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Swiss National Body Resolution on NFC/ ISO/IEC 14443 Harmonization

The Swiss National Body welcomes resolutions 6.1.3a-c taken by SC6 at the recent Tokyo meeting and is confident that harmonization is now on track. To contribute to the success of this technical task we outline subsequently some facts about its technical background which are not commonplace, but may help to create a common understanding and a constructive, technical approach to harmonization.

While both standards, ISO/IEC 18092 and ISO/IEC 14443, define contact-less communications technologies with an operating distance of less or equal 10cm, typically, they have different characteristics:

- 14443 defines two device classes, the cards (PICC) and the readers (PCD). The readers generate an RF field which supplies power to the cards. 14443 defines two different technologies, type A and B. Compliant readers must implement at least one of them.
- NFC defines a single device class, the NFC Device. As NFC Devices are pairing, one of them takes the Initiator role, the other one the Target role. The Target can either be powered by the Initiator's RF field or by its own power supply. In the former case, the passive mode, the communications protocol is different from the latter case, the active mode. Compliant NFC Devices must implement Initiator and Target capability in active and in passive mode.

NFC	14443
NFC Device	Card and Reader device
Initiator and Target role	Type A and B protocol
Active and passive mode	PICC is allways passive
All combinations required	At least one type required

There exist some correspondences between the two standards which facilitate some level of interoperability between NFC Devices on the one hand and PICCs and PCDs on the other hand. There are many information gaps and misperceptions of this aspect. Replacing them by accurate technical facts will give a much clearer and less dramatic picture of harmonization.

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Correspondences are, of course, limited to the passive mode NFC specification. There, the coding, modulation, initialization and anti-collision at 106kbps is identical with that specified for type A in parts 2 and 3 of 14443. At 212 and 424 kbps the corresponding NFC specification is identical with FeliCa. However, the activation and transport protocol is different from 14443-4 as well as from the FeliCa specification. And no correspondences exist with the type B specification.

18092 Passive Mode	PICCs
Initialization and anticollision at 106 kbps	14443 part 2-3 type A
Initialization and anticollision at 212/424kbps	FeliCa
Activation and transport protocol	Different from 14443-4 andFeliCa
No correspondence	14443 type B

Consequently, while FeliCa as well as type A cards and readers can perform initialization and anti-collision with NFCIP-1 devices, they are incapable to activate the data transport protocol and to exchange data. To overcome this limitation, an NFCIP-1 device must be enhanced with the respective 14443-4 and FeliCa functions, using the escape option of figure 24 of 18092. Alternatively, NFCIP-2 devices provide full interoperability with 14443 type A and B as well as with 15693, and can be enhanced by the FeliCa data transport protocol.

The present situation is unsatisfactory as the overlaps of 18092 and 14443 demand synchronization of the standard maintenance in SC6 and SC17, type B is not interoperable with 18092 and FeliCa not with 14443 PCDs. To overcome this the SC6 Study Group on Harmonization (SG) has been established, which according to its Terms of Reference will in the next 12 months analyze the related standards and propose technical changes.

The analyzes will be complex and must be performed with care. Therefore their results cannot be implemented in the current revisions of 18092 and 14443, but will have to await the next revision.

SC6 has decided to implement the findings of the SG and to replace existing overlaps of the standards by references to 14443. We encourage SC6 and SC17 to commit to one more step, namely to reference the type B initialization and anti-collision specifications of parts 2-3 of 14443 in 18092 and the respective FeliCa specifications of 18092 in parts 2-3 of 14443. This will resolve all the issues mentioned above and create new opportunities for suppliers and customers of contact-less products.

18092	14443
Reference 14443 part 2-3 for type A and B initialization and anticollision	Reference 18092 for FeliCa initialization and anticollision

The above sketches the core of harmonization, though the whole task is bigger and more complex, as also the testing specifications, the NFCIP-2 standard, the security architecture as well as other standards related to 18092 and 14443 must be concerned.

We hope that our outline clarifies the harmonization route map and call all SC6 and SC17 members to follow it.

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