INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.108

Amendment 1
(09/2003)

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

International telephone connections and circuits – General definitions

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Application of the E-model: A planning guide

Amendment 1: New Appendix I: The relationship between and interaction of talker echo and absolute delay

ITU-T Recommendation G.108 (1999) – Amendment 1

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ITU-T Recommendation G.108

Application of the E-model: A planning guide

Amendment 1

New Appendix I: The relationship between and interaction of talker echo and absolute delay

Source

Amendment 1 to ITU-T Recommendation G.108 (1999) was agreed by ITU-T Study Group 12 (2001-2004) on 30 September 2003.

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

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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 G.108

Application of the E-model: A planning guide

Amendment 1

New Appendix I: The relationship between and interaction of talker echo and absolute delay

This appendix is intended to provide guidance on the relationship between and interaction of talker echo and absolute delay by means of graphs which result from calculations with the E-model as contained in ITU-T Rec. G.107 (03/2003).

Figure I.1 illustrates the combined effects of talker echo in the presence of absolute delay, whereas Figures I.2a and I.2b illustrate the effects of talker echo only (all three figures have been taken from ITU-T Rec. G.131).

It should be noted that, the upper graph in Figure I.1 illustrates the effect of absolute delay in the absence of any echo (see also Figure 1 of ITU-T Rec. G.114).

Figures I.3 through I.7 illustrate the comparison of the effects of talker echo only with the combined effects of talker echo and absolute delay; each for a given value of talker echo loudness rating TELR.

NOTE – All graphs are based on the 2003 version of the E-model. The graphs depicting the effects of talker echo have been calculated with Ta = 0, T = Tr/2 by means of recursive calculation; whereas the graph for absolute delay, in the absence of echo, is based on Ta = 0, Tr = 0 as provided in ITU-T Rec. G.114.

From a transmission planner's perspective, it is important to understand that the effects of talker echo may be eliminated by the proper deployment of an echo cancelling device, which performs in accordance with, or even exceeds, the requirements given in ITU-T Rec. G.168.

In addition, it is also very important to understand that the effect of absolute delay cannot be eliminated by the deployment of technology. Talker echo and absolute delay may effect different sequences of the same conversation, which is the reason why, under normal circumstances, the combination of both effects has to be taken as the basis for transmission planning.

However, the differences, as shown in Figures I.3 through I.7, may be taken as useful brackground information for tutorial purposes; any application, in exceptional cases, is left to the individual transmission planner's discretion.

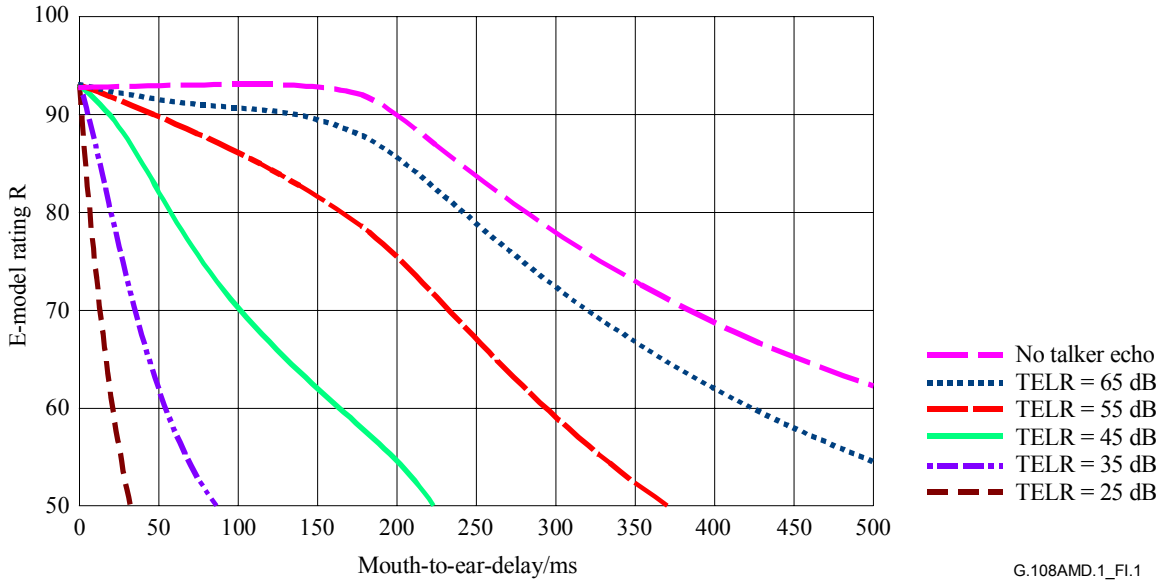

Figure I.1/G.108 – Combined effects of talker echo in the presence of absolute delay

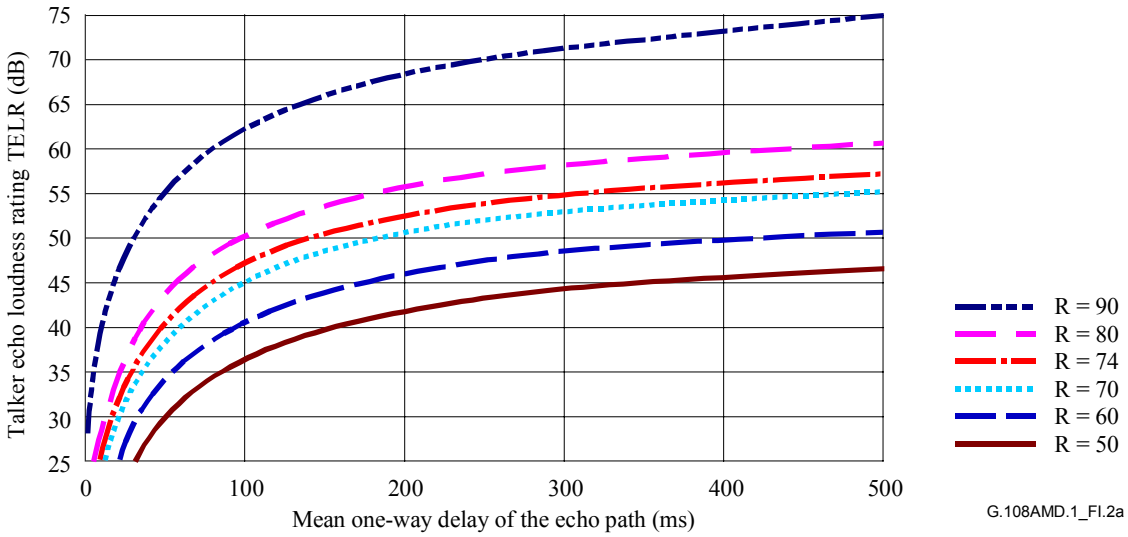

Figure I.2a/G.108 – Effects of talker echo based on E-model

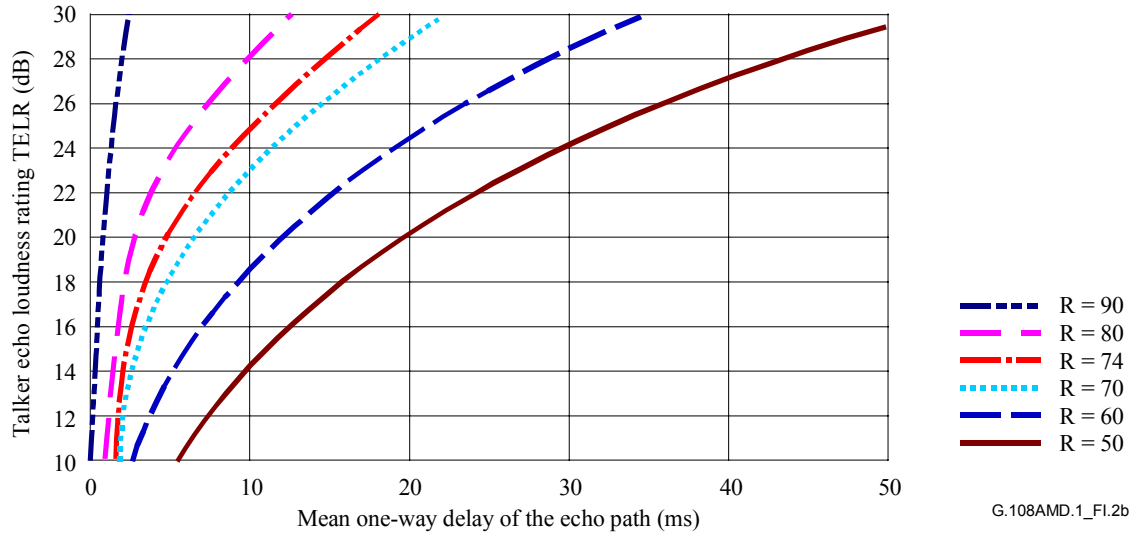

Figure I.2b/G.108 – Effects of talker echo based on E-model

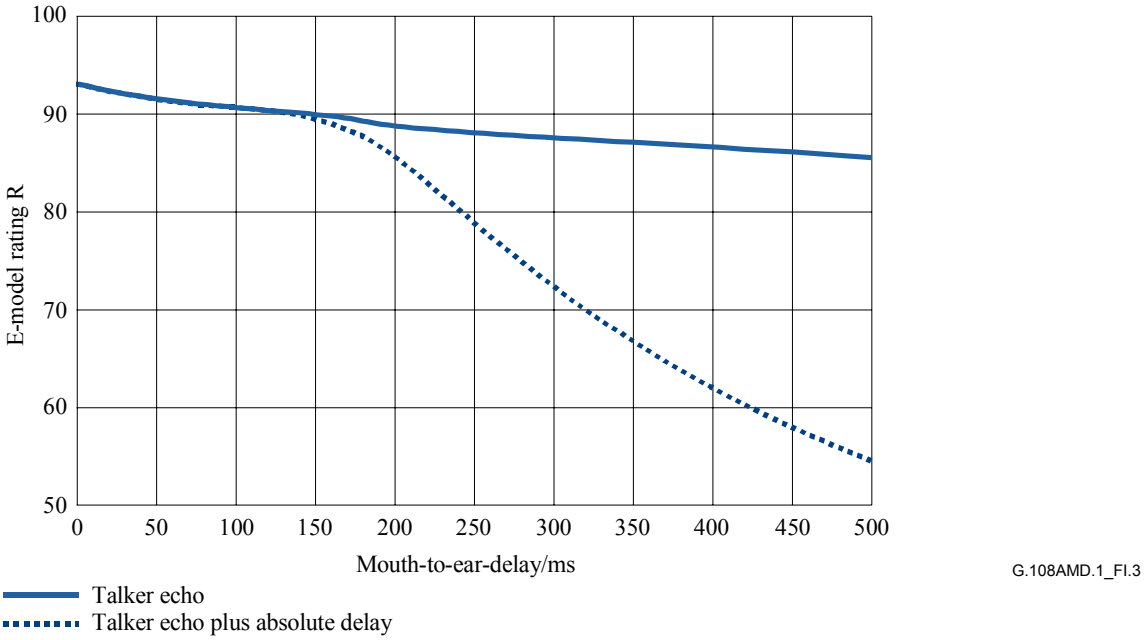

Figure I.3/G.108 – Comparison of the effects of talker echo with the combined effects of talker echo and absolute delay; for TELR = 65 dB

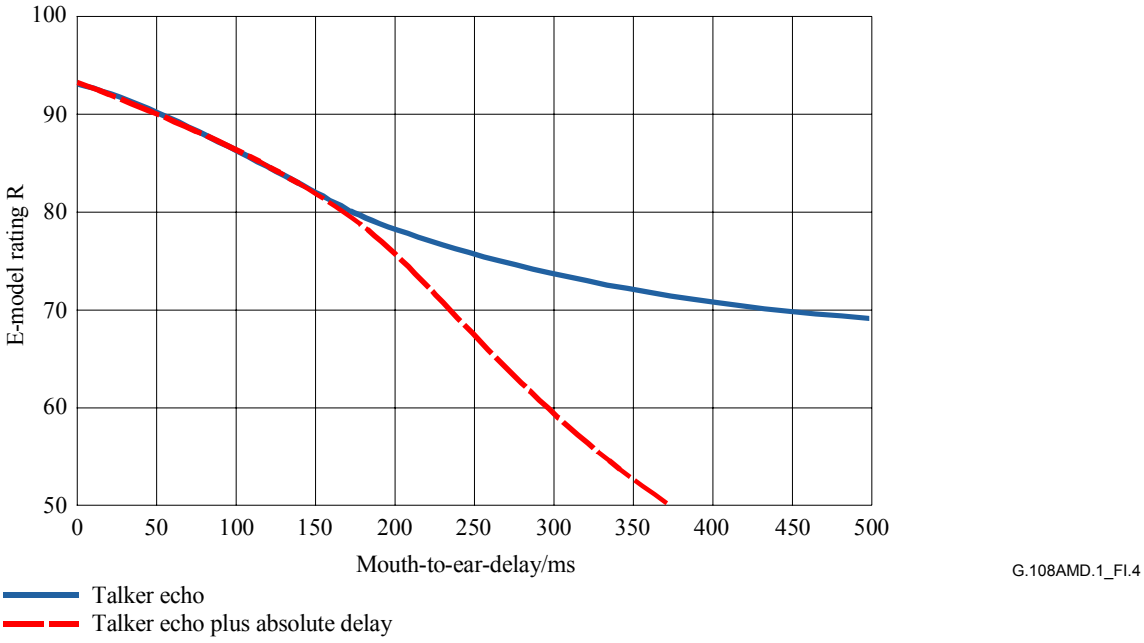

Figure I.4/G.108 – Comparison of the effects of talker echo with the combined effects of talker echo and absolute delay; for TELR = 55 dB

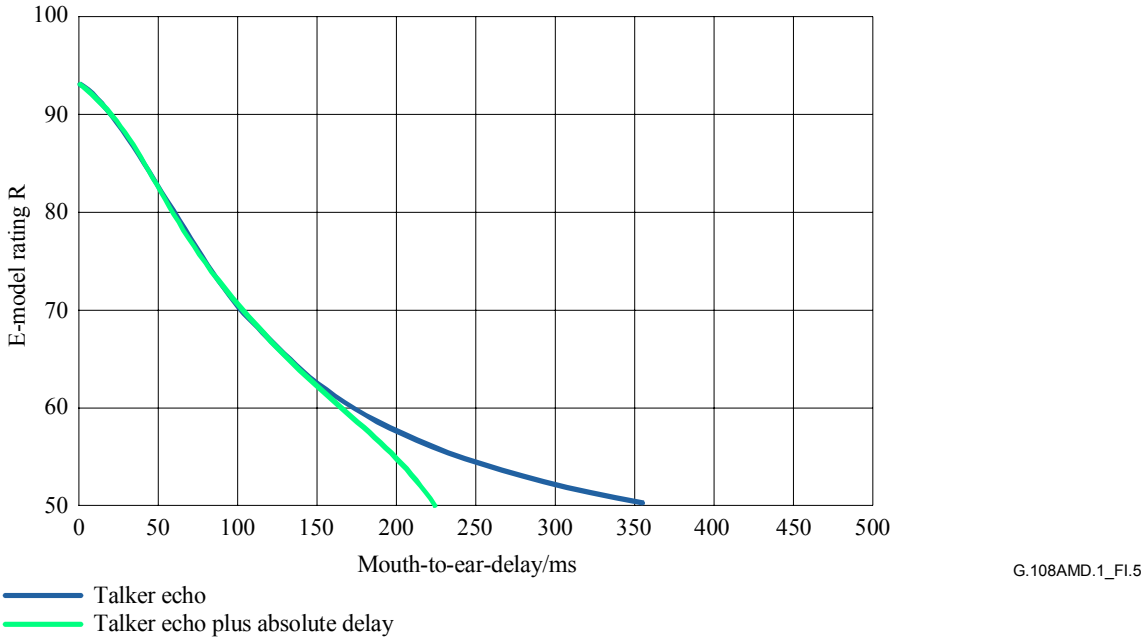

Figure I.5/G.108 – Comparison of the effects of talker echo with the combined effects of talker echo and absolute delay; for TELR = 45 dB

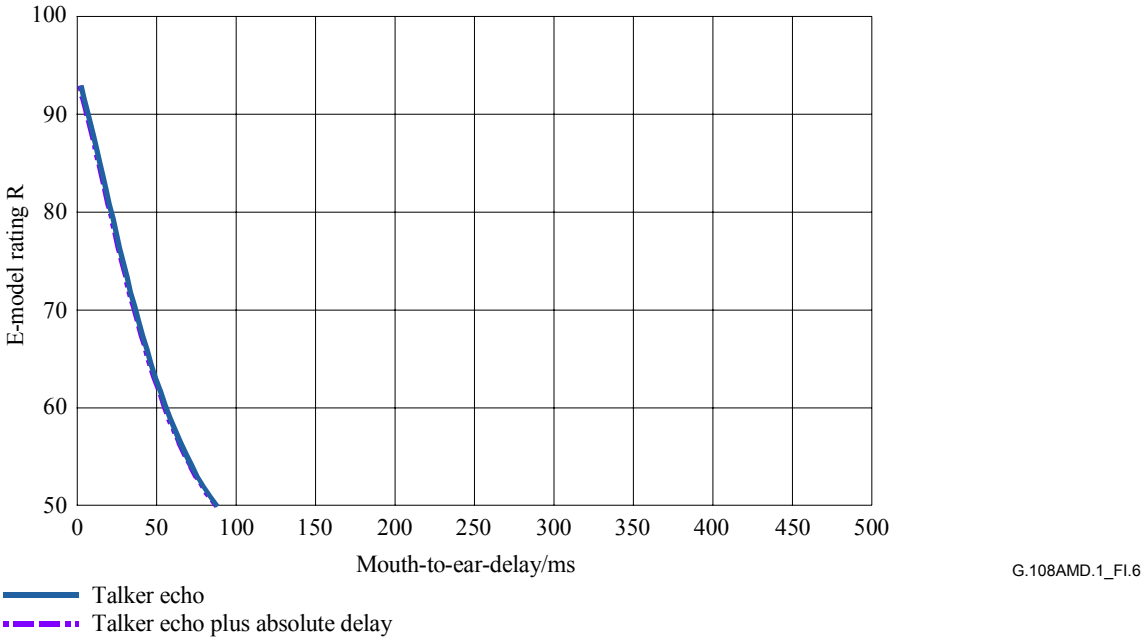

Figure I.6/G.108 – Comparison of the effects of talker echo with the combined effects of talker echo and absolute delay; for TELR = 35 dB

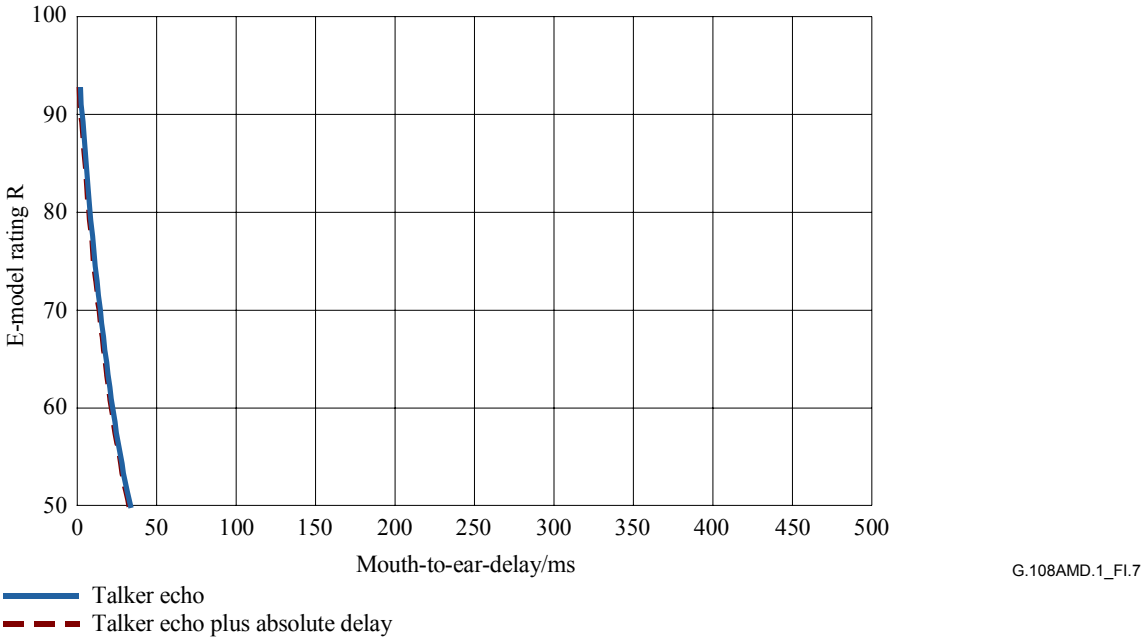

Figure I.7/G.108 – Comparison of the effects of talker echo with the combined effects of talker echo and absolute delay; for TELR = 25 dB

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Printed in Switzerland
Geneva, 2004