Consultation Paper No. 17/2016

Telecom Regulatory Authority of India

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Consultation Paper on
Review of Interconnection Usage Charges

New Delhi, the 5th August, 2016

Mahanagar Door Sanchar Bhawan, Jawahar Lal Nehru Marg, New Delhi – 110002

Stakeholders are requested to furnish their written comments by 5th September, 2016 and counter-comments by 19th September, 2016 to the Advisor (Broadband and Policy Analysis), TRAI. The comments may also be sent by e-mail to interconnection.trai@gmail.com. Comments would be posted on TRAI's website www.trai.gov.in. For any clarification/ information, Shri Arvind Kumar, Advisor (Broadband and Policy Analysis), TRAI may be contacted at Tel. No. +91-11-23220209 Fax: +91-11-23230056.

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Chapter - I
Introduction and Background

A- Interconnection and Interconnection Usage Charges

1.1 Interconnection means the commercial and technical arrangements under which telecom service providers (TSPs) connect their equipment, networks and services to enable their customers to have access to the customers, services and networks of other TSPs.

1.2 Interconnection is extremely important from a consumer perspective. Telecom users cannot communicate with each other or connect with services they demand unless necessary interconnection arrangements are in place. Commercial and technical arrangements must be made to facilitate interconnection between TSPs. A number of issues must be agreed upon by the TSPs or determined by the regulator in order to finalize these arrangements. The most important commercial issue for a successful interconnection arrangement is the Interconnection Usage Charge (IUC). A brief description of the various components of IUC is given below.

(1) Termination Charges

1.3 Termination charges are the charges payable by an access provider, whose subscriber originates the call, to the access provider in whose network the call terminates. In a calling-party-pays (CPP) regime, the calling party subscriber pays for the call to his access provider and the calling party's access provider usually pays termination charge to the called party's access provider to cover the interconnection/ network usage cost.

(2) International Termination Charges

1.4 International termination charges are the charges payable by an International Long Distance Operator (ILDO), which is carrying calls from outside the country, to the access provider in the country in whose network the call terminates.

(3) Transit Charges

1.5 When two telecom networks are not directly connected, an intermediate network is used through which calls are transmitted to the terminating network. Such an

intermediate network is known as a transit network and the charges to be paid to the transit network to cover the interconnection/ network usage cost are called transit charges.

(4) Carriage Charges

1.6 Access providers in India can offer access services within the Licensed Service Areas (LSAs), also known as circles; the inter-circle traffic is required to be routed through a National Long Distance Operator (NLDO). The charges to be paid by an access provider to the NLDO to cover the cost of carrying the inter-circle calls are called carriage charges.

(5) Origination Charges

1.7 The calling party's access provider collects call charges from the calling party (i.e. his subscriber) as per the applicable tariff. From the amount so collected from the subscriber, the access provider has to pay termination charges to the called party's access provider and carriage charges (in case of an inter-circle call) to the NLDO. The access provider retains the balance amount to cover the cost of originating the call. The amount so retained by the calling party's access provider is called an origination charge. In India, origination charges have not been specified and are under forbearance.

(6) International Settlement Rates

1.8 International settlement rates are the charges exchanged between foreign service providers and Indian ILDOs for exchanging international traffic. The international settlement rate includes international carriage charge, national carriage charge (if any) and the termination charge applicable in the respective country.

B- Framework for IUC in India

1.9 The framework for IUC was established by Telecom Regulatory Authority of India (hereinafter, referred to as, TRAI or the Authority) through 'The Telecommunication Interconnection Usage Charges (IUC) Regulation, 2003 (1 of 2003)' dated 24.01.2003. This Regulation also introduced the CPP regime in India. The origination charge, carriage charge and termination charge were specified through this Regulation. The charges were based on the type of network in which the call

originated or terminated and the distance travelled in a TSP's network. In case of the cellular network, the charges were also based on whether the destination network was in a metro or a non-metro city. While termination charges varied from ₹ 0.15 to ₹ 0.50 per minute depending on the distance, carriage charges varied from ₹ 0.20 to ₹ 1.10 per minute.

1.10 On the basis of the feedback received from various stakeholders about the IUC regime put in place through the Telecommunication Interconnection Usage Regulation, 2003, the Authority revised the IUC regime through 'The Telecommunication Interconnection Usage Charges Regulation, 2003 (4 of 2003)' dated the 29.10.2003 superseding the earlier Regulation. This Regulation came into effect from 01.02.2004. In this Regulation, a uniform termination charge of ₹ 0.30 per minute was prescribed irrespective of distance for all types of calls viz. fixed-line, wireless in local loop and full mobility. The carriage charges remained distance based.

1.11 The Authority conducted another review of IUC regime in 2005. Based on the consultation process and discussions with the stakeholders, the Authority notified the Telecommunication Interconnection Usage Charges (Sixth Amendment) Regulation (1 of 2006) dated 23.02.2006, through which the ceiling on carriage charges was amended while other IUC components were kept at the same level as before. The change in the carriage charge regime effected through this Amendment Regulation provided a strong basis to the TSPs to reduce long-distance tariffs and to offer uniform STD tariffs across the country.

1.12 Subsequently, another IUC review was conducted in the year 2008-09. Based on a detailed consultation process, the Authority notified the Telecommunication Interconnection Usage Charges (Tenth Amendment) Regulations, 2009 (2 of 2009) on 09.03.2009 which became effective from 01.04.2009. The following charges were prescribed through these Amendment Regulations:

(i) Termination charge of ₹ 0.20 per minute for local and national long-distance voice calls to fixed-line and mobile (revised downwards from the erstwhile charge of ₹ 0.30 per minute)

(ii) Termination charge of ₹ 0.40 per minute for international long-distance call (revised upwards from the erstwhile charge of ₹ 0.20 per minute)

(iii) A ceiling carriage charge of ₹ 0.65 per minute (unchanged)

(iv) Transit carriage charge of ₹ 0.15 per minute (revised downwards from the erstwhile charge of ₹ 0.20 per minute)

1.13 Some TSPs challenged the Telecommunication Interconnection Usage Charges (Tenth Amendment) Regulations, 2009 dated 09.03.2009 before the Telecom Disputes Settlement & Appellate Tribunal (TDSAT) on various grounds. TDSAT passed its judgment on 29.09.2010 and directed TRAI to consider determining the IUC afresh, on the basis of its observations and directions.

1.14 TRAI filed an appeal in the Hon'ble Supreme Court challenging the order of TDSAT dated 29.09.2010 on various technical and legal grounds including, *inter-alia*, the principal legal issue whether the validity of the TRAI's Regulation framed in exercise of powers conferred under section 36 of the TRAI Act, can be challenged before the TDSAT under section 14 of the TRAI Act, 1997. TRAI also prayed the Hon'ble Supreme Court to allow the appeal and set aside the final judgment and order dated 29.09.2010 passed by TDSAT.

1.15 On 29.07.2011, the Hon'ble Supreme Court passed the following order:

"… Before taking up the matter for final hearing, this Court would like the Regulator to compute the IUC with the inclusion of capital cost and without inclusion of the capital cost. In this case, the TRAI, which is the original Authority, has taken the view as a matter of law/regulation that capital cost should not be taken into account in the matter of fixation of IUC, whereas the Telecom Disputes Settlement and Appellate Tribunal [`TDSAT', for short] has taken a contrary view saying that the capital cost should be taken into account in the matter of fixation of IUC. Therefore, we want the Regulator to give us the computation of the IUC to be worked out on both the basis, namely, what would be the IUC if capital cost is taken into account and what would be the IUC if the capital cost is not taken into account?...

…The Regulator will give its working by 31st October, 2011. …"

1.16 Accordingly, TRAI filed its report in the Hon'ble Supreme Court on 29.10.2011. In the report, The Authority made the following observations:

"To conclude, there would thus be a 3 year time horizon for IUC in the country culminating in BAK in the third year. The majority of service providers also expressed their preference during the consultation process for a 3 year time horizon for IUC.

Establishment of a clear 3-year outlook for IUC would provide regulatory predictability and enable service providers to plan their networks and businesses accordingly."

1.17 On preliminary issue relating to jurisdiction of the TDSAT, Hon'ble Supreme Court vide its judgment dated 06.12.2013 ruled that TDSAT does not have the jurisdiction to entertain the challenge to the regulations framed by the Authority under section 36 of the Act. Relevant paragraph of the judgment are as given below.

"3. When the cases were listed before this Bench, learned counsel for the parties agreed that a preliminary issue relating to jurisdiction of the Telecom Disputes Settlement Appellate Tribunal (TDSAT) to entertain challenge to the regulations framed by the Authority may be decided …… Thereupon, the Court decided to hear the arguments on the following question:

"Whether in exercise of the power vested in it under Section 14(b) of the Act, TDSAT has the jurisdiction to entertain challenge to the regulations framed by the Authority under Section 36 of the Act."

……

……

64. In the result, the question framed by the Court is answered in the following terms:

In exercise of the power vested in it under Section 14(b) of the Act, TDSAT does not have the jurisdiction to entertain the challenge to the regulations framed by the Authority under section 36 of the Act.

……

As a corollary, we hold that the contrary view taken by TDSAT and the Delhi High Court does not represent correct law. …"

1.18 After following a due consultation process, the Authority issued the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2015, through which, the termination charges w.e.f. 01.03.2015 were prescribed as below:

Table 1.1: Termination Charges prescribed through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015

Type of call	Type of traffic	Termination charge
Local and national long distance call	Wireless to wireless	₹ 0.14 per minute
	Wireless to wireline	0 (Zero)
	Wireline to wireline	0 (Zero)
	Wireline to wireless	0 (Zero)
International call	International incoming call to wireless and wireline	₹ 0.53 per minute

* Wireless means full mobility, limited mobility and fixed wireless access services.

1.19 Subsequently, through the Telecommunication Interconnection Usage Charges (Twelfth Amendment) Regulations, 2015 dated 24.02.2015, which became effective from 01.03.2015, the Authority prescribed a ceiling for domestic carriage charge as ₹ 0.35 per minute.

C- Need for Review

1.20 In the beginning of the year 2016, M/s BSNL submitted a proposal to the Authority to launch fixed-mobile-telephony (FMT) service in the country. The gist of the proposal was that any landline telephony subscriber of M/s BSNL could avail FMT service for making voice calls from anywhere in the world. For this, the subscriber had to register as a SIP subscriber after installing an application (App) on his/her user device (e.g. mobile handset, tablet etc.). In order to make or receive a FMT voice call, the subscriber would, essentially, require internet access, which could be through xDSL, WiMAX, Wi-Fi, 3G/4G etc. The FMT voice call originated by the subscriber would travel over the public Internet and reach NGN switch of M/s BSNL. The NGN switch would then route the call to M/s BSNL's point-of-interconnection (POI) with other TSPs for further terminating the call in the destination network. A few TSPs raised concern against the proposed FMT service of M/s BSNL, stating, *inter-alia*, that such FMT voice calls would exploit the existing arbitrage between international termination charge (₹ 0.53 per minute) and 'zero' domestic termination charge for the calls originated from wireline networks; it would lead to huge losses to not only the terminating TSPs, but also loss of revenue share to the exchequer. Subsequently, M/s BSNL put the proposed FMT service on hold. However, the matter

requires a close look to redress the concern as to how voice calls travelling on public internet should be treated from the perspective of termination charges.

1.21 At this juncture, it is worth mentioning that the Authority has already issued a Consultation Paper (no. 13/2016) on Internet Telephony (VoIP) dated 22.06.2016, through which, *inter-alia*, the following question has been raised for comments of the stakeholders: "What should be the termination charge when call is terminating into Internet telephony network?"

1.22 Further, in the recent past, several TSPs in the country have built access networks using 4G mobile technology. A few of these TSPs may carry voice on such networks using Voice-over-LTE (VoLTE) technology in near future. 4G networks have Packet-Switched (PS) Radio Access Networks (RANs) unlike the yester-years' networks (viz. 2G and 3G) which have circuit switched (CS) RANs. It is worthwhile to mention that through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2015, the mobile termination cost was estimated on the basis of underlying network having CS RAN and not PS RAN. Introduction of PS RAN in the new networks raises a concern as to whether the MTC estimated for networks having CS RAN would still be applicable on networks with PS RAN.

1.23 Further, the Authority has received representations from several International Long Distance operators (ILDOs) requesting intervention of the Authority to set a floor for International carriage charge/ International settlement rate so that the stand-alone ILDOs can survive in the market dominated by the integrated service providers (having both international long distance and access service licenses).

1.24 While revising the regime for termination charges in the country through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015, the Authority had indicated that the termination charges would be reviewed after two years of being in force. Generally, a comprehensive regulatory review exercise in TRAI takes six to nine months' time to complete and, hence, the present review exercise is being undertaken.

D- The Present Consultation Paper

1.25 In this background, the present Consultation Paper (CP) embarks on the review of the regime for IUC with a focus on domestic termination charges, international settlement rates and international termination charges in the country. Chapter - II of the CP deals with the regulatory aspects of domestic termination charges. Chapter - III deals specifically with international settlement rates and international termination charges. Finally, Chapter - IV lists the issues for consultation.

Chapter - II
Domestic Termination Charges

A- Regimes for retail charging of telecommunication services

2.1 For retail charging of telecommunication services, there are predominately two regimes as outlined below:

(i) **Calling Party Pays (CPP) Regime**: Under CPP, the calling party pays to his/her service provider for the call, while the called party does not have to pay for the call.

(ii) **Receiving Party Pays (RPP) Regime**: Under RPP, the called party also pays for the call.

2.2 In 1994, when mobile telephony was introduced in India, the mobile subscribers were to pay for receiving a call on their mobile connections; in effect, RPP was the regime for retail charging of calls terminating on mobile connections. This continued for about a decade. However, the growth of mobile telephony (in terms of subscriber base, usage and revenue) in the country, during this period, remained below expectations. The consumers faced high tariffs for receiving incoming calls; many of them kept their mobile phones switched off as they had only limited cost control under RPP. At the end of the year 2002, there were only about 1.08 crore mobile consumers in the country and mobile tele-density was merely 1.01.

2.3 With a view to encourage usage of the cellular mobile services and an increase in the subscriber base, the Authority, *inter-alia*, notified the CPP regime in the country in the year 2003 through the Telecommunication Interconnection Usage Charges (IUC) Regulation, 2003 dated 24.01.2003. After the introduction of CPP regime in the country, the growth story of the telecommunication services sector in the country has been phenomenal. From a mobile tele-density of 1.01 in December, 2002, the mobile tele-density leapfrogged to 81.18 in May, 2016. The average mobile tariffs for outgoing voice calls declined from ₹ 3.24 per minute in March, 2003 to ₹ 0.47 per minute in December, 2015. Today, the telecom services are ubiquitous and are enjoyed not only in the bustlling streets of a metropolis but also in the hinterland villages of the country. The Adjusted Gross Revenue (AGR) of access services segment in the country has been growing at an impressive rate; the AGR of the

access services segment has grown by more than 11.5% on year-on-year (Y-o-Y) basis in the past three years[1]. Undisputedly, CPP regime has played a key role in the growth of the telecommunication services sector in the country.

2.4 With retail charging regime as CPP, either of the following two regimes is used for wholesale charging between TSPs:

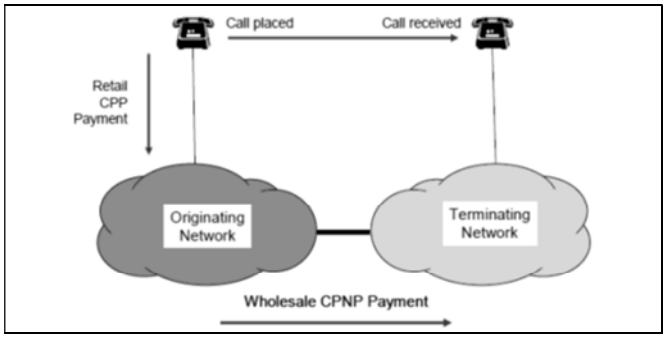
(i) Calling-Party-Network-Pays (CPNP) regime

(ii) Bill-and-Keep (BAK) regime

(1) CPNP regime

2.5 Under the CPNP regime, the originating TSP pays termination charge for terminating calls in the networks of other TSPs as indicated in the following figure.

Figure 2.1: CPP and CPNP charging regimes



2.6 Internationally, the CPNP regime is, generally, implemented by setting cost-oriented or cost-based termination charges i.e. the termination charges are set to recover costs in roughly the manner in which the TSPs incur them. Cost-oriented or cost-based termination charges have a strong economic rationale; however, there is no single, simple way to estimate the termination cost. Such estimation is a complex exercise. The moot question in a cost-based exercise is what are the relevant costs

[1] As per the information furnished by the TSPs to the Authority, the AGR of access segment has grown by more than 11.5% on annual basis in each of the past three financial years.

Financial Year (F.Y.)	AGR of access service segment (in ₹ Crore)	% Annual growth rate
F.Y. 2012-13	1,11,256	
F.Y. 2013-14	1,24,175	11.61%
F.Y. 2014-15	1,38,566	11.59%
F.Y. 2015-16	1,54,640	11.60%

to be taken into account for determining the termination charge. A related issue is whether current costs or historical costs have to be considered. Lastly, there are a number of methodologies like Fully Allocated Cost (FAC), Long Run Incremental Cost (LRIC) and Pure LRIC, which are used in various jurisdictions across the globe. Therefore, the regulator has to choose the methodology to be used for determining IUC.

(2) BAK Method

2.7 In this method, a TSP does not have to pay any termination charge to its interconnecting TSP. Each TSP bills its own subscribers for outgoing traffic that it sends to other interconnecting TSPs and keeps all the revenue received from its subscribers.

B- Suitability of CPNP or BAK in the present telecommunication services sector

2.8 In summary, CPP regime can be implemented in either of the following two ways viz.-

(i) The calling party's TSP has to pay cost-oriented or cost-based termination charges to called party's TSP.

(ii) TSPs do not have to pay termination charges when they send calls to other TSPs.

2.9 Supporters of BAK regime argue that BAK provides a solution to address the issue of market power of call-terminating networks. They also argue that the theory and practice of identifying an optimal termination charge is complex. The result is that any determination of a termination charge, even if done with great care and at a cost, could be disputed by a set of TSPs who perceive it to be loaded against them. Various factors like determination of costs, the method of allocation, determining costs sensitive to traffic volumes and the extent to which different products/ services should contribute to common costs, etc. can, at times, be debated. They further argue that a termination charge becomes an effective floor for retail tariffs. BAK helps to remove this barrier to retail pricing for off-net calls (i.e. inter-TSP calls) and has been proven to result in significantly higher levels of calling activity as TSPs are given the flexibility to offer innovative customized tariff plans to their subscribers.

2.10 With the evolution of technology and convergence, more and more telecom networks are migrating towards IP-based networks. Regulators, the world over, are working towards facilitating migration towards Next Generation Networks (NGN) which are IP-based networks so that innovative services could be provided to consumers. In IP–based networks, traditionally, there has been no custom of levying termination charges for the traffic arriving in a particular network; BAK is the natural regime in the public Internet. One argument is that the regime of termination charges works as a disincentive to the deployment of IP-based telecom networks by the TSPs. Moving towards BAK will encourage deployment of IP-based telecom networks. Since IP based networks are poised to be the networks of the future for providing telecom services, a BAK regime may be seen as a natural progression in line with the development of technology.

2.11 At the same time, it is argued by the detractors of BAK method that BAK may result in 'a race to the bottom' in which case the TSPs may be incentivized to set prices well below costs to enter new market segments and capture larger market share. This may result in inadequate investment in network infrastructure and consequent inefficiencies in capturing positive externalities. This is particularly important for India which suffers from poor rural coverage, both in fixed line and mobile. As on 31.05.2016, the rural wireless tele-density was 51.27 while rural wireline tele-density was only 0.47.

2.12 Beginning from the year 2003 when CPP regime was introduced in the country, the Authority has, generally, followed the principle of cost-oriented or cost-based domestic termination charges in the country. However, in the year 2015, the Authority, in effect, used the following methods for prescribing domestic termination charges through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2015.

Table 2.1: Methods used by the Authority for determining domestic termination charges for various types of calls in 2015

S. No.	Type of call	Method of determining domestic termination charge
1	Wireless to wireless	Cost-based termination charge (using LRIC+ method)
2	Wireless to wireline	BAK
3	Wireline to wireline	BAK
4	Wireline to wireless	BAK

2.13 In this exercise, the Authority followed the BAK method for prescribing fixed termination charges (i.e. wireless to wireline and wireline to wireline) as well as mobile termination charges from wireline (i.e. wireline to wireless) with an aim to promote investment in, and adoption of, wireline networks so that wireline networks may become effective vehicles for the delivery of high-speed Internet in the country. At this juncture, it would be worthwhile to examine as to whether the afore-mentioned step taken by the Authority for uplifting the wireline networks has achieved the desired success in the past one year.

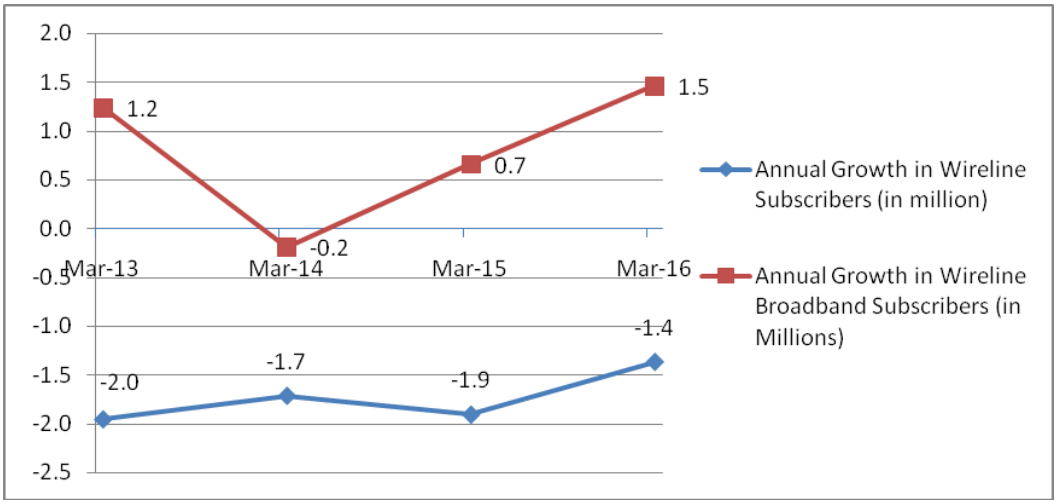
2.14 The Table 2.2 below depicts the subscriber base of wireline telephony and wireline broadband services and their annual growths. The Chart 2.1 depicts the annual growth of wireline telephony and wireline broadband services in a graphical manner.

Table 2.2: Subscriber base of wireline telephony and wireline broadband services* and their annual growths

As on the last day of	No. of Wireline Subscribers (in Million)	No. of Wireline Broadband Subscribers (in Million)	Annual Growth in Wireline Subscriber base (in million)	Annual Growth in Wireline Broadband Subscriber base (in Millions)
March, 2012	32.2	13.8	-	-
March, 2013	30.2	15.1	-2.0	1.2
March, 2014	28.5	14.9	-1.7	-0.2
March, 2015	26.6	15.5	-1.9	0.7
March,2016	25.2	17.0	-1.4	1.5

*Source: TRAI's monthly Press Release on Telecom Subscription Data

Chart 2.1: Annual growth of wireline telephony and wireline broadband services in the past four years



2.15 The above Chart demonstrates that the performances of both wireline telephony and wireline broadband services in terms of subscriber bases have improved significantly in the F.Y. 2015-16 with respect the previous three financial years. Clearly, the Authority's initiative to boost the wireline telephony and wireline broadband segments by way of prescribing BAK regime for fixed termination charges (i.e. wireless to wireline and wireline to wireline) as well as mobile termination charges from wireline (i.e. wireline to wireless) has been a success so far.

2.16 Before we proceed to examine the suitability of cost-based or cost-oriented termination charges vis-à-vis BAK regime, in general, it would be worthwhile to examine the latest technological trends in the radio access networks.

2.17 Traditionally, voice calls have been carried over public switched telephone networks (PSTNs) using circuit switched (CS) networks. In CS networks, the communication takes place over a dedicated circuit. However, in recent times, some TSPs have built packet-switched (PS) networks to carry voice. The PS networks differ from CS networks in that they group all transmitted data into suitably sized blocks, called packets, which are routed independently of their respective destinations. This means that in a PS-based voice call, there is no single dedicated network path reserved for the call; instead, various paths can be used in parallel while other services such as video and data may be carried over the same paths. A PS voice call is typically

carried over Internet Protocol (IP) and is typically referred to as a Voice over IP (VoIP) call.

2.18 2G and 3G mobile technologies carry voice over a CS network. However, 4G[2] is a PS-only network which does not intrinsically support CS calls. Currently, TSPs are using circuit switched fall back (CSFB) scheme where handsets are instructed to switch from 4G to 3G (or 2G) when making or receiving voice calls. It is expected that some mobile TSPs may carry voice using the technology of Voice-over-LTE (VoLTE) in near future. Similarly, a few wireline TSPs may also carry voice over their managed IP networks/ NGN access networks in near future.

2.19 Further, under the current licensing framework in the country, the access service providers can also provide 'Internet Telephony'. When voice is transmitted over public internet, it is termed as Internet Telephony. When a TSP uses Internet Telephony for terminating a call, the call has, not necessarily, to travel through its own 2G, 3G or 4G radio access networks (RANs). Whenever a TSP does use its RAN for delivering an Internet Telephony call to its subscriber, the receiving party separately pays for the data transfer done in receiving the call.

2.20 Thus, a TSP can, potentially, deliver a voice call reaching at its point of interconnection to its subscriber as any of the following call type, depending on the underlying network:

(i) CS call
(ii) VoLTE call (or call over managed IP)
(iii) Internet telephony call

2.21 Intuitively, the cost of delivery of a VoLTE call by a terminating service provider to its subscriber would be significantly different from the cost of delivery of a CS call. The difference in cost of delivery would be accentuated in case of an Internet Telephony call, which does not necessarily have to travel through the RAN of terminating service provider. Essentially, with the new arrivals viz. VoLTE and Internet Telephony, any attempt to set uniform domestic termination charges on cost basis would be a challenging task.

[2] 4G or the Fourth Generation Mobile Networks have been built using LTE and WiMAX technologies in India.

2.22 From the above discussion, it may concluded that the general direction of telecommunication services sector is towards PS networks and Internet Telephony where voice calls would be transported as data. In such a scenario, the call receiving party may have to pay data charges while receiving a call. At this juncture, one may be tempted to ask – Does CPP regime (which requires that the call receiving party pays nothing for the call) still hold good? Apparently, the case for cost oriented termination charge would also fall apart in case CPP is no longer the underlying regime for retail charging.

2.23 The critics of BAK regime may argue that there is no need to depart from the time-tested principle of cost-based domestic termination charge in the short-run when the underlying network is predominantly CS network at present and only a small part of it is likely to be replaced with PS network and Internet Telephony in near future. On the other hand, one may contend that in case the present regime of cost-based domestic termination charge is continued, it would hamper the movement of the sector towards (i) deployment of more efficient technologies; and (ii) more innovative and customer friendly tariff offerings; and, in turn, it would be detrimental to the growth of telecommunication services sector. It may be argued that, in case, a TSP continues to get a cost-oriented termination charge estimated on the basis of yester-years' network technology (such as 2G or 3G), where is the incentive for him to migrate towards a more efficient network technology (such as 4G) requiring capital investments in short-run.

2.24 At this juncture, it would be worthwhile to examine the impact of lowering of domestic termination charge through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2015 which became effective from 01.03.2015 on the retail tariffs for voice calls in the country. The following Table depicts the trend of average outgo per outgoing minute (a proxy for retail tariff for voice call) for GSM service segment[3] in the country.

[3] At present, the GSM service segment comprises of about 96% of the subscriber base of the overall wireless services in India.

Table 2.3: Trend of retail tariff for outgoing voice calls for GSM Service Segment in India

S. No.	Quarter Ending	Retail tariff for voice call per minute*
1	June, 2013	₹ 0.50
2	September, 2013	₹ 0.51
3	December, 2013	₹ 0.51
4	March, 2014	₹ 0.50
5	June, 2014	₹ 0.51
6	September, 2014	₹ 0.50
7	December, 2014	₹ 0.51
8	March 2015	₹ 0.50
9	June 2015	₹ 0.49
10	September, 2015	₹ 0.48
11	December, 2015	₹ 0.47

*Source: TRAI's Quarterly Reports on Indian Telecom Service Performance Indicators

2.25 As can be seen from the above table, the retail tariff for voice calls for GSM service, which was hovering in the range of ₹ 0.50 per minute to ₹ 0.51 per minute in the F.Y. 2013-14 and F.Y. 2014-15, started declining by ₹ 0.01 per minute in each successive quarter after the lowering of domestic termination charge through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 w.e.f. 01.03.2015. It is worthwhile to mention that the AGR of access service segment has demonstrated an annual growth rate of 11.6% during the F.Y. 2015-16. One may conclude on the basis of the above facts that the lowering of domestic termination charge in the year 2015 did not result in the water-bed effect[4] in the telecommunication services sector. Instead, it resulted in lower retail tariffs without, in any way, jeopardizing the overall revenue of the TSPs. Thus the lowering of domestic termination charges through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 was essentially a win-win proposition for both, the TSPs as well as the consumers.

2.26 One may contend that the twin factors viz. (i) lowering of domestic termination charge resulted in overall good for the telecommunication services sector in the past

[4] The 'Waterbed effect' theory says that pressing down prices in part of firms's operation causes another set of prices to rise. Some theorists argue that if domestic termination charges are reduced and thereby the wholesale revenues, the TSPs would be forced to raise their retail tariffs to compensate for the reduction in the wholesale revenues.

one year; and (ii) the need to give a nudge to the sector for deploying more efficient network technologies, together suggest a need for adoption of BAK regime.

Issue for consultation:

Q1: In view of the recent technological developments in the telecommunication services sector, which of the following approaches is appropriate for prescribing domestic termination charge (viz. mobile termination charge and fixed termination charge) for maximization of consumer welfare (i.e. adequate choice, affordable tariff and good quality of service), adoption of more efficient technologies and overall growth of the telecommunication services sector in the country?

(i) Cost oriented or cost based termination charges; or

(ii) Bill and Keep (BAK)?

Please provide justification in support of your response.

C- Appropriate costing methodology for estimation of cost-based or cost-oriented domestic termination charges

2.27 The two most commonly used methods for estimation of domestic termination charges are Fully Allocated Cost (FAC) Method and (ii) Long Run Incremental Cost (LRIC) Method. LRIC also has variants such as LRIC+ Method and pure LRIC Methods. These methods are being briefly described below.

(1) FAC method

2.28 The core idea in the FAC method is to simply divide the total cost that the service provider incurs amongst the services it provides to arrive at termination charges. FAC is, generally, based on historic costs because accounting data reflect the firm's actual costs. In this method, shared and common costs are assigned to individual services or service elements. This method has the advantage of simplicity and also ensures that cost corresponding to each network element on the basis of work done has been taken into account. This method is generally used with top-down costing methodology. It uses accounting data submitted by service providers in their balance sheet, profit & loss account and accounting separation report.

2.29 In most countries of the world, the termination charge was traditionally determined with the help of FAC methods using historical costs. Most regulators seek Accounting Separation Reports (ASRs) from the TSPs in their respective countries. These reports contain, *inter-alia*, segregated costs for various services. Based on the ASRs, many regulators computed termination charges per minute as 'the relevant annual cost for providing voice telephony' divided by 'annual voice minutes'. However, as telecom markets started growing, the traffic increased manifold while the relevant costs, particularly the network-related costs, started declining owing to the march of technology and economies of scale. Though market costs of telecom networks declined significantly, incumbent TSPs continued to carry historical costs, albeit depreciated, on their balance sheets. Since the incumbent TSPs had an incentive for gold-plating their costs, the information on costs furnished by them in the ASRs started becoming more and more removed from the actual level of current costs. Further, ironically, the incumbent TSPs were being rewarded for their inefficiencies, if any, in running their networks; because full historical costs were being recovered through the termination charges.

2.30 Intuitively, the termination charge per minute would be best captured when the network is valued with the help of replacement costs as on date i.e. on the basis of current costs, and not historical costs. This is especially so because these costs are to be borne by competing TSPs. In view of the inherent limitations of the FAC model and the growing consensus on the view that the inefficiencies of incumbent TSPs should not be passed on to interconnecting TSPs, most regulators in the world have slowly but steadily moved away from the use of the FAC methods for determining termination charge. In view of the above, the Authority did not consider FAC method for estimation of termination charge in the last IUC review held in the year 2014-15.

(2) LRIC method

2.31 An access provider offers a wide range of services. While some services (viz. telephony, SMS, data transfer and other value added services) are offered in retail markets, some other services such as off-net incoming minutes are offered at a wholesale level. While the level of competition in the market for retail services is high, the same for wholesale services is much less, to the extent that the access service providers have a monopoly on carrying off-net incoming minutes in their network. In such a scenario, it is important that an incumbent access service

provider does not charge a high price for wholesale services and uses the proceeds to subsidize low prices for its retail services. In many jurisdictions around the world, the regulators use long run incremental cost (LRIC) method to determine an appropriate level of termination charge for the off-net incoming calls.

2.32 In any LRIC model, termination cost is estimated on the basis of the following basic assumptions:

(i) The model is run for an equivalent TSP[5] i.e. a TSP who has a fair share in the relevant market.

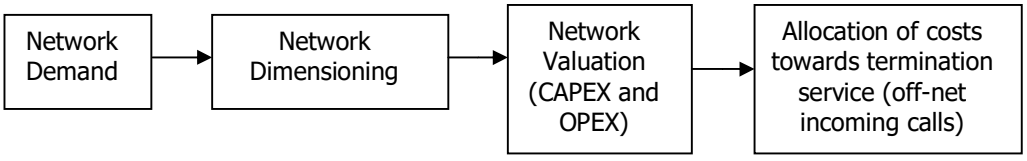
(ii) This TSP incurs costs that would occur in a competitive market. Thus the model uses present costs i.e. forward looking costs.

(iii) The method of costing is long-run costing i.e. the size of the network deployed is reasonably matched to the level of network demand; any over- or under- provisioning would be leveled out in the long-run.

(iv) The model allocates the costs to wholesale services i.e. off-net incoming calls.

2.33 A block schematic diagram of the LRIC model for computation of termination cost is given below:

Figure 2.2: Block Schematic Diagram of LRIC Model



2.34 In the LRIC model, the network demand for an equivalent TSP is identified. In order to meet this demand, an efficient network is dimensioned. The costs of the various network elements are then computed on the basis of present costs. These costs are then allocated to wholesale service (i.e. off-net incoming minutes) using a routing table in order to determine termination cost per minute.

[5] An equivalent TSP is a representative TSP in each LSA. It has an average size, which can be determined through the Herfindahl-Hirschman Index (HHI).

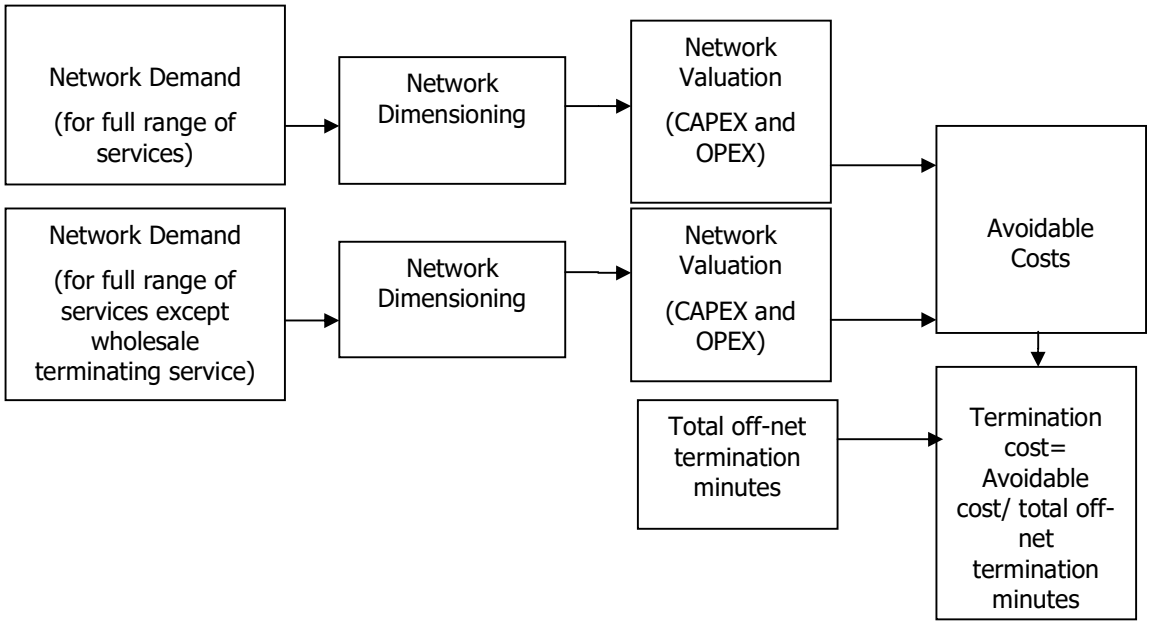
Termination cost as per LRIC model = (Total annualized termination cost computed on a long-run incremental cost basis) *divided by* (No. of off-net incoming minutes to be served by in the year)

2.35 In the LRIC+ model, a certain portion of the common costs is also allocated for the purpose of computation of termination cost. The costs that are common to both the wholesale business and the retail business of the TSPs are termed common costs e.g. costs pertaining to the corporate office, head offices etc. The reason for including a part of these common costs is that these costs are incurred by TSPs while providing mobile termination service. This add-on is called the mark-up for common costs.

Termination cost as per LRIC+ model = (Termination cost as per LRIC model) *plus* (Mark-up for common costs)

2.36 In the pure LRIC model, the relevant increment is the wholesale call termination service and it includes only avoidable costs. A block schematic diagram of the pure LRIC model is given below.

Figure 2.3: Block schematic diagram of Pure LRIC Model



Termination cost as per Pure LRIC = (Avoidable cost if wholesale termination service is not provided) *divided by* (No. of total off-net incoming minutes) = (Total annualized cost for providing entire range of services *minus* Total annualized cost for providing entire range of service excluding wholesale termination minutes) *divided by* (No. of total off-net incoming minutes)

2.37 A summary of the foregoing discussion yields the following conclusions:

(i) The LRIC model allows recovery of direct costs of providing the termination service.

(ii) The LRIC+ model not only allows recovery of direct costs of providing the termination service but also a reasonable portion of the common costs is allocated to the termination service.

(iii) The Pure LRIC model allows recovery of only avoidable costs.

(1) Determination of Mobile Termination Charges

2.38 The Authority, through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015, had prescribed a termination charge of ₹ 0.14 per minute for wireless to wireless calls using LRIC+ method.

2.39 As described in the Chapter-1 of the CP, the Authority had filed an appeal in the Hon'ble Supreme Court challenging the order of TDSAT dated 29.09.2010. The Hon'ble Supreme Court, in this case, on 29.07.2011, passed an interim order and asked the Authority to submit the computation of the IUC to be worked out on both the basis, namely, what would be the IUC if capital cost is taken into account and what would be the IUC if the capital cost is not taken into account.

2.40 Accordingly, the Authority filed its report in the Hon'ble Supreme Court on 29.10.2011. In the report, the Authority had, *inter-alia*, submitted the computation of mobile termination cost (MTC) for the year 2011 using LRIC+, LRIC and Pure LRIC methods as below:

Table 2.4: Estimates of MTC for the year 2011 using LRIC methods submitted to the Hon'ble Supreme Court in its report dated 29.10.2011

S.No.	Method	MTC per minute
1	LRIC+	₹ 0.14
2	LRIC	₹ 0.12
3	Pure LRIC	₹ 0.10

2.41 Further, the Authority had estimated MTC using LRIC and LRIC+ methods in the year 2015 which formed basis of the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 as below:

Table 2.5: Estimates of MTC using LRIC methods in the year 2015

S.No.	Method	MTC per minute
1	LRIC+	₹ 0.1379
2	LRIC	₹ 0.1183

2.42 As can be seen from the above, the estimates of MTC using LRIC+ and LRIC method yielded approximately the same results on the afore-mentioned two separate occasions using the information on subscriber base, usage and network cost for the F.Y. 2010-11 and F.Y. 2013-14. Intuitively, any further exercise for estimation of termination charge using the same underlying network technology would yield nearly the same results as obtained in the afore-mentioned costing exercises. It is worth mentioning here that while LRIC model was run in nearly the same manner in both the costing exercises, there were slight variations in the methodology to arrive at MTC using LRIC+ model. In the costing exercise of 2011, mark-up for common cost was considered to be ₹ 0.02 per minute. This was added to the LRIC estimate of ₹ 0.12 per minute to arrive at LRIC+ estimate of ₹ 0.14 per minute.

Table 2.6: Estimates of MTC using LRIC+ Model in 2011

Termination cost per minute as per LRIC model	(a)	₹ 0.12
Mark-up for common cost per minute	(b)	₹ 0.02
Termination cost per minute as per LRIC+ model	(c)=(a)+(b)	₹ 0.14

2.43 On the other hand, in the costing exercise of 2015, mark-up for common cost was considered to be 10% of LRIC estimate. Further, spectrum cost per minute was estimated as ₹ 0.0078 per minute.

Table 2.7: Estimates of MTC using LRIC+ Model in 2015

Termination cost per minute as per LRIC model	(a)	₹ 0.1183
Mark-up for common cost per minute	(b)= (a)*10%	₹ 0.0118
Spectrum cost per minute	(c)=(a)+(b)	₹ 0.0078
Termination cost as per LRIC+ model	(d)=(a)+(b)+(c)	₹ 0.1379

Issues for Consultation:

Q2: In case your response to the Q1 is '<u>Cost oriented or cost based termination charges</u>', which of the following methods is appropriate for estimating mobile termination cost?

(i) LRIC+

(ii) LRIC

(iii) Pure LRIC

(iv) Any other method (please specify)

Please provide justification in support of your response.

Q3: In view of the fact that the estimates of mobile termination cost using LRIC method and LRIC+ method yielded nearly the same results in year 2011 (as filed in the Hon'ble Supreme Court on 29.10.2011) and in year 2015 (as estimated for the Telecommunication Interconnection Usage

Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2016), would it be appropriate to put to use the estimates of mobile termination cost arrived in the exercises of year 2011 and year 2015 in the present exercise?

Q4: If your response to the Q3 is in the negative, whether there is a requirement of running the various LRIC methods afresh using the information on subscriber, usage and network cost for F.Y. 2015-16 for estimation of mobile termination cost?

2.44 A brief international experience in setting up mobile termination charges is placed as **Annexure** to this CP.

(2) Determination of Fixed Termination Charges

2.45 As discussed before, the Authority, through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015, prescribed fixed termination charge (i.e. domestic termination charge for calls terminating on wirline networks) as 'zero'. The Authority also prescribed the mobile termination charge (i.e. domestic termination charge for calls terminating on wireless networks) for calls originated from wireline networks as 'zero'. This was done with an aim to promote investment in, and adoption of, wireline networks so that the wireline networks may become an effective vehicle for the delivery of high-speed Internet in the country. While, *prima facie*, these steps have yielded good results for the growth of wireline telephony service and wired broadband service segment in the short-run, it needs to be seen as to how such a regime would impact the growth of telecommunication services sector, as a whole, in the medium-to-long-run.

Issues for consultation:

Q5: In what manner, the prescription of fixed termination charge as well as the mobile termination charge from wire-line networks as 'zero' through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 is likely to impact the growth of the Indian telecommunication services sector as a whole? Please support your viewpoint with justifications.

Q6: Whether termination charges between different networks (e.g. fixed-line network and wireless network) should be symmetric?

2.46 The following Chapter analyzes the issues related to International Settlement and Termination Charges.

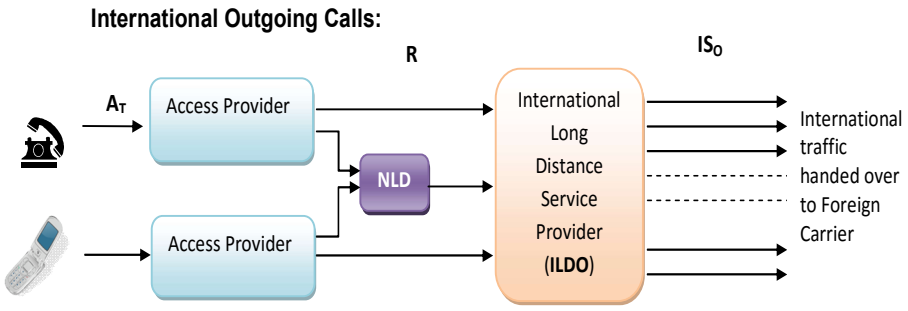
Chapter - III
International Settlement Rates and International Termination Charges

3.1 There is a key difference between the international termination charges and other charges which are part of the IUC regime. The domestic mobile termination charge and domestic carriage and transit charges are settled amongst TSPs located within a single legal-cum-geographical jurisdiction. However, the international settlement charge is different in that, in completing a call, the TSPs belong to two separate legal-cum-geographical jurisdictions. In effect, for an outgoing call the domestic access service provider is a price-taker; it cannot materially affect the international settlement rate/ international termination charge set by the foreign carrier. Similarly, for an incoming call, the foreign access provider has to be a price-taker; the international settlement rate/ international termination charge to be paid to the Indian access provider is decided domestically.

3.2 For international long distance calls, international carriage charges and international termination charges at the foreign end are settled between International Long Distance Operators (ILDOs) and foreign service providers. As per the clause (c) of Schedule II of the Telecommunication Interconnection Usage Charges Regulation, 2003 (4 of 2003) dated 29.10.2003, these charges are under forbearance.

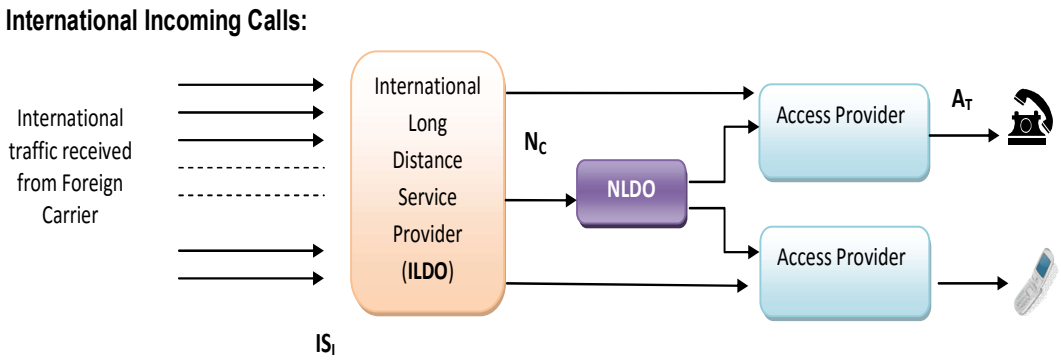
3.3 The flow of traffic for international outgoing calls is depicted in the following figure.

Figure 4.1: Schematic diagram for the traffic flow of international outgoing calls



3.4 The flow of traffic for international incoming calls is depicted in the following figure.

Figure 4.2: Schematic Diagram for Traffic flow of International Incoming Calls



A- International Settlement Rates

3.5 During discussions, some ILDOs have informed the Authority that operators in some countries (especially, the countries in the Middle East) have fixed very high international settlement rates for outgoing calls from India. These charges are to be paid by Indian ILDOs for international outgoing calls from India to those countries. However, the international settlement rates, paid to the Indian ILDOs for international incoming calls, are much lower owing to aggressive competition amongst Indian ILDOs.

3.6 The average international settlement rate for international outgoing calls to a few countries, as submitted by some ILDOs, is shown in the following table.

Table 4.1: Average International Settlement Rates for International outgoing calls to a few countries

S. No	Name of the Country	Average International Settlement Rates paid by Indian ILDOs to foreign carriers for international outgoing calls (in ₹ per minute)*
1	Australia	2.46
2	Bangladesh	1.50
3	Brunei	1.94

S. No	Name of the Country	Average International Settlement Rates paid by Indian ILDOs to foreign carriers for international outgoing calls (in ₹ per minute)*
4	China	0.55
5	France	9.06
6	Hongkong	1.29
7	Indonesia	3.64
8	Israel	2.72
9	Italy	7.75
10	Japan	2.68
11	Kuwait	3.54
12	Malaysia	1.50
13	Maldives	51.59
14	Mauritius	7.95
15	Oman	14.96
16	Pakistan	2.06
17	Saudi Arabia	6.65
18	Singapore	1.11
19	South Korea	1.60
20	Srilanka	8.90
21	Taiwan	4.55
22	Thailand	2.03
23	UAE	9.02
24	USA	0.46
25	Vietnam	5.28
26	Yemen	8.30

* Source: Information furnished by the TSPs to the Authority for the quarter ending March 2016

3.7 Many stakeholders are of the view that the core issue is the comparatively low level of international termination charges in India which sets an artificially low floor price for international settlement rates. A few TSPs have also indicated that the issue is not confined to the countries in the Middle East only but applies to many other countries too i.e. it is a general problem of high termination charge in many countries.

3.8 One option could be to fix differentiated international settlement rates for calls originating from specific world regions for India. However, this may create serious challenges in monitoring in-bound calls to India.

3.9 A second option could be a regime of 'reciprocal arrangements' i.e. mandating the same international settlement rate for calls from a country as that is applicable for calls from India to the country. However, this may lead to complexity in settlement. There would be a large number of international settlement rates for calls terminating in various countries and settlement disputes may, in turn, increase. This arrangement would also lead to hubbing of international traffic in a country that has a low international settlement rate arrangement with India. This would not only lead to dependence on huge bandwidth on some routes and inefficient utilization of bandwidth on other routes but may also encourage the operators to alter Calling-Line-Identification (CLI) to show that the calls are from a country that enjoys low international settlement rate for calls to India.

3.10 Some ILDOs have also represented that they also incur substantial costs in the form of international call carriage, gateway transit in carrying ISD traffic to and from the country. However, because of hyper-competition in carrying the international incoming traffic, ILDOs are not being compensated enough vis-à-vis the cost incurred by them; this may hamper further investment in the international routes.

B- International Termination Charge

3.11 The prevalent termination charge for international incoming calls is ₹ 0.53 per minute while the termination charge is ₹ 0.14 per minute for domestic calls. During various discussions, TSPs have submitted that the international termination charge for international calls fixed by the Authority, puts the Indian access providers in a hugely disadvantageous situation vis-à-vis foreign service operators, as termination charges in some other countries are 8 to 10 times higher than International termination charges in India. On the other hand, some TSPs are of the view that there is a no extra cost involved in terminating the international call, and, therefore, termination charges for domestic and international calls should be same.

3.12 One option could be forbearance regime for International Termination Charge i.e. leaving the charges to negotiation between ILDOs and access providers; but this has

both advantages and disadvantages. It may help access providers in negotiating higher than prevalent rates and earn more revenue. It may also reduce the tariffs for outgoing international calls if access providers are willing to share the increased revenue with the customers. However, such negotiations may become protracted and may lead to uncertainty and disputes in the market. Call termination is a monopoly; therefore, an access provider would always try to obtain higher termination charges from the ILDOs which may lead to a situation of non-settlement and, therefore, non-completion of calls.

3.13 The option of increasing the international incoming termination charge from the current level also has its pros and cons. The advantages are that it may help access providers earn more revenue; at the same time, the disadvantage of stalled negotiations, as in the case of forbearance, would disappear. It may also reduce tariffs for outgoing international calls if access providers are willing to share the increased revenue with customers. Critics of this approach would cite the disadvantage of the substantial arbitrage opportunity that differential domestic and international termination charge would create. A view has also been expressed that the grey market is a concern of the Government and should not be taken into account by the Authority while fixing the international termination charge.

3.14 Mandating the international termination charge to be the same as domestic termination charge has the obvious advantage of justifying the fixation of such charge as the cost involved in terminating the international call is equal to that of domestic calls. However, this does not ensure parity for access providers as they would be paying higher charges for their international outgoing calls as international settlement rates with the foreign carrier for international outgoing calls from India cannot be regulated by the Authority.

Issues for Consultation:

Q7: Which approach should be used for prescribing International Termination Charge in the country? Should it be kept uniform for all terminating networks?

Q8: Whether, in your opinion, in the present regulatory regime in the country, the stand-alone ILDOs are not able to provide effective competition owing to the presence of integrated service providers (having both ILDO and

access service licenses) and, therefore, there are apprehensions regarding sustainability of the stand-alone ILDOs in the long-run?

Q9: If your response to the Q8 is in the affirmative, which of the following approach should be used as a counter-measure?

(i) Prescription of revenue share between Indian ILDO and access provider in the International Termination Charge; or

(ii) Prescription of a floor for international settlement rate (levied by ILDO upon the foreign carrier) for international incoming calls; or

(iii) Any other approach (please specify)

Please provide justification in support of your response.

C- Other issues related to Interconnection Usage Charges

3.15 While a review of IUC is being undertaken, it is imperative to not ignore any issue which may have a bearing on the reasonable interests of the consumers and TSPs and also on the overall growth of the sector.

Issue for Consultation:

Q10: Is there any other relevant issue which should be considered in the present consultation on the review of Interconnection Usage Charges?

3.16 The following chapter lists the issues for consultation.

Chapter-IV
Issues for Consultation

It may please be noted that answers/ comments to the issues given below should be supported with justification. The stakeholders may also comment on any other issues related to interconnection usage charges, along with all necessary details:

Q1: In view of the recent technological developments in the telecommunication services sector, which of the following approaches is appropriate for prescribing domestic termination charge (viz. mobile termination charge and fixed termination charge) for maximization of consumer welfare (i.e. adequate choice, affordable tariff and good quality of service), adoption of more efficient technologies and overall growth of the telecommunication services sector in the country?

(i) Cost oriented or cost based termination charges; or

(ii) Bill and Keep (BAK)?

Please provide justification in support of your response.

Q2: In case your response to the Q1 is 'Cost oriented or cost based termination charges', which of the following methods is appropriate for estimating mobile termination cost?

(i) LRIC+

(ii) LRIC

(iii) Pure LRIC

(iv) Any other method (please specify)

Please provide justification in support of your response.

Q3: In view of the fact that the estimates of mobile termination cost using LRIC method and LRIC+ method yielded nearly the same results in year 2011 (as filed in the Hon'ble Supreme Court on 29.10.2011) and in year 2015 (as estimated for the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2016), would it be appropriate to put to use the estimates of mobile termination cost arrived in the exercises of year 2011 and year 2015 in the present exercise?

Q4: If your response to the Q3 is in the negative, whether there is a requirement of running the various LRIC methods afresh using the information on subscriber, usage and network cost for F.Y. 2015-16 for estimation of mobile termination cost?

Q5: In what manner, the prescription of fixed termination charge as well as the mobile termination charge from wire-line networks as 'zero' through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 is likely to impact the growth of the Indian telecommunication services sector as a whole? Please support your viewpoint with justifications.

Q6: Whether termination charges between different networks (e.g. fixed-line network and wireless network) should be symmetric?

Q7: Which approach should be used for prescribing International Termination Charge in the country? Should it be kept uniform for all terminating networks?

Q8: Whether, in your opinion, in the present regulatory regime in the country, the stand-alone ILDOs are not able to provide effective competition owing to the presence of integrated service providers (having both ILDO and access service licenses) and, therefore, there are apprehensions regarding sustainability of the stand-alone ILDOs in the long-run?

Q9: If your response to the Q8 is in the affirmative, which of the following approach should be used as a counter-measure?

(i) Prescription of revenue share between Indian ILDO and access provider in the International Termination Charge; or

(ii) Prescription of a floor for international settlement rate (levied by ILDO upon the foreign carrier) for international incoming calls; or

(iii) Any other approach (please specify)

Please provide justification in support of your response.

Q10: Is there any other relevant issue which should be considered in the present consultation on the review of Interconnection Usage Charges?

Acronyms

S. No.	Acronym	Description
1	2G	2nd Generation
2	3G	3rd Generation
3	4G	4th Generation
4	AGR	Adjusted Gross Revenue
5	App	Application
6	ASR	Accounting Separation Report
7	BAK	Bill and Keep
8	BSNL	Bharat Sanchar Nigam Limited
9	BU-LRAIC+	Bottom up – Long Run Average Incremental Cost Plus
10	BU-LRIC	Bottom up – Long Run Incremental Cost
11	BU-LRIC+	Bottom up – Long Run Incremental Cost plus
12	CAPEX	Capital Expenditure
13	CLI	Calling Line Identification
14	CP	Consultation Paper
15	CPNP	Calling Party Network Pays
16	CPP	Calling Party Pays
17	CS	Circuit Switched
18	CS RAN	Circuit Switched Radio Access Network
19	CSFB	Circuit Switched Fall back
20	FAC	Fully Allocated Cost
21	FMT	Fixed Mobile Telephony
22	FTC	Fixed Termination Charge
23	GSM	Global System for Mobile Communication
24	HCA FDC	Historical Cost Accounting Fully Distributed Cost
25	HHI	Herfindahl–Hirschman Index
26	ILDO	International Long Distance Operator
27	IP	Internet Protocol
28	ISD	International Subscriber Dialing
29	IUC	Interconnection Usage Charge
30	LRIC	Long Run Incremental Cost
31	LRIC+	Long Run Incremental Cost plus
32	LSA	Licensed Service Area
33	LTE	Long Term Evolution
34	MTC	Mobile Termination Charge
35	NGN	Next Generation Network
36	NLDO	National Long Distance Operator
37	OPEX	Operating Expenditure
38	POI	Point of Interconnection
39	PS	Packet Switched
40	PS RAN	Packet Switched Radio Access Network
41	PSTN	Public Switched Telephony Network
42	QoS	Quality of Service

43	RAN	Radio Access Network
44	RPP	Receiving Party Pays
45	SMS	Short Messaging Service
46	TDSAT	Telecom Disputes Settlement & Appellate Tribunal
47	TRAI	Telecom Regulatory Authority of India
48	TSP	Telecom Service Provider
49	VoIP	Voice over Internet Protocol
50	VoLTE	Voice over LTE
51	Wi-Fi	Wireless Fidelity
52	Wi-MAX	Worldwide Interoperability for Microwave Access
53	xDSL	(any type of) Digital Subscriber Line
54	Y-o-Y	Year-on-Year

Annexure

International Experience on Mobile Termination Charges

A- Recent developments in setting Mobile Termination Charges

(1) Australia

1. In August, 2015, the Australian Competition and Consumer Commission (ACCC) reduced[6] the mobile termination charges to AUD 0.017 (about USD 0.013) per minute from the previously prevailing charge of AUD 0.036 per minute.

(2) Norway

2. In January, 2015, NPT, The Norwegian Communications Authority (NKOM), set mobile termination charges to a maximum of NOK 0.083 (USD 0.012) per minute from 1 July 2015, before mandating further reductions[7] to NOK 0.075 per minute and NOK 0.065 per minute from 1 January 2016 and 1 January 2017, respectively.

(3) Portugal

3. In August, 2015, ANACOM, the telecom regulator in Portugal reduced[8] the mobile termination charges to 0.85 eurocents (USD 0.009) per minute from the previously prevailing charge of 1.27 eurocents per minute.

(4) South Africa

4. In September, 2014, the Independent Communications Authority of South Africa (ICASA) announced its new call termination regulations setting mobile termination charges as R 0.20 (USD 0.014) per minute from 1 October, 2014, before mandating further reductions[9] to R 0.16 per minute and R 0.13 per minute from 1 October, 2015 and 1 October, 2016 respectively.

[6] Source: http://www.itnews.com.au/news/aussies-set-for-lower-mobile-call-sms-rates-408288
[7] Source: https://www.telenor.com/investors/company-facts/business-description/telenor-norway
[8] Source: http://www.anacom.pt/render.jsp?contentId=1363058#.V5Xs5zt97IU
[9] Source: http://www.moneyweb.co.za/uncategorized/icasa-finalises-new-call-termination-rates/

(5) Saudi Arabia

5. In February, 2015, Saudi Arabia's telecommunication regulator - the Communications and IT Commission (CITC) reduced[10] mobile termination charges to SAR 0.15 (USD 0.04) per minute from the previously prevailing charge of SAR 0.25 per minute.

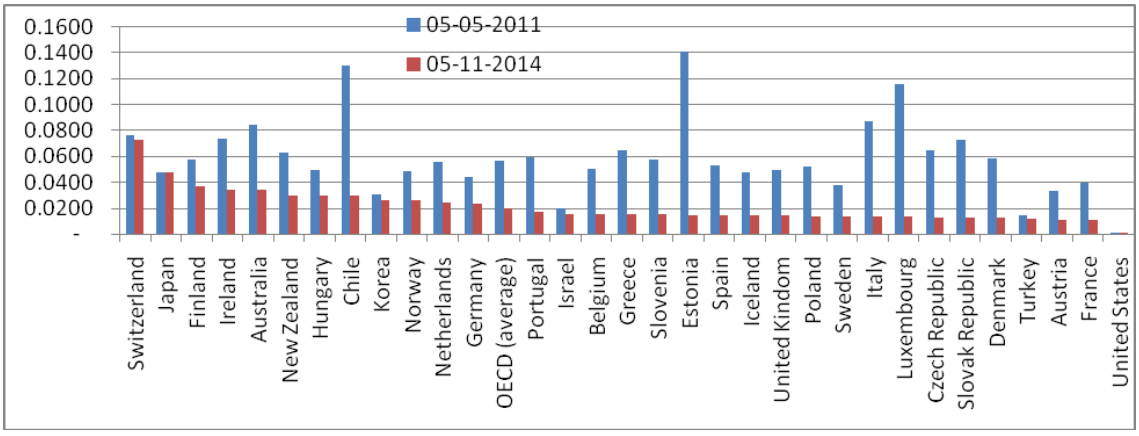
(6) United Kingdom

6. In March, 2015, The Office of Communications (Ofcom) reduced[11] mobile termination charge to 0.477 Europence (about USD 0.0052) per minute from 01.04.2017 from 0.817 Europence per minute.

B- Trend of mobile termination charges in OECD countries from 2011 to 2014

7. As per the OECD Digital Economy Outlook, 2015 (Chapter 4: Main trends in communication policy and regulation), the mobile terminations charges are on a constant decline in OECD countries; the OECD average of mobile termination charges fell by 65% in 3.5 years from USDD 0.0561 per minute (May, 2011) to USD 0.0197 per minute (November, 2014). The following Chart depicts the level of mobile termination charges in various OECD countries in May, 2011 and November, 2014.

Chart: Mobile termination charges in US Dollars in various OECD countries in May, 2011 and November, 2014



[10] Source: https://www.telegeography.com/products/commsupdate/articles/2015/02/24/citc-cuts-mtrs-to-sar0-15-fixed-termination-rates-down-by-30/

[11] Source: https://www.theguardian.com/business/2015/feb/06/uk-mobile-phone-call-rates-slashed-ofcom

C- Regulatory models used to compute mobile termination charges in European countries

8. As per a July 2015 report of Body of European Regulators of Electronic Communications (BEREC) on 'Terminal Rates at European Level', Bottom-up Long Run Incremental Cost (BU-LRIC) models are used to estimate mobile termination costs in majority of European countries. The costing models used by various European counties for estimating mobile termination costs have been compiled in the following table.

Costing models used by European countries for estimating mobile termination cost

S. No.	Country	Costing model for estimating mobile termination Cost
1	Austria	BU-LRIC
2	Belgium	BU-LRIC
3	Bulgaria	Pure BU-LRIC
4	Cyprus	Top Down LRIC
5	Czech Republic	Pure BU-LRIC
6	Denmark	BU-LRIC
7	Germany	BU-LRAIC+
8	Estonia	Benchmark
9	Greece	BU-LRIC
10	Spain	BU-LRIC
11	Finland	Other
12	France	BU-LRIC
13	Croatia	Pure BU-LRIC
14	Hungary	BU-LRIC
15	Ireland	Other
16	Iceland	Benchmark
17	Italy	BU-LRIC
18	Liechtenstein	Benchmark
19	Lithuania	Benchmark BU-LRIC
20	Latvia	Benchmark BU-LRIC
21	Luxembourg	Pure BU-LRIC

22	Montenegro	HCA FDC
23	The Former Yugoslav Republic of Macedonia	BU-LRAIC+
24	Malta	Pure BU-LRIC
25	Netherlands	BU-LRAIC+
26	Norway	BU-LRIC
27	Poland	Pure BU-LRIC
28	Portu gal	BU-LRIC
29	Romania	Pure BU-LRIC
30	Serbia	Benchmarking
31	Sweden	BU-LRIC
32	Slovenia	Pure BU-LRIC
33	Slovakia	Pure BU-LRIC
34	Turkey	BU-LRAIC+
35	United Kingdom	BU-LRIC