Cobalt 4 DA

Automatic balunless measuring system for LAN cables

DESCRIPTION

LAN cables are more and more specified for large and wider frequency ranges. Balun based systems cannot measure more than 3 frequency decades with reasonable accuracy. The Cobalt system based on a modal decomposition mathematical algorithm supports the development of new cables (complete tests at the lab) and simplifies operator's difficult job within systematic testing operations during production which are essential to achieve reliable results.

Cobalt can measure very easily patch cords or coaxial cables. Using a simple interface and introducing a de-embedding software correction, it doesn't need frequent and time-consuming calibration routines. It can provide not only the standard parameters as Next and RL, but also many other cable and individual wire parameters required for development of new cable designs as well as for detailed troubleshooting and quality analysis.

KEY FEATURES

- **Multiple uses**
  - Quality inspection, with very high accuracy
  - Development, with individual values per wire
  - Data cables
  - Patch cords with RJ45 connectors (standard) or others
- **High-Tech**
  - Balunless technology (modal decomposition mathematical algorithm)
  - Executive HF switches using MIL standardized relays (min 2'000'000 cycles)
- **Performant**
  - More than 170 parameters (including TCL measurement with integrated common mode)
  - Performs all electric tests on cables responding to major standards
- **Go over the limits**
  - Very broad frequency range (<4GHz) for cat 8 and higher
  - Full dynamic range available
  - Short cable length (10m)
- **Add-on**
  - EMC parameters (TI, AS, AC)
  - Alien Crosstalk

AESA Cortaillod

TECHNICAL SPECIFICATIONS

Parameters	More than 170 parameters available (Transmission, Reflection, NEXT, FEXT, TCL…) *Note: Cobalt offers complete S-parameter capabilities (Differential-, Common- and Mixed Mode Parameters)*
Standards	Performs all electrical tests on cables responding to: • ANSI/TIA-568-C.2 for Category 3, 5e, 6 and 6A • ANSI/TIA-568-C.2-1 for Category 8 • IEC 61156-5/-6 for Category 5e, 6, 6A, 7 and 7A • IEC 61156-7/-8 for cables up to 1200MHz • IEC 61156-9/-10 for Category 8.1 and 8.2
Measuring length	Cable samples from 10m up to 100m
Components	• 4 pairs connecting frame for HF measurements exceeding 4 GHz • 1 state-of-the-art computer with a 17" colour monitor • Operating Windows system • 1 license OptiTest, AESA measurement and result management software • Power supplies, interfaces, connecting cables and measurement accessories
Supply Voltage	100 - 240 VAC / 50 - 60 Hz, Consumption: 600 W without printer, 1000 W with printer
Article No:	03.3504.0001.0

ACCURACY

	100 kHz - 10 MHz	10 MHz - 100 MHz	100 MHz - 200 MHz	200 MHz - 400 MHz	400 MHz - 750 MHz	750 MHz - 1.5 GHz	1.5 GHz - 3 GHz	3 GHz - 4.5 GHz (typical)
Attenuation (corrected at 20°C)								
-80 to -50 dB	± 1.3 dB	± 1.5 dB	± 1.7 dB	± 1.9 dB	± 3 dB	± 4 dB	± 6 dB	± 6 dB
-50 to -25 dB	± 0.5 dB	± 0.6 dB	± 0.6 dB	± 0.7 dB	± 0.9 dB	± 1.5 dB	± 2 dB	± 3 dB
-25 to -10 dB	± 0.2 dB	± 0.2 dB	± 0.3 dB	± 0.4 dB	± 0.8 dB	± 1.3 dB	± 1.7 dB	± 2 dB
-10 to 0 dB	± 0.2 dB	± 0.2 dB	± 0.2 dB	± 0.4 dB	± 0.8 dB	± 1.3 dB	± 1.5 dB	± 1.5 dB
Near-End Crosstalk NEXT & Far-End Crosstalk FEXT								
-90 to -60 dB	± 2 dB	± 2 dB	± 2 dB	± 2.5 dB	± 4 dB	± 6 dB	± 8 dB	± 8 dB
-60 to -30 dB	± 1.6 dB	± 1.4 dB	± 1.4 dB	± 1.6 dB	± 1.8 dB	± 4 dB	± 6 dB	± 6 dB
-30 to -10 dB	± 0.5 dB	± 0.8 dB	± 0.8 dB	± 1 dB	± 1.5 dB	± 2 dB	± 3 dB	± 3 dB
Impedance								
70 Ω - 90 Ω	± 1 Ω	± 1.5 Ω	± 2 Ω	± 2 Ω	± 3 Ω	± 4.5 Ω	± 6 Ω	± 6 Ω
90 Ω - 110 Ω	± 0.75 Ω	± 1 Ω	± 1.5 Ω	± 1.5 Ω	± 2 Ω	± 4 Ω	± 5 Ω	± 5 Ω
110 Ω - 130 Ω	± 1 Ω	± 1.5 Ω	± 2 Ω	± 2 Ω	± 3 Ω	± 4.5 Ω	± 6 Ω	± 6 Ω

REQUIRED COMPONENTS

The system must be completed with:

- Vector Network Analyzer (VNA).
  This can be provided by AESA or by the customer.

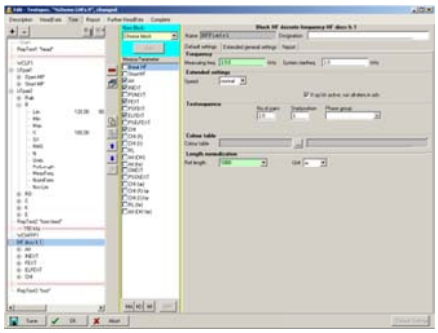
AVAILABLE OPTIONS

The equipment can be completed with:

- Low freqeuncy parameters measuring unit
- Coaxial cable measurement (50Ω or 50+75Ω)
- Switch for options
- EMC parameters
  (Transfer Impedance, Screening/Coupling Attenuation)
- Connecting frame for connectors (e.g. RJ45)
- 9000 Low Frequency standards
- 9800 High Frequency standards
- Spare parts

AESA proposes other specific equipment for high frequency measurement

KEY BENEFITS



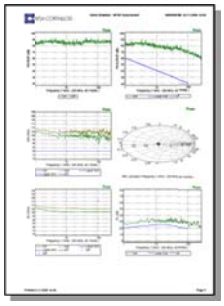
USER-FRIENDLY

- Fast measurements
- No special HF or LF knowledge required
- OptiTest software is multilingual
- Direct results without post calculation
- Test order library

ISO 17025 ACCREDITED

ACCURATE AND REPEATABLE

- The equipment is checked against traceable calibration standards according to ISO/IEC 17025
- Perfect reproducibility
- The risk of human error is reduced to its strict minimum
- Calibration managed/saved by computer



SMART

- All data (results & conditions) are saved in the PC
- Reports and evaluations can be printed
- Data can be exported (PDF, TXT or XLS files)

Overview

SYSTEM

No balun so individual values per wire available and not only pair.
Accept wire diameters between 0.3 and 1.0mm (28AWG to 18AWG).
Full two ports calibration (Thru-Open-Short-Load) for high accuracy measurement.
No movable parts for maximum measurement speed and reliability.
Robust mechanical design studied to facilitate maintenance and servicing operations.

LOW FREQUENCY PARAMETERS (Optional)

The low frequency parameters feature is designed to measure pairs or quads.
The resistance is measured at 4 points (Kelvin bridge)
The capacitance can be measured at different frequencies in order to accommodate different cable lengths
(Please refer to our application note 'Length Restrictions in Cable Testing').
The feature provides self-calibration.

Measured parameters	**Pairs**	**Quads**
Conductor Resistance	Ra, Rb	Ra, Rb, Rc, Rd
Loop Resistance	R	R1, R2
Resistance unbalanced	DR	DR1, DR2, DR3
Capacitance	C	C1, C2, C3
Capacitance unbalanced	K	K1-K12
Capacitance unbalanced to ground	Ei, Ea, E	Ei1-Ei3, Ea1-Ea3, E1-E3

Calculated parameters at (from 100Hz to 10kHz)

Attenuation
Characteristic Impedance

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
and more …	

HIGH FREQUENCY PARAMETERS

The high frequency parameters are measured as pairs only (1 quad = 2 pairs).
The measurement can be done according to a configurable curve or predefined fixed points.
2 connecting frames allow to connect both ends of the cable for an automatic measurement of all parameters.
A complete calibration is saved in the system allowing to change specifications without having to perform a new calibration.

Available HF parameters:

Transmission/Reflection	• Reflection Differential Mode (each parameter is available at near and/or far end): Return Loss dd, characteristic impedance, S11, Fitted impedance, SRL • Transmission Differential Mode (each parameter is available for forward and reverse measurement): Attenuation (Insertion Loss), S21, S21 phase, Phase delay, phase delay velocity, Group delay, Delay skew… • Reflection Common Mode (each parameter is available at near and/or far end): Return Loss cc, characteristic impedance, S11, Fitted impedance, SRL • Transmission Common Mode (each parameter is available for forward and reverse measurement): Insertion Loss, S21, S21 phase, Phase delay, phase delay velocity, Group delay, Delay skew… • Conversion Loss (each parameter is available for forward and reverse measurement): LCLdc, LCTLdc, TCLcd, TCTLcd, ELTCTLcd • Single Ended Reflection (each parameter is available at near and/or far end and for wire a and/or b): Characteristic impedance, S11, Fitted impedance, SRL • Single Ended Transmission (each parameter is available for forward and reverse measurement and for wire a and/or b): Attenuation (Insertion Loss), S21, Phase, Phase delay, In Pair Skew… • Single Ended NEXT: S31, S13, S42, S24 • Single Ended FEXT: S41, S14, S32, S23
Near-NEXT	• NEXT Differential Mode: Nextdd, PSNextdd, ACR-Ndd, PSACR-Ndd • NEXT Common/Differential Mode: Nextcd • NEXT Differential/Common Mode: Nextdc • NEXT • Common Mode: Nextcc
Far-NEXT	• Same as Near-NEXT but measured at the far end
FEXT	• FEXT Differential Mode: Fextdd, PSFextdd, Elfextdd, PSElFextdd, ACR-Fdd, PSACR-Fdd • FEXT Common/Differential Mode: Fextcd • FEXT Differential/Common Mode: Fextdc • FEXT Common Mode: Fextcc

Statistical parameters

Maximum and minimum measured values
Pair of worst case
and more …
Worst case
Frequency of worst case

STANDARDS

Cobalt capabilities | Standard requirements

	Port 1		Port 2		Port 3		Port 4		Port 5		Port 6		Port 7		Port 8	
Port 1	RLdd11	Sdd11	NEXTdd12	Sdd12	NEXTdd13	Sdd13	NEXTdd14	Sdd14	ILdd15	Sdd15	FEXTdd16	Sdd16	FEXTdd17	Sdd17	FEXTdd18	Sdd18
Port 2	NEXTdd21	Sdd21	RLdd22	Sdd22	NEXTdd23	Sdd23	NEXTdd24	Sdd24	FEXTdd25	Sdd25	ILdd26	Sdd26	FEXTdd27	Sdd27	FEXTdd28	Sdd28
Port 3	NEXTdd31	Sdd31	NEXTdd32	Sdd32	RLdd33	Sdd33	NEXTdd34	Sdd34	FEXTdd35	Sdd35	FEXTdd36	Sdd36	ILdd37	Sdd37	FEXTdd38	Sdd38
Port 4	NEXTdd41	Sdd41	NEXTdd42	Sdd42	NEXTdd43	Sdd43	RLdd44	Sdd44	FEXTdd45	Sdd45	FEXTdd46	Sdd46	FEXTdd47	Sdd47	ILdd48	Sdd48
Port 5	ILdd51	Sdd51	FEXTdd52	Sdd52	FEXTdd53	Sdd53	FEXTdd54	Sdd54	RLdd55	Sdd55	NEXTdd56	Sdd56	NEXTdd57	Sdd57	NEXTdd58	Sdd58
Port 6	FEXTdd61	Sdd61	ILdd62	Sdd62	FEXTdd63	Sdd63	FEXTdd64	Sdd64	NEXTdd65	Sdd65	RLdd66	Sdd66	NEXTdd67	Sdd67	NEXTdd68	Sdd68
Port 7	FEXTdd71	Sdd71	FEXTdd72	Sdd72	ILdd73	Sdd73	FEXTdd74	Sdd74	NEXTdd75	Sdd75	NEXTdd76	Sdd76	RLdd77	Sdd77	NEXTdd78	Sdd78
Port 8	FEXTdd81	Sdd81	FEXTdd82	Sdd82	FEXTdd83	Sdd83	ILdd84	Sdd84	NEXTdd85	Sdd85	NEXTdd86	Sdd86	NEXTdd87	Sdd87	RLdd88	Sdd88
Port 1	LCLdc11	Sdc11	NEXTdc12	Sdc12	NEXTdc13	Sdc13	NEXTdc14	Sdc14	LCTLdc15	Sdc15	FEXTdc16	Sdc16	FEXTdc17	Sdc17	FEXTdc18	Sdc18
Port 2	NEXTdc21	Sdc21	LCLdc22	Sdc22	NEXTdc23	Sdc23	NEXTdc24	Sdc24	FEXTdc25	Sdc25	LCTLdc26	Sdc26	FEXTdc27	Sdc27	FEXTdc28	Sdc28
Port 3	NEXTdc31	Sdc31	NEXTdc32	Sdc32	LCLdc33	Sdc33	NEXTdc34	Sdc34	FEXTdc35	Sdc35	FEXTdc36	Sdc36	LCTLdc37	Sdc37	FEXTdc38	Sdc38
Port 4	NEXTdc41	Sdc41	NEXTdc42	Sdc42	NEXTdc43	Sdc43	LCLdc44	Sdc44	FEXTdc45	Sdc45	FEXTdc46	Sdc46	FEXTdc47	Sdc47	LCTLdc48	Sdc48
Port 5	LCTLdc51	Sdc51	FEXTdc52	Sdc52	FEXTdc53	Sdc53	FEXTdc54	Sdc54	LCLdc55	Sdc55	NEXTdc56	Sdc56	NEXTdc57	Sdc57	NEXTdc58	Sdc58
Port 6	FEXTdc61	Sdc61	LCTLdc62	Sdc62	FEXTdc63	Sdc63	FEXTdc64	Sdc64	NEXTdc65	Sdc65	LCLdc66	Sdc66	NEXTdc67	Sdc67	NEXTdc68	Sdc68
Port 7	FEXTdc71	Sdc71	FEXTdc72	Sdc72	LCTLdc73	Sdc73	FEXTdc74	Sdc74	NEXTdc75	Sdc75	NEXTdc76	Sdc76	LCLdc77	Sdc77	NEXTdc78	Sdc78
Port 8	FEXTdc81	Sdc81	FEXTdc82	Sdc82	FEXTdc83	Sdc83	LCTLdc84	Sdc84	NEXTdc85	Sdc85	NEXTdc86	Sdc86	NEXTdc87	Sdc87	LCLdc88	Sdc88
Port 1	TCLcd11	Scd11	NEXTcd12	Scd12	NEXTcd13	Scd13	NEXTcd14	Scd14	TCTLcd15	Scd15	FEXTcd16	Scd16	FEXTcd17	Scd17	FEXTcd18	Scd18
Port 2	NEXTcd21	Scd21	TCLcd22	Scd22	NEXTcd23	Scd23	NEXTcd24	Scd24	FEXTcd25	Scd25	TCTLcd26	Scd26	FEXTcd27	Scd27	FEXTcd28	Scd28
Port 3	NEXTcd31	Scd31	NEXTcd32	Scd32	TCLcd33	Scd33	NEXTcd34	Scd34	FEXTcd35	Scd35	FEXTcd36	Scd36	TCTLcd37	Scd37	FEXTcd38	Scd38
Port 4	NEXTcd41	Scd41	NEXTcd42	Scd42	NEXTcd43	Scd43	TCLcd44	Scd44	FEXTcd45	Scd45	FEXTcd46	Scd46	FEXTcd47	Scd47	TCTLcd48	Scd48
Port 5	TCTLcd51	Scd51	FEXTcd52	Scd52	FEXTcd53	Scd53	FEXTcd54	Scd54	TCLcd55	Scd55	NEXTcd56	Scd56	NEXTcd57	Scd57	NEXTcd58	Scd58
Port 6	FEXTcd61	Scd61	TCTLcd62	Scd62	FEXTcd63	Scd63	FEXTcd64	Scd64	NEXTcd65	Scd65	TCLcd66	Scd66	NEXTcd67	Scd67	NEXTcd68	Scd68
Port 7	FEXTcd71	Scd71	FEXTcd72	Scd72	TCTLcd73	Scd73	FEXTcd74	Scd74	NEXTcd75	Scd75	NEXTcd76	Scd76	TCLcd77	Scd77	NEXTcd78	Scd78
Port 8	FEXTcd81	Scd81	FEXTcd82	Scd82	FEXTcd83	Scd83	TCTLcd84	Scd84	NEXTcd85	Scd85	NEXTcd86	Scd86	NEXTcd87	Scd87	TCLcd88	Scd88
Port 1	RLcc11	Scc11	NEXTcc12	Scc12	NEXTcc13	Scc13	NEXTcc14	Scc14	ILcc15	Scc15	FEXTcc16	Scc16	FEXTcc17	Scc17	FEXTcc18	Scc18
Port 2	NEXTcc21	Scc21	RLcc22	Scc22	NEXTcc23	Scc23	NEXTcc24	Scc24	FEXTcc25	Scc25	ILcc26	Scc26	FEXTcc27	Scc27	FEXTcc28	Scc28
Port 3	NEXTcc31	Scc31	NEXTcc32	Scc32	RLcc33	Scc33	NEXTcc34	Scc34	FEXTcc35	Scc35	FEXTcc36	Scc36	ILcc37	Scc37	FEXTcc38	Scc38
Port 4	NEXTcc41	Scc41	NEXTcc42	Scc42	NEXTcc43	Scc43	RLcc44	Scc44	FEXTcc45	Scc45	FEXTcc46	Scc46	FEXTcc47	Scc47	ILcc48	Scc48
Port 5	ILcc51	Scc51	FEXTcc52	Scc52	FEXTcc53	Scc53	FEXTcc54	Scc54	RLcc55	Scc55	NEXTcc56	Scc56	NEXTcc57	Scc57	NEXTcc58	Scc58
Port 6	FEXTcc61	Scc61	ILcc62	Scc62	FEXTcc63	Scc63	FEXTcc64	Scc64	NEXTcc65	Scc65	RLcc66	Scc66	NEXTcc67	Scc67	NEXTcc68	Scc68
Port 7	FEXTcc71	Scc71	FEXTcc72	Scc72	ILcc73	Scc73	FEXTcc74	Scc74	NEXTcc75	Scc75	NEXTcc76	Scc76	RLcc77	Scc77	NEXTcc78	Scc78
Port 8	FEXTcc81	Scc81	FEXTcc82	Scc82	FEXTcc83	Scc83	ILcc84	Scc84	NEXTcc85	Scc85	NEXTcc86	Scc86	NEXTcc87	Scc87	RLcc88	Scc88

OPTITEST (Software)

The measuring system is equipped with OptiTest (a module of our CIQ quality data managemen software) which allows to prepare a measurement, to control the ATE to automatically acquire all the values of the defined parameters, to evaluate the results, to provide the measurement reports in the desired format and finally to save or export the measured values.
The software has been developed in the Microsoft® Windows™ environment and complies with the Windows features.

Creation and administration of test specification

The early creation of "Test Plan" file allows to define:
- the successive measuring sequences (Line test, LF, HF, EMC, …)
- the appropriated limits and conditions (including complex limit curves)
- the scales (logarithmic or linear)
- the HF measuring method (sweep or frequency table; start/stop frequencies; number of points,…)
- the configuration of reports

The test plan is created only once per cable type and can be saved and re-used accordingly.
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.
Most of the limits and formulas recommended by the international standards are already integrated.
Their variables are programmable to enable the preparation of special specifications

Measurement

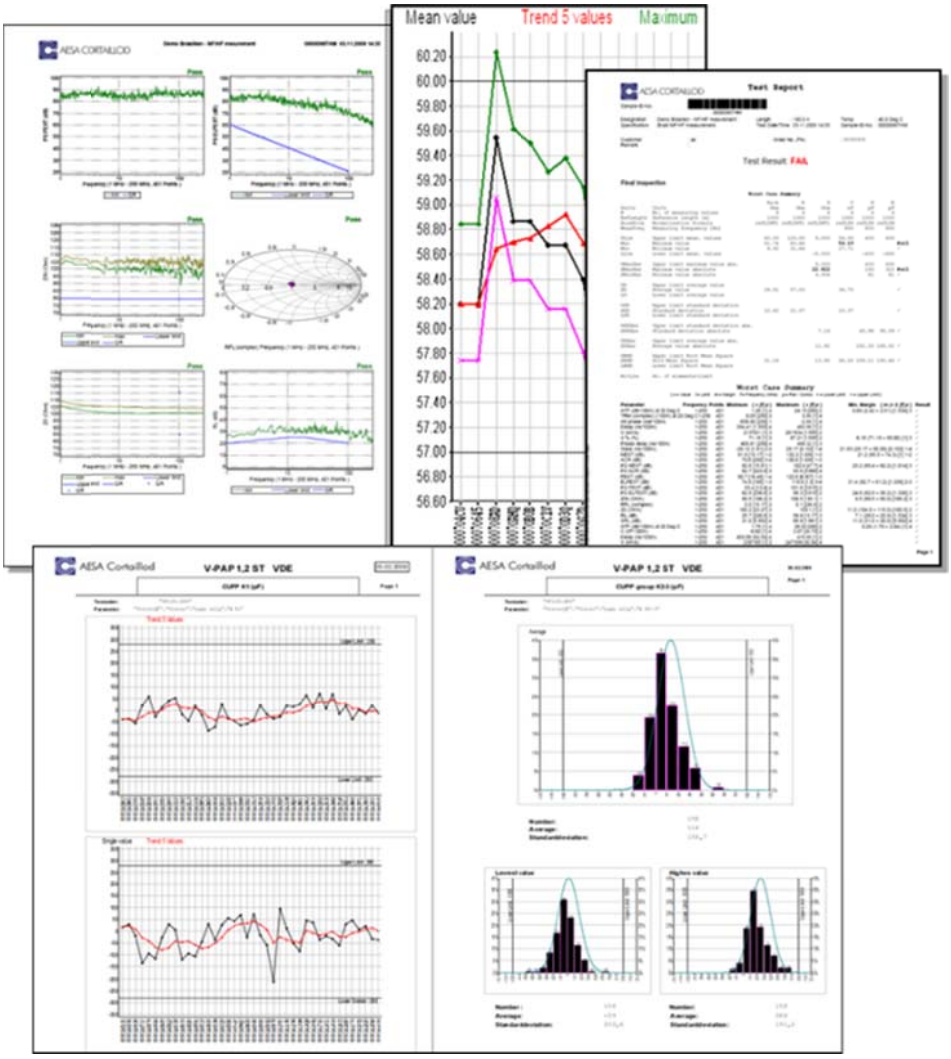
The operator only needs to connect the cable on the frame, set the right test plan, fulfil the specific data (order number, operator name,…) and start the full automatic measurement.
- Fully automatic calibration management including automated calibration procedure
- Preliminary line test to verify the cable connection (short cut, crossover,…)
- Switching sequences indicated by LEDs
- In case of problem, the operator can repeat the measurement or continue in accepting the wrong value.

Reporting

Report generation is set in the test plan and is automatically generated.
The results may be displayed, printed, stored as PDF files, exported (e.g. Excel) or sent by email.
Different highly comprehensive reports can be generated containing a limit case compilation with graphics and for each measuring block a separate summary with related graphics.
Filters and search criteria normally generate sample lists which facilitate multiple further actions such as:
- Display and process measured values
- Print reports and labels

Evaluation

All data is 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 through the data pool
- Generate quality charts (statistics)
- Statistical distribution (Gauss type curve)
- Evolution and parameter survey as function of time
- Measurements repartition in a defined time period to determine the testing load



Data management

Connected to CIQ (AESA quality data management system), 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 to the dispatch of the finished product.

Options

1. Network Analyzer

- Agilent type E5071C 4 ports (9 kHz – 4.5 GHz) Article No: 51.0001.0044.0
- Rohde & Schwarz ZNB4 (9 kHz – 4.5 GHz) Article No: 51.0001.0060.0

Other types can be proposed upon request. VNA from customer can also be integrated.

2. Coaxial cables measuring option

The option includes the modification of the equipment (N-connectors, switch,…) and the related software module to allow the measurement of coaxial cables with Vega.

- **50 or 75 ohms coaxial option** Article No: 50.0001.0031.0
- **50 + 75 ohms coaxial option** Article No: 50.0001.0029.0

Coaxial accuracy (frequency range will depend on the VNA)	From	To		100 kHz 100 MHz	100 MHz 500 MHz	500 MHz 1 GHz	1 GHz 3 GHz	3 GHz 6 GHz
S21 transmission (Attenuation, NEXT) corrected at 20°C	-80	-50	dB	± 1.5 dB	± 1.7 dB	± 1.9 dB	± 2.4 dB	± 3.0 dB
	-50	-25	dB	± 0.5 dB	± 0.6 dB	± 0.7 dB	± 0.9 dB	± 1.5 dB
	-25	-10	dB	± 0.2 dB	± 0.3 dB	± 0.4 dB	± 0.8 dB	± 1.3 dB
	-10	0	dB	± 0.2 dB	± 0.2 dB	± 0.4 dB	± 0.8 dB	± 1.3 dB
Impedance	50	50	Ω	± 0.5 Ω	± 0.7 Ω	± 1.0 Ω	± 1.5 Ω	± 4.0 Ω
	75	75	Ω	± 0.75 Ω	± 1.2 Ω	± 1.5 Ω	± 2.0 Ω	± 6.0 Ω

3. LF option for Cobalt 4 DA

Article No: 50.0001.0061.0

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

Calculated parameters (from 100Hz to 10kHz)

Attenuation

Characteristic Impedance

Statistical parameters

Maximum and minimum measured values Upper quality factor

Absolute minimum measured valueLower quality factor

Average value RC product

Quadratic average Standard deviation RC

Standard deviation Variance

4. Switch for options

The option includes the necessary hardware to connect specific options to the system (e.g. EMC,...).

- **Switch + 50 ohms N-connector for options** Article No: 50.0001.0032.0

*5. EMC Parameters (TI, AS, AC)**

To perform EMC measurements (Transfer Impedance, Coupling Attenuation, Screening Attenuation) with the tri-axial method, following accessories are required

- One hardware package to prepare the sample and take care for the impedance adaptation
- One software package (specific measurement module)

These accessories allow measuring the transfer impedance, the screening attenuation and coupling attenuation according to IEC 62153-4-9 when knowing the impedance of the internal coaxial cable created with the sample under test.

** this option requires a system with a 50 ohms switch. If the system is not equipped with it, it must be ordered separately.*

Pictures next page.

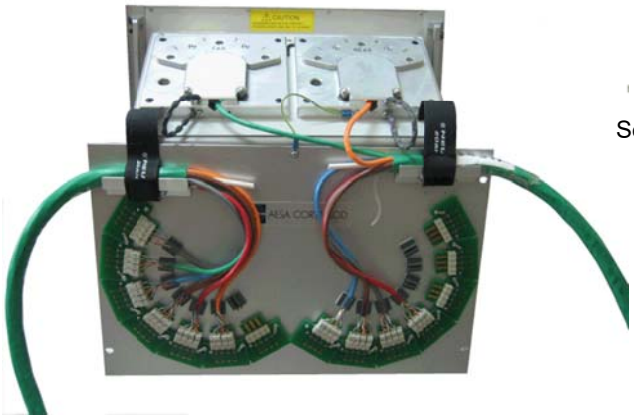
- Transfer Impedance Kit, ∅ 2.3 - 9.8 mm Article No: 51.0001.0035.0

- Transfer Impedance Kit, ∅ 6 - 22 mm Article No: 51.0001.0056.0

6. Option Alien Crosstalk AXT for ATE up to Cat. 6A (semi-automatic, incl. software)

Article No: 52.0001.0007.0

AESA has developed a software package along with a test procedure that allows the swapping of the different cables on a 4-pair connecting frame. It allows making all necessary measurements in a well-defined order. The software will then compute the measured crosstalk and show the results as specified in the standards.
This option is optimized for 4-pair unscreened cables (U/UTP) up to 500MHz.



Semi-automatic AXT option connecting frame

7. Option Alien Crosstalk AXT for ATE up to Cat. 8 (semi-automatic, incl. software)

Article No: 52.0001.0011.0

AESA has developed a software package along with a test procedure that allows the swapping of the different cables on a 4-pair connecting frame. It allows making all necessary measurements in a well-defined order. The software will then compute the measured crosstalk and show the results as specified in the standards.
This option is optimized for screened cables (X/FTP, F/UTP) up to 2000MHz and unscreened cables (U/UTP) up to 500MHz.

Semi-automatic AXT option Cat 8 connecting frame

8. *Option for connector RJ45*

Article No: 50.0001.0070.0

Patch cord for RJ45 connectors: easy and direct adaptation to the Cobalt frame.
Using a simple interface and introducing a de-embedding software correction, it doesn't need frequent and time-consuming calibration routines. It can provide not only the standard parameters as Next and RL, but also other cable parameters for development and further analysis

9. *Set of ISO 17025 certified LF standards type AESA 9000*

Article No: 45.9000.0001.0

This set of "Low Frequency" standards, certified ISO 17025, allows the periodic calibration, thus proving the accuracy of the complete measurement system. The kit is composed of:

- Standard type 9001	C1,2	19,20 nF	± 0,1 %	± 30 ppM/°C
- Standard type 9002	C1,2	192,0 nF	± 0,1 %	± 30 ppM/°C
- Standard type 9003	C3	16,0 nF	± 0,1 %	± 30 ppM/°C
	K1, K2, K3	16000 pF	± 0,1 %	± 30 ppM/°C
- Standard type 9004	E1, E2, E3	12000 pF	± 0,1 %	± 30 ppM/°C
- Standard type 9005	RA, RD	192 Ω	± 0,01 %	± 2 ppM/°C
	RB, RC	1920 Ω	± 0,01 %	± 2 ppM/°C

ISO 17025 ACCREDITED

10. *Set of ISO 17025 certifies HF calibration standards type AESA 9800*

Article No: 45.9800.0001.0

This set of "coaxial" primary standards, certified ISO 17025, allows the periodic calibration, thus proving the accuracy of the complete measurement system (Vector Network Analyzer + RF multiplexer + connecting frame).

This set of "coaxial" primary standards should not be mixed up with the "symmetrical" zero correction kit, delivered with the ATE, which is used to carry out the periodical zero correction files of the equipment, required to measure LAN cables.

The set of certified HF standards is composed of:

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

ISO 17025 ACCREDITED

11. Movable Trolley

Article No: 51.0190.0001.0

For convenience or operational reasons, it is possible to add a professional movable trolley to the system. In such a case, all tester components are integrated in the trolley, including the computer system and the printer.

12. Spare parts

AESA recommends following set of spare parts for a secured operation for two years:

Cobalt Type	HF measurement only (Mini kit)	Including optional LF measurement (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