FLUKE networks™

CopperPro™ DSLAM Verify Test

CopperPro's DSLAM verification test is designed to be a fast, easy way to verify that ADSL transmission equipment is properly installed and functioning. On a working pair, the DSLAM Verify test can answer these questions for the technician:

- *Are all jumpers provided to connect the DSLAM to the pair under test?*
- *Is the loss of the of the ADSL signal from the DSLAM to the point at which the test is performed within an acceptable range?*
- *What are the approximate upstream and downstream rates the circuit can be expected to deliver?*

When impairments or other problems are detected, the CopperPro provides the technician with all the tools needed to identify and locate the specific impairment that may interfere with proper ADSL performance. A POTS or TDR AutoTest can be used to identify and locate any impairments to ADSL service on the line, such as excessive pair length, bridge taps or load coils. A wideband noise test may also be performed to determine the presence or absence of interference from any other digital services that could impair the ADSL service.

How the CopperPro DSLAM test works

The 990 emulates the start up process (training) of ADSL DMT transmission equipment to provide a fast and simple verification that the equipment is provisioned properly and functioning. It is chipset independent, so it will work with all nominally ANSI/ITU compliant equipment.

The test modes are:

- **ATU-C:** Tests the modem card in the central office DSLAM (990 emulates the subscriber modem).
- **ATU-R:** Tests the subscriber modem (990 emulates the DSLAM modem).

ATU-C (DSLAM)

Once provisioned, the DSLAM waits to be signaled by the subscriber modem. When the subscriber modem is connected to the pair and powered on, it initiates the connection process by transmitting a signal at 34.5 kHz at a specified level. It follows this transmission with another 34.5 kHz signal at a lower level. It then waits for a set period for the DSLAM to respond, then repeats the above transmission.

When the DSLAM receives this bi-level signal, it responds with another bi-level signal, usually 189 kHz or 172 kHz (depending on the type of equipment being used). The subscriber modem responds in turn, and the training sequence continues.

When the 990 is emulating ATU-C equipment, the pair is terminated at the 990, and it waits to receive the 34.5 kHz signal sequence from the subscriber modem. If successful, the tester reports that the modem was found, and displays the measured loss and frequency of the signal transmitted by the modem and provides an estimate of line speed.

ATU-R (Subscriber Modem)

When emulating the subscriber modem, the 990 transmits the 34.5 kHz bi-level "wake-up" signals as described above, and waits for the DSLAM to respond. If successful, the tester reports "DSLAM Detected" and presents the measured signal loss and frequency of the signal received, and estimated line speed. The frequency of the DSLAM's bi-level response signal is usually 189 or 172 kHz. However, it may

Determine pair status, condition and DSLAM performance quickly.

respond with one of several other signals, depending on its state. For example, a return signal at 310 kHz means the DSLAM is active but busy. This usually happens when a technician is working on the equipment. All are monitored by the 990.

In Service Lines

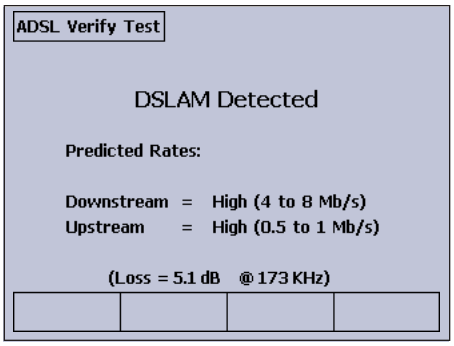
Since ADSL is essentially a point-to-point service, the above are out-of-service tests—intended for ADSL lines with either the DSLAM or customer modem disconnected. If the line is active (i.e., DSLAM and customer modem are connected and communicating), the 990 automatically detects data activity on the line in a non-intrusive fashion, displays this to the operator, and terminates the test.

Test Results

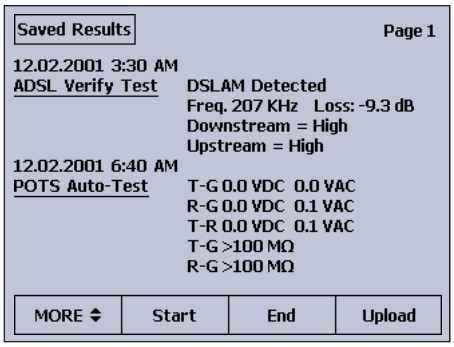
The 990 detects the DSLAM or subscriber modem response and displays the frequency and loss of the received signal, and provides an estimated speed classification.

Applications

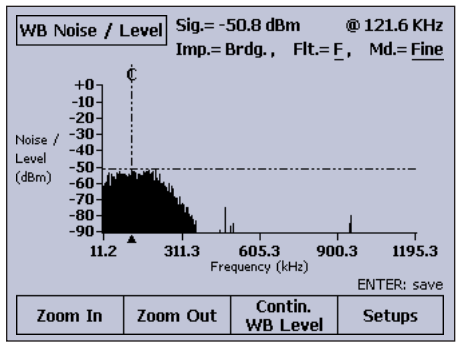
- Before installation, verify from the main distribution frame that the assigned pair is of suitable length, has no load coil and minimal bridge taps by running the TDR AutoTest. The technician might also make sure there is no excessive noise or interference by running the Wideband Noise/Level test. Finish up with verification that the DSLAM is jumpered to the assigned pair and is responding with the ADSL Verify test. At the cross box and/or pedestal, repeat TDR AutoTest and Wideband Noise/Level test to verify proper jumpering and performance of the F2 pair.
- **Troubleshooting.** The technician can verify the status of the pair (proper length, balanced, no impairments). The wideband noise and level test can be performed unobtrusively in bridged mode on a suspect active pair to identify activity or interference. If no service is detected, ADSL Verify test can be used to determine if the subscriber modem is transmitting its training signal or to verify whether or not the DSLAM is responding properly.



Using special software emulation, the CopperPro activates communications with the central office DSLAM and measures performance on the line.



Test results are automatically saved for printing or uploading to PC.



Interference from other services in a binder group, such as HDSL in this example, are easily detected using the CopperPro's wide band noise/level spectrum measurement. Interference masks simplify identification of the source.

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