PROMAX

FULL FEATURED ANALYZER FOR
NORTH AMERICAN TELEVISION

4K ULTRAHD FRAME GRABBER

BROADCAST, CABLE, SATELITE,
IPTV, OPTICAL FIBRE AND WIFI

TV & SPECTRUM ANALYZERS

www.promaxelectronics.com

PROMAX

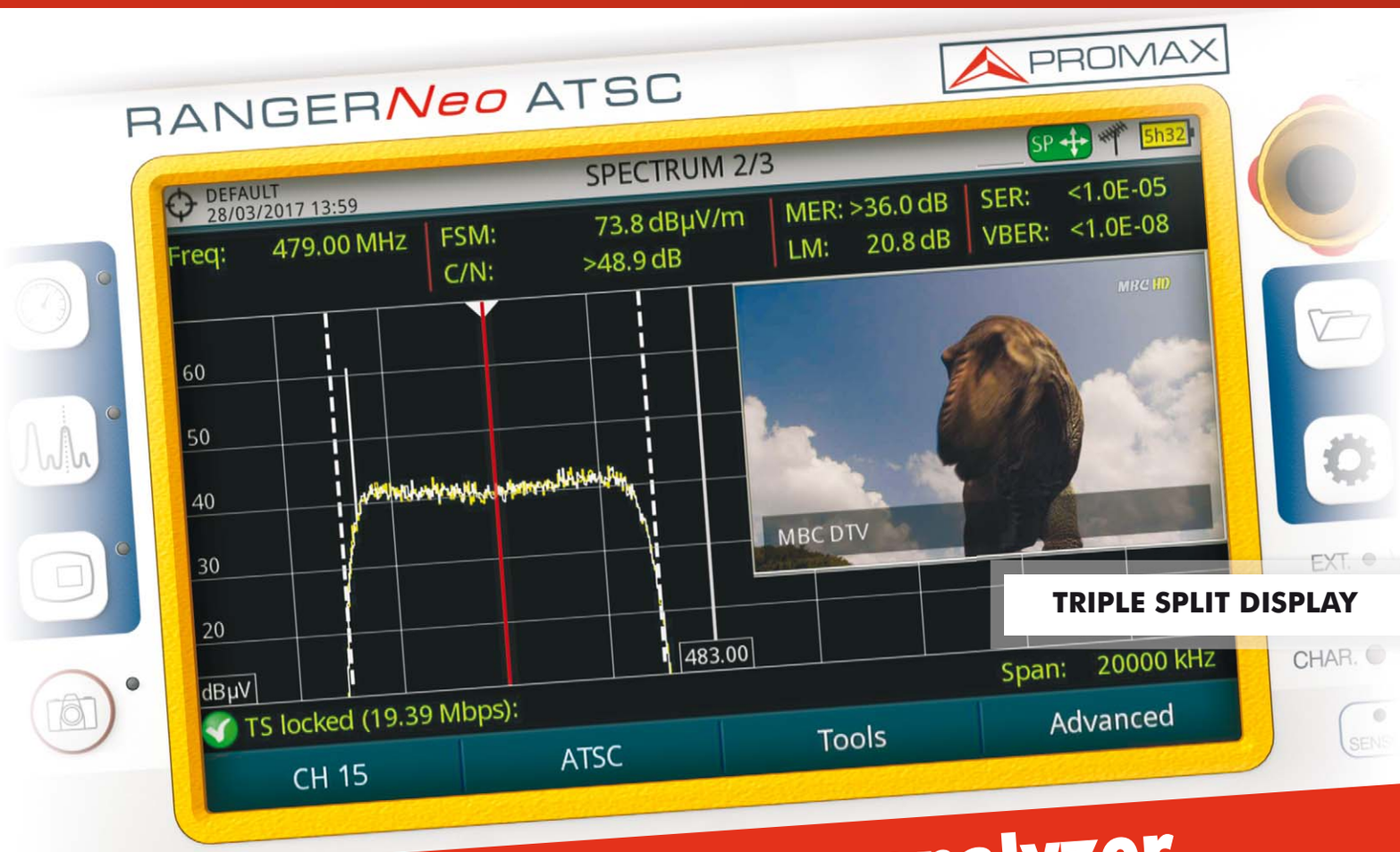
HEVC H.265 compatible

High efficiency Video Codec

RANGER*Neo* ATSC is the new industry standard in field strength meters, TV and spectrum analyzers. They cover from 5 to 2500 MHz and are HEVC compatible. They feature the “4K frame grabber” tool which decodes UHD video frames and displays them in a slideshow mode.

- **ULTRA FAST SPECTRUM**
- **TRIPLE SPLIT DISPLAY**
- **LIGHT WEIGHT (< 5 pounds)**
- **SMART BATTERY CONTROL**

CHECK COMPARISON TABLE

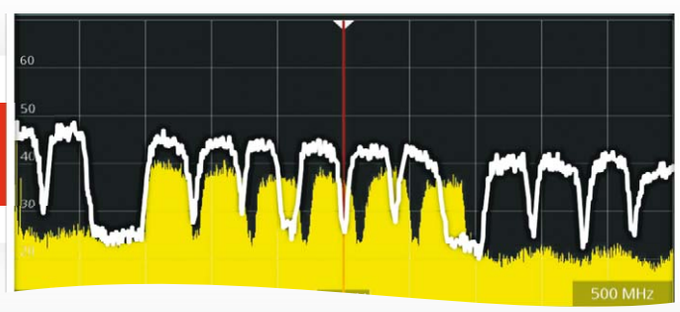


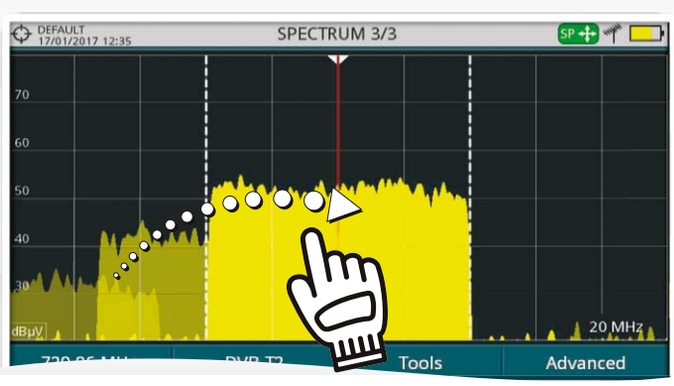
TRIPLE SPLIT DISPLAY

Professional spectrum analyzer

Reference traces

Freeze the spectrum graph and compare it with the running trace.



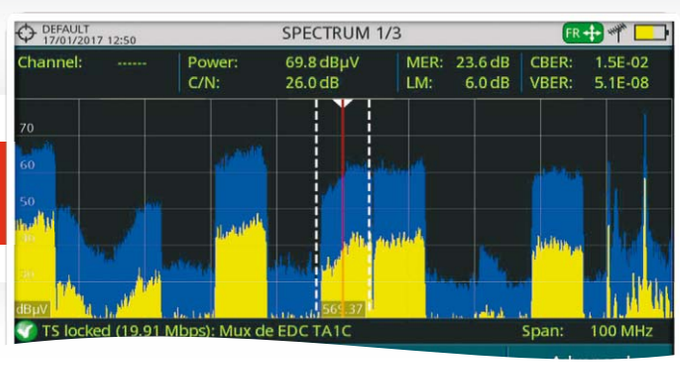


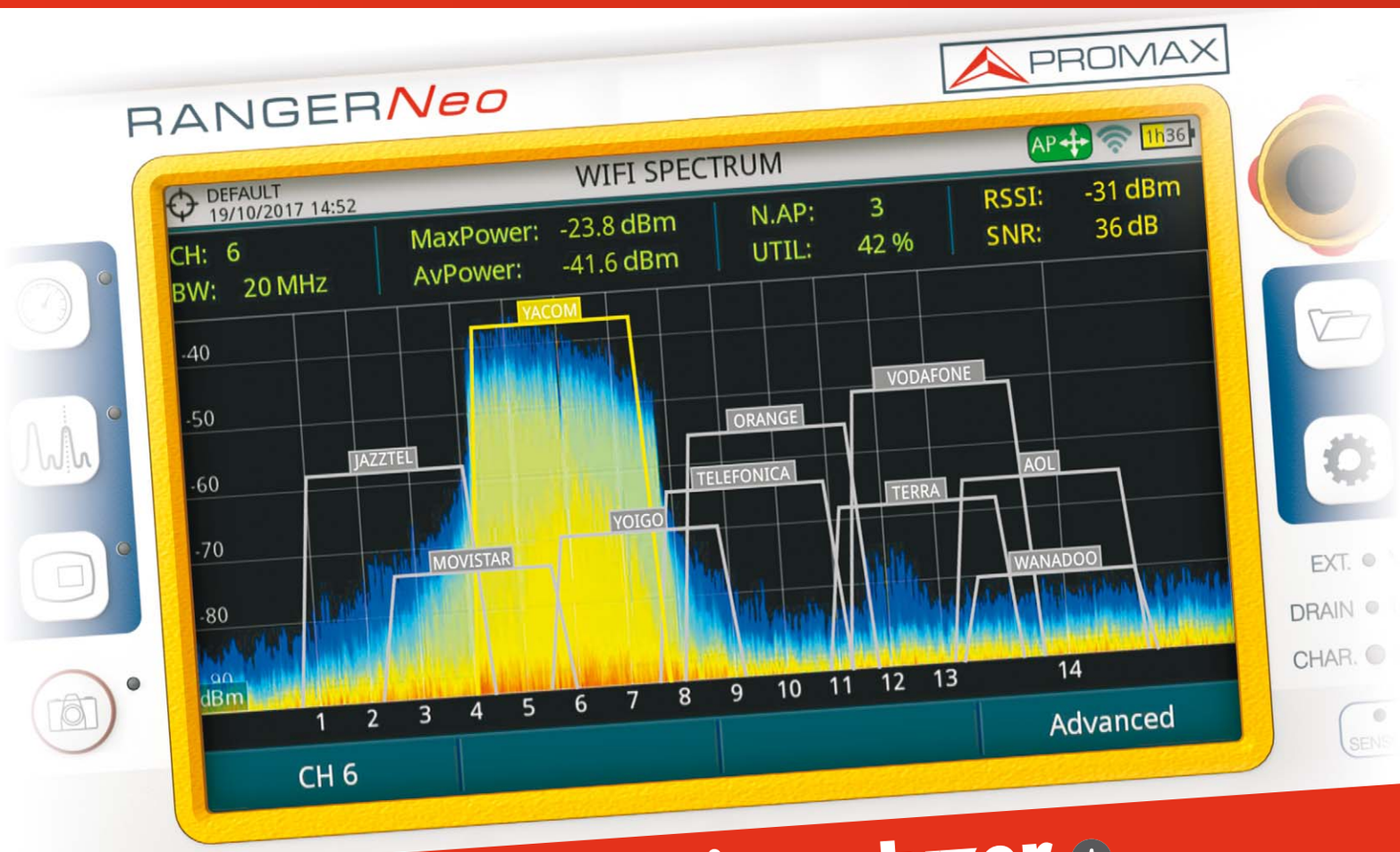
Touch screen

Place the marker on any channel and move the trace using your finger.

MIN and MAX hold

Display them separately or simultaneously along with the current spectrum trace.

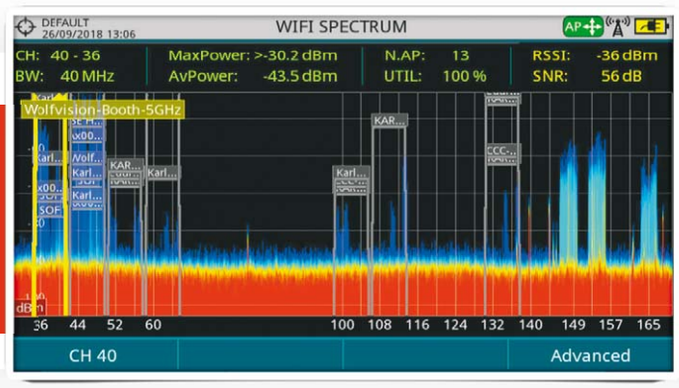


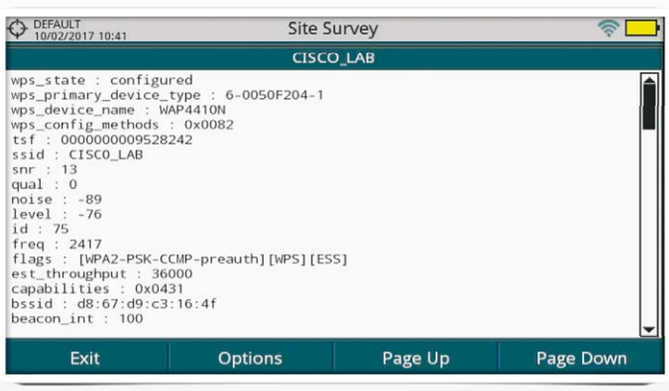


2.4 & 5.7 GHz WiFi analyzer ★

Simultaneous real spectrum analyzer information + WiFi access point data

WiFi signals can be disturbed by interference from other WiFi stations, for example other access points, but also from non-WiFi signals such as wireless CCTV cameras or a microwave oven. **RANGER*Neo* ATSC** can display real spectrum analyzer information and access point data simultaneously.





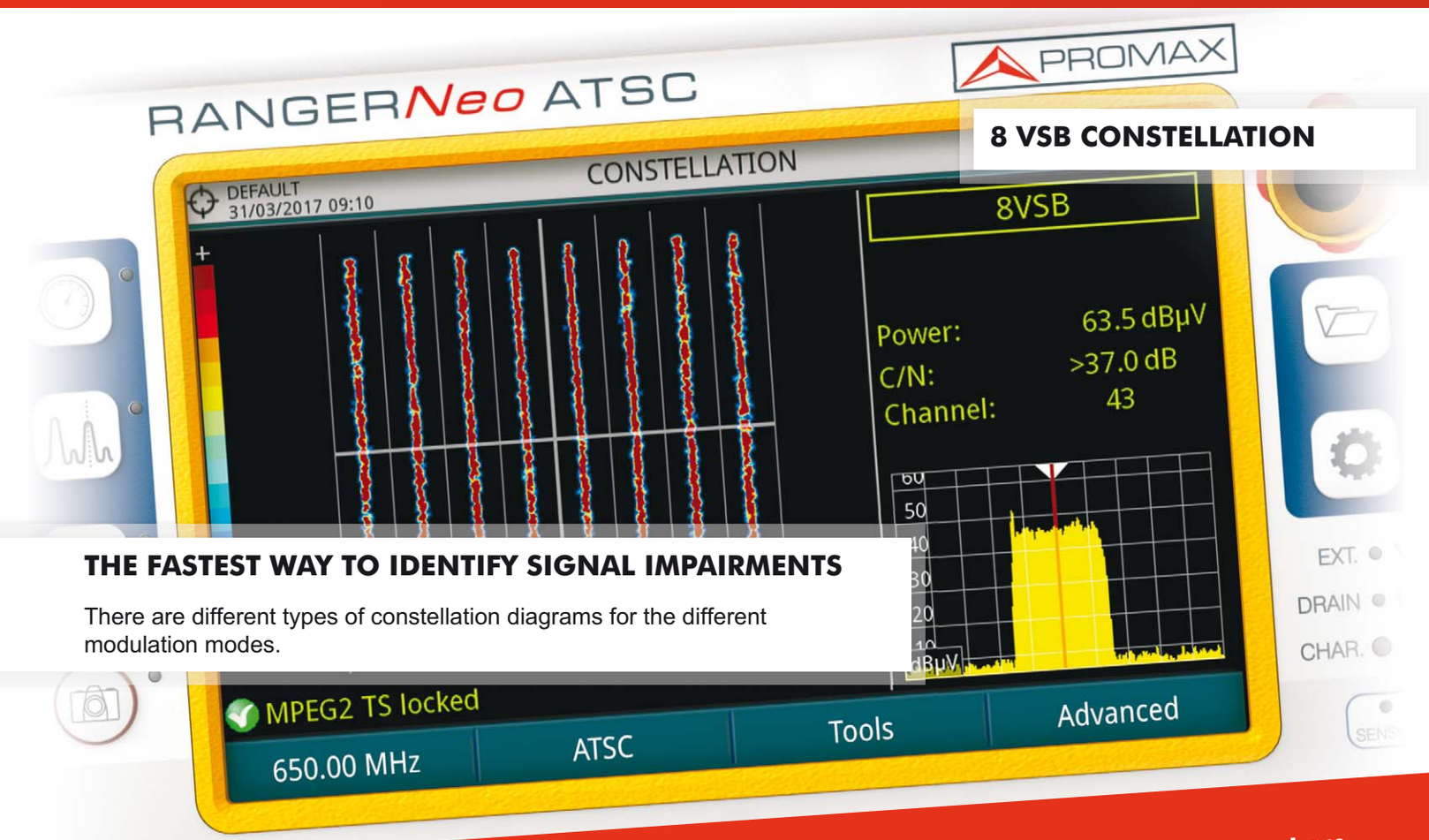
Access point information

RANGER*Neo* ATSC shows convenient information from the access points such as SSID, RSSI, SNR, security information, etc. It also indicates the number of access points per channel and offers you guidance regarding the level of occupancy of a specific channel.

★ CHECK COMPARISON TABLE

Wi Fi™

PROMAX



8 VSB CONSTELLATION

THE FASTEST WAY TO IDENTIFY SIGNAL IMPAIRMENTS

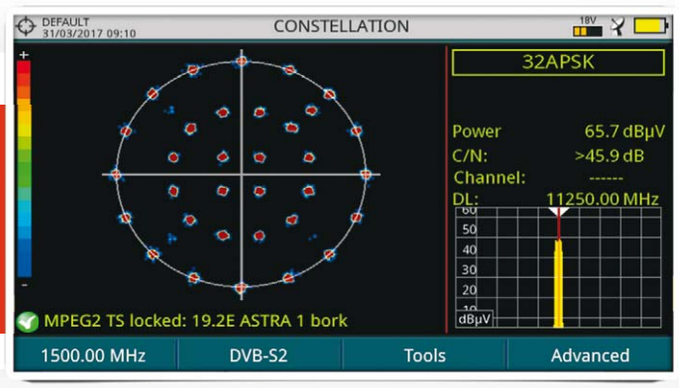
There are different types of constellation diagrams for the different modulation modes.

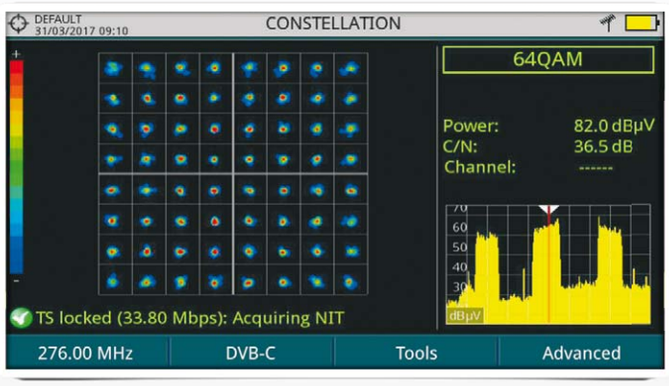
Constellation diagram

Detecting signal impairments at a glance

16/32 APSK, 8PSK and QPSK constellation

In the case of an ideal transmission channel, free of noise and interferences, all symbols are recognized by the demodulator without errors. In this case, they are represented in the constellation diagram as well defined points hitting in the same area and forming a clear dot.



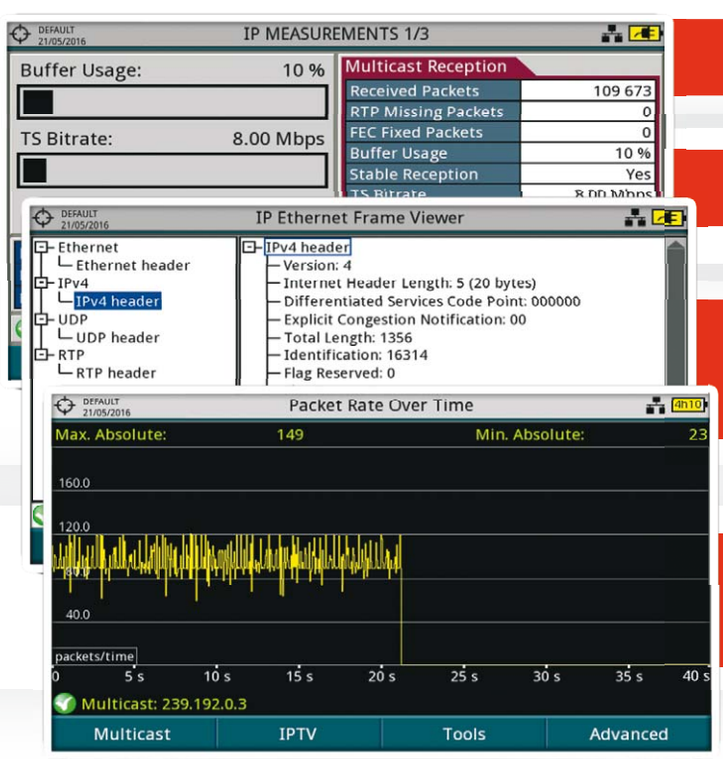


16, 32, 64, 128, 256 QAM

Every modulation type is represented differently. A ITU J.83 Annex B 16QAM signal is represented on the screen by a total of 16 different zones, and a DVB-C 64QAM is represented on the screen by a total of 64 different zones and so on.

IPTV MEASUREMENTS

IPTV functions



Network bitrate

The network bitrate gives you an indication of the network load and possibility of overload.

Media Delivery Index and FEC

A key quality measurement formed by the Delay Factor and the Media Loss Rate. FEC measurements are also available.

IP Ethernet frame viewer

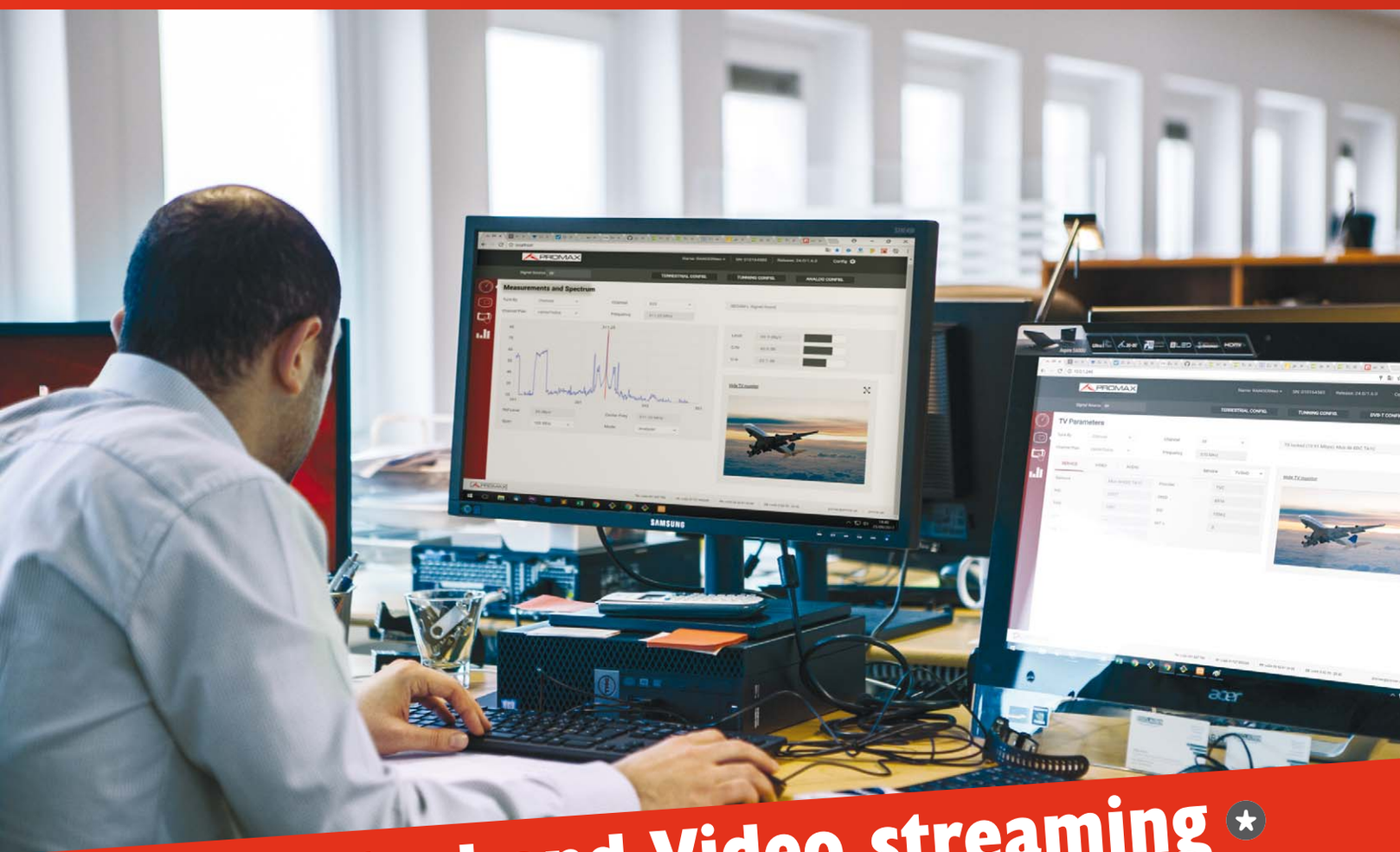
IP Ethernet frame viewer captures a multicast packet displaying all its frame details, for example Time-To-Live (TTL), all fields of RTP protocol, etc. It is very helpful to study IPTV signalisation problems.

PING, Trace, Average packet delay and IPDV

They are very useful to identify the reasons for communication problems, anything from complete service interruptions to uncontrolled delays which can be as important in terms of service performance.

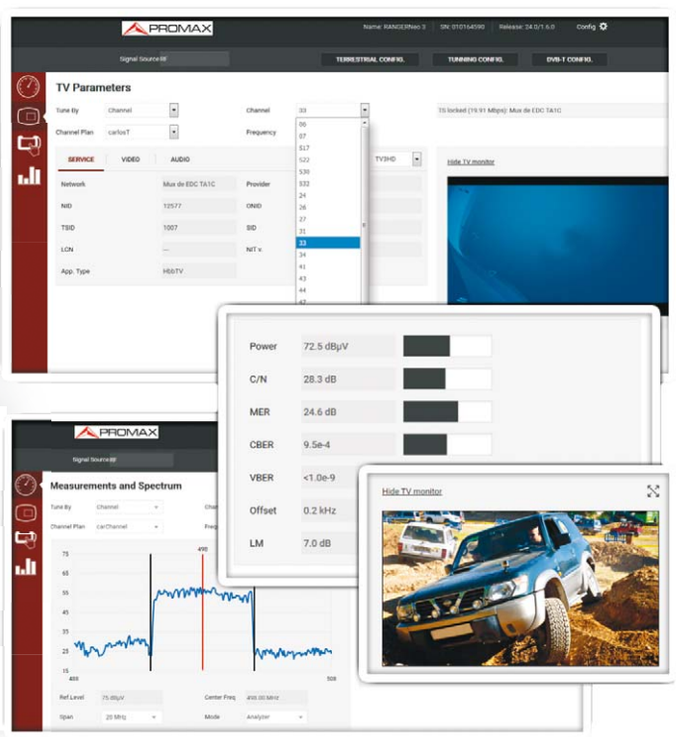
CHECK COMPARISON TABLE

PROMAX



webControl and Video streaming

The *webControl* is an operating mode of the **RANGER *Neo* ATSC** field strength meter that enables its remote control via a local area network (LAN) or the Internet. Thus, it is possible to log into the equipment from anywhere in the world at any time.



MEASUREMENTS AND SPECTRUM
Tuning parameters, real time navigation and adjustment of the spectrum, channel measurements....

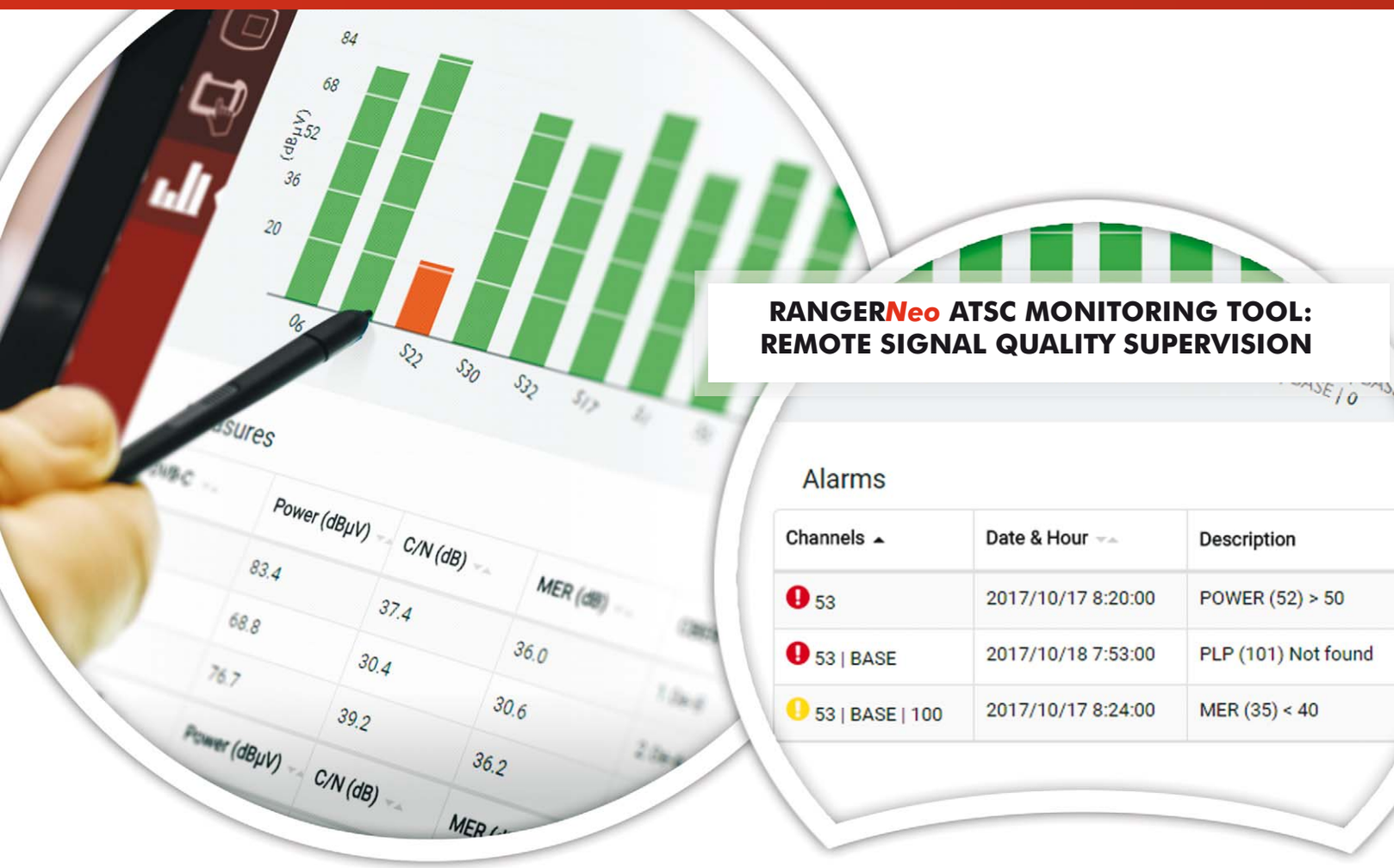
TV PARAMETERS
Streaming of a TV/radio service, displaying information, recording the TS or the service...

MONITORING
Monitoring the quality parameters, setting alarms and pre-alarms, e-mail warnings...

HISTORICAL MONITORING
Displaying a measurement graph, reviewing the measurements, exporting data to CSV...

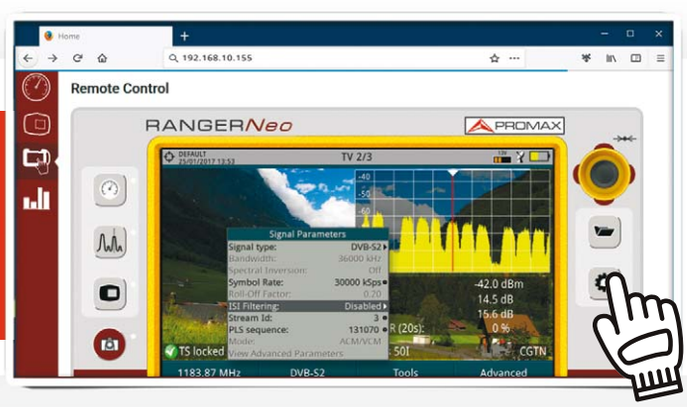
INSTALLATIONS MANAGEMENT
Uploading and downloading files from the internal memory of the equipment or the connected USB storage media.

CHECK COMPARISON TABLE



RANGER*Neo* Console

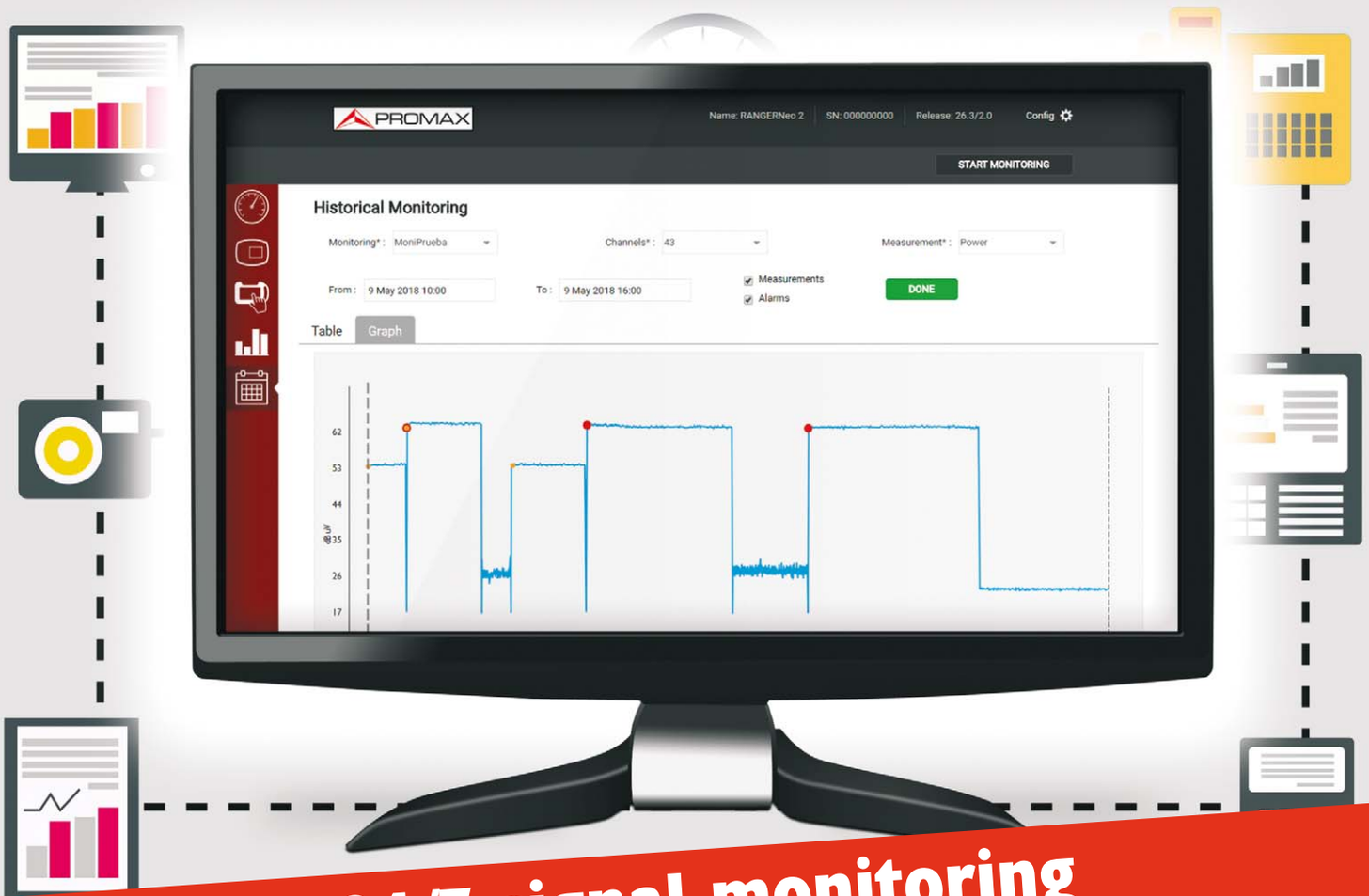
Complete control over your field strength meter from anywhere in the world and with no additional software installation required. A virtual platform that gives you access to all of the analyzer features.



Video / Audio Streaming

It is now possible to stream the Transport Stream after channel demodulation either over a private LAN or over the Internet, as a unicast (UDP) stream. The service as seen on the analyzer screen can be streamed as a SPTS over IP, or as a full TS containing all services for the channel being tuned.

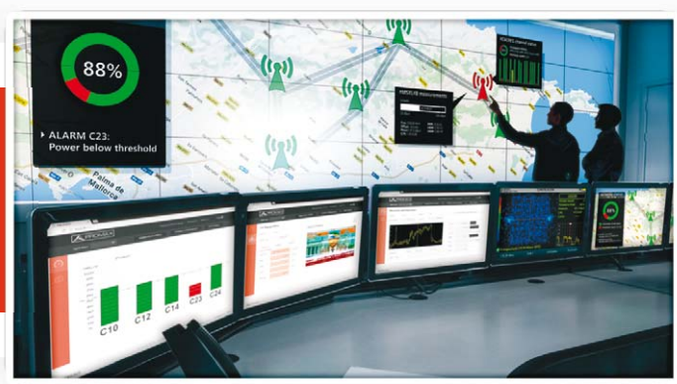
The same feature can be used for other streams received over IP or previously recorded, instead of coming from an RF source.



Remote, 24/7 signal monitoring

PROWATCH *Neo*

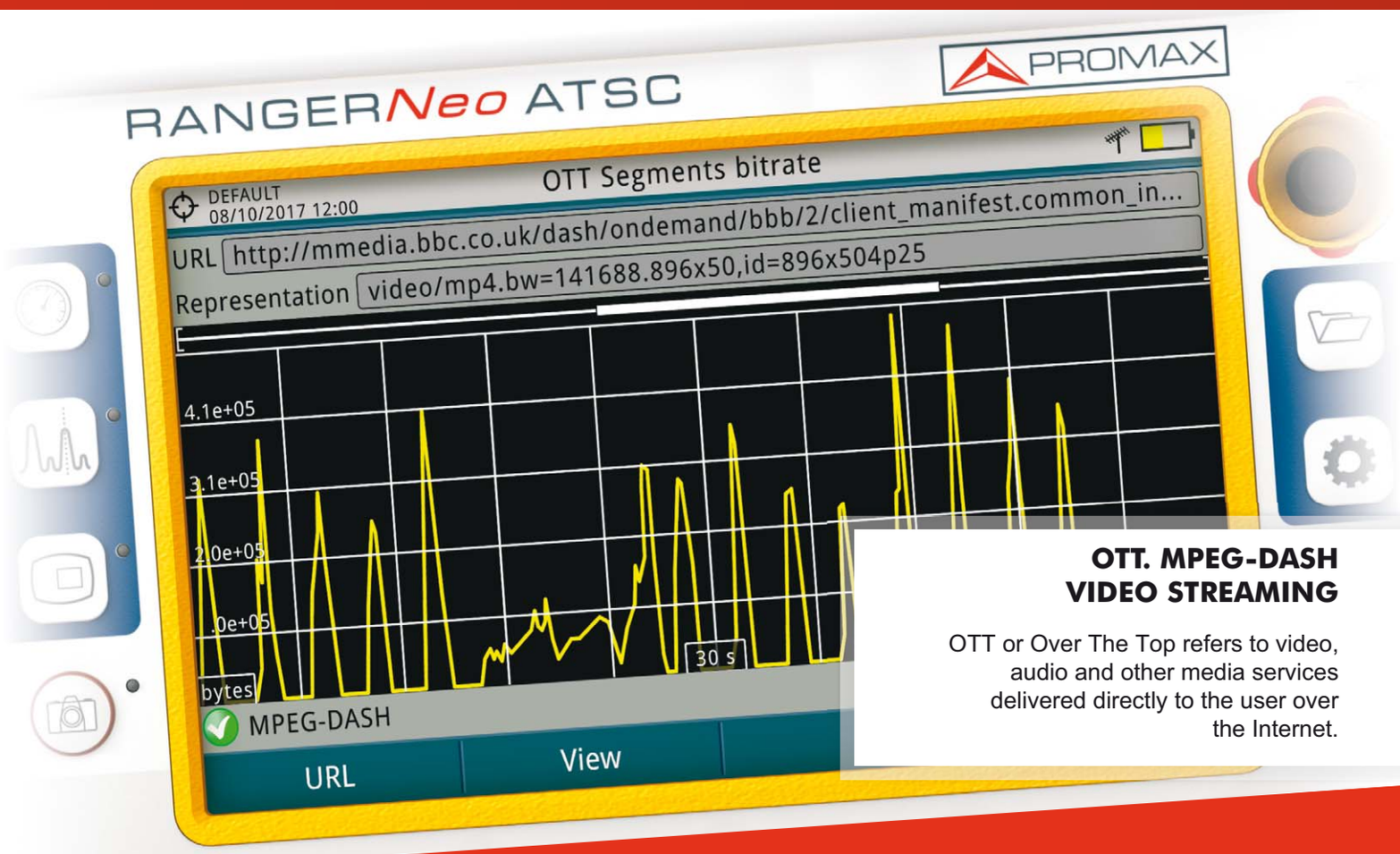
PROWATCH *Neo* is our response to the need for remote, permanent, 24/7 signal monitoring operations. It is embedded in a 19" 1U rack case and it allows you to do everything you can do with the portable analyzers but remotely. It is also possible to connect it to a keyboard and monitor using USB and HDMI™ interfaces.



Professional monitoring system

PROWATCH *Neo* is a professional monitoring system based in the **RANGER *Neo*** technology allowing users to perform:

- Live transport stream and service recording.
- Service IP streaming.
- Alarm generation.
- Service quality and alarm statistics.



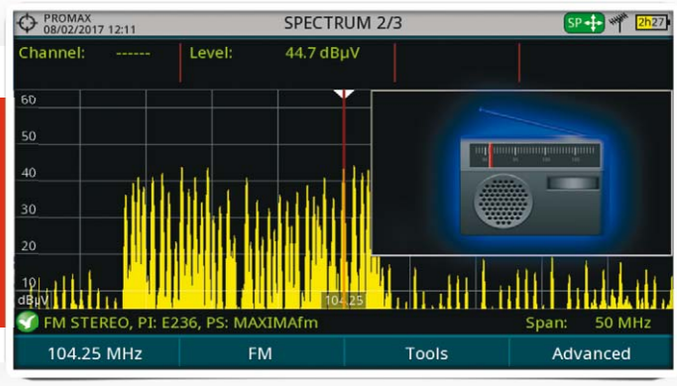
OTT. MPEG-DASH VIDEO STREAMING

OTT or Over The Top refers to video, audio and other media services delivered directly to the user over the Internet.

Many useful functions

FM RDS radio receiver and analyzer

FM-RDS radio signals can be scanned, measured and demodulated, and any RDS data that is present can be decoded and shown in a dedicated results screen. The Drive test GPS option can also work in FM mode, and provide valuable field strength measurements for your radio station.



Field strength measurements

The **RANGER*Neo* ATSC** can do FSM Field Strength Measurements. The antenna K factor can be entered manually or in the form of a file.

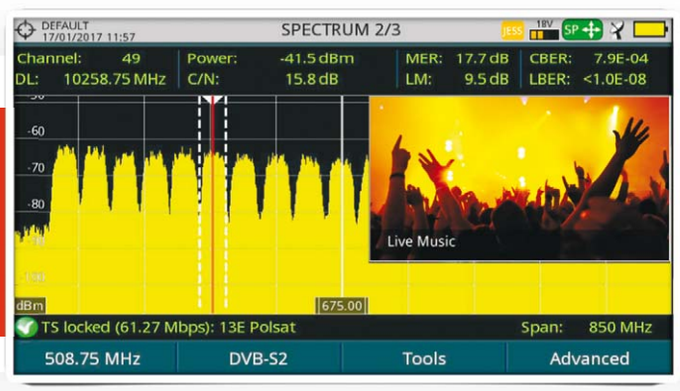
WIDEBAND LNB COMPATIBLE

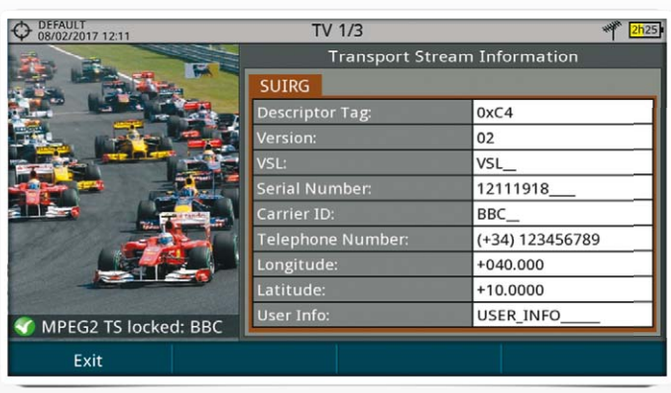
Wideband LNBs deliver the entire vertical and horizontal satellite polarities (low and high band together) using two separate RF cables and an extended IF frequency range from 290 to 2,340 MHz. **Is your analyzer ready?**

Advanced satellite technology

dCSS LNBs

Digital Channel Stacking Switch LNB can support several users on a single cable distribution system by allocating specific user bands for each of them. It is not possible to work with this type of LNB unless your field strength meter communicate using EN50495 and EN50607 standard protocols. This is the case of **RANGER*Neo* ATSC** which also covers JESS and SATCR.





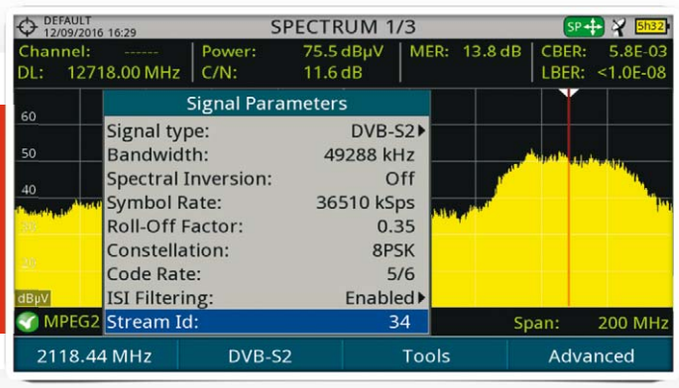
IRG descriptor identification

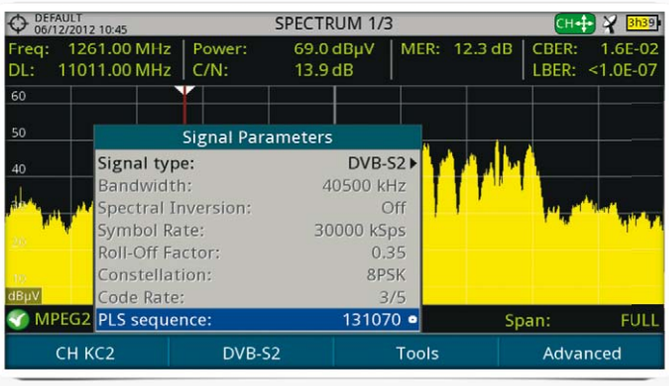
The IRG descriptor is an embedded code that is added to video links containing contact info, GPS coordinates, etc from the source signal to allow a quick troubleshoot of interferences in scenarios such as live transmissions of sports events.

Multistream and PLS

DVB-S2 multistream

Advanced modulation techniques combine several independent transport streams into one single RF carrier. Selecting a specific TS is easy with your **RANGER*Neo* ATSC** using the ISI Filtering function.





PLS - Physical Layer Scrambling

The PLS index is a number generated by the broadcaster that must be properly decoded by the customer so that demodulation is possible. **RANGER*Neo* ATSC** can also work with this type of signals.

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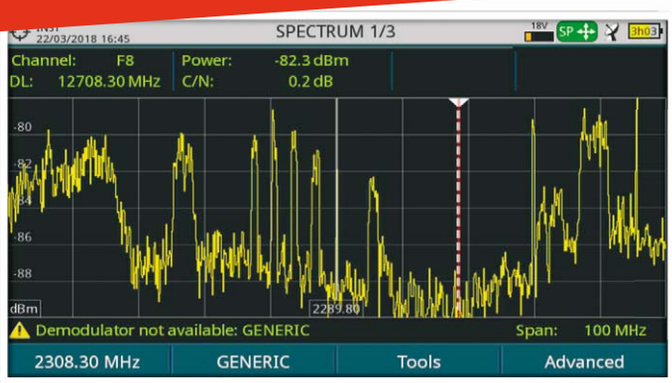
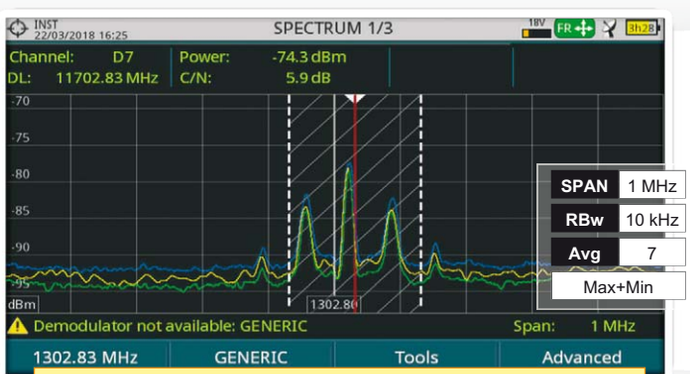
Advanced satellite technology

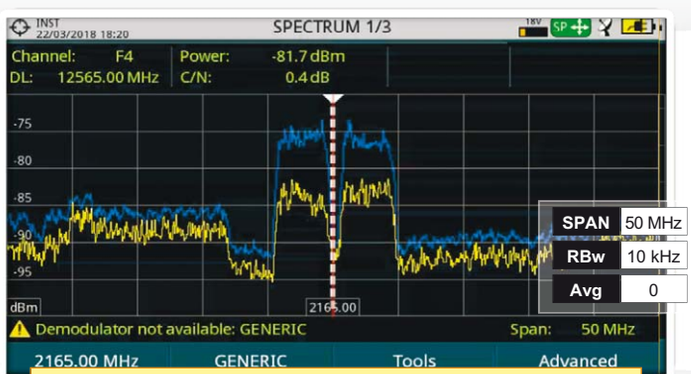


L-band spectrum analyzer

RANGER ***Neo*** are more than just spectrum analyzers. They are truly multifunctional including characteristics such as 10 kHz to 1 MHz resolution bandwidths, high frequency accuracy, screen capture functionality, datalogger and 24/7 signal monitoring, spectrogram, remote control via webserver and SNMP, all in one box.



Satellite beacon with Max and Min hold



2.1 GHz Terrestrial Interference from mobile phone base station

CHECK COMPARISON TABLE

LIGHTWEIGHT AND DURABLE

Teleport operators, as well as anyone involved in transmission quality assessment can rely upon the **RANGER *Neo*** to obtain the information they need to ensure proper system performance.

Weighing just 2.2 kg it is built to last in a sturdy double injection moulding weatherproof body.

Teleports, SNG, VSAT, SATCOM

If you need 24/7 monitoring...

The **RANGER *Neo*** spectrum analyzers will help you identify signal impairments locally or remotely. They will offer you remote control, webserver, SNMP compatibility, video streaming capabilities or the possibility to set up alarms for automatic monitoring applications.

Specifications

- **Frequency range**: 5 to 2,500 MHz
- **Input range**: -90 dBm to +20 dBm (approx. 20 dBµV - 130 dBµV)
- **Resolution filters**: 10 / 20 / 30 / 40 / 100 / 200 kHz, 1 MHz
- **Span range**: Full span, 1500, 1265, 850, 500, 250, 200, 100, 50, 20, 10, 2, 1 MHz
- **Fast sweep time**: 70 ms depending on span/RBW
- **Amplitude sensitivity**: 1, 2, 5, 10 dB/DIV
- **Advanced features**: Markers, Max/Min hold, Persistence, Trace averaging, RMS/PEAK, SAT IRG descriptor
- **LNA/LNB power**: 5/13/15/18 VDC, 22 kHz, DiSEqC, SATCR, dCSS
- **Remote control**: Ethernet port, webserver, SNMP
- **Display**: 7” touch screen colour TFT
- **Battery time**: More than 4 hours
- **Size & Weight**: 290 x 185 x 95 mm, 2.2 kgr (approx. 5 lbs)

Applications

- Teleport 24/7 monitoring
- SNG, VSAT, Flyaway antenna alignment
- SOTM Terminals (Satcom On-The-Move)
- Government and military SATCOM
- Oil rig & maritime satellite communications
- Beacon, TT&C (Telemetry, Tracking, and Command) signal location and monitoring
- Satellite, TV, CATV entertainment systems
- VSAT system on-site and remote commissioning
- OB van antenna alignment and signal monitoring

CHECK COMPARISON TABLE

RANGER*Neo* TV ANALYZERS

HD RANGER *Eco*

DVB-T2, DVB-C2, DVB-S2, DSS

Super spectrum analyzer

Triple split display

Dolby Digital Plus

Dynamic echoes analysis

DVB version

HD RANGER *UltraLite*

Tablet size

The lightest in the range

DVB version

RANGER *Neo* Lite

Touch screen

HEVC H.265 decoding

Wide band LNB Compatibility

Wi-Fi analyzer

DVB ISDB-T

DVB ISDB-T ATSC

Versions

Please note ***HD*** **RANGER** ***Eco*** and ***HD*** **RANGER** ***UltraLite*** do not belong to **RANGER*Neo*** series.

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H.265 — H-265 HEVC analysis and display

WiFi analyzer

PSIP analysis and CC closed caption

Transport stream recorder and analyzer

HbbTV

4K ULTRAHD

webControl via Ethernet port

Optional DAB and DAB+ digital radio

Optional optical power meter and RF converter

Common Interface slot for encrypted channels

Digital Channel Stacking Switch LNB (dCSS)

Optional GPS for signal coverage analysis

Extended IPTV functions

Optional 6 GHz RF input

RANGER *Neo* +

- Web Server remote control
- Merogram and Spectrogram
- Fibre optics and GPS options
- More than 4 hours battery time
- DVB ISDB-T / DVB ISDB-T ATSC Versions

RANGER *Neo* 2

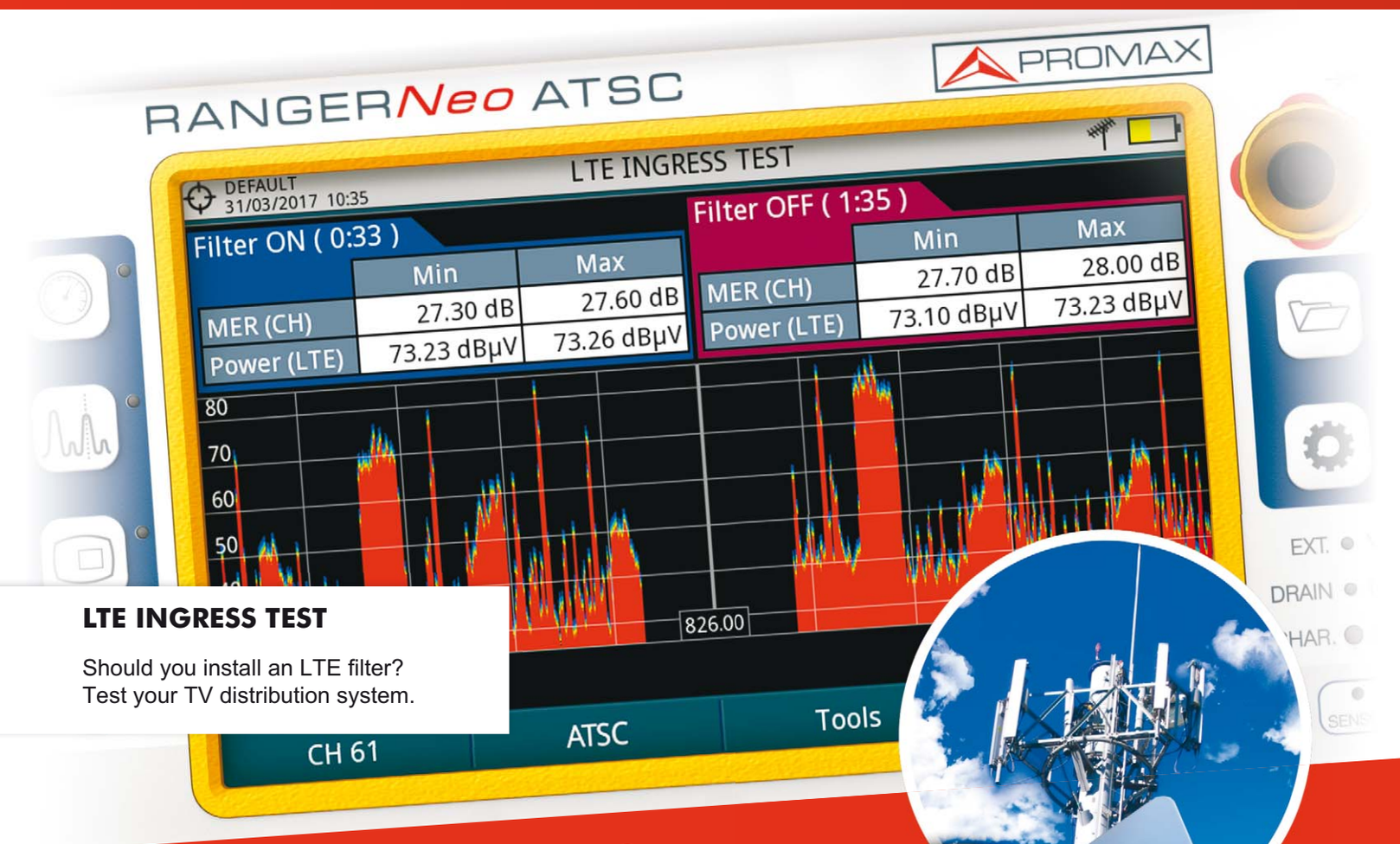
- IPTV analyzer
- High resolution filters
- TS-ASI input and output
- Common Interface slot
- Transport Stream recorder and player
- Transport Stream analyzer
- DVB ISDB-T / DVB ISDB-T ATSC Versions

RANGER *Neo* 3

- *Network Delay Margin (DVB)*
- T2-MI analysis
- GPS for drive test measurements
- DVB ISDB-T version

ALL MODELS SUPPORT THE MOST RECENT BROADCASTING STANDARDS

- UHD/4K DETECTION & MEASUREMENT
- HbbTV INFORMATION
- DAB+ CHANNEL PLAN



LTE INGRESS TEST

Should you install an LTE filter?
Test your TV distribution system.

LTE interference

LTE interference on SMATV systems

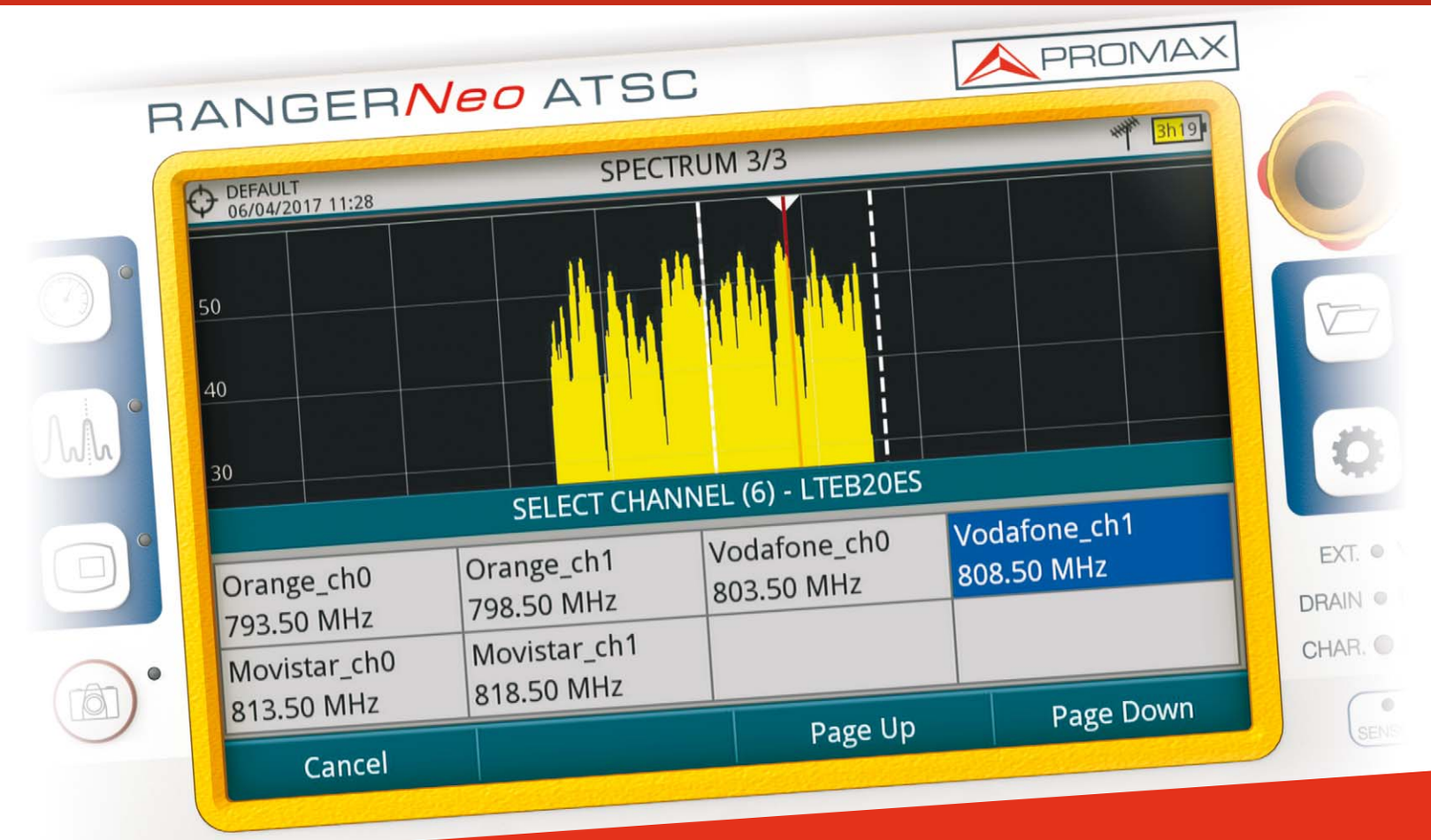
The **RANGER*Neo* ATSC** has a variery of tools to compare the signal reception quality measurements on digital TV channels with and without the LTE filter. This is very helpful to anticipate the performance improvement you should expect on your TV distribution system well before you physically make changes to the cabling to insert the LTE filter.

LTE interference on CATV networks

Some of the bands allocated to LTE are near or inside former television bands. For example band 5 (uplink 824-849 MHz; downlink 869-894 MHz). The **RANGER*Neo* ATSC** has special functions to help installers determine the level of activity in those bands and therefore anticipate potential interference problems.

Downlink and Uplink interference

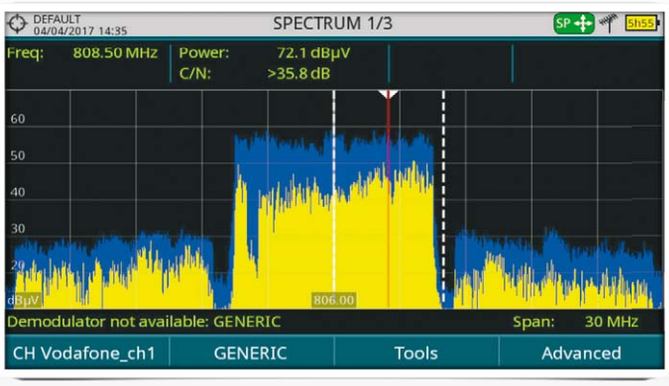
Downlink interference comes from the mobile phone base stations which are placed at fixed locations and are always on. This is not the case of Uplink interference which comes from the handheld devices and therefore it can be a lot more difficult to locate and mitigate.



LTE Signals

LTE signals and channel repack

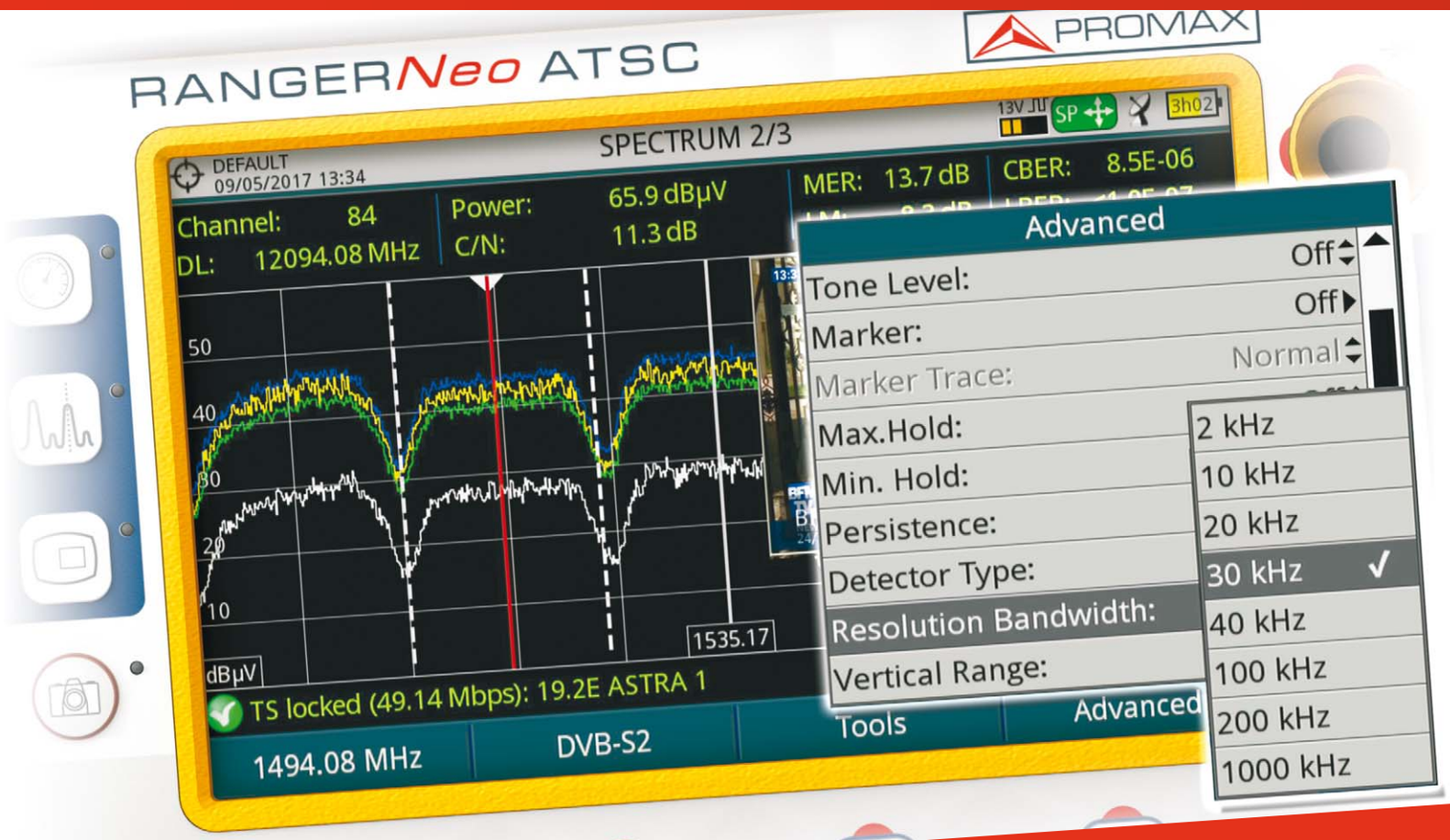
The use of Smartphones is widely spread all over the world. In order to meet user demand for bandwidth, mobile phone operators need to expand their networks, use more efficient transmission standards (LTE) and use part of the bandwidth historically assigned to TV broadcast services (channel repack in the US or digital dividend in Europe).



M2M Machine to Machine applications

Besides LTE interference measurements there is also an increasing need to look at the LTE signals themselves. This function can also be useful for Machine to Machine applications (electric car charging station, vending machine, wireless credit card reader...). One of the first problems you encounter is to make sure there is good signal coverage from the operator the system is working with.

PROMAX

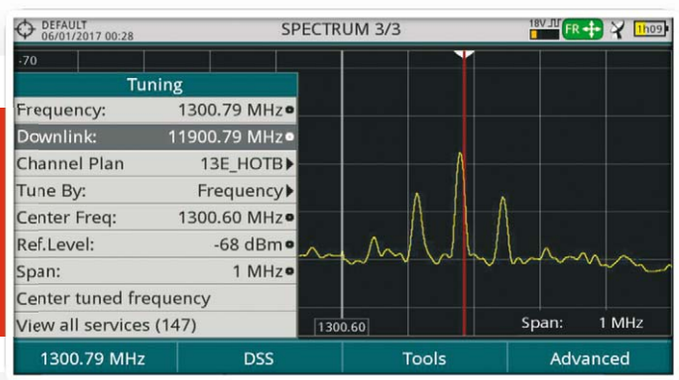


High resolution filters

Beacon-flyaways, SNG and VSAT

Satellite BEACON signals can be clearly seen thanks to the 1 MHz SPAN and 10 kHz resolution filters.

Having the proper resolution filters is critical in some applications, **RANGER*Neo* ATSC** includes a very narrow 2 kHz filter available in terrestrial TV band.

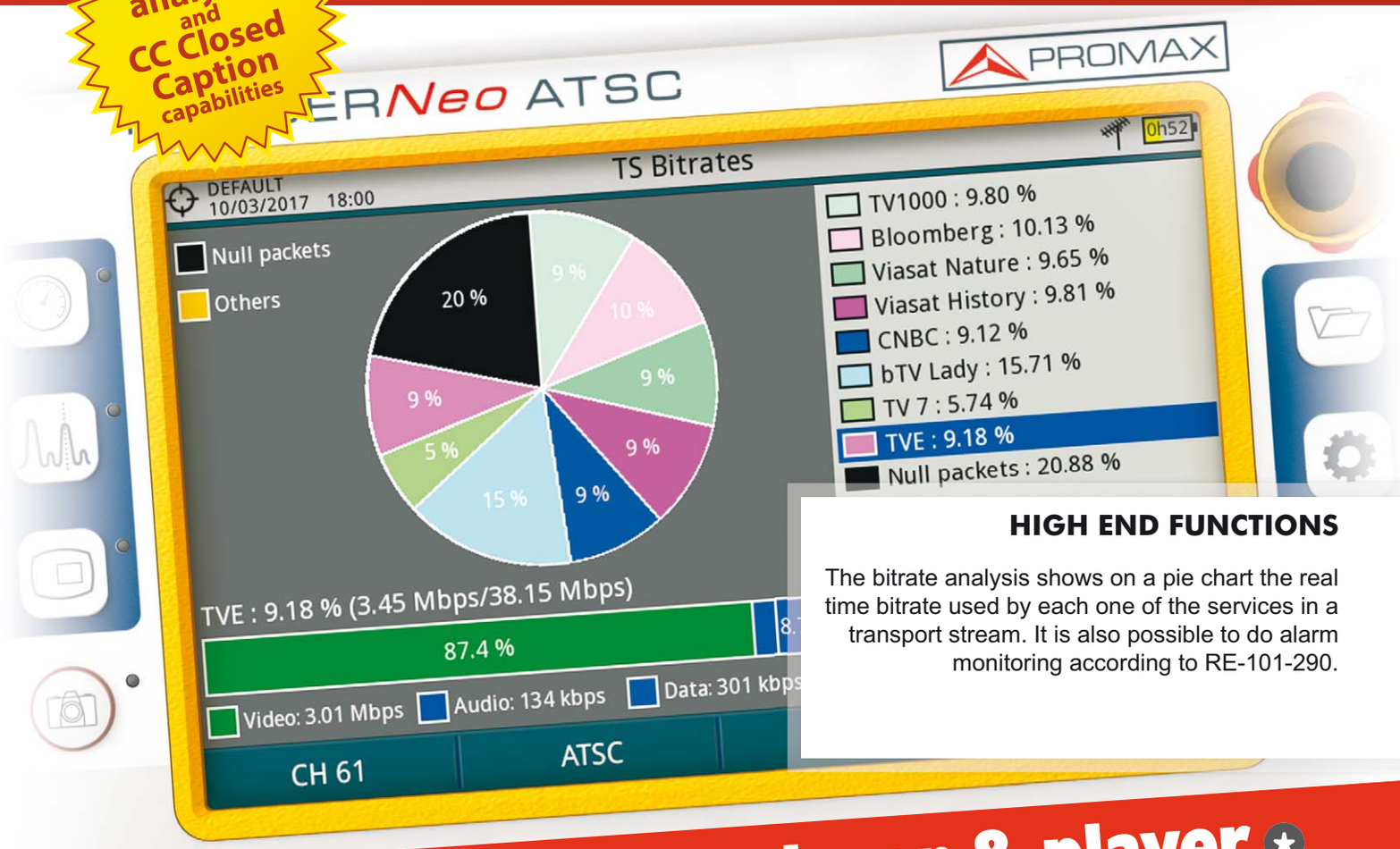


Helping live broadcast in remote areas

The **RANGER*Neo* ATSC** spectrum analyzer function makes it easy for VSAT technicians to set up their satellite transmission-reception systems.

CHECK COMPARISON TABLE

PSIP analysis and CC Closed Caption capabilities



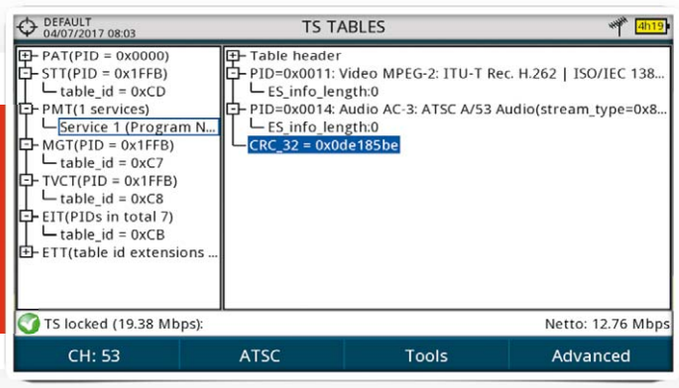
HIGH END FUNCTIONS

The bitrate analysis shows on a pie chart the real time bitrate used by each one of the services in a transport stream. It is also possible to do alarm monitoring according to RE-101-290.

Transport stream analyzer & player

Table analysis

This function shows every detail of the transport stream tables in real time on a tree diagram. This is an outstanding function which is normally only available in more expensive equipment. It is possible to navigate through the tree branches using the joystick or the touch screen functionality.

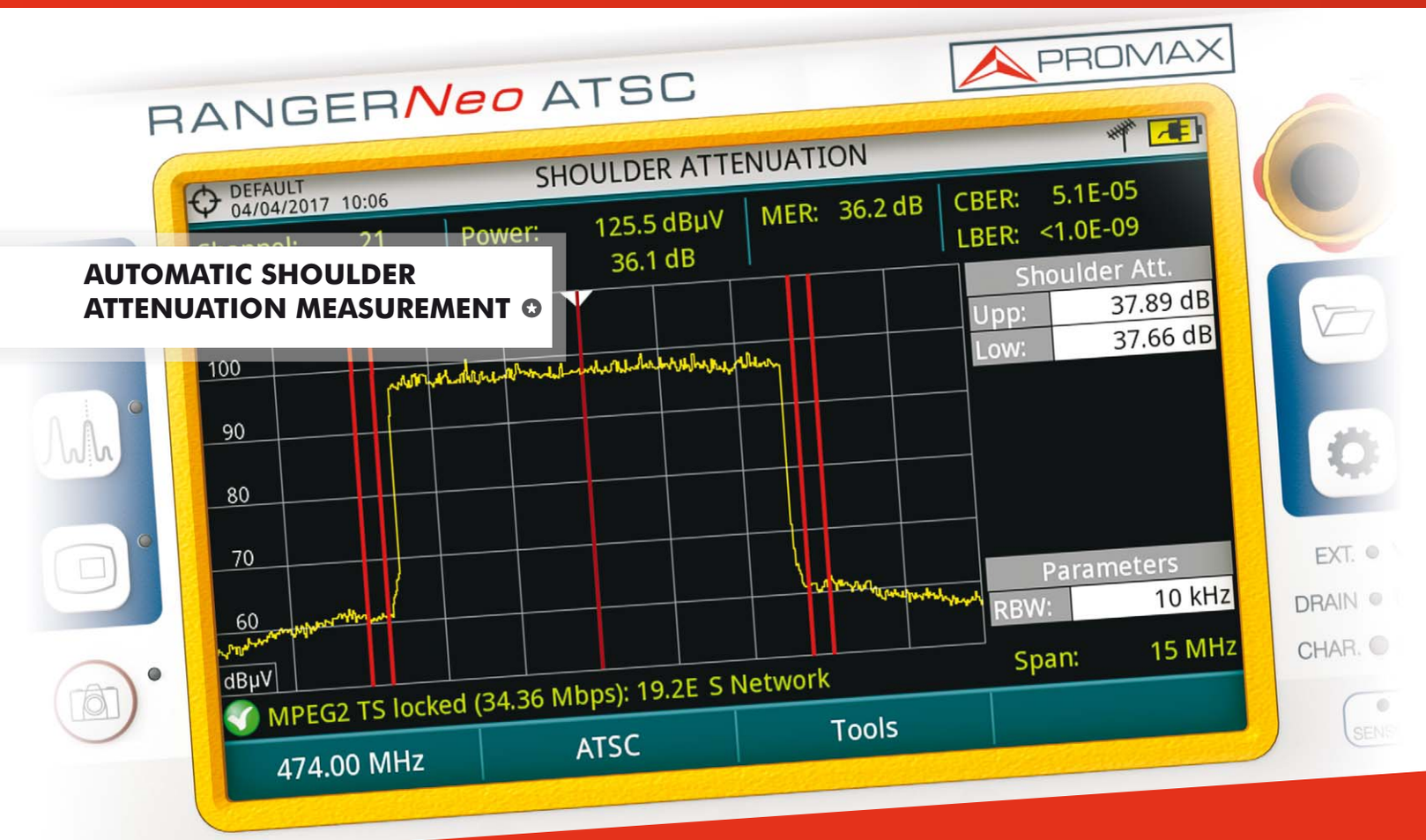


Record, analyze, decode and copy a Transport stream

A function available for **RANGER*Neo* ATSC** that enables the instrument to record the received TS in real time onto a USB pendrive or on its internal memory. The recorded TS can also be decoded or analyzed.

CHECK COMPARISON TABLE

PROMAX

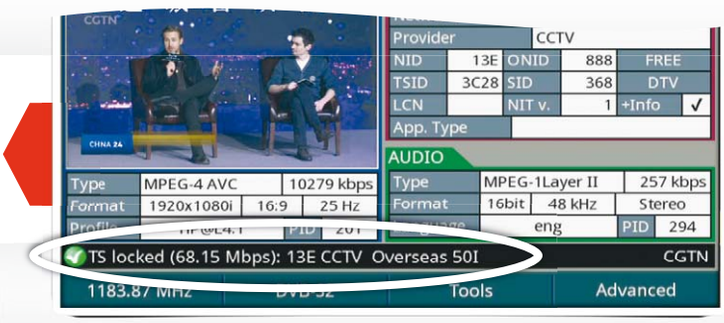


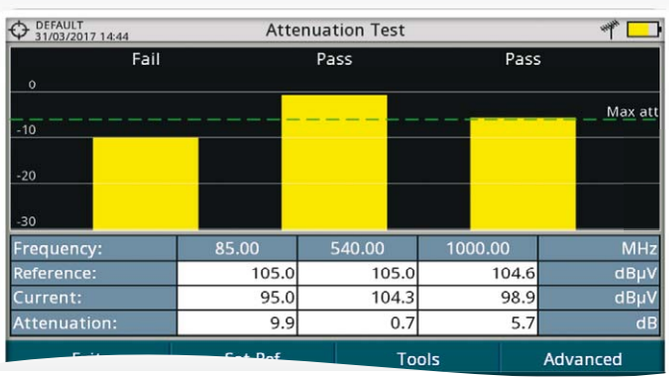
AUTOMATIC SHOULDER ATTENUATION MEASUREMENT

Productivity tools

StealthID

The **RANGER*Neo* 2 ATSC** StealthID function automatically identifies the required demodulation settings while tuning so that you don't need any previous information about the signal.



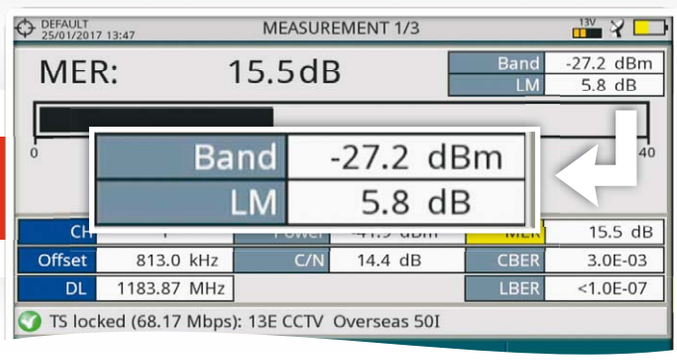


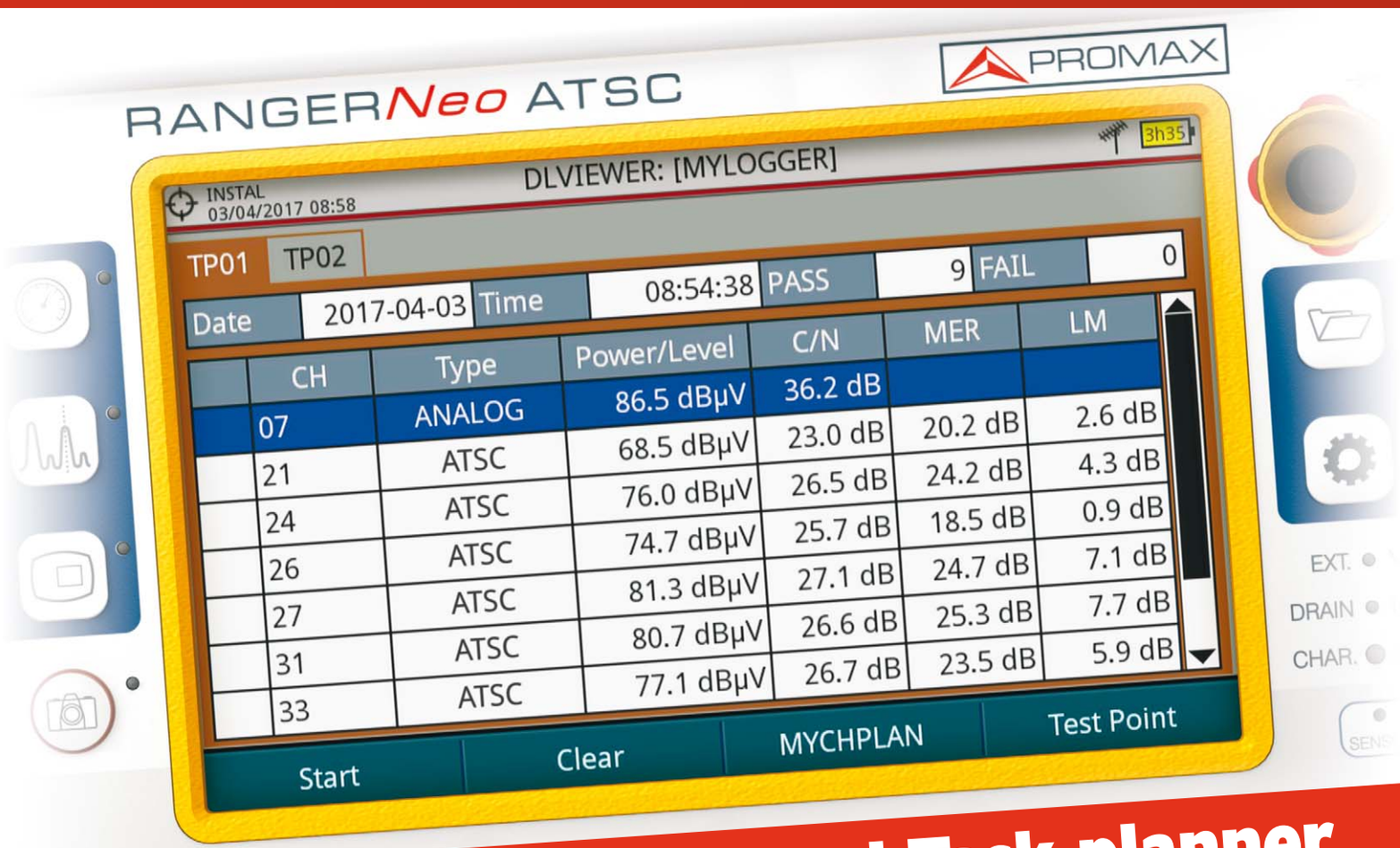
Attenuation test

Test the frequency response of your installation using RP-050, RP-080, RP-110B signal generators.

Full band power

The measurement of full band power is very useful to understand how much energy is available in total at the test point.

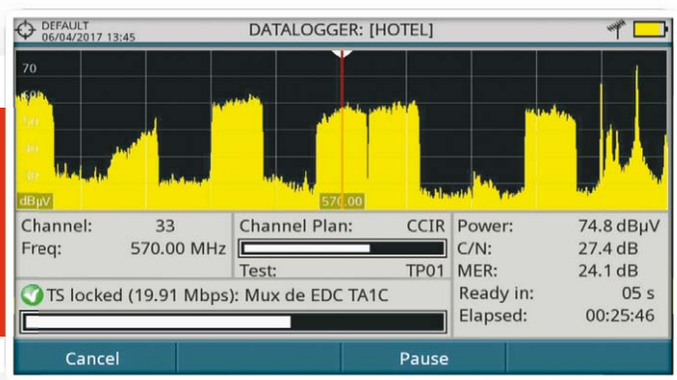


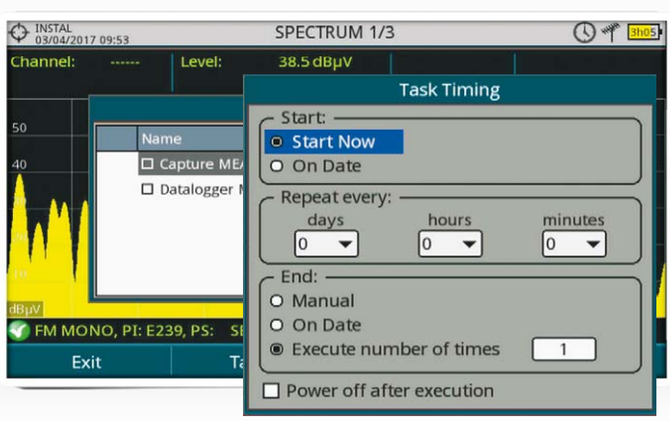


Powerful datalogger and Task planner

Datalogger and Test&Go

The datalogger can perform channel power, carrier/noise, BER, MER... measurements automatically. It can also save information from the NIT table such as the network name or even the SID and names of the services in the mux under test. All this information is saved inside the meter and it can be downloaded to a USB memory or to a PC for further processing later on.

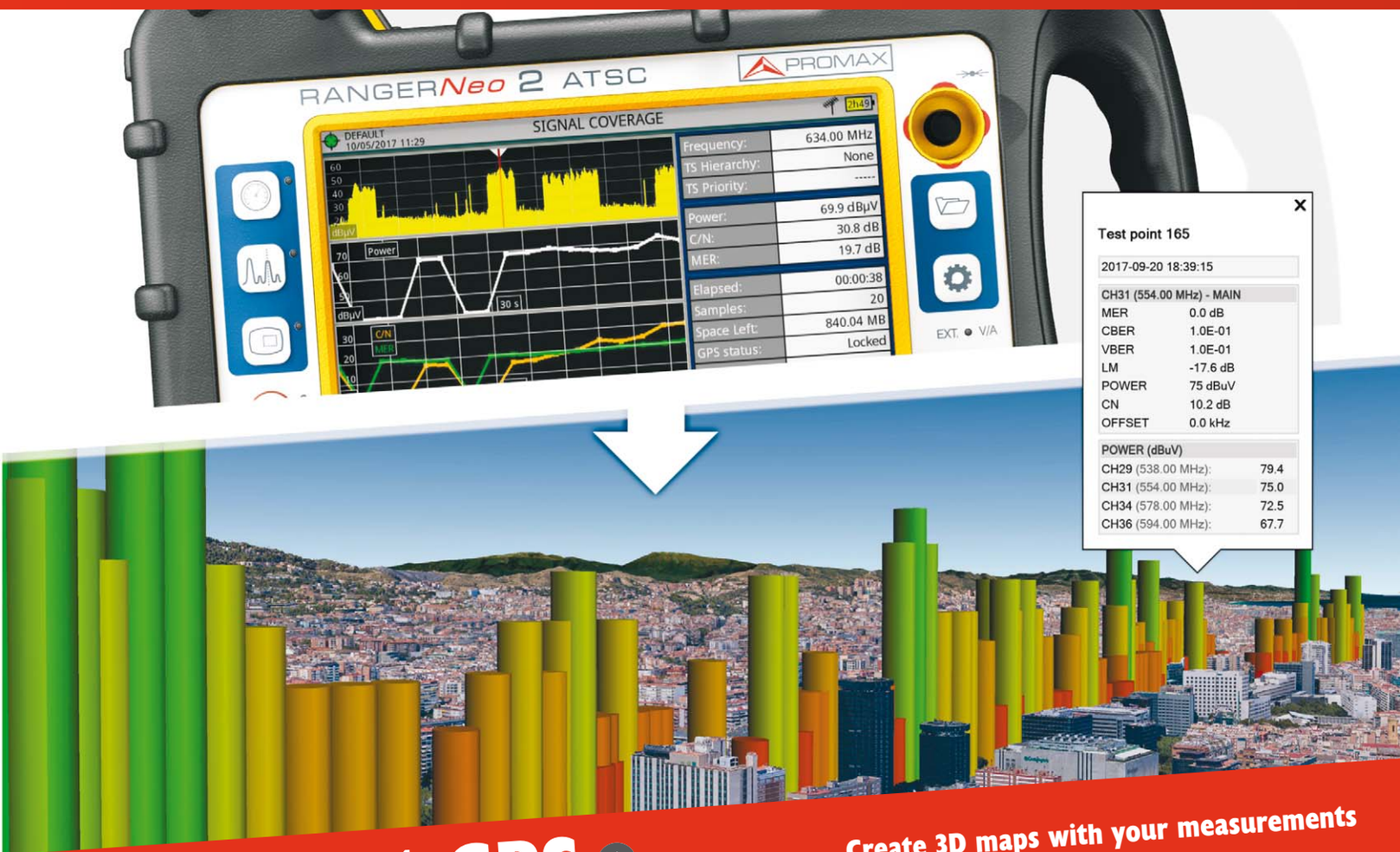




Task planner

This function allows to set a set-up task list, both for screen capture or Datalogger acquisition, selecting when to start, a repetition rate and the number of times the selected task must be performed. The equipment can be switched off after setting all parameters and will itself wake-up, at the required time, to perform the planned tasks.

PROMAX

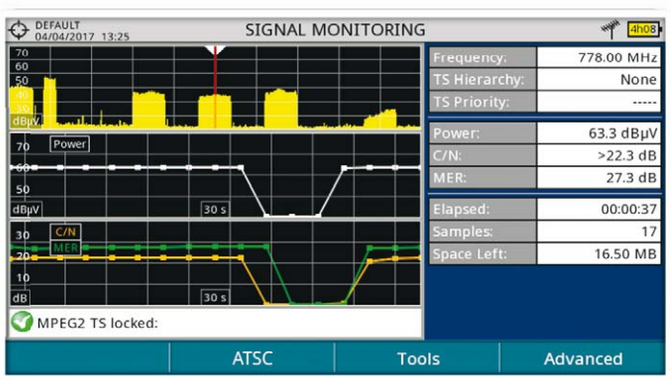


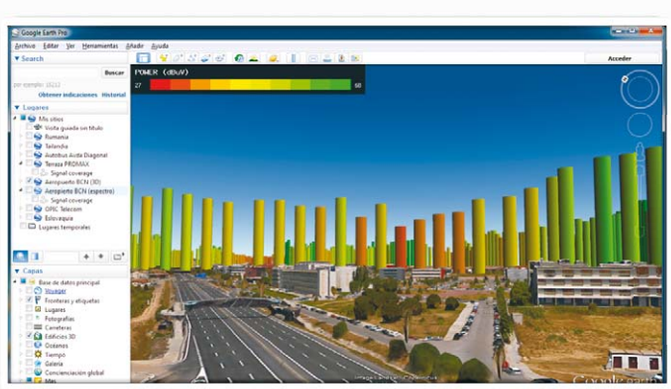
Drive test GPS

Create 3D maps with your measurements

Coverage analysis and GPS

This option turns the **RANGER*Neo* ATSC** into the perfect tool to perform signal cogerage “drive test” analysis functions. It can capture different kind of measurements embedding time/date and geographic coordinates information.





Creating reports

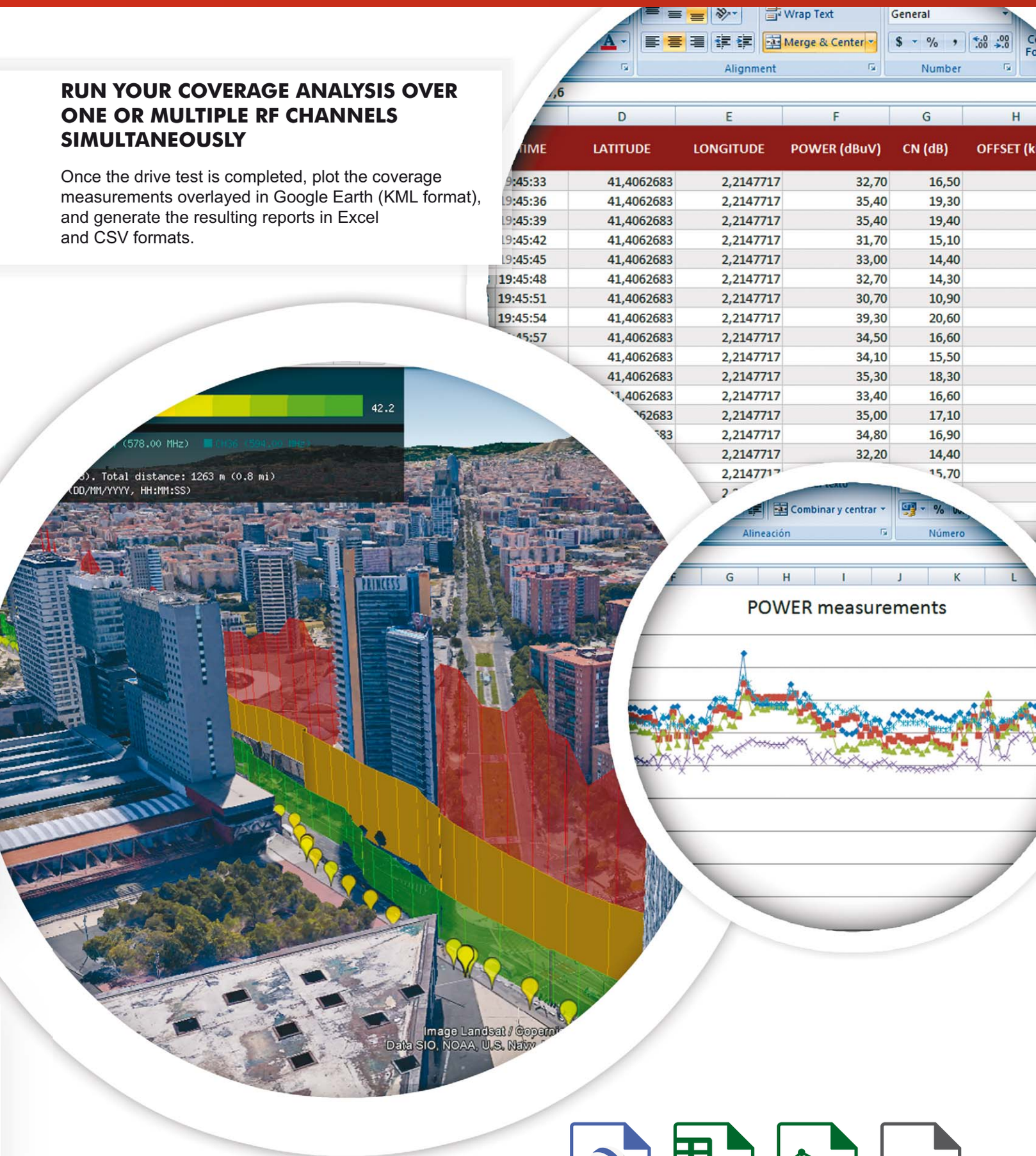
All this information is saved automatically to either the internal meter’s memory or to an external USB memory and can be transferred to a PC computer using an universal XML format. Once on the PC the data can be processed and presented in different ways among which overlaying the values on a map is the most interesting.

Google Earth

CHECK COMPARISON TABLE

RUN YOUR COVERAGE ANALYSIS OVER ONE OR MULTIPLE RF CHANNELS SIMULTANEOUSLY

Once the drive test is completed, plot the coverage measurements overlayed in Google Earth (KML format), and generate the resulting reports in Excel and CSV formats.



KML EXCEL EXCEL CSV

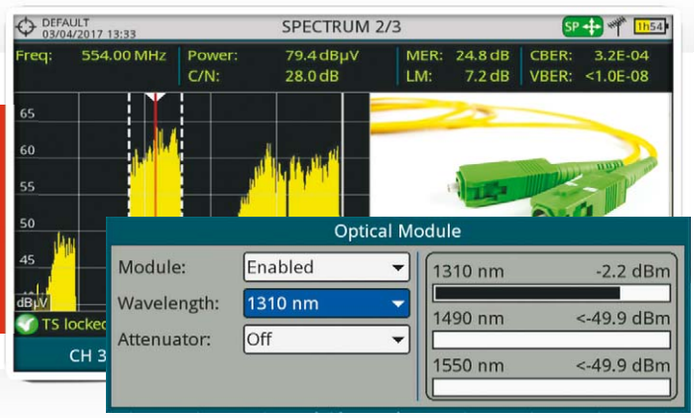
PROMAX

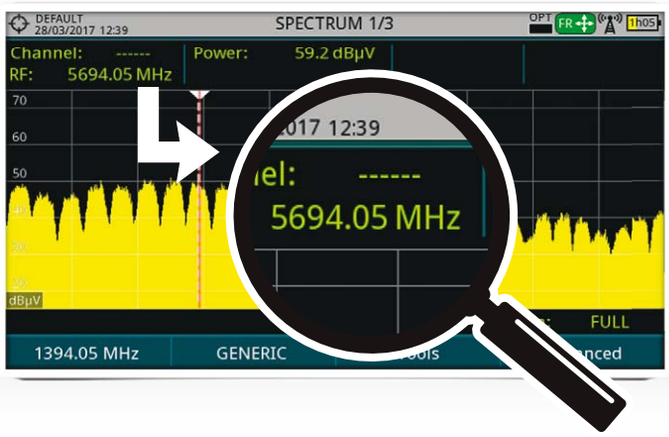
Optical measurements option ★

... plus 6 GHz RF input

Selective optical-to-RF converter

RFoG (Radiofrequency-over-Glass), as well as optical TV&SAT distribution, is used more and more by operators because it allows them to benefit from the advantages of fibre optics to compete with FTTH service providers. The RF signal at the converter output can be analyzed, measured and decoded by the meter as one would usually do with any signal over copper wires.



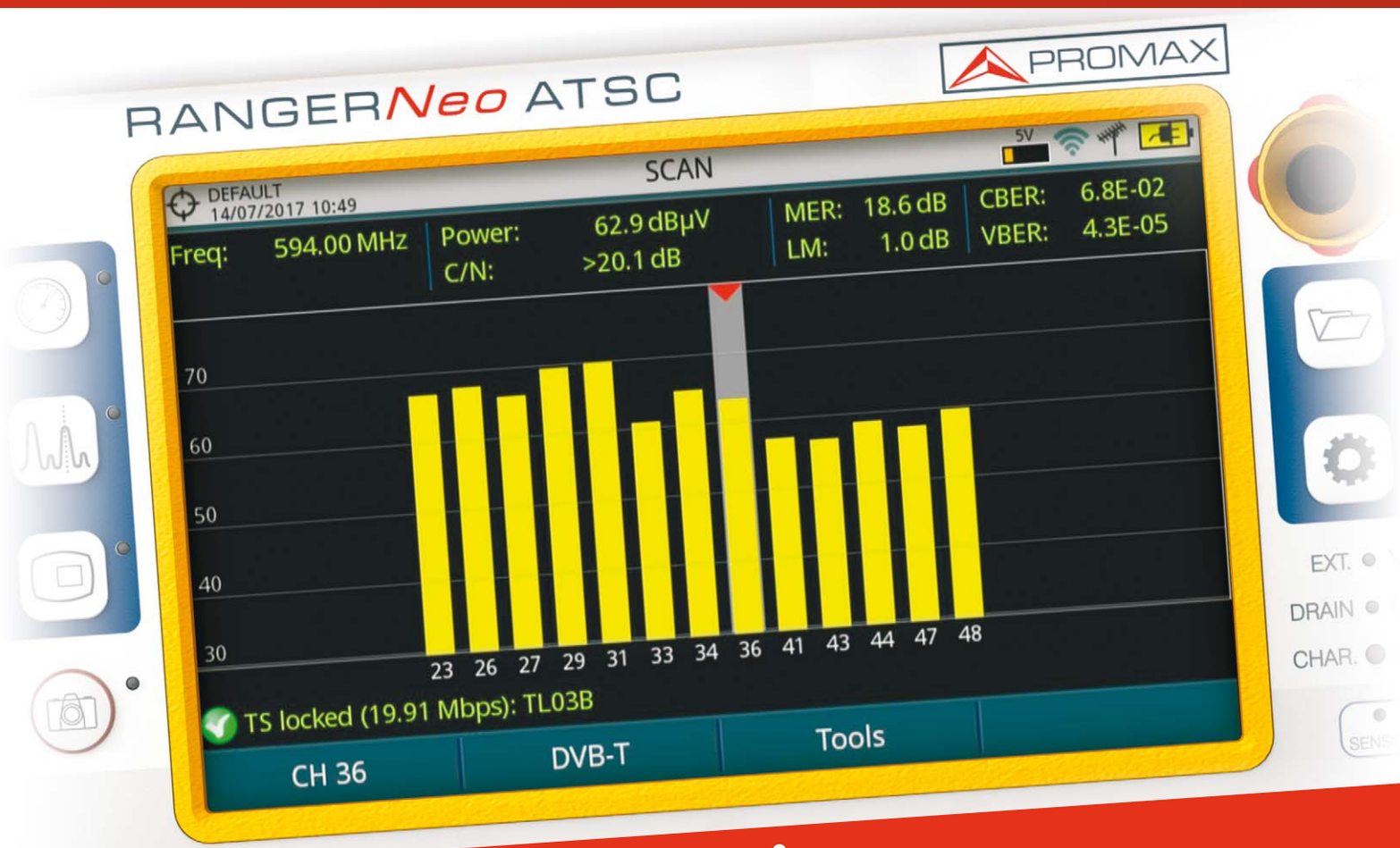


6 GHz RF auxiliary input

The **RANGER*Neo* ATSC** optical fibre option comes along with 6 GHz RF auxiliary input which can be used among other applications for direct connection to wholeband LNB's with 5.45 GHz RF output. This auxiliary input covers three bands:

Band I	From 2150 MHz to 3000 MHz
Band II	From 3400 MHz to 4400 MHz
Band III	From 4400 MHz to 6000 MHz

★ VER TABLA COMPARATIVA



CATV network analysis

SCAN

CATV installers appreciate very much having a SCAN function on their analyzer for it allows them to check all the channel levels in a graphical way.

TILT

Using pilot generators as a reference, the TILT feature helps us to equalize the CATV network. We can detect as many as 4 pilots along the band from 6 – 999 MHz. The meter will calculate the level difference between the two most distant pilots and the tilt measurement (dB/MHz).

HANDHELD: Compact, lightweight, durable, more than 4 hours of battery.

PROWATCH: For 24/7/365 monitoring of broadcasting signal.

19" RACK: Perfect for integration in OBvans.

Three formats, one soul

Perfect to be integrated into OB Vans

RANGER *Neo* rack and **PROWATCH *Neo*** systems are the solution needed by any professional involved in the reception and retransmission of satellite signals.

Including 24/7 permanent monitoring of satellite feeds, continuous evaluation of the transmission quality, system performance tracking… PROMAX systems feature remote control, webserver, SNMP compatibility, video streaming and alarms management.

Soft bag and hard case

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

CHECK COMPARISON TABLE

Create, save and transfer data

Ethernet connectivity

Ethernet and IP protocols are now the gold standards for remote control applications and **RANGER*Neo* ATSC** offers this functionality. Besides remote control the IP interface can be used to save or retrieve data from a PC, copy channel tables or installation information, dataloggers, screenshots, etc.

No running out of memory

There is a lot of information that **RANGER *Neo* ATSC** can store in its internal memory: Dataloggers, screenshots, signal monitoring files, etc. Its large storage capacity will make you think it's unlimited. However, files such as transport stream recordings can be very heavy. Storage capacity can also be extended to up to several Terabytes using a USB storage device.

Extended connectivity features

Transport stream input and output

RANGER*Neo* ATSC can monitor and analyze streams coming out from satellite receivers, transport stream players, multiplexers, etc. Received transport stream signals can also be output to other devices.

Common Interface

The **RANGER*Neo* ATSC** includes a CI slot to interface with CAM modules available in the market and decode encrypted channels. The use of encryption is widely spread among television operators so this function is very useful.

HDMI™ interface

The **RANGER*Neo* ATSC** includes an HDMI™ output to interface with other High Definition equipment. It can also be very useful to check proper operation of the client's TV while on a service call. Everything that can be seen on the meter's screen is available through the HDMI™.

USB and Ethernet connections

RANGER*Neo* ATSC includes USB and Ethernet interfaces. The USB can be used to copy files to memory sticks for example. Remote control and web server functionality are available through the Ethernet port.

CHECK COMPARISON TABLE

SPECIFICATIONS	RANGER *Neo* Lite ATSC	RANGER *Neo* + ATSC	RANGER *Neo* 2 ATSC
DIGITAL BROADCAST STANDARDS	ATSC DVB-T, DVB-T2, ISDB-T DVB-S, DVB-S2, DVB-S2 Multistream DVB-C, QAM Annex B DSS, ACM / VCM / CCM		*... Also includes:* MPEG-TS
AUDIO CODECS	MPEG-1, MPEG-2, AAC, HE-AAC, Dolby Digital, Dolby Digital Plus		
VIDEO CODECS	MPEG-2, MPEG-4 / H.264, HEVC / H.265		
INPUTS AND OUTPUTS	- Universal RF input 50/75 Ω - HDMI™ 1.4b output - IP input for remote control - Analogue Video/Audio input - 2xUSB (Type-A) for data tranferring		*... Also includes:* - ASI-TS input and output (BNC female 75 Ω) - IPTV multicast input (UDP / RTP, RJ45) - Common Interface slot
FUNCTIONS	- Constellation diagram - LTE ingress test - StealthID (instant identification of tuning parameters) - 4K detection - PLS (Physical Layer Scrambling) - Ultra fast spectrum analyzer (70 ms sweep time) - 4K Frame grabber - MAX and MIN hold - FM RDS radio meas. and decoding - Screenshots and Datalogger for measurement reports - Beacon-Flyaways SNG and VSAT - Wideband LNB - WiFi 2.4 GHz - LTE 1.8 GHz - OTT - Service recording - Field strength measurement - Task planner - HbbTV information - DAB+ channel plan included		
ADDITIONAL FUNCTIONS		- Spectrogram - Signal monitoring - Remote control (*webControl*) - GPS coverage analysis (optional) - Video/Audio Streaming - *SCAN+TILT* - Shoulder attenuation	*... Also includes:* - TS recording - TS analysis - IPTV multicast measurement and decoding - PSIP analysis - Closed Caption
SPECTRUM ANALYZER Frequency Margin Measurement range Span Resolution bandwidths	From 5 - 1000 MHz (Terrestrial) From 250 - 2500 MHz (Satellite) From 10 - 130 dBµV Full / 500 / 200 / 100 / 50 / 20 / 10 MHz		
	100 kHz	100, 200 kHz 1 MHz	2 kHz (terrestrial) 10, 20, 30, 40, 100, 200 kHz 1 MHz
MEASUREMENT MODE (refer to STANDARDS section) Frequency Margin ATSC QAM ITU-J83 Annex B DVB-C QAM,ITU - J83 Annex A PAL, SECAM and NTSC analogue FM radio DVB-S QPSK DVB-S2 QPSK, 8PSK, 16/32APSK DSS QPSK	From 5 - 1000 MHz (Terrestrial) From 250 - 2350 MHz (Satellite) Power (45 to 100 dBµV), SER, VBER, MER, C/N, Link margin Power (35 to 115 dBµV), BER, MER, C/N, Noise Margin, BCH ESR, LDCP iterations, Wrong packets Power (45 to 115 dBµV), BER, MER, C/N, Link margin M, N, B, G, I, D, K and L Level measurement Power (35 to 115 dBµV), CBER, MER, C/N, Link Margin Power (35 to 115 dBµV), CBER, LBER, MER, C/N, BCH ESR, Wrong packets, Link Margin Power (35 to 115 dBµV), CBER, VBER, MER, C/N, Link margin		
INTERNAL STORAGE	6 GB for measurement protocols, screenshots and transport stream recordings		
PC CONNECTION (via ethernet interface)	NetUpdate 4 (free software) + Free and automatic firmware updates + User customised channel plans + Measurement reports and screenshots		
GENERAL	Hybrid operation: Touch screen (7") or conventional keyboard DiSEqC 2.x generator (DiSEqC 1.2 commands implemented) dCSS / SCD 2 (EN50607) and SATCR/SCD (EN50494)		
BATTERY	> 2h	> 4 h (smart battery)	
HARD CASE	Optional	Included	

OPTIONS	RANGER *Neo* + ATSC	RANGER *Neo* 2 ATSC
GPS Coverage Analysis	Available	Available
Rack assembly 19" 4U: 482 (W.) x 178 (H.) x 205 (D.) mm	Available	Available
OPM + Optical-to-RF converter + WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	Available	Available
WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	Available	Available

The terms HDMI, HDMI High-Definition Multimedia Interface, HDMI Trade dress and the HDMI Logos are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.

RANGERNeo TV analyzers

A new breed of analyzers for a new world

✓ Included
● Optional

	RANGER Neo							HD RANGER	
	3	2		+		Lite		Ultra Lite	Eco
	DVB ISDB-T	DVB ISDB-T	ATSC	DVB ISDB-T	ATSC	DVB ISDB-T	ATSC	DVB	DVB
4K detection	✓	✓	✓	✓	✓	✓	✓	✓	✓
HEVC H.265 decoder + 4K Frame Grabber	✓	✓	✓	✓	✓	✓	✓		
MPEG-2 and MPEG-4 H.264 decoder	✓	✓	✓	✓	✓	✓	✓	✓	✓
HbbTV Information	✓	✓	✓	✓	✓	✓	✓	✓	✓
Touch screen	✓	✓	✓	✓	✓	✓	✓		
Wide band LNB Compatibility (wbLNB)	✓	✓	✓	✓	✓	✓	✓		
2.4 GHz Wi-Fi analyzer	✓	✓	✓	✓	✓	✓	✓		
1.8 GHz LTE	✓	✓	✓	✓	✓	✓	✓		
OTT	✓	✓	✓	✓	✓	✓	✓		
Service recording	✓	✓	✓	✓	✓	✓	✓	✓	
HDMI output	✓	✓	✓	✓	✓	✓	✓		
Video/Audio input	✓	✓	✓	✓	✓	✓	✓	✓	✓
USB interface	2x Type A	2x Type A	2x Type A	2x Type A	2x Type A	2x Type A	2x Type A	1x Mini USB	1x Mini USB
Battery time	> 4 h	> 4 h	> 4 h	> 4 h	> 4 h	> 2 h	> 2 h	> 2 h	> 2 h
Resolution filter 100 kHz	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resolution filters 200 kHz, 1 MHz	✓	✓	✓	✓	✓			✓	
Resolution filters 2, 10, 20, 30, 40 kHz	✓	✓	✓						
Echoes analysis	✓	✓		✓		✓		✓	✓
Constellation diagram	✓	✓	✓	✓	✓	✓	✓	✓	✓
webControl and Video/Audio Streaming	✓	✓	✓	✓	✓				
Spectrogram	✓	✓	✓	✓	✓				
DVB-T/T2: Merogram and MER by carrier	✓	✓		✓					
SCAN + TILT	✓	✓	✓	✓	✓				
IPTV analyzer	✓	✓	✓						
TS-ASI input and output	✓	✓	✓						
TS analysis and recording	✓	✓	✓						
Common Interface (encrypted channels)	✓	✓	✓						
Shoulder attenuation measurement	✓	✓	✓	✓	✓				
T2-MI	✓								
Network delay Margin (DVB)	✓								
GPS for drive test	✓	●	●	●	●				
Signal monitoring	✓	✓	✓	✓	✓				
DAB/DAB+ channel plan	✓	✓	✓	✓	✓	✓	✓	✓	✓
Advanced DAB/DAB+ analyzer	●	●		●					
Advanced FM radio analyzer	●	●		●					
OPM + Optical-to-RF + WiFi 5G + LTE 2.6G + 6 G RF input	●	●	●	●	●				
WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	●	●	●	●	●				
ATSC standard			✓		✓		✓		
ISDB-T standard	✓	✓	✓	✓	✓	✓	✓		
DVB-T/T2 standard	✓	✓	✓	✓	✓	✓	✓	✓	✓
DVB-S/S2, DSS and ACM/VCM standards	✓	✓	✓	✓	✓	✓	✓	✓	✓
DVB-C standard	✓	✓	✓	✓	✓	✓	✓	✓	✓
DVB-C2 standard	✓	✓	✓	✓	✓	✓	✓	✓	✓
QAM annex B standard	✓	✓	✓	✓	✓	✓	✓		
PSIP analysis			✓						
Closed Caption			✓						
Soft carrying bag	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hard transport case	✓	✓	✓	✓	✓				

DESIGN AND SPECIFICATIONS ARE SUBJECT TO CHANGES WITHOUT PRIOR NOTICE. 09/25