

# **A response to Cable & Wireless (Cayman Islands)' LRIC models**

**A report on behalf of Digicel**

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# 1 Introduction

Ovum has prepared this document as a response to the Information and Communications Technology Authority (ICTA) on behalf of Digicel in regard to the Cable and Wireless (Cayman Islands) Limited (C&W) LRIC costing manual. The C&W material came in three parts:

- A background document that introduces the LRIC costing manual and deals with issues common to both the fixed and mobile models
- A generic version of the fixed network LRIC model (i.e. a model without any of the confidential data used to derive C&W's actual cost estimates), together with a manual describing the key features of the model.
- A generic version of the mobile network LRIC model, together with a manual describing the key features of the model

Ovum has conducted an initial review of the models and documentation provided by C&W. Ovum notes, however, that it is impossible to verify the results of the sample Case Studies introduced by C&W because a range of key inputs have been obscured on the grounds of confidentiality. Ovum also notes that some of the case studies have changed significantly between the December and March drafts, and thus we question whether they are robust, stable and fit for the purpose of determining interconnection charges. Ovum is particularly concerned that the Case Study pertaining to mobile call termination appears to produce unreasonably low results.

At this stage we can therefore only comment on the generic models and documentation that have been provided. We reserve the right to comment on the outcomes of these models, and any usage that the ICTA intends to make of them, separately at a later date.

In reviewing the generic models and documentation Ovum has found:

- a range of assumptions within the fixed network model that Ovum believes to be unreasonable and inconsistent with the ICTA's Principles and Guidelines from Decision 2005-4. These assumptions invariably seem to increase the imputed cost of call termination on C&W's fixed network
- a number of significant and unjustifiable differences between the fixed and mobile models, each of which tends to overstate fixed network costs and/or understate mobile network costs - a move that would be clearly detrimental to Digicel's interests.

There may be other examples of this bias which are inherent in the models but are not so visible to a third party, especially in the absence of full working models.

Ovum therefore submits to the ICTA that C&W's cost models do not currently provide a robust basis for determining fixed or mobile termination rates in the Cayman Islands. Furthermore, even if some of these errors were to be corrected, we would like to stress that C&W's mobile cost model is not representative of

Digicel's costs and it should not be used by the ICTA to determine Digicel's mobile termination rates.

The rest of this paper follows the structure of the C&W documents, raising issues that arise from these documents.

## 2 Background document

### 2.1 Least cost technology

The ICTA Decision 2005-4, *Decision for the Forward-Looking Long-Run Incremental Costing Consultation* of 22 July 2005, specified the principles upon which the ICTA expects the LRIC models to be constructed. Principle 2 states that:

*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. [emphasis added]*

Ovum does not believe that C&W has followed this Principle. There are two basic issues here.

- Firstly, C&W has not in any way demonstrated that the technology used in its models, particularly the IP technology that underpins its fixed network model, is least cost. C&W claims that it has developed its models on the basis of the "latest technology current in use" (*Background Document, 5*) without any reference to whether this technology is the least cost approach. In Ovum's view the use of IP technology exaggerates fixed network costs, probably because of higher asset costs (although this information is excluded from the C&W models on confidentiality grounds) and definitely on the basis that C&W claims shorter depreciation periods for these assets (*Background Document, 42*).
- Secondly, it is not at all clear that the IP technology claimed by C&W in its model is currently operational in the C&W network, as required by ICTA Principle 2. C&W claims that "C&W Cayman and new entrants are currently moving towards an Internet Protocol (IP)-based network" (*Background Document, 6*), but no evidence is presented to demonstrate that IP technology is currently operational. Furthermore, C&W makes no claims in its model to be operating any new services that require the implementation of IP technology.

Ovum submits that by basing its fixed network model on IP technology, C&W has merely increased the costs associated with basic services such as voice call termination, in contradiction to the explicit requirement of ICTA Principle 2. The corresponding approach within mobile networks would be to build the model on the basis of 3G technology, which is also the "latest available technology current in use", capable of supporting new services, and operators in the Cayman Islands are "currently moving towards" this technology. However, it is notable that C&W has not followed this approach, instead preferring to stick with (2G) GSM technology for mobile networks (*Background Document, 6*). This inconsistency of approach appears to be a means of exaggerating fixed network costs (from which C&W exclusively benefit) at the expense of mobile network costs (which equally affects C&W's rivals, such as Digicel).

## 2.2 Self-standing network

C&W models fixed and mobile networks as self-standing businesses (*Background Document*, 16). C&W therefore claims separate fixed and mobile Fixed Common Costs (FCC), and none that span both models. This, however, is not an accurate representation of C&W's business. There are clearly many costs that are held in common between the fixed and mobile businesses of C&W (and this is not the case for other operators). The failure to account for these costs in both models therefore excludes the substantial economies of scope enjoyed by C&W (and not by other operators), so exaggerating C&W costs relative to those of other operators.

Relevant components of this cost exaggeration include: site-sharing, duct-sharing, equipment co-location, treatment of costs of mobile transmission networks, WACC, and use of equipment only for Cayman when there is excess capacity that could be used internationally. We examine some of these items in detail in Section 2.6 below, and when considering the mobile LRIC model in Section 4.1. Here we present only our objection to this approach in principle.

In *Background Document*, 21 C&W argues that the ICTA's Guideline 1, concerning the use of bottom-up models, gives it justification for ignoring all economies of scope between fixed and mobile networks. Ovum does not accept this point. It is probably true that the economies of scope cannot be adequately resolved solely through the use of bottom-up LRIC models. However, it would be quite possible for C&W to determine the extent of site or infrastructure sharing in its network from a top-down analysis, and then to incorporate this in the bottom-up models as a simple re-allocation of costs. It has apparently adopted such a top-down approach to expense factors (see 2.5 below) so C&W clearly accepts that such an approach is possible.

Indeed, Ovum believes that a model that ignores site sharing and infrastructure sharing is by definition in violation of ICTA Principle 1, which requires costs to be efficiently incurred and to provide the right incentives for efficient facilities-based investment, entry and exit. It is patently inefficient for an operator that has both a fixed and a mobile licence not to engage in some site and infrastructure sharing, so a model that disregards such matters must be estimating inefficient costs. And to the extent that these outcomes exaggerate C&W's costs, so they also give other operators the wrong incentives for facilities-based investment, entry and exit.

Ovum submits that this a serious flaw in the C&W models, and one that the ICTA must address if its LRIC Principles are to be met.

Ovum notes that the above argument requires that differences between C&W's costs as an integrated fixed-mobile operator, and Digicel's costs as a self-standing mobile operator, are reflected in the mobile termination rates. However, even if the ICTA determines that mobile termination rates should be reciprocal<sup>1</sup>, Ovum submits that the above analysis requires that:

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<sup>1</sup> We understand that rates in Cayman may be reciprocal but the actual rates themselves may be different owing to cost differences that are outside the operators' control.

- a) the mobile termination rates should be set on the basis of a self-standing mobile operator. This is necessary so that Digicel can recover its efficiently incurred costs.
- b) C&W's fixed network termination rates should be set on the basis of an efficient integrated fixed-mobile operator. This is necessary so that Digicel does not pay in excess of the efficiently incurred costs of C&W for fixed network termination.

## 2.3 Asset lives

C&W indicates that the asset lives on the public record are consistent with those found in discussions with engineers and vendors, with two notable exceptions:

- NGN components. Ovum is not in a position to verify this information, but refers the ICTA back to the argument in Section 1.1 indicating that the use of NGN components with their shorter asset lives is inappropriate in the context of fixed network voice services.
- GSM network elements. Ovum concurs with this view.

Ovum is, however, concerned to note that some of the other fixed network asset lives proposed by C&W (*Background Document, 43*), are significantly below those on the public record (*Background Document, 41*). For example, C&W uses 20 year lives for ducts, poles and manholes, whereas the two public record studies that it quotes (those of Europe Economics and PTS) both assume 38-40 year lives for equivalent assets. The effect of these changes is to exaggerate C&W's fixed network costs.

## 2.4 Depreciation

Ovum notes some confusion in the form of depreciation to be used within the LRIC models. The model itself assumes a simple annuity (*Background Document, 44-47*), but the Case Studies quoted by C&W use straight line depreciation, and C&W claims (in the December 2005 version of the Background Document, but not in the March update) that a tilted annuity would be better.

Ovum believes that some consistency is required here, and proposes the use of a tilted annuity approach. An annuity is an approach in which the annual capital charge, the sum of depreciation and return on capital employed, is the same in each year of the defined asset life. With the tilted annuity methodology, the annual capital charge declines over time consistent with the reduction in the replacement value of the asset.

It is especially important to use an annuity-based depreciation profile in bottom-up modelling. The bottom-up model typically assumes that the network is a modern network every year, and thus only first-year capital charges are ever captured

within the model. This presents no problem with an annuity-based depreciation profile, since capital charges are constant each year, but it is an issue for other depreciation methods (e.g. straight-line depreciation) which rely on taking different capital charges each year of an asset's life.

A key feature of the annuity calculation is that it takes account of the discount rate (cost of capital) which suggests that it is rational to delay depreciation payments to some extent. However such a "back-loaded" depreciation profile is inappropriate for telecommunications assets, because real prices tend to be declining, which means that future entrants will be able to purchase cheaper assets and so existing players need to "front-load" unit cost recovery. Tilted annuities are designed to alleviate the problem of "back-loading" to the extent justified by the annual reduction in asset values.

## 2.5 Expense factors

Ovum finds the treatment in the C&W LRIC model of expense factors for the calculation of network opex, non-network capital costs and non-capital expenses to be opaque. The numbers included in the models appear to be taken directly from C&W financial statements, but their relationship to direct capital expenditure cannot be ascertained since the latter is only represented in the models by dummy numbers. This means that it is impossible to verify the C&W expense factors against the expense factor benchmarks (*Background Document, 51*).

Ovum requests that the C&W expense factors, or at least those parts that are relevant to interconnection services, be represented as mark-ups on the direct network capital costs captured in the LRIC model, as follows:

- Indirect network capital costs (i.e. capital costs not otherwise captured in the model) as a % of direct network capital costs. Typically we expect these to be 10-15% of direct capital costs.
- Direct network opex as a % of direct network capital costs. Typically we expect these costs to be 10-15% of direct network capital costs.
- Indirect network opex as % of direct network opex. Typically we expect these to be 20-30% of direct network opex.
- Common costs as % of investment. Typically we expect these to be 5-10% of direct capital costs.

Presenting expense factors in this way will enable Digicel and others to compare the assumptions in the model with benchmarks on the public record.

## 2.6 WACC

Ovum supports the use of the Capital Asset Pricing Model for the estimation of the weighted average cost of capital. However, we have a number of concerns with the approach and outcomes produced by C&W.

The principal concern regarding the approach relates to the fact that the WACC is a company specific measure, illustrating the risk-adjusted cost of investing in that business compared with the stock market as a whole. This means that there should be a single WACC for C&W, applied to both fixed and mobile networks.

It is notable that the companies chosen by C&W to determine the fixed network beta derive at least 70% of their revenue from the fixed network, rather than being exclusively fixed network operations. As many of these companies are integrated fixed/mobile operators it would therefore make sense to apply this WACC to C&W as a whole and not just to C&W's fixed network business<sup>2</sup>. In contrast the companies chosen by C&W to determine the mobile network beta are exclusively mobile operators, and thus should not be used to derive a WACC for C&W.

Ovum also believes that there should be a significantly greater difference between the WACC of fixed and mobile operators than is being shown by the C&W analysis. In other countries, the WACC for mobile operators is typically in the range 12-20% whereas the WACC for fixed network operators is typically around 10-12% as shown in the table below. It therefore seems unreasonable that C&W have produced figures of 10.01% for fixed network WACC and 10.70% for mobile WACC.

Country	Fixed network WACC	Mobile network WACC	% difference
Austria	10.04%	16.22%	61.5%
Belgium	11.52%	19.5%	69.3%
France	10.4%	17%	63.4%
Italy	10.2%	12.4%	21.6%
Spain	12.3%	18%	46.3%
UK	10% - 11.4%	12%	12.1%
<b>Average</b>	<b>10.86%</b>	<b>17.66%</b>	<b>62.6%</b>
<i>C&amp;W Cayman</i>	<i>10.01%</i>	<i>10.70%</i>	<i>6.9%</i>

<sup>2</sup> If the ICTA decides to apply reciprocal rates for mobile termination then, by implication, it should assume a mobile-only WACC for the determination of mobile termination rates. In this case the appropriate WACC to use for determining the fixed termination rates of C&W is therefore the fixed-only operator WACC, which should be lower.

One reason for C&W understating the difference between fixed and mobile WACC, is that the C&W analysis appears significantly to underestimate the mobile beta. In other studies that Ovum is aware of, the mobile unlevered (asset) beta has been at least twice the C&W estimate of 0.6. For example, in the UK, Ofcom uses a range of 1.3 to 1.6 for the mobile operators; while in France ARCEP uses a beta of 1.2.

## 3 Fixed LRIC model

### 3.1 Efficient network design

C&W has chosen to model an IP-based fixed network on the basis that it is the technology that an efficient operator would employ today (*Fixed Network Document, 8*). In Section 2.1, we have indicated its opposition to the use of IP technology in the fixed network model. However, even if it is to be used, Ovum submits that the way in which C&W incorporates IP-based technology in its model is inefficient, and thus in contravention of ICTA Principle 1.

C&W argues that:

*Although the IP technology is radically different to the traditional switches, C&W Cayman plans indicate that the topological structure of the network in Cayman is likely to remain as it is today, with changes only in the type of equipment deployed at each node. (Fixed Network Document, 11)*

There are two basic problems here.

Firstly, by adopting this approach C&W is merely replacing low-cost equipment with high-cost equipment without obtaining any efficiency advantages from the change. Of course, over time C&W might use the IP equipment to introduce some new services, but there is no such assumption in the model - in other words the full cost of the IP-based equipment is being borne (inefficiently) by existing services in the C&W model.

The MSE (media gateway) is a good example of this systematic overstating of costs within the C&W fixed network model. C&W admits that the configuration that it is proposing has sufficient capacity to support "the entire voice and data requirements for a market the size of Cayman", and "as such the equipment costs of the MSEs are fixed and do not vary with volume" today (*Fixed Network Document, 40*). If this is the case, Ovum submits that it is entirely inappropriate and inefficient simply to replace the existing Local Switches in the C&W network architecture on a like-for-like basis with MSEs. Instead an efficient deployment would involve a rationalisation of this part of C&W's asset base.

Secondly, there are many examples of other fixed network operators around the world implementing IP-based technologies as a means to rationalise their network architectures. For example, in the UK, BT has committed to removing some 3000 nodes from its network as part of its 21<sup>st</sup> Century Network concept. Granted in an island economy such as Cayman there is not the same scope for rationalisation as in the UK, but there clearly is scope for some reduction in C&W's network with the deployment of IP.

Ovum wants to make this point to the ICTA in the strongest possible terms. The way in which C&W's fixed network model is currently constructed is grossly inefficient. If fixed network termination rates are to be set on the basis of this

model, Digicel will in effect be subsidising C&W in its roll-out of IP technology. Far from rewarding efficient network competition, this will reward C&W's inefficiency and reduce Digicel's ability to compete effectively in this market. For the long-term benefit of the Cayman economy it is imperative that the ICTA does not allow this to happen.

## 3.2 Assumptions

Ovum has reviewed the assumptions used in the C&W fixed network model and compared them with the equivalent assumptions in the mobile network model. These assumptions fall into two categories, Demand Assumptions and Technical Assumptions, and in each case there is a significant difference between the models.

### Demand assumptions

The table below summarises the main demand assumptions in the two models.

Assumption	Fixed network model	Mobile network model
Non-conversation holding time	0.11 minutes	0.11 minutes
Busy days	365 per year	21 per month
% of busy day traffic in the busy hour	8%	10%
Total calls to successful calls ratio	1.24	1.24

It is not clear why C&W has chosen to make different assumptions about busy hour traffic in the two models. Ovum notes that the effect of the different assumptions is that the fixed network model assumes 16% greater busy hour demand than the mobile model. We believe that, unless this difference can be empirically justified, the same assumptions ought to be used in both models.

### Technical assumptions

A range of different technical assumptions are required for each of the fixed and mobile models. Many of these assumptions need to be different because of the different network technologies deployed in fixed and mobile networks. Nevertheless, a key assumption which is common to both models is the expected maximum utilisation of network assets. Here there is a dramatic difference between the C&W approach in the two models.

- In the fixed network model there is a utilisation factor for each separate equipment (e.g. a Circuit Efficiency Factor of 66%, a MG Fill rate of 75%, a transmission capacity allowance of 20%), in addition to which there is a Provisioning Allowance of 5% (to cover growth in traffic demand) and a 3% allowance for growth in subscriber numbers.

- In the mobile model there appears to be only a single parameter (Capacity Planning Maximum Load Factor) of 20% to cover all utilisation issues.

This difference in treatment between the fixed and mobile models is substantial and unjustified. In fact the utilisation constraints on a mobile network are greater than on a fixed network as there is considerably more variability in where and when traffic is generated by mobile subscribers (e.g. the geographical spread of mobile traffic can be significantly affected by a large social event).

Ovum is concerned that this significant and otherwise inexplicable difference between the fixed and mobile models, may be the result of C&W deliberately trying to overstate fixed network costs and/or understate mobile network costs - a move that would be clearly detrimental to Digicel's interests. There may be other examples of this bias which are inherent in the models but are not so visible to a third party, especially in the absence of full working models.

## 4 Mobile LRIC model

### 4.1 Modelling of a stand-alone mobile network

As noted in Section 2.2, Ovum does not agree with C&W costing its network as if it were a stand-alone mobile network operated by an independent business. C&W enjoys significant economies of scope between its mobile and fixed networks, and these economies of scope should be included within the model.

The economies of scope enjoyed by C&W include, but are not necessarily limited to:

- **Shared transmission costs.** It is not reasonable for C&W to cost its own transmission network on the basis of its published tariffs for leased circuits (*Mobile Network Document, 20-21*)<sup>3</sup>. This treatment implies that C&W will make a double return on capital employed for these assets (once within the fixed network and then for a second time within the mobile model). Furthermore as commercial leased lines are provided by C&W on a monopoly basis, the tariffs charged for this service are effectively monopoly rents. It is totally unreasonable that Digicel, or other parties interconnecting with the C&W mobile network, should pay these charges. The cost of transmission facilities in the mobile model should be the LRIC derived from the fixed model, and no further return on capital should be allowed.
- **Equipment co-location.** In operating its mobile network C&W has the advantage of being able to co-locate much of its equipment with assets used in the fixed network. In particular, transmission cables may share ducts and trenches or microwave towers with fixed network transmission facilities; switching equipment (e.g. BSC, MSC, IMS) and service platform equipment (e.g. GPR, SMS) may be housed in the same buildings as fixed network equipment and in some cases (e.g. VMS) its usage may actually be shared with fixed network services. By treating the fixed and mobile networks each as a standalone network, C&W is able to extract double rents for these facilities from interconnecting parties.

Ovum submits that C&W's approach to modelling fixed and mobile networks as self-standing businesses (*Background Document, 16*) is fundamentally at odds with the ICTA's Principle 1, and does not constitute "efficient market prices". In particular they greatly exceed C&W's right to recover efficiently incurred, forward-looking costs, they discourage C&W to operate in a cost effective manner, and they provide the wrong incentives for efficient facilities-based investment, entry and exit.

<sup>3</sup> Even if the model were based on the assumption of a stand-alone mobile operator the use of published leased circuit prices would be inappropriate. In practice a stand-alone mobile operator (such as Digicel) builds its own transmission facilities using microwave links.

## 4.2 Scorched node principle

Bottom-up models are, by nature, theoretical and have a tendency to underestimate costs because they cannot adequately model the complexities of real-world operations. For this reason a scorched node approach to bottom-up modelling is normally practised, as has been recognised in the ICTA's Guideline 3:

*The FLLRIC study shall be based upon the locations of, and planned changes to, the existing central office and facilities configuration.*

In the case of the mobile model, the key facilities to be configured according to the scorched node approach are the cell sites. At first glance the C&W model achieves this: all existing cell sites are listed in the *Cost Assumptions* sheet of the model. However, Ovum notes that these sites are only used to derive average site leasing costs. When it comes to determining the number of network nodes the model employs a purely bottom-up approach (Radio Calculations sheet) which determines that there should be:

- 5 cell sites in dense urban areas
- 6 cell sites in medium urban areas
- 6 cell sites in rural areas.

In contrast C&W's actual cell sites as listed in *Cost Assumptions* comprise 14 urban sites and 12 rural sites. Thus the model actually underestimates the number of nodes by more than 20% in urban areas and by 50% in rural areas.

Ovum considers this to be a fundamental concern. It indicates that the model is entirely theoretical and does not follow the instructions laid down by the ICT in Guideline 3. Furthermore the model is significantly more inaccurate in rural areas, suggesting that the model systematically and substantially underestimates the costs of coverage, these being precisely the costs that will dominate in a new entrant network such as Digicel's.

## 4.3 Detailed assumptions

Ovum has reviewed the detailed assumptions used within the C&W model. In general we find the assumptions to be reasonable, and consistent both with Digicel's own operating experience and benchmarks from other mobile cost models. However, we have concerns about a number of the assumptions:

- Unsuccessful calls. C&W assume that unsuccessful calls represent a 24% uplift on successful calls (*Demand Assumptions, C32*). In our experience this is considerably too low, with 40% being a more realistic figure. Indeed in some cost models we have seen assumptions of greater than 100% being used.
- Maximum load factor. C&W quote a maximum load factor of 80% (*Technical Assumptions, D38*). This seems to be the only factor dealing with equipment utilisation and seems to be applied across all network equipment. In our experience such a load factor is not achievable in practice. There are at least

three separate reasons for assuming a lower load factor: maintaining quality of service (typically restricting load factors to 80% as C&W allows for), planned growth (typically allowing head room for 6 months growth), and practical restrictions created by the scorched node requirement (i.e. growth does not occur exactly where the network nodes are placed, with the result that capacity requirements in practical terms always exceed those in theory based on smooth and predictable traffic growth). Putting all of these factors together, Ovum considers that built capacity should be at least 150-200% of the theoretical capacity requirement given by the bottom-up model. (See also Section 3.2, Technical Assumptions)