

Amex Quick Chip Technical Manual

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Version 1.2



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1 Summary of Changes

The following reference table highlights the revisions included in this manual.

Version	Subject	Revision
1.1	Certification requirements, throughout.	Removal of mandatory Terminal certification for existing certified AEIPS EMV terminals introducing Amex Quick Chip functionality .
1.2	Provisional amount requirements	Updated to : <ul style="list-style-type: none">• Allow for provisional transaction amounts that exceed the No Signature/No PIN threshold.• Support post EMV CVM processing, for provisional amounts• Reflect that signature capture on receipts is optional

2 Introduction

As a leading global payments network, American Express is focused on helping our partners get the most out of the technologies they need to stay competitive. To address the need to improve perceptions around the speed of EMV^{®1} Chip Card transactions in the U.S.², American Express offers support of Amex Quick Chip.

Amex Quick Chip enables Card Members to dip their Card at anytime during the checkout process and remove it before the transaction is completed — significantly improving Card Members' perception of payment transaction speed and streamlining the checkout experience, while providing the security benefits of an EMV Chip Card transaction.

Merchants that choose to implement Amex Quick Chip should take into account the considerations and specific implementation tradeoffs highlighted in [Section 6](#).

2.1 Intended Audience

This document is intended for:

- American Express personnel
- Terminal vendors
- Merchants who are approved to accept American Express Cards as payment for goods or services and approved to submit files to American Express for payment
- Programmers working on behalf of a Merchant
- Authorized third-party processors
- Acquirers
- Issuers of EMV Contact Chip Cards

2.2 Document Structure

This document provides an introduction to Amex Quick Chip, the requirements implementers need to adhere to, and the considerations for parties impacted by its implementation.

To the maximum extent permitted by law, American Express does not make and hereby disclaims any and all representations, warranties, and liabilities, whether express or implied, or arising by law or from a course of dealing or usage of trade, including implied warranties of merchantability or fitness for a particular purpose or any warranty of title or non-infringement. You must comply with laws and regulations applicable to the subject matter of this document. These laws and regulations can differ from country to country, and you are solely responsible for being aware and adhering to them in all countries where you implement this document.

2.3 References

Readers should also reference the following documents to fully understand the American Express EMV requirements.

¹EMV[®] is a registered trademark or trademark of EMVCo, LLC in the United States and other countries.

²Currently, Quick Chip can only be utilized or enabled by merchants, processors, and vendors on terminals being deployed for use in the U.S.

Table 1: Reference Documents

Abbreviation	Full Document Name	Audience
[EMV 4.3]	EMV ICC Specifications for Payment Systems, version 4.3, November 2011	All
[ATM 4.3]	AEIPS Terminal Technical Manual	All
[ATG]	AEIPS Terminal Guide	All
[AG]	Acquirer Chip Card Implementation Guide	All
[NSNP]	American Express EMV No Signature/No PIN Program Guide	All
[NW]	Network Specification*	Network Partners
[ACQ]	<ul style="list-style-type: none"> o American Express Global Credit Authorization (GCAG ISO) guide** o American Express Global Credit Authorization guide (GCAG XML format)** o American Express Global Electronic Data Capture (GEDC) guide** o American Express Global Host Data Capture (GHDC) guide** o American Express Global Financial Settlement Guide (GFSG)** 	<ul style="list-style-type: none"> o Terminal Vendors o Merchants o Programmers working on behalf of a Merchant o Authorized Third Party Processors

*The American Express Network Specification defines the authorization and settlement data messaging requirements for participants operating across the American Express Network. Implementers of Amex Quick Chip should also reference any additional country or Acquirer specific messaging specifications relevant to their implementation.

** The American Express Acquirer Specifications define the authorization and settlement data messaging requirements for Acquirers and processors of American Express transactions. Implementers of Amex Quick Chip should also reference any additional country or Acquirer specific messaging specifications relevant to their implementation.

2.4 Use of Terms

Throughout this document, attention is drawn to specific Terminal and Acquirer systems requirements within the text through the use of bold and italics on key words as follows:

- Mandatory requirements are highlighted through the use of the words ***must***, ***shall***, ***mandatory***, or ***mandate(s)***
- Optional recommendations are highlighted through the use of the words ***should*** or ***recommend(s)***

3 Amex Quick Chip

3.1 Background

EMV Contact Chip Card issuance and Merchant acceptance is gaining momentum in the U.S, helping to combat fraud. Many U.S. merchants, specifically those for whom speed at the checkout is critical, rely on the user experience associated with existing Card acceptance to meet their business needs. However, this user experience is not available with the standard EMV flow. This difference in user experience has led to a perception that, in certain environments, Card Members who are paying with an EMV Contact Chip Card are spending longer at the checkout. This is because standard EMV processing requires that:

- The final transaction amount is known before the transaction can start and Card Member Verification can be performed. U.S. Card Members are used to a process where transaction initiation and Card Member interaction can happen before, during or after the goods have been scanned.
- The Card remains inserted in the reader for the duration of transaction processing. This includes the time it takes for the authorization request to be sent to the Issuer, and for the Issuer to provide its response back to the terminal.

3.2 What is Amex Quick Chip?

Amex Quick Chip is a modification of the EMV transaction flow for processing of American Express branded Cards, which allows an EMV Contact Chip Card to be inserted before the final transaction amount is known, and does not require the Card to remain in the reader during the Online authorization process. In summary, Amex Quick Chip:

- Enhances Card Member Experience
 - Improves perception of payment speed and a more convenient checkout experience.
- Facilitates Improved Merchant Throughput at Point of Sale
 - Speeds up checkout times on chip transactions at the point of sale increasing Merchant efficiencies
- Enables You To Take Advantage of Best in EMV Security
 - Continued support for Card Member Verification methods like PIN (Offline and Online) and signature.
 - Leverages embedded microprocessor chip, which increases transaction security by exchanging authentication data with terminals and Card Issuers
- Provides a Simple Testing Process
 - Involves a change to the local POS application, but doesn't require EMVCo (level 2) re-certification of terminals.
 - For AEIPS certified Terminals, feature testing is recommended. Testing support is provided through the American Express test environment and self-service test tools. Upon successful completion of feature testing, or an attestation that inclusion of Quick Chip was the only change made, American Express will provide an amendment to the AEIPS Letter of Approval (LOA) . More information on the attestation process is available in the Amex Quick Chip certification overview document.
 - For new AEIPS Terminals, streamlined certification (level 3) is required, made simple through the American Express test environment and self-service test tools. More information on certification is available in the Amex Quick Chip Test Plan document.

The result is an implementation which meets the needs, and aids the launch, of EMV in the U.S.

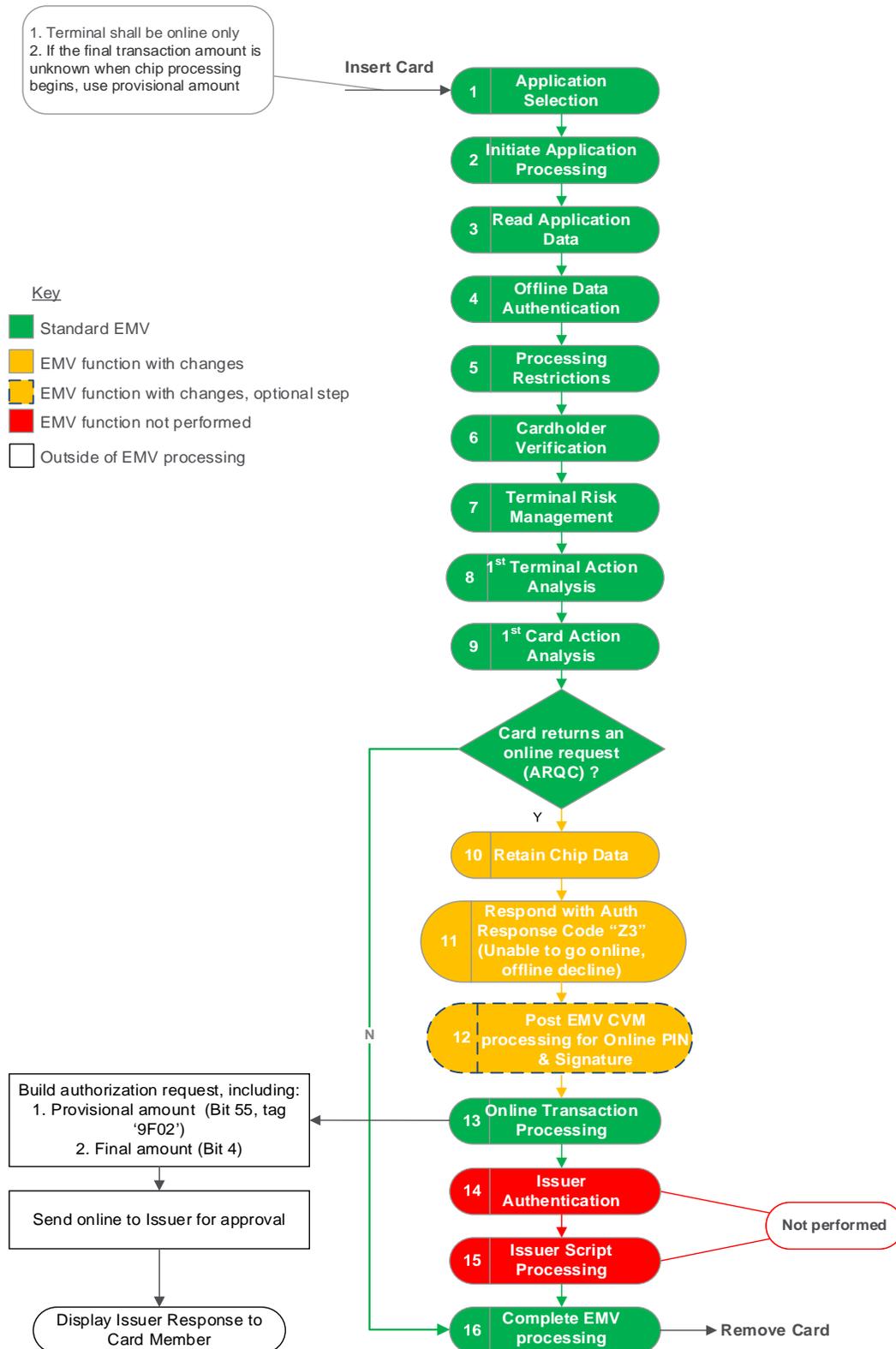
3.3 The American Express Integrated Circuit Card Payment Specifications (AEIPS)

American Express has published the American Express Integrated circuit card Payment Specifications (AEIPS), which detail its specific EMV Contact Chip implementation requirements. AEIPS is compliant with the standard EMV specifications. Amex Quick Chip implementations will be based on the underlying requirements defined within the EMV specifications [EMV4.3] and the AEIPS Terminal Technical Manual [ATTM 4.3]. Amex Quick Chip is designed to be used with all available AEIPS versions.

4 Amex Quick Chip Processing

4.1 Overview

Figure 1: Processing Overview



4.2 Processing Summary

This section provides an overview of Amex Quick Chip processing. It focuses on the differences from standard EMV processing, as highlighted in Figure 1.

- If the final transaction amount is known, EMV processing will be performed using that amount.
- If the final transaction amount is not known, EMV processing will be performed using a provisional transaction amount. The provisional transaction amount should represent an amount that is reflective of the most current transaction total, (e.g. goods totalled so far).
- EMV processing, up to the first Generate AC, is unaltered. There are, however, some CVM processing considerations for transactions being performed using a provisional amount. If:
 - Offline PIN is the selected CVM, a PIN entry request shall be made to the Card Member while the Card is in the terminal's chip reader. The provisional transaction amount shall not be displayed to the Card Member.
 - Online PIN is the selected CVM, then TVR Byte 3, bit 3 (Online PIN entered) shall be set to '1'. PIN entry shall not be requested at this time. The provisional transaction amount shall not be displayed to the Card Member.
 - Signature is the selected CVM, signature capture can be performed at any time ³.
- Terminals will always request an ARQC and store the EMV data for later use in the authorization request to the Issuer.
- If the Card responds with an AAC then the Terminal will complete EMV processing as a decline.
- If the Card returns an ARQC, the Terminal will always respond with an 'Unable to go Online, offline declined' response. This allows EMV processing to complete so the Card can be removed from the reader. A message will be displayed to prompt the Card Member to remove the Card.
- Once the final transaction amount is known, the Terminal will build the authorization request message. The authorization request will include the relevant transaction amounts in Amount, Authorized (Data Field 55; Tag '9F02') and Amount, Transaction (Data Field 4) [NW]/[ACQ].
- The Issuer will use the value in Amount, Transaction (Data Field 4) [NW]/[ACQ] to determine the true value of the authorization request.
- The Issuer response message will be used to determine if the transaction has been approved or declined and the relevant message will be displayed to the Card Member to advise them of the transaction outcome.
- Acquirers use the Terminal EMV data from the first Generate AC in order to perform clearing.

4.3 EMV Functions Not Performed

This section highlights the areas of standard EMV processing that are not performed at a Terminal that has implemented Amex Quick Chip.

In order to meet the optimized Card Member experience, the Card is removed from the reader before the authorization response is received from the Issuer. The impacts of this are:

- Issuer Authentication is not performed – AEIPS implements Issuer Authentication, which relies on standard EMV processing, where the Card is in the reader to validate that the Issuer response message has come from the genuine Issuer. The fact that the Card is removed before the response data is received means that authentication data from the Issuer cannot be forwarded by the Terminal to be processed by the Card.

³ American Express no longer requires signature capture on receipts, as it is often unchecked, making it unsuitable as a strong customer authentication method. This means that signature is "optional" for merchants and they are no longer required to capture signature on receipts at the Point-of-Sale. However, please note that if local law requires signature capture on receipts, then this supersedes the above clarification.

- Issuer Script Processing is not performed – AEIPS implementations allow the Issuer to perform Card updates, post personalization, using Issuer Scripts. Issuers return script data in the Authorization response message and the Terminal forwards them to the Card to process and make the relevant updates. The fact that the Card is removed before the response data is received means any scripts the Issuer has sent cannot be forwarded by the Terminal to be processed by the Card.

Merchants that choose to implement Amex Quick Chip should take into account the considerations and specific implementation tradeoffs highlighted in [Section 6](#).



5 Amex Quick Chip Requirements

5.1 Terminal Requirements

Terminals supporting Amex Quick Chip need to implement the following requirements.

Table 2: Terminal Requirements

Reference	Requirement
TR1	An Online authorization shall be required for all transactions. This shall be achieved by implementing a zero Floor Limit.
TR2	If the final transaction amount is known before EMV processing begins, then that amount shall be populated in Amount, Authorized (Tag '9F02', Data Field 55) [NW]/[ACQ] and used for EMV processing purposes.
TR3	If the final transaction amount is not known, the Terminal shall implement a provisional transaction amount and populate Amount, Authorized (Tag '9F02', Data Field 55) [NW]/[ACQ] and use it for EMV processing purposes. The provisional transaction amount shall be greater than zero.
TR4	If PIN is the selected result of CVM processing, and if the Terminal is using a provisional transaction amount, the Terminal shall not display the provisional transaction amount to the Card Member on the PIN Pad.
TR5	If Signature is the selected result of CVM processing then the signature capture panel shall be made available to the Card Member, either displayed or printed.
TR6	If the Card returns an AAC, the Terminal shall decline the transaction.
TR7	If the Card returns an ARQC the Terminal shall : <ul style="list-style-type: none"> Retain the chip data for the authorization request Issue the second Generate AC command with Authorization Response Code (Tag '8A') set to "Z3" (Unable to go Online, offline declined)
TR8	Once EMV processing is complete, the Terminal shall prompt the Card Member to remove its Card.
TR9	Once the final transaction amount is known, it shall be populated in Data Field 4 [NW]/[ACQ] of the authorization request along with the retained chip data.
TR10	The Terminal shall use the Issuer authorization response to determine the outcome of the transaction and display the outcome to the Card Member. The Terminal shall discard the Issuer Authentication Data and any scripts included within the Issuer's response message.
TR11	Terminals shall make the EMV data from the first generate AC available to the Acquirers for clearing purposes.
TR12	The mechanism by which Amex Quick Chip is implemented shall be proprietary and configurable. If configured, Amex Quick Chip shall be enabled for all American Express EMV Contact Chip transactions.
TR13	If offline PIN is the selected CVM, the Card Member shall be requested to enter their PIN while the Card is in the terminal's chip reader.
TR14	If Online PIN is the selected CVM, TVR Byte 3 bit 3 (Online PIN entered) shall be set to '1'.

5.2 Acquirer Requirements

Acquirers processing Amex Quick Chip need to implement the following requirements.

Table 3 : Acquirer Requirements

Reference	Requirement
AR1	Acquirers shall not reject transactions just because the transaction amount values in Data Field 4 and Data Field 55 [NW]/[ACQ] are different.
AR2	Acquirers shall use EMV data from the first generate AC in the clearing message.
AR3	Acquirers shall not reject transactions if TVR Byte 3, bit 3 is set to '1' and there is no PIN Block in Field 55 in the Authorization Message.

5.3 Issuer Requirements

American Express Issuers processing Amex Quick Chip transactions need to implement the following requirements.

Table 4: Issuer Requirements

Reference	Requirement
IR1	Issuers shall not reject transactions just because the transaction amount values in Data Field 4 and Data Field 55 [NW]/[ACQ] are different.

6 Implementation Considerations

6.1 Merchant

Merchants should take into account the following factors when rolling out Amex Quick Chip capable terminals:

- The Amex Quick Chip solution is:
 - Currently limited for use in U.S. implementations.
 - Designed for environments where speed at the checkout is critical to the merchant's business. Merchants should work with their Terminal provider to determine whether the standard AEIPS or Amex Quick Chip solutions best meet their implementation needs.
 - Not meant to replace other efforts by merchants and Acquirers to optimize overall authorization processing times.
- Terminals will send authorization request messages which contain different values in the Amount, Transaction (Data Field 4) and the Amount, Authorized (Tag '9F02', Data Field 55) [NW]/[ACQ] fields.
- Amex Quick Chip can be implemented without impacting the EMVCo Level 2 approval of the EMV payment kernel.
- For EMV Terminals, that have been AEIPS certified, American Express recommends feature testing be performed to validate Quick Chip functionality. Additional Level 3 certification is not required
- For new AEIPS Terminals, that have not previously been AEIPS certified, Amex Chip Quick certification is required. If Amex Quick Chip is disabled then re-certification will be required in order to accept AEIPS Cards using the standard EMV flow.
-

6.1.1 Merchants Eligible for Implementing the No Signature/No PIN Program

The Amex Quick Chip solution allows merchants to implement EMV transaction processing based on either the final transaction amount, or a provisional transaction amount. Where implemented, a provisional transaction amount may be less than, equal to, or greater than, the No Signature/No PIN threshold.

The table below details the possible implementation options available to merchants, along with the associated impacts.

Table 5: Transaction Processing Scenarios & Impacts to Merchant & Card Member experience

	Provisional amount used for EMV processing?	Final transaction amount	Impacts
1	No. Final amount known and used.	Provisional amount not used. Final amount known and used for EMV processing.	Card Member Verification will be performed during standard EMV processing, if the transaction amount is greater than the No Signature/No PIN threshold. No impact.
2	Yes. Provisional amount is equal to, or less than, the No Signature/No PIN threshold.	Final amount is equal to, or less than, the No Signature/No PIN threshold.	Card Member Verification was not performed as part of EMV processing and was not required for the final transaction amount. No impact.
3	Yes. Provisional amount is equal to, or less than, the No Signature/No PIN threshold.	Final amount is greater than the No Signature/No PIN threshold.	Card Member Verification was not performed as part of EMV processing but was required for the final transaction amount. <u>Impact to merchants: Card Member Verification was not performed when it was required to be. Mitigation approach outlined in section 6.1.1.1</u>
4	Yes. Provisional amount is greater than the No Signature/No PIN threshold.	Final amount is equal to, or less than, the No Signature/No PIN threshold.	Card Member Verification has been performed during EMV processing, but was not required based on the final transaction amount. <u>Impact to Card Member experience: Card Member Verification has been performed unnecessarily. Mitigation approach outlined in section 6.1.1.2</u>
5	Yes. Provisional amount is greater than the No Signature/No PIN threshold.	Final amount is greater than the No Signature/No PIN threshold.	Card Member Verification was performed as part of standard EMV processing and was required for the final transaction amount. No impact.

IMPLEMENTATION CONSIDERATIONS

6.1.1.1 Merchant Impact Mitigation Approach

If a Merchant anticipates that transactions in their environment may exceed the No Signature/No PIN threshold, they should set the provisional transaction amount to always exceed the No Signature/No PIN threshold. This will ensure that the Merchant is able to meet Card Member Verification requirements, mitigating the Merchant impact outlined in [Table 5, Scenario 3](#). In these environments, it is also possible to delay performing Card Member Verification until the final amount is known. This allows merchants to mitigate the Card Member experience impact outlined in [Table 5, Scenario 4](#). Details of the Card Member Verification requirements supporting this delayed CVM approach are provided in [section 6.1.1.2](#).

Merchants should work with their Terminal provider to determine which implementation approach best meets their business needs.



6.1.1.2 Card Member Impact Mitigation Approach

Merchants that implement a provisional transaction amount, which exceeds the No Signature/No PIN threshold, can reduce the need to perform Card Member Verification, when not required by the final transaction amount. This can be achieved by performing part of the Card Member Verification processing after the Card has been removed from the reader (post EMV processing).

The following table details the requirements for each Card Member Verification method.

Table 6: Post EMV Processing Card Member Verification Requirements

Card Member Verification Method	Processing Requirement
Offline PIN	The Card is required to remain in the terminal's chip reader in order to validate the offline PIN. Offline PIN cannot be performed post EMV processing.
Online PIN	If the final amount exceeds the No Signature/No PIN threshold the Terminal shall display the final transaction amount and request the Card Member to enter their PIN.
Signature	It is recommended that signature capture only be requested once the final transaction amount is known to be greater than the No Signature/No PIN threshold.

6.2 Acquirer / Processor

Acquirers and processors should take into account the following factors when processing transactions initiated at Amex Quick Chip terminals:

- Implementations are limited to the U.S. market.
- Terminals will send authorization request messages which contain different values in the Amount, Transaction (Data Field 4) and Amount, Authorized (Tag '9F02', Data Field 55) [NW]/[ACQ] fields.
- When Online PIN is the selected CVM, TVR Byte 3, bit 3 (Online PIN entered) will be set to '1'. The setting of this bit is an indication of Online PIN being the selected CVM, not confirmation that an Online PIN was actually entered. Authorization Messages with this TVR bit set may or may not include a PIN block.
- A new set of network certification test cases will need to be performed. The approval letter associated with the Terminal certification shall only be valid for Amex Quick Chip processing. If an Acquirer disables Amex Quick Chip then re-certification will be required in order to accept AEIPS Cards using the standard EMV flow.
- Amex Quick Chip can be implemented without impacting the EMVCo Level 2 approval of the EMV payment kernel.
- For EMV Terminals that have been AEIPS certified, American Express recommends feature testing be performed to validate Quick Chip functionality. Additional Level 3 certification is not required.
- For new EMV Terminals, that have not previously been AEIPS certified, Amex Quick Chip certification is required. If Amex Quick Chip is disabled then re-certification will be required in order to accept AEIPS Cards using the standard EMV flow.

6.3 Issuer

Issuers should take into consideration the following factors, which can or will occur at an Amex Quick Chip terminal:

- CVM processing may be based on a provisional transaction amount, rather than the final transaction amount.
- When Online PIN is the selected CVM, TVR Byte 3, bit 3 (Online PIN entered) will be set to '1'. The setting of this bit is an indication of Online PIN being the selected CVM, not confirmation that an Online PIN was actually entered. Authorization Messages with this TVR bit set may or may not include a PIN block .
- The Amount, Authorized in the EMV data (Data Field 55, Tag '9F02') [NW]/[ACQ] may not be the true value of the sale. Issuers should use Amount, Transaction (Data Field 4) [NW]/[ACQ] to determine the true transaction value.
- Issuer authentication will not be performed.
- Issuer Scripts will not be processed.
- Settlement files will include the EMV data from the first Generate AC.

Appendix A : Glossary and Acronyms

Term	Meaning
AAC	A type of Cryptogram indicating that the Chip Card has declined the transaction.
AC	Application Cryptogram
Acquirer	An American Express Entity which has, or any other Person authorized by an American Express Entity which has, a contract with an S/E pursuant to which: A Card Member is entitled to charge purchases of goods or services at such S/E by means of a Card, and the S/E agrees to transfer such charges to the Acquirer.
AEIPS	American Express ICC Payment Specifications
Application Cryptogram	A secure data element generated by the Card across a defined set of transaction data to enable the Issuer to verify the authenticity of an authorization or settlement request.
ARC	Authorization Response Code
ARPC	A type of Cryptogram generated by the Issuer, used to enable the Chip Card to validate the authorization response.
ARQC	A type of Cryptogram indicating that the Chip Card wishes the transaction to go Online.
Data Field 4	The field in an ISO 8583 authorization request and response message that holds Amount, Transaction data.
Data Field 55	The field in an ISO 8583 authorization request and response message that holds Chip Card data.
Card	In this document, a generic term for all devices which are compliant to American Express AEIPS Card specifications.
Card Member Verification	An EMV defined term. The process by which AEIPS compliant Chip Cards and Terminals verify the Card Member.
Card Member	A person who has entered into an agreement and established a Card account with any Issuer, or whose name is embossed on a Card.
Chip Card	A Card with an embedded chip containing AEIPS and/or Expresspay applications that, when used at a Chip Card-enabled POS device, interacts with the POS device to initiate AEIPS or Expresspay Transactions.
Contact Chip	Describes a device or specification that uses a contact interface as defined in ISO/IEC 7816
Cryptogram	Security data created by the Chip Card or Issuer systems and used to validate a transaction or authorization response.
CVM	Card Member Verification Method
EMV	Europay, MasterCard and Visa. A term that is used to refer to the specifications developed by these three bodies and the application that resides on the Chip Card and the Terminal used to generate transactions.
EMVCo	EMVCo LLC, the organization that manages the EMV specifications and the approval process for Cards and Terminals. See emvco.com .
Floor Limit	A maximum monetary amount for a single transaction, at or above which Authorization must be obtained before completing the transaction.
ICC	Integrated Circuit Card, alternative term for Chip Card
Issuer	Any entity (including, without limitation, American Express and American Express Entities) authorized by American Express or an American Express Entity to issue a Card and to engage in the Card issuing business.
Issuer Authentication Data	The Data field within Data Field 55 in an authorization response message that contains the ARPC and the ARC for use in Issuer authentication.

Term	Meaning
Issuer Script	A collection of Card commands constructed and sent by the Issuer for the purpose of updating and managing their Cards.
Merchant	See "Service Establishment (S/E)"
Online	A transaction that is sent to the Acquirer prior to transaction completion.
PIN	Personal Identification Number
PIN Pad	The component of a Terminal that is used by the Card Member to enter the PIN for Card Member Verification.
S/E	Service Establishment. A person or organization, such as a retailer or a Transit Authority/Transit Integrator (TA/TI), that has entered into a contract with an Acquirer wherein such entity agrees to: <ul style="list-style-type: none"> i. Permit any Card Member to charge purchases of Goods and Services at or from such entity by means of the Card; and ii. Transfer such Charges to an Acquirer.
Terminal	A device capable of accepting American Express Card products for payment for goods or services.
Terminal Vendor	A party that manufactures and sells Terminals.