



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

J.67

(03/2001)

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

Circuits for analogue television transmission

Test signals and measurement techniques for transmission circuits carrying MAC/packet signals

ITU-T Recommendation J.67

(Formerly CCITT Recommendation)

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Test signals and measurement techniques for transmission circuits carrying MAC/packet signals

Summary

The purpose of this Recommendation is to give the tools of the transmission methodology of the MAC packet family signals. This Recommendation is devoted to the traditional MAC packet signals (D/D2).

This Recommendation begins with the definition of the test signals and the test lines that are the basis of the transmission methodology. Furthermore, the main quality measurement parameters are defined, as well as the corresponding application methods.

Source

ITU-T Recommendation J.67 was revised by ITU-T Study Group 9 (2001-2004) and approved under the WTSA Resolution 1 procedure on 9 March 2001.

ITU-T J.67 (03/2001)

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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Introduction

A clear description of what is meant by the transmission circuit is essential for defining the measurement problem. The figure below shows a studio encoder driving the transmission circuit, and a studio decoder driven by the transmission circuit. MAC is a multiplex of luminance, chrominance, and sound/data signals. The video inputs to the encoder are the luminance component and the two colour difference components. These are also present at the output of the decoder. The measurement methods described in this Recommendation are for automatic measurements of the transmission circuit between the MAC encoder and the MAC decoder.

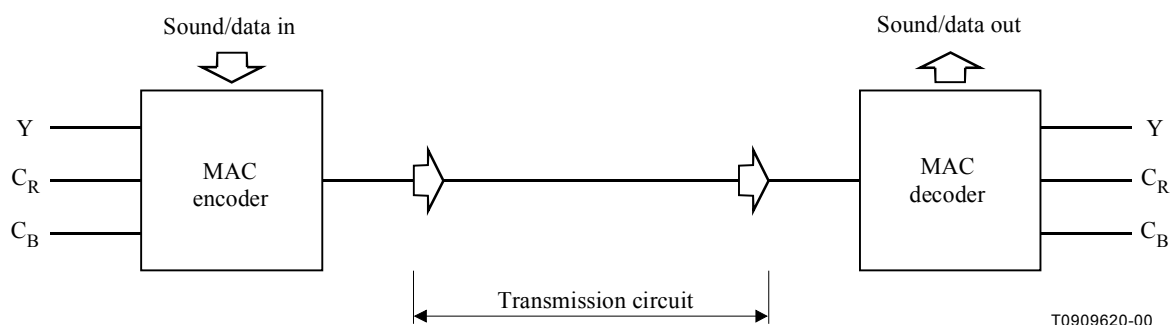


Figure Intro./J.67 – Transmission of MAC signals

**Test signals and measurement techniques for transmission circuits
carrying MAC/packet signals**

1 Scope

The purpose of this Recommendation is to give the tools of the transmission methodology of the MAC packet family signals. Thus, MAC/packet signals, whose quality parameters are defined in clause 2 should be measured using the test signals defined in clause 3 and Annex A, and measured using the methods defined in clause 4.

2 Definition of the quality parameters of a MAC/packet signal

2.1 MAC signal

2.1.1 Waveforms and line allocations

The MAC analogue waveform is directly derived from the standard 4:2:2 sampling ratio used for digital television (ITU-R BT.601). MAC coding produces a sequential transmission of a chrominance signal, compressed in a 3:1 ratio, and the luminance signal, compressed in a 3:2 ratio.

Given the sampling frequencies defined for the digital television standard (13.5 MHz for luminance and 6.75 MHz for chrominance), the consequent MAC sampling frequency is 20.25 MHz. The resulting nominal bandwidth required for the coded MAC signal is 8.4 MHz. After decompression the luminance bandwidth is 5.6 MHz.

It is important to note that, even though the MAC signal is derived through a sampling process, the resulting signal has an analogue form for transmission. A remarkable feature of the MAC coding system is that there is no absolute limit for the bandwidth. This characteristic can be used to broadcast the MAC signal in a narrow-band channel.

2.1.2 Quality parameters

2.1.2.1 Nominal signal amplitude

The nominal amplitude of a MAC signal is 1 V. It is defined as the difference between the white level and the black level of the reference signal of line 624.

2.1.2.2 Distortions

2.1.2.2.1 Gain/frequency response

The gain/frequency characteristic of the circuit is defined as the variation in gain between the input and the output of the circuit over the frequency band extending from the field repetition frequency to the nominal cut-off frequency of the MAC signal, relative to the gain at a suitable reference frequency.

2.1.2.2.2 Phase distortion

The phase-frequency distortion is defined as the difference in degrees relative to a linear phase characteristic over a frequency band extending from, ideally, 0 Hz to a defined upper frequency.

¹ Formely ITU-R CMTT.772.