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15 July 2011

Ms Aileen Chia  
Deputy Director-General (Telecoms & Post)  
Infocomm Development Authority of Singapore  
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Dear Ms Chia,

**PUBLIC CONSULTATION ON OPENNET INTERCONNECTION OFFER -  
PROPOSED CO-LOCATION SUPPLEMENTARY COOLING SERVICE**

1. We refer to the above Consultation Paper, issued by the Authority on 24 June 2011. StarHub Ltd ("StarHub") appreciates the opportunity to comment on this matter.

**Description of StarHub and Its Interest in the Proceeding**

2. StarHub is a Facilities-Based Operator ("FBO") in Singapore, having been awarded a licence to provide public basic telecommunication services ("PBTS") by the Telecommunications Authority of Singapore ("TAS") (the predecessor to IDA) on 5 May 1998. Nucleus Connect Pte Ltd, a wholly-owned subsidiary of StarHub incorporated on 14 April 2009, is the appointed Operating Company of the Next Generation Nationwide Broadband Network (the "Next-Gen NGN").
3. StarHub is a Requesting Licensee ("RL") under the Interconnection Offer ("ICO") of OpenNet Pte Ltd ("OpenNet"). Should OpenNet be unable to accommodate the heat loading of the RLs' equipment due to its incapable cooling services, the RLs' equipment would face potential defaults problems or even break down eventually, depending on how serious the cases may be.



### **StarHub's Position**

4. We are of the view that the introduction of a separate cooling service to supplement the Co-location Service is inappropriate and unnecessary. We therefore find the terms of Schedule 12B unacceptable. The cooling service should be provided as an integral part of the Co-location Service as it forms the most basic requirement of any Co-location Service that may be requested by Qualified Persons ("QPs") for use at OpenNet's Central Offices. We do not believe that the environmental conditions and technical specifications of any cooling system required by QPs are significantly so unique or fall beyond the reasonable industry standards, that they justify the cooling service being provided as a separate supplementary service to the Co-location Service and at additional charge by OpenNet. Environmental controls are an essential element of any service provided by any provider of co-location services. We are not aware of any other provider of co-location services that separately contracts for supplementary cooling.
5. Our comments on Schedule 12B are premised on our above view, and are intended to be general with reference to the principle or concept expressed in each clause, rather than the specificity of the clauses. Where we do not state our comments, this should not be taken as an indication of our acceptance.

### **General Comments**

6. OpenNet should not be allowed to decouple the cooling service from the Co-location Service as the cooling service is a fundamental and integral element of the Co-location Service. It is the responsibility of OpenNet as NetCo to ensure that the cooling systems in its Central Offices are capable of providing adequate level of cooling service that meets RLS' requirements when RLS take up Co-location Service with OpenNet. OpenNet would be aware of RLS' cooling service requirements at the time RLS put in the request for Co-location Service as RLS are required under Annex 12C of Schedule 12 of the ICO to furnish relevant information such as 'Power Requirements Per Rack' and 'Heat Load Per Rack' of their co-location equipment. Thus, OpenNet should have ample opportunity to address any inadequacy of its cooling systems and ensure that the provisioning of the Co-location Service (including the cooling service) is not affected.
7. In addition, OpenNet retains full and sole control over the installation, operation and maintenance of the cooling systems at its Central Offices. Therefore, it would be logical for RLS to assume that it is OpenNet's responsibility to monitor the service levels of the cooling systems and make the necessary system adjustments or modification to ensure that the provisioning of the Co-location Service (including the cooling service), is timely and in accordance with RLS' requirements.

8. Further, we hold the view that it is a waste of time, cost and resources to layer on extra provisioning, termination and post-termination procedures for the cooling service as that have already been adequately provided for under the Co-location Service in Schedule 12 of OpenNet's ICO. For example, the Project Study and Site Preparation Work. After all, the cooling service should be provided as a fundamental and integral part of the Co-location Service, and not as a separate supplementary service.
9. We would therefore like to respectfully reject the proposed Schedule 12B in its entirety.

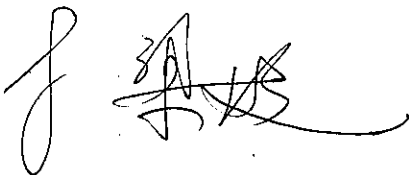
#### **Views Regarding Specific Provisions**

10. StarHub's detailed comments are attached in Annex A.

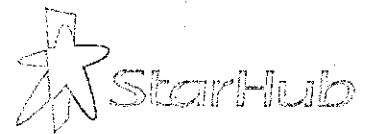
#### **Conclusion**

11. StarHub would like to respectfully reject the proposed Schedule 12B in its entirety, with the reasons clarified above. In the event that the Authority deem that such a service is good for the industry and would not impede the progress of the Next-Gen NBN eco-system, which is still facing significant issues, we would suggest that the Authority require OpenNet to take in comments from all RLs and that the next draft be subject to further industry consultation.
12. We are grateful for the Authority's consideration of our views and comments, and welcome the opportunity to discuss this matter further with the Authority. Please do not hesitate to contact me, should anything in this letter require clarification or elaboration.

Yours Sincerely,  
For and on behalf of  
StarHub Ltd

A handwritten signature in black ink, appearing to read "Tim Goodchild".

Tim Goodchild  
Head (Government & Strategic Affairs)



**Annex A**  
**Detailed Comments on the Proposed Schedule 12B:**

Clause	Comments
General	<p>We are of the view that the introduction of a separate cooling service to supplement the Co-location Service is inappropriate. The terms of Schedule 12B are therefore unacceptable. The cooling service should be provided as an integral part of the Co-location Service as it forms the most basic requirement of any Co-location Service that may be requested by Qualified Persons ("QPs") for use at the Central Offices. We do not believe that the environmental conditions and technical specifications of any cooling system required by QPs are significantly so unique or fall beyond the reasonable industry standards, that they justify the cooling service being provided as a separate supplementary service to the Co-location Service and at additional charge to QPs by OpenNet. Environmental controls are an essential element of any service provided by any provider of co-location services. We are not aware of any other provider of co-location services that separately contracts for supplementary cooling.</p> <p>Our comments on Schedule12B are premised on our above view and represent our general comments relating to the principle or concept expressed in each clause, rather than the specificity of the clause. Where we do not state our comments, it should not be taken as an indication of our acceptance of the provisions.</p>
1.2	<p>When providing the cooling service, OpenNet should ensure that the RL's Co-location Equipment requirements are met. It is unreasonable to expect the RL to have to:</p> <ul style="list-style-type: none"> <li>(i) adjust and/or modify its Co-location Equipment, at its own cost, in order to fit OpenNet's cooling system requirements so that the RL may use the cooling service at the relevant Central Office; and</li> <li>(ii) provide installation materials, tools, equipment and manpower for any such adjustment and/or modification of its Co-location Equipment.</li> </ul> <p>This is not acceptable as the cooling service is a fundamental and integral part of the Co-location Service. It should be provisioned together with the Co-location Service based on the RL's requirements. Further, the RL should not be made to pay extra for the cooling service in addition to the Co-location Service charges.</p> <p>It is also unreasonable and unfair for the RL to have to pay for works</p>

Clause	Comments
	<p>carried out by OpenNet, at its own discretion, in connection with the provision of the cooling service. Any installation or hardware costs should be borne by OpenNet as the cooling equipment may not be used exclusively by the RL for its Co-location Space. Instead, it is likely to be commonly shared amongst other co-location equipment within the same Central Office.</p> <p>Further, there should not be any additional charges for the cooling service and this should be spelt out clearly within the OpenNet ICO.</p> <p>Any general provision that gives OpenNet the ability to impose additional charges will lead to potential disputes on the right and amount to charge.</p> <p>Accordingly, we find this entire Clause 1.2 unacceptable.</p>
1.5	<p>It is unreasonable to impose a higher standard of proof for OpenNet's negligence or breach of the ICO Agreement. OpenNet should be responsible for any damage to the RL's Co-Location Equipment notwithstanding whether it was 'gross' negligence or 'willful or reckless' breach, or otherwise.</p>
1.6	<p>The reference to 'events outside OpenNet's reasonable control' is vague and subjective. Please clarify what would be considered "reasonable control".</p>
2.2	<p>We are concerned that there is no redundant backup system for the cooling service provided at the Central Offices of OpenNet. We believe that this clause should set out OpenNet's plan for a redundant backup system.</p>
3.2	<p>For the effective implementation of any ICO, there must be clear definition of the terms used. For example in this instance, it is unclear whether each Cooling Request that makes up the Request Quota, is limited to (i) a specific number of Co-location Equipment or otherwise, and (ii) a specific Central Office or more than one Central Office.</p>
3.4(a)	<p>In general, the basis of rejection should be provided to the RL if its Request is rejected. Sufficient details should also be furnished to give the RL the opportunity to take rectification steps and re-submit a compliant Request. For example, stating that the RL has committed a material breach of the ICO Agreement is not sufficient. Details of the material breach should be furnished to the RL.</p>

Clause	Comments
3.4(c)	<p>Under this clause, OpenNet has wide discretion to reject the Request by the RL as it merely have to show that it has plans or otherwise proposes to decommission the Central Office within a certain timeframe. This creates uncertainty for the RL.</p> <p>OpenNet should only be able to reject if its proposed decommissioning has been approved by IDA and it confirms to the RL in writing such IDA's approval.</p>
3.5(b)	<p>The cooling service is an important requirement of the Co-location Service at a Central Office. It is unreasonable for OpenNet to reject the RL's Request on the basis of unavailability. Cooling is an integral and fundamental part of the Co-location Service and should not be treated as a separate service request by the RL to OpenNet. OpenNet should be obliged to provide the cooling service so long as the Co-location Service is available.</p> <p>Thus, this Clause 3.5(b) is unacceptable.</p>
3.5(c)	<p>"Insufficient space for installation of system" cannot reasonably be used as an excuse for rejecting the RL's Request. OpenNet should be obliged to provide the cooling service so long as the Co-location Service is available as cooling is an integral and fundamental part of the Co-location Service.</p> <p>Thus, this Clause 3.5(c) is unacceptable.</p>
3.5(d)	<p>It is necessary for this clause to clarify what constitutes "significant technical or engineering issues" and how one verifies the occurrence of it.</p>
3.6	<p>We do not agree that a separate request is required of the RL for the cooling service. Thus, accordingly, we do not agree that any request for the cooling service be subject to a processing fee or any fee at all.</p>
3.7	<p>Please refer to our comments to Clause 3.5(b). In any event, where the cooling service is unavailable, OpenNet should take reasonable steps to provide interim measures or temporary workaround solutions to ensure that the associated Co-location Service is not affected or disrupted.</p>
4 & 5	<p>OpenNet should be well-aware of the RL's cooling system requirements as relevant information (including without limitation, heat load per rack and power per rack) would have been furnished pursuant to Annexes of Schedule 12 at the time when the Request for Co-location Service was</p>

Clause	Comments
	submitted. Another round of Project Study to assess the site conditions is not necessary, and would be a waste of time and resources.
5.3	<p>(i) There is no Clause 4.4(b) in Schedule 12B. Please clarify the completion period of any Site Preparation Work.</p> <p>(ii) There should be a service level guarantee for the Site Preparation Work. In the event OpenNet fails to complete the Site Preparation Work within the stipulated timeframe, OpenNet should provide a remedy to the Requesting Party.</p> <p>In any case, given that the cooling service is a fundamental and integral part of the Co-location Service, the completion period of any Site Preparation Work in respect of the cooling service should be transparent to the RL and should not affect the provisioning lead-in time for the Co-location Service under Schedule 12.</p>
6.1(a)	<p>(i) Please replace the words "at Annex 12D" with "as set out in Annex 12D".</p> <p>(ii) Please delete the words "and as amended by OpenNet from time to time". Any change to the terms and conditions of the ICO must be subject to IDA's prior written approval.</p>
6.1(b)	Any change to the terms and conditions of the ICO must be subject to IDA's prior written approval. OpenNet should not be allowed to amend the ICO as and when it wishes.
6.2	The RL should not be made to pay additional charges for the cooling service as it should be provided together with the Co-location Service at all times at no additional charge since it is a fundamental and integral part of the Co-location Service.
6.3	Any revision of charges in Schedule 15 must be subject to IDA's approval.
6.4(a)	The scope of the indemnity in favour of OpenNet is too wide. The RL should not be obliged to indemnify OpenNet for losses and damages which result from OpenNet's negligence or breach. Thus, an exemption should be provided for in the indemnity such that the indemnity applies "except to the extent such actions, claims, proceedings, costs, losses and/or damages result from or are due to OpenNet's negligence or breach of this ICO Agreement".

Clause	Comments
6.4(d)	OpenNet should take into account the relevant circumstances (including without limitation reasonable requirements of the RLs) in determining the technical means by which it supplies the cooling service. Hence, the determination should be made at OpenNet's "reasonable discretion", instead of "sole discretion".
6.5	The standard of reasonableness should apply when determining whether any hardware, software or cabling component of the RL is capable of causing a hazard, interference or obstruction to OpenNet's operation of the Central Office. Thus, OpenNet should not be allowed to use its sole discretion in such determination.
6.6	We submit that this clause needs to clarify what a "supplementary cooling system" is.
6.8	OpenNet should not be permitted to exclude liability if the loss was due to OpenNet's negligence or breach of this ICO Agreement.
6.9(d)	It is unreasonable to place the onus of ensuring sufficient working space around the cooling unit for use by OpenNet or its agents. This is because the installation, operation and maintenance of the unit are carried out by OpenNet. The RL does not in any way control the manner in which the unit is installed, operated and maintained.
6.10	Any modifications to the cooling system must not affect the obligation of OpenNet to ensure there is service continuity and that the performance of the cooling service to the RL is maintained. It should also not result in the RL having to pay more cost.
6.11 & 6.12	It is unacceptable for OpenNet to be able to disclaim or exclude liabilities arising from the Modifications necessitated by it at its sole discretion. If the implementation of any Modification causes the interruption, interference or impairment of the cooling service, the RL must have the right seek legal redress from OpenNet.
6.13	This Clause 6.13 is irrelevant and unacceptable. The obligation to provide the cooling service rests on OpenNet. Accordingly, it should be OpenNet's sole responsibility to ensure any cooling system that comes to its End of Life be replaced with a suitable and comparable system. Any such replacement must not affect the obligation of OpenNet to ensure the service continuity of the cooling service to the RL. It should also not result in the RL having to pay more cost.
7.1	It would be unreasonable to expect the RL to determine the source of



Clause	Comments
	any fault, when the maintenance of the cooling service is provided by OpenNet.
7.2	OpenNet should be mandated to respond with an on-site service within the On-Site Response Time.
7.3	In the event OpenNet fails to respond with an on-site service within the On-Site Response Time, it should provide remedy to the RL by way of a rebate or otherwise.
7.6	OpenNet has full and sole control over the installation, operation and maintenance of the cooling system. It would be unreasonable for OpenNet to disclaim all liabilities for any loss or damage caused by the fault to the cooling system.
8.1	The proposed 8-year term of the cooling service licence that runs independent of the Co-location Service licence is illogical and should not be applicable at all. OpenNet should not be allowed to decouple the cooling service from the Co-location Service as the cooling service is a fundamental and integral part of the Co-location Service. Serious consideration needs to be given to the unintended consequence of the licence terms of the two de-coupled services not being in sync, as it would result in extra costs to the RL and ultimately, the Next-Gen NBN ecosystem.
8.2 & 8.3	It is OpenNet's sole responsibility in ensuring continued and uninterrupted provision of the cooling service during the effective term. Thus, any decision on the use of any new, additional or replacement cooling system should be made by OpenNet. It would be unreasonable for OpenNet to pass such risks to the RL.
9.1	<p>(i) The reference to "and Co-Location Service licence" should not appear in this Schedule 12B as any matter that concerns the Co-Location Service is regulated by Schedule 12.</p> <p>(ii) Any physical or technical harm caused by the RL to the cooling system should relate to the impact it has on the operation of the cooling service only.</p>
9.2(b)	We believe that it is necessary for OpenNet to provide the basis for having a Reconnection Charge. We note that there are no such charges in Schedule 12.
10.2(d),	It would be reasonable for the RL to have a mutual right of termination

Clause	Comments
10.2(e) & 10.2(f)	for the circumstances stated in Clauses 10.2(d), 10.2(e) and 10.2(f) to the extent such circumstances are not due to the RL's fault. These clauses should be amended accordingly.
10.6(b)	Any costs payable by the RL for OpenNet's reinstatement of the Co-location Space must be reasonable. In any case, this clause should be dealt with in Schedule 12 which regulates the provision of Co-location Service. In fact, it is already addressed in Schedule 12.
Annex 12D, Clause 1	<p>The reference to 'Clause 4.4(b)' is erroneous as the clause does not exist.</p> <p>It is unacceptable for the cooling service to be provided only on a 'best endeavors' basis. This would give rise to uncertainty as to OpenNet's obligation to provide the service. Further, too wide a discretion is given to OpenNet on (i) determining whether the RL has indeed caused or occasioned any unnecessary delay to its commencement or completion of service provisioning, and also (ii) charging for service from the date the service is anticipated to be delayed, without any regard to reasonable circumstances of the matter. The provision of the cooling service by OpenNet should be a strict obligation.</p>
Annex 12D, Clause 2	<p>(i) We note that the environmental conditions and technical specifications set out in Table A did not specify the room capacity and floor area. Please clarify how the parameters for the heat load and number of overhead units are derived.</p> <p>(ii) It is highly unreasonable to place the onus on the RL to ensure that the cooling system is operated within the environmental conditions and parameters set out in Table A, which are prescribed by OpenNet. This is because unlike OpenNet, the RL has no control over the cooling system, as well as the installation, operation and maintenance of the cooling system. Logically, OpenNet should be solely responsible in ensuring that the cooling systems are installed, operated and maintained within the relevant environmental conditions and parameters such that the cooling systems would meet the requirements of the RL for cooling. OpenNet would be aware of the RL's requirements at the time the RL submit its Request for Co-location Service. We reiterate that the cooling service should be provided as a fundamental and integral part of the Co-location Service, and should not be treated as a separate service with separate charges by OpenNet.</p>
Annex	The scope of the RL's liability is too wide under this clause. The RL's

Clause	Comments
12D, Clause 3	liability should be limited to "any defect in the cooling system caused by the negligence or breach of its obligations under this Schedule by the RL, its officers, employees, agents or contractors."
Annex 12D, Clause 4	It is unacceptable for OpenNet to absolve itself from all liabilities for loss or damage caused by or as result of the use of the cooling system, in particular when OpenNet has sole and total physical and operational control over the cooling system.
Annex 12D, Clause 5	We submit that it is essential for this clause to clarify what are the 'relevant provisions' that are applicable to the replacement cooling system.
Annex 12D, Clause 6	Given that the cooling service is a fundamental and integral part of the Co-location Service, the service provisioning lead-in time of the cooling service should be transparent to the RL and not affect the provisioning lead-in time for the Co-location Service under Schedule 12.
Annex 12E, Clause 1	<p>The reference to 'Clause 4.4(b)' is erroneous as the clause does not exist.</p> <p>It would be unacceptable for the provision of the cooling service to be only on a 'best endeavors' basis. This would give rise to uncertainty as to OpenNet's obligation to provide the service. Further, too wide a discretion is given to OpenNet on (i) determining whether the RL has indeed caused or occasioned any unnecessary delay to its commencement or completion of service provisioning, and also (ii) charging for service from the date the service is anticipated to be delayed, without any regard to reasonable circumstances of the matter.</p>
Annex 12E, Clause 2	<p>(i) We note that the environmental conditions and technical specifications set out in Table A did not specify the room capacity and floor area. It is necessary for this clause to clarify how the parameters for the heat load and the number of overhead units are derived.</p> <p>(ii) It is highly unreasonable to place the onus on the RL to ensure that the cooling system is operated within the environmental conditions and parameters set out in Table A, which are prescribed by OpenNet. This is because unlike OpenNet, the RL has no control over the cooling system, as well as the installation, operation and maintenance of the cooling system. Logically, OpenNet should be solely responsible in ensuring that the cooling systems are installed, operated and maintained within the relevant environmental conditions and parameters such that the cooling systems would</p>

Clause	Comments
	<p>meet the requirements of the RL for cooling service. OpenNet would be aware of the RL's requirements at the time the RL submit its Request for Co-location Service. We reiterate that the cooling service should be provided as a fundamental and integral part of the Co-location Service, and should not be treated as a separate service with separate charges by OpenNet.</p> <p>(iii) There is an error in the references to 'Clause 4.3(b) and Table D'.</p>
Annex 12E, Clause 3	The scope of the RL's liability is too wide under this clause. The RL's liability should be limited to "any defect in the cooling system caused by the negligence or breach of its obligations under this Schedule by the RL, its officers, employees, agents or contractors."
Annex 12E, Clause 4	It is unacceptable for OpenNet to absolve itself from all liabilities for loss or damage caused by or as result of the use of the cooling system, as OpenNet has sole and total physical and operational control over the cooling system.
Annex 12E, Clause 5	We submit that it is necessary for this clause to clarify what are the 'relevant provisions' that are applicable to the replacement cooling system.
Annex 12E, Clause 6	Given that the cooling service is a fundamental and integral part of the Co-location Service, the service provisioning lead-in time of the cooling service should be transparent to the RL and not affect the provisioning lead-in time for the Co-location Service under Schedule 12.