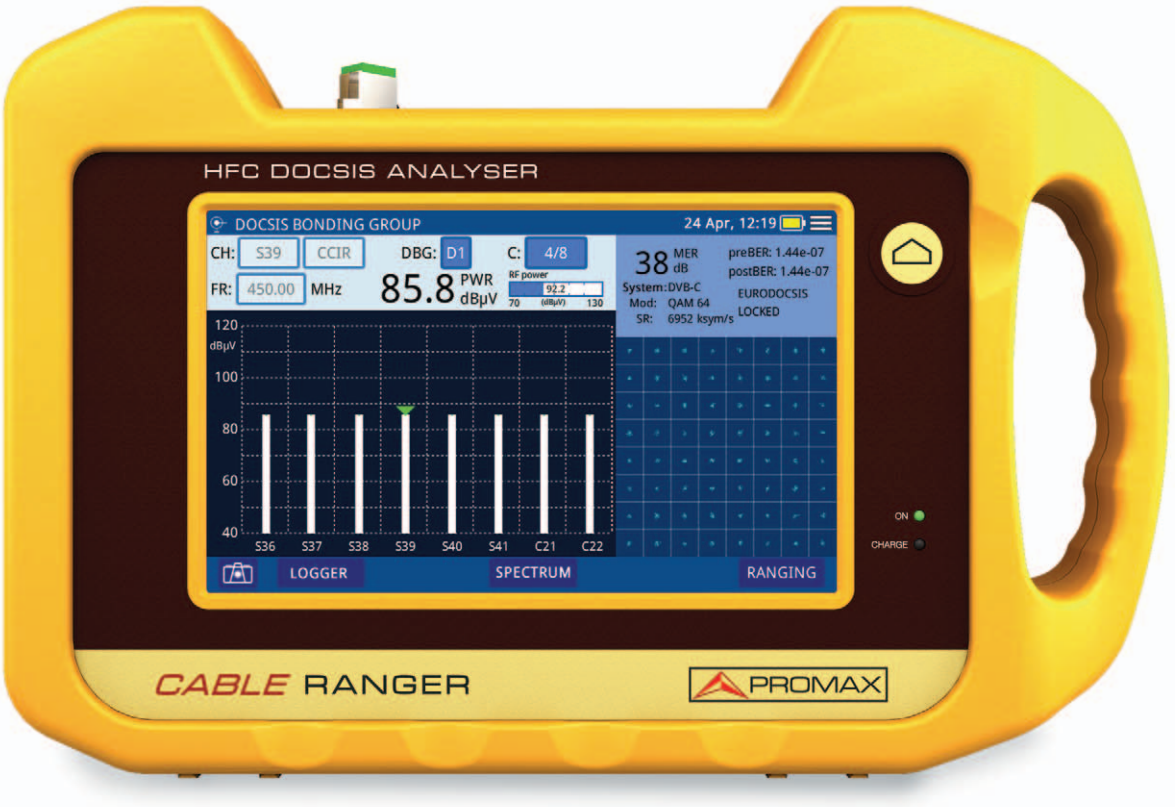
PROMAX

Fibre-Coaxial DOCSIS Analyzer

CABLE RANGER



5 - 1700 MHz

DOCSIS ANALYZER

FIBRE OPTICS

CHANNEL BONDING

Hybrid Optical & DOCSIS 3 Analyzer

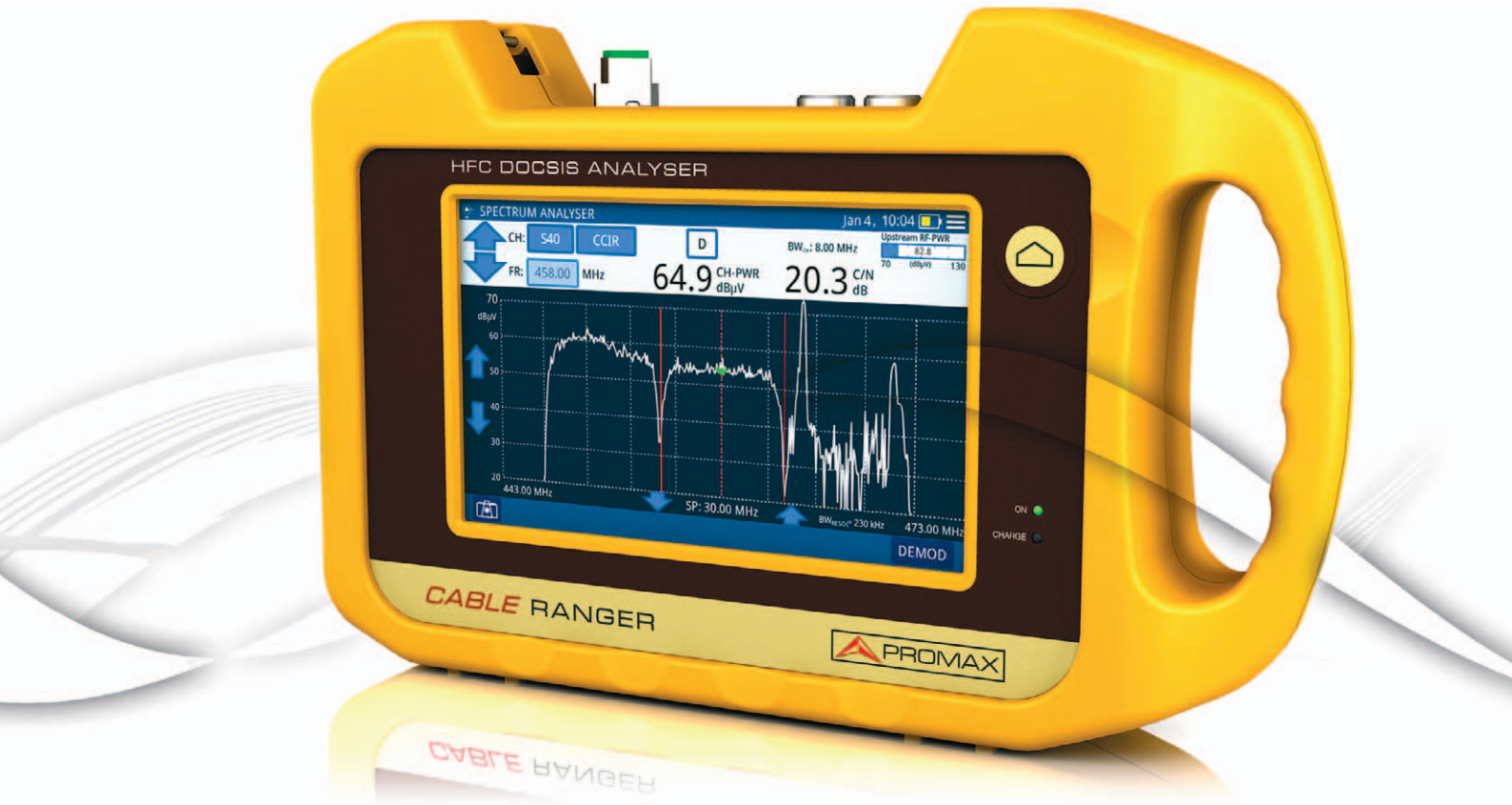
Hybrid Optical & DOCSIS 3 Analyzer

Doing your measurements right is not enough in today's challenging and competitive CATV world. Field crews are demanded to understand and fix problems at the first attempt when going out to a service call and there is no question technicians are therefore put under pressure. Moreover, problems are not always simple to understand or fix and having a proper CATV analyzer can make a big difference.

PROMAX first CATV analyzer was developed more than two decades ago and since then things have gone a long way. Modern CATV systems use as much fibre as coaxial cables if not more. Analog has been replaced by digital QAM and DOCSIS came into play to provide the infrastructure needed to offer internet connectivity. While all this was happening **PROMAX** has been honored with valuable customer feedback which we have incorporated in the different CATV analyzer families we have been offering to the market.

The ***CABLE*** **RANGER** is the latest introduction in our CATV analyzer product range. It is designed to be very easy to use yet offering all measurements required working with today's complex hybrid fibre and coaxial networks.

7” Color touch-screen



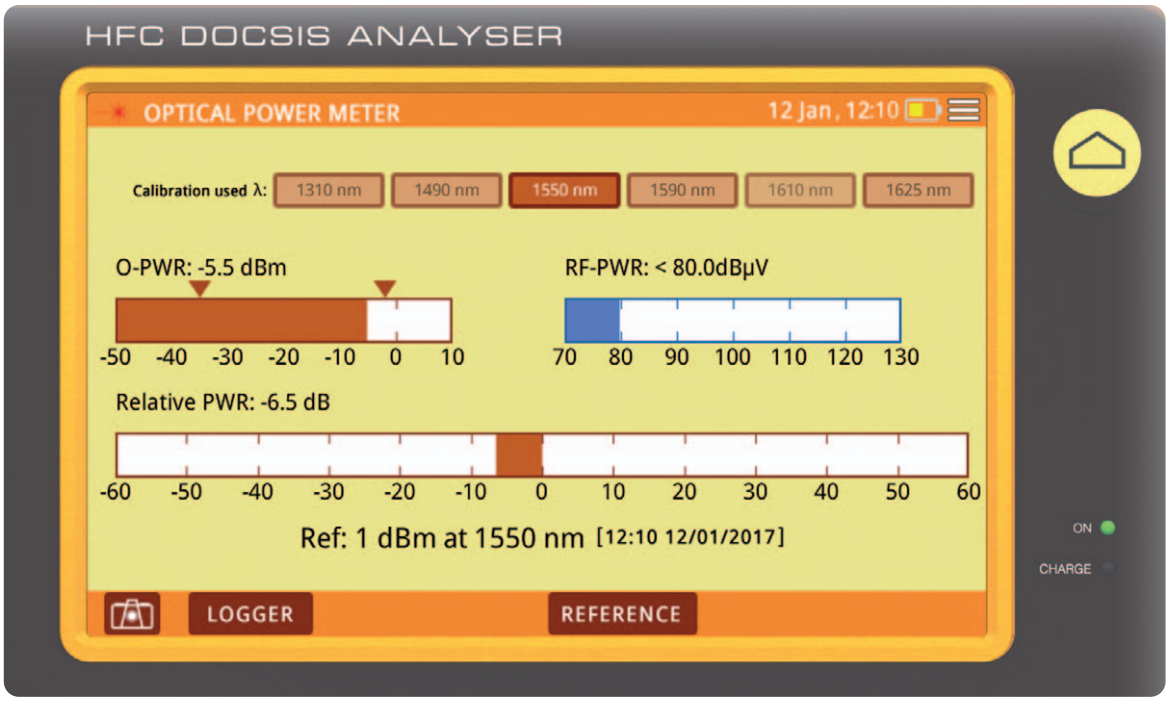
7” Color touch-screen

CABLE **RANGER** features a 7” professional grade resistive type touch-screen with excellent brightness and superior image sharpness that can also be used wearing gloves.

Intuitive user friendly graphical menus

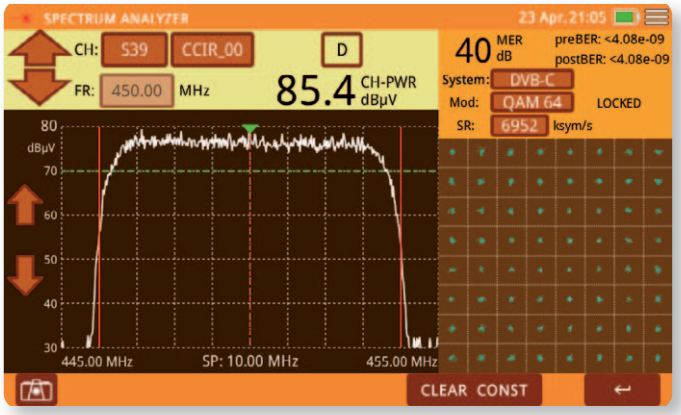
One of the main complaints CATV technicians have about their test & measurement equipment is that it is not technician-friendly. ***CABLE*** **RANGER** operation is easy and it is based on a graphical menu. A direct access ‘home’ button helps you return to a main menu page no matter what function you using.

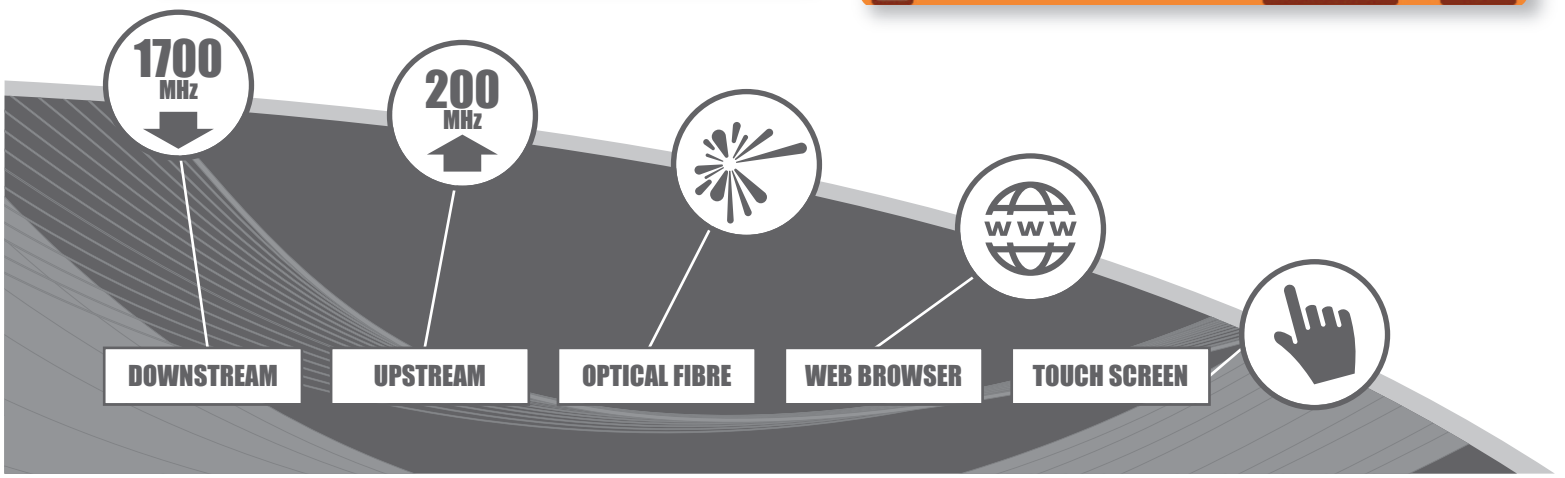
Optical Measurements



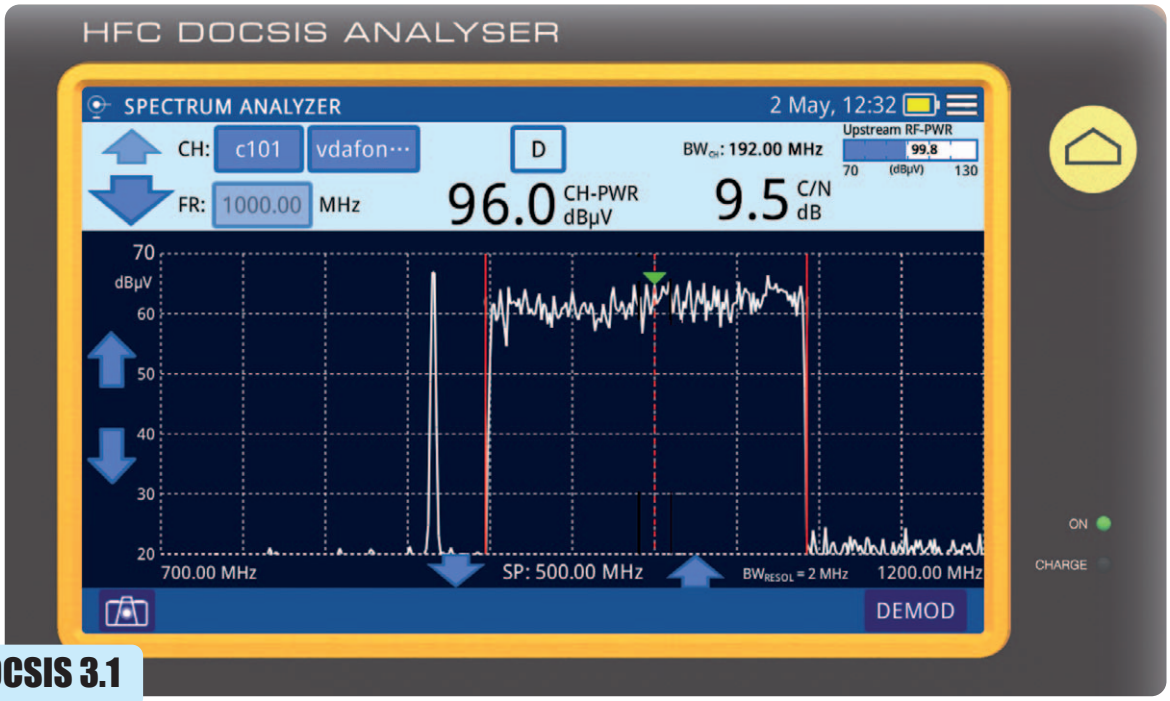
OPTICAL MEASUREMENTS

HFC networks use more and more fibre every time. ***CABLE*** **RANGER** includes an optical measurement input allowing field technicians not only to perform optical power measurements but also to do all the RFoG related RF measurements thanks to the built-in optical to RF converter. In this mode optical power measurement is shown together with the rest of the RF measurements. RFoG (Radiofrequency-over-Glass) is used by CATV operators because it allows them to benefit from the advantages of fibre optics to compete with FTTH service providers.





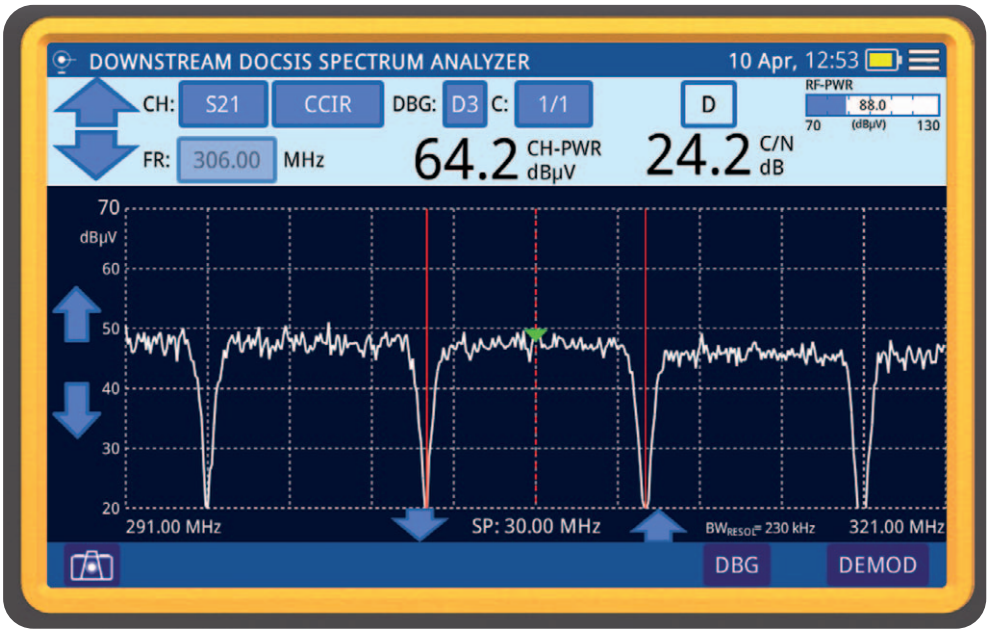
DOCSIS 3.1 RF COMPATIBLE



DOCSIS 3.1

DOCSIS 3.1 systems can use among other things an extended frequency range which goes up to 1500 MHz in the forward path with a return band up to 200 MHz. The ***CABLE*** **RANGER** RF input covers up to 1700 MHz.

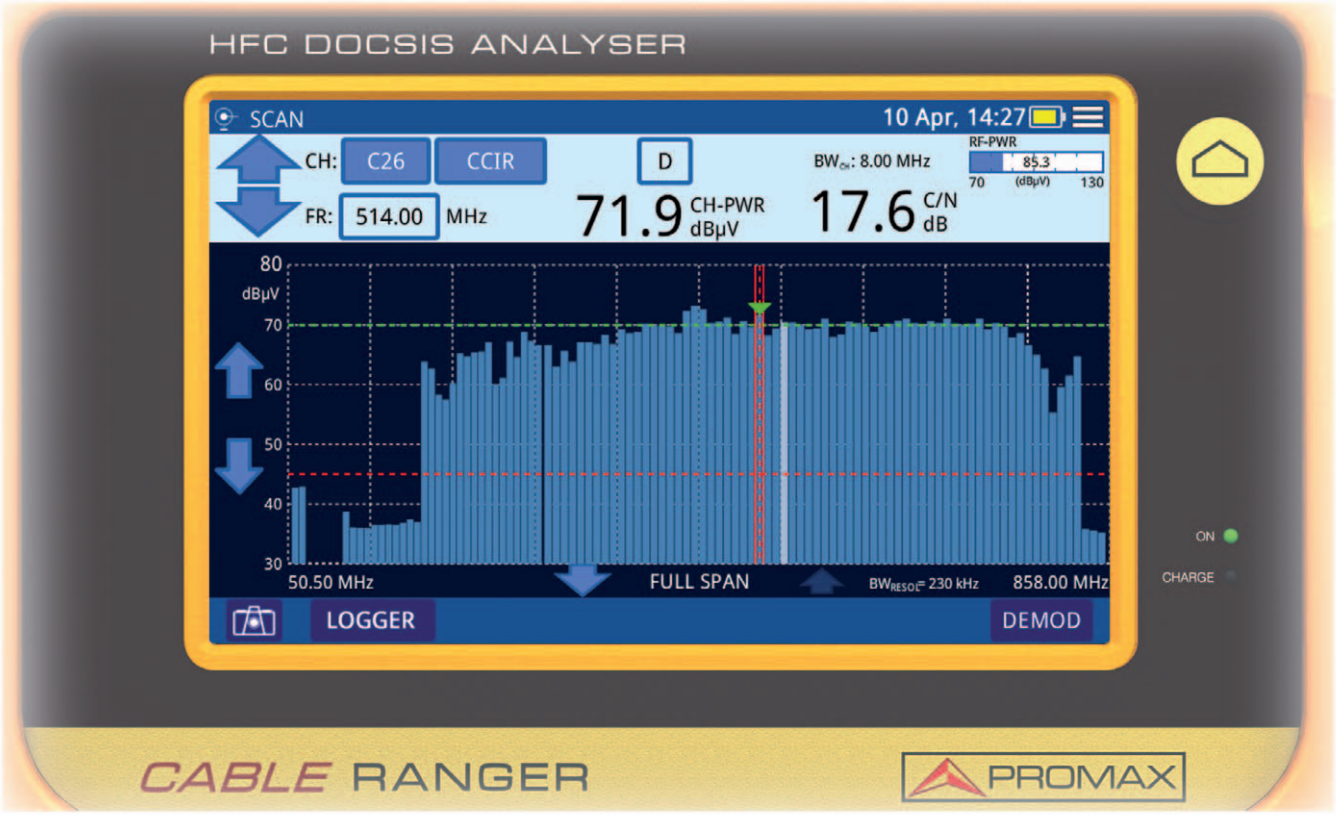
Spectrum analyzer



SPECTRUM ANALYZER

It is one of the essential functions in a field CATV analyzer. It allows you to have an overview of the RF content at the test point or to analyze a specific channel in detail and it is very helpful for interference and noise problem troubleshooting both in the forward and return bands. Signal level and C/N are displayed along with the spectrum trace. Also the total input power is displayed, a measurement of the power over the complete frequency band, which is very useful to detect saturation caused by fibre links.

SCAN



SCAN

It is probably the fastest way to check if all signals in your network are present. The SCAN function displays graphically all the analog and digital channels in a selected channel plan along with their signal levels. Channel power, C/N, frequencies, channel numbers and total RF power are also shown on the screen.

TILT

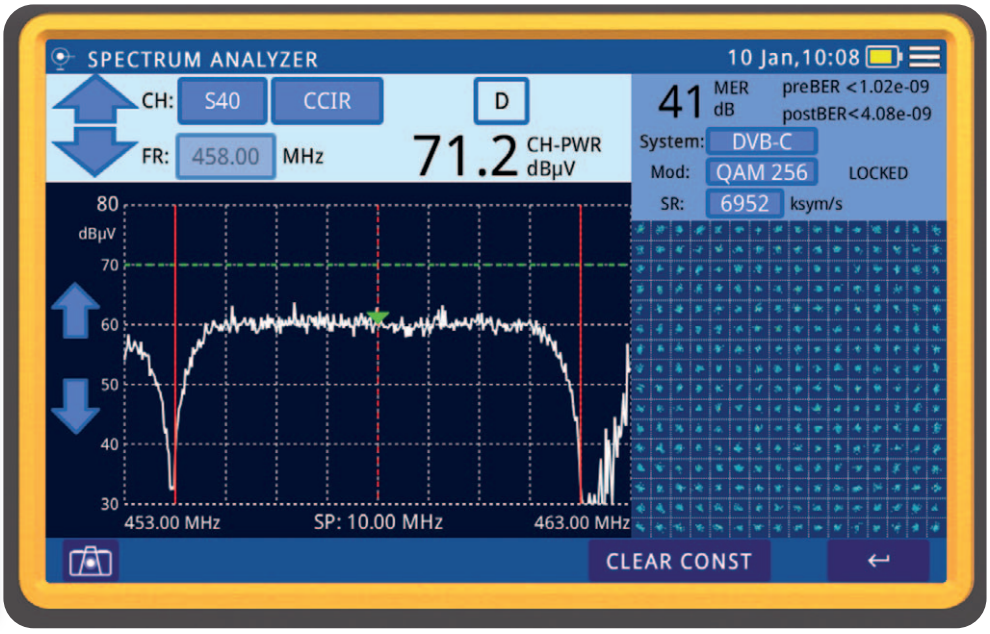
TILT

TILT measurements are used to identify system frequency unbalance which must be accurately compensated by field technicians. Up to four pilot frequencies or analog/digital channels can be configured to be part of the TILT measurement which is displayed in both graphical and numerical formats.

MER, BER, constellation

CONSTELLATION

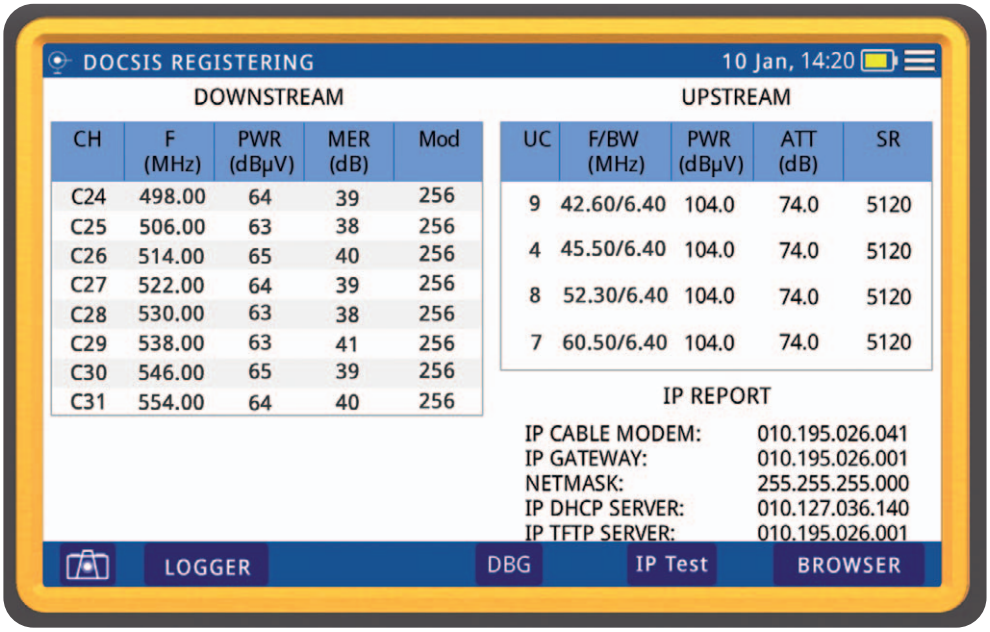
These are probably the most important measurements technicians can do to assess digital QAM channel quality. Constellation diagram is a simple and graphical way to identify signal impairments which impact MER and ultimately BER. An ideal QAM channel for example will be represented by a set (constellation) of very sharp dots. These dots will become small dot clouds to indicate the presence of noise or other signal degradation sources. ***CABLE*** **RANGER** displays constellation diagram, MER, preBER and postBER simultaneously with the spectrum trace.



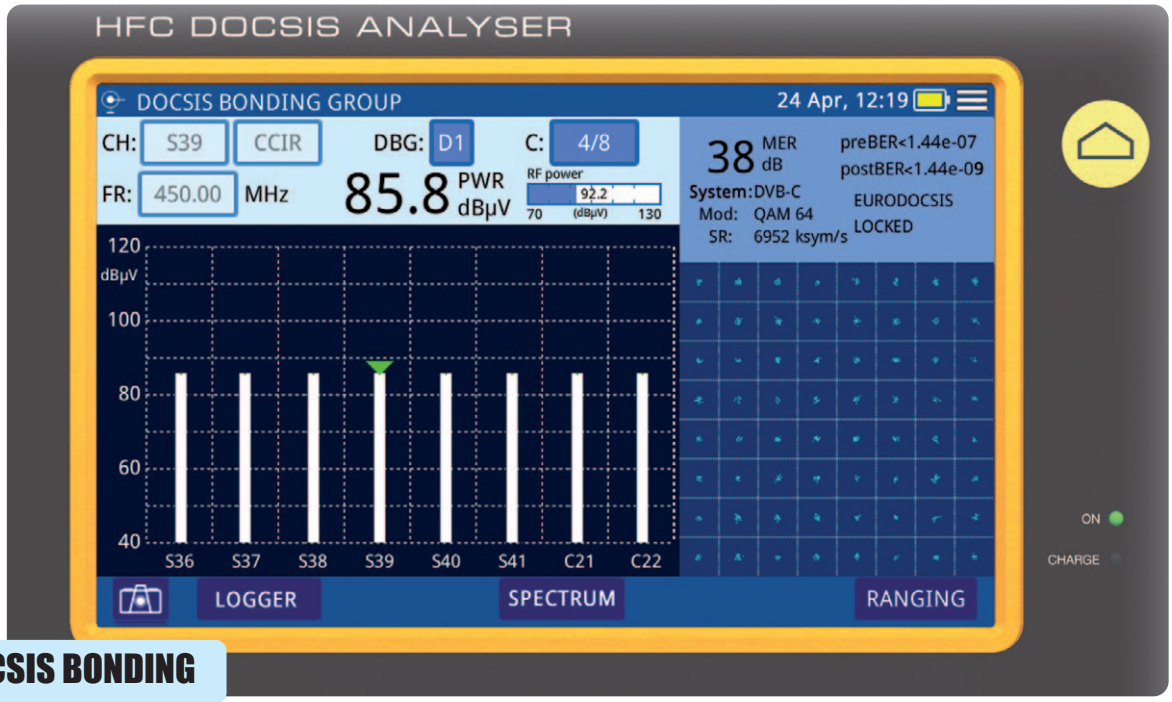
Built-in Cable Modem

CABLE MODEM

The ***CABLE RANGER*** built-in cable modem can be used to perform unregistered measurements such as the visualisation of the ranging process or the return path attenuation measurement. It can also be used for registered measurements such as PLR, Delay and Jitter, for IPTV and VoIP system quality evaluation, sending RTPS and UGS packets. It monitors all the IP addresses involved in the communication process as well.



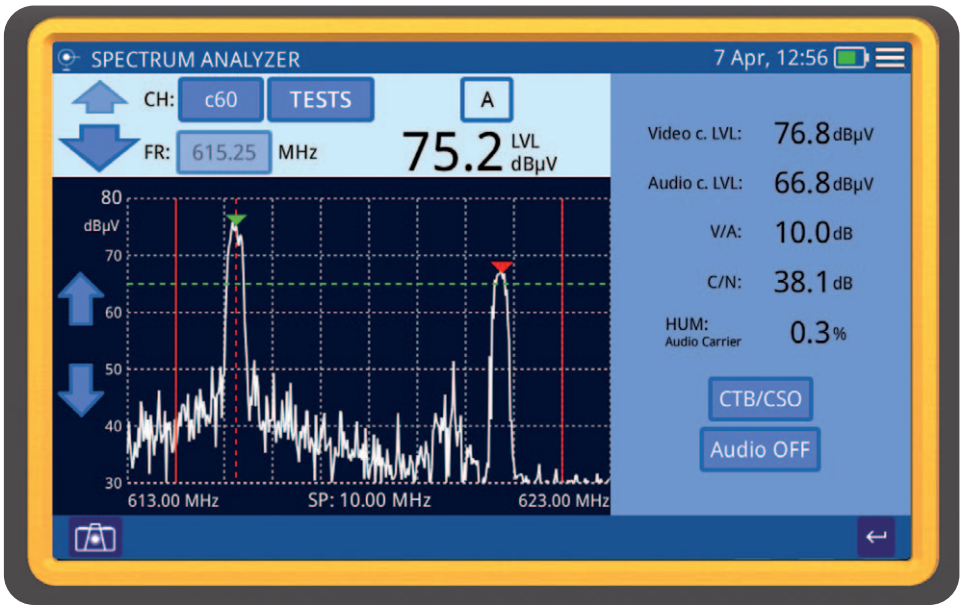
DOCSIS bonding group



DOCSIS BONDING

As part of the DOCSIS 3.0 standard multiple upstream and downstream channels can be 'bonded' to be used together as one. ***CABLE*** **RANGER** includes a comprehensive channel bonding screen where information about all of them is combined with other single channel measurements such as the constellation diagram.

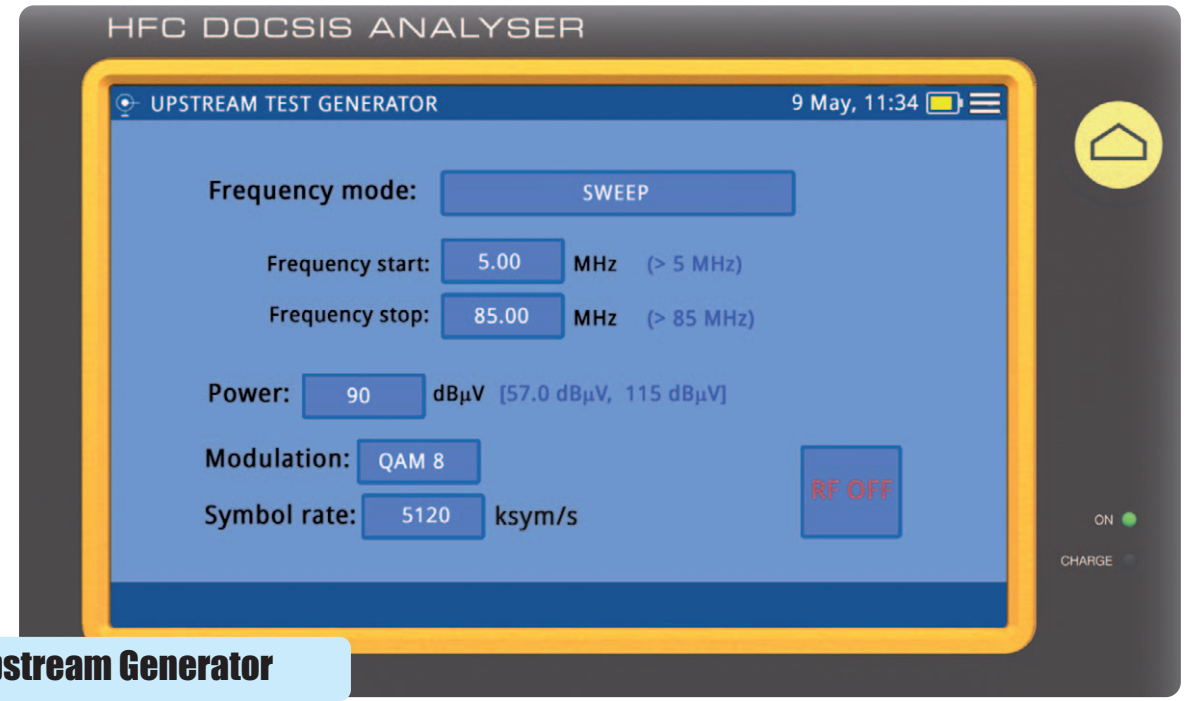
Analog and HUM



Analog and HUM

The *CABLE* RANGER can measure video carrier signal level, Video/Audio and C/N ratio and HUM in analog mode. This is all shown alongside the screen together with the spectrum analyzer graphic.

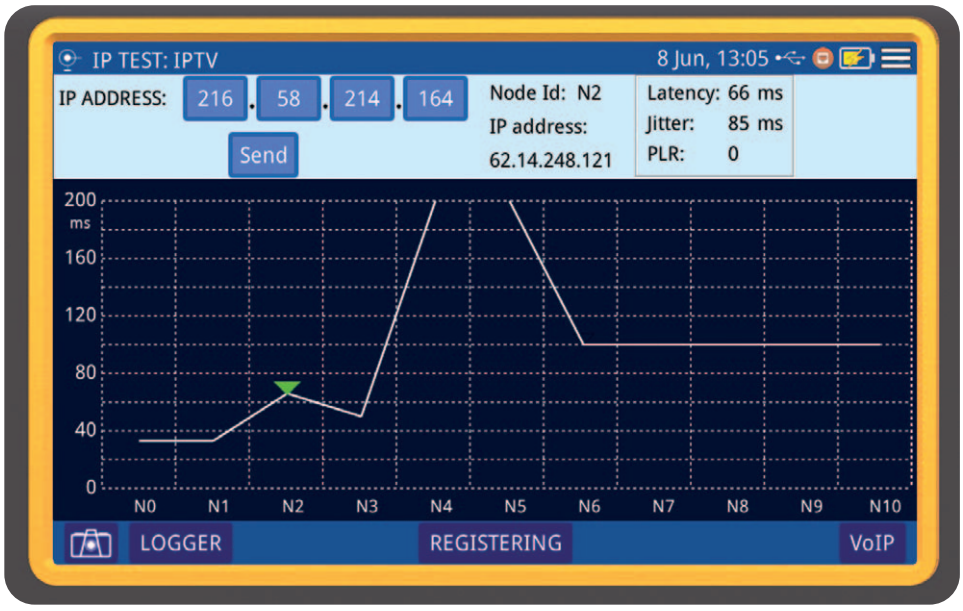
Upstream test generator



Upstream Generator

A frequency and amplitude agile return path generator is also available in the ***CABLE*** **RANGER**. It allows generating a test signal which can be tuned from 5 to 85 MHz and it can be CW or modulated in QAM and QPSK. It can also be configured to sweep a specific frequency range within that band.

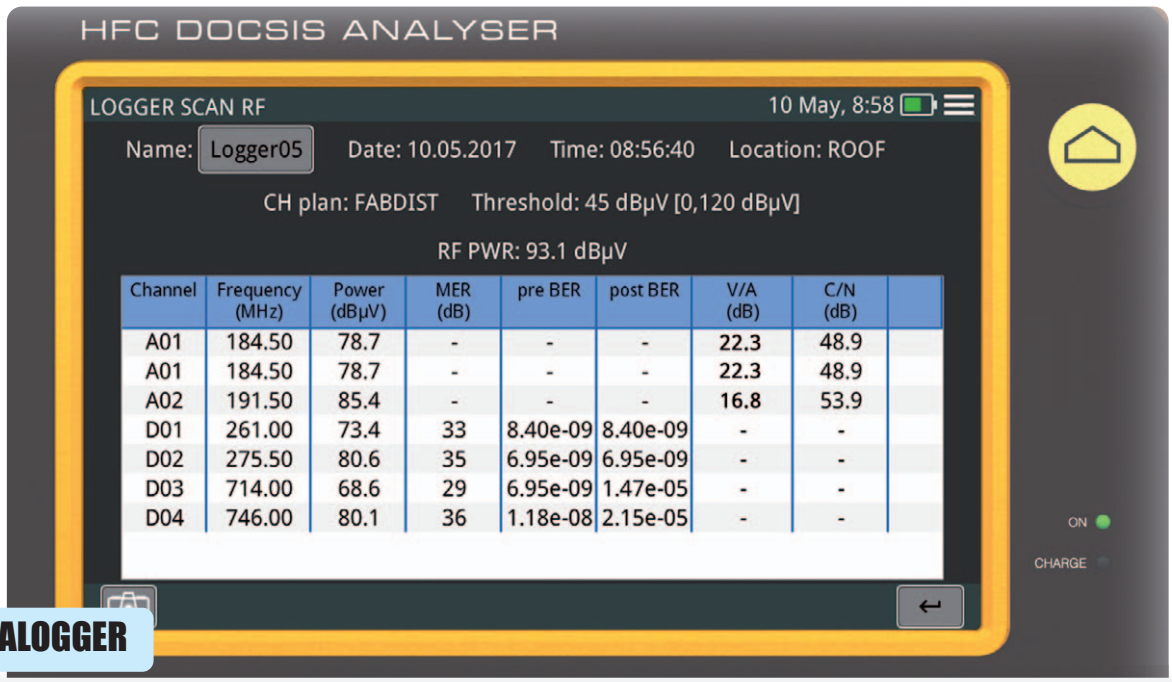
VoIP functionality testing



VoIP

The ***CABLE*** **RANGER** can be used to analyze network performance for VoIP applications using UGS QoS (Quality of Service) parameters in accordance to DOCSIS / Euro-DOCSIS 3.0 standards. UGS stands for Unsolicited Grant Service. Most important measurements to assessing communication quality include latency, jitter, lost packets or MOS and R value.

Datalogger

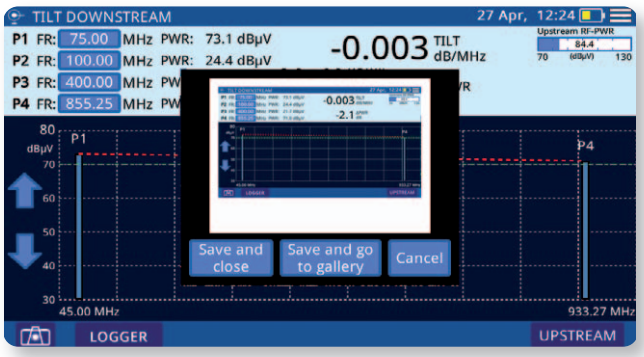


Channel	Frequency (MHz)	Power (dBµV)	MER (dB)	pre BER	post BER	V/A (dB)	C/N (dB)
A01	184.50	78.7	-	-	-	22.3	48.9
A01	184.50	78.7	-	-	-	22.3	48.9
A02	191.50	85.4	-	-	-	16.8	53.9
D01	261.00	73.4	33	8.40e-09	8.40e-09	-	-
D02	275.50	80.6	35	6.95e-09	6.95e-09	-	-
D03	714.00	68.6	29	6.95e-09	1.47e-05	-	-
D04	746.00	80.1	36	1.18e-08	2.15e-05	-	-

DATALOGGER

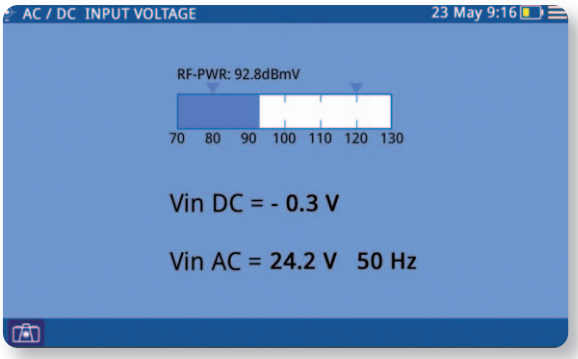
The datalogger function can perform various measurements including signal level and channel power, carrier/noise, BER and MER for all the channels listed in a given channel table automatically. All this information is saved in the analyzer and it can be copied to a pendrive or to a PC for further processing at a later stage.

Screenshot



Taking screenshots is very easy with the *CABLE* RANGER. Whatever's on the screen of the analyzer can be saved to a graphic file which will become very handy when doing technical reports.

Input voltage measurement

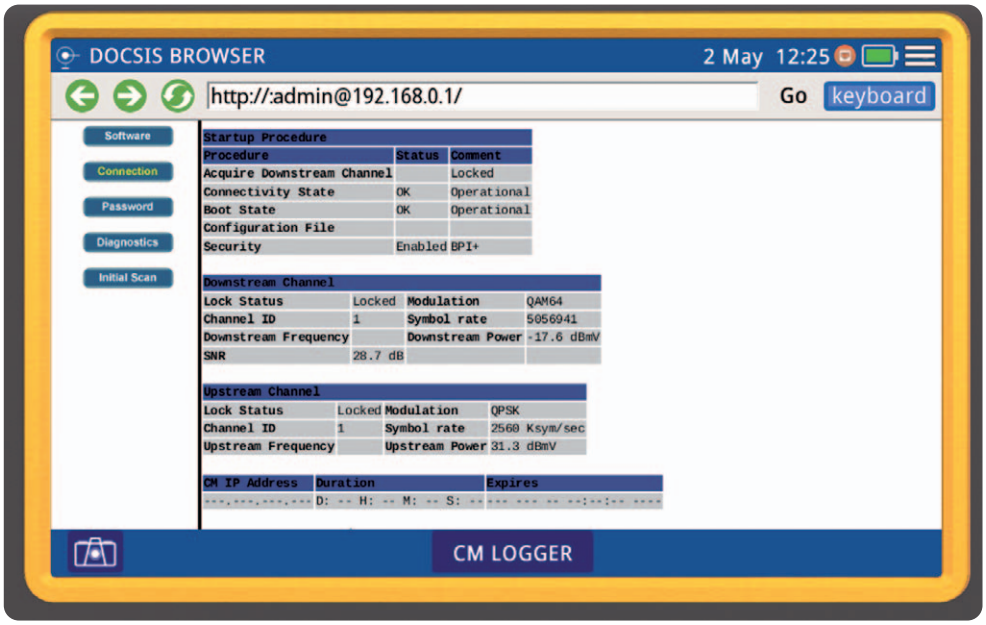


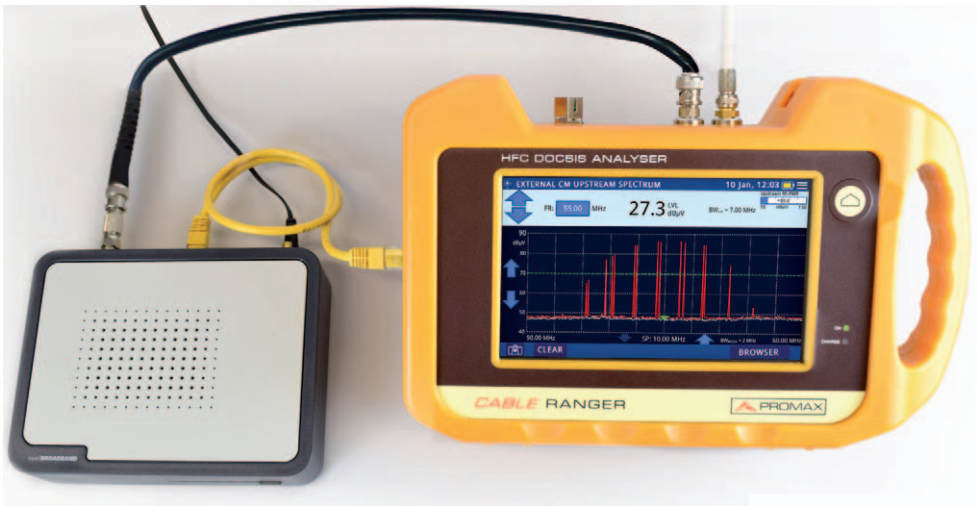
The measurement of the DC and AC voltages present at the RF input is displayed together with the total RF power for convenience.

Web browser and service activation

WEB BROWSER

The built-in web browser can be used to register a maintenance action directly on the operator's website, rendering the use of other devices such as laptops unnecessary. The ***CABLE*** **RANGER** can also be connected to the subscriber's cable modem to perform the service activation procedures.





EXTERNAL CABLE MODEM

The ***CABLE*** **RANGER** can also be connected to the RF of the subscriber's cable modem to verify it is working properly.

CARRYING BAG

A soft carrying bag and a heavy duty transport case are included as standard accessories.

SPECIFICATIONS	*CABLE* RANGER	*CABLE* RANGER Lite
SPECTRUM ANALYZER		
Frequency	From 5 to 1700 MHz (Covering DOCSIS 3.0 & 3.1 RF requirements)	
Tuning Range	10 KHz	
Resolution	230 kHz, 2 MHz	
Resolution Bandwidth		
LEVEL MEASUREMENT		
Dynamic range	-50 dBmV to 60 dBmV	
Measuring range	50 dB	
Resolution	0.1 dB	
Accuracy	± 2 dB	
Input impedance	75 Ω	
Units	dBmV, dBuV, dBm	
FREQUENCY TUNNING MODE		
Level	- 50 dBmV to 60 dBmV	
Audio demodulation	Analog FM	
C/N	>50 dB for level >10 dBmV	
HUM	1-15 % , ± 1 % accuracy (For CW carriers)	
DIGITAL CHANNEL TUNNING MODE		
Power measurements	From –40 dBmV to 60 dBmV by integration	
Lock range	-20 dBmV to 60 dBmV	
QAM Systems compatibility:	DVB-C, ITUJ83 Annex B and C	
SR	1000-7000 ksym/s	
MER	From 24 dB to 42 dB for QAM16,32,64,128,256 and QPSK; Accuracy ± 2 dB	
BER	Pre BER (Before RS): From 10 E-2 to 10 E-10; Post BER (After FEC): From 10 E-2 to 10 E-10	
Constellation Diagram	For all systems with x2, x4 zoom	
FUNCTIONS	**CABLE, RF BAND 5-1700 MHz**	
	SCAN, TILT, RF POWER METER, SPECTRUM	
	EXT. CM CONNECTION	
	DIGITAL QAM / ANALOG TV ANALYSIS	
	UPSTREAM TEST GENERATOR	
	INPUT DC / AC VOLTIMETER	
	BUILT-IN DOCSIS 3.0 CABLE MODEM	–
	FIBRE, OPTICAL BAND 1100-1700nm	–
	OPTICALPOWER METER	–
	OPTICAL TO RF CONVERTER (45-1700 nm)	–
	SCAN, TILT, SPECTRUM,	–
	DOCSIS ANALYSIS AND TV ANALYSIS	–
	SCREEN-SHOT / PHOTO GALLERY, DATALOGGER, ETHERNET, 2 x USB, WEB BROWSER	
OPTICAL POWER METER & RF CONVERTER		
Optical Band	1100 nm – 1700 nm	–
RF Conversion band	45 MHz-1700 MHz	–
Connector	SC-APC	–
Dynamic range	- 50 dBm to 10 dBm (0.5 dB accuracy)	–
Calibrated wavelength	1310, 1490, 1550, 1625 nm	–
GENERAL SPECIFICATIONS		
Inputs and Outputs	RF Input (F male socket), Ext. Cable Modem (F male socket), USB type A, mini USB, Ethernet	
	Optical Input (SC-APC)	–
Monitor Display	7” touch-screen color TFT	
POWER SUPPLY		
Battery type	Internal battery 7.2 V; 6,6 Ah Li-Ion smart battery	
Battery Operation Time	> 2.5 hours in continuous mode	
Recharging time	3 hours up to 80% Instrument off	
External Voltage	12 V DC	
Consumption	40 W	
INCLUDED ACCESSORIES	DC power adapter, Car lighter adapter, F (f) - F (f) Input adapter, Mains cord, Carrying bag, Transtport case, Quick reference guide.	
Mechanical Features		
Dimensions	290 (W.) x 185 (H.) x 65 (D.) mm	
Weight	1.6 kg	