

April 07, 2022

Taeyang (Sunny) Ha

DUALi Inc.

1-309 Innoplex

306 Shinwn-ro, Youngtng-gu (Woncheon-dong)

Suwn, Gyeonggi-do 16675

KOREA, REPUBLIC OF

Re: EMVCo Letter of Approval - Contact Terminal Level 2

EMV Application Kernel: DE-633_EMVL2_Lib Version 2.1

Approval Number(s):
2-05000-1-1S-ICTK-0422-4.3k
2-05000-1-1P-ICTK-0422-4.3k
2-05000-1-1OS-ICTK-0422-4.3k

The EMV Application Kernel has been tested on the following terminal

Terminal: DualPay

PinPad: 1P = Host Simulator_PINPAD on Desktop Dell inspiron 3671, HostSimulator V1.3

Operating System: 1OS = EMV_KERNEL_FW 32bit Version 1.1

Renewal Date: 30-Mar-2026

Report ID Session 1: EDT22011 Version 1.0 - ICTK Co., Ltd.

Kernel Checksum:

5F35A8EF

Configuration Checksum:

Config	Vendor Config ID	Terminal	Checksum
1S		21	DD218456

PIN Pads Checksums:

PinPad	Checksum
1P	

Dear Taeyang (Sunny) Ha:

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

Terminal Capabilities		Value Supported
Card Data Input Capability		
Manual Key Entry		No
Magnetic Stripe		Yes
IC with Contacts		Yes
CVM Capability		
Plaintext PIN for ICC Verification		No
Enciphered PIN for online Verification		Yes
Signature (Paper)		Yes
Enciphered PIN for offline Verification		No
No CVM Required		Yes
SB185		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
Security Capability		
Static Data Authentication and Dynamic Data Authentication		No
Card Capture		No
Combined Dynamic Data Authentication / Application Cryptogram Generation		No
Transaction Type Capability		
Cash		No
Goods		Yes
Services		Yes
Cash Back		No
Inquiry		No
Transfer		No
Payment		No
Administrative		No
Cash Deposit		No
Terminal Data Input Capability		
Does terminal have keypad		Yes
Numeric Keys		Yes
Alphabetic and Special Character Keys		No
Command Keys		Yes
Function Keys		No
Terminal Data Output Capability		
Print, Attendant (Mandatory for terminals supporting signature)		Yes
Print, Cardholder		No
Display, Attendant (Mandatory for Attended terminals)		Yes
Display Cardholder		No

Terminal Capabilities		Value Supported
Terminal Data Output Capability		
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
Application Selection		
Support PSE selection Method		Yes
Support Cardholder Selection & Confirmation		Yes
Does Terminal have a preferred order of displaying applications		No
Does terminal perform partial AID selection		Yes
Does the terminal have multi language support		No
Does the terminal support the EMV Language Selection method		No
Does the terminal support the Common Character Set as defined in Annex B table 20 Book 4		Yes
Selectable Kernel Configurations		
Is your Multi-Configuration Kernel capable of dynamically selecting a configuration at the time of transaction		No
Data Authentication		
What is the maximum supported Certificate Authority Public Key Size (Mandatory for terminals supporting Data Authentication with minimal support for 248 bytes)		N/A
What exponents does the terminal support (Mandatory for terminals supporting Data Authentication, 3 and 2 ¹⁶ +1)		N/A
During data authentication does the terminal check validity for revocation of Issuer Public Key Certificate		No
When supporting certificate revocation, what is the Certificate Revocation List format?		
Does the terminal contain a default DDOL (Mandatory for terminals supporting DDA)		No
Is operator action required when loading CA Public Key fails		No
CA Public Key verified with CA Public Key Check Sum		No
Cardholder Verification Method		
Terminal supports bypass PIN Entry		No
Terminal supports Subsequent bypass PIN Entry		No
Terminal supports Get Data for PIN Try Counter		No
Terminal supports Fail CVM		Yes
Are amounts known before CVM processing		Yes
Terminal Risk Management		
Floor Limit Checking (Mandatory for offline only terminals and offline terminals with online capability)		No
Random Transaction Selection (Mandatory for offline terminals with online capability, except when cardholder controlled)		No
Velocity Checking (Mandatory for offline only terminals and offline terminals with online capability)		No
Transaction Log		No
Exception File		No
Performance of Terminal Risk Management irrespective of AIP setting (expected behavior)		Yes

Terminal Capabilities		Value Supported
Terminal Action Analysis		
Does the terminal support Terminal Action Codes		Yes
Can the Terminal Action Codes be deleted or disabled?		Yes
If yes what are the default TAC values supported? (according to Book 3 Section 10.7)	TAC Denial:	0000000000
	TAC Online:	CC00000000
	TAC Default:	CC00000000
How does Offline Only Terminal process Default Action Codes prior to First Generate AC? (Offline Only Terminal shall support one option)		N/A
How does online only terminal process TAC/IAC-Default when unable to go online?		Skipped
Completion Processing		
Transaction Forced Online Capability		No
Transaction Forced Acceptance Capability		No
Does terminal Support advices		No
Does the terminal support Issuer initiated Voice Referrals		Yes
Does the terminal support Batch Data Capture		No
Does the terminal support Online Data Capture		Yes
Does the terminal support a Default TDOL		Yes
If a Default TDOL is supported, can this default TDOL be not configured (or not loaded) in the terminal		Yes
Default TDOL TVR bit set before or after the 1st Generate AC Terminal Action Analysis		Before
Exception Handling		
What is the POS Entry Mode value when IC cannot be read and the transaction falls back using Magstripe (Mandatory for attended terminals)		02
Miscellaneous		
Is the terminal equipped with a PIN Pad		Yes
Is the amount and PIN entered at the same keypad		Yes
Is the ICC/Magstripe Reader combined		No
If Combined ICC/Magstripe reader is supported, is Magstripe read first		No
Does the terminal support account type selection		No
Does the terminal support 'on fly' script processing (not recommended behavior)		No
Is the Issuer Script device limit greater than 128 bytes		No
If the Issuer Script device limit is greater than 128 bytes, what is the value supported		
Does the terminal support Internal Date Management		No
Is the Level 2 Contact Kernel Random Generator using the algorithm described in SB144		No
If the Level 2 Contact Kernel Random Generator is not using the algorithm described in SB144, is this function PCI approved		No
If the Level 2 Contact Kernel Random Generator is not using the algorithm described in SB144, describe the function (such as algorithm used, etc)		hardware PRNG
Is the Level 2 Contact Kernel Software dependent on the Terminal Hardware		Yes
If answer to previous question is Yes, describe the function and the Hardware		STM32F415 CUP chipset
Are the Cryptographic functions (RSA, Hash, etc) of the Level 2 Contact Kernel Software dependent on the Terminal Hardware		No
If answer to previous question is Yes, describe the Hardware		
Is any other functions of the Level 2 Contact Kernel Software dependent on the Terminal Hardware		No
If answer to previous question is Yes, describe the functions and the Hardware		

Terminal Capabilities		Value Supported
Miscellaneous		
Does the terminal support Receipt (by printing or any electronic means)?	Yes	
Does the terminal store declined transactions?	No	
List the Currency Codes supported as for ISO 4217	840	
Does the terminal support the Application Selection Registered Proprietary Data (ASRPD)?	No	
List the Language(s) supported as for ISO 639 (minimum one shall be declared, and up to 4 if Multiple Languages are supported)	EN	
Can the Kernel be configured so the data object 'Terminal Risk Management Data' '9F1D' is absent or configured with no value (00 is a value)?	No	
Can the Transaction Sequence Counter (TSC) be personalized to any value?	No	
If answer to previous question is Yes, what is the Maximum Value of the Transaction Sequence Counter?		
Checksum		
Does the product comply with the Checksum rules as defined in Contact Terminal Level 2 administrative process	Yes	
This is an Initial submission or Subsequent submission or renewal of the original approved product prior to the effective date of checksum rules (cf Terminal Type Approval Bulletin No. 134)	n/a	
Configuration Checksum (Static Kernel only)	DD218456	

Attachment 1

Specific Terms and Conditions to the Letter of Approval

Restriction:

None