

FLLRIC Model for the Cayman Islands
Background Document Draft Costing Manual

Cable & Wireless Cayman Islands

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1. Introduction

1. This document is the first part of a revised version of a draft LRIC costing manual, which C&W submitted on 14 December 2005 fulfilling requirements set out in the Authority's *Public Consultation on Costing Manual* (CD 2005-1), dated 27 October 2005, to submit a draft LRIC costing manual. That draft and this revised LRIC costing manual, as required by the Authority, includes
 - a) our proposed costing manual along with supporting rationale and explanations;
 - b) two example costing studies developed using this manual, the first being mobile termination service, the second being the residential fixed line access service;
 - c) our proposal on how to allocate common costs, proposed determination and level of expense factors, and proposed economic asset lives;
 - d) additional information from other jurisdictions where competition exists regarding the determination and level of expense factors as well as any information supporting the applicability of such factors to the Cayman Islands; and
 - e) any supporting asset life studies used in developing its proposed economic asset lives.
2. The original draft costing manual also include two WACCs proposed for use in the fixed and mobile network models, respectively.
3. This revised version reflects the Authority's revised process determination of 8 February 2006, which in addition to the above, requires C&W to file the costing models. With this additional requirement, C&W has had to expand its written submission to tie the documents more closely to the model. We have also used the intervening time to:
 - a. gather more evidence with respect to expense factors,
 - b. provide an alternative method of allocating fixed and common costs, and
 - c. correct a number of typographical errors and make a number of clarifications to the original text.
4. This revised submission is divided into five parts:

- a. The Background Document:
 - explains our understanding of the principles and guidelines set out in the Authority *Decision for the Forward-looking Long-Run Incremental Costing Consultation* (ICT Decision 2005-4);
 - describes the overall methodological approach and treats issues common to both the fixed and mobile issues, including the cost of capital, expense factors, asset lives and treatment of retail costs; and
 - provides definitions for terms and acronyms used in the other parts of the submission.
- b. The Fixed Network Model Manual, which describes the structure and functioning of the fixed network model. The Manual includes a Retail Case study—Residential Fixed Line Service, which traces the inputs and calculations of costs relevant to the retail residential fixed line service to identify how outputs are determined.
- c. The Mobile Network Model Manual, which describes the structure and functioning of the mobile network model. The Manual includes an Interconnection Case study--Mobile termination, which traces the inputs and calculations of costs relevant to mobile termination to identify how outputs are determined.
- d. The cost separations methodology, which describes how the inputs to the expense factor analysis were developed.
- e. The LRIC models themselves, which are comprised of three modules: i) bottom-up fixed network model; ii) the bottom-up mobile network model; and iii) a consolidation module for presenting results and reports. As explained below, C&W has generated two versions of the LRIC models—a confidential version that it has submitted to the authority and a non-confidential version that it has submitted to other interested parties in the proceeding.

2. The FLLRIC Approach

Efficient networks and technology

5. In its ICT Decision 2005-4, *Decision for the Forward-Looking Long-Run Incremental Costing Consultation*, 22 July 2005, (“Decision 2005-4”), the Authority specified that the FLLRIC methodology capture those costs for services that would lead to prices found in an efficient market (Principle 1), that the costs be calculated as if the service was being provided based on the least cost technology currently available (Principle 2) and that the costs of services or network elements be based upon those costs assumed to be incurred by an efficient carrier operating in the Cayman Islands for the first time. (Principle 3).

Principle 1:

The FLLRIC methodology should capture those costs for services or network elements that would lead to prices found in an efficient market for provision of such elements or services. Efficient market prices are those that ensure the service provider has the opportunity to recover efficiently incurred, forward-looking costs and encourage the service provider to operate in a cost effective manner. In addition, efficient market prices should provide the right incentives for efficient facilities-based investment, entry and exit.

Principle 2:

Forward-looking costs are the costs to be incurred by a carrier in the provision of a service. These costs shall be calculated as if the service was being provided for the first time by a new carrier and shall reflect planned adjustments in the company's plant and equipment. Forward-looking costs ignore embedded or historical costs; rather, they are based on the least cost technology currently available whose cost can be reasonably estimated based on available data. As such forward-looking cost estimates must reflect technologies that are currently operational used and available in the marketplace.

Principle 3:

The forward-looking long-run incremental costs of services or network elements are to be based upon those costs assumed to be incurred by an efficient carrier operating in the Cayman Islands for the first time. A carrier is deemed to be efficient where the total capital and operating expenditures are those that are necessary and sufficient in order to meet the required demand at a particular grade of service.

6. In implementing these efficiency requirements, this draft manual assumes an efficient network (or, more properly, networks, as a fixed and a mobile network costing is described) which, using the latest technology current in use, can handle a specified level of customers and amount of traffic at a required quality of service.
7. With respect to technology, C&W Cayman and new entrants are currently moving towards an Internet Protocol (IP)-based network. Therefore, the LRIC methodology for the fixed network is based on an IP-based architecture as opposed to the traditional PSTN.

8. For the mobile network, to date all new entrants have pursued GSM technologies. Therefore, only GSM technologies are included in the model.
9. All equipment costs are based on current market prices.

Cost Causality and Increment definition

10. In its Decision 2005-4, the Authority specified that the FLLRIC methodology should only include “causal” costs (Principles 4 and 5), that all relevant causal costs—be they start-up, volume sensitive, volume insensitive, etc.--be included (Principles 6 and 7), that incremental cost is the forward-looking additional cost of the entire output of a service or network element (Principle 8 and Guideline 5).

Principle 4:

FLLRIC should include only those forward-looking costs that are incurred as a direct result of providing the service or network element in question. These are referred to as "causal" costs. Conversely, only costs that could be avoided by not offering the service or network element should be included in FLLRIC.

Principle 5:

Costs that remain the same whether or not the relevant course of action (e.g., proposed introduction of a new service, proposed reduction or increase in rates, or other changes to existing services) is undertaken are not causal to the course of action and therefore are not taken into account in calculating the incremental costs associated with that course of action. Since costs and revenues that have been realized prior to the start of the course of action cannot be affected by that course of action, incremental costs and revenues do not consider cost and revenue components prior to the course of action. Historical or sunk costs are an example of this type of cost because no action after a decision point can affect costs already incurred prior to that decision point.

Principle 6:

A FLLRIC study should include all relevant service or element-specific start-up costs, including installation costs.

Principle 7:

The FLLRIC of a service or network element should include both volume-sensitive and non-volume sensitive costs.

Principle 8:

The FLLRIC of a service or network element is the forward-looking additional costs incurred by an efficient company to provide the entire output of a service or network element, including any required additional resources such as labour, plant, and equipment. These are the direct incremental costs of providing a service. FLLRIC excludes any costs, including any common costs that would be incurred if the service is not produced.

Guideline 5:

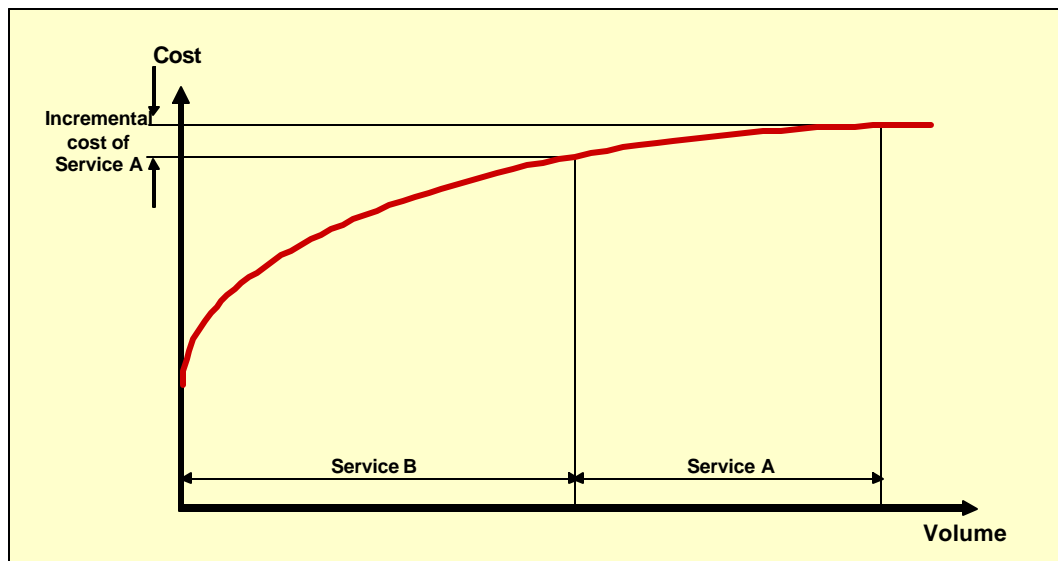
The increment to be modelled is the total service increment.

11. LRIC is generally defined as the cost of adding a product or service to a portfolio of existing products or services or, conversely, the cost avoided if production of a product or service is taken away from the list of existing products or services. For

example, if the company currently produces two services (A and B) and then decides to stop producing service A, then the company's costs will decrease. The company will save:

- the variable costs associated with production of this service; and
- the fixed costs specific to the production of this service (service specific fixed costs).

12. Figure 1 (below) illustrates the definition of LRIC for a service (Service A). The LRIC approximates the slope of the cost curve, which is often referred to as the Cost-Volume Relation, or CVR.



13. This draft manual incorporates the Authority's principles in its definition and implementation of the service increments. An increment is the set of products or services over which the costs are being measured. We use the following increments:

Fixed Line Network

- Access: contains all the Access services currently offered by C&W Cayman (PSTN Access, ISDN Access, ADSL).
- Transmission: includes all retail and wholesale traffic services, leased lines and data services. On a service level, the traffic related services are split into call set up and call conveyance parts.

Mobile Network

- Traffic: contains all mobile traffic services
- Subscriber: contains all subscriber related costs, such as handsets and customer care.

14. We note that site costs and costs of the network management system are considered a common cost to the two mobile increments. The cost of providing the mobile switching centre is treated as incremental to traffic services.

Common Costs

15. In its Decision 2005-4, the Authority specified that the FLLRIC methodology should identify a reasonable assignment of common costs to all services and network elements regardless of whether the purpose of the FLLRIC cost is a “price floor” or “price ceiling” (Principle 10). As mentioned above, the models work on the principle that network costs and capital values are calculated for each network component according to the volume inputs given. If the volume input for a particular service is removed, then the reduction in costs shown by the model will indicate the LRIC value for that particular service increment. Similarly, volumes may be removed for a group of services which represent a higher-level increment.

Principle 10:

Common costs are those costs that a carrier must incur in order to operate and are not directly attributable to any particular service or network element or group of services or network elements. C&W has the onus to prove the specific nature and magnitude of any forward-looking common costs. A reasonable assignment of common costs should be applied to all services and network elements regardless of whether the purpose of the FLLRIC cost is a "price floor" or a "price ceiling".

16. Fixed common costs (FCC) are fixed costs associated with the production of two or more services, which cannot be avoided unless production of all services to which they are common is stopped. FCC are fixed with respect to volume. In other words, FCC are the costs that are not incremental to any defined increments and are only avoided when the production of all services has ceased. Examples of FCC are the network equipment required for mobile coverage (as opposed to the mobile network required for capacity or traffic) and the fixed and mobile the license fees.
17. As the fixed and mobile networks are modeled as self-standing businesses, there are separate fixed and mobile FCCs..
18. The model calculates network common and increment specific fixed costs for each cost category. There are a number of potential methodologies for calculating the value of the actual mark-up on services. The model employs the most widely accepted and used mark up methodology, Equal Proportionate Mark-Up (EPMU), where the FCC are allocated to the services based on the LRIC costs previously allocated. The calculation process is discussed in further detail in paragraph 128.

19. Cable & Wireless has modeled all of the direct FCC associated with network elements and their derivation is found in the methodology below. We will continue to present Cayman specific information on these expense factors over the course of these proceedings as they become available.

Transparency and the Evolving Manual and Case Studies

20. In its Decision 2005-4, the Authority made it clear that the input data and the model structure and operation should be transparent and that the onus is on C&W to demonstrate that its methodology complies with the Authority's principles and guidelines (Principles 11 & 12). We believe that these costing manuals, the case studies and the attached cost models achieve that goal of transparency and that the methodology is consistent with the Authority's requirements.

Principle 11:

The process used to generate FLLRIC cost information should be transparent. In this context, transparency means that the processes for generating cost information are clear and understandable, that the numbers are objective and based on verifiable data, and that any models used in the FLLRIC process are fully documented.

Principle 12:

C&W has the onus to establish to the satisfaction of the Authority that its costing methodology complies with the approved FLLRIC principles and guidelines and produces reasonable results.

The Bottom-up methodology

a. Structure

21. In its Decision 2005-4, the Authority specified that the FLLRIC should be developed using a bottom-up methodology (Guideline 1). The balance of this introductory section describes in general form this methodology.

Guideline 1:

The FLLRIC of a service or network element should be developed using a bottom-up methodology. That is, costs should be built up from the costs of the components that would be required in order to deliver those services or elements. The bottom-up approach requires the following steps:

- a. specifying the components necessary to provide the volume increment,
- b. estimating the volume increment and required capacity of each of these components,
- c. dimensioning the components to serve the estimated increment on an efficient, forward-looking basis,
- d. determining the cost of different components,
- e. estimating the capital costs and operating expenses associated with the different components,
- f. quantifying the unit costs of each component, and
- g. aggregating the component unit costs by the use made of them by different services or network elements. Routing factors may be used for this purpose pursuant to the definition and requirements specified below.

22. There are three critical assumptions on the networks that must be noted before a fuller discussion of the modelling:

- the networks are considered as separate entities, each with its own network and sites. When assuming separate fixed and mobile networks, the required number of sites is computed separately for the fixed and mobile networks. It is assumed that there is no site sharing between the fixed and mobile businesses and no sharing of infrastructure with other countries.
- the networks are assumed to be based entirely in Cayman Islands.
- as per Guideline 3 of Decision 2005-4, a scorched node approach is applied to both the fixed and mobile networks.

Guideline 3:

The FLLRIC study shall be based upon the locations of, and planned locational changes to, the existing central office and facilities configuration. "Facilities" shall be interpreted to include feeder routes, central offices, drop wire, network interface devices, and other specific items that make up the facilities of a telecommunications company. This is referred to as the "scorched node" approach. The adoption of this approach does not imply that the modelled equipment located at the network nodes is of the same type or function as the equipment currently situated at those locations; however, the locations themselves are retained.

23. Following the Guideline 4, the bottom up model assumes "instantaneous build": it takes specified traffic volumes and customer numbers as an input and constructs a theoretical network capable of handling these volumes, with due regard to a particular

grade of service (as per Guideline 2 of Decision 2005-4). The costs of all required network elements are then calculated and annualised. This annualised cost is then used to derive an in-year depreciation charge and net replacement cost (NRC) per network element. Figure 2 below provides a high level illustration of the logical structure of the model. We emphasize that Figure 2 is a *logical* structure of the bottom-up model, not the physical structure of the model.

Guideline 2:

The modelled network should also be capable of providing a particular grade of service. The issue of the appropriate service standards for the mobile and fixed line networks and services shall be addressed in phase two of this proceeding.

Guideline 4:

Carriers are constantly upgrading, developing and refining their networks. As a result, a carrier's network will at any time include a range of technologies and vintages of equipment types, all of which must interwork. A FLLRIC approach, however, should approximate those costs that would be faced by a new carrier investing in the network at the time of the study. Thus, it is assumed that the network will be fully constructed using the current generation of technology, without any allowance for the need to interwork with previous generations. This is referred to the "instantaneous build" approach.

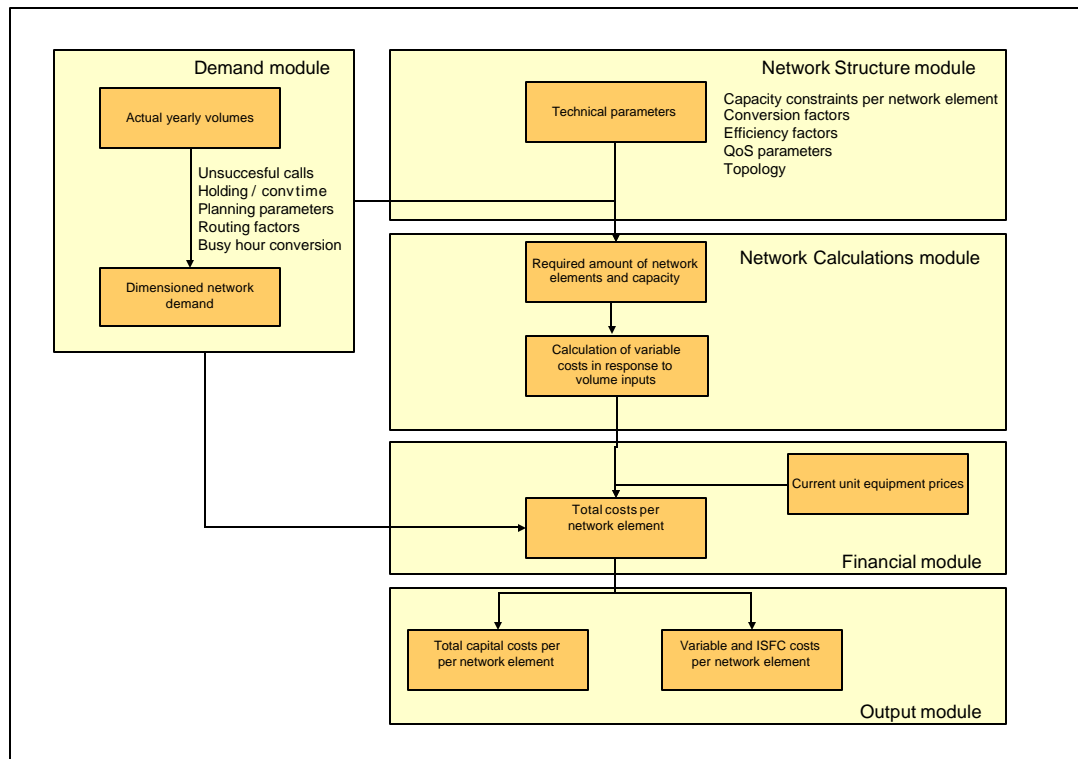


Figure 2 Logical Structure of the Bottom Up LRIC model

24. In the **demand module**, the demand inputs for each service are collected. These include traffic per service and of the number of customers. These are all external inputs for the model. These volumes are then translated into dimensioning volumes, using parameters such as percentage of unsuccessful calls, planning parameters, routing factors and busy hour data. The output from the demand module serves as an input to the network structure module and is used later on to calculate unit cost prices for network equipment and the cost prices of the services.
25. In the **network structure module** the network topology is described. External inputs are technical information regarding network elements (element size and modularity, the logical structure of the network, and the area types (urban, suburban, rural and highway) and their characteristics (e.g., cell radius, number of sectors)).
26. In the **calculations module**, the required number of each network and transmission element type is calculated. The inputs to this module are the required capacity per network and transmission element type (from the routing module), area type characteristics, radio and core blocking requirements, minimum requirements for coverage and availability and a translation method to calculate the required capacity from the amount of traffic or the number of subscribers (such as an Erlang formula). In this module the network elements and some of the other network related assets will be split into common costs and non-common costs. The output of this module is the required quantity of each element type and the classification into common and specific costs, which is used in the financial module to calculate the costs incurred by each element type.
27. In the **financial module** the required network investments are determined for the relevant year. The required equipment quantities are multiplied by the current equipment prices. For the case studies outlined in this manual, we have used a straight line method for depreciation.
28. In the **output module** the unit costs per network element and the network related fixed common costs are calculated using the network volumes. The result of this is a bottom up, fully distributed view, of the costs per network element. The incremental costs per network element are obtained by setting the volume of each service to zero and identifying the difference in cost per element with and without the relevant service. Figure 3 illustrates this on a high level

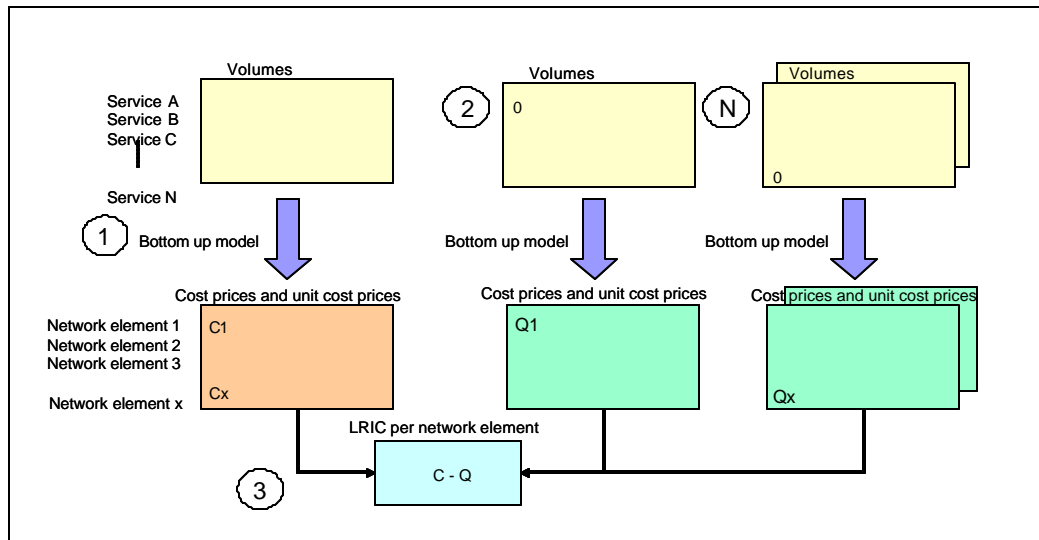


Figure 3 Obtaining incremental costs per service

b. Volumes and Routing Factors

29. The model takes, as inputs, the actual service volumes for the various services, which may be measured in minutes of duration, number of calls or number of lines. These service volumes must be converted to a demand for the various network elements – the process for achieving this is:
- Volumes are scaled by factors to allow for such things as failed calls and planning allowances.
 - The scaled volumes are then multiplied by the related routing factors for each network element to calculate a volume demand by network element.
 - In the case of traffic products, the resulting annual demand is converted to busy-hour demand, which is used to dimension the network.
30. In the following sections, this process is described in more detail for the different volume types.

Volume Scaling

Minutes

31. Call conversation minutes for each service (which are provided as an input to the model) are converted to network occupancy minutes via the following formula:

$$\text{Occupancy minutes} = \text{conversation minutes} + \text{number of successful calls} * (\text{ratio of total/successful calls}) * \text{non-conversation holding time per call}$$

where:the ratio of total/successful calls and non-conversation holding time per call are inputs to the model

Calls

32. The number of calls for each service (provided as an input to the model) are converted to total calls (successful and unsuccessful) via the following formula:

$$\text{Total calls} = \text{successful calls} * \text{ratio of total/successful calls}$$

Lines

33. The number of lines for each service is converted to a demand volume via the following formula:

$$\text{Lines network demand} = \text{Lines} * \text{Annual growth rate for lines}$$

where the annual growth rate is a planning assumption to ensure that sufficient capacity is provided to cover projected growth.

Capacity

34. For certain products a simple line driver is not adequate for modeling, because the lines may have different capacities. This applies to leased lines, frame relay and direct connections. In these cases, a capacity volume driver is derived from an analysis of the lines sold by capacity.
35. For each capacity of circuit, the capacity driver volume is calculated according to the following formula:

$$\text{Service capacity} = \sum [\text{line } j * \text{capacity of line } j] / 2 \text{ Mbit/s}$$

The service capacity is then summed for all the capacities sold to give the total capacity for each product.

36. Service capacities are then converted to network capacities via the following formula:

$$\text{Network capacity} = \text{Service capacity} * (1 + \text{transmission capacity allowance})$$

where transmission capacity allowance is a planning benchmark

Routing Factors

37. Routing factors tell us how many times each network component is used by each service. The routing factors can therefore be regarded as a set of weights which allow us to translate service demand into network element demand.

38. So for each network element, the routing factors are multiplied by the scaled service demands to arrive at the total demand for each network element. The formula is as follows:

$$\begin{aligned} \text{Demand for NE1} &= \text{demand}_{\text{service 1}} * \text{RF}_{\text{service1, NE1}} \\ &+ \text{demand}_{\text{service 2}} * \text{RF}_{\text{service2, NE1}} \\ &+ \text{demand}_{\text{service 3}} * \text{RF}_{\text{service3, NE1}} \\ &\text{Etc} \end{aligned}$$

39. The end result is a set of demand measures for each network element which can then be used to dimension the network.

3. Economic Asset lives

40. Guideline 7 of the Decision 2005-4 states that the LRIC studies should identify and provide a basis for the projected economic life used to calculate depreciation cost of the equipment involved in providing the service or element or group of services or elements.

Guideline 7:
Each FLLRIC study shall identify and provide a basis for the projected economic life used to calculate depreciation costs of the equipment involved in providing the service or element or group of services or elements.

41. There are numerous LRIC studies that give economic asset lives for fixed network elements. For example, Europe Economics (2000) and PTS (2003) give the following economic asset lives¹:

¹ “Study on the Preparation of an Adapatable Bottom-up Costing Model for Interconnection and Access Pricing in European Unioin Countries”, Europe Economics, April 2000 and <http://www.pts.se/Archive/Documents/SE/Model%20documentation%20-28%20mars%2003.pdf>

	Europe Economics (citing various)	PTS
Fixed cost of processor	10-11	10
Site costs	37-38	30-35
Processing costs per BHCA (variable costs)	12	10
Switchblock	13	10
DTU	11-12	10
Synchronisation & Signalling	16	10
Network Management	9	10
Transmission Electronics	10	10
Cable infrastructure	23	20
Duct & Trenching	38	40

PSTN asset lives: Europe Economics and PTS

42. Public records of economic asset lives for mobile network equipment are more difficult to find. One source is the 2002 Ofcom's review for mobile termination.²

² See, http://www.ofcom.org.uk/consult/condocs/mobile_call_termination/wmvct/annexc/?a=87101

It is worth noting that PTS in Sweden refer to largely the same lives in their 2003 proceeding. See "Mobile LRIC Model specification: Final version for the industry working group". PTS, 2003. .

		Asset Lives
Base Station Sites	Macrocell-omni sector: site acquisition and preparation and lease	50
	Macrocell: equipment (omni sector)	22
	Macrocell-3 sector: site acquisition and preparation and lease	50
	Macrocell: equipment (3 sector)	18
TRXs	Macrocell: additional TRXs	15
BSCs	BSC: base unit	14
	BSC: BS-facing port increment	50
	BSC: MSC-facing port increment	50
BSC-MSC transmission	2 Mbit/s microwave link	14
	8 Mbit/s microwave link	14
	16 Mbit/s microwave link	14
	32 Mbit/s microwave link	14
	2 Mbit/s leased line	50
	8 Mbit/s leased line	50
	16 Mbit/s leased line	50
MSCs	32 Mbit/s leased line	50
	MSC: processor	14
	Software	15
	Interconnect interface	15
	Switching Support Plant	15
	Buildings (switch building preparation)	15
	MSC: site lease	50
	MSC: BSC-facing port increment	14
MSC: interconnect-facing port increment	14	
MSC: switch-facing port increment	14	
Interswitch transmission	140 Mbit/s leased line (per 2Mbit/s circuit)	50
HLRs	HLR	14
	HLR Upgrade	50
Licence fees	Annual GSM licence fee	50
NMS	Network management	14

Mobile Network asset lives: Ofcom

43. The lifing for given assets in the fixed network are consistent with those that we have found in our discussion with engineers and vendors. However, we have found considerably shorter economic lives for NGN components relative to PSTN components. Similarly, the GSM network elements appear to be shorter lived in our experience than those on the public record. Our initial assumptions on asset lives are found in the cost assumptions sheets in the models, and reproduced here for ease of reference.

Fixed Network Asset Lives

NGN Equipment	5
Duct	20
Fibre Cable	15
Fibre Joints	15
Poles	20
Management Systems	5
Manholes	20
Copper Cable	15
Copper Joints	15
DPs, Dropwire, NID	10
Transmission Equipment	10
Payphone Equipment	5
DSLAM Equipment	3
IRU	20

Mobile Network Asset Lives

Cell Site	10
TRX	5
BTS	5
BSC	5
MSC	5
TCU	5
HLR	5
SGSN	5
GGSN	5
PCU	5
Internet Gateway	5
Voicemail Platform	5
Network Management System	5

44. Currently the model uses an annuity approach to derive the annualised capital costs, including the cost of capital. The use of annuities for determining annual capital costs has the merit of smoothing annual capital costs over the life of the asset.
45. A simple annuity is the equal annual payment received from an investment. It represents the partial repayment of the capital invested and a return on the investment. The annual payment continues until the end of the investment term.
46. The bottom-up model uses a flat annuity approach to calculating annualised capex costs, where the annualised cost is given by the following formula:

$$\text{Annualised cost} = \text{capex} * [\text{wacc} * (1+\text{wacc})^{\text{asset life}}] / [(1+\text{wacc})^{\text{asset life}} - 1]$$

This can be expressed more simply as an excel function:
Annualised cost = -PMT(wacc, asset life, capex)

47. A simple annuity approach is similarly used to calculate depreciation.

4. Expense Factors for Network Opex, non-network capital and non-capital expenses

48. In its Decision 2005-4, the Authority states that the calculation of network operating costs should be developed based on a bottom-up approach and considers that the use of expense factors, adjusted for expected productivity gains, a reasonable method of estimating operating costs. Guideline 6 then states that to the extent that any cost factors were based on historic data, historic averages or rely on ABC, supporting studies, analysis and documentation must be provided to demonstrate they are relevant to forward-looking costs.

Guideline 6:

If cost factors are based on historical data, historic averages or rely on ABC, C&W must provide the underlying supporting studies, analysis and documentation showing that those historical data, historic averages or the ABC relationships are relevant to the study of forward-looking costs.

49. The bottom-up modelling approach outlined in this submission directly derives all network capital costs. In addition, the expense factor components of the bottom-up models also derive the following categories of cost:
- Network operating expenses
 - Annualised cost of support assets
 - Network recharges (assuming that any fixed and/or mobile operator in Cayman will be part of a larger group of companies, thus providing for economies of scale in relation to certain categories of costs that can be shared across other operating companies in the region)
 - Annualised cost of working capital balances
50. Non-network common operating and capital costs are calculated using a similar expense factored approach in the consolidation and reporting module. The categories of cost calculated in this way are:
- Fixed and mobile network overheads
 - General overheads attributed to fixed and mobile networks using an ABC-based allocation
 - Overhead recharges
 - Annualised cost of working capital balances

51. Retail expenses and capital costs relating to the retail part of the business are calculated using a top-down LRIC approach in a separate MS Access model and imported to the service cost statements in the consolidation and reporting module.
52. This section explains the expense factor approach used to calculate all non-retail operating expenses and capital costs.
53. As provided for in Guideline 6, the analysis of expense factors has been conducted using an existing ABC tool which has been updated for financial and, where available, operating data for the financial year ending 31st March 2006. It was not considered appropriate to use data for the preceding financial year due to the distorting effect of Hurricane Ivan.
54. The ABC analysis calculates the cost of a series of activities performed by the business and provides for an activity-defined view of the cost of operating the business. Each cost centre in the business may perform several activities. Each cost centre/activity combination in the ABC analysis has been mapped to an expense factor for calculation in the LRIC model. A full list of expense factors is provided in Appendix I. The main groups of expense factors are as listed below. Where similar categories of expense factor appear in different parts of the model, this is based on the allocation of the base activities between the fixed and mobile networks and the retail part of the business.

Fixed Network Model (Expense factored)

- Distribution network operating expenses
- Core network operating expenses
- Other fixed network operating expenses
- International network operating expenses
- Interconnect specific operating expenses
- Fixed network recharges
- Fixed network specific costs
- Fixed network support expenses
- Annualised cost of fixed network working capital
- Annualised cost of fixed network support assets

Mobile Network Model (Expense factored)

- Mobile network operating expenses
- Mobile interconnect specific operating expenses
- Mobile network specific costs
- Mobile network support expenses

- Annualised cost of mobile network working capital
- Annualised cost of mobile network support assets

Consolidation & Reporting Model (Expense factored)

- Fixed & mobile network overhead expenses
- General overhead expenses – apportioned to networks
- Overhead recharges
- Overhead specific costs

Retail Expense Model (Top Down)

- Retail expenses
- General overhead expenses – apportioned to retail
- Retail recharges
- Retail specific costs
- Annualised cost of retail working capital
- Annualised cost of retail support assets

Definition of Expense Factors

55. The expense factors are based on the definition and allocation of activities in the ABC model. The ABC model defines the activities performed by each cost centre, such that each cost centre is apportioned between the activities it performs.
56. Where necessary, an ABC activity may be mapped to more than one expense factor in order to reflect more precisely the sensitivity of that expense to particular parts of the business eg; fixed network, mobile network, retail. The mapping of cost centre/activity combination to expense factors is provided in Appendix II.
57. The mapping exercise allows the calculation of a total value of each expense factor, which can be reconciled back to the total activity costs extracted from the ABC model. A description of each expense factor is provided in Appendix III.

Adjustment of Expense Factors

58. Facility is provided to adjust certain expense factors to take account of circumstances that are modelled in the bottom up models, but which vary from the actuality, For example, the bottom-up mobile model assumes that an MSC is sited in Cayman rather than remotely and shared with another operator in the group. In order to reflect this, the mobile switching expense factors have been upwardly adjusted to reflect the estimated expense of having to maintain such a switch on the island.

59. Similarly, there are certain costs that are modelled directly in the bottom up model and need therefore to be excluded from the expense factors in order to avoid the double counting of such costs. A rationale for each adjustment is documented in the working files.

Selection of Expense Factor drivers

60. In order to calculate each expense factor it is necessary to understand the cost driver of that expense factor. Each expense factor calculated in the bottom-up models is driven by the Gross Replacement Cost (GRC) of a network element or group of network elements. The selection of the driver element or group of elements is based on the way in which the associated activities are allocated in the ABC model. This means that when a service volume reduction in the bottom up model causes a reduction in the GRC of a network element, a corresponding reduction in the expense factor will be observed against that network element in respect of that service. This reduction will be the LRIC of that expense factor in respect of that network element for the service in question.
61. Driver groups are defined in the expense factor worksheets in the bottom up models. Once a group has been defined, it is possible to derive the appropriate percentage which should be applied to the GRC of the group in order to calculate an expense factor value.
62. For example:

If Expense Factor A has an ABC-based value of \$1,000,000, is driven by the GRC of a group of network elements called Driver Group 1, and the total GRC value of Driver Group 1 is \$6,000,000, then the expense factor % would be \$1,000,000 divided by \$6,000,000 = 16.67%

Calculation of Expense Factor LRICs

63. When the bottom up models are run each service volume is reduced to zero in turn, and the reduction in network element annualised cost, and the consequent reduction in expense factor costs, are measured and captured by the model for export to the Consolidation & Reporting module.

Calculation of Overhead Expense Factors in the Consolidation & Reporting Module

64. Expense factors representing non-network and non-retail operating cost overheads are calculated in the Consolidation & Reporting Module based on the GRC and Operating Cost of each Network Element as calculated by the bottom-up models.

Calculation of retail costs

65. The calculation of operating costs and annualised capital costs relating to the retail part of the business are calculated using a top down LRIC approach as described in the following section.
66. The Authority has requested that we introduce any international benchmarks for expense factors. On the public record, there is a body of work on expense factors, which associate these costs to ratios derived ultimately to bottom-up modelled network costs. In recent submissions to a New Zealand proceeding, the studies from the FCC, ACCC/NERA, Europe Economics, iTST and PTS were cited. We have looked at these benchmarks. These are summarized in the table below.

Source	Network, Date	Expense Category	Factor
MCMC-Taskforce (Malaysia)	Fixed, 2002	Fixed Switching Opex, % of Inv.	7%-8%
		Fixed Transmission Opex, % of Inv.	5%
		Buried Cable, Opex % of Inv.	4%
		Duct, Opex % of Inv.	4%
		Common Cost Inv, % of Inv	6.39%
		Common Cost Opex, % of Opex	31.20%
MCMC-Taskforce (Malaysia)	Mobile, 2002	BTS site	9.00%
		BTS equipment	31.00%
		MSC	10.00%
		Fiber	6.00%
		Duct	3.00%
		Common Cost Inv, % of Inv	8.60%
		Common Cost Opex, % of Opex	43.96%
FCC (US)	Fixed 1999	Fixed Switching Opex, % of Inv.	3.40%
		Fixed Transmission Opex, % of Inv.	1.10%
		Buried Cable, Opex % of Inv.	3.80%
		Duct, Opex % of Inv.	0.20%
		Common Cost Inv, % of Inv	6.20%
		Common Cost Opex, % of Opex	21.30%
iTST (Denmark)	Fixed 2002	ISFC + Common Cost, % mark-up of Investment (minimum)	24.40%
		ISFC + Common Cost, % mark-up of Investment (maximum)	26.40%
ACCC/NERA (Aus)	Fixed, 2000	Local Network Opex, % of Inv.	24.70%
		LD Network Opex, % of Inv.	43.40%
		Common Cost, % of Inv	6.90%
Europe Economics	Fixed, 2000	Local Network Opex, % of Inv.	24.80%
		LD Network Opex, % of Inv.	43.44%
		Common Cost, % of Inv	7.10%

Expense Factors Benchmarks.

5. Calculation of Retail Costs

Introduction

67. While a bottom-up methodology is universally recognized as being adequate to measure hypothetical network costs, there is much less consensus about how well it measures non-network costs. As described in Section 5, expense factors are used to calculate network operating costs, however to calculate non-network costs for retail services, a top-down analysis is used to examine C&W Cayman Islands' actual annual operating expenses. This section describes the top-down methodology for deriving LRIC measures for retail costs.
68. All capital and operating costs associated with the provision of C&W Cayman Islands' network elements are calculated in the BU model or using expense factors. This includes common costs such as the finance department and legal & regulatory costs. Capital and operating costs incurred in the operation of the retail business are calculated using the Top Down (TD) methodology described below.
69. The first step in the TD analysis is the categorization of actual operating expenditure and capital balances according to functional purpose and materiality, based on C&W Cayman Islands' product profitability reporting.³ This analysis provides a basis for understanding the cost drivers and dependency hierarchy for cost categories to be modeled on a top down basis, and involves the exclusion of all costs that are modeled using the bottom up and expense factors approaches in order to ensure that no costs are modeled twice. In cases where a cost type might be incurred in support of the network and retail parts of the business, an apportionment is made to segregate the two types of cost in order to avoid any double counting.
70. For example, if the company's product profitability reporting indicates that 60% of the HR department is attributable to parts of the business supporting the network part of the business, then only 40% of the cost of the department is included in the top down analysis. The 60% attributable to the network part of the business is excluded and simulated using the expense factor approach outlined in Section 5.
71. In order to strip current operating expenditures down into cost-causal measures, we develop and apply Cost Volume Relations (CVRs) to the defined cost categories. CVRs have been developed for the more material and functionally important cost categories. The other categories use either Straight Line Through Origin (SLTO) or Horizontal Fixed Element (HFE) shaped CVR curves depending on the nature of the cost category.

³ The output of this analysis is also used to inform any adjustment to non-network costs expense factors for network services

72. There are three types of top down (TD) cost category, defined according to their cost sensitivity:
- The cost of **independent** cost categories is driven directly by service volumes.
 - The cost of **semi-independent** cost categories is driven by the capital cost of network elements as calculated in the bottom-up models.
 - The cost of **dependent** cost categories is driven by the cost of one or more of the other TD cost categories calculated previously in the dependency hierarchy.
73. It is, therefore, critical to calculate LRIC for independent and semi-independent cost categories prior to the calculation of the dependent cost categories that are driven by predecessor cost categories. Therefore, the retail LRIC of a service is calculated for each service in turn following a sequence defined in the dependency order.

Cost Volume Relationships

74. This section describes the use of Cost Volume Relations (CVRs) used in the top-down part of the model for retail cost measurement.

CVR background and definition

75. The quantification of the relationship between the volume of services provided and the cost of providing those services is fundamental to the calculation of LRIC. CVRs describe and quantify that relationship.
76. CVRs are used to model C&W Cayman's retail operating and annualised capital costs as service volumes (e.g lines or minutes) vary. A CVR defines, for a particular cost category, how much variable cost would be avoided due to the removal of a particular product or service. Where there is no direct causal link between a cost category and service volumes, an indirect relationship is defined whereby a cost is dependent on the volume of cost in a category with a direct link.
77. For each cost category, a relationship is defined that represents the extent to which costs might be saved by the exclusion of one of the defined service increments. The costs can:
- be directly attributable to a one or more service increments being measured, and
 - be variable or fixed.
78. The relationship between costs and volumes is mapped with cost driver volumes on the X-axis and the costs, caused by the cost driver, on the Y-axis. Fixed costs

are represented on a CVR graph by an intercept that passes through the y-axis rather than through the origin of the graph.

79. In the diagram below, the first row of CVRs exhibit fixed costs. The first column exhibits a linear relationship between costs and volume, the second column exhibits a two stage linear relationship, and the third column exhibits economies of scale enjoyed at higher levels of volume

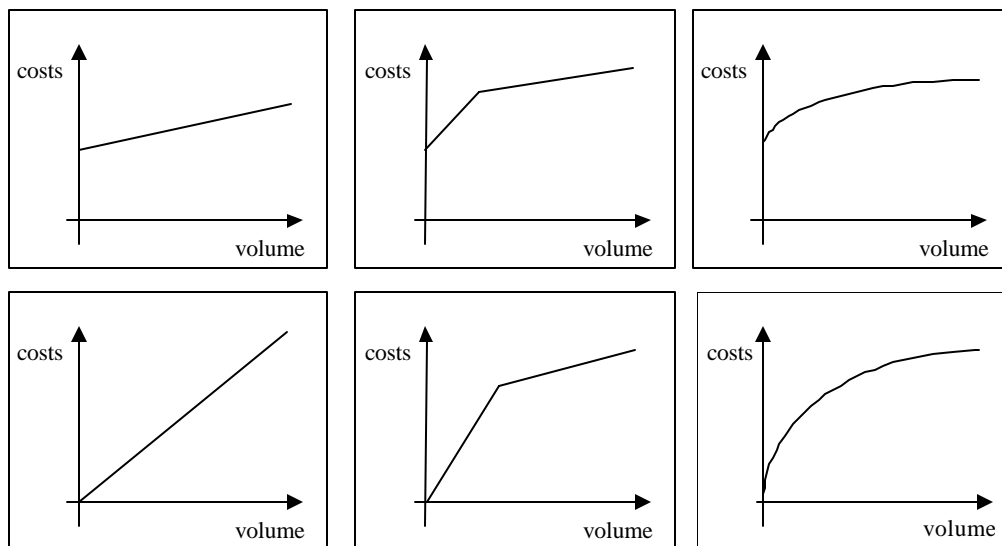


Figure 1 Example CVRs

80. As is the case in the bottom-up models, the LRIC of each service is calculated by removing the volumes of that service. In the bottom-up models, this causes a reduction in the Gross Replacement Cost of the network elements providing that service. However, the top down part of the model includes many cost categories which do not have a direct relationship with service volumes. Therefore, in the top-down part of the model, such cost categories may be driven by the reduction in the GRC or operating cost of a network element or group of network elements, where that reduction in the GRC is calculated in the bottom-up models resulting from a reduction in service volume.
81. Each CVR that defines a fixed element to the cost category is associated with an Increment Specific Fixed Cost (ISFC) label that instructs the model how to treat that fixed element. If no ISFC label is defined, the fixed cost element is considered to be common to all services.

Construction of CVRs

82. For each CVR it is necessary to identify the minimum and maximum points and the technique for joining the two points.

83. In defining the minimum point the scorched node principle is applied to the retail environment in order to ensure that the operating costs being modelled are sufficient to support the notional minimum volume of services provided by the network simulated in the BU model. The maximum point is the fully allocated cost (FAC) output from C&W Cayman Islands' product profitability system.
84. The following process is undertaken for each CVR:
- The cost driver is identified.
 - The current cost structure of the cost category is investigated, in order to understand the most material elements of cost in the category, and how they might vary in respect of the cost driver volume.
 - The resources necessary at the minimum point are determined. These are then expressed in cost terms taking account of any economies of scale which are enjoyed at the 100% point but may not be enjoyed at the minimum point.
 - A method for linking the minimum and maximum points is determined (i.e. the shape of the curve). This is achieved for interim points, for example, 50% by replicating the process used to determine the minimum point.
85. Because CVRs are expressed as curves constructed from a finite number of data points (x, y co-ordinates), there will usually be a need to interpolate between data points to calculate the appropriate LRIC. The interpolation takes the x-axis value of the cost driver volume being measured and finds the two co-ordinates either side of that x-axis value. The decrease in cost from the higher data point is calculated by multiplying the gradient between the two data points by the difference between the cost driver volume being measured and the higher data point. Once the CVRs have been developed, it is possible to identify, for those which exhibit a fixed element, increment-specific fixed costs.

Information Sources

86. CVRs are generated by way of interviews with key stakeholders in the business, particularly those responsible for management of cost centres represented in the cost categories for which CVRs have been defined.

Defining the Dependency Hierarchy

87. Cost categories are identified as being independent, semi-independent or dependent. Independent cost categories are driven by exogenous drivers, such as minutes or number of lines. Semi-independent cost categories are driven by costs calculated by the bottom-up models. Dependent cost categories are driven by endogenous drivers, such as total salary costs or net replacement cost of an asset.

Independent cost categories

88. Independent cost categories each map to a cost volume relationship which describes the relationship between service volumes and cost. The model uses the CVR associated with the cost category to determine by how much the cost will fall if a given service increment is removed.
89. An example of an independent cost category is the Mobile Customer Services department. The operating expenditure associated with this department is a function of the number of active mobile customers. When the model calculates the LRIC of independent cost categories it references the CVR that describes the relationship between the cost driver volume (number of active mobile customers) and the cost of the category (departmental operating expenditure).

Semi-independent cost categories

90. Semi-independent cost categories each map to a CVR which describes the relationship between a cost calculated by the BU part of the model and the cost category. Therefore, semi-independent cost categories may be driven by either BU-derived Net Replacement Costs or by BU expense factor-derived operating costs.
91. An example of a semi-independent cost category is the Sales Support Engineering department, the operating cost of which is a function of the network cost of providing the products supported. When the model calculates the LRIC of semi-independent cost categories it references the CVR that describes the relationship between the cost driver volume (product network cost) and the cost of the category (departmental operating cost)

Dependent cost categories

92. Dependent cost categories each map to a CVR which describes the relationship between an independent or semi-independent cost category (or group of cost categories) and the cost category.
93. An example of a dependent cost category is the Mobile Retail Sales Management department, the operating cost of which is a function of the cost of other departments over which the management team has responsibility. When the model calculates the LRIC of a dependent cost category it references the CVR that describes the relationship between the cost driver volume (the total operating cost of the group of mobile retail sales cost categories) and the cost of the category (departmental operating cost).
94. Dependency groups such as the one described above, define which cost categories contribute to the cost driver volume of the affected cost category. For example, the dependency group for the Mobile Retail Sales Management cost category might include all the previously calculated Mobile Retail Sales cost categories, but cannot include the driven cost category or any of the cost categories that are calculated later in the dependency hierarchy.

Dependency hierarchy

95. In order to capture the different drivers, it is necessary to define ‘hierarchies’ of relationships within the analysis. This allows for cost categories that are driven by service volumes to be calculated first, with successive interdependencies being ‘rippled’ through the analysis. The dependency hierarchy is defined so as to ensure there is no circularity in the dependencies.
96. The dependency hierarchy is defined in the LRIC Driver Affected (LDA) table. The guiding principle in constructing the table is to calculate independent cost categories first, then semi-independent cost categories, and to calculate dependent cost categories last, whilst avoiding any circularities that would arise by including a cost category in the group which it is driven by.

Worked Example

97. The following worked example demonstrates the calculation process in the top-down part of the model.

Assumptions

98. The Weighted Average Cost of Capital (WACC) is assumed to be 10%.
99. There are five services in the increment:

Product	Minutes
Service A	1,000,000
Service B	1,000,000
Service C	2,000,000
Service D	500,000
Service E	500,000

100. Two Network Elements provide the services. The incremental reduction in the cost of these network elements shown below results from ceasing to provide Service A:

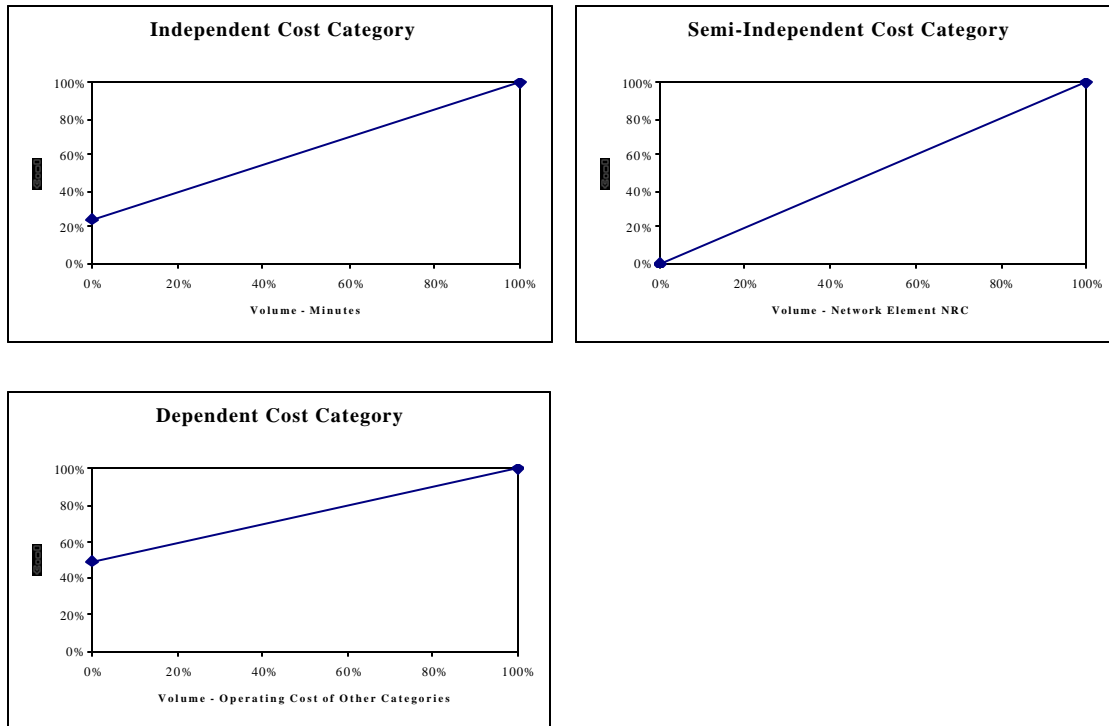
Network Element	NRC	Reduction	Depreciation	Reduction
Network Element 1	\$ 1,000	\$ 400	\$ 200	\$ 80
Network Element 2	\$ 4,000	\$ 1,000	\$ 800	\$ 320

101. Three cost categories are driven by the volume of service A, or by the network elements which product Service A:

Cost Category	Operating Cost
Independent Cost Category	\$ 1,000

Semi Independent Cost Category	\$ 500
Dependent Cost Category	\$ 2,000

102. The CVRs constructed for the three cost categories are shown below:



- The CVR for the independent cost category has an intercept point of 25%. Fixed costs are increment specific to services A, B and C.
- The CVR for the Dependent cost category has an intercept point of 50%. Fixed costs are common to all five services.

Step 1

- The Independent Cost Category is an Operating Cost category driven by the volume of minutes for Services A, B and C.
- If Service A is reduced to zero minutes, this represents a 25% reduction in the driver volume for the cost category.
- The model therefore reads off the CVR graph from the 75% point on the x-axis, which corresponds to the 81.25% point on the y-axis.
- The cost reduction is therefore 18.75%, which is \$187.50. This is the LRIC of the cost category in respect of Service A.
- The fixed cost of the independent cost category is an increment specific cost shared by Services A, B and C.

Step 2

- The Semi-Independent Cost Category is an Operating Cost category driven by the NRC of Network Elements 1 and 2.
- If Service A is reduced to zero minutes in the BU part of the model, this causes a reduction of \$400 in the NRC of Network Element 1 and a \$1000 reduction in the NRC of Network Element 2.
- This is a 28% reduction in the driver volume for the cost category.
- The model therefore reads off the CVR graph from the 72% point on the x-axis, which corresponds to the 72% point on the y-axis as the CVR is Straight Line Through Origin (SLTO) type.
- The cost reduction is therefore 28%, which is \$140. This is the LRIC of the cost category in respect of Service A.
- There is no fixed cost for this cost category.

Step 3

- The Dependent Cost Category is driven by the amount of operating expenditure incurred in the Independent and Semi-Independent Cost Categories.
- If Service A reduces to zero minutes, this causes the operating cost in the Independent and Semi Independent cost categories to decline by a total of \$327.50
- This is a 21.8% reduction in the driver volume for the cost category
- The model therefore reads of the CVR graph from the 78.2% point on the CVR graph, which corresponds to the 89.1% point on the y-axis
- The cost reduction is therefore 10.9%, which is \$218. This is the LRIC of the cost category in respect of Service A
- The fixed cost of the independent cost category is a Common Cost shared by all Services
- The retail LRIC of Service A can now be calculated by adding the \$545.50 of operating cost, to the capital cost (NRC x WACC) and depreciation increments for Service A of Network Elements 1 and 2.
- The LRIC of Service A is \$1085.50.

Step 4

- The increment specific fixed cost calculated at Step 1 is apportioned over Services A, B and C on an equiproportionate basis using the calculated retail LRIC of each service.
- It is assumed that the retail LRIC of Service B is \$1200, the retail LRIC of Service C is \$800, the retail LRIC of Service D is \$750 and the retail LRIC of Service E is \$400.
- Service A would receive 35% of the increment specific fixed cost of \$250 from the Independent Cost Category

- The retail Distributed LRIC of Service A is \$1173.45

Step 5

- The fixed common cost calculated at Step 3 is apportioned over all services on an equiproportionate basis using the calculated retail DLRIC of each service.
- It is assumed that the retail DLRIC of Service B is \$1297, the retail DLRIC of Service C is \$864, the retail DLRIC of Service D is \$785 and the retail DLRIC of Service E is \$430.
- Service A would receive 26% of the increment specific fixed cost of \$500 from the Semi-Independent Cost Category.
- The retail DLRIC plus Mark Up of Service A is \$1302.39

6. Cost of Capital

103. Guideline 8 of the Decision 2005-4 requires a demonstration of a forward-looking weighted average cost of capital (WACC) for use in the FLLRIC model. C&W has conducted a WACC analysis looking at a group of fixed network operators (70% of revenues coming from fixed services) for the fixed network model and of wireless operators for the mobile network model. This section describes our approach and the results from the analysis.

Guideline 8:

FLLRIC should allow the carrier to earn a reasonable return on its investment as measured by a weighted average cost of capital ("WACC"). The carrier is required to provide support for the forward-looking WACC assumed in its FLLRIC analysis. Among other things, the carrier is required to demonstrate, with specificity, the business risks it faces in providing certain carrier services such as interconnection and access to infrastructure sharing, as contrasted to the business risks it faces when providing retail services in competition with other carriers. Alternatively, or in the absence of sufficiently robust supporting information, benchmarking analysis of the WACCs of similarly situated carriers providing comparable services may be used to support a proposed forward-looking WACC for C&W.

General Approach

104. The WACC must represent the opportunity cost of funds invested in the businesses modeled, stated differently, it must reflect the level of return that must be earned by a business if it is to continue to attract investible funds. Companies raise funds in the form of equity or debt. Typically equity is viewed as the more costly of the two forms as the providers of equity will share in a less certain, more volatile source of return. Providers of debt receive generally stable, set returns.
105. The WACC by definition arrives at an estimate of the cost of capital as a function of the cost of each of the two forms of capital and the relative share of the two used to finance the investment. The WACC formula is as follows:

$$\text{WACC} = R_e W_e + R_d W_d$$

Where:

R_e = cost of equity capital

R_d = cost of debt capital

W_e = weight of equity capital (equity/(debt + equity)); and

W_d = weight of debt capital (debt/(debt + equity))

106. A standard approach for deriving the cost of equity is the Capital Asset Pricing Model (CAPM). Under the CAPM, the return on the investment must be equal to that of a risk-free investment (for example, US or UK Government bonds) plus an additional premium for the risk involved in making an equity investment in the company in question. The risk premium is measured by multiplying general equity market risk premium by the company specific beta. The beta is a measure of the specific riskiness of an individual company's stock compared to the average riskiness of investing in the equity market. The greater the beta, the higher the risk and the higher cost of equity.
107. Similar to the cost of equity, the cost of debt of a company is viewed in terms of a risk free rate plus a mark up for the company specific debt.
108. The weighting factor for debt (Wd) is commonly called the Gearing Ratio. The weighting factor for equity (We) is the complement of the Gearing Ratio (1- Wd).

Cost of Equity

109. For this submission, C&W Cayman Islands' has adopted the standard the Capital Asset Pricing Model (CAPM) for calculating the cost of equity.
110. The Capital Asset Pricing Model (CAPM) is generally written as:

$$R_e = R_f + \beta (R_m - R_f)$$

where

R_f = the estimated return available from risk free investment

R_m = the estimated returns available from risky investments in the market generally

β = the correlation between movements in the share price of the company concerned compared with movements in the market generally, a measure of its systematic risk.

To account explicitly for the country equity risk, we measure R_m and R_f in terms of a minimum risk, developed market then add a separate country equity risk premium term, R_c :

$$R_e = R_f + \beta (R_m - R_f) + R_c$$

Risk Free Rate

111. The risk free rate is the return that can be earned on government securities that generally carry a negligible risk of default. We have chosen US Treasury bonds. With respect to term, there is no internationally accepted yield period when selecting bonds for these purposes. Long-term bonds are a better proxy for the risk free rate than short-term bonds as the prices incorporate both short-term and long-term interest rate. We therefore have chosen the 30 year bond, which in the first week of December 2005 was sitting at **4.72%**.

Equity Market Risk Premium (EMRP)

112. The market risk premium is the premium of a broad portfolio of equity investments over the risk free rate. It reflects the extra return that investors require in return for investing in equities rather than a risk free asset.
113. For the market risk premium, we have compared volatility of Large US corporate stocks vs. that of Long-term Government Bonds. This gives us an equity Market Risk premium of **6.57%**.

Equity Beta

114. The equity beta measures the “covariance” of movements in a company’s share price and movements in the market index and provides a measure of the specific risk associated with an individual company compared to the market.
115. There are several approaches that may be taken to calculating a beta. We have benchmarked it against other operators: fixed network operators earning 70% or more of their revenues from fixed services for the fixed network WACC and mobile network operators for the mobile network WACC. See Appendix IVA for the Fixed network beta data and Appendix IVB for the mobile network beta data.
116. The equity beta of their peer companies must be modified for our purposes as it measures not only the specific risk of the company but also the implications of its capital structure. In particular, volatility generally increases as a company’s debt levels increases, On the other hand, interest payments on debt are tax deductible offsetting the effects of higher gearing.
117. In order to correct for these effects of debt and tax, we make the following adjustment-unlevering the company specific betas, then relevering on the basis of the assumed gearing.

$$\beta_a = \beta_e / [1 + (W_d / W_e) * (1 - t)]$$

where

- β_a = the asset (unlevered) beta
 β_e = the equity (levered) beta
 t = the corporate tax rate
 W_d = weighting of debt in the capital structure
 W_e = weight of equity in the capital structure

118. This calculation is performed assuming, as is done typically done in such studies, that the beta of debt is zero.
119. The tables in IVA and IVB contain levered and unlevered betas for a selection of listed telecoms companies. Unlevered or asset betas were calculated based on levered betas obtained from Bloomberg.

Country Equity Risk Premium

120. The last component is the Country equity risk. We add an additional premium to reflect the differential risk between investing in the United States and in Cayman. We have looked at a number of different proxies and have chosen Aswath Damodaran’s approach. See, http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html
121. The Damodaran’s site provides methodology and justification. Here we simply replicate his numbers relevant for the Cayman Islands. The calculations implies that the country equity risk premium of **1.25%**.

Cost of Debt

122. Turning to the debt component of the WACC, we follow the usual approach of adding a corporate debt premium to the risk-free return on government debt:

$$R_d^{bt} = R_f + P_d$$

where

- R_d^{bt} = the estimated pre-tax cost of debt;
- R_f = the estimated risk-free return on government debt; and
- P_d = the estimated corporate debt premium.

123. In considering the anticipated corporate debt premium, we looked at two measures: the historic yield to maturity of bonds issued by peer operators (with respect to the fixed operators we choose peers with 80% or more fixed revenues); and forward looking bond rating. The differences are significant so we provide both measures. We provide the base data in Appendices VA and VB.

	Fixed operators	Mobile operators
Cost of Debt on historic basis	10.34%	11.65%
Cost of Debt forward-looking	6.39%	6.39%

Weighted Average Cost of Capital

124. The assumed capital structure has two impacts on the WACC, as a higher gearing level:
- Increases the weighting of the cost of debt relative to the cost of equity. Since the cost of debt is lower than the cost of equity this reduces the WACC
 - Leads to an increase in the cost of equity since higher gearing is associated with greater financial risk
125. We use the average debt to equity structure of the peer group provided in Appendices VA and VB. These are 48.8%:51.2% for fixed network operators and 36%:64% for wireless.
126. Utilising the value of the parameters presented previously yields a value of WACC in the following ranges:

	Fixed WACC	Mobile WACC
High	11.03%	12.59%
Low	10.01%	10.70%

Cost of Capital for Cayman Islands Fixed Line Operator

Country Equity Risk Premium

(a) Moody's rating of Cayman Island Long Term Government Bond	Aa3	
(b) Moody's U.S. Corporate Bond Yield (AA)	5.55%	
(c) Risk Free Rate - 30 year U.S. Treasury Bond	4.72%	
(d) Country Default Risk Spread	0.83%	=b-c
(e) Aswath Damodaran's Average Equity Market to Debt Market Volatility	1.5	
Country Equity Risk Premium	1.25%	=d*e

Cost of Equity

Beta Sensitivity: Proxy Company Pool with Fixedline Revenue Percentage >=50%, >=70%

Proxy Company Pool with Fixedline Revenue Percentage:

(f) Averaged Levered Beta	1.02	
(g) Market Equity Risk Premium	6.57%	
(h) Risk Free Rate - 30 year U.S. Treasury Bond	4.72%	
(i) Cost of Equity	12.68%	=i+(g*h)+f

Cost of Debt

Choose Accounting Cost of Debt, Forward Looking Cost of Debt, OR
Cable & Wireless Cost of Debt:

(j) Average cost of debt (peer companies)	6.39%	8.47%	
(k) Adjusted for Country Risk	7.22%	9.30%	=j+d

Capital Structure

(k) Debt	48.8%
(l) Equity	51.2%

WACC **10.01%** **11.03%**

Cost of Capital for Cayman Islands Wireless Operator

Country Equity Risk Premium

(a) Moody's rating of Cayman Island Long Term Government Bond	Aa3	
(b) Moody's U.S. Corporate Bond Yield (AA)	5.55%	
(c) Risk Free Rate - 30 year U.S. Treasury Bond	4.72%	
(d) Country Default Risk Spread	0.83%	=b-c
(e) [3] Aswath Damodaran's Average Equity Market to Debt Market Volatility	1.5	
(f) Country Equity Risk Premium	1.25%	=d*e

Cost of Equity

(g) Averaged Levered Beta	1.02	
(h) Market Equity Risk Premium	6.57%	
(i) Risk Free Rate - 30 year U.S. Treasury Bond	4.72%	
(j) Cost of Equity	12.66%	=i+(g*h)+f

Cost of Debt

	Choose Forward Looking Cost of Debt OR Accounting Cost of Debt:		
	Forward- Looking	Accounting	
(k) Average cost of debt (peer companies)	6.39%	11.65%	
(l) Adjusted for Country Risk	7.22%	12.48%	=k+d

Capital Structure

(m) Debt	36.0%
(n) Equity	64.0%

WACC	10.70%	12.59%
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7. Output and consolidated reports

Reporting Sheets

127. This section describes the individual worksheets of Consolidation excel file which a) pulls together the output of the bottom-up models for network costs, b) generates the expense factors for non-network costs based on C&W Cayman cost information, and c) summarizes the LRIC results by service. We look at each of the component sheets in turn:

- **Main**

The main worksheet allows the user to establish the link to the appropriate Bottom-Up fixed and mobile models, to run these models and finally to check the set of parameters necessary to run the expense factor calculation (macro).

- **Reconciliation**

The reconciliation worksheet contains a single pivot table called PT_RECONCILIATION that contains calculated bottom-up LRIC results from the MLRIC Worksheet.

- **Fixed Service Costs**

The fixed service cost worksheet contains a report describing the total and unit costs of individual Fixed Services by Network Element.

- **Fixed Network Costs**

The fixed network cost worksheet contains a report describing total and unit cost of individual Fixed Network Elements.

- **Mobile Service Costs**

The mobile service cost worksheet contains a report describing the total and unit costs of individual Mobile Services by Network Element.

- **Mobile Network Costs**

The mobile network cost worksheet contains a report describing total and unit cost of individual Mobile Network Elements.

- **Expense Factors**

The expense factor worksheet contains the formulae used to calculate overhead expense factors based on capital and operating costs previously calculated in the fixed and mobile bottom-up models. The outputs of this worksheet are LRIC values of Overheads Opex for each Increment.

- **REL_PERC**

The REL_PERC worksheet contains the PR_REL_PERC pivot table, which contains the calculated allocation percentages of individual 400-level Network Elements to the relevant 900-level Products. The pivot table is based on data found on the RF worksheet and shows how much of each network element is consumed by each product.

- **RF**

The RF worksheet contains:

- In Columns A:E – Route factor relationships imported from the bottom-up models;
- Column F - Product volumes from the Volume worksheet (imported from the bottom-up models).
- Columns G:H – Route factored volumes generated by a macro using calculated network element volumes and allocation percentages.
- In Columns K:Q the PT_RF Pivot Table contains Routing Factors from Network Elements to Products.
- In Columns T:V the PT_ALLOCATED_VOLUME Pivot Table contains route factored volumes from Network Elements to Products.
- In Columns X:Y the PT_ALLOCATED_VOLUME_SUM Pivot Table contains total route factored base element volumes for all Network Elements.

- **DET_VAL**

The Detail Values 'DET_VAL' worksheet contains the PT_DET_VAL pivot table, which contains calculated bottom-up LRIC results from the MLRIC Sheet with following dimensions:

- By Increment (Products),
- By Network Element,
- By Cost Type (called Element in the model)

- With or without Markup.

- **ABS_VAL**

The Absolute Values 'ABS_VAL' worksheet contains the PT_ABS_VAL pivot table which contains the bottom-up LRIC calculated results from the MLRIC worksheet with the following dimensions:

- By Network Element,
- By Cost Type (called Element in the model)
- With or without markup.

- **RET_VAL**

The Retail Values 'RET_VAL' worksheet contains the PT_DET_VAL pivot table, which contains calculated top down LRIC retail results from the associated retail cost model. The user is prompted to refresh retail costs when opening the Consolidation and Reporting module, and will be able to do so if the retail cost model (MS Access) is present in the same folder. If no file is present then the Consolidation and Reporting module will continue to operate using the most recently available retail cost data. Retail costs are reported in the following dimensions:

- Per Increment (Products),
- Per Element (Cost Type)
- With or without Markup.

- **MLRIC Values**

The Marked Up LRIC 'MLRIC' Values worksheet contains:

- calculated LRIC values from the bottom-up models,
- calculated LRIC values from the Expense Factors component of the Consolidation & Reporting module and
- calculated markup values.

- **Volumes**

The Volumes worksheet contains:

- In Columns A:G – Volumes imported from the bottom-up models;
- The PT_Volumes Pivot Table, which contains Volumes per Product and per Volume Type.

- **Markup Perc**

The Markup Perc worksheet contains calculation of Markup Percentages, i.e. percentages defining how the total markup (as calculated in the Total Markup worksheet) should be distributed between individual product increments.

- **Total Markup**

The Total Markup worksheet contains the calculation of Total Markup values, i.e. total values of joint and common costs per Network Element and per Cost Type.

- **FAC_Results**

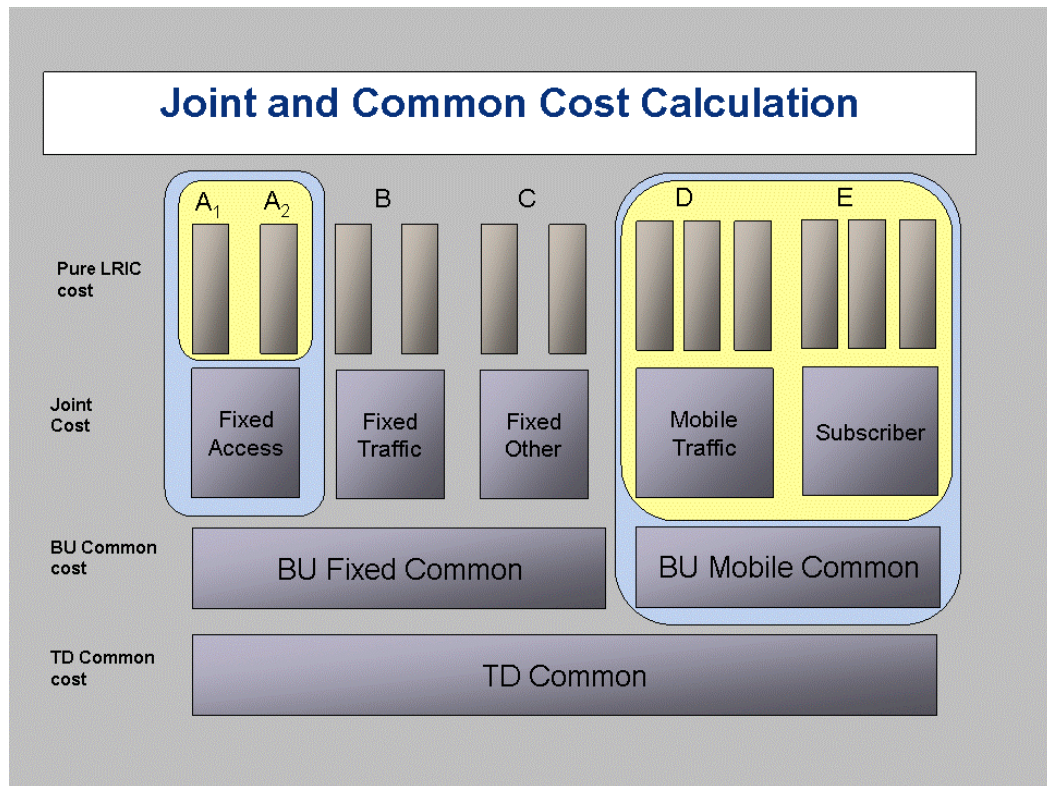
The FAC_Results worksheet contains imported values from the bottom-up models showing the full costs of each Network Element per Cost Type.

The Mark-up Calculation

128. The Markup Calculation process embedded in the model consists of several steps:

- In the first step the model calculates LRIC values for individual Product Increments, Sub Increments (G-Fixed Access, G-Fixed Traffic, G-Mobile Traffic...) and Total Increment (G-ALL-PROD). The model does this by removing the service volumes from individual service (Product Increment), groups of similar services (Sub Increment) and for all services (Total Increment).
- In the 2nd step the Total Markup Values are calculated:
 - The total values of Joint Costs for each Sub Increment (Fixed Access, Fixed Traffic, Mobile Traffic, Subscriber etc...) are calculated as the LRIC values of Sub Increment (see the blue Fixed Access rectangle in the picture below) minus the sum of LRIC values of individual Product Increments that belong to the specified group (see the yellow Fixed Access rectangle below).
 - The total values of Common Costs for BU Fixed Common, BU Mobile Common and TD Common are calculated as LRIC values of Total Increment (see the blue BU Mobile Common rectangle in the picture

below) minus the sum of LRIC values of Sub Increments that belong to the specified group (see the yellow BU Mobile Common rectangle below).



- Common Costs are calculated per individual Network Elements and per Cost Types.
- In the 3rd step the Markup Percentages for Joint Cost Allocation are calculated. Joint Costs are allocated only to the associated Group of Products (Product Increments). Joint costs are allocated proportionally based on pure LRIC Economic Cost. Joint costs are calculated per individual Network Elements and per Cost Types. The allocation of Joint Cost will keep this level of detail, and therefore the allocated Joints Costs will contain the same dimensions.
- When Joint Costs are allocated, the Markup Percentages for Common Cost Allocation are calculated (in the 3rd step). Common Costs are allocated to all associated Products (e.g. BU Mobile Common costs to all Mobile Products). Common costs are allocated proportionally based on the sum of pure LRIC Economic Cost and allocated Joint Cost. Common costs are also calculated per

individual Network Elements and per Cost Types. The allocation of Common Cost will keep this level of details, and therefore the allocated Common Costs will contain the same dimensions.

Output

In Appendix VIA and VIB, we present the results of the model for fixed and mobile services, respectively with service volume inputs given in Appendix VII. We note again that the underlying cost input information is confidential and has been provided to the Authority and not other Interested Parties.

Appendices

Appendix I. List of Expense Factors

Distribution Network Operating Expenses

- 100-Plan Distribution Network
- 100-Monitor Distribution Network
- 100-Maintain & Repair Distribution Network
- 100-Provide Underground Distribution Network Cabling
- 100-Provide Aerial Distribution Network Cabling
- 100-Provide Basic Business Telephony Services
- 100-Provide Basic Residential Telephony Services

Core Network Operating Expenses

- 100-Plan Core Network
- 100-Monitor Core Network
- 100-Maintain National Transmission Technologies
- 100-Maintain National Transmission Infrastructure
- 100-Provide National Transmission
- 100-Provide National Switching Equipment
- 100-Maintain National Switching

Other Fixed Network Operating Expenses

- 100-Maintain Internet Services Equipment
- 100-Provide & Maintain Other Service Platforms
- 100-Provide & Maintain Payphone Services
- 100-Provide & Maintain VAS
- 100-Provide & Maintain Voicemail
- 100-Provide & Maintain ADSL Services
- 100-Provide Dial Up Internet Services
- 100-Provide Direct Connect Internet Services
- 100-Provide Domestic Frame Relay
- 100-Provide Domestic LeasedLines
- 100-Provide Fixed Network Prepaid Calling Card Services
- 100-Provide Internet Services
- 100-Provide Operator Assistance
- 100-Provide Wholesale ISP Services

International Network Operating Expenses

- 100-Maintain International Switching
- 100-Maintain International Transmission
- 100-Provide International Frame Relay
- 100-Provide International Leased Lines

Interconnect Specific Operating Expenses

100-Billing: Manage Interconnect Billing
100-Maintain Interconnection Services
100-Manage Fixed Interconnect Specific Requirements
100-Plan & Monitor Interconnection Services
100-Provide Interconnection Services
100-Respond to Other Local Operators (OLOs)
100-Support Regulatory Costing
100-Prepare Quotations for Fixed Interconnect Services

Fixed Network Recharges

INTER-Region Recharges IN (2304195) - Jamaica earthstation
INTER-Region Recharges IN (2304195) - RNMC
INTER-Region Recharges IN (7504195) - Call centres
INTER-Region Recharges IN (9004195) Carrier Sales & Operations
INTER-Region Recharges IN (9004195) Carrier Service Billing
INTER-Region Recharges IN (9004195) PLC Support

Fixed Network Specific Costs

100-Underground Line Plant
100-Submarine Cable
100-Cable Circuit/Pole Rentals
100-Consultancy Fees (Hurricane Ivan)
100-Engineering Support
100-Intelsat Space Segment Rentals
100-R&M Exchange Equipment - Ericsson Switch
100-Overhead Line Plant

Fixed Network Support Expenses

100-Support Fixed Network

Fixed Network Cost of Working Capital

100-C&W Loan - Fixed Network
100-Frame Relay Creditors - Fixed Network
100-Leased Circuit Debtors - Fixed Network
100-Line Plant Stock - Fixed Network
100-Maya Cable Creditor - Fixed Network
100-Network Restoration Provision - Fixed Network
100-VoIP Creditors - Fixed Network
100-Wholesale Debtors - Fixed Network
100-Capital Accruals - Fixed Network

100-Cash - Networks - Fixed Network
100-Intercompany Creditors - Networks - Fixed Network

100-Operational Debtors - Networks - Fixed Network
100-Staff Creditor - Networks - Fixed Network
100-Trade Creditors - Networks - Fixed Network

Fixed Network Capital Cost of Support Assets

100-Freehold Technical Infrastructure - Fixed Network
100-Furniture and Fittings - Fixed Network
100-Computers - Fixed Network
100-Building Infrastructure - Fixed Network
100-Vehicles - Fixed Network

MOBIE NETWORK OPERATING EXPENSES

Mobile Network Operating Expenses

100-Plan Mobile Network
100-Monitor Mobile Network
100-Maintain Cellsites
100-Maintain Mobile Network
100-Maintain Mobile Switch
100-Provide Mobile Cellsites
100-Provide Mobile Switching Equipment
100-Provide Mobile Network Services
100-Prepare Quotations for Mobile Services

Mobile Interconnect Specific Operating Expenses

100-Manage Mobile Interconnect Specific Requirements

Mobile Network Recharges

INTER-Region Recharges IN (8004195) Mobile Roaming

Mobile Network Specific Costs

100-Non Broadband Radio - Ericsson Support
100-Licence Fees - Spectrum
100-Courier & Telephone - GSM links
100-Electricity - Cell Sites
100-Non Broadband Radio - E-mail
100-Telecoms Equipment - Nortel Support

Mobile Network Support Expenses

100-Support Mobile Network

Mobile Network Cost of Working Capital

100-C&W Loan - Mobile Network

100-CCBS Creditor - Mobile Network
100-Cellular Licence Fee Creditor - Mobile Network
100-Line Plant Stock - Mobile Network
100-Mobile Creditors - Mobile Network
100-Network Restoration Provision - Mobile Network
100-Capital Accruals - Mobile Network

100-Cash - Networks - Mobile Network
100-Intercompany Creditors - Networks - Mobile Network
100-Operational Debtors - Networks - Mobile Network
100-Staff Creditor - Networks - Mobile Network
100-Trade Creditors - Networks - Mobile Network

Mobile Network Capital Cost of Support Assets

100-Freehold Technical Infrastructure - Mobile Network
100-Furniture and Fittings - Mobile Network
100-Computers - Mobile Network
100-Building Infrastructure - Mobile Network
100-Vehicles - Mobile Network

CONSOLIDATION SHEET EXPENSES

Fixed & Mobile Network Overhead Expenses

100-Billing: Collect Call Data
100-Billing: Systems support
100-Manage Disaster Recovery Process
100-Provide Operational Support Systems

100-Maintain Generators
100-Maintain Network Buildings
100-Manage Hurricane Recovery
100-Manage Insurance Premium & Claims
100-Janitorial Services
100-Building Repairs
100-Electricity - General
100-Electricity - Trinity Square

General Overhead Expenses - Apportioned to Networks

100-Finance, accounting and budgeting - Networks
100-Human Resources - Networks
100-Provide Business Support Systems - Networks
100-Provide Legal Services - Networks
100-Manage Corporate Affairs - Networks

100-Provide Strategy & Policy - Networks
100-Provide Public Relations - Networks
100-Administer Government & International Relations - Networks
100-Manage Security - Networks
100-Operate Fleet - Networks
100-Procurement & Stores - Networks
100-Manage Admin Buildings - Networks
100-Manage Switchboard - Networks
100-Property Rentals - Networks
100-Fleet Expenses - Networks
100-Security Expenses - Networks

Overhead Recharges

INTER-Region Recharges IN (3304195) - Area Office North
INTER-Region Recharges IN (5004195) Oracle licences
INTER-Region Recharges IN (5004195) (BAR & JAM business support)
INTER-Region Recharges IN (5004195) PLC Support
INTER-Region Recharges IN (5004195) OBS Support

Overheads - Specific Costs

100-Audit Fees
100-Bank Charges
100-Computer Bureau, Licence Fees & Central Systems
100-Licence Royalty
100-C&W Group Management Fee
100-Sundry Financial Charges
100-Regulatory Authority Fees

A series of cost categories are also defined for calculation on a top-down LRIC basis in an associated MS Access retail cost model.

Appendix II.

Information Technology	Licence Fees (5004410)	100-Computer Bureau, Licence Fees & Central Systems
Information Technology	INTER-Region Recharges IN (5004195) (BAR & JAM business support)	INTER-Region Recharges IN (5004195) (BAR & JAM business support)
Information Technology	Computer Bureau Cost (5004140)	100-Computer Bureau, Licence Fees & Central Systems
Corporate Communications	INTER-Region Recharges IN (6154195) - Cricket	INTER-Region Recharges IN (6154195) - Cricket
Corporate Communications	Sponsorship (6154925)	100-Sponsorship
Corporate Communications	Giveaways (6154941)	100-Advertising
Corporate Communications	Customer Events (6154960)	100-Advertising
Corporate Communications	PR (6154940)	100-Advertising
Corporate Communications	Publicity/Advertising (6154910,4911,4912,4913,4914,4915,4916)	100-Advertising
Retail Sales - Galleria	Licence Fees (7104410) TEC	100-TEC
Retail Sales - Galleria	Computer Bureau Cost (7104140) TEC development	100-TEC
Partner Sales	Licence Fees (7104410) TEC	100-TEC
Partner Sales	Computer Bureau Cost (7104140) TEC development	100-TEC
Partner Sales	Property Rentals (7204360) Comms stations	100-Property Rentals
Customer Services	INTER-Region Recharges IN (7504195) - Call centres	INTER-Region Recharges IN (7504195) - Call centres
Mobile	INTER-Region Recharges IN (8004195) Telesales	INTER-Region Recharges IN (8004195) Telesales
Mobile	INTER-Region Recharges IN (8004195) Mobile Roaming	INTER-Region Recharges IN (8004195) Mobile Roaming
Govt, Regulatory & Carrier Relations	Legal & Professional Fees (9004820)	100-Provide Legal Services
Govt, Regulatory & Carrier Relations	INTER-Region Recharges IN (9004195) Carrier Service Billing	INTER-Region Recharges IN (9004195) Carrier Sales & Operations
Govt, Regulatory & Carrier Relations	INTER-Region Recharges IN (9004195) Carrier Sales & Operations	INTER-Region Recharges IN (9004195) Carrier Service Billing
Govt, Regulatory & Carrier Relations	Space Segment Rentals (9004310) - Intelsat	100-Intelsat Space Segment Rentals
Govt, Regulatory & Carrier Relations	INTER-Region Recharges IN (9004195) PLC Support	INTER-Region Recharges IN (9004195) PLC Support
Information Technology	INTER-Region Recharges IN (5004195) PLC Support	INTER-Region Recharges IN (5004195) PLC Support
Information Technology	INTER-Region Recharges IN (5004195) OBS Support	INTER-Region Recharges IN (5004195) OBS Support

Appendix III. Description of Expense Factors

Fixed Access Network expenses

Distribution Network Expenses

100-Plan Distribution Network

This expense factor represents the cost of planning the local distribution network. These costs relate to planning from the line sensitive element of the main distribution frame (MDF) to the distribution point (DP). The tasks captured primarily relate to demand forecasting and the planning of network expansion into new areas (for example new residential or business developments). The team that the expense factor represents are also responsible for identifying potential new sites for equipment such as cabinets and distribution points. This expense factor does not include the cost of planning the core network, customer equipment (CPE) requirements or any aspect of the mobile network.

100-Monitor Distribution Network

This expense factor captures the cost of fault reporting and performance analysis of the access network. Examples of these expense factor activities include regular inspections of physical facilities (from MDF to NID including cabinets and Distribution Point's (DP's)), review of equipment manufacturing specifications, current network performance measurement and assessment against set performance standards. This expense factor excludes any monitoring activities as regards customer premises equipment (CPE) or the Core Network.

100-Maintain & Repair Distribution Network

This expense factor captures the cost of the access network team in providing preventative maintenance and corrective repair services to the access network. The Access Network provides connections to and from the Core Network and relates to cabling from the line sensitive element of the main distribution frame (MDF) to the distribution point (DP). This expense factor incorporates maintenance and repair of reported line faults to any part of the network between these two points. This also captures maintenance of underground fibre and copper cable and duct, cable heads, necessary maintenance of distribution points and other miscellaneous preventative maintenance and repair as necessary. This expense factor does not represent the maintenance and repair of the core network, customer premises equipment or any aspect of the mobile network.

100-Provide Underground Distribution Network Cabling

This expense factor captures the cost of provisioning the underground distribution network cabling. The Access Network provides connections to and from the Core

Network and relates to underground cabling from the line sensitive element of the main distribution frame (MDF) to the distribution point (DP). I.e. this includes all the customer-dedicated underground cable components of the Network including, for example. This expense factor excludes any installation and commissioning costs capitalised, any expense related to the Core Network and also any provisioning of CPE or other retail activities, for instance, customer line connections.

100-Provide Aerial Distribution Network Cabling

This expense factor captures the cost of provisioning the aerial network cables. This activity includes the installation of cable on, or suspension from, a pole or other overhead structure. This cabling relates only to the Access Network i.e. providing connections to and from the Core Network and relating to cabling up to the line sensitive element of the main distribution frame (MDF) to the distribution point (DP). Specific tasks include, developing an implementation schedule based on plan, administer contract works; this is primarily for any civil works required, mobilise resources, construct Aerial cable route, perform civil works, perform network acceptance testing ensuring that specifications are maintained, perform post construction testing. This expense factor excludes any provisioning or maintenance of aerial cable related to the Core Network, and also excludes any installation and commissioning costs capitalised.

100-Provide Basic Business Telephony Services

This expense factor captures the network specific costs regarding line plant provisioning, network operations and network-side sales support for business telephony services. Specifically this expense factor includes inspecting the site of equipment installations to ensure necessary infrastructure is present to support system installation, station reviews to map out any area to be served and to identify the services to be provided on the lines and extensions. Optimal routing for cabling provision is also identified via the production of network schematics and floor drawings of equipment room / customer premises where necessary. Appropriate facilities must also be assigned at the exchange. This expense factor excludes any retail costs or installation and commissioning costs capitalised.

100-Provide Basic Residential Telephony Services

This expense factor captures the network specific costs regarding line plant provisioning, network operations and network-side sales support for residential telephony services. Specifically this expense factor captures costs of provisioning access network cable pairs for residential customers', up to and including the NID. Also captured is the cost of assigning facilities at the exchange and ensuring the presence of dial tone to the line. This expense factor excludes any retail cost elements relating to customer premises equipment and excludes any installation and commissioning costs capitalised.

Core Network Expenses

100-Plan Core Network

This expense factor captures the cost planning all technology and transmission elements of the fixed core network in support voice and data services. Specific activities include preparation of demand forecasting, network design and technology assessment, feasibility analysis and project planning.

100-Monitor Core Network

This expense factor captures the cost of developing standards and Key Performance Indicators (KPI's) and the the cost of monitoring the performance of the Core network against these. It involves the review and analysis of technology performance, transmission statistics, fault prevention and detection through regular inspection and the reporting of network errors and anomalies.

100-Maintain National Transmission Technologies

This expense factor captures the cost of maintaining national transmission technologies, including the preventative maintenance and repair of equipment such as multiplexors and related support block equipment. This expense factor does not include maintenance of simple transmission infrastructure such as core network cable and duct.

100-Maintain National Transmission Infrastructure

This expense factor captures the cost of maintaining national transmission infrastructure, including the trunk terminating equipment and ODF. It also includes the cost of maintaining the duct and fibre cables (both underground and aerial) within the core network. This expense factor excludes any installation and commissioning costs capitalised.

100-Provide National Transmission

This expense factor captures the cost of providing and testing national transmission facilities (including the trunk terminating equipment and ODF). This also captures the cost of ongoing installation, acceptance testing and commissioning issues transmission equipment i.e. underground duct and fibre cables within the core network, but excludes any installation and commissioning costs capitalised.

100-Provide National Switching Equipment

This expense factor captures the cost of ongoing installation, acceptance testing and commissioning of national switching equipment including host exchanges, national facilities and remotes. This expense factor excludes any installation and commissioning costs that have been capitalised.

100-Maintain National Switching

This expense factor captures the cost of maintaining national switching. This expense includes both preventative maintenance and repair carried out across the switches.

Other Fixed Network Expenses

100-Maintain Internet Services Equipment

This expense factor captures the cost of preventative maintenance and repair of the network equipment supporting the various internet services including wholesale ISP network services, dial up network services, direct connect internet services, and other internet systems such as web hosting and web commerce.

100-Provide & Maintain Other Service Platforms

This expense factor captures the cost of providing and maintaining other network platforms, for example the IVR platform that provides a voice response service, a platform for the provision of bill payment reminders, bus timetables services etc. Maintenance includes any preventative works or on-demand repair. Provisioning includes network-side support of the sales function and any ongoing provisioning issues and network operations costs not captured in the capitalised value of these platforms.

100-Provide & Maintain Payphone Services

This expense factor captures the cost of providing and maintaining the payphone services.

100-Provide & Maintain VAS

This expense factor captures the cost of provisioning and maintaining the VAS platform. Maintenance includes any preventative works or corrective repair to the platform. Provisioning includes network-side support of the sales function, network acceptance testing and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide & Maintain Voicemail

This expense factor captures the cost of provisioning and maintaining Voicemail. Maintenance includes any preventative works or corrective repair to the platform. Provisioning includes network-side support of the sales function, network acceptance testing and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide & Maintain ADSL Services

This expense factor captures the cost of providing and maintaining the ADSL equipment and involves activities such as equipment monitoring, fault detection and control, ensuring compliance with operating standards and corrective and preventative maintenance. Provisioning involves administration of relevant servers (and/or platforms) testing and any other ongoing provisioning activities or network operations not captured in the capitalised value. This expense factor does not include any capitalised costs.

100-Provide Dial Up Internet Services

This expense factor captures the cost of providing Dial Up Internet Services and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, co-ordination of required network resources and any other ongoing provisioning activities and network set-up operations not captured in the capitalised value.

100-Provide Direct Connect Internet Services

This expense factor captures the cost of providing Direct Connect Internet Services and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function and the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide Domestic Frame Relay

This expense factor captures the cost of providing Domestic Frame Relay and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide Domestic Leased Lines

This expense factor captures the cost of providing Domestic Leased Lines and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide Fixed Network Prepaid Calling Card Services

This expense factor captures the cost of providing Fixed Network Prepaid Calling Card services and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the

sales function, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide Internet Services

This expense factor captures the cost of providing Internet Services and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide Operator Assistance

This expense factor captures the transfer charge cost arising from the outsourced (off-island) service provision of Operator Assistance and Emergency Call services. This involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide Wholesale ISP Services

This expense factor captures the cost of providing Wholesale ISP and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

International Network Expenses

100-Maintain International Switching

This expense factor is representative of the cost for maintaining and on demand repair of the international switching element of a fixed network. This expense factor does not include any costs capitalised.

100-Maintain International Transmission

This expense factor captures the cost of maintaining international transmission technologies and infrastructure, including the cost of preventative maintenance and repair of equipment such as multiplexors, related support block equipment and submarine cable links. This expense factor does not include any costs capitalised.

100-Provide International Frame Relay

This expense factor captures the cost of providing International Frame Relay and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

100-Provide International Leased Lines

This expense factor captures the cost of providing International Leased Lines and involves activities such as the administration of relevant servers and applications (and/or platforms), network acceptance testing, network-side support of the sales function, the co-ordination of required network resources and any other ongoing provisioning activities or network operations not captured in the capitalised value.

Interconnect Expenses

100-Billing: Manage Interconnect Billing

This expense factor captures the cost of managing the systems and processes in support of interconnect billing.

100-Maintain Interconnection Services

This expense factor captures the cost of the maintenance, both preventative and on demand fault repair, required to support the equipment and processes associated with the interconnection services.

100-Manage Fixed Interconnect Specific Requirements

This expense factor captures the cost of the administration and management of interconnect specific requirements fulfilled by various parts of the business including network services, line plant services, and government, regulatory and carrier relations.

100-Plan & Monitor Interconnection Services

This expense factor captures the cost of planning and monitoring interconnect specific elements of the fixed network. The activities included in this cost include the monitoring of capacity and connectivity requirements for interconnect services, and the planning of new links as required.

100-Provide Interconnection Services

This expense factor captures the cost of providing interconnection links based on planning requirements determined by the planning and monitoring team. This involves the physical installation and commissioning of network equipment as well as services

performed by the carrier relations team to manage any interactions with interconnecting parties during the provision process.

100-Respond to Other Local Operators (OLOs)

The expense factor captures the cost of responding to requests and enquiries from other licensed telecoms operators in relation to interconnect matters.

100-Support Regulatory Costing

This expense factor captures the cost of providing support to the fulfilment of regulatory costing requirements defined by the ICTA.

100-Prepare Quotations for Fixed Interconnect Services

This expense factor captures the cost of preparing quotations for the provision of interconnection services.

Fixed Network Recharges

INTER-Region Recharges IN (2304195) - Jamaica earthstation

This expense factor captures the recharged cost of the circuits supporting the fixed network that link via the Jamaican earth station to onward international destinations. This cost reflects the necessity of building resilience and redundancy into the network, particularly important in the case of being geographically located in an area susceptible to natural disasters i.e. in the case of hurricane Ivan.

INTER-Region Recharges IN (2304195) - RNMC

This expense factor captures the recharge for the 'out of office' monitoring support function and their related systems. This remote team provide 24 hour service to monitor faults on the network, contacting local engineers if necessary, answer calls regarding international data services or transit traffic and are a general point of contact for customers or others outside of normal Cayman business hours.

INTER-Region Recharges IN (7504195) - Call centres

This expense factor captures the recharge payable for the use of the off-island call centre services utilised by the fixed network business.

INTER-Region Recharges IN (9004195) Carrier Sales & Operations

This expense factor represents the recharge from group carrier sales and operations that manage international settlement negotiations, international carrier relationships and cost reduction programmes

INTER-Region Recharges IN (9004195) Carrier Service Billing

This expense factor represents the recharge made by the off-island C&W carrier services unit (in Jamaica) that provision the end to end carrier services billing capability for C&W in the Caribbean region.

INTER-Region Recharges IN (9004195) PLC Support

This expense factor represents the recharge made by head office in relation to support provided regarding the regulatory, government and carrier services functions and operations.

Fixed Network Specific Costs

100-Underground Line Plant

This expense factor represents the cost of monitoring, maintenance and repair of to the underground line plant , including duct and feeder cables. This expense factor excludes any capitalised costs.

100-Submarine Cable

This expense factor captures the cost of the operation, monitoring, testing and maintenance of the two submarine cables. The cost includes the expense incurred for the on demand services of the ship that provides immediate submarine cable repairs if necessary. This expense factor excludes any installation and commissioning cost capitalised.

100-Cable Circuit/Pole Rentals

This expense factor captures the cost incurred through the rental of poles from a local electricity company and the rental cable circuits used in support of the fixed network infrastructure.

100-Consultancy Fees (Hurricane Ivan)

This expense factor captures the cost of consultancy fees that were incurred, but not capitalised, in the wake of hurricane Ivan. Consultancy included both disaster recovery assistance and advice to deal with the immediate aftermath and strategic advice for readying for future hurricanes. This consultancy was related to the fixed network infrastructure only.

100-Engineering Support

This expense factor captures the cost of a number of engineering and maintenance support contracts entered into in order to provide access to fixed network engineering expertise from outside the company.

100-Intelsat Space Segment Rentals

This expense factor captures the cost of renting space segment capacity on the intelsat satellite network.

100-R&M Exchange Equipment - Ericsson Switch

This expense factor represents the cost of Ericsson support of the national and international switch. This includes emergency repair and maintenance, general advice and warranty provision.

100-Overhead Line Plant

This expense factor captures the cost incurred through the use of overhead line plant used in conjunction with the local electricity company.

Fixed Network Overheads

100-Support Fixed Network

This expense factor captures the cost of senior management support of the operation of the fixed telecoms network.

Fixed Network Cost of Working Capital

100-C&W Loan - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards the C&W Loan.

100-Frame Relay Creditors - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Frame Relay Creditors.

100-Leased Circuit Debtors - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Leased Circuit Debtors.

100-Line Plant Stock - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Line Plant Stock.

100-Maya Cable Creditor - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Maya Cable Creditor.

100-Network Restoration Provision - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Network Restoration Provision.

100-VoIP Creditors - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards VoIP Creditors.

100-Wholesale Debtors - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Wholesale Debtors.

100-Capital Accruals - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Capital Accruals.

100-Cash - Networks - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Cash.

100-Intercompany Creditors - Networks - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Intercompany Creditors.

100-Operational Debtors - Networks - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards operational Debtors.

100-Staff Creditor - Networks - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Staff Creditors.

100-Trade Creditors - Networks - Fixed Network

This expense factor captures the annualised cost of the working capital balance as regards Trade Creditors.

Fixed Network Capital Cost of Support Assets

100-Freehold Technical Infrastructure - Fixed Network

This expense factor captures the annualised capital cost relating to the Freehold Technical Infrastructure that supports the fixed network.

100-Furniture and Fittings - Fixed Network

This expense factor captures the annualised capital cost relating to Furniture and Fittings supporting the fixed network.

100-Computers - Fixed Network

This expense factor captures the annualised capital cost relating to Computers supporting the fixed network.

100-Building Infrastructure - Fixed Network

This expense factor captures the annualised capital cost relating to Building Infrastructure supporting the fixed network.

100-Vehicles - Fixed Network

This expense factor captures the annualised capital cost relating to Vehicles that support the fixed network.

MOBIE NETWORK EXPENSES

Mobile Network Expenses

100-Plan Mobile Network

This expense factor captures the cost of the planning and design of the mobile telephony network. Specific tasks include the assessment of network capacity, demand forecasting,

evaluation of current network dimensions, feasibility studies and the planning of required network build-out. This expense factor excludes any costs regarding the Jamaica link the supports the existing network.

100-Monitor Mobile Network

This expense factor captures the cost of measuring and monitoring the mobile network operation to ensure effective and efficient performance inline with internal targets i.e. Key Performance Indicators (KPI's) and/or ICTA imposed criteria. Examples of KPI assessment would include the measurement of network utilisation, congestion, Erlang minutes per dropped call, call set up success rates, incoming handover success rates and calls successfully terminated.

100-Maintain Cellsites

This expense factor captures the cost of preventative maintenance and repair of the mobile cellsites.

100-Maintain Mobile Network

This expense factor captures the cost of preventative and regular maintenance of mobile network equipment excluding cell sites which are considered separately

100-Maintain Mobile Switch

This expense factor represents an estimate of the cost that would be incurred to maintain a mobile switch onsite in Cayman. At present the mobile switch for C&W Cayman is located off-shore and this amount represents the cost centre activities that relate to remote maintenance. This expense factor does not capture any costs capitalised.

100-Provide Mobile Cellsites

This expense factor captures the cost of identifying and arranging prospective mobile cell sites. Specific tasks include specifying appropriate cellsite locations, site acquisition and negotiation of related agreements. This expense factor excludes any installation and commissioning costs capitalised.

100-Provide Mobile Switching Equipment

This expense factor captures the cost of providing mobile switching equipment. This addresses the two main divisions of providing mobile switching: Base-station controllers (BSC's), each of which can control several BTS units, and the Mobile Switching Centres (MSC) itself. The MSC provides the switching of mobile traffic and the interface. This expense factor excludes any cost capitalised as part of the installation and commissioning.

100-Provide Mobile Network Services

This expense factor captures the cost of providing mobile network services and includes the cost of planning and providing the transmission connections that are needed to connect the BTS units to the Base Station Controllers (BSC), and the BSC units to the switches. This expense factor excludes any installation and commissioning costs capitalised.

100-Prepare Quotations for Mobile Services

This expense factor captures the cost of preparing quotations for mobile related network services.

100-Telecoms Equipment - Nortel Support

This expense factor represents the cost of support provided by Nortel under contract in relation to general mobile network equipment. This includes emergency maintenance, general advice and warranty provision.

Mobile Interconnect Expenses

100-Manage Mobile Interconnect Specific Requirements

This expense factor captures the cost of managing the interconnect specific elements of the mobile network.

Mobile Network Specific Costs

100-Non Broadband Radio - Ericsson Support

This expense factor captures the cost of support provided by Ericsson under contract. This generally represents emergency-type support, budgeted figure for 2005/06 is \$124,500.

100-Licence Fees – Spectrum

This expense factor captures the cost of mobile spectrum licence fees.

100-Courier & Telephone - GSM links

This expense factor captures the cost of local courier and telephone services relating to the mobile network.

100-Electricity - Cell Sites

This expense factor captures the commercial cost of the electricity used to run, support and maintain the functioning of the mobile cell sites.

100-Non Broadband Radio - E-mail

This expense factor represents the cost of providing e-mail services over the mobile data network.

Mobile Network Overheads

100-Support Mobile Network

This expense factor represents the cost of senior management support to the management of the mobile network.

Mobile Network Cost of Working Capital

100-C&W Loan - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the C&W Loan.

100-CCBS Creditor - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the CCBS Creditor.

100-Cellular Licence Fee Creditor - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Cellular Licence Fee.

100-Line Plant Stock - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Line Plant Stock.

100-Mobile Creditors - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards Capital Accruals.

100-Network Restoration Provision - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Network Restoration Provision.

100-Capital Accruals - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Capital Accruals.

100-Cash - Networks - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards Cash.

100-Intercompany Creditors - Networks - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Intercompany Creditors.

100-Operational Debtors - Networks - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Operational Debtors.

100-Staff Creditor - Networks - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Staff Creditors.

100-Trade Creditors - Networks - Mobile Network

This expense factor captures the annualised cost of the working capital balance as regards the Trade Creditors.

Mobile Network Capital Cost of Support Assets

100-Freehold Technical Infrastructure - Mobile Network

This expense factor captures the annualised capital cost relating to Freehold Technical Infrastructure supporting the mobile network.

100-Furniture and Fittings - Mobile Network

This expense factor captures the annualised capital cost relating to Furniture and Fittings supporting the mobile network.

100-Computers - Mobile Network

This expense factor captures the annualised capital cost relating to Computers supporting the mobile network.

100-Building Infrastructure - Mobile Network

This expense factor captures the annualised capital cost relating to Building Infrastructure supporting the mobile network.

100-Vehicles - Mobile Network

This expense factor captures the annualised capital cost relating to Vehicles supporting the mobile network.

CONSOLIDATION SHEET EXPENSES

Fixed & Mobile Network Overheads

100-Billing: Collect Call Data

This expense factor represents the cost of collecting and analysing call data records from network equipment.

100-Billing: Systems support

This expense factor represents the cost of providing maintenance and operating support to the fixed and mobile network billing systems.

100-Manage Disaster Recovery Process

This expense factor captures the cost of ensuring that the business is prepared to maintain operations in the event of disruption arising from natural or man-made disasters.

100-Provide Operational Support Systems

This expense factor captures the cost of operating and maintaining key operational IT systems such as those used for network management and monitoring. The operating cost associated with these systems that support CIS and billing platforms, SMS, mobile prepaid platforms, security for Internet infrastructure and platforms.

100-Maintain Generators

This expense factor captures the cost of maintenance to company generators and other power infrastructure.

100-Maintain Network Buildings

This expense factor represents the cost of providing preventative and corrective maintenance of buildings housing fixed and mobile network equipment.

100-Manage Hurricane Recovery

This expense factor captures the cost of repairs to company assets and infrastructure as a result of the damage incurred from hurricane Ivan. These operating costs have not been capitalised.

100-Manage Insurance Premium & Claims

This expense factor captures the cost of insurance premiums and claims necessary for the operation of and protection for a telecommunications operator. These operating costs are not capitalised.

100-Janitorial Services

This expense factor captures the support cost associated with cleaning and janitorial services for the company's buildings and facilities.

100-Building Repairs

This expense factor captures the support cost associated with building repair services for the company's buildings and facilities.

100-Electricity – General

This expense factor captures the support cost associated with general electricity used in the normal course of business across the company's buildings and facilities etc. This charge excludes electricity as regards Trinity Square.

100-Electricity - Trinity Square

This expense factor captures the support cost associated with electricity within Trinity Square, the company's head quarters and the site of a concentration of network equipment. This charge excludes any general electricity costs used to support the wider operation.

Apportioned Overheads - Networks

100-Finance, accounting and budgeting – Networks

This expense factor captures the cost of operating the corporate finance function in respect of the fixed and mobile network parts of the business as regards the network .

Similar expenses incurred in relation to the retail part of the business are captured separately. The activities represented by this expense factor include the preparation of financial and management accounts, the preparation, management and monitoring of annual and longer term budgets, the management of the external audit process (but not audit fees), the management and payment of overtime and staff bonuses, the management of working capital, and the provision of general financial support to other areas of the business

100-Human Resources - Networks

This expense factor captures the cost of the corporate human resources function in respect of the network parts of the business. Similar expenses incurred in relation to the retail part of the business are captured separately. The activities represented by this expense factor include the management of payroll, the training and development of staff, the organisation of travel, meetings and conferences, and the general management of human resources process throughout the network parts of the business. The expense factor also includes the cost of uniforms and medical insurance for staff.

100-Provide Business Support Systems – Networks

This expense factor captures the cost of operating and maintaining key business support systems in relation to the network. Similar expenses incurred in relation to the retail part of the business are captured separately. This apportionment has been made according to the fully allocated cost model. Examples of the systems supported include MS Windows, firewall and corporate security systems including anti-virus solutions, human resource support systems, finance systems, back-up software and structures for corporate data, payroll, tracking software and other general admin IT. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Provide Legal Services - Networks

This expense factor captures the cost of providing legal services and legal advice specifically as regards the network side of the business. Similar expenses incurred in relation to the retail part of the business are captured separately i.e. the total legal services cost has been apportioned between network and retail according to the allocations in the fully allocated cost model.

100-Manage Corporate Affairs – Networks

This expense factor captures the cost of managing corporate affairs specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Provide Strategy & Policy - Networks

This expense factor captures the cost of providing strategy and policy advice specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Provide Public Relations - Networks

This expense factor captures the cost of providing public relations activities specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Administer Government & International Relations - Networks

This expense factor captures the cost of administering government and international relations activities specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Manage Security - Networks

This expense factor captures the cost of administering managing security specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Operate Fleet - Networks

This expense factor captures the cost of operating a fleet of vehicles specifically as regards the network side of the business. The split between retail vehicle costs, which have been excluded, and network vehicle costs have been calculated by apportioning the total expense according to the allocations in the fully allocated cost model.

100-Procurement & Stores - Networks

This expense factor captures the cost of the procurement and stores function specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Manage Admin Buildings - Networks

This expense factor captures the cost of managing administrative buildings specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Manage Switchboard - Networks

This expense factor captures the cost of managing the switchboard specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Property Rentals - Networks

This expense factor captures the cost of property rentals specifically as regards the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Fleet Expenses - Networks

This expense factor captures the substantial fleet expenses required to support the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

100-Security Expenses - Networks

This expense factor captures the substantial security expenses incurred to support and protect the network side of the business. The split between retail costs, which have been excluded, and network costs have been calculated by apportioning the total expense category according to the allocations in the fully allocated cost model.

Overhead Recharges

INTER-Region Recharges IN (3304195) - Area Office North

This expense factor captures the recharge costs incurred in relation to the provision of general management services shared by operating companies in the region.

INTER-Region Recharges IN (5004195) Oracle licences

This expense factor captures the recharge costs incurred for C&W Cayman's proportion of the Group Oracle licence fees.

INTER-Region Recharges IN (5004195) (BAR & JAM business support)

This expense factor captures the recharge costs incurred for the proportion cost attributable to Cayman for of the overall governance of Information Technology within the Caribbean. Specifically it consists of approval and implementation of IT strategy and architecture; implementation and monitoring of IT standards and policies; management of regional IT initiatives; rationalize IT resources; and centralization of IT where applicable. Check

INTER-Region Recharges IN (5004195) PLC Support

This expense factor captures the recharge costs incurred for receiving general support services from C&W Caymans parent company, C&W Plc. This team provide preventative and upgrade services as well as maintenance and repair as required

INTER-Region Recharges IN (5004195) OBS Support

This expense factor captures the recharge costs incurred for receiving services from the regional team that support business financial systems and related it equipment. This team provide preventative and upgrade services as well as maintenance and repair as required.

Overheads - Specific Costs

100-Audit Fees

This expense factor captures the cost of the annual statutory audit of Cable & Wireless Cayman Islands financial statements. These fees are agreed in ne negotiation with our Auditors. This factor represents the network part of an apportionment between the network and retail parts of the business.

100-Bank Charges

This expense factor captures the cost of ordinary bank charges incurred by Cable & Wireless Cayman Islands in the normal course of business. This factor represents the network part of an apportionment between the network and retail parts of the business.

100-Computer Bureau, Licence Fees & Central Systems

This expense factor captures the cost of identification transactions, peripheral IT costs and general purchases of miscellaneous computing equipment for use across various business functions.

100-Licence Royalty

This expense factor captures the royalty charge made on eligible operating revenue. This is a proportionate cost that any operator in the market would incur

100-C&W Group Management Fee

This expense factor captures the cost of the management fee paid to Cable & Wireless International for management support in relation to various senior management services, including legal and regulatory support.

100-Sundry Financial Charges

This expense factor captures the cost of various financial charges incurred by the business.

100-Regulatory Authority Fees

This expense factor captures the cost of the fees paid to ICTA.

Appendix IVA. Fixed network Betas

Index	Company	Country	Corporate	Fixed Line	Wireless	Levered Beta ¹	Total			Equity Ratio	Unlevered Beta
			Tax Rate	Revenue Percentage	Revenue Percentage		Total Debt (\$M) ²	Shareholders Equity (\$M)	Debt Ratio		
1	Telefonos de Mexico	MEX	30.0%	100%	0%	0.85	\$ 8,073	\$ 8,416	49%	51%	0.51
2	Citizens Communications	USA	35.0%	100%	0%	0.83	\$ 4,273	\$ 1,362	76%	24%	0.27
3	CenturyTel Inc.	USA	35.0%	100%	0%	0.87	\$ 3,012	\$ 3,410	47%	53%	0.55
4	Commonwealth Telephone	USA	35.0%	100%	0%	0.76	\$ 336	\$ 266	56%	44%	0.42
5	BT Group	GBR	30.0%	98%	2%	0.81	\$ 23,778	\$ 7,274	77%	23%	0.25
6	Telemar Norte Leste	BRA	34.0%	96%	7%	1.09	\$ 3,450	\$ 4,489	43%	57%	0.72
7	CT Communications Inc.	USA	35.0%	91%	0%	1.23	\$ 70	\$ 188	27%	73%	0.99
8	Warwick Valley Telephone	USA	35.0%	90%	0%	0.53	\$ 12	\$ 41	22%	78%	0.45
9	Iowa Telecom Services	USA	35.0%	86%	0%	0.50	\$ 478	\$ 276	63%	37%	0.24
10	Tele Norte Leste Participacoes SA	BRA	34.0%	86%	1%	1.16	\$ 2,127	\$ 1,570	58%	42%	0.61
11	BCE Inc.	CAN	22.1%	74%	26%	0.70	\$ 10,873	\$ 11,660	48%	52%	0.41
12	Telecomunicacoes De Sao Paulo SA	BRA	34.0%	73%	20%	1.00	\$ 543	\$ 2,247	19%	81%	0.86
13	IDT Corp.	USA	35.0%	65%	0%	0.66	\$ 197	\$ 1,038	16%	84%	0.59
14	BellSouth Corp.	USA	35.0%	65%	28%	0.73	\$ 20,583	\$ 23,066	47%	53%	0.46
15	TDC	DNK	30.0%	64%	34%	0.76	\$ 5,523	\$ 6,546	46%	54%	0.48
16	North Pittsburgh System Inc.	USA	35.0%	64%	0%	1.01	\$ 25	\$ 87	22%	78%	0.85
17	Telus Corporation	CAN	22.1%	63%	37%	1.03	\$ 5,265	\$ 5,838	47%	53%	0.60
18	Brasil Telecom	BRA	34.0%	62%	0%	1.17	\$ 1,041	\$ 1,278	45%	55%	0.76
19	Cable & Wireless	GBR	30.0%	60%	20%	1.02	\$ 1,556	\$ 3,434	31%	69%	0.77
20	Telecom. de Chile	CHL	17.0%	60%	19%	0.77	\$ 1,101	\$ 1,765	38%	62%	0.51
21	Telefonica SA	SPA	35.0%	59%	40%	0.92	\$ 32,739	\$ 21,966	60%	40%	0.47
22	Verizon Communications	USA	35.0%	53%	39%	0.76	\$ 39,267	\$ 37,560	51%	49%	0.45
23	Deutsche Telekom	GER	26.4%	50%	50%	0.90	\$ 57,742	\$ 45,918	56%	44%	0.47

Fixed Line Revenue Percentage	Averaged Peer Group Debt	Averaged Peer Group Equity	Averaged Unlevered Beta	Averaged Levered Beta
>=50%	45%	55%	0.55	1.011
>=70%	49%	51%	0.52	1.021

Notes & Sources:

¹ Levered data from Bloomberg

² Currency exchange of \$0.444 per Real from YahooFinance Currency Converter as of December 9, 2005

³ Accounting cost of debt financials from FactSet and Year End 2004 and Fiscal Year End 2005 financial reports

⁴ Small Companies defined as those with an equity value less than \$1 billion.

Appendix IVB. Mobile Network Betas

Index	Company Pool	Country	Levered Beta ¹	Total							Unlevered Beta	Notes
				Short Term Debt (\$M)	Long Term Debt (\$M)	Total Debt (\$M)	Shareholders Equity (\$M)	Debt Capital Structure	Equity Capital Structure			
1	Vodafone Group		0.81	\$ 740	\$ 21,935	\$ 22,675	\$ 187,590	11%	89%	0.72		
2	U.S. Cellular	USA	0.72	\$ 30	\$ 1,161	\$ 1,191	\$ 2,588	32%	68%	0.49		
3	China Mobile LTD	HKG	1.31	\$ 8,180	\$ 13,000	\$ 21,180	\$ 233,161	8%	92%	1.20	2	
4	SK Telecom Co LTD	KOR	0.83	\$ 892	\$ 2,794	\$ 3,686	\$ 6,867	35%	65%	0.54		
5	Telesp Celular Participacoes Tssp	BRA	1.52	\$ 2,897	\$ 2,066	\$ 4,963	\$ 2,907	63%	37%	0.56	3	
6	Telefonica Moviles SA	ESP	0.64	\$ 6,806	\$ 11,172	\$ 17,978	\$ 6,390	74%	26%	0.17		
7	America Movil SA	MEX	1.07	\$ 483	\$ 5,027	\$ 5,510	\$ 6,805	45%	55%	0.59		
8	NTT Docomo Inc	JAP	0.61	\$ 1,402	\$ 7,445	\$ 8,847	\$ 36,448	20%	80%	0.49		
9	Turkcell Iletisim Hizmet	TUR	1.04	\$ 563	\$ 270	\$ 833	\$ 1,986	30%	70%	0.73		
10	Vimpel Communications	RUS	1.12	\$ 190	\$ 1,392	\$ 1,581	\$ 2,157	42%	58%	0.65		
11	Millicom International Cellular SA	LUX	1.82	\$ 89	\$ 1,026	\$ 1,114	\$ 239	82%	18%	0.32		
12	O2	GBR	1.07	\$ 1,681	\$ 1,375	\$ 3,056	\$ 10,091	23%	77%	0.82	4	
13	Priority Telecom NV	NLD	0.46	\$ 2	\$ 15	\$ 17	\$ 101	15%	85%	0.39	5	
14	Mobistar SA	BEL	0.65	\$ 6	\$ 250	\$ 256	\$ 441	37%	63%	0.41	5	
15	Advent Wireless Inc	CAN	0.81	\$ -	\$ 0	\$ 0	\$ 3	8%	92%	0.75	6	
16	China Motion Telecom International LTD	HKG	0.69	\$ 56,900	\$ 69,382	\$ 126,282	\$ 705,567	15%	85%	0.59		
17	America Telecom	MEX	1.24	\$ 479	\$ 4,977	\$ 5,456	\$ 6,885	44%	56%	0.69		
18	Tele Leste Celular Participacoes Tlcp	BRA	1.34	\$ 20	\$ 99	\$ 118	\$ 141	46%	54%	0.73		
19	Tele Norte Celular Participacoes	BRA	0.88	\$ 47	\$ 61	\$ 108	\$ 85	56%	44%	0.39		
20	Telemig Celular Participacoes	BRA	1.16	\$ 215	\$ 268	\$ 483	\$ 1,046	32%	68%	0.79	3	
21	Suncom Wireless Holdings	USA	1.56	\$ 17	\$ 1,688	\$ 1,705	\$ 404	81%	19%	0.30		
22	Tele Centro Oeste Celular Participacoes Tcoc	BRA	1.19	\$ 39	\$ 47	\$ 85	\$ 920	8%	92%	1.09		
23	Tele Sudeste Celular Participacoes Tsep	BRA	0.68	\$ 19	\$ -	\$ 19	\$ 742	2%	98%	0.66		
24	MobileOne LTD	SGP	0.55	\$ 322	\$ 250	\$ 572	\$ 403	59%	41%	0.23	7	
25	MTN Group LTD	ZAF	0.93	\$ 167	\$ 3,011	\$ 3,178	\$ 18,257	15%	85%	0.79	8	
26	Telefonica Moviles Peru Holding	PER	0.57	\$ 1,597	\$ 335	\$ 1,932	\$ 2,727	41%	59%	0.33	9	
27	LEAP Wireless International	USA	1.12	\$ 40	\$ 371	\$ 412	\$ 1,470	22%	78%	0.87		
28	Partner Communications Company LTD	ISR	0.88	\$ -	\$ 450	\$ 450	\$ 368	55%	45%	0.40		
29	Mobile Telesystems Ojsc	RUS	1.01	\$ 379	\$ 1,558	\$ 1,937	\$ 2,523	43%	57%	0.57		

Averaged Peer group Debt	36%
Averaged Peer group Equity	64%
Averaged Unlevered Beta	60%
Averaged Levered Beta	0.93

Notes and Sources:

- Accounting cost of debt financials from FactSet and Year End 2004 and Fiscal Year End 2005 financial reports

¹ Levered data from Bloomberg

² Currency in Millions of Renminbi

³ Currency in Millions of Reais

⁴ Currency in Millions of Pounds

⁵ Currency in Millions of Euros

⁶ Currency in Millions of Canadian \$

⁷ Currency in Millions of Singapore \$

⁸ Currency in Millions of Rand

⁹ Currency in Millions of Sols

Appendix VA. Cost of Debt- Fixed Network Operators

Index	Company Pool	Country	Fixed Line Revenue Percentage	Wireless Revenue Percentage	Corresponding Rating Score	Accounting Cost of Debt					Cost of Debt	
						Short Term Debt (\$M) ²	Long Term Debt (\$M) ²	Total Debt (\$M)	Total Shareholders Equity (\$M) ²	Debt Capital Structure		Interest Expense (\$M) ²
1	Telefonos de Mexico	MEX	100%	0%	7	\$ 1,183	\$ 6,890	\$ 8,073	\$ 8,416	49%	\$ 572	7.08%
2	Citizens Communications	USA	100%	0%	13	6	4,267	4,273	1,362	76%	381	8.92%
3	CenturyTel Inc.	USA	100%	0%	9	250	2,762	3,012	3,410	47%	211	7.01%
4	Commonwealth Telephone	USA	100%	0%	none listed	316	300	336	266	56%	17	5.00%
5	BT Group	UK	98%	2%	10	8,496	15,282	23,778	7,274	77%	2,013	8.47%
6	Telemar Norte Leste	BRA	96%	7%	10	850	2,600	3,450	4,489	43%	762	22.10%
7	CT Communications Inc.	USA	91%	0%	none listed	5	65	70	188	27%	5	6.71%
8	Warwick Valley Telephone	USA	90%	0%	none listed	2	10	12	41	22%	0	2.48%
9	Iowa Telecom Services	USA	86%	0%	13	-	478	478	276	63%	54	11.30%
10	Tele Nire Leste Participacoes SA	BRA	86%	1%	10	1,350	3,440	4,790	3,536	58%	1,073	22.40%
11	BCE Inc.	CAN	74%	26%	8	1,060	9,813	10,873	11,660	48%	858	7.89%
12	Telecomunicacoes De Sao Paulo SA	BRA	73%	20%	7	235	988	1,224	5,061	19%	179	14.67%
13	IDT Corp.	USA	65%	0%	15	33	164	197	1,038	16%	16	8.03%
14	Bellsouth Corp.	USA	65%	28%	6	5,475	15,108	20,583	23,066	47%	916	4.45%
15	TDC	DNK	64%	34%	11	241	5,282	5,523	6,546	46%	621	11.24%
16	North Pittsburgh System Inc.	USA	64%	0%	3	3	22	25	87	22%	2	7.82%
17	Telus Corporation	CAN	63%	37%	4	490	5,262	5,752	5,838	47%	545	10.34%
18	Brasil Telecom	BRA	62%	0%	10	490	1,855	2,345	2,878	45%	257	10.97%
19	Cable & Wireless	UK	60%	20%	13	43	1,513	1,556	3,434	31%	134	8.62%
20	Telecom. de Chile	CHL	60%	19%	9	262	839	1,101	1,765	38%	97	8.80%
21	Telefonica SA	SPA	59%	40%	7	12,744	19,995	32,739	21,966	60%	1,679	5.13%
22	Verizon Communications	USA	53%	39%	7	3,593	35,674	39,267	37,560	51%	2,561	6.52%
23	Deutsche Telekom	GER	50%	50%	7	12,077	45,665	57,742	45,918	56%	4,891	8.47%

Forward Looking			Accounting	
Fixed Line Revenue Percentage	Average Moody's Rating	Average Moody's Rating	Yield / Cost of Debt	Cost of Debt
>=50%	9.65	Baa3	6.39%	9.32%
>70%	9.63	Baa3	6.39%	10.34%

Notes & Sources:

¹ Moody's Senior Unsecured Debt Ratings obtained from Bloomberg

² Currency exchange of \$0.444 per Real per YahooFinance Currency Converter as of December 9, 2005

³ Criteria for company selection: The company is (1) an incumbent exchange carrier and (2) has greater than 50% revenue from wireline operations

⁴ Accounting Cost of Debt from Year End 2004 and Fiscal Year End 2005 financial report

Appendix VB. Cost of Debt- Mobile Operators

Index	Company Pool	Country	Forward Looking Cost of Debt		Accounting Cost of Debt							Notes
			Moody's Rating ¹	Moody's Rating Score	Short Term Debt (\$M)	Long Term Debt (\$M)	Total Debt (\$M)	Total Shareholders Equity (\$M)	Debt Capital Structure	Interest Expense (\$M)	Cost of Debt	
1	Vodafone Group		A2	6	\$ 740	\$ 21,935	\$ 22,675	\$ 187,590	11%	2,308	10%	
2	U.S. Cellular	USA	Baa3 (-)	10	\$ 30	\$ 1,161	\$ 1,191	\$ 2,588	32%	86	7%	
3	China Mobile LTD	HKG	A2	6	\$ 8,180	\$ 13,000	\$ 21,180	\$ 233,161	8%	1,679	8%	2
4	SK Telecom Co LTD	KOR	A2	6	\$ 892	\$ 2,794	\$ 3,686	\$ 6,867	35%	293	8%	
5	Telesp Celular Participacoes Tssp	BRA	A3	7	\$ 2,897	\$ 2,066	\$ 4,963	\$ 2,907	63%	1,095	22%	3
6	Telefonica Moviles SA	ESP	A3 (-)	7	\$ 6,806	\$ 11,172	\$ 17,978	\$ 6,390	74%	804	4%	
7	America Movil SA	MEX	A3	7	\$ 483	\$ 5,027	\$ 5,510	\$ 6,805	45%	412	7%	
8	NTT Docomo Inc	JAP	Aul	2	\$ 1,402	\$ 7,445	\$ 8,847	\$ 36,448	20%	92	1%	
9	Turkcell Iletisim Hizmet	TUR	B (+)	16	\$ 563	\$ 270	\$ 833	\$ 1,986	30%	122	15%	
10	Vimpel Communications	RUS	B1	14	\$ 190	\$ 1,392	\$ 1,581	\$ 2,157	42%	86	5%	
11	Millicom International Cellular SA	LUX	B2	15	\$ 89	\$ 1,026	\$ 1,114	\$ 239	82%	109	10%	
12	O2	GBR	Baa2 (+)	9	\$ 1,681	\$ 1,375	\$ 3,056	\$ 10,091	23%	58	2%	4
13	Priority Telecom NV	NLD	none listed	-	\$ 2	\$ 15	\$ 17	\$ 101	15%	2	10%	5
14	Mobistar SA	BEL	none listed	-	\$ 6	\$ 250	\$ 256	\$ 441	37%	24	9%	5
15	Advent Wireless Inc	CAN	none listed	-	\$ -	\$ 0	\$ 0	\$ 3	8%	0	8%	6
16	China Motion Telecom International LTD	HKG	none listed	-	\$ 57	\$ 69	\$ 126	\$ 706	15%	4	3%	
17	America Telecom	MEX	none listed	-	\$ 479	\$ 4,977	\$ 5,456	\$ 6,885	44%	408	7%	
18	Tele Leste Celular Participacoes Tlcp	BRA	none listed	-	\$ 20	\$ 99	\$ 118	\$ 141	46%	6	5%	
19	Tele Norte Celular Participacoes	BRA	none listed	-	\$ 47	\$ 61	\$ 108	\$ 85	56%	13	12%	
20	Telemig Celular Participacoes	BRA	none listed	-	\$ 215	\$ 268	\$ 483	\$ 1,046	32%	124	26%	3
21	Suncom Wireless Holdings	USA	none listed	-	\$ 17	\$ 1,688	\$ 1,705	\$ 404	81%	129	8%	
22	Tele Centro Oeste Celular Participacoes Tcoc	BRA	none listed	-	\$ 39	\$ 47	\$ 85	\$ 920	8%	19	22%	
23	Tele Sudeste Celular Participacoes Tsep	BRA	none listed	-	\$ 19	\$ -	\$ 19	\$ 742	2%	15	79%	
24	MobileOne LTD	SGP	none listed	-	\$ 322	\$ 250	\$ 572	\$ 403	59%	10	2%	7
25	MTN Group LTD	ZAF	none listed	-	\$ 167	\$ 3,011	\$ 3,178	\$ 18,257	15%	571	18%	8
26	Telefonica Moviles Peru Holding	PER	none listed	-	\$ 1,597	\$ 335	\$ 1,932	\$ 2,727	41%	123	6%	9
27	LEAP Wireless International	USA	B1	14	\$ 40	\$ 371	\$ 412	\$ 1,470	22%	21	5%	
28	Partner Communications Company LTD	ISR	Ba1	11	\$ -	\$ 450	\$ 450	\$ 368	55%	51	11%	
29	Mobile Telesystems Ojsc	RUS	Ba3	13	\$ 379	\$ 1,558	\$ 1,937	\$ 2,523	43%	108	6%	
Averages			Baa3	9.53					36%		11.65%	

Forward Looking Average			Accounting
Moody's Rating	Moody's Rating Score	Moody's Average Yield	Cost of Debt
Baa3	9.53	6.39%	11.65%

Appendix VIA. Summary Output: Fixed Service Costs

Statement of Network Service Costs - Fixed Network Wholesale Services



			Wholesale Services												
			ACCESS SERVICES	DOMESTIC VOICE SERVICES					DOMESTIC DATA SERVICES	INTERNATIONAL VOICE SERVICES				INTERNATIONAL DATA SERVICES	
			800-ADSL WHOLESALE	800-PSTN TERMINATION	800-DOMESTIC DQ WHOLESALE	800-DOMESTIC TRANSIT	800-EMERGENCY SERVICES WHOLESALE	800-DOMESTIC LEASED CIRCUITS WHOLESALE	800-FIXED INTERNATIONAL INCOMING	800-INTERNATIONAL TRANSIT to OLC	800-INTERNATIONAL TRANSIT from OLO	800-INTERNATIONAL TRANSIT to OLC	800-INTERNATIONAL DQ WHOLESALE	800-INTERNATIONAL LEASED CIRCUITS WHOLESALE	800-INTERNATIONAL
Total Cost \$'000	Average Component Cost \$														
Route Factors															
Line Sensitive															
400-RSU line sensitive	1,029	47.681													
400-Access Local Loop	23,122	1020.385						2.00							
400-ADSL Equipment	1,995	268.658	1.00												
Duration Sensitive															
400-RSU traffic sensitive	49	0.000		1.00					1.00	1.00	1.00	1.00			
400-PSTN Host Switch - duration sensitiv	2,925	0.006		1.00	1.00	1.00	1.00		1.24	1.00	1.00	1.00	1.00	1.00	
400-RSU-Host Tx	2,189	0.005	1.00	1.00				2.00	1.00	1.00	1.00				1.0
400-Host-Host Tx	1,052	0.013	0.50	0.25				0.50	0.24						0.3
400-National submarine Tx	1,204	0.064	0.04	0.05				0.04	0.04						0.0
400-International Tx	3,653	0.025	1.00						1.00	1.00	1.00	1.00		1.00	1.0
400-PSTN Voicemail	224	0.189													
400-DQ Operator services equipment	434	0.120			1.00		1.00						1.00		
400-Interconnect Specific Costs	39	0.000		1.00	1.00		1.00			1.00	1.00	1.00	1.00		
Call Sensitive															
400-PSTN Host Switch - call sensitive	3,063	0.012		1.00	1.00	1.00	1.00		1.18	1.00	1.00	1.00	1.00	1.00	
400-Payphone Equipment	157	582.406													
400-Contact Centre Platforms	434	0.153			1.00		1.00						1.00		
400-VAS platforms	941														
400-Prepaid PSTN Calling Card Equipme										1.00	1.00	1.00	1.00	1.00	
400-Interconnect billing platform	995	0.018		1.00	1.00		1.00								
Bandwidth Sensitive															
400-Data Network Equipment	397	1659.070						1.00						1.00	
400-IP Equipment	1,337	392.944	1.00												
Service Volume															
Minutes				50,365	629	107,122	1	804	42,398	32,196	21,199	32,196	129		
Calls				22,874	645	88,705	1		20,248	10,124	10,124	10,124	129		
Lines			0.68					0.14							
2M								0.04							
Total network service cost \$'000	45,238		181	1,570	197	1,673	0	359	2,093	1,473	1,074	1,473	40		
Network unit cost \$			268.66	0.031	0.31	0.0156	0.31	2,564.91	0.0494	0.0457	0.0507	0.0457	0.31	-	1

Statement of Network Service Costs - Fixed Network Retail Services

	Retail Services																				
	ACCESS SERVICES				DOMESTIC VOICE SERVICES								DOMESTIC DATA SERVICES				INTERNATIONAL VOICE SERVICES			INTERNATIONAL DATA SERVICES	
	900-PSTN ACCESS BUS	900-PSTN ACCESS RES	900-ADSL RETAIL	900-ISDN ACCESS RETAIL	900-FIXED VOICEMAIL RETAIL	900-NATIONAL PAYPHONE	900-OPERATOR ASSISTANCE	900-NATIONAL CALL RETAIL	900-FIXED CALL TO C&W MOBILE	900-FIXED CALL TO OTHER MOBILE	900-FIXED CALL TO OLO	900-DOMESTIC DO RETAIL	900-EMERGENCY SERVICES RETAIL	900-DIAL UP INTERNET USAGE	900-DIRECT CONNECT	900-DOMESTIC LEASED CIRCUITS RETAIL	900-FIXED INTERNATIONAL OUTGOING	900-INTERNATIONAL PAYPHONE	900-INTERNATIONAL DQ RETAIL	900-INTERNATIONAL FRAME RELAY RETAIL	900-INTERNATIONAL LEASED CIRCUITS RETAIL
Route Factors																					
Line Sensitive																					
400-RSU line sensitive	1.00	1.00		1.00																	
400-Access Local Loop	1.00	1.00		1.00											2.00		1.00				
400-ADSL Equipment			1.00																		
Duration Sensitive																					
400-RSU traffic sensitive					1.00	1.69	1.74	1.69	1.00	1.00	1.00	1.00	1.74	1.00			1.00	1.00	1.00		
400-PSTN Host Switch - duration sensitive					1.22	0.86	1.04	0.86	1.00	1.00	1.00	1.24	1.04	1.07			1.24	1.24	1.24		
400-RSU-Host Tx			1.00		1.00	1.38	1.48	1.38	1.00	1.00	1.00	1.48	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00	
400-Host-Host Tx			0.50		0.23	0.17	0.30	0.17	0.30	0.30	0.30	0.24	0.30	0.07	1.00	0.50	0.24	0.24	0.24	0.30	
400-National submarine Tx			0.04		0.01	0.08	0.08	0.08	0.05	0.05	0.05	0.04	0.08		0.04	0.04	0.04	0.04	0.05		
400-International Tx			1.00										1.00	1.00		1.00	1.00		1.00	1.00	
400-PSTN Voicemail					1.00																
400-DQ Operator services equipment							1.00				1.00							1.00			
400-Interconnect Specific Costs										1.00	1.00										
Call Sensitive																					
400-PSTN Host Switch - call sensitive					1.25	1.17	1.29	1.17	1.00	1.00	1.00	1.18	1.29	1.03			1.18	1.18	1.18		
400-Payphone Equipment						1.00											1.00				
400-Contact Centre Platforms							1.00					1.00						1.00			
400-VAS platforms																					
400-Prepaid PSTN Calling Card Equipment																					
400-Interconnect billing platform										1.00											
Bandwidth Sensitive																					
400-Data Network Equipment																1.00				1.00	
400-IP Equipment			1.00											1.00	1.00						
Service Volume																					
			900	4	1,185	12	1,342	110,647	22,004	33,554	22,004	1,258	1	7,248	22	4,882	41,046	493	258	316	158
					2,958	3	516	44,780	9,938	14,181	9,938	1,290		246		8,773	99	258			
	8.00	13.50	6.75	0.08	6.41	0.27								0.68	0.05	0.40				0.04	0.02
			3.38	0.00										0.00	0.03	0.20				0.01	0.00
Total network service cost \$'000	8,545	14,419	3,175	85	286	1,619	278	2,780	516	775	706	388	0	274	11	1,241	1,876	57,418	79	12	11
Network unit cost \$	1,068.07	1,068.07	470.35	1,068.07	0.24	136	0.21	0.03	0.02	0.02	0.03	0.31	0.04	0.04	216.30	3,102.85	0.05	116.53	0.30	266.44	646.56
Retail Costs \$'000	1,605	666	1,213	1	66	6	14	501	478	261	4	34	27	130	293	1,087	31	28	28	28	28
Total Service Cost \$'000	10,150	15,085	4,388	87	352	1,625	292	3,281	993	1,036	711	422	0	301	141	1,534	2,962	57,449	79	12	39
Service unit cost \$	1,269	1,117	650	1,083	0.2966	137	0.2179	0.0296	0.0451	0.0309	0.0323	0.3357	0.0380	0.0415	2,818	3,836	0.0722	116.5889	0.3043	266	2,318

Appendix VIB. Summary Output: Mobile Service Costs

Statement of Network Service Costs - Mobile Network



	Total Cost \$'000	Average Component Cost \$	MOBILE WHOLESALE SERVICES			MOBILE RETAIL SERVICES								
			900-MOBILE TERMINATION	900-MOBILE INTERNATIONAL INCOMING	900-INBOUND ROAMING	900-Mobile Subscriber	900-MOBILE ON NET CALL	900-MOBILE TO FIXED	900-MOBILE TO OTHER MOBILE	900-MOBILE VOICEMAIL RETAIL	900-MOBILE DATA	900-SMS	900-MOBILE INTERNATIONAL OUTGOING	
Route Factors														
Duration Sensitive														
400-Cellsite land & masts	1,823	0.009	1.00	1.00	1.28		2.00	1.00	1.00		1.00	1.00		
400-GSM: BTS	3,285	0.016	1.00	1.00	1.28		2.00	1.00	1.00		1.00	1.00		
400-GSM: BSC	1,460	0.007	1.00	1.00	1.28		2.00	1.00	1.00		1.00	1.00		
400-GSM: MSC -duration sensitive	1,656	0.010	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		
400-GSM National Tx	164	0.001	1.00	1.00	1.28		2.00	1.00	1.00		1.00	1.00		
400-GSM: Voicemail platform	73	0.013								1.00				
400-GSM: Roaming platform	509	0.863			1.00						1.63	1.00		
Call Sensitive														
400-GSM: MSC -call sensitive	1,422	0.006	2.60	2.60	1.73		3.60	1.00	1.00	1.00	1.00	1.00		
400-GSM: SMS platform	42	0.006										1.00		
400-GSM: Prepaid platform	32	0.000	0.74	0.74			1.48	0.74	0.74		0.74	0.74		
400-GSM: HLR/VLR - traffic sensitive	560	0.005	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		
Subscriber Sensitive														
400-GSM: HLR/VLR - subscriber sensitive	383	12.763					1.00							
400-GSM: Handsets and SIM card/activati		0.000					1.00							
Bandwidth Sensitive														
400-GSM: GPRS platform	1,628	0.000								1.00				
Service Volume														
Minutes			42,525	26,571	589		36,826	12,238	25,815	5,475		17,714		
Calls			26,951	7,473	577		26,304	6,119	21,478	10,950	6,666	4,982		
Subscribers							30							
2M														
Total network service cost \$'000	13,037		2,422	1,317	549		383	3,569	603	1,370	248	117	830	
Retail Costs \$'000							2,676	1,725	433	1,051	0	24	248	1,242
Total Service Cost \$'000			2,422	1,317	549		3,059	5,294	1,036	2,421	248	24	365	2,071
Service unit cost \$			0.0570	0.0496	0.93		102	0.1438	0.0847	0.0938	0.0454	-	0.0548	0.1169

Appendix VII. Summary Input: Volumes

Service	Data				
	Sum of Volume - Calls	Sum of Volume - Lines	Sum of Volume - Lines2	Sum of Volume - Minutes	Sum of Volume - 2M
900-ADSL RETAIL	0	6,750	6,750	900,000	3,375
900-ADSL WHOLESALE	0	675	675	0	0
900-CARDS	0	0	0	0	0
900-CPE	0	0	0	0	0
900-DIAL UP INTERNET USAGE	246,375	675	675	7,247,504	1
900-DIRECT CONNECT	0	50	50	21,674	25
900-DOMESTIC DQ RETAIL	1,290,000	0	0	1,258,208	0
900-DOMESTIC DQ WHOLESALE	645,000	0	0	629,104	0
900-DOMESTIC LEASED CIRCUITS RETAIL	0	400	400	4,882,410	200
900-DOMESTIC LEASED CIRCUITS WHOLESALE	0	140	140	803,700	35
900-DOMESTIC TRANSIT	88,704,661	0	0	107,122,022	0
900-EMERGENCY SERVICES RETAIL	1,075	0	0	1,075	0
900-EMERGENCY SERVICES WHOLESALE	538	0	0	538	0
900-FIXED CALL TO C&W MOBILE	9,937,758	0	0	22,003,567	0
900-FIXED CALL to OLO	9,937,758	0	0	22,003,567	0
900-FIXED CALL TO OTHER MOBILE	14,181,366	0	0	33,553,582	0
900-FIXED INTERNATIONAL INCOMING	20,247,565	0	0	42,398,302	0
900-FIXED INTERNATIONAL OUTGOING	8,772,807	0	0	41,045,680	0
900-FIXED VOICEMAIL RETAIL	2,958,017	6,407	6,407	1,185,495	0
900-INBOUND ROAMING	577,052			589,300	
900-INTERNATIONAL DQ RETAIL	258,000	0	0	258,000	0
900-INTERNATIONAL DQ WHOLESALE	129,000	0	0	129,000	0
900-INTERNATIONAL FRAME RELAY RETAIL	0	44	44	315,855	7
900-INTERNATIONAL FRAME RELAY WHOLESALE	0	10	10	45,270	3
900-INTERNATIONAL LEASED CIRCUITS RETAIL	0	17	17	157,500	4
900-INTERNATIONAL LEASED CIRCUITS WHOLESALE	0	0	0	0	0
900-INTERNATIONAL PAYPHONE	98,550	0	0	492,750	0
900-INTERNATIONAL TRANSIT from OLO	10,123,783	0	0	21,199,151	0
900-INTERNATIONAL TRANSIT to OLO	10,123,783	0	0	32,195,789	0
900-ISDN ACCESS RETAIL	0	80	80	3,802	0
900-MOBILE DATA	0			0	
900-MOBILE INTERNATIONAL INCOMING	7,472,694			26,570,648	
900-MOBILE INTERNATIONAL OUTGOING	4,981,796			17,713,765	
900-MOBILE ON NET CALL	26,304,479			36,826,183	
900-Mobile Subscriber		30,000	30,000		
900-MOBILE TERMINATION	26,950,809			42,524,718	
900-MOBILE TO FIXED	6,119,166			12,238,331	
900-MOBILE TO OTHER MOBILE	21,477,974			25,814,630	
900-MOBILE VOICEMAIL RETAIL	10,950,000			5,475,000	
900-NATIONAL CALL RETAIL	44,780,099	0	0	110,646,975	0
900-NATIONAL PAYPHONE	2,779	270	270	11,881	0
900-OPERATOR ASSISTANCE	516,000	0	0	1,342,462	0
900-PSTN ACCESS BUS	0	8,000	8,000	0	0
900-PSTN ACCESS RES	0	13,500	13,500	0	0
900-PSTN TERMINATION	22,874,356	0	0	50,365,313	0
900-SMS	6,665,587				

Appendix VIII: Glossary

BU – Bottom Up

CAPM –Capital Asset Pricing Model

Common Cost - LRIC costs calculated as a consequence of volume reduction of all Products that are not pure and joint LRIC. They are calculated technically as LRIC cost of Total Increment (i.e. G-ALL-PROD - contains all products) minus sum of LRIC costs of all Sub Increments. Common costs are calculated individually for BU Fixed model, BU Mobile model and TD model.

CVR – Cost-Volume Relationship – a graph which defines the relationship between a cost and a driver volume, with the driver being an exogenous variable (i.e., external to the system being considered)

CCR – Cost-Cost Relationship – a graph which defines the relationship between a cost and a driver volume, with the driver being an endogenous variable (i.e., internal to the system being considered).

DLRIC – Distributed LRIC

DP – Distribution Point

Economic Cost, Total Cost - Sum of Operating and Capital Cost.

Element ID - Types of Cost, e.g. Annualized Cost, GRC, Opex and Overhead Opex.

Entity ID - Cost Object, e.g. 100-level Cost Categories, 400-level Network Elements and 900-level Products.

EMRP – Equity Market Risk Premium

EPMU – Equal Proportionate Mark-Up

FCC – Fixed Common Cost

GRP - Field GRP is defined only for individual Product Increments (GRP is defined as zero for Sub Increments and Total Increment). It defines the Group of Products that is also definition of Sub Increments.

HFE – Horizontal Fixed Element

Increment: The output over which costs are being measured.

Incremental costs: The additional costs that would result from a defined increment to demand.

Increment ID, Sub Increments, Total Increment - ID of Cost Object whose volumes were reduced to zero – individual Products (for calculation of pure LRIC), Sub Increments – groups of products (for calculation of Joint Cost) and Total Increment – all Products (for calculation of Common Cost).

ISFC – Increment-Specific Fixed Costs – those costs which do not vary with a particular driver volume, but which can be attributed entirely to a single increment.

Joint Cost: LRIC costs calculated as a consequence of a reduction in volume of a Group of Products that are not pure LRIC costs. They are calculated as the LRIC of a Sub-Increment (e.g. Mobile Traffic) minus the sum of the LRIC of individual Product Increments that belong to specified Group of Products.

LDA – LRIC Driver Affected

Long run: The period over which all factors of production, including capital, are variable.

Long Run Incremental Costs (LRIC): The incremental costs that would arise in the long run with a defined increment to demand.

Markup Type: Type of LRIC values:

- LRIC without Markup - LRIC values of Product Increments (also known as pure LRIC),
- G-Fixed Access, G-Fixed Traffic, G-Mobile Traffic... - Joint Costs (these costs are removed only when all volumes of specified products are removed)
- BU-F: Common - Variable, BU-F: Mobile – Variable, BU-F: Common - Fixed, BU-F: Mobile – Fixed are Common Costs (these costs are removed only when all volumes of all products (group G-ALL-PROD) are removed).

MG – Media gateway

MSE- Multi-Service Edge

NRC – Net Replacement Cost.

Network Component – a group of costs which relate to a particular, identifiable part of the network infrastructure (e.g., a local switch), loaded with all the related direct and indirect costs.

OLO – Other Licensed Operators – telecommunications network or service providers other than C&W.

Operating Cost-Values of LRIC Operating Costs, i.e. values of Opex and Overhead Opex Elements.

Routing Factor, Allocated Volume - Routing Factor defines, how many times a specific Network Element is used by a specific Product. The same mechanism allows also backward allocation of volume from Products to Network Elements.

RSU – Remote Switching Unit.

Scenario Values, LRIC and FAC Values - FAC values are defined here as the costs that are calculated when all products have their full volumes. Scenario Values are calculated as the costs when volumes of selected Products are reduced from full volume to zero. LRIC values are calculated as the difference between Scenario Values and FAC Values.

STLO – Straight Line Through Origin

TD – Top Down

WACC – Weighted Average Cost of Capital