

Improvements to CLI Leakage Products

Application Note 5



**Cable Networks
Application:**
Using Acterna
equipment for
faster, efficient
leakage testing.



“Find & Fix” Leakage Test Equipment

With Acterna’s firmware version 6 (or higher) and the new HD-1 hand-held dipole, you can be sure that the leak detected by the CLI-1450/CLI-1750 is truly leaking from your network. With version 6, an easier to use and faster search mode has been added. Called ‘find & fix’ mode, version 6 is a dedicated user interface that optimizes maximum detection performance using the new, advanced HD-1 directional dipole antenna. By working together, the new firmware and the HD-1 allows you to more rapidly seek and discover hard-to-locate leaks. Ten times faster (with ten screen updates per second), these two improvements increase the sensitivity of your leakage test system—while reducing and simplifying leakage training for technicians. The HD-1 can be used with all CLI-1450/CLI-1750 instruments. Also, version 6 is an upgrade to CLI-1450/CLI-1750’s already in the field.

New Directional Hand-held Antenna ‘HD-1’

The HD-1 dipole antenna is designed for “on-foot” leakage detection for both field and in-home leakage detection. The features of the HD-1 dipole antenna include:



- improved directionality and accuracy when pin-pointing the leak source
- increased CLI meter sensitivity compared to the “rubber duck” antenna—this directivity dynamic range is approximately 10-20 dB in an outside environment and approximately 5-10 dB in an inside environment
- precise directional pattern in the location of RF energy
- in conjunction with the PL-1 adjustable 10 foot (3 meter) pole and adapter, the HD-1 can be used for calibrated leaks and FCC/CENELEC conformance testing

The HD-1 can also be used for locating leaks in areas with limited space. With the elements partially retracted, the sensitivity of the antenna may not be as critical since the general proximity of the leak has been determined. The HD-1 has “reduced sensitivity,” but maintains the directionality advantage of a dipole antenna.

The HD-1 retractable elements can be pulled out to the appropriate length for the frequency measured. The general equation used is:

- in inches = $2,952 \text{ in/freq (in MHz)} * 0.96$
- or
- in centimeters = $7,500 \text{ cm/freq (in MHz)} * 0.96$



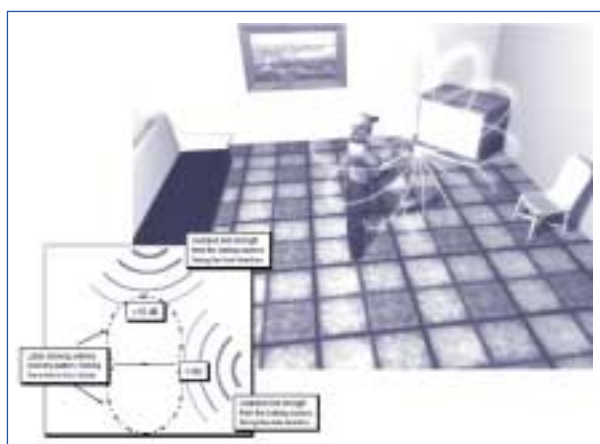
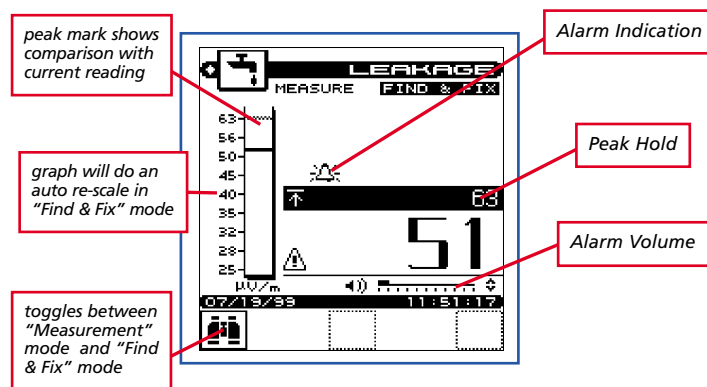
PL-1 for Calibrated Leak and FCC/CENELEC Testing

The new PL-1 is an adjustable 10 foot (3 meter) fiberglass pole with an adaptor for the HD-1 hand-held dipole antenna. The HD-1, attached to the top of the PL-1, is recommended for calibrated leak testing. The HD-1 and PL-1 combination is also recommended for FCC/CENELEC compliance testing which requires identification and repair of leaks greater than 20uV/m at 10 feet (3 meters).



Leakage ‘Find & Fix’ Mode is a New Leakage Search Mode

Any directional search antenna is only useful if the display of the meter can keep up with the movement of the technician’s arm motion. In other words, a fast update rate of the field strength value is required. Replacing older version’s ‘search’ mode, version 6 updates the leakage value 10 times per second. A huge benefit, the ‘find & fix’ mode makes the CLI ten times faster to use.



▲ HD-1 is compact and directional. This makes life significantly less frustrating for the technician. Version 6.0 with “Find & Fix” is ten times faster and ‘keeps up’ with the technician’s arm movements. This also simplifies use while increasing confidence that the leak is being properly hunted.

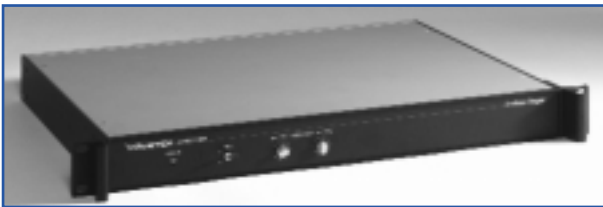
To quickly identify the source of the leak, the 'find & fix' mode uses peaking to indicate the best direction to walk. Sacrificing a small amount of accuracy, this mode is especially useful when searching for leaks on foot in drop-to-home or in-home applications. Zeroing in on the leak, the technician can switch any time to traditional 'measurement' mode for full accuracy.

This new firmware benefits all current and future users of Acterna leakage field meters. Compatible with the LT-1000, this new firmware reinstalls the tagging capability in the 'measurement' mode. And this new firmware adds the new fast 'find & fix' mode. (The new antenna is only recommended for use with version 6.). Version 6 is now downloadable from our web-site, www.acterna.com, and is free of charge.

LT-1000 Tagger Continues to Help Distinguish Leaks

During any leakage measurement, made during a drive-by or during search-on-foot, the objective is to remain 'attached' to the leak from your cable plant. You want to be 100% sure that the leak you are measuring originates from your plant and not from other plants. Using an LT-1000, your CLI instruments won't detect leaks from other-than-your-plant RF sources.

In a noisy environment, or when interfering signals are present (e.g., air-traffic communication, base stations, etc.), tagging improves the detection sensitivity and makes differentiation between real leaking signals easier. The CLI field meter will only generate an alarm when field strength is above the alarm threshold, and when the special tagging signal is detected.



▲ *LT-1000 Leakage Tagger*

The tagger modulation frequency range can be set from 3 Hz to 25 Hz. Proven in numerous cable systems, the LT-1000 improves the CLI's ability to differentiate real from false leaks. With the HD-1, version 6, and signal tagging, you can be sure you're tracking down real leaks while reducing technician frustration.

Convenience is Now in the Bag

The "new and improved" CLI bag has been designed to provide convenience for the field technician while doing drive-outs and wall-about for leakage testing. With the new bag, the CLI meter can be directly mounted in the DS-1 docking station which provides a "heads up" view of the LCD screen while patrolling and allows for automatic recharge. For on-foot leakage detection, the CLI meter can also be



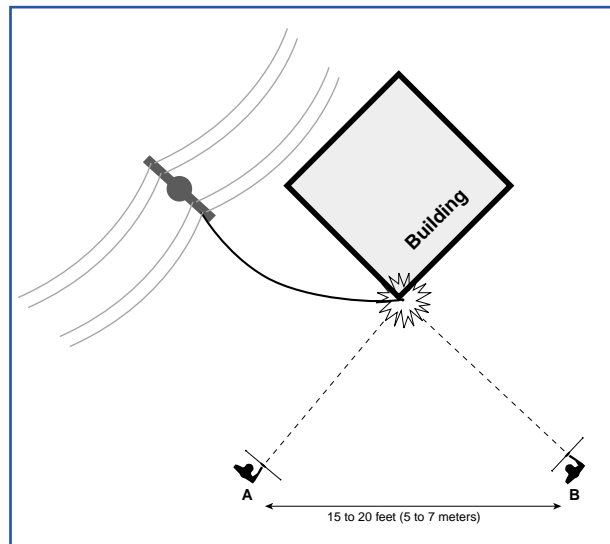
quickly removed from the docking station while remaining in the bag, allowing for meter protection and technician convenience. The bag still maintains the ease of use in removing the battery while the meter is inside the bag.

With the introduction of the HD-1 hand-held antenna, a collapsible storage area has been added to the bag design. This new design allows both the meter and antenna to remaining together for easy transport from a drive-out to a walk-about.

Tip of the Day—The Triangulation Method

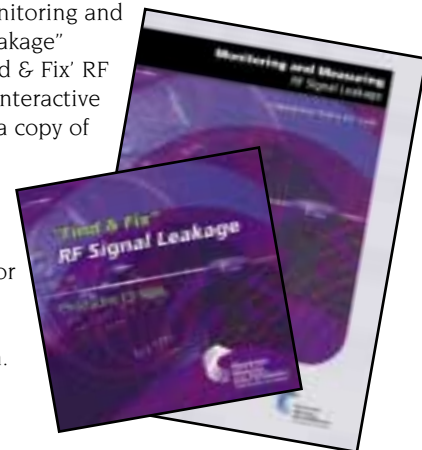
Triangulation is an uncomplicated method used to locate a leakage source using the HD-1 and the 'find & fix' mode in your CLI-1450/CLI-1750 meter.

1. Stand in one spot and rotate the HD-1 hand-held antenna until a peak reading is obtained. The leakage line is perpendicular to the HD-1 elements (position A).
2. Move to a different area approximately 10-15 feet away, parallel to the cable, and again rotate the dipole for a peak reading. The leak is along the imaginary line perpendicular to the new HD-1 position.
3. The leakage source is located where the two imaginary lines intersect.



Leakage Training and You

To assist with your leakage training needs, Acterna has developed a "Monitoring and Measuring RF Leakage" booklet and "Find & Fix" RF Signal Leakage" interactive CD-ROM. To get a copy of either, call (1) 317-788-9351 (in the U.S. toll-free at 1-800-622-5515) or log-on to our website at www.acterna.com.



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