecommunications incremental costing models have been developed in a number of countries. Fully allocated costing systems have been attacked on the following grounds:

- any common costs between different services can only be apportioned in an arbitrary manner[7]
- all apportionments and allocations in a fully allocated costing system are necessarily arbitrary
- these systems take no account of inefficiencies.

The first issue is undoubtedly important in the case of fixed networks, although the use of very large increments and equi-proportionate mark-ups means that the difference between FAC in current cost terms and LRIC (with mark-ups) may not be significant. However, the

[4] Marginal costs can be defined as the additional cost of producing an additional unit of output without altering the factors or production.

[5] Incremental costs can be defined as the additional cost of producting an additional unit of output. In telecommunications networks the increment is usually defined as total traffic such that total relevant costs are averaged over the total traffic carried. In its purest form incremental costing does not allow for any recovery of common or overhead costs. However, in practice regulators have allowed operators to recover some portion of the common costs via a 'mark-up' scheme.

[6] Fully Allocated costs can be defined as the average cost of producing each unit of output and allows allocation of both direct and common costs.

[7] This point notwithstanding in many situations some apportionment bases appear to be more reasonable than others.

use of activity based costing and granular management accounting can address this issue to some degree.

In the ODTR's view there is no underlying reason why the apportionments and allocations of fixed costs cannot be based on rational principles and one of the purposes of this document is to outline what these principles should be. Hence, the ODTR does not consider this to be a valid criticism in the current context.

Finally, with respect to inefficiencies the ODTR notes that inefficiencies should be calculated on a market basis having regard to customer and traffic volumes, topography, population densities as well as general market conditions. Given that one of the reasons for requesting accounting separation is to gather much of this data the Director is minded to set aside this question until the first separated accounts have been submitted and analysed.

Given the above arguments the ODTR believes that fully allocated costing methodologies can provide useful information, provided that the underlying asset data is in current cost terms. Given the time involved in developing LRIC estimates the ODTR believes that initially the separated accounts need not be based on LRIC costing methodology. Rather the Director is minded to impose both HCA and CCA costing as the common minimum standard for the separated accounts.

5.5 SUMMARY OF VIEWS ON COSTING METHODOLOGIES

The ODTR believes that the separate accounts should be produced in both historic and current cost terms with information provided to reconcile the two outputs. The information should be provided in fully allocated cost terms based on a top-down approach.

Q. 19. Do you agree that the common minimum standard for the production of the Separated Accounts should be both historic and current costing (see chapter 6.0 for the definition of CCA)?

Q. 20. Do you agree that the basis of this information should be fully allocated costs?

5.6 OTHER ISSUES

The following issues are addressed below:

- Ramsey pricing
- Network Externalities
- Bases for allocation of common costs

5.6.1 Ramsey Pricing

Ramsey pricing involves marking-up prices above marginal cost in such a way as to minimise economic welfare losses while at the same time ensuring the recovery of fixed costs[8]. In the simplest case where only own-price demand elasticities are considered, this involves imposing the highest mark-up (relative to cost) on the service with the lowest demand elasticity and the lowest mark-up (relative to cost) on the service with the highest demand elasticity. More sophisticated models of Ramsey pricing take account of cross-elasticities and network externalities.

The ODTR has a number of concerns with regard to Ramsey pricing. Firstly, the information requirements for implementing Ramsey pricing are extensive, encompassing, for example, own and cross-price elasticities and the extent to which these vary with prices. Further, while Ramsey prices should be based on market elasticities, MNOs are likely to focus on the elasticities that they face which may be very different. Hence, if the regulator were to impose a Ramsey based price for a service for which it deems that there is insufficient competitive pressure, there is no guarantee that the firm will impose Ramsey based prices, based on market elasticities, for other services.

In addition, there is no evidence to suggest that the relative elasticity functions can be easily ascertained especially in light of the level of customer segmentation. Price elasticity at the product level is a function of the various consumers within the market all of whom may exhibit different utility factors at both the individual and customer level for the product in question. These individual elasticities need to be measured, at least on a sampling in order to arrive at a meaningful elasticity factor.

Finally, as argued below, the ODTR does not believe that network externalities are a factor which should be adjusted for. In consequence, the ODTR believes that there is little to be gained from using Ramsey pricing.

5.6.2 Network Externalities

An externality arises where a decision is made by one party which conveys either costs or benefits to another party. As a result the social benefits of that decision differ from its private benefits. In order to achieve economic efficiency, prices should be adjusted in such a way that the individual consumes the socially optimal output. Where the externality is positive this will result in a reduction in the price of the product; where negative this will result in an increase in the price of the product.

In the case of telecommunications two types of externalities are generally considered, namely call and line externalities. In both cases the externality arises because two parties are affected by the party making a call or joining the network. Therefore, in principle, the social benefits could be double the private benefits where both parties benefit equally. However, where these benefits are fully internalised, as discussed below, the private and social benefits will be the same.

[8] More strictly speaking this definition of Ramsey prices only applies to uniform pricing schemes. Where there are non-uniform pricing schemes, e.g. different combinations of rentals and call prices, these can yield higher welfare than simple Ramsey pricing.

Call externalities arise because a call initiated by the originating party confers benefits (or costs) on the receiving party. However, call externalities can be largely internalised (for example, parties can take it in turns to call one another) although total internalisation may not be possible, e.g. for parties with no community of interest. Where full internalisation takes place private and social benefits will be the same[9].

Network externalities are the benefits obtained by fixed and mobile subscribers when a person decides to become a new mobile subscriber. Existing subscribers value the calls that they make to and receive from the new mobile subscriber. They may also obtain a benefit from the *ability* to contact and be contacted by the new subscriber – the so-called 'option value'.

It is generally argued that it is more difficult to internalise network externalities than call externalities. This means that if some people are faced with the full costs of becoming a subscriber, they may choose not to join the network, although economic welfare would be enhanced if they did, because the sum of benefits (those gained directly and those obtained by others) exceed cost. There is, therefore, an argument for adjusting prices to reflect the network externality, i.e. adding a surcharge to mobile termination and encouraging MNOs to offer lower prices to mobile subscribers. We examine below the impact of such an adjustment on termination rates.

While internalisation may be more difficult for network externalities some internalisation will nevertheless take place. For example, within communities of interest one party with greater access to resources can purchase a phone for the other party. The likelihood of this form of action may be higher where the costs of doing so are low.

In addition, the MNOs may undertake internalisation themselves, for example:

- By setting subscription fees/handset cost below cost to attract more users to their network (or where other parties follow suit to get additional incoming/outgoing calls);
- By segmenting the market, using multi-part tariffs. This enables them to offer packages to attract new customers.

The former practice results in a subscription charge below cost for all users which needs to be compensated for by higher than cost charges for other services. However, the latter practice means the subscription charge is only below cost for targeted customers and thus compensation is only required for losses incurred on these customers. The use of targeted pricing has a very significant impact on the subscription loss which needs to be covered by higher call rates.

A number of estimates have been made of the impact of externalities on optimal termination changes. In the UK, the Competition Commission estimated the impact of these externalities to result in a 0.5 pence increase in the optimal termination rate[10]. More recently Oftel has

[9] Note that where there is no internalisation social benefits will be double private benefits where the value of the link is the same for both parties.

[10] Monoplies and Mergers Commission *Cellnet and Vodafone: Reports on references under Section 13 of the Telecommunications Act 1984 on the charges made by Cellnet and Vodafone for terminating calls from fixed-line networks'*, 21 January 1999.

proposed a higher figure of around 2 pence with the difference largely reflecting higher subscription cost figures and a higher externality value[11].

The ODTR has a number of concerns with estimates of externality impacts, many of which have been recognized by Oftel and the CC[12]. In the ODTR's view many of these factors would significantly reduce the size of the mark-up allowable for externalities.

Firstly, the own-price elasticity of subscription is likely to decline with the price level (indeed to assume otherwise implies infinite demand at zero price). The fact that some people do not have a mobile may be a lifestyle choice which would be little affected by any change in subscription prices. With the market at or near saturation level it is therefore likely that subscription elasticities are rather low. This will reduce the level of the optimal mark-up for termination rates.

Secondly, the likelihood of internalisation is likely to change as the price level falls and penetration levels increase. For example, an increase in the penetration rate is an indication that mobiles are more highly valued and may encourage more people with circles of interest to purchase mobiles as gifts. A reduction in the externality factor will reduce the level of the optimal mark-up for termination rates.

Thirdly, estimates of the mark-up are based on uniform pricing. However, an examination of actual pricing practices indicates that targeting does take place both between pre and post paid customers and within each of these categories. In a world of perfect pricing targeting the amount of money required to cover the loss on subscription changes is far lower than where there is no targeting. The ratio between the two will depend on a range of factors including own-price elasticities but may be very low. In practice, targeting will be imperfect but will nevertheless reduce the optimal mark-up very significantly.

Finally, the mark-up for externalities is based on a Ramsey pricing methodology. However, there is no reason to suppose that the additional monies generated from pricing termination above cost would be used to set subscription prices below cost to encourage new network joiners. Mobile network operators may believe that the benefits of encouraging additional membership are limited given the calling rates of these potential customers. Hence, they may pass on the additional monies in the form of price reductions for other services. Further, where there is imperfect competition they may use the monies to achieve a higher rate of return.

In summary, network externalities are considered by many to be a factor which should be taken into account in telecommunications pricing. Whereas for fixed networks it is argued that low user schemes ensure that the difference between private and social benefits is reduced and/or eliminated, there is no such mechanism for mobile networks. Hence, it is often argued that if as a result of externalities the optimal subscription price is below cost the termination charge should include an element to compensate for this subsidy.

[11] Oftel, *Review of the Charge Control on Calls to Mobiles,* 26 September 2001.

[12] These are outlined in Oftel's Response to the Competition Commission's Letter on Externalities of 28 March. In addition, J Rohlfs who has been working for Oftel has identified a number of major issues associated with estimating the impact of externalities.

In the ODTR's view there is a high degree of uncertainty about the optimal level of the mark-up. However, it believes that the optimal mark-up is likely to be small, due to the combination of inelastic demand for subscription at current prices; low externality factor and current prices and penetration rates and because of the MNO's ability to segment the market. As a result of these factors and given that any mark-up may not flow through the subscription charge, the ODTR does not believe that a mark-up for externalities is warranted.

Q. 21. Do you agree that no allowance should be made for the impact of network externalities in regulating the prices of network services?

5.6.3 Bases for allocation of common costs

In order for allocation bases to operate as expected it is a necessary prerequisite that only relevant costs are attributed via that allocation key or base. Only true common costs which are defined as costs that are not caused by any one driver neither network nor retail, should be subject to these allocation keys. From the perspective of definitions it may be considered that allocation bases relate to the more theoretical approach to overall allocations whereas allocation keys relate to the practical alternatives.

With regard to the allocation base there are two main bases considered, Ramsey Pricing Mark-Ups and Equi-Proportionate Mark-ups:

5.6.3.1 Ramsey Pricing Mark-Ups

Ramsey Pricing has been discussed above (section 5.6.1) and for the reasons noted, the Director is minded not to use Ramsey Mark-Ups as the allocation base.

Q. 22. Do you agree with this treatment?

5.6.3.2 Equi-Proportionate Mark-Ups

As the name suggests this mark up is based on applying common costs in direct proportion to some underlying cost component whether it be asset costs, total relevant costs, or some other basis. For reasons of practicality the Director is minded to use this approach. Operators should assess a variety of allocation cost component keys and select the most appropriate one having regard to the principles of cost orientation and non discrimination between the network business and the retail business.

Q. 23. Do you agree with this treatment?

5.7 TREATMENT OF COST DIFFERENCES

Given that there are two SMP operators in the Irish market the issue of comparability of the cost levels arises. In considering this issue it is useful to examine major areas of cost, highlight areas where differences are likely to arise and indicate where these differences can be reduced in the separate accounts. It is further recognised that there may be legitimate reasons why such costs differences may arise.

The main cost areas envisaged where cost differences can arise are capital expenditure, operating costs and commercial costs.

5.7.1 Capital Expenditure

The SMP operators have almost identical coverage with the implication that these operators may have a similar number and mix of network elements. Nevertheless, some differences are likely to arise, for example in the extent to which assets have been written-off and possibly in equipment prices. Differences could also arise because the SMP operators use different asset lives.

The extent of differences in the value of capital assets can be reduced if the accounts for the two companies are prepared on appropriate bases. In particular:

- The use of CCA may reduce the impact of different rollout profiles
- Standard asset lives will be specified for each class of network asset
- Allocation and apportionment bases are specified for areas where differences in treatment are likely.

Differences in depreciation charges may be lessened by the use of standard asset lives. Nevertheless, some differences are still likely. For example, one operator may have been able to achieve a greater reduction (or smaller increase) in equipment prices during the year for which the accounts are to be prepared. As a result its overall depreciation charge may differ from the other operator.

5.7.2 Operating Costs

In the case of network maintenance charges may differ because of differences in maintenance practices. For example, one operator might adopt a 'turn key' approach while the other may undertake maintenance internally. This could result in different levels of maintenance costs in a given year and a different profile of costs over time. The operators should provide information on the way in which maintenance is undertaken within their organization. In the event that it is decided to regulate prices in some way the ODTR may request for information on maintenance costs and also on capital costs over a number of years to determine whether any efficiency adjustment is required.

5.7.3 Commercial Costs

Commercial costs may also differ between the operators reflecting, for example:

- Re-branding costs
- Market communications spend
- Management fees, if any
- Service provider incentives.

In order to identify the significance of such differences it is important to show operating costs at a sufficient level of granularity such that major areas of difference can be isolated. Once isolated these price differences can be analysed and normalised if due to timing differences. In the case of non-timing differences each cost difference should be considered on a case by case basis.

In summary, the ODTR believes that the extent of cost differences can be reduced through the application of standardization in certain cases. Further, it believes that information should be provided on a sufficiently dis-aggregated basis to provide an indication of the reasons for differences. Additional investigation may be required in some cases to understand whether differences arise from different level of efficiencies. However, the ODTR believes that some differences in costs are likely and that these differences will arise even if the operators' have the same level of efficiency. For example maintenance practices may differ as between the operators (one may outsource while another may not). To the extent that this is the case this should be reflected in prices allowed if it is decided to regulate the price of any services.

Q. 24. Do you believe that there is merit to normalising the asset lives between operators?

Q. 25. Are there any other measures which can be taken to ensure cross comparability between operators?

5.8 COST OF CAPITAL AND CALCULATION OF ROCE

The Cost of Capital can be measured using a variety of methods. In the EU's view the 'Weighted Average Cost of Capital' (WACC) is the most appropriate measure. WACC can be defined as follows:

$$WACC = Cost\ of\ Equity \cdot \frac{Total\ Equity}{Total\ Equity + Total\ Debt} + Cost\ of\ Debt \cdot \frac{Total\ Debt}{Total\ Equity + Total\ Debt}$$

The WACC can be calculated on either a pre-tax or post tax basis and in either nominal or real terms.

The most commonly used methodology to calculate the cost of equity is known as the Capital Asset Pricing Methodology (CAPM), although other methodologies, such as the dividend growth model and arbitrage pricing theory, are also used in some cases. According to CAPM the cost of equity (in the absence of taxes) is the risk free interest rate plus the equity market premium multiplied by Beta. The cost of debt figure can be calculated on the basis of the coupon associated with debt instruments.

The Return on Capital Employed (ROCE) is calculated by applying the Cost of Capital to the Mean Capital Employed figure. Mean capital employed is defined as total assets less current liabilities, excluding corporate taxes and dividends payable, and provisions other than those for deferred taxation. The mean is computed from the start and end values for the period,

except in the case of short-term investments and borrowings, where if available, daily averages are used in their place.

The value of the Cost of Capital used by the operator should be disclosed on the face of each statement and the basis of the calculation should be disclosed in the notes to the Statements.

Q. 26. Do you agree that CAPM is the most appropriate model for calculating the cost of equity?

5.9 COST OF CAPITAL FOR MOBILE OPERATORS

Most regulators in the European market use a pre-tax WACC in the region of 11% -14%, the WACC in Ireland for the fixed incumbent has been set at 12%. Given the low level of risk associated with the fixed incumbent's business, this level of WACC is appropriate to the sector in which the fixed incumbents operate and its application across all the different national markets is a means of comparing the cost levels of incumbents. This low risk level reflects the fixed incumbent's high market share, full network deployment and self financing operations.

The issue arises as to whether the same pre-tax WACC should be applied to mobile operators. One reason for allowing a different WACC is that the Beta factor applying to these operators may be higher than for fixed network operators. In the past there was certainly some evidence that mobile operators had a higher Beta factor than fixed operators[13]. However, in recent years mobile market penetration has increased substantially and this may have reduced the Beta in the mobile market.

Another possible reason for allowing a higher cost of capital for mobile operators is that they are subject to higher bankruptcy risk than fixed incumbents, a factor which is not reflected in the standard CAPM approach, but is reflected in the cost of debt.

Q. 27. Do you believe that the Beta factor is different for SMP mobile operators than for fixed incumbents? If so, how large do you believe the difference to be and what is the basis for your view?

Q. 28. Do you believe that the risk of bankruptcy results in a higher cost of capital for the SMP mobile operators than for fixed operators? If so, how large do you believe the difference to be and what is the basis for your view?

[13] See for example, the CC's discussion (op. cit.) of the cost of capital.

6 ASSET REVALUATIONS USING ELEMENTS OF CCA METHODOLOGY

6.1 GROSS REPLACEMENT COST

There are three alternative valuation methodologies which might be used to determine CCA values. These are:

- **Replacement cost** which is a measure of the cost of replacing the existing asset with another asset of similar performance characteristics;
- **Net Present Value,** determined as the sum of discounted cash flows which the asset is expected to generate over its lifetime
- **Net Realisable Value,** which reflects the amount the asset could be sold for.

One approach which is sometimes recommended for selecting between these alternatives is known as the Value to the Owner Convention. This can be stated as follows:

Current Cost = min[replacement cost, max (NRV,NPV)].

In practice this approach is rarely used. One problem is that it is difficult to calculate NPVs since these depend, inter alia, on the regulatory environment in which the firm is operating. Additionally, the net realisable value methodology is only appropriate where the asset is to be sold. However, the purpose of separate accounts is to look at the costs of activities which need to be provided.

In general therefore CCA tends to be measured on the basis of replacement costs. An exception is for those assets which are readily tradable in the open market - in the current context the clearest example is office buildings. In such cases the realisable approach (open market valuation) is appropriate.

Where the replacement cost methodology is used it is important to distinguish between those assets which would be replaced with the same technology and those where an alternative technology would be used. For assets which would be replaced with the same technology, the valuation can either be based on an absolute valuation methodology or on an indexation approach. The former involves examining the volume of equipment used in the network and multiplying it by the current asset price. While in principle straightforward issues arise in practice because the price may be sensitive to the quantity purchased. The alternative methodology involves adjusting the historic valuation by an asset price index for the period between acquisition and the current date.

Absolute valuations should be preferred to indexation since, for example:

- The asset may be comprised of a number of separate elements requiring different indexes particularly as the importance of these elements may vary over time
- Absolute valuation requires an inventory of equipment needed whereas indexation does not
- Assets in the books may not be used or alternatively may still be in use despite having been completely written off.

In some cases new technologies may have been developed since the existing asset was installed. In this case the Modern Equivalent Asset (MEA) valuation approach, as described here, should be used. While there may be no such cases in the mobile industry there may nevertheless be cases where the functionality of equipment has changed. These differences should be reflected in the value attributed to equipment. For example:

- Where the new equipment has greater capacity than the existing equipment the value attributed to that equipment should be written down to reflect its lower functionality. Thus, if the existing equipment has 75% of the functionality of the new equipment it should be attributed 75% of the new equipment's value (in gross terms);
- Where there are operating cost differences between the two classes of equipment the difference should be estimated for each year of the asset's life, discounted by the relevant cost of capital and summed. The resultant total should be subtracted from the capital cost of the new asset.

In summary, the replacement cost valuation methodology should generally be used. Where the MEA is different from the existing asset the existing asset should be valued on the basis of the MEA but with appropriate adjustments for differences in performance.

Where assets are tradable on the open market as is the case for some land and buildings the valuation should be based on the realisable value approach.

Q. 29. Do you agree with the use of MEA with adjustments for differences in performance as valuation methodology?

Q. 30. Do you believe that there have been significant changes in the nature/functionality of mobile equipment in recent years that would justify adjustments in MEA valuations?

6.2 NET REPLACEMENT COST

There are a number of methodologies which could be used for this purpose:

- The NPV methodology
- Application of the historic cost ratio of net to gross book value
- The roll forward methodology
- Detailed estimation from the financial records.

6.2.1 The NPV Methodology

The NPV methodology implies the use of economic depreciation. Essentially it involves estimating the NPV of the asset at the end of each year based on cumulated expected discounted cash flows (economic depreciation is the difference between these cash flows at the end of one year and at the end of the next year). While from an economic perspective there is much to be said for this approach, it is generally difficult to obtain the necessary data to put it into practice and in any case it is subject to a significant element of subjectivity. A further issue is that whereas the application of this methodology may make a significant difference to the profile of Net Replacement Costs over the lifetime of a single asset where

there are multiple vintages to be considered, as in a top-down model, it is likely to generate similar results to the rolling forward methodology.

6.2.2 Application of the historic ratio of NBV to GBV

A second and much more straightforward approach is to multiply Gross Replacement Costs by the NBV/GBV ratio. This approach will generate accurate results where there have been no price changes but will otherwise result in biased outcomes. For example, where the asset price has been increasing in value the NBV/GBV approach will overestimate asset values; where the asset price has been decreasing in value the NBV/GBV approach will underestimate asset values. For a 5% average decrease in asset values, the bias is in the order of 8%.

6.2.3 Roll Forward Methodology

The roll forward methodology calculates the net asset valuation as the gross asset valuation less cumulated current cost depreciation. To generate the gross asset statement the following procedure is used:

i) multiply the gross replacement cost at the start of the year by the square root of (1+ Asset price inflation during the year)
ii) add capital expenditure during the year
iii) subtract the gross values of disposals
iv) multiply sum of i)-iii) by the square root of (1+Asset price inflation during the year).

An analogous procedure can be used to generate the cumulated current cost depreciation statements. The rolling forward procedure produces accurate results except where there are fully depreciated assets. Where these are significant an alternative should be used.

6.2.4 Detailed Estimation from the Financial Records

The final methodology uses as a starting point the gross replacement cost of equipment (by class of asset) for each vintage of equipment. The valuation for individual years is then multiplied by remaining lifetime over book lifetime. Thus, if the equipment has a GRC of £2m, was purchased 8 years ago and has a 10 year asset life, its Net Replacement Cost of £2m x (10-8)/10 =£0.4m. This approach is to be preferred where the FAR contains sufficiently detailed information, as is the case in the current context.

In summary, while economic depreciation is appealing from a theoretical viewpoint it is difficult to implement, subjective and may result in similar results to other methodologies where multiple vintages of equipment are being considered. The Director considers that the best approach is to estimate Net replacement costs using information contained in the FAR.

Q. 31. Do you agree that the last option, described in section 6.2.4, detailed estimation from the financial records is the most appropriate method for revaluing each asset class?

6.3 TREATMENT OF HOLDING GAINS/LOSSES AND SUPPLEMENTAL DEPRECIATION

Regulatory accounts are by their nature based on decision making modelling rules (also termed managerial economic models). As a result, the revaluation process is carried out on an annual basis with no account taken of any sunk asset investments. Rather, the cost of acquiring assets in their current state is measured as an input into the decision model thereby ignoring the consequences of previous decisions. Each year the model is re-run from the same point, termed the year zero modelling concept, such that a 'new' value is created for each asset type based on its current state without any regard for its valuation in the previous period. Consequently, assets that may have been written off in the financial accounts but are still in use are considered live assets and revalued in current terms.

In practical terms in the first year of running the model revaluation holding gains or losses may arise due to appreciation or diminution in the replacement cost of the asset over the life to date of the asset. This is termed the life to date (LTD) holding gain or loss. As the model is re-run in future years the LTD gain/loss may lessen or increase depending on movements is asset pricing trends.

The LTD gains or losses can be treated in three different ways:

- Write off the LTD holding gain/loss to the P&L in the year of revaluation
- Amortise LTD holding gain/loss and write it off over remainder of the assets' life.
- Ignore the LTD holding gain/loss

The first option would be appropriate in the event where CCA is being applied to the financial accounts. Holding gains or losses cannot be ignored, otherwise the accounts will not balance without an adjustment to either reserves or the current profit. However, this practice runs contrary to decision making rules as it takes into account the old value of the assets rather than the current value. This results in distortions to the underlying profit figures and consequently reduces the usefulness of the statements in assessing profitability and return on capital employed. Thus the Director is of the view that LTD gains and losses should not be written off to the P&L.

The second option is to amortise the gains or losses and write them off over the remaining life of the asset, thus spreading the impact over many years' results. This system is in effect subject to the same conceptual weakness as option 1. However, in real terms the outcome of option 2 is to defer the full impact to future periods.

The third option may cause fewer distortions, values assets at true current costs and may lead to greater transparency in the accounts.

Q. 32. Which treatment for holding gain/losses is preferable? Please provide reasons for your answer.

7 FORMAT AND LAYOUT OF REGULATORY ACCOUNTING STATEMENTS AND ASSOCIATED NOTES

7.1 INTRODUCTION

Regulatory Accounting Statements consist of a variety of documents and statements. In order to preserve the commercial confidentiality of the operator, some documents and statements will not be made public. Instead they will be shared only with the ODTR.

This section lays out the proposed content and format of such statements, identifies the party responsible for producing the statement and the proposed distribution of the statements.

The Director's proposed approach is to require financial statements for the total network business plus each constituent network service. In addition the Director proposes that financial statements be prepared for the retail business as a whole plus each of three retail bundles, residential post-paid, business post-paid and prepaid. It is not proposed that all of this information would be published, but only the financial statements for each of the network and retail businesses as a whole. In calculating retail bundles operators may find it useful to perform the intermediate step of calculating financial statements for each retail product and pro-rating these across the relevant retail bundles. However it is not proposed that this be a requirement.

It is intended that the financial statements for each entity would comprise a Profit & Loss (P&L) Statement, a Mean Capital Employed Statement and a Return on Mean Capital Employed Statement.

The object of the exercise is to evaluate the profitability and rate of return for each entity as if it were a stand alone business. The proposal is that where one entity sells internally to another (for example a network , wholesale service to a retail service), that the seller should be allowed recover its costs plus a mark-up (or capital charge) to allow it to make a return (calculated as the business's cost of capital). The Director also proposes that financial statements for entities which consume internal resources (i.e. retail businesses which use network resources) should include their share of all costs incurred by the operator to provide that service, including the costs of providing the associated network service.

Similarly, their Statement of Mean Capital Employed should include not just the retail business's own assets, but their share of the network assets used to provide the underlying wholesale services. This also means that, since we are looking at the costs of retail services as a whole, that the margin uplift (referred to as "Capital Charge" throughout this paper) allowed to the wholesale network business should not be counted as, from this perspective, it represents an artificial internal uplift.

To summarise:

- Network business revenues would be comprised of external revenues (for example, interconnection revenues) plus internal transfer charges. The internal transfer charge is calculated as a) actual volumes sold internally times unit operating cost plus b) actual volumes sold internally times unit capital charge.
- Unit operating costs will include the appropriate depreciation element
- Capital charges are calculated as WACC times the average CCA net book value for the entity in question.
- Retail revenues should be entirely external.
- Retail business costs will be comprised of its own costs plus the internal transfer charge described above *excluding* the capital charge element.
- Retail business assets will be comprised of its own assets plus the attributable assets of the underlying wholesale services.

Q. 33. Do you agree with this general approach?

7.2 FORMAT OF ACCOUNTS

The Director must distinguish between the information necessary for her to perform her duties and information necessary for public disclosure to promote the operation of the market generally. She is minded to publicly disclose the introductory statements with financial statements for the total network and total retail business. She also specifies more detailed information that may be appropriate for submission to the ODTR. The various statements are described below.

7.2.1 Introductory Statements

The introductory statements do not include any detailed financial information. They describe the basis of preparation of the statements, the audit opinion and the responsibility of the Board of Directors for the package as whole

Statement Number	Statement	Prepared By	Distribution
1.0	Statement of Introduction Purpose: To set out the guiding principles under which the financial information is prepared i.e. the basis of preparation. Content: Regulatory Cost Accounting Guiding Principles applied	MNO	Public

	Accounting Policies applied Note on Attribution Methodology used Note on CCA valuation Methodology Cost of Capital Applied Routing Factors Calculations		
2.0	Statement of the Board of Directors <u>Purpose:</u> A formal statement of responsibility from the Board of Directors relating to the preparation of the HCA, CCA and Supplementary statements, as well as the reconciliation to the Annual Accounts.	MNO	Public
3.0	Audit Opinion <u>Purpose</u>: The auditors formally give their opinion as to whether: the HCA, CCA, Supplementary statements and notes thereto agree with the underlying accounting records; the basis of preparation conforms with the 'Statement of Introduction'; all information and statements required have been prepared.	Auditors	Public
4.0	Basis of Audit Opinion <u>Purpose:</u> To explain the work performed to reach the audit opinion laid out in statement 3.0.	Auditors	ODTR

Q. 34. Do you agree that these four statements should accompany the separated accounts? Are there any further statements that should be included?

Q. 35. Do you agree with the proposed content of the introductory statements?

7.2.2 Financial Accounts Reconciliation

These statements reconcile the input figures for the HCA statements to the figures quoted in the published annual accounts.

Q. 36. Do you agree with the content of the Reconciliation Statements? If not please provide alternative suggestions.

Statement Number	Statement	Prepared By	Distribution
1.0	Reconciliation of return per the separated accounts to the annual accounts Purpose: To reconcile retained earnings in the annual accounts to the separated accounts	MNO	Public
2.0	Reconciliation of mean capital employed per the separated accounts to the annual accounts Purpose: To reconcile shareholders funds in the annual accounts to the separated accounts	MNO	Public

7.2.3 Statements of the Network Business

A variety of statements should be produced in both HCA and CCA terms. Each statement is listed below.

Q. 37. Do you agree with the content of the Network Business Statements below? If not please provide alternatives.

Statement Number	Statement	Prepared By	Distribution
1.0	HCA Profit and Loss Statement for the Network Business as a whole.	MNO	Public
2.0	HCA Calculation of Return on Mean Capital Employed for the Network Business as a whole.	MNO	Public
3.0	HCA Statement of Mean Capital Employed for the Network Business as a whole	MNO	Public
4.0 – 6.0	CCA versions of the HCA statements noted above (Statements 1-3) for the Network Business	MNO	Public
7.0-n	HCA and CCA versions of the P&L & ROCE and Statement of Mean Capital Employed for each of the Network Business Products ➢ Origination ➢ Termination ➢ SMS ➢ Infrastructure Sharing ➢ Any other business line not already included	MNO	ODTR

7.2.4 Statements of Retail Bundles

Q. 38. Do you agree with the content of the Retail Bundles Statements listed below? If not please provide alternatives.

Statement Number	Statement	Prepared By	Distribution
1.0	HCA Profit and Loss Statement for the each of the three Retail Product Bundles segments: ➢ Business; ➢ Consumer Post Paid ; and ➢ Prepaid. Within each 'Profit and Loss Account the gross margin on each retail product would be shown e.g. for the M-F retail calls, the associated direct interconnect costs, direct internal transfer and the free minutes could be shown together on a line by line basis.	MNO	ODTR
2.0	HCA Calculation of Return on Mean Capital Employed for the three Retail Bundles.	MNO	ODTR
3.0	HCA Statement of Mean Capital Employed for the three Retail Bundles	MNO	ODTR
4.0	HCA Profit and Loss Statement for the Retail Business as a whole.	MNO	Public
5.0	HCA Calculation of Return on Mean Capital Employed for the Retail Business as a whole.	MNO	Public
6.0	HCA Statement of Mean Capital Employed for the Retail Business as a whole	MNO	Public
7.0 – 12.0	CCA Version of the HCA statements for the Retail Business	MNO	Public

7.2.5 Statements of 'Other Business'

Statement Number	Statement	Prepared By	Distribution
1.0	HCA Statement of Capital Employed	MNO	ODTR
2.0	HCA Profit and Loss Statement	MNO	ODTR
3.0	HCA Return on Capital Employed	MNO	ODTR

Q. 39. Do you agree with the content of the Other Business Statements? If not please provide alternatives.

7.2.6 Supplementary Statements

Supplementary statements are statements that are required to be filed with the separated accounts so as to show the basis of calculation. A variety of statements should be produced and these statements are deemed as equally important as the actual accounting statements.

Q. 40. Do you agree with the content of the Supplementary Statements? If not please provide alternatives.

Statement Number	Statement	Prepared By	Distribution
1.0	Network Component Table	MNO	ODTR
2.0	HCA and CCA asset valuation Table (at the component level)	MNO	ODTR
3.0	Traffic Volumes by each Call Type for period of the accounts	MNO	ODTR
4.0	Traffic Volumes by Network Components for the period of the accounts	MNO	ODTR
5.0	Basis of calculation of Routing Factors by Network Component	MNO	ODTR
6.0	Routing Factors for the period in question	MNO	ODTR
7.0	Actual Mobile Termination Rates (MTR) available to MNOs and FNOs for peak, off peak and weekends for the period in question	MNO	ODTR
8.0	Blended average MTR by FNO and MNO for the period of the accounts (i.e. total revenues divided by total volumes)	MNO	ODTR
9.0	Rates charged to the foreign MNO by call type for foreign Roamers on the national MNO	MNO	ODTR
10.0	Retail Rates levied on home customers roaming in other countries	MNO	ODTR
11.0	Rates levied by the foreign MNO for serving home customers	MNO	ODTR
12.0	Numbers of subscribers and customers by retail bundle	MNO	ODTR

8 PROCEDURAL MATTERS

8.1 TIME LINE FOR SUBMISSION AND PUBLICATION OF THE SEPARATED ACCOUNTS

The Director is of the view that timely publication of separated accounts is essential to the usefulness of the information contained therein. However, it is recognised that preparation of separated accounts is not an insignificant task. Hence, the need for timely publication should be tempered with allowing sufficient time for the preparation of such accounts. To meet the overall objective in the first year of preparation the Director proposes the operators are given six months from the end of the period to which the accounts relate.

8.1.1 Proposed Publication Dates

The Director is of the view that the Separated Statements should be issued in the following time frame:

Company	Accounting Period	Publication Dates
Vodafone Ireland Ltd.	April 1 2001 to March 31, 2002	By end of September 2003
	April 1 2002 to March 31, 2003	By end of September 2003
	Thereafter, for each full accounting period	Within six months of the end of the period to which the accounts relate.

Company	Accounting Period	Publication Dates
O2 Communications Ireland Ltd.	January 1, 2001 to December 31, 2001	By end of June 2003
	January 1, 2002 to December 31, 2002	By end of June 2003
	Thereafter, for each full accounting period	Within six months of the end of the period to which the accounts relate.

Q. 41. Do you agree with the proposed timeframe for publishing the separated accounts? If you disagree please state the reasons for such a view and provide an alternative proposal with full details and justification.

Q. 42. Do you agree with the proposed timeframe for publication of the separated accounts from year 2004 onwards?

Q. 43. Do you believe that year on year comparatives should be provided in the first year of publication?

8.2 TIME PERIOD COVERED BY THE STATEMENTS

The statements should match the time periods of the published Financial Accounts and the external MTR rates. In the event that an Operator cannot for any reason meet this requirement, a full reconciliation of the back to the HCA figures, for the HCA financial period in question, shall be required.

8.3 APPOINTMENT OF THE AUDITORS

Regulation 9(6) of SI 15 of 1998 require that financial reports relating to the accounts of organisations which provide a public network should be submitted to independent audit and published by the organisation concerned within six months of the end of the accounting year unless otherwise agreed by the Director.

The new EU regulations may change the legal background to the audit of separated accounts and underlying systems. The Director proposes to revisit the issue of the audit of separated accounts in due course.

Q. 44. Do you agree that the separated accounts should be audited and an audit report published with those separated accounts?

8.4 AUDIT REPORT

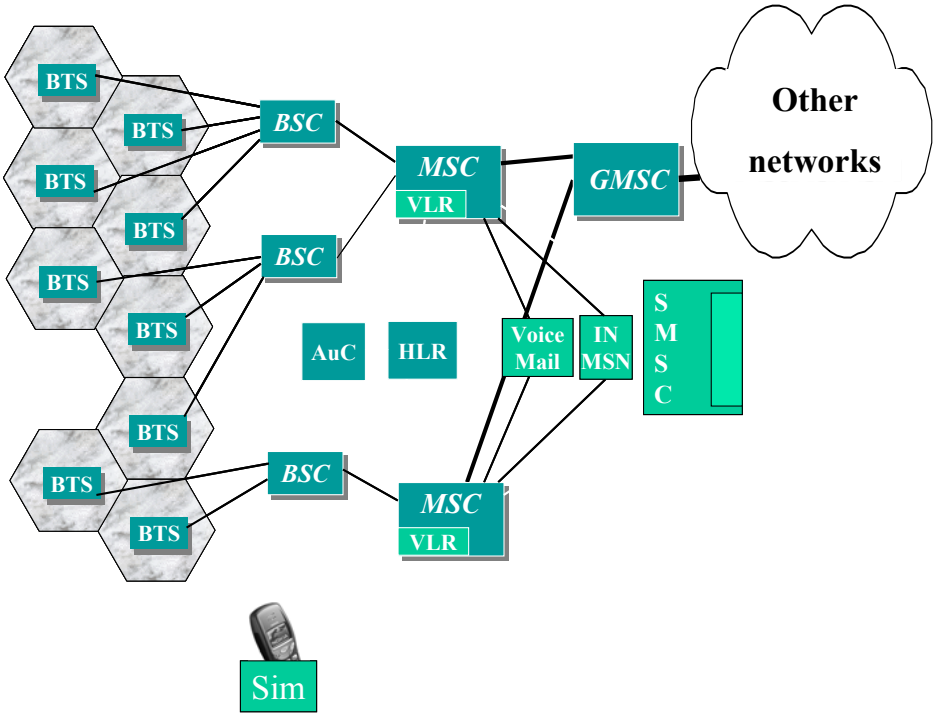
The Audit Report should be addressed to the Director and the audit opinion shall encompass the following:

Whether the Statements of each business and of each product within that business:

1. fairly present in accordance with the Accounting Documents, dated xx, the returns and mean capital employed of each business and each product or customer segment within that business;
2. complies with the Decision Notices; and
3. contains all the information and documents specified to be submitted by the Decision Notices.

Q. 45. Do you agree with the proposed 'Audit Opinion' extract?

APPENDIX I – Technical Overview



Explanation and Definiton of Terms:

MSC - Mobile Switching Centre. The MSC is responsible for the routing of traffic. The main elements of the MSC are the Processor (CPU), Routing Tables, Ports and VLR.

VLR – Visitor Location Centre. The VLR is a subset of the MSC and contains the data relevant to subscribers logically covered by that MSC at that point in time. As subscribers physically move through the network their movements are recorded in the VLR.

GMSC – Gateway MSC. This switching element controls handover of calls with other networks and is connected to other networks via a Point of Interconnect. In many cases an MSC may also perform GMSC functions.

HLR – Home Location Register. The HLR contains the details necessary to identify the network subscribers. This element has no switching capabilities.

BTS- Base Transceiver Station. This element comprises the radio transmission and reception devices including the antennas. Each BTS is parented to a single BSC.

BSC – Base Station Controller. The BSC handles the radio interface management, (allocation and release of radio channels and handover management) and is connected to an MSC and a number of BTS.

SIM – Subscriber Identity Module. In physical terms the SIM is the small card which is placed in the handset. Logically this element connects the subscriber to the network.

Without this element the subscriber cannot make or receive calls.

SMSC – Short Message Centre. This is a stand-alone element which enables subscribers to send and receive messages. Foreign network roamers do not use the visited neworks SMSC to receive SMS while abroad. Messages are always deposited in the SMSC of the home network.

AuC- Authentication Centre. This is a logical subset of the HLR but may be a separate functional element. The AuC verifies the rights of the subscriber to traffic on the network.

IN – Intelligent Network. This element is not mandatory in a mobile network. In effect it centralises the switching management function and is usually a standalone computer connected to the signalling and switching elements.

APPENDIX II - List of Network Components and Associated Operating Costs

Network elements should be broken into their constituent components and re-valuation takes place at the component level. Likewise routing factors are calculated at the component level.

Network Element	Component Cost Breakdown Level (Detailed Analysis)	Comment
Annual Spectrum Fees		Includes initial fees and periodic fees that cover the period in question
SIM card		Procurement and provisioning costs for SIM cards
Base Transceiver Station (BTS)	Site Footprint	Includes site acquisition costs and preparation costs. Also includes power costs and ongoing site rental costs or derived site rental cost if the building or land on which the station is located is owned by the MNO.
	Masts	Should include separate lines for costs saved by sharing and costs incurred by sharing.
	Transceivers (TRX) incl. antennae	
	Annual Spectrum Fees	Includes initial fees and periodic fees that cover the period in question
	BTS Hardware	
	BTS Software	
	BTS – Personnel	Should be matched to their function
Connectivity between BTS and BSC - (CBB)	CBB – Connection	Either Leased Circuit or Microwave or own infrastructure (duct and cable)
	CBB - Other HW	E.g. Cross Connect equipment
Base Station Controller (BSC)	BSC – Hardware	
	BSC – Software	
	BSC – Personnel	Should be matched to their function
Connectivity between BSC and MSC - (CBM)	CBM – Connection	Either Leased Circuit or Microwave or own infrastructure (duct and cable)
	CBM – Other HW	E.g. Cross Connect equipment
	CBM – Personnel	Should be matched to their function
Gateway Mobile-services Switching Centre - (GMSC)	MSC HW – Casing	In some cases MNOs will utilise a separate MSC to perform the role of the Gateway switch serving the POIs. If so the costs should be separated from in-network MSCs.
	GMSC HW – Ports	Ports not dedicated to POI links (should be stated elsewhere)
	GMSC HW – CPU	
	GMSC Software	
Mobile-services	MSC HW – Casing	

Switching Centre (MSC)	MSC HW – Ports	
	MSC HW – CPU	
	MSC Software	
	MSC Personnel	Should be matched to their function
	VLR – Hardware	Visitor Location Register
	VLR – Software	
	VLR Personnel	Should be matched to their function
MSC Billing Gateway	MSC Billing Gateway – Hardware	In some cases MNOs purchase the Billing Gateway with the MSC in which case the costs associated with the Billing Gateway need to be removed and separately analysed. Only the portion of the Billing Gateway allocated to interconnect traffic should be included in the network cost group. Retail billing and roaming billing allocations should not be charged to the Network business.
	MSC Billing Gateway – Software	
Connectivity between (G)MSC and (G)MSC (CMM)	CMM- Connection	Either Leased Circuit or Microwave or own infrastructure (e.g. SDH duct and cable)
	CMM – Other HW	E.g. Cross Connect equipment, terminal multiplexers
	CMM – Personnel	Should be matched to their function
Serving GPRS Service Node (SGSN)	SGSN – Hardware	
	SGSN – Software	
	SGSN – Personnel	Should be matched to their function
Gateway GPRS Service Node (GGSN)	GGSN – Hardware	
	GGSN – Software	
	GGSN – Personnel	Should be matched to their function
Home Location Register (HLR)	HLR – Hardware	
	HLR – Software	
	HLR – Personnel	Should be matched to their function
Authentication Centre (AuC)	AuC – Hardware	Authentication Centre
	AuC – Software	
	AuC – Personnel	
SMS Controller (SMSC)	SMSC – Hardware	Relates only to outgoing SMS as incoming does not use the SMSC.
	SMSC – Software	Relates only to outgoing SMS as incoming does not use the SMSC.
	SMSC Personnel	Should be matched to their function
Voice Mail Platform (VMP)	VMP – Hardware	
	VMP – Software	
	VMP - Personnel	Should be matched to their function
Intelligent Network (IN)	IN – Hardware	IN Serves VPN applications
	IN – Software	
	IN – Personnel	Should be matched to their function
Other Virtual Private Network (VPN) facilities	VPN - Hardware	Hardware other than for IN system, e.g. PABX interface switch/ports 'protocol converter' hardware

	VPN – Software	Software other than for IN system, e.g. PBX interface software (ISDN-30, G-SIG, etc.)
	VPN – Connection	Access facilities to customer site/PBX (e.g. leased line)
	VPN – Personnel	Should be matched to their function
Point of Interconnect (POI) to Fixed Network Operator (FNO)	GMSC Ports	Ports between GMSC and POI, should include separate lines for interconnect services provided and obtained from FNO
	Interconnect Links	Transmission facilities (e.g. leased lines, SDH, cable, duct etc.)
	Personnel	Should be matched to their function
	Interconnect Billing system – HW	The capital cost should be charged to interconnection products. Depending on the organisation of the interconnection function the interconnect billing system sometimes serve as an auditor of bills received as well as producing outgoing bills. Thus it may be chargeable to both traffic types.
	Interconnect Billing system – SW	
	Interconnect Billing system - Personnel	Should be matched to their function
Point of Interconnect (POI) to Mobile Network Operator (MNO)	GMSC Ports	Ports between GMSC and POI, should include separate lines for interconnect services provided and obtained from MNO
	Interconnect Links	Transmission facilities (e.g. leased lines, SDH, cable, duct etc.)
	Personnel	Should be matched to their function
	Interconnect Billing system – HW	The capital cost should be charged to interconnection products. Depending on the organisation of the interconnection function the interconnect billing system sometimes serve as an auditor of bills received as well as producing outgoing bills. Thus it may be chargeable to both traffic types.
	Interconnect Billing system – SW	
	Interconnect Billing system - Personnel	Should be matched to their function
Point of Interconnect (POI) to International Network Operator (INO)	GMSC Ports	Ports between GMSC and POI, should include separate lines for interconnect services provided and obtained from INO
	Interconnect Links	Transmission facilities (e.g. leased lines, SDH, cable, duct etc.)
	Personnel	Should be matched to their function
	Interconnect Billing system – HW	The capital cost should be charged to interconnection products. Depending on the organisation of the interconnection function the interconnect billing system sometimes serve as an

		auditor of bills received as well as producing outgoing bills. Thus it may be chargeable to both traffic types.
	Interconnect Billing system – SW	
	Interconnect Billing system - Personnel	Should be matched to their function
Network Management Centre	Buildings	This may be an operating or a capital item. If the MNO rents space the yearly inclusive rental charge should be included. If the MNO owns the building an equivalent rental charge can be used. Alternatively, the building costs inclusive of any commissioning (false flooring etc.) costs may be included in capital items. Only the portion of the building used by the MNO should be included. The valuation methodology for both the underlying land and the building itself may have a material impact
	Systems Hardware	
	Systems Software	
	Personnel	Should be matched to their function. Base Station Engineers, Switching engineers and Signalling engineers should not be included.
Network Maintenance Centre	Buildings	This may be an operating or a capital item. If the MNO rents space the yearly inclusive rental charge should be included. If the MNO owns the building an equivalent rental charge can be used. Alternatively, the building costs inclusive of any commissioning (false flooring etc.) costs may be included in capital items. Only the portion of the building used by the MNO should be included. The valuation methodology for both the underlying land and the building itself may have a material impact
	Equipment	E.g. spare parts stock
	Personnel	Should be matched to their function. Base Station Maintenance, Switching and Signalling engineers should not be included.
IT Equipment	Hardware	Should be allocated in line with the ratio of network personnel to other personnel
	Software	Should be allocated in line with the ratio of network personnel to other personnel
Fixtures & Fittings	Office Costs	Should be allocated in line with the ratio of network personnel to other personnel

APPENDIX III - Options for Treatment of the Signalling Layer

Segregation of Signalling Costs from Traffic Costs

The signalling layer is significant for a number of reasons. Firstly, in order to assess the applicability of duration or per minute charging as opposed to two part charging it is necessary to evaluate the signalling costs as a portion of the overall network costs. If the signalling costs account for a significant portion of the overall costs it may be more appropriate to move to two-part charging which requires separate analysis of signalling costs. Secondly, SMS, which is a very significant retail product in revenue and volume terms, utilises only the signalling layer. In order to prove the allocation of costs to SMS it is more efficient and effective to have segregated signalling from traffic costs. Thirdly signalling loads for termination products and origination products are not the same as there are different signalling functions performed depending on the call type and the call direction. Thus, analysis of the signalling layer may prove highly beneficial in the proper allocation of network costs to underlying products and not just the differential between call set up and duration[14].

Network Element Components

Signalling functions may use more of a network component that traffic conveyance functions. Thus, before the traffic routing factors are calculated it may be necessary to compute the respective loadings of signalling and traffic functions. For this reason the Director is considering the merits of separating signalling costs from the traffic costs for each network element or component listed in Appendix II. The reason behind requesting this split is that different loadings may occur for each network component. Thus averaging across the different components may lead to incorrect allocations.

Calculation of the Signalling load

The signalling loading should be calculated from the network element or component perspective. By this we mean that the some network elements such as the transmission paths only support signalling to a limited extent (generally 2 signalling channels are required to support the signalling requirements of 900 voice paths) whilst other elements such as the BTS, MSC CPU etc may be used for signalling to a much greater extent. The network loading between signalling and traffic should be applied to arrive at the costs of each network element allocated to the signalling layer as opposed to the traffic layer.

Allocation of Signalling Costs

The signalling layer performs a number of discrete jobs which are not common to all traffic types. Therefore, it may be appropriate to analyse the signalling costs by jobs type.

[14] See discussion of two part charging later in this section

Signalling Layer	Signalling Task	Product Supported
	Location Updates	Termination Products
	Authentication	All
	Call Encryption	All
	Call Set up	Origination and Termination, Inbound Roaming products and own network Outbound Roaming termination.
	Call Tear Down	All
	Call Handover	All
	Call Monitoring	All
	SMS Inbound On-Net	SMS Inbound
	SMS Inbound Off-Net	
	SMS Outbound On-Net	SMS Outbound
	SMS Outbound Off-Net	
	GPRS Signalling	

Each individual product[15] will have a different routing factor based on the usage of the network element involved and is in some part determined by the split between call set up costs and call monitoring costs. Thus, the call type/product 'origination to fixed network' may have a different routing factor to 'origination on –net' at both the MSC layer and the MSC- SIM layer. Likewise outbound SMS will have a routing factor for the SMSC whereas inbound SMSC will have no usage or routing factor for the SMSC.

Q. 46. Do you believe that the signalling load and associated costs may be significant on a network wide basis? If so how do you think the loading and routing factors should be calculated? Should they be calculated for each network component?

Q. 47. Do you believe that the level of analysis described above is necessary to allow informed allocation of costs of the signalling layer and the individual products that use the signalling layer?

Q. 48. Do you envisage any practical difficulties with gathering this level of information for each of the network elements and network layers?

[15] See Appendix VI for individual products or call types.

Two Part Charging

The ODTR has previously addressed the issue of two part charging in its review of the fixed accounting separation[16]. Overall the ODTR is of the opinion that two part charging is a more appropriate means of pricing traffic based services as it supports the concept of unbundling thereby providing more meaningful economic triggers to the market place. The effect of two part charging is to separate out the costs associated with call establishment, termed call set-up, from costs associated with the ongoing conversation time or call duration. The level of difference between the call set up charge and the per minute call duration charge may be mainly due to the signalling load required to establish the call as opposed to the signalling load required to monitor the call. Signalling makes extensive use of the CPU of the MSC and thus the difference in both ratio terms and pure cost terms may be significant, if as suspected signalling costs in mobile networks are significant. Generally, as a result of two part charging, short duration calls will attract a higher charge averaged over the duration of the call than longer calls. However, given that the signalling load is not the same for all mobile call types this may not be true in all cases. For this reason and depending on the outcome of the signalling question the Director is considering requesting the separation of charges between call set up and duration on a product basis.

Q. 49. Do you believe that two part charging is appropriate for the mobile sector?

Q. 50. Should two part charging analysis be required in the separated accounts? (Please note that analysis at this level does not imply that the Director shall impose two-part charging for mobile interconnection products.)

Q. 51. Do you have any views on the potential differential in the call set up charge between termination and origination? Please provide as much detail as possible.

[16] Document ODTR 01/24 Decision No. 8.1

APPENDIX IV – Routing Factors

Routing factors identify the usage of network components by network products at a given point in time. The sum of the routing factors per network product for each component should yield 100% usage. In this way, the routing factors can be used to allocate costs of network components (capital element and opex) to network products, by multiplying the specific network component cost with the routing factor for that specific network product.

When determining routing factors it must be borne in mind that the routing factors are intended to allocate costs of that moment only. Routing factors are not intended to be used to model network costs over a large range of usage, a relationship which is often non-linear. In fact, routing factors temporarily linearise the principally non-linear relationship between usage and costs for cost allocation purposes.

The usage of network components is determined using a specific 'allocation key' that is suitable to quantify the network product in a representative way, For example, 'minutes' can be a suitable allocation key for voice services. Hypothetically, the number of calls could also be a suitable allocation key, provided e.g. that all calls had more or less the same length.

The following allocation keys are proposed for different MNO services considered.

- Voice products: minutes
- SMS products: messages
- GPRS products: bytes

Depending on the (intelligence included in the) network component considered, the underlying information for routing factors should either be determined directly (e.g. measured) or indirectly (e.g. derived). Intelligent network components such as switch processors will usually keep track of all events handled by a switch, including e.g. call set ups and durations (also reflected in Call Detail Records), VLR updates, number of SMS messages, Authentications etc. Less intelligent network components, such as transmission, cannot store such information and therefore the volume of traffic accommodated by these components must be derived indirectly. For instance, one could assume that the number of minutes that is conveyed through the transmission between MSC and BSC and between BSC and BTS is equal to the number of calls originating from and terminating to mobiles.

It is important to note that network component costs do in this case not refer to the costs of individual physical network components, but to the total costs associated with that (type of) network component. The costs and utilisation of individual network components will therefore be averaged over all network components of a certain type.

The below steps describe how routing factors should be determined and used to arrive at network product costs.

1. Calculate the total actual volumes across the network by network product

This step calculates the total volumes per network product (e.g. total number of

minutes for fixed to mobile call termination). This will yield variables $V_{m,NP}$ where m stands for the allocation key and NP for the network product.

2. Determine the total actual volumes per each network component type

Similar to the previous step, this step determines the total volumes (of 'allocation key') per network component. This will yield variables $V_{m,NC}$ where m stands for the allocation key and NC for the network component. Determining the actual volumes per network component can be done as described earlier either by directly measuring load on 'intelligent' network components, or deriving loads indirectly by applying 'network routing rules'.

The total number of minutes, messages and bytes determined per network component should match the total number of minutes, messages and bytes determined per network product.

3. Determine each network product's utilisation factor of each individual network component type at the current network product volume

This step details out the results from the previous step, by allocating total volumes as derived in step 2 to specific network products. In addition, the relative loads of different allocation keys need to be taken into account. (E.g. a 'byte' may have substantially less impact on a Transceiver than a 'minute' or a 'message'). This will yield variables $U_{m,NP,NC}$ where m stands for the allocation key and NC for the network component and NP stands for the network product. $U_{m,NP,NC}$ is a routing factor.

Similar to step 2, the routing factors should be determined as much as possible by measuring loads rather than deriving or estimating them.

The routing factors represent a percentage distribution of the load of different network products on the network component. Summing up the routing factors per network component should yield 100%.

4. Calculate the total capital element and opex per component type and multiply by the routing factor to obtain the capital element and opex per component type per network product

This step performs the actual cost allocation. First, the capital element and opex associated with each network component are determined. Capital element should represent the asset's average net 'CCA' value over the year multiplied by the cost of capital and opex should include all relevant asset specific opex including e.g. depreciation, accommodation etc. This will yield the variables C_{NC} and O_{NC}. Subsequently, these variables must be multiplied with their respective routing factors to obtain network component and opex by network product.

$$C_{NC,NP} = C_{NC} \cdot U_{m,NP,NC}$$
$$O_{NC,NP} = O_{NC} \cdot U_{m,NP,NC}$$

5. Sum the total capital element and opex allocated to each network product to arrive at its share of network costs

The total capital element and opex per network product are obtained by summing up capital element and opex over all individual network components for a specific network product.

$$C_{NP} = \sum_{NC_1}^{NC_n} C_{NP,NC}$$
$$O_{NP} = \sum_{NC_1}^{NC_n} O_{NP,NC}$$

6. Divide by the total volumes over the year to arrive at the per minute/message/byte rate for each network product

Finally, the costs per allocation key unit are obtained by dividing network product capital element and opex by the respective allocation key unit volumes per network product.

$$c_{NP} = \frac{C_{NP}}{V_{NP}}$$

$$o_{NP} = \frac{o_{NP}}{V_{NP}}$$

APPENDIX V - Proposed List of Network Products

Voice Products	Explanation
On-Net (Origination)	Origination part of On-Net call
On-Net (Termination)	Termination part of On-Net call
I/C M-M (Termination)	Incoming Mobile to Mobile Termination
O/G M-M (Origination)	Outgoing Mobile to Mobile Termination
Mobile – Fixed (Origination)	Call from Mobile Network to National Fixed Network
Fixed – Mobile (Termination)	Call from National Fixed Network to Mobile network
Mobile –International (Origination)	Call from Mobile Network to International Interconnect
International-Mobile (Termination)	Call from International Interconnect to Mobile Network
M- Freefone (Origination)	Call from Mobile Network to Freefone (0800) number
M-Premium Rate (Origination)	Call from Mobile Network to Premium (0900) number
M-Voicemail On Net (Origination)	Call from Mobile Network to Voice Mail Platform
M-Voicemail Foreign Roaming (Origination)	Call from Foreign Mobile Network (Foreign Roaming) to Voice Mail Platform of Home Mobile Network
M- Directory Enquiry (Origination)	Call from Mobile Network to Directory Service
SMS Products	
On Net SMS (Origination)	Origination part of on-net SMS message
Off Net SMS (Termination)	Termination part of on-net SMS message
O/G SMS (Origination)	Outgoing SMS message
I/C SMS (Termination)	Incoming SMS message
GPRS Products	
On Net (Origination)	Origination part of On Net GPRS session
On Net (Termination)	Termination part of On Net GPRS session
O/G (Origination)	Outgoing GPRS session
I/C (Termination)	Incoming GPRS session
Roaming	
Fgn. Rmg. Termination from On Net (Termination)	Call to foreign roamer from Home Network On Net
Fgn. Rmg. Termination from Fixed (Termination)	Call to foreign roamer from Home Country Fixed Network
Fgn. Rmg. Termination from OMNO (Termination)	Call to foreign roamer from Home Country Other Mobile Network Operator
Fgn. Rmg. Termination from Int'l (Termination)	Call to foreign roamer from International Interconnect
Fgn. Rmg. Authorisation Verification	Foreign Roamer Network asking Home Network for Authorisations (Signalling Only) to make call that does not further involve Home Network (see below)
Fgn. Rmg. On Net (Origination)	On Net Call by Foreign Roamer
Fgn. Rmg. To Fixed (Origination)	Call by Foreign Roamer to National Fixed Network
Fgn. Rmg. Off Net (Origination)	Call by Foreign Roamer to National Other Mobile Network Operator
Home Rmg. (Termination)	Call to Home Roamer on Mobile Network
Home Rmg. Home Network (Termination)	Call by Home Roamer to Home Network
Home Rmg. On Net (Termination)	On Net Call by Home Roamer
Home Rmg. Off Net (Termination)	Off Net Call by Home Roamer (from Other Mobile Network Operator)
Home Rmg. Fixed (Termination)	Call by Home Roamer to National Fixed Network
Home Rmg. Int'l (Termination)	Call by Home Roamer to International

APPENDIX VI - Glossary

3G:	3rd Generation (Network) (UMTS)
ACQ:	Acquisition
AuC:	Authentication Centre
BSC:	Base Station Controller
BTS:	Base Transceiver Station
CAPEX:	CAPital EXpenditures
CAPM:	Capital Asset Pricing Model
CBB:	Connection BSC-BSC
CBM:	Connection BSC – (G)MSC
CC:	UK Competition Commission/Cost of Capital
CCA:	Current Cost Accounting
CDR:	Call Detail Record
CGR:	Call Group Register
CMM:	Connection (G)MSC-MSC
CPS:	Carrier Pre-Select
CPU:	Central Processing Unit
EC:	European Commission
EU:	European Union
F-M:	Fixed to Mobile
FNO:	Fixed Network Operator
GGSN:	Gateway GPRS Switching Node
GMSC:	Gateway Mobile Switching Centre
GPRS:	General Packet Radio Service
GRC:	Gross Replacement Cost
GSM:	Global System for Mobile communication
GBV:	Gross Book Value
HCA:	Historic Cost Accounting
HLR:	Home Location Register
HW:	Hardware
IN:	Intelligent Network
INO:	International Network Operator
IT:	Information Technology
LRIC:	Long Run Incremental Costs
LTD:	Life to Date
MCE:	Mean Capital Employed
MEA:	Modern Equivalent Asset
M-F:	Mobile to Fixed
M-M:	Mobile to Mobile
MNO:	Mobile Network Operator
MSC:	Mobile Switching Centre
MTR:	Mobile Termination Rate
NBV:	Net Book Value
NPV:	Net Present Value
NRA:	National Regulatory Authority
NRC:	Net Replacement Cost

NTP:	Network Termination Point
NTU:	Network Termination Unit
ONP:	Open Network Provision
OPEX:	OPerational EXpenditures
PBX:	Private Branch Exchange
PC:	Personal Computer
POI:	Point of Interconnect
Q:	Question
ROCE:	Return on Capital Employed
SGSN:	Serving GPRS Switching Node
SI:	Statutory Instrument
SIM:	Subscriber Identity Module
SMS:	Short Message System
SMSC:	SMS Switching Centre
SW:	Software
TRX:	Transceiver
UMTS:	Universal Mobile Telecommunications System
VLR:	Visitor Location Register
VMP:	Voice Mail Platform
VPN:	Virtual Private Network
WACC:	Weighted Average Cost of Capital
WIP:	Work in Progress

SUBMITTING COMMENTS

All comments are welcome, but it would make the task of analysing responses easier if comments were referenced to the relevant question numbers from this document.

The consultation period will run from Friday, 11 October, 2002 to Friday, 22 November**,** 2002 during which the Director welcomes written comments on any of the issues raised in this paper. Having analysed and considered the comments received, the ODTR will review the separated accounts and publish a report in December 2002 on the consultation which will, *inter alia* summarise the responses to the consultation. In order to promote further openness and transparency the ODTR will publish the names of all respondents and make available for inspection responses to the consultation at her Offices.

The Director appreciates that many of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful. Respondents are requested to clearly identify confidential material and if possible to include it in a separate annex to the response. Such information will be treated as strictly confidential.

"All responses to this consultation should be clearly marked "Reference: Submission re ODTR 02/86" and sent by post, facsimile or e-mail to:

FREEPOST

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to arrive on or before 5pm on Friday 22 November 2002.

Office of the Director of Telecommunications Regulation

October 11, 2002