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**CONSULTATION PAPER ISSUED BY**

**THE INFO-COMMUNICATIONS MEDIA DEVELOPMENT**

**AUTHORITY**

**ON**

**SINGAPORE TELECOMMUNICATIONS LIMITED'S REFERENCE**

**INTERCONNECTION OFFER**

**Submission by StarHub Ltd to the**

**Infocomm Media Development Authority**

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## Introduction:

1. StarHub Ltd (“**StarHub**”) thanks the Info-comm Media Development Authority of Singapore (the “**Authority**”) for providing the opportunity to comment on the proposed amendments to the Reference Interconnection Offer (“**RIO**”) by Singapore Telecommunications Limited (“**Singtel**”).
2. It is timely for the Authority to consult on changes to the RIO as the industry collectively moves towards IP-based interconnection. As the dominant licensee, it is necessary that Singtel closely cooperates with the industry to facilitate migration to IP-based interconnect as soon as practicably possible, and this should be actively reflected in the RIO.
3. StarHub has reviewed the proposed changes to the RIO, and our detailed comments are set out in the next section.

## StarHub's Detailed Comments:

Reference	Singtel's proposed change	StarHub's comments
Main body, Part 2 – Clause 8.1(b)	New clause allowing Singtel to suspend the Interconnect Link and for the Requesting Licensee ("RL") to rectify the fault.	<p>The earlier part of this clause requires both parties not to cause physical or technical harm to each other's networks. However, the subsequent drafting only allows Singtel to suspend the Interconnection Link and for the RL to rectify the fault.</p> <p>For consistency, the drafting of this clause should be bilateral instead of unilateral in favour of Singtel only. This would be consistent with the drafting of the remaining parts of Clause 8 which apply to both parties.</p>
Main body, Part 2 – Clause 8.5	New clause covering origination of calls.	This new clause should not stop RLs from terminating calls from other operators locally connected to the RL (such as mobile virtual network operators and local call resellers).
Main body, Part 2 – Clause 8.6	New clause requiring the segregation of local originated and international originated calls into separate trunk groups.	<p>For consistency, we propose to treat calls from inbound and outbound roamers as international originated calls.</p> <p>This will include outbound roamers making voice over long-term evolution calls to Singapore numbers, even if such calls are home-routed. These calls are originated by mobile subscribers roaming overseas and there will be +65 appended to the caller-line identifier, hence they should be treated as international originated calls.</p> <p>However, please note that international calls terminated to a local subscriber, which are then call-forwarded would be treated as local originated calls and should be sent over the local trunk groups.</p>
Main body, Part 2 – Clause 12.7	New clause covering breach of the Interconnection Agreement.	To ensure level playing field and fairness, this requirement should be bilateral and cover damage to either party's network. If Singtel causes interference / disruption to the other party's network, there should also be an obligation on Singtel to prove to the Authority that it is not in breach.
Main body, Part 2 – Clause 12.8	New clause allowing Singtel the right to suspend interconnect services.	Suspension of interconnect services may have serious consequences. The right to suspend the services is too broad, as it allows Singtel to

		<p>suspend services to address "<i>any event, incident, or issue</i>".</p> <p>Any unilateral suspension of service should only apply to a limited set of circumstances (e.g., where there are imminent threats to life or property or compliance with other legal or regulatory obligations requiring immediate action).<sup>1</sup> The clause should also apply bilaterally, rather than only allowing Singtel to suspend Services.</p>
Main body, Part 2 – Clause 13.1(j)	New clause allowing Singtel to terminate the RIO agreement with immediate effect if the RL discontinues all Interconnection Links.	We understand that any termination of an interconnection agreement requires the Authority's approval. If an RL is indeed ceasing services and has discontinued all Interconnection Links, the normal process of terminating the RIO agreement should apply.
Main body, Part 2 – Clause 20.6	New clauses relating to the SS7-based to IP-based Interconnection migration	<p>From its proposed drafting, Singtel is placing a significant onus and burden on RLs to submit large amounts of paperwork (such as new Call Types requests). Furthermore, Singtel has also stated that charges for IP-based Interconnection Testing will only be waived for five business days, and it is also unclear if other charges associated with the migration (such as Call Type charges) will be waived.</p> <p>The migration to IP-based Interconnection is a mandated regulatory obligation applying to all parties, and the Authority should require all interconnected operators to cooperate closely with each other to facilitate the migration process. It should not be an opportunity for Singtel to impose additional administrative obligations or seek to impose new charges for this migration. This will simply unnecessarily delay and frustrate the migration process.</p> <p>We therefore request that the Authority require all parties to comply with the following migration principles:</p> <p>1) Singtel and other interconnected operators should mutually agree on reasonable migration plan and process.</p>

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<sup>1</sup> Consistent with Paragraph 5.6.2 of the Telecom and Media Competition Code.

		<p>2) Singtel shall approve all existing Call Types already in-place to avoid unnecessary delays and disruptions, unless the Call Type may adversely impact the interoperability, security or functionality of the IP-based Interconnection or Singtel's Network. There should not be any Call Type-related charges associated with the migration of existing Call Types.</p> <p>3) There should not be any costs associated with IP-based Interconnect Testing for existing operators migrating to IP-based interconnect. As this is a regulatory requirement, each party shall bear their own costs to ensure that the migration is successfully completed.</p> <p>4) To avoid unnecessary administrative overhead and delays, there should be a simplified process for existing operators to exchange Call Type and network information. Parties should not have to go through unnecessary paperwork for this migration process.</p>
Schedule 1 – Clause 1.6	Cessation of new SS7-based interconnection arrangements from 28 Feb 2027	We understand that phased migrations to IP-interconnection are starting from early-2026 onwards. Hence, it is not clear why Singtel will need until Feb 2027 to cease new SS7-based arrangements.
Schedule 1 – Clause 5.1, Figure 1	Updated FBO Physical Interconnection diagram.	<p>The current RIO diagram shows a MUX in the RL co-lo space. However, the updated diagram only shows an FDF.</p> <p>We seek confirmation that this does not mean that Singtel will prohibit the installation of active equipment (such as transmission MUX) within the co-lo space.</p> <p>If a RL's active transmission equipment is not allowed at the RL co-lo space, such requirement will adversely impact the interconnection arrangements with Singtel. RLs may be forced to install their active equipment elsewhere, for example at their nearest transmission serving site, and Singtel may need to install long-distance SFP transceivers to receive the RL fibres. Such arrangements may be less resilient and could result in significant signal loss and service degradation.</p>

		<p>If it is indeed Singtel's position that active transmission equipment cannot be installed in the RL co-lo space, further study is needed to determine the implications to service and operations. Similarly, if Singtel is disallowing active transmission equipment to be installed in its premises, RLs should also have the right to disallow Singtel from installing its active equipment at their premises.</p>
Schedule 1 – Clause 7.5	Compliance with Interconnect testing, technical and security requirements	<p>We request that Singtel provide its amendments to the Schedule 1 Annexures as soon as possible, and if possible, by 1-Nov 2025.</p> <p>The interconnect testing, and technical and security requirements are crucial for operators to prepare our systems for IP-based interconnection. In particular, we will need to study the IP connectivity design, link redundancy, IP routing, SIP and media protocol specifications and network security requirements.</p>
Schedule 1 – Clause 10	Clauses relating to decommissioning	<p>We foresee that parties will need to carry out decommissioning of existing equipment as part of the migration to IP-based interconnection. We therefore seek confirmation that parties should be required to facilitate access to each other's sites on a free-of-charge basis for the necessary decommissioning works. This is in-line with our comments above on how parties should closely cooperate and facilitate the migration process.</p>
Schedule 1 – Annex 1A.2	Revised form for Request for Interconnect Bandwidth.	<p>In the revised form, parties must request for interconnect bandwidth for each Trunk Group ("TG") in terms of "No. of 1Gbps Data Links". This suggests that each TG must have a minimum of 1Gbps bandwidth.</p> <p>Under the current SS7-based interconnection, the interconnect capacity is in terms of E1 (2Mbps) circuits. In contrast, under IP-based interconnection, the interconnect bandwidth is in terms of 1Gbps links. A single 1Gbps link has enough bandwidth to support 7000 concurrent calls (or equivalent to approximately 233 E1 links).<sup>2</sup></p>

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<sup>2</sup> Based on the following dimensioning parameters: G.711a codec, 100kbps bandwidth per call, and bandwidth utilisation kept below 70% to prevent packet drop.

		As one IP link can support many more calls than one E1 link, we propose that operators should have the option to set up multiple TGs within a single 1Gbps link. It is wasteful and not logical to have dedicated 1Gbps links for each single call types. For example, transit or emergency calls will have very low call volumes, and it is not reasonable that operators must use one 1Gbps link to support each service.
Schedule 8A – Annex 8A.1	Updated list of POI Co-Location Sites	We seek confirmation that Serial Numbers 1 - 4 will be removed and not serve as POI Co-Location Sites under IP-based interconnection.
Schedule 8 Attachments – Attachment H	FBO Physical Interconnection diagram.	Please see our comments above for Schedule 1 of RIO – Clause 5.1, Figure 1. We seek confirmation that active transmission equipment can still be installed in the RL co-lo space as per current arrangements.
Schedule 9	Updated Charges schedule	<p>We understand that the Bill-and-Keep (“<b>BAK</b>”) regime for fixed call termination will only be reflected after Singtel completes its migration to IP-based interconnection with all existing RLs.</p> <p>However, if there are any specific details on how BAK will be implemented other than what is stated in the Authority’s consultation paper, we request that the Authority provide these to the industry upfront for comments.</p> <p>We also seek the Authority’s confirmation on whether Singtel will still be allowed to charge for Emergency Calls, since it is also a form of call termination from a locally originated number.</p> <p>The Authority must also provide the industry with sufficient time to implement the necessary changes, as these will involve changes to our billing systems.</p>

## **Conclusion:**

4. In summary, StarHub's key comments are as follows:

- Singtel should be required to actively facilitate the migration process from SS7 to IP-based interconnection. This should mean that administrative overhead should be minimised, and each party should bear their own costs for the migration. It is also important Singtel and other interconnected operators mutually agree on reasonable migration plan and process, minimising any disputes and delays.
- New clauses introduced by Singtel should be on a bilateral basis, rather than give Singtel the unilateral right to cease or suspend services.
- We will need more details to be provided on the detailed technical specifications and how BAK will be implemented. This is necessary to facilitate the migration process.

5. StarHub is grateful for the opportunity to comment on this matter, and we appreciate the Authority's consideration of our comments.