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EXTRAORDINARY PART III SECTION 4

TELECOM REGULATORY AUTHORITY OF INDIA

THE TELECOMMUNICATION TARIFF (FIFTY SEVENTH AMENDMENT) ORDER, 2014

No.4 of 2014

NOTIFICATION

New Delhi, the 14th July, 2014

No. 312-2/2013-F&EA — In exercise of the powers conferred upon it under sub-section (2) of section 11, read with sub-clause (i) of clause (b) of sub-section (1) of the said section, of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997), the Telecom Regulatory Authority of India hereby makes the following Order further to amend the Telecommunication Tariff Order, 1999, namely:-

1. (1) This Order may be called the Telecommunication Tariff (Fifty Seventh Amendment) Order, 2014.

(2) This Order shall come into force on the 1st day of August, 2014.

2. For Schedule IV and its Annexures of the Telecommunication Tariff Order, 1999, the following Schedule and Annexure shall be substituted, namely: -

"Schedule IV

Domestic Leased Circuits

ITEM	TARIFF
(1) Date of implementation	01.08.2014
(2) Coverage	(a) All tariffs specified as ceilings (b) It is mandatory for domestic leased circuits to be

	provided through utilization of spare capacity when such capacity is available and when not available, on Rent and Guarantee Terms/ Special Construction/ Contribution basis. All service providers shall report to the Authority the commercial and economic basis of their terms and conditions with respect to Rent and Guarantee/ Special Construction/ Contribution basis etc. schemes, under the provisions of the Telecommunication Tariff Order, 1999 relating to reporting requirement. (c) Service providers may offer discounts on the ceiling tariffs. Discounts, if offered, shall be transparent and non-discriminatory, based on laid down criteria and subject to reporting requirement.
(3) (a) Ceiling tariffs for domestic leased circuits of E1 (2 Mbps), DS-3 (45 Mbps), STM-1 (155 Mbps) and STM-4 (622 Mbps) capacities	As specified in Annexure to this Schedule
(3) (b) Tariff for domestic leased circuits of other speeds/ capacities	Under forbearance
(3) (c) Chargeable distance for a domestic leased circuit	The chargeable distance for a domestic leased circuit shall not exceed 1.25 times the radial distance between the two ends of the domestic leased circuit.

(3) (d) Ceiling tariffs for domestic leased circuits of intermediate distances	The ceiling tariffs for distances lying in between the distances specified in Annexure to this Schedule shall be computed on pro-rata basis.
(4) Ceiling tariffs for end-links (or local leads)	(i) Tariffs for end-links shall be same as the ceiling tariffs for domestic leased circuits specified under item (3) of this Schedule. (ii) In case such leasing is technically not possible then on Rent and Guarantee Terms/ Special Construction/ Contribution Basis
(5) Ceiling tariffs for E1/R2 links for ISPs	(i) Tariffs for E1/R2 links for ISPs shall contain the Port charges as specified in the Telecommunication Interconnection (Port Charges) Regulation 2001 (6 of 2001) and tariff for domestic leased circuit/ end-link as specified under this Schedule. (ii) Each component of the tariff shall be specified separately in the bill.
(6) Other matters relevant to domestic leased circuits not specified in this Schedule	Under forbearance

Annexure to Schedule IV

Ceiling tariffs (in Rs. per annum) for domestic leased circuits of E1 (2 Mbps), DS-3 (45 Mbps), STM-1 (155 Mbps) and STM-4 (622 Mbps) capacities

Table-I

Distance (in Km)	Ceiling tariff for E1 (2 Mbps)
5	12,086
10	19,117
20	33,180
30	47,243
40	61,305
50	75,368
60	89,431
70	103,493
80	117,556
90	131,618
100	145,681
150	169,353
200	193,750
250	218,147
300	242,544
350	266,941
400	291,339
450	315,736
500	340,133
>500	341,000

Table-II

Distance (in Km)	Ceiling tariff for DS-3 (45 Mbps)	Ceiling tariff for STM-1 (155 Mbps)	Ceiling tariff for STM-4 (622 Mbps)
<50	584,000	1,610,000	4,188,000
50	584,919	1,610,973	4,188,531
60	690,388	1,887,831	4,908,361
70	795,858	2,164,689	5,628,191
80	901,327	2,441,546	6,348,020
90	1,006,797	2,718,404	7,067,850
100	1,112,267	2,995,261	7,787,680
150	1,317,960	3,459,645	8,995,077
200	1,508,698	3,960,333	10,296,865
250	1,699,436	4,461,020	11,598,652
300	1,890,174	4,961,707	12,900,439
350	2,080,912	5,462,395	14,202,226
400	2,271,650	5,963,082	15,504,014
450	2,462,388	6,463,770	16,805,801
500	2,653,126	6,964,457	18,107,588
>500	2,654,000	6,965,000	18,108,000

"

(Manish Sinha)
Advisor (F&EA)

Note.1. – The Telecommunication Tariff Order, 1999 was published in the Gazette of India, Extraordinary, Part III, Section 4 under notification No.99/3 dated 9th March, 1999, and subsequently amended as given below:

Amendment No.	**Notification No. and Date**
1st	301-4/99-TRAI (Econ) dated 30.3.1999
2nd	301-4/99-TRAI(Econ) dated 31.5.1999
3rd	301-4/99-TRAI(Econ) dated 31.5.1999
4th	301-4/99-TRAI(Econ) dated 28.7.1999
5th	301-4/99-TRAI(Econ) dated 17.9.1999
6th	301-4/99-TRAI(Econ) dated 30.9.1999
7th	301-8/2000-TRAI(Econ) dated 30.3.2000
8th	301-8/2000-TRAI(Econ) dated 31.7.2000
9th	301-8/2000-TRAI(Econ) dated 28.8.2000
10th	306-1/99-TRAI(Econ) dated 9.11.2000
11th	310-1(5)/TRAI-2000 dated 25.1.2001
12th	301-9/2000-TRAI(Econ) dated 25.1.2001
13th	303-4/TRAI-2001 dated 1.5.2001
14th	306-2/TRAI-2001 dated 24.5.2001
15th	310-1(5)/TRAI-2000 dated 20.7.2001
16th	310-5(17)/2001-TRAI(Econ) dated 14.8.2001
17th	301/2/2002-TRAI(Econ) dated 22.1.2002
18th	303/3/2002-TRAI(Econ) dated 30.1.2002
19th	303/3/2002-TRAI(Econ) dated 28.2.2002
20th	312-7/2001-TRAI(Econ) 14.3.2002
21st	301-6/2002-TRAI(Econ) dated 13.6.2002
22nd	312-5/2002-TRAI(Eco) dated 4.7.2002
23rd	303/8/2002-TRAI(Econ) dated 6.9.2002
24th	306-2/2003-Econ dated 24.1.2003
25th	306-2/2003-Econ dated 12.3.2003
26th	306-2/2003-Econ dated 27.3.2003
27th	303/6/2003-TRAI(Econ) dated 25.4.2003
28th	301-51/2003-Econ dated 5.11.2003

29th	301-56/2003-Econ dated 3.12.2003
30th	301-4/2004(Econ) dated 16.1.2004
31st	301-2/2004-Eco dated 7.7.2004
32nd	301-37/2004-Eco dated 7.10.2004
33rd	301-31/2004-Eco dated 8.12.2004
34th	310-3(1)/2003-Eco dated 11.3.2005
35th	310-3(1)/2003-Eco dated 31.3.2005
36th	312-7/2003-Eco dated 21.4.2005
37th	312-7/2003-Eco dated 2.5.2005
38th	312-7/2003-Eco dated 2.6.2005
39th	310-3(1)/2003-Eco dated 8.9.2005
40th	310-3(1)/2003-Eco dated 16.9.2005
41st	310-3(1)/2003-Eco dated 29.11.2005
42nd	301-34/2005-Eco dated 7.3.2006
43rd	301-2/2006-Eco dated 21.3.2006
44th	301-34/2006-Eco dated 24.1.2007
45th	301-18/2007-Eco dated 5.6.2007
46th	301-36/2007-Eco dated 24.1.2008
47th	301-14/2008-Eco dated 17.3.2008
48th	301-31/2007-Eco dated 1.9.2008
49th	301-25/2009-ER dated 20.11.2009
50th	301-24/2012-ER dated 19.4.2012
51st	301-26/2011-ER dated 19.4.2012
52nd	301-41/2012-F&EA dated 19.09.2012
53rd	301-39/2012-F&EA dated 1.10.2012
54th	301-59/2012-F&EA dated 05.11.2012
55th	301-10/2012-F&EA dated 17.06.2013
56th	301-26/2012-ER dated 26.11.2013

Note.2. – The Explanatory Memorandum explains the objects and reasons for the Telecommunication Tariff (Fifty Seventh Amendment) Order, 2014.

Explanatory Memorandum

A- Introduction and Background

1. Tariffs for domestic leased circuits (DLCs) have been regulated in the form of ceiling tariffs prescribed by the Authority under Schedule IV of the Telecommunications Tariff Order, 1999 (hereinafter referred to as the TTO, 1999) as amended by The Telecommunication Tariff (Thirty Sixth Amendment) Order, 2005 (hereinafter referred to as the TTO (36th Amendment), 2005) dated 21.04.2005. Separate ceiling tariffs for DLCs of less than 2 Mbps capacities provided on Managed Leased Line Network (MLLN) technology utilizing Versatile-MUX and Transit Stations were also prescribed by the Authority through the Telecommunication Tariff (Thirty Eighth Amendment) Order, 2005 (hereinafter referred to as the TTO (38th Amendment), 2005) dated 02.06.2005.

2. Since 2005, the Indian telecom services market has witnessed a remarkable change – a huge increase in the demand for access services and national long distance (NLD) services including DLCs. In order to meet the increased demand, the national long distance operators (NLDOs) and access service providers (ASPs) in the country made substantial investments into building new transmission routes and augmenting their existing transmission infrastructure. Simultaneously, the advancements in the transmission technologies, such as Dense Wavelength Division Multiplexing (DWDM), made it possible to carry several hundred times more bandwidth capacities on the same transmission media. As a result of (i) increase in demand of telecommunication services, (ii) increase in transmission infrastructure and (iii) increase in the bandwidth carrying capacity of transmission media, the per unit cost of providing DLCs declined substantially. However, the prevalent tariffs for DLCs offered in the present market suggest that the benefit of reduction in cost has been passed on only those routes which are extremely competitive. The following facts demonstrate the structure of tariffs for DLCs in the country:

(i) On the dense routes connecting metros and large cities where competition is vigorous, the prevailing tariffs for DLCs are substantially below the ceiling tariffs prescribed by the Authority.

(ii) On the routes connecting small cities, remote and hilly areas where competition is much less, the prevailing tariffs for DLCs continue to remain near the ceiling tariffs prescribed by the Authority.

3. Further, several new methods of provisioning DLCs e.g. Multi-Protocol Label Switching - Virtual Private Networks (MPLS-VPN) and Internet Protocol - Virtual Private Networks (IP-VPN) etc. have emerged in the market which were not covered in the TTO (36th Amendment), 2005.

4. In light of the above, it was deemed necessary to undertake an exercise to review the tariff for DLCs in the country.

5. As a prelude to the review exercise, the Authority, on 22.11.2013, asked the telecom service providers[1] (TSPs) to provide information on subscriber base, revenue and prevailing tariffs in respect of DLCs. On the basis of information received from the TSPs, a market analysis was conducted and it was felt that there is a need for review of tariffs for DLCs. Accordingly, the Authority, on 06.02.2014, asked the TSPs to provide information on transmission infrastructure used for providing DLCs including VPNs. Subsequently, the Authority issued a Consultation Paper (No. 1/2014 dated 24.03.2014) on 'Review of Tariff for Domestic Leased Circuits' to seek the views of stakeholders on various aspects of tariff for DLCs. The stakeholders were asked to submit written comments by 14.04.2014 and counter-comments by 21.04.2014. On the request of some stakeholders, the date for submission of written comments and counter-comments was extended till 25.04.2014 and 02.05.2014 respectively. Written comments were received from three industry associations, 17 TSPs, four consumer organizations and one individual. The comments and counter-comments

[1] As per the present licensing regime in the country, both NLDOs and ASPs can provide DLCs.

received from the stakeholders were placed on the TRAI's website – www.trai.gov.in. An Open House Discussion (OHD) with stakeholders was held on 15.05.2014 in Delhi. The following section examines the views of stakeholders on the issues raised in the Consultation Paper (CP) and presents an analysis thereof.

B- Analysis of the key issues raised in the Consultation Paper

6. In the CP on 'Review of Tariff for Domestic Leased Circuits', the Authority had, *inter-alia*, sought views of stakeholders on the following broad issues:

(i) Appropriateness of the cost basis and methodology used to estimate ceiling tariffs for DLCs in the TTO (36th Amendment), 2005 in the today's DLC market

(ii) Need for separate ceiling tariffs for trunk segment and local lead

(iii) Need for separate ceiling tariffs for DLCs in remote and hilly areas

(iv) Capacities and distances of DLCs for which ceiling tariffs need to be prescribed

(v) Relevance of separate ceiling tariffs for MLLN based DLCs and

(vi) Need for bringing VPNs such as MPLS-VPN under tariff regulation

7. Based on the comments and inputs received from stakeholders, an analysis of the broad issues related to the tariff framework for DLCs is being presented below.

(1) Need for tariff regulation for DLCs

8. Since the year 1999, when the DLCs were brought under tariff regulation for the first time, the tariffs for DLCs have always been prescribed as ceilings by the Authority. In the year 2005, when the Authority reviewed the tariffs for DLCs, the need for tariff regulation for DLCs was again examined. Upon observing signs of inadequate competition in the then DLC market, revised ceiling tariffs for DLCs were prescribed through the TTO (36th Amendment), 2005. The Authority, in the present exercise also, has carefully examined the need for tariff regulation for DLCs.

9. In the present consultation process, majority of TSPs and their industry associations have favoured leaving the tariff for DLCs under forbearance. They have argued that presence of 7 to 10 ASPs in each licensed service area (LSA) and 31 NLDOs in the country provides sufficient competition in the DLC segment. These stakeholders have opined that, in case, the Authority feels that there is a lack of adequate competition in the DLC segment in remote and hilly areas such as Assam, North East and Jammu & Kashmir, it should regulate the tariffs for DLCs for such areas only and should leave tariffs for DLCs in the remaining areas under forbearance.

10. On the other hand, many stakeholders including a few TSPs have favoured prescription of ceiling tariffs for DLCs. They have argued that despite the presence of 7 to 10 ASPs in each LSA and 31 NLDOs in the country, only a few ASPs and NLDOs offer DLCs to the customers; as a result, in a major part of the market, the customers find only a small number of providers of DLCs. They have contended that on the thin routes and remote and hilly areas, the customers face challenges in getting DLCs at competitive prices.

11. During the OHD held on 15.05.2014, a few stakeholders stated that lack of adequate competition in DLC segment is not restricted to Assam, North East and Jammu & Kashmir only; there are several geographical pockets within other states such as Himachal Pradesh, Uttarakhand, Jharkhand, Orissa etc. where level of competition in DLC segment is extremely low.

12. Upon the analysis of tariffs for DLCs reported to the Authority by the TSPs in compliance to the reporting requirement mandated in the TTO, 1999, it has been observed that while DLCs on the dense routes viz. Delhi – Mumbai, metros and large cities are being offered at a substantial discount with respect to the ceiling tariffs prescribed by the Authority, in many cases, the tariffs for DLCs in Circle - A and Circle - B are nearly at the level of ceiling tariffs prescribed by the Authority. It has been observed that although the number of NLDOs has increased from 4 to 31 after the liberalization of NLD license in 2006, not many of the new NLDOs have created transmission infrastructure in the country. About half of the 27 new entrants have

reported to the Authority that they do not own any transmission infrastructure in the country and most of these NLDOs have reported 'nil' or negligible revenue from NLD operations in the country. Hence the contention of some of the TSPs that the DLC market is sufficiently competitive, owing to the presence of a large number of ASPs and NLDOs, does not hold good.

13. Upon analysis of the information on revenues from DLC business for the financial year (F.Y.) 2012-13 furnished by the TSPs to the Authority, it has been observed that six TSPs together command about 90% of the DLC market (in terms of revenue) in the country. Understandably, these large players in the DLC market have deployed transmission infrastructure in the country as per their business strategies and, thus the coverage of transmission infrastructure in the country is highly asymmetric. As a result, competition in the DLC segment is almost non-existent on the thin routes connecting small cities, remote and hilly areas. It has been observed that the thin routes are not restricted to some specific geographical regions. Indeed, they may be predominant in some geographical regions but they exist in almost every service area. Thus if we attempt to visualize the map of the country in terms of level of competition in DLC segment, the map would have some patches and routes having heavy competition, some other patches and routes with moderate competition while a substantial part of the country would depict low and scant competition.

14. Regulatory forbearance in the matter of fixing tariff for access services has been an important factor in the remarkable growth of Indian telecommunication services over the last decade. As the market for DLCs is much less competitive than that for access services, the Authority, with a view to protect the interests of the consumers, has decided, for the time being, to continue with the regime of ceiling tariffs for DLCs.

(2) Methodology for estimation of ceiling tariffs for point-to-point DLC

15. Through the TTO (36th Amendment), 2005, the Authority had prescribed ceiling tariffs for point-to-point DLCs (P2P-DLCs) on the basis of a bottom-up methodology using fully allocated cost of setting up a new optical fiber cable (OFC) system. The method is equivalent to calculating full replacement cost of the system.

16. In the present consultation process, a few TSPs including a state owned company have favoured the use of bottom-up fully allocated cost (BU-FAC) method for computation of ceiling tariffs for P2P-DLC. As indicated before, most of the TSPs and their industry associations have opined that in case the Authority believes that competition is inadequate in certain areas in the country, BU-FAC method may be used to compute ceiling tariffs for DLC for such areas. On the other hand, one TSP has favoured the use of long run incremental cost (LRIC) method to compute ceiling tariffs for DLCs.

17. While regulating tariffs for telecommunication services in the country, the Authority has always aimed to balance the following twin objectives, viz.

(i) to protect interests of consumers (by ensuring adequate choice and affordable tariffs to them by promoting competition and efficiency in the market), and;

(ii) to create incentives for TSPs (by ensuring adequate returns on investment to them).

18. The BU-FAC method is appropriate for determining ceiling tariffs in those markets which are at early stages of maturity and where level of competition is inadequate. In view of the fact that (i) the TSPs in the country are still in the process of building transmission networks, (ii) different parts of the DLC market are at different stages of maturity and (iii) a substantial part of the market is witnessing lack of adequate competition, the Authority has decided to continue to use BU-FAC method for computation of ceiling tariffs for DLCs in the present exercise.

(3) Need for separate ceiling tariffs for trunk segment and local lead

19. In the present consultation process, majority of the TSPs and their industry associations have opposed introduction of separate ceiling tariffs for local lead and trunk segment of DLC for the following reasons:
    (i) Most of the TSPs have integrated networks and there is no demarcation between local lead and trunk segment.
    (ii) Provisioning of DLC is done end-to-end and, therefore, separate ceiling tariffs may put the customers in disadvantageous position during negotiation of rates.

20. On the other hand, some stakeholders including a few TSPs have favoured a regime in which separate ceiling tariffs for local lead and trunk segment are prescribed since the underlying cost of setting up local lead is generally higher than that for trunk segment.

21. Based on the comments of the stakeholders and further discussions with them, it has been observed that in the today's DLC market, customers, generally, seek an end-to-end solution from TSPs. Accordingly, the Authority has decided to prescribe ceiling tariffs for end-to-end DLCs.

(4) Need for separate ceiling tariffs for remote and hilly areas

22. Through the TTO (36th Amendment), 2005, the Authority had prescribed ceiling tariffs for P2P-DLCs regardless of the location of the end-points of the DLC. Thus no separate ceiling tariff for remote and hilly areas was prescribed.

23. In the present consultation process, many TSPs and their industry associations have opined that in case the Authority feels that there is a lack of adequate competition in the DLC segment in remote and hilly areas such as Assam, North East and Jammu & Kashmir, it should regulate the tariffs for DLCs for such areas only and should leave

tariffs for DLCs in the remaining areas under forbearance. They have also stated that there should be a clear classification of remote and hilly areas; further, the Authority should recommend some fiscal/ regulatory incentives to encourage more investments and easy entry in such areas.

24. On the other hand, many stakeholders including a few TSPs, one of their industry association and an individual have opposed prescription of separate ceiling tariffs for remote and hilly areas. One industry association has stated that the Authority should follow the 'death of distance concept' for DLCs in line with other segments such as carriage charge.

25. The Authority examined the issue carefully and observed that the lack of adequate competition is not limited only to some specific geographical regions such as Assam, North East and Jammu & Kashmir but is also prevalent in pockets of Himachal Pradesh, Uttarakhand, Jharkhand, Bihar, Madhya Pradesh etc. and in small cities of the country. Any attempt to classify such areas would essentially be a challenging task. Further, while 'higher' ceiling tariffs for DLCs for areas characterized by low level of competition are likely to discourage customers from subscribing DLCs in such areas, 'lower' ceiling tariffs are likely to disincentivize the TSPs who chose to invest there. Besides, dissimilar ceiling tariffs on the basis of geography would run counter to the principle followed by the Authority in prescription of uniform interconnection usage charges, ceiling tariff for national roaming service, tariffs for rural wire-line services etc. in the country.

26. Further, based on the information submitted by the NLDOs, who are present in North East and Assam, it has been observed that the present capital cost of setting up an OFC system in such areas is more or less same as that in the remaining parts of the country. In view of the above, the Authority has decided to continue with the practice of prescribing ceiling tariffs for DLCs regardless of the location of the end points of the DLC.

(5) Which capacities of P2P-DLCs should be under tariff regulation?

27. Through the TTO (36th Amendment), 2005, the Authority had prescribed ceiling tariffs for DLCs of 64 kbps, 128 kbps, 256 kbps, E1 (2 Mbps), DS3 (45 Mbps) and STM-1 (155 Mbps) capacities.

28. In the present consultation process, the stakeholders have expressed a wide range of views on the issue of 'which capacities of P2P-DLCs should be under tariff regulation'. Nevertheless, there is a near consensus on leaving the tariffs for P2P-DLCs of 'below 2 Mbps' capacity under forbearance. Because, in their opinion, 2 Mbps is, generally, the minimum capacity being offered in the present market for P2P-DLC.

29. Many TSPs have opined that in case the ceiling tariffs for DLCs need to be prescribed, capacities of E1, DS-3, STM-1, STM-4, STM-16, STM-64 and 10 Gbps may be considered. One TSP has stated that ceiling tariffs for 64 Kbps, 128 kbps, 1 Mbps, 4 Mbps, 8 Mbps, 10 Mbps, 16 Mbps, 34 Mbps, 100 Mbps, 1 Gbps should also be prescribed.

30. Based on the information on revenue from P2P-DLCs in the F.Y. 2012-13 submitted by the TSPs and their inputs during the consultation process, the following observations have emerged:

(i) The market for P2P-DLCs of 'below 2Mbps' capacities is very small (less than 2%) and is on a constant decline.

(ii) Most of the P2P-DLC market comprises DLCs of capacities in the range of E1 (2 Mbps) to STM-4 (622 Mbps).

(iii) The market for P2P-DLCs of capacities greater than STM-4 is competitive due to high deal size. Besides, demand for DLCs of such high capacities is mainly on the dense routes where competition is vigorous.

31. In view of (i) very small demand for P2P-DLCs of 'below 2Mbps' capacities and (ii) presence of high level of competition on the routes on which P2P-DLCs of capacities greater than STM-4 capacity are generally sought by the customers, the Authority has decided to prescribe ceiling tariffs for only E1, DS-3, STM-1 and STM-4 capacities. Though the tariffs for higher capacities (>STM-4) have been kept under forbearance, the Authority is of the view that the ceiling tariffs for DLCs of STM-4 capacity would act as a reference point for the tariffs for DLCs of higher capacities and the customers would be able to get better tariffs owing to competition in the market for higher capacities.

(6) Distances for which ceiling tariffs should be prescribed

32. Through the TTO (36th Amendment), 2005, the Authority had prescribed ready-reckoner ceiling tariffs for DLCs for distances from 5 Km[2] to 500 Km in the interval of 5 Km and for distance 'greater than 500 Km' (>500 Km). The ceiling tariffs for DLCs of intermediate distances were to be computed on pro-rata basis.

33. In the present consultation process, most TSPs have favoured the existing practice of prescription of ceiling tariffs for distances from 5 Km to 500 Km and for >500 Km. On the other hand, some stakeholders, including a few TSPs, have opined that ceiling tariffs for higher distances should also be specified. A few TSPs have stated that lower distance intervals such as 5 Km or 10 Km should be used for distances up-to 50 Km and higher distance intervals such as 50 Km should be used for distance above 50 Km.

34. Based on the comments of the stakeholders and further analysis, the Authority, in the present exercise, has decided to prescribe ceiling tariffs for DLCs from 5 Km[3] to 500 Km and for >500 Km. With a view to help simplify the DLC tariff cards of TSPs,

[2] For DLCs of DS-3 and STM-1 capacities, the minimum distance band was 'less than 50 Km' (<50 Km) in the TTO (36th Amendment), 2005.

[3] For the DLCs of DS-3, STM-1 and STM-4 capacities, the minimum distance band has been kept as 'less than 50 Km' (<50 Km) in the present exercise.

ready-reckoner ceiling tariffs for DLCs have been prescribed for the distances given in the following table:

Table-1: Distances for which ready-reckoner ceiling tariffs for DLCs have been prescribed through this Amendment Order

S. No.	Capacities of P2P-DLC	Distances
1	E1	5 Km, 10 Km to 100 Km (in a distance interval of 10 Km), 100 Km to 500 Km (in a distance interval of 50 Km), >500 Km
2	DS-3, STM-1 and STM-4	<50 Km, 50 Km to 100 Km (in a distance interval of 10 Km), 100 Km to 500 Km (in a distance interval of 50 Km), >500 Km

35. The ceiling tariffs for DLCs of distances, lying in between the distances for which ceiling tariffs for DLCs have been specified in the Annexure to the Schedule IV of this Amendment Order, shall continue to be computed on pro-rata basis.

(7) Relevance of separate ceiling tariffs for MLLN based DLCs

36. Through the Telecommunication Tariff (38th Amendment) Order, 2005, separate ceiling tariffs for DLCs of 64 kbps, 128 kbps and 256 kbps capacities provided on Managed Leased Line Network (MLLN) technology utilizing Versatile-MUX and Transit Stations were specified. Presently, a couple of TSPs use MLLN technology to offer DLCs with improved quality-of-service (QoS), availability and reliability. Generally, MLLN technology is used for providing DLCs of capacities 'below 2 Mbps'.

37. In the present consultation process, most stakeholders opined that there is no need for separate ceiling tariffs for MLLN based DLCs. One TSP stated that MLLN technology is used for delivery of 'below 2 Mbps' capacities; the market for P2P-DLCs of 'below 2 Mbps' capacities is very small and, therefore, there is no requirement for prescription of separate ceiling tariffs for MLLN based DLCs.

38. On the other hand, two TSPs, who provide MLLN based DLCs in the country, have opined that MLLN based DLCs are premium services because these facilitate last mile monitoring and thereby provision of service level agreements (SLAs) with the end-customers and, therefore, a higher ceiling tariff for MLLN based DLCs should be considered.

39. The Authority, in the present exercise, has already decided to forbear the tariffs for DLCs of 'below 2 Mbps' capacities. In view of the fact that MLLN based DLCs are, generally, offered for capacities 'below 2 Mbps', requirement for separate ceiling tariffs for MLLN based DLCs does not arise.

(8) Need for bringing VPNs such as MPLS-VPNs under tariff regulation

40. Through the TTO (36th Amendment), 2005, the Authority had prescribed ceiling tariffs for P2P-DLCs. In the intervening period since the year 2005, new methods of provisioning DLCs such as Virtual Private Network (VPN) have emerged. While a P2P-DLC is offered on the basis of capacity and distance, a VPN is offered solely on the basis of capacity. Thus, the tariff regime prescribed by the Authority through the TTO (36th Amendment), 2005 was not directly applicable on the VPNs. As a result, the tariffs for VPNs were not regulated.

41. Upon the issue of bringing VPNs under tariff regulation, most TSPs and their industry associations have opined that there is no need to regulate tariffs for DLCs which are provided in the form of VPNs. They have cited following reasons in support of their view:

(i) VPN is a managed and customized service in which TSPs take full responsibility for providing and managing total solution to the customer unlike a P2P-DLC which provides merely a committed capacity to the customer.

(ii) Determining cost based ceiling tariffs for VPNs would be extremely challenging in view of the fact that -

(a) VPNs have many variants e.g. L2-MPLS, L3-MPLS, P2P-VPLS, P2MP-VPLS[4] etc.

(b) The customers seek several network topologies to route their traffic e.g. hub and spoke, point-to-point, mesh etc.

(c) There are numerous commercial considerations for provisioning VPNs e.g. number of customer ports, redundancy required in the last mile, backbone network, overall volume of business etc.

42. Many TSPs have stated that VPN market is adequately competitive; there have been no signs of market failure and, therefore, there is no need of any regulatory intervention in this market at this stage. One TSP has contended that since VPN technology is constantly evolving, it should be left to the market forces to enable such innovation and advancement. On the other hand, some stakeholders including a few TSPs have argued in favour of bringing VPNs under tariff regulation.

43. In view of the comments of the stakeholders and analysis of tariffs for VPNs offered by the TSPs, the Authority has observed the following facts:

(i) VPN technology is, presently, in a stage of continuous improvement and innovation.

(ii) Unlike P2P-DLC market which is predominantly commanded by a limited number of large TSPs who possess their own transmission infrastructure (primarily built upon OFC), VPN market is fairly competitive owing to the presence of many other small-sized TSPs (apart from the large TSPs who possess their own transmission infrastructure). These small-sized TSPs lease-in transmission bandwidths from the owners of transmission infrastructure on major routes and provide customized VPN solutions to the end customers.

(iii) VPNs are preferred choice of knowledge based enterprises such as financial institutions where deal sizes are substantially high and competition is sufficient.

[4] L2-MPLS, L3-MPLS, P2P-VPLS, P2MP-VPLS are abbreviations of Layer 2 - Multi Protocol Label Switching, Layer 3 - Multi Protocol Label Switching, Point to Point - Virtual Private LAN Service and Point to Multi Point - Virtual Private LAN Service respectively.

44. In view of the above, the Authority has decided, for the time being, not to bring VPNs under tariff regulation. However, the Authority is of the opinion that a downward revision of ceiling tariffs for P2P-DLCs would result in a reduction of input costs for the TSPs who lease-in transmission bandwidths from other TSPs for providing VPNs and it is expected that such reduction in input costs would be passed on to the customers by way of lowering of tariffs for VPNs.

C- Methodology for determination of ceiling tariffs for DLCs

45. For computation of ceiling tariffs for DLCs, which were prescribed through TTO (36th Amendment), 2005, the Authority had used the following methodology:

(i) The underlying cost base was developed using an OFC system.

(ii) BU-FAC method was used to compute the ceiling tariffs for DLCs using present cost of setting up an OFC system. This method is equivalent to calculating full replacement cost of the OFC system.

(iii) The capital cost of the underlying OFC system was considered to be comprising three cost categories viz.

  (a) Fixed Cost (capital cost of terminal equipment)

  (b) Semi-variable Cost (capital cost of repeaters at a distance interval of 50 Km)

  (c) Variable Cost (capital cost of OFC per Km)

(iv) For computing the average capital cost of OFC per Km, the proportion of bituminous soil and non-bituminous soil was considered to be 15:85.

(v) The second lowest of capital costs provided by the TSPs in each cost category was used as normated cost.

(vi) The capital cost of OFC was amortized over 1.5 systems (i.e. amortization factor =1.5) as the average number of lit fiber pairs in OFC was considered to be 1.5.

(vii) The annual capital expenditure (Annual CAPEX) for the three cost categories was computed on the basis of (a) return on capital employed (ROCE)

@13.93% and (b) annual depreciation based on useful lives of terminal equipment, repeater and OFC separately.

(viii) Annual operating cost (Annual OPEX) for the three cost categories was considered to be equal to 10% of the capital costs of the respective cost categories.

(ix) For computation of ceiling tariffs for DLCs of E1, DS-3 and STM-1 capacity, the following benchmark capacity of underlying OFC system, percent capacity utilization and factor of use were considered:

Table-2: Benchmark capacity, percent capacity utilization and factor of use used in the tariff review exercise held in the year 2005

S. No.	Capacity of a DLC	Benchmark capacity of underlying OFC system	Percent capacity utilization of underlying OFC system	Factor of use = No. of circuits per underlying OFC system
1	**STM-1**	STM-4	40%	4
2	**DS-3**	STM-4	35%	12
3	**E1**	STM-1	50%	63

(x) License fee of 10% was considered.

46. Based on the comments and inputs of the stakeholders and further analysis thereof, the Authority, in the present exercise, has decided to use methodology similar to the one which was used for computation of ceiling tariffs for DLCs in the review exercise held in the year 2005 with minor changes wherever necessary. The following paragraphs describe the methodology used in the present exercise.

(1) Cost basis for computation of ceiling tariffs

47. As outlined before, the Authority, in the present exercise, has decided to continue to use BU-FAC method for computation of ceiling tariffs for DLCs of E1, DS-3 and STM-1 capacity and to use the cost of OFC system as the underlying base in view of the fact that OFC is still the most widely used transmission system and, therefore, its cost provides a rational justification for deriving the ceiling tariffs for DLCs.

48. Similar to the last tariff review exercise held in the year 2005, the Authority, in the present exercise, has considered the cost of the underlying OFC system to be made up of three cost categories viz. -

(i) Fixed Cost [i.e. present capital cost of terminal equipment (including accessories and associated powering and housing infrastructure) and annual operating cost thereof],

(ii) Semi-variable Cost [i.e. present capital cost of repeater (including accessories and associated powering and housing infrastructure) which would be incurred after a distance interval of 50 Km and annual operating cost thereof] and

(iii) Variable Cost [i.e. present capital cost of OFC, High Density Polyethylene (HDPE) pipe, trenching and cable laying, project management, accessories and other related costs per Km and annual operating cost thereof]

49. Fixed Costs are the costs which are independent of distance. Semi-variable Costs are the costs which change after a specified distance (50 Km, in the present case) but remain unchanged within the distance interval. Variable Costs are directly linked to the distance covered.

50. An end-to-end DLC, generally, has to pass through both the city/town area, which is predominantly bituminous soil area, and highways, which are predominantly soft soil areas. The cost of laying cables in the two types of areas differs on account of difference in (i) charges for right of way (ROW) and (ii) cost of trenching and cable laying. Therefore, a proportion of the two soil types has to be assigned when costing the end-to-end DLC. The Authority, in the present exercise, has computed the cost

of OFC per Km on the basis of proportion of bituminous soil and non-bituminous soil **as submitted by the TSPs.**

(2) Computation of average cost of transmission equipment and OFC

51. In the present exercise, the Authority obtained information on transmission infrastructure to provide DLCs from both NLDOs and ASPs in the country. These TSPs were asked to furnish information on both historical costs and present costs of setting up transmission infrastructure. In view of the fact that most of the TSPs are still in the process of laying OFC in the country, the present cost of OFC system has been used for computation of ceiling tariffs for DLCs.

52. It is understood that the ASPs have built their transmission networks primarily to transport voice, SMS and data traffic originated from their telephony subscribers and have used the spare capacities of their transmission networks to provide DLCs. In F.Y. 2012-13, Adjusted Gross Revenue (AGR) from DLC business for the ASPs accounted for only about 2% of total AGR for the ASPs in the country. On the other hand, AGR from DLC business for the NLDOs accounted for about 24% of total AGR for the NLDOs in the country. It is worth noting that the market share of NLDOs in the DLC segment is about 72%. Based on the above and further analysis, the costs of only NLDOs have been considered in the present exercise. Further, costs of only those NLDOs have been considered who possess their own transmission infrastructure in the country.

53. Upon analysis of the information on transmission infrastructure to provide DLCs furnished by the TSPs, the Authority observed significant variations in the costs of NLDOs. One possible reason for the variation in costs could be that the NLDOs are at various stages of maturity, market penetration and, most importantly, the geography they operate in. The Authority observed that choosing costs of any one NLDO as the basis for computation of ceiling tariffs for DLCs would not be justified. In the tariff review exercise held in the year 2005, the second lowest cost for each cost element was considered. However, in the present exercise, the Authority has considered the

average of the costs submitted by the NLDOs (after excluding the outliers) as it better reflects the cost structure of an average NLDO. For determination of outliers from data sets, a statistical tool called 'Box Plot' has been used. The following table presents the average present capital cost and annual operating cost per terminal equipment of various capacities.

Table-3: Average present capital cost and annual operating cost per terminal equipment

Terminal Equipment	Average cost per Terminal Equipment (in Rs.)	
	Present capital cost	**Annual operating cost**
STM-1	90,382	23,975
STM-4	240,766	45,016
STM-16	528,270	85,877

54. The information on annual operating costs of terminal equipment furnished by a few NLDOs was not amenable for analysis for a number of reasons like information not furnished in the manner sought by the Authority, inconsistencies in the furnished data etc. and, therefore, such information had to be excluded while deriving the average annual operating costs.

55. In digital transmission systems, repeaters are used to regenerate signals attenuated by transmission losses after a specific distance. As per the discussions held with the TSPs, repeaters in OFC systems are, generally, used at a distance interval of 50 Km. Generally, the cost of repeaters (including accessories and associated powering and housing infrastructure) in SDH systems is comparable with the cost of terminal equipment (including accessories and associated powering and housing infrastructure). In the present exercise, the benchmark capacity of the underlying OFC systems has been considered to be SDH system such as STM-1, STM-4 and STM-16 and, therefore, average present cost and average annual operating cost of

repeater have been considered to be the same as the average present cost and average annual operating cost respectively of terminal equipment.

56. The following table presents the average present capital cost and annual operating cost of OFC per Km based on the information furnished by the NLDOs.

Table-4: Average present capital cost and annual operating cost of OFC per Km

Item	Average cost per Km (in Rs.)
Present capital cost of OFC	739,530
Annual operating cost of OFC	10,999

(3) Computation of annual costs of transmission equipment and OFC

57. While most of the stakeholders have opined that a return on capital employed (ROCE) of 13% to 15% would be appropriate, a few stakeholders have stated that a higher ROCE (in the range of 15.93% to 25%) should be considered for reasons such as increased risk in the telecom business environment, increased cost of capital and debts etc. It is noteworthy that the Authority has made use of ROCE @ 15% in various costing and valuation exercises conducted in the recent past. After analyzing the comments of the stakeholders, the Authority has decided to consider ROCE @ 15% (in place of 13.93% used in the previous tariff review exercise held in the year 2005) for computation of annual costs of the various cost categories. Further, on the basis of the comments and inputs of the stakeholders, the Authority has decided to continue to consider the useful lives of transmission equipment and OFC as 8 years and 18 years respectively and thus rates of annual depreciation using straight line method (SLM) of 12.5% and 5.56% have been used for transmission equipment and OFC respectively. Accordingly, the Annual cost of terminal equipment and OFC has been computed as below:

(i) Annual cost of terminal equipment

= {(15% + 12.5%) * Average present cost per terminal equipment} + Average annual operating cost per terminal equipment

(ii) Annual cost of OFC per Km

= {(15% + 5.56%) * Average present cost of OFC per Km} + Average annual operating cost of OFC per Km

(4) Computation of Annual Fixed Cost per unit, Annual Semi-Variable Cost per unit and Annual Variable Cost per Km for computation of ceiling tariffs for DLCs of various capacities

58. Based on the comments of stakeholders and further analysis, the Authority has observed the following facts:

(i) The local leads are generally of upto 50 Km length beyond which the DLCs are transported through the trunk segment.

(ii) While underlying capacity in trunk segment is high, the underlying capacity in the local lead is relatively lower. Therefore, per unit cost of bandwidth capacity on local lead is relatively higher than per unit cost of bandwidth capacity on trunk segment.

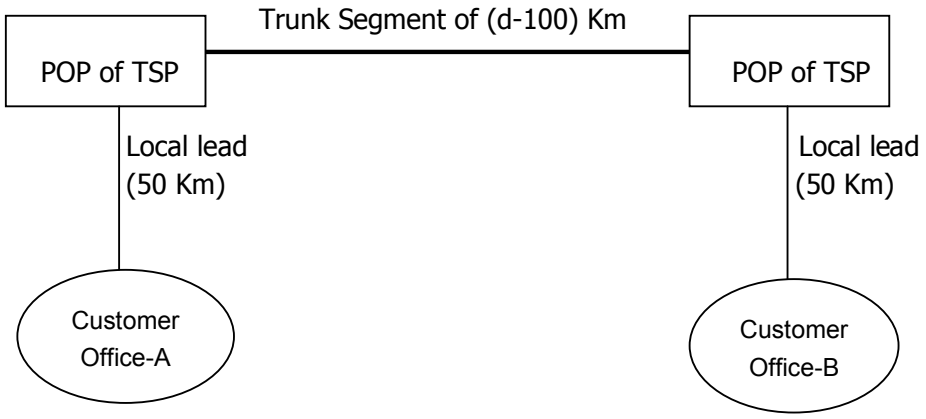
59. In view of the above, the Authority has decided to prescribe the ceiling tariffs for end-to-end DLCs by considering the DLC of 'd' Km distance (in case, 'd' is greater than 100 Km) to be comprising the following -

(i) Two local leads each of 50 Km (Thus a total distance of 100 Km has been considered in the local leads on the two sides.)

(ii) One trunk segment of (d-100) Km

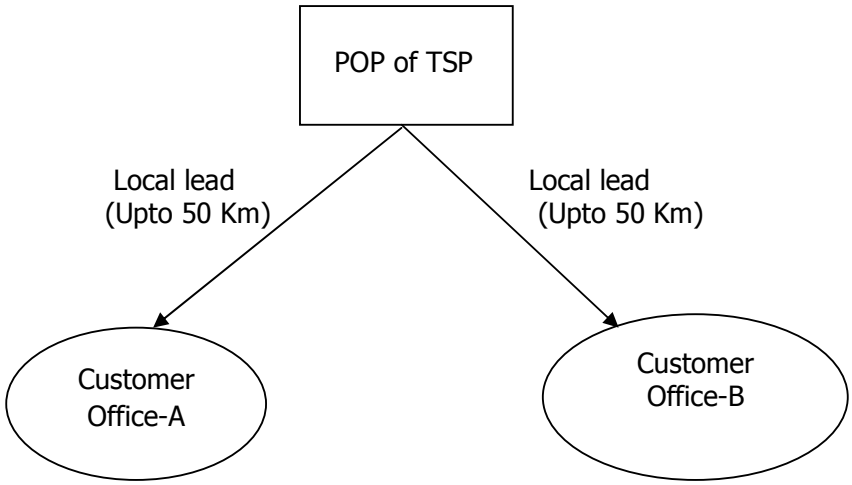
60. The following figure depicts transport of a P2P-DLC of 'd' Km distance (where 'd' is greater than 100 Km) through two points of presence (POP) of a TSP.

Figure-1: Transport of a P2P-DLC of 'd' Km, where 'd' > 100 Km



61. On the other hand, a DLC of distance less than or equal to 100 Km (≤ 100 Km) has been considered to be comprising two local leads connected from a POP as depicted in the following figure:

Figure-2: Transport of a P2P-DLC of 'd' Km, where 'd' ≤ 100 Km



62. Presently, most NLDOs have deployed OFC systems that contain 18 fibers or more. The NLDOs are, generally, able to light multiple pairs of fiber on any route. On the basis of the comments and inputs of the stakeholders and further analysis, the Authority has decided to consider average number of lit fiber pairs (i.e. amortization factor of Variable Cost) in the local lead and trunk segment as 4 and 3 respectively.

63. Based on the information on transmission infrastructure used to provide DLCs furnished by the NLDOs and further discussions with them, it has been observed that most NLDOs have built their core transmission networks using Dense Wavelength Division Multiplexing (DWDM) systems, in which capacity of a lit fiber is, generally, of the order of 100Gbps. On the other hand, in the aggregation network, metro networks and access networks, the fiber pairs have been lit with STM-64 (10 Gbps), STM-16 (2.5 Gbps) and STM-4 (622 Mbps) capacities depending upon the demand. However, based on the comments and inputs of the stakeholders in the present consultation process and further analysis, the Authority, has adopted a conservative approach while considering benchmark capacities of the underlying OFC system in order to compute the ceiling tariffs for DLCs of various capacities. The following table presents the benchmark capacity of underlying OFC systems considered, in the present exercise, for computation of the ceiling tariffs for DLCs.

Table-5: Benchmark capacity of underlying OFC system for computation of ceiling tariffs for DLCs of various capacities

Capacity of DLC	**Benchmark capacity of underlying OFC system**	
	For distance upto 100 Kms (50 Kms at each end)	**For distance >100 Kms**
E1 (2 Mbps)	STM-1	STM-4
DS-3 (45 Mbps)	STM-4	STM-16
STM-1 (155 Mbps)	STM-4	STM-16

64. For example, the underlying OFC system for computation of ceilings tariffs for DLCs of E1 capacity is a fiber pair lit with STM-1 capacity in local leads and STM-4 capacity in trunk segment.

65. For computation of ceiling tariffs for DLCs of various capacities viz. E1, DS-3 and STM-1, the allowance for capacity utilization and redundancy is necessary for full cost recovery. For this purpose, similar to the tariff review exercise held in the year 2005, the percent capacity utilizations of 50%, 35% and 40% of the underlying OFC

system have been considered for computation of ceiling tariffs for E1, DS-3 and STM-1 capacities respectively in the present exercise also.

66. Further, in the present exercise, the Authority has considered same factor of use (i.e. number of circuits in the underlying OFC system) as that considered in the tariff review exercise held in the year 2005. For example, the factor of use for computation of ceilings tariffs for DLCs of E1 capacity is 63 in local lead (where underlying OFC system is STM-1) and 63*4 = 252 in trunk segment (where underlying OFC system is STM-4).

67. The following table summarizes the amortization factor of Variable Cost, percent capacity utilization and factor of use of the underlying OFC system.

Table-6: Amortization factor of Variable Cost, percent capacity utilization and factor of use of underlying OFC system for computation of ceiling tariff for DLCs of various capacities

Capacity of DLC	For the first 100 Km of DLC				For the remaining distance of DLC i.e. (d-100) km			
	Amortization factor of Variable Cost = No. of lit fiber pairs in the OFC	Benchmark capacity of underlying OFC system	Percent capacity utilization of underlying OFC system	Factor of use = No. of circuits in underlying OFC system	Amortization factor of Variable Cost = No. of lit fiber pairs in the OFC	Benchmark capacity of underlying OFC system	Percent capacity utilization of underlying OFC system	Factor of use = No. of circuits in underlying OFC system
E-1	4	STM-1	50%	63	3	STM-4	50%	63*4 = 252
DS-3	4	STM-4	35%	12	3	STM-16	35%	12*4 = 48
STM-1	4	STM-4	40%	4	3	STM-16	40%	4*4 = 16

68. Annual Fixed Cost per unit and Annual Semi-variable Cost per unit in trunk segment and local lead have been computed on the basis of percent capacity utilization and factor of use of the underlying OFC system. Further, Annual Variable Cost per Km in trunk segment and local lead have been computed on the basis of the percent capacity utilization and factor of use of the underlying OFC system apart from the

amortization factor of Variable Cost. The computation of the above costs has been carried out in the following manner:

(i) Annual Fixed Cost per unit

$$= \frac{\text{Annual cost of terminal equipment}}{\text{(Percent capacity utilization * factor of use)}}$$

(ii) Annual Variable Cost per Km

$$= \frac{\text{Annual cost of OFC per Km}}{\text{(Amortization factor of Variable Cost*Percent capacity utilization*factor of use)}}$$

69. These costs, for determination of ceiling tariffs for DLCs of various capacities, have been computed as below:

Table-7: Annual Costs in various categories for determination of ceiling tariffs for DLCs

Capacity of DLC	Segment	Annual Fixed Cost per unit (in Rs.)	Annual Semi-variable Cost per unit (in Rs.)	Annual Variable Cost per Km (in Rs.)
E1	Local lead (First 100 Km)	1,550	1,550	1,294
	Trunk segment (Remaining distance)	883	883	431
DS-3	Local lead (First 100 Km)	26,483	26,483	9,703
	Trunk Segment (Remaining distance)	13,759	13,759	3,234
STM-1	Local lead (First 100 Km)	69,517	69,517	25,471
	Trunk segment (Remaining distance)	36,117	36,117	8,490

(5) Computation of distance based ceiling tariffs for DLCs of E1, DS-3 and STM-1 capacities

70. On the basis of Annual Fixed Costs per unit, Annual Semi-variable Costs per unit and Annual Variable Costs per Km for the two segments, distance based ceiling tariffs for

DLCs of E1, DS-3 and STM-1 capacities for various distances have been computed after making provision for expense on License Fee (LF). As per the present licensing regime, LF is 8% of Adjusted Gross Revenue (AGR). Accordingly, in the present exercise, provision for expense on LF @ 8% has been made while computing ceiling tariffs for DLCs as below:

(i) <u>If distance 'd' is less than or equal to 100 Km</u>,
Annual ceiling tariff for DLC of 'x' capacity and of 'd' Km distance (in Rs.)
$= [2*F_1 + F_1 + (d*V_1)] / (1 – 0.08)$

Where F_1 and V_1 are the Annual Fixed Cost per unit and Annual Variable Cost per Km respectively in local lead for DLC of 'x' capacity

(ii) <u>If distance 'd' is more than 100 Km and less than or equal to 500 Km</u>,
Annual ceiling tariff for DLC of 'x' capacity and of 'd' Km distance (in Rs.)
$= [2*F_1 + (100*V_1) + 2*F_2 + \text{Floor of } \{(d-100-1)/50\}*S_2 + (d-100)*V_2]/ (1 – 0.08)$

Where F_1 and V_1 are the Annual Fixed Cost per unit and Annual Variable Cost per Km respectively in local lead and F_2, S_2 and V_2 are the Annual Fixed Cost per unit, Annual Semi-variable Cost per unit and Annual Variable Cost per Km respectively in trunk segment for DLC of 'x' capacity

(6) Ceiling tariffs for DLCs of distances greater than 500 Km

71. The Authority observed that the OFC systems on the key routes covering very long distances are of very high capacities like DWDM with several lambdas (λ_s) and such routes are intensively used. As a result, unit costs on the key routes covering distances greater than 500 Km are very much lower than those derived in the present exercise. Given the large reduction in unit costs on the key routes, the cost based tariffs for distances greater than 500 Km with very high capacities on such routes would be much lower than the ceiling tariffs for 500 Km derived in the present exercise. Therefore, the Authority has decided to prescribe distance-based

ceiling tariffs up-to 500 Km and to apply the ceiling tariff prescribed for 500 Km to distances greater than 500 Km (>500 Km). This is consistent with the methodology adopted in the TTO, 1999 and TTO (36th Amendment), 2005 also. The ceiling tariffs for distance >500 Km have been obtained by way of rounding up the ceiling tariffs for 500 Km distance to the nearest thousand.

(7) Ceiling tariffs for DLCs of STM-4 capacity

72. Through the TTO (36th Amendment), 2005, the ceiling tariffs for DLCs of capacities up-to STM-1 were prescribed. As outlined before, it has been observed that there is ample demand for DLCs of up-to STM-4 capacity in the market and, therefore, the Authority, in the present exercise, has decided to prescribe ceiling tariffs for STM-4 capacity also.

73. It can be seen that there is a ratio of 1 : 4 in the bandwidth capacities of STM-1 and STM-4. With a view to determine the ceiling tariffs for STM-4 capacity on the basis of ceiling tariffs prescribed for STM-1 capacity, the authority took note of the following facts:

(i) There is a ratio of 1 : 3.44 in the bandwidth capacities of DS-3 and STM-1. However, the ratio of the ceiling tariffs for DS-3 and STM-1 capacities for >500 Km distance prescribed through the TTO (36th Amendment), 2005 was 1 : 2.68. The ratio of the ceiling tariffs for DS-3 and STM-1 capacities for >500 Km distance, in the present exercise, is 1 : 2.62. This is in line with the principle of 'economies of scale' i.e. per unit cost reduces with increase in production.

(ii) From the information on base tariffs for DLCs submitted by the TSPs to the Authority, it can be seen that most of the TSPs use a multiplicative factor (i.e. coefficient) of about 2.6 on the base tariffs for STM-1 capacity to derive base tariffs for STM-4 capacity. The following table presents the multiplicative

factors used by the major TSPs to derive base tariff for STM-4 capacity from the base tariffs for STM-1 capacity:

Table-8: Multiplicative factor used by the major TSPs to derive base tariff for STM-4 capacity from the base tariffs for STM-1 capacity

TSP	Multiplicative factor applied on the base tariff for STM-1 capacity to derive the base tariff for STM-4 capacity
TSP-1	2.5
TSP-2	2.5
TSP-3	2.5
TSP-4	2.6
TSP-5	2.6
TSP-6	2.6
TSP-7	2.6
TSP-8	3.1
TSP-9	3.1
TSP-10	3.1

(iii) In the 'International Telecommunication Cable Landing Station Access Facilitation Charges and Co-location Charges Regulations, 2012' issued by the Authority on 21.12.2012, a multiplicative factor of 2.6 was applied on the Access Facilitation Charge (AFC) for STM-1 capacity in order to determine AFC for STM-4 capacity. This multiplicative factor of 2.6 was used keeping in mind (i) the economies of scale for higher capacities and (ii) prevailing multiplicative factor used in the DLC market.

74. In view of the above facts and further analysis, the Authority has decided to apply a multiplicative factor of 2.6 on the ceiling tariffs prescribed for DLCs of STM-1 capacity to determine the ceiling tariffs for DLCs of STM-4 capacity. Thus –

Ceiling tariff for DLC of STM-4 capacity and 'd' distance = 2.6 * Ceiling tariff prescribed for DLC of STM-1 capacity and 'd' distance

(8) Ceiling tariffs for DLCs of distances less than 50 Km for DS-3, STM-1 and STM-4 capacity

75. As discussed before, the minimum distance band for ceiling tariffs for DLCs of DS-3, STM-1 and STM-4 capacities have been kept as 'less than 50 Km' (<50 Km). The ceiling tariffs for DLCs of DS-3, STM-1 and STM-4 capacities for <50 Km distance have been obtained by way of rounding down the ceiling tariffs for DLCs of respective capacities for 50 Km distance to the nearest thousand.

D- Mandatory provision of DLCs

76. Similar to the last tariff review held in the year 2005, the Authority has specified that DLCs must be provided wherever capacity is available, and when such capacity is not available it should be provided on Rent and Guarantee Basis/ Special Construction/ Contribution Basis. All service providers are required to report to the Authority the commercial and economic basis of their terms and conditions with respect to Rent and Guarantee/ Special Construction/ Contribution basis etc. schemes, under the provision of the Telecommunication Tariff Order, 1999 relating to reporting requirement. Service providers may offer discounts on the ceiling tariffs. Discounts, if offered, shall be transparent and non-discriminatory, based on a laid down criteria and subject to reporting requirement.

E- Ceiling tariffs for end-links

77. As outlined in the Explanatory Memorandum of the TTO (36th Amendment), 2005, end-link (or local lead) is a circuit between subscriber's premises and the nearest Short Distance Charging Center (SDCC). Similar to the last tariff review exercise held in the year 2005, the Authority has specified that the first option for charging for end-links shall be as per the ceiling tariffs for DLCs specified in item (3) of Schedule IV of this Order. In case, such leasing is technically not possible, then tariffs could be on Rent and Guarantee Basis/ Special Construction/ Contribution basis i.e. on the basis of mutual agreement between the parties concerned about the extent of

contribution to costs that will be made by the party leasing the circuits. The Authority is of the view that such provisions should be invariably based upon costs and the terms and conditions need to be fair, just, reasonable and transparent. The providers of DLCs shall submit to the Authority the commercial and economic basis of various terms and conditions of the above-mentioned schemes including but not limited to the cost of capital, life of assets used, depreciation norms adopted with respect to their agreement with the customers as part of the reporting requirement mandated under the TTO, 1999. Besides, the providers of DLCs shall also make these terms and conditions known to the customers in a transparent manner.

F- Tariffs for E1/R2 Links for ISPs

78. Tariff for E1/R2 ports for ISPs has been incorporated in item (5) of Schedule IV of this Order. The overall tariff for E1/R2 ports for ISPs shall contain the following components, namely, Port charges and tariff for DLC/ end-link. As stated in the Explanatory Memorandum to the TTO (36th Amendment), 2005, Port charges are relevant in case of E1/R2 links to ISPs also, as the same direct costs are involved in this situation.

79. The Authority has specified Port charges in the Telecommunication Interconnection (Port Charges) Regulation 2001 dated 28.12.2001 as amended from time to time. The last amendment in these regulations was carried out through the Telecommunication Interconnection (Port Charges) (Second Amendment) Regulations, 2012 dated 18.09.2012.

G- Review

80. The tariff regime, prescribed in this Amendment Order will be subject to review by the Authority after a period of three years. The Authority will closely monitor the implementation of the regime and, in particular, its impact on competition and consumer interests and may intervene, if necessary, in the interim period.