Payment Card Industry (PCI)

PTS POI Security Requirements

Technical FAQs for use with Version 5

December 2020

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POI Device Evaluation: Frequently Asked Questions

These technical FAQs provide answers to questions regarding the application of PCI's (Payment Card Industry) physical and logical POI device security requirements as addressed in the *PCI PTS Point of Interaction Device Security Requirements* manual. These FAQs provide additional and timely clarifications to the application of the Security Requirements. The FAQs are an integral part of those requirements and shall be fully considered during the evaluation process.

Updates: New or questions modified for clarity are in **red.**

General Questions

Q 1 The security requirements now use a modular approach based on device functionality instead of specific form factors (e.g., EPPs, PEDs, etc.). How do I determine which requirements are applicable to my product?

A *The PCI PTS modular approach supports the submission of devices in accordance with the product types and approval classes defined in Appendix A of the PTS Device Testing and Approval Guide. In order to determine the modules and requirements within those modules that are applicable to a specific product, the vendor should:*

- *Review the "PTS Approval Modules Selection" diagram in the PTS POI Modular Security Requirements to determine which modules are applicable*
- *Go to "Appendix B: Applicability of Requirements" of the PTS POI Modular Security Requirements. Based upon the functionalities provided by the target of evaluation, determine what requirements within each applicable module apply.*

Q 2 If a device application includes prompts for non-PIN data and the device enforces PCI Requirement B16 compliant controls, can it be listed as an acquirer controlled prompts device with the application excluded from the device identifiers?

A *Yes, if an application cannot impact any of the functionality needed to comply with PCI requirements. Code within the device that does not provide and cannot impact security, need not be represented by the identifiers of the approved device.*

Q 3 September (update) 2015: When is an "N/A" response to a requirement acceptable?

A *An "N/A" response is acceptable in two cases: First, if compliance is achieved by meeting another requirement option, if one exists. Second, if the characteristics governed by the requirement are absent in the device. The evaluation laboratory will verify that all responses are appropriate.*

Q 4 May (update) 2018: What is the definition of "Secret Information?"

A *"Secret information" is any cryptographic keys or passwords/authentication codes that the device relies on to maintain security characteristics governed by PCI requirements.*

Q 5 Some components of a device may include cryptographic keys that cannot be erased. Are there any instances when this would be acceptable? See Requirements A1 and A5.

A *Cryptographic keys that are never used to encrypt or decrypt data; or are not used for authentication, do not need to be considered secret data, and therefore do not need to be erased.*

Q 6 What type of epoxy is acceptable for encapsulation?

A *Acceptable epoxy will possess the following characteristics:*

- *Opaqueness: Epoxy must be opaque in the visible spectrum.*
- *Hardness: Epoxy must be hard enough so that a sharp object cannot be used to penetrate the epoxy to the depth of the underlying circuitry.*
- *Tamper Evidence: The epoxy must show visible evidence of tamper when an attempt to penetrate the epoxy with a sharp object is made.*
- *Adhesion: Epoxy must resist attempts to forcibly separate it from the circuit board. When enough force is applied to remove the epoxy, severe damage should result such that the device is non-functional.*

Q 7 Is it assumed that the surface of the potted area is visible without disassembly of the device?

A *No. The potted, security sensitive components of the device are within the device enclosure and are therefore, unlikely to be visible without opening the enclosure.*

Q 8 Is it acceptable for a device to include removable components and add-ons provided by the vendor?

A *Any removable components (privacy shields, docking stations, interface modules, etc.) must be evaluated by an approved laboratory to determine that they do not present any additional security risk. However, individual components will not receive a separate approval.*

Q 9 What is a "Delta"

Revisions to approved devices are termed "deltas." Delta reviews involve the laboratory assessing the changes based on the current major version (e.g., 1.x, 2.x, 3.x etc.) of the requirements that were used for the approval of the device. Examples of deltas include:

- *Revisions to existing firmware or hardware on existing approved devices to add or modify functionality*
- *Adding EMV level 1 to an existing approval*
- *Maintenance fixes on devices that have expired and are no longer approved for new deployments*
- *Assessment of a device for offline PIN entry where the existing approval is only for online PIN entry, or vice versa*
- *The porting of a new set of firmware to an existing approved device.*

Q 10 July (update) 2014: Does the device have to show the version numbers of the hardware, firmware and Application?

A *The device must show the version numbers of hardware and firmware like they have been approved and they are shown in the list of approved devices. The hardware number must be shown on a label attached to the device. The firmware and application version numbers, and optionally the hardware version number, must be shown on the display or printed during startup or on request. This includes all modules addressed in testing, including SRED and Open Protocols. If the hardware version label is not visible when the device is installed, such as on an EPP in an ATM, then other means must exist to display the version number. This shall be illustrated by photographic evidence provided in the evaluation report.*

Q 11 February (update) 2014: Does the use of protective keypad overlays impact the approval status of a device?

A *Yes. In general, overlays are not supported by the device approval program due to the potential for keypad tapping or hiding tamper evidence. Overlays may be used where they do not cover any portion of the PIN entry area. For example, in a touchscreen device whereby the touchscreen is used for both signature capture and PIN entry, an overlay may be used to protect the signature area from excessive wear. In this example, only the area used for signature capture may be protected. The material used must be transparent, and not merely translucent, so as not to obstruct the key-entry area when viewed from any angle.*

Q 12 Is it acceptable to make changes to an approved device's hardware or firmware and keep the existing version #s?

A *No. Any hardware changes to an approved device that has been deployed must result in a new hardware version #. Any firmware changes to an approved device must result in a new firmware version. As described in the* PCI PTS Device Testing and Approval Program Guide*, vendors may use a combination of fixed and variable alphanumeric characters in the version numbers. However, variable characters are not permitted for any physical or logical device characteristics that impact security. Device characteristics that impact security must be denoted using fixed characters. The use of variable characters shall be validated by the test laboratory so as to not impact security. The use of variable characters is appropriate to delineate differences such as country usage code, customer code, communication interface, device color, etc.*

Q 13 May (update) 2018: Does the entry of the authentication code (e.g., password) that is used for settlement/balancing at an ATM require the use of the secure EPP, or may it use an alternate mechanism such as the keyboard at the back of the ATM?

A *The entry of the authentication code used for settlement/balancing at the ATM does not need to be entered through the EPP, but may use the keyboard installed in the rear of the ATM. However, in all cases it is not permitted to use the key(s) used for encryption of cardholder PINs in connection with a financial transaction to encrypt this authentication code. The PIN-encryption keys used for protection of cardholder PINs must not be used for protecting the settlement authentication code, whether that value is entered from the rear or through the EPP. A separate data key would have to be used for any protection of the settlement authentication code.*

Note that authentication codes entered to put the EPP into a sensitive state, such as those used to enable manual key loading, must be entered via a secure interface, i.e., through the EPP.

Q 14 Some devices ship with firmware that may be convertible into a compliant version but is not compliant as shipped. When is this acceptable?

A *This is only acceptable where the conversion is one way and cannot be reversed. A device can only be converted to a compliant version. It shall not be capable of converting a compliant version to a non-compliant version. The conversion must be performed at the initial key loading of the acquiring entity's secret keys. The transformation must result in the zeroization of any previously existing acquiring entity secret keys. The compliant version of firmware must be clearly distinguishable from the non-compliant version. Merely appending a suffix (one or more characters) to an existing firmware version is not acceptable. Rather the conversion must result in a high order version number that is clearly distinguishable to purchasers of such devices. Only the compliant version shall be approved and listed.*

Q 15 February (update) 2014: When submitting hardware and/or firmware changes on existing approved devices, must a vendor submit the device to the same lab as the one that did the initial evaluation?

A *Vendors may select a different lab then the lab that was used to perform the initial evaluation. However, the subsequent lab is free to determine the level of reliance they wish to place upon the prior lab's work, which may result in additional work than would otherwise be necessary. For Version 3 or higher reports, the delta lab or the final form factor lab shall have access to the prior lab's report(s), including any delta or OEM component reports subsequent to the original evaluation. If those reports are not available, the delta lab or final form factor lab shall decline the engagement or else must complete a full evaluation of the device.*

Q 16 The DTRs indicate that software developed to enable an attack can be considered bespoke equipment (Appendix B, under "Equipment"). Does this mean that PIN-disclosing bug software should be considered bespoke equipment?

A *Software required for a PIN-disclosing bug is typically straightforward to implement and would not be considered bespoke. Bespoke software would be software that requires significant time and expertise to develop such as is required for side channel attacks. PCI requires strong justification to be provided when bespoke equipment is indicated as necessary for an attack.*

Q 17 How do the point calculations take into account the development of a PIN-disclosing bug? Does PCI provide fixed values for use by the labs?

A *PIN bugs must often be customized for a specific device. Due to numerous possible variations in bug form, function, and complexity, PCI does not provide standard point values for PIN bugs. The evaluation lab is responsible for addressing this as part of the device evaluation. The development of an appropriate PIN-disclosing bug is to be included in the Identification calculation, as are other aspects of attack development.*

Q 18 When can multiple devices be costed in the calculation to support the compliance of a device to those requirements that have a minimum attack potential?

A *The requirement for multiple devices during either the identification or the exploitation phase of an attack value calculation depends upon the difficulty of attacking a device, and the risk that the device may be tampered during the attack. However, PCI expects that most attacks can be performed with only one or two samples in the identification phase, and a single sample in the exploitation phase. Strong justification explaining why multiple sample devices are necessary must be provided when such additional samples are necessary to meet the minimum attack potential.*

Q 19 Are PC-based instruments like protocol sniffers, USB attached oscilloscope adapters and graphical multimeters, etc. considered standard or specialized equipment.

A *PC-based instrument like those mentioned above shall be considered standard equipment, especially if they do not require dedicated hardware or adapters.*

Q 20 Some attacks are technically simple in that they do not require an extensive identification, like sniffing a communication on standard interfaces like USB/Ethernet between devices. How is the attack value calculation to be performed then?

A *For technically simple attacks that do not require an extensive identification, like sniffing a communication on standard interfaces like USB/Ethernet between devices, all cost factors besides time and expertise should be disregarded. Also, attack time and expertise is to be considered only for the identification of the general device setup and the property to be attacked (e.g., the interface type).*

Q 21 If a device is submitted for evaluation of offline PIN entry, is it acceptable for the device to only support plain-text PIN or to only support enciphered PIN?

A *No. In order to receive an approval for offline PIN entry, a device must be capable of supporting both plaintext and enciphered PIN.*

Q 22 May (update) 2018: Several requirements, such as those for access to sensitive services, key loading, and removal detection, provide for the use of authentication using passwords or authentication codes. Are there any restrictions on this type of authentication data?

A *Yes, any passwords, authentication codes, or similar used to meet a PCI requirement must be at least a seven-character minimum. These passwords/authentication codes must either be unique per device (and per user where dual control is required) except by chance, or if vendor default they must be pre-expired and force a change upon initial use. Passwords/authentication codes that are unique per device can be made optionally changeable by the acquirer or their agent (e.g., merchant), but this is not required. These passwords/authentication codes are entered directly through the keypad of the applicable device or are conveyed encrypted into the device. In all cases, the authentication values (passwords, authentication codes, or similar) for each user on a given device must be different for each user.*

Q 23 November (update) 2020: This FAQ has been superseded.

Q 24 In occurrences where it is necessary to return a device to the device vendor for maintenance, are there any restrictions on what must happen to the secret keys in the device?

A *When a device is returned to the vendor for maintenance, mechanisms must be in place to automatically cause the erasure of all previously loaded acquirer secret keys upon servicing the device—e.g., loading a new public RSA key causes the erasure of all previously loaded secret keys.*

Q 25 Security requirements are normally available for a four-year period from date of publication for new evaluations of products. Products are approved until six years after the retirement/expiration of the version of security requirements against which they were approved. This results in approvals that are a minimum of six years and a maximum of ten years, depending on the timeframe in which the approval occurs in relation to the life cycle of the applicable security requirements. Modifications for approved devices, termed "deltas," can occur at any time during the product's approval.

Can products for which the approval has expired undergo deltas?

A *Yes. Vendors may need to make maintenance fixes to devices that the vendor has already sold, but must still provide support for. In addition, vendors may wish to port updated versions of firmware that were approved against newer security requirements to products for which the approval has expired. This may occur because customers of a vendor wish to standardize their deployment against a given version of firmware and/or to add functionality to that device.*

Q 26 Technical FAQs are updated on a regular basis, and add clarifications for the application of defined security requirements. Are new FAQs applicable to devices that are currently in evaluation? Furthermore, must FAQs that were not in existence at the time of the original evaluation be considered in subsequent delta evaluations?

A *Yes. Technical FAQs not only add clarifications to requirements in order to provide a consistent and level playing field in the applications of those requirements, but may also address new security threats that have arisen. As such, technical FAQs are generally effective immediately upon publication.*

The intent is not to cause a device in evaluation to fail if otherwise it would not unless known exploitations exist. Unless such an exploitation exists, a product currently in evaluation will generally not be subject to new FAQs issued during the product's evaluation. This does not exempt a product from the applicability of the FAQ if the product must be reworked and resubmitted at a later date because of other issues that cause it to fail the evaluation.)

Devices undergoing delta evaluations must take into account the current FAQs of the associated major version of security requirements only for the security requirement(s) that are impacted by the delta change. For example, if a change impacts compliance with requirements B1 and B4, only the current FAQs associated with B1 and B4 must be taken into account as part of the delta.

Furthermore, it is not sufficient for the lab to determine that the change does not lessen the security of the device. Due to the evolution of threats and attack techniques from the time of the original evaluation (which may have occurred many years earlier) the lab must determine that the device still meets the relevant security requirements impacted by the change, given the changes in attack vectors. This is because whether deltas are done to enhance or fix functionality or for other purposes, the end result is to extend the life of the device in the marketplace.

In all cases, the evaluation laboratory must advise PCI SSC of the circumstances, and PCI SSC will make the final decision based upon the circumstances. Additionally, for both new and delta evaluations, the laboratory will also state in their submission the version of the security requirements used in the evaluations, as well as the publication date of the technical FAQs used.

Q 27 Compound devices, such as unattended payment terminals, may be evaluated as part of a single evaluation of all applicable components, or may be evaluated with one or more previously approved OEM components. Where a compound device incorporates previously approved components, what considerations must be made for the evaluation?

A *There are several considerations:*

- *UPT evaluation reports containing separately approved OEM components must at a minimum contain a summary table of all requirements (whether Yes or N/A) of any module that is relevant to the final form factor of the UPT. This table may reference the pertinent OEM component for compliance to any specific requirement.*
- *All requirements impacted (e.g., additional cardholder input mechanisms, displays, controllers, removal detection, etc.) by the final form factor of the UPT must be addressed in detail for each impacted requirement.*
- *Where the lab evaluating the final form factor is not the same lab as the lab that evaluated OEM component(s), the lab **should** have access to the OEM component lab report(s). If those reports are not available—e.g., because submitting vendors are different or for any other restriction—the lab must determine the extent of additional work required.*
- *If the lab is unable to place reliance, where necessary, on information that is available in reports that are not available to the lab, and the lab is unable to perform the degree of necessary additional work to achieve such reliance, they must decline the engagement.*
- *In all cases, PCI SSC may reject the report if in the judgment of PCI SSC the report does not contain adequate information to substantiate the conclusions of compliance to overall UPT criteria.*

Q 28 Are OEM components, such as EPPs, approved against an earlier version of security requirements allowed for use in achieving an overall UPT approval without additional testing of requirements that were already evaluated, even if those requirements were updated as part of the POI v5 Security Requirements?

A *OEM components approved against earlier security requirements are only allowed for use in obtaining an overall UPT approval evaluation without additional testing of those components if they are no more than one major version of requirements earlier. For example, EPPs evaluated and approved using PCI POI v4.x can be used without additional testing of requirements they have previously met as part of an overall POI v5 evaluation. However, EPPs that were evaluated and approved using PCI EPP v3.x must undergo a full evaluation against all applicable POI v5 requirements.*

Additional individual security requirements in POI v5 that were not previously evaluated shall still apply if applicable to the overall UPT evaluation. Furthermore, for devices that embed other PCI-approved devices and are therefore basing their security on these sub-components (even partially), the renewal/expiration date shall be the earliest to expire date among all evaluations, including the embedded device itself.

Q 29 UPT Version 1 was no longer available for new evaluations after April 2011. Under what conditions is a delta for a Version 1 approved UPT allowed?

A *A vendor with an overall Version 1 UPT approval may get deltas on that device for changes that occur to the OEM components used, including replacement of any given OEM component with a different model—e.g., a separately approved OEM ICCR produced by one vendor is replaced in the final form factor UPT with a different model, even if from a different vendor. This applies as long as the vendor continues to have control over the final assembly and manufacture of the UPT.*

Changes that occur in the final form factor itself (e.g., the housing) because of the complexity of integration must undergo testing as a new evaluation against a version of requirements that has not been retired from use for new evaluations.

In all cases, though, any security requirements impacted will be assessed, including those not previously applicable—for example, if the new casing introduces additional cardholder-interface devices not present in the original evaluation.

Q 30 Does it make any difference if the OEM component vendor is also the vendor who gets the overall UPT approval, vs. a scenario where the OEM vendor sells its components/drop in module to other vendors such as kiosk or AFD vendors who then pursue an overall UPT approval?

A *No. The OEM components can be manufactured by any vendor, even if that vendor is different than the UPT vendor. However, if the vendors are different, those components must have already been PCI approved or the OEM vendor must give permission to the UPT vendor to have those components evaluated as part of the overall UPT approval.*

Q 31 September (update) 2016: The program manual states that hardware and firmware version number identifiers may consist of a combination of fixed and variable alphanumeric characters, whereby a lowercase "x" is used by PCI to designate all variable fields. The "x" represents fields that the vendor can change at any time to denote a different device configuration. Examples include: country usage code, customer code, communication interface, device color, etc. What are examples of options that cannot be addressed by use of a variable field, but must be addressed by a fixed character?

A *Options that cannot be a variable character include those that directly pertain to meeting security requirements. For example, requirements exist for magnetic-stripe readers (MSRs) and integrated circuit card readers (ICCRs). A variable character cannot be used to designate whether a device contains a MSR or ICCR. A requirement exists for the deterrence of visual observation of PIN values as they are being entered by the cardholder, which can be met by privacy shields or the device's installed environment or a combination thereof. It is not appropriate to wildcard options if the device supports more than one means of observation deterrence.*

If a device supports SRED or OP, some options that might normally be acceptable for identification by a wildcard variable would not be permitted. Examples include the addition of contactless readers or the inclusion of different communication packages. In such cases, the specific configurations validated by the PTS Recognized Lab must be explicitly noted on the approval.

In addition, all wildcard options, both security and non-security relevant, must be clearly defined and documented as to the options available and their function in both the evaluation report and in the security policy.

Q 32 July (update) 2014: The program manual stipulates that "Vendors or other third parties licensing approved products from other vendors to market or distribute under their own names are not required to pay a new evaluation fee if the only change is to the name plate. If firmware and/or hardware changes are made that require a PCI-recognized test laboratory to evaluate the changes for potential security impact, then the licensee shall be required to pay the new evaluation fee. In all cases the licensed device will receive a new approval number and the licensee vendor or third party shall be billed the annual listing fee for each such approval."

What are additional considerations for a third party to license an approved product from a vendor, whereby the third party wants to distribute it as their own product?

A *There are several additional considerations:*

1. *The licensee vendor cannot directly make the request. The licensor vendor must make the request on their behalf.*
2. *All such requests must be received by PCI SSC as a delta letter from one of the PCI SSC PTS recognized laboratories. If the only change is to the nameplate of the product, there is not any new evaluation fee, but as noted above, there will be an annual listing fee.*
3. *There is not any requirement for the licensee's version of the product to reference or list the original vendor.*
4. *Products may be licensed from another vendor even if the version of the security requirements against which the original product was approved is retired from use for new evaluations, as long as the approval has not expired.*
5. *As noted, licensed products requiring physical and/or logical changes will incur a new evaluation fee. However, as long as the original vendor continues the manufacture of the device on behalf of the licensee vendor, the licensed product can be evaluated against the security requirement's version against which the original product was evaluated and approved, even though those requirements may be expired for new approvals.*
6. *If the licensee vendor wishes to directly manufacture the licensed product, or have a third party other than the original vendor manufacture the licensed product on their behalf, the product must be reassessed as a new evaluation against the current version of security requirements—unless the licensor vendor can demonstrate that it retains both the intellectual property and engineering control. This is due to the potential for changes in plastics, etc. that may impact the security of the device.*

Vendors seeking multiple separate approval listings for their own products are subject to the same conditions for items 2, 3, 4 and 5 as applicable.

Q 33 May 2011: For attack potential calculations, information is classified as Public, Restricted or Sensitive. What are examples of each?

A *Information is considered Public if it can be easily obtained from the Internet or is provided without any control mechanisms. Examples include open protocol specifications and electronic component datasheets. Information with automated access controls mechanisms (such as online account subscription) without human intervention classifies as Public. Restricted information is distributed upon request and is subject to human-based control mechanisms. Examples of Restricted information are mechanical drawings for OEM device integration, external command API specifications, partial Gerber files, and secure processor datasheets available under NDA. Sensitive information is not intended to be distributed to external entities and is obtained by means such as "social engineering" theft or coercion. Typical examples are terminal schematics and firmware source code.*

Q 34 May 2011: For attack-potential calculations, if the same equipment used for the identification phase can be reused for exploitation, the equipment cannot be accounted for twice, but instead must be divided by two and spread equally over the two phases. Does a similar rational apply where parts are reused?

A *No. While equipment readily lends itself to reuse for each exploitation, parts are typically a one-time use for each exploitation. Each exploitation should have the same attack potential value. Accounting for parts that are reused in the initial exploitation only in the Identification phase, or even splitting between the Identification and Exploitation phases, will result in the initial exploitation having a lower attack-potential value than the actual subsequent exploitations. Therefore, parts used during the Identification phase that can be used in the initial exploitation must be counted fully in the Exploitation phase to equalize the attack-potential value across all exploitations. If it is not readily reusable (the part once used in installation becomes unusable for exploitation because, for example, it is glued with epoxy and difficult to remove), it can be accounted for twice—once in the Identification phase and again in the Exploitation phase.*

Q 35 May (update) 2018: PIN entry devices may physically integrate in the same device other functionality, such as mobile phone, PDA capabilities or POS terminal. Handheld configurations of PIN entry devices may accommodate the attachment (e.g., via a sled, sleeve or audio jack) of a mobile phone, PDA or POS terminal, where the attached device communicates with the PED. Such a configuration appears as a single device, with separate interfaces for input by the clerk and cardholder. What considerations must be taken into account for either of these configurations?

A *For any device where the cardholder is expected to use the same interface for PIN entry as the clerk would use for phone, PDA, payment application, etc. purposes, or where there are multiple interfaces in a single integrated device, the integrated device must be physically and logically hardened in accordance with the PTS POI security requirements.*

In a handheld configuration with an attached device, there is a risk that the cardholder enters the PIN on the wrong interface. Furthermore, the communication interface between the PED and the attached device may give the latter access to MSR functions without cryptographic controls, allowing skimming of card account data. In this integration model, then either:

- *Both devices are assessed and validated as compliant to the PTS POI requirements, or*
- *The PED device, which must also control the card reader(s), must implement and be validated against the PTS POI SRED module. The PED must enforce SRED functions for encryption of card data at all times. The PED is only allowed one state, and that is to encrypt all account data. It cannot be configured to enter a state where account data is not encrypted.*

Q 36 July 2011: Hashing algorithms are an integral part of digital signatures. Digital signatures are frequently used in connection with meeting a number of security requirements, including those related to firmware updates, display prompt control, and remote key distribution. With the release of *PCI PTS POI v3,* SHA-1 was explicitly prohibited for use, and only SHA-2 was allowed. Does this prohibition apply only to the signatures of the data that is being updated and to only the device's specific individual certificates, or to all certificates used by the device?

A *Hashing algorithms must possess two properties in order to be considered secure. First, they must be one way such that it is easy to compute the hash value, but given the hash value, it is infeasible to reproduce the original unhashed value. Second, they must be collision-free, i.e., it is not possible to find two different messages (sets of data) that hash to the same hash value.*
In recent years, successful attacks have been developed against two popular hashing algorithms. First MD-5 and then SHA-1 attacks have been successfully developed to make these algorithms non-collision-free. These attacks allow for the spoofing of authentication and the ability to produce counterfeit credentials.

Except as noted below, the use of SHA-1 is prohibited for all digital signatures used on the device that are used in connection with meeting PCI security requirements. This includes certificates used by the device that are non-device-specific that are part of a vendor PKI, up to and including a vendor root certificate.

The only exception to this is that the initial code on ROM that initiates upon the device start may authenticate itself using SHA-1, but all subsequent code must be authenticated using SHA-2.

Q 37 October (update) 2018: Are Bluetooth/Wi-Fi interfaces part of the evaluation?

A *Bluetooth and/or Wi-Fi, like any other open security protocol declared in the POI Protocol Declaration form, must be assessed by the laboratory.*

If a Bluetooth interface is used, the Bluetooth interface must enforce encryption. This encryption is in addition to any other encryption the data may have undergone. If PIN or passkey entry is to be used, the evaluator must validate that vendor default values can be changed. The device must not support or allow for the use of insecure communication options such as, but not limited to, security modes 1 & 2 and the "Just Works" secure pairing option of security mode 4.

For Bluetooth 4.1 or higher devices that have BR, EDR, and High Speed (HS) features, Security Mode 4, Level 4 must be used. This requires Secure Connections, which uses authenticated pairing and encryption using 128-bit strength keys generated using FIPS-approved Advanced Encryption Standard (AES) encryption. For Bluetooth 2.1 through 4.0 devices, Security Mode 4, Level 3 must be used.

If a Wi-Fi interface is used, the Wi-Fi interface must enforce encryption. This encryption is in addition to any other encryption the data may have undergone. Security must be enabled. WEP cannot be used or configured at any time, and WPA and/or WPA2 must be supported. If passkey is used, it must not be a vendor default. The evaluator must validate that default values can be changed on the target of evaluation.

Where the interface is supplied by an OEM module:

- *If the module is under the control of the firmware and runs in the same space as the firmware, the OEM interface module must still be assessed to ensure secure pairing (for wireless technologies listed above) is provided for and that secure communications is enforced by the interface.*
- *If an independent OEM module is used:*
  - *The protocol and the pairing mechanism must be assessed and*
  - *The security of the link between the module and the firmware must be assessed*
- *If the OEM module shares resources with the rest of the device then a vulnerability assessment is required to ensure that the OEM module cannot adversely impact the function of the device.*

OEM modules that are found to have unaddressed exploitable vulnerabilities may result in the removal of the entire POI device approval.

Q 38 December 2011: Specific requirements are identified in the Core and SRED modules that Secure Card Readers must be validated against. Are there any other requirements that must be considered?

A *Yes, all of the non-designated SRED requirements should be considered for applicability. In most cases they will not be applicable and will not require any assessment beyond that determination.*

Q 39 June 2012: If a device supports multiple IP enabled interfaces, does testing need to be performed on all IP enabled interfaces by the laboratory during the evaluation?

A *If a device supports multiple IP enabled interfaces and the IP stack (including all IP Protocols, IP Services and IP Security Protocols) are identical for all interfaces, testing is only required to be performed on one of the IP enabled interfaces.*

Q 40 June 2012: During an evaluation, it is determined that a new device includes the identical IP stack that was previously evaluated and approved under the most recent version of the Open Protocols Requirements module. Is it required to redo all Open Protocols testing?

A *If the vendor is able to provide evidence that supports the assertion that the IP stack is 100% identical, including the same version of various components and identical IP Protocols, IP Services and IP Security Protocols, no new testing needs to be performed. The report should document how it was verified that the IP stack is identical and shall include the IP stack information including the component version, the IP Protocols, IP Services and IP Security Protocols supported.*

Q 41 June 2012: The approval requirements for an SCR or Non-PIN device do not include PCI PTS DTR A1, which requires active tamper-response mechanisms. Is it possible to meet the physical security requirements of an SCR or Non-PIN device using only tamper resistance and tamper evident characteristics, if the attack costing can be shown to exceed the minimum levels required for each of the physical security testing requirements?

A *No, it is a requirement that all devices implement active tamper detection mechanisms to meet the physical security requirements of PCI PTS. SCR and Non-PIN devices must have permanently active tamper detection mechanisms that monitor for intrusion and respond to such events with the immediate erasure of sensitive information within the device, rendering the device inoperative.*

Q 42 September 2012: Vendors may provide application toolkits for third parties to develop applications that cannot impact any of the functionality needed to comply with PCI requirements. The exceptions to this are for alteration of display prompts by third parties and for SRED applications developed by third parties, subject to controls stipulated in the PTS POI Derived Test Requirements and these FAQs. Can a vendor provide a toolkit that allows third parties to implement applications that supplant the cryptographic processing of PCI Payment Brand PIN data that is provided for in the approved vendor firmware?

A *No, the addition of applications that replace or disable the PCI evaluated firmware functionality invalidates the device approval for each such implementation unless those applications are validated for compliance to PTS POI Security Requirements and listed as such in the approval listings. Specifically, those applications must be validated to ensure that:*

- *It cannot adversely affect the security features of the product that are relevant to the PCI POI approval.*
- *It cannot modify any of the cryptographic functionality of the POI or introduce new primitive cryptographic functionality. However, new composite functionality that builds on existing primitives is permitted.*
- *The application is strongly authenticated to the POI secure controller by digital signature.*
- *The application can only work on the keys it alone manages and cannot affect or see any other keys.*

A mechanism must exist to display the application version upon request.

The vendor must provide clear security guidance for the development and implementation of the aforementioned additional applications. This guidance at a minimum must define procedural controls to ensure that the applications are properly reviewed, tested and authorized.

Applications, in this context, are functional entities that execute within the secure boundary of the POI and may or may not provide services external to the POI. Applications are typically processes or tasks that execute under the control of an Operating System (OS) or software executive routine.

Q 43 January (update) 2015: This FAQ has been superseded.

Q 44 September 2012: In the approval listing, the vendor must provide via the evaluation lab pictures detailing all security relevant components (PIN pad, display, card reader(s)) of the approved device. These pictures are then placed on the PCI website as part of the approval listing. Are there any other stipulations?

A *Yes, at least one of the pictures must fulfill the requirement that the hardware version number must be shown on a label attached to the device. Note that for devices with multiple approved hardware versions, only one such illustration is necessary to facilitate purchasers of these devices recognizing how to determine the approved version(s).*

Q 45 November 2012: What are the algorithms and associated minimum key lengths that are acceptable for use with the default operation of any open protocol used in a POI?

A *The minimum requirements for cryptographic algorithms used to provide security to any confidential data, including data transmitted using open protocols, is specified in DTR B11. Only TDES, RSA, ECC, DSA, and AES are acceptable for encryption or signing operations. SHA256 or above may also be used for hashing purposes.*

Q 46 November 2012: What communication methods should be assessed with the Open Protocols Module?

A *Any communication method that uses a wireless, local, or wide area network to transport data. This includes, but is not limited to: Bluetooth, Wi-Fi, Cellular (GPRS, CDMA), or Ethernet. A serial point-to-point connection would not need to be assessed unless that connection is wireless or through a hub, switch or other multiport device. In addition, any communication that uses a public domain protocol or security protocol would also be assessed with the Open Protocols Module.*

Q 47 July (update) 2013: Can a secure card reader (SCR) send data in the clear?

A *A secure card reader intended for use with a non-PTS approved device such as, but not limited to, a mobile phone or tablet, is only allowed one state, and that is to encrypt all account data. It cannot be configured to enter a state where account data is not encrypted.*

Q 48 July (update) 2014: What requirements must a Secure Card Reader be validated against?

A *SCRs must meet as applicable the ICCR and/or MSR requirements designated in Appendix B of the PCI PTS POI Security Requirements and the Secure Reading and Exchange of Data Module and additionally must meet B20, security policy. If the device is capable of communicating over an IP network or uses a public domain protocol (such as but not limited to Wi-Fi or Bluetooth), then requirements specified in the Open Protocols Module must also be met. Other requirements, such as B1, self-tests and B9, random numbers, may apply depending on device functionality. In all cases, if a security requirement is impacted, the device must be assessed against it.*

Q 49 July (update) 2015: The PCI POI Testing and Approval Program Guide specifies that the PCI test laboratory is to provide to MasterCard on behalf of the Council two devices containing the same firmware, any supporting PC based test applications, and any keying material as those evaluated by the test laboratory. Under what conditions are these devices to be provided?

A *This applies to all new evaluations that result in a new approval number. It does not apply to deltas. It also does not apply to a situation where the vendor is merely rebranding another vendor's previously approved product. However, if a vendor is rebranding a product, and additionally makes other changes, such as in the firmware, it does apply.*
In conjunction with the transmittal of the evaluation report to the Council, these two devices must be sent to the following location, where they will be placed into secure storage:

Attn: MasterCard Global Products and Solutions
MasterCard Worldwide
5 Booths Park
Chelford Road
Knutsford
Cheshire WA16 8QZ
UK

Q 50 July 2013: Vendors are allowed to use a combination of fixed and variable alphanumeric characters in device hardware and firmware version identifiers, provided that variable characters are not used for any physical or logical device characteristics that impact security. Can variables be used as part of the model name?

A *The model name cannot contain any variable characters except as low order/suffix type identifiers for non-security relevant differentiators within the device family. All devices within a device family that are intended to be marketed under the same approval number must be explicitly named and pictures of those devices presented in both the evaluation report and for display on the approval listing.*

Q 51 July 2013: Can a device with an ICCR be approved for online PIN only if it supports any offline PIN entry method (i.e., the device supports enciphered and/or plaintext PIN)?

A *Devices with an ICCR that are not evaluated under the offline module cannot have the approved version of the firmware support any offline PIN acceptance. Furthermore, devices that support online PIN must be evaluated for online PIN, or the approved version of firmware must have online PIN acceptance disabled.*

Q 52 July 2013: Devices are not required to support SRED, but if they do, they must be validated to SRED. If a device does encryption to protect account data but the vendor will not claim SRED, is SRED a required module?

A *There are several scenarios where SRED is mandatory. Those scenarios include any device validated to the Non-PED or SCR approval classes, or in some handheld scenarios involving a PIN entry devices attached (e.g., via a sled, sleeve or audio jack) to a mobile phone, PDA or POS terminal.*

*The overall intent of the validation requirement is to ensure that implementations of account data protection are fully robust as evidenced by validation and approval against the SRED module. However, the requirement is not intended to inhibit the vendor from implementing account data protections that are not sufficient to meet the SRED module, but which still may provide some lesser level of protection for account data. Thus a vendor implementing account data protections and **not** seeking SRED as an approved function provided may do so.*

Q 53 December 2013: Beginning with POI v3, SHA-1 is prohibited for use in conjunction with digital signatures. Is SHA-1 prohibited for other usages?

A *SHA-2 or higher is recommended for other usages, but SHA-1 may be used in conjunction with the generation of HMAC values and surrogate PANs (with salt), for deriving keys using key derivation functions (i.e., KDFs) and random number generation. Where applicable, appropriate key length minimums as delineated in the Derived Test Requirements are also required.*

Q 54 December 2013: The PCI PTS requirements do not dictate any specific form factor for devices. Is there any restriction to the types of systems or devices which can be approved under the PCI PTS program?

A *PCI PTS does not dictate device form factors to allow for vendors to develop innovative solutions to address market needs. However, PTS approval can only be obtained by devices that are designed for direct interaction with customers. Sub-components, such as microprocessors, magnetic card reader 'cans', ICC acceptors, and others that are designed for integration into another device which would prevent direct sight and interaction of the approved system by the cardholder cannot be approved under the PCI PTS requirements.*

Q 55 July (update) 2014: POS PIN pads without card interfaces can be approved for offline operation when validated for compliance with a PTS approved external card reader (this may be a PTS approved PED acting as external card reader or a secure card reader). What details need to be listed for such a configuration?

A *A: Under the listing the POS PIN pad shall be detailed with which specific PTS approved PED or SCR the PIN pad is able to perform offline PIN validation. A hyperlink to the approved PED or SCR will be included as an approved component. Where there are multiple devices with which it is possible to operate all shall be listed. The use of the device with a non-listed reader invalidates the offline approval.*

Q 56 February 2014: When assessing a device for a delta review, is it the number of changes or the number of types of changes that determine whether a delta is acceptable. For example, a vendor makes a change to the tamper grids and signal routing on six PCBs within a device. According to the delta scoping guidance in the program manual, the inclusion of four or more hardware change types as categorized in the program guide in a single delta submission for a previously approved PTS device may effectively represent a new device and should be subject to its own full assessment against the latest version of the current PTS Standard. Does such a change as described count as six changes or as a single change since they are all of the same change 'type' according to the guidance?

A *The delta scoping guide states that it is the number of types of identified changes. For the example above, that would constitute one change and not six. This meets the criteria for a delta.*

Q 57 February 2014: If a device is submitted that has internal hardware changes sufficient to require a new evaluation, but does not have any external changes, can the device still be submitted as a delta?

A *No. Even though the external appearance is identical, the degree of changes made internally requires that the device receive a full evaluation against a current requirements version available for use in new evaluations and if the evaluation is successful, it will result in a new approval number. Furthermore, while the new device will have a different hardware version then the existing device, and if the firmware is modified, a different firmware version, it is also required to have a new model name/number. This is to prevent confusion in the market, especially if issues arise subsequent to deployment impacting only one of the approvals, but not the other(s).*

Q 58 February 2014: If an existing approved device undergoes a hardware change that does not impact any of the internal components but impacts the appearance of the device, i.e., the only change is to the exterior of the device, can that change be treated as a delta?

A *Yes, such changes in casing plastics that result in a change in the device's look and feel is a permitted hardware type change under the delta guidance provided the amended device remains consistent to the device's original form factor. The change must result in a new hardware version number and a change in the model identifier.*

Q 59 February 2014: Can an approved product change the entire operating system and the change is treated as a delta e.g., from a proprietary system to a Linux based system?

A *In general, any change in firmware is permitted as a delta. However, completely changing the OS must be treated as a new evaluation. The change must also result in a new firmware version number and a change in the model identifier.*

Q 60 February 2014: Can a device meet the PTS POI requirements without having an active tamper response mechanism to zeroize secret and private keys during a penetration attack?

A *No. Regardless of which modules of the PTS POI standard the device is designed to comply with, penetration of the device must cause the automatic and immediate erasure of any secret and private keys such that it becomes infeasible to recover the keying material. This is true of devices even if they do not accept customer PINs, or are not designed for the protection of customer PINs. Secret or private cryptographic keys that are never used to encrypt or decrypt data, or are not used for authentication are excluded from this requirement, as such keys would never be keys involved in protecting customer PINs or customer card data.*

Q 61 February 2014: Vendors are allowed to make revisions to approved devices, provided the changes are evaluated by an approved lab. What limits are placed on the number and type of changes that are allowed?

A *The large number of possible changes and their impacts cannot be determined in advance. Changes will be assessed on a case-by-case basis. Vendors should contact one of the recognized laboratories for guidance. Laboratories will consult with PCI on an as needed basis to determine if a change is too great to be addressed under the delta process. The laboratories will determine whether the change impacts security. In all cases, changes that impact security require an assessment that must be presented in the delta report. At a minimum, for a given change type, all requirements identified in the Delta Evaluations – Scoping Guidance of the PCI PIN Transaction Security Device Testing and Approval Program Guide must be assessed for security impact. A rationale must be presented in the delta report for each change that is determined to not have a security impact.*

Q 62 February 2014: Can a SCR be used for offline PIN acceptance.

A *SCRs or other POI devices that include an ICCR or hybrid reader must have "Offline" designated under PIN Support in order to be used for offline PIN acceptance.*

Q 63 February 2014: If a SCR processes PINs, i.e., it supports offline PIN authentication via an ICCR component, or it formats and encrypts a PIN block to send online directly to the host, does it have to be evaluated with a specific PIN entry device?

A *Yes it must be validated in conjunction with a specific PIN entry device, e.g., PED or EPP, to validate the security of the interaction, including the establishment of the keying relationship. The PIN entry device must either be previously approved or obtain approval concurrent with the SCR in the same or a concurrent separate laboratory evaluation.*

Q 64 July 2014: POI devices may be approved with support for Open Protocols. Vendors provide a PCI prescribed security policy and other security guidance for the proper implementation of the Open Protocols that are part of the approval. If the entity deploying the device makes changes that are not in accordance with the security guidance necessary to deploy the device in compliance to the Open Protocols module, does it impact the approval? For example: adding additional services or protocols that were not listed in the guidance or using or otherwise replacing the IP stack with one imbedded in the application.

A *Yes, this would invalidate the approval status of the device for any implementation making such changes. Any such change must result in the device successfully undergoing a delta evaluation in order to maintain approval.*

The Open Protocols module is to ensure that open protocols and services in POI devices do not have vulnerabilities that can be remotely exploited and yield access to sensitive data or resources in the device. In that regard, it does not matter what type of network (public or private) the device is used with.

The vendor defines what protocols and services are supported by the device and provides guidance to their use. The protocols and services are evaluated by the lab. Adding or enabling additional services and protocols or failing to follow the issued security guidance after the evaluation would invalidate the approval status of that device for that implementation.

Q 65 July 2014: If the firmware is composed of independent blocks (e.g. bootloader, main firmware, kernel), how should the firmware version number be managed?

A *The displayed firmware version number must represent all firmware in the device.*

- *If firmware blocks have independent version numbers then the version number display should include the version number of each firmware block.*
- *If a single version number is used, then a documented process must be used to ensure the single version number is updated whenever changes are made to any of the firmware blocks in the device.*

Q 66 December (update) 2017: Does the use of a protective case impact the approval status of a device?

A *Yes. In general, cases are not supported by the device approval program due to the potential for hiding tamper evidence. Cases may be used where they do not cover any portion of the MSR or ICCR area. For example, a case used to protect a drop of a mobile device or the addition of a lanyard may not cover the ICCR or MSR. The interfaces must be clear and visible to the consumer such that wires or tamper evidence cannot be hidden. The material used must be transparent, and not merely translucent. Overlays for the PIN input area must comply with Technical FAQ Q11 above. If the POI has been approved for use with a protective case, the security policy shall provide a picture of the approved protective case as properly installed and tested by the lab.*

Q 67 October (update) 2018: Can Low Power Bluetooth, also known as Bluetooth Light, Bluetooth Smart or Bluetooth Low Energy (BLE) be used?

A *BLE implementations must use version 4.2 or higher. BLE must use LE Security Mode 1 Level 4 (Secure Connections) only and Just Works cannot be used at any time. The device must not support or allow for the use of insecure communication options such as, but not limited to, LE Security Mode 2, and levels 1, 2 and 3 of LE Security Mode 1 and the "Just Works" secure pairing option of Security Mode 1. This must be documented in the security policy made available on the PCI website.*

BLE implementations in SCRPs, regardless of Bluetooth version, for use in SPoC Solutions may use unauthenticated pairing (Just Works) provided compensating controls to mitigate against eavesdropping and MITM attacks are in place as part of the Solution. These controls shall be validated during testing of the SPoC solution. SCRPs that allow either the use of Just Works for pairing or do not exclusively implement Secure Connections are not approved for use outside of a SPoC Solution.

Q 68 January 2015: There are a number of FAQs on the use of wireless technologies, such as Bluetooth and Wi-Fi. What is the intent of these FAQs, and does PCI have any specific requirements for other types of communications technologies?

A *The intent of the FAQs on all wireless communications for POI devices is to ensure that the interfaces of the POI are protected such that:*

- *Card data cannot be easily intercepted*
- *Command interfaces to the terminal cannot be easily accessed, intercepted for attack (such as MITM), or used as an attack vector into the device.*
- *Compromise of the interface does not lead to, support, or facilitate further compromise of security assets of the POI*

PCI does not mandate or require the use of any specific communication technology, but any implementation must meet the above requirements through some aspect of the physical or logical layers of communication. Physical or direct wired communication often achieves this through the nature of its physical interface. Wireless communications cannot rely on this and therefore must rely instead on security at the link or application layers through use of a Security Protocol to establish a trusted path for all communications over the wireless link. This Security Protocol must have been tested and approved under the open protocols module of the PCI PTS evaluation of that device, and examples of acceptable Security Protocol implementations include WPA2 (implemented at the link layer), or VPN encrypted tunnels (implemented at the application layer).

Q 69 October (update) 2018: In light of the discovery of the Padding Oracle on Downgraded Legacy Encryption (POODLE) attack, is SSL still an allowed protocol.

A *SSL may continue to be supported, but the vendor must document (for version 4 and higher devices this includes the Security Policy published on the PCI website) that it is inherently weak and should be removed unless required on an interim basis to facilitate interoperability as part of a migration plan. For SSL 3, or older versions of TLS, if supported, all cipher suites using single DES or RC4 must be removed. Both of these objectives may be achieved by modifying the source code to remove support for SSL and non-allowed cipher suites and/or by modifications to the configuration file. In either case, the version information of the code, including where applicable the modified configuration file, shall be identifiable as part of the approved firmware.*

Furthermore, for all new POI evaluations using the Internet Protocol Suite, devices must support TLS 1.2 or higher. In addition, all delta evaluations for POI v3, V4 or v5 devices where the open protocols module is impacted, must meet the same criteria.

PCI requires that devices must only support Cipher Suites for use in TLS 1.2 that provide at least 112 bits of security. Cipher suites that comprise AES and other NIST-approved algorithms are acceptable to use. Cipher suites that use TDEA (3DES) are no longer allowed due to the limited amounts of data that can be processed under a single key i.e., the 64-bit block size does not provide adequate protection in applications such as TLS where large amounts of data are encrypted under the same key.

Q 70 July 2015: Handheld PEDs that attach to a mobile phone, PDA or POS terminal via a sled, sleeve or audio jack are required to support SRED. Does this apply to PEDs that connect via wireless technologies such as Bluetooth or Wi-Fi to mobile phones and tablets?

A *Yes. Furthermore, for devices that do not implement SRED encryption, the Security Policy must clearly state that the system cannot be implemented to connect to a tablet or mobile phone, and any such use will violate the approval of the device. Systems that do have SRED approval must note that SRED functions must be enabled and enforced for such use cases to maintain their approval.*

Q 71 December (update) 2016: Can a PTS device be used as a beacon (iBeacon or BLE beacon) transmitter?

A *Beacons for any version of BLE (e.g., 4.0, 4.1) are allowed providing the following conditions exists and are validated by a PTS approved lab:*

- *The beacon is listed as a device interface in the PTS POI report.*
- *Over the Air (OTA) provisioning is not allowed at any time. Provisioning and updating of beacons must be consistent with existing PTS standards. (i.e. Section J, B4 or B4.1)*
- *Must be referenced in the security policy.*
- *Beacons are transmit only. The lab must validate that BLE communication cannot be used to respond to any external requests, connect, pair, or otherwise provide two way communication to any other device.*
- *The vendor provides documentation on the secure use and provisioning of the beacon and that the documentation clearly states the beacon is used for transmit only and that OTA provisioning is not allowed.*
- *The vendor will document the purpose of use of the beacon functionality i.e. its intended use. The documentation must include what data is transmitted and ensures that no sensitive data can be transmitted.*
- *The PTS device is never allowed to receive beacon transmissions.*

Q 72 October 2015: POI v4.1 supersedes v4.0. Changes include the addition of a new Core section, Configuration and Maintenance Security that previously only applied to the Open Protocols Module. It also now requires for the first time the validation by PCI test laboratories of POI vendor compliance to the Device Management Security Requirements Module. Is compliance to these new v4.1 additions required for devices originally evaluated using 4.0 when those devices undergo a delta evaluation?

A *No. In order to allow vendors sufficient time to adjust, devices originally evaluated and approved using version 4.0 do not need to meet these specific changes in v4.1. All other changes in v4.1 are applicable for requirements impacted by the delta. This abeyance for deltas of v4.0 devices will remain in effect until publication of POI v5.0.*

Q 73 October 2015: In v4.1 of PCI PTS, requirement L1 allows for 'bug fix' changes to the firmware of the device to be made without requiring an immediate delta evaluation, as long as any such changes are later bundled and ultimately passed to a PCI lab for evaluation. Does this requirement apply only to devices approved under v4.1, or to all PCI PTS devices?

A *The Module 5 requirements as stated in the PCI PTS v4.1 standard are applicable only to devices assessed to the v4.1 requirements, or above. This means that the caveat allowing for bug-fix changes only applies to devices approved under this version of the standard, and any documentation reviewed under requirement L1 must make the distinction that 'delayed' delta evaluations are not possible for devices approved under an earlier version of the standard.*

Q 74 October 2015: Does the installation, for example in seatbacks, of POI PIN acceptance devices in mass transit vehicles such as airplanes and trains require that these devices contain an anti-removal mechanism to protect against unauthorized removal and/or unauthorized re-installation?

A *No. Installations in mass transit vehicles constitutes a semi-attended environment and as such, removal detection is not required. A semi-attended environment is one where a transaction is completed under all of the following conditions:*

- *Card or Proximity Payment Device is present;*
- *Cardholder is present;*
- *Cardholder completes the Transaction and, if required, an individual representing the Merchant or Acquirer assists the Cardholder to complete the Transaction*

If the device does not meet the removal detection requirement, the security policy must stipulate its usage is restricted to attended environments, or to semi-attended environments as defined above. It must also state that any other usage invalidates the approval.

Q 75 May (update) 2018: PIN Entry Devices that attach to a mobile phone, PDA or POS terminal via a sled, sleeve, audio jack, or wireless connection are required to support SRED. Does this apply to PEDs that are integrated with other devices (such as a tablet or mobile phone) that appear as a single device?

A *Yes. An integrated device is one where two physically and electronically distinct devices (e.g., a PED and a commercial off the shelf (COTS) device such as a mobile phone) appear as a single device through the use of the plastics to mask the connectivity.*

In such a configuration, there is a risk that the cardholder enters the PIN on the wrong interface. Furthermore, the communication interface between the PED and the integrated device may give the latter access to card reader functions without cryptographic controls, allowing skimming of card account data. In this integration model, then either:

- *Both the PED and non-PED are assessed and validated as compliant to the PTS POI requirements, or*

- *The PED, which must also control the card reader(s), must implement and be validated against the PTS POI SRED module and be both physically and electronically distinct from the non-PED system (for example, it is not acceptable to have the PED firmware execute within the same processor as the non-PED firmware). The PED must enforce SRED functions for encryption of card data at all times. The PED is only allowed one state, and that is to encrypt all account data. It cannot be configured to enter a state where account data is not encrypted.*

  The Security Policy must also state that the non-PED has not been assessed under the PCI PTS program and security guidance is required to ensure the secure operation of the solution. An additional note will be added to the portal noting that the non-PED has not been assessed under the PTS program.

Q 76 December 2016: Vendors may make devices that are only intended to be sold and/or manufactured by other vendors. Can devices such as these be evaluated and listed, even though the original vendor may never directly sell these devices?

A *Yes, these devices can be evaluated and listed as long as the following criteria is met:*

- *The device must be fully capable of performing its intended functionality for the approval class it is evaluated against and can be sold as is as a fully functional product. This does not preclude the device requiring additional software such as payment applications, but the firmware of the device must meet all applicable requirements.*
- *The device must have its own evaluation and product listing*
- *Each of the 2nd vendors that use the device design and/or manufacture the device must have their own full evaluation (NOT A DELTA) and separate listing.*

Devices that require additional hardware and/or firmware to operate (such as individual components) would not be allowed to be assessed. Those components must be integrated into a device design that meets the required PTS (HSM or POI) requirements.

Q 77 July 2017: If an attack requires damage to a part of the POI casing, does this mean that the attack must cost for the replacement of that entire casing to hide the tamper evidence?

A *No. There are many ways in which tamper evidence can be hidden, either through the installed environment of the POI, through the application of stickers, epoxy putty and paint, or other methods. Complete replacement of the plastic part is to be considered only when it adds little to no cost to the overall attack (e.g. when the process causing the damage to the casing results in the disablement of the tamper detection, thereby facilitating the removal and replacement of the casing at no cost).*

Q 78 May (update) 2018: Is there a limit to the level of damage to a POI that may be 'covered up' without casing replacement?

A *No. It is easy to either cut out a suitable part from a mechanical sample (obtained during identification) or 3D print a part for the replacement area. Paint or stickers can easily hide any seams or damage as it is common in the marketplace for deployed POIs to have painted plastic casings or stickers of some type. Therefore 'pure' casing damage, including full case replacement, will receive 1 point for a standard part in the exploitation phase.*

Q 79 July 2017: Should damage to the front or back be treated differently, given increased visibility of frontal damage?

A *No, unless the rear can be expected to not be visible (e.g., in an EPP) where any damage does not need to be covered up at all. If an attack path requires damage to the part visible to the card holder, than the effort for hiding it must be considered, which consists of the replacement parts (spare device), the time needed and the skill to mask it.*

Q 80 July 2017: What about if the repair makes the device look materially different?

A *Small changes, such as added stickers or small increases in volume/size, are acceptable. Larger changes noticeably altering the shape of the device to a layman are not appropriate for consideration.*

Q 81 July 2017: For purposes of PCI acceptance, a draft standard is a document that either has been published as a draft for trial use (e.g., ISO FDIS) or has been published as a draft for public comment (e.g., NIST drafts).

A *However, ANSI (X9) does neither of these and further clarification must be made. For purposes of PCI acceptance, an ANSI (X9) draft standard is one that has been successfully balloted out of the assigned X9 working group (e.g., X9F1, X9F4, or X9F6). Prior to this point, working group procedures allow members to post documents in various stages of "draft" which may conflict with each other and may not reflect a consensus of the working group.*
A breach of the algorithm invalidates any standard - draft or final.

Q 82 December 2017: Applications that execute within the secure boundary of the POI device that are added (e.g., by a third party) to the device subsequent to a PTS laboratory evaluation that meet the following do not require assessment and listing as part of the device's firmware:

- **The application cannot impact any of the functionality needed to comply with PCI requirements.**
- **The application does not replace or disable the PCI evaluated firmware functionality.**

Does this apply to all POI approval classes?

A *No. Any code present in an SCR intended to be connected to a COTS devices or SCRP approval class devices is considered firmware and must be assessed and listed as part of the device's approval.*

Q 83 December 2017: Are laboratories allowed to do PTS HSM and POI work at a vendor site?

A *The purpose of the laboratory assessment is to provide an independent review and testing of PTS devices using approved laboratory personnel and equipment. Device testing for PTS approvals shall be done in the PCI recognized laboratory facility and not at vendor site unless:*

- *The laboratory work is in connection with evaluating policies and procedures of the vendor.*
- *Evaluating Module 5 Manufacturing requirements.*
- *Evaluating Module 5 Manufacturer and Facility of Initial Key Loading or Facility of Initial Deployment requirements.*
- *Where necessary, to review source code.*

Any work completed outside the PCI recognized laboratory facility should be clearly documented in the PCI PTS device evaluation report.

Q 84 December 2017: Attacks may require spare parts, e.g. plastic housings, which can be obtained from a mechanical sample of the same device. How should these spare parts be included in the attack costing?

A *Replacement plastic housings are considered 'standard specific parts' and can be included in the exploitation phase of an attack costing. A mechanical sample should not be included in the exploitation phase for access to the device and thus double counted.*

Q 85 May 2018: If an attack requires the creation of a hole in the POI casing, is it required to consider that a full casing replacement must occur?

A *No. Tamper evidence is not considered a suitable protection in and of itself. Attacks that damage the casing must consider hiding the damage through use of stickers, stands, or other such methods. With the advent of inexpensive 3D printing and home laser printers, there is not considered to be a limit to the damage which may be repaired through simple means, and costed as 'standard' parts using 'standard' equipment.*

Where sensitive data is exposed inside the PED, but outside of the immediate area of the keypad contacts (i.e., outside the keypad area), or internally within the security processor, this data must be protected by a tamper responsive envelope. Use of physical barriers alone, such as plastic walls or tamper evident protections, are not considered sufficient to meet the requirements to protect customer PIN data or cryptographic keys. A POI that does not implement tamper detecting side walls for its secure area must be implemented in such a way that the sensitive signals are otherwise protected with methods that go beyond purely physical and tamper evidence or otherwise it fails the evaluation. This must include the use of a dedicated security processor which has internal protections against accessing signals on the pins or bond-out wires, with no sensitive signals exposed outside of this security processor that are not otherwise protected by a tamper detecting envelope.

Q 86 May 2018: Is it acceptable for a terminal application to parse input data, which dynamically changes its execution behaviour at runtime? E.g., can a web browser or email client parse and display HTML5, Java, Javascript or any other scripting language?

A *Yes as long as the data is being parsed, verified and displayed by the firmware.*

Q 87 May 2018: Is authenticity checking provided by TLS sufficient to meet B16?

A *No. TLS is only designed to offer IP security, it does not provide security or integrity of the message interpretive content or context. I.e., it does not prevent message content code (such as HTML5, Java, Javascript, etc.) from requesting an input prompt.*
Vendor or acquirer certified applications and/or data that are communicated using a managed PKI (in addition to TLS) are acceptable. However, the application and/or data provider must attest that the application and/or data does not contain instructions to make use of a prompt.

Q 88 October 2018: Are there minimum requirements for the version of Android to be used within a PTS device?

A *Yes, it is expected that the Android version is officially supported with security patches, at a minimum. Any reports, including deltas, where the Android version is not supported with regular security patches will be rejected. Where these patches are not provided by Google, evidence of security patches (implemented at least monthly) provided by the vendor must be documented in the report provided by PCI; evidence for this is expected to be validation of the update code by the laboratory for at least two previous patches, as well as validation by the laboratory that these patches have remediated existing known vulnerabilities in the version of Android used.*

Vendors should note that this means that consideration for the future patch status of any Android version used must be made during the initial design stages of the device, to prevent unexpected rejection of devices after an Android version becomes unsupported during the development of a solution.

Q 89 October 2018: DTRs state 'Evidence-based reporting, demonstrating device compliance through robust testing, is the fundamental basis for achieving device approval.' What are the minimum expectations for testing / test evidence for any device resistance to attacks involving physical penetration / modification?

A *Although evidence of cutting and/or drilling into the device (exterior case, interior parts) is a primary test activity in most evaluations, cutting and/or drilling alone is rarely sufficient to demonstrate satisfactory resistance to all / any Security Requirements where a viable attack path has elements of physical penetration / modification. It is necessary for the evaluating lab to show, additionally, robust evidence of the device's resistance to physical attacks attempting to circumvent for example (but not restricted to): tamper switches, meshes, PCBs, tamper circuits, keyboards, screens, card readers, boards, etc., and these device parts' components and / or components connecting these.*

Q 90 September 2020: Removal detection requirements were eliminated in POI v6. Are these requirements now eliminated for v4 and v5 devices?

A *Yes. All aspects of requirements on anti-removal mechanisms eliminated in POI v6 become optional for v4/v5 devices. If applied as changes to approved v4/v5 devices, they shall be assessed in a delta evaluation, in which the relevant hardware and firmware identifiers are updated.*

Although no longer mandatory in v6, for new devices optionally implementing protections satisfying the eliminated requirements, the lab shall reference these in the evaluation test report device summary section.

POI Requirement A1

Q 1 Do attack scenarios considered under A1 include replacement of the enclosure to conceal tamper evidence?

A *A1 allows the evaluator to use any method of attack feasible against the terminal limited only by the attack potential of 26. The POI device must be able to withstand attack from any side, including front and rear case replacement up to the attack potential value.*

Q 2 Attack scenarios should consider keypad removal or replacement associated with unattended payment terminals, such as in connection with overlay attacks. How can this be addressed by the device's design?

A *Since in vending machines or other unattended acceptance/payment terminals only the keypad area of a device is usually visible to the cardholder, attacks may be mounted which use device removal and the insertion of keypad overlays or keypad substitutes as an attack element. These attacks may be easier to perform than direct attacks to the device. The attack scenarios must therefore consider removal/replacement attacks as part of an overall attack scenario. The device must have design properties to detect and respond to removal/replacement attacks. Examples of countermeasures include, but are not limited to, removal detectors, movement detectors, special mounting brackets or special keypad designs. Future releases of the requirements will require specific countermeasures.*

Q 3 June (update) 2020: This FAQ has been superseded.

Q 4 Are there circumstances under which a device can comply with Requirement A1 while employing one tamper switch to protect the keypad area?

A *No. If switches are used as the primary protection for the area around a physical keypad area, then at least three blind, tamper switches must be implemented. The switches must be protected from attacks that use the application of adhesives or conductive liquids to disable the switches. The design must ensure that a minimum of three switches in the keypad area must be individually attacked to disable them. Note that these criteria are in addition to exploitation time and attack potential minimums and that the keypad in question is a physical keypad, not a touch screen.*

Q 5 What vulnerabilities must be taken into account for a touch screen?

A *If the sides are accessible, an overlay attack utilizing a second, clear touch screen could be a problem. The connection/path from the touch screen to the processor (and any devices used for decoding the signals in between) needs to be verified to be secure. Bezels around the touch screen are especially dangerous because they can conceal access to areas of concern that are described above.*

The API for firmware and applications (if applicable) needs to be looked at carefully to determine the conditions under which plain-text data entry is allowed. Example: it should not be possible unless under acquirer display prompt controlled devices, for a third party to display an image (JPEG) that states "press enter when ready for PIN entry" and then have a plain-text keypad pop up on the next screen. The extra caution is warranted for touch screen devices because of the desire to make touch-screen devices user-friendly and to run many different, unauthenticated, uncontrolled applications. This is especially true for the devices that are intended to be held because of the tendency to regard them as a PDA that can perform debit transactions.

Q 6 **In the attack-potential calculation for A1, is it allowed to include in the point calculation a value for disabling the removal detection mechanism of an EPP or OEM PED intended for use in an unattended environment?**

A *If attack scenarios in A1 do not necessarily require the removal of the device out of its location (e.g., the attack could take place at a time before field placement), the cost for disabling the removal sensor should not be included in the point calculation for A1. Removal detection is considered in Requirement A9. However, if an attack considered in A1 requires the deactivation of the removal-detection mechanisms, the effort for that can be included in the attack-cost calculation. Most likely, this will increase the attack costs only marginally (e.g., by 1 or 2 points). In no circumstances can the attack costs determined under A9 simply be added to the attack costs determined under A1.*

Q 7 **In the event of tamper, the device must become immediately inoperable and result in the automatic and immediate erasure of any secret information that may be stored in the device, such that it becomes infeasible to recover the secret information. Guidance notes provide that secret or private keys do not need to be zeroized if either or both of the following conditions exist:**

- **If any of these keys are not zeroized, then other mechanisms must exist to disable the device, and these keys must be protected in accordance with Requirement A5.**
- **The keys are never used to encrypt or decrypt data, or are not used for authentication.**

Do any other conditions apply?

A *The keys (secret or private) are never used to encrypt or decrypt other keys. Keys that can be used to download other keys to make the device operable must either be zeroized or rendered inoperable for use in downloading new keys. E.g., both symmetric KEKs used for key loading using symmetric techniques and private keys associated with key loading using asymmetric techniques. The device must enforce that tampered devices require withdrawal from use for inspection, key reloading, and re-commissioning. It is not sufficient to rely upon procedural controls for this.*

Q 8 **A device uses a key that is randomly generated internally in the secure processor to protect other keys. This key is stored in the clear and protected within a register in the same secure processor. The secure processor resides within a secure area of the device. This key is used to encrypt other keys, which are stored encrypted outside the secure processor—e.g., in flash memory that also resides within the secure area of the device. Upon tamper, the device erases this internally generated key but leaves intact the other keys encrypted by this key, which can no longer be used because the device cannot decrypt them. Under A1, must the device also zeroize these encrypted keys upon tamper?**

A *The device need not zeroize these encrypted keys provided that they are encrypted using appropriate algorithms and key sizes as defined in Requirement B11.*

Q 9 **March 2011: When calculating the Identification phase for PIN-bug attacks, when should Restricted or Sensitive Information be used?**

A *In many cases, additional time spent analyzing the device under attack can be used in lieu of Restricted or Sensitive information. Restricted or Sensitive information should only be used when the total attack-potential calculation using Restricted or Sensitive information is less than the total attack-potential calculation using the additional attack time, such as through reverse engineering.*

Q 10 March 2011: Should an Expert level of expertise be used when calculating a front-case PIN-bug insertion attack on a device that includes front-case switches with guard rings as the only keypad (front-case) protection for Requirement A1?

A *If a device includes front-case switches with guard rings as the only keypad security mechanisms protecting the insertion of a PIN bug, then a Proficient level of expertise should be used in the exploitation phase of the attack for Requirement A1. If Expert level is accounted for in the exploitation phase, strong justification, including full testing on a sufficient number of samples, must be provided in the assessment. In most cases, the device must include additional types of security mechanisms protecting the front case of the device.*

Q 11 March 2011: What level of expertise should be accounted for in the installation and testing of a PIN bug during the exploitation phase of the attack calculation for Requirement A1?

A *In most cases, only a Layman or Proficient level of expertise should be used for the installation and testing of a PIN bug during exploitation. It is expected that, during the identification phase, an attacker would develop a script executable by a Layman or Proficient person during the exploitation phase of the attack. If an Expert level is used for this phase of the attack, strong justification must be provided in the assessment, such as a full description of the specialized nature of the bug to be installed.*

Q 12 March 2011: Should the Identification phase include a complete dry run for the installation and testing of a PIN bug, or can some of the final steps be deferred until the Exploitation phase?

A *In general the Identification phase should include a full dry run for the installation and testing of a PIN bug resulting in a complete script to be followed in the Exploitation phase. In rare instances, additional steps may be required in the Exploitation phase because of nuances (e.g., slight variations in tamper switch connections) between devices.*

Q 13 May (update) 2018: Requirement A1 states that a device uses tamper-detection and response mechanisms that cause it to become immediately inoperable. If the device is tampered, can it still be used to process non-PIN based payment card transactions?

A *A PIN-acceptance device that is tampered must immediately cease processing all PIN based payment card transactions. If implemented only one reset shall be supported unless the device is removed for inspection and repair. Any intervention enabling transactions, must require an onsite presence which validates there was NO tamper of the device and is subject to the following conditions:*

- *Use of dual-control techniques;*
- *Provide accountability and traceability including logging of user IDs, date and time stamp, and actions performed;*
- *Sensitive information required for the authorization (e.g., passwords/authentication codes) is initialized or used in a way that prevents replay at the same or a different device.*

Q 14 May 2018: What is considered as a 'standard' bug for attack costings?

A *Given the recent rise of cheap electronic systems which provide integrated communications and processing options, any bug that would be used for detecting binary data (such as key pressed / not pressed, or capturing data on an ICC I/O signal) must be considered to have a size of 15 x 15 x 5 mm, with a minimum width of 10 mm when costed as a standard part, which includes wireless communication capabilities. Use of a flexible keypad membrane to capture keypad signals must also be considered as no more than a standard part.*

Where interception of very high speed signals – that require impedance or transmission path length matching – is required, a specialized part may be considered. The lab must provide justification of the reasons for this in the report, including captures of the signals to be intercepted showing a phy bandwidth per trace in excess of 200MHz.

POI Requirement A3

Q 1 Is A3 intended to address the ICC reader security?

A *No. A3 does not apply to the ICC reader. The security of the ICC reader and the path from the reader to the crypto-processor are addressed by D1, D2, and D3.*

POI Requirement A4

Q 1 What standards and methods are used for measuring "electro-magnetic emissions"?

A *Vendors should take into account that EM emissions can be a risk to PIN data, and should design to address this risk. There are many methods for shielding and minimizing EM emissions. The vendor must describe to the laboratory in writing how EM emissions are addressed by the device design. The laboratory will examine evidence provided by the vendor to determine if the evidence supports the vendor's assertion. Evidence can include the device itself, design documents, third-party test results and approvals. Testing will be performed as necessary.*

Q 2 May 2017: Are there any situations where the evaluation report does not have to provide an attack costing.

A *Yes for A4 (Monitoring During PIN Entry), where testing of any external characteristic available for monitoring demonstrably satisfying the applicable DTR test steps has not found any leakage, then it must be explained why any attack scenario cannot be feasible for less than 26 points, with a minimum of 13 for initial exploitation. In such a situation no formal attack calculation needs to be presented.*

POI Requirement A5

Q 1 Does "The keys resident in the device, *if determined*..." mean plain-text keys or does it include encrypted keys as well.

A *The requirement is referring to plain-text keys.*

Q 2 July 2017: Evaluators typically use both source code review and testing of the implementation to verify that side channel protection methods are implemented. How must the evaluator proceed where protections are in code created by the chip vendor and this is only provided to the POI vendor as a library and not source code?

A *The evaluator must treat the device as a black box and extend testing beyond what would otherwise be required if the source code was available in order to determine that the device is resistant to attack. The Side-Channel Analysis Standards for PCI-PTS Evaluations appendix in the Derived Test Requirements provides guidance.*

The report must clearly stipulate what materials were provided for the evaluation and what specifically was tested, details of counter-measures put in place and implemented, including what code was reviewed. If the materials are not provided it must be treated as a black box evaluation as delineated in the prior paragraph and reported as such.

Q 3 May 2018: Can a POI device satisfy Security Requirement A5, if it has cryptographic implementations that may feasibly be attacked by side channel analysis (SCA) yet having no designed SCA countermeasures?

A *No. Even if physical protections against tampering are robust, and even in the presence of electronic noise and algorithmic complexity obscuring signals, it is expected that an attacker can defeat any undefended cryptographic implementation repeatedly exercising static keys. Hence, a device must have at least one demonstrably effective SCA countermeasure protecting all cryptographic algorithms in scope of DTR A5. For software implementations and hardware implementations with known countermeasures, the evaluation shall identify one countermeasure, at least, and show its effectiveness. For hardware implementations with unknown countermeasures, the evaluation shall demonstrate the implementation's SCA characteristics are consistent with having at least one effective countermeasure.*

Q 4 October 2018: What should correlation analysis achieve in an SCA test, to show device compliance to DTR A5/ DTR K3?

A *Appendix F in DTRs outlines basic expectations for SCA testing. A fundamental aspect of this is correlation analysis. Establishing definite correlation of non-sensitive I/O data is important to (1) validate the collection setup and test methodology are not flawed, (2) to localize sensitive cryptographic operations, in developing attacks, and (3) demonstrate that cryptographic key data is more resistant to leakage than other data. The expectation is for most tests to be capable of establishing definite correlation of non-sensitive I/O data. Very strong justification for null correlation results is needed otherwise, in asserting device compliance.*

Q 5 November 2020: POI v6 allows the reuse of testing for emanations (Side Channel Analysis) where testing was done from a prior major version i.e., 5.x. This is only allowed where a complete chain of trust is demonstrated validating why the previous testing is wholly applicable to the newly evaluated device. POI v5, under the same conditions, only allows reuse if less than 3 years old. Can POI v5 devices undergoing SCA use applicable testing from POI v4.x evaluations?

A *Yes, where applicable POI v5 emanations testing follows the same criteria as stipulated in the POI v6 DTRs.*

POI Requirements A6, B16 and E3.4

Q 1 Does "non-PIN data" include data that can be entered while the device is in a maintenance mode?

A *No. A6, B16, and E3.4 are applicable to the device while in its normal working mode. A6, B16, or E3.4 does not apply to data entered while the device is in special modes that are not intended to be accessed by cardholders and merchants.*

Q 2 Does "non-PIN data" include control inputs such as "enter," "cancel," etc.?

A *No. Non-PIN data refers to numeric data entered via the keypad.*

Q 3 The intent of A6, B16, and E3.4 is to eliminate the possibility that PIN values will be entered at an improper time and handled by the device in a non-secure manner. One way for a vendor to address A6, B16, or E3.4 is to allow for the entry of PIN values only. Would it be acceptable to allow the input of numerical data if the numerical data is three characters or less and therefore could not represent a PIN value?

A *This would be acceptable if there is no way for a device to accept the input of a PIN value at an inappropriate time. For instance, it must not be possible for a device to allow the entry of three characters, automatically change states without the cardholder pressing "enter" or some other control key, and then accept the remainder of the PIN value.*

Q 4 What restrictions exist if a device can display uncontrolled messages and the keypad is used to enter non-PIN data?

A *The prompts for non-PIN data entry must be under the control of the cryptographic unit and must be specific such that a cardholder would not enter a PIN at an inappropriate time. An uncontrolled message followed by an ambiguous prompt for non-PIN data could lead to a cardholder entering their PIN at an inappropriate time. For example, if the device displayed the uncontrolled message "Ready for PIN" then prompted for plain-text data while displaying "Enter Data," the cardholder may enter their PIN at this non-PIN data prompt.*

Q 5 The vendor chooses to comply with Requirement A6, B16, or E3.4. What criteria should a vendor use to determine which one to comply with?

A6 applies to any components or paths containing plaintext display signals between the cryptographic processor and display unit. B16 applies to devices that allow for updates of prompts or use cryptography to communicate with a display, whether performed by the vendor or the acquirer. E3.4 is appropriate for unattended devices that do not meet any of the aforementioned.

Q 6 Is it acceptable for uncontrolled messages to be displayed simultaneously with prompts for data entry?

A *No. Any text, including images, other than numbers and punctuation, displayed along with a prompt is considered a prompt and must comply with all requirements governing prompts.*

Q 7 Some device designs fit either vendor-controlled or acquirer-controlled display prompts on who is given custody of cryptographic keys protecting prompt updates are managed. Does such a device need to have different identifiers?

A *If the device is to be listed as both an acquirer-controlled and a vendor-controlled display prompts device, there must be a differentiation so customers can distinguish between the two (e.g., different hardware and/or firmware versions).*

Q 8 For devices that implement acquirer-controlled prompts, is it required to use a secure cryptographic device to implement the dual control required to manage those prompts?

A *Except as noted below, dual control must be enforced by a SCD. The SCD can be the PED itself or another device. If a SCD other than the PED enforces dual control, the vendor must either provide the SCD to third parties, or describe how a SCD must be used to comply with B16. The description must include an example of a specific, existing SCD that can be purchased and used to comply with B16. The PED must have an API that is compatible with the SCD. The complete solution must be fully developed. It is not acceptable to provide detailed instructions that require users to develop part of the solution.*

A SCD is not required for protecting the user prompts if the authentication solution meets all of the following:

- *The signing device implements dual control mechanisms such that it is infeasible for a single person to sign user prompts.*
- *The signing device provides for all logging details as stipulated in the requirement.*
- *Compromise of a signing device does not compromise any other signing device.*
- *Compromise of a signing device does not affect the security of POI devices outside the domain of the signing device.*
- *POI devices outside the domain of any signing device cannot be modified to accept user prompts from other user prompt sources.*
- *The signing device is a single use device or is used in a restricted secure area.*
- *The vendor provides the secure operating procedures to the customer.*

Q 9 December (update) 2017: For PEDs designed with multiple data acceptance interfaces, where there is a hard keypad dedicated to PIN (and other sensitive data) entry, and the other interface is a touch interface not intended to accept any sensitive data entry, what controls are required for the 2nd interface?

A *In this type of design, the following controls on the "non-sensitive" interface must be enforced, in addition to the existing restriction that applications must not ask for input of sensitive data:*

- *The firmware must be designed such that no sensitive data can be entered into the "non-sensitive" interface*
- *If the x/y touch coordinates are sent to the authenticated applications on the device, the vendor must provide guidance to application developers to not ever send out touch coordinates. Additionally, the vendor also must review all applications and NOT sign/authenticate them if they are written to send out touch coordinates, thus not allowing them to be loaded or*
- *If the PED authenticates the endpoint that receives the x/y coordinates and if the communication link between those instances is securely encrypted (for instance using a TLS v1.2 tunnel) then the device can provide x/y touch coordinates only to applications or servers that have been authenticated by the device.*

POI Requirement A6

Q 1 Can the calculation for the attack potential of 18 per device include the cost of development kits that provide application programming information?

A *No. The device must include protections that require an attacker to achieve an attack potential of at least 18 to order to defeat them. Administrative controls on application programming information are not adequate to meet this requirement.*

Q 2 Is the attack potential of 18 per device to be applied to a single device, or averaged over multiple devices?

A *A6 addresses an attack performed on a single device. If an attack has a potential of 18 to develop, A6 is met regardless of whether or not applying the attack to additional devices is less than 18.*

Q 3 Touch-screen devices offer multiple possibilities for the data entry: traditional PIN pad layout, QWERTY layout, signature capture, handwriting recognition, etc. Does A6 apply to all of these methods of data entry, or only the traditional PIN pad?

A *A6 applies to all methods of data entry that can be used by a cardholder to disclose their PIN, including QWERTY layout, signature capture, and handwriting recognition.*

POI Requirement A7

Q 1 What methods may be employed to comply with this requirement?

A *The PIN entry device must be equipped with a privacy shield, or designed so that the cardholder can shield it with his/her body to protect against observation of the PIN during PIN entry.*

Q 2 When a device is not a handheld device, it must have a privacy shield to meet A7. Are there any special considerations if the shield is detachable?

A *A user's guide must accompany the device that states that the privacy shield must be used to comply with ISO 9564. Optionally, the user's guide can also reference PCI device requirements.*

Q 3 The DTR "Appendix A—Guidance for the Privacy Screen Design" specifies size and weight guidelines for handheld devices. Are handheld devices required to meet these guidelines?

A *No. In order to be considered a handheld device, it must by weight, size, and shape encourage its handheld operation; however, the guidelines listed are suggestions, not requirements.*

Q 4 Requirement A7 stipulates that the device must provide a means to deter the visual observation of PIN values as they are being entered by the cardholder. What methods are acceptable?

A *The POI Security Requirements provide for several options that may be used separately or in combination to provide privacy during PIN entry. These options are:*

- *A physical shielding barrier,*
- *Limited viewing angle (for example, a polarizing filter or recessed PIN pad),*
- *Housing that is part of the ATM or kiosk, cardholder's hand or body (applies to handheld devices only), and*
- *The installed device's environment.*

Q 5 September (update) 2016: Is there any impact on the device's approval if the laboratory evaluated privacy method is not used?

A *Frequently, the deployers of devices rationalize that privacy-protection mechanisms may be bulky or obtrusive, make it more difficult to see the device's screen, or, with less dexterous users, interfere with card payment and PIN entry. However, in order to maintain the device's approval, and any associated liability protection for compromise attributable to use of said device, it is required that the device meet the privacy-shield requirements as evaluated by the laboratory and upon which the approval was based. Devices deployed that do not use the privacy-shield requirements evaluated by the test laboratory are no longer considered approved devices. This must be disclosed in the security policy for the device.*

Q 6 September 2016: Vendors must either provide a privacy shield providing privacy protections during PIN entry for the cardholder, or alternatively, the vendor may use less restrictive privacy-shield criteria provided that the vendor supplies rules and guidance as to how the visual observation is to be deterred by the environment in which the device is installed. Does this impact the security policy disclosure?

A *Yes. The security policy must stipulate the rules and guidance under which the device was evaluated as to how the visual observation is to be deterred by the environment in which the device is installed. The policy must also disclose that deployment not using these considerations that were evaluated by the lab and upon which the approval was based will invalidate the device's approval.*

If the device comes with a removable privacy shield, the security policy must disclose that deployment without the shield invalidates the approval unless the device is deployed in accordance with instructions in the security policy validated by the lab for deploying the device with protections provided by the environment in which it is installed. The policy must also disclose that deployment not using these considerations that were evaluated by the lab and upon which the approval was based will invalidate the device's approval.

POI Requirement A8

Q 1 March 2015: MSRs must have protections against any additions, substitutions, or modifications for the purpose of determining or modifying magnetic-stripe track data. Does that include attacks where a bug is installed on the opposite side of the card track of the original MSR such that the attacker would only capture card data if the cardholder swipes the card with the track side facing the wrong way?

A *Yes. Some MSRs are intentionally designed to capture the track data regardless of which way the card is swiped. Thus cardholders become conditioned to swiping the card from either side, even where the reader does not support.*

POI Requirement A9

Q 1 Requirement A9 states that the minimum attack potential for the removal of a secure component from its intended environment is 18 points. Does this figure include the cost required to produce and install an overlay bug after removal of the secure component?

A *No. The 18-point requirement for the removal of a secure component (e.g., EPP) includes all stages of identification and exploitation up to the point that the secure component is removed from its installed environment. No further steps, such as the production or installation of an overlay to capture PINs after the removal of the secure component, are considered in the attack calculation.*

Q 2 **May 2011: The procedure for authorized installation or re-installation must use dual controls. Dual-control techniques must use two or more separate entities (usually persons), operating in concert, to protect sensitive functions or information. Is it acceptable to use a dual-control technique where one party is a technician visiting the device and the other is not a person (for example, a remote server)?**

A *Yes, provided that one single party cannot disable the removal-detection mechanism. Dual control implies mutual supervision and that for a breach to be committed; both parties must be in collusion. As such, a mechanism where the server allows disabling the removal-detection mechanism based only on the person's authentication credentials is not acceptable, because it does not prevent access by someone with valid credentials, but with the intention of attacking the device. An acceptable technique would be, for example, that the server only grants access to authorized interventions that are previously scheduled on the server, and there is an associated timeframe during which the server would grant the authorization for disabling the removal-protection mechanism. If such a technique is used, the person visiting the device cannot be the same as the person requesting or authorizing the maintenance intervention at the server.*

Q 3 **May (update) 2018: Secure components intended for use in unattended devices must contain an anti-removal mechanism to protect against unauthorized removal and/or unauthorized re-installation. The installation or removal of the device requires an authorized process using dual control techniques. One mechanism for doing so involves the use of passwords/authentication codes. Can a device have a function (e.g., a specified key-press sequence) to reset the passwords/authentication codes to their default values if the reset zeroizes all the secret keys and new passwords/authentication codes must be entered to re-enable the device to load keys?**

A *No. There are several concerns where a device can be easily reset in the field:*

- *Denial of Service*
- *The fraudsters could load known keys to harvest PINs on a short term basis*
- *The device is removed and a PIN-disclosing bug installed and then is reinstalled using the default passwords/authentication codes. Authorized staff may then load legitimate keys without detecting the tamper on the reinstalled device.*

Q 4 **December 2011: In connection with removal detection and authorized installation/re-installation, accountability and traceability must exist, including logging of user IDs, date and time stamps, and action performed. What are acceptable locations for the logging to reside at?**

A *It may be logged at the device's (e.g., ATM) host, or it may be logged directly by the device (i.e., EPP or OEM PED), and either stored by the device where feasible, or externally by the host's controller.*

Q 5 December 2011: Dual control is required for removal detection and authorized installation/re-installation. Can the same dual-control that is used to authorize the device's removal also be used to authorize the re-installation?

A *The vendor may not necessarily require both options. Possible scenarios include:*

- *Implementation of an authorized removal command to disable the removal sensors, and therefore also require an authorized replacement command to re-enable the sensors.*
- *Implementation of only an authorized replacement command, and reliance upon the removal sensors to automatically activate the removed state.*
- *Erasure of the secret keys whenever the device is removed, and then re-loading new keys once the device is re-installed.*

However, in all cases PIN processing must be disabled.

Q 6 December 2011: For a removal then re-installation, if communication to the device is not possible before the removal but only after the re-installation, what are the requirements?

A *The device can either:*

- *Erase all keys when removed or*
- *Go to an unauthorized state upon removal and require an authorized re-installation process.*

Q 7 December 2011: Under what conditions can a device that does not undergo an authorized removal process be re-installed?

A *The device can either:*

- *Erase all keys when removed or*
- *Go to an unauthorized state upon removal and require an authorized re-installation process.*

Q 8 September 2012: Some implementations of ICCRs are not intended to support offline PIN acceptance. In those circumstances, can an ICCR be approved if it is not validated as compliant to the removal detection requirement?

A *No. Support for offline PIN acceptance can readily be modified by a firmware change without physically having to touch the device. However, for deployed devices it is unlikely that an ICCR without removal detection would be physically replaced in the field due to the additional costs. In addition, removal detection is a Core requirement for unattended PIN handling devices (such as EPPs and ICCRs) and cannot be made optional.*

POI Requirement B1

Q 1 What is required to meet B1?

A *The device must perform an internal self-test automatically at least once every day, in addition to at power-up. Firmware integrity tests may use techniques such as SHA-2 or equivalent. Authenticity testing must use cryptographic methods (MACs, digital signature or encryption). The hash must either be cryptographically protected using a key (e.g., HMAC-SHA-2) or physically protected equivalent to a secret key. LRC, CRC and other non-cryptographic methods and weak cryptographic methods (e.g., SHA-1, MD5) are not allowed as the primary mechanisms for either authentication or integrity checking.*

Q 2 Is it acceptable to perform firmware integrity checks before each PIN transaction instead of once daily?

A *Yes. It is acceptable to perform firmware integrity checks before each PIN transaction as opposed to performing them at least once every 24 hours.*

Q 3 Is it acceptable to perform a self-test after several minutes of inactivity rather than once every 24 hours?

A *Yes, as long as it is 24 hours or less. Note that the power-up self-tests are still required.*

Q 4 B1 requires that firmware integrity and authenticity be tested every 24 hours. Some firmware, such as a boot block, is rarely executed. For such firmware, is it acceptable to perform an integrity and authenticity check prior to execution, rather than every 24 hours?

A *Yes, it is acceptable to test such firmware immediately prior to each execution rather than once every 24 hours. However, note that all firmware must additionally be checked as part of the self-test performed at startup.*

Q 5 Requirement B1 states that a self-test must check for both integrity and authenticity of the installed firmware. Is it necessary to perform both checks separately?

A *No. The self-test required by B1 must perform an authenticity check, using cryptographic means such as a digital signature or a MAC. As such, an authenticity check will also confirm the integrity of the installed firmware, an additional integrity check is not necessary, but optionally may be additionally performed using a non-authenticated digest such as a CRC.*

Q 6 If a device employs firmware on the MSR's read head to encrypt account data, is that firmware subject to authenticity checking as defined in Requirement B1?

A *No. Authenticity checking as defined in Requirement B1 is for the management of firmware that is directly or indirectly involved in the protection of cardholder PINs as defined in the various security requirements. However, the firmware on the read head must be designed such that it cannot be updated.*

Q 7 Under what circumstances can a device not use authenticity checking when self-testing its firmware?

A *A device does not require authenticity checking when self-testing its firmware if (all apply):*

- *The authenticity checking of firmware—either internally and according to B4 or externally using appropriate procedures within a secured environment under the vendor's control—is performed whenever the firmware is established in that secure area;* ***and***
- *The effort to deliberately modify or replace the firmware or parts of it in order to get access to sensitive information (access to the memory device) must be addressed as an attack scenario under Requirements A1, A3, and A5 and meet the respective attack potentials;* ***and***
- *A periodic integrity check according to Requirement B1 is performed for the firmware, ensuring that random changes will be detected; and if cryptographic authenticity is not performed, the integrity check must be cryptographically based. Although an algorithm using a secret key, such as a keyed hash, can be used, it is not necessary for meeting the integrity criteria.*

These conditions apply regardless of any non-reconfigurable property of the device memory.

When firmware is externally authenticated, the level of security shall be of the same level as for key-injection facilities.

Q 8 July 2013: Will micro-code be required to meet B1?

A *Chip-level code delivered with a component that cannot be configured, modified, or changed by any standard interface and, where an error cannot compromise the security of the device, does not need to be validated against Requirement B1. Examples may include smart card controllers, keypad controllers, or modem firmware.*

Q 9 July 2015: Can a memory re-initialization (security) cycle last longer than 24 hours?

A *Yes, to allow the adjustment of the security cycle of the PIN Entry device (max. 24 hours duration) to the business cycle of an integrated POS system it may be connected to (max. 24 hours duration). The Firmware of the PIN Entry device, during the cycles' adjustment processes, must not allow any security cycle to last longer than the combined maximum durations of the security cycle and the business cycle (48 hours). This must be included in the security policy for the device.*

POI Requirement B2

Q 1 November 2012: What interfaces should be assessed under Requirement B2?

A *All interfaces and associated communication methods of the device must be assessed to ensure that no interface can be abused or used as an attack vector. Specifically, this includes any physical, logical, or application interface that is executed within the POI device with sufficient privilege to allow for direct interface to sensitive assets within the POI (should that protocol be compromised in some way). The interfaces must be documented and assessed whether they are used for or have access to card data or not. Sufficient evidence must be provided to demonstrate the validity of laboratory assessments. Interfaces using open protocols are further assessed in the Open Protocols Module.*

Q 2 December 2012: The device's functionality must not be influenced by logical anomalies. This includes assessment of the device's interfaces and associated communication methods. What type of evidentiary matter should a vendor provide a lab to support this assessment?

A *The vendor shall provide evidentiary matter providing details on internal testing including, but not limited to, the following:*

- *Source code reviews targeting specific relevant security–critical functionalities*
- *Vulnerability analysis; that includes gathering and considering evidence necessary to perform practical testing*
- *Penetration testing to validate the robustness of the device to protect against feasible attacks by addressing known attack methods. For example (but not restricted to) fuzzing; using appropriate tools and techniques*
- *Audits of relevant existing test evidence, which may be utilized where appropriate, by giving justifications for validity of evidence and test methodologies overall.*

The laboratory shall determine the veracity of the material provided to determine the degree of reliance that may be placed upon the evidence, and where necessary, the laboratory shall extend the testing.

Q 3 December 2017: Is it necessary to use ASLR and stack canaries in operating systems within a POI?

*Yes. Where a complex operating system (such as Linux, other *nix variants, and operating systems such as Android) is used, ASLR must be enabled and correctly configured to be compliant in PCI PTS v5 and above.*

For Linux, this means setting 'randomize_va_space' to a value of '2', and ensuring that all code is correctly compiled (and/or configured) to implement and enable ASLR.

Where options are provided for use of stack canaries and data execution prevention bits, these must always be enabled (including for application code).

POI Requirement B3

Q 1 What is considered "firmware"? (OS, EPROM code, DLL's, parameter files, applications, kernel code)?

A *Firmware is considered to be any code within the device that provides security protections needed to comply with PCI POI requirements. Other code that exists within the device that does not provide security, and cannot impact security, is not considered firmware under PCI POI requirements.*

Q 2 What methods are acceptable to "certify" firmware?

A *"Certify firmware" refers to self-certification. This requirement, in essence, requires the vendor to have implemented and to use internal quality control and change control systems. With these systems in place, the vendor is in control of the code and can attest to the fact that the code is free of hidden or unauthorized functions by answering yes to B3.*

Q 3 Many devices are designed so that third parties can create and load applications. Vendors often support this by providing third parties the tools needed to create and load applications. How can a vendor ensure that the application will not need to be controlled by the vendor?

A *If applications are not considered firmware, they do not need to be controlled by the vendor. The device design must prevent applications from impacting functions and features governed by the requirements. Examples of functions that must not be influenced by "non-firmware" applications include: key management (key selection, key authentication, key generation, key loading, etc.), self-tests, time between PIN block encryptions, access to sensitive services, limits on sensitive services, firmware update and authentication, tamper response, etc.*

Alteration of prompts by third parties is a special case that can be impacted by non-firmware applications provided that PCI POI B16 is met.

SRED applications developed by third parties are also an exception. They must meet all applicable criteria in the SRED module, including any associated FAQs.

POI Requirement B4

Q 1 What parties may possess keys used for the cryptographic authentication of firmware updates?

A *The firmware is the responsibility of the device vendor, and as such the cryptographic keys that authenticate it within the device must be held solely by the vendor or their designated agent.*

Q 2 Firmware updates must be cryptographically authenticated, and if the authentication fails, the update is rejected and deleted. Are there any circumstances where firmware can be updated without authentication?

A *Some chipsets are not designed for firmware updates, but only to support firmware replacement. The deletion of the existing firmware and cryptographic keys during the replacement does not allow for the authentication of the new firmware to occur.*

In such cases it is acceptable to update the firmware without authentication if the process requires that the device be returned to the vendor's facilities and results in the secure zeroization of all secret and private keys contained within the device.

Q 3 December 2011: If a device supports firmware updates, the device must cryptographically authenticate the firmware, and if the firmware is not confirmed, the firmware update must be rejected and deleted. Can a device completely load new firmware before checking its authenticity and overwrite its primary copy of existing authenticated code if it retains a secure backup copy of the existing authenticated code?

A *Yes, provided the following is true:*

- *The new code is cryptographically authenticated prior to execution.*
- *If the new code fails authentication, the backup copy of code is cryptographically authenticated, and if the backup copy is successfully authenticated, the device boots from the backup copy and the backup is then used to overwrite the new code that failed authentication.*
- *If both firmware versions fail authentication, the device fails in a secure manner.*

Q 4 February 2017: If the device uses digital signatures for authenticating firmware updates (compliant with B4), does it need to use a secure protocol to meet J4 and K9?

A *B4 stipulates that firmware loaded into the device must be authenticated regardless of how the file is delivered to the device.*

J4 ensures that the management platform delivers the files to the device securely and that the interface cannot be used as an attack vector into the device.

- *For remote access, i.e. the files are delivered to the device across a private or public network, the use of a security protocol is required and must be validated.*
- *For manual access, i.e. where the operator has physical control of the terminal and the files, and the files are not delivered across a network, the device must ensure that the interface cannot be exploited (e.g., by restricting access/functionality on the interface, requiring administrative rights, using cryptographic authentication techniques, etc.)*

K9 states it is for remote access only and does not include a manual element, a security protocol would be required to ensure the interface cannot be exploited.

POI Requirement B5

Q 1 What symbols are acceptable as "non-significant"?

A *Any symbol can be used as long as it cannot be used to determine PIN values. Using a different symbol for different digit numbers or groups of numbers is not acceptable. Here is an example of symbol use that would NOT be allowed: 1=*, 2=@, 3=%.*

POI Requirement B6

Q 1 What does "encrypted immediately" mean in term of software or hardware architecture?

A *This means when the cardholder signifies that PIN entry is complete, either by pressing an "enter" button, or by entering the last digit of the PIN, the device does not perform any processes other than those required to encrypt the PIN.*

Q 2 Requirement B6 requires that a PIN be encrypted immediately. Typically, this means that the secure processor forms and encrypts the PIN block before performing any other operation. However, some device designs place a microprocessor between the keypad and the secure processor. Under what conditions, if any, would such a design be allowed?

A *Such a design is considered compliant if the microprocessor, the secure processor, and the path between them are completely within the protective boundary of the device. This boundary is established by the method chosen to meet A1.*

An alternate method of meeting the requirement would be for the microprocessor to immediately encrypt the PIN before passing it to the secure processor, which would then decrypt it and create the encrypted PIN block. Note that in this type of design, the microprocessor software used to encrypt the PIN data is being used to meet PCI requirements. Therefore, this software must be considered "firmware" as addressed by PCI requirements. As such Requirements B3 and B4 would apply to this firmware.

Q 3 It is common practice for encrypting PIN pads used in ATMs to support the use of one command to initiate PIN entry and another command to encrypt the PIN. Is this acceptable under B6?

A *Yes. It is acceptable for an EPP to allow one command to initiate PIN entry and a second command to initiate PIN encryption. However, it must not be possible for the encryption command to be used to encrypt the PIN multiple times to output the encrypted PIN from the EPP under different cryptographic keys or to output the PIN in plain-text. Also, the plain-text PIN value must only exist in tamper protected memory or equivalent.*

Q 4 September 2012: Devices may support the encipherment of the PIN multiple times as part of a transaction series. B6 stipulates that the encipherments must use the same encryption key for this series. Can the transaction series be encrypted by a series of keys if the current key is a derivation of a predecessor key?

A *The purpose of the requirement is to prevent an adversary from using the authorized key to send the transaction online for authorization and another key to log the transaction for later recovery. In that regard a UKPT methodology may be used for the transaction series, whereby the keys are part of the same series and the entire hierarchy is secured in the same manner and it is infeasible in the design to insert a rogue key.*

Q 5 April 2013: B6 requires that online PINs must be encrypted immediately after PIN entry is complete. It is further stipulated that plaintext PINs must not exist for more than one minute from the completion of the cardholder's PIN entry. In all cases, erasure of the plaintext PIN must occur before the tamper-detection mechanisms can be disabled using attack methods described in A1. Are there any circumstances where a plaintext PIN can exist for more than one minute?

A *Some ATMs have implemented intelligent deposit technologies to enhance the customer experience. As a result, some deposit transactions take longer than one minute and result in the PIN being cleared from the buffer after one minute and the cardholder then needing to start the transaction over, and in some cases, unable to complete the transaction at all. In those cases, the ATM applications require modification to prompt for PIN re-entry if a transaction goes over the time out period, rather than requiring the entire transaction to be re-started.*

In order to allow a sufficient time for the modification of those applications, PCI will allow three years from the publication of this FAQ for those applications to be modified. During this three-year abeyance, the unenciphered PIN may remain in the buffer for up to five minutes. However, the PIN must remain protected from compromise using attack methods described in A1, and the test laboratory shall take into consideration the lack of timely encipherment when designing attacks.

This abeyance only applies to encrypting PIN Pads designed and used for ATMs.

POI Requirement B7

Q 1 Is it acceptable to XOR key components during key loading to satisfy the authentication requirements of B7?

A *The XOR of key components alone is not enough to constitute authentication. Some type of authentication of the users that use the key loading function, or authentication of the key-loading command is required.*

Q 2 May (update) 2018: Under what circumstances is key entry via the device keypad permitted?

A *Plain-text secret keys cannot be entered into the device using the keypad. Plain-text key components may be entered via the keypad in accordance with ISO 11568-2. Encrypted keys may also be entered via the keypad. Entry of key components or encrypted keys must be restricted to authorized individuals. Functions used to enter keys must only be available when the device is placed in a special maintenance mode. Access to special modes must be restricted through the use of passwords/authentication codes or other secret knowledge.*

Q 3 Do maintenance menus that provide services such as LCD Contract Adjustment, Self-tests, Printer Maintenance, and Key Tests constitute a "sensitive service?"

A *If the services provided in these normally non-permitted functions do not affect the security of the terminal or the cardholder data, they are not considered sensitive services. Only services that could compromise the security of the terminal are sensitive services.*

Q 4 For devices that require the use of authentication data to access sensitive functions, and the authentication data are static, can the authentication data be sent with the device?

A *The authentication data can be sent with the device only when the authentication data is in tamper-evident packaging, such as the use of PIN mailers. Otherwise separate communication channels must be used with pre-designated recipients.*

Q 5 March 2011: Plain-text secret or private keys and their components may be injected into a PIN pad using a key loader (which has to be some type of secure cryptographic device). Are there any restrictions on loading keys via this methodology?

A *Yes, the loading of plain-text secret or private keys and their components using a key-loader device is restricted to secure key-loading facilities. Unattended devices deployed in the field shall have plain-text secret or private key loading restricted to key components entered via the keypad of the PIN pad. If encrypted, those keys can be loaded over another interface, such as a serial or USB port.*

Q 6 December 2011: Devices may have functions for zeroizing secret and private keys in the device. Are these functions considered sensitive services that require authentication?

A *Yes, the intentional zeroization of secret or private keys in a non-tamper event is the execution of functions that are not available during normal use. This requires authentication consistent with the implementations of other sensitive services, such as the use of PINs/passphrases. If implemented, the device must force the authentication values to be changed from default values upon configuration of the device. The authentication mechanism may optionally employ dual control techniques.*

Q 7 June (update) 2015: Devices may have functions for zeroizing secret and private keys in the device. This functionality is regarded as a sensitive service that requires authentication. In some cases there is an upstream effect where software changes must occur on interfaces points, such as ATM platforms, applications, switches and hosts that interface with EPPs. Is there any dispensation from this requirement?

A *All devices implementing this functionality must meet the requirement. However, the device may do so by implementing a new authenticated deletion command to the EPP command set, in addition to the existing commands. This must be coded as an either/or option such that both methods would not be available at the same time. Once the authenticated option is chosen, this would permanently lock out the non-authenticated commands.*

In all cases a time bound validity period must exist to force the upstream software changes to be implemented within a set timeframe. PCI will allow three years from the publication of this FAQ for those applications to be modified. This abeyance only applies to encrypting PIN Pads designed and used for ATMs.

Effective 1 January 2017, all newly approved EPPS must only support authenticated deletion capability. EPPs approved prior to January 2017 with non-authenticated deletion capability are not required to be upgraded to authenticated deletion capability to maintain PCI compliance.

POI Requirements B7, B11, K17

Q 1 May (update) 2018: B7 defines sensitive functions as those functions that access sensitive data, such as cryptographic keys, and that authentication is required for such access. The guidance note for B7 stipulates that authentication shall be considered as dual-control techniques when entering sensitive information through a secure user interface, or cryptographic techniques when entering electronic data. The use of other techniques to access sensitive services results in the device being unable to use previously existing keying material. How does this guidance apply to secret or private key loading?

A ***1)*** *When entering plain-text secret keys through the keypad, they must be entered as two or more components and require the use of at least two passwords/authentication codes. The passwords/authentication codes must be entered through the keypad or else conveyed encrypted into the device. These passwords/authentication codes must either be unique per device (and per custodian), except by chance, or if vendor default, they are pre-expired and force a change upon initial use. Passwords/authentication codes that are unique per device can be made optionally changeable by the acquirer, but this is not required. Passwords/authentication codes are at least seven characters.*

Note: *EPPs or OEM PEDs intended for use in an unattended environment shall only support methods 1, 3, and 4.*

Entry of key components without the use of at least two separate passwords/authentication codes results in the zeroization of pre-existing secret keys, i.e., the invoking of the key-loading function/command causes the zeroization prior to the actual loading of the new key. For devices supporting multiple key hierarchies (e.g., multi-acquirer devices), only the hierarchy (specific TMK and working keys) associated with the key being loaded must be zeroized. In all cases, the authentication values (passwords, authentication codes or similar) for each user on a given device must be different for each user.

2) *For injecting plain-text secret or private keys from a key loader (which has to be some type of secure cryptographic device), either the key loader or the device or both must require two or more passwords/authentication codes before injecting the plain-text key into the device. (**Note:** This may be the entire key—if components/shares, each component/share requires a separate password/authentication code.) These passwords/authentication codes are entered directly through the keypad of the applicable device or are conveyed encrypted into the device and must be at least seven characters in length. These passwords/authentication codes must either be unique per device (and per custodian), except by chance, or if vendor default, they are pre-expired and force a change upon initial use. Plain-text keys or their components/shares are never permitted over a network connection.*

Injection of plain-text secret keys or their components/shares where the device does not itself require the use of at least two passwords/authentication codes for injection results in the zeroization of pre-existing secret keys. For devices supporting multiple key hierarchies (e.g., multi-acquirer devices), only the hierarchy (specific TMK and working keys) associated with the key being loaded must be zeroized. In all cases, the authentication values (passwords, authentication codes or similar) for each user on a given device must be different for each user.

3) *For encrypted values injected into the device, either from a key loader or from a network host, or via loading through the keypad, the ability of the device to successfully decrypt the value and use it is sufficient. In this case, the loading of the key-encipherment key would have been done under dual control, e.g., in examples a) and b) above.*

4) *Remote key-loading techniques using public key methods requires compliance with PCI defined criteria for key sizes and mutual authentication between host and device. For devices generating their own key values, the generation process must meet the criteria defined in the random number appendix of the DTRs and validation that appropriate key sizes are used. The protocol must meet the criteria stipulated in Annex A of the PCI PIN Security Requirements.*

POI Requirement B9

Q 1 **January 2015: It is a requirement of DTR D4 that a POI generate the EMV Unpredictable Number (UN) for any PIN based transaction using the internal RNG, as tested under requirement B9. Are non-PIN based transactions also required to generate the UN from the RNG of the POI?**

A *Yes, the RNG of the POI must be used to generate all random and unpredictable values that are used for the security of card data and PIN transactions. When the POI is used to generate the EMV UN, the RNG of the POI must be used to generate EMV UN values, regardless of the Cardholder Verification Method implemented for that transaction. Note that the EMV UN generation process may incorporate other data such as internal registers and transaction data (see for example the EMV UN Generation algorithm at http://www.emvco.com/download_agreement.aspx?id=973).*

POI Requirement B10

Q 1 **Should the average delay between encryptions be calculated for the exhaustive attack of a single PIN block, or should the time be averaged over attacks on multiple PIN blocks?**

A *The average time delay should be calculated for an attacker to determine a single PIN value.*

Q 2 June (update) 2015: In order to prevent exhaustive PIN determination, examples of preventive measures such as a unique key per transaction or the limiting of the rate of PIN encryption to thirty seconds or greater between encipherments as measured over 120 transactions are given. Are any other methods possible?

A *The list of examples is not exhaustive. Other methods are possible. For example, the exclusive use of ISO PIN block formats 1, 3 and/or 4 whereby each PIN is enciphered using a unique except by chance random pad of characters with permissible values of 0000 to 1111 depending on the format may be used to prevent exhaustive PIN determination.*

Q 3 One example given to prevent exhaustive PIN determination is to limit the rate of PIN encryption to thirty seconds or greater between encipherments as measured over 120 transactions. Can this average of 30 seconds between encipherments be determined over a longer time frame than one hour?

A *The intent of the requirement statement is that for any 120 consecutive transactions, the average time between encryptions for a specific PIN entry averages out to approximately 30 seconds.*

POI Requirement B11

Q 1 Is it acceptable for a device to have the ability to use Master Keys as both key-encryption keys for session key and as fixed keys—i.e., the Master Key could be used to encrypt PIN blocks and to decrypt session keys?

A *No. A key must be used for one purpose only as mandated in ANSI X9.24 and ISO 11568.*

Q 2 September (update) 2015: What PIN block formats are allowed?

A *ISO 9564–1 PIN block formats 0, 1, 3 or 4 are acceptable for online transactions. Format 2 must be used for PINs that are submitted from the IC reader to the IC for offline transactions. This applies whether the PIN is submitted in plaintext or enciphered using an encipherment key of the IC.*

PINs enciphered only for transmission between the PIN entry device and the IC reader shall use one of the PIN block formats specified in ISO 9564-1. Where Format 2 PIN blocks are used then a unique key per transaction method in accordance with ISO 11568 shall be used.

Q 3 Is it acceptable to use the same authentication technique for loading both cryptographic keys and firmware?

A *The technique may be the same, but the secrets used for authentication must be different. Example: If RSA signatures are used, the RSA private key used to sign cryptographic keys for loading must be different from the private key used to sign firmware.*

Q 4 Is it acceptable to use TDES ECB mode encryption for session keys when using the Master Key/session key technique?

A *Yes. TDES ECB mode can be used to encrypt session keys.*

Q 5 PCI PIN Security Requirement 20 states that all secret and private cryptographic keys ever-present and used for any function (e.g., key-encipherment or PIN-encipherment) by a transaction-originating terminal (device) that processes PINs must be unique (except by chance) to that device. How does this requirement apply to device testing?

A *Devices must implement unique secret and private keys for any function directly or indirectly related to PIN protection. The basic rule is that any private or secret key resident in the device that is directly or indirectly used for PIN protection whose compromise would lead to the compromise of the same key in another device must be unique per device. For example, this means not only the PIN-encryption key(s), but keys that are used to protect other keys, firmware-update and authentication keys and display prompt control keys. As stated in the requirement, this does not apply to public keys resident in the device.*

Q 6 Is it acceptable to load double-length 128-bit TDES key components into a device in smaller bit-values (e.g., two 64-bit parts held by key custodian 1 and two 64-bit parts held by key custodian 2)?

A *Yes, provided the 128-bit cryptographic TDES keys (and key components) are generated and managed as full double-length 128 bit TDES keys during their entire life cycle in accordance with ANSI X9.24 and ISO 11568.*

For example, it would be acceptable to generate a full-length 128-bit TDES key component, but load it into the device as two 64-bit component halves.

It would not be acceptable to generate 64 bit keys or key components separately, and then concatenate them for use as a double length key after generation.

If key-check values are used to ensure key integrity, they must be calculated over the entire 128-bit key component or the resultant 128-bit key, but never on a portion of the key or key component. In addition, the resultant key inside the device must be recombined in accordance with PCI requirements and ANSI/ISO standards. Similarly for triple-length keys, the entire 192 bit key component or the resultant 192-bit key must be used to calculate the key-check values.

Q 7 Under what conditions is it acceptable for a device to allow single component plain-text cryptographic keys to be loaded via the keypad?

A *None. A device must not accept entry of single component plain-text cryptographic keys via the keypad. Full-length key components and encrypted keys may be loaded via the keypad if the requirements for sensitive functions are met* ***(PCI B7, B8)****.*

Q 8 ISO 11568-2 *Symmetric ciphers, their key management and life cycle* and ANSI X9.24-1 *Retail Financial Services Symmetric Key Management Part 1: Using Symmetric Techniques* stipulate that any key that exists in a transaction-originating device shall not exist in any other such device. Does that apply to all secret and private keys contained in a device?

A *The intent of the requirement is that the compromise of a key in one transaction-originating device (e.g., an EPP or POS device) does not impact the security of another similar device. In that regard, any private or secret key present or otherwise used in a transaction originating device must be unique to that device except by chance. This includes keys used for PIN encipherment, firmware validation, display prompt control or the protection of any of those same keys during loading to the device or storage within the device. Note that each of these functions requires its own unique key.*

This requirement applies to both vendor and acquirer-originated or controlled keys. This does not include public keys present or used by the device.

Q 9 **ISO 11568-2 *Symmetric ciphers, their key management and life cycle* and ANSI X9.24-1 *Retail Financial Services Symmetric Key Management Part 1: Using Symmetric Techniques* stipulate that a key-encipherment key shall be at least of equal or greater strength than the key that it is protecting. What keys does this apply to in a device?**

A *This applies to any key-encipherment keys used for the protection of secret or private keys stored in the device or for keys used to encrypt any secret or private keys for loading or transport to the device. For purpose of this requirement, the following algorithms and keys sizes by row are considered equivalent.*

Algorithm	DES	RSA	Elliptic Curve	DSA
Minimum key size in number of bits	168	2048	224	2048/224

DES refers to non-parity bits. The RSA key size refers to the size of the modulus. The Elliptic Curve key size refers to the minimum order of the base point on the elliptic curve; this order should be slightly smaller than the field size. DSA for digital signatures, and Diffie-Hellman and MQV key agreement key sizes refer to the size of the modulus (p) and the minimum size of a large subgroup (q).

AES keys, of 128 bits or larger are considered stronger than any of the aforementioned.

This does not apply to keys that are used for authentication purposes, such as keys used to validate firmware or display prompts. The sizes of those keys must at minimum be as stipulated in B4 and B16. DES keys with an effective length of 112 bits may also be used, as long as they are not used to protect stronger keys, such as those stated above.

Q 10 **Devices may support the remote loading of secret acquirer keys using asymmetric techniques. Any such remote key-loading protocol must provide for a mechanism to minimize the probability of man-in-the-middle attacks where a device may be spoofed into communicating with a non-legitimate host. One common mechanism is to "bind" the host to the device such that the device will not accept communications that are not digitally signed by the legitimate host and authenticated by the device. Different scenarios exist where it may become necessary to change hosts and/or host asymmetric key pairs. When unbinding a host's key pairs from a device, which may be done manually at the device, or remotely using a digitally signed and authenticated command, are there any special provisions that must be made?**

A *Upon receipt of a valid instruction to unbind a host key pair from a device, the device must zeroize any existing acquiring entity's secret keys. Most scenarios involving a need to unbind a host are due to a change in the acquiring entity. In all cases though, the device must be initialized with new secret keys for the acquiring entity before placing the device back into service.*

Q 11 May (update) 2018: Remote key distribution using asymmetric techniques methodologies must provide for protection against man-in-the-middle attacks and the hijacking of PIN-acceptance devices where the devices are under a PKI hierarchy that facilitates more than one acquirer (e.g., a hierarchy under a PIN-acceptance device vendor's Root). In order to achieve this, many vendors have implemented techniques that force the PIN-acceptance device to "bind" to a specific transaction-processing host's certificate, and not accept commands digitally signed by any other hosts. However, in the case of portfolio transfers or other situations where a device must be decommissioned (unbound), from a specific host, what techniques are acceptable for compliance?

A *Decommissions, such as sending a new host's certificate to replace the existing host's certificate without authentication are not acceptable. Any remote decommissioning must require cryptographic techniques and be specific per PIN-acceptance device. For example:*

- *The existing bound host can digitally sign an "unbind" command to the PIN-acceptance device, that when validated returns the PIN-acceptance device to its original unbound state.*
- *In situations where the bound host's private key is not available to sign the command, or other similar scenarios, a forced decommission may occur. However, any such decommission done remotely requires a cryptographic (digital signature, MAC, etc.) technique, and must be unique per PIN-acceptance device.*
- *Decommissions may also be done manually directly at the device, using system administration menus that authenticate users via PINs, passphrases, etc.*

Other acceptable techniques include those stated in ANSI TR-34.

In all cases of decommissioning, the existing acquirer-related keys must be zeroized as a result of the decommission.

In the event of a permanent device decommissioning, the device may be tampered which must result in the zeroizing of all private and secret keys.

Q 12 May 2011: What are acceptable methods for remote key distribution using asymmetric techniques methodologies to protect against man-in-the-middle attacks and the hijacking of PIN-acceptance devices?

A *There are several techniques available, four of which are:*

- *For devices under a PKI hierarchy that facilitates more than one acquirer (e.g., a hierarchy under a PIN-acceptance device vendor's root), an acceptable technique is to force the PIN-acceptance device to bind to a specific transaction-processing host's certificate, and not accept commands digitally signed by any other hosts. This is frequently done at initialization of a new PIN-acceptance device, and subject to unbinding techniques as noted in another FAQ.*
- *The acquirer KDH public key can be loaded only once and requires a factory return (preceded by a zeroization of acquirer keys function) to put the device back to ready state.*
- *An acquirer specific PKI hierarchy can be implemented. For this scenario, because of the rigor of criteria for operating a Certification Authority, it is best to have the PIN-acceptance device vendor operate the hierarchy, or else use a company that provides professional Certification Authority services.*
- *Certificate Revocation Lists can be distributed to the device to identify compromised key distribution hosts. This requires that device vendors maintain and distribute the CRLs for KDH keys that are part of their remote key distribution PKI. It further requires that the CRLs have a lifetime not to exceed one week to minimize the exposure window. Furthermore, it requires that the device cease processing if it does not possess a valid unexpired CRL.*

Q 13 Version 2 and higher stipulates that the device must provide support for TR-31 or an equivalent methodology for maintaining the TDES key bundle. Under what circumstances does this apply?

A *If the device supports the exchange of TDEA keys between itself and another device (e.g., a remote host) encrypted under a shared symmetric key, the device must provide support for TR-31 or an equivalent methodology for this key conveyance. This does not imply that the device must support TR-31 or an equivalent methodology between the device and an external ICC reader, but it optionally may do so. The device may also optionally support TR-31 or an equivalent methodology for the storage of keys encrypted under a symmetric key. Any equivalent method must include the cryptographic binding of the key-usage information to the key value using accepted methods. Any binding or unbinding of key-usage information from the key must take place within the secure cryptographic boundary of the device.*

Q 14 TR-31 defines three keys. A key block protection key (KBPK), a key block encryption key (KBEK) and a key block MAC key (KBMK). The KBPK is used to calculate the KBEK and the KBMK. Can the KBPK be used for any other purpose?

A *No, in order to meet the requirement that a key is used only for a single purpose as defined in ANSI X9.24, the key block protection key is only used to calculate the KBEK and the KBMK, and is not used for any other purpose. Only the KBPK is used to generate the KBEK and the KBMK key; no other key is used for this purpose.*

Q 15 A device may support key-check values to validate the successful entry of symmetric key components and/or keys. Are there any restrictions on the use of key-check values?

A *Yes. Any returned values shall not exceed six hexadecimal characters and should be at least four hexadecimal characters in length.*

Q 16 Requirement B11 stipulates that the device must support TR-31 or equivalent. Key blocks that support padding include a key length that allows the key to be distinguished from the pad characters. In TR-31, the key-length information and padding are encrypted along with the key itself by the KEK (termed the key block encryption key). Does this violate the requirement that a cryptographic key be only used for one purpose, e.g., key encipherment?

A *No. For all TDEA modes of operation, the three cryptographic keys (K1, K2, K3) define a TDEA key bundle. The keys are used in three operations, such that they form the logical equivalent of one key. Keys used in conjunction with a key bundle cannot be unbundled for any purpose—i.e., must never be used separately for any other purpose. A key used to encrypt the key bundle may include in the encrypted portion of the key bundle the key-length information and padding as necessary to protect the integrity of the key bundle.*

Q 17 TR-31 or an equivalent methodology must be used whenever a symmetric key is downloaded from a remote host enciphered by a shared symmetric key. Are there other circumstances where TR-31 or an equivalent methodology applies or does not apply?

A *Devices must support TR-31 or an equivalent methodology for key loading whenever a symmetric key is loaded encrypted by another symmetric key. This applies whether symmetric keys are loaded manually (i.e., through the keypad), using a key-injection device, or from a remote host. It does not apply when clear-text symmetric keys or their components are loaded using standard dual-control techniques.*

Q 18 In support of the conversion of deployed devices to the use of TR-31, can a key previously loaded for another purpose, such as a KEK, be re-statused as a TR-31 Key Block Protection Key.

A *No, loading of a key into a slot (register) must set the slot to its given function. If the slot's function is changed—or if a new clear-text key is loaded into the slot without authentication using dual control—all other keys in the device (or at least all keys that were previously protected under the key that was previously in the slot) must be erased. This mechanism helps ensure that a device cannot be maliciously taken over.*

Q 19 May (update) 2018: TR-31 or equivalent support is required as an option for any device that allows the loading of symmetric keys that are encrypted by another symmetric key as a configuration option. To implement TR-31 or equivalent for devices that are currently implementing a non-TR-31 symmetric methodology, what characteristics must the device have to support this migration?

A *The device must enforce the following where applicable:*

- *The conversion from a less secure methodology (non-TR-31 or non-TR-31 equivalent) to a more secure (TR-31 or equivalent) methodology must be nonreversible.*
- *When entering the plain-text KBPK (or equivalent) through the keypad, it must be entered as two or more components and require the use of at least two passwords/authentication codes. The passwords/authentication codes must be entered through the keypad or else conveyed encrypted into the device.*

  These passwords/authentication codes must either be unique per device (and per custodian), except by chance, or if vendor default, they are pre-expired and force a change upon initial use. Passwords/authentication codes that are unique per device can be made optionally changeable by the acquirer, but this is not required. Passwords/authentication codes are at least seven characters.

  Entry of key components without the use of at least two separate passwords/authentication codes results in the zeroization of pre-existing acquirer secret keys—i.e., the invoking of the key loading function/command causes the zeroization prior to the actual loading of the new key. For devices supporting multiple-acquirer key hierarchies (e.g., multi-acquirer devices), only the hierarchy (e.g., specific TMK and working keys) associated with the key being loaded must be zeroized. In all cases, the authentication values (passwords, authentication codes or similar) for each user on a given device must be different for each user.
- *Loading of a plaintext KBPK (or equivalent) using a key loader must be done using dual control and require the use of two or more passwords/authentication codes before injection of the key. These passwords/authentication codes are entered directly through the keypad of the applicable device or are conveyed encrypted into the device and must be at least seven characters in length. These passwords/authentication codes must either be unique per device (and per custodian), except by chance, or if vendor default, they are pre-expired and force a change upon initial use. Plain-text keys or their components are never permitted over a network connection.*

  Injection of plain-text secret keys or their components where the receiving device does not itself require the use of at least two passwords/authentication codes for injection results in the zeroization of pre-existing acquirer secret keys. For devices supporting multiple-acquirer key hierarchies (e.g., multi-acquirer devices), only the hierarchy (e.g., specific TMK and working keys) associated with the key being loaded must be zeroized. In all cases, the authentication values (passwords, authentication codes or similar) for each user on a given device must be different for each user.
- *It is not permitted to load the KBPK to the device encrypted by a non-TR-31 or non-TR-31 equivalent symmetric key. However, the KBPK may be loaded using asymmetric techniques.*

Q 20 The Guidance for DTR B11 states, "A device may include more than one compliant key-exchange and storage scheme. This does not imply that the device must enforce TR-31 or an equivalent scheme, but it must be capable of implementing such a scheme as a configuration option." If the use of TR-31 as the key-exchange mechanism is optional, must there be an explicit device configuration change to enable/disable TR-31 as the "active" key-exchange scheme?

A *Yes an explicit configuration change is required. The change is considered a sensitive service and must meet the requirements of B7, protection of sensitive services.*

Q 21 August 2011: When a device is converted to or otherwise implements TR-31, the conversion must be one way. On a device supporting multiple independent key hierarchies, such as one designed to support multiple acquirers, does the implementation apply to all key hierarchies on the device?

A *No, a device supporting multiple independent hierarchies may implement TR-31 (or equivalent) on a hierarchy-by-hierarchy basis.*

Q 22 Are there any restrictions on how the terminal master key is loaded into the device?

A *The initial terminal master key (TMK) must be loaded to the device using either asymmetric key-loading techniques or manual techniques—e.g., the device keypad, IC cards, key-loading device, etc. Subsequent loading of the terminal master key may use asymmetric techniques, manual techniques, or the existing TMK to encrypt the replacement TMK for download. Keys are not allowed to be reloaded by any methodology in the event of a compromised device, which must be withdrawn from use.*

Q 23 Some devices allow the use of a decrypt data function that if not controlled may allow sensitive information—e.g., keys or PINs—to be output in the clear. How must a device protect against the outputting of sensitive data?

A *It must be managed using at least one of five techniques:*

- *The key-usage information of any downloaded key must be cryptographically bound to the key value using accepted methods, and the device must enforce that the key is only used for the intended use.*
- *The addition of a new key type (slot) subsequent to the initial configuration of the device causes the zeroization of all other secret keys, Devices supporting remote key-distribution techniques using asymmetric techniques shall only support the use of such techniques for the loading of TMKs. Support shall not exist to use remote key-distribution techniques for working keys (e.g., PIN, data, MAC, etc.) unless the key-usage information is cryptographically bound to each individual key.*
- *Downloaded data key types must not be accepted by the device unless enciphered by a different terminal master key than sensitive keys such as the PEK or MAC key types.*
- *The device does not provide any support for a decrypt data or similar function.*
- *The device must ensure that keys with different purposes can never have the same value; this requirement must be maintained until the device is decommissioned (or until the applicable TMK(s) changes).*

Q 24 May (update) 2018: Can secret keys or their components be used for other purposes such as passwords/authentication codes to enable the use of sensitive services?

A *No. The use of secret keys or their components for other purposes violates the requirement that keys be used for their sole intended purpose, e.g., key encipherment or PIN encipherment, etc.*

Q 25 September (update) 2016: The PCI PIN Security Requirements stipulate that any cryptographic device used in connection with the acquisition of PIN data that is removed from service must have all keys stored within the device destroyed that have been used (or potentially could be) for any cryptographic purpose. If necessary to comply with the above, the device must be physically destroyed so that it cannot be placed into service again, or allow the disclosure of any secret data or keys. Does this apply only to symmetric keys?

A *No, this applies to any secret or private key used by the device for PIN encipherment, firmware validation, display prompt control or the protection of any of those same keys during loading to the device or storage within the device, including private keys used in connection with remote key distribution using asymmetric techniques. This requirement applies to both vendor and acquirer-originated or controlled keys. This does not include public keys present or used by the device.*

The vendor must provide decommissioning instructions and associated mechanisms for rendering all such keys non-recoverable to an adversary that are verifiable by the evaluation laboratory. These techniques include, but are not limited to:

- *Specific menu commands to zeroize stored keys*
- *Inducement of a tamper event to zeroize those keys*
- *Encryption by a key of equal or greater strength that is itself zeroized, i.e., only cryptograms of the protected keys are recoverable.*

Note that PIN pads and integrated circuit card readers used in unattended devices that have anti-removal mechanisms to protect against unauthorized removal and/or unauthorized re-installation may not require zeroization of keys for repair purposes if all other tamper protection mechanisms remain active. These mechanisms must be validated as part of the device's PCI POI approval and must be appropriately implemented in accordance with applicable POI requirements, including technical FAQs.

Q 26 May 2018: POI devices may possess asymmetric key pairs for use in remote key loading to the device. A POI key pair used for remote key distribution cannot be used for other purposes. Can a device use the same key pair for both authentication and encryption?

A *Yes, currently that is allowed. For example a POI private key used for remote key distribution may be used for both decryption and for creating digital signatures. However, effective 1 September 2018, a POI device cannot use the same key pair for both encryption and authentication purposes.*

Q 27 May 2018: ANSI TR-34 describes two protocols for implementing the distribution of symmetric keys using asymmetric techniques. The two techniques are described as the Two Pass method and the One Pass method and should be used as follows:

- **The Two Pass method is appropriate for where the POI and KDH can communicate in real time. It uses random nonces for the prevention of replay attacks.**
- **The One Pass method is appropriate for environments where the POI and KDH will not be able to communicate in real-time i.e. the POI cannot initiate the sequence of cryptographic protocol messages. In these environments, the KDH will generate the cryptographic message that can be transported to the POI over untrusted channels in non-real time. It includes the use of time-stamps in lieu of random nonces to prevent replay attacks.**

The malicious keying of a POI device by a second KDH under the same PKI is possible where the POI has already exchanged credentials with a first KDH. In order to prevent this attack, binding (or an equivalent method as noted in FAQ B11 #12) is necessary for all POI devices, and is a pre-requisite for both the Two Pass and One Pass key exchange protocols.

Are POI devices required to support both methods?

A *No a device may support only one. Whether the device supports only one or both, the vendor must describe in the device's security policy that is posted to the PCI website the environments and circumstances under which it is appropriate to implement the supported method(s).*

Q 28 September 2020: PIN Security Requirement 18-3 requires the implementation of key blocks. Interoperable methods include those defined in ASC X9 TR-31 and ISO 20038. The requirement also allows for any equivalent method whereby the equivalent method includes the cryptographic binding of the key-usage information to the key value using accepted methods. How are equivalent methods determined?

A *Equivalent methods must be subject to an independent expert review and said review is publicly available for peer review:*

- *The review by the independent expert must include proof that in the equivalent method the encrypted key and its attributes in the Key Block have integrity protection such that it is computationally infeasible for the key to be used if the key or its attributes have been modified. Modification includes, but is not limited to:*
  - *Changing or replacing any bit(s) in the attributes or encrypted key*
  - *Interchanging any bits of the protected Key Block with bits from another part of the block.*
- *The independent expert must be qualified via a combination of education, training and experience in cryptology to provide objective technical evaluations that are independent of any ties to vendors and special interests. Independent expert is further defined below.*
- *The PTS laboratory will validate that any device vendors implementing this methodology have done so following all guidelines of said evaluation and peer review, including any recommendations for associated key management.*

An Independent Expert possesses the following qualifications:

- *Holds one or more professional credentials applicable to the field, e.g., doctoral-level qualifications in a relevant discipline or government certification in cryptography by an authoritative body (e.g., NSA, CES, or GCHQ) and*
- *Has ten or more years of experience in the relevant subject and*
- *Subscribes to an ethical code of conduct and would be subject to an ethics compliance process if warranted and*
  - *Has published at least two articles in peer-reviewed publications on the relevant subject or*
  - *Is recognized by his/her peers in the field (e.g., awarded the Fellow or Distinguished Fellow or similar professional recognition by an appropriate body, e.g., ACM, BCS, IEEE, IET, IACR).*

Independence requires that the entity is not subject to control, restriction, modification, or limitation from a given outside source. Specifically, independence requires that a person, firm or corporation who holds itself out for employment as a cryptologist or similar expert to more than one client company is not a regular employee of that company, does not work exclusively for one company and where paid, is paid in each case assigned for time consumed and expenses incurred.

Q 29 September 2020: Devices must support the ANSI TR-31 key-derivation methodology for TDES keys, and for AES keys must support either the TR-31 methodology or the ISO 20038 methodology. In either case, equivalent methods can be used where subject to an independent expert review and said review is publicly available as described. What characteristics enforced in TR-31 and ISO 20038 must be considered in determining equivalence?

A *"Equivalency" must be demonstrated in the context of security proofs. The equivalent method must provably accomplish the functions of key integrity, restricting key usage, preventing key reuse, and the secrecy of keys. Specifically, an equivalent key block scheme must minimally offer the following properties:*

a) *It must prevent the loading of PIN, MAC, and/or Data keys - or any keys used to manage these within the key hierarchy - from being used for another purpose. IPEK, KEKs, and derivation keys must be uniquely identified where supported.*
b) *It must prevent the determination of key length for variable length keys.*
c) *It must ensure that the key can only be used for a specific algorithm (such as TDES or AES, but not both).*
d) *It must ensure a modified key or key block can be rejected prior to use, regardless of the utility of the key after modification. Modification includes changing any bits of the key, as well as the reordering or manipulation of individual single DES keys within a TDES key block.*
e) *Where different key block formats are supported, with some providing the above protections and some not, it must be humanly readable from the key block prior to loading/use which format is implemented. E.g., by looking at the commands sent to the device.*
f) *It must support all symmetric algorithms implemented by the device(s) that are to use the key blocks.*
g) *Where asymmetric algorithms are supported, the algorithm type, padding and signature formats must be identified in the key block.*
h) *It must use NIST approved modes of operation, with separate keys used for confidentially and authenticity. Any keys used must not be related in a reversible way.*

The equivalent key block may optionally support other characteristics such as:

i. *A key version number that prevents the use of older or expired keys.*

ii. *Support for key 'direction' (uni-directional keys) so that a MAC key may be identified as 'verify only', or a data key as 'encrypt only'.*

iii. *Support for key purposes other than PIN, MAC, and Data.*

iv. *Support for both TDES and AES (where devices implementing the key blocks only support one of these algorithms – transitional only – new devices must support AES).*

v. *To implement confidentiality controls over any key metadata other than the key length.*

vi. *Support for asymmetric algorithms.*

Q 30 September 2020: POI devices are required to support key blocks using the ASC X9 TR-31 key-derivation methodology for TDES keys, and for AES keys must support either the TR-31 methodology and/or the ISO 20038 methodology. TR-31 and ISO 20038 are methods to package keys (the key blocks) for conveyance or storage, but they use symmetric mechanisms for that and for key conveyance require a symmetric key exchange key that is pre-shared for use as the key block protection key. Where a symmetric key is not previously established with a POI device for remote key distribution, and asymmetric methods will be used, is it required to support a key block methodology?

A *Yes. A method such as ASC X9 TR 34: Interoperable Method for Distribution of Symmetric Keys using Asymmetric Techniques: Part 1 – Using Factoring-Based Public Key Cryptography Unilateral Key Transport must be used. Under TR-34, similar to TR-31 and ISO 20038, the Key Block consists of three parts:*

- *The Key Block Header (KBH) which contains attribute information about the Key and the Key Block*
- *The confidential data that is being exchanged/stored*
- *The Key Block Binding Method*

However, TR-34 uses asymmetric methods for the Key Block Binding Method, instead of the symmetric methods used in TR-31 or ISO 20038 which require that a symmetric key was previously exchanged between the POI device and the KDH.

Q 31 November 2020: POI devices must support one or more of four specified techniques for the loading of private or secret keys. Methods a and b are for plaintext key loading and methods c and d are for encrypted key loading. The requirement specifies that EPPs and OEM PEDs intended for use in an unattended environment shall only support methods a, c, and d. It further specifies that SCRPs shall only support the loading of encrypted keying material. Are there any other restrictions?

A *Yes. For all new evaluations (i.e., evaluations that result in a new approval) of POI v5 devices, the POI devices must support at least one of the encrypted key loading methods for the loading of private or secret keys.*

Q 32 December 2020: Devices must support the ANSI TR-31 key-derivation methodology for TDES keys, and for AES keys must support either the TR-31 methodology or the ISO 20038 methodology. In either case, equivalent methods can be used where subject to an independent expert review and said review is publicly available for peer review. What constitutes publicly available?

A *"Publicly available" means posted in a forum or otherwise published such that it is available for peer review for the time frame for which the solution is relied upon.*

Any proprietary posting that would require peers to know in advance where to find it is not in the spirit of "publicly available"; however, if a notice is given in a cryptographic forum or publication that provides a link to the proprietary posting, that suffices.

POI Requirement B12

Q 1 **ISO 9564 stipulates that a PIN shall be not less than four and not more than twelve characters in length. What PIN lengths must an EPP or POS device support?**

A *EPPs and POS devices must be able to support from four- to twelve-digit PINs for payment card transactions.*

Q 2 **October 2016: POI devices must support at least one of the following PIN block formats if supporting online PIN entry:**

- **ISO Format 0**
- **ISO Format 1**
- **ISO Format 3**
- **ISO Format 4**

Can a device support all four online PIN block formats?

A *Yes, a device may support any combination of PIN block formats. However, the device must provide support for ISO Format 4, the extended PIN Block Format, which uses 128 bit ciphers, e.g., AES. As stated in the PCI PIN Security Requirements RSA keys encrypting keys greater in strength than double-length TDEA keys shall use a modulus of at least 2048 bits.*

POI Requirement B13

Q 1 **Is it acceptable for a PIN-encryption key to be used as a key-encrypting key, or for a key-encrypting key to be used as a PIN-encrypting key?**

A *No. A key must be used for one purpose only as mandated by ANSI X9.24 and ISO 11568-3.*

Q 2 **Can a device use a key-encrypting key to encrypt or decrypt key-tag information along with a key?**

A *Yes, associated key-tag information such as the algorithm, key expiration, usage, or key MAC may be encrypted or decrypted along with the key using a key-encrypting key. The key and its tag are bound together using a chaining mode of encipherment as defined in IS0 10116.*

Q 3 **The device must enforce that data keys, key-encipherment keys and PIN-encryption keys have different values. Does this apply to replacement keys downloaded throughout the processing life of the device?**

A *The intent of the requirement is to help ensure that these keys are not intentionally used for multiple purposes. Thus the uniqueness check applies for both when the device is initially loaded with these keys and for those that are subsequently loaded. The check must occur across all secret-key hierarchies supported by the device. No two secret keys, regardless of purpose, can have the same value.*

Q 4 **May 2011: B13 requires that keys are not intentionally used for multiple purposes. This uniqueness check applies for both when the device is initially loaded with these keys and for those that are subsequently loaded and must occur across all secret-key hierarchies supported by the device. No two secret keys, regardless of purpose, can have the same value. Do parity bits factor into the check?**

A *Yes, keys that are identical except for parity bits must be rejected because they have the same effective value.*

POI Requirement B16

Q 1 What is the definition of "cryptographic unit"?

A *The cryptographic unit is the microprocessor that encrypts the PIN block. This processor is subject* to *PCI device requirements*, *and is therefore considered secure when within a compliant device. This means that a general-purpose micro-controller can be used as long as it is within a device that complies with PCI device requirements.*

Q 2 Is it acceptable to use an LED controlled exclusively by the crypto-processor as the prompt for PIN entry?

A *No. Cardholders expect the prompt for PIN to come from the same display as other prompts. If it does not, there is a greater possibility of cardholders being misdirected.*

Q 3 Would the display of plain-text PIN digits by the device qualify as tamper evidence?

A *No. The cardholder may not be familiar with the typical behavior of a given device and may not recognize that the device is violating Requirement B5.*

Q 4 If a terminal includes a display under its control and a keypad with its own display, must the cryptographic unit of the device control both displays?

A *Yes. If a single device has two displays that could prompt the cardholder for data, then both displays would be governed under B16. This means the terminal and keypad are a single device that must meet PCI requirements.*

Q 5 What constitutes appropriate algorithms and key sizes?

A *Appropriate algorithms and key sizes will change slowly over time, as the computing capability for brute force attacks will increase. At the moment, examples of appropriate algorithms and key sizes are:*

Algorithm	DES	RSA	Elliptic Curve	DSA
Minimum key size in number of bits	112	2048	224	2048/224

DES refers to non-parity bits. The RSA key size refers to the size of the modulus. The Elliptic Curve key size refers to the minimum order of the base point on the elliptic curve; this order should be slightly smaller than the field size. The DSA key sizes refer to the size of the modulus and the minimum size of a large subgroup.

AES may also be used with a key size of at least 128 bits.

Principles of dual control/split knowledge apply as defined in ISO 11568.

Q 6 What log file characteristics and content are necessary to meet Requirement B16?

A *A device must automatically record events that are relevant to B16 to a file that is automatically saved. Because each device vendor solution will be unique, the data set that is appropriate to be included in a log file can vary. At a minimum, it is expected that actions that involve cryptographic operations, the user(s) and the time and date of the action will be recorded in the log file. The logs may exist either internally or externally to the device, and a mechanism must be implemented which prohibits the overwriting of log events without proper authentication.*

Q 7 Cryptographic keys used for updating display prompts must be managed under the principles of dual control and split knowledge, and any secret or private keys used must not appear in the clear outside of a secure cryptographic device. Can the authentication data used to enable use of a signing or MACing key travel through an unprotected environment—e.g., the unprotected RAM of a computer?

A *The authentication data may exist in the clear outside of a secure cryptographic device. However, the vendor must provide to the lab customer instructions for using a secure room, dedicated PC, implementation of dual control techniques, equipment inspection procedures, etc.*

Q 8 What logging requirements must be met by a SCD under B16?

A *The logs must provide sufficient evidentiary matter to demonstrate to the lab that the control techniques and mechanisms specified by the vendor exist.*

Q 9 May (update) 2018: Can USB authentication tokens or smart cards be considered to be the SCD required to enforce dual control under B16?

A *The use of dual tokens alone would not meet the requirement. The tokens would need to enforce the use of passwords/authentication codes, and they would need to include security to protect their contents.*

Q 10 May 2011: If a device complies with B16, what are the requirements for controlling the updates of these prompts?

A *B16 is assessed when a device uses firmware updates to control the changing of display prompts. Therefore, updating of prompts for devices that comply with B16 requires the creation of a new firmware version, and a resultant change in the firmware version number of the PED.*

It is not acceptable to have vendor-controlled prompts that are updated separately of the firmware, without the generation of a new firmware version. It is acceptable for prompt updates to use a separate cryptographic key to that used for other firmware updates—but any separate update method must be assessed by the laboratory as being compliant to Requirements B3 and B4. At all times, the cryptographic keys used to update prompts and firmware must be different than those used to update non-firmware code, such as applications.

Q 11 May 2011: If a device complies with B16, does this mean I need to re-submit the device for lab evaluation every time I change the prompts?

A *If there are suitable wildcards in the firmware version listing to accommodate new prompt versions that have been previously reviewed and confirmed as appropriate by a PCI laboratory, the review of each change by a PCI laboratory is not necessary.*

Q 12 May 2011: Requirement B16 does not specify any minimum attack potential. What requirements are placed on the physical security of a device that allows for display prompts to be updated by third parties using cryptographically based controls?

A *All prompts that may be used to request plaintext data entry from the cardholder must be secured against an attack potential of at least 18 PCI points with a minimum of 9 for exploitation. This includes prompts that may be updated by third parties using cryptographically based controls.*

Q 13 March 2015: PIN pads designed for use with ATMs typically support both a secure (encrypts the data entered) and non-secure state. Does the transition between states require authentication?

A *Yes, cryptographic mechanisms consistent with Appendix D of the POI Derived Test Requirements must be used for the authentication. Specifically:*

- *A secure channel is required between the PIN pad interface and the (ATM) controller to manage changes between PIN and plaintext data entry modes*
- *For touchscreens, the management of the keypad 'buttons' is done in a secure way to prevent the determination of the customer PIN through exploitation of potential differences in the displayed keypad and the organization of the numeric buttons on the touch interface.*

This is not to infer that the device must force the implementation, but that it must provide support for such an implementation.

Note this FAQ is effective 1 July 2015

POI Requirement B18

Q 1 August 2011: The operating system of the device must contain only necessary components and must be configured securely and run with least privilege. What is considered an "operating system" for PCI purposes?

A *In the scope of PCI-PTS, any underlying software providing services for code running in the device is considered part of the operating system. Examples of such services include: system initialization and boot, hardware abstraction layers, memory management, multitasking, synchronization primitives, file systems, device drivers and networking stacks. Services that provide security or may impact security are, in addition, considered firmware.*
Operating systems may range from hardware abstraction layer libraries and embedded micro-kernels, to complex multi-user operating systems.

POI Requirement B20

Q 1 July 2014: Does the security policy need to state the exact approval class and use case of the device?

A *Yes, the security policy must state the exact approval class and use case of the device. For example, a device approved under the Non-PED approval class must outline that the use of the device to accept customer PIN data will invalidate the device's PCI approval.*

Q 2 June 2015: Is there any impact on the device's approval if the laboratory evaluated security policy is changed by the vendor?

A *Beginning with V4, the content of the security policy is part of the evaluation of a device by the laboratory and is an integral input upon which the approval of a device is based. Deployers rely on the security policy in order to ensure that they do not breach the conditions of a device's approval. Any change to the security policy which impacts on the security requirements of the device must be evaluated in order for the device to remain approved. Additionally, any change to the functionality offered by the device impacting information required to be contained in the security policy must be reflected in an update to the listed security policy document.*

Depending on the nature of the changes, this may be reflected in updates (e.g., appendices) to an existing security policy, or as additional security policies posted to the website. In all cases, all approved product versions must be addressed in security policies posted to the PCI website.

Q 3 October (update) 2018: The PCI PTS Lab Requirements prohibit a PTS lab from creating any vendor-documentation. Are there any scenarios where a PTS lab may assist a vendor in creating documentation?

A *In some cases, a PTS lab may revise a Security Policy for grammar, formatting, or spelling edits for a device under evaluation. This may be done to assist the vendor in creating a document sufficient to be submitted to PCI. In this case, the PTS lab will provide the following as part of the evaluation report submission:*

- *A track-changed/redlined version of the edited Security Policy, showing the original text created by the vendor as well as the updated text.*
- *A clean copy of the edited Security Policy for posting.*

POI Requirement C1

Q 1 What are acceptable methods of meeting this requirement?

A *The use of accepted key-management techniques will typically satisfy this requirement:*

- *When* Master/session key-management technique is used this requirement is met because successful key substitution requires the attacker to know the Master Key contained within the device*.*
- *This requirement is satisfied when using DUKPT key-management technique because the PIN keys are derived from secret information contained within the device.*

However, when the device is intended to support multiple acquirers and the acquirer is selected by a user (i.e., merchant pressing a button), the device must verify that the correct acquirer has been chosen.

Q 2 Is it acceptable for a device that supports multiple key hierarchies to meet C1 by ensuring that specific applications can only access keys that are associated with them?

A *Yes. It is acceptable provided each application can only access a single key hierarchy's keys.*

Q 3 What are acceptable means of external cryptographic keys selection?

A *Keys may be selected through the device keypad, or commands sent from another device such as an electronic cash register. Any commands sent from another device must be cryptographically authenticated to protect against man-in-the-middle and replay attacks.*

Q 4 If a key externally selected is not the encryption key used to directly encrypt the PIN block, is this selection required to be authenticated?

A *If the external selection is associated with the PIN encryption, the authentication would apply. For example, externally selecting the Master Key under which a session key will be decrypted for use in PIN block encryption would need to be authenticated.*

Q 5 Is it acceptable for PIN keys to be externally selected indirectly by selecting the acquirer if the acquirer selection is performed with a cryptographically authenticated command? It is assumed that there are multiple key hierarchies related to PIN encryption under each acquirer?

A *Yes, as long as there is a mechanism that ensures that keys under each acquirer are associated exclusively with that acquirer.*

Q 6 May (update) 2018: External key selection includes selection performed by either a local or remote host. Under what circumstances is a device supporting multiple key hierarchies not required to enforce authentication for each external key selection command?

A *If an application can select keys from multiple key hierarchies, the device must enforce authentication of commands used for external key selection. If the device only allows an application to select keys from a single hierarchy, then command authentication is not required.*

Alternatively, authentication is not required under either of the following two circumstances:

- *Key hierarchies for PIN encryption are only established directly by the vendor at their secure facility or at an authorized facility operated by a third party that regularly performs key-loading on behalf of the vendor and is registered to do so under applicable payment brand rules; and subsequent to leaving the facility it is physically and/or logically impossible to load additional key hierarchies without returning to the facility.*
- *Key hierarchies can only be established in accordance with Requirement B7. New key hierarchies must be authenticated using dual control (passwords/authentication codes) either via the key loader or directly via the EPP or POS PED. Existing key hierarchies may be replaced without using authentication if the loading results in the zeroization of pre-existing secret keys, i.e., the invoking of the key-loading function/command causes the zeroization prior to the actual loading of the new key. In addition, existing key hierarchies may be replaced or new key hierarchies may be established through the use of remote key distribution using asymmetric techniques that are in compliance with the PCI PIN Security Requirements, Annex A.*

Q 7 When is C1 not applicable to acquirer-controlled display prompt devices?

A *C1 is not applicable to acquirer-controlled display prompt B devices that do not include commands for external key selection, or cannot hold multiple keys related to PIN encryption.*

POI Requirement D1

Q 1 The PCI v1.3 requirements specified that precautions against unauthorized removal were required for unattended devices (PCI POS PED v1.3 DTR 1.4). Are such precautions required for compliance to DTR D1 of the v4.0 requirements?

A *Yes, an unattended device that supports offline PIN entry using a separate ICC reader must provide protections against the unauthorized removal of that reader. Circumvention of these protections must require an attack potential of at least 20 points.*

Q 2 What is meant by "sufficient space to hold a PIN-disclosing 'bug'"?

A Space accessible via the ICC card slot large enough to conceal a PIN-disclosing bug is not allowed. Such a bug could utilize ICC technology. Therefore, there must not be space accessible via the card slot large *enough to conceal an ICC chip and small battery.*

Q 3 What volume of space is allowed under D1?

A *The objective of D1 is to guard against a PIN-disclosing bug being inserted into the device through the card slot. The volume of space accessible via the card slot that could be utilized by an attacker can vary with the geometry of the space and attack methods. For this reason, the requirement does not prohibit a specific volume. Rather, the feasibility of effective bug placement is to be considered when assessing D2 compliance. Examples of these considerations are:*

- *Contact points must be present for the bug to connect to.*
- *The bug and wires must not obstruct normal operation.*
- *The placement of the bug must not cause tamper evidence that would be noticed by a typical cardholder.*

Q 4 March 2011: D1 stipulates that it must not be possible for both an ICC card and any other foreign object, such as a PIN-disclosing bug to reside within the IC card insertion slot. Part of the determination relies upon it must not be possible to simultaneously insert two payment cards into the slot and still perform a transaction. Are there any further restrictions on this test?

A *Yes. As unembossed cards become more common, the device must not allow the successful execution of a transaction while two juxtaposed un-personalized (un-embossed) cards are simultaneously inserted, each card with the minimum ISO 7810 thickness. And the IC card insertion slot height must be as small as possible along its full width.*

Q 5 May 2018: The new SCRP approval class increases the level of protection required for the ICC I/O interface to 26 points. Why is this required when other approval classes continue to allow for a device meeting a level of 20 points of protection to be considered compliant?

A *The intent behind the SCRP approval class is to ensure that the customer card data is protected and strongly encrypted before it is sent through the passed into the COTS environment device onto the backend systems for payment processing. This is an important part of the overall security of the Software Based PIN entry on COTS (SPoC) PIN on COTS system solution, and helps to prevent correlation attacks and reduce the threat of the compromise of the PIN on the COTS device. Because protection of the ICC I/O signal requires protection from the physical interface to the customer card, through to the security processor that performs the encryption of this data – requiring an increase in the attack point minimums for this therefore has the effect of increasing the overall protections required in the SCRP as a whole, which in turn then has a carry-on effect to reducing the risk of PIN theft on the COTS device.*

Other approval classes where ICC cards are accepted may not process PINs at all, or are required to conform to other attack costing calculations and minimums within the PCI PTS requirements, and therefore do not rely so strongly on the separation of customer card data and PIN data. This is why the attack points can remain at 20 points for those other use cases.

POI Requirement D2

Q 1 Is D2 intended to address the opening of the ICC reader, or the entire reader?

A *D2 is written with the understanding that the opening (slot) is a potential point of attack for the insertion of a tapping mechanism.*

Q 2 July 2014: The ICC reader's slot is required to be in full view of the cardholder so that any untoward obstructions or suspicious objects at the opening are detectable. The construction of the device must be such that the entire slot opening is in full view of the cardholder prior to card insertion. In certain Unattended Payment Terminal designs the ICCR slot cannot be positioned straight (horizontal) to the cardholder, when could this be acceptable?

A *The intent of requirement D2 is to make successful installation of PIN disclosing bugs via the card slot infeasible. To meet this requirement the cardholder must have at least the ability to inspect the card slot entry zone to enable detection of a suspicious object at the card slot entry. And where the slot is neither positioned straight towards the cardholder nor is upward facing (i.e., it is downward facing), a design has to meet the following criteria:*

- *The ICCR slot entry area must be designed such that a cardholder has a full unlimited view of the housing surrounding the card slot opening. The card entry area should be extended to make it easier to observe the card slot area*
- *The part of the cover below the slot must be in a light color, for example white or silver, to improve visibility of the area and to make identification of any wires easier*
- *The ICCR contacts must be strongly protected to prevent attachment of bug wires*
- *There must not be any seams around the slot that can be used to hide wires*
- *The ICCR slot internal sizes must not be sufficient to simultaneously insert two un-embossed cards and execute a transaction in order to minimize the likelihood of sufficient space for a bug.*
- *The maximum angle of the ICCR slot with the horizon should be no more than a maximum of 70 degrees.*
- *The installation guidance and security policy must stipulate the allowed installation height ensuring a sufficient view on the card slot entry area and the lab must validate that when the device is set at the minimum height the area around the slot is visible.*

POI Requirement D3

Q 1 Some device designs include components (e.g., privacy shield) that are near the IC card slot, which could be used to conceal a wire. What criteria are used to determine compliance when such components are present?

A *The design is considered compliant with D3 if a portion of the wire is visible between the slot and the concealing component.*

POI Requirement D4

Q 1 **ISO 9564 stipulates that if the PIN is to be submitted to the IC card in enciphered form, then the device shall encipher the PIN using the authenticated encipherment key of the IC card and submit the enciphered PIN to the IC card. Are there any restrictions on where the authentication must occur?**

A *The device must protect the integrity of all public keys (ICC, applicable issuer, and payment brand) using techniques defined in ISO 11568. In all cases the authentication must occur in a secure component of the device, such as the PIN pad or ICCR. This includes the authentication of the ICC public key(s) as well as the associated issuer public key in the certificate chain up to the applicable payment brand key.*

Q 2 **When is "No" or "N/A" an acceptable response to D4.1, D.4.2, D4.3, and D4.4?**

A *"No" or "N/A" is only an acceptable response when the device does not support the specified method of PIN submission to the IC Card.*

Q 3 **How many options should be marked "Yes" if a device supports more than one of the PIN submission options?**

A *All applicable options must be checked "Yes." The evaluation laboratory will verify that all responses are appropriate.*

POI Requirement E4.1

Q 1 **February 2012: Are there any scenarios where an OEM device intended for use in an unattended environment does not require protections against unauthorized removal?**

A *Yes. Self-contained OEM products that are "bolt-on" or drop-in type modules, i.e. fully functional PED modules integrating all required components, do not require removal protections if the module provides a complete tamper envelope around all security sensitive parts, and any attacks considered during the evaluation must not assign any points to access of the device, or the 'fixing' of any tamper evidence with replacement parts or stickers (unless the attack must go through the front). In the absence of removal detection it should be assumed that no restrictions on access to attack the device exist other that what the device itself provides via the tamper envelope and that any tamper evidence other than the exposed front of the device will be hidden by the casing into which the device is fitted. These provisions may not be used for devices intended for use in attended environments.*

POI Requirement G1

Q 1 **May 2018: Effective 1 May, 2018, POI vendors must complete and submit to PCI an Attestation of Validation (AOV) that includes providing evidentiary materials that an auditable record of an ongoing vulnerability assessment process exists. This is demonstrated by providing a copy of the vendor's sign-off form specified in Requirement G1 regarding all physical interfaces and the corresponding logical protocols that are supported by the device as stated in Requirement F1. This applies to all unexpired approvals that exist for the vendor as of 31 December of the prior year. Does this vulnerability assessment process apply to non-public domain protocols and interfaces?**

A *Yes the intent of the vulnerability assessment process is to be comprehensive. Effective with the May 2019 reporting for the 2018 calendar year, the vulnerability process reported on in the AOV must include all physical interfaces and their corresponding logical protocols. To facilitate this, evaluations beginning subsequent to 30 June 2018 shall treat Section G of the Security Requirements as part of the Core Evaluation Module and ensure it covers all physical interfaces and their corresponding logical protocols.*

POI Requirement I3

Q 1 **May (update) 2017: This FAQ has been superseded.**

POI Requirement K1

Q 1 **March 2011: K1 allows the disclosure of clear-text account data by the secure controller to authenticated applications. What constitutes an authenticated application for purposes of SRED?**

A *There are several conditions that an authenticated application must meet:*

- *The application must reside and execute within the physically and logically secure boundary of the target of evaluation.*
- *The application must be cryptographically authenticated by the secure chip of the POI using algorithms and keys sizes consistent with those stipulated in K4.*

Q 2 **November 2012: Where a whitelist is used to control whether PAN data exits the device in plaintext or ciphertext, does the whitelist updating have to be under the direct control of the vendor?**

A *No, the vendor may provide the mechanisms to the acquirer to directly control the updating of the whitelists in a manner consistent with acquirer controlled display prompts. That is the use of dual control techniques and provisions for auditability and logging.*

The vendor may alternately provide user documentation detailing the management of cryptographic keys following these principles and implementing the use of a secure cryptographic device for management of these keys. The process exists upstream of the device, but the device must still provide enforcement—e.g., validate the MAC or digital signature.

Q 3 December 2017: Account data is defined to include the full PAN and, if present, any elements of sensitive authentication data. Other data that is sent in conjunction with the PAN are also considered account data such as, but not limited to, cardholder name, expiration date, and service code. What is the minimum that must be encrypted under SRED?

A *The following must be encrypted, if present:*

- *Full Track or Equivalent (when aggregated as a single data element), including both Track 1 and Track 2.*
- *Manually Entered Security Validation Value e(.g. CVV2, CVC2, and CID2),*
- *Issuer Discretionary Data (as a single, unparsed field)*
- *Issuer Discretionary Data – Sensitive Data (as a parsed field). Any or all portions of the discretionary data are considered to be sensitive unless known to be non-sensitive*
- *The PAN itself. If the PAN can be parsed, then the Sensitive PAN Middle digits (after the first six left-most digits of the PAN- the Issuer Identification Number and before Trailing Digits (max of four)) must be encrypted.*

In addition, the following must be encrypted if it is feasible to associate with the corresponding cleartext PAN

- *Cardholder Name*
- *Expiration Date*
- *Service Code*

In all cases cardholder name, expiration date and service code must be encrypted for SCRs intended for use with COTS devices and for SCRPs.

Q 4 May 2019: In an SRED device, can cleartext account data be present in the device or component or must it be encrypted at the point of capture?

A *Cleartext account data cannot leave the secure boundary of the device except as part of a white list function. This applies whether or not it is encrypted at the point of capture (e.g., read head).*

POI Requirement K1.1

Q 1 June 2012: The guidance states that the path for contactless data must be secured to 16 points from the point of digitization of the data. Does the point of digitization include the point of entry—e.g., the antennae?

A *The point of digitization occurs when the data is processed by the NFC controller and not at the point of entry. The NFC controller acts as a modem converting the analog signal to a digital signal just as a magnetic stripe reader or smart card reader reads data and converts that to a digital signal. In all cases, the point of digitization is where the wireless signal is converted to a digital data stream.*

Q 2 July (update) 2014: K1.1 stipulates that all methods of card-data entry supported by the device must be assessed. Can a device supporting one or more card reader types (Contactless, ICCR, MSR) receive SRED validation if one or more of the card readers cannot meet K1.1?

A *No, a device validated to SRED cannot have any card reader types as part of the approved hardware and firmware version identifiers where that reader could not meet K1.1, nor can the firmware support the receiving of card data from an external component that does not meet K1.1.*

Q 3 September 2012: Many devices offer contactless readers as an optional module, in addition to an ICCR and/or a MSR. Does the contactless module have to meet K1.1 in order to be included as part of the approval?

A *Devices undergoing SRED validation must have all readers supported by the approved firmware compliant to K1.1. If the contactless reader cannot meet K1.1 it cannot be part of the approved hardware version that includes SRED.*

Devices that do not support SRED and thus are not validated to SRED may include contactless readers as a function provided in the approval. However, the contactless readers cannot be used as part of a P2PE solution.

Q 4 September 2013: Can a device be validated to SRED if it receives account data that is entered on a non-integrated module or device—for example, where a device receives account data that is key-entered on another device?

A *The external module or device where the account data is captured can receive SRED approval if evaluated in conjunction with the POI device. The SRED approval would be contingent on both devices meeting all applicable SRED requirements, including the protection of cryptographic keys. Account data (as defined in the glossary of the* PCI POI Security Requirements*) traversing the communication path from the external point of capture must be encrypted in accordance with these requirements. Both devices would be part of the approval listing, and the substitution of the external device with another that is not validated to SRED invalidates the approval of SRED as a function provided.*

If the external device cannot meet SRED requirements, the primary device—even though it otherwise protects account data in accordance with SRED—cannot receive the SRED designation where it is capable of receiving account data from such a device, regardless of whether that data is received encrypted. In this situation, in order for the primary device to receive SRED approval, the firmware of the primary device must not support the receipt of the externally captured account data.

POI Requirement K3.1

Q 1 December 2011: What requirements exist for the security of public keys and key management functions on SCR approval class devices?

A *Public keys must be protected against change within the device, to prevent attacks to compromise the security of the system through this attack vector. Devices designed for compliance to the SCR approval classes, and which rely on public keys to provide security or authentication to functions such as firmware updates, must be assessed by the PCI PTS laboratory to Requirement K3.1.*

POI Requirement K4

Q 1 February 2012: Can a device meet SRED requirements without encrypting account data?

A *No. Compliance with K4 is mandatory for any device to be approved against SRED and have SRED listed as functionality provided.*

Q 2 December (update) 2017: Can a POI device approved for SRED have a default configuration to not encrypt account data?

A *The default configuration of a device approved against SRED must be to encrypt account data unless that data is explicitly excluded through use of a method treated as a sensitive service—i.e., requiring dual control or the use of cryptographic authentication. For example:*

- *Where a device implements a "whitelist" function—i.e., the device can be configured to allow for output of some subset of card data in plaintext (e.g., for loyalty or other non-PCI cards)—the absence of the whitelist causes all account data to be encrypted. Any whitelists must be cryptographically authenticated by the POI before use, or entered manually through the keypad only when the device is in a sensitive state.*
- *Where a device can be configured to enter a state where all account data is not encrypted, the transition to or from this state is treated as a sensitive service.*
- *For devices that allow the enablement (turning on) or the disablement (turning off) of SRED functionality, the enablement must result in the firmware revision number changing and the device providing visual indication of SRED enablement. Disablement must result in the firmware revision number reverting and the device no longer providing visual indication of SRED enablement. The visual indication must not be transient and shall be illustrated by photographic evidence provided in the evaluation report. This is treated as a sensitive function under B7. This must be documented in information provided by the vendor to the entities deploying these devices, including the security policy enumerated in B20.*
- *The device has only one operational mode, and the firmware is not able to export the card data—it only provides the data to an authenticated application. The firmware does not allow any other mechanism for card data export.*

In all cases, the device's firmware must manage the cryptographic keys and operations using the device's secure controller (chip), including those for both SRED enablement and SRED relevant protections.

Q 3 March (update) 2015: Do the same minimum key sizes apply for the protection of account data under SRED as exists for the protection of PINs?

A *All minimums apply equally with one exception. Double length TDES keys used in connection with SRED can only be used in unique key per transaction implementations as defined in ISO 11568 for key derivation or transformation, e.g., DUKPT. Double length TDES keys are not permitted for use in SRED in Master/Session or Fixed key implementations.*

Note: This requirement only applies to keys used to encrypt account data where that encryption is used for the purposes of compliance with the external data security requirements of the SRED module. For example, keys used to encrypt data only between an encrypting MSR read head and the security processor, where the data is then decrypted and re-encrypted by the security processor with a different, stronger key, are not in scope of this FAQ. However, if the TOE is an SCR, it does apply.

Q 4 **June (update) 2016: Requirement K4 states that any method used to produce encrypted text that relies on "non-standard" modes of operations (for example, format-preserving Feistel-based Encryption Mode (FFX)) shall be approved by at least one independent security evaluation organization (for example, a standards body) and subjected to independent expert review. How is this requirement met if the method is not included in a published standard?**

A *All account data shall be encrypted using only ANSI X9 or ISO approved encryption algorithms (for example, AES, TDES). Additionally, the mode of operation that is used shall be either:*

1. *One that is described in ISO/IEC 10116:2006 (or equivalent) and follows secure padding guidelines.*

Or

2. *Exist on a draft standard from a standards body applicable to the financial payments industry i.e., ANSI, ISO or NIST*

And

3. *Be subject to an independent expert review and said review is publicly available and is reviewed by the PCI PTS evaluation laboratory.*

The review by the independent expert must include proof that this FPE secures against Message Recovery as defined in Bellare, M., Ristenpart, T., Rogaway, P., & Stegers, T. (2009, August). Format-preserving encryption. In Selected Areas in Cryptography (pp. 295-312). Springer Berlin Heidelberg (https://eprint.iacr.org/2009/251.pdf).

The independent expert must be qualified via a combination of education, training and experience in cryptology to provide objective technical evaluations that are independent of any ties to vendors and special interests. Independent expert is further defined in the glossary.

The PTS laboratory will validate that the device vendor has implemented the FPE solution following all guidelines of said evaluation and peer review, including any recommendations for associated key management.

POI Requirement K6

Q 1 **November 2012: Requirement K6 uses the word "supports." Does this imply the device must enforce the use of data-origin authentication, or is it optional in the sense it must be supported but its use is not mandatory?**

A *No, this does not imply that the device must enforce the implementation of data-origin authentication but it must be capable of implementing such a scheme as a configuration option.*

POI Requirement K8

Q 1 **December 2011: Account data encryption keys can only be used to encrypt account data and if applicable, transaction-relevant information. What is acceptable for "transaction-relevant" information?**

A *ICC EMV dialog messages exchanged between an external ICCR and a PIN pad, including the ICC public key*, are considered transaction relevant information.

Q 2 December 2011: Account data is defined to include the full PAN and, if present, any elements of sensitive authentication data. Other data that is sent in conjunction with the PAN are also considered account data such as, but not limited to, cardholder name, expiration date, and service code. For messages to the host, can the account data key be used for full message encipherment?

A *Yes, provided it meets all of the following:*

- *The method of encryption used must ensure that the output produces a unique cryptogram each time that is statistically uncorrelated with any previous encrypted message across its whole length, even if the same input is used.*
- *The transaction message must be formatted and constructed by firmware/application code resident within the POI that is authenticated by using cryptographic techniques consistent with B4.*

POI Requirement K11.1

Q 1 March 2011: Authenticated applications may be developed by the POI vendor or by other third parties. The applications are to be developed using techniques consistent with PA-DSS and must be cryptographically authenticated by the POI. Are there any other considerations?

A *Yes. The technique used to manage the authentication mechanism (e.g., digital signatures) must use a SCD and dual-control techniques. For third parties, the device vendor must either provide the SCD to the third parties or describe how a SCD must be used to comply with B7. The description must include an example of a specific, existing SCD that can be purchased and used to comply with B7. The POI must have an API that is compatible with the SCD. The complete solution must be fully developed. It is not acceptable to provide detailed instructions that require users to develop part of the solution.*

A SCD is not required for applying the authentication mechanism if the technique used meets all of the following:

- *The signing device implements dual-control mechanisms such that it is infeasible for a single person to sign user prompts;*
- *The signing device provides for all logging details as stipulated in the requirement;*
- *Compromise of a signing device does not compromise any other signing device;*
- *Compromise of a signing device does not affect the security of POI devices outside the domain of the signing device;*
- *POI devices outside the domain of any signing device cannot be modified to accept user prompts from other user prompt sources;*
- *The signing device is a single use device or is used in a restricted secure area; and*
- *The vendor provides the secure operating procedures to the customer.*

POI Requirement K11.2

Q 1 May 2017: POI vendors must provide clear security guidance consistent with B2 and B6 to all application developers to ensure:

- **Applications are not influenced by logical anomalies that could result in clear-text data being outputted when the terminal is in encrypting mode.**

- **Account data is not retained any longer, or used more often, than strictly necessary**.

How is it differentiated between firmware that is evaluated as part of the POI approval process versus other code that exists on the device?

A *The vendor must provide to the PCI PTS laboratory a guidance document that states the exact scope of the PTS evaluated firmware (down to the level of libraries and binaries). This shall include all security relevant APIs to confirm that they are used by the application rather than the application using its own cryptographic primitives and key management. This document shall be included with the guidance that is available to application developers and must be validated as correct by the PTS laboratory. A reference to this document must be provided in the device security policy that is included with the approval on the PCI website.*

POI Requirement K15

Q 1 **June 2012: K15 stipulates that changing between encrypting and non-encrypting modes of operation requires explicit authentication. How is this implemented?**

A *Changing between modes is considered a sensitive service as stated in K24 and K25 and therefore requires that authentication use dual control techniques when entering sensitive information through a secure user interface, or cryptographic techniques when entering electronic data.*

Q 2 **June 2012: The guidance states that encrypting mode is defined to be when the device's encryption of account data functionality is enabled and operational. Can a device output all or some account data in the clear when in encrypting mode?**

A *Yes, even for devices that only support encrypting mode. For example, a device can implement cryptographically authenticated whitelists for outputting account data in the clear, ever if that whitelist causes all account data to be output in the clear. The absence of the whitelist causes all account data to be encrypted.*

POI Requirement K16.1

Q 1 **October (update) 2016: If hash functions are used to generate surrogate PAN values, the input to the hash function must use a salt with a minimum length of 64-bits. Are salt values required to be unique per transaction?**

A *The salt may be unique per transaction, unique per a group of transactions, unique per device or unique per merchant.*

- *Salts that are unique per transaction or otherwise unique per device must be generated by the transaction device.*
- *Salts that are unique per merchant are generated outside the transaction device and require loading to each merchant device. The vendor must supply documentation to the merchant/acquirer processor on how to securely load the salt values and that this loading is treated as a sensitive service in accordance with K22.*