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TELEVISION AND SOUND TRANSMISSION

**CHARACTERISTICS OF EQUIPMENT FOR
THE CODING OF ANALOGUE MEDIUM
QUALITY SOUND - PROGRAMME SIGNALS
FOR TRANSMISSION ON 320 kbit/s
CHANNELS**

ITU-T Recommendation J.44

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(Extract from the *Blue Book*)

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NOTES

1 ITU-T Recommendation J.44 was published in Fascicle III.6 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 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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Recommendation J.44

CHARACTERISTICS OF EQUIPMENT FOR THE CODING OF ANALOGUE MEDIUM QUALITY SOUND-PROGRAMME SIGNALS FOR TRANSMISSION ON 320 kbit/s CHANNELS¹⁾

(Melbourne, 1988)

1 General

1.1 This Recommendation gives the characteristics of equipment for the coding of 7 kHz monophonic analogue sound-programme signals into a digital signal. Two monophonic digital signals can be combined to form a 320 kbit/s signal having a structure specified in Recommendation J.43.

1.2 Equipment for coding of analogue sound-programme signals, as specified in this Recommendation, can be:

- a) A stand-alone encoder/decoder with a digital interface at 320 kbit/s. The encoder operation and the decoder operation may be performed in two separate equipments or in the same equipment.
- b) A combined encoder-multiplex/decoder-demultiplex with a digital interface at 1544 or 2048 kbit/s. The encoder-multiplex operation and the decoder-demultiplex operation may be performed in two separate equipments or in the same equipment.

In case b) it is not mandatory to provide an external access at 320 kbit/s.

2 Transmission performance

The transmission performance per encoder/decoder pair shall be such that the limits specified in Recommendation J.23 (CCIR Recommendation 503) are exceeded by three encoder/decoder pairs connected in tandem at audio frequencies.

3 Method of encoding

3.1 The encoding method is based on a uniformly quantized 14-bit per sample technique with differential 14 to 9.5-bit near instantaneous companding.

3.2 Fundamental characteristics of the equipment are:

Nominal audio bandwidth:	0.05 to 7 kHz.
Audio interface:	see Recommendation J.23, § 2.
Sampling frequency:	$16 (1 \pm 5 \times 10^{-5})$ kHz.
Pre/de-emphasis:	Recommendation J.17 with 6.5 dB attenuation at 800 Hz.

4 Characteristics of the equipment

4.1 Introduction

The equipment described in this section uses the differential near-instantaneous method of companding in the coding of medium quality sound-programme signals into digital form.

¹⁾ Digital interface between Administrations which have adopted different systems should, if a bilateral agreement is not reached, operate at 348 kbit/s (H_0 channel) and carry signals encoded according to Recommendation J.42, § 4. Any necessary transcoding will be carried out by Administrations using the system specified in this Recommendation.

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A two-stage process is used in the encoding equipment:

- a) conversion of a 7 kHz channel into a 158 kbit/s stream;
- b) asynchronous insertion of two synchronous in-phase 158 kbit/s streams into a 320 kbit/s stream.

Note – The asynchronous insertion of two asynchronous in-phase 158 kbit/s streams into a 320 kbit/s stream allows the use, at the encoder location, of a clock not necessarily synchronous to the network clock. It can be advantageous when the encoder equipment and the insertion equipment are located in different places, and when the transmission link between them is unidirectional,

and the reverse processes in the decoding equipment.

4.2 *Conversion from 7 kHz to 158 kbit/s and constitution of the 316 kbit/s signal*

4.2.1 *Overload level*

The overload level for a sine-wave signal at the zero dB insertion loss frequency (2.1 kHz) of the pre-emphasis circuit is +12 or +15 dBm0s.

4.2.2 *Companding*

The same differential near-instantaneous companding procedure with a block of 32 samples (2 ms), as described in § 4.2.2 of Recommendation J.43, is used.

4.2.3 *Range coding*

The same range coding for a block of 32 samples (2 ms), as described in § 4.2.3 of Recommendation J.43, is used.

4.2.4 *Sample error protection*

The same sample error protection for a block of 32 samples (2 ms), as described in § 4.2.4 of Recommendation J.43, is used.

4.2.5 *316 kbit/s channel frame*

Two 7 kHz channels (C1 and C2) are contained in one 316 kbit/s stream. The frame structure of the 316 kbit/s stream is described in § 4.2.5 of Recommendation J.43. The first block ($k = 1$) of each frame corresponds to channel C1 and the second block ($k = 2$) of each frame corresponds to channel C2.

4.3 *Asynchronous insertion of the 316 kbit/s signal into a 320 kbit/s stream*

See § 4.3 of Recommendation J.43.

4.4 *Digital interface between the encoder equipment and the insertion equipment*

Under study.

4.5 *Fault conditions and consequent actions*

Under study.

5 **Digital interface between equipments using different coding standards**

Under study.