C&W Cayman Islands Response to ICTA/Telcordia Round 2 LRIC Interrogatories [Part 4 June 8 submission]

Unfortunately, as noted in our cover letter, due to the delay in getting information from Telcordia and slower-than-expected turn-around from our vendor, we have not yet been able to respond to interrogatories 2.3.1, 3.2.1, 3.2.2, 4.1.2 and 4.5.1 in this filing. After further discussions with our vendor, we feel that we should have those responses to you by 22 June.

In addition to the responses to interrogatories 2.3.1, 2.7.1 and 2.7.2, we submit with this filing the disaggregated telecoms equity data which Telcordia confirmed should be a part of our response to interrogatory The telecommunications companies that are apart of the S&P 90 (pre 1957) and S&P 500 1957 to present are given in Appendix IX. We also give their industry category, as S&P classified them, which indicates their service portfolio. S&P in its Analysts' Handbook only reports the return on these classifications back to 1993. Although we cannot assess the degree to which any of these companies are "efficient", as Telcordia asks, we could surmise that among the traditional telephone companies, the incentive to be efficient increased as rate of return RoR regulation was lifted. An increasing number of states started to move from RoR to price-caps or earnings sharing mechanisms in the late eighties. AT&T's long-distance rates came under a price cap in 1989. By the mid-1990s in terms of number of lines, more retail activity was regulated under incentive-based mechanisms than under RoR. By the end of the nineties, fewer than 10% of telephone lines were associated with a RoR regime.[1]

2.7.1   In Section 4 of both Fixed Network and Mobile Network Costing Manuals, C&W states "Again, we have made these simplifications to facilitate presentation. Upon request we will be happy to provide a more detailed demonstration of the Model." In its response to section 3.12 of ICTA/Telcordia interrogatories, C&W explains that the statement quoted above is meant to convey that C&W would be happy to make a direct presentation (in confidence) of the model if so desired. C&W submitted that this was in recognition that a full understanding of the model may be better achieved through a "one on one" presentation where questions or issues can be raised, discussed and indeed, where possible, answered immediately. To the greatest extent possible, the Authority wishes to generate a full record of the proceeding and also enable participation by any interested parties.

   a.   Please provide an extended case study showing the calculation steps, intermediate outputs and final outputs to demonstrate how the model determines the D-LRIC and full LRIC for the Residential Access Service (as an extension of the Fixed Model Case Study) and the D-LRIC and full LRIC for the Mobile Termination Service (as an extension of the Mobile Model Case Study).

   b.   C&W may make the simplifications it considers appropriate in order to make the presentation of results clearer, but it should demonstrate how the models calculate and allocate FCCs/Joint Costs, Network-Wide Common Costs and TD Common Costs.

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[1] See for example, "Regulation in the US telecommunication sector and its impact on risk", Daniel Grote, University of Bristol, August 2006 at http://www.bath.ac.uk/cri/pdf/ecpr_pdf/6_Grote.pdf

Round 2 Telcordia Interrogs Responses Part 4

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C&W Response

Case Study for determination of DLRIC and Fully loaded LRIC for the Residential Access Service as modelled in the Fixed BU model

This case study follows from the previously submitted case study on the determination of the Pure LRIC values of the Residential Access service. Here we focus on the development of the Distributed LRIC and Fully loaded LRIC (FLLRIC) values for the same service. Combined, both case studies provide the complete steps in calculating all the LRIC values as developed in the Fixed BU model.

Summary BU pure LRIC results for PSTN Access Residential service

WACC   ###%

Volume – lines   ###

A	B	C
Network Element	**LRIC value – GRC**	**LRIC value – Annualised Costs**
400-PSTN Access	$###	$ # ##
400-MG line sensitive	$###	$ ###
TOTAL PURE LRIC	$###	**$ ###**

Figure 1a

Step 2 of paragraph 128 in the Background document provides a description of how the model calculates DLRIC and FLLRIC. It states

"In the 2nd step the Total Markup Values are calculated:

o 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 minus the sum of LRIC values of individual Product Increments that belong to the specified group.

o The total values of Common Costs for BU Fixed Common, BU Mobile Common and TD Common are calculated as LRIC values of Total Increment minus the sum of LRIC values of Sub Increments that belong to the specified group."
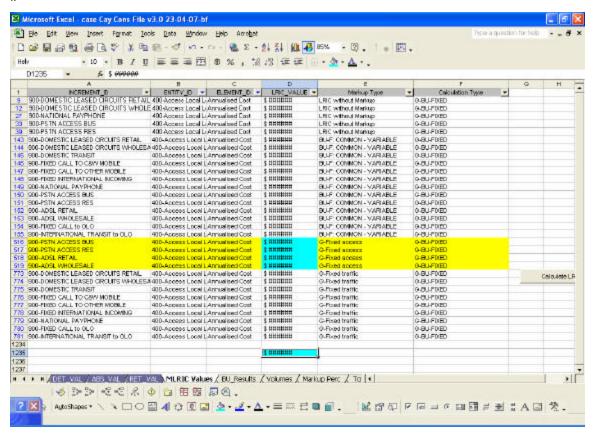
After calculating the LRIC values (described in the previous case study) shown in the table above

and captured in the BU Output sheet, lines 35 – 39 including the opex LRIC value in line 37, the model then calculates the DLRIC (ISFCs) and FLLRIC (FCCs).

The DLRIC values associated with the Residential Access service and the network increment 400-Access Local Loop are obtained through the Increment ID G-Fixed access. For simplicity we will focus on the annualised cost of the network increment 400-Access Local Loop starting with the DLRIC result and working our way through the BU model to explain its derivation.

The DLRIC result for the 400-Access Local Loop network element is shown in the 'MLRIC Values' sheet of the Consolidation file and repeated below with filters on the Entity_ID column for the network element 400-Access Local Loop and Element-ID column for the annualised cost.

#

#

Figure 1b

The total DLRIC allocated across the four services (900-PSTN Access BUS, 900-PSTN Access RES, 900-ADSL RETAIL and 900-ADSL WHOLESALE) shown above is ###, this has been distributed equi-proportionately based on LRIC values of the four services, resulting in an allocation of ### to 900-PSTN Access RES (Residential Access service). This is shown in Figure 1b.

Note 1 - Therefore in the following explanation the figure we are working towards is the allocation of ### to the Residential Access service.

As stated in the Background document the BU model removes the volumes of all the services associated with the G-Fixed Access increment and then finds the difference between the before and after states to obtain the cumulative DLRIC value stored in the BU Output sheet.

Steps:

Remove the volumes of the following four services 900-PSTN Access BUS, 900-PSTN Access RES, 900-ADSL RETAIL and 900-ADSL WHOLESALE.

Check the Cost Summary & Mapping sheet, range L51-L85 to make sure that all the relevant service volumes have been removed. Once the correct volumes have been removed the L88 should say 'YES' and all zeros should be contained in the range.

Upon removing the relevant volumes the 400-Access Local Loop network elements would be affected, this could be seen in the Cost Summary & Mapping sheet which has been extracted and shown below in the before and after states. Reference: Cost Summary & Mapping; A26:L30.

#

Access		Copper Cable	Copper Joints	Poles	Manholes	Manholes-Access	Manholes-Core	DPs, Dropwire, NID	
	Annualised Cost	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######	$ ######
	GRC	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######	
	Opex			$ ######					
ISFC		Access	Access	G-ALL	G-ALL			Access	

#Figure 1c – Values before removal of Access volumes

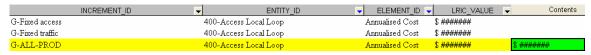Note the total value (shaded blue) of the before stated:- ###

#

Access		Copper Cable	Copper Joints	Poles	Manholes	Manholes-Access	Manholes-Core	DPs, Dropwire, NID	
	Annualised Cost	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######	$ ######
	GRC	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######	
	Opex			$ ######					
ISFC		Access	Access	G-ALL	G-ALL			Access	

#

Figure 1d - Values after removal of Access volumes

Note the total value (shaded blue in Figure 1d) after removal of the volumes:- ###

The result of the difference between the before and after states is:- ### - ### = ###, which is the amount listed in the BU Output sheet, row 63 (see figure 1e below – shaded green).
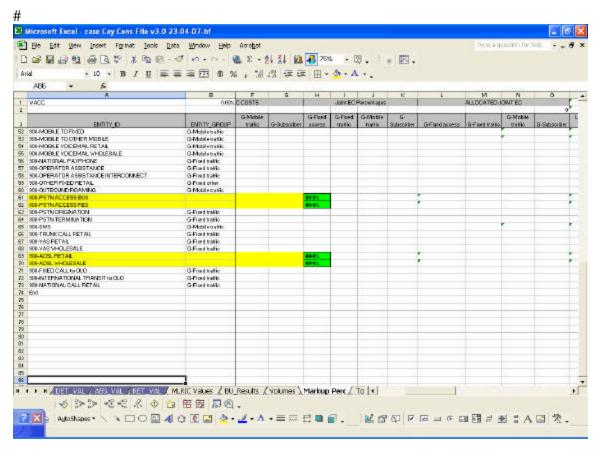
#

INCREMENT_ID	ENTITY_ID	ELEMENT_ID	LRIC_VALUE	Contents
G-Fixed access	400-Access Local Loop	Annualised Cost	$ #######	
G-Fixed traffic	400-Access Local Loop	Annualised Cost	$ #######	
G-ALL-PROD	400-Access Local Loop	Annualised Cost	$ #######	$ #######

#

Figure 1e – BU Output sheet extract

This value represents the cumulative, therefore to obtain the exact amount of the DLRIC (ISFC) markup we subtract the pure LRIC values for the PSTN Access residential and Business services. That is, as shown above, ### – ### – ### = ###

This value is then distributed equi-proportionately across the following four services:

900-PSTN Access BUS; 900-PSTN Access RES; 900-ADSL RETAIL and 900-ADSL WHOLESALE

This is done based on the markup percentages derived in the Markup Perc sheet of the Consolidation file. See column H (G-Fixed Access) and cells 61, 62, 69 and 70 for the allocations, they are as shown in the extract below (figure 1f).

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#

#Figure 1f

900-PSTN Access BUS – ###%

900-PSTN Access RES – ###%

900-ADSL RETAIL – ###%

900-ADSL WHOLESALE – ###%

Applying these proportions to the DLRIC markup value of ### gives:

900-PSTN Access BUS – ###%   x   ### = ###

900-PSTN Access RES – ###%   x   ### = ###

900-ADSL RETAIL – ###%   x   ### = ###

900-ADSL WHOLESALE – ###%   x   ### = ###

Thus the DLRIC markup value for the Residential Access service shaded green has been derived, consistent with the value originally quoted in the paragraph marked Note 1 above.

Summary:

Summary BU pure LRIC and DLRIC results for PSTN Access Residential service

A	B	C
Network Element	**LRIC value – Annualised Capital Costs**	**DLRIC Markup value – Annualised Capital Costs**
400-PSTN Access	$ ###	###
TOTAL DLRIC		**$ ###**

The Fully Loaded LRIC (FLLRIC) value for the Residential Access service can be derived similarly to the DLRIC value. In this case however the model removes volumes from all services and then takes the difference in the before and after states to obtain the cumulative FLLRIC value. This is obtained in the BU Output sheet and is shown below in Figure 1g. The value of ### corresponds to the cumulative FLLRIC value and the value of ### represents the actual FLLRIC markup value (this is obtained by subtracting the DLRIC values (### and ###) from the cumulative value of ###).

#

INCREMENT_ID	ENTITY_ID	ELEMENT_ID	LRIC_VALUE	Contents
G-Fixed access	400-Access Local Loop	Annualised Cost	$ ######	
G-Fixed traffic	400-Access Local Loop	Annualised Cost	$ ######	
G-ALL-PROD	400-Access Local Loop	Annualised Cost	$ ######	$ ######

#

Figure 1g

Also, in the Consolidation file, sheet MLRIC Values we obtain the resulting distribution of the FLLRIC value as shown below in Figure 1h.
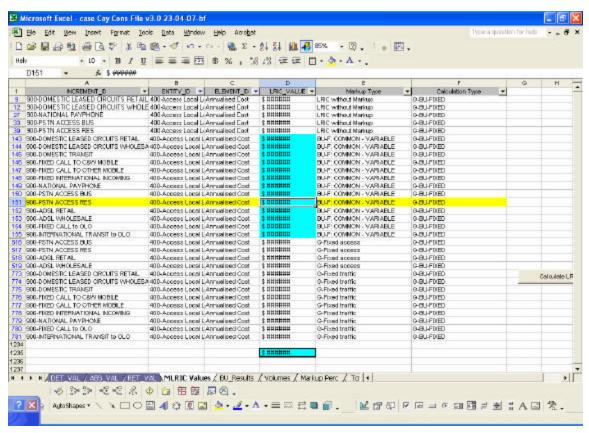
\#

\#

Figure 1h

Note 2 - The sum of the values shaded blue is ###. And the FLLRIC allocation to the Residential Access service is ###. This is the value we will derive in demonstrating the calculation of the FLLRIC markup.

Steps:

As mentioned in paragraph 17 above, the model starts by removing the volumes of all services then takes the difference of the before and after states to determine the cumulative FLLRIC value.

Upon removal of the volumes of all services, the affected network elements are: (shown below in figure 1i and 1j for the before and after states) Reference: Cost Summary & Mapping; A26:L30.
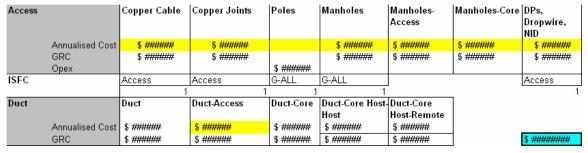
#

Access		Copper Cable	Copper Joints	Poles	Manholes	Manholes-Access	Manholes-Core	DPs, Dropwire, NID
	Annualised Cost	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######
	GRC	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######
	Opex			$ ######				
ISFC		Access	Access	G-ALL	G-ALL			Access
		1		1	1	1		1
Duct		Duct	Duct-Access	Duct-Core	Duct-Core Host-Host	Duct-Core Host-Remote		
	Annualised Cost	$ ######	$ ######	$ ######	$ ######	$ ######		
	GRC	$ ######	$ ######	$ ######	$ ######	$ ######		$ ########

#

Figure 1i – Values before removal of volumes

The sum of the yellow shaded area is ###.

#

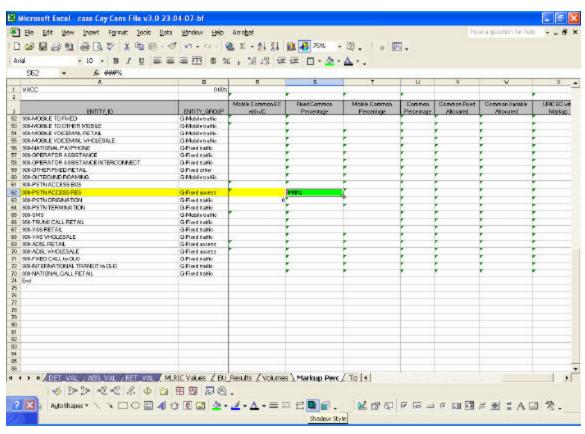| Access		Copper Cable	Copper Joints	Poles	Manholes	Manholes-Access	Manholes-Core	DPs, Dropwire, NID
	Annualised Cost	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######
	GRC	$ ######	$ ######		$ ######	$ ######	$ ######	$ ######
	Opex			$ ######				
ISFC		Access	Access	G-ALL	G-ALL			Access
		1		1	1	1		1
Duct		Duct	Duct-Access	Duct-Core	Duct-Core Host-Host	Duct-Core Host-Remote		
	Annualised Cost	$ ######	$ ######	$ ######	$ ######	$ ######		
	GRC	$ ######	$ ######	$ ######	$ ######	$ ######		$ ########

#

Figure 1j – After removal of volumes

The sum of the yellow shaded areas is ###.

The difference is ###, the cumulative FLLRIC value.

Subtracting the cumulative DLRIC values as shown in the BU Output sheet (shown in Figure 1g) results in the FLLRIC markup value of ###.

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This value is then distributed across the services in the proportions obtained from the Markup Perc sheet, column S. See Figure 1k below for the proportion of the FLLRIC value allocated to Residential Access service.

\#

\#

Figure 1k

This proportion is ###%. Applying this to the FLLRIC markup value of ### gives the amount of FLLRIC allocated to the Residential Access service. This is:

x ###% = ### which is the value obtained in the paragraph marked Note 2 above.

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Summary:

Summary BU pure LRIC, DLRIC and FLLRIC results for PSTN Access Residential service

A	B		C
Network Element	**LRIC value – Annualised Capital Costs**	**DLRIC Markup value – Annualised Capital Costs**	**FLLRIC Markup value – Annualised Capital Costs**
400-PSTN Access	$ # ##	$ ###	$ ###
TOTAL FLLRIC			**$ ###**

Case Study for determination of DLRIC and Fully loaded LRIC for the Mobile Termination Service as modelled in the Mobile BU model.

This case study follows from the previously submitted case study on the determination of the Pure LRIC values of the Mobile Termination service. Here we focus on the development of the Distributed LRIC and Fully loaded LRIC (FLLRIC) values for the same service. Combined, both case studies provide the complete steps in calculating all the LRIC values as developed in the Mobile BU model.

Step 2 of paragraph 128 in the Background document provides a description of how the model calculates DLRIC and FLLRIC. It states "In the 2nd step the Total Markup Values are calculated:

o 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 minus the sum of LRIC values of individual Product Increments that belong to the specified group
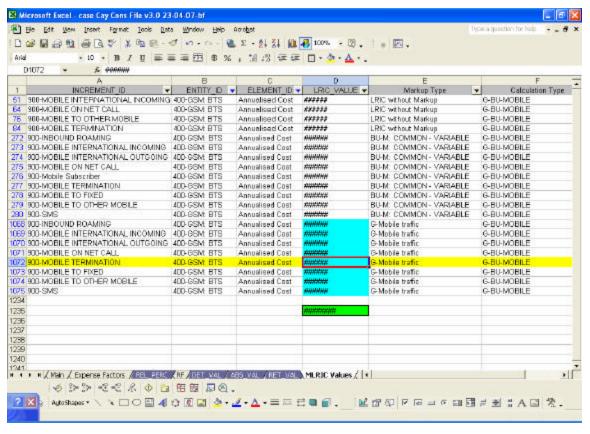
o The total values of Common Costs for BU Fixed Common, BU Mobile Common and TD Common are calculated as LRIC values of Total Increment minus the sum of LRIC values of Sub Increments that belong to the specified group."

After calculating the LRIC values (described in the previous case study), the model then calculates the DLRIC (ISFCs) and FLLRIC (FCCs).

The DLRIC values associated with the Mobile Termination service and the network increment 400-GSM: BTS are obtained through the Increment ID G-Mobile traffic. For simplicity we will focus on the annualised cost of the network increment 400-GSM: BTS starting with the DLRIC result and working our way through the BU model to explain its derivation.

The DLRIC result for the 400-GSM: BTS network element is shown in the 'MLRIC Values' sheet of the Consolidation file and repeated below with filters on the Entity_ID column for the network element 400-GSM: BTS and Element-ID column for the annualised cost.

#

#

Figure 2a

The total DLRIC allocated across the services shown above is ###, this has been distributed equi-proportionately based on LRIC values of the four services, resulting in an allocation of ### to 900-MOBILE TERMINATION. This is shown in Figure 1a.

Therefore in the following explanation the figure we are working towards is the allocation of ### to the Mobile Termination service.

As stated in the Background document the BU model removes the volumes of all the services associated with the G-Mobile Traffic increment and then finds the difference between the before and after states to obtain the cumulative DLRIC value stored in the BU Output sheet.

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Steps:

Remove the volumes of the following services:

900-MOBILE VOICEMAIL RETAIL

900-INBOUND ROAMING

900-MOBILE INTERNATIONAL INCOMING

900-MOBILE INTERNATIONAL OUTGOING

900-MOBILE ON NET CALL

900-MOBILE TERMINATION

900-MOBILE TO FIXED

900-MOBILE TO OTHER MOBILE

900-SMS

Check the Network Cost sheet, range B130-K144 to make sure that all the relevant service volumes have been removed. Once the correct volumes have been removed cell J144 should say 'YES' and all zeros should be contained in range J131-142.

Upon removing the relevant volumes, the 400-GSM: BTS network elements would be affected, this could be seen in the Network Cost sheet which has been extracted and shown below in the before and after states. Reference: Network Cost sheet; B118:I122.

#

Mapping to TD Network Elements				
	GSM: BTS	GSM: BSC	GSM: MSC-call sensitive	GSM: MSC-duration sensitive
Annualised Cost	#####	#####	######	#####

#

Figure 2b – Values before removal of Access volumes

Note the total value (shaded blue) of the before state:- ###

#

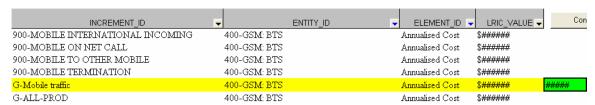| Mapping to TD Network Elements				
	GSM: BTS	GSM: BSC	GSM: MSC-call sensitive	GSM: MSC-duration sensitive
Annualised Cost	#####	#####	######	#####

#

Figure 2c - Values after removal of Access volumes

Note the total value (shaded blue in Figure 1c) after removal of the volumes:- ###

The resulting value of the difference between the before and after states is:- ### - ### = ###, which is the amount listed in the BU Output sheet, row 47 (see figure 2d below).

#

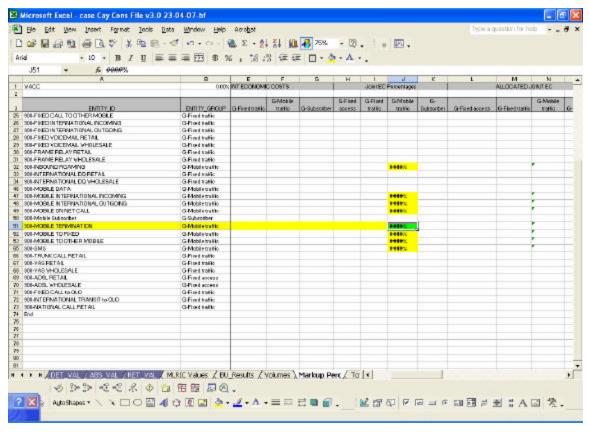| INCREMENT_ID	ENTITY_ID	ELEMENT_ID	LRIC_VALUE	Con
900-MOBILE INTERNATIONAL INCOMING	400-GSM: BTS	Annualised Cost	$######	
900-MOBILE ON NET CALL	400-GSM: BTS	Annualised Cost	$######	
900-MOBILE TO OTHER MOBILE	400-GSM: BTS	Annualised Cost	$######	
900-MOBILE TERMINATION	400-GSM: BTS	Annualised Cost	$######	
G-Mobile traffic	400-GSM: BTS	Annualised Cost	$######	#####
G-ALL-PROD	400-GSM: BTS	Annualised Cost	$######	

#

Figure 2d – BU Output sheet extract

This value represents the cumulative, therefore to obtain the exact amount of the DLRIC (ISFC) markup we subtract the pure LRIC values for the PSTN Access residential and Business services. That is, as shown above, ### – ### – ### – ### – ### = ###

This value is then distributed equi-proportionately across the following services:

900-INBOUND ROAMING

900-MOBILE INTERNATIONAL INCOMING

900-MOBILE INTERNATIONAL OUTGOING

900-MOBILE ON NET CALL

900-MOBILE TERMINATION

900-MOBILE TO FIXED

900-MOBILE TO OTHER MOBILE

900-SMS

This is done based on the markup percentages derived in the Markup Perc sheet of the Consolidation file. See column J (G-Mobile Traffic) and cells 32, 47, 48,49, 51, 52, 53 and 65 for the allocations, they are as shown in the extract below (figure 2e).

\#

\#

Figure 2e

900-INBOUND ROAMING – ###%

900-MOBILE INTERNATIONAL INCOMING – ###%

900-MOBILE INTERNATIONAL OUTGOING – ###%

900-MOBILE ON NET CALL – ###%

900-MOBILE TERMINATION – ###%

900-MOBILE TO FIXED – ###%

900-MOBILE TO OTHER MOBILE – ###%

900-SMS – ###%

Applying these proportions to the DLRIC markup value of ### gives:

900-INBOUND ROAMING – ###% X ### = ###

900-MOBILE INTERNATIONAL INCOMING – ###% X ### = ###

900-MOBILE INTERNATIONAL OUTGOING – ###% X ### = ###

900-MOBILE ON NET CALL – ###% X ### = ###

900-MOBILE TERMINATION – ###% X ### = ###

900-MOBILE TO FIXED – ###% X ### = ###

900-MOBILE TO OTHER MOBILE – ###% X ### = ###

900-SMS – ###% X ### = ###

Thus the DLRIC markup value for the Residential Access service, shaded green, has been derived, consistent with the value originally quoted in the paragraph marked Note 1 above.

Summary BU pure and DLRIC results for Mobile Termination service and BTS network element

A	
Network Element	**Pure LRIC value – Annualised Costs**	**DLRIC Markup Value - Annualised Costs**
400-GSM: BTS	$ ###	$ ###
TOTAL DLRIC		**$ ###**

The Fully Loaded LRIC (FLLRIC) value for the Mobile Termination service can be derived similarly to the DLRIC value. In this case however the model removes volumes from all services and then takes the difference in the before and after states to obtain the cumulative FLLRIC value. This is obtained in the BU Output sheet and is shown below in Figure 2f. The value of ### corresponds to the cumulative FLLRIC value and the value of ### represents the actual FLLRIC markup value (this is obtained by subtracting the DLRIC value of ### from the cumulative value of ###).
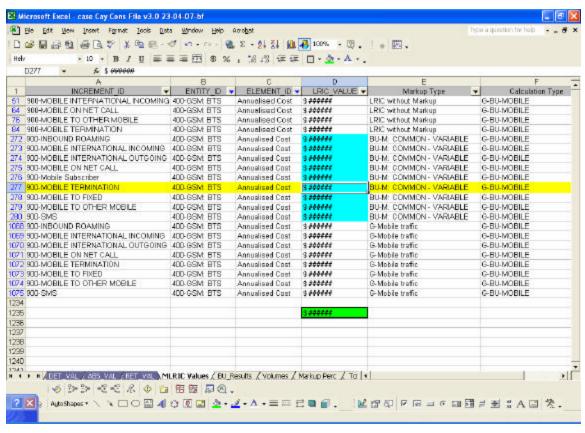
#

INCREMENT_ID	ENTITY_ID	ELEMENT_ID	LRIC_VALUE	Con
900-MOBILE INTERNATIONAL INCOMING	400-GSM: BTS	Annualised Cost	$######	
900-MOBILE ON NET CALL	400-GSM: BTS	Annualised Cost	$######	
900-MOBILE TO OTHER MOBILE	400-GSM: BTS	Annualised Cost	$######	
900-MOBILE TERMINATION	400-GSM: BTS	Annualised Cost	$######	
G-Mobile traffic	400-GSM: BTS	Annualised Cost	$######	
G-ALL-PROD	400-GSM: BTS	Annualised Cost	$######	#####

\#

Figure 2f

Also, in the Consolidation file, sheet MLRIC Values we obtain the resulting distribution of the FLLRIC value as shown below in Figure 2g.

\#

\#

Figure 2g

The sum of the values shaded yellow is ###. And the FLLRIC allocation to the Mobile Termination service is ###. This is the value we will derive in demonstrating the calculation of the FLLRIC markup.

Steps:

As mentioned above, the model starts by removing the volumes of all services then takes the difference of the before and after states to determine the cumulative FLLRIC value.

Upon removal of the volumes of all services, the affected network elements are: (shown below in figure 2h and 2i for the before and after states) Reference: Network Cost; B118:I122.

#

Mapping to TD Network Elements

		GSM: BTS	GSM: BSC	GSM: MSC-call sensitive	GSM: MSC-duration sensitive
	Annualised Cost	####	####	#####	####

#

Figure 2h – Values before removal of volumes

The sum of the yellow shaded area is ###.

#

Mapping to TD Network Elements

		GSM: BTS	GSM: BSC	GSM: MSC-call sensitive	GSM: MSC-duration sensitive
	Annualised Cost	####	####	#####	####

#

Figure 2i – After removal of volumes

The sum of the yellow shaded areas is ###.

The difference is ###, the cumulative FLLRIC value.

Subtracting the cumulative DLRIC values as shown in the BU Output sheet (captured in Figure 2f) results in the FLLRIC markup value of ###.

This value is then distributed across the services in the proportions obtained from the Markup Perc sheet, column T. See Figure 2j below for the proportion of the FLLRIC value allocated to Mobile Termination service.
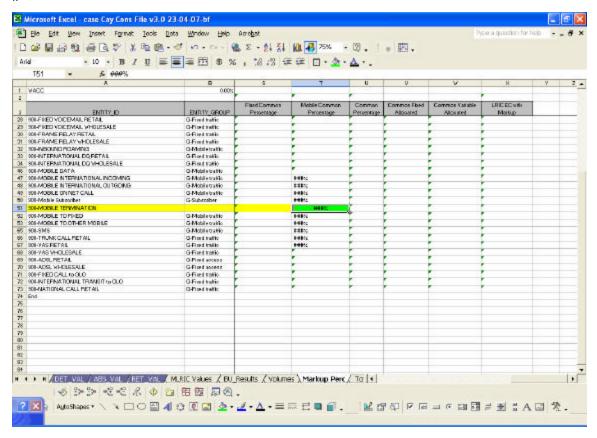
\#

\#

Figure 2j

This proportion is ###%. Applying this to the FLLRIC markup value of ### gives the amount of FLLRIC allocated to the Mobile Termination service. This is:

x ###% = ### which is the value obtained in the paragraph marked Note 2 above.

In Summary for the Mobile Termination service:

Summary BU pure, DLRIC, FLLRIC LRIC results for Mobile Termination service and BTS network element

A			B
Network Element	**Pure LRIC value – Annualised Capital Costs**	**DLRIC Markup Value - Annualised Capital Costs**	**FLLRIC Markup value- Annualised Capital Costs**
400-GSM: BTS	$ ###	$ ###	$ ###
TOTAL FLLRIC Value			**$###**

2.7.2 As requested in section 5.1 of ICTA/Telcordia interrogatories, please provide a Case Study for the Consolidation Model with a complete description, including screen shot extracts showing how actual numbers flow through the model, of the calculations for the Service unit cost of one fixed network service and one mobile network service.

C&W Response

After reviewing our previous responses, we believe that we have now responded to this interrogatory fully. Please note that our description of the Consolidation Model submitted in response to interrogatory 5.1 contains the case studies of residential access and mobile termination in the form of worked examples of the sheets and calculations making up the Consolidation file. We have further provided, as part of our response to interrogatory 2.1.6d and Appendix VIII in this round 2 of Interrogatory responses, descriptions of how the network costs and service costs are derived in the Consolidation file for all modeled services, of which residential access and mobile termination are a part. If we have not responded fully to this interrogatory to date, please let us know what else you require.