

December 21, 2007

Mr David Archbold  
Managing Director  
Information and Communication Technology Authority  
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Dear Mr Archbold,

**Public Consultation on Costing Manual – CD 2005-1. Digicel comments on C&W's letter of 30 November 2007**

Digicel welcomes the opportunity to comment on C&W's 30 November 2007 submission. In that letter C&W makes a number of unsubstantiated assertions in relation to the validity of the cost model and manual, and its wish to move to stage 3 – i.e. implementation. Throughout the consultation process, Digicel has raised fundamental concerns with the validity of the model and in particular, C&W's wholesale redaction of information which should have properly been disclosed.

As a result of the significant redaction of information, interested parties such as Digicel have been wholly unable to substantively review the model and/or provide meaningful comments. Digicel's views about C&W's strategic and manipulative redaction of information are not mere conjecture. As the parties will recall, in March 2007, C&W mistakenly disclosed a non redacted response to interrogatories to interested parties. A comparison of this and the later 'redacted' version enabled Digicel to discover that C&W had removed information that:

- (i) under no circumstances could such information be classified as 'confidential', and
- (ii) the information that was withheld under the pretence of being confidential was likely to have an enormous impact on the output of the FLLRIC model.

This incidence enabled Digicel to discover one instance of strategic redaction. Unfortunately Digicel suspects that C&W has employed this strategy both prior and subsequent to the March disclosure. Even on the basis of the model in its highly redacted form, Digicel diametrically opposes C&W's assertions that the model is currently compliant with ICT Decision 2005-4 and therefore should be implemented. Digicel also disagrees with C&W's claim in its 30 November letter that it has "demonstrated" that the points raised by Digicel are unjustified and incorrect.

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We respond to C&W's comments in turn:

***"...the record contains a manual and model that complies with Authority's directives..."<sup>1</sup>***

Digicel categorically disagrees with the claims made by C&W that its model "is now a robust model that is fully compliant with the Authority's determinations in the ICT Decision 2005-4". C&W has not seriously addressed most of Digicel's concerns but has asserted that the points raised by Digicel are unjustified or incorrect. Its assertions have sometimes been supported by relatively shallow argument. Moreover, C&W is an interested party and its responses to many if not most of the ICTA's queries are not of the quality Digicel would need to see if our concerns raised during the interrogatories are to be addressed.

C&W provide a list of bulleted items which it claims demonstrate the model's compliance and we quote these below and then discuss why C&W's assertions are incorrect.

***"In our comments...we took up each of its concerns and demonstrated that... the FLLRIC model applied least-cost technology and efficient network design;"<sup>2</sup>***

Digicel raised this issue previously and we remain unconvinced that the supposed NGN fixed network that C&W claims is envisaged by the model, provides for lower output prices than a model more traditional network that uses real circuits and SS7 signalling in the upper layers of the network. There are unresolved issues about the pricing / valuation of inputs, suitable depreciation periods for assets, and potential step-cost issues with new IP architectures.

In an earlier document, C&W presented data to the ICTA (redacted for other readers) that supposedly demonstrated the savings provided by its NGN network model compared to a model of a PSTN network. This comparison seems to us to have been disingenuous, since there is no way of knowing whether either network and associated Opex costs are truly optimised.

Moreover, the valuation and optimisation of a virtual NGN designed to meet certain service demands in a particular location, are subject to rather more uncertainty than is associated with an equivalent PSTN network. Uncertainties about the optimality of any NGN network architecture, whether market values of capital inputs are stable, and about estimated market demands, lead Ofcom (as part of its process of developing a cost model on which to base termination rates) to commit to setting BT's termination charges

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<sup>1</sup> At page 1 of 6 of C&W's letter of 30 November.

<sup>2</sup> At page 4 of 6 of C&W's letter of 30 November, 2007.

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for 2005-2009 based on a modern narrow-band technology.<sup>3</sup> Ofcom called this approach the “technology neutral model”. The fixed cost model was based on modelled PSTN costs, despite the fact that BT is likely to have replaced its network and moved to all-IP platforms by the end of the control charge period in 2009. In Ofcom’s view, adopting a ‘wait and see’ approach would allow the regulator access to more accurate information at a later time, when NGN is more pervasive within the BT network and on international markets. BT supported Ofcom’s approach view stating that:

“The time to consider the costs of the new network will be when the older ones are close to being retired, not when the new networks are being introduced.”<sup>4</sup>

Digicel is not privy to the output prices of the model but believes that by modelling an NGN network, which C&W claims to have done; there will be too many opportunities for C&W to manipulate things to its own advantage. Therefore, we forcefully disagree with C&W’s claim.

***“... determining whether there is an access deficit”<sup>5</sup>***

Moreover, far from being “a robust model” which can be used for “determining whether there is an access deficit”, it should have come to C&W’s attention that an Excel based model cannot be used to provide either unbiased or efficient estimates of actual customer access network costs. The problems found in other jurisdictions concerns the inability of Excel models to provide for the accurate placement of network termination points. This has resulted in Excel models being rejected for the purpose of estimating access network costs, and was the reason higher programming language was used by regulators in the USA and in Germany to model the customer access network. The issue was documented by the FCC over a period of time in the late 1990s and were described later in a private publication.<sup>6</sup> The FCC’s research results establish irrefutable and serious failings in Excel to estimate access network costs and so any decision (by C&W) to rely on Excel should have been justified.

***“C&W provided...Revised approach to economic depreciation to meet the concerns of the Authority, its consultants and interested parties”<sup>7</sup>***

Cost models attempt to price inputs according to what a competitive market would provide.<sup>8</sup> Respected London based consultants Indepen write in one of their discussion documents,

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<sup>3</sup> Digicel understands that BT is one of the World leaders in adopting NGN architecture for its telecommunications network.

<sup>4</sup> See BT’s response to the 2005 Ofcom review of mobile call termination, p.5. The source document can be found here: <http://www.ofcom.org.uk/consult/condocs/termination/responses/bt.pdf>

<sup>5</sup> At page 1 of 6 of the C&W letter of 30 November, 2007.

<sup>6</sup> See, Bush, C. A., D. M. Kennet, J Presbrey, W Sharkey, and V Gupta, (2001), “Computer Modeling of the Local Telephone Network”, *Telecommunication Systems* 18:4, 359–383, Kluwer Academic Publishers. The Netherlands.

<sup>7</sup> At page 4 of 6 of C&W’s letter of 30 November, 2007.

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*“Long Run Incremental Cost (LRIC) models have been applied by regulators in the UK, US and elsewhere in pricing access and interconnection in telecommunications networks since the mid 1990’s. Advocacy of LRIC is often based on the assumption that this is the level at which effective competition would drive prices, or more colloquially “mimic competition”. In practice the application of the LRIC methodology has been based around hypothetical network models that may depart substantially from the real-world attributes of the actual network in question.*

*The conditions necessary for LRIC to “mimic competition” and allow a firm to recover exactly its costs over the life of an asset are still a matter of academic research, and failure to take account of known potential sources of bias in modelling can result in large errors.”<sup>9</sup>*

In recent years research by leading academics has shown that FLLRIC models that have actually been used to price network services or unbundled elements have generated substantially incorrect values i.e. the models failed to properly mimic competitive markets. C&W chose to ignore this research and its failure to do so is reflected in the flawed way in which its model addresses depreciation.

Recent research looks at the problem in terms of the recovery of irreversible investments. This research is concerned with how future prices impact on returns and investment decisions. Indeed, the relatively recently acquired body of knowledge known as “Real Options” has aided in advancing our understanding of these issues. Probably the leading contributor to this research is Robert Pindyck of MIT. In a recent paper he explains why TELRIC models (also known as FLLRIC models outside of the USA) will under-compensate investors in a market where the replacement cost of equipment is declining over time.

Pindyck writes,<sup>10</sup>

*“One may ask why, if improved technologies are available and equipment costs have fallen, should CLECs lease equipment from ILECs at rates based on the older-technology and/or higher-cost equipment that the ILEC actually purchased? Indeed, as explained above, the FCC believes that with new and improved systems available, competitors should be given access to facilities at their current cost, as if the best systems had been deployed by the ILEC now and not at some point in the past. The FCC’s view is that to allow the ILEC to recover its actual costs would be inefficient: Pricing should simulate a competitive market and in a*

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<sup>8</sup> We not 2 sorts of errors here: (i) errors in logic and method that we can recognise today, and (ii) errors in method or design that we do not understand today.

<sup>9</sup> See <http://www.independ.co.uk/panda.html> and in particular the 2004 paper, “Access Pricing in Telecommunications – Time to Revisit LRIC?”

<sup>10</sup> Robert Pindyck (2007), “Mandatory Unbundling and Irreversible Investment in Telecom Networks”, *Review of Network Economics* Vol.6, Issue 3 (Sept): pp 274-298.

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*competitive market, equipment that is leased should be valued at current incremental cost.”*

Assuming there are only sunk costs (marginal costs are zero) in order to demonstrate his point, he continues,

*“Each firm invests in machines up to the point that the net present value (NPV) of a machine is just positive. But the NPV must account for the fact that the output price will fall over time as other firms enter at a lower machine cost. Thus, the anticipated profit from owning and using the machine in the first year must be higher than it would be were the cost of a machine expected to remain constant. In this way, a firm that buys a machine today can expect to recoup its “losses” from output price declines in the future. If someone were to look at this industry, he or she may think that it was not competitive because the output price today exceeded the amortized price of capital. Of course, this just reflects the fact that firms require a positive NPV to invest, thus must be compensated now for expected entry and price declines in the future. Thus the industry is indeed competitive in the sense that any firm can enter and compete by buying machines. **It is this model of competition that UNE pricing should try to simulate.”**<sup>11</sup>*

What Pindyck has outlined is no less than a refutation of C&W’s understanding of how capital and depreciation should be treated in a FLLRIC model. It is not the concept that a model should mimic a competitive market which is wrong, but C&W’s understanding of the competitive market model.

Pindyck’s message is that if Capex costs increase over time (e.g. the customer access network) a FLLRIC model based on MEA prices will over-compensate the investors; and where Capex costs decline over time a FLLRIC model based on MEA prices will under-compensate investors (they will not earn a fair rate of return) leading to under-investment in the long term. A regulated firm must be given the opportunity, to earn a fair rate of profit on its actual (i.e. historical) investments. Pindyck outlines how capital investments to which access is to be wholesale price regulated must be treated in order to simulate competitive market outcomes. These are quite different to C&W’s present understanding of the issues.

In practice the FCC has outlined a way to solve the problem through the calculation of depreciation, although without outlining the problem with the same clear language as Pindyck has done. The problem was originally brought to the FCC’s attention in the early 2000s and resulted in the FCC’s indirect admission of the seriousness of its error in publishing Working Paper 40 which outlines the way depreciation must work in a FLLRIC model.<sup>12</sup> Where forward-looking costs are used, the depreciation expense which enables

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<sup>11</sup> Ibid p.284

<sup>12</sup> Mandy D. and W. Sharkey (2003), “Dynamic Pricing and Investment from Static Proxy Models”, *OSP Working Paper Series*. See also David Mandy (2002), “Pricing network elements when costs are changing”, *Telecommunications Policy* 26: pp 53–67.

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cost recovery will be greater than if Capex costs used in the model remain the same as their purchase price. Depreciation modelling by Mandy and Sharkey (2003) show that in the early years the depreciation expense required in FLLRIC models can be expected to be sharply higher in the early years compared to the way the FCC's own FLLRIC (TELRIC) model had worked until that time. C&W should have revised its treatment of depreciation so as not to impose gross pricing errors on the industry.

***"In our comments...we took up each of its concerns and demonstrated that ...the assets lives were reasonable ..."***<sup>13</sup>

In its 30<sup>th</sup> November letter to the ICTA, C&W considers that it has provided sufficient justification for the various assets lives that are used in the model. Depreciation periods have been debated during the interrogatories but in Digicel's view there has been a lack of rigour in this debate and C&W has by default had too much say in decided on these periods. The large difference in the numbers Telcordia provided, those used by leading cost modellers WIK of Germany, and the depreciation lives chosen by C&W, has not been adequately explained. C&W is asking interested parties to accept at face value the information provided by its suppliers regarding either the suitability of certain assets used in the cost model, their market price, or the depreciation lives of assets. It is not difficult to see the source of Digicel's concern with this latter issue; C&W has a relationship with its suppliers.

***"The absolute and relative level of the mobile WACC applied were justified"***<sup>14</sup>

Digicel disagrees with C&W's position that its estimate of "the absolute and relative level [of] the mobile cost of capital applied were justified". Digicel has not been privy to all communication between C&W and the ICTA on this issue but Digicel has enough information to conclude that C&W has not adopted best practice when it comes to estimating the cost of capital.

There are several features of a WACC calculation which it appears that C&W has not understood:

1. The claim in C&W's July 2006 document (p.10) that a FLLRIC approach implies a single WACC for all competitors:
  - a) This is contrary to theory and practice that efficient mobile operators competing in the same country can and do have a different costs of capitals
  - b) Theory and practice shows that the cost of capital for a fixed operator will not be the same as for a mobile operator or for an integrated fixed and mobile operator.
2. C&W's failure to differentiate clearly between pre-tax and post tax WACC, and real and nominal WACC figures, or to specify whether arithmetic or geometric means

<sup>13</sup> At page 4 of 6 of C&W's letter of 30 November, 2007.

<sup>14</sup> At page 4 of 6 of C&W's letter of 30 November, 2007.



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have been used to estimate the third party ERPs which are a part of any WACC, and where both arithmetic or geometric means are used is practice.

3. The cost of capital is known to change significantly over time.

We discuss these issues further below.

### **1.a) Efficient Mobile Network Operators have different WACCs**

Even fully efficient operators that compete to provide mobile services in a country can and do have different WACCs. In theory and in fact it is incorrect to argue that there is but one efficient WACC; i.e. that any firm that has a WACC higher than this is inefficient. Reasons for WACC to differ between efficient competitors are numerous and include differences in ownership structure, differences in the mix of services provided; differences in the size of the operator, and differences in the value of real options, an important aspect of which we take up further below. There may also be structural differences operators cannot avoid due to regulatory, legislative or technological restrictions.

Importantly, each firm faces a different situation at the time of entry. Certain of these differences are outside of the firm's control, such as the number of entrants there were before it. Determining the moment of entry is, however, under the control of the firm. It is now well understood that at the moment of entry an operator extinguishes a valuable option to invest.<sup>15</sup>

A common cause of such option values is technical change. If the investor waits the risks reduce due to better information about the technology and the business case for using it. In order to extinguish at an earlier time the option to invest when there is much greater uncertainty associated with early investment, will require a greater expected future payback, otherwise the investor will wait. The value the option forgone at the time of entry or a major investment must be factored into the cost of capital, and is another reason why the cost of capital is different a priori for each efficient competing firm.

The arguments are outlined with care by Dixit and Pindyck and have recently been accepted by Ofcom.<sup>16</sup>

### **1.b) Stand alone Mobile as the reference**

In the event that each firm's WACC is not calculated and used in the model to obtain firm-specific WACCs, a stand-alone mobile network operator should be the reference case for a hypothetical efficient mobile operator because it represents the likely characteristic of a new market entrant. A hypothetical new entrant in Cayman is not

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<sup>15</sup> This draws on the theory of "real options" in which the seminal work was by Dixit and Pindyck and synthesised in, Dixit, A. and Pindyck, R, (1994), *Investment under uncertainty*, Princeton University Press.

<sup>16</sup> Cit op 16.

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able in the foreseeable future to enjoy the economies of scope from operating a fixed and a mobile network.<sup>17</sup> The scenario of a free-standing mobile network operator (not integrated with a fixed network) is the appropriate reference point for an efficient mobile operator, because it is impossible for every mobile operator in Cayman to reach a similar structure as C&W.<sup>18</sup> C&W's use of a single WACC for mobile and fixed is in conflict with finance theory and accepted practice.

Modelling stand-alone mobile costs and stand alone fixed network costs will result in higher mobile unit costs, but this is legitimate: the task at hand is not to find the lowest possible price but the price that is in the long term is in the interest of citizens; that is, a price that enables the regulated firm to meet optimal investment activity through continuing to attract investors' funds. Digicel considers this to be apparent.

## **2. C&W's failure to specify which WACC related measures are being used**

There are numerous junctures in a WACC calculation where estimation and sometimes adjustment is required. The results of a WACC estimation will vary significantly depending on whether pre or post tax WACC is being calculated, whether risk premia are being estimated according to arithmetic or geometric means, and whether the WACC is being expressed in nominal or real terms.<sup>19</sup> The WACC figures C&W has obtained and presented needed to be investigated carefully in order to see the degree to which comparisons would be invalid; the information would then need to be presented with the figures.<sup>20</sup> C&W appears to have failed to appreciate these matters.

What is needed is for WACCs relevant to Cayman operators to be estimated by experts; not for C&W to brashly argue in favour of simplistic and flawed comparisons.

## **3. WACCs change over time**

Long time series data shows that WACC varies over time. While internationally the rates have been in recent years low in relation to historic figures, the evidence suggests that we have entered a period where this no longer applies. Moreover, WACC is in theory and practice both country as well as company specific. For all

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<sup>17</sup> This integrated structure also enables C&W to lever its market power across markets in ways that are not available to its competitors. Regulators in other jurisdictions often initially required accounting separation, but it is understood that this is only partially effective against such strategies. Legal separation into mobile and fixed operators is the preferred way to address such risks.

<sup>18</sup> The fact that Digicel's is facing wholesale industry prices which come out of a complex model designed by an interested party (C&W) even if these are subject to changes by ICTA, raises Digicel's ERP compared to C&W mobile's ERP.

<sup>19</sup> In this regard the Independent Regulators Group (IRG) recently wrote, "Most of the parameters used to calculate the WACC are unobservable and have to be estimated or inferred from observable data, therefore one should bear in mind that the rate obtained will be an estimation based on assumptions and judgements about the theory and the data used in the calculation." IRG (2007), "Regulatory Accounting Principles of Implementation and Best Practice for WACC calculation", February: p.7.

<sup>20</sup> In Digicel's experience the most common form for WACC to be expressed in is pre-tax nominal terms. However, Ofcom has in recent years sometimes published WACC figures in real pre-tax terms.



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these reasons Digicel considers that C&W's reliance on benchmarking with existing international WACC data is flawed.

What is more, while CAPM is generally accepted as the best available means we have for estimating the cost of capital, it has known and significant theoretical and empirical shortcomings and thus WACC estimates which are derived from the use of CAPM methodology need to be viewed as estimates that are subject to a significant margin for error. This is one reason why a range of WACC figures is usually used to identify a range within which the cost of capital will likely fall. In its in-depth study into the cost of capital for mobile operators, the UK Competition Commission wrote,

*"Inputs to the WACC formula are continually changing, not only as a result of movements in financial markets, but also as a result of continuing work by financial and academic analysts. This can result in changes over time to the WACC of an individual company. In addition there can be considerable uncertainty over the appropriate value of some parameters".<sup>21</sup>*

C&W has not employed the circumspect approach to cost of capital estimation which is necessary given the theoretical and practical uncertainties concerning CAPM methodology.

***"...We believe that the model could reasonably be fully implemented, and useful MTR outputs available to licensees, by April 2008..."<sup>22</sup>***

Digicel notes that C&W is keen to implement the current version of the model. In view of Digicel enduring suspicions concerning C&W's strategic redaction of key information so as to artificially reduce the mobile termination rate, Digicel is not entirely surprised by C&W's position. Digicel of course keen to see the completion of the cost model process; however before implementation can take place, ICTA and the other interested parties must be fully satisfied that the model is compliant with the principles set out in ICTA's 2005 decision – for the reasons set out above, Digicel considers that this is not currently the case and therefore the model cannot be implemented in its current form.

***"C&W provided definitions and justification of the various concepts of common, fixed common and joint costs in the model"<sup>23</sup>***

Digicel has previously outlined its concerns regard C&W's understanding of common and joint costs. These concerns have still not been adequately addressed by C&W.

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<sup>21</sup> Competition Commission (2002), "Reports on references under section 13 of the Telecommunications Act 1984 on the charges made by Vodafone, O2, Orange and T-Mobile for terminating calls from fixed and mobile networks": Chapt. 7, p 187.

<sup>22</sup> At page 5 of the C&W letter of 30 November.

<sup>23</sup> At page 5 of the C&W letter of 30 November.

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Conclusion

The largely redacted nature of the models and the fact that C&W has the incentive to use this model to its own advantage raises fundamental concerns. Without non-redacted i.e. generic models and full and frank description of what lies behind figures in the models, the process will remain extremely opaque to Digicel and the outputs viewed with a high degree of suspicion. Digicel has the impression that many of C&W's Opex costs are used as inputs in the model, with other costs chosen by C&W. The fact that the model is so heavily redacted strongly suggests that it is not generic, and Digicel also remains deeply suspicious of its bottom-up credentials. In its present form Digicel considers (contrary to the position outlined in the C&W letter) that the model does not meet the principles outlined by ICTA in its 2005 Decision.

Yours sincerely,

**“SIGNED”**

John Byrne  
General Manager