

## Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 1: General

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## Foreword

This ETSI Guide (EG) has been produced by ETSI Technical Committee Speech Processing, Transmission and Quality Aspects (STQ).

The present document is part 1 of a multi-part deliverable covering Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements, as identified below:

**Part 1: "General";**

Part 2: "Voice telephony, Group 3 fax, modem data services and SMS";

Part 3: "QoS parameters specific to Public Land Mobile Networks (PLMN)";

Part 4: "Internet access".

EG 202 057-1 (the present document) contains general user related QoS parameter definitions and measurement methods that can be applied to any service. Additional parts of the present document will contain service specific user related QoS parameter definitions and measurement methods.

EG 202 057-2 [i.1] contains user related QoS parameter definitions and measurement methods for voice, Group 3 fax, modem data services and SMS accessed via the public telecommunications network. The data parameters are specified for the case where an ITU-T Recommendations V.90 [5] and V.92 [6], compliant modem is used since this kind of modem is in common use.

EG 202 057-3 [i.2] contains user related QoS parameter definitions and measurement methods for public land mobile networks (PLMN).

EG 202 057-4 [i.3] contains user related QoS parameter definitions and measurement methods specific to Internet access.

The present document has been written to provide a balanced approach taking into account as far as practicable the following seven principles:

- 1) QoS parameters should be easily understood by the public, and be useful and important to them.
- 2) All network related parameters are applicable at the network termination point (where appropriate).
- 3) To be as realistic as possible, real traffic rather than test calls should be used as a basis of the measurements, wherever possible.
- 4) Parameters should be capable of verification by independent organizations. This verification might be made by direct measurements or by audit of service provider's measurements.
- 5) The accuracy of QoS values should be set to a level consistent with measurement methods being as simple as possible with costs as low as possible.

- 6) The parameters are designed for both statistical and individual application. The statistical values should be derived by the application of a simple statistical function to the individual values. The statistical function should be specified in this multi-part deliverable. This multi-part deliverable should also contain guidelines on how statistically significant samples should be selected.
- 7) The statistical functions should be designed so QoS figures from different service providers can be compared easily by users and in particular consumers.

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# 1 Scope

The present document contains definitions and measurement methods for a range of user perceivable Quality of Service (QoS) parameters. The purpose of these parameters is to define objective and comparable measures of the QoS delivered to users/customers for use by users/customers. The present document applies to any telecommunication service, however, some parameters may have a limited application.

The present document is intended to provide a menu from which individual items can be selected. There is no obligation to use any or all of the parameters.

The QoS parameters are related primarily to services and service features and not to the technology used to provide the services. Therefore the parameters should be capable of use when the services are provided on new technologies such as IP and ATM or other packet switched technologies as well as on circuit switched technologies.

The establishment of target values for QoS is beyond the scope of the present document. The QoS parameters listed in the present document are also not intended to assess the complete QoS of a telecommunication service. The present document provides a set of QoS parameters that covers specific user related QoS aspects rather than a complete list of QoS parameters. This set has been chosen to address areas where monitoring of QoS is likely to be most worthwhile, i.e. the areas that are most likely to be affected by any QoS problems.

If stakeholders wish to examine other QoS aspects they are recommended to follow the general approach of the present document - as far as practicable - as a basis for the development of definitions and measurement methods for new specific QoS parameters.

The set of QoS parameters is designed to be understood by the users of various telecommunications services. Sub-sets of these parameters can be selected for use in different circumstances. For example a specific parameter might be relevant for many users in some countries or markets but the same parameter might not be of relevance in others. Therefore stakeholders - users, customers, regulators, service providers, network operators and other parties interested in the use of QoS parameters - should decide in co-operation, which parameters and which measures should be used in their particular situation. This decision should take account of:

- The precise purpose for which they will be used.
- The general level of quality achieved by most operators.
- The degree to which the parameters will provide a reliable comparison of performance.
- The cost of measuring and reporting each parameter.

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# 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

## 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] Directive 98/10/EC of the European Parliament and of the Council of 26 February 1998 on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment.
- [2] ITU-T Recommendation E.105: "International telephone service".
- [3] ITU-T Recommendation E.800: "Terms and definitions related to quality of service and network performance including dependability".
- [4] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [5] ITU-T Recommendation V.90: "A digital modem and analogue modem pair for use on the Public Switched Telephone Network (PSTN) at data signalling rates of up to 56 000 bit/s downstream and up to 33 600 bit/s upstream".
- [6] ITU-T Recommendation V.92: "Enhancements to Recommendation V.90".

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI EG 202 057-2: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 2: Voice telephony, Group 3 fax, modem data services and SMS".
- [i.2] ETSI EG 202 057-3: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 3: QoS parameters specific to Public Land Mobile Networks (PLMN)".
- [i.3] ETSI EG 202 057-4: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 4: Internet access".



## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**access line:** connection from the Network Termination Point (NTP) to the entry point to the local switch or remote concentrator, whichever is the nearer

NOTE: In many cases this is the main distribution frame.

**access network operator:** organization that provides the access line

NOTE: In many cases the access network operator will be the direct service provider, but if the line is unbundled, the direct service provider would be a separate organization.

**call by call carrier selection:** form of carrier selection where the user dials a carrier access code to indicate which carrier is to route the call

**carrier access code:** code that the user may or must dial before the national (significant) number when dialling an access line in another telecommunications network, so that the call is routed by the carrier of his choice

**customer:** party that pays for the telecommunication service(s) provided

NOTE: Customers can generally be categorized as business or residential; the definition of business and residential customers is left to individual service providers. Service providers who receive interconnect services from other service providers are not considered to be customers for the purpose of the present document. The term "customer" is equivalent to "subscriber", which is used in Directive 98/10/EC [1].

**direct service:** service where the service provider that provides the telecommunication service(s) also provides the access network or rents an unswitched local loop (unbundled local loop) to use for the provision of the service to the customer

**indirect service:** service where the service provider that provides the telecommunication service(s) does not provide the access network but is selected by the customer or user using a form of call by call carrier selection or carrier preselection

**Internet:** computer network consisting of a worldwide network of computer networks that use the TCP/IP network protocols to facilitate data transmission and exchange

**Internet access:** making available of facilities and/or services for the purpose of providing an access to the public Internet in order to provide a user with access to services or resources of the Internet

NOTE 1: The Internet access can be separated in two parts, the physical and the logical access. The physical access provides a connection from the user's premises to, but not including, the POP (normally a dial-up circuit or broadband link or leased line) whereas the logical access consist of the setting up of an account that later on enables the user by a login process with the ability to access to the services and resources of the Internet (normally by assigning an IP address).

NOTE 2: The physical and logical access may be provided by different service providers.

NOTE 3: The function of the physical access may be provided by several interconnected networks.

**Internet Access Provider (IAP):** organization that provides users with an Internet access

**login process:** multi-step process which includes both authentication and authorization as well as other system start-up tasks in order to provide a user with access to services or resources

**network operator:** organization that provides a network for the provision of a public telecommunication service

NOTE: If the same organization also offers services it also becomes a service provider.

**Network Termination Point (NTP):** physical point at which a user is provided with access to a public telecommunications network

**ported number:** subscriber number (directory number) where the location of the NTP and/or the identity of the service provider has changed after the number was originally allocated

**preselection:** form of carrier selection where the customer informs his access network operator which carrier is to route all or a particular subset of his calls, unless call by call carrier selection is used

**public Internet:** part of the Internet that is available to the general public

NOTE: The access is normally provided by Internet access and Internet service providers.

**Public Telecommunications Network (PTN):** telecommunications network used wholly or partly for the provision of publicly available telecommunications services

**Quality of Service (QoS):** collective effect of service performance which determines the degree of satisfaction of a user of the service

NOTE: See ITU-T Recommendation E.800 [3].

**service provider:** organization that offers a telecommunication service to the customer and/or user

NOTE: A service provider need not be a network operator.

**stakeholder:** party having an interest in the level of quality of a service

**supplementary service:** additional service that modifies or supplements a basic telecommunication service

NOTE: Consequently, it cannot be offered to a customer as a stand-alone service; it has to be offered in association with a basic telecommunication service. The same supplementary service may be common to a number of basic telecommunication services (see ITU-T Recommendation I.210 [4]).

**telecommunications:** technical process of sending, transmitting and receiving any kind of message in the form of signs, voice, images or sounds by means of telecommunications systems

**telecommunication services:** provision of telecommunications and the provision of other additional services that are closely related to the provision of telecommunications

EXAMPLE: Billing, directory services.

**telecommunications systems:** technical equipment or systems capable of sending, transmitting, switching, receiving, steering or controlling as messages identifiable electromagnetic signals

**user:** individuals, including consumers, or organizations using or requesting publicly available telecommunications services

NOTE: See Directive 98/10/EC [1].

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACD	Automatic Call Distribution
ACR	Anonymous Call Rejection
AoC	Advice of Charge
ATM	Asynchronous Transfer Mode
CDR	Call Detail Record
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CPE	Customer Premises Equipment

NOTE: Controlled and normally provided by the customer.

GSM	Global Service for Mobile communication
IAP	Internet Access Provider
ISDN	Integrated Services Digital Network
IVR	Interactive Voice Response

MOS	Mean Opinion Score
NTP	Network Termination Point
ONP	Open Network Provision
POP	Point of Presence
PSTN	Public Switched Telephone Network
PTN	Public Telecommunications Network
QoS	Quality of Service
SMS	Short Message Service
VAT	Value Added Tax
xDSL	generic Digital Subscriber Line

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## 4 General considerations

### 4.1 Services covered

The QoS parameters of the present document cover aspects of telecommunications services which are typically provided via the public telecommunications network such as voice, fax or data services. These services may be accessed via terminals connected to fixed network termination points or via mobile accesses e.g. GSM.

The definitions and measurement methods of the QoS parameters were elaborated primarily in order to assess QoS aspects of "standard" telecommunication services. Therefore mainly common aspects and applications of telecommunication services were considered and are reflected in the present parameters. In principle the QoS parameters may also be used for the investigation of special or non-standard telecommunication services but further enhancements/additions to the definitions and measurements methods may be necessary.

Most parameters are in principle applicable to any service provided via the public telecommunications network. Some parameters are however only applicable to specific services depending on technical aspects of the provision of those services, e.g. mobile, data, fixed NTP. Depending on the set of QoS parameters used by the stakeholders the scope of the services covered may vary.

The parameters are end-user/customer and end-to-end orientated and are not intended to address the quality of interconnect services explicitly. Any dependence on interconnect services is included implicitly in the measures of QoS provided to the end user. Separate Guides in this series deal with the QoS of interconnect arrangements.

In many cases the provider of telecommunications services to the customer may depend on other providers for part of the service. An example is an international call where several service providers are normally involved. In such cases the provider of the service to the customer is responsible for all elements for which it receives payment from the customer. In order to provide satisfactory QoS, this service provider will need to ensure that adequate QoS is provided by the other interconnected service providers. QoS figures for the responsible service provider will reflect both its own capability and that of the interconnected service providers.

### 4.2 Use of the parameters

The parameters may be used for various purposes including:

- specifying the level of quality of service in customer telecommunication service contracts or in the description or terms and conditions of the service;
- comparing the quality of service of different service providers;
- comparing the quality of service aspects of different service offers;
- preparing long term studies on the quality of service aspects of a specific service.