VIVA Bahrain

REFERENCE INTERCONNECTION OFFER (RIO)

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Annex F – Operations and Maintenance

Version number:	V1.0
Version date:	9 June 2016
Date of original Issue:	9 June 2016
Authority for issue:	
Approval by TRA:	
Next scheduled review date:	

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Clause **Page number**

1. PLANNING

1.1. Provision of Network Information

1.1.1 VIVA and the Other Licensed Operator will cooperate in planning and implementing network capacity and interconnections to ensure, as far as possible, that their respective Networks work together efficiently and effectively for carriage of the Interconnection Services provided as part of this RIO. Such cooperation will include the mutual exchange of relevant capacity and network topology information to facilitate preparing for and implementing interconnection in practice.

1.1.2 Each Party will provide the other Party with advance information about any planned introduction, closure, replacement or modification of any network element which may impact the interconnection service between the parties (insofar as is relevant to the other Party's Network or the operation thereof).

1.1.3 Each Party will provide the other Party with advance information about any proposed alterations to a Network that would make it necessary to change the other Party's Network in order to maintain the interconnection between VIVA and the Other Licensed Operator.

1.1.4 Any changes should be notified as soon as the proposal becomes firm and in any event not less than one (1) Calendar Months prior to the implementation of the alteration.

1.2. Network Plan

1.2.1 The Network Plan will form part of the Interconnection Agreement between VIVA and the Other Licensed Operator to provide and underwrite interconnection capability.

1.2.2 The Network Plan will contain those elements of necessary and specific information required to achieve Interconnection between VIVA and the Other Licensed Operator. Such information includes but is not limited to:

- Capacity and traffic forecast from the Other Licensed Operator;
- Capacity orders;
- Numbering plans for both VIVA and the Other Licensed Operator;
- Contact points for both VIVA and the Other Licensed Operator;
- Date of next review;
- A diagram of relevant Points of Interconnection;
- Changes to call routing;
- Circuit Identification Codes;
- Notification and information relating to planned network changes and upgrades;
- Transmission plan;
- Traffic routing plan;
- Switch connections;
- Numbering information;
- Switch details;
- Switch testing;
- Network performance;
- Resilience, diversity and security;
- Call handling sequences;
- Capacity profiles;
- Operations and maintenance principles
- Interconnection Link capacity forecast and preventive maintenance.

1.2.3 The Network Plan will be agreed between VIVA and the Other Licensed Operator in accordance with Clause 11 (*Network Design and Planning*) of the Supply Terms and reviewed in accordance with Clause 12 (*Routine Network Alteration and Data Management Amendments*) of the Supply Terms, at least on a rolling quarterly basis.

1.2.4 The Network Plan will address also the forecast of the Interconnection requirements of Other Licensed Operator where the Interconnection Forms as

provided in Attachment 1 of this Annex F shall be filled by the Other Licensed Operator.

1.2.5 The Network Plan shall be reviewed and updated by VIVA and the Other Licensed Operator on a frequency to be agreed between the Parties in the joint Technical Review Committee. In any case, the maximum period between reviews and the revised Network Plan shall not exceed one (1) year.

1.3. Numbering

1.3.1 Prior to opening new numbering blocks on its Network, either Party will notify the other Party in writing at least one (1) Calendar Months in advance of the activation of such numbers.

1.3.2 A Party will give not less than one (1) Calendar Months prior written notice to the other Party before making any change in its numbering structure, which may necessitate modifications to the other Party's Network. Implementation periods for changes to existing routings and for the introduction of new number ranges will be specified in this Annex F.

1.4. Changes to Call Routing

1.4.1 Changes to call routing should be reflected in detail in the Network Plan as specified in Clause 1.2 of this Annex F.

1.5. Interconnection of New Switching Equipment

1.5.1 Prior to making interconnection available on new switching facilities, VIVA or the Other Licensed Operator, whichever is the equipment owner, will have completed all commissioning and testing activities in accordance with the recommendations of the switch vendor and industry best practice, including but not limited to inter-working testing within its own Network, and activation of the SS7 point code.

1.6. Ordering of New or Changed Interconnection Services

1.6.1 A request for Interconnection Services detailed in Annex B *(Service Schedules)* will be placed by the Other Licensed Operator using the ordering process included in the Interconnection Agreement pursuant to this RIO.

1.6.2 In case of rejection of an order in whole or in part, the Commercial Account Manager will state the reason for rejection to the requesting Other Licensed Operator The Other Licensed Operator has the right to start a Dispute under Clause 19 of the Supply Terms.

1.6.3 The Other Licensed Operator will submit a request for change(s) to existing interconnection arrangements such as alterations to network configuration and data management information by ordering according to Clause 12 of the Supply Terms. Such orders will be executed by VIVA according to Clause 12 of the Supply Terms .

2. PROVISIONING

2.1. Lead Times for Delivery

2.1.1 Lead times for delivery vary according to the type of service and requirements and will be detailed in the Network Plan.

2.2. Implementation

2.2.1 VIVA will endeavour to complete the implementation of orders from the Other Licensed Operator in accordance with the timetable given in the agreed Network Plan that is current at the date of ordering.

3. MONITORING & NETWORK TRAFFIC MANAGEMENT

3.1. Monitoring

3.1.1 VIVA and the Other Licensed Operator will monitor and control the flow and routing of traffic in order to maintain compliance with the measures specified in Annex G (*Quality of Service*).

3.1.2 VIVA will deploy resources to carry out all activities required to monitor and maintain the quality of service, in accordance with the terms of the Interconnection Agreement pursuant to this RIO between VIVA and the Other Licensed Operator.

3.1.3 VIVA may also carry out specific monitoring activities on a case-by-case basis at its discretion or in response to a request from an interconnected Other Licensed Operator or the TRA.

3.2. Reactive Capacity Planning

3.2.1 The Other Licensed Operator and VIVA will measure traffic on all Interconnection Links to identify congestion and enable maintenance at or above the target Grade of Service for Voice Call Interconnection.

3.2.2 In the event that the traffic, capacity and route forecasting processes have failed to maintain the target Grade of Service, VIVA and the Other Licensed Operator will agree to work together in good faith to resolve congestion issues by planning as necessary further interconnection capacity or new traffic routing plans in an expedient manner and permit the free flow of traffic between the Networks according to the target Grade of Service.

3.2.3 Either VIVA or the Other Licensed Operator will have the right to call a meeting of the joint Technical Review Committee to progress resolution of any congestion issues.

3.3. Joint Operational Interconnection Testing

3.3.1 VIVA and the Other Licensed Operator will each be responsible for testing and monitoring the performance of its own Network. Testing of Interconnection Links and signalling links will be kept to a minimum and will be avoided during the busy hour periods.

3.3.2 No testing that may adversely affect an Interconnection Service will be carried out before VIVA and the Other Licensed Operator have agreed to the conduct of such tests, including any routine tests.

3.3.3 The requesting Party will book the required test date and the testing duration at least five (5) Business Days prior to the requested testing date. The requesting Party will submit the application form (as contained in Attachment 2 of this Annex) to the requested Party. The request will include the reason for testing and the necessary details for the planning of testing as well as the proposed test schedule.

3.3.4 The requested Party will respond in writing within two (2) Business Days upon receipt of the written request, stating whether it is able to accommodate the testing on the proposed test dates. If the requested Party is not able to perform the testing on the requested test dates, an alternative schedule will be submitted in response to the initial request and discussed in good faith with the requesting Party.

3.3.5 The requested testing duration is subject to mutual agreement between VIVA and the Other Licensed Operator.

3.3.6 VIVA and the Other Licensed Operator will act in good faith to complete all test items within the agreed testing period.

3.3.7 All test forms and test specifications for each interface shall be agreed between VIVA and the Other Licensed Operator. All test items and test results shall be recorded in the Technical Service Acceptance Form (as contained in Attachment 3 of this Annex) and signed by both Parties, and a copy of the test results shall be available in the respective site for reference.

3.3.8 Any request for extension to the testing duration beyond the agreed timeframe is subject to mutual agreement. Any request for extension will be made at least two (2) Business Days prior to the end of scheduled testing.

3.3.9 Neither Party will be held responsible for any delay in completing the agreed testing unless such delay is directly attributable to one Party's fault or negligence.

3.4. Mass Call Event

3.4.1 A Mass Call Event is defined as the planned occurrence of an unusually high volume of calls to a specific destination (a number or group of numbers).

3.4.2 Either Party with knowledge of a Service Provider planning a Mass Call Event will provide the other Party with reasonable advance notice, not less than two (2) Calendar Months, and sufficient information for the other Party to take appropriate action prior to the event. VIVA reserves the right to reject any request if the proposed increase in traffic would exceed the planned network capacity of the VIVA Network.

4. FAULT MANAGEMENT

4.1. Fault Management

4.1.1 Fault Management processes can be found in Annex I (*Fault Management*).

5. INFORMATION COMMUNICATION AND NOTIFICATION

5.1.1 VIVA and the Other Licensed Operator will provide a twenty four (24) hour point of contact to receive network traffic management information and queries from each other. Such contact points will be detailed in the Network Plan as created under Clause 1.2 of this Annex F.

5.1.2 VIVA and the Other Licensed Operator will use reasonable endeavours to notify each other when service-affecting problems occur that are likely to impact interconnected traffic.

6. TRAFFIC CONTROLS

6.1.1 Protective measures such as call-gapping maybe requested by either VIVA or the Other Licensed Operator to prevent overloads in the other's Network. Such

measures however will only be applied to emergency or exceptional circumstances and after information has been exchanged and discussions held between VIVA and the Other Licensed Operator in line with Annex E (Management of Interconnection)

6.1.2 When taking such measures unilaterally, either VIVA or the Other Licensed Operator will inform the other immediately. Advice of removal of the control will also be given without unnecessary delay.

7. INTERCONNECTION MAINTENANCE PROCESSES

7.1. Planned Engineering Work

7.1.1 For any planned engineering work within either Network which will result in an outage or degradation of Interconnection Services between the Networks, the Party carrying out the engineering work will inform the other in accordance with the procedure detailed below.

7.1.2 The details of the works to be carried out will be recorded and communicated on the "Advice of Planned Engineering Work" Form as shown in Attachment 4 of this Annex. The Advice will state the date, time and duration of such works, the impact to the conveyance of Interconnection Services between the Networks, any management procedures required, and any contingency measures to be taken by either or both Parties. The schedule and duration of the planned work proposed by the requesting Party will be agreed upon by the other Party before commencement of such works and should wherever practical avoid peak traffic periods.

7.1.3 The requesting Party, prior to planned engineering works, will give advance notice of at least five (5) Business Days notice to the other Party.

7.1.4 The requesting Party will notify the other Party when the work is complete by filling the relevant section of the “Advice of Planned Engineering Work” form, which will be transmitted to the other Party without unnecessary delay.

7.2. Safety of Persons and Equipment

7.2.1 VIVA and the Other Licensed Operator will agree to ensure the protection and safety of persons and equipment at all times during the conduct of testing and engineering works activities.

7.2.2 The use of wrist straps, conducting mats and other safety precautions recommended by the equipment manufacturers shall be strictly followed at all times. VIVA shall not be held responsible for any consequences resulting from the Other Licensed Operator's negligence in this regard.

7.3. Integrity of Networks

7.3.1 VIVA and the Other Licensed Operator will agree to take adequate measures to maintain the integrity of their Networks. Integrity of the Network refers to the ability of its systems to preserve and retain their original operational status and remain unaffected by interconnection with other Networks.

7.3.2 VIVA and the Other Licensed Operator will ensure that:

a. Adequate measures are taken to prevent the transmission of any signalling message across interconnected Networks which does not comply with industry standards.
b. Efficient arrangements are established for screening functions to detect and reject non-compliant signals which do not comply with industry standards.
c. VIVA and the Other Licensed Operator are responsible for the safe operation of its own Network and will, so far as is reasonably possible, take all necessary steps to ensure that its Network and its network operations:
    - Do not endanger the safety or health of any person, including employees and contractors of either as well as the general public; and
    - Do not cause physical or technical harm to the other Party's Network, including but not limited to causing damage, interfering with or causing deterioration to the operations of the other Party's Network.

8. INTERCONNECT TRAFFIC MANAGEMENT

8.1. Routing Management

8.1.1 All routing will be carried out in accordance with the National Numbering Plan, as published by the TRA and amended from time to time, including the TRA's Number Management System broadcast messages updates, reflecting new allocations and de-allocation of numbering blocks.

8.1.2 VIVA will manage the routing of incoming Voice Calls, SMS Messages and MMS Messages from the POI to their destination.

8.1.3 Each Party will make reasonable effort to ensure that all Voice Calls and Messages to the Network of the other Party are successfully routed, using overflows to alternative routing if necessary and possible.

8.1.4 The Other Licensed Operator shall present to VIVA the full Calling Line Identifier (CLI) for all Voice Calls, SMS Messages and MMS Messages insofar as it is available.

8.1.5 National numbers will not be passed in the international format.

8.2. Routing of the Other Licensed Operator's traffic to the VIVA Network

8.2.1 The Other Licensed Operator will convey to VIVA traffic of the type(s) described in the relevant Service Schedules included in the Interconnection Agreement pursuant to this RIO.

9. REVIEW AND UPDATE

9.1. The Operational and Maintenance procedures stated in this Annex will be reviewed periodically by VIVA after consultation with the Other Licensed Operators and updated as appropriate subject to technical and operational capabilities.

Attachment 1: Interconnection Forms

Microsoft Excel
97-2003 Worksheet

1. Voice

Type of Interconnection	TDM		
	VIVA	<Partner Name>	

Technical paramters:

Media Point Code (Site 1)			
Signaling Point Code (Site 1)			
Media Point Code (Site 2)			
Signaling Point Code (Site 2)			
Network Address Indicator	NAT 1		
No. of Circuits			
CIC's Range Starting From			
Time Slot Number			
Signaling E1 Number			
Frame Type in case of STM	SDH Type		
Frame Mode	Huawei Mode		
TX Line Code Structure	HDB3		
RX Line Code Structure	HDB3		
Distance Mode	Short		

Platform:

Make and Model of Softswitch	Huawei MSOFTX3000	
Make and Model of Media GW	Huawei UMG8900	

Additional info:

Numbering Ranges RN Testing Numbers used for testing		

2. SMS

Type of Interconnection	SMS	
	VIVA	<Partner Name>

Technical paramters:

Signaling Point Code (Site 1)		
Signaling Point Code (Site 2)		
Network Address Indicator	NAT 1	
Time Slot Number		
Signaling E1 Number		
Frame Type in case of STM	SDH Type	
Frame Mode	Huawei Mode	
TX Line Code Structure	HDB3	
RX Line Code Structure	HDB3	
Distance Mode	Short	

Platform:

Make and Model of STP	Huawei SG7000	

Additional info:

3. MMS

Type of Interconnection	MMS	
	VIVA	<Partner Name>

Technical paramters:

Server IP (Site 1)		
Server IP (Site 2)		
Port #		

Platform:

Make and Model of Softswitch	Huawei	

Additional info:

Attachment 2: Interconnection Testing Request Form

Application Form for Interconnection Testing	Reference No:
OPERATOR	
Name of Other Licensed Operator	
Business Address	
I wish to apply for……..Test For the period from……..to……(……Days)	
Reason for Request / Purpose of Test	
In support of my application, I provide the following Technical Information for setting up the Interconnection Testing.	

Attachment 3: Technical Service Acceptance Form

Technical Service Acceptance Form	
Test Request Reference Number:	
Start Date: ----------	End Date: ----------
Test Acceptance and Conclusion:	
Approved By (VIVA BSC Closed)	Approved by (Operator Name)

Attachment 4: Advice of Planned Engineering Work

Activity Description	Planned Maintenance Activity at VIVA Network
Planned Date	
Planned Time	
Effected Service & SPC Details	
Third Party Involvement	
Activity Descriptions	

Document History and Version Control

Name of document:	Operations and Maintenance
Author:	VIVA Bahrain
Authorised Officer:	
Description of document:	Includes all the Operations and Maintenance Processes and Procedures for the Interconnection Services provided by VIVA
Approved by:	The Telecommunications Regulatory Authority of the Kingdom of Bahrain
Date of approval:	

Version Number	Version Date	Authorized Officer	Amendment Details