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## Swiss National Body Contribution to NFC/14443 Harmonization

The Swiss National Body thanks the Study Group for NFC/14443 Harmonization for their encouraging comments on our contribution (6N14035) expressed in the Singapore meeting minutes (6N14085). Following the invitation to amend and extend our contribution we present below a revised text taking into account the significant progress achieved by the SG as well as the Japanese (6N14054) and the Netherlands's (6N14060) contributions.

### Problem Outline

Whereas Sc17 focuses on PCDs and PICCs, the NFC suite of standards targets consumer equipment such as mobile phones. The main goals of harmonization, as we understand it, are to

- eliminate overlaps in the work of Sc6 and Sc17,
- enhance interoperability between the two worlds<sup>1</sup>.

To facilitate a common understanding and a constructive, technical approach to harmonization we summarize subsequently some facts and propose the next steps of the harmonization work.

While both standards, 18092 (NFC) and 14443 (Proximity), define contact-less communications technologies with an operating distance<sup>2</sup> of less or equal 10cm, typically, they have different characteristics:

- 14443 considers two kinds of devices, the cards (PICC) and the readers (PCD). The readers generate an RF field which supplies power to the cards. 14443 defines two different protocol types, A and B. Compliant readers must support Initialization and Anti-collision of both types (part 3). Available products also implement the transmission protocol (part 4)<sup>3</sup>.
- NFC considers a single kind of devices, 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 Initialization and Anti-collision 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 always passive
All combinations required	Both required

<sup>1</sup> By modifications/additions to the relevant standards, along the lines of 17N3590 and 6N14085.

<sup>2</sup> The operating distance implied by the antenna sizes and loading effects specified.

<sup>3</sup> No Sc17 standard seems to require PCDs to implement part 3 and 4. 10373-6 explicitly refrains from doing so.

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, 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 (JIS X 6319-2 and 3). However, the activation and transport protocol is different from 14443-4 as well as JIS X 6319-4. 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	JIS X 6319 part 2-3 (FeliCa)
Activation and transport protocol	Different from 14443-4 and JIS X 6319-4
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. However, the escape option of figure 24 of 18092 allows to activate these protocols in devices implementing 14443-4 and JIS X 6319-4 in addition to 18092.

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. The Sc6 Study Group on Harmonization (SG) is working to resolve these issues, envisaging new cross-interoperable device classes in 21481, while preserving the characteristics of 14443 and 18092. This will create new opportunities for suppliers and customers of contact-less products.

## 21481 Revision<sup>4,5</sup>

At the Singapore meeting, the SG has targeted ISO/IEC 21481 (NFCIP-2). A revised<sup>4</sup> text (6N14086) will be discussed at the forthcoming Berlin meeting. NFCIP-2 devices defined therein implement 18092 Initiator and Target, 14443 PCD and 15693 VCD function<sup>6</sup>. They interoperate with 18092 Targets and Initiators, 14443 type A and B PICCs as well as with 15693 VICCs, but still need to be upgraded by JIS X 6319-4 if FeliCa interoperability is to be achieved.

ISO/IEC 15693 (Vicinity Cards) defines contact-less cards with operating distances of some decimeters, and yet another Initialization, Anti-collision and Transmission protocol. While some use cases require interoperability of proximity and vicinity devices, proximity technology has been designed for tap'n go transactions. Here the cardholders express their consent to the transactions by willingly tapping the PCD with their PICC. In typical proximity applications any activations without the holder's awareness and consent are undesirable.

<sup>4</sup> The revision is in the authority of and will be performed by Sc6.

<sup>5</sup> Our support of and contributions to the 21481 revision are subject to strong reservations regarding the IPR aspect. See below.

<sup>6</sup> The standard text intends to specify that they support 18092, 14443 part 2-4 and 15693 part 2-3.

The current definition (6N14086) of NFCIP-2 devices lacks precision, requires each NFCIP-2 device to support all 18092 modes plus PCD and PICC plus VCD and VICC, and does not provide FeliCa interoperability<sup>7</sup>.

We<sup>8</sup> therefore propose to further revise 21481 to specify the following two device classes:

Device class	Standards	Modes
Dual-type	18092, 14443 part 2-4 type A and B, FeliCa transmission protocol <sup>7</sup>	NFC, PCD, PICC
Triple-type	18092, 14443 part 2-4 type A and B, 15693 part 2-3, FeliCa transmission protocol <sup>7</sup>	NFC, PCD, PICC VCD, VICC

The dual type (NFC + proximity) matches 6N14086, the triple type adds vicinity, consequently with VCD and VICC. The PICC/PCD mode adds interoperability with the existing base of PCDs/PICCs, the VICC/VCD mode adds interoperability with the existing base of VCDs/VICCs.

Alternatively, if the SG rejects the idea of two device classes, we suggest to require the triple-type class to allow for configuration options to enable/disable the vicinity mode.

While stationary PCDs and VCDs are configured for operating distances counted in decimeters, typically, for portable NFCIP-2 devices an operation distance of a few centimeters is sufficient, generally, while a requirement of a longer range would adversely impact the battery life. The specifications should respect this and admit implementations of various ranges.

The specification of the various modes should be enhanced by naming explicitly all specifications, parts and amendments to be implemented for each mode, to make the conformance requirements unequivocally comprise all elements needed for interoperability.

Furthermore the current polling specification should be enhanced taking into account page 15 of 6N13898.

## IPR Issues<sup>9</sup>

<sup>7</sup> Option, depending on the availability of satisfactory IPR conditions and an International Standard specifying this protocol, which is currently only available as JIS X 6391-4.

<sup>8</sup> One Swiss NB member doesn't recognize a need to revise 21481. See furthermore our IPR reservations below.

In spite of our preceding technical contribution, we are ought to declare our strong reservations against this development from the IPR point of view. Though the envisaged devices undoubtedly bear significant business potentials, the accumulation of licenses in a single device raises concerns, as in the presence of a high license fee burden and heterogeneous, incompatible licensing models Reasonable and Nondiscriminatory (RAND) licensing conditions are unachievable in practice. The current licensing situation for PCDs being most unsatisfactory and far from RAND<sup>10</sup>, the prospects for NFCIP-2 devices are even worse. Though these issues are in the scope of WTO, antitrust and competition authorities rather than of ISO, we are addressing them here and would welcome informal talks with the major patent holders on appropriate solutions. Our final approval to the revised 21481 standard will depend on the availability of satisfactory licensing solutions guaranteeing truly RAND conditions for NFCIP-2 devices.

FeliCa inter-operability may be desirable from a consumer perspective, but inclusion of FeliCa will even increase the licensing issues. Anyway, since JIS X 6391-4 is a Japanese National Standard, before the FeliCa transmission protocol has become part of an International Standard its inclusion into 21481 cannot be considered and is not supported by the Swiss NB. Our approval to an International Standard specifying the FeliCa transmission protocol will depend on the availability of satisfactory license conditions guaranteeing truly RAND conditions for devices implementing the FeliCa protocol. Under this proviso, we invite and encourage<sup>11</sup> the Japanese NB to submit JIS X 6391-4 to ISO, but only after having disclosed FeliCa IP licensing conditions.

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<sup>9</sup> Though IPR issues are out of scope of the SG and of ISO, they are nevertheless essential strategic aspects which must be considered and resolved before adoption of new standards.

<sup>10</sup> Some patent holders arbitrarily approve licenses to some manufacturers and deny them to others.

<sup>11</sup> One Swiss NB member considers FeliCa outside the scope of harmonization and objects to this statement.

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