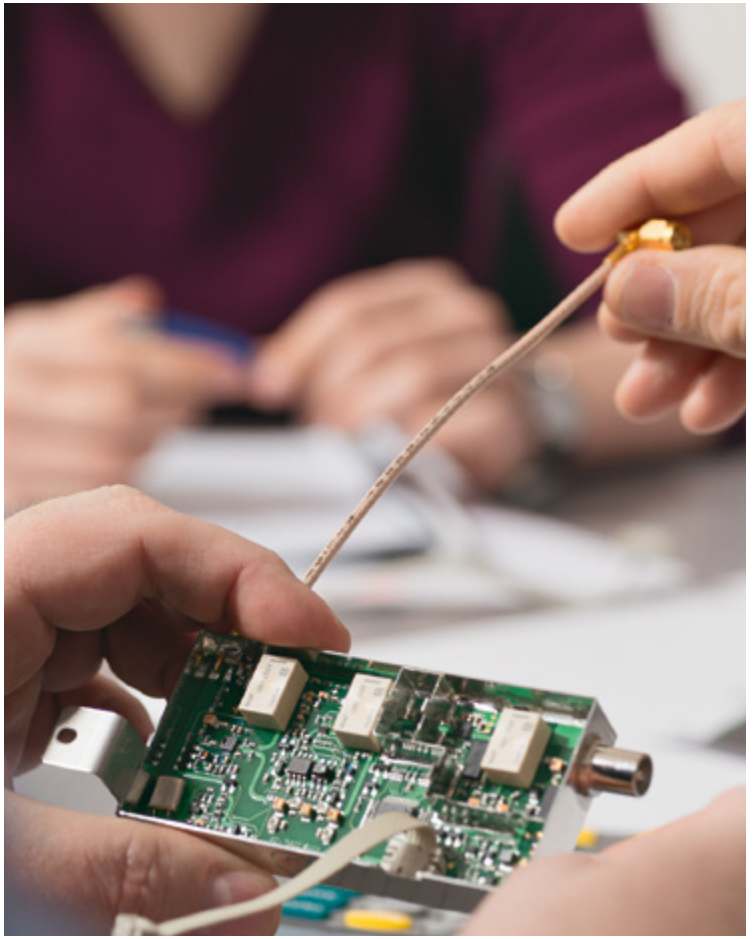
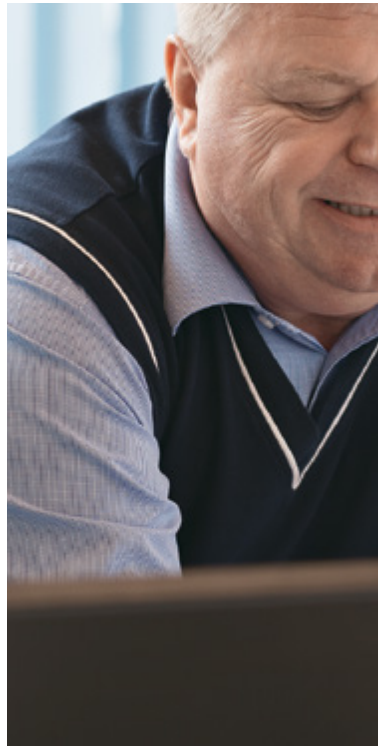
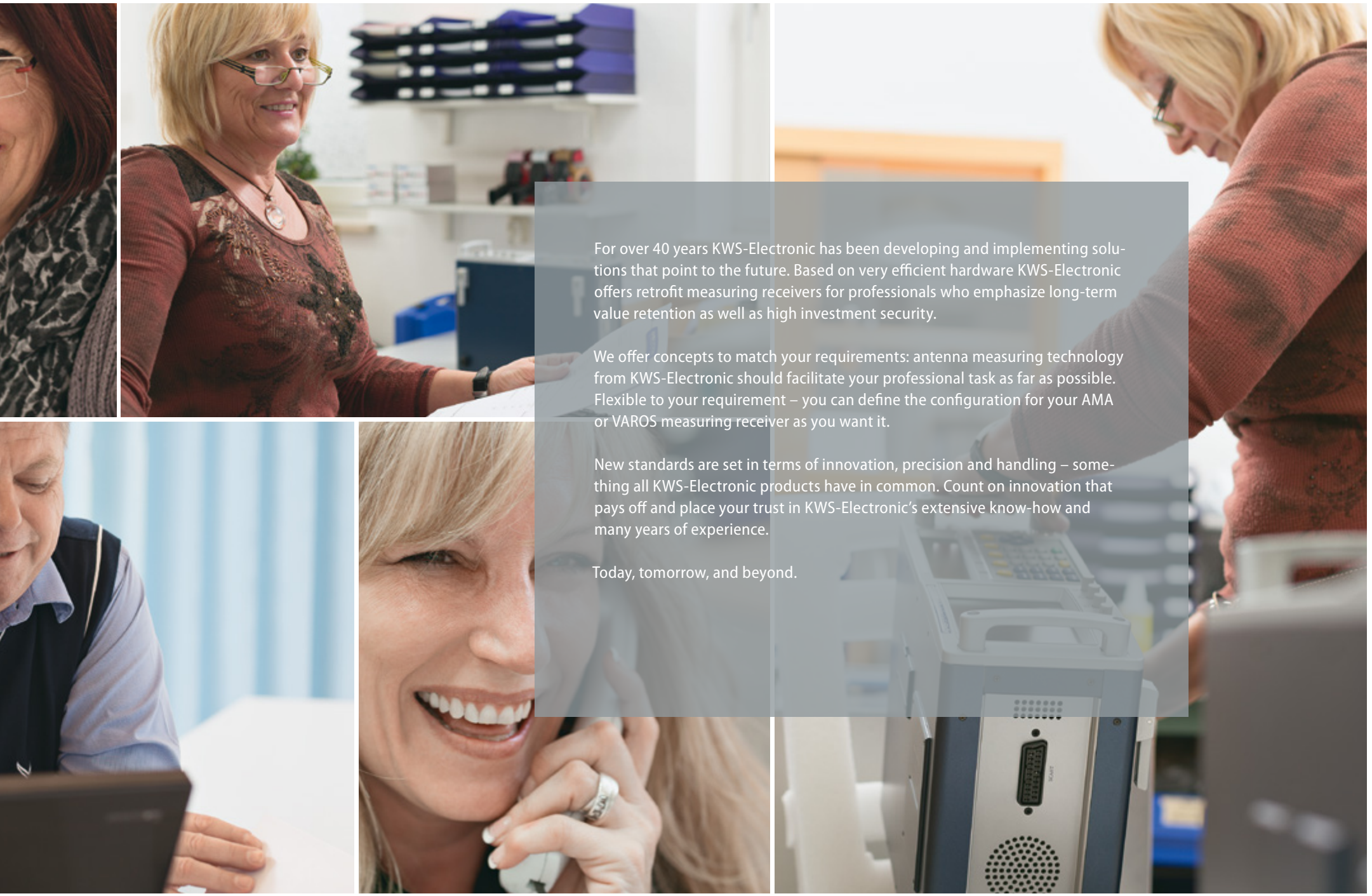
KWS ELECTRONIC

HIGH FREQUENCY TEST EQUIPMENT

PRODUCT LINE G



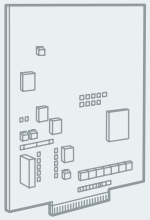



For over 40 years KWS-Electronic has been developing and implementing solutions that point to the future. Based on very efficient hardware KWS-Electronic offers retrofit measuring receivers for professionals who emphasize long-term value retention as well as high investment security.

We offer concepts to match your requirements: antenna measuring technology from KWS-Electronic should facilitate your professional task as far as possible. Flexible to your requirement – you can define the configuration for your AMA or VAROS measuring receiver as you want it.

New standards are set in terms of innovation, precision and handling – something all KWS-Electronic products have in common. Count on innovation that pays off and place your trust in KWS-Electronic's extensive know-how and many years of experience.

Today, tomorrow, and beyond.



HARDWARE MODULES

HEVC/AVS+/UHD decoder

DAB/DAB+ measurement module

DOCSIS 3.0 analyzer

Optical measurement module

Electro Magnetic Interference measurement (EMI)

Valued S/N measurement for ATV signals

CATV frequency extension up to 1,214 MHz

WiFi module

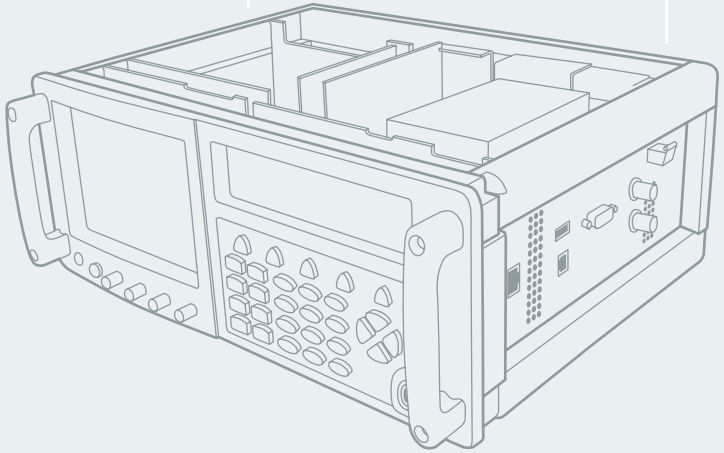
UMS measurement module
(real-time spectrum analyzer and upstream monitoring)

SOFTWARE MODULES

SNMP activation

Constellation diagram

UMS firmware for upstream
monitoring field device



FUTURE-ORIENTED MODULAR

KWS hardware for tomorrow's technology.

With a KWS TV analyzer you are purchasing a future-proof and expandable platform.

On one hand this includes of course regular updates of the device's firmware. These updates can be downloaded from our homepage and easily installed in an AMA or VAROS device via USB – on site, free of charge, quickly ... install your update and continue working!

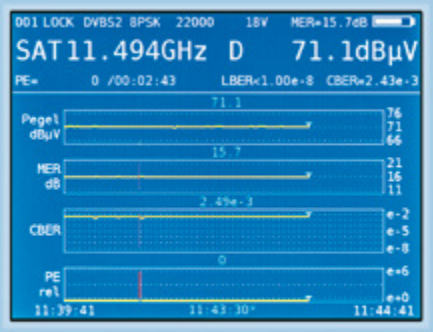
The main decisive fact however is the flexibility and modularity from a hardware point of view. No matter whether current developments or future standards – our devices can be upgraded over many years. This strategy saves your investment and you can further on make state-of-the-art measurements with the device you are familiar with even in many years.

Overview and main features of our TV analyzers

	AMA 310	VAROS 106	VAROS 107	VAROS 109
FM/UKW	✓	✓	✓	×
TV analog	✓	✓	✓	×
DVB-S/-S2	✓	✓	×	✓
DVB-C	✓	✓	✓	×
DOCSIS- (J83B-)/EuroDOCSIS-DS	✓	✓	✓	×
DOCSIS 1.0/1.1/2.0/3.0 analyzer	✓	×	✓	×
DVB-T/-T2 & DTMB	✓	✓	✓	×
DAB/DAB+	✓	✓	×	×
WiFi (802.11 a/b/g/n) via SMA jack (50 Ω)	×	✓	×	×
Common interface (CI)	✓ 2×	✓ 1×	✓ 1×	✓ 1×
ASI IN/ASI OUT	✓	×	×	×
DVI & USB	✓	✓	✓	✓
Ethernet (LAN)	✓	×	×	×
SCART	✓	×	×	×
Optical receiver (SC/APC)	✓	✓	✓	✓
User editable TV channel table and tuning memory	✓	✓	✓	×
TILT function (TV range)	✓	✓	✓	×
Analog S/N measurement per CCIR 569	✓	✓	✓	×
DiSEqC V1.0–2.0, UNICABLE (EN 50494), JESS (EN 50607)	✓	✓	×	✓
Constellation diagram for all ranges	✓ Real-time (except DVB-T2)	✓	✓	✓
MPEG-2/MPEG-4 (AVC) video decoder	✓	✓	✓	✓
MPEG-H (HEVC) and AVS+ video decoder	✓	✓	✓	×
Microscope function for fiber inspection	×	✓	✓	✓
Remote control and monitoring via SNMP including SNMP traps	✓	×	×	×

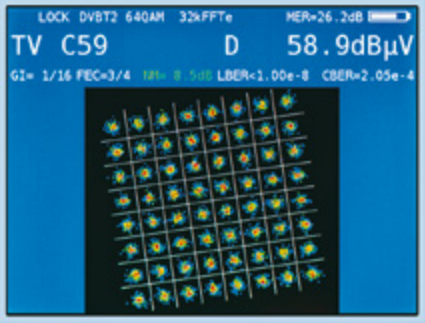
Dimensions in mm: 206 w × 297 h × 84 d
Weight 2.5 kg

The technical data sheets and device-specific downloads are available from our homepage **www.kws-electronic.de**.



Function DataGrabber when monitoring an HD transponder on SAT.

Option WiFi measurement: listing of available access points stating all relevant information.



Measurement of a DVB-T2 transponder with constellation diagram and noise margin.

- High resolution luminous 5.7" TFT screen
- Frequency range from 5–2,150 MHz
- Analogue: FM, TV, return channel (RF level measurement), EMI measurement
- Digital: DVB-S/-S2, DVB-C, DVB-T/-T2 (RF level/ BER/MER/Constellation diagram/Packet errors/ Noise Margin)
- MPEG 4 decoder for SD and HD video with CI slot and DVI out
- Electro Magnetic Interference Measurement (EMI)
- NIT evaluation and LCN display
- Spectrum analyzer for all ranges, TILT function
- Echo measurement for DVB-T/-T2
- DiSEqC, UNICABLE, JESS (EN 50494 and 50607)
- Measured values memory/Screenshots/ Channel tables directly via USB
- Rechargeable lithium ion battery 7.4 V/6.6 Ah

Possible options

- Optical receiver with SC/APC input
- HEVC/AVS+/UHD decoder (H.265)
- Extended CATV frequency range up to 1,214 MHz
- WiFi measurement module at 2.4/5 GHz
- DAB/DAB+ measurement module
- S/N measurement module for analog TV
- Accessory: Protective case with 4-point carry strap

TV analyzer: Smaller, lighter, more powerful...

VAROS 106

Combo measuring receiver

Based on a high-quality hardware platform our combo measuring receiver VAROS 106 as successor device of the VAROS 306 is the next milestone in the consistent device strategy of KWS-Electronic.

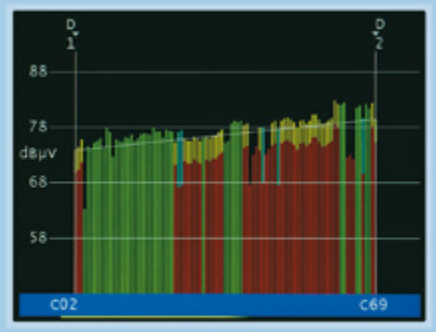
High accuracy, an easy handling as well as the modular and rugged construction will support the technician on-site in his tasks: perfect troubleshooting in all distribution networks with FM, return channel, DAB/DAB+, DVB-T/-T2, cable TV, WiFi or SAT – the VAROS 106 covers all ranges reliably. By any means a real all-rounder.

Retrofitting WiFi-measurement or the HEVC/AVS+/UHD decoder later? No problem with the VAROS 106 ... it has the same modular design like all our devices. Also measuring methods that do currently play no role yet can be upgraded.

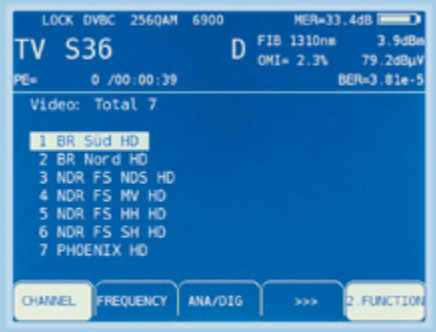
With this flexibility updates either as a firmware or as a hardware upgrade can be done ... you decide.

Dimensions in mm: 206 w × 297 h × 84 d
Weight 2.5 kg

The technical data sheets and device-specific downloads are available from our homepage **www.kws-electronic.de**.



TILT meas.: automatic detection of the QAM constellation and compensation for the level reduction.



Measurement of an optical CATV signal with evaluation of all familiar RF parameters.

– High resolution luminous 5.7" colour TFT
– Frequency range from 5–867 MHz
– Analogue: FM, TV, return channel (RF level measurement), EMI measurementt
– Digital: DVB-C, DOCSIS, DVB-T/-T2 (RF level/BER/MER/Constellation diagram/Packet errors/Noise Margin)
– MPEG 4 decoder for SD and HD video with CI slot and DVI out
– NIT evaluation and LCN display
– DOCSIS analyzer (DOCSIS 3.0)
– Digital analyzer for all ranges, tilt measurement
– Signal quality monitoring with DataGrabber
– Measured value storage via USB
– Upstream generator 5–65 MHz (CW and PRBS)
– Electro Magnetic Interference Measurement (EMI)
– Rechargeable lithium ion battery 7.2 V/6.6 Ah

Possible options

– Extended CATV frequency range up to 1,214 MHz
– HEVC/AVS+/UHD decoder (H.265)
– S/N measurement module for analog TV
– Optical receiver with SC/APC input including possibility to connect microscope via USB
– Software module for upstream evaluation
– Accessory: Protective case with 4-point carry strap

The innovative portable cable TV analyzer:

VAROS 107

Cable TV measuring receiver

The VAROS 107 was specially designed for measuring cable TV networks. The large high resolution TFT display and the backlit keyboard contribute to making work for the technician easier.

The DOCSIS 3.0 analyzer as well as options for optical measurements, UHD image representation and the possibility to measure DOCSIS 3.1 frequencies up to 1,214 MHz lead to a guaranteed future and a high value retention.

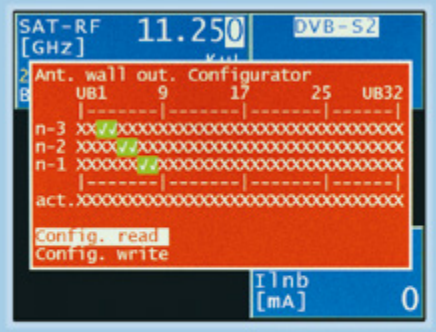
The VAROS 107 is equipped with an upstream signal generator to enable it to manage the increased demands on the return channel capability in the networks with regards to measurements.

For this the device transmits up to 4 carriers simultaneously (CW or PRBS) from the subscriber's connection socket in the return channel frequency range. These carriers can then be measured with the AMA 310/UMS or Kronback X16/KWS.

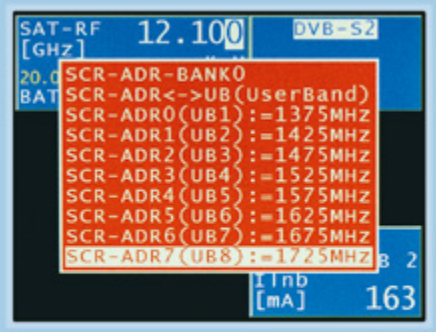
VAROS TECHNOLOGY

Dimensions in mm: 164 w × 266 h × 70 d
Weight 1.3 kg

The technical data sheets and device-specific downloads are available from our homepage **www.kws-electronic.de**.



Configuration menu for programmable UNICABLE/ UNICABLE II/JESS antenna sockets.



Selection of a UNICABLE user band from one of the UNICABLE memory banks.

For SAT specialists:

VAROS 109

Satellite meter/TV analyzer

- High resolution luminous 5.7" colour TFT
- Frequency range from 910–2,150 MHz
- DVB-S and DVB-S2
- RF level, BER, MER, Packet errors, Noise Margin
- MPEG 4 decoder for SD and HD video with CI slot
- NIT evaluation
- Spectrum analyzer for narrow/broadband modes
- Scan functions for reliable satellite detection
- DiSEqC, UNICABLE, JESS (EN 50494 and 50607)
- Programming function for addressable antenna sockets
- Screenshots and updates via USB
- DVI-out
- Rechargeable lithium ion battery 7.2 V/6.6 Ah

Possible options

- Constellation diagram
- Optical receiver with SC/APC input including possibility to connect microscope via USB

Compact device and yet a full-fledged satellite measuring receiver: the VAROS 109 is used for installation and troubleshooting in classic multi-switch systems as well as UNICABLE/UNICABLE II (dCSS) distribution networks.

Using the optical measuring input (option) it is possible to measure optical LNBs. The device displays the optical power and the optical modulation index (OMI). The LNB power supply is provided directly from the RF connector of the VAROS 109.

The scan function has access to a comprehensive list of pre-installed satellite positions. The unambiguous display, especially with regards seldom used orbital positions, significantly reduces time consuming searches. The packet loss counter supports the localization of critical problems.


KWS
SEMINARS


KWS ELECTRONIC
ANALYZ
PRINT
RANGE
ANA/DIG
LNB
MODE
RECALL
SAVE

Setting a precedent:

Seminars

at KWS-Electronic.

Goal of **AMA seminars** is to identify and document all kinds of errors in larger distribution networks. Especially issues such as the evaluation of constellation diagrams and NIT tables are explained.

Distribution network basics are addressed marginally in the AMA seminars.

Goal of **VAROS seminars** is to make the technicians fit for simple and uncomplicated problem solving when out on the network.

The operation of the measuring devices and interpretation of measured values are addressed extensively.

Please note: the seminars at KWS-Electronic are only held in German language.

In addition to providing on-site training at wholesalers, chambers of craft, and electrical guilds, KWS-Electronic also offers you the opportunity to participate in 2-day seminars directly at the company in Tattenhausen. These intensive courses constitute a successful combination of theoretical knowledge and its application in daily usage. Via error simulation interferers are reproduced in line with actual practice. Each participant can detect and follow changes in the signal on his measurement device.

In the picturesque foothills of the Alps we provide a seminar group of maximal 8 participants exactly the knowledge they need to successfully deploy their KWS measuring receiver.

Knowledge as a competitive advantage – seminars from KWS-Electronic provide you with know-how that pays dividends.

AMA TECHNOLOGY

Possible options

- HEVC/AVS+/UHD decoder (H.265)
- DAB/DAB+ measurement module
- DOCSIS analyzer (DOCSIS 3.0)
- Optical receiver with SC/APC input
- UMS module for return path monitoring in conjunction with VAROS 107
- Electro Magnetic Interference Measurement (EMI)
- SNMP activation for remote monitoring

Dimensions in mm: 360 w × 160 h × 300 d
Weight 6.1 kg

Professional technology doesn't have to be complicated.

AMA 310

Combo TV analyzer

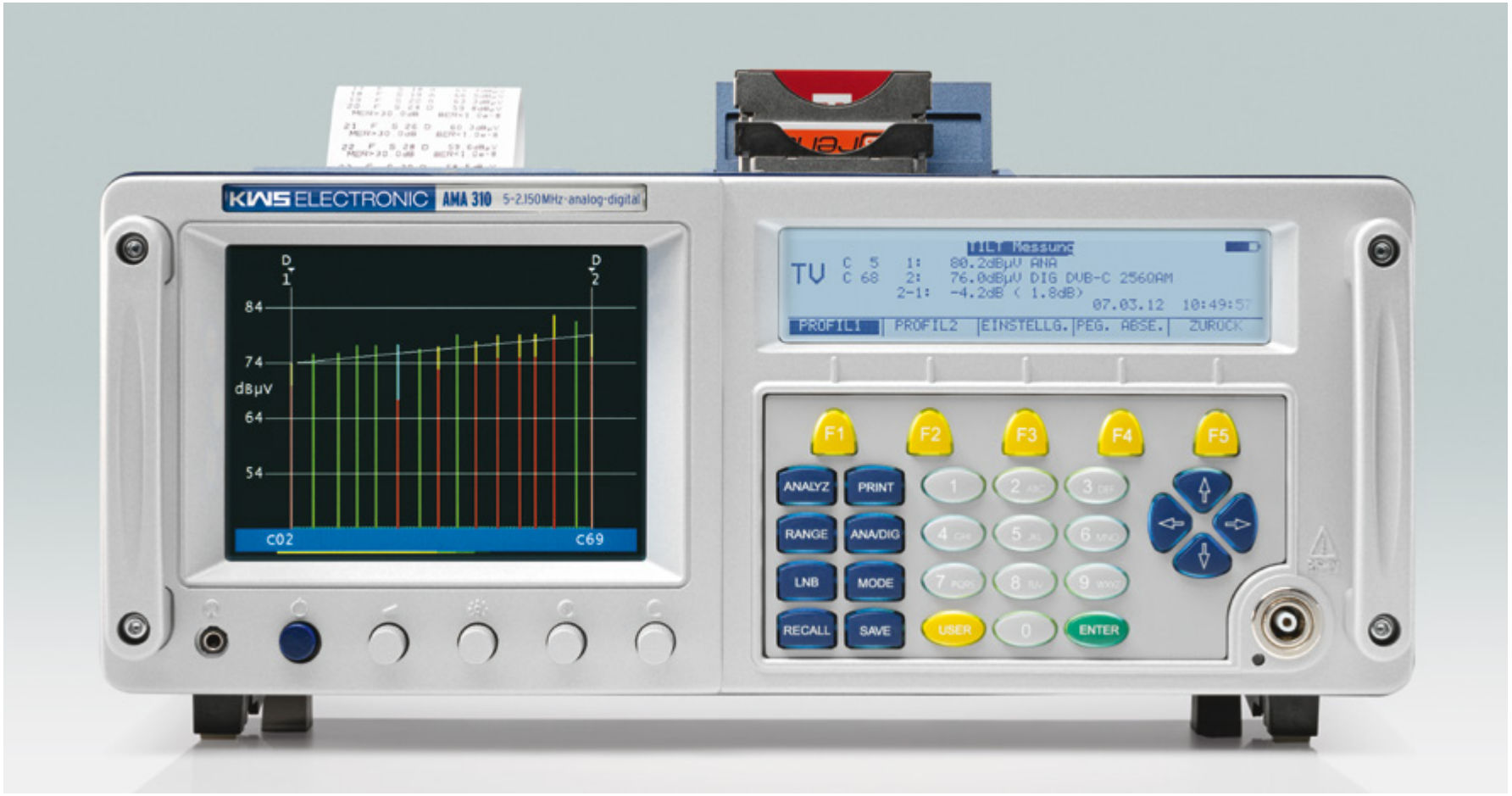
- High resolution luminous 5.5" TFT screen
- Frequency range from 5–1,214 MHz for return path, FM, TV and 910–2,150 MHz for SAT
- Analogue: FM, TV
  Digital: DVB-S/-S2, DVB-C, DOCSIS, DVB-T/-T2
- Return path: RF level, BER, MER and constellation diagram in conjunction with VAROS 107
- MPEG 4 decoder for SD and HD video with 2 CI slots
- Real-time constellation diagram
- Valued S/N measurement for analog TV signals with SCOPE/HUM representation
- Hum and phase jitter verification
- CATV: MER up to 40 dB, S/N (analogue) up to 55 dB
- Digital analyzer for all ranges, tilt measurement, ingress measurement
- Echo measurement for DVB-T/-T2 (impulse response)
- DiSEqC, UNICABLE, JESS (EN 50494 and 50607)
- Signal quality monitoring with DataGrabber
- Printer for measured values and screenshots
- USB, SCART in/out, DVI out, ASI in/out, Ethernet (RJ 45)
- Rechargeable lithium ion battery 14.4 V/6.6 Ah

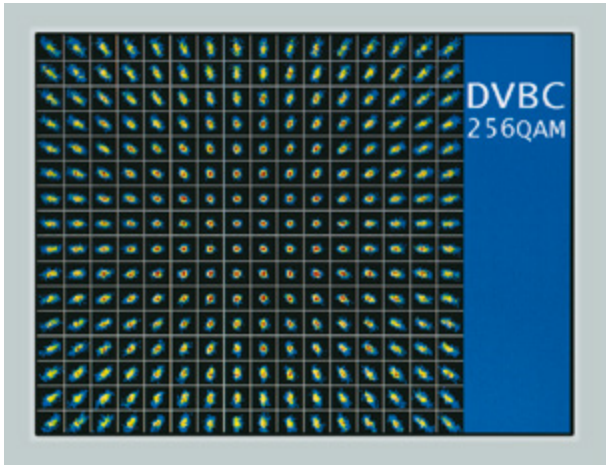
The combo measuring receiver AMA 310 is an obvious step into broadband measuring technology. Despite having an abundance of functions thanks to the time-proven KWS concept it still retains a clear user-friendly interface.

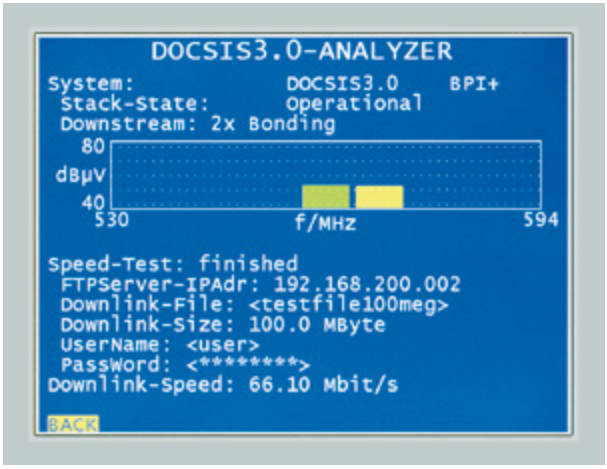
Advanced modules and a sophisticated matured housing concept ensure extreme durability and longevity. Extensive surveillance and monitoring functions, diverse copy and save functions are outwardly visible qualities of the AMA 310.

Resulting from the numerous upgrade possibilities and the on-going development of the device firmware the life AMA 310 is not limited by changes in technical standards.

It is a model of longevity and investment security … measurement technology "Made in Germany".


KWS ELECTRONIC
AMA 310
5-2.150MHz-analog-digital
84
74
dBµV
64
54
C02
C69
TU
C 5 1: 80.2dBµV ANA
C 68 2: 76.0dBµV DIG DVB-C 256QAM
2-1: -4.2dB (1.8dB)
07.03.12 10:49:57
PROFIL1
PROFIL2
EINSTELLG.
PEG. ABSE.
ZURÜCK
F1
F2
F3
F4
F5
ANALYZ
PRINT
RANGE
ANA/DIG
LNB
MODE
RECALL
SAVE
USER
ENTER


DVBC
256QAM


DOCSIS3.0-ANALYZER
System: DOCSIS3.0 BPI+
Stack-State: Operational
Downstream: 2x Bonding
80
dBµV
40
530
f/MHz
594
Speed-Test: finished
FTPServer-IPAdr: 192.168.200.002
Downlink-File: <testfile100meg>
Downlink-Size: 100.0 MByte
UserName: <user>
PassWord: <********>
Downlink-Speed: 66.10 Mbit/s
BACK

AMA TECHNOLOGY

AMA 310

Combo TV analyzer

The DOCSIS analyzer in the AMA 310 was implemented in accordance with the DOCSIS 3.0 specification.

Both Euro-DOCSIS and US-DOCSIS signals can be measured. Channel bonding, as available with DOCSIS 3.0, is presented in a highly visible graphical manner.

With the AMA 310 it is possible to assess the quality of the transmission in return path with greater confidence. With the VAROS 107 used as signal source – e. g. at the customer's antenna socket – the AMA 310 displays the RF level, BER, MER, and constellation diagram for the received signal in the return path – e. g. in the head end or at the house amplifier.

An overview of the various option packages as well as information about the »AMA.remote« software is available on our homepage **www.kws-electronic.de**.

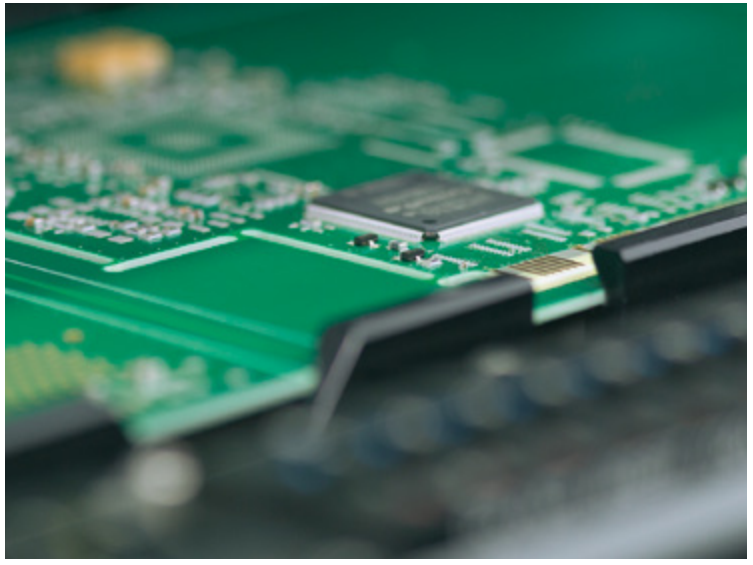
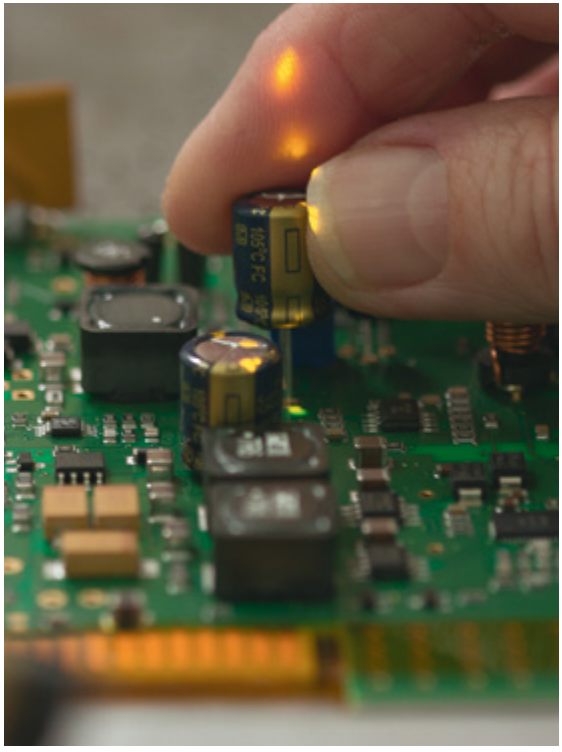
You can comfortably generate and process the measuring receiver's memory lists with the PC software "AMA.remote". Via SNMP (Simple Network Management Protocol) the AMA.remote additionally allows for remote controlling and monitoring of the AMA 310.

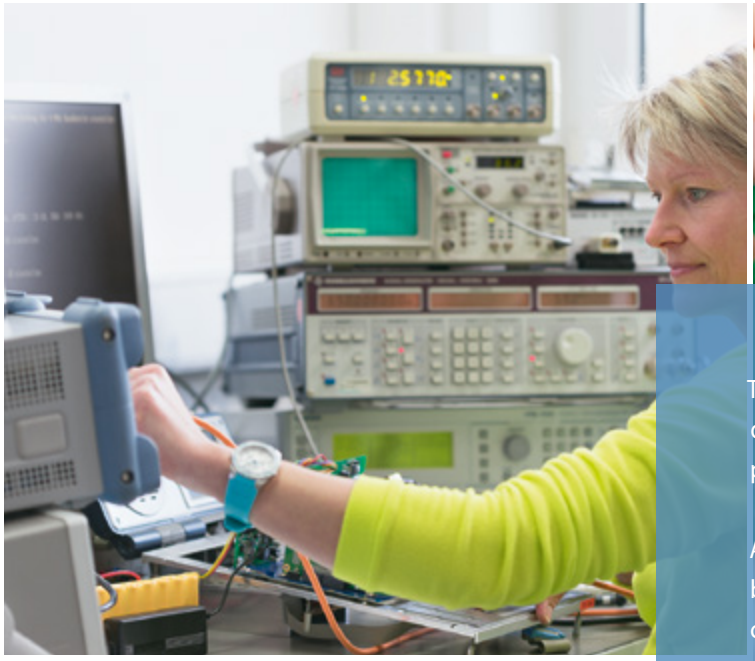
You can also check cable networks for RF leakage using the EMI option in the AMA 310 in conjunction with additional equipment available from KWS-Electronic. Locating leaks, which are largely responsible for increased interference, is as a result greatly facilitated.

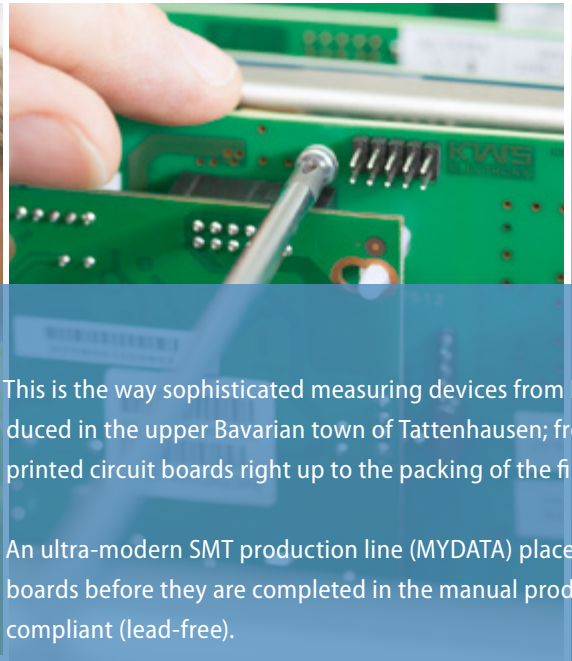
The functional bag not only offers protection for the device but also enables the smooth operation of the instrument. The large opening side flaps provide easy access to all the interfaces.

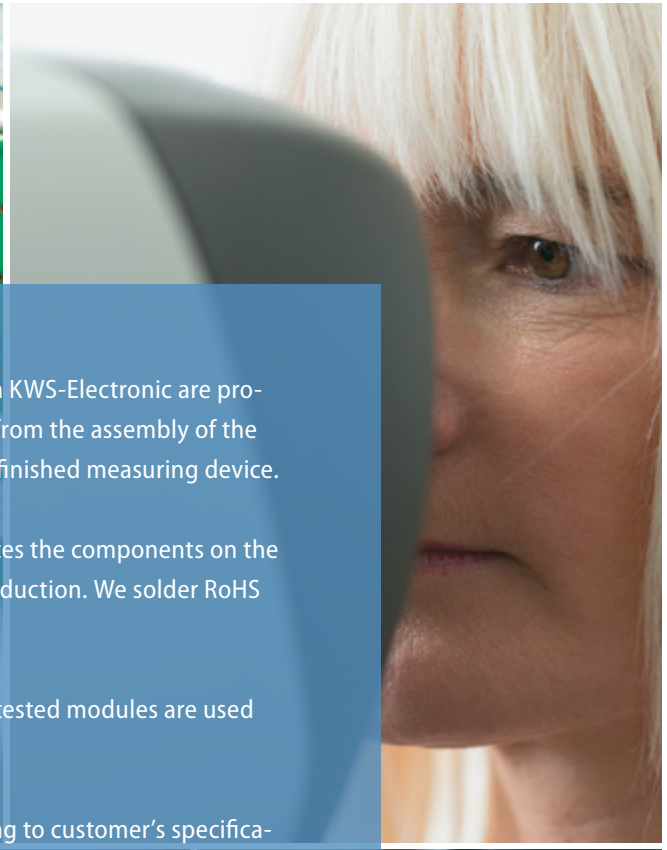










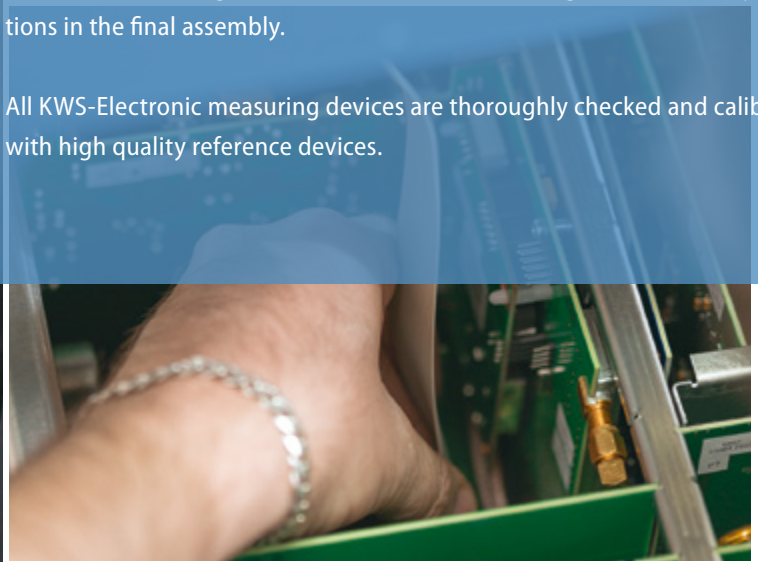
This is the way sophisticated measuring devices from KWS-Electronic are produced in the upper Bavarian town of Tattenhausen; from the assembly of the printed circuit boards right up to the packing of the finished measuring device.

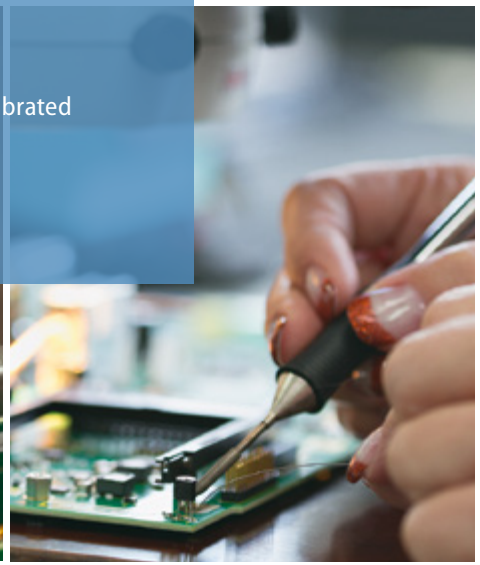
An ultra-modern SMT production line (MYDATA) places the components on the boards before they are completed in the manual production. We solder RoHS compliant (lead-free).

Assembly inspection: Only optically and electrically tested modules are used for new and upgraded devices as well as repairs.

Each KWS measuring receiver is customized according to customer's specifications in the final assembly.

All KWS-Electronic measuring devices are thoroughly checked and calibrated with high quality reference devices.





KWS UPSTREAM

AMA 310/UMS (19" – 3,5 RU), dimensions in mm:
440 w × 155,5 h × 275 d (without clamping angle)
483 w × 155,5 h × 275 d (with clamping angle)
Weight 7.9 kg

SW 024 (19" – 1 RU), dimensions in mm:
440 w × 44,45 h × 275 d (without clamping angle)
483 w × 44,45 h × 275 d (with clamping angle)
Weight 3.5 kg

Return channel measurement -
the high-end solution.

- Frequency range from 5–65 MHz
- Real-time spectrum analyzer
- Max-hold function
- Frequency sweep
  (frequency response measurement)
- Measurement of level, MER, BER
  and constellation diagram
- Real-time constellation diagram
- Modulated test channels up to
  256 QAM and 6.4 MHz bandwidth

Acquisition of qualitative and quantitative parameters.

The heart of the AMA 310/UMS is a real-time spectrum analyzer. Typical errors are reliably detected like e.g. an increased noise floor, short-term ingress interferers or a TILT in the upstream frequency range.

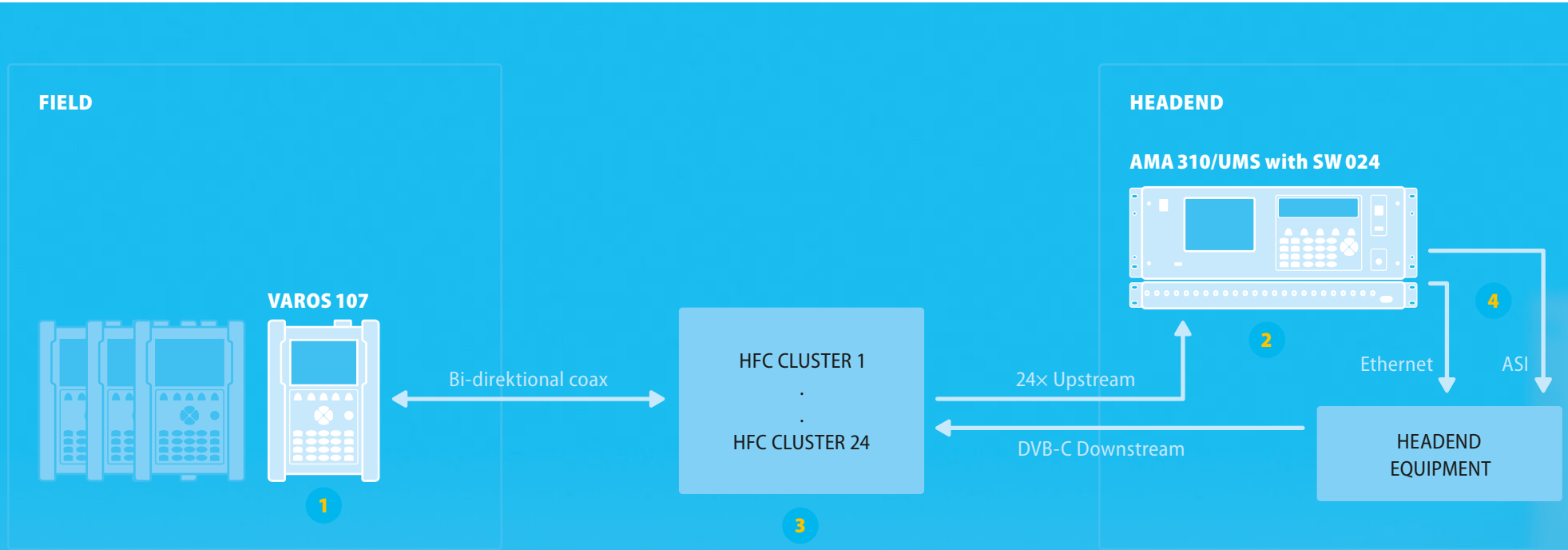
In addition standard (and well know from the downstream) RF measurement parameters such as MER and BER or constellation diagram can be gathered and transmitted back to the field devices VAROS 107. For this purpose test signals transmitted by the field devices are highly precisely measured by the AMA 310.

AMA 310/UMS & VAROS 107

Upstream-Measurement-System

This system combines the KWS devices AMA 310/UMS and VAROS 107 to a high-end monitoring system for the return path frequency range. An AMA 310 in a 19-inch version (3.5 RU) with UMS module is used in the headend, in the field the CATV handheld VAROS 107 is the counterpart. Both devices communicate bi-directionally through the cable or HFC network to be measured. Thus no internet connection is necessary.

An optionally available 24-fold RF switch (model type SW 024) and the hand over of the measuring results to the head end equipment either in ASI format or as an IP data stream (UDP or RTP/UDP) lead to great flexibility when measuring as well as when connecting the entire monitoring system to the headend equipment.



1 VAROS 107 measurement possibilities

Cluster selective:

- Meas. of the frequency response in the return path (sweeping)
- Comfortable adjustment of return path amplifiers (in-house and line)
- Display of MER, BER, noise margin and constellation diagram of modulated test carriers in the return path
- Automated measurements with protocol generation
- Ranging to reference level (forced by headend device)

Sum signal and cluster selective:

- Display of the received spectrum (in the headend) in real-time
- Max-hold and waterfall diagram display
- Registration and deregistration of field devices for exclusive measuring access (signaling via telemetry frequencies in the return channel)

2 AMA 310/UMS with SW 024 (optional)

The SW 024 allows for an optional extension to up to 24 upstream clusters: switching of field devices on one cluster; creation of a sum signal out of all 24 clusters. Thus measurements can be performed cluster selective or with the sum signal.

- Real-time spectrum of the return path range (5–65 MHz) as well as max-hold function
- Measurement of modulated test carriers (transmitted by VAROS 107) in the upstream with MER, BER and constellation diagram

Interaction with VAROS 107

- Bi-directional communication between AMA 310/UMS and VAROS 107 possible over the HFC network

AMA 310/UMS: standalone mode usable as real-time spectrum analyzer with max-hold function (sum signal and cluster selective).

3 HFC

Hybrid Fiber Coax Network: Optical and coax cable distribution network for downstream and upstream from the headend to the subscriber.

4 Transfer of measurement data to …

to the headend equipment

- as MPEG-2 data stream over Ethernet (UDP and RTP)
- as MPEG-2 data stream over ASI

In the headend these data streams can be multiplexed in existing DVB-C channels as a separate data service.

KWS UPSTREAM

AMA 310/UMS & VAROS 107

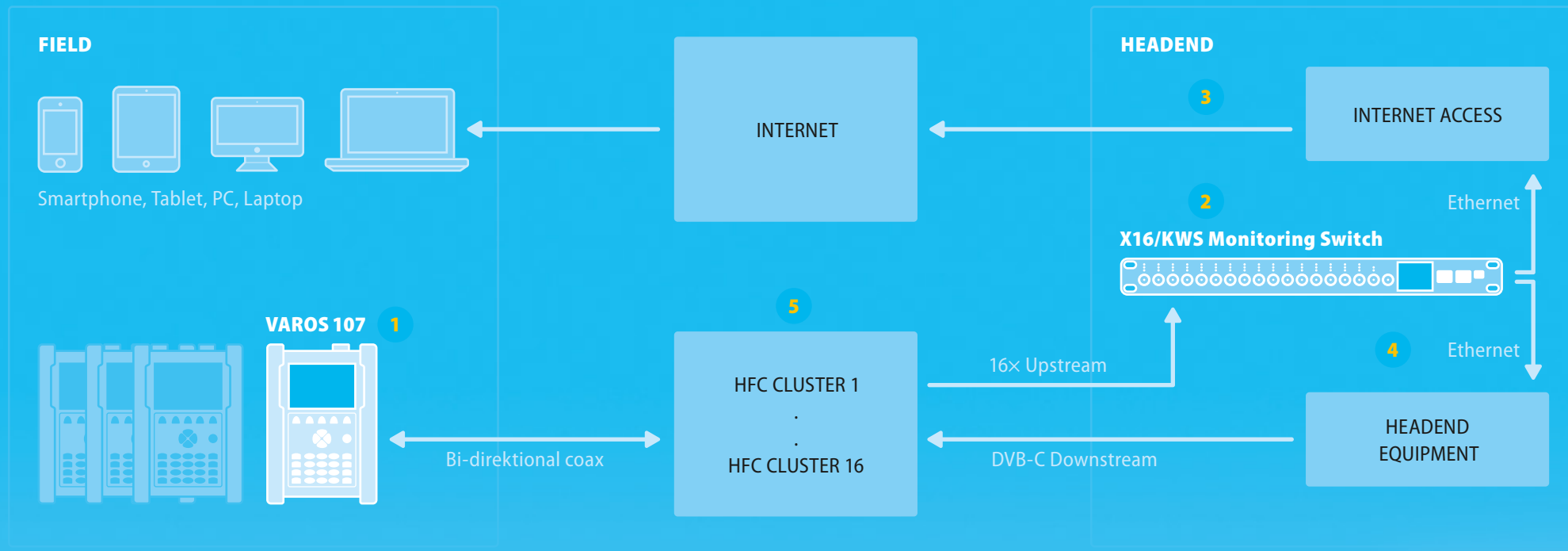
Cluster selective measurement with 24-fold switch SW 024.

The RF switch SW 024 (19-inch, 1 RU), which is available as a separate option to the AMA 310/UMS in the head-end, allows for measuring up to 24 clusters or CMTS upstream inputs separately.

Thus e. g. a measured ingress can be assigned precisely to the cluster from where it comes. This significantly facilitates the search for the source of an interferer.

The UMS system automatically ensures that a field device VAROS 107 displays the spectrum or the measurement results of exactly the one switch input where it is physically connected to.

In addition to the selective mode, the sum signal of all 24 RF inputs can be generated and monitored from a spectrum point of view.



1 VAROS 107 measurement possibilities

- Real-time display of the Kronback X16/KWS measured spectrum
- Signaling possibility of the VAROS 107 via the return channel in order to select the X16's input channel for the spectrum display on the field device
- Waterfall diagram representation
- Measurement of the frequency response in the return path (sweeping)
- Comfortable adjustment of the in-house return path amplifiers
- Ranging to reference level (forced by headend device)

2 X16/KWS device

Up to 16 X16 devices (256 input channels) can be cascaded. Each X16 device provides 16 input channels for:

- Spectrum display in real-time (5–85 MHz)
- Waterfall diagram
- Long-term recording of the ingress including quantitation
- Waterfall diagam view of the ingress

3 Using a web interface ...

to display the following on lap tops and mobile devices:

- Spectrum data of each return channel in real-time
- Long-term monitoring of the spectrum data for each single return channel as waterfall diagram

4 To transfer the data ...

to the VAROS 107 field devices, an MPEG-2 data stream via Ethernet (UDP and RTP) is issued. In the headend equipment this can then be multiplexed into in a DVB-C channel (as a separate data service).

5 HFC

Hybrid Fiber Coax Network: Optical and coax cable distribution network for downstream and upstream from the headend to the subscriber.

KWS UPSTREAM

Kronback X16/KWS & VAROS 107

Upstream-Monitoring-System

Fast internet services, VoIP, online gaming … an interference-free return path is essential for a high-quality broadband DOCSIS connection.

The combination of a special KWS version of the real-time spectrum analyzer X16 by the Danish company "Kronback Tracers" in the headend and the successful cable handheld VAROS 107 as a field device provides a system that ensures high signal quality in the upstream frequency range.

Communication between the field device and headend unit is bi-directional and uses the coaxial or HFC network currently being measured. As such, no internet connection is required.

All real-time spectral measurement parameters in the headend are displayed on the field device. The 16 inputs of the headend device, its small size (19"/1 RU), the option to cascade up to 16 units, and the possibility of measuring with multiple handheld devices simultaneously in the field, provide for sufficient flexibility even in large networks.

Numerous measurement and adjustment aids complete this powerful system.


KWS SEMINARS
Optional: Verschlüsselung
Kanalcodierung
Modulation
Coax, HFC
z.B. DVB-C, J83
DVB-C2, DOCS
Evtl. Entschlüs


kronback tracers

Setting a precedent:

CATV-Seminars

and technology seminars at KWS-Electronic

KWS offers special technical seminars for all users and technicians with the corresponding prior knowledge. Alongside practical training this 2-day event at the company headquarters in Tattenhausen also provides comprehensive theoretical content.

Issues such as DOCSIS, optical transmission, or the very extensive area of return path measurements belong to the program just as much as the theoretical foundations of RF transmission and common modulation types. Our instructors are in a position to respond precisely to your expectations and requirements.

A selection from an extensive portfolio of prepared topics is discussed with the participants at the beginning of the first seminar day.

Each participant should learn exactly what they want to know and what they need for their work as on-site technicians.

A selection of possible topics:

- Useful reference signals in the broadband cable network
- Frequency bands and channel tables
- Calculating in dB sizes
- Level relationships in the broadband cable network
- CATV modulations and transmission standards
- Source and channel coding for digital transmissions
- Spectral analysis
- MPEG transport stream and MPEG decoder
- DOCSIS
- Basics of fibre optical technology and measurements
- Electro Magnetic Interference Measurement (EMI)
- Return path monitoring
- SNMP & AMA.remote

Please note: the seminars at KWS-Electronic are only held in German language.

KWS ELECTRONIC

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