

APPENDIX 2

DIRECTED MODIFICATIONS TO SCHEDULE 1

SCHEDULE 1

PHYSICAL AND VIRTUAL (DISTANT) INTERCONNECTION

**NOTE: UNLESS OTHERWISE SPECIFIED BY IMDA, IMDA
CONDITIONALLY APPROVES THE PROPOSED CHANGES BY SINGTEL
IN THIS DOCUMENT.**

SCHEDULE 1

PHYSICAL AND VIRTUAL (DISTANT) INTERCONNECTION

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SCHEDULE 1

PHYSICAL AND VIRTUAL (DISTANT) INTERCONNECTION

1. GENERAL

- 1.1 This Schedule details the establishment of Interconnection between SingTel's Network and the Requesting Licensee's Network and describes the forecasting and provisioning procedures for Interconnection provided under this RIO Agreement.
- 1.2 Schedule 1A and 1B contain the details on the Network interface requirements and specifications for Interconnection between SingTel's Network and the Requesting Licensee's Network. Schedule 1A details the requirements for Physical or Virtual (Distant) Interconnection for a Requesting Licensee who is an FBO for Interconnection to SingTel's Interconnect Gateway Switches, while Schedule 1B details the requirements for Virtual (Distant) Interconnection for SBOs for Interconnection to SingTel's SBO Gateway Switches.
- 1.3 If the Requesting Licensee is an FBO, the Parties will comply with Schedule 1A.
- 1.4 If the Requesting Licensee is an SBO, the Parties will comply with Schedule 1B.
- 1.5 If SingTel requires Physical Interconnection or Virtual (Distant) Interconnection with the Requesting Licensee, the Requesting Licensee will provide such Interconnection on reciprocal terms and conditions to those set out in this Schedule 1.

SCHEDULE 1A

**PHYSICAL AND/OR VIRTUAL (DISTANT) INTERCONNECTION
FOR FBOs**

SCHEDULE 1A

PHYSICAL AND/OR VIRTUAL (DISTANT) INTERCONNECTION FOR FBOS

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SCHEDULE 1A

PHYSICAL AND/OR VIRTUAL (DISTANT) INTERCONNECTION FOR FBOs

1. GENERAL

- 1.1 Each Party agrees to interconnect and keep interconnected their respective Networks subject to and in accordance with the terms and conditions of this Schedule 1A.
- 1.2 For the avoidance doubt and unless the Parties agree otherwise, where both Parties have established Interconnection of their respective Networks prior to the RIO Review Date:
 - (a) the existing interconnect configuration that applies between each Party's respective Network at the RIO Review Date will continue to apply; and
 - (b) the Parties need not change the Interconnection configuration of their respective Networks as may be required under this Schedule 1A.
- 1.3 The Requesting Licensee will notify SingTel whether it requires Physical Interconnection or Virtual (Distant) Interconnection under this Schedule. If there is insufficient Co-location Space at a SingTel Co-location Site to permit Physical Interconnection, SingTel shall provide Virtual (Distant) Interconnection under this Schedule 1A to the Requesting Licensee. The determination of whether sufficient Co-location Space exists will be made pursuant to the terms and conditions specified in Schedule 8A.
- 1.4 The provisions of this Schedule 1A apply to both Physical Interconnection and Virtual (Distant) Interconnection, unless otherwise indicated.
- 1.5 This Schedule 1A only applies to a Requesting Licensee which is an FBO.

2. INTERCONNECT CONFIGURATION

- 2.1 SingTel's Network is divided into two (2) sectors, comprising an east zone and a west zone. Subject to clause 2.5, the Requesting Licensee must interconnect its Network with the SingTel Network at each of SingTel's Interconnect Gateway Switches (**IGS**) in both the east zone and west zone as specified in Section 2E of Annex A.

- 2.2 Both Parties' Networks shall interface at IGS level.
- 2.3 SingTel and the Requesting Licensee are responsible for managing and maintaining their own Interconnection Links, taking into account the need for growth, diversity and security in traffic routes and signalling links. For the avoidance of doubt, there is no obligation on either Party to manage or maintain the other Party's Interconnection Links.
- 2.4 Unless otherwise agreed and subject to clause 2.5, the Requesting Licensee must interconnect its Network with the SingTel Network, whether by way of Physical Interconnection or Virtual (Distant) Interconnection, at each of SingTel's IGS in the east zone and the west zone.

CLAUSE 2.5 – MODIFICATION REQUIRED

- 2.5 ~~[Deleted]If the Requesting Licensee wishes to adopt an alternative interconnect configuration with its Network interconnecting at only one (1) SingTel IGS in the east zone and one (1) SingTel IGS in the west zone, the Requesting Licensee may only do so with SingTel's agreement and must be prepared to accept a performance level which is different to that applicable to Interconnection at each of SingTel's IGS in the east zone and west zone.~~

IMDA Directed Modifications: As explained in IMDA's Decision, IMDA agrees that the removal of the alternative interconnect configuration would enhance the overall resilience of the interconnected networks and minimise disruptions to end-users during outages. However, in view of impending network changes when industry migrates to IP-based interconnection and to minimise commercial impact to existing Requesting Licensees, IMDA will require Singtel to propose modifications to clause 2.5 to apply the proposed removal of the alternative interconnect configuration to only future FBO Requesting Licensees of this service.

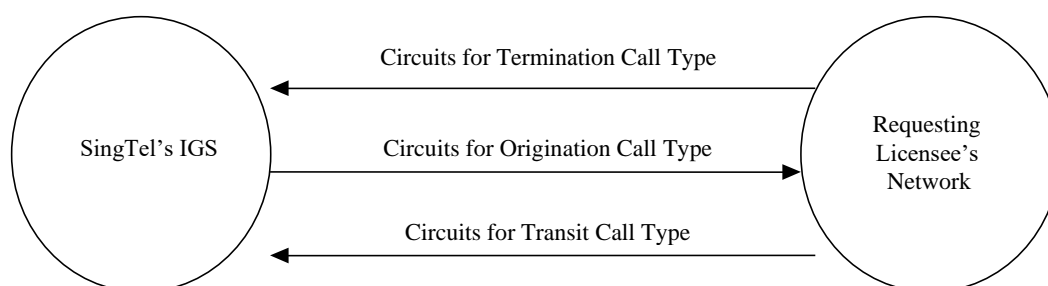
- 2.6 Initially, the Requesting Licensee shall interconnect only one (1) of its IGS(s) to any given SingTel IGS. Any subsequent Interconnection of another Requesting Licensee IGS to that SingTel IGS is subject to mutual agreement.
- 2.7 The Minimum Interconnection Capacity for Interconnection by the Requesting Licensee to a SingTel IGS is two (2) 2Mbps E1 links.

CLAUSE 2.8 – MODIFICATION REQUIRED

- 2.8 ~~[Deleted] If the Requesting Licensee interconnects to SingTel's Network with Interconnect Capacity less than the Minimum Interconnection Capacity, the Requesting Licensee acknowledges that the Network performance may not be equivalent to other Licensees which have fulfilled the Minimum Interconnection Capacity for Interconnection to each of SingTel's IGS in the east zone and west zone. SingTel shall not be liable for any degradation in Call handling and/or Network performance experienced by the Requesting Licensee who does not fulfil the Minimum Interconnection Capacity.~~

IMDA Directed Modifications: *As explained in IMDA's Decision, IMDA agrees that having link diversity would ensure the continual provision of the Requesting Licensee's service during outage and minimise disruptions to end-users. However, in view of impending network changes when industry migrates to IP-based interconnection and to minimise commercial impact to existing Requesting Licensees, IMDA will require Singtel to propose modifications to clause 2.8 to apply the proposed removal of the option for Requesting Licensees to interconnect at less than the minimum interconnection capacity, to only future Requesting Licensees (both FBOs and SBOs) of this service.*

- 2.9 An Interconnection Link may comprise different types of circuit groups. The circuits in each circuit group may convey traffic in a specific direction (one-way) as shown below. The Requesting Licensee must designate the Interconnection Link for each type of circuit group. SingTel shall assign the Circuit Identification Code (CIC) for both SingTel's and the Requesting Licensee's Interconnection Links terminating on SingTel's IGS, unless the Parties agree otherwise.



Circuit Groups

- 2.10 If SingTel or the Requesting Licensee wishes to interconnect their respective Networks at additional IGSs, that Party may request an additional POI and the Parties will negotiate in good faith in relation to the interconnect configuration

applicable to such additional Interconnection. The Party that wishes to interconnect their Network at additional IGSs is liable for any reasonable costs incurred by the other Party where those costs are caused by the requesting Party's request in relation to establishing any additional POI. Such costs are to be determined as part of the good faith negotiations, which shall take into account factors such as the principle of cost causality and the benefit enjoyed by both parties arising from the additional POIs.

- 2.11 Neither Party shall be required to commence work on the installation of Network Facilities to support a new POI under clause 2.10 until the Parties have agreed on the interconnect configuration to apply under clause 2.10.

3. POINT OF INTERCONNECTION

- 3.1 The Parties agree that the POI will be determined by the following criteria:
- (a) subject to clause 3.1(c), if the Parties establish two (2) Interconnection Links, the first link to carry SingTel's traffic and the second link to carry the Requesting Licensee's traffic, the POI for each link may be established at the Digital Distribution Frame (**DDF**) (or comparable equipment) of the Party providing the Call Origination, Call Termination and Call Transit Service; or
 - (b) subject to clause 3.1(c), if the Parties establish only one (1) Interconnection Link to carry each Party's traffic to the other Party's Network, the POI may be at a notional mid-point of the Interconnection Link; or
 - (c) the POI may be established at such other interconnection configurations as the Parties may agree on.
- 3.2 Each Party is responsible for the provisioning and maintenance of Network Facilities (including those Network Facilities which form part of the Interconnect Links and the transmission equipment) on its "side" of the POI.
- 3.3 The cost of the installation, maintenance and operation of the Network Facilities on each Party's side of the POI which form part of the Interconnect Link(s) shall be borne by that Party.
- 3.4 Each Party will ensure that its Network Facilities which form part of the Interconnection Link(s) are provisioned and maintained with Interconnect Capacity in accordance with the ordered Capacity under this Schedule 1A.

3.5 The Requesting Licensee may request the modification of an Interconnection Link by completing the request form set out in Annex 1A.3. SingTel will consider the request for modification and approve or reject the request for modification by written notice to the Requesting Licensee within fourteen (14) Calendar Days of receipt of a duly completed request form from the Requesting Licensee. If SingTel agrees to such a modification, SingTel will undertake the modification in accordance with that request. The Requesting Licensee will be liable for any costs incurred by SingTel in performing the modification of the Interconnection Link. If SingTel rejects the request for modification, it will specify the reasons in its written notice to the Requesting Licensee. SingTel may reject a request for modification of an Interconnection Link on reasonable grounds including (without limitation) where the requested modification:

- (a) would have, or would likely have, the effect of impairing, disrupting or damaging SingTel's Network or SingTel's equipment or other Interconnection Links;
- (b) is not technically feasible;
- (c) would cause, or would likely cause, SingTel to be in breach of any applicable laws, regulations or its licence; or
- (d) does not contain all the necessary information or is illegible.

4. ALTERNATIVE INTERCONNECT CONFIGURATIONS AND POINTS OF INTERCONNECTION

4.1 The Requesting Licensee may request alternative interconnect configurations and locations for the POI at any technically feasible point.

4.2 On receipt of a request under clause 4.1 in respect of an alternative interconnect configuration or POI location specified in the Code, SingTel and the Requesting Licensee will promptly discuss the Requesting Licensee's request.

4.3 If, thirty (30) Calendar Days after the receipt of a request under clause 4.1 and following discussions under clause 4.2, the Requesting Licensee wishes to pursue the alternative interconnect configuration and locations for the POI and SingTel reasonably determines that the alternative interconnect configuration requested is technically feasible, SingTel will commence the formulation of terms and conditions to incorporate into this RIO Agreement.

- 4.4 SingTel will submit terms and conditions to the Authority for approval and incorporation into the RIO and this RIO Agreement within sixty (60) Calendar Days after the receipt of a request under clause 4.1. Alternatively, SingTel may seek an exemption from the relevant aspects of the Code.

5. PHYSICAL INTERCONNECTION

- 5.1 Figure 1 depicts a possible configuration of the Physical Interconnection of the Interconnection Links between SingTel's Network and the Requesting Licensee's Network and the location of the POI.

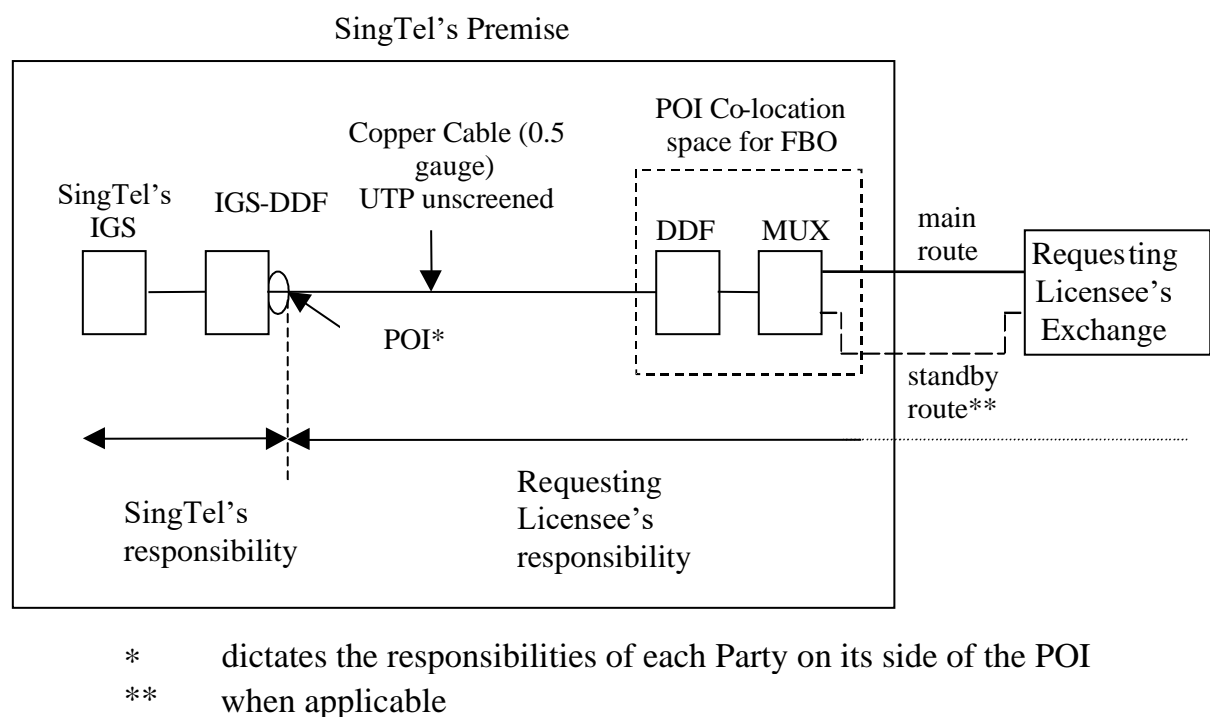
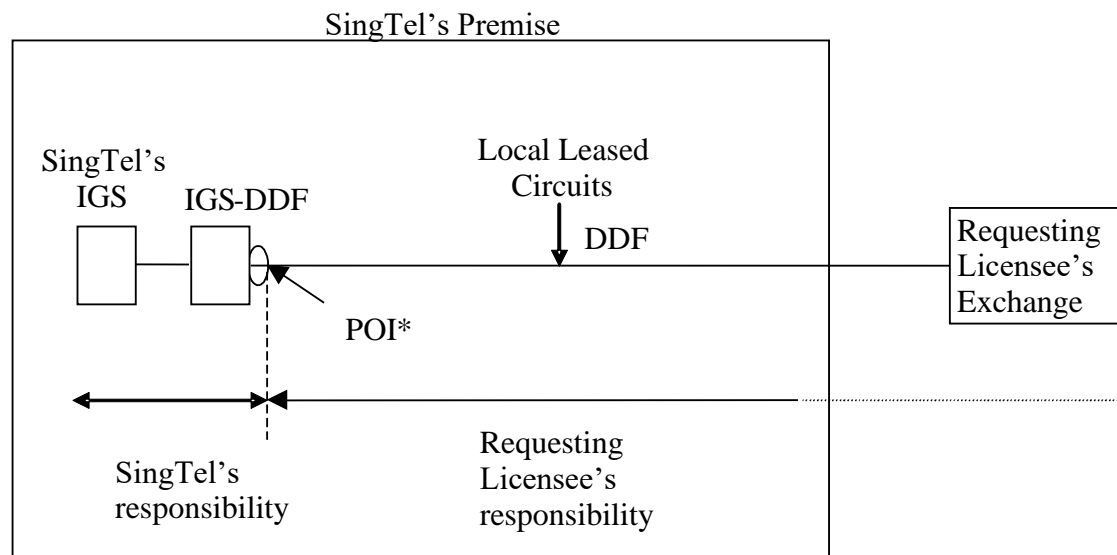


Figure 1: FBO Physical Interconnection

- 5.2 The provisions in Schedule 8 will apply to access to and Co-location of Co-location Equipment at SingTel's IGS for Physical Interconnection.

6. VIRTUAL (DISTANT) INTERCONNECTION

- 6.1 Figure 2 depicts a possible configuration of the Virtual (Distant) Interconnection between SingTel's Network and the Requesting Licensee's Network and the location of the POI.



* dictates the responsibilities of each party on its side of the "POI"

Figure 2: FBO Virtual (Distant) Interconnection

6.2 The Requesting Licensee shall acquire Local Leased Circuits from SingTel or a third party to form part of the Interconnection Link. The Requesting Licensee's leased Interconnection Link shall consist of multiple 2 Mbps (E1) circuits terminated at a DDF in SingTel's IGS.

6.3 On the Requesting Licensee's request, SingTel will lease Local Leased Circuits at 2 Mbps (E1) G.703 interface to the Requesting Licensee's Network based on SingTel's standard terms and conditions for supply of Local Leased Circuit service.

7. TECHNICAL REQUIREMENTS AND SPECIFICATIONS

7.1 Transmission

7.1.1 The Parties' shall interface at 2Mbps level and comply with ITU-T Rec G.703.

7.2 Signalling

7.2.1 The Parties shall comply with the Common Channel Signalling (**CCS**) No.7 Signalling System – Message Transfer Part (**MTP**) and ISDN User Part as specified in Section 1 of Annex A.

7.2.2 The Requesting Licensee shall obtain its own Signalling Point Code from the Authority.

7.2.3 The Parties' IGS shall interwork on associated mode of signalling for the establishment of Interconnected Calls between the Parties' Network.

7.2.4 Both Parties shall provide CCS No. 7 Signalling System (**SS7**) Signalling Linkset comprising of two (2) SS7 Signalling Links on each Interconnect Link.

7.2.5 The Parties shall adhere to additional SS7 signalling requirement as follows:

- (a) The Calling Party Number and Redirecting Number if available shall be conveyed for all calls across the Network Interconnection without manipulation;
- (b) The Dummy CLI received from Mobile Operators from inbound and outbound roamers shall be an eight (8) digit Dummy CLI;
- (c) The number dialled by the calling subscriber shall not be changed or amended for the routing of international outgoing calls from one Party's Network to the other Party's Network. In addition, the Nature of Address (**NOA**) of the Called Party Number shall be set to 'International';
- (d) Each Party's Network shall deliver international incoming Calls to the terminating Party's Network with the international Call indicator 'A' bit of FCI parameter of the IAM set to '1'.

7.3 **Synchronisation**

7.3.1 The Parties shall interwork with each other on plesiochronous mode of synchronisation.

7.4 **Routing**

7.4.1 The Parties shall route Interconnected Calls in accordance with the agreed arrangements applicable to that Call Type under Schedule 2.

7.5 **Interconnect Testing**

7.5.1 The Parties shall comply with the testing procedures in Section 1A of Annex A.

8. **FORECASTING AND PROVISIONING OF INTERCONNECT CAPACITY**

8.1 Sections 8.2 to 8.14 apply to Forecasts to be provided by each Party (**the Forecasting Party**) in relation to Interconnect Capacity, if the Forecasting Party

reaches a minimum Interconnect Capacity of sixty-three (63) E1s for Interconnection with the other Party's (**the Supplying Party**) Network.

- 8.2 Where Interconnect Capacity is below sixty-three (63) E1s, each Party shall provide the Interconnect Capacity without the need for a Forecast. Each Party (**Requesting Party**) shall apply for the Interconnect Capacity under clause 8.15.
- 8.3 The Forecasting Party shall provide to the Supplying Party the Forecasts for Interconnect Capacity on or near 1 March and 1 September of each year and in the formats in Annex 1A.1.
- 8.4 The Forecasts shall be for periods commencing six (6) months from 1 April and 1 October (**Forecast Date**) respectively, and be for a period of thirty-six (36) months, in intervals of six (6) months for the first twelve (12) months, and yearly thereafter.
- 8.5 The Supplying Party will respond to a Forecast within fifteen (15) Business Days of receipt, or such other period as may be agreed. The response shall be either:
- (i) an acknowledgment that the Supplying Party is able to provide the forecasted Interconnect Capacity in the first six (6) month period by a particular date (**Forecast Delivery Date**); or
 - (ii) an acknowledgment that the Supplying Party is able to provide the forecasted Interconnect Capacity in the first six (6) month period, but not be able to provide those quantities in accordance with the Forecast timeframes; or
 - (iii) an advice that the Supplying Party is unable to provide the forecasted Interconnect Capacity in the first six (6) month period as procurement is required.
- 8.6 Where procurement is required in order to meet the Forecast, and where the Supplying Party advises the Forecasting Party pursuant to clause 8.5, the Supplying Party shall seek confirmation of the Forecast from the Forecasting Party. Upon confirmation by the Forecasting Party, the Supplying Party shall complete the procurement no later than it would complete such procurement for itself.
- 8.7 If the Forecasting Party seeks Interconnect Capacity at a level other than the Forecast level or on a Forecast Delivery Date other than the agreed Forecast Delivery Date, it may make a request to the Supplying Party to provide the revised level of capacity or revise the Forecast Delivery Date. The Supplying Party will use

its reasonable endeavours to undertake and complete a feasibility study within thirty (30) Business Days, and the Forecasting Party shall pay a fee to the Supplying Party to recover the reasonable costs involved in the conduct of the study in response to the request

8.8 The Supplying Party is under no obligation to provide Interconnect Capacity other than in accordance with the accepted forecast capacity requirements and the accepted Forecast delivery times. Where there is a dispute as to forecast capacity requirements, the Supplying Party shall provide that level of Interconnection Capacity that it considers reasonable pending resolution of the dispute under Schedule 11.

8.9 Clauses 8.6 and 8.7 are not intended to create a process in substitution for the normal forecasting process.

8.10 The Forecasting Party agrees that:

- (a) the first six (6) months of each Forecast given by it is a commitment for the full quantity of Interconnect Capacity which the Supplying Party will necessarily supply or install in order to meet that Forecast; and
- (b) it will pay any Charges calculated in accordance with clause 8.13; and
- (c) there shall be no variation in the Forecasts as provided to the Supplying Party.

8.11 If, following acceptance of a Forecast, the Supplying Party is unable to provide the Interconnect Capacity or provide the Interconnect Capacity by the Forecast Delivery Date, in whole or part, it must advise the Forecasting Party promptly and both Parties must, where practicable, negotiate a new delivery timetable. To assist in this negotiation, the Supplying Party must offer alternatives where available.

8.12 Delivery of Forecast Capacity

8.12.1 The Parties shall use their reasonable endeavours to ensure that its Network Facilities on its side of the relevant POI are provisioned on the Forecast Delivery Date (or as otherwise agreed) and maintained in accordance with the Forecasts.

8.12.2 Delivery of Interconnect Capacity is taken to occur on the Forecast Delivery Date or on such other date as may be agreed (as applicable) provided that the Supplying Party has advised that it is ready to commence testing.

8.13 Recovery for Over Forecasting

8.13.1 If the Actual Usage by the Forecasting Party of the Interconnect Capacity is greater than or equal to the Minimum Utilisation Percentage, no over forecasting Charges shall apply.

8.13.2 If the Actual Usage by the Forecasting Party of the Interconnect Capacity is less than the Minimum Utilisation Percentage, the Forecasting Party shall pay the amount calculated in accordance with Schedule 9 until such time as Actual Usage reaches the Minimum Utilisation Percentage.

8.13.3 Where a dispute arises in respect to the Actual Usage under this clause 8.13, the matter will be referred for resolution in accordance with Schedule 11 – Dispute Resolution.

8.13.4 For the purposes of this clause 8.13, the Minimum Utilisation Percentage means:

- (a) for the first twelve (12) months of this RIO Agreement, when a Party is required to provide a Forecast, seventy-five (75) percent of the Forecasting Party's Forecast; and
- (b) in all other cases, eighty (80) percent of the Forecasting Party's Forecast.

8.14 Virtual (Distant) Interconnection

8.14.1 Notwithstanding anything else in this clause 8, the Requesting Licensee remains responsible for Forecasting and ordering sufficient Capacity on Local Leased Circuits to enable Virtual (Distant) Interconnection to occur.

8.15 Ordering and Provisioning Procedure for Interconnect Capacity Without Forecast

8.15.1 The Requesting Party shall submit its Request for Interconnect Capacity Without Forecast to the Supplying Party in the form of Annex 1A.2.

8.15.2 The Supplying Party shall process all Requests for Interconnect Capacity Without Forecast on a 'first come, first served' basis.

8.15.3 The Supplying Party shall respond to a Request of Interconnect Capacity Without Forecast within fifteen (15) Business Days, or any other period as may be agreed,

of receipt of such request, or such other period as may be agreed. The response shall be either:

- (a) an acknowledgement that the Supplying Party is able to provide the full Interconnect Capacity without Forecast by the “**Required By Date**”;
- (b) an acknowledgement that the Supplying Party is able to provide the Interconnect Capacity without Forecast, but not be able to provide the quantities by the “**Required By Date**”; or
- (c) an advice that the Supplying Party is unable to provide the Interconnect Capacity without Forecast as procurement is required.

8.15.4 When procurement is required in order to meet the request, and the Supplying Party advises the Requesting Party pursuant to clause 8.15.3, the Supplying Party shall seek confirmation of the required Capacity from the Requesting Party. Upon confirmation, the Supplying Party shall complete the procurement no later than it would complete such procurement for itself.

9. MONITORING UTILIZATION OF INTERCONNECT CAPACITY

9.1 CUT and CUS levels

9.1.1 Both Parties must provide sufficient capacity in the Interconnection Links between each Party’s Networks to accommodate their own traffic. The Parties shall monitor the utilisation of circuits comprising information in clause 9.1.2 (**Capacity Utilization Statistics** or **CUS**) in their own circuit group(s) in the Interconnection Links between each Party’s Networks and ensure that the CUS of each circuit group is less than the Capacity Utilization Threshold (**CUT**) level set out under clause 9.1.3 below.

9.1.2 The CUS of each circuit group means the busy hour circuit utilization of the circuit group (%) divided by the number of circuits in the circuit group.

9.1.3 The CUT level of each circuit group in the Interconnection Link between each Party’s Network shall be reached where:

- (a) there is utilization of eighty five percent (85%) of the Interconnect Capacity, where Interconnect Capacity is less than sixty-three (63) E1s for Interconnection with the Supplying Party’s Network; and

- (b) there is utilization of ninety percent (90%) of the Interconnect Capacity, where Interconnect Capacity is more than sixty-three (63) EIs for Interconnection with the Supplying Party's Network.

9.2 Biannual Provision of Circuit Utilization Statistics (CUS)

9.2.1 Each Party shall provide the other Party on a bi-annual basis (commencing six (6) months from the commencement date agreed in accordance with clause 9.2.2) its CUS for its own circuit group(s) in the Interconnection Links between each Party's Networks.

9.2.2 SingTel and the Requesting Licensee shall negotiate in good faith on:

- (a) the agreed circuit groups to be measured; and
- (b) the commencement date for measurement,

in relation to the provision of CUS.

9.2.3 Each Party shall:

- (a) measure the agreed circuit groups under clause 9.2.2 for a period of one (1) week; and
- (b) calculate its CUS based on the busiest hour of each day in that one (1) week period as determined by total traffic handled by the circuit group(s) to the other Party; and
- (c) provide the other Party with the following information:
 - (i) dates/period of measurement;
 - (ii) circuit group;
 - (iii) busy hour of the day; and
 - (iv) the CUS.

9.2.4 Where one Party reasonably believes that there are any inconsistencies in the CUS, that Party shall seek clarification in writing from the other Party within thirty (30) Calendar Days from receipt of the CUS from the other Party. Both Parties shall attempt to resolve in good faith any inconsistencies in a Party's CUS.

9.3 On-going Traffic Measurement and Provision of Interconnect Capacity for CUS Exceeding CUT level

9.3.1 On an on-going basis, where the Party responsible for the circuit group(s) (**Triggering Party**) determines that its CUS has exceeded the CUT level for seven (7) consecutive days, the Triggering Party shall within twenty (20) Business Days provide a notification (**Notification**) to the other Party (**Receiving Party**). The Notification shall contain the CUS and any remedial measures or recommended steps which the Triggering Party proposes to undertake to address potential congestion levels in Interconnect Capacity.

9.3.2 Upon receipt of the Triggering Party's Notification under clause 9.3.1, the Receiving Party will respond within ten (10) Business Days (or such other period as may be agreed). The response shall be either:

- (a) an acknowledgement that traffic congestion levels in the allocated Interconnect Capacity may be avoided or minimised, provided the Triggering Party duly satisfies any remedial measures or recommended steps outlined in the Triggering Party's Notification; or
- (b) an acknowledgement, based on the Triggering Party's Notification, that traffic congestion levels in allocated Interconnect Capacity is likely to, or will, occur and an accompanying request to the Triggering Party to procure increased Interconnect Capacity.

9.3.3 Where a dispute arises in respect to any provision in clause 9, including differences in the traffic utilization levels measured by SingTel and a Requesting Licensee, which cannot be otherwise resolved by the Parties, the matter will be referred for resolution in accordance with Schedule 11.

9.3.4 Nothing in this clause 9 affects SingTel's rights under clause 8, in particular 8.8 and this clause 9 are not intended to create a process in substitution for the normal forecasting processes and obligations under clause 8.

10. DECOMMISSIONING

10.1 Subject to clauses 10.2 and 10.3, a Party (**Decommissioning Party**) may, for whatever reason upon giving no less than six (6) months prior written notice to the other Party (**Decommissioning Period**), close, replace or relocate any IGS in respect of which

an Interconnection Link is connected, decommission an Interconnection Link or close a POI (**Decommissioning**).

- 10.2 (a) Subject to paragraph (b), the Decommissioning Party shall be responsible for and bear all direct costs incurred by both Parties in carrying out the Decommissioning. Direct costs are limited to removal of equipment and cabling at the POI or IGS. Each Party will bear its own costs of recovering its own part of the Interconnection Link.
- (b) When the request for Decommissioning is at the direction of a Third Party pursuant to a legal obligation binding on the Decommissioning Party, each Party shall bear its own costs associated with the Decommissioning together with the direct costs incurred by that Party in respect of the establishment of alternative arrangements necessary to support the provision of Call Origination, Call Transit and Call Termination Services provided at the time of the Decommissioning.
- 10.3 If Decommissioning is to occur where Physical Interconnection has been established, the Decommissioning Party will, if requested by the other Party within thirty (30) Business Days after receiving a notice under clause 10.1, offer alternative interconnection solutions to the other Party. The alternative interconnection solutions offered must, to the extent feasible, be comparable in terms of cost and functionality and, if accepted by the other Party within sixty (60) Calendar Days from the date of the offer, must permit the full implementation of the alternative interconnection solutions. Nothing in this clause prevents the Decommissioning from occurring on the expiry of the Decommissioning Period provided that the Decommissioning Party has complied with this clause 10.3.
- 10.4 If Decommissioning is to occur where Virtual (Distant) Interconnection has been established:
- (a) the Requesting Licensee is the Decommissioning Party, the Requesting Licensee must also comply, where the Requesting Licensee has acquired Local Leased Circuits from SingTel, with the terms and conditions under which Local Leased Circuits are supplied by SingTel (including the payment of any early termination payments); or
- (b) SingTel is the Decommissioning Party, SingTel will arrange for the connection of Local Leased Circuits to the alternative or relocated IGS or POI prior to the Decommissioning.

10.5 Upon the happening of an event which causes or is likely to cause significant damage to the Network of a Party or which endangers or is likely to endanger the health or safety of any person (**Emergency Event**), that Party may close or replace its IGS or a POI or Decommission an Interconnection Link without prior written notice to the other Party, provided that it notifies the other Party as soon as practicable that the Emergency Event exists and that emergency relocation work is being or will be performed. The costs incurred as a result of, or in connection with, a closure or replacement of an IGS or a POI or Decommissioning of an Interconnection Link under this clause 10.5 shall be borne as follows:

- (a) where the occurrence of the Emergency Event was caused as a result of the negligence or wilful act or omission of the first-mentioned Party, its employees, agents or contractors, that Party shall bear the costs associated with the closure, replacement or Decommissioning incurred by both Parties; and
- (b) where the occurrence of the Emergency Event was not caused as a result of the negligence or wilful act or omission of the first-mentioned Party, its employees, agents or contractors, each Party shall bear its own costs associated with the closure, replacement or Decommissioning.

ANNEX 1A.1: FORECASTING OF INTERCONNECT CAPACITY

Interconnect Capacity Forecasts shall be in accordance with clause 8 of Schedule 1A and include the maximum Interconnect Capacity required at each POI.

Interconnect Capacity Forecast for the Interconnect Link between _____ and _____ .				
Forecasting Period: From _____ to _____				
	Year 1		Year 2	Year 3
	First 6 months	Subsequent 6 months		
No. of E1s for Origination Call Type				
No. of E1s for Termination Call Type				
No. of E1s for Transit Call Type				
		Circuits for Origination Call Type	Circuits for Termination Call Type	Circuits for Transit Call Type
No. of E1s to be turned on in 1st month of Forecasting period:				
No. of E1s to be turned on in 2nd month of Forecasting period:				
No. of E1s to be turned on in 3rd month of Forecasting period:				
No. of E1s to be turned on in 4th month of Forecasting period:				
No. of E1s to be turned on in 5th month of Forecasting period:				

ANNEX 1A.2: INTERCONNECT CAPACITY WITHOUT FORECAST

Request For Interconnect Capacity Without Forecast			
Name of Operator:			
Purchase Order No:			
Required By Date:			
Operator's Switch:			
SingTel's Switch:			
	Circuits for Origination Call Type	Circuits for Termination Call Type	Circuits for Transit Call Type
No. of E1s			

ANNEX 1A.3: REQUEST FORM FOR ACTIVATION, DEACTIVATION AND MODIFICATION OF INTERCONNECT LINKS

Date: _____ Application Reference Number: _____

To: Manager, Network Integration and Interconnect

- ☐ Activation of New Interconnection Links
- ☐ Deactivation of Interconnection Links
- ☐ Modification of Interconnection Links

Requesting Licensee Particulars																																								
<p>Requesting Licensee Name : _____</p> <p>Requesting Licensee's BRN: _____</p> <p>Name : _____</p> <p>Designation : _____</p> <p>Signature : _____</p> <p>Telephone : _____</p> <p>Email : _____ Company Stamp : _____</p>																																								
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_____	_____	_____																																						

_____	_____	_____																																						

_____	_____	_____																																						

_____	_____	_____																																						

Information for Modification of Interconnection Links:

* CIC no. is not applicable for activation of new interconnection links

SingTel's Reply to the Requesting Licensee

- ☐ Application returned – incomplete/illegible
- ☐ Not Approved Reason for Rejection : _____
- ☐ Approved SingTel Approval Code : _____
- Ready for Service Date : _____

On Behalf of SingTel

Sign : _____ Contact Number : _____

Name : _____ Email : _____

Processed Date : _____

SCHEDULE 1B

VIRTUAL (DISTANT) INTERCONNECTION FOR SBOs

SCHEDULE 1B

VIRTUAL (DISTANT) INTERCONNECTION FOR SBOS

CONTENTS

1. GENERAL 1

2. INTERCONNECT CONFIGURATION 1

3. POINT OF INTERCONNECTION 3

4. TECHNICAL REQUIREMENTS AND SPECIFICATIONS 4

5. DECOMMISSIONING 5

**ANNEX 1B.1 – REQUEST FORM FOR ACTIVATION, DEACTIVATION AND MODIFICATION OF
INTERCONNECT LINKS**

SCHEDULE 1B

VIRTUAL (DISTANT) INTERCONNECTION FOR SBOS

1. GENERAL

- 1.1 Each Party agrees to interconnect and keep interconnected their respective Networks subject to and in accordance with the terms and conditions of this Schedule 1B.
- 1.2 This Schedule 1B only applies to a Requesting Licensee which is an SBO.
- 1.3 For the avoidance doubt and unless the Parties agree otherwise, where both Parties have established Interconnection of their respective Networks prior to the RIO Review Date:
 - (a) the existing interconnect configuration that applies between each Party's respective Network at the RIO Review Date will continue to apply; and
 - (b) the Parties need not change the Interconnection configuration of their respective Networks as may be required under this Schedule 1B.

2. INTERCONNECT CONFIGURATION

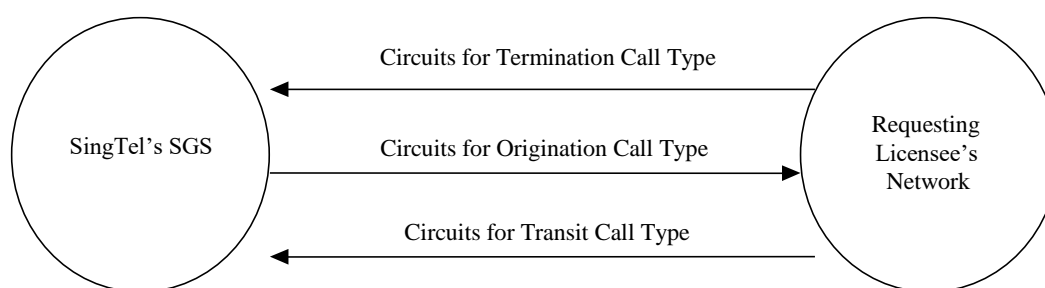
- 2.1 The Requesting Licensee must interconnect its Network with the SingTel Network at SingTel's SBO Gateway Switches (**SGS**) as specified in Section 2F of Annex A.
- 2.2 SingTel and the Requesting Licensee are responsible for managing and maintaining their own Interconnection Links, taking into account the need for growth, diversity and security in traffic routes and signalling links. For the avoidance of doubt, there is no obligation on either Party to manage or maintain the other Party's Interconnection Links.
- 2.3 The Minimum Interconnection Capacity for Interconnection by the Requesting Licensee to one (1) SingTel SGS is two (2) 2Mbps E1 links. The Minimum Interconnection Capacity for Interconnection by the Requesting Licensee to two (2) of SingTel SGS is four (4) 2Mbps E1 links.

CLAUSE 2.4 – MODIFICATION REQUIRED

- 2.4 ~~[Deleted] If the Requesting Licensee interconnects to SingTel's Network with Interconnection Capacity less than the Minimum Interconnection Capacity, the Requesting Licensee acknowledges that the Network performance may not be equivalent to other Licensees which have fulfilled the Minimum Interconnection Capacity for Interconnection at each of SingTel's SGSs. SingTel shall not be liable for any degradation in Call handling and/or Network performance experienced by a Requesting Licensee who does not fulfil the Minimum Interconnection Capacity.~~

IMDA Directed Modifications: *As explained in IMDA's Decision, IMDA agrees that having link diversity would ensure the continual provision of the Requesting Licensee's service during outage and minimise disruptions to end-users. However, in view of impending network changes when industry migrates to IP-based interconnection and to minimise commercial impact to existing Requesting Licensees, IMDA will require Singtel to propose modifications to clause 2.4 to apply the proposed removal of the option for Requesting Licensees to interconnect at less than the minimum interconnection capacity, to only future Requesting Licensees (both FBOs and SBOs) of this service.*

- 2.5 An Interconnection Link may comprise different types of circuit groups. The circuits in each circuit group will convey traffic in a specific direction (one-way) as shown below. The Requesting Licensee must designate the Interconnection Link for each type of circuit group. SingTel shall assign the Circuit Identification Code (CIC) for both SingTel's and the Requesting Licensee's Interconnection Links terminating on SingTel's SGS, unless the Parties agree otherwise.



Circuit Groups

- 2.6 The Requesting Licensee is responsible for the correct dimensioning of the type of circuit groups (one-way) that it will require.
- 2.7 If SingTel or the Requesting Licensee wishes to interconnect at additional POIs, that Party may request an additional POI and the Party will negotiate in good faith

in relation to the interconnect configuration applicable to such additional Interconnection. The Party that wishes to interconnect at additional POIs is liable for any reasonable costs incurred by the other Party where those costs are caused by the requesting Party's request in relation to establishing any such additional POIs. Such costs are to be determined as part of the good faith negotiations, which shall take into account factors such as the principle of cost causality and the benefit enjoyed by both parties arising from the additional POIs.

- 2.8 Neither Party shall be required to commence works on the installation of Network Facilities to support a new POI under clause 2.7 until the Party has agreed on the interconnect configuration under clause 2.7.

3. POINT OF INTERCONNECTION

- 3.1 The Parties agree that the POI will be located on the Requesting Licensee's side of the SingTel SGS Digital Distribution Frame (**DDF**) at the SingTel SGS.
- 3.2 Each Party is responsible for the provisioning and maintenance of Network Facilities on its "side" of the POI.
- 3.3 The Interconnection between SingTel's SGS and the Requesting Licensee's Network located at a different site will be implemented by means of 2Mbps E1 Interconnection Link.
- 3.4 The Requesting Licensee will be responsible for the connection of the Interconnection Link between the POI and the Requesting Licensee's Network.
- 3.5 The Requesting Licensee shall acquire its own Local Leased Circuits at 2Mbps (E1) G.703 interface to form part of the Interconnection Link from SingTel or another Licensee. The Requesting Licensee's Interconnection Link must consist of multiple 2Mbps (E1) circuits terminated at a DDF in SingTel's designated SGS exchanges.
- 3.6 At the Requesting Licensee's request, SingTel will lease Local Leased Circuits at 2Mbps (E1) G.703 interface to the Requesting Licensee's Network based on SingTel's standard terms and conditions for supply of Local Leased Circuit service.
- 3.7 The Requesting Licensee may request modification of an Interconnection Link by completing the request form set out in Annex 1B.1. SingTel will consider the request for modification and approve or reject the request for modification by written notice to the Requesting Licensee within fourteen (14) Calendar Days of receipt of a duly completed request form from the Requesting Licensee. If SingTel

agrees to such a modification, SingTel will undertake the modification in accordance with that request. The Requesting Licensee will be liable for any costs incurred by SingTel in performing the modification of the Interconnection Link. If SingTel rejects the request for modification, it will specify the reasons in its written notice to the Requesting Licensee. SingTel may reject a request for modification of an Interconnection Link on reasonable grounds including (without limitation) where the requested modification:

- (a) would have, or would likely have, the effect of impairing, disrupting or damaging SingTel's Network, SingTel's equipment or other Interconnection Links;
- (b) is not technically feasible;
- (c) would cause, or would likely cause, SingTel to be in breach of any applicable laws or regulations or its licence; or
- (d) does not contain all the necessary information or is illegible.

4. TECHNICAL REQUIREMENTS AND SPECIFICATIONS

4.1 Transmission

- 4.1.1 The Parties shall interface at 2Mbps level and comply with ITU-T Rec G.703.

4.2 Signalling

- 4.2.1 The Parties shall comply with CCS SS7 – MTP and ISUP as specified in Section 1 of Annex A.
- 4.2.2 The Requesting Licensee shall obtain its own Signalling Point Code from the Authority.
- 4.2.3 Both Parties shall provide CCS SS7 Signalling Link(s) up to a maximum of two (2) SS7 Signalling Links for Interconnection to one (1) SGS (or POI) or a maximum of four (4) SS7 Signalling Links for Interconnection to two (2) SGSs.
- 4.2.4 The Parties shall adhere to additional SS7 signalling requirement as follows:
 - (a) The Calling Party Number and Redirecting Number if available shall be conveyed for all Calls across the Network connection without manipulation.

- (b) The Dummy CLI received from Mobile Operators from inbound and outbound roamers shall be an eight (8) digit Dummy CLI.
- (c) The number dialled by the calling subscriber shall not be changed or amended for the routing of international outgoing Calls from one Party's Network to the other Party's Network. In addition, the NOA of the Called Party Number shall be set to 'International'.
- (d) Each Party's Network shall deliver international incoming Calls to the terminating Party's domestic Network with the international Call indicator 'A' bit of FCI parameter of the IAM set to '1'.

4.3 **Interconnect Testing**

- 4.3.1 The Parties shall comply with the testing procedures in Section 1A of Annex A.

4.4 **Routing**

- 4.4.1 The Parties shall route Interconnected Calls in accordance with the agreed arrangements applicable to that Call Type under Schedule 2.

5. **DECOMMISSIONING**

- 5.1 Subject to clauses 5.2 and 5.3, a Party (**Decommissioning Party**) may, for whatever reason, upon giving no less than six (6) months prior written notice to the other Party, close, replace or relocate any SGS in respect of which an Interconnection Link is connected, decommission an Interconnection Link or close a POI (**Decommissioning**).
- 5.2
 - (a) Subject to paragraph (b), the Decommissioning Party shall be responsible for and bear all direct costs incurred by both Parties in carrying out the Decommissioning. Direct costs are limited to removal of equipment and cabling at the POI.
 - (b) When the request for Decommissioning is at the direction of a Third Party pursuant to a legal obligation binding on the Decommissioning Party, each Party shall bear its own costs associated with the Decommissioning together with the direct costs incurred by that Party in respect of the establishment of alternative arrangements necessary to support the provision of Call Origination, Call Transit and Call Termination Services provided at the time of the Decommissioning.

- 5.3 If Decommissioning is to occur where Virtual (Distant) Interconnection has been established:
- (a) if the Requesting Licensee is the Decommissioning Party, the Requesting Licensee must comply, where the Requesting Licensee has acquired Local Leased Circuits from SingTel, with the terms and conditions under which Local Leased Circuits are supplied by SingTel (including the payment of any early termination payments); and
 - (b) if SingTel is the Decommissioning Party, SingTel will arrange for the connection of Local Leased Circuits which are supplied by SingTel to the alternative or relocated SGS or POI prior to the Decommissioning.
- 5.4 Upon the happening of an event which causes or is likely to cause significant damage to the Network of a Party or which endangers or is likely to endanger the health or safety of any person (**Emergency Event**), that Party may close or replace its SGS or a POI or Decommission an Interconnection Link without prior written notice to the other Party, provided that it notifies the other Party as soon as practicable that the Emergency Event exists and that emergency relocation work is being or will be performed. The costs incurred as a result of, or in connection with, a closure or replacement of an SGS or a POI or Decommissioning of an Interconnection Link under this clause shall be borne as follows:
- (a) where the occurrence of the Emergency Event was caused as a result of the negligence or wilful act or omission of the first-mentioned Party, its employees, agents or contractors, that Party shall bear the costs associated with the closure, replacement or Decommissioning incurred by both Parties; and
 - (b) where the occurrence of the Emergency Event was not caused as a result of the negligence or wilful act or omission of the first-mentioned Party, its employees, agents or contractors, each Party shall bear its own costs associated with the closure, replacement or Decommissioning.

ANNEX 1B.1: REQUEST FORM FOR ACTIVATION, DEACTIVATION AND MODIFICATION OF INTERCONNECT LINKS

Date: _____ Application Reference Number: _____

To: Manager, Network Integration and Interconnect

- ☐ Activation of New Interconnection Links
- ☐ Deactivation of Interconnection Links
- ☐ Modification of Interconnection Links

Requesting Licensee Particulars																																											
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