The Evolution of CDMA
Mobile Device Testing

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The Testing Evolution

• Five years ago, CDMA mobile devices were primarily voice terminals
  ➢ Testing was limited to minimum performance and signalling conformance

• Today’s devices are a much more complex mix of voice, packet data and an environment for software applications
  ➢ Testing requirements continue to evolve and increase with each new application
Minimum Performance Testing

- Lab-based - typically performed at certification labs, service provider labs and mobile device manufacturer labs
- Designed to verify the minimum performance of the mobile device’s *transmitter* and *receiver*
- Two documents define Minimum Performance test cases:
  - **TIA-98** (C.S0011) for 1X mobile devices
  - **TIA-866** (C.S0033) for EV-DO mobile devices
Signalling Conformance Testing

• Lab-based and typically performed at certification labs, service provider labs and mobile device manufacturer labs

• Designed to verify the mobile device’s ability to transfer signalling and messaging to/from a CDMA network

• Two documents define Signalling Conformance test cases:
  - **TIA-898** (C.S0031) for 1X mobile devices†
  - **TIA-919** (C.S0038) for EV-DO mobile devices

† - **TIA-898** is evolving into two documents:
**TIA-1035** (C.S0043) for Signaling Conformance and **TIA-1036** (C.S0044) for Interoperability
Location-based services (LBS) were originally driven by government mandates, such as E911 in the US.

Commercial, revenue-generating services are now driving location-based applications over the user plane. Service providers are also taking advantage of the faster data rates of EV-DO to deliver richer content to mobiles.

In CDMA networks, high accuracy LBS are generally enabled by three location techniques:
- Assisted GPS – Range measurements made from satellites
- AFLT – Range measurements made from base stations
- Hybrid – Ranges from both satellites and base stations

LBS performance test cases exist in TIA-916 (C.S0036)
A wide range of new applications are being introduced on CDMA mobile devices… almost all of which are data-centric.

The end user’s perceived performance of embedded applications and data services will help differentiate one mobile device from another (or one service provider from another?)

- How long do I have to wait for the data call to set up?
  - Example: Push-to-Talk over Cellular call setups

- How much time does it take to complete my transfer?
  - Example: downloading email

- What other metrics determine the quality of the app under test?
  - Example: audio or video quality metrics

Test cases are largely in the service provider proprietary domain at this point.
The CDMA Testing Evolution

- Spirent’s automated test solutions address all phases of the CDMA mobile device testing evolution

- Minimum Performance Testing
  - C2K-ATS for TIA-98 / TIA-866

- Signalling Conformance & Location-Based Services
  - PLTS for TIA-916

- Applications Performance Testing
  - C2K-ATS for TIA-898

- User Experience Testing
  - APEX C2K for Applications Testing
Summary

- CDMA mobile devices have evolved rapidly from voice-only to a complex mix of services and applications.
- Test solutions need to be scalable to address evolution in testing needs and in industry standards.
- Increased scope of testing requires solutions that maximise test coverage while minimising test time with test automation.
- Spirent’s broad portfolio of turnkey solutions allows focus on mobile device and applications testing, not on developing/debugging the test system.

**Bottom Line:** Cut time to market and ensure customer satisfaction with new devices and services.
Getting customers’ new technology out of the lab faster... and into wide-scale deployment more profitably... with lower risk