qpos manual

**EMV TAG BOOK**

V1.0.7

Document Change History

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Version** | **Author** | **Description** |
| Dec 13th 2021 | V1.0.0 | Zizhou Xu | Basic custom tags are added by AIDs  Added Extends Information for specific tags |
| Dec 23th 2021 | V1.0.1 | Zizhou Xu | Added Extends Information  TAC |
| Dec 28th 2021 | V1.0.2 | Zizhou Xu | Added JCB tags |
| Sept 26th 2022 | V1.0.3 | Ziwei Wang | Added Standard tags |
| Nov 21th 2022 | V1.0.4 | Ziwei Wang | Added common standard tags’ explanations |
| Oct 24th 2023 | V1.0.5 | Zhenliang Lv | Added comments for qpos mini and exception file configuration |
| Oct 29th  2024 | V1.0.6 | Shasha Lv | Add DF8124、DF8125 and adjust some formats |
| June 17th, 2025 | V1.0.7 | Yongliang Li | In global setting:  Add 9F8223 9F8224 9F8225 9F8226 9F8248 9F8220 9F821C 9F8725 |

*Copyright notification* Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent - or other industrial or intellectual property rights.

© Dspread technology CO.,LTD

All rights are reserved.

Summary

This document introduces the tags commonly used in the EMV configuration. The document is divided according to different kinds of kernels, and lists the name, format, length, description and scope for each tag. At the end of the document, the source of the tags corresponding to each kernel is indicated, users can query the corresponding kernel specification manual for more information.

Content

[1. Global Settings 5](#_Toc181117383)

[2. VISA 7](#_Toc181117384)

[3. MASTERCARD 8](#_Toc181117385)

[4. AMEX 12](#_Toc181117386)

[5. DISCOVER 13](#_Toc181117387)

[6. PURE 14](#_Toc181117388)

[7. JCB 16](#_Toc181117389)

[8. RUPAY 18](#_Toc181117390)

[9. BANCOMAT 20](#_Toc181117391)

[10. MIR 22](#_Toc181117392)

[11. UNIONPAY 23](#_Toc181117393)

[12. Extends information 26](#_Toc181117394)

[13. Exception file 37](#_Toc181117395)

[14. Reference 37](#_Toc181117396)

Global Settings

(AID:00000000000000000000000000000000)

The tags configured are Global Settings, which can be directly referenced without having to definite it again.

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact, Contactless |
| 5F2A | HEX | 2 | Transaction Currency Code | Contact, Contactless |
| 5F36 | HEX | 1 | Transaction Currency Exponent | Contact, Contactless |
| 9F01 | HEX | 6 | Acquirer Identifier | Contact, Contactless |
| 9F15 | HEX | 2 | Merchant Category Code | Contact, Contactless |
| 9F16 | ASC | 15 | Merchant Identifier | Contact, Contactless |
| 9F1A | HEX | 2 | Terminal Country Code | Contact, Contactless |
| 9F1C | ASC | 8 | Terminal Identification | Contact, Contactless |
| 9F1E | ASC | 8 | Interface Device (IFD) Serial Number | Contact, Contactless |
| 9F33 | HEX | 3 | Terminal Capabilities (details in chap.[12.1](#Tag_9F33)) | Contact, Contactless |
| 9F35 | HEX | 1 | Terminal Type | Contact, Contactless |
| 9F39 | HEX | 1 | Point-of-Service (POS) Entry Mode | Contact, Contactless |
| 9F40 | HEX | 5 | Additional Terminal Capabilities | Contact, Contactless |
| 9F4E | ASC | 1- 20 | Merchant Name and Location | Contact, Contactless |
| 9F53 | HEX | 1 | Mastercard Merchant Category Code | Contactless |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F8117 | HEX | 1 | Contact Boolean indicating whether use the PSE | Contact |
| 9F8118 | HEX | 1 | Contact reselect PSE | Contact |
| 9F8143 | HEX | 1 | Contact floor limit checking | Contact |
| 9F8145 | HEX | 1 | Contact Velocity Checking | Contact |
| 9F8147 | HEX | 1 | Contact Transaction force online | Contact |
| 9F8303 | HEX | 1 | Support AID Choosing | Contactless |
| 9F8223 | HEX | 1 | Contactless Transaction Limit Check | Contactless |
| 9F8224 | HEX | 1 | Contactless Floor Limit Check | Contactless |
| 9F8225 | HEX | 1 | Terminal Floor Limit Check | Contact Contactless |
| 9F8226 | HEX | 1 | Contactless CVM Limit Check | Contactless |
| 9F8248 | HEX | 1 | Zero Check | Contact Contactless |
| 9F8220 | HEX | 1 | Amount Zero Check Options | Contact Contactless |
| 9F821C | HEX | 1 | Cardholder Confirmation | Contact |
| 9F8725 | HEX | 1 | PSE selection | Contact Contactless |
| 7F15 | HEX | 0- 76 | AMEX DRL(details in chap.[12.](#AmexDRL)8) | Contactless |

Note: If you need to configure 9F8117, 9F8118, 9F8143, 9F8145, 9F8147, 9F8303, 9F8701, DF8204, and 9F92810D labels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10> 9F811701009F92810D0100</7F10>

VISA

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact, Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |
| 9F66 | HEX | 4 | Contactless Terminal Transaction Qualifiers (details in chap.[12.2](#Tag_9F66)) | Contactless |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator (details in chap.[12.9](#Tag_DF01)) | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact |
| 9F928100 | HEX | 2 | AUTH CODE is the same as returned by the server | Contact |
| 9F928101 | HEX | 1 | Contactless online/Declined when the ODA failed, 0: Declined; 1: online | Contactless |
| 9F92810A | HEX | 2 | Contactless Terminal Limit Check Configuration | Contactless |
| 9F92810D | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F92810E | DEC | 6 | Contactless CVM Transaction Limit | Contactless |
| 9F92810F | DEC | 6 | Contactless Terminal Offline Floor Limit | Contactless |

Note: If you need to configure 9F8125, 9F8127, 9F8128, 9F8129,9F928100,9F928101, F92810A,9F92810D and 9F92810E labels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10>9F81250300000019F81270100</7F10>

MASTERCARD

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier(AID)–terminal | Contact, Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |
| 9F1D | HEX | 8 | Terminal Risk Management Parameters | Contact, Contactless |
| 9F5C | HEX | 8 | DS Requested Operator ID | Contactless |
| 9F6D | HEX | 2 | Contactless Mag-stripe Application Version Number (Reader) | Contactless |
| 9F7E | HEX | 1 | Mobile Support Indicator | Contactless |
| DF21 | ASC | 6 | Contact CVM Transaction Limit | Contact |
| DF60 | HEX | 8 | Contactless DS Input (Card) | Contactless |
| DF62 | HEX | 6 | Contactless DS ODS Info | Contactless |
| DF63 | HEX | 6 | Contactless DS ODS Term | Contactless |
| DF8108 | HEX | 1 | Contactless DS AC Type | Contactless |
| DF8109 | HEX | 8 | Contactless DS Input (Term) | Contactless |
| DF810A | HEX | 1 | Contactless DS ODS Info For Reader | Contactless |
| DF810C | HEX | 1 | Contactless Kernel ID | Contactless |
| DF810D | HEX | 1 | Contactless DSVN Term | Contactless |
| DF8117 | HEX | 1 | Contactless Card Data Input Capability | Contactless |
| DF8118 | HEX | 1 | Contactless CVM Capability – CVM Required (details in chap.[12.3](#Tag_DF8118)) | Contactless |
| DF8119 | HEX | 1 | Contactless CVM Capability – No CVM Required (details in chap.[12.4](#Tag_DF8119)) | Contactless |
| DF811A | HEX | 3 | Contactless Default UDOL | Contactless |
| DF811B | HEX | 1 | Contactless Kernel Configuration (details in chap.[12.5](#Tag_DF811B)) | Contactless |
| DF812C | HEX | 1 | Contactless Max Lifetime of Torn Transaction Log Record | Contactless |
| DF812D | HEX | 1 | Contactless Max Number of Torn Transaction Log Records | Contactless |
| DF811E | HEX | 1 | Contactless Mag-stripe CVM Capability – CVM Required | Contactless |
| DF811F | HEX | 1 | Contactless Security Capability | Contactless |
| DF8120 | HEX | 5 | Contactless Terminal Action Code – Default | Contactless |
| DF8121 | HEX | 5 | Contactless Terminal Action Code – Denial | Contactless |
| DF8122 | HEX | 5 | Contactless Terminal Action Code – Online | Contactless |
| DF8123 | DEC | 6 | Contactless Reader Contactless Floor Limit | Contactless |
| DF8124 | DEC | 6 | Reader Contactless Transaction Limit (No On-device CVM) | Contactless |
| DF8125 | DEC | 6 | Reader Contactless Transaction Limit (On-device CVM) | Contactless |
| DF8126 | DEC | 6 | Contactless Reader CVM Required Limit | Contactless |
| DF812C | HEX | 1 | Contactless Mag-stripe CVM Capability – No CVM Required | Contactless |

**Note:** If you need to configure 9F5C，9F6D，9F7E，DF62，DF63，DF8108，DF8109，DF810A，DF810C，DF810D，DF8117，DF8118，DF8119，DF811A，DF811B，DF812C，DF812D，DF811E，DF811F，DF8120，DF8121，DF8122，DF8123，DF8124，DF8125，DF8126 and DF812C labels in **Qpos Mini**, you need to configure these labels into the 7F10 label.

**For example:**<7F10>9F5C0800000000000000019F6D020001DF812C0103</7F10>

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact |
| 7F11 | HEX | 12-33 | Refund Decline (details in chap.[12.10](#Tag_7F11)) | Contact, Contactless |

**Note:** If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B and 9F812C labels in **Qpos Mini**, you need to configure these labels into the 7F10 label.

**For example:**<7F10>9F81250300000019F81270100</7F10>

AMEX

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact, Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |
| 9F6D | HEX | 2 | Contactless Mag-stripe Application Version Number (Reader) | Contactless |
| 9F6E | HEX | 4 | Enhanced Contactless Reader Capabilities (details in chap.[12.6](#Tag_9F6E)) | Contactless |

**Note:** If you need to configure 9F6D and 9F6E labels in **Qpos Mini**, you need to configure these labels into the 7F10 label.

**For example:**<7F10>9F6D 0200019F6E0400000000</7F10>

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact, Contactless |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact, Contactless |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact, Contactless |
| 9F8208 | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F8209 | DEC | 6 | Contactless CVM Required Limit | Contactless |
| 9F820A | DEC | 6 | Contactless Floor Limit | Contactless |
| 9F8218 | HEX | 1 | DRL Reader Limit Control (details in chap.[12.11](#Tag_9F8218)) | Contactless |
| 9F8240 | HEX | 1 | Detect CDA before GAC | Contactless |

**Note:** If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B,9F812C,9F8208,9F8209,9F820A,9F8218 and 9F8240 labels in **Qpos Mini**, you need to configure these labels into the 7F10 label.

**For example:**<7F10>9F81250300000019F81270100</7F10>

DISCOVER

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact, Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact |
| 9F8208 | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F8209 | DEC | 6 | Contactless CVM Required Limit | Contactless |
| 9F820A | HEX | 6 | Contactless Floor Limit | Contactless |

Note: If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B,9F812C,9F8208,9F8209 and 9F820A labels in Qpos Mini, you need to configure these labels into the 7F10 label.

**For example:**<7F10>9F81250300000019F81270100</7F10>

PURE

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F2A | HEX | 1 | Kernel ID | Contactless |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Contact Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Contact Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Contact Terminal Action Code - Online | Contact |
| 9F8245 | HEX | 5 | Terminal Action Code Default | Contactless |
| 9F8246 | HEX | 5 | Terminal Action Code Denial | Contactless |
| 9F8247 | HEX | 5 | Terminal Action Code Online | Contactless |
| 9F9309 | HEX | 1 | Transaction Type value for Application Authentication Transactions | Contactless |
| 9F9311 | HEX | 7 | Additional Tag Object List (ATOL) | Contactless |
| 9F9312 | HEX | 21 | Mandatory Tag Object List (MTOL) | Contactless |
| 9F9313 | HEX | 5 | Authentication Transaction Data Tag Object List (ATDTOL) (Pure) | Contactless |
| 9F9301 | HEX | 5 | Contactless Application Capabilities | Contactless |
| 9F9302 | HEX | 1 | Contactless POS Implementation Options | Contactless |
| 9F9314 | HEX | 3 | Default DDOL (Pure) | Contactless |
| 9F8208 | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F8209 | DEC | 6 | Contactless CVM Required Limit | Contactless |
| 9F820A | DEC | 6 | Contactless Terminal Offline Floor Limit | Contactless |

**Note:** If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B，9F812C，9F8245,9F8246,9F8247,9F9309,9F9311,9F9312,9F9313,9F9301,9F9302,9F9314,9F8208,9F8209 and 9F820A labels in **Qpos Mini**, you need to configure these labels into the 7F10 label.

**For example:**<7F10>9F81250300000019F81270100</7F10>

JCB

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact, Contactless |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact, Contactless |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact, Contactless |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact, Contactless |
| 9F8204 | HEX | 2 | Combination Options | Contactless |
| 9F8205 | HEX | 3 | Terminal Interchange Profile Static | Contactless |
| 9F8206 | HEX | 1 | Implementation Options | Contactless |
| 9F8207 | HEX | 1 | I Acquirer Options | Contactless |
| 9F8208 | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F8209 | DEC | 6 | Contactless CVM Required Limit | Contactless |
| 9F820A | HEX | 6 | Contactless Terminal Offline Floor Limit | Contactless |

Note: If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B, 9F812C,9F8208,9F8209and 9F820AFlabels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10>9F81250300000019F81270100</7F10>

RUPAY

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact, Contactless |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact |
| DF8120 | HEX | 5 | Terminal Action Code – Default | Contactless |
| DF8121 | HEX | 5 | Terminal Action Code – Denial | Contactless |
| DF8122 | HEX | 5 | Terminal Action Code – Online | Contactless |
| 9F8208 | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F8209 | DEC | 6 | Contactless CVM Required Limit | Contactless |
| DF19 | HEX | 4 | Contactless Terminal Offline Floor Limit | Contactless |
| 9F928100 | HEX | 2 | AUTH CODE is the same as returned by the server | Contact |

Note: If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B, 9F812C, DF8120, DF8121, DF8122,9F8208,9F8209 and 9F928100 Flabels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10>9F81250300000019F81270100</7F10>

BANCOMAT

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier(AID)–terminal | Contact, Contactless |
| 9F2A | HEX | 1 | Kernel ID | Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |
| 9F66 | HEX | 4 | Contactless Terminal Transaction Qualifiers | Contactless |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact |
| 9F812D | HEX | 5 | Contactless Terminal Action Code - Switch Interface | Contactless |
| 9F928100 | HEX | 4 | AUTH CODE is the same as returned by the server | Contact |
| 9F928101 | HEX | 1 | Contactless online/Declined when the ODA failed, 0: Declined; 1: online | Contactless |
| 9F92810A | HEX | 2 | Contactless Terminal Limit Check Configuration | Contactless |
| 9F8226 | HEX | 1 | Contactless CVM Required Limit Check | Contactless |
| 9F8224 | HEX | 1 | Contactless Floor Limit Check | Contactless |
| 9F8223 | HEX | 1 | Contactless Transaction Limit Check | Contactless |
| 9F8208 | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F8209 | DEC | 6 | Contactless CVM Required Limit | Contactless |
| 9F820A | DEC | 6 | Contactless Floor Limit | Contactless |
| DF8120 | HEX | 5 | Contactless Terminal Action Code – Default | Contactless |
| DF8121 | HEX | 5 | Contactless Terminal Action Code – Denial | Contactless |
| DF8122 | HEX | 5 | Contactless Terminal Action Code – Online | Contactless |

Note: If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B, 9F812C, 9F812D,9F928100,9F928101,9F92810A,9F8226,9F8224,9F8223,9F8208,9F8209,9F820A, DF8120, DF8121and DF8122 Labels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10>9F81250300000019F81270100</7F10>

MIR

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact, Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact |
| DF51 | HEX | 6 | Terminal Floor Limit | Contactless |
| DF52 | DEC | 6 | Terminal No CVM Limit | Contactless |
| DF53 | DEC | 6 | Terminal Contactless Limit Non-CD CVM | Contactless |
| DF54 | DEC | 6 | Terminal Contactless Limit CD CVM | Contactless |
| DF55 | HEX | 2 | Terminal TPM Capabilities | Contactless |
| DF56 | HEX | 1 | Terminal Transaction Recovery Limit | Contactless |

Note: If DF51, DF52, DF53, DF54, DF55, and DF56 labels need to be configured in Qpos Mini, they need to be configured in the 7F10 label.

For example:<7F10>DF5106000000100000DF52060000000000</7F10>

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact, Contactless |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact, Contactless |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact, Contactless |

Note: If you need to configure 9F8125, 9F8127, 9F8128 and 9F8129 labels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10>9F81250300000019F81270100</7F10>

UNIONPAY

* 1. Standard tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| 9F06 | HEX | 5- 16 | Application Identifier (AID)–terminal | Contact, Contactless |
| 9F09 | HEX | 2 | Terminal Application Version Number | Contact |
| 9F1B | HEX | 4 | Terminal Floor Limit | Contact, Contactless |
| 9F66 | HEX | 4 | Contactless Terminal Transaction Qualifiers | Contactless |

* 1. Custom tags

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tag | Format | Length | Description | Scope |
| DF01 | HEX | 1 | Application Selection Indicator | Contact, Contactless |
| 9F8125 | HEX | 3 | Contact Default Dynamic Data Authentication Data Object List (DDOL) | Contact |
| 9F8127 | HEX | 1 | Contact Maximum Target Percentage to be Used for Biased Random Selection | Contact |
| 9F8128 | HEX | 1 | Contact Target Percentage to Be Used for Random Selection | Contact |
| 9F8129 | HEX | 4 | Contact Threshold Value for Biased random Selection | Contact |
| 9F812A | HEX | 5 | Terminal Action Code - Default | Contact |
| 9F812B | HEX | 5 | Terminal Action Code - Denial | Contact |
| 9F812C | HEX | 5 | Terminal Action Code - Online | Contact |
| 9F928100 | HEX | 2 | AUTH CODE is the same as returned by the server | Contact |
| 9F928101 | HEX | 1 | Contactless online/ Declined when the ODA failed, 0: Declined; 1: online | Contactless |
| 9F92810A | HEX | 2 | Contactless Terminal Limit Check Configuration | Contactless |
| 9F92810D | DEC | 6 | Contactless Transaction Limit | Contactless |
| 9F92810E | DEC | 6 | Contactless CVM Required Limit | Contactless |
| 9F92810F | HEX | 6 | Contactless Terminal Offline Floor Limit | Contactless |
| DF30 | ASC | 6 | Contactless CVM Transaction Limit | Contactless |

Note: If you need to configure 9F8125, 9F8127, 9F8128, 9F8129, 9F812A, 9F812B, 9F812C,9F928100,9F928101, 9F2810A,9F92810D,9F92810E 9F92810F and DF30 labels in Qpos Mini, you need to configure these labels into the 7F10 label.

For example:<7F10>9F81250300000019F81270100</7F10>

Extends information

Standard Tags

* 1. Terminal Capabilities (Tag 9F33)

Indicates the card data input, CVM, and security capabilities of the terminal.

This section provides the coding for Terminal Capabilities:

• Byte 1: Card Data Input Capability

• Byte 2: CVM Capability

• Byte 3: Security Capability

In the tables:

• A ‘1’ means that if that bit has the value 1, the corresponding ‘Meaning’

applies.

• An ‘x’ means that the bit does not apply.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 | x | x | x | x | x | x | x | Manual key entry |
| x | 1 | x | x | x | x | x | x | Magnetic stripe |
| x | x | 1 | x | x | x | x | x | IC with contacts |
| x | x | x | 0 | x | x | x | x | RFU |
| x | x | x | x | 0 | x | x | x | RFU |
| x | x | x | x | x | 0 | x | x | RFU |
| x | x | x | x | x | x | 0 | x | RFU |
| x | x | x | x | x | x | x | 0 | RFU |

Table 12-1-1: Terminal Capabilities Byte 1 - Card Data Input Capability

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 | x | x | x | x | x | x | x | Plaintext PIN for ICC verification |
| x | 1 | x | x | x | x | x | x | Enciphered PIN for online verification |
| x | x | 1 | x | x | x | x | x | Signature (paper) |
| x | x | x | 1 | x | x | x | x | Enciphered PIN for offline verification |
| x | x | x | x | 1 | x | x | x | No CVM Required |
| x | x | x | x | x | 0 | x | x | RFU |
| x | x | x | x | x | x | 0 | x | RFU |
| x | x | x | x | x | x | x | 0 | RFU |

Table 12-1-2: Terminal Capabilities Byte 2 - CVM Capability

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 | x | x | x | x | x | x | x | SDA |
| x | 1 | x | x | x | x | x | x | DDA |
| x | x | 1 | x | x | x | x | x | Card capture |
| x | x | x | 0 | x | x | x | x | RFU |
| x | x | x | x | 1 | x | x | x | CDA |
| x | x | x | x | x | 0 | x | x | RFU |
| x | x | x | x | x | x | 0 | x | RFU |
| x | x | x | x | x | x | x | 0 | RFU |

Table 12-1-3: Terminal Capabilities Byte 3 - Security Capability

If the terminal supports a CVM of signature, the terminal shall be an attended terminal (Terminal Type = 'x1', 'x2', or 'x3') and shall support a printer (Additional Terminal Capabilities, byte 4, ‘Print, attendant’ bit = 1).

* 1. Terminal Transaction Qualifiers (TTQ, Tag 9F66)

Terminal Transaction Qualifiers (TTQs) are online and CVM processing options that may be supported by the Terminal during Entry Point processing. Detailed definitions of TTQs are provided in Tables below.

(For VISA)

Indicates reader capabilities, requirements, and preferences to the card.

TTQ byte 2 bits 8-7 are transient values, and reset to zero at the beginning of the transaction. All other TTQ bits are static values, and not modified based on transaction conditions.

TTQ byte 3 bit 7 shall be set by the acquirer-merchant to 1b.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 | x | x | x | x | x | x | x | Mag-stripe mode supported |
| x | 0 | x | x | x | x | x | x | RFU |
| x | x | 1 | x | x | x | x | x | EMV mode supported |
| x | x | x | 1 | x | x | x | x | EMV contact chip supported |
| x | x | x | x | 1 | x | x | x | Offline-only reader |
| x | x | x | x | x | 1 | x | x | Online PIN supported |
| x | x | x | x | x | x | 1 | x | Signature supported |
| x | x | x | x | x | x | x | 1 | Offline Data Authentication for Online Authorizations supported |
|  | | | | | | | | Note: The TTQ 'Mag-stripe mode supported' bit is set to 0b for products using this specification |

Table 12-2-1: Terminal Transaction Qualifiers Byte 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 | x | x | x | x | x | x | x | Online cryptogram required  Note: A qVSDC online-only reader must have TTQ byte 2 bit 8 set to 1b. It may be coded to 1b or set as a result of device configuration parameters. |
| x | 1 | x | x | x | x | x | x | CVM required |
| x | x | 1 | x | x | x | x | x | (Contact Chip) Offline PIN supported |
| x | x | x | 0 | x | x | x | x | RFU |
| x | x | x | x | 0 | x | x | x | RFU |
| x | x | x | x | x | 0 | x | x | RFU |
| x | x | x | x | x | x | 0 | x | RFU |
| x | x | x | x | x | x | x | 0 | RFU |

Table 12-2-2: Terminal Transaction Qualifiers Byte 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 | x | x | x | x | x | x | x | Issuer Update Processing supported |
| x | 1 | x | x | x | x | x | x | Consumer Device CVM supported |
| x | x | 0 | x | x | x | x | x | RFU |
| x | x | x | 0 | x | x | x | x | RFU |
| x | x | x | x | 0 | x | x | x | RFU |
| x | x | x | x | x | 0 | x | x | RFU |
| x | x | x | x | x | x | 0 | x | RFU |
| x | x | x | x | x | x | x | 0 | RFU |

Table 12-2-3: Terminal Transaction Qualifiers Byte 3

Byte 4 - RFU (0,0,0,0,0,0,0,0)

* 1. CVM Capability – CVM Required (Tag DF8118)

Indicates the CVM capability of the Terminal and Reader when the transaction amount is greater than the Reader CVM Required Limit.

(For MASTERCARD)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 |  |  |  |  |  |  |  | Plaintext PIN for ICC verification |
|  | 1 |  |  |  |  |  |  | Enciphered PIN for online verification |
|  |  | 1 |  |  |  |  |  | Signature (paper) |
|  |  |  | 1 |  |  |  |  | Enciphered PIN for offline verification |
|  |  |  |  | 1 |  |  |  | No CVM required |
|  |  |  |  |  | 0 |  |  | RFU |
|  |  |  |  |  |  | 0 |  | RFU |
|  |  |  |  |  |  |  | 0 | RFU |

Table 12-3: CVM Capability (CVM Required)

* 1. CVM Capability – No CVM Required (Tag DF8119)

Indicates the CVM capability of the Terminal and Reader when the transaction amount is less than or equal to the Reader CVM Required Limit.

(For MASTERCARD)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 |  |  |  |  |  |  |  | Plaintext PIN for ICC verification |
|  | 1 |  |  |  |  |  |  | Enciphered PIN for online verification |
|  |  | 1 |  |  |  |  |  | Signature (paper) |
|  |  |  | 1 |  |  |  |  | Enciphered PIN for offline verification |
|  |  |  |  | 1 |  |  |  | No CVM required |
|  |  |  |  |  | 0 |  |  | RFU |
|  |  |  |  |  |  | 0 |  | RFU |
|  |  |  |  |  |  |  | 0 | RFU |

Table 12-4: CVM Capability (No CVM Required)

* 1. Kernel Configuration (Tag DF811B)

Indicates the Kernel configuration options.

(For MASTERCARD)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 |  |  |  |  |  |  |  | Mag-stripe mode contactless transactions not supported (Not applicable if MAG not implemented) |
|  | 1 |  |  |  |  |  |  | EMV mode contactless transactions not supported (Not applicable if MAG not implemented) |
|  |  | 1 |  |  |  |  |  | On device cardholder verification supported |
|  |  |  | 1 |  |  |  |  | Relay resistance protocol supported |
|  |  |  |  | 1 |  |  |  | Reserved for Payment system |
|  |  |  |  |  | 1 |  |  | Read all records even when no CDA |
|  |  |  |  |  |  | 0 |  | RFU |
|  |  |  |  |  |  |  | 0 | RFU |

Table 12-5: Kernel Configuration

* 1. Enhanced Contactless Reader Capabilities (Tag 9F6E)

Proprietary Data Element for managing Contactless transactions and includes Contactless terminal capabilities (static) and contactless Mobile transaction (dynamic data) around CVM.

(For AMEX)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| x |  |  |  |  |  |  |  | 1 = Contact mode supported (if set, Try Another Interface after a decline shall be set as well) |
|  | x |  |  |  |  |  |  | 1 = Contactless Mag-Stripe Mode supported |
|  |  | 0 |  |  |  |  |  | 0 = Contactless EMV full online mode not supported (full online mode is a legacy feature and is no longer supported) |
|  |  |  | 1 |  |  |  |  | 1 = Contactless EMV partial online mode supported |
|  |  |  |  | 1 |  |  |  | 1 = Contactless Mobile Supported |
|  |  |  |  |  | x |  |  | 1 = Try Another Interface after a decline |
|  |  |  |  |  |  | 0 |  | RFU |
|  |  |  |  |  |  |  | 0 | RFU |

Table 12-6-1: Terminal Capabilities Byte 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| 1 |  |  |  |  |  |  |  | 1 = Mobile CVM supported |
|  | x |  |  |  |  |  |  | 1 = Online PIN supported |
|  |  | x |  |  |  |  |  | 1 = Signature |
|  |  |  | x |  |  |  |  | 1 = Plaintext Offline PIN |
|  |  |  |  | 0 |  |  |  | RFU |
|  |  |  |  |  | 0 |  |  | RFU |
|  |  |  |  |  |  | 0 |  | RFU |
|  |  |  |  |  |  |  | 0 | RFU |

Table 12-6-2: Terminal CVM Capabilities Byte 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| x |  |  |  |  |  |  |  | 1 = Reader is offline only |
|  | x |  |  |  |  |  |  | 1 = CVM required |
|  |  | x |  |  |  |  |  | RFU |
|  |  |  | x |  |  |  |  | RFU |
|  |  |  |  | 0 |  |  |  | RFU |
|  |  |  |  |  | 0 |  |  | RFU |
|  |  |  |  |  |  | 0 |  | RFU |
|  |  |  |  |  |  |  | 0 | RFU |

Table 12-6-3: Transaction Capabilities Byte 3

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | Meaning |
| x |  |  |  |  |  |  |  | 1 = Terminal exempt from No CVM checks |
|  | x |  |  |  |  |  |  | 1 = Delayed Authorization Terminal |
|  |  | x |  |  |  |  |  | 1 = Transit Terminal |
|  |  |  | 0 | 0 |  |  |  | RFU |
|  |  |  |  |  | X | X | X | C-4 Kernel Version: |
|  |  |  |  |  | 0 | 0 | 1 | 2.2 – 2.3 |
|  |  |  |  |  | 0 | 1 | 0 | 2.4 – 2.6 |
|  |  |  |  |  | 0 | 1 | 1 | 2.7 |
|  |  |  |  |  | 1 | x | x | RFU – other values |

Table 12-6-4: Transaction Capabilities Byte 4

Note:

Tag 9F6E Byte 1 Bit 6 (Contactless EMV full online mode not supported) is present for backward compatibility with previous versions of C4, but does not have any associated logic in determining the operating mode of the transaction. As such, any incorrect value of this bit setting must be ignored by the reader and not impact the transaction processing.

Custom Tags

* 1. Fallback processing (Tag 9F8701)

|  |  |  |
| --- | --- | --- |
| Tag | Value | Description |
| 9F8701 | 01 | Display change to MSR and send fallback message to SDK |
| 02 | Display change to MSR and restart MSR transaction on the terminal |

* 1. AMEX DRL (Tag 7F15)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | 7F15 | | |  | | --- | | 7F16 | | 9F8218 Set of Dynamic Reader limit |
| 9F8208 Contactless Transaction Limit |
| 9F8209 Contactless CVM Required Limit |
| 9F820A Contactless Floor limit |
|  |  |
| |  | | --- | | 7F16 | | 9F8218 Set of Dynamic Reader limit |
| 9F8208 Contactless Transaction Limit |
| 9F8209 Contactless CVM Required Limit |
| 9F820A Contactless Floor limit |

* 1. Application Selection Indicator (Tag DF01)

|  |  |  |
| --- | --- | --- |
| Tag | Value | Description |
| DF01 | 00 | Application ID selection partially matching |
| 01 | All matching |

* 1. Refund Decline (Tag 7F11)

When the transaction type is “Refund”, the transaction can be declined by configuring the TAC Denial to “FFFFFFFFFF” (Applicable to contact and contactless).

**1.Only ICC need to be configured:**

(E.g.:<7F11>9C01209F812B05FFFFFFFFFF</7F11>)

|  |  |
| --- | --- |
| 7F11 | 9C Transaction Type (Value = 20) |
| 9F812B Terminal Action Code – Denial (Value = FFFFFFFFFF) |

**2.Only NFC need to be configured:**

(Eg: <7F11>9C0120DF812105FFFFFFFFFF<7F11>)

|  |  |
| --- | --- |
| 7F11 | 9C Transaction Type (Value = 20) |
| DF8121 Terminal Action Code – Denial (Value = FFFFFFFFFF) |

**3.If ICC&NFC need to be configured at the same time:**

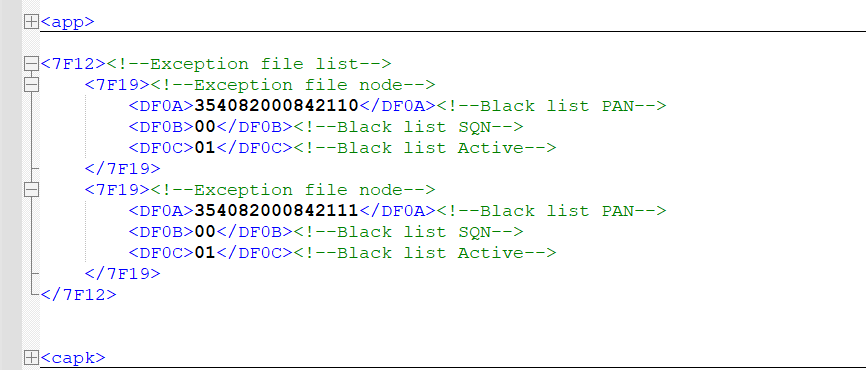
(Eg:<7F11>7F171E7F180C9C01209F812B05FFFFFFFFFF7F180C9C0120DF812105FFFFFFFFFF</7F11>)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | | 7F17 | | |  | | --- | | 7F18 | | 9C Transaction Type |
| 9F812B Terminal Action Code – Denial |
|  |  |
| |  | | --- | | 7F18 | | 9C Transaction Type |
| DF8121 Terminal Action Code – Denial |

* 1. DRL Reader Limit Control (Tag 9F8218)

|  |  |  |
| --- | --- | --- |
| Tag | Value | Description |
| 9F8218 | 80 | Disable DRL |
| 40 | Enable DRL |

Exception file



Reference

The standard tags of all the above kernels can be queried in the kernel specification manual, and the corresponding references are shown in the following table.

|  |  |
| --- | --- |
| Kernel | Reference |
| EMV | EMV book3 v4.3 |
| VISA | EMV Book C-3 v2.9 |
| MASTERCARD | EMV Book C-2 v2.9 |
| AMEX | EMV Book C-4 v2.7 |
| DISCOVER | EMV Book C-6 v2.7 |
| PURE | PURE Contactless Reader\_v2.1.8 |
| JCB | EMV Book C-5 v2.7 |
| RUPAY | Rupay Terminal Specification 2.0 |
| BANCOMAT | SPE-DEF-347-220 |
| MIR | Mir PS Contactless terminal kernel specification\_v.1.5.8\_02 |
| UNIONPAY | UnionPay Integrated Circuit Card Specifications (2018) |