Draft Specification & Bulletin
Industry Feedback Form

Working Group: Contactless Kernel Task Force

Document:

EMV® Contactless Specifications for Payment Systems Book C-8
Kernel 8 Specification Version DRAFT2, April 2022

Company Name: Consolidated Comments

Primary Contact
Name: EMVCo Contactless Kernel Task Force

Date: October 2022

Consolidated Responses – C-8 Kernel Specification DRAFT2

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Comment Source[1] **EA/Sub**	**Clause No./ Subclause No. / Annex**	**Paragraph/ Figure/ Table/ Note**	**Type of com-ment**[2]	**Comment (justification for change)**	**Proposed change**	**Status** Accept, Reject, In progress, Acknowledge	**EMVCo observations** on each comment submitted
Sub	3.3 and 3.5	-	ge	The encryption of the data exchanged during the execution of the read records commands and the read and write of the Data Storage functionality might infringe potential existing patent.	If not already done, check if there is no patent infringement	Acknow-ledged	Thank you for the comment.

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EA	All specification	N.A.	ge	The secure channel defined in the specification protects against a passive attacker (e.g., eavesdropping of the communication link between Card and Terminal is no longer possible). The one-sided authentication from the Card to the Terminal avoids man-in-the-middle attacks. Unfortunately, the fact that it is not a mutual authentication still allows any Terminal (including malicious ones) to mount a secure channel with a Card in order to access its private data.	To prevent such an attack, it would be interesting to consider an additional feature, possibly optional, which would allow to carry out a mutual authentication in the case where the Terminal and the Card recognize the same trusted authority.	Reject	Mutual authentication creates an overhead on terminal management and transaction performance, and the independent feasibility study and report, commissioned by EMVCo, did not identify it as a business requirement.

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Sub	6.3.8	S23-B p.119	te	Looks like the flow S23-B on p. 119 give priority over READ DATA compared to READ RECORD in case the DE/DS option is implemented, setting "Next CMD" to READ DATA after a previous READ DATA. Is this the intention? Will this have any negative effect on the overall transaction time?	(blank)	Reject	If DE/DS is implemented, the READ DATA command is sent first till all the data envelopes to be read are read, so they can be processed by the terminal as soon as possible and the Kernel does not have to wait for the response of the terminal if any. There is no negative effect on transaction time.
Sub	6.3.9	S22 p. 124	te	Do you see any risk that the Kernel gets stuck (i.e. remain in state S22) in the process of READ DATA in case of exception cases? Similarly, Do you see any risk that data doesn't get sent to the terminal because of a data element not being read.	(blank)	Reject	No there is no risk because all states have an exit in case of exception. Processes C and K will respond. Card L1 has a timeout if card doesn't respond. And if the Terminal First Write Flag is not sent – this too has a specific timeout.

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Sub	6.3.10	S24 p. 129	te	State S24 proceeds to S24-D through RECORD DECRYPTED. Should there be a check on Crypto Read Data Counter > 0?	(blank)	Reject	No, there is no need to check if Crypto Read Data Counter > 0 at this point. The check is performed later in S202122232425 – A.

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Sub	6.3.12	p. 141	te	in Step 202122232425.16, the DF name is compared to the AID of the configuration data. This seems a bit late in the process. Assumingly the same check is done when the Kernel is started, and the kernel is configured, so that a mismatch at this point should never happen?	(blank)	Reject	A mismatch at this point only happens in the event of a man-in-the-middle (MITM) attack. Entry Point has selected the configuration dataset based on the ADF Name in the PPSE. The ADF Name is not secure and can be changed by the MITM to force Entry Point to use another configuration dataset. The Kernel checks whether the AID in the configuration dataset corresponds to the DF Name in the FCI, but this time based on data that is secured (for example by including tag '9F06' in the Extended SDA Tag List).

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Sub	Annex A.3	p. 299	te	If multiple brands use the C8 kernel, will the kernel have multiple instances of table A.39, each identified by an AID? If so, we assume there will be one table (one set of configuration data objects) active (used), i.e. the one related to the AID of the card used in the transaction. Maybe it can be considered to make this more explicit in the specification.	(blank)	Accept	There is an instance of the configuration data table per AID and Transaction Type. This is explained in Fig 2.3 and Table 2.7. In section 2.3, we will add extra explanation to describe that configuration can also be per RID.
Sub	A.1.124 A.1.126 Others…	p.285 (A.1.124), p.287 (A.1.126)	ed	The tables contain respectively "Not used for Kernel 8" and "Not used for contactless". For most readers, it will be clear that these (sets of) bits are used in other contexts. It would however be more readable if these lines would be visually distinguished from the relevant bits e.g. by using italic font.	(blank)	Accept	The statements “Not used for Kernel 8” and “Not used for contactless” will be replaced by RFU in the final version.

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EA	-	-	ge	Cardholders get more and more used to contactless transaction processing which leads to fewer and fewer contact transactions. In addition, the number of contactless-only terminals, in particular mPOS without an additional contact reader, increases. Therefore, issuers who want to update cards via script and/or 2nd GENERATE AC (e.g. like CSU processing in CPA) should have an option to do this over the contactless interface.	Add an implementation option in the specification of Kernel 8 to support a restart of the Kernel for issuer update processing after an Online Request Outcome. Such a restart should be supported at Start B and at Start D for EMV Data being sent by the issuer. Processing after a restart should be similar to EMV processing of online responses for contact transactions (see Sections 10.10 and 10.11 of EMV Book 3). We do not request to add this implementation option immediately. For now it would be considered sufficient to get a confirmation from EMVCo, that this implementation option will be added. [Company name redacted], is ready to deliver input for the specification of this implementation option.	Acknow-ledged	The independent feasibility study and report, commissioned by EMVCo, did not identify this as a business requirement. However, EMVCo may consider this in the future.

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Sub	All		ge	EMVCo has released this document as “Kernel 8 Specification”. Yet it appears that the technical details specified are those visible at the interface between the card application and the Kernel. Meaning is more a specification for interoperability than a Kernel implementation one. By comparison the EMVCo Next Gen was also named as “ EMV Next Generation Kernel System”. Meaning that a complete “technical architecture” was in the scope. It remains that the card application side of the “equation” is absent in the present “Kernel 8 Specification”. Yet, from a Vendor perspective, card applications able to communicate with the C-8 Kernel are to be designed.	As card vendors, we suggest EMVCo to produce a minimum set of common requirements/functionalities for a card application to be interoperable with a C-8 Kernel.	Reject	Kernel 8 cannot be used by entries in the PPSE under the following conditions: • without Kernel ID, • Kernel ID of length 0, • or Kernel ID with value 0. This is because Entry Point would use the wrong default value from Table 3-6 in EMV® Book B. Book C-8 specifies the behaviour of the Kernel and card application behaviour is out of the scope.

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Sub	All		ge	When EMVCo specified the " EMV Next Generation Kernel System", it was paid attention to migration aspects for next gen cards and terminals. That's an aspect that has not been addressed by EMVCo neither in SB 243 nor in the present Draft Specification A case is when a card with a legacy application and a new one compliant with C-8 in face of a Terminal supporting existing Kernels and the C-8 should behave	A Migration Guidance Document should be created by EMVCo. [Company name redacted] suggests that documentation with that respect produced by EMVCo during the Next Gen specification process could be used as a basis	Reject	Aspects of the transition to Kernel 8 are outside of the scope of the kernel specification. EMVCo does not control the rollout of the EMV® Contactless Kernel. Each Payment Systems will choose if and when they move to support the use of the EMV Contactless Kernel.

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Sub	3.3	All	ge	Section 3.3 is a summary of the transaction steps initiated by the terminal Kernel- Application data flows yet [Company name redacted] considers that it lacks technical details for the card behaviour making it not so useful	§ 3.3 assumes that C-8 is already selected and active. We suggest that the preliminary steps are included in section 3.3. Complete this section with details from the card-side of the message exchange and in particular the APDU-C's generated by the C8. Make consistent the figure with the text describing the protocol.	Reject	Section 3.3 is informative and aims to clarify the kernel behaviour, not the card behaviour.
Sub			te	The expression " if the card supports remote data authentication…."	A definition and a description of "remote data authentication" is needed	Accept	The Card may use its instance of the Issuer Application Data MAC as input to the Application Cryptogram generation. In that case the Kernel instance of the Issuer Application Data MAC has to be transferred to the issuer. A definition and description will be added.

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Sub	5.2	All	ge	Section 5.2 specifies the commands and data elements for the "Exchange Relay Resistance Data protocol". But no technical details are provided. A Relay Resistance Protocol (RRP) was specified in the past by EMVCo in the Book 11 of the Next Generation Kernel System. But the C-8 draft makes no reference to this original RRP, so we ignore what functionalities are required from the card side to support the RRP	Requirements for the card to implement the RRP protocol should be specified in a new document. The functional description of both the card and the terminal behaviour during the execution of the RPP should be included in the C-8 Specification Clarify whether the implementation of the RRP is mandatory/optional for the C-8 Kernel. The same for card applications: Is the RRP optional or mandatory.	Reject	We believe that the informative section 3.6 together with the detailed state transition descriptions in chapter 6, provide sufficient information to develop the card side.
Sub		All	ge	IP situation for any used protocol and/or algorithm on both the card and terminal sides as required by C-8 kernel (e.g., RRP, DH Exchange…)	Please clarify	Acknow-ledged	Thank you for the comment.

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Sub	8.4	All	te	This section seems only consider the ECDSA signature to sign the ECC certificates. Yet, SM2-DSA is also a possible signature scheme for ECC certificates as referenced in Annex C Table C-3. 8.4 seems to have to be completed	Complete clause 8.4 with the case that the SM2-DSA scheme is used to digitally sign the ECC card certificates.	Reject	This version of the specification supports only Certificate ASI '01' (RSA) and '10' (ECSDSA with P-256). The tables in Annex C give an overview of the coding of ASIs in general. The certificate ASIs supported by this version of the Kernel are set in C.10. Other ASI values may be assigned with support reserved for future use.
EA	Annex A		te	The tags IIN (42) and IINE (9F0C) have been added recently in several specification Book C-X. As the book C-8 aims at being a single kernel in the future, it would be interesting to define these tags in Book C-8 too.	Add the 2 tags in Annex and define the appropriate actions in the different error cases (parsing error, length error, inconsistencies between tags…).	Accept	These tags will be added to the data dictionary and will become 'known tags' for Kernel 8.

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EA	3.2 The Kernel TLV Database ; 4.1 TLV Database	Table 2.7	te	Risk of overlapping or collisions of proprietary (i.e., custom) tags.	Since the C-8 Kernel will be used by multiple Card schemes, there should be some rules to govern the definition of custom tags. to avoid overlapping and collision. Otherwise, a custom tag can have multiple meanings depending on the context.	Reject	Tag ranges for 3-byte proprietary tags will be included in the final version of the specification. The proprietary tag ranges are provided for use by Issuers. Proprietary tags, known to the Kernel, have meaning only in the context of the AID/Transaction type. EMVCo cannot prevent the risk of overlap and collision within this context.

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EA	1.1	last para	ed	The statement "This document defines the behaviour of the Kernel used in combination with cards having a Kernel Identifier indicating Kernel 8, as defined in [EMV Book B]" may be understood in a way that Kernel 8 may only be used with cards combining an AID and Kernel ID = 8 in a Directory Entry in the FCI of the PPSE. But according to EMV Book B, Req. 3.3.2.5, also cards which combine an AID with no Kernel ID, Kernel ID of length 0 or Kernel ID with value 0 can be used with Kernel 8 (like with any other kernel) if the terminal supports a combination of the AID and Kernel 8.	Change the last paragraph of Section 1.1 to clarify that Kernel 8 can also be used with cards having no Kernel ID (or Kernel ID of length 0 or Kernel ID = 0) combined with an AID if the terminal supports a combination of the AID and Kernel 8.	Reject	Kernel 8 cannot be used by entries in the PPSE under the following conditions: • without Kernel ID, • Kernel ID of length 0, • or Kernel ID with value 0. This is because Entry Point would use the wrong default value from Table 3-6 in EMV® Book B.

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EA	3.3 6.3.14 - 6.3.16	4-5 Processing between states 27 and 28	te	When the card sends its decision in the GPO response, the terminal has to still go through another terminal action analysis which can alter the decision of the card. The issue is really around the testing and tracing. Since we see the card response but the final terminal decision we don't see what failed (during the second terminal action analysis) as it is not visible as it would be when you send the TVR where the terminal performs all the risk management before the GEN AC and then the card returns the final decision which can be traced.	Follow the standard EMV flow where the card makes the final decision at the 1st Gen AC and not as part of the GPO response.	Reject	Please note that the card does not make a decision during the GPO response. The card's decision is returned in the response to the Generate AC command together with the Card TVR. The Kernel uses the Card TVR to update the TVR. The TVR contains all the information as to why the transaction may have failed.

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