

## Phoenix 10056

Complete Solution for xDSL Cables Cat 3, 4, 5 and 5e



### DESCRIPTION

Customer requirements can vary considerably in terms of size and design of connecting frames depending on how many pairs need to be hooked up to the frame simultaneously.

The Phoenix 10056 system allows you to hook up a maximum of 56 pairs.

Thanks to the "OptiTest" software module (an element of the CIQ family) supplied with it, operators can work quickly and efficiently. OptiTest also allows analysis of parameter measurements for process control, traceability or any other functions requiring statistical information..

### KEY FEATURES

- **Fast and compliant**
  - The fastest measurement system on the market
  - Compliant to all major national standards for telephone and xDSL cables
- **Easy to use**
  - No cable preparation behalf of self-cutting knives
  - Intuitive software
- **Accurate and certified**
  - Quality inspection, with very high accuracy
  - Check against certified ISO 17025 standards
- **Add-on**
  - LCL/LCTL parameters
  - EMC parameters (TI, AS, AC)



AESA Cortailod

## TECHNICAL SPECIFICATIONS

|                |  |
|----------------|--|
| Parameters     | All standard low frequency and high frequency parameters available (Resistance, Capacitance, Insertion Loss, Impedance, NEXT, FEXT, ... )  |
| Standards      | Performs all electrical tests on cables responding to: <ul style="list-style-type: none"> <li>• ANSI/TIA-568-C.2 for Category 3 and 5e</li> <li>• IEC 61156-5/-6 for Category 5e</li> </ul>  |
| Components     | <ul style="list-style-type: none"> <li>• 2x 56 pairs connecting frames for LF &amp; HF measurements up to 100MHz</li> <li>• 1 state-of-the-art computer with a 17" colour monitor</li> <li>• Operating Windows system</li> <li>• 1 license OptiTest, AESA measurement and result management software</li> <li>• Power supplies, interfaces, connecting cables and measurement accessories</li> </ul> |
| Supply Voltage | 100 - 240 VAC / 50 - 60 Hz, Consumption: 600 W without printer, 1000 W with printer  |
| Article No:    | 10.1056.0001.0   |

## HIGH FREQUENCY ACCURACY

|   | 100 kHz -<br>30 MHz | 30 MHz -<br>60 MHz | 60 MHz -<br>100 MHz |
|---|---------------------|--------------------|---------------------|
| <b>Attenuation (corrected at 20°C)</b>                      |                     |                    |                     |
| -80 to -50 dB   | ± 2 dB              | ± 2 dB             | ± 3 dB              |
| -50 to -25 dB   | ± 0.8 dB            | ± 1 dB             | ± 1.5 dB            |
| -25 to -10 dB   | ± 0.3 dB            | ± 0.5 dB           | ± 1 dB              |
| -10 to 0 dB   | ± 0.2 dB            | ± 0.4 dB           | ± 0.8 dB            |
| <b>Near-End Crosstalk NEXT &amp; Far-End Crosstalk FEXT</b> |                     |                    |                     |
| -90 to -50 dB   | ± 2 dB              | ± 2 dB             | ± 2 dB              |
| -50 to -30 dB   | ± 1 dB              | ± 1 dB             | ± 1 dB              |
| -30 to -20 dB   | ± 0.5 dB            | ± 0.5 dB           | ± 0.5 dB            |
| <b>Impedance</b>  |                     |                    |                     |
| 70 Ω - 90 Ω   | ± 2 Ω               | ± 2 Ω              | ± 2 Ω               |
| 90 Ω - 110 Ω  | ± 1.5 Ω             | ± 1.5 Ω            | ± 1.5 Ω             |

## COMPONENTS

We deliver:

- Integrated equipment
- External Display, keyboard and mouse

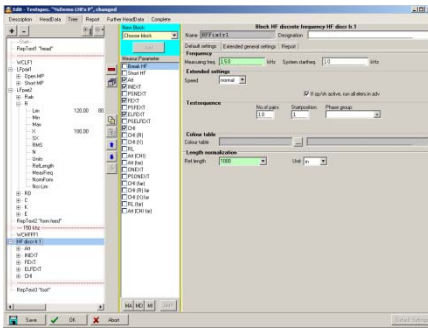
## AVAILABLE OPTIONS

The equipment can be completed with:

- LCL/LCTL family parameters
- EMC parameters (Transfer Impedance (TI), Screening Attenuation (AS))
- 9800 HF standards (50Ω SMA)
- 9000 LF standards
- Printer
- Maintenance contract

*AESA proposes other specific equipment for high frequency measurement.*

## KEY BENEFITS



### USER-FRIENDLY

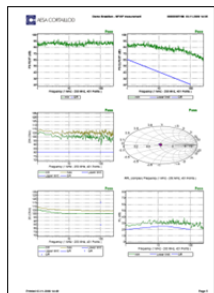
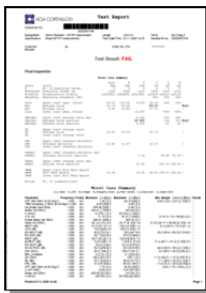
- Optitest software is multilingual
- Direct results without post calculation
- Calibration managed/saved by computer
- Test orders library

## ISO 17025 ACCREDITED



### ACCURATE

- The equipment is checked against traceable calibration standards according ISO/IEC 17025
- The risk of human error is reduced to its minimum



### SMART

- All data (results and conditions) are saved in its internal PC
- Reports can be printed
- Data can be exported through the LAN in an ASCII or XLS file

## LOW FREQUENCY PARAMETERS SPECIFICATIONS

The low frequency parameters measuring technology provides a self-calibration. It is designed to test up to 4 pairs or 2 quads. Different measuring frequencies are integrated in the capacitance bridge. They can be used depending on the length of the cable

| Description                     | Designation for pairs | Designation for quads       | Accuracy   | Scale         |
|---------------------------------|-----------------------|-----------------------------|--|---------------|
| Conductor resistance            | Ra, Rb                | Ra, Rb<br>Rc, Rd            | ± 0,1% + 10 mΩ   | 0 - 19,999 kΩ |
| Loop resistance                 | R                     | R1, R2                      |  |               |
| Resistance unbalance            | DR                    | DR1, DR2,<br>DR3            | Computed   | %, Ω          |
| Capacitance                     | C                     | C1, C2, C3                  | ± 0,25% ± 10pF at 800 Hz<br>± 0,25% ± 10pF at 125 Hz<br>± 0,25% ± 50pF at 12,5Hz | 0 – 2'000nF   |
| Capacitance unbalance           | K                     | K1 – K12                    | ± 1% ± 6pF at 800 Hz   |               |
| Capacitance unbalance to ground | Ei, Ea, E             | Ei1-Ei3<br>Ea1-Ea3<br>E1-E3 | ± 1% ± 3pF at 125 Hz<br>± 1% ± 30pF at 12,5 Hz                                   |               |

### Calculated parameters at 800Hz (1'000Hz)

Attenuation Phase

Characteristic Impedance Velocity of propagation (VOP)

Crosstalk

### Statistical parameters

Maximum and minimum measured values Upper quality factor

Absolute minimum measured value Lower quality factor

Average value RC product

Quadratic average Standard deviation RC

Standard deviation Variance

## KEY BENEFITS

### 1. Technical hardware features

- Test heads with "open/short/load" facility allowing a fully automatic calibration procedure
- No other calibration is required, which speeds up the measurements
- For a fast cable connection, the standard connecting frames are equipped with self-cutting knives designed for copper diameters from 0.35mm to 0.9mm. Special knives are available on request for diameter up to 1.5mm
- No movable parts for maximum measurement speed, accuracy and reliability
- Mechanical design studied to facilitate maintenance and servicing operations

## 2. Main software features

The OptiTest software is a stand-alone application specially designed for data capture with automatic testing equipment. This module is a part of the AESA's Quality Management System CIQ 3.0 specially designed according to the needs of the cable manufacturing industry.

- The software has been developed in the Microsoft® Windows™ environment and complies with the Windows features.
  - All data gathered with OptiTest can be used for further statistical evaluations and combined with other measurements gathered during the complete manufacturing process, from incoming good inspection until to the dispatch of the finished product.
  - No special HF or LF knowledge required, thus ideal for shop floor integration.
  - Full automatic measurements.
  - The measurements can be performed in the sweep mode and/or by using frequency tables.
  - Open choice for start/stop frequencies and number of points (for HF sweep measurements, the test system allows to enter an unlimited number of measurement points, which is not limited by the specified number of points as referred by the used VNA analyzer itself).
  - Choice of logarithmic or linear scales.
  - Self-configurable reports.
  - Fully automatic calibration management including automated calibration procedure.
  - Possibility to create an unlimited number of cable specifications and test sequences. These "test specifications" will be stored with an individual customised name and are easily retrievable.
  - Possibility to generate complex limit curves. Most of the limits and formulas recommended by the international standards are integrated. Their variables are programmable to enable the preparation of special specifications.
- I. OptiTest facilitates the tasks itemised below:
    - a. Creation and administration of test specifications
    - b. Performance of tests
    - c. Report generation after testing
    - d. Basic statistic evaluation
  - II. Test Plan Creation:
    - a. A wide range of measurement modes are available as options, such as HF Sweep, HF Sweep(Alien), HF Coax-50, HF Coax-75, HF fixed frequency, LF single cores, LF pairs, LF triples, LF quads, LCL, LCTL, TCL,
    - b. TCTL, TI, AS, worst case summaries for HF-Sweep / LF / HF discrete frequencies, inductance, conductance and high voltage.
    - c. Report generation is very easy. If set by default, a highly comprehensive report is generated, containing a limit case compilation with graphics and for each measuring block a separate summary with related graphics.

III. Document:

a. Reports:

OptiTest offers various report options such as:

- Test certificates for the customer
- Creating (control) quality charts
- Graphical HF evaluations

The results may be printed, stored as PDF files, or sent as emails.

It is also possible to create data files for Office products such as Microsoft Excel.

b. Evaluation:

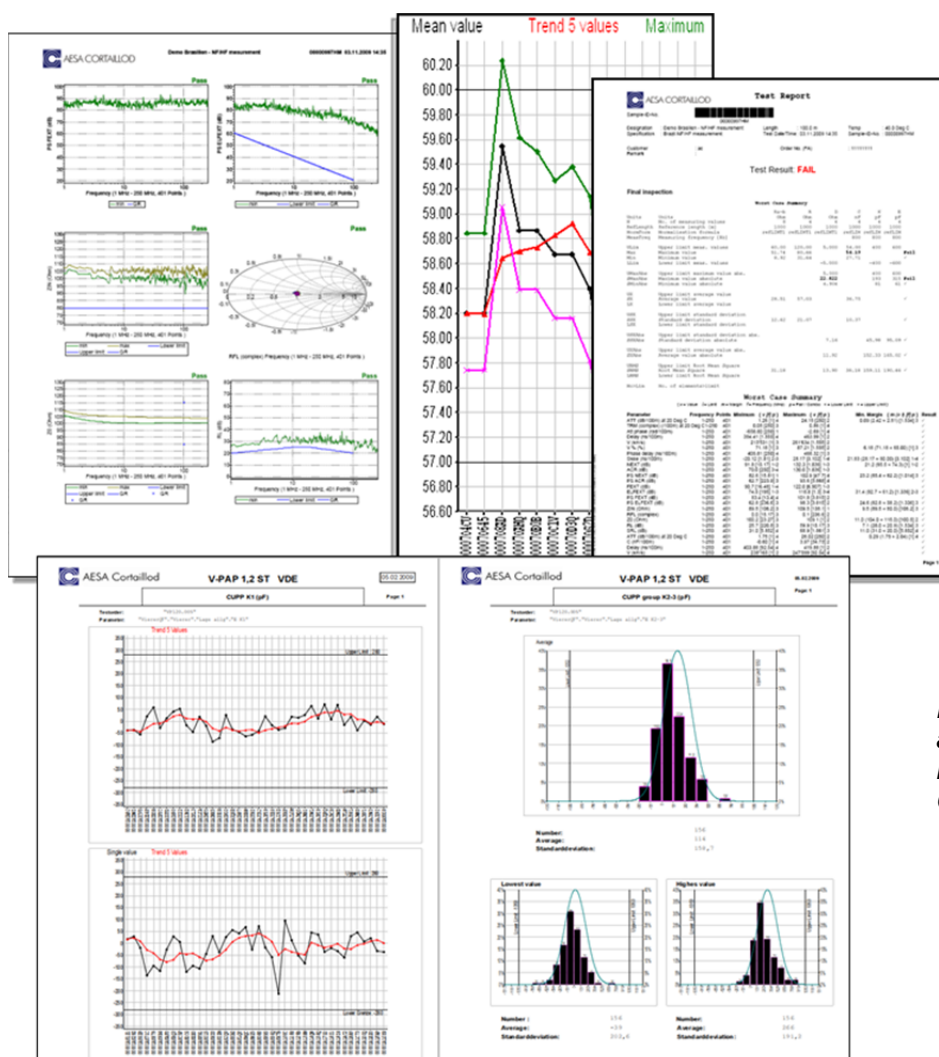
All data are available for evaluation at any time. Thus, all test data of a cable can be collectively evaluated and printed.

Some examples of how to perform evaluations are:

- Sample list sorted by test order
- Search with pre-defined or customized filters (e.g. searching for the last 20 samples by cable number, date, certain characteristics)
- Free search through the data pool with user-specific search criteria

Filters and search criteria normally generate sample lists which facilitate multiple further actions as:

- Display and process measured values
- Print reports and labels
- Generate quality charts (statistics)



Examples of test and statistical reports with AESA Optitest

c. Archiving:

Windows backup function used for archiving the data.

**d. Statistics:**

Filtering tool: Select a group of measurements according to various criteria such as:

- Cable specification
- Cable structure
- Production period
- Production line, test station
- Etc...

Following the measurements management, this powerful tool allows generating many types of statistics.

Worst case values for a pair or a cable

- Pair identification with extreme values
- Min, max, average values
- Standard deviation, quality factor, RMS values
- Etc...

These statistical means are calculated for all measured LF (and partly HF) parameters

**e. Graphical presentation:**

- Statistical distribution (Gauss type curve)
- Evolution and parameter survey in function of the time
- Measurements repartition in a defined time period to determine the testing load

# Options

## 1. Network Analyzer

- Agilent type E5061B 2 ports (100 kHz – 1.5 GHz)

Article No: 51.0001.0045.0

Other types can be proposed upon request.

## 2. Set of 5 standards (resistance & capacitance) type AESA 9000

Article No: 45.9000.0001.0

Complete ISO 17025 certified LF calibration standards.

The kit of certified LF calibration standards is composed of:

- **Standard type 9001**  
C1,2 with 19,20 nF  $\pm 0,1 \% \pm 30 \text{ ppM}/^{\circ}\text{C}$
- **Standard type 9002**  
C1,2 with 192,0 nF  $\pm 0,1 \% \pm 30 \text{ ppM}/^{\circ}\text{C}$
- **Standard type 9003**  
C3 with 16,00 nF  $\pm 0,1 \% \pm 30 \text{ ppM}/^{\circ}\text{C}$   
K1, K2, K3 with 16000 pF  $\pm 0,1 \% \pm 30 \text{ ppM}/^{\circ}\text{C}$
- **Standard type 9004**  
E1, E2, E3 with 12000 pF  $\pm 0,1 \% \pm 30 \text{ ppM}/^{\circ}\text{C}$
- **Standard type 9005**  
RA, RD with 192  $\Omega$   $\pm 0,01 \% \pm 2 \text{ ppM}/^{\circ}\text{C}$   
RB, RC with 1920  $\Omega$   $\pm 0,01 \% \pm 2 \text{ ppM}/^{\circ}\text{C}$



ISO 17025 ACCREDITED



## 3. Set of HF calibration standards (attenuators and loads) type AESA 9800

Article No: 45.9800.0001.0

With each sold measuring system, AESA delivers a "daily" calibration kit to create the different calibration files necessary to measure LAN cables. These easy-to-use standards have been developed in the symmetrical way to get the maximum accuracy. Unfortunately, these "daily" standards cannot be referenced as primary standards. But AESA has developed its HF technology by using hi-tech strategic components. These miniaturized resistors are sorted and guaranteed up to 3GHz. Tolerance: 1% (50 ppm/deg.) for values between 50 and 200 $\Omega$ .

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During a quality control calibration, the symmetric elements have to be replaced by 50Ω coaxial standards which are certified. With an appropriate set of terminations and attenuators, it is possible to prove within defined tolerances that the testing system (network analyzer + HF multiplexer + connecting frame) is measuring correctly. It is also possible to prove that the calibration done for the measurement of LAN cables has been done correctly.

The kit of certified HF calibration standards is composed of:

- 2 attenuation references –3dB type 9801
- 2 attenuation references –6dB type 9802
- 2 attenuation references –10dB type 9803
- 2 attenuation references –20dB type 9804
- 2 attenuation references –30dB type 9805
- 2 x 50Ω terminations
- 2 special connectors for the terminations
- 4 HF connecting cables for the attenuation
- 1 set of miscellaneous HF material

#### 4. Coaxial options

Specific output (N-connectors) for coax measurement. The solution includes the equipment modification and the related software module.

- **50 ohms**                    **coaxial option**
- **50 and 75 ohms**   **coaxial option**

Article No: 50.0001.0031.0  
Article No: 50.0001.0029.0

#### 5. Spare Parts

AESA recommends following set of spare parts for an operation safety of two years:

| Phoenix Type  | Mini Kit       | Full Kit       |
|---|----------------|----------------|
| 1 CKE measuring bridge type KM                        |                | ✓              |
| 1 R measuring bridge type RM                          |                | ✓              |
| 1 LF relay matrix board type AZU                      |                | ✓              |
| 1 CPU board   |                | ✓              |
| 2 test heads (4 if two different connecting frames)   | ✓              | ✓              |
| 2 HF relays (3 if two different connecting frames)    | ✓              | ✓              |
| 1 control boards set                                  | ✓              | ✓              |
| 1 set of HF cable                                     | ✓              | ✓              |
| 1 set of different mechanical and electronic hardware | ✓              | ✓              |
| Article No  | 50.0900.0003.0 | 50.0900.0002.0 |