INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

P.79

Annex G
(11/2001)

SERIES P: TELEPHONE TRANSMISSION QUALITY, TELEPHONE INSTALLATIONS, LOCAL LINE NETWORKS

Measurements related to speech loudness

Calculation of loudness ratings for telephone sets

Annex G: Wideband loudness rating algorithm

ITU-T Recommendation P.79 – Annex G

ITU-T P-SERIES RECOMMENDATIONS

TELEPHONE TRANSMISSION QUALITY, TELEPHONE INSTALLATIONS, LOCAL LINE NETWORKS

Vocabulary and effects of transmission parameters on customer opinion of transmission quality	Series	P.10
Subscribers' lines and sets	Series	P.30
		P.300
Transmission standards	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 quality	Series	P.80
		P.800
Audiovisual quality in multimedia services	Series	P.900

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

ITU-T Recommendation P.79

Calculation of loudness ratings for telephone sets

Annex G

Wideband loudness rating algorithm

Summary

This Annex G to ITU-T Rec. P.79 "Calculation of Loudness Ratings for telephone sets" gives a set of *WB*-weights to extend the use of the general algorithms described in the main part of the Recommendation for calculating sending and receiving loudness ratings of wideband (100 to 8000 Hz) terminals.

Source

Annex G to ITU-T Recommendation P.79 was prepared by ITU-T Study Group 12 (2001-2004) and approved under the WTSA Resolution 1 procedure on 29 November 2001.

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.

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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, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

ITU-T Recommendation P.79

Calculation of loudness ratings for telephone sets

Annex G

Wideband loudness rating algorithm

This annex gives a set of *WB*-weights that is suitable for the calculation of sending and receiving loudness ratings of wideband (100 to 8000 Hz) terminals. The same G-Functions, as given in this Recommendation, Table A.1/P.79, are used and it is assumed that S_{JE} is measured to ERP. The theoretical transmission characteristics of ARAEN are used as the reference system, except that the send part, S_{RMJ} has the rising frequency response and the receive part, S_{RJE} has a flat response to ERP. In addition an earphone coupling loss L_E appropriate for the ARAEN earphone has been applied. The derived *WB*-weights are adjusted by constant corrections so that the loudness ratings are all 0 dB when the IRS (ITU-T Rec. P.48) is used as the unknown system. These changes to the ARAEN reference system have been supported by calculations and subjective assessments of the difference in loudness between narrow-band and wideband speech paths.

The *WB*-weights used in wideband calculation are given in Table G.1. Equation 5-1 should be used for the calculation of wideband SLR and RLR, where m = 0.175. Note that if coupling leakage has been incorporated in the artificial ear used, the real ear loss correction L_E should be set to zero. Also if the measured value of receiving sensitivity/frequency characteristics refers to the eardrum, it must be converted to a value of S_{JE} that refers to ERP.

Table G.1/P.79 – *WB*-weights for wideband SLR and RLR

Frequency (Hz) (1)	W_S wideband (2)	W_R wideband (3)
100	103.0	115.4
125	75.3	87.5
160	60.2	72.3
200	59.5	72.1
250	52.9	67.2
315	59.4	75.8
400	45.4	63.6
500	56.6	74.6
630	53.5	70.4
800	53.8	69.9
1000	55.9	70.9
1250	64.2	78.4
1600	60.6	74.9
2000	73.7	85.2
2500	70.4	81.6
3150	87.1	95.4
4000	68.2	77.0
5000	84.5	91.7
6300	86.5	92.4
8000	71.0	89.0

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
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	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
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 and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems

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