NFC Market Update and Technology Overview

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Agenda

- Contactless and Smartcards influence on NFC
- NFC Market Today
- Implementation Approaches to NFC
- Commercial and Trials Snapshot
Smartcard contactless reference

- The contactless smartcard is the driving element for embedded smartcard solutions
- The existence of multi-application contactless smartcard is a precursor to multiple smartcard resident in a mobile device on a single secure element
- Infrastructure on the reader side, as well as the bridge to OTA manage a smartcard in a mobile will drive the use cases accordingly
Main NFC Application Categories

**Card Emulation Mode**
*Transactions:*

*Mobile payment, Ticketing, Access control, Transit, Top-ups, Toll-Gate*

**Peer-to-Peer Communication**
*Connectivity:*

*Data transfer: Fast, easy & convenient device association, setup & configuration*

**Reader Mode**
*Service Discovery:*

*Content distribution, Information access, Smart advertising*
NFC market today

- Over 150 trials in the past 3 years and first commercial roll-outs all reporting very positive user experience
- Main standards in place (ETSI, NFC Forum, WiFi alliance, BT SIG, GP…)
- Industry players in the value chain investing in NFC
- NFC design-ins underway for mobile handsets to be ready in volumes by late 2009.
- Involvement of GSM Association in NFC roll-out and active endorsement to have NFC technology in "mainstream mobile phones by mid-2009 by using the standardized single wire protocol (SWP) interface."
- Non-mobile market – PC, infrastructure, medical, gaming, automotive - represents market growth in the short term while the mobile market is maturing
NFC - Secure Elements (NFC-SEs) and non NFC - Secure Elements (SEs)
What is NFC-SE (secure element)?

- NFC-SEs
  - Represents the combination of NFC with Smart Card technology for secure and trusted transactions

- NFC provides the RF front end for connectivity

- Smart Card provides security/crypto engine
  - Many configuration possibilities
What is (non-NFC) secure element?

- Secure Elements
  - Represents the Smart Card technology for secure and trusted transactions applied to mobile devices
  - Elements have the ability to drive their own RFID interface, no NFC transceiver or controller needed
Stickers – example First Data Go-Tag™

- Bridge product which allows contactless deployment in form factor compatible with mobile device, while compatible with existing contactless card specifications

- Provides a new, convenient way for customers to pay
  - Preferred form factors include stickers to support migration to mobility

- Enables placement of a payment type on any personal item
  - Mobile handset, mp3 player, employee badge or other

- Different form factors can be used for customized branding
Typical NFC SE Architectures in Mobile Phones

- Secure element embedded in the phone
- SIM/UICC centric solution, pay by mobile

Alternative Architectures based on different combinations and connections of eSE, SD, NFC and SIM/UICC are also possible
Other SE Architectures in Mobile Phones

- **SD or microSD card hosting the application**
- **SD or microSD card hosting NFC and SE**
- **No NFC controller SD or microSD card hosting application. Antenna in phone**
- **Phone agnostic solution, micro SD hosting application**

- Alternative Architectures based on different combinations and connections of eSE, SD, NFC and SIM/UICC are also possible.
SD-SE vs UICC/SIM, eSE
What is SD-SE?

- **Embedded secure element**: Direct connect to antenna in phone or dongle/token

- **SD or microSD**: This approach is similar to existing contactless credit card, but adding support for multi-app deployment

- **SD or microSD and NFC with direct connect to antenna in phone or dongle/token**: Embedded secure element and NFC with direct connect to antenna in phone or dongle/token

- **Embedded secure element with NFC-WI connect to NFC embedded in phone or dongle/token**: Embedded secure element direct connect to antenna also embedded on card
Latest NFC Projects – adding to the 150 +

Malaysia
- Apr 2009 – Mobile payment and transport ticketing
- Visa, Maybank, Maxis, Nokia, Touch ‘n Go

Austria
- January 2009: Transport ticketing - field testing an NFC system based on Germany's VDV contactless ticketing standard.
- ÖBB – Austrian federal railways group, Mobilkom Austria, Nokia, NXP

Singapore
- Mar 2009 - Mobile payment trial
- Visa, Citibank, Nokia, MobileOne

Boston, US
- November 2008: “Touch 'N Go Event Solutions”
- Greenbuild event using 500 NFC enabled Nokia 6212 phones to wirelessly scan visitors' NXP chip-equipped badges, collect contact information and qualified inquiries and to conduct surveys
- ITN International, NXP, Nokia
Summary

- Mobile “swiss army” device a natural fit for NFC integration
- Smart card technology will be the enabler of value added NFC applications
- Secure Element NFC and Secure Element non-NFC the current architectures being assorted
- Commercial uptake happening in tightly controlled geo’s and regions, setting the stage for larger deployments
Terminology

- **eSE (embedded Secure Element)**
  - The secure element is soldered on the PCB of the phone and can not be removed without special equipment

- **Plug-In**
  - The secure element can be removed by the user without special equipment. Form factor can be SIM, SD, micro SD,…

- **UICC (Universal Integrated Circuit Card)**
  - Name for the SE used in mobile terminals in GSM and UMTS networks. In a GSM network, the UICC contains the SIM applications, in UMTS networks the USIM applications

- **R-UIM (Removable User Identity Module)**
  - is a card developed for CDMA handsets that extends the SIM card to CDMA phones and networks. The card also contains SIM (GSM) application, so it can work on both networks

- **Contactless frontend**
  - NFC-IC providing card emulation and reader functionality

- **Contactless frontend interface**
  - Interface between contactless frontend (NFC-IC) and secure element

- **SWP (Single Wire Protocol)**
  - Contactless Frontend Interface standardized by ETSI to connect a UICC to a contactless frontend

- **Direct Antenna**
  - Proprietary solution to provide NFC-like contactless card emulation, does not require a contactless frontend. The antenna is directly connected to the secure element (a dual interface smartcard).

- **OTA (Over the Air)**
  - Mechanism to provision, personalize and manage SE via global platform compliant commands over the air

- **OTI (Over the Internet)**
  - Mechanism to provision, personalize and manage SE via global platform compliant commands over the internet

- **GP (Global Platform)**
  - Organization defining infrastructure and management of smart cards across various industries