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APPLICATION PROFILE FOR RECOMMENDATION T.82 – PROGRESSIVE BI-LEVEL IMAGE COMPRESSION (JBIG CODING SCHEME) FOR FACSIMILE APPARATUS

ITU-T Recommendation T.85

(Previously “CCITT Recommendation”)

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The 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 Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation T.85 was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 11th of August 1995.

NOTE

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

CONTENTS

SUMMARY

This Recommendation specifies an application profile to apply the JBIG coding scheme, defined by Recommendation T.82, for facsimile apparatus. The main specifications in this Recommendation are:

1) Application profile of "single-progressive sequential coding" is defined. Other profiles (progressive coding) are for further study.

2) Data format consists of header information and coded information. The parameter ranges in the header are specified.

Recommendation T.85

APPLICATION PROFILE FOR RECOMMENDATION T.82 – PROGRESSIVE BI-LEVEL IMAGE COMPRESSION (JBIG CODING SCHEME) FOR FACSIMILE APPARATUS

(Geneva, 1995)

1 Scope

This Recommendation defines an application profile of Recommendation T.82 "Progressive Bi-level Image Compression (JBIG coding scheme)" for facsimile apparatus.

2 References

The following Recommendations, and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- ITU-T Recommendation T.82 (1993), *Information technology – Coded representation of picture and audio information – Progressive bi-level image compression.*

For group 3 facsimile:

- ITU-T Recommendation T.4.
- ITU-T Recommendation T.30.

For group 4 facsimile:

- ITU-T Recommendation T.503.
- ITU-T Recommendation T.521.
- ITU-T Recommendation T.563.

3 Principle

This Recommendation specifies an application profile for Recommendation T.82 for facsimile apparatus.

Recommendation T.82 defines a method for lossless compression encoding and decoding process of a bi-level image. Recommendation T.82 has three types of coding methods: single-progression, sequential coding, progressive-compatible sequential coding and progressive coding. Application profiles for each coding type are described in clauses 4, 5 and 6.

The use of error free transmission is mandatory for the coding scheme specified in this Recommendation. The Least Significant Bit (LSB) shall be sent first in data transmission.

4 Application profile of single-progression sequential coding

This clause describes an application profile of single-progression sequential coding defined in Recommendation T.82 for facsimile apparatus.

4.1 Function for facsimile application

Image data shall be processed in single-bit precision and single resolution-layer in single-progression sequential coding according to Recommendation T.82 for facsimile application.

4.2 Page boundary

Signals of page boundaries are defined in relevant Recommendations: T.30 for Group 3 and T.521 for Group 4 facsimile.

4.3 Parameters in BIH

Parameters in Bi-Level Image Header (BIH) are specified precisely in Recommendation T.82. In facsimile applications, within Bi-Level Image Entity (BIE), one BIH table shall be assigned to one facsimile document.

Table 1 shows the profile of parameter setting for facsimile applications.

The parameter sizes are defined in 6.2.2/T.82. The range of parameter values in Table 1 does not indicate the number of bits transmitted in each parameter.

4.4 Usage of the COMMENT marker segment

COMMENT – The interpretation of the information transmitted by COMMENT marker segment depends on the implementation of both ends.

5 Application profile of progressive-compatible sequential coding

For further study.

6 Application profile of progressive coding

For further study.

TABLE 1/T.85

Parameter		Value	Notes
D_L	initial layer to be transmitted	0 fixed	
D	number of differential layers	0 fixed	
P	number of bit planes	1 fixed	
X_D	horizontal image size at layer D	–	(See Note 2)
Y_D	vertical image size at layer D	Full range of T.82	
L0	lines per stripe at the lowest resolution	BASIC: 128 OPTION: from 1 to Y_D	(See Note 4)
MX	maximum horizontal offset allowed for AT pixel	From 0 to 127	
MY	maximum vertical offset allowed for AT pixel	0 fixed	
HITOLO	transmission order of differential layers	0 fixed	(See Note 1)
SEQ	indication of progressive-compatible sequential coding	0 fixed	(See Note 1)
ILEAVE	interleaved transmission order of multiple bit plane	0 fixed	(See Note 1)
SMID	transmission order of stripes	0 fixed	(See Note 1)
LRLTWO	number of reference lines	0/1	0: 3 lines 1: 2 lines
VLENGTH	indication of possible use of NEWLEN marker segment	0/1	0: NEWLEN not used 1: NEWLEN may be used (See Note 3)
TPDON	use of TP for Typical Prediction for differential layers	0 fixed	(See Note 1)
TPBON	use of TP for base layer	0/1	0: OFF 1: ON
DPON	use of Deterministic Prediction	0 fixed	(See Note 1)
DPPRIV	use of private DP table	0 fixed	(See Note 1)
DPLAST	use of last DP table	0 fixed	(See Note 1)

NOTES

1 These parameters are not applied in single-progression sequential coding. Transmitter shall set “0” to these unused parameters. It is not necessary to recognize these parameters at receiver.

2 Parameter X_D, horizontal image size, shall conform to the values defined in clause 2/T.4 for Group 3 facsimile and clause 3/T.563 for Group 4 facsimile.

3 See for 6.2.6.2/T.82.

4 When using this Recommendation, BASIC is 128. OPTIONS shall be negotiated by the appropriate facsimile protocol.