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

International telephone connections and circuits – General
definitions

Transmission planning aspects of echo cancellers

ITU-T Recommendation G.108.2



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ITU-T Recommendation G.108.2

Transmission planning aspects of echo cancellers

Summary

ITU-T Recommendation G.108.2 provides guidance for the transmission planning aspects in conjunction with the deployment of echo cancellers in the network.

Recognizing that echo cancellers are required on an increasing number of connections due to the increase of end-to-end delay by the introduction of speech processing techniques as well as of packet-based transportation mechanisms, this Recommendation is intended to assist network operators and transmission planners as well as equipment manufacturers and application designers in controlling the effects of echo cancellers on end-to-end speech transmission performance.

Source

ITU-T Recommendation G.108.2 was approved on 1 March 2007 by ITU-T Study Group 12 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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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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Transmission planning aspects of echo cancellers

1 Introduction

Echo cancellers are adaptive signal processors used to control echo¹. Echo cancellers are present on nearly every long-distance connection and may today and in future be required on an increasing number of shorter connections which gather delay from sources other than propagation (e.g., coding, signal processing, packetization). Unintended tandem operation of echo cancellers also is an issue which needs increasing consideration. The purpose of this Recommendation is to:

- provide guidance on the general principles of operation of echo cancellers;
- identify application rules and constraints under which echo cancellers operate properly;
- provide guidance on the different tasks of transmission planners regarding the control of echo.

The user of this Recommendation is advised on the availability of [ITU-T G.161], "Interaction aspects of signal processing network equipment", parts of which cover issues which are also dealt with here.

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.

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| [ITU-T G.122] | ITU-T Recommendation G.122 (1993), <i>Influence of national systems on stability and talker echo in international connections.</i> |
| [ITU-T G.131] | ITU-T Recommendation G.131 (2003), <i>Talker echo and its control.</i> |
| [ITU-T G.161] | ITU-T Recommendation G.161 (2004), <i>Interaction aspects of signal processing network equipment.</i> |
| [ITU-T G.164] | ITU-T Recommendation G.164 (1988), <i>Echo suppressors.</i> |
| [ITU-T G.165] | ITU-T Recommendation G.165 (1993), <i>Echo cancellers.</i> |
| [ITU-T G.168] | ITU-T Recommendation G.168 (2007), <i>Digital network echo cancellers.</i> |
| [ITU-T G.961] | ITU-T Recommendation G.961 (1993), <i>Digital transmission system on metallic local lines for ISDN basic rate access.</i> |
| [ITU-T P.10/G.100] | ITU-T Recommendation P.10/G.100 (2006), <i>Vocabulary for performance and quality of service.</i> |
| [ITU-T P.300] | ITU-T Recommendation P.300 (2001), <i>Transmission performance of group audio terminals (GATs).</i> |
| [ITU-T P.310] | ITU-T Recommendation P.310 (2003), <i>Transmission characteristics for telephone-band (300-3400 Hz) digital telephones.</i> |

¹ Echo cancellers have – in modern telecommunication networks – replaced echo suppressors.

- [ITU-T P.340] ITU-T Recommendation P.340 (2000), *Transmission characteristics and speech quality parameters of hands-free telephones.*
- [ITU-T P.341] ITU-T Recommendation P.341 (2005), *Transmission characteristics for wideband (150-7000 Hz) digital hands-free telephony terminals.*
- [ITU-T P.342] ITU-T Recommendation P.342 (2000), *Transmission characteristics for telephone band (300-3400 Hz) digital loudspeaking and hands-free telephony terminals.*
- [ITU-T P.561] ITU-T Recommendation P.561 (2002), *In-service non-intrusive measurement device – Voice service measurements.*
- [ITU-T V.32] ITU-T Recommendation V.32 (1993), *A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits.*
- [ITU-T V.34] ITU-T Recommendation V.34 (1998), *A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits.*

3 Definitions

This Recommendation defines the following terms:

3.1 activated NLP: A non-linear processor (NLP) that is performing signal processing on the speech path and is non-transparent to signals.

NOTE – The definition of an NLP is given in [ITU-T G.168].

3.2 deactivated NLP: A non-linear processor (NLP) that is not performing signal processing on the speech path and is transparent to signals.

3.3 echo cancellers in tandem: Multiple echo cancellers in a connection that are meant to cancel echo from the same source.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

DTDT	Double-Talk Detection Threshold
NEST	Near-End Speech Threshold
NLP	Non-Linear Processor
PCM	Pulse Code Modulation
SLA	Service Level Agreement

5 Conventions

None.

6 Echo control in telecommunication networks

In the light of liberalization, responsibility of the PSTN transmission planner for the totality of the national section of the worldwide telecommunication plant can no longer be assumed. Therefore, shared responsibilities have to be implemented.