

Migration to MEID – Nokia View

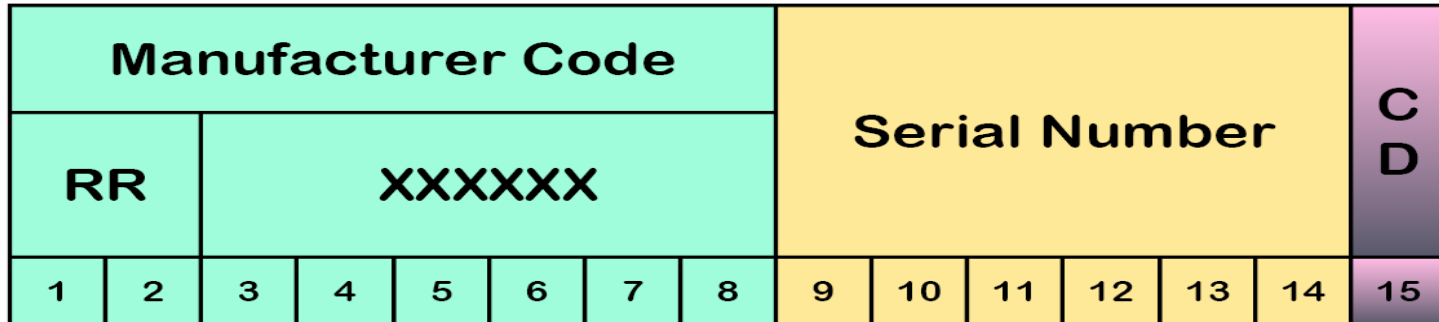
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Outline

- Background info
- Nokia plan and readiness
- Logistics and operation considerations
- Other concerns
- Recommendation

MEID

- MEID - Mobile Equipment Identity
- MEID (14 hexadecimal digits, 56 bits) to be used to replace 32 bit ESN, which may be exhausted by 2005
- In addition to larger numbering space, MEID
 - Compatible with 3GPP terminals for multi-technology devices (e.g. RR = 99)
 - Separate 3GPP2 terminals from 3GPP (i.e. RR = A0-FF for CDMA; RR = 00-99 reserved for use as 3GPP IMEIs)
- MEID format



ESN & UIMID

- ESN – Electronic Serial Number is a 32 bit number that presently used on CDMA networks
 - ESN is used as an input to authentication
 - ESN is used to derive the Public Long Code Mask (PLCM)
 - Only 256 distinct manufacturer assignment blocks/codes existed
- ESN format: 8 bits Manufacturer Code + 24 bits serial number
- UIMID is a 32 bit number that identifies a R-UIM card for use on CDMA networks
 - UIMID shares same address space with ESN
 - Each UIMID should be unique, not matching any other assigned UIMID or ESN
 - UIM-ID replace ESN in air interface message and TIA-41 message when the R-UIM card is programmed to use UIMID (i.e. R_UIM usage indicator = UIMID) instead of ESN (i.e. R-UIM usage indicator = ESN)

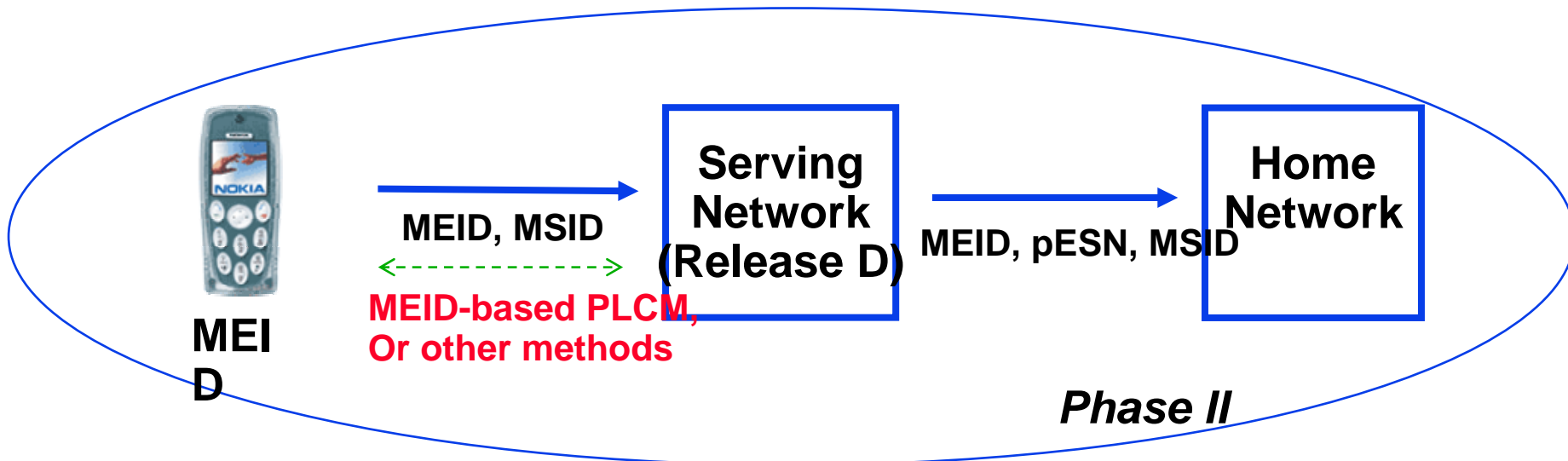
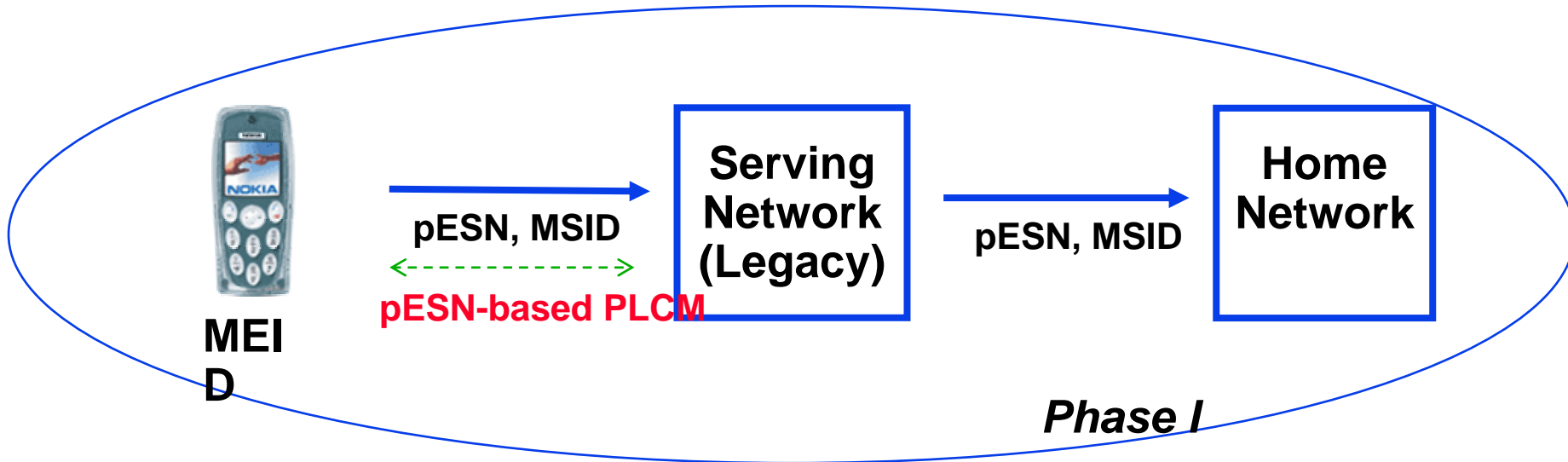
Pseudo ESN (pESN)

- Pseudo ESN is a 32 bit number that has the reserved ESN manufacture code (i.e. 0x80), followed by a 24 bit hash of the 56 bit MEID using the SHA-1 algorithm
- MEID to Pseudo ESN mapping fixed
- **Pseudo ESN not unique**
- Pseudo ESN not match any UIMID or ESN (also referred as true ESN), because they have an unique manufacture code of 0x80
- For MEID-equipped mobile, pseudo ESN is used in place where ESN is used
 - RN_HASH_KEY, to randomize the start of transmission in CDMA systems
 - IMSI_M & IMSI_T
 - CAVE Authentication input
 - **ESN based PLCM if (P_REV<11)**
 - Pseudo-random number generator for CDMA timer-based registration
 - CDMA status response / extended status response message
 - LAC header on CDMA r-csch

Nokia Plan

- We started to draw a migration plan in the early 2004. We were based upon initial TIA assumption that ESN exhaust could happen in 2005.
- We believe that a phase approach would be necessary
 - Phase I – the MS equipped with MEID. MEID is not transmitted
 - Pseudo ESN (not MEID) is used over air interface to replace ESN
 - It is backward compatibility to existing networks (i.e. PREV<11)
 - It requires some upgrade to carriers back office systems
 - Known issue – a chance of PLCM collision
 - Phase II – the MS equipped with MEID. MEID will be transmitted
 - MEID will be used over air interface (per Release D standard)
 - It requires release D networks (i.e. PREV=11 and up)
 - It requires upgrade to networks and related back office systems
 - No PLCM collision issue
 - Phase I solution still required when the MS talks to legacy networks
 - Phase I.5 – the MS to support MEID provision over the air
 - MEID-equipped MS to support 683D (prior to Release D)

Phase I & Phase II



Nokia Readiness

- Phase I – 3Q05
 - Nearly all models of terminals, which first introduced in 3Q05 and later, are having a capability to ship using either MEID (or ESN)
 - Business infrastructure and manufacturing systems are upgraded to support MEID products
 - MEID equipped test terminals are available now
- Phase II – TBD (network dependent)
 - Industry consensus needed for us to move to Phase II
 - Nokia supports the idea to get release-D MEID feature deployed as early as possible to reduce the risk of PLCM collision
- Phase I.5 – 2H05 (if required)
 - To support IS683D MEID related features in 2H05
 - Need input from carriers and infra-vendors

Logistics and Operation Considerations (1)

- Nokia will continue to use ESN only for terminals that introduced prior to the middle of 2005
- Nokia will have MEID/ESN dual capability for terminals that introduced in the middle of 2005 and later
- Nokia will continue to use ESN only for TDMA terminals for their product lifetime
- Nokia encourages carriers to adopt MEID equipped terminals as soon as possible to help diminish the possibility of ESN availability literally stopping terminal supply

Logistics and Operation Considerations (2)

- Nokia looking forward to carriers' feedback upon MEID terminals:
 - When to start requiring MEID terminals in commercial shipments?
 - When to start requiring MEID terminal prototypes?
 - When to start requiring MEID terminals in Field Testing?
 - Label and barcode requirements (e.g. Hexadecimal representation only)
 - EDI/EDF flat-file requirements (e.g. MEID only)
 - User Interface requirements (e.g. a short cut to display MEID and pESN)
 - Security requirements (e.g. A-key checksum to use pESN)
- Nokia ready and willing to assist any carrier begin the transition to MEID, e.g.
 - Testing EDI/EDF systems
 - Changing label formats
 - Testing UI and/or security requirements
 - etc.
- Nokia has teams in place from various disciplines including logistics and customer development to address customers need in transition to MEID

Other Concerns

- ESN reserve and assignment
 - New ESN blocks availability to Nokia?
 - Any policy changes regarding ESN assignment by TIA?
 - Latest ESN exhaustion estimate from TIA?
- Carriers awareness and readiness
- UIMID
 - 32-bit UIMID code will be used up soon as same as ESN code
 - No recommendation yet from the industry on the UIMID issue
 - Nokia proposed to use 56-bit UIMID code to replace 32-bit UIMID, just as MEID to replace ESN

Recommendation

- Be prepared as soon as possible
- It is not a trivial task
 - Take about a year (working on background) to get ready to support MEID products
 - Most of operation systems have to be upgraded, e.g. manufacturing, inventory, shipping & handling, customer cares, etc.

Thank You