

PUBLIC VERSION

ORDER No. 2 of 2007

Reference Interconnection Offer

Reference Interconnection Offer Order

Order issued by the Telecommunications Regulatory Authority on the Reference Interconnection Offer of the Bahrain Telecommunications Company B.S.C. dated

8 May 2007

17 July 2007

Note: This is the non-confidential version of the order issued to Batelco on 17 July 2007. Parts of this text have been edited to ensure that confidential information is not disclosed; those parts are enclosed in square brackets and marked with an asterisk.



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Assessment of those Charges with Documentation Supplied

In the majority, the supporting documentation for the termination charges in the Reference Interconnection Offer allows these services to be reconciled with the 2005 Accounts. Therefore the main difference between those charges proposed by Batelco and the TRA is the Interconnect specific cost (ISC). This is discussed in detail below.

From this assessment, it appears to the Authority that for those charges that have changed between the Reference Offer (RO) of 8 November 2006 (approved 7 February 2007) and the Proposed Reference Offer of 8 May 2007 the following charges apply:

Schedule	Service	Approved Charges – Feb 2007	Batelco Proposed Charges – May 2007	Authority Proposed Charges – July 2007
1-3.1	GMSC PSTN Terminating Access	3.22 Fils	5.33 Fils	3.22 Fils
1-3.2	PSTN Terminating Access	2.49 Fils	4.60 Fils	2.49 Fils
1-4.1	Mobile Terminating Access	8.56 Fils	10.67 Fils	7.83 Fils
1-5.1	Paging Call Terminating Access	346.06 Fils	348.17 Fils	346.06 Fils
1-6.1	SMS Terminating Access	4.52 Fils	6.63 Fils	0.58 Fils
1-7.1	PSTN Emergency Call	2.86 Fils	4.97 Fils	2.86 Fils ^a
1-8.1	Freephone from a Mobile Phone	8.56 Fils	10.67 Fils	7.83 Fils ^b
1-8.2	Freephone from a PSTN Phone	2.86 Fils	4.97 Fils	2.86 Fils ^a
1-11.1	MMS Termination	138.77 Fils	140.88 Fils	140.81 Fils
2-7.1	Int'l PSTN Call Termination	5.38 Fils	7.08 Fils	4.97 Fils
2-8.1	Int'l Mobile Call Termination	12.85 Fils	14.83 Fils	11.98 Fils

Notes:

- a) Average of the 1-3.1 and 1-3.2 PSTN terminating charges
- b) Equals Mobile terminating charge

Each of the charges is explained in more detail below:

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Interconnection Specific Costs (ISC)

An ISC represent the costs of those activities carried out because of the existence of wholesale markets.

In its email of 8 May 2007 Batelco state the following in relation to the ISC “review of the interconnection service prices to reflect a proposed interconnect specific cost of 3.11 fils per minute (if calculated according to the reasoning contained in pages 21-22 of the draft RAO order received by Batelco on 8 April 2007). Batelco has added an additional 2.11 fils per minute to the relevant interconnection charges approved by the TRA on 7 February 2007”

The Authority does not accept Batelco’s total ISC charge of 3.11 fils per minute, as it appears to the Authority that recovering the ISC solely on the basis of interconnection traffic would discriminate against interconnecting operators and put them at a cost disadvantage relative to Batelco (Retail). This has been discussed in detail in the Authority’s Order of August 2006 in relation to the Reference Interconnection Offer and Orders of July 2006 and May 2007 in relation to the Reference Access Offer.

It appears to the Authority that the principle of non-discrimination should apply in the calculation of ISC for Batelco, and that the total number of interconnection, on-net and off-net minutes should apply. Therefore using the traffic categories Batelco included in the calculation of its interconnection minutes and adding on-net and off-net traffic results in the non-discriminatory total ISC minutes as shown in the table below.

2005	Interconnect Traffic (mins)	Batelco On net and off net (mins) ⁽¹⁾	Total ISC ⁽⁶⁾ minutes
Fixed	[*]	[*]	[*]
Mobile postpaid	[*]	[*]	[*]
Mobile prepaid	[*]	[*]	[*]
International	[*]	[*]	[*]
Total	[*]	[*]	[*]

Notes:

- (1) All minutes as provided by Batelco in April 2007 in response to the Strategic Review request for information;
- (2) Includes fixed to fixed traffic of [*]mins and fixed to mobile traffic of [*]mins (does not include PPCC, payphone and ISDN);
- (3) Postpaid to fixed;
- (4) Prepaid to fixed;
- (5) International to fixed; and
- (6) Does not include mobile to mobile - the Authority is still considering whether these should be included and reserve its judgment at this stage.

The table below presents a summary of cost and traffic information that was supplied and used by the Authority to calculate the ISC charges.

Year	Allocated Cost	Traffic	ISC
2005	[*]	[*]	0.88 Fils/min

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The Authority therefore considers that the charge of 1 Fils per minute, which is currently applied by Batelco to interconnection charges, is sufficient to allow Batelco to recover its ISCs.

PSTN Terminating Access Charges

The Authority has been able to reconcile the network components of these charges with Batelco's 2005 Accounts. The tables below show the network charges that appear to the Authority to be fair and reasonable:

Single Tandem PSTN Terminating Access charge of 1.48 Fils/minute, calculated as set out in the table below - LRAIC based:

Network Component	Component Charge	Route Factor
RLU	[*] Fils	1.00
LX	[*] Fils	1.00
TX	[*] Fils	1.00
RLU-LX	[*] Fils	1.00
LX-TX	[*] Fils	1.00
Total Network Charge	1.48 Fils	N/A

Double Tandem PSTN Terminating Access of 2.09 Fils/min, calculated as shown in the table below - LRAIC based:

Network Component	Component Charge	Route Factor
RLU	[*] Fils	1.00
LX	[*] Fils	1.00
TX	[*] Fils	2.00
RLU-LX	[*] Fils	1.00
LX-TX	[*] Fils	2.00
TX-TX	[*] Fils	0.00
Total Network Charge	2.09 Fils	N/A

In an email to the Authority from Batelco dated 1 February 2007 Batelco state "In respect of the weighting between Single and Double Tandem for PSTN Termination Service, Batelco's best estimate is that 2% of the traffic utilizes both Transit Switches (Double Tandem) and 98% uses a Single Tandem Switch". In light of this the Authority had decided to include only a PSTN Access terminating charge which is a calculated weighted average of single tandem and double tandem:

PSTN Terminating Access: $(1.48 \times 0.98) + (2.09 \times 0.02) = 1.49$ Fils per minute.

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GMSC PSTN Terminating Access of 2.22 Fils/minute, calculated as shown in the table below – LRAIC based:

Network Component	Component Charge	Route Factor
RLU	[*] Fils	1.00
LX	[*] Fils	1.00
TX	[*] Fils	1.00
GMSC	[*] Fils	1.00
RLU-LX	[*] Fils	1.00
LX-TX	[*] Fils	1.00
TX-GMSC	[*] Fils	1.00
Total Network Charge	2.22 Fils	N/A

It appears to the Authority that to these network charges no more than 1 Fils/min should be added to represent the cost of Interconnection-specific services.

Mobile Terminating Access Charge

The Authority has been able to reconcile the network components of this charge with Batelco's 2005 Accounts. The tables below show the network charges that appear to the Authority to be fair and reasonable:

Mobile Terminating Access - LRAIC Based

Network Component	Component Charge	Route Factor
TX	[*] Fils	1.00
TX-GMSC	[*] Fils	1.00
BTS	[*] Fils	1.00
BSC	[*] Fils	1.00
MSC	[*] Fils	1.00
GMSC	[*] Fils	1.00
HLR/VLR	[*] Fils	1.00
BTS-BSC	[*] Fils	1.00
BSC-MSC	[*] Fils	1.00
MSC-GMSC	[*] Fils	1.00
GMSC-HLR	[*] Fils	2.00
Total Network Charge	6.83 Fils	N/A

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It appears to the Authority that to this network charge no more than 1 Fils/min should be added to represent the cost of Interconnection-specific services.

The Authority commissioned an independent study from Mobile Network Engineering consultants to comment on the use of the Prepaid Platform during mobile terminated calls in the Batelco network. In their final report to the Authority, the consultant concluded that it is very uncommon to involve the prepaid platform for mobile terminated calls. This report was sent to Batelco on 7 March 2007 and Batelco were given until 2 April 2007 to comments. The Authority received Batelco's written response on 2 April 2007. A further meeting was undertaken on 13 June 2007 between Batelco, the Authority and the Consultants of the report. From this meeting it was concluded that the Prepaid Platform should be excluded as a network component from the mobile terminating access charge.

Paging Terminating Access Charge¹

The Authority has been able to reconcile the network components of this charge with Batelco's 2005 Accounts. The table below shows the network charge that appear to the Authority to be fair and reasonable:

Paging Terminating Access - LRAIC Based

Network Component	Component Charge	Route Factor
GMSC	[*] Fils	0.33
TX	[*] Fils	0.33
MSC	[*] Fils	0.00
TX-GMSC	[*] Fils	0.33
Paging Platform	[*] Fils	1.00
TX-Paging Platform	[*] Fils	1.00
Total Network Charge	345.73 Fils	N/A

It appears to the Authority that to this network charge no more than 0.33 Fils/message (1 Fils/min x 0.33 route factor = 0.33 Fils/message) should be added to represent the cost of Interconnection-specific services.

SMS Terminating Access Charge

The Authority has been able to reconcile the network components of this charge with Batelco's 2005 Accounts.

The Authority has commissioned an independent study from Mobile Network Engineering consultants to establish the accurate number of SMS messages a network is capable of carrying per minute.

¹ The Authority understands that Batelco are withdrawing this service from public use. Once the service is completely withdrawn the Authority considers that the terminating charge should also be withdrawn from the RIO.

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The consultant concluded the following:

- 1- An SMS occupies a SDCCH channel for a period of 5 seconds; each SDCCH channel is equivalent to 1/8th of a normal GSM channel (which could for example be used for speech). This means that one SMS is equivalent to 1/40th of a one minute voice/speech call. Conversion to routing factor gives a figure of 0.025.
- 2- SMS Platform is not, as standard, involved in Mobile Terminated SMSs.

Batelco replied on 2 April 2007 that it has introduced a new element within the GSM network in 2005 called NAS (Network Anti-Spam). This node is placed between the GSMC and SMSC platforms to filter or block any unwanted messages where Batelco thinks that the inclusion of the NAS element is crucial.

In TRA views, to include the NAS element for terminating SMS and MMS would be the same as adding any minor software element of a signaling protocol stack, or a mediation device for billing systems. The element is not necessary as a function of terminating SMS or MMS, just as a firewall would not be included as an element of communications. The element is selected by Batelco to perform an internal management function to the benefit of Batelco administration, not as a benefit to OLOs terminating an SMS on Batelco's network.

The conclusion is that NAS is not an element that is required for the service and as a consequence should not be included as a valid element of interconnect costs.

Additionally, with regards to Batelco argument to include IN (Intelligent Network) TRA noted that the case presented by Batelco has a look up process for incoming Short Messaging to the IN node for checking balances of roaming prepaid customers. As this applies to Batelco's prepaid customer base only, and not the customers of OLOs interconnected to Batelco, the facility is not applicable to interconnect costs and as such the IN node and its links should not be included in the list of elements applicable.

The conclusion is that IN is not an element that is required for the service and as a consequence should not be included as a valid element of interconnect costs.

The table below shows the network charge that appears to the Authority to be fair and reasonable.

SMS Terminating Access - LRAIC Based

Network Component	Component Charge	Route Factor
BTS	[*] Fils	0.025
BSC	[*] Fils	0.025
MSC	[*] Fils	0.025
GMSC	[*] Fils	0.025
HLR/VLR	[*] Fils	1.00
BTS-BSC	[*] Fils	0.025

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BSC-MSC	[*] Fils	0.025
MSC-GMSC	[*] Fils	0.025
GMSC-SMS	[*] Fils	0.00
SMS Platform	[*] Fils	0.00
GMSC-HLR	[*] Fils	2.00
Total Network Charge	0.5565 Fils	NA

As a result of the study, it appears to the Authority that to this network charge no more than 0.025 Fils/message (1 Fils/min x 0.025 route factor = 0.025 Fils/message) should be added to represent the cost of Interconnection-specific services.

Therefore the Authority considers that no more than 0.025 Fils per message, as calculated above, should be added to represent the cost of Interconnection-specific services.

MMS Terminating Access Charge

The Authority has been able to reconcile the network components of this charge with Batelco's 2005 Accounts.

The Authority has commissioned an independent study from Mobile Network Engineering consultants to establish the accurate number of MMS messages a network is capable of carrying per minute.

The consultant concluded the following:

- 1- They noticed that Batelco have stated that the average MMS size is 20kBytes (160kbits), at a 40kbits/s rate a message this size would take a total of 4 seconds to download. The following calculation is actually based on the maximum current message size of 100kBytes (20 seconds to download) which means that the route factor for MMS in the network should be 0.333 (20/60).
- 2- The difference between the original Batelco submission and the calculation below is that the MMS Platform is only used once during the procedure.

The table below shows the network charge that appears to the Authority to be fair and reasonable.

MMS Terminating Access - LRAIC Based

Network Component	Component Charge	Route Factor
BTS (SMS)	[*] Fils	0.025
BSC (SMS)	[*] Fils	0.025
MSC (SMS)	[*] Fils	0.025

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Network Component	Component Charge	Route Factor
GMSC (SMS)	[*] Fils	0.025
HLR/VLR (SMS)	[*] Fils	1.00
BTS-BSC (SMS)	[*] Fils	0.025
BTS (MMS)	[*] Fils	0.333
BSC (MMS)	[*] Fils	0.333
MSC (MMS)	[*] Fils	0.333
GMSC (MMS)	[*] Fils	0.333
BTC-BSC (MMS)	[*] Fils	0.333
BSC-MSC (MMS)	[*] Fils	0.333
MSC-GMSC (MMS)	[*] Fils	0.333
GMSC-SMS (MMS)	[*] Fils	0.333
BSC-GPRS (MMS)	[*] Fils	0.333
SMS Platform	[*] Fils	1.00
MMS Platform (MMS)	[*] Fils	1.00
Total Network Charge	140.48 Fils	N/A

It appears to the Authority that to this network charge no more than 0.333 Fils/message (1 Fils/min x 0.333 average route factor = 0.333 Fils/message) should be added to represent the cost of Interconnection-specific services.

Therefore the Authority considers that no more than 0.333 Fils per message, as calculated above, should be added to represent the cost of Interconnection-specific services.

International Inbound Call charges – Fixed

The Authority has been able to reconcile the network components of this charge with Batelco's 2005 Accounts. The tables below show the network charges that appear to the Authority to be fair and reasonable:

International Inbound Call charge – Fixed - LRAIC Based

Network Component	Component Charge	Route Factor
RLU	[*] Fils	1.00
LX	[*] Fils	1.00

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Network Component	Component Charge	Route Factor
TX	[*] Fils	1.00
RLU-LX	[*] Fils	1.00
LX-TX	[*] Fils	1.00
GMSC	[*] Fils	0.00
TX-GMSC	[*] Fils	0.00
Total Network Charge	1.48 Fils	NA

International Inbound Call charge – Fixed (from MTC) - LRAIC Based

Network Component	Component Charge	Route Factor
RLU	[*] Fils	1.00
LX	[*] Fils	1.00
TX	[*] Fils	1.00
RLU-LX	[*] Fils	1.00
LX-TX	[*] Fils	1.00
GMSC	[*] Fils	1.00
TX-GMSC	[*] Fils	1.00
Total Network Charge	2.22 Fils	NA

The final network charge is the average of the International Inbound Call charge – Fixed of 1.48 Fils per minute and the International Inbound Call charge – Fixed (from MTC) of 2.22 Fils per minute²:

$$(1.48 \text{ Fils per minute} + 2.22 \text{ Fils per minute})/2 = 1.85 \text{ Fils per minute}$$

Batelco has calculated the Interconnect Specific Cost to be of 3.11 Fils (per minute), Network Cost of 1.85 Fils and a buffer charge of 2.12 Fils per minute to give a combined cost of 7.08 Fils per minute.

It appears to the Authority that to this network charge no more than 1 Fil/min should be added to represent the cost of Interconnection-specific services.

² In approval of this charge the Authority has accepted an equal weighting between OLOs who provide fixed income international call services and MTC who also provides this service. However, as the number of other operators offering this service has increased in recent years, the Authority considers that this equal weight may advantage Batelco. Therefore, in future RIOs the authority will use a weight that is based on MTC's share of all terminated incoming fixed call traffic and OLO's share.

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In the RIO approval notice proposed by the Authority on 7 February 2007, the Authority has accepted Batelco's proposal to include a buffer charge on international inbound call charges fixed, of 2.53 Fils per minute which reduces by 30 percent annually until it is eliminated by 1st July 2010. The buffer charge for May 2007 RIO should be 2.12 Fils per minute $((100\% - 16.33\%) * 2.53)$ Therefore, the inclusion of a buffer charge of 2.12 Fils per minute will result in a total international inbound call charge – fixed of 4.97 $(2.12 + 1.85 + 1)$ Fils per minute.

International Inbound Call charges – Mobile

The Authority has been able to reconcile the network components of this charge with Batelco's 2005 Accounts. The tables below show the network charge that appear to the Authority to be fair and reasonable:

International Inbound Call charges – Mobile - LRAIC Based

Network Component	Component Charge	Route Factor
BTS	[*] Fils	1.00
BSC	[*] Fils	1.00
MSC	[*] Fils	1.00
GMSC	[*] Fils	1.00
HLR/VLR	[*] Fils	1.00
BTS-BSC	[*] Fils	1.00
BSC-MSC	[*] Fils	1.00
MSC-GMSC	[*] Fils	1.00
GMSC-HLR	[*] Fils	2.00
TX	[*] Fils	1.00
TX-GMSC	[*] Fils	1.00
Total Network Charge	6.83 Fils	NA

International Inbound Call charges – Mobile from MTC - LRAIC Based

Network Component	Component Charge	Route Factor
BTS	[*] Fils	1.00
BSC	[*] Fils	1.00
MSC	[*] Fils	1.00
GMSC	[*] Fils	1.00
HLR/VLR	[*] Fils	1.00

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Network Component	Component Charge	Route Factor
BTS-BSC	[*] Fils	1.00
BSC-MSC	[*] Fils	1.00
MSC-GMSC	[*] Fils	1.00
GMSC-HLR	[*] Fils	2.00
TX	[*] Fils	0.00
TX-GMSC	[*] Fils	0.00
Total Network Charge	6.24 Fils	NA

The final network charge is the average of the International Inbound Call charge – Mobile of 6.83 Fils per minute and the International Inbound Call charge – Mobile (from MTC) of 6.24 Fils per minute³:

$$(6.83 \text{ Fils per minute} + 6.24 \text{ Fils per minute}) / 2 = 6.54 \text{ Fils per minute}$$

It appears to the Authority that to this network charge no more than 1 Fil/min should be added to represent the cost of Interconnection-specific services.

In the RIO approval notice proposed by the Authority on 7 February 2007, the Authority has accepted Batelco's proposal to include a buffer charge on international inbound call charges fixed, of 5.31 Fils per minute which reduces by 30 percent annually until it is eliminated by 1st July 2010. The buffer charge for May 2007 RIO should be 4.44 Fils per minute $((100\% - 16.33\%) * 5.31)$ Therefore, the inclusion of a buffer charge of 4.44 Fils per minute will result in a total international inbound call charge – fixed of 11.98 $(4.44 + 6.54 + 1)$ Fils per minute.

Revised Wholesale IDD Rates

As per the attachment to an email sent to the Authority on 8 May 2007 the Authority accepts Batelco's revised IDD wholesale rates.

³ In approval of this charge the Authority has accepted an equal weighting between OLOs who provide mobile income international call services and MTC who also provides this service. However, as the number of other operators offering this service has increased in recent years, the Authority considers that this equal weight may disadvantage Batelco. Therefore, in future RIOs the authority will use a weight that is based on MTC's share of all terminated incoming mobile call traffic and OLO's share.