

**LIST OF REVISIONS TO NUCLEUS CONNECT INTERCONNECTION OFFER
("ICO") SINCE 19 APRIL 2010**

Revisions to ICO submitted by Nucleus Connect on 13 July 2010

(IDA approved the revision on 21 July 2010)

No.	Clause	Reason
1.	Various Updates to page 3 of the Master ICO Agreement to reflect the change of Nucleus Connect's address.	Administrative update

Revisions to ICO submitted by Nucleus Connect on 21 September 2010

(IDA approved the revision on 6 October 2010)

No.	Clause	Reason
1.	Recital B, Master Interconnection Offer (ICO) Agreement	To reflect the approval date of amendments.
2.	<p>Clause 4.2 (a), Service Schedule – Non-Residential Per-End-User Connection</p> <p>(a) Choose one Service Port type which is either Fast Ethernet ("FE Service Port") or Gigabit Ethernet ("GE Service Port"). In the same Order, the Contracting QP may choose up to two (2) additional Service Ports to be aggregated to the same Non-Residential Per-End-User Connection, provided that all the Service Ports are of the same type.</p> <p>For FE Service Port(s), each Non-Residential Per-End-User Connection will have a Symmetrical PIR of L00Mbps.</p> <p>For GE Service Port(s), each Non-Residential Per-End-User Connection will have a Symmetrical PIR of 1Gbps.</p> <p>GPON is only applicable to FE Service Port, and AE is applicable to both FE Service Port and GE Service Port.</p> <p>If the Contracting QP chooses FE Service Port(s), the Contracting QP shall be required to further specify whether it requires the underlying access technology for such Non-Residential Per-End-User Connection to be based on AE or GPON. If pursuant to the Contracting QP's request, Nucleus Connect is not able to provide such Non-Residential Per-End-User Connection based on AE, Nucleus Connect shall be entitled to reject the Order for such Non-Residential Per-End-User Connection, but shall not impose any charges on the Contracting QP in respect of the rejection of such an Order.</p> <p><u>If the Contracting QP chooses FE Service Port(s), the Contracting QP shall be required to further specify whether it requires the underlying access technology for such Non-Residential Per-End-User Connection to be based on AE or GPON.</u></p>	To clarify that the provision of Non-Residential Per-End-User Connections based on Active Ethernet is subject to availability.

Revisions to ICO submitted by Nucleus Connect on 25 February 2011

(IDA approved the revision on 14 March 2011)

No.	Clause	Reason
1.	Recital B, Master Interconnection Offer (ICO) Agreement	To reflect the approval date of amendments.
2.	<p>Clause 9.5, General Service Terms and Conditions</p> <p>The Contracting QP may request Nucleus Connect for a joint investigation to rectify the Fault. If, following such joint investigations, it is ascertained that the Fault is not within Nucleus Connect's Network or its suppliers' and contractors' Nnetworks <u>or equipment</u>, the Contracting QP shall pay to Nucleus Connect the applicable charges in respect of such joint investigation as set out in the relevant Service Schedule. Any charges imposed by Nucleus Connect's suppliers and contractors shall not be borne by the Contracting QP.</p>	To provide documentation detailing Nucleus Connect's investigation when imposing a "no fault found" charge on its QPs.
3.	<p>Clause 9.6, General Service Terms and Conditions</p> <p>If the Contracting QP reports a Fault in accordance with paragraph 9.2 and following investigations by Nucleus Connect, either no Fault is found or Nucleus Connect determines that the <u>alleged</u> Fault is not with Nucleus Connect's, its suppliers' or contractors' network or equipment, Nucleus Connect may, at its sole and absolute discretion, charge the Contracting QP a fee for the fault report (No Fault Found Charge) as set out in the relevant Service Schedule. <u>If Nucleus Connect imposes the No Fault Found Charge on the Contracting QP, Nucleus Connect will provide the Contracting QP with a customer incident report (the "Incident Report") setting out the finding of Nucleus Connect's investigations; Provided That Nucleus Connect will not be obliged to provide the Contracting QP with the Incident Report if (a) the alleged Fault relates to a matter arising out of OpenNet's network or equipment and (b) OpenNet has not provided Nucleus Connect with any reason for determining that there is no fault with OpenNet's network or (as the case may be) equipment.</u> Any charges imposed by Nucleus Connect's suppliers and contractors shall not be borne by the Contracting QP.</p>	As above.

4.	<p>Clause 7.18, Service Schedule – Co-location Service</p> <p>The Contracting QP’s authorised staff and agents may only have escorted request for <u>access (with or without escort service)</u> to the Contracting QP’s leased Co-location Space within the NC CO, and. <u>If access with escort service is requested</u>, the escort service provided by Nucleus Connect are chargeable to the Contracting QP at the stipulated Charges set out in paragraph 13. Such escorted access <u>Physical access (with or without escort service) to the Co-location Space</u> shall be made available to the Contracting QP in accordance with the Physical Access Procedures annexed hereto as Appendix A, and as follows:</p>	To allow Nucleus Connect’s QPs to access their co-location space without being accompanied by Nucleus Connect’s personnel.
5.	<p>Clause 13, Service Schedule – Co-location Service, Description for Escort Service</p> <p>Escort service, (if requested), site inspection, etc per manhour charge</p>	As above.
6.	<p>Clause 1.2, Appendix A, Physical Access Procedures, Service Schedule – Co-location Service</p> <p>Nucleus Connect shall permit the Contracting QP’s authorised staff and/or authorised agents to access the Contracting QP’s leased Co-location Space within the NC CO on a seven (7) days-a-week, twenty-four (24) hours-a-day basis, subject to escort service provided by Nucleus Connect at the Charges prescribed by Nucleus Connect to the Contracting QP as set out in paragraph 13. Nucleus Connect shall make such escort service. <u>Nucleus Connect shall make physical access to the Co-location Space</u> available to the Contracting QP subject to:</p>	As above.
7.	<p>Customer Temporary Access Declaration Form, Service Schedule – Co-location Service</p> <p>Additional field in the form to allow Nucleus Connect’s QPs to indicate its requirement for the Escort Service.</p>	As above.

**Revisions to ICO submitted by Nucleus Connect on 24 March 2011
and 6 April 2011**

(IDA approved the revision on 25 April 2011)

No.	Clause	Reason
1.	Recital B, Master Interconnection Offer (ICO) Agreement	To reflect the approval date of amendments.
2.	<p>Clause 4.1, General Service Terms and Conditions</p> <p>Before the Contracting QP may submit any Order to take up any Basic Mandated Service (excluding any L2 VPN Service, E-LAN Service or L3 VPN Service), the Contracting QP must take up the Interoperability Testing Service offered by Nucleus Connect as an Ancillary Mandated Service under the Master ICO Agreement, and successfully complete the various tests which are mandatory for such Basic Mandated Service as set out in the Service Schedule in respect of the Inter-operability Testing Service. Notwithstanding the aforesaid, the Contracting QP may (at its own option) select to take up the Interoperability Testing Service in respect of any L2 VPN Service, E-LAN Service or L3 VPN Service.</p>	To make Interoperability Testing non-mandatory for Contracting QPs who order L2 VPN Service, E-LAN Service or L3 VPN Service.
3.	<p>Clause 1.1, Service Schedule – IOT Service</p> <p>This Service Schedule sets out the terms and conditions under which Nucleus Connect will provide testing services based on the Basic Mandated Service(s) subscribed by the Contracting QP (the “IOT Services”); Provided That it is not mandatory for the Contracting QP to take up IOT Services in respect of any L2 VPN Service, E-LAN Service or L3 VPN Service.</p>	As above.
4.	<p>Annex B, Service Schedule – IOT Testing</p> <p>Layer 2 VPN Service @ Layer 2 Ethernet LAN Service @ Layer 3 VPN Service @</p> <p>@ Note: It is not mandatory for the Contracting QPs to take up IOT Services in respect of L2 VPN Service, E-LAN Service, or L3 VPN Service</p>	As above.

5.	<p>Clause 4.7 – 4.10, Service Schedule – L2 VPN Service</p> <p><u>Requirements for EPL-Gigabit Connections</u></p> <p>4.7 When placing an Order for an EPL-Gigabit Connection, the Contracting QP shall be required to:</p> <ul style="list-style-type: none"> (a) place one (1) Order for each EPL-Gigabit Connection. For example, if the Contracting QP wishes to take up two (2) EPL-Gigabit Connections, the Contracting QP shall submit two (2) separate Orders. (b) Specify two (2) L2 VPN Service Ports (GE (1Gbps) Service Port for Non-Residential Premise type only) and the addresses of the installation locations. The installation locations shall be Non-Residential Premises only. The underlying access technology for such L2 VPN Service Ports shall be based on AE. If pursuant to the Contracting QP’s request, Nucleus Connect is not able to provide such EPL-Gigabit Connection based on AE, Nucleus Connect shall be entitled to reject the Order for the EPL-Gigabit Connection, but shall not impose any charges on the Contracting QP in respect of the rejection of such Order. (c) Specify the VLAN (IEEE 802.1q or IEEEQ-in-Q) tag permitted to be transparently carried by the EPL-Gigabit Connection. Sharing of multiple EPL-Gigabit Connection(s), or EPL-Gigabit Connection and L2 VPN Connection(s) on the same L2 VPN Service Port (GE (1Gbps) Service Port for Non-Residential Premise type only) is not permitted. (d) Subscribe to only one (1) Class of Service for such EPL-Gigabit Connection. Each EPL-Gigabit Connection shall have a Symmetrical PIR/CIR of 1Gbps The Contracting QP may subsequently from time to time, change the Class of Service subscribed for such EPL-Gigabit Connection. Such changes shall constitute a Modification for which the Contracting QP shall be required to submit an Order pursuant to and in accordance with the General Service Terms and Conditions. 	<p>To introduce an additional L2 VPN service, which provides a point-to-point symmetrical connection of guaranteed throughout of 1Gbps between two Non-residential Premises based on Active Ethernet technology.</p>
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The table below sets out the performance parameters of the Classes of Services for EPL-Gigabit Connection.

Class Of Service	Jitter	Latency	Packet Loss
Class A Real Time	1ms	8ms	0.1%
Class B Near Real Time	1ms	15ms	0.1%
Class C Mission Critical	4ms	20ms	0.05%
Class D Best Effort	Best Effort	60ms	Best Effort

4.8 Only one (1) Class of Service is supported per EPL-Gigabit Connection. A L2 VPN Service Port can only support a single EPL-Gigabit Connection.

4.9 The Contracting QP must adhere to Nucleus Connect's QoS tagging scheme when sending or receiving data traffic through any EPL-Gigabit Connection from the relevant L2 VPN Service Port(s). Such QoS tagging scheme requires the use of priority bit value 5 for Class A, priority bit value 4 for Class B, priority bit value 2 for Class C and priority bit value 1 for Class D.

General Requirements

4.10 In relation to any L2 VPN Connection/Service Port taken up by the Contracting QP, if the Contracting QP wishes to change the L2 VPN Connection/Service Port into an EPL-Gigabit Connection, the Contracting QP shall:

- (a) place an Order for the Deactivation of such L2 VPN Connection/Service Port, whereupon paragraph 8 of the General Service Terms and Conditions will apply; Provided That no Deactivation Charge or Early Termination Charge will be imposed on the Contracting QP in respect of such Order which was submitted by the Contracting QP to Nucleus Connect before 9 May 2011; and
- (b) pursuant to paragraph 4.7, place an Order to take up a new EPL-Gigabit Connection/Service Port with an underlying access technology based on AE, whereupon paragraph 5.3 of the

	<p style="text-align: center;">General Service Terms and Conditions will apply.</p> <p style="text-align: center;">The provisions of sub-paragraphs (a) and (b) shall also apply mutatis mutandis where the Contracting QP wishes to change from an EPL-Gigabit Connection to a L2 VPN Connection.</p>	
6.	<p>Clause 4.11, Service Schedule – L2 VPN Service</p> <p>4.7 4.11 If, in relation to an Order to take up a L2 VPN Service, the installation location required is a Non-Residential Premises and the Contracting QP indicates to Nucleus Connect in such Order that it does not require OpenNet to provide the fibre and in-building cabling between the FTTB Node and the 1st TP for the relevant Non-Residential Building, the Contracting QP shall be responsible for the supply and maintenance of such fibre and in-building cabling. In such event, the Contracting QP acknowledges and agrees that:</p> <p>(a) the Contracting QP shall bear the following Charges on a per L2 VPN Service Port basis:</p> <p>(i) ON Charges, except those ON Charges which would be subject to paragraph 4.7 4.11(a)(iii), which have been incurred by Nucleus Connect, or which Nucleus Connect has committed to incur, in connection therewith;</p>	Change in paragraph numbering
7.	<p>Clause 5, Service Schedule – L2 VPN Service</p> <p>The Charges set out in this paragraph 5 are the rates payable by the Contracting QP on a L2 VPN Connection (or as the case may be, an EPL-Gigabit Connection) and a L2 VPN Service Port basis.</p>	To introduce an additional L2 VPN service, which provides a point-to-point symmetrical connection of guaranteed throughput of 1Gbps between two Non-residential Premises based on Active Ethernet technology.

8.

Clause 5.1, Service Schedule – L2 VPN Service

As above.

Nucleus Connect will commence charging the Contracting QP the Monthly Recurring NC Charges specified below on the RFS Date.

Per End-to-End L2 VPN Connection		Monthly Recurring NC Charge	
		First 25Mbps	Next 5Mbps
Class of Service	Real Time	\$420	\$84.00
	Near Real Time	\$358	\$71.60
	Mission Critical	\$277	\$55.40
	Best Effort	\$215	\$43.00
Per EPL-Gigabit Connection (Symmetrical 1Gbps PIR/CIR)			Monthly Recurring NC Charge
Class of Service	Real Time (Class A)		\$4,500
	Near Real Time (Class B)		\$4,200
	Mission Critical (Class C)		\$3,600
	Best Effort (Class D)		\$3,000
Per L2 VPN Service Port		Monthly Recurring NC Charge	
FE (100Mbps) Service Port	Residential Premise	\$25	
	Non-Residential Premise	\$100	
	NBAP	\$380	
GE (1Gbps) Service Port	Non-Residential Premise	\$600	
	NBAP	\$930	

9.	<p>Clause 5.2(b)(i), Service Schedule – L2 VPN Service</p> <p>Upon the installation of a L2 VPN Connection (or as the case may be, an EPL-Gigabit Connection) by Nucleus Connect, the following Charges shall be imposed on the Contracting QP on a per L2 VPN Service Port basis:</p>	As above.						
10.	<p>Clause 6.2, Service Schedule – L2 VPN Service</p> <p><u>6.2 Paragraph 2 of Appendix 1 of the General Service Terms and Conditions</u></p> <p>For the purpose of this Service Schedule, paragraph 2 of Appendix 1 of the General Service Terms and Conditions shall not apply and the following provisions of this paragraph 6.2 shall apply instead:</p> <p>“The Prescribed SAPs in relation to taking up of new Connections (except Connections provided through the NBAP Service Port) are:</p> <table border="1" data-bbox="395 925 1169 1982"> <thead> <tr> <th data-bbox="395 925 774 1032">Type of Connection</th> <th data-bbox="774 925 1169 1032">Prescribed SAP (from SAP Start Date)</th> </tr> </thead> <tbody> <tr> <td data-bbox="395 1032 774 1547">(i) L2 VPN Service (where the Connection provided is through a Residential Service Port); excluding EPL-Gigabit Connection referred to in subparagraph (iii) below</td> <td data-bbox="774 1032 1169 1547">8 Business Days</td> </tr> <tr> <td data-bbox="395 1547 774 1982">(ii) L2 VPN Service (where the Connection provided is through a Non-Residential Service Port); excluding EPL-Gigabit Connection referred to in subparagraph (iii)</td> <td data-bbox="774 1547 1169 1982">15 Business Days</td> </tr> </tbody> </table>	Type of Connection	Prescribed SAP (from SAP Start Date)	(i) L2 VPN Service (where the Connection provided is through a Residential Service Port); excluding EPL-Gigabit Connection referred to in subparagraph (iii) below	8 Business Days	(ii) L2 VPN Service (where the Connection provided is through a Non-Residential Service Port); excluding EPL-Gigabit Connection referred to in subparagraph (iii)	15 Business Days	As above.
Type of Connection	Prescribed SAP (from SAP Start Date)							
(i) L2 VPN Service (where the Connection provided is through a Residential Service Port); excluding EPL-Gigabit Connection referred to in subparagraph (iii) below	8 Business Days							
(ii) L2 VPN Service (where the Connection provided is through a Non-Residential Service Port); excluding EPL-Gigabit Connection referred to in subparagraph (iii)	15 Business Days							

		below		
		(iii) EPL-Gigabit Connection	15 Business Days (where there is sufficient network capacity in existing AE access) 45 Business Days (where there is insufficient network capacity in existing AE access)	
11.	Application Form, L2 VPN Service (L2 VPN) Service Schedule – Co-location Service Amendments to fields under column for Network Protocol Options to allow Nucleus Connect’s QPs to indicate its choice of connection configuration (i.e., L2 VPN Connection or EPL-Gigabit Connection).			As above.

Revisions to ICO submitted by Nucleus Connect on 3 November 2011

(IDA approved the revision on 1 November 2011)

No.	Clause	Reason
1.	Recital B, Master Interconnection Offer (ICO) Agreement	IDA's approval to Nucleus Connect's Platform Connection Service and introduction of the new ICO schedule for Platform Connection Service.