

Qualcomm CDMA Technologies



The NFC Ecosystem – Technology and Applications

John Hillan

Principal Engineer, Qualcomm (UK) Ltd.

Agenda

- Introduction
- NFC handset architecture
- Factors in deployment
- User experience
- Conclusion





Introduction

- NFC has been around for a long time
 - Fundamental technology is mature
 - Legacy aspects present some challenges
- Why consider NFC in mobile phones?
 - End user demand?
 - Competitive advantage?
 - New revenue opportunities?
- What does it mean for a handset?
 - Yet another radio!
 - Additional cost, size, and current consumption
 - Another protocol stack
- So why do it?
 - Improves some features of existing handsets
 - Adds powerful new capabilities

NFC Handset Architecture



- Hardware solution for touch-to-do is well understood
 - Contactless Front End (aka NFC Controller)
 - Coil antenna with matching circuit and filter
 - Major cost and size impacts are discrete components and the antenna itself
 - Major power concern is impact of “always on” activity
- For infrastructure transactions, an additional secure element is needed
 - Several options including UICC-based, embedded, MicroSD
 - Preferred option varies between the different stakeholders
 - Not all are available in all possible scenarios
 - Handset loss, lending, replacement are impacted in different ways
 - Handset may need to support multiple options
- Software is relatively self-contained
 - Familiar protocol stack with multiple client applications accessing the U/I
 - Over the air lifecycle management especially for secure applications
 - Must be self-consistent but allow customer differentiation

Factors in Deployment



- Standards
 - ISO, ECMA, NFC Forum , ETSI, Global Platform, EMVCo, ...
 - How soon, how robust, how compatible?
- Tier
 - High cost of solution would argue for deployment in smart phones first
 - Micropayment capability would argue for mass deployment in low cost phones
- Adoption rate
 - Push or pull?
 - Happy path or problems galore?
 - Lessons learned from other complementary wireless technologies
- Stakeholders
 - Network operators, OEMs, technology vendors, software companies
 - Financial institutions, transport companies, retail outlets
- Geography
 - Already here in some parts of the world
 - Global community requires seamless operation

User Experience



- The expectation is that “wireless is easy”
 - No need to go through menus to use it
 - No impact on standby time
 - Understand what is wanted and “just do it”
 - Do it immediately
 - Download new applications if desired
- Do existing things better
 - Pair a Bluetooth headset by a simple tap
 - Get actual time of next train, not the scheduled time
- Do new things
 - Provide physical shortcuts
 - Leave your wallet and keys behind
 - Do multiple things concurrently

Conclusion



- NFC is widely regarded as an important technology for handsets
 - Touch-to-do simplifies existing activities, and enables new ones
 - Most people own both smart cards and handsets, so why not combine them?
- Most technical aspects of deploying NFC in handsets are already solved
- Some commercial aspects are still being worked out
 - Who pays for the added cost of the handset?
 - How is the revenue from use shared between the stakeholders?

Thank You

John Hillan

jhillan@qualcomm.com