

CONTENTS

<u>Section</u>	<u>Page</u>
1 INTRODUCTION	1-1
1.1 PURPOSE.....	1-1
1.2 SCOPE.....	1-1
1.3 APPLICABILITY.....	1-1
1.4 RATIONALE.....	1-1
1.5 CONVENTION.....	1-2
1.6 DEFINITION.....	1-2
1.7 NOMENCLATURE.....	1-3
1.8 REFERENCES.....	1-3
2 OVERVIEW	2-1
2.1 GENERAL.....	2-1
2.2 DATA DELIVERY.....	2-2
3 DESCRIPTION OF THE DISCRETE WAVELET TRANSFORM	3-1
3.1 OVERVIEW.....	3-1
3.2 IMAGE FRAME.....	3-2
3.3 ONE-DIMENSIONAL SINGLE-LEVEL DWT.....	3-3
3.4 INVERSE DWT.....	3-5
3.5 TWO-DIMENSIONAL SINGLE-LEVEL DWT.....	3-7
3.6 INVERSE OF TWO-DIMENSIONAL DWT.....	3-8
3.7 MULTI-LEVEL TWO-DIMENSIONAL DWT.....	3-8
3.8 INVERSE MULTI-LEVEL 2-D DWT.....	3-9
3.9 SUBBAND WEIGHTS.....	3-10
4 THE BIT PLANE ENCODER (BPE)	4-1
4.1 OVERVIEW.....	4-1
4.2 SEGMENT HEADER.....	4-5
4.3 INITIAL CODING OF DC COEFFICIENTS.....	4-18
4.4 SPECIFYING THE AC BIT DEPTH IN EACH BLOCK.....	4-24
4.5 BIT PLANE CODING.....	4-25

CONTENTS (continued)

<u>Section</u>	<u>Page</u>
5 SECURITY	5-1
5.1 INTRODUCTION	5-1
5.2 SECURITY CONCERNS WITH RESPECT TO THIS RECOMMENDED STANDARD	5-1
5.3 POTENTIAL THREATS AND ATTACK SCENARIOS	5-2
5.4 CONSEQUENCES OF NOT APPLYING SECURITY TO THE TECHNOLOGY	5-2
ANNEX A GLOSSARY OF ACRONYMS AND TERMS (Informative)	A-1
ANNEX B INFORMATIVE REFERENCES (Informative)	B-1
ANNEX C SYMBOLS USED IN CODING STAGES (Informative)	C-1

Figure

2-1 General Schematic of the Coder	2-1
3-1 2-d DWT (One Level).....	3-7
3-2 Three-Level 2-d DWT Decomposition of an Image.....	3-9
4-1 Schematic of Wavelet-Transformed Image	4-1
4-2 Overview of the Structure of a Coded Segment	4-4
4-3 Overview of Segment Header Structure When All Parts Are Included	4-5
4-4 Segment Header Part 1 When Part 1B Is Included.....	4-7
4-5 Segment Header Part 2	4-10
4-6 Segment Header Part 3	4-13
4-7 Segment Header Part 4	4-16
4-8 Coded Data Format for a Gaggle When Uncoded Option Is Selected	4-22
4-9 Coded Data Format for a Gaggle When a Coding Option Is Selected	4-22
4-10 Coded Bit Plane Structure for a Segment.....	4-25

Table

3-1 Analysis Filter Coefficients for the 9/7 Filter.....	3-3
3-2 Synthesis Filter Coefficients for the 9/7 Filter	3-5
3-3 Standard Subband Weights for 9/7 Integer DWT.....	3-10
4-1 Within-Subband Coordinates for Coefficients in a Single Family	4-2
4-2 Subband of Origin for AC Coefficients.....	4-2
4-3 Summary of Segment Header Functionality.....	4-6
4-4 Contents of Segment Header Part 1	4-7
4-5 Contents of Segment Header Part 2.....	4-10

CONTENTS (continued)

<u>Table</u>	<u>Page</u>
4-6 Contents of Segment Header Part 3	4-13
4-7 Contents of Segment Header Part 4	4-15
4-8 DC Coefficient Quantization	4-18
4-9 Code Option Identifiers	4-21
4-10 Code Option Selection Rules	4-23
4-11 Summary of Maximum Word Lengths and Impossible Word Values	4-29
4-12 Integer Mapping for Two-Bit Words	4-30
4-13 Integer Mapping for Three-Bit Words	4-30
4-14 Integer Mapping for Four-Bit Words	4-30
4-15 Variable Length Code Options for Two-Bit Words	4-31
4-16 Variable Length Code Options for Three-Bit Words	4-31
4-17 Variable Length Code Options for Four-Bit Words	4-32
4-18 Identifying the Variable Length Code Options	4-33
C-1 Symbols Used in Coding Stages in Section 4	C-1