

International Telecommunication Union

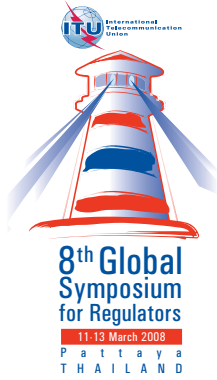
# GSR 2008

## Discussion Paper

Comments are welcome and should be sent by 13 April 2008 to [GSR08@itu.int](mailto:GSR08@itu.int)



International  
Telecommunication  
Union



INTERNATIONAL TELECOMMUNICATION UNION

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# INTERNATIONAL SHARING: INTERNATIONAL GATEWAY LIBERALIZATION SINGAPORE'S EXPERIENCE

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## 1 BACKGROUND AND INTRODUCTION

Today, a nation's information backbone is predominantly made up of fibre optic cables, and is usually linked to other nations in other regions by a complicated web of cable networks. These networks are essential to the health of the domestic and global economy.

### 1.1 What Is An International Gateway (IGW)?

An International Gateway is defined as any facility through which international telecommunications traffic is sent and received. IGWs are potential bottlenecks in any nation's telecommunications market as they can restrict international traffic flows and maintain artificially high prices. Most international traffic goes through submarine cable systems, which will be the focus of this paper. Another important form of IGW, particularly for land-locked countries, is satellite communications.

### 1.2 Importance of International Gateway Liberalization in Singapore

Over the years, voice and data transmissions via submarine cables had traditionally been seen as a natural monopoly of incumbent operators, due to the high costs of investment and maintenance. However, with the arrival of the Internet and an explosion in the need to transmit voice and data, demand for capacity and interconnection has grown exponentially. A nation's ability to fully participate in the global Information Society may be impeded due to the high costs of Internet access or international communications.

In Singapore, the decision to introduce competition in the local and international telecommunications market was influenced by two main factors. First, rapid technological advancement had greatly reduced infrastructural costs and hence, the natural monopoly argument no longer held true. Second, a monopoly provider would not have sufficient incentives to provide the increasingly diverse and sophisticated demand for telecom services to support Singapore's aim to be a global economic and communication centre. Telecom liberalization was thus necessary to enable competition, increase consumers' choice and stimulate greater market efficiencies. Ensuring effective competition in the international telecom market is a key consideration of the Infocomm Development Authority's (IDA) objective in enhancing Singapore's economic competitiveness.

## 2 SUBMARINE CABLE SYSTEMS

A submarine cable system comprises 4 main portions (a) the wet side<sup>1</sup>; (b) the beach manhole<sup>2</sup>; (c) the backhaul<sup>3</sup> and (d) The Submarine Cable Landing Station (SCLS)<sup>4</sup>. Note the collocation spaces and connection services inside the SCLS which we shall discuss later.

*Please see Figure 1 for a schematic of a Submarine Cable System.*

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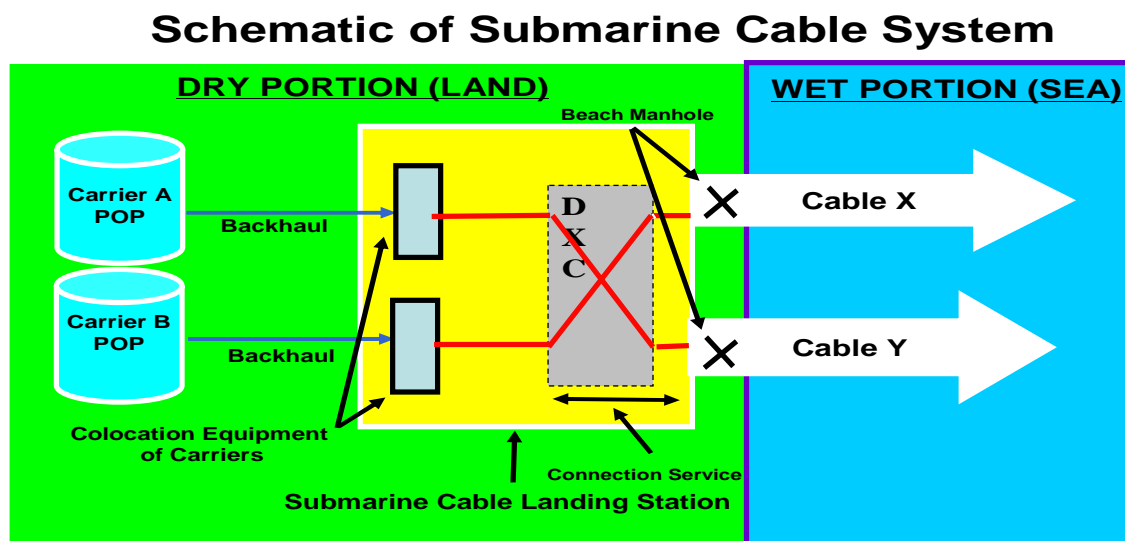
<sup>1</sup> Which refers to the portion of cable which is under the sea

<sup>2</sup> Where the cable emerges from the sea to land

<sup>3</sup> Backhaul refers to high capacity circuits that connect an SCLS to another terminating point (e.g. an operator's telecoms exchange) within the same country. From this terminating point, voice or data can be distributed to smaller capacity circuits over a network. Telecoms operators who have built backhaul facilities to the SCLS are licensed as Facilities-Based Operators (FBOs)

<sup>4</sup> A submarine cable landing station houses all terminal equipment; including lasers, multiplexers and power supply that takes the optical signals from the Cable and passes it on to a terrestrial system.

Figure 1: Schematic of Submarine Cable System



Note: DXC or Digital Cross Connect is a switching system that routes signals among multiple paths or different operators' circuits in this case.

## 2.1 Growth in International Traffic

With advances in optical fibre technologies, the cost of building and maintaining submarine cables has fallen. This resulted in a growing number of submarine cable networks worldwide. The Trans-Atlantic route is no longer the only well-served route. In addition, the Pacific routes and routes through the Middle East are growing rapidly. In fact, some countries now have international capacity measured not in gigabits per second but in terabits per second.

Liberalisation also made it possible for new operators to construct their own cable systems instead of being forced to join a consortium of various national operators and having to pay a high entrance fee. The first such cable was PTAT-1, which crossed the North Atlantic Ocean in 1989, linking New Jersey, Bermuda, Ireland and the UK. It effectively broke the joint monopoly of AT&T and British Telecom.<sup>5</sup>

For developing countries, the emergence of Next-Generation Networks (NGN), coupled with the increasing demand for international Internet connectivity means an even more urgent need to accelerate their efforts to connect. The WSIS<sup>6</sup> Agenda for the Information Society in 2005 urged the development of strategies that enable affordable global connectivity and facilitate equitable access to all.

<sup>5</sup> The PTAT-1 was shut down in 2004 as being no longer viable, because prices of other trans-Atlantic cables fell significantly.

<sup>6</sup> World Summit on the Information Society (WSIS), Tunis 2005, [www.itu.int/wsis](http://www.itu.int/wsis)

### 3 REGULATING IGWs IN SINGAPORE

One of the most important drivers of increased international bandwidth capacity is long-term, sustainable and effective competition in the international telecommunication services market. In 2000, IDA fully liberalised its telecoms sector and at the same time revamped its regulatory framework. By September 2000, the IDA created the Code of Practice for Competition in the Provision of Telecommunication Services (The Code) which establishes a clear regulatory framework to help foster competition in Singapore. IDA also evolved a regulatory/policymaking methodology as a systematic means to achieve policy outcomes and address regulatory challenges (See Box 1).

#### Box 1: IDA's Regulatory / Policy Making Methodology

1. Determine the desired policy/regulatory outcomes
2. Apply IDA's Regulatory Principles throughout the process
  - Rely on market forces, wherever possible
  - Promote effective and sustainable competition
  - Promote facilities-based competition, wherever possible
  - Regulate in proportionate manner
  - Be technology neutral
  - Be transparent
  - Be timely in implementation and enforcement
3. Consult interested parties/stakeholders (including research on domestic and international practices)
4. Address concerns and analyze findings
5. Make preliminary recommendations
6. Advise interested parties on preliminary recommendations
7. Make decision, explain the reasons behind the decision (and address industry's requests for reconsideration and appeal, if any)
8. Implement decision (ensure legislation, enough resources, training)
9. Monitor that policy/regulatory objectives are being met. If not, take corrective action
10. Review overall decision after 2-4 years

The important first step is to determine the desired regulatory/policy outcomes. In this case, Singapore's desired outcomes in regulating IGWs are: Firstly, to create a vibrant international market in Singapore, with multiple players in the market. Secondly, to substantially increase Singapore's international bandwidth capacity. Thirdly, to ensure significant drops in the costs of international communications.

#### 3.1 Dominant Licensee's Reference Interconnection Offer (RIO)

The next step is to require the Dominant Licensee to provide a Reference Interconnection Offer to its competitors. The RIO is essentially a model interconnection contract that facilitates rapid access and interconnection with the Dominant Licensee. The RIO covers, amongst others, a range of interconnection issues, including domestic interconnection, unbundled network elements, collocation and infrastructure sharing.

The RIO is important because it sets out in a transparent, efficient and non-discriminatory manner, regulator-approved prices, terms and conditions for other operators to interconnect, collocate and access the Dominant Licensee's SCLS. In Singapore, the RIO becomes a critical instrument in which to facilitate rapid adoption of reasonable interconnection agreements between the Dominant Licensee and other operators, which in turn, reduces the timeframe for interconnection negotiations, expedites market entry and promotes effective and sustainable competition.

Full texts of SingTel's Reference Interconnection Offer (RIO) can be found at:  
[www.ida.gov.sg/Policies%20and%20Regulation/20060602171047.aspx](http://www.ida.gov.sg/Policies%20and%20Regulation/20060602171047.aspx)

## 4 ACCESS TO SCLS

A key component of full liberalization is to encourage the landing of multiple submarine cable systems, with operators being able to access and backhaul their capacity on these cable systems effectively and efficiently for the provision of international telecommunications services. Singapore now has two operators who have four SCLSs between them.

In practice, most of the submarine cable systems that land in Singapore do so in the Dominant Licensee's SCLS. Operators that compete with the Dominant Licensee to provide international telecommunication services usually need access to the Dominant Licensee's SCLS to connect to their own submarine cable capacity, and to backhaul this capacity to their own exchange.

### 4.1 Mandating Collocation

As part of the full liberalization, IDA required that collocation<sup>7</sup> should be mandated at the Dominant Licensee's SCLS, at cost-based rates. This allowed operators providing international services direct and more efficient access to submarine cable capacity that land at the SCLSs and backhaul the capacity to their own exchange. This requirement was put into the Dominant Licensee's RIO that was approved in 2001. See Box 3 for collocation details, and Annex A for collocation charges.

#### Box 2: Collocation Details in Dominant Licensee's RIO

- ↳ Requesting Licensee can request up to a maximum of 10 square meters of collocation space at cost-based rates of about US\$2000 per square meter per year
- ↳ Requesting Licensee may request for collocation space using a request form that is included in the RIO. Dominant Licensee will process and respond within 3 business days
- ↳ Dominant Licensee will undertake preliminary site survey and joint site survey within 15 business days
- ↳ Dominant Licensee will finish site preparation work within 25 business days, at rates stated in the RIO
- ↳ If Dominant Licensee fails to meet Service Level Guarantees stated above, rebates will be given to Requesting Licensee (rates stated in the RIO)
- ↳ RIO indicates detailed requirements that Dominant Licensee will provide eg at least 13 amps of power per collocation space, and earthing standard of 1 ohm
- ↳ RIO includes procedures to allow Requesting Licensee to maintain and repair their equipment. Upon request, Dominant Licensee will provide an escort for the Requesting Licensee within 24 hours, at reasonable rates stated in the RIO. (within 1 hour for emergencies)

<sup>7</sup> Collocation refers to the lease of space at the SCLS, incumbent's facilities, such as an exchange or to house transmission equipment.



Mandating collocation in the SCLS is a significant step in facilitating competition in the provision of international services. As a result of IDA's mandating collocation at the SCLS, operators are able to access and backhaul their own submarine cable capacity. In addition, competition in the backhaul services market was introduced, thereby bringing down the prices of backhaul in Singapore and international services. Notwithstanding, IDA noted that mandating collocation alone is insufficient to achieve the objectives of liberalization, because other bottlenecks, like Connection Services, had to be similarly addressed.

## 4.2 Mandating Connection Services and Price Regulation

An operator who has collocated equipment in the Dominant Licensee's SCLS must connect its national network to a submarine cable system. In order to do so, the Dominant Licensee must provide "Connection Services" to the operator. In 2000, while IDA mandated collocation, IDA had allowed Connection Services to remain as a service to be commercially-negotiated. It had also found that this was usually not a mandatory interconnection service in other regimes such as Japan or US.

Nevertheless after some industry feedback, IDA reviewed Connection Services and assessed that such services would constitute a clear bottleneck service. Essentially, IDA had three concerns. The first concern was that the Dominant Licensee could set its connection services rates unreasonably high because the other licensees have no other viable alternatives. Secondly, the Dominant Licensee could offer unreasonable terms and conditions which would further delay the ability of competing licensees to access and backhaul its own capacity. The third of IDA's concerns was the potential impact on Singapore's attractiveness as an international communications hub. In our review, IDA had found that the costs of accessing submarine cable capacity in other countries like Japan, the United States and Australia were much lower, for similar connection services. The high costs for connection services may cause licensees to reconsider lighting up their cable capacity in Singapore and instead they may choose to activate the capacity in other markets where the prices were more in-line with costs.

IDA thus amended the Code in 2002 to designate Connection Services as a mandatory service under the Code and required the Dominant Licensee to provide Connection Services under the RIO at prices that are cost-based and determined by IDA using forward looking economic costs and long run average incremental cost (FLEC/LRAIC)<sup>8</sup> methodology.

Connection Service charges have fallen by more than 90 per cent since the measure came into effect in 2002. See Annex B for Connection Service charges and Service Level Guarantees.

## 4.3 Enable Unrestricted Access in SCLS

Even with mandatory Connection Services, more work needed to be done.

Prior to 2004, if an operator owned international capacity on a submarine cable system landing at SingTel's SCLS, it can access such capacity to offer services to businesses or third parties. However, this operator cannot access capacity that it does not own in other submarine cable systems that land at the same station. Neither can they access capacity on behalf of a third party,

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<sup>8</sup> FLEC refers to the prospective costs an operator would incur in producing a service, using most efficient technology and best practices. This cost standard favors the prospective rather than historical basis for costs; economic rather than accounting measures of cost; and costs based on most efficient technology rather than embedded technology. To the Dominant Licensee operators, FLEC would incentivize them to be more efficient since they will only be compensated as such. To the new operators, FLEC would assist them in their build vs buy decisions, since it will be reflective of the costs they will be incurring if they were to construct their own facilities. If charges were priced below FLEC, new operators will not invest in additional infrastructure, but "free-ride" on Dominant Licensee operators' network. However, if charges were priced above FLEC, new operators may construct too much of their own facilities, resulting in unnecessary duplication and uneconomic bypass of Dominant Licensee operators' facilities. LRAIC consists of all variable costs and those fixed costs that are directly attributable to the provision of an additional unit of a service, and the share of indirect costs that are discernibly caused by such provision.

who owns capacity in these other cable systems, but lacks the necessary backhaul infrastructure for connection between the SCLS and its exchange premises.

It is evident that the restrictions on access in SCLS are increasingly inappropriate in today's market environment and will unnecessarily restrict operators from connection and/or transiting more submarine cable traffic through Singapore, thereby limiting effective competition in the telecommunications market.

In 2004, taking into account the changes in the market, IDA reviewed the regulatory framework for access to SCLS and made the following change. From 2004, operators can access capacity that is owned, or leased on a long term basis, on any submarine cable at the SCLS. Furthermore, these operators can also access capacity that is owned or leased by third parties, in order to offer them backhaul and transit services. IDA's decision provides greater flexibility and choice to operators in accessing, backhauling and transiting submarine cable capacity.

More details in:

<http://www.ida.gov.sg/News%20and%20Events/20050712175459.aspx?getPagetype=20>

## **5 SUBMARINE CABLE LANDING COORDINATION IN SINGAPORE**

Apart from regulation, IDA also aims to facilitate submarine cable landing in Singapore. The nature of the submarine landing requires use/access of several government controlled resources, operators usually need to seek approval from more than one governmental agency for example, the port authorities, utilities authorities, land control authorities etc. Hence, as with most regimes, operators need to face multi-governmental agencies in order to land submarine cables. In Singapore, the wet side, or sea approach, is under the purview of the Maritime & Port Authority of Singapore ("MPA") while approval on the land portion is under the purview of several agencies with the lead agencies for land usage being the Urban Redevelopment Authority ("URA") and the Singapore Land Authority ("SLA").

### **5.1 Landing Process and Coordination in Singapore**

When an interested licensee intends to land a cable in Singapore, IDA facilitates the process as a "one-stop-shop" for the licensee to interface with all the necessary government agencies. The process involves guiding the licensee on the steps and processes necessary to land the cable as well as to reduce time and administrative hassle that may arise.

As there are multiple agencies involved in the clearance for the landing of a submarine cable system, IDA takes on the role to coordinate any issues that may arise from the licensee's application. Depending on the complexity of the landing of a submarine cable, the time taken for obtaining approval from the various government agencies may be between 2 to 6 months.

The most obvious benefit of having a "one-stop shop" concept is the convenience accorded to operators who wishes to land submarine cables in Singapore.

## **6 IMPACT ON DOMINANT LICENSEE AND CONSUMERS**

Faced with competition and a loss of monopoly in the Singapore market, the Dominant Licensee was forced to adopt a new business strategy to grow and internationalize. As a commercial entity that was accountable to its shareholders and that would eventually be subjected to competition, the Dominant Licensee was also forced to revamp and improve its operational efficiency, which led to lower tariffs and improved services for business and retail customers. Compared to 10 years ago, the Dominant Licensee's overall global revenues are three times more than pre-liberalization days.

With effective competition at the IGW, more players entered the international market. International Direct Dialling (IDD) rates had fallen more than 90 per cent since 2000 and there are today, more than 900 service providers in Singapore (more than 70 are ISPs). International private leased

circuit rates had fallen by a staggering 95 per cent. In 2007, the mobile phone penetration rate stands at 116 per cent, while broadband penetration rates per household had hit 77 per cent.

## **7 CHALLENGES & LESSONS**

Because Singapore is a small island of 4.6 million people, it had to be bold in formulating a highly effective competition management framework for international gateways. We had to learn from international best practices because Singapore in the year 2000 did not have a general competition law or a relevant history of competition policy that could be applied. Plans for full liberalization had also been accelerated (from 2007 to 2000) and IDA urgently needed to put rules in place to encourage new players to enter the sector.

The international gateway liberalization experience specifically has been a long learning process with many iterations. There were many potential bottlenecks that the regulator did not foresee. The regulator has to be vigilant in order to keep the nascent IGW competition alive.

Because of the many issues that demand attention in a regulatory decision, it is of utmost importance that there are clear policy objectives, firm regulatory principles and a consultative rulemaking methodology to ensure that regulation is prescribed and implemented in a consistent, optimal manner. At the same time, regulation should not be for regulation's sake. In this light, the dual hat of IDA as a regulator and development agency is advantageous in ensuring that regulation is prescribed with a developmental mindset in order to achieve certain policy/regulatory outcomes.

Lastly, the authority to require a RIO and to mandate collocation already exist in many countries. Therefore most countries already have the tools to address the issue of access to an SCLS that is deemed to be a bottleneck.

In conclusion, it is important to note that as different economies have different socio-economic landscapes and national economic goals, there is no standard regulatory blueprint for every regime. We hope our experience will provide some helpful learning points for you.

More details can be found at [www.ida.gov.sg](http://www.ida.gov.sg) or contact the author at [muhd\\_hanafiah@ida.gov.sg](mailto:muhd_hanafiah@ida.gov.sg)

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## ANNEX A: DETAILS OF SCLS COLLOCATION IN THE RIO

### RATES/CHARGES

#### 8.2 Charges

##### 8.2.1 The Charges are as follows:

**TABLE 1 - COMMON CHARGES FOR CO-LOCATION AT:**

**POI/POA/ SUBMARINE CABLE LANDING STATION**

DESCRIPTION	CHARGES (\$\$)
<b>Ordering And Provisioning</b>	
Per order <sup>30</sup>	\$ 39.27
Per order (applicable where the application is rejected by SingTel pursuant to clause 3.3 of Schedules 8A, 8B and 8D)	\$ 14.21
Project Study (per Co-location Site)	\$ 1,517.47
<b>Modified Co-Location Equipment</b>	
Per Request	on a case-by-case basis
<b>Site Preparation &amp; Installation</b>	
Site Preparation Work –for M&E works etc	on a case-by-case basis
Fire Safety Bureau Charges (where applicable)	on a case-by-case basis
Building & Construction Authority Charges (where applicable)	on a case-by-case basis
Construction of Connection Duct – 1 metre of 110mm diameter Connection Duct	\$ 1,011.41
Road Opening Application Fee (where applicable)	\$ 75.90
Installation of Optical Fibre	on a case-by-case basis
Provision, installation and termination of Transmission Tie Cables, Power and Earth comms cables	on a case-by-case basis

<sup>30</sup> This charge will not apply where the order is rejected pursuant to clause 3.3 of Schedules 8A, 8B or 8D.

DESCRIPTION	CHARGES (\$\$)
Provision, installation and termination of Tie Cables for IRS Tail Circuit Service (n x 64 kbps, 2 Mbps, 45 Mbps and 155 Mbps)	on a case-by-case basis
<b>Recurrent Charges (paid quarterly)</b>	
Co-location Space (minimum of 1 square metre to maximum of 10 square metre) per square metre per year (where the Requesting Licensee also leases Roof Space under Schedule 5C)	\$ 3,034.35
Co-location Space (minimum of 1 square metre to maximum of 10 square metre) per square metre per year (where the Requesting Licensee leases only Co-location Space under Schedules 8A, 8B and 8D)	\$ 3,337.79
Power (minimum of 13 fused amp for AC and minimum of 20 fused amp for DC) per fused amp per year	\$ 286.09
<b>Lead-in Ducts (per duct metre per year)</b>	
Central Business District	\$ 4.28
Non-Central Business District	\$ 4.17
<b>Lead-in Manholes (per duct bore per year)</b>	
Central Business District	\$ 50.25
Non-Central Business District	\$ 48.18

DESCRIPTION	CHARGES (\$\$)
<b>Manpower Cost</b>	
<b>Supervision of work during installation, Site Inspection, Final Inspection, Escort Service for Physical Access</b>	
During Office Hours (Minimum 2 hrs) – per hour	\$ 46.42
After Office Hours (Minimum 2 hrs) – per hour	\$ 69.63
After Office Hours (Minimum 4 hrs if recalled from home) – per hour	\$ 69.63
Saturday (Minimum 4 hrs) – per hour	\$ 69.63
Sunday (requiring < 4 hrs) – per activation	\$ 408.50
Sunday (requiring > = 4 hrs) – per activation	\$ 816.99
Public Holiday – per activation	\$ 742.72
For all recalls/activations, the Requesting Licensee shall reimburse SingTel for its staff's reasonable transportation claim	
<b>Physical Access/Emergency Physical Access</b>	
Per Request	\$ 12.53
<b>Updating Master List</b>	
Administrative Fee (per form)	\$ 12.53
<b>Termination Charges</b>	
Per Termination Request including recovery of Equipment, Cable Trays, M&E works (where applicable) upon termination of Co-location.	on a case-by-case basis
<b>Reconnection Charges</b>	
Per Reconnection Request <sup>31</sup> (per Co-location Site)	on a case-by-case basis
<b>SingTel Exchange Related Information</b>	
Application Fee per application	\$ 12.53
Address of SingTel Exchange Building and diagram of network boundary per SingTel Exchange	\$ 58.83

<sup>31</sup> These charges shall apply in the event of the lifting of suspension of this RIO Agreement or Schedules 8A, 8B or 8D.

## SERVICE LEVEL GUARANTEES FOR COLLOCATION

### 1. REBATES FOR CO-LOCATION REQUEST TIMEFRAMES

Missed notification timeframe as to whether Co-Location Request is accepted or rejected (clause 3.3) by:	Rebate
1-30 Calendar Days	Number of days of delay x weekly recurring Charge
More than 30 Calendar Days	30 x weekly recurring Charge

Missed notification timeframe as to response to Co-Location Request following detailed processing (clause 3.5) by:	Rebate
1-30 Calendar Days	Number of days of delay x weekly recurring Charge
More than 30 Calendar Days	30 x weekly recurring Charge

### 2. REBATES FOR PROJECT STUDY TIMEFRAMES

Missed timeframe for completion of Project Study (clause 4.1) by:	Rebate
1-30 Calendar Days	Number of days of delay x weekly recurring Charge
More than 30 Calendar Days	30 x weekly recurring Charge

### 3. REBATES FOR SITE PREPARATION WORK

Missed timeframe for completion of Site Preparation Work (clause 5.1) by:	Rebate
1-30 Calendar Days	Number of days of delay x weekly recurring Charge
More than 30 Calendar Days	30 x weekly recurring Charge

## **ANNEX B: DETAILS OF “CONNECTION SERVICES” IN THE RIO**

### **RATES/CHARGES**

#### **SCHEDULE 4B – SUBMARINE CABLE CONNECTION SERVICE**

##### **4.3 General**

4.3.1 The Requesting Licensee shall be liable to pay and shall pay SingTel the relevant Charges for the Connection Service as provided in Schedule 4B. A link is referred to as a fibre pair or co-axial cable pair.

##### **4.3.2 Application Charge**

The Requesting Licensee shall pay to SingTel the Application Charge for processing each Request for Connection Service (including all requests that are rejected). The Application Charge shall be applied if the Request for Connection Service is not approved by SingTel or prematurely cancelled or terminated by the Requesting Licensee.

##### **4.3.3 Activation Charge**

The Requesting Licensee shall pay to SingTel a one-time Activation Charge for each link activation (for service or protection links) or each capacity activation or each concurrent link/capacity activation.

##### **4.3.4 Deactivation Charge**

The Requesting Licensee shall pay to SingTel a one-time Deactivation Charge for each link deactivation (for service or protection links) or each capacity deactivation or each concurrent link/capacity deactivation.

##### **4.3.5 Annual Charge for Group A Cable Systems**

The Requesting Licensee shall pay to SingTel the recurring Annual Charge for the use of each link activated (for service or protection links).

##### **4.3.6 Annual Charge for Group B Cable Systems**

The Requesting Licensee shall pay to SingTel the recurring Annual Charge for the use of each STM-1 (or VC4) Input Port capacity. Additionally, the Requesting Licensee shall pay the recurring Annual Charge for the use of each



STM-1 (or VC4) Output Port capacity or the lower rate output port capacity such as VC3 or VC12 capacity.

#### 4.4 Charges

Charges payable by the Requesting Licensee for the Submarine Cable Connection Services are as follows:

DESCRIPTION	CHARGES (\$\$)
<b>Application Charge per Request</b>	
- Link Activation	\$ 424.32
- Capacity Activation	\$ 424.32
- Link and Capacity Activation	\$ 578.90
- Link Deactivation	\$ 424.32
- Capacity Deactivation	\$ 424.32
- Link and Capacity Deactivation	\$ 578.90
<b>Activation Charge</b>	
- Link Activation per link activated (for each service or protection link)	\$ 2,672.00
- Capacity Activation per capacity activated	\$ 2,186.18
- Link and Capacity Activation per link and capacity activated	\$ 4,372.36
<b>Deactivation Charge</b>	
- Link Deactivation per link deactivated (for each service or protection link)	\$ 971.36
- Capacity Deactivation per capacity deactivated	\$ 817.06
- Link and Capacity Deactivation per link and capacity deactivated	\$ 1,788.69
<b>Annual Charge for Group A Cable Systems</b>	
- Per link activated (for each service or protection link)	\$ 750.98

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DESCRIPTION	CHARGES (\$)
<b>Annual Charge for Group B Cable Systems</b>	
- STM1 or VC4 (per Input Port)	\$ 8,739.29
- STM1 or VC4 (per Output Port)	\$ 8,739.29
- VC3 (per Output Port)	\$ 4,369.65
- VC12 (per Output Port)	\$ 208.08

## FAULT RESOLUTION

### 8.5 Target Response Times

The target response time for attendance to an alarm or reported fault will depend on the time of its occurrence as contained in Table 1 below. "Office Hours" is defined as 8am to 5pm for Mondays to Fridays (except Public Holidays). The whole of Saturday, Sunday and any Public Holiday and the hours outside the Office Hours are referred to as "After Office Hours".

Fault Type	Response Time	
	During Office Hours	After Office Hours
Service Affecting	within one (1) hour of receipt of notification	within two (2) hours of receipt of notification
Non-Service Affecting	within two (2) hours of receipt of notification	within next Business Day of receipt of notification

**Table 1 - Target Response Time**

## SERVICE LEVEL GUARANTEES FOR FAULT RESOLUTION

### 3. (A) FAULT REPAIR QOS STANDARDS (FOR NON-SERVICE AFFECTING FAULTS)

Missed timeframe for fault rectification by:	Rebate
(i) 24 – 48 hours	weekly recurring Charge
(ii) 48 –72 hours	2 x weekly recurring Charge
(iii) More than 72 hours	3 x weekly recurring Charge

### (B) FAULT REPAIR QOS STANDARDS (FOR SERVICE AFFECTING FAULTS)

Missed timeframe for fault rectification by:	Rebate
(i) 6 – 12 hours	weekly recurring Charge
(ii) 12 – 24 hours	2 x weekly recurring Charge
(iii) More than 24 hours	3 x weekly recurring Charge