International Telecommunication Union

# ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# P.10/G.100

**Amendment 4**

(06/2015)

SERIES P: TERMINALS AND SUBJECTIVE AND OBJECTIVE ASSESSMENT METHODS

Vocabulary and effects of transmission parameters on customer opinion of transmission quality

SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

International telephone connections and circuits – Transmission planning and the E-model

## Vocabulary for performance and quality of service

## Amendment 4: New definitions for inclusion in Recommendation ITU-T P.10/G.100

Recommendation ITU-T P.10/G.100 (2006) – Amendment 4

ITU-T P-SERIES RECOMMENDATIONS

**TERMINALS AND SUBJECTIVE AND OBJECTIVE ASSESSMENT METHODS**

| | | |
|---|---|---|
| **Vocabulary and effects of transmission parameters on customer opinion of transmission quality** | **Series** | **P.10** |
| Voice terminal characteristics | Series | P.30 |
| | | P.300 |
| Reference systems | Series | P.40 |
| Objective measuring apparatus | Series | P.50 |
| | | P.500 |
| Objective electro-acoustical measurements | Series | P.60 |
| Measurements related to speech loudness | Series | P.70 |
| Methods for objective and subjective assessment of speech quality | Series | P.80 |
| | | P.800 |
| Audiovisual quality in multimedia services | Series | P.900 |
| Transmission performance and QoS aspects of IP end-points | Series | P.1000 |
| Communications involving vehicles | Series | P.1100 |
| Models and tools for quality assessment of streamed media | Series | P.1200 |
| Telemeeting assessment | Series | P.1300 |
| Statistical analysis, evaluation and reporting guidelines of quality measurements | Series | P.1400 |
| Methods for objective and subjective assessment of quality of services other than voice services | Series | P.1500 |

*For further details, please refer to the list of ITU-T Recommendations.*

# Recommendation ITU-T P.10/G.100

## Vocabulary for performance and quality of service

## Amendment 4

## New definitions for inclusion in Recommendation ITU-T P.10/G.100


**Summary**

Amendment 4 to Recommendation ITU-T P.10/G.100 provides new definitions for narrowband signals, wideband signals, super-wideband signals and fullband signals. The existing definitions for normal-band telephony, wideband telephony, super-wideband telephony and fullband telephony remain unchanged.



**History**

| Edition | Recommendation | Approval | Study Group | Unique ID* |
|---|---|---|---|---|
| 1.0 | ITU-T P.10 | 1980-11-21 | | 11.1002/1000/7976 |
| 2.0 | ITU-T P.10 | 1984-10-19 | | 11.1002/1000/5883 |
| 3.0 | ITU-T P.10 | 1988-11-25 | | 11.1002/1000/1715 |
| 4.0 | ITU-T P.10 | 1993-03-12 | XII | 11.1002/1000/1716 |
| 5.0 | ITU-T P.10 | 1998-12-03 | 12 | 11.1002/1000/4535 |
| 5.1 | ITU-T P.10 (1998) Amd. 1 | 2003-11-13 | 12 | 11.1002/1000/7039 |
| 6.0 | ITU-T P.10/G.100 | 2006-07-14 | 12 | 11.1002/1000/8857 |
| 6.1 | ITU-T P.10/G.100 (2006) Amd. 1 | 2007-01-25 | 12 | 11.1002/1000/9068 |
| 6.2 | ITU-T P.10/G.100 (2006) Amd. 2 | 2008-07-14 | 12 | 11.1002/1000/9542 |
| 6.3 | ITU-T P.10/G.100 (2006) Amd. 3 | 2011-12-14 | 12 | 11.1002/1000/11456 |
| 6.4 | ITU-T P.10/G.100 (2006) Amd. 4 | 2015-06-29 | 12 | 11.1002/1000/12513 |


* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

## FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

## INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

# Recommendation ITU-T P.10/G.100

## Vocabulary for performance and quality of service

## Amendment 4

## New definitions for inclusion in Recommendation ITU-T P.10/G.100

### Introduction

*The following definitions are to be included in Recommendation ITU-T P.10/G.100 in correct alphabetical order at the respective correct places.*

### Fullband signal

A signal that has no significant signal components outside the range 10 Hz to 20 000 Hz. A fullband signal can be generated by applying the filter from Table 1 to an unfiltered source signal recorded without band limitation in a high quality recording environment. The application of sub-sonic and rumble filters to the source before filtering to fullband is allowed.

NOTE – A real fullband transmission system may limit the passband further. The low-pass filter definition does not emulate a fullband transmission system, channel, device or codec.

**Table 1 – Minimum bandwidth filter definition to derive a fullband signal from a unfiltered source signal**

| Frequency (Hz) | Fullband gain (dB) |
|---|---|
| 10 | −20 (max) |
| 20 | 0 to −3 |
| 30 | 0 |
| 19 500 | 0 |
| 20 000 | 0 to −3 |
| 21 000 | −40 (max) |
| 24 000 | −50 (max) |

### Narrowband signal

A signal that has no significant signal components outside the range 20 Hz to 4 000 Hz. A narrowband signal can be created by applying the filter from Table 2 to a fullband signal as defined in this Amendment, the upper cut-off frequency of 3 800 Hz is due to a realistic interpolation low-pass when re-sampling to 8 000 Hz sampling frequency.

The narrowband signal can also be derived by applying the filter in Table 2 to a wideband or super-wideband signal as defined in this Amendment.

NOTE – A real narrowband transmission system may limit the passband further. The low-pass filter definition does not emulate a narrowband transmission system, channel, device or codec.

**Table 2 – Minimum bandwidth filter definition to derive a narrowband signal from a fullband signal**

| Frequency (Hz) | Narrowband gain (dB) |
|---|---|
| 20 | 0 |
| 3 700 | 0 |
| 3 800 | 0 to −3 |
| 4 000 | −40 (max.) |

**Super-wideband signal**

A signal that has no significant signal components outside the range 20 Hz to 14 000 Hz. A super-wideband signal can be generated by applying the filter from Table 3 to a fullband signal.

NOTE – A real super-wideband transmission system may limit the passband further. The low-pass filter definition does not emulate a super-wideband transmission system, channel, device or codec.

**Table 3 – Minimum bandwidth filter definition to derive a super-wideband signal from a fullband signal**

| Frequency (Hz) | Super-wideband gain (dB) |
|---|---|
| 20 | 0 |
| 13 500 | 0 |
| 14 000 | 0 to −3 |
| 15 000 | −40 (max) |

**Wideband signal**

A signal that has no significant signal components outside the range 20 Hz to 8 000 Hz. A wideband signal can be generated by applying the filter from Table 4 to a fullband signal, the upper cut-off frequency of 7 600 Hz is due to a realistic interpolation low-pass when re-sampling to 16 000 Hz sampling frequency.

The wideband signal can also be derived by applying the filter in Table 2 to a super-wideband signal as defined in this Amendment.

NOTE – A real wideband transmission system may limit the passband further. The low-pass filter definition does not emulate a wideband transmission system, channel, device or codec.

**Table 4 – Minimum bandwidth filter definition to derive a wideband signal from a fullband signal**

| Frequency (Hz) | Wideband gain (dB) |
|---|---|
| 20 | 0 |
| 7 400 | 0 |
| 7 600 | 0 to −3 |
| 8 000 | −40 (max) |

ITU-T G-SERIES RECOMMENDATIONS

**TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS**

| | |
|---|---|
| INTERNATIONAL TELEPHONE CONNECTIONS AND CIRCUITS | G.100–G.199 |
| **Transmission planning and the E-model** | **G.100–G.109** |
| General Recommendations on the transmission quality for an entire international telephone connection | G.110–G.119 |
| General characteristics of national systems forming part of international connections | G.120–G.129 |
| General characteristics of the 4-wire chain formed by the international circuits and national extension circuits | G.130–G.139 |
| General characteristics of the 4-wire chain of international circuits; international transit | G.140–G.149 |
| General characteristics of international telephone circuits and national extension circuits | G.150–G.159 |
| Apparatus associated with long-distance telephone circuits | G.160–G.169 |
| Transmission plan aspects of special circuits and connections using the international telephone connection network | G.170–G.179 |
| Protection and restoration of transmission systems | G.180–G.189 |
| Software tools for transmission systems | G.190–G.199 |
| GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS | G.200–G.299 |
| INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES | G.300–G.399 |
| GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO-RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES | G.400–G.449 |
| COORDINATION OF RADIOTELEPHONY AND LINE TELEPHONY | G.450–G.499 |
| TRANSMISSION MEDIA AND OPTICAL SYSTEMS CHARACTERISTICS | G.600–G.699 |
| DIGITAL TERMINAL EQUIPMENTS | G.700–G.799 |
| DIGITAL NETWORKS | G.800–G.899 |
| DIGITAL SECTIONS AND DIGITAL LINE SYSTEM | G.900–G.999 |
| MULTIMEDIA QUALITY OF SERVICE AND PERFORMANCE – GENERIC AND USER-RELATED ASPECTS | G.1000–G.1999 |
| TRANSMISSION MEDIA CHARACTERISTICS | G.6000–G.6999 |
| DATA OVER TRANSPORT – GENERIC ASPECTS | G.7000–G.7999 |
| PACKET OVER TRANSPORT ASPECTS | G.8000–G.8999 |
| ACCESS NETWORKS | G.9000–G.9999 |

## SERIES OF ITU-T RECOMMENDATIONS

| | |
|---|---|
| Series A | Organization of the work of ITU-T |
| Series D | General tariff principles |
| Series E | Overall network operation, telephone service, service operation and human factors |
| Series F | Non-telephone telecommunication services |
| Series G | Transmission systems and media, digital systems and networks |
| Series H | Audiovisual and multimedia systems |
| Series I | Integrated services digital network |
| Series J | Cable networks and transmission of television, sound programme and other multimedia signals |
| Series K | Protection against interference |
| Series L | Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant |
| Series M | Telecommunication management, including TMN and network maintenance |
| Series N | Maintenance: international sound programme and television transmission circuits |
| Series O | Specifications of measuring equipment |
| **Series P** | **Terminals and subjective and objective assessment methods** |
| Series Q | Switching and signalling |
| Series R | Telegraph transmission |
| Series S | Telegraph services terminal equipment |
| Series T | Terminals for telematic services |
| Series U | Telegraph switching |
| Series V | Data communication over the telephone network |
| Series X | Data networks, open system communications and security |
| Series Y | Global information infrastructure, Internet protocol aspects and next-generation networks |
| Series Z | Languages and general software aspects for telecommunication systems |

Printed in Switzerland
Geneva, 2015