



Paywave Certificate Guide

V-1.0

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版本

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1 Introduction

This document details the terminal capabilities, parameter settings, test case usage, etc. Help developers perform Paywave certification

1.1 Terminal configuration

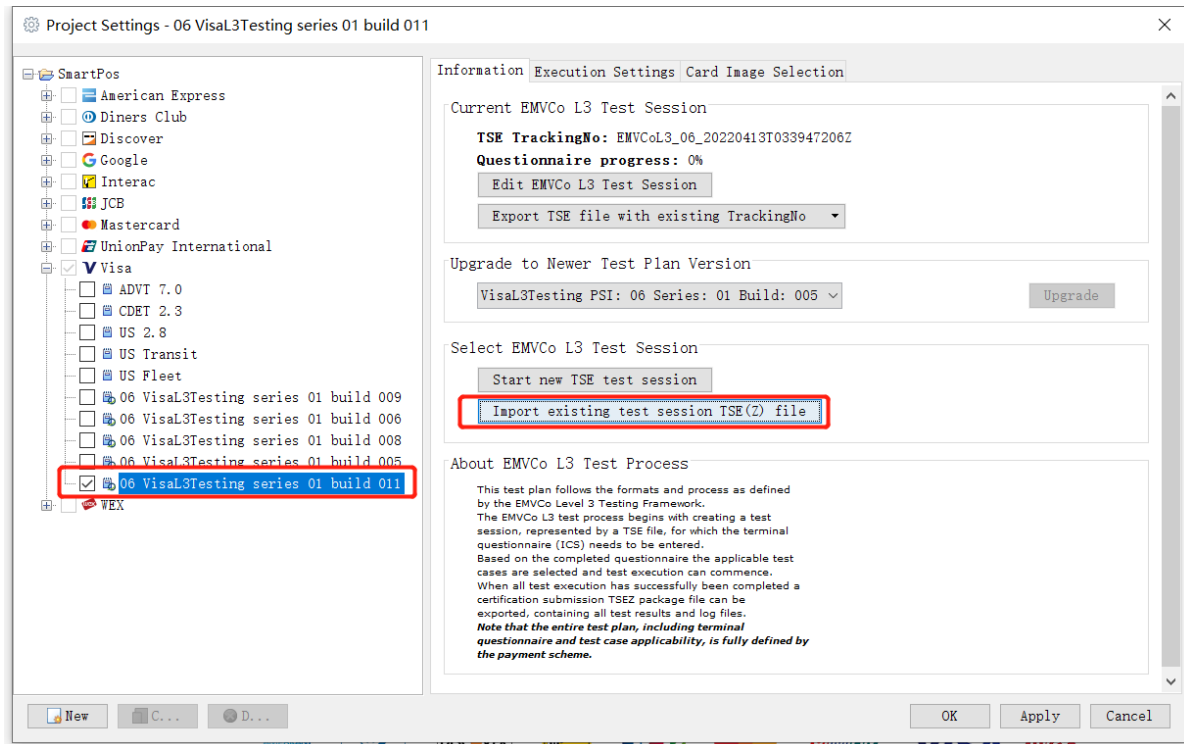
Terminal type	Pos
Terminal capability	Offline with online capability
Online Pin	Support
Signature	Support
Contact EMV	Support
qVSDC	Support
MSD	Do not support MSD for Paywave
Offline Data Authentication	Support
Offline Data Authentication for Online Transaction	Support
Electron AID	Support
Interlink AID	Support
Extended Selection	Support
TTQ B2b6 is set (switch interface when CVM is required)	Support
Terminal Contactless Floor Limit	0.00
Terminal Contactless CVM Limit	15.00
Terminal Contactless Trans Limit	50.00

Nexgo Paywave kernel support all the above configuration. Different customer maybe have different configuration. The final configuration should be confirmed by the Bank or Acquirer. After confirm the configuration, they will generate the TSE file.

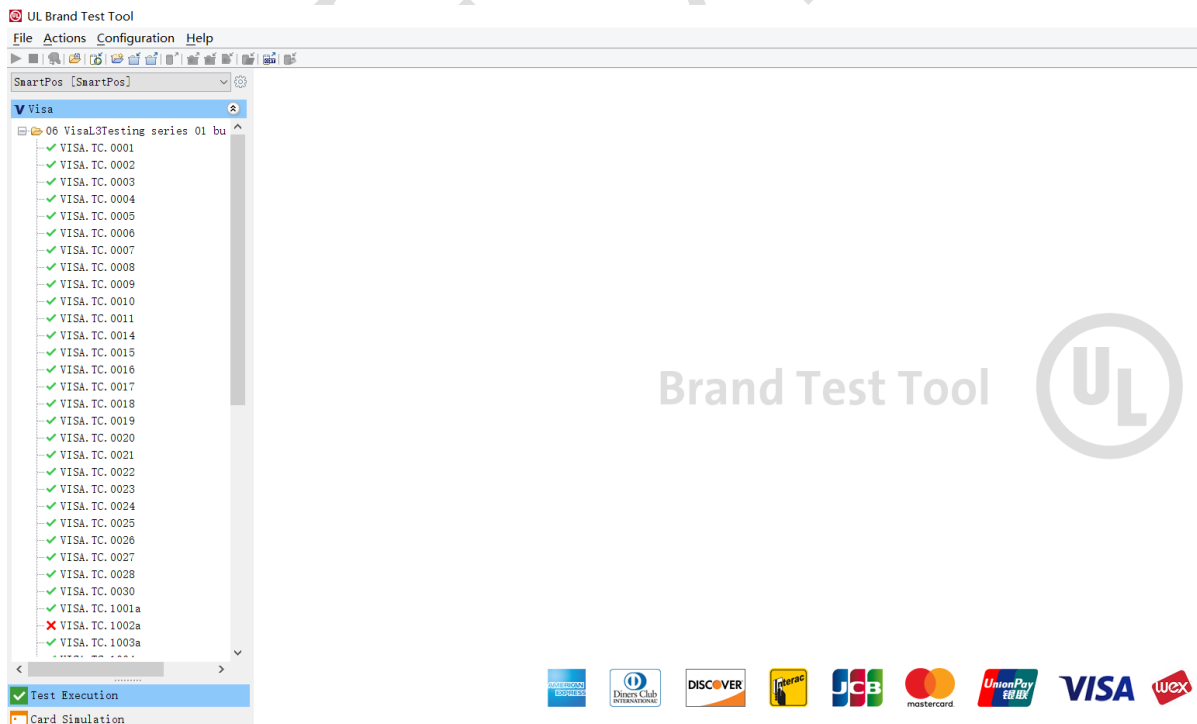
See below picture, select the correct version, and import the TSE file which is provided by the Bank or Acquirer. (for example, TSE file: Smartpos Visa 20220302.tse)



API interface specification



Below is the screen shot of all the VISA test cases:





2 Terminal AID and CAPK configuration

2.1 AID

You can refer to Nexgo SDK EMV sample code to set the AID, or call below API to load the emv Aid parameter:

```
emvHandler2.setAidParaList(aidEntityList);
```

AID list:

A000000003

AID detail for source code configuration:

```
{  
  "ddol": "9f3704",  
  "aid": "a000000003",  
  "appVerNum": "008c",  
  "asi": 0, // partial match flag. asi=0, partial match; asi=1, full match  
  "contactlessCvmLimit": 1500,  
  "contactlessFloorLimit": 0,  
  "contactlessTransLimit": 5000,  
  "floorLimit": 0,  
  "maxTargetPercent": 0,  
  "onlinePinCap": 1,
```



```
"tacDefault": "DC4000A800",  
  
"tacDenial": "0010000000",  
  
"tacOnline": "DC4004F800",  
  
"targetPercent": 0,  
  
"threshold": 0,  
  
"transLimit": 4000  
},
```

2.2 CAPK

You can refer to Nexgo SDK EMV sample code to load the CAPK, or call below API to load the emv CAPK parameter:

```
emvHandler2.setCAPKList(capkEntityList);
```

Note:

- a. Nexgo SDK does not check the expireDate of the CAPK, but check the checksum value. If the checksum is incorrect, the CAPK will load failed
- b. The CAPK parameters should be provided by the bank or the Acquirer

CAPK details for source code configuration:

```
{  
  
"arithInd": 1,  
  
"capkIdx": 1,  
  
"checkSum": "d34a6a776011c7e7ce3aec5f03ad2f8cfc5503cc",
```



API interface specification

"expireDate": "20201231",

"exponent": "03",

"hashInd": 1,

"modulus":

"c696034213d7d8546984579d1d0f0ea519cff8deffc429354cf3a871a6f7183f1228da5c7470c055387100cb935a712c4e2864df5d64ba93fe7e63e71f25b1e5f5298575ebe1c63aa617706917911dc2a75ac28b251c7ef40f2365912490b939bca2124a30a28f54402c34aeca331ab67e1e79b285dd5771b5d9ff79ea630b75",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 7,

"checksum": "b4bc56cc4e88324932cbc643d6898f6fe593b172",

"expireDate": "20201231",

"exponent": "03",

"hashInd": 1,

"modulus":

"a89f25a56fa6da258c8ca8b40427d927b4a1eb4d7ea326bbb12f97ded70ae5e4480fc9c5e8a972177110a1cc318d06d2f8f5c4844ac5fa79a4dc470bb11ed635699c17081b90f1b984f12e92c1c529276d8af8ec7f28492097d8cd5beca16fe4088f6cfab4a1b42328a1b996f9278b0b7e3311ca5ef856c2f888474b83612a82e4e00d0cd4069a6783140433d50725f",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 8,

"checksum": "20d213126955de205adc2fd2822bd22de21cf9a8",

"expireDate": "20201231",



API interface specification

"exponent": "03",

"hashInd": 1,

"modulus":

"d9fd6ed75d51d0e30664bd157023eaa1ffa871e4da65672b863d255e81e137a51de4f72bcc9e44ace12127f87e263d3af9dd9cf35ca4a7b01e907000ba85d24954c2fca3074825ddd4c0c8f186cb020f683e02f2dead3969133f06f7845166aceb57ca0fc2603445469811d293bfebfabafab57631b3dd91e796bf850a25012f1ae38f05aa5c4d6d03b1dc2e568612785938bbc9b3cd3a910c1da55a5a9218ace0f7a21287752682f15832a678d6e1ed0b",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 9,

"checkSum": "1ff80a40173f52d7d27e0f26a146a1c8ccb29046",

"expireDate": "20201231",

"exponent": "03",

"hashInd": 1,

"modulus":

"9d912248de0a4e39c1a7dde3f6d2588992c1a4095afbd1824d1ba74847f2bc4926d2efd904b4b54954cd189a54c5d1179654f8f9b0d2ab5f0357eb642fed95d3912c6576945fab897e7062caa44a4aa06b8fe6e3dba18af6ae3738e30429ee9be03427c9d64f695fa8cab4bfe376853ea34ad1d76bfcad15908c077ffe6dc5521ecef5d278a96e26f57359ffaeda19434b937f1ad999dc5c41eb11935b44c18100e857f431a4a5a6bb65114f174c2d7b59fdf237d6bb1dd0916e644d709ded56481477c75d95cdd68254615f7740ec07f330ac5d67bcd75bf23d28a140826c026dbde971a37cd3ef9b8df644ac385010501efc6509d7a41",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 153,

"checkSum": "4abffd6b1c51212d05552e431c5b17007d2f5e6d",



API interface specification

"expireDate": "20201231",

"exponent": "03",

"hashInd": 1,

"modulus":

"ab79fcc9520896967e776e64444e5dcdd6e13611874f3985722520425295eea4bd0c2781de7f31cd3d041f565f747306eed62954b17edaba3a6c5b85a1de1beb9a34141af38fcf8279c9dea0d5a6710d08db4124f041945587e20359bab47b7575ad94262d4b25f264af33dedcf28e09615e937de32edc03c54445fe7e382777",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 149,

"checksum": "ee1511cec71020a9b90443b37b1d5f6e703030f6",

"expireDate": "20201231",

"exponent": "03",

"hashInd": 1,

"modulus":

"be9elfa5e9a803852999c4ab432db28600dcd9dab76dfaaa47355a0fe37b1508ac6bf38860d3c6c2e5b12a3caaf2a7005a7241ebaa7771112c74cf9a0634652fbca0e5980c54a64761ea101a114e0f0b5572add57d010b7c9c887e104ca4ee1272da66d997b9a90b5a6d624ab6c57e73c8f919000eb5f684898ef8c3dbefb330c62660bed88ea78e909aff05f6da627b",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 146,

"checksum": "429c954a3859cef91295f663c963e582ed6eb253",

"expireDate": "20201231",



"exponent": "03",

"hashInd": 1,

"modulus":

"996af56f569187d09293c14810450ed8ee3357397b18a2458efaa92da3b6df6514ec060195318fd43be9b8f0cc669e3f844057cbddf8bda191bb64473bc8dc9a730db8f6b4ede3924186ffd9b8c7735789c23a36ba0b8af65372eb57ea5d89e7d14e9c7b6b557460f10885da16ac923f15af3758f0f03ebd3c5c2c949cba306db44e6a2c076c5f67e281d7ef56785dc4d75945e491f01918800a9e2dc66f60080566ce0daf8d17ead46ad8e30a247c9f",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 148,

"checkSum": "c4a3c43ccf87327d136b804160e47d43b60e6e0f",

"expireDate": "20201231",

"exponent": "03",

"hashInd": 1,

"modulus":

"acd2b12302ee644f3f835abd1fc7a6f62cce48ffec622aa8ef062bef6fb8ba8bc68bbf6ab5870eed579bc3973e121303d34841a796d6dcbc41dbf9e52c4609795c0ccf7ee86fa1d5cb041071ed2c51d2202f63f1156c58a92d38bc60bdf424e1776e2bc9648078a03b36fb554375fc53d57c73f5160ea59f3afc5398ec7b67758d65c9bff7828b6b82d4be124a416ab7301914311ea462c19f771f31b3b57336000dff732d3b83de07052d730354d297bec72871dccf0e193f171aba27ee464c6a97690943d59bdabb2a27eb71ceebdafa1176046478fd62fec452d5ca393296530aa3f41927adfe434a2df2ae3054f8840657a26e0fc617",

"rid": "a000000003"

}, {

"arithInd": 1,

"capkIdx": 87,

"checkSum": "251a5f5de61cf28b5c6e2b5807c0644a01d46ff5",



```
"expireDate": "20491231",

"exponent": "010001",

"hashInd": 1,

"modulus":
"942b7f2ba5ea307312b63df77c5243618acc2002bd7ecb74d821fe7bdc78bf28f49f74190ad9b23b9713b140ffec
1fb429d93f56bdc7ade4ac075d75532c1e590b21874c7952f29b8c0f0c1ce3aeedc8da25343123e71dcf86c6998e1
5f756e3",

"rid": "a000000003"
}, {

"arithInd": 1,

"capkIdx": 16,

"checksum": "833B1947778036B6D759FCE3F618DDEB2749372C",

"expireDate": "20491231",

"exponent": "03",

"hashInd": 1,

"modulus":
"9F2701C0909CCBD8C3ED3E071C69F776160022FF3299807ED7A035ED5752770E232D56CC3BE159BD8F0CA8B59435
688922F406F55C75639457BBABEFE9A86B2269EF223E34B91AA6DF2CCAD03B4AD4B443D61575CA960845E6C690401
01E231D9EF811AD99B0715065A0E661449C41B4B023B7716D1E4AFF1C90704E55AE1225",

"rid": "a000000003"
},
```

2.3 Paywave related EMV tags

9f66 :TTQ



API interface specification

Terminal Transaction Qualifiers (TTQ) F: b 32 T: 9F66 L: 4 S: Reader P: Q M D: N/A	Required	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.	N/A	<p>Byte 1</p> <p>bit 8: 1 = MSD supported</p> <p>bit 7: RFU (0)</p> <p>bit 6: 1 = qVSDC supported</p> <p>bit 5: 1 = EMV contact chip supported</p> <p>bit 4: 1 = Offline-only reader</p> <p>bit 3: 1 = Online PIN supported</p> <p>bit 2: 1 = Signature supported</p> <p>bit 1: 1 = Offline Data Authentication (ODA) for Online Authorizations supported.</p> <p><i>Note:</i> Readers compliant to this specification set TTQ byte 1 bit 1 to 0b.</p> <p>Byte 2</p> <p>bit 8: 1 = Online cryptogram required</p> <p>bit 7: 1 = CVM required</p> <p>bit 6: 1 = (Contact Chip) Offline PIN supported</p> <p>bits 5-1: RFU (00000)</p> <p>Byte 3</p> <p>bit 8: 1 = Issuer Update Processing supported</p> <p>bit 7: 1 = Mobile functionality supported (Consumer Device CVM)</p> <p>bits 6-1: RFU (000000)</p> <p>Byte 4</p> <p>RFU ('00')</p>
9F6C:CTQ				
Card Transaction Qualifiers (CTQ) F: b 16 T: 9F6C L: 2 S: Card P: Q M _C , Exclusive D: –	Conditional If CVM supported or if issuer CTQ preferences supported or if Issuer Update Processing at the POS supported	In this version of the specification, used to indicate to the device the card CVM requirements, issuer preferences, and card capabilities.	UC: Modifiable (byte 1 bits 6-1, byte 2 bits 6-1) Transient (byte 1 bits 8-7, byte 2 bits 8-7) IU: PUT DATA R: GET DATA (SD), GPO	<p>Byte 1</p> <p>bit 8: 1 = Online PIN Required</p> <p>bit 7: 1 = Signature Required</p> <p>bit 6: 1 = Go Online if Offline Data Authentication Fails and Reader is online capable.</p> <p>bit 5: 1 = Switch Interface if Offline Data Authentication fails and Reader supports VIS.</p> <p>bit 4: 1 = Go Online if Application Expired</p> <p>bit 3: 1 = Switch Interface for Cash Transactions</p> <p>bit 2: 1 = Switch Interface for Cashback Transactions</p> <p>bit 1: RFU (0)</p> <p>Byte 2</p> <p>bit 8: 1 = Consumer Device CVM Performed</p> <p><i>Note:</i> Bit 8 is not used by cards compliant to this specification, and is set to 0b.</p> <p>bit 7: 1 = Card supports Issuer Update Processing at the POS</p> <p>bits 6-1: RFU (000000)</p>



3 Test cases

VISA. TC. 1001a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.

VISA. TC. 1001a x

VISA. TC. 1001a
Objective Ensure online approval for a baseline VCPS 2.0.2 card.
Configuration -
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader' s compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction will approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 1002a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1002a x

VISA.TC.1002a

Objective

Ensure online approval for a VCPS 2.2 baseline card and TTQ settings are correct.

Note:

The static TTQ settings are verified as part of this test but apply to all other tests.

Applicability

All regions
Contactless
POS

Test Case Instructions

• Tap the test card against the active contactless chip reader and follow any terminal prompt instructions

Show details

Observation

☐ Manual results mode

Manual Validations

✓

✓

●

✗

○

?

○

Transaction approved message displayed.

APDU Validations

✓

PC.1013 - TTQ B1b5 = 1b (Contact chip supported)

✓

PC.1016 - TTQ B1b3 = 1b (Online PIN supported)

✓

PC.1019 - TTQ B1b2 = 0b (Signature not supported)

✓

PC.1020 - TTQ B1b1 = 0b (ODA for Online Authorizations not supported)

✓

PC.1021 - TTQ B2b8 = 1b (Online Cryptogram Required)

✓

PC.1023 - TTQ B2b6 = 1b (Offline PIN (for contact chip) supported)

✓

PC.1026 - TTQ B3b7 = 1b (CDCVM supported)

✓

PC.1032 - TTQ B1b8 = 0b (MSD not supported)

✓

PC.1033 - TTQ B1b6 = 1b (qVSDC supported)

Note :This case checks the terminal TTQ, needs to config the TTQ in the source code.

Find **onTransInitBeforeGPO** callback, and check if it is Paywave , and do the configuration for TTQ.



```
@Override
public void onTransInitBeforeGPO() {
    Log.d( tag: "huacong",    msg: "onAfterFinalSelectedApp" );

    byte[] aid = emvHandler2.getTlv(new byte[] {0x4F}, EmvDataSourceEnum.FROM_KERNEL);
    //contactless
    if (mExistSlot == CardSlotTypeEnum.RF) {
        CPUCardHandler cpuCardHandler = deviceEngine.getCPUCardHandler(CardSlotTypeEnum.RF);
        Log.d( tag: "huacong",    msg: "onAfterFinalSelectedApp readUid-->" + cpuCardHandler.readUid);
        if (aid != null) {
            if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000004")) {
                //Paypass
                configPaypassParameter(aid);
                configPaypassParametersTest();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000003")) {
                //Paywave
                configPaywaveParameters();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000025")) {
                //ExpressPay
                configExpressPayParameter();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000541")) {
                configPureContactlessParameter();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000065")) {
                configJcbContactlessParameter();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000333")) {
                configUPIParameters();
            }
        }
    }
}
```

```
private void configPaywaveParameters() {
    byte[] TTQ ;
    byte[] kernelTTQ = emvHandler2.getTlv(ByteUtils.hexString2ByteArray("9F66"), EmvDataSourceEnum.FROM_KERNEL);
    Log.d( tag: "Paywave",    msg: "configPaywaveParameters, TTQ" + ByteUtils.byteArray2HexString(kernelTTQ));
    //default TTQ value
    TTQ = ByteUtils.hexString2ByteArray("34004000");
    kernelTTQ[0] = TTQ[0];
    kernelTTQ[2] = TTQ[2];
    kernelTTQ[3] = TTQ[3];

    //B2b6 offline pin(for contact) support
    kernelTTQ[1] = (byte) (kernelTTQ[1] | ((byte) (0x20)));
    Log.d( tag: "Paywave",    msg: "====kernelTTQ==== " + ByteUtils.byteArray2HexString(kernelTTQ));

    emvHandler2.setTlv(ByteUtils.hexString2ByteArray("9F66"), kernelTTQ);
}
```

Transaction will approve, test case pass.

Note: Nexgo kernel default TTQ = 3600C000, can follow the above method to change the required TTQ.



VISA. TC. 1003a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.

VISA. TC. 1003a x

VISA. TC. 1003a

Objective	Ensure online approval for a card that does not contain the Card Transaction Qualifiers (CTQ) (tag '9F6C').
Applicability	All regions Contactless POS, ATM, Visa Ready Tap to Phone
Test Case Instructions	<ul style="list-style-type: none">• Tap the test card against the active contactless chip reader and follow any terminal prompt instructions• Review reader' s compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction will approve,test case pass.

Note: do not need any special configuration.

VISA. TC. 1004a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 1004a x

VISA. TC. 1004a
Objective Ensure online approval for a multi-application card.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

Manual Validations

✓

✓

⊙

✗

○

?

○

Transaction approved message displayed.

✓

✓

⊙

✗

○

?

○

The terminal automatically selects the Visa Credit application - it does not display applications to the cardholder for confirmation or selection.

APDU Validations

✓

PC.1012 - Visa Credit application selected for the transaction

Network Validations

No applicable pass criteria in this validation section

Transaction will approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 1005a

Enter amount below contactless transaction limit (such as 2.00), tap the card directly.



VISA. TC. 1005a x

VISA. TC. 1005a

Objective Ensure online approval for a card that returns additional data in the SELECT PPSE Response.

Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone

Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader' s compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

✓ ✓ ● ✗ ○ ? ○ Transaction approved message displayed.

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Transaction will approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 1006a

Enter amount below contactless transaction limit (such as 2.00), tap the card directly.



VISA. TC. 1006a x

VISA. TC. 1006a
Objective Ensure terminal properly processes a card with a 19-digit PAN.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Transaction will approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 1007a

Enter amount below contactless transaction limit (such as 2.00), tap the card directly.



VISA.TC.1007a x

VISA.TC.1007a
Objective Ensure online approval for a card that contains the Electron AID.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader' s compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Transaction will approve, test case pass.

Note: do not need any special configuration.

VISA.TC.1010a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1010a x

VISA.TC.1010a
Objective Ensure online approval for a card with an IAD length of 23-bytes.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

✓ ✓ ● ✗ ○ ? ○ Transaction approved message displayed.

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Transaction will approve, test case pass.

Note: do not need any special configuration.

VISA.TC.1011a

Enter amount below contactless transaction limit (such as 2.00), tap the card directly.



VISA.TC.1011a x

VISA.TC.1011a
Objective Ensure terminal properly processes a card that causes a pre-tap.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

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Optional: "Refer to your payment device for further instructions" message (or equivalent) displayed

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Ensure that the reader/terminal returns to discovering processing after removing the card from the RF field

☒ **APDU Validations**

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PC.1026 - ITQ B3b7 = 1b (CDCVM supported)

☒ **Network Validations**

No applicable pass criteria in this validation section

Note: This case is see phone test case.

The EMV onFinish callback will return -8027

```
public final static int Emv_Plz_See_Phone = EmvHandler_Base_Error - 27;
```

Application needs to display "please check your Phone" message or equivalent message. Then call search card API(cardReader.searchCard(slotTypes, 20, this);) to search the contactless card again.

```
slotTypes.add(CardSlotTypeEnum.RF);  
cardReader.searchCard(slotTypes, 20, this);
```

Transaction will approve, test case pass.



VISA. TC. 1013a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.

VISA. TC. 1013a x

VISA. TC. 1013a

Objective	Ensure the terminal <u>declines</u> the transaction and does not attempt to switch the transaction to another interface.
Applicability	All regions Contactless POS, ATM, Visa Ready Tap to Phone
Test Case Instructions	<ul style="list-style-type: none">• Tap the test card against the active contactless chip reader and follow any terminal prompt instructions• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

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Transaction is DECLINED by the terminal without going online

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Reader must not indicate that a switch to the contact interface(chip or magnetic stripe) is required

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

The EMV onFinish callback will return -8025 , transaction offline decline

```
public final static int Emv_Offline_Declined = EmvHandler_Base_Error - 25;
```

Transaction decline directly, test case pass.

Note: do not need any special configuration.

VISA. TC. 1017a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.

VISA.TC.1017a

VISA.TC.1017a

Objective

Ensure terminal properly processes a card with non-compliant Track 2 Equivalent Data (Tag '57').

Applicability

All regions
Contactless
POS, ATM, Visa Ready Tap to Phone

Test Case Instructions

- Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
- Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ Manual Validations

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Any outcome is acceptable as long as the device finishes the transaction. Acceptable outcomes include: offline decline, online approval, online decline, or a clear error message. If the device hangs and needs to be rebooted, the device fails this test.

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Application needs to handle the 57 track 2 data correctly.

Terminal can handle this case correctly, test case pass.

Note: do not need any special configuration.

VISA. TC. 1018a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1018a x

VISA.TC.1018a
Objective Ensure terminal does **not** support MSD.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Error Message Displayed (e.g., "Card Not Supported" or "Card Not Accepted")

☒ **APDU Validations**

☒ PC.1032 - TTQ B1b8 = 0b (MSD not supported)

☒ **# Network Validations**

No applicable pass criteria in this validation section

Note: Nexgo Paywave kernel does not support MSD, so the terminal(kernel) configuration should be "MSD not support"

The EMV onFinish callback will return -8030

```
public final static int Emv_USE_OTHER_CARD = EmvHandler_Base_Error - 30;
```

Transaction decline, test case pass.

VISA.TC.1021a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 1021a x

VISA. TC. 1021a
Objective Ensure online transaction for a card that contains an unrecognized Cryptogram Version Number (CVN).
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria
Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Transaction declined after online authorization

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Note: This case checks the CVN by the host, the host needs to decline the transaction.

Transaction decline by the host, test case pass.

Note: do not need any special configuration.

VISA. TC. 1022a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1022a x

VISA.TC.1022a
Objective Ensure online approval for a card with no PAN Sequence Number.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA.TC.1023a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 1023a x

VISA. TC. 1023a

Objective Ensure online approval for a card with a PAN Sequence Number of 11.

Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone

Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review merchant's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

✓ ✓ ● ✗ ○ ? ○ Transaction approved message displayed.

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 1024a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1024a x

VISA.TC.1024a
Objective Ensure online approval and successful Online PIN processing.
Applicability All regions
Contactless
Contactless Online PIN supported
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Enter PIN of 1234
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

✓ Manual Validations

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 Transaction approved message displayed.

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 Terminal requests cardholder to enter their PIN

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA.TC.1025a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 1025a x

VISA. TC. 1025a
Objective Ensure correct processing when incorrect Online PIN entered.
Applicability All regions
Contactless
Contactless Online PIN supported
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Enter incorrect PIN value of 4321
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

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Terminal requests cardholder to enter their PIN

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Terminal prompts for PIN re-entry or declines transaction

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction decline by the host, test case pass.

Note: do not need any special configuration.

VISA. TC. 1026a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1026a x

VISA.TC.1026a

Objective Ensure online approval for a card that returns additional data in the GPO response (the card returns two unrecognized tags: '9F3F' and '9F60').

Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone

Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader's compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA.TC.1027a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 1027a x

VISA. TC. 1027a

Objective Ensure online approval for a card form factor that supports Consumer Device Cardholder Verification Method (CDCVM).

Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone

Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions
• Review reader' s compliance with the applicable pass criteria

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 1028a

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.1028a x

VISA.TC.1028a
Objective Ensure online approval for a card with a large ATC value ('7FFF').
Note: The ATC is initialized to the value of '7FFF' but will increment to '8000' upon first use and subsequent values on further use.
Applicability All regions
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Tap the test card against the active contactless chip reader and follow any terminal prompt instructions

Show details

Observation

☐ Manual results mode

☒ **Manual Validations**

☒ ☒ ☒ ☒ ☒ ☒ Transaction approved message displayed.

☒ **# APDU Validations**

No applicable pass criteria in this validation section

☒ **# Network Validations**

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA.TC.1043

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 1043 x

VISA. TC. 1043
Objective Ensure U.S. card containing the U.S. Common Debit AID can be accepted at the terminal via the Visa AID.
Applicability All regions except U.S.
Contactless
POS, ATM, Visa Ready Tap to Phone
Test Case Instructions • Initiate transaction
• (Transaction accepted via Visa AID)
Show details

Observation

☐ Manual results mode

✓ Manual Validations

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 Transaction approved message displayed.

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 Visa AID correctly printed on transaction receipt (A000000003 1010)

APDU Validations

No applicable pass criteria in this validation section

Network Validations

No applicable pass criteria in this validation section

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 3103

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA. TC. 3103 x

VISA. TC. 3103
Objective SCA Tests RC 1A ID-1 Card
Applicability EEA - POS Only
Test Case Instructions Complete a transaction for the lowest acceptable amount

Show details

Observation

☐ Manual results mode

? Manual Validations

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Device shall prompt for card to be inserted into chip reader "Insert Card" or "Use Contact Chip"

✓ APDU Validations

✓

PC.3018 - CVM NOT Required

? Network Validations

?

Optional: PC.3049 - Check for response code 1A

Note: this case tests **SCA-insert** card. The first contactless transaction sends to host, and host return **specific response code 1A**, application receive this special code needs to let user insert card, and start new EMV flow(contact) again.

Transaction approve, test case pass.

Note: do not need any special configuration.

VISA. TC. 3116

Enter amount below contactless transaction limit(such as 2.00), tap the card directly.



VISA.TC.3116 x

VISA.TC.3116
Objective SCA Tests RC 70 Online PIN
Applicability EEA - POS Only
Test Case Instructions Complete a transaction for the lowest acceptable amount

Show details

Observation

☐ Manual results mode

? Manual Validations

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The device shall request the cardholder to enter their PIN into the PED for validation online by the cardholder's issuing bank or their representative

✓ APDU Validations

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PC.3018 - CVM NOT Required

🔗 Network Validations

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Optional: PC.3048 - Check for response code 70

Note: this case tests **SCA-input online PIN**. The first contactless transaction sends to host, and host return **specific response code 70**, application receive this special code needs to let user enter online PIN, then send the transaction into host again(emv data is same with previous transaction)

```
pinPad.inputOnlinePin(new int[]{0x00, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09, 0x0a, 0x0b, 0x0c},  
    60, cardNo.getBytes(), 10, PinAlgorithmModeEnum.ISO9564FMT1,  
    this);
```

Transaction approve, test case pass.

Note: do not need any special configuration.



4 FAQ

4.1 How to config the 9F66 (TTQ)?

Q: We found the default value(9F66) is incorrect with some test cases.

A: You can config other bytes use below methods, except Byte2. (because the Byte 2 is generate by the kernel.)

Find `onTransInitBeforeGPO` callback, and check if it is Paywave , and do the configuration for TTQ.

```
@Override
public void onTransInitBeforeGPO() {
    Log.d( tag: "huacong",   msg: "onAfterFinalSelectedApp" );

    byte[] aid = emvHandler2.getTlv(new byte[]{0x4F}, EmvDataSourceEnum.FROM_KERNEL);
    //contactless
    if (mExistSlot == CardSlotTypeEnum.RF) {
        CPUCardHandler cpuCardHandler = deviceEngine.getCPUCardHandler(CardSlotTypeEnum.RF);
        Log.d( tag: "huacong",   msg: "onAfterFinalSelectedApp readUid-->" + cpuCardHandler.readUid);
        if (aid != null) {
            if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000004")){
                //Paypass
                configPaypassParameter(aid);
                configPaypassParametersTest();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000003")){
                //Paywave
                configPaywaveParameters();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000025")){
                //ExpressPay
                configExpressPayParameter();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000541")){
                configPureContactlessParameter();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000065")){
                configJcbContactlessParameter();
            }else if(ByteUtils.byteArray2HexString(aid).toUpperCase().contains("A000000333")){
                configUPIParameters();
            }
        }
    }
}
```



```
private void configPaywaveParameters() {  
    byte[] TTQ ;  
    byte[] kernelTTQ = emvHandler2.getTlv(ByteUtils.hexString2ByteArray("9F66"), EmvDataSourceEnum.FROM_KERNEL);  
    Log.d( tag: "Paywave", msg: "configPaywaveParameters, TTQ" + ByteUtils.byteArray2HexString(kernelTTQ));  
    //default TTQ value  
    TTQ = ByteUtils.hexString2ByteArray("34004000");  
    kernelTTQ[0] = TTQ[0];  
    kernelTTQ[2] = TTQ[2];  
    kernelTTQ[3] = TTQ[3];  
  
    //B2b6 offline pin(for contact) support  
    kernelTTQ[1] = (byte) (kernelTTQ[1] | ((byte) 0x20));  
    Log.d( tag: "Paywave", msg: "====kernelTTQ==== " + ByteUtils.byteArray2HexString(kernelTTQ));  
  
    emvHandler2.setTlv(ByteUtils.hexString2ByteArray("9F66"), kernelTTQ);  
}
```

4.2 How to get the Paywave CVM result?

Q: How to get the CVM result ,Online PIN, signature or No CVM ?

ANSWER:

- a. You can call API `emvHandler2.getEmvCvmResult()` to get the cvm result directly.



EmvCvmResultEnum

Enumeration Name	Description
EMV_CVMR_NA	CVM result is not specified, or the result is null
EMV_CVMR_NOCVM	No cvm required
EMV_CVMR_SIGNATURE	Signature

Confidential

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EMV_CVMR_ONLINEPIN	Online pin
EMV_CVMR_CONFVERIFIED	ID verify (not used)
EMV_CVMR_CDCVM	CDCVM
EMV_CVMR_OFFLINEPIN_PLAINTEXT	Offline plaintext pin
EMV_CVMR_OFFLINEPIN_ENCIPHER	Offline encipher pin
EMV_CVMR_OFFLINEPIN_PLAINTEXT_SIGNATURE	Offline plaintext pin & signature
EMV_CVMR_OFFLINEPIN_ENCIPHER_SIGNATURE	Offline encipher pin & signature

b. You can check EMV tag 9F6C (CTQ).

Byte1 bit8 = 1; Online PIN required

Byte1 bit7 = 1; Signature required

Byte2 bit8 = 1, CDCVM performed



4.3 How to get the TVR and TSI for Paywave?

Paywave does not define the TVR and TSI, so if you getTlv with 95 and 9B, the kernel will return null.

You can call below API to get the Paywave TVR and TSI.

```
PayWaveResultEntity payWaveResultEntity = emvHandler2.getPayWaveResult();
```

```
PayWaveResultEntity getPayWaveResult();
```

Return :

PayWaveResultEntity

Parameter	Description
tvr	TVR
tsi	TSI

4.4 How to set Paywave DRL?

If terminal support DRL, and card also have the DRL flag, then the transaction will use DRL limit to process the transaction.

You can call below API to config the DRL limit(or you can refer to Nexgo SDK EMV sample code).

```
emvHandler2.setDynamicReaderLimitListForPaywave(dynamicReaderLimitEntity);
```

Normally, the program ID has :

```
new byte[]{0x31, 0x02, 0x68, 0x26,0x00}
```

```
new byte[]{0x31, 0x02, 0x68, 0x26, 0x12}
```

```
new byte[]{0x31, 0x02, 0x68, 0x26, 0x12, 0x00,0x00,0x03}
```

```
new byte[]{0x31, 0x02, 0x68, 0x26, 0x20}
```

you need to follow below code to set the 4 program ID .



```
DynamicReaderLimitEntity entity3 = new DynamicReaderLimitEntity();
entity3.setDrlSupport(true);
//get from 9f5a,program ID
entity3.setAppProgID(new byte[]{0x31, 0x02, 0x68, 0x26,0x00});
entity3.setAuthOfZeroCheck(true);
entity3.setStatusCheck(false);
entity3.setReaderCVMReqLimitCheck(true);
entity3.setReaderContactlessFloorLimitCheck(true);
entity3.setReaderContactlessTransLimitCheck(false);
entity3.setReaderCVMReqLimit(new byte[]{0x00, 0x00, 0x00, 0x00, 0x50, 0x01});
entity3.setReaderContactlessFloorLimit(new byte[]{0x00, 0x00, 0x00, 0x00, 0x50, 0x00});
entity3.setReaderContactlessTransLimit(new byte[]{0x00, 0x00, 0x00, 0x00, 0x60, 0x01});
dynamicReaderLimitEntity.add(entity3);

emvHandler2.setDynamicReaderLimitListForPaywave(dynamicReaderLimitEntity);
```