

To be published in the part III – Section 4 of extraordinary Gazette of India

New Delhi

5th July 2000

[File No. 112-17/98-TRAI (Tech.)Vol.-III]. In exercise of the powers conferred upon it under sub–clause (b) (v) of sub section (1) of section 11 of TRAI (Amendment) Act 2000 in regard to laying down the standards of quality of service to be provided by the service providers, the Telecom Regulatory Authority of India hereby makes the following Regulation:

REGULATION ON QUALITY OF SERVICE

OF

BASIC AND CELLULAR MOBILE TELEPHONE SERVICES, 2000

(2 of 2000)

Section-I

Title, Extent and Commencement

Short title, extent and commencement

1. i) The title of this regulation shall be '*Regulation on Quality of Service of Basic and Cellular Mobile Telephone Services , 2000*'
- ii) This regulation lays down the 'Quality of Service' parameters applicable to the Basic and Cellular Mobile Service Provider's Network.
- iii) This regulation shall be applicable to all the Basic Service Providers including DTS / MTNL and Cellular Mobile Telephone Service Providers.
- iv) This regulation shall come into effect from the 5th day of July 2000.

Section-II

Definitions

2. In this Regulation, unless the context otherwise requires:
 - i) 'Act' means the Telecom Regulatory Authority of India (Amendment) Act, 2000 as amended from time to time.
 - ii) 'Authority' means the Telecom Regulatory Authority of India.

- iii) 'Basic Telecommunication Services' mean services derived from a Public Switched Telephone Network (PSTN) & as specified in the license.
- iv) 'Cellular Mobile Telephone Services' means services derived from a Public Land Mobile Network (PLMN) & as specified in the License.
- (v) 'DTS' means Department of Telecom Services, Government of India.
- vi) 'GSM' means Global System for Mobile Communications.
- vii) 'License' means a license granted or having effect as if granted under section 4 of the Indian Telegraph Act 1885 and Indian Wireless Act 1933.
- viii) 'Licensee' means any person licensed under sub-section (1) of section 4 of the Indian Telegraph Act 1885 (13 of 1885) for providing specified public telecommunication services.
- ix) 'Message' means anything falling within paragraph 3 section 3 of the Indian Telegraph Act.
- x) 'MTNL' means Mahanagar Telephone Nigam Limited.
- xi) 'Operator means any person who is authorized by the Licensor to run a relevant connectable system.
- xii) 'Public Land Mobile Network' means a network set up and operated by Department of Telecom Services or the licensed operator(s) including MTNL, for the specified purpose of providing land based mobile communication services to the public. It provides communication facilities to subscribers using mobile set.
- xiii) 'Public Switched Telephone Network' means a network set up and operated by Department of Telecom Services / MTNL or other licensed Basic Service Providers for the specified purpose of providing fixed communication between subscribers using telephone sets/accessories.
- xiv) 'Quality of Service' is the main indicator of the performance of a telephone network and of the degree to which the network conforms to the stipulated norms. The subscriber's perception of the Quality of Service (QOS) is determined by a number of

performance factors. The most important of these have been specified in this regulation.

- xv) 'Regulation' mean the Regulation on Quality of Service of Basic and Cellular Mobile Telephone Service, 2000 made by the Authority under TRAI (Amendment) Act 2000.
- xvi) 'Service Provider' means a licensee of Basic and Cellular Mobile Telephone Services and also includes the Department of Telecom Services & MTNL.
- xvii) "TRAI" means Telecom Regulatory Authority of India constituted under TRAI (Amendment) Act 2000.
- xviii) 'Telecommunication Services' means service of any description (including electronic mail, voice mail data services, audio tex services, video tex services, radio paging and cellular mobile telephone services) which is made available to users by means of any transmission or reception of signs, signals, writing images, and sounds or intelligence of any nature, by wire, radio, visual or other electro- magnetic means but shall not include broadcasting services.
- xix) '**Time Consistent Busy Hour (TCBH)**': The one hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration. ITU recommends analysis of 90 days to establish TCBH.

Section-III

Purpose of laying down Quality of Service Parameters:

3. The purpose of laying down Quality of Service Parameters is to:

- i) Create conditions for customer satisfaction by making known the quality of service which the service provider is required to provide and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) To generally protect the interests of consumers of telecommunication services.

Section-IV

4. QOS Parameters:

(i) For Basic Telecommunication Services:

S.N.	Parameters	Short term before the end of 12 months	Intermediate term before the end of 24 months	Long term before the end of 48 months	Averaged over a period of
1	Provision of a telephone after registration of demand	<21 days	<15 days	<7 days	One quarter
2	Fault incidences (No. of faults/100 subscribers /month)	<12	<7	<3	One quarter
3	Fault repair by next working day	>85%	>87%	>90%	One month
4	Mean Time To Repair (MTTR)	<24 Hrs.	<12 Hrs	<8 Hrs	One month
5	Dial Tone Delay	0.90 Probability of not exceeding 600msec with a mean value of ≤ 400 mS	0.92 Probability of not exceeding 600msec with a mean value of ≤ 400 mS	0.95 Probability of not exceeding 600msec with a mean value of ≤ 400 mS	One quarter
6	Grade of Service	a) Junction between local exchanges – 0.002 b) Outgoing junctions from TAX to local exchange –0.005 c) Incoming junctions from local exchange to TAX –0.005 d) Incoming or outgoing junctions between TAX's 0.005 e) Switching network should be non-blocking or should have extremely low blocking probability	Same as short term	Same as short term	One quarter

7	Call Completion Rate within a local network should be better than	>55%	>60%	>65%	
8	Metering and billing credibility	Not more than 0.2% of bills issued should be disputed over a billing cycle	Not more than 0.15% of bills issued should be disputed over a billing cycle	Not more than 0.1% of bills issued should be disputed over a billing cycle	One Billing Cycle
9	Operated Assisted Trunk Calls	Urgent Calls < 1 hr.30 min delay Ordinary calls<2 hrs 30 min delay	Urgent Calls < 1 hr. 15 min delay Ordinary calls<2 hrs 15 min delay	Urgent Calls < 1 hr. delay Ordinary calls<2 hrs delay	One month
10	Response Time to other operator assisted services	85% calls < 10 sec	90% calls < 10 sec	95% calls < 10 sec	One month
11	Customer Care (Promptness in attending to customers requests) 95% of requests - Shifts - Closures - additional Facility	< 7 days <24 Hrs. <48 Hrs.	< 5 days <24 Hrs <36 Hrs	< 3 days <24 Hrs <24 Hrs	One month
12	Percentage of repeat faults	<2%	<1.5%	<1%	One month
13	Customer perception of services				
(i)	% satisfied with the provision of service	>80	>90	>95	
(ii)	% satisfied with the billing performance	>80	>85	>90	
(iii)	% satisfied with help services	>80	>85	>90	
(iv)	% satisfied with network performance, reliability and availability	>85	>90	>95	

(v)	% satisfied with maintainability	>85	>90	>95	
(vi)	Overall customer satisfaction	>80	>85	>95	
(vii)	Customer satisfaction with offered supplementary services %satisfied	>80	>85	>95	

(ii) For Cellular Mobile Telephone Services:

S.N.	Parameter	Short term (before the end of 12 months)	Intermediate term (before the end of 24 months)	Long term (before the end of 36 months)	Averaged over a period of
A	Fault incidence & Repair				
(i)	Fault Incidence (Number of faults/100 subscribers /month)	<3	<2	<1	One quarter
(ii)	Faults cleared within 24 hours	>98%	>99%	100%	One quarter
(iii)	Accumulated down time of Community Isolation	<24 hours	<24 hours	<24 hours	One quarter
B	Network Performance				
(i)	Call Success Rate (within licensee's own network)	>98%	>98%	>99%	One quarter
(ii)	Service Access Delay	Between 9 to 20 seconds depending upon number of paging attempts (Average of 100 calls =< 15 sec)			One quarter
(iii)	Call Drop Rate	<4%	<3.5%	<3%	One quarter

(iv)	Percentage of connections with good voice quality	>90%	>92%	>95%	One quarter
C	Billing Complaints				
(i)	Billing complaints per 100 bills issued	<0.2%	<0.15%	<0.1%	One quarter
(ii)	%age of billing complaints resolved within 4 weeks	>99%	>100%	>100%	One quarter
(iii)	Period of all refunds / payments due to customers from the date of resolution of complaints as in (ii) above	<6 weeks	<5 weeks	<4 weeks	One quarter
D	Customer perception of service				
(i)	% satisfied with the provision of service	>80	>90	>95	
(ii)	% satisfied with the billing performance	>80	>85	>90	
(iii)	% satisfied with help services	>80	>85	>90	
(iv)	% satisfied with network performance, reliability and availability	>85	>90	>95	
(v)	% satisfied with maintainability	>85	>90	>95	
(vi)	Overall customer satisfaction	>80	>85	>95	
(vii)	Customer satisfaction with offered supplementary services % satisfied	>80	>85	>95	

Section V

5. Review:

- i) The QOS parameters given in Section IV may be reviewed by the Authority from time to time.
- ii) The Authority, on reference from any affected party, and for good and sufficient reasons, may review and modify this regulation.

Section VI

6. Explanatory Memorandum:

This regulation contains at Annexure A and B, an explanatory memorandum, which seeks to clarify various issues dealt in this regulation.

Section VII

Residuary Clauses

7. Over-riding Effect:

Wherever higher quality parameter has been stipulated as a condition of license, the QOS as required by the license will over ride the parameters given herein.

8. Interpretation:

In case of disputes regarding interpretation of any of the provisions of this Regulation, the decision of the Authority shall be final and binding.

(Rajendra Singh)

Joint Secretary (Engineering)

EXPLANATORY MEMORANDUM

ANNEXURE A

BASIC SERVICES:

1. This regulation is the result of a consultation process through written comments and open house discussions, which comprehensively addressed all aspects of Quality of Service (QOS). Discussions with Service providers, Consumer Organizations and general public were held in various parts of the country to get inputs from the stakeholders. The comments and feedback received from stakeholders have been taken into account in finalising the QOS parameters.
2. In respect of QOS parameters for Basic Services, this regulation covers all parameters specified in the License. An additional parameter relating to '% repeat faults' has been specified as it directly affects customer satisfaction.
3. A provision for customer survey through opinion polls to assess their perception of the quality of service has been included within the scope of this Regulation. Parameters of subjective assessment

have been introduced to make the survey more customer centric.

4. TRAI has been monitoring selected QOS parameters for the last two years and certain trends have been noticed. Based on these observations it has been possible to develop, the QOS standards, which are considered achievable over the specified time frames. All the measurements of engineering standards such as Grade of Service (GOS) are to be carried out in the Time Consistent Busy Hour (TCBH) as specified by ITU-T.
5. The norm is in regard to provision of a telephone after registration of demand (Sl. No. 1 Section IV of the regulation) in exchange areas where telephone is available on demand, the operator should specify such areas and the same should be widely publicised. In order to ensure that applications for telephone connections are, registered without any discrimination, it is mandatory for the service provider to register all demands for telephones and give registration number to the prospective customer. If the telephone can be provided on demand, the same should be provided within the time frames indicated in the Regulation. In all other cases, waiting list should be maintained and connections released in a non-discriminatory manner as per the waiting list, objectively predetermined for various categories.
6. Network performance parameters like dial tone delay, grade of service and call completion rate (CCR) shall be measured on sample basis by the Authority from time to time, directly or if it so chooses, through an independent agency. These measurements shall be taken in the Time Consistent Busy Hour (TCBH).
7. Customer perception regarding telecom service shall be measured through customer survey conducted by the Authority through an independent agency. The results of this survey may be made public for the information of the customers to generate healthy competition amongst service providers to improve service.
8. The metering and billing credibility parameters have been specified for on line charging systems as well as for off line Billing Software system. It includes charging errors in preparation of telephone bills by the latter.
9. Call Completion Rate: (CCR) Call completion rate is defined as the ratio of the number of completed calls to the number of call attempts. Not all call attempts result in effective calls i.e. called party answers. A variety of reasons such as called line busy, no answer and congestion in the network as well as subscriber behaviour like premature release wrong dialing etc. are responsible for the failure. Congestion or blocking occurs due to either node or link congestion in the network due to paucity of resources both hardware and software to handle the call.
10. Grade of Service: This is defined as ratio of lost calls to total call attempts offered to a group of junctions. The smaller the value of grade of service, the better is the service. 0.002 grade of service means that two calls in one thousand calls or one call in every five hundred calls may be lost.
11. The periods indicated for basic services quality parameters at S.N. 1,4 & 11 refer to the working days/ hours as relevant.
12. Repeat fault percentage refers to the ratio as percentage of repeat faults to total number of faults in the month.

EXPLANATORY MEMORANDUM

ANNEXURE B

CELLULAR SERVICES:

1. The cellular QOS parameters have been divided in four categories viz. (i) fault incidence and repair; (ii) network performance (iii) billing complaints and (iv) Customer Perception regarding Services. The fault incidence and repair parameters have been specified based on the monitoring of the services during last two years by TRAI, the feed back received from COAI and other cellular operators on QOS consultation paper. Since the cellular network is a new network based on state of the art digital standards, the QOS parameters for fault incidence and repair have been laid down mostly based on GSM MOU.
2. Network performance parameters are based on GSM MOU standards, which are slightly modified in the light of the feedback received from various cellular operators in response to the consultation paper released by TRAI.
3. The quality of voice in cellular mobile telecom services is measured on a scale from 0 to 7. As the quality deteriorates, this value increases. The quality of the voice is considered to be good, if this value remains between 0 and 4.
4. The network performance parameters like call success rate (within licensee's own network), service access delay, call drop rate and voice quality are the parameters which are directly related to the quality of service that is available to the customer. These shall be measured on sample basis during the Time Consistent Busy Hour (TCBH).
5. Group Access Delay comprises of the following:
 - a. Time to connect Call: Telecom engineering Centre (TEC) test schedule has specified this time as the time between " Pressing the send button " and " getting ring back tone". This should not exceed four seconds.
 - b. Time to confirm instruction to connect: This will be defined as the maximum time from initiating the call set up command to when this is acknowledged to the user.
 - c. Time to release call: The maximum time from initiating the disconnect command to when this command is passed on to the called network. This should not exceed 2 seconds.
 - d. Time to alert Mobile Set: The maximum time from when the PLMN receives a call for a Mobile Set (assumed to be within the coverage area) to when the alert is energized. This time period is 4-15 seconds depending upon the number of paging attempts.

The value of Group Access Delay should be between 9-20 seconds
6. Call Success Rate: This is defined, as the probability that a call attempt made from a mobile set within the coverage area, in 90% of the cases, will be successfully signalled to the called network, within the specified time. It does not refer to the performance of the called network, and does not include the congestion on the air interface.

7. Call Drop Rate; It is defined as ratio of calls lost after establishment to all established calls. This shall include calls dropped due to failure of handover, radio loss and network congestion.
8. Accumulated downtime of community isolation: This shall be defined as the accumulated downtime due to community isolation lasting for more than one hour i.e. failure of entire exchange area resulting from trunk failure, switch failure, Base Station failure.
9. Handover means the action of switching the call in progress from one radio channel to another radio channel and is used to allow established calls to continue by switching them to another radio source, e.g. when mobile station moves from one base station area to another.