

March 18, 2019



Stephen Downie  
Verifone Inc.  
88 Plumeria Drive

San Jose 95134  
UNITED STATES OF AMERICA

**Re:** *EMVCo Letter of Approval - Contact Terminal Level 2*

**EMV Application Kernel:** EMV L2 Version 7.0.3l

**Approval Number(s):**

- 2-04358-1-1C-ULVS-1118-4.3g**
- 2-04358-1-2C-ULVS-1118-4.3g**
- 2-04358-1-3C-ULVS-1118-4.3g**
- 2-04358-1-4C-ULVS-1118-4.3g**
- 2-04358-1-5C-ULVS-1118-4.3g**
- 2-04358-2-6C-ULVS-1218-4.3g**
- 2-04358-2-7C-ULVS-1218-4.3g**
- 2-04358-2-8C-ULVS-1218-4.3g**
- 2-04358-3-9C-ULVS-0319-4.3g**
- 2-04358-3-10C-ULVS-0319-4.3g**
- 2-04358-3-11C-ULVS-0319-4.3g**
- 2-04358-3-12C-ULVS-0319-4.3g**
- 2-04358-4-13C-ULVS-0319-4.3g**
- 2-04358-1-10S-ULVS-1118-4.3g**

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The EMV Application Kernel has been tested on the following terminal

**Terminal:** Vx520  
**PinPad:** n/a  
**Operating System:** IOS = Linux Version 2.6

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**Renewal Date:** 28-Nov-2022

**Report ID**

- Session 1: **2 HYPE-RP12187559JD02A-ULVS Version 2.0 - UL VS Ltd**
- Session 2: **2 HYPE-RP12187559JD03A-ULVS Version 1.0 - UL VS Ltd**
- Session 3: **2 HYPE-RP12187559JD04A-ULVS Version 2.0 - UL VS Ltd**
- Session 4: **2 HYPE-RP12187559JD05A-ULVS Version 2.0 - UL VS Ltd**

**Kernel Checksum:**

234576F7
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*Configurations Checksums:*

Config	Vendor Config ID	Terminal	Checksum
1C	549D909B	22	5FC6AD1B
2C	572F73C1	22	F2C24AFA
3C	9D6F4632	22	3E05007C
4C	579BEB33	22	0F602A4C
5C	568049F4	25	ADBEBD4D
6C	336D22CD	24	FE48EA81
7C	31077982	24	3EB96771
8C	DBE7E79A	25	D196BA9D
9C	AF62A57C	22	A5F485F3
10C	679F3C65	25	49D432BB
11C	48ACCCDC	25	CD05C972
12C	2C6E6025	25	599008D3
13C	568049F4	25	FBB17ACE

Dear Stephen Downie:

EMVCo, LLC ("EMVCo"), a Delaware limited liability company, has received your request for Level 2 terminal type approval for the EMV Application Kernel identified above (hereafter referred to as the "Application"). In connection with your request, we have reviewed all test file number(s) listed above.

After assessing such file(s), EMVCo has found reasonable evidence that the submitted samples of the above referenced Application sufficiently conform to EMV Integrated Circuit Card Specifications for Payment Systems, Version 4.3 of November 2011.

EMVCo hereby grants your Application EMVCo Type Approval for Terminal Level 2, based on the requirements stated in the EMV 4.3 Specifications. Please note that EMVCo may publish this letter and publicly identify your Application as an approved Application, including in EMVCo's published list of approved Applications.

EMVCo's grant to your Application is subject to and specifically incorporates (i) the General Terms and Conditions to the Letter of Approval enclosed as Exhibit A, and (ii) the Specific Terms and Conditions to the Letter of Approval attached hereto as Attachment 1. Because EMVCo's grant is subject to such limitations, including certain events of termination, you and any third parties should confirm that such approval is current and has not been terminated by referring to the list of approved Applications published on the EMVCo website ([www.emvco.com](http://www.emvco.com)).

Please note that EMVCo makes certain logos available for use in connection with an Application that has received EMVCo approval. To obtain permission to use the "EMV Approved" certification mark, please contact EMVCo to request a license agreement.

***This Letter of Approval is valid while the approval number is posted on the EMVCo website.***

EMVCo, LLC, a Delaware limited liability company

By:

Name: Frédéric Fortin

Title: EMVCo Terminal Type Approval Chair

**Note:**

**The Random Number Generator is part of the EMV specifications. This Contact Level 2 Kernel utilizes specific Hardware device in the tested terminal to generate random numbers. To be EMV compliant, this Contact Level 2 Kernel shall be used in conjunction with Terminal Type having this specific Hardware.**

Terminal Capabilities	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
<b>Card Data Input Capability</b>										
Terminal Type	22	22	22	22	25	24	24	25	22	25
Manual Key Entry	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
Magnetic Stripe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IC with Contacts	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>CVM Capability</b>										
Plaintext PIN	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No
Online Enciphered PIN	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No
Signature (Paper)	Yes	Yes	Yes	No	No	No	No	No	Yes	No
Offline Enciphered PIN	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No
No CVM	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes
<b>Security Capability</b>										
SDA & DDA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Card Capture	No	No	No	No	No	No	No	No	No	No
CDA	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1
<b>Transaction Type Capability</b>										
Tran Type - Cash	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes
Tran Type - Goods	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tran Type - Services	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tran Type - Cash Back	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
Tran Type - Inquiry	No	No	No	No	No	No	No	No	No	No
Tran Type - Transfer	No	No	No	No	No	No	No	No	No	No
Tran Type - Payment	No	No	No	No	No	No	No	No	No	No
Tran Type - Admin	No	No	No	No	No	No	No	No	No	No
Tran Type - Cash Deposit	No	No	No	No	No	No	No	No	No	No
<b>Terminal Data Input Capability</b>										
Keypad	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Numeric Keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Alpha and Special Character Keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Command Keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Function Keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Terminal Data Output Capability</b>										
Print, Attendant	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
Print, Cardholder	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes
Display, Attendant	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
Display, Cardholder	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes
Code Table 10	No	No	No	No	No	No	No	No	No	No
Code Table 9	No	No	No	No	No	No	No	No	No	No
Code Table 8	No	No	No	No	No	No	No	No	No	No
Code Table 7	No	No	No	No	No	No	No	No	No	No
Code Table 6	No	No	No	No	No	No	No	No	No	No
Code Table 5	No	No	No	No	No	No	No	No	No	No
Code Table 4	No	No	No	No	No	No	No	No	No	No
Code Table 3	No	No	No	No	No	No	No	No	No	No
Code Table 2	No	No	No	No	No	No	No	No	No	No
Code Table 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
<b>Application Selection</b>										
PSE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cardholder Confirmation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Preferred display order	No	No	No	No	No	No	No	No	No	No
Partial AID Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multi language	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EMV Language Selection method	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Common Character Set	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Data Authentication</b>										
MAX CA Public key	248	248	248	248	248	248	248	248	248	248
Exponents	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1
Revocation of Issuer PK Certificate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Certificate Revocation List Format	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number
Default DDOL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manual act. when CA PK loading fails	No	No	No	No	No	No	No	No	No	No
CA PK verified with check sum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Cardholder Verification Method</b>										
Bypass PIN Entry	Yes	Yes	No	No	No	No	No	No	Yes	No
Subsequent Bypass PIN Entry	Yes	Yes	No	No	No	No	No	No	Yes	No
Get Data for PIN Try Counter	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No
Fail CVM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Amount known before CVM proces.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Terminal Risk Management</b>										
Floor Limit Checking	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Random Transaction Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Velocity Checking	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transaction Log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exception File	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TRM irrespective of AIP setting (expected behavior)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Terminal Action Analysis</b>										
Terminal Action Codes supported	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TAC can be deleted or disabled	No	No	No	No	No	No	No	No	No	No
How does offline only Terminal process Default Action Codes?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
How does online only terminal process TAC/IAC-Default when unable to go online?	N/A	N/A	N/A	N/A	N/A	Normal	Normal	N/A	N/A	N/A

(continued)	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
<b>Completion Processing</b>										
Forced Online	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
Forced Acceptance	Yes	No	No	Yes	No	No	No	No	No	No
Advices	No	No	No	No	No	No	No	No	No	No
Voice Referrals Initiated by Issuer	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
Batch Data Capture	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Online Data Capture	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Default TDOL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Exception Handling</b>										
POS Entry Mode	0x80	0x80	0x80	0x80	0x80	0x80	0x80	0x80	0x80	0x80
<b>Miscellaneous</b>										
Amount and PIN on same keypad	No	No	No	No	No	No	No	No	No	No
ICC/Magstripe Reader Combined	No	No	No	No	No	No	No	No	No	No
If Combined, is Magstripe read first?	No	No	No	No	No	No	No	No	No	No
Supports account type selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Supports 'on fly' script processing	No	No	No	No	No	No	No	No	No	No
Issuer Script device limit > 128 bytes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If limit > 128, value supported?	0	0	0	0	0	0	0	0	0	0
Internal Date Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Does the terminal support Receipt?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Terminal Capabilities	11C	12C	13C							
<b>Card Data Input Capability</b>										
Terminal Type	25	25	25							
Manual Key Entry	Yes	No	Yes							
Magnetic Stripe	Yes	Yes	Yes							
IC with Contacts	Yes	Yes	Yes							
<b>CVM Capability</b>										
Plaintext PIN	Yes	Yes	Yes							
Online Enciphered PIN	No	No	Yes							
Signature (Paper)	No	No	No							
Offline Enciphered PIN	Yes	Yes	Yes							
No CVM	Yes	No	No							
<b>Security Capability</b>										
SDA & DDA	Yes	Yes	Yes							
Card Capture	No	No	No							
CDA	Mode 1	Mode 1	Mode 1							
<b>Transaction Type Capability</b>										
Transaction Type - Cash	Yes	No	No							
Transaction Type - Goods	Yes	Yes	Yes							
Transaction Type - Services	Yes	Yes	Yes							
Transaction Type - Cash Back	Yes	No	No							
Transaction Type - Inquiry	No	No	No							
Transaction Type - Transfer	No	No	No							
Transaction Type - Payment	No	No	No							
Transaction Type - Admin	No	No	No							
Transaction Type - Cash Deposit	No	No	No							
<b>Terminal Data Input Capability</b>										
Keypad	Yes	Yes	Yes							
Numeric Keys	Yes	Yes	Yes							
Alpha and Special Character Keys	Yes	Yes	No							
Command Keys	Yes	Yes	Yes							
Function Keys	Yes	Yes	Yes							
<b>Terminal Data Output Capability</b>										
Print, Attendant	No	No	No							
Print, Cardholder	Yes	Yes	Yes							
Display, Attendant	No	No	No							
Display, Cardholder	Yes	Yes	Yes							
Code Table 10	No	No	No							
Code Table 9	No	No	No							
Code Table 8	No	No	No							
Code Table 7	No	No	No							
Code Table 6	No	No	No							
Code Table 5	No	No	No							
Code Table 4	No	No	No							
Code Table 3	No	No	No							
Code Table 2	No	No	No							
Code Table 1	Yes	Yes	Yes							

(continued)	11C	12C	13C							
<b>Application Selection</b>										
PSE	Yes	Yes	Yes							
Cardholder Confirmation	Yes	Yes	Yes							
Preferred display order	No	No	No							
Partial AID Selection	Yes	Yes	Yes							
Multi language	Yes	Yes	Yes							
EMV Language Selection method	Yes	Yes	Yes							
Common Character Set	Yes	Yes	Yes							
<b>Data Authentication</b>										
MAX CA Public key	248	248	248							
Exponents	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1	3 and 2 <sup>16</sup> +1							
Revocation of Issuer PK Certificate	Yes	Yes	Yes							
Certificate Revocation List Format	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number	RID, CAPK index and Certificate Serial Number							
Default DDOL	Yes	Yes	Yes							
Manual act. when CA PK loading fails	No	No	No							
CA PK verified with check sum	Yes	Yes	Yes							
<b>Cardholder Verification Method</b>										
Bypass PIN Entry	No	No	No							
Subsequent Bypass PIN Entry	No	No	No							
Get Data for PIN Try Counter	Yes	Yes	Yes							
Fail CVM	Yes	Yes	Yes							
Amount known before CVM proces.	Yes	Yes	Yes							
<b>Terminal Risk Management</b>										
Floor Limit Checking	Yes	Yes	Yes							
Random Transaction Selection	Yes	Yes	Yes							
Velocity Checking	Yes	Yes	Yes							
Transaction Log	Yes	Yes	Yes							
Exception File	Yes	Yes	No							
TRM irrespective of AIP setting (expected behavior)	Yes	Yes	Yes							
<b>Terminal Action Analysis</b>										
Terminal Action Codes supported	Yes	Yes	Yes							
TAC can be deleted or disabled	No	No	No							
How does Offline Only Terminal process Default Action Codes?	N/A	N/A	N/A							
How does online only terminal process TAC/IAC-Default when unable to go online?	N/A	N/A	N/A							



(continued)	11C	12C	13C							
<b>Completion Processing</b>										
Forced Online	No	No	No							
Forced Acceptance	No	No	No							
Advices	No	No	No							
Voice Referrals Initiated by Issuer	No	No	No							
Batch Data Capture	Yes	Yes	Yes							
Online Data Capture	Yes	Yes	Yes							
Default TDOL	Yes	Yes	Yes							
<b>Exception Handling</b>										
POS Entry Mode	0x80	0x80	0x80							
<b>Miscellaneous</b>										
Amount and PIN on same keypad	No	No	No							
ICC/Magstripe Reader Combined	No	No	Yes							
If Combined, is Magstripe read first?	No	No	No							
Supports account type selection	Yes	Yes	No							
Supports 'on fly' script processing	No	No	No							
Issuer Script device limit > 128 bytes	Yes	Yes	Yes							
If limit > 128, value supported?	0	0	0							
Internal Date Management	Yes	Yes	Yes							
Does the terminal support Receipt?	Yes	Yes	Yes							

# **Attachment 1**

## **Specific Terms and Conditions to the Letter of Approval**

Restriction:

**None**