Telecommunications Authority of Trinidad and Tobago

A Consultative Document

Proposed Framework for Local Loop Unbundling in Trinidad and Tobago

Telecommunications Authority of Trinidad and Tobago
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Executive Summary

In keeping with the Government of the Republic of Trinidad and Tobago (GoRTT) National Information and Communications Technology (NICT) Agenda (***fastforward*** Agenda), the Telecommunications Authority of Trinidad and Tobago (*herein referred to as the Authority*) has embarked on the liberalization of the telecommunications sector which *a priori*, will serve to facilitate telecommunications infrastructure growth essential for accessing information and the provision of communications services. Infrastructural growth should lead to ubiquity of connectivity which in turn constitutes a critical component to harnessing and developing the knowledge based society that the GoRTT envision by 2020.

In pursuing its mandate to ensure ubiquitous connectivity that maximizes resources while ensuring affordability, availability and accessibility, the Authority has adopted the hybrid facility-based and resale regulatory strategy of Local Loop Unbundling (LLU) which is but a subset of Unbundled Network Elements (UNEs). The Authority in its *Telecommunications (Access to Facilities) Regulations, 2006* ("the Access to Facilities Regulations") has already provisioned for its LLU and UNEs strategies. However, to ensure the orderly implementation of these strategies, the Authority has articulated a number of key regulatory considerations that are necessary for effective implementation and sustainability of these approaches. These include *inter alia:*

- Re-emphasizing that unbundling is already prescribed by the Access to Facilities Regulations and that the Authority will continue to ensure that unbundled facilities are provided in accordance with the provisions of the Access to Facilities Regulations
- Adoption of a managed approach to unbundling, commencing initially with unbundling of the Public Switch Telephone Network (PSTN) local loop;
- Pronouncement by official notification as to when the functional equivalent of the local loop of other access networks may be unbundled;

- Mandating the types of LLU and the forms of collocation that are to be rendered available by the PSTN access provider to all access seekers;
- Adoption and implementation of appropriate mechanisms to ensure that the transfer of the Local Loop and other requested UNEs are achieved within a stipulated timeframe;
- Ensuring the access to facilities rate (line rental rate) is cost- based or as prescribed by the Authority in accordance with its *Costing Methodology for the Telecommunications Sector*;
- Encouraging the expansion of access providers network in under-served areas;
- Facilitating the development of Inter-modal (inter-platform) competition;
- Mandating the access network providers to develop and publish a Reference Unbundling Offer *when directed by the Authority*. This document should have at a minimum the types of services and facilities necessary for unbundling with their accompanying costs;
- Mandating the requisite information necessary for effecting unbundling, be shared on a timely basis between access seekers and the PSTN access provider and that the confidentiality and integrity of said information be ensured at all times;
- Developing and implementing a clearly defined process for fault handling and resolution as it pertains to LLU and ensuring that said process is clearly communicated to all stakeholders;
- Ensuring that the process of LLU acquisition is transparent and non-discriminatory.

1.1 Introduction

The Telecommunications Authority of Trinidad of Tobago (TATT), hereinafter referred to as 'the Authority', is empowered under the Telecommunications Act, 2001 ("the Act") with the regulatory oversight of the Telecommunications and Broadcasting sectors in Trinidad and Tobago (T&T). At present, the Authority is in the process of giving effect to the relevant Telecommunications and Broadcasting components of the Government of the Republic of Trinidad and Tobago (GoRTT) Vision 2020 Initiative. In this 'Vision', the GoRTT has effectively commenced a transformation process oriented towards the creation of a knowledge based society by year 2020. Indeed, it is envisaged that through the creation of such a society, T&T will be able to develop a self-sustaining entrepreneurial environment which will foster the development of a sustainable competitive advantage that will drive the country towards developed country status.

As one of the key implementing agencies of the GoRTT's Telecommunications and Broadcasting sectors strategy, the Authority recognizes the nexus between information and knowledge and the criticality of the former in shaping the latter. It is from this perspective that the Authority endeavours to hasten the availability and affordability of real time acquisition and dissemination of information to every citizen regardless of their locale in life (geographic and politico-socio-economic). The Authority also recognizes that a necessary condition to effecting this instantaneous access to information, is the development of robust, resilient and reliable Telecommunications and Broadcasting sectors. In fact, these sectors not only provide the requisite content for knowledge development but also the foundational communications infrastructure which serves as the life force for the dissemination of said content. From the Authority's perspective therefore, it is extremely critical that this communications infrastructure and its carrying capacity (bandwidth) be made ubiquitous across T&T.

As part of its implementation strategy, the Authority draws heavily from the GoRTT's articulated Broadband Strategy contained within the Framework of the

National Information and Communications Technology (NICT) Initiative (***fastforward***). An integral component of this overarching Broadband Strategy is the harnessing and maximization of resources[1] for the attainment of ubiquity in connectivity and 'carrying capacity'. This approach is reflective not only of the GoRTT's articulated policy prescription as encoded under Section 26 of the Act but also of the necessity to ensure that 'access to facilities', facilitates the orderly development of the Telecommunications and Broadcasting sectors in T&T.

Given the parameters of ubiquitous connectivity, 'carrying capacity' and resource maximization, the Authority recognizes that it is incumbent upon it to engage in and explore the potential for Local Loop Unbundling (LLU) and more generally Unbundled Network Elements (UNEs) of which the former is a part. Prior to the development of this Consultative Document, the Authority conducted a Survey to ascertain the demand for local loop in T&T. The findings of this Survey, which is presented elsewhere in this document, were used to inform the development of this framework. At this time however, it must be noted that the approach to UNEs inclusive of LLU in no way negates the Authority's infrastructural-base regulatory strategy but rather emphasises the need to utilize a UNEs regulatory strategy together with that of its infrastructural strategy. Thus, the Authority will ensure infrastructural ubiquity with the requisite broadband bandwidth in T&T while simultaneously encouraging the sharing of facilities where necessary such that resource maximization occurs.

Finally and very importantly, the Authority underscores the UNEs strategy as encapsulated in Section 26 of the Act, wherein it is incumbent on every concessionaire of a public telecommunications network and broadcasting service to provide access to its facilities that it owns or controls on a non-discriminatory and equitable basis to other concessionaires, such access not to be unreasonably withheld. This requirement is further embodied in *Regulation 4* of the *Access to Facilities Regulations* wherein UNEs, inclusive of the local loop must be made available to requesting concessionaires upon

[1] The terms maximization of resources or resource maximization is used in this document to express the attainment of maximum value from the input resources utilized.

request. However, to ensure effective and orderly implementation of UNEs, the Authority has engaged the Telecommunications and Broadcasting sectors on the development of appropriate mechanisms for governing the implementation of its UNEs strategy. It is anticipated that this transparent and non-discriminatory collaborative approach adopted by the Authority will provide the requisite regulatory certainty to all stakeholders within the Telecommunications and Broadcasting sectors.

1.2 Objectives

The objectives of this UNEs strategy inclusive of Local Loop Unbundling are:

1. To articulate the Authority's proposed approach to effecting the GoRTT Broadband Strategy wherein LLU and the broader set of UNEs to which it belongs are leveraged to facilitate ubiquitous connectivity, carrying capacity and resource maximization;
2. To attain consensus within the Telecommunications and Broadcasting sectors as to the development of appropriate mechanisms for effective implementation of UNEs inclusive of the Local Loop;
3. To maintain continuity in transparency and regulatory certainty in the Authority's regulatory processes while continuing the excellent working relationship between the Authority and the various stakeholders of the Telecommunications and Broadcasting sectors.

1.3 Review Cycle

On 12th July 2008, the Authority published the first draft of this document and invited the comments and recommendations from all interested parties. The first consultation period ended on 31st October 2008. The Authority received several comments from the following parties:

- Telecommunications Services of Trinidad and Tobago (TSTT)
- Digicel (Trinidad) Limited
- Three Sixty Communications

The Authority took into consideration the comments and recommendations received from the service providers previously identified and revised this *Proposed Framework for Local Loop Unbundling in Trinidad and Tobago*. Framework accordingly. A Decisions on Recommendations (DOR) Matrix which articulates the Authority's preferred position is included at Annex I of this revised document.

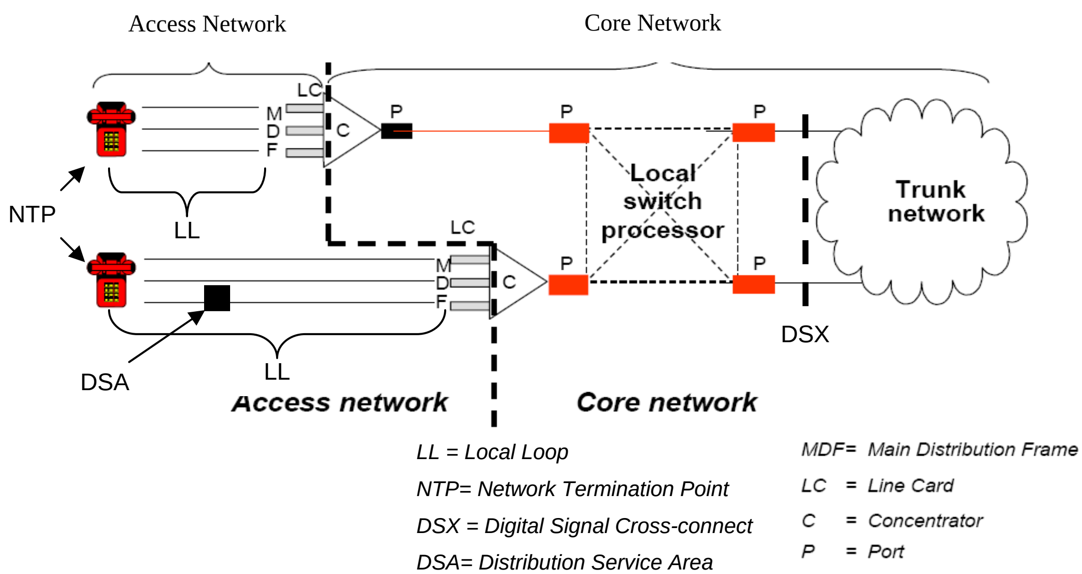
The Authority, in accordance with its "***Procedures for Consultation in the Telecommunications Sector of Trinidad and Tobago***" (http://www.tatt.org.tt/pfc-m.html), is seeking the views of industry stakeholders on this revised draft consultative document. Comments should be submitted on or before **September 25th, 2009** to policy@tatt.org.tt or mailed to:

Telecommunications Authority of Trinidad and Tobago
#5, Eight Avenue Extension, off Twelfth Street,
Barataria,
Republic of Trinidad & Tobago

2 Local Loop Unbundling

Local Loop Unbundling (LLU) is defined by the Authority as the process of disaggregating the Public Switched Telephone Network (PSTN) access provider's local loop and rendering same available to access seekers. The local loop (LL) is defined as the physical link in the local access network, connecting the network termination point (NTP) at the customer's premises to the network operator's Main Distribution Frame (MDF). In Figure 1 the Authority makes a clear distinction between the Access Network and the Core Network. The Authority further elucidates in Figure 1 that access to the Local Loop, can occur at either the line or trunk side of the access providers local switch. Where access occurs at the line side, either at the MDF or anywhere between the MDF and the NTP (LL) or at the NTP, the access seeker is desirous of obtaining *unbundled* access to the local transmission function of the access provider's network. On the other hand, where access occurs at the trunk side of the local switch (DSX), the access seeker endeavours to make use of all of the functions (conveyance, switching and network management) of the access provider's network.

Figure 1: Access Points on the Access Network



Adapted from Malaysia Communications and Multimedia Commission. 2002. A Consultation Paper on Local Access Funding. MCMC/IDD/IRA/LAF/No. 4 of 2002.

It is evident that the above discourse broadens the concept of LLU to include Unbundled Network Elements (UNEs) of which LLU is a subset. The rationale for this approach emanates from the substantive of the Act, which mandates access providers to render access to their facilities inclusive of the local loop and its associated network infrastructures and other equipment or object connected therewith used for the purpose of telecommunications.[2] This rationale is further captured in the Access to Facilities Regulations in which Regulation 4 provides that concessionaires shall provide access to the following facilities including where applicable their functional equivalent *inter alia*:

a) Local Loop access;
b) Line side access;
c) Trunk side access;
d) Network infrastructure; and
e) Switching facilities.

Notwithstanding, it must be noted that the precept of UNEs as contained in the Act and in the Access to Facilities Regulations as referred to above, support the Objects of the Act which mandate the establishment of conditions that facilitate an open competitive telecommunications market, wherein end users' benefits are maximized and efficient infrastructural investment occurs. However, given the characteristics of small open economies like Trinidad and Tobago (T&T)[3], the Authority recognizes that duplication of the access network may be prohibitive and therefore opines that unbundling should be considered as a mechanism for the attainment of the both the Objects of the Act and the Telecommunications and Broadcasting policy goals of the Government's Vision 2020 Initiative.

[2] Part I, Section 2- Interpretation of the Telecommunications Act 2001.
[3] *See* Section 5.2.1 "Defining Characteristics of T&T" in the Authority's "Proposed Costing Methodology for Telecommunications Sector".

Statement on Unbundling in T&T:

The Authority re-emphasises that unbundling is mandated by the Act and by the Access to Facilities Regulations. The Authority will continue to ensure that unbundled facilities are provided in accordance with the provisions of the Access to Facilities Regulations.

Statement on LLU in T&T:

The Authority proposes to Unbundled the Local Public Switch Telephone Network Loop in the first instance, given the technical challenges of unbundling other types of access networks.

3 Types of LLU

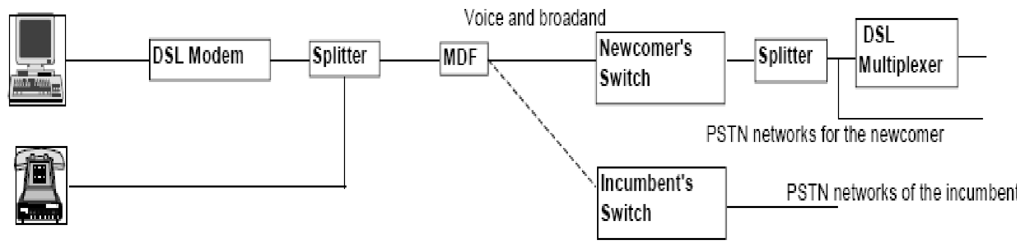
The Local Loop can be unbundled into four main types:

1. Full unbundling;
2. Line sharing or shared access;
3. Bitstream access; and
4. Sub-Loop.

3.1 Full Unbundling

In this approach, control over the Unbundled Local Loop (ULL) is transferred from the access provider to the access seeker. Herein, the link between the access provider's MDF and its switching equipment is physically re-routed and connected to the access seeker's switch, once that subscriber has decided to change service provider (Figure 2). However, while the access provider is not able to offer any of its services to said end user, because the entire spectrum of the loop is under the control of the access seeker, it nevertheless retains ownership of the loop and is therefore required to maintain same. It is evident from Figure 2 that the access seeker has the ability not only to augment its local facilities with the local facilities of the PSTN access provider but it can also utilize whatever broadband technologies that it desires on the local loop.

Figure 2: Full Unbundling

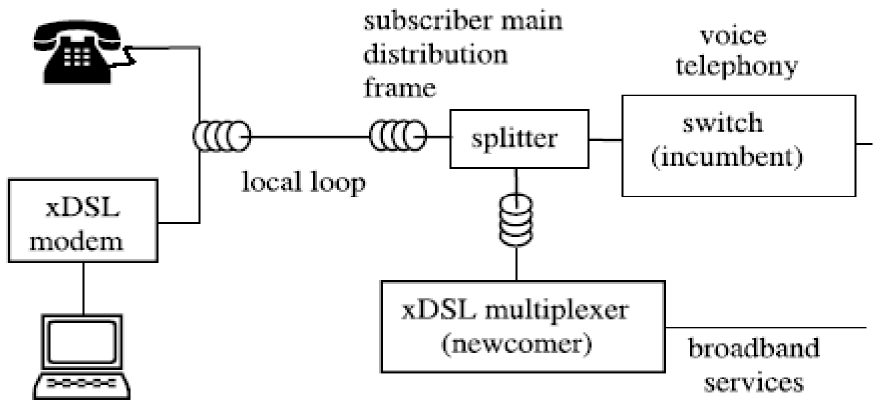


Source: Organisation of Economic Co-operation and Development. 2002. Development in Local Loop Unbundling. Working Party on Telecommunication and Information Services Polices. OECD.

3.2 Line Sharing (Shared Access)

Under this approach, the local loop is shared by both the access provider and the access seeker. The typical arrangement is for the access provider to maintain control of the loop and utilizes the voice frequency spectrum of the loop to provision fixed line telephony to its subscribers. The non-voice frequency spectrum of the loop is leased by the access seeker to provide data service inclusive of broadband. Voice telephony and data services are separated through the use of a filter or Splitter located between the MDF and the access provider’s switch. Voice telephony is thereafter handed over to the access provider’s switch and the data services to the access seeker’s network (Figure 3). It must be noted however, that this variant of LLU is the most utilized arrangement, given that it is more economical for an access seeker to replicate the data aspects of the network than that of the voice (switch). This is attributed to the minimization of sunk costs and the ability to expand the market size for broadband services. Alternatively, technological advancement and market conditions may facilitate the reversal of this approach wherein the access providers maintains control of the loop and utilizes the non-voice frequency spectrum to provide data services and lease the voice frequency spectrum to access seekers to provide telephony.

Figure 3: Line Sharing

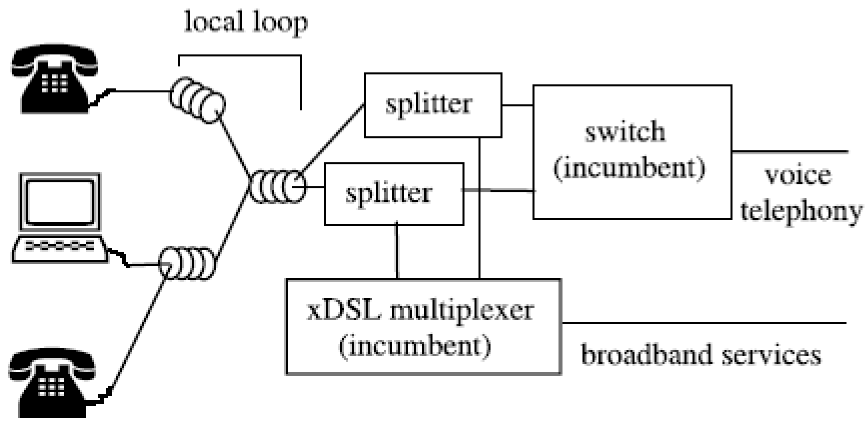


Source: Gabelmann, Anne. 2001. Regulating European Telecommunications Market: Unbundled Access to the Local Loop outside Urban Areas. *Telecommunications Policy* 25: 729-741.

3.3 Bitstream (wholesale) Access

In Bitstream access the access provider maintains control of the local loop and upgrades same to create a broadband connection between the end user and the local exchange. The access seeker is thereafter granted access to a specific bandwidth on the local loop to provision broadband services, with voice and data traffic separated from each other via a splitter located after the MDF (Figure 4). However, the access seeker has neither physical access to the loop nor any impact on the functionality of the access service or the access technology. Additionally, management of the spectrum allocated for use by the access seeker is typically performed by the PSTN access provider. In reality therefore, the access seeker can only provide the services that the access provider designates. This can reduce the degree of competition on the local loop as compared with full unbundling or line sharing.

Figure 4: Bitstream Access



Source: Gabelmann, Anne. 2001. Regulating European Telecommunications Market: Unbundled Access to the Local Loop outside Urban Areas. *Telecommunications Policy 25*: 729-741.

3.4 Sub-loop Unbundling

In sub-loop unbundling the access seeker is typically allowed to connect at specific point along the local loop (Figure 1). This typically occurs at the primary connection points (PCPs) or street cabinets, referred to locally as the Distribution Service Area (DSA) Cabinets on the PSTN access provider's network. This type of unbundling is best suited to PSTN access networks that deploy a fiber to the curb topology inclusive of Digital Loop Carriers (DLC), as a solution for effecting the delivery of very high bandwidth services to end users. The network equipments (DSAs) required to facilitate the transfers of the sub- loop from the access provider to the access seeker are located adjacent to each other rather than at the telephone exchange. In sub-loop unbundling, both full unbundling and/or shared access is available to the access seekers.

4 Implementation of LLU

The Authority recognizes that while different approaches may be used for implementing and regulating LLU, the four main types mentioned in the preceding section are not necessarily mutually exclusive. In fact, a review of the experience globally suggests that many regulatory agencies have made various permutations and combinations of the aforementioned types of LLU mandatory within their respective markets (Table 1). However, as illustrated in Table 1, in those countries that have implemented LLU, the regulatory strategy of choice has been either full LLU or line sharing given that these approaches empower access seekers to compete effectively against the access provider. Alternatively, the low demand for bitstream access may be directly correlated with the control of the access network by the PSTN access provider. This control can potentially limit the creativity and innovativeness of the access seeker, the timeframe for availability and delivery of services to the access seeker's subscribers and the associated costs for service provisioning

From the perspective of implementing LLU in the domestic telecommunications market, the Authority draws from the results of its LLU Survey of existing and potential access seekers. The results from the survey, as summarized in Table 2, indicated that all respondents desired full unbundling. The Survey also indicated that forty-three percent of respondents that desired full-unbundling also desired line sharing, bitstream and sub-loop unbundling (Table 2). While the Authority recognizes that a significant percentage of respondents desire all forms of unbundling, the Authority nevertheless proposes to adopt a managed approach to unbundling, with full unbundling and line sharing mandated in the initial stages of unbundling. The Authority however, recognized that the incumbent has a mix of legacy and next generation access networks and unbundling of the latter may include some technical and economic challenges. The Authority is therefore of the view that its managed approach would require unbundling, in the first instance, at all of the incumbents Class V Switching Offices and Remote Switching Centers (RSC). In this initial phase unbundling would not be implemented at the incumbent's smaller switching offices unless there is adequate space and facilities to support same. For the avoidance of doubt the Authority states that the point of interface (POI) for full and shared unbundling would be at the MDF located at TSTT's Class V Switching Offices and at the Remote Switching Centers. For sub-loop unbundling the POI would be at TSTT's DSA or DLC.

Table 1: Availability of Unbundling by Type[4]

	Full LLU	Line sharing	Bitstream access	Sub-loop unbundling
Australia	√	√	√	×
Austria	√	√	√ (price not regulated)	√
Belgium	√	√	√	√
Canada	√	√	×	×
Czech	×	×	×	×
Denmark	√	√	√	√
Finland	√	√	√	×
France	√	√	√	√ (full unbundling only)
Germany	√	√	√(1)	×
Greece	√	√ (from January 2002)	×	√
Hungary	√	√	×	×
Iceland	√ (not yet legally)	√ (not yet legally)	×	×
Ireland	√	√	√	√ (2)
Italy	√	√	√	√
Japan	√	√	×	√
Korea	√	√	√	×
Luxembourg	√	√	×	√
Mexico	×	×	×	×
Netherlands	√	√	×	×
New Zealand	×	×	×	×
Norway	√	√	√	√ (only experimental)
Poland	×	×	×	×
Portugal	√	√	×(3)	√(4)
Slovak	×	×	×	×
Spain	√	√	√	√
Sweden	√	√	√	√
Switzerland	×	×	×	×
Turkey	×	×	×	×
United Kingdom	√	√	√	√
United States	√	×	×	√

Notes:

(1) Deutsche Telekom provides the whole range of bitstream access products. In addition, DT provides wholesale offer for IP platform operators and ISPs, which allows them to be accessed through DT DSL access lines.

(2) Only one offer has been made for sub-loop unbundling, which has not proven to create any significant demand.

(3) An wholesale ADSL offer is available through PT ADSL Network service, a service exclusively aimed at the 'Telecommunications Operators and Service Providers' market segment.

(4) Following ANACOM's decision in March 2002, which determined that PT Communicacoes should include the sub-loop unbundling offer in the RUO, PT Communicacoes published, in compliance, a revised RUO in May 2002, which includes conditions for the provision of sub-loop unbundling.

Source: OECD.

On the supply side, the Authority notes from its inquiry into the state of readiness of the incumbent's outside plant that effecting LLU at this time may be somewhat challenging. This was reflected in the high levels of fault incident and the mean time to

[4] Replicated from the Directorate for Science, Technology and Industry (DSTI) document by its Working Party on Telecommunication and Information Services Policies entitled "Developments in Local Loop Unbundling" DSTI/ICCP/TISP(2002)5/Final.

repair (MTTR) faults. Fault incident approximated 8.0 faults per 100 subscribers for the period 1st quarter 2004/05 to 3rd quarter 2006/07. The majority of faults on TSTT's Outside Plant (OSP) were classified as other, which on average accounted for approximately fifty percent (50%) of faults during the specified time period. Given the breakdown of faults, it was obvious that 'Other Faults' were correlated with faults occurring either with the Line Card and/or on the subscriber premises albeit at the NTP. The two other major network faults on TSTT's OSP were 'Drop Wire' and 'Distribution Faults'.[5] The incidence of these faults average 1.4 and 1.3 faults per 100 subscribers for distribution and drop wire faults respectively for the analyzed period (2004/05 to 2006/07).

Pertaining to the MTTR, the data received revealed that on averaged eight-one percent (81%) of outside plant (OSP) faults were repaired within ten (10) days over the stipulated period. It was also visible from the data presented that there was a relative downward trend in the number of faults repaired within ten (10) days, especially in the last two quarters in the analyzed time period. In fact, the data suggested an increase in the number of faults repaired in excess of twenty (20) days over the last two quarter investigated.

After careful evaluation of the demand and supply side constraints, the Authority proposes to adopt a phased approach to the implementation of LLU. This would allow both the access seeker and incumbent access provider to implement appropriate plans to either roll out or upgrade their networks respectively to support the LLU deployment in T&T.

[5] The former fault is located between the Distribution Point (DP) or Fixed Count (FC) and the NTP on the subscriber's premises, while the latter is located on the distribution line that connects the District Servicing Area (DSA) Cabinets and the DP or FC.

Table 2: Summary of LLU Survey[6]

SURVEY CRITERIA	PERCENTAGE (%) OF RESPONSES BY ACCESS SEEKERS
DEMAND	
1. Demand for LLU by Access Seekers	100
2. Demand for UNE-P Access Seekers	70
TYPES OF LLU DEMANDED BY ACCESS SEEKERS	
1. Full Unbundling	100
2. Line Sharing	43
3. Bitstream	43
4. Sub-loop	43
MAJOR DETERRENT TO LLU DEPLOYMENT	
1. Rental Cost	95
2. Collocation Cost	30
PREFERRED TECHNOLOGICAL ALTERNATIVE TO FIXED ACCESS NETWORK	
1. Wireless	100
a) WiMax/Wi-Fi	75
b) Fixed Wireless	56

Statement on the Types of LLU to be made Available in the Domestic Telecoms Market:

The Authority proposes to implement Full Unbundling and Line Sharing at all of the incumbents Class V Switching Offices and Remote Switching Centers (RSC) in the initial stages of LLU implementation. The Authority will consider the implementation of Bitstream and Sub-loop Unbundling upon a review of the effectiveness of initial Unbundling in the domestic market.

Statement on the Duration of LLU in T&T:

The Authority proposes to review periodically but not less than once every three (3) years the relevant market to which local loop unbundling is applied. This review shall be in accordance with Regulation 4 as detailed in the Draft Telecommunications (Pricing) Regulations.

[6] The various components of Table 2 are discussed in the relevant sections of this document.

Statement on the Date for Commencement of LLU in T&T:

The Authority proposes to review the readiness of the access network of the incumbent PSTN provider for implementing LLU. The Authority proposes to make a definite pronouncement on the effective date for implementing LLU ex post this review.

Further detailed analysis of the global experience by the Authority reveals that at the implementation level, successful deployment of LLU mandates a number of key responsibilities upon both the access provider and access seeker. Pertaining specifically to those of the PSTN ***access provider,*** it is imperative that access to the local loop comprise the following services:

1. *Supply of network information necessary for implementation of LLU*. This may include specific network information on the number of loops per exchange area, line qualification information, plans for network upgrade and expansion and individual customer information (billing names and addresses);
2. *Unbundled access to the local loop inclusive of delivery and maintenance schedules and service guarantees*. Inclusive herein is line qualification testing to ascertain whether the local loop is qualified for provisioning xDSL services;
3. *The establishment of procedures for the transfer of the Local Loop and the actual implementation of same*;
4. *Collocation for the installation of access seekers equipment;*
5. *Modification of the Operational Support System to support effective implementation of LLU;* and
6. *Cost of unbundling inclusive of loop maintenance costs*.

Pertaining to the responsibilities of the ***access seeker***, as per LLU implementation, it is imperative that access seekers:

1. *Provide to the access provider forecasts regarding the local exchange areas where LLU services are to be provisioned, their initial and future type of collocation and space requirements and number of LLU lines for the forecast period.* Provisioning of this information is critical to network planning and expediting the LLU implementation process;
2. *Make available the necessary resources for effecting the LLU implementation process.* This should include the requisite human resources for expediting the transfer of the Local Loop under a Full Unbundling arrangement and the necessary financial resources for provisioning of collocation equipment and line qualification testing; and
3. *Report faults resulting from LLU after its implementation to the access provider*. This is critical towards ensuring the timely repairs of faults by access providers and the minimization of faults as a mechanism for anti competitive practices.

The requirement to provide information as outlined above are also reflected in Regulations 7 and 8 of the Access to Facilities Regulations which speak to the need for a concessionaire to provide information in relation to the availability of collocation within its facilities and to supply information in relation to procuring access to its facilities.

It is also noteworthy that Section 24(1) of the Act mandates concessionaires of a public telecommunications network or service to adhere to conditions requiring the submission of information to the Authority as per their network development plans, quality of service and other matters as the Authority may require. The Authority will therefore require concessionaires to submit information on their network plans for its approval as mandated under *Section 24(1)* of the Act. This will ensure that the information necessary for LLU exists in advance of any request made by an access seeker.

Further, the Authority notes that Regulation 5 of the Access to Facilities Regulations provides that access to facilities inclusive of the Local Loop and collocation is to be provided in accordance with the principle of non-discrimination.

The Authority will also ensure that the Quality of Service (QoS) requirements outlined in *Schedule F* of the Concession (Conditions A44 & A45), specifically *Elements 1- 5,* are adhered to until the promulgation of QoS Regulations.

As it pertains to collocation, the Authority elucidates that the availability of said service may be categorized into the following three (3) main types, namely:

1. *Physical collocation* - whereby the access seeker locates its equipment within the access provider's local exchange. This can be done in one of two ways:
    a) *Caged Collocation*: The identification and dedication of a physical area which is caged by some form of partition (wire or wall) to separate the access seekers' and provider's equipment; and
    b) *Co-mingling*: The placement of the access seeker's equipment alongside that of the access provider.
2. *Distant or remote collocation*- this entails the placement of the access seeker's equipment at a location proximate to the access provider's exchange with the connection between the MDF and the access seeker's equipment made via a tie cable; and
3. *Virtual collocation*- this is where the access provider houses, owns, installs and maintain the equipment necessary for the access seeker to provide service and the latter having no access to the premises or equipment.

Finally, the Authority recognizes that the provisions relating to access to facilities in *Section 26* of the Act necessitates commercial negotiations between the PSTN access providers and access seekers. This therefore underscores the need for close cooperation between an access seeker and an access provider for LLU implementation. However, analysis and review of negotiations within the telecommunications and broadcasting sectors globally and locally suggests that in reality this may be somewhat difficult to achieve. Yet, imposing cooperation through regulations can increase the costs of regulations associated with regulatory oversight and may not achieve the desired outcome of cooperative behaviours. The Authority would therefore seek to encourage all market participants to reach a commercial agreement on the different technical and commercial aspects of LLU, failing which a dispute may be filed with the Authority by either or by both concessionaires in accordance with the *Procedures for Dispute Resolution in the Telecommunications and Broadcasting Sectors of Trinidad and Tobago*.

The requirement to negotiate is codified in the Access to Facilities Regulations, however, the Authority reserves the determine the rates and the terms and conditions of access to facilities as prescribed in *Section 26(4)* of the Act..

Statement on the Types of Collocation Available to LLU Access Seekers:

The Authority proposes that Physical (Caged and co-mingling) and Distant Collocation would be provided by the Domestic Public Switched Telephone Network (PSTN) access provider to all access seekers on a fair, non-discriminatory and transparent manner.

Statement on Quality of Service Standards for LLU:

The Authority proposes to include in its draft Telecommunications (Network Quality of Service) Regulations, relevant parameters that address quality and standards of service specific to LLU and timeframes for the transfer of the local loop and fault repairs.

Statement on Reference Local Loop Unbundling Offer:

The Authority proposes to mandate a concessionaire of a given access network, to develop and implement a Reference Unbundling Offer for Local Loop Unbundling, as and when directed by the Authority. This offer shall contain relevant information inclusive of Local Loop costs, quality of service parameters and the types of information and associated timeframes for sharing such information necessary for implementing Local Loop Unbundling. This Offer shall be available in a fair and non-discriminatory manner and shall be made available to the Authority for regulatory approval.

Statement on the Commercial Negotiation of Access to Facilities:

The Authority proposes that commercial negotiations between the Domestic Public Switched Telephone Network (PSTN) access provider and access seekers be encouraged in accordance with Section 26 of the Telecommunications Act and the Access to Facilities Regulations. The Authority may at its discretion under Section 26(4) of the Telecommunications Act establish prices for the ULL.

4.1 Determining the Cost of LLU

The Authority recognizes that successful implementation of LLU pivots upon the effectiveness of demand for the local loop by existing and potential access seekers. However, effective ‘loop’ demand is conditioned by the price for and cost of the ULL. This was reemphasised by the LLU survey conducted by the Authority, which found that ninety-five percent (95%) and thirty percent (30%) of respondents, opined that Loop Rental and collocation costs would be the major deterrents of LLU (Table 2). This therefore underscores the need for the Authority to implement an appropriate methodology for costing LLU.

4.1.1 Implementing an Appropriate LLU Costing Methodology

The Authority's review of LLU globally clearly indicates that there are primarily three types of costs the access providers may incur when provisioning LLU, all of which need to be recovered through the prices charged to the access seeker. These cost types are:

1. *Line connection costs*: This is a one-off cost as derived from either the relocation of the line to the access seeker switch (the *Physical Line Transfer process* under full unbundling) or the line connection to the access seeker Digital Subscriber Loop Access Multiplexor (DSLAM) under line sharing arrangement;
2. *Access to loop costs*: This pertains to the monthly rental of the local loop; and
3. *Collocation costs*: This entails amongst others, the costs of space rental, site preparation, power usage, exchange site survey and security.

Access to Loop costs or the monthly rental for local loops is the main charge that the access seeker has to pay the PSTN access provider. This charge varies depending upon the type of LLU implemented. However, the Authority adheres strongly to the precepts that the determination of relevant costs for loop rental (line access) is critical for the build or buy decision of access seekers given that this cost constitutes the central input cost of access seekers. The criticality of implementing an appropriate costing methodology for ascertaining the costs of LLU cannot be overemphasised. This is extremely important given that different costing methodological approaches can yield different results.

In ensuring consistency in its approach to costing and to guarantee regulatory certainty, the Authority refers Stakeholders to its Consultative document entitled *"Proposed Costing Methodology for Access Services in the Telecommunications Sector"* for an expansive discourse on the various costing approaches. In that Consultative document, the Authority proposes the use of a top-down long run average incremental cost (LRAIC) model, wherein asset values are based on current cost accounting for the determination of access services costs of which ULL is a key constituent. To avoid any doubt, the Authority proposes to utilize a top-down long run average incremental cost (LRAIC) model for the determination of line access charges.

Collocation and line connection costs shall be the subject of commercial negotiations between the PSTN access provider and access seekers as stipulated in *Section 26* of the Act. If such negotiations fail, the Authority may resolve the dispute in accordance with the *Procedures for the Resolution of Disputes in the Telecommunications and Broadcasting Sectors of Trinidad and Tobago*.

This approach as articulated previously is codified in the *Access to Facilities Regulations*. The Authority however, reserves the right to impose price regulations for determining line connection and collocations costs as empowered under *Section 26(4)* of the Act.

Statement on Access to Loop Rental:

The Authority proposes to determine access to Loop (line rental) costs in accordance with its proposed Costing Methodology for Access Services in the Telecommunications Sector.

Statement on the Commercial Negotiation of Access to Facilities:

The Authority proposes to facilitate commercial negotiations between the Domestic Public Switched Telephone Network (PSTN) access provider and access seekers in accordance with Section 26 of the Telecommunications Act and the Access to Facilities Regulations for collocation and line connection costs.

There are three interrelated issues that must be considered when defining an appropriate cost for LLU, namely:- access deficit, rate rebalance and geographic averaging/de-averaging. While these issues are beyond the scope of this consultation and would be discussed in more detail in forthcoming documents, the following is noted:

4.1.2 Access Deficit & Rate Rebalancing

Access deficit pertains to the existence of a cost deficit associated with the build out of the access network. The Authority defines *access deficit* as follows:

> *"The difference between the efficient economic cost of providing and maintaining the access network and the appropriate revenues generated from services utilising the access network."*

This definition would inform the deliberations of any access deficit and would serve as a guide for ascertaining the need to rebalance or to implement any other appropriate remedies.

Statement on Access Deficit and Rate Rebalancing for LLU:

The Authority proposes to determine whether any Access Deficit currently exists in the PSTN Access Network and will take such steps as are necessary to address same.

4.1.3 Geographic Averaging

The Authority defines Geographic Averaging as the uniformity of the rate charged for the LLU, irrespective of the geographic locale of the end user even though the costs of provisioning the local loop may differ, especially between rural and urban areas. The Authority opines that the presence of economics of density in urban areas may reduce the costs of local loop deployment therein as opposed to rural areas. Conversely, the costs of deployment of the loop in rural areas may not only be higher because of the disperse populace but also because of the loop length. Notwithstanding this, the Authority recognizes that the present local loop rental rate in T&T, as established by the Public Utilities Commission (PUC) in 1986, is geographically averaged. The Authority proposes a continuation of this approach pending any new information to the contrary that may arise from a detailed review of the existing access seeker's access deficit claims.

Statement on Geographically Average LLU Rate:

The Authority proposes to adopt geographic averaged rate for LLU.

5 Beyond LLU

LLU is not the only regulatory strategy available to the Authority for achieving ubiquity of connectivity, carrying capacity and resource maximization. There are other complementary strategies available to the Authority that can be used to achieve efficient and effective resource maximization, ubiquitously available, affordable and accessible connectivity and bandwidth. These strategies, in the Authority's opinion *are not* mutually exclusive with that of LLU. In fact, it is the Authority's expectation that existing and potential access seekers will utilize LLU in conjunction with these other strategies to build out their access network and to provide broadband services ubiquitously in T&T.

5.1 From LLU to UNEs

As previously articulated in this document (*Sections 1 & 2*), LLU is but a subset of a much broader approach to Unbundling Network Elements (UNEs). In its narrowest definitional construct of UNEs, LLU is categorized in the United States of America (USA) as UNE-L, where the L represents an abbreviation for the Local Loop. A much broader definitional construct of UNEs would entail the application of unbundling to all of the various elements necessary for the provisioning of services to end users on the local loop. This approach, termed UNE-P (UNE-Platform) in the USA, enables the access seeker to combine only those UNEs that it requires to provide services while not owning any of the necessary equipment.

An important distinction in the Authority's perspective needs to be made between UNE-P and resale given that both strategies utilize the same network elements to enable the access seeker to provide end to end connectivity to its end users over the access provider's network. The fundamental difference between these two strategies pivots upon two interrelated factors- the cost of and the elements and services required by the access seeker. The cost of UNE-P is conditioned by the network elements necessary for and leased by the access seeker for the provisioning of its access services. The cost of resale on the other hand is influenced by the summation of the access provider's costs of network elements used for access services and the associated relevant services incorporated in the provisioning of access services. It follows therefore that resale can be perceived as the summation of the cost of UNE-P and the associated costs of resale. Typically, UNE-P costs are determined on a cost basis while that of resale is usually done on a 'retail minus' basis. As a consequence, the cost of leasing UNEs for UNE-P is less than that for resale.

The Authority recognizes that seventy percent (70%) of respondents to the LLU Survey desired UNEs-P (Table 2). However, the Authority is concerned that UNE-P and resale may not engender roll-out of network infrastructure beyond that which already exists. To address this possibility, the Authority will implement appropriate mechanisms to encourage access seekers who are desirous of leasing UNE-P from the PSTN access provider, to either engage in network infrastructure roll-out in un-served and under-served areas and/or contribute to the roll-out of such networks inclusive of that of the existing PSTN access provider. As a corollary, the Authority will ensure that such contributions by access seekers do not disadvantage those entities such that their exit from the market is hastened by anti-competitive practices.

The Authority notes that the global experience indicates that one such anti-competitive practice typically engaged in, is that of a price squeeze on access services. Such practices shall be addressed in the Authority's "Price Regulation Framework for Telecommunications Services in Trinidad and Tobago" and other associated regulations.

Statement on Reference Unbundling Element Offer:

The Authority proposes to require a concessionaire authorised to operate a public telecommunications network to which access may be sought and provided under the Access to Facilities Regulations, to develop and implement a Reference Unbundling Offer for specific facilities, as and when directed by the Authority. This offer shall contain relevant information inclusive of unbundled element costs, quality of service parameters and the types of information and associated timeframes for sharing such information necessary for implementing access to specific unbundled element or facilities. This Offer shall be available in a fair and non-discriminatory manner and shall be made available to the Authority for regulatory approval.

Statement on the Date for Commencement of UNE-P in T&T:

The Authority re-emphasises that unbundling is prescribed by the Telecommunications Act and the Access to Facilities Regulations. Access to unbundled facilities shall not be denied unless for insufficient capacity, or for reasons of safety, security, reliability or difficulty of a technical or engineering nature as prescribed for in the Access to Facilities regulations.

Statement on UNE-P Negotiations and Cost Determination:

The Authority proposes to regulate UNE prices and associated costs of provisioning UNEs in accordance with Section 26 of the Telecommunications Act and its Access to Facilities Regulations. The Authority shall also monitor UNE prices to detect acts of anti-competitive practices and unfair competition as required under Section 29(2)(c) of the Telecommunications Act and the Price Regulation Framework for Telecommunications Services in Trinidad and Tobago.

5.2 Operational Separation of the Local Loop

In its Draft Policy Document entitled "*Accounting Separation Guidelines for the Telecommunications Sector*" the Authority explicitly states:

> "*The Authority is equally aware that some regulators are looking at alternative models of operational separation, in which the access network is separated from the core network so that equivalent access services can be offered to all competing network and service providers. This model may become important in the future as well, particularly with the moves towards next generation IP networks and the convergence of services (e.g. between fixed and mobile, and between telecoms and broadcasting). For these reasons the Authority may consider operational separation in the future, but it is not a requirement at this time*"

While the Authority stated that it may not consider operational separation at this time, it recognizes that within the ambit of a LLU strategy this may assume heightened importance as the need to restrict and/or negate anti-competitive behaviour by the PSTN access provider may arise. A review of the existing literature and experiences on this subject matter by the Authority suggests that operational separation, within the ambit of LLU, may entail the separation of the control and ownership of the non-competitive access assets of the access provider (the local loop) from the competitive assets and its transfer and placement into a new LoopCo entity.[7] This LoopCo will in turn provide wholesale access services at regulated prices to all access seekers inclusive of the former access provider. While the Authority recognizes that two-thirds of respondents to its LLU Survey desired operational separation, with an emphasis on the establishment of a Network Company (NetCo), the Authority shall not pursue this at this point in time as explicitly stated in its *Accounting Separation Guidelines for the Telecommunications Sector*. In ascertaining whether or not operational separation is necessary, the Authority shall continue to monitor and evaluate the status of LLU implementation in T&T and where it detects anti-competitive practices by the PSTN access provider, such that LLU

[7] There are two other alternative approaches to operational separation, NetCo and ADCo, which The Authority may consider. However both approaches goes beyond the operational separation of the local loop to encompass either the separation of the entire network infrastructure (access and non-access network) of the access provider and its placement in a Network Company (NetCo) or the establishment of a 'carriers' carrier' which involves the joint ownership of the non-competitive access assets by all access seekers (ADCo).

deployment is stymied, it may thereafter adopt an appropriate approach to operational separation.

> ***Statement on Operational Separation:***
>
> *The Authority proposes to continue to monitor and to evaluate the status of LLU implementation in T&T and where it determines the existence of anti-competitive practices by the Public Switched Telephone Network access provider such that LLU deployment is stymied, it will thereafter consider and adopt an appropriate approach to operational separation.*

5.3 Alternatives to LLU

In the earlier part of this Section the Authority alluded to the fact that that there are alternative complementary strategies for the attainment of ubiquitous connectivity, carrying capacity and resource maximization in T&T. One of these strategies is for the encouragement of alternative access networks such that the objectives articulated in *Section 1* are achieved. The Authority therefore opines that the concept of LLU as articulated in the existing literature implicitly assumes constant returns to scale and/or constancy of costs, firm size and/or technological development. However, this can be perceived as being at variance with the present dynamic of the telecommunications and broadcasting sectors which pivots upon increasing returns to scale. It follows therefore that the presence of increasing returns to scale or technological changes in access network technologies could engender possible alternatives to ULL. Thus, the Authority postulates that it would encourage alternative forms of access networks in T&T for the provisioning of ubiquitous connectivity, carrying capacity and resource maximization, namely:

1. Coaxial Cable and Fibre Optic Networks (*also Hybrid fibre coaxial (HFC*);
2. Wireless Networks; and
3. Power Lines (*where possible*).

However, prior to discussing these types of access networks, it is important to note that Section 26 of the Act mandates all concessionaires of a public telecommunications network to provide access to facilities that it owns or controls to other concessionaires (access seekers). This stipulation is encapsulated in *Regulation 4* of the *Access to Facilities Regulations* which states:

> *"Without prejudice to the generality of the foregoing, a concessionaire shall provide access to the following facilities including where applicable, their functional equivalents:*
>
> > *(a) local access loop;*
> > *(b) line side facilities including the connection between an access loop termination at the main distribution frame and the switch line card or such points which are functionally equivalent;*
> > *(c) trunk-side facilities, including the trunk-side cross connect panel and a switch trunk card or such points which are functionally equivalent;*
> > *(d) trunk connect facilities, including the connection between trunk termination at a cross connect panel and a switch trunk card or such points which are functionally equivalent;*
> > *(e) inter-office transmission facilities;*
> > *(f) signalling networks including signalling links and signalling transfer points;*
> > *(g) service control points; and*
> > *(h) ducts, poles and towers used for supporting or carrying telecommunication facilities."*

The generality of *Clause 4* and it being conditioned by the phrase "*functionally equivalent*" lends itself to an interpretation that all concessionaires that are network providers are required to provide access to their network facilities. This therefore speaks to the possibility of UNEs inclusive of unbundled local access being applicable to all access networks. The Authority recognizes that such an interpretation could not only create a significant regulatory challenge but it could retard investment in networks while engendering a litigious environment. To avoid the occurrence of these unwanted effects, the Authority will adopt a managed approach to unbundling wherein the local loop of the PSTN access provider is unbundled first. The Authority will monitor the effectiveness of this strategy and depending upon the degree of success, require the implementation of unbundling in other access networks where applicable.

Statement on Unbundling of non-PSTN Access Networks:

The Authority re-emphasises that the Telecommunications Act and the Access to Facilities Regulations requires all access providers to unbundle their access network. The Authority however, proposes to adopt a managed approach to LLU commencing initially with PSTN Network unbundling. The unbundling of the functional equivalent of the local loop of other networks may be considered after a review of the domestic market to ascertain the effectiveness of PSTN Network LLU.

5.3.1 Coaxial Cable & Fibre Optic Access Networks

The Authority recognizes that within recent times the demand for new services requiring greater bandwidth has resulted globally in fibre being increasingly used in the access network. The global experience suggests that the approach typically embraced by access providers for the deployment of fibre in the access network is twofold:

1. Fibre To The Home (FTTH) - wherein fibre is used as the access medium to replace the local loop. This approach is typically perceived as being very costly to implement due to the related expenses of laying fibre cables and the end user's cost of optical termination equipment; and
2. Fibre To The Curb (FTTC) – wherein fibre is utilized to either shorten the local loop length and/or in conjunction with other access network medium including coaxial and/or wireless, to provision broadband services to end users. There is a variant of FTTC, termed Hybrid Fibre Coaxial (HFC) that is utilized by traditional Cable Broadcasters, to provision multiple to end users – video, data services and voice telephony.

The global literature and experience reveals that the utilization of fibre in the access network, specifically by traditional cable broadcasters in the form of HFC platforms have enabled those 'broadcasters' to blur the traditional barriers between broadcasting and telecommunications, thereby permitting inter-modal competition across traditionally distinct industries.[8] This form of competition (inter-modal) strikes directly at margins and provides substantial and direct consumer benefits in both price and non price dimensions –inevitably leading to consumer welfare maximization. Where the Authority encourages inter-modal competition, it would implicitly require broadcasters to upgrade their traditional HFC networks to bi-directional communication networks and/or to deploy new access network infrastructure with broadband capabilities. This, the Authority has duly encouraged when it awarded concessions to six (6) Cable concessionaires. These concessionaires were issued with Types 2 and 5 concessions to provide broadcasting and telecommunications (inclusive of video and data) services. In addition, concessionaires were required by their respective concession to achieve specific network build out conditionalities within the parameters of their territorial authorization (major, minor or niche). The Authority will therefore encourage Cable companies (cableco) to continually roll-out access network in underserved and un-served areas and/or to engage the incumbent PSTN provider to lease its access network such that the duplication of access networks is minimized. The Authority will also engage the Town and Country Division of the Ministry of Planning and Development to develop collaboratively a policy paper on 'rights of way', of which pole proliferation is a constituent thereof, in similar manner to the Ministry's Policy on Tower Proliferation.

It is also the Authority's understanding that the emergence of HFC access networks as proximate substitutes for traditional telecommunications access networks has engendered calls from telephone companies (telcos) for harmonization of regulations for cablecos and telcos. As such, telcos have been clamouring for a 'cable network unbundling' (CNU) initiative in like manner to that of the LLU imposed upon telecommunications networks. The Authority recognizes however, that the success of such an initiative is premised upon the specific details of the relevant legislation that governs the telecommunications sector in the various jurisdictions.

In the United States for instance, cablecos have argued successfully that they are not telcos and should be treated differently when it comes to network access. The basis of

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[8] Intra – modal competiton occurs within the same traditionally distinct industry.

the cablecos argument was that they are primarily a cable service providing telecommunications services, and therefore fell outside the bounds of the Telecommunications Act[9], which specifically states, “if a cable operator or affiliate thereof is engaged in the provision of telecommunications service ... the provisions of this title shall not apply to such cable operator or affiliate for the provision of telecommunications services.”

This view was upheld by the United Stated of America (U.S.A) Supreme Court in its landmark decision in June 2005 wherein it concurred with the Federal Communications Commission (FCC) categorization of cable broadband as “information services” which under its rules, allows cablecos to prevent competitors from sharing their networks.[10] A similar determination was made by the Dutch Court in The Hague in July of 2006 in a case brought by KPN for harmonization of regulation between cablecos and telcos. However, the Authority again recognizes that this determination was premised by the specifics of the telecommunications legislation in the Netherlands. In fact, the Authority notes that there are measures afoot to revisit legislation to address CNU, specifically in The Hague, where the Dutch Parliament approved a CNU Bill in October of 2006 effectively initiating the process for CNU.

It is evident from the above discourse that in the jurisdictions of the Netherlands and the US, the respective pieces of telecommunications legislation implicitly differentiate between a telecommunications and broadcasting (cable) networks. In Trinidad and Tobago however, no such difference is made. This, in the Authority’s opinion, constitutes the major difference between CNU in the Netherlands, the United States and in Trinidad and Tobago. In fact, the Authority, in accordance with its powers under Section 18(1)(b) of the Act, has classified both cable networks and the PSTN as

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[9] The Act defines “telecommunications” as the “transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received.”

[10] See Supreme Court of the United States No. 04-277 (National Cable & Telecommunications Association et al *v* Brand X Internet Services et al) and No. 04-281 (Federal Communications Commission and United States Petitioners *v* Brand X Internet Services et al). Available online at http://www.fcc.gov/ogc/documents/opinions/2005/04-277-062705.pdf

public telecommunications networks[11] providing public telecommunications services[12]. This classification reflects the service neutrality approach embraced by the Authority in its Authorization Framework. This 'neutrality' approach authorizes a concessionaire of a public telecommunications service concession, Type II[13], to provide any telecommunications service over its networks. In Trinidad and Tobago both cablecos and telcos are awarded Type II concessions in accordance with the Authority's 'neutrality' approach as contained in its Authorization Framework.

The Authority is aware therefore, that Section 26 of the Act of 2001 and *Regulation 4* of the *Access to Facilities Regulations*, as previously mentioned in Section 5.3 above, mandates CNU. This is further emphasised by the absence of any real distinction (apart from technology) between the PSTN (Public Telecommunications Network) and a cable network (Public Telecommunications Network) in Trinidad and Tobago. However, the Authority, in its managed approach to unbundling, will not engage in CNU at this point in time but will continually monitor the international and domestic telecommunications and broadcasting sectors in order to ascertain the feasibility of CNU and to determine the appropriate timeframe for implementing CNU.

Statement on Rights of Way:

The Authority proposes to collaborate with the Town and Country Division of the Ministry of Planning and Development to develop a Policy on 'rights of way' that seeks to minimize the proliferation of poles.

[11] "public telecommunications network" means a telecommunications network used to provide a public telecommunications service

[12] "public telecommunications service" means a telecommunications service, including a public telephone service, offered to members of the general public, whereby one user can communicate with any other user in real time, regardless of the technology used to provide such service

[13] Type 2: Network-Service Concession (network-based): Authorizes a concessionaire to own or operate a public telecommunications network in addition to providing public telecommunications services over that network.

5.3.2 Wireless Access Networks

The Authority duly notes that the rapidity of technological changes has enabled the provisioning of the full gambit of telecommunications and broadcasting services via many flavours of wireless access networks. This may be inferred from the Authority's LLU Survey which sought to obtain respondents' preferences to alternative access networks to that of the PSTN for provisioning access services. It was found therein that all respondents desired to provision access services via wireless access networks of one form or the other. Respondents exhibited a strong preference for either WiMax/Wi-Fi (approx. 75%) and/or Fixed Wireless (approx. 56%) (Table 2). At this juncture, the Authority wishes to remind potential telecommunications and broadcasting providers that relevant licences and/or concessions are required for the provisioning of public telecommunications services. This notwithstanding, the Authority's focus in this document is on certain wireless access networks given their relevance to objectives articulated above –ubiquitous connectivity and carrying capacity and resource maximization. In this regards, the Authority's focus is three main wireless access mediums that may replicate the local loop and provision broadband services, namely:

1. Wireless Cable Access Networks;
2. Wireless Fidelity (WiFi) and WiMax Networks; and
3. Cellular Networks.

5.3.2.1 Wireless Cable Access

The Authority recognizes that wireless cable systems such as Multichannel Multipoint Distribution System (MMDS) and Local Multipoint Distribution Systems (LMDS), have evolved from their original uni-directional multichannel terrestrial microwave distributive system, to one capable of two-way communication, with bandwidth capacity in excess of 180 Mbit/s. It is also recognized that there is an argument that these systems can provide multiple service offering at lower investment costs to end users.[14] The rationale for this argument, in the Authority's understanding, resides in the apparent correlation between deployment of these networks and the cost to end users. It is acknowledged that the cost to end users which entails a fixed antenna, modem and installation are only incurred upon service activation. Thus, from the service provider's perspective, receipt of revenues from end users only occurs upon service activation, i.e. after the service is actually contractually agreed to with the end user and the network is deployed thereto.

However, the Authority is aware that when deploying these systems, cognizance must be given to the impact of atmospheric conditions on signal transmission and frequency allocation to signal propagation. Overcoming these challenges may require increased expenditures on additional spectrum acquisition and infrastructural outlay (sites, repeaters etc) to achieve network robustness. This notwithstanding, the Authority will require all access providers utilizing wireless cable access technologies to adhere to the grade of service parameters as detailed in their concession and relevant regulatory instruments.

Statement on Wireless Cable Service Offerings & Quality of Service:

The Authority proposes to require all access providers of wireless access networks to comply with grade of service parameters as contained in their respective concessions and any relevant regulatory instruments.

Statement on Wireless Cable Network Roll Out:

The Authority proposes to encourage wireless cable providers to roll out access network in under-served areas.

[14] OECD Ibid.

5.3.2.2 Wireless Fidelity (Wi-Fi) and WiMax

A more robust treatment of these systems is contained in the Authority's consultative document entitled "*Spectrum Plan for the Accommodation of Broadband Wireless Access Services*". However for the purposes of this consultative document the Authority wishes to provide a few important comments on Wi-Fi and WiMax.

The Authority notes that:

1. Wi-Fi is increasingly being used for advanced telecommunications and broadcasting applications, inclusive of Internet and Voice over Internet Protocal (VoIP) services;
2. Wi-Fi access providers can deploy a hybrid Wi-Fi/LLU network topology with a Wi-Fi *Hot Spot* located at the end of each loop to provide ubiquitous coverage across T&T; and
3. The primary challenges for Wi-Fi access providers are located in its shared network architecture, its non carrier grade technology and the effective range for connectivity.

Pertaining specifically to WiMax, the Authority notes that it is a rapidly emerging technological standard[15] that:

1. enables the provision of broadband bandwidth capacity, capable of the delivery of multiple service offerings;
2. is emerging as a viable alternative to the last mile or local loop;
3. allows for mobility similar to a cellular network[16];
4. can be deployed in a WiMax/Wi-Fi hybrid access network topology similar to that outlined for Wi-Fi/LLU (*supra*);
5. has some teething problems, especially with the trade-off between reach and bandwidth (it can have either high bandwidth or long reach, but not both simultaneously), and its conformance to a shared network

[15] IEEE 802.16
[16] IEEE 802.20

architecture in a given radio sector. However, the Authority notes that this latter limitation can be addressed through the implementation of appropriate QoS parameters that ensures carrier grade of services.

These comments notwithstanding, the Authority will encourage Wi-Fi and WiMax access network solutions to achieve the articulated objectives identified in this consultative document. While this approach is reflective of the LLU Survey, the Authority will ensure that relevant measures adopted to encourage adoption of these access network infrastructures conform to the parameters defined within its consultative document entitled "*Spectrum Plan for the Accommodation of Broadband Wireless Access Services*". As a corollary, the Authority shall ensure that these networks conform to QoS parameters and/or indicators explicitly identified in either their concession and/or any relevant regulations.

Statement on BWA Quality of Service:

The Authority proposes require all concessionaires of wireless access networks to comply with grade of service parameters contained in their concession and any relevant regulations.

Statement on Wi-Fi/WiMax Network Roll Out:

The Authority proposes to mandate Wi-Fi and WiMax providers to roll out access networks in under-served areas.

5.3.2.3 Cellular Access

The rapid evolution of cellular technologies has to some extent given rise to the perception within the telecommunications and broadcasting sectors as to the possibility of cellular networks becoming the *de facto* telecommunications network for provisioning voice services. The focus of this consultative document is not on the merits and/or demerits of this perception, but rather that of the utilization of emerging cellular technologies to provide accessible and affordable broadband services that adhere to the objectives previously articulated in *Section 2*. In this context, the Authority recognizes that there are currently two main cellular technological standards that can be harnessed to attain the desired objectives, namely, Universal Mobile Telecommunications System (UMTS) and 1x Evolution-Data Optimized (1xEV-DO).

UMTS is a third generation cellular radio technology which most commonly utilizes W-CDMA[17][18] as the underlying air interface and is often marketed as 3GSM, with the GSM[19] reflective of the standard it was designed to succeed. The Authority's research suggests that while theoretically UMTS is touted as capable of supporting up to 11Mbit/s, in reality the actual data transfer rate is limited by the type of handsets utilized-384 kbit/s per subscriber for R99 handsets and 3.6 Mbit/s for HSDPA[20] handsets in the downlink connection.

Perceived as the natural evolutionary path from GSM to 3GSM, UMTS-W-CDMA would require existing GSM operators to engage in a technological migration path towards deployment of UMTS. However, the Authority recognizes that this migration would entail increased cost during the transitory stage where additional spectrum is required and where the requisite network infrastructures necessitates the overlay of UMTS at existing GSM towers.

Pertaining to 1x Evolution-Data Optimized (1xEV-DO), it is the Authority's understanding that it is utilized with Code Division Multiple Access (CDMA) Networks and can presently provide end users with air interface speeds of up to 2.4576 Mb/s with Rev. 0 and up to 3.1 Mb/s with Rev. A[21]. It is further understood by the Authority that Rev. A not only offers fast packet establishment on both the downlink and uplink along with air interface enhancements that reduce latency but this low latency supports the

[17] Wideband Code Division Multiple Access (W-CDMA) is a wideband spread-spectrum mobile air interface which utilizes the CDMA signal method to achieve higher data throughput.
[18] Other forms utilized by UMTS are Time Division-CDMA (TD_CDMA) or Time Division- Synchronous CDMA (T-SCDMA).
[19] GSM is the acronym for Global System for Mobile Communications.
[20] HSDPA is the acronym for High Speed Download Packet Access.
[21] 1xEV-DO Rev.A. is the first revision of the standard and successor to Rev.0.

provisioning of VoIP and Video Telephony on the same carrier with traditional Internet packet data services.

Further research by the Authority on 1xEV-DO has revealed that technological improvements to Rev. A. has lead to additional enhancements and the upgrade to Rev B. which is capable of, in addition to those functionalities of Rev. A., *inter alia*:

1. Higher data rates of 4.9 Mbps download per carrier;
2. Higher data rates that enables new services such as high definition video streaming;
3. Reduction in latency for services such as gaming, http, and video telephony; and
4. Efficient support for services that have asymmetric download and upload requirements (e.g., file download/upload, or http).

At an implementation level in T&T, the Authority draws stakeholders' attention to its approach to liberalization of the telecommunications market in T&T. Therein, the Authority awarded two mobile concessions in December of 2005 to Digicel Trinidad and Tobago and Laqtel Limited, bringing the total number of authorized cellular providers to three (3) in the domestic marketplace. Two of the three providers (Digicel T&T and the incumbent TSTT) utilize GSM networks, while the other (Laqtel Limited) was purported to utilize a CDMA network. As a natural evolutionary path towards 3G networks both Digicel and TSTT provision General Packet Radio Services (GPRS), also known as 2.5G.[22] It follows therefore that these two network providers can evolve into 3GSM or UMTS network providers. The Authority also notes that one of these said GSM providers (TSTT) also advertises and markets 1xEV-DO services to business end users. Pertaining specifically to Laqtel Limited, the Minister of Public Administration, under whose purview telecommunications resides, terminated Laqtel's concession in accordance with his powers under section 30 and 39 of the Telecommunications Act of 2001.

[22] Where both network providers is to utilize Enhanced Date Rates for GSM Evolution (EDGE) or Enhanced GPRS (EGPRS) there network would be referred to as 2.75G networks.

The main challenge that the Authority perceives as arising, when utilizing UMTS and 1x.EV-DO for ubiquitous wireless broadband access connectivity, resides in their non-substitutability for fixed broadband. The experiences globally suggest that broadband services over these networks are typically considered by service providers to be ‘premium services’ and therefore priced as such. However, it is highly possible to harness all forms of wireless broadband technologies to render inter-modal competition feasible. Attainment of this, in the Authority’s perspective, would require the adoption of an approach that encourages service providers utilizing cellular technologies, to reduce prices, such that prices are comparable to those of broadband services provisioned by other forms of network technologies. It is therefore incumbent upon the Authority to continually review the domestic market and to ascertain whether or not sufficient competition (intra- modal and inter-modal) exists to yield affordable prices.

Statement on inter-modal Competition:

The Authority proposes to encourage inter-modal competition where broadband service is ubiquitous and affordable to all end users irrespective of geographic locale.

Statement on Cellular 3G Networks:

The Authority proposes to encourage (as far as possible) all cellular providers of access networks to upgrade their access networks to provision 3G Services.

5.3.3 Power Line Telecommunications

The Authority is aware that Power Line Telecommunications (PLT) also termed Power Line Communications (PLC) or Broadband over Power Lines (BPL) enables the delivery of high frequency broadband data at maximum speeds of 45 Mbit/s over existing electricity distribution cables, on a secondary basis. However, it is the Authority’s understanding that the main challenge with PLT’s rollout, pertains to the untwisted and unshielded nature of power lines network infrastructure which enables these said lines to function as large antennas.

This notwithstanding, the Authority notes that the relatively ubiquitous nature of power lines in T&T, renders them excellent candidates for the provisioning of communications services. This latent communication potential of power lines has within recent times, received tremendous impetus from investment from major Information and Communication Technology (ICT) players and from the USA Federal Communications Commission (FCC) which reaffirmed its stance on the deployment of PLT.[23] This position by the FCC has hastened the possible trial and deployment of PLT as a potential option for access network service provisioning.

In T&T the incumbent electricity utility provider, the Trinidad and Tobago Electricity Company (TTEC), has the potential to leverage its relatively ubiquitous electricity distribution network to rapidly enter the domestic telecoms markets through the deployment of PLT. While it is recognized however, that there does not exist an official position on PLT, it is the Authority's position that the utilization of PLT by TTEC to provide telecommunications services to the public shall require a Concession from the Authority.

Beyond PLT, the Authority is aware that TTEC has at its disposal existing microwave links and dark fibre which it can utilize to establish a core telecommunications network. This 'core network' can be harnessed with LLU to create a telecommunications network infrastructure which can be leveraged upon by the company to provide the full gambit of telecommunications and broadcasting services. The Authority therefore notes the rapid spate of convergence across non-traditional markets and recognizes the importance of developing and maintaining a strong and harmonious working relationship between itself and the Regulated Industries Commission (RIC) under whose regulatory jurisdiction TTEC resides.

[23] In a Memorandum Opinion and Order adopted by the FCC on August 3rd 2006, the commission affirmed that PLT providers have the right to provide data access using power transmission lines, provided they do not interfere with existing radio services.

Statement on PLT:

The Authority proposes to monitor the development and deployment of PLT in T&T and shall mandate the requirement of a concession for its utilization to provision public telecommunication service.

Statement on Collaboration with the RIC:

The Authority proposes to collaborate closely with the Regulated Industries Commission in the regulation of PLT in Trinidad and Tobago.

6 Conclusion

The Authority, as one of the key implementing agencies of the GoRTT's telecommunications and broadcasting policies has been mandated to ensure ubiquitous connectivity that maximizes resources while ensuring affordability, availability and accessibility. In this vein the Authority has adopted the hybrid facility-based and resale regulatory strategy of UNEs inclusive of LLU.

While the Authority recognizes that the *Access to Facilities Regulations* permits UNEs inclusive of LLU, effective and orderly implementation of UNEs necessitates the adoption of specific rules and guidelines which are proposed in this document for industry consultation. Most notable of these rules and guidelines are:

- Adoption of a managed approach to unbundling, commencing initially with unbundling of the PSTN local loop;
- Mandating the types of LLU and the forms of collocation that are to be rendered available by the PSTN access provider to all access seekers;
- Pronouncement by official notification as to when the functional equivalent of the local loop of other access networks may be unbundled;
- Ensuring access facilities rates are cost or as prescribed by the Authority in accordance with its *Proposed Costing Methodology for the Telecommunications Sector*;
- Encouraging the availability of access network in under-served areas;
- Mandating the access network providers to develop and publish a Reference Unbundling Offer *when directed by the Authority*. This document should have at a minimum the types of services and facilities necessary for unbundling with their accompanying costs.

The Authority, after considering all relevant factors, will encourage competition in the domestic environment such that social welfare is maximized. In this context, the Authority will facilitate inter-modal competition and will continuously monitor the development of said competition to ensure that the delicate balance between consumer welfare maximization and service providers' return on their investment is achieved and maintained. Finally, the Authority will ensure that the interests of all stakeholders are considered in its formulation of regulatory objectives as a means of ensuring regulatory credibility, certainty and transparency in all of its processes.

ANNEX B: Decisions on Recommendations

The following summarizes the comments and recommendations received from stakeholders on the first draft of this document (dated 31st October, 2008), and the decisions made by TATT as incorporated in this revised document (dated 20th July 2009)

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Introduction				
Introduction	TSTT	Key policy makers are facing some really important questions and decisions in seeking to achieve the goals of developing a sound ICT sector for Trinidad and Tobago, through increased broadband penetration. TSTT concurs with the Authority that there is need to develop a sound ICT strategy. The key difference between TSTT's and TATT's respective positions is how this goal will be accomplished. TATT believes that the sustained investment needed for the deployment of a robust ICT platform will come from local loop unbundling and infrastructure sharing. Disturbingly it limits such unbundling and infrastructure sharing to TSTT, to the exclusion of other providers of available infrastructure. TATT's perception is based on the stepping stone hypothesis, which claims that new or existing competitors need not invest in infrastructure, but instead make use of the incumbent's	The Authority should encourage the development of a robust ICT sector based on broadband infrastructure by encouraging facility-based competition in Trinidad and Tobago, promoting effective investments by competitors (traditional telecommunication operators, cable operators, wireless operators, etc). The Authority should pay more attention to the overwhelming international	All concessionaires are reminded that Unbundled Network Elements (UNE) inclusive of unbundling of the local loop is already prescribed in Section 26 of the Telecommunications Act and mandated in Clause 4 of the Access to Facilities Regulations. TSTT and all other stakeholders are aware that the Authority has pursued an infrastructure base strategy over the last two years and has encouraged all network and service providers to roll out their respective network. The

[24] Regional regulatory or Governmental agencies, Existing service and/ or network provider and affiliates, Potential service and/ or network providers and affiliates, Service/ Network Provider Associations/ Clubs/ Groups, General Public

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		existing infrastructure. It is anticipated that over time, new players will invest in their own infrastructure. The empirical results do not support the hypothesis. On the contrary, the primary effect of LLU and facilities sharing policies in those developed countries where they have been tried, has been lower investment by incumbents and no substantial or sustained investment from competitors. It is TSTT's respectful view, that the most efficient way to encourage the development of a robust ICT sector is to promote and encourage investment in infrastructure-based competition rather than service or resale based competition. This is especially true in a developing country such as Trinidad and Tobago, which in contrast to most developed countries that have tried unsuccessfully to promote investment through LLU and sharing policies, have limited economic resources for the kind of investment that is needed for the rolling out LLU. Local Loop Unbundling (LLU) of TSTT's network may seem on the surface to be a simple, attractive and inexpensive concept to define, understand and implement. However, upon closer investigation the converse holds true. In most, if not all, cases there are significant costs and additional network investments that TSTT would have to incur in order to implement LLU. These investments include but are not limited to, network infrastructure and operations support	evidence coming from developed countries, in which compulsory LLU and sharing policies have been adopted, that shows that the "stepping stone hypothesis" has been proven wrong: new competitors have not invested and incumbents have decreased their investments since incentives to do so have been reduced by LLU and sharing policies. The Authority has already started to play a fundamental role to promote the development of a robust ICT sector by encouraging facilities-based competition when in 2006 it allowed the entrance of new facility based competitors (cable, wireless, etc). But this achievement will be put in danger if LLU and sharing agreements are	Authority continues to encourage infrastructure based competition and have issued a number of concessions in the domestic fixed (wireless and wire) and mobile markets The Authority also sees the need to deepen the level of competition in the domestic market and opines that the hybrid facility-based-service based competition can achieve same. The Authority has reviewed the international experience and the evidence suggests that unbundling has been successful in many countries, especially where the National Regulatory Agency (NRA) has enforced unbundling regulations. By way of illustration, the Authority directs TSTT to the European Competitive Telecommunications Associations Regulatory Scorecard for 2008 which explicitly stated that: "the penetration of LLU is most

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		systems (e.g. billing, ordering, testing, maintenance, network inventory systems etc.). The LLU Consultation recognizes that a myriad of issues associated with LLU can and will arise. All of the costs and benefits that are potentially expected from the proposed implementation of LLU therefore need to be examined if the Authority wishes to implement policies that are designed to bring about positive benefits to consumers and competitors, while simultaneously encouraging TSTT in the continued modernization of its network.	compulsorily imposed to TSTT or any other facility-based competitor. There is a permanent role by the Authority: to get rid off barriers to entry to the various telecommunication relevant markets in Trinidad and Tobago. Real economic barriers to entry may be the source to market power. It is imperative that sufficient dialogue is carried out among the stakeholders to discuss and minimise the complexity of LLU and develop a comprehensive cost benefit analysis (CBA) before any decision to mandate LLU. Clear criteria must be established as being ▪ Transparent ▪ Cost oriented and	strongly correlated (0.63) with the overall penetration of broadband in the market, LLU is also associated with higher overall retail broadband penetration rates for the incumbent (0.44)". ECTA, Regulatory Scorecard 2008, page 9. David Sraer found "that unbundling by at least one operator causes a large, significant shift in penetration, ranging from 1.1 percentage point in the very short run up to 5.9 percentage points in the medium to long run. (Local Loop Unbundling and Broadband Penetration. 2008. University of California, Berkeley). In the UK, the Office of the Telecommunications Adjudicator report ending January 2009 showed that LLU grew exponentially over the last two

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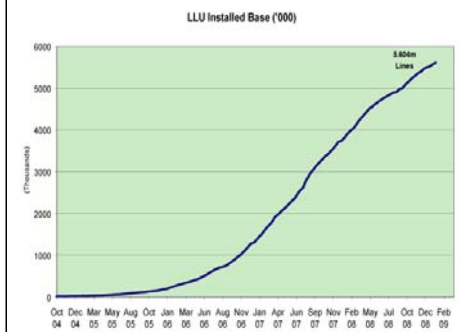
			▪ Non-discriminatory	years and stood at 5.604 Million lines at the end of January 2009.  OFCOM quarterly telecommunications market report for Q3 2008 showed that residential and small business LLU connections increased by 323,000 lines. Pertaining specifically to TSTT's investment concerns, the Authority notes that a recent study found that "unbundling may lower incentives for quality improvements, but raises incentives for cost

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				reduction. Therefore, it is not true that all types of investment are crowded out with unbundling. If the regulator can commit to a socially optimal unbundling price before investment, the incumbent makes both types of investment. (João Vareda. 2007. "Unbundling and Incumbent Investment in Quality Upgrades and Cost Reduction" FEUNL Working Paper Series wp526, Universidade Nova de Lisboa, Faculdade de Economia The Authority is appreciative of TSTT comments but wishes to remind TSTT that it is ever mindful of the challenges that may arise when introducing LLU. In overcoming these challenges, the Authority is presently consulting stakeholders on the framework and associated regulations which it believes would address the concerns raise by TSTT and other

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				stakeholders. Further, the Authority wishes to assure TSTT and all stakeholders that the criteria to be used for LLU would be transparent, non-discriminatory and cost-oriented. Finally, the Authority notes TSTT concerns as it pertains to the potential impact that LLU may have on investment by incumbent. The Authority directs TSTT attention to the US experience, where the FCC in a series of three orders, removed the "unbundling" obligations on certain fiber facilities deployed by incumbents. However as the EDUCAUSE White Paper of January 2008 stated where reviewing the US experience "even if deregulating a telephone company removes a disincentive to invest, it does not necessarily mean that investment will occur. Many other factors also

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				affect the decision to invest. Note that even though the FCC removed the unbundling obligations for all the incumbent telephone companies, only Verizon has chosen to deploy fiber to the home" EDUCAUSE. "A Blueprint for Big Broadband" page 30.
	TSTT	TSTT fully supports the Government's objective of creating a knowledge-based society by year 2020 and notes that we have already begun our very own rollout plans which we believe align with those objectives. LLU is a concept that has been applied by National Regulatory Authorities (NRAs) in well developed countries to open up the Public Switched Telecommunications Network (PSTN) operated *via* traditional 'raw copper' lines to deploy broadband lines ubiquitously. Broadband provision is already a competitive service offering in Trinidad and Tobago without LLU and is anticipated to become increasingly so; all this in the absence of LLU. However, counter to the Government's objectives LLU is known, *inter alia*, to create disincentives to investment in newer facilities. TSTT must therefore question the appropriateness of LLU as a suitable policy tool to achieve both the Government's objective of a knowledge based society	TSTT believes that a full cost benefit analysis be done prior to the commencement of second round consultation.	While the Authority appreciates TSTT's concerns, it nonetheless reminds TSTT that Unbundled Network Elements inclusive of unbundling of the local loop is already prescribed in Section 26 of the Telecommunications Act and mandated in Clause 4 of the Access to Facilities Regulations.

[25] *Ibid.* at para. 272.

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		and also the Authority's objective of increased competition, greater innovation in the retail markets and by extension lower prices. It is clear, for example, through pages 7 and 8 in the Consultative Document, that the policy objectives of the Government and the Authority are to encourage broadband development in Trinidad and Tobago. While the objective may be centered on achieving a greater diffusion of broadband, it is necessary to place an emphasis on the likely effectiveness of LLU in the context of the country Moreso, pursuant to the Telecommunications (Access to Facilities) Regulations 2006, a concessionaire is required upon written request "*to provide access to its facilities...*" Section 4 of the said regulations provides that "*... a concessionaire shall provide access to [inter alia*] (a) [the] *local access loop;..*" Therefore it is submitted that under the current Regulations another concessionaire can in fact request, negotiate and obtain access to another concessionaire's local access loop without need for this consultation process. It is both interesting and extremely important to note that to date TSTT has not received any requests for such access. TSTT must therefore query the sincerity of the responses received by the Authority in its survey of concessionaires who would require access to the local loop.		The Authority wishes to direct TSTT to Three Sixty's response to this document where said company explicity stated that it was advised upon making a request for LLU that the fee structure for such could only be measured in the tens of million of TT dollars. The Authority has also received enquiries from other service providers for unbundled local

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		Furthermore, as the said Regulations facilitate any concessionaire to request and obtain such access from any other concessionaire, it is submitted that, in attempting to implement a managed approach to unbundling as proposed hereunder, the Authority will be acting *ultra vires* the existing legal framework, should it carry out that intent. Nevertheless, before we address the issues in greater detail, we note once more that the rationale for mandatory unbundling as proposed by the Authority is based on the "ladder of investment" or "stepping stone" hypothesis. According to this hypothesis, allowing entrants to obtain access to an incumbent's facilities at low, regulated wholesale rates, provides the necessary incentives for entrants to climb the "ladder of investment" or advance across the "stepping stone" from resale, to leasing unbundled loops, and finally to building their own networks. However, international experience with the stepping-stone or ladder-of-investment hypothesis indicates that mandatory unbundling has not encouraged facilities-based investment by entrants. To the contrary, it has depressed network investment by incumbents. The net effect of mandatory unbundling on dynamic efficiency (investment by both entrants and incumbents) is therefore unequivocally negative (See Robert		loop. The Authority has indicated to these providers that such request should be placed on hold until its LLU framework and accompanying regulations are effected. The Authority does not agree with TSTT's position that the adoption of a managed approach renders the Authority *ultra vires* the Telecommunications Act. In fact, the Telecommunications ACT mandates the Authority to "to guide the sector's transformation from virtual monopoly, in which Telecommunications Services of Trinidad and Tobago is the principal provider of telecommunications services, to a competitive environment, to monitor and regulate the sector so transformed and, in particular, to prevent anti-competitive practices." The Authority opines therefore that it is mandated by

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		W. Crandall and J. Gregory Sidak, "Is Mandatory Unbundling the Key to Increasing Broadband Penetration in Mexico? A Survey of International Evidence," Working Paper available at http://ssrn.com/abstract=996065). Additionally, the current Authorisation Framework prescribes the types of concessions obtainable by an entrant. It is recognised therefore that some entrants, by virtue of the very Concession awarded to them, may be prohibited from climbing the "ladder of investment." For example the award of Type 3 or Type 4 Concessions will limit Concessionaires thereof to the provision of telecommunications services alone. In order for them to climb the ladder of investment and engage in infrastructure development they would have to acquire a new concession permitting them to rollout a network. It is therefore submitted that this framework would be a significant deterrent to the realization of the stepping stone hypothesis in relation to those concessionaires. It remains TSTT's view that mandatory unbundling will significantly compromise not only the objectives of the Authority but also GoRTT's goals for ICT development as established in the Vision 20/20 Operational Plan. The key goal of Vision 20/20 is to implement a robust ICT sector, and the way to achieve it best is to promote facilities-	Given the importance and relevance to the issue of Local Loop Unbundling therefore, TSTT is prepared to go so far	said Act to manage the transformation of the Telecommunications sector inclusive of the approach to unbundling. The Authority also opines that where it did not adopt a managed approach: 1. The degree of regulatory uncertainty would increases tremendously; 2. The status of TSTT's network, as reported to the Authority by TSTT in its response to the Authority's LLU Survey, may suggest that TSTT may be unable to entertainment request for LLU (at this time); and 3. Provides TSTT with sufficient time to achieve network readiness to effect LLU. TSTT cited Crandall and Sidak to support its argument that

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		based competition and not to implement mandatory LLU and sharing requirements. The Authority has already started to promote facilities-based competition with the further liberalization of the telecommunication sector beginning in 2006 when it allowed the entry of fibre optic cable competitors and new wireless competitors. However, there are additional efforts that the country must undertake, focused mainly on reducing barriers to entry in the broadband market and Next Generation Networks since that is where competition, through convergence, is taking place. In most jurisdictions with liberalized telecommunications environments, access is only mandated to those facilities which are deemed **"essential."** Indeed, TSTT is heartened at the fact that the Authority on pages 4 and 13 of its consultative document recognizes "*that competition in the retail access market cannot be achieved without mandatory unbundling .... and the existence of* ***an essential facility***". Therefore in order to achieve its objectives it is critical that the concept of essentiality be detailed and the criteria for determining what facilities are to be deemed essential be established. It is internationally accepted (e.g. the U.S., Canada and Europe) that for a facility to be deemed essential it must exhibit **ALL** three following characteristics: 1. it is a necessary input for the production of other	as to insist that the Authority refrain from establishing a policy for LLU without taking into consideration the essential facilities doctrine.	"international experience with the stepping-stone or ladder-of-investment hypothesis indicates that mandatory unbundling has not encouraged facilities-based investment by entrants." However, the Authority notes that said Authors stated on page 15 "If the stepping-stone hypothesis is valid, then one should observe a decreasing reliance on entry paths at the bottom of the ladder of investment over time." That is a move away from low investment (resale/bitstream) to high investment (LLU). Using the ECTA data for 1Q 2008, and an abridged version of the method used by said Authors the Authority notes that the quantum of higher investment (full unbundling and line sharing) increased in real terms from approx. 8M to 24 M, while lower investment (resale and bitstream) increased from approx. 7M to 13M for the period 3Q 2005 to 1Q 2008. The Authority also notes that the number of xDSL lines owned by entrants and wholesale broadband lines supplied by entrants

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		products or services; 2. it is provided by a firm with monopoly control over the facility; **AND** 3. it cannot be economically duplicated or self-supplied by a competitor. This essential facilities doctrine is referenced in the World Trade Organization's Reference Paper on regulatory principles adopted by Trinidad and Tobago in 1997: GATS/SC/86/Suppl.1, April 11 1997, 97-1490. It is noted that TATT's legal framework has not yet incorporated this doctrine into its domestic law, despite Trinidad and Tobago being a party to the GATS agreement. We respectfully submit that the incorporation of the essential facilities doctrine is necessary both from a legal perspective and a regulatory perspective as this doctrine is the legitimate basis upon which the requirement for LLU must be judged. In the telecommunications context, the essential facilities doctrine has generally been used as a rationale for imposing access regulation on legacy networks of incumbent providers, i.e. those ubiquitous networks that were built under monopoly conditions (See also the European Commission, *On relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in*		increased from approx. 48K to 278K. and 0 to 1M for the same period respectively. Therefore the evidence provides credence for the stepping stone theory. The Authority further notes that said Authors stated that the Mexico's Ministry with responsibility for Communications stated that the best way to stimulate the demand for broadband services, and to achieve lower prices is by "eliminat[ing] market restrictions with discriminatory treatment toward [other] broadband providers," which we interpret as generating synthetic competition through mandatory unbundling at regulated access rates. The Authority notes that these Authors made this interpretation in spite of Mexico having no unbundling regulations mandating same (See OECD Communications Outlook 2007).

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		accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, December 2007). LLU sharing requirements should therefore firstly pass a test of being an essential facility or service in Trinidad and Tobago. The essential facilities doctrine is a principled and well-established test, with clear criteria for delimiting the number of situations in which the provision of facilities or services could be mandated. The second step is to analyze the effects that LLU and sharing requirements would have on infrastructure investments that have yet to be made in this country, which are necessary in order to develop the robust ICT sector needed for advanced economic development in Trinidad and Tobago. The third is to determine whether indeed the particular facility or service could be economically duplicated. It is also noted that the evidence reflected in a growing economic literature has found that when rights are reallocated from network owners to users by regulation, investment incentives to create, expand or modernize telephone networks are negatively affected, because the potential return on investment is diminished (See, e.g. Robert S. Pindyck, "Mandatory Unbundling and Reversible Investment in		The Authority also draws from Adams (2006) who cited Eduaedo Perez Motta, President of Mexico's Comision Federal de Comperencia who stated that "Ironically, Mexican law does mandate all carriers to provide unbundled services, but adds the condition "where technically possible". Telmex has managed to persuade Cofetel that such a thing is not possible for the local loop, which means the "commercial viability of the first-movers in these markets has been seriously challenged", Perez says. "Telmex has the ability and incentive to restrict competition in downstream markets by denying, delaying or discriminating against its downstream competitors in the retail markets, which need to obtain wholesale access, by treating its own downstream business more favourably," he

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		Telecom Networks," Working Paper 4452-03, December 2003 (MIT Sloan School of Management) at 2). A competitor who leases elements of facilities or services need not face the risk that the future demand for the service will not support the investment, that future technology will render an investment obsolete, or that investments will be stranded based on changes in the market or in the technology. These risks will all be assumed by the investor which, in most cases, is the incumbent. Put simply, mandated sharing gives competitors a "free ride" by enabling them to derive the benefits of the investment and compete with the investor, without having to bear the start-up costs or the same level of risk. As a result, mandated access to too many facilities and services not only serves as a disincentive for incumbents to invest, since they will not be able to fully realize a return on their investment, but also discourages competitors to invest in their own networks, facilities and services, thus reducing innovation across the board and – in the case of Trinidad and Tobago – preventing fulfillment of not only the Authority's objectives but also the GoRTT's Vision 2020 objectives. Because unbundling and sharing policies inherently diminish the upside potential of risky investments and do not afford comparable protection on the downside, they thereby substantially reduce the expected returns from such investments. This phenomenon is referred to as a type of		says. "This situation severely compromises Mexico's competitiveness and opportunities to take advantage from convergence to reduce the digital divide."" (http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10377782) The Authority notes TSTT's argument on the Authorization Framework and wishes to inform TSTT that it has not awarded any Type 3 Concessions. Where the Authority has granted a Type 4 Concession, said concessionaire has applied for a Type 2 and has built out relevant infrastructure. Therefore, where concessionaires are awarded Type 3 or 4, and desires to or are mandated to roll-out networks accordingly, the Authority shall require said concessionaires to apply for appropriate network and/or based concession.

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		"real-option effect." Two examples from other industries illustrate why this is the case. First, suppose that a hypothetical airline regulator were to impose an unbundling requirement on an existing airline to share capacity on its aircraft with a competitor that had not acquired its own aircraft. The existing airline has no particular incentive in purchasing new aircraft if a competitor can just as easily gain access thereto, and compete with the existing airline without the same level of risk Indeed any such competitor can equally purchase a new aircraft from the manufacturer. A barrier to entry into the airline industry is not created by the simple fact of an existing airline company owning an airplane. To enter practically any business requires initial investment. Second, suppose that a hypothetical Federal Oil Commission ("FOC") imposed unbundling requirements on incumbent oil companies ("IOCs"). In particular, if an IOC drills a well, competing oil companies ("COCs") can get the oil by compensating the IOC for its drilling and operating costs (calculated according to a bottom-up cost model). In this example, COCs would, of course, be interested only in wells that struck oil. They would not pay any costs (TELRIC or otherwise) for holes that turned out to be dry. Thus, IOCs would bear the entire loss from dry holes, while losing much		The Authority notes TSTT's comments on the doctrine of essential facilities and inform TSTT that page 19 of its Proposed Price Regulation Framework has already addressed this concern. The Authority notes TSTT's extensive discourse on unbundling and its impact on investment and innovation. The Authority's review of the literature on this issue suggests

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		of the compensating benefits from wells that strike oil. It is completely obvious that the unbundling requirements in this example vastly reduce the incentives of IOCs to drill for oil. The requirements would reduce incentives even if the FOC's costing methodology significantly overestimated the incumbent's costs (See J. Haring and J. Rohlfs, "The Disincentives for Broadband Deployment Afforded by the FCC's Unbundling Policies," Strategic Policy Research (April 4, 2002) at 2). ***These examples are particularly applicable, in the case of telecommunications, to investments in new technologies for facilities and services. It is noted that while it is consistently argued by regulators that sunk costs for legacy networks can pose a barrier to entry for competitors and give advantages to an incumbent, who has already had the opportunity to recoup the costs of its existing network over the course of many years, such is simply cannot be the case with new technologies.*** As the U.S. Federal Communications Commission ("FCC") has found, "Some barriers are the result of firms' attempts to develop new technologies and improve their efficiencies, and the barriers provide the appropriate reward for their innovative activity." (see *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange*		that said literature is more of a theoretical nature and that the results derived therein "are relatively close to those of traditional literature in terms of innovation and R&D" (See Baranes and Bourreau, 2005. An Economist's Guide to Local Loop Unbundling. Communications and Strategies). The Authority also notes that the results are dependent upon: 1. The framework of analysis utilized. Whether unbundling and facility-base entry are complementary (Christodoulol and Vlahos, 2001. Implications if regulation for entry and investment in the local loop. Telecom Policy. Vol 25: 743-757) (De Bijl and Peitz, 2004. Dynamic regulation and entry in telecommunications markets: A policy framework. Discussion Paper. Tilburg University) or substitute (Candall, Ingraham and Singer. 2004. Do unbundling policies discourage CLEC facilities-based investment?

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		Carriers; Implementation of the Local Competition Provisions of the Telecommunications Act Of 1996; *Deployment of Wireline Services Offering Advanced Telecommunications Capability, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking*, 18 FCC Rcd 16987 (2003) [hereinafter "*Triennial Review Order*"] at para. 82.) Over the years, advances in technology have created opportunities for both competitors and incumbents to offer new services and compete by building or upgrading networks rather than sharing old ones. While the cost of connecting subscribers to these new networks may require significant investments for competitors, the legacy networks themselves no longer represent barriers to entry, access to which must not be mandated nor regulated. In Trinidad and Tobago, as technology develops and continues to develop, the progression of convergence brings new opportunities (for both the incumbents and entrants), increased competition between different kinds of network prohibits the Authority from categorizing the legacy network as an essential facility. Accordingly, the international trend is for regulators to refrain from mandating access to new technologies in order to promote new investment, not to impose *more* regulation,		Topics in Economic Analysis and Policy, Vol 4: (1) Article 14); 2. The terms and conditions of unbundling (Bourreau and Dogan, 2005. Unbundling the local loop. European Economic Review, Vol 49: 173-199) and Baranes and Bourreau. 2005 An economist's guide to local loop unbundling. Communications and Strategies.). The Authority also notes that many of the concerns posed by TSTT in its extensive discourse are addressed by regulators through: 1. The terms and conditions for unbundling (sunset clause for unbundling as in the US or review of the market to ascertain the continuity of unbundling as in the EU); 2. Enforcement of the

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		particularly with respect to new facilities such as NGN. For example: a. In the U.S., the FCC declined in 2003 to require that NGN fibre-based local loops be unbundled, reasoning that relieving incumbent local exchange carriers ("LECs") from unbundling requirements for such networks would promote investment in, and deployment of, NGNs.[25] The FCC refrained from mandating access both with respect to "greenfield" (new construction) and overbuild scenarios, noting that competitive and incumbent LECs faced essentially the same obstacles in both cases. After these decisions, incumbents announced billions of dollars in new investments. In particular, Verizon announced it would invest $18 billion between 2004 and 2010 in new fibre-optic networks, while AT&T announced it would invest up to $6 billion into fibre to the nodes. b. In Singapore, although the regulator may designate specific infrastructure as Critical Support Infrastructure and mandate that a Licensee share the use of the infrastructure with other Licensees, very little has actually been designated as "critical support infrastructure" (see http://www.ida.gov.sg/Policies%20and%20Regulation/20060427160157.aspx). The results of this hands-off	It is clear therefore that fostering investment in facilities is the best way that the goals of the Authority, the National ICT Strategy and Vision 2020 can be met. As such the Authority should strongly reconsider the implementation of any form of Local Loop Unbundling accordingly.	unbundling regulations (as in the case of the EU); and 3. The rollback of regulations as competition develops.

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		approach are notable: Singapore has benefited from a fibre-to-the-home ("FTTH") network that offers services to customers at speeds up to 1 Gbps and has one of the highest broadband penetration rates in the world. Today, more than 90 per cent of Fortune 1000 technology companies have made Singapore a key node in their global network (IDA, Overview, available online at http://www.ida.gov.sg/Infocomm%20Industry/20060406160952.aspx). c. In the United Kingdom, Ofcom, in its consultation on next generation access, recognizes that investment risk must be reflected when dealing with access, to ensure investment is not discouraged. Ofcom has stated: "Our first challenge, and one of our duties, is to secure efficient and timely investment in next generation access." (See Ofcom, *Future broadband: Policy approach to next generation access,"* presentation of Ed Richards, Chief Executive, 1 October 2007.) d. In Canada, the Canadian Radio-television and Telecommunications Commission ("CRTC") has recently completed a review of its framework for access to essential facilities and services, in which it revised its definition of an "essential" facility or service		While the Authority notes TSTT arguments on technological advancements and next generation access, it is also aware that recent literature is mindful that "… as the

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		and categorized a variety of existing services and facilities according to this revised definition. While it retained mandated access for a core group of facilities, functions and services, it also determined that access to many more – including, for example, access to high speed broadband facilities and services – would be phased out over a period of three to five years. These examples demonstrate an international trend toward less regulation of access, not more, as well as recognition that those who invest in new technologies, facilities and services should have the opportunity to reap the rewards from their investments. This is not surprising as it is consistent with the application of the principles of the essential facilities doctrine of the World Trade Organization (which must be applied by signatories thereto). TSTT believes that the Authority should encourage facilities-based competition, not simply service-based competition. The National ICT Strategy published by the GoRTT envisions ICT-driven innovation, increased levels of investment and high broadband connectivity and uptake as among the GoRTT's goals for a knowledge-based society. Among its outcomes, the National ICT Strategy seeks the development of a world-class telecommunications and computing infrastructure (see Fast Forward: Trinidad and Tobago's National ICT Strategy at		next generation access networks are implemented, this implies that as long as regulation is required to deal with competition problems, the cost orientation obligation is a must for successful regulation. Hence, in this situation, imposition of regulatory holidays and/or a removal of price regulation for NGA network operators with SMP will likely lead to a re-monopolization in the retail markets." (Martin Lundborg Juconomy Consulting AG. 2008, "Lessons Learned from the Regulation of LLU for the Future Regulation of NGA Networks". Paper Presented at the 19th European Regional ITS Conference n Rome, Italy). A view also supported by Osorno. 2007, who states that "Legacy network carriers oppose unbundling because they claim to carry the greater cost of investing in NGN adaptation; but the also oppose it

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		pg.11). This requires competition on the level of infrastructure, not simply services. The technological advances that allow facilities-based competition are already underway in Trinidad and Tobago. Flow, for example, has an infrastructure that is being upgraded to provide Ethernet speeds (10/100 Mbps) using cable modems. The infrastructure is being built on a fibre ring that links some key towns. Since almost a third of Trinidad and Tobago's 376,000 households subscribe to cable services provided by Flow (Telecommunications Authority of Trinidad and Tobago - Annual Market Report Telecommunications and Broadcasting Sectors, January-December 2006. Appendix I Domestic Telecom Market Data), these subscribers represent Flow's immediately addressable market to which triple play services (voice, data and video) will be provided. Clearly, Flow will continue to upgrade its infrastructure to provide a competitive alternative to TSTT's broadband services and will be an effective facilities based competitor to TSTT. In addition to Flow, other broadband companies providing service in Trinidad and Tobago, including Greendot and Lisa Communications. Illuminat and other vendors offer national wireless services. It may not be long before, like its counterparts in North America, the Trinidad and Tobago		because they hold an advantage in integrating all the NGN layers vertically to create control points of access to essential resources for new competitors." (Osorno. Beatriz Adriana Camarena. 2007. Unbundling Path Dependence: A Case Study of Telecommunications Reform in Mexico (1990 -2006). Phd Dissertation. Stanford University). The Authority recognizes TSTT's recommendation and is in agreement with the concept of fostering facility-based and inter-modal competition. However, the Authority is ever mindful of the tradeoff between promoting static efficiency through competition in the short run and stimulating dynamic efficiency through inducing entrants to roll out networks in the long run. The

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		Electricity Commission takes advantage of its ubiquitous infrastructure to provide broadband access. Accordingly, consumers already have several sources of facilities-based supply of broadband services and can therefore look forward to even more.		Authority is also mindful of the need to cannibalize static efficiency to achieve dynamic efficiency. The Authority is also mindful of the limitations of Wireless Access Networks as evident in its discourse on said Networks in this Consultative document (See Section 5.3.2 of the "Proposed Framework for Local Loop Unbundling in Trinidad and Tobago". The Authority shall therefore continue to encourage and enforce roll out obligations for network/service based concessionaires. In the interim, the Authority shall promote competition through unbundling and shall enforce unbundling obligations as prescribed by regulations.

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	360	1. Introduction Finally and very importantly, the Authority underscores the UNEs strategy as encapsulated in Section 26 of Telecommunications Act, wherein it is incumbent on every concessionaire of a public telecommunications network and broadcasting service to provide access to its facilities that it owns or controls on a non-discriminatory and equitable basis to other concessionaires, such access not to be unreasonably withheld. This requirement is further embodied in *Clause 4* of the *Access to Facilities Regulation* wherein UNEs, inclusive of the local loop must be made available to requesting concessionaires upon request.	Three Sixty strongly agrees and can only add that upon making such requests for local loop unbundling to the incumbent operator, Three Sixty was advised that the fee structure for such could only be measured in the tens of millions of TT dollars.	The Authority notes 360 comments and refer TSTT to said, given that the latter indicated that it "has not received any request for such access" (referring to local loop).
1.2 Objectives	360	A key objective of TATT's articulation of a UNE strategy should be to (i) obligate the sector to a discrete implementation timeframe (ii) ensure a fair cost based approach that can be independently verified.		The Authority notes 360's comment and assures 360 and all other concessionaires that UNE costs shall be in accordance with the framework prescribed by Section 26 of the Telecommunications Act and more so in accordance with its costing methodology. The Authority also advises 360

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				that its costing model will determine the cost of the local loop. The Authority shall also make a determination when UNEs is to be implemented and shall communicate this date and time to the industry accordingly.
Section 2. Local Loop Unbundling				
2.Competition in retail access markets cannot be achieved without unbundling; 4.Competition in wholesale markets is desirable	TSTT	While TSTT notes the four rationales found on pages 4 and 13, it is concerned as to the merit of the appropriateness of that framework in determining the need for LLU especially in light of the essential facilities doctrine referred to above. This not withstanding TSTT proposes to examine each of the rationales posited. It is noted that the author Scott Wallsten (2006) from whom the Authority has adopted the said rationales to support LLU himself ultimately concluded mandatory unbundling was a failure. In fact these rationales were previously posited by Professors Jerry Hausman and Greg Sidak (2004) in their seminal paper entitled: "Did Mandatory Unbundling Achieve its Purpose? Empirical Evidence from Five Countries *(http://ssrn.com/abstract=623221)*. Indeed Wallsten in his		The Authority reminds TSTT and other concessionaires that Unbundled Network Elements (UNE) inclusive of unbundling of the local loop is already prescribed in Section 26 of the Telecommunications Act and mandated in Clause 4 of the Access to Facilities Regulations. The Authority in its framework advanced four economic rationales for unbundling. While the Authority notes TSTT's arguments

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		analysis clearly stated that "*[E]mpirical research on the effects of unbundling on broadband generally reaches the same negative conclusions, that is, local loop unbundling has no robustly significant impact on broadband penetration*". Altogether, the findings of all these authors demonstrated that mandatory unbundling at TELRIC or TSLRIC was not sustained in practice; either, the rationale was never supported in theory, or, the rationale was supported in theory but those theories could not be transported from textbook into real world practice. For these reasons that TSTT strongly rejects the appropriateness of LLU and the Authority's basis for mandating same. Rationales (2) and (4) were found not to be supported in economic theory, which necessarily implies that no matter how thorough the implementation of LLU it remains unlikely for any form of regulatory intervention to achieve the Authority's purpose i.e. broadband penetration, increased competition etc. ▪ *"Rationale (2) fails in theory since the rationale cannot account for the significant facilities-based competition that has emerged independent of mandatory unbundling. For example, cable television providers did not avail themselves of access obligations yet have positioned themselves to make significant inroads in*		against each of these rationales, it nonetheless notes the validity of these rationales (see below). This notwithstanding, the Authority has modified its framework accordingly; omitting these rationales but adhering to the unbundling mandate as contained in the existing legislation and regulation. The Authority notes TSTT's comments and direct TSTT attention to Scott Wallsten (2006) "Broadband and Unbundling Regulations in OECD Countries". AEI-Brooking Joint Centre for Regulatory Studies. In said study, the author find unbundling "significantly positively correlated with broadband penetration." (page 12). The Authority notes that depending on the variables adopted in the regression analysis the results vary. What the

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		residential voice markets and have seized two-thirds of the market for high-speed data in the United States. Wireless networks have displaced significant minutes of long distance service that previously traveled across fixed networks and have displaced some primary and secondary fixed lines altogether for a growing number of voice customers." In the local context, as can be seen with FLOW, it is likely that providers will develop their own facilities based network without any LLU being mandated. *"Rationale (4) fails in theory as well. This is the idea that mandatory unbundling would stimulate competition in the wholesale market for network elements. If wholesale supply of network elements were a viable business strategy, then one would expect several firms to pursue and succeed at such a strategy. But the experience suggests that the most valuable 'component' of the network is the carrier's relationship with the customer. It therefore makes little sense to cede this valuable asset to an intermediary for the sake of avoiding the retail costs of providing the service to the end user. Moreover, the idea of divorcing the wholesale activities from the retail activities ignores the significant economies of scope that can be realized in their joint production. For these reasons, it was not reasonable to expect that mandatory unbundling would*	The Authority should consider the evidence carefully before concluding that the imposition of LLU will achieve the objectives stated in Rationales 2 and 4.	Authority finds most interesting is that Wallsten (2006) in his discussion on unbundling finds "…that regulation can also be an important tool in promoting broadband adoption. Rules that might be interpreted as making it more difficult for the incumbent to exercise market power—but without putting the incumbent at a disadvantage—seem to foster broadband adoption." Further research by the Authority found that recent research by Lee and Brown (2008) found that "…countries fostering broadband deployment need to adopt LLU policy for broadband, but the costs and benefits of the different LLU policy types should be carefully considered." Sangwon Lee and Justin Brown. "The Diffusion of Fixed Broadband: An Empirical Analysis. Network Electronic Commerce and Telecommunications (NET)

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		induce new carriers to enter and limit their business plans to wholesale activities only."		Institute Working Paper No. 08-19). The Authority therefore sees the regulations as the key to the success of unbundling, hence its reason for industry consultation at this time. The Authority further notes TSTT's comments on the applicability of TELRIC or TSLRIC to unbundling. It is the Authority's understanding that TELRIC or TSLRIC was adopted by the FCC for the determination of unbundling prices. While the Authority recognized that the FCC's TSLRIC cost model was forward looking and premised upon the "assumption of an efficient, modern network (rather than the legacy network) (Johannes Bauer. 2005. "Unbundling policy in the United States: players, outcomes and effects" Communications and Strategies) it was nonetheless

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				upheld by the United States Supreme Court in the appellate case of AT&T v. Iowa Utilities Board. (The TELRIC was challenged by ILECs as leading to rates so low that they were confiscatory. However in the Verizon v. FCC, the US Supreme Court again upheld TELRIC as one possible cost standad that the FCC could use (see (Johannes Bauer. 2005. "Unbundling policy in the United States: players, outcomes and effects" Communications and Strategies) The Authority is aware that in the EU, LLU prices are set according to the costs based on the LRIC cost standard by the regulatory authorities of the EU Member states (Obtain from discussions with Martin Lundborg Juconomy Consulting AG). The approach adopted by the Authority for determining the price of the local

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				loop is in accordance with its proposed costing model which is predicated upon LARIC. The Authority also notes TSTT citation of Wallsten (2006) and notes that said Study stated on page 6 "*Empirical research on the effects of unbundling on broadband generally reaches the same negative conclusions.*" However, said statement was in relation to a literature review of unbundling. In fact, the section from which this was taken concluded "*In sum, there is still debate about the effects of unbundling policies …. Unbundling, however, comes in many forms and there is still much debate regarding what impact different types of unbundling may have on investment." (pages 6 & 7).*

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				Byway of illustration, the Authority notes that Sraer 2008(Local Loop Unbundling and Broadband Penetration,) found that "the impact of local loop unbundling remains in all specifications and for all years of unbundling statistically significant as well as economically meaningful." The Authority notes TSTT's comments cited from Hausman and Sidak (2004) and recommendation as it pertains to rationale 2 and 4. The Authority also noted TSTT's argument that rationale 2 and 4 is not supported by economic theory. However, the Authority directs TSTT to Hausman and Sidak (2004) from which it quotes extensively from. These Authors present the theoretical underpinnings of each rationale and their associated

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				testable hypotheses which they investigated. The Authority has carefully considered the evidence and is not in agreement with TSTT's arguments. The Authority notes that TSTT's argument for the failure of rationale 2 is premised upon dynamic efficiency. In this context the Authority agrees with TSTT that the availability of alternative platforms in the long run would facilitate competition in the retail access market. This the Authority recognizes as feasible given that barriers to entry are eliminated in the long run and technological changes engender inter-modal or inter-platform competition. However, the Authority is mindful that there is a need in the short run to encourage competition. This in the Authority's opinion is feasible through the adoption of the short-run static efficiency hybrid

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				strategy of unbundling as proposed by the Authority. The Authority is not unaware of the present status of the domestic telecommunications market and the technological changes that have rendered inter-modal competition therein. However, while there is some degree of inter-platform competition, the Authority is ever mindful of the present limitations of fixed wireless platforms as evident in its discourse as contained in this document. Additionally, the Authority is also aware of the challenges to alternative fixed wired networks, specifically rights of way, new build, expansion and infrastructure upgrade and urban planning and governmental approval. These limitations and challenges have concentrated inter-platform competition in specific areas thereby rendering

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				alternative infrastructure not ubiquitous. Further, the lumpiness of investment in alternative platforms (be it new build or upgrades) may only yield the benefits of such investment in the long run. Thus, the Authority recognizes the need for competition in the short run and therefore is of the opinion that unbundling is a strategy for achieving said objective. The Authority further recognizes the need to encourage network build out and advises TSTT and other concessionaires that it would review the status of inter-platform (modal) competition to ascertain the continuity of its unbundling strategy. Pertaining to rationale 4, the Authority notes that Hausman and Sidak (2004) stated that "if mandatory unbundling promotes

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				wholesale competition (rationale 4), then we should observe facilities-based CLECs acting as wholesalers of network elements." The Authority cites for TSTT's consideration the ECTA data for 1Q 2008, which noted that the number of xDSL lines owned by entrants and wholesale broadband lines supplied by entrants (CLEC) increased from approx. 48K to 278K. and 0 to 1M for the period 3Q 2005 to 1Q 2008. In the domestic context the Authority directs TSTT attention to the entrant FLOW who has already commenced offering 'local loop' in the domestic telecommunications sector to corporate customers. In the Authority's opinion this adds credence to Objective 4 i.e. entrant as wholesalers of network elements.

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Rationale 1 and 3 1.LLU ensures that competition in access services leads to lower prices and greater innovation in the retail market 3.Mandatory LLU enables future facilities-based investment – 'Stepping Stone' Theory	TSTT	TSTT notes that rationales (1) and (3) were the most plausible in theory. Even so their applicability to the real world was minimal given that the Regulatory framework was not flexible enough to unanticipated exogenous shocks. Rationale (1); that is, *competition in the form of lower prices and greater innovation in the retail market is desirable*. This statement holds true in static economic theory, whereby, competition will encourage pure oligopoly markets to become more efficient as characterized by lower prices while at the same time seek to be innovative to have that competitive edge for homogeneous products. Unfortunately, this theory fails in a dynamic model largely for two (2) reasons. Firstly, prices have not always been shown to decline as the cost of entry has prevented entrants from under-pricing the incumbent, - to offer any discounts in the form of lower prices would have been at the expense of the entrant. Secondly, the only 'innovation' offered by entrants came in the form of branding and distribution rather than improvements (investments) in networks and other infrastructure. Therefore, in a dynamic model the degree to which greater entry will facilitate increased efficiency in the provision of broadband services placing downward pressure on price and increasing innovation is questionable.		The Authority notes TSTT's extensive discourse and citation from Hausman and Sidak (2004). The Authority agrees with TSTT's argument that rationale 1 hold true in static economic theory. This is precisely the rationale for unbundling; to achieve short term efficiency. The Authority therefore separates the benefits associated with static efficiency from that of dynamic efficiency given that the former must be cannibalized to achieve the latter. However, the Authority is aware that where clearly define rules that ensured regulatory credibility and certainty were established, unbundling was successful. This perspective was supported by Viviane Reding (Member of the European Commission responsible for Information Society and Media) in 2006 when she stated

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		There is scant evidence really to support this theory. In the UK for example, Hausman and Sidak (2004) revealed in their study, "*pricing data from Oftel indicated that mandatory unbundling, which was implemented in the United Kingdom in the middle of 2001, has not measurably decreased prices of telecommunications services. According to Oftel, from 1996 through the middle of 2001, the time at which BT was required to begin unbundling, prices for residential service decreased by approximately 20 percent. In contrast, prices for residential service slightly increased after BT was required to unbundle… (Hausman, pg 36)*" In the same way, the prices of telecommunications services for business did not decline measurably in response to the implementation of mandatory unbundling. Similarly, BT's investment depicted in the table below shows conflicting results as we see from 1996 up to the period when BT was required to unbundle in 2001; fixed capital investments were monotonically increasing. The opposite holds true after BT was required to unbundle its loops in 2001. Certainly, if the theory posits that in a competitive environment greater innovations will be stimulated, then one will expect to see a relative increase in investments. However, the opposite was experienced in the UK as ILEC capital expenditure decreased. This trend was not only noted within the UK but other representative OECD countries as well, for		"that where there has been more effective implementation of the framework, including enforcement of full or shared access rules, there has also been more progress up the ladder of investment. Conversely where, ineffective regulation leads to continues dominance of the retail market by incumbents." The Authority therefore opines that LLU regulations would be unambiguous and enforceable thereby ensuring regulatory credibility and certainty. The Authority notes that the Authors (cited extensively by TSTT), argued that "If competition among CLECs is robust (rationale 1), then CLEC margins should disappear and consumers should enjoy lower retail prices" and "If mandatory unbundling is a stepping stone to facilities-based investment (rationale 3), then we

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<tr><td></td><td></td><td>example, the USA, New Zealand, Canada and Germany.

<table><tr><th>Fiscal Year</th><th>Fixed Capital Investment (£ billion)</th></tr><tr><td>1993</td><td>0.74</td></tr><tr><td>1994</td><td>1.31</td></tr><tr><td>1995</td><td>1.08</td></tr><tr><td>1996</td><td>1.06</td></tr><tr><td>1997</td><td>1.27</td></tr><tr><td>1998</td><td>1.71</td></tr><tr><td>1999</td><td>1.83</td></tr><tr><td>2000</td><td>5.88</td></tr><tr><td>2001</td><td>5.20</td></tr><tr><td>2002</td><td>1.22</td></tr><tr><td>2003</td><td>0.56</td></tr></table>
Comparing the level of investments made with unbundling opposed to levels obtained without unbundling therefore comes into question. TSTT found within its assessment of this comparison that less extensive unbundling regulations or none at all, positively correlated with greater investments. For example, Hazlett (2005) quoted in Wallsten's study (pg 5) that cable companies, whose broadband services were largely unregulated, invested more quickly in their broadband networks than did telephone companies, who were required to share their broadband facilities with competitors. Hazlett concludes after the</td><td></td><td>should observe individual CLECs transitioning from UNE-based to facilities-based approaches over time." Again these arguments were used by TSTT to substantiate its position on unbundling.

Pertaining to the argument advanced for rationale 1. The Authority refers to an email correspondence with SBR Juconomy Consulting AG (http://sbr-net.com/) in which information was provided on the price trends for LLU in Europe.;., In said email it was stated that "Regarding the price trend, this is in many European countries ... in a downward trend." However "the prices for the LLU are not set by competition though, but by the regulatory authorities. These typically set the prices according to the costs based on the LRIC cost standard." (Martin Lundborg Juconomy Consulting AG).</td></tr>
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		FCC had lifted the mandatory line sharing agreements in 2003, the number of DSL subscribers began to grow more quickly in addition to incumbent operators increasing investments in fiber to the home. This conclusion was also met by several independent researchers when comparing the level of investments made with and without unbundling. Likewise the Stepping Stone Hypothesis (also known as the "ladder-of-investment hypothesis") postulated in rationale (3); in theory, allows for an entrant to acquire a portion of the incumbent's network through Unbundle Network Elements (UNE) as it may be economically challenging to duplicate the incumbents' infrastructure. The impetus behind this is to allow the entrant to invest in their own infrastructure over time and compete directly with the incumbent offering greater broadband diffusion. This approach therefore assumes over a period of time an entrant will transition from: (i) Resale competition (ii) Leasing unbundled loops (iii) Building their own networks Unfortunately, this is generally not always the case as experience has shown failure of entrants to build out their own facilities over time; thus, remaining at the resale competition stage to the detriment of facilities based competition.		Pertaining to argument advanced against rationale 3, the Authority draws TSTT's attention to: 1. The ECTA data for 1Q 2008, which showed that the number of xDSL lines owned by entrants and wholesale broadband lines supplied by entrants increased from approx. 48K to 278K. and 0 to 1M for the same period respectively; 2. The European Union 13th Report on the Implementation of the Telecommunications Regulatory Package – 2007 which states "…new entrants are moving away from simple service-based competition. Wholesale unbundled local loops, which now represent 12.8% of PSTN lines in the EU, have grown over the year (full unbundling by 54.2%, shared access by 33.8%), while

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		• *There are two hypotheses that might explain the failure of the stepping stone hypothesis in practice. First, regulators have been remarkably unconditional in developing access regulations that would support the transition to facilities-based competition. In particular, regulators have failed to impose obligations to ensure that promises to evolve from UNE-based to facilities-based competitor are subsequently realized. For example, regulators could allow the prices for fixed unbundled elements to increase over time to ensure that access seekers have incentives to invest in their own facilities. Second, mandatory unbundling may have attracted 'fly-by-night' firms that were primarily interested in short-term margins and eschewed long-term development of a rival network.* TSTT also notes the differentiation between a committed entrant as well as an uncommitted entrant. Committed entrants do not generally need inducements to compete against incumbent carriers. For example, cable television operators in the United States refrained from accepting the resale opportunities made possible by the U.S. Federal Communications Commission (in the form of UNE-P) and instead upgraded their antiquated networks to offer cable telephony. As a result, cable telephony now represents the		bitstream grew by 10.5%. The fact that there are now 23.5 million unbundled lines, compared to 11.6 million resold and 6.0 million bitstream lines, suggests that new entrants are climbing the investment ladder." (page 10); 3. The Authority also draws TSTT's attention to Commissioner Reding who stated in 2006 that "I can say with satisfaction that across Europe, there has been on average a very significant move up the ladder of investment in the 3-years of implementation of this framework. In July 2003, 52% of new entrants were offering broadband services through simple *resale* and only 27% through full or shared access (Local Loop Unbundling). In July 2006, *resale* has gone down to 36% and *full or*

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		greatest threat to incumbents' services in the United States. Uncommitted entrants, in contrast, are not interested in making investments that would tether them to a business plan for the long term. They are interested only in the prospect of capturing the retail-resale spread without bearing any concomitant risk. Stated differently, if the type of firm that is attracted to the resale opportunity has no intention of incurring the risk of investing its own capital, then no subsidy—however large—will induce that firm to change its ways. Under this theory, if the regulator tries to induce conversion from resale to LLU by increasing the resale rate or decreasing the LLU rate or both, then the resale-based CLEC would exit before building its own facilities.		*shared access* has gone up to 46%. This progress is certainly due, to a large extent, to the effective implementation of the regulatory framework." In the Authority's opinion, the empirical evidence presently found in countries that have implemented LLU supports the Authority's position on said regulatory strategy.
	TSTT	The arguments propounded by the Authority therefore do not address the perspectives of both the access seeker and the access provider. Unbundling the local loop may create certain disincentives to invest and innovate, among these are: ▪ **"Damage done to cost recovery on existing fixed services"** by allowing access seekers to cherry pick, that is, access seekers could choose to serve only the	Develop a sound framework: LLU is known to potentially create disincentives for investment and innovative services unless the right framework is embarked upon LLU would be in jeopardy. TSTT concludes that LLU might cause an unfair burden if	The Authority concurs with TSTT that a sound framework for the implementation of LLU is critical to its success. In developing this Framework, the Authority is presently consulting with relevant stakeholders. The Authority would implement appropriate unbundling regulations that ensure regulatory certainty and credibility. This

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		most profitable customers which are businesses, high income residential and other profitable areas. ▪ **"Damage to plans to roll-out the network to underserved areas."** Due to cherry picking, some areas would be more exposed to advance telecommunication technologies than others thereby creating a divide. TSTT would be unable to generate a similar margin which could contribute to the development of underserved areas. ▪ **"Disincentive to invest in new facilities**" as the access provider would believe why go out and spend capital on infrastructure when the Authority will by law, force the largest player to hand it over at regulated prices (free loading). In fact this free loader concept counters the very notion of controlling the economies of scale captured by vertical integrated firms as access seekers would thrive for maximum return by the lowest possible investment. The disincentive effect of LLU is the same whether the facilities operator is the incumbent or the entrant. No facilities based operator would roll out its network simply to lease that capacity to other service providers. Facilities based operators base their returns on the services provided over those facilities	it is not implemented in a manner that is fair and reasonable to all parties. As such a particular variant of LLU may create an unfair burden (incur significant cost to unbundled) if it does not allow an efficient operator to: a. earn a reasonable rate of return on the provision of services; and b. compete effectively in the provision of all services	notwithstanding, Authority would amend the Unbundling framework to include a statement on reviewing the relevant market to which LLU is applied to ascertain the continuity of said strategy. This statement would state that the Authority will review the LLU market periodically but no less than every three years to ascertain the continuity of LLU. The Authority also recognized that it is guided by the Telecommunications Act of 2001 (as amended) and the provisions as contained therein pertaining to access to facilities. The relevant Section of the Act together with the access to facilities regulations provides the general guidelines for rendering facilities accessible and for the determination of rates for said facilities. The Authority has also stated in its

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		and not simply on rental income from the lines. Therefore LLU stands to stagnate facilities based competition and create an arbitrage for the access seeker to remain at the resale stage. The same arguments put forward by the Authority to preclude new entrants from unbundling their access network are the same arguments that are relevant for TSTT. This heightens the inappropriateness of LLU as a mechanism for greater access to broadband.		LLU Framework that it proposes to instruct providers of access networks to develop a reference unbundling offer "wherein specific information inclusive of LLU costs, quality of service parameters and the types of information and associated timeframes for sharing such information are contained." In the first instance the Authority proposed in its framework to instruct the incumbent public switch telecommunications network provider to develop a reference unbundling offer for LLU. Pertaining specifically to cherry picking and roll out of networks in underserved areas, the Authority is ever mindful of the possibility of cherry picking or rent seeking (rentier) behaviours by concessionaires. The Authority therefore opines that it shall monitor these practises to ascertain

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				whether or not said practices are anticompetitive in nature. As it pertains to underserved areas, the Authority is aware, from its Universality Data requirement, of the number of areas of Trinidad and Tobago that are presently underserved by TSTT, and given this number the Authority is presently able to ascertain TSTT's LLU requirements. On the issue of Unbundling being a disincentive to invest, the Authority directs TSTT's attention to its previous discourse which demonstrates that there is an alternative school of thought with supporting empirical evidence that suggest that unbundling encourages investment.
Section 3. Types of Local Loop Unbundling				
3.1 Full Unbundling	TSTT	We note that Figure 2 illustrates full unbundling in respect of a pure copper loop architecture. In an instance of full		The Authority notes TSTT's

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		unbundling of "raw copper" loops leaves two critical points unidentified and undefined by the Authority. These points are the demarcation points or simply points of interface (POIs) between the incumbent network and the entrants' network. Theoretically the POI is used to establish the technical interface, the test points, and the points of operational responsibility. Simply put, the access seeker would need to interface to the access provider Operational Support Systems (OSS) for provisioning, ordering fault resolution and maintenance. It is public knowledge that the MDF is located in TSTT's central office. We do not know and TSTT has no control over where the newcomers will/have locate their switch or what type (e.g. manufacturer or model) of switch they have placed. From a technical perspective there are several possible scenarios for locating the required POI. Either party could construct, own and maintain an "entrance facility" connecting the TSTT MDF and the newcomer's switch. This necessarily means that one of the two carriers must be co-located on the other's premises. It also means that if TSTT were required to build the entrance facility and connect the TSTT loop to that facility then TSTT would clearly be providing more than just an unbundled "raw copper" loop. This would seem to go well beyond the unbundling of TSTT's loops.	Any cost benefit analysis would need to consider the relative merits or appropriateness of each of these variants of LLU and the extent to which TSTT's current network could support them. Clear and accurate identification of POIs for each diagram is critical to the manner in which LLU would/could be implemented and they are unique to each loop platform and to each "type" of LLU. Taking the case of the full unbundling diagram provided, the most logical and straightforward location of one of the POIs would be at the customer location at the point where TSTT's raw copper loop	comments and advises TSTT that collocation and interoperability must be included in the LLU reference offer to be developed by the access provider and as guided by the access to facilities regulations. Pertaining specifically to TSTT's recommendations, the Authority opines that TSTT's current network can support the forms of unbundling prescribed in the initial phase (full unbundling and line sharing). The Authority advises TSTT that the POIs for full and shared unbundling would be at the MDF located at TSTT's Class V Switching Offices and at the Remote Switching Centers. For sub-loop unbundling the POI would be at TSTT's DSA or DLC.

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			terminates on a protected connector block (usually on the side of the building). The second POI clearly and necessarily must be located between the TSTT MDF and the "Newcomer's Switch", depicted in the diagram.	The Authority disagrees with TSTT's statement that one of the POIs would be at the protected connector block located at the customer premises. If this was so, then there would be no need to unbundle the local loop given that the entrant would be building infrastructure that terminates at the subscriber's premise..
Figure 2.	TSTT	This diagram is quite simplistic and has little or no probative value in the context of LLU for any loop architecture other than a100% raw copper loop architecture. LLU is a concept that has been applied by National Regulatory Authorities (NRAs) to open up the Public Switched Telecommunications Network (PSTN) operated via traditional 'raw copper' lines to deploy broadband lines ubiquitously. TSTT has already embarked on such an initiative with its Blink Broadband capability in addition to other broadband providers in Trinidad and Tobago. LLU could be viewed therefore as a concept way past its prime as it applies to modernizing its voice/broadband network. As technology has changed, TSTT has had to modernize its	If, as the diagram suggests, TATT is looking at unbundling a 100% raw copper loop network, the question must be asked, which network can satisfy that requirement?	The Authority notes TSTT's recommendation and has modified this document accordingly. Such modification recommends a phased approached to unbundling wherein Full and Shared unbundling would be implemented initially at TSTT's Class V Switching Offices and Remote Switching Centers (RSC) or 100% of the 'raw copper' loop. Unbundling would not be implemented during this phase at TSTT's smaller switching offices unless there is adequate space and

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		network by deploying hybrid fiber/copper digital loop carrier systems (DLCs) when building new loops systems and when retiring old copper loop systems. The application of the diagram, therefore has little relevance to the reality of a modernizing network. Loop Unbundling provided over hybrid fiber/copper loop platforms is very different from raw copper loop unbundling. If indeed hybrid fibre/copper loop unbundling is contemplated the myriad of issues surrounding same will necessarily be the basis of a further consultation. TSTT urges the Authority to note the utmost importance the difference in technology as this could for the reasons articulated earlier, prove to be a disincentive to modernizing our network.		facilities to support unbundling. In the second phase unbundling would be implemented at the sub-loop level, specifically at TSTT's DSA and DLC. This would be done *ex post* a review of the initial phase of unbundling. The Authority reminds all access providers and access seekers that it will review the LLU market periodically but no less than every three years to ascertain the continuity of LLU.
3.2 line sharing (Shared Access)	TSTT	TSTT notes, Full Unbundling; Line-sharing and Sub-loop services involve coordination of efforts between loop providers and Local Loop Unbundling Operators (LLUO) on particular issues associated with co-location. There are a number of difficulties associated with shared		The Authority notes and agrees with TSTT comments. However, the Authority opines that these concerns would be best addressed in the Unbundled Reference Offer to be developed and implemented

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		access, including remote line testing, - as the customers line is still connected to the incumbents MDF, testing will temporarily disrupt any broadband services provided over that line, all which needs to be addressed.		by TSTT and subjected to the Authority's approval
3.3 Bitstream (wholesale) access	TSTT	TSTT already leases dedicated ports to ISP's such as Green Dot, Illuminat, Caribel, Carib Link and CCTL via an internet gateway. These companies then in turn re-brand the service to their customers.		The Authority disagrees with TSTT and opines that said service is not bitstream but rather wholesale ISP Ports.
	360	Excellent overview of LLU implementation strategies		Comment noted
Section 4. Implementation of Local Loop Unbundling				
	TSTT	In the absence of a proper assessment of LLU, TSTT does not see how the Authority can achieve its policy objective or whether, more importantly, the objectives that LLU is supposed to achieve can be realized. It is therefore essential that the Authority conducts a comprehensive analysis of the suitability of LLU in achieving that objective in the local context. This notwithstanding the observation that Regulators in other jurisdictions would have invested in research and unbundle in a manner consistent with its cultural and demographic characteristics, and even in the face of such analysis, have concluded that LLU has failed to achieve these objectives. Further to this, benchmarking against those jurisdictions on	Based upon the experience internationally the application of LLU as a tool to achieve greater broadband penetration is suspect; furthermore proper application of the essential facilities doctrine would also lend to the view that LLU is unnecessary.	The Authority notes TSTT's arguments against local loop unbundling. The Authority draws TSTT's attention to recent international experiences which clearly demonstrates that LLU take up has been increasing exponentially in countries that have implemented and enforced local loop unbundling (see earlier sections of this DOR). The Authority notes that there are

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		page 18 within the consultation proffers no further clarity as it is unclear what type of access structure (i.e. copper, hybrid loop, wireless etc.) these jurisdictions may have that prompted the NRAs to unbundle their local loops in the manner in which they did. TSTT notes, within the same OECD (2003) report the Authority cited in its consultative document shows the take up in most countries has been relatively low failing to drive the required take up in broadband. The OECD (2003, p 20) indicated that LLU take-up was highest in the US at 5.5% and as low as 0.0008% as in the case of Ireland. Although the OECD study reported up to 2003, the information shows that even countries where LLU has been implemented for many years, the take up has yet to achieve the inflated levels projected prior to LLU implementation. When discussing the unbundling experience in the United Kingdom, a previous OECD report (2002) conceded that "*the policy of unbundling the local loop has failed, as yet, to generate the benefits expected*". It is submitted that, for a policy that intends to maximize broadband penetration, LLU policies are inconsistent with the realities of a developing country such as Trinidad and Tobago. For instance, Mexico -another developing country- has not	TSTT recommends that the Authority revisit the need for LLU as a means to achieving broadband penetration. Rather TSTT submits that the demand side issues be addressed in conjunction with the governments' initiatives.	many reasons that may have delayed the impact of unbundling, notably, 1. The presence of regulatory lag;The delays associated with National regulatory agencies to implement and enforce unbundling in Europe (See Bijl and Peitz. 2005 Local loop unbundling in Europe: Experience, prospects and policy challenges. Communications and Strategies. And the European Union: DIRECTIVE 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive)). The delay in implementation of unbundling by certain countries (France, Germany,

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		actively engaged in LLU policies since there are other constraints inhibiting broadband penetration: low computer penetration and low per capita income. In the Trinidad and Tobago context, the low penetration rate is primarily a demand side issue as broadband infrastructure is available (supply side) from more than one provider. Attention should be directed to the Digital Divide Report commissioned by TATT (2007) as it showed the proportion of households in Trinidad and Tobago with internet access at approximately 0.29 as a result of not many households owning computers and the level of incomes to be abysmally low (pg, 46). TSTT envisages that given the current demand side environment, real world conditions will counter what the Authority purports		Ireland, the Netherlands and Portugal) resulted in the European Commission opening infringement proceedings.; and 2. The legal challenges to unbundling rules in the US See Bauer. J. 2005. Unbundling policy in the United States: Players, outcomes and effects. Communications and Strategies. Bauer and Bohlin. 2007. From Static to Dynamic Regulation- Recent Developments in the U.S. Telecommunications Policy. Paper presented as the 18th ITS European Regional Conference." The Authority is not fully in agreement with TSTT's position that proper application of the essential facilities doctrine would lend to the view that LLU is unnecessary. The Authority opines

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				that application of the essential facilities doctrine must be cognizant of the limitation of alternative platforms, notably the technological limitations and infrastructural challenges of wireless networks and the infrastructural challenges, rights of way and non-ubiquitous reach of wire networks. In these instances, the Authority is of the view that TSTT position on the application of the essential facilities doctrine may not holds true. The Authority notes TSTT's recommendation and disagrees with same. The Authority opines that supply side issues are equally as important as demand side issues. The Authority further opines that there is sufficient evidence (as previously presented) to suggest a significant correlation between unbundling and

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				broadband penetration. The Authority will, in consultation with the industry, implement the appropriate regulatory framework for effecting and enforcing the implementation of unbundling.
4. Implementation of LLU The results from the survey, as summarized in Table 2, indicated that all respondents desired full unbundling. The Survey also indicated that forty-three percent of respondents that desired full-unbundling also desired line sharing, bitstream and sub-loop unbundling **Table 2: Summary of LLU Survey10**	360	Access seeker preferences will be significantly influenced by cost parameters. Statements on preferences amiss cost parameters may be misleading.		The Authority notes 360 comments and wishes to assure stakeholders that cost for the local loop would be an output obtained from its costing model. Pertaining specifically to the Authority's statement as cited by 360, the Authority reminds 360 that it was simply reporting on the results of its LLU survey.
4. Implementation of LLU ***Statement on the Types of LLU to be made Available in the Domestic Telecoms Market:*** *The Authority proposes to*	360	The option of subloop unbundling should be granted at the onset of LLU. Subloop unbundling will provide prospects for increased speed and capability on the copper lines by giving access seekers increased	*The Authority proposes to implement Full Unbundling and Line Sharing, with options for subloop unbundling, in the initial stages of LLU*	The Authority notes 360 comments and recommendation on the inclusion of sub-loop unbundling in the initial stages. The Authority would give due

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implement Full Unbundling and Line Sharing in the initial stages of LLU implementation. The Authority will consider the implementation of Bitstream and Sub-loop Unbundling upon a review of the effectiveness of initial Unbundling in the domestic market.		proximity to end users. Cabinets to be installed by access seekers at the subloop level can be fed by copper and fiber. In the absence of subloop unbundling and without adequate consultation and certainty there is an unnecessary risk of "asset stranding". For example if an access seeker places DSLAM equipment in an exchange and the copper access lines that it serves are subsequently allocated to cabinets. Subloop unbundling will increase competition at the true access level.	*implementation. The Authority will consider the implementation of Bitstream upon a review of the effectiveness of initial Unbundling in the domestic market.*	consideration to this recommendation provided that the access seeker has acquired the relevant concession from the Authority to build out its core domestic network and has commenced said build. In the initial phase however, the Authority proposes to implement Full and Shared unbundling at TSTT's Class V Switching Offices and Remote Switching Centers (RSC).
4. Implementation of LLU ***Statement on the Date for Commencement of LLU in T&T:*** *The Authority proposes to facilitate the unbundling of the local loop only after a detailed review of the readiness of the incumbent PSTN provider access network. The Authority proposes to notify all participants in the*	360	As worded, the statement is extremely open-ended and vague. If the Authority is awaiting a detailed readiness statement from the incumbent, such statement could be unduly delayed - even into perpetuity. Discrete timelines should be established.		The Authority notes 360 comments and is presently conducting appropriate and relevant assessment of TSTT's fixed line access network for both the implementation of local loop unbundling and for the delivery of quality service to end users.

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Telecommunications Sector by regulatory determination as to the precise date that Unbundling will be commenced.				
4. Implementation of LLU Access Provider's Detailed Provision of (5) Cost of Local Loop inclusive of Maintenance Costs	360	This element, in particular, should be independently verified by a third party.		The Authority disagrees with 360. This cost will be obtained from the costing model to be developed by the Authority..
Statement on the Commercial Negotiation of Access to Facilities: *The Authority proposes to encourage commercial negotiations between the Domestic Public Switched Telephone Network (PSTN) access provider and access seekers in accordance with Section 26 of the Telecommunications Act and the Access to Facilities Regulations for collocation and line connection costs.*	360	The Authority should determine the LLU cost in order to avoid protracted negotiations and unnecessary disputes.		The Authority agrees with 360's comments but reminds 360 and other access seekers that it is guided by the Telecommunications Act. This notwithstanding, the Authority directs all access seekers to its access to facilities regulation wherein specific timelines are provided for contractual negotiations. The Authority may also include such timelines in its LLU regulations.

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4.12 Access Deficit and Rate Rebalancing *"The difference between the efficient economic cost of providing and maintaining the access network and the appropriate revenues generated from services utilising the access network."*	360	Definition of Services should include but not be limited to revenue from: - local line rental - broadband services - ARPU for domestic voice origination - ARPU for 3rd party mobile and fixed line domestic termination - ARPU for 3rd party international termination - ARPU for subscription TV		The Authority has addressed these concerns raised by 360 in its draft determination on Access Deficit. The Authority's position has already been communicated to TSTT and a final determination would be made.
4. Implementation of LLU	Digicel	The Authority draws from the results of an LLU survey as a clear indicator of what type of LLU should be introduced. However, Table 2 does not reveal the number or composition of respondents; persons looking at this table have no idea whether the respondents were all existing players in the domestic market, whether the respondents were concessionaires in specific markets, whether the respondents were made up of existing and potential concessionaires.	Digicel would like the Authority to publish some more detail of the methodology and results of this LLU survey i.e. the number of respondents considered, the number of respondents in the entire respondents population, the method of selecting respondents from the population frame, etc.	The Authority's LLU Survey, surveyed all existing concessionaires authorized to provide public telecommunications network and services, inclusive of domestic, and international concessionaires). The Authority also surveyed potential network and service providers, namely existing ISPs and TTEC). The population size was 100% and the respondent rate as stated in the document was seventy-five percent (75%).

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4. Implementation of LLU	Digicel	The Authority notes that effecting LLU at this time is challenging (page 17) because of the incumbent's network readiness or lack thereof.	We recommend that the Authority and TSTT seek to resolve this high fault incidence and improve the mean recovery time on faults prior to the implementation of LLU, so that access seekers are not exposed to unnecessary and unforeseen risks. The accepted way of addressing these and other such problems is to require the incumbent to enter into a "Service Level Agreement" (SLA), which are legally binding documents, which would see it incur financial penalties if such matters as provision time, faults and QoS statistics did not meet reasonable and accepted industry standards. Often these are derived from the incumbent's provision of same	The Authority is presently concluding its Network Quality of Service regulations which shall address the incidence of high faults. Additionally, said document would contain parameters for local loop unbundling. This notwithstanding, the Authority reminds Digicel and other service providers that Schedule F of the concessions granted to service providers contain Quality of Service parameters for local loop unbundling. The Authority agrees with Digicel that SLAs are critical to the success of unbundling. The Authority opines that such agreement would be detailed in the local loop unbundling Reference Offer as developed by the access provider and approved by the

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			to its own down-stream operations.	Authority.
4. Implementation of LLU	Digicel	On page 21, TATT places the reporting of faults as a responsibility of the access seeker; this has the potential to be highly problematic because depending on the type of unbundling, different parties will have differing responsibilities with respect to reporting of faults, physically repairing faults, recharging for repairs, timelines for repairs, whose 'side' the fault is on.	TATT once again needs to oversee this and ensure that access seekers and access providers enter into proper agreements and commit themselves to quick regulatory intervention. Without such a commitment, the door is open to have an onerous number of disputes before the Authority. It then raises the question of whether it may be more cost effective to develop strong regulatory policies for fixed line offerings in terms of price and quality of service.	The Authority notes Digicel comments and recommendation and assures Digicel that the local loop Unbundling Reference Offer will be required to have relevant and appropriate Schedules that address Service Level Agreements, Technical specifications for network interoperability, fault repair procedures and quality of service. This 'Offer' shall be similar to that of the Reference Interconnect Offer. Rates however shall be determined in accordance with the Authority's proposed costing methodology. The Authority is every mindful of avoiding the pitfall of micro-managing the sector.
	Digicel			

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4. Implementation of LLU		On page 23, the Authority notes that all Concessionaires are required to submit network plans for approval. Digicel is interested in finding out the circumstances under which the Authority would *not* approve the network plan of an operator. Network plans are highly confidential and we are not clear how the Authority intends to use the network plan in this circumstance, except where the Authority says it is for use in planning information for LLU purposes. However, LLU applies to already built networks, not networks that might be built. In this regard it should be evident that operators are best placed to decide on what, where and how they will invest. In general, information about good business opportunities and good business practice is not held by the authorities but by firms. It is because these decisions have been trusted to firms that market-based economies have been vastly superior to centrally planned economies at creating wealth.	Digicel would like the Authority to clarify the need for network plans in the planning of LLU. Digicel urges TATT not to attempt to go down the path of attempting to micro-manage the sector by seeking information about the business	The Authority is of the view that Section 24 of The Act is clear on the submission of Network Plans to the Authority. However, for regulatory certainty, the submission of such plans as it pertains to LLU would allow the Authority to: 1. ascertain access seekers plans to migrate from Local loop unbundled seeker to a network provider; and 2. the possibility of an unbundled access engaging in anti competitive practices. The Authority is every mindful of avoiding the pitfall of micro-managing the sector and endeavors to develop LLU regulations that provide regulatory certainty to the sector.

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			intentions of firms	
4. Implementation of LLU	Digicel	On page 22, the Authority mentions that under Access to Facilities, there is need for close cooperation between access seekers and access providers. This is highly impractical i.e. access seekers and access providers are more often than not competitors in the market, and there is no incentive for the access provider to arrive at an agreed position on any matter with the access seeker.	Digicel maintains that a significant responsibility is placed on the shoulders of the Authority to develop effective regulatory mechanisms to safeguard all current and potential parties that have an interest in LLU. Without these forward thinking mechanisms, current players may have to suffer the severe 'teething' costs of ineffective regulation and may even have to shut down their operations if they are not safeguarded against unfair competition.	The Authority notes Digicel's comments and recommendations and assures Digicel and all other providers in the market who may desire unbundling that relevant and appropriate local loop unbundling regulation that addresses these concerns shall be implemented and enforced.
Summary of LLU Survey	TSTT	The summary does facilitate an assessment of the data behind it, which could be a critical component in the responses by providers. TSTT is confident that the Authority could at least provide the questions and answers as well as the number of respondents to this survey without compromising any confidentiality obligations it may have.	Allow access by providers to the full scale survey	The Authority would consider making a generic version of its Survey request form available to TSTT upon request. The Authority does not agree with TSTT that the responses by other

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				concessionaires should be made public. Where the Authority was to adopt this approach, TSTT's response to the Authority's network readiness survey (submitted under confidentiality) must also be made public.
Co-location	TSTT	Each of the variants of LLU requires some form of co-location. TSTT is concerned that the specifics of such co-location have not been explored. Certainly co-location issues such as power, ventilation, space availability and security etc. must be fully addressed.	TSTT recommends the Authority to address issues on and around co-location adequately.	The Authority opines that details on collocation (inclusive of the types available at each exchange) should be contained in the local loop Unbundling Reference Offer which shall be made available to access seekers. The Authority does not foresee any major challenges on this issue as collocation is presently encouraged by the Authority as it pertains to tower sharing. Additionally, the issue of collocation and the variants thereto were either addressed during interconnection or contained in the interconnection regulations.
	TSTT	TSTT notes that in the determination of an adequate rate for	The Authority shall consider a	The Authority shall determine the

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		access to local loops is a rather contentious issue. On the one hand, if rates are set too high it could avert entry. On the other hand, if rates are set too low it could delay the date in which customers will build out is own facilities. Therefore, in determining a suitable rate for unbundled loops it must: a) allow the incumbent an appropriate rate of return to induce the incumbent to make further investments. b) Set rates at a level to allow the entrant to build out its own infrastructure over time to establish effective competition. However, significant evidence has been provided in this response to illustrate the latter does not hold true. In practice regulators usually set up unbundled rate bases on long run incremental costs estimates, which by definition do not include other opportunity costs coming from "real options". Since the rates based on incremental costs do not recover all relevant costs incurred by investors, they are rates below costs, and therefore they disincentive investments. In our oil example above, the rates set by the regulator would not take into account the downside of the not successful investments.	cost standard for LLU that includes all relevant cost including opportunity cost. Otherwise, investments will reduce.	rate for Unbundling in accordance with its costing model as proposed by its costing methodology. The Authority notes TSTT's arguments on the establishment of rates for LLU. The Authority is ever mindful of this given that a recent study by (Martin Lundborg Juconomy Consulting AG. 2008, "Lessons Learned from the Regulation of LLU for the Future Regulation of NGA Networks". Paper Presented at the 19th European Regional ITS Conference n Rome, Italy). found that "the success of LLU is mainly depending on the wholesale prices for the LLU and the price margins between retail and wholesale prices." Ever mindful of this fact, the Authority recognizes the need to monitor the price margins for LLU. Additionally, the wholesale price would be determined in

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				accordance with the Authority's cost model as proposed in its costing methodology.
Section 5. Alternative Networks				
5.2 Operational Separation	Digicel	The Authority intends to adopt a 'wait and see' approach to the need for operational separation but the need for this is a forgone conclusion. The parties that enter into LLU agreements are all competitors so it is expected that there will be dissension. In adopting this approach, the Authority will always be playing 'catch-up' and having to expend considerable resources to monitor and evaluate the need for operational separation.	Digicel submits that it is necessary for the Authority to create stringent penalties for errant firms who decide to engage in anticompetitive behavior i.e. fines and penalties with immediate effect and then impose operational separation. Any firm found to be acting anti-competitively will be liable to pay a fine, and should even face the possibility of revocation of its concession.	The Authority agrees with Digicel and is presently seeking relevant and appropriate amendments to the Telecommunications Act to address anti-competitive behaviors. The Authority dos not agree that structural separation is necessary at this time. However, the Authority shall require all service providers (where applicable) to implement accounting separation in the first instance.
5.31 Coaxial Cable and Fiber Optic Access Networks ***Statement on Rights of Way:***	360	This issue of rights of way and, in particular, aerial pole rights, requires urgent addressing by TATT as it poses a potential roadblock to rapid backbone and access network growth and proliferation for new entrant operators. The incumbent and power utilities must cooperate in this critical initiative for broadband and ultra-broadband (FTTx) roll-out.		The Authority recognizes and understands the importance of rights of way to network providers built of core and access networks. The Authority will work with the relevant agencies to ensure that an

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The Authority proposes to collaborate with the Town and Country Division of the Ministry of Planning and Development to develop a Policy on 'rights of way' that seeks to minimize the proliferation of poles.				appropriate balance is achieved between the network providers' access to rights of way and the adherence by said providers to the mandates of these agencies as outline in their respective legislations.
5.3.2.1. Wireless Cable Access	Digicel	On page 39, "*..the Authority proposes to encourage all access providers of wireless access networks to provision multiple service offerings…*"	Digicel would like the Authority to clarify what it is referring to by the term 'multiple service offerings.'	The Authority notes that the statement as quoted by Digicel is incomplete and should read "*..the Authority proposes to encourage all access providers of wireless access networks to provision multiple service offerings (as far as practical)…*" The Authority is aware of the technological limitation of the technologies identified in this section and the need for these technologies to be used in conjunction with other forms of technologies to provide voice, data and video herein

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				referred to as multiple service offering. Hence the Authority's conditioning phrase.
5.3.2.3.Cellular Access	Digicel	On page 44, the Authority makes reference to 3G technology and that the two network providers can evolve into a 3GSM technology. The Authority goes on to say on Page 45 that it will encourage cellular providers to upgrade their access networks to provision of 3G.	The Authority should give the commitment that it will not impose price regulations on 3G investment or any other new network investment for a minimum of 5 years so as to encourage and fast track adoption of the latest available technology. The Authority should be on a path of technological neutrality. There are several wireless technologies capable of providing voice and data services. If the Authority is desirous of operators adopting a particular technology, then it should create positive incentives to encourage operators to make the necessary investments.	The Authority reminds Digicel and all other providers that pricing for telecommunications services shall be informed by Section 29 of the Telecommunications Act and the Pricing Regulations when promulgated. Thus, in markets that are competitive, the Authority shall allow market forces to set prices. In contested or uncontested markets, the Authority has outlined its approach to pricing. The Authority has adopted the principle of technologically neutrality (see the Authority's Authorization Framework for the Telecommunications and Broadcasting Sectors in Trinidad and Tobago"). The Authority would create the relevant positive

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				incentives for migration towards 3G technologies but it will not chose any one form of technology for said migration.
Conclusion				
6. Conclusion	360	Three Sixty welcomes and supports this TATT initiative. Timing, oversight, and the Authority's ability to establish a fair cost structure will be key to its success.		The Authority agrees with 360 comments.
6. Conclusion	Digicel	While the consultation confines itself to suggesting that the Authority will mandate LLU on TSTT's fixed line network, we are concerned to note that the door has been left open to mandating some form of unbundling of other networks in the future. With the Authority indicating that it intends to unbundle other networks in the future, this creates an immediate disincentive for any potential investor that is desirous of entering into a specific market. Competition based on the services provided over competing networks is far superior to competition based on a number of service providers providing their services over a single network. The former enables real competition to occur; the latter relies on regulation to approximate the effect of competitive forces to arrive at terms and conditions.	In their effort to promote effective competitive strategies through regulation, the Authority must also take into consideration the extrapolated costs and benefits of certain decisions and the timing of these decisions. Accordingly, as an incentive to attract further investment in an increasingly regulated industry, the Authority should make a clear statement that it does not intend to mandate access to other networks for a minimum of 5 years.	The Authority directs Digicel and all other providers to applicability of Section 26 of the Telecommunications Act to all concessionaires. This non-discriminatory approach of Section 26 is also reinforced in the Access to facilities Regulations. Therefore all concessionaires are required to render access to their respective facilities. Where the Authority was to impose a five (5) year moratorium on access to facilities it would be acting *ultra vires* the existing legal framework. The Authority has adopted a

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				managed approach to unbundling. However, this notwithstanding, the Authority recognizes the value of inter-platform or inter modal competition and would continue to encourage same. In the interim, the Authority would promote its local loop unbundling strategy but will review the LLU market periodically but no less than every three years to ascertain the continuity of LLU.