

November 23, 2023



Jun Liu

Wuhan Tianyu Information Industry Co., Ltd.

Huazhong University of Sci. & Tech., East Lake Dev. Zone, Wuhan  
430223, Hubei, China

Wuhan 430223  
China

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

**EMV Application Kernel: TYEmvKernel Version V2.02**

**Approval Number(s): 2-05287-1-1C-BCTC-1123-4.4a**  
**2-05287-1-1OS-BCTC-1123-4.4a**

The EMV Application Kernel has been tested on the following terminal

**Terminal: MP45**  
**PinPad: n/a**  
**Operating System: IOS = TYOS Version V1.00**

**Renewal Date: 12-Oct-2027**

**Report ID Session 1: TEMV234NH1T Version V1.0 - Beijing Unionpay Card Technology Co., Ltd**  
**(Bank Card Test Center)**

**Kernel Checksum:**

83D887259E7E1DD15CFC

**Configurations Checksums:**

Config	Vendor Config ID	Terminal	Checksum
1C	C1	11	6C898F5912D6475B3170

Dear Jun Liu:

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 4.4 of October 2022.

EMVCo hereby grants your Application EMVCo Type Approval for Terminal Level 2, based on the requirements stated in the EMV 4.4 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 Testing Group 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								
<b>Card Data Input Capability</b>										
Terminal Type	11									
Manual Key Entry	No									
Magnetic Stripe	No									
IC with Contacts	Yes									
<b>CVM Capability</b>										
Plaintext PIN	Yes									
Online Enciphered PIN	Yes									
Signature (Paper)	No									
Offline Enciphered PIN (RSA)	Yes									
No CVM	Yes									
Biometric	No									
Offline Finger	No									
Online Finger	No									
Offline Facial	No									
Online Facial	No									
Offline Palm	No									
Online Palm	No									
Offline Iris	No									
Online Iris	No									
Offline Voice	No									
Online Voice	No									
<b>Security Capability</b>										
SDA & DDA	Yes									
Card Capture	No									
CDA	Mode 1									
<b>Transaction Type Capability</b>										
Tran Type - Cash	No									
Tran Type - Goods	Yes									
Tran Type - Services	Yes									
Tran Type - Cash Back	Yes									
Tran Type - Inquiry	Yes									
Tran Type - Transfer	Yes									
Tran Type - Payment	Yes									
Tran Type - Admin	Yes									
Tran Type - Cash Deposit	No									
<b>Terminal Data Input Capability</b>										
Keypad	Yes									
Numeric Keys	Yes									
Alpha and Special Character Keys	No									
Command Keys	Yes									
Function Keys	Yes									

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

(continued)	1C									
<b>Terminal Action Analysis</b>										
Terminal Action Codes supported	Yes									
TAC can be deleted or disabled	Yes									
How does offline only Terminal process Default Action Codes?	N/A									
How does online only terminal process TAC/IAC-Default when unable to go online?	Normal									
<b>Completion Processing</b>										
Forced Online	No									
Forced Acceptance	No									
Advices	No									
Voice Referrals Initiated by Issuer	Yes									
Batch Data Capture	Yes									
Online Data Capture	Yes									
Default TDOL	Yes									
Default TDOL not configured	No									
<b>Exception Handling</b>										
POS Entry Mode	80									
<b>Miscellaneous</b>										
Amount and PIN on same keypad	Yes									
ICC/Magstripe Reader Combined	No									
If Combined, is Magstripe read first?	No									
Supports account type selection	No									
Supports 'on fly' script processing	No									
Issuer Script device limit > 128 bytes	No									
If limit > 128, value supported?										
Internal Date Management	Yes									
Does the terminal support Receipt?	No									

## **Attachment 1**

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

Restriction:

**None**