



**Telecom Regulatory Authority of India**



**Consultation Paper**  
**on**  
**Estimation of Access Facilitation Charges and Co-**  
**location Charges**  
**at Cable Landing Stations**

New Delhi: 18.10.2018

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**Stakeholders are requested to furnish their comments to the Principal Advisor (Network, Spectrum & Licensing), TRAI by 29.10.2018. Counter comments, if any, may be sent by 03.11.2018. Comments and Counter Comments would be posted on TRAI's website [www.trai.gov.in](http://www.trai.gov.in). No further extension of timeline for Comments and Counter Comments shall be provided to the stakeholders. The Comments in electronic form may be sent by e-mail to [pradvnsl@traigov.in](mailto:pradvnsl@traigov.in) with a copy to [ja.nsl1@traigov.in](mailto:ja.nsl1@traigov.in) . In case of any clarification/ information, Shri U.K. Srivastava, Principal Advisor (NSL) may be contacted at Tel. No. +91-11-23233291.**

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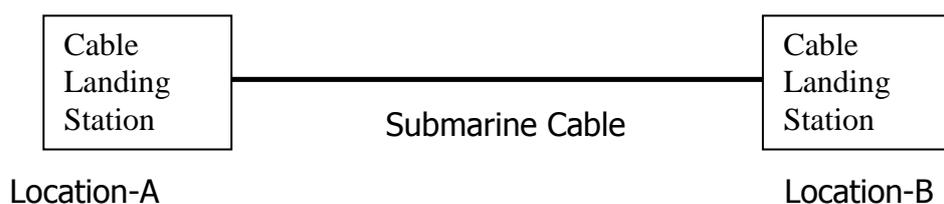
# CHAPTER 1

## Introduction and Background

### A- Background

- 1.1 A submarine communications cable is a cable laid on the sea bed between land-based stations to carry telecommunication signals across stretches of ocean and sea. The first submarine communications cable laid in the 1850s carried telegraphy traffic, establishing the first instant telecommunications links between continents, such as the first transatlantic telegraph cable which became operational on 16 August 1858. Subsequent generations of cables carried telephone traffic, then data communications traffic. Modern submarine cables use optical fiber technology to carry digital data, which includes telephone, Internet and private data traffic.
- 1.2 Submarine cables provide vital international telecommunication links between countries across the world. There is no effective substitute for submarine cables. Submarine cables terminate in the country through cable landing stations. Access to submarine cable landing stations is an essential input for telecommunication services including broadband requiring international connectivity. Provision of access at cable landing station involves costs for which owners of the cable landing station need to be fairly compensated. Cost based access facilitation charges and collocation charges would compensate owners of the cable landing stations for the costs incurred by them for providing access facilitation and other resources to other operators at the cable landing stations.
- 1.3 A submarine cable system consists of a communication cable laid on the sea bed between cable landing stations (CLS) on the land to carry telecommunication signals across stretches of ocean. A block diagram of a submarine cable system is as follows:

**Figure 1.1**  
**Block Diagram of a Submarine Cable System**



- 1.4 Submarine cable systems generally use optical fiber cables to carry international traffic. Owing to a huge transmission capacity of optical fiber cables, such systems have become the backbone of International Long Distance (ILD) service.
- 1.5 Access to Facilities at submarine cable landing stations (CLS) is an essential input for many telecom services. Any unnecessary access restrictions in any form tend to limit an operator's competitive scope to provide international telecom services at an affordable rate.
- 1.6 TRAI issued the International "Telecommunication Access to Essential Facilities at Cable Landing Stations Regulations, 2007" on 07.06.2007. The Regulations provides that the owner of cable landing station (OCLS) shall provide access to any eligible Indian International Telecommunication Entity (ITE), on fair and non-discriminatory terms and conditions, at its cable landing stations. It further provides that OCLS is required to submit a 'Cable landing Station Reference Interconnect Offer (CLS RIO)' to TRAI, in a specified format, containing the terms and conditions of access facilities and co-location facilities; including landing facilities for sub-marine cables at its cable landing stations for its approval. After getting approval from TRAI, OCLSs were required to publish the RIO. Accordingly, in 2007, after approval of the Authority, owners of cables landing stations published their RIO containing access facilitation charges and co-location charges. The regulations also provides that in case of a cable

landing station which comes into existence after commencement of these regulations, the owner of such cable landing station is required to submit, on or before the date of coming into existence of such cable landing station, the Cable Landing Station-Reference Interconnect Offer in respect of such cable landing station to the Authority for its approval.

- 1.7 In the year 2010, the Authority received representations from a number of service providers and their associations requesting formal broad based consultation with all industry players on review of Access Facilitation Charges (AFC). They submitted that since the year 2007, when TRAI had issued its regulations, there has been a dramatic change in the international bandwidth market, both in terms of a significant drop in the prices of IPLC as well as an exponential rise in capacity utilization of submarine cable systems. They further submitted that international capacity utilization at the major cable landing stations in India has also gone up by at least ten times since 2007. They argued that the increased capacity utilization should have translated in proportional reduction in Access Facilitation Charges and Operation and Maintenance (O&M) Charges, however, these charges have remained virtually unchanged since 2007. As a result, CLS facility continues to remain a bottleneck facility and, therefore, there is no effective competition possible in the sector for the ILDOs, who do not own cable landing stations. Some of the service providers represented to TRAI that the access facilitation charges and co-location charges at cable landing station need a review as the cost of telecom equipment has gone down while the capacity utilization of cable landing station has gone up over the previous three years.
- 1.8 In order to address divergent views and to protect the interests of service providers and consumers of the telecom sector, the Authority initiated consultation process on this issue. The Authority, vide its letter dated 22.06.2011, requested all ILDOs

to furnish information on prevalent regulatory practices for providing such access and mechanism prevalent for its charges in other countries.

- 1.9 After analyzing responses received from service providers and based on the inputs received in the pre-consultation stage i.e. responses received to the 8 queries in the letter dated 22.06.2011, the Authority issued a Consultation Paper on 'Access Facilitation Charges and Co-location Charges at Cable Landing Stations' dated 22.03.2012, inviting comments from stakeholders.
- 1.10 Based on the inputs received in the consultation process the Authority came out with an amendment to the 2007 regulations titled "International Telecommunication Access to Essential Facilities at Cable Landing Stations (Amendment) Regulations, 2012". Vide the said Amendment; a sub regulation 4 was introduced in regulation 10. It provided that *"the Access facilitation charges referred to in sub regulation (1) and sub regulation (2) shall be such as had been included in the cable Landing Station reference interconnect offer published under sub regulation (4) of regulation 3: provided that the authority may specify Access facilitation charges which shall be payable by a class or classes of eligible Indian International Telecommunication Entity and in such case the approval of the Access Facilitation Charges, as specified in part II of the schedule, by the authority shall not be required to be obtained under these regulations"*. Similar changes were made in regulation 12, 14 and 16.
- 1.11 The Authority issued another consultation paper on "Estimation of Access Facilitation Charges and Co-location Charges at Cable Landing Stations" dated 19<sup>th</sup> October 2012 seeking comments of stakeholders. Considering the comments given by the various stakeholders and in order to give a fair opportunity to Owners of Cable Landing Stations (OCLSs), meetings were held with CLS owners in which cost data, costing methodology used by TRAI

were discussed in details. Based on the discussion held in the above meeting and submission of stakeholders in response to the consultation paper, Access Facilitation Charges, both at cable landing stations and at alternate location, were re-estimated. These interactions provided inputs on network design and the cost data. Almost all components of costs, including life of equipment and optical fibre, OPEX, consideration of standby equipment, CAPEX Elements, project management cost, weighted average cost of capital, space required to block for future expansion, company overhead, rate of dollar, taxes in equipment sector etc. were taken into account in the revised calculations. These eventually found an expression in 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges' Regulations dated 21.12.2012.

1.12 The charges as prescribed in the Regulations dated 21.12.2012 were to be effective from 01.01.2013. However, two of the OCLSs filed separate writ petitions (Nos. 1875 and 3652 of 2013) in Madras High court challenging all the three regulations issued by the Authority regarding CLS viz.

(i)International Telecommunication Access to Essential Facilities at Cable Landing Stations (CLS) Regulation, 2007 dated 07.06.2007

(ii)International Telecommunication Access to Essential Facilities at Cable Landing Stations (Amendment) Regulations, 2012 dated 19.10.2012

(iii)The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012 dated 21.12.2012

1.13 The Single Judge Bench of the Hon'ble Madras High Court passed the final judgment and order on 11.11.2016 dismissing both the writ petitions. Subsequently, appeals were filed by both the petitioners before a Division Bench of the Hon'ble Madras

High Court (WA Nos. 283 and 285 of 2017). The Hon'ble Court vide its final judgment and order dated 02.07.2018, partly upheld the judgment of the learned single judge. The Hon'ble Division Bench held that the Authority has the power to frame the above-mentioned regulations in exercise of its powers under Section 36 of the TRAI Act. However, the Schedules I, II, III of the "The International Telecommunication Cable Landing Station Access Facilitation charges and Co-location charges Regulations, 2012 (no. 27 of 2012)" dated 21.12.2012 were quashed by the Hon'ble Division Bench.

1.14 The decision of the Hon'ble Division Bench of Madras High Court is reproduced below:

*"(a) Both appeals are partly allowed. We partly confirm the dismissal of writ petitions, W.P.Nos.1875 and 3652 of 2013. We confirm the dismissal of the writ petitions insofar as it pertains to challenge to 'International Telecommunication Access To Essential Facilities At Cable Landing Stations Regulations, 2007 (5 of 2007)' dated 7.6.2007, i.e., 'CLS Regulation' and 'International Telecommunication Access To Essential Facilities At Cable Landing Stations (Amendment) Regulations, 2012 (No.21 of 2012)' dated 19.10.2012, i.e., 'CLS Amendment Regulation'.*

*(b) Insofar as dismissal of the aforesaid writ petitions qua 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No.27 of 2012)' dated 21.12.2012, i.e., 'CLS Co-location Charges Regulation' is concerned, we partly set aside the same holding that Schedules I, II and III of 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No.27 of 2012)' dated 21.12.2012 stand quashed.*

*(c) TRAI shall redo and re-enact the aforesaid quashed schedules, i.e., schedules I, II and III of 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No.27 of 2012)' dated 21.12.2012 after strictly following the procedure for subordinate legislation making, particularly transparency and principles of natural justice which have also been built into section 11(4) of TRAI Act within six months from the date of receipt of a copy of this order.*

*(d) Consequently, 'International Telecommunication Access To Essential Facilities At Cable Landing Stations Regulations, 2007 (5 of 2007)' dated 7.6.2007, 'International Telecommunication Access To Essential Facilities At Cable Landing Stations (Amendment) Regulations, 2012 (No.21 of 2012)' dated 19.10.2012 and 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No.27 of 2012)' dated 21.12.2012 are kept in abeyance for a period of six months from the date of receipt of a copy of this order or redoing / re-enacting aforesaid Schedules whichever is earlier.*

*(e) Writ appeals are partly allowed to the limited extent set out supra. Considering the nature of the matter and trajectory of the hearings, parties are left to bear their respective costs.”*

1.15 TRAI filed a Petition for Special Leave to Appeal on 26.09.2018 in the Hon'ble Supreme Court (Nos. 26726-26727/2018) with prayer for interim relief requesting inter-alia for grant of ex-party stay of the operation of impugned final judgment and order dated 02.07.2018 of the Division Bench of Hon'ble Madras High

Court. Petition for Special Leave to Appeal was also filed by Reliance Communications Limited on 21.08.2018 (Nos. 23351-23352/2018) with prayer for interim relief requesting inter-alia for grant of ex-parte stay of the operation of the impugned final judgment and order dated 02.07.2018. Similar Petition for Special Leave to Appeal was also filed by Association of Competitive Telecom Operators on 04.09.2018(Nos. 25506-25507/2018).

These petitions were tagged together and upon hearing the counsel on 08.10.2018 the Hon'ble Supreme Court made the following order:

*“In these Special Leave Petitions filed against the High Court judgment, it is clear that the Division Bench of the High Court has interfered only on two counts. Insofar as both the counts are concerned, the ultimate finding is that both need to be re-worked by the Authority.*

*We would request the Authority to re-work the figures on both counts within a period of six weeks from today. It will be open to the Authority, if it so finds, to re-determine the same two figures that have been accepted by the learned Single Judge.*

*All contentions may be raised and are kept open to both sides. The parties shall not take adjournment on any count.*

*The Special Leave Petitions are disposed of accordingly.*

*Pending applications also stand disposed of.”*

**B- Re-working the figures on two counts in view of the orders of Hon'ble Supreme Court**

1.16 The Schedules I, II, III of the 'The International Telecommunication Cable Landing Station Access Facilitation charges and Co-location charges Regulations, 2012 (no. 27 of 2012)' dated 21.12.2012 were quashed by the Division Bench of the Hon'ble Madras High Court vide its final judgment and order

dated 02.07.2018. The Schedule I of these regulations specifies the access facilitation charges at cable landing stations and alternate location. The Schedule II specifies the annual operation and maintenance charges for capacity provided on IRU (Indefeasible Right of Use) basis, at cable landing stations and alternate location. The co-location charges are specified in the Schedule III of these regulations.

1.17 The Division Bench of the Hon'ble Madras High Court had further asked TRAI to re-do and re-enact the schedules I,II and III of 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No. 27 of 2012)' dated 21.12.2012 after strictly following the procedure for subordinate legislation making particularly transparency and principles of natural justice which have also been built into Section 11(4) of TRAI Act within six months from the date of receipt of copy of the aforesaid order.

1.18 The Division Bench of the Hon'ble High Court in its final judgment and order dated 02.07.2018 has concluded *inter alia* that:

*“However, with regard to utilisation factor being taken as 70% and the conversion factor being fixed at 2.6, we hold that the same breach the requirement of transparency and natural justice principles which are non-negotiable ingredients of subordinate legislation making, besides being built into the sub-section 4 of section 11 of TRAI Act.....*

*However, this has direct impact only on the access facilitation charges, annual operation and maintenance charges and co-location charges contained in Schedules I, II and III of the CLS Co-location Charges regulations..... ”*

1.19 The Hon'ble Supreme Court in its order dated 08.10.2018 has observed that the Division Bench of the Hon'ble High Court has

interfered only on two counts. The Hon'ble Supreme Court in its order has requested the Authority to re-work the figures on both counts within a period of six weeks from the date of judgment. The order further says that it will be open to the Authority, if it so finds, to re-determine the same two figures that have been accepted by the learned Single Judge.

- 1.20 In view of the above, this exercise is being done by the Authority to re-work the figures in the Schedule I, II, III of the 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No. 27 of 2012)' dated 21.12.2012 with respect to the 'utilisation factor' and 'conversion factor' in compliance to the Hon'ble Supreme Court order dated 08.10.2018.
- 1.21 The Consultation Paper is divided into three chapters. The first chapter is an introductory one which broadly gives brief background and need to review of these charges. The second chapter describes the various aspects of submarine cables systems, cable landing stations and the methodology used in estimating Access Facilitation and Co-location charges. The third chapter lists the issues for consultation.

## **CHAPTER 2**

### **Estimation of Access Facilitation charges and Co-location charges**

2.1 This chapter gives a description of various aspects of sub-marine cable systems. It then gives the details of the estimation of access facilitation charges and co-location charges as per the network model adopted while framing “The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 (No. 27 of 2012)” dated 21.12.2012.

#### **A- Submarine Cable Systems**

2.2 Submarine cables are laid on the sea bed between land-based stations to carry telecommunication signals. They offer highly secure, greatly reliable and very high capacity telecommunication links between countries across the world. The transmission quality of a sub-marine cable is significantly better than a typical satellite media. Submarine cables are only a few inches thick and they carry only a few optical fibers. Yet they have transmission capacities of the order of terabits per second (Tbps). However, a typical multi-terabit, trans-oceanic submarine cable system costs several hundred million dollars to construct.

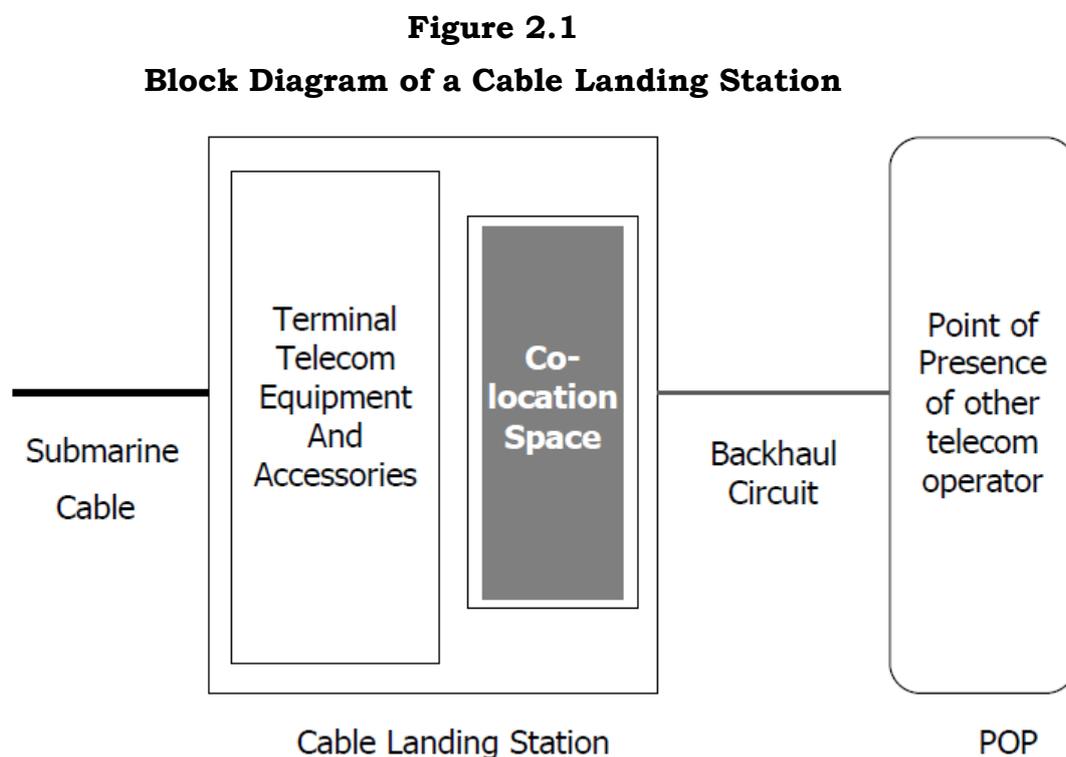
2.3 There are presently 16 submarine cable systems, which connect India to the rest of the world. A submarine cable used for providing international telecommunication links stretches across many countries. In each country, it lands in a land based facility called cable landing station (CLS). Thus, a typical submarine cable system consists of (i) a submarine cable in the sea-bed and (ii) cable landing stations at lands.

## B- Cable Landing Station (CLS)

2.4 A “Cable landing station” means the location:

- (a) at which the international submarine cable capacity is connectable to the backhaul circuit;
- (b) at which the international submarine cables are available on shore, for accessing international submarine cable capacity; and such location includes buildings containing the onshore end of the submarine cable and equipment for connecting to backhaul circuits.

2.5 The block diagram of a typical cable landing station (CLS) is as follows:



2.6 The meaning of various terms used with reference to CLS as defined in “The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations 2012” are reproduced below:

- (a) **“Access Facilitation”** means access or interconnection, as the case may be, to the essential facilities (including landing facilities for submarine cable) at cable landing station;

(b) **“Access Facilitation Charges”** means charges payable by the eligible Indian International Telecommunication Entity to the owner of the cable landing station to interconnect or access the capacity acquired on Indefeasible Right of Use basis or on short-term lease basis from an owner of the submarine cable capacity or a member of consortium owning submarine cable capacity ;

(c) **“Alternate location”** or **“Alternate Site”** means the location other than the cable landing station where the owner of cable landing station provides, through interconnecting link from cable landing station, access to international submarine cable capacity and such location includes space for collocation of equipment;

(d) **“Co-location Facilities”** means the facilities at a submarine cable landing station (including building space, power, environment services, security and site maintenance) which may be offered by the owner of cable landing station to the eligible Indian International Telecommunication Entity to facilitate access to the cable landing station of such owner (including installation of co-location equipment);

(e) **“Co-location charges”** means the charges payable by the eligible Indian International Telecommunication Entity based on the type of facilities used, for the purpose of housing the equipment of such eligible Indian International Telecommunication Entity, at the premises of owner of cable landing station which provides the access to its cable landing station, and such charges include charges for providing space, power supply, accessing physical facilities, operation and maintenance of co-location site for the said purpose;

(f) **“Capacity owner”** means an International Telecom Carrier or Foreign Carrier or Indian International Long Distance Operator who owns capacity on the international submarine cable landing at the cable landing station in India;

(g) **“Eligible Indian International Telecommunication Entity”** means--

(i) an International Long Distance Operator, holding licence to act as such, and, who has been allowed under the licence to seek access to the international submarine cable capacity in submarine cable system landing at the cable landing stations in India; or

(ii) an Internet Service Provider, holding valid international gateway permission or licence to act as such, and, who has been allowed under the licence to seek access to the International submarine cable capacity in submarine cable system landing at the cable landing stations in India;

(h) **“International Long Distance Operator”** means a service provider or operator who has been granted licence to act as such to provide international long distance service;

(i) **“Indefeasible Right of Use”** means the right to use the Reference Capacity,

(i) on long term lease for the period for which the submarine cable remains in effective use;

(ii) acquired (including equipment, fibers or capacity) under an agreement entered into between the Capacity owner and an eligible Indian International Telecommunication Entity;

(iii) in respect of which maintenance cost incurred becomes payable in any circumstances during the period of validity of the agreement referred to in sub-clause (i) of this clause;

(j) **“operation and maintenance charges”** means the annual charges,-

(i) payable to the owner of cable landing station by the eligible Indian International Telecommunication Entity;

(ii) for operation and maintenance of facilities for accessing the capacity of the cable landing station of such owner;

(k) **“Reference Capacity”** means the international submarine cable capacity,--

(i) in the submarine cable system landing at the cable landing station in India;

(ii) acquired whether on ownership basis or lease basis by the eligible Indian International Telecommunication Entity;

(iii) activated by the owner of the submarine cable system or a member or members of consortium of submarine cable system;

(l) **“owner of cable landing station”** means a service provider who owns and manages submarine cable landing station in India and has been granted licence to provide international long distance service or Internet service provider.

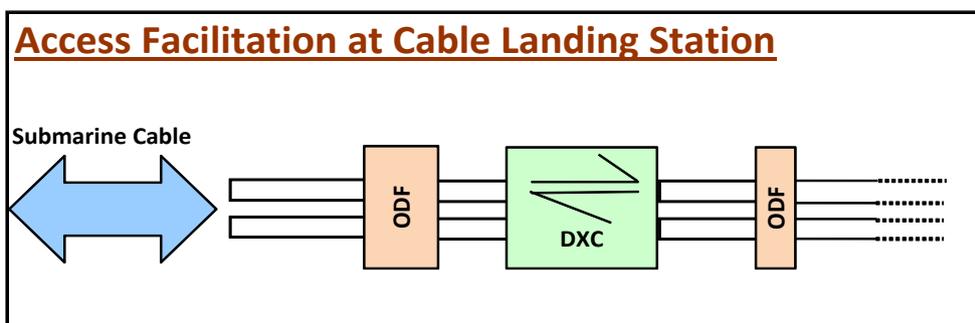
## **C- Estimation of Access Facilitation Charges:**

### **(i) Network Elements considered**

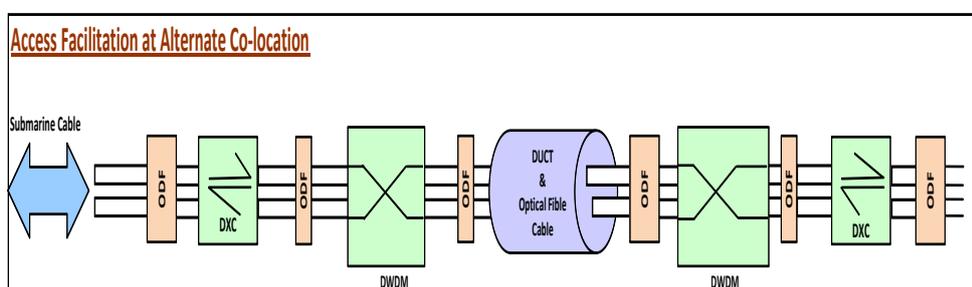
2.7 The Authority issued a consultation paper titled “Estimation of Access Facilitation Charges and Co-location charges at Cable Landing Stations” on 19<sup>th</sup> October 2012 on the basis of cost data and comments received from stakeholders in previous consultation. Stakeholders had generally agreed to the costing methodology adopted by TRAI in the consultation paper. However, M/s Tata Communications Ltd. indicated few cost elements which according to them have not been considered in the calculation of the charges. Similarly, M/s Bharti Airtel Ltd. also submitted that costing data and methodology applied to arrive at proposed charges by TRAI were not very clearly understood and there are items which have not been considered in arriving at the cost.

2.8 After several meeting and discussions with these two OCLs and also taking into consideration the submissions made by various stakeholders during the consultation process, TRAI identified network elements required for estimating access facilitation charges at cable landing station and alternate location and indicated in the Figure-2.2 and Figure-2.3. These network elements formed the basis of estimations done while formulating “The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location Charges Regulations, 2012 dated 21.12.2012.

**Figure-2.2 Access Facilitation at Cable Landing Station**



**Figure-2.3 Access Facilitation at Alternate Location**



**(ii) CAPEX items used for provisioning of AFC at CLS and Alternate location**

2.9 The CAPEX items used for providing access facilitation at cable landing station and alternate location are listed below in Table-2.1 and Table-2.2, respectively.

**Table-2.1  
CAPEX items used for access facilitation at CLS**

<b>Sl.No.</b>	<b>Description</b>
i	ODF (Optical Distribution Frame)
ii	Digital Cross Connect (DXC)
iii	Fiber Patch Cords
iv	Inter Floor cabling and tray work
v	Manpower towards installation
vi	NMS
vii	Test Instruments
viii	Project Management cost

**Table-2.2 (i)  
CAPEX items used for access facilitation at alternate location  
(At CLS Access Section)**

<b>Sl.No.</b>	<b>Description</b>
i	ODF (Optical Distribution Frame)
ii	Digital Cross Connection
iii	DWDM Equipment
iv	Fiber Patch Cords
v	Inter Floor cabling and tray work
vi	Manpower towards installation
vii	NMS
viii	Test Instruments
ix	Project Management cost

**Table-2.2 (ii)  
CAPEX items used for access facilitation at alternate location  
(Link between CLS Access Section and MMR)**

<b>Sl.No.</b>	<b>Description</b>
i	Fiber between CLS and MMR

**Table-2.2 (iii)  
CAPEX items used for access facilitation at alternate location  
(At MMR Section)**

<b>Sl.No.</b>	<b>Description</b>
i	ODF (Optical Distribution Frame)
ii	Digital Cross Connection
iii	DWDM Equipment
iv	Fiber Patch Cords
v	Inter Floor cabling and tray work
vi	Manpower towards installation
vii	NMS
viii	Test Instruments
ix	Project Management cost

**(iii) Cost data used for the CAPEX items**

2.10 In the consultation paper dated 19.10.2012, cost for each CAPEX item for providing one STM64 (10G) was derived from the costs submitted by both the OCLS. As per the data submitted by both of them for their CLS at Mumbai, one OCLS was using a DXC with 640G capacity, while the other OCLS was using 4 DXCs with 120G capacity each for providing access facilitation. Therefore, in the consultation paper dated 19.10.2012, the cost of fully loaded DXC i.e. loaded with only 10G/STM-64 cards in all the slots in protected mode was taken in order to calculate the cost for provision of one 10G/STM-64.

2.11 During the consultation process, it was suggested by both the OCLSs that design capacity for DXC should be taken on the basis of market projections and while designing this capacity it should be ensured that all interfaces i.e. STM-1, STM-4, STM-16 and STM-64 are available in the equipment. As per the discussion with the OCLS and demand projection for various interfaces and capacity of DXC used by them, the network design was modified for 60 G capacity ensuring availability of all interfaces i.e. STM-1, STM-4, STM-16 and STM-64. The combination of interfaces was also selected based on the prevalent demand projection. AFC both at CLS and alternate location was re estimated. However, while estimating the AFC at alternate location, the DXC used at CLS access section was loaded with STM-64 (10G) cards only for delivering 60 G capacity in protection mode. Cost of all DXC components along with number of cards required to provide interfaces as mentioned in Table-2.3 were taken into account for calculation of the DXC cost. Thus, in the cost calculation, it was ensured that cost of network elements are recovered through interfaces available. Following Table (Table-2.3) provides DXC configuration taken for 60 G capacity in protection mode.

**Table-2.3**  
**DXC configuration for 60-G Capacity**

<b>Sl.No.</b>	<b>Interface</b>	<b>Total No. of interfaces</b>	<b>No. of interfaces available (in protection mode) at client side for sale</b>	<b>Equivalent Capacity in Gbps</b>
(i)	STM-1	128	64	10
(ii)	STM-4	32	16	10
(iii)	STM-16	32	08	20
(iv)	STM-64	16	02	20
Total				60

2.12 For the access facilitation at alternate location, the costs submitted by OCLSs for fibre link and DWDM were apportioned for carrying 60 G capacity. Similarly the cost of passive network elements i.e. ODF, fibre patch cord, inter floor cabling and tray work were appropriately apportioned for provisioning of 60G, on the basis of cost data submitted by the OCLSs for respective passive elements.

2.13 In addition to the above, taxes @ 18% and project management cost @ 10% of CAPEX were taken into account. The major OCLSs had provided the costs of the equipments in US Dollars for which a conversion rate of Rs. 52 was used.

2.14 The apportioned capital cost for 60 G (in protection mode) for each CAPEX item for OCLS-1 and OCLS-2, for access facilitation at CLS is given in the following Table-2.4. Keeping in view the commercial sensitivity of data, details of items and names of the OCLSs were not provided.

**Table-2.4**  
**Apportioned Capital Cost for 60 G (in protected mode) used for Access Facilitation (in Rs.)**

<b>Sl.No.</b>	<b>CAPEX item</b>	<b>OCLS-1</b>	<b>OCLS-2</b>
(i)	Apportioned Capital Cost for 60 G (in protected mode) used for Access Facilitation at CLS	1,34,31,961	1,03,47,315
(ii)(a)	Apportioned Capital Cost for 60-G (in protected mode) used for Access Facilitation at Alternate location (For both CLS Access and MMR Section)	3,58,16,799	3,06,08,722
(ii)(b)	Apportioned Capital Cost for Optical Fiber Link between CLS and MMR	7,80,000	32,25,000

**(iv) Annual Recovery of capital cost:**

2.15 Following parameters were used for estimating annualized capital cost in the Regulations:

- (i) Life of network element (except optical fibre) = 10 years
- (ii) Life of link of optical fibre between CLS and MMR = 15 years
- (iii) Method of depreciation = Straight Line Method (SLM)
- (iv) Pre-tax WACC = 15%

**(v) Operational cost**

2.16 Actual value of OPEX was estimated on the basis of data submitted by both the OCLSs. One of the OCLS had submitted market prevailing rental and annualized cost of external fit-out and internal fit-out for Mumbai. On the basis of its data, TRAI had earlier in the consultation paper dated 19.10.2012, estimated the space charges for calculating the co-location charges. Therefore, the same estimated space charge for Mumbai was used as space charges in the calculations for OPEX for that OCLS. The other OCLS had submitted the cost of land, building and other fixture for their data centre wherein it was providing Access facilitation; in place of prevailing market rent for the space. Therefore, for estimating space charges for this OCLS, RoCE of 15% was provided for the cost of land (book value) as submitted by the OCLS. Cost of building was annualized by taking 20 years life of building. For estimating annual cost of other capital expenditure for fit-out etc, life was taken as 10 years. On both items, Pre Tax WACC of 15% was taken.

2.17 AMC of equipment and Optical fibre were taken as 4% and 3% of capital costs. In addition Manpower Cost was taken as 2% of CAPEX.

2.18 Summary of various OPEX items and annual OPEX taken in the calculations are given in Table-2.5 and Table-2.6, respectively :

**Table-2.5  
OPEX ITEMS**

<b>Sl.No.</b>	<b>Description</b>
(i)	AMC of equipment @ 4%
(ii)	AMC of Optical Fibre @ 3%
(iii)	Space Charges/Sq.ft./Annum for Mumbai (Including External fit outs (transformers, DG sets, HT panels, LT panels, cables, air conditioner), Internal fit outs (UPS, battery, internal electrical panel, precision AC, power distribution units, fire alarm and access control and cabling), Security services charges) @ for OCLS-1 Rs. 8636 and for OCLS-2 Rs.9926.
(iv)	Electricity Charges @ Rs. 15.64 Per unit
(v)	Manpower Cost @ 2% of CAPEX
(vi)	Miscellaneous (Corporate Overhead, IT etc) @ 10% of OPEX

**Table-2.6  
OPEX for 60 G used for Access Facilitation (in Rs.)**

<b>Sl.No.</b>	<b>Item</b>	<b>OCLS-1</b>	<b>OCLS-2</b>
(i)	OPEX for 60 G used for Access Facilitation at CLS	19,93,789	25,01,028
(ii)	OPEX for 60 G used for Access Facilitation at Alternate location (For both CLS Access and MMR Section)	69,69,511	78,30,337

**(vi) Utilization**

2.19 Utilization factor of 70% was taken into account in the estimation of charges. In their comments to the consultation paper most of the stakeholders had supported the utilization factor of 70% and mentioned that it is in line with the best regulatory practices.

**(vii) Calculation of Access Facilitation Charges**

2.20 Estimation of access facilitation charges for 60G at CLS and MMR was made as follows:

**Table-2.7**  
**Calculation of Access Facilitation Charges (in Rs.) for 60 G**  
**(in protected mode) at CLS**

<b>Sl.No.</b>	<b>Description</b>	<b>OCLS-1</b>	<b>OCLS-2</b>
(a)	Average Annualized CAPEX (Annualised value of apportioned capital cost indicated in item (i) of Table-2.4)	24,51,333	18,88,385
(b)	OPEX per annum (Item (i) of Table-2.6)	19,93,789	25,01,028
(c)	Total Annual charges per annum {(a)+(b)}	44,45,122	43,89,413
(d)	Total Annual charges per annum with utilisation @ 70% {(c) ÷ 70%}	63,50,174	62,70,589
(e)	Annual charges per annum (Including Licence Fee @ 8%) {(d) ÷ (1-0.08)}	69,02,363	68,15,858

**Table-2.8**  
**Calculation of Access Facilitation Charges (in Rs.) for 60 G**  
**(in protected mode) at Alternate location**

<b>Sl.No.</b>	<b>Description</b>	<b>OCLS-1</b>	<b>OCLS-2</b>
(a)	Average Annualized CAPEX {( Annualised value of apportioned capital cost indicated in item (ii)(a) of Table 2.4) + (Annualised value of apportioned capital cost indicated in item (ii)(b) of Table-2.4)}	66,50,966	60,59,092
(b)	OPEX per annum (Item (ii) of Table-2.6)	69,69,511	78,30,337
(c)	Total Annual charges per annum {(a)+(b)}	1,36,20,477	1,38,89,429
(d)	Total Annual charges per annum with utilisation @ 70% {(c) ÷ 70%}	1,94,57,824	1,98,42,042
(e)	Annual charges per annum (Including Licence Fee @ 8%) {(d) ÷ (1-0.08)}	2,11,49,808	2,15,67,437

2.21 The Authority was of the opinion that work done to provide access facilitation at a cable landing station is same for all CLS. Therefore, it was not required to estimate the cost based charges separately for each CLS. The only variation could be due to space and electricity charges, if the CLS are located in two different cities. Therefore, in the final calculations, space and electricity charges for Mumbai, which are the highest among various locations, were used. As the charges prescribed were ceiling charges, the Authority was of the opinion that higher of the costs of the two OCLSs, calculated separately for CLS and MMR be taken for prescribing the charges.

**(viii) Access Facilitation Charges for various capacities i.e. STM-1, STM-4, STM-16 or STM-64**

2.22 In the consultation paper dated 19.10.2012, for estimating access facilitation charge for lower capacities i.e. STM-1, STM-4 and STM-16 from 10 G/ STM-64 capacity, a conversion factor of 2.6 was used keeping in view two important factors in mind: (a) scale of economy for higher capacities (b) prevailing market factor in domestic leased circuit. Most of the stakeholders favoured using the factor of 2.6. However, the two OCLSs were of the view that using a factor of 4 is more appropriate. They were also of the view that irrespective of the conversion factor taken into account for the calculations, the charges determined should be such that they are able to recover their total cost for providing various capacity interfaces. Therefore, keeping the submissions of the two OCLSs in view, the charges of various capacity interfaces were calculated in “The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012” so that total cost is recovered from the interfaces for which DXC was configured. Accordingly, AFC for various interfaces was calculated using following formula:

$$\begin{aligned} & \text{Total Cost of 60 G} \\ & = \{[(\text{No of STM-1 Interfaces}) * (\text{AFC of one STM-1 Interface})] + \\ & \quad \{[(\text{No. of STM-4 Interfaces}) * (2.6) * (\text{AFC of one STM-1 Interface})] + \\ & \quad \{[(\text{No. of STM-16 Interface}) * (2.6*2.6) * (\text{AFC of one STM-1} \\ & \quad \text{Interface})] + [(\text{No. of STM-64 Interface}) * (2.6*2.6*2.6) * (\text{AFC of} \\ & \quad \text{one STM-1 Interfaces})]\} \} \end{aligned}$$

2.23 TRAI was of the opinion that if a higher factor of 4 as proposed by OCLSs is used for calculation, then price of STM-1 will be very low and price of STM-64 will be on higher side and this will also not provide the economies of scale for higher capacities. Moreover, 2.6 was the prevalent conversion factor in the market which was generally agreeable to most of the stakeholders.

2.24 Accordingly, the access facilitation charges for various interfaces came out to be as given in Table-2.9 and Table-2.10.

**Table-2.9**  
**Access Facilitation Charges per annum (in Rs.) at**  
**Cable Landing Station**

Sl. No.	Capacity	Charges per unit Interface		
		OCLS-1	OCLS-2	Ceiling prescribed
(a)	STM-1	35,427	34,983	36,000
(b)	STM-4 {{a}* 2.6}	92,111	90,956	93,000
(c)	STM-16 {{b}* 2.6}	2,39,488	2,36,487	2,40,000
(d)	STM-64 {{c}* 2.6}	6,22,669	6,14,866	6,25,000

**Table-2.10**  
**Access Facilitation Charges per annum (in Rs.) at**  
**Alternate location (Meet Me Room)**

Sl. No.	Capacity	Charges per unit Interface		
		OCLS-1	OCLS-2	Ceiling prescribed
(a)	STM-1	1,08,554	1,10,698	1,11,000
(b)	STM-4 {{a}* 2.6}	2,82,241	2,87,814	2,88,000
(c)	STM-16 {{b}* 2.6}	7,33,826	7,48,316	7,50,000
(d)	STM-64 {{c}* 2.6}	19,07,946	19,45,621	19,50,000

**(ix) Access facilitation charges on Indefeasible Right of Use (IRU) basis:**

The Authority was of the view that there was no need to prescribe charges on IRU basis for access facilitation provided after the commencement of the regulations. However, to maintain level playing field and to protect the interest of those ITEs who have already entered into agreement on IRU basis before the commencement of the regulations, revised annual Operation and Maintenance charges on the basis of estimated OPEX may be provided. Using the same formula as used for Annual Access Facilitation charges after utilization factor of 70%

on OPEX the Annual Operation and Maintenance charges for various interfaces were prescribed as follows:

**Table 2.11**  
**Annual Operation and Maintenance Charges at Cable Landing Stations for Capacity Provided on IRU basis**

Sl.No	Capacity	Operation and Maintenance Charges per Unit Capacity Per Annum (In Rs.)		
		OCLS-1	OCLS-2	Ceiling Prescribed
(a)	STM-1	14,619	18,338	19,000
(b)	STM-4 {(a)*2.6}	38,010	47,680	48,000
(c)	STM-16 (b)*2.6	98,825	1,23,967	1,24,000
(d)	STM-64 (c)*2.6	2,56,945	3,22,315	3,23,000

**Table 2.12**  
**Annual Operation and Maintenance Charges at Alternate Location (Meet Me Room) for Capacity Provided on IRU basis**

Sl.No.	Capacity	Operation and Maintenance Charges for Unit Capacity Per Annum (In Rs.)		
		OCLS-1	OCLS-2	Ceiling Prescribed
(a)	STM-1	51,103	57,415	58,000
(b)	STM-4 {(a)*2.6}	1,32,867	1,49,278	1,50,000
(c)	STM-16 (b)*2.6	3,45,454	3,88,123	3,89,000
(d)	STM-64 (c)*2.6	8,98,181	10,09,119	10,10,000

**D- Issues under consideration in this consultation process:**

2.25 The utilization factor of 70% was taken into account in the estimation of access facilitation charges and annual operation and maintenance charges for capacity provided on IRU basis; in the consultation paper dated 19.10.2012. In their comments to the consultation paper, most of the stakeholders had supported the utilization factor of 70% and mentioned that it is line with the best international regulatory practices. In the consultation paper dated 19.10.2012 the cost for each CAPEX item for providing one STM-64 (10G) was derived from the cost submitted by both the OCLSs. As per the data submitted by the OCLSs for their CLSs at Mumbai, one OCLS was using a DXC with 640 G capacity, while the other OCLS was using 4 DXCs with 120 G capacity each for

providing access facilitation. In the consultation paper dated 19.10.2012, the cost of fully loaded DXC i.e. loaded with only 10G/STM-64 cards in all the slots in protected mode was taken in order to calculate the cost for provision of one 10G/STM-64. During the consultation process, as per the discussion with the OCLS and demand projection for various interfaces and capacity of DXC used by them, the network design was modified for 60 G capacity ensuring availability of all interfaces i.e. STM-1, STM4, STM-16 and STM-64. The combination of interfaces was also selected based on the prevalent demand projection as shown in table 2.3. However, while estimating the AFC at alternate location, the DXC used at CLS access section was loaded with STM-64 (10G) cards only for delivering 60 G capacity in protection mode. It may be noted that the capacity of a DXC can be utilized up to 100 percent. When we are taking 70% of 60G capacity, it means 42G loading. If the OCLS are installing DXC with only 60G capacity and are able to sell 42G, they will be able to recover the full cost.

2.26 After making the estimations regarding access facilitation charges for one 10G/STM-64 in protected mode at CLS and at alternate location in the consultation paper dated 19.10.2012, the Authority proceeded to give the calculations for the access facilitation charges at CLS and alternate location for lower capacities i.e. STM-1, STM-4 or STM-16. However, as per the discussions with the OCLS and demand projection for various interfaces and capacity of DXC used by them, the network design was modified for 60G capacity ensuring availability of all interfaces i.e. STM-1, STM4, STM16 and STM-64. The access facilitation charges both at CLS and alternate location was re-estimated. However, while estimating the AFC at alternate location, the DXC used at CLS access section has been loaded with STM-64 (10G) cards only for delivering 60 G capacity in protection mode. A conversion factor of 2.6 was used for

estimating access facilitation charges for lower capacities i.e. STM-1, STM-2 and STM-16. The conversion factor of 2.6 was only meant to derive the access facilitation charges for lower capacities from 10 G/STM 64 capacity and not for the purposes of determination of the total cost of the CLS. The conversion factor of 2.6 was taken to give the advantage of economies of scale for access seekers who take higher bandwidth. It was also noted during the consultation process that the ratio prevalent in the market for domestic leased circuit charges of STM-64 to STM-16 or STM-16 to STM-4 or STM-4 to STM-1 was 2.5 to 2.6. The Authority was of the view that if the higher factor of 4 as proposed by the OCLS is used for the calculation, then price of STM-1 will be very low and price of STM-64 will be on higher side and this will also not provide the economies of scale for higher capacities. A sample comparative calculation using a conversion factor of 4(keeping utilization factor as 70%) for access facilitation charges per annum(in Rs.) at Cable Landing station is given below:

**Table 2.13**  
**Access facilitation charges per annum (in Rs.) at Cable Landing Station**

Sl. No.	Capacity	Charges per unit Interface			
		conversion factor=2.6		conversion factor=4	
		OCLS-1	OCLS-2	OCLS-1	OCLS-2
(a)	STM-1	35,427	34,983	17,975	17,750
(b)	STM-4	92,111	90,956	71,900	70,999
(c)	STM-16	2,39,488	2,36,487	2,87,598	2,83,994
(d)	STM-64	6,22,669	6,14,866	11,50,394	11,35,976

Similar changes will be there in all the capacity based charges in the Schedule I and II in case the conversion factor is increased.

2.27 The Schedule III of “The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012” specifies the co-location charges. These charges are based on the space charges, other infrastructure charges and electricity charges for a rack (rack space =16 sq feet and power consumed=2KW). In the consultation

paper dated 19.10.2012 in Table 9(a) and 9(b) the co-location charges per annum (excluding power) was calculated by using a utilization factor of 70%. The ‘conversion factor’ discussed in the previous paragraph is not relevant in this case. The co-location charges are basically dependent on space and electricity charges and as per the data submitted by the two OCLSs, space and electricity charges were found higher in Mumbai as compared to other cities. Hence, the Authority prescribed one co-location charge for Mumbai and the other common for all other cities. The co-location charges finally prescribed in the Schedule III of the International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-location charges Regulations, 2012 were as follows:

**Table 2.14**  
**Co-location Charges**

Sl.No.	Description	Co-location Charges Per Rack (Rack space= 16 sq.ft.) Per Annum (In Rs.)
(i)	For Mumbai	6,00,000 (upto 2KW Power)
(ii)	For Cities other than Mumbai	4,00,000 (upto 2KW Power)

2.28 The Hon’ble Supreme Court vide its order dated 08.10.2018 has requested the Authority to re-work the figures on two counts viz. ‘utilisation factor’ and ‘conversion factor’. This consultation is focused on these two factors only. Accordingly, as per the directions of the Hon’ble Supreme Court only these two factors will be determined through this consultation process. The charges contained in Schedule I, II and III of “The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012” will be re-calculated considering the same network design, cost data and other cost factors used in the previous exercise.

### **CHAPTER 3**

#### **Issues for Consultation**

Stakeholders are requested to comment on the following issues. It may please be noted that answers/comments to the issues given below should be provided with justification. In case any commercially sensitive data is being submitted by stakeholders in support of their response the same should be sent in separate envelope marked 'Confidential'.

- Q 1. What should be the 'utilization factor' for determination of annual access facilitation charges, annual operation and maintenance charges for capacity provided on IRU basis, and co-location charges in the Schedules appended to "The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012" dated 21.12.2012 ?**
- Q 2. What should be the 'conversion factor' (refer Para 2.22) for determination of annual access facilitation charges and annual operation and maintenance charges for capacity provided on IRU basis in the Schedules appended to "The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012" dated 21.12.2012?**

## List of Acronyms

<b>Acronym</b>	<b>Expansion</b>
AFC	Access Facilitation Charges
CLC	Co-Location Charges
CLS	Cable Landing Station
CLS-RIO	Cable Landing Station - Reference Interconnect Offer
CAPEX	Capital Expenditure
DoT	Department of Telecommunications
DWDM	Dense Wavelength Division Multiplexing
DXC	Digital Cross Connect
IITE	Indian International Telecommunication Entity
ILD	International Long Distance
ILDO	International Long Distance Operator
IPLC	International Private Leased Circuit
IRU	Indefeasible Right of Use
ISPs	Internet Service Providers
ITE	International Telecommunication Entity
NLD	National Long Distance
NLDOs	National Long Distance Operators
NMS	Network Management System
O&M	Operational & Maintenance
OCLS	Owner of Cable Landing Station
ODF	Optical Distribution Frame
OPEX	Operating Expenditure
STM	Synchronous Transport Module
Tbps	Terabits per second
WACC	Weighted Average Cost of Capital