

# KWS ELECTRONIC

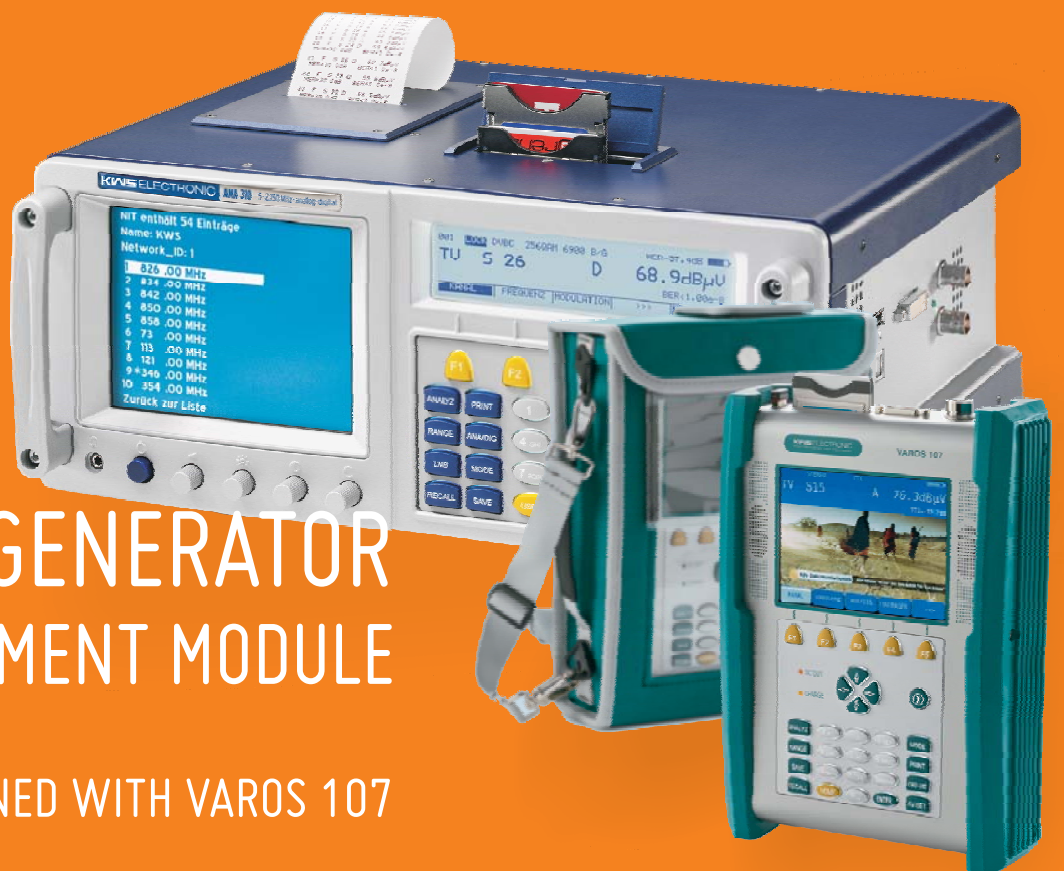
HIGH FREQUENCY TEST EQUIPMENT

## KWS ELECTRONIC

HIGH FREQUENCY TEST EQUIPMENT

INFORMATION UPSTREAM GENERATOR  
INFORMATION OPTICAL MEASUREMENT MODULE

ANTENNA MEASURING RECEIVER AMA 310 COMBINED WITH VAROS 107



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# CATV MEASURING RECEIVER VAROS 107

- 5.7" VGA Color TFT
- Frequency range 45 MHz- 868 MHz
- TV (analogue) and FM: Level measurement
- DVB-C: Level measurement, BER, MER, PE (Packet error counter)
- MPEG4 decoder for SD picture and HD picture, DVI out
- NIT, LCN display
- Digital analyzer for all ranges, TILT
- DOCSIS analyzer (DOCSIS 3.0)
- Signal quality monitoring with Datagrabber
- DataLogger via USB
- Upstream generator 5 - 65 MHz (CW and PRBS)
- Electro magnetic interference measurement (EMI)
- Li-Ion battery package 7.2V/6.6Ah
- Dimensions: (W x H x D) 206 x 297 x 84 mm
- Weight: Approx. 2.5 kg with installed battery pack



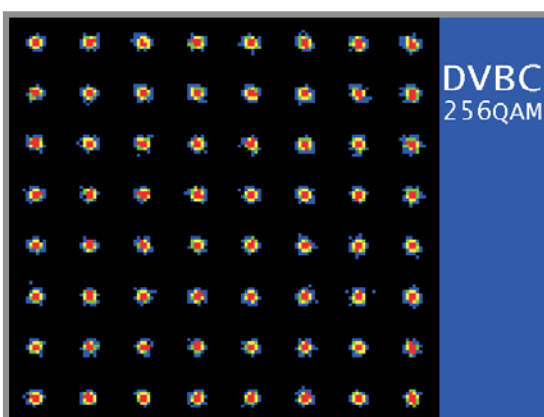
## POSSIBLE OPTIONS

- Analog TV: S/N measurement module
- Frequency extension to 1.050 MHz (CATV)

# OPTICAL MEASUREMENT MODULE AMA 310

### CONSTELLATION DIAGRAM VIA OPTICAL INPUT

Measurement from QAM signals with zoomed constellation diagram



LOCK	DVBC	256QAM	6900	MER=38.6dB
TV S 29	D	FIB 1310nm	3.6dBm	
		OMI= 1.3%	73.9dBµV	
			BER<1.00e-8	
FREEZE	ZOOM	1. QUADRANT		BACK

### OPTICAL MEASUREMENTS AND PARAMETERS

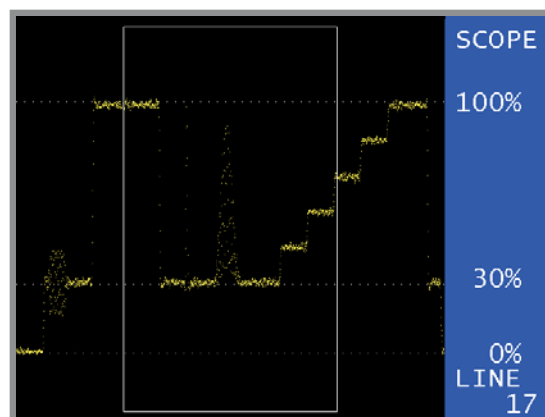
FIB 1310nm = Wavelength  
 3.2 dBm = Optical power  
 OMI 3.3 % = Optical modulation index

### RF MEASUREMENTS AND PARAMETERS

TV S29 D = Digital transponder S29  
 256QAM = Modulation 256QAM  
 SR 6900 = Symbol rate=6.900 kBd (kSymbols/sec)  
 MER 40.0dB = Modulation error rate  
 BER 1.0e-8 = Bit error rate  
 77.9 dBµV = RF level

### S/N MEASUREMENT / TEST LINE VIA OPTICAL INPUT

Measurement of an analog PAL signal with SCOPE



	STEREO	SC1	B/G	S/N=50.6dB
TV S 25	A	FIB 1310nm	3.6dBm	
		OMI= 3.0%	80.8dBµV	
		CNI=DDCh	SC1=-13.4dB	
FREEZE	ZOOM	HUM		BACK

### OPTICAL MEASUREMENTS AND PARAMETERS

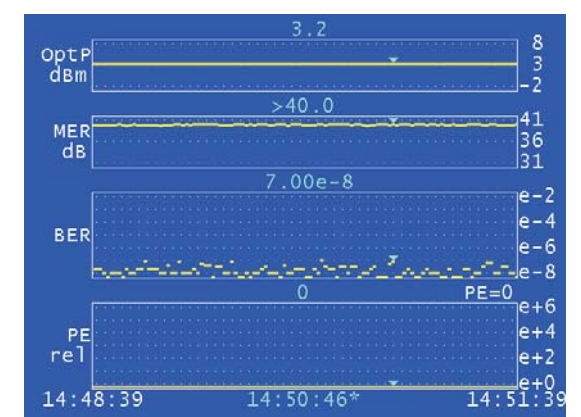
FIB 1310nm = Wavelength  
 3.3 dBm = Optical power  
 OMI 4.0 % = Optical modulation index

### RF MEASUREMENTS AND PARAMETERS

TV S25 A = Analog channel S25  
 B/G = TV norm  
 S/N 48.7 dB = Signal-noise ratio (evaluated)  
 77.9 dBµV = RF level  
 TT1 13.6 dB = Reduction SC1  
 df 0.000MHz = Carrier offset

### CHANNEL MONITORING VIA OPTICAL INPUT

Long-term monitoring with Datagrabber



### OPTICAL POWER (dBm)

The optical power is stable at 3.2 dBm during the monitoring period

### RF MEASUREMENTS (MER / BER / PR)

MER = The MER value is stable at 40dB  
 BER = Variation between 1.0e-8 and 7.0e-8  
 PE = No packet error



## OPTICAL MEASUREMENT MODULE AMA 310

### OPTICAL INPUT

The optical input for the signal feeding is on the right side of the instrument. The instrument has a built in SC/APC jack.



### OPTICAL INPUT

Because of the solid metal casing from the jack, a high operational safety can be ensured. After pulling out the connection cable, a metal flap encloses the plug connection.



### OPTICAL MEASUREMENT - INTRODUCTION

#### MEASUREMENT OF THE OPTICAL POWER

- Optical transmission is an intensity modulation of the light output. The measuring receiver measures the optical operating level in dBm. This will also be measured, when light from an unmodulated laser source is fed in. In this case the instrument can be used solely as an optical performance instrument.

#### MEASUREMENT OF THE OPTICAL MODULATION INDEX (OMI)

- The optical modulation index is similar to the modulation index from an amplitude modulation. A carrier, here the light, is modulated in its amplitude. The bigger the difference between maximal and minimal intensity is, the higher the OMI and therefore the optical receiver in the RF voltage (level).
- AMA 310 analyses the channel selective single-OMI and the complete-OMI.

#### OPTICAL RECEIVER

- There is no input attenuator connected with the optical receiver. The instrument can process a signal capacity of -35 to +9dBm. For higher signal power, a suitable attenuator should be placed at the optical input of AMA 310.
- Wave lengths of the optical signal: 1310nm or 1490nm or 1550 nm
- Wave length multiplex: if signals with different wave lengths are being transferred on the same fiber at the same time, a patch-cable with a wave length filter should be used. Otherwise false measurements could be the result.
- The optical receiver transfers the input signals back into regular RF signals.

#### DOWNSTREAM / UPSTREAM

- SAT signals from OPTO-LNBs can also be connected to the optical input. The reversal into RF signals will be processed in the instrument. The vert/low layer can be evaluated with known measurements then. At the same time the RF input can be used as power supply for the optical LNB.
- All optical CATV signals can be evaluated with the measuring receiver after the RF reconversion. Analog signals (PAL), digital signals (QAM), VHF (FM) or DOCSIS (EURO or US).
- DOCSIS upstream signals cannot be sent to CMTS through the optical input. The optical receiver does not have a signal generator.

## ANTENNA MEASURING RECEIVER AMA 310

- Analog: TV and VHF
- Digital: DVB-S, DVB-S2, DVB-C, DVB-T
- Return channel measurement / Measuring EURO- and US-DOCSIS
- Hum and Phase jitter detection
- Digital analyzer for all ranges / TILT function
- Constellation diagram in real time and for all digital standards
- DiSEqC, UNICABLE, JESS
- MPEG4 decoder with NIT
- Signal quality monitoring (level / BER / MER / S/N / PE)

### NEW OPTION: OPTICAL MEASUREMENT MODULE

- Optical input (1310 / 1490 / 1550nm) SC/APC  
(Measuring range -35 to +9dBm)

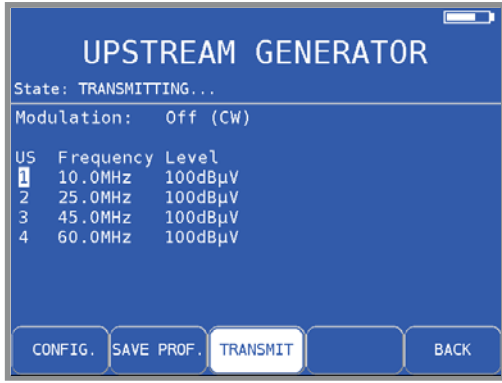
The postarmament is possible in all AMA 310



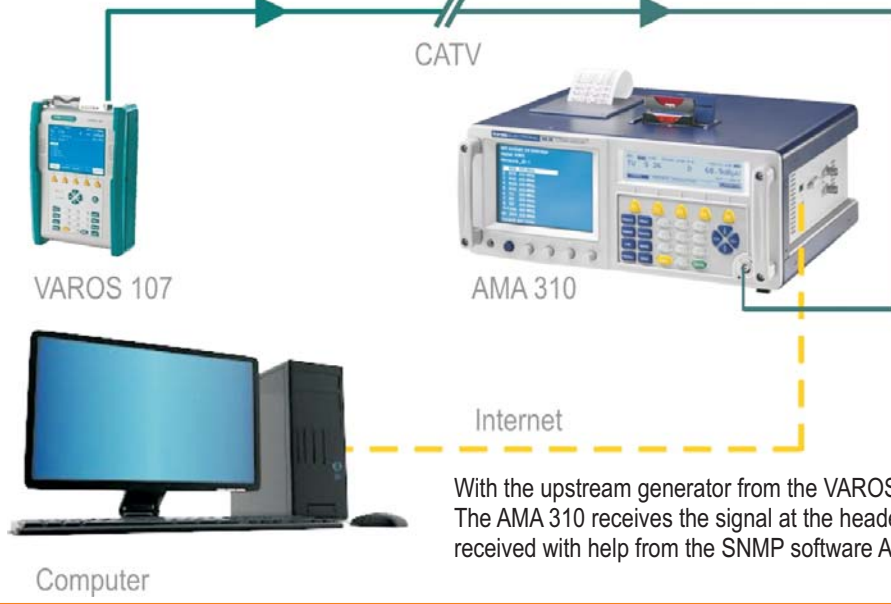
# LONG-TERM MONITORING WITH UPSTREAM GENERATOR (VAROS 107 / AMA 310)

## UPSTREAM GENERATOR

The CATV measuring receiver VAROS 107 has a built-in upstream generator. In the example, an unmodulated signal (sinus) with the frequency 10,0 / 22,5 / 45,0 / 55,6 MHz was sent. The signal level by all 4 carriers is 100 dBµV. Transmission frequencies and level are adjustable.

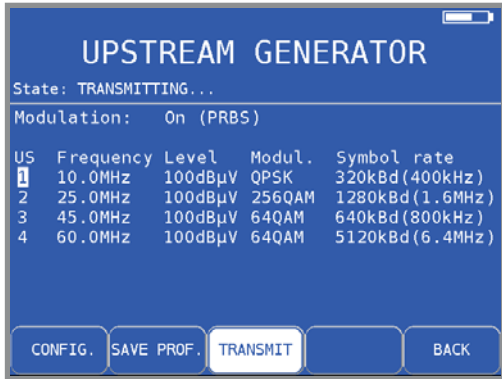


## UPSTREAM TESTING WITH AMA.remote

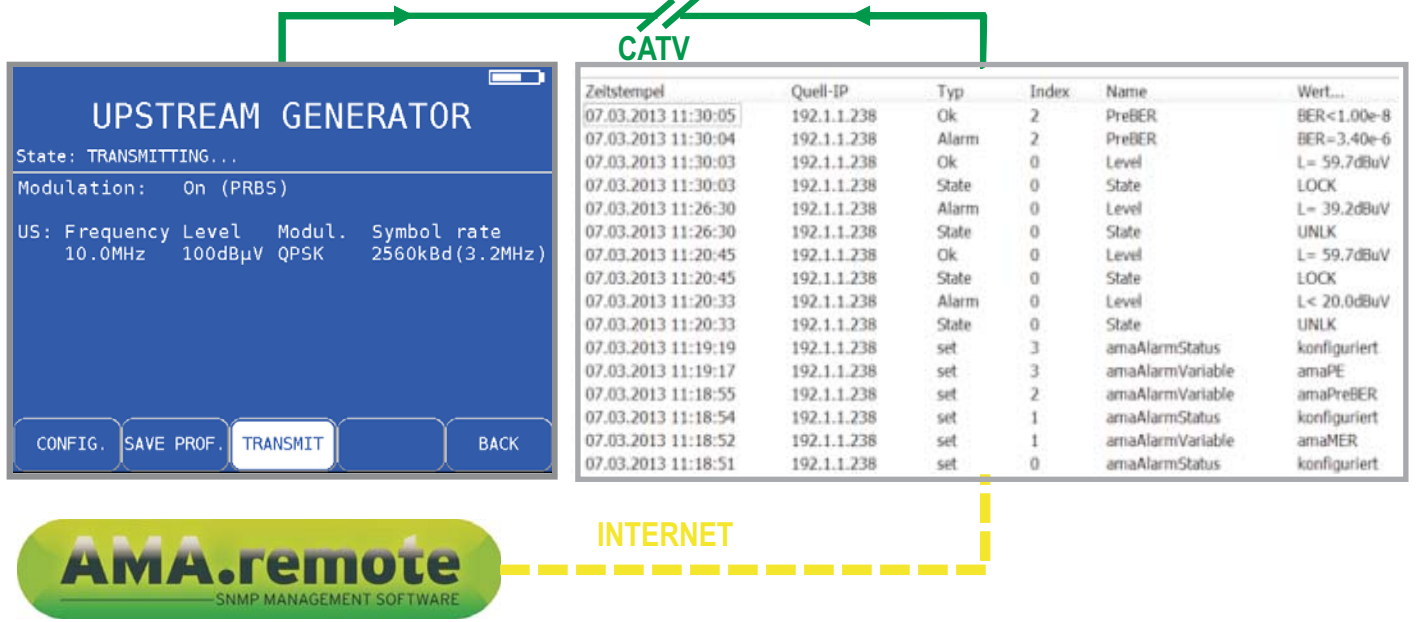


With the upstream generator from the VAROS 107 you can transfer from the outlet into the network. The AMA 310 receives the signal at the headend or at a booster point. Measured data can be received with help from the SNMP software AMA.remote.

In this example, modulated signals were sent. The following adjustments besides the transmission frequency and level are possible:  
Modulation: QPSK / 16QAM / 64QAM / 256QAM  
Symbol rate: 320 / 640 / 1.280 / 2.560 / 5.120 kBd

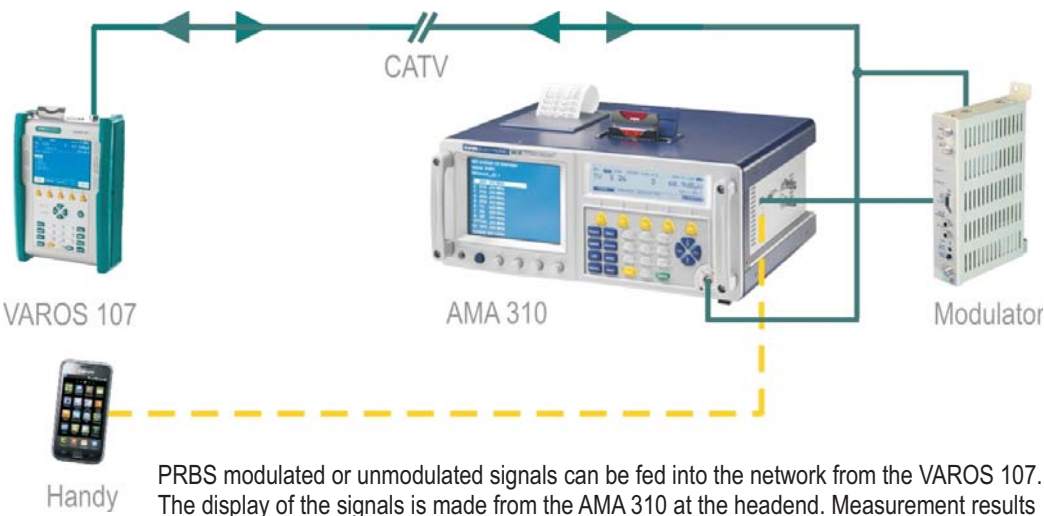


## UPSTREAM TESTING WITH AMA.remote

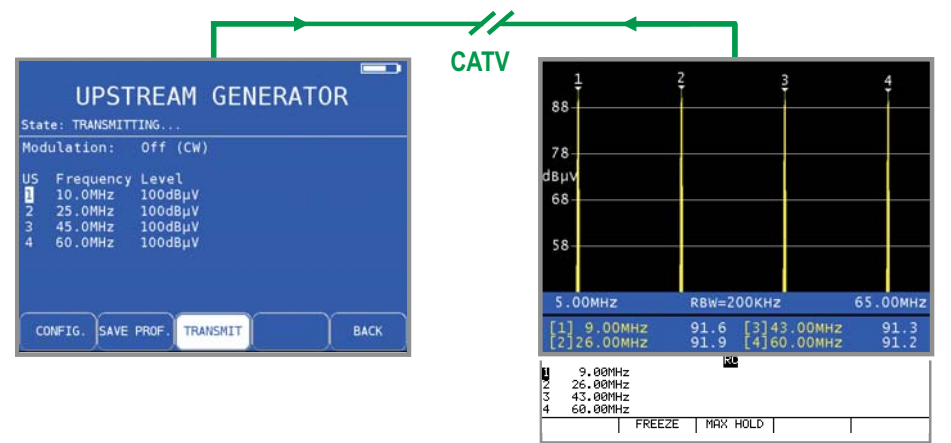


# REAL-TIME MEASUREMENT WITH UPSTREAM GENERATOR (VAROS 107 / AMA 310)

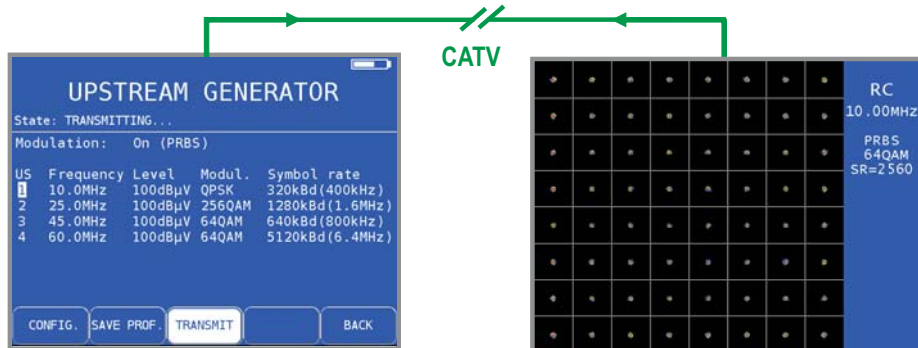
## REAL-TIME MEASUREMENT



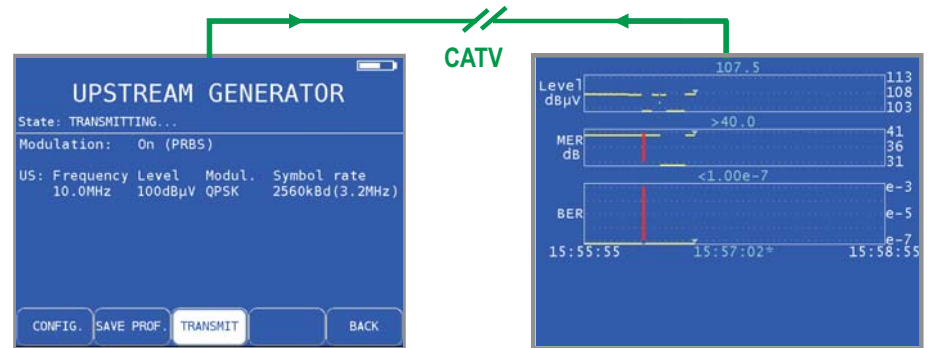
PRBS modulated or unmodulated signals can be fed into the network from the VAROS 107. The display of the signals is made from the AMA 310 at the headend. Measurement results will be fed over a free downstream channel to the transceiver point. At the headend, the AMA 310 can be controlled through an APP on your handy.



The AMA 310 was tuned into the spectrum mode. The carriers which were sent from the upstream generator (unmodulated) are being measured. The frequency spectrum is sent back to the VAROS 107.



In the example four 64QAM-modulated channels are being fed into the network. With help from the handy APP the AMA 310 was adjusted at the headend to constellation diagram. The measurement results are fed back to the VAROS 107.



A modulated channel (here 25,0 MHz) is fed into the network for the datagrabber function (long-term monitoring). The incoming signal will be evaluated with the AMA 310. The measurements will be shown in a diagram. This diagram can also be fed back to the VAROS 107.