ISO/IEC 15438:2015-09 (E)

Information technology - Automatic identification and data capture techniques - PDF417 bar code symbology specification

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Symbols, operations and abbreviated terms 3
4.1 Symbols 3
4.2 Mathematical operations 4
4.3 Abbreviated terms 4

5 Requirements 4
5.1 Symbology characteristics 4
5.1.1 Basic characteristics 4
5.1.2 Summary of additional features 5
5.2 Symbol structure 6
5.2.1 PDF417 symbol parameters 6
5.2.2 Row parameters 6
5.2.3 Codeword sequence 7
5.3 Basic encodation 8
5.3.1 Symbol character structure 8
5.3.2 Start and stop characters 9
5.4 High level (data) encodation 9
5.4.1 Function codewords 10
5.4.2 Text Compaction mode 12
5.4.3 Byte Compaction mode 17
5.4.4 Numeric Compaction mode 19
5.4.5 Advice to select the appropriate compaction mode 20
5.4.6 Treatment of PDF417 reserved codewords 20
5.5 Extended Channel Interpretation 21
5.5.1 Encoding the ECI assignment number 22
5.5.2 Pre-assigned and default Extended Channel Interpretations 22
5.5.3 Encoding ECI sequences within compaction modes 23
5.5.4 Post-decode protocol 25
5.6 Determining the codeword sequence 25
5.7 Error detection and correction 25
5.7.1 Error correction level 25
5.7.2 Error correction capacity 26
5.7.3 Defining the error correction codewords 26
5.8 Dimensions 27
5.8.1 Minimum width of a module (X) 27
5.8.2 Row height (Y) 27
5.8.3 Quiet zones 27
5.9 Defining the symbol format 27
5.9.1 Defining the aspect ratio of the module 27
5.9.2 Defining the symbol matrix of rows and columns 28
5.10 Generating the error correction codewords 29

5.11 Low level encodation 30
5.11.1 Clusters 31
5.11.2 Determining the symbol matrix 31
5.11.3 Determining the values of the left and right row indicators 32
5.11.4 Row encoding 32
5.12 Compact PDF417 32
5.13 Macro PDF417 32

5.13.1 Compaction modes and Macro PDF417 33
5.13.2 ECIs and Macro PDF417 33
5.14 User guidelines 33
5.14.1 Human readable interpretation 33
5.14.2 Autodiscrimination capability 33
5.14.3 User-defined application parameters 33
5.14.4 PDF417 symbol quality 34
5.15 Reference decode algorithm 34
5.16 Error detection and error correction procedure 34
5.17 Transmitted data 34
5.17.1 Transmitted data in the basic (default) interpretation 34
5.17.2 Transmission protocol for Extended Channel Interpretation (ECI) 35
5.17.3 Transmitted data for Macro PDF417 36
5.17.4 Transmission of reserved codewords using the ECI protocol 36
5.17.5 Symbology identifier 36
5.17.6 Transmission using older protocols 36

Annex A (normative) Encoding/decoding table of PDF417 symbol character bar- space sequences 37

Annex B (normative) The default character set for Byte Compaction mode 60

Annex C (normative) Byte Compaction mode encoding algorithm 61

Annex D (normative) Numeric Compaction mode encoding algorithm 63

Annex E (normative) User selection of error correction level 65

Annex F (normative) Tables of coefficients for calculating PDF417 error correction codewords 66

Annex G (normative) Compact PDF417 70

Annex H (normative) Macro PDF417 71

Annex I (normative) Testing PDF417 symbol quality 79

Annex J (normative) Reference decode algorithm for PDF417 80

Annex K (normative) Error correction procedures 84

Annex L (normative) Symbology identifier 86

Annex M (normative) Transmission protocol for decoders conforming with original PDF417 standards 87

Annex N (informative) Algorithm to minimise the number of codewords 93

Annex O (informative) Guidelines to determine the symbol matrix 95

Annex P (informative) Calculating the coefficients for generating the error correction codewords - worked example 99

Annex Q (informative) Generating the error correction codewords - worked example 100

Annex R (informative) Division circuit procedure for generating error correction codewords 104

Annex S (informative) Additional guidelines for the use of PDF417 106

Bibliography 108