

TELECOM REGULATORY AUTHORITY OF INDIA

**NOTIFICATION**

**New Delhi, the 1<sup>st</sup> November, 2019**

F. No. 301-02/2018-QoS(Misc.).....In exercise of the powers conferred upon it under section 36, read with sub-clauses (i) and (v) of clause (b) of sub-section (1) of section 11, of the Telecom Regulatory Authority of India Act 1997 (24 of 1997), the Telecom Regulatory Authority of India hereby makes the following regulations further to amend the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009), namely: -

**THE STANDARDS OF QUALITY OF SERVICE OF BASIC TELEPHONE SERVICE (WIRELINE) AND  
CELLULAR MOBILE TELEPHONE SERVICE (SEVENTH AMENDMENT) REGULATIONS, 2019  
(8 of 2019)**

**1.** (1) These regulations may be called the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Seventh Amendment) Regulations, 2019 (8 of 2019);

(2) They shall come into force after fifteen days from the date of their publication in the Official Gazette.

**2.** After regulation 6 of the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009), the following regulation shall be inserted, namely: -

“6A. Duration of alert for the called party: (1) The time duration of alert for an incoming voice call, which is neither answered nor rejected by the called party, shall be thirty seconds for Cellular Mobile Telephone Service and sixty seconds for Basic Telephone Service.

(2) The terminating network shall, on expiry of thirty seconds in case of Cellular Mobile Telephone Service and sixty seconds in case of Basic Telephone Service, release the incoming voice call and transmit the call release message to the originating network:

*Provided that* the originating network may release an unanswered call after ninety seconds in case the call release message is not received from the terminating network.”

(Sunil Kumar Gupta)  
Secretary

Note.1. —The principal regulations were published in the Gazette of India, Extraordinary, Part III, Section 4 dated the 20<sup>th</sup> March, 2009 vide notification No. 305-25/2008-QoS dated the 20<sup>th</sup> March, 2009.

Note.2. —The principal regulations were amended by issuing the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Amendment) Regulations, 2012 (10 of 2012) dated the 7<sup>th</sup> May, 2012.

Note.3. —The principal regulations were further amended by issuing the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Second Amendment) Regulations, 2012 (24 of 2012) dated the 8<sup>th</sup> November, 2012.

Note.4. —The principal regulations were further amended by issuing the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Third Amendment) Regulations, 2014 (12 of 2014) dated the 21<sup>st</sup> August, 2014.

Note.5. —The principal regulations were further amended by issuing the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Fourth Amendment) Regulations, 2015 (8 of 2015) dated the 15<sup>th</sup> October, 2015.

Note.6. —The principal regulations were further amended by issuing the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Fifth Amendment) Regulations, 2017 (4 of 2017) dated the 18<sup>th</sup> August, 2017.

Note.7. — The principal regulations were further amended by issuing the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Sixth Amendment) Regulations, 2018 (7 of 2018) dated the 31<sup>st</sup> July, 2018.

Note.8. —The Explanatory Memorandum explains the objects and reasons of the “Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Seventh Amendment) Regulations, 2019 (8 of 2019).

## **Explanatory Memorandum**

### **1. Background**

- 1.1. A telecom subscriber is alerted by the network for a certain duration in which it expects the called party, if available and willing to respond to it, to either answer or reject it. Networks are configured to release the call from their end, if neither the calling party has abandoned the call nor the called party has responded to it. Network cannot wait for more than a reasonable time as it wastes resources that are reserved during the setup phase of the call. To reduce the impact on network resources for the calls which are likely to remain unanswered, it is necessary to limit the duration of alert. But if this duration is too low, some users may fail to respond to the alert even when willing to do so. Short duration may also result in increase in repetitive attempts to call or return a missed call though conversation could have happened in first attempt itself. Not giving sufficient time to respond to alert for an incoming call for significant number of cases will adversely impact the quality of experience of the customers. The present range of duration of call alert by different TSPs varies from 30 seconds to 45 seconds in case of the mobile networks, except one Access Provider who has set “alert duration” as 25 seconds and in case of basic telephone networks, it varies from 60 seconds to 120 seconds.
- 1.2. Recently, it was brought to the notice of the Authority that one of the Telecom Service Providers (TSPs) has reduced duration of alert to a lower value in comparison to values configured in rest of other networks and it is adversely affecting the customers’ experience. It was also brought to notice that effective control to release the call when it remains unanswered, usually rests with the terminating network but lowering value of timer at originating leg of the call has shifted this control to originating end and is causing earlier release of even those calls for which terminating network has set higher values. This was reported to have resulted in significant rise in number of calls not released on the basis of response of the called party to the alert but on the originating network’s initiation to release the call.
- 1.3. It was also noticed that range of value for timer is prescribed in International Telecommunication Union (ITU) specifications for international calls or circuits but there is no prescribed value for the timer for the domestic calls. Values recommended for international circuits are of the order of 1.5 to 3 minutes which may be relevant for originating network but may not be relevant for the terminating networks.
- 1.4. The Telecom Service Provider (TSP) who has lowered the timer value argued that initiative was taken to reduce the impact on their network resources. But other TSPs argued that it is affecting customer’s experience and instead of reducing impact on network resources, may increase the impact due to repetitive call attempts. To address the concerns of the customers and also to avoid the situation where TSPs might start lowering the timer value only from network’s perspective and not considering customers’ perspective, Authority felt that there is need to consult with stakeholders on the issues.

- 1.5. To understand and resolve the issues, TRAI held meetings on 23<sup>rd</sup> of August and 6<sup>th</sup> of September 2019. However, no consensus could be achieved with the TSPs upon the appropriate duration of the alert.
  - 1.6. The Authority undertook a public consultation in the matter by releasing a consultation paper on “Duration of alert for the called party” on 16<sup>th</sup> September, 2019 seeking comments of stakeholders by 30<sup>th</sup> September, 2019 and counter comments by 7<sup>th</sup> October, 2019. In response to the Consultation Paper, the Authority received comments from eleven stakeholders and counter comments from one stakeholder. An Open House Discussion was also held with the stakeholders at New Delhi on 17<sup>th</sup> October, 2019.
2. Key issues raised in consultation and comments of stakeholders:
- 2.1. **Appropriate values of  $T_{Ring}$  from customer’s perspective:** All the Stakeholders from TSP side except one, were of view that appropriate value of  $T_{Ring}$  should not be less than 30 seconds and it should be enforced by the terminating network. There were no examples in international experience where this was done from the originating end. Some stakeholders, including those from consumer side, commented that arbitrary value of  $T_{Ring}$  would impact the consumer experience adversely, therefore the timers relating to ringing should be configured in a uniform manner. One stakeholder commented that  $T_{Ring}$  value has never been the same across networks and it is a technical matter, which must be determined by the Department of Telecommunication’s (DoT) technical standard body i.e. Telecom Engineering Centre (TEC). No stakeholder suggested the appropriate values of percentage of calls that can be force released by the network i.e. value of  $C_{REL}$  (Call forced released by the network) except one individual stakeholder who suggested the value as 98%, however he has not corroborated this through supporting data. One stakeholder commented that  $C_{REL}$  cannot be determined in isolation from a customer’s perspective alone. It may be noted that the term  $T_{Ring}$  referred here is same as the term  $T_{Ringing}$  referred in the Consultation Paper.
  - 2.2. **Impact on the utilization of different types of telecommunication resources:** Most of the stakeholders commented that with decrease in timer value, there is hardly any benefit on account of better network utilization in terms of radio resources. Rather, with reduction in timer value the probability of repeat call will increase leading to adverse consumer experience and network resource utilization will actually increase. Few Stakeholders suggested that arbitrary reduction in  $T_{Ring}$  would be contrary to the interest of the subscribers and would impact the overall network performance in terms of decreased Answer-to-Seizure Ratio (ASR). One stakeholder commented that decreasing the alert duration enable their network to carry more calls without any adverse impact on ASR.
  - 2.3. **Provide customers options to change or modify the duration of ringing time particularly for them:** Majority of stakeholders commented that, the options to the consumers will seriously complicate and may not be viable therefore at the present time, customer need not be offered the option of changing or modifying the  $T_{Ring}$  value. Few stakeholders commented that it will enhance consumer experience. During Open House Discussions (OHD), most of the TSPs agreed that, if technically feasible such arrangement will surely help consumers. However, current deployed capabilities do not support to offer changing or modifying duration

of ringing time by the customers, and it may also require additional cost of deployment by the telecom operators

2.4. **Use of Artificial Intelligence (AI) and Machine Learning (ML) techniques to discover appropriate value of ringing duration specific to a subscriber or class of subscriber:** Most Stakeholders were in the favour of exploring use of new technologies like AI and ML techniques to discover appropriate value of ringing duration specific to a class of subscribers. Few stakeholders commented that adaption of new techniques to discover a specific ringing duration may not be required as it is a onetime analysis based on the historical reports of records collected and sorted by all Unified License Holders.

3. Based on the deliberations in consultation paper, inputs received from the stakeholders and publicly available information, key outcomes on the issues of Consultation Paper (CP) are as under:

**3.1. Appropriate values of duration of alert from the perspective of customers:**

3.1.1. Inputs relating to distribution of percentage of calls answered or rejected by the called party after different time intervals, provided by Access Service Providers for mobile network is tabulated as under:

<b>Ringing Duration (seconds)</b>	<b>TSP1 (% of call answered or rejected, cumulative)</b>	<b>TSP2 (% of call answered or rejected, cumulative)</b>	<b>TSP3 (% of call answered or rejected, cumulative)</b>	<b>TSP4 (% of call answered or rejected, cumulative)</b>	<b>TSP5 (% of call answered or rejected, cumulative)</b>
<b>20</b>	83.62	83.5	84.76	88.93	87
<b>25</b>	91.34	NA	NA	93.95	92
<b>30</b>	95.84	90.1	96.44	96.65	99
<b>35</b>	98.24	NA	NA	98.19	NA
<b>40</b>	99.34	94.7	NA	99.16	100
<b>&gt;40</b>	100	100	100	99.97	100

3.1.2. It indicates that called party would not be able to respond to the alert for an incoming call in case of about 11-16% incoming calls if duration of alert is kept as 20 seconds. This figure of release of calls from network's end would come down to value in the range of 2-10% if duration of alert is increased from 20 seconds to 30 seconds and to 0-5.3% if duration of alert is increased to 40 seconds.

3.1.3. Based on the inputs from TSPs, adverse impact on the network resource utilization in case of mobile network, would be around 0.07% - 0.21%, if alert duration increased from 25 sec to 30 sec. One TSP

has submitted that adverse impact on network resource utilization would be approximately 2.8% by increasing the alert duration from 25 seconds to 30 seconds (total extra seconds/Mean holding time\* no. of calls per day). However, it has been observed that this TSPs has considered all the calls while calculating the impact on the network resource utilization whereas only the calls in the bracket of 25-30 seconds needs to be considered as detailed below:

3.1.3.1. Below diagram (Figure 1) as depicted in the consultation paper indicates the impact on resources utilization with change in the timer value.

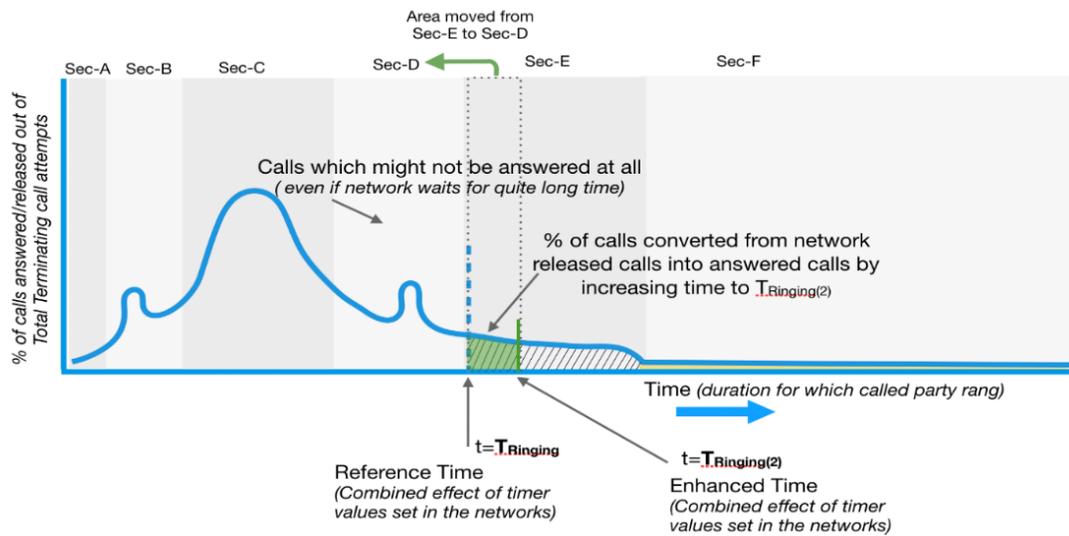


Figure 1: Impact due to increase in  $T_{\text{Ringing}}$  value

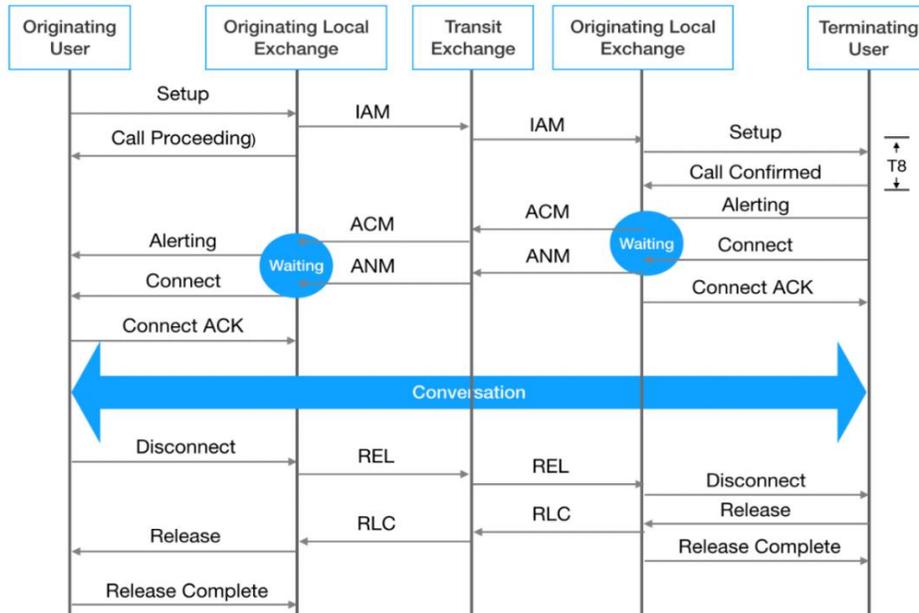
3.1.3.2. As can be seen from the above diagrams, the benefit of increasing maximum time duration of call alert is only for those calls which remains unanswered or not released by the calling party. Area under region shaded in green colour indicates increased time period and quantum of network resources engaged in alerting the called party. Area of this shaded region after point  $T_{\text{Ringing}}$  is depicted in bit darker shade to indicate that network resources will no more engaged as network will force calls to release if calls remains unanswered and the timer set gets expired.  $T_{\text{Ringing}}$  is set to save the resources unnecessarily engaged in alerting the called parties which are unlikely to answer the call. By changing  $T_{\text{Ringing}}$  to  $T_{\text{Ringing}}(2)$ , there will be additional area which will be included. Actual additional resource utilization would be dependent only upon the size and shape of the cumulative curve.

3.1.3.3. The TSP has submitted that total calls answered between 25 to 30 second ringing are 2.7%. Hence, only 2.7% calls would have impact on network resources if alert duration is increased from 25 seconds to 30 seconds. Therefore, their submission regarding impact on network if alert duration is increased from 25 seconds to 30 seconds is required to be

corrected and net impact of network resource utilization would be only 2.7% of 2.8 i.e. 0.07%. Therefore, it is observed that impact on the network resources, if alert time is increased by 5 seconds, is in the range of 0.07% to 0.21% for all the TSPs, which is quite insignificant.

- 3.1.4. Few TSPs submitted network impact in terms of ASR. ASR would be adversely affected by 5.68% to 16.4 % by reduction of call alert duration from 45 seconds to 20 seconds. However, ASR being indirect measurement, may not be appropriate to measure impact on the network as it depends upon the network as well as customer behavior. No TSP provided any information about  $C_{REL}$  (% of calls which may be allowed to force release by the network) even after this information was specifically asked from TSPs during the OHD.
  - 3.1.5. Regarding comment of one of the stakeholders that defining value is a technical matter and should be defined by DoT's technical standard making body i.e. TEC. Authority is of the view that TRAI is prescribing duration of alert from customers perspective. Most of the networks were following  $T_{Ring}$  value around 30 seconds, so the capabilities are already there in the network to adopt these values. There is no need to revise the technical specification for the same. As such, it is only a configuration of the parameter value within the range of capabilities of networks in view of consumer convenience.
  - 3.1.6. It is also noted that no concerns were raised by TSPs or consumers earlier, when TSPs have configured majority of their networks with the timer values as 30 seconds for the Mobiles and 60 seconds for the fixed lines.
  - 3.1.7. Fixed network consumer may take longer time to pick up phone as compared to mobile phone because it is not expected to always be in proximity to the consumer. Therefore, the call alert duration in fixed network is set higher than the mobile network.
  - 3.1.8. As discussed above, adequate value of  $T_{Ring}$  is necessary to allow consumer to answer the call failing which it will result in a missed call and the subscriber may reattempt the call resulting in adverse consumer experience. Most of the networks have been using at least 30 seconds as  $T_{Ring}$  value with satisfactory consumer experience.
  - 3.1.9. In view of above, **Authority felt that appropriate value of duration of alert is to be as 30 seconds for Cellular Mobile Telephone Service and 60 seconds for Basic Telephone Service.**
- 3.2. **Margin in alert duration between Originating and Terminating Network:**
- 3.2.1. Majority of stakeholders submitted that timer value at the originating network should always be higher than value set at the terminating network end. Any reverse arrangement would lead to failure of functioning of supplementary services such as call forwarding for No Answer, as Terminating network will not be able to forward the call in case of no answer condition as originating network would initiate release of the call before it is forwarded.

3.2.2. On examining the issue, it was noted that not following the proper order of sequence among network entities which are involved in releasing of a call when no answer condition persists for the certain duration of alert then there may be impact on quality of experience of the customers. Usually, which network entity, originating or terminating network, would initiate the process of release of the call would depend upon the action of calling or called party. The message flow diagram for ISDN User Part (ISUP) is as shown in Figure 2:



IAM: Initial Address Message    ACM: Address Complete Message    ACK: Acknowledgement  
 ANM: Answer Message    REL: Release    RLC: Release Complete

Figure 2: Message Sequence chart in ISUP

3.2.3. As can be seen in the above figure, if calling party abandons the calls during alert phase or disconnects the call in conversation phase before the called party then release process is initiated by the originating network. In case, called party rejects the call during alert phase or disconnects the call in conversation phase before the calling party then terminating network initiates the release process. Whoever releases the call, conveys the release message to other network entities in the chain. In case there is no action either from calling or called party during the alert phase of a call means that call remains in no answer condition then network may decide to release the call in order to make network resources free which were reserved to establish the call. These network resources might be required to serve other customers. In scenario of no answer condition, usually effective control to release the call rests with the terminating network as it is in best position to determine the no answer condition.

As applicable in other cases, terminating network, which has to initiate process of release, would be responsible to convey other entities involved in the call. If this sequence is not followed to release the call in case of no answer condition (Figure 3), and for example, originating network takes decision to release the call, then terminating network would not be in a position to honour the target time duration for which called party should have been alerted. There would be situations where called party is being alerted but originating network has initiated release of the call or, there would be situations where two ends have simultaneously initiated the process of release of the call.

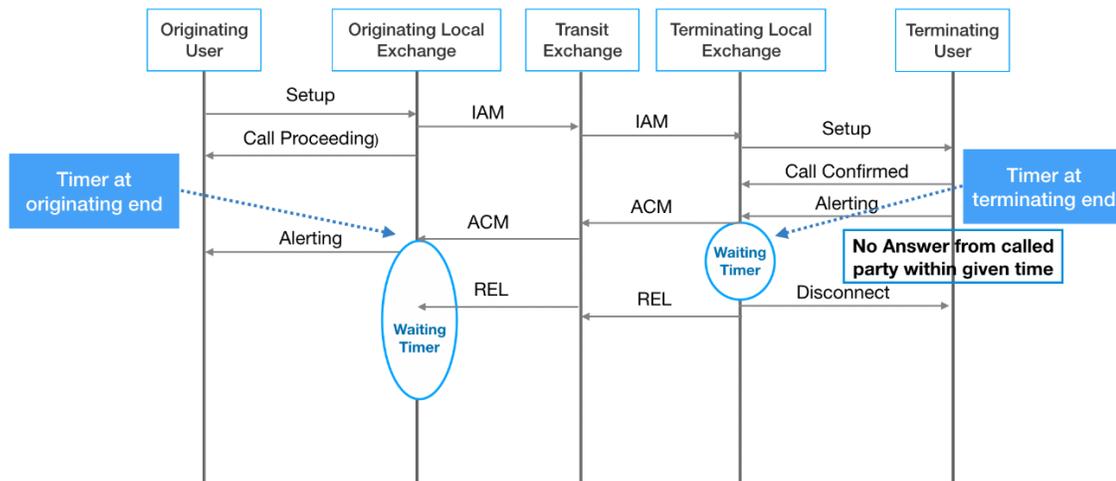


Figure 3: Message Sequence Chart - No Answer Condition

3.2.4. However, there may be circumstances where release message supposed to be conveyed by a particular entity is either not initiated due to some malfunctioning or does not reach even after long time in comparison to time within which called party should have either answered the call or rejected the call then originating network might be required to initiate the process of release of the call irrespective of release message from terminating network (Figure 4). This would be required by the originating network to protect its network and release the network resources from getting stuck. Such situations are rare as telecom signalling networks are designed to operate in a reliable manner. The value at originating network is required to be much higher than the typical values configured at the terminating network's end, to facilitate availability of supplementary services both for mobile as well as fixed line. Values required from called party's perspective may also differ depending upon the supplementary services and customised settings for duration of alert. Therefore, it is necessary to ensure that forced release from originating network in abnormal conditions may trigger only after waiting for sufficient time for response of terminating network. As possibility of failure to send

release message in case of no response to originating end is low, hence this is not going to impact the efficient resource utilization of originating end.

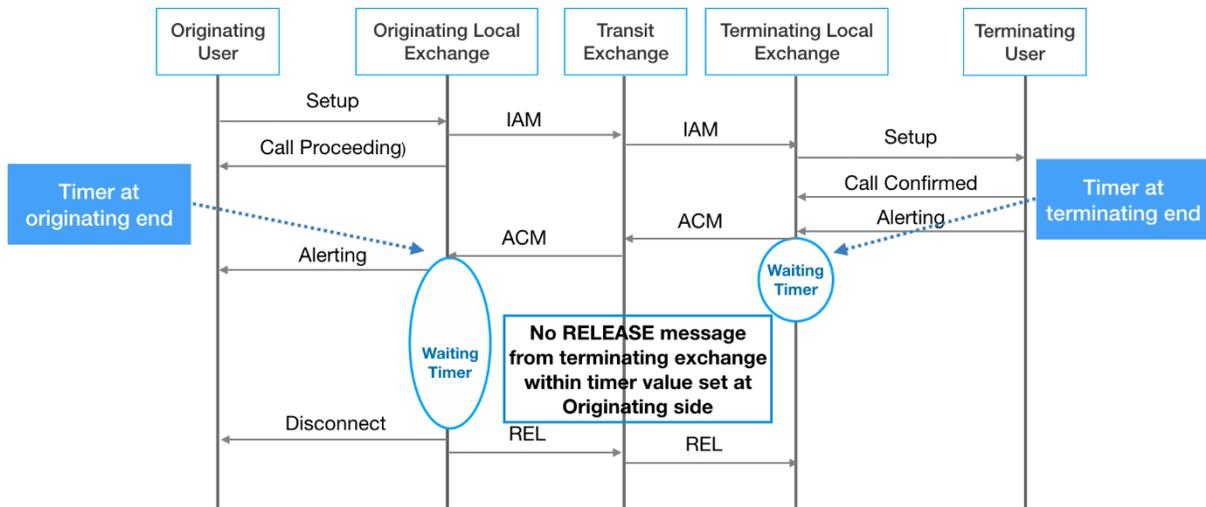


Figure 4: Message sequencer chart - RELEASE Message not received by Originating networks

3.2.5. Considering above facts, **Authority is of the view that force release of incoming voice call after specified duration of alert shall be initiated by the terminating network. However, in case of abnormal conditions, originating network may force release the call after waiting at least for 90 seconds.**

### 3.3. Customer specific alert duration:

3.3.1. In the consultation paper, one of the issues raised was to facilitate the customer to increase or decrease the duration of alert as per his specific requirements in terminating networks. If such features are available in the networks deployed in the country and offered to the customers, then network operators may set default values for the duration of alert and prescribe procedure for the customers to modify it, as per their specific need which may be different at different point in time. TSPs and other stakeholders have appreciated the usefulness of the feature and some of the TSPs submitted that this kind of options are already offered in few other countries. However, TSPs have submitted that such features are not available in presently deployed networks in India and in future these may be available.

3.3.2. In the consultation paper, comments were also sought to explore how Artificial Intelligence (AI) and Machine Learning (ML) may be useful for setting duration of alerts specific to customers and whether network can adapt their behaviour best suitable to a class of subscribers. However, TSPs submitted that such capabilities are not available in the networks currently deployed, but they would explore

the possibilities.

- 3.3.3. In view of above, **Authority is of view that the regulation may be reviewed as and when such capabilities becomes available.**