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SERIES J: CABLE NETWORKS AND TRANSMISSION
OF TELEVISION, SOUND PROGRAMME AND OTHER
MULTIMEDIA SIGNALS

Measurement of the quality of service

Objective picture quality measurement method by use of in-service test signals

ITU-T Recommendation J.147

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Objective picture quality measurement method by use of in-service test signals

Summary

This Recommendation presents an objective picture quality measurement method by use of in-service test signals in a digital television network. This method is separated into three procedures:

- a) test signal generation at the transmission side using the invisible marker method;
- b) test signal detection at measurement points; and
- c) picture quality measurement using the result of test signal detection. A practical implementation is described in Appendix I, whilst the parameters for generating in-service test signals and the performance of this method are described in Appendices II and III, respectively.

Source

ITU-T Recommendation J.147 was prepared by ITU-T Study Group 9 (2001-2004) and approved under the WTSA Resolution 1 procedure on 29 July 2002.

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.

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Introduction

The Reduced Reference (RR) and No Reference (NR) methods, which are currently being studied by an independent body, are expected to be covered in a future Recommendation for an objective measurement method of perceived picture quality that does not require reference pictures.

This Recommendation recommends a different framework from RR or NR for measuring picture quality without reference pictures by use of in-service test signals. In-service test signals are embedded into the active picture area of television signals by using the invisible marker method. Television signals with test signals are transmitted to the receiver side and the test signals are detected from the received pictures. Degradation of the test signals is measured to estimate picture quality degradation. This framework does not require an additional circuit for reference information because the reference information is already embedded into the transmitted pictures.

It may be possible to apply this method also to audio signals to ensure that the correct audio and video is matched within a multichannel environment, to ensure that audio and video are properly synchronized, and to measure any asynchronies, which are beyond the scope of this Recommendation.