

# **CSP-5850 Script Package for Agilent E5515C and MIP-5850**

**Software Concepts, Inc**

## **CSP-5850 Script Package for Agilent E5515C and MIP-5850**

by Software Concepts, Inc

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This is the user manual for the CSP-5850 Script Package. The document is specific to the MIP-5850 Mobile IP Simulator and the Agilent E5515C RF test set and explains the installation and operation of the CSP-5850 Script Package in that environment. The user is expected to have a familiarity with the Agilent E5515C and Mobile IP technology in general.

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# Preface

This manual is meant to provide the information required to fully utilize the Mobile IP Conformance Script Package from Software Concepts. It does not discuss the theory or standards upon which mobile IP depends, but succinctly presents the procedures required to accomplish your job. In short, resort to the manual when you need to perform a specific task. The tasks discussed include:

- Required equipment
- Setting up the test system hardware
- Configuring the CSP, simulator, RF test set, and Mobile IP device
- Understanding the logs written by the Conformance Scripts
- Modifying the Conformance Scripts content and operating system

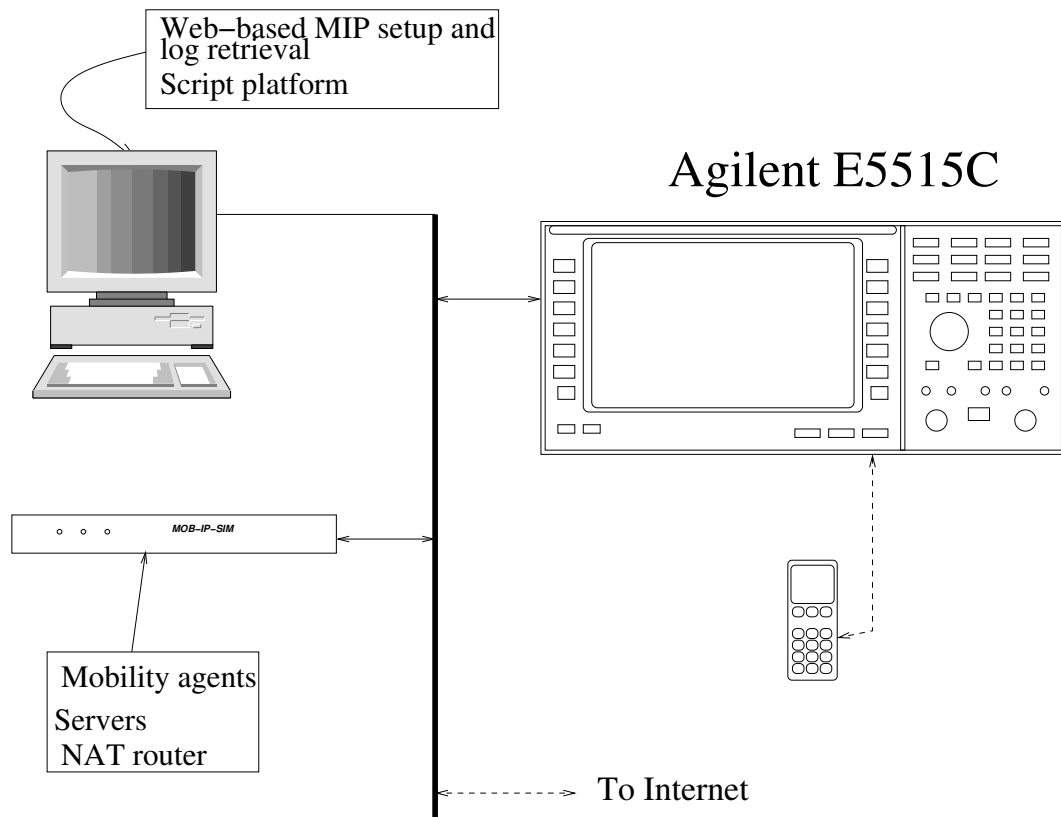
# Chapter 1. Introduction

This chapter will:

- Describe what the Conformance Scripts can do
- Describe how the Conformance Scripts does its job

This Conformance Script Package is a suite of scripts that tests the mobile device for conformance to a subset of the 3GPP2 Signaling Conformance Specification for cdma2000 Wireless Networks (3GPP2 C.S0037). The scripts control the Agilent E5515C via a GPIB 488 interface and the MIP-5850 mobile IP simulator via an ethernet interface. The user is expected to be versed in the operation of these devices. While the script controls the MIP-5850 and the test set, the user is required to control the mobile device under test. This is accomplished via script initiated popup prompts that describe specific action that the user should take (such as starting or ending a call) or information defining a particular mode for the mobile device (such as set to Simple IP mode).

**Figure 1-1. Test Setup Overview**



The previous figure shows the complete Mobile IP network test system. The Agilent E5515C communications test set provides the required cdma2000 radio network emulation and control, containing the radio link, call setup, and Inter-Working Function (IWF) needed for packet data communications. Please note that the MIP-5850 supports only a single mobile station. The MIP-5850 provides the additional IP network elements needed to complete the Mobile IP network simulation environment, namely the simulated PDSN, Foreign Agent (FA), and Home Agent (HA). The PC provides the platform that runs the Conformance Scripts and is used to configure and control the MIP-5850.

# Chapter 2. Installation

This chapter will tell you:

- How to confirm you that have all the components of the Conformance Scripts
- What additional components you are required to supply
- How to connect the components
- How to install the Conformance Scripts and supporting programs and drivers

The user should have setup and configured the MIP-5850 and Agilent E5515C and be familiar with their operation.

- The CSP is located on the "CSP-5850" CD. In addition to the scripts, there are Python libraries and drivers, GPIB drivers, the WireShark protocol viewer, this manual and copies of other documentation that may be useful.

The user is expected to provide the following items:

- A Windows PC that is connected to the Ethernet network and the below described GPIB interface. It is very useful to have a spare RS-232 port to communicate with the MIP-5850 during setup and configuration. If you are planning to use the IOtech Micro488/P adapter, then the PC needs to have an available serial port for it also.
- A GPIB 488 interface and cable for communications between the Agilent E5515C and the Script package. These scripts have been tested with the IOtech Micro488/P (serial to GPIB) and the National Instruments PCI-GPIB.NI-488.2M for Windows (PCI card). Drivers are provided for these two interfaces. Other cards and drivers should work once the new drivers are installed.
- Several ethernet cables and an ethernet hub to connect all the devices.

Connect the Agilent E5515C, The MIP-5850, the controller PC and the mobile device according to the connection diagram in Appendix C

The MIP-5850 and the Agilent E5515C, and the PC all need to be connected to the Ethernet network. As part of this process you should decide whether you want to use DHCP to assigned IP address for the PC and MIP-5850, or to manually assigned IP addresses to all three of the devices.

The Agilent E5515C needs to have a static IP address assigned to it. It does not have an option to use DHCP. It also seems to work better when plugged into the ethernet before being powered on.

Regarding the PC, you can check to see if it has been configured for IP by running "ipconfig /all" in a command prompt. If you do not see an IP address, you need to check the configuration. If you are attempting to use DHCP to assign it an IP address, please check to make sure all the ethernet cables are correctly plugged in and the hubs and routers are all plugged in and powered. (For a good ethernet cable, you can hear a 'click' when the cable is plugged in.)

For the MIP-5850, you may either assigned a static IP address using AT commands over a serial connection, or if you have a DHCP server (such as a linksys router) on the ethernet, you may allow it to use DHCP to allocate an IP address. Please refer to the MIP-5850 manual for configuration instructions.

#### Installation of the software

- Python installation.

There are four pieces of the installation for python and libraries. In order, the files to install are:

python-2.4.1.msi: The python interpreter

ctypes-1.0.2.win32-py24.exe: c-Types library

pyserial-2.0.win32.exe: Serial Communications library

wxPython2.8-win32-ansi-2.8.9.1-py24.exe: wxPython GUI library

- GPIB 488 driver installation.

For the ioTech Micro448/P, the `iot488_gpib.py` driver uses the python Serial Communications library to communicate over the GPIB bus. In "config.py", this driver uses the "iot488" prefix in the GPIB description.

For a National Instruments card, the `ni_gpib.py` driver uses the c-Types library to access the drivers provided with the card. You will need to follow the instructions provided by National Instruments for installing their drivers. (If the NI GPIB card was already install, then the drivers may already be present.)

- MIP-5850 Installation

If you have not already configured the MIP-5850, please take a moment to do so.

For configuration using the MOB-IP-SIM Manager (available on the MIP CD), you need to connect a Null Modem cable between the PC and the MIP-5850. Before running the program, please take a moment to check your PC clock. MOB-IP-Sim Manager will synchronize the time and date on the MIP-5850 to the time and date on the PC. If the PC time is not correct, the timestamps in the log files will be incorrect.

- Script Installation

You should create a working directory for the scripts and log files. Once you have decided where to keep you working directory, copy all the python (\*.py) files from the Conformance Scripts CD into the working directory.

- Other Utilities.

Install as needed.

# Chapter 3. Configuration

This chapter will suggest items that need to be configured to ensure proper script operation:

- How to configure the Conformance Scripts for use
- How to set up your MIP-5850 for testing
- How to set up your test set for testing
- How to set up your wireless device for testing

## CSP Configuration

This section outlines the setup of the script configuration database. The Conformance Scripts are provided with a configuration file "config.py". This file contains the necessary information for the scripts to control Agilent E5515C and MIP-5850. The file is an ASCII file. The "#" is used to indicate a comment or to comment out a given selection.

The script system should be fully exited and restarted in order for changes to config.py to take effect.

## **PPP Saved in Log Enable**

Enables or disables the saving of the PPP log information in the script log. Set the variable to True or False

```
include_ppp_packets_in_log = False
```

## GPIB Driver Selection

Select the appropriate GPIB driver and comment out the others. The example selects the National Instruments GPIB driver.

```
testsets=[]
# GPIB device names:
# "ni:BOARDNUM:ADDRESS": National Instruments GPIB board number BOARDNUM
# "iot488:PORT:ADDRESS": IOtech Micro-488 on com PORT.
testsets.append(TestSet(GPIB("ni:0:14")))
#testsets.append(TestSet(GPIB("iot488:6:14")))
```

To use an IO Tech adapter attached to COM6 with the Agilent E5515C configured at GPIB address 14:

```
#testsets.append(TestSet(GPIB("ni:0:14")))
testsets.append(TestSet(GPIB("iot488:6:14")))
```

## Cellular System Parameters

The Conformance Scripts needs to know some system parameters in order to program the Agilent E5515C. Band is normally either 'uscellular' or 'uspcs'. Refer to the E5515C manual for other possible parameter values for the ":CALL:BAND" gpib command. There are two sets of values given, one for the normal call and one for the handoff target.

You should adjust the values for band, channel, sid, and nid to match those expected by the mobile device being tested.

In the following example, the primary channel used is ch. 350 of the PCS band. It will be configured to have a SID of 4274 and NID of 1:

```
# {sid,nid,band,channel}1 are used for the control channel the mobile
# is expected to acquire in most scripts.
sid1=4274
nid1=1
band1='uspcs'
channel1=350
```

# The mobile should also be able to acquire {sid,nid,band,channel}2 for handoff purposes.

```
sid1=sid2=22
nid2=2
band2='uspcs' # 'uscellular'
channel2=666
```

This completes the Conformance Scripts configuration.

## MIP-5850 Configuration

The MIP-5850 must be configured for normal operation in your system and the specific wireless device under test. The user should be able to place calls and transmit/recieve data before trying script operation. The scripts modify the MIP database as needed for each of the tests. Use the Mobile IP Simulator for the Agilent E5515C:User Manual for the correct setup procedures. At a minimum, the following values need to be set:

Configuration -> PPP -> Username

Configuration -> PPP -> Password / shared secret

Primary DNS for phone

Home Agent IP Address, Netmask, secret, and SPI

This completes the MIP-5850 setup.

## Agilent E5515C Configuration

The Agilent E5515C needs to be configured with a static IP address, a GPIB address, and the IP address for the MIP-5850.

The GPIB address programmed into the Agilent E5515C must match the GPIB address in "config.py". The default (example) config.py uses 14 as the GPIB address of the Agilent E5515C. To set the Agilent E5515C GPIB Address, first select "System Config" button (found in the "Screens" box on the front panel). Then, on the left hand side of the screen, you should see "Instrument Setup" (F1 key). Select that, and the window open has the settings for GPIB Address, LAN (ethernet) IP Address, Subnet Mask, and UTC Date/Time.

Mobile IP typically uses cdma2000 Service Option 33 for data calls. All the normal data call setup parameters on the E5515C apply to mobile IP and are not covered in this manual. The E5515C configuration does need to include setting the External PDSN IP Address of the MIP-5850 unit. If the MIP-5850 is configured to use DHCP to allocate an address, you can use the AT command "at+ipdhcaddr?" to query its IP address from its serial port. The E5515C is also assumed to be set up and ready to handle standard data calls.

This completes the E5515C setup.

## Mobile Device Configuration

For simple IP tests, the username and password must match the username and password set on the MIP-5850 PPP configuration page.

For mobile IP tests, the Mobile IP shared secret and spi values should match those entered for the home agent on the MIP-5850 Mobile IP configuration page

If you plan to use a mobile phone's built-in browser, you will need to set the browser's home page to something that can be accessed when the browser is launched. The suggested home page setting is `http://mobipsimaddress/mobipdemo.htm` where `mobipsimaddress` is the MIP-5850 address.

If you plan to use the mobile as a wireless modem from a PC, follow the phone manufacturer's instructions for configuring this connection.

Generally the user must be able to set IP addresses in the phone as well as different modes (such as Simple IP).

Check to make sure you have completed the following steps before attempting a Mobile IP Call:

- The MIP-5850 was set up on the network and its IP address was recorded on the worksheet.
- The mobile station provisioning parameters related to Mobile IP were recorded on the Configuration Worksheet.
- The MIP-5850 was configured using the data from the Configuration Worksheet.
- The E5515C was successfully configured.
- The test phone was configured to use either its built-in browser with a valid home page or to act as a wireless modem for a PC-based web browser.

Things to consider when testing Mobile IP operation:

Mobile IP establishes an IP connection on the first call attempt. The traffic channel may be released by the phone's dormant mode inactivity timer, by closing the dial up connection, by exiting the built-in browser, or by manually releasing the call from the E5515C. In most cases, the IP connection remains active even though the call is released. Phones typically have an icon to show this state where the connection is dormant. You will need to become familiar with the characteristics of the mobile device you are using to verify this state.

**Note:** The phone may unexpectedly start and end Mobile IP call sessions due to dormant timer expirations and registration lifetime expirations. This behavior is often confusing to first time Mobile IP users.

# Chapter 4. Operation

This chapter will teach you:

- How to run scripts
- Script operation with sample screens
- How to change configuration
- How to modify scripts

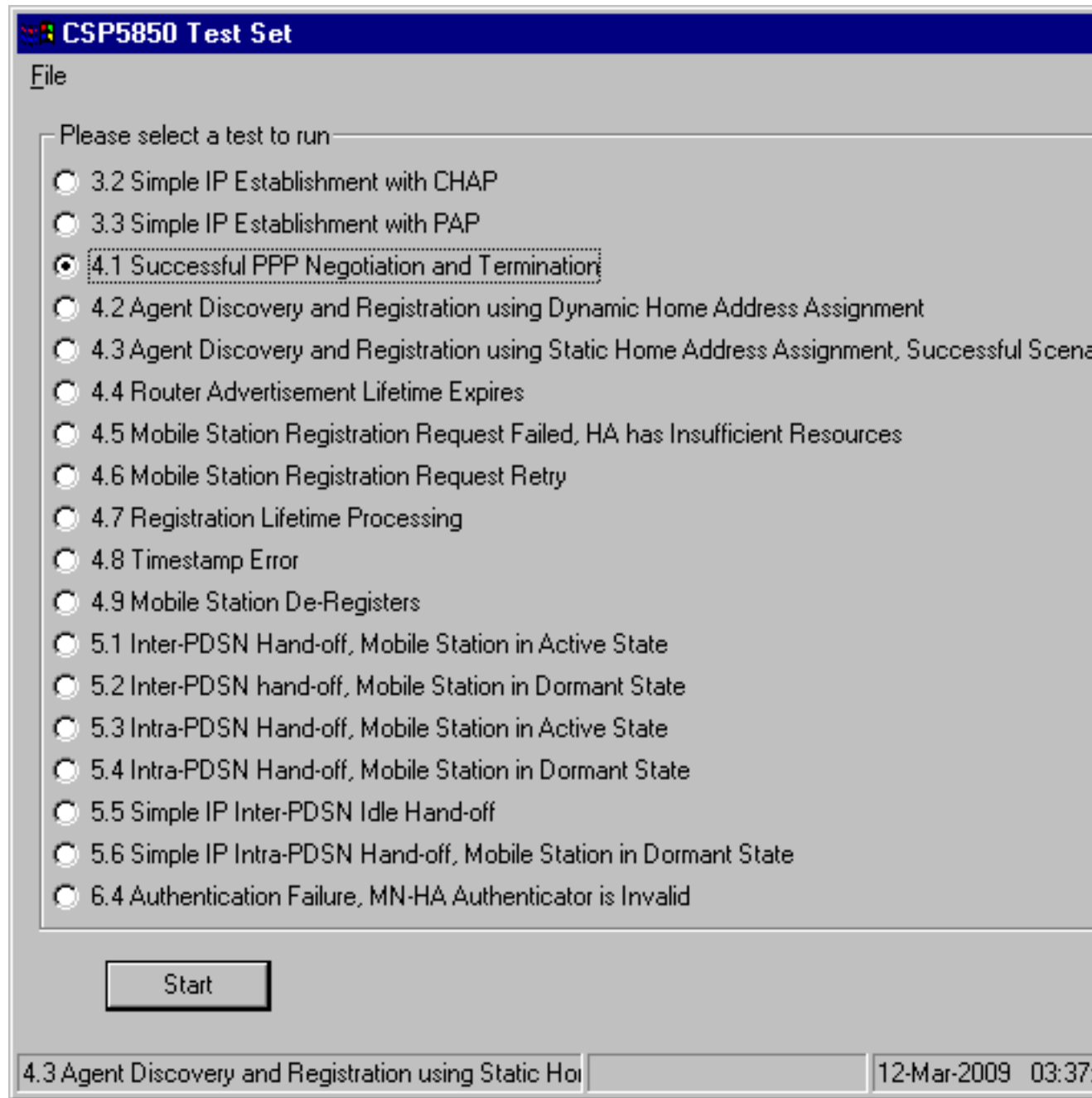
## Script Startup

Once the system is configured such that the wireless device can make data calls, and the Conformance Scripts has been properly installed the user is ready to execute scripts.

From the command prompt, the user executes `ct_main.py`. A window is displayed that shows the available scripts. The user can select the desired script and hit the start button. Only one script can be run at a time.

For most scripts, the testset setup takes around 20 seconds to complete. You will normally see a popup prompt requiring the operator to take an action (normally starting a call).

Figure 4-1. Script Selection



## Script Execution

Once a selected script starts a status window and a log widow are displayed. The status window lists the specific functions that must be executed in order for the script to pass. On the left hand side of the

functions is a placeholder to indicate pass/fail for each step. Generally the E5515C and MIP setup are the first functions performed. The log will show each bit of communications between the entities and the results. Once the setup is complete the "setup" function is marked as "pass". The script then begins the next step. If the user is required to perform a function on the device under test, a prompt window pops up directing the user to take an action. The prompt typically provides suggested methods such as the AT command that may be used to implement the action. The prompt may also ask the user to verify state or action of the device under test. The script proceeds through the steps until all have passed. If there is a failure, the script stops at that step. Generally it is up to the user to ensure the device under test is in the correct mode for the next test.

Once the script completes, the information in the status screen is added to the end of the log. if the "include\_ppp\_packets\_in\_log = True" in the config file, the ppp dump is obtained from the MIP-5850 and placed in the log file (after the standard log and before the status information). The entire log is then saved to disk. Note that the TCP dump can be enabled or disabled via the configuration database.

Note that the scripts poll the MIP-5850 to determine if a specific action has happen. if the MIP-5850 has not received the message, it returns ERROR as seen in the below log. This is expected behavior and does not indicate a problem. However, if it does not see the required message in an appropriate time, it should be considered a failure. Generally there are no time limits placed on a wait for a message if the message is initiated by user action.

The format for the file name is:

testnumber testname yyyyymmddhhmmss.log

**Figure 4-2. Script Execution - Typical Status Screen**

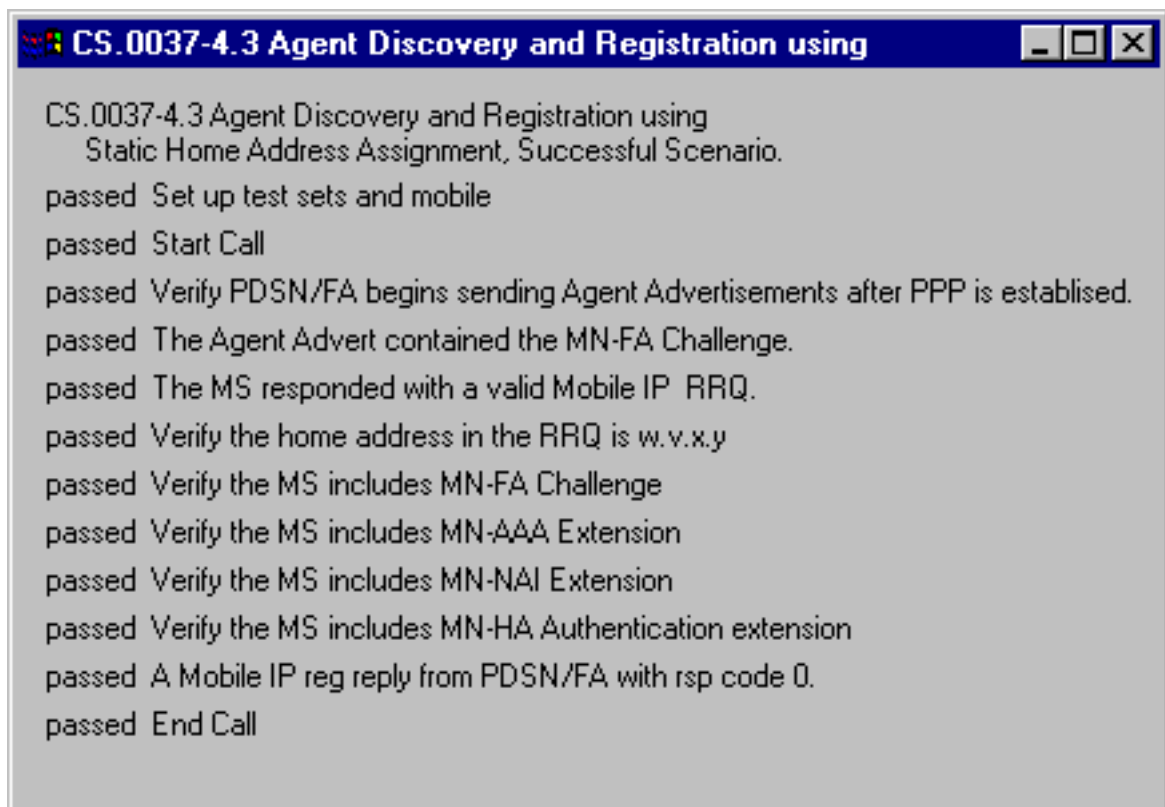


Figure 4-3. Script Execution - Typical Prompt Screen

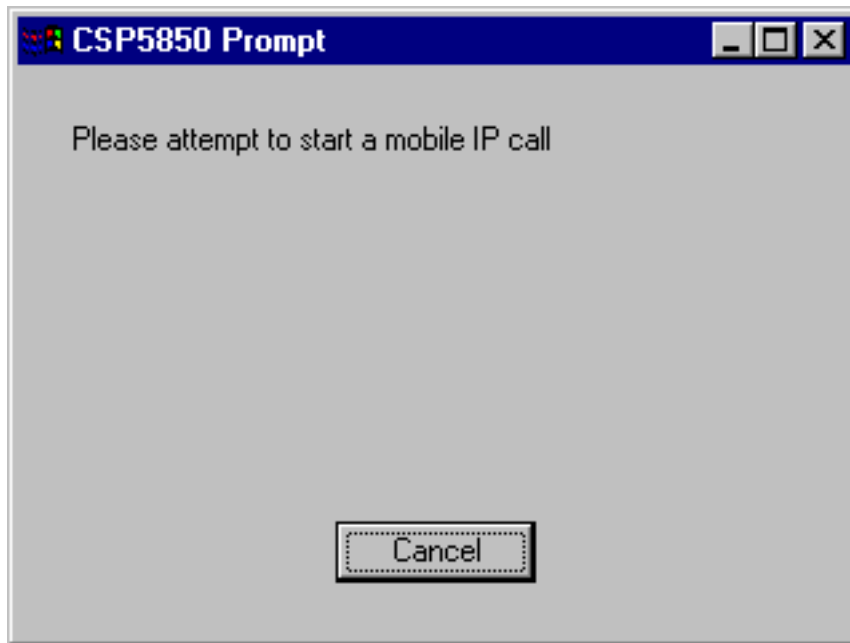


Figure 4-4. Script Execution - Typical Log Screen

```

4.3 Agent Discovery and Registration using Static 2009Mar12143407.log
14:34:46 - MOBIPSIM:at+capfind=0,lcp.term_ack
14:34:46 - MOBIPSIM:=> ERROR
14:34:48 - MOBIPSIM:at+capfind=0,lcp.term_ack
14:34:49 - MOBIPSIM:=> ERROR
14:34:51 - MOBIPSIM:at+capfind=0,lcp.term_ack
14:34:51 - MOBIPSIM:=> +CAPFIND: 53
14:34:51 - MOBIPSIM:=> OK
14:34:51 - Term-Ack found at index 53
14:34:51 - MOBIPSIM:at+capstop
14:34:52 - MOBIPSIM:=> OK
14:34:52 - passed End Call
14:34:52 - PASS
14:34:52 -
14:34:52 -
14:34:52 - Script Completed
14:34:52 -
14:34:52 - CS.0037-4.3 Agent Discovery and Registration using
14:34:52 -   Static Home Address Assignment, Successful Scenario.
14:34:52 - passed   Set up test sets and mobile
14:34:52 - passed   Start Call
14:34:52 - passed   Verify PDSN/FA begins sending Agent Advertisements after PPP is established.
14:34:52 - passed   The Agent Advert contained the MN-FA Challenge.
14:34:52 - passed   The MS responded with a valid Mobile IP RRQ.
14:34:52 - passed   Verify the home address in the RRQ is w.v.x.y
14:34:52 - passed   Verify the MS includes MN-FA Challenge
14:34:52 - passed   Verify the MS includes MN-AAA Extension
14:34:52 - passed   Verify the MS includes MN-NAI Extension
14:34:52 - passed   Verify the MS includes MN-HA Authentication extension
14:34:52 - passed   A Mobile IP reg reply from PDSN/FA with rsp code 0.
14:34:52 - passed   End Call

```

## Changing Script Configuration

Script configuration can be changed by editing the file `config.py`. This file also contains Python commands that should not be changed. See Chapter 3 for items in the configuration.

**Note:** The script program (`ct_main.py`) must be stopped and restarted if the config file is changed as it stores some of these values up start up.

## **Script Modification**

The scripts are written in Python. A person knowledgeable in Python and CDMA cellular systems may modify the scripts. The scripts are ASCII files and are not locked or encrypted in any manner.

# Chapter 5. Scripts

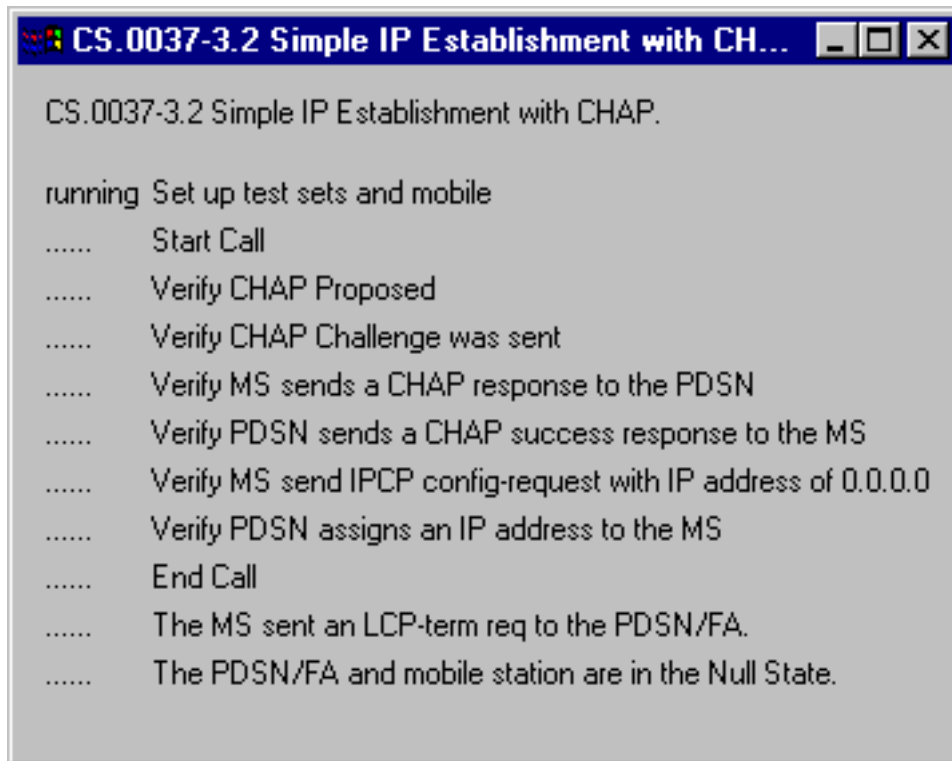
This chapter defines the scripts supported and general information to assist in running them. A few items are worth noting:

- Test section 3 covers Simple IP data call originations. The wireless device must be set to originate the data call in Simple IP mode. This may be accomplished by sending the wireless device an AT\$QCMIP=0 command. The user's device may require a different method.
- Test section 4 covers Mobile IP agent discovery and registration. The wireless device must be set to originate the data call in Mobile IP mode. This may be accomplished by sending the wireless device an AT\$QCMIP=2 command. The user's device may require a different method.
- Test sections 5.1-5.4 cover Mobile IP inter and intra PDSN handoff. The wireless device must be set to originate the data call in Mobile IP mode. This may be accomplished by sending the wireless device an AT\$QCMIP=2 command. The user's device may require a different method.
- Test sections 5.5-5.6 cover Simple IP inter and intra PDSN handoff. The wireless device must be set to originate the data call in Simple IP mode. This may be accomplished by sending the wireless device an AT\$QCMIP=0 command. The user's device may require a different method.
- Test section 6.4 covers mobile response to Authentication Failure

## Test 3.2 Simple IP Establishment with CHAP

This test verifies the proper operation of Simple IP with CHAP authentication. This test verifies the mobile station can terminate the PPP session. The wireless device must be set to originate the data call in Simple IP mode.

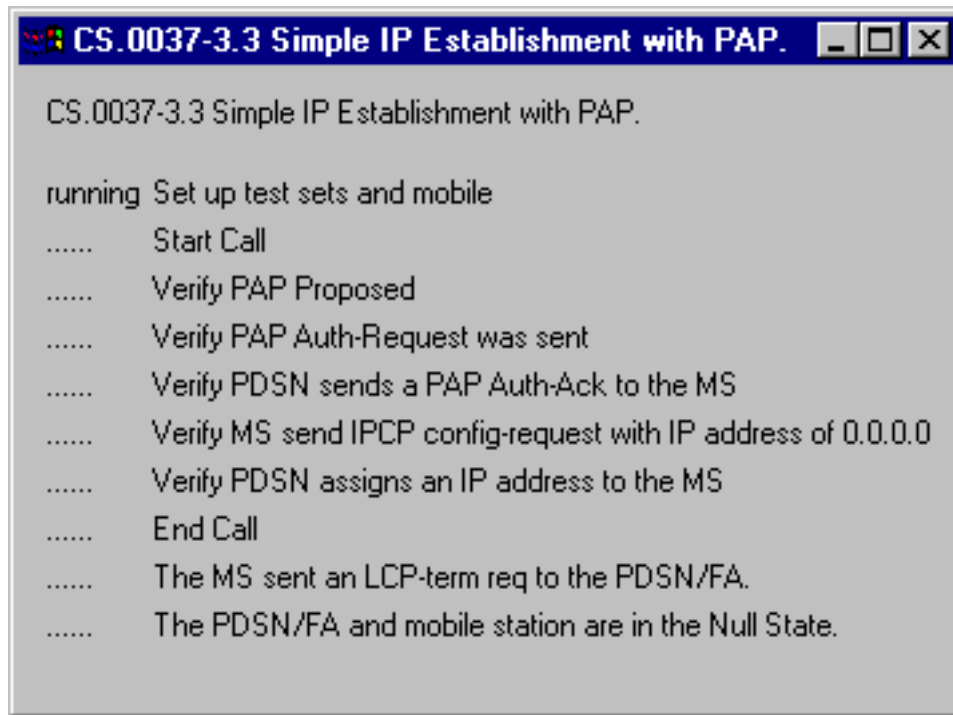
Figure 5-1. Simple IP with CHAP



### Test 3.3 Simple IP Establishment with PAP

If the mobile station supports using PAP and can be configured to prefer PAP instead of CHAP, this test verifies the proper operation of Simple IP with PAP authentication. The wireless device must be set to originate the data call in Simple IP mode.

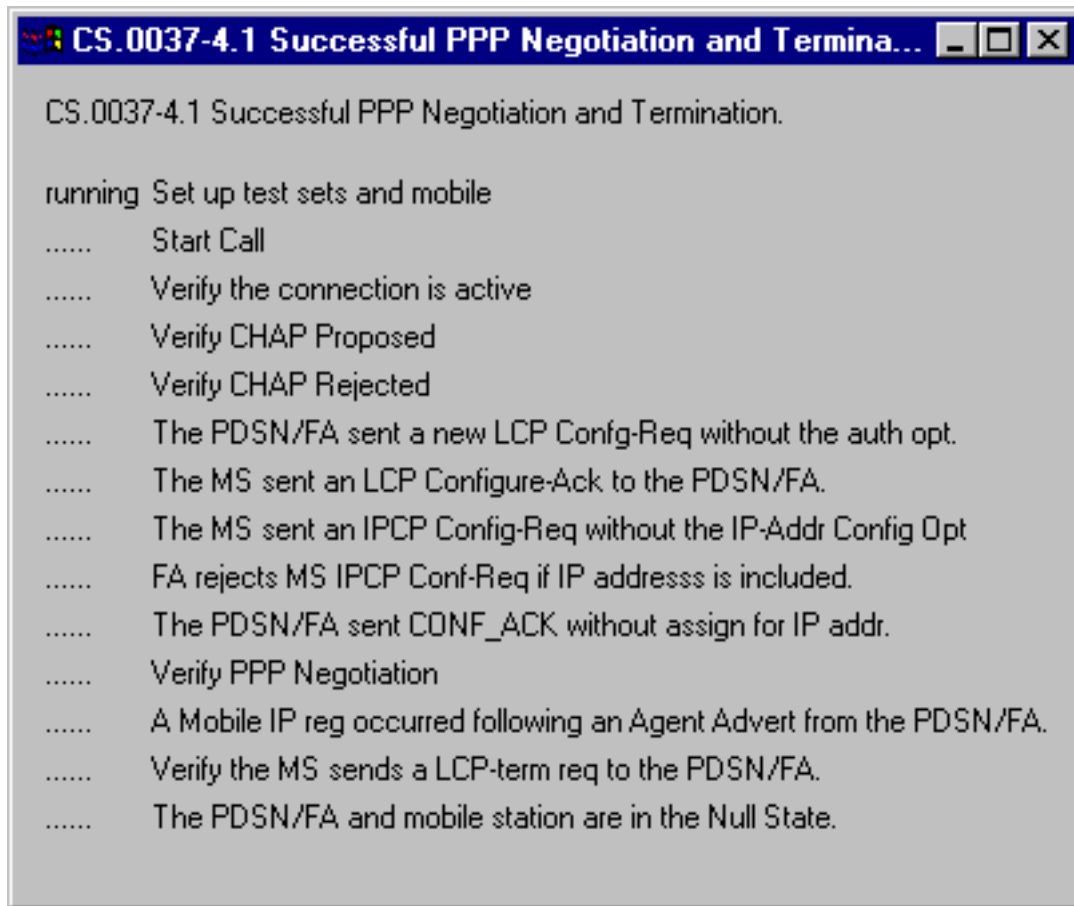
Figure 5-2. Simple IP with PAP



## Test 4.1 Successful PPP Negotiation and Termination

This test verifies that the mobile station and PDSN/FA can successfully negotiate a PPP session when initiating a Mobile IP call. This test verifies the mobile station will not include an IP-Address Configuration Option in the IPCP Configure-Request and the PDSN shall not assign an IP address to the mobile station in IPCP. This test also verifies the mobile station can successfully terminate the PPP session. The wireless device must be set to Mobile IP mode.

Figure 5-3. PPP Negotiation and Termination



```

CS.0037-4.1 Successful PPP Negotiation and Termina...
CS.0037-4.1 Successful PPP Negotiation and Termination.

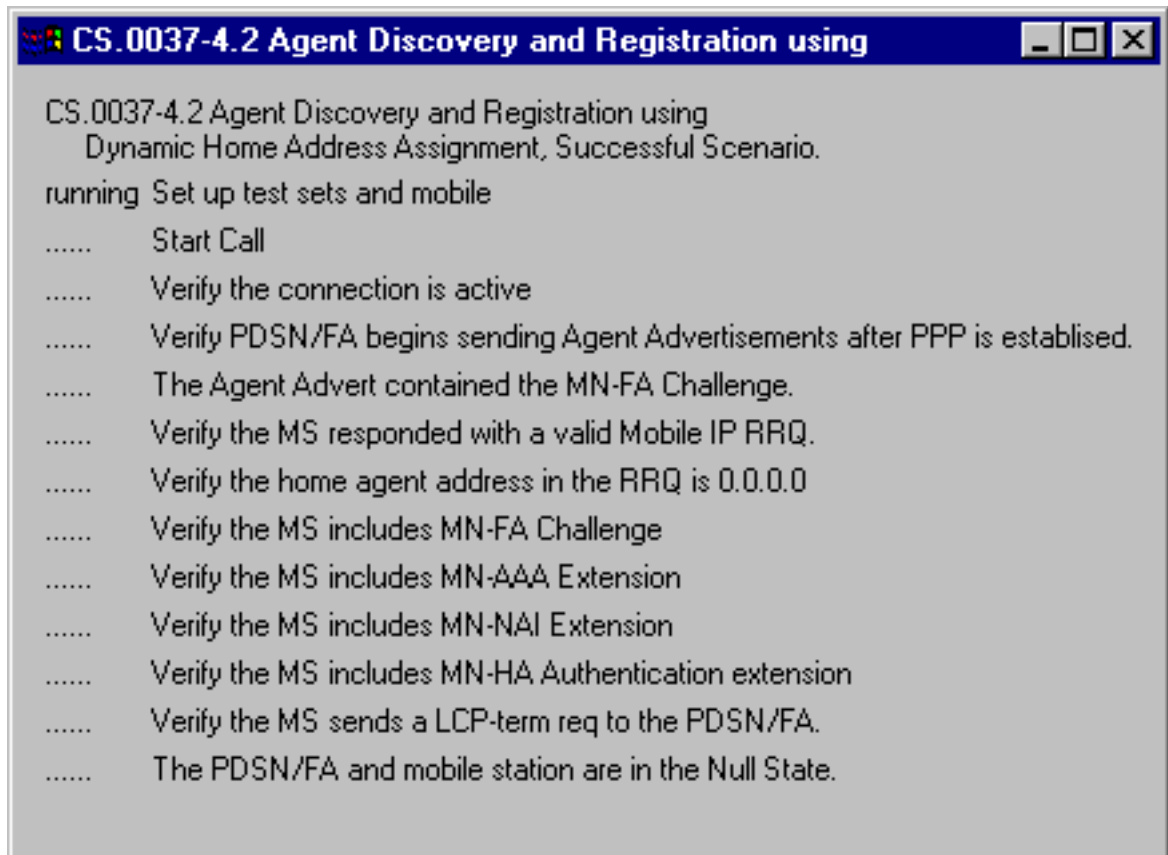
running Set up test sets and mobile
..... Start Call
..... Verify the connection is active
..... Verify CHAP Proposed
..... Verify CHAP Rejected
..... The PDSN/FA sent a new LCP Config-Req without the auth opt.
..... The MS sent an LCP Configure-Ack to the PDSN/FA.
..... The MS sent an IPCP Config-Req without the IP-Addr Config Opt
..... FA rejects MS IPCP Conf-Req if IP addresss is included.
..... The PDSN/FA sent CONF_ACK without assign for IP addr.
..... Verify PPP Negotiation
..... A Mobile IP reg occurred following an Agent Advert from the PDSN/FA.
..... Verify the MS sends a LCP-term req to the PDSN/FA.
..... The PDSN/FA and mobile station are in the Null State.

```

## Test 4.2 Agent Discovery and Registration using Dynamic Home Address Assignment

This test verifies that the PDSN/FA sends Agent Advertisements upon the establishment of a PPP Session and the mobile station processes the Agent Advertisement correctly. The Mobile IP Registration Request (RRQ) and Mobile IP Registration Reply (RRP) process is verified. The Home Agent address must be set to 0.0.0.0. This may be accomplished by sending the wireless device an AT\$QCMIPHA=0.0.0.0,1 command. The user's device may require a different method.

Figure 5-4. Agent Discovery and Registration, Dynamic HA Address



```

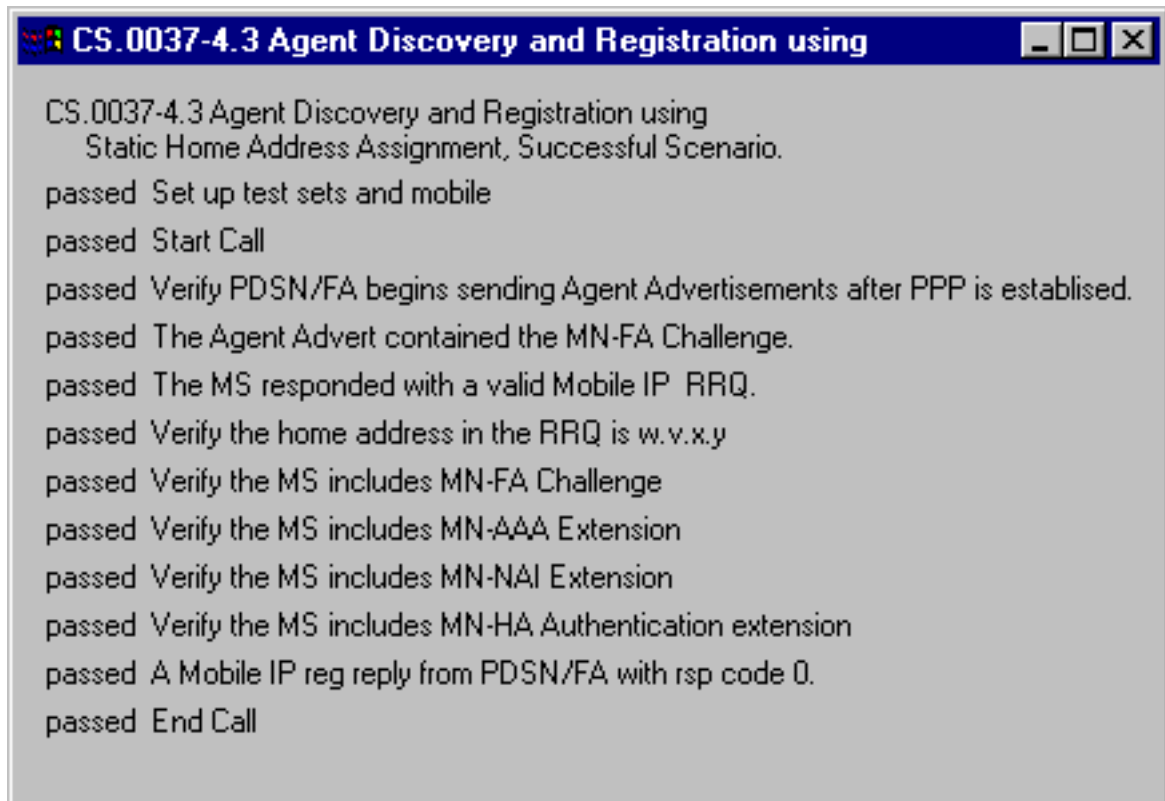
CS.0037-4.2 Agent Discovery and Registration using
Dynamic Home Address Assignment, Successful Scenario.
running Set up test sets and mobile
..... Start Call
..... Verify the connection is active
..... Verify PDSN/FA begins sending Agent Advertisements after PPP is established.
..... The Agent Advert contained the MN-FA Challenge.
..... Verify the MS responded with a valid Mobile IP RRQ.
..... Verify the home agent address in the RRQ is 0.0.0.0
..... Verify the MS includes MN-FA Challenge
..... Verify the MS includes MN-AAA Extension
..... Verify the MS includes MN-NAI Extension
..... Verify the MS includes MN-HA Authentication extension
..... Verify the MS sends a LCP-term req to the PDSN/FA.
..... The PDSN/FA and mobile station are in the Null State.

```

## Test 4.3 Agent Discovery and Registration using Static Home Address Assignment, Successful Scenario

This test verifies that the PDSN/FA sends Agent Advertisements upon the establishment of a PPP Session and the mobile station processes the Agent Advertisement correctly. This test also verifies the Mobile IP Registration Request (RRQ) and Mobile IP Registration Reply (RRP) are processed correctly. The Home Agent address in the wireless device must be set to the Home Agent address that is configured in the MIP-5850. The script prompt will display this address. The user may be able to set the address by sending the wireless device an AT\$QCMIPHA=a.b.c.d,1 command where a.b.c.d is the Home Agent address. The user's device may require a different method.

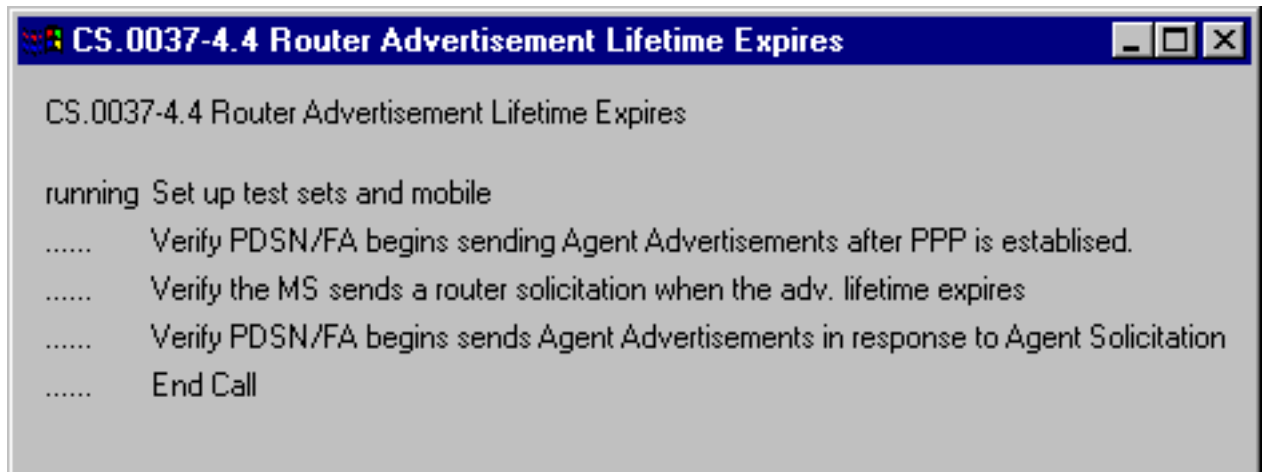
Figure 5-5. Agent Discovery and Registration, Static HA Address



## Test 4.4 Router Advertisement Lifetime Expires

Perform this test only if the mobile station supports sending an Agent Solicitation after the FA Router Advertisement Lifetime expires. If sent, the FA shall respond with Agent Advertisements including a new FA challenge value. Most modules do not support this feature.

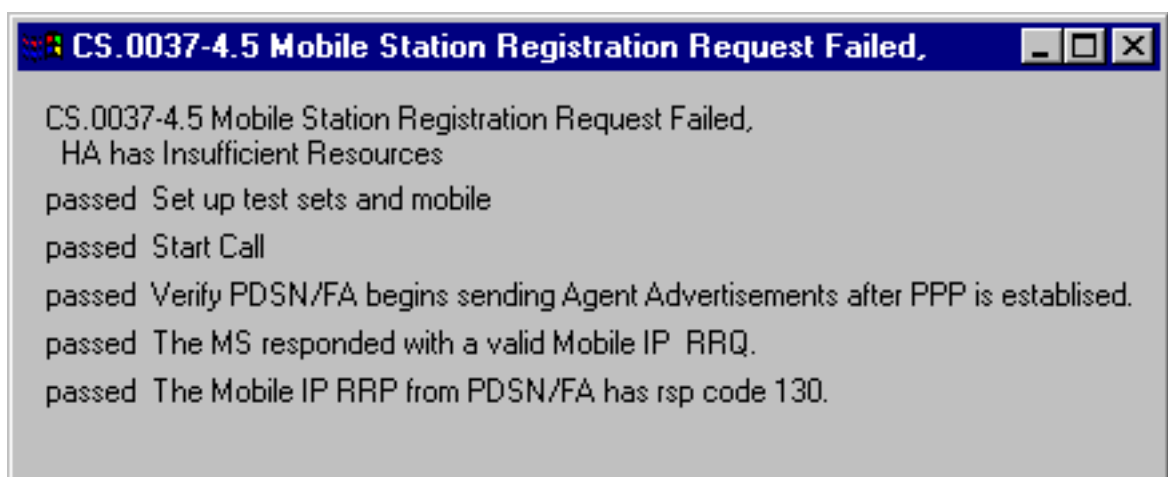
Figure 5-6. Router Advertisement Lifetime Expires



## Test 4.5 Mobile Station Registration Request Failed, HA has Insufficient Resources

This test verifies that when the mobile station initiates a dynamic Mobile IP call, the Mobile IP RRQ is denied due to insufficient HA resources. The HA will not have resources either because the HA address pool is not configured or all IP addresses in the address pool have been exhausted. The Home Agent address must be set to 0.0.0.0. This may be accomplished by sending the wireless device an AT\$QCMIPHA=0.0.0.0,1 command. The user's device may require a different method. Note that a call is never set up in this test. It is up to the user to clear any remnants of the call before proceeding.

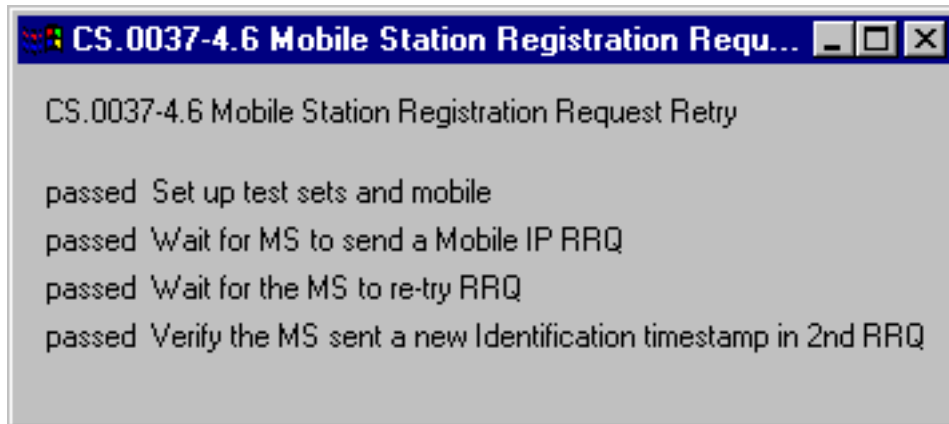
Figure 5-7. Registration Request Failed, Insufficient HA Resources



## Test 4.6 Mobile Station Registration Request Retry

This test verifies the mobile station re-sends a Mobile IP Registration Request if the Registration Reply is not received. This test also verifies the mobile station uses a different ID in the new Registration Request. This test also verifies the mobile station and the HA support the mandatory replay protection using timestamps.

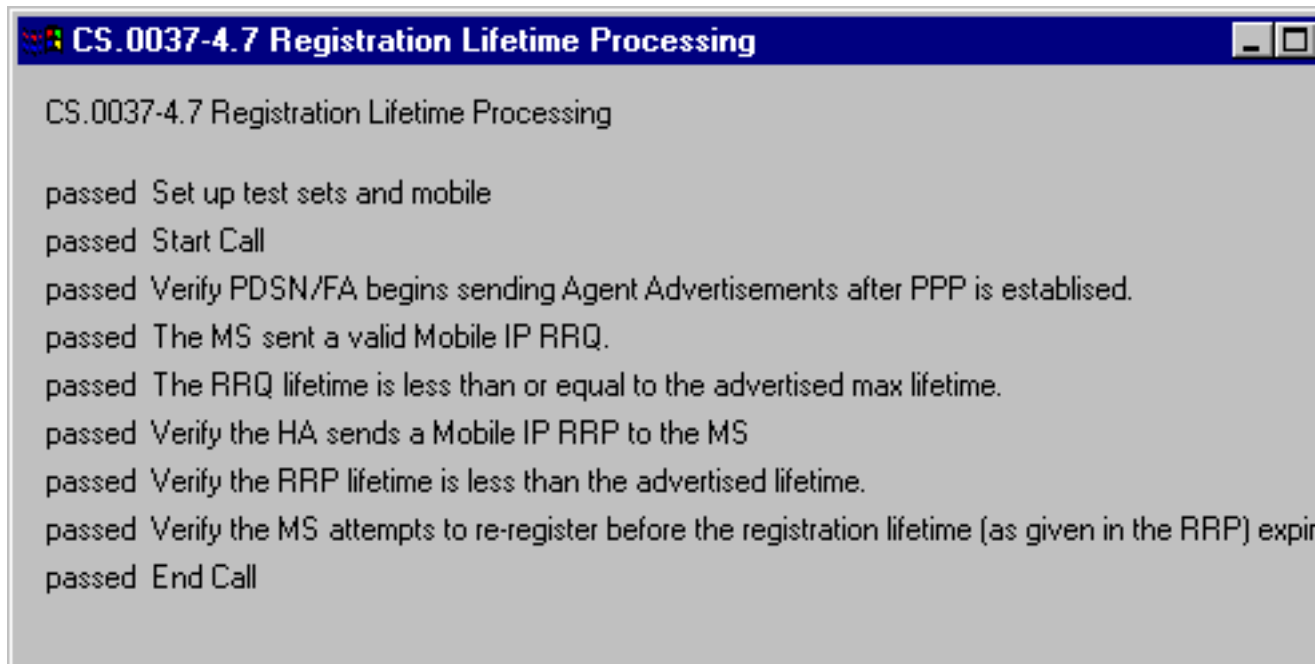
Figure 5-8. Mobile Station Registration Request Retry



## Test 4.7 Registration Lifetime Processing

This test verifies the mobile station accepts a Mobile IP Registration Reply with the registration lifetime less than the requested lifetime.

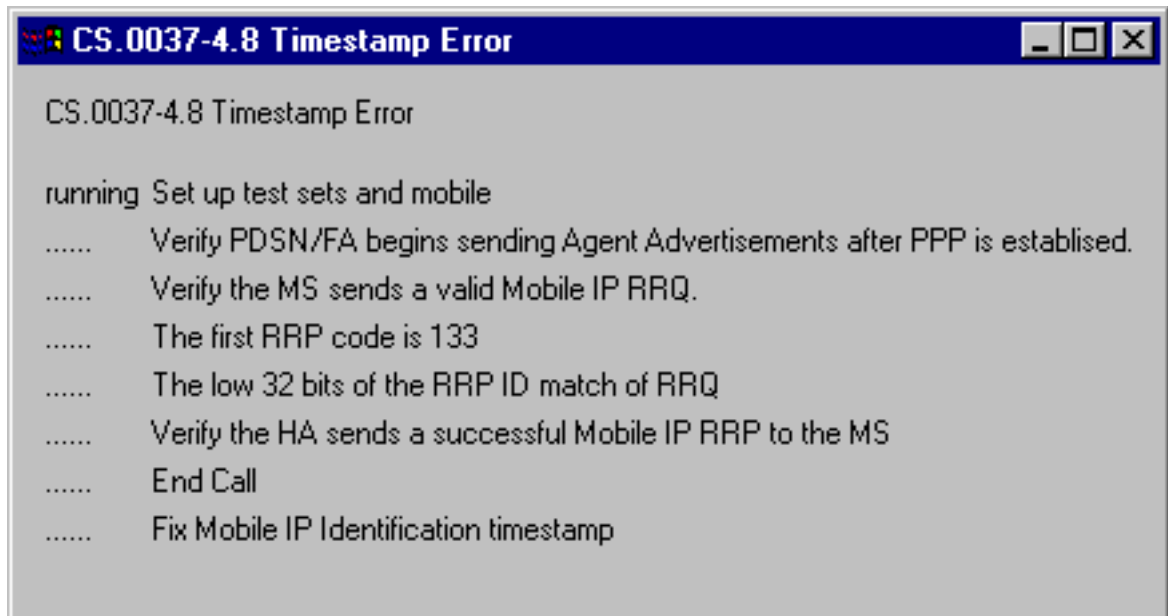
Figure 5-9. Registration Lifetime Processing



## Test 4.8 Timestamp Error

This test verifies the HA will reject the Mobile IP RRQ if the timestamp in the Mobile IP RRQ is incorrect when the mobile station initiates a dynamic or static Mobile IP call. Once this script test is completed, the user is requested to initiate another data call to allow the wireless device and the MIP-5850 to synchronize the correct time of day.

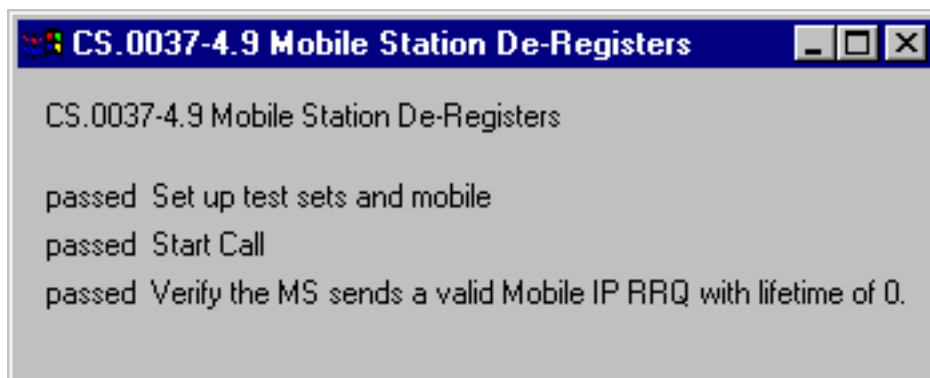
Figure 5-10. Timestamp Error



## Test 4.9 Mobile Station De-Registers

If the mobile stations supports de-registration, perform this test to verify the mobile station is able to de-register by setting the registration lifetime to 0 in the Mobile IP RRQ.

Figure 5-11. Mobile Station De-Registers

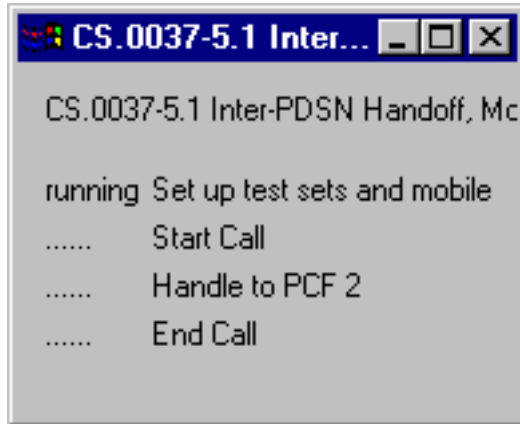


## Test 5.1 Inter-PDSN Hand-off, Mobile Station in Active

## State

This test verifies the successful handoff between PDSNs. The Inter-PDSN handoff will result in the establishment of a new PPP session, detection of the new FA and registration with the HA. PDSN 1 is associated with PCF 1 and PDSN 2 is associated with PCF 2.

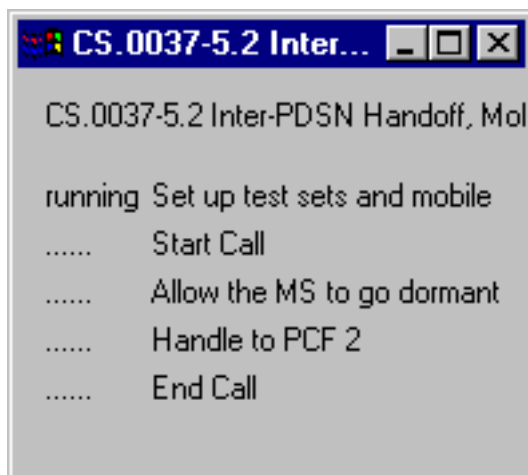
**Figure 5-12. Active State Inter-PDSN Hand-off**



## Test 5.2 Inter-PDSN hand-off, Mobile Station in Dormant State

This test verifies the mobile station can be successfully transitioned from the dormant state to the active state in order for an Inter-PDSN handoff to occur.

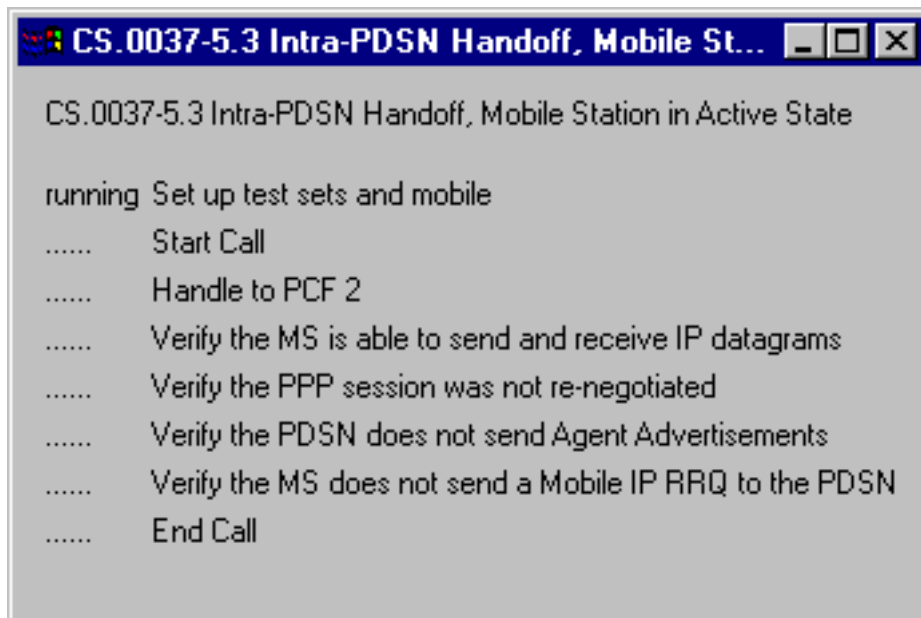
**Figure 5-13. Dormant State Inter-PDSN hand-off**



## Test 5.3 Intra-PDSN Hand-off, Mobile Station in Active State

This test verifies the successful handoff between PCFs on the same PDSN/FA. The Intra-PDSN handoff will result in a continuation of the same PPP session and no Mobile IP registration with the HA. The user is asked to verify that the wireless device can send and receive IP datagrams. This can be accomplished by either pinging an IP address or opening browser and bringing up a web page. Note: if the wireless device is connected to a computer, make sure the network link is through the wireless device and not through the local lan or some other connection.

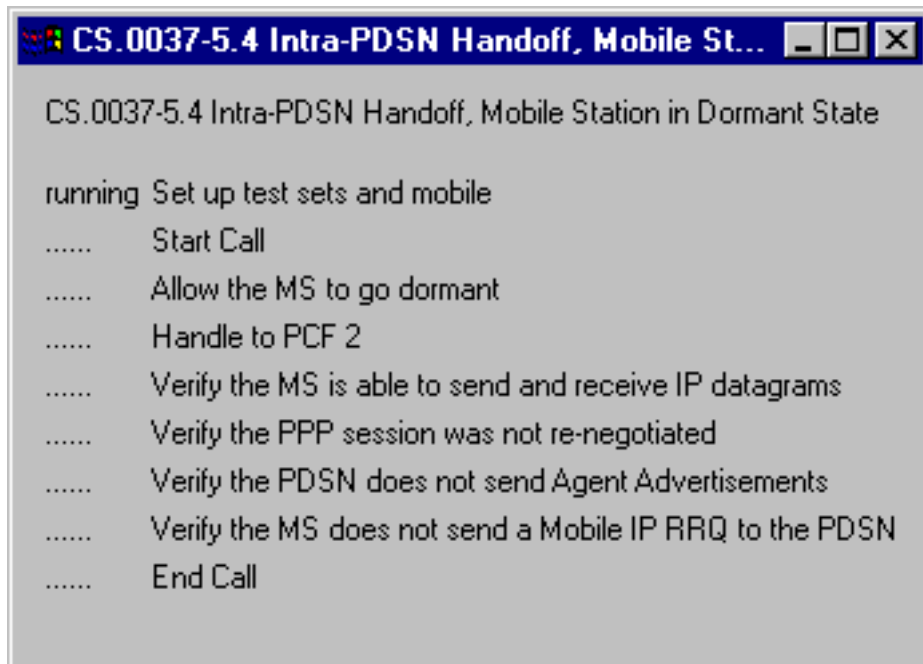
Figure 5-14. Active State Intra-PDSN Hand-off



## Test 5.4 Intra-PDSN Hand-off, Mobile Station in Dormant State

This test verifies the successful handoff between PCFs on the same PDSN/FA while the mobile station is in the dormant state. The Intra-PDSN handoff will result in a continuation of the same PPP session and no mobile IP registration with the HA. The user is asked to verify that the wireless device can send and receive IP datagrams. This can be accomplished by either pinging an IP address or opening browser and bringing up a web page. Note: if the wireless device is connected to a computer, make sure the network link is through the wireless device and not through the local lan or some other connection.

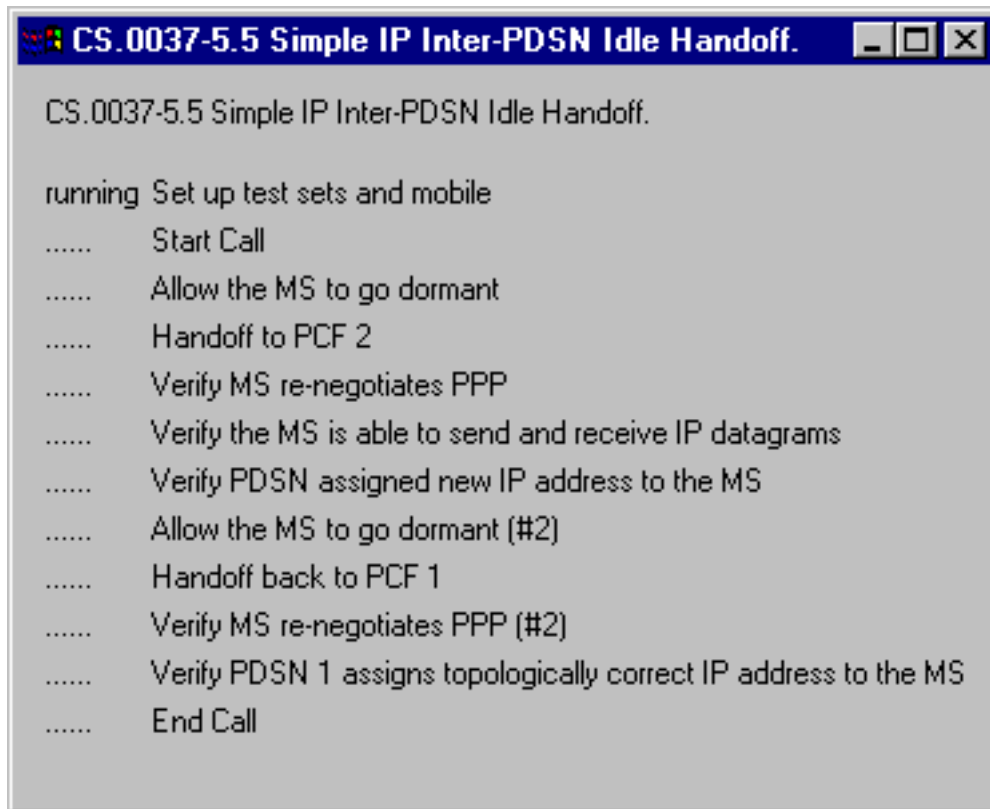
Figure 5-15. Dormant State Intra-PDSN hand-off



## Test 5.5 Simple IP Inter-PDSN Idle Hand-off

This test verifies the mobile station can be successfully transitioned from the dormant state to the active state in order for an Inter-PDSN idle handoff to occur. The result of the handoff to a new PDSN is a complete restart of PPP. PDSN 1 is associated with PCF 1 and PDSN 2 is associated with PCF 2. This test is only applicable to handheld devices. Devices that are connected to a computer allow the computer to handle the PPP in the Simple IP mode. The computer does not necessarily follow these rules.

Figure 5-16. Simple IP Inter-PDSN Idle Hand-off

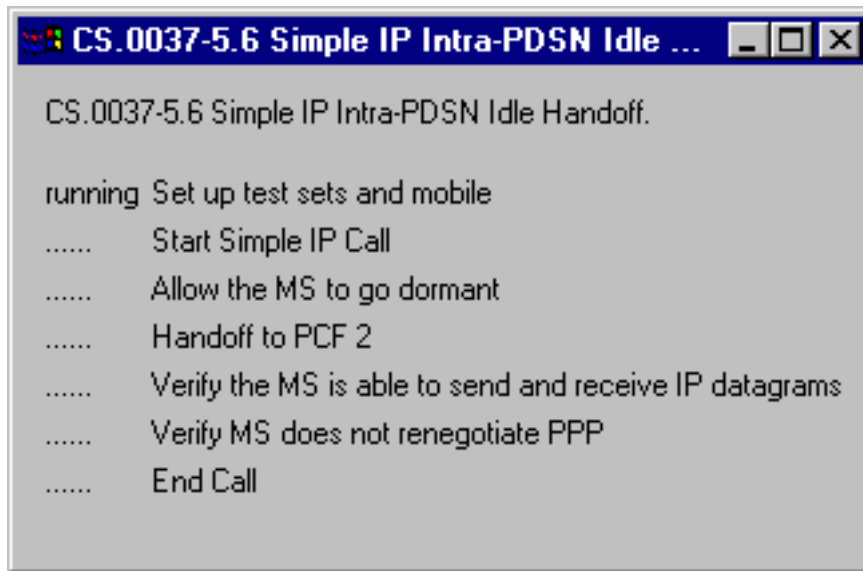


```
CS.0037-5.5 Simple IP Inter-PDSN Idle Handoff.  
CS.0037-5.5 Simple IP Inter-PDSN Idle Handoff.  
running Set up test sets and mobile  
..... Start Call  
..... Allow the MS to go dormant  
..... Handoff to PCF 2  
..... Verify MS re-negotiates PPP  
..... Verify the MS is able to send and receive IP datagrams  
..... Verify PDSN assigned new IP address to the MS  
..... Allow the MS to go dormant (#2)  
..... Handoff back to PCF 1  
..... Verify MS re-negotiates PPP (#2)  
..... Verify PDSN 1 assigns topologically correct IP address to the MS  
..... End Call
```

## Test 5.6 Simple IP Intra-PDSN Hand-off, Mobile Station in Dormant State

This test verifies the successful Simple IP handoff between PCFs on the same PDSN while the mobile station is in the dormant state. The Intra-PDSN handoff will result in a continuation of the same PPP session and no mobile IP registration with the HA.

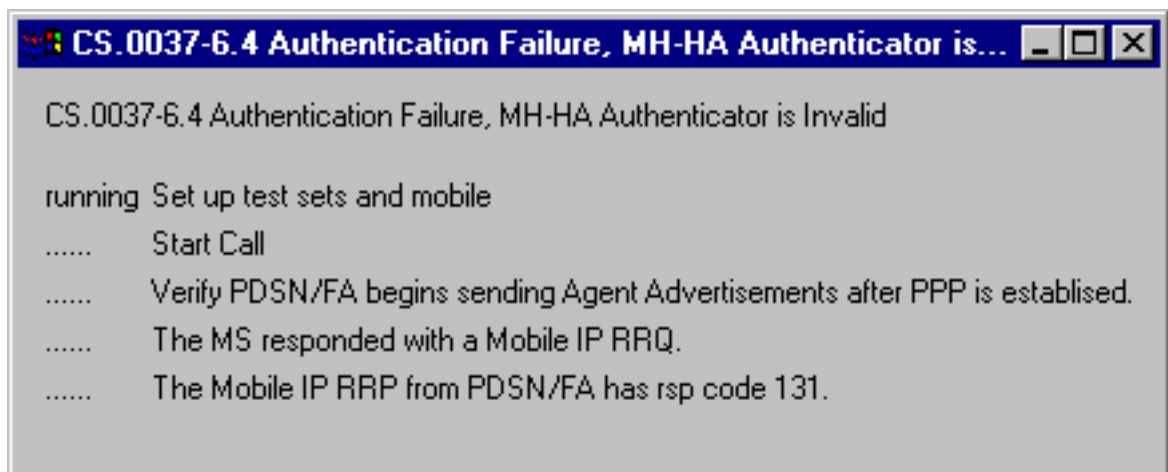
Figure 5-17. Dormant State Simple IP Intra-PDSN Hand-off



## Test 6.4 Authentication Failure, MN-HA Authenticator is Invalid

This test verifies that the mobile station will fail authentication if the authenticator in the MN-HA Extension is invalid. The HA shall set the Code field in the Mobile IP RRP to 131.

Figure 5-18. Invalid Authenticator



# Appendix A. Useful AT Commands for the Wireless Device

AT commands are used to set the configuration of the Wireless Device and to query the Wireless Device about its state or configuration.

AT\$QCMIP=x Sets the IP mode. x=0 - Simple IP, x=2 - Mobile IP (x=1 - either, which is useful in the real world, but not useful in testing and should not be used).

AT\$QCMIP? Prints the current IP mode.

AT\$QCMIPP? Prints the currently selected MIP profile.

AT\$QCMIPGETP=1 Gets profile #1 of the Wireless Device. (Many phones use profile #0 for simple IP configuration)

AT\$QCMIPEP=1 Enables the current profile

AT\$QCMIPHA=x.x.x.x,1 Sets the home address of the Wireless Device.

AT\$QCMIPPHA=x.x.x.x,1 Sets the primary home agent address used by the Wireless Device.

AT\$QCMIPNAI? Displays the identifier (username) for the current profile

AT\$QCMIPNAI=mobile\_device@softwareconceptsinc.net,1 Set the network access identifier (i.e. username) for the current profile

AT\$QCMIPMHSS=secret,1 Stores "secret" as the MN-Home Agent Shared Secret

AT\$QCMIPMHSPI=1234,1 Sets the MN-Home Agent SPI to 1234

AT\$QCMIPMASS=secret,1 Stores "secret" as the Mobile Node-AAA Shared Secret

AT\$QCMIPMASPI=1234,1 Sets the MN-AAA SPI to 1234

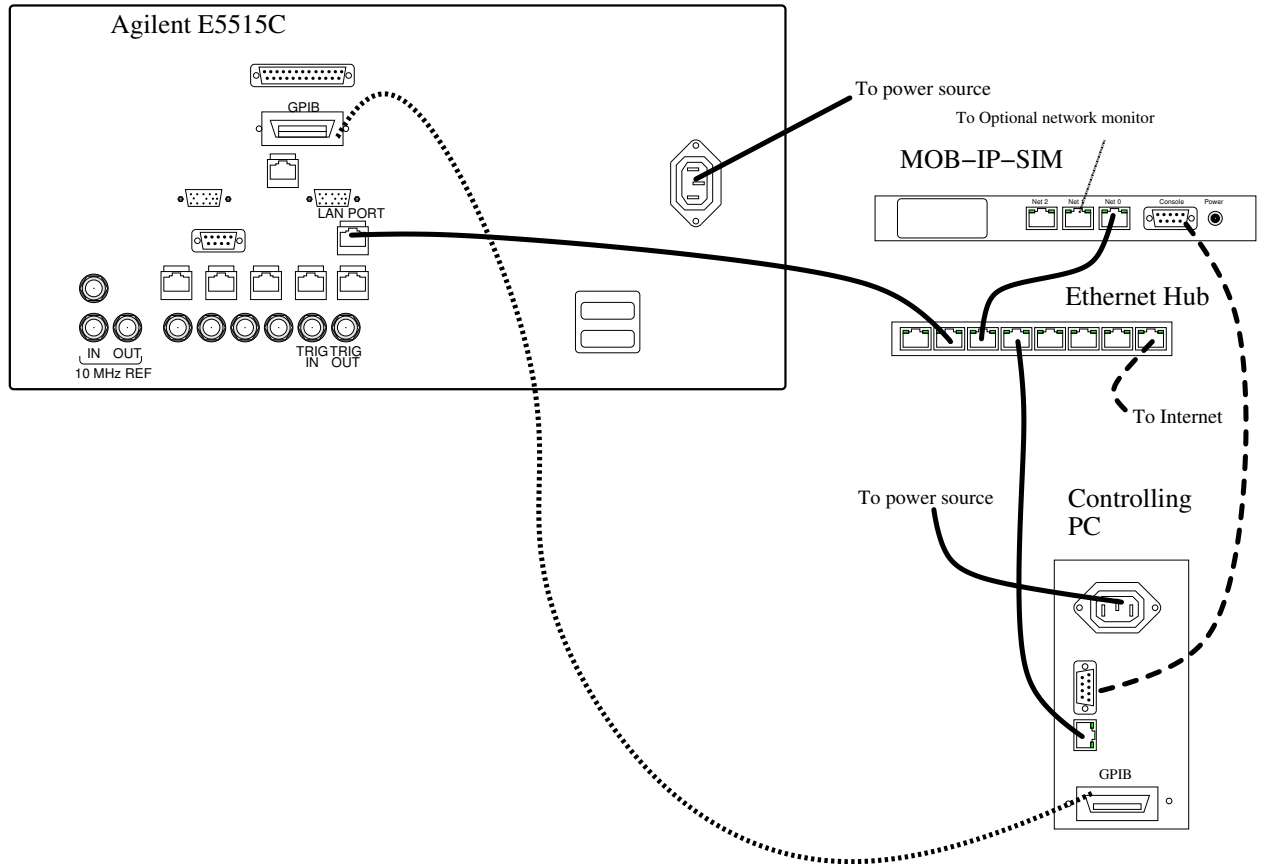
# Appendix B. CD Contents

The Compact Disc that accompanies the Conformance Scripts contains a variety of files that may be helpful in the use of your simulator. These files include:

- The Conformance Script Package
- This manual in PDF and XHTML formats
- Python Suite
- GPIB Drivers
- Ethernet/Wireshark network analyzer software
- Sample Logs

# Appendix C. Test System Interconnect

Figure C-1. MIP-5850 / Agilent E5515C Interconnection diagram



The previous figure shows the typical interconnection required for the MIP-5850 to be used with the Agilent E5515C. The MIP-5850, the Agilent E5515C, and a PC are all connected to an Ethernet for normal operation. The Ethernet may be connected to a larger LAN or the public Internet if desired.

During setup, the PC is connected to the serial port in order to configure the MIP-5850's network parameters; this link may be disconnected for normal operation.

# Colophon

This manual was produced in the DocBookx version 4.2 format as a single-source document and converted to PDF and HTML formats using OpenJade and pdfjadetex. PDF documents were sent directly to the printer.

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