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# CCITT

THE INTERNATIONAL  
TELEGRAPH AND TELEPHONE  
CONSULTATIVE COMMITTEE

**T.81**

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## TERMINAL EQUIPMENT AND PROTOCOLS FOR TELEMATIC SERVICES

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## INFORMATION TECHNOLOGY – DIGITAL COMPRESSION AND CODING OF CONTINUOUS-TONE STILL IMAGES – REQUIREMENTS AND GUIDELINES



Recommendation T.81

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## Foreword

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the ITU. Some 166 member countries, 68 telecom operating entities, 163 scientific and industrial organizations and 39 international organizations participate in CCITT which is the body which sets world telecommunications standards (Recommendations).

The approval of Recommendations by the members of CCITT is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988). In addition, the Plenary Assembly of CCITT, which meets every four years, approves Recommendations submitted to it and establishes the study programme for the following period.

In some areas of information technology, which fall within CCITT's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of CCITT Recommendation T.81 was approved on 18th September 1992. The identical text is also published as ISO/IEC International Standard 10918-1.

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### CCITT NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized private operating agency.

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## Introduction

This CCITT Recommendation | ISO/IEC International Standard was prepared by CCITT Study Group VIII and the Joint Photographic Experts Group (JPEG) of ISO/IEC JTC 1/SC 29/WG 10. This Experts Group was formed in 1986 to establish a standard for the sequential progressive encoding of continuous tone grayscale and colour images.

*Digital Compression and Coding of Continuous-tone Still images*, is published in two parts:

- Requirements and guidelines;
- Compliance testing.

This part, Part 1, sets out requirements and implementation guidelines for continuous-tone still image encoding and decoding processes, and for the coded representation of compressed image data for interchange between applications. These processes and representations are intended to be generic, that is, to be applicable to a broad range of applications for colour and grayscale still images within communications and computer systems. Part 2, sets out tests for determining whether implementations comply with the requirements for the various encoding and decoding processes specified in Part 1.

The user's attention is called to the possibility that – for some of the coding processes specified herein – compliance with this Recommendation | International Standard may require use of an invention covered by patent rights. See Annex L for further information.

The requirements which these processes must satisfy to be useful for specific image communications applications such as facsimile, Videotex and audiographic conferencing are defined in CCITT Recommendation T.80. The intent is that the generic processes of Recommendation T.80 will be incorporated into the various CCITT Recommendations for terminal equipment for these applications.

In addition to the applications addressed by the CCITT and ISO/IEC, the JPEG committee has developed a compression standard to meet the needs of other applications as well, including desktop publishing, graphic arts, medical imaging and scientific imaging.

Annexes A, B, C, D, E, F, G, H and J are normative, and thus form an integral part of this Specification. Annexes K, L and M are informative and thus do not form an integral part of this Specification.

This Specification aims to follow the guidelines of CCITT and ISO/IEC JTC 1 on *Rules for presentation of CCITT | ISO/IEC common text*.

## INTERNATIONAL STANDARD

## CCITT RECOMMENDATION

**INFORMATION TECHNOLOGY – DIGITAL COMPRESSION  
AND CODING OF CONTINUOUS-TONE STILL IMAGES –  
REQUIREMENTS AND GUIDELINES**

**1 Scope**

This CCITT Recommendation | International Standard is applicable to continuous-tone – grayscale or colour – digital still image data. It is applicable to a wide range of applications which require use of compressed images. It is not applicable to bi-level image data.

This Specification

- specifies processes for converting source image data to compressed image data;
- specifies processes for converting compressed image data to reconstructed image data;
- gives guidance on how to implement these processes in practice;
- specifies coded representations for compressed image data.

NOTE – This Specification does not specify a complete coded image representation. Such representations may include certain parameters, such as aspect ratio, component sample registration, and colour space designation, which are application-dependent.

**2 Normative references**

The following CCITT Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this CCITT Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this CCITT Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The CCITT Secretariat maintains a list of currently valid CCITT Recommendations.

- *CCITT Recommendation T.80 (1992), Common components for image compression and communication – Basic principles.*

**3 Definitions, abbreviations and symbols****3.1 Definitions and abbreviations**

For the purposes of this Specification, the following definitions apply.

**3.1.1 abbreviated format:** A representation of compressed image data which is missing some or all of the table specifications required for decoding, or a representation of table-specification data without frame headers, scan headers, and entropy-coded segments.

**3.1.2 AC coefficient:** Any DCT coefficient for which the frequency is not zero in at least one dimension.

**3.1.3 (adaptive) (binary) arithmetic decoding:** An entropy decoding procedure which recovers the sequence of symbols from the sequence of bits produced by the arithmetic encoder.

**3.1.4 (adaptive) (binary) arithmetic encoding:** An entropy encoding procedure which codes by means of a recursive subdivision of the probability of the sequence of symbols coded up to that point.

**3.1.5 application environment:** The standards for data representation, communication, or storage which have been established for a particular application.

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