Consultation Paper No. 2 /2005

TELECOM REGULATORY AUTHORITY OF INDIA

Consultation Paper

on

Review of Quality of Service (QOS) Parameters of Basic and Cellular Mobile Telephone services

NEW DELHI

22nd February, 2005

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Preface

TRAI has been monitoring the Quality of Service (QOS) of basic and cellular operators viz-a-vis the QOS parameters laid down vide TRAI's 'Regulation of Quality of Services of Basic and Cellular Mobile Telephone Services, 2000' dated 5th July 2000. The benchmarks for these QOS parameters were to be achieved in three stages viz. (i) in the short term before the end of 12 months, (ii) in the intermediate term before the end of 24 months; and (iii) in the long term of 36 months for cellular and 48 months for basic service operators. The Regulation provides for review of the parameters from time to time.

2. The long term period set for achieving the QOS benchmarks is already over and the performance of the operators viz-a-vis the QOS benchmarks is unsatisfactory. The Authority had been discussing this matter with the service providers and during these meetings the Basic Service Operators had indicated certain constraints and had suggested a review of some specific parameters and their benchmarks because of these constraints. Further, the independent agency appointed by TRAI to conduct the QOS survey on behalf of TRAI has recommended that there is a need to review some QOS parameters for mobile services also. The Authority has examined these recommendations, discussed the matter with mobile operators, and has also noted a number of new developments in the mobile sector since the QOS parameters were specified in the year 2000 (e.g. CDMA mobile phones), and has included in this consultation papers proposals for some changes in the QOS parameter for mobile service. Based on the above, this Consultation Paper reviews the implementation of the present QOS parameters and presents a number of issues raised by the service providers on these parameters. It also discusses the need for prescribing new parameters and measures needed for effective implementation of the QOS benchmarks, including the possibility of imposing penalties in case of violation of the QOS parameters.

3. The consultation paper consists of three chapters. Chapter 1 gives the background of the consultation paper. In Chapter 2, problems being faced by the operators in complying with the QOS benchmarks for various parameters, as laid down by TRAI and the need for stipulating benchmarks for certain new parameters are discussed. Chapter 3 discusses the issue of penal action for non-compliance of the benchmark. The consultation paper has been placed on TRAI's website (www.trai.gov.in).

4. All stakeholders are requested to send their written comments on the issues raised in this paper on or before 21st March, 2005. For any clarification on the matter, Advisor (QOS) may be contacted on Phone No. 26160404 or email sgupta03@bol.net.in.

(Pradip Baijal)
Date: 22nd February, 2005 Chairman, TRAI

Chapter 1

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1. Background:

1.1 Section 11 (1) (b) (v) of the TRAI Act 1997 mandates the Authority to " lay down the standards of quality of service to be provided by the service providers and ensure the quality of service and conduct the periodical survey of such service provided by the service providers so as to protect interest of the consumers of telecommunication services". In order 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; and

(iii) to generally protect the interests of consumers of telecommunication services,

the Authority, in exercise of its functions under the above provisions in the TRAI Act, had notified the "Regulation on Quality of Services (QOS) of Basic and Cellular Mobile Telephone Services, 2000" vide Notification dated 5th of July, 2000. **A copy of this regulation is attached at Annexure I for ready reference.** The benchmarks for these QOS parameters were to be achieved in three stages viz. (i) in the short term before the end of 12 months, (ii) in the intermediate term before the end of 24 months; and (iii) in the long term of 36 months for cellular and 48 months for basic service operators.

1.2 The QOS standards in the above regulation were finalized after extensive consultation with the stakeholders and also based on the QOS standards in the licenses of the new entrants, and also of the prevalent international practices. It is seen that during the last four years of implementation of the QOS Regulation, based on the performance monitoring reports submitted by the Basic Service Operator and also on the recommendations of the independent agency appointed by TRAI to conduct QOS Survey, the performance in respect of parameters related with Fault incidences, Clearance of Faults etc is way below

the prescribed benchmarks. This is more so in the case of the incumbent operators viz. BSNL and MTNL. The primary reason for this seems to be the presence of a legacy copper network and the lack of network up-gradation over the last few years.

1.3 The benchmarks for cellular service prescribed in the Regulation were mostly based on the GSM MOU. However, the last few years have seen the emergence of CDMA technology in a big way. Hence, parameters need to be stipulated for CDMA technology also. It could be similar for both the networks.

1.4 The experience gained over the last four years in implementing the QOS Regulation has revealed the necessity for deletion of some parameters as they are no longer required in the present scenario. The International practices on the prevailing QOS standards have been studied for Malaysia, Singapore and Australia **(Annexure - II)**. The comparison reveals that some of the standards of these countries are quite comparable with those prevailing in India, whereas some of the Indian QOS standards may require modifications, as these seem to be stringent in the prevailing Indian conditions.

1.5 In view of the above, the Authority felt that a need has arisen to review the implementation of the existing QOS parameters. As a first step in such a review, the Authority had detailed discussions with the operators. The outcome of these discussions is enumerated in Chapter 2.

1.6 While reviewing the efficacy of the existing parameters in ensuring quality of service provided by the service providers, the Authority felt the need for stipulating some additional parameters to assess the network operational performance of the service providers. These additional parameters have also been discussed in Chapter 2.

1.7 As per the TRAI Act, the Authority is not empowered to directly penalize the service provider for any act of omissions or for non-achievement of benchmarks mandated by it in its QOS regulation. In Chapter 3, certain International practices on this issues have been discussed.

Chapter 2

Discussions on review of QOS parameters and their benchmarks:

2. BASIC SERVICE

2.1 In order to get the views of the operators about the reasons for their failure to meet the benchmarks stipulated by TRAI for the various QOS parameters and also to know their Action Plans to meet the benchmarks/ improving their poor performance, the Authority had convened a meeting with all the Basic service providers on 5th July 2004. A separate meeting with incumbent operators i.e. BSNL and MTNL were also held on 18th August 2004. During discussions on the QOS parameters of Basic service, the service providers, mainly BSNL and MTNL, expressed their inability to achieve the benchmarks of some of the parameters and wanted some relaxation either, in the benchmarks or in the timeframe due to one or the other reasons as mentioned below in respect of each parameters.

(a) Objective Parameters:

2.2 Existing Parameters:

2.2.1 Provision of a telephone after registration of demand (100% in <7 days):

This 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. This parameter is largely not met by the operators. Both MTNL and BSNL expressed the view that it is not possible to meet the benchmark of 100% due to following reasons: -

i) Address problem—Sometimes no proper correspondence is possible due to improper address of the subscriber being provided in the registration form. This delays the process of providing a new connection.

ii) Non-availability of the subscribers at their residences except on Sunday, where both husband and wife are working.

iii) Technically Non-Feasible (TNF) areas—There are certain TNF pockets where the new connections can not be provided within the stipulated period..

They suggested modifying the benchmarks from 100% to 90%, in view of above reasons.

2.2.2 Fault incidence (No. of faults/100 subs/month) (<3) :

The benchmarks for this parameter is less than 3 faults per 100 subscribers in a month. The fault rates for BSNL and MTNL are generally very high. The reasons for the high incidence of faults were discussed in detail, as BSOs are not meeting this parameter in most of the circles. MTNL/BSNL suggested that while calculating this parameter, instead of " no. of subscribers", " no. of Stations " should be taken in to account as per the norms of DOT. Alternately, they wanted **extension of the Intermediate term and long term by 2 years and 3 years, with benchmark of < 5 and <3** respectively. In support of their argument, they quoted the following reasons:

(i) In large cities, most of the subscribers have more than one telephone connected on the same line and this increases the incidence of faults.

ii) A number of organizations / Offices have large PBXs with junctions of MTNL/BSNL These PBXs have a large number of both internal and external Extensions. These also contribute to the fault incidence.

iii) As most of the connections are through wire line, fault incidences also occur due to construction works being carried out such as the Metro (in Delhi), flyovers, etc. Very old network consisting of paper core under ground cable also leading to faults in the rainy seasons.

iv) Slums are also responsible for increasing the fault incidence as the telephone connections have been provided using hanging drop wires, which are often broken by Slum dwellers. They intimated that though they have taken up the work of rehabilitation of external plants on a large scale however, extension of time is needed for achieving the benchmark of < 3 faults.

It is for consideration whether the benchmarks for this parameter should be changed as suggested or the present benchmarks should be enforced.

2.2.3 Mean Time to Repair (<8 Hrs):

The operators had suggested that since the parameter no. 3 viz. " Fault repair by next working day" takes care of this parameter, this parameter may be dropped.

2.2.4 Percentage of repeat faults:

This parameter is **less than 1% averaged over a period of one month**. Since this parameter is related with the parameter "Fault Incidences" it was suggested by the operators that this parameter should be dropped. There could be a possibility that a fault once attended might not have been repaired to the satisfaction of the customer and he may have again complained about the fault. It is for consideration whether this parameter should be dropped from the QOS Regulation or not.

2.2.5 Dial tone delay:

It was also suggested by the operators that in the present scenario where all the exchanges are state of the art digital one this parameter could be removed.

2.2.6 Call Completion Rate within a local network (>65 %)

During discussions, the operators informed that-

a. In Residential Areas the CCR is high.

b. In Commercial Areas the CCR is low as the incidence of telephone remaining busy is very high.

c. In different technology Exchanges, the methods of measurements are different, and this results in variations in the CCR values.

d. In most of the exchanges in the commercial areas, the % of calls not maturing due to either “busy subscriber” or “ no reply” is as high as 40%-45%.

In view of the above reasons, the operators had proposed that the existing benchmark of 65 % be downwardly revised to 55%. It is for consideration whether any change is needed on the benchmarks for this parameter.

2.2.7 Response Time to other operator assisted services:

Presently the need for operator assisted services is very limited as most of the services are performed automatically by the customers, through the IVR systems. As such, it is felt that there is no utility in having this parameter in the present format.

2.3 Proposed additional parameters:

2.3.1 Response time to the Customer for Assistance

The service providers are presently not maintaining sufficient no. of Junctions and staff to entertain the customers’ calls for assistance. As a result, the customers have to try again and again for connecting to operator assistance number and they are facing a lot of problem to access the lines for assistance. Hence, it is felt necessary to introduce this parameter, which reflects the speed in which a call is answered either by the operator or by the IVR system provided by the service provider. This parameter will be an improvement to the existing parameter “Response Time to other operator assisted services”, which is proposed for deletion. During the meetings with the operators the following benchmarks were proposed and the operators had not raised any objection to these benchmarks:

(i) % age of calls answered (electronically)

within 20 seconds = 80% of all operator assisted calls;
within 40 seconds = 95% of all operator assisted calls;

(ii) % age of calls answered by operator (voice to voice) :

within 30 seconds = 80% of all operator assisted calls;
within 60 seconds = 95% of all operator assisted calls;

2.3.2 Time taken for refund of deposits after closures:

This parameter is not there in the existing QOS regulation for Basic Service. As there are large numbers of complaints on account of delay in the refund of the security deposits, it is felt that a parameter in this regard may be included in the QOS regulation of basic service, in the interest of the consumer. The benchmark could be 100 % refunds within 60 days of closures.

(b) Subjective Parameters:

2.4 The TRAI undertakes Quarterly Survey of the customer perception of services offered by the service providers. The result of the Surveys shows that none of the operators is meeting the benchmarks in this regard. It is for consideration whether the benchmarks prescribed in this regard for basic and cellular services should be relaxed or not.

B CELLULAR MOBILE SERVICE:

2.5 In connection with the review of QOS for cellular mobile service, the Authority also had a similar meeting with all CMSPs on 28th October 2004. During this meeting the issues relating to non-compliance of the benchmark of mobile services were discussed. The outcome of these discussions are given below:

(a) Objective Parameters:

2.6 Existing Parameters:

2.6.1 Fault Incidence (Number of faults/100 subscribers /month) & Faults cleared within 24 hours

These parameters are more significant for fixed line service where the telephone Instrument and the lead lines etc are maintained by the service providers. In

case of mobile service, the mobile phone is purchased and owned by the subscriber and the service provider is not responsible for its maintenance. The other network related faults like poor coverage, call drop rate and network congestion etc are not limited to the individual subscriber. Moreover, these network related parameters have already been considered in this Paper. Hence, these parameters, being less relevant for mobile service could be dropped.

2.6.2 Call success Rate:

Within licensees own network, CSR is defined, as "The **probability** that call attempts made from mobile within the coverage area, in 90 % of the cases, will be signalled to the called network within the **specified time**."

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As **probability** is an item that cannot be measured and also, the **specified time** has not been mentioned which can lead to its measurement in different ways by different operators.

IMRB have also mentioned in their survey reports that "Call Success Rate " is a widely misunderstood and poorly measured parameter. The parameter definitely needs revision, as it is currently unable to provide any valid measure pertaining to the network that might have an impact on the subscribers' satisfaction".

In view of the above, it is felt that CSR may be dropped and instead a modified parameter called **"Call Set up Success Rate (CSSR)"** may be included, as suggested later in this Paper.

2.7 <u>New Parameters proposed to be included in the regulation</u>;

2.7.1 Call set-up Success Rate (within licensees own network):

Call Setup Success Rate is defined as the ratio of Established calls to Attempts. Established Calls means the following events have happened in call setup:

i) Attempt is made
ii) The TCH is allocated &
iii) The call is routed to the outwards path of the concern MSC.

Thus this includes complete signaling in the call setup process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (PoI).

- **CSSR** calculation should be measured using OMC generated data only.
- Measurement should be only in Time Consistent Busy Hour for all days of week**.**

Suggested Benchmark: >98%

2.7.2 Blocked Call Rate:

Numbers of blocked calls are those times where there is no free channel to serve a call attempt. Hence this parameter represents congestion in the network. The congestion may be at SDCCH level or TCH level. This objective parameter is an accepted engineering level for determining the hardware and software requirements in any network. Hence, this parameter is proposed to be included in the regulation. This parameter should be measured using OMC generated data only in Time Consistent Busy Hour (TCBH).

Suggested Benchmark: (i) SDCCH Congestion <0.5 %
(ii) TCH Congestion < 2 %

2.7.3 End Point Service Performance:

This assessment is proposed to be done from the view of what the customer get from their end. Endpoints are defined as the interface between the customer and the equipment providing access to the service. End points Service Availability (ESA) is defined as the percentage of time a usable call can be established and maintained between two end points.

The measurement of ESA is described by the ratio:

(Number of attempted calls – number of calls blocked – number of dropped calls) x100 / Total no. of attempted calls

Blocked call means a call that is not connected because there is no free channel to serve a call attempt.

Dropped call means a call where connection succeeds (i.e. the network is accessed and set up is successful, whether or not the communication channel is assigned) but is disconnected due to abnormal call release.

The measurement of dropped call is described by the ratio:

$$\frac{\textbf{Number of dropped calls x100}}{\textbf{Total no. of attempted calls}}$$

Methodology

The ESA testing shall be as follows: -

a) ESA testing shall be by way of static tests and system drive tests in the ratio 30:70.

b) The test call sequence for both tests shall be as follows: -

(i) Call holding time set to last 120 seconds with not more than an interval of 15 Seconds between calls;

ii) If any call is blocked or dropped the test system shall stay idle for the rest of the call duration and interval until the next call attempt is made.

For ESA testing, the terminating end point shall be a test number attached to a mobile switching centre.

Static tests shall be conducted as follows: -

The test shall be conducted while stationary in pre-identified commercial and residential areas accessible to the public where the relevant service provider has coverage. The measurement shall be based on test call sampling on busy hours of business days. **The minimum sample size shall be 50 test calls.**

System drive tests shall be conducted as follows: -

At least **one quarterly comprehensive drive test** of the city tests shall be conducted to check the network performance of the whole city in the following manner:

i) **In-door locations** – at least 10 location per quarter, one residential and one residential and one commercial each from North, South, East , West and Central zone of the town;

ii) **Out door locations** - all major routes in city (main roads and some of the other lanes) covering all the BTS sites in that city;

iii) **Highway drive** – the operator should also cover at least a 10 Kms distance starting from the out skirts of the city in all the highways connecting the town to other cities;

iv) Operator must also cover the entire **"Blackout"** areas identified in the previous quarter drive.

Each area where the tests are conducted should cover not less than 200 KM or 5 hours driving time. The dedicated originating and terminating mobile unit's antenna shall be placed at the same height and in the same vehicle. **The minimum sample size shall be 100 test calls.**

Suggested Benchmark: > 95 %

2.7.4 <u>Service Coverage</u>: The Methodology of the drive test as explained above in item (2.7.3).

Suggested Benchmark:

In door >= -75 dBm
In-vehicle >= -85 dBm
Out door- in city >= -95 dBm

2.7.5 Response Time to the customer for Assistance:

As the service providers are not having the sufficient no. of access lines and the staff to entertain the customers' calls for assistance, the customers have to try again and again to access the lines for assistance. Hence, it is felt necessary to introduce a parameter, which reflects the speed in which a call is answered either by the operator or by the IVR system provided by the service provider.

Suggested Benchmark:

(i)% age of calls answered (electronically)

within 20 seconds = 80% of all operator assisted calls;
within 40 seconds = 95% of all operator assisted calls;

(ii) % age of calls answered by operator (voice to voice) :

within 30 seconds = 80% of all operator assisted calls;
within 60 seconds = 95% of all operator assisted calls;

(b) Subjective Parameters (**Customer perception of service):**

2.8 TRAI had undertaken a Survey of the customer perception of services. As in the case of basic service, the result of the Survey shows that none of the operators is meeting the benchmarks in this regard. It is for consideration whether the benchmarks prescribed in this regard for basic and cellular services should be relaxed or not.

2.9 **QOS benchmarks for CDMA based cellular service:**

As mentioned earlier, the QOS parameters for cellular service were mostly based on the GSM MOU. However, with the launch of CDMA based cellular services by a number of operators, the CDMA based service is now equally competing with the GSM based service. Hence, parameters need to be stipulated for CDMA technology also. It is felt that since the network infrastructure of CDMA is same as that of GSM, CDMA mobile service could have the same parameters with same benchmarks as in the case of GSM mobile service.

2.10 A table showing the existing benchmarks and the proposed benchmarks by the service providers and also the proposed additional benchmarks is given in **Annexure-III**.

2.11 Based on the above discussions with the service providers and the need felt for introducing new QOS parameters, the following questions are put forth for the consideration of the stakeholders:

1. **What are your comments on the existing parameters with benchmarks? Is there any need to change the existing parameters with benchmarks as suggested by the service providers and if so, your suggestion on the benchmark?**

2. **What are your comments on the new parameters suggested above?**

Chapter 3

Empowerment of TRAI for imposing Penalty

3.1 As per Section 11(1)(b)(v) of the TRAI Act, 1997, the Authority is statutorily bound to "lay-down the standards of quality of service to be provided by the service providers and ensure the quality of service and conduct the periodical survey of such service provided by the service providers so as to protect the interest of the consumers of telecommunication service". The provisions of this Section mandate the Authority to

- lay-down the standards of quality of service to be provided by the service providers;
- ensure the quality of service
- conduct the periodical survey of such service provided by the service providers.

so as to protect the interest of the consumers. The license conditions for various services also bind the service providers to adhere to the Quality of Service standards stipulated by TRAI. Although TRAI can recommend to the Government to take penal action for violation of license conditions, including failure to meet QOS standards stipulated by TRAI, neither the TRAI Act nor the license provides any specific powers to TRAI to take penal action in case the Quality of Service standards stipulated by TRAI is not adhered to by the service providers. The absence of any powers to TRAI to directly impose penal action on erring service providers has virtually resulted in making the regulation ineffective and also in areas where enough competition is not there, the service provider is reluctant to invest for improving its network. It is, therefore, felt that there should be powers to TRAI for directly imposing penalty on service providers not meeting the QOS benchmarks. Certain international practices in this regard are given below.

3.2 In Malaysia, the Malaysian Communication and Multimedia Commission regulates the performance of Application service Providers by setting Quality of Service Standards. Non-compliance with these standards means an offender is

liable to be fined for a sum not exceeding one hundred thousand ringgit or imprisonment to a term not exceeding two years or both.

3.3 In Singapore, iDA Singapore regulates the performance of service operators by setting the quality of service standards. To ensure the operators' compliance, iDA has established a penalty framework which imposes a fine of $5000 per primary indicator per month and $1000 per month per secondary indicator.

3.4 In Australia, an act has been passed " Telecommunication (Customer Service Guarantee) Standard 2000 (No. 2) wherein certain basic service parameters related with service provisioning and fault rectification have been identified and are benchmarked. In case the phone company fails to meet the laid down timeframe then they are liable to pay compensation to the customer for each working day of delay.

3.5 Based on the above, the following questions are put forth for the consideration of the stakeholders:

1) **Whether TRAI should also be empowered to impose penalty on the service providers for non-compliance of certain key standards laid down in the regulation?**

2) **If Yes, then what should be the quantum of the penalty and what parameters should be identified as key parameters?**

Annex.I

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	Same as short term	Same as short term	One quarter

		d) Incoming or out going junctions between TAX's 0.005 e) Switching network should be non-blocking or should have extremely low blocking probability			
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 - Addition	< 7 days <24 Hrs. <48 Hrs.	< 5 days <24 Hrs. <36 Hrs.	< 3 days <24 Hrs. <24 Hrs.	One month

	al Facility				
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 licensees 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	<6 weeks	<5 weeks	< 4 weeks	One

	customers from the date of resolution of complaints as in (ii) above				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.

ANNEXURE-II

INTERNATIONAL PRACTICE ON

QOS STANDARDS

Annex II

International Practice on QOS Standards

Sr. No.	QOS Indicators	Benchmarks			
		Malaysia	Singapore	Australia	India
(A) Basic					
1	**Standards on fulfillment of installation order**	a) Installation orders within 24 hours of receipt of the order = 80%: and b) Installation orders shall be fulfilled within 48 hours of receipt of the order = 90%. Notwithstanding the above 100% of installation orders shall be fulfilled within 7 business days	a) Installation time within 5 working days or on date specified by customer = 95% b) Appointment met on date specified by customer = 98% c) Waiting time One month or less	a) in place connection = with in two working days b) **No. in place connection close to available infrastructure and capacity** - Urban > 10000 people = Within 5 working days. Major rural- Between 2500 and 10000 people = within 10 working days. Minor rural and remote- up to 2500 people = within 15 working days. **No. in place connection not close to available infrastructure and capacity**- Urban - More than 10000 people = within one month. Major rural - Between 2500 and 10000 people = within 1 month. Minor rural and remote- up to 2500 people = within 6 months.	100% in < 7 Days

2	**Standards on Fault Complaints**	The number of complaints for every 1000 lines shall not exceed 500 complaints over a twelve month period			Fault incidences per 100 subscribers per month = < 3
3	**Standards on Service restoration Performance (Fault repair)**	a) 80% of all service restoration requests shall be fulfilled within 24 hours of receipt of request b) 90% of all service restoration requests shall be fulfilled within 48 hours of receipt of request.	a) 90% within 24 hrs. b) 95% within 48 hrs.		> 90% by next working day
4	**Mean time to repair**		3 hrs	Urban = End of next working day after report Rural and Remote in certain situations = end of next working day after report Rural = End of second working day after report Remote = End of third working day after report .	< 8 hrs
5	**Grade of Service**				
	a) Intra Network	Not more than 6% of Intra Network Calls shall be lost calls			0.002
	b) Inter-network Calls	Not more than 6% of Intra Network Calls shall be lost calls			0.005

6	**Call Competition Rate within a local network should be better than**				>65%
7	**Standard on Operator speed on Answer**	a) 90% of all operator assisted calls for emergency services shall be answered in not more than 10 seconds: and b) 100% of all operators assisted calls for emergency services shall be answered in not more than 20 seconds.	a) 90% of all operator assisted calls for emergency services shall be answered in not more than 10 seconds: and b) 95% of all operators assisted calls for emergency services shall be answered in not more than 20 seconds.		90% Calls < 10 seconds
8	**Standards on Billing Performance**				
	i) The Percentage of Billing Complaints in any one Billing period against the total no. of bills issued during that billing period	Shall not exceed 2%			Not more than 0.1% of bills issued should be disputed over a billing cycle.
	ii) Resolution of Billing Complaints	a) 90% of Billing complaints shall be resolved within 15 business days of receipt of the complaint: and b) 95% of billing complaints shall be resolved within 30 business days of receipt of the complaint.	100% enquiries dealt within 5 working days		**Proposed to be added**

	(B) Cellular Service				
1	**Standards on general customer complaint handling**	The number of general complaints shall not exceed not exceed 50 complaints per 1000 customers in a 12 month period.			Fault incidence complaints per 100 subscriber per month < 1
2	**Standards on end point service availability (ESA)**	a) ESA shall not be less than 90% for both intra and inter network calls connections b) Drop Call Rate not more than 5% of intra network calls	Call drop Rate below 5%		**Proposed to be added**
3	**Standard on Operator speed on Answer**	a) 90% of all operator assisted calls for emergency services shall be answered in not more than 10 seconds: and b) 100% of all operators assisted calls for emergency services shall be answered in not more than 20 seconds.			
4	**%age of time network is operating**		Over 99%		
5	**%age of calls lost due to busy channel**		Below 5%		< 2% (**proposed to be added**)

6	**%age of calls successfully connected**		Over 95%		Call Success Rate (within licensees own network > 99%) **Proposed to be deleted**
7	**Extent of service coverage**				
8	**a) on street level**		Over 95%		
	b) In building		Over 85%		
9	**Average time taken for calls to be connected**		Below 5 seconds		Service access delay between 9 to 20 seconds depending up on no. of paging attempts
10	**Standards on Billing Performance**				
	i) The Percentage of Billing Complaints in any one Billing period against the total no. of bills issued during that billing period	Shall not exceed 2%			Billing complaints per 100 bill issued < 0.1%
	ii) Resolution of Billing Complaints	a) 90% of Billing complaints shall be resolved within 15 business days of receipt of the complaint: and b) 95% of billing complaints shall be resolved within 30 business days of receipt of the complaint.			100% billing complaints resolved within 4 weeks

ANNEXURE-III

PROPOSALS OF SERVICE PROVIDERS

(A) BASIC SERVICES

S.N.	Parameters	Present benchmarks	Averaged over a period of	Proposal by service providers
1	Provision of a telephone after registration of demand	100% of cases in <7 days	One quarter	90% cases in <7 days
2	Fault incidences (No. of faults/100 subscribers /month)	<3	One quarter	Extension of intermediate and long term by 2 years and 3 years from July, 2004
3	Fault repair by next working day	>90%	One month	No change
4	Mean Time To Repair (MTTR)	<8 Hrs	One month	Delete
5	Dial Tone Delay	0.95 Probability of not exceeding 600msec with a mean value of =<400 mS	One quarter	Delete
6	Grade of Service	Same as short term	One quarter	No change
7	Call Completion Rate within a local network should be better than	>65%		>55%
8	Metering and billing credibility	Not more than 0.1% of bills issued should be disputed over a billing cycle	One Billing Cycle	No change
9	Operated Assisted Trunk Calls	Urgent Calls < 1 hr. delay Ordinary calls<2 hrs delay	One month	No change
10	Response Time to other operator assisted services	95% calls < 10 sec	One month	No change
11	Customer Care		One month	No change

	(Promptness in attending to customers requests) 95% of requests - Shifts - Closures - Additional Facility	 < 3 days <24 Hrs. <24 Hrs.		
12	Percentage of repeat faults	<1%	One month	Delete
13	**Customer perception of services**			
(i)	% satisfied with the provision of service	>95		No change
(ii)	% satisfied with the billing performance	>90		No change
(iii)	% satisfied with help services	>90		No change
(iv)	% satisfied with network performance, reliability and availability	>95		No change
(v)	% satisfied with maintainability	>95		No change
(vi)	Overall customer satisfaction	>95		No change
(vii)	Customer satisfaction with offered supplementary services % satisfied	>95		No change

PROPOSED ADDITIONAL PARAMETERS

S. No.	Parameters	Proposed benchmarks	Averaged over a period of
1	Response Time to the customer for assistance.	(i)% age of calls answered (electronically) : within 20 seconds = 80%, within 40 seconds = 95% (ii) % age of calls answered by operator (voice to voice) : Within 30 seconds = 80%, Within 60 seconds = 95%	One month
2	Time taken for refund of deposits after closures	100% within 60 days.	One Quarter

(B) CELLULAR MOBILE SERVICE

S.No.	Parameter	Long term (before the end of 36 months)	Averaged over a period of	Proposal by service providers
A	**Fault incidence & Repair**			
(i)	Fault Incidence (Number of faults/100 subscribers /month)	<1	One quarter	Delete
(ii)	Faults cleared within 24 hours	100%	One quarter	Delete
(iii)	Accumulated down time of Community Isolation	<24 hours	One quarter	No change
B	**Network Performance**			
(i)	Call Success Rate (within licensees own network)	>99%	One quarter	Delete
(ii)	Service Access Delay			No change
(iii)	Call Drop Rate	<3%	One quarter	No change
(iv)	Percentage of connections with good voice quality	>95%	One quarter	No change
C	**Billing Complaints**			
(i)	Billing complaints per 100 bills issued	<0.1%	One quarter	No change
(ii)	%age of billing complaints resolved within 4 weeks	100%	One quarter	No change
(iii)	Period of all refunds / payments due to customers from the date of resolution of complaints as in (ii) above	< 4 weeks	One quarter	No change
D	**Customer perception of service**			
(i)	% satisfied with the provision of service	>95		No change
(ii)	% satisfied with the billing performance	>90		No change
(iii)	% satisfied with help services	>90		No change
(iv)	% satisfied with network performance, reliability and availability	>95		No change

(v)	% satisfied with maintainability	>95		No change
(vi)	Overall customer satisfaction	>95		No change
(vii)	Customer satisfaction with offered supplementary services % satisfied	>95		No change

PROPOSED ADDITIONAL PARAMETERS

S. No.	Parameters	Proposed benchmarks	Averaged over a period of
1	Call set-up Success Rate (within licensees own network)	**>98%**	One Quarter
2	Blocked Call Rate	(i) SDCCH Congestion <0.5 % (ii)TCH Congestion < 2 %	One Month
3	End Point Service Performance	**> 95 %**	One Month
4	Service Coverage	In door >= -75 dBm In-vehicle >= -85 dBm Out door- in city >= -95 dBm	One Month
5	Response Time to the customer for Assistance	(i) % age of calls answered (electronically), within 20 seconds = 80 %, within 40 seconds = 95 % (ii) % age of calls answered by operator (voice to voice) within 30 seconds = 80 % within 60 seconds = 95 %	One month