

This literature was published years prior to the establishment of Agilent Technologies as a company independent from Hewlett-Packard and describes products or services now available through Agilent. It may also refer to products/services no longer supported by Agilent. We regret any inconvenience caused by obsolete information. For the latest information on Agilent's test and measurement products go to:

www.agilent.com/find/products

Or in the U.S., call Agilent Technologies at 1-800-452-4844 (8am–8pm EST)



Agilent Technologies
Innovating the HP Way

CDPD MDBS Cell Site Test Software Troubleshooting



Product Note

CDPD MDBS cell site test software

Introduction

General situations ----- 1

- Data collection does not work
- A parameter you changed does not seem to take effect
- You see the message "Internal DSP communication time out"
- You see the message "CDPD module error"
- The MDBS does not power up with the test set connected to it
- You need to speed up testing

TX test situations: ----- 4

- Frequency error reads differently than expected
- "No Signal Found" appears intermittently in the middle of a test, or transmitter test results imply an intermittent transmitter
- Power or sensitivity measurements seem to be in error
- Modulation Index measurements fail

RX test situations: ----- 6

- Sensitivity test results seem to be wrong or intermittent
- The message: "Unable to perform test set parameters for lower levels" appears
- The Forward Channel Control Flag Test does not pass after trying all templates and timing

Sniffer situations: ----- 8

- Disconnecting the sniffer from the AMPS equipment causes the MDBS transmit to shut down
- Sniffer testing does not work as expected

Protocol data unit (PDU) situations: ----- 9

- Adjacent cell sites' channel lists appear in the test set's cell configuration message PDU display

Introduction:

This trouble shooting guide is designed to answer the most problematic and typical questions that occurs when testing a CDPD MDDBS with the HP 8921A CDPD test solution. The document's format follows a natural "here is your problem" "check the following" process and is broken into the following topics; General Situations, Transmitter Tests, Receiver Tests, Sniffer Tests, and Protocol Data Units (PDU) Reports. For ease of use, refer to the table of contents for quick reference problem identification. (Note: A few sections in this product note require detailed procedures that are referenced in the **CDPD MDDBS Cell Site Test software manual**, hence this manual is required for comprehensive troubleshooting.)

Solution:

Hewlett Packard provides the only RF parametric CDPD infrastructure tester available today. This cell site test set's measurements conform to specification 1.1 of the CDPD standard.

Objective:

Refer to this Troubleshooting Guide when you are testing a CDPD Mobile data base station (MDDBS) using the HP software package. This guide was developed using tests on the following manufacturers' MDDBSs: Hughes, Motorola, Nortel, PCSI, and Steinbrecher.

NOTE:

Some of the instructions in this guide are specific to a vendor's MDDBS and do not refer to all MDDBSs in general.

CDPD MDBS cell site test software

General Situations:

Problem	Check the Following
Data collection does not work	<ul style="list-style-type: none">◆ Verify that your data collection device (terminal emulator or printer) is connected to serial port A0/B0.◆ Verify that the RJ-11 port on the rear panel is connected to the cable labeled "To HP 8921" and the other non-labeled RJ-11 connector of the cable is connected to the side RJ-11 port when running CDPD software.◆ Verify rear cables between the CDPD adapter (HP 83204A or HP 83205A) and HP 8921 are securely fastened as per the diagram in Chapter 1 of the MDBS test set software manual.◆ Refer to test system configuration (Chapter 6) in the CDPD MDBS cell site software manual and verify proper communication entries are made on test set screens.◆ Verify communication parameters such as baud rate, parity, stop length, and so forth are set correctly. To verify these settings, go to the I/O CONFIGURE screen by selecting "More" from the "To

Problem	Check the Following
A parameter you changed does not seem to take effect	<ul style="list-style-type: none">◆ After changing a parameter, you must press K1 ("Run Test") USER key to make the software read the parameter list and use the new value.²

Problem	Check the Following
<p>You see the message "Internal DSP communication time out"</p>	<ul style="list-style-type: none"> ◆ Check the rear panel cabling and verify no loose connections. ◆ Verify that the gray HP-IB cable is securely connected to both the CDPD adopter and the HP 8921A. ◆ Load a different program into the test set's memory (this will erase any corrupted CDPD programs), then reload the CDPD test software: <ol style="list-style-type: none"> 1. Go to the TESTS (Main Menu) screen 2. Select "ROM" in the "Select Procedure Filename:" field 3. Select "I_CONFIG" from the "Select Procedure Filename:" field 4. Select "Run Test" (K1) to load the procedure 5. Reload the CDPD test software

1. Communication port parameters will be retained in battery backup memory, through power down/power up cycles.
2. The continue USER key does not accomplish this and the parameter will not be reset to the default values on the card unless you over write the procedure stored in memory.

General Situations:

Problem	Check the Following
<p>You see the message "CDPD module error"</p>	<ul style="list-style-type: none"> ◆ Check the rear panel cabling and verify no loose connections. ◆ See "If Data Collection does not work" for RJ-11 connections (page 3).

Problem	Check the Following
<p>The MDDBS does not power up with the test set connected to it</p>	<ul style="list-style-type: none"> ◆ Disconnect the MDDBS test set when powering up the MDDBS¹.

Problem	Check the Following
<p>You need to speed up testing</p>	<ul style="list-style-type: none"> ◆ Choose the "Set and Measure" tests. The "Set and Measure" tests are faster than "Iterative" tests because they test only a the level set in the parameters for that test.² "Iterative" tests utilize a lengthier search algorithm to find the level where the test crosses from pass to fail. ◆ Create a sequence of tests you wish to run ("Seqn" in the Customize Test Procedures field), enter it into the "Tests" (order of tests) screen and save the order to a Procedure ("Proc" in the Customize Test Procedure field).³ ◆ Consider adding a directional coupler or "tap" to the transmit signal. The signal being tapped must only have the CDPD MDDBS signal present. All MDDBS transmitter tests may be performed while the MDDBS is on the air. Remember to enter the value of the coupler into the parameter for TX Splitter/Coupler loss.

1. *If the DUPLEX OUT cable is connected to the MDDBS RX Input, a signal may be applied to the MDDBS receiver and it may not power up properly.*
2. *Determine the specified performance of the MDDBS you are testing, include whatever margin is necessary, and enter the parameters into the (Test Parameters) screen.*
3. *This will eliminate the menu selection steps that are in the Main Menu TEST.*

TX Test Situations:

Problem	Check the Following
Frequency error reads differently than expected	<ul style="list-style-type: none"> ◆ Wait for additional TX frequency error readings. The average frequency of a signal can be affected by the frequency modulation of the signal. For example, a long string of raw "zero" data bits will cause a slightly lower average frequency.¹

Problem	Check the Following
"No Signal Found" appears intermittently in the middle of a test, or transmitter test results imply an intermittent transmitter	<ul style="list-style-type: none"> ◆ Verify that the MDBS transmitter is configured for continuous transmission.² <ol style="list-style-type: none"> 1. Stop the test by pressing the "CANCEL" softkey to pause the program. 2. Select "Spectrum Analyzer" to see if signal is dropping out of the spectrum. 3. Restart testing by pressing the "TESTS" key followed by the "Run Test" USER key. ◆ Verify the sniffer input is disconnected and terminated (note: the sniffer should be disconnected after the MDBS transmitter to minimize the possibility of CDPD-to-AMPS interference). ◆ Verify that you have chosen the correct input port for the power level you are testing. For power levels below 100 milliwatts, the test set's ANT IN port must be connected to the RF IN/OUT TO TEST SET connector on the CDPD adopter. Change the parameter GN Test Set Input Port to match the port you have chosen. ◆ Verify that only one signal is present at the output. If you are tapping out of a PA output, all other transmitters, including the control channel, must be turned off.

1. The frequency measurement algorithms in the cellular adapter measure the positive and negative peak frequency deviations of the MDBS signal and determine the average frequency from these values. This minimizes the measurement uncertainty caused by changing modulation patterns.

2. Some MDBS diagnostic and slow-hop setups may cause the transmitter to shut off for brief times (less than 100 milliseconds) causing apparent test failures.

TX Test Situations:

Problem	Check the Following
Power or sensitivity measurements seem to be in error	<ul style="list-style-type: none"> ◆ Perform a power measurement using the software calibration test (generally, the CDPD MDDBS cell site software will automatically perform a calibration when needed).^{1,2} ◆ Perform the cable loss test for the cables you are using. ◆ Verify that RX Cable Loss and TX Cable loss value are correct in the test's parameter entries. Run the software cable test if necessary. ◆ Verify that the RX Splitter/Coupler Loss and TX Splitter/Coupler Loss parameter values are correct. Run the software cable test if necessary.

Problem	Check the Following
Modulation Index measurements fail	<ul style="list-style-type: none"> ◆ MDDBS adjustment may be required³.

1. *If the ambient temperature changes significantly, perform this procedure for measurement accuracy.*
2. *Certain calibrations may effect the accuracy of CDPD measurements: HP 8921A GMSK Deviation Calibration; HP 8921A Center Frequency calibration; Cable Loss Calibration and Power Calibration.*
3. *The CDPD MDDBS is closely specified in the standard; less than $\pm 1\%$ of error in the modulation index. The Cellular Adapter has digital signal processing algorithms that ensure accuracy much better than this. Digitally generated modulation easily passes the specification. MDDBS adjustment may be required to pass the specification if analog techniques are used in the MDDBS modulator. Modulation index can fail due to degradation in the modulation waveform, such as excessive droop in the positive or negative deviation. The TX Incidental FM measurement, posted when running TX tests, may be a better indicator of this sort of problem.*

RX Test Situations:

Problem	Check the Following
<p>Sensitivity test results seem to be wrong or intermittent</p>	<ul style="list-style-type: none"> ◆ Set busy/set threshold value to the lowest value attainable (you must actually change this at the MTSO, reset the system locally, or physically pull the radio out of the rack to reset it). The reason for this is that the busy/set threshold is the lowest common denominator (LCD) between sensitivity and busy/set threshold. For example; you may have a radio that has an ultimate sensitivity specification of -105 dBm but if the MDDBS's busy/set threshold is set to -90 dBm, sensitivity measurements will record -90 dBm. The Mobile End Station (M-ES) cannot toggle the busy/set threshold to busy to acquire the MDDBS and send data bits until it reaches this -90 dBm level, thus sensitivity is reported as the LCD busy/set level.¹ Verify that the parameters RX Busy Idle Flag Template, RX Decode State Timing, and RX Decode Status Flag template are set for the type of base station you are testing. (See Chapter 4 of the CDPD MDDBS Cell Site Test Software manual for more information.) ◆ Verify that the main and diversity antennas are disconnected from the MDDBS's co-channel signals and that the M-ES signals can be received by the MDDBS causing the erroneous sensitivity. ◆ If measuring the diversity antennas, note that some main/diversity switches favor the main path or the MDDBS may be configured to use the diversity input.

Problem	Check the Following
<p>The message: "Unable to perform test set parameters for lower levels" appears</p>	<ul style="list-style-type: none"> ◆ Check the parameter in the parameters "RX sensitivity max level & min level" and verify that the expected level falls between these values; otherwise, adjust accordingly. ◆ If possible, keep the difference between the maximum and minimum levels less than 10 dB to optimize testing efficiency.

1. *With some base stations, a newly installed radio will show a difference between the Busy Set Level, stored in the MDDBS and the desired Busy Set Level. M-ES traffic applied to the MDDBS will cause the two values to approach each other. Use the test "RX Busy Set Threshold (with training)" to bring this level up. This test is only available in software revision A.01.04 and after.*

RX Test Situations:

Problem	Check the Following
The Forward Channel Control Flag Test does not pass after trying all templates and timing	<ul style="list-style-type: none">◆ Other templates may be required. Contact your local HP sales offices.

Sniffer Situations:

Problem	Check the Following
Disconnecting the sniffer from the AMPS equipment causes the MDBS transmitter to shut down	<ul style="list-style-type: none">◆ Test modes in the MDBS may require that an AMPS signal be continuously applied to the sniffer input. Connect the AMPS equipment tap point to the MDBS sniffer. Input the signal through a directional coupler or 3-port splitter, and connect the test set's Duplex Out connection to the third port of the directional coupler or splitter.◆ Make the connections so the AMPS to sniffer path has little attenuation and the Duplex Out connection is injected into the MDBS.◆ Enter the value of the Duplex-Out-to-MDBS-sniffer-input attenuation or coupling into the parameter field "Sniffer Port Pad".◆ Restart tests.

Problem	Check the Following
Sniffer testing does not work as expected	<ul style="list-style-type: none"> ◆ Check connections (note these are different for the Sniffer Activation Time test and the Sniffer threshold level tests). ◆ Verify that the 12 dB pad is between the Duplex Out and the sniffer input. ◆ If you are using high power output from the MDBS to the test set's RF IN/OUT connection (through the cellular adapter), use a larger pad since the MDBS is very sensitive and a pad must be large

1. *Try using the fixed attenuation (typically about 50 dB) that is used in the sit to attenuate the AMPS coupled signal.*

Protocol Data Unit (PDU) Situations:

Problem	Check the Following
Adjacent cell sites' channel lists appear in the test set's cell configuration message PDU display	<ul style="list-style-type: none"> ◆ Restart tests as an adjacent cell configuration message is sent after starting the software and prior to channel stream identifier being received.¹

1. *The CDPD MDBS Cell Site Test Software normally will not report adjacent cells' configuration messages. An exception exists when an adjacent cell configuration message is sent after starting the software and prior to a channel stream identifier being received. In this case the software has not identified the channel stream and the current cell site identifier and also all cell configuration messages are reported.*



For more information on Hewlett-Packard Test & Measurement products, applications or services please call your local Hewlett-Packard sales offices. A current listing is available via Web through **AccessHP** at **<http://www.hp.com>**.

If you do not have access to the internet please contact one of the HP centers listed below and they will direct you to your nearest HP representative.

United States:

Hewlett-Packard Company
Test and Measurement Organization
5301 Stevens Creek Blvd.
Bldg. 51L-SC
Santa Clara, CA 95052-8059
1 800 452 4844

Canada:

Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario
L4W 5G1
(905) 206 4725

Europe:

Hewlett-Packard
European Marketing Center
P.O. Box 999
1180 AZ Amstelveen
The Netherlands

Japan:

Hewlett-Packard Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
Tokyo 192, Japan
Tel: (81-426) 56-7832
Fax: (81-426) 56-7840

Latin America:

Hewlett-Packard
Latin American Region Headquarters
5200 Blue Lagoon Drive
9th Floor
Miami, Florida 33126
U.S.A.
(305) 267 4245/4220

Australia/New Zealand:

Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130
Australia
1 800 629 485 107/11/96

Asia Pacific:

Hewlett-Packard Asia Pacific Ltd
17-21/F Shell Tower, Times Square,
1 Matheson Street, Causeway Bay,
Hong Kong
Fax: (852) 2506 9285 107/11/96

Data subject to change

© **Hewlett-Packard Company 1997**

Printed in U.S.A. 6/97

5965-7060E