

June 18, 2021

Mr. Stephen Gilhooly
Elo Touch Solutions, Inc.
670 N. McCarthy Blvd
Suite 100
Milpitas 95035
UNITED STATES OF AMERICA

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

EMV Application Kernel: CBM-EMV Version v1.0.6

Approval Number(s):

- 2-04840-1-1C-ICTK-0621-4.3i
- 2-04840-1-2C-ICTK-0621-4.3i
- 2-04840-1-3C-ICTK-0621-4.3i
- 2-04840-1-4C-ICTK-0621-4.3i
- 2-04840-1-5C-ICTK-0621-4.3i
- 2-04840-1-6C-ICTK-0621-4.3i
- 2-04840-1-7C-ICTK-0621-4.3i
- 2-04840-1-8C-ICTK-0621-4.3i
- 2-04840-1-9C-ICTK-0621-4.3i
- 2-04840-1-10C-ICTK-0621-4.3i
- 2-04840-2-11C-ICTK-0621-4.3i
- 2-04840-2-12C-ICTK-0621-4.3i
- 2-04840-2-13C-ICTK-0621-4.3i
- 2-04840-2-14C-ICTK-0621-4.3i
- 2-04840-2-15C-ICTK-0621-4.3i
- 2-04840-1-10S-ICTK-0621-4.3i

The EMV Application Kernel has been tested on the following terminal

Terminal: SATURN1000
PinPad: n/a
Operating System: IOS = CTOS, 32-bit Version v1.0.0

Renewal Date: 29-Dec-2024

Report ID Session 1: EDT20032 Version 1.0 - ICTK Co., Ltd.
Session 2: EDT20032 Version 1.0 - ICTK Co., Ltd.

Kernel Checksum:

67AF3ECF0E65839EAEB09BF8987CDC3534BFE223
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Configurations Checksums:

Config	Vendor Config ID	Terminal	Checksum
1C	Cfg12F8-1	12	8466CB934A4BA19E49FF69136D97F0CF39141A94
2C	Cfg22B8-3	22	AE5672BD6772B623CC201581574D896862402CF6
3C	Cfg11F8-1	11	39F208BFEB305BF6379ECBE93674D38E8592A892
4C	Cfg25D8-3	25	B2FD957168DBD8AD820930D11B7B32C2F04F956D
5C	Cfg22F8-1	22	89E8685CFC6243F2F8B2C295B84968A366CAF1A4
6C	Cfg22B0-2	22	AF915FF8E35B8258D117B18607D43CD7A502689A
7C	Cfg22F0-2	22	556221C279FE02692D34AB350AB3962A141E1DA7
8C	Cfg25D8-1	25	DD03DD0BEFE13E0D1049ED644EDF21798F958CD8
9C	Cfg25D0-1	25	ECEF6A46E552E3B6E46B99316D506548EDF54700
10C	Cfg2508-1	25	8CB861C9A4E7DE7C871908B7DE42453A53502B2E
11C	Cfg25D8-2	25	CE93D48D363EA1D9D11FB5800FCE62E1D782FD40
12C	Cfg22F0-3	22	2CD8E1C3BD61C5FE49FAF93DE08F2911065AE86C
13C	Cfg2208-1	22	35573BA50CD7C3AD2C44A1C1C4F0732386225C89
14C	Cfg2228-1	22	1CC598C09EE4980F5F72FCF029007F03F0735659
15C	Cfg12F0-1	12	EA57FD0537A6B62FE109E59490AD39F731AB617A

Dear Mr. Gilhooly:

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).

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 and the Cryptographic Functions are part of the EMV specifications. This Contact Level 2 Kernel utilizes a specific Hardware component in the tested terminal to generate random numbers and/or Cryptographic Functions. To be EMV compliant, this Contact Level 2 Kernel shall be used in conjunction with terminals having this specific Hardware component.

Terminal Capabilities	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
Card Data Input Capability										
Terminal Type	12	22	11	25	22	22	22	25	25	25
Manual Key Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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
CVM Capability										
Plaintext PIN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Online Enciphered PIN	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Signature (Paper)	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Offline Enciphered PIN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
No CVM	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
SB185	No	No	No	No	No	No	No	No	No	No
Offline Finger	No	No	No	No	No	No	No	No	No	No
Online Finger	No	No	No	No	No	No	No	No	No	No
Offline Facial	No	No	No	No	No	No	No	No	No	No
Online Facial	No	No	No	No	No	No	No	No	No	No
Offline Palm	No	No	No	No	No	No	No	No	No	No
Online Palm	No	No	No	No	No	No	No	No	No	No
Offline Iris	No	No	No	No	No	No	No	No	No	No
Online Iris	No	No	No	No	No	No	No	No	No	No
Offline Voice	No	No	No	No	No	No	No	No	No	No
Online Voice	No	No	No	No	No	No	No	No	No	No
Security Capability										
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 3	Mode 1	Mode 3	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1	Mode 1
Transaction Type Capability										
Tran Type - Cash	Yes	Yes	Yes	No	Yes	No	No	No	No	No
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	No	Yes	No	No	No	No	No
Tran Type - Inquiry	Yes	No	Yes	No	No	No	No	No	No	No
Tran Type - Transfer	Yes	No	Yes	No	No	No	No	No	No	No
Tran Type - Payment	Yes	No	Yes	No	No	No	No	No	No	No
Tran Type - Admin	Yes	No	No	No	No	No	No	No	No	No
Tran Type - Cash Deposit	Yes	No	Yes	No	No	No	No	No	No	No
Terminal Data Input Capability										
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	Yes
Command Keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Function Keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
Terminal Data Output Capability										
Print, Attendant	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Print, Cardholder	No	No	No	Yes	No	No	No	No	No	No
Display, Attendant	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Display, Cardholder	No	No	No	Yes	No	No	No	Yes	Yes	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
Application Selection										
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	Yes	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
Data Authentication										
MAX CA Public key	248	248	248	248	248	248	248	248	248	248
Exponents	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1
Revocation of Issuer PK Certificate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Certificate Revocation List Format	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)
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
Cardholder Verification Method										
Bypass PIN Entry	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Subsequent Bypass PIN Entry	No	Yes	No	No	No	No	No	No	No	No
Get Data for PIN Try Counter	Yes	Yes	Yes	Yes	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
Terminal Risk Management										
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	No	No	Yes	No	No
TRM irrespective of AIP setting (expected behavior)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
Terminal Action Analysis										
Terminal Action Codes supported	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TAC can be deleted or disabled	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Normal	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Completion Processing										
Forced Online	Yes	Yes	Yes	No	Yes	No	No	No	No	No
Forced Acceptance	Yes	Yes	Yes	No	Yes	No	No	No	No	No
Advices	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes
Voice Referrals Initiated by Issuer	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	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
Exception Handling										
POS Entry Mode	8x	8x	8x	8x	8x	8x	8x	8x	8x	8x
Miscellaneous										
Amount and PIN on same keypad	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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	No	Yes	No	No	No	No	No	No	No	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?	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
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	No

Terminal Capabilities	11C	12C	13C	14C	15C					
Card Data Input Capability										
Terminal Type	25	22	22	22	12					
Manual Key Entry	No	Yes	Yes	Yes	Yes					
Magnetic Stripe	Yes	Yes	Yes	Yes	Yes					
IC with Contacts	Yes	Yes	Yes	Yes	Yes					
CVM Capability										
Plaintext PIN	Yes	Yes	No	No	Yes					
Online Enciphered PIN	Yes	Yes	No	No	Yes					
Signature (Paper)	No	Yes	No	Yes	Yes					
Offline Enciphered PIN	Yes	Yes	No	No	Yes					
No CVM	Yes	No	Yes	Yes	No					
SB185	No	No	No	No	No					
Offline Finger	No	No	No	No	No					
Online Finger	No	No	No	No	No					
Offline Facial	No	No	No	No	No					
Online Facial	No	No	No	No	No					
Offline Palm	No	No	No	No	No					
Online Palm	No	No	No	No	No					
Offline Iris	No	No	No	No	No					
Online Iris	No	No	No	No	No					
Offline Voice	No	No	No	No	No					
Online Voice	No	No	No	No	No					
Security Capability										
SDA & DDA	Yes	Yes	Yes	Yes	Yes					
Card Capture	No	No	No	No	No					
CDA	Mode 1	Mode 3	Mode 1	Mode 1	Mode 1					
Transaction Type Capability										
Transaction Type - Cash	No	Yes	Yes	Yes	Yes					
Transaction Type - Goods	Yes	Yes	Yes	Yes	Yes					
Transaction Type - Services	Yes	Yes	Yes	Yes	Yes					
Transaction Type - Cash Back	No	Yes	Yes	Yes	Yes					
Transaction Type - Inquiry	No	No	No	No	Yes					
Transaction Type - Transfer	No	No	No	No	Yes					
Transaction Type - Payment	No	No	No	No	Yes					
Transaction Type - Admin	No	No	No	No	Yes					
Transaction Type - Cash Deposit	No	No	No	No	Yes					
Terminal Data Input Capability										
Keypad	Yes	Yes	Yes	Yes	Yes					
Numeric Keys	Yes	Yes	Yes	Yes	Yes					
Alpha and Special Character Keys	Yes	Yes	Yes	Yes	Yes					
Command Keys	Yes	Yes	Yes	Yes	Yes					
Function Keys	Yes	Yes	Yes	Yes	Yes					

(continued)	11C	12C	13C	14C	15C					
Terminal Data Output Capability										
Print, Attendant	No	Yes	Yes	Yes	Yes					
Print, Cardholder	No	No	No	No	No					
Display, Attendant	No	Yes	Yes	Yes	Yes					
Display, Cardholder	Yes	No	No	No	No					
Code Table 10	No	No	No	No	No					
Code Table 9	No	No	No	No	No					
Code Table 8	No	No	No	No	No					
Code Table 7	No	No	No	No	No					
Code Table 6	No	No	No	No	No					
Code Table 5	No	No	No	No	No					
Code Table 4	No	No	No	No	No					
Code Table 3	No	No	No	No	No					
Code Table 2	No	No	No	No	No					
Code Table 1	Yes	Yes	Yes	Yes	Yes					
Application Selection										
PSE	Yes	Yes	Yes	Yes	Yes					
Cardholder Confirmation	Yes	Yes	Yes	Yes	Yes					
Preferred display order	No	No	No	No	No					
Partial AID Selection	Yes	Yes	Yes	Yes	Yes					
Multi language	Yes	Yes	Yes	Yes	Yes					
EMV Language Selection method	Yes	Yes	Yes	Yes	Yes					
Common Character Set	Yes	Yes	Yes	Yes	Yes					
Data Authentication										
MAX CA Public key	248	248	248	248	248					
Exponents	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1	3 and 2 ¹⁶ +1					
Revocation of Issuer PK Certificate	No	Yes	Yes	Yes	Yes					
Certificate Revocation List Format	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)	RID(5B)+CA PKI(1B)+CS N(3B)					
Default DDOL	Yes	Yes	Yes	Yes	Yes					
Manual act. when CA PK loading fails	No	No	No	No	No					
CA PK verified with check sum	Yes	Yes	Yes	Yes	Yes					
Cardholder Verification Method										
Bypass PIN Entry	No	Yes	No	No	Yes					
Subsequent Bypass PIN Entry	No	No	No	No	No					
Get Data for PIN Try Counter	Yes	Yes	No	No	Yes					
Fail CVM	Yes	Yes	Yes	Yes	Yes					
Amount known before CVM proces.	Yes	Yes	Yes	Yes	Yes					
Terminal Risk Management										
Floor Limit Checking	Yes	Yes	Yes	Yes	Yes					
Random Transaction Selection	Yes	Yes	Yes	Yes	Yes					
Velocity Checking	Yes	Yes	Yes	Yes	Yes					
Transaction Log	Yes	Yes	Yes	Yes	Yes					
Exception File	No	Yes	Yes	Yes	Yes					
TRM irrespective of AIP setting (expected behavior)	Yes	Yes	Yes	Yes	Yes					

(continued)	11C	12C	13C	14C	15C					
Terminal Action Analysis										
Terminal Action Codes supported	Yes	Yes	Yes	Yes	Yes					
TAC can be deleted or disabled	Yes	Yes	Yes	Yes	Yes					
How does offline only Terminal process Default Action Codes?	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					
Completion Processing										
Forced Online	No	Yes	Yes	Yes	Yes					
Forced Acceptance	No	Yes	Yes	Yes	Yes					
Advices	Yes	Yes	Yes	Yes	Yes					
Voice Referrals Initiated by Issuer	No	Yes	Yes	Yes	Yes					
Batch Data Capture	Yes	Yes	Yes	Yes	Yes					
Online Data Capture	Yes	Yes	Yes	Yes	Yes					
Default TDOL	Yes	Yes	Yes	Yes	Yes					
Exception Handling										
POS Entry Mode	8x	8x	8x	8x	8x					
Miscellaneous										
Amount and PIN on same keypad	Yes	Yes	Yes	Yes	Yes					
ICC/Magstripe Reader Combined	No	No	No	No	No					
If Combined, is Magstripe read first?	No	No	No	No	No					
Supports account type selection	No	No	No	No	No					
Supports 'on fly' script processing	No	No	No	No	No					
Issuer Script device limit > 128 bytes	Yes	Yes	Yes	Yes	Yes					
If limit > 128, value supported?	1024	1024	1024	1024	1024					
Internal Date Management	Yes	Yes	Yes	Yes	Yes					
Does the terminal support Receipt?	No	Yes	Yes	Yes	Yes					

Attachment 1

Specific Terms and Conditions to the Letter of Approval

Restriction:

None