

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

F.790

(01/2007)

SERIES F: NON-TELEPHONE TELECOMMUNICATION
SERVICES

Audiovisual services

**Telecommunications accessibility guidelines for
older persons and persons with disabilities**

ITU-T Recommendation F.790



ITU-T F-SERIES RECOMMENDATIONS
NON-TELEPHONE TELECOMMUNICATION SERVICES

TELEGRAPH SERVICE	
Operating methods for the international public telegram service	F.1–F.19
The gentex network	F.20–F.29
Message switching	F.30–F.39
The international telemesssage service	F.40–F.58
The international telex service	F.59–F.89
Statistics and publications on international telegraph services	F.90–F.99
Scheduled and leased communication services	F.100–F.104
Phototelegraph service	F.105–F.109
MOBILE SERVICE	
Mobile services and multideestination satellite services	F.110–F.159
TELEMATIC SERVICES	
Public facsimile service	F.160–F.199
Teletex service	F.200–F.299
Videotex service	F.300–F.349
General provisions for telematic services	F.350–F.399
MESSAGE HANDLING SERVICES	F.400–F.499
DIRECTORY SERVICES	F.500–F.549
DOCUMENT COMMUNICATION	
Document communication	F.550–F.579
Programming communication interfaces	F.580–F.599
DATA TRANSMISSION SERVICES	F.600–F.699
AUDIOVISUAL SERVICES	F.700–F.799
ISDN SERVICES	F.800–F.849
UNIVERSAL PERSONAL TELECOMMUNICATION	F.850–F.899
HUMAN FACTORS	F.900–F.999

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

ITU-T Recommendation F.790

Telecommunications accessibility guidelines for older persons and persons with disabilities

Summary

This Recommendation is intended to provide general guidelines for standardizing, planning, developing, designing and distributing all forms of telecommunications equipment and software and associated telecommunications services to ensure their accessibility for people with the widest possible range of abilities. It gives guidance on understanding the topic of accessibility and the ways that accessibility may be incorporated in products and services.

Source

ITU-T Recommendation F.790 was approved on 13 January 2007 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. 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/>.

© ITU 2007

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

CONTENTS

	Page
1 Scope	1
2 References.....	1
3 Definitions	2
4 Abbreviations.....	2
5 Conventions	2
6 General principles.....	3
7 Requirements for planning, development and design.....	3
7.1 Basic policies.....	3
7.2 Activities concerning development process	4
8 Common requirements for operation and usage of telecommunications equipment and services.....	5
8.1 Operation	5
8.2 Installation, connection and configuration	6
8.3 Physical safety	6
8.4 Information security	7
8.5 Rights of content usage	7
9 Requirements for terminal equipment	7
9.1 Input/Output interface	7
9.2 Body shapes and structures	9
9.3 External connection ports	9
9.4 Terminology, icons and graphic symbols.....	10
9.5 Alternatives.....	10
9.6 Standardization and disclosure of interface specifications.....	10
10 Requirements for telecommunications services	10
10.1 Interactive telecommunications services.....	10
10.2 Telecommunications platform services.....	11
10.3 Emergency calls.....	11
10.4 Telecommunications services specifications.....	11
11 Requirements for user support.....	11
11.1 User manuals	11
11.2 Disclosure of information about telecommunications accessibility	12
11.3 Instruction.....	12
11.4 Customer support centres	12
Appendix I – Further details of informative references.....	13
Bibliography	15

Introduction

Information and communications technology (ICT), in particular the rapid proliferation of the Internet, has provided substantial benefits to the community; but many older persons and persons with disabilities cannot enjoy these benefits due to barriers in using telecommunications products and services. This issue is becoming more serious with the increasing percentage of aging persons worldwide. In response, some nations have developed their own guidelines for telecommunications accessibility. In today's world, however, telecommunications equipment moves freely across national borders. Thus, in order to enhance telecommunications accessibility, telecommunications accessibility guidelines are indispensable not only domestically but also internationally.

ITU-T Recommendation F.790

Telecommunications accessibility guidelines for older persons and persons with disabilities

1 Scope

This Recommendation is intended to provide general guidelines for standardizing, planning, developing, designing and distributing all forms of telecommunications equipment and software and associated telecommunications services (hereinafter referred to collectively as "telecommunications equipment and services") to ensure their accessibility for people with the widest possible range of abilities including older persons and persons with permanent or temporary disabilities (hereinafter referred to as "older persons and persons with disabilities").

For many years, ITU-T has addressed the needs of persons with disabilities in the development of specific Recommendations. Making telecommunications equipment and services accessible makes sense not only in terms of humanitarian aspects but also in terms of economic aspects. The most obvious reason is the increase in potential customers. Features that make products and services usable for older persons and persons with disabilities can often make them convenient and easy to use for everyone else.

This Recommendation is intended to be part of the overall framework that ITU-T can use in its efforts to support the need for older persons and persons with disabilities to provide more accessible equipment and services. This Recommendation provides information by identifying problem areas which need to be considered when drafting such Recommendations addressing the needs of older persons and persons with disabilities. In the process of developing those Recommendations, it is necessary to actively involve a broad range of users such as older persons and persons with disabilities and clearly understand user and task requirements. Especially, addressing needs earlier rather than later in the development process is preferable in order to reduce or eliminate extra cost for developing those Recommendations.

Also it is to be noted that an accessible design approach may not resolve everything. Where accessible design cannot fully respond to the needs of older persons and persons with disabilities, in particular in the field of services, the need for personal assistance may still be required. However, the provision of personal assistance should never be relied upon to replace the accessible design approach.

Of necessity, guidance provided in this Recommendation is general. It is recognized that additional specific guides need to be developed for specific equipment or service. Though the scope of this Recommendation is given for a development of Recommendations specific to meet the needs of older persons and persons with disabilities, the guidelines described in this Recommendation are expected to be a good reference for producing any other Recommendations in ITU-T to improve telecommunication accessibility.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ISO/IEC Guide 71] ISO/IEC Guide 71:2001, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*.

[ISO 13407] ISO 13407:1999, *Human-centred design processes for interactive systems*.

3 Definitions

This Recommendation defines the following terms:

3.1 user: End-users of telecommunications products and services are people, groups of people and organizations that use or consume telecommunications products and services. They are a diverse group, including people, whatever the age or gender, level of income, geographic environment or work activities. End-users, whether they be organizations or people, have varied requirements.

See Resolution GSC 11-22 (UWG) on *User needs, considerations and involvement*.

3.2 disability: In this Recommendation, "disability" is defined as a state when use of telecommunications equipment and services is restricted.

Mainly, "disability" is viewed as a result of temporary or permanent functional limitation due to disease, accident, ageing and so on. More generally, "disability" includes a state when full use of telecommunications equipment and services is not possible due to the physical and/or social environment (e.g., voice telephony under noisy environment).

NOTE – For more detailed information about the definition of "disability", please refer to appropriate documents such as WHO ICF (World Health Organization – International Classification of Functioning, Disability and Health).

3.3 telecommunications equipment: Any machine, device, line or other form of equipment used to perform telecommunications operations.

3.4 telecommunications services: Services provided to users via the use of telecommunications equipment.

3.5 interactive telecommunications services: Services designed to enable the two-way exchange of information between multiple users in multiple locations via telecommunications equipment such as exchanges and network servers. (Examples: voice telephony, facsimile, video phone, e-mail and instant messaging services.)

3.6 telecommunications platform services: Services designed to support telecommunications equipment and user management, user authentication, content management, charging and payment procedures by operators engaged in the provision of information services via telecommunications equipment.

3.7 telecommunications accessibility: For the telecommunications area, the usability of a product, service, environment or facility by the widest possible range of users and especially users with disabilities.

3.8 assistive technology: Piece of equipment, product system, hardware, software or service that is used to enable, maintain or improve functional capabilities of individuals with disabilities.

4 Abbreviations

None.

5 Conventions

None.

6 General principles

In order to ensure and improve telecommunications accessibility, developers of telecommunications equipment and services shall comply with the following general principles.

- a) When planning, developing, designing, and distributing telecommunications equipment and services, developers should consider older persons and persons with disabilities to ensure that they can use such equipment and services as much as possible. This concept is known as "inclusive design". There will be cases where inclusive design is not practical and, in those cases, the aim should be to provide a service with absolute or near functional equivalence to the original service.
- b) If the required degree of accessibility cannot be provided in the standard configuration of telecommunications equipment or services, such accessibility may be attained by using the product in combination with optional equipment or assistive technology from other manufacturers. Again, the aim should be to provide a service with absolute or near functional equivalence to the original service.
- c) The functions related to telecommunications accessibility should ensure the safety of users.
- d) The functions related to telecommunications accessibility should maintain the information security of users.
- e) Telecommunications equipment and services should be as operable and usable as possible without imposing excessive load on cognitive and memory capabilities. Telecommunications equipment and services should also be as operable and usable as possible even if there are differences in culture or language or if users operate and use them for the first time.

7 Requirements for planning, development and design

In order to ensure and improve telecommunications accessibility, developers of telecommunications equipment and services shall comply with the requirements provided in this Recommendation as well as plan, develop and design all telecommunications equipment and services.

Also, management shall consider the importance of planning, development and design of accessible telecommunications equipment and services, and set specific policies on telecommunications accessibility.

New designs of equipment should use existing international standards wherever possible and be designed to be compatible with existing equipment. Consideration should be given to making the equipment compatible with foreseeable future standards.

7.1 Basic policies

In order to ensure and improve telecommunications accessibility, developers should understand the concept of human-centred design. The incorporation of a human-centred approach for telecommunications accessibility is characterized by the following:

- a) the active involvement of a broad range of users such as older persons and persons with disabilities and a clear understanding of user and task requirements;
- b) an appropriate allocation of functions between users and technology to make an interface friendly to older persons and persons with disabilities;
- c) the iteration of design solutions and evaluations;
- d) multi-disciplinary design.

7.2 Activities concerning development process

Until designs meet requirements, developers should iterate the development process, which includes the following four human-centred design activities (see Figure 1):

- a) Understanding and specification of the context of use.
- b) Specification of the user and organizational requirements.
- c) Production of design solutions.
- d) Evaluation of designs against requirements.

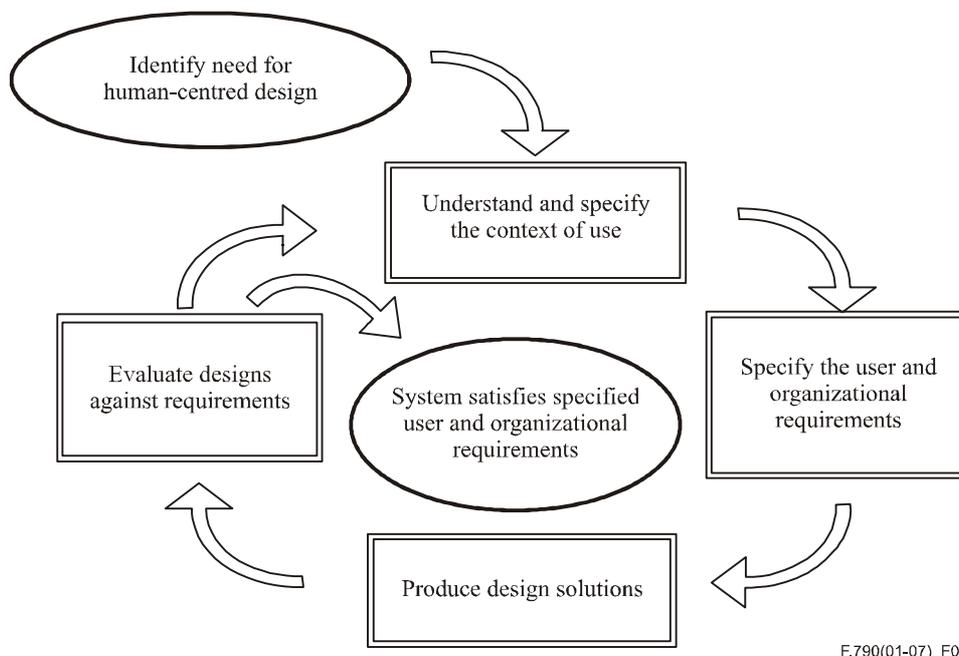


Figure 1 – Human-centred design activities for telecommunications accessibility (based on ISO 13407)

7.2.1 Understanding and specification of the context of use

The following activities are performed to understand and specify the context of use:

- Understanding of physical and cognitive functions of the intended users.
- Understanding of knowledge, experience, and requirements of the intended users concerning use of telecommunications equipment.
- Understanding of environments around the intended users when they use telecommunications equipment because the environments often have an impact on older persons and persons with disabilities.

7.2.2 Specification of the user and organizational requirements

The following activities are performed to specify the user and organizational requirements:

- Identification of the range of users who are older persons and persons with disabilities.
- Identification of requirements suitable for the intended users.
- Determination of the priority of the intended user requirements.
- Understanding of requirements of relevant laws, standards, etc.

7.2.3 Production of design solutions

The following activities are performed to produce design solutions:

- Use of existing knowledge of ergonomics, cognitive engineering, this Recommendation, etc.
- Development of solution prototype by using simulations, models, mock-ups, etc.
- Comprehensive study covering older persons and persons with disabilities besides other studies that mainly cover younger generations.

7.2.4 Evaluation of designs against requirements

The following activities are performed to evaluate designs against requirements:

- Involvement of the intended users in the prototype evaluation.
- Return to appropriate activities based on the evaluation results and iteration of the development process until designs meet the intended user requirements.

8 Common requirements for operation and usage of telecommunications equipment and services

This clause indicates what users such as older persons and persons with disabilities need to be able to do when they use telecommunications equipment and services that are designed with accessibility and usability in mind.

8.1 Operation

8.1.1 Operation of functions

The aim is that functions shall be operable without any difficulties from beginning to end.

8.1.2 Simplicity of operation procedures

Telecommunications equipment and services should avoid unnecessarily high cognitive demands on users by ensuring that the basic activities required to operate the equipment or use the service are as straightforward and simple as possible.

8.1.3 Confirmation

The following shall be confirmable via multiple senses (visually, aurally and by touch):

- Whether the device is in the ready mode.
- Whether the line is in a usable condition.
- The outcome of an operation.
- Whether an input operation was intended or completed.
- Whether the device is about to become unusable and, if possible, why.

8.1.4 Time restrictions

If a task requires users to make responses within a limited time, the users should be able to adjust the time if possible. Users should in any event be able to receive a notice of time restrictions.

8.1.5 Error prevention

Developers shall consider how to ensure that users do not make operation mistakes.

8.1.6 Error cancellation

Users shall be able to cancel erroneous operations and revert to the previous setting or status as far as possible.

8.1.7 Revert to initial status

Users shall be able to revert to the initial status during any given procedure.

8.1.8 Error reset

Devices shall be designed so that they may be reset to a known state. This state should have a high probability of operation in, at least, a basic mode. The method of activating this reset should be simple to use but protected from accidental operation.

8.1.9 Output adjustment

Older persons and persons with disabilities shall be able to adjust the level and nature of outputs such as sound, vibration and screen flashing. In addition, the device should display status of the level and nature of the outputs.

8.1.10 Error messages

Error messages and the consequential action to be taken should be clear and unambiguous.

8.2 Installation, connection and configuration

- a) Packages should be designed so that they are easy to open and easy to unpack without damaging the contents.
- b) Setup procedures for products should be simple for users to perform unaided.
- c) A product should be of simple structure and it should be made simple to plug power strips and any connectors and wire them so that users have an opportunity to do so unaided. Connectors should be easily distinguished to avoid incorrect insertion.
- d) Plugged connectors shall remain secure once connected but easy to remove.
- e) A product shall be designed to resist movement and remain in position during operation.
- f) The installation of batteries and other auxiliary equipment such as a tray shall be easy and simple.
- g) The procedures to store information such as time, names, and phone numbers to a product should be simple so that users have a possibility to do them unaided if required.
- h) It should be easy to replace consumables such as batteries, inks, and roll paper, so that users have an opportunity to do so unaided.

8.3 Physical safety

8.3.1 Safety

Products shall be designed so as not to cause bodily harm or adversely affect the health of users during operation.

8.3.2 Electromagnetic noise

EMI (electromagnetic interference) levels generated by telecommunications equipment, such as radio waves and electromagnetic noise, shall be within internationally agreed limits. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) publishes guidelines on electromagnetic field levels.

Hearing aids have widely different levels of immunity to electromagnetic fields. Telecommunications equipment should be designed to minimize interference to hearing aids while maintaining intended functionality.

8.3.3 Photosensitive epilepsy

Any flashing of lights or screen elements shall be carefully designed to avoid potential problems such as photosensitive epilepsy.

8.3.4 Allergies

The use of materials that are likely to cause allergic reactions should be avoided if such materials are used for equipment that comes into contact with the skin of users. In any event, information on the materials used shall be disclosed. See section 9.5 of [ISO/IEC Guide 71].

8.3.5 Acoustic shock

Acoustic signal levels should not be so loud as to cause danger or discomfort to users of the equipment. See [b-ITU-T P.360]. Note, however, that hard-of-hearing people may require very high audio levels.

8.4 Information security

8.4.1 Privacy protection

Secure yet accessible operation procedures shall be provided for the protection of information of a private or confidential nature. Third parties who obtain confidential information during these procedures must keep that information confidential.

8.4.2 Alternative method of user identification

When biometrics technology is used to identify the user or permit user operations, the device shall also offer the option of an alternative means of identification that is not dependent on the physical characteristics of the user.

8.5 Rights of content usage

Data protected for copyright or other reasons should be converted to other media if laws allow older persons or persons with disabilities to use such data.

9 Requirements for terminal equipment

This clause contains the requirements for terminal equipment, mainly concerning visual or aural characteristics of terminal equipment such as parts layout, shapes of buttons, and alert tones.

9.1 Input/Output interface

9.1.1 Layout of operation panel

- a) Design the display and key layout on the basis of user thought processes and operational procedures.
- b) Avoid excessive line length on the display and overly detailed information.
- c) Avoid crowded display and key layout configurations.
- d) Align the direction of operation of switches with the direction of movement of the device itself.
- e) Arrange operation keys in functional groups by shape, position, colour or other attributes that can be readily identified by persons with visual or tactile sensory impairment.

9.1.2 Operation keys, buttons and switches

- a) Operation keys, buttons and switches shall be designed for both visual and tactile recognition.
- b) Operation keys, buttons and switches shall be designed in an appropriate size and shape for easy operation.
- c) Operation keys, buttons and switches shall be easily recognizable both visually and tactilely when there are a lot of buttons and keys of similar shape or function.
- d) When they are depressed, operation keys, buttons and switches shall provide not only a tactile response but also a visual and aural response.
- e) Both visual and auditory confirmation of key input shall be provided.
- f) The device should be equipped with a double input suppression feature.
- g) The key repeat delay should be fully adjustable.
- h) The placement, size and shape of keys and buttons should be designed to prevent accidental pressing of adjacent keys.
- i) For users who need a lot of time to operate devices, another input method with fewer keystrokes should be provided.
- j) Operation keys, buttons and switches shall be manipulated by using an aid such as an artificial limb or mouse stick as far as possible.
- k) Touch panel software keys and buttons shall be user-friendly with involuntary movement of hands or hand-shaking and operated without direct visual confirmation as far as possible.

9.1.3 Displays

- a) Text shall be as easy to read as possible.
- b) Display content shall be colour-independent.
- c) Surface reflection shall not create any difficulty in seeing the screen as far as possible.
- d) Brightness and contrast shall be adjustable as far as possible.
- e) The size, typeface, character-spacing, line-spacing and colour of text should be made adjustable for ease of use.
- f) Visual information should be understandable in other sensory ways.
- g) Standard position (or starting position) should be verifiable both visually and aurally.

9.1.4 Ringing tones

- a) The volume and frequency of ringing tones shall be designed to make the tone easy to hear depending on the hearing characteristics of users as far as possible.
- b) The sound level shall be adjustable and be able to be muted. In addition, the current status of the level shall be able to be confirmed visually.
- c) It should be possible to choose tones, patterns and melodies for ringing tones.
- d) Information provided by ringing tones shall be available not only in an aural way but also in other sensory ways.

9.1.5 Alert tones and voice guidance system

- a) The volume and frequency of alert tones shall be designed to make the tone easy to hear depending on the hearing characteristics of users as far as possible.
- b) The voice guidance system shall use plain and clearly-enunciated language, and employ logical procedures based on the thought processes of users.

- c) The sound level shall be adjustable and be able to be muted. In addition, the current status of the level shall be able to be confirmed visually.
- d) Basic frequency and sound acoustics should be adjustable.
- e) The speaking rate of voice guidance should be adjustable.
- f) Information provided by voice guidance system should be able to be repeated if necessary.
- g) Information provided by alert tones shall be available not only in an aural way but also in other sensory ways.
- h) Information provided by voice guidance shall also be available in visual form.

9.1.6 Voice input/output system

- a) Receiver sound shall be as easy to hear as possible depending on the hearing characteristics of users.
- b) The volume of receiver sound shall be adjustable, during a call if possible.
- c) The volume of receiver sound shall return to normal levels at the end of a call if a device is expected to be used by several people.
- d) If receiver sound can be amplified, sound leakage should be avoided.
- e) Parameters concerning receiver sound should be adjustable depending on the hearing characteristics of users.
- f) An appropriate side-tone (the sound of the speaker's own voice in the earpiece) shall be provided.
- g) Devices shall be as compatible with hearing aids equipped with induction pick-up coils as possible.
- h) Devices shall be as compatible with external input of hearing aids and cochlear implants as possible.
- i) Devices shall not cause noise in assistive technology such as hearing aids and cochlear implant as far as possible.
- j) Telephone calls shall be available without holding a receiver.

9.2 Body shapes and structures

- a) A receiver or a whole device (if the device must be held during operation) shall have appropriate shape and structure, be made from appropriate materials and be evenly-weighted in order for them to be held easily.
- b) Stationary devices should have appropriate shape and structure, be made from appropriate materials, be evenly-weighted in order to accommodate various sitting positions.
- c) Devices shall be operable with either hand.
- d) The position and aspects of the operation panel shall be easy to understand both visually and tactilely.
- e) Procedure of opening/closing moving parts shall be easy and users should be able to confirm the status of moving parts (open or close) both visually and tactilely.
- f) Moving parts shall be able to be moved without excess force but not moved too easily.

9.3 External connection ports

- a) External connection ports shall be located at convenient location.
- b) When several external connection ports exist, each of them shall be easy to distinguish from one another.

- c) External connection ports shall be designed (with respect to their position and form) to enable correct insertion and prevent accidental removal.

9.4 Terminology, icons and graphic symbols

9.4.1 Commonly used terms and notations

Professional terms, foreign words, and abbreviations shall not be used so often. Instead, commonly-used terms and easily-understandable notations shall be used.

9.4.2 Printed information and engraved marks

- a) Information including texts and symbols shall be easy to read at normal viewing distance under normal light conditions. Not only viewing distance and light conditions but also the choice of font, whether with or without serif, in upright form or *italics* and light, medium or **bold** appearance has a significant impact on legibility. It is to be noted that text written in CAPITAL letters is more difficult to read. This is significant for those with a visual impairment. Consideration should be given to specifying size and style of font and symbols for warnings.
- b) Information content shall be colour-independent.
- c) The display shall be close to the relevant keys and buttons.
- d) Printed information and engraved marks shall be of appropriate length, easily understandable and durable.

9.4.3 Icons and graphic symbols

Icons and graphic symbols shall be easy to understand and consistent.

9.5 Alternatives

- a) The product shall be as compatible with assistive technology for older persons and persons with disabilities as possible.
- b) Even when users use assistive technology, any functions of the main body (including operation buttons, keys and power switches) should be available.

9.6 Standardization and disclosure of interface specifications

- a) Specifications of the input-output interface for external connection to peripheral devices such as assistive technology should be open to the public as far as possible.
- b) The input-output interface for external connection is based on interface specifications used extensively among manufacturers, except where the aim is to promote the use of interface specifications for the connection of external input-output devices.

10 Requirements for telecommunications services

This clause contains the requirements for telecommunications services such as mediated interactive telecommunications services and telecommunications platform services.

10.1 Interactive telecommunications services

10.1.1 Real-time transmission

If technically feasible, real-time text, image and video functionality should satisfy the following requirements:

- simultaneous two-way transfer of data (full duplex);
- no delay or minimal delay with no effect on communication;

- no information loss, or minimal information loss with no effect on communication.

10.1.2 Multimedia

Two-way communication services involving combinations of different media (such as text, voice and video) should be supported.

10.1.3 Compatibility

Real-time text, audio and video communication should be supported among different carriers and devices.

10.1.4 Media conversion

Media conversion services (such as voice to text and text to voice) should be provided.

10.2 Telecommunications platform services

10.2.1 Alternative media

Certain types of information cannot be subject to media conversion by terminal equipment. In this case, provision should be made to enable information providers to provide information services via alternative media.

10.2.2 Media conversion

Media conversion services (such as voice to text and text to voice) should be provided, if technically feasible.

10.2.3 Multimedia content information alternatives

Where multimedia content is supported, provision should be made to enable information providers to supply text or other alternatives to non-text information if technically feasible.

10.2.4 Device identification

If the network is capable of recognizing the characteristics of a terminal device, provision should be made to enable information providers to supply content tailored to the characteristics of the device.

10.3 Emergency calls

Accessible means of every variety should be provided for emergency calls and confirmation of personal safety.

10.4 Telecommunications services specifications

If possible, international standard specifications should be used in planning, development, and design of telecommunications services in order to promote development and usage of assistive technology for older persons and persons with disabilities. If non-standard specifications are necessarily used, these should be open to the public if possible.

11 Requirements for user support

This clause includes the requirements for user support to ensure and improve telecommunications accessibility.

11.1 User manuals

Product user manuals should be provided on forms of media that are accessible to older persons and persons with disabilities.

11.2 Disclosure of information about telecommunications accessibility

11.2.1 Scope of disclosed information

Information on telecommunications accessibility for as many products as possible should be disclosed to the public.

11.2.2 Methodology

Information on telecommunications accessibility should be disclosed in formats that are accessible to as many people (including older persons and persons with disabilities) as possible.

11.3 Instruction

11.3.1 Support for suppliers

Information on telecommunications accessibility of a product should be supplied to retailers, information service providers and support providers as far as possible.

11.3.2 Support for users

When users receive instructions, such instructions should be provided in accessible formats.

11.4 Customer support centres

- a) Customer support centres should be able to provide information in as varied a format as possible to mesh with user needs. Customer support centres should be also able to communicate with persons with disabilities.
- b) To check whether products can be used, customers should be able to try to use them beforehand.

Appendix I

Further details of informative references

(This appendix does not form an integral part of this Recommendation)

ETSI EG 202 048 V1.1.1 (2002-08): Human Factors (HF); Guidelines on the multimodality of icons, symbols and pictograms

ETSI EG 202 048 presents guidelines for the design and use of multimodal symbols using a Design for All approach. It also provides a study of the needs and requirements for the use of multimodal symbols in user interfaces, with special emphasis on the requirements of people with disabilities and elderly people.

ETSI EG 202 116 V1.2.1 (2002-09): Human Factors (HF); Guidelines for ICT products and services; "Design for All"

ETSI EG 202 116 is applicable to ICT products with a user interface that are connectable to all kinds of fixed and mobile telecommunications networks. This includes products such as telephones, multimedia terminals, personal digital assistants (PDAs) and services such as e-mail, short message services (SMS) and voice messaging. It is applicable to public and private access devices and services.

ETSI TR 101 806 V1.1.1 (2000-06): Human Factors (HF); Guidelines for Telecommunication Relay Services for Text Telephones

ETSI TR 101 806 is applicable to all kinds of relay services especially those which enable a text telephone user to converse with a telephone user and to relay services which enable a text telephone user to converse with another text telephone user. It also applies to "Spoken to spoken" relays (which translate from a speech impaired user) and to videophone relays.

Resolution GSC 11-22 (UWG): User Needs, Considerations and Involvement

Resolution GSC 11-22 is the resolution of GSC (Global Standards Collaboration) regarding user needs.

ITU-T Rec. P.360 – Efficiency of devices for preventing the occurrence of excessive acoustic pressure by telephone receivers and assessment of daily noise exposure of telephone users

ITU-T Rec. P.360 proposes limits to the acoustic pressure generated by the handset and headset earphones and some guidance on how to measure it. It includes also some guidance to avoid speech degradation due to the use of devices implemented in the terminal to prevent the occurrence of excessive acoustic pressure.

ITU-T Rec. E.135 – Human factors aspects of public telecommunication terminals for people with disabilities

ITU-T Rec. E.135 includes services for people with vision, hearing, and motion impairments. Preferably, this Recommendation applies to all public terminals. Practically, however, this Recommendation may cover a subset of public terminals, as determined by particular service provider's circumstances and/or national laws.

ITU-T Rec. E.138 – Human factors aspects of public telephones to improve their usability for older people

ITU-T Rec. E.138 proposes guidelines for the design of public telephone terminals for voice communication to make them simpler to use for older people whose sight, hearing, information processing and motor functions have deteriorated. This Recommendation provides information on the requirements of older people and how telephones can be adapted for their use. This

Recommendation addresses manufacturers, designers, procurers, network operators, regulatory authorities, and those who deploy telecommunication terminals intended for general (public) use.

"Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)"; The International Commission on Non-Ionizing Radiation Protection (ICNIRP). <http://www.icnirp.de/documents/emfgdl.pdf>

ICNIRP publishes guidelines on electromagnetic field levels. The main objective of this publication is to establish guidelines for limiting EMF exposure that will provide protection against known adverse health effects. Studies on both direct and indirect effects of EMF are described. Results of laboratory and epidemiological studies, basic exposure criteria, and reference levels for practical hazard assessment are discussed, and the guidelines presented apply to occupational and public exposure.

Bibliography

- [b-ITU-T E.135] ITU-T Recommendation E.135 (1995), *Human factors aspects of public telecommunication terminals for people with disabilities*.
- [b-ITU-T E.138] ITU-T Recommendation E.138 (2002), *Human factors aspects of public telephones to improve their usability for older people*.
- [b-ITU-T P.360] ITU-T Recommendation P.360 (2006), *Efficiency of devices for preventing the occurrence of excessive acoustic pressure by telephone receivers and assessment of daily noise exposure of telephone users*.
- [b-GSC 11-22] Resolution GSC 11-22 (UWG), *User Needs, Considerations and Involvement*.
- [b-ETSI EG 202 048] ETSI EG 202 048 V1.1.1 (2002-08), *Human Factors (HF); Guidelines on the multimodality of icons, symbols and pictograms*.
- [b-ETSI EG 202 116] ETSI EG 202 116 V1.2.1 (2002-09), *Human Factors (HF); Guidelines for ICT products and services; "Design for All"*.
- [b-ETSI TR 101 806] ETSI TR 101 806 V1.1.1 (2000-06), *Human Factors (HF); Guidelines for Telecommunication Relay Services for Text Telephones*.
- [b-ICNIRP] Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz); The International Commission on Non-Ionizing Radiation Protection (ICNIRP), April 1998. <http://www.icnirp.de/documents/emfgdl.pdf>

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	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	Telephone transmission quality, telephone installations, local line networks
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