

**THE STANDARDS OF QUALITY OF SERVICE OF BASIC TELEPHONE SERVICE (WIRELINE) AND CELLULAR MOBILE
TELEPHONE SERVICE REGULATIONS, 2009**

(7 OF 2009)

PREAMBLE

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, namely

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SECTION I

PRELIMINARY

1. Short title, commencement and application.--

(1) These regulations may be called the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service Regulations, 2009.

(2) They shall come into force with effect from the 1st day of July, 2009.

(3) These regulations shall apply to --

all service providers [including Bharat Sanchar Nigam Limited and Mahanagar Telephone Nigam Limited, being the companies registered under the Companies Act, 1956 (1 of 1956)] providing,--

(i) Basic Telephone Service;

(ii) Unified Access Services;

(iii) Cellular Mobile Telephone Service;

³[(iv) Access Services authorized under Unified License (UL);]

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2. Definitions.--

(1) In these regulations, unless the context otherwise requires,-

(a) "Act" means the Telecom Regulatory Authority of India Act, 1997 (24 of 1997);

³[(aa) Access Services Authorization under Unified License (UL)

(i) means collection, carriage, transmission and delivery of voice and/or non-voice messages over Licensee's network in the designated Service Area.

(ii) The Licensee can also provide Internet Telephony. Internet Services including IPTV. Broadband Services and triple play i.e. voice, video and data.

(iii) While providing Internet Telephony service, the Licensee may interconnect Internet Telephony network with PSTN/PLMN/GMPCS network. The Licensee may provide access service, which could be on wireline and/or wireless media with full mobility, limited mobility and fixed wireless access;]

(b) "Authority" means the Telecom Regulatory Authority of India established under sub-section (1) of section 3 of the Act;

³[(ba) "Base Station" or "BS" means a network element in a radio access network that is responsible for radio transmission and reception in one or more Cells to or from the user equipment and it includes BTS, Node B and eNode B;

(bb) "Base Transceiver Station" or "BTS" means a Base Station in a GSM or CDMA based radio access network technology;]

(c) "Basic Telephone Service" covers collection, carriage, transmission and delivery of voice or non-voice messages over licensee's Public Switched Telephone Network in licensed service area and includes provision of all types of services except those requiring a separate licence;

⁴[(d) "Cell" means an area of radio coverage identified by a Cell Global Identity or CGI;]

(e) "Cell Bouncing Busy Hour" means the one hour period in a day during which a cell in a cellular mobile telephone network experiences the maximum traffic;

³[(ea) "Cell Identity" or "CI" means identity of a cell which is unique within a Location Area(LA) or a Tracking Area (TA)";

(eb) "Cell Global Identity" or "CGI" means the Globally Unique Identification of a cell and is the concatenation of the Mobile Country Code (MCC), Mobile Network Code (MNC), Location Area Code(LAC) or Tracking Area Code (TAC) and the Cell Identity (CI)";

(ec) "Cell_Q(t)" or "Cell Quality of Service Performance Measure for DCR Parameter" means the tth percentile value in the set of DCR values corresponding to a Cell observed during the assessment period";

(ed) "Cell_Q(90)" means Cell_Q(t) with t=90 and indicates the 90th percentile DCR value in the set of DCR values observed for a Cell in the assessment period;

Explanation: If a Cell was operating for ninety days during an assessment period and computed DCR values were available for all these ninety days then arranging these ninety DCR values in ascending order and finding 90th percentile DCR value for that Cell would point to 81st DCR value (counted from lowest to highest DCR value). This Cell_Q(90) DCR value will be the representative DCR value for calculation of Spatial Distribution Measure of that Cell during that assessment period;]

¹[(f) "Cellular Mobile Telephone Service" -

(i) means telecommunication service provided by means of a telecommunication system for the conveyance of messages through the agency of wireless telegraphy where every message that is conveyed thereby has been, or is to be, conveyed by means of a telecommunication system which is designed or adapted to be capable of being used while in motion;

(ii) refers to transmission of voice or non-voice messages over Licensee's Network in real time only but service does not cover broadcasting of any messages, voice or non-voice, however, Cell Broadcast is permitted only to the subscribers of the service;

(iii) in respect of which the subscriber (all types, pre-paid as well as postpaid) has to be registered and authenticated at the network point of registration and approved numbering plan shall be applicable;

⁵[(iv) includes any service provided through Global System for Mobile Communications (GSM), Code Division Multiple Access (CDMA), Wideband CDMA based Universal Terrestrial Radio Access Network (UTRAN), Evolved Universal Terrestrial Radio Access Network (E-UTRAN) based on Long Term Evolution (LTE) technologies and any other technologies permitted under the CMTS or UASL or UL;]

(g) "Call Centre" means a department or a section or a facility established by the service provider under regulation 3 of the Telecom Consumers Protection and Redressal Grievances Regulations, 2007 (3 of 2007);

(h) "consumer" means a consumer of a service provider falling in sub-regulation (3) of regulation 1 and includes its customer and subscriber;

³[(ha) "Day_Q(s)" or "Network Quality of Service Performance Measure on a Day for DCR Parameter" means the sth percentile DCR value in the set of DCR values of all cells of the network on a particular day;

(hb) "Day_Q(97)" means Day_Q(s) with s=97 and indicates the 97th percentile DCR value in the set of DCR values of all Cells of the network on a particular day;

Explanation: If ten thousand cells were operating in a network on a particular day and computed DCR values were available for all these ten thousand cells then arranging these ten thousand DCR values in ascending order and finding the 97th percentile DCR value would point to the 9700th DCR value (counted from lowest to highest). This Day_Q(97) value will be the representative DCR value for calculation of Temporal Distribution Measure of the network on that day;

⁷[(hba) "Down Link (DL) Packet Drop Rate or DL-PDR" means fraction of Packet Data Convergence Protocol (PDCP) Service Data Units (SDUs), in percentages, which are dropped by the network or lost in the network while transferring data on the downlink for Quality of Service (QoS) Class Identifier (QCI)=1 in LTE based radio access networks;]

(hc) "Drop Call Rate" or "DCR" means the percentage of voice calls which once having been established are interrupted prior to their normal completion;

(hd) "eNode B" or "evolved Node B" or "eNB" means a Base Station that acts as a logical node in Evolved Universal Terrestrial Radio Access Network (E-UTRAN) based on Long Term Evolution (LTE) technology;]

(i) "licence" means a licence granted or having effect as if granted under section 4 of the Indian Telegraph Act, 1885 (13 of 1885) or the provisions of the Indian Wireless Telegraphy Act, 1933 (17 of 1933);

(j) "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;

³[(ja) "Location Area" or "LA" means an area in which a mobile station may move freely without updating the Visitor Location Register (VLR) and includes one or several cells in GSM or CDMA or UTRAN Network;

(jb) "Location Area Code" or "LAC" means a number of fixed length identification number (of 2 octets) used for identifying a Location Area (LA) within a Public Land Mobile Network (PLMN)];

(k) "message" shall have the same meaning assigned to it in clause (3) of section 3 of the Indian Telegraph Act, 1885 (13 of 1885);

(l) "MTTR" means Mean Time to Repair;

⁶[(la) "Node B" means a Base Station that acts as a logical node in a Universal Terrestrial Access Network (UTRAN) based on Wideband CDMA (WCDMA) technology;]

³[(lb) "Network_QSD(s, t)" or "Network Quality of Service (QoS) DCR Spatial Distribution Measure" means the sth percentile value in the set of Cell_Q(t) values for all cells in a network during the assessment period;

Explanation: Network_QSD(s, t) is a representative DCR spatial distribution value for the entire network during the assessment period and indicates that Cell_Q(t) value of at-least s% of the cells were equal to or lower than the Network_QSD(s, t) value;

(lc) "Network_QSD(90,90)" means Network_QSD(s, t) with s=90 and t=90, and indicates 90th percentile value of Cell_Q(90) values of all cells in the network;

Explanation: Network_QSD(90,90) value is a representative DCR spatial distribution value for the entire network during the assessment period indicating that Cell_Q(90) value for at-least 90% of the Cells were equal to or lower than the Network_QSD(90,90) value. For example, if a network was operating with ten thousand cells on ninety days during the assessment period then Network_QSD(90,90) value will be the 90th percentile Cell_Q(90) value out of the available ten thousand Cell_Q(90) values;

(ld) "Network_QTD(s, t)" or "Network Quality of Service(QoS) DCR Temporal Distribution Measure" means the tth percentile value in the set of Day_Q(s) values for a network on all days in the assessment period;

Explanation: Network_QTD(s, t) is a representative DCR temporal distribution value for the entire network during the assessment period which indicates that the Day_Q(s) value for at-least t% of the days during the assessment period were equal to or lower than the Network_QTD(s, t) value:

(le) "Network_QTD(97,90)" means Network_QTD(s, t) with s=97 and t=90, it indicates 90th percentile value of Day_Q(97) values of network on all days in the assessment period;

Explanation: Network_QTD(97,90) is a representative DCR temporal distribution value for the entire network during the assessment period indicating that the Day_Q(97) values of the network for at-least 90% of the days of the assessment period were equal to or lower than the Network_QTD(97,90) value. For example, if a network was operating with ten thousand cells for ninety days during the assessment period, then the Network_QTD(97,90) value will be the 90th percentile Day_Q(97) value out of available ninety Day_Q(97) values;

"(lf)" nth Percentile" or "nth Percentile Value" means the smallest data value in a given data set with the property that n% of the data values in that data set are less than or equal to it.

Explanation: Percentile is a measure of relative standing of an observation within the data set, for example, if 90th percentile value is to be calculated in a data set of 200 DCR values each falling in the interval from 0 to 100 (in percent), then it would point to DCR value at 180th position (90% of 200), when all 200 DCR values are arranged in ascending order and say it is 3.45% (DCR value) in this example. The 3.45% DCR value will be the smallest DCR value in the given set of 200 DCR values with the property that 90% of the DCR values in this set i.e. DCR values from position 1 to 179 in set of values arranged in ascending order, are less than or equal to it. If the data set has many data values in the given data set with 3.45% DCR value, then 90th percentile would point to all such DCR values. In case. n% of the data values comes out to be a number with fraction then rounded up number shall be used.]

(m) "OMC" means Operation and Maintenance Centre;

³[(ma) "Evolved-Universal Terrestrial Radio Access Network (E-UTRAN) Radio Access Bearer" or "E-RAB" means a user plane connection between User Equipment (UE) and Serving Gateway (SGW) in the LTE based technology;]

(n) "Paging Channel" means a signaling control channel in a CDMA network to send control, call setup and paging messages used for communication between mobile station (MS), i.e., mobile handset and Base Transceiver Station (BTS) before such mobile station is assigned a Traffic Channel (TCH);

(o) "Point of Interconnection (POI)" means a mutually agreed upon point of demarcation where the exchange of traffic between the networks of two service providers takes place;

(p) "Public Switched Telephone Network" means a fixed specified switched public telephone network providing a two-way switched telecommunication services to the general public;

(q) "Public Land Mobile Network" means a network set up and operated by any of the licensed operators including Mahanagar Telephone Nigam Limited and Bharat Sanchar Nigam Limited, for the purpose of providing land based mobile communication services to the public and which provides communication facilities to subscribers using mobile stations (MS), i.e., mobile handsets;

(r) "Quality of Service" is the main indicator of the performance of a telecommunication network and of the degree to which such network conforms to the standards of such quality of service as specified in these regulations for specified parameters;

²[(ra) "Radio Access Bearer" or "RAB" means a service provided by the Access Stratum to the Non-Access Stratum for the transfer of user data between the User Equipment and the Core Network;

(rb) "Radio interface" means the interface between User Equipment and the Universal Terrestrial Radio Access Network access point, which encompasses all the functionality required to maintain such interfaces;

³[(rba) "Radio Link Timeout" or "RLT" means ³Radio Link Timeout value broadcast by the GSM based radio access networks to initialize 'S' counter;]

(rc) "Radio Resource Control" or "RRC" means a sub layer of radio interface Layer 3 existing in the control plane which provides information transfer service to the Non-Access Stratum and is responsible for controlling the configuration of radio interface Layers 1 and 2;]

(s) "regulations" means the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service Regulations, 2009;

(t) "Stand-alone Dedicated Control Channel" or "SDCCH" means, a GSM control channel for signaling purposes where the majority of call setup occurs, which is used for communication between mobile station (MS), i.e, mobile handset and Base Transceiver Station (BTS) before such mobile station is assigned a Traffic Channel (TCH);

(u) "service provider" means any service provider to which these regulations apply.

³[(ua) "Tracking Area" or "TA" means an area in which a mobile station may move freely without updating the Mobile Management Entity (MME) and includes one or several cells of Evolved Universal Terrestrial Radio Access Network (E-UTRAN);

(ub) "Tracking Area Code" or "TAC" means a fixed length identification number (of 2 octets) used for identifying a Tracking Area within a Public Land Mobile Network (PLMN);]

(v) "Traffic Channel" or "TCH" means, a logical channel in a GSM or CDMA network which carries either encoded speech or user data;

(w) "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;

(x) "Time Consistent Busy Hour" or "TCBH" means 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 and such Time Consistent Busy Hour shall be established on the basis of analysis of traffic data for a period of ninety days;

(y) "Unified Access Services" -

(i) means telecommunication service provided by means of a telecommunication system for the conveyance of messages through the agency of wired or wireless telegraphy;

(ii) refers to transmission of voice or non-voice messages over Licensee's Network in real time only but service does not cover broadcasting of any messages, voice or non-voice, except, Cell Broadcast which is permitted only to the subscribers of the service;

(iii) in respect of which the subscriber (all types, pre-paid as well as postpaid) has to be registered and authenticated at the network point of registration and approved numbering plan shall be applicable;

⁷[(ya) "Up Link (UL) Packet Drop Rate or UL-PDR" means fraction of Packet Data Convergence Protocol (PDCP) Service Data Units (SDUs), in percentages, which are lost in the network while transferring data on the uplink for Quality of Service (QoS) Class Identifier (QCI)=1 in LTE based radio access networks;]

³[(z) "Voice over LTE" or "VoLTE" means voice call established, maintained and released using IP (Internet Protocol) Multi-Media Sub-System (IMS).]

(2) Words and expressions used but not defined in these regulations and defined in the Act and the rules and other regulations made thereunder shall have the meanings respectively assigned to them in the Act or the rules or the regulations, as the case may be.

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1. Substituted by the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Amendment) Regulations, 2012 vide Notification No. 305-08/2012-QoS dated 07.05.2012 w.e.f. 07.05.2012 for the following : -

"(f) "Cellular Mobile Telephone Service" -

(i) means telecommunication service provided by means of a telecommunication system for the conveyance of messages through the agency of wireless telegraphy where every message that is conveyed thereby has been, or is to be, conveyed by means of a telecommunication system which is designed or adapted to be capable of being used while in motion;

(ii) refers to transmission of voice or non-voice messages over Licensee's Network in real time only but service does not cover broadcasting of any messages, voice or non-voice, however, Cell Broadcast is permitted only to the subscribers of the service;

(iii) in respect of which the subscriber (all types, pre-paid as well as post-paid) has to be registered and authenticated at the network point of registration and approved numbering plan shall be applicable;

(iv) includes both Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA) Technology;"

2. Inserted by the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Amendment) Regulations, 2012 vide Notification No. 305-08/2012-QoS dated 07.05.2012 w.e.f. 07.05.2012.

3. Inserted by the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Fifth Amendment) Regulations, 2017 (4 of 2017) vide Notification No. 304-2/2016-QoS dated 18.08.2017.

4. Substituted by the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Fifth Amendment) Regulations, 2017 (4 of 2017) vide Notification No. 304-2/2016-QoS dated 18.08.2017 for the following:-

"(d) "Cell" means the radio frequency coverage area of a site in radio access network which is part of a cellular mobile telephone network and --

(i) in case it is an omni-site, it is synonymous with the site; and

(ii) at a sectored site, it is synonymous with the sector;"

5. Substituted by the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Fifth Amendment) Regulations, 2017 (4 of 2017) vide Notification No. 304-2/2016-QoS dated 18.08.2017 for the following:-

"(iv) includes access service provided through Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA) technologies and any other technologies permitted under the CMTS or UASL licence;"

6. Substituted by the Standards of Quality of Service of Basic Telephone Service (wireline) and Cellular Mobile Telephone Service (Fifth Amendment) Regulations, 2017 (4 of 2017) vide Notification No. 304-2/2016-QoS dated 18.08.2017 for the following:-

"²[(1a) "Node B" means a logical node responsible for radio transmission or reception in a cell to or from the User Equipment;]"

7. Inserted by the Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Sixth Amendment) Regulations, 2018 (7 of 2018) w.e.f. 01.10.2018 vide Notification No. 305-03/2018-QoS dated 31.07.2018.