

# Mobile IP Test Solution

## Software option 141

**AEROFLEX**  
A passion for performance.



Rigorous testing for the development and conformance of  
Wireless IP on cellular devices

- Available as a simple upgrade to existing CDMA-AIME systems
- Can simulate a wide variety of simple IP and Mobile IP scenarios
- Comprehensive suite of conformance scripts supporting C.S0037 for 1x/EV-DO
- Support for test automation
- Logs interleaved with signaling messages and data in standard format for later viewing or export to other software
- Supports reverse tunneling, DMU and MIP to SIP fall back

*Mobile IP is an established technology for data transmission over cell phones and other access terminals. It has been adopted by 3GPP2 and major CDMA network operators are utilizing it. The technique has also been incorporated into IPv6 and it provides seamless handoff between cells for data, which was not previously possible. Previously, Simple IP was used and data connections often had to be broken when an access terminal moved from one area to another. Now Wireless IP incorporating both Simple IP and Mobile IP is deployed. With the major growth in cellular revenues being seen to come from data, this technology is clearly a requirement, and one that must be thoroughly tested.*

The Aeroflex Mobile IP option for the CDMA AIME systems enables rigorous testing, for development and conformance of Wireless IP (including both Mobile IP and Simple IP) on cellular devices, ensuring that they operate satisfactorily under a variety of conditions.

The system makes it possible to simulate a Home Agent(HA), two Foreign Agents(FA), and an Authentication, Authorising and Accounting(AAA) module, to create realistic scenarios. In addition to this it is also possible to simulate Correspondent Nodes (CN) or use real ones to undertake testing. The system is also able to connect to the Internet to access further realistic scenarios.

The system is controlled by the main CDMA-AIME system software for CDMA testing via a controller PC. The Mobile IP element is controlled via an additional window, enabling all the required Mobile IP parameters to be configured to complete the advanced test configurations.

### APPLICATIONS

The test cases can be used in a wide variety of applications from development testing to conformance testing, in regression testing applications, for soak testing, and in any application where an access terminal needs to be tested for conformance or interoperability.

to emulate realistic scenarios and thereby apply a comprehensive set of tests to any access terminal.

## TEST SCENARIOS

Sample scripts are provided. These enable the user to test additional functions such as Simple IP, Basic MIP Registration and Inter / Intra PDSN handoff with MIP.

Beyond the sample scripts, a suite of other test cases is available to fully test the requirements needed for conformance and interoperability. These tests are defined in C.S0037 and they are written in SAX Basic to complement the other CDMA test cases.

The following test scenarios are supported by the Mobile IP package:

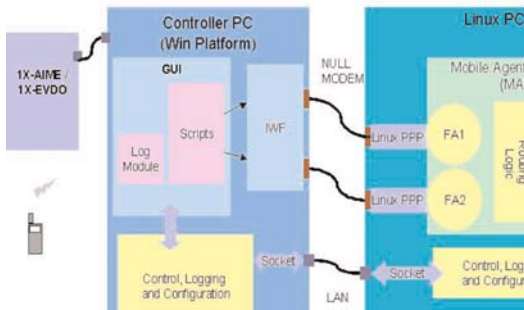
- (Simple IP) to EV-DO (Mobile IP)
- 1X(Mobile IP) to EV-DO (Simple IP)
- 1X(Mobile IP) to EV-DO (Mobile IP)
- 1X(Simple IP) to EV-DO (Mobile IP)
- 1X(Simple IP) to EV-DO (Simple IP)
- EV-DO (Mobile IP) to EV-DO (Mobile IP)
- EV-DO (Simple IP) to EV-DO (Mobile IP)
- EV-DO (Mobile IP) to EV-DO (Simple IP)
- EV-DO (Simple IP) to EV-DO (Simple IP).
- 1x/EV-DO MIP to SIP fall back

For a full list of Mobile IP scripts, please see the user documentation.

## LICENSE OPTIONS

The Mobile IP test support is obtained through the following options:

- 6204/6402-141 Mobile IP System Software
- 6204/6402-141D DMU (Dynamic Mobile Update) System Software



## BUILDS ON EXISTING SYSTEM

The Mobile IP facility comes as an upgrade to the existing 1x or CDMA-AIME system and consists of an additional Linux-based PC running the Mobile Agent emulation. The upgrade package provides all equipment, cabling and software required.

## USER INTERFACE

The Graphical User Interface (GUI) for the MIP function is fully integrated within the main system GUI on the CDMA-AIME controller PC. It displays clear, easy-to-read message structures enabling complicated procedures like handoff to be displayed in formats such that they can be easily understood.

## LOGGING

When running tests, particularly long test campaigns, the test logs provide access to investigation of failures and examining terminal operation. To be able to achieve this, interleaved logs, including all L3/MIP/PPP/RLP transactions, are stored with timestamps and are available for later review. Using the built in filtering facilities, these are then decoded to enable investigations of the operation of the MIP messages to be undertaken.

Date Stamp	Time Stamp	Dir	Protocol	Foreign Agent	Message Type	M
6/28/2004	15:18:09.042	Forward	PPP LCP	-	PPP LCP Contig	7a
6/28/2004	15:18:09.510	Reverse	PPP LCP	-	PPP LCP Contig	7a
6/28/2004	15:18:09.845	Reverse	PPP LCP	-	PPP LCP Contig	7d
6/28/2004	15:18:09.846	Reverse	PPP LCP	-	PPP LCP Contig	7d
6/28/2004	15:18:10.016	Forward	PPP IPCP	-	PPP IPCP Contig	7e
6/28/2004	15:18:10.241	Forward	PPP IPCP	-	PPP IPCP Contig	80
6/28/2004	15:18:10.720	Reverse	PPP CCP	-	PPP CCP Contig	80
6/28/2004	15:18:11.079	Forward	PPP IPCP	-	PPP IPCP Contig	80
6/28/2004	15:18:11.542	Forward	PPP CCP	-	PPP CCP Contig	80
6/28/2004	15:18:13.007	Reverse	PPP IPCP	-	PPP IPCP Contig	80
6/28/2004	15:18:13.213	Forward	Mobile IP	FA1	Mobile IP Agent	45
6/28/2004	15:18:13.359	Forward	Mobile IP	FA1	Mobile IP Agent	45
6/28/2004	15:18:13.544	Reverse	Mobile IP	FA1	Mobile IP Agent	45
6/28/2004	15:18:13.969	Forward	Mobile IP	FA1	Mobile IP Agent	45
6/28/2004	15:18:14.431	Forward	Mobile IP	FA1	Mobile IP Agent	45

## SUPPORT FOR HANDOFF SCENARIOS

The system is able to support a variety of handoff scenarios to rigorously test the scenarios encountered when using Mobile IP. These include both Simple and Mobile IP and transfers between 1x and EV-DO (when EV-DO option is installed), and a variety of combinations. Further features include both Inter and Intra PDSN handoff. By employing such a wide selection of handoff capabilities it is possible

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