

**EXPLANATORY MEMORANDUM
ISSUED BY
INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE**

**DESIGNATION OF SINGAPORE TELECOMMUNICATIONS LIMITED'S LOCAL
LEASED CIRCUITS AS A MANDATED WHOLESALE SERVICE**

16 December 2003

Introduction

1. On 30 May 2003, IDA issued a consultation paper¹ to elicit public comments on IDA's proposal to designate Singapore Telecommunications Limited's ("SingTel") local leased circuits ("LLCs") as a mandated wholesale service under the Telecom Competition Code (the "Code"), and to allow co-location at SingTel's exchange buildings to access the LLC tail circuits.
2. At the close of the consultation on 30 June 2003, 12 parties filed comments with IDA. These comments are available at IDA's website – www.ida.gov.sg. IDA would like to thank all commenters for the responses.
3. IDA has given careful consideration to all the comments received. IDA recognises that LLCs are important elements in the telecommunication market, commonly used by telecommunication service providers to provide telecommunication services to wholesale and retail customers, and by business users to communicate with their local and international offices. Many corporate telecommunication products are dependent on LLCs for access, such as international leased capacity, Internet connectivity and a host of value-added and managed data services. IDA has assessed that the full conditions for effective and sustainable competition in the Retail and Wholesale LLC Markets (as defined below) are not yet present, and that further regulatory intervention is necessary to enhance competition in the provision of LLC services. This will bring about more competitive LLC prices to commercial End Users in Singapore and enhance the competitiveness of Singapore's economy.

Assessment Methodology

4. In assessing whether further regulatory measures are necessary to enhance competition in the provision of LLC services, IDA first determined the boundaries of the LLC markets and then proceeded to determine the competitiveness of each of the markets identified. In this respect, IDA considered 3 key criteria when assessing the competitiveness of each market: (a) market structure (number of operators, relative

¹ The title of the consultation paper is "Designation of Singapore Telecommunications Limited's Local Leased Circuits as Mandatory Wholesale Service".

market shares, and ease of market entry and exit); (b) choice of substitute products; and (c) pricing levels and trends.

LLC Market Definition

5. An LLC is characterised by the following features: (i) it provides a dedicated telecommunication link between two premises for customers' exclusive use; (ii) it provides transparent dedicated capacity and does not include on-demand switching; and (iii) it provides a reliable and versatile communication link. IDA has determined that it is appropriate to define at least 2 separate service markets for LLCs:
 - (a) A **Retail LLC Market** that comprises LLC services sold to End Users, mainly business End Users; and
 - (b) A **Wholesale LLC Market** that comprises LLC services provided to other telecommunication operators for the supply of telecommunication services.
6. IDA considered LLC services a separate economic market from managed data services (such as IP VPN), other connectivity technologies (such as ATM, Frame Relay and microwave) and data services using switched or wireless technologies (such as ISDN, xDSL, UMTS and GPRS). These other managed data services, connectivity technologies and data services using public switching or wireless technologies do not offer superior quality features of both reliability and versatility, as is the case for LLCs. Also rather than being substitutes for LLCs, some of these other technologies and services would typically require LLCs as a fundamental input to support the service provisioning.
7. IDA also considered the different degree of competition in the Central Business District ("CBD") and non-CBD areas for both the Retail and Wholesale LLC Markets. IDA recognises the different availability of competing access infrastructure throughout Singapore, particularly between the CBD and the non-CBD areas. SingTel is the only operator with a ubiquitous nation-wide network coverage, while the other competing operators' networks are geographically limited, focusing mainly within the CBD areas. IDA also notes that SingTel's retail prices for LLCs in the CBD areas are lower by up to 35% compared with prices in the non-CBD areas, thus suggesting a different degree of competitive pressure between the two geographical areas. However, today, these differences are not sufficient to justify a different regulatory approach between CBD and non-CBD areas.
8. IDA assessed that it is not effective to further segment the LLC market by bandwidth levels, e.g., low-bandwidth market and high-bandwidth market, because a supplier of LLCs can easily switch from providing low-bandwidth LLCs to those of a higher bandwidth through reconfiguration of or limited upgrades to existing networks. Also, no further segmentation based on customer types is necessary within the Retail and Wholesale LLC Markets, because customers in the Retail LLC Market are mainly business End Users while those in the Wholesale LLC Market are telecommunication operators.

Competitiveness of Retail and Wholesale LLC Markets

9. While IDA notes that SingTel's published retail prices for certain LLC bandwidths are generally competitive vis-à-vis countries overseas², IDA has determined that the full conditions for effective and sustainable competition in the Retail LLC Market, as a whole, are not yet present. Even though competition is developing in the CBD areas, where SingTel's prices for LLCs have fallen by up to 35%, the prices for LLCs in non-CBD areas have however remained largely unchanged since full liberalisation in 2000. SingTel continues to be the main LLC supplier and retains a substantial share of this market with StarHub as the primary alternative LLC supplier.
10. Similarly, the Wholesale LLC Market is also not competitive. SingTel is the main LLC supplier to operators and it retains a substantial share of this market. Currently, wholesale prices for most of its LLC services are absent. As a result, competing operators have no alternative but to buy LLCs at or near SingTel's retail prices and compete with SingTel for customers at the same retail price levels. The absence of wholesale prices also resulted in higher LLC prices to operators in Singapore when compared to wholesale prices available in markets overseas.
11. In addition, entry barriers for competing operators in the Retail and Wholesale LLC Markets are high due to the significant upfront investments and extensive lead-time necessary to build the network. The fundamental economic characteristics for providing LLC services, particularly the "last-mile" access to End Users (i.e., LLC tail circuits), dictate that new entrants are unlikely to build competing LLC tail circuit networks that are of the same ubiquitous reach as the incumbent's network.
12. In the current market situation, operators deploying alternative networks would need to build their customer base in order to justify their significant upfront investments in network build. However, the absence of wholesale LLC services has constrained the operators' competitiveness in the retail markets (LLCs as well as other "downstream" data and Internet services), thereby hampering them from building their customer base.
13. IDA therefore determined that further regulatory measures are necessary to enhance competition in the provision of LLC services, in both the Retail and Wholesale LLC Markets.

IDA's Policy Consideration

14. IDA recognises that any regulatory measure taken to facilitate competition in both the Wholesale and Retail LLC Markets must be in line with IDA's over-arching policy objective of ensuring sustainable and effective competition in a fully liberalised market. IDA believes that this objective is best achieved through facilities-based competition, by striking a balance between facilitating entry of new players to

² SingTel's published retail LLC prices for 64kbps, 2Mbps, 45Mbps and 155Mbps are competitive compared to published prices in HongKong, New York, London, Sydney and Tokyo.

compete in the market within a reasonable and practicable timeframe, and maintaining the economic incentives for new entrants to build. To achieve this, IDA needs to balance two key considerations:

- (a) The need to maintain economic incentives for both the incumbent and competing operators to build, innovate, and upgrade infrastructure and services in the long-term. In other words, the regulatory measures taken by IDA should not: (i) discourage the incumbent operator from continuing to make longer-term infrastructure investment in Singapore, ensuring network resiliency, or investing in innovations that require higher risk-taking; and (ii) erode competing operators' incentive to build simply because it would be cheaper to rent from the incumbent operator.
- (b) The need to bring about competitive telecommunication prices in the immediate to short term to benefit End Users in Singapore. As many corporate telecommunication products are dependent on LLCs as an input, more competitive LLC prices will bring about more competitive pricing in many dependent products and this will result in broader-based cost savings to businesses in Singapore. There is a need to complement IDA's facilities-based competition approach with shorter-term regulatory goals to lower wholesale LLC prices, so as to give new entrants a more reasonable and comparable cost structure for fair competition and to better justify network building.

IDA's Decision

Designation of LLCs as a Mandated Wholesale Service under the Code

15. IDA has assessed that the most appropriate *longer-term measure* to address the current lack of competition in the Wholesale LLC Market is to designate "last-mile" LLCs (i.e., LLC tail circuits) as an Interconnection Related Service ("IRS") under the Code. This is because it is not likely to be economically feasible for a new entrant to duplicate the extensive reach of the incumbent's LLC network in Singapore. However, in line with IDA's policy of encouraging facilities-based competition, new entrants should build portions of the LLC infrastructure where it is economically feasible to do so. These portions include LLC trunk circuits or also known commonly as the "head-end" circuits (i.e., higher bandwidth circuits commonly used to connect two operators' exchange buildings, fibre rings/backbone and backhaul connection to cable landing stations).
16. When determining the appropriate LLC tail circuit IRS prices, IDA will seek to ensure that the appropriate costing methodology to be adopted would balance the various policy considerations. Cost-based LLC tail circuits should provide sufficient incentives for competing operators to at least build the LLC trunk circuits to SingTel's exchange buildings in order to access SingTel's LLC tail circuits. However, IDA recognises that competing operators will require sufficient lead-time to build their own LLC trunk circuits. The process to designate SingTel's LLC tail

circuits as an IRS under the Code, including the determination of the appropriate LLC tail circuit prices, will also take time to complete.

17. Therefore, as an *interim measure* to bring about more competition in the Wholesale and Retail LLC Markets, and to provide an incentive for competing operators to build their LLC trunk circuits, IDA will designate SingTel's LLCs as a mandated wholesale service under the Code, and to be priced on a "retail-minus" basis as follows:
 - (a) discount of 30% from SingTel's prevailing standard retail LLC prices if a Facilities-based Operator ("FBO Licensee") seeks to lease *both trunk and tail* circuits (i.e., full circuits) from SingTel to connect End Users' sites to its own network sites (such as point-of-presence, exchange buildings and/or data centres); and
 - (b) discount of 50% from SingTel's prevailing standard retail LLC prices if an FBO Licensee seeks to lease *only* tail circuits from SingTel to connect an End User's site to its own equipment, which is co-located at SingTel's exchange building nearest to and serving the End User's site.

(Please refer to **Annex 1** for more details on the application of the retail-minus adjustment in determining the wholesale LLC prices.)

18. IDA views the above retail-minus adjustment to be reasonable, as it will bring about more competitive wholesale LLC prices. The discount percentages were determined after reviewing the discounts generally offered in the Retail LLC Market, such as those offered to providers of Internet access services. The differentiated discount in the wholesale full circuit and tail circuit LLC prices aim to provide sufficient incentives to encourage competing operators to build their LLC trunk circuits. IDA's mandate will bring the wholesale LLC prices to levels lower than those observed in Hong Kong and comparable to those observed in economies like Australia, S. Korea, Taiwan and the EC recommended price ceilings for EU member states.
19. IDA's designation of SingTel's LLCs as a mandated wholesale service under the Code will be for a period of up to 2 years, commencing from the date on which IDA approves the prices, terms and conditions of the service for incorporation into SingTel's Reference Interconnection Offer ("RIO"). In this regard, by separate notice in the *Government Gazette*, IDA will specify the commencement date ("Commencement Date"). IDA considers that a maximum period of 2 years is reasonable as an interim measure to provide competing operators with competitive wholesale LLC prices while they build their LLC trunk circuits. After the 2-year period, IDA will lift the mandated wholesale service requirement for LLCs, and only designate SingTel's LLC tail circuits as an IRS, to be provided under the Code at cost-based prices. IDA will disclose the IRS prices before the expiry of the 2-year period.
20. For the avoidance of doubt, only FBO Licensees are eligible to obtain SingTel's LLCs as a mandated wholesale service under the Code. This clearly follows from IDA's

rationale that the purpose of this 2-year designation is to provide an incentive, and allow sufficient lead-time, for FBO Licensees to build their own LLC trunk circuits. On the other hand, Services-based Operators (“SBO Licensees”), by definition, have chosen a different business model that avoids committing to infrastructure roll-out, and consequently they will not be eligible for the mandated wholesale LLC service. Nonetheless, to further IDA’s policy objective of bringing about more competitive LLC prices for business users in Singapore, IDA will not prohibit any FBO Licensee from reselling SingTel’s mandated wholesale LLC service to any SBO Licensee. This approach is also consistent with the IDA’s facilities-based competition philosophy of striking a balance between (i) providing the economic incentive to build or upgrade infrastructure by the incumbent and new entrants; and (ii) permitting services-based competition to take place for the benefit of End Users.

21. Also, the designation of SingTel’s LLCs as a mandated wholesale service will only apply to new LLCs acquired from SingTel after the Commencement Date and will not affect any existing LLC agreements entered into with SingTel prior to the Commencement Date. This is to provide commercial certainty to SingTel with regard to existing contracts signed prior to IDA’s designation. However, in the event that any FBO Licensee wishes to terminate its existing LLC service contract with SingTel, pay any applicable premature termination liability and “migrate” the provision of the existing circuits to the RIO, SingTel must ensure that there is no service disruption to these circuits during the “migration” process.

Co-location at SingTel's Exchange Buildings

22. IDA will require SingTel to allow co-location at any of SingTel’s exchange building to access the LLC tail circuits served by the same exchange building. However, the co-location requirement will not be extended to SingTel’s facilities management data centres, because these are established by SingTel to provide facilities management services. Should there be space constraints in the exchange buildings, SingTel must allow virtual (distant) co-location, in which the FBO Licensee could locate its equipment in a nearby building and uses an interconnection cable to connect to SingTel’s network.

Effecting IDA's Decision

23. Subsection 1.5.9 of the Code provides that any licensee who is adversely affected by IDA’s decision may appeal to the Minister within 14 days from the date of the decision. In this respect, after the expiry of 14 days from the date of the Notification and if IDA does not receive notice of any appeal made to the Minister, IDA will proceed to publish a *Gazette Notification* to amend the Code and designate SingTel’s LLCs as a mandated wholesale service and to allow co-location at SingTel’s exchange buildings for access to the LLC tail circuits.
24. Upon the Code amendments taking effect, SingTel must make corresponding modification to its RIO to include its offer of LLCs as a mandated wholesale service and allow co-location at its exchange buildings for access to SingTel’s LLC tail

circuits. This will include the non-price terms and implementation issues (including testing, fault repairs, lead-time provisioning, and service quality). IDA will conduct an industry consultation on SingTel's proposed modification to its RIO before approving the modification.

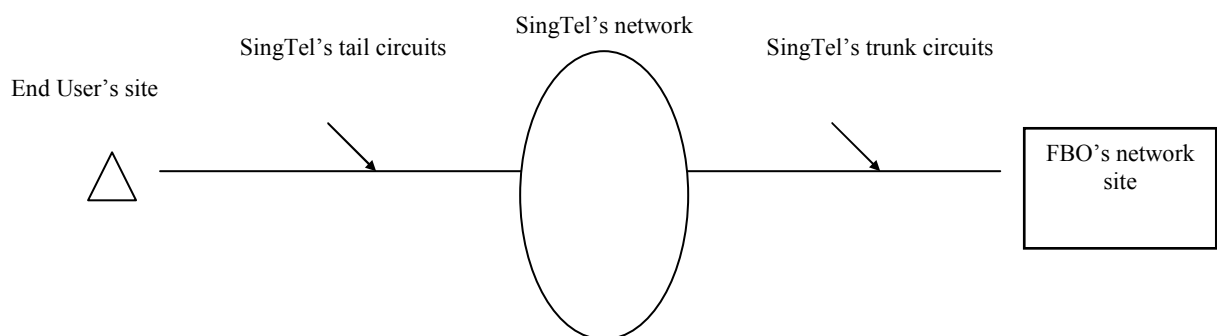
APPLICATION OF WHOLESALE DISCOUNT

1. SingTel must offer the following local leased circuits (“LLCs”) to Facilities-based Operators (“FBOs”) for a period of 2 years, or earlier as determined by IDA, commencing from a date that IDA will specify by separate notice in the *Gazette*:
 - (a) LLC full circuits (*i.e.*, both trunk and tail circuits); and
 - (b) LLC tail circuits *only*.

LLC Full Circuits (Both Trunk and Tail Circuits)

2. An LLC full circuit provides a dedicated end-to-end link from an End User’s site to the FBO’s network site. SingTel currently offers LLC full circuits for (i) point-to-point connection and (ii) multipoint-to-point connection, under product names called “DigiLink” and “DigiPlus”. An LLC full circuit (for point-to-point connection) provides a dedicated single end-to-end link of the same bandwidth from an End User’s site to the FBO’s network site. An LLC full circuit (for multipoint-to-point connection) allows an FBO to collect traffic from multiple End Users’ sites using several “last-mile” circuits of lower bandwidths (“tail circuits”) and to aggregate that traffic using circuits of higher bandwidth (“trunk circuits”) to the FBO’s network sites.

LLC full circuit connecting an End User’s site to the FBO’s network site (point-to-point connection)



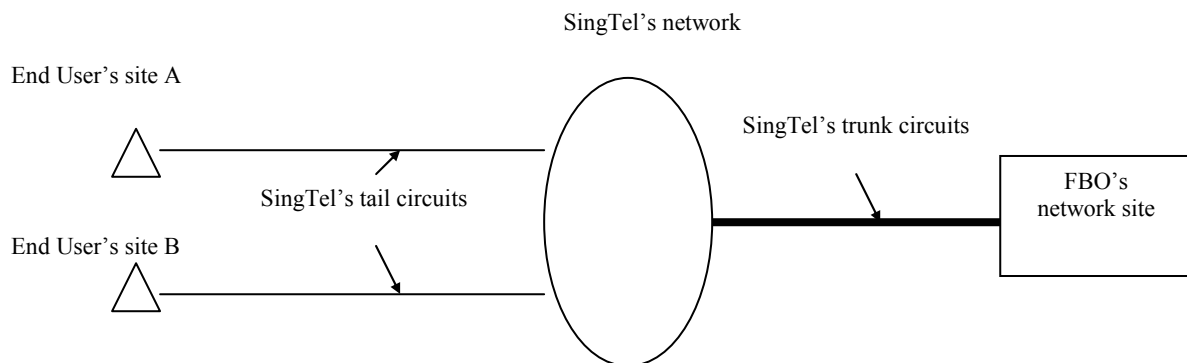
3. SingTel must offer and allow an FBO to obtain LLC full circuits (for point-to-point connection) between the End User’s site and the FBO’s network site, at the following bandwidths:
 - (a) 64Kbps;
 - (b) 128Kbps;
 - (c) 192Kbps;
 - (d) 256Kbps;
 - (e) 384Kbps;
 - (f) 512Kbps;

- (g) 768Kbps;
- (h) 1024Kbps;
- (i) 1536Kbps;
- (j) 1984Kbps;
- (k) 2Mbps;
- (l) 45Mbps; and
- (m) 155Mbps.

4. The applicable wholesale prices for the LLC full circuits (for point-to-point connection) shall be based on a 30% discount off the prevailing standard retail prices of SingTel's DigiPlus or DigiLink (or their successors), where applicable. The standard retail prices shall be based on SingTel's DigiPlus or DigiLink prices for the Central Business District ("CBD") areas.
5. For example, if an FBO requires two LLC full circuits (for point-to-point connection) – a 64Kbps and a 2Mbps connection – between an End User's site and the FBO's network sites, the retail-minus wholesale LLC prices will be as follows:

$$(DigiPlus \text{ full circuit } 64Kbps \text{ LLC rate} * 70\%) + (DigiLink \text{ full circuit } 2Mbps \text{ LLC rate} * 70\%)$$

LLC full circuit connecting multiple End Users' sites to the FBO's network site (multipoint-to-point connection)



6. SingTel must offer and allow an FBO to obtain LLC full circuits (for multipoint-to-point connection) between multiple End Users' sites and the FBO's network site, at the following bandwidths:
 - (a) In relation to tail circuits, SingTel must offer to provide circuits at the following bandwidths:
 - (1) 64Kbps;
 - (2) 128Kbps;
 - (3) 192Kbps;
 - (4) 256Kbps;
 - (5) 384Kbps;
 - (6) 512Kbps;
 - (7) 768Kbps;

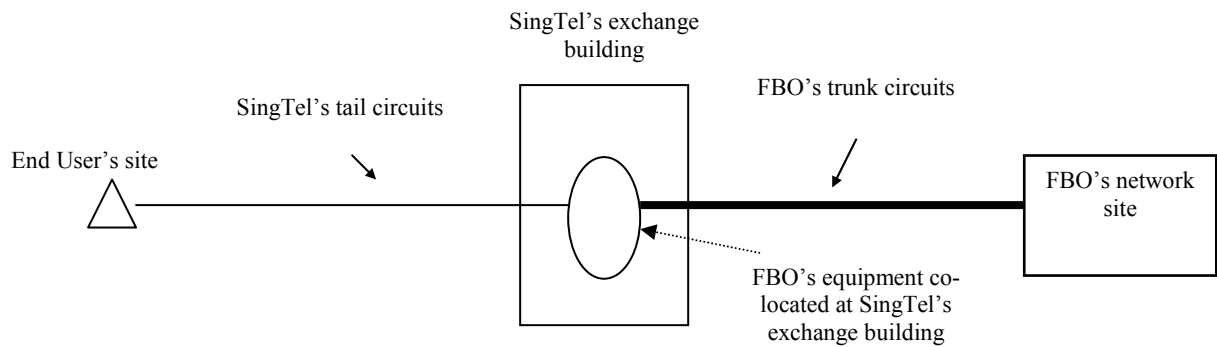
- (8) 1024Kbps;
 - (9) 1536Kbps; and
 - (10) 1984Kbps.
- (b) In relation to trunk circuits, SingTel must offer to provide circuits of 1984Kbps bandwidth.
7. The applicable wholesale prices for the LLC full circuits (for multipoint-to-point connection) shall be based on a 30% discount off the prevailing standard retail prices of SingTel's DigiPlus (or its successors). The standard retail prices shall be based on SingTel's DigiPlus prices for the CBD areas.
8. For example, if an FBO requires several 64Kbps LLC tail circuits and a 1984Kbps LLC trunk circuit for an LLC full circuit (for multipoint-to-point connection), the retail-minus wholesale LLC prices will be as follows:

$$(n * \text{DigiPlus half circuit 64Kbps LLC rate} * 70\%) + (\text{DigiPlus half circuit 1984Kbps LLC rate} * 70\%)$$

where n = number of circuits

LLC Tail Circuits

9. An LLC tail circuit provides a dedicated end-to-end link connecting an End User's site to the FBO's equipment which is co-located at SingTel's exchange building nearest to and serving the End User's site. SingTel must offer to provide LLC tail circuits at the following bandwidths:
- (a) 64Kbps;
 - (b) 128Kbps;
 - (c) 192Kbps;
 - (d) 256Kbps;
 - (e) 384Kbps;
 - (f) 512Kbps;
 - (g) 768Kbps;
 - (h) 1024Kbps;
 - (i) 1536Kbps;
 - (j) 1984Kbps;
 - (k) 2Mbps;
 - (l) 45Mbps; and
 - (m) 155Mbps.
10. The applicable wholesale prices for LLC tail circuits shall be based on a 50% discount off the prevailing standard retail prices of SingTel's DigiPlus or DigiLink (or their successors), where applicable. The standard retail prices shall be based on SingTel's DigiPlus or DigiLink prices for the CBD areas.



11. For example, if an FBO co-locates its equipment at SingTel's exchange building and requires two LLC tail circuit connections – a 64Kbps and a 2Mbps LLC tail circuit between the End Users' sites and its equipment – the retail-minus wholesale LLC prices will be as follows:

$$(DigiPlus \text{ full circuit } 64Kbps \text{ LLC rate} * 50\%) + (DigiLink \text{ full circuit } 2Mbps \text{ LLC rate} * 50\%)$$

12. For an FBO co-locating at SingTel's exchange buildings and taking only the LLC tail circuits, the FBO will "groom" the LLC tail circuits while SingTel will provide the connection service similar to its existing connection service under its RIO. Inter-exchange connections which are not "last-mile" will not be included in the designation as a mandated wholesale service.

Other Requirements

13. The wholesale LLC prices (which are based on a discount off SingTel's applicable prevailing LLC retail prices for the CBD area) will apply to wholesale LLCs leased from SingTel in both the CBD and non-CBD areas. Should SingTel's DigiPlus and/or DigiLink retail LLC price plans change, IDA may require SingTel to adjust the wholesale prices accordingly.
14. The specified discounts will apply to the monthly recurring charges only. One-time charges for work done to set-up the service will be charged at applicable retail rates.
15. SingTel is not required to provide mandated wholesale LLCs between two FBOs' sites or two End Users' sites using IDA determined wholesale prices. For example: an FBO requesting LLCs from SingTel to connect End User site A and End User site B without passing through the FBO's network sites.
16. SingTel must provide the LLCs to FBOs in a timely and non-discriminatory manner. SingTel must provide the LLCs that are of the same quality and capable of supporting the same transmission characteristics as those that it supplies to its End Users. SingTel will retain responsibility for the maintenance and administration of the LLCs it provides. SingTel must provide maintenance and repair services on the LLCs that are equivalent to the service that it provides to its End Users. To maintain the integrity of

the LLCs and associated equipment, SingTel may retain responsibility for performing the necessary cross-connections required to connect the FBO's equipment to each LLC provided.